Computer Museum

HP 3000 Computer Systems

System Operation and Resource Management

Reference Manual

HEWLETT PACKARD
19447 PRUNERIDGE AVENUE, CUPERTINO, CA 95014

Part No. 32033-90005
U1088

Printed in U.S.A. 06/87

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LIST OF EFFECTIVE PAGES

The List of Effective Pages gives the date of the current edition, and lists the dates of all changed pages. Unchanged pages are listed as "ORIGINAL". Within the manual, any page changed since the last edition is indicated by printing the date the changes were made on the bottom of the page. Changes are marked with a vertical bar in the margin. If an update is incorporated when an edition is reprinted, these bars and dates remain. No information is incorporated into a reprinting unless it appears as a prior update.

First Edition	JUL 1984
Update #1 Incorporated	JAN 1985
Second Edition	FEB 1986
Update #1	AUG 1986
Update #2	JUN 1987
Update #3	OCT 1988

Effective Pages	Date
Title page	OCT 1988
ii	OCT 1988
iii to iv	OCT 1988
v	AUG 1986
vi	ORIGINAL
vii to xvii	OCT 1988
xviii to xix	AUG 1986
xx to xxi	OCT 1988
xxii to xxiii	OCT 1988
1-1	ORIGINAL
1-2 to 1-4	JUN 1987
2-1 to 2-12	ORIGINAL
3-1 to 3-2	ORIGINAL
4-1	ORIGINAL
4-2	JUN 1987
4-3 to 4-4	OCT 1988
4-5 to 4-6	JUN 1987
4-7	OCT 1988
4-8 to 4-9	ORIGINAL
4-10	OCT 1988
4-11 to 4-15	ORIGINAL
4-16 to 4-16b	AUG 1986
4-17 to 4-21	ORIGINAL
4-22	OCT 1988
4-23 to 4-26	ORIGINAL
4-27	AUG 1986
4-28 to 4-29	ORIGINAL
4-30	AUG 1986
4-31	JUN 1987
4-32	ORIGINAL
4-33	OCT 1988
4-34 to 4-35	ORIGINAL
4-36 to 4-41b	OCT 1988
4-42	JUN 1987
4-43 to 4-46	ORIGINAL
4-47 to 4-48	JUN 1987
5-1	ORIGINAL
5-2	JUN 1987
5-3 to 5-7	OCT 1988
5-8 to 5-8b	JUN 1987
5-9	ORIGINAL
5-10	OCT 1988
5-11 to 5-13	JUN 1987
5-14 to 5-15	ORIGINAL
5-16	AUG 1986
5-17	JUN 1987
5-18	AUG 1986
5-19 to 5-21	OCT 1988
5-22	JUN 1987
5-23 to 5-27	AUG 1986
5-28 to 5-30	ORIGINAL
5-31	JUN 1987
5-32 to 5-39	ORIGINAL
5-40	JUN 1987
5-41 to 5-42a	OCT 1988
5-43 to 5-46	AUG 1986
5-47	JUN 1987
5-48 to 5-54	AUG 1986
5-55	JUN 1987
5-56 to 5-64	AUG 1986
5-65	JUN 1987
5-66 to 5-71	AUG 1986
5-72 to 5-94	OCT 1988
6-1	OCT 1988
6-2 to 6-10	JUN 1987
6-11 to 6-38	ORIGINAL

LIST OF EFFECTIVE PAGES

Effective Pages	Date
7-1	JUN 1987
7-1a to 7-1b	OCT 1988
7-2 to 7-4	ORIGINAL
7-5	JUN 1987
7-6	AUG 1986
7-7	OCT 1988
7-8	JUN 1987
7-9	AUG 1986
7-10 to 7-14	ORIGINAL
7-15	AUG 1986
7-16	ORIGINAL
7-17	AUG 1986
7-18	ORIGINAL
7-19 to 7-19b	AUG 1986
7-20	ORIGINAL
7-21 to 7-21a	OCT 1988
7-22 to 7-24	ORIGINAL
7-25 to 7-25a	OCT 1988
7-26 to 7-28	JUN 1987
7-29	OCT 1988
7-30	JUN 1987
7-31	OCT 1988
7-32 to 7-35	JUN 1987
7-36 to 7-36a	OCT 1988
7-37	ORIGINAL
7-38	JUN 1987
7-39 to 7-46	ORIGINAL
7-47 to 7-47a	OCT 1988
7-48 to 7-51	ORIGINAL
7-52	JUN 1987
7-53	ORIGINAL
7-54	JUN 1987
7-55 to 7-56	ORIGINAL
7-57 to 7-58	JUN 1987
7-59	AUG 1986
7-60 to 7-60a	OCT 1988
7-61 to 7-62	ORIGINAL
7-63	AUG 1986
7-64	JUN 1987
7-65 to 7-66	ORIGINAL
7-67	OCT 1988
7-68 to 7-69	JUN 1987
7-70 to 7-72	ORIGINAL
7-73 to 7-73a	OCT 1988
7-74 to 7-75	ORIGINAL
7-76	JUN 1987
7-77 to 7-78a	OCT 1988
7-79 to 7-80	ORIGINAL
7-81	AUG 1986
7-82	JUN 1987
7-83	ORIGINAL
7-84	AUG 1986
7-85 to 7-85b	OCT 1988
7-86	AUG 1986
7-87 to 7-89	ORIGINAL
7-90	AUG 1986
7-91 to 7-93	ORIGINAL
7-94	AUG 1986
7-95	JUN 1987
7-96 to 7-97	ORIGINAL
7-97a to 7-97b	AUG 1986
7-98	ORIGINAL
7-99	JUN 1987
7-100 to 7-102	AUG 1986
7-103 to 7-104	OCT 1988
7-105 to 7-121	AUG 1986
7-122	OCT 1988
7-123 to 7-126	AUG 1986
8-1	ORIGINAL
8-2 to 8-2h	JUN 1987
8-3	ORIGINAL
8-4 to 8-4b	JUN 1987
8-5 to 8-14	ORIGINAL
8-15	JUN 1987
8-16 to 8-18	AUG 1986
9-1 to 9-9	AUG 1986
9-10	OCT 1988
9-11 to 9-17	AUG 1986
9-18	OCT 1988
9-19 to 9-24	AUG 1986
9-25	JUN 1987
9-26 to 9-47	ORIGINAL
9-48	AUG 1986
9-49	JUN 1987
9-50 to 9-52	ORIGINAL
9-53	OCT 1988
9-54 to 9-57	ORIGINAL
9-58	OCT 1988
9-59 to 9-62	ORIGINAL
10-1 to 10-2b	JUN 1987
10-3	ORIGINAL
10-4	JUN 1987
10-5 to 10-7	ORIGINAL
10-8	JUN 1987
10-9 to 10-10	ORIGINAL
10-11 to 10-11b	JUN 1987
10-12 to 10-20	ORIGINAL
10-21	JUN 1987

LIST OF EFFECTIVE PAGES

Effective Pages	Date
10-22	AUG 1986
10-23 to 10-26	ORIGINAL
10-27 to 10-28	OCT 1988
10-29	JUN 1987
10-30	ORIGINAL
10-31	AUG 1986
10-32 to 10-33	JUN 1987
10-34	OCT 1988
10-35	JUN 1987
10-36 to 10-37	ORIGINAL
10-38 to 10-42b	JUN 1987
10-43 to 10-44	ORIGINAL
10-45	JUN 1987
10-46 to 10-48	ORIGINAL
10-49	AUG 1986
10-50 to 10-53	ORIGINAL
10-54 to 10-55	JUN 1987
10-56 to 10-58	OCT 1988
11-1 to 11-6	JUN 1987
11-7 to 11-9	ORIGINAL
11-10	JUN 1987
11-11	AUG 1986
11-12 to 11-13	ORIGINAL
11-14	JUN 1987
11-15 to 11-17	ORIGINAL
11-18	JUN 1987
11-19	AUG 1986
11-20 to 11-21	ORIGINAL
11-22 to 11-25	AUG 1986
11-26 to 11-28	ORIGINAL
11-29	AUG 1986
11-30 to 11-32	ORIGINAL
11-33	JUN 1987
11-34 to 11-36	ORIGINAL
11-37 to 11-38b	AUG 1986
11-39	JUN 1987
11-41 to 11-47	ORIGINAL
11-48	JUN 1987
11-49 to 11-51	AUG 1986
11-52	ORIGINAL
11-52a to 11-53	JUN 1987
11-54	AUG 1986
11-55	JUN 1987
11-56 to 11-57	ORIGINAL
11-58	AUG 1986
11-59	ORIGINAL
11-60	AUG 1986
11-61 to 11-62	ORIGINAL
11-63 to 11-64	AUG 1986
11-65 to 11-66	ORIGINAL

Effective Pages	Date
A-1 to A-1b	AUG 1986
A-2	ORIGINAL
A-3 to A-4	JUN 1987
A-5 to A-7	ORIGINAL
A-8 to A-9	OCT 1988
A-10	ORIGINAL
A-11 to A-14	JUN 1987
A-15 to A-16	ORIGINAL
A-17	JUN 1987
A-18	AUG 1986
A-19	ORIGINAL
A-19a to A-19b	OCT 1988
A-20	JUN 1987
A-21	ORIGINAL
A-22	JUN 1987
A-23	ORIGINAL
A-24	JUN 1987
A-25	JUN 1987
A-26	JUN 1987
A-27	AUG 1986
A-28	ORIGINAL
A-29	ORIGINAL
A-30	JUN 1987
A-31	ORIGINAL
A-32	JUN 1987
A-33 to A-34	ORIGINAL
A-35	JUN 1987
A-36	AUG 1986
A-37	ORIGINAL
A-38	AUG 1986
A-39	ORIGINAL
A-40	AUG 1986
A-41 to A-42	ORIGINAL
A-43	AUG 1986
A-44	ORIGINAL
A-45	AUG 1986
A-46 to A-48	ORIGINAL
A-49	AUG 1986
A-50	ORIGINAL
A-51	AUG 1986
A-52	ORIGINAL
A-53	AUG 1986
A-54 to A-55	ORIGINAL
A-56 to A-57	AUG 1986
A-58	ORIGINAL
A-59	AUG 1986
A-60	ORIGINAL
A-61	AUG 1986
A-62	ORIGINAL
A-63	AUG 1986

LIST OF EFFECTIVE PAGES

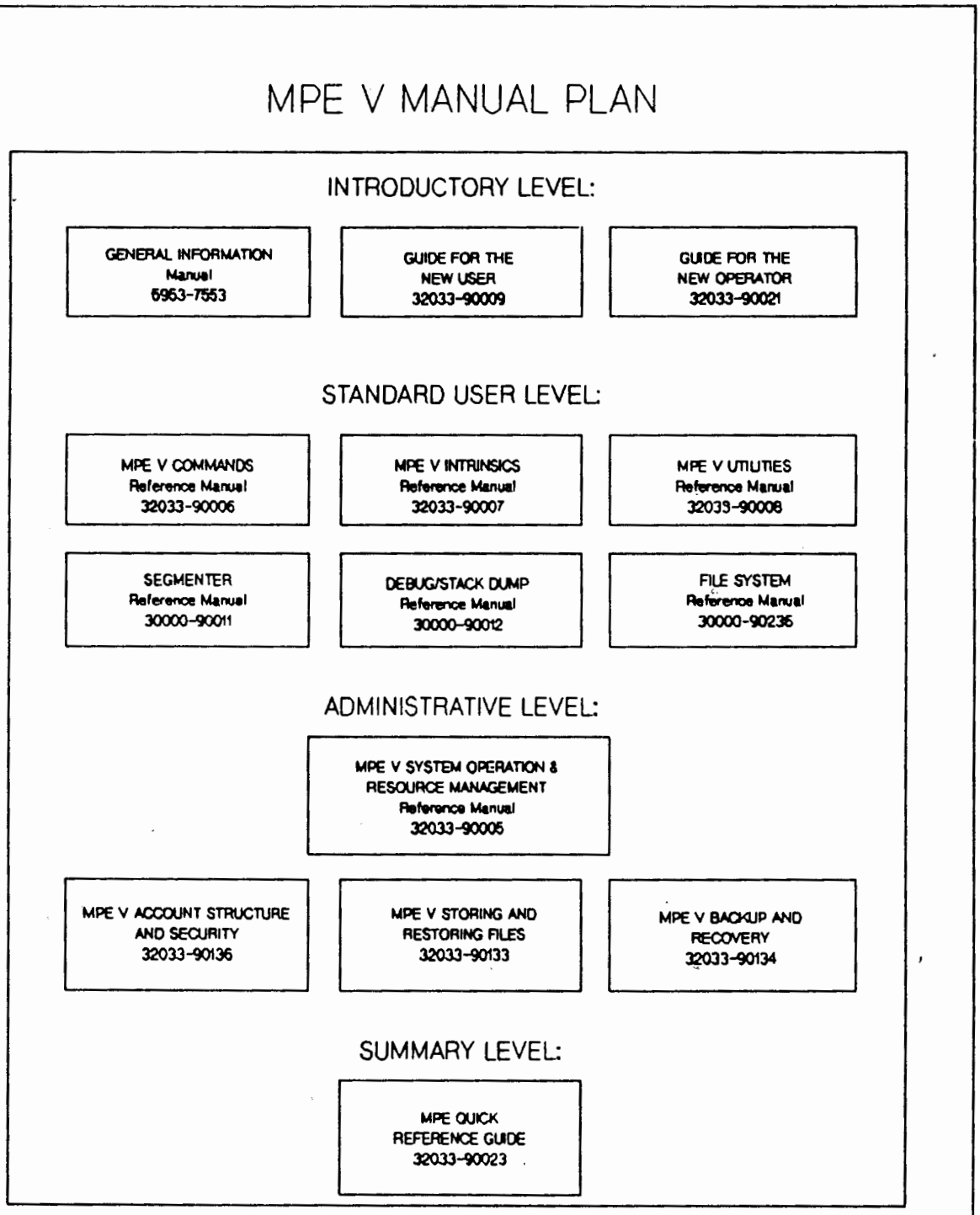
Effective Pages	Date
A-64 to A-65	ORIGINAL
A-66	AUG 1986
A-67 to A-68	ORIGINAL
A-69	AUG 1986
A-70 to A-72	ORIGINAL
A-73	AUG 1986
A-74	ORIGINAL
A-75 to A-76	AUG 1986
A-77 to A-78	ORIGINAL
A-79 to A-80	AUG 1986
A-81	ORIGINAL
A-82 to A-85	AUG 1986
A-86	ORIGINAL
Glossary-1 to Glossary-3	JUN 1987
Glossary-4	ORIGINAL
Glossary-5	AUG 1986
Glossary-6	ORIGINAL
Glossary-7	JUN 1987
Glossary-8	AUG 1986
Glossary-9 to Glossary-27	ORIGINAL
Glossary 28 to Glossary-32	AUG 1986
Index-1 to Index-20	OCT 1988

PRINTING HISTORY

New editions are complete revisions of the manual. Update packages, which are issued between editions, contain additional and replacement pages to be merged into the manual by the customer. The date on the title page and back cover of the manual changes only when a new edition is published. When an edition is reprinted, all the prior updates to the edition are incorporated. No information is incorporated into a reprinting unless it appears as a prior update.

First Edition	July 1984
Update #1	January 1985
Update #1 Incorporated	January 1985
Second Edition	February 1986
Update #1	August 1986
Update #1 Incorporated	August 1986
Update #2	June 1987
Update #3	October 1988

MPE V MANUAL PLAN



There are many more manuals applicable to the HP 3000. A complete list may be found in every issue of the MPE V Communicator. Please contact your System Manager.

CONVENTIONS USED IN THIS MANUAL

NOTATION	DESCRIPTION
COMMAND	Commands are shown in CAPITAL LETTERS. The names must contain no blanks and be delimited by a nonalphabetic character (usually a blank).
KEYWORDS	Literal keywords, which are entered optionally but exactly as specified, appear in CAPITAL LETTERS .
parameter	Required parameters, for which you must substitute a value, appear in ***bold italics***.
parameter	Optional parameters, for which you may substitute a value, appear in *standard italics*.
[ ]	An element inside brackets is optional. Several elements stacked inside a pair of brackets means the user may select any one or none of these elements. Example: [A] [B] user may select A or B or neither. When brackets are nested, parameters in inner brackets can only be specified if parameters in outer brackets or comma place-holders are specified. Example: [*parm1*[,*parm2*[,*parm3*]]] may be entered as: *parm1*,*parm2*,*parm3* or *parm1*,,*parm3* or ,,*parm3* , etc.
{ }	When several elements are stacked within braces the user ***must*** select one of these elements. Example: { A } { B } user must select A or B.
...	An ellipsis indicates that a previous bracketed element may be repeated, or that elements have been omitted.
user input	In examples of interactive dialog, user input is underlined. Example: NEW NAME? ALPHA1
superscript^{c}	Control characters are indicated by a superscript^{c}. Example: Y^{c}. (Press Y and the CNTL key simultaneously.)
⟨ ⟩	⟨ ⟩ indicates a terminal key. The legend appears inside.
<<COMMENT>>	Programmer's comments in listings appear within << >> .
** Comment **	Editor's comments appear in this form.

CONTENTS

PREFACE Page

PREFACE xxi

Section I Page

OVERVIEW

MPE OPERATING SYSTEM 1-1
COMMAND INTERFACE 1-1
ACCOUNT STRUCTURE 1-2
SYSTEM OPERATION 1-3
System Startup and Modification 1-3
System Backup and Recovery 1-4
Spooling 1-4
System Logging 1-4

Section II Page

INTRODUCTION

COMMUNICATING WITH MPE 2-1
The Command Interpreter 2-1
System Prompts and Messages 2-2
Terminal Functions 2-2
Deleting a Character 2-2
Deleting a Line 2-3
Echoing and Non-Echoing Terminal Output 2-3
Interactive Access 2-3
Logging On 2-3
Logging Off 2-5
Batch Access 2-5
INTRODUCTION TO COMMANDS 2-5
Command Elements 2-6
Positional Parameters 2-7
Keyword Parameters 2-8
Continuation Characters 2-8
Command Errors 2-9
Interrupting Command Execution 2-10
Interrupting Nonprogram Commands 2-10
Interrupting Program Commands 2-10
Aborting a Program 2-11

Section III Page

COMMANDS 3-1

Section IV Page

THE SYSTEM OPERATOR

THE SYSTEM OPERATOR'S ROLE 4-1
Operator Tasks 4-1
Operator Commands 4-2
STARTING THE SYSTEM 4-4
Starting the Series 37 4-5
Starting the Micro 3000 4-5

CONTENTS (Continued)

THE SYSTEM OPERATOR (Continued) Page

Starting the Series 39/40/42,44/48/58 4-5
Starting the Series 64/68 4-6
THE FIVE STARTUP PROCEDURES 4-6
Starting From Disc: WARMSTART 4-7
Starting From Disc: COOLSTART 4-7
Starting From Serial Storage Media: UPDATE 4-7
Starting From Serial Storage Media: COLDSTART 4-9
Starting From Serial Storage Media: RELOAD 4-10
Enabling Other Devices and Processes During a Restart 4-10
Enabling the Private Volumes Facility 4-10
Enabling the STREAMS Facility 4-11
Starting a Spooler Process for Nonspooled Devices 4-11
MONITORING THE EXECUTION OF JOBS AND SESSIONS 4-11
The Introduction of Jobs and Sessions 4-11
Operator Control of Accepting Devices 4-12
Limiting the Execution of Jobs and Sessions 4-12
Limiting the Number of Jobs and Sessions 4-13
Displaying the Status of Jobs and Sessions 4-14
Aborting Jobs and Sessions 4-16
MANAGING PERIPHERAL DEVICES 4-16a
Device Files 4-17
Device Classes 4-17
Active Device Files 4-17
Input Device Files 4-18
Output Device Files 4-19
Controlling Device Availability 4-21
Controlling Device Access With ACDs 4-22
Altering ACDs 4-22a
Listing ACDs 4-22a
Using Disc Volumes 4-22b
Disc Conditioning 4-22
Controlling the Use of Private Volumes 4-23
The Foreign Disc Facility 4-23
The Care and Handling of Disc Devices 4-25
Using Magnetic Tapes 4-26
Operator Tasks Requiring Tapes 4-26
The Care and Handling of Tapes 4-26
Using Printers 4-28
Forms Message 4-28
Controlling Header/Trailer Output 4-29
SPOOLING 4-30
Input Spooling 4-30
Operator Control of Input Spooling 4-31
Maintaining Job Sequence 4-32
Abnormal Termination of the Spooler Process 4-32
Output Spooling 4-32
Output Spool File States 4-33
Listing Output Spool Files 4-33
Controlling Spooled Devices and Device Classes 4-34
Suspending the Spooler 4-34
Resuming the Spooler 4-34
Setting the Output Fence 4-35

CONTENTS (Continued)

THE SYSTEM OPERATOR (Continued) Page

Altering a Single Spool File 4-35
Controlling Spool Queues 4-35
BACKING UP SYSTEM AND USER FILES 4-36
SYSTEM SHUTDOWN 4-42
DISTRIBUTING OPERATOR CAPABILITIES 4-43
The :ASSOCIATE And :DISASSOCIATE Commands 4-43
Allowing Users Operator Commands 4-44
Allowing Users Control Over Their Own Jobs 4-44
Moving the Console 4-45
DATA COMMUNICATIONS OVERVIEW 4-45
What is Data Communications? 4-45
Networks 4-45
Cluster and Distributed Networks 4-46
Telecommunications and Network Components 4-46
Terminals 4-47
Modems 4-47
Communication Links 4-47
Transmission Modes 4-47
Circuits 4-48
Grades 4-48

Section V Page

THE SYSTEM SUPERVISOR

THE SYSTEM SUPERVISOR'S ROLE 5-1
STARTING THE SYSTEM 5-8
Using the INITIAL Program 5-8
Five Restart Options 5-9
Starting From Disc: WARMSTART 5-9
Starting From Disc: COOLSTART 5-9
Starting From Serial Storage Media: UPDATE 5-9
Starting From Serial Storage Media: COLDSTART 5-9
Starting From Serial Storage Media: RELOAD 5-10
RECONFIGURING THE SYSTEM 5-10
The I/O Configuration Table 5-11
Logical Device Number 5-11
Device Reference Table (DRT) Entry Number 5-12
Unit Numbers 5-12
Software Channel Number 5-13
Type/Subtype 5-13
Terminal Type/Speed 5-13
Terminal Type Descriptor Files 5-13
Record Width 5-13
Corresponding Output Device 5-13
Mode 5-14
Driver Name 5-15
Device Classes 5-15
Device Access Types 5-16
The Default Configuration Table 5-19
Configuring the MPE Streaming Facility 5-21
Changing System Tables and Queue Parameters 5-23
System and User Process Control Tables 5-23
Other System Tables, Queues, and Lists 5-24

Computer Museum

CONTENTS (Continued)

THE SYSTEM SUPERVISOR (Continued) Page

System, Message, and Terminal Buffers 5-26
The Message Catalog 5-27
CHANGING OTHER SYSTEM PARAMETERS 5-27
Changing Miscellaneous Values 5-28
Allocating Resource Identification Numbers 5-28
Setting Logon Recognition Time 5-29
Limiting Concurrent Jobs and Sessions 5-29
Establishing the CPU Processing Time Limit 5-30
Changing Segment Limits 5-29
Modifying the Segmented Library 5-31
Changing Scheduling Queues 5-31
Permanently Allocating Programs and Procedures 5-32
Disc Caching 5-32
THE SYSTEM DISC 5-33
Disc Structure and Format 5-33
Disc Structure 5-33
Disc Platter Format 5-33
Disc Volume Conditioning 5-34
Disc Formatting 5-34
Disc Initialization 5-34
Disc Labeling 5-34
The System Volume Table 5-36
Checking Volume Tables During a Startup 5-36
Disc Error Recovery 5-36
Error Recovery During the INITIAL Program 5-36
Special Considerations in Disc Error Handling 5-37
The Layout of the System Disc 5-37
Changing the System Disc Layout 5-38
Altering the Size of Virtual Memory 5-38
Changing the Size of the System Directory 5-39
Changing the Maximum Spool File Size 5-40
MPE LOGGING FACILITIES 5-40
System Logging 5-41
Creating and Naming Log Files 5-42
Log File Commands 5-42a
Log Record and File Size 5-43
File Security 5-43
Console Messages for Log Files 5-44
File Error Handling 5-46
Log File Format 5-46
Log Record Formats 5-47
Reviewing Log Records 5-93
User Logging 5-94
User Logging Processes 5-94
The Number of Users Per Logging Process 5-94
Manual and Automatic Change of Log Files 5-94

Section VI Page

THE SYSTEM MANAGER

Account Manager Attribute (AM) 6-2

CONTENTS (Continued)

THE SYSTEM MANAGER (Continued) Page
SYSTEM STARTUP STATE CONFIGURATOR 6-1
Managing Expanded Console Capabilities 6-3
Creating a Device-User Association Table 6-3
Creating OPERATOR.SYS 6-4
BILLING ACCOUNTS FOR RESOURCE USE 6-4
Using :REPORT 6-4
Reporting Information for all Accounts 6-6
Reporting Information for Groups in a Single Account 6-6
Reporting Information for Accounts on Private Volumes 6-7
Printing a :REPORT Listing 6-7
Storing a :REPORT Listing in a Disc File 6-7
Resetting Accounts 6-8

Section VII Page
SYSTEM CONFIGURATION/STARTUP
INTRODUCTION TO THE SYSDUMP PROGRAM 7-2
A DESCRIPTION OF THE SYSDUMP PROGRAM 7-2
RUNNING THE SYSDUMP PROGRAM 7-5
Beginning the SYSDUMP Program 7-5
Entering the Main Portion of the SYSDUMP Program 7-8
I/O Configuration Changes 7-9
System Table Changes 7-27
Miscellaneous Configuration Changes 7-31
Logging Changes 7-35
Disc Allocation Changes 7-37
Scheduling Changes 7-40
Segment Limit Changes 7-40
System Program Changes 7-42
System SL Changes 7-43
Terminating the SYSDUMP Program 7-45
Determining the Errors for a SYSDUMP Batch Job 7-49
THE FIVE DIFFERENT KINDS OF SYSDUMPS 7-50
A Carriage Return SYSDUMP 7-50
A Future Date 7-51
A Partial Backup SYSDUMP 7-52
A Coldload SYSDUMP 7-53
A Full Backup SYSDUMP 7-54
INTRODUCTION TO THE INITIAL PROGRAM 7-55
THE FIVE DIFFERENT KINDS OF SYSTEM STARTUPS 7-55
Starting from Disc: WARMSTART 7-55
Starting from Disc: COOLSTART 7-55
Starting from Serial Storage Media: UPDATE 7-56
Starting from Serial Storage Media: COLDSTART 7-56
Starting from Serial Storage Media: RELOAD 7-56
RUNNING THE INITIAL PROGRAM 7-57
Beginning the INITIAL Program 7-57
Terminating the INITIAL Program 7-57
PERIPHERAL CONFIGURATION INFORMATION 7-83
SUGGESTED PARAMETER SETTINGS 7-100
A QUICK REFERENCE TABLE FOR SYSDUMP AND INITIAL 7-112

CONTENTS (Continued)

Section VIII — Page

SPECIAL CONSIDERATIONS FOR PERIPHERAL DEVICES

THE HP 268X LASER PRINTERS: SPECIAL CONSIDERATIONS 8-1
- Format Control of the HP 2680A and HP 2688A 8-1
- Automatic Recovery of the HP 2680A and HP 2688A 8-1
- Job-to-Job Integrity 8-2

HOW TO SWITCH BETWEEN PRIMARY AND SECONDARY CHARACTER SETS . 8-2

THE HP 2608A/S AND HP 2563A PRINTER: SPECIAL FEATURES 8-3
- FEATURE and TRANSPARENT Access Modes 8-3
- Automatic VFC 8-3
- Downloading VFC 8-4
- Format of the Editor File 8-5

THE HP 2619 PRINTER: CHARACTERISTICS 8-15

PREVENTING PRINTER DATA LOSS 8-15

THE HP 7933 AND 7935 DISC DRIVES: SPECIAL CONSIDERATIONS 8-15

UNLOADING A SYSTEM DISC 8-16

UNLOADING A NONSYSTEM DISC 8-16

HP 9144 TAPE CARTRIDGE MEDIA LIFE CONSIDERATIONS 8-16

TAPE CARTRIDGE UNIT: CONTROLS AND INDICATORS 8-17

Section IX — Page

MPE MESSAGE SYSTEM

ERROR MESSAGES 9-1
- Categories of System Failures 9-1
- Cold Load Error Messages With Numbers 9-41

MESSAGE CATALOG 9-58

MAKECAT PROGRAM 9-59
- MAKECAT Examples 9-60
- HELP Subsystem Catalog 9-61

Section X — Page

SUBSYSTEMS AND UTILITIES

PRIVATE VOLUMES OVERVIEW 10-1
- Private Volumes Applications 10-1
- Disc Domains 10-2
  - System Domain Devices 10-3
  - Nonsystem Domain Devices 10-3
  - Allocating Drives to a Domain 10-3
  - Adding a New Private Volume Disc 10-3
  - Adding a New System Disc 10-4
  - Converting a System Disc to a Private Volume Disc 10-4
  - Converting a Private Volume Disc to a System Disc 10-5
- Disc Volume Conditioning 10-7
  - System Volume Conditioning 10-7
  - Private Volume Conditioning 10-7

Section X (Continued) . . . . . Page
Mounting and Dismounting Private Volumes 10-8
Physical Mount/Dismount 10-8
Logical Mount 10-8
Managing Private Volumes 10-9
Logical Dismount 10-9
Obtaining Information About Private Volumes 10-10
Report the Directory on a Private Volume 10-10
Moving a Volume Set from One System to Another 10-10
Volume Sets and Volume Classes 10-11
Volume Sets 10-11
Volume Classes 10-12
Home Volume Set 10-12
Volume Set/Class Definition 10-13
Altering a Volume Set Definition 10-14
Deleting a Volume Set Definition 10-14
Spanning Accounts 10-15
Assigning a Group to a Private Volume Set 10-15
Moving an Existing Group With Files to a Private Volume Set 10-18
Purging Accounts and Groups on Private Volumes 10-18
Private Volumes Summary 10-19
User Commands for Private Volumes 10-20
The :MOUNT Command 10-21
The :DISMOUNT Command 10-22
The :LISTVS Command 10-22
The :VSUSER Command 10-23
The :DSTAT Command 10-23
Operator Commands for Private Volumes 10-23
The :VMOUNT Command 10-23
The :LMOUNT Command 10-24
The :LDISMOUNT Command 10-24
Examples Of User Mounts and Dismounts 10-24
THE VINIT SUBSYSTEM 10-27
The COND Command 10-28
The COPY Command 10-29
The DSTAT Command 10-31
The DTRACK Command 10-32
The EXIT Command 10-32
The FOREIGN Command 10-32
The FORMAT Command 10-32
The HELP Command 10-34
The INIT Command 10-34
The PDEFN Command 10-35
The PDTRACK Command 10-36
The PFSPACE Command 10-36
The PLABEL Command 10-37
The SCRATCH Command 10-38
The SERIAL Command 10-38
The VERIFY Command 10-39
Using the VINIT Subsystem 10-39

CONTENTS (Continued)

SUBSYSTEMS AND UTILITIES (Continued) Page

SERIAL DISCS 10-40
Conditioning Serial Disc Media 10-41
Foreign Discs 10-42
THE SOFTWARE DUMP FACILITY 10-43
Creating a Backup SDF 10-43
Taking a Standard Memory Dump With the SDF 10-44
Performing a Backup Software Dump 10-49
Changing the SDF Command File 10-51
THE DIAGNOSTIC UTILITY SYSTEM (DUS) 10-54
USING SLEUTHSM TO FORMAT SYSTEM PACKS 10-55

Section XI Page

SYSTEM CONTROLS AND SPECIAL FUNCTIONS

SERIES 37 11-1
Front Panel Controls 11-1
Calculating a (DRT) Number and Channel Number 11-6
Control-B Mode 11-7
Automatic WARMSTART 11-8
The Time of Century Clock 11-9
SERIES 39/40/42, 44/48/58 11-10
The System Control Panel 11-10
Series 39/40/42 11-10
Series 44/48/58 11-13
Device Reference Table (DRT) Number and Channel Number 11-18
The Control and Maintenance Processor (CMP) 11-19
SERIES 64/68 11-22
System Status and Display Panel 11-22
The Diagnostic Control Unit (DCU) 11-24
DCU Operation Modes 11-25
DCU Control Mode Commands 11-26
Default Parameter Values 11-30
System Load (MPL) Errors
(DCU ROM Date Code Earlier Than 2403) 11-31
Microcode Program Load (MPL) Error Messages
(DCU ROM Date Code Earlier Than 2403) 11-31
System Load (MPL) Errors
(DCU ROM Date Code 2403 and Later) 11-33
Microcode Program Load (MPL) Error Messages
(DCU ROM Date Code 2403 and Later) 11-33
SYSSTOP Error Messages (Printed on DCU Console) 11-36
System Halt Conditions 11-38
DRT Calculation 11-39
Using an HP 150 as the System Console 11-39
How Communication Program Menu Keys
Differ From User and System Keys 11-40
Moving Between Menus 11-40
Communication Program Menus 11-41
Printer Logging Considerations 11-44
Communication Program Error Messages 11-44
MS-DOS Error Messages 11-47

CONTENTS (Continued)

SYSTEM CONTROLS AND SPECIAL FUNCTIONS (Continued) Page

TELE-SUPPORT 11-47
Hardware Requirements 11-47
Software Requirements 11-48
Series 37 11-48
Series 39/40/42, 44/48/58 11-49
Series 64/68 11-50
OVERTEMPERATURE SHUTDOWN 11-53
Series 37 11-53
Series 39/40/42 11-53
Series 44/48/58 11-54
Series 64/68 11-54
DIAGNOSTICS 11-55
Series 37 - Control-B Mode Self Test 11-55
Series 39/40/42, 44/48/58 - CMP Diagnostic Commands 11-58
Series 64/68 - DCU Maintenance Mode and Diagnostics 11-63
Maintenance Mode Commands 11-63
Shift String Dump 11-64
HOW TO CALCULATE A DRT NUMBER 11-64

Appendix A Page

QUICK REFERENCE GUIDE

GENERAL INSTRUCTIONS A-1
CHANGING FORMS A-2
SYSTEM BACKUP WITH THE SYSDUMP PROGRAM A-3
RESTORING FILES A-6
ENABLING/DISABLING LOGGING A-8
RESTART USER LOGGING A-10
SERIALIZING A DISC PACK A-11
POWER DOWN A-12
POWER UP A-13
SYSTEM SHUTDOWN A-14
STARTUP STATE CONFIGURATOR A-15
Operation A-15
Example SYSSTART File A-16
SERIES 37 - WARMSTART A-17
SERIES 37/MICRO 3000LX/MICRO 3000GX - WARMSTART A-19a
SERIES 37 - COOLSTART A-20
SERIES 37 - UPDATE A-22
SERIES 37 - COLDSTART A-24
SERIES 37 - RELOAD A-26
SERIES 37 - ADDING I/O DEVICES A-28
SERIES 37 - DELETING I/O DEVICES A-30
SERIES 37 - SOFTWARE DUMP A-32
SERIES 37 - LOADING THE DUS A-35
SERIES 39/40/42, & 44/48/58 - WARMSTART A-36
SERIES 39/40/42, & 44/48/58 - COOLSTART A-38
SERIES 39/40/42, & 44/48/58 - UPDATE A-40
SERIES 39/40/42, & 44/48/58 - COLDSTART A-43
SERIES 39/40/42, & 44/48/58 - RELOAD A-45
SERIES 39/40/42, & 44/48/58 - ADDING I/O DEVICES A-49

CONTENTS (Continued)

QUICK REFERENCE GUIDE (Continued)	Page
SERIES 39/40/42, & 44/48/58 - DELETING I/O DEVICES	A-51
SERIES 39/40/42, & 44/48/58 - SOFTWARE DUMP	A-53
SERIES 39/40/42, & 44/48/58 - LOADING THE DUS	A-56
SERIES 39/40/42, & 44/48/58 - FORMATTING SYSTEM PACKS	A-57
SERIES 64/68 - WARMSTART	A-59
SERIES 64/68 - COOLSTART	A-61
SERIES 64/68 - UPDATE	A-63
SERIES 64/68 - COLDSTART	A-66
SERIES 64/68 - RELOAD	A-69
SERIES 64/68 - ADDING I/O DEVICES	A-73
SERIES 64/68 - DELETING I/O DEVICES	A-75
SERIES 64/68 - SOFTWARE DUMP	A-76
SERIES 64/68 - LOADING THE DUS	A-79
SERIES 64/68 - FORMATTING SYSTEM PACKS	A-80
SERIES 64/68 - SHIFT STRING DUMP (HP 2647F CONSOLE TERMINAL)	A-82
SERIES 64/68 - SHIFT STRING DUMP (HP 150 SYSTEM CONSOLE)	A-85

GLOSSARY	Page
GLOSSARY	Glossary-1

ILLUSTRATIONS

Title	Page
Control Panel on the HP 2608S Line Printer	4-29
Simplified I/O Spooling Diagram	4-31
File Eligibility for Dumping to Tape	4-39
Disc Drive Structure	5-35
Disc Platter Format	5-35
Typical System Disc Layout	5-39
Log File Format	5-46
Log Record Heading Format	5-48
Log Error Record (Type 0)	5-49
System Up Record (Type 1)	5-50
Job Initiation Record (Type 2)	5-51
Job Termination Record (Type 3)	5-53
Process Termination Record (Type 4)	5-54
File Close Record (Type 5)	5-55
System Shut-Down Record (Type 6)	5-57
Power Failure Record (Type 7)	5-58
Spooler's Spoolfile Done Record (Type 8)	5-59
Line Disconnection Record (Type 9)	5-61
Line Close Record (Type 10)	5-62
I/O Error Record (Type 11)	5-63
Physical Mount/Dismount Record (Type 12)	5-65
Logical Mount/Dismount Record (Type 13)	5-66
Tape Labels Log Record (Type 14)	5-67
Console Log Record (Type 15)	5-68
Program File Event Record (Type 16)	5-69
Call Process Signals Log Record Format (Type 17)	5-69
DCE Provided Information Record (Type 18)	5-70
System Software Tracer Record (Type 19)	5-72
RESTORE Record (Type 36)	5-73
Printer Access Failure Record (Type 37)	5-75
ACD Changes Record (Type 38)	5-77
Stream Initiation Record (Type 39)	5-79
User Logging Record (Type 40)	5-82
Process Initiation Record (Type 41)	5-84
Security Configuration Changes Record (Type 42)	5-86
File Open Record (Type 44)	5-88
Command Access Record (Type 45)	5-89
MPE Maintenance Request Log Request (Type 46)	5-91
Diagnostic Control Unit Log Record (Type 47)	5-92
Accounting Structure in a Corporation	6-15
Sample Account Structure	6-33
Basic Framework of the SYSDUMP Program	7-4
Example of Domain Reassignment During System Startup	10-6
Spanning Groups and Accounts	10-17

ILLUSTRATIONS

Title	Page
Series 37 Front Panel	11-1
Series 39/40/42/52 System Processor Unit (SPU)	11-10
Series 39/40/42/52 System Control Panel Switch/Indicator Function	11-11
Series 44/48/58 System Processor Unit (SPU)	11-14
Series 44/48/58 System Control Panel Switch/Indicator Function	11-15
Series 39/40/42/52, 44/48/58 Thumbwheel Switches	11-19
Series 64/68/70 System Status and Display Panel	11-22
Series 64/68/70 System Status and Display Panel	11-23
Local to Remote Cable Connections for Series 39/40/42/52	11-51
Local to Remote Cable Connections for Series 44/48/58	11-52
Local to Remote Cable Connections for Series 64/68/70	11-52
Maintenance Display	11-61

TABLES

Title	Page
Commands Issued by the Operator	4-2
System Startup of the HP 3000	4-8
Source of MPE System Components	4-9
System Supervisor Commands	5-2
Device Defaults (DEFDATA.PUB.SYS), G.01.00 or Later	5-20
Log File Errors	5-45
Log Record Types	5-47
File Access Modes	6-9
User Type Definitions	6-10
Default Security Provisions	6-12
Report Record Format	6-22
Device Defaults (DEFDATA.PUB.SYS), G.01.00 or Later	7-85
Asynchronous Data Communication Controller (ADCC) and Advanced Terminal Processor (ATP) for Terminals (E/F.00.00 and G.00.00)	7-86
Terminal Types for Terminals and Printers	7-87
Terminal Subtypes for Device Type 16	7-88
Terminal Line Speeds for the ATP and ADCC	7-88
Printer Port Speeds for the ATP and ADCC	7-88
Serial Application Printers	7-89
Serial Spooled Printers	7-90
The HP 2608A, HP 2631A/B, and HP 2613/17/19 Line Printers	7-91
The HP 2608S, HP 2563 (HP-IB Interface only), HP 2565, and HP 2566 CIPHER Line Printers	7-92
The HP 2680A and HP 2688 Laser Printing Systems	7-93
The HP 2893 Card Reader	7-94
Nine-Channel Magnetic Tape Units	7-95
The HP 9140 Integrated Cartridge Tape Units	7-96
The HP 9144 Tape Unit	7-97
The HP 9145A Cartridge Tape Unit	7-97a
The HP 35401 Tape Unit	7-97b
The HP 9895 Flexible Disc	7-98
Discs	7-99
Absolute Minimum and Maximum Configuration Settings Allowed by SYSDUMP (MPE E/F.00.00)	7-113
Absolute Minimum and Maximum Configuration Settings Allowed by SYSDUMP (MPE G.00.00 and Later Versions)	7-115
System Table Default Sizes for G.01.00 and Later Versions	7-117
SYSDUMP and INITIAL Quick Reference	7-120
Standard Six Line Per Inch Format	8-12
Standard Eight Line Per Inch Format	8-12
Carriage-Control Directives	8-13
System Failure List	9-3
Console Messages	9-26

TABLES (Continued)

Title	Page
Coldload Error Messages With Numbers	9-42
Coldload Error Messages Without Numbers	9-57
CATALOG.PUB.SYS	9-59
Software Dump Facility Commands	10-52
MPE Status Code	11-3
Front Panel LED Codes	11-4
Series 37 Keyswitch	11-5
Control-B Mode Commands	11-7
MPL Error Codes (DCU ROM Date Code Earlier Than 2403)	11-32
MPL Error Codes (DCU ROM Date Code 2403 and Later)	11-34
SYSSTOP Error Messages	11-37
System Halt Conditions	11-38a
Self Test Mode Commands	11-56
General CMP Error Messages	11-62
Decimal/Pseudo-Octal Conversion of DRT Numbers	11-66
Five Port PDP/MPE UNIT Cross Reference	A-19b
Eight Port PDP/MPE UNIT Cross Reference	A-19b

PREFACE

This manual is one in a series intended for HP 3000 System Managers, Account Managers, System Supervisors, and System Operators. In addition to this manual, the MPE V/E System Administrator series of manuals includes:

- MPE V Storing and Restoring Files (32033-90133)
- MPE V Backup and Recovery (32033-90134)
- MPE V Account Structure and Security (32033-90136)

The System Operation and Resource Management Reference Manual describes all System Administrator tasks not included in one of the three task-oriented manuals. Although not a tutorial, the System Operation and Resource Management Reference Manual does explain basic tasks and procedures. You should, however, be familiar with the operation of the HP 3000 and understand the relationship between hardware and software. For a basic introduction to System Administrator tasks, refer to the Guide for the New Operator (32033-90021).

HP 3000 Systems Described in the Manual

This edition of the System Operation and Resource Management Reference Manual and the other manuals in the System Administrator set describe the following models of the HP 3000 computer:

- The Series 37.
- The Series 39, Series 40, Series 42, and Series 52. Because these systems have similar features they are often treated as a single series and abbreviated, Series 39/40/42/52.
- The Series 44, Series 48, and Series 58. These similar systems are abbreviated Series 44/48/58.
- The Series 64, Series 68, and Series 70, abbreviated Series 64/68/70.

If you are using a Series II, Series III, Series 30, or Series 33 HP 3000 computer, refer to the MPE V/R System Operation and Resource Management Reference Manual (32002-90016) for a description of System Administrator tasks.

Contents of the Manual

This manual contains eleven sections, one appendix, and a glossary:

Section I	OVERVIEW Introduces the HP 3000 computer system and MPE.
Section II	INTRODUCTION Explains MPE's Command Interpreter, system prompts and messages, batch and interactive processing, and command usage.
Section III	COMMAND DEFINITIONS Previously this section contained descriptions of MPE System Operator commands. These commands are now described in the MPE V Commands Reference Manual (32033-90006).
Section IV	THE SYSTEM OPERATOR Explains System Operator tasks and the MPE commands you use to perform those tasks.
Section V	THE SYSTEM SUPERVISOR Discusses the role of the System Supervisor, including system modification and performance tuning.
Section VI	THE SYSTEM MANAGER Previously this section described System Manager and Account Manager tasks such as setting up an accounting structure, modifying the accounting structure, billing for resource use, and providing for system security. In this edition of the manual, Section VI has been replaced with MPE V Account Structure and Security (32033-90136).
Section VII	SYSTEM CONFIGURATION/STARTUP Describes how to run the SYSDUMP and INITIAL Programs by explaining each step of their respective dialogs. It also describes the uses of these programs. The end of this section contains information on configuring peripherals, suggested system parameter values, and a quick reference table.
Section VIII	SPECIAL CONSIDERATIONS FOR PERIPHERAL DEVICES Presents issues that you must consider when using certain peripheral devices.
Section IX	MPE MESSAGE SYSTEM Documents system failure messages, MPE error messages, and cold load error messages. Explains the MAKECAT Program.
Section X	SUBSYSTEMS AND UTILITIES Explains how to use Private Volumes, Serial and Foreign discs, the Software Dump Facility, and the Diagnostic Utility System.
Section XI	SYSTEM CONTROLS AND SPECIAL FUNCTIONS Describes system controls for the HP 3000.

Appendix A	QUICK REFERENCE GUIDE Describes frequently-used procedures in a simple, easy-to-follow format.
Glossary	A glossary of technical terms.

The manual also has a comprehensive index to help you find the information you need. Primary index entries indicate the most thorough treatment of a topic, while secondary entries provide further discussion, and lead you to other related topics.

MPE Versions Described in the Manual

This update to the System Operation and Resource Management Reference Manual reflects the ongoing development of the HP 3000 product line. It describes the E/F.00.00, G.00.00, G.01.00, G.02.00, G.02.A0, G.02.B0, G.03.00, G.03.02 and G.03.04 releases of MPE V. Most of the technical information in the manual applies to all of these releases. When a feature applies to only a certain release or set of releases, the manual lists the release numbers that apply.

Sources of Additional Information

As you use the System Operation and Resource Management Reference Manual, you may want to consult the following sources for additional information:

- MPE V Storing and Restoring Files (32033-90133)
- MPE V Backup and Recovery (32033-90134)
- MPE V Account Structure and Security (32033-90136)
- HP 3000 Computer Systems General Information Manual (5953-7553)
- MPE V Intrinsics Reference Manual (32033-90007)
- MPE V Commands Reference Manual (32033-90006)
- MPE V Utilities Reference Manual (32033-90008)
- Using Files (30000-90102)

OVERVIEW

SECTION I

This section introduces you to the HP 3000 computer systems, hardware and software, including the Multi-Programming Executive (MPE) operating system. It also directs you to the other sections of the manual which cover specific areas of interest in greater detail.

An HP 3000 computer system begins with hardware, the actual physical components of the computer. Generally, HP 3000 hardware includes a system processor unit (SPU), mass storage, and various peripheral devices. Each system will have different elements, depending on the applications, but will include such advanced design characteristics as stack architecture, variable length code segmentation, hardware-assisted virtual memory user protection, and dynamic storage allocation. For more specific information on system hardware, refer to the HP 3000 Computer Systems General Information Manual (5953-7553).

The Fundamental Operating Software (FOS) includes MPE, which is the fundamental heart of the HP 3000, plus utility programs, and data base management and data entry subsystems.

MPE OPERATING SYSTEM

The Multi-Programming Executive operating system (MPE) is the disc-based software system that supervises the processing of all programs which run on the HP 3000. MPE dynamically allocates system resources such as main memory, the central processor, and peripheral devices to each process as needed. MPE also coordinates all user interaction with the system and provides an easy-to-use command interface. In addition, MPE automatically maintains records of all resources used at the account, group, and user levels.

Through multiprogramming, MPE can execute many different jobs and sessions at the same time. The number of jobs or sessions that can be processed concurrently depends on such factors as the hardware and software configurations, limits defined by the System Operator, and the applications involved. Each user interacts with the computer as if it were a private machine; it isn't necessary to even be aware of others using the machine, since MPE permits system resources to be shared by multiple users, each of whom interfaces with the system independently.

MPE is equipped with many different utilities, subsystems, and programs to help each user to do his or her job quickly, efficiently, and conveniently. For more information on how an individual user interacts with MPE, refer to Section II.

COMMAND INTERFACE

The command or "user interface" portion of the operating system provides the means for users to communicate with MPE. This user interface consists of five subsets, or levels, of commands. Access to each command is primarily determined by the capabilities assigned to the user. For example, "System Manager" commands require SM capability, while user commands require no special capability; any user may execute them.

- Operator commands — They are executed at the standard MPE colon prompt (:), but only from the device configured as the system console. These commands are executed by the System Operator, i.e. the user logged on to the current console device, to perform specific Operator tasks. The Operator may, however, choose to distribute Operator commands to standard MPE users. Section IV of this manual discusses Operator commands.

- Console commands — subset of commands which the Operator executes at the console, but only at the "= " prompt. This prompt is made by pressing $\underline{A}^{C}$. No terminal other than the console generates this prompt, and hence commands requiring the "= " prompt are referred to as "Console commands", even though they are normally executed by the Operator. Section IV of this manual discusses Console commands.

- System Supervisor commands — These require System Supervisor capability, identified by the mnemonic "OP". These commands allow you to have day-to-day external control of the system, manage scheduling of resources, alter configuration, make partial or complete backup copies of your software, maintain logging facilities, and display various items of system information. For more information on the function of the System Supervisor and the OP capability, refer to Section V.

- System Manager commands — Use of these commands is restricted to users who have been assigned System Manager capability (identified by the mnemonic "SM"). The SM capability grants the user the ability to manage the overall system and the accounts within it. Users with the SM capability can protect the system and its other users by limiting access to special system capabilities only to those who fully understand their correct use. For detailed information on the function of the System Manager and the SM capability, refer to MPE V Account Structure and Security (32033-90136).

- User commands — These are commands available to almost any user in the MPE operating system.

For a complete description of the syntax and operation of MPE commands, refer to the MPE V Commands Reference Manual (32033-90006).

ACCOUNT STRUCTURE

MPE provides a complete account structure and automatic resource accounting. This allows the System Manager, through the Command Interpreter, to set up a hierarchical accounting structure on the system in a style similar to a company organization chart. Refer to MPE V Account Structure and Security (32033-90136) for additional information.

When you log on to MPE, three basic elements must be defined: an identifiable unit to which system resources are allocated and charged (account), a local set of disc files which you may access (group), and a name (user name) which identifies you to the system as having access to the account and group.

The account is the major "billable unit" in MPE. Associated with each account are the following three items: one, a unique file domain; two, a set of users who can access MPE through this account; and three, a set of groups which partition the account's accumulated resources and divide its file domain into private sub-domains.

Just as the overall system has a manager (the user with SM capability who manages the system's resources), each account has a specific user who manages the resources of the account. This user has the Account Manager capability (identified by the mnemonic "AM"). The first Account Manager for each account is designated by the System Manager when the account is created.

MPE automatically keeps track of system resources used by each account and group. This resource usage information can be used for billing, accounting, or any other application which requires such data. Refer to MPE V Account Structure and Security (32033-90136) for detailed information the account structure.

SYSTEM OPERATION

General operation of the system is primarily the responsibility of those users identified as the System Manager, System Supervisor, and System Operator. Depending upon the installation, the associated responsibilities may be distributed among several individuals, or may all be done by one person.

These functions of system operation and resource management are categorized, for clarity, in this manual based on the capabilities they require. This does not imply that the tasks should be limited to the positions indicated here. Rather, they should be delegated so as to ensure the most efficient operation of your particular organization. In some installations, the System Operator may have to perform any and all system functions, and will therefore have all the capabilities needed. In others, certain functions may be restricted to the System Supervisor or System Manager user.

Once you are familiar with system organization and functions, you will be able to distribute the responsibilities of system operation and resource management, based on the structure and needs of your particular installation.

In general, the System Operator is responsible for routine, day-to-day system operation. The Operator responds to system messages and keeps the system and peripheral devices functioning smoothly and efficiently. More details on how specific operator functions are accomplished are available in Section IV. The System Supervisor maintains the system logging and resource accounting facilities, does system backup and configuration, can retrieve information, and change parameters relating to the master scheduling queue. Section V covers these tasks in greater detail. The System Manager implements and maintains the accounting structure, and appoints Account Managers to monitor account usage. MPE V Account Structure and Security (32033-90136) is devoted to a thorough discussion of the responsibilities of the System Manager.

System Startup and Modification

MPE is initially "brought up" on an HP 3000 by the Operator at the system console, through one of five startup options: WARMSTART, COOLSTART, COLDSTART, UPDATE, or RELOAD. Although the mechanics of system startup may vary with the different systems, the interactive dialog between the System Operator and the MPE INITIAL Program is virtually the same for all systems. (There are a few minor exceptions, which are detailed in Section VII.) This dialog permits the Operator to change the configuration of the system, and/or to specify certain limits and defaults which will apply to users. Section IV offers step-by-step instructions for system startup procedures. The Quick-Reference Section (Appendix A) offers a simplified version of those instructions for use only after the overall processes are clearly understood.

System Backup and Recovery

System backup refers to copying the MPE operating system and optionally, user files, to a serial storage device (i.e., magnetic tape, serial disc, etc.). The serial storage device is then available for reloading the system in the event of lost data. System backups are done daily in most installations, but this may vary according to usage and other installation-dependent factors. Refer to MPE V Backup and Recovery (32033-90134) for step-by-step instructions for backup and recovery procedures.

Spooling

This MPE facility permits the concurrent usage of devices which would otherwise be non-sharable, such as card readers, magnetic tape drives, and printers. This is accomplished by copying the input or output from these devices to disc, where it waits to be processed until the required device is available. The process is called spooling, from the acronym SPOOL, which stands for Simultaneous Peripheral Operation On-Line. The spooling facility includes commands for monitoring and controlling the spooling facility, a capability for recovering spooled device files (spool files) and jobs when restarting the system (WARMSTART), and the ability to generate multiple spooled output. Refer to Section IV for more details on Spooling.

System Logging

The MPE logging facility records details of system resource requests in a series of log files on disc, and can be used to monitor system resource usage. The System Supervisor selects those systems and user events that are to be recorded. Such events may include job and session initiation or termination, program termination, file closing, file spooling completion, and system shutdown. Refer to Section V for a discussion of System Logging.

INTRODUCTION

SECTION II

To communicate with a computer, you should speak its language. The "language" for speaking with the HP 3000 is the Multi-Programming Executive (MPE) operating system: a disc-based system that supervises all processing and maintains the user interface.

In this section you'll learn how to use MPE. You'll find that this operating system, with its powerful and straightforward command language, is both versatile and easy to use.

COMMUNICATING WITH MPE

Using MPE, you can start, control, and end the processing of programs, and can ask for other system functions. Generally, you use MPE commands for functions that are outside of the application source-language programs which run on the system, although such functions can support these programs. For example, with the proper capabilities, you would use commands from this manual to:

- Obtain accounting information about accounts and groups (:REPORT command).
- Add or remove users from the system list of legitimate users (:NEWUSER and :PURGEUSER commands).
- Copy the software operating system (MPE) onto either magnetic tape or disc for backup and modification purposes (:SYSDUMP command).
- Control timeslice and priorities for executing processes (:TUNE command).
- Create, alter, or remove private-disc volume sets (:NEWVSET, :ALTVSET, and :PURGEVSET commands).

Other commands and functions are available, as well. The MPE V Commands Reference Manual (32033-90006) contains the complete specifications for all commands.

The Command Interpreter

With one exception, you may enter any commands to MPE through any standard input device. The exception is the subset of MPE commands known as "Console Commands", which may only be issued from the System Console. All other MPE commands, including the user commands, Operator commands, System Supervisor commands, and System Manager commands, may be executed from devices configured to accept jobs and sessions and/or data. Terminals are used to conduct sessions, while either a terminal or tape drive is used to submit jobs. (Refer to the discussion of "BATCH ACCESS" in this section for information about jobs.)

When a command is entered for execution by MPE, it is first processed or "parsed" by the MPE Command Interpreter. The Command Interpreter (or "CI") is part of the operating system, and serves three main functions. The CI determines if the command you entered is legitimate, and whether

the syntax is correct. The CI also determines if you have the capabilities to execute the command. If applicable, it passes the command on to an appropriate part of the operating system, where it is executed.

The CI is the way you communicate with MPE. In an interactive session (a session from a terminal), when MPE is ready to accept a command from you, it transmits a colon prompt, (:) to your terminal. In response to the colon prompt, you can enter a command, which is parsed by the CI, as described above. After typing the command on your terminal, you must always press (RETURN) on the terminal keyboard. This signals the system that you are ready to process your command.

If there is no colon prompt on your terminal, you can get the attention of the CI by pressing (RETURN) on your keyboard. The CI responds by printing the colon prompt.

MPE includes a special subset of commands, known as "Console Commands", which may only be executed at the Console. These include =LOGON, =LOGOFF, and =SHUTDOWN. They are issued following a "=" prompt, which is generated by simultaneously pressing the (CONTROL) key and the A key on the Console keyboard. This combination of characters, written A^C, only has meaning at the Console: no other terminal will generate the "=" prompt.

Four additional Operator commands may also be executed at the "=" prompt, but should only be used when the Console does not respond to the standard MPE (":") prompt. These are :ABORTIO, :ABORTJOB, :RECALL, and :REPLY. More information about Console and Operator commands is available in Section IV and the MPE V Commands Reference Manual (32033-90006).

System Prompts and Messages

The system communicates with you through prompts, reports, and messages that appear on the System Console or your terminal. You communicate with the system by entering commands at the Console or your keyboard, as previously described.

Console messages can request Operator action: for example, a request that a tape be mounted, or special forms installed on the line printer. Operating messages can also provide records of current system activity. They might report the status of an I/O device, data transfer errors, or some other abnormal system condition.

Reports from the system reflect its state at any given time. They show the status of jobs or sessions, devices, device files, and queues (priority assignments).

Certain MPE commands initiate a dialog with the user to simplify complex system processes. Such dialogs are used to initialize, backup, shutdown, and restart the operating system.

Terminal Functions

Some terminal functions allow you to manipulate text. The following paragraphs describe these capabilities.

DELETING A CHARACTER. To delete the previous character, either press the BACK SPACE key, or H^C. BACK SPACE and H^C work in the following ways for all HP terminals (including the System Console).

CRT Terminals. CRT terminals backspace the cursor. The BACK SPACE key or the H^C cause the cursor to move back one position at a time, leaving the cursor positioned over the character to be replaced. Although backspacing the cursor does not erase this character from the screen, the character is deleted from MPE's internal system buffer.

Hardcopy Terminals. For terminals that have physical backspacing capability, the BACK SPACE key and H^C cause a physical backspace to occur. The terminal then emits a line feed, unless the previous character was also a BACK SPACE or H^C. The result is that the user resumes typing beneath the first character to be replaced.

For hardcopy terminals without this capability, no backspacing takes place. Instead, these terminals verify the BACK SPACE or H^C by typing a backslash (\).

DELETING A LINE. To delete the current line of a command prior to pressing RETURN, press X^C. The terminal verifies the cancellation by printing three exclamation marks (!!!) followed by a carriage return and line feed.

ECHOING AND NON-ECHOING TERMINAL OUTPUT. Normally, your terminal operates in full-duplex mode. What you type on the terminal keyboard is "echoed" or printed on the screen or hardcopy output. However, certain conditions or programs can set your terminal to half-duplex mode, where input characters are not echoed. Also, for security reasons, you might occasionally want to turn the echo off, and then back on. The following paragraphs describe how to perform both functions.

Non-echoing Terminal Output. To place your terminal in half-duplex mode so commands entered on the console keyboard are not echoed as terminal output, press the escape (ESC) key followed by the semicolon (;) key.

Echoing Terminal Output. To change your terminal from half-duplex mode to full-duplex mode so commands entered on the terminal keyboard are once again echoed as terminal output, press the escape (ESC) key followed by the colon (:) key.

Interactive Access

In the interactive processing mode, users at remote or local terminals interact conversationally with the computer. This is called a session. During a session, users are prompted for input. They simultaneously share the central processor, main memory, and discs, all of which are used for program development, information retrieval, computer-assisted instruction (CAI), as well as other applications. Users can communicate with the System Operator, and vice versa, by way of messages between terminals and the System Console.

LOGGING ON. To start a session, you must identify yourself to MPE in a process called "logging on". To do so, enter the word HELLO when the colon prompt (":") appears at the left side of your terminal's screen. Follow the :HELLO command with a space, then your user name, a period, and account name. If you are logging onto a group other than your home group, you must supply a comma, then the group name following the account name. You also have the option of entering a session name (before the user name, and separated from it by a comma) which will uniquely identify your session.

After you have entered this information, MPE may respond with the message "ENTER ACCOUNT PASSWORD:", or prompt you for a group and user password as well. If it does, you are required to supply the correct password(s) to successfully log on. You have three chances to enter the correct password, otherwise you must re-issue the :HELLO command. Passwords are assigned to accounts by the System Manager and to groups and users by the Account Manager. Check with one or both of these people for the proper passwords.

The following steps comprise the logon procedure:

1. Press (RETURN) on the terminal keyboard and a colon (:) will appear at the left of your screen, next to the cursor.

   If a colon prompt doesn't appear after pressing (RETURN), check these items before calling your HP service representative:

   - Be sure your terminal is plugged into an AC outlet, and turned on.
   - Be sure the keyboard cable, modem cable, and the cable connection from your terminal to the computer are all secure.
   - Be sure your terminal is not in Block mode, but in Remote mode.
   - Be sure there is not a program already operating from your terminal.
   - Check the System Console for a "system failure" message.

2. Enter your logon identification, consisting of:

   - A colon (:) provided by MPE.
   - The word HELLO, followed by a space.
   - A session name (optional), followed by a comma (,).
   - Your user name, followed by a period (.).
   - Your account name, followed by a comma (,) if you are going to enter a group name.
   - Your group name (optional).

A typical logon might look like this:

```
:HELLO OPERATOR.SYS,PUB
```

When you log on successfully, the computer responds with a standard logon message similar to this:

```
HP3000/MPE V G.00.00. (BASE G.02.00) MON, SEP  9, 1985,  9:59 AM
:
```

A brief welcome message may also appear (refer to the :WELCOME command in the MPE V Commands Reference Manual (32033-90006). The colon below the message indicates that the computer is ready for your next command.

Incidentally, you must log on within a few minutes after pressing (RETURN) or the computer will not respond. The exact time varies from system to system because logon recognition time is selected by the System Supervisor when he or she configures the system. If you are disconnected, press (RETURN) again and repeat the process of logging on.

LOGGING OFF. To end your session with the HP 3000, simply type the word BYE and press (RETURN). The computer logs off, telling you how many seconds of CPU (Central Processing Unit) time your session used, the number of minutes your session lasted (connect time), the date, and the time your session ended, as shown in the following example:

```
:BYE
CPU=26.  CONNECT=42.  MON, SEP  9, 1985, 3:41 PM
```

Batch Access

Batch access allows you to submit a set of MPE commands to the computer as a single entity, called a job. They can be submitted on any input device, although non-sharable spooled devices such as tape drives or card readers are typically used. Because jobs contain predefined MPE commands, they require minimal input from the user or Operator once they are running.

Programmers may create job files at their terminal, and then submit one or several jobs for concurrent processing with the :STREAM command. MPE selects the jobs according to their input priorities, then sequentially executes their commands. Refer to the :STREAM and :JOB commands in the MPE V Commands Reference Manual (32033-90006) for more information.

The primary difference between interactive and batch processing is this: during a session, the programmer maintains a dialog with system by controlling input and monitoring output. By contrast, a batch job relies upon a predefined command stream.

INTRODUCTION TO COMMANDS

There are many commands available to you for communication with MPE. They are logically divided into five major categories based on the different capabilities required to execute them.

- User commands, which do not require any special capabilities.
- Operator commands, which are executable only at the System Console unless the Operator specifically distributes them to other users.
- Console commands, which are only executable at the Console.
- System Supervisor commands require the user and account to have System Supervisor (OP) capability.
- System Manager commands require the user and account to have System Manager (SM) capability.

This manual is solely concerned with those commands that deal with system operation and resource management. User commands are not discussed in detail here. Complete specifications and explanations of user commands can be found in the MPE V Commands Reference Manual (32033-90006).

Command Elements

Each MPE command consists of:

- Required colon prompt, supplied by the system in a session.
- Required command name.
- Optional parameter list.

A typical command includes all of the above elements and appears as follows:

```
:DEALLOCATE PROGRAM,COBOL
```

The colon identifies a statement as an MPE command. In a session, MPE prints the colon on the terminal whenever the system is ready to accept a command. You respond by entering the remainder of the command after the colon. In a batch job, however, you must enter the colon in the first column of either the source card or the disc file in which the command is to appear.

The command name, which you enter immediately after the colon, requests a specific operation. MPE prohibits blanks embedded within the command name and will reject the command if they appear; blanks, however, may appear between the colon and the command name. The system also interprets the first non-alphabetic character as the end of the command name. Typically, this character will be a blank.

The parameter list, which is required in some commands but optional or even prohibited in others, contains one or more parameters that specify options for the command. The list can include positional parameters and/or keyword parameter groups. These groups (defined later in this section) must be separated from each other by delimiters such as commas, semicolons, equal signs, or other punctuation marks. MPE permits both decimal and octal numbers as parameters. You distinguish between the two by preceding an octal number with a percent sign (%).

If a parameter is required, you must include a value for it in the parameter list. MPE substitutes default values for optional parameters not included in the list. These default values are specified in the parameter definitions in the MPE V Commands Reference Manual (32033-90006).

Normally, you must separate the command name from the parameter list by one or more blanks. However, when you omit the first optional parameter in a list of positional parameters (refer to POSITIONAL PARAMETERS later in this section), you can begin the list immediately after the command name, starting with the comma or other delimiter that normally follows the first parameter. The comma in the place of blanks serves as a delimiter. Within the parameter list, any delimiter can be surrounded by any number of blanks, permitting a free and flexible command format.

The end of each command is indicated by the end of the record on which it appears. For example, a RETURN marks the end of terminal or disc file input. It is possible for the last nonblank character of the record to be a continuation character, in which case command line input continues to the next record (the next line). The maximum length of a command allowed is 280 characters; the maximum number of continuation lines permitted is 230. (For further information, refer to the discussion of "CONTINUATION CHARACTERS" in this section.

POSITIONAL PARAMETERS. In many commands found in this manual (for example: :STORE and :RESTORE), the meaning of a parameter depends upon its position in the parameter list. In the case of :STORE, the system expects to see the required parameters, which indicates the file set to be stored, followed by the required parameter, which indicates the file to which the file set is to be stored. In some commands such as :LISTUSER, some of the positional parameters are optional; if they are omitted, a default value is supplied by the system.

Positional parameters are separated (delimited) from one another by commas or semicolons. When you omit an optional positional parameter from within a list, you must still include the delimiter that would normally follow that parameter. Thus, on a listing, two adjacent delimiters indicate a missing optional parameter. When you omit a positional parameter that would otherwise immediately follow a command name, indicate this by entering its delimiter as the the first character in the parameter list. When you omit positional parameters from the end of the list, however, you need not include delimiters to signify this — the terminating return or end-of-card is sufficient. The following examples show how to properly omit parameters from a command.

```
:FORTRAN , OUT, *LST, MFL, NFL        ** First parameter omitted. **
:FORTRAN INP,, *LST, MFL, NFL         ** Second parameter omitted. **
:FORTRAN INP, OUT, *LST               ** Last two parameters omitted. **
:FORTRAN                              ** All parameters omitted. **
```

For some commands you may substitute "wild card characters" for certain parameters in the list. Note the wild card characters count toward the 8-character limit for file names. Here is a list of the wild card characters, and their meanings:

@	Specifies zero or more alphanumeric characters. When used by itself, @ denotes "all members of the set" as in ":LISTF @". @ occupies a character position within the file, group, or account name; thus, :LISTF @A1234567, and similar syntaxes are not acceptable since they contain more than eight characters.
#	Specifies one numeric character.
?	Specifies one alphanumeric character.

These characters, placed in the parameter list just as the actual parameter name would be, allow for greater flexibility when using the list commands. The characters can be used as follows:

k@	Represents all file names starting with the character "k".
@n	Represents all file names ending with the character "n".
n@x	Represents all file names starting with the character "n" and ending with the character "x".
k#...#	Represents all file names starting with the character "k" followed by up to seven digits (useful for working with EDIT/3000 temporary files).
?n@	Represents all file names whose second character is "n".

n?	Represents two-character file names starting with the character "n".
?n	Represents two-character file names ending with the character "n".

KEYWORD PARAMETERS. When a parameter list is so long that it becomes difficult to use positional parameters, MPE provides keyword parameter groups. A keyword group consists of a keyword that denotes the group's meaning, sometimes followed by an equal sign and one or more subparameters.

You can enter keyword groups in any order because their meaning is independent of their position in the list. Each keyword group is preceded by a semicolon. When more than one subparameter appears in the group, they are usually separated from each other by commas. It is optional to precede or follow the delimiters with blanks. In the following example, a :PREP command contains both positional and keyword parameters. INPT and OUTP are the variable names of the positional parameters; DL and CAP are keywords that designate the keyword parameter groups; and IA, PH, DS, and MR are subparameters of the keyword group CAP.

```
:PREP INPT,OUTP;DL=500;CAP=PH,DS,MR,IA
```

When both positional parameters and keyword groups form a list, positional parameters always occur before the keyword groups. If you omit trailing parameters from the positional group in this list, you do not need to include their delimiters, since the occurrence of the first keyword indicates the omission.

To illustrate parameter choices for easy referencing, syntax boxes are included for each command in the MPE V Commands Reference Manual (32033-90006). Brackets ([ ]) that enclose separate groups of keyword parameters within the syntax box indicate that the choice of that group is optional. If, however, the individual choices are further enclosed in braces ({ }), this indicates that if you do choose to include that group in your command string, you must choose exactly one of its members. Refer to "CONVENTIONS USED IN THIS MANUAL" on page vi for a more detailed explanation.

CONTINUATION CHARACTERS. When the length of a command exceeds one record (for example, one entry-line or source card), you may enter an ampersand (&) as the last nonblank character of the record and continue the command on the next record. This new record must begin with a colon. You may embed blanks between the colon that begins the continuation record and the first nonblank character of the continuation record. In the following example, the command contains a continuation character at the end of the first line and an embedded blank at the beginning of the second line:

```
:RUN PROGB;NOPRIV;LMAP;STACK=500;PARM=5;&
: DL=600;LIB=G
```

You can continue commands up to 278 characters, excluding the colon prompt and continuation ampersands, which are not counted as part of this total.

When continuing a command onto another line, you must not divide a command name, keyword, positional parameter, or keyword subparameter. MPE does not permit any such element to span more than one line. MPE does not begin to interpret a command until the last record of the command has been issued, even if it spans several lines.

Command Errors

If you make an error while entering a command in an interactive session, MPE suppresses the execution of that command and attempts to determine the cause of the error. The cause of the error might be of a nature that can be easily pointed out to you. If so, MPE will print a caret (^) under the incorrect part of the command, along with an appropriate message. On the other hand, the command entry might be such that MPE cannot print the caret to signify a specific error point. If this is true, the system displays an appropriate error message. In either case, control returns to your terminal.

If you enter an erroneous command in a batch file and do not precede this command with a :CONTINUE command, MPE suppresses the execution of the command. Refer to the MPE V Commands Reference Manual (32033-90006) for more information on the uses of the :CONTINUE command. The system will print an error message on your standard list device, ignore all subsequent commands in this job, and abort (flush) the job.

If you continue a command over several lines and the system detects an error, MPE will echo the offending line preceded by its line number. MPE reads all continued entries as though they were portions of the commands on one line.

```
:FILE ABC&
:=TAP%&
:;NEW
(1)=TAP%
      ^

UNEXPECTED CHARACTER IN FILE NAME; EXPECTED "." OR "/".
IS THE DELIMITER BETWEEN PARAMETERS CORRECT?  (CIERR 582)
```

The MPE :REDO command can save you time when you enter a command improperly. It allows you to edit the last command that you entered. To use it, enter :REDO and your terminal will echo the previous command. Using the following edit symbols you can then:

I	Insert a character(s).
D	Delete a character(s).
R	Replace a character(s).
U	Undo the previous edit. (Entering U again will undo all previous edits.)

If you do not use an edit symbol, MPE assumes that you want to replace a character(s). Refer to the :REDO command in Section II of the MPE V Commands Reference Manual (32033-90006) for more information.

MPE provides an online facility for obtaining information on MPE commands. To access the HELP subsystem, enter :HELP followed by the name of the command that you want information about. The :HELP command has several optional parameters such as PARMS, OPERATION, ALL, and EXAMPLE, which can be very useful for quickly obtaining additional information. For more information, refer to the :HELP command in Section II of the MPE V Commands Reference Manual (32033-90006).

Interrupting Command Execution

It is sometimes necessary to interrupt an executing MPE command to execute another command, such as listing your files (:LISTF), creating a new disc file (:BUILD), or determining information about other jobs and sessions (:SHOWJOB). You can stop a command by pressing [BREAK] on your terminal (sometimes labeled "INTERRUPT" or "ATTENTION"). In some cases, pressing [BREAK] will cause the executing command to be either suspended or aborted. In other cases, [BREAK] will be ignored. The exact effect that [BREAK] will have on your currently executing command depends upon, among other things, whether the command executes either a subsystem or a user program (program command), or whether the command does not execute such a program (nonprogram command).

INTERRUPTING NONPROGRAM COMMANDS. Breaking from a breakable nonprogram command will abort the command, and the Command Interpreter will issue a colon prompt for a new MPE command.

Several commands, such as :STORE, :RESTORE, :REPORT and the list commands (:LISTF, :LISTACCT, :LISTGROUP, :LISTUSER, and :LISTVS), may require the operator to mount a tape for the output file. If you break from one of these commands while waiting for the operator to intervene, only three commands will function after the colon prompt is displayed. These are :RECALL, :RESUME, and :REPLY. If you use any other command, MPE issues a warning message and ignores the command. Note, however, that the CONTROL A (denoted A^C) version of the :RECALL and :REPLY commands can be executed from the System Console, even when a program is running.

If you log on with the :HELLO command and press [BREAK] during the output of your logon message, MPE terminates the output, keeps you logged on, and prompts you for your next command.

INTERRUPTING PROGRAM COMMANDS. Program commands either invoke MPE subsystems or run user programs. All program commands are breakable; however, while you may be able to break the commands themselves, the actual programs may disable the BREAK facility. Also, if you invoke a program with a NOBREAK UDC, [BREAK] will be disabled for the purposes of that program. Refer to Section III of the MPE V Commands Reference Manual (32033-90006).

When you press [BREAK] to interrupt a program command, MPE suspends the execution of that program and the Command Interpreter issues a prompt for a new MPE command. If you enter a nonprogram command (not including :HELLO, :BYE, :JOB, or :DATA), the Command Interpreter performs the requested operation and allows you to re-activate the suspended program by entering :RESUME. But when you enter another program command, such as :FORTRAN, :EDITOR, or :RUN, or when you enter :HELLO, :BYE, :JOB, or :DATA, the Command Interpreter prints the following message on your terminal:

```
ABORT?  (YES/NO)
```

If you respond YES to the "ABORT?" message, the Command Interpreter aborts the current program and executes the command first entered, in the usual way.

If you respond NO to the "ABORT?" message, the Command Interpreter prints the message "NOT ALLOWED IN BREAK" and prompts you for another command. By entering :RESUME, you can now continue at the point where the suspended program was interrupted. Note that [BREAK], :ABORT, and :RESUME are valid only in sessions, not in batch jobs.

ABORTING A PROGRAM. When a program contains logical errors, such as an infinite loop, you can abort it as follows:

1. Press (BREAK). If it is enabled in your program, it immediately suspends its execution and MPE prompts you for a new command.

2. Type ABORT to terminate the program; it does not disrupt the session.

3. MPE confirms that your program has been terminated by displaying:

```
PROGRAM ABORTED PER USER REQUEST (CIERR 989)
```

4. MPE then prompts you for a new command.

You can also use the (BREAK)/ABORT sequence to abort certain MPE subsystem and command operations. The associated command specifications indicate the operations under the "Breakable?" entry in the "USE" matrix in the MPE V Commands Reference Manual (32033-90006). (Some of the commands abort immediately when (BREAK) is pressed, without requiring the :ABORT command.)

COMMANDS

SECTION III

For a complete description of the MPE V commands, refer to the MPE V Commands Reference Manual (32033-90006).

THE SYSTEM OPERATOR

SECTION IV

THE SYSTEM OPERATOR'S ROLE

The System Operator, also referred to as the Console Operator, or just Operator, is responsible for daily operational control of the HP 3000. The Operator logs onto the Console with the user name and account OPERATOR.SYS, which may or may not be assigned special capabilities. Unlike the System Manager, who is assigned SM capability, or the System Supervisor, who is assigned OP capability, no "System Operator" mnemonic exists which entitles the Operator to execute a special subset of commands. Instead, the Operator's role and responsibilities are derived from his or her control of the Console, since the commands the Operator uses may only be entered at the Console (or be specifically permitted to users at the Operator's discretion). For this reason, the Console is considered a privileged resource; the Operator must carefully monitor the Console and prevent unauthorized access to it.

Operator Tasks

Just as the System Manager's and System Supervisor's roles are clearly defined (with some overlap that requires consultation and the coordination of their efforts), the Operator's job consists of clearly defined tasks. To perform these tasks, the Operator should be familiar with the Operator commands listed in Table 4-1, and should have a thorough technical knowledge of system operation. Although the specific responsibilities will vary according the needs of each installation, the Operator typically performs the following functions:

1. Starts the system with one of five load options. (The System Manager can specify the system startup state for each option using the System Startup State Configurator, which is described in Section VI.)

   The last step of any system startup is responding to a date and time prompt. On a Series 37, when the processor first runs MPE, a Time of Century (TOC) clock is set (this clock is described in Section XI). Just before the system comes up, the date and time are displayed on the Console for the Operator to verify. On any other system, the Operator, rather than verifying the date and time, must enter this information at a prompt.

2. Monitors the execution of jobs and sessions, including:

   - Establishing job/session limits (within the maximums imposed by the System Supervisor during system configuration).
   - Displaying the status of sessions and jobs.
   - Aborting and/or suspending jobs when necessary.

3. Controls the use of peripheral devices, including:

   - Setting peripheral devices on line, and taking them off line.
   - Designating which devices (within the class of "accepting" devices initially configured by the System Supervisor) will accept the :JOB, :HELLO, and :DATA commands.
   - Responding to users' requests for Operator-assigned devices.

4. Controls the spooling of input and output files.

5. Distributes Operator capabilities among standard MPE users with the :ALLOW, :ASSOCIATE, and :JOBSECURITY commands.

6. Backs up user and system files. Refer to MPE V Backup and Recovery (32033-90134).

7. Shuts down the system.

8. Opens and closes communications lines, and uses data communications equipment.

Each of these tasks will be discussed in this section. In cases where a subject cannot be covered in complete detail, you will be referred to the appropriate sections of this and other manuals. Since, as Operator, you will work with your System Supervisor, you may wish to read Section V, "THE SYSTEM SUPERVISOR", (which follows this section) to familiarize yourself with the System Supervisor's role.

Operator Commands

Operator commands, a subset of MPE commands, are listed in Table 4-1. They are executed by the user logged onto the System Console, although Operator commands may be permitted to standard users and executed from other terminals.

It is important to distinguish between Operator, Console, and System Supervisor (OP) commands. The System Supervisor, who is assigned OP capability, uses a subset of MPE commands to optimize the performance of the system. They are not Operator commands as the name might suggest, but instead require that the user have OP capability in order to execute them.

Operator commands do not require OP capability. They are used primarily to allocate and manage system resources, not to tune the computer, and are executed at the standard MPE colon prompt (:). Unless a specific Operator command is permitted to a user, Operator commands are only executable from the session running on the Console.

Console commands can never be permitted to users. They are only executable at the device currently designated as the System Console, since it is the only terminal which produces the "= " prompt, generated by simultaneously pressing the CONTROL key and the A key (A^C). (This prompt can be generated even when no session is running on the Console.) Three commands entered by the Operator, =LOGON, =LOGOFF and =SHUTDOWN, may only be executed at this prompt. At the Operator's discretion, the commands =ABORTIO, =ABORTJOB, =RECALL, or =REPLY may also be executed in this manner. Therefore, any command executed at the "=" prompt is considered a Console command, not an Operator command, even though they are normally executed by Operators.

The Operator commands listed in Table 4-1 are fully documented in the MPE V Commands Reference Manual (32033-90006).

Table 4-1. Commands Issued by the Operator

COMMAND NAME	DESCRIPTION
:ABORTIO/=ABORTIO	Aborts pending I/O requests for a device.
:ABORTJOB/=ABORTJOB	Aborts a job a scheduled job, or session.
:ACCEPT	Permits a device to accept job, sessions, and/or data.
:ALLOW	Grants a user access to specified Operator commands.

Table 4-1. Commands Issued by the Operator (continued)

COMMAND NAME	DESCRIPTION
:ALTJOB	Alters attributes of a waiting job or session.
:ALTSPOOLFILE	Alters attributes of spool files.
:BREAKJOB	Suspends an executing job.
:CONSOLE	Moves the System Console to another logical device. Also displays the LDEV number of the currently assigned Console.
:DELETESPOOLFILE	Deletes a spool file.
:DISALLOW	Prevents a user from executing specified Operator commands.
:DOWN	Removes a device from normal system use.
:DOWNLOAD	Downloads margins and VFC to a line printer.
:FOREIGN	Creates a foreign disc.
:GIVE	Assigns a downed device for diagnostic program use.
:HEADOFF	Stops header/trailer output to a line printer.
:HEADON	Resumes header/trailer output to a line printer.
:JOBFENCE	Defines input priorities for executing jobs and sessions.
:JOBSECURITY	Controls the availability of certain job commands to a user.
:LDISMOUNT	Logically dismounts a private volume set/class.
:LIMIT	Limits the number of concurrently running jobs/sessions.
:LMOUNT	Logically mounts a private volume.
:LOG	Starts, restarts or stops User Logging.
=LOGOFF	Aborts all jobs/sessions and prevents any non-HIPRI job/sessions from logging on.
=LOGON	Allows jobs and sessions to log on to the system again following a =LOGOFF.
:OPENQ	Opens spooling queues.
:OUTFENCE	Defines the minimum output priority for ACTIVE spool files.
:RECALL/=RECALL	Displays all pending Console request messages.

Table 4-1. Commands Issued by the Operator (continued)

COMMAND NAME	DESCRIPTION
:REFUSE	Disallows jobs/sessions and/or data on a designated device.
:REPLY/=REPLY	Replies to a pending Console request.
:RESUMEJOB	Resumes a job suspended with :BREAKJOB.
:RESUMESPOOL	Resumes operation of a spooled device.
:SHOWALLOW	Displays which Operator commands have been allowed the user.
:SHOWCOM	Displays the status of a communications device.
=SHUTDOWN	Aborts any remaining jobs or sessions and closes down the operating system.
:SHUTQ	Closes spooling queues.
:STARTSPOOL	Initiates spooling of a device or device class.
:STOPSPOOL	Terminates spooling of a device.
:STREAMS	Enables or disables the STREAMS device to allow or prohibit batch processing of jobs.
:SUSPENDSPOOL	Suspends spooling to a device.
:TAKE	Releases a device that was assigned for diagnostic use.
:UP	Allows a downed device to function again.
:VMOUNT	Allows or prevents users from accessing private volumes.
:WARN	Sends an urgent message to jobs and sessions.
:WELCOME	Defines the message users receive when they log on.

STARTING THE SYSTEM

There are five different methods of starting MPE. Three methods are referred to as "cold load" operations, so that starting (or restarting) the system is often referred to as "cold loading". Cold load methods use tapes or serial devices as the data source. These are UPDATE, COLDSTART, and RELOAD. The other two startup options, WARMSTART and COOLSTART, restart the system from the system disc and, therefore, require no tape or serial device. Restarting MPE by executing one of these five startup procedures is the Operator's responsibility.

Anyone can turn the system power on and off, start MPE, alter the current I/O configuration, or shut down the system. No special capability is required, nor must the person be logged onto the system. This is possible because starting the system is accomplished with the help of a standalone program called INITIAL. It prompts the user with a series of questions and, based upon the response, INITIAL will load MPE, subsystems, utility programs, and user files from either tape or disc, recover spool files, and handle disc errors.

INITIAL may also be used to alter the system configuration. The procedure for using the INITIAL Program depends on the computer hardware used in the installation. The following comments review the major differences. Complete instructions for starting a particular HP 3000 can be found in Appendix A, "QUICK REFERENCE GUIDE". Refer also to Section VII, which steps through the complete SYSDUMP and INITIAL Programs.

NOTE

To restart the system after a system failure, or in some cases after a system halt, Hewlett-Packard recommends that you take a memory dump (and a shift string dump if you have a Series 64/68/70) BEFORE YOU RESTART THE SYSTEM. Instructions for both of these procedures are available in Appendix A of this manual.

Starting the Series 37/MICRO 3000XE

The front panels of the Series 37 and MICRO 3000XE are identical. The front panel indicator lights display which power configuration is active. A keyswitch indicates the mode in which the system is running. A single-digit LED in the lower lefthand corner displays MPE status codes when MPE is running. You must set the four-position keyswitch located on the front panel to bring up the system.

When the keyswitch is turned to 1, 2 or 3, microcode performs a 30-second series of selftests. The LED on the front panel tells you the selftest is in progress. You can change the key position any time before the LED displays "C" for "Card Test".

For detailed information on the Series 37/MICRO 3000XE front panel controls, refer to Section XI, "SYSTEM CONTROLS AND SPECIAL FUNCTIONS".

Starting the MICRO 3000

The front panel of the MICRO 3000 contains two indicator lights and a keyswitch. The indicator lights display system activity and any fault conditions. When the keyswitch is turned to 1, 2, or 3, microcode performs a series of selftests. The time required for the tests depends upon the amount of memory present. Two megabytes requires about 45 seconds; four megabytes, about 60 seconds. Both indicators are lit during the selftest. If the selftest completes successfully, the ACTIVITY indicator will remain illuminated and the FAULT indicator will go out. If there is a selftest error, the FAULT indicator display identifies the error.

For detailed information on the MICRO 3000 front panel controls and indicators, refer to Section XI, "SYSTEM CONTROLS AND SPECIAL FUNCTIONS."

Starting the Series 39/40/42/52, 44/48/58

To start the system from magnetic tape or serial disc on these models of the HP 3000, you must first set the LOAD thumbwheel switch on the front panel to the DRT number of the device on which the SYSDUMP tape or serial disc is mounted. The next step is to press the LOAD key, which will bring the INITIAL Program into main memory.

To start the system from the system disc, set the START thumbwheel switch on the front control panel to the DRT number of the system disc (*ldev* 1) and press the START key. This loads INITIAL into main memory.

If no message appears on the System Console after you have pressed either the LOAD key or the START key, press (RETURN). This causes the system hardware to speed-sense the Console, after which INITIAL displays your current version of MPE, update level number, and fix level number, in the form HP 32033V.UU.FF. Your copy of MPE, for example, might appear as G.02.00.

For detailed information on the Series 39/40/42/52 and Series 44/48/58 System Control Panel, refer to Section XI, "SYSTEM CONTROLS AND SPECIAL FUNCTIONS".

Starting the Series 64/68/70

The major difference in the restart procedure for the Series 64/68/70 is that no "START" or "LOAD" key is pressed to load INITIAL. Instead, you will enter LOAD at the Diagnostics Control Unit (DCU) prompt. To generate the DCU prompt on a running system, simultaneously press the (CONTROL) key and B ($\underline{B}^{C}$). If the system is not running, press (RETURN). When you see the DCU prompt (M>), enter LOAD on the System Console.

INITIAL begins on the Series 64/68/70 in the same way as it does on the Series 39/40/42/44/48/52/58. Your installation's version of MPE, update and fix level numbers are displayed in a message of the form HP 32033V.UU.FF.

THE FIVE STARTUP PROCEDURES

The startup procedure you choose depends upon a few key factors: whether the system is being restarted from a planned shutdown, or if it is being brought up after a system failure; if a system failure occurred, whether it was catastrophic or not; and, whether you will be restarting the current configuration again, or you have made changes to the system which must be installed.

The five Startup options available to you are described in the following discussion. For a comparative overview of startup operations, refer to Table 4-2. Table 4-3 illustrates which parts of the system are loaded from disc or tape during the various startups.

CAUTION

Do not halt INITIAL before it is complete, i.e., before the request for DATE? appears. This stops the loading procedure in an intermediate stage, and will require you to RELOAD the entire system from tape.

Starting from Disc: WARMSTART

This option loads the operating system from the system disc. Use WARMSTART to recover scheduled jobs and incompletely processed spooled jobs and spooled files; any other startup deletes any spooled files found in the system. You may not WARMSTART the system if a COOLSTART, COLDSTART, UPDATE, or RELOAD has failed. If you attempt to do so, an error message will be displayed on the System Console and the system will halt.

Starting from Disc: COOLSTART

This option also loads the system from the system disc. Use COOLSTART as the standard operating procedure when a system is routinely shut down at night and brought up the next day. This operation saves all permanent user files (including programs that run on MPE subsystems such as FORTRAN/3000, COBOL/3000, SPL/3000, and EDIT/3000). It does not retain the operational environment present prior to the last shutdown. Therefore, all jobs and sessions in progress at the time the system is shut down are logged off or terminated, and all spool files and scheduled jobs are lost.

Starting from Serial Storage Media: UPDATE

This option cold loads the system from magnetic tape or serial disc. System files are loaded from the backup media; the I/O device configuration, directory, accounting information, and assigned global RINs come from the system disc; the user files remain undisturbed. Use UPDATE as the standard operating procedure when starting the system with either an updated MPE tape from Hewlett-Packard or an MPE tape prepared for a different HP 3000 Computer System. If for any reason an UPDATE is unsuccessful, you may either attempt an UPDATE again with another good tape or restart the system with a COLDSTART or a RELOAD. If you attempt another type of cold load option, the system will halt, and an error message will be displayed on the Console.

Table 4-2. System Startup of the HP 3000

TYPE OF STARTUP	SUBSET OF INITIATION PROGRAM LOADED FROM	PRIMARY USE	ALLOWS ALTERATION OF I/O CONFIGURATION	SPOOLFILE RECOVERY	PERMANENT USER FILES	INFORMATION THAT COMES FROM SYSTEM DISC	INFORMATION THAT COMES FROM BACKUP MEDIUM (MAGNETIC TAPE OR SERIAL DISC)
WARMSTART	System Disc	Standard procedure to save spoolfiles & restartable jobs.	NO	YES	Retained	All	None
COOLSTART	System Disc	To bring up system after routine shutdown.	YES	NO	Retained	All	None
UPDATE	Magnetic Tape or Serial Disc	To install a new version of MPE.	YES	NO	Retained	I/O & System Configuration, Directory, Accounting Info, Global RINs	System Files
COLDSTART	Magnetic Tape or Serial Disc	To make I/O configuration changes and retain them on disc.	YES	NO	Retained	Directory, Accounting Information, Global RINs	System Files, I/O & System Configuration
RELOAD	Magnetic Tape or Serial Disc	To install a new system.	YES	NO	Reloaded (if Dumped on Backup Medium) or purged	None	All (including Users' Files if Dumped on Backup Medium)

Starting from Serial Storage Media: COLDSTART

This option cold loads the system from magnetic tape or serial disc. System files, the I/O device configuration, and the system table configuration are loaded from the backup media. User files, the file directory, accounting information, and assigned global RINs remain unchanged, and are loaded from the system disc. COLDSTART is used to keep multiple system configurations available, each one stored on its own cold load tape or disc. This way, a COLDSTART allows system modification while retaining user data. If a COLDSTART fails, you should attempt another COLDSTART, followed by an UPDATE or RELOAD. Attempting to start the system with another startup procedure results in a Console error message and a system halt.

Table 4-3. Source of MPE System Components

MPE COMPONENT	WARMSTART	COOLSTART	UPDATE	COLDSTART	RELOAD*
MPE Programs, System Library	Disc	Disc	Serial Storage Device	Serial Storage Device	Serial Storage Device
I/O & System Configurations	Disc	Disc	Disc	Serial Storage Device	Serial Storage Device
Accounting Info, File Directory, Volume Table & User Files	Disc	Disc	Disc	Disc	Serial Storage Device
Spoolfiles & Jobs	Disc	--	--	--	--

*Certain information which may reside on the disc is checked for validity.

Starting from Serial Storage Media: RELOAD

This option cold loads the entire system, including all system and user files, I/O configuration information, from the backup tape. RELOAD assumes that there is no information on the system disc: if the backup tape contains user files, then the file directory, accounting structure, assigned global RINs and user files are restored to the system disc from the backup copy. If the accounting structure was not copied to tape, a default directory is created with the SYS account, PUB group, and MANAGER user.

The RELOAD option is normally used when the System Supervisor or System Manager installs the first MPE system supplied by Hewlett-Packard. RELOAD is also used when restoring the complete system from a SYSDUMP tape following a catastrophic system failure, such as a crash of the system disc. Always consult the System Manager in the event of such a failure: he or she will authorize the RELOAD procedure. (Consultation is critical. The RELOAD procedure completely rebuilds the system, and it is a time-consuming task. It should only be selected if all other startup options have failed. Furthermore, if for any reason a RELOAD of the system fails, you must attempt another RELOAD.)

When reloading from multiple tape volumes or serial discs that were created by the SYSDUMP Program, begin with the first volume of the most recent backup copy. It contains the current file directory and accounting information, which must first be entered into the system before files belonging to those accounts and groups may be copied. If all of the files are not contained in the first volume, MPE will request that you mount the next volume.

Files belonging to non-system domain volume sets, specifically private volumes, are not restored during RELOAD.

Enabling Other Devices and Processes During a Restart

Three additional procedures may be necessary when you restart the system. They are discussed briefly below.

ENABLING THE PRIVATE VOLUMES FACILITY. If your system uses Private Volumes, you must execute the :VMOUNT command to allow users to access them. To enable the Private Volumes facility so that users' :MOUNT requests are displayed on the Console and you are required to respond, enter:

```
:VMOUNT ON
```

If you would like to minimize the number of times you must respond to :MOUNT requests, specify the AUTO parameter of the :VMOUNT command, such as:

```
:VMOUNT ON,AUTO
```

MPE will then attempt to satisfy :MOUNT requests automatically. (For complete information about Private Volumes, refer to "PRIVATE VOLUMES" in Section X of this manual.)

ENABLING THE STREAMS FACILITY. As part of the I/O configuration process, the System Supervisor designates one device to accept jobs which MPE will process in batch mode. You control whether or not users are able to submit jobs for batch processing by issuing the :STREAMS command for the configured device. In the example below, logical device 10 was selected to accept streamed jobs. Though used only as an example here, *ldev* 10 is frequently configured as the STREAMS device:

```
:STREAMS 10
```

To prevent users from streaming jobs, enter:

```
:STREAMS OFF
```

STARTING A SPOOLER PROCESS FOR NON-SPOOLED DEVICES. When the System Supervisor configures the system, he or she determines which devices will be controlled by a spooler process. Although most of these devices will be started as spooled devices automatically, some may not. In such cases, you must issue an explicit :STARTSPOOL command for each device you wish to be controlled by a spooler process. For example, to start spooling for the device class "LP ", enter:

```
:STARTSPOOL LP
```

This allows the user to create spool files in class LP.

Or, to start spooling for logical device 9, enter:

```
:STARTSPOOL 9
```

In the second example, the spooler process for *ldev* 9 will control all output device files directed specifically to *ldev* 9, and any and all device class names associated with that *ldev*.

MONITORING THE EXECUTION OF JOBS AND SESSIONS

As Operator, your job is to keep the system running smoothly at all times. To do so, you must monitor all jobs and sessions, and alter their status (which includes aborting a job or session) when necessary. The discussion below will familiarize you with how MPE processes jobs and sessions. It also explains and illustrates the commands you will use to manage job/session processing. They include:

:ACCEPT	:BREAKJOB	:LIMIT	:SHOWJOB
:REFUSE	:RESUMEJOB	:JOBFENCE	:ALTJOB

The Introduction of Jobs and Sessions

Jobs and sessions, initiated with the :JOB and :HELLO commands, may be introduced to MPE only on devices designated for that purpose by the System Supervisor. When the system is first configured, tape drives are typically designated as "job-accepting" devices. Terminals, because they are used to initiate sessions, comprise the other general category of "session-accepting" devices. When such a device is not being used to process a job or session, it is controlled by the MPE Device Recognition process. This process automatically issues a read instruction after a user enters a RETURN on a terminal or when the tape drive is loaded and on line. This allows users to log onto the system without Operator assistance when they enter a legitimate :JOB or :HELLO command.

If the user enters an incorrect :JOB or :DATA command, the remainder of the job tape is "flushed", or read rapidly, while MPE searches for a legitimate :JOB image. An incorrect :HELLO command causes an error message, such as the one below, to be printed on the terminal, after which the colon prompt (:) is repeated:

```
EXPECTED HELLO, :JOB, :DATA, OR (CMD) AS LOGON. (CIERR 1402)
```

The user may again attempt to enter a legitimate :JOB or :HELLO command without Operator assistance or intervention; MPE's Device Recognition process controls interaction between the user and the device.

Operator Control of Accepting Devices

Of the devices that the System Supervisor initially configured as accepting devices, you may designate which will accept jobs, sessions, and data. The :REFUSE command allows you to temporarily prevent an accepting device from validating the :JOB and :HELLO, and/or the :DATA commands. For example, to prevent job, session, and data recognition on the terminal MPE identifies as logical device 58, enter:

```
:REFUSE 58
```

To prevent only data recognition, enter:

```
:REFUSE DATA,58
```

The :REFUSE command is frequently used when you need to take an accepting device off line. Before the device can be "downed" (using the :DOWN command) you must prevent it from any further job/session or data processing.

To restart the Device Recognition process on an accepting device for which you have issued the :REFUSE command, enter:

```
:ACCEPT 58
```

This will allow all three commands users execute to introduce jobs and sessions: :HELLO, :JOB, and :DATA.

Limiting the Execution of Jobs and Sessions

After the Device Recognition process has validated the :HELLO or :JOB command, the new job or session is considered a candidate for dispatching. (Dispatching, in this context, implies that MPE allocates the resources the job or session needs, and that it will begin executing.) Before processing may begin, MPE's Job Scheduler determines which among the group of jobs/sessions should be selected for execution. The decision to dispatch a job or session is based upon a set of simple rules and whether or not the necessary system resources are available. In general:

- A session is dispatched before a job.
- The job/session with a higher input priority is dispatched before one with a lower priority.
- A job/session introduced earlier is chosen over one more recently introduced.

System resources which cannot be controlled by the Operator affect the dispatching of jobs and sessions. When one of these resources is unavailable, a job will wait until it is available. If a resource is unavailable for a session, the message "CAN'T INITIATE NEW SESSIONS NOW" is displayed on the standard list device. Potentially limiting resources include:

- The size of MPE tables. An insufficient number of table entries will prevent the execution of a job or session since MPE will be unable to monitor and manage the process.
- The availability of a list device, whether that device is spooled or dedicated to a single process. If the device is unavailable, the job remains in a WAIT state.

In these cases, a "JOB OVERLOAD" message specifying the critical resource(s) appears on the Console. Table 9-2 contains a listing of these messages. Several of these would suggest the need to configure more of the critical system resource. If this is the case, consult your System Supervisor.

Limiting the Number of Jobs and Sessions

The Operator can control the number of executing jobs and sessions with two commands: :LIMIT and :JOBFENCE. The :LIMIT command limits the number of jobs or sessions which execute concurrently. To limit the number of jobs to 12 and the number of sessions to 20, enter:

```
:LIMIT 12,20
```

The limits you set with the :LIMIT command cannot exceed the maximum job/session limit determined by the System Supervisor when he or she initially configured the system.

To list the current job and session limits, as well as a summary of current job/session status, enter:

```
:SHOWJOB STATUS

12 JOBS:
    0 INTRO; 0 SCHEDULED
    0 WAIT; INCL 0 DEFERRED
   12 EXEC; INCL 9 SESSIONS
    0 SUSP
JOBFENCE= 2; JLIMIT= 5; SLIMIT= 40


CURRENT: 11/ 5/84 13:49

JOBNUM  STATE IPRI JIN  JLIST  SCHEDULED-INTRO   JOB NAME

#J519   SCHED   15  10S   PP   11/ 5/84 13:48    SEESPOOL,RSPOOL.SYS

1 SCHEDULED JOB(S)
```

In this example, "JLIMIT" is the current limit on the number of scheduled jobs that MPE will execute, and "SLIMIT" is current session limit. "WAIT", "EXEC", "SUSP", "INTRO", "SCHEDULED", and "DEFERRED" are job states. These, and "JOBFENCE= 2" are explained in the next subsection, "DISPLAYING THE STATUS OF JOBS AND SESSIONS."

The second command available to you to control the execution of jobs and sessions is :JOBFENCE. With it, you choose the priority fence, which is a number between 0 and 14, inclusive. Each session or job logs onto the system with an input priority between 1 and 13, inclusive; the default input

priority for standard MPE users is 8. In order for MPE to execute a session or job, the input priority of the job or session must exceed the current job fence.

When you set the job fence high, jobs with an input priority less than or equal to the fence enter the WAIT state (explained below). When a user attempts to initiate a session with an input priority that does not exceed the current fence, it will be refused with the following message:

```
CAN'T INITIATE NEW SESSIONS NOW.
```

If you set the JOBFENCE to its highest possible value, 14, only users assigned SM or OP capability will be able to log on. This is because System Managers and System Supervisors are the only users who are allowed to log on with the ;HIPRI parameter of the :HELLO and :JOB commands. In effect, this prevents all other users from gaining access to the system during a critical situation, or when the System Supervisor or System Manager needs exclusive access to MPE, subsystems, and utility programs.

Displaying the Status of Jobs and Sessions

Once the job/session candidate is selected for dispatching, MPE's Command Interpreter program gains control of the process. As the name implies, its function is to interpret commands (entered by the user during a session or included in a :JOB file) and to transfer control to the named program. While MPE is processing the job or session, it passes through three or four job states: INTRO, EXEC, SUSP, and WAIT. (Not all jobs/sessions will pass through each of these states.) To determine the current status of all jobs and sessions known to MPE, execute the :SHOWJOB command. It will produce a listing similar to the sample below, with a summary of job/session status at the end of the listing:

```
:SHOWJOB

JOBNUM  STATE IPRI JIN  JLIST    INTRODUCED  JOB NAME

#S5534  EXEC        20  20       THU  5:33P  OPERATOR.SYS
#S5559  WAIT        42  42       FRI  7:12A  JOHN,ACCT3.ACCTNG
#J643   EXEC        10S PP       THU 11:38P  MANAGER,MAILMAN.HPOFFICE
#S5467  EXEC QUIET  32  32       THU  2:47P  BECKY.ANDERSON
#J640   EXEC        10S PP       THU 11:38P  MAILROOM.HPOFFICE
#S5216  EXEC        64  64       WED  5:22P  A.KELLY
#S5572  EXEC QUIET  30  30       FRI  8:43A  LAURIE.JED
#S5326  EXEC        45  45       THU  8:26A  TODD,CHECKS.PAYROLL

 8 JOBS:
    0 INTRO
    1 WAIT; INCL 0 DEFERRED
    7 EXEC; INCL 5 SESSIONS
    0 SUSP
JOBFENCE= 2; JLIMIT= 5; SLIMIT= 40


CURRENT: 11/ 5/84 13:49

JOBNUM  STATE IPRI JIN  JLIST  SCHEDULED-INTRO    JOB NAME

#J519   SCHED   15  10S   PP   11/ 5/84 13:48    SEESPOOL,RSPOOL.SYS

1 SCHEDULED JOB(S)
```

JOBNUM identifies the session or job by the number MPE assigned to it. Jobs are listed as *Jnnn*, while sessions are listed as *Snnn*. The second column of the listing, STATE, indicates the processing state of the job or session, which may be one of the following:

INTRO	The state of a job/session while it is being introduced. This state is typically displayed for batch jobs input on a spooled device. In this case the Spooler, and not the Device Recognition process, validates the :JOB command. If legitimate, the job's input records are copied to disc, at which point the job's state changes from INTRO to WAIT.
WAIT	Waiting jobs are those that cannot execute until critical system resources become available, or because their input priority is less than or equal to the current job fence. Jobs which would cause the current job limit to be exceeded will also enter the WAIT state. Sessions, which are only initiated at a terminal and are by definition interactive, enter the WAIT state briefly.
DEFERRED	Deferred jobs are those whose input priority is a value less than or equal to the current JOBFENCE. The term also applies to jobs which were introduced to MPE with an input priority less than or equal to the current job fence. It is not a true job state in the sense that the term "Deferred" will appear in the STATE column. Instead, a D will appear in the third column of the :SHOWJOB listing for jobs in the INTRO or WAIT state only.
EXEC	This indicates that the job or session has all needed resources, and its own Command Interpreter process is executing. EXEC is the normal state for all sessions, whereas only those jobs currently being processed by MPE will be listed as EXEC. :SHOWJOB will report a job or session being initialized as EXEC*. The summary of executing jobs and sessions will reflect the jobs/sessions that are listed as EXEC and EXEC*.
SUSP	Suspended jobs are those for which the Operator has issued a :BREAKJOB command. Any executing job may be suspended; sessions cannot. To produce a listing of suspended jobs, enter ":SHOWJOB SUSP". MPE will respond by displaying a list of suspended jobs, or print "NO SUCH JOBS(S)".
SCHEDULED JOBS	Scheduled jobs are batch jobs scheduled to execute on the system at a time specified by the user.

The third column of the :SHOWJOB listing, IPRI, displays the input priority for jobs in the WAIT state. It also informs you whether or not an EXEC session is running "quietly". If it is, :TELL messages will not be displayed on the user's terminal. Therefore, any important messages that you need to transmit to all users should be sent via the :WARN command. (Or, in the :TELL message text, you can request users who receive your message to pass the information along to their "quiet" co-workers.)

The fourth and fifth columns (JIN and JLIST, respectively) list the input and output devices used by the job/session. The number listed is the logical device number of a terminal, tape drive, card punch, or printer. Note that for sessions, the number listed in each column is the same. This is because sessions use a single terminal as both the $STDIN and $STDLIST device. Jobs, however, are usually submitted on the STREAMS device, or logically "streamed" on it, with output directed to a printer. In the sample :SHOWJOB listing on the preceding page, both jobs are submitted on logical device 10, which is used to stream jobs, and their output is sent to PP, which is a device class name for the HP 2680 Laser Printer.

"INTRODUCED", the sixth column, tells you when the job or session last changed state. The last column, "JOB NAME", displays the user name and account of the person who initiated the session or submitted the job. If a session name is used, it will precede the user name and account in the listing so that the job name will appear similar to "TODD,CHECKS.PAYROLL". (Session names are optional. The name itself can be chosen arbitrarily, and they are used primarily as a convenient means for two users who are logged onto the same user name and account to uniquely identify their session or job.)

Aborting Jobs and Sessions

There are occasions when you may need to abort a job or session. This usually occurs when a user receives no response from a terminal (called a "hung" terminal), and any attempt to free the terminal is ineffective. Another instance in which aborting a job or session may be necessary is during system shutdown. After warning users of the pending shutdown, any sessions or jobs which have not been terminated will be aborted when you issue the =SHUTDOWN command. You may, however, want to selectively abort individual sessions or jobs with the :ABORTJOB command before executing =SHUTDOWN. (The procedure for shutting down the system is explained in the subsection "SYSTEM SHUTDOWN", below.)

Use the :ABORTJOB command to terminate a session or a job. If you don't receive the standard MPE colon prompt (:), enter A^C to produce the "=" prompt and enter "ABORTJOB ". For example, to abort session number 3556 (the unique session number displayed with the :SHOWJOB command) enter:

```
:ABORTJOB #S3556
```

You may also execute :ABORTJOB to abort a job, by specifying the *username.acctname* of the job or session you wish to abort. If more than one person is logged onto the system under the same user name and account, MPE will abort one of the qualifying jobs or sessions. You, as Operator, cannot choose which will be aborted in this case. Therefore, the preferred method is to abort a job or session by referencing its unique job or session number.

One other command, =LOGOFF, will log off all jobs and sessions on the system. Since this affects all users, it should be preceded by a :TELL or :WARN message so that they may prepare for the logoff.

Communicating with Users

You can use the :TELL and :WARN commands to send messages to system users. You might send a message, for example, to warn users of an impending shut down so they can save their work files. Use the :TELL command to send a message to a particular session or group of sessions. For example, the command below asks session 36 to log off:

```
:TELL  #S36; PLEASE LOG OFF
```

Use :WARN to send an urgent message to all users, a particular job or session, or all users in an account. For example, the command below warns all users that the system will be shut down:

```
:WARN @; THE SYSTEM WILL BE SHUT DOWN IN 5 MINUTES. PLEASE LOG OFF
```

The following :WARN command notifies all users in the ACCTG account:

```
:WARN @.ACCTG; SYSTEM SHUT DOWN IN 2 MINUTES
```

For more information on the use of :WARN and :TELL, refer to the MPE Commands Reference Manual (32033-90006)

MANAGING PERIPHERAL DEVICES

To ensure that the computer system functions smoothly, you must know when and how to allocate peripheral devices and be able to monitor their use. The following pages discuss managing peripheral devices with device files, the :SHOWIN, :SHOWOUT, and :SHOWDEV commands, and the following Operator commands:

:UP	:HEADON	:GIVE	:DOWNLOAD
:DOWN	:HEADOFF	:TAKE	

The information presented below is intended to be a basic introduction to the care and management of disc drives, including System Domain discs, private volumes, serial and foreign discs; tape drives and cartridge tapes; and printers. Since an exhaustive discussion is beyond the scope of this manual, refer to the documentation supplied with the equipment for detailed information about each device.

Device Files

Many operating systems use the term "file" to describe a group of records on a disc or tape. They can be either program files or data files, and are created by users or supplied with the system software. The identity of such files, their location, and other pertinent information is normally kept in a file directory. One function of an operating system is to provide a convenient, systematic means to create and manage disc and tape files.

Another equally important operating system function is the management of peripheral devices such as magnetic tapes, flexible discs, terminals, card readers, line printers, card punches, plotters, and paper tape equipment. Since each device has unique operating characteristics, which include both physical and logical considerations for data manipulation, many operating systems choose to separate device I/O handling into two mutually exclusive operations: one, a file system for handling disc files; and two, a standard software interface for all other devices. This requires users to learn two methods of performing input/output operations and inhibits device-independent programming.

MPE enlarges the concept of a file so that it encompasses the control of physical devices as well as data and program files. This way, MPE users treat all input/output operations as if they were reading or writing to a file, whether that file is actually a group of records residing on disc, or the disc drive itself. In general, data stored on disc is a disc file, while files used for I/O operations to or from a device (any non-disc file) are by definition device files.

MPE provides users with a selection of commands to manage and monitor device files and the input/output (or peripheral) devices themselves. Each input/output device known to the system has a unique logical device number (*ldev*). In addition, each device is assigned one or more device class names. A class name can be unique to a device, or it may be associated with more than one *ldev*.

DEVICE CLASSES. With few exceptions, device class names are arbitrarily selected by the System Supervisor. (Exceptions include SYSDISC, which is always assigned to *ldev* 1, the system disc; VTERM, which is assigned to the pseudo terminal devices used by the Virtual Terminal service of NS/3000; SPOOL, which must be assigned to disc drives used by the spooling process; JOBTAPE, which is the device class name required for the STREAMS device, usually configured as *ldev* 10; and DUMPTAPE.) Since more than one device may be assigned the same class name (i.e. two disc drives can both be assigned the class name "DISC"), referencing a device by its class name is always less specific than referring to its logical device number.

ACTIVE DEVICE FILES. An idle device is known by its *ldev* or unique device class name only. By contrast, an active device file is assigned a unique value known as the device file ID. The device file ID for an input device is of the form #I*nnnn* ; an output device is represented as #O*nnnn*. For both input and output device files, *nnnn* is a unique identification number.

The device file ID and additional information about the device file is listed when you execute the :SHOWIN command (for input device files) and :SHOWOUT command (for output device files) as shown in the following partial examples:

```
:SHOWIN

DEV/CL   DFID     JOBNUM  FNAME    STATE  FRM SPACE RANK PRI #C
58       #I2520   #S2224  $STDIN   OPENED      8
43       #I2438   #S1223  $STDIN   OPENED      8

:SHOWOUT

DEV/CL   DFID     JOBNUM  FNAME    STATE  FRM SPACE RANK PRI #C
58       #O10587  #S2224  $STDLIST OPENED    128      D  1  1
40       #O12222  #S1211  $STDLIST OPENED   2048    1   8  1
21       #O56675  #S1009  SLP      WAIT     2048    1   8  2
56       #O34456  #S1224  PP       ACTIVE  36000    1   8  1
```

The information displayed in these commands is defined as follows:

DEV/CL	The logical device number or device class of the device file.
DFID	The device file ID number, which MPE uses to uniquely identify the input or output data.
JOBNUM	The number of the job or session which generated the data. This is the same number that identifies each job/session currently executing, listed when you issue the :SHOWJOB command.
FNAME	The name assigned to the device file.
STATE	The job state, which can be either ACTIVE, OPENED, READY, or LOCKED (for output device files).
FRM	Forms message indicator. The letter "F" will appear only if a forms alignment message applies to the device file.
SPACE	The amount of disc space, in sectors, used by the device file.
RANK	The order in which the READY file is output with respect to other files of the same output priority and class name or logical device.
D	Deferred file indicator, which applies only to spooled device files.
PRI	The output priority of the device file, requested by the user or adjusted by the Operator. Specified for spooled output device files only.
#C	The number of copies needed, specified for spooled output device files only.

INPUT DEVICE FILES. Input devices that accept :JOB or :DATA commands automatically attempt to read the first input record as part of the Device Recognition and validation process. (Refer to the preceding discussion of job/session evolution in this section.) There are three types of input device files, each of which is defined below: job/session input device files, data device files, and Operator-assigned device files.

Job/Session Input Device Files. When users enter the :JOB or :HELLO command on a job- or session-accepting device, MPE creates a device file on behalf of the job or session. This file always assumes the system-defined name $STDIN.

Data Device Files. The :DATA command provides the user with a method of associating a data device file with a specific user name and account, and optionally a file name. In a manner similar to :JOB command processing, the data-accepting device (whether spooled or unspooled) reads and validates the first input record. If the :DATA command is syntactically correct, and the specified user and account exist, the device file is created. Only the specified user, however, may access the device file without Operator intervention. This restriction provides a measure of file security, and simplifies the Operator's job of monitoring data sets.

If the data-accepting device is spooled, the entire device file is spooled to disc. It will remain on the disc until accessed by the user who created it or until it is deleted by the Operator.

Operator-Assigned Device Files. Input devices that do not accept :JOB, :HELLO, or :DATA commands will not automatically recognize or validate the job, session, or file. Instead, the user must request the use of a non-accepting device. You, the Operator, respond by assigning the device to that user exclusively, or informing the user that the device is unavailable. Such devices are known as Operator-assigned device files.

User programs gain access to input data by "opening" an input device file. Since you normally control the device, and the user (who is located at a remote terminal) controls the device file opening program, some coordination between user and Operator is required. If the device to be used is configured as a data-accepting device, the appropriate :DATA command and :EOD command are embedded within the data file as the first and last records respectively. MPE will read the :DATA command automatically, recognize the device file, and make it available to the user program.

Listing Input Device Files. The :SHOWIN command will list all input device files "known" to MPE. For example:

```
:SHOWIN

DEV/CL   DFIN   JOBNUM  FNAME     STATE  FRM SPACE RANK PRI #C
25       #I16   #S14    $STDIN    OPENED
43       #I14   #S13    $STDIN    OPENED
5        #I15           GOODFILE  READY          4
                FIELD.SUPPORT

3 FILES:
    0 ACTIVE
    1 READY; INCLUDING 1 SPOOFLES, 0 DEFERRED
    2 OPENED; INCLUDING 0 SPOOFLES
    0 LOCKED; INCLUDING 0 SPOOFLES
    1 SPOOFLES: 4 SECTORS
```

Device files #I16 and #I14 are session input device files on logical device 25 and 43 respectively. Device file #I15 is a :DATA device file that was spooled from logical device 5. It was created by the user FIELD under the account SUPPORT, and assigned the file name GOODFILE.

OUTPUT DEVICE FILES. An output device file contains data from a user program which is directed to devices such as line printers or tape drives. Like input device files, output device files fall into three categories: standard list device files used by jobs and sessions, non-standard output device files created by job and sessions, and Operator-assigned device files.

Job/Session List Device Files. When the system is first configured, each job or session accepting device is assigned a corresponding standard output device. There is exactly one such output device file assigned to each executing job and session, which assumes the system-defined file name $STDLIST. For example, the standard output device for sessions is a terminal. (Since sessions are interactive, the standard input device file, $STDIN, and standard output device file, $STDLIST are always the same logical device.) The standard list device for jobs is more likely to be a printer, since users submit jobs to be separately processed by MPE, and would not want output results to appear on their terminal while they are working.

Redirecting Output to Another Device. Users may redirect output, which would normally appear on the $STDLIST device, to another logical device or device class. This is done with file equations, which use the :FILE command to equate a file name with a device, or a system-defined file name (representing a device) with a user-defined file. For example, the LISTEQ5 utility lists the file equations and temporary files in use during the current session. By default, the information is displayed on your terminal, identified by the formal file designator "LIST". To redirect the output to device class LP, enter:

```
:FILE LIST;DEV=LP
:RUN LISTEQ5.PUB.SYS
```

Operator-Assigned Output Device Files. If users select a magnetic tape or serial disc as the output device file for their job or session, you must :REPLY to the request. Until you respond, their program (which needs the device for output) will remain suspended. Since you may either allow the user use of the device, or deny access to it, devices assigned with a :REPLY are known as "Operator-assigned device files."

A user's device class request will generate a Console message similar to the following:

```
?8:32/#S5889/192/LDEV# FOR "T" ON TAPE (NUM)?
```

In this example, Session #5889 (#S5889) is requesting the use of a tape drive in device class TAPE. To respond, send a message (via the :REPLY command) to the user's process, identified by the process identification number, or *pin*. (The *pin* is always the number which follows the second slash mark ("/ ") in the request. In the example, the *pin* is 192.) Your reply may either grant the user access to a device in the class identified by the device class name, or inform the user that no device is available. For example, to respond to the request by assigning logical device 7 to *pin* 192, enter:

```
:REPLY 192,7
```

To tell the user that no device is available, respond:

```
:REPLY 192,0
```

This way, the user can request the device at a later time, rather than remain suspended indefinitely.

Note that if the user has requested a device class you may assign any available logical device in the class. However, if the request is for a specific disc or tape drive, identified by its logical device number, you may assign the device if or when it becomes available.

Listing Output Device Files. To list the output device files known to MPE, issue the :SHOWOUT command, illustrated below:

```
:SHOWOUT

DEV/CL   DFID    JOBNUM  FNAME     STATE FRM SPACE RANK PRI #C
PP       #012    #J4     $STDLIST  OPENED      2048      8   1
PP       #024    #S11    BASLIST   OPENED      2048    D 0   1
PP       #080    #S24    PP        READY       2048    D 0   1
19       #0131   #S21    SLP       ACTIVE      1408      8   1
.
.
.
41 FILES:
    1 ACTIVE
    3 READY; INCLUDING 3 SPOOFLES, 3 DEFERRED
    37 OPENED; INCLUDING 7 SPOOFLES
    0 LOCKED; INCLUDING 0 SPOOFLES
    11 SPOOFLES:  19948 SECTORS
OUTFENCE = 6
```

Controlling Device Availability

As Operator, you can control which peripheral devices are on line and available to users, and which are not. The :DOWN command takes a device off line (called "downing" a device), while the :UP command brings it back on line. Any device, except the System Console or system domain disc drive, can be downed.

For example, to take a tape drive (identified as logical device 7) off line, enter:

```
:DOWN 7
```

The most common reason for taking a device off line is to perform diagnostic tests on the device. In this case, after downing the device, you would give the device to diagnostics by executing the :GIVE command. For example, to take logical device 81 off line so that diagnostic tests can be performed on the device, enter:

```
:DOWN 81
:GIVE 81

12:53/3/LDEV#81 IN USE BY DIAGNOSTICS
```

To release *ldev* 81 from diagnostics control, so that it can be brought back on line, enter:

```
:TAKE 81
```

To bring a device back on line, enter:

```
:UP 81
```

To determine that the device is again available, check its status with the :SHOWDEV command. If it is, "AVAIL" will be displayed in the third column of the :SHOWDEV listing.

```
:SHOWDEV 81
LDEV    AVAIL          OWNERSHIP          VOLID      DEN     ASSOCIATION

 81     AVAIL
```

Controlling Device Access With ACDs

Access to devices can be controlled by associating Access Control Definitions (ACDs) with the devices. Refer to *MPE V/E Security and Account Structure Manual*, (32033-90136) for detailed information.

An ACD determines who can access files and devices. It consists of list of pairs. Each pair is a list of users and a list of the access granted to those users. The access list defines the type of access a user has to a device, and the type of access a user has to the ACD itself. The access modes are:

R: READ access
W: WRITE access
L: LOCK access
A: APPEND access
X: EXECUTE access
NONE: no access allowed
RACD: READ (list) ACD permission

If you wish to restrict a device, such as a terminal, to a limited set of users, you may create an ACD that allows READ and WRITE access only to users in a specific account, e.g., @.Security. You may even restrict access to a specific user, e.g., Susan.Security.

CREATING ACDs

The :ALTSEC command is used to create the ACD. You first specify the name of the device, the type (LDEV [logical device] or DEVCLASS [Device Class]), then the ACD access desired. The access can be shown by using either a pair specification (*pair_spec*) or a file containing one or more *pair_specs*).

```
:ALTSEC objectname [,LDEV]     [;NEWACD={(pair_spec)} ]
                   [,DEVCLASS]           {^acdfilename}

:ALTSEC 14,LDEV;NEWACD=(R,W:SUSAN.SECURITY)
```

If a device belongs to more than one *device class*, the ACD associated with it is the last ACD created for the *device number*, or any of the *device classes* to which the device belongs.

If a device is protected by an ACD associated with a device class, and an ACD is then created for the specific device number, the former ACD will be lost.

ALTERING ACDs

The :ALTSEC command also allows you to copy the ACD from one device to another, modify the ACD, or delete it. Only a user with SM capability may create, copy, modify, or delete an ACD.

To copy an ACD from one device to another, use the COPYACD function of the :ALTSEC command.

```
:ALTSEC objectname [,LDEV] [;COPYACD={sourceobjectname}[,LDEV]]
                   [,DEVCLASS]
```

To add users and access modes to an ACD, use the ADDPAIR function of the :ALTSEC command.

```
:ALTSEC objectname [,LDEV]    [;ADDPAIR={(pair spec)} ]
                   [,DEVCLASS]          {^acdfilename}
```

To replace a user's set of access modes with another set of access modes, use the REPPAIR (replace pair) function of the :ALTSEC command.

```
:ALTSEC objectname [,LDEV]    [;REPPAIR={(pair spec)} ]
                   [,DEVCLASS]          {^acdfilename}
```

To delete a user along with the access modes assigned to the user, use the DELPAIR (delete pair) function of the :ALTSEC command.

```
:ALTSEC objectname [,LDEV]    [;DELPAIR={(pair spec)} ]
                   [,DEVCLASS]          {^acdfilename}
```

To delete an ACD from a device, use the DELACD function of the :ALTSEC command.

```
:ATSEC objectname [,LDEV]    [;DELACD]
                  [,DEVCLASS]
```

LISTING ACDs

Both the System Manager and a user with READ ACD permission can list the ACDs associated with a device.

To list the ACDs associated with a specified device or device class, use the :SHOWDEV command.

```
:SHOWDEV [ldev          ]  [;ACD]
         [devclassname]
```

Using Disc Volumes

Disc files are the principal means of permanent data storage on the HP 3000. The majority of disc storage is shared among all users on the system and stored on devices known as System Domain discs. Non-system domain discs, the other category of disc device, consist of foreign (non-MPE formatted) disc volumes, private volumes, and serial discs.

Since system domain and private volume disc drives are used as shared devices, and therefore are not assigned to users as are tape drives, accessing disc files requires little Operator intervention. Your primary interaction with disc drives will be in manipulating private volumes. This entails enabling the Private Volumes facility and mounting and dismounting private disc volumes using three Operator commands: :VMOUNT , :LMOUNT , and :LDISMOUNT. (For detailed information, refer to "PRIVATE VOLUMES" in Section X of this manual.)

The following information is an introduction to the care and handling of disc drives. It includes general information about disc conditioning, the Private Volumes facility, the Foreign Disc Facility, disc pack storage requirements, and maintenance of flexible discs, or diskettes. Specific hardware information about different models and types of disc drives is available in the hardware documentation supplied with the peripheral device.

DISC CONDITIONING. Discs must be "conditioned" before users can access them. Normally done by the System Supervisor or System Manager, disc conditioning includes the following three procedures, performed in the listed order:

- Formatting: writing address and timing information on the disc.
- Initializing: configuring the Free Space and Defective Tracks Tables on the disc (system domain and private volumes only).
- Labeling: assigning a name to the disc volume.

System Volume Conditioning. System domain discs are always formatted off line (when the operating system is shut down) by the stand-alone program SLEUTHSM. They are initialized during a RELOAD of the operating system when the INITIAL Program creates a Defective Tracks Table. You may label discs during a COOLSTART, COLDSTART, UPDATE, or RELOAD by responding to the program's prompt for a volume name.

Private Volume Conditioning. Unlike System domain discs, non-system domain discs (which include Private Volumes, serial discs, and foreign discs) may be conditioned while MPE is operational. Online disc conditioning may be done only by users with OP capability since access to MPE's VINIT subsystem, which is used to condition non-system discs, is restricted to such users. VINIT includes an array of commands to format, initialize, label, and verify non-system domain discs. (For more information about non-system domain discs, refer to "PRIVATE VOLUMES" in Section X of this manual.)

CONTROLLING THE USE OF PRIVATE VOLUMES. You, as Operator, control the use of private volumes on your system with three Operator commands: :LMOUNT, :LDISMOUNT, and :VMOUNT. The first two commands, :LMOUNT and :LDISMOUNT, let you control which private volume sets are online and available to users. Unless a volume set is logically mounted, users will be unable to use the files stored on the disc, because MPE will have no means to access the disc. (A disc volume, whether private or shared, must be "known" to MPE through a logical mount operation. Unlike System domain discs, which are mounted when the system is started, private volumes require Operator intervention in the form of an explicit :LMOUNT command.)

The third command, :VMOUNT, enables or disables the entire Private Volumes facility. To enable the Private Volumes facility enter:

```
:VMOUNT ON
```

This allows users to access private volumes. In this case, users' :MOUNT requests will be displayed on the Console and you must respond to their request. If you would like to enable the Private Volumes facility so that :MOUNT requests do not interrupt you, enter:

```
:VMOUNT ON;AUTO
```

In this case, MPE will attempt to satisfy users' :MOUNT requests automatically.

To disable the Private Volumes facility without suppressing the display of :MOUNT request messages on the Console, enter:

```
:VMOUNT OFF;ALL
```

To prevent users from accessing private disc volumes, and suppress the display of Console messages, enter:

```
:VMOUNT OFF
```

THE FOREIGN DISC FACILITY. The Foreign Disc Facility (FDF) allows standard MPE users to access and alter data on disc volumes that do not conform to the standard MPE format. MPE considers a disc "foreign" if it lacks a standard MPE volume label. Volume labels which MPE recognizes as standard include:

- Valid private volume labels.
- Scratch volume labels.
- System volume labels.
- Serial disc volume labels.

Since the format of a foreign disc is completely arbitrary, it is conceivable that a foreign disc's format could duplicate a Private Volume, serial disc, or other MPE-recognized format. In this case, the foreign volume might be treated as a standard MPE disc, which would require Operator intervention. To inform MPE that a particular disc volume is in fact a foreign disc, enter:

```
:FOREIGN ldev
```

In this example, *ldev* is the logical device number of the device on which the disc volume is mounted. :FOREIGN forces the system to treat the volume currently mounted on the specified device as a foreign disc. For this command to succeed, the mounted device must be in a foreign device class, the device must be UP , and the volume cannot be in use.

CAUTION

If the restrictions stated above are met, the system will treat any volume mounted on the logical device as a foreign disc. As long as the volume is not a System Domain disc, no security checking is done. Therefore, any disc (System, Private Volume, etc.) could be accidentally mounted and used as a foreign disc. Since one characteristic of the Foreign Disc Facility is the ability to write on the MPE label area, volume labels could be destroyed and important information lost.

Foreign discs, like serial discs and private volumes, are not considered part of the System Domain and are not identified by entries into the System Volume Table. Standard MPE users may access and alter data residing on a foreign disc if two conditions are met: one, the Operator must allow them access to the device which contains the foreign disc. Two, users must be able to access the data on the disc in a form which is meaningful to MPE. The second condition is accomplished by using a program to interpret (read) the disc format and also write data which is compatible with the foreign disc's file and record structure. For example, provided you (or your program) know the disc format, you could treat a foreign disc as an HP 250-, HP 300-, or IBM 3741-formatted diskette.

You may designate a device class to be "foreign" when running either the SYSDUMP or INITIAL Programs. Once the device class is designated as foreign, you may mount a disc in the drive (*ldev*) corresponding to that device class and access any and all information on that disc. If you want to treat another type of disc (such a serial disc) as foreign, it must first be conditioned as a foreign disc using FOREIGN or the VINIT subsystem.

To create a foreign disc on logical device 3 (which must be a non-system domain disc drive in the down state), mount a disc pack on the drive and enter the following command in the VINIT subsystem:

```
>FOREIGN 3
```

This command will fill in the MPE volume label with zeros, regardless of its previous contents, since MPE does not acknowledge zeros as a valid disc label. (Any other unrecognizable character sequence would suffice.) MPE will then treat the volume as a foreign disc for all subsequent accesses.

The DSTAT command of the VINIT subsystem will display the status of the foreign disc on *ldev* 3. The user command :DSTAT will also indicate that MPE considers a disc as foreign ; it uses the same format as the VINIT DSTAT command.

THE CARE AND HANDLING OF DISC DEVICES. Disc drives and disc volumes, like all media used to store computer data, require careful handling and proper environmental conditions. Following the guidelines listed below will extend the life of your disc storage equipment and help maintain the integrity of data stored on disc packs and diskettes.

Disc Packs. Temperature and cleanliness of the storage area affect the interchangeability of disc packs between drives. Disc packs should be stored in environmental surroundings that are nearly identical to those of the operating area. To ensure optimum performance, the temperature of the disc drive and disc pack must be within +3 degrees C (+5.4 degrees F) of each other. If the disc packs are stored separately from the disc drives, the temperature of the storage area should be maintained between -15 degrees C and 60 degrees C (5 degrees F and 140 degrees F) with the relative humidity between 0 and 95 percent (non-condensing). When the temperature and relative humidity of the storage area are different than the disc drives' operational requirements, allow a minimum of two hours for environmental stabilization before using the disc packs.

Store disc packs in a clean, dust-free area. Do not allow them to come into contact with any magnetic material. Steel storage cabinets protect the packs, and allow easy access since you can adjust the shelf height. Always store disc packs flat, not more than two high, with the top cover of the storage case resting on the gasket of the bottom cover. It is also a good idea to wipe the outside of the disc pack storage case with a liquid anti-static plastic cleaner periodically; this will minimize the possibility of introducing dust and dirt into the disc pack.

Other general precautions for handling disc packs include:

- Replace covers that are cracked, distorted or damaged.
- Do not touch the surface of the disc with any object, including your hands. The disc surfaces can be distorted or damaged through impact, excessive pressure, or abrasion.
- Keep beverages off the disc drive and away from the disc pack storage area. If spilled, they will leave a residue on the recording surface, which may require reconditioning of the disc.
- Keep all smoking materials away from the disc drives. Smoke will contaminate the disc packs and interfere with the reliable operation of the drives.

Flexible Discs. The flexible disc is enclosed in a plastic jacket which is lined with a wiping material that cleans the disc of foreign matter. When not in use, the disc should always be stored in its protective envelope. To ensure error-free disc drive operation, the following additional precautions should be observed:

- Use only flexible discs approved by Hewlett-Packard. Use of any others can result in damage to the drive mechanism, high maintenance costs, and data loss. Hewlett-Packard warranty does not cover damage caused by the use of flexible discs not approved by Hewlett-Packard.
- Return the disc to its storage envelope whenever it is removed from the disc drive.

- Replace storage envelopes when they become worn, cracked, or distorted.
- Do not touch or attempt to clean the surface of the disc. Abrasions may cause loss of data.
- Do not write on the plastic jacket of the disc with a lead pencil or ballpoint pen. Use a felt-tip pen and write only on the label.
- Do not expose the disc to extremes of temperature and/or humidity.
- Keep the flexible discs away from magnetic fields and ferromagnetic materials that may become magnetized. Strong magnetic fields can distort the data recorded on a disc.

Using Magnetic Tapes

Tape drives, unlike most disc drives, are nonsharable devices, and users cannot access them without your assistance. As a result, you will be called upon to manage tape devices far more frequently than disc drives. When a user (or a user's program) requests the use of a tape drive, you will :REPLY to the request at the Console, either granting access to the device, or telling the user that the device is unavailable. If the device is available, you will mount and load the tape, put the tape drive on line, and assign that logical device to the user.

OPERATOR TASKS REQUIRING TAPES. In addition to responding to users' tape requests, you will use tapes to perform specific Operator functions. These functions include:

- Backing up the system.
- Restarting the system from tape (the COLDSTART, UPDATE, or RELOAD options of the INITIAL Program).
- Storing files to tape, using the :STORE command.
- Restoring files from tape with the :RESTORE command.

As you can see from this summary, it is important for you to be familiar with the tape drives used with your system. Some of the pertinent information is discussed below. Other information, such as using the :STORE and :RESTORE commands, and using tapes during the SYSDUMP and INITIAL Programs is discussed in subsequent parts of this section. Additional information about peripheral devices is also available in Section VIII, entitled "SPECIAL CONSIDERATIONS FOR PERIPHERAL DEVICES".

THE CARE AND HANDLING OF TAPES. An important part of using tapes correctly is to follow the maintenance procedures outlined in the documentation supplied with the equipment. Tape drives, like disc storage devices, should be handled with care and used under the proper environmental conditions. Guidelines for the use of magnetic tapes and cartridge tapes are discussed below.

Magnetic Tapes. The reliability of data stored on magnetic tapes is affected by environmental conditions. Tape heads, since they are exposed to particles of dust and smoke in the air most of the time, should be cleaned after every eight hours of use. Like disc packs, it is a good idea to store magnetic tapes in cabinets. They should be stored vertically, away from operating disc drives because of the magnetic field a disc drive generates. Arrange the storage area so that the tapes do not contact any magnetic material (even magnetic latches on cabinets), since any magnetic field greater than 50 oersteds can destroy information on the tape.

To reduce read errors, plan the storage area so that extremes of temperature and humidity are avoided. If this cannot be done, you must bring tapes to computer-room temperature 4 to 16 hours before use. An exception applies to the handling of acetate and polyester tapes: they must always be maintained at the same temperature as the computer system room.

Cartridge Tapes. The cartridge intended for use in the HP 35401A, 9144, and 9140 integrated cartridge tape drive is a 4-inch by 6-inch DC600 preformatted data cartridge. It is available in either a 67-megabyte, 600-foot size (HP 88140L) or a 16.7-megabyte, 150-foot size (HP 88140S). The formatted blocks include space for 1K bytes of data, error correction, block addresses, and other data used internally by MPE. A mechanical write protect key is built into the cartridge. Data on a cartridge can be protected against accidental overwriting by turning the safe arrow in the upper left corner of the cartridge to the "SAFE" position. However, if you insert such a cartridge and writing is required, you will have to remove and reinsert it after turning the save arrow to allow writing. These steps can take up to 5 minutes.

The following is a list of general procedures for the correct use of cartridge tapes:

1. Do not touch or attempt to clean the tape or tape guide within the cartridge.

2. Do not attempt to remove a tape cartridge while the "BUSY" indicator is lit. Wait until the tape cartridge unloading sequence is complete.

3. Do not use excessive force on the tape eject lever. It will not operate when the power is off (unless the tape was properly unloaded) or when the "BUSY" indicator is lit.

4. When not in use, tape cartridges should be removed from the drive and stored in the protective plastic case. Do not leave cartridges in the tape drive; they can deform the rubber capstan and collect excessive amounts of dust and dirt. You can, however, leave up to eight cartridges in the HP 35401A's caddy.

5. Tape cartridges should not be left in excessively warm, dry, or humid areas; they should be stored away from magnetic fields and direct sunlight.

6. Tape cartridges should only operate between temperatures of 10 degrees C (50 degrees F) and 40 degrees C (104 degrees F); they should be stored at temperatures in the range of -40 degrees C (-40 degrees F) to 65 degrees C (149 degrees F).

7. Do not drop tape cartridges or subject them to rough handling.

8. To protect data stored on the cartridge, turn the safe arrow in the corner of the tape cartridge to "SAFE".

9. NEVER erase a cartridge tape with a bulk erase! It is preformatted at the factory and you will not be able to use it again.

Using Printers

Printers are the principal output device used by jobs, and they are frequently used for output during sessions. As Operator you are responsible for monitoring the printer, which consists of three main tasks:

- Controlling the operation of the spooler.
- Replacing paper, preventing (or fixing) paper jams, and unloading finished printouts.
- Responding to users' forms requests by mounting and adjusting new forms.

In addition, you may also determine whether to print header or trailer data, controlled with two MPE commands: :HEADOFF and :HEADON. Controlling the operation of the spooler is a major task requiring you to know several MPE spooler commands. Because of its magnitude, spooling is treated in a separate discussion immediately following this subsection. For complete instructions, for replacing paper and fixing paper jams, refer to the documentation supplied with your system's printers. Information about peripheral devices used with the HP 3000 is also included in Section VIII of this manual, entitled "SPECIAL CONSIDERATIONS FOR PERIPHERAL DEVICES".

FORMS MESSAGE. When a user opens an output device file, the program generating the output may request special forms (using the *formsmsg* parameter of the FOPEN intrinsic). In this case, a request to mount the forms will be displayed on the Console. If the request for special forms is for an HP 2608A, HP 2608S, or HP 2563 Line Printer, you can send the special format information to the printer with the :DOWNLOAD command.

CAUTION

> Do not issue a :DOWNLOAD command to an HP 2608S or HP 2563 printer while a spool file is printing. This will disable the device and it will remain so until the system is restarted with a WARMSTART. HP recommends that an environment file be used to transmit the required information to these printers.

If the user has requested a device class, you are asked to mount the forms on any free device in the class. If the user has requested a specific *ldev*, the form must be mounted only on the requested device, if it is available. If special forms are mounted on a device, and the user's program does not need them, MPE will automatically request that you mount standard forms.

When the user has requested special forms on a line printer (other than the HP 2608S or HP 2563), MPE will initiate a dialog with you to align the forms. A standard record of the following form is output to the line printer:

```
0                                    1/  /2                                  3
.................................../  /.................................
                                   /  /
```

In addition, a message will be displayed on the Console asking if the forms are aligned. This dialog is repeated until they are correct, at which point the file can begin printing at the proper user-defined position.

Forms alignment on an HP 2608S or HP 2563 printer is an exception to this procedure. Press the "PRINT ONE LINE" switch on the printer shown in Figure 4-1 to produce a test line and then make any necessary adjustments to the form. The printer must be offline. For more detailed information, refer to the HP 2608S Operator's Manual (02608-90911).

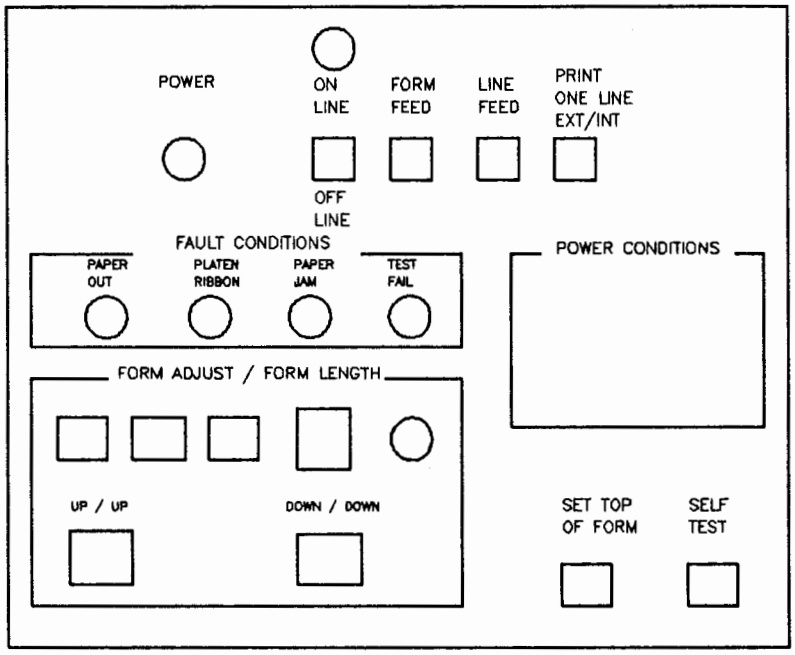


Figure 4-1. Control Panel on the HP 2608S Line Printer

CONTROLLING HEADER/TRAILER OUTPUT. Header/trailer output is the page of data which precedes and follows the text file. It identifies the file by session (or job) number, output spool file number, session name (if any), user name, and account. If you want to suppress the printing of header/trailer output, enter:

```
:HEADOFF 6
```

This will prevent the printing of header/trailer data on logical device 6. If this command is issued while a file is being printed, the request to suppress header/trailer output will take effect after the ACTIVE file's trailer page is printed.

To resume the printing of header/trailer data for logical device 6, enter:

```
:HEADON 6
```

SPOOLING

MPE is equipped with a spooling facility to assist the operation of certain nonsharable devices. When a spooler process controls a device such as a line printer, the device appears to be shared among several users, when in fact it can only process one file at a time. This is done by temporarily storing data on disc, instead of sending it directly to the spooled device. The disc essentially becomes a staging area, while the spooler manages the collection of input data (usually from a terminal or tape drive) and the selection of an output spool file destined for the printer.

A simplified diagram illustrating the input/output spooling process is shown in Figure 4-2. As the figure illustrates, MPE's spooling facility actually consists of two separate parts: an input spooler and an output spooler. The following discussion, separated into two subsections, explains each part of the process in detail.

Input Spooling

When a nonsharable job- or data-accepting input device is "spooled", the device (spoolee) is controlled by a spooling process. It collects data from the input device and writes the data to a disc file. When there is no input data to be collected, the spooler enters a suspended state.

The input spooling operation continues until the logical end-of-file indicator (:EOJ for job files :EOD for data files) is encountered. At that point, the spool file is complete (the READY state) and is available for access by a program or MPE. A data file states changes from READY to OPEN once a program opens it with a valid FOPEN intrinsic. Once the program no longer needs the file (and issues an FCLOSE), the file will be deleted from the disc. To summarize, the three states of an input spool file are:

ACTIVE	The input spool file is being created, but is not yet complete.
READY	The file is available for program access; it also may be deleted by the Operator.
OPEN	The file is currently being read by a user program or MPE.

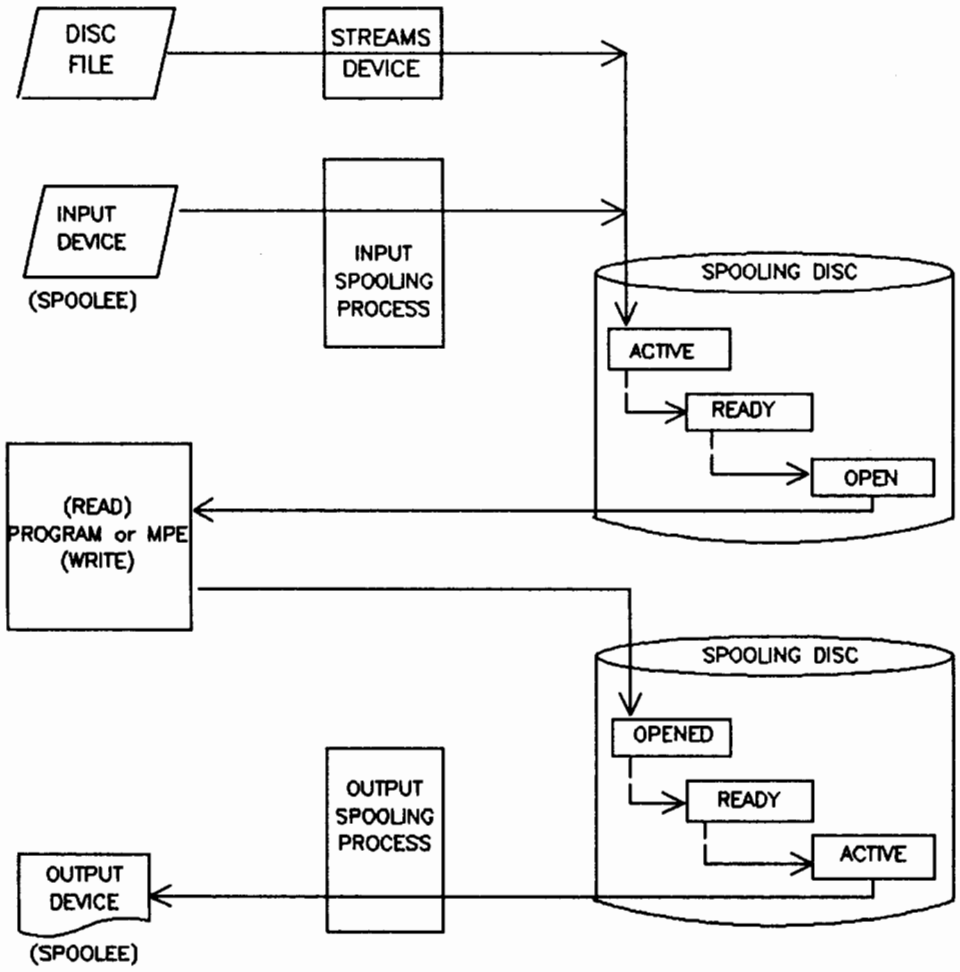


Figure 4-2. Simplified I/O Spooling Diagram

OPERATOR CONTROL OF INPUT SPOOLING. There are three ways in which you can control the processing of input spool files. First, you may stop the input spooling process with the :STOPSPOOL command. Second, you may issue the :STARTSPOOL command to start or restart the spooling process for an input device. And third, you may delete a READY spool file from disc with the :DELETESPOOLFILE command.

Peripheral devices that the System Supervisor configures as spooled devices (during the SYSDUMP Program) are automatically activated when the system is started. Devices which are not automatically spooled must be allocated to a spooler process by issuing a :STARTSPOOL for each device. To deallocate the input device, enter the :STOPSPOOL command. This action will immediately stop the spooler and delete the currently ACTIVE spool file.

An exception to this occurs when a :DELETESPOOLFILE command is issued in combination with the :STOPSPOOL command. In this case, the spooler is not stopped until the currently ACTIVE spool file is deleted from the system. When issued by itself, :DELETESPOOLFILE deletes the ACTIVE file but the device remains allocated to the spooler process. Note that $STDIN files cannot be deleted with the :DELETESPOOLFILE command; you must use :ABORTJOB on such files.

MAINTAINING JOB SEQUENCE. Normally, every job in a sequence of jobs is independent of the others, and may be submitted and executed in any order. In certain exceptional cases, the order in which jobs are executed is critical. When such a job sequence is submitted on an unspooled device, this order is implicitly maintained, because each command is executed when MPE reads it.

When a job-accepting device is spooled, this order may not be maintained for two reasons: first, jobs are accepted by the spooler program before preceding jobs have been completely executed; and second, the spooler allows jobs to execute concurrently. Therefore, a sequence of jobs which must be executed in a specific order should be submitted on an unspooled device since the order in which they are submitted is the exact order in which they will be processed. An example will illustrate this: when the System Manager establishes an account, he or she will typically create the account with just one user and one group as a single job. A second job establishes all of the remaining users and groups. If this two-job sequence were submitted on a spooled device, the first job would probably not be complete before the spooler attempted to validate the second job. That is, the user, group, and account needed to successfully execute the second job would not yet exist when the spooler attempted to validate the job.

ABNORMAL TERMINATION OF THE SPOOLER PROCESS. When the spooled input device is a tape drive, the I/O system automatically issues a rewind command whenever spooling is stopped. In normal operation, this feature ensures that the tape may be unloaded properly. However, when a power failure or overtemperature shutdown occurs, spooling is stopped abnormally, which leaves a rewind request outstanding when the system is restarted. If no tape is mounted on the tape drive assigned as the input spooling device when the system is restarted, one of the following I/O messages will be displayed on the Console:

SP#ldev/STOPPED
SPOOLEE IO ERROR
LDEV#*ldev* OFFLINE
LDEV#*ldev* NOT READY

Therefore, as a standard power fail or overtemperature recovery procedure, mount an expendable tape on the input spooling device.

Output Spooling

You can exercise more control over output spool files than input spool files. In addition to the :STARTSPOOL, :STOPSPOOL, and :DELETESPOOLFILE commands discussed above, you may also suspend and resume a spooling process using the :SUSPENDSPOOL and :RESUMESPOOL commands, and alter the status or destination of an output spool file with the :ALTSPOOLFILE command. Two other Operator commands, :OPENQ and :SHUTQ, are available on the G.00.00 release of MPE V. They are used to open and close spool queues, which allow or prohibit spooled files to be stored on disc to await printing.

OUTPUT SPOOL FILE STATES. When a nonsharable device is spooled, a spooling process controls the device, which is referred to as the "spoolee". A user program writing data to a spooled output device actually writes output records to an OPEN spooled device file instead of the device itself. This spool file is stored on disc until it is complete, at which point the file's status changes from OPEN to READY. Before the records are written to the file, the spooling process checks that the user has access to the spooled devices.

In addition to building output spool files on disc, the output spooler also searches continuously for READY device files. When the output device (usually a printer) is available, the spooler process selects a READY file and again verifies that the user who originally sent the data has access to the device. The file selected changes from the READY state to ACTIVE, and printing begins. Below is a summary of the sequence of output spool file states:

OPEN	An output spool file currently being created by MPE.
READY	A complete file, available and waiting to be processed by an output device. READY or ACTIVE files may be deleted with the :DELETESPOOLFILE command.
ACTIVE	The file currently being output to the device.

A spooled output device file may also be LOCKED, which means that the file is READY but cannot be selected as the next ACTIVE file. Typically, a spool file will be locked when a user is accessing it through the SPOOK utility. (For a discussion of SPOOK, refer to the MPE V System Utilities Reference Manual (32033-90008)).

LISTING OUTPUT SPOOL FILES. The :SHOWOUT SP command lists all spooled output device files known to MPE, and a summary of spooler statistics, as shown in the example below.

```
:SHOWOUT SP

DEV/CL   DFID    JOBNUM  FNAME     STATE FRM SPACE RANK PRI #C
PP       #03162  #J66    $STDLIST  OPENED     2048      13   1
PP       #03164  #J67    $STDLIST  OPENED     2048      13   1
PP       #01182  #J27    $STDLIST  READY       756    D 3   1
PP       #01370  #J33    SYSADGID  READY      1520    D 1   1
PP       #01787  #S531   SLP       READY      2740    D 1   1
PP       #02631  #S711   STDLIST   OPENED     2048    D 0   1
PP       #03364  #S863   SLP       OPENED     2048      13   1
LP       #03327  #S'293  MAILLOG   READY        48   1  8   1
LP       #03339  #S'299  MAILLOG   READY        48   2  8   1
LP       #096    #S'246  LP        READY      1200     D 1   1
LP       #03359  #S868   WPHDUMP   READY       660     D 1   1
6        #03325  #S'296  MAILLOG   ACTIVE       48       8   1

12 FILES (DISPLAYED):
    1 ACTIVE
    7 READY; INCLUDING 7 SPOOFLES, 6 DEFERRED
    4 OPENED; INCLUDING 4 SPOOFLES
    0 LOCKED; INCLUDING 0 SPOOFLES
    12 SPOOFLES:  15212 SECTORS
OUTFENCE = 6
```

CONTROLLING SPOOLED DEVICES AND DEVICE CLASSES. You may use a combination of the :STARTSPOOL and :STOPSPOOL commands to control spooled devices (identified by their logical device numbers) separately from spooled device classes. For example, suppose you want the system's line printer (*ldev* 6) to be an unspooled "hot" device, yet you also want any users directing output to device class LP (which is assigned to more than one device) to be able to build spool files while *ldev* 6 is unavailable. To do so, start spooling for device class LP, and stop spooling on *ldev* 6, as shown below.

```
:STARTSPOOL LP
:STOPSPOOL 6
```

When *ldev* 6 can again be shared (spooled), and you wish to print the spool files which have accumulated, enter:

```
:STARTSPOOL 6
```

Note that starting the spooling process for a particular device can activate spooling for all device classes associated with the device.

SUSPENDING THE SPOOLER. Another frequently used output spooling command is :SUSPENDSPOOL. It temporarily suspends the spooler process without deallocating the device. If the ":SUSPENDSPOOL *ldev*;FINISH" form of the command is used, the output device will finish printing the currently ACTIVE file before the process is suspended. If FINISH is not specified, spooling stops immediately and any ACTIVE file is returned to the READY state in its original queue and at its current output priority.

RESUMING THE SPOOLER. To resume the spooler after it has been suspended, use :RESUMESPOOL. With this command you may backspace or advance a specified number of files or pages, or resume printing at the beginning of the ACTIVE file that was interrupted when the spooler was suspended. (This is possible because the entire spool file remains intact until printing is complete, even though it may consist of up to 32 distinct sections, or "extents". Printers capable of recovering from a malfunction run "silently" from the beginning of the spool file to the point of interruption, then resume printing.)

The "BACK *nnn* PAGES" parameter of the :RESUMESPOOL command is particularly helpful when the paper jams after printing most of a large job. If only the last few pages are damaged, simply resume printing two or three pages before the jam occurred. (A page in this context is a literal page, which is usually 60 lines of output.) Because the spooler uses literal pages, and also because partial and header pages affect the count, it is difficult to determine where the spooler was interrupted. Therefore, when resuming the spooler, overestimate the number of pages you will need. For example, if you need to reprint the last three pages, resume printing "BACK 5 PAGES".

NOTE

You cannot use the "FILES" parameter of the :RESUMESPOOL command to go BACK or FORWARD in the spool file when using the HP 2680A Laser Page Printer and the HP 2608S printer. Even on printers which do support the "FILES" parameter, using it properly is extremely complex. For the purpose of the :RESUMESPOOL command, individual files within a complete output spool file are defined as data separated by the FOPEN intrinsic. In order to go back or forward *nnn* number of files, you must first identify individual "files" by examining the spool file with the SPOOK utility for "FOPEN " statements.

SETTING THE OUTPUT FENCE. To control output spooling for all devices on the system, or optionally, for individual logical devices, use the :OUTFENCE command. Output device files with a priority less than or equal to the current system or device output fence are not selected for printing by an output spooler process. Such files remain deferred until the output fence is lowered, or until their output priority is raised. When the spooler fails to find a READY spool file, the output device will wait. It will be reactivated automatically when a spool file with high enough priority is READY for printing.

ALTERING A SINGLE SPOOL FILE. If you want to print a particular file without affecting others, you may change the output priority of the spool file with the :ALTSPOOLFILE command. :ALTSPOOLFILE is also used to change the destination of an OPEN, READY or ACTIVE file, or to direct the printer to produce multiple copies of a file. For example, to raise the output priority of a spool file to 10 and print 4 copies of the document, enter:

```
:ALTSPOOLFILE #O116;PRI=10;COPIES=4
```

In this example "#O116 " is the MPE-assigned output spool file number, displayed when you issue the :SHOWOUT SP command.

CONTROLLING SPOOL QUEUES. Two new Operator commands have been included in the G.00.00 release of MPE V: :OPENQ and :SHUTQ. The first command, :OPENQ, allows users to create output spool files on disc even while the printer spooler is stopped or suspended. The spool queue also need not correspond to a particular logical device; files will continue to be collected in the queue until no more disc space is available or until you shut the spool queue by issuing a :SHUTQ command. (Spool files which accumulate in the queue may be stored off on tape with the SPOOK utility for later printing. Refer to the discussion of SPOOK in the MPE V Utilities Reference Manual, (32033-90008).)

If the spool queues become full, a Console message will be issued, MPE shuts the spool queues and no more spool files can be created. In this case, you must shut the spool queue, and allow the spooler time to print some of the files. Other options include storing some of the less-important files on tape (with SPOOK, mentioned above) or deleting some of the accumulated spool files from the system.

BACKING UP SYSTEM AND USER FILES

Previously, this section described System Operator tasks such as complete backup tape procedures, displaying the results of STORE, error recovery during STORE and tape error recovery. This information is now included in the new MPE V Backup and Recovery Manual (32033-90134).

If a system failure occurs, the amount of data you lose directly depends upon two factors: how recently you performed a backup, and the level of system activity since files were stored off line. The System Supervisor creates a backup schedule that best meets the needs of system users. This may include saving all files in a particular account every day, or copying only those files which have been added or modified since files were last stored off line. Or, the System Supervisor may ask you to remove infrequently used files from the disc completely, and store them in a tape library. Refer to MPE V Backup and Recovery (32033-90134) for complete instructions.

NOTE

It is possible to acquire another copy of the system software from Hewlett-Packard. Restarting the system with a new Installation Tape should only be considered as a "last resort", since it contains no user files or programs, nor will it contain any of the configuration information unique to your system.

SYSTEM SHUTDOWN

Shutting down the system is a simple procedure which involves some or all of the following steps.

- Warning users of the impending shut down.
- Closing any open communications lines.
- Storing off spool files with the SPOOK utility.
- Issuing the =SHUTDOWN command.

The procedures necessary to shut down the system will vary greatly from installation to installation. For example, your system may not support any communication links to another remote computer. Or, you may perform a system backup each night before the shut down so that warning users to log off and aborting any remaining jobs or sessions may have been done already. Regardless of variations, however, there are a few key points to remember:

1. Inform users well in advance of a planned system shutdown. If you shut the system down every night at the same time, include a reminder of this fact in the :WELCOME message that users see when they log onto the system. Also remember that the :TELL command will not be transmitted to users who are working in quiet mode. Therefore, it is a good idea to issue a :WARN command, which will be displayed on "QUIET" terminals to allow users to save their files before the system is shut down.

NOTE

The :WARN command writes over VPLUS screens and should be used when there is no other practical means of notifying users of a shutdown.

2. Display the current system status with the :SHOWJOB command before you abort any sessions or jobs. Continue to use the :SHOWJOB command to monitor which sessions and jobs have logged off, and which are still executing.

3. Close all communications lines in an orderly manner, using the SHUT parameter of the :DSCONTROL command.

One additional step may be necessary: if there are any output spool files remaining that have not yet been printed, they should be stored off onto tape using the SPOOK utility. Refer to the discussion of SPOOK in the MPE V Utilities Reference Manual (32033-90008). This is necessary unless you plan to restart the system with a WARMSTART, which is the only startup option which preserves spool files.

Once all users have logged off, all DS communications lines are closed, and spool files either printed or stored, you may shut down MPE by issuing:

```
A^C
=SHUTDOWN
```

DISTRIBUTING OPERATOR CAPABILITIES

As System Operator, you may choose to distribute some of your capabilities and responsibilities to standard MPE users. The four ways to do so are explained below. Briefly, they are:

- Using the :ASSOCIATE and :DISASSOCIATE commands to permit users Operator control over a specific device.
- Controlling the use of specific Operator commands with the :ALLOW and :DISALLOW commands.
- Setting :JOBSECURITY high or low, which allows or restricts users from using job control commands on their own jobs.
- Transferring the Console to another logical device, allowing the user logged onto a session at that device access to Console commands.

The :ASSOCIATE and :DISASSOCIATE Commands

These commands allow or prohibit users' capability to control devices in a device class. The System Manager determines what associations are allowed with the utility ASOCTABL.PUB.SYS (E/F.00.00) or ASOCTBL5.PUB.SYS (G.00.00). It creates a device class/user association table, permitting specific users to execute the :ASSOCIATE command for the specified device class(es). While the device class remains in the user's control, status messages for the devices in the class are displayed on the user's $STDLIST device, rather than the System Console. Associations remain in effect until the user or Operator explicitly disassociates the device with the :DISASSOCIATE command, or until the user logs off.

When a user associates or disassociates a device class, you will be notified by a message to the System Console. Additionally, when you issue a command to control an associated device, you will be notified that the device is associated and asked to verify your action, as shown below. A "Y" response directs MPE to execute your command. If you respond "N", your command will be ignored.

```
time/#Sxxx/pin/USER.ACCT IS ASSOCIATED TO LDEV ldev.
CONTINUE (Y/N)?
```

Use the SHOWDEV command to determine which devices are associated with whom, as in the following example:

```
:SHOWDEV
LDEV  AVAIL      OWNERSHIP      VOLID     DEN  ASSOCIATION

  1   DISC       1 FILES
  2   DISC       0 FILES
  3   DISC       15 FILES
  5   DISC       58 FILES
  6   SPOOLED    DOWN                          #S48-LP
  7   AVAIL                                    #S18-TAPE
  8   AVAIL                                    #S18-TAPE
  9   AVAIL                                    #S18-TAPE
 10 A AVAIL
 11   SPOOLED    SPOOLER OUT                   #S38-LP
 12   AVAIL                                    #S18-TAPE
 13   AVAIL                                    #S18-TAPE
 14   AVAIL                                    #S18-TAPE
 15   AVAIL                                    #S18-TAPE
 16   AVAIL
 17   AVAIL
 18 A AVAIL
```

Allowing Users Operator Commands

The :ALLOW command permits the Operator to allow specific commands to users, including those used to manage devices (such as :ASSOCIATE and :CONSOLE). Any Operator command may be allowed to non-Console users via :ALLOW. Its effect then, is much broader than the :ASSOCIATE command, which only permits a user Operator control of a single device.

CAUTION

Standard MPE users should never be allowed the :ALLOW command. It will enable them to :ALLOW themselves any Operator command, thereby bypassing normal system security.

Allowing Users Control Over Their Own Jobs

The :JOBSECURITY command allows you to control whether or not users may execute four Operator commands to manage their own jobs. When you set the job security high (by entering :JOBSECURITY HIGH at the Console), only you are permitted to abort, alter, suspend, or resume any or all jobs running on the system.

When you issue the command ":JOBSECURITY LOW", users can execute the following commands for their own jobs: :ABORTJOB, :BREAKJOB, :ALTJOB, and :RESUMEJOB.

Moving the Console

The :CONSOLE command moves the System Console from its current device (usually *ldev* 20) to another job-accepting terminal. Only users with OP and SM capability can move the Console. Standard MPE users, however, may execute the :CONSOLE command with no parameters to determine the current location of the Console.

Although not recommended, you may :ALLOW users the :CONSOLE command, and with it all of the privileges that access to the Console implies. If you do so, a user other than OPERATOR.SYS will have Operator control of the system when he or she switches the Console to their own terminal. At best, this will create confusion, since two Operators, each taking a turn with the Console, would be attempting to manage devices, jobs, and sessions. At worst, allowing a standard user the Console will cause a serious breach of system security.

Using the Console for non-Operator activities increases the chance that it will lock up. If this happens, the system may have to be halted and restarted. For example, executing :STORE at the Console prevents the use of all Console commands except those which can be entered with the A^C prompt. Or, if for any reason the display of messages on the Console is blocked, the system could hang. Moving the MPE Console does not transfer the ability to LOAD, START, or DUMP the system. Hardware-detected B^C (Control-B) remains on the same terminal port.

DATA COMMUNICATIONS OVERVIEW

The following discussion is an overview of MPE's data communications subsystems. It is intended to provide you with a working understanding of data communications, and to familiarize you with terms and equipment you will encounter as an Operator. More detailed information about data communications is available in the Data Communications Handbook (5957-4634), and the following Communications Reference Manuals:

NS/3000 Network Manager Reference Manual (32344-90002)
X.25 Link for the HP 3000 Reference Manual (32187-90001)
DS/3000 HP 3000 to HP 3000 Network Administrator Manual (32185-90002)
DSN/IMF Reference Manual (32229-90001)
DSN/MRJE Reference Manual (30249-90001)
DSN/RJE Reference Manual (30000-90047)
SNA/IMF Reference Manual (30247-90001)
SNA/NRJE Reference Manual (30245-90001)
DSN/MTS Reference Manual (32193-90002)
Point-To-Point Workstation I/O Reference Manual (30000-90250)
Workstation Configurator Reference Manual (30239-90001)

What is Data Communications?

Data communications refers to the exchange of data between computers, or between a remote user and a single computer system. The data is transmitted via telecommunications equipment, which eliminates geographical distance and time as major factors prohibiting the collection and manipulation of data. Virtually 90% of all computer applications can be performed in a distributed data processing environment using data communications hardware and software.

NETWORKS. A data communications network is a combination of hardware components and software programs. Networking is an economical and efficient use of resources since several users can share a single computer as well as peripheral hardware such as printers, plotters, disc and tape drives.

It is also possible to use a number of computers in a single network, with each dedicated to a specific type of data processing.

A distributed data communications network consists of a series of computers, each of which operates independently of the others. Each computer is capable of collecting, processing, and storing data, as well as transferring data from one system to another. The network relies on a host system to manage the orderly transfer of data between computers. The host's operating system controls processing, data base management, and peripheral I/O; it may also contain communications control software for network activity.

Hewlett-Packard's Distributed System software allows terminals on one HP 3000 to appear as terminals on another HP 3000 within the network. If alongside one another, the computers may be directly connected, or "hard wired". If not, data may be transferred via modems using dialup or leased (dedicated) telephone lines. Regardless of the method of connecting the two systems, the Distributed Systems software permits users to access another computer exactly as though they were logged onto their own system.

Minicomputers can be used in a number of ways in a distributed network. A large network could consist of a host computer in a central location being accessed by other minicomputers at satellite locations. These satellite stations, which would do their own data processing, could be the host to local and remote terminals. A small network might consist of a number of remote terminals connected to a single minicomputer. This type of network allows users in remote locations data processing power not available locally.

When a large computer is used in the network, there are other roles a minicomputer can play. As the number of terminals and data links in a network increase, some form of "traffic management" is needed. An efficient way to do this is to use a minicomputer as a front end processor or remote concentrator. This eliminates the need for a link to each terminal and reduces link usage time.

CLUSTER AND DISTRIBUTED NETWORKS. A distributed network is dispersed geographically. It processes and stores information in two or more sites. In this case, network traffic consists of communication from computer to computer, as well as computer to terminal and vice versa. Networks which concentrate all resources in a single location lack two benefits offered by distributed networks: first, a distributed network is less vulnerable to loss by fire or other major disaster; and second, when computer facilities are distributed throughout the country, peak loading periods will occur at different hours for each time zone and loads can be shifted for better equipment utilization.

When all the elements of a network reside in one geographic location, they are considered "clustered". (On a smaller scale, when the individual elements are microcomputers, this type of clustering is referred to as a Local Area Network, or LAN. This term is generally not used when minicomputers are clustered.) In a cluster network, all application processing and information files are kept in a single center. The network traffic consists exclusively of the communications between remote terminals and the host processor.

Telecommunications and Network Components

To understand the role of telecommunications in data communications, you must have an understanding of the basic components used to generate and transmit data on the communications link. When a computer interacts with a remote terminal over a voice telephone line, two general classifications of equipment are used:

- Data Communications Equipment (DCE), which transmits information between locations.
- Data Terminal Equipment (DTE), which is the remote terminal serving as the user's access point to the data link.

TERMINALS. Data communications networks use terminals for the same purpose as a non-networked computer system: they are the primary input/output device for users accessing the system. A remote terminal, which is physically located away from the host computer, can be either a stand-alone device directly connected to the data link, a controller device regulating other nearby terminals, or a minicomputer-based intelligent terminal. Typically, a remote terminal is connected to a computer via a voice telephone line.

There are two ways of connecting remote terminals to the HP 3000. The most common configuration is "point-to-point", in which each terminal has a dedicated line and port. Point-to-point terminals usually operate asynchronously with very little error checking. Point-to-point terminals require no special software, and may be connected directly (hard-wired) to the computer, or they may transfer information via modem.

Multipoint configurations connect several terminals to a single line. Such networks require a special Multipoint Terminal software product called MTS/3000 and an Intelligent Network Processor (INP). Multipoint networks can either use hard-wired terminals, or transmit data via modem. They use a bisynchronous communications protocol, in which data is transferred in blocks of several hundred characters. Each time a block of data is received, it is checked for errors. If none have occurred, the data block is acknowledged. When an error does occur, the data is retransmitted and verified again.

MODEMS. The most familiar piece of communications equipment used in distributed data processing systems is a modem. Although a variety of modems are used with computers, they all perform the same essential function: MOdulation and DEModulation of electronic computer signals (hence the term "modem") to permit transmission of digital data via telecommunications lines. Modems are used at both the originating and receiving end of the communications link. At its origin, digital information is converted into the analog format used by the telephone system. This conversion impresses, or modulates, the signal onto a carrier wave. The receiving modem demodulates the signal, converting it from analog back to its original digital form.

The types of modems most commonly used in data communications require some System Operator intervention. The MRJE subsystem, for example, requires you to dial the phone number of the host computer's modem. Other types of modems dial the phone number electronically, called "auto-dial" modems, since dialing is done automatically, while still others use a a leased or private line so that the connection always exists and no System Operator intervention is necessary.

COMMUNICATION LINKS. A communications link may be either a line or a channel. A line is a path connecting the telecommunications equipment which originates and receives the signal; it may be a wire pair, coaxial cable, optical cable, microwave link, or a combination of these. Other additional equipment may be used along the line.

A channel is another type of communications link, best described as an electronic path within a line. The type of channel identifies the mode of message flow; the grade refers to the capacity of the channel in bits per second, or BPS. Channels are combined into lines with multiplexors.

TRANSMISSION MODES. The three main types of transmission modes used in data communication are: simplex, half duplex, and full duplex. Simplex channels are restricted to unidirectional message flow, meaning that an input terminal can only receive, and an output terminal can only transmit. A half duplex channel, the most commonly used mode, can transmit and receive, but not simultaneously. Information traveling over a full duplex channel can be sent and received between two locations simultaneously. Full duplex is faster than half duplex, since the turnaround time (50 to 250 milliseconds required to halt and reverse the direction of the transmission) is eliminated.

CIRCUITS. Telephone circuits are described as "Two Wire", "Four Wire", "Switched" (Public), and "Leased" (Private) circuits. The voice telephone network is a switched network.

Leased or private circuits are not part of the switched network. They are permanent circuits intended for private use, consisting of a direct line between the two locations routed through a central telephone office. Although a leased line is more expensive than using a switched network, they are also more convenient: setup time, dialing, call routing, ringing, and obtaining billing information is eliminated.

GRADES. Transmission speed is the most important characteristic of a communication channel. Speed is determined by bandwidth, or the frequency range of the channel. The three grades of channels are Sub Voice (or Narrow Band), Voice Band, and Wideband. A sub-voice channel has the narrowest bandwidth and slowest speed of the three grades. Normal transmission speeds range from 45 to 150 BPS. Voice grade, also called Type 3002, allows data to be transmitted along the entire bandwidth, generally operating at 60 to 4800 BPS. It provides a flexible and economical method to transmit data of good quality. Wideband grade is used when large volumes of data must be transmitted at high speed. Speeds up to 500,000 BPS and higher are possible for special applications.

THE SYSTEM SUPERVISOR

SECTION V

THE SYSTEM SUPERVISOR'S ROLE

The System Supervisor's principal task is to tune the system and ensure its continued good performance and reliability. He or she works with the System Manager to design a system configuration that best meets the demand for computer resources, altering the configuration as necessary to accommodate changing resource usage.

The user name and account that the System Supervisor logs onto is assigned OP (System Supervisor) capability, entitling the System Supervisor to execute the commands needed to supervise the operation of MPE. The System Supervisor has other capabilities as well, which allow for more control over the system. For example, with PS (Programmatic Session) capability, the System Supervisor can create sessions at any terminal on the system, using the MPE :STARTSESS command. (The System Supervisor commands are listed in Table 5-1.) In this respect, the System Supervisor is similar to the System Manager: both are assigned special capabilities which allow them to issue MPE commands and interact with the system to fulfill their designated roles.

The task of "fine-tuning" the computer requires the System Supervisor to thoroughly understand the effect of changing various system parameters, such as the size of system tables or the amount of disc space reserved for virtual memory. Although the Supervisor does not operate the computer on a daily basis (this is the Operator's role, discussed in Section IV), many of the System Supervisor's responsibilities require familiarity with Operator tasks. Specifically, the System Supervisor must be able to:

1. Create backup copies of the complete system (including user files), particularly when modifications to the operating system, utility programs, subsystems, or system configuration are necessary.

2. Understand the different procedures used to restart the system.

3. Reconfigure MPE with the SYSDUMP Program.

4. Display performance data and tune the system, which includes:

   - Scheduling processes and setting resource-use limits for each.
   - Allocating and deallocating programs.
   - Managing the disc caching facility.

5. Manage the system logging facility and limit the number of user logging processes and the number of users per logging process.

6. Manage communications subsystems. Refer to Section IV for a general discussion of data communications concepts and a reference to additional, more specific, sources of information about data communications products available to HP 3000 users.

The System Startup State Configurator allows the System Manager to specify the expected System Startup State for each possible startup (WARMSTART, COOLSTART, COLDSTART, UPDATE, RELOAD). The system values are stored in an ASCII file, SYSSTART.PUB.SYS. This feature is explained in Section VI.

This section discusses the role and responsibilities of the System Supervisor in detail. In addition to explaining each major functional area and the corresponding commands that make up the System

Supervisor's job, it explains background information you will need, such as the structure of a disc pack or data contained in the Code Segment Table. Other complex subjects can only be introduced here. In such cases, you will be referred to appropriate additional sources.

Table 5-1. System Supervisor Commands

COMMAND NAME	DESCRIPTION
:ALLOCATE	Permanently loads a program or procedure into memory.
:CACHECONTROL	Controls disc caching on a single logical device.
:CONSOLE	Moves the Console to another logical device, or displays the current location (logical device number) of the Console.
:DEALLOCATE	Unloads a program or procedure from memory previously allocated with the :ALLOCATE command.
:FULLBACKUP	Performs a backup of MPE and all files on the system.
:JOBPRI	Sets or changes the default execution priority for batch jobs and the maximum execution priority for jobs.
:PARTBACKUP	Performs a backup of MPE and all files that have been modified since the last full backup.
:RESUMELOG	Resumes system logging following suspension caused by an error.
:RESTORE *	Restores files to the system previously saved with the :STORE command.
:SHOWCACHE *	Displays disc caching performance statistics.
:SHOWLOG	Displays the current system log file number and percentage of available file space used.
:SHOWQ	Displays process scheduling data and the contents of each subqueue.
:STARTCACHE	Starts disc caching on a single logical device.
:STARTSESS	Allows creation of sessions on any terminal on the system.
:STOPCACHE	Stops disc caching on a single logical device.
:STORE *	Copies disc files to other storage media to be saved off line.
:SWITCHLOG	Closes the current system log file and creates and opens a new one.
:SYSDUMP	Starts the SYSDUMP Program and/or copies system and user files to tape or serial disc.
:TUNE	Manipulates queue priority levels and the memory manager algorithm to improve system performance.

* These commands may also be executed by users without OP capability.

SYSTEM BACKUP

Previously, this section described System Operator tasks such as complete backup tape procedures, displaying the results of :STORE, error recovery during :STORE and tape error recovery. This information is now included in the new MPE V Backup and Recovery Manual (32033-90134).

As System Supervisor, you are ultimately responsible for data integrity and system performance. One of your first tasks is to create a copy of the complete system on magnetic tape, serial disc, or cartridge tape. This procedure, called "backing up" the system, is an ongoing responsibility whether the backup copy is intended to preserve the system as is, or to change it. Refer to MPE V Backup and Recovery (32033-90134) for instructions on managing and performing system backups.

STARTING THE SYSTEM

With one exception, the same basic procedure is used to start (or restart) the system following a planned shutdown or system failure: after a system failure, you or your Operator should always dump the contents of memory so that your SE can analyze it and determine the cause of failure. Once you have taken a memory dump, you will use the same program to restart the system, and choose among the same five restart options, whether the system halted normally or abnormally.

Your choices to restart the system may be limited by the cause of the system failure. A crash of the system disc, for example, would prohibit you from performing either a WARMSTART or COOLSTART, since these two startups use the disc as the data source. This is explained fully below.

Restarting the system is also necessary to permanently load any modifications you have made to the system software, such as enlarging MPE tables, buffers, or virtual memory. Refer to the discussion of "RECONFIGURING YOUR SYSTEM", which immediately follows this subsection. Either you or your System Operator will restart the system in this case. In general, a normal restart following a planned system shutdown, or a restart after a non-catastrophic system failure will be the Operator's responsibility. In case of a catastrophic system failure, when a complete reload of system and user files is necessary, you or your Operator should always consult the System Manager, who may in turn phone Hewlett-Packard for advice and assistance.

Using the INITIAL Program

Starting the system is accomplished with the help of a standalone program called INITIAL. The INITIAL Program prompts you with a series of questions, and based upon the restart procedure you choose, the INITIAL Program will load MPE, subsystems, utility programs, and user files from either tape or disc, recover spool files, and handle disc errors.

Five restart options are available. Three of the five options use tapes as the data source. These are UPDATE, COLDSTART, and RELOAD. The other two options, WARMSTART and COOLSTART, restart the system from the system disc and therefore require no tape.

The INITIAL Program may also be used to alter the system configuration. Any changes that are made during the INITIAL Program are permanent. After making the changes, the System Operator or System Supervisor should create a backup copy of the modified configuration. This copy can be used to start the system if, for example, a disc corruption occurs.

Although restarting MPE with the INITIAL Program is the Operator's responsibility, you should be familiar with the process since you may need to install changes recorded on tape during the SYSDUMP Program. The process of engaging the INITIAL Program varies with the model of the HP 3000 you use. For information about this process, and additional information about the SYSDUMP Program see Sections IV and VII.

Five Restart Options

The startup procedure you choose depends upon a few key factors: whether the system is being restarted from a planned shutdown, or if it is being brought up after a system failure; if a system failure occurred, whether it was catastrophic or not; and whether you will be restarting the current configuration again, or if you have made changes to the system which must be installed.

The five options available to you are described in the following discussion. For a comparative overview of startup operations, refer to Table 4-1 in Section IV's discussion of "THE FIVE STARTUP PROCEDURES". A second table adjacent to Table 4-1 in Section IV, Table 4-2, illustrates which parts of the system are loaded from disc or tape during the various load options.

CAUTION

Do not halt the INITIAL Program before it is complete, i.e., before the request for "DATE?" appears. This stops the loading procedure in an intermediate stage, requiring you to RELOAD the entire system from your backup media.

STARTING FROM DISC: WARMSTART. Restarts the system from the system disc. Use WARMSTART to recover incompletely processed spooled jobs and spooled files; any other load option deletes spool files. You may not WARMSTART the system if a COOLSTART, COLDSTART, UPDATE, or RELOAD has failed. If you attempt to do so, an error message will be displayed on the System Console and the system will halt.

STARTING FROM DISC: COOLSTART. Restarts the system from the system disc (*ldev* 1). Use COOLSTART as the standard operating procedure when a system is routinely shut down at night and brought up the next day. This operation saves all permanent user files (including programs that run on MPE subsystems, such as FORTRAN/3000, COBOL/3000, SPL/3000, and EDIT/3000).

STARTING FROM SERIAL STORAGE MEDIA: UPDATE. Uses magnetic tape or serial disc to restart the system. System files are loaded from the backup media; the I/O device configuration, directory, accounting information, and assigned global RINs come from the system disc; the user files remain undisturbed. Use UPDATE as the standard operating procedure when starting the system with either an updated MPE tape from Hewlett-Packard or an MPE tape prepared for a different HP 3000 Computer System. If for any reason an UPDATE is unsuccessful, you must restart the system with either a COLDSTART, attempt another UPDATE with a known, good tape, or perform a RELOAD. If you attempt another type of coldload option, the system will halt, and an error message will be displayed on the Console.

STARTING FROM SERIAL STORAGE MEDIA: COLDSTART. Restarts the system from magnetic tape or serial disc. System files, the I/O device configuration, and system table sizes are loaded from the backup media. User files, the file directory, accounting information, and assigned global

RINs remain unchanged, and are loaded from the system disc. COLDSTART is used to keep multiple system configurations available, each one stored on its own cold load tape. This way, a COLDSTART allows system modification while retaining user data. If a COLDSTART fails, attempt another COLDSTART from a previous tape that is known to be good. If that fails, RELOAD. Attempting to startup the system with another coldload procedure results in a Console error message and a system halt.

STARTING FROM SERIAL STORAGE MEDIA: RELOAD. Loads the entire system, including all system files and I/O configuration information, from the backup tape. RELOAD assumes that there is no information on the system disc: if the backup tape contains user files, then the file directory, accounting structure, assigned global RINs and user files are restored to the system disc from the backup copy. If the accounting structure was not copied to tape, a directory is created with the SYS account, PUB group, and MANAGER user.

The RELOAD option is normally used when you or the System Manager installs the first MPE system supplied by Hewlett-Packard. RELOAD is also used when restoring the complete system from a SYSDUMP tape following a catastrophic system failure, such as a crash of the system disc. Always consult the System Manager in the event of such a failure: he or she will authorize the RELOAD procedure. (Consultation is critical. The RELOAD procedure completely builds the system. It is a time consuming task, and should only be selected if all other coldload options have failed. Furthermore, if a RELOAD of the system fails for any reason, you must attempt another RELOAD.)

When reloading from multiple tape volumes or serial discs that were created by the SYSDUMP Program, begin with the first volume of the most recent backup copy. It contains the current file directory and accounting information, which must first be entered into the system before files belonging to those accounts and groups may be copied. If all of the files are not contained in the first volume, MPE will request that you mount the next volume.

Files belonging to private volumes are not restored during RELOAD.

RECONFIGURING THE SYSTEM

The SYSDUMP Program, in addition to being used to create backup copies of the system, also permits a user with OP capability to change the system configuration. Using the SYSDUMP Program begins a series of dialog steps, which you use to define, in terms meaningful to MPE, any or all of the peripheral devices attached to the computer for the input (entering) or output (storage) of data. Such devices include terminals, line printers, disc and tape drives, and card readers.

The System Supervisor also uses the SYSDUMP Program to define or modify system parameters other than the I/O device configuration. These include system tables and queues, buffers, the size of virtual memory, the message catalog, user logging processes, and system logging events. The discussion below explains the I/O Configuration process. Each of the remaining subjects is treated in a separate discussion following this subsection.

NOTE

If you alter system parameters during the SYSDUMP Program, any changes that you make will not affect the system immediately. Instead, the new parameters are copied to the SYSDUMP tape, and will only take effect after you start the system with the modified tape.

The I/O Configuration Table

When you respond YES to the question "I/O CONFIGURATION CHANGES", the SYSDUMP Program will ask if you want the current I/O Configuration Table displayed. Whether you are adding a device, or modifying one already defined for MPE, you should respond YES. The I/O Configuration Table will be displayed as thirteen columns of information, as shown below:

```
LOG DRT U  C T SUB              REC   OUTPUT   MODE   DRIVER   DEVICE
DEV  #  N  H Y TYPE  TERMINAL   WIDTH DEV              NAME    CLASSES
 #      I  A P      TYPE SPEED
        T  N E
```

These columns of information define, for each I/O device known to MPE, the following information:

- Logical device number
- Device Reference Table (DRT) number
- Device Unit Number
- Software Channel Number
- Device Type
- Device Sub Type
- Terminal Type
- Terminal Speed
- Record Width
- Corresponding Output Device
- Device Mode
- Device Driver Name
- Device Classes

Input/output configuration is the process of assigning to each peripheral device values for these categories. In some cases, these values will be determined by the characteristics of the device itself or by system architecture. For example, the Device Reference Table (DRT) entry number and the device Unit number are dictated by which computer hardware is used at your installation and its physical layout. Other values may be assigned arbitrarily by the System Supervisor. Examples of these include device mode (whether it is duplicative or interactive), if the device can accept jobs and sessions, and the device class or classes to which it belongs. When you add a new device to the system, consider its hardware characteristics (that defines data entered into the table for you), and choose optional characteristics with care.

A device, though in the configuration, need not be physically connected if it is not being used. To avoid NOT READY messages if someone attempts to access such a device, it can be DOWNed if desired.

The following discussion explains device characteristics and configuration values. Refer to Section VII in this manual for a step-by-step explanation of the complete SYSDUMP Program dialog.

LOGICAL DEVICE NUMBER. The logical device number is the value by which MPE recognizes a particular device. Each device has its own unique logical device number, abbreviated "*ldev*". (In conversation and in written material, *ldev* is often used as a shorthand term for the logical device.) You may assign logical device numbers in any way you choose with one exception: The system disc must be logical device 1. Although other values for *ldev* are arbitrary, numbering conventions have developed which are followed in many HP 3000 installations. They are:

- Logical device numbers 2 through 5 are typically reserved for disc drives other than the system disc, unless the system is configured with more than one system disc.
- The system line printer is assigned logical device 6.
- Logical device numbers 7 through 9 are typically assigned to tape drives.
- Logical device 10 is a pseudo-device. Although it is often the case that no physical device corresponds to *ldev* 10, it must be entered in the Configuration table as though it were an actual device. Otherwise, users will be unable to stream jobs via MPE's streaming facility. Logical device 10 is enabled with the :STREAMS command, which is executed by the Operator when the system is started.
- Logical device 19 usually corresponds to the system's HP 2680 Laser Printer.
- Logical device 20 is assigned to the System Console, although it may be temporarily associated with another terminal (via the :CONSOLE command) after the system is started.

Users will reference the device by either the logical device number assigned to it in the I/O Configuration table, or by the device class associated with it. (DEVICE CLASSES, the last column in the table, is explained below.) Note that in the MPE V Commands Reference Manual (32033-90006), command specifications generally offer you a choice of specifying either the *ldev* or *devclass* when the command references a device. *Ldev* is always a more precise specification, since multiple devices may be assigned the same device class, but no two devices will have the same logical device number.

DEVICE REFERENCE TABLE (DRT) ENTRY NUMBER. The Device Reference Table, like other MPE tables, resides in main memory. It contains hardware-dependent information for each peripheral device known to MPE. The DRT values for each device are system-defined, and not arbitrarily selected by the Supervisor.

Every device on the system is connected to a device controller, which may serve more than one device of the same type. The Device Reference Table contains, for each device, the address of the controller to which the device is connected. Devices of the same type connected to the same controller will have the same DRT number, and the bus address of the attached device is eight times the controller's channel number plus the device's bus address.

When reconfiguring the system, the highest DRT entry number that can be assigned to a device is 127 for the Series 39/40/42/44/48/52/58 of the HP 3000, 511 for the Series 64/68/70 and for the Series 37/MICRO 3000/MICRO 3000XE. The smallest DRT number used is 8.

UNIT NUMBERS. The Unit Number is a hardware-dependent characteristic determined by the physical connection of a device to its controller. Each controller supports a particular type of device. A disc controller, for example, cannot be used to connect a line printer to the computer. Similarly, a printer controller cannot be used to control disc drives. Also, each type of controller board will support a different number of devices. A disc controller can generally support up to eight separate disc drives; a tape controller will support four tape drives, whereas each printer uses its own dedicated controller board.

When a controller services only one device, that device is assigned a Unit Number of 0. When the controller serves more than one device, each device is assigned a consecutive Unit Number to distinguish it from the other devices connected to the controller. To illustrate, assume that four disc drives are connected to the system through a single controller board. The first disc drive, identified as Unit

0, is commonly referred to as the Master device. The second, third, and fourth disc drives connected to it are assigned Unit Number 1, 2, and 3, respectively. They are referred to as Slave devices.

SOFTWARE CHANNEL NUMBER. To deal with special configuration problems, a software channel number may be defined in the I/O Configuration table. Generally, no software channel number need be assigned to a device, and a zero will be entered in the table under the Channel column heading ("CH").

TYPE/SUBTYPE. Each device is assigned a number designating its device type, and a second number which indicates the device subtype. These numbers are determined by Hewlett-Packard and are not alterable by the System Supervisor. In general, they classify a device according to the means MPE uses to access it and the features the device supports.

TERMINAL TYPE/SPEED. When configuring a terminal or a line printer you must specify the terminal type number that corresponds to that device. This number, ranging from 0 to 30 (refer to Table 7-3 for a list of supported terminal types), tells MPE the exact model of the device you are defining in the Configuration Table. If the device is a terminal, you must also specify its speed in characters per second (CPS), or enter a zero. For example, to configure a terminal that operates at 9600 baud, enter 960 in the SPEED column of the Configuration table for this terminal since CPS is equivalent to the baud rate divided by 10. (Each character consists of 10 bits: the 8-bit ASCII character, plus a start bit and a stop bit.) If you enter a zero, which will be indicated by two question marks (??) in the "TERMINAL SPEED" column, MPE will "speed sense" the transmission rate of the terminal.

TERMINAL TYPE DESCRIPTOR FILES. Each terminal type descriptor file supplies device dependent information for the device being configured. It is only valid for terminals and RS232 printers.

RECORD WIDTH. The record width for a device is a decimal value specified in words, rather than bytes. For most devices, record width may be arbitrarily chosen as long as the value entered in the "RECORD WIDTH" column does not exceed the maximum for the device. However, certain standard and recommended values have evolved, which are listed below. For discs, the default record widths referenced in Section VII should be used.

Device	Record Width (in words)
Disc Drives	128
Tape Drives	128
Line Printers	66
Laser Printers	66
STREAMS device	128
Terminals	40

CORRESPONDING OUTPUT DEVICE. If a device will be used to initiate jobs and/or sessions, you must specify a corresponding output (list) device. This specification may either be the logical device number of the corresponding device, or a device class name. Note, however, that if you specify a class name, all data from the input device will be listed on the particular ldev chosen by MPE from the devices in the class to be used for the job output. (Usually, the class will be spooled, so the device used for printing will be selected by the spooler system.) If the device is a disc, or if it is configured as an output-only device (such as a line printer), enter 0 in the "CORRESPONDING OUTPUT DEVICE" column.

MODE. During the configuration process, the System Supervisor may specify six modes, or options, for a device. Explained below, these are:

- Job/Session Accepting (J)
- Data Accepting (A)
- Interactive (I)
- Duplicative (D)
- Spooled (S)
- Auto Reply (R)

Job/Session Accepting Devices. A "J" entry in the "MODE" column of the I/O Configuration Table specifies that the device can accept the :JOB or :HELLO commands, thereby functioning as a job/session input device. This option causes MPE to automatically read the first input record, which must be a valid :JOB or :HELLO command. This way, users may gain access to the device without requiring the Operator to :REPLY to their request to use it, which is necessary for nonaccepting devices. You will see this feature referred to as "auto-recognition". Note that sessions cannot be started on job/session accepting devices unless the interactive option is also specified.

Data-Accepting Devices. An "A" entry in the "MODE" column allows a job or session to acquire, without Operator intervention, an auxiliary input device in addition to its $STDIN device. The auxiliary device must be configured as a data-accepting device via the :DATA command. For example, a session (which uses a terminal as its $STDIN device) could read data from a card reader, if the reader is configured as a data-accepting device and the user entered the appropriate data record.

The A option, like the J option, instructs MPE to automatically recognize the device by reading the first input record. If the device is also spooled, the data will be immediately input to a spooled device file.

Interactive Option. This option, designated by an I in the "MODE" column, indicates that the device is used for sessions. Such devices are called interactive because the user interacts with MPE (and utilities, subsystems, and application programs) by entering instructions to the computer through a terminal, and receiving an immediate response in the form of program results or system messages.

An interactive device supports both jobs and sessions. When it is used to submit a job (defined via the :JOB command), MPE assumes that the instructions for processing the job have been predefined and that errors will only be corrected after the job is complete or aborts. If the input is not predefined, but instead entered interactively during a session, any errors that occur while the user is entering the instructions will cause MPE to terminate the job immediately.

Duplicative Option. A device is configured as duplicative (D) when all input operations can be echoed to a corresponding display without intervention by MPE. In general, terminals, which are interactive devices, are also duplicative: all input from the terminal's keyboard is echoed back to the display portion of the terminal. This enables users to see the instructions they have sent to MPE. A device is nonduplicative when it does not automatically echo user input. In this case, MPE's command interpreter must intervene to "echo" the input, as is done with a card reader.

Echoing capability is generally handled by the terminal controller board, rather than the terminal itself. Some nonstandard terminals, however, have a self-contained echo feature. If there is no switch on the terminal to turn off this capability, the terminal controller will echo user input to the terminal while the terminal is echoing to itself, which will garble the display. To avoid this, press the escape key and a semicolon ([ESCAPE] ;) after logging on. This will suppress the terminal controller's echoing feature, so that only the echo capability built into the terminal itself will operate. To restart the hardware echo feature, press the escape key and a colon ([ESCAPE] :).

In general, the duplicative option should be specified if the device is both a job/session accepting device and an interactive device.

Spooling Option. When MPE is brought on line, devices which contain an "S" in the "MODE" column of the I/O Configuration Table display will be automatically controlled by the spooling facility. Job- and/or data-accepting card readers and magnetic tape units may be designated as either input spooling devices or output spooling devices, but not as both simultaneously. Line printers and plotters may only be used for output spooling.

Auto Reply Option. This configuration option allows automatic allocation of tape drives and serial disc drives.

DRIVER NAME. This entry designates the name of the driver associated with the device's controller. It is the program that serves as an interface between the device and MPE. Each unique device requires a separate driver program. A list of drivers, corresponding to standard Hewlett-Packard supported, devices can be found in Section VII's discussion of "PERIPHERAL CONFIGURATION INFORMATION". When the device is nonstandard and not supported by Hewlett-Packard, the driver name duplicates the name of the program file which contains the driver. Like all MPE file names, it must begin with a letter and consist of one to eight alphanumeric characters. If the driver name is preceded by an asterisk (*) , the driver program permanently resides in main memory.

DEVICE CLASSES. Device class names, which are arbitrarily selected by the System Supervisor, are one of two ways in which users may reference a device. The other method, discussed previously, is the logical device number, or *ldev*. Requesting a particular device class is less specific than a reference to logical device number. Unlike the *ldev*, which is a unique number assigned to each device, the same class name may be assigned to more than one device. Also, the same device may have more than one device class name. In this case, users can reference the device by any one of its class names.

Device class names must begin with an alphabetic character and consist of one to eight alphanumeric characters. MPE reserves certain class names for a specific function. For example, to use the spooling facility with a particular disc drive, the disc must be assigned two class names: DISC and SPOOL. Standard device classes recognized by MPE are defined as follows:

DISC	The default device class for files created with the :BUILD command.
SPOOL	The device class that designates a spooling disc. If the device is not assigned the class name SPOOL , it will not be used by the spooler program to create and store spool files. Discs used by the spooler are also used to store standard user files.
JOBTAPE	The device class name that may be included in the system configuration for use with the streaming facility. This usually refers to a pseudo-device, rather than an actual device physically connected to the computer.

VTERM	The device class name assigned to the pseudo terminal devices used by the Virtual Terminal Service of NS/3000.
TAPE	The device class name assigned to magnetic tape drives.
DDUMP	The device class name assigned to the tape or serial disc device which receives the output of the SOFTDUMP facility.
LP	The class name assigned to the system line printer. The other commonly used class name for line printers is simply PRINTER.
PP	An acronym for Page Printer, and one of several class names commonly associated with the HP 2680 Laser Printer. Other class names used to designate a laser printer are FASTLP, LASER, and EPOC.

To use the user logging facility with devices in a class other than DISC, MPE specifically requires that the following classes be included:

TAPE	The class name which refers to magnetic tapes.
SDISC or CTAPE	The class name assigned to serial disc devices.

When you list the system configuration, you may notice that a single disc drive has been assigned the same class name (usually "DISC ") more than once. There is a simple explanation: when your system uses two or more disc drives, MPE attempts to distribute file extents among them so that each disc has approximately the same number of file extents and a similar disc search sequence time. MPE does this by writing files to each device assigned the class name "DISC" in a round-robin distribution scheme.

It is not uncommon to have multiple disc drives of different storage capacity connected to a single computer. If this is the case, and each *ldev* were assigned the class name DISC once, the smaller disc drives would become full at a proportionally faster rate than the larger drives. To accommodate this difference, the device class name "DISC" is often assigned to a single device more than once. For example, if a 100-megabyte drive is assigned the class name DISC once, a 300-megabyte drive should be assigned the class DISC three times. This way, MPE will store one file extent on the smaller disc drive for every three file extents it writes to the larger drive.

You assign multiple class names to a disc drive through the class changes portion of the SYSDUMP Dialog. (Refer to SYSDUMP Dialog Steps 57 through 63 in Section VII).

DEVICE ACCESS TYPE. In addition to categorizing input/output devices by type and subtype, and assigning to each device one or more class names, devices are also classified by access type. MPE recognizes seven I/O device access categories. By convention, each device supported by MPE is assigned to one of the seven categories based upon information about the device that you as System Supervisor (or your SE) enter into the Configuration table.

Examples of Device Access Type. Suppose, for example, that you are adding an HP 7976 Tape Drive to your system and are entering information about the device in the I/O Configuration Table. Its device type, 24, is determined by system convention; you do not choose it arbitrarily. Also determined by system convention is the corresponding Device Access Type (DAT) for device type 24. Since MPE "knows" the physical properties of a tape drive, it confines the mode of access to operations that are consistent with these properties. In this case, your HP 7976 Tape Drive is within the

classification of types 24 through 30, with an access type of "I/O,NC", meaning a nonconcurrent input/output device. These devices are used for data input and output (I/O). Nonconcurrent refers to the fact that such devices cannot perform I/O operations concurrently. A tape drive can either be used for input or for output, but not both. (Note that this excludes the automatic read-after-write process which verifies the data copied by the tape drive.) By contrast, terminals are concurrent I/O devices because it is the combination of input and output processes to a terminal which allows sessions to be conducted interactively.

Another example further explains device access type. Discs are direct access storage media (unless specifically limited to serial access) because the drive's read/write heads can position themselves at any track on the disc without the need to read preceding tracks. Yet MPE distinguishes between MPE-formatted discs and foreign discs. The former are assigned device access types 0 through 6, whereas foreign discs are assigned a device access type of 7. Although both are direct access devices, MPE cannot access a Type 7 disc in the same way it can read data on an MPE-formatted disc because the data storage format is different.

Below is a table listing device types and their corresponding Device Access Types:

Device Types	**Access Type**
0-7	Direct access (DA)
8-15	Serial input (IN)
16-23	Concurrent input/output (I/O, C)
24-31	Nonconcurrent input/output (I/O, NC)
32-39	Serial output (OUT)

Special Note: A device type 7 defines foreign disc (FD) in the direct access type domain.

A device type 31 defines a serial disc (SD) in the nonconcurrent input/output domain.

Definition of Device Access Types. Device Access Types are defined as follows:

Direct Access (DA) Allows data stored on the device to be directly accessed by positioning the read/write mechanism at a precise location. Direct Access mode is limited to disc drives. Other devices, such as tape drives, terminals, and printers treat data sequentially.

Foreign Disc (FD) The access mode that informs MPE that data stored on the device does not conform to MPE's standard disc format.

Serial Input (IN) Serial Input access mode limits the device to input operations only. Data is entered sequentially. Example: card reader.

Concurrent Input/Output (I/O,C) Concurrent Input/Output Access mode allows input and output operations to and from the device in any order. Terminals are typically assigned this access mode.

Nonconcurrent Input/Output (I/O,NC) Nonconcurrent Input/Output, the access mode assigned to tape drives, allows input and output operations to the device, but restricts the order. For example, you may not read what you have just written to a magnetic tape unless you backspace over the record and then read it.

Serial Disc (SD) Restricts disc access to serial (sequential) read and write operations.

Serial Output (OUT) Serial Output access designates that the device may only be used for output (data storage) operations.

To display access types associated with each device class name and their associated logical devices, respond YES to the questions "CLASS CHANGES?" and "LIST CLASSES?" during the SYSDUMP Program. Occasionally, a device type number (instead of the access type) will be specified for a device class name. You may use this table to cross reference device classes, and see all of the devices (designated by their logical device numbers) that belong to any given device class. The order in which logical devices appears in this table represents the order of device allocation within the class. This is configurable for each installation by either you or your SE.

Device Class Access Types. The standard Device Access Types determined by MPE may be augmented by a further classification which you, as Supervisor, may determine. When you respond YES to the SYSDUMP Program questions "CLASS CHANGES?" and "LIST CLASSES?", you have the opportunity to enter a new device class name and its corresponding access types, or modify an existing class name. You can then assign the new or modified class name to the device. You may not, however, define Device Class Access Types (DCAT) in a completely arbitrary manner. The access mode must be a subset of the MPE-determined Device Access Type for the *ldev* to which you are assigning a class name.

The Device Class Access Type you define for a device redefines how it will be used. Since the purpose of creating a Device Class Access Type, in addition to the MPE-defined Device Access Type, is to provide a choice of access modes, you must be able to open the device in either mode. To use the device as MPE has defined it (according to the device type), open the device by referencing its logical device number. To use it as you have defined it, open the device by referencing the restricted-access device class name.

Choosing Device Class Access Type. When you are assigning devices to a class, use the following rules.

- Assign a DCAT of direct access (DA) or serial disc (SD) to a class containing only removable, moving-head discs, depending on its specification when it is initially defined. Classes containing only direct access devices with one or more nonremovable discs are automatically assigned a Direct Access DCAT. The class name DISC is always assigned a Direct Access DCAT.

- Assign a class containing one or more serial input access devices a DCAT of serial input (IN), even if other devices within the class are concurrent or nonconcurrent input/output access devices, or both.

- Assign a class containing one or more serial output access types a serial output (OUT) DCAT, even though the remainder of the devices in the class are assigned either a concurrent or nonconcurrent input/output access type, or both. For example, a card punch is always a serial output device (OUT) and a magnetic tape is a nonconcurrent input/output device (I/O,NC). If a class PUNCH is assigned to both the card punch and the magnetic tape, then it will have a DCAT of serial output (OUT) only.

- You may choose the DCAT for a class containing only concurrent input/output access types. The SYSDUMP Program prompts you to choose among serial input (IN), serial output (OUT), concurrent input/output (I/O,C), or nonconcurrent input/output (I/O,NC).

- You may also choose the DCAT for a class containing only nonconcurrent input/output access types. The SYSDUMP Program asks you to choose a DCAT of serial input (IN), serial output (OUT), or nonconcurrent input/output (I/O,NC).

- When a class contains a combination of concurrent and input/output access types, the SYSDUMP Program prompts you to choose a DCAT of serial input (IN), serial output (OUT), or nonconcurrent input/output (I/O,NC).

- A class containing any combination of access types other than those mentioned above is illegal. For example, a line printer, which is an output device (OUT) and a card reader, which is an input device (IN) cannot belong to the same device class since their access types are incompatible.

- A class containing devices of a single type is assigned the DCAT for that device type.

The Default Configuration Table

When you respond YES to I/O CONFIGURATION CHANGES?, the SYSDUMP Program asks a series of questions; if your system is on MPE version G.01.00 or later, the question LIST DEVICE DEFAULTS? will appear. You may wish to respond YES if you are adding a device or modifying one already defined for MPE; doing so will list the default specification values for all Hewlett-Packard supported devices. The table will be displayed in twelve columns of information, as shown in Table 5-2.

Table 5-2. Device Defaults (DEFDATA.PUB.SYS), G.03.00 or Later

DEVICE NAME	ID CODE	CHAN	TYPE	SUB TYPE / TERMINAL TYPE	REC WIDTH	OUTPUT DEV	MODE	DRIVER NAME	DEVICE CLASS
HP2563	!2101	0	32	9	66	0	S	HIOCIPR0	LP
HP2565	!2101	0	32	9	66	0	S	HIOCIPR0	LP
HP2566	!2101	0	32	9	66	0	S	HIOCIPR0	LP
HP2608A	!2001	0	32	4	66	0	S	HIOLPRT0	LP
HP2608S	!2101	0	32	9	66	0	S	HIOCIPR0	LP
HP2613	!200A	0	32	2	66	0	S	HIOLPRT2	LP
HP2617	!200A	0	32	2	66	0	S	HIOLPRT2	LP
HP2619	!200A	0	32	2	66	0	S	HIOLPRT2	LP
HP2680	!2004	0	32	8	66	0	S	HIOPPRT0	LP
HP2688	!2004	0	32	8	66	0	S	HIOPPRT0	LP
HP2893	!0101	0	8	0	40	0		HIOCDRD0	CARDRDR
HP35401	!0270	0	3	6	128	0		HIOCTAP2	CTAPE SDISC
HP7902	!0081	0	2	0	128	0		HIOFLOP0	FLOP
HP7906BP	!FF02	0	0	12	128	0		HIOMDSC1	DISC
HP7906FP	!FF02	0	0	11	128	0		HIOMDSC1	DISC
HP7906RP	!FF02	0	0	10	128	0		HIOMDSC1	DISC
HP7911	!0204	0	3	1	128	0		HIOMDSC2	DISC
HP7912	!0208	0	3	2	128	0		HIOMDSC2	DISC
HP7914	!020A	0	3	4	128	0		HIOMDSC2	DISC
HP7920	!FF03	0	0	8	128	0		HIOMDSC1	DISC
HP7925	!FF04	0	0	9	128	0		HIOMDSC1	DISC
HP7933	!0212	0	3	8	128	0		HIOMDSC2	DISC
HP7935	!0212	0	3	8	128	0		HIOMDSC2	DISC
HP7936	!0215	0	3	9	128	0		HIOMDSC2	DISC
HP7937	!0214	0	3	10	128	0		HIOMDSC2	DISC
HP7945	!0220	0	3	5	128	0		HIOMDSC2	DISC
HP7957B	!022A	0	3	11	128	0		HIOMDSC2	DISC
HP7958	!022B	0	3	12	128	0		HIOMDSC2	DISC
HP7958B	!022D	0	3	14	128	0		HIOMDSC2	DISC
HP7959B	!022E	0	3	15	128	0		HIOMDSC2	DISC
HP7961B	!022C	0	3	13	128	0		HIOMDSC2	DISC
HP7962B	!022D	0	3	14	128	0		HIOMDSC2	DISC
HP7963B	!022E	0	3	15	128	0		HIOMDSC2	DISC
HP7970	!0183	0	24	0	128	0		HIOTAPE0	TAPE
HP7974	!0174	0	24	3	128	0		HIOTAPE2	TAPE
HP7976	!0176	0	24	1	128	0		HIOTAPE1	TAPE
HP7978	!0178	0	24	2	128	0		HIOTAPE2	TAPE
HP7979	!0179	0	24	4	128	0		HIOTAPE3	TAPE
HP7980	!0180	0	24	5	128	0		HIOTAPE3	TAPE
HP9140	!0240	0	3	0	128	0		HIOCTAP0	CTAPE SDISC
HP9144	!0260	0	3	3	128	0		HIOCTAP1	CTAPE SDISC
HP9895	!0081	0	2	0	128	0		HIOFLOP0	FLOP
HPASNP	!000F	0	42	0	40	0		HIOASNP0	ASNL

Table 5-2. Device Defaults (DEFDATA.PUB.SYS), G.03.00 or Later* (continued)

DEVICE NAME	ID CODE	CHAN	TYPE	SUBTYPE	TERMINAL TYPE	TERMINAL SPEED	REC WIDTH	OUTPUT DEV	OUTPUT MODE	DRIVER NAME	DEVICE CLASS
HPLPADCC	!0010	0	32	14	19	240	66	0	S	HIOASLP2	LP
HPLPATP	!000F	0	32	14	19	240	66	0	S	HIOASLP0	LP
HPMODEMADCC	!0010	0	16	1	10	120	40	& JAID		HIOTERM2	MODEM
HPMODEMATP	!000F	0	16	1	10	120	40	& JAID		HIOTERM1	MODEM
HPPCLADCC	!0010	0	32	14	??*	960	66	0	S	HIOASLP2	LP
HPPCLATP	!000F	0	32	14	??*	960	66	0	S	HIOASLP0	LP
HPTERMADCC	!0010	0	16	0	10	960	40	& JAID		HIOTERM2	TERM
HPTERMATP	!000F	0	16	0	10	960	40	& JAID		HIOTERM1	TERM

*The device DRT and UNIT numbers are unique for particular systems; therefore, they are not supplied in this table. To determine the default DRT and UNIT numbers for devices on systems with MPE version G.01.00 or later, respond YES to the question I/O MAP? (Step 4.1) of the INITIAL Program.

Configuring The MPE Streaming Facility

The MPE streaming facility allows users to batch process jobs or data so that they can continue with other work while MPE processes them. Users designate such jobs by executing the :STREAM or :JOB command, but before they can do so, MPE's streaming facility must first be enabled with the :STREAMS command. (For a complete description of the :STREAM and :JOB commands refer to the MPE V Commands Reference Manual (32033-90006).)

Before users or the Operator can execute any of these commands, you must define a pseudo device in the I/O Configuration table which will appear to be a reel-to-reel magnetic tape drive or a card reader. (The pseudo device cannot be a cartridge tape drive.) The device itself is usually not connected to the computer, hence the term "pseudo device". In fact, if a device is physically present, it can only be used to introduce jobs.

The pseudo device used by the streaming facility must have the following:

- A unique logical device number, usually 10 (a Hewlett-Packard convention).
- A DRT number, which can be the number of an existing card reader or reel-to-reel tape device. If no such device is physically present, the DRT number can be the number that such a device would have had if it did exist.
- A unit number, determined by how many other devices are configured on the same controller.
- A software channel, type number, subtype number, and record width value, which duplicate the values for an actual card reader or reel-to-reel tape drive.
- An output device, which should be a printer.
- Mode, which must be job and data accepting.
- The name of the driver which would correspond to an actual card reader or reel-to-reel tape drive.
- The class name JOBTAPE. This may be included regardless of what additional class names are specified for other purposes.

The following example illustrates the result of configuring *ldev* 10 to accept spooled or batched data from a session or job. Note that it is not apparent from the I/O Configuration table whether the device is physically connected to the system, or whether it is a pseudo device. Once the Operator enables the streaming facility with the :STREAMS command, users will be able to execute the :STREAM command to process jobs.

LOG DEV #	DRT #	UNIT	CHAN	TYPE	SUB TYPE	TERMINAL TYPE	TERMINAL SPEED	REC WIDTH	OUTPUT DEV	MODE	DRIVER NAME	DEVICE CLASSES
1	89	0	0	0	9			128	0		HIOMDSC1	SYSDISC
2	90	0	0	3	8			128	0		HIOMDSC2	DISC SPOOL
3	91	0	0	3	8			128	0		HIOMDSC2	DISC SPOOL
6	82	0	0	32	4			66	0	S	HIOLPRT0	LP LP08
7	73	0	0	24	0			128	0		HIOTAPE0	TAPE DDUMP
8	73	1	0	24	0			128	0		HIOTAPE0	TAPE
9	73	2	0	24	0			128	0		HIOTAPE0	TAPE
10	73	3	0	24	0			128	PP	JA	HIOTAPE0	JOBTAPE
19	83	0	0	32	8			66	0	S	HIOPPRT0	EPOC PP FASTLP PP
20	8	0	0	16	0	10	240	40	20	JAID	HIOTERM0	CONSOLE

NOTE

The pseudo device used by the streaming facility should always be configured with the same LDEV number, channel number, type, subtype, record width, output device, mode, driver name, and device class as shown above. The DRT number and unit number, however, may differ, depending on what tape drive(s) is configured on the system.

As in the above example, if one or more nonvariable density reel-to-reel magnetic tape drives are configured on your system, the pseudo streams device can be configured with the same DRT number as the tape drives, and with a unit number that is one greater than that of the last configured tape drive. This is allowed because nonvariable density magnetic tape drives, such as the HP 7970, can have multiple units on the same DRT number. Therefore, there is no need to use a unique DRT number for the streams device.

On the other hand, if a variable density magnetic tape drive is configured on your system, the pseudo streams device should be configured with a unique DRT number (the unit number is unimportant here). This is allowed because on variable density magnetic tape drives, such as the HP 7974, HP 7976, and HP 7978, you cannot have multiple units on the same DRT number. Therefore, you must use a unique, dummy DRT number for the streams device. The dummy DRT number, however, must refer to an existing General I/O Channel (GIC).

Changing System Tables and Queue Parameters

In addition to configuring I/O devices, you may use the SYSDUMP Program to change MPE system tables, queues, and other data structures by responding YES to the question "SYSTEM TABLE CHANGES? ". The factory or your SE defines the appropriate parameters for your particular system configuration when the system is installed, and changes are not generally necessary. However, as the needs and resource demands of your users change over time, or as you add or upgrade your hardware or software, you may need to alter these values to ensure the ongoing efficiency of your system.

To guide you when you experiment with system tables, queues, buffers, and lists, the following discussion explains their function. The requirements for each HP 3000 configuration can be quite different. For this reason, no specific values are presented here. Section 7 lists suggested parameter settings; use it as a guide to changing system parameters. Excercise caution when altering system parameters; any changes will directly influence MPE's operation.

The following discussion explains the purpose of:

- MPE tables used to control system and user processes.
- Other tables, queues, and lists not directly intended to control processes.
- System buffers, terminal buffers, message tables, and the message catalog.

SYSTEM AND USER PROCESS CONTROL TABLES. MPE is a table-driven operating system, which means that it uses several tables to manage and monitor system activity. There are four principle memory-resident tables MPE uses to control all system processes, whether they be MPE functions, subsystem or utility programs, or user programs. These tables, explained below, are:

- The Code Segment Table, or CST
- The Extended Code Segment Table, or XCST
- The Data Segment Table, or DST
- The Process Control Block Table, or PCB Table

Code Segment Table (CST). The Code Segment Table, or CST, keeps track of all allocated MPE and subsystem code segments and all code segments that are contained in a segmented library. Each CST entry, which is 4 words long, contains information about a single code segment. When a program is loaded, the code itself is not usually resident in memory, unless that portion of the code is currently executing. Instead, information (including the following data) is entered into the CST or XCST so that the code segment can be immediately accessed when necessary: current location (disc or memory address), segment length, whether the code was prepared with Privileged Mode (PM), etc.

The Code Segment Table used in the E/F.00.00 release of MPE contains both permanently and temporarily allocated code segments. Always set this table to the total number of CST entries available, which is 192.

The Code Segment Table used in the G.00.00 and later release of MPE allocates a maximum of 2048 entries for temporarily allocated programs. Of these, 192 entries are reserved for MPE segments. Typically, you should configure four times the number of terminals, but this number really depends on the number of segments accessed.

If the CST is underconfigured, programs will not run when the system is heavily loaded. If overconfigured, main memory space is wasted. The number you select for your particular configuration will depend upon which version of the operating system you have, the amount of main memory, and average (and maximum) system load.

Extended Code Segment Table (XCST). The Extended Code Segment Table, or XCST, functions similarly to the CST. The difference is that entries in the XCST contain information about code segments that come from user's program files and those segments which are assigned by running a program (with the :RUN command).

If the Extended Code Segment Table is underconfigured, programs will not run when the system is heavily loaded. If overconfigured, main memory is wasted. In general, if your users run large programs with many code segments, or if your installation is involved in program development, the size of the XCST should be larger than it would otherwise be at sites not involved in either of these activities. The maximum size is 8191 entries.

Data Segment Table (DST). The Data Segment Table monitors all data segments, including those used by MPE and user's data stacks. Like the CST and XCST, each entry in the DST represents a single data segment. If underconfigured, programs may not run when the system is heavily loaded. If overconfigured, main memory is wasted. The maximum DST size for the E/F.00.00 release of MPE is 1024 entries. The maximum for the G.00.00 and later releases is 4096 entries.

Process Control Block (PCB) Table. The Process Control Block (PCB) Table contains the status of each process on the system. A single entry corresponds to one process. Use extreme care when reducing the size of this table; if it is too small, the system will crash. But, since the PCB Table is main-memory resident like the CST, XCST, and DST, main memory space is wasted when it is too large.

The maximum PCB table size for the E/F.00.00 release of MPE is 256 entries. The maximum size for the G.00.00 release or later is 1024 entries.

OTHER SYSTEM TABLES, QUEUES, AND LISTS. Few system resources are truly sharable. Those that are include System Domain discs, used to store user and program files, and main memory, which is subdivided among executing processes. Other resources, including peripheral devices such as terminals, printers, and tape drives, are only serially reusable. MPE relies upon queues, lists, and other tables to monitor requests for such devices and manage the competing demands for them. These structures share a similar function: each maintains the order of resource requests to ensure the systematic allocation of nonsharable devices. The following discussion explains the purpose of various queues, tables, and lists used by MPE to manage resource allocation.

Loader Segment Table (LST). The LOADER uses the LST to keep track of information for processes that require code to be loaded for execution. It is actually a DST that contains entries describing code already loaded, being loaded, or being shared by different users. If this table is underconfigured, programs may not run, because of segment table overflow. Its absolute maximum value is 32,760 words.

Input/Output Queue (IOQ). The I/O Queue resides in main memory. It contains requests from any process running on the system for all nondisc I/O devices. In general, the total number of I/O entries you allocate will reflect the number of nondisc devices your system supports. Note, however, that spooled devices must be treated as an exception: allocate at least 10 entries in the I/O queue for each

spooled input device and 15 entries for each spooled output device. Allow 4 entries for each system user. If using MRJE, IMF, or DS, increase by 3 or 4 entries per line.

The maximum number of I/O Queue entries for the E/F.00.00 release of MPE is 255. The maximum number for the G.00.00 and later releases of MPE has been expanded to 1300 entries. If the I/O Queue is underconfigured, system response time will be degraded. Overconfiguring the I/O queue will waste main memory.

User Controller Process (UCOP) Request Queue. The UCOP request queue resides on disc in virtual memory, and is only loaded into main memory when needed by the system. It limits the number of jobs and sessions which can be terminated simultaneously. The maximum size for the E/F.00.00 release of MPE is 256 entries. The maximum for the G.00.00 and later releases of MPE is 1023 entries.

Disc Request Table. The Disc Request Table holds request parameters and queries for pending disc I/O requests. It is functionally and structurally similar to the I/O queue for nondisc devices. Like the I/O Queue, it resides in main memory. The maximum number for the E/F.00.00 release of MPE is 255. The maximum number of entries for the G.00.00 and later releases of MPE is 900. Allocating too few entries will result in a System Failure 601.

Swap Table. The Swap Table is a memory-resident table that monitors data segments referenced by every process executing on the system. This table is needed to inform MPE whether a process's data stack or extra data segment is currently stored in main memory or has been swapped out to disc to allow space for another process's stack. One five-word entry is used per data segment. The maximum setting for the E/F.00.00 release of MPE is 2048 entries. The maximum for the G.00.00 and later release of MPE is 4096 entries. If the Swap Table is underconfigured, it may cause a System Failure 602.

Interrupt Control Stack (ICS). The Interrupt Control Stack resides in main memory. It is used by the System Dispatcher and for input/output processing. The maximum size of the ICS for the E/F.00.00 release of MPE is 2048 words. The maximum size for the G.00.00 and later release of MPE is 4096 words. Exercise extreme care when experimenting with the size of the ICS. If it is too small, the operating system will fail.

Timer Request List (TRL). The Timer Request List is used to store requests to delay a process or a function for a specified amount of time. The maximum size of the TRL for the E/F.00.00 release of MPE is 255 words. The maximum size for the G.00.00 release of MPE is 1023 entries. Use care when altering the size of this list, because reducing the number of TRL entries too much will cause the operating system to fail.

Breakpoint Table. Unlike other tables, each entry in the Breakpoint Table may vary in length. It is used by the DEBUG facility to save the addresses of program breakpoints selected by users when they are debugging code. If you anticipate very little program development (and therefore debugging) on your system, you may reduce the table size to a minimum value. The absolute maximum number of entries is 1024.

SYSTEM, MESSAGE, AND TERMINAL BUFFERS. MPE also uses buffers to coordinate communication and data transfer between system resources. Although some of these are referred to as tables, their primary purpose is to buffer data transmitted between processes running on the system. Buffers, like tables, queues, and lists, facilitate the use of peripheral devices such as disc and tape drives, terminals, and printers and other system resources (memory and CPU time) in a multitasking environment. The following discussion describes the buffers used by MPE, along with general size guidelines to follow when you alter the system configuration.

System Buffers. System buffers are used by MPE's message system (the :LOGON, :LOGOFF, :WARN, and :TELL commands) and by Multipoint Terminal Software (MTS) lines. Each buffer consumes 128 words of memory. The minimum number of system buffers is 8; the maximum is 253 for both the E/F.00.00 and G.00.00 releases of MPE, and the average range is 18 to 25 buffers. If your system has many interactive users and a large number of streamed jobs, you will need a larger number of buffers to handle the logon and logoff processes. The result of underconfiguring the number of system buffers is very slow system response time, particularly during peak loading periods when a number of users are logging on or off, or submitting jobs.

Primary Message Table. The Primary message table, which resides in main memory, is used to buffer messages transmitted between system processes during the execution of critical areas of system code. The maximum setting for the E/F.00.00 release of MPE is 255. The maximum for the G.00.00 (and later) releases of MPE is 1023. If underconfigured, it may cause a System Failure 620.

Secondary Message Table. The Secondary Message Table also resides in main memory. It is used to buffer the content of pending messages that are transmitted between system processes using the low-level message system. The maximum setting for the E/F.00.00 release of MPE is 255. The maximum for the G.00.00 (and later) releases of MPE is 1023. Failure to allocate enough entries impedes the table and degrades system performance until more entries become available.

NOTE

MPE G.00.00 and later versions use the values you specify for the Primary and Secondary Message Tables to set up the Message Harbor Table. MPE uses the Message Harbor Table for communication between system processes. Underconfiguring the Message Harbor Table may result in a system failure 620.

Special Request Table. The Special Request Table is used for two purposes: to temporarily buffer the parameters for segment expansions, and to form the queue for devices waiting for the segment. The maximum setting for the E/F.00.00 release of MPE is 255. The maximum for the G.00.00 (and later) releases of MPE is 2048. If too few entries are allocated, it may cause a System Failure 600.

Terminal Buffers. Terminal buffers are used to buffer all input to and output from terminals. The

number of buffers needed on your system depends on the number of concurrent terminal users supported on the system. A larger number of terminal buffers must also be allocated if users are working in block (page) mode, since block mode causes a larger amount of data to be transferred to and from the terminal at one time. For example, if your installation consists almost entirely of V/PLUS users, configure the maximum number of terminal buffers, because each of these users will be working in block mode.

The maximum number of terminal buffers per port that you can configure varies: 255 on an ATC, 255 on an ADCC, 400 on an ATP with MPE version E/F.00.00, and 1024 on an ATP with MPE version G.00.00.

If you configure too few terminal buffers, terminal response time will be slow and the cursor movement will be erratic when writing data to the screen. However, because terminal buffers are memory-resident, overconfiguring the number of buffers will waste main memory.

THE MESSAGE CATALOG. The system and error messages which MPE displays on users' terminals (during sessions), or prints on their job's standard list device, are contained in a single file. Known as the message catalog, MPE uses it to store both standard system messages and error messages. Its source file is CATALOG in the group PUB of the SYS account. Like any other text file, you may examine the Message Catalog, and even modify it. Since messages contained in the catalog inform users of their current status though, exercise caution when altering any of the text. For a description of the MPE message system, refer to Section IX of this manual, entitled "MPE MESSAGE SYSTEM".

CHANGING OTHER SYSTEM PARAMETERS

The System Supervisor's primary responsibility is to ensure that the system consistently meets the needs of its users. As demands upon the system change due to more or fewer users or a change in the type of work performed on the computer, you will need to re-evaluate the original system configuration. As you know from reading the preceding discussion, configuration covers a broad range of topics. Most of the system parameters you can modify are part of the SYSDUMP Program. Some others, however, are not. Elements of the SYSDUMP Program which have not yet been discussed, and other means available to you to tune the system are the subjects of the following discussion. These include:

- Modifying miscellaneous system parameters such as:
  - o The maximum number of Resource Identification Numbers, or RINs, in the RIN pool.
  - o Logon recognition time.
  - o The maximum number of concurrently executing jobs and sessions.
  - o The default CPU time limit for job processing.
- Changing segment limits.
- Modifying the Segmented Library (SL) or system programs.
- Modifying scheduling queues.
- Permanently allocating programs with the :ALLOCATE command.
- Enabling the disc caching facility and tuning caching performance with the :CACHECONTROL command.
- Changing the V.UU.FF.

Changing Miscellaneous Values

In addition to I/O configuration changes and system table changes, the SYSDUMP Program prompts you for "MISC CONFIGURATION CHANGES". If you respond YES, you may change RIN usage, logon recognition time, the maximum number of concurrent jobs and sessions, and the default CPU time limit. These miscellaneous elements, explained below, are system resources in the same sense that a disc drive or an entry in the Code Segment Table is a resource. Just as changes to the I/O configuration or system tables affect MPE users, modifying any of these miscellaneous parameters will also affect system performance and usage.

ALLOCATING RESOURCE IDENTIFICATION NUMBERS. Resource Identification Numbers, or RINs, are used by application programs to coordinate the use of system resources between sessions or jobs, or between processes within a job. A RIN is not a physical entity, nor is it logically associated with a particular resource. It is an abstract concept supported by MPE. Programmers define the scope and purpose of one or more RINs within their program code. It is this definition, and only this definition, which gives RINs meaning.

As System Supervisor, you will not define RINs. You are, however, responsible for configuring the maximum number of local, file, and global RINs available to programmers and deleting global RINs previously defined by programmers. SYSDUMP asks you four RIN-related questions. These are shown in the partial sample of the SYSDUMP dialog below, and are explained in the following discussion:

```
ANY CHANGES? Y
.
.
.
MISC CONFIGURATION CHANGES? Y
LIST GLOBAL RINS? Y
RIN #  USERNAME.ACCTNAME
 4     JOE      .SMITH
 6     MANAGER  .ACCTNG
 10    MGR      .PROGTEAM
 23    SARAH    .G
DELETE GLOBAL RINS?
# OF RINS = <48> (MIN=23, MAX=1024, USED=23)?
# OF GLOBAL RINS = <16> (MIN=4, MAX=1024, USED=4)?
.
.
.
```

The list of global RINs identifies each RIN by the RIN number (RIN#) and the user name and account of the person who defined the RIN. RINs are acquired with the GETRIN intrinsic, and assigned a number by MPE. For further information about RIN definition and usage from the programmer's perspective, refer to Section III of the MPE V Intrinsics Reference Manual (32033-90007) under the heading "RESOURCE MANAGEMENT".

Once you have listed the currently defined global RINs, the SYSDUMP Program asks if you want to delete any of them. There is no way for you to determine from the listing if any of the listed RINs are still being used by the programmer, or if they are obsolete; therefore, before you delete a global RIN, consult the programmer to find out if the RIN can safely be deleted from the RIN table.

The next question, # OF RINS = <48> (MIN=23, MAX=1024, USED=23)? , allows you to change the maximum number of RINs in the RIN table. This maximum applies to all three types of RINs which are available to programmers: global RINs, local RINs, and file RINs. Local RINs and file RINs are considered temporary, and do not appear in the RIN listing described above. As a general

rule, the maximum number of RINs should be roughly equal to the jobs/session limit established by your System Operator with the :LIMIT command. For example, if the job limit is 5 and the session limit is 45, you should allocate approximately 50 RINs.

Although it is confusing from the phrasing of the question # OF RINS = <48> (MIN=23, MAX=1024, USED=23)? , the minimum number of RINs actually refers to the highest RIN assigned by MPE. If none of these RINs have been released, the minimum size of the RIN table is 23, and the next RIN assigned will be a minimum of 23. If, on the other hand, one or more RINs have been released, and the user requests a free RIN, a free RIN between 1 and 23 may be assigned to the user.

The MIN number will usually, but not always, be equivalent to the highest-number RIN listed in the global RIN listing. (Note that in the sample dialog above, the user SARAH.G owns RIN number 23, the largest RIN number listed.) If these two numbers are not equal, then MPE has assigned the highest RIN number to a temporary RIN, which will not be listed with the global RINs.

The next question, # OF GLOBAL RINS = <16> (MIN=4, MAX=1024, USED=4)? , tells you the number of global RINs in use (which is also apparent from the RIN listing). It prompts you to define the maximum number of global RINs available to programmers. As a general rule, this maximum should be approximately 30% of the total number of RINs allocated. To reiterate, RINs are defined and used by applications programmers: if the maximum number of RINs you allow them is too small, they should ask you to modify the number. To increase the number of available global RINs, you must reload the system from the backup tape.

SETTING LOGON RECOGNITION TIME. The next in the series of miscellaneous configuration questions is "# OF SECONDS TO LOGON = ? ". This prompts you to select the maximum amount of time, in seconds, users are allowed to enter a legitimate :HELLO or :JOB command when logging onto the system. The standard amount of time used in most installations is 120 seconds. For the G.01.00 release # OF SECONDS TO LOGON=120 (MIN=10, MAX=600)?

There are three factors which affect the selection of this value. The first is security. In this case, you may shorten the logon time limit, allowing users less time to attempt to access a password-protected account. The second factor, heavy system usage, and the third, allowing a number of users to access the system via modems, both dictate an extended amount of time to validate users' :HELLO or :JOB commands. Loading the system slows down MPE's response to logon attempts because many more processes compete for the operating system's attention. Supporting remote users requires a longer logon recognition time, since they interact with MPE at a slower data transmission rate than do local users.

LIMITING CONCURRENT JOBS AND SESSIONS. There are two ways in which the total number of concurrently executing jobs and sessions may be controlled. One way is to set the job and session limit with the Operator command :LIMIT. This provides the Operator with moment-by-moment control of the mix of jobs and sessions permitted to execute on the system. For a description of the :LIMIT command, refer to the MPE V Commands Reference Manual (32033-90006). The Operator is, in turn, limited by the job/session limits which you, as System Supervisor, initially configure during the SYSDUMP Program. The SYSDUMP Program prompts you with the following questions:

```
MAX # OF CONCURRENT SESSIONS = (MIN=1, MAX=500)? (G.01.00)
MAX # OF CONCURRENT RUNNING JOBS = (MIN=1, MAX=500)? (G.01.00)
```

The values you choose depend upon the model of the HP 3000 you use in your installation and the amount of peripheral equipment it supports. In general, you will choose these values after consulting your Customer Engineer and Systems Engineer when the system is first installed. Similarly, these values will normally only be changed when your HP representative upgrades your hardware and/or your software.

ESTABLISHING THE CPU PROCESSING TIME LIMIT. The next question asked during the SYSDUMP dialog is "DEFAULT JOB CPU TIME LIMIT = (MIN=0, MAX=32767)? ". If you enter 0, there is no limit on the amount of time the CPU will process a job. The CPU time limit is usually set at zero.

Within the limit you establish, users can limit the processing time allowed their own jobs or sessions when they enter the :JOB or :HELLO commands. (For a full description of these commands, refer to the MPE V Commands Reference Manual (32033-90006).) Furthermore, a maximum CPU processing limit can be set for accounts (by the System Manager) and groups (by the Account Manager) with the :NEWACCT and :NEWGROUP commands. If users do not limit the processing of their own jobs or sessions, and if no limits are imposed at the account and group level, the default CPU processing time limit is used.

Changing Segment Limits

During the SYSDUMP Program, responding YES to the question "SEGMENT LIMIT CHANGES? " allows you to change the following code and data segment limits:

- The maximum number of concurrently running programs.
- The maximum number of words allowed in any code segment. A useful rule of thumb is to set this value to 5 percent of the available words in memory, but in no case less than 4096 words.
- The maximum number of code segments per program file.
- The maximum size, in words, of a user stack. A smaller stack size increases multiprogramming performance. The maximum stack size depends on the data processing environment. Appropriate stack sizes for three types of installations are as follows:

Recommended Max Stack Size (words)	Environment
7000-8000	School/Students
12000-16000	Scientific/Engineers
26000-313232	Commercial

- The maximum number of words allowed in any extra data segment. A useful guideline is to set this value to 20 percent of the maximum number of words allowed in the user process stack.
- The maximum number of data segments per process.
- The default number of words initially assigned to the Z-Q area of the user process stack, when the user specified no value at program execution time. Hewlett-Packard recommends that this value be kept to a minimum. If the program is prepared from a User Subprogram Library file via the :PREP command with the *maxdata* parameter, the operating system will allow for dynamic increases in the stack size. The minimum recommended for any configuration is is 1200 words.

Section VII provides you with values that are generally recommended for the initial configuration. Over time, and through experimentation, you will develop guidelines best suited to your installation.

Modifying the Segmented Library

The Segmented Library (SL), contains the code segments, which, together, make up the MPE Operating System. You may use the Segmenter to list all code segments currently in the system library: the complete file specification is SL.PUB.SYS. This is useful for finding the physical segment number of the code segment that returned an error to a user's program. You also need access to the SL when adding, deleting, or replacing code segments. This generally occurs during operating system updates, such as when your CE installs a new version of MPE, but the need to examine the SL may arise at other times, too.

Changing Scheduling Queues

All competing processes access the central processor through MPE's Scheduling Queues. You may change the base, limits, or minimum and maximum values of the C, D, and E queues via the :TUNE command. Because changing these queues directly affects system performance, and also because the system attempts to tune itself, exercise caution when you make any changes. For a description of the :TUNE command and scheduling queues, refer to the MPE V Commands Reference Manual (32033-90006).

Permanently Allocating Programs and Procedures

You can enhance the efficiency of the system by permanently allocating a program file or procedure with the :ALLOCATE command. Whether or not such programs and procedures are currently being accessed, entries in the Code Segment Table and Extended Code Segment Table are assigned to them. This reduces the drain on system resources that otherwise may occur when programs or procedures are loaded each time they are used.

The Code Segment Table (CST) contains a list of code segments that have been allocated, including system code segments. The length of the CST is determined when the system is first configured. Each entry in the CST consumes four words of memory and contains control information about the segment as well as its length and starting address. Since entries are dynamically allocated by MPE as segments are loaded and unloaded, the actual number of entries in use at any time varies, limited only by the length of the table.

In your decision to :ALLOCATE a program, consider two things. One, how many users need the program and how frequently is it used; and two, how large is the program in terms of the total number of CST and CSTX entries it will consume. Some programs use only one or a few table entries, while others, comprised of multiple code segments referencing many SL procedures, use a large number of entries both in the CST and CSTX.

Any programs or procedures that you allocate with the :ALLOCATE command must be able to resolve all its external references in SL.PUB.SYS. Most Hewlett-Packard supplied software does so. Applications programs supplied by other vendors must assign externally referenced code segments to SL.PUB.SYS before you may :ALLOCATE them.

To deallocate a program or procedure previously loaded with the :ALLOCATE command, issue the :DEALLOCATE command. The program file or procedure segment will be immediately deallocated if it is not being used by a process. Otherwise, it is deallocated as soon as it is no longer in use.

Disc Caching

Disc caching is an optional subsystem that uses main memory to store portions of disc files, or "disc domains". The disc caching subsystem locates, moves, and replaces disc domains in main memory so that frequently referenced code is quickly available. This happens without incurring the delays caused by the physical disc access which would otherwise be necessary to complete a read operation. Cached writes need only to be moved into cached memory, rather than waiting for the physical disc updates to complete. This allows programs to continue running while physical disc updates occur. For I/O-bound systems with available memory, caching noticeably improves response time by enabling processes to execute at processor speed. CPU utilization increases, and disc utilization decreases in a cached system.

To control disc caching, four new commands have been added to the System Supervisor's command set. Explained briefly below, and documented in the MPE V Commands Reference Manual (32033-90006), they are: :STARTCACHE, :STOPCACHE , :CACHECONTROL , and :SHOWCACHE.

:STARTCACHE	Starts caching on a single logical device.
:STOPCACHE	Stops caching on a single logical device.
:CACHECONTROL	Tunes the performance of caching on your system. You will use this command to determine the number of sectors fetched from disc when a read "miss" occurs. (A "miss" occurs when the needed data is not currently stored in the disc cache.) :CACHECONTROL is also used to specify whether processing continues before posting of the cache buffers to disc is complete.

:SHOWCACHE — This command requires no special capabilities. It provides a brief summary of disc caching performance on your system.

In addition to these new commands, the FSETMODE intrinsic has been extended to allow control over disc caching on a file-by-file basis, as opposed to a system-wide basis. For information about FSETMODE, refer to the MPE V Intrinsics Reference Manual (32033-90007).

THE SYSTEM DISC

Since MPE is a disc-based operating system, the allocation of disc space, particularly on the system disc, noticeably affects system performance. This section provides you with information pertinent to the system disc, prefaced with with a discussion of disc volume conditioning, disc drive structure, and disc platter format that applies to all hard discs used with the HP 3000. These topics are addressed in the following sequence.

- Disc structure and format.
- Disc volume conditioning, including system domain discs and private volumes.
- Disc error recovery procedures.
- The layout of the system disc, including the organization of MPE, the file directory, virtual memory, and disc formatting data on the system disc.
- Modifying the system disc layout.

Disc Structure and Format

MPE always addresses a disc by its logically ascending sector addresses. A disc pack, however, consists of three or more platters and a top and bottom cover mounted on a center spindle. It is physically divided into cylinders, tracks, and sectors. Onto this physical structure, MPE imposes its own logical format through the process of disc conditioning.

DISC STRUCTURE. Figure 5-1 illustrates the disc drive structure of a typical moving-head disc. For this example, the HP 7920 disc drive is used. Each inner platter of the disc pack has two surfaces for data storage, except the servo platter, which has one data surface. A cylinder is the area of a pack where all five heads can access a particular area of a platter surface. The head mechanism moves the entire group of heads anywhere from cylinder 0 to 822, depending upon the cylinder requested by the disc driver program.

The area under one head on one surface is a track, and each track is divided into sectors. Because the read/write heads access information in an entire cylinder, the disc can read or write to any of the sectors on all five tracks of a single cylinder before moving the head mechanism to a new cylinder.

DISC PLATTER FORMAT. Each disc platter conforms to the same format. The two ways in which data is organized on a disc platter are illustrated in Figure 5-2. The left side of the platter surface shows that tracks are concentric rings of data, numbered 000 through 822. Note that tracks and cylinders are identically numbered: cylinder 0 contains the data stored on track 0 of each of three platters. The right side of the figure shows the division of sectors on a particular track.

The sector size of a disc is the amount of data that can be stored in a single sector of one track, which Hewlett-Packard defines to be 128 words, or 256 bytes. This is also the smallest amount of data which can be transferred to and from the disc at one time. Although the sector size and structure of the disc pack will vary from manufacturer to manufacturer, this type of disc head/cylinder, track/sector addressing is common for most moving-head discs.

Disc Volume Conditioning

A newly manufactured disc pack contains no formatting information or user data. Before it can be used, it must be "conditioned". This process consists of three separate steps, formatting, initializing, and labeling, as summarized below.

DISC FORMATTING. This first step of the conditioning process places addressing information on the disc so that the hardware controller can locate each track and sector.

DISC INITIALIZATION. Initializing creates the Free Space Map and Defective Tracks Table on the disc. MPE uses the Free Space Map to determine which portions of the disc currently contain user data, and which are available for file storage. The Defective Tracks Table monitors bad disc tracks and sectors, so that logically contiguous data can be stored on alternate tracks if the next physically contiguous track is bad.

Track Verification. Verifying the integrity of the disc before MPE attempts to write files to it provides an orderly method to anticipate and manage disc errors. For this reason, the second step of the initialization process creates the Defective Tracks Table by performing a track-by-track read of the disc volume before any user files are stored on the disc. Any tracks found to be defective during the initialization procedure may be reassigned to alternate tracks or deleted. If the bad track is deleted, it will not be listed in the Free Space Map, and will be inaccessible by MPE.

Track Reassignment. If the track is not deleted, it will be assigned an alternate, verifiable track. This way, when MPE cannot read from or write to a track or sector after a specified number of attempts, the file is stored on an alternate area of the disc selected from the the spare tracks originally reserved for that purpose. The information that the disc driver program needs to manage defective tracks is stored in MPE's Defective Tracks Table, and the entire process is transparent to the user.

DISC LABELING. Labeling assigns a name to the disc volume. All disc packs used by the MPE will have a disc label at track 0, sector 0. The volume name is part of the label. For each disc pack, the name must be a unique ASCII character string of up to eight alphanumeric characters beginning with a letter. Volume names are added to a disc pack when you are starting the system with the INITIAL Program.

When the INITIAL Program encounters a foreign disc (one that does not have a disc label which MPE recognizes) you are asked whether the volume should be added to the system volume set, and if so, what volume name it should be assigned. If it is a type 0 disc, you are also requested to define the logical pack size of the disc in cylinders; your answer is the amount of space available for use by system and user files. The remaining portion of the the disc will be reserved for alternate, or spare, tracks.

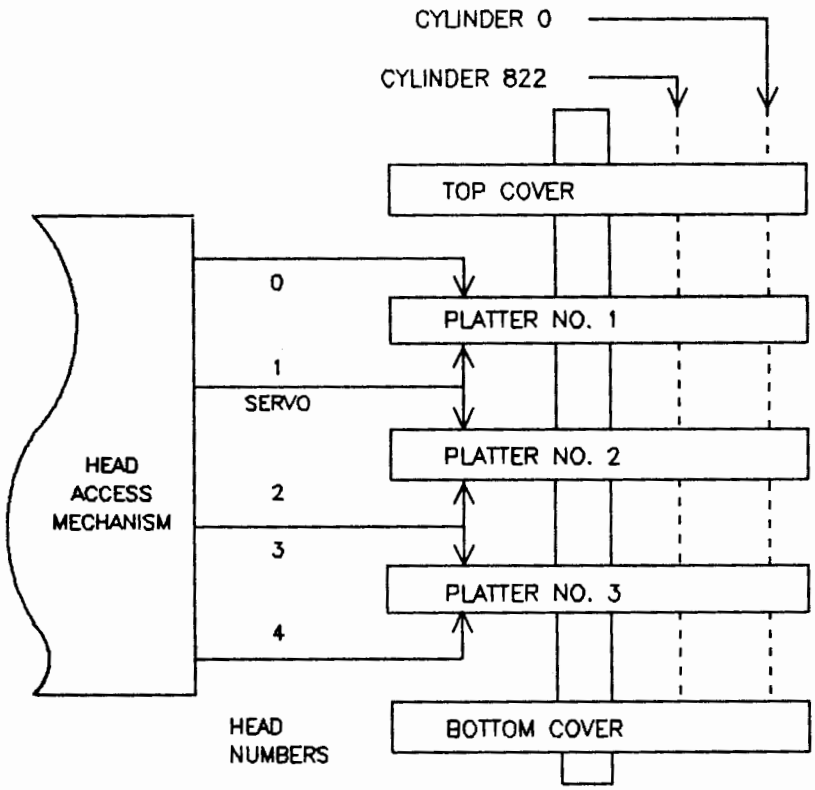


Figure 5-1. Disc Drive Structure

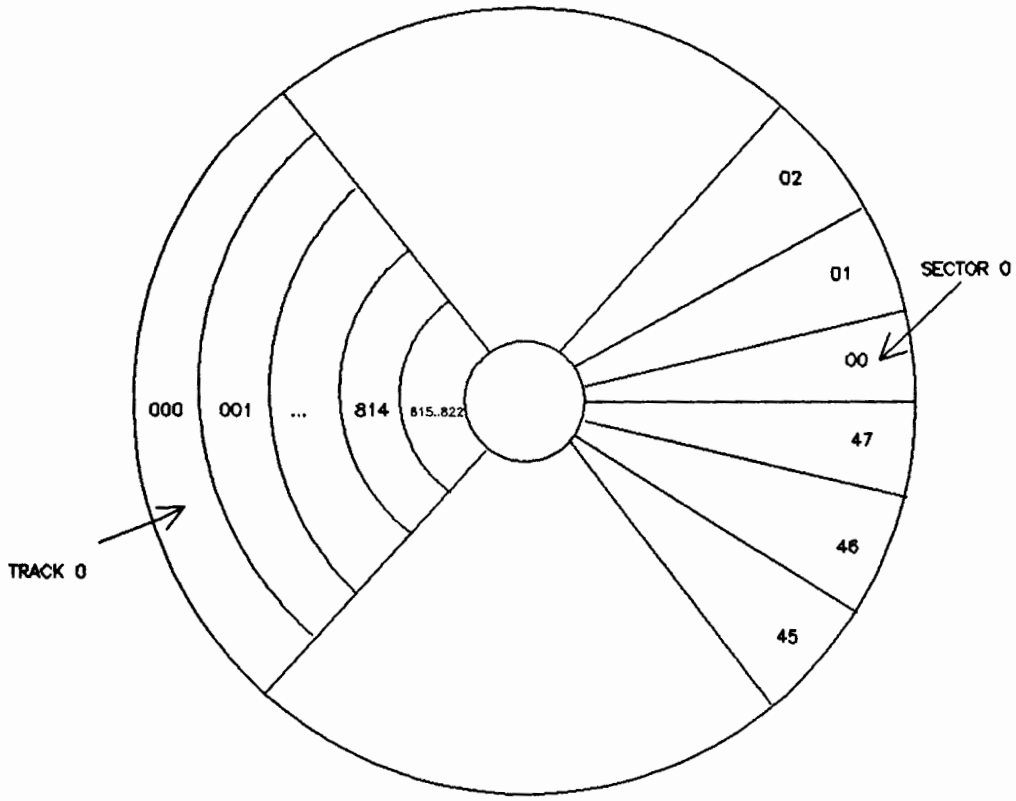


Figure 5-2. Disc Platter Format

Disc diagnostics and conditioning is normally done by your SE when the system is first installed. If you need to format your own discs, we recommend that you contact HP for assistance. You may also refer to "FORMATTING SYSTEM PACKS" in Appendix A, and the discussion of Private Volumes in Section X.

THE SYSTEM VOLUME TABLE. A list of volume names, called the System Volume Table, is stored on the system disc. It maps each volume name into the logical device number of the disc drive on which the volume is mounted. This enables you to mount disc packs of similar type on any disc drive so that you may, for example, switch disc packs between drives before a cold load.

CHECKING VOLUME TABLES DURING A STARTUP. The System Directory stores the volume and sector addresses of files. When the system is restarted with a WARMSTART, COOLSTART, COLDSTART, or UPDATE, the volume table that resides on the disc is used. The INITIAL Program checks to see that all previously defined volumes are indeed mounted; doing so ensures that all files contained in the file directory are still there. A volume may be added but not deleted, since files defined in the directory may reside on one of the volumes.

When the system is cold loaded with the RELOAD option, the volume table on the cold load tape is used. Discs are checked for the validity of both the volume label and the Defective Tracks Table. If the label and the table are not corrupt, the INITIAL Program will use the information on the disc without rebuilding a volume label or Defective Tracks Table over the existing information. At this time, volumes may be added or deleted, since all of the user files defined in the directory (on the tape) will be reloaded onto one of the available volumes. The INITIAL Program automatically assigns sector 1 of track 0 as the Defective Tracks Table on a newly formatted pack.

Disc Error Recovery

MPE expects bootstrap procedures, system tables, the accounting structure and file directory, files, and system programs to be in the same logically ascending order on the system disc each time MPE is restarted. Therefore, it is critically important to detect and compensate for disc errors on logical device 1 which might otherwise obstruct the reliable operation of MPE. If disc errors are discovered during a cold load, the INITIAL Program assists you or your Operator to work around the errors before the system is brought on line.

ERROR RECOVERY DURING THE INITIAL PROGRAM. The INITIAL Program will automatically reassign any defective tracks it encounters in the Defective Tracks Table. To handle track errors during a restart of the system, you or the Operator may choose one of the following four courses of action:

1. DELETE. Causes the INITIAL Program to set a permanent defective code within the track entry of the Defective Tracks Table, which cannot be removed from the Table. The program then alters the disc Free Space Map so that all sectors on the bad track are inaccessible by MPE. If the cold load procedure being executed is not a RELOAD, the INITIAL Program will purge the file or files stored on the defective track.

2. REASSIGN. Causes the INITIAL Program to write a special alternate track address on the defective track. The alternate track will then be used in place of the defective one. During a track reassignment, the program also modifies the Defective Tracks Table. If the system is not undergoing a RELOAD, MPE will purge the file or files that were stored before and after the defective track was found. If you are performing a RELOAD, files can be stored preceding and following the defective track.

3. RECOVER. Causes the INITIAL Program to remove an entry in the Defective Tracks Table, enabling you to attempt to access the track again. There are several valid reasons for choosing to ignore the suspect-track report: if, for example, a dust particle had caused the error, and no permanent damage to the disc surface occurred, another access will have a good chance of succeeding.

4. "CARRIAGE RETURN". This will leave the entry in the Defective Tracks Table. During the next cold load, the INITIAL Program will again request the disposition of both the specified track and any new entries that may have been added to the table.

SPECIAL CONSIDERATIONS IN DISC ERROR HANDLING. Disc errors which occur in certain physical areas of the disc must be handled in light of the following considerations:

- You may not use the Delete or Reassign options for tracks in the Directory area of the system disc except during a RELOAD. In this case, the entire directory will be moved to a single physically contiguous area on the disc. No defective tracks are allowed in the Directory.

- You may not use the Reassign option for tracks in the alternate track area of the moving-head disc pack. This restriction accommodates those hardware controllers which can handle only one level of defective tracks for a given disc access.

- You may not use the Delete or Reassign options for tracks in the reserved areas of any disc, whether it be *ldev* 1 (the system disc) or another logical device. For fast access and chaining of input/output operations, the system software must have contiguous access to certain positions of the disc. The Volume Label and Defective Tracks Table, for example, must always occupy sectors 0 and 1 of track 0 on any disc.

- During a COOLSTART, you may not use the Delete or Reassign options for tracks in the system area of the disc. Because a COOLSTART loads the system from the system disc rather than from magnetic tape or serial disc, a track error and subsequent Delete or Reassign option would be equivalent to destroying a portion of the system software.

The Layout of the System Disc

The System disc, *ldev* 1, typically stores all system files (the majority of which reside in the Segmented Library), the file directory, the accounting structure, the subsystem and utility programs, and virtual memory. A portion of the system disc may also be used to store spool files. Since your installation's resource requirements directly affect, and are affected by, the utilization of space on the system disc, it will be important for you to monitor disc usage.

Figure 5-3 is a block diagram illustrating how the operating system, the directory, and virtual memory are typically arranged on the system disc. Sectors 0 through 399 are reserved for the disc volume label, the bootstrap program, and the Defective Tracks Table.

The disc Free Space Map, the directory, and virtual memory do not reside at a fixed, predetermined location. Their location will change when you alter the configuration or when you update or install a new version of system software. The disc address of the directory and virtual memory, and as a consequence, the starting address of user files, will also shift when you enlarge the directory or virtual memory. Although it is possible to reduce the size of the directory and virtual memory, their size usually grows over time, reflecting increasing, rather than decreasing demand for system resources.

Changing the System Disc Layout

During the SYSDUMP Program you may change the disc layout by modifying the following parameters:

- The amount of space reserved for virtual memory on the System disc (*ldev* 1).
- The size of the system directory.

ALTERING THE SIZE OF VIRTUAL MEMORY. Virtual memory is an area on disc used to temporarily store data segments needed by executing processes. Moving data segments to main memory from virtual memory, and swapping those stored in main memory out to disc, is known as "disc swapping". Like track reassignment, disc swapping is transparent to the user. However, it is of considerable significance to the overall performance of the system. By reserving a portion of the system disc as a supplemental data storage area, many more processes can execute "simultaneously" than would otherwise be possible.

The size of virtual memory determines the amount of data which can be temporarily transferred to disc. This will in turn affect processing speed and system response time. If an executing job or program runs out of virtual memory, it will abort.

How Virtual Memory is Allocated. Virtual memory is allocated in 4-sector blocks. Each data segment using virtual memory will require approximately 250 sectors of disc space. To determine the amount of virtual memory you will need in your installation, estimate the following parameters: the average number of concurrent users, the average stack size, the average number of buffered files open for every user, and the number of users who will be simultaneously loading programs. Use these figures in conjunction with the values listed below to calculate the amount of disc space you should reserve for virtual memory:

- 32 sectors for the Command Interpreter stack.
- Approximately 8 sectors for all unbuffered files, depending upon the buffer size.
- 4 sectors for every open buffered file.
- 16 sectors for the system area in the user's stack, plus 4 sectors for every 512 words in the DL/Z area of the stack.
- 40 sectors for each program being loaded in the system.

Enlarging Virtual Memory During the INITIAL Program. When you attempt to increase the amount of disc space reserved for virtual memory during a restart of the system, the INITIAL Program tries to locate a contiguous, defect-free area. If no such area exists, the program will search for an area containing deleted tracks. If it is again unable to locate space for virtual memory, the program will consider an area which contains both reassigned and deleted tracks. If none of these search options is successful, all of the space previously reserved for virtual memory is released from that volume.

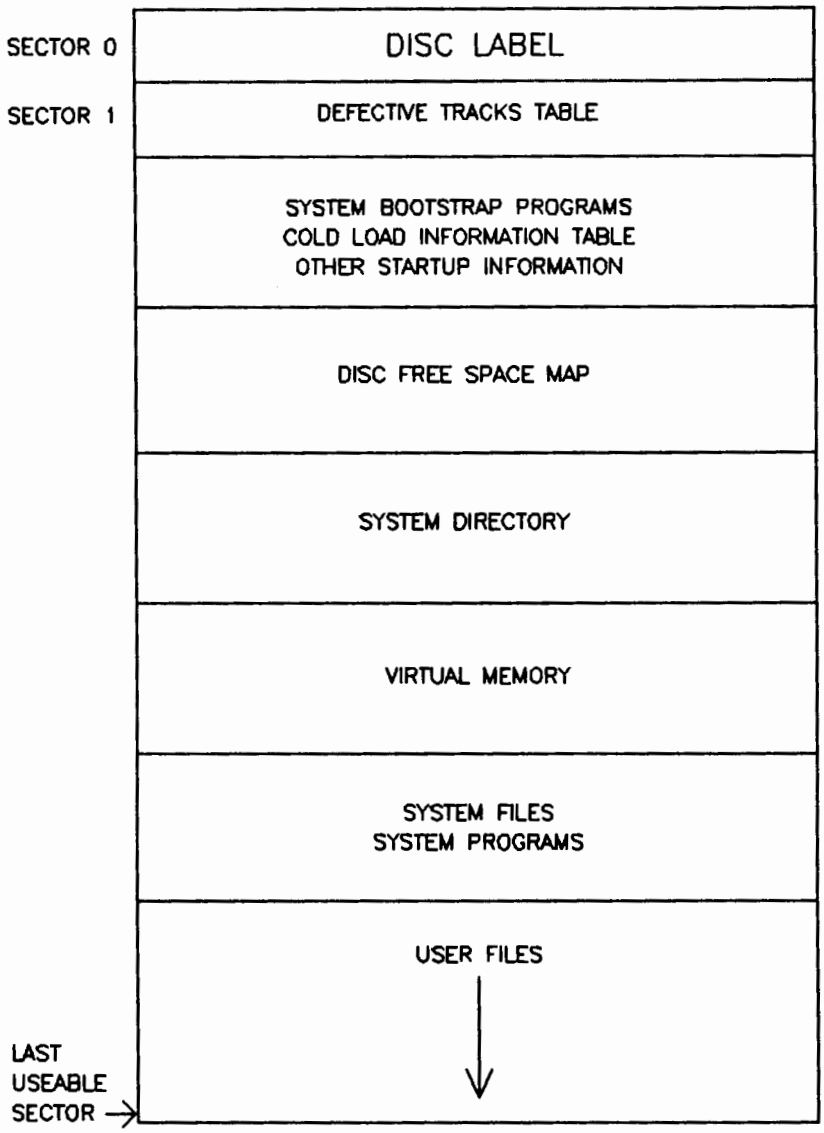


Figure 5-3. Typical System Disc Layout

At this point, three courses of action are available to you:

1. Repack the discs to recover lost disc space. This involves creating a SYSDUMP tape and cold loading system and user files with the RELOAD process using either the SPREAD or COMPACT options. All system domain discs, not just the system disc, will be affected by the reduction in fragmentation.

2. Transfer any user files stored on the system disc to another disc volume. This will make more space available for critical files, tables, and programs which must be stored on logical device 1.

3. Use the amount of virtual memory previously allocated until you can exercise options 1 or 2.

CHANGING THE SIZE OF THE SYSTEM DIRECTORY. You also can change the maximum number of disc sectors available for the system directory, which contains the file and accounting structure

addresses for all accounts, groups, and users in the system. To determine the approximate number of sectors needed for the disc directory, use the following formula:

SECTORS = 6 + 6 * A + (5.4 * G) + (0.15 * U) + (0.05 * F) + (0.5 * VS) + (0.5 * VC)

where:

A = Total number of accounts in system (maximum value = 744).
G = Total number of groups in system (maximum value per account = 372).
U = Total number of users in system (maximum value per account = 806).
F = Total number of files in system (maximum value per group = 1722).
VS = Total number of volume sets in the system (maximum value per group = 32).
VC = Total number of volume classes in the system (maximum value per group = 32).

CHANGING THE MAXIMUM SPOOL FILE SIZE. When, during the SYSDUMP Program, you respond YES to the question "DISC ALLOCATION CHANGES? ", you are prompted to change the maximum number of spool file kilosectors and the extent sizes with the following questions:

```
MAX # OF SPOOLFILE KILOSECTORS = <XXX> (MIN=0, MAX=777777)
# OF SECTORS PER SPOOLFILE EXTENT = <XXXXX> (MIN=128, MAX=32764)
```

The first question allows you to determine the maximum amount of disc space that the spoolers can use to build and store spool files. However, spoolers compete with other processes for file space, so the number of sectors you specify does not guarantee that the amount will be available for spool files.

Your response to the second question determines two things: the size of spool file extents, and the maximum spool file size. This is because spool files like all MPE disc files, are limited to a maximum of 32 extents, regardless of the size of each individual file extent. The default extent size is 384 sectors. Using the default, the maximum spool file size is:

384 sectors * 32 extents = 12,288 sectors

This is approximately equal to 25,000 print lines.

You should increase the extent size only if your spool files are very large. File extents must be contiguous areas of disc space, and the larger they are, the more difficult they are to find. Particularly when disc space on the spooling disc is fragmented, a large spool file extent size may require using RELOAD, repacking the discs to recover usable space, or using VINIT to CONDENSE with RECOVER more often than would be necessary with a smaller extent size.

MPE LOGGING FACILITIES

MPE provides users with three separate logging facilities: system logging, memory logging, and user logging. The operation of each is unique and has no effect on the other. Each has a specific purpose, defined below.

System Logging — System logging is intended to record the use of certain system resources by accounts, groups, and users on a job/session basis. As System Supervisor, you choose to enable or disable system logging during the SYSDUMP Program; it is also your responsibility to determine which events will be logged.

Memory Logging	The Memory Logging facility records errors which have occurred in memory. The System Manager determines how frequently the log file is posted with memory error data by using the utility MEMTIMER. He or she is also responsible for analyzing the log file (MEMLOG.PUB.SYS) with the MEMLOGAN utility, and flushing the log file.
User Logging	User logging allows users and subsystems to record additions and modifications to data bases and other files used in applications programs. As Supervisor, you will determine the maximum number of logging processes and the maximum number of users per logging process.

In the following discussion, system logging is explained in detail. Your role in user logging is also discussed. However, since this topic is treated in depth elsewhere, the information presented here is selective rather than comprehensive. Additional information about user logging is presented in Section III ("OPTIONAL CAPABILITIES") of the MPE V Intrinsics Reference Manual (32033-90007) and in Section II ("COMMAND DEFINITIONS") of the MPE V Commands Reference Manual (32033-90006). Memory logging, which is the System Manager's responsibility, is not discussed in this section. For further information about memory logging, refer to the MPE V Utilities Reference Manual (32033-90008).

System Logging

System logging records the use of certain resources by accounts, groups, and users. Like the Accounting System, system logging can be used for billing purposes or simply for obtaining an overview of system usage. Unlike the Accounting System, however, system logging describes system usage by creating a running log of actual events, correlated with the job or session that caused each event. System logging provides a means to record system usage on a job/session basis. This creates an audit trail which can tell you: who is and who has been using the system; when; for how long; which files were accessed; and which commands and system facilities were used. For a discussion of Auditing System Use refer to the *MPE V/E Security and Account Structure Manual* (32033-90136).

To modify system logging, or simply to list the current logging status, respond "YES" to the SYSDUMP questions "LOGGING CHANGES? " and "LIST LOGGING STATUS? ". MPE will respond by displaying a list of system logging events, their type, and their status (whether ON or OFF) as shown in the sample listing below. Following this, the SYSDUMP Program prompts you to change two additional logging parameters: the log file's record size (in sectors), and the number of records in the log file (i.e., the maximum log file size). For more details, refer to the description of Steps 112 and 118 of the SYSDUMP Dialog in Section 7.

The majority of logging events displayed during the SYSDUMP Program are optional, meaning that you can select whether they will be recorded or not. Three events, in addition to the "LOGGING ENABLED" event, are always enabled when the system is started. These three are: Type 11, I/O error, Type 46, Maintenance events, and Type 47, DCU events. (The last two, Type 46 and Type 47, are not displayed when you list the logging status during the SYSDUMP Program.) Therefore, only optional logging events can be disabled. Logging itself cannot be disabled, regardless whether you change the status of the first event, LOGGING ENABLED, to "OFF" or not.

```
LOGGING CHANGES? Y
LIST LOGGING STATUS? Y
TYPE          EVENT          STATUS
  1    LOGGING ENABLED         ON
  2    JOB INITIATION          ON
  3    JOB TERMINATION         ON
  4    PROCESS TERMINATION     ON
  5    FILE CLOSE              ON
  6    SYSTEM SHUTDOWN         ON
  7    POWER FAIL              ON
  8    SPOOLING                ON
  9    LINE DISCONNECTION      ON
  10   LINE CLOSE              ON
  11   I/O ERROR               ON
  12   VOLUME MOUNT            OFF
  13   VOLUME SET MOUNT        OFF
  14   TAPE LABELS             OFF
  15   CONSOLE                 ON
  16   PROGRAM FILE EVENT      ON
  17   CALL PROGRESS SGNLS     OFF
  18   DCE PROVIDED INFO       OFF
  19   SYSTEM SOFTWARE TRACER
  36   RESTORE                 OFF
  37   PRINTER ACCESS FAIL     OFF
  38   ACD CHANGES             OFF
  39   STREAM INITIATION       OFF
  40   USER LOGGING            OFF
  41   PROCESS INITIATION      OFF
 *42   SECURITY CONF CHNGS     OFF
 *44   FILE OPEN LOGGING       OFF
 *45   COMMAND ACCESS          OFF
STATUS CHANGES? N
LOG FILE RECORD SIZE (SECTORS) = 2 (MIN=1, MAX=8)?
LOG FILE SIZE (RECORDS) = 1024 (MIN=16, MAX=32767)?
```

* Valid only if HP Security Monitor (HP30392) has been installed.

The events you choose to monitor are recorded on log records contained in a disc file. Each event is recorded in one logical record. As System Supervisor, you can configure the log files, create, close, and purge such files, and display the status of the log file currently being used to record system events. However, the contents of log files (the individual log records) are not displayed nor otherwise used by MPE. They are intended for system users who use the information for billing and/or security purposes. The system logging records are also used to analyze system performance. For example, "I/O ERROR" event, which is always turned ON, helps your SE/CE determine the cause of system failures. Log files can be read by calling them with the LISTLOG5 utility.

CREATING AND NAMING LOG FILES. When system logging is first enabled, MPE creates and opens the first log file and begins recording events as they occur. When this log file is full, or when the system is shut down and cold loaded, MPE creates and opens a new log file. This new file becomes the current log file, and the previous log file is deactivated. The System supervisor can also open a new log file by using the :SWITCHLOG command.

Log file names always take the form "LOG*xxxxx*.PUB.SYS", where *xxxx* is the log file number, ranging from 0000 to 9999. The first log file is LOG0000; when it is closed and a new log file opened, MPE increments *xxxx* by one. Each time a new log file is created, a message similar to the following displays the new log file number:

```
LOG FILE NUMBER xxxxx ON
```

LOG FILE COMMANDS. Three MPE commands, :SHOWLOG, :SWITCHLOG, and :RESUMELOG are available to you to control system logging. At any time you may issue the :SHOWLOG command to display the number of the current log file as well as the amount (percentage) of available file space already used to record logging events. For example, if the current log file is LOG9675, and it is 16 percent full, the following response to ":SHOWLOG" would be displayed:

```
LOG FILE LOG9675 IS 16% FULL
```

The second command, :SWITCHLOG, will close the current log file before it is full, and create and open a new one. The third command you may use to control system logging is :RESUMELOG, which, as the name implies, resumes the logging process after it is suspended due to an error.

To summarize, there are three ways in which a new log file is created and the current one deactivated.

1. When the current log file is full.

2. When the system is restarted.

3. When the System Supervisor issues the :SWITCHLOG command.

Because new log files are opened and the current one closed with varying frequency, several log files are usually stored on the system at one time. MPE will post logging events to only the current log file. The other log files, which are no longer used by MPE, are considered permanent disc files. As such, they remain on disc until you copy them to tape and purge the old log files from the disc. You may also duplicate them on tape without purging the disc files.

LOG RECORD AND FILE SIZE. After the list of logging events and their status is displayed, SYSDUMP prompts you to choose the log file record size and the size of the log file itself with the following questions.

```
LOG FILE RECORD SIZE (SECTORS) = (MIN=1, MAX=8)?
LOG FILE SIZE (RECORDS) = (MIN=16, MAX=32767)?
```

The first question asks you to define the number of logical records to be treated as a single physical unit. This is called the "block size", and is determined in disc sectors. The block size cannot exceed 1024 words, or 8 sectors. Because the logging system uses an internal double-buffering system, the block size will also be equivalent to the size of the log file buffer.

The second question asks you to define the size of the log file size, specified in number of blocks. Regardless of configured size, the log file is always created with 16 disc extents. One extent is allocated initially; others are allocated, one at a time, as needed. The number of sectors in each extent (except possibly the last) is determined by the following formula:

Sectors = [(Log File Size)/16] * Log Record Size

FILE SECURITY. Log files are created by, and therefore belong to, the system logging process. By implication, their creator is the original System Manager, MANAGER.SYS. They are assigned the MPE default security provisions typically assigned files within the PUB group of the SYS account. The current log file can only be modified by users assigned Account Librarian (AL) capability for SYS account, or by PUB group users (GU capability) of the SYS account.

Once the log file has been closed, MPE changes all the file access restrictions on the file from "ANY" to "CR" (the file creator) only. The result is that only the System Manager controls access to current and closed log files. You, as System Supervisor, manage the logging facility by specifying the log file and record size, enabling and disabling logging, and selecting which events will be logged.

CONSOLE MESSAGES FOR LOG FILES. Log file status and error messages are reported to the system console. They conform to the format: *hh/mm/PIN/message*

Where:

hh = The hour of the day.
mm = The minute of the hour.
PIN = The process identification number.
message = The message text.

The log file status message text may consist of any of the following:

- "LOG FILE NUMBER *xxxxx* ON" indicates that a new log file has been created. This message always appears prior to the *WELCOME* message after a cold load. If displayed while the system is running, it indicates that the previous current log file has been closed.

- "LOG FILE NUMBER *xxxxx* IS 1/2 FULL" indicates that logging data fills up half of the log file's allotted file space.

- "LOG FILE NUMBER *xxxxx* IS 3/4 FULL" indicates that logging data fills up three-quarters of the log file's allotted file space.

- "LOG FILE NUMBER *xxxxx* LOGGING RESUMED" indicates that a :RESUMELOG command was successfully executed.

Log file errors are reported in one of the following messages. Refer to Table 5-3 for a summary of log file error numbers, their meaning, and whether they are recoverable or irrecoverable errors.

- "LOG FILE NUMBER *xxxxx* ERROR *#nn*. LOGGING STOPPED" indicates that an irrecoverable error occurred; system logging is disabled until the next system startup.

- LOG FILE NUMBER *xxxxx* ERROR *#nn*. LOGGING SUSPENDED" indicates that a recoverable error occurred. A recoverable error will temporarily suspend logging until the System Supervisor issues the :RESUMELOG command, discussed above.

FILE ERROR HANDLING. Two types of errors can prevent the System Logging facility from maintaining the log file:

- Catastrophic errors, which are either physical input/output errors or unit failures. These errors are not recoverable, and will disable logging until the next cold load.

- Managerial errors during the creation and management of the log file. These are usually recoverable, and will only cause logging to be temporarily suspended until the problem is resolved and a :RESUMELOG command is issued.

When logging resumes, a special log record is created, denoting the total number of records missed, the number of job/session initiation records missed, and the number of job/session termination records missed. To analyze this log record, run the LISTLOG5 utility (if on the MPE version E/F.00.00, run LISTLOG2). The LISTLOG5/LISTLOG2 utility requires SM capability; it is discussed in the MPE V Utilities Reference Manual (32033-90008).

Table 5-3. Log File Errors

Error No.	Error	Recoverable?
1	Input/output error in accessing the system disc.	No
2	Input/output error in accessing disc log file.	No
21	Data parity error.	No
26	Transmission error.	No
27	Input/output timeout.	No
28	Data overrun.	No
29	SIO failure.	No
30	Unit failure.	No
46	Insufficient disc space to create log file.	Yes
47	Input/output error on file label.	No
57	Virtual memory not sufficient.	No
61	Group (PUB) disc space exceeded in creating log file.	Yes
62	Account (SYS) disc space exceeded in creating log file.	Yes
63	Group disc space exceeded in allocating new extent to the log file.	Yes
64	Account disc space exceeded in allocating new extent to the log file.	Yes
100	A file of the same name as the current log file already exists in the system file directory.	Yes
102	Directory input/output error.	No
103	System directory overflow.	No
105	Illegal variable block structure.	No

LOG FILE FORMAT. All log files are initially created as files containing fixed-length records, but are later transformed into files formatted for variable-length records. They should always be treated as files containing variable-length records, accessed sequentially.

For a log file, the end-of-file pointer can point at the last record (block) written to the file (if the file is closed normally) or at any point beyond the last record written (if the system has not been shut down); in the latter case, all space following the last record is padded with zeros.

The general format of a log file is shown in Figure 5-4.

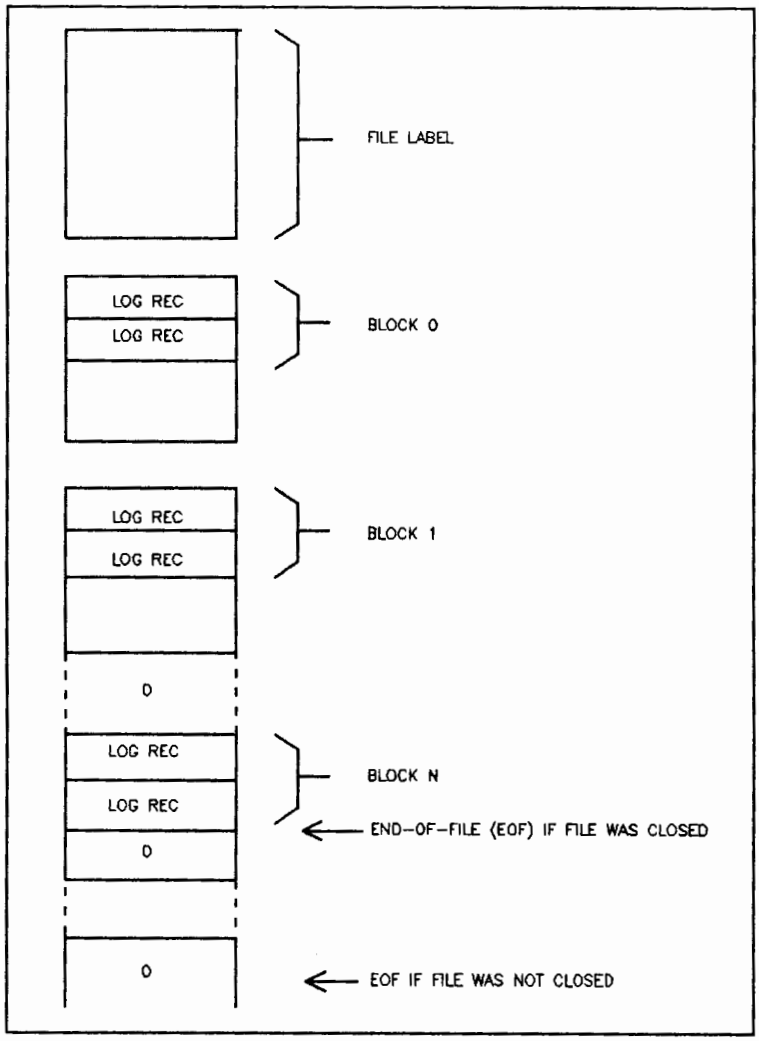


Figure 5-4. Log File Format

LOG RECORD FORMATS. Log records are written to the log file by MPE. This is done by calls to a special log intrinsic or process that requires the recording of a particular event. The log records can be subsequently accessed, manipulated, and displayed through user-supplied analysis routines.

Twenty-three types of log records can be entered (see Table 5-4).

Table 5-4. Log Record Types

TYPE NO.	TYPE	LENGTH
0	Log Error Record	10
1	System Up Record	17
2	Job Initiation Record	30
3	Job Termination Record	12
4	Process Termination Record	14
5	File Close Record	29
6	System Shut-Down Record	9
7	Power Failure Record	7
8	Spooler's Spoolfile Done Record	34
9	Line Disconnection Record	43
10	Line Close Record	14
11	I/O Error Record	Varies
12	Physical Mount/Dismount Record	24
13	Logical Mount/Dismount Record	41
14	Tape Labels Log Record	31
15	Console Log Record	Varies
16	Program File Event Record	23
17	Call Progress Signals Log Record	8
18	DCE Provided Information Record	10
44*	File Open Record	46
45*	Command Access Log Record	Varies
46	MPE Maintenance Request Log Record	Varies
47	Diagnostic Control Unit Log Record (For Series 64 Systems)	Varies

* Valid only if HP Security Monitor (HP30392) has been installed.

When logging is enabled, log failure and head records are always output. The remaining types of records may or may not be omitted, depending on the options selected during system configuration.

Each log record has a heading, that is comprised of the first six words of the record. The format of the heading is the same for all log records. Following is an illustration of the heading format.

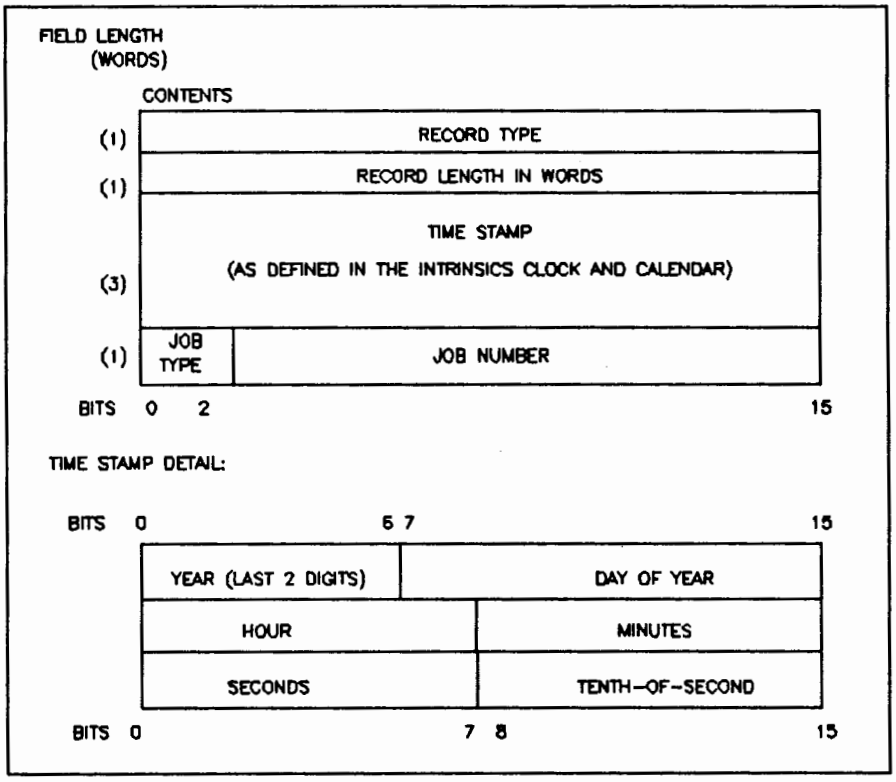


Figure 5-5. Log Record Heading Format

The following definitions describe the components of the Log Record heading:

RECORD TYPE. defines the record as one of the 21 types described above.

RECORD LENGTH. defines the number of words that the record contains.

TIME STAMP. is the date and time, in the format shown in the lower portion of Figure 5-5.

JOB TYPE. is the type of main process being run, where bit 0 and 1 have the following meaning:

(00) System
(01) Session
(10) Job

JOB NUMBER is a number defining the job/session under which the log record has been output. If this last word is 0, this means that the record is related to the system and was not output for a user.

Figures 5-6 to 5-26 show the format for each type of log record.

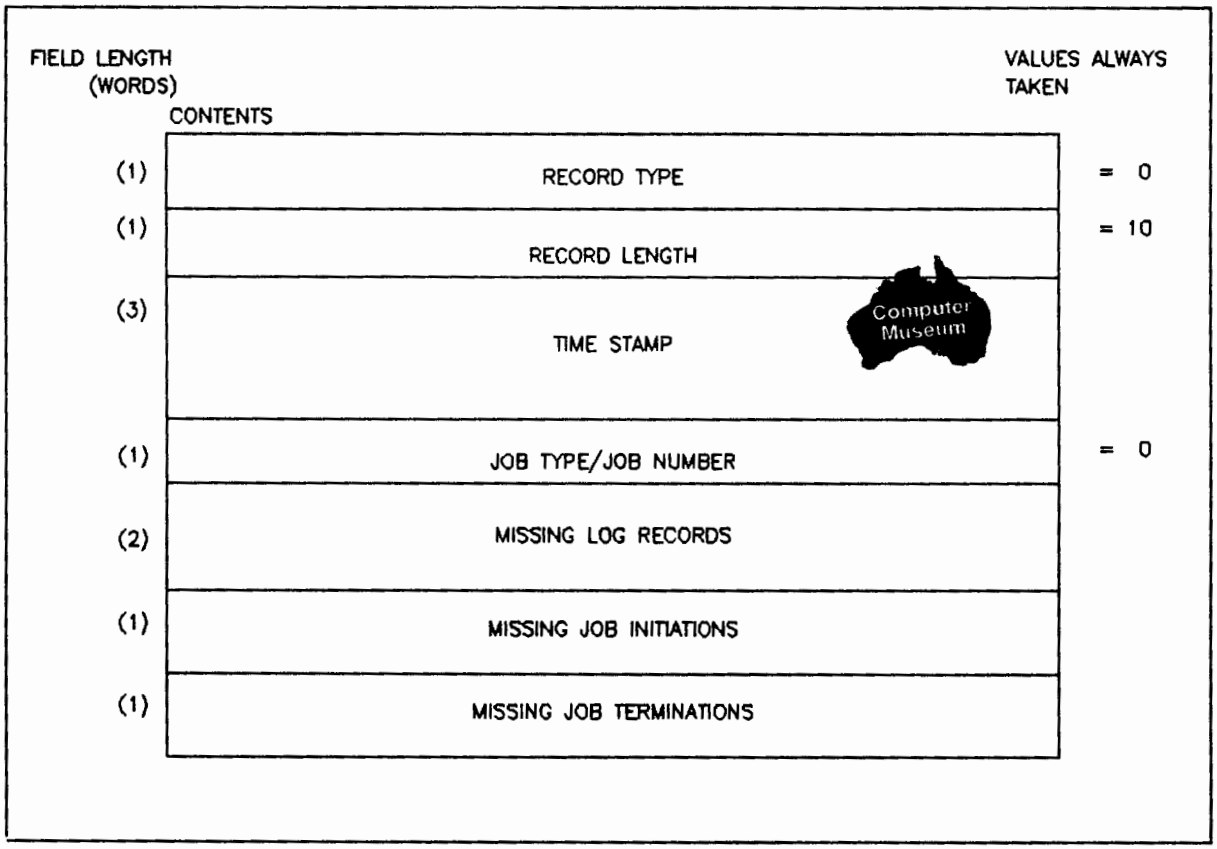


Figure 5-6. Log Error Record (Type 0)

A log error record is issued after a recoverable logging error has occurred, and when logging resumes. Its characteristics are described below.

JOB TYPE/JOB NUMBER	is always set to 0.
MISSING LOG RECORDS	(2 words) is the total number of Log Record events occuring while the Loggins System was suspended.
MISSING JOB INITIATIONS	(1 word) is the number of jobs/sessions initiated while logging was suspended.
MISSING JOB TERMINATIONS	(1 word) is the number of jobs/sessions terminated while logging was suspended.

Note: The last three numbers correspond to log records that would have been omitted if logging was not suspended.

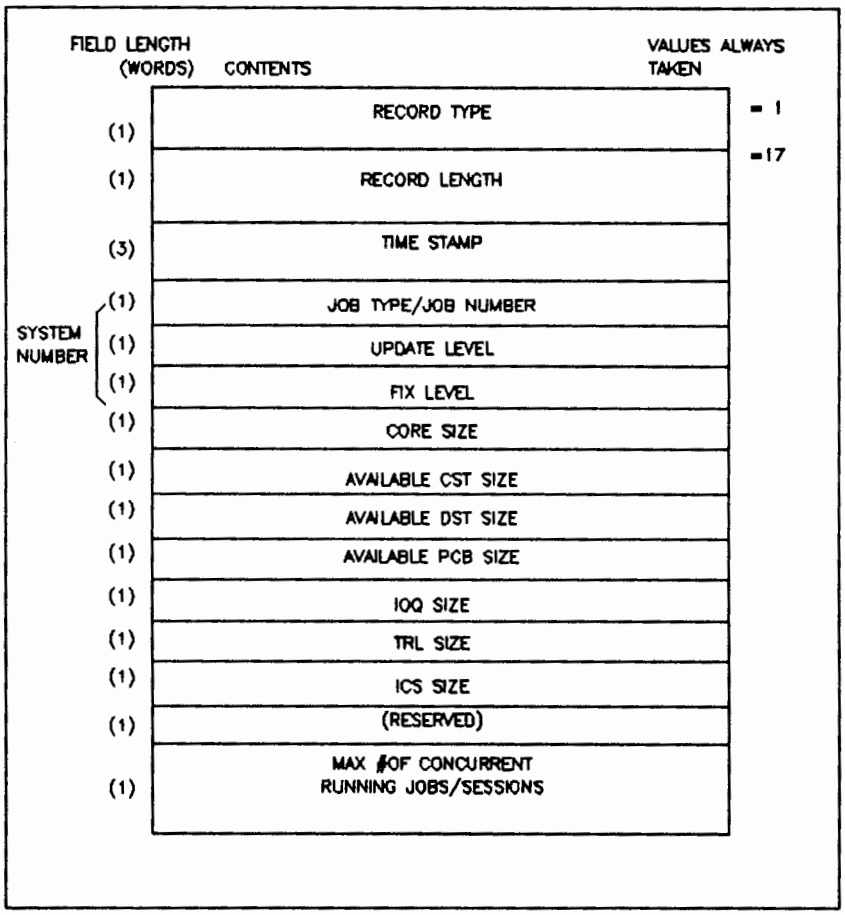


Figure 5-7. System Up Record (Type 1)

A System Up record is issued after each cold-load or reload before the system is up. Its characteristics are defined as follows:

JOB TYPE/JOB NUMBER	is always set to 0.
SYSTEM NUMBER	(2 words) is comprised of:
	UPDATE LEVEL (1 word) is the update level of the system, composed of two ASCII characters.
	FIX LEVEL (1 word) is the fix level of the system, composed of two ASCII characters.
CORE SIZE	(1 word) is the main-memory size in K (1024) words of memory.
AVAILABLE CST SIZE	(1 word) is the number of entries in the Code Segment Table.
AVAILABLE DST SIZE	(1 word) is the number of entries in the Data Segment Table.
AVAILABLE PCB SIZE	(1 word) is the number of entries in the Process Control Block.
IOQ SIZE	(1 word) is the number of entries in the Input/Output Queue.
TRL SIZE	(1 word) is the number of entries in the Time Request List.
ICS SIZE	(1 word) is the number of words in the Interrupt Control Stack.
MAX = OF RUNNING JOBS	(1 word) is the maximum number of running jobs/sessions allowed in execution.

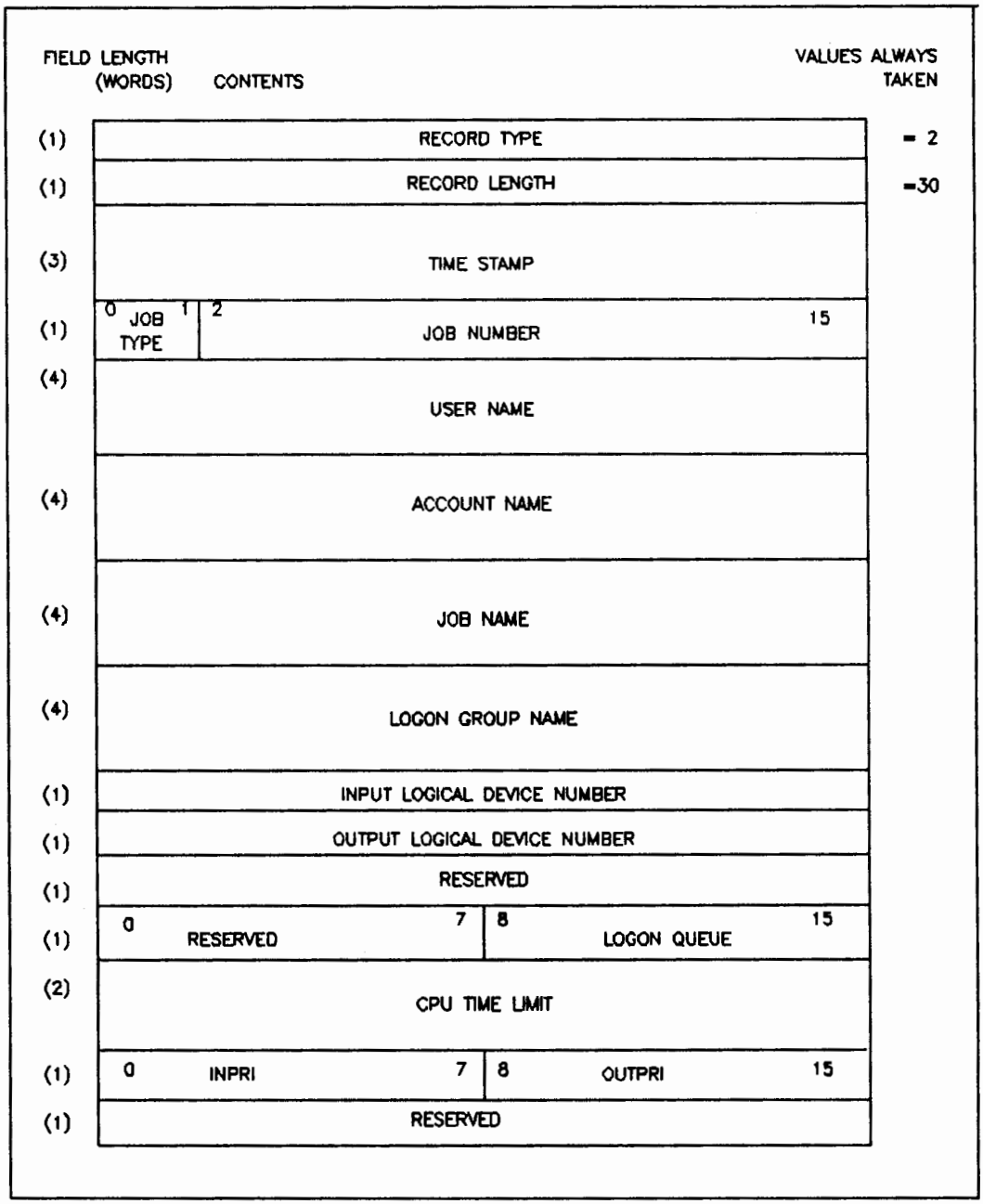


Figure 5-8. Job Initiation Record Type (Type 2)

A Job Initialization record is issued by the MPE Command Interpreter following a successful logon to MPE. Its characteristics are described below.

JOB TYPE/JOB NUMBER (1 word) are the type and number of job/session.

USER NAME (4 word array) is the user name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

ACCOUNT NAME (4 word array) is the account name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

JOB NAME	(4 word array) is the job name as specified on the :JOB card, or the session name as specified in the :HELLO command, left- justified, blank-padded. If jobname or sessionname was omitted,
LOGON GROUP NAME	(4 word array) is th group name under which the log on was performed, left-justified, blank padded.
INPUT LOGICAL DEVICE NUMBER	(1 word) is the logical device number of the standard input device for the job/session.
OUTPUT LOGICAL DEVICE NUMBER	(1 word) is the logical device number of the standard listing device for the job/session.
LOGON QUEUE	(1 byte, right justified) is a single ASCII character representing the sub-queue in which the job/session will execute;i.e. "B", "C", "D", OR "E".
CPU TIME LIMIT	(2 words) is a double-word showing the central processor time limit as specified on the :JOB card or in the :HELLO command. If no limit applied, the field contains -1. If omitted, the field contains 0.
INPRI	(1 byte) is the job selection priority as defined on the :JOB card, or the default value if no priority specified.
OUTPRI	(1 byte) is the job output priority as specified in the OUTCLASS parameters of the :JOB card, or 0 if no priority is specified or the job type is a session.

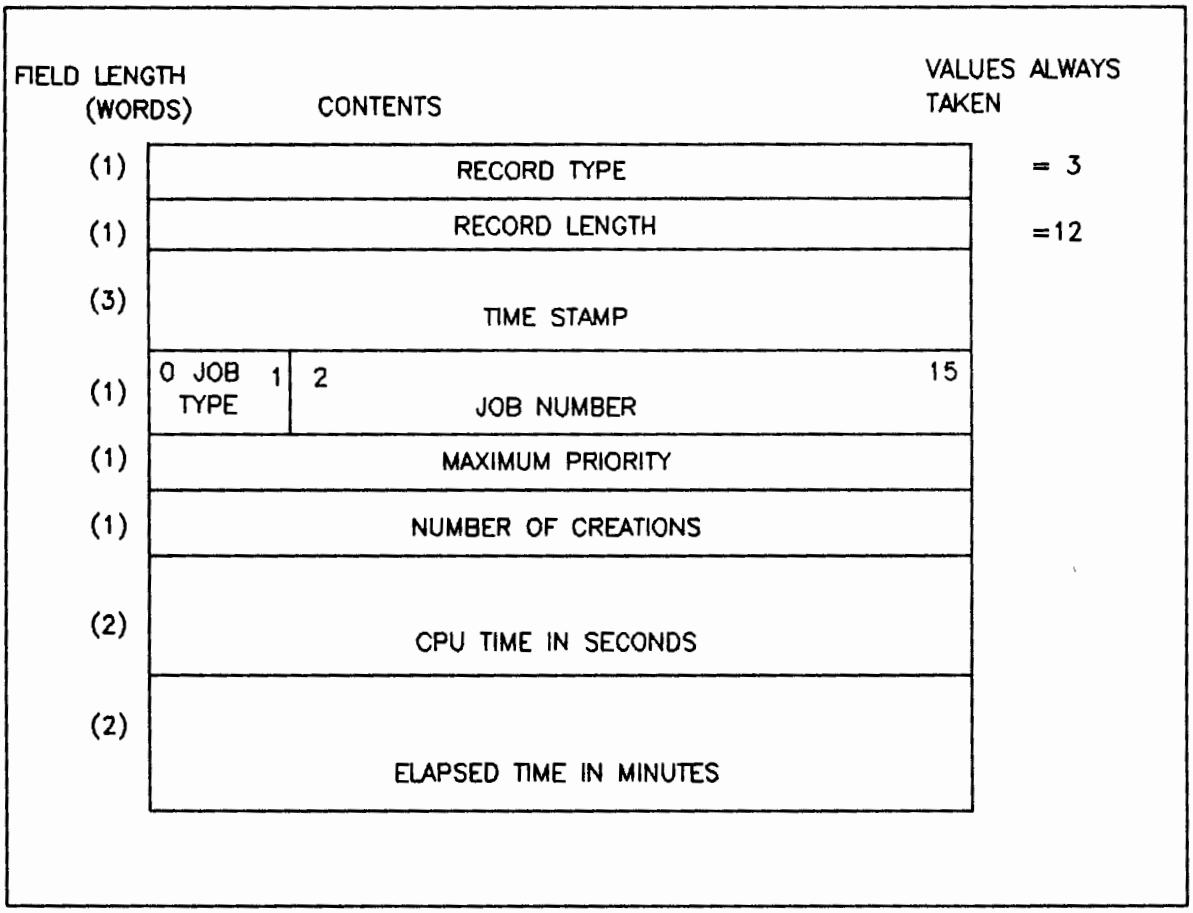


Figure 5-9. Job Termination Record (Type 3)

A Job Termination Record is issued at the end of a job or session, regardless of the cause of termination.

JOB TYPE/JOB NUMBER (1 word) are the type and number of the job/session.

MAXIMUM PRIORITY (1 word) is the lowest priority number (highest priority) ever run under by any process of the job/session. This value can range from 0 to 255.

NUMBER OF CREATIONS (1 word) is the total number of processes created under the main process during the job/session.

CPU TIME (2 words) is a double-word containing the total central processor time used (in seconds) by all processes of the job/session.

ELAPSED TIME (2 words) is a double-word containing the wall clock time (in minutes) during which the job/session has existed in the system. For a session, this time is called connect time.

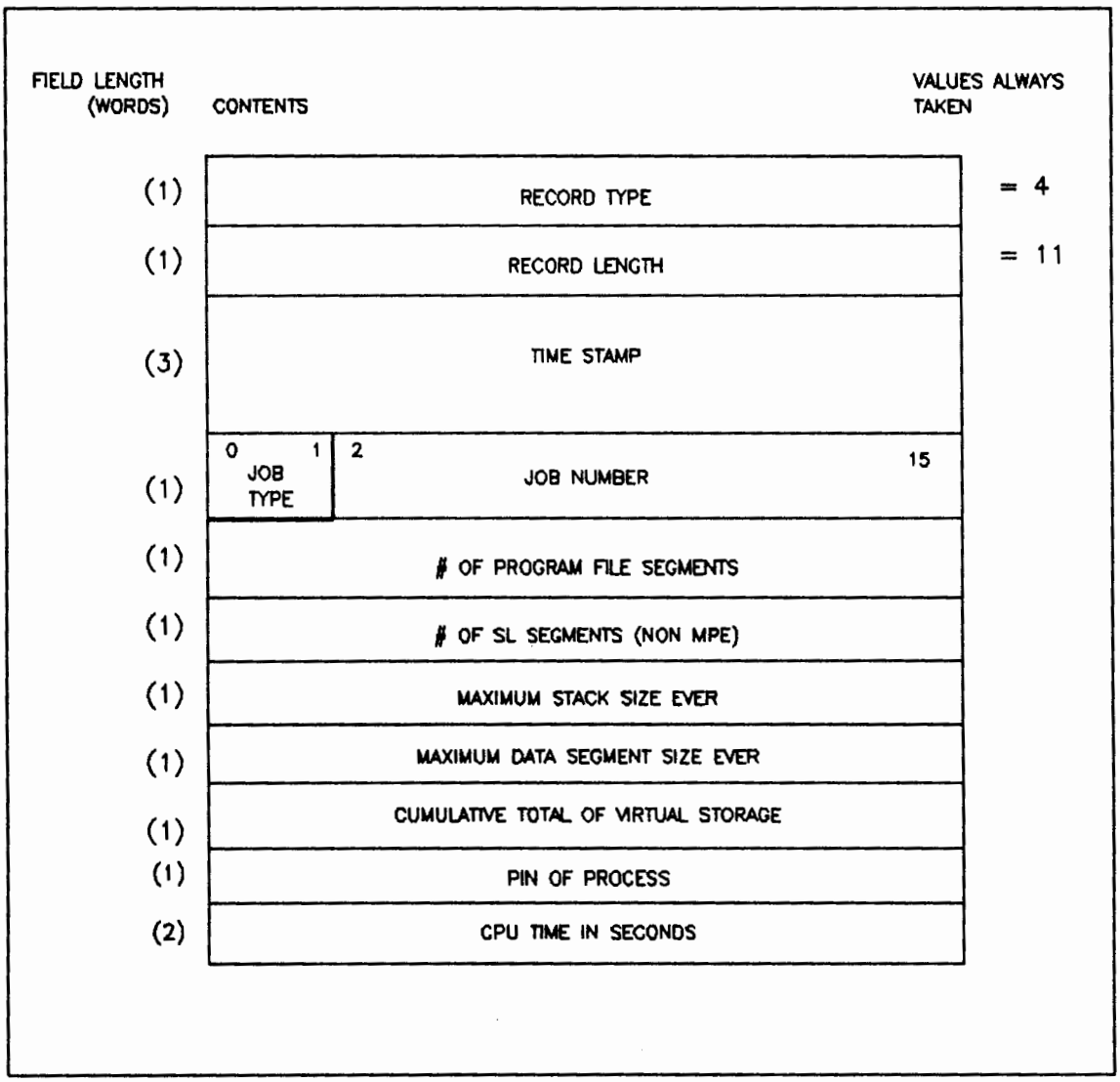


Figure 5-10. Process Termination Record (Type 4)

A Process Termination record is issued when a user process other than a Main Process terminates.

JOB TYPE/JOB NUMBER	(1 word) are the type and number of the job/session.
NUMBER OF PROGRAM FILE SEGMENTS	(1 word) is the number of segments contained in the program file loaded on behalf of the process.
NUMBER OF NON-MPE SL SEGMENTS	(1 word) is the number of segments from the segmented library (excluding MPE), loaded on behalf of the process.
MAXIMUM STACK SIZE EVER	(1 word) is the largest size (in words) ever attained by the stack during process life.
MAXIMUM DATA SEGMENT SIZE EVER	(1 word) is the largest size (in sectors) ever attained by an extra data segment during process life.
TOTAL AMOUNT OF VIRTUAL STORAGE REQUESTED	(1 word) is the total amount of disc space (in sectors) requested for data (stack and extra data segments) during process life.

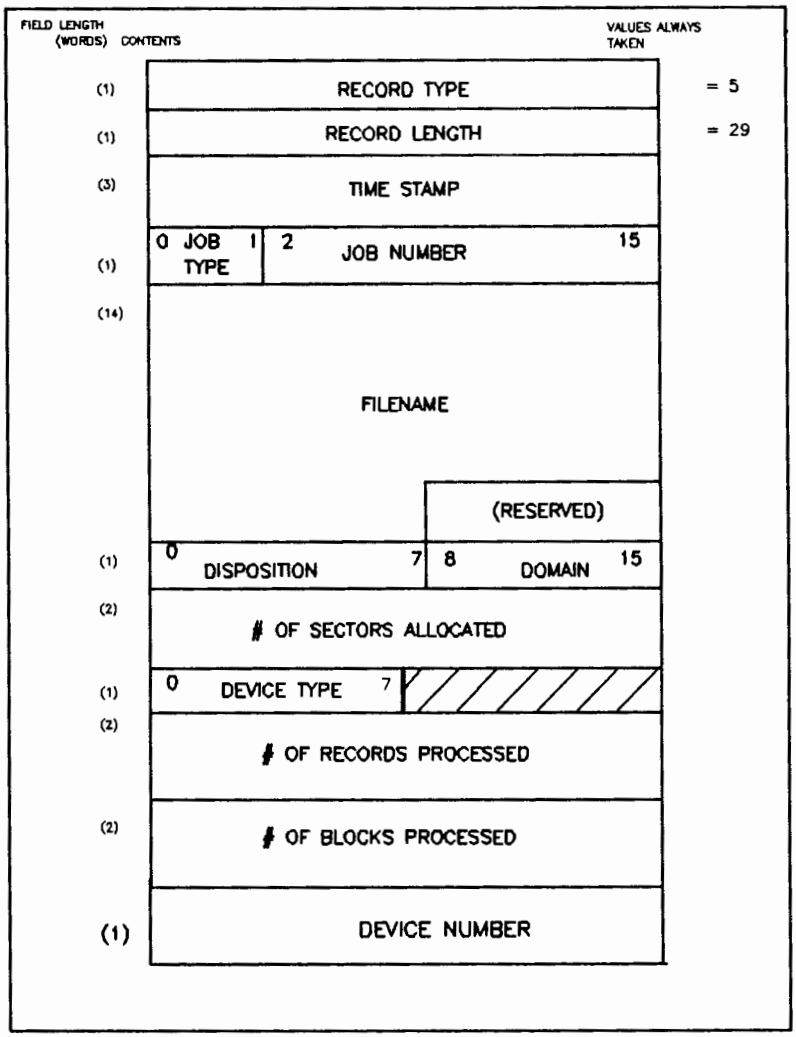


Figure 5-11. File Close Record (Type 5)

A File Close Record is issued whenever a file is closed.

JOB TYPE/JOB NUMBER (1 word) are the type and number of the job/session.

FULL FILENAME (27 bytes) contains the *filename.groupname,accountname* of the file; each name is eight bytes long, left justified with trailing blanks, with the 27th byte containing garbage.

DISPOSITION (1 byte) is the file disposition as specified in the FCLOSE intrinsic.

DOMAIN (1 byte) is the file domain, as specified in the FOPEN intrinsic.

NUMBER OF SECTORS ALLOCATED (2 words) is the physical space (in sectors) actually reserved on disc for the file. (When the file does not reside on disc, this value is 0.

DEVICE TYPE	(1 byte) is the device type of the device on which the file resides, as returned by the FGETINFO intrinsic.
DEVICE NUMBER	(1 byte) is the logical device number of the device on which the file resides.
RECORDS PROCESSED	(2 words) is the number of records processed since the last FOPEN on that file by the process.
BLOCKS PROCESSED	(2 words) is the number of blocks written and read to and from the file since the last FOPEN on the file by the process.

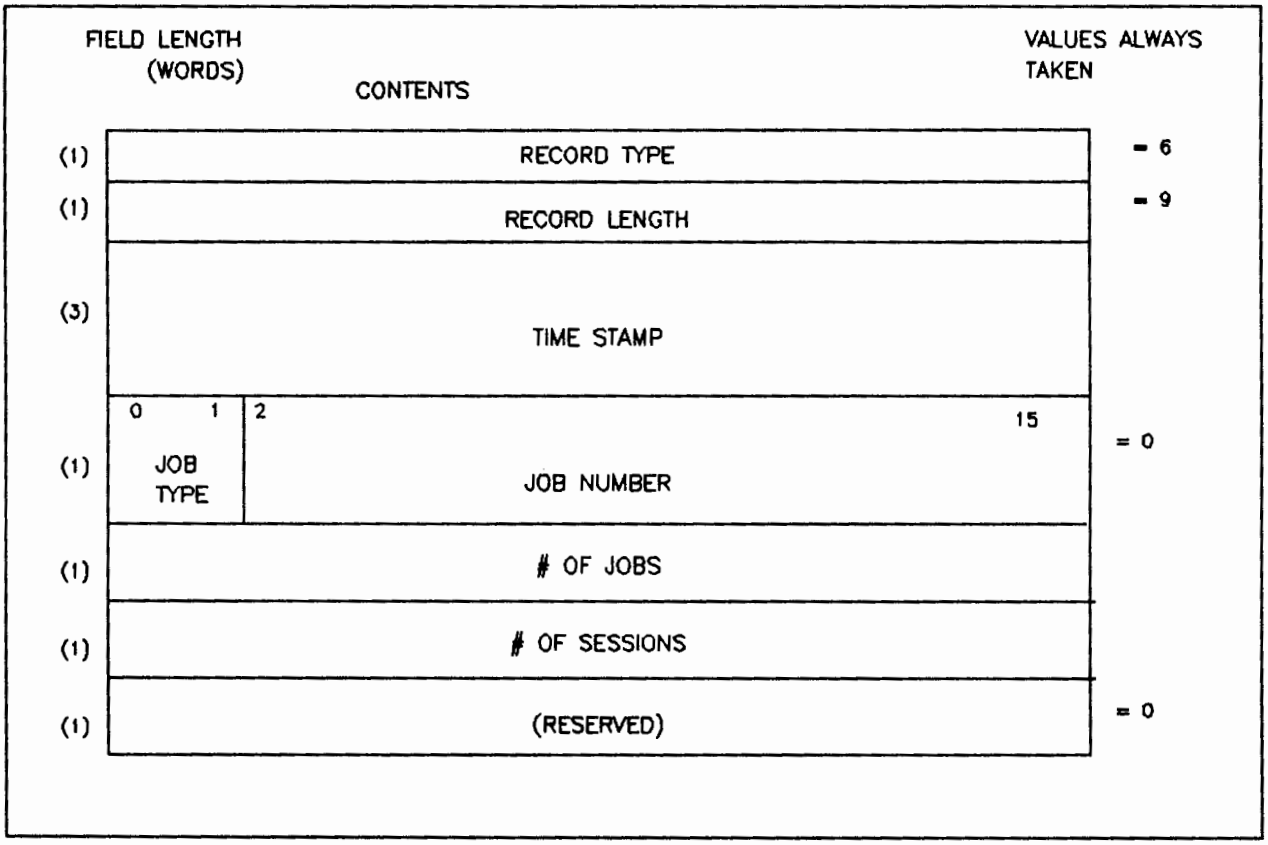


Figure 5-12. System Shut-Down Record (Type 6)

A System Shut-Down Record is output when the system is shut down by the =SHUTDOWN console command. (Refer to the MPE V Commands Reference Manual (32033-90006).)

JOB TYPE/JOB NUMBER is always set to 0.

NUMBER OF JOBS ON SYSTEM (1 word) is the number of jobs on the system when command took effect.

NUMBER OF SESSIONS ON SYSTEM (1 word) is the number of sessions on the system when the command took effect.

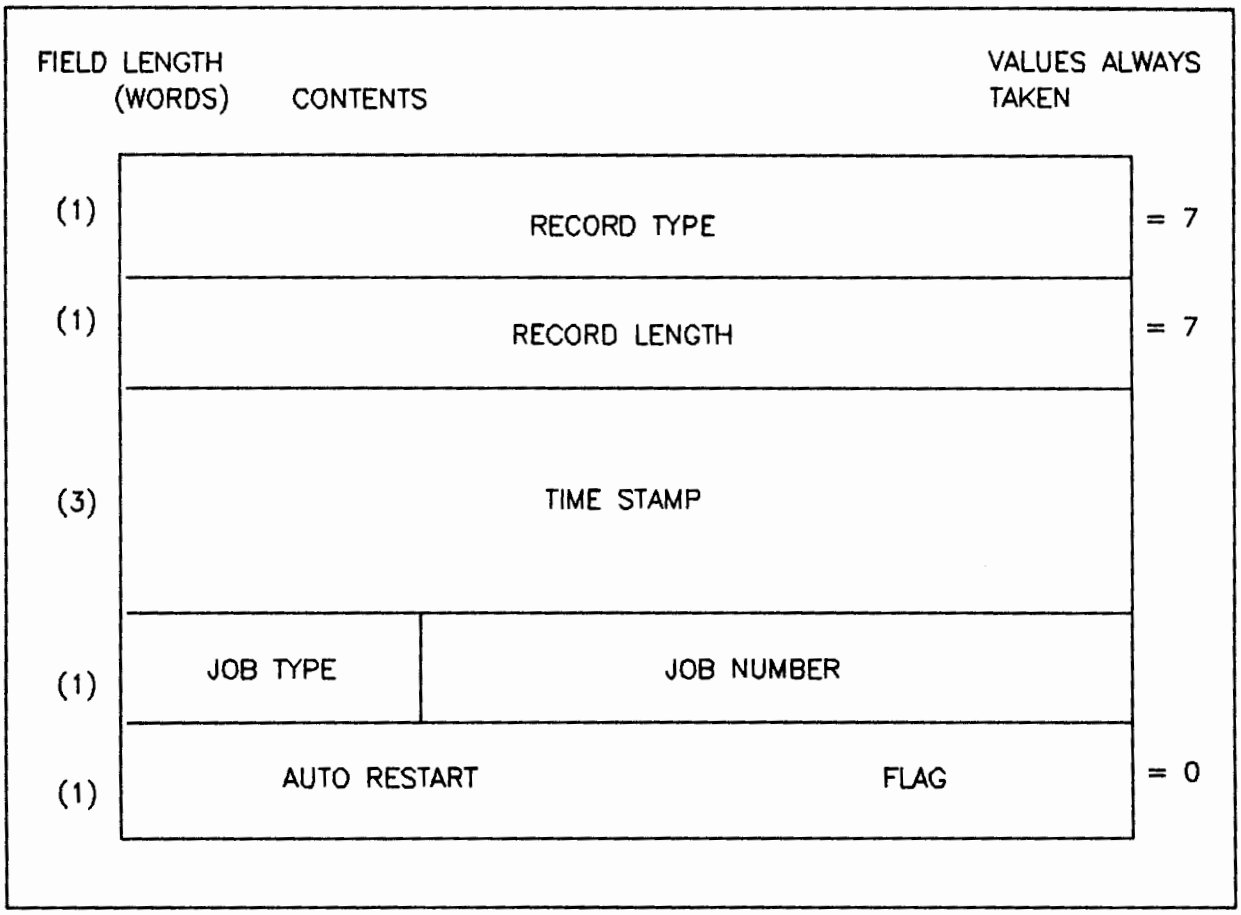


Figure 5-13. Power Failure Record (Type 7)

AUTO RESTART FLAG (1 word) is a logical value representing the state of the restart flag. This record is output when a restart occurs following a power failure.

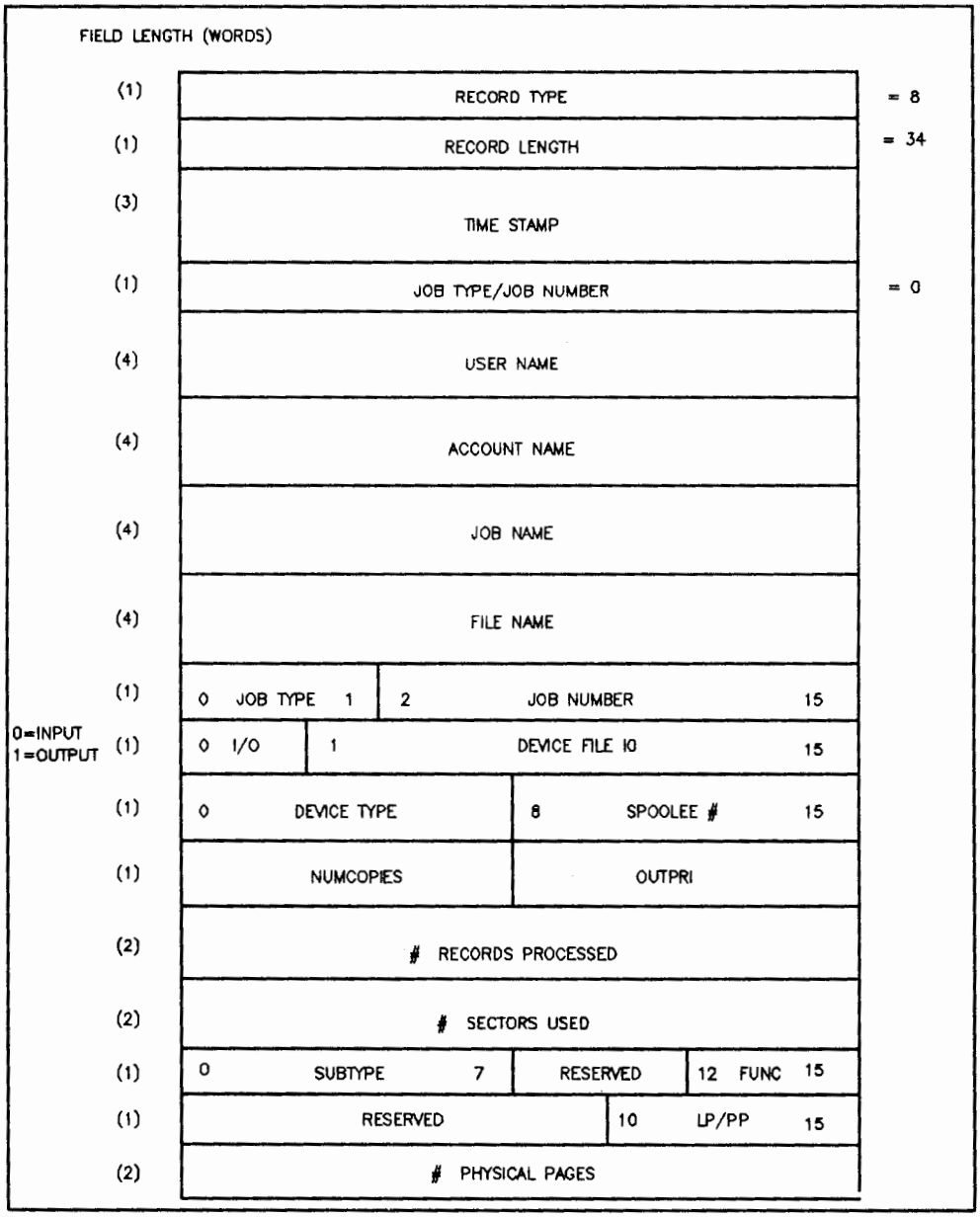


Figure 5-14. Spooler's Spoolfile Done Record (Type 8)

A Spooler's Spoolfile Done record is output when a spooler completed loading a spoolfile.

JOB TYPE is defined as:

(00) SESSION'	=	Spoolfile originally created on another system by a session.
(01) SESSION	=	Spoolfile created for a session on this system.
(10) JOB	=	Spoolfile created for a job on this system.
(11) JOB'	=	Spoolfile originally created on another system by a job.

For job types (00) and (11), SPOOK was used to create the spoolfile on this system. In all cases, the **JOB NUMBER** is the number of the job/session which originally created the spoolfile.

DEVICE TYPE is defined as:

Input = Zero (0) for input spoolfiles.
Output = 32 for output spoolfiles (device type of a lineprinter).

SPOOLEE # is defined as:

Input = The logical device number of the disc on which the
Output = resided.
The logical device number of the printer used.

NUMCOPIES:

This value represents the number of copies that are yet to be printed for this spoolfile. For multiple copy spoolfiles, this number is decremented after each copy has been printed and a different spooling logging record exists for each copy printed. If there is only one copy to be printed, the field is zero (0).

RECORDS PROCESSED is defined as:

Input = The number of lines in the input spoolfile.
Output = The number of lines printed for this spoolfile.

SECTORS USED is defined as:

The number of disc sectors that the spoolfile occupied on disc.

SUBTYPE is defined as:

Input = Zero (0) for input.
Output = The subtype of the lineprinter used.

If the subtype is that of the 2680A, subtype 8, then the following two fields will be non-zero. For any other lineprinter, the fields will contain zeros.

PHYSICAL PAGES: The total number of physical pages printed.

LP/PP: If the spoolfiles is using an LPX type environment file, this field is defined as the number of logical pages per physical page when the spoolfile ended.

NOTE

This value can change while the spoolfile is printing.

FUNC (4 bits) is the last operation the spooler performs on the spoolfile and is defined as:

0 = Normal completion
1 = Delete spoolfile
2 = Defer spoolfile
3 = Relink spoolfile

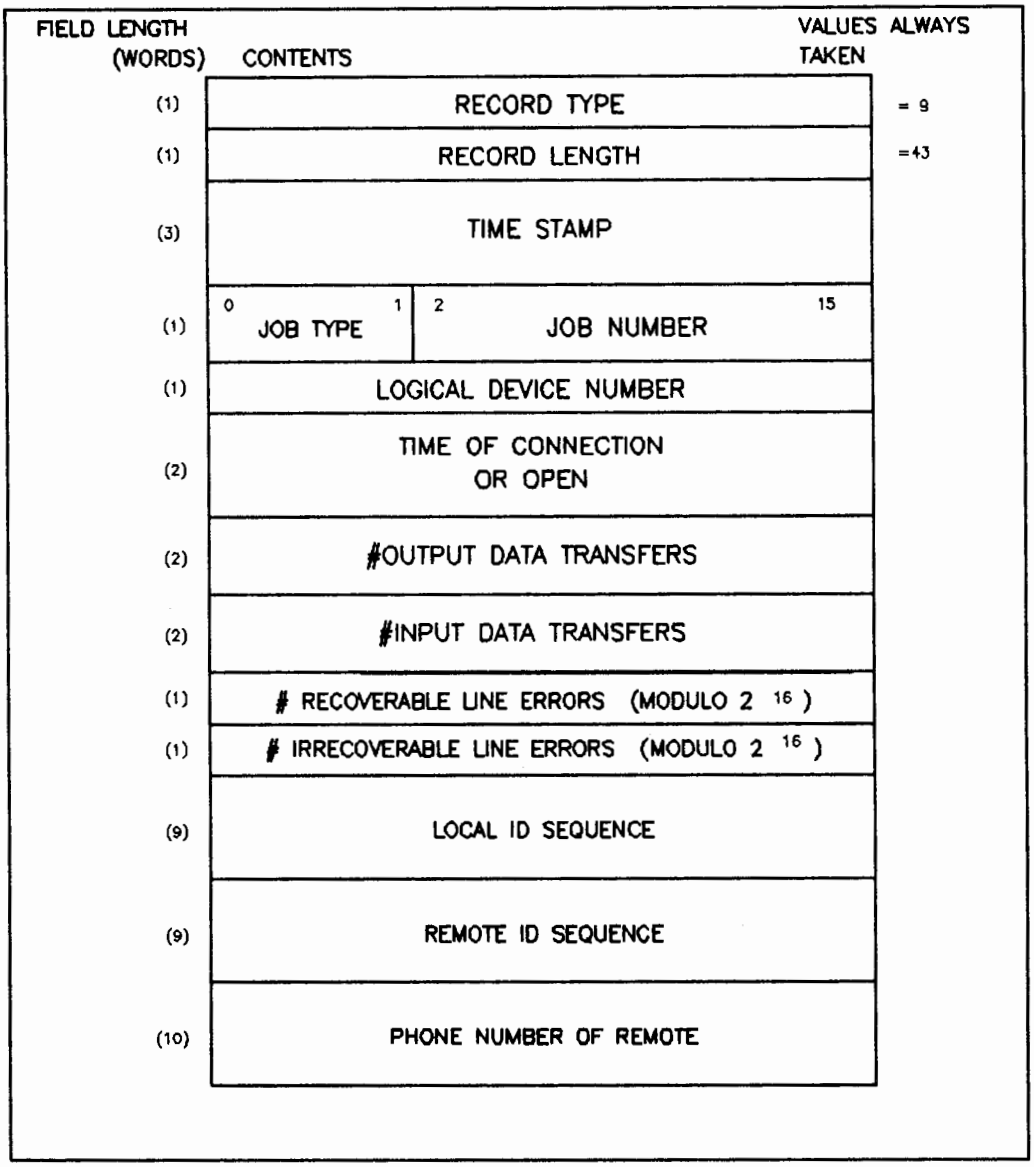


Figure 5-15. Line Disconnection Record (Type 9)

I/O sequences are significant for both switched and non-switched lines. The first byte is the length of the sequence. The remainder is the acutal I/O sequence (up tol 16 bytes, left justified with trailing blanks.).

The phone number is significant only if the local system (MPE) performed the dialing for an outgoing call (up to 20 characters, left justified with trailing blanks).

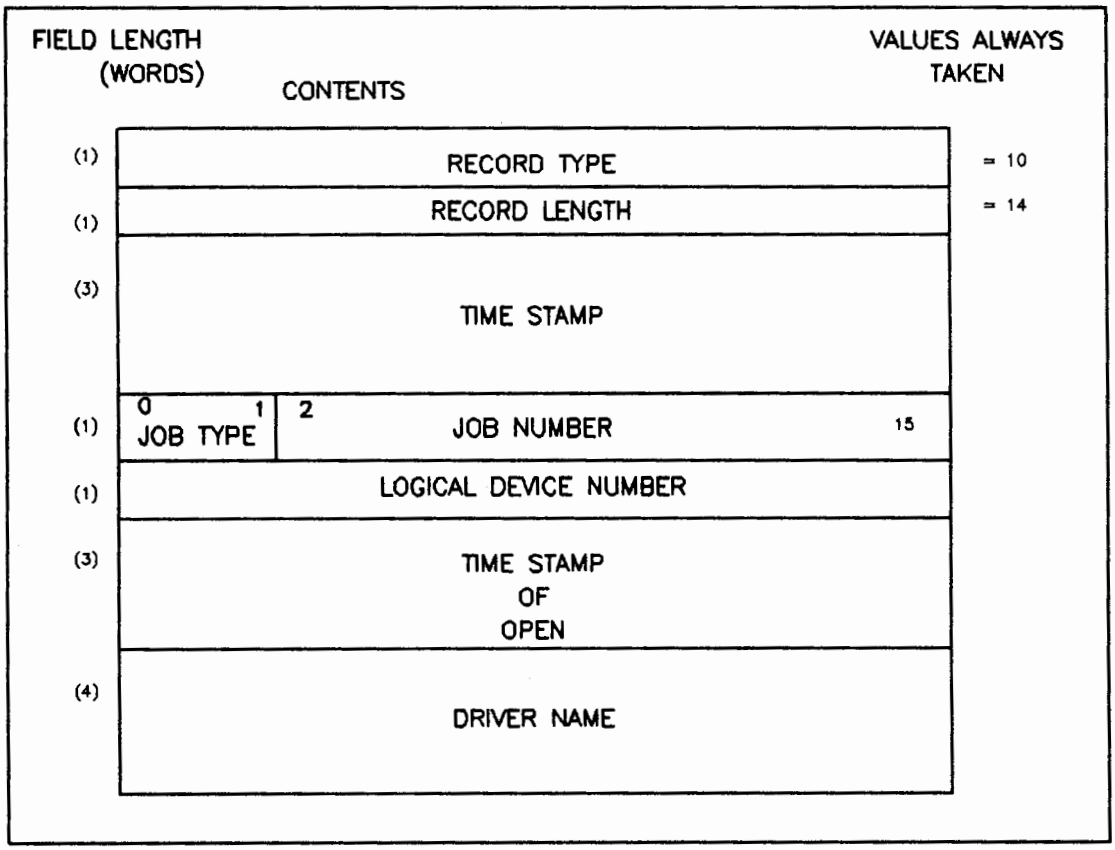


Figure 5-16. Line Close Record (Type 10)

The driver name may be up to eight ASCII characters in length, left justified with trailing blanks.

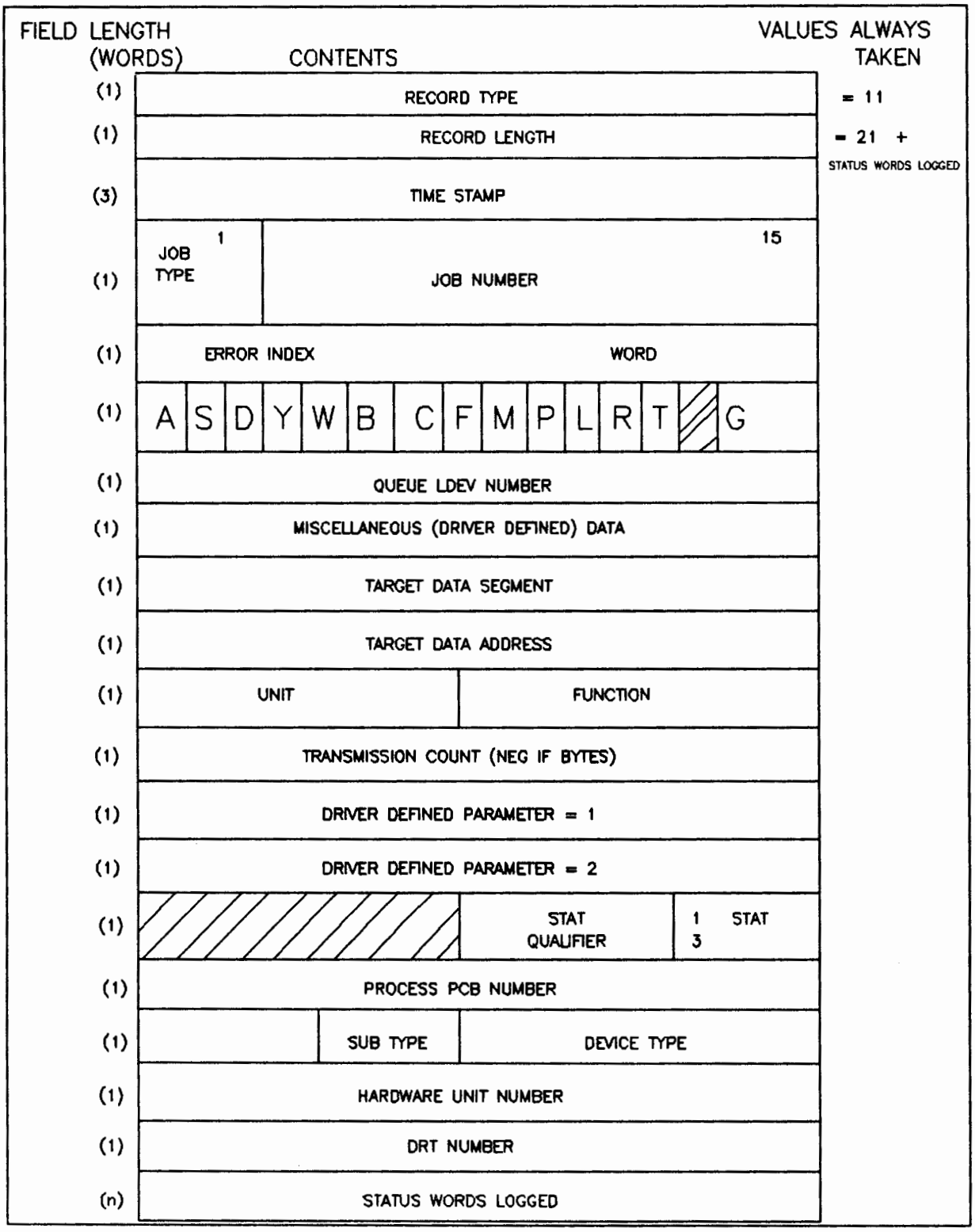


Figure 5-17. I/O Error Record (Type 11)

A "1" in any bit position indicates:

A	(ABORT	Request has been aborted externally.
S	(SPECIAL)	Special handling is to be applied to this request: for disc this indicates a Memory Management request.
D	(DIAG)	Diagnostic request (not used).
Y	(SYSBUFR)	Indicates the target data segment is irrelevant: the target data address is the absolute main memory address of the buffer.
W	(IOWAKE)	Wake caller on completion of request.
B	(BLOCKED)	Blocked I/O: caller is waited until request is completed.
C	(COMPLETED)	Request has been completed and caller is awake if he had so specified.
F	(DATAFRZN)	Data segment has been made present and is frozen.
M	(MAMERRORD)	MAM error on data segment make-present.
P	(PREQ)	This request has been started but was preempted by a MAM request.
L	(SFAIL)	Start SIO failure in General Interrupt Processor.
R	(PFAIL)	The I/O has been aborted because of a power fail.
T	(PREEMPT)	Preemptive type code: 1=soft, 2=hard.
G	(MSGDONE)	A message request reply has completed.

* Error index word - 1st byte in No. of error words logged. 2nd byte is Device Information Table relative index to words logged.

Transmission Count is the final transfer count (if any) for this I/O request. If positive, it indicates words; if negative, it indicates a byte count.

Driver Parameters 1 and 2 are defined within the I/O system for various drivers.

The Process PCB Number is zero if not associated with a user process.

STAT (general status) indicates current and resultant state of the request according to the following codes:

0 Bit started, or awaiting completion.
1 Successful completion.
2 End of file detected.
3 Unusual condition (normally recoverable).
4 Irrecoverable error.

The Device Subtype and Type are as defined in Appendix A.

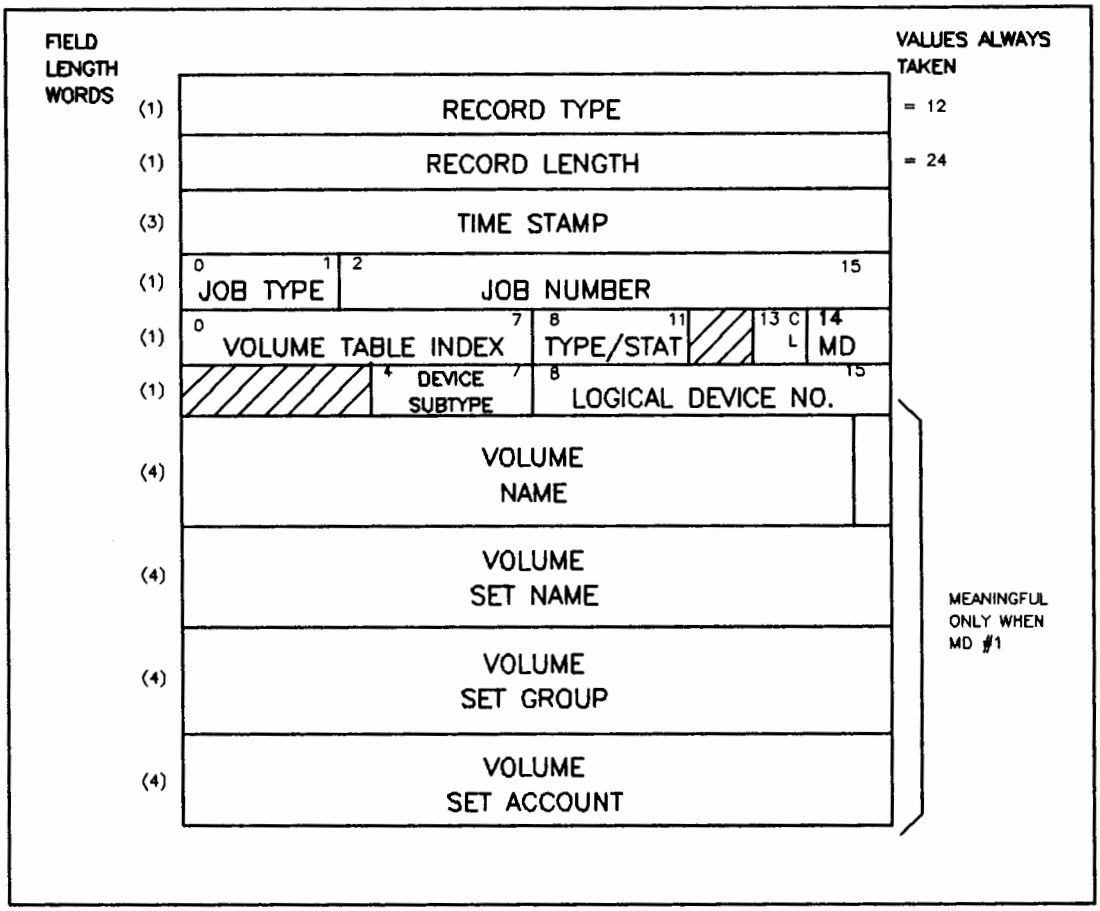


Figure 5-18. Physical Mount/Dismount Record (Type 12)

MD
- = 0 Mount
- = 1 Dismount
- = 2 New volume created by initial function

CL
- = 1 Volume mounted at coldload time
- = 0 Mount/dismount detected by autorecognition

TYPE/STAT - VOLUME TYPE/STATUS

- = 0 Valid Private Volume
- = 1 Scratch Volume
- = 2 System Volume
- = 3 Unformatted Volume
- = 4 Unreadable Volume
- = 5 Serial Disc Volume
- = 6 Foreign Volume

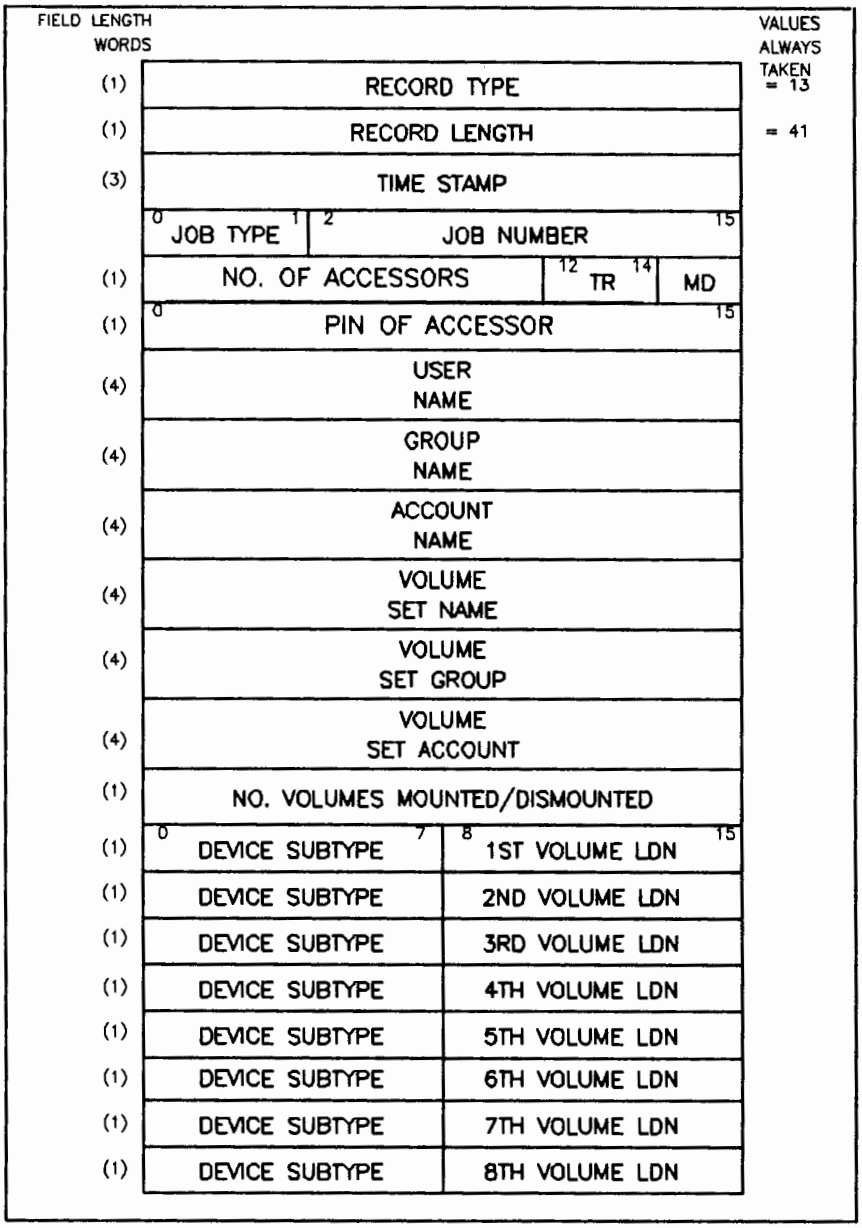


Figure 5-19. Logical Mount/Dismount Record (Type 13)

MD = 0 Mount
= 1 Dismount

= Type of Request

TR
= 0 :MOUNT/:DISMOUNT with directory binding.
= 1 :MOUNT/:DISMOUNT without directory binding.
= 2 Unconditional Implicit Mount
= 3 Conditional Implicit Mount
= 4 =MOUNT/=DISMOUNT
= 5 Dismount due to Job/Session Termination

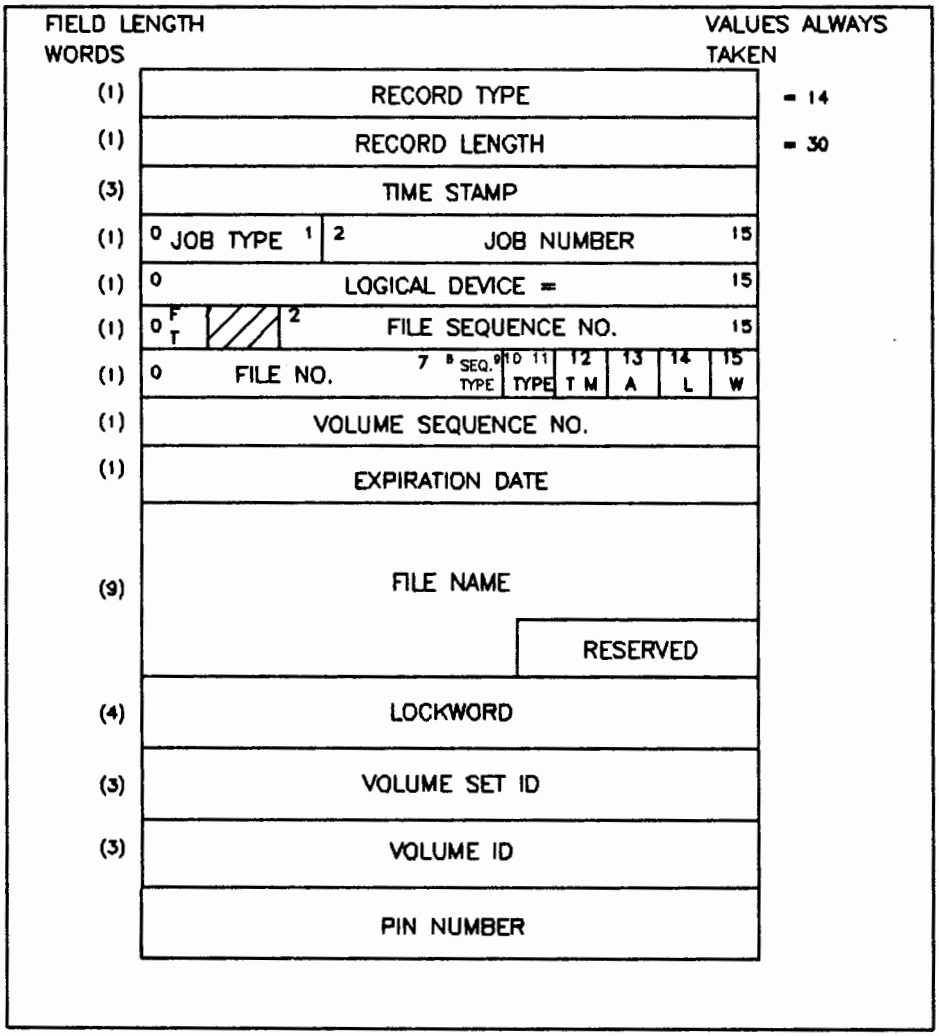


Figure 5-20. Tape Labels Log Record (Type 14)

TYPE = 2 ANSI-Standard Label
TYPE = 3 IBM-Standard Label

SEQ.TYPE = 0 Search for match on file name
= 1 Next or default
= 2 Add file to end of volume set
= 3 Specified file sequence number

W = Waiting for mount
L = Job entry linked to logical device
A = User header label
TM = User trailer label
FT = 1 At least one read write completed

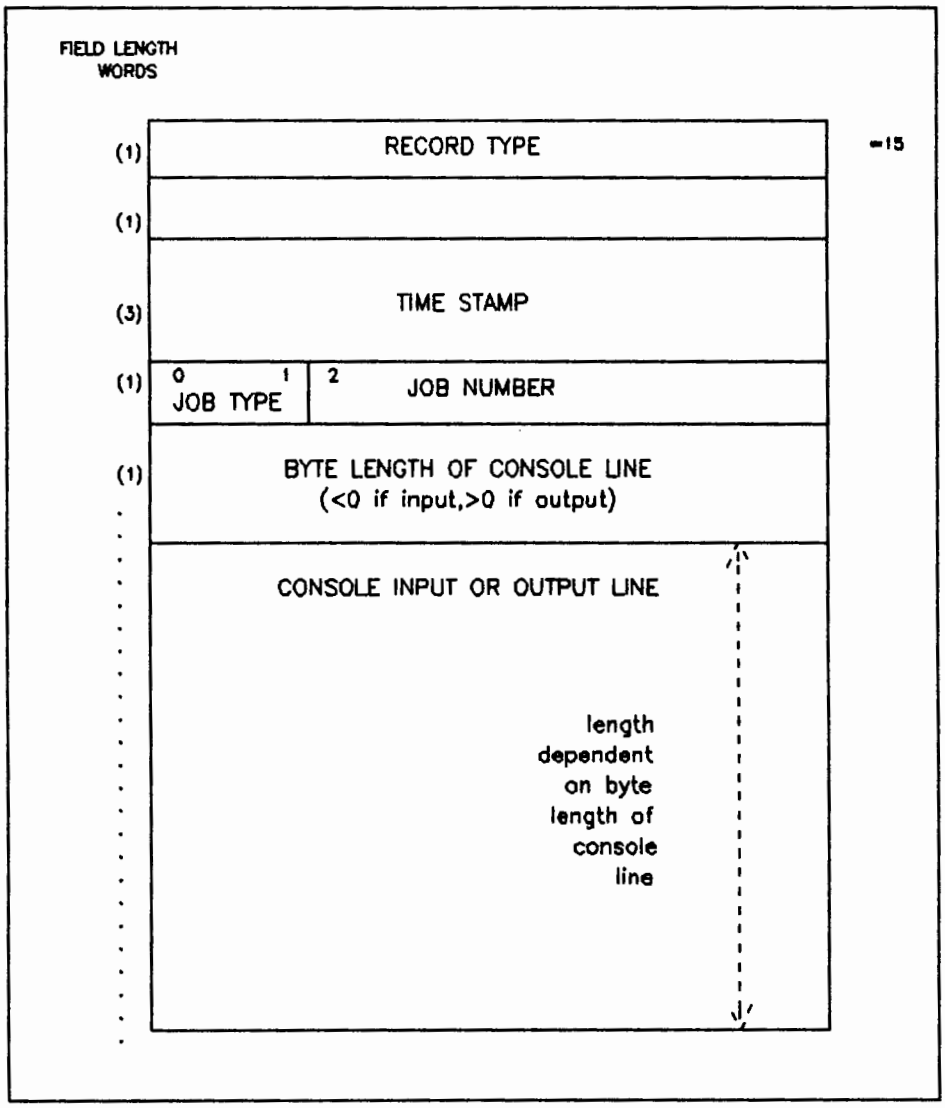


Figure 5-21. Console Log Record (Type 15)

The length of the console line found in Word 7 of the Log Record is the actual number of characters transmitted to the console. This value may be greater than the number of characters found in the Log Record because the maximum size of the Log Record is currently set at 99 words.

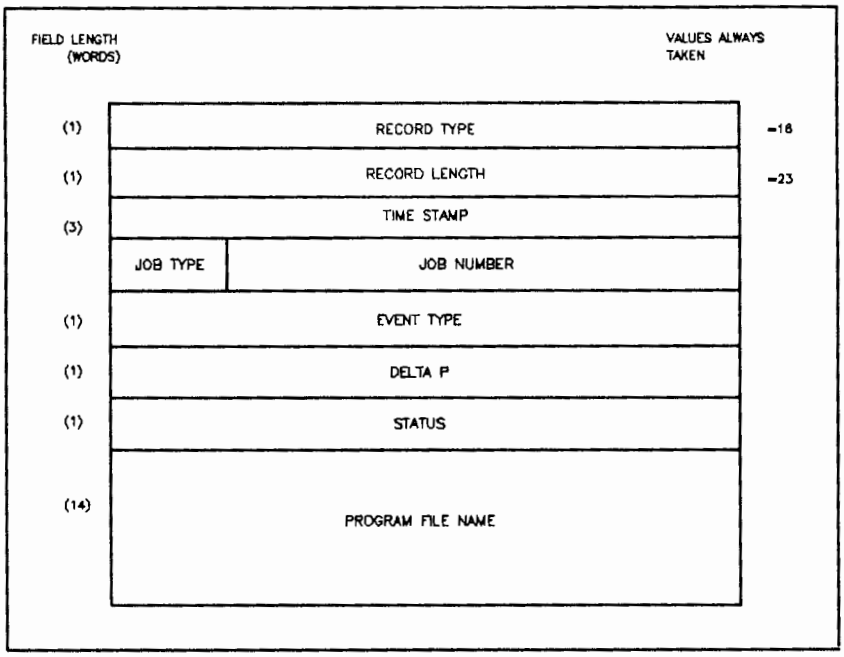


Figure 5-22. Program File Event Record (Type 16)

EVENT TYPE = 0, stack underflow simulation.
DELTA P = not applicable when event type = 0.
STATUS = not applicable when event type = 0.

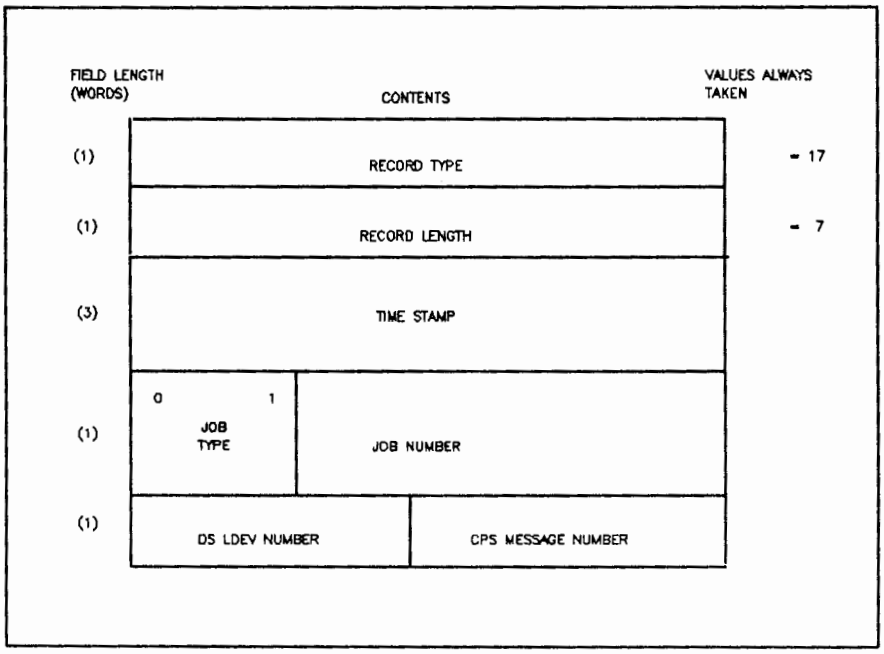


Figure 5-23. Call Progress Signals Log Record Format (Type 17)

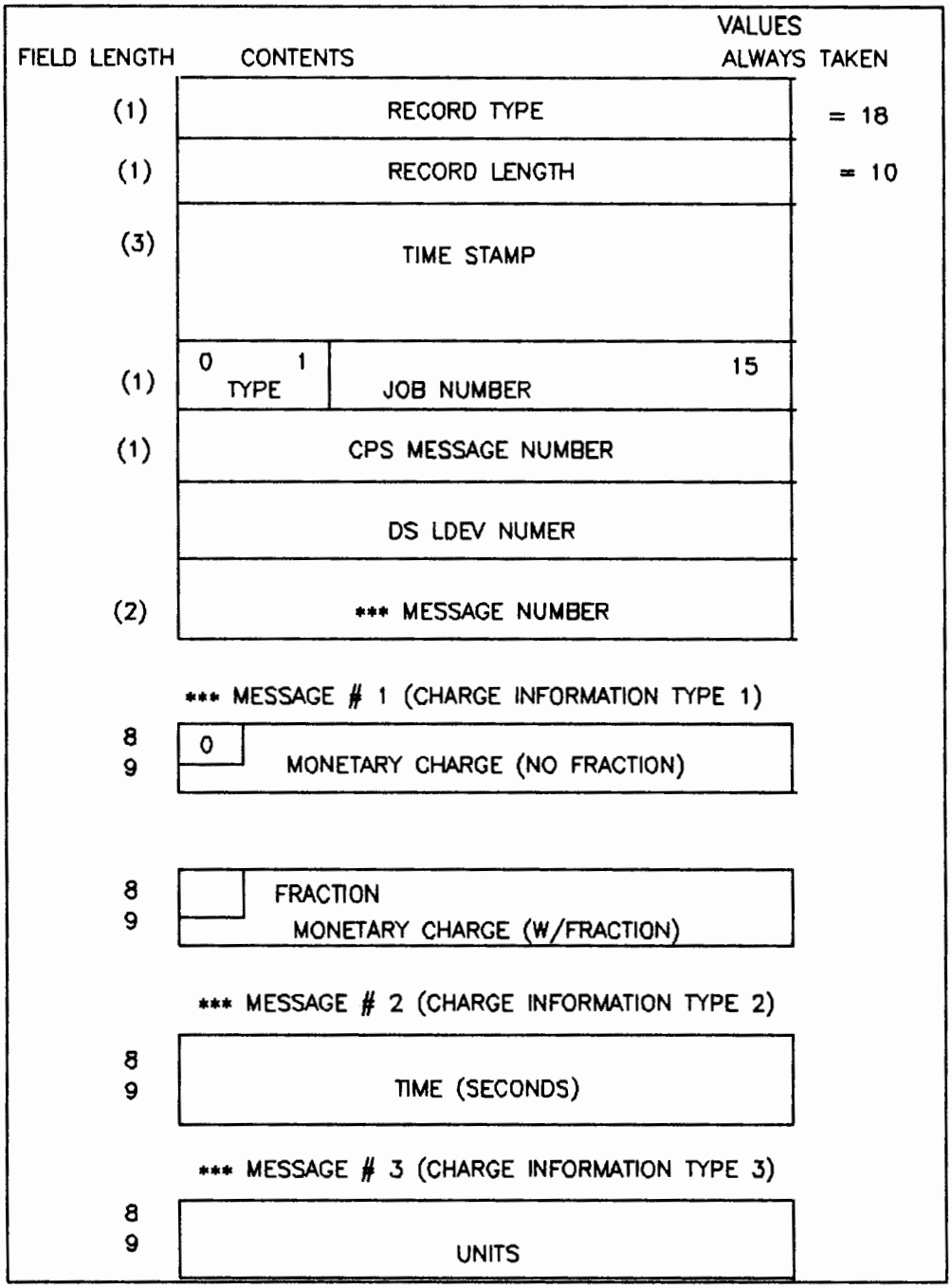


Figure 5-24. DCE Provided Information Record (Type 18)

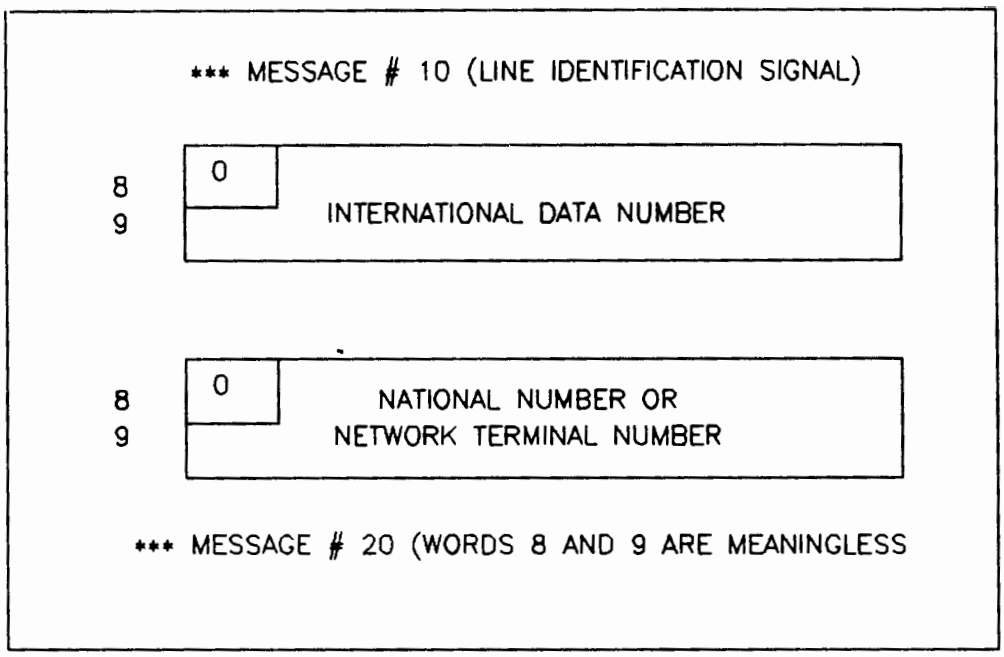


Figure 5-24. DCE Provided Information Record (Type 18) (Continued)

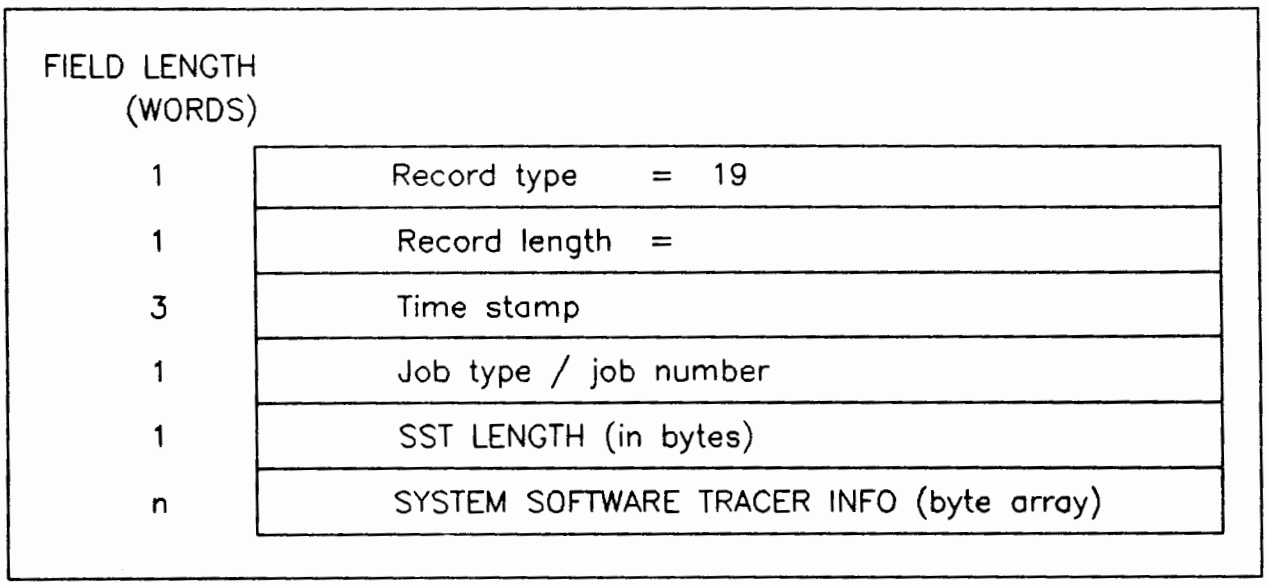


Figure 5-25. System Software Tracer Record (Type 19)

The system generates a System Software Tracer Log Record each time an intrinsic is enabled by the System Software Tracer (SST).

SST LENGTH

(1-word) gives the size of the SST INFO byte array.

SYSTEM SOFTWARE TRACER INFO

(variable array) contains information on intrinsic calls.

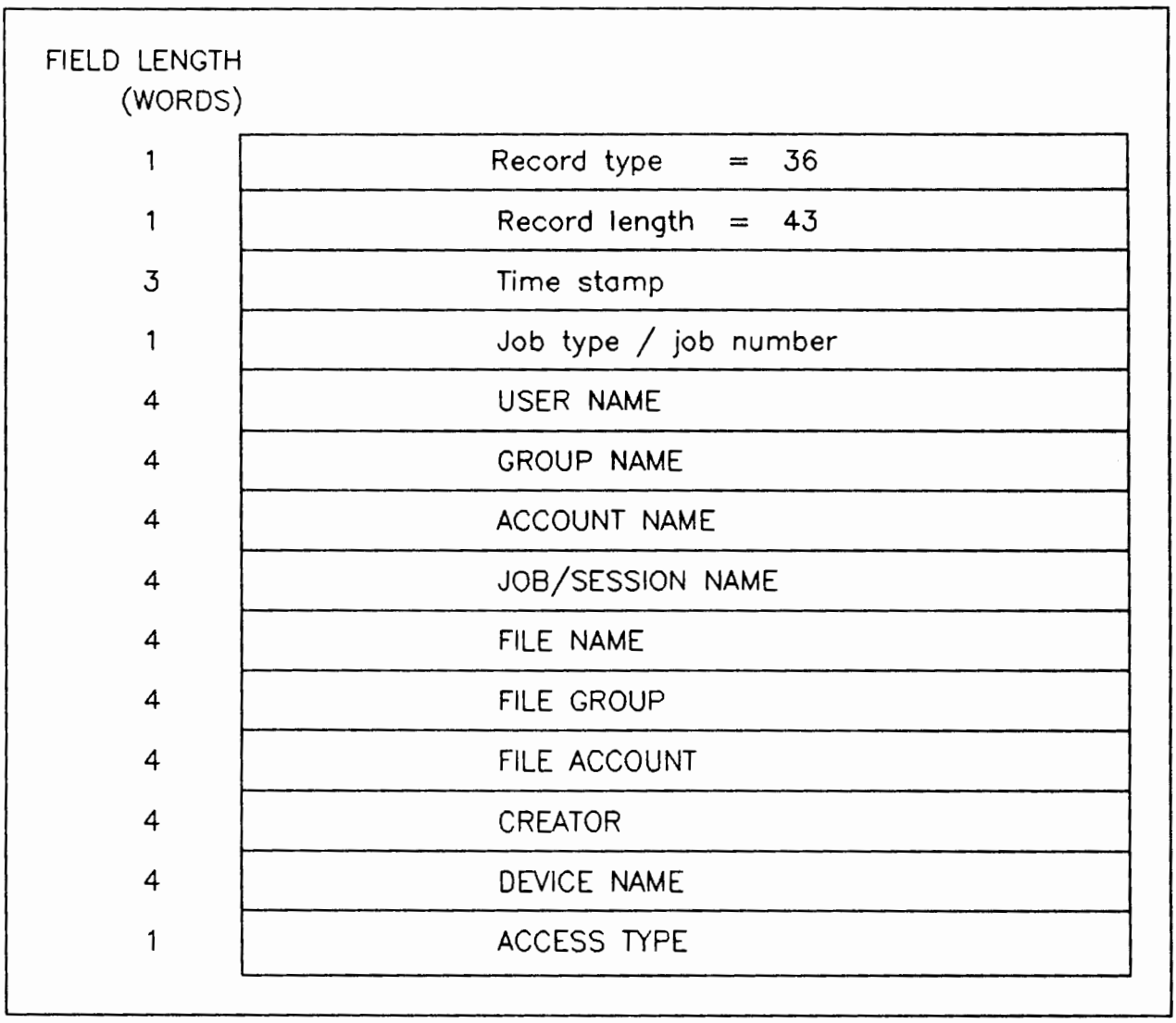


Figure 5-26. RESTORE Log Record (Type 36)

The system generates a RESTORE Log Record each time files are restored by the RESTORE facility.

USER NAME

(4-word array) is the user name under which the logon was performed, left-justified, blank-padded.

GROUP NAME

(4-word array) is the group name under which the logon was performed, left-justified, blank-padded.

ACCOUNT NAME

(4-word array) is the account name under which the logon was performed, left-justified, blank-padded.

JOB/SESSION NAME

(4-word array) is the job name as specified on the :JOB card, or the session name as specified in the :HELLO command, left-justified, blank-padded.

FILE NAME

(4-word array) is the name of the file that was restored.

FILE GROUP

(4-word array) is the group associated with the restored file.

FILE ACCOUNT

(4-word array) is the account associated with the restored file.

CREATOR

(4-word array) is the name of the creator of the file.

DEVICE NAME

(4-word array) is the name of the device where the file resides.

ACCESS TYPE

1: Restores a new file
2: Replaces an existing disc file

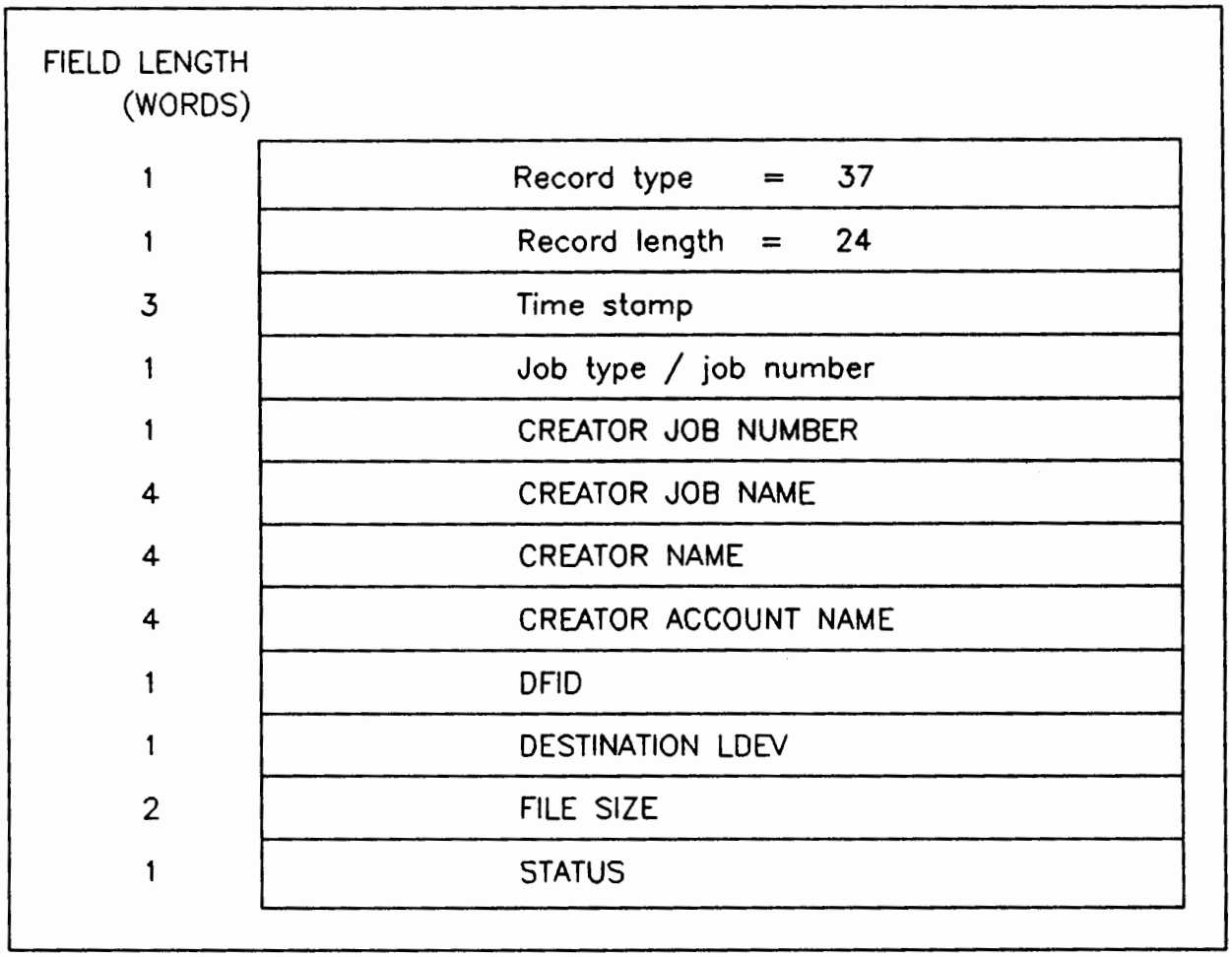


Figure 5-27. Printer Access Failure Record (Type 37)

The system generates a Printer Access Failure Log Record when a printer refuses an output spoolfile.

CREATOR JOB NUMBER

(1 word) is the number of the job/session.

CREATOR JOB NAME

(4-word array) is the job name assigned the owner of the spoolfile, left-justified, blank-padded.

CREATOR NAME

(4-word array) is the user name of the owner of the output spoolfile as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

CREATOR ACCOUNT NAME

(4-word array) is the account name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

DFID

(1 word) is the device file ID.

DESTINATION LDEV

(1 word) is the logical device number of the printer which refused the spoolfile.

FILE SIZE

(2 words) is the number of records in the output spoolfile.

STATUS

1: Internal failure of access check
2: Security violation

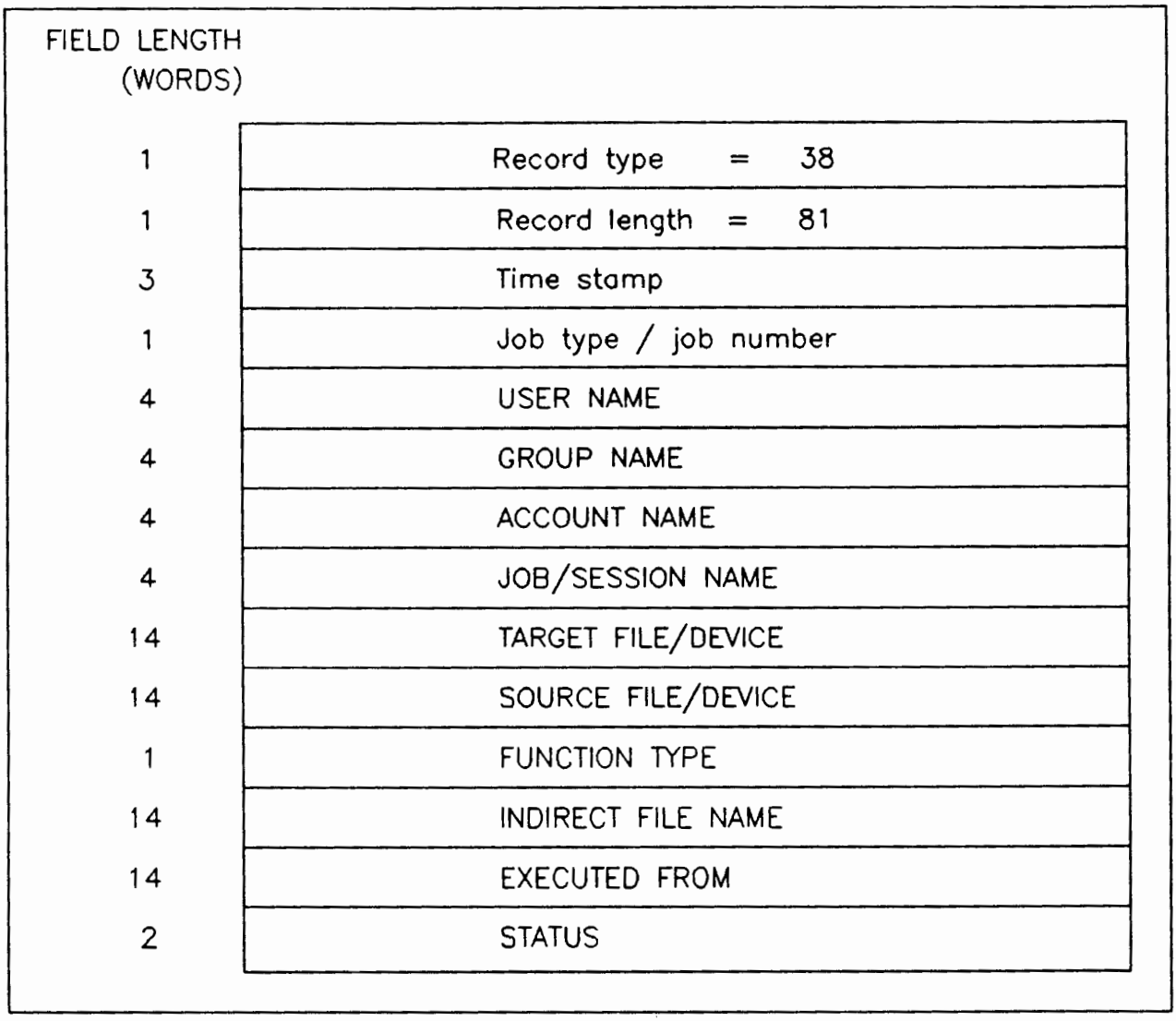


Figure 5-28. ACD Changes Record (Type 38)

The system generates an ACD Change Log Record each time an ACD is changed. This allows the System Manager to audit changes to ACDs whether by MPE commands or intrinsic calls.

USER NAME

(4-word array) is the user name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

GROUP NAME

(4-word array) is the group name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

ACCOUNT NAME

(4-word array) is the account name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

JOB/SESSION NAME

(4-word array) is the job name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

TARGET FILE/DEVICE

(14-word array) is the file name/device number whose ACD was changed.

SOURCE FILE/DEVICE

(14-word array) is the file name/device number from where the ACD was copied. (Only valid with COPY function.)

FUNCTION TYPE

(1 word) is the type of change to the ACD: create, copy, delete, add pairs, replace pairs, or delete pairs from the ACD.

INDIRECT FILE NAME

(14-word array) is the indirect file name which contained the ACD specifications.

EXECUTED FROM

(14-word array) is the file name from which the ACD change was executed.

STATUS

(2 words) is the status of the ACD, formatted as *word1.word2*. *Word1* is the error number and *word2* is the subsystem number.

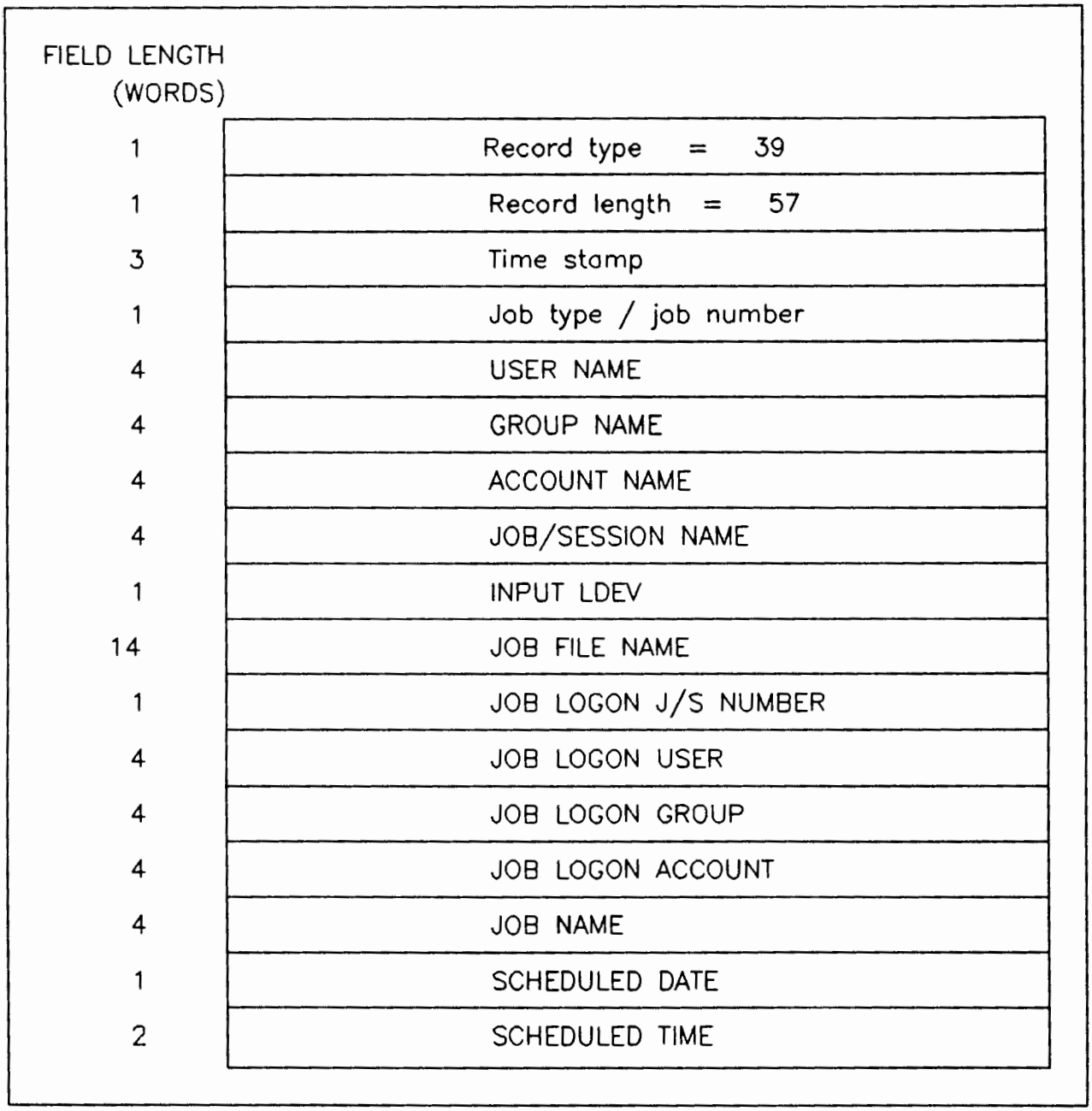


Figure 5-29. Stream Initiation Record (Type 39)

The system generates a Stream Initiation Logging Record Format each time a user streams or attempts to stream a job.

USER NAME

(4-word array) is the user name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

GROUP NAME

(4-word array) is the group name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

ACCOUNT NAME

(4-word array) is the account name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

JOB/SESSION NAME

(4-word array) is the job name as specified on the :JOB card or the session name as specified in the :HELLO command, left-justified, blank-padded.

INPUT DEVICE

(1 word) is the logical device number where the job was streamed.

JOB FILE NAME

(14-word array) is the name of the job file that was streamed.

JOB LOGON J/S NUMBER

(1 word) is the job/session number assigned to the job that was streamed.

JOB LOGON USER

(4-word array) is the user name assumed by the job.

JOB LOGON GROUP

(4-word array) is the group name assumed by the job.

JOB LOGON ACCOUNT

(4-word array) is the account name assumed by the job.

JOB NAME

(4-word array) is the job name assumed by the job.

SCHEDULED DATE

(1 word) is the date for which the job was scheduled.

SCHEDULED TIME

(2 words) is the time for which the job was scheduled.

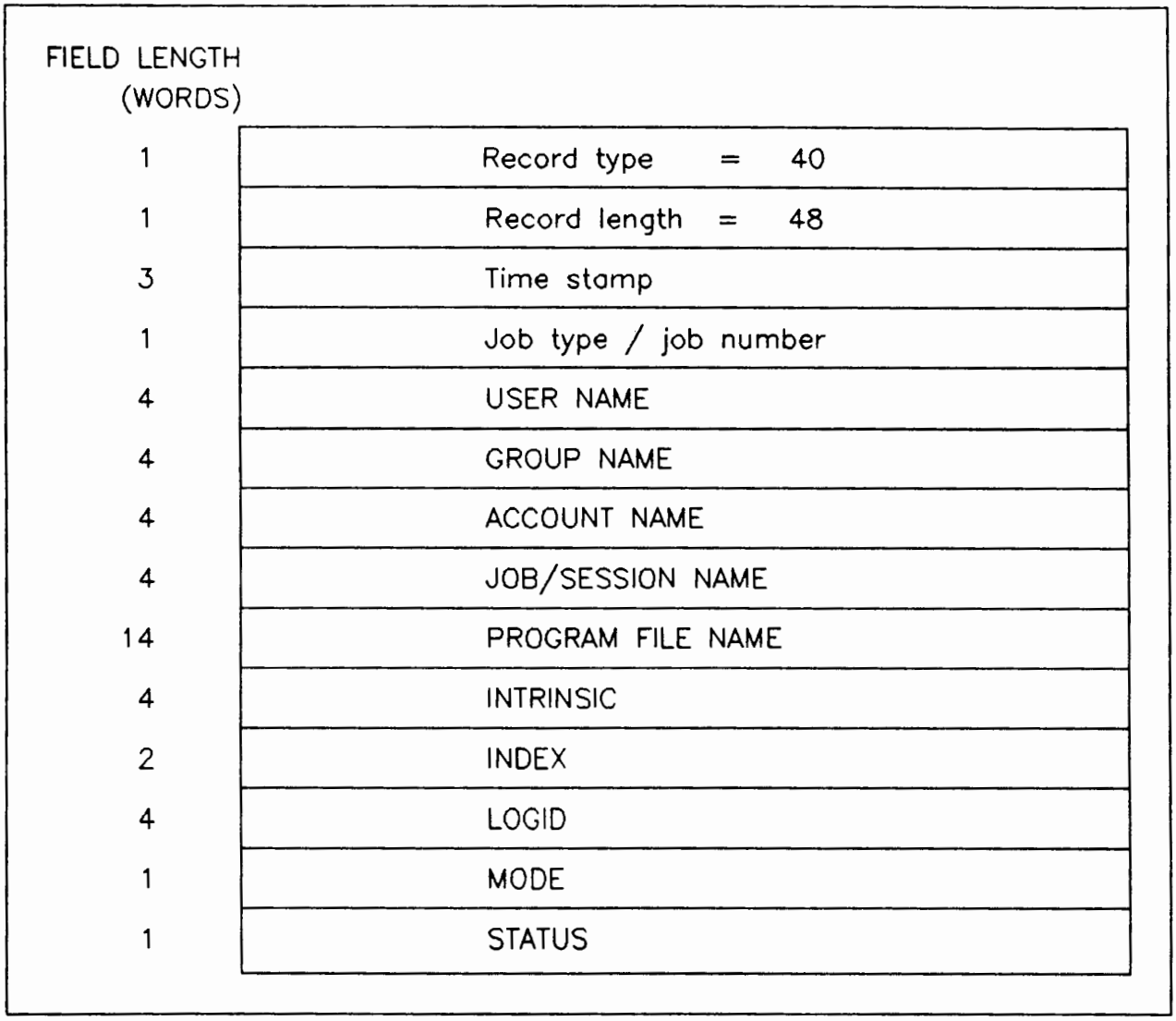


Figure 5-30. User Logging Record (Type 40)

The system generates a User Logging Log Record each time the OPENLOG or CLOSELOG intrinsics are called.

USER NAME

(4-word array) is the user name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

GROUP NAME

(4-word array) is the group name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

ACCOUNT NAME

(4-word array) is the account name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

JOB/SESSION NAME

(4-word array) is the job name as specified on the :JOB card or the session name as specified in the :HELLO command, left-justified, blank-padded.

PROGRAM FILE NAME

(14-word array) is the name of the program file from where OPENLOG or CLOSELOG was called.

INTRINSIC

(4-word array) is the intrinsic that the user called, either OPENLOG or CLOSELOG.

INDEX

(2 words) is the value returned from OPENLOG which identifies the access to the user logging facility.

LOGID

(4-word array) is the logging identification.

MODE

0: WAIT
1: NOWAIT

STATUS

(1 word) is the status of the intrinsic call.

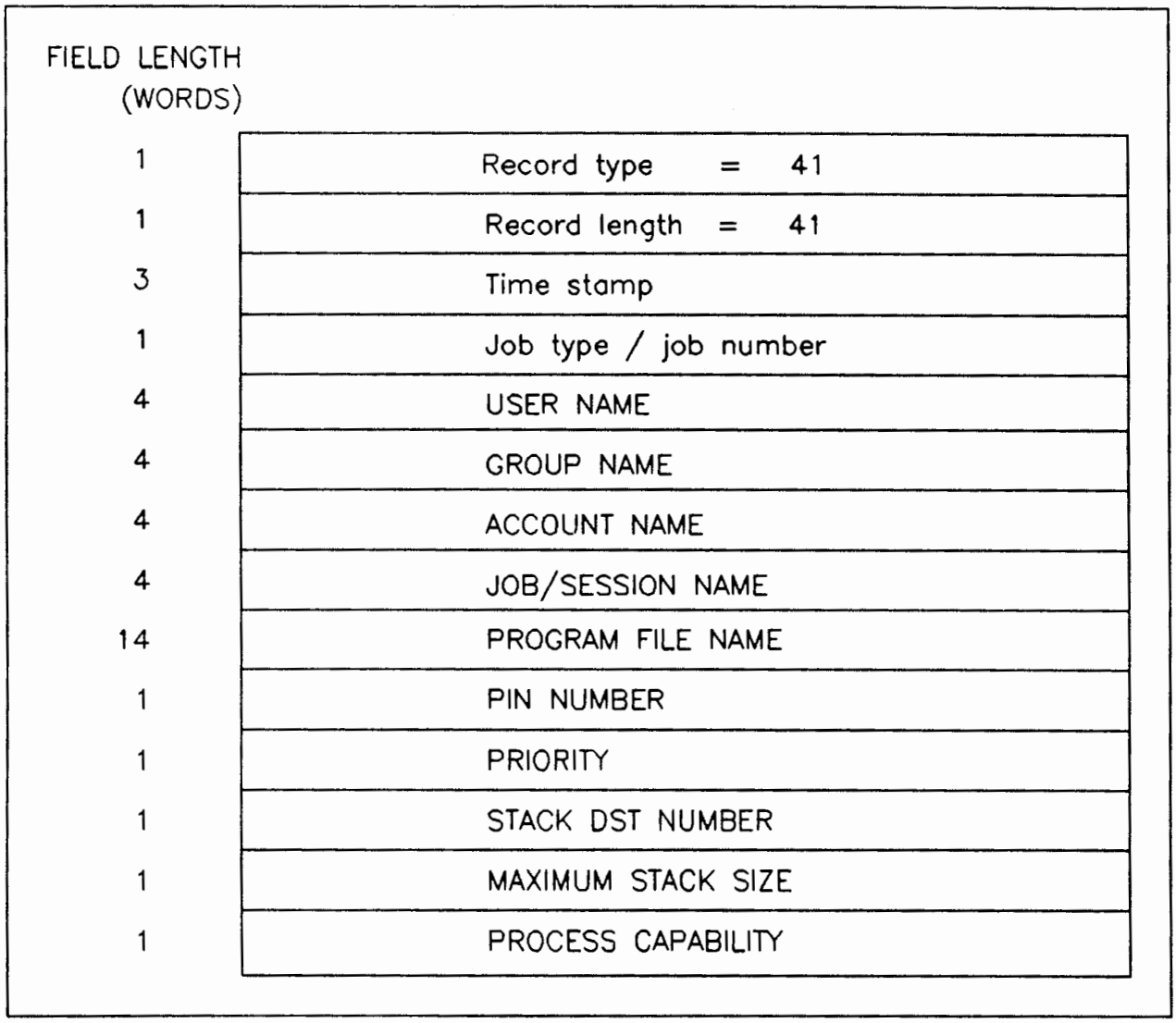


Figure 5-31. Process Initiation Record (Type 41)

The system generates a Process Initiation Log Record each time a process is initiated.

USER NAME

(4-word array) is the name of the user who initiated the process, as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

GROUP NAME

(4-word array) is the group name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

ACCOUNT NAME

(4-word array) is the account name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

JOB/SESSION NAME

(4-word array) is the job name as specified on the :JOB card or the session name as specified in the :HELLO command, left-justified, blank-padded.

PROGRAM FILE NAME

(14-word array) is the name of the program from which the process was initiated.

PIN NUMBER

(1 word) is the process ID of the process initiated.

PRIORITY

(1 word) is the priority of the process.

STACK DST NUMBER

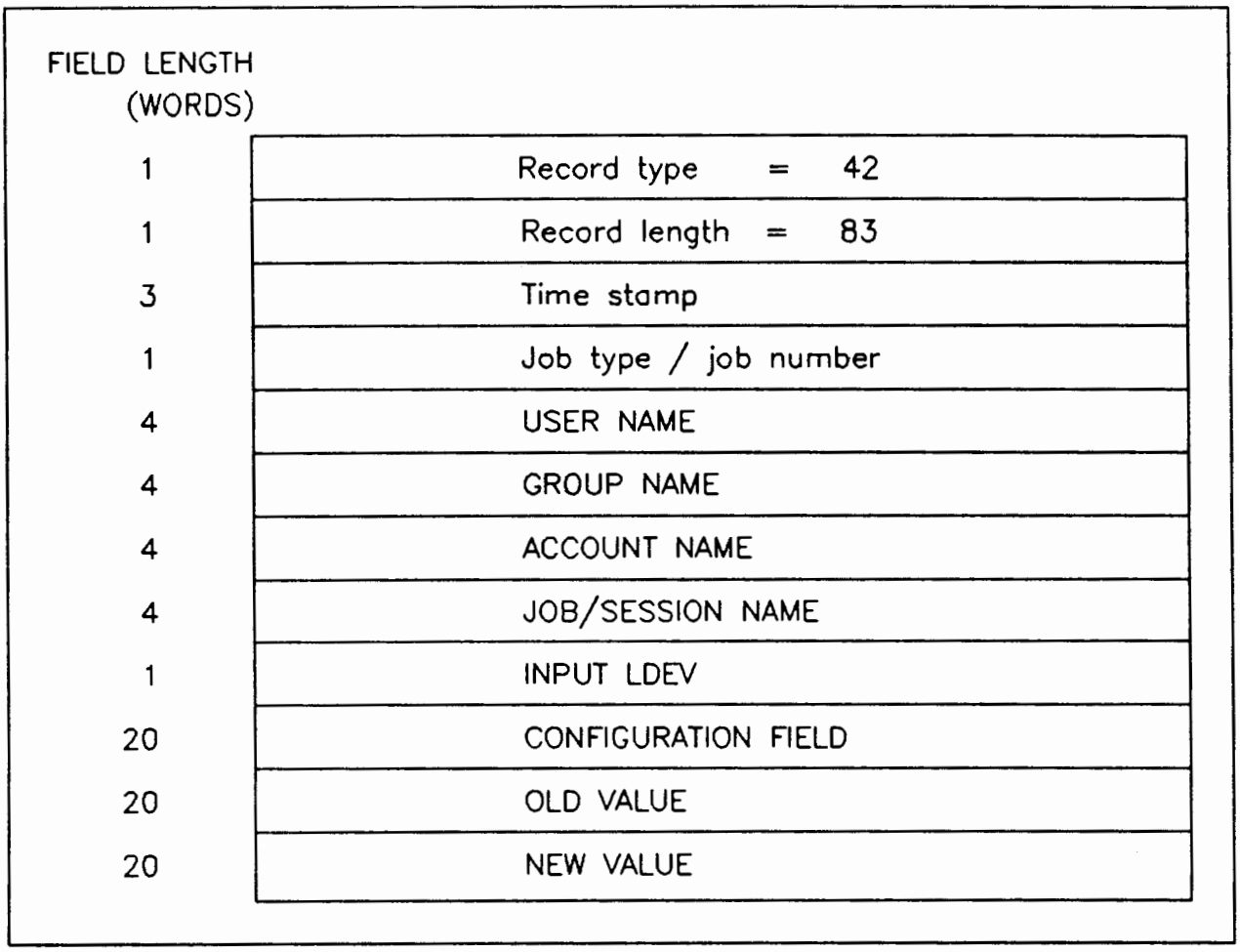
(1 word) is the DST number where the stack for the process resided.

MAXIMUM STACK SIZE

(1 word) is the maximum stack size in bytes for the process.

PROCESS CAPABILITY

(1 word) is the list of capabilities of the initiated process.



*Valid only if HP Security Monitor (HP30392) has been installed.

Figure 5-32. Security Configuration Changes Record (Type 42)

The system creates a Security Configuration Changes Log Record each time changes are made to the system's security configuration.

USER NAME

(4-word array) is the name of the user who made changes to the security configuration.

GROUP NAME

(4-word array) is the group name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

ACCOUNT NAME

(4-word array) is the account name as specified on the :JOB card or in the :HELLO command, left-justified, blank-padded.

JOB/SESSION NAME

(4-word array) is the job name as specified on the :JOB card or the session name as specified in the :HELLO command, left-justified, blank-padded.

INPUT DEVICE

(1 word) is the number of the logical device where the user making the changes was logged on.

CONFIGURATION FIELD

(20-word array) is the field of security configuration.

OLD VALUE

(20-word array) is the old security configuration information.

NEW VALUE

(20-word array) is the updated security configuration information.

WORD NUMBER	FILE OPEN RECORD*	LENGTH IN WORDS
(0)	RECORD TYPE = 44	1
(1)	RECORD LENGTH = 46	1
(2)	TIME STAMP	3
(5)	JOB TYPE / JOB NUMBER	1
(6)	USER NAME	4
(10)	ACCOUNT NAME	4
(14)	LOGON GROUP NAME	4
(18)	STDINLDEV	1
(19)	FILE NAME	4
(23)	FILE GROUP NAME	4
(27)	FILE ACCOUNT NAME	4
(31)	FOPTIONS	1
(32)	AOPTIONS	1
(33)	RECORD SIZE	1
(34)	FILE SIZE	2
(36)	DEVICE	1
(37)	FILE CODE	1
(38)	FILE NUMBER	1
(39)	FILE ERROR	1
(40)	RESERVED	2
(42)	RESERVED	4

* Valid only if HP Security Monitor (HP30392) has been installed.

Figure 5-33. File Open Record (Type 44)

The system generates a File Open Log Record each time a program issues an FOPEN call or each time an FOPEN call fails. You set the circumstances with the Security Configurator utility program. Refer to MPE V Account Structure and Security (32033-90136) for additional information. The File Open Log Record applies only to MPE G.03.00 and later releases.

TYPE No. 45 | TYPE COMMAND ACCESS* | RECORD LENGTH

WORD	LEN	
(0)	(1)	RECORD TYPE = 45
(1)	(1)	RECORD LENGTH
(2)	(3)	TIME STAMP
(5)	(1)	JOB TYPE / JOB NUMBER
(6)	(4)	LOG ON USER NAME
(10)	(4)	LOG ON ACCOUNT NAME
(14)	(4)	LOG ON GROUP NAME
(18)	(1)	STDINLDEV
(19)	(1)	CIERR
(20)	(1)	CIPARM
(21)	(1)	F
(22)	(14)	FILENAME
		8 RSV 15
(36)	(1)	COMMAND LENGTH
	(n)	COMMAND IMAGE

* Valid only if HP Security Monitor (HP30392) has been installed.

Figure 5-34. Command Access Record (Type 45)

The system generates a Command Access Log Record each time a user or a program issues a command for which you have turned on command logging. You select commands to be logged with the Security Configurator utility program. Refer to MPE V Account Structure and Security (32033-90136) for additional information. The Command Access Log Record applies only to MPE G.03.00 and later releases.

LOGON USER NAME	(4-word array) is the user name under which the logon was performed, left-justified, blank-padded.
LOGON ACCOUNT NAME	(4-word array) is the account name under which the logon was performed, left-justified, blank-padded.
LOGON GROUP NAME	(4-word array) is the group name under which the logon was performed, left-justified, blank-padded.
STDINLDEV	(1 word) is the input logical device on which the logged command was issued.
CIERR	(1 word) is the CIERR number of any detected error or warning found by the command executor. Errors are positive numbers and warnings are negative numbers. If no errors or warnings occurred, this should be zero.
CIPARM	(1 word) indicates which parameter was in error if an error or warning was found. This should be zero if no error was found or if no parameter was associated with the detected error.
FLAG	1: command is programmatically executed 0: command is executed through CI
FULL FILENAME	(27 bytes) contains the *filename.groupname.acctname* of the file; each name is 8 bytes long, left-justified with trailing blanks, with the 27th byte containing garbage. If CI, the filename will always be "command interpreter".
CMDLEN	(1 word) indicates the length of the entire command image in bytes.
COMMAND IMAGE	(byte array) though the CI will take an input string up to 278 bytes long for command image, the logging buffer can only hold 200 characters overall. The other input data will take up the first 46 characters, so only 154 characters are left for command image. Command image longer than 154 will be truncated.

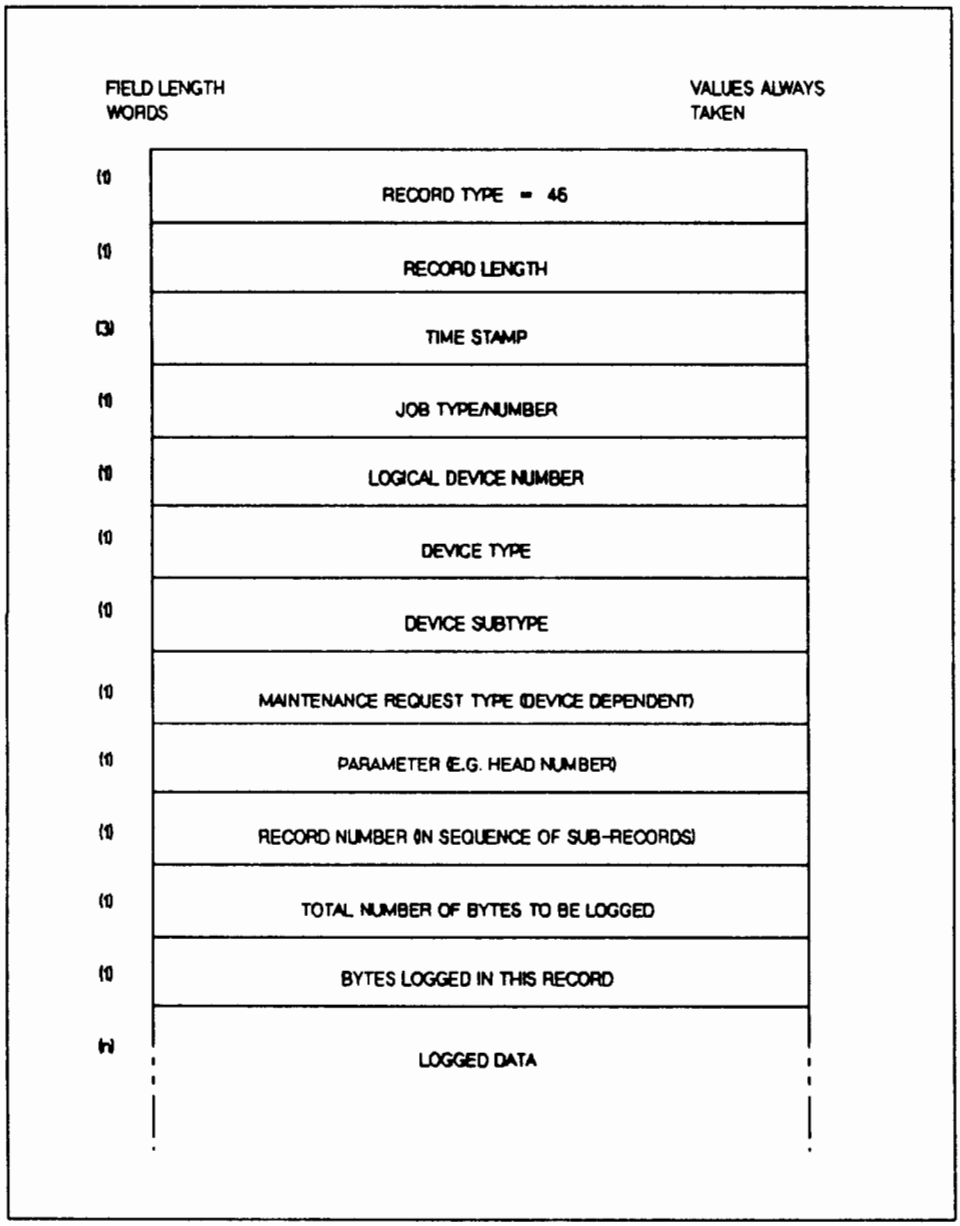


Figure 5-35. MPE Maintenance Request Log Record (Type 46)

The system generates a Maintenance Request log record when a CS80 device needs to perform internal maintenance (for example, head alignment or error logging).

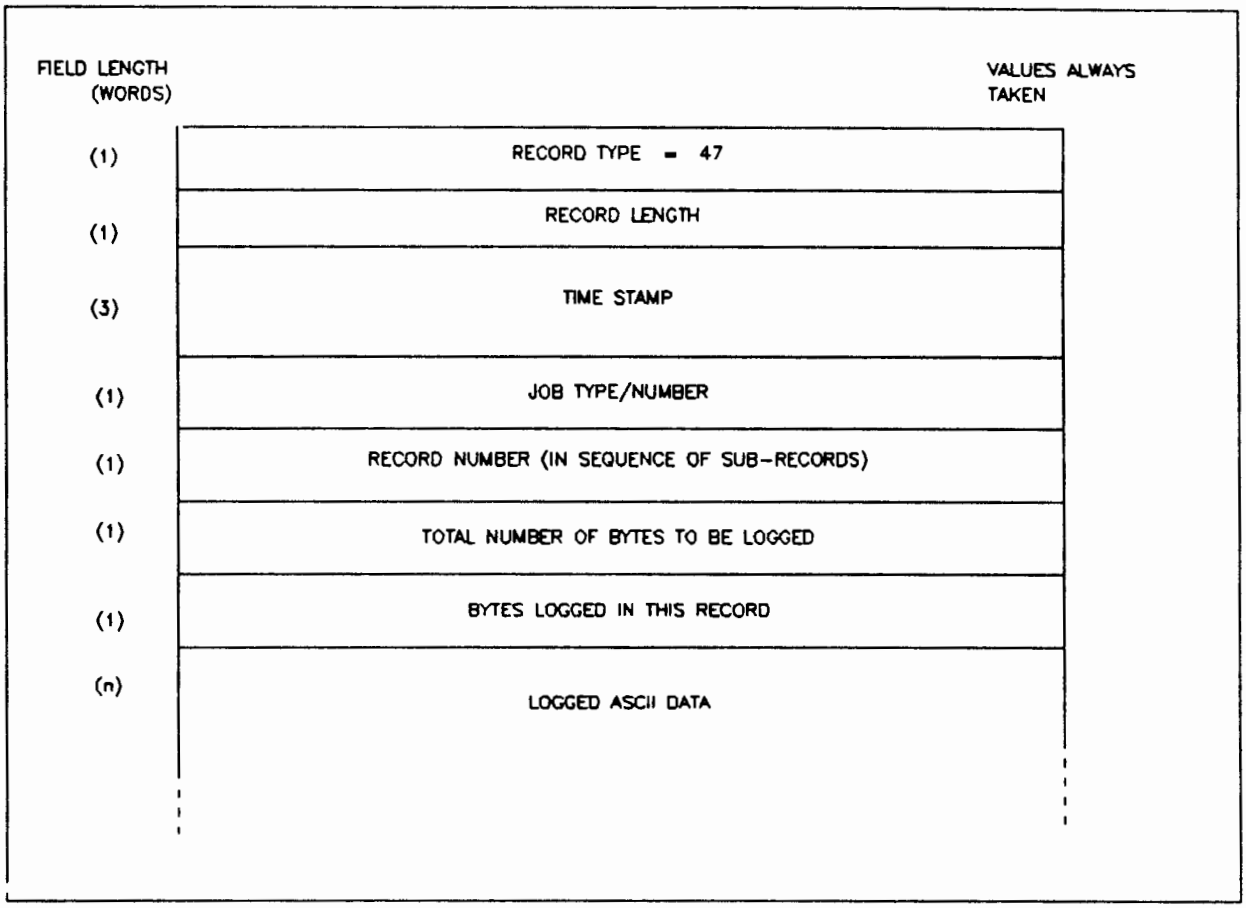


Figure 5-36. Diagnostic Control Unit Log Record (Type 47)

The system generates a Diagnostic Control Unit log record when the Diagnostic Control Unit (DCU) buffer is full. The DCU buffer contains information on the hardware state of the computer (for example, power failure, remote on, remote off, run, halt, start, load, dump, and microcode version). The DCU log record is only generated on an HP 3000 Series 64/68/70.

Reviewing Log Records

The System Manager can review any of the log records by running the LISTLOG2/LISTLOG5 utility, discussed in the *MPE V Utilities Reference Manual* (32033-90008).

To review the log records:

STEP 1. List the log files in your system and select the series you wish to examine. Enter:

```
:LISTF LOG@.PUB.SYS
```

STEP 2. Run LISTLOG5 by entering:

```
:RUN LISTLOG5.PUB.SYS
```

or

```
:RUN LISTLOG5.PUB.SYS,NAME
```

STEP 3. Enter the number of the first log file in the series you wish to examine. For example, if LOG1958 is the first file you wish to review, in response to the prompt:

```
ENTER THE FIRST AND LAST LOG FILES TO BE ANALYZED FIRST?
```

enter:

```
1958
```

STEP 4. In response to the prompt LAST, enter the number of the last log file in the series. For example:

```
1968
```

STEP 5. LISTLOG5 displays a list of log records (see page 5-42). Enter the numbers of the log record types you wish to examine. Separate record numbers with commas. To examine all records, press RETURN. For example, to examine File Open (record 44) and File Close (record 5), enter:

```
ENTER EVENT NUMBERS SEPARATED BY COMMAS? 5,44
```

LISTLOG5 processes the log files, prepares a spool file and prints the number of each log file that contains the record types you selected. If it does not find any of the records you selected, it notifies you. For example:

```
NO DESIRED EVENTS FOUND IN LOGFILE 1066
```

STEP 6. When it finishes processing log files, LISTLOG5 asks if you wish to purge the log files which have been searched. If you answer yes, the files are purged. If you answer no, they are retained.

STEP 7. LISTLOG5 also asks if you wish to run the program again. Answer Y (yes) or N (no).

```
DO YOU WISH TO RUN AGAIN (Y OR N)?
```

User Logging

The MPE User Logging facility provides a means to record additions and modifications to data bases and subsystem files. The logging data can be recorded on disc, tape, serial disc, and cartridge tape. Logging is done programmatically by incorporating the following intrinsics into the program code: LOGSTATUS, OPENLOG, CLOSELOG, FLUSHLOG, BEGINLOG, and ENDLOG. Another intrinsic, LOGINFO, is only available on MPE version G.02.00 and later versions. These intrinsics, and a more detailed discussion of user logging, can be found in the MPE V Intrinsics Reference Manual (32033-90007).

In addition to these logging intrinsics, there are also standard MPE commands used with the logging facility. They are: :ALTLOG, :GETLOG, :LISTLOG, :RELLOG, and :SHOWLOGSTATUS. These commands are documented in the MPE V Commands Reference Manual (32033-90006). Another command, :CHANGELOG, is only available on MPE version G.02.00 and later versions.

The Operator :LOG command turns on logging:

```
:LOG LOGID,START     ** LOGID is the name of the logging process. **
```

To enter data into the log file, applications programmers will incorporate the intrinsics OPENLOG, WRITELOG, and CLOSELOG in their code. Like any other file used with MPE, access may be restricted to a log file by assigning a lockword to it. The data stored in the log file can then be used in combination with a lost data set to recover lost transactions.

USER LOGGING PROCESSES. The number of user logging processes permitted on the system is principally determined by the flexibility of your logging requirements. The maximum number of user logging processes is 64 for MPE versions prior to G.02.B0 and 128 for version G.02.B0 and later versions. The size of the logging identifier table affects the number of logging processes per application: One user logging file per application, which allows one logging process per application, is normally sufficient.

THE NUMBER OF USERS PER LOGGING PROCESS. You will also need to enter the number of users who can access a single log file. This number cannot exceed 128 on the E/F.00.00 release of MPE. The maximum number of users per logging process on the G.00.00 and later releases of MPE has been expanded to 256. Determine the maximum number of users that will need access to the log file and enter that number in response to the question # OF USERS PER LOGGING PROCESS?.

MANUAL AND AUTOMATIC CHANGE OF LOG FILES. (Only available on MPE version G.02.00 and later releases, not available on the E/F.00.00 release.) A user logging file can be changed manually, with the :CHANGELOG command, or automatically, with the AUTO parameter of the :GETLOG and :ALTLOG commands.

THE SYSTEM MANAGER

SECTION VI

The System Manager has the most extensive capabilities of any user on the system. By definition, System Managers have all the capabilities of the standard users, as well as more powerful capabilities which are unique to them. Unique to System Managers (and Account Managers in some cases) is the ability to determine and refine the systems accounting structure by adding accounts, groups, and users, the ability to monitor resource usage, and the responsibility for system-wide security. Previously, this section described System Manager and Account Manager tasks such as setting up an account structure, modifying the accounting structure, billing for resource use, and providing for system security. Refer to the new MPE V Account Structure and Security Manual (32033-90136) which describes theses System Manager tasks in detail.

This section describes two other important System Manager tasks:

- Setting the System Startup State Configurator
- Billing users for system use

SYSTEM STARTUP STATE CONFIGURATOR

Each time that the system is started, various system parameters (e.g., JOBFENCE, Job LIMIT, OUTFENCE, etc.) are automatically assigned default values. The System Manager can use the System Startup State Configurator facility to automatically reset any of the system defined defaults, stream special jobs, open DS lines, or perform any task appropriate to system initialization. In conjunction with the Programmatic Creation of Sessions capability the System Manager can automatically create user sessions on selected terminals when the system comes up. Using the full functionality of the System Startup State Configurator it is possible for the System Manager to describe beforehand exactly what the desired System Startup State should be.

The System Startup State Configurator facility is maintained by the System Manager in a file named SYSSTART.PUB.SYS. The MANAGER.SYS is the only user with sufficient privilege to create this file. SYSSTART.PUB.SYS defines selected System Startup State Commands. The only System Startup State Commands supported are STARTUP, WARMSTART, COOLSTART, UPDATE, RELOAD, and COLDSTART. Each of these commands, except for STARTUP, corresponds to one of the different system starts. A sample SYSSTART.PUB.SYS is shown below:

```
STARTUP
STREAMS 10
ALLOW @.@;COMMANDS=REPLY
ALLOCATE COBOLII.PUB.SYS
LIMIT 4, 16
JOBFENCE 4
OUTFENCE 5
OUTFENCE 12;LDEV=14
COMMENT A continuation record follows:
DSCONTROL 90;OPEN;RETRY=10;&
TRACE,ONALL,,60,WRAP
***
```

```
WARMSTART
STARTSESS 20;MGR.ACCT;HIPRI;NOWAIT
STARTSESS 21;USER.ACCT
STARTSESS 22;USER.ACCT
STARTSESS 23;USER.ACCT
***
COOLSTART
STARTSESS 20;MGR.ACCT;HIPRI;NOWAIT
STARTSESS 21;USER.ACCT
STARTSESS 22;USER.ACCT
STARTSESS 23;USER.ACCT
***
```

In the example above the STARTUP command defines actions that the system will perform regardless of the type of system startup used by the operator. WARMSTART and COOLSTART, as defined above, will cause sessions to be created for MGR.ACCT on logical device 20 (the Console) and for USER.ACCT on the other selected terminals. Note that UPDATE, RELOAD, and COLDLOAD were not defined; if the system comes up in any of these starts, only those commands listed under the STARTUP block will be executed. There is no requirement that any or all of the possible System Startup State Commands be present in SYSSTART.PUB.SYS.

The MPE commands available for execution in SYSSTART.PUB.SYS are:

ACCEPT	DOWNLOAD	LIMIT	STOPSPOOL
ALTLOG	DSCONTROL	LMOUNT	STREAM
ALLOCATE	FOREIGN	LOG	STREAMS
ALLOW	GIVE	MPLINE	SUSPENDSPOOL
CACHECONTROL	HEADOFF	MRJECONTROL	TAKE
COMMENT	HEADON	OUTFENCE	TELL
CONSOLE	IMFCONTROL	REFUSE	TELLOP
DEALLOCATE	JOBFENCE	STARTCACHE	TUNE
DISALLOW	JOBSECURITY	STARTSESS	UP
DISCRPS	JOBPRI	STARTSPOOL	VMOUNT
DOWN	LDISMOUNT	STOPCACHE	

These MPE commands were chosen on the basis of being programmatically executable and requiring no user interaction. No other commands, UDCs, or other System Startup State Commands are allowed in the body of a System Startup State Command.

The following restrictions apply to the System Startup State Configurator:

- No options are available with the six System Startup State Commands. They will be echoed to the Console (with passwords stripped), BREAK will be disabled.

- A "valid" SYSSTART.PUB.SYS is a regular EDITOR ASCII file which has one of the six System Startup State Commands as its first record. Blocks are terminated by a "*" in the first byte of a record or by the end-of-file. Records are continued onto another line by adding a "&" as the last non-blank character in the record. The maximum continued record length is 239 bytes.

- The commands in the STARTUP block (if it exists) will be executed first, no matter what kind of startup is specified; the commands in the appropriate block are executed next (if a block corresponding to the specified type of startup exists). These executions occur immediately before OPERATOR.SYS is logged onto the Console.

- If no SYSSTART.PUB.SYS can be found, system startup works as it has in the past, and OPERATOR.SYS is allowed to log on. If any of the MPE commands in the System Startup State block results in an error, an error message will be generated and execution will continue at the next MPE command in the block.
- If one of the System Startup State Commands (SSSC) creates a session on the Console, the automatic logon of OPERATOR.SYS will fail.
- Once the system is up, the System Startup State Commands will not be recognized.
- The System Startup State Configurator facility can be disabled simply by renaming SYSSTART.PUB.SYS
- Lockwords are not permitted on SYSSTART.PUB.SYS.

Managing Expanded Console Capabilities

System Operator functions are sometimes associated with one specific user: the System Operator. The use of expanded Console capabilities increases System Console accessibility and enables the System Operator to disperse Console functions to other users who may require them. The fact that Console commands are processed by the MPE Command Interpreter enables the System Operator to assign to individual users the ability to execute certain Console commands. The System Console, itself, can be moved to any terminal on the system with the :CONSOLE command. Users with System Manager (SM) capability may use the :CONSOLE command even if they have not been allowed the command. This enables them to retrieve the Console at any time. Users can be associated with specific devices, thereby enabling them to use the commands that control each device. Users can also be granted the ability to use job control commands on their own jobs.

Although not directly responsible for assigning these capabilities to users, the System Manager plays an important role in managing expanded Console capabilities. Specifically, the System Manager must:

- Create a device-user association table for use with the :ASSOCIATE command.
- Create a special user called OPERATOR.SYS .

CREATING A DEVICE-USER ASSOCIATION TABLE. The device-user association table identifies the devices which may be assigned by the System Manager with SAVE and WRITE access to PUB.SYS , to other system users. The table is generated by running the utility ASOCTABL.PUB.SYS for MPE version E/F.00.00 or earlier, or ASOCTBL5.PUB.SYS for MPE version G.00.00 and later. Each utility creates a file called ASSOCIATE.PUB.SYS , the device-user association table. These utilities are described in the MPE V System Utilities Reference Manual (32033-90008).

In response to the ">" prompts issued by the utility, the System Manager enters association statements in the form:

>deviceclassname = username.accountname [,username.accountname,...]

The parameter *deviceclassname* is the appropriate device identifier (class name) assigned to the device to be associated. The *username* parameter is the name of the user to be allowed to associate with the device. The *accountname* parameter specifies the name of the user's account. More than one user may be allowed to associate with a device in the table. The specification @. acct may be used to indicate all users within an account; @.@ may be used to indicate all users on the system.

For example, to allow device class LPX to be associated by a user named ALDEN in account SALES, enter:

```
>LPX=ALDEN.SALES
```

Once the table is created, any of the users listed can associate with the special device class by using the :ASSOCIATE command. Although more than one user may have permission to associate with a device class in the table, a user can actually associate to a device class only if none of the devices in that class are associated to anyone else. Refer to the MPE V Command Reference Manual (32033-90006) for additional information.

CREATING OPERATOR.SYS. The creation of the user OPERATOR.SYS should be done at the time the system is first brought up. You need only create this user once, as OPERATOR.SYS remains on the system for use thereafter.

The first step in creating OPERATOR.SYS is to determine the home group and system capabilities that will be needed by the user. The home group used can be PUB or another group, even one created particularly for OPERATOR.SYS. The capabilities you decide to assign should take into account the kinds of activities that the user of OPERATOR.SYS will need to perform. It is recommended that the following capabilities be assigned as a minimum: OP to allow ;HIPRI logons, and IA. This will allow the user to log on and run programs. Additional capabilities that will usually be required are: UV for handling private volumes, SF for storing files, ND for using tapes, and BA for batch jobs. Additional capabilities can be assigned if they are needed. Care should be taken, however, not to jeopardize the integrity of the system.

To create OPERATOR.SYS, log on with:

```
:HELLO MANAGER.SYS
```

Then enter the following information, substituting the home group and capabilities you've selected for assignment. For example:

```
:NEWUSER OPERATOR.SYS;HOME=PUB;CAP=OP,IA,UV,BA,SF,ND
```

BILLING ACCOUNTS FOR RESOURCE USE

As System Manager, you can monitor the system resources used by each account. Depending on how your system is used, you might actually bill users at regular intervals according to their resource use. You use the :REPORT command to report resource use at the end of a billing interval. You use the :RESETACCT command to reset resource use figures to 0 at the beginning of a new billing period.

For additional information on :REPORT and :RESETACCT, refer to the MPE V Commands Reference Manual (32033-90006).

Using :REPORT

You use the :REPORT command to report account and group resource use. For each group, :REPORT lists:

- The amount of disc storage space in use
- The disc storage space limit

- The total amount of CPU time used (in seconds)
- The CPU time limit
- The total amount of connect time (in seconds)
- The connect time limit

Table 6-1 describes the parameters for the :REPORT command.

Table 6-1. :REPORT Parameters

Parameter	Description
groupset	The accounts and groups for which to list resource use information. Legal values include: *group* *@* *group.acct* *@.acct* *@.@* *group.@* Default: For System Managers: All groups in all accounts For Account Managers: All groups in the Manager's account For standard users: Logon group
listfile	Name of the output file to which to write resource use information. The default is $STDLIST.
;VS= *volset*	Name of a particular volume set for which to report resource use information.

For example, suppose that your site is a timesharing business that bills customers monthly. You bill customers for their accounts and for the amount of the following resources they have used during the month:

- Permanent disc space
- CPU processing time
- Connect time in minutes

At the end of each period, you use the :REPORT command to list resource usage for each account. You can list information for all accounts at once, list individual accounts, and store the listings in files. If accounts reside on private volumes, you must follow special procedures.

REPORTING INFORMATION FOR ALL ACCOUNTS. To report resource use for all accounts in your system, enter:

```
:REPORT @.@
```

The system lists resource use information for each account and group as shown in Figure 6-1.

```
:REPORT @.@

ACCOUNT          FILESPACE-SECTORS      CPU-SECONDS      CONNECT-MINUTES
   /GROUP          COUNT    LIMIT     COUNT    LIMIT     COUNT    LIMIT
FINANCE            55300       **     60050       **     85060       **
   /ACCTRCVD       13000    20000     20030    50000     35010    90000
   /INVENTRY       10300    20000     15020    50000     20040    90000
   /PAYROLL        17000    20000     13000    50000     15010    90000
   /PUB            13000       **     12000       **     10000       **
MARKTING           40100       **     56030       **     68200       **
   /ADVERPR         9080    15000     12010    40000     15000    75000
   /MKTRESCH       15020    15000     17000    40000     19100    75000
   /PUB            11000       **     15010       **     20100       **
   /SALES          13000    15000     12010    40000     14000    75000
PERSNNEL           89500       **     75320       **     98060       **
   /PUB            26300       **     13010       **     12040       **
   /RECORDS        34100       **     21210    60000     34010    95000
   /RECRUITG       15100    30000     17100    60000     25000    95000
   /TRAINING       14000    30000     24000    60000     27010    95000
SYS                62503       **     68410       **     70204       **
   /PUB            57300       **     34300       **     10103       **
   /OPERATOR        5203    30000     34110       **     60101       **
TECHNLGY           98796       **     74986       **     86946       **
   /ENGINRG        35113    40000     30411    60000     32102    60000
   /MFGENGG        21460    40000     14370    60000     10522    60000
   /PUB            30103    40000     20101    60000     13301    60000
   /RESEARCH       12110    40000     10104    60000     31021    60000
```

Figure 6-1. Use Report for All Accounts

REPORTING INFORMATION FOR GROUPS IN A SINGLE ACCOUNT. You report resource use for a single account by including the account name within your :REPORT command. For example:

```
:REPORT @.CUSTA
```

Reporting resource use for a single account is useful when you need information about a particular account. For example, suppose there is a deliquent account, DIAG. You intend to purge that customer from the system. Therefore, you want an individual report for that account. Use the following :REPORT command:

```
:REPORT @.DIAG
ACCOUNT        FILESPACE-SECTORS      CPU-SECONDS      CONNECT-MINUTES
   /GROUP       COUNT     LIMIT     COUNT     LIMIT     COUNT     LIMIT
DIAG            49552     50000     56729        **     65820        **
   /PUB          4354     50000      5254        **      4466        **
   /TEST        45198     50000     51475        **     61354        **
```

REPORTING INFORMATION FOR ACCOUNTS ON PRIVATE VOLUMES. To get complete accounting information for a private volumes group, use two :REPORT commands. When a group is bound to a private volume set, the system keeps accounting information for that group in two places. It keeps the CPU time and connect counts and limits in the system directory and keeps the file space counts and limits in the directory on the group's home volume set.

Use the following form of :REPORT to obtain the accounting information from the system directory:

:REPORT *groupset*

The system reports the CPU and connect time and limits for all groups, but only the file space counts and limits for the groups that are not bound to a private volume set. Note that the total file space count for an account obtained from this command does not include the file space counts for private volume groups. To obtain file space counts for private volume groups, :REPORT command in the following form:

:REPORT *groupset*;VS=*volset*

The command above lists only the groups and accounts that are in the directory for the private volume set specified. The only information in this type of report is the file space counts and limits.

PRINTING A :REPORT LISTING. To print a :REPORT listing, issue a :FILE command describing the printer, and then name that file in your :REPORT command. For example, enter:

```
:FILE LIST1;DEV=LP
:REPORT @.@,*LIST1
```

STORING A :REPORT LISTING IN A DISC FILE. If you intend to store the report in an existing disc file, omit the :FILE command. For example, to store the report in the disc file RPT1, enter:

```
:REPORT @.@,RPT1
```

Storing resource use reports in online files is useful for record keeping purposes, and when you use billing programs that use the report as input

The type of output written to the list file depends on the type of file (ASCII or binary) specified or implied. If the list file is an ASCII file, :REPORT produces a standard ASCII listing; in this listing, an unlimited quantity is denoted by a double asterisk (**). If the list file is a binary file, which is typically used to help in automatic processing of the report data, :REPORT writes a 17-word record for each account/group. Counts and limits are double-word integers; an unlimited quantity is denoted as %17777777777. When :REPORT opens the file, it opens it as NEW, ASCII,

Variable,Carriage-Control, Write-only Access, and Exclusive. Since CCTL and BINARY do not work together, you must specify NOCCTL to override with binary files.

In the list files for both ASCII and binary, the entry for each account immediately precedes the entries for all of its groups. Table 6-2 shows the record report format.

Table 6-2. Report Record Format

WORD	CONTENTS
0	Type of entry, where: 1 = A group entry 2 = An account entry
1-4	Account or group name, left justified and padded with blanks
5-6	Permanent file space count (in sectors)
7-8	Permanent file space limit (in sectors)
9-10	Central processor time count (in seconds)
11-12	Central processor time limit (in seconds)
13-14	Connect time count (in minutes)
15-16	Connect time limit (in minutes)

Resetting Accounts

After you have obtained the necessary reports for the billing period, use the :RESETACCT command to reset the CPU time and connect time counts for the new billing period. Enter:

```
:RESETACCT @
```

This command, without any optional parameters, resets to zero the CPU processing time and connect time for all accounts and groups on the system. Users now begin accumulating CPU and connect time for the new billing period. Note that this command does not change the allowable limits for each account and group, only the counters for actual use. Use the :ALTACCT and :ALTGROUP commands to change limits.

Table 6-3 describes all :RESETACCT parameters.

Table 6-3. :RESETACCT Parameters

Parameter	Description
[@] [*acct*]	Names the accounts to reset: either all accounts (@), or specific accounts (by name). When you name a specific account, the system resets resource use counters for all groups in that account.
[CPU] [CONNECT]	CPU tells the system to reset only CPU use counters. CONNECT tells the system to reset only connect time counters. Default: Resets both CPU and connect time.

Also, at the group level, five user types are recognized:

- Any User (ANY).
- Account Librarian User (AL).
- Group Librarian User (GL).
- Group User (GU).
- Account Member (AC).

If no security provisions are explicitly specified, the following provisions apply by default:

- For a public group (named PUB), whose files are normally accessible in some way to all users within the account, READ and EXECUTE access are permitted to all users; APPEND, WRITE, SAVE, and LOCK access are limited to Account Librarian users and group users (including Group Librarian users) (R,X:ANY; A,W,L,S:AL,GU).
- For all other groups in the account, READ, APPEND, WRITE, SAVE, LOCK, and EXECUTE access are limited to group users (R,A,W,L,X,S:GU).

File-Level Security

When a file is created, the security provisions that apply to it are the default provisions assigned by MPE at the file level, coupled with the provisions assigned to the account and group to which the file belongs. At any time, however, the creator of the file (and only this individual) can change the file-level security provisions, as described in the MPE V Commands Reference Manual (32033-90006).

If no security provisions are explicitly specified by the user, READ, APPEND, WRITE, LOCK and EXECUTE access are permitted to all users (R,A,W,L,X:ANY), for all files, by default.

Because the total security for a file always depends on security at all three levels, a file not explicitly protected from a certain access mode at the file level may benefit from the default protection at the group level. For example, the default provisions at the file level allow the file to be read by any user; but the default provisions at the group level allow access only to group users. Thus, the file can be read only by a group user.

In summary, the default security provisions at the account, group, and file levels combine to result in overall default security provisions as listed in Table 6-3. Stated another way, when the default security provisions are in force at all levels, the standard user without any other user attributes has:

- Unlimited access (in all modes) to all files in the logon group, and the home group.
- Reading and executing access (only) to all files in the PUB group of his account, and the PUB group of the SYS account.

Following are the important file security rules:

- Users can only create files in their own account, regardless of their capability.
- Only the creator can modify a file's security.
- If a lockword is present on a file, then it is always required in order to open the file. A program could open the file specifying the lockword, but the user will not be able to open the file unless he knows the lockword.
- Account Managers have unlimited access to the files within their account (must supply lockword).
- System Managers have unlimited access to any file, but can only save files in their account (must supply lockword).
- The :RELEASE command allows unlimited file access, and the :SECURE command resecures a file that has been released.
- The :ALTSEC command restricts access to files in a group to which access is normally not restricted.

Table 6-3. Default Security Provisions

FILE REFERENCE	FILE	ACCESS PERMITTED	SAVE ACCESS TO GROUP
filename.PUB.SYS	Any file in Public group of System account.	(R,X:ANY; W:AL,GU)	AL,GU
filename.groupname.SYS	Any file in any group in System account.	(R,W,X:GU)	GU
filename.PUB.*accountname*	Any file in Public group of any account.	(R,X:AC; W:AL,GU)	AL,GU
filename.groupname.accountname	Any file in any group in any account.	(R,W,X:GU)	GU

ACCOUNT/GROUP/USER ORGANIZATION

When you log onto MPE, two basic elements must be defined: an identifiable unit to which system resources (such as disc file space and central processor time) are allocated and charged, and a local set (domain) of disc files accessible by you. The basic unit to which resources are assigned is the account. This is the major "billable unit" in MPE. Associated with each account are three items: one, an unique file domain; two, a set of users who access MPE through the account; and three, a set of

groups which partitions the account's accumulated resources and divides its file domain into private subdomains.

Each account is defined, modified, and deleted by commands issued by a user with the System Manager capability. Every account is identified by a name. Optionally, a logon password can be associated with the account to validate a user's ability to access MPE under this account. A maximum priority also is associated with the account. This designates the highest priority at which any process within this account can be scheduled. Limits are assigned for maximum disc file space, central processor time, and online connect time permitted each account. Running counts of the use of these resources are maintained for billing purposes. To maintain an account, the user acting as System Manager grants a user the Account Manager capability. This Account Manager may then assign the same capabilities, or some subset of these capabilities, to other users in his account.

The users and groups associated with each account are defined by commands issued by the Account Manager user. Each user is identified by a unique name, within this account, and by an optional password. He is assigned a maximum allowable priority for his processes, which cannot exceed the maximum account priority. Each account possesses a Public group (called PUB), to which all of its users have read and program-execution access, in addition to other groups that may be covered by various security provisions. Each group is identified by a name unique within its account, and optionally, by a password used to validate access to the group and its files at logon. As with an account, limits are assigned for the maximum disc file space, central processor time, and online connect time usable by a group. Running counts of resources used by the group are maintained. File space is always charged to the group containing the file, rather than the group to which the user who created the file was logged on.

Any MPE installation can contain several accounts. Each account can have several users and groups associated with it. Each group can possess several files which constitute a subset of the file domain. When the user logs on, he specifies the account, user and group names (and, if required, the account, user, and group passwords). Furthermore, any file in a group may also be protected by a lockword, which must be supplied at any time the user opens the file during the course of his job or session. In addition, there are standard file security mechanisms that are described later.

Each user can be associated with a home group by the Account Manager. If the user does not specify a group when he logs on, he is associated to the home group by default. If the Account Manager does not assign a user a home group, that user must always specify a group when he logs on.

Once the standard user has established communication with MPE, if the normal (default) system security provisions are in force, the user has unlimited access to all files in his logon group and home group. Furthermore, he can read and execute programs residing in files in the Public group (PUB) of his account, or in the public group of the System account (PUB.SYS). He cannot, however, access other files in the system in any way.

The normal MPE security provisions can be overridden at the account, group, or file level, (by System Manager, Account Manager, or standard users, respectively) to provide more or less restriction to users. Users with special capabilities are generally subject to fewer restrictions.

A user with MPE System Manager capability can create, modify, and delete accounts. With each account, the System Manager user also creates a user with the Account Manager capability and a public group (named PUB). The Account Manager user can then create, modify, and delete groups and users within his account. The public group (PUB) is a group whose file library is normally accessible for reading and program execution to all users within the account.

Typical Accounts

To illustrate the various ways in which accounts, groups, and users can be defined and organized at an HP 3000 Computer System site, several examples are presented. Notice that these are only examples, and are not meant to imply formal organizational rules.

A MULTI-DIVISION COMPANY. Suppose that a certain multi-division company has a corporate HP 3000 Computer System. The company has many separate operating divisions, but we will use the General Systems Division (GSD) to show the details of the accounting structure. (See Figure 6-1.)

The System Manager user assigns the name GSD to an account, and an Account Manager user name MGR. The Account Manager then logs onto the system and defines the groups for the Accounting department (ACCTG), Marketing department (MKTG), and Engineering department (ENGR). He or she also assigns users to the various groups as detailed in the figure. In this case, the structure within the account follows the functional departmental scheme.

AN IN-HOUSE SERVICE BUREAU. An in-house service bureau, providing both batch and interactive capabilities, serves different users within the same company. The manager of the Data Center, having System Manager capability, creates an account for each department (Engineering, Marketing, Accounting, and other departments) in the company. For each account, an Account Manager user assigns all programmers in his department as users, and assigns them all standard capabilities, plus the following optional capabilities: Process-Handling (PH), Data-Segment handling (DS), and Multiple RINs (MR). The Account Manager user also defines the groups for the account.

As an example of a typical account, the account for the Engineering department defines all programmers in that department as users. This account contains the following groups:

- Public Group, containing utility programs, for which all users of the account have EXECUTE and READ access only.
- Data-Collection Group, for which all users have READ, WRITE (append only), SAVE, and LOCK access.
- Common Group, used for miscellaneous department overhead. Unrestricted access; no passwords necessary.
- Project Groups (one per project). Access restricted to project members.
- Private Groups (one for each programmer), with private password.

The MPE Accounting System would be used, to some extent, for internal bookkeeping. This system monitors permanent file space and central-processor time used by job/sessions for accounts and groups, and interactive terminal connect-time used by sessions for accounts and groups.

A COMMERCIAL SERVICE BUREAU. A commercial service bureau, also providing batch and interactive capabilities, offers its services to various outside companies (customers). An account is established for each customer. Users are given standard capabilities but no optional capabilities. The group organization is similar to that for the in-house service bureau described previously. The MPE Accounting System is used more fully in the commercial service bureau, however, because with this organization, each customer can be billed separately for his/her CPU time and disc space.

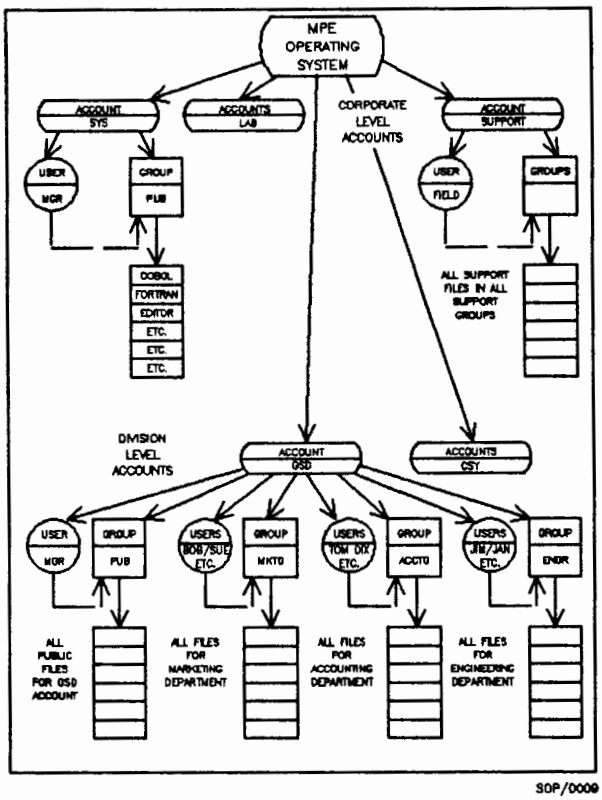


Figure 6-1. Accounting Structure in a Corporation.

A SCIENTIFIC RESEARCH CENTER. In a research center, where scientific programmers are using the system for batch and interactive applications, the following accounts are available:

- System account, used by all users.
- Data-processing account, containing groups allocated as required, used by all research users. For this account, all users have the standard capabilities and the following optional capabilities: Process-Handling, Data-Segment handling, and Multiple RINs.
- Special accounts, used by agencies such as the Personnel and Accounting Offices. Access is restricted to members of these agencies.

ACCOUNTING INFORMATION

The MPE Accounting System keeps track of various system resources used by each account and group. These resources are: total permanent file space and central processor time (accumulated by jobs and sessions), and terminal connect time (accumulated by sessions). Furthermore, limits can be set for the maximum use of these resources at the account level (by System Manager users issuing the :NEWACCT or :ALTACCT commands) and at the group level (by Account Manager users issuing the :NEWGROUP and :ALTGROUP commands).

When a job or session is in progress, MPE maintains counts of the resources used by that job or session. When the job or session is logged off, its total time-resource use counts are used to update the time resource-use counters for its logon account and group. When another job or session attempts to log on to the same account (and, perhaps, group), and the central-processor time limit or session connect-time limit has been exceeded by the previous job/session at the account (or group) level, access is refused.

When a request is made to save a file, or add an extent to an existing file, and this action would result in exceeding the permanent file space limit at either the account or group level, the request is denied. File space is always charged to the group containing the file, rather than the group where the user who created the file was logged on.

Accounts Supplied With System

When Hewlett-Packard delivers an HP 3000 Computer System, there are two accounts on the system: SYS, and SUPPORT.

The SYS account is present on the system because system files must belong to some account. Files such as PROGEN, INITIAL, SYSDUMP, the system Segmented Library (SL.PUB.SYS), DEFDATA and Hewlett-Packard-supplied subsystems such as COBOL and FORTRAN, have been assigned to the SYS account. (Subsystem programs and files are not part of the operating system, but are in the SYS account for convenience.)

The SUPPORT account is primarily used by Hewlett-Packard's Systems Engineering organization to distribute and maintain system software and all supported software utilities and verification programs. Software support is not considered a user function, so the SUPPORT account is not discussed in this manual. Your local Hewlett-Packard field representative can provide any information you may require concerning this special account.

Thus, the system's primary initial account is the SYS account. It is always initially present, and thereafter, is expected to be present at all times. It cannot be purged. The SUPPORT account can be purged.

Every account has a group to contain files, and a user to access those files. The SYS account also has an initial group, and user. The group is named PUB; the user is named MANAGER. The PUB group contains all system files, subsystem files, and Segmented Library procedures.

The System Manager user has full control over the SYS account and, in addition, has the ability to create all other accounts and managers that will be required for the installation.

SYSTEM MANAGER CAPABILITIES

The System Manager has the most extensive capabilities of any user on the system. By definition, he has all the capabilities of the standard user, as well as those that are unique to the System Manager user. There are functions unique to the System Manager capability:

- Creation of new accounts, and Account Managers.
- Modification of account capabilities and status.
- Deletion of entire accounts, with associated groups, users, and files.
- Listing of any, or all, files on the system.
- Obtaining account reports of system usage and resources.
- Storing/restoring any, or all, files on the system on to magnetic tape or serial disc.
- Defining altering, and deleting private disc volume sets and classes.
- Describing User-Defined Commands (UDCs) known to all system users.
- Creating the device-user association table.
- Creating an OPERATOR.SYS user.

The System Manager normally logs on in session mode with:

```
:HELLO MANAGER.SYS
```

Initially there is no password on either the account, the group, or the user. Once logged on, the user can define new accounts and Account Manager users in order to set up the various billable units. He also can alter the SYS account, PUB group, and MANAGER user. He may create a new account with any or all of the MPE attributes. If the System Manager capability (SM) is assigned to another user of a different account, then that manager user will also be a System Manager. Thus, it is possible that several different "system" accounts and several "system managers" could exist simultaneously on one system. However, it is recommended that only passwords be added or altered. This is especially true during the first few days of system use, since the SYS account is specially known by the operating system. If alterations are made to the SYS account before a working knowledge of the system is acquired, it could result in loss of system integrity.

In any case, the SYS account will always reside in the system; it cannot be purged. Normally (as when delivered by Hewlett-Packard), the SYS account is assigned the maximum attributes. The PUB group of the SYS account is assigned the maximum group capabilities when the system is delivered and should not be altered routinely. If the SYS account is altered for any reason, it must have the following attributes, as a minimum:

capabilitylist	It is recommended that all capabilities be assigned to the SYS account.
passwords	Account, group, and user *passwords* may be assigned by the System Manager, to the SYS account, as desired.
filespace	Must be unlimited for the SYS account. Additionally, the system is periodically changed by Hewlett-Packard. In most cases, more disc space is required in the SYS account when changes are made.

cpu — Central processing time is not counted against system files, and subsystems which are run on behalf of users in other accounts. CPU process time in the SYS account is primarily used to determine the accounting of the System Manager and System Supervisor. If there are other users and groups in the SYS account, it may be useful to keep track of the CPU resource used by those users and groups, and to impose a limit. If this limit is exceeded, System Manager users will be warned when logging on. Other users will be denied access.

connect — Like the *cpu* processing attribute, a connect-time limit may be useful for accounting purposes, particularly if there are other groups and users in the SYS account. If this limit is exceeded, a System Manager user will be warned when logging on. Other users will be denied access.

fileaccess — It is not advisable to alter the file accessing parameters of the SYS account, and PUB group. Normally, all users in the system can read and execute any file in the PUB group of the SYS account. Since all systems programs, and all supported subsystems reside in the PUB group of the SYS account, it is reasonable to allow all users the READ and EXECUTE access. If a System Manager desires to place user programs and files in the PUB group of the SYS account, and requires limited access to those programs and files, it is better to place lockwords on those programs and files rather than to alter the access attribute.

NOTE

The system programs residing in the PUB group of the SYS account are normally executed by the operating system on behalf of users. If users should attempt to :RUN such system programs as PROGEN or PFAIL, for example, the operating system will reject the attempt.

subqueuename — The default subqueue assigned to the SYS account is CS. The CS subqueue is the highest priority subqueue under which any user should access the system, and this includes System Managers. Allowing any user to execute on a higher priority will interfere with normal system processing and could cause degradation of system performance.

localattribute — The default assigned to the SYS account is a double-word 0. The System Manager can assign to the SYS account any local attribute he desires.

The System Manager user has the following commands for his exclusive use:

- :ALTACCT
- :LISTACCT (For all accounts)
- :NEWACCT
- :PURGEACCT
- :REPORT (For all accounts)
- :RESETACCT

Defining Accounts

To create a new account (and an associated Account Manager user and PUB group), the System Manager logs on to the system and enters the :NEWACCT command, together with any optional parameters.

Suppose that Bill Williams, of the accounting department, wants an account for his personnel. He plans 25,000 sectors of disc space, so that some of his programs can create large permanent files. He will be the Account Manager, and decides on an account password: USONLY. He further states that he wants unlimited connect and CPU processing time, and desires to access magnetic tapes and the line printer. As the System Manager, you determine, with Bill, that his account will be named ACCTG, and the Account Manager name will be BILL. You then log onto the system as MANAGER.SYS (with passwords, if any) and assign the new account, as follows:

```
:NEWACCT ACCTG,BILL;FILES=25000
```

When a new account is created, the :NEWACCT command assigns default values to any optional parameters. Refer to :NEWACCT command in the MPE V Commands Reference Manual (32033-90006) for the assigned default values.

To ensure that the account, the PUB group, and Account Manager user are correct, you enter the following:

```
:LISTACCT ACCTG  ** A listing of the account will be printed;

:LISTGROUP PUB.ACCTG ** A listing of the PUB group of ACCTG will be printed; and

:LISTUSER BILL.ACCTG ** A listing of the Manager user will be printed.
```

Refer to :LISTACCT, :LISTGROUP, and :LISTUSER commands in the MPE V Commands Reference Manual (32033-90006) to translate the octal listing into its decimal representation. After decoding the account/group/user, you will have the following information:

ACCOUNT

acctname	ACCTG
password	Null (none)
filespace	25,000 sectors available
cpu	Unlimited time
connect	Unlimited time
capabilitylist	AM,AL,GL,SF,ND,IA,BA
fileaccess	(R,A,W,L,X:AC)
subqueuename	CS
localattribute	Null (double-word 0)

GROUP

groupname	PUB
password	Null (none)
filespace	25,000 sectors available
cpu	Unlimited time
connect	Unlimited time
capabilitylist	IA,BA
fileaccess	(R,X:ANY;A,W,L,S:AL,GU)

USER

username	BILL
password	Null (none)
subqueuename	CS
localattribute	Null (double-word 0)
homegroup	PUB
capabilitylist	AM,AL,GL,SF,ND,IA,BA

After all the decoding is complete, you become aware that the account password was inadvertently omitted. You correct the problem by entering:

```
:ALTACCT ACCTG;PASS=USONLY
```

All the other attributes described for the account ACCTG remain the same except that the account password is now USONLY. After establishing the account, it is a good idea to discuss the Account Manager responsibilities with Bill Williams before he, and any of his personnel, begin to use the account.

After several weeks, Bill Williams returns to you and informs you that he must have the capability to obtain extra data segments. You then log onto the system, and enter:

```
:ALTACCT ACCTG;CAP=AM,AL,GL,SF,ND,IA,BA,DS
```

You must enter the complete list of "CAP=" capabilities in order to retain the existing capabilities. All other attributes of the account remain the same. In addition, all groups and all users within the account have remained the same. That is, the PUB group and all other groups, as well as the Manager user BILL, and all other users' attributes, have not been changed to include the extra data segment (DS) capability. It is now the responsibility of the Account Manager user to alter any groups by using the (:ALTGROUP) command, and users (including himself) by using the :ALTUSER command, to include the extra data segment (DS) capability for those who need it. If a capability is removed, all users and groups within the account will lose the capability.

Displaying Accounting Information

A System Manager can list the attributes (previously specified in the :NEWACCT or :ALTACCT commands) for one or all accounts in the system by using the :LISTACCT command. Also, by using the :LISTGROUP and :LISTUSER commands, he can list the attributes for one or all groups and users in the system.

Each listing appears as an octal dump showing one or more entries. Each entry is headed by A= (for accounts), G= (for groups), or U= (for users), followed by an appropriate name and three or four lines of octal-coded information.

There is also a supported utility program, LISTDIR2.PUB.SYS for MPE version E/F.00.00 or earlier, and LISTDIR5.PUB.SYS for MPE version G.00.00 and later, which will format all of the octal information that is printed by the commands. Privileged information within the programs is limited to System Managers and Account Managers.

In addition to the list commands, the System Manager also may use the :REPORT command to obtain account and group reports. As an example, suppose that your site is a timesharing business which bills the various customers monthly. You bill each customer by their account, and by how much of the following resources have been used:

- Permanent disc space being used.
- CPU processing time.
- Connect time in minutes since last billing cycle.

Further, suppose that today is the end of the billing period and you as System Manager must obtain a list of resources used by each account (customer). In addition, there is a delinquent account, DIAG. You intend to purge that customer from the system, in order to deny them access. Therefore, you want an individual report for that account. In order to obtain these reports of account usage, the System Manager will use the :REPORT command:

```
:REPORT DIAG
ACCOUNT          FILESPACE-SECTORS      CPU-SECONDS      CONNECT-MINUTES
   /GROUP          COUNT     LIMIT     COUNT     LIMIT     COUNT     LIMIT
DIAG               49552     50000     56729        **     65820        **
   /PUB             4354     50000      5254        **      4466        **
```

When obtaining information for a private volumes group, two :REPORT commands must be entered to get the complete accounting information. Two commands are necessary because when a group is bound to a private volume set, the accounting information for that group is kept in two places. The CPU time and connect counts and limits are kept in the system directory, while the file space counts and limits are kept in the directory, on the group's home volume set.

Therefore, to obtain the accounting information from the system directory, a command of the following form should be entered:

```
:REPORT groupset
```

This gives the CPU and connect time and limits for all groups, but only the file space counts and limits for those groups which are not bound to a private volume set. Note that the total file space count for an account obtained from this command does not include the file-space counts for private volume groups.

To obtain these counts, a command of the following form must be used:

:REPORT *groupset*;VS=*volset*

This command lists only the groups and accounts which are in the directory for the private volume set specified. The only valid information obtained in this report is the file space counts and limits.

The :REPORT command for the System Manager is an expanded version of the command that is available to the standard user for displaying total accounting information for a user's logon account and group; this is discussed in the MPE V Commands Reference Manual (32033-90006).

The type of output written to the list file depends on the type of file (ASCII or binary) specified or implied. If the list file is an ASCII file, a standard ASCII listing is produced; on this listing, an unlimited quantity is denoted by a double asterisk (**). If the list file is a binary file, which is typically used to help in automatic processing of the report data, a 17-word record is written for each account/group. Counts and limits are double-word integers; an unlimited quantity is denoted as %17777777777. When :REPORT does an FOPEN on the file, it opens it as NEW, ASCII, Variable, Carriage-Control, Write-only Access, and Exclusive. Since CCTL and BINARY will not work together, the user must specify NOCCTL to override with binary files.

On the list files for both ASCII and binary, the entry for each account is followed immediately by the entries for all of its groups. The record report format is decoded as shown in Table 6-4.

Table 6-4. Report Record Format

WORD	CONTENTS
0	Type of entry, where: 1 = A group entry. 2 = An account entry.
1-4	Account or group name, left justified and padded with blanks.
5-6	Permanent file space count (in sectors).
7-8	Permanent file space limit (in sectors).
9-10	Central processor time count (in seconds).
11-12	Central processor time limit (in seconds).
13-14	Connect time count (in minutes).
15-16	Connect time limit (in minutes).

As an example, the System Manager logs onto the system in the usual way, entering passwords as appropriate. Since this is to be a very long printed report, the manager first enters a file command to direct output to the high-speed line printer. Assuming that logical device 6 is the line printer, the command is:

```
:FILE LINEPR;DEV=6
```

The System Manager then enters the command to obtain the accounting report as follows:

```
:REPORT @.@,*LINEPR
```

The report for the entire accounting system is then printed on the high speed line printer. After the report is done, the System Manager then desires to have a report on all groups of the delinquent account DIAG printed on his terminal. He enters:

```
:REPORT @.DIAG
```

Resetting Accounts

After the foregoing reports are obtained and the printed accounting report is delivered to the billing department, the System Manager desires to reset the CPU time and connect time counts for the new billing period. He enters the following command:

```
:RESETACCT @
```

This command, without any optional parameters, will reset the CPU processing time and the connect time for all accounts and groups on the system. The end result is that all CPU and connect counts will be set to zero. Users on the system will now begin accumulating CPU and connect time for the new billing period. Note that this command does not change the allowable limits for each account and group, only the counters for actual use.

Storing Files Offline

Continuing with the preceding example, suppose that the System Manager now desires to purge the DIAG account. Before he does this, he must ensure that any users, groups, and files are saved on tape. He does this in anticipation of the customer paying his delinquent account, which would require reinstatement of the account. The System Manager saves the account files via the :STORE command.

The System Manager user, like the System Supervisor user, has the ability to dump and retrieve any or all files in the system by using the :STORE and :RESTORE commands. These commands are defined in the MPE V Commands Reference Manual (32033-90006). In this example, the System Manager first enters the :FILE command to direct the output to magnetic tape unit as (associated with the class TAPE) as follows:

```
:FILE SAVDIAG;DEV=TAPE
```

The System Manager then mounts a magnetic tape on the magnetic tape device and enters the following command.

```
:STORE @.@.DIAG;*SAVDIAG;SHOW
```

After the System Operator intervenes to assign the proper magnetic tape device, all files in all groups of the DIAG account will be stored on the magnetic tape. In addition, the optional parameter SHOW was included by the System Manager, so that a record of all files for the account can be kept. Once the entire file structure has been saved, the System Manager is now ready to delete the account.

Purging Accounts

Now the System Manager can delete the DIAG account and still be able to restore it if the customer is reinstated. He enters the command as follows:

```
:PURGEACCT DIAG
```

The system will then request verification from the user:

```
ACCOUNT DIAG TO BE PURGED? (YES/NO)
```

The System Manager responds "YES". At this time, files, users, and groups are purged, along with user-level and account-level UDCs within the DIAG account, and the DIAG account itself.

Job/Session Priority Request

A special capability granted to System Managers and System Supervisors is the use of the optional HIPRI parameter in the :HELLO and :JOB commands. (Refer to the MPE V Commands Reference Manual (32033-90006).) This is a request for maximum job-selection priority, and will cause the job or session to be initiated regardless of current job fences set by the operator.

Listing Files

The System Manager, as well as any system user, has the ability to list files. The System Manager can list any or all files on the system using the :LISTF command with a -1 optional parameter. A :LISTF,-1 displays the octal listing of the file, which includes the directory entry and the file label. Refer to the MPE V Commands Reference Manual (32033-90006) for a discussion of this command.

User Defined Command (UDC) Files

A User Defined Command, or UDC, is a command defined by one or more standard MPE commands. Entering the UDC name causes MPE to execute the command or commands previously defined. UDC's, defined by the System Manager, can be made known and available to all system users.

The UDC definitions are stored in one or more files. These files can exist at one of three levels: user, account or system. UDCs may be created by any user for personal use, by the Account Manager for anyone in the account, and by the System Manager for use by any user on the system. System-wide UDCs must be defined in a file that is released to all users who have READ and LOCK access to the file.

When identically named UDCs occur at different levels, the user UDC takes precedence over the account-level UDC, which in turn, takes precedence over the system-level UDC. For this reason, it is a good practice to give your UDCs distinct names. Exceptions to this rule are Nested and Logon UDCs.

ESTABLISHING A UDC CATALOG. The :SETCATALOG command is used to inform MPE that a specified file name contains user-defined commands. A user must have LOCK access specified for the group in which the file is located to use the :SETCATALOG command; a user must also have READ access to the file. Note that the default file access for the PUB group gives LOCK access only to those users with AL, GL or home group (GU) capability.

You may want to restrict general-user access to COMMAND.PUB.SYS , since this file contains information which you may consider sensitive: the names of all UDC files on the system and the lockwords for those files. To use UDCs, users need only have EXECUTE and LOCK access to COMMAND.PUB.SYS . If, on your system, the default access rights to COMMAND.PUB.SYS include READ access, you can use the :ALTSEC command to restrict the access rights to this file. For example:

```
:ALTSEC COMMAND;(X,L:ANY;R,W,A:CR)
```

Refer to Section II of the MPE V Commands Reference Manual (32033-90006) for more information on this command.

COMMAND.PUB.SYS must exist for the :SETCATALOG command to execute properly. If this file does not exist on your system, log on as MANAGER.PUB.SYS, and build it as follows:

```
:BUILD COMMAND.PUB.SYS;REC=20,6,F,BINARY
```

If you want to have the UDC file named SMUDC1 established for all users in the system, enter:

```
:SETCATALOG SMUDC1;SYSTEM
```

If the file has a lockword, you must include it with the file name. Note: once a UDC file is entered into a catalog with the :SETCATALOG command, that file cannot be purged with the :PURGE command, or modified and kept under the same name with the Editor, while the file is being accessed by any user. Any attempt to do either of these two operations will result in an error message (Exclusive Violation).

To purge or modify such a file, it must be removed from the catalog by issuing the :SETCATALOG command without a file name, as follows:

```
:SETCATALOG;SYSTEM
```

The effect is that all UDC files are removed from the catalog after all users, except you, who were accessing the file have logged off, or issued a :SETCATALOG command themselves. Incidentally, the files are not purged; they are merely deleted from the catalog. To re-enter them into the catalog, issue the :SETCATALOG command, followed by the file names and associated lockwords, if any. LOGON UDCs do not allow the user to respond to an MPE prompt with a new :SETCATALOG command.

:SETCATALOG has been enhanced to allow users with AM capability to assign a set of user-level UDC catalogs to any user in their account. Users with SM capability can assign a set of user-level UDC catalogs to any user in the system.

The syntax is:

```
:SETCATALOG ...[;USER=username[.acctname]]
```

For more information on the :SETCATALOG command refer to the MPE V Commands Reference Manual (32033-90006).

LISTING UDCs. To list the contents of the UDC file catalog, enter:

```
:SHOWCATALOG
```

MPE responds by providing a list of UDCs by assigned name and level (USER, ACCOUNT, or SYSTEM). For more information on UDCs refer to Section III of the MPE V Commands Reference Manual (32033-90006).

SYSTEM STARTUP STATE CONFIGURATOR

Each time that the system is started, various system parameters (e.g., JOBFENCE, Job LIMIT, OUTFENCE, etc.) are automatically assigned default values. The System Manager can use the System Startup State Configurator facility to automatically reset any of the system defined defaults, stream special jobs, open DS lines, or perform any task appropriate to system initialization. In conjunction with the Programmatic Creation of Sessions capability the System Manager can automatically create user sessions on selected terminals when the system comes up. Using the full functionality of the System Startup State Configurator it is possible for the System Manager to describe beforehand exactly what the desired System Startup State should be.

The System Startup State Configurator facility is maintained by the System Manager in a file named SYSSTART.PUB.SYS. The MANAGER.SYS is the only user with sufficient privilege to create this file. SYSSTART.PUB.SYS defines selected System Startup State Commands. The only System Startup State Commands supported are STARTUP, WARMSTART, COOLSTART, UPDATE, RELOAD, and COLDSTART. Each of these commands, except for STARTUP, corresponds to one of the different system starts. A sample SYSSTART.PUB.SYS is shown below:

```
STARTUP
STREAMS 10
ALLOW @.@;COMMANDS=REPLY
ALLOCATE COBOLII.PUB.SYS
LIMIT 4, 16
JOBFENCE 4
OUTFENCE 5
OUTFENCE 12;LDEV=14
COMMENT A continuation record follows:
DSCONTROL 90;OPEN;RETRY=10;&
TRACE,ONALL,,60,WRAP
***
WARMSTART
STARTSESS 20;MGR.ACCT;HIPRI;NOWAIT
STARTSESS 21;USER.ACCT
STARTSESS 22;USER.ACCT
STARTSESS 23;USER.ACCT
***
COOLSTART
STARTSESS 20;MGR.ACCT;HIPRI;NOWAIT
STARTSESS 21;USER.ACCT
STARTSESS 22;USER.ACCT
STARTSESS 23;USER.ACCT
***
```

In the example above the STARTUP command defines actions that the system will perform regardless of the type of system startup used by the operator. WARMSTART and COOLSTART, as defined

above, will cause sessions to be created for MGR.ACCT on logical device 20 (the Console) and for USER.ACCT on the other selected terminals. Note that UPDATE, RELOAD, and COLDLOAD were not defined; if the system comes up in any of these starts, only those commands listed under the STARTUP block will be executed. There is no requirement that any or all of the possible System Startup State Commands be present in SYSSTART.PUB.SYS.

The MPE commands available for execution in SYSSTART.PUB.SYS are:

ACCEPT	DOWNLOAD	LIMIT	STOPSPOOL
ALTLOG	DSCONTROL	LMOUNT	STREAM
ALLOCATE	FOREIGN	LOG	STREAMS
ALLOW	GIVE	MPLINE	SUSPENDSPOOL
CACHECONTROL	HEADOFF	MRJECONTROL	TAKE
COMMENT	HEADON	OUTFENCE	TELL
CONSOLE	IMFCONTROL	REFUSE	TELLOP
DEALLOCATE	JOBFENCE	STARTCACHE	TUNE
DISALLOW	JOBSECURITY	STARTSESS	UP
DISCRPS	JOBPRI	STARTSPOOL	VMOUNT
DOWN	LDISMOUNT	STOPCACHE	

These MPE commands were chosen on the basis of being programmatically executable and requiring no user interaction. No other commands, UDCs, or other System Startup State Commands are allowed in the body of a System Startup State Command.

The following restrictions apply to the System Startup State Configurator:

- No options are available with the six System Startup State Commands. They will be echoed to the Console (with passwords stripped), BREAK will be disabled.

- A "valid" SYSSTART.PUB.SYS is a regular EDITOR ASCII file which has one of the six System Startup State Commands as its first record. Blocks are terminated by a "*" in the first byte of a record or by the end-of-file. Records are continued onto another line by adding a "&" as the last non-blank character in the record. The maximum continued record length is 239 bytes.

- The commands in the STARTUP block (if it exists) will be executed first, no matter what kind of startup is specified; the commands in the appropriate block are executed next (if a block corresponding to the specified type of startup exists). These executions occur immediately before OPERATOR.SYS is logged onto the Console.

- If no SYSSTART.PUB.SYS can be found, system startup works as it has in the past, and OPERATOR.SYS is allowed to log on. If any of the MPE commands in the System Startup State block results in an error, an error message will be generated and execution will continue at the next MPE command in the block.

- If one of the System Startup State Commands (SSSC) creates a session on the Console, the automatic logon of OPERATOR.SYS will fail.

- Once the system is up, the System Startup State Commands will not be recognized.

- The System Startup State Configurator facility can be disabled simply by renaming SYSSTART.PUB.SYS

- Lockwords are not permitted on SYSSTART.PUB.SYS.

Managing Expanded Console Capabilities

System Operator functions are sometimes associated with one specific user: the System Operator. The use of expanded Console capabilities increases System Console accessibility and enables the System Operator to disperse Console functions to other users who may require them. The fact that Console commands are processed by the MPE Command Interpreter enables the System Operator to assign to individual users the ability to execute certain Console commands. The System Console, itself, can be moved to any terminal on the system with the :CONSOLE command. Users with System Manager (SM) capability may use the :CONSOLE command even if they have not been allowed the command. This enables them to retrieve the Console at any time. Users can be associated with specific devices, thereby enabling them to use the commands that control each device. Users can also be granted the ability to use job control commands on their own jobs.

Although not directly responsible for assigning these capabilities to users, the System Manager plays an important role in managing expanded Console capabilities. Specifically, the System Manager must:

- Create a device-user association table for use with the :ASSOCIATE command.
- Create a special user called OPERATOR.SYS .

CREATING A DEVICE-USER ASSOCIATION TABLE. The device-user association table identifies the devices which may be assigned by the System Manager with SAVE and WRITE access to PUB.SYS , to other system users. The table is generated by running the utility ASOCTABL.PUB.SYS for MPE version E/F.00.00 or earlier, or ASOCTBL5.PUB.SYS for MPE version G.00.00 and later. Each utility creates a file called ASSOCIATE.PUB.SYS , the device-user association table. These utilities are described in the MPE V System Utilities Reference Manual (32033-90008).

In response to the ">" prompts issued by the utility, the System Manager enters association statements in the form:

>*deviceclassname* = *username.accountname* [,*username.accountname*,...]

The parameter *deviceclassname* is the appropriate device identifier (class name) assigned to the device to be associated. The *username* parameter is the name of the user to be allowed to associate with the device. The *accountname* parameter specifies the name of the user's account. More than one user may be allowed to associate with a device in the table. The specification @. acct may be used to indicate all users within an account; @.@ may be used to indicate all users on the system.

For example, to allow device class LPX to be associated by a user named ALDEN in account SALES , enter:

```
>LPX=ALDEN.SALES
```

Once the table is created, any of the users listed can associate with the special device class by using the :ASSOCIATE command. Although more than one user may have permission to associate with a device class in the table, a user can actually associate to a device class only if none of the devices in that class are associated to anyone else. Refer to the MPE V Command Reference Manual (32033-90006) for additional information.

CREATING OPERATOR.SYS. The creation of the user OPERATOR.SYS should be done at the time the system is first brought up. You need only create this user once, as OPERATOR.SYS remains on the system for use thereafter.

The first step in creating OPERATOR.SYS is to determine the home group and system capabilities that will be needed by the user. The home group used can be PUB or another group, even one created particularly for OPERATOR.SYS . The capabilities you decide to assign should take into account the kinds of activities that the user of OPERATOR.SYS will need to perform. It is recommended that the following capabilities be assigned as a minimum: OP to allow ;HIPRI logons, and IA. This will allow the user to log on and run programs. Additional capabilities that will usually be required are: UV for handling private volumes, SF for storing files, ND for using tapes, and BA for batch jobs. Additional capabilities can be assigned if they are needed. Care should be taken, however, not to jeopardize the integrity of the system.

To create OPERATOR.SYS , log on with:

```
:HELLO MANAGER.SYS
```

Then enter the following information, substituting the home group and capabilities you've selected for assignment. For example:

```
:NEWUSER OPERATOR.SYS;HOME=PUB;CAP=OP,IA,UV,BA,SF,ND
```

ACCOUNT MANAGER CAPABILITIES

When an account is created by a System Manager, it always has an account name, a public group (PUB), and an Account Manager with the AM capability attribute. This attribute allows this user certain expanded capabilities over other users within the account. The Account Manager has less capability than the System Manager, but does have final control over the overall use of the account. The Account Manager is automatically assigned a home group of PUB .

Suppose that a System Manager has created an account for Tom Smith, having used the command

```
:NEWACCT SMITH,TOM;CAP=AM,AL,GL,CV,SF,ND,UV,IA,BA;LOCATTR=%177
```

The account structure would be as follows:

ACCOUNT	
acctname	SMITH
password	Null (none)
filespace	Unlimited
cpu	Unlimited time
connect	Unlimited time
capabilitylist	AM,AL,GL,CV,SF,ND,UV,IA,BA
fileaccess	(R,A,W,L,X:AC)
subqueuename	CS
localattribute	%177

GROUP

groupname	PUB
password	Null (none)
filespace	Same as account files
cpu	Same as account time
connect	Same as account time
capabilitylist	UV,IA,BA (Default)
fileaccess	(R,X:ANY;A,W,L,S:AL,GU) (Default)

USER

username	TOM
password	Null (none)
subqueuename	Same as account
localattribute	Same as account
homegroup	PUB
capabilitylist	Same as account

It is important for an Account Manager (like TOM in the present example) to remember that any changes required to the account must be made by the System Manager. The Account Manager, however, can perform the following functions within his own account:

- Create new groups and users.
- Modify the attributes of groups and users.
- Delete entire groups, users, and files within the group.
- Obtain reports on resources used within the account.
- List any or all groups, users, and files within the account.
- Store and restore files within the account (some files may also require SM, OP or PM capability).
- Define, alter, and delete private disc volume sets and classes for groups within the account. (Must have CV capability.)
- Define User-Defined Commands (UDCs) which are known to all users in the account.

After the SMITH account has been created, the Account Manager can log onto the system with:

```
:HELLO TOM.SMITH
```

There is no password on this account; the System Manager did not assign one. The Account Manager can define new groups and users in order to divide the account logically. The only limitation to the number of groups and users that can be defined is the physical size of the System Directory. The System Directory resides on the system disc. Its size, in sectors, is determined when the system is configured for a given installation by the System Supervisor. The directory contains the structures for all accounts, groups, users, and files. Therefore, it is possible to have insufficient disc space allocated for the directory if a great many accounts, groups, users, and files will be required. The Account Manager's responsibility in this case is to discuss his account structure with the System Manager and System Supervisor prior to implementation. This will preclude any possibility of exceeding the directory space limitations.

The Account Manager has the following commands available for his use:

:ALTGROUP	
:ALTUSER	
:ALTVSET	(Must have CV capability)
:LISTACCT	(For his account only)
:LISTGROUP	
:LISTUSER	
:NEWGROUP	
:NEWUSER	
:NEWVSET	(Must have CV capability)
:PURGEGROUP	
:PURGEUSER	
:PURGEVSET	(Must have CV capability)
:REPORT	(For his account only)
:SETCATALOG	
:SHOWCATALOG	

Defining Groups

To create a new group the Account Manager logs onto the system and enters the :NEWGROUP command and any optional parameters.

Suppose that Account Manager Tom Smith has three programmers working for him. Jim Johnson is developing a parts inventory system. Mary Mason is developing a parts processing system. Bob Blake is developing an order processing system, and is responsible for maintaining and executing the current employee salary data base. Each programmer desires an individual group in order to save his developmental programs and files. Tom Smith consults his programmers and the System Manager. He proposes that four groups will be created, with three users. He charts the structure and the various non-default attributes as follows:

GROUPS	
groupname	JOHNSON
filespace	10000 sectors
groupname	MASON
filespace	10000 sectors
groupname	BLAKE
filespace	10000 sectors
groupname	PAYROLL
filespace	Unlimited
password	MANYBUKS
capabilitylist	BA

USERS	
username	JIM
password	J2DEV
homegroup	JOHNSON
username	MARY
password	AQUARIUS
homegroup	MASON
username	BOB
password	ME98
homegroup	BLAKE
localattribute	%41

Tom then logs onto the system and carries out the group creations. He enters:

```
:NEWGROUP PAYROLL;PASS=MANYBUKS;CAP=BA
```

In a similar manner, Tom defines groups BLAKE, MASON, and JOHNSON.

Defining Users

Following the previous example, the Account Manager Tom Smith assigns new users to the previously created group structures. He enters:

```
:NEWUSER BOB;PASS=ME98;HOME=BLAKE;LOCATTR=%41
```

Tom defines the other users, JIM and MARY, in the same way.

Altering Account Attributes

The Account Manager can change one or more attributes of users or groups within his own account. The Account Manager Tom Smith desires to have a password (T1X2Z) on his own user name. Tom needs to prevent unauthorized entry to the Account Manager user's structure. He enters:

```
:ALTUSER TOM;PASS=T1X2Z
```

It should be noted here that the password is not in effect for Tom until he terminates the current session. The next logon to the system, however, will require the password.

Account Discussion

The account SMITH as defined by the Account Manager Tom Smith is now fully created. Figure 6-2 shows the basic structure within this account.

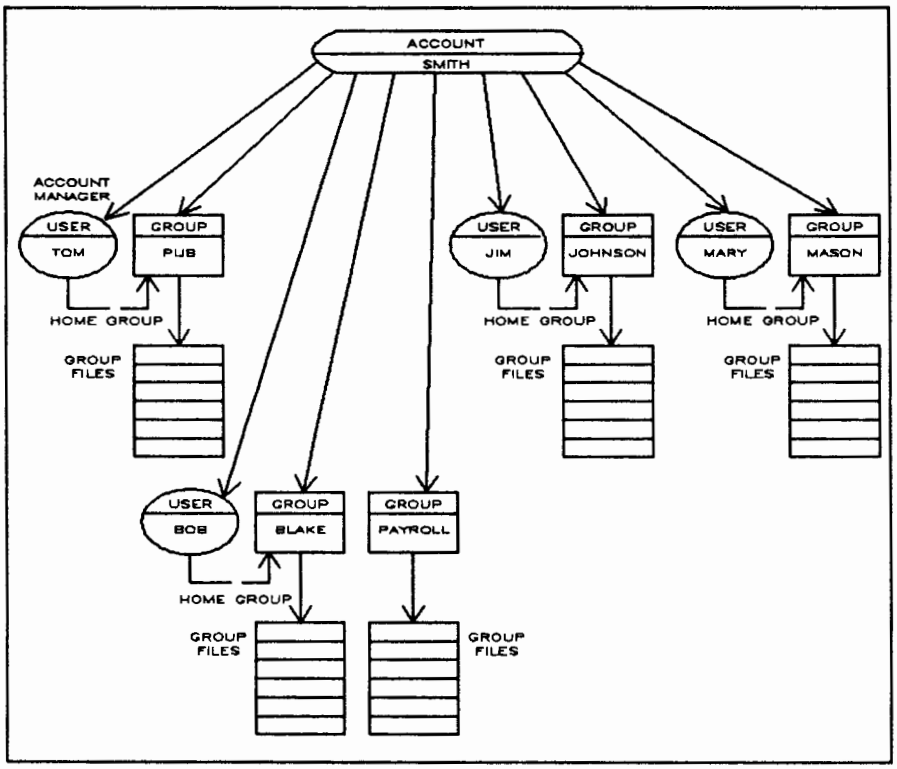


Figure 6-2. Sample Account Structure

Notice that each group is empty of files. Since neither Tom nor any other user has had the opportunity to create files, there is really no file space for those files as yet. Note also that the PAYROLL group has no user assigned. As stated previously, Bob Blake is responsible for maintaining and executing the payroll system. He also is responsible for development of an order processing system. For his development work, he has been assigned a home group of BLAKE . This does not prevent him from using the group PAYROLL as a logon group. A home group assignment is primarily for the convenience of the user, so that he will not be required to enter the name of the group desired each time he logs onto the system. Also, a user is not required to enter the password for his home group when logging on.

If Mary Mason desired to log on the system and access the files belonging to the group JOHNSON , she would log on as follows:

```
:HELLO MARY.SMITH,JOHNSON
```

When the group JOHNSON is specified in the logon, it overrides the default home group assignment made by the Account Manager. Provided that Jim Johnson has not placed a lockword on the file that Mary Mason desires to read, she will be allowed access to that file.

In looking back at the account structure, you will notice that there is a password, MANYBUKS , assigned to the group PAYROLL . The reason for the password is to deny access to the PAYROLL group for other users within the account. In addition, since it is Bob Blake's responsibility to ensure the security of the payroll group and files, Bob has altered the payroll program by inserting a call to the WHO intrinsic. (This intrinsic is discussed in the MPE V Intrinsics Reference Manual (32033-90007).) This alteration to the program has the purpose of checking the local attribute of the user running the program. Within the program, it specifically checks to see that the calling user has a local attribute of 184 . In this way, a further check on the proper user is made prior to actual execution of the program. Looking back at the examples where the SMITH account was created and given a local attribute of %177 (001 111 111), and the user BOB given a local attribute of %41 (100 001), the SMITH account is restricted to 7 of the 10 system-wide payroll programs, and the user, BOB, is restricted to 2 of the 7 applications that are available to the account. Each of the 10 restricted applications will call the WHO intrinsic to return the local attribute of the user running it; it then checks its assigned bit and if this bit is not on, the program will terminate.

Bob now moves the programs and data files into the PAYROLL group. Then he assigns a lockword on the program file PAYPROG , using the :RENAME command as follows:

```
:RENAME PAYPROG,PAYPROG/NOWDOIT
```

This will provide further security for execution of the payroll program. In addition, he places a lockword on the data file, and alters his program to be able to open the data file, by placing the lockword in the *formaldesignator* in the FOPEN intrinsic.

Suppose, now, that Bob Blake must run the new payroll for the current pay period. Bob gathers the new data on cards, places his special logon and logoff cards in the deck, and places the whole deck in the card reader. He also will make arrangements for the blank checks to be placed in the high speed line printer at the appropriate time. He commences the job as follows:

```
!JOB PAYROLL,BOB/ME98.SMITH,PAYROLL/MANYBUKS
!RUN PAYPROG/NOWDOIT
  .
  .
  .
data cards
  .
  .
  .
!EOJ
```

Now consider the various security checks that are required in order to execute the payroll program. The system first checks Bob's user password (ME98) against the password that is being input. Then the system checks for a proper account name, SMITH. Then it checks the group password (MANYBUKS) against the password which is being input. After being passed on all these checks, the user BOB is finally able to achieve logon. The next command calls for execution of the PAYPROG program. The system now checks for the existence of the program and then validates the lockword that is being input. At this time, the program is brought into execution, having passed every system security check placed by the Account Manager and by the user BOB. Now the program itself issues a call to the WHO intrinsic and checks the local attribute to ensure that the proper user is executing the program. The program then opens the data file and commences to issue new pay checks for the period defined.

The above example shows how some of the various attributes assigned by the Account Manager and the user can be used to ensure a high level of privacy within an account. Note that the Account Manager Tom Smith has knowledge of the user's password, the group's password, and the user's local attributes. The Account Manager could also obtain information on the lockwords through use of the :LISTF command, with certain optional parameters allowed for Account Managers. It is then apparent that the Account Manager who has the local attribute of %177, as well as the user BOB, could access the PAYROLL group and execute the payroll program. Remember that the Account Manager can gain access to any file within the account, with one exception: an Account Manager cannot gain access to files with negative file codes unless he also has the Privileged Mode (PM) capability.

Purging Groups and Users

The Account Manager user has the responsibility for removing users and groups which are no longer required in the account. He does this with the :PURGEGROUP and :PURGEUSER commands. If, for instance, a :PURGEGROUP command is entered, it will remove every file within the group and then remove the group from the account structure. If a file was somehow left in a state such that the operating system verified it to be in an OPEN (busy) mode, then that file and the group itself would not be purged but all other files in the group would be . Under those conditions, it is conceivable that the system would have to be restarted in order to clear the file, so that it and the group could be removed with another :PURGEGROUP command. Additionally, if no files are in use, but a user is logged onto the system with the group used as a logon group, then all files will be removed, but not the group.

If a group is to be deleted from a private volume set, the *volset* parameter must be specified in the :PURGEGROUP command, and a :MOUNT command must be entered for that volume set before the :PURGEGROUP command is entered. If the volume is already mounted due to an explicit or implicit request by a user, then all files not in use for the group will be purged, but the group itself will not be purged.

The :PURGEGROUP command is useful for removing all files within a group, especially if there are many files to be removed. For example, suppose Bob Blake has used all of his disc space within his

group BLAKE. In order to continue his development schedule without requesting more disc space, he saves all of the present files on magnetic tape or serial disc using the :STORE command defined in the MPE V Commands Reference Manual (32033-90006). Then he requests the Account Manager to purge the BLAKE group. The Account Manager logs onto the system in Blake's home group and enters:

```
:PURGEGROUP BLAKE
GROUP BLAKE TO BE PURGED? (YES/NO) YES
IN USE: CAN'T BE PURGED (CIERR 724)
```

What has occurred is the removal of all of Bob Blake's files from within his group. However, his group structure still exists, because the Account Manager was logged onto the system in the home group BLAKE, at the time the command was entered. This is the desired effect, and the error indication can be ignored.

Suppose, now, that Jim Johnson receives a promotion and leaves Tom Smith's organization. The Account Manager Tom Smith hires Fred Free to replace Jim Johnson. Fred desires to have his own group and user name, rather than using Jim Johnson's identification. Tom creates a new group, FREE, and a user, FRED , with the same attributes as previously granted to Jim Johnson. Fred then uses the FCOPY utility (described in the FCOPY/3000 Reference Manual (03000-90064)) to copy the pertinent programs and files into his group, from the JOHNSON group. On completion of the transfers, Fred notifies Tom Smith that the group and username identified with Jim Johnson are no longer required. Tom logs onto the system as TOM.SMITH and enters:

```
:PURGEGROUP JOHNSON
GROUP JOHNSON TO BE PURGED? (YES/NO) YES
:
```

At this point, all files within the JOHNSON group have been removed, and the group structure structure itself has also been removed. However, the username JIM and its attributes still exist within the account. Tom must issue a specific command to remove the user JIM from the account structure. He enters:

```
:PURGEUSER JIM
USER JIM TO BE PURGED? (YES/NO) YES
:
```

At this time, the username JIM and all its attributes, and any associated UDCs, will be removed from the account structure. Note that, unlike the :PURGEGROUP command, if someone had been logged onto the system with the username JIM under the account SMITH, that user would have prevented the *username* JIM from being removed. The Account Manager would have to wait until the person using that user name logs off.

Account Librarian/Group Librarian

The Account Librarian (AL) and Group Librarian (GL) attributes are assigned to the Account Manager of a newly created account. The Account Manager can, in turn, pass on the AL and GL capabilities to other users as needed.

The Account Librarian (AL) attribute is normally assigned to a user in order to grant that user special file access for maintenance of certain files within the account. It is assigned to a user so that he may create and purge programs and account SL segments with the PUB group (or any group) of the account. Those files are usually accessible by any user of the account, but can only be modified or deleted by the user with the Account Librarian (AL) attribute.

The Group Librarian (GL) attribute is assigned to a user for the same reason as an Account Librarian, except that the Group Librarian attribute is restricted to the user's home group.

Basically, both attributes are meant to be used to control the degree of file access that standard users may attain. AL and GL do not give a user special command capability as do OP, AM, or SM.

Displaying Accounting Information

MPE gives you the ability to list account attributes, and to obtain other information about the various groups within a specified account.

ACCOUNT/GROUP/USER ATTRIBUTES. An Account Manager can list the attributes for his own account by using the :LISTUSER command. He can list the attributes for one, or all, groups in his account, or for one, or all, users in his account.

Each listing appears as an octal dump showing one or more entries. Each entry is head by A= (for accounts), G= (for groups), or U= (for users), followed by the appropriate name, and three or four lines of octal-coded information. Refer to the specific commands, :LISTACCT, :LISTGROUP, and LISTUSER, for decoding information. These commands are discussed in the MPE V Commands Reference Manual (32033-90006).

There are also supported utility programs, LISTDIR2.PUB.SYS and LISTDIR5.PUB.SYS which will format all of the octal information that is printed by the commands. Privileged information within LISTDIR5 is limited to System Managers and Account Managers.

ACCOUNT/GROUP REPORTS. The accounting information for the logon account, or for any groups in that account, can be extracted and displayed, showing counts and limits for permanent file space (in disc sectors), central processor time (in seconds), and session connect-time (in minutes).

The accounting information, requested with the :REPORT command, can be used for billing or for simply obtaining an overview of system usage on an account/group basis.

The :REPORT command is an expanded version of the command that is available to the standard user for displaying the total accounting information for his logon account and group; this is discussed earlier in this Section, and in the MPE V Commands Reference Manual (32033-90006). For any particular resource, the sum of all group counts within any account always equal the total count accumulated by the account.

Backing Up Disc Files on Tape or Serial Disc

Account Manager Users have the ability to dump and retrieve any files in their account by using the :STORE and :RESTORE commands. SM, OP, or PM capability may also be required to store or restore some files. These commands are defined in the MPE V Commands Reference Manual (32033-90006).

Defining UDC Commands

A User Defined Command (UDC) is a procedure built from one or more standard MPE commands. When you combine several MPE commands into a single procedure and assign a name to that procedure, you create a UDC. In this way it is possible to enter the UDC name and cause several MPE commands to be executed. UDCs defined by the Account Manager may be known to and available to all users in the account.

User Defined Commands may also be defined by the System Manager for use by all system users, and by individual users for private use. When identically named UDCs occur at different levels, the user level UDC takes precedence over the account level UDC which, in turn, takes precedence over system level UDCs. The format of a User-Defined Command is fully described in Section III of the MPE V Commands Reference Manual (32033-90006).

ESTABLISHING A UDC CATALOG. The :SETCATALOG command is used to inform MPE that a specified file name contains user defined commands. The Command Interpreter then searches the file and establishes a directory for each command contained in the file. The file name is stored in a directory (COMMAND.PUB.SYS) of all UDC users. A user must have lock access specified for the group in which the file is located to use the :SETCATALOG command. Note that the default file access for the PUB group gives lock access only to users with AL, GL, or home group (GU) capability.

The EDIT/3000 subsystem, or an equivalent editor, can be used to modify commands stored in a file, if that file is not being accessed. Note, however, that a UDC file, once entered into a catalog with the :SETCATALOG command, cannot be modified and kept under the same name with the editor. You must first release the file from the UDC catalog by issuing the :SETCATALOG command without parameters. This releases all the files in the UDC catalog.

The UDC directory, COMMAND.PUB.SYS, must exist for the :SETCATALOG command to properly execute. If this file does not exist on your system, you must build it with a record size of 20.

If you want to have the file named AMUDC1 searched by the Command Interpreter, and have the User Defined Commands contained therein entered into a catalog, enter:

```
:SETCATALOG AMUDC1;ACCOUNT
```

Note that once a UDC file is entered into a catalog, using the :SETCATALOG command, that file cannot be purged with the :PURGE command or modified and kept under the same name with the Editor. Any attempt to do either of these two operations will result in an error message (Exclusive Violation).

In order to purge or modify such a file it must be removed from the catalog by issuing the :SETCATALOG command with no files names, as in:

```
:SETCATALOG;ACCOUNT
```

The effect is that all UDC files are removed from the catalog. They are not purged, merely deleted from the catalog. This will take effect only after all users, except you, who have been accessing the file, have logged off or issued a :SETCATALOG themselves. To enter UDC files into the catalog, enter the :SETCATALOG command for these files.

LISTING UDCs. To list the contents of a UDC file catalog, enter:

```
:SHOWCATALOG
```

MPE responds by providing a list of UDCs by assigned name and level (USER, ACCOUNT, or SYSTEM).

SYSTEM CONFIGURATION/STARTUP

SECTION VII

Computer Museum

This section explains how to configure your system with the SYSDUMP and INITIAL Programs. It includes information on configuring all peripherals (with the exception of data communication devices), and it offers suggestions for setting system table parameters. All dialog questions that appear both in the SYSDUMP Program and in the five startup options of the INITIAL Program are listed in a table at the end of this section.

This manual documents the following MPE V software releases of the SYSDUMP and INITIAL Programs:

- E/F.00.00. This is the first software release of MPE V; it includes disc caching. This release supports the HP 3000 High Performance Series 39, and the Series 42, 48, and 68.

- E/F.00.01. This is an enhanced version of the E/F.00.00 release; it also includes disc caching. Besides supporting the High Performance Series 39, Series 42, 48, and 68, this release supports the Series 39, 40, 44, and 64 as well. (Because of its similarity with version E/F.00.00, this release is designated as "E/F.00.00" in this manual.)

- G.00.00. This is the second software release of MPE V; it includes tables expansion. When first introduced, it supported the High Performance Series 39, and the Series 42, 48, 64, and 68. It now supports the Series 39, 40, and 44 as well.

- G.01.00. This is the third software release of MPE V; it includes many user interface enhancements. It was the first software release to support the Series 37 and 37/XE; it also supports the High Performance Series 39, and the Series 39, 40, 42, 44, 48, 64, and 68.

- G.01.01. This is an enhanced version of the G.01.00 release; it offers added productivity enhancements and improved capabilities. It supports the Series 37, 37XE, the High Performance Series 39, and the Series 39, 40, 42, 44, 48, 64, and 68. (Because of its similarity with version G.01.00, this release is designated as "G.01.00" in this manual.)

- G.01.02. This is an enhanced version of the G.01.01 release; if offers support for new software products. It supports the Series 37, 37XE, the High Performance Series 39, and the Series 39, 40, 42, 44, 48, 64, and 68. (Because of its similarity with version G.01.00, this release is designated as "G.01.00" in this manual.)

- G.02.00. This is the fourth software release of MPE V. It supports the Series 37, 37XE, 39, 40, 42, 44, 48, 58, 64, and 68.

- G.02.A0. This is an enhanced version of G.02.00. It adds support for the new, top-of-the-line, Series 70.

- G.02.B0. This is an enhanced version of G.02.00 that offers support for new software products and the new Series 52. It supports the Series 37, 37XE, 39, 40, 42, 44, 48, 52, 58, 64, 68, and 70.

- G.02.B1. This enhanced version of G.02.B0 adds support for the MICRO 3000 and MICRO 3000XE.

- G.03.00. This version of MPE supplies new system security features and supports the enhanced backup :STORE and :RESTORE commands. It supports all of the systems supported in G.02.B1 and additional peripherals.

- G.03 02. This enhanced version of G.03.00 adds support for the MICRO 3000LX/MICRO 3000GX. Dialog prompts and messages that occur with some, but not all, of these software releases will be noted in this section.

NOTE

For information on configuring data communication devices, refer to the Data Communications Handbook (5957-4634). For information on configuring and troubleshooting the HP Network Link products used for HP 3000 to HP 3000 Local Area Network (LAN) communication, refer to the NS/3000 Network Manager Reference Manual (32344-90002).

- G.03.04 This version of MPE provides new system security features, such as, Access Control Definitions (ACDs) and enhanced system audibility.

INTRODUCTION TO THE SYSDUMP PROGRAM

One of the two ways to modify system parameters and tune the performance of your system is with the SYSDUMP Program, also called the Configurator Program. This program resembles a dialog with a series of predetermined questions and statements. By answering the questions, you can modify as many, or as few, system parameters as you wish.

The SYSDUMP Program is different from the INITIAL Program in that any modifications made to MPE during the SYSDUMP dialog do not take effect immediately. The modifications occur only after copying them to tape or serial disc, then loading the changes onto the system.

A DESCRIPTION OF THE SYSDUMP PROGRAM

The best way to understand the SYSDUMP Program is to look at the questions in the dialog that make up its basic framework. The main portion of the SYSDUMP Program consists of "level-one" questions. These are subunits of the program itself; they describe what you are allowed to change on the system. Answering yes to the question "ANY CHANGES?" always allows you access to the level-one questions; answering no always bypasses them. The level-one questions always appear in the same order on your screen.

The following example of a SYSDUMP dialog shows all of the level-one questions and the order in which they always appear (the $NULL parameter of the :SYSDUMP command allows you to step through the SYSDUMP dialog without actually changing the system):

```
:SYSDUMP $NULL (RETURN)                          ** SYSDUMP with $NULL parameter **

ANY CHANGES? YES (RETURN)                        ** Answer YES **
SYSTEM ID = HP32033G.02.00.? (RETURN)
MEMORY SIZE = 4096 (MIN=256, MAX=8192)? (RETURN)
I/O CONFIGURATION CHANGES? (RETURN)              ** Level-One Question **
SYSTEM TABLE CHANGES? (RETURN)                   ** Level-One Question **
MISC CONFIGURATION CHANGES? (RETURN)             ** Level-One Question **
LOGGING CHANGES? (RETURN)                        ** Level-One Question **
DISC ALLOCATION CHANGES? (RETURN)                ** Level-One Question **
SCHEDULING CHANGES? (RETURN)                     ** Level-One Question **
SEGMENT LIMIT CHANGES? (RETURN)                  ** Level-One Question **
SYSTEM PROGRAM CHANGES? (RETURN)                 ** Level-One Question **
SYSTEM SL CHANGES? (RETURN)                      ** Level-One Question **
ENTER DUMP DATE? (RETURN)
ERROR #459  ILLEGAL TAPE FILE OPEN PARAMETERS

ABORT :SYSDUMP.PUB.SYS.%5.%132
PROGRAM ERROR #18 :PROCESS QUIT

PROGRAM TERMINATED IN AN ERROR STATE.  (CIERR 976)
:
```

After answering a level-one question, the framework of the program becomes more apparent. You are allowed only one response: either yes or no (pressing (RETURN) to a level-one question is the same as answering no).

As you might have noticed from the previous example, answering no to a level-one question causes the next level-one question to appear on your screen. For example:

```
MISC CONFIGURATION CHANGES? NO (RETURN)     ** Level-One Question **
LOGGING CHANGES?                            ** Level-One Question **
```

On the other hand, answering yes to a level-one question causes a series of level-two questions, all relating to the level-one question that you just answered, to appear. Only after answering all of the level-two questions will the next level-one question appear. For example:

```
MISC CONFIGURATION CHANGES? YES (RETURN)    ** Level-One Question **
LIST GLOBAL RINS? (RETURN)
DELETE GLOBAL RINS? (RETURN)
# OF RINS = 48 (MIN=23, MAX=1024, USED=23)? (RETURN)
# OF GLOBAL RINS = 16 (MIN=4, MAX=1024, USED=4)? (RETURN)
# OF SECONDS TO LOGON = 120 (MIN=10, MAX=600)? (RETURN)
MAX # OF CONCURRENT RUNNING SESSIONS = 80 (MIN=1, MAX=500)? (RETURN)
MAX # OF CONCURRENT RUNNING JOBS = 8 (MIN=1, MAX=500)? (RETURN)
DEFAULT JOB CPU TIME LIMIT = 0 (MIN=0, MAX=32767)? (RETURN)
MESSAGE CATALOG CHANGES? (RETURN)
SOFTDUMP COMMAND CHANGES? (RETURN)
LOGGING CHANGES?                            ** Level-One Question **
```

The dialog subdivides even further. Just as answering yes to a level-one question displays level-two questions, answering yes to a level-two question that requires an affirmative or negative response will display level-three questions (or, if not, it will display a listing). For example, answering yes to the level-two question "DELETE GLOBAL RINS?" (shown in the previous example) would display the following level-three questions:

```
DELETE GLOBAL RINS? YES (RETURN)            ** Level-Two Question **
ENTER RIN #? (RETURN)
LIST GLOBAL RINS? (RETURN)
# OF RINS = 48 (MIN=23, MAX=1024, USED=23)? ** Level-Two Question **
```

In summary, the basic framework of the SYSDUMP Program consists of a series of dialog questions that contain subunits of themselves. You always begin at the uppermost level: the program itself. Answering yes to the question "ANY CHANGES?" sends you directly to the level-one questions. These questions are subunits of the whole program. Because they describe what you are allowed to change on the system, you can skip (answer no to) the level-one questions that you don't want to change and go directly to the question of your concern.

The level-one questions contain various subunits of themselves which are one level lower, at level two. Furthermore, many level-two questions contain subunits that go down yet another level, to level three. (Level three is usually about as far down into the program as you can go.)

Answering yes to a question that allows only an affirmative or a negative response will always send you to a lower level; answering no will either keep you on the same level or bring you back up.

When you finish answering all of the subquestions relating to a level-one question, the next level-one question always will appear. This process of going into the subquestions and coming back out continues until you have answered all of the level-one questions. At this time the program ends.

The following figure illustrates the SYSDUMP Program; to emphasize the basic framework of this program, its dialog questions are not specifically listed:

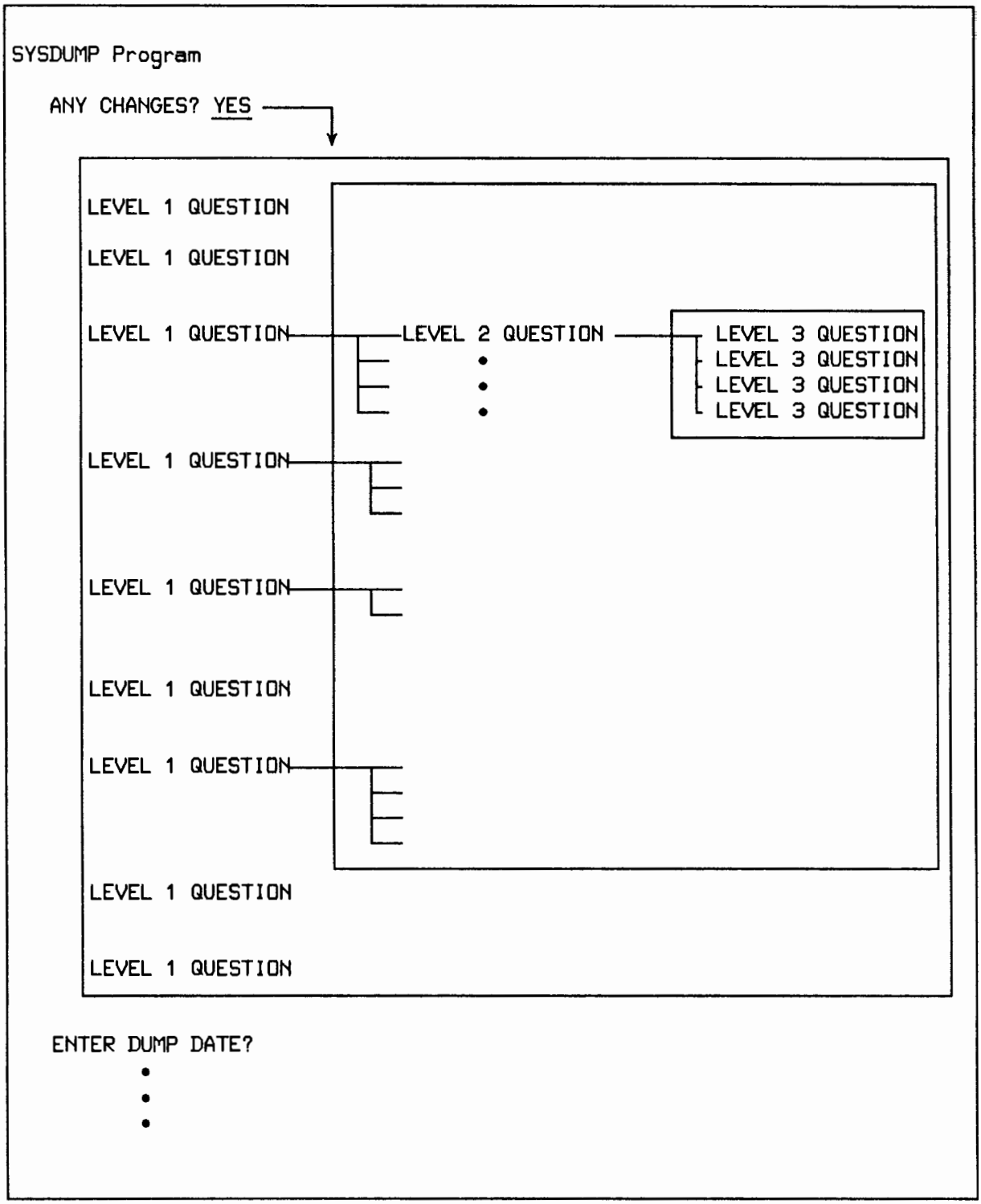


Figure 7-1. Basic Framework of the SYSDUMP Program

RUNNING THE SYSDUMP PROGRAM

The following pages explain how to change system parameters and tune the performance of your system with the SYSDUMP Program. After you complete the program, the various methods for creating serial storage media will be explained.

Here is some information that will help you to communicate with the SYSDUMP Program as you proceed through the dialog:

- The SYSDUMP Program asks three kinds of questions: those that require an affirmative or negative response, those that require you to enter a value, or those that require you to enter a name. Usually, the content of the question indicates the type of response.
- To questions requiring an affirmative or negative response, you can answer with an affirmative YES, Y, or y, or a negative NO, N, n, or (RETURN).
- To questions requiring that you enter a value, you can change the old value by entering a new value, or you can keep the existing value by pressing (RETURN).
- Always conclude all of your answers with a (RETURN). This transmits your response to MPE. If you notice making a typing error after pressing (RETURN), press the (BREAK) key, enter :ABORT, and start the SYSDUMP Program over again.

Beginning the SYSDUMP Program

To run the SYSDUMP Program, you need OP (System Supervisor) capability. Log onto the system as a user with this capability; usually, this will be the System Manager (MANAGER.SYS,PUB) or the System Operator (OPERATOR.SYS).

Before beginning the SYSDUMP Program, you should prevent users (and jobs) from accessing files. The reasons for this are twofold: first, part of the program's procedure consists of storing files, and second, files that are in use with write, append, update, or read/write access cannot be stored. The steps for preventing users from accessing files (which may differ for various sites,) commonly are as follows:

1. Set the job and session limits so that no more users or jobs can log onto the computer (use the :LIMIT and :JOBFENCE commands).
2. Warn all users that you are about to begin the SYSDUMP Program and tell them to log off (use the :WARN command).
3. Get rid of all outstanding Console requests (use the :RECALL and :REPLY commands).
4. Approximately five minutes after telling the users to log off, get rid of any jobs or sessions that still remain (use the :SHOWJOB command to find out which jobs and sessions are using the computer, and the :ABORTJOB command to log off jobs and sessions).

For information on the :LIMIT, :JOBFENCE, :WARN, :RECALL, :REPLY, :SHOWJOB, :BREAKJOB, and :ABORTJOB commands, refer to the Commands Reference Manual (32033-90006).

When you are ready to begin the SYSDUMP Program, follow these steps:

1. Ensure that your serial storage media are write-enabled. (On cartridge tapes, the arrows on the tapes must point away from SAFE; on reel tapes, you must insert write rings.)

2. Mount (or insert) the serial storage medium and, if necessary, put the storage device online.

NOTE

If flexible discs are to be used, you must be certain that an adequate number of preserialized flexible discs are available.

3. Enter the following commands:

```
:FILE T;DEV=devclass     ** devclass = TAPE or CTAPE **
:FILE SYSDLIST;DEV=LP
:SYSDUMP *T
```

NOTE

Do not label backup tapes with the LABEL parameter of the :FILE command; for example:

```
:FILE T; DEV=devclass; LABEL=name
:FILE SYSDLIST; DEV=LP
:SYSDUMP *T
```

If you use the LABEL parameter (as above) and are on MPE version G.02.00, the SYSDUMP Program will terminate with the following error message:

```
LABELLED TAPE NOT ALLOWED
```

If you use the LABEL parameter and are on any other MPE version, the SYSDUMP Program will not terminate; however, you will be unable to successfully load the tape onto your system with the INITIAL Program.

NOTE

The steps of the SYSDUMP dialog are numbered so that you can easily reference the appropriate text. The step numbers will not be displayed on the System Console.

Step Number	Dialog
1	ANY CHANGES?

If you want to omit making configuration changes and go directly to creating your serial storage media, enter NO or (RETURN) and skip to "ENTER DUMP DATE?" (Step 153) under the heading entitled "Terminating the SYSDUMP Program".

If you want to prepare your system for making configuration changes, enter YES and continue with the next step.

2 VERSION = G.03.04

This is the Version-Update-Fix Number for MPE, where *V* is the current MPE version, *UU* is the present update-level number, and *FF* is the fix-level number. In the example, *V*=G, *UU*=03, and *FF*=04.

At logon, G.03.04 reports both the user-defined *V.UU.FF* and the official base *V.UU.FF* of the operating system software offered by Hewlett-Packard. The official base *V.UU.FF* is not modifiable by the :SYSDUMP command.

When making system software changes or user-defined changes, a change to the *V.UU.FF* is recommended and should be recorded in the system log book.

If it is necessary to change the *V.UU.FF*, your SE will provide you with the appropriate instructions. Otherwise, enter (RETURN).

3 Prior to G.01.00: MEMORY SIZE = *XXXX*?

G.01.00 or later: MEMORY SIZE=<*XXXX*> (MIN=256, MAX=8192)?

XXXX denotes the present size of main memory in kilowords (512 kilowords represents 1 Mb of main memory).

The amount of supported memory depends on which HP 3000 Series you have. Here is a list of all HP 3000 computer systems, showing the amount of memory that they support:

- The Series 64/68/70 supports 4 to 16 Mb (2048 to 8192 kilowords).
- The Series 58 supports 4 to 8 Mb (2048 to 4096 kilowords).
- The Series 44/48 supports 2 to 4 Mb (1024 to 2048 kilowords).
- The Series 52 supports 2 to 8 Mb (1024 to 4096 kilowords).
- The Series 40/42 supports 1 to 3 Mb (512 to 1536 kilowords).
- The Series 39 supports 1/2 to 3 Mb (256 to 1536 kilowords).

- The MICRO 3000XE supports 2 to 8 Mb (1024 to 4096 kilowords).
- The MICRO 3000 supports 2 or 4 Mb (1024 to 2048 kilowords).
- The Series 37 supports 1/2 to 2 Mb (256 to 1024 kilowords).

To indicate the size of main memory for which MPE is being configured, enter one of the following values (in kilowords): 256, 512, 1024, 1536, 2048, 3072, 4096, or 8192.

To retain the present memory size, enter a RETURN.

Entering the Main Portion of the SYSDUMP Program

You have just completed the initial phase of the SYSDUMP Program. The rest of the program consists of making configuration changes to the following level-one questions that you answer yes to:

```
I/O CONFIGURATION CHANGES?
SYSTEM TABLE CHANGES?
MISC CONFIGURATION CHANGES?
LOGGING CHANGES?
DISC ALLOCATION CHANGES?
SCHEDULING CHANGES?
SEGMENT LIMIT CHANGES?
SYSTEM PROGRAM CHANGES?
SYSTEM SL CHANGES?
```

Notice that the questions themselves describe what you can change with the SYSDUMP Program. Each of these questions are represented as headings in the following text.

I/O Configuration Changes

The question "I/O CONFIGURATION CHANGES?" is the first level-one question of the SYSDUMP Program. If you answer no to this prompt, you will skip to the next level-one question, "SYSTEM TABLE CHANGES?" (Step 77). If you answer yes, the following level-two questions will appear:

```
LIST I/O DEVICES?
LIST CS DEVICES?     ** Appears only if CS devices are configured **
LIST DEVICE DEFAULTS?
HIGHEST DRT = 207 (MIN=8, MAX=511)?
LOGICAL DEVICE #?
MAX # OF OPEN SPOOLFILES = 200 (MIN=0, MAX=928)?
LIST I/O DEVICES?
LIST CS DEVICES? ** Appears only if CS devices are configured **
TERMINAL TYPE CHANGES?  ** Appears only on G.00.00 or later **
CLASS CHANGES?
LIST I/O DEVICES?
ADDITIONAL DRIVER CHANGES?  ** Appears only if CS devices are configured **
I/O CONFIGURATION CHANGES?
```

Step Number **Dialog**

4 I/O CONFIGURATION CHANGES?

To bypass these changes, enter NO or (RETURN) and skip to "System Table Changes" (Step 77).

To prepare your system for adding, deleting, or changing any input/output devices, enter YES and continue with the next step.

5 LIST I/O DEVICES?

Enter YES for a list of I/O devices. A sample format is:

```
LOG DRT U  C T SUB              REC   OUTPUT  MODE   DRIVER    DEVICE
DEV  #  N  H Y TYPE  TERMINAL   WIDTH DEV             NAME     CLASSES
 #      I  A P      TYPE SPEED
        T  N E
1   25  0  0 0  9                128     0           HIOMDSC1  SYSDISC
2   26  0  0 3  8                128     0           HIOMDSC2  SPOOL

6   33  0  0 3  99               66      0       5   HIOCIPR0  LP

20   8  0  0 16  0    1096        40     20     JAID  HIOTGRIM  CONSOLE
```

Enter NO to suppress this listing.

The headings denote the following:

LOG DEV #	Logical device number.
DRT#	Hardware device address (Device Reference Table number).
UNIT	Hardware unit number of device on its controller.
CHAN	Software channel number of device on its controller.
TYPE	Device type.
SUB TYPE	Device subtype.
TERMINAL	Subtype.
TYPE	Terminal type.
SPEED	Terminal speed.
REC WIDTH	Record width in decimal words.
OUTPUT DEV	Device class name or logical device number of associated output devices.
MODE	J = Accept jobs. A = Accept data. I = Interactive device. D = Duplicative device. S = Spooled device. R = Auto reply (G.01.00 or later).
DRIVER NAME	Driver name (Refer to Tables 7-0/7-16).
DEVICE CLASSES	General class(es) to which the device belongs.

NOTE

The following prompt (Step 6) appears only if a communications interface (INP) is currently configured into the system.

6 LIST CS DEVICES?

To list the characteristics of all Communications Systems devices currently assigned to the system, enter YES. The format of the output is:

```
LDN PM PRT LCL TC  RCV   LCL   CON  MODE   TRANSMIT  TM BUFFER D DRIVER
           MOD    TMOUT TMOUT TMOUT          SPEED       SIZE  C OPTIONS
```

If you have a switched device, such as those that are connected through a dial-up telephone line, you will receive the following additional output:

```
LDN CTRL  PHONE NUMBER LIST    LOCAL ID SEQUENCE
    LEN                           REMOTE ID SEQUENCE
```

To suppress this listing, enter NO.

The headings denote the following:

LDN	Logical device number.
PM	Port Mask.
PRT	Protocol.
LCL MOD	Local mode.
TC	Transmission code.
RCV TMOUT	Receive timeout.
LCL TMOUT	Local timeout.
CON TMOUT	Connect timeout.
MODE	O = Dial out. I = Manual answer. A = Automatic answer. D = Dual speed. H = Half speed. C = Speed changeable.
TRANSMIT SPEED	Transmission speed (characters per second).
TM	Transmission mode.
BUFFER SIZE	Default buffer capacity (words).
DC	Driver changeable or not changeable.
DRIVER OPTION	Driver options.
DEVICE CLASSES	Class name assigned to device.
LDN	Logical device number.
PHONE NUMBER LIST	A single telephone number - the default for the communications line.
LOCAL ID SEQUENCE	The default identification of the local computer.
REMOTE ID SEQUENCE	The default identification of the remote computer.

6.1 G.01.00 or later: LIST DEVICE DEFAULTS?

The device configuration defaults for the SYSDUMP and INITIAL Programs are contained in the table DEFDATA.PUB.SYS, introduced with the G.01.00 software release. This table eliminates the need to look up configuration information every time a device is added to the system. To receive a listing of device defaults on your screen, enter Y. To suppress the listing, enter N. Table 7-0, Device Defaults, contains the complete listing as it would appear on your screen.

DEFDATA.PUB.SYS is automatically loaded onto the system during a COLDSTART or a RELOAD. To load DEFDATA.PUB.SYS during an UPDATE, run the program PNEWDEF.PUB.SYS before shutting down the system to perform the UPDATE. (Do not perform a COOLSTART or a WARMSTART after running the program PNEWDEF.PUB.SYS. Doing so will force you into a RELOAD situation.)

7 Prior to G.01.00: HIGHEST DRT=*XX*?

G.01.00 or later: HIGHEST DRT=<*XXX*> (MIN=*X*, MAX=*XXX*)?

XX is a value denoting the present highest Device Reference Table (DRT) entry number that can be assigned to a device.

The highest DRT entry number that can be assigned to a device is 511. To change *XX*, enter the new value desired. The maximum DRT value offered is CPU-dependent. To maintain the current *XX*, enter a RETURN.

8 LOGICAL DEVICE #?

To specify a device to be added, changed or removed, enter the logical device number of that device.

For E/F.00.00, the maximum number of logical devices is 255.

For G.00.00 the maximum number of logical devices is 1024. However, a number in the range 1-999 must be entered. Remaining logical devices are used for spoolfiles if necessary.

If a zero (0) or a (RETURN) is entered, skip to Step 46.

8.1 G.01.00 or later: DEVICE NAME?

Enter a device name (beginning with "HP" plus a product number) from the DEFDATA file to take advantage of default information. Enter (RETURN) to configure devices not included in DEFDATA or to delete a device. See Table 7-0 for a listing of the DEFDATA file.

9 Prior to G.01.00: DRT #?

G.01.00 or later: DRT # = *X*?

To delete a device and remove it from the configuration, enter 0 as the DRT entry number. The dialog will skip back to Step 8.

To add a device, enter its Device Reference Table (DRT) entry number. In the case of all data communications devices, the DRT number you assign must be the logical device number of the associated INP, preceded by a pound sign (#). For example: #40.

NOTE

Each ADCC-connected terminal has its own DRT, and handles up to 8 terminals. If port 0 starts at DRT 8_{10} (%10) then port 2 on that same ADCC would be DRT 10_{10} (%12) and port 7 would be DRT 15_{10} (%17). The System Console must be configured as DRT 8_{10}, the lowest configurable DRT.

10 Prior to G.01.00: UNIT #?

G.01.00 or later: UNIT = X?

Enter the physical hardware unit number of the device, if the device shares its controller with other devices. If the device does not share its controller with other devices, enter 0 to continue.

NOTE

All ADCC-connected terminals must be configured as UNIT 0.

If you are configuring a data communications subsystem, refer to the Data Communications Handbook (5957-4634) for unit numbers. Note that for MTS multipoint terminals, unit numbers identify the terminal by group ID and device ID. The numbering scheme is explained in the MTS Reference Manual (32193-90002). For MRJE, you must specify unit numbers for pseudo devices.

11 Prior to G.01.00: SOFTWARE CHANNEL #?

G.01.00 or later: SOFTWARE CHANNEL# = X?

If the device is to be on a multicontroller channel, enter channel number; if not, enter 0.

Enter 0 for all data communications devices and pseudo devices.

12 Prior to G.01.00: TYPE?

G.01.00 or later: TYPE = X?

Enter the device type. Use one of the decimal numbers listed below:

0 = Moving-Head Disc (HP 7906, HP 7920, HP 7925).
2 = Flexible Disc (HP 7902, HP 9896).
3 = HP 7911; HP 7912; HP 7914; HP 7933; HP 7935; HP 7945; HP 9140; HP 9144.
7 = Foreign Disc.
8 = Card Reader.
16 = Terminals, DS pseudo terminals, multipoint terminals, multipoint supervisor.
17 = Intelligent Network Processor (INP).
22 = MRJE, Pseudo Device.
24 = Magnetic Tape.
31 = Serial Disc.
32 = Line Printer.
41 = DS Communications Driver.

13 Prior to G.01.00: SUB TYPE?

G.01.00 or later: SUB TYPE = *X*?

Enter the device subtype in the range 0 to 15.

Refer to Tables 7-1/7-16 at the end of this section for the subtype information.

NOTE

If you are configuring a terminal or printer (type 16 or 32), the dialog continues to Step 14. If you are configuring an INP (type 17), the dialog skips to Step 16. For all other device types, the dialog skips to Step 30.

14 E/F.00.00: TERM TYPE?

G.00.00: ENTER [TERM TYPE#], [DESCRIPTOR FILENAME]?

G.01.00 or later: ENTER [TERM TYPE#],[DESCRIPTOR FILENAME] = (XX,TTPCL*nn*.PUB.SYS)?

This question is asked only if the device type is 16 or 32 (subtypes 14 and 15). To specify a default terminal type to be used at log on, enter one of the terminal type numbers in Table 7-2.

For DS pseudo terminals, refer to the Data Communications Handbook (5957-4634) for terminal types.

The possible responses are:

- A (RETURN) to specify no terminal type number, or to accept the default value for G.01.00 or later.
- Enter a terminal type number from Table 7-3.
- Enter a descriptor file name and no terminal type number.
- Enter a terminal type number and descriptor file name. In this case, the terminal type number is used only in the event that the descriptor file cannot be found. For additional information on descriptor file names and creating a user-defined file, refer to the Workstation Configurator Reference Manual (30239-90001).

NOTE

For DS pseudo terminals, or if the terminal type is not known, enter a (RETURN). Terminal types 19 through 22 are intended for use only with devices configured as Device Type 32.

15 Prior to G.01.00: SPEED IN CHARACTERS PER SECOND?

G.01.00 or later: SPEED IN CHARACTERS PER SECOND =XXX?

This question is asked only if the device type is 16 or 32.

Enter 0 or a (RETURN) for all DS pseudo-terminals, the multipoint supervisor, and MTS multipoint terminals.

For other terminals, specify the terminal speed in characters per second by entering 10, 14, 15, 30, 60, 120, 240, 480, 960, or 1920. (A numeric response is required for subtypes 4-5). See Table 7-4/7-5 for acceptable speeds for each controller type.

NOTE

For an ATP Terminal Interface Controller, you can enter the maximum speed of 1920. For an ADCC Terminal Interface Controller, the most you can enter is 960.

Because of DCU limitations on a Series 64/68/70 Console port, the highest speed that you can enter for this port is 960, even with an ATP Terminal Interface Controller.

Otherwise, enter 0 or a (RETURN) to cause speed sensing at log on.

The dialog skips to Step 30 if you are not configuring a communications device.

16 RECEIVE TIMEOUT?

A value from 0 to 32,767. Default is 20 seconds. Entering 0 disables the timeout feature. Enter the positive number of seconds the communications software will wait to receive text before terminating the read mode.

A batch job terminates if a timeout occurs. In a session, Receive Timeout is disabled.

NOTE

For all timeout responses (Steps 19, 20 and 21), the subsystem displays an error when the communications software (CS) disconnects because of a timeout.

17 LOCAL TIMEOUT?

A value from 0 to 32,767. Default is 60 seconds. Entering 0 disables the timeout feature. Enter the positive number of seconds a connected local station will wait to transmit or receive before disconnecting.

The local timeout feature notes the time between requests to the communications interface.

The local timeout feature is disabled in a session.

18 CONNECT TIMEOUT?

A value from 0 to 32,767. Default is 900 seconds. Entering 0 disables the timeout feature. Enter the positive number of seconds the local station will wait after one attempt to make a connection to a remote station.

A connect timeout occurs if the "data terminal ready" signal fails to indicate line connection within the specified time.

NOTE

Steps 19 through 21 apply only to CS devices with switched lines connected through a modem (dial telephones, subtype 0). For CS devices with nonswitched lines connected through a modem (private lines, subtype 1), the dialog skips to Step 22. If the CS device is hardwired (subtype 3), the dialog skips to Step 27.

19 DIAL FACILITY?

Enter YES when calls can be dialed from the local station. Enter NO when they cannot. Enter the LDEV # of the INP if it is equipped for auto dialing.

20 ANSWER FACILITY?

Enter YES if the modem can answer calls, either manually or automatically. Enter NO if it cannot. A NO response causes the next step to be skipped.

21 AUTOMATIC ANSWER?

Enter YES if the local modem can automatically answer calls. Enter NO if manual answering is required.

22 DUAL SPEED?

Enter YES if the local modem is dual speed (European modem). Enter NO if it is single speed. A NO response causes the next step to be skipped.

23 HALF SPEED?

Enter YES if the local modem is to operate at half speed. Enter NO if it is to operate at full speed.

The dialog skips to Step 25.

24 SPEED CHANGEABLE?

Enter YES if the speed of the line is changeable. Enter NO if the line speed is fixed. You must respond YES if the line is hardwired and users will specify the transmission speed (that is, override the configured transmission speed).

25 TRANSMISSION SPEED?

For the Intelligent Network Processor, enter the speed in characters per second (150, 300, 600, 1200, 2400, 3600, 4800, or 7000).

The transmission speed you specify is ignored for modems that provide internal clocking signals. This allows modems of different speeds to be used without reconfiguring the operating system.

The speed you specify becomes the system default. For DS and MTS, the System Operator can override the default by including the speed parameter in the :DSCONTROL console command.

26 TRANSMISSION MODE?

Enter the appropriate number for the transmission mode in use.

0 = Full duplex (i.e. constant carrier)
1 = Half duplex (i.e. switched carrier)

Configure an INP for Full Duplex (0) if your facility uses one of the following:

- A leased line with four-wire point-to-point installation.
- A dial network with two lines (four-wire equivalent).
- A dial network with Wide Band Service.
- A hardwired INP to INP.

Configure an INP for Half Duplex (1) if your facility uses one of the following:

- A leased line four-wire multidrop installation.
- A dial network with a single-line (two-wire) installation.
- An HP Data Link.

Your response must agree with the remote system's configuration and with the characteristics of the communication line. Refer to the appropriate data communications product documentation for more information.

27 PREFERRED BUFFER SIZE?

Enter the desired buffer size in words, up to a maximum of 1024 for an INP. Large buffer sizes can increase transmission efficiency depending on the error rate of the line, but use up memory space. Match buffer sizes whenever possible, because the effective buffer size that can be used is the smaller of the two buffer sizes between sender and receiver.

For MTS subsystems, your response must correspond to the strapped buffer size on the Multipoint Communications Printed Circuit Assemblies in the multipoint terminals.

28 DRIVER CHANGEABLE?

Enter NO.

29 DRIVER OPTIONS?

Enter 0.

30 Prior to G.01.00: RECORD WIDTH?

G.01.00 or later: RECORD WIDTH = XX?

Enter the record width (in decimal words) for the device. Default widths are referenced in Tables 7-1/7-16. Disc device defaults should be used. However, for other devices, any record width up to the maximum may be specified for your configuration.

31 Prior to G.01.00: OUTPUT DEVICE?

G.01.00 or later: OUTPUT DEVICE = XX?

If the device is ever used as a job or session input device, enter the class name or logical device number to be used for the corresponding default job/session listing device. There are advantages in using class names under certain circumstances. Suppose there are two line printers and two card readers in the system. Both line printers are in class LP. You may configure the output device for both card readers as LP. In this way, jobs submitted from either card reader can acquire either one of the line printers dynamically (provided at least one line printer is unallocated or spooled) at run time.

If this device is not a job/session input device, enter 0.

32 Prior to G.01.00: ACCEPT JOBS/SESSIONS?

G.01.00 or later: ACCEPT JOBS/SESSIONS= X?

To specify that this device can accept a job or session input stream (J in I/O list), enter YES. Otherwise, enter NO. Note that disc devices should not be job accepting.

33 Prior to G.01.00: ACCEPT DATA?

G.01.00 or later: ACCEPT DATA = X?

To specify that this device can accept data external to a job or session input stream (A in I/O list), enter YES. Otherwise, enter NO or (RETURN). Note that disc devices should not be data accepting.

34 Prior to G.01.00: INTERACTIVE?

G.01.00 or later: INTERACTIVE= X?

To specify that this is an interactive device (I), enter YES. Otherwise, enter NO. Note that disc devices should not be interactive.

35 Prior to G.01.00: DUPLICATIVE?

G.01.00 or later: DUPLICATIVE= X?

To specify that this is a duplicative device (D in I/O list), enter YES. Otherwise, enter NO. Note that disc devices should not be duplicative.

36 Prior to G.01.00: INITIALLY SPOOLED?

G.01.00 or later: INITIALLY SPOOLED = X?

To designate this device as being spooled at cold load (S in I/O list), enter YES. Otherwise, enter NO or (RETURN); the dialog will proceed to Step 37.1.

NOTE

Do not COLDSTART the system from a COLDLOAD tape that was created after using the :STOPSPOOL command. Doing so may inadvertently change the configuration of an initially spooled device.

37 INPUT OR OUTPUT?

This question is asked only if the device is initially spooled and the device is an input/output device, such as a card reader/punch. Enter IN or OUT. If using device defaults, this question is only asked if the device was not initially spooled, but the default was overridden with a "Y" response.

37.1 G.01.00 or later: AUTO REPLY= X?

To designate this device as automatically allocatable (R in I/O list) enter YES. Otherwise, enter NO. Note that a YES reply will be ignored for a device other than a tape drive or serial disc.

38 Prior to G.01.00: DRIVER NAME?

G.01.00 or later: DRIVER NAME=*name*?

Enter the name of the program file containing the driver for this device (Tables 7-1/7-16). For drivers written and supplied by the user, this name must contain from one to eight alphanumeric characters, beginning with an alphabetic character. If the driver name is preceded by an asterisk (*), the driver will reside permanently in main memory (which is not necessary for normal MPE operation).

NOTE

Steps 39 through 42 apply to CS devices with switched lines (device type 17, subtype 0). The dialog for all other devices skips to Step 43.

39 PHONE LIST?

You can supply one number (usually a frequently dialed number) which will be the system default. Note that MRJE does not use this number. Instead, it uses the number configured in the MRJE configuration file.

Enter YES to provide a default phone number. Enter NO if none is to be provided. A NO response causes the next step to be skipped.

40 PHONE NUMBER?

Enter a string of no more than 30 characters (which can include hyphens and blanks to cause delays for dial tones).

41 LOCAL ID SEQUENCE?

Only DS recognizes local ID sequences.

The default local ID sequence can be specified in terms of a code or a number system. Enter a RETURN for a null local ID sequence. Enter a RETURN for a null local ID sequence. Enter one of the letters below, followed by the ID sequence in quotes, if code, or parentheses, if number system:

A = ASCII	Example: A "JOE"
E = EBCDIC	Example: E "STRING"
O = Octal	Example: O (7, 35, 5)
H = Hexadecimal	Example: H (A1, 1F, BB)

Do not enter more than 16 characters for the local or remote ID sequence.

42 REMOTE ID SEQUENCE?

Only DS recognizes remote ID sequences.

Enter the default remote ID sequence in the same format as the local ID sequence (above). This can be repeated until a RETURN is entered.

43 Prior to G.01.00: DEVICE CLASSES?

G.01.00 or later: DEVICE CLASSES = *class*?

Enter a list containing a device class name (*devclass*) (up to eight alphanumeric characters, beginning with an alphabetic character). Device class names are separated from each other by commas. These names are left to the discretion of the System Supervisor. They will be used in certain file commands or intrinsics when any member of a group of devices, rather than a specific device, can be referenced. No name need be entered.

A device can belong to more than one class, such as DISC and FHDISC. Only the classes DISC and SPOOL (if spooling is desired) are specifically required by MPE. DISC is the default device class for building files. SPOOL is the device class for designating "spooling discs." Spool files will only be allocated on discs which are included in the special device class SPOOL. User files also may reside on spooling discs.

NOTE

It is not uncommon to have multiple disc drives of different storage capacity connected to a single computer. If this is the case, and each *ldev* were assigned the class name DISC once, the smaller disc drives would become full at a proportionally faster rate than the larger drives. To accommodate this difference, the device class name "DISC" is often assigned to a single device more than once. For example, if a 100-megabyte drive is assigned the class name DISC once, a 300-megabyte drive should be assigned the class DISC three times. This way, MPE will store one file extent on the smaller disc drive for every three file extents to write to the larger drive.

JOBTAPE is usually included as a device class if the streaming facility is used.

The class DDUMP must be specified on the serial device to be used for doing memory dumps.

LP is usually assigned to the system line printer.

PP is one of several classes commonly associated with the HP2680 Laser Printer.

The following classes must also be included if the User Logging Facility will be used with devices in a class other than DISC:

TAPE must refer to devices in a magnetic tape class.

SDISC or CTAPE must refer to devices in a serial disc class.

VTERM is used to distinguish pseudo terminals configured for the Virtual Terminal Service of NS/3000. VTERM must not be used for any other types of devices.

If Step 44 is not necessary, control returns to Step 8.

44 IS *devclass* A SERIAL DISC CLASS?

This question is asked for each class being implicitly created by this logical device change, if the device being configured is a supported serial disc device, and *devclass* is not the name of an existing device class.

Enter YES or NO or (RETURN).

Note that the response to this question must be NO for all classes of system and private volume discs. If *devclass* is one of CTAPE, SDISC, or DDUMP, you should respond YES.

If the answer is YES, control returns to Step 8.

45 IS *devclass* A FOREIGN DISC CLASS?

This question is asked for each class being implicitly created by this logical device change, if the device being configured is a supported serial disc device, and *devclass* is not the name of an existing device class.

Answer YES or NO

Note that a YES response is appropriate only if the class is NOT a serial disc class, a private volume class, or a system disc class.

This question will be asked only if Question 44 was answered NO. Control returns to Step 8.

46 Prior to G.01.00: MAX # OF OPENED SPOOLFILES = *XXX*?

G.01.00 or later: MAX # OF OPENED SPOOLFILES = *XXX*?
(MIN = 0, MAX = *XXX*)?

To change the maximum number of input and output spool files which can be opened at one time, enter the new limit. To retain the current value, enter a RETURN. This can be used to control the generation of output spool files.

The highest number you can specify as a maximum is dependent upon the number of logical devices on your system. The formula for determining this maximum number of spool files is:

E/F.00.00: 255 - (number of logical devices)

G.00.00 or later: 1023 - (number of logical devices)

NOTE

Each concurrent batch job to be executed requires at least two spool files - one for standard input and one for standard output. Thus, if you specify a maximum of 20 spool files in response to the above prompt, the system is restricted to running ten concurrent jobs, assuming no sessions have opened spool files.

47 LIST I/O DEVICES?

To print a listing of the new input/output device configuration, enter YES. This list appears in the format described in Step 5.

To suppress the list, enter NO.

NOTE

The prompt in Step 48 below, appears only if you have configured a CS device into the system.

48 LIST CS DEVICES?

Enter YES to list the characteristics of the new CS device configuration. Enter NO to suppress the listing. On MPE V/P systems, the dialog will now skip to Step 57.

49 G.00.00 or later: TERMINAL TYPE CHANGES?

Enter YES to make changes to terminal type files. Otherwise, enter a (RETURN) to skip to Step 57.

50 G.00.00 or later: LIST TERMINAL TYPE FILES?

Enter YES to list terminal type files. Otherwise enter a (RETURN) or NO to continue.

51 G.00.00 or later: DELETE TERMINAL TYPE FILES?

Enter YES to delete terminal type files. Otherwise enter a (RETURN) to skip to Step 53.

52 G.00.00 or later: FILES?

Enter file name to be deleted. This prompt repeats until a (RETURN) is entered.

53 G.00.00 or later: ADD TERMINAL TYPE FILES?

Enter YES to add terminal type files. Otherwise, enter a (RETURN) to skip to Step 56.

54 G.00.00 or later: FILE NAME?

Enter terminal type file name to be added.

55 G.00.00 or later: LOGICAL DEVICE #'S?

Enter logical device number of terminal. Steps 54 and 55 repeat until just a (RETURN) is entered.

56 G.00.00 or later: LIST TERMINAL TYPE FILES?

Enter YES to list terminal type files. Otherwise enter a (RETURN) to continue.

57 CLASS CHANGES?

If you plan to add, delete, or change device class specifications, enter YES and continue at Step 58.

Otherwise, enter NO. All device classes are checked for validity. If there are no errors, the dialog skips to Step 69. Otherwise, it returns to Step 4.

58 LIST CLASSES?

To list the device classes and the logical devices contained in them, enter YES. Enter NO to suppress the listing.

The format of the listing is:

```
CLASS          ACCESS          LOGICAL
NAME           TYPE            DEVICES
```

Where:

- CLASS NAME shows the classes specified in the I/O configuration.
- ACCESS TYPE is in the form:

  IN - serial input (device types 8-15).
  OUT - serial output (device types 32-39).
  DA - direct access (device types 0-7).
  FD - foreign disc (device types 0, 2, 3).
  SD - serial disc (device types 0, 2, 3).
  I/O,C - input/output, concurrent devices (device types 16-23).
  I/O,NC - input/output, nonconcurrent devices (device types 24-31).
  nn - the actual device type in numeric form sometimes appears in place of the above abbreviations.

- LOGICAL DEVICES are the logical device numbers of all devices specified for this class in the I/O configuration.

59 DELETE CLASSES?

To delete previously defined classes, enter YES. Otherwise, enter NO to skip to Step 61.

60 CLASSES?

Enter names, separated by commas, of classes to be deleted.

61 ADD CLASSES?

To define new classes or to add devices to previously defined classes, enter YES. To skip to Step 68, enter NO.

62 CLASS NAME?

To define a new class or to add devices to a previously defined class, enter class name.

To skip to Step 68, enter a (RETURN).

63 LOGICAL DEVICE #'S?

Enter logical device numbers, separated by commas, in the preferred order of allocation.

If it is not necessary to ask Question 64 or 66 the dialog returns to Step 62.

NOTE

It is not uncommon to have multiple disc drives of different storage capacity connected to a single computer. If this is the case, and each *ldev* were assigned the class name DISC once, the smaller disc drives would become full at a proportionally faster rate than the larger drives. To accommodate this difference, the device class name "DISC" is often assigned to a single device more than once. For example, if a 100-megabyte drive is assigned the class name DISC once, a 300-megabyte drive should be assigned the class DISC three times. This way, MPE will store one file extent on the smaller disc drive for every three file extents to write to the larger drive.

64 IN, OUT, OR IN/OUT?

Depending upon the types of the devices within the class, this question is asked to determine the desired device class access type. Enter one of the following:

IN	(Used primarily for card readers and some MRJE devices)
OUT	(Generally used for printers)
IN/OUT	(Used for terminals and magnetic tape devices)

If your response to this question was IN/OUT, then you are asked an additional question:

65 CONCURRENT OR NON-CONCURRENT?

Are all the devices in the class capable of concurrent IN/OUT? If so, enter C. Otherwise, enter NC.

If it is not necessary to ask Question 66, the dialog returns to Step 63.

66 SERIAL DISC CLASS?

This question is asked if all devices in the class are supported serial disc devices.

Enter YES if the class name is to be used exclusively for access of serial disc devices.

Enter NO for all other device classes.

NOTE

It is possible to configure a disc drive into two classes, one of which is a serial disc class and the other which is not, thus giving the drive the potential for use in either class.

The dialog returns to Step 63 if the answer is YES.

67 FOREIGN DISC CLASS?

This question is asked if the class is not a serial disc class.

Enter YES if the *devclass* is to be used exclusively for access of foreign discs.

Enter NO if the *devclass* is not foreign disc.

68 LIST CLASSES?

To list the device classes and logical devices contained therein, enter YES.

To suppress the listing, enter NO.

If there are any errors in classes the dialog returns to Step 4.

69 LIST I/O DEVICES?

To print a listing of the new I/O configuration, enter YES.

To suppress the listing, enter NO.

NOTE

The prompts in Steps 70 through 76, appear only if a CS device is configured or if additional drivers exist (for the CS driver changeable option). If neither case exists, the dialog returns to Step 4.

70 ADDITIONAL DRIVER CHANGES?

To prepare for additional driver changes, enter YES.

NOTE

The dialog skips to Step 74 if drivers have not yet been configured; otherwise, if drivers already have been configured, the dialog proceeds to Step 71.

If no additional driver changes are required, enter NO. The dialog returns to Step 4.

71 LIST ADDITIONAL DRIVERS?

To print a listing showing the presently configured additional drivers, enter YES.

To suppress this listing, enter NO.

Drivers on this list will be dumped as part of the system part of the SYSDUMP, even though the system as configured does not require them in order to operate. This permits them to be used for configuration changes on a COLDSTART. Since these drivers will be loaded and hence occupy virtual memory, they should not be specified without reason

72 DELETE DRIVERS?

To delete an existing additional driver, enter YES; otherwise, enter NO and skip to Step 74.

73 DRIVER NAME?

Enter the name of the driver to be deleted. This prompt is repeated until you enter a (RETURN), or until all drivers are deleted.

74 ADD DRIVERS?

To prepare for adding drivers, enter YES; otherwise, enter NO. If you enter NO, you will either return to Step 4 if drivers have not yet been added, or you will skip to Step 76.

75 DRIVER NAME?

Enter the name of the driver to be added. This prompt is repeated until you enter a (RETURN), or until the maximum of 32 drivers have been added.

76 LIST ADDITIONAL DRIVERS

To print a listing showing the presently configured additional drivers, enter YES; to suppress this listing, enter NO. The dialog will return to Step 4.

System Table Changes

The question "SYSTEM TABLE CHANGES?" is the second level-one question of the SYSDUMP Program. If you answer no to this prompt, you will skip to the next level-one question, "MISC CONFIGURATION CHANGES?" (Step 97). If you answer yes, the following level-two questions will appear:

```
CST = 192 (MIN=80, MAX=2048)?
EXTENDED CST = 1024 (MIN=16, MAX=8191)?
DST = 1024 (MIN=70, MAX=4096)?
PCB = 256 (MIN=12, MAX=1024)?
I/O QUEUE = 220 (MIN=20, MAX=1300)?
DISC REQUEST QUEUE = 255 (MIN=20, MAX=900)?
TERMINAL BUFFERS PER PORT = 6 (MIN=1, MAX=99)?
SYSTEM BUFFERS = 64 (MIN=8, MAX=253)?
SWAP TABLE = 1024 (MIN=128, MAX=5400)?
PRIMARY MESSAGE TABLE = 25 (MIN=10, MAX=1023)?
SECONDARY MESSAGE TABLE = 25 (MIN=10, MAX=1023)?
SPECIAL REQUEST TABLE = 20 (MIN=10, MAX=2048)?
ICS = 1500 (MIN=256, MAX=4096)?
LOADER SEGMENT TABLE = 16384 (MIN=2048, MAX=32760)? **on G.00.00 or later**
UCOP REQUEST QUEUE = 150 (MIN=1, MAX=1024)?
TIMER REQUEST QUEUE = 255 (MIN=6, MAX=1023)?
BREAKPOINT TABLE = 30 (MIN=1, MAX=1024)?
MAX NUMBER OF USER LOGGING PROCESSES = 2 (MIN=2, MAX=64)?
MAX NUMBER OF USERS PER LOGGING PROCESS = 3 (MIN=1, MAX=256)?
```

Step Number	Dialog
77	SYSTEM TABLE CHANGES? To bypass these changes, enter NO or (RETURN) and skip to "Miscellaneous Configuration Changes" (Step 97). To prepare your system for making changes to the CST, DST, PCB, IOQ, MTAB, or other parameters relating to memory usage, enter YES and continue with the next step.
78	Prior to G.01.00: CST = *XXX*? G.01.00 or later: CST=<*XXX*> (MIN=80, MAX=2048)? To change the size of the sharable portion of the Code Segment Table from *XXX* entries to another value, enter the new value. To retain the current value, enter a (RETURN).
79	Prior to G.01.00: EXTENDED CST= *XXXX*? G.01.00 or later: EXTENDED CST = <*XXXX*> (MIN=16, MAX=8191)? To change the size of the program portion of the CST from *XXXX* entries to another value, enter the new value. To retain the current value, enter a (RETURN).
80	Prior to G.01.00: DST = *XXXX*? G.01.00 or later: DST = <*XXXX*> (MIN=70, MAX=4096)? To change the size of the DST from *XXXX* entries to another value, enter the new value. To retain the current value, enter a (RETURN).
81	Prior to G.01.00: PCB = *XXX*? G.01.00 or later: PCB = <*XXX*> (MIN=12, MAX=1024)? To change the size of the PCB table from *XXX* entries to another value, enter the new value. To retain the current value, enter a (RETURN).

82 Prior to G.01.00: I/O QUEUE = *XXX*?

G.01.00 or later: I/O QUEUE = <XXX> (MIN=20, MAX=1300)?

To change the number of the input/output queue entries permitted from *XXX* entries to another value, enter the new value.

To retain the current value, enter a RETURN.

83 Prior to G.01.00: DISC REQUEST TABLE = *XXX*?

G.01.00 or later: DISC REQUEST QUEUE = <XXX> (MIN=20, MAX=900)?

To change the size of the disc request table from *XXX* to another value, enter the new value.

To retain the current value, enter a RETURN.

84 Prior to G.01.00: TERMINAL BUFFERS PER PORT = *XXX*?

G.01.00 or later: TERMINAL BUFFERS PER PORT = <XX> (MIN=1, MAX=99)?

To change the number of terminal buffers per port in the system from *XXX*, enter the new value.

To retain the current value, enter a RETURN.

NOTE

Terminal buffers are shared among all terminals. Entering a number for terminal buffers "per port" will not necessarily limit a given terminal to that number of buffers.

85 Prior to G.01.00: SYSTEM BUFFERS = *XXX*?

G.01.00 or later: SYSTEM BUFFERS = <XXX> (MIN=8, MAX=253)?

To change the number of system buffers in the system, from *XXX* to another value, enter the new value. To retain the current value, enter a RETURN.

86 Prior to G.01.00: SWAP TABLE = *XXX*?

G.01.00 or later: SWAP TABLE = <XXX> (MIN=128, MAX=5400)?

To change the size of the swap table from *XXX* to another value, enter the new value. To retain the current value, enter a RETURN.

87 Prior to G.01.00: PRIMARY MESSAGE TABLE = *XXX*?

G.01.00 or later: PRIMARY MESSAGE TABLE = <*XXX*> (MIN=10, MAX=1023)?

To change the size of the primary message table from *XXX* to another value, enter the new value. To retain the current value, enter a RETURN. You should have at least as many primary message table entries as system buffers.

88 Prior to G.01.00: SECONDARY MESSAGE TABLE = *XXX*?

G.01.00 or later: SECONDARY MESSAGE TABLE = <*XXX*> (MIN=10, MAX=1023)?

To change the size of the secondary message table from *XXX* to another value, enter the new value. To retain the current value, enter a RETURN.

89 Prior to G.01.00: SPECIAL REQUEST TABLE = *XXX*?

G.01.00 or later: SPECIAL REQUEST TABLE = <*XXX*> (MIN=10, MAX=2048)?

To change the size of the special request table from *XXX* to another value, enter the new value. To retain the current value, enter a RETURN.

90 Prior to G.01.00: ICS = *XXXX*?

G.01.00 or later: ICS = <*XXXX*> (MIN=256, MAX=4096)?

To change the number of words in the interrupt control stack (ICS), enter the new value. To retain the current value, enter a RETURN.

91 G.00.00: LOADER SEGMENT TABLE = *XXXXX*?

G.01.00 or later: LOADER SEGMENT TABLE = <*XXXXX*>
(MIN=2048, MAX=32760)?

To change the number of words in the Loader Segment Table, enter the new value. To retain the current value, enter a RETURN.

92 Prior to G.01.00: UCOP REQUEST QUEUE = *XXX*?

G.01.00 or later: UCOP REQUEST QUEUE = <*XXX*> (MIN=1, MAX=1024)?

To change the number of entries allowed in the user controller process request queue to another value, enter the new value. To retain the current value, enter a RETURN.

93 Prior to G.01.00: TIMER REQUEST LIST = *XXX*?

G.01.00 or later: TIMER REQUEST QUEUE = <*XXX*> (MIN=6, MAX=1023)?

To change the maximum number of concurrent time-out requests for the system clock allowed, enter the new value. To retain the current value, enter a RETURN.

94 Prior to G.01.00: BREAKPOINT TABLE = *XXX*?

G.01.00 or later: BREAKPOINT TABLE = <*XXX*> (MIN=1, MAX=1024)?

To change the size of the breakpoint table from *XXX* entries, enter the new value. To retain the current value, enter a RETURN.

95 Prior to G.01.00: MAX NUMBER OF USER LOGGING PROCESSES = *XXX*?

G.01.00 or later: MAX NUMBER OF USER LOGGING PROCESSES = <*XX*> (MIN=2, MAX=64)?

To change the maximum number of processes allowed on the system, enter the new value. To retain the current value, enter a RETURN.

NOTE

Any change to the maximum number of user logging processes will only take effect if the SYSDUMP is followed by a RELOAD.

96 Prior to G.01.00: MAX NUMBER OF USERS PER LOGGING PROCESS = *XXX*?

G.01.00 or later: MAX NUMBER OF USERS PER LOGGING PROCESS = <*XXX*> (MIN=1, MAX=256)?

To change the maximum number of users who need to access a single logging file per logging process, enter the new value. To retain the current value, enter a RETURN.

Miscellaneous Configuration Changes

The question "MISC CONFIGURATION CHANGES?" is the third level-one question of the SYSDUMP Program. If you answer no to this prompt, you will skip to the next level-one question, "LOGGING CHANGES?" (Step 112). If you answer yes, the following level-two questions will appear:

```
LIST GLOBAL RINS?
DELETE GLOBAL RINS?
# OF RINS = 48 (MIN=23, MAX=1024, USED=23)?
# OF GLOBAL RINS = 16 (MIN=4, MAX=1024, USED=4)?
# OF SECONDS TO LOGON = 120 (MIN=10, MAX=600)?
MAX # OF CONCURRENT RUNNING SESSIONS = 80 (MIN=1, MAX=500)?
MAX # OF CONCURRENT RUNNING JOBS = 8 (MIN=1, MAX=500)?
DEFAULT JOB CPU TIME LIMIT = 0 (MIN=0, MAX=32767)?
MESSAGE CATALOG CHANGES?
SOFTDUMP COMMAND CHANGES?
```

Step Number	Dialog
97	MISC CONFIGURATION CHANGES?

To bypass these changes, enter NO or (RETURN) and skip to "Logging Changes" (Step 112).

To prepare your system for making the following miscellaneous configuration changes, enter YES and continue with the next step.

- Listing and (optionally) deleting global resource identification numbers (RINs) assigned to users.
- Number of RINs available in the RIN pool.
- Maximum number of global RINs available.
- Number of seconds allowed for logging on.
- Maximum number of jobs allowed on the system.
- Maximum number of concurrent sessions allowed in execution.
- Default central processor time limit for jobs.
- Message catalog changes.

98 LIST GLOBAL RINS?

To list the currently assigned global resource identification numbers (RINs), enter YES. To suppress this listing, enter NO.

The listing consists of the RIN number and the name of the user and account to which it is assigned (for each RIN).

99 DELETE GLOBAL RINS? (RELOAD option only.)

To prepare for deleting any of the currently assigned global RINs, enter YES. To bypass deletion and skip to Step 102, enter NO.

100 ENTER RIN #?

To delete a currently assigned global RIN, enter the RIN number.

This step is repeated until a (RETURN) is entered.

NOTE

Since global RINs are permanently assigned to users and the RIN numbers will be hard-coded into their programs, RINs should be deleted with caution.

For this same reason, the most up-to-date RIN table (which resides on disc) is used when the system is cold-loaded, except in the case of a RELOAD. This implies that any changes to the RIN table occurring during the SYSDUMP Program, including changes to the size of the table, only take effect when the tape produced by the program is cold loaded using the RELOAD option.

101 LIST GLOBAL RINS?

To list the updated global RINs (as in Step 98), enter YES.

To suppress the listing, enter NO.

102 Prior to G.01.00: # OF RINS MIN = *YYY*, MAX = *XXXX*?

G.01.00 or later: # OF RINS = <*YY*> (MIN=*XX*, MAX=1024, USED=*XX*)?

To change the number of RINs available in the RIN pool, enter a new value for *XXXX*. This value must be at least as great as *YYY*. (*YYY* is the maximum of 5 and the highest currently assigned global RIN number).

To maintain the current maximum, enter a RETURN.

Changes will be effective only on a RELOAD.

103 Prior to G.01.00: # OF GLOBAL RINS USED = *YYY*, MAX = *XXXX* ?

G.01.00 or later: # OF GLOBAL RINS = <*YYY*>
(MIN=*XX*, MAX=1024, USED=*XX*)?

To change the maximum number of global RINs available, enter a new value for *XXX*. Because of the current assignment of global RIN numbers, this must be at least as great as *YYY*.

To maintain the current value, enter a RETURN.

Changes will be effective only on a RELOAD.

104 Prior to G.01.00: # OF SECONDS TO LOG ON = *XXX*?

G.01.00 or later: # OF SECONDS TO LOG ON = <*XXX*> (MIN=10, MAX=600)?

To change the number of seconds allowed for logging on, enter the new value.

To retain the current value, enter a RETURN.

105 Prior to G.01.00: MAX # OF CONCURRENT RUNNING SESSIONS = *XXXX*?

G.01.00 or later: MAX # OF CONCURRENT RUNNING SESSIONS = <*XXX*>
(MIN=1, MAX=500)?

To change the maximum number of sessions allowed in execution at one time, enter the new value.

To retain the current value, enter a RETURN.

106 Prior to G.01.00: MAXIMUM # OF CONCURRENT RUNNING JOBS = *XXX*?

G.01.00 or later: MAX # OF CONCURRENT RUNNING JOBS = <*XXX*>
(MIN=1, MAX=500)?

To change the maximum number of jobs allowed in execution at one time, enter the new value.

To retain the current value, enter a RETURN.

107 Prior to G.01.00: DEFAULT JOB CPU TIME LIMIT =*XXXXX*?

G.01.00 or later: DEFAULT JOB CPU TIME LIMIT = <*XXXXX*>
(MIN=0, MAX=32767)?

To change the value, enter the new value in seconds. A zero implies that jobs are not limited; sessions are limited only if the user supplies a limit on the :HELLO command.

To retain the current value, enter a RETURN.

108 MESSAGE CATALOG CHANGES?

To create a new message catalog from a user-supplied file, enter YES.

To skip to Step 110, enter NO or a RETURN.

109 CATALOG INPUT FILE NAME?

Name of disc file or formal designator to define the input file from which new catalog is to be built.

110 SOFTDUMP COMMAND CHANGES?

To make changes, enter YES. For no changes, enter NO dialog. Skips to Step 112.

111 SOFTDUMP COMMAND FILE NAME?

Enter file name.

Dialog will respond with: NEW COMMAND FILE CREATED

Logging Changes

The question "LOGGING CHANGES?" is the fourth level-one question of the SYSDUMP Program. If you answer no to this prompt, you will skip to the next level-one question, "DISC ALLOCATION CHANGES?" (Step 119). If you answer yes, the following level-two questions will appear:

```
LIST LOGGING STATUS?
STATUS CHANGES?
LOG FILE RECORD SIZE (SECTORS) = 2 (MIN=1, MAX=8)?
LOG FILE SIZE (RECORDS) = 1024 (MIN=16, MAX=32767)?
```

Step Number	Dialog
112	LOGGING CHANGES?

To bypass these changes, enter NO or (RETURN) and skip to "Disc Allocation Changes" (Step 119).

To prepare your system for making changes to the logging characteristics of the system, enter YES and continue with the next step.

113 LIST LOGGING STATUS?

To print a list of the events that can be logged and whether or not they are currently being logged, enter YES.

To suppress the listing, enter NO.

114 STATUS CHANGES?

To prepare for changes to the logging status, enter YES. If no changes are desired, enter NO to skip to Step 117.

115 ENTER TYPE, ON/OFF?

You should enter the type number of the event (defined below), a comma (,), and either ON to signify that it is to be logged, or OFF to state that it is not.

The following events may be logged:

Type No.	Event
1	Logging enabled.
2	Job initiation.
3	Job termination.
4	Process termination.
5	File close.
6	System shutdown.
7	Power failure.
8	Spooling log record.
9	Line disconnection.
10	Line close.
11	I/O error.
12	Physical mount/dismount log record.
13	Logical mount/dismount log record.
14	Tape labels log record.
15	Console log record.
16	Program file event.
17	Call process signals.
18	DCE provided information.
19	System Software Tracer
36	Restore
37	Printer Access Failure
38	ACD Changes
39	Stream Initiation
40	User Logging
41	Process Initiation
*42	Security Configuration Changes
*44	File open logging.
*45	Command access.

*Displayed only if HP Security Monitor (HP 30392) has been installed.

NOTE

For software release G.00.00, event 1 must be ON for any logging to take place. Turning event 1 OFF will disable all types except 11. Event 11 is always enabled. Requests to disable this type will be ignored.

Step 115 is repeated until a RETURN is entered.

Log record types 46 and 47 are not configurable, and are always ON. SYSDUMP does not list them.

116 LIST LOGGING STATUS?

To list the updated logging status, respond with YES. To suppress the listing, enter NO. A NO response returns you to Step 114.

117 Prior to G.01.00: LOG FILE RECORD SIZE (SECTORS) = *XX*?

G.01.00 or later: LOG FILE RECORD SIZE(SECTORS) = <*X*> (MIN=1, MAX=8)?

To change the value of the log file physical record size, enter the number of sectors desired. This number determines the size of the buffer for entries in the log file. (A sector is equal to 128 words.)

To retain the current value, respond with a (RETURN).

118 Prior to G.01.00: LOG FILE SIZE (RECORDS) = *XXXX*?

G.01.00 or later: LOG FILE SIZE (RECORDS) = <*XXXXX*>
(MIN=16, MAX=32767)?

To change the maximum number of physical records permitted in the log file, enter a new value. The log file has 16 extents, so each extent will contain:

[(*log file size*/16) * (*log file record size*)] = sectors of disc space.

To retain the present value, enter a RETURN.

Disc Allocation Changes

The question "DISC ALLOCATION CHANGES?" is the fifth level-one question of the SYSDUMP Program. If you answer no to this prompt, you will skip to the next level-one question, "SCHEDULING CHANGES?" (Step 133). If you answer yes, the following level-two questions will appear:

```
MAX DIRECTORY SIZE (SECTORS) = 5000 (MIN=4311, MAX=65000, USED=2508)?
LIST VOLUME TABLE?
DELETE VOLUME?
ADD VOLUME?
LIST VOLUME TABLE?
VIRTUAL MEMORY CHANGES?
MAX # OF SPOOLFILE KILOSECTORS = 1024 (MIN=0, MAX=777777)?
# OF SECTORS PER SPOOLFILE EXTENT = 2048 (MIN=128, MAX=32764)?
```

Step Number **Dialog**

119 DISC ALLOCATION CHANGES?

To bypass these changes, enter NO or RETURN and skip to "Scheduling Changes" (Step 133).

To prepare your system for making disc allocation changes, enter YES and continue with the next step.

120 Prior to G.01.00: DIRECTORY USED = *YYYY*, MIN = *ZZZZ*, MAX = *XXXX*?

G.01.00 or later: MAX DIRECTORY SIZE (SECTORS) = *XXXX*
(MIN=*ZZZZ*, MAX=65000, USED=*YYYY*)?

To change the maximum size of the directory from *XXXX* sectors, enter the new value; *YYYY* specifies the amount of directory currently used; *ZZZZ* specifies the minimum value to which *XXXX* can be set. (*ZZZZ* will often be greater than *YYYY* due to unused areas that are not at the end of the space allotted to the directory.) Maximum size cannot exceed 65,000 sectors.

To retain the present maximum size, enter a RETURN.

CAUTION

Changes made to the directory size will only become effective on a RELOAD from the tape produced by the SYSDUMP Program.

121 LIST VOLUME TABLE?

To list the disc volumes and their currently-assigned logical device numbers, enter YES.

The listing is printed in the following format:

VOLUME#	NAME	LOG DEV#
volnumber	*volname*	*ldev*
.	.	.
.	.	.
.	.	.

In this listing, *volname* is a name of up to eight alphanumeric characters, beginning with an alphabet, identifying the volume; *ldev* is the logical device number assigned to that volume.

To suppress this listing, enter NO.

NOTE

Volume table changes take effect during RELOAD only. If you are planning to load this SYSDUMP onto a machine with fewer discs, you must delete the extra volumes now.

122 DELETE VOLUME?

To prepare to delete a volume, enter YES. To bypass deletion and skip to Step 124, enter NO.

123 ENTER VOLUME NAME?

To delete a volume, enter the volume name. (When the name is entered, the question is repeated.) Otherwise, enter RETURN.

124 ADD VOLUME?

To prepare to add a volume, enter YES. To bypass addition and and skip to Step 126, enter NO.

125 ENTER VOLUME NAME

To add a volume, enter the volume name. (When the name is entered, the question is repeated.) Otherwise, enter RETURN.

126 LIST VOLUME TABLE?

To list the disc volumes and their currently assigned logical device numbers (as in Step 121), enter YES. In this listing, volumes just added (Step 124) will have logical device numbers of zero. To suppress this listing, enter NO.

127 VIRTUAL MEMORY CHANGES?

To change the allocation of disc space used for virtual memory, enter YES. To retain the current allocation, enter (RETURN). Dialog skips to Step 131.

Changes made in SYSDUMP to the virtual memory allocation for LDEV 1 (the system disc) will only take effect on a RELOAD. Allocation changes for other discs will take effect on a COLDSTART, UPDATE or RELOAD.

128 Prior to G.01.00: LIST VIRTUAL MEMORY ALLOCATION?

G.01.00 or later: LIST VIRTUAL MEMORY DEVICE ALLOCATION?

To list the disc volume, logical device number, and virtual memory allocation, enter YES. To suppress listing, enter a (RETURN). The listing is printed in the following format:

```
VOLUME NAME        LDEV#          VM ALLOCATION
MH7920U0           1              10
```

129 Prior to G.02.00: ENTER VOLUME, SIZE IN KILOSECTORS?

G.02.00: ENTER VOLUME, SIZE IN KILOSECTORS (MAX=255)?

Enter volume name or logical device number, a comma (,), and the size (in kilosectors). If an incorrect value is specified, you will receive an error message telling you to enter another value. The same question, ENTER VOLUME, SIZE IN KILOSECTORS, will reappear.

CAUTION

If you are on MPE version G.00.00 or later, you may need to configure at least four kilosectors of virtual memory space on logical device 1. It is, however, a legal input to configure one kilosector of virtual memory space on this device, due to the complexity of different system configurations.

130 VIRTUAL MEMORY CHANGES?

Enter a YES. to loop back to Step 128. Enter a (RETURN) to continue dialog.

131 Prior to G.01.00: MAX# OF SPOOLFILES KILOSECTORS=*XXXXX*?

G.01.00 or later: MAX # OF SPOOLFILE KILOSECTORS = <*XXX*>
(MIN=0, MAX=777777)?

To change to maximum number of sectors (expressed in thousands of sectors) which can be allocated to spool files, enter new value.

The retain the current limit, enter a (RETURN).

132 Prior to G.01.00: # OF SECTORS PER SPOOLFILE EXTENT = *XXXXX*?

G.01.00 or later: # OF SECTORS PER SPOOLFILE EXTENT = <*XXXXX*> (MIN=128, MAX=32764)?

Enter the size for each spool file extent (must be between 128 and 32,767 sectors).

Scheduling Changes

The question "SCHEDULING CHANGES?" is the sixth level-one question of the SYSDUMP Program. There are no level-two questions for this prompt.

Step Number **Dialog**

133 SCHEDULING CHANGES?

This heading preserved to eliminate the need to alter batch job headings.

Subheading reserved for future use.

NOTE

Scheduling changes are accomplished only by use of the :TUNE command.

Segment Limit Changes

The question "SEGMENT LIMIT CHANGES?" is the seventh level-one question of the SYSDUMP Program. If you answer no to this prompt, you will skip to the next level-one question, "SYSTEM PROGRAM CHANGES?" (Step 142). If you answer yes, the following level-two questions will appear:

```
MAX # OF CONCURRENT RUNNING PROGRAMS = 127 (MIN=1, MAX=511)?
MAX CODE SEGMENT SIZE = 16384 (MIN=1024, MAX=16384)?
MAX # OF SEGMENTS/PROCESS = 63 (MIN=1, MAX=255)?
MAX STACK SIZE = 31232 (MIN=256, MAX=31232)?
MAX EXTRA DATA SEGMENT SIZE = 32764 (MIN=0, MAX=32764)?
MAX # OF EXTRA DATA SEGMENTS/PROCESS = 255 (MIN=0, MAX=255)?
STD STACK SIZE = 1200 (MIN=256, MAX=4096)?
```

Step Number	Dialog
134	SEGMENT LIMIT CHANGES? To bypass these changes, enter NO or (RETURN) and skip to "System Program Changes" (Step 142). To prepare your system for making changes to the limits on code and data segments, enter YES and continue with the next step.
135	Prior to G.01.00: MAX # OF CONCURRENT RUNNING PROGRAMS=*XXX*? G.01.00 or later: MAX # OF CONCURRENT RUNNING PROGRAMS = <*XXX*> (MIN=1, MAX=511)? This parameter is often referred to as "CST Block Table." To change the maximum number of concurrently running programs from *XXX*, enter the new value. To retain the current value, enter a (RETURN).
136	Prior to G.01.00: MAX CODE SEGMENT SIZE=*XXXXX*? G.01.00 or later: MAX CODE SEGMENT SIZE = <*XXXXX*> (MIN=1024, MAX=16384)? To change the maximum number of words allowed in any code segment from *XXXXX*, enter the new value. To retain the current value, enter a (RETURN).
137	Prior to G.01.00: MAX # OF SEGMENTS/PROCESS = *XX*? G.01.00 or later: MAX # OF SEGMENTS/PROCESS = <*XX*> (MIN=1, MAX=255)? To change the maximum number of code segments allowed any user process, enter the new value. To retain the current value, enter NO.
138	Prior to G.01.00: MAX STACK SIZE = *XXXXX*? G.01.00 or later: MAX STACK SIZE = <*XXXXX*> (MIN=256, MAX=31232)? To change the maximum number of words allowed in any user stack from *XXXXX*, enter the new value. (A maximum value of 31,232 is permitted.) To retain the current value, enter a (RETURN).

139 Prior to G.01.00: MAX EXTRA DATA SEGMENT SIZE = *XXXXX*?

G.01.00 or later: MAX EXTRA DATA SEGMENT SIZE= <*XXXXX*> (MIN=0, MAX=32764)?

To change the maximum number of words allowed in any extra data segment from *XXXXX*, enter the new value. New value must be divisible by 4 without a remainder.

To retain the current value, enter a (RETURN).

140 Prior to G.01.00: MAX # OF EXTRA DATA SEGMENTS/PROCESS = *XXX*?

G.01.00 or later: MAX # OF EXTRA DATA SEGMENTS/PROCESS = <*XXX*> (MIN=0, MAX=255)?

To change the maximum number of extra data segments that a process can have, enter the new value.

To retain the current value, enter a (RETURN).

141 Prior to G.01.00: STD STACK SIZE = *XXXX*?

G.01.00 or later: STD STACK SIZE= <*XXXX*> (MIN=256, MAX=4096)?

To change the number of words initially assigned for a user stack (Z-QI area) by default (when the user specifies no value) at preparation time from *XXXX*, enter the new value.

To retain the current value, enter a (RETURN).

System Program Changes

The question "SYSTEM PROGRAM CHANGES?" is the eighth level-one question of the SYSDUMP Program. If you answer no to this prompt, you will skip to the last level-one question, "SYSTEM SL CHANGES?" (Step 144). If you answer yes, the following level-two question will appear:

```
ENTER PROGRAM NAME , REPLACEMENT FILE NAME?
```

Step Number **Dialog**

142 SYSTEM PROGRAM CHANGES?

To bypass these changes, enter NO or (RETURN) and skip to "System SL Changes" (Step 144).

To prepare your system to replace a program belonging to the system, enter YES and continue with the next step.

143 ENTER PROGRAM NAME, REPLACEMENT FILE NAME?

To replace a program belonging to the system, enter the name of the program, a delimiting comma, and the name of the program file which is to replace the program. The replacement program need not be in the public group of the system account, PUB.SYS. However, a fully qualified program file name will be required if the program file is not in the logon account/group structure.

The question is repeated until a (RETURN) is entered.

System SL Changes

The question "SYSTEM SL CHANGES?" is the last level-one question of the SYSDUMP Program. If you answer no to this prompt, you will skip to "ENTER DUMP DATE?" (Step 153) under the heading entitled "Terminating the SYSDUMP Program". If you answer yes, the following level-two questions will appear:

```
LIST LIBRARY?
DELETE SEGMENT?
REPLACE SEGMENT?
ADD SEGMENT?
LIST LIBRARY?
```

Step Number **Dialog**

144 SYSTEM SL CHANGES?

To bypass these changes, enter NO or (RETURN) and skip to "Terminating the SYSDUMP Program" (Step 153).

To prepare your system for making changes to the system Segmented Library (SL.PUB.SYS) enter YES and continue with the next step.

145 LIST LIBRARY?

To list the names of the code segments in the system Segmented Library and their entry points and external procedures, enter YES.

NOTE

The list is extremely long. To suppress this listing, enter NO.

146 DELETE SEGMENT?

To prepare for deleting a code segment from the system Segmented Library (SL.PUB.SYS), enter YES.

To proceed directly to Step 148, enter NO.

147 ENTER SEGMENT NAME?

To delete a code segment from the system Segmented Library, enter the name of that segment. (When the segment name is entered, the question is repeated.)

Otherwise, enter a (RETURN).

148 REPLACE SEGMENT?

To prepare for replacing a code segment in the system Segmented Library, enter YES.

To proceed directly to Step 150, enter NO.

149 ENTER SEGMENT NAME, USLFILE NAME [,S/C/P]?

To replace a code segment in the System Segmented Library, enter the name of the segment; a delimiting comma, and the name of the USL file where the replacement segment can be found. Also, optionally, enter a delimiting comma followed by one of these indicators:

None Segment is placed in the library as a user segment, but is not permanently allocated.

P To declare the segment to be a permanently allocated user segment. This option requests the same function as the :ALLOCATE command, defined in the Commands Reference Manual (32033-90006).

S To declare the segment to be a permanently allocated system intrinsic segment (in virtual memory).

C To declare the segment to be a Core Resident system intrinsic segment.

The question is repeated until a (RETURN) is entered.

To proceed without replacing a code segment, enter a (RETURN).

NOTE

If you incorrectly enter a USL file name, an error message results and the SYSDUMP Program proceeds back to Step 146. The segment which was to have been replaced has, in fact, been deleted. You may proceed to Step 150 and attempt to add the USL file.

150 ADD SEGMENT?

To prepare for adding a code segment to the system Segmented Library, enter YES.

Otherwise, enter NO to skip to Step 152.

151 ENTER SEGMENT NAME, USLFILE NAME [,S/C/P]?

To add a code segment to the system Segmented Library, enter the name of the segment; a delimiting comma, the name of the USL file where the segment can be found. Also, optionally, enter a delimiting comma followed by one of these indicators:

None Segment is placed in the library as a user segment, but is not permanently allocated.

P To declare the segment to be a permanently allocated user segment, in virtual memory. This option requests the same function as the :ALLOCATE command, defined in the Commands Reference Manual (32033-90006).

S To declare the segment to be a permanently allocated system intrinsic segment, in virtual memory.

C To declare the segment to be a Core Resident system intrinsic segment.

The question is repeated until a (RETURN) is entered.

Otherwise, enter a (RETURN).

NOTE

If you enter a USL file name which is in error (any error), an error message results and the SYSDUMP Program proceeds back to Step 146.

152 LIST LIBRARY?

To list the updated system Segmented Library, enter YES.

NOTE

The list is extremely long. To suppress this listing, enter NO.

Terminating the SYSDUMP Program

You are now at the end of the SYSDUMP Program; the point at which you arrive after either making system configuration changes or bypassing the changes. It is time to create your serial storage media. If you have just made any system configuration changes, they will be copied onto the storage media, along with other information.

Step Number **Dialog**

153 ENTER DUMP DATE?

Much of what will soon be copied onto your serial storage media depends on your response to this question. There are four possible responses, each allowing you to copy something different:

- (RETURN) (and nothing else). This response copies MPE, the I/O configuration, parameter settings, and any changes you may have just made in the SYSDUMP Program.

  The serial storage media created with this response can be used to load configuration changes and new parameter settings onto the system during a COLDLOAD

  If you enter a (RETURN), skip to Step 156.

- A Future Date. This response copies MPE, the I/O configuration, the system parameter settings, any changes you may have just made in the SYSDUMP Program, and the current accounting structure and directory (not including any user files). (Enter any future date in the *mm/dd/yy* format; the date *1/1/99* is commonly used.)

  The serial storage media created with this response can be used to transfer your configuration onto another system.

  If you enter a future date, proceed to the next step.

- A Past Date. This response copies MPE, the I/O configuration, the system parameter settings, any changes you may have just made in the SYSDUMP Program, the current accounting structure and directory, and any user files that were created or modified on or after the past date. (Enter a past date in the *mm/dd/yy* format.)

  The serial storage media created with this response can be used in conjunction with other media to RELOAD the system. The media can also be used to retrieve one or more files by using the :RESTORE command.

  If you enter a past date, proceed to the next step.

- 0. This response copies MPE, the I/O configuration, the system parameter settings, any changes you may have just made in the SYSDUMP Program, the current accounting structure and directory, and all user files.

  The serial storage media created with this response can be used to RELOAD the system. The media can also be used to retrieve one or more files by using the :RESTORE command.

  If you enter a 0, proceed to the next step.

154 ENTER DUMP FILE SUBSET(S)?

This question will appear if you entered a future date, a past date, or a "0" in your response to the previous question, ENTER DUMP DATE?.

Of the files delineated in your previous response, you must now specify which ones to copy onto the serial storage media. (For example, if your previous response was a past date, you must now specify which of the files created or modified on or after that date that you want to copy; if your previous response was a 0, you must now specify which of the files on the entire system that you want to copy.)

You may copy all system and user files or a subset of files. The files are entered the same as the *fileset* positional parameter of the :STORE command (refer to the :STORE command in the Commands Reference Manual (32033-90006)). The :STORE command options (SHOW, FILES, DATE, and ONERROR, Indirect Files, and Fileset Exclusion) are also available for use. The *storefile* parameter is the only :STORE command parameter not available for use with the SYSDUMP Program.

To copy all system and user files, enter @.@.@ (RETURN)). The SYSDUMP Program will copy the system, the account, group, user, and file structure, as well as all the files on the system.

To copy ACDs associated with files, use the COPYACD parameter when you specify the files (i.e. @.@.@;COPYACD). For information on ACDs refer to the *MPE V/E Security and Account Structure Manual* (32033-90136).

To copy only specific files, you must enter file subsets (for example, @.PUB.SYS). The SYSDUMP Program has a limit of 240 characters in which to specify dump file subsets. For a file subset that requires more than a 240-character description, use indirect files.

NOTE

To run the SYSDUMP Program in a job stream using indirect files, insert a blank in column one to avoid getting an end-of-file on $STDIN.

File subsets may be continued on a new line by entering an ampersand (&) as the last nonblank character of the present line. Be sure to enter the ampersand before you get to column 73. A *fileset* may not be divided between two lines. The total number of lines that may be entered is determined by the amount of available stack space remaining. If the total space is exceeded, the SYSDUMP Program will terminate with the message UNABLE TO OBTAIN STACK SPACE.

Looking at an example, you may enter the following:

```
@.@.@; FILES=20000
```

Here, the FILES option is used to raise the number of files that you can dump with the SYSDUMP Program. If this option is not used, the default number of files that you can dump is 16,000 (if this option is used with the :STORE command, the default is 4,000).

155 LIST FILES DUMPED?

Like the previous question, this question will appear if you entered a future date, a past date, or a "0" in your response to the question ENTER DUMP DATE?.

To obtain a list showing the name of each file copied, enter YES. To suppress this list, enter NO.

NOTE

Answering YES is the same as using the SHOW option in your response to the previous question.

The optional *listfile* parameter of the :SYSDUMP command is useful to direct the list to a high speed printing device when it is known that a great many files exist in the system. A list showing the number (count) of files copied, the number of files not copied, the names of the files not copied, and the reasons why they were not copied is always provided.

156 This step marks the end of the SYSDUMP dialog; all that is left to do before the program terminates is to create the serial storage media and check your files listing.

With auto-reply enabled on your serial storage device, files immediately will begin to be stored onto your storage medium.

Without auto-reply enabled on your serial storage device, you will see a tape request on the Console. You must respond appropriately (for information on how to respond to tape requests, refer to the :REPLY command in the Commands Reference Manual (32033-90006)). As soon as you respond, information immediately should begin to be stored onto your serial storage medium.

If your MPE software version is G.01.00 or later, and if you specified that files should be copied onto the storage media during ENTER DUMP FILE SUBSET(S)?, progress messages will appear after approximately ten minutes.

In the event that your serial storage medium cannot hold any more information, a message will inform you, in which case you must continue with another tape.

When you are finished, ensure that your tapes are write-disabled, and label them.

157 If you entered a RETURN in your response to the question ENTER DUMP DATE?, the SYSDUMP Program will terminate with the following message:

```
NO FILES WERE FOUND TO STORE (S/R 47)

END OF SUBSYSTEM
:
```

If you entered a future date, a past date, or a "0" in your response to the question ENTER DUMP DATE?, the list and count of files will be provided, as described in Step 155.

Check the list of files not dumped for user files you want to save. Frequently the files LOADLIST, MEMLOG, SL, and LOG*XXX* are open when the SYSDUMP Program is running, so their names often appear on the list of files not dumped. By a special process, the SYSDUMP Program records the system file SL on the serial media, so it is saved. The other three files mentioned above are recreated from scratch by the INITIAL Program each time the system is started.

If any file belonging to the system is not copied, the following message will appear along with the reason it was not copied:

```
***WARNING*** FOLLOWING SYSTEM FILES NOT DUMPED
```

If the file was to replace a system program, the program name follows in parentheses.

The following message will appear when the SYSDUMP Program terminates:

```
END OF SUBSYSTEM
:
```

The tape just created with the SYSDUMP Program can now be loaded with the INITIAL Program.

Determining the Errors for a SYSDUMP Batch Job

Beginning with MPE version G.02.00, the SYSDUMP Program can inform you of any errors and warnings that may occur during a batch job. SYSDUMP does this by accepting messages from STORE, the process used to back up user files, and by setting the job control words JCW, CIERROR, and, most of the time, STOREJCW. (You can check these job control words with the :SHOWJCW command, which is discussed in the MPE V Commands Reference Manual (32033-90006).)

If errors are generated during a SYSDUMP batch job, the SYSDUMP Program will terminate with JCW set to FATAL0 and CIERROR set to 976. This holds true for any SYSDUMP error that may occur, with one exception. If a tape write error occurs on a SYSDUMP batch job that requires more than one volume, and if a volume subsequent to the first is mounted, JCW and CIERROR will not be set to their respective error values. The tape write error will, however, be reported; and if any actions are required, STORE will prompt you.

If warnings are generated during a SYSDUMP batch job, one of two things will happen. If the warning occurred during the backup of MPE, JCW will be set to WARN0, CIERROR will remain unaltered, and the warning message will be reported. If, on the other hand, the warning occurred during backup of user files, both JCW and CIERROR will remain unchanged, STOREJCW will be set to either 7 or 8, and a warning message will be reported. The SYSDUMP Program does not terminate during a warning.

The values JCW and CIERROR can now be used as error flags to determine whether or not the SYSDUMP batch job finishes successfully. Here is an example of how you may set error flags in a SYSDUMP batch job:

```
!JOB A
! *
! *
! *
! SETJCW JCW = 0
! SETJCW CIERROR = 0
! CONTINUE
!   SYSDUMP
    *
    *
    *
!    IF JCW = FATAL0 THEN
!      TELLOP   SYSDUMP HAS NOT RUN SUCCESSFULLY
!    ENDIF
!    IF JCW = WARN0 THEN
!      TELLOP   SYSDUMP HAS WARNING(S)
!    ELSE
!      TELLOP   SYSDUMP HAS NO WARNINGS
!    ENDIF
!EOJ
```

THE FIVE DIFFERENT KINDS OF SYSDUMPS

To understand the purpose of running the SYSDUMP Program, it is important to discuss the five different kinds SYSDUMPs that you can perform. Each kind of SYSDUMP copies something different to your serial storage media. (For example, one kind of SYSDUMP copies MPE, the I/O configration, the system parameter settings, and all changes made in the main portion of the program's dialog; while another kind of SYSDUMP copies MPE, the I/O configuration, the system parameter settings, the current accounting structure and directory, and all user files.)

Your response to two of the program's questions, ENTER DUMP DATE? (Step 153) and ENTER DUMP FILE SUBSET(S)? (Step 154), determines the kind of SYSDUMP that you perform. The following pages define the five different kinds of SYSDUMPs; for each SYSDUMP, you are shown how to respond to these two questions (and others of importance).

A Carriage Return SYSDUMP

A Carriage Return SYSDUMP is normally performed when you need to create serial storage media that contain configuration changes or new parameter settings. Once created, the media are loaded onto your system (via the COLDSTART option of the INITIAL Program) so that the changes take effect.

This kind of SYSDUMP copies MPE, the I/O configuration, the system parameter settings, and all changes made in the program's dialog prior to the question ENTER DUMP DATE?.

To perform a Carriage Return SYSDUMP, respond to the following questions as indicated:

Step Number	Dialog
1	ANY CHANGES? YES or NO If you answer YES, you will proceed through the main portion of the SYSDUMP dialog, which will eventually lead you to Step 153; if you answer NO, you will skip directly to Step 153.
153	ENTER DUMP DATE? (RETURN)

To complete the Carriage Return SYSDUMP, create your serial storage media (as described in Step 156).

A Future Date SYSDUMP

A Future Date SYSDUMP is normally performed when you need to create serial storage media that contain your configuration and accounting/directory information. Once created, the configuration and accounting/directory information on the media can be transferred onto another system (via the RELOAD option of the INITIAL Program).

This kind of SYSDUMP copies MPE, the I/O configuration, the system parameter settings, and the current accounting structure and directory (not including any user files). (A Future Date SYSDUMP normally does not contain configuration or parameter setting changes.)

To perform a Future Date SYSDUMP, respond to the following questions as indicated:

Step Number	Dialog
1	ANY CHANGES? NO
153	ENTER DUMP DATE? 1/1/99
154	ENTER DUMP FILE SUBSET(S)? NOFILES
155	LIST FILES DUMPED? NO

To complete the Future Date SYSDUMP, create your serial storage media (as described in Step 156).

A Partial Backup SYSDUMP

A Partial Backup SYSDUMP is normally performed when you need to create serial storage media that contain files created or modified since the last full backup. (It is the same as performing a partial backup with the :PARTBACKUP command, which is available on MPE software release G.01.00 or later.) Once created, the media can be loaded onto your system (via the RELOAD option of the INITIAL Program) to replace any lost files. If not all files are contained in the partial backup media, additional volumes will be requested from your full backup media until all files are restored. The media can also be used to retrieve one or more files (via the :RESTORE command).

This kind of SYSDUMP copies MPE, the I/O configuration, the system parameter settings, the current accounting structure and directory, and any user files that were created or modified on or after a particular date. (A Partial Backup SYSDUMP normally does not contain configuration or parameter setting changes.)

Refer to MPE V Backup and Recovery (32033-90134) for instructions for performing regular system backups. To perform a Partial Backup SYSDUMP, respond to the following questions as indicated:

Step Number **Dialog**

1 ANY CHANGES? NO

153 ENTER DUMP DATE? ** Enter the date of your last full backup **

Assume that on Friday, September 30, 1983, you did a full system backup, and on Monday, October 3, the users on the system created and modified many files. To copy all the files that were created or modified since the last full backup (i.e. the files created or modified on Monday, October 3), enter 9/30/83, the date on which the last full system and file backup was made.

NOTE

Writing to an existing file, creating a permanent file, and using the :RENAME command on a file constitutes changing (or adding) a modification date to the file label during the file close process. The process of reading or purging a file does not constitute a modification.

154 ENTER DUMPFILE SUBSET(S)? @.@.@ or RETURN

Entering @.@.@ will examine the modification dates of all files on the system. Only those files whose modification date is the same or later than the date entered in the previous step will be considered for saving.

155 LIST FILES DUMPED? YES

To complete the Partial Backup SYSDUMP, create your serial storage media (as described in Step 156), and check your files listing (as described in Step 157).

A Coldload SYSDUMP

A Coldload SYSDUMP is normally performed when you need to create serial storage media that contain everything on your system except user files. Once created, the media can be used to start the system (via the COLDSTART option of the INITIAL Program) in the event of a system failure.

This kind of SYSDUMP copies MPE, the I/O configuration, the system parameter settings, the current accounting structure and directory, all changes made in the program's dialog prior to the question ENTER DUMP DATE?, and all files in @.PUB.SYS.

To perform a Coldload SYSDUMP, respond to the following questions as indicated:

Step Number	Dialog
1	ANY CHANGES? YES or NO If you answer YES, you will proceed through the main portion of the SYSDUMP dialog, which will eventually lead you to Step 153; if you answer NO, you will skip directly to Step 153.
153	ENTER DUMP DATE? 0
154	ENTER DUMPFILE SUBSET(S)? @.PUB.SYS
155	LIST FILES DUMPED? YES

To complete the Cold Load SYSDUMP, create your serial storage media (as described in Step 156), and check your files listing (as described in Step 157).

A Full Backup SYSDUMP

A Full Backup SYSDUMP is normally performed when you need to create serial storage media that contain all files on your system. (It is the same as performing a full backup with the the :FULLBACKUP command, which is available on MPE software release G.01.00 or later.) Once created, the media can be loaded onto your system (via the RELOAD option of the INITIAL Program) to replace all files. The media can also be used to retrieve one or more files (via the :RESTORE command).

This kind of SYSDUMP copies MPE, the I/O configuration, the system parameter settings, the current accounting structure and directory, and all user files. (A Full Backup SYSDUMP normally does not contain configuration or parameter setting changes.)

For instructions for performing a system backup, refer to MPE V Backup and Recovery (32033-90134). To perform a Full Backup SYSDUMP, respond to the following questions as indicated:

Step Number	Dialog
1	ANY CHANGES? NO
153	ENTER DUMP DATE? 0
154	ENTER DUMPFILE SUBSET(S)? @.@.@,@.@.*accountname*,...@.@.@
155	LIST FILES DUMPED? YES

This procedure creates a complete copy of the system, in which files are stored in their order of importance. Entering @.@.@ as the dumpfile subset stores files in the alphabetic order of accounts. Storing files in order of importance causes important files to be unlocked earlier, allowing users access to important files before SYSDUMP is complete. The procedure above is equivalent to the :FULLBACKUP command, except :FULLBACKUP does not let you store files in order of importance (refer to the MPE V/E Commands Reference Manual (32033-90006)).

To complete the Full Backup SYSDUMP, create your serial storage media (as described in Step 156), and check your files listing (as described in Step 157).

INTRODUCTION TO THE INITIAL PROGRAM

Another way to modify system parameters and tune the performance of your system is with the INITIAL Program, also called the MPE Initiator. This program, like the SYSDUMP Program, resembles a dialog with a series of predetermined questions and statements. By answering the questions, you can make changes to your computer system.

Although the INITIAL Program is somewhat similar to the SYSDUMP Program, there are some major differences:

- The MPE Initiator is a stand-alone program. It not only enables you to make modifications to your system, but it also enables you to start the software on your computer system. The program itself contains five subprograms. Depending on which of the subprograms you start your system with, a subset of the INITIAL Program is loaded into memory from disc, from serial storage media, or from both. The INITIAL Program is brought into memory for execution via the Initial Program Loader (IPL).

- Modifications made to MPE during the INITIAL dialog take effect as soon as the system is started.

- Any person with access to the System Console can turn the system power on and off, start up MPE, alter the current input/output device configuration, and shut down the system. This person need not have System Manager or System Supervisor capability, or even standard user capability. In fact, there is no need to even log onto the system.

THE FIVE DIFFERENT KINDS OF SYSTEM STARTUPS

The five INITIAL subprograms for starting your system are: WARMSTART, COOLSTART, UPDATE, COLDSTART, and RELOAD. A subset of the INITIAL Program is loaded into memory from the system disc during a WARMSTART or a COOLSTART. A subset of the INITIAL Program is loaded from serial storage media during an UPDATE, a COLDSTART, or a RELOAD.

Starting from Disc: WARMSTART

This startup option of the INITIAL Program loads the system from the system disc. This procedure is used if incompletely processed spooled jobs and spooled files need to be recovered, or if user logging was in operation. Spool files found in the system are deleted with any other startup option. WARMSTART is the only startup option that does not allow you to alter the current I/O configuration.

If a WARMSTART does not complete for any reason, it must be followed by a COOLSTART or a COLDSTART.

Starting from Disc: COOLSTART

This startup option of the INITIAL Program loads the system from the system disc. This is the standard operating procedure when a system is routinely shut down at night and brought up the next day. All permanent user files (including programs such as FORTRAN/3000, COBOL/3000, SPL/3000 and EDIT/3000 that run as MPE subsystems) are saved; but the operational environment present

prior to the last shutdown is not retained. Thus, all jobs and sessions in progress at the previous shutdown are lost.

If a COOLSTART does not complete for any reason, it must be followed by another COOLSTART or a COLDSTART. Any violation of this causes an error message and a halt.

Starting from Serial Storage Media: UPDATE

This startup option of the INITIAL Program loads the system from tape or serial disc. The system files come from the serial storage media while the I/O device configuration, directory, accounting information and global RINs come from the system disc (user's files remain undisturbed). This is the standard operating procedure when starting the system with an updated MPE tape from Hewlett-Packard or an MPE tape prepared for a different HP 3000 Computer System; an UPDATE should be used only in those situations.

If an UPDATE does not complete for any reason, it must be followed by another UPDATE, a COLDSTART, or a RELOAD. Any violation of this causes an error message and a halt.

Starting from Serial Storage Media: COLDSTART

This startup option of the INITIAL Program loads the system from tape or serial disc. The system files and I/O configuration come from the serial storage media, while the user files, directory, accounting information, assigned resource identification numbers (global RINs) are retained current on the system disc. This allows modification of the system configuration while retaining user information. COLDSTART is commonly used to allow an installation to keep several cold load tapes or discs, each with a different configuration. If you previously copied system changes onto serial storage media with the SYSDUMP Program, you must now perform a COLDSTART to load the changes onto your system.

If a COLDSTART does not complete for any reason, it must be followed by another COLDSTART, an UPDATE, or a RELOAD. Any violation of this causes an error message and a halt.

Starting from Serial Storage Media: RELOAD

This startup option of the INITIAL Program loads the entire system, including all user and system files and I/O configuration information, from the backup media. This option assumes that there is no valid information on the system disc. If any user files are dumped on the backup media, the directory, accounting information, assigned global RINs and user files may be restored to the disc from the backup copy. If the accounting structure was not dumped, a directory is created with the SYS account, the PUB group, and the MANAGER user. RELOAD is normally the method used to install the first MPE system supplied by Hewlett Packard. It is also used when restoring the system (from a tape or serial disc generated by the user through a :SYSDUMP command) following a disc crash. Files belonging to the nonsystem domain (private volumes) are not restored during a RELOAD.

When reloading from multiple volumes of tapes or serial discs that were created by the :SYSDUMP command, the first volume of the latest backup copy should be used initially because it contains the most up-to-date directory and accounting information. If not all of the files on the system are contained in this volume, additional volume(s) will be requested.

When the system is started with RELOAD, the initialization of blank system disc packs, the writing of labels for them, and the renaming of volumes, is accomplished by the INITIAL Program. The

formatting of blank disc packs is done by a diagnostic program (SLEUTHSM) which is part of the Diagnostic Utility System (DUS), rather than by the INITIAL Program.

If a RELOAD does not complete for any reason, it must be followed by another RELOAD.

RUNNING THE INITIAL PROGRAM

The following pages explain how to start and modify your system with the INITIAL Program.

Here is some information that will help you to communicate with the INITIAL Program as you proceed through the dialog:

- The INITIAL Program asks three kinds of questions: those that require an affirmative or negative response, those that require you to enter a value, or those that require you to enter a name. Usually, the content of the question indicates the type of response.
- To questions requiring an affirmative or negative response, you can answer with an affirmative YES, Y, or y, or a negative NO, N, n, or (RETURN).
- To questions requiring that you enter a value, you can change the old value by entering a new value, or you can keep the existing value by pressing (RETURN).
- Always conclude all of your answers with a (RETURN). This transmits your response to MPE.

CAUTION

The INITIAL Program should never be halted. If error recovery is not possible, the program should be allowed to complete; that is, run until the request for DATE? appears. If the program is halted before it completes, a RELOAD may be required.

Beginning the INITIAL Program

WARMSTART and COOLSTART, which start your system from disc, are initiated as follows:

- On the Series 37/MICRO 3000/MICRO 3000XE: Perform an automatic WARMSTART (if enabled), or enter the START command in the Control-B Mode. (You may also enter the WARMSTART or COOLSTART commands in the Control-B Mode, which is the same as performing a WARMSTART or COOLSTART without dialog.)
- On the Series 39/40/42/44/48/52/58: Enter the CMP START command in the Control-B Mode, or press the START button on the System Control Panel.
- On the Series 64/68/70: Enter the DCU START command in the Control-B Mode.

If necessary, refer to Section XI for the specifics on how to start your system. The dialog begins in Step 0.

UPDATE, COLDSTART, and RELOAD, which start your system from serial storage media, are initiated by first mounting (or inserting) the serial storage media that you are loading onto the system, and if necessary, putting the storage device online. Then you must complete the following:

- On the Series 37/MICRO 3000/MICRO 3000XE: Enter the LOAD command in the Control-B Mode. (You may also enter the UPDATE, COLDSTART, or RELOAD commands in the Control-B Mode, which is the same as performing an UPDATE, COLDSTART, or RELOAD (SPREAD option) without dialog.)
- On the Series 39/40/42/44/48/52/58: Enter the CMP LOAD command in the Control-B Mode, or press the LOAD button on the System Control Panel.
- On the Series 64/68/70: Enter the DCU LOAD command in the Control-B Mode.

If necessary, refer to Section XI for the specifics on how to start your system. The dialog begins in Step 0.1.

NOTE

The INITIAL dialog is similar to the SYSDUMP dialog, described previously, and is only explained in detail where the two operations differ.

The steps of the INITIAL dialog are numbered so that you can easily reference the appropriate text. The step numbers will not be displayed on the System Console.

NOTE

Once the INITIAL Program is started, an interactive dialog will be displayed on the Console. If the Console is NOT a Hewlett-Packard terminal, it is necessary to press RETURN to begin the dialog.

Step Number	Dialog
0	WHICH OPTION <WARMSTART/COOLSTART>?

Enter the desired option.

Only the first 3 characters of the option are required, for example WAR or COO. If WARMSTART is selected, the system will recover certain input and all output spool files, spooled jobs that have not yet been started, and partially complete jobs remaining in the system from before the system was halted. The spool files recovered are available for further processing. Spooled jobs (i.e., those with spooled job input files) which were executing at the time of interruption will be recovered in the waiting state, if RESTART was specified in the :JOB command.

All waiting spooled jobs are also recovered. Some spoolfiles may be damaged if a crash occurred. MPE will defer all recovered jobs and output spoolfiles by establishing job and output fences of 14. (A job or output spool file whose priority is at or below the appropriate fence is said to be deferred.)

If the System Operator specifies the WARMSTART load option, spool file recovery is initiated. All output spoolfiles are placed in the READY state, even if they were OPENED or ACTIVE when the interruption occurred. The output fence is set to 14, thereby deferring all output spoolfiles.

READY input spoolfiles and spooled WAITING jobs are also recovered. In order to recover certain EXECUTING jobs, you may specify the ;RESTART parameter in the :JOB command. A job input spool file for a nonrestartable job which was executing when the interruption occurred will not be recovered; nor will any :DATA spool files opened by such a job be recovered. All other input spool files opened at the time of interruption will be placed in the READY state, completely recovered. Input spool files which were being created (i.e., were ACTIVE) when the interruption occurred can not be recovered and are automatically deleted during a WARMSTART. The job fence is set to 14, thereby deferring all jobs not specified as HIPRI.

These actions are summarized below.

Input Spoolfiles:

Interrupted State	**WARMSTART Action**
ACTIVE	Deleted
READY	READY (no change)
OPENED, not ;RESTART	Deleted
OPENED, ;RESTART	READY (complete)

Output Spoolfiles:

Interrupted State	**WARMSTART Action**
OPENED	READY (incomplete)
READY	READY (no change)
ACTIVE (single, or last copy)	READY (remaining extents)
ACTIVE (*m* out of *n* fully copied)	READY (make *n*-*m* full copies)

Note, however, that recovered HIPRI jobs will start immediately; and that HIPRI jobs/sessions can be submitted and processed.

When the WARMSTART option is selected, the configuration changes portion of the initiator dialog is skipped (i.e., Steps 1 through 72 and Steps 75 through 124).

If COOLSTART is selected, skip to Step 1.

If WARMSTART is selected, skip to Step 3.1.

0.1 WHICH OPTION <COLDSTART/RELOAD/UPDATE>?

Enter the option desired. Note that only the first three characters of the option are required to be input; for example COL, REL, or UPD may be entered for COLDSTART, RELOAD, or UPDATE, respectively. All existing spoolfiles will be deleted. If RELOAD is chosen and the directory exists on the input medium, the INITIAL Program proceeds to Step 0.2. If no directory is present, the dialog skips to Step 0.3.

NOTE

Files belonging to nonsystem domain (private) volume sets are not restored during RELOAD.

If COLDSTART is selected, the dialog skips to Step 1. If UPDATE is selected, the following question is asked:

```
SYSTEM DISC DRT = nn
```

The default *nn* is, 33 for Series 37; 89 for Series 39/40/42/44/48/52/58; and 25 for Series 64/68/70.

If the system disc DRT number is not the same as indicated here, enter the correct DRT number.

If the DRT number is correct, enter (RETURN).

The INITIAL Program checks the system volume table to ensure that the system disc is mounted on *ldev* 1. If the system disc is not mounted on *ldev* 1 and the system disc is a serial disc, the INITIAL Program prompts with the questions:

```
**WARNING** SYSTEM DISC AND COLD LOAD DEVICE ARE ON SAME DRT
SYSTEM DISC MUST BE ONLY UNIT ZERO ON THIS DRT MAKE DISC UNIT #
CHANGE NOW
READY?
NEW SERIAL DISC UNIT#?
```

Before you respond to the prompts:

- Set the *ldev n* to the correct unit number, according to the I/O configuration.
- Set the unit number of *ldev* 1 to "0".
- Reply YES to the READY prompt and reply with the new unit number of *ldev n*.

The dialog then skips to Step 1.

0.2 `WHICH OPTION <SPREAD/COMPACT/RESTORE/ACCOUNTS/NULL>?`

Enter the desired RELOAD option, as described below. Entering (RETURN) is the same as SPREAD. The dialog skips to Step 1.

These options select the algorithm used to determine on which disc a file is placed during RELOAD, and whether the account, group, user structure is to be placed into the appropriate directory area, as follows:

SPREAD — MPE attempts to put the files back on a disc in the same device class where they were originally created. If this fails, an

attempt is made to replace the files on a disc of the same type and subtype on which they were previously located (e.g., a cartridge disc). If this fails, an attempt is made to put them on a disc of the same type (e.g., a moving head disc). If this fails, an attempt is made to put the file on any disc, in device class DISC. If this fails, a message is printed and the file is not reloaded. In each of these attempts, the files are spread among similar discs, if possible. For example, if when the system was dumped there was one cartridge disc which was full, and when it is reloaded there are now two cartridge discs, each will contain one half of the files. The advantages to SPREAD are that disc seeking is reduced since files are spread out; and fragmentation is reduced because the disc is repacked. The disadvantage is that if the discs are nearly full it may not be possible to get all files that were previously on the discs back. This situation will be encountered very rarely, and when it is, one of the other options may be used.

COMPACT — MPE attempts to place the files back on the same volume from which they came. If this fails, the SPREAD option is used. The major advantage of COMPACT is that if there are no new deleted tracks and the same discs are used, reloading of the system is guaranteed, no matter how full the discs are. In addition, each disc is compacted within the area between deleted tracks (if there are n deleted tracks, there will be at most $(n+1)$ fragments). The disadvantage is that the loading of the discs may be unequal.

RESTORE — MPE attempts to place the files back on the same volume at the same locations from which they came. If this fails, MPE attempts to place the files anywhere on the volumes from which they came. If this fails, the SPREAD option is used. The advantages to RESTORE are that it offers the same guarantee made in COMPACT for reloading the system, and that the same files that were previously using alternate tracks are still using them. The disadvantage is that no compacting of the discs is done so that the same fragmentation still exists. In addition, if there is a defective sector found during RESTORE, the process will take much longer, since it will still attempt to restore every file to a location.

ACCOUNTS — This option loads the system, creates a directory from the input media, and loads the system files which reside in the PUB group of the SYS account. No user files are loaded onto the system.

The directory which is created will consist of all accounts, groups, and user structures which were current at the time the tape or serial disc was written by the SYSDUMP Program.

This option is useful because files saved on the input media by the SYSDUMP Program are compatible with files stored using the STORE command. In this way you would, for example:

1. Create a new directory structure if the previous directory was destroyed.

2. Conserve vital disc space by selectively loading files into certain accounts with the :RESTORE command after the system is operational.

NULL — MPE creates a null directory (as described in Step 0.3) and no user files are copied to the disc.

NOTE

Hewlett-Packard recommends using the ACCOUNTS option to reload the accounting structure, and completing the RELOAD operation. When the system is up and operational, use the :RESTORE command to restore user files into the accounts.

0.3 NO USER FILES ON TAPE - DO YOU WANT TO RELOAD?

This implies that when the system storage medium was created, no user files were dumped. To proceed with reloading the system, creating a null directory with only the SYS account, PUB group, and MANAGER user, enter YES. To return to Step 0.1 enter NO.

1 ANY CHANGES?

To change the current configuration, enter YES and proceed to Step 2. Otherwise enter NO and skip to Step 3.1.

NOTE

Any changes you make to the configuration at this step will not be backed up. At your earliest opportunity use the SYSDUMP Program to obtain a backup for your changes.

2 LOAD MAP?

To request a map on the Console showing the correspondences between MPE segments, programs, and code segment table (CST) entries, enter YES; to suppress this map, enter NO.

NOTE

When a particular running system halts for any reason, it is mandatory to have a LOAD MAP for analysis, provided a system memory dump is taken for the analysis.

A typical Load Map appears as shown below. This map shows the correspondence between MPE code segments to code segment table (CST) entries. First, the CST number (in octal) is shown. Next, the System Segmented Library (SL) segment name is presented. SL segment names are followed by a parenthesized value, program file names are not. The number in parenthesis indicates the logical segment number of the segment within the system library, identified as SL.PUB.SYS:

```
01 ININ                    31 ALLOCATE (27)
02 FILESYS1 (0)            32 ALLOCUTIL (30)
03 FILESYS4 (1)            33 HARDRES (31)
04 FILESYS5 (2)            34 ABORTDUMP (32)
05 FILESYS6 (3)            35 MESSAGE (33)
06 FILESYS6A (4)           36 PROCSEG (34)
07 FILESYS7 (5)            37 NRIO (35)
10 CIALTORG (6)            40 PCREATE (36)
11 CICOMSYS (7)            41 MORGUE (37)
12 CIERR (10)              42 BIPC (40)
13 CIFILEB (11)            43 IPC (41)
14 CIFILEM (12)            44 CHECKER (42)
15 CIINIT (13)             45 UTILITY1 (43)
16 CILISTF (14)            46 UTILITY2 (44)
17 CIMISC (15)             47 LOADER1 (45)
20 CIORGMAN (16)           50 RINS (46)
21 CIPREPRUN (17)          51 JOBTABLE (47)
22 CISUBS (20)             52 DEBUG (50)
23 CISYSMGR (21)           53 NURSERY (51)
24 CIUSERUTIL (22)         54 SPOOLING (54)
25 CXSTOREST (23)          55 SPOOLCOMS1 (55)
26 RESTORE (24)            56 SPOOLCOMS2 (56)
27 STORE (25)              57 PVCOMSEG (57)
30 DIRC (26)               60 PVSYSD (60)
```

3 Prior to G.01.00: MEMORY SIZE = *XXXX*?

G.01.00 or later: MEMORY SIZE=<*XXXX*> (MIN=256, MAX=8192)?

XXXX denotes the present size of main memory in kilowords (512 kilowords represents 1 Mb of main memory).

The amount of supported memory depends on which HP 3000 Series you have. Here is a list of all HP 3000 computer systems, showing the amount of memory that they support:

- The Series 64/68/70 supports 4 to 16 Mb (2048 to 8192 kilowords).
- The Series 58 supports 4 to 8 Mb (2048 to 4096 kilowords).
- The Series 44/48 supports 2 to 4 Mb (1024 to 2048 kilowords).

- The Series 52 supports 2 to 8 Mb (1024 to 4096 kilowords).
- The Series 40/42 supports 1 to 3 Mb (512 to 1536 kilowords).
- The Series 39 supports 1/2 to 3 Mb (256 to 1536 kilowords).
- The Series 37 supports 1/2 to 2 Mb (256 to 1024 kilowords).
- MICRO 3000 supports 2 or 4 Mb (1024 to 2048 kilowords).
- MICRO 3000XE supports 2 to 8 Mb (1024 to 4096 kilowords).

To indicate the size of main memory for for which MPE is being configured, enter one of the following values (in kilowords): 256, 512, 1024, 1536, 2048, 3072, 4096, or 8192.

To retain the present memory size, enter a RETURN.

3.1 At this time, the INITIAL Program confirms that the configured memory size can be supported on the available physical memory. If the configured memory size exceeds the physical memory size, the following message will be output:

```
CONFIGURED MEMORY SIZE EXCEEDS PHYSICAL MEMORY AVAILABLE
PHYSICAL MEMORY AVAILABLE IS memsize
MEMORY SIZE = memsize
```

If this is a WARMSTART, or if this is a COOLSTART, COLDSTART, UPDATE, or RELOAD without changes, skip to Step 72. Otherwise, proceed to Step 4.

4 I/O CONFIGURATION CHANGES?

To prepare for addition or deletion of input/output devices, enter YES.

To maintain the same input/output device configuration, and proceed to Step 71 enter NO.

4.1 G.01.00 or later: I/O MAP?

To print a listing of input/output devices physically connected to the system, enter YES. To suppress this listing, enter NO. The listing is displayed in tabular form.

At this point, the INITIAL Program asks the same questions the SYSDUMP program asks in the I/O configuration section. Refer to "I/O Configuration Changes" earlier in this section, under the description of the SYSDUMP Program.

70 ADDITIONAL DRIVER CHANGES?

To prepare for additional driver changes, enter YES.

If no additional driver changes are required, enter NO. If NO. is entered, dialog returns to Step 4. Step 4 repeats until a NO response is entered.

70.1 LIST ADDITIONAL DRIVERS?

To print a listing showing the presently configured additional drivers, enter YES .

To suppress this listing, enter NO .

70.2 DELETE DRIVERS?

To delete an existing additional driver, enter YES; otherwise, enter NO and skip to Step 70.4.

70.3 DRIVER NAME?

Enter the name of the driver to be deleted. This prompt is repeated until you enter a (RETURN), or until all drivers are deleted.

70.4 ADD DRIVERS?

To prepare for adding drivers, enter YES; otherwise, enter NO. If you enter NO, you will either return to Step 4 if drivers have not yet been added, or you will skip to Step 70.6

70.5 DRIVER NAME?

Enter the name of the driver to be added. This prompt is repeated until you enter a (RETURN), or until the maximum of 32 drivers have been added.

70.6 LIST ADDITIONAL DRIVERS

To print a listing showing the presently configured additional drivers, enter YES; to suppress this listing, enter NO. The dialog will return to Step 4.

71 At this time, one or more of the following messages may be output, reflecting errors in the input/output device configuration. If any of these messages appear, the INITIAL Program returns to Step 4, unless otherwise noted.

DEVICE OF DIFFERENT TYPE RANGES IN CLASS *devclass*

Device types (defined in Step 4 of the SYSDUMP dialog) are divided into ranges from different kinds of devices:

Type Range	Class
0-6	Direct access
7	Foreign disc
8-15	Serial input
16-23	Concurrent input/output
24-30	Nonconcurrent input/output
31	Serial disc
32-39	Serial output

Within a device class, all defined devices must have types which are compatible; the above message indicates a violation of this rule. See the discussion of device classes (DCATs) in Section V.

USER SPECIFIED MAX DRT IS *DRT*
FOLLOWING DRTs MUST BE CHANGED
LDEV *ldev* DRT *DRT*

At least one device has been defined with a DRT number higher than the specified maximum. Return to Step 4.

USER SPECIFIED MAX DRT IS
HIGHEST DRT SUPPORTED BY THIS CPU IS *DRT*

The user-specified maximum DRT cannot be supported on this CPU. Return to Step 4.

USER SPECIFIED MAX DRT IS *DRT*
HIGHEST DRT SUPPORTED BY THIS CPU IS *DRT*
FOLLOWING DRTs MUST BE CHANGED
LDEV *ldev* DRT *DRT*

At least one device has been defined with a DRT number which:

a) is higher than the specified maximum and/or
b) cannot be supported on this CPU.

Possibly the user-specified maximum DRT cannot be supported on this CPU. Return to Step 4.

LOGICAL DEVICE *ldev* DOES NOT EXIST

A device (*ldev*) specified as an output device is not defined in the configuration.

LDEV *ldev* AND LDEV *ldev* ON SAME DRT AND UNIT

More than one logical device has been defined with the same DRT and unit.

NO DEVICE IN CLASS DISC

There must always be at least one device defined in the device class DISC .

NO OUTPUT DEVICE FOR LOGICAL DEVICE *ldev*

Logical device *ldev*, which has been defined as a device which accepts jobs or sessions, does not have a corresponding job/session list device or device class assigned.

OUTPUT CLASS FOR DEVICE *ldev* NO LONGER EXISTS

The device class specified as the output (listing device) class for device *ldev* is not defined in the configuration.

72 At this time, the INITIAL Program tests to make sure that DRTs have been handled correctly. If any messages appear, the dialog returns to Step 4.

If no messages appear, the dialog proceeds as follows.

If the answer to Step 1 is YES and you are performing a RELOAD, UPDATE, or COLDLOAD with or without changes, continue to Step 76.

73 At this time, the INITIAL Program checks to ensure that all volumes defined in the previous startup are mounted. If all volumes were not found, the message FOLLOWING VOLUMES NOT FOUND is output, followed by a list of volumes that were defined but not mounted. The INITIAL Program then proceeds to Step 74.

NOTE

One of the following messages may be printed, indicating that a disc device is not in the ready state:

LDEV # *ldev* NOT READY
DISC IN DRT *DRT #* UNIT 0 NOT READY

You should make the appropriate device ready. It is imperative that you do not halt the system at this point, (or during any other portion of the INITIAL Program), since the program may be in the process of updating the volume labels. If the computer is halted, the message FOLLOWING VOLUMES NOT FOUND may be printed during the next cold load, necessitating a RELOAD operation.

If all volumes were found and you had responded YES to the ANY CHANGES? question in Step 1, the dialog skips to Step 76.

If all volumes were found and you responded NO to the ANY CHANGES? question in Step 1, the dialog skips to Step 87.

If this is a WARMSTART, control skips to Step 125.

74 LIST VOLUME TABLE?

This question is asked only if all volumes were not found in Step 73 above.

To list the disc volumes and their currently assigned logical device numbers, enter YES. The listing is printed in the following format:

VOLUME#	NAME	LOG DEV#
volnumber	*volname*	*ldev*
.	.	.
.	.	.
.	.	.

In this listing, *volname* is a name of up to eight alphanumeric characters, beginning with a letter, identifying the volume; *ldev* is the logical device number assigned to that volume. If *ldev* is 0, this indicates that the volume is not mounted.

NOTE

In order to perform a listing of defective tracks (Step 83) for any disc, the logical device is required. Listing the volume table will give you the logical devices.

To suppress this listing, enter NO.

75 MOUNT CORRECT VOLUMES OR RELOAD

Following this message, the system halts. The System Operator should either find the volumes defined on the previous cold load (listed in Step 73), mount them, and cold load the system again, or cold load using the RELOAD option and redefine the disc volume configuration (as discussed below).

76 DISC VOLUME CHANGES?

To prepare for changes to the disc volume configuration or to delete tracks, enter YES. Otherwise, enter NO or a (RETURN). Control skips to Step 91.

77 LIST VOLUME TABLE?

To list the disc volume table (as in Step 74), enter YES. Otherwise, enter NO.

78 DELETE VOLUME?

To prepare to delete a volume, enter YES.

To bypass deletion and skip to Step 80, enter NO or a (RETURN).

79 ENTER VOLUME NAME?

To delete a volume, enter the volume name. (When the name is entered, the question is repeated.)

Otherwise, enter a (RETURN).

80 ADD VOLUME?

To prepare to add a volume, enter YES.

To bypass addition and skip to Step 82, enter NO or a (RETURN).

81 ENTER VOLUME NAME

To add a volume, enter the volume name. When the name is entered, the question is repeated.

Otherwise, enter a (RETURN).

82 LIST VOLUME TABLE?

To list the disc volumes and their currently assigned logical device numbers (as in Step 75), enter YES.

To suppress this listing, enter NO.

83 LIST DEFECTIVE TRACKS TABLE?

For 7911, 7912, 7913, 7914, 7933, 7935, 7936, 7937, 7945, 7957, or 7958 discs,

LIST DEFECTIVE TRACK/SECTOR INFORMATION?

To prepare for listing the defective tracks table or defective track/sector information which resides on any one of the disc volumes, enter YES. To bypass the listing and skip to Step 87, enter NO.

84 LOGICAL DEVICE# ?

To list the defective tracks table or defective track/sector information for a particular disc, enter the disc's logical device number. (After this listing, the question is repeated.) Otherwise, enter a (RETURN).

If the disc is a type 0 disc, the following information is printed:

- Logical size of the device (in cylinders).
- Number of alternate tracks available.

For each entry in the defective tracks table, the following information is printed:

- Cylinder and head number of defective track.
- Absolute sector number of the first sector of the track (in octal).
- Absolute sector number of the last sector of the track (in octal).
- Track - may be one of the following:
  1. SUSPECT - An error has been encountered on this track.
  2. SUSPECT ALT - An error has been encountered on the track to which this track was reassigned.
  3. UNREADABLE ALT - This track was reassigned to another track but the disc driver was unable to read the alternate track assignment.
  4. DELETED - The track is no longer available for use by the system.
  5. REASSIGNED - The track has been reassigned to another track.
- The cylinder and head number of the alternate track (if the track status is (2) or (5).

If the disc is a type 1 fixed head disc, the following information is provided in the listing for each track in the table:

- Track number of the defective track.
- Absolute sector number of the first sector of the track (in octal).
- Absolute sector number of the last sector of the track (in octal).
- Track status - may be (1) or (4) as described above.

For type 3 discs, the following information is printed:

- Number of spare operations.
- Number of spare tracks used.
- Number of spare tracks available.

This is followed by a list of the logically spared tracks on the disc. This includes the logical cylinder and head of the track, and the beginning and ending sector addresses. All tracks will appear as REASSIGNED. There are no deleted tracks on a type 3 disc.

NOTE

The number of spared tracks listed will not necessarily correspond to the number of spare tracks used. This is because a logical track can be spared more than once, and thereby use up more than one spare track.

85 DELETE TRACK?

To prepare for deleting tracks, enter YES. Otherwise, enter NO to skip to Step 90.

NOTE

If you answer YES and then attempt to delete a track on a type 3 disc, the INITIAL Program will reject the attempt and issue an error message.

86 ENTER LDEV, CYLINDER AND HEAD?

NOTE

Listing the defective tracks table of (Step 83) will provide the input for this dialog.

To delete a track on a moving head disc, enter these three parameters separated by commas: the logical device number of the disc, the cylinder number, and the head number corresponding to the track to be deleted.

To delete a track on a fixed head disc, enter the logical device number and track number, separated by a comma.

If this is a system disc, see the discussion of disc error recovery for more information.

Otherwise, enter a [RETURN] to proceed to Step 88.

If input was entered to delete a track, one of the following messages may result:

ALTERNATE TRACK - CANNOT DELETE

The track is being used as alternate track and cannot be deleted.

IN DIRECTORY - CANNOT DELETE

The track is in the area used by the directory and cannot be deleted since this is not a RELOAD function.

IN DISC FREE SPACE MAP - CANNOT DELETE

The track is in the disc free space map and cannot be deleted, since this is not a RELOAD.

IN A SYSTEM DISC RESIDENT TABLE - CANNOT DELETE

The track is in an area used by a system disc resident table and cannot be deleted, since this is not a RELOAD.

IN RESERVED AREA - CANNOT DELETE

The track is in the area reserved for the disc label or bootstrap program, and cannot be deleted.

IN SYSTEM AREA - CANNOT DELETE

The track is in the area reserved for the INITIAL Program and its associated tables, and therefore cannot be deleted since this is a COOLSTART.

INVALID CYLINDER NUMBER

The cylinder number is not in the correct range for this moving- head disc.

INVALID HEAD NUMBER

The head number is not in the correct range for this moving-head disc.

INVALID TRACK NUMBER

The track number is not in the correct range for this fixed-head disc.

NOT A DISC

The device is not a disc. Wrong *ldev#* specified.

UNINITIALIZED DISC

A volume label has not yet been written on the disc.

WARNINGIN VIRTUAL MEMORY DELETE?

The track is in the area reserved for the virtual memory. To delete the track (which will cause the virtual memory to be moved), respond with YES; otherwise respond with NO.

CAUTION

If you are deleting a track, you should be aware that you will lose all data and the data files on the track.

Regardless of whether one of these messages printed, control returns to the beginning of this Step.

87 At this point, the INITIAL Program ensures that each disc defined in the configuration has a valid label, that the volume name is defined in the volume table, and that all volumes defined in the volume table are mounted. The program also lists any suspect tracks, suspect alternate tracks, and unreadable alternate tracks and requests the operator to take action on them. As a result of this verification, one or more of the following messages may appear. (All messages require a response. If no messages appear, the INITIAL Program proceeds directly to Step 88.)

NOTE

Messages that prompt the user to "DELETE," "REASSIGN," or "RECOVER" tracks will not appear for type 3 discs.

(a) INVALID LABEL FOR DEVICE *ldev*
ENTER VOLUME NAME?

This indicates that *ldev* does not contain a valid MPE volume label. You must enter a volume name. If the name entered corresponds to that of a volume in the volume table, the logical device number *ldev* is set for that volume. Otherwise, a new entry is made in the volume table. The disc label is then updated. If device *ldev* is a type 0 disc, this is followed by the message:

LOGICAL PACK SIZE (CYLINDERS) = SIZE?

The System Operator should specify the number of cylinders to be used on this disc; the remainder will be available for alternate track assignments. To retain the default specified by maximum logical size enter a RETURN. Otherwise, enter a value between minimum logical size and maximum logical size as defined by the table below:

Disk Model	Type	Subtype	Minimum Logical Size	Maximum Logical Size	Maximum Physical Size
	0	4*	300	400	411
	0	5*	300	400	411
	0	6*	300	400	411
	0	7*	90	120	135
7920	0	8	611	815	823
7925	0	9	611	815	823
7906RP	0	10	300	400	411
7906FP	0	11	300	400	411
7906BP	0	12	300	400	411

*These subtypes are not supported on HP-IB systems.

(b) DEVICE *ldev* VOLUME *VOLNAME* NOT DEFINED IN TABLE
ADD TO SYSTEM VOLUME SET?

If you enter YES the following message is displayed:

ENTER VOLUME NAME?

This means that the volume identified by *volname*, with the logical device number *ldev*, does not appear in the volume table. To add this volume, identified by this *volname* and *ldev*, enter a RETURN.

To add this volume under a different volume name, enter the new name. The new name will be entered in the volume table and the volume will be relabeled with that name.

(c) VOLUME NAME *volname* ON DEVICE *ldev* ALREADY IN USE
ENTER VOLUME NAME?

This means that two volumes have the same name. To change the name of the volume on device *ldev*, enter the new name. If the name corresponds to that of a volume in the volume table, the logical device number *ldev* is set on that volume. Otherwise, a new entry is made in the volume table. The disc label is then updated.

(d) ALL VOLUMES MUST BE MOUNTED
LIST VOLUME TABLE?

This message occurs when an entry appears in the volume table, but no corresponding volume is mounted on a disc defined in the configuration. To list the volume table (as in Step 74), response with YES. Otherwise, respond with NO. In either case, control returns to Step 5.

(e) [SUSPECT]
[SUSPECT ALT] TRK LDEV# *ldev* CYL= *CYL* HEAD= *HEAD*
[UNREADABLE ALT]

This message, applying to a type 0 disc, indicates that an entry in the defective tracks table requires action.

The following information applies to message (e) above. A suspect track is the one on which an error has been detected while the system was running. A suspect alternate track is one that has been previously reassigned and an error has been detected on the alternate track. An unreadable alternate track is one that has been reassigned but the disc driver was unable to read the address of the reassigned track while attempting a transfer. *ldev* gives the logical device number of the disc where the error occurred; *TRACK* gives the track in error for fixed head discs: *CYL* and *HEAD* give the cylinder and head number of the bad track. Immediately following message (e) one of the messages (g) through (q) may appear; they require one of the following replies, or YES or NO as indicated:

DELETE - To remove the track from the space available for use by the system.

REASSIGN - To reassign the space on the bad tracks to one of the available alternate tracks.

RECOVER - To remove the entry from the defective tracks table, ignoring the error.

RETURN - To ignore the error. The message will be repeated the next time the system is restarted.

(f) DELETE OR REASSIGN?

The track was flagged as defective previously. Only responses DELETE or REASSIGN are valid.

(g) **WARNING** IN ALTERNATE AREA
DELETE?

The track was flagged as defective previously. It is located in the area reserved for alternate tracks. The only valid response is YES , since tracks in the alternate area cannot be reassigned (reassigned tracks cannot be "chained").

(h) **WARNING** IN ALTERNATE AREA
DELETE OR RECOVER?

A suspect track is located in the area reserved for alternate track assignment. Valid responses are DELETE, RECOVER or a RETURN to ignore the error.

(i) FLAGGED TRACK IN RESERVED AREA - MUST REINITIALIZE PACK

A track flagged as defective is located in the reserved area of the disc. The system halts at this time. You must either mount a new pack previously formatted or rerun the diagnostic on the present pack to reformat it. Following this, you should restart using the RELOAD option. See Section X for formatting procedures.

(j) **WARNING** IN RESERVED AREA
RECOVER?

A suspect track is located in the reserved area of the disc. Respond with YES to remove the entry from the defective tracks table, or NO to leave it in the defective tracks table.

NOTE

RECOVER assumes that the error never occurred. This could be dangerous to system integrity.

(k) **WARNING** IN SYSTEM AREA
RECOVER?

A suspect track is located in the area used for the INITIAL Program and its associated tables. Respond with YES to remove the entry, or NO to leave it in the defective tracks table.

(l) **WARNING** IN DIRECTORY
RECOVER?

A suspect track is located in the area used by the system for the file directory. Respond with YES to remove the entry, or NO to leave it in the defective tracks table.

(m) **WARNING** IN DISC FREE SPACE MAP
REASSIGN OR RECOVER?

A suspect track is located in the disc free space map. Enter REASSIGN or RECOVER, or a (RETURN) to ignore the error.

(n) **WARNING** IN A SYSTEM DISC RESIDENT TABLE
RECOVER?

A suspect track is located in a table that is resident on the system disc. Respond with YES to remove the entry, or NO to leave it in the defective tracks table.

(o) **WARNING** IN VIRTUAL MEMORY
DELETE, REASSIGN OR RECOVER?
DELETE OR RECOVER?

A suspect track is located in the area used for the virtual memory. If this load is not a RELOAD, the second form of the question will be used and responses DELETE or RECOVER are valid. If it is RELOAD using the RESTORE option, the first form of the question will be used. Responses are DELETE, REASSIGN or RECOVER.

(p) DELETE OR RECOVER?

The suspect track is located in no special area of a moving-head disc. All responses DELETE, RECOVER, or a (RETURN) to ignore the problem, are valid.

(q) DELETE, REASSIGN OR RECOVER?

The suspect track is located in no special area of a moving-head disc. All responses are valid, including a (RETURN) to ignore the problem.

```
NON-SYSTEM VOLUME ON DEVICE#
ADD TO SYSTEM VOLUME SET?
```

Answer YES if the disc volume is to be added to the system domain or NO if it is to be added to the private volumes (nonsystem) domain.

88 If any changes have been made in the defective tracks table in Step 87, the following question will be printed:

LIST DEFECTIVE TRACKS TABLE?

Or for 7911, 7912, 7913, 7914, 7933, 7935, 7936, 7937, 7945, 7957, or 7958 discs:

LIST DEFECTIVE TRACK/SECTOR INFORMATION?

To prepare for listing the defective tracks table or defective track/sector information of any disc, respond with YES. Otherwise, respond with NO or a (RETURN) to go on to Step 125.

89 LOGICAL DEVICE# ?

Enter the logical device number of the disc for which the defective tracks table listing is desired (as in Step 85). This question is repeated until a (RETURN) is entered signifying that no further listings are desired.

90 If any changes have been made to the volume table in Step 87, the following question is printed.

LIST VOLUME TABLE?

Respond with YES to obtain a listing of the volume table (as described in Step 75); otherwise, enter NO or a (RETURN) to bypass the listing.

91 VIRTUAL MEMORY CHANGES?

To change the allocation on disc used for virtual memory, enter YES.

Logical device 1 memory allocation may be changed during RELOAD only; virtual memory allocation on other discs may also be changed during COOLSTART, COLDSTART or UPDATE.

To retain the current allocation, enter a (RETURN). Dialog skips to Step 95.

92 LIST VIRTUAL MEMORY DEVICE ALLOCATION?

To list the disc volume, logical device number, and virtual memory allocation, enter YES. The listing is in the format:

```
VOLUME NAME      LDEV#              VM ALLOCATION
MH7920U0         1                  10
```

To suppress listing, enter a (RETURN).

93 Prior to G.02.00: ENTER VOLUME, SIZE IN KILOSECTORS?

G.02.00: ENTER VOLUME, SIZE IN KILOSECTORS (MAX=255)?

Enter volume name or logical device number, a comma (,), and the size (in kilosectors). If an incorrect value is specified, you will receive an error message telling you to enter another value. The same question, ENTER VOLUME, SIZE IN KILOSECTORS, will reappear.

CAUTION

If you are on MPE version G.00.00 or later, you may need to configure at least four kilosectors of virtual memory space on logical device 1. It is, however, a legal input to configure one kilosector of virtual memory space on this device, due to the complexity of different system configurations.

94 VIRTUAL MEMORY CHANGES?

Enter a YES, to loop back to Step 92. Enter a (RETURN) to continue dialog.

95 If this system has been configured with the MPE Logging Facility enabled, the following question is printed:

DISABLE LOGGING

To turn off all nonmandatory logging until the next cold load, enter YES. Otherwise, respond with NO.

96 SYSTEM TABLE CHANGES?

To bypass these changes, enter NO or (RETURN) and skip to Step 114.

To prepare your system for making changes to the CST, DST, PCB, IOQ, MTAB, or other parameters relating to memory usage, enter YES and continue with the next step.

NOTE

Steps 97-113 are identical to Steps 78-94 of the SYSDUMP Program.

114 Prior to G.01.00: MAX # OF SPOOLFILES KILOSECTORS=*XXXXXX* ?

G.01.00 or later: MAX # OF SPOOLFILES KILOSECTORS= <*XXX*>
(MIN=0, MAX=777777)?

115 Prior to G.01.00: # OF SECTORS PER SPOOLFILE EXTENT?

G.01.00 or later: # OF SECTORS PER SPOOLFILE EXTENT=<*XXXXX*>
(MIN=128, MAX=32764)?

Enter the size in sectors, for each spool file extent. This must be a value between 128 and 32,764.

116 If this is not a RELOAD and no tracks have been deleted, the following question is printed:

```
RECOVER LOST DISC SPACE?
```

If you delete a track, you will invoke a RECOVER LOST DISC SPACE condition.

To recover lost disc space caused by the loss of temporary files and spoolfiles due to a system failure, answer YES. Otherwise, enter NO.

NOTE

For systems with large numbers of files, this may take between 10 and 15 minutes for every 1000 files.

117 If this load is not a RELOAD and the size of the directory on disc differs from the configured size, the following message will be printed:

```
**WARNING** DIRECTORY SIZE ONLY CHANGED ON RELOAD
```

118 If this load is not a RELOAD and any tracks were deleted or reassigned, the following list may be printed:

```
FOLLOWING FILES PURGED - DISC ERROR

filename.groupname.accountname
```

These files reside wholly or partially on tracks that were deleted or reassigned and were therefore purged from the directory. The space used by the files (except for the area on the defective track) was returned to the disc free-space list.

119 If any files lost data (but not in the file label) because of tracks or sectors which were spared (reassigned), the following list appears. Otherwise, control skips to Step 122.

```
FOLLOWING FILES LOST DATA DURING SPARING
```

The list contains file names and the addresses at which they lost data.

120 PURGE ALL FILES WHICH LOST DATA?

To purge all files listed in Step 119 which lost data during sparing, answer YES. This is the recommended response, since the listed files are damaged and probably cannot be relied upon or accessed easily. All of the files are purged and control proceeds to Step 122. If a file must be preserved, answer NO and control proceeds to Step 121.

121 SAVE FILE *filename.groupname.accountname*?

This prompt appears for each of the files listed in Step 119. To save the file, answer YES. To purge the file, answer NO.

122 If this is a RELOAD where user files are to be loaded onto the system, then continue. For all other types of start-up (including RELOAD where no user files are on the media, or the ACCOUNTS option of RELOAD is specified) control proceeds to Step 123.

The user files read from the backup media and written to disc can cause one of the following messages to be printed:

(a) MOUNT REEL# *REELNUM*

The next reel of the set, *REELNUM* , should be mounted and placed on line.

(b) TAPE NOT A MEMBER OF THIS SET

The tape mounted in response to message (a) was not a member of the tape set.

(c) WRONG REEL

Reel *REELNUM* , specified in message (a), was not mounted. Another reel out of the normal sequence of reels was mounted erroneously.

(d) NOT A RELOAD TAPE OR IMPROPER TAPE FORMAT

The tape mounted in response to message (a) is not a tape generated by :SYSDUMP or :STORE .

(e) *XXX* FILES NOT FOUND - ANOTHER TAPE SET AVAILABLE ?

Not all of the files in the directory when the system was dumped have been found on the tape. If another set of tapes is available, respond with YES , mount the first reel of the set, and place it on line. Otherwise, respond with NO . Note that when the logging facility is enabled, the most recent in-use log file is not dumped to magnetic tape, because it is busy. However, the directory entry for the file is dumped to the tape. On RELOAD, the above message may appear even if the entire user file set is loaded onto the system. The directory entry for the log file plus the actual absence of the file on tape will provoke this message. Of course, there may be one or more other files which are missing from the tape. If you answer NO, it is advisable to list the files not found when the question is asked in the Dialog below.

(f) WRONG TAPE SET - MUST HAVE EARLIER DATE

The tape mounted in response to message (e) has a date later than the previous tape set processed. The operator should find the first reel of the correct set, mount it, and place it on line.

(g) NOT ALL FILES FOUND - LIST?

To list files not found on the RELOAD tape, enter YES . To suppress the listing, enter NO or a (RETURN).

NOTE

Listing a large number of "files not found" on the System Console device can be very time consuming.

(h) FOLLOWING FILES PURGED BECAUSE OF
INSUFFICIENT DISC SPACE (1)
TAPE PARITY ERROR (2)
LIST?

To list files which were found on reload tape but for which disc space was unavailable or which were unreadable because of a tape parity error, enter YES . To suppress the listing, enter NO or a (RETURN). See note in Step (g) above. The message, NAME.IS.UNKNOWN , received during the listing of files, means the parity error occurred while reading the file label.

(i) DISC SPACE ERROR

The INITIAL Program erred while attempting to return allocated disc space after detection of a parity error on tape. This halts the configuration. Dialog changes to INITIAL Program for recovery from parity errors during RELOAD of user files.

(j) **WARNING** DOUBLE EOF MARK
CONTINUE FROM NEXT REEL?

Two consecutive EOF marks were read. Either the tape is of the wrong format or a parity error was detected during reading of the tape trailer label. It should be possible to determine if the tape is located at the trailer label by the position of the tape reel. If this is the case enter YES, otherwise, enter NO. The INITIAL Program cannot recover from improper tape format. A parity error in the trailer label will cause the first file of the next tape to be skipped, (probably a continuation of the last file of the previous tape) and continue RELOAD with the next file.

(k) IRRECOVERABLE PARITY ERRORS

The INITIAL Program encountered parity errors in both the header and trailer levels of the tape and was not able to continue with the RELOAD operation. The INITIAL Program aborts as a result.

123 One of the following messages may be printed due to disc errors.

(a) **WARNING** OLD WELCOME MESSAGE ON DEFECTIVE TRACKS

If doing a WARMSTART, COOLSTART, or UPDATE, an attempt is made to recover the welcome message; but if it or the Descriptor Track Table is located on defective tracks, the welcome message is set to null. The System Operator should enter a new welcome message after the load is complete.

(b) CANNOT RECOVER DISC SPACE OF SPOOLFILE #*XXXX*

A disc error occurred during the attempt to recover lost disc space of the input/output spool file (WARMSTART only).

124 The following progress messages will now appear:

```
DIRECTORY MAINTENANCE COMPLETED
PART 1 OF 6 COMPLETED - MEMORY RESIDENT TABLES SET UP
PART 2 OF 6 COMPLETED - SL BINDING
PART 3 OF 6 COMPLETED - SYSTEM I/O PROCESS CREATION
PART 4 OF 6 COMPLETED - DRIVER LOADING
PART 5 OF 6 COMPLETED - DISC RESIDENT TABLES SET UP
PART 6 OF 6 COMPLETED - SYSTEM PROCESS CREATION
BANK 0 DEPENDENT MEMORY USED - nnnnn
```

Where *nnnnn* is the amount of bank 0 memory used (up to 64K decimal words) during MPE system initialization.

Terminating the INITIAL Program

The last step in completing the INITIAL Program is to input (or verify) the date and time on your system. As soon as you do this, the INITIAL Program will terminate; control will be transferred to MPE and your system will be ready for use.

NOTE

The Series 37 SPU supports a Time of Century (TOC) clock. Refer to Appendix A for a description.

If the machine contains a built-in clock (Series 37), go to step 127.

Step Number	Dialog
125	Prior to G.01.00: DATE (M/D/Y)?
	G.01.00 or later: TUES, JAN 22, 1985, 9:00 AM? (Y or N)
	Enter a RETURN or the current date in the following format:
	mm/dm/yy
	Where:
	mm = one or two digits representing the month. *dd* = one or two digits representing the day of the month. *yy* = the last two digits of the year.
126	TIME (H:M)?
	Enter the current time of day (24-hour clock) in the following format:
	hh:mm

NOTE

When prompted for DATE (M/D/Y)?, if RETURN is entered instead of an actual date, the system will assume the default date/time of WED, NOV 1, 1972, 12:00 AM. This default is intended for factory use only. Always be sure to enter the correct date and time upon system startup to assure proper operation of functions related to the system clock.

hh = one or two digits indicating the hour (on a 24-hour basis).
mm = one or two digits indicating the minute.

127 MPE prints the date and time and the message ? (Y/N)

If the date and time were entered in Steps 125 and 126, MPE echoes them for verification. If you respond with NO (or N), the INITIAL Program returns to Step 125.

If the date and time are correct, enter YES or a (RETURN) to continue.

Startup State processing is done after the date and time prompts before a session is signed onto the Console. Refer to Section VI for a discussion of Startup State Configurator.

The INITIAL Program now terminates, transferring control to MPE. When the system prints *WELCOME*, it is ready for use.

PERIPHERAL CONFIGURATION INFORMATION

To configure peripherals onto your system, you must respond appropriately to the questions in Steps 12-43 of the SYSDUMP or the INITIAL Programs. These questions ask you to supply information on the device type, subtype, terminal type, line and terminal speed, record width, and the driver name of the peripherals.

The following pages describe how to configure the peripherals listed below. The descriptions are presented in tabular form:

TABLE NO.	TITLE
7-0	Device Defaults (DEFDATA.PUB.SYS), G.01.00 or Later
7-1	Asynchronous Data Communication Controller (ADCC) and Advanced Terminal Processor (ATP) for Terminals (E/F.00.00 and G.00.00)
7-2	Terminal Types for Terminals and Printers
7-3	Terminal Subtypes for Device Type 16
7-4	Terminal Line Speeds for the ATP and ADCC
7-5	Printer Port Speeds for the ATP and ADCC
7-6	Serial Application Printers
7-7	Serial Spooled Printers

TABLE NO.	TITLE
7-8	The HP 2608A, HP 2631A/B, and HP 2613/17/19 Line Printers
7-9	The HP 2608S, HP 2563 (HP-IB Interface only), HP 2565, and HP 2566 CIPER Line Printers
7-10	The HP 2680 and HP 2688 Laser Printing Systems
7-11	The HP 2893 Card Reader
7-12	Nine-Channel Magnetic Tape Units
7-13	The HP 9140 Integrated Cartridge Tape Units
7-14	The HP 9144 Tape Unit
7-14a	The HP 35401A Tape Unit
7-15	The HP 9895 Flexible Disc
7-16	Discs

If necessary, refer to the following manuals for additional information:

- The Data Communications Handbook (5957-4634). This manual contains information on configuring data communications devices.
- The NS/3000 Network Manager Reference Manual (32344-90002). This manual contains information on configuring and troubleshooting the HP Network Link products used for HP 3000 to HP 3000 Local Area Network (LAN) communications.
- The Workstation Configurator Reference Manual (30239-90001). This manual contains information on user-defined terminal types created with the Workstation Configurator. (For device types 16 and 32 (subtypes 14 and 15), the prompt DESCRIPTOR FILENAME will appear after Step 14 on MPE version G.00.00 or later. This prompt allows you to include a user-defined terminal type via the Workstation Configurator.)

Table 7-0. Device Defaults (DEFDATA.PUB.SYS), G.03.00 or Later *

DEVICE NAME	ID CODE	CHAN	TYPE	SUB TYPE	REC WIDTH	OUTPUT DEV	MODE	DRIVER NAME	DEVICE CLASS
				TERMINAL TYPE SPEED					
HP2563	!2101	0	32	9	66	0	S	HIOCIPR0	LP
HP2565	!2101	0	32	9	66	0	S	HIOCIPR0	LP
HP2566	!2101	0	32	9	66	0	S	HIOCIPR0	LP
HP2608A	!2001	0	32	4	66	0	S	HIOLPRT0	LP
HP2608S	!2101	0	32	9	66	0	S	HIOCIPR0	LP
HP2613	!200A	0	32	2	66	0	S	HIOLPRT2	LP
HP2617	!200A	0	32	2	66	0	S	HIOLPRT2	LP
HP2619	!200A	0	32	2	66	0	S	HIOLPRT2	LP
HP2680	!2004	0	32	8	66	0	S	HIOPPRT0	LP
HP2688	!2004	0	32	8	66	0	S	HIOPPRT0	LP
HP2893	!0101	0	8	0	40	0		HIOCDRD0	CARDRDR
HP35401	!0270	0	3	6	128	0		HIOCTAP2	CTAPE
									SDISC
HP7902	!0081	0	2	0	128	0		HIOFLOP0	FLOP
HP7906BP	!FF02	0	0	12	128	0		HIOMDSC1	DISC
HP7906FP	!FF02	0	0	11	128	0		HIOMDSC1	DISC
HP7906RP	!FF02	0	0	10	128	0		HIOMDSC1	DISC
HP7911	!0204	0	3	1	128	0		HIOMDSC2	DISC
HP7912	!0208	0	3	2	128	0		HIOMDSC2	DISC
HP7914	!020A	0	3	4	128	0		HIOMDSC2	DISC
HP7920	!FF03	0	0	8	128	0		HIOMDSC1	DISC
HP7925	!FF04	0	0	9	128	0		HIOMDSC1	DISC
HP7933	!0212	0	3	8	128	0		HIOMDSC2	DISC
HP7935	!0212	0	3	8	128	0		HIOMDSC2	DISC
HP7936	!0215	0	3	9	128	0		HIOMDSC2	DISC
HP7937	!0214	0	3	10	128	0		HIOMDSC2	DISC
HP7945	!0220	0	3	5	128	0		HIOMDSC2	DISC
HP7957B	!022A	0	3	11	128	0		HIOMDSC2	DISC
HP7958	!022B	0	3	12	128	0		HIOMDSC2	DISC
HP7958B	!022D	0	3	14	128	0		HIOMDSC2	DISC
HP7959B	!022E	0	3	15	128	0		HIOMDSC2	DISC
HP7961B	!022C	0	3	13	128	0		HIOMDSC2	DISC
HP7962B	!022D	0	3	14	128	0		HIOMDSC2	DISC
HP7963B	!022E	0	3	15	128	0		HIOMDSC2	DISC
HP7970	!0183	0	24	0	128	0		HIOTAPE0	TAPE
HP7974	!0174	0	24	3	128	0		HIOTAPE2	TAPE
HP7976	!0176	0	24	1	128	0		HIOTAPE1	TAPE
HP7978	!0178	0	24	2	128	0		HIOTAPE2	TAPE
HP7979	!0179	0	24	4	128	0		HIOTAPE3	TAPE
HP7980	!0180	0	24	5	128	0		HIOTAPE3	TAPE
HP9140	!0240	0	3	0	128	0		HIOCTAP0	CTAPE
									SDISC
HP9144	!0260	0	3	3	128	0		HIOCTAP1	CTAPE
									SDISC
HP9895	!0081	0	2	0	128	0		HIOFLOP0	FLOP
HPASNP	!000F	0	42	0	40	0		HIOASNP0	ASNL

Table 7-0. Device Defaults (DEFDATA.PUB.SYS), G.03.00 or Later* (continued)

DEVICE NAME	ID CODE	CHAN	TYPE	SUB TYPE	TERMINAL TYPE	TERMINAL SPEED	REC WIDTH	OUTPUT DEV	OUTPUT MODE	DRIVER NAME	DEVICE CLASS
HPLPADCC	!0010	0	32	14	19	240	66	0	S	HIOASLP2	LP
HPLPATP	!000F	0	32	14	19	240	66	0	S	HIOASLP0	LP
HPMODEMADCC	!0010	0	16	1	10	120	40	& JAID		HIOTERM2	MODEM
HPMODEMATP	!000F	0	16	1	10	120	40	& JAID		HIOTERM1	MODEM
HPPCLADCC	!0010	0	32	14	??*	960	66	0	S	HIOASLP2	LP
HPPCLATP	!000F	0	32	14	??*	960	66	0	S	HIOASLP0	LP
HPTERMADCC	!0010	0	16	0	10	960	40	& JAID		HIOTERM2	TERM
HPTERMATP	!000F	0	16	0	10	960	40	& JAID		HIOTERM1	TERM

*The device DRT and UNIT numbers are unique for particular systems; therefore, they are not supplied in this table. To determine the default DRT and UNIT numbers for devices on systems with MPE version G.01.00 or later, respond YES to the question I/O MAP? (Step 4.1) of the INITIAL Program.

Table 7-1. Asynchronous Data Communication Controller (ADCC) and Advanced Terminal Processor (ATP) for Terminals (E/F.00.00 and G.00.00)

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	16
13	SUB TYPE?	Refer to Table 7-3. For G.00.00, any invalid subtypes entered defaults to subtype 0.
14 E/F.00.00	TERM TYPE?	Refer to Table 7-2.
14 G.00.00 or later	ENTER [TERM TYPE#], [DESCRIPTOR FILENAME]?	Refer to Table 7-2 for terminal types, and to the Workstation Configurator Reference Manual (30239-90001) for information on creating a user-defined terminal type.
15	SPEED IN CHARACTERS PER SECOND?	Refer to Table 7-4.
30	RECORD WIDTH?	40
31	OUTPUT DEVICE?	*ldev#*
32	ACCEPT JOB/SESSIONS?	YES
33	ACCEPT DATA?	YES
34	INTERACTIVE?	YES
35	DUPLICATIVE	YES
36	INITIALLY SPOOLED?	NO
38	DRIVER NAME?	HIOTERM0 ADCC (E/F.00.00) HIOTERM1 ATP HIOTERM2 ADCC (G.00.00 or later)
43	DEVICE CLASSES?	*devclass*[,*devclass*...]

Table 7-2. Terminal Types for Terminals and Printers

TERMINAL TYPES	DESCRIPTION
4	HP 2600A or Datapoint 3300 Keyboard Display Terminal (10/15/30/60/120/240 cps). This terminal type is only supported by the ADCC for MPE V/P.
6	HP 2762A/B (General Electric Terminet 300 or 1200), or Data Communications terminal, Model B (10/15/30/120 cps) with Paper Tape Reader/Punch, Option 2. Note that this terminal must be equipped for ECHO PLEX.
9	HP2615A (10 - 240 cps). This is only supported on Series II/III.
10	For HP devices. If ATP hardware is installed, 1920 CPS is also possible.
12	HP 2645K Katakana/Roman Data Terminal.
13	Message switching network or other computer.
14	Multipoint Terminal.
15	HP 2635A Printing Terminal. 8-bit protocol (for second character set).
16	HP 2635A Printing Terminal. 7-bit protocol (standard character set).
18	For non-HP devices. Only provides XON/XOFF protocol data-handling. All application printers.
19	HP 2631B or HP 2631B-compatible Remote Spooled Printers.
20	8-bit Remote Spooled Printer (not supported with subtype 15).
21	Remote Spooled Printer with embedded escape sequences allowed. HP 2631B or 2631B-compatible printers.
22	8-bit Remote Spooled Printer with embedded escape sequences allowed (not supported with subtype 15). Specific to HP 2631B or 2631B-compatible printers with 8-bit data, no parity.

For further information refer to the Data Communications Handbook (5957-4634).

Table 7-3. Terminal Subtypes for Device Type 16

SUBTYPE	DESCRIPTION
0	Directly connected terminals requiring speed sensing. Not recommended for use with modems.
1	Asynchronous full duplex modems. Compatible with Bell 103, 202T, 212A, and CCITT V.21 modems requiring speed sensing. ATP and ADCC (HIOTERM2) require Data Set Ready (RS-232-C "CC", CCITT 107) and Data Carrier Detect (RS-232-C "CF", CCITT 109) to be ON.
4	Identical to subtype 0 except that automatic speed sensing is disabled. This subtype is intended for operation with leased-line full duplex modems which can be configured to operate without control signals (i.e., 202T). (Not supported for G.00.00 and later.)
5	Identical to subtype 1 except that automatic speed sensing is disabled. (Not supported for G.00.00 or later.)
9	ATP only — Asynchronous CCITT modem that requires monitoring circuit 108 (clear to send); otherwise identical to subtype 1.

Table 7-4. Terminal Line Speeds for the ATP and ADCC

LINE SPEED	CHARS/ SEC	ATP HIOTERM1 SENSED	ADCC HIOTERM2 SENSED/SPECIFIED	ADCC HIOTERM0 SENSED/SPECIFIED
150	15	N	N / Y	Y / Y
300	30	Y	Y / Y	Y / Y
600	60	Y	Y / Y	N / Y
1200	120	Y	Y / Y	Y / Y
2400	240	Y	Y / Y	Y / Y
4800	480	Y	Y / Y	N / Y
9600	960	Y	Y / Y	N / Y
19200	1920	Y	N / N	N / N

Table 7-5. Printer Port Speeds for the ATP and ADCC

Line Speed	Chars/Sec	ATP	ADCC
150	15	N	Y
300	30	Y	Y
600	60	Y	Y
1200	120	Y	Y
2400	240	Y	Y
4800	480	Y	Y
9600	960	Y	Y
19200	1920	Y	N

Table 7-6. Serial Application Printers

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	32
13	SUB TYPE?	14
14 E/F.00.00	TERM TYPE?	18
14 G.00.00 or later	ENTER [TERM TYPE#], [DESCRIPTOR FILENAME]?	18 (terminal type). Refer to the Workstation Configurator Reference Manual (30239-90001) for information on creating a user-defined terminal type.
15	SPEED IN CHARACTERS PER SECOND?	Refer to Table 7-5.
30	RECORD WIDTH?	40
31	OUTPUT DEVICE?	0
32	ACCEPT JOB/SESSION?	NO
33	ACCEPT DATA?	NO
34	INTERACTIVE?	NO
35	DUPLICATIVE?	NO
36	INITIALLY SPOOLED?	NO
38	DRIVER NAME?	HIOTERM0 ADCC (E/F.00.00) HIOASLP2 ADCC (G.00.00 and later) HIOASLP0 ATP
43	DEVICE CLASSES?	*devclass*[,*devclass*...]

Table 7-7. Serial Spooled Printers

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	32
13	SUB TYPE?	14 or 15 Subtype 14 is direct connect. Subtype 15 is modem connect.
14 E/F.00.00	TERM TYPE?	19, 20, 21, or 22 (Refer to Table 7-2.)
14 G.00.00 or later	ENTER [TERM TYPE], [DESCRIPTOR FILENAME]?	19, 20, 21, or 22 (terminal types). Refer to the Workstation Configurator Reference Manual (30239-90001) for information on creating a user-defined terminal type.
15	SPEED IN CHARACTERS PER SECOND?	Refer to Table 7-5.
30	RECORD WIDTH?	66
31	OUTPUT DEVICE?	0
32	ACCEPT JOB/SESSION?	NO
33	ACCEPT DATA?	NO
34	INTERACTIVE?	NO
35	DUPLICATIVE?	NO
36	INITIALLY SPOOLED?	YES
37	INPUT OR OUTPUT?	IN or OUT
38	DRIVER NAME?	HIOTERM0 ADCC (E/F.00.00) HIOASLP2 ADCC (G.00.00 and later) HIOASLP0 ATP
43	DEVICE CLASSES?	*devclass*[,*devclass*...]

Table 7-8. The HP 2608A, HP 2631A/B, and HP 2613/17/19 Line Printers

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	32
13	SUB TYPE?	4 -HP2608A 5 - HP2631A/B 2 - HP261X
30	RECORD WIDTH?	66
31	OUTPUT DEVICE?	0
32	ACCEPT JOB/SESSION?	NO
33	ACCEPT DATA?	NO
34	INTERACTIVE?	NO
35	DUPLICATIVE?	NO
36	INITIALLY SPOOLED?	NO or YES
38	DRIVER NAME?	HIOLPRT0 - HP2608A HIOLPRT1 - HP2631A/B HIOLPRT2 - HP261X
43	DEVICE CLASSES?	*devclass*[,*devclass*...]

Table 7-9. The HP 2608S, HP 2563(HP-IB Interface only), HP 2565, and HP 2566 CIPER Line Printers

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	32
13	SUB TYPE?	9 - feature access 13 - transparency
30	RECORD WIDTH?	66
31	OUTPUT DEVICE?	0
32	ACCEPT JOB/SESSION?	NO
33	ACCEPT DATA?	NO
34	INTERACTIVE?	NO
35	DUPLICATIVE?	NO
36	INITIALLY SPOOLED?	YES or NO
38	DRIVER NAME?	HIOCIPRO
43	DEVICE CLASSES?	*devclass*[,*devclass*...]

Table 7-10. The HP 2680 and HP 2688 Laser Printing Systems

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	32
13	SUB TYPE?	8
30	RECORD WIDTH?	66
31	OUTPUT DEVICE?	0
32	ACCEPT JOB/SESSION?	NO
33	ACCEPT DATA?	NO
34	INTERACTIVE?	NO
35	DUPLICATIVE?	NO
36	INITIALLY SPOOLED?	YES
37	INPUT OR OUTPUT?	IN or OUT
38	DRIVER NAME?	HIOPPRT0
43	DEVICE CLASSES?	*devclass*[,*devclass*...]

Table 7-11. The HP 2893 Card Reader

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	8
13	SUB TYPE?	0
30	RECORD WIDTH?	40
31	OUTPUT DEVICE?	*ldev* or *devclass* of listing device
32	ACCEPT JOB/SESSION?	YES
33	ACCEPT DATA?	YES
34	INTERACTIVE?	NO
35	DUPLICATIVE?	NO
36	INITIALLY SPOOLED?	NO or YES
38	DRIVER NAME?	HIOCDRD0
43	DEVICE CLASSES?	*devclass*[,*devclass*...]

Table 7-12. Nine-Channel Magnetic Tape Units

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	24
13	SUB TYPE?	0 or 8 (auto-reply) * HP7970 1 or 9 (auto-reply) * HP7976 2 or 10 (auto-reply) * HP7978 3 or 11 (auto-reply) * HP7974 4 HP7979 5 HP7980
30	RECORD WIDTH?	128
31	OUTPUT DEVICE?	0
32	ACCEPT JOB/SESSION?	YES or NO
33	ACCEPT DATA?	YES or NO
34	INTERACTIVE?	NO
35	DUPLICATIVE?	NO
36	INITIALLY SPOOLED?	NO
38	DRIVER NAME?	HIOTAPE0 - HP7970 HIOTAPE1 - HP7976 HIOTAPE2 - HP7974, 7978
43	DEVICE CLASSES?	*devclass*[,*devclass*...]

* To enable auto-reply beginning with release G.01.00, refer to Step 37.1 of the SYSDUMP dialog.

Table 7-13. The HP 9140 Integrated Cartridge Tape Units

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	3
13	SUB TYPE?	0
30	RECORD WIDTH?	128
31	OUTPUT DEVICE?	0
32	ACCEPT JOB/SESSION?	NO
33	ACCEPT DATA?	NO
34	INTERACTIVE?	NO
35	DUPLICATIVE?	NO
36	INITIALLY SPOOLED?	NO
38	DRIVER NAME?	HIOCTAP0
43	DEVICE CLASSES?	*devclass*[,*devclass*...]
44	IS *devclass* A SERIAL DISC CLASS?	YES

Table 7-14. The HP 9144 Tape Unit

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	3
13	SUB TYPE?	3
30	RECORD WIDTH?	128
31	OUTPUT DEVICE	0
32	ACCEPT JOB/SESSION?	NO
33	ACCEPT DATA?	NO
34	INTERACTIVE?	NO
35	DUPLICATIVE?	NO
36	INITIALLY SPOOLED?	NO
38	DRIVER NAME?	HIOCTAP1
43	DEVICE CLASSES?	*devclass* [,*devclass*...]
44	IS *devclass* A SERIAL DEVICE CLASS?	YES

Table 7-14A. The HP 35401 Tape Unit

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	3
13	SUB TYPE?	6
30	RECORD WIDTH?	128
31	OUTPUT DEVICE	0
32	ACCEPT JOB/SESSION?	NO
33	ACCEPT DATA?	NO
34	INTERACTIVE?	NO
35	DUPLICATIVE?	NO
36	INITIALLY SPOOLED?	NO
38	DRIVER NAME?	HIOCTAP2
43	DEVICE CLASSES?	*devclass* [,*devclass*...]
44	IS *devclass* A SERIAL DEVICE CLASS?	YES

Table 7-15. The HP 9895 Flexible Disc

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	2
13	SUB TYPE?	0
30	RECORD WIDTH?	128
31	OUTPUT DEVICE?	0
32	ACCEPT JOB/SESSION?	NO
33	ACCEPT DATA?	NO
34	INTERACTIVE?	NO
35	DUPLICATIVE?	NO
36	INITIALLY SPOOLED?	NO
38	DRIVER NAME?	HIOFLOP0
43	DEVICE CLASSES?	*devclass*[,*devclass*...]

Table 7-16. Discs

CONFIGURATOR STEP NO.	CONFIGURATOR DIALOG	USER RESPONSE
12	TYPE?	0 - HP7906A, 792X 3 - HP791X, 793X, 794X, 795X
13	SUB TYPE?	10 HP7906 (removable platter), 7937 11 HP7906 (fixed platter), 7957 12 HP7906 (both platters), 7958 1 HP7911 2 HP7912 4 HP7914 8 HP7920, 7933, 7935 9 HP7925, 7936 5 HP7945
30	RECORD WIDTH?	128
31	OUTPUT DEVICE?	0
32	ACCEPT JOB/SESSION?	NO
33	ACCEPT DATA?	NO
34	INTERACTIVE?	NO
35	DUPLICATIVE?	NO
36	INITIALLY SPOOLED?	NO
38	DRIVER NAME?	HIOMDSC1 - HP7906A, 792X HIOMDSC2 - HP791X, 793X, 7945
43	DEVICE CLASSES?	*devclass*[,*devclass*...]

SUGGESTED PARAMETER SETTINGS

Choosing an appropriate set of configuration parameters in an important part of tuning an HP 3000. In general, the various parameters should be as small as possible while still providing sufficient resources to process the required work load. The following guidelines are offered to help the System Manager make an intelligent choice of parameters for each particular system. The absolute minimum and maximum configuration settings are listed in Table 7-17 and Table 7-18.

The guidelines presented here assume that users are using only the standard capabilities; sites using the process handling (PH) or extra data segment (DS) capabilities should make additional allowances for the extra resources required. The following terms are used:

- Jobs: The maximum number of jobs that will be run at any given time.
- Sessions: The maximum number of sessions that will be run at any time.
- Users: The maximum number of jobs and sessions that will be run at any given time.
- Terminals: The number of configured terminals.

The following recommendations for parameter settings are listed in the order that they appear in the SYSDUMP Program:

1. MAX # OF OPEN SPOOLFILES

   This is the maximum number of spool files that may be in the OPEN state at any one time; it does not affect spool files in the ACTIVE or READY states. When a spool file is opened, MPE creates a "virtual device" of the required type by filling in an unused logical device entry with the appropriate values. This parameter tells MPE how many virtual device numbers to reserve for spooling.

Minimum Value:	0
Maximum Value:	1024 (MPE G.00.00 and later versions) 255 (MPE E/F.00.00)
Recommended Value:	A spooled or streamed job requires at least two open spoolfiles: one for $STDIN and one for $STDLIST. In addition, each user requires an open spoolfile for each access to a spooled device.

2. CST

The Code Segment Table (CST) is used for all permanently allocated MPE and subsystem code segments (those listed in the LOADMAP) plus all code segments that come from any segmented library (SL). MPE needs a minimum of 128 entries to operate. Facilities doing program development, and those that have large SL's, need more CST entries. If the CST is underconfigured, some programs will not run when the system is heavily loaded. If overconfigured, main memory space is wasted.

Minimum Value:	128
Maximum Value:	2048 (MPE G.00.00 and later versions) 192 (MPE E/F.00.00)
Recommended Value:	4 * number of users. Add more if your site has large SLs.

3. EXTENDED CST

This table, the XCST, is used for all program code segments that are assigned dynamically via the :RUN command or allocated permanently via the :ALLOCATE command. MPE needs at least 32 entries to operate. Large programs with many code segments require more table entries. The number of additional XCST entries is dependent on the number of users and the number and size of different application that are running. If the extended CST is underconfigured, some programs will not run when the system is heavily loaded. (The :ALLOCATE command should be used cautiously if there is a limited amount of space in the XCST). The :AUTOALLOCATE Command automatically deallocates Program Code Segments when the table becomes full.

Minimum Value:	32
Maximum Value:	8191
Recommended Value:	10 * number of users. Typical range is 128 to 1024.

4. DST

The Data Segment Table is used to reference all data segments, including MPE and user data stacks. Programs that use many extra data segments, or that have many open files, require more entries than generally recommended. If underconfigured, some programs may not run when the system is heavily loaded.

Minimum Value:	128
Maximum Value:	4096 (MPE G.00.00 and later versions) 1024 (MPE E/F.00.00)
Recommended Value:	8 * number of processes or 20 * number of users. Typical range is 256 to 1024 entries.

5. PCB

The Process Control Block contains the status of each process on the system. Each entry consumes 21 words, and there is 1 entry per process. If underconfigured, a system failure may result.

Minimum Value: 24

Maximum Value: 1024 (MPE G.00.00 and later versions)
256 (MPE E/F.00.00)

Recommended Value: 2 * maximum number of users + 32. Add more if your facility uses IPC. Typically ranges from 128 to 256.

6. I/O QUEUE

This single queue is used to hold all I/O requests on the system, except disc requests. If underconfigured, nondisc requests will wait for free entries, and performance will be affected.

Minimum Value: 20

Maximum Value: 1300 (MPE G.00.00 and later versions)
255 (MPE E/F.00.00)

Recommended Value: 4 * number of users. If using MRJE, IMF, or DS add 3 or 4 entries per line. Typically ranges from 96 to 192.

7. DISC REQUEST TABLE

The Disc Request Table (DRQ) is used to hold request parameters and queries for pending I/Os. If underconfigured, disc requests will wait for free entries, and performance will be affected.

Minimum Value: 32

Maximum Value: 900 (MPE G.00.00 and later versions
255 (MPE E/F.00.00)

Recommended Value: 4 * number of terminals. Must be 255 or more if you are using disc caching.

8. TERMINAL BUFFERS PER PORT

Terminal buffers are used for all buffered terminal I/O. If mostly block mode applications are to be run on the system (i.e. V/PLUS), configure the maximum 1024 buffers (actually configure 1024/(number of terminals), per port) on all Series. If underconfigured, terminal response will be slow to the screen.

Minimum Value: 32

Maximum Value: ATP: 1024 (MPE G.00.00 and later versions)
400 (MPE E/F.00.00)
ADCC: 255
ATC: 255

Recommended Value: Series 64/68/70 <50 terminals:
3 * number of ports.
Series 64/68/70 >50 terminals:
5 * number of ports.
Series 37/39/40/42/44/48/50 with ADCC:
4 * number of block mode users.

NOTE

On systems with both ATP and ADCC subsystems, select the subsystem with the most ports.

9. SYSTEM BUFFERS

System buffers are used by the message system to handle console messages and by the communications subsystems. If the system has many interactive users and a large number of streamed jobs, you will need a large number of buffers to handle the logons and logoffs. Heavy usage of :TELLOP or :TELL, or using private volumes without issuing the Console command :VMOUNT ON,AUTO, will also require more system buffers. One additional buffer is needed for each multipoint line. If underconfigured, system response may be very slow.

Minimum Value: 8

Maximum Value: 253

Recommended Value: Typically ranges from 18 to 25. The number of system buffers should be less than the number of entries in the Primary Message table. For systems with an HP 7976 Tape Drive, configure 25 to 30 system buffers.

10. SWAP TABLE

The Swap Table is used by the Memory Manager to determine which segments need to be brought into memory in order for an absent process to run. If underconfigured, System Failure 602 may occur.

Minimum Value:	128
Maximum Value:	5400 (MPE G.00.00 and later versions) 2048 (MPE E/F.00.00)
Recommended Value:	8 * number of PCB entries (MPE G.00.00 and later versions) 5 * number of PCB entries (MPE E/F.00.00)

11. PRIMARY MESSAGE TABLE

The Primary Message Table is used to buffer message contents for pending messages transmitted within the system, using the internal message facility. If the Primary Message Table becomes full, processes requiring it will be impeded until entries become available.

Minimum Value:	16
Maximum Value:	1023 (MPE G.00.00 and later versions) 255 (MPE E/F.00.00)
Recommended Value:	$\frac{\text{number of PCB entries}}{0}$ For heavily loaded systems: number of PCB entries.

12. SECONDARY MESSAGE TABLE

The Secondary Message Table is used to buffer message contents for pending messages transmitted within the system, using the internal message facility during the execution of critical areas of system code. If the Secondary Message Table becomes full, a SYSTEM FAILURE 620 will result.

Minimum Value:	16
Maximum Value:	1023 (MPE G.00.00 and later versions) 255 (MPE E/F.00.00)
Recommended Value:	$\frac{\text{number of PCB entries}}{2}$ Configure more for heavily loaded systems.

NOTE

MPE G.00.00 and later versions use the values you specify for the Primary and Secondary Message Tables to set up the Message Harbor Table. MPE uses the Message Harbor Table for communication between system processes. Underconfigurating the Message Harbor Table may result in a System Failure 620.

13. SPECIAL REQUEST TABLE

The Special Request Table is used to temporarily buffer the parameters for segment expansion and to form the queue for devices waiting for a segment to arrive in memory.

Minimum Value: 10

Maximum Value: 2048 (MPE G.00.00 and late versions)
255 (MPE E/F.00.00)

Recommended Value: MPE G.00.00 and later versions: 50 or number of PCB entries + number of ldevs.

MPE E/F.00.00: 25

14. ICS

The Interrupt Control Stack is used to process all interrupt requests. If underconfigured, the system may fail with a SYSTEM HALT 4.

Minimum Value: 128

Maximum Value: 4096 (MPE G.00.00 and later versions)
2048 (MPE E/F.00.00)

Recommended Value: Series 64/68/70: 2048 or more.
MPE G.00.00 and later versions: 1024 or more.
MPE E/F.00.00: 768 or more.

15. LOADER SEGMENT TABLE

This is a DST used by the LOADER. It holds information for a process that requires code to be loaded for execution.

Maximum Value: 32,760 words

Recommended Value: 16,384 words

16. UCOP REQUEST QUEUE

This is the request queue for the User Controller Process. UCOP is responsible for deleting processes, changing priorities, and expanding or contracting stacks.

Minimum Value: 1

Maximum Value: 1023 (MPE G.00.00 and later versions)
256 (MPE E/F.00.00)

Recommended Value: 2 * number of users (add more for process handling)

17. TIMER REQUEST LIST

The Timer Request List is used for the memory logging facility, calls to PAUSE, timed terminal I/O, and various other timings such as modem turn-around.

Minimum Value: 1

Maximum Value: 1023 (MPE G.00.00 and later versions)
255 (MPE E/F.00.00)

Recommended Value: Number of terminals + number of users.

18. BREAKPOINT TABLE

The Breakpoint table is used to hold the information needed for DEBUG breakpoints.

Minimum Value: 24

Maximum Value: 1024

Recommended Value: Typically ranges from 24 to 48 (specify a larger Number if DEBUG is used extensively)

19. MAX # OF USER LOGGING PROCESSES

The absolute maximum number of user logging processes is 64. You enter changes during the SYSDUMP Dialog; changes take effect after a reload.

Minimum Value: 2

Maximum Value: 64

Recommended Value: 1 per application

20. MAX # OF USERS PER LOGGING PROCESS

The number of users who need to access a logging file.

Minimum Value: 1

Maximum Value: 256 (MPE G.00.00 and later versions)
128 (MPE E/F.00.00)

Recommended Value: The maximum number of users who need to access a logging file.

21. # OF RINS

This parameter determines the total number of Resource Identification Numbers available to the system. It includes global RINs, local RINs, and file RINs which are used whenever dynamic file locking is requested. The number of RINs needed depends on the users' applications, but there should be at least one per user, to allow for the dynamic file locking used by subsystems such as the SEGMENTER and the SYSDUMP Program.

Minimum Value: 5

Maximum Value: 1024

Recommended Value: Depends on users' applications. Configure at least 1 per user.

22. # OF GLOBAL RINS

This parameter is used to allocate the space needed to save the user names, account names, and passwords associated with global RINs.

Minimum Value: 0

Maximum Value: 1024

Recommended Value: Since this parameter can only be changed during a RELOAD, configure a few more global RINs than you expect to use.

23. # OF SECONDS TO LOGON

Whenever a terminal is speed sensed to begin a logon, MPE starts a logon timeout. If the time expires before the logon is complete, the port is reset to its initial state. This is particularly important with modems to prevent a wrong number from hanging a port indefinitely. The time should be as short as possible so that improper logons can be reset promptly, but it must be long enough so that the slowest typist can log on successfully.

Minimum Value: 10

Maximum Value: 600

Recommended Value: 60

24. MAX # OF CONCURRENTLY RUNNING SESSIONS

MAX # OF CONCURRENTLY RUNNING JOBS

These parameters limit the number of interactive sessions and batch jobs allowed on the system at one time. The number of sessions is limited by the number of configured terminals, and by the number of PCB entries. Generally, the more sessions/jobs, the greater the system load. Do not underconfigure the session and job values; control them by using the :LIMIT command up to the value specified in the configuration. The :LIMIT command may be used to dynamically adjust the job/session mix, up to the configured maximums.

Recommended Value: There is at least 1 PCB entry for each session or job. Therefore, setting the job and session limits is an important function of load management. Values vary accoring to the appllications you run. Generally the more sessions and jobs, the greater the system load.

25. DEFAULT JOB CPU TIME LIMIT

This parameter may be used to establish a default limit on the number of CPU seconds that a job may use. This default will be used whenever the TIME= *cpusecs* parameter is omitted from a :JOB statement. If this parameter is 0, no default limit will be imposed.

Minimum Value: 0

Maximum Value: 32,767

26. LOG FILE RECORD SIZE (SECTORS)

Minimum Value: 1

Maximum Value: 8

LOG FILE SIZE (RECORDS)

Minimum Value: 16

Maximum Value: 32,767

These parameters specify how log files are to be built.

27. DIRECTORY

The directory size can only be changed during a RELOAD.

Minimum Value: 384

Maximum Value: 65,000

Recommended Value: 6 + (6 * A) + (5.4 * G) + (0.15 * U) + (0.05 * F) + (0.5 * VS) + (0.5 * VC)

where:

A=total number of accounts in the system (maximum = 632)
G=total number of groups in the system (maximum per account = 96)
U=total number of users in the system (maximum per account = 200)
F=total number of files in the system (maximum per group = 1385)
VS=total number of volume sets in the system (maximum per group = 32)
VC=total number of volume classes in the system (maximum per group = 32)

28. VIRTUAL MEMORY

Virtual memory may be allocated on any system domain disc volume. This area is used only for data segments since code segments are read directly from the program file or segmented library. When virtual memory space is allocated, enough space is reserved to hold the largest size allowed for the data segment. In the case of a process's data stack, this is the value of MAXDATA that was specified when the program was prepared. The amount of virtual memory required is highly dependent on the users' applications as well as the number of users. Large numbers of data segments or large data segment sizes may require more space than generally recommended.

Minimum Value: 1024

Maximum Value: Size of disc drive

Recommended Value: Depends on users applications and number of users. Configure a minimum of 4096 for logical device 1. You can change the virtual memory allocated to system volumes during any restart except a WARMSTART. You can change virtual memory size of logical device 1 only during a RELOAD.

29. MAX # OF SPOOLFILE KILOSECTORS

This parameter allows the System Manager to specify the maximum amount of disc space that may be used by the spooler. If this amount of space is exceeded, all spooling queues will be shut until they are opened by the System Operator. Many sites may choose to set this value large enough so that the effective limit on disc space is the amount of free space in the device class SPOOL.

Minimum Value: 128

Maximum Value: 262,143

30. # OF SECTORS PER SPOOLFILE EXTENT

Spoolfiles use a special type of variable length records with trailing blanks stripped.

Minimum Value: 128

Maximum Value: 32,767

Recommended Value: The maximum spoolfile size is 32 times the number of sectors per extent. Choose a value according to the anticipated size of the largest spoolfile.

31. MAX # OF CONCURRENTLY RUNNING PROGRAMS

This determines the maximum number of CST BLOCK entries. There is one entry per program; shared programs use one entry.

32. MAX CODE SEGMENT SIZE

This parameter is used to limit the amount of resources that can be used by any one process. Its size is application-dependent.

Minimum Value: Application dependent

Maximum Value: Application dependent

Recommended Value: Between 4096 and 8192 words. This size restricts programmers to segment sizes that can be most efficiently managed by the system.

33. MAX NUMBER OF SEGMENTS PER PROCESS

This parameter is used to limit the amount of resources that can be used by any given process.

Minimum Value: 1

Maximum Value: 255 (MPE G.00.00 and later versions)
63 (MPE E/F.00.00)

Recommended Value: If the systems users are conscientious about using the minimum resources required for a given task, you can set this value to the maximum allowed, thereby giving users maximum freedom. Otherwise, you can impose system-wide limits that apply to all users.

34. MAX STACK SIZE

Maximum Value* 31,232

Recommended Value: 31,232

MAX EXTRA DATA SEGMENT SIZE

Recommended Value: 8192 words

These parameters are used to limit the amount of resources that can be used by any one process. Their sizes are application-dependent.

35. MAX # EXTRA DATA SEGMENTS PER PROCESS

This parameter is used to limit the amount of resources that can be used by any given process.

Minimum Value: 1

Maximum Value: 255 (MPE G.00.00 and later versions)
63 (MPE E/F.00.00)

Recommended Value: If the system's users are conscientious about using the minimum resources required for a given task, you can set this value to the maximum allowed, thereby giving users maximum freedom. Otherwise, you can impose system-wide limits that apply to all users.

36. STANDARD STACK SIZE

This is the default stack size used if the STACK= parameter is not included in the :PREP and :RUN commands. Since the amount of stack space needed is highly application-dependent, users should be encouraged to tune their applications, and use an explicit STACK=, declaration instead of relying on a default value.

Minimum Value: 1200

Maximum Value: 4096

Table 7-17. Absolute Minimum and Maximum Configuration Settings Allowed by SYSDUMP (E/F.00.00)

CONFIGURATOR DIALOG	UNIT OF MEASURE	MINIMUM VALUE	MAXIMUM VALUE
MAX# OF OPEN SPOOLFILES=XXX.?	---	0	255
CST=XXX.?	ENTRIES	80*	192
EXTENDED CST=XXX.?	ENTRIES	16*	8192
DST=XXXX.?	ENTRIES	70*	1024
PCB=XXX.?	ENTRIES	12*	256
I/O QUEUE=XXX.?	ENTRIES	20	255
DISC REQUEST TABLE=XXX.?	ENTRIES	20	255
TERMINAL BUFFERS PER PORT=XXX?	BUFFERS	1**	99**[1]
SYSTEM BUFFERS=XXX.?	BUFFERS	8	255
SWAP TABLE=XXX.?	ENTRIES	128	2048
PRIMARY MESSAGE TABLE=XXX.?	WORDS	10	255
SECONDARY MESSAGE TABLE=XXX.?	WORDS	10	255
SPECIAL REQUEST TABLE=XXX.?	WORDS	10	255
ICS=XXX.?	WORDS	256*	2048
UCOP REQUEST QUEUE=XXX.?	ENTRIES	1*	256
TIMER REQUEST LIST=XXX.?	---	6*	128
BREAKPOINT TABLE=XXX.?	ENTRIES	1	1024
MAX# OF USER LOGGING PROCESSES	PROCESS	2	64
MAX# OF USERS PER PROCESS	PROCESS	1	128
# OF RINS=YYY.?	---	5	1024
#OF GLOBAL RINS USED=YYY.MAX=XXXX.?	---	0	1024
#OF SECONDS TO LOGON=XXX.?	SECONDS	10	600
MAX# OF CONCURRENT SESSIONS=XXX.?	SESSIONS	1	96
MAX# OF CONCURRENT RUNNING JOBS=XXX.?	JOBS	1	30
DEFAULT JOB CPU TIME LIMIT=XXXXX.?	---	0	32767
LOG FILE RECORD SIZE (SECTORS)=X.?	SECTORS	1	8
LOG FILE SIZE (RECORDS)=XXXXX.?	---	16	32767
DIRECTORY USED=XXX.MIN=384 MAX=XXXX.?	SECTORS	384	65000
VIRTUAL MEMORY=XXXXX.?	KILO-SECTORS	0[2]	255[2]
MAX# SPOOLFILES KILOSECTORS=XXXXXX.?	KILO-SECTORS	0	262143[3]
#SECTORS PER SPOOLFILE EXTENT=XXXX.?	SECTORS	128	32764[4]
MAX# CONCURRENTLY RUNNING PROGRAMS=XXX.?	PROGRAMS	1	127
MAX CODE SEGMENT SIZE=XXXXX.?	WORDS	1024*	16384
MAX# OF CODE SEGMENTS/PROCESS=XXX.?	---	1*	63
MAX STACK SIZE=XXXXX.?	WORDS	256*	31232
MAX EXTRA DATA SEG SIZE=XXXXX.?	WORDS	0	32764
MAX# EXTRA DATA SEGMENTS/PROCESS=XXX.?	---	0	255
STD STACK SIZE=XXXX.?	WORDS	256	4096

*MPE, subsystems, and utilities may require values larger than these minimum values to function.

**Minimum and maximum table size. It is calculated by multiplying value entered in response to prompt X number of ports.

1. Base value on 6 times the number of concurrent terminal users.

2. Maximum value allowed is 65 kilosectors for LDEV 1. Minimum value for LDEV 1 is 4 kilosectors.
3. Depends on number and size of discs and planned spooling load.
4. Maximum spool file size is 32 times the number of sectors per extent. Choose value according to anticipated size of largest spoolfile; 384 usually adequate.

Table 7-18. Absolute Minimum and Maximum Configuration Settings Allowed by SYSDUMP (G.00.00 and Later Versions)

CONFIGURATOR DIALOG	UNIT OF MEASURE	MINIMUM VALUE	MAXIMUM VALUE
MAX# OF OPEN SPOOLFILES=XXX.?	---	0	1023 - # configured ldevs
CST=XXX.?	ENTRIES	80*	192/2048***
EXTENDED CST=XXX.?	ENTRIES	16*	8191
DST=XXXX.?	ENTRIES	70*	4096
PCB=XXX.?	ENTRIES	12*	1024
I/O QUEUE=XXX.?	ENTRIES	20	1300
DISC REQUEST TABLE=XXX.?	ENTRIES	20	900
TERMINAL BUFFERS PER PORT=XXX.?	BUFFERS	1**	99**
SYSTEM BUFFERS=XXX.?	BUFFERS	8	253
SWAP TABLE=XXX.?	ENTRIES	128	5400
PRIMARY MESSAGE TABLE=XXX.?	WORDS	10	1023
SECONDARY MESSAGE TABLE=XXX.?	WORDS	10	1023
SPECIAL REQUEST TABLE=XXX.?	WORDS	10	2048
ICS=XXX.?	WORDS	256*	4096
LOADER SEGMENT TABLE=XXXXX.?	WORDS	2048	32760
UCOP REQUEST QUEUE=XXX.?	ENTRIES	1*	1024
TIMER REQUEST LIST=XXX.?	---	6*	1023
BREAKPOINT TABLE=XXX.?	ENTRIES	1	1024
MAX# OF USER LOGGING PROCESSES	PROCESS	2	64
MAX# OF USERS PER PROCESS		1	256
# OF RINS=YYY.?	---	23	1024
#OF GLOBAL RINS USED=YYY.MAX=XXXX.?	---	4	1024
#OF SECONDS TO LOGON=XXX.?	SECONDS	10	600
MAX# OF CONCURRENT SESSIONS=XXX.?	SESSIONS	1	500
MAX# OF CONCURRENT RUNNING JOBS=XXX.?	JOBS	1	500
DEFAULT JOB CPU TIME LIMIT=XXXXX.?	---	0	32767
LOG FILE RECORD SIZE (SECTORS)=X.?	SECTORS	1	8
LOG FILE SIZE (RECORDS)=XXXXX.?	---	16	32767
DIRECTORY USED=XXX.MIN=384 MAX=XXXX.?	SECTORS	384	65000
VIRTUAL MEMORY=XXXXX.?	KILO-SECTORS	0[2]	255[2]
MAX# SPOOLFILES KILOSECTORS=XXXXXX.?	KILO-SECTORS	0	777777[3]
#SECTORS PER SPOOLFILE EXTENT=XXXX.?	SECTORS	128	32764[4]
MAX# OF CONCURRENT RUNNING PROGRAMS=XXX.?	PROGRAMS	1	511
MAX CODE SEGMENT SIZE=XXXXX.?	WORDS	1024*	16384
MAX# OF CODE SEGMENTS/PROCESS=XXX.?	---	1*	63/255***
MAX STACK SIZE=XXXXX.?	WORDS	256*	31232
MAX EXTRA DATA SEG SIZE=XXXXX.?	WORDS	0	32764
MAX# EXTRA DATA SEGMENTS/PROCESS=XXX.?	---	0	255
STD STACK SIZE=XXXX.?	WORDS	256	4096

*MPE, subsystems, and utilities may require values larger than these minimum values to function.

**Minimum and maximum table size. It is calculated by multiplying value entered in response to prompt X number of ports.

***The expansion of these tables, requires new microcode for the Series 39/40/42, and 44/48/58.

1. Base value on 6 times the number of concurrent terminal users.
2. Maximum value allowed is 65 kilosectors for LDEV 1. Minimum value for LDEV 1 is 4 kilosectors.
3. Depends on number and size of discs and planned spooling load.
4. Maximum spool file size is 32 times the number of sectors per extent. Choose value according to anticipated size of largest spoolfile; 384 usually adequate.

Table 7-18A. System Table Default Sizes for G.01.00 and Later Versions

	S/6X/70	S/4X/5X	S/37
MAX # OF OPEN SPOOLFILES (0,1023-J)	72	32	10
CST (80,2048)	224	*192	*192
EXTENDED CST (16,8191)	225	200	*160
DST (70,4096)	*1024	*1024	*512
PCB (12,1024)	150	90	48
I/O QUEUE (20,1300)	256	96	*36
DISC REQUEST TABLE (20,900)	*512	512	*128
TERMINAL BUFFER (1, 99)	3	3	3
SYSTEM BUFFERS (8,253)	8	8	8
SWAP TABLE (128,5400)	1024	*1024	*512
PRIMARY MESSAGE TABLE (10,1023)	64	32	25
SECONDARY MESSAGE TABLE (10,1023)	64	32	25
SPECIAL REQUEST TABLE (10,2048)	64	64	64
ICS (256,4096)	1024	1024	1024
LOADER SEG TABLE SIZE (2048,32760)	16384	16384	16384
UCOP REQUEST QUEUE (1,1024)	150	60	32
TIMER REQUESTLIST (6,1023)	150	60	32
BREAKPOINT TABLE (1,1024)	32	32	16
MAX # OF USER LOGGING PROCS (2,64)	*10	*7	*5
MAX # OF USERS/LOGGING PROC (1,256)	3	3	3
MISC CONFIGURATION CHANGES			
# OF RINS (MINRIN, 1024)	48	48	48
# OF GLOBAL RINS (MINGRIN, 1024)	16	16	16
# OF SECONDS TO LOGON (10,600	120	120	120
MAX # OF CON RUN SESS (1,500)	60	*40	*7
MAX # OF CON RUN JOBS (1,500)	*6	*6	*2
DEFAULT JOB CPU TIME LIMIT (0,32767)	0	0	0
LOGGING CHANGES			
LOG FILE RECORD SIZE (SECTORS) (1,8)	2	2	2
LOG FILE SIZE (RECORDS) (16,32767)	1023	1023	1023

*MPE, subsystems, and utilities may require values larger than these default values to function.

Table 7-18A. System Table Default Sizes for G.01.00 or Later Versions (continued)

	S/6X/70	S/4X/5X	S/37
DISC ALLOCATION CHANGES			
MAX DIRECTORY SIZE (SECTORS) (65000)	*6000	*4000	*3000
MAX # OF SPOOLFILES KILOSECTS (0,777777)	128	128	128
# OF SECT/SPOOLFILE EXT (128,32764)	384	384	384
SEGMENT LIMIT CHANGES			
MAX # OF CON RUN PROG (1,511)	64	*64	10
MAX CODE SEGMENT SIZE (1024,16384)	*12288	*12288	*12288
MAX # CODE SEG PER PROCESS (1,255)	63	63	63
MAX STACK SIZE (256,31232)	31232	31232	31232
MAX EXTRA DATA SEG SIZE (0,32767)	*32767	*32767	*32767
MAX # EXTRA DATA SEG PER PROC (0,255)	8	*8	4
STANDARD STACK SIZE (256,4096)	1200	1200	1200
CONFIGURED TERMINALS	60	*40	*7
MAX # OF CONC JOBS	*6	*6	*2
INPs	4	4	0
MRJE	2	2	0
Spooled Devices	1	1	2
User Logging Processes	*10	*7	*5

*MPE, subsystems, and utilities may require values larger than these minimum values to function.

NOTE

These changes reflect the limitations and features of the systems. The default CST value takes into account the CPS board not being present. Directory size was increased to reflect larger discs available. Default code segment size and default extra data segment size were increased due to V/PLUS.

A QUICK REFERENCE TABLE FOR SYSDUMP AND INITIAL

Table 7-19 on the following pages lists the options for modifying the I/O configuration and critical system parameters on your system. It shows which options can be accessed in the SYSDUMP Program as well as in the five startup options of the INITIAL Program (WARMSTART, COOLSTART, COLDSTART, RELOAD, and UPDATE). In some cases, the modifications you make do not immediately take effect. You must restart the system from the SYSDUMP tape. In other cases, you can make changes while restarting the system. Sometimes you have both options. Table 7-19 shows you when you have the option to make changes, when those changes take effect, and when your answers to questions produce output.

As you can see from Table 7-19, the SYSDUMP Program and the five startup options of the INITIAL Program differ in the range of parameters that can be modified. Other differences between the two programs, not included in the table, include: the way the programs can be used, how they are engaged, and how the modifications made in each program take effect. Concerning this last item, modifications made to MPE during the INITIAL Program take effect immediately; modifications made during the SYSDUMP Program must first be copied onto serial storage media and only take effect when you start the system from the serial storage media.

Quick Reference Table Key

Table 7-19 uses the following symbols:

X = A question is asked; input a value if appropriate
O = Value takes effect
# = Output is produced

For example, look up "DELETE VOLUME" in Table 7-19. The table shows that you can name a disc volume for deletion during the SYSDUMP Dialog or during a RELOAD. (There is an X in both columns.) The change only takes effect during a RELOAD. Changes that you make during RELOAD overwrite any changes stored on the SYSDUMP tape.

Table 7-19. SYSDUMP and INITIAL Quick Reference

OPTION	SYSDUMP	WARMSTART	COOLSTART	COLDSTART	RELOAD	UPDATE
SPREAD					X O	
COMPACT					X O	
RESTORE					X O	
ACCOUNTS					X O	
NULL					X O	
SYSTEM DISC DRT						X O
LOAD MAP			X #	X #	X #	X #
ANY CHANGES	X		X O	X O	X O	X O
SYSTEM ID	X			O	O	O
MEMORY SIZE	X		X O	X O	X O	X O
I/O CONFIG CHANGES	X		X O	X O	X O	X O
LIST I/O DEVICES	X #		X #	X #	X #	X #
LIST CS DEVICES	X #		X #	X #	X #	X #
HIGHEST DRT	X		X O	X O	X O	X O
LOGICAL DEVICE	X		X O	X O	X O	X O
MAX #OPEN SPOOLFILES	X		X O	X O	X O	X O
TERMINAL TYPE CHANGES	X		X	X	X	X
LIST TERMINAL TYPE FILES	X		X	X	X	X
DELETE TERMINAL TYPE FILES	X		X	X	X	X

Table 7-19. Options For Modifying The System (Continued)

OPTION	SYSDUMP	WARMSTART	COOLSTART	COLDSTART	RELOAD	UPDATE
FILES	X		X	X	X	X
ADD TERMINAL TYPE FILES	X		X	X	X	X
FILE NAMES	X		X	X	X	X
CLASS CHANGES	X		X O	X O	X O	X O
LIST CLASSES	X #		X #	X #	X #	X #
DELETE CLASSES	X		X O	X O	X O	X O
ADD CLASSES	X		X O	X O	X O	X O
ADDITIONAL DRIVER CHANGES	X		X O	X O	X O	X O
SYSTEM TABLE CHANGES	X		X O	X O	X O	X O
CST	X		X O	X O	X O	X O
EXTENDED CST	X		X O	X O	X O	X O
DST	X		X O	X O	X O	X O
PCB	X		X O	X O	X O	X O
I/O QUEUE	X		X O	X O	X O	X O
DISC REQUEST TABLE	X		X O	X O	X O	X O
TERMINAL BUFFERS	X		X O	X O	X O	X O
SYSTEM BUFFERS	X		X O	X O	X O	X O

Table 7-19. Options For Modifying The System (Continued)

OPTION	SYSDUMP	WARMSTART	COOLSTART	COLDSTART	RELOAD	UPDATE
SWAP TABLE	X			O	O	
PRIMARY MESSAGE TABLE	X		X O	X O	X O	X O
SECONDARY MESSAGE TABLE	X		X O	X O	X O	X O
SPECIAL REQUEST TABLE	X		X O	X O	X O	X O
ICS	X		X O	X O	X O	X O
UCOP REQUEST QUEUE	X		X O	X O	X O	X O
TIMER REQUEST LIST	X		X O	X O	X O	X O
BREAKPOINT TABLE	X		X O	X O	X O	X O
MAX #OF USER LOGGING PROCESSES	X				O	
MAX #OF USERS PER LOGGING PROCESS	X			O	O	O
DISC ALLOC CHANGES			X O	X O	X O	X O
DIRECTORY USED MIN MAX	X				O	
LIST VOLUME TABLE	X		X #	X #	X #	X #
DELETE VOLUME	X				O	

Table 7-19. Options For Modifying The System (Continued)

OPTION	SYSDUMP	WARMSTART	COOLSTART	COLDSTART	RELOAD	UPDATE
ADD VOLUME	X		X O	X O	X O	X O
LIST DEFECT TRACKS			X #	X #	X #	X #
DELETE TRACK			X O	X O	X O	X O
*VIRTUAL MEMORY CHANGES	X		X O	X O	X O	X O
LIST V.M. DEV. ALLOCATION	X #		X #	X #	X #	X #
DISABLE LOGGING			X O	X O	X O	X O
MAX #OF SPOOLFILES KILOSECTORS	X		X O	X O	X O	X O
MAX #SEC-TORS/SPOOL-FILE EXTENT	X		X O	X O	X O	X O
MISC CONFIG CHANGES	X					
LIST GLOBAL RIN'S	X #					
DEL GLOBAL RIN'S	X				O	
#RIN'S MIN MAX	X				O	
#GLOBAL RIN USED MAX	X				O	
#SECONDS TO LOGON	X			O	O	
MAX #CONCUR SESSIONS	X			O	O	

*Virtual memory for ldev 1 (the system disc) can be changed only during a RELOAD from a SYSDUMP tape.

Table 7-19. Options For Modifying The System (Continued)

OPTION	SYSDUMP	WARMSTART	COOLSTART	COLDSTART	RELOAD	UPDATE
MAX #CONCUR JOBS	X			X O	X O	
DEFAULT JOB CPU LIMIT	X			X O	X O	
MESSAGE CAT CHANGES	X			X O	X O	X O
SOFTDUMP COMMAND CHANGES	X			X O	X O	X O
LOGGING CHANGES	X					
LIST LOG-GING STATUS	X					
CHANGE STATUS	X			X O	X O	
LOG FILE RECORD SIZE	X			X O	X O	
LOG FILE SIZE	X			X O	X O	
SCHEDULING CHANGES	X					
SEGMENT LIMIT CHANGE	X					
MAX #CONCUR PROGRAMS	X			X O	X O	
MAX CODE SEG SIZE	X			X O	X O	
MAX #CODE SEG/PROCESS	X			X O	X O	

Table 7-19. Options For Modifying The System (Continued)

OPTION	SYSDUMP	WARMSTART	COOLSTART	COLDSTART	RELOAD	UPDATE
MAX STACK SIZE	X			X O	X O	
MAX EXTRA DATA SEG SIZE	X			X O	X O	
MAX #EXTRA DATA SEG PER PROCESS	X			X O	X O	
STD STACK SIZE	X			X O	X O	
SYSTEM PROGRAM CHANGE	X			O	O	O
SYSTEM SL CHANGES	X			O	O	O
LIST LIBRARY	X #					
DELETE SEGMENT	X					
REPLACE SEGMENT	X					
ADD SEGMENT	X					
RECOVER LOST DISC SPACE			X O	X O		X O

SPECIAL CONSIDERATIONS FOR PERIPHERAL DEVICES

SECTION VIII

The use of peripheral devices, such as printers, discs, and tape cartridges, can greatly enhance the power of the MPE operating system. This section details issues which must be considered when using certain peripheral devices. The HP 2563A and the HP 2688A are only supported beginning with the G.00.00 release of MPE V.

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THE HP 268X LASER PRINTERS: SPECIAL CONSIDERATIONS

The HP 2680A and HP 2688A are laser printers. These printers have several special features, some of which need special operator attention:

- Format control of the page size, character fonts, forms and other printed requirements of the HP Laser Printing System.
- Automatic job recovery for spooled jobs, after a power fail or paper jam.
- Job-to-job integrity and separation. Each spool file prints independently of the features which were programmed for the previous job.

Format Control of the HP 2680A and HP 2688A

The environments of the HP 2680A and 2688A are created with IFS/3000. The specifications in the environment file include: page size, character fonts, forms, logical pages, and other printed requirements. After the files are in the system, they may be accessed through the ENV= parameter of the :FILE command or the FOPEN intrinsic. The environment files are created specifically for either the HP 2680A or the HP 2688A and therefore, are not directly compatible. For more information on creating environment files, refer to the IFS/3000 Reference Guide (36580-90001).

Automatic Recovery of the HP 2680A and HP 2688A

The HP 2680A and 2688A are configured as spooled devices. Therefore, the spooler is able to automatically recover print jobs in progress. Some operator intervention may be required in some cases before automatic recovery can take place.

The MPE software allows the spooler process to automatically recover from unexpected events such as power failures or paper jams, and allows the operator to go back or forward any number of logical pages within the currently active print job. This feature is useful, for example, in the case of a paper jam, where perhaps several pages may have been reported as "good" status, but were actually lost due to the jam. In this case, you would issue a :RESUMESPOOL command, using the BACK option, for as many pages as necessary. The maximum number of pages possible in one command is 256.

MPE keeps track of the actual logical pages printed in the device by means of an environmental status block from the device. This status block is programmatically set to be returned by the device at every logical page, or every "*n*" logical pages.

The environmental status block contains information which relates directly to the spooled file. For example, it returns the actual logical page just printed, and other information such as the exact place a particular environment has been loaded into the device. This technique is called "checkpoint recovery".

When some unexpected event occurs, such as a power failure or paper jam, MPE reads the environmental status to determine the last complete logical page printed, and determines whether an environment was present in the printer at the time of the event. If an environment was present, a backward search is made of the saved status blocks to determine when the environment was loaded. When found, the printer is instructed to "silent run", i.e., to resend the data as though printing were going to take place, but not actually print the data. Thus, the file is resent, including the environment, silent running up to the point where the last complete logical page was printed. The device resumes printing when the data is received for the first page for which no checkpoint was received.

HP 2680 Error Trailers

When the HP 2680 encounters illegal commands in the files being sent to it, it reports each error and the record in which the error occurred to the spooler. The spooler collects these errors and prints them in an error "trailer" at the end of the job. The error trailer lists the record and physical page in which the error occurred, a message describing the error, and "environment statistics" describing the printer's status. You can use the error trailer to diagnose problems with your printer, environment, or application.

The spooler aborts a job after the printer reports more than 100 programming errors. It prints the error trailer, with messages for the first 100 errors, and the message "**EXCEEDED 100 ERRORS FOR THIS JOB, SPOOLFILE DEFERRED." The spooler defers aborted jobs so that the programmer can read the error trailer and examine the bad records using the SPOOK Utility as shown below. (Refer to the MPE Utilities Reference Manual (32033-90008) for instructions for using SPOOK.)

```
:RUN SPOOK5.PUB.SYS
>TEXT devicefileid
>MODE CONTROLS=ON
LIST firstrecnum/lastrecnum
>EXIT
```

Figure 8-1 illustrates the error trailer format on an HP 2680.

```
                SAMPLE ERROR TRAILER

      ***  ERROR LOG FOR LDEV = 14   DFID = #0667 ***
REC = 1667, PHYS PAGE = 1, MOVED LOGICAL PEN OFF THE LOGICAL PAGE
      ***                           ***
      ***   ENVIRONMENTAL STATISTICS ***
      ***                           ***
BUFFER = 16 BLOCKS  BUCKETS AVAILABLE = 32051  BUCKETS USED = 1772
MEMORY = 1024K WORDS
3 VFCs;  1 FORMS;  7 CHARACTER SETS;  1 ACTIVE LOGICAL PAGES;
0 PICTURES
CHARACTER SETS = 43568 WORDS; FORMS = 6256 WORDS; VFCs = 192 WORDS;
PICTURES = 0 WORDS
PAGE LENGTH = 8.50 INCHES  ( 21.59 CM )
PAGE WIDTH  = 11.0 INCHES  ( 27.94 CM )
FORMS CLIPPED = NO;  DATA TRUNC = NO;  CHARS CLIPPED = 77;
PICTURES CLIPPED = NO
TOTAL USER MEMORY = 50016 WORDS    DATE CODE = 2214
TOTAL PHYSICAL PAGES PRINTED = 1
```

Figure 8-1. Error Trailer Format

Listed below are the items on the error trailer (as shown in Figure 8-1) and a brief description of each:

ERROR LOG FOR LDEV= — Logical device number of the laser printer that produced the error trailer.

DFID= — Device File Identification Number. The number of the output spoolfile that contained the error. If the output spoolfile is deferred, you can use this number to identify the spoolfile with SPOOK.

REC=, PHYS PAGE=, error — Certain errors cause an error message to appear. The error trailer lists the number of the record that caused the error and the physical page where the error occurred along with the error message. If the output is deferred, use SPOOK to view the record(s) that have errors.

Specific error messages are listed below, along with a brief explanation of corrective action.

NOT ENOUGH MEMORY FOR CHARACTER SET LOAD -- There is insufficient memory available to load the character set being sent to the laser printer.

NOT ENOUGH MEMORY FOR FORMS LOAD -- There is insufficient memory available to load the form being sent to the laser printer.

NOT ENOUGH MEMORY FOR VFC LOAD -- There is insufficient memory available to load the VFC being sent to the laser printer.

OUT OF MEMORY - JOB ABORTED, SPOOLFILE DEFERRED -- The main memory is completely occupied with character sets, VFCs, forms, and data so that the current input data is lost.

NOT ENOUGH MEMORY FOR PICTURE DOWNLOAD -- The main memory is completely occupied with character sets, VFCs, forms, and data so that it cannot download the current picture.

To correct any of the five preceding errors, add additional memory to the laser printer, and/or reduce the amount of TOTAL USER MEMORY. Look at the memory used for CHARACTER SETS, FORMs, VFCs, and PICTURES. Eliminate any of these that are not essential. If possible, limit the range of character sets in the environment (at the character font menu in IFS) by specifying the lowest and highest character codes actually used. Consider changing permanent (addressable) PICTURES to temporary.

ATTEMPT TO SELECT AN UNDEFINED CHARACTER SET -- The character set number specified is not in the environment file. The record is ignored and the currently selected character set remains active. Either add the character set to the environment (at the logical page menu if IFS) or change the character set reference to a valid one.

AN UNDEFINED FORM WAS SELECTED -- The form name referenced by the environment or an IFS/3000 procedure or the form number referenced by an intrinsic does not exist. Either correct the reference, download the form with an intrinsic, or remove the intrinsic call that deleted the form.

ATTEMPT TO PRINT WITH NO VFC SELECTED -- The printer attempted to print data, but there is no currently selected VFC. VFCs were turned off, but an attempt was made to issue a channel call. The printer ignores the channel call and performs single spacing. Either specify a VFC file for the environment (at the VFC selection menu in IFS), specify a VFC file with an intrinsic, or eliminate the channel call.

ATTEMPT TO PRINT WITH NO LOGICAL PAGE TABLE -- The printer attempted to print data, but there was no active logical page. Be sure to have a logical page active when printing data. Either select a logical page or make a logical page initially active in the environment (at the logical page menu IFS).

MOVED LOGICAL PEN OFF THE LOGICAL PAGE -- The printer attempted to move the logical pen off the logical page. Either modify the "move pen" command or change the size of the logical page.

DATA SATURATION - DATA WAS LOST -- The HP 2680 could not process all of the data fast enough to transfer it to the drum. The number of characters that can appear on any scan line is a function of the horizontal width and vertical height of each character. Wider and higher characters require greater processing than smaller ones. Consequently, the printer can place fewer on a scan line. The absolute maximum number of characters (excluding blanks) and form elements that can appear on any scan line is 255. Forms (including shading, boxes, and lines) and pictures also reduce the number of characters that the printer can place on one scan line. Consider the factors just mentioned to solve the problem. Blank scan lines between two adjacent rows of print may help solve this problem. This error also occurs if two logical pages are superimposed on each other so that the total items per scan line exceed the limits of the machine.

SPOOLER BLOCK CONTAINS FORMAT ERROR -- The information in the spoolfile was not in the correct format for the HP 2680 to interpret it. This could be:

1. An invalid function code or,

2. An incorrect record size or block size. Use SPOOK to analyze the record in error. (Use the procedure explained at the beginning of this section.)

A MULTI-COPY FORMS ERROR HAS OCCURRED -- The printer attempted to use the multi-copy forms table, but the table had not been loaded for this job. Ensure that the multi-copy forms box is set to "Y" on the IFS physical page menu or ensure that an intrinsic downloads the multi-copy form overlay table.

EXCEEDED MAXIMUM COPIES PER PAGE -- The maximum number of copies per physical page has been exceeded. The physical page menu of the environment file allows you to specify how many times you want a page printed before the next physical page is printed. This error indicates that you specified a number greater than the maximum number of 32767. However, you can change the maximum value with the FDEVICECONTROL intrinsic. If this error occurs, the printer prints only the maximum number of copies per page allowed. Note that this error is unrelated to the number of copies generated by the spooler.

EXPECTED JOB OPEN FROM SPOOLER -- The printer received a command or function code when no job was in progress. The printer expects that the first record received is a JOB OPEN.

SPACING PARAMETER IS <=0 IN LPT FOR VFC -- The VFC linespacing is less than or equal to zero. The base height of the character set was non-positive. Check that word 10 (height of base character set) of the logical page table downloaded by the FDEVICECONTROL intrinsic is correct.

ATTEMPT TO SKIP TO A NON-EXISTENT VFC CHANNEL -- A non-existent VFC channel was selected. Change your VFC call to point to a valid channel, modify your VFC file to include that channel, or reference a VFC file that has that VFC channel.

LOGICAL PAGE WAS TRUNCATED TO FIT ON PAPER -- Modify the environment (using IFS) to change the logical page, physical page, or scaling on the logical page forms menu.

OPERATOR MOUNTED WRONG SIZE PAPER -- The page size requested by the user did not match the paper length set by the operator. The printer uses the page length set by the operator. Rerun using correct size paper, have the proper page length entered on the HP 2680 panel, or change the physical page of the environment at the physical page menu in IFS.

ATTEMPT TO PRINT WITH NO CHARSET SELECTED -- No character set was selected when a print record was processed. The printer skipped the record. Specify a valid character set in the environment (using IFS), or select a valid character set with a procedure or intrinsic.

ATTEMPT TO PRINT WITH TOO MANY PICTURES ON A PHYSICAL PAGE -- The printer attempted to print more than 64 pictures on a physical page, the maximum allowed by the system. Modify your program.

ATTEMPT TO PRINT A PICTURE WHICH IS NOT PRESENT -- The printer attempted to print a picture that was not present in memory. Modify your program to reference a valid picture or make the picture available.

BUFFER= This is the size of the incoming data buffer in 512-word blocks. Rather than receiving one data record at a time, the HP 2680 expects large multi-block transfers. Each transfer is composed of between one and eight 512-word blocks created by the host system spooler. This method of receiving data increases throughput and relieves the burden of deblocking from the host.

BUCKETS AVAILABLE= The number of buckets (i.e., 32-word blocks of memory) available. The printer uses these buckets in data linking and command processing. The number of buckets controls how many pages the printer can process (link up) ahead of the actual printing.

BUCKETS USED= The maximum number of buckets used since the beginning of the job. The number of buckets required to print a job is data-dependent.

MEMORY= The number of words of memory contained in the laser printer. The HP 2680 supports a minimum of 128K 16-bit words. Up to one megaword memory configurations are optionally available. The mainframe and power supply are capable of supporting up to one megaword.

Users cannot access approximately 23,000 words of the printer's memory that are allocated to the printer's exclusive use for system tables. System tables do not vary in size, regardless of the amount of memory installed. The remainder of memory is available to the user and is called the user area. This memory space contains all character sets, forms, VFCs and pictures that have been downloaded. It also contains the buckets (32-word blocks) used in data linking and command processing.

#VFCs The number of VFCs that are loaded in the printer. The printer supports up to 32 VFCs simultaneously, one for each defined logical page. A VFC consists of a two-word descriptor block and a table of N words. Each bit in a word corresponds to one of the 16 VFC channels. Each word in the table corresponds to one line of the logical page. When it receives a VFC command the printer calculates the line on the page where the pen is currently located. It then accesses the VFC table at this particular address + 1, and starts searching the VFC table for a word with the bit set corresponding to the VFC channel described in the command. When it finds the bit, the printer moves the page to the new line position and left-justifies the pen on the logical print line.

If the printer does not find a VFC bit before the end of the table or the end of the page, it performs a logical page eject and scans the VFC table of the next logical page from the beginning, looking for the bit. If the printer finds that VFC table then it places the pen on the first line of that VFC table.

#FORMS

The number of electronic forms loaded in the printer. The HP 2680 can print electronic forms on plain paper thus eliminating costly, pre-printed forms. The printer allows a physical page to be divided into a maximum of 32 logical pages. In addition each logical page may have up to two forms overlayed on it. The printer checks whether the form overflows the physical page but does not check whether the form overflows the logical page. Several different logical pages can use a single form, stored only once in the HP 2680 memory. The printer will properly place each copy of the form on the corresponding logical page. The orientation of a form depends on the rotation of the logical page. The number of logical page form overlays on any physical page cannot exceed 30 forms.

In addition, you can specify two forms to be overlaid on the physical page, (multi-copy forms). For each copy of the same sheet of paper, you can instruct the printer to overlay two different forms on each of the first eight copies. The multi-copy forms overlay table controls this feature. This means that you can place a total of 32 forms on one sheet of paper.

#CHARACTER SETS

The number of character sets loaded in the printer. The maximum is 32.

#ACTIVE LOGICAL PAGES

The number of active logical pages. The term logical page refers to any rectangular area on the physical page to which the printer writes text or graphics. The HP 2680 allows up to 32 logical pages per physical page.

#PICTURES

The number of permanent (addressable) pictures currently loaded. The maximum is 32. A user wishing to output graphics to the HP 2680 does so by using a construct called a picture. A picture is a dot/bit image of a print area that has been partitioned into a set of picture cells, (i.e., small subsections of the complete picture).

There are two types of pictures, temporary and permanent (addressable). A temporary picture is downloaded, printed as data, and then deleted from memory. A permanent picture is downloaded, stored in memory, and is then available to the user for printing on demand. These two picture types give the HP 2680 the flexibility to efficiently address conflicting requirements:

1. A job that prints multiple copies of the same picture on the same or different pages may use permanent pictures, as directed by the programmer or creator of the job. The job downloads the picture, assigns it an index, and references the picture by index whenever desired. Permanent pictures minimize data communication overhead when the same picture must be printed many times. However, memory limitations may become a problem.

2. Jobs that print many pictures, but rarely repeat them use temporary pictures. Whenever the job requires a picture to be printed, it issues a print picture command which downloads the pictures, prints it, and deletes it from memory.

The HP 2680 supports up to 32 permanent pictures and 64 total pictures depending on memory limitations. Both types of pictures may be used simultaneously within the same job in any manner. The only absolute restrictions are memory availability and the performance limitations of the HP 2680.

CHARACTER SETS= The number of HP 2680 memory words used for character set definition.

FORMS= The number of HP 2680 memory words used for forms definition.

VFCs= The number of HP 2680 memory words used for VFCs.

PICTURES= The number of HP 2680 memory words used for pictures.

PAGE LENGTH= The page length, in the direction of the paper motion in .25-inch increments (or corresponding length in centimeters).

PAGE WIDTH= The page width, in the direction of the laser scan in .1-inch increments (and corresponding width in centimeters).

FORMS CLIPPED (Yes/No)= If yes, one or more forms were not printed on a physical page because the form started in the non-printable area of the physical page (i.e., within 1/4 inch of the perforation between pages). Either a programming error occurred or the operator used the registration buttons to locate the form off the page.

DATA TRUNC (Yes/No)= If yes, the printer truncated data from the top or bottom of the physical page. Either a programming error occurred or the operator moved the print off the page with the registration buttons.

CHARS CLIPPED= The number of non-blank characters not printed. As it processes characters, the printer computes the bounds of each character cell to ensure that the entire character cell is within the limits of the active logical page. If a character cell fails this check, the printer does not print it. If a character cell is not completely within a logical page, the printer truncates the character and increments the number of characters clipped for the job. The pen position remains unchanged.

There is an exception to this rule. If a character cell is oriented in the same direction as the logical page, and the character cell is off the bottom of the logical page, the printer performs a logical page eject and places the character in the first cell position of the next logical page.

PICTURE CLIPPED (Yes/No)= If yes, one or more pictures were not printed because they started in the non-printable area of the page (i.e., within 1/4 inch of the perforation between pages). Either a programming error occurred or the operator used the registration buttons to locate the picture off the page.

TOTAL USER MEMORY=	The number of user area words actually loaded.
DATE CODE=	The date code of the DCS firmware ROMs currently installed. This date code is in standard HP format - year/week. The years start from 1960 and the weeks include one through 52. A date code of 1901 is year 1979 (1960 + 19) and the first week of the year, or in other words, the first week of January, 1979.
TOTAL PHYSICAL PAGES PRINTED=	Total number of physical pages printed since the beginning of the job.

Job-to-Job Integrity

The purpose of using an environment file specification is to allow the user job-to-job control of the printers without the need for operator intervention. The HP 2680A and HP 2688A always clear the printing environment at the end of every print job. This means that it returns to the configured environment of the HP 2680A and 2688A.

If a special environment has been specified, multiple copies of the spool file can be printed correctly, even if other, higher priority jobs print in between. This is because the environment for each print job is actually contained in the spool file, thus ensuring that every individual job will print using the correct environment for that job.

HOW TO SWITCH BETWEEN PRIMARY AND SECONDARY CHARACTER SETS

Default primary and secondary character sets are specified by switch settings on the front panel. The default primary and secondary character sets are selected whenever the HP 2608A/S, 2563A or the HP 268X is powered on or reset.

The user may programmatically switch back and forth between default primary and secondary sets (and only those sets), by using a "shift-out/shift-in" protocol. Following a shift-out (%16) in the data stream, all characters will access the secondary character set, until a shift-in (%17) is detected, or until the printer is reset. At the end of an output listing, the printer is reset. Note that a shift-out or shift-in should not be the last character in a line. If it is desired that the shift-out or shift-in follow the last printed character in a line, add a blank character after the shift-out or shift-in.

If power is lost in the middle of a printjob, and if the operator restarts the printing at some point in the job beyond the original shift-out (%16), the remainder of the job will be printed in the primary character set, instead of the secondary set. This can be avoided by restarting interrupted jobs at the beginning. Alternatively, the application could be written to include a shift-out/shift-in pair, with each line to be printed containing secondary set characters.

THE HP 2608A/S AND HP 2563A PRINTER: SPECIAL FEATURES

The HP 2563A is plug-compatible with the HP 2608S. Being plug-compatible means that switching the printers requires minimal MPE software changes. In addition, the HP 2563A supports compressed printing and the ability to print bar codes. The HP 2608S and HP 2563A have several special software-controlled features, some of which will affect a System Operator's duties:

- Two system default modes: FEATURE and TRANSPARENT.
- Job-to-job integrity and separation. This is the same feature as for the HP 2680A and HP 2688, if the :FILE command or FOPEN is used.
- Automatic electronic VFC and left margin control without operator intervention.
- Automatic job recovery for spooled jobs, after power failure or paper jam. This the same as for the HP 2680A and HP 2688A, if the :FILE command or FOPEN intrinsic is used.

FEATURE and TRANSPARENT Access Modes

The HP 2608S and HP 2563A support two system default modes. These are FEATURE and TRANSPARENT access.

FEATURE access is a means for the user to implement full control embedded in data which is to be printed on the HP 2608S and HP 2563A. Control consists of character controls (such as backspace, shift-in, shift-out, vertical tab, etc.), as well as supported escape sequences. These controls are executed in the HP 2608S and HP 2563A as commands to the printing mechanism. When the device is configured as FEATURE access default, MPE will ensure this default state at the start of every print job.

TRANSPARENT access is a means for the user to restrict data so that control characters and escape sequences embedded in the data are not executed. Instead, they are printed as a part of the data stream just like any other printable character. This access will make the HP 2608S and HP 2563A very similar to all other printers supported on HP 3000 systems.

One difference for this mode occurs between the HP 2608S/2563A and the HP 2608A. The HP 2608S and HP 2563A will not execute backspace, shift-in, or shift-out in the TRANSPARENT mode. The HP 2608A, however, does execute these control characters in the normal course of operation. There are no selectable modes for the HP 2608A.

Automatic VFC

In some printers, vertical tabulation is accomplished by inserting a loop of paper tape into the printer. This paper tape has holes punched in various columns (called "channels") corresponding to lines on the page. If a program issues "skip to channel *n*", the tape and paper are slewed (advanced at high speed) until the printer detects a hole in channel *n*. These tapes are called VFC tapes or VFU tapes, which stand for Vertical Format Control and Vertical Format Unit, respectively. The HP 2608A/S and HP 2563A use "electronic VFCs", which are programmatically downloaded into the printer before a print job begins.

The HP 2608A/S and HP 2563A printers allow users to set a specified electronic left margin in the file created for environment loading. This feature allows the user to offset the beginning left column of each print line up to 16 spaces from the real left margin. In addition, the HP 2608S and HP 2563A offers full left and right indentation through the use of escape sequences in the FEATURE mode.

User-created VFC files can be downloaded to the HP 2608A/S and HP 2563A by use of the operator :DOWNLOAD command. Hewlett-Packard recommends that VFCs be downloaded to the HP 2608S and HP 2653A by the user through the use of the "ENV= " keyword parameter of the :FILE command or FOPEN intrinsic without any operator intervention. The environment entered with the :FILE command will override any environment entered with the :DOWNLOAD command or the FOPEN intrinsic. The HP 2608S and HP 2563A automatically reset to the default mode and VFC after each print job completes. Even if the user does not specify a special VFC, there is still no operator intervention required. Refer to the :DOWNLOAD command in the MPE V Commands Reference Manual (32033-90006) for more information.

NOTE

Always set the HP 2608S physical form length, using the switches on the printer control panel, before downloading VFC or specifying an environment file for the printer.

The VFC or environment file for the printer can specify a logical form length. When the printer receives a "top of form" or "form feed" command programmatically, the printer advances to the top of the next logical form. Pressing the front panel "TOP OF FORM" button, however, always advances the printer to the top of the next physical form.

The last change you make to the form length always takes precedence. For example, if you download VFC, then change the physical form length, the physical length overrides the logical length set in the VFC file.

For instructions on setting the physical form length, refer to the HP 2608S Operator's Manual (02608-90911). For more information on VFC, refer to the HP 2608S Technical Reference Manual (02608-90910).

Downloading VFC

If your system has an HP 2608A line printer, you may receive a forms message requesting specific FORMS and/or the Vertical Format Control (VFC) needed for printing a particular job/session.

If your system has an HP 2608S or HP 2563A printer, the users can specify an environment file for their output without operator intervention. Only these printers allow the user to directly control VFC, left margin and printer mode. A user-created file containing the VFC specifications is entered in the "ENV=" parameter of the :FILE command or the FOPEN intrinsic. The environment file for the HP 2608S and HP 2563A is different from the environment file of the HP 2680A or HP 2688. The

file is not an IFS/3000 file; it is an editor file. Using the HP 2608S and HP 2563A environment file with the :FILE command or FOPEN intrinsic, allows job-to-job integrity and automatic recovery procedures the same as for the HP 2680A and HP 2688A.

To change the format of output from your 2608A printer, a user-created file may be downloaded, via the :DOWNLOAD command, by the operator at run time. The HP 2608S and 2563A will also support certain programs which use the :DOWNLOAD command intended for an HP 2608A.

To utilize this file, the user should:

- Create the file with EDIT/3000 or an equivalent, and store it.
- Include in the application program a FORMS message (HP 2608A only), instructing the operator to download the file using a :DOWNLOAD command and, if applicable, to set up special forms in the printer. The user may also include a FORMS message for the HP 2608S or HP 2563A if special forms are to be used with the environment file.
- At print time, MPE will display the FORMS message for appropriate action by the operator.

For the HP 2608A, the job will be printed and completed. Complete all other jobs requiring the currently downloaded VFC and margin. Then, simply remove any special forms, and download a standard VFC, such as VFC8, or VFC6, or any other appropriate VFC and margin. Refer to Tables 8-1 and 8-2 for details of VFC6 and VFC8. A full list of octal codes and associated carriage actions are given in Table 8-3.

For the HP 2608S and HP 2563A, the job will be printed and completed. If a special FORMS message has been received and forms mounted, the next job output will ask you to remove the special forms.

As mentioned above, the HP 2608S and HP 2563A will accept and act on a :DOWNLOAD command. Nevertheless, Hewlett-Packard recommends using an environment file to supply the required formatting information, as well as other data used by the HP 2608S.

CAUTION

DO NOT ISSUE A :DOWNLOAD COMMAND TO AN HP 2608S OR HP 2563A, except when FORMS ALIGNED OK? is displayed. A :DOWNLOAD issued any other time may cause the printer to hang. A WARMSTART must be performed before it can be used again.

Format of the Editor File

The Editor file consists of 80 character records (lines). Three parameters can be specified in this file: MARGIN= , MODE= , and VFC. These parameters are placed on separate lines at the beginning of the file; MARGIN= and MODE= are optional, but, if used, should appear before VFC . All text in the Editor file should begin in column 1.

NOTE

Certain limitations exist in using the MODE= and MARGIN= parameters. First, MODE= cannot be used in a VFC Editor file for an HP 2608S. Secondly, MARGIN= should not be used in a VFC Editor file for an HP 2563A; doing so will cause data to be lost in the last printable column (column 132) of the output. (The reason for losing this data is that the physical left margin of the HP 2563A is "0". The HP 2608S, which is configured with the same type and subtype as the HP 2563A and uses the same driver, has a physical left margin of "1"; this makes it possible to use the MARGIN= parameter without losing any data.)

This is the format of the three parameters:

MARGIN=*nn*

The value *nn* is an integer between 1 and 16, inclusive, and specifies the left margin indentation. MARGIN= is valid for the HP 2608A/S only.

The HP 2608A hardware documentation discusses a "margin offset" which varies from 0 to 15. This offset is not the same as the MARGIN= parameter, because the software compensates for the hardware offset of *nn*+1.

MODE=[TRANSPARENT]
[FEATURE]

TRANSPARENT specifies that control characters and escape sequences, which are embedded in the data, are not executed. FEATURE allows the printer to act on these control characters and escape sequences. MODE= is valid only on the HP 2608S and the HP 2563A. The default is the MODE specified by the system-configured SUBTYPE.

VFC,*x*,*y*,*string*

The value of *x* is either 6, 8, or blank, and specifies print density in lines per inch. Default (blank) is six lines per inch; if a blank is used, a comma (,) must be used as a place holder. Note that a comma must also always follow "VFC".

The value of *y* is an integer between 0 and 127, inclusive, and specifies the number of lines (rows) in the VFC pattern. If "0" is specified, the printer will reset its internal VFC to the default state, including lines and pages.

The *string* is an optional comment field that may be used to describe the VFC file. If used, it must be separated from *y* by a comma.

Note that the first record consists of the string MARGIN=*nn*, where *nn* is between 1 and 16, inclusive. The next record (or the first, if no MARGIN) identifies the following records of the file as a VFC image. It consists of a record of 80 bytes, with the string VFC in columns 1 through 3. Column 5 contains either a 6, 8 or a blank, indicating the number of lines per inch; the default is 6 lines per inch. Following the lines per inch is the number of print lines per page. This number must be between 0 and 127, inclusive. If 0 is specified, the printer resets its internal VFC to the default state. All the parameters are separated by commas. A blank, or a zero in a column, indicates a 0, or no-punch. Column 1 of the record corresponds to channel 1, column 2 to channel 2, and so on up to channel 16. Each record corresponds to a line position on the page.

The " MODE=" parameter can only be used with the HP 2608S or HP 2563A. If the " MODE" parameter parameter is :DOWNLOADed to an HP 2608A, it will not cause an error condition, but will be ignored.

The first record can be a string containing the keywords "MARGIN= ", "MODE=" (for the HP 2608S or HP 2563A) or "VFC". Ordinarily, for the HP 2608S or HP 2563A, you would specify "MODE= " in the first record, then "MARGIN= " in the second record and "VFC " in the third record. For the HP 2608A, it would be "MARGIN= " in the first record and "VFC " in the second. The optional column punch information would be in the records following.

VFC must be the last parameter. It identifies the records which follow as VFC information for each line on the page. A blank or zero in a column indicates a 0, or no-punch. Column 1 of the record corresponds to channel 1, column 2 is channel 2, and so on, up to channel 16.

Several VFC channels are used by MPE. If you or a user change their specification, unexpected behavior may result. The following description, together with Table 8-3, explains these dependencies for each device:

HP2608A: Channel 1. Top of form button on the printer.
Opening or closing a printjob or a printfile within a printjob.
Specifying a carriage-control directive of "1" (%61).

Channel 3. The previous request was in pre-space mode with a nonzero count, the current request is in post-space mode, and automatic page eject is in effect. The skip to channel 3 is applied to the pre-space mode data.

Channel 4. The request specifies a carriage-control directive of "0" (%60) and automatic page eject is in effect.

Channel 5. The request specifies a carriage-control directive of "-" (%55) and automatic page eject is in effect.

HP2608S: Channel 1.
HP2563A: Opening or closing a printjob or a printfile within a printjob.
Specifying a carriage-control directive of "1" (%61).
(The top of form button on the printer ejects a physical page, whose length is displayed on the printer control panel. This length is independent of both VFC Channel 1 and the length of the logical page. The latter length is defined by the number of lines in the VFC.)

Channel 3. The previous request was in pre-space mode with a nonzero count, the current request is in post-space mode, and automatic page eject is in effect. The skip to channel 3 is applied to the pre-space mode data.
In FEATURE mode (by default, by use of MODE=FEATURE in a VFC file, or when set by an FDEVICECONTROL call), with automatic page eject in effect, a request specifying a carriage-control directive of "0" (%60) is changed to two skips to channel 3. A directive of "-" (%55) is changed to three skips to channel 3. This achieves true double or triple spacing, and also skips the page perforation if it occurs during the skip.

Channel 4. The request specifies a carriage-control directive of "0" (%60) and automatic page eject is in effect.

Channel 5. The request specifies a carriage-control directive of "-" (%55) and automatic page eject is in effect.

Channel 11. The request specifies a carriage-control directive of "2" (%62).

Here are examples of various VFCs:

- A standard VFC for 6 lines per inch:

```
VFC,6,0
```

- A standard VFC for 8 lines per inch:

```
VFC,8,0
```

- A standard VFC for 6 lines per inch with the MODE feature set to FEATURE access:

```
MODE=FEATURE
VFC,6,0
```

- A standard VFC for 8 lines per inch with MODE feature set to TRANSPARENT access:

```
MODE=TRANSPARENT
VFC,8,0
```

- A standard VFC for 6 lines per inch, left margin set to 6, and MODE set to FEATURE access:

```
MODE=FEATURE
MARGIN=6
VFC,6,0
```

- The same example as above, with records 1 and 2 reversed:

```
MARGIN=6
MODE=FEATURE
VFC,6,0
```

- A special VFC with 6 lines per inch, a page length of 24 lines, MARGIN=6, and MODE=FEATURE. The VFC image defines channel 1 to be top of form, channel 2 to be bottom of form, channel 3 to be single spacing, channel 4 to be every second line, channel 5 to be every third line and channel 13 selects line 8, as well as line 1. Line 1 has all but one channel set. Lines 19 through 24 define a 6 line per skip area (outside of the form defined by channels 1 and 2). Channels 6 through 16, except channel 13, are all set to top of form:

```
                          1 1 1 1 1 1 1    (Columns in Editor file
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6            represent VFC channels)

M O D E = F E A T U R E                    ** First line of Editor file **
M A R G I N = 6
V F C , 6 , 2 4
1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1              ** line 1 of VFC image **
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0                        .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0                ** line 10 **
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 1 1 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                ** line 20 **
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                ** line 24 **
```

The standard form of the VFC is a ten-inch form area on an 11-inch page with 60 lines possible. The following example illustrates an eight-line-per-inch format shifted to a six-line-per-inch format, with all sixteen channels used:

```
M A R G I N = 1                            ** First line of Editor file **
V F C , 6 , 6 6
1 0 1 1 1 1 1 1 0 0 0 1 1 1 1 1              ** line 1 of VFC image **
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1                        .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0                        .
0 0 1 1 1 0 0 0 0 0 0 0 0 1 0 0                        .
0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0                        .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1                        .
0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0                ** line 10 **
0 0 1 1 0 0 0 1 0 0 0 0 0 0 1 0                        .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 1 1 0 0 0 0 0 0 0 0 1 0 1                        .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                        .
0 0 1 1 0 0 0 0 0 0 0 0 1 0 0 0                        .
0 0 1 0 1 0 1 0 0 0 0 0 0 0 1 0                        .
```

```
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1                .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 1 1 0 0 0 0 0 0 0 0 1 0 0                .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0          ** line 20 **
0 0 1 1 0 0 0 1 0 0 0 0 0 0 1 1                .
0 0 1 0 1 0 0 0 0 0 0 0 1 0 0 0                .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 1 1 0 0 0 0 0 0 0 0 1 0 1                .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0                .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 1 0 0 0 0 0 0 0 0 1 0 0 1                .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0          ** line 30 **
0 0 1 1 1 1 1 1 0 0 0 0 0 1 1 0                .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1                .
0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 0 0 0 0 0 0 0 0 0 1 0 1 0                .
0 0 1 1 1 0 0 0 0 0 0 0 0 1 0 1                .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0          ** line 40 **
0 0 1 1 0 0 0 1 0 0 0 0 0 0 1 1                .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 1 1 0 0 0 0 0 0 0 1 1 0 0                .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1                .
0 0 1 0 1 0 1 0 0 0 0 0 0 0 1 0                .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 1 1 0 0 0 0 0 0 0 0 1 0 1                .
0 0 1 0 0 0 0 0 0 0 0 0 1 0 0 0          ** line 50 **
0 0 1 1 0 0 0 1 0 0 0 0 0 0 1 0                .
0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 1                .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 1 1 0 0 0 0 0 0 0 0 1 0 0                .
0 0 1 0 0 0 0 0 0 0 0 0 0 0 1 0                .
0 0 1 1 0 0 0 0 0 0 0 0 1 0 0 1                .
0 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0                .
0 0 1 1 0 0 0 0 0 1 0 0 0 0 0 0                .
0 1 1 0 0 0 0 0 1 0 0 0 0 0 0 0          ** line 60 **
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0                .
0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0          ** line 66 **
```

If no channel specifications appear below line 66, then an end-of-file can occur after record 66, as in the above example. Also, blanks and zeros are interchangeable.

NOTE

If all entries in a column are blank or zero, and a program issues a skip to the corresponding channel, the printer will advance paper until the number of lines in the VFC specification has been exceeded.

- A special VFC for 8 lines per inch. Channel 1 is top of page. There are 88 lines per page, and channel 9 is skip to line 13. Channel 2 defines bottom of page, and channel 3 is skip one line:

```
V F C , 8 , 8 8
1 0 1
0 0 1
0 0 1
0 0 1
0 0 1
0 0 1
0 0 1
0 0 1
0 0 1
0 0 1
0 0 1
0 0 1
0 0 1 0 0 0 0 0 1
0 0 1
.
.
.
0 1 1                                          ** line 88 **
```

Table 8-1. Standard Six Line Per Inch Format

CHANNEL	FUNCTION	LINE POSITIONS OF LOGICAL ONE*
1	Slew to top of next form	0
2	Slew to bottom of form	59
3	Single space	0,1,2,...59
4	Slew to next double space line	0,2,4,...58
5	Slew to triple space line	0,3,6,...57
6	Slew to half page line	0,30
7	Slew to next quarter page line	0,15,30,45
8	Slew to next tenth line	0,10,20,...50
9	Slew to bottom of form	59
10	Slew to one line previous to bottom of form	58
11	Slew to one line previous to top of next form	65
12	Slew to top of next form	0
13	Slew to next seventh line	0,7,14,...56
14	Slew to next sixth line	0,6,12,...54
15	Slew to next fifth line	0,5,10,...55
16	Slew to next fourth line	0,4,8,...56

*Logical one is similar to the hole in a paper tape or destination point for that channel.

NOTE: A ten-inch printed form area on an 11-inch page with 60 lines possible is assumed.

Table 8-2. Standard Eight Line Per Inch Format

CHANNEL	FUNCTION	LINE POSITIONS OF LOGICAL ONE*
1	Slew to top of next form	0
2	Slew to bottom of form	79
3	Single space	0,1,2,...79
4	Slew to next double space line	0,2,4,...78
5	Slew to triple space line	0,3,6,...77
6	Slew to half page line	0,40
7	Slew to next quarter page line	0,20,40,60
8	Slew to next tenth line	0,10,20,...70
9	Slew to bottom of form	79
10	Slew to one line previous to bottom of form	78
11	Slew to one line previous to top of next form	87
12	Slew to top of next form	0
13	Slew to next seventh line	0,7,14,...77
14	Slew to next sixth line	0,6,12,...78
15	Slew to next fifth line	0,5,10,...75
16	Slew to next fourth line	0,4,8,...76

*Logical one is similar to the hole in a paper tape or destination point for that channel.

NOTE: A ten-inch printed form area on an 11-inch page with 80 lines possible is assumed.

Table 8-3. Carriage-Control Directives

OCTAL CODE	ASCII SYMBOL	CARRIAGE ACTION
%40	" "	Single space (with or without automatic page eject).
%53	"+"	No space, return (next printing at column 1). This cannot be used more than once on the HP 2608 without losing data.
%55	"-"	Triple space (with or without automatic page eject).*
%60	"0"	Double space (with or without automatic page eject).*
%61	"1"	Conditional page eject (form feed) is performed by the software. If the printer is not already at the top of the form, a page eject is performed. Ignored if: Post-space mode: The current request has a transfer count of 0 and the previous request was FOPEN, FCLOSE, or FWRITE which specified a carriage-control directive of %61. Pre-space mode: Both the current request and the previous request have transfer counts of 0, and the current request and previous request are any combination of FOPEN, FCLOSE or FWRITE specifying a carriage-control of %61.
%62		Skip to one line before top of form. This specification is valid only for HP 2608S and HP 2563A printers.
%63		A conditional page eject form (form feed) is performed by the printer. If the printer is not already at the top of form, perform a page eject. This specification is valid only for HP 2608S and HP 2563A printers.
%2nn (nn is any octal number from 0 through 77)		Space nn lines (no automatic page eject).
%300 - %313		Select VFC Channel 1 - 12 (2619).
%300 - %317		Select VFC Channel 1 - 16 (2608 A/S).

*Note: If these codes are selected with automatic page eject in effect (by default or following an Octal Code of %102 or %402), the resulting skip is to a location absolute to the page. A code of %60 is replaced by %303 and %55 is replaced by %304. Thus, the resulting skip may be less than two or three lines, respectively.

If automatic page eject is not in effect, a true double or triple space results, but the perforation between pages is not automatically skipped. For the HP 2608S and 2563A, if auto eject and feature mode are in effect, a code of %60 will be replaced by two codes of %302, and a code of %55 is replaced by three codes of %302. The resulting skip will be double or triple space with auto-reject, respectively.

Table 8-3. Carriage-Control Directives (continued)

OCTAL CODE ASCII SYMBOL	CARRIAGE ACTION
NOTE	Channel assignments shown below are the Hewlett-Packard standard defaults.
%300	Skip to top of form (page eject).
%301	Skip to bottom of form.
%302	Single spacing with automatic page eject.
%303	Skip to next odd line with automatic page eject.
%304	Skip to next third line with automatic page eject.
%305	Skip to next 1/2 page.
%306	Skip to next 1/4 page.
%307	Skip to next 1/6 page.
%310	Skip to bottom of form.
%311	User option (HP 2619), skip to one line before bottom of form (HP 2608).
%312	User option (HP 2619), skip to one line before top of form (HP 2608).
%313	User option (HP 2619), skip to top of form (HP 2608).
%314	Skip to next seventh line with automatic page eject.
%315	Skip to next sixth line with automatic page eject.
%316	Skip to next fifth line with automatic page eject.
%317	Skip to next fourth line with automatic page eject.
%320	No space, no return (next printing physically follows this).
%2 - %37	
%41 - %52	
%54	
%56-%57	Same as %40.
%62-%77	
%104-%177	
%310-%317 (2607)	
%314-%317 (2618/19)	
%321-%377	
%400 or %100	Sets post-space movement option; this first prints, then spaces. If previous option was pre-space movement, the driver outputs a line with a skip to VFC Channel 3 (automatic page eject in effect) or a one line advance (equivalent to an octal code of %201; without automatic page eject) to clear the buffer.
%401 or %101	Sets pre-space movement option; this first spaces, then prints.
%402 or %102	Sets single-space option, with automatic page eject (60 lines per page).
%403 or %103	Sets single-space option, without automatic page eject (66 lines per page).

THE HP 2619 PRINTER: CHARACTERISTICS

These are operational characteristics of an HP 2619 line printer in an HP 3000 system environment:

- While listing to the line printer, if the operator presses the alarm button, a " NOT READY " message will appear on the System Console, and the VF LED on the printer will light. The operator must realign the paper and reload the VFC tape. When the printer is put back on line, a line of data may be lost.
- While listing to the line printer, if the operator opens the yoke without first pressing the offline button, a " NOT READY " message will appear on the console. When the yoke is closed, and the printer is put back on line, a " POWERFAIL " message will appear on the System Console. One or more lines of data will be lost.
- If you power up first on the system, and then on the line printer, one page will be ejected. If the line printer is powered up first, two pages will be ejected. This will happen only once per system startup.

PREVENTING PRINTER DATA LOSS

Occasionally, a possibility of data loss is detected on the HP 2619 line printer. This triggers an alarm light on the printers' control panel, and the device goes offline. This situation may be caused by a power failure, paper jam, paper out, or other similar condition.

When the printer detects the possible data loss, the System Operator should issue a :SUSPENDSPOOL command for the device, then :RESUMESPOOL. Use the BACK option to reset the spool file prior to the point where the possible data loss occurred. The maximum number of pages possible in one command is 256. The following example illustrates:

```
:SUSPENDSPOOL 6
:RESUMESPOOL 6; BACK 3 PAGES
```

THE HP 7933 AND 7935 DISC DRIVES: SPECIAL CONSIDERATIONS

The HP 7933 and HP 7935 are 404-megabyte moving-head disc drives. They are equipped with internal offline diagnostics, which are accessed with the keypad and display on the front panel. They also have built-in controllers which assign spare sectors and spare tracks, as requested by the SPU (System Processing Unit). They can be used as a system disc or a serial disc. The HP 7935 can be used as a private volume.

The HP 7933 and HP 7935 have features which were not available on previous HP disc drives, so it is necessary to become familiar with the procedure for "unloading" the disc. It consists of unloading the heads and "spinning down", or stopping the disc's rotation, as described below. The HP 7933 disc pack is not removable; the HP 7935 is. "Unloading" the disc refers only to retracting the heads, not to physically removing the disc pack.

UNLOADING A SYSTEM DISC

It is necessary to =SHUTDOWN the operating system (MPE) before attempting to UNLOAD or "spin down" a disc in the system domain. If the LOAD/UNLOAD button (or ONLINE/OFFLINE switch for 792x disc drives) on the disc drive is inadvertently pressed while the system is running, the system disc will refuse to UNLOAD. The ACTIVITY panel will indicate "BUSY", momentarily, and the following message will appear on the System Console:

```
UNLOAD ON LDEV #n DENIED.=SHUTDOWN MUST PRECEDE AN UNLOAD ON A SYSTEM DISC
WARNING: REPOSITION BUTTON BACK TO LOAD POSITION.
```

Note that if the LOAD/UNLOAD button is not repositioned to the LOAD position, and a powerfail occurs, the drive will spin down, and a "NOT READY " message will appear on the System Console. At this point, it is necessary to reposition the LOAD/UNLOAD button back to the LOAD position in order to spin the drive up.

If the system is shut down before the LOAD/UNLOAD button is repositioned (set to the "in" position), it is necessary to reposition the button to the LOAD position, then again to the UNLOAD position, since the first UNLOAD request was denied by the system.

UNLOADING A NONSYSTEM DISC

Private volumes, serial, and foreign discs cannot be unloaded when in use. If the LOAD/UNLOAD button is pressed on a nonsystem disc while it is in use, the following error message will be displayed on the System Console:

```
UNLOAD ON LDEV #n  DENIED. NON-SYSTEM DISC IN USE!
WARNING: REPOSITION BUTTON BACK TO LOAD POSITION.
```

It is then necessary to reposition the button back to the LOAD position, and wait until the disc is no longer in use, before depressing the button again. If the private volume is "disc cached", turn disc caching off to that volume before unloading.

Note that, as with the system disc, if you forget to reposition the LOAD/UNLOAD button after receiving the above warning, and a powerfail occurs, the disc will spin down (unload). It will then be necessary for you to restart the disc by resetting the LOAD/UNLOAD button to the LOAD (in) position.

CARTRIDGE TAPE MEDIA LIFE CONSIDERATIONS

The media life of a cartridge tape is approximately 125 full tape backups. The cartridge tape drive signals the operator when a tape is about to wear out. At the completion of the UNLOAD sequence, the cartridge tape is unlocked and the BUSY LED goes out. At this time the WRITE PROTECT LED may begin flashing. If it does flash, the cartridge tape has exceeded its useful life and will begin to wear out soon (and rapidly). The WRITE PROTECT LED will continue to flash until the tape cartridge is removed from the drive.

Just before the cartridge is unlocked, two items in the USE log are incremented: the AUTOLOAD count and the count of blocks accessed. Two conditions will cause the WRITE PROTECT LED to flash:

1. When the AUTOLOAD count exceeds the media life limit of 2000.

2. When the count of blocks accessed exceeds the media life limit of the equivalent of 125 full tape backups (2,048,000 for the Short Tape, 8,192,000 for the Long Tape).

CAUTION

Commands are not disabled when the WRITE PROTECT flashes. It is still possible to reload the tape and perform reads and writes. However, it is STRONGLY suggested that the operator replace the media when the media life limit is signaled.

If the serial tape is WRITE PROTECTED, the USE log will not be updated. Therefore, an accurate count of AUTOLOAD or of blocks accessed will not be maintained. If the operator continues to use this tape to boot from then eventually it will wear out (with NO warning from the drive via the media monitor).

NOTE

The end of media life can also be detected by a sudden increase of recoverable or marginal data errors. If this is the case then the heads should be cleaned and the media replaced.

CARTRIDGE TAPE UNIT: CONTROLS AND INDICATORS

The UNLOAD button, located on the front panel of the cartridge tape portion of the HP 7911, HP 7912, or HP 7914 disc drive, or on the front panel of the HP 9144 cartridge tape unit, initiates the rewind and unload sequence unless the device is in use as a serial disc. The tape's error and use logs are updated, if applicable. Then the tape rewinds. (Note that if the write-protect arrow is turned to the SAFE position, the error and use logs will not be updated, since the cartridge is write-protected.) When the unload is complete (30-55 seconds for the 150-foot, 16.7 megabyte tape), an audible buzz from the latch mechanism indicates that the cartridge is free and can be removed. The EJECT button on the front panel of the HP 35401A initiates the UNLOAD sequence; it unloads the current tape into the caddy and loads the next sequential tape (if there is one). If the UNLOAD or EJECT button is pushed during an autoload, the autoload will stop and the tape will unload.

MPE MESSAGE SYSTEM

SECTION IX

ERROR MESSAGES

The System Failure messages, MPE system error messages, cold load error message, and the MPE message system are included in this section.

System Failures result in messages, followed by a halt. These failures do not occur during system initialization; MPE must be operating to receive these messages. When a halt occurs, a software dump should be initiated. These failures are referenced in Table 9-1.

The MPE system messages are issued to the System Console, while the system is still running. The errors are referenced in Table 9-2.

Cold load errors occur when the System Operator is doing a cold load. A cold load error message is generated, after which the system halts. The error messages are numbered, in most cases. They require the System Operator to take an action based on the individual message. The error messages with numbers are referenced in Table 9-3, and those without numbers are referenced in Table 9-4.

In some cases communication lines may cause an irrecoverable error message to occur. These messages are always followed by "(DSERR)". For information on communication errors, refer to the Fundamental Communications Handbook (5997-4634).

All the MPE error messages can be found in CATALOG.PUB.SYS. The catalog is divided into different message sections to find the messages more easily. The online Help subsystem is CICAT.PUB.SYS. A user can also modify and expand the "CATALOG.PUB.SYS" and "CICAT.PUB.SYS" with the program "MAKECAT".

Categories of System Failures

System Failures typically fall into eight categories:

NUMBER	TYPE	MODULE
0-199	SYSTEM INTERNALS	CHECKER, HARDRES, INCLHARD, LOG, UTILITY, FILEACC, FILEIO, LABSEG, KERNELD, DEBUG, KERNELC, ININ, MISCSEGC
200-299	I/O SYSTEM	INCLHARD, HARDRES, ININ, NRIO, CACHESEG
300-399	PROCESS AND USER RELATED	MORGUE, PROCSEG, RINS, ABORTDMP, CIMAIN, LOAD, LOADER1, ALLOCATE, NURSERY, OPCOMMND, PROGEN, SPOOLCOMS
400-499	FILE SYSTEM	

600-799	KERNEL	KERNELC, PCREATE, INCLHARD, PORT, INCLVMC, SOFTIO, ININ, CACHESEG, KERNELD, BIPC, ADCCINIT, ATPINIT, TICINIT, TERMUTIL, ATPDRIVR, FILEIO , IMANAGER
900-999	DATACOMM	COMSYS1, COMSYS3, COMSYS4, COMSYS5, COMSYS6, FILEIO, DS, MRJE, KERNELC, ININ, DSN, DSCOMPLETE
1000-1999	DISC CACHING	CACHESEG, INCLCDEF

When a System Failure occurs, a message appears on the System Console in the following format:

```
****SYSTEM FAILURE #enum
    STATUSsnum
    DELTAPpnum
```

where:

enum is the error number that identifies the type error.

snum is the code segment number from which the system failure was called.

pnum is the program counter (Delta-P) offset into the code segment.

The System Failure List in Table 9-1 gives the failure numbers, the names of the modules in which the failure was detected, the cause of errors, and what action you should take in response to the messages. In most cases, Table 9-1 directs you to perform a standard recovery. You should also perform a standard recovery when system failures occur abnormally, without a System Failure message.

To perform a standard recovery:

1. Perform a memory dump.
2. Perform a WARMSTART.
3. Print or copy spoolfiles, if necessary, then delete them to avoid losing disc space.
4. Perform a COOLSTART, or check for free space on logical device 1 and perform a COLDLOAD.

Table 9-1. System Failure List

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
0	KERNELC/TAKEOFFARL	Request size is greater than size of bank.	Standard Recovery
1	CHECKER/REQUOP	UCOP request list full.	Enlarge the UCOP request queue. See your System Manager.
3	HARDRES/TIMEREQ	Timer request list full.	Enlarge the table. See your System Manager.
4	KERNELC/PSEUDOINT	Illegal pseudo interrupt or bad parameters.	Standard Recovery
8	ININ/TESTCRUNCH	Nonresponding module when MPE code executing.	Standard Recovery
9	ININ/TESTCRUNCH	Illegal address in MPE.	Standard Recovery
10	ININ/TESTCRUNCH	Bounds violation.	Standard Recovery
13	ININ/DATAPARITY	Data parity error.	Hardware problem, run diagnostic.
	MISCSEGC/THUSCPU	Invalid CPU type.	Hardware problem, run diagnostic.
15	ININ/GHOST	Interrupt from unconfigured device or undefined internal interrupt.	Hardware problem, run diagnostic.
16	ININ/DSTVIOLATION	DST violation internal interrupt.	Standard Recovery
24	HARDRES/ABORTTIMER	Invalid timer request list Index.	Standard Recovery See your System Manager.

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
25	HARDRES/TIMEREQ	Invalid free list for timer request list.	Standard Recovery system. See your System Manager.
26	HARDRES/TIMEREQ	Invalid requester.	Standard Recovery
27	HARDRES/OLDTICK	TRL entry is zero.	Standard Recovery
28	HARDRES/ ABORTTIMEREQ	An attempt was made to return a free entry to the free list (TRL Table).	Standard Recovery
29	INCLHARD	Try to perform fetch I/O segment for a segment already frozen.	Standard Recovery
30	LOG (PROCESS)	Process awakened with nonfull buffer to be written.	Standard Recovery
31	LOG (PROCESS)	Want to switch to other buffer, but it is not empty.	Standard Recovery
33	UTILITY/LOG	Invalid log record parameter type number.	Standard Recovery
35	UTILITY/LOG	System logging error.	Standard Recovery
50	FILEIO	Tried to unlock FCB that is locked by another PIN, or is not locked.	Standard Recovery
51	FILEACC	No CSCLOSE, 3270 *plabel*.	Standard Recovery
52	FILEACC	DS error.	Check for misconfigured I/O devices such as terminals or RJE.

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
53	FILEIO	I/O completed for 3270, but 3270 not installed in system.	Check for misconfigured I/O devices, such as terminals or RJE.
54	FILEACC	Volume Table Index associated with the *ldev* is zero.	Standard Recovery
59	FILEIO	Bad CB address in Vector Table.	Standard Recovery
60	FILEIO	Unexpected zero word count in FCB.	Standard Recovery
61, 62, 63, 64	FILEIO	Bad FCB size.	Standard Recovery
86	LABSEG	Data inconsistency in the Tape Label Table.	Standard Recovery
100	KSAM	Locking Table corruption.	Standard Recovery
124	KERNELD/RELDATASEG	Attempt made to release a system-defined (permanent) DST.	Standard Recovery
160	KERNELD/ABORTDSEG	Attempt to decrement JDT reference counter for shared extra data segment below zero.	Standard Recovery
199	DEBUG/KERNELC	Cannot lock Break Point Table.	Standard Recovery
201	HARDRES/TIP	I/O Failure, nonresponding device on start I/O Instruction (frequent cause, misconfiguration).	Reconfiguration needed; otherwise it may be a hardware problem, so run diagnostic.
205	HARDRES/GIP'HPIB INITIO	Set mask failed.	Verify channel configuration.
206	HARDRES/ATTACHIO	Invalid logical device number.	Standard Recovery
222	PFAIL-HPIB	Set mask (SMSK) instruction failed.	Hardware problem, run diagnostic.

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
249	HARDRES/CHECKINDEX	Invalid TBUF, SBUF, IOQ, DRQ Index. Return IOQ, DRQ already free.	Standard Recovery
250	NRIO/GETSYSBUF	Bad SYSBUF Free List.	Standard Recovery
251	HARDRES/ RETURNSYSBUF	Bad SYSBUF Index.	Standard Recovery
252	HARDRES/ RETURNSYSBUF	Bad SYSBUF Index.	Standard Recovery
260	HARDRES/SIODM	Bank wrap around on data transfer.	Contact your HP customer engineer. Standard Recovery
261	HARDRES/CACHESEG	Attempt to complete IOQ, DRQ, LDR that is already complete.	Standard Recovery Check for a peripheral hardware problem.
271	NRIO/IOMESSPROC	Driver asked for reply from operator, but failed to supply a DST number for the reply.	Standard Recovery
278	INCLHARD/ GETDRT/PUTDRT	Invalid DRT.	Standard Recovery
289	ININ/TRACE	Invalid STT entry.	Standard Recovery
299	HARDRES/SIODM	Bad return from IOUNFREEZE.	Standard Recovery
300	MORGUE/EXPIRE	FREELOCRIN failed, RIN locked.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
301	MORGUE/EXPIRE	UCOP did not kill process.	Standard Recovery
302	PROCSEG/ABORTPROG	Main process does not have a son when in BREAK mode.	Standard Recovery
303	RINS/FREELOCRIN	Global RIN in local RIN list.	Standard Recovery
310	ABORTDMP/ABORT	System process aborted.	Standard Recovery
311	ABORTDMP/ABORT	Process aborting while critical.	Standard Recovery
314	MORGUE	Process terminating with SIR.	Standard Recovery
315	CIMAIN	CI command completion with SIR locked.	Standard Recovery
341	LOAD/Load program	Bad LST, segment entry not found.	Standard Recovery
343	LOAD/ ADDSEGDATA'SLDB	Bad LST, no seglist entry.	Standard Recovery
344	LOADER1/SUMSEGS	Bad LST, segment entry not found.	Standard Recovery
345	LOADER1/UNLOAD	Bad LST, segment entry not found.	Standard Recovery
346	LOADER1/ADJSEG	Bad LST, segment entry not found.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
347	LOAD LOADER1/LOADER	RECEIVEMSG failed.	Standard Recovery
348	LOADER1/ UPDATESEGTABLE	Bad Loader Segment Table, master entry not found.	Standard Recovery
349	LOADER1/ UPDATESEGTABLE	Load Loader Segment Table, segment entry not found.	Standard Recovery
350	LOAD/SATISFY	Segment number not allocated.	Standard Recovery
	ALLOCATE/ ALLOCENTRY	Error expanding XDD.	Standard Recovery
	NURSERY/ ALLOCATE'JMAT	Error expanding JMAT.	Standard Recovery
351	ALLOCATE/ DEALLOCENTRY LOADER1/Load Procedure	Error contracting XDD. Bad LST, master entry not found.	Standard Recovery Standard Recovery
	NURSERY/ ALLOCATE'JMAT	Error contracting JMAT.	
352	ALLOCATE/ SRELINKODD	Logical device not found in ODD head entries.	Standard Recovery
	LOADER1/ UNLOADPROC	Bad LST, master entry not found.	Standard Recovery
353	ALLOCATE/SPUTXDD	Logical device not found in XDD head entries.	Standard Recovery
354	ALLOCATE/SLINKXDD, DELINKENTRY	Bad XDD, invalid links, invalid subentry.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
360	ALLOCATE/GETCLASS	Bad Device Class Table pointer.	Standard Recovery
361	ALLOCATE/ALLOCATE	Invalid Device Class Table pointer.	Standard Recovery
362	ALLOCATE/ALLOCATE	Bad LDT or LPDT for first device in class.	Standard Recovery
363	ALLOCATE/ALLOCATE	LDEV 0 specified, or LDT/LPDT for specified device.	Standard Recovery
364	ALLOCATE/ALLOCATE	Invalid Device Class Table Index.	Standard Recovery
365	ALLOCATE/GETCLASS	Illegal combination of procedure parameters.	Standard Recovery
366	ALLOCATE/ DEALLOCATE	Negative use count (in LDT) upon device deallocation.	Standard Recovery
367	ALLOCATE/GETCLASS	Missing required parameter(s).	Standard Recovery
370	SPOOLCOMS/ INITSPOOLING	Unable to create spooler process during system startup.	Standard Recovery
371	OPCOMMAND/DELETJOB	:ABORTJOB failed when the job was in EXEC, INIT, or SUSP state.	Standard Recovery
372	PROGEN/ CONSSHUTDOWN	Unable to stop spooler.	Standard Recovery
373	PROGEN/CHECK 'FOR' MESSAGE	Receive message failed.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
374	PROGEN	JMAT destroyed, cannot WARMSTART.	COOLSTART the system.
400	DIRC	Directory I/O error.	Standard Recovery
401	DIRC	Bad directory DST number.	Standard Recovery
402	DIRC	Error in directory data segment buffer.	Standard Recovery
404	FILEACC	Directory error while searching for group entry.	Standard Recovery
406	DIRC	Internal directory error while logging on or off.	Standard Recovery Standard Recovery
407	DIRC	Internal directory bit map error while allocating or deallocating space.	
408	DIRC	Directory corruption detected.	RELOAD
418	DIRC	Internal directory error when binding/unbinding a group to its home volume set.	Standard Recovery
419	PVSYS	Error in MVTAB.	Standard Recovery
421	DFS	Disc Free Space problems: 1. Error on logical/physical mount/dismount of disc. 2. Internal data structure inconsistency. 3. Free space bit map error 4. Accessing nonexistent free space. 5. I/O error accessing bit map.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
423	DFS	DFS page I/O error or device is not a disc.	Standard Recovery
455	FILEIO/POST'ACB'ERROR	Corrupted ACB or AFT.	Standard Recovery
466	FILEACC/FCREATECB	Illegal strategy (bad parameter) in finding room in the control block table.	Standard Recovery
468	FILEIO	Error allocating/ deallocating disc space.	Standard Recovery
469	FILEACC/FOPENDA	Cannot deallocate disc space.	Standard Recovery
470	FILEACC/FOPEN	Cannot DEALLOCATE disc space.	Standard Recovery
471	FILEACC/FCLOSE	Cannot deallocate disc space.	Standard Recovery
475	FILEIO/FCONV BLK	Condition Code is > or < from FCLEAR.	Standard Recovery
478	FILEIO/FNOBUF	Condition Code is > or < from FCLEAR.	Standard Recovery
479	FILEIO/GETREC	WAITFORIO error.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
480	FILEIO/FQUIESCEIO	WAITFORIO error.	Standard Recovery
481	FILEIO/FBREAK	BREAK on $NULL.	Standard Recovery
483	FILEIO/FRESETEOF	Corrupted ACB/AFT entry.	Standard Recovery
484	FILEACC/FOPEN	DIRECFINDFILE error.	Standard Recovery
486	FILEIO	DS error.	Standard Recovery
487	FILEIO/IOWAIT	WAITFORIO error.	Standard Recovery
488	FILEACC/FRENAME	Cannot remove temporary file from JDT.	Standard Recovery
489	FILEACC/FCLOSE	Error releasing disc space for $OLDPASS.	Standard Recovery
490	FILEACC/FCLOSE	Error (Not I/O) from DirecPurge file.	Standard Recovery
495	IPC	Message file access error.	Standard Recovery
500	JOBTABLE/REMJTENTRY	Failure to contact JDT.	Standard Recovery
501	JOBTABLE/ XADDJTENTRY	Invalid JDT pointer.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
502	CIMGR/ CXNEWACCT, CXNEWVSET	Directory cannot be purged.	Standard Recovery
503	CIMGR/ CXNEWACCT, CXNEWVSET	Duplicate entry in directory.	Standard Recovery
504	CIMGR/CXNEWGROUP CXNEWUSER, CXALTGROUP, CXALTUSER, CXALTVSET	Cannot find account logged on.	Standard Recovery
505	CIMGR/CXNEWGROUP, CXNEWVSET, CXALTGROUP, CXALTVSET, CXALTUSER	Nonexistent name in directory search.	Standard Recovery
506	CIMAIN/CYDIRERR	Catastrophic directory error.	Perform a RELOAD.
509	CIMAIN	Error returned by Command Interpreter Log Table during :( ) COMMAND LOGON or logoff.	Standard Recovery
535	UDC/INITUDC	UDC directory data segment is corrupted.	Standard Recovery
600	KERNELC/ GENSPECREQ PUTDEVONOBJMPQ	Ran out of entries in Special Request Table (only if an ICS in MPE IV or MPE V/P).	Configure more entries.
601	KERNELC/ STARTOBJWRITE, FETCHOBJECT	Ran out of entries in Disc Request Table.	Configure more entries.
602	PCREATE/ PROCREATE, FLAGPROCABSENT	Ran out of swappable (SLL) entries (only if on ICS).	Configure more entries.

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
603	KERNELC/ RELSYSTABENTRY, REL'PHY'CST	Entry out of range or already released.	Standard Recovery
604	KERNELC/WAIT	Event has already occurred.	Standard Recovery
605	KERNELC/ GETSYSTABENTRY, RELSYSTABENTRY	System Table not core resident.	Standard Recovery
606	KERNELC/ UNLOCKSEG' UNFREEZESEG'	Attempt to unlock or unfreeze a segment which is not locked or frozen.	Standard Recovery
607	KERNELC/ LOCKSEG', FREEZESEG'	Attempt to lock or freeze a segment when on ICS.	Standard Recovery
608	KERNELC/ ABORTPROCESS	Not supported.	Standard Recovery
	QUEUEPROC	Invalid PIN number.	Standard Recovery
610	KERNELC/AWAKE	Attempt to unexpectedly awaken process from critical event wait.	Standard Recovery
611	KERNELC/ EXCHANGEDB, RESETDB	Illegal DB placement.	Standard Recovery
612	KERNELC/ UNDEFEROBJSMPQ,	Object not in processor's SLL.	Standard Recovery
	PROCESSINITMSG,	Problem with size in region header.	Standard Recovery
	PUTDEVONOBJSMPQ	SRT integrity problem.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
613	KERNELC/ PROCESSCOMPMSG, PROCESSINITMSG,	Synchronization problem with In-Motion-In mechanism.	Standard Recovery
	OBJWRITECOMPLETOR,	DST already written out. Bad DRQ pointer in region header.	Standard Recovery
	OBJREADCOMPLETOR,	Segment was already present. Segment was not In-Motion-In.	Standard Recovery
	PUTPROCONOBJSMPQ	Processor's SLL already says In-Motion-In.	Standard Recovery
614	KERNELC/ RELEASEREGION, CLEANREGION, RECOVEROC, PROCESSCOMPMSG,	Bad region size: 1. Size in header is greater or less than the size in trailer. 2. Size of region is greater than bank size. 3. Invalid region size.	Standard Recovery
	MAKEROOM, COLLECTGARBAGE,	Object identifier in region header is invalid.	Standard Recovery
	PROCESSCOMPMSG	Inconsistency in Region Assignment State.	Standard Recovery
615	MAKEROOM	Cannot make room for critical MPE segment.	Standard Recovery
616	KERNELC/MAKEOC	Attempting to make resident locked, frozen, or I/O frozen segment into overlay candidate.	Standard Recovery
617	KERNELC/ FETCHOBJ, ISOBJABSENT, ISOBJIMI, ISOBJROC	Request access of an unallocated DST, CST.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
618	KERNELC/ CLEANREGION, RECOVEROC, FETCHOBJECT	Problem with DST post to disc: 1. DRQ for write already queued. 2. Cannot abort DRQ for write. 3. No DRQ for segment write.	Standard Recovery
619	KERNELC/RESERVEREG BUILDOBJID/ ADJUSTLOCALITY, ADDTOLOCALITY/ ADJUSTLOCALITY, FETCHOBJECT, PROCESSSCHEDMSG, DISP/LAUNCH	Memory management integrity problem: 1. Error in available region list. 2. Request region is greater than bank size. 3. Cannot find available region. 4. Invalid parameter. 5. Inconsistency in SLL flags word. 6. Tried to fetch object with size and region address of zero. 7. Bad message received from RECEIVEMSG. 8. DB segment absent when launch process.	Standard Recovery
620	PORT KERNELC/ PROCESSSCHEDMSG	Low-level message system integrity problem: 1. Corrupted MSG Harbor Table. 2. Bad message frames. 3. Bad message queue structure. RECEIVEMSG error	Standard Recovery Standard Recovery
621	PORT	Bad port DST number.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
622	PORT	Bad message length, bad parameter, bad destination PIN, bad subqueue.	Standard Recovery
623	KERNELC/AWAKE	Awake of an invalid PCB.	Standard Recovery
624	KERNELC/FETCHIOSEG	Tried to fetch unallocated object.	Standard Recovery
625	KERNELC/ EXCHANGEDB	Tried to set DB to unallocated DST.	Standard Recovery
629	KERNELD/ RELCODESEG	Tried to release a system code segment.	Standard Recovery
630	KERNELD/ RELDATASEG	Attempt to release memory resident segment.	Standard Recovery
631	KERNELD/ RELDATASEG	Attempt to release I/O frozen segment.	Standard Recovery
632	KERNELD, INCLVMC	Cannot release Virtual Memory for DST or bad VM data structure.	Standard Recovery
633	KERNELD/ ALTPXFILESIZE	Error contracting PXFILE area.	Standard Recovery
634	KERNELC, KERNELD	Pdisabled count is greater than zero.	Standard Recovery
635	SOFTIO/ CPR'SHUTDOWN	Invalid parameter/markers when you SHUTDOWN CIPER printer.	Standard Recovery
640	ININ/STACKOVERFLOW	Second stack overflow while disabled.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
641	ININ/STACKOVERFLOW	Critical stack overflow and no more stack.	Standard Recovery
642	ININ/STACKOVERFLOW	Stack overflow while I/O frozen and disabled/pdisabled.	Standard Recovery
643	ININ/STACKOVERFLOW	Stack overflow on resident, frozen, or locked in memory.	Standard Recovery
644	ININ/ CODEABSENCE DATAABSENCE	Absence trap while pdisabled.	Standard Recovery
645	ININ/ CODEABSENCE	Code absent and Delta-P is bad.	Standard Recovery
646	ININ/STACKOVERFLOW	Stack overflowed out of the memory region that it currently resides in.	Standard Recovery
650	KERNELC/ OBJREADCOMPLETOR	Segment read disc I/O error (detects the defective track).	Hardware problem. Contact your Customer Engineer.
651	KERNELC/ OBJWRITECOMPLETOR	Segment write disc I/O error (detects the defective track).	Hardware problem. Contact your Customer Engineer.
654	KERNELC/ UPDATEDISCCOPY	ATTACHIO returned I/O error code (detects the defective track).	Hardware problem. Contact your Customer Engineer.
660	INCLHARD	Attempt to queue disc request that is already queued.	Standard Recovery
661	INCLHARD	Detection of integrity problem with disabling disc request.	Standard Recovery
662	FNCLHARD	Adding a segment to SLL that is already in SLL.	Standard Recovery
663	INCLHARD	Current request flag already set in next disc request selected for device.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
671	KERNELC/ CACHESEG	Synchronization problem handling Cached Domains: 1. Problem with Cached Domain assignment state/Flags. 2. READ completes, but CD already present. 3. WRITE completes, but CD was not In-Motion-Out. 4. CD object not found in processors locality.	Standard Recovery
672	KERNELC/CACHESEG, HARDRES	Integrity problem handling Cached Domains: 1. Bad cache Domain list. 2. Bad return from measurement interface. 3. Cached region linked/unlinked when it should not be. 4. DRQ for Mapped Cache Domain is zero. 5. Invalid size of Cached Domain. 6. Error in serial write queue manager.	Standard Recovery
680	KERNELC, KERNELD	1. Invalid send message. 2. Abort bit set on object read completion. 3. Fetch object and try to lock mapped Cached Domain. 4. Try to launch process with DB below DL. 5. Cannot clear virtual memory for a stack.	Standard Recovery
681	KERNELC, HARDRES	1. Try to access PIN 0. 2. Bad PCB impeded list. 3. Write complete interrupt for object not DST or Cached Domain. 4. Attempt to disable/abort current request. 5. Attempt to abort LDR.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
690	BIPC	Internal IPC problem.	Standard Recovery
700	ATPINIT, INCLDFSC	DB placement bad (not at SYSGLOB).	Standard Recovery
	DFS	Invalid page number, word number, map or disc address.	Standard Recovery
701	ADCCINIT, ATPINIT, TICINIT, TERMUTIL	Invalid CPU.	Standard Recovery
703	ATPINIT, TICINIT	Cannot initialize Port for the System Console.	Verify that the System Console has been configured correctly, otherwise perform a Standard Recovery.
704	ATPINIT	Failure to allocate the System Console.	Standard Recovery
705	ADCCINIT, ATPINIT	Cannot build internal tables.	Standard Recovery
706	ADCCINIT, ATPINIT, TICINIT	Cannot load ADCC, ATP, or ATP37 software.	Verify that all the required terminal segments are present. If not perform an UPDATE. If all the segments are present, perform a memory dump and attempt a RELOAD.
708	ADCCINIT, ATPINIT, TICINIT	DST could not be frozen in memory.	Reduce the number of terminal ports configured and/or reduce the system resources (i.e. the number of CST, DST, TBUF), or perform a Standard Recovery.

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
709	ATPINIT	Cannot access Bank 0 Table or cannot load ATP software.	Standard Recovery
710	ADCCINIT, ATPINIT, TICINIT	Invalid MPE table or inconsistent internal table.	Verify that the device type is appropriate for the driver configured. If it is correct, perform a memory dump, then attempt a RELOAD. If the RELOAD fails, start troubleshooting the processor's hardware.
711	TERMUTIL	Bad TBUF link pointer in the returned TBUFs.	Standard Recovery
712	TERMUTIL	Bad TBUF Table.	Standard Recovery
713	ATPINIT	Cannot write a message to the System Console.	Standard Recovery
714	ATPDRIVR	Hardware Error or no interrupt bit was set.	Begin troubleshooting via off-line diagnostics.
715	TERMUTIL	Port error on the System Console.	After verifying that the System Console is operating correctly, perform a Standard Recovery.
716	ATPDRIVR	An I/O Instruction failure occurred (RIOA, RIOC, WIOA, WIOC).	Troubleshoot the hardware outside of the terminal subsystem, then perform a Standard Recovery.
717	ADCCINIT, ATPINIT, TICINIT, IMANAGER	Corrupted IMANAGER code; therefore the terminal type information could not be accessed.	Perform a memory dump and UPDATE from tape.

Computer Museum

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
718	ADCCINIT	Invalid *ldev* specified.	Standard Recovery
719	ADCCINIT, TICINIT	Corrupted device sort.	Standard Recovery
720	ADCCINIT, TICINIT	Inconsistency between the MPE tables and hardware.	Standard Recovery
721	ADCCINIT, TICINIT	The wrong driver specified for the wrong controller.	Check the driver name to match the controller. Standard Recovery
722	TERMUTIL	Cannot load INIT code.	Standard Recovery
723	TERMUTIL	Invalid controller type.	Check the tape that you are using to update the system.
777	FILEIO	CSIOWAIT missing.	Reconfigure.
888	TITOM	Trace buffer overflow.	Standard Recovery
900	COMSYS1/ CSIOWAIT COMSYS4/CREAD, CWRITE	I/O request no longer with caller's process.	Standard Recovery
902	COMSYS3/ CSDRIVERLOCK	Unable to freeze or un-freeze segment in main memory.	Standard Recovery
903	COMSYS3/ CDRIVERLOCK, CRELEASE	Unable to lock or unlock segment in main memory.	Standard Recovery
	COMSYS5/ CCONTROL, CPOLLIST		Standard Recovery
	COMSYS6/ CDELETETRACE- AREA		Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
904	COMSYS5/ CCONTROL	Unable to increase data segment size.	Standard Recovery
905	COMSYS6/ CDELETETRACE- AREA	Unable to decrease data segment.	Standard Recovery
906	COMSYS3/ CDRIVERUNLOCK COMSYS6/CPOLLIST	Unable to unfreeze segment in main memory.	Standard Recovery
907	COMSYS3/ CDRIVERUNLOCK	Unable to unlock segment in main memory.	Standard Recovery
909	COMSYS3	Invalid pointer to pollist area	Standard Recovery
910	COMSYS3	Unable to find IOQ in CS Table.	Standard Recovery
911	FILEIO	IOWAIT to CS.	Standard Recovery
912	DS/DSSEG1, DSSEG4	RFA buffer size less than zero.	Standard Recovery
913	DS/IODS0	DSW and DSWR count disagree.	Standard Recovery
914	DS/IODS0, IODSTRM0	DS use count is less than zero.	Standard Recovery
915	DS/DSMON	Bad data and DEBUGON, 3.	Standard Recovery
916	DS/DSMON	DEBUGON,3 and DS error.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
917	DS/DSSEG2	Unable to locate DS line control block.	Standard Recovery
918	DS MONX	Virtual PIN corresponding to a real PIN not found.	Standard Recovery
919	DS MONX	Real PIN corresponding to a virtual PIN not found.	Standard Recovery
920	MRJE/IOMCONS0	Irrecoverable buffer state.	Contact your System Applications Organization (AEO).
921	MRJE/IOMCONS0	Irrecoverable buffer state.	Contact your AEO.
923	IO DSTRMX	UNC0=0 in GETQ.	Contact your AEO.
926	IO DSX	UNCNUM>255 or <0.	Contact your AEO.
930	SNA LINK	SNA/Transport internal error.	Standard Recovery
940	SNA LINK	Translator, internal data element failure.	Standard Recovery
941	SNA LINK	Translator, no free element available.	Standard Recovery
969	TRANSPORT	Class 1 logging error (use PARMS).	Standard Recovery
970	TRANSPORT	Error occurred but could not SF9696.	Standard Recovery
980	DSCOMPLETE/DSIOM	IOQ index not found in the DIT queue.	Standard Recovery
981	DSCOMPLETE/DSIOM	IOQ index too large.	Standard Recovery
982	TRANSPORT	Bad READ length from $STDIN.	Standard Recovery
983	TTSMON	No NOWAIT I/O pending.	Standard Recovery
999	KERNELC/ MAPPEDCSTTOPHY	Bad call.	Standard Recovery
	ININ/CODEABSENCE	Bad CST number.	Standard Recovery

Table 9-1. System Failure List (continued)

ERR. NO.	MODULE/ PROCEDURE NAME	CAUSE	ACTION
1001	INCLCDEF	Bad CDT entry number.	Standard Recovery
1002	CACHESEG	CDT Table uninitialized.	Standard Recovery
1003	CACHESEG	Invalid CDT entry number.	Standard Recovery
1004	CACHESEG	Invalid LDR index.	Standard Recovery
1005	CACHESEG	Bad state in CDT Mapped Domain Entry.	Standard Recovery
1006	CACHESEG	CDT Table is full.	Standard Recovery
1007	CACHESEG	Bad CDT/LDR queue structure, or bad state in CDT Mapped Domain Entry upon LDR completion.	Standard Recovery
1008	CACHESEG	Out of DRQ entries.	Standard Recovery
1009	CACHESEG, INCLCDEF	CDT entry is already assigned or unassigned when it should not be.	Standard Recovery
2001	KERNELC/ PUTPROCONOBJMPQ	Object not in processor's SLL.	Standard Recovery
6601	IPC	Delete block - empty file.	Standard Recovery
6602	IPC	Delete block - no records in file.	Standard Recovery
6603	IPC	Delete block - invalid WRITE block count.	Standard Recovery
6604	IPC	Delete block - invalid WRITE block count.	Standard Recovery
8600-8699	LABSEQ	Data inconsistency in Tape Label Table.	Standard Recovery
10,000	DEBUG/VALIDATE	Invalid segment.	Standard Recovery

Table 9-2. Console Messages

MESSAGE	MEANING	ACTION
message (MAX CHARS= *num*)?	A message was sent to you by the PRINTOPREPLY intrinsic.	:REPLY/=REPLY to the message.
ACCESS TO *vcsname*. *group.acct* BY *user.acct* (Y/N)?	A user asked you to verify access to the specified disc volume (*vcsname*) that is mounted.	=REPLY *pin*,YES or =REPLY *pin*,NO
ALL JOBS LOGGED OFF	You aborted all executing jobs with =LOGOFF or you shut down the system (=SHUTDOWN).	You must enter the =LOGON command to re-establish the pre-logoff limits or restart the system if it is shutdown.
AVAILABLE DRIVES ON LDEV#*ldevlist*	The last users of a volume set has just performed a dismount on the specified logical device.	You can physically dismount the volumes and the drive can be made available for other requests.
CAN'T INITIALLY SPOOL LDEV#*nnn*	An *ldev* was configured to be initially spooled. You did not specify either a legitimate spoolee (*ldev*) or a *ldev* that was job/session accepting or data-accepting.	This indicates a system configuration error. The device specified cannot be spooled. The :ACCEPT[JOBS,]*ldev* or the :ACCEPT[DATA,]*ldev* command can be used to allow the :JOBS or :DATA command if the device is legitimate spoolee, then use :STARTSPOOL*ldev* to start the spooler.
DATA COMMAND ERROR *number*,*number* ON LDEV *nnn*	A data command error was detected on the indicated device The bracketed numbers are the command interpreter error numbers.	The system detected an invalid :DATA command. Correct syntax for command is :DATA[*jobname*,] *user*[*/userpass*]. *acct*[*/acctpass*]. [;*filename*]. The most common errors are undefined user or account specified, or the group name was specified (not required).
DATA IN INVALID DEVICE,LDEV#*nnn*	A user input :DATA on a nondata-accepting device.	If not a user error, use =ACCEPT DATA,*ldev* to allow :DATA from this device.

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
DEFERRED JOB INTRODUCED ON LDEV#*nnn*	A user entered a job on a logical device (*ldev*) whose input priority is less than or equal to the currently defined job fence.	You must intervene by either lowering the job fence or raising the job's input priority.
DIAL REMOTE *number*	The communications link has been initially established.	Dial the number shown in the message, and complete the connection. This message is printed only if the SSLC is configured as a dial-up (not a leased) line.
DISMOUNT ON LDEV *nnn*	A drive in the nonsystem domain, not in use, was switched off line.	Information only. This message indicates that the drive went off line, but was not in use. Otherwise, "LDEV *nnn* NOT READY" will appear.
DRIVES FOR *vcsname.group.acct* BY *user.acct* (Y/N)?	A private volume mount mechanism needs more drives to satisfy its current request. You are asked if the rescan for the drives should be performed.	If you =REPLY *pin*,YES, the drives already reserved are kept, and the scan for the remainder of the drives continues. If you =REPLY *pin*,NO, the drives already reserved are released, and a mount request is rejected, due to lack of drives.
FILE LABEL ERROR: LDEV=*nnn*	During FOPEN the file system found an invalid file label on the disc.	The file cannot be accessed or purged unless you perform a COOLSTART.
FORMS: *formsmsg*	A user has requested special forms to be mounted on a line printer. The device file and job number are printed on the following device assignment request by the PIN (Process Identification Number).	Information only.
HELLO ON INVALID DEVICE, LDEV *nnn*	A user input :HELLO either on a nonjob-accepting device or on a noninteractive device.	If not a user error, enter :ACCEPT JOBS,*ldev* to enable :HELLO from this device. The device must be configured as job/session accepting.

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
IN-USE SERIAL DISC DISMOUNTED ON LDEV *nnn*	A serial disc that you were using was dismounted.	Put the original disc back on line.
IN-USE VOLUME DISMOUNTED ON LDEV *nnn*	A disc volume that you were using was dismounted.	Put the drive back on line.
INVALID PASS FOR *user.acct,group* ON LDEV *nnn*	A user specified an illegal password.	If the accessor is a legitimate user of the system, instruct the user to specify the proper password.
IS FILE *filename* ON LDEV=*nnn*	You are asked by the system whether the specified file is on the specified *ldev*.	You are required to =REPLY *pin*,YES or =REPLY *pin*,NO.
JOB ON INVALID DEVICE, LDEV= *nnn*	A user input a :JOB on a nonjob-accepting device.	If not a user error, enter :ACCEPT JOBS, *ldev*. Device must be configured as job/session accepting device.
(The following messages were formerly called Job Overload messages.)	It was not possible to initiate a job or session because there are insufficient system resources, as indicated by the *message*. The *nnn* denotes the logical device from which the attempted job/session initiation took place.	Recovery of this type of overload is automatic. However, if the condition occurs frequently, it indicates a chronic condition that should be remedied. The System Manager can enlarge the table entries using the SYSDUMP Program discussed in Section VII of this manual. When $STDLIST and $STDIN cannot be allocated, the spooling queues have shut or the system has exceeded the configured MAX # OF OPEN SPOOLFILES. Check the device of the jobs in the WAIT state with :SHOWDEV *n* to see if it is unavailable (queue shut). If so, reopen the spool queue with :OPENQ. If there is a lack of disc space, you may have to store off spool files, or COOLSTART with the RECOVER LOST DISC SPACE option, before using :OPENQ.
LDEV *nnn*, NO PROCESS CONTROL BLOCK AVAILABLE	No Process Control-Block (PCB) available.	
LDEV *nnn*, UNABLE TO ALLOCATE STACK	No Data Segment Table (DST) available for stack or not enough virtual memory.	
LDEV *nnn*, UNABLE TO ALLOCATE JOB INFORMATION TABLE	No DST available for Job Information Table (JIT).	
LDEV *nnn*,UNABLE TO ALLOCATE JOB DIRECTORY TABLE	No DST available for Job Directory Table (JDT).	
LDEV *nnn*, NO JOB PROCESS COUNT TABLE ENTRY AVAILABLE	No Job Process Count Table (JPCNT) entry available.	

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
LDEV *nnn*, UNABLE TO ALLOCATE FILE SYSTEM DATA SEGMENT	No DST available for File System Data Segment Table.	Recovery of this type of overload is automatic. However, if the condition occurs frequently, it indicates a chronic condition that should be remedied. The System Manager can enlarge the table entries using the SYSDUMP Program covered in Section VII of this manual. When $STDLIST and $STDIN cannot be allocated, the spooling queues have shut or the system has exceeded the configured MAX # OF OPEN SPOOLFILES. Check the device of the jobs in the WAIT state with :SHOWDEV *nn* to see if it is unavailable (queue shut). If so, reopen the spool queue with :OPENQ. If there is a lack of disc space, you may have to store off spool files, or COOLSTART with the RECOVER LOST DISC SPACE option, before using :OPENQ.
LDEV *nnn*, UNABLE TO ALLOCATE $STDLIST	$STDLIST not able to be allocated.	
LDEV *nnn*, UNABLE TO ALLOCATE $STDIN	$STDIN not able to be allocated.	
NO PROCESS CONTROL BLOCK AVAILABLE FOR J*nn* FOR WAITING	No process Control-Block (PCB) available.	
UNABLE TO ALLOCATE STACK FOR J*nn* JOB WAITING	No Data Segment Table (DST) available for stack or not enough virtual memory.	
UNABLE TO ALLOCATE JOB INFORMATION TABLE FOR J*nn* JOB WAITING	No DST available for Job Information Table (JIT).	
UNABLE TO ALLOCATE JOB DIRECTORY TABLE FOR J*nn* JOB WAITING	No DST available for Job Directory Table (JDT).	
NO JOB PROCESS COUNT TABLE AVAILABLE FOR J*nn* JOB WAITING	No Job Process Count Table (JPCNT) entry available.	
UNABLE TO ALLOCATE FILE SYSTEM DATA SEGMENT FOR J*nn* JOB WAITING	No DST available for File System Data Segment Table.	
UNABLE TO ALLOCATE $STDLIST FOR J*nn* JOB WAITING	$STDLIST not able to be allocated.	
UNABLE TO ALLOCATE $STDIN FOR J*nn* JOB WAITING	$STDIN not able to be allocated.	

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
LDEV#*nnn* DIAL *number* ANSWER (Y/N)?	A user's program did a PHNUM= on DS 3000 or RJE.	Dial the number and enter =REPLY *pin*,YES or =REPLY *pin*,NO if dialing was unsuccessful.
LDEV# FOR *filename* ON *classname* (NUM)?	You are asked by the system to identify the logical device in *classname* where *filename* resides.	You are required to =REPLY with a *ldev* (If =REPLY is 0 (zero) the request is denied).
LDEV#*nnn* FORMS ALIGNED OK (Y/N)?	You are asked by the system, following the printing of the standard "forms alignment image," if the forms are positioned correctly on the specified *ldev*.	You are required to enter =REPLY *pin*,YES or =REPLY *pin*,NO. If the image is correctly positioned, =REPLY *pin*,YES and the requesting program will continue. If the image is not correctly positioned, reposition the forms and =REPLY *pin*,NO. This will cause the alignment image to be printed again, and the question will be reissued.
LDEV#*nnn* IN USE BY DIAGNOSTICS	You have attempted to bring up a device without first taking it from diagnostics.	Get the device from diagnostics with the :TAKE command, then bring the device up with the :UP command.
LDEV#*nnn* IN USE BY FILE SYSTEM	You have attempted to assign a device to diagnostics without taking the device off line.	Using the :DOWN command, take the device off line then assign the device to diagnostics using the :GIVE command.
LDEV#*nnn* IN USE, DOWN PENDING	You have issued a =DOWN command, but the device is in use by the file system.	As soon as the use count goes to zero, the device will be down and you will be notified.
LDEV#*nnn* INVALID HOLLERITH COL# *column number*, HOPPER# *number*	The data from a defective card was not transferred. The error applies only to a card reader.	Fix the card, put it back into the specified hopper, and ready the device.

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
LDEV# *nnn* NOT READY	You did not ready the indicated device.	Place the device online.
LDEV *nnn* NOT READY OR NOT A SERIAL DISC	The serial disc on LDEV#*nnn* has not been automatically recognized, or the disc on LDEV#*nnn* is the wrong disc (not a serial disc).	Cycle the disc drive off/on when the message repeats, then mount the correct disc pack.
LDEV#*nnn* NO WRITE RING	Writing is required and you did not put a write ring on the tape. If LDEV#*nnn* is a serial disc, you replied "N" to the "WRITE RING?" question during device allocation, or failed to respond (assumed "N").	For magnetic tape, you must remove the reel, put on a write ring, remount the reel and ready the unit to allow the process to continue. To abort the I/O request, ready the unit without putting in a write ring. For serial disc you are prompted "WRITE RING (Y/N)?". =REPLY,*pin*,Y to continue or =REPLY,*pin*,N to abort the I/O request.
LDEV#*nnn* OFFLINE	You are trying to access a device that is no longer available to the file system.	If the device is functional, enter :UP *ldev* to place device on line.
LDEV#*nnn* PAPER OUT	You ran out of paper on the indicated device.	Install the paper, press PAGE EJECT, and ready the device.
LDEV#*nnn* QUEUE EMPTY	You attempted an =ABORTIO and no requests were pending on the device.	Information only.
LDEV#*nnn* READ CHECK HOPPER#*number*	The data from a defective card was not transferred. The error applies only to a card reader.	Fix the card, put it back into the specified hopper, and ready the device.
LDEV#*nnn* UNIT FAILURE	Bad status was returned from the specified logical device.	Retry. If the problem persists call your System Engineering Organization (SEO).
LDEV#*nnn* WRITE RING? (Y/N)	The "WRITE RING" response to a serial disc request in the =REPLY statement was "NO WRITE RING" ("NO" is the default). The user is attempting to write on the serial disc.	Enter =REPLY *pin*,YES to allow writing and continue. Enter =REPLY *pin*,NO to abort the request.

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
LOCKSEG FAILURE	LOCKSEG intrinsic failure. Internal software problem.	Contact your System Engineering Organization (SEO).
LOGON FOR:*jobname* ON LDEV#*nnn*	A job has logged on.	Information only.
LOGOFF ON LDEV #*nnn*	A job has logged off.	Information only.
LOG FILE NUMBER *number* ON	The System Supervisor created a new log file. This message always appears before the *WELCOME* message after cold load. When this message appears while the system is running, it indicates that the previous current log file has been closed. File name is LOG *xxxxx* where *xxxx* is numeric with leading zeros.	Information only.
LOG FILE NUMBER *number* IS 1/2 FULL	The total space now occupied by the log file data is half the allotted file size.	Information only.
LOG FILE NUMBER *number* IS 3/4 FULL	The total space now occupied by the log file data is 3/4 the allotted file size.	Information only.
LOG FILE NUMBER *number* LOGGING RESUMED	You successfully executed a :RESUMELOG command.	Information only.
LOG FILE NUMBER *number* ERROR #*number* LOGGING STOPPED	A fatal log file error occurred. Logging is disabled. Refer to the error numbers explained in Section V of this manual.	To re-enable logging after this error you must shut the system down and COOLSTART the system.
LOG FILE NUMBER *number* ERROR #*number* LOGGING SUSPENDED	A recoverable log file error occurred. Logging is temporarily suspended. Most likely errors are log file space problems or duplicate log file names. Refer to the error numbers explained in Section V of this manual.	To re-enable logging, the System Manager or a user with System Supervisor (OP) capability must enter the :RESUMELOG command.

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
MAX SPOOFLE KILOSECTORS IN USE, ALL QUEUES SHUT	The configured maximum number of spooled device file kilosectors are in use. MPE shut all output queues (equivalent to :SHUTQ *ldev*), on all *ldevs* and :SHUTQ *devclass* on all device classes), so users are automatically prevented from creating new spooled device files.	When space becomes available, you may reopen the queues with the :OPENQ *ldev* command.
MEMORY ERROR LOGGING INITIATED	Memory error logging was initiated.	Information only. Occurs when the system comes up.
MEMORY LOGGING ERROR#*errnum* LOGGING STOPPED.	You signaled the initiation of memory error logging. The errors are internal MEMLOGP errors ranging from 1 through 10: 1= FLOCK error on MEMLOG file. 2= FUNLOCK error on MEMLOG file. 3= TIO error. Error logging hardware went not ready. 4= CIO error during copy operation from logging array. 5= RIO error during scan of logging array. 6= Timeout on TIO (lower 128K logging board). Memory logging board did not respond before software Timeout (0.3 second). 7= Timeout on TIO (upper 128K logging board). Memory logging board did not respond before software Timeout (0.3 second). Range 20 through 500 are file system errors involving MEMLOG file. (All file system errors encountered by MEMLOGP are fatal to the process and will cause it to terminate).	You can run the MEMLOGAN utility to read and interpret the logged error information. You can also modify the time interval between successive memory log updates with the MEMTIMER utility (Refer to the MPE V Utilities Reference Manual (32033-90008).)

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
MISSING ACCT FOR *user.acct* ON LDEV *nnn*	A user specified a nonexistent account.	If the accessor is a legitimate user of the system, instruct the user to specify the proper account name.
MISSING GROUP FOR *user.acct,group* ON LDEV *nnn*	A user specified a nonexistent group.	If the accessor is a legitimate user of the system, instruct the user to specify the proper group.
MISSING USER FOR *user.acct* ON LDEV *nnn*	A user specified a nonexistent user.	If the accessor is a legitimate user of the system, instruct the user to specify the proper user name.
MOUNT NEXT REEL ON LDEV#*nnn*	You are asked to mount the next tape or serial disc for multi-reel files on the magnetic tape drive, serial disc drive, or paper tape reader.	You need to mount the media on the indicated device and ready the unit.
MOUNT REEL#*nnn* ON LDEV#*nnn*	You are asked to mount the next indicated tape or serial disc required on the indicated device for restoring multiple reels. The REEL# is the sequence number (2 for second, 3 for third, etc.).	You need to mount the media on the indicated device and ready the unit.
MOUNT FOR *user.acct* REJECTED (VMOUNT OFF)	A user attempted to use the Private Volumes Facility, but no :VMOUNT ON command has been issued.	Information only. To allow future mount requests to succeed, enter :VMOUNT ON with desired parameters.
MOUNT *vcsname.group.acct* ON LDEV#*nnn* (Y/N)?	You are asked to mount the specified disc volume on the indicated device.	Mount the requested disc volume on the specified logical device and =REPLY *pin*,YES.
MOUNT TAPE VOLUME *volid*	A user is trying to open a labeled tape file, but the tape is not mounted.	Mount the requested volume without any reply; or =REPLY *pin,ldev* to specify a different volume; or =REPLY *pin*,0 to reject the opening of the file.

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
MOUNT VOL*n* OF VOLUME SET *volid* ON LDEV #*nnn*	A file spans more than one volume, making it necessary to switch volumes.	Mount the specified volume on the specified logical device. No reply is necessary.
MPE TABLE DISC REQUEST HAS OVERFLOWED	The MPE Disc Request Queue is full in HARDRES segment.	Increase the size of the Disc Request Table using the SYSDUMP Program.
NEW TAPE REQD. ON LDEV#*nnn* IS TAPE MOUNTED?	You did not mount the tape on the indicated device.	You need to put a new tape in the paper tape punch and =REPLY *pin*,YES.
NO ACCT TIME FOR *user.acct,group* ON LDEV#*nnn*	A user attempted to log on, but the CPU or connect time for the account has exceeded the amount specified.	The System Manager must :RESETACCT or increase the account limits.
NO GROUP TIME FOR *user.acct,group* ON LDEV *nnn*	The user attempted to log on, but the CPU or connect time for the group has exceeded the amount specified.	The System Manager must :RESETACCT or increase the group limits.
NO HOME GROUP FOR *user.acct* ON LDEV *nnn*	No default home group was assigned when this user was added to the system, and the user did not specify a logon group.	If the accessor is a legitimate user of the system, instruct the user to specify a group name.
NO MORE SPACE IN SPOOL CLASS, ALL QUEUES SHUT	No more space exists in the (disc) class SPOOL. MPE shut all output queues (equivalent to :SHUTQ *ldev* on all *ldevs* and :SHUTQ *devclass* on all device classes), so users are automatically prevented from creating new spooled device files.	When space becomes available, you may reopen the queues with the :OPENQ *ldev* command.
NO SYSTEMS BUFFER FOR SIGNOFF	A SIGNOFF command failed because no system buffers are available.	To print lost data: 1. :DOWN all MRJE pseudo card readers. 2. Clear all host printers and punches. 3. Enter the :MRJE SIGNOFF [*hostid*] command. 4. Contact your System Engineering Organization (SEO).

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
OK TO WRITE ON UNEXPIRED VOL ON LDEV#*nnn* (Y/N)	A labeled, unexpired tape was opened as unlabeled; or an unexpired, labeled tape was mounted for a write operation.	=REPLY *pin*,YES causes the tape to be overwritten. =REPLY *pin*,NO causes the user's write request to be rejected.
OK TO WRITE ON EXPIRED VOL ON LDEV *nnn* /(Y/N)	A labeled, expired tape was opened as unlabeled, or an expired, labeled tape was mounted for a write operation.	A =REPLY *pin*,YES causes the tape to be overwritten. =REPLY *pin*,NO causes the user's write request to be rejected.
REQUEST REQUIRING OPERATOR REPLY FOR PIN *pin* HAS BEEN ABORTED	A request for operator response (i.e. =REPLY) for *pin* is no longer pending.	Information only.
SCRATCH VOLUME ON LDEV#*nnn*	The nonsystem domain disc mounted on the drive specified by *ldev* is a scratch volume. It has been fully conditioned and designated by the >SCRATCH command of the VINIT Subsystem.	The volume is available for assignment to a volume set by the System or Account Manager.
SERIAL DISC ON LDEV#*nnn*	A serial disc volume has been mounted and recognized on the specified nonsystem domain device.	Information only.
SP#*nnn*/#O*nnn* DEFERRED	The output spooler on the specified *ldev* has deferred the spooled device file with the specified device file identification (#O*nnn*), due to some action taken by you (for example, refusing a spooler's forms request).	To allow the deferred device file to print from the beginning enter :ALTSPOOLFILE #O*nnn*;PRI=*k* (where *k* is a value above the current out fence).
SP#*nnn*/#O*nnn* DEFERRED, SPOOFLE I/O ERROR	The output spooler on *ldev* has encountered an error while opening or reading the spooled device file with identification #O*nnn*. The spooler has deferred the file.	To allow the deferred device file to try to print again use :ALTSPOOLFILE #O*nnn*;PRI=*k* (where *k* is a value above the current out fence). To delete the file, enter :DELETESPOOLFILE command.

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
SP#*nnn*/#I*nnn* DELETED, SPOOFLE I/O ERROR	The input spooler on the specified spoolee *ldev* has deleted spooled device file #I*nnn* due to a disc I/O error, or a problem obtaining disc space.	Ensure that a sufficient space exists for the spooled device file. The System Operator should enter :RUN FREE5.PUB.SYS. Check free space for all SPOOL class discs. Delete unreferenced spooled device files if possible. Allow output spoolers to free up space and try input operation again. Try to recover lost disc space by doing a COOLSTART, if trouble is not indicated.
SP#*nnn*/ IS *jobnum*;*filename* ON LDEV#*nnn* (Y/N)?	You are asked to verify that you did request *jobnum*; *filename* forms on the device (*ldev*) indicated.	Enter =REPLY *pin*,YES to confirm that forms were requested or =REPLY *pin*,NO to reject the request.
SP#*nnn*/ LDEV#FOR :*jobnum*; *filename* ON *devclass* (NUM)?	You requested device assignment (or rejection 0) following a forms request for spooled device files.	Enter =REPLY *pin*,*ldev* to assign the correct printer, with forms to the requesting job/session.
SP#*nnn*/#O*nnn* PREVIOUS FORMS ASSUMED	The output spooled device file with the indicated device file identification is about to be copied to the spoolee *ldev*, but it was previously deferred while forms were mounted. The spooler assumes these forms are currently mounted on the indicated device (*ldev*).	If correct forms are not mounted, physically stop the printer and enter :ALTSPOOLFILE *ldev*,DEFER. Mount the correct forms and resume output with :ALTSPOOLFILE#O*nnn*; PRI=14.

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
SP#*nnn*/SPOOLED IN	The spooler on the specified spoolee *ldev* has begun input spooling.	Information only.
SP#*nnn*/SPOOLED OUT	The spooler on the specified spoolee *ldev* has begun output spooling.	Information only.
SP#*nnn*/STOPPED	A normal termination of a spooler on the specified spoolee *ldev* is confirmed.	Information only.
SP#*nnn*/STOPPED, NO SUCH DEVICE	You attempted to initiate a spooler on an undefined spoolee *ldev*.	Information only.
SP#*nnn*/#I*nnn*STOPPED, SPOOFLE I/O ERROR	The input spooler on the specified spoolee *ldev* has detected a disc I/O error or a problem obtaining disc space for a spooled device file. The spooler stops, and the active device file is deleted.	Ensure that sufficient space exists for the spooled device file. Have the System Manager :RUN FREES.PUB.SYS to check the free space for all SPOOL class discs. Delete unreferenced spooled device files if possible. Allow output spoolers to free up space and try input operation again. If the trouble is not disc space, then a disc I/O error is indicated.
SP#*nnn*/STOPPED, SPOOLEE I/O ERROR	The spooler on the indicated spoolee *ldev* has detected an error in attempting to read, write, or control its spoolee. The spoolee stops immediately; an input spooler will delete any currently ACTIVE spooled device file, while an output spooler will defer any currently ACTIVE spooled device file (set OUTPRI to 0). May be attempting a rewind on a magnetic tape device without a tape mounted. This generally indicates a hardware problem, but can also occur in response to an =ABORTIO command.	Try and restart the spooler :STARTSPOOL,*ldev*. If problem persists, the device or the medium (cards,magnetic tape,etc.) is faulty. If device is magnetic tape, check that a tape is mounted.

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
SP#*nnn*/STOPPED, SPOOLEE NOT ACCEPTING	The specified *ldev* is neither :JOB nor :DATA accepting, causing the input spooler to stop. It cannot recognize further :JOB or :DATA commands.	Use the :ACCEPT JOBS,*ldev* command or the :ACCEPT DATA,*ldev* command and :STARTSPOOL,*ldev* to restart the input spooler.
STANDARD FORMS	You have special forms mounted on a device, and a device file not requiring special forms is assigned to the device.	Reply to the message by entering either =REPLY *pin*,YES when standard forms are mounted or =REPLY *pin*,NO when special forms are mounted and printing is to be deferred.
STANDARD FORMS REQUIRED FOR $STDLIST:LDEV *nnn* READY (Y/N)?	You are asked if the specified logical device (*ldev*) is ready to mount the standard forms required for $STDLIST.	You are required to enter =REPLY *pin*,YES or =REPLY *pin*,NO. If the *ldev* is ready to have forms mounted, =REPLY *pin*,YES. If the *ldev* is in use, =REPLY *pin*,NO.
SYSTEM VOLUME ON LDEV#*nnn*	A system volume is mounted on the specified *ldev* which is a nonsystem domain device.	
UNFORMATTED VOLUME ON LDEV#*nnn*	An unconditioned volume has been mounted on the specified nonsystem domain device.	The volume can be conditioned on line using the VINIT subsystem.
UNLOCKSEG FAILURE	The UNLOCKSEG intrinsic failed. Internal software device.	1. COOLSTART the system (to reclaim the line monitor's stack). 2. Contact your System Engineering Organization (SEO).
UNREADABLE LABEL ON LDEV#*nnn*	The volume mounted on the nonsystem domain device *ldev* contains a media error which prevents its label from being read.	
vcsname.group.acct IN USE BY *user.acct*	The specified private volume set/class is being used by the user specified.	Information only.

Table 9-2. Console Messages (continued)

MESSAGE	MEANING	ACTION
vname OF *vcsname.group.account* ON LDEV#*nnn*	A Private Volume disc has been mounted on the drive specified by *ldev*. The volume has been fully conditioned and assigned to a volume class/set.	Information only.
(VOLUME DISMOUNTED) *rname* OF *vcsname.group.account* ON LDEV *ldn*	A 7911/12/14/45 private volume disc has been mounted on the drive specified by *ldn* following an offline power fail which occurred since the last system startup. The message is displayed when the disc is powered on line again. There is no effect on the operation of the private volume.	Information Only.
VOLUME ID FOR *filename*	A labeled tape was opened but no volume header information is supplied; or an unlabeled tape was mounted for a write operation when a labeled tape was expected.	Supply a six-character alphanumeric volume header which will be written on the tape as identification (for example, =REPLY *pin*,VOL02).
VOLID FOR VOL*n* OF VOLUME SET *volid* ON LDEV#*nnn*	An unlabeled tape is mounted.	Supply a six-character volume identification which will be written on the tape for identification.
VOL*volid* (ANSI) MOUNTED ON LDEV#*nnn*	The recognized tape has an ANSI-standard label.	Information only.
VOL *volid* (IBM) MOUNTED ON LDEV#*nnn*	The recognized tape has an IBM-standard label.	Information only.
VOL UNLABELED MOUNTED ON LDEV#*nnn*	The recognized tape has no label.	Information only.
WRONG REEL ON LDEV#*nnn* ANOTHER AVAILABLE (Y/N)?	When performing multi-reel restores, you allocated tapes in the wrong order, or you mounted a tape which was not in this tape set.	If another reel is available, you need to =REPLY *pin*,YES and mount the new reel on the logical device specified in the message. If not, =REPLY *pin*,NO.
ZSIZE ERROR	The ZSIZE intrinsic failed. Internal software error.	Contact your AEO.

Cold Load Error Messages With Numbers

Cold load messages are divided into number ranges specified by the following classifications:

Number Range	Classification
1-34	Input/Output(I/O)
100-137	Configuration
200-205	Volume Table
225-237	Defective Tracks
250-254	I/O Table Initialization
275-277	Directory
300-305	Table
325-335	Disc Space Management
350-374	Memory Management
375-379	Restore
400	Internal Traps
450-452	File System
500-501	CS-80 Sparing

Table 9-3. Cold Load Error Messages With Numbers

ERR#	MESSAGE	ACTION
1	NON-RESPONDING DEVICE CONTROLLER DRT *nn*	An I/O instruction returned a condition code of CCL, meaning the device controller did not respond. This could be due to a configuration problem. If the I/O configuration is correct, contact your Customer Engineer.
2	CHANNEL PROGRAM FAILURE - DRT *nnn*	An I/O instruction returned a condition code of CCL or CCG. This could be due to a configuration problem. If the I/O configuration is correct, contact your Customer Engineer.
3	CHANNEL PROGRAM ABORTED - CPVA *%status*	%140000 DMA abort %164000 Channel program aborted due to an address rollover. %162000 Channel program aborted due to an HP-IB parity error. %161000 Channel program aborted due to a status change in the HP-IB interface. %160400 Channel program aborted due to a device clear during channel program. %160200 Channel program aborted due to a FIFO handshake abort. %160100 Channel program aborted due to a serial poll error. %160040 Channel program aborted due to an illegal CSRQ. %160020 Channel program aborted due to a memory parity error. %160010 Channel program aborted due to a nonresponding IMB module. %160004 Channel program aborted due to a channel hardware timeout. %160002 Channel program aborted due to a data chain error. %160001 Channel program aborted due to an invalid instruction.
4	IOP ERROR	An impossible status indication was returned by the tape controller, indicating a failure in the controller or the input/output processor. At this time it is advisable to request assistance from your Customer Engineer. It is possible to try the requested cold load operation again. The system may commence normal operations, but could be extremely unreliable. File integrity could be lost. It is better to have your Customer Engineer check out the system before you try again.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
5	TAPE I/O CMD REJECTED	This error, reported by the magnetic tape controller, implies that there is a bad tape controller. If you have more than one drive on your system, check to ensure that only one drive is on line and the proper unit has been selected (Unit 0). Also ensure the tape drive is configured correctly. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
6	TAPE TRANSFER ERROR	This error, reported by the magnetic tape controller, implies either a defective tape or a defective tape controller. Try a backup tape after cleaning the tape heads.
7	TAPE PARITY ERROR	A parity error was detected while reading the magnetic tape. Try a backup tape after cleaning the tape heads.
8	TAPE TIMING ERROR	This error, reported by the magnetic tape controller, implies a defective tape controller. Contact your Customer Engineer.
9	READING BLANK TAPE	This error, reported by the magnetic tape controller, implies either a defective tape or a defective tape controller. Try a different backup tape after cleaning the tape heads. If that fails and the same error is printed, contact your Customer Engineer.
10	COLD LOAD TAPE READ ERROR	A tape-read error was detected during the cold load operation. This may be a magnetic tape hardware problem. Clean tape heads and try again. If the error persists, temporarily use a different system backup tape and try to load. If this fails, contact your Customer Engineer immediately.
11	IRRECOVERABLE PARITY ERRORS	This error, reported by the magnetic tape controller, implies either a defective tape or a defective tape controller. Try a different backup tape after cleaning the tape heads. If that fails and the same error is printed, contact your Customer Engineer immediately.
12	ILLEGAL CMD	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
13	CYLINDER COMPARE ERROR	This is an error returned by the disc controller. Retry the operation; if it fails, with the same error message, contact your Customer Engineer.
14	UNCORRECTABLE ERROR	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
15	HEAD SECTOR COMPARE ERROR	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
16	SIO PROGRAM ERROR	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
17	END OF CYLINDER	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
18	OVERRUN	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
19	POSSIBLE CORRECTABLE ERROR	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
20	ILLEGAL ACCESS TO SPARE TRACK	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
21	DEFECTIVE TRACK	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
22	HEAD MOVING DURING OPERATION	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
23	DISC DRIVE ERROR	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
24	ATTEMPT TO PROTECT DEFECTIVE TRACK	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
25	DRIVE UNAVAILABLE	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
26	DRIVE ATTENTION	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
27	BAD DISC ADDRESS	An address greater than the available number of sectors on the disc was passed to the disc driver. Attempt a COLDLOAD. If this fails, attempt a RELOAD. If this fails, contact your Customer Engineer.
28	BAD FILE ADDRESS	An attempt was made to write outside the range of one of the system files. A RELOAD should be attempted. If the system disc does not have enough space to hold all system files, this error will occur again. If another, larger capacity disc is available, use it as the system disc.
29	HP-IB INTERFACE	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
30	CS'80 DRIVER ERROR NUMBER *nnn*	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, try a different backup tape and try to load. If the error persists, contact your Customer Engineer.
31	DRIVER COMMAND STACK OVERFLOW, LDEV *nnn* DRT# *nn* UNIT *nnn*	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
32	NUMBER OF RETRIES EXCEEDS MAX LDEV *nnn* DRT *nn* UNIT *nnn*	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
33	TRANSFER SIZE TOO LARGE LDEV *nnn*	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
34	INVALID DRIVER CALL LDEV *nnn*	This is an error returned by the disc controller. Retry the operation; if it fails with the same error message, contact your Customer Engineer.
100	PREVIOUS RELOAD ABORTED - MUST RELOAD	The last cold load was a RELOAD that was aborted. Therefore, the next cold load must be a RELOAD.
101	PREVIOUS TAPE COLD LOAD ABORTED - MUST COLD LOAD FROM TAPE	The last cold load was a COLDSTART or UPDATE, and was aborted. Therefore, this cold load must be a COLDSTART, UPDATE or RELOAD.
102	USER SPECIFIED MAX DRT IS *nnn*	At least one device has been defined with a DRT number higher than the specified maximum. Increase the value for the highest DRT number configured.
103	SYSTEM DISC MUST BE UNIT ZERO	The I/O configuration is incorrect. Change the I/O configuration so that ldev1 is unit 0.
104	SYSTEM DISC MAY ONLY BE CONFIGURED ON RELOAD	The type and subtype on the disc label do not match the type and subtype of the system disc in the I/O configuration. Change the I/O configuration or use the correct system disc.
105	LDEV ONE MUST BE SYSTEM DISC	The I/O configuration is incorrect. Change the I/O configuration so that ldev1 is the system disc.
106	WRONG DRT FOR SYSTEM DISC	This error happens only during an UPDATE. The disc label is incorrect for the system disc (ldev1), the disc is not on line, or the device is not a disc. Change the I/O configuration or use the system disc with the correct DRT on the disc label.
107	NO DEVICE IN CLASS DISC	At least one system disc must be in class "DISC ".

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
108	COLD LOAD DEVICE MUST BE CONFIGURED	A cold load is being performed from a cold load device which is configured incorrectly or not included in the current I/O configuration. Configure the device using the appropriate DRT number.
110	SYSTEM CONSOLE MUST BE IN DRT EIGHT UNIT ZERO	Change the I/O configuration so that ldev 20, the System Console, is DRT 8 unit 0.
111	IMPROPER SPEED FOR SYSTEM CONSOLE	The terminal speed configured may not be supported for the System Console. Change the I/O configuration for ldev 20 so the terminal speed matches specifications.
112	LDEV *nnn* TERMINAL UNIT MUST BE ZERO	The terminal controller does not support multiple units. Usually occurs when trying to configure ADCC terminals. When configuring ADCC terminals use increasing DRT numbers.
113	LDEV *nnn* TERMINAL DRT MUST BE UNIQUE	The terminal controller does not support multiple units.
114	ILLEGAL MASTER DEVICE	Specified value is not the logical device number of a configured communications interface (INP). When configuring a communications driver or virtual terminal you must assign the logical device number (preceded by "#") of the associated communications interface.
115	UNDEFINED CLASS *devclass* USED AS OUTPUT DEVICE BY FOLLOWING DEVICES	The I/O configuration is incorrect. The devclass name mentioned must be used as a device class name for the appropriate logical device in the configuration.
116	NO OUTPUT DEVICE FOR LOGICAL DEVICE *nnn*	Refer to the description of the INITIAL Program, Section VII.
117	OUTPUT CLASS FOR DEVICE *nnn* NO LONGER EXISTS	Refer to the description of the INITIAL Program, Section VII.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
118	DEVICE CLASS *devclass* CANNOT BE OUTPUT DEVICE	The I/O configuration is incorrect. An invalid device class is being used as an output device. An invalid device class contains logical devices with device types 0-7 direct access; 8-15 serial input; 24-31 noncurrent I/O access range. Change the device class of the output device name or delete the invalid logical devices from the device class.
119	LOGICAL DEVICE *nnn* CANNOT BE OUTPUT DEVICE	The I/O configuration is incorrect. An invalid logical device number is being used as an output device. Invalid logical devices are defined by device types (see action in #118 for values). Change the output device in the I/O configuration.
120	LOGICAL DEVICE *nnn* DOES NOT EXIST	Refer to the description of the INITIAL Program, Section VII.
121	LDEV *nnn* AND LDEV *nnn* ON SAME DRT AND UNIT	Refer to the description of the INITIAL Program, Section VII.
122	DEVICES OF DIFFERENT TYPE RANGES IN CLASS *devclass*	Refer to the description of the INITIAL Program, Section VII.
123	ILLEGAL TYPE COMBINATIONS IN CLASS *devclass*	Refer to the description of the INITIAL Program, Section VII.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
124	CONFIGURED MEMORY SIZE EXCEEDS PHYSICAL MEMORY AVAILABLE	The value displayed is not physically present. Reduce the value.
125	CANNOT RECOVER DISC SPACE OF SPOOLFILE #O*nnn*	Information only.
126	DISC DRIVER DOES NOT EXIST	A load has been attempted on a disc with a type or subtype not known to the system. This usually indicates an error internal to the system. If you have inserted user-written drivers into the system, try deleting them from the I/O configuration on a COLDSTART, or try a RELOAD from system backup tape which contains the driver in PUB.SYS. If this fails, contact your Customer Engineer.
127	DIFFERENT DEVICE DRIVES CONFIGURED FOR DRT *nn*.	The I/O configuration is incorrect. With the exception of RS232 devices, terminals, or data communication devices, devices using different drivers may not be configured on the same DRT number. Change the DRT number(s) of these devices in the I/O configuration making appropriate hardware connections if necessary.
128	HIGHEST DRT SUPPORTED BY THIS CPU IS *nn*	The highest DRT supported is 127 for the Series 39, Series 4X, and Series 5X; and 511 for the Series 37/MICRO 3000/MICRO 3000XE and Series 64/68/70. Change the I/O configureation so that all the logical device DRT numbers are less than or equal to the maximum for the corresponding CPU type.
129	FOLLOWING DRTS MUST BE CHANGED LDEV *nn* DRT *xx* LDEV *nn* DRT *xx* . . .	The I/O configuration is incorrect. The ldev numbers listed are configured on DRT numbers greater than the highest DRT supported by the CPU, or greater than the configured maximum. Increase the value for the maximum DRT allowed, or change the DRT numbers of these devices.
130	NOT A SUPPORTED SPEED	The terminal speed entered is not valid. Enter a supported terminal speed according to specifications for the device.
131	LDEV *nnn* TERMINAL SPEED NOT SUPPORTED BY HARDWARE	ADCC terminals are configured with terminal speeds greater than 9600. Reduce the terminal speed for these devices in the I/O configuration.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
132	NON RESPONDING BOARD FOR TERMINAL ON LDEV *nnn* DRT *nn*	Check the DRT number of the terminal or RS232 device. If correct and the same error message is printed, contact your Hewlett-Packard CE.
133	WRONG BOARD FOR TERMINAL ON LDEV *nnn* DRT *nn*	Check the DRT number of the terminal or RS232 device. If correct and the same error message is printed, contact your Hewlett-Packard CE.
134	CHANGE LDEV *nnn* TO DRT *nn*	The terminals listed must be configured on the corresponding DRT number. Change the I/O configuration accordingly.
135	LDEV *nn* DRTS #125-127 RESERVED BY HPIB INTERFACE	Because DRT numbers 125, 126, and 127 are reserved, change the DRT number of the ldev listed.
136	CHANNEL ON HPIB INTERFACE CANNOT BE ZERO, ONE OR FIFTEEN	The I/O configuration is incorrect. Change the I/O configuration.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
137	HIGHEST SUPPORT DISC LDEV IS *nnn*	Reconfigure disc drives with ldev numbers greater than maximum ldev number shown.
200	VOLUME TABLE FULL	You tried to configure more than 64 volumes.
201	VOLUME TABLE DESTROYED - MUST RELOAD	The Volume Table maintained on the system disc has been overwritten; RELOAD system.
202	MOUNT CORRECT VOLUMES OR RELOAD	The volumes specified in the Volume Table do not agree with the mounted volumes.
203	ALL VOLUMES MUST BE MOUNTED	The volumes specified in the Volume Table cannot be found among the mounted discs. Mount the appropriate volumes or reload.
204	DEVICE *nnn* VOLUME *volname* NOT DEFINED IN TABLE	A system volume not declared in the Volume Table is mounted on this logical device. Add volume name to Volume Table or delete this logical device and power off the disc drive.
205	VOLUME NAME *volname* ON DEVICE *nnn* ALREADY IN USE	Two volumes are mounted with the same name. You will be requested to assign the volume a new name.
225	DEFECTIVE TRACKS TABLE FULL	The table can hold a maximum of 120 deleted or reassigned tracks.
226	NO ALTERNATES AVAILABLE	There are no alternate tracks available to reassign a track.
227	IN RESERVED AREA - CANNOT DELETE	Track is either the first 400 sectors of the disc, or the Disc Free Space Table.
228	IN DIRECTORY - CANNOT DELETE	Information only.
229	ALTERNATE TRACK - CANNOT DELETE	This alternate track is the target of a reassigned track, and therefore cannot be deleted.
230	IN SYSTEM AREA - CANNOT DELETE	Information only.
231	SYSTEM TABLE ON DEFECTIVE TRACKS - CANNOT WARMSTART	At least one of the tables (DST Descriptor Table, JMAT, IDD or ODD), which must be recovered for a WARMSTART, is located on defective tracks. Either a COOLSTART, COLDSTART, or RELOAD may be attempted. The INITIAL Program will then lead you to the defective track (refer to the description of the INITIAL Program in Section VII). You will be requested to take some action on the defective track.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
232	FLAGGED TRACK IN RESERVED AREA - MUST REINITIALIZE PACK	A defective track is illegal in the first 400 sectors of the disc or in the Disc Free Space Table. Information only.
233	NO MORE REASSIGNS ALLOWED IN THIS BOOT	Information only.
234	INVALID DISC LABEL ON LDEV *nnn*	Information only.
235	INVALID DEFECTIVE TRACKS TABLE ON LDEV, *nnn*	Information only.
236	IN A SYSTEM DISC RESIDENT TABLE- CANNOT DELETE	Information only.
237	IN DISC FREE SPACE MAP- CANNOT DELETE	Information only.
250	TERMINAL INITIALIZATION PROGRAM TOO LARGE	This usually indicates an error internal to the system. Contact your Customer Engineer.
251	TERMINAL CHANNEL PROGRAM TOO LARGE	This usually indicates an error internal to the system. Contact your Customer Engineer.
252	DIFFERENT PROCESSES SPECIFIED FOR DRT *nn*	This usually indicates an error internal to the system. Contact your Customer Engineer.
253	INITIATOR, COMPLETOR FOR LDEV *nnn* SUPPOSED TO BE CORE RESIDENT	This usually indicates an error internal to the system. Contact your Customer Engineer.
254	MORE THAN ONE PRIMARY INTERRUPT HANDLER FOR DRT *nn*	This usually indicates an error internal to the system. Contact your Customer Engineer.
275	INVALID DIRECTORY ENTRY - ENTRY LEVEL WRONG OR MISSING AT ACCOUNT, GROUP OR FILE LEVEL	Bad directory. RELOAD.
276	INVALID DIRECTORY ENTRY - ENTRY LEVEL WRONG OR MISSING AT ACCOUNT OR USER LEVEL	Bad directory. RELOAD.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
277	DIRECTORY ERROR A=*a*,B=*b*	An error occurred while accessing the directory. The directory software, part of the operating system, is included in the INITIAL Program in slightly modified form. Errors which occur for the INITIAL Program are the same type of errors that occur when the system is operational. The INITIAL Program cannot recover these errors because it isn't as sophisticated as the operating system. All directory software errors are listed below. Some errors are not possible in the INITIAL Program because they are illogical at this point.
300	OUT OF CST ENTRIES	The INITIAL Program has run out of Code Segment Table (CST) entries for the system. Rebuild the system tape through the SYSDUMP Program, increasing the number of entries in this table or COOLSTART and make the appropriate System Table change. Refer to Step 79 of the SYSDUMP Program.
301	OUT OF DST ENTRIES	The INITIAL Program has run out of Data Segment Table (DST) entries for the system. Rebuild the system tape through the SYSDUMP Program as described in action #300. See Step 80 of the SYSDUMP Program.
302	OUT OF PCB ENTRIES	The INITIAL Program has run out of Process Control Block (PCB) table entries for the system. Rebuild the system tape through the SYSDUMP Program as described in the action for #300. See Step 81 of the SYSDUMP Program.
303	OUT OF WSTAB ENTRIES	The INITIAL Program has run out of working test table entries for the system. Rebuild the system tape through the SYSDUMP Program, increasing the size of the Swap Table. See Step 135 of the SYSDUMP Program.
304	OUT OF CSTBLK ENTRIES	The INITIAL Program has run out of extended CST table (XCST) entries for the system. Rebuild the system tape through the SYSDUMP Program, increasing the maximum number of running programs or COOLSTART and make the appropriate System Table change. See Step 79 of the SYSDUMP Program.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
325	DISC SPACE ERROR	A conflict exists between the disc free space map and the space used as defined in the directory. A RELOAD should be attempted. If the RELOAD fails, attempt to format all packs, and then attempt a RELOAD. If that fails, contact your Customer Engineer.
326	OUT OF DISC SPACE ON LDEV *nnn*	Attempt a RELOAD and configure on additional system disc in order to provide more disc space for files being restored.
327	OUT OF BOOTSTRAP DISC SPACE	The 400 sectors of the system disc allocated to the bootstrap program and certain tables has been exceeded. This is an error internal to the system. A RELOAD should be attempted. If that fails, contact your Customer Engineer for assistance.
328	DISC SPACE ERROR - WHILE RESTORING SPACE	See action for #325.
329	DISC SPACE ERROR - WHILE GETTING SPACE	See action for #325.
330	OUT OF VIRTUAL MEMORY ON LDEV *nnn*	The system tables are too large. Use a previous SYSDUMP tape with unaltered system table values and COLDLOAD.
331	LDEV *nnn* HAS NOT BEEN CONVERTED TO NEW DISC FREE SPACE MAP	Run the conversion program "CONFVP.CREATOR.SYS" for system domain drives and "PVCONFVP.CREATOR.SYS" for Private Volume drives.
332	DISC FREE SPACE MAP HAS BEEN FLAGGED AS BAD, CANNOT ALLOCATE SPACE ON LDEV *nnn*, TRY RECOVER LOST DISC SPACE.	COOLSTART and answer yes to the question "RECOVER LOST DISC SPACE". If this fails, RELOAD.
333	DISC FREE SPACE MAP FOR LDEV *nnn* IS ON A DEFECTIVE AREA OF THE DISC, MUST RELOAD	RELOAD.
334	RETURNING SPACE NOT IN THE RESERVED AREA	Attempt an UPDATE. If this fails, COLDLOAD. If this fails, RELOAD. If all these attempts fail, contact your Customer Engineer.
335	RETURNING SPACE ALREADY FREE IN THE RESERVED AREA	See action for #334.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGE	ACTION
350	OUT OF MEMORY	The total amount of main-memory needed to build the resident portion of the system has been exceeded. You can decrease the size of core resident tables through the SYSDUMP Program. Refer to "SUGGESTED PARAMETER SETTINGS" in Section VII. This error can also be caused by too many core resident code segments, although unlikely.
351	OUT OF BANK ZERO	Core-resident tables must be resident in the first 64k words (128K bytes) of memory. You can delete some I/O devices, or decrease the size of core resident tables through the SYSDUMP Program. Refer to "SUGGESTED PARAMETER SETTINGS" in Section VII.
352	BANK WRAP-AROUND	You configured too many devices during the I/O configuration. You should delete un-needed devices.
374	FATAL ERROR *nnn*	This usually indicates an error internal to the system. Contact your Customer Engineer.
375	IMPROPER TAPE FORMAT	The information on a tape used for a LOAD does not agree with the format of tapes produced by the SYSDUMP Program. Double check all tape reels to ensure they are properly marked as store or SYSDUMP tapes.
376	NOT A RELOAD TAPE	Either the tape label is not 40 words long, or the label identification is incorrect. Mount the correct tape, and proceed.
377	TAPE NOT A MEMBER OF THIS SET	The creation date in the tape label is incorrect for this tape to be a member of this RELOAD set. Mount correct tape, and proceed.
378	WRONG TAPE SET - MUST HAVE EARLIER DATE	The creation date in the tape label exceeds the date of the RELOAD. Mount an earlier dated tape and proceed.
379	WRONG REEL	The reel identification in the tape label does not match what the system expected to be mounted. Mount the correct reel and proceed.

Table 9-3. Cold Load Error Messages With Numbers (continued)

ERR#	MESSAGES	ACTION
400	NON-RESPONDING MODULE INTERRUPT	This error can occur from referencing a nonexistent I/O channel or memory controller. Check your configuration of I/O devices for invalid DRTs and your configured memory size. If configuration is correct, contact your Customer Engineer.
450	FILE LABEL CHECKSUM ERROR	This error message is generated when a system file has a file label checksum error. Try to LOAD again. If this fails use an earlier system backup tape set.
451	TAPE FILE LABEL CHECKSUM ERROR	This error message is generated when the new system file from tape or serial disc has a file label checksum error. Try to LOAD again. If this fails use an earlier system backup tape set.
452	DEFECTIVE FILE LABEL	This error message is generated whenever there is a volume number in the file label that does not exist on the system.
500	NO MORE SPARING ALLOWED THIS BOOT	Information only.
501	DATA LOST DURING SPARE LDEV *nnn*, SECTOR *nn* - *nn*	Information only.

Table 9-4. Cold Load Error Messages Without Numbers

MESSAGE	ACTION
DISC READ ERROR ON LDEV# *nnn* STATUS=	A disc error has occurred on the specified logical device. The System Operator should cold load again, and take action on the bad track.
DISC WRITE ERROR ON LDEV# *nnn* STATUS=	A disc error has occurred on the specified logical device. The System Operator should cold load again, and take action on the bad track.
DISC SEEK ERROR ON LDEV# *nnn* STATUS= %*status* ADDR=% *addr* WORDS= *words*	A disc error has occurred on the specified logical device. The System Operator should cold load again, and take action on the bad track.
EOF	An attempt has been made to read past the end of one of the system files. Try an UPDATE or COLDSTART from tape. If this fails, a RELOAD should be attempted. If this fails, use an earlier system backup tape and RELOAD. If that fails, contact your Customer Engineer.
FILE *filename*.PUB.SYS NOT ON DISC	The specified file was needed, but was not found in the directory. Obtain another system backup tape, and UPDATE. If no current system tape is available, and the filename mentioned is a driver in the I/O configuration, delete the device(s) from the configuration during an UPDATE and then contact the Software Engineering Organization (SEO) for a current copy of the system.
TAPE UNIT WENT NOT READY	This error, reported by the magnetic tape controller, implies either that the tape controller is defective or you switched the tape unit off line during an operation.
LDEV *nnn*,FUNC*x*, DISCADR%*x*,CPADR%*x* *** STATUS DISPLAY *** – – – – – – – – – –	An error, reported by the disc controller, for CS-80 devices, gives the status of the bits at the occurrence of the error. Attempt the LOAD again. If this fails, contact your Customer Engineer.

MESSAGE CATALOG

The MPE message system consists of a message catalog (CATALOG.PUB.SYS), the HELP subsystem catalog (CICAT.PUB.SYS), user message catalogs, a program for building message catalogs (MAKECAT.PUB.SYS), and the GENMESSAGE intrinsic.

The message catalog (CATALOG.PUB.SYS) is a numbered Editor file containing message sets. The sets serve to break the catalog into manageable portions, so that each set contains a particular type of error message. The sets are numbered in ascending order.

The message catalog contains a system and a user message facility. The user facility is for application programmers. It can be accessed through the GENMESSAGE intrinsic with MAKECAT.PUB.SYS. In this case, the MAKECAT.PUB.SYS program is used without parameters.

Messages in both catalogs can be of any length and can contain up to five parameters. Continuation of a message is indicated with either a percent sign (%) or an ampersand (&) at the end of the line to be continued. The percent sign (%) indicates that the message is continued on the next line. The ampersand (&) indicates that the message is continued on the same line with no carriage return or line feed. Message numbers need not be contiguous, but must be in ascending order.

The position of parameters in a message is indicated by an exclamation point (!). For the system message catalog, the back slash (\) is also a parameter, reflecting a logical device number. Message sets are indicated by "$SET *n*", starting in column 1; the rest of the line is a comment. The maximum value for *n* is 62, and the minimum value is 1. Comments can be inserted in the catalog by placing a dollar sign ($) in column 1. After processing by the MAKECAT.PUB.SYS program, the user catalog file contains 80 byte records, a blocking factor of 16, and 32 extents. For the system message catalog the extent size is one, but all other file specifications are the same. The format of the message catalog is as follows:

```
$SET 1 SYSTEM MESSAGES

1 LDEV #! IN USE BY FILE SYSTEM
2 LDEV #! IN USE BY DIAGNOSTICS
  .
  .
  .
$ MESSAGE 57 DELETED
  .
  .
  .
204 FILE COMMAND REQUIRES AT LEAST TWO PARAMETERS, INCLUDING THE FORMAL
NAME OF THE FILE (CIERR 204)
```

Each message set is reserved for a particular type of error message. Refer to Table 9-5 on the following page for a listing of the message sets and their designated error message categories.

Table 9-5. CATALOG.PUB.SYS

```
$SET 1  - SYSTEM MESSAGES FORMER MESSAGE CATALOG
$SET 2  - CIERROR MESSAGES
$SET 3  - MISCELLANEOUS ABORT MESSAGES
$SET 4  - PROGRAM ERROR ABORT MESSAGES
$SET 5  - INTRINSIC ABORT MESSAGES
$SET 6  - RUN-TIME ABORT MESSAGES
$SET 7  - CI GENERAL MESSAGES
$SET 8  - FILE SYSTEM ERROR MESSAGES
$SET 9  - LOADER ERROR MESSAGES
$SET 10 - CREATE ERROR MESSAGES
$SET 11 - ACTIVATE ERROR MESSAGES
$SET 12 - SUSPEND ERROR MESSAGES
$SET 13 - MYCOMMAND ERROR MESSAGES
$SET 14 - LOCKGLORIN ERROR MESSAGES
$SET 15 - PRIVATE VOLUME ERROR MESSAGES
$SET 16 - DS/3000 ERROR MESSAGES
$SET 17 - HELP ERROR MESSAGES
$SET 18 - *NOT USED*
$SET 19 - SERIAL DISC ERROR MESSAGES
$SET 20 - USER LOGGING
$SET 21 - ASOCTABL.PUB.SYS MESSAGES
$SET 22 - 268X PAGE PRINTER MESSAGES
$SET 23 - NOT USED
$SET 24 - NOT USED
$SET 25 - 2680A ERROR MESSAGES
$SET 26 - DISC FREE SPACE MESSAGES
$SET 27 - SYSTEM INTERNAL ERROR MESSAGES
$SET 28 - CIPER DEVICE MESSAGES
$SET 29 - STORE/RESTORE MESSAGES
```

MAKECAT PROGRAM

The MAKECAT program formats and installs CATALOG and the HELP subsystem catalog "CICAT". The program has the following entry points:

- Beginning of program (no entry point) -Builds a new temporary file, and renames any old temporary catalog CAT*xxxxx*. Thus, the catalog can be verified without actually installing it, and users can create their own message catalogs.

- BUILD - Reads input file (formal designator INPUT), installs, and formats this file as a new catalog. This can be done while the system is running. You must log on as MANAGER.SYS to use this entry point.

- DIR -Installs a previously formatted CATALOG.PUB.SYS .

- HELP - Reads an input file (formal designator INPUT) and formats the file into a help catalog (formal designator HELPCAT).

To modify and then install CATALOG with MAKECAT, you must be MANAGER.SYS. The procedure is as follows:

1. Log on as System Manager (MANAGER.SYS).
2. Text the file (CATALOG.PUB.SYS) into the Editor.
3. Make the change.
4. Keep the file under a new name and exit the Editor.
5. Enter the following file equation:

   :FILE INPUT=*newname*

6. Perform one of the following:

   a. Enter :RUN MAKECAT.PUB.SYS,BUILD.

      If everything is satisfactory, MAKECAT prints:

      XX NEW CATALOG INSTALLED

      Purge old catalog CAT*nnnn* , where *nnnn* is an archival number, CAT0001 , CAT0002 , etc.

   b. Run MAKECAT by performing a SYSDUMP. A new catalog is placed on the SYSDUMP tape. The user must answer "YES" to the "MISC. CONFIGURATION CHANGES" prompt and "YES" to the "MESSAGE CATALOG CHANGES" prompt in the SYSDUMP dialog. Refer to the SYSDUMP dialog in Section VII of this manual.

MAKECAT Examples

The System Manager changes or adds a few messages to CATALOG.PUB.SYS , and keeps it in file "NEWCAT".

```
:FILE INPUT=NEWCAT
:RUN MAKECAT.PUB.SYS,BUILD
```

The System Manager restores CATALOG.PUB.SYS from magnetic tape. This is restored only if the file CATALOG.PUB.SYS no longer exists on the system. In the following example, :RUN MAKECAT,DIR will install the previously formatted catalog file.

```
:RESTORE *T;CATALOG.PUB.SYS
:RUN MAKECAT.PUB.SYS,DIR
```

A user could create his own message catalog and keep it in a file "MYMSGS".

```
:FILE INPUT=MYMSGS
:RUN MAKECAT.PUB.SYS
:SAVE CATALOG
```

HELP Subsystem Catalog

The HELP subsystem catalog (CICAT) contains descriptions of all MPE commands. A typical command entry in the catalog is in the following format:

```
778     \ENTRY=ABORT,PARMS,OPERATION,EXAMPLE
780         :ABORT
782
784     Aborts current program or operation.
786
788     SYNTAX
790
792         :ABORT
794
796     \ITEM=PARMS
798     PARAMETERS
800
802     None
804
806     \ITEM=OPERATION
808     OPERATION
810
812     After you suspend a program or MPE command operation by pressing
814     the BREAK key, the :ABORT command immediately terminates that
816     program or operation.  Note that the :ABORT command is available
818     only from a session and only during a break.  An :ABORT command
820     results in the Job Control Word being set to the SYSTEM 0 state.
822
824     \ITEM=EXAMPLE
826     EXAMPLE
828
830     To abort the current operation, enter:
832
834         :ABORT
```

MPE commands in the catalog are indicated by "\ENTRY ". Subparameters (**parameters**, **operation**, **example**) are indicated by "\ITEM" or "\SUBITEM ". The entry "\STOPHELP" causes HELP to skip over any subsequent lines until "\STARTHELP" is encountered. The entry "\STARTHELP" causes HELP to start displaying again. With "\SUBSET " placed at the beginning of the file, MAKECAT builds a file that omits the lines between "\STOPHELP \STARTHELP" pairs, making the HELP file smaller.

To modify the HELP Subsystem Catalog (CICAT) with MAKECAT perform the following steps:

1. Log on as System Manager (MANAGER.SYS,PUB).
2. Text the file (CICAT.PUB.SYS) into the Editor.
3. Make the change or addition.

4. Keep the file under the new name CATNEW.

5. Enter the following file commands:

```
:FILE INPUT=CATNEW
:FILE HELPCAT=CATNEXT
:RUN MAKECAT,HELP                    ** Creates a new help catalog
                                        called CATNEXT. **
:FILE CICAT.PUB.SYS=CATNEXT          ** Check the modifications. **
:HELP                                ** If the modifications are
                                        correct, the old CICAT
                                        is replaced. **

:PURGE CICAT.PUB.SYS
:RENAME CATNEXT,CICAT.PUB
```

SUBSYSTEMS AND UTILITIES

SECTION X

PRIVATE VOLUMES OVERVIEW

The Private Volumes Facility allows users who have the Use Volumes (UV) capability to access removable disc volumes on HP 7920, HP 7925, and HP 7935 discs, as well as on the nonremovable HP 7911, HP 7912, HP 7914, HP 7933, HP 7936, HP 7937, HP 7945, HP 7957, and HP 7958. (The cartridge tape on the HP 7911, HP 7912 , and HP 7914 disc drives cannot be used as a private volume.) Users access a file using a fully qualified designator which causes the system to access (and logically mount, if necessary) the appropriate set of volumes on which the file resides. The System Manager and Account Managers who have the Create Volumes (CV) capability can define, alter, and delete private volume sets and classes.

Some of the features of private volumes are:

- Increases system availability.
- Quick recovery from system failures.
- Access to files on removable media.
- Disc packs that are transportable between HP 3000 computer systems.
- Automatic volume recognition.
- Disc packs that can be formatted on line.
- Disc packs that can be condensed on line. This feature enables you to reclaim free space on a disc volume by making occupied portions of the disc contiguous.

Computer Museum

The following text presents an operational overview of the Private Volumes Facility.

Private Volumes Applications

Private volumes, with the capability of mass data storage and fast data recovery, have many applications. Some typical applications are presented in the following paragraphs.

Consider an environment in which a computer system is being used by two or more different types of users. For example, one group of users may consist of members of an engineering department who are using the HP 3000 for calculations and to write and execute programs which demonstrate the feasibility of certain functions. This group may consist of several interactive users, each with moderately large data bases which are used in mathematical model testing.

A separate group with a different application on the same system could be an accounting department or a manufacturing department, each with the large data bases necessary for payroll, order processing, inventory control, etc.

If, let's say, both the engineering and manufacturing departments are simultaneously contending for system resources, the resources will be used inefficiently. A larger number of disc drives will have to be physically mounted and configured and more disc file space will be utilized by the system than if the departments contended for resources separately, at different times. More efficient use of the system's resources does occur by using Private Volumes because they allow a separate contention of system resources. Observe the following procedures to see how this is done:

1. Configure the system so that a suitable number of disc drives are allocated for Private Volume use.

2. Establish two accounts: one for engineering and one for manufacturing.

3. Define two private volume sets and assign the groups in each account to a separate volume set.

4. Assign a different time period for each group of users to access the computer system.

Thus, each group of users would load their private volume disc packs on the system at the beginning of their time period, access their files for the duration of this period, and unload the disc packs at the end of the time period.

A second application could be where a program periodically (once a week or once a month) updates a large data base. If such a data base is left on the system, otherwise usable disc space is not available. Rather than store the files offline on magnetic tape, the files and the program could reside on a private volume set. Then, when the files are to be updated, the private volume set can be mounted and the program run.

Private Volume Benefits

In addition to increasing a system's versatility, private volumes increase system availability. Because using private volumes separates system discs and nonsystem discs, a disc failure does not have as great an impact upon your system. For example, if you configure all the discs on a large system into the system domain, then experienced a head crash on the disc that contained the directory, you would have to reload the whole system. If you configured only one disc as the system disc and all the other discs as private volumes, a similar head crash would require you to reload only one system disc without having to reinitialize the private volumes. Also, if you use private volumes and if a hardware failure occurred on one of the private volumes, users on the system disc or one of the other private volumes are able to function normally.

Disc Domains

All disc drives are divided into two domains at configuration time: the system domain and the nonsystem domain. The system domain may be occupied by up to eight discs. The master volume of the system domain must use Logical Device Number 1 (one). The system domain is used for system and user files, for spooling (spool files), and for virtual memory.

The drives used for system domain discs cannot be used by nonsystem domain discs. Disc drives from the system domain can be reconfigured to the nonsystem domain only during a RELOAD. However, disc drives can be added to either domain during COOLSTART, COLDSTART, or UPDATE.

The nonsystem domain contains all disc drives to be used for private volumes, serial discs, or foreign discs. The Private Volumes Facility allows users to keep files on removable media (discs). Keeping files on private volumes protects them if disc drives go down during system failure. If a system failure destroys system information or the directory on a system domain disc, a RELOAD is necessary to bring the system back up. However, if the system information is destroyed or if the private volume directory is destroyed, you can restore your files, allowing online recovery from the crash.

Drives are determined to be system or nonsystem domain devices according to the contents of the Volume Table. This table lists the volume names and respective logical devices of the volumes that are mounted on the system domain drives; therefore, the system assumes that each volume the System Manager adds to the Volume Table resides on a system domain drive. Each time the system is cold loaded, the INITIAL Program checks that all volumes in the Volume Table are physically present on the system and assigns all other drives that were configured into MPE to the nonsystem domain. The additional drives are available for private volumes, foreign, and serial discs. These nonsystem domain discs cause volume table entries to be dynamically added and deleted as the devices are physically mounted and dismounted. These volume table entries are temporary, however, and are not included in the INITIAL Program's permanent version of the Volume Table.

SYSTEM DOMAIN DEVICES. System domain devices are considered by the operating system to be permanently mounted. The domain can consist of drives which do not have removable packs and/or those with removable packs which the System Manager does not wish to have used as private volume devices. The system disc is always mounted on a system domain device.

NONSYSTEM DOMAIN DEVICES. Nonsystem domain devices may or may not have removable media. They are allocated by the System Manager for private volumes and other nonsystem uses, and those which have removable media can be mounted and dismounted during normal system operation. Private volumes, foreign discs, and serial discs can only be mounted on nonsystem domain drives.

ALLOCATING DRIVES TO A DOMAIN. When allocating a drive to a domain, one of the following distinct situations exists:

- A new drive will be added to the nonsystem domain of the current operating system.
- A new drive will be added to the system domain of the current operating system.
- A new drive will not be introduced into the I/O configuration. Volumes can, however, be added to or deleted from the Volume Table; doing so will alter the number of devices in each domain.

These procedures are summarized in the following paragraphs. Specific instructions are given in the appropriate areas of the configuration dialogs in Section VII.

ADDING A NEW PRIVATE VOLUME DISC. To add a private volume disc to the nonsystem domain, perform the following steps:

1. Have the new disc "powered on", but offline. A pack does not have to be mounted on the drive.
2. Cold load the operating system using any option (except a WARMSTART) that allows I/O configuration changes to be made.
3. Configure the drive into the I/O system as you would any other device (refer to Step 4 in the INITIAL Program). Do not, however, add the device to the Volume Table (Refer to Step 80 of the INITIAL Program). (Only devices that are defined in the system volume set are assumed to be mounted on a system domain device. Any additional drives are allocated to the nonsystem domain.)
4. After the system has come up and is running, place the drive with a disc pack on line.
5. If necessary, using the VINIT utility, format and initialize the pack that resides on the drive (refer to "THE VINIT SUBSYSTEM" later in this section).

ADDING A NEW SYSTEM DISC. You can add a device to the system domain on any coldload except WARMSTART. The volume name of this new disc also may be changed. Use the following procedure:

1. Use the =SHUTDOWN command to close down the operating system.

2. Have the new disc "powered on" and on line.

3. Format the disc pack, if necessary, using the standalone SLEUTHSM program. (Refer to "FORMATTING SYSTEM DISC PACKS" in this section.)

4. Start up the operating system using the COOLSTART, COLDSTART, RELOAD, or UPDATE options.

5. During the INITIAL Program, configure the drive into the I/O system, being sure to add the device to the Volume Table. This adds a device in the system domain.

6. One of the following messages will appear if the volume name does not match the volume you added when you formatted the disc pack in Step 3:

```
NONSYSTEM VOLUME ON DEVICE ldev
ADD TO SYSTEM VOLUME SET?
```

   or

```
VOLUME xxxxxx NOT IN TABLE
ADD TO SYSTEM VOLUME SET?
```

   If such is the case, reply with "YES " and the device name you gave in Step 5.

CONVERTING A SYSTEM DISC TO A PRIVATE VOLUME DISC. To make a system domain device available for private volume use, perform the following steps:

1. Do a SYSDUMP, deleting the appropriate volume from the volume table. Dump all user files.

2. Close down the operating system with the =SHUTDOWN command.

3. Have the disc "powered on", but off line.

4. Use the RELOAD option to restart the system.

5. After the system has come up and is running, place the device on line.

6. Use the VINIT utility, described later in this section, to initialize a pack for private volume use. You can also scratch a pack; for example, you could make a system pack a private volume pack if you scratch the label. Refer to "THE SCRATCH COMMAND" later in this section.

CONVERTING A PRIVATE VOLUME DISC TO A SYSTEM DISC. To remove a device from the nonsystem domain, perform the following steps (also see Figure 10-1, which illustrates converting a private volume disc to a system disc):

1. Close down the operating system with the =SHUTDOWN command.

2. Have the disc "powered on" and on line.

3. Restart the system using the COOLSTART, COLDSTART, RELOAD, or UPDATE options.

4. During the INITIAL Program, change the I/O configuration, being sure to add the device to the Volume Table. This removes the device from the nonsystem domain, and allocates it to the system domain.

5. The INITIAL Program detects the presence of any pack that is initialized for private volumes use and prints the following message if the volume name does not match the volume you added in Step 4:

   ```
   NON-SYSTEM VOLUME ON DEVICE ldev
   ADD TO SYSTEM VOLUME SET?
   ```

   or

   ```
   VOLUME xxxxx NOT IN TABLE
   ADD TO SYSTEM VOLUME SET?
   ```

   If such is the case, reply with "YES" and the device name you gave in Step 4.

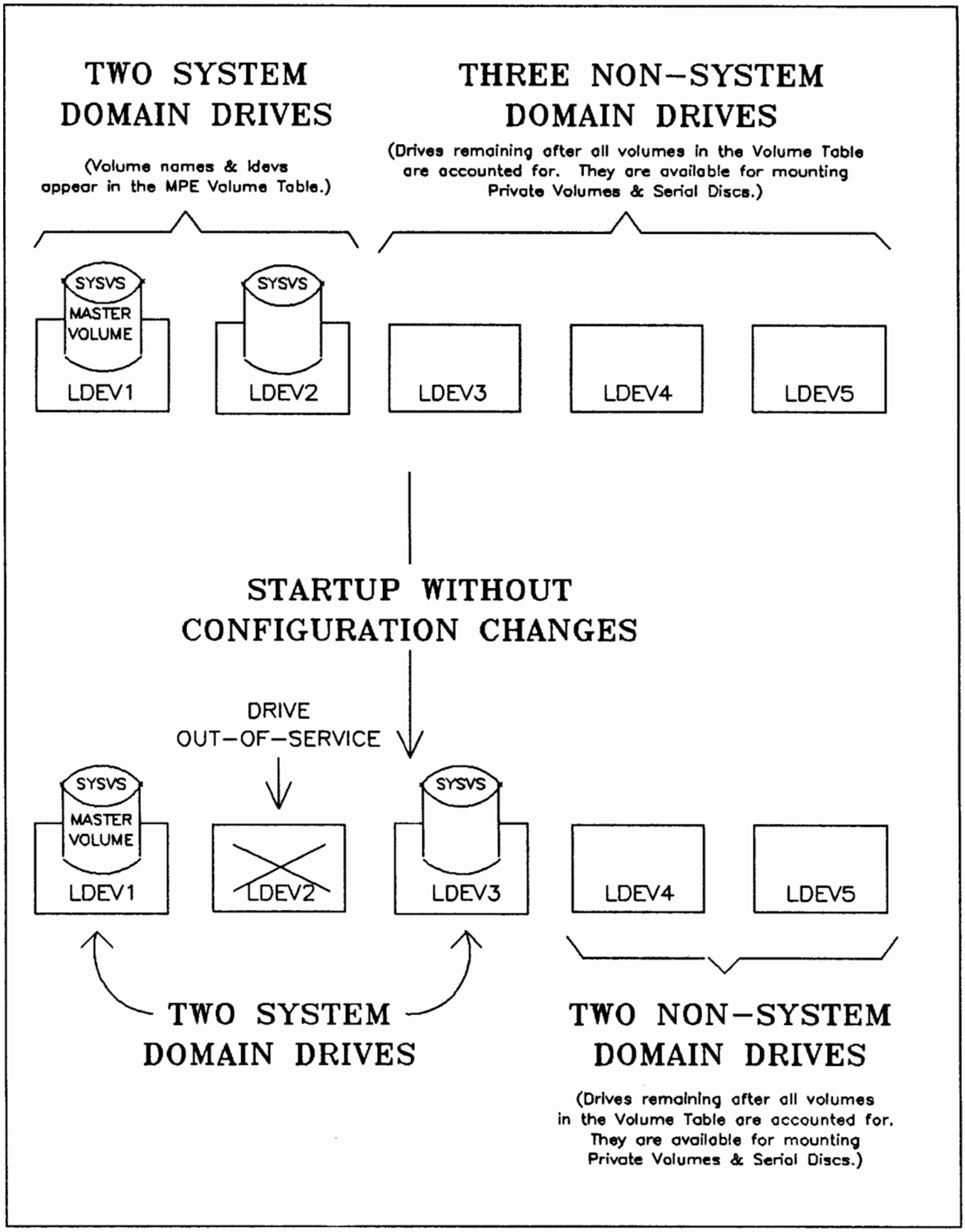


Figure 10-1. Example of Domain Reassignment During System Startup

Disc Volume Conditioning

Before users can access any disc, it must first be conditioned. The conditioning process includes three steps:

1. Formatting - placing addressing information on the disc.

2. Initializing - configuring the Free Space and Defective Tracks Tables on the disc.

3. Labeling - giving the volume a name.

The standalone program named SLEUTHSM formats packs off line for use as system or nonsystem volumes; the VINIT utility formats, initializes, and labels private volume packs on line. VINIT can be used either to condition private volume packs already formatted with the SLEUTHSM program or to format private volume packs not previously formatted by SLEUTHSM.

SYSTEM VOLUME CONDITIONING. System domain discs are always formatted off line. That is, the operating system must be shut down. They are formatted by a standalone program named SLEUTHSM, without the presence of the MPE operating system. (SLEUTHSM is discussed in detail later in this section.)

System discs are initialized during a system RELOAD when the INITIAL Program organizes the Defective Tracks Table.

Discs can be labeled during any system restart, except WARMSTART. When the INITIAL Program detects an unlabeled pack, you are prompted for a volume name.

PRIVATE VOLUME CONDITIONING. Private volume packs are conditioned online, when the operating system is up and running. This means that domains have been established, volume sets have been defined, and accounts and groups exist with the necessary attributes and capabilities when conditioning occurs.

Users with System Supervisor (OP) or System Manager (SM) capabilities may invoke the VINIT subsystem. That is, they may condition a pack mounted on a nonsystem domain drive that has been removed from normal system use via :DOWN.

The VINIT utility is used to condition packs on line. It provides a >FORMAT command so users can format new discs or reformat discs with track problems, an >INIT command which is used for initializing and labeling private volume packs, a >SCRATCH command for making packs "scratch" discs, plus numerous other commands.

The VINIT subsystem allows you to format and initialize private volumes (for example, to initialize the directory on a master volume) in the interactive mode.

Refer to "PRIVATE VOLUMES SUMMARY" later in this section for an example of creating and conditioning a private volume disc.

Mounting and Dismounting Private Volumes

There are two different types of mount/dismount functions: physical and logical. The physical mount of a private volume disc makes the disc "visible" to the system. The MPE :DSTAT command will display the status of the private volume disc, including the name of the volume. The volume set can be accessed when all members of the volume set or class are physically mounted.

To access files on a private volume, a logical mount operation of the volume set or class must be performed.

The logical mount/dismount can be done implicitly through either the File System (FOPEN/FCLOSE) or the MPE commands :NEWACCT or :NEWGROUP. Refer to "LOGICAL MOUNT" AND "LOGICAL DISMOUNT" to see how explicit mount/dismount requests are made.

PHYSICAL MOUNT/DISMOUNT. A pack should never be mounted or dismounted while the system is being cold loaded. A system domain drive should never be taken off line while the system is running. A nonsystem domain drive can be taken off line, and removable-type packs can be mounted and dismounted without interfering with the operating system, but only if the drive is not logically mounted (private volumes) or owned by a process (serial or foreign disc).

During normal system operation, a message is printed on the System Console each time you start or stop a disc drive. If a private volume is mounted, the online message includes the name of the volume and the name of the set to which the volume belongs. If a user was accessing a volume on the drive taken off line, a "IN-USE VOLUME" message is printed. If this occurs, immediately place the drive on line again. To avoid this situation, :DOWN the drive, and wait until any DOWN PENDING is resolved before taking the drive off line.

Some drives usually (HP 7911, HP 7912, HP 7914, HP 7936, HP 7937, HP 7945, HP 7957, and HP 7958) do not allow you to physically mount and dismount them. Their discs are nonremovable, and the drives do not have ONLINE buttons. Powering on one of these drives is the same as bringing a drive online, but powering off the drive is not the same as bringing it offline. Therefore, keep these drives powered on while the system is running. If you must power down one of these drives use the :DOWN command to make it unavailable to the system before you power it off.

LOGICAL MOUNT. It is important to understand that "mounting" a volume class/set is a logical operation. It attaches a particular volume class/set to the set of disc devices that are recognized by the operating system. The system does not consider a volume class/set to be mounted simply because one or all of its member volumes are physically mounted on a spindle. Rather, the system must receive a volume class/set mount request, and the System Operator must ultimately grant or reject the request.

In order for users to access private volumes, the Private Volumes Facility must be enabled with the :VMOUNT console command. This command can also be used for disabling the Private Volumes Facility. Mount requests are generated explicitly either by the user :MOUNT command or by the operator :LMOUNT command. Requests are also generated implicitly by the operating system when a user attempts to access files that are stored on a private volume. In this case, the user may not even be aware that a private volumes facility exists. :LMOUNT commands entered from the console override all users' mount requests.

Whether a volume set can be mounted largely depends on the individual states of discs in the nonsystem domain. At any point, a device used as a private volume can be in one of the following states, which can be determined with the :DSTAT command:

- DOWN or DOWN PENDING - The logical device is out of service. It is not a candidate for assignment to a volume set.
- OFFLINE - The logical device is "up", but no pack is physically mounted.
- AVAILABLE - The logical device is "up". It is available for assignment (i.e. for logical mounting).
- MOUNTED - The logical device is "up" and a volume set/class is currently mounted.

States differ for system and nonsystem domain devices. System domain devices can only be MOUNTED. They can never be DOWN or AVAILABLE because they are always owned by the operating system. Nonsystem domain devices change state with the :UP, :DOWN, :MOUNT, :DISMOUNT, :LMOUNT, and :LDISMOUNT commands.

When the system is cold loaded, nonsystem discs are OFFLINE or AVAILABLE for satisfying logical mount requests. A subsequent mount request causes an appropriate console message. If the required volume is not in place on the spindle of a device, physically place the pack containing the requested volume on the logical device named in the message and reply if it is requested. The system will recognize the volume, grant the request, mount the volume, and place the drive (or drives) in the MOUNTED state.

MANAGING PRIVATE VOLUMES. From the discussion of states, it becomes apparent how you can selectively control mount requests without disabling the Private Volumes Facility. :UP and :DOWN commands place a particular logical device in the AVAILABLE or DOWN state, causing mount requests to be satisfied or rejected at the device level. :LMOUNT and :LDISMOUNT commands place a device in the AVAILABLE or MOUNTED state, also causing mount requests to be satisfied or rejected; but this time at the volume set/class level.

The System Manager and those Account Managers who have the Create Volumes (CV) capability can create, alter, and purge volume sets. Once defined with a :NEWVSET command, a volume set/class definition remains in the system directory until explicitly deleted by a :PURGEVSET command.

Private volumes users can back up files using the :STORE and :RESTORE commands. These commands function the same for both system and nonsystem volumes, except that with private volumes, users must always issue an explicit mount request (except with the SYSDUMP Program) if files are restored to or stored from a group other than the logon group (refer to "THE MOUNT COMMAND" later in this section).

Any user with the System Supervisor (OP) capability can back up any private volume with the >COPY command of the VINIT utility.

LOGICAL DISMOUNT. As with mount requests, dismount requests can be generated by users and by the System Operator. Users generate the requests explicitly with the :DISMOUNT command; implicitly through their programs, or by logging off the system. :LDISMOUNT cancels LMOUNT. Users can still :MOUNT/:DISMOUNT, or do so implicitly via :FOPEN/FCLOSE.

Obtaining Information About Private Volumes

You can list the users who currently have one or more volume sets mounted with the :VSUSER command. This command displays job/session numbers, the names of mounted volume sets/classes, and the fully qualified names of users associated with each.

You can list the volumes that physically reside on each drive with the :DSTAT command. The information displayed includes: logical device number, device type, device state, and the name of the currently mounted volume. If the device resides in the nonsystem domain, the name of the volume set to which the mounted volume belongs and the volume generation number is also displayed. (The volume generation number can be assigned to a nonsystem domain device when it is initialized via the VINIT >INIT command; this number is used to denote different versions of the same data on separate discs.

The :LISTVS command produces a formatted listing of volume set information as well.

Report the Directory on a Private Volume

The :REPORT command can be used to report the directory on a private volume. List the private volume, group and account, as follows:

```
REPORT ;VS=PUDISCI.PUB.SYS
ACCOUNT          FILESPACE-SECTORS        CPU-SECONDS        CONNECT-MINUTES
   /GROUP        COUNT     LIMIT      COUNT     LIMIT      COUNT     LIMIT
SOPRM            99004        **      99057        **      88407        **
   /GLOSSARY      1068        **        542        **        656        **
   /PUB            182        **        123        **       1155        **
   /SECT1          180        **         85        **        429        **
   /SECT10       11779        **      25271        **       9716        **
   /SECT2          390        **       4123        **       5302        **
   /SECT3        10675        **       8176        **      13116        **
   /SECT4         2372        **        225        **        294        **
   /SECT5        46579        **      27218        **      25744        **
   /SECT6         6008        **       9324        **       6638        **
   /SECT7         4748        **       8303        **      13263        **
   /SECT8         1957        **       6348        **       3997        **
   /SECT9         3195        **       4570        **       4213        **
```

Moving a Volume Set from One System to Another

One of the advantages of private volumes is that they are transportable between HP 3000 computer systems, provided the following conditions are met:

- The second system must have sufficient drives of the type required to hold all the volumes of a volume class or set.
- The volume set must be defined on the second system, via the :NEWVSET command, and must be associated with the same group and account as on the first system.
- For the files that will be accessed, accounts, groups, and users must exist with the same attributes and capabilities as on the first system.

Perform the following steps to prepare to use the same private volume set on one or more HP 3000 systems:

1. Create the same volume set definition on all HP 3000 systems which are to share the private volume set.

2. Establish an account with the same name on all HP 3000 systems which are to share the private volume set.

3. On one of the HP 3000 systems, span the account, and create and span all groups, so that they have the same attributes and capabilities as the private volume set. Doing so enters the appropriate accounting information in the system's directory, and creates the appropriate entries in the volume set's directory. (The system is told of the volume set so that the system may access that volume set.)

4. Create the same groups on the other HP 3000 systems and use the VS = *volset* parameter without the :SPAN option with the :NEWGROUP command to specify the volume set definition. The groups should have the same home volume set on each system. However, the groups and accounts need be spanned only once to create the entries in the volume set's directory.

The master volume of a volume set (or class) must be mounted when an account or group is being spanned. Refer to "SPANNING ACCOUNTS" later in this section.

Once the above four steps are completed, the volume set is recognizable to each of the HP 3000 systems, and can be transported between any of the systems.

Switching Private Volume Packs

Another advantage of private volumes is that you can mount different volume sets on your available disc drives. The steps below describe how to interchange private volumes on a system.

The most important thing to remember when changing private volume packs is not to remove a disc pack when it is in use. If a pack is logically mounted, logically dismount it and make it unavailable with the :DOWN command before placing it offline and switching packs. To switch private volumes on a removable-media disc:

1. Issue a :DOWN command for the device where the private volume resides.

3. Use the :DSTAT command to check the status of the device. If files are in use on the volume, the drive is in a DOWN PENDING state.

3. If the :DSTAT command shows that the drive is in DOWN PENDING status, wait until the status shows DOWN. When the status is DOWN you can be sure that no files are in use.

4. Spin the drive down and remove the disc pack.

5. Load the new disc pack in and spin up the drive.

6. Issue an :UP command for the new drive. The new private volume is ready for use.

You can remove a non-removable disc volume from the system only after shutting down the entire system.

Volume Sets and Volume Classes

A system or account manager uses the :NEWVSET command to combine individual removable volumes into logical units known as volume sets or volume classes. The system references these units when users request access to private volumes. The system also uses volume set or volume class names in all operator commands, console messages, and operator replies concerning volume mounting. A manager can subsequently change volume class/set definitions with the :ALTVSET command and delete definitions entirely with the :PURGEVSET command.

VOLUME SETS. A volume set is a set of not more than eight removable disc volumes which share a common file directory. Each volume set has a master volume, which includes not only the accounting directory but also a table of the volumes defined as members of the set. The member named in a :NEWVSET command that has the same name as the volume set name becomes the set's master volume.

Private volume sets and classes are assigned and allocated at the group level within an account. Each group is assigned to only one volume set: its home volume set. However, a volume set, if so defined, may be shared by more than one group within an account, or even among several accounts. Each volume in a volume set has a unique name (which consists of up to eight alphanumeric characters, beginning with a letter) which designates the volume itself. The name of the volume is followed by the name of the group and account of the volume (*volumename.groupname.accountname*).

As mentioned previously, every volume set has as one of its members a volume designated as the master volume of the set. This volume contains a directory of the volume set. Each volume set has its own accounting directory analogous to the system directory for the system volume set. The directory contains such information as a list of all accounts and groups sharing the volume set, a list of all files

within the volume set. The files of a volume set are unique to that volume set and cannot be shared among other volume sets. For example, if a volume set is defined with the name "VOLSET1 ", then one of the members of this volume set must be the master volume and must be named "VOLSET1 ". Volume sets can be divided into subdivisions, called volume classes. One of the volumes of a volume class must be the master volume of the set.

VOLUME CLASSES. A volume class is a subset of the volumes in a volume set and must include the master volume of the set. It is accessed as a unit and is identified by a unique volume class name. It is the smallest volume unit that can be referenced by a user. A single volume can be referenced only if it is the master volume for the set or class. When a user references a volume class, he is, therefore, notifying MPE that only a portion of a defined volume set need be mounted to satisfy his anticipated file access requests. If a volume class consists of more than one volume, all volumes must be mounted in order to access the volume class.

When a user with the Create Volumes (CV) capability defines members of a volume set, he may also assign a subset of those same members to a volume class. A volume set may contain several volume classes, each with a unique name. Each volume class must include the set's master volume. When a user references a file in a group assigned to a volume class, the system checks that all volumes assigned to the class are mounted before granting the file access request.

Because all members of a volume set need not be mounted in order for users to access the set, the number of volumes in a set may exceed the number of physical drives available in the nonsystem domain. However, because all members of a volume class must be mounted in order for users to access the class, the number of volumes in a class may not exceed the number of drives in the nonsystem domain.

HOME VOLUME SET. A home volume set is the volume set assigned to a group when the group is either created with the :NEWGROUP command or altered with the :ALTGROUP command. Files belonging to the group are located on the home volume set. The home volume set is the set implicitly referenced when a user logs on under the group. The home volume set for the group, however, need not be mounted until such time as when a user attempts to access file space in the set. At this time, MPE generates a console request for the System Operator to mount the set.

It is possible for a group's home volume set to be mounted but not "bound" for that group; that is, the volume set may be mounted but the system may be unaware that the volume set exists, unless it is bound. Technically speaking, binding links the group entry in the volume set directory with the group entry in the system directory, so that files belonging to that group can be accessed, and new files created by that group will be assigned to the volume set. (Refer to "SPANNING ACCOUNTS" later in this section to see how binding is accomplished.) For example, group A may have volume set A mounted and bound. Group B, however, even though volume set A is also its home volume set, cannot access volume set A until it mounts and binds the volume to its group. This is accomplished with an explicit or implicit mount request. An explicit mount request is generated with the :MOUNT command. The :MOUNT command causes the volume set to be mounted (possibly only logically; it may already be physically mounted) and bound for the group that issued the command. The command remains in effect until it is explicitly released with a :DISMOUNT command. Implicit requests to mount a group's home volume set are invoked any time the user attempts to access file space on that volume set. Implicit requests cause the volume set to be mounted and bound only for the duration of the operation which generated the request. Implicit mounts are generated by the following operations: running a program, opening a file, and the following commands: :STORE, :RESTORE, :EDITOR, :BUILD, :PURGE, :LISTF, :NEWACCT, :ALTACCT, :NEWGROUP, :ALTGROUP, :REPORT, :PURGEACCT, :PURGEGROUP, and :RENAME. Refer to the MPE V Commands Reference

Manual (32033-90006) and "USER COMMANDS FOR PRIVATE VOLUMES", later in this section, for a description of user mount and dismount requests.

Any temporary files will be built on the home volume set, requiring that the set be physically mounted. Also, certain MPE commands (such as :SHOWJOB, :STORE, and :RESTORE) build temporary files; these commands can only be used if the volume set is mounted.

VOLUME SET/CLASS DEFINITION. Volume sets and classes are defined, or created, by System Managers or Account Managers who have the Create Volumes (CV) capability. Each volume set and volume class within the set is distinguished by a unique name assigned with the *vsname* (volume set name) and *vcname* (volume class name) parameters of the :NEWVSET command. Once defined, a volume set or volume class can be referenced and used by users with the Use Volumes (UV) capability.

The syntax of the :NEWVSET command is:

```
:NEWVSET vsname

    [;MEMBERS=vname:type[,vname:type[,...]]]
    [;CLASS=vcname:vname[,vname[,...]]]
```

where:

vsname — Specifies the volume set name, consisting of one to eight alphanumeric characters, beginning with a letter. This name is also given to the master volume of the set. MPE references *vsname* as *vsname.groupname.acctname*, where *groupname* and *acctname* are the logon group and account.

vname:type — Names the members of the volume set and the types of devices on which the members will reside (a maximum of eight volume names may be specified).

vcname — Specifies the volume class name, consisting of from one to eight alphanumeric characters, beginning with a letter.

Let's define a volume set with the following characteristics (remember, you must have Create Volumes (CV) capability): group (GRP1), account (ACCT1), volume set name (USERSET1), members (MEM1,MEM2,USERSET1), type (HP7920), and classes (CLASS1:MEM1,USERSET1). You would log on with:

```
username.ACCT1.GRP1
```

You would then enter:

```
:NEWVSET USERSET1;MEMBERS=USERSET1:HP7920,MEM1:HP7920,&
:MEM2:HP7920;CLASS=CLASS1:USERSET1,MEM1
```

To create a volume set definition named PRIVOL1, log on as MANAGER.SYS (or as Account Manager if you have CV capability) and enter:

```
:NEWVSET PRIVOL1;MEMBERS=PRIVOL1:HP7920,SLAVE1:HP7920,&
:SLAVE2:HP7920
```

This defines a private volume set named PRIVOL1.PUB.SYS, with a master volume PRIVOL1, and two slave volumes, SLAVE1 and SLAVE2. In the MEMBERS list, note that one member, and one member only, must have the name of the volume set. It is this member that is, by definition, designated to be the master volume of the set. The name can appear anywhere in the MEMBERS list.

The foregoing :NEWVSET command creates an entry in the system directory for volume set PRIVOL1.PUB.SYS. The group (PUB) and account (SYS) are merely part of the identifying name for the volume set, signifying the logon group and account under which the definition was created. This group and account does not imply that files on this volume set must belong to the PUB.SYS group and account.

If volume classes are to be defined, you could enter:

```
:NEWVSET PRIVOL1;MEMBERS=PRIVOL1:HP7920,SLAVE1:HP7920,&
:SLAVE2:HP7920;CLASS=PV1CL1:PRIVOL1,SLAVE2
```

One of the members of a volume class must be the master volume of the volume set; thus, note that in the class PV1CL1 above, PRIVOL1 is a member.

ALTERING A VOLUME SET DEFINITION. To modify an existing volume set definition, use the :ALTVSET command. The syntax of the :ALTVSET command is:

```
:ALTVSET vsname

   [;ADDCLASS=vcname:vname[,vname[,...]]]
   [;EXPANDCLASS=vcname:vname[,vname[,...]]]
   [;EXPANDSET=vname:type[,vname:type[,...]]]
```

To alter home volume set USERSET1 to add a new class, CLASS1, with a new member, MEM4, you would log on with:

```
username.ACCT1.GRP1
```

and enter:

```
:ALTVSET USERSET1;ADDCLASS=CLASS3:USERSET1,MEM4;EXPANDSET=&
:MEM4:HP7920
```

DELETING A VOLUME SET DEFINITION. To delete the volume set USERSET1, you would enter:

```
:PURGEVSET USERSET1
```

MPE will request verification that USERSET1 is to be purged by displaying the following:

```
VOLUME SET/CLASS DEFINITION USERSET1 TO BE PURGED (YES/NO)?
```

You must answer "YES" to continue the operation. The volume set will not be purged if any member is in use when the :PURGEVSET command is entered.

Spanning Accounts

The SPAN parameter of the :NEWACCT, :NEWGROUP, :ALTACCT, and :ALTGROUP commands enters the accounting information in the system directory and creates an account entry in the volume set's directory. This is called "spanning"; that is, an entry is created in both the system directory and the volume set's directory (the system directory is "bound" with the volume set's directory). The purpose of spanning is to tell the system of the volume set so the system may access that volume set. The master volume of a volume set, or class, must be mounted physically when spanning an account into a volume set directory.

To create a new account named PVUSER, you could enter:

```
:NEWACCT PVUSER,MGR;CAP=AM,AL,GL,SF,ND,UV,CV,IA,BA;&
:VS=PRIVOL1.PUB.SYS:SPAN
```

The above :NEWACCT command creates a new account named PVUSER with one user named MGR and a home group named PUB. Included in the capability list are the Use Volumes (UV) and Create Volumes (CV) capabilities. The SPAN parameter of the command enters this account in the system directory and creates an account entry in the volume set's directory.

To modify an existing account's capabilities to add Create Volumes (CV) and Use Volumes (UV) capabilities, you could enter:

```
:ALTACCT OLDACCT;CAP=AM,AL,GL,SF,ND,UV,CV,IA,BA;&
:VS=PRIVOL1.PUB.SYS:SPAN
```

The above :ALTACCT command added the Create Volumes (CV) and Use Volumes (UV) capabilities to the account named OLDACCT and created an account entry in the PRIVOL1 volume set's directory. The account still exists in the system directory; the SPAN parameter has no effect on this directory. Note that the only time you would use the SPAN parameter of the :ALTACCT or :NEWACCT command is when you plan to assign one or more of the account's groups to a private volume set or when you plan to create a new group in the account and assign it to a private volume set. An account may contain any mix of system domain groups and private volume groups. The only time a group's files are assigned to a private volume is when the group itself is assigned to that private volume, provided that the files do not already exist.

Assigning a Group to a Private Volume Set

Use the :NEWGROUP command (you must be the Account Manager) to create a new group and assign it to a private volume set. For example:

```
:NEWGROUP PVGROUP1;CAP=IA,BA;VS=PRIVOL1.PUB.SYS:SPAN
```

The above command both marks the group entry for group PVGROUP1 in the system directory as a private volume group, and creates a group entry for the group in the PRIVOL1 volume set's directory. Remember that the master volume of a volume set (or class) must be mounted physically when spanning a group into a volume set directory.

To create new users for PVGROUP1 and assign Use Volumes (UV) capability, you could enter:

```
:NEWUSER JOHN;HOME=PVGROUP1;CAP=SF,ND,UV,IA,BA
:NEWUSER JANE;HOME=PVGROUP1;CAP=SF,ND,UV,IA,BA
```

Thus, a new account, PVUSER , and a new group, PVGROUP1 have been created and spanned into the private volume directory that is located on the master volume for volume set PRIVOL1 . Figure 10-2 illustrates what happens when an account and group are spanned from the system directory into a private volume set directory.

To modify an existing group to assign the group to a private volume set, use the :ALTGROUP command. For example:

```
:ALTGROUP OLDGROUP;CAP=IA,BA;VS=PRIVOL1.PUB.SYS:SPAN
```

The above command modifies the existing group OLDGROUP (to mark its entry in the system directory as a private volume group) and creates a group entry in the PRIVOL1 volume set directory. No files are transferred to the private volume set. An existing group that contains files cannot be spanned to a private volume set in this manner. It is possible, however, to transfer the files through a series of steps that includes the above command. Refer to "MOVING AN EXISTING GROUP WITH FILES TO A PRIVATE VOLUME SET", the next paragraph, to see how this is done.

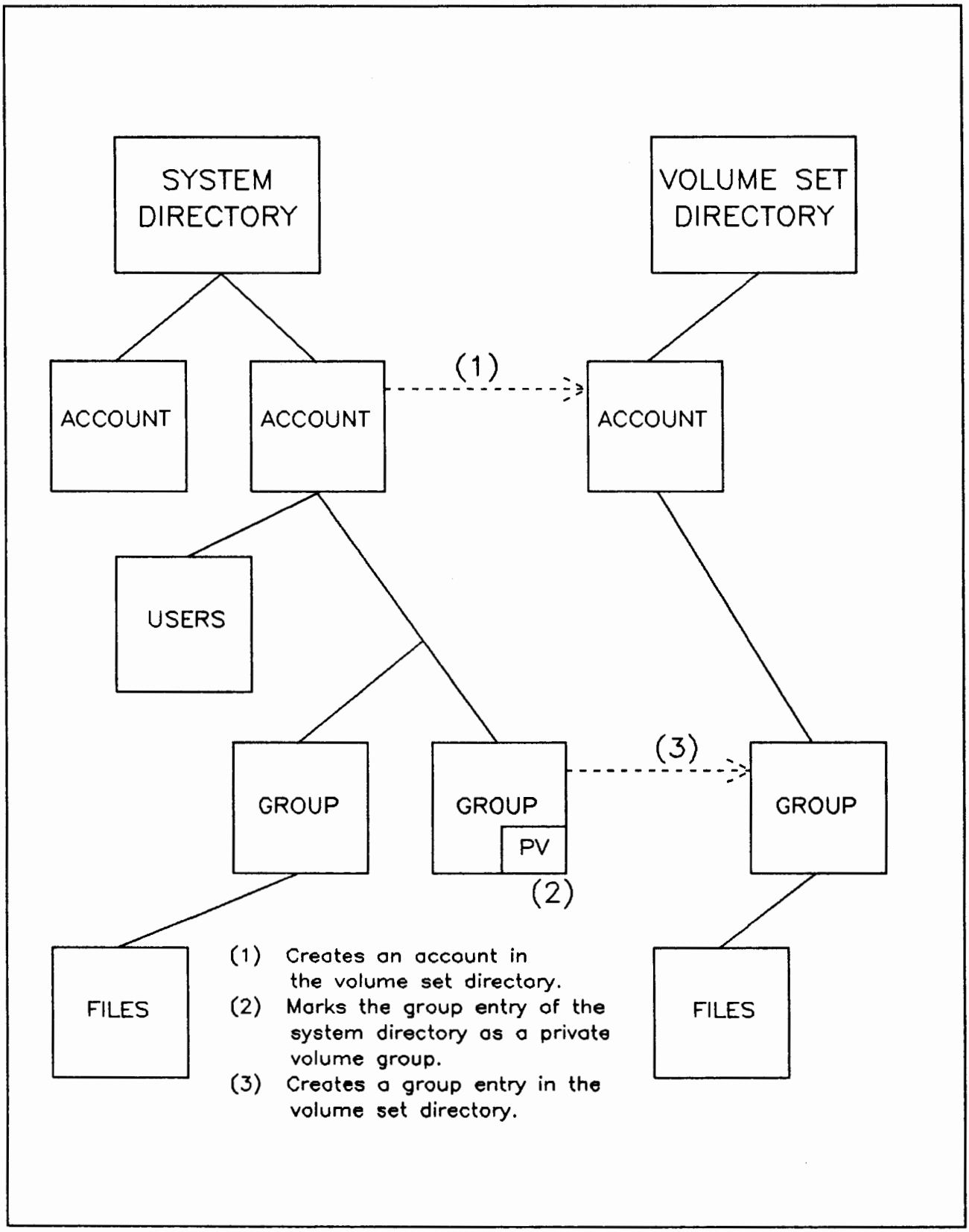


Figure 10-2. Spanning Groups and Accounts

Moving an Existing Group With Files to a Private Volume Set

To assign an existing group and its files to a private volume set, proceed as follows:

1. Store the group's files on tape or serial disc.
2. Purge the files from the group.
3. Enter an :ALTACCT command with the SPAN parameter to create an entry in the private volume set's directory for the account to which the group belongs.
4. Enter an :ALTGROUP command with the SPAN parameter to create an entry for the group in the private volume set's directory.
5. Restore the group's files.

For example:

```
:LISTF @.OLDGRP

FILENAME

PROLL  GFILE  PGUIDE

:FILE STOR;DEV=TAPE
:STORE @.OLDGRP;*STOR

FILES STORED=3
FILES NOT STORED=0

:PURGE PROLL
:PURGE GFILE
:PURGE PGUIDE
:ALTACCT OLDACCT;CAP=AM,AL,GL,SF,ND,UV,CV,IA,BA;&
:VS=PRIVOL1.PUB.SYS:SPAN
:ALTGROUP OLDGRP;CAP=IA,BA;VS=PRIVOL1.PUB.SYS:SPAN
:RESTORE *STOR;@.OLDGRP

FILES RESTORED=3
FILES NOT RESTORED=0
```

Purging Accounts and Groups on Private Volumes

The account or group entry can be purged from either the system directory or the private volume directory. The MPE :PURGEACCT command will remove the account entry from the system directory. You can purge the account entry from the private volumes directory by specifying the name of the volume set (:PURGEACCT *accountname*;VS=*volsetname*). Therefore, to completely remove the account entry from both directions, :PURGEACCOUNT must be specified twice. The MPE :PURGEGROUP command performs the same functions for the group entry. Refer to the :PURGEACCT and :PURGEGROUP commands in the MPE V Commands Reference Manual (32033-90006).

Private Volumes Summary

The complete procedure for establishing private volumes and providing users with the capability to access them is as follows:

1. Allocate one or more disc drives to the nonsystem domain during a RELOAD.

2. Create a volume set definition with the :NEWVSET command.

3. "Down" a nonsystem domain disc drive with the console :DOWN command.

4. Physically mount a disc volume on this downed device; refer to "USING THE VINIT SUBSYSTEM" later in this section.

5. Run the VINIT subsystem. Each member of the volume set must be conditioned with this subsystem. Refer to "THE VINIT SUBSYSTEM" later in this section for a detailed explanation of the VINIT commands.

6. "Up" the device with the console :UP command.

7. Give users the Use Volumes (UV) capability with the :NEWACCT and :NEWUSER commands or the :ALTACCT and :ALTUSER commands. If you use the :NEWACCT or :ALTACCT commands, include the SPAN parameter to create an entry in the private volume set's directory for the account to which the group belongs.

The following example illustrates the complete procedure. Assume that the disc drives have already been assigned to the nonsystem domain.

```
:VMOUNT ON,AUTO
:NEWVSET PRIVOL1;MEMBERS=PRIVOL1:HP7920,SLAVE1:HP7920,&
:SLAVE2:HP7920;CLASS=PV1CL1:PRIVOL1,SLAVE2
:DOWN 3
13:29/8/DISMOUNT ON LDEV#3
13:33/8/UNKNOWN VOLUME ON LDEV#3

:VINIT
VINIT C.01.00 (C) HEWLETT-PACKARD CO., 1978
>DSTAT ALL
  LDEV-TYPE      STATUS      VOLUME (VOLUME SET-GEN)
-------------------------------------------------------
  1-7920         SYSTEM      MH7920U0
  2-7925         AVAIL       USERVOL1 (USERVOL1.PUB.SYS-0)
  3-7920         DOWNED
  4-7920         AVAIL       SLAVOL1  (USERVOL1.PUB.SYS-0)
  5-7920         AVAIL       SLAVOL2  (USERVOL1.PUB.SYS-0)
>FORMAT 3
>INIT PRIVOL1,3,PRIVOL1.PUB.SYS
ENTER DIRECTORY SIZE (SECTORS): 500
>DSTAT ALL
  LDEV-TYPE      STATUS      VOLUME (VOLUME SET-GEN)
-------------------------------------------------------
  1-7920         SYSTEM      MH7920U0
  2-7925         AVAIL       USERVOL1 (USERVOL1.PUB.SYS-0)
  3-7920         DOWNED
  4-7920         AVAIL       SLAVOL1  (USERVOL1.PUB.SYS-0)
  5-7920         AVAIL       SLAVOL2  (USERVOL1.PUB.SYS-0)
```

```
>EXIT
END OF SUBSYSTEM
:UP 3
:MOUNT P1VOL1.PUB.SYS
:NEWACCT PVUSER,MGR;CAP=AM,AL,GL,SF,ND,UV,CV,IA,BA;&
:VS=PRIVOL1.PUB.SYS:SPAN
:HELLO MGR.PVUSER
:NEWGROUP PVGROUP1;CAP=IA,BA;VS=PRIVOL1.PUB.SYS:SPAN
:NEWUSER JOHN;HOME=PVGROUP1;CAP=SF,ND,UV,IA,BA
:NEWUSER JANE;HOME=PVGROUP1;CAP=SF,ND,UV,IA,BA
```

The following points concerning private volumes are important to remember:

1. A private volume set consists of from one to eight volumes.

2. One of the members of a private volume set must be the master volume and must have the same name as the volume set.

3. One of the members of a volume class must be the master volume.

4. The volume class is the smallest volume unit that can be referenced by a user.

5. The master volume of a volume set (or class) must be mounted in order to access the volume set.

6. All members of a volume set (or class) must be mounted to span either an account or group into the volume set's directory.

7. No files are transferred when an existing group is assigned to a private volume set. Using an :ALTGROUP command to assign a group with a nonempty file domain to a private volume set is not allowed. A group's files must be stored off line, purged from the group, then restored after the group has been assigned to a private volume set.

8. These conditions must exist before a volume set can be accessed by a group:

   - A definition must exist for the volume set.
   - The group must be spanned into the volume set's directory.
   - All members of the volume set (or class) must be mounted.
   - The system directory must be "bound" to the volume set directory, either implicitly or explicitly with the :MOUNT command.

User Commands for Private Volumes

The five user commands relating to the use of private volumes are :MOUNT, :DISMOUNT, :LISTVS, :VSUSER, and :DSTAT. These commands are discussed below.

THE :MOUNT COMMAND. The :MOUNT command logically associates a user with a specific volume set, which must be physically mounted on the system. The syntax is:

```
:MOUNT [ * ]
       [vcsname] [.groupname [.acctname]]

  [;GEN=[genindex]]
```

where:

*	Specifies either the home volume set for the specified group and account, or the logon group and account if *groupname.acctname* are not specified. Default.
vcsname	Specifies a previously defined volume class/set name.
groupname.acctname	Specifies the group and account under which the volume set definition was created.
genindex	Specifies a value from -1 to 32767 that determines which generation of the home volume set is to be mounted. A value of -1 indicates that any generation is permitted. If omitted, the system will ignore the generation when attempting to satisfy the :MOUNT request.

If you are logged on in the same group as the private volume group, the *groupname.acctname* parameter of the :MOUNT command can be omitted. If you are logged on in a group other than the private volume group, you must specify that group in the mount request so that the correct volume set will be mounted and bound.

If the :MOUNT command is entered in one of the following forms, the volume set is bound so that files of the volume set's group can be accessed.

```
:MOUNT *.groupname.acctname   ** Group/account for mounting if not logged on
                                 in this group **

:MOUNT *      ** If logged on in the group to be mounted **

:MOUNT        ** Logged on in the group to be mounted **
```

As an example, if you want to bind group PUB.TEST, which resides on PRIVOL1.PUB.SYS, you would enter:

```
:MOUNT *.PUB.TEST
```

If you are logged on under group PUB, you could enter:

```
:MOUNT *
```

Or:

```
:MOUNT
```

If the actual volume set name is specified in the :MOUNT command, as in the following, the operator will be requested to mount the volume set, but no groups will be bound:

```
:MOUNT PRIVOL1.PUB.SYS
```

Note that the :MOUNT command is not breakable.

THE :DISMOUNT COMMAND. The :DISMOUNT command allows dismounting a volume set previously mounted via a :MOUNT command. The syntax is:

```
:DISMOUNT [    *    ][.groupname[.acctname]]
          [vcsname]
```

If you are not logged on in the group to be dismounted, the group and account must be specified with the :DISMOUNT command. If you are logged on in the group to be dismounted, you can enter the :DISMOUNT command in one of the following forms:

```
:DISMOUNT
```

or

```
:DISMOUNT *
```

If the :MOUNT command is called *n* times for the same volume set by the same job, n dismounts are required.

THE :LISTVS COMMAND. The :LISTVS command produces a formatted listing of volume set definition information. Three different formats are available: ":LISTVS", ":LISTVS,1", and ":LISTVS,2". A volume class is indicated by a "(C)", a currently mounted volume set or class by an "*". These are illustrated in the following examples:

```
:LISTVS
ACCOUNT=SYS              GROUP=PUB

VOLSET
-------------------------------------------------------------
UCLASS2(C)   USERVOL1    USERVOL2


:LISTVS,1
ACCOUNT=SYS              GROUP=PUB

VOLSET       MEMBERS      TYPE
-------------------------------------------------------------
UCLASS2(C)   USERVOL2    HP7920
USERVOL1     USERVOL1    HP7920
USERVOL2     USERVOL2    HP7920
             SLAVOL2     HP7905


:LISTVS,2
ACCOUNT=SYS              GROUP=PUB

VOLSET       MEMBERS      TYPE         LDEV    STATUS
-------------------------------------------------------------
UCLASS2(C)   USERVOL2    HP7920
USERVOL1     USERVOL1    HP7920
USERVOL2*    USERVOL2    HP7920        2       MOUNTED
             SLAVOL2     HP7920        3       MOUNTED
```

THE :VSUSER COMMAND. The :VSUSER command prints a listing of all users of a currently mounted volume set, as shown in the following example:

```
:VSUSER
VOLUME SET NAME          JOBNUM       JOB NAME
-------------------------------------------------------
USERVOL2.PUB.SYS         #S32         TEST.MPE
```

If no volume sets are in use, :VSUSER returns the message:

```
NO VOLUME SETS IN USE
```

THE :DSTAT COMMAND. The :DSTAT command displays the current status of the disc drives on the system. The syntax of the :DSTAT command is:

```
:DSTAT [ldev]
       [ALL ]
```

where:

ldev — Specifies the logical device number (an integer) of the disc drive whose status is desired.

ALL — Causes the status of all disc drives, system and nonsystem, to be displayed.

The default, if no parameters are included, is that only nonsystem discs are displayed, for example:

```
:DSTAT

LDEV-TYPE          STATUS      VOLUME (VOLUME SET-GEN)
-------------------------------------------------------
2-7920(R)          MOUNTED     USERVOL2 (USERVOL2.PUB.SYS-0)
3-7920(R)          MOUNTED     SLAVOL2  (USERVOL2.PUB.SYS-0)
```

Operator Commands for Private Volumes

The three operator commands relating to the use of private volumes are :VMOUNT, :VSUSER, and :LMOUNT. These commands are discussed below.

THE :VMOUNT COMMAND. The :VMOUNT command enables or disables the Private Volumes Facility. The syntax of the :VMOUNT command is:

```
:VMOUNT {ON[,AUTO]}
        {OFF      }
  [;ALL]
```

where:

ON,AUTO	Sets the Private Volume Facility on. All valid requests are allowed. If the operator replies with "ON", the operator must reply to such requests. If the operator replies with "ON,AUTO", MPE attempts to satisfy such requests without operator intervention; no message is sent to the Console. If the specified volume set, or class, is physically mounted, MPE logically mounts it. If the specified volume set, or class, is not physically mounted, the mount request is denied.
OFF	Sets the Private Volumes Facility off. All requests, explicit and implicit, are rejected. Requests, even though they cannot be satisfied, are still printed on the Console.
ALL	Causes all private volumes related messages to be printed on the Console, including those not requiring operator intervention.

THE :LMOUNT COMMAND. The :LMOUNT command logically mounts a private volume set or class. No binding occurs with this command. The syntax of the :LMOUNT command is:

```
:LMOUNT vcsname.groupname.acctname
  [;GEN=genindex]
```

THE :LDISMOUNT COMMAND. This command logically dismounts a Private Volume set or class. It is used to dismount nonsystem domain discs while the system is on line. The dismount remains pending until any files being accessed on the disc volume are closed. The LDISMOUNT syntax is:

```
:LDISMOUNT vcsname.group.account
```

Examples of User Mounts and Dismounts

User and console messages and commands are combined in some of the examples that follow. Read through these examples, noting when to reply as a user and when to reply as an operator.

If the System Operator enters the command :VMOUNT ON;ALL, all private volume generated messages are displayed on the Console. In addition, the operator must respond to all mount requests.

```
:VMOUNT ON;ALL
:DSTAT

LDEV-TYPE        STATUS     VOLUME (VOLUME SET-GEN)
-------------------------------------------------------
2-7920(R)        AVAIL      USERVOL2 (USERVOL2.PUB.SYS-0)
3-7933           AVAIL      SLAVOL2  (USERVOL2.PUB.SYS-0)
```

If the user enters a :MOUNT command, a message is displayed on the Console and the operator is required to answer "YES" or "NO".

```
:MOUNT
15:33/#S76/19/ACCESS TO USERVOL2.PUB.SYS BY MGR.MPETEST (Y/N)
:REPLY 19,Y
:DSTAT
LDEV-TYPE          STATUS      VOLUME (VOLUME SET-GEN)
-------------------------------------------------------------------
2-7920(R)          MOUNTED     USERVOL2 (USERVOL2.PUB.SYS-0)
3-7920(R)          MOUNTED     SLAVOL2  (USERVOL2.PUB.SYS-0)
```

When a :DISMOUNT command is entered, no intervention is required of the operator, but the following message is displayed on the Console:

```
:DISMOUNT
15:33/#S76/19/AVAILABLE DRIVE ON LDEV# 2,3
```

An implicit mount request resulting from the Editor "/ADD" command requires operator intervention (because the Editor builds a work space file in the user's file domain).

```
:EDITOR
HP32201A.7.16 EDIT/3000 TUE, OCT 25, 1983,  4:51 PM
(C) HEWLETT-PACKARD CO. 1982
/ADD
?16:51/#S76/23/ACCESS TO USERVOL2.PUB.SYS BY MGR.MPETEST (Y/N)
:REPLY 23,Y
   1   //
...
/END
16:52/#S76/23/AVAILABLE DRIVE ON LDEV #2,3

END OF SUBSYSTEM
```

When the Editor is exited, MPE indicates that the drives are available.

The :BUILD command generates an implicit mount request requiring operator intervention. The volumes are mounted only for the duration of the :BUILD command, then MPE displays the device available message.

```
:BUILD FILE1
15:34/#S76/19/ACCESS TO USERVOL2.PUB.SYS BY MGR.MPETEST (Y/N)
:REPLY 19,Y
15:35/#S76/19/AVAILABLE DRIVE ON LDEV# 2,3
```

Calling the FOPEN intrinsic generates an implicit mount request. This is demonstrated in the following example:

```
:FILE T;DEV=TAPE
:FCOPY FROM=*T;TO=FILE1
    .
    .
    .
15:35/#S76/23/ACCESS TO USERVOL2.PUB.SYS BY MGR.MPETEST (Y/N)
:REPLY 23,Y
    .
    .
    .
END OF PROGRAM
15:35/L#S76/23/AVAILABLE DRIVE ON LDEV# 2,3
```

Note that, again, the mount only lasts for the duration of the operation which generated the implicit mount request and the drive available message is displayed when the dismount occurs.

A user who does not want to be delayed while the operator responds to every mount request should enter the :MOUNT command at the beginning of the session and leave the volume set mounted until no longer needed, as shown in the following example:

```
:MOUNT
:DSTAT
LDEV-TYPE          STATUS      VOLUME (VOLUME SET-GEN)
-------------------------------------------------------------------
2-7920(R)          MOUNTED     USERVOL2 (USERVOL2.PUB.SYS-0)
3-7920(R)          MOUNTED     SLAVOL2  (USERVOL2.PUB.SYS-0)
:EDITOR
HP32201A.7.16 EDIT/3000 TUE, OCT 25, 1983,  4:51 PM
(C) HEWLETT-PACKARD CO. 1982
/ADD
  1
  2//
...
/E
END OF SUBSYSTEM

:BUILD FILE1
:RUN FCOPY.PUB.SYS
    .
    .
    .
END OF PROGRAM

:DISMOUNT
16:55/#S34/16/AVAILABLE DRIVE ON LDEV# 2,3
```

Note that operator intervention was not necessary when the :EDITOR, :BUILD, and :RUN commands were entered.

THE VINIT SUBSYSTEM

The VINIT (Volume INITialization) subsystem allows you to condition, copy, and verify disc packs, serialized flexible discs (diskettes), and cartridge tape media from the HP 35401A, 7911,7912,7914, and 9144 cartridge tape drives. Unlike the SLEUTHSM program, which can only be run off line while the system is down, VINIT is run on line while the system is up and running.

VINIT can be used to condition disc packs formatted previously with the SLEUTHSM program, to format and condition disc packs not formatted previously, or to perform other limited functions on diskettes or HP 35401A, 7911, 7912, 7914, and 9144 cartridge tapes. Refer to individual commands to determine which functions of VINIT are applicable to which media.

The VINIT subsystem is accessed with the :VINIT command. You must have System Supervisor (OP) or System Manager (SM) capability to use the VINIT subsystem. The syntax for :VINIT is:

```
[:FILE filename=VINLIST;DEV=listdevice]
:VINIT [* filename]
```

(If you want your output sent to another device besides the standard list device, you can use a file equation, in which case, in the above example, your output would be sent to *listdevice*.)

NOTE

In JOB mode, the VINIT subsystem can be invoked only as follows:

```
!RUN PVINIT.PUB.SYS
```

Once accessed, VINIT displays a "greater than" prompt (>) and awaits a command from you. The VINIT subsystem uses the following commands (brief descriptions of the commands are specified):

- COND condenses free disc space holes and recovers lost disc space for private volumes.
- COPY copies the contents of one volume to another.
- DSTAT gives status of disc drives.
- DTRACK processes suspect tracks in the Defective Track Table and defective sectors in the Defective Sectors Table. In doing so, you can either recover (i.e. ignore), delete, or reassign the defective tracks.
- EXIT exits the VINIT subsystem.
- FOREIGN makes a disc volume foreign by filling the label area of a volume with zeros.
- FORMAT allows online formatting of disc packs.
- HELP prints a listing of the VINIT commands, including syntax and descriptions.
- INIT completes the conditioning of a private volume previously formatted by the SLEUTHSM program or the FORMAT command.
- PDEFN lists the specified volume set.

- PDTRACK prints the contents from the Defective Tracks Table or the Defective Sectors Table.
- PFSPACE prints the Disc Free Space Map.
- PLABEL prints the disc label.
- SCRATCH writes (resets) a scratch-type label.
- SERIAL writes a serial-type label.
- VERIFY verifies (reads) data.

A detailed description of the VINIT subsystem commands (including the syntax of each command) is presented in alphabetical order in the following paragraphs. Then, at the end of this section, an example showing how to run the VINIT subsystem is given.

The COND Command

The COND command will condense all free space referenced in a volume's Disc Free Space Map (DFSM) into one contiguous area. The RECOVER option operates like the "Recover lost disc space" option of the INITIAL Program, in that it reclaims free unused space not referenced by the DFSM. The syntax of the VINIT >COND command is:

```
>COND ldev
   [;RECOVER]
```

where:

ldev	Specifies the logical device number of the device on which the volume to be condensed is mounted. It requires all volumes in the volume set (not the volume class) to be physically mounted.
RECOVER	Is equivalent to the "Recover lost disc space" option of the INITIAL Program. This option is for private volumes only.

A condense operation can be performed on either a system volume or a private volume; serial volumes or foreign volumes cannot be condensed. If a private volume is to be condensed, the whole volume set (not just the volume class) that includes that private volume must be mounted. You must do this because as extents are moved, pointers to them in file labels must be updated.

Areas that contain open permanent files, temporary files, new files (including $OLDPASS), and defective tracks cannot be moved. In addition, if any temporary files were open when a system failure occurred, those areas will not be reclaimed by COND *ldev*. Such space can only be recovered by either the "Recover lost disc space" option of the INITIAL Program for system volumes or by COND *ldev*;RECOVER for private volumes. The latter option, however, requires that the user of VINIT is the only one running a session or job on the system; if system logging is enabled during a condense operation, COND will temporarily disable logging until the condense is finished and an appropriate message will then be displayed on the System Console. The COND *ldev*;RECOVER option also requires that the user has no temporary files. If any open permanent file is encountered, the RECOVER option will be rejected. If the RECOVER option is rejected, reset all UDC files using the :SETCATALOG command.

When phase two is finished, a message is printed informing you that the file disc space has been recovered, and the condense operation will begin. If a system failure should occur before the message is printed, the volume does not need to be reinitialized, nor do the files need to be restored. When the system is brought up again, you must re-enter VINIT and do the COND *ldev* operation again. If a system failure should occur during phase three, no action is necessary. However, there will be a loss of disc space.

The condense function also checks that there are no suspect tracks on any member of the volume set (system volume set or private volume set). Any such tracks must be processed either by the VINIT DTRACK command for private volumes or by the INITIAL Program for system volumes.

The COND command locks directories (system, private volumes) so that no one can open or close files.

The COND *ldev* operation tries to move files to lower addresses on the disc in order to create large contiguous blocks of free space. By its very nature, however, this process may create many small fragments of free space.

The COPY Command

The COPY command copies the contents of one volume to a second volume. It will copy only used portions of the disc. Volumes with either a scratch disc label (refer to the SCRATCH command) or foreign volumes are copied entirely. This command is applicable to discs, diskettes, and HP 35401A, 7911, 7912, 7914, and 9144 cartridge tapes. The syntax is:

```
>COPY fromldn,toldn

  [;GEN=[genindex]]
  [;VER[ify]]
  [;BUF=size]
```

where:

fromldn Denotes the logical device number of the device containing the volume to be copied from. The device must be in the DOWN state, with the exception of system domain discs. (Refer to the :DOWN command in the MPE V Commands Reference Manual (32033-90006).

toldn Indicates the logical device number of the device containing the volume to be copied to. The device must be in the DOWN state.

genindex Indicates a value from 0 to 32767, specifying the generation index of the medium. If not specified, the generation index of the to-volume will be one greater than that of the from-volume. You may specify a generation index for the to-volume that is different than that of the from-volume. Valid only for private volumes.

NOTE

When a nonzero generation index is specified, the accounting structure on this volume set cannot be altered.

VER[ify] Verifies any bad data which is encountered during the copy process (that is,

this option tries to recover a track; if the track is unrecoverable, the option reassigns the track and then copies it again). The [VERify]] option checks only the readability of data on destination medium.

size Signifies a value from 1 to 32 which specifies the internal buffer size in kilowords. (Default is 32.)

NOTE

No more than two of the options GEN, VER, or BUF can be specified at a time.

The following is an example of output generated by the COPY command:

```
>COPY 2,3;VERIFY
Beginning Copy (20% of disc space)
UNREADABLE OR LOST DATA IN SECTORS 8075 - 8075 (TRACK: CYL 6 HEAD 11)
20% completed.
40% completed.
60% completed.
80% completed.

Beginning Verify
UNREADABLE OR LOST DATA IN SECTORS 8075 - 8075 (TRACK: CYL 6 HEAD 11)

-------------------------------------------------------------
FILE                          LOST DATA (SECTORS)
                         PHYSICAL ADDRESS   LOGICAL ADDRESS
-------------------------------------------------------------
JUNK.PUB.SYS                     8075             (3)

>
```

The following conditions must exist for the COPY command to be successful:

- If you are not copying system domain discs, both the to-device and the from-device must be in the DOWN state or have scratch media mounted on them. If you are copying system domain discs, only the to-device must be in the DOWN state, only one user can be on the system, and no temporary files can exist. (VINIT will disable the logging facility.)
- Both devices must be of the same type (i.e., HP 7920A, etc.).
- If the to-device has deleted or suspected tracks, they will be reassigned or spared automatically.

The COPY command allows you to copy system domain discs, private volumes, serial discs, and foreign discs. Except for foreign discs, only the used part of the disc is copied; i.e., the portion from the beginning of the disc to the highest used sector on the disc. If you decide to copy the entire disc image, you must scratch the medium. (Refer to the SCRATCH command.)

Several special conditions apply when you are copying system domain discs: you cannot down the device; to preserve data integrity, there can be only one user on the system, and there must be no temporary files on the system. The COPY command will place an image of the from-volume on the to-volume. No compaction or other reorganization of the file space on the volume will be performed.

The COPY command operates on only one from-volume at a time. Thus, in order to back up a multi-volume set, multiple COPY operations have to be performed. It would be of little practical value to back up only one member of a multi-volume set, since the volume set directory is located only on the master volume of a set. In the case of private volumes, the volume set need not be mounted. However, if the volume set is not mounted and an I/O error resulting in the loss of data from a file is encountered, the user will not be notified. Therefore, it is recommended that you mount the entire volume set.

This command is breakable, except when used with system domain discs.

The DSTAT Command

The DSTAT command displays the status of one or more disc drives or cartridge tape drives. The syntax is:

```
          [ldev]
>DSTAT    [ALL ]
          [ @  ]
```

where:

ldev — Specifies the logical device number of a particular disc drive(s).

ALL or @ — Displays the status of all system and nonsystem disc drives.

The default displays the status of all nonsystem disc drives.

An example of the >DSTAT command is:

```
>DSTAT ALL
LDEV-TYPE        STATUS     VOLUME (VOLUME SET-GEN)
-------------------------------------------------------------
1-7933           SYSTEM     MH7933U0
2-7920           MOUNTED    USERVOL2 (USERVOL2.PUB.SYS-0)
3-7920           DOWNED
4-7920           AVAIL      SLAVOL1  (USERVOL1.PUB.SYS-0)
5-7920           AVAIL      SLAVOL2  (USERVOL1.PUB.SYS-0)
6-7920           AVAIL      SLAVOL3  (USERVOL1.PUB.SYS-0)
```

Let's examine the "STATUS" of each logical device in the above example.

- The status "SYSTEM" for LDEV 1 means that the volume is a system disc with the volume name MH7933U0. This disc cannot be downed when the system is up.
- The status "MOUNTED" for LDEV 2 indicates that the volume is a private volume with the name USERVOL2. This disc, like the system disc (LDEV 1), is currently being accessed and should not be dismounted or downed.

- The status "DOWNED" for LDEV 3 denotes that this disc cannot be accessed.
- The status "AVAIL" for LDEVs 4, 5, and 6 indicates that the device is up and that a private volume is physically but not logically mounted; that is, the disc is on line, but there are no files being accessed in this volume.

The DTRACK Command

The DTRACK command allows you to process defective tracks (from the Defective Tracks Table) and defective sectors (from the Defective Sectors Table). In doing so, you can either recover (i.e. ignore), delete, or reassign the defective tracks. The syntax is:

```
>DTRACK ldev
```

where:

ldev Specifies the logical device number of the device on which the volume is mounted. Private volumes only.

For HP 7911, 7912, 7933, 7935, and 7945 discs, DTRACK will try to recover data in the suspect sector before the sector is spared. The user will be notified if data is lost. If a private volume is mounted, DTRACK will also print the names of files which have lost data and will ask if the files should be purged or saved.

The EXIT Command

The EXIT command exits the VINIT subsystem.

The FOREIGN Command

The FOREIGN command allows you to create a foreign disc by filling the label area of a volume with zeroes, whether or not it was previously formatted. This command is not appropriate for the HP 35401A, 7911, 7912, 7914, and 9144 Integrated Cartridge Tape. The syntax is:

```
>FOREIGN ldev
```

where:

ldev Specifies the device on which the volume is mounted. The device must be a nonsystem domain disc drive in the DOWN state. If the disc is subsequently mounted, the nonstandard label area (track 0, sector 0) will result in the disc being automatically recognized as a foreign disc.

The FORMAT Command

The FORMAT command allows online formatting of disc packs (including foreign discs and diskettes and HP 35401A, 7911, 7912, 7914, and 9144 cartridge tapes). Formatting is necessary only when a new, previously unused volume is to be initialized, when an irrecoverable pack error has been detected on a previously used volume, or when using an uncertified cartridge tape or diskette for the first

time. The FORMAT command performs the following functions, which are not performed by the SLEUTHSM program:

1. Writes a valid SCRATCH label. The FORMAT command automatically calls in the procedures that are called in with the SCRATCH command.

2. Sets the tracks above the logical pack size to the SPARE state. (HP 7920 and 7925 discs only.)

3. For HP 7920 and 7925 discs, the FORMAT command builds a Defective Tracks Table (DTT) containing tracks that failed the verification part of the formatting process. The user is prompted to decide whether to reassign or recover each suspect track. The user may also request that certain tracks be reassigned if he or she knows they are defective, even though they passed the verification phase. These HP disc packs come with a list of tracks which have failed a long and extensive diagnostic test. It is conceivable that such tracks may pass the single test of the FORMAT command, but these tracks should still be reassigned.

   For the HP 35401A, 7911, 7912, 7914, 7957, 7958, and 9144 Integrated Cartridge Tape Units and HP 7933, 7935, 7036, 7937, and 7945 discs, the FORMAT command builds a Defective Sectors Table (DSCT) containing suspect sectors. The process of reassignment and recovery is automatic.

The syntax of the command is:

```
>FORMAT ldev

   [;IBM[:volid]]
```

where:

ldev Specifies the logical device number of the device on which the medium to be formatted is mounted. This parameter must specify a nonsystem disc or cartridge tape drive which is in the DOWN state or a scratch volume.

IBM Indicates IBM format (single-sided diskette only). Default is HP standard format.

volid Denotes the IBM volume identifier. Default is IBMIRD. For single-sided diskette only.

NOTE

To format a disc pack, the FORMAT switch on the disc drive must be ON for the FORMAT command to be effective. This switch is located behind the front door of the disc drive. Refer to the appropriate maintenance manual for the device if you have any questions.

The HELP Command

The HELP command lists the VINIT commands, displaying the name, the syntax, and a brief definition of each. An example of the HELP command is as follows:

```
>HELP
FORMAT ldev                    <<writes a scratch label; sets up dtt,spares>>
SERIAL ldev                    <<writes a serial disc type label>>
FOREIGN ldev                   <<makes disc volume foreign>>
INIT volumename,ldev,
  vsid.gname.aname[;GEN=xx]    <<writes PV label>>
INIT volumename,ldev,
  [;GEN=xx]                    <<uses last VS from INIT or PDEFN>>
SCRATCH ldev[;RESET]           <<writes (resets) a SCRATCH type label>>
VERIFY ldev[;DTT]              <<verifies (reads) data>>
COPY fromldev,toldev
  [;GEN=xx][;VER][;BUF=yy]     <<copy disc-disc>>
COND ldev                      <<condenses disc space holes>>
COND ldev;RECOVER              <<recovers lost disc space for PV>>
DSTAT [ALL!@!ldev]             <<gives status of drives>>
PDEFN vsname.gname.acctname    <<lists VS specified>>
PDEFN *.gname.acctname         <<lists home VS of gname.acctname>>
PDEFN                          <<lists home VS of logon group
                                 or repeats last VS>>
PLABEL ldev                    <<prints disc label>>
PDTRACK ldev                   <<prints defective track label contents>>
PFSPACE ALL                    <<prints DFSM as histogram>>
PFSPACE ldev                   <<prints out DFSM as histogram for LDEV>>
PFSPACE ldev;ADDR              <<prints out Disc Free Space Map (DFSM)>>
DTRACK ldev                    <<processes suspect tracks in defective
                                 track table>>
```

The INIT Command

The INIT command is used to complete the conditioning of a private volume formatted previously either by the SLEUTHSM program or by the VINIT FORMAT command. Do not use the >INIT command to label a disc pack destined for the system domain; this function is performed during cold load as the disc is configured into the system. The INIT command is not applicable to foreign discs or HP 35401A, 7911 or 7912, 7914, and 9144 integrated cartridge tapes. The syntax of the INIT command is:

```
>INIT vname,ldev[,vsname.groupname.acctname]

  [;GEN=genindex]
```

where:

vname	Specifies the name of the volume set member (volume) to be conditioned.
ldev	Specifies the logical device number on which the volume is mounted. This parameter must specify a nonsystem disc drive that is in the DOWN state or the SCRATCH state.
vsname.groupname .acctname	Specifies the name of the volume set. These parameters (although shown as optional above) must be specified if the volume set name has not been

volume of a volume set, additional initializing is performed. Specifically, a table of volume members and a volume set file directory nucleus are placed on the volume.

genindex A value from 0 to 32767 specifying the generation index of the volume. If not specified, VINIT assigns an index of zero. Only volume sets with indexes of zero allow changes to the accounting structure. All volumes of a volume set should be initialized with the same generation index to allow subsequent mountings to be successful.

Before a volume can be initialized, the following conditions must be met:

1. The volume set must have been defined previously by a :NEWVSET command.

2. The directory must be set up for a master volume of a volume set. If a master volume is being initialized, the user will be prompted for directory size.

3. The volume must be physically mounted on the device specified by *ldev*.

4. The logical device must be a nonsystem disc drive with a SCRATCH volume mounted, or it must be in the DOWN state. If it is DOWN but not in the SCRATCH state, the user will be prompted to verify that he wishes to destroy the old contents of the pack. This requirement for DOWN or SCRATCH is called "DOWN/SCRATCH".

5. The volume must have been formatted previously with the SLEUTHSM program or with the VINIT FORMAT command.

For HP 7920 and HP 7925 discs, VINIT will construct a Defective Tracks Table (DTT) as a part of the initializing process. If defective tracks are encountered during initialization, a message indicating the number of detected suspect tracks is printed; VINIT will reassign any tracks designated by the user.

For the HP 7911, 7912, 7933, 7935, 7936, 7937, 7945, 7957, and 7958 VINIT will construct a Defective Sectors Table (DSCT) which will record suspect sectors. Defective sectors are spared automatically.

The INIT command is not appropriate for the Foreign Disc Facility because foreign discs have no label and, therefore, no volume name (e.g., the *vname* parameter). This command is also not appropriate for serial discs.

The PDEFN Command

The PDEFN command prints a listing from the system directory of the volume set definition of the specified volume set. The PDEFN command is only applicable to private volumes. The listing contains the following information:

- Volume set definition.
- Number of volumes in the volume set.
- The index numbers, names, and device subtypes of all the member volumes.

This command is not applicable to foreign discs.

The syntax of the PDEFN command is:

```
>PDEFN [    *    .group.account]
       [vsname.group.account]
```

where:

*	Specifies the home volume set for the specified group and account.
vsname	Specifies the volume set name.

If neither * nor *vsname* is specified, the listing will be for the volume set specified in the last INIT command.

An example of the PDEFN command is:

```
>PDEFN USERVOL2.PUB.SYS
SET DEFINITION:  USERVOL2.PUB.SYS    MVTAB INDEX:  0
NUMBER OF VOLUMES:  2  VOLUME MASK:  %000003
INDEX    MEMBER    SUBTYPE
-----    ------    -------
  1      USERVOL2      4
  2      SLAVOL2       4
```

The PDTRACK Command

The PDTRACK command allows you to print a list of all suspected, reassigned, and deleted tracks referenced in the volume's Defective Tracks Table or Defective Sectors Table. This command is not appropriate for foreign discs or cartridge tapes. The syntax is:

```
>PDTRACK ldev
```

where:

ldev	Specifies the number of the logical device on which the volume is mounted.

The PFSPACE Command

The PFSPACE command prints a listing of the Disc Free Space Map in one of two formats: either as a table of free space areas or a report of the free space area addresses and sizes. This command is not appropriate for foreign discs. The syntax of PFSPACE is:

```
>PFSPACE {ldev[;ADDR]}
         {ALL       }
```

where:

ldev	Specifies the logical device on which the volume is physically mounted. When this parameter is included, a table of the free space on the specified logical device is printed.
ADDR	Displays the Disc Free Space entries (in free space address/free space size format) for the specified logical device.
ALL	Displays the Disc Free Space Map in table format for all system and private volumes which are physically mounted.

The following examples illustrate the output from the PFSPACE command:

```
>PFSPACE 1;ADDR
LDEV: 1
 ADDRESS     SIZE     ADDRESS     SIZE     ADDRESS     SIZE
  36736        1       38454       1       43056       1
  44620        1       70307       1       74696      158
  75355   120245
NO. ENTRIES:  7
TOTAL VOLUME CAPACITY:  195600 SECTORS
TOTAL FREE SPACE AVAILABLE:  120408 SPACE
MAXIMUM CONTIGUOUS AREA:  120245 SECTORS

>PFSPACE 2
VOLUME DFST                          LDEV 2
LARGEST FREE AREA = 194444
SIZE      COUNT      SPACE      AVERAGE
>100000     1        194444      194444
>10000      0        0           0
>1000       0        0           0
>100        0        0           0
>10         0        0           0
>1          100      200         2
TOTAL FREE SPACE = 194644
*****************************************
```

The PLABEL Command

The PLABEL command lists the contents of the mounted volume's label on the specified logical device. If the volume is a scratch volume or serial volume, a message signifying such is printed. For all system or nonsystem discs which are not private volumes, only the device type and subtype are printed. Otherwise, the following information is printed for nonsystem private volumes:

- Volume name.
- Device type and subtype.
- Creation date and generation index.
- Volume set to which the volume belongs.
- Master volume set information.
- The names of the member volumes of the set.

This command is not appropriate for foreign discs. The information generated is incorrect and is not taken from the label. Instead, the following error message is generated:

```
INAPPROPRIATE OPERATION FOR FOREIGN DISC
```

The syntax of the PLABEL command is:

```
>PLABEL ldev
```

where:

ldev	Specifies the logical device number of the mounted volume's device.

The following example illustrates output from the PLABEL command:

```
>PLABEL 2
LDEV NAME:  USERVOL2, TYPE:  0, SUBTYPE:  4
CREATE DATE:  1/20/83, GENERATION: 0
VS NAME:  USERVOL2, GROUP:  PUB     , ACCOUNT:  SYS
MASTER VOLUME INFORMATION -
 DIR. BASE:  48   , DIR. SIZE:  500
VOLUME DIRECTORY
  NAME      SUBTYPE
-------------------------------------------------------------
USERVOL1       4
SLAVOL2        4
```

For private volumes only, the subtype listed under the volume directory is actually the device pseudo-subtype, which is: Pseudo-subtype=(16*type)+subtype.

The SCRATCH Command

The SCRATCH command allows you to set an initialized volume to the SCRATCH state, thus making it available for assignment to a volume set. In addition, the RESET parameter of this command can be used to set a volume from scratch to nonscratch. This command is not appropriate for foreign discs, nor for the HP 35401A, 7911, 7912, 7914, or 9144 cartridge tapes. The syntax is:

```
SCRATCH ldev

  [;RESET]
```

where:

ldev	Specifies the logical device number of the device on which the medium to be scratched is mounted. Device must be in the DOWN state.
RESET	Resets a volume from scratch to nonscratch.

The SERIAL Command

The SERIAL command is used with all serial media (including HP 35401A, 7911, 7912, 7914, and 9144 cartridge tapes, and diskettes). It changes the volume label to indicate that the volume is a serial medium. The syntax of the SERIAL command is:

```
>SERIAL ldev
```

where:

ldev	Specifies the logical device number of the device on which the medium is mounted. This parameter must specify a nonsystem serial medium which is in the DOWN/SCRATCH state.

The VERIFY Command

The VERIFY command checks readability of data on discs or HP 35401A, 7911, 7912, 7914, and 9144 cartridge tapes. It will verify only the used part of the medium, except in the case of scratch volumes or foreign discs, where the entire medium is examined. The syntax is:

```
>VERIFY ldev

  [;DTT]
```

where:

ldev	Specifies the logical device on which the medium is physically mounted.
DTT	Only suspect sectors/tracks (as recorded in the Defective Sectors/Tracks Table) are verified. This option is not applicable to serial or foreign discs or cartridge tapes.

For mounted private volumes or configured system discs, any bad sectors/tracks which are encountered are checked against the File System. All files with bad data are reported.

The VERIFY command locks the system directory when looking for files with bad data.

The command is breakable, but cannot be aborted.

Using the VINIT Subsystem

To condition (format and initialize) a private volume, perform the following steps:

1. Down the drive on which the volume will be conditioned (use the console :DOWN command).
2. Set the RUN-STOP switch on the disc drive to STOP.
3. Set the FORMAT switch (behind the front door of the disc drive) to ON.
4. Install the disc pack to contain the private volume on the disc drive.
5. Set the RUN-STOP switch on the disc drive to RUN.
6. Log on (you must have System Manager (SM) or System Supervisor (OP) capability.
7. Run the VINIT subsystem (:VINIT command).
8. Format the volume (VINIT FORMAT command).
9. Initialize the volume (VINIT INIT command).
10. Exit the subsystem (VINIT EXIT command).
11. Set the FORMAT to OFF.
12. Up the disc drive (use the console :UP command).

The following example illustrates the above procedure. In the example, a previously used private volume mounted on logical device 3 is being formatted and initialized.

```
:DOWN
13:29/8/DISMOUNT ON LDEV# 3
13:33/8/UNKNOWN VOLUME ON LDEV# 3
:VINIT       ** Runs the subsystem **
VINIT G.01.00 (C) HEWLETT-PACKARD CO., 1978
>DSTAT ALL       ** Gives the statuses of the drives **
LDEV-TYPE   STATUS   VOLUME    (VOLUME SET-GEN)
---------   ------   ------------------------
1-7920      SYSTEM   MH7920U0
2-7920(R)   AVAIL    USERVOL1  (USERVOL1.PUB.SYS-0)
3-7920(R)   DOWNED
4-7920(R)   AVAIL    SLAVOL1   (USERVOL1.PUB.SYS-0)
5-7920(R)   AVAIL    SLAVOL2   (USERVOL1.PUB.SYS-0)
6-7920(R)   AVAIL    SLAVOL3   (USERVOL1.PUB.SYS-0)
>FORMAT 3       ** Allows online formatting of disc packs **
>INIT PRIVOL1,3,PRIVOL1.PUB.SYS    ** Completes volume conditioning
ENTER DIRECTORY SIZE (SECTORS - 384 TO 65,000): 500
>EXIT       ** Exits the subsystem **
END OF SUBSYSTEM
:UP 3       ** Ups the disc drive **
:DSTAT ALL       ** Gives the statuses of the drives **
LDEV-TYPE   STATUS   VOLUME    (VOLUME SET-GEN)
---------   ------   ------------------------
1-7920      SYSTEM   MH7920U0
2-7920(R)   AVAIL    USERVOL1  (USERVOL1.PUB.SYS-0)
3-7920(R)   AVAIL    PRIVOL1   (PRIVOL1.PUB.SYS-0)
4-7920(R)   AVAIL    SLAVOL1   (USERVOL1.PUB.SYS-0)
5-7920(R)   AVAIL    SLAVOL2   (USERVOL1.PUB.SYS-0)
6-7920(R)   AVAIL    SLAVOL3   (USERVOL1.PUB.SYS-0)
```

SERIAL DISCS

Serial discs are cartridge tapes or nonsystem domain discs treated as serial devices. To MPE, the discs appear to be magnetic tape drives and thus provide fast backup and recovery capability when used as an alternative to magnetic tape in the SYSDUMP Program and in :STORE and :RESTORE activities.

Cartridges can be configured as serial discs, either during the SYSDUMP or INITIAL Programs. First, the disc is assigned to a class by logical device number, and then the class is designated a serial disc class in response to a special prompt.

The following devices are supported as serial discs: HP 7920, 7925, 7933, and 7935 disc drives, the HP 35401A, and 9144 cartridge tapes, and the integrated cartridge tape of the HP 791X disc drive. Cartridge tapes are supported only as serial discs.

Media mounted on a serial disc device must be initialized for serial use by the System Operator using the VINIT subsystem. This serialization places a special serial disc label, which is subsequently used

for identification by MPE. When MPE recognizes a medium with this label, it sends a mount notification message to the System Console.

NOTE

The configuration dialog of the SYSDUMP or INITIAL Programs allows the user to specify any moving-head disc supported by private volumes as a serial disc. However, the VINIT subsystem will only initialize media for serial use on supported serial disc devices. The configuration dialog also does not restrict the user to a serial disc class for cartridge tape drives, but results are unpredictable if they are not so specified.

It is possible to configure a disc drive into two types of classes, one of which is a serial disc class and the other a private volume class. For example:

CLASS NAME	LOGICAL DEVICE NUMBER
PVDISC	5,6,7,8
SDISC	7,8

All of the above devices (LDEVs 5,6,7, and 8) can be used for private volumes or serial discs (provided that LDEVs 5,6,7, and 8 are not Integrated Cartridge Tape Units, which are treated only as serial disc devices, and that classes PVDISC and SDISC are in the nonsystem domain).

The device class SDISC (assuming that it has been configured as a serial disc class) can be used in the :FILE and :BUILD commands. For example:

:FILE *filename*;DEV=SDISC

This file equation will allocate devices 7 or 8. To use device 5 or 6 for a serial disc operation, you must specify the logical device number rather than the device class SDISC:

:FILE *filename*;DEV=5 or (6).

If only one device 7 was configured as device class SDISC, then only FILE *filename*;DEV=SDISC would allocate ldev 7.

Conditioning Serial Disc Media

Before a medium can be used as a serial disc, it must be conditioned with the VINIT subsystem. The procedure is as follows:

1. Down the disc drive on which the medium will be conditioned (Console :DOWN command).
2. Set the RUN-STOP switch on the disc drive to STOP. (Applicable only the HP7920/25.)
3. Set the FORMAT switch (behind the front door of the disc drive) to ON. (Applicable to the HP7920/25.)

4. Mount the volume on the disc drive or insert cartridge into drive and wait until it is loaded.

5. Log on (you must have System Manager (SM) or System Supervisor (OP) capability.

6. Run the VINIT subsystem (:VINIT command).

7. Format the medium (VINIT FORMAT command).

8. Condition the volume as a serial disc (VINIT >SERIAL command).

9. Exit VINIT, using the VINIT EXIT command.

10. Bring up the drive before accessing the medium (Console :UP command).

11. Unload and load the media before attempting to access it.

Foreign Discs

The foreign disc is a type of nonsystem domain disc (similar to a serial disc and private volume) that enables nonprivileged users to access and alter data residing on any removable disc (including the flexible disc, or diskette) not in standard HP 3000 MPE format. For example, you can read or write HP 250, HP 300, or even IBM 3741 formatted diskettes provided that you know the disc and diskette formats. The data is written to or read from a disc volume as though it were a standard MPE file. All that you need to do is write your own programs to interpret (if reading) or format (when writing) the data. (Foreign disc operations are not applicable to the Integrated Cartridge Tape Unit.)

A query in the SYSDUMP and INITIAL Programs will allow the user to assign the device class "FOREIGN". Once a device class has been designated as a foreign class, it is then possible to mount any drive-compatible disc on the corresponding logical device and, by utilizing your own code, you can access and alter any and all information on that disc. Whenever you want to convert any disc format (i.e., serial disc format) to a foreign disc, VINIT is used.

To create a foreign disc on logical device 3, you would mount a diskette on the drive, down the drive, enter the VINIT subsystem, and enter:

```
>FOREIGN 3
```

Logical device 3 must be a nonsystem domain disc drive in the DOWN state. The action of this command is to fill the MPE disc label that either was or was not a previously formatted volume with zeros, since having all zeroes on a label is not a recognizable MPE label. (Any other nonrecognizable sector-zero content would do as well.) This volume will then be recognized as a foreign disc with all subsequent usage. (The MPE label area is track 0, sector 0.)

The status of the foreign disc on logical device number 3 can be displayed using the VINIT >DSTAT command.

The user command :DSTAT will also display the FOREIGN status of a disc; this command has the same format as the VINIT >DSTAT command. The operator command :FOREIGN is designed to enable the System Operator to intervene when necessary. For example, to label the disc mounted on LDEV 3 as foreign, you must first verify the status of this disc by entering:

```
:DSTAT 3
```

To verify the change, enter:

```
:DSTAT 3

 LDEV-TYPE          STATUS      VOLUME  (VOLUME SET-GEN)
------------        --------    ----------------------------

   3-7902            FOREIGN           *UNALLOCATED*
```

THE SOFTWARE DUMP FACILITY

The Software Dump Facility (SDF), also known as SOFTDUMP, operates in a standalone environment after a system failure has occurred or a system halt has been performed. The SDF enables you to store information onto serial storage media so that you can later format the media with the DPAN utility and obtain information about a system failure.

Prior to MPE version G.02.00, the SDF stored only main memory to either a serial disc or magnetic tape. Now, on MPE version G.02.00, the SDF includes the following enhancements, in addition to storing all of main memory:

- You can store all of virtual memory to serial storage media.
- The system files LOADMAP.PUB.SYS, MPECHECK.PUB.SYS, CONFDATA.PUB.SYS, and HPPMAP.PUB.SYS are appended onto the dump media. As a result, the DPAN utility is now used only to format the dump media, not to write to it. The benefit of this enhancement is that you no longer need to run DPAN on the same system which the dump media was created. The correct version of system files will always be present on your media regardless of which system is used to format the media.

If you ever need a backup copy of the SDF, you cannot create one after a software dump has failed. Consequently, it is a wise precaution to have one or more backup copies of the SDF on serialized media. It is also important to keep some serialized media on hand for taking dumps, since you cannot serialize cartridges after the system has crashed or hung.

Creating a Backup SDF

Regardless of your system's configuration, it is a wise precaution to have one or more backup copies of the Software Dump Facility on serial disc or cartridge tape.

As previously mentioned, there may be times when a system failure or other system problem could cause the system disc or its files to be inaccessible. In this case you would need a backup copy of the SDF on a dedicated removable serial medium, such as a flexible disc or cartridge tape. If your system does not include a flexible disc or cartridge tape and does not have a nonsystem domain disc drive available for serial disc use, you cannot create a backup SDF. In such cases, contact your Hewlett-Packard Customer Engineer if an attempted memory dump fails.

NOTE

Remember that a backup SDF cannot be created after a software dump has failed; you must have one already on hand. A backup SDF disc or cartridge tape should be created when the system is initially configured, and you should create a new backup SDF each time you receive a software update. This will ensure that you have the correct version of SDF on your backup copy at all times.

You can create a backup copy of SDF by proceeding through the following steps:

1. If your serial disc or cartridge tape has not been previously serialized, or if you are not sure if it has, perform Steps 2 through 6. If your serial disc or cartridge tape is already serialized, simply mount it in your drive, close the door, then proceed to Step 7.

2. Mount a serial disc or cartridge tape in your drive and close the door.

3. In session mode, enter :DOWN *ldev* (where *ldev* is the logical device number of the serial disc drive or the cartridge tape unit).

4. Enter the VINIT subsystem (:VINIT).

5. The VINIT subsystem will prompt you with a greater-than sign (>). Enter:

```
>SCRATCH ldev      ** >SCRATCH is not appropriate for cartridge tapes **
>FORMAT ldev
>SERIAL ldev
```

6. Exit the VINIT subsystem (>EXIT).

7. Enter :UP *ldev*.

8. Log on and enter:

```
:FILE SDFLOAD = SDFLOAD.PUB.SYS
:FILE SDFBACK;DEV = ldev        ** Number of that device **
:RUN SDFGEN.PUB.SYS,BACKUP
```

9. When the program finishes, remove the serial medium and keep it for future use.

Taking a Standard Memory Dump With the SDF

To perform a standard memory dump, proceed through the following steps:

1. Mount a serial storage medium on a logical device specified by the device class DDUMP, then place the drive on line.

NOTE

Device class DDUMP can only be configured on one *ldev* at a time.

2. Initiate the memory dump as follows:

Series 37/ MICRO 3000/ MICRO 3000XE	If the DCU prompt is not displayed on the System Console, turn keyswitch to position 2 or 3, then enter B^C. When the prompt H for help-> appears, enter DUMP.
Series 39/40/42/52, & 44/48/58	On the System Control Panel, set the DUMP thumbwheel switches to the channel and device address of the system disc. (Refer to Section XI for more information on thumbwheel switch settings.) Enable the CMP by entering B^C. When you see the CMP prompt character (->), enter DUMP on the System Console or press the DUMP key on the control panel.
Series 64/68/70	If the DCU prompt (M>) is not already present on the System Console, enter B^C. When the prompt appears, enter DUMP.

If the system halts while loading the SDF, the following error message will appear on the System Console:

```
***DUMP FAILED
```

This message indicates that an error has been detected, and the SDF is unable to execute. A backup software dump must be performed. (Refer to "Performing a Backup Software Dump", in this section.)

3. If a system failure has occurred or a system halt has been performed prior to beginning this memory dump, the following message will appear:

```
OK to dump the system?  (Y/N)
```

To access the SDF, answer Y.

4. There will now be an attempt to load the SDF from the specified device. One of two things will occur:

   - If the Software Dump Facility is loaded correctly, the following message will appear on the System Console:

     SOFTWARE DUMP FACILITY (VER *XX.XX/XX*)

     The serial execution of the SDF command file (SDFCOM.PUB.SYS) will now begin. This file, which is located on the system disc, contains SDF commands.

NOTE

Entering Y^C on the System Console at any time while the SDF file is executing may cause SDF to abort the current command and place the user in interactive mode.

- If the SDF command file does not exist or has been corrupted, or if your serial storage medium is flawed, the following message may appear on the System Console:

```
SERIAL DEVICE I/O ERROR - You are now in
SOFTDUMP INTERACTIVE MODE.  Please mount
new media, then type 'DUMP' in response to the
prompt SOFTDUMP COMMAND>.
```

  If you receive the SDF interactive prompt, SOFTDUMP COMMAND>, enter any of the SDF commands listed in Table 10-1. When you are finished entering SDF commands (at which time your dump should have been successfully performed and your system will be operational), advance to Step 10 to conclude this procedure.

5. The SDF command file on your system may be the system's default file, or it may be a file previously modified. (The SDF command file may be modified when the system is operational. Instructions for modifying this file are presented in "Changing the SDF Command File", in this section.)

   The default SDFCOM file contains the PROMPT, DUMP, and WARMSTART SDF commands:

```
PROMPT MOUNT DUMP MEDIA, AND PLACE DRIVE ON-LINE.
DUMP DSEG=ALL
WARMSTART
```

   The rest of the SDF dump procedure, as described in this text, assumes that the default SDFCOM file is being used.

NOTE

The DSEG=ALL option of the SDF DUMP command has been added to MPE version G.02.00 of the SDF command file. The inclusion of this option in the file enables you to dump virtual memory onto the serial storage media.

6. The system now will execute the first instruction in the SDFCOM file. You will see the following message:

```
MOUNT DUMP MEDIA, AND PLACE DRIVE ON-LINE.
PRESS THE RETURN KEY TO CONTINUE EXECUTION OF SOFTDUMP.
```

   The dump media must be write enabled. When it is mounted and the drive is on line, respond by pressing (RETURN).

NOTE

If a cartridge tape is being used and you enter (RETURN) while the drive is still active, the system will wait until the cartridge has been loaded. If a cartridge has not been inserted when you press (RETURN), the user will be informed that the drive is not ready:

```
TAPE DRIVE NOT READY.
```

Check to see that the serial storage medium is on line and ready, then press (RETURN) to continue SDF execution.

7. The system next will execute the second instruction in the SDFCOM file. You will see the following message:

```
DUMP DSEG=ALL
```

8. If your dump device is not connected to the system, you are automatically entered into the IOMAP facility. This facility will show you a device list and prompt you for a selection number, as follows:

```
DUMP DEVICE AT DRT# 97, UNIT#0 DOES NOT IDENTIFY

THE FOLLOWING DEVICES ARE AVAILABLE FOR DUMPING MEMORY:

SELECTION NO. IMB CHAN DEV  DRT UNIT  DESCRIPTION

0                     2    34    0  9140 Cartridge Tape Drive
1                     4    36    0  9144 Cartridge Tape Drive

ENTER SELECTION NO. FOR MEMORY DUMP,
PRESS THE RETURN KEY TO RE-DISPLAY DEVICE LIST, OR
TYPE "EXIT" FOR SOFTDUMP INTERACTIVE COMMAND PROMPT.

SELECTION NO.>
```

Let's assume that the dump device needed was not shown in the IOMAP. If this was the case, you would connect the device and press (RETURN) to redisplay the device list:

```
THE FOLLOWING DEVICES ARE AVAILABLE FOR DUMPING MEMORY:

SELECTION NO.  IMB CHAN DEV  DRT UNIT  DESCRIPTION

0                      2    34    0  9140 Cartridge Tape Drive
1                      4    36    0  9144 Cartridge Tape Drive
2                 11   1    89    0  7970E Mag Tape

ENTER SELECTION NO. FOR MEMORY DUMP,
PRESS THE RETURN KEY TO RE-DISPLAY DEVICE LIST, OR
TYPE "EXIT" FOR SOFTDUMP INTERACTIVE COMMAND PROMPT.

SELECTION NO.>2
```

The dump is written to the DRT of the device that was selected, DRT #89 in this example.

9. The rest of the SDF command file will execute, and progress messages will appear:

```
DUMP OF REAL MEMORY STARTED.
DUMP OF REAL MEMORY FINISHED.
DUMP OF VIRTUAL MEMORY STARTED.
DUMP OF VIRTUAL MEMORY FINISHED.
DUMPING FILE:  LOADMAP.PUB.SYS
DUMPING FILE:  MPECHECK.PUB.SYS
DUMPING FILE:  CONFDATA.PUB.SYS
DUMPING FILE:  HPPMAP.PUB.SYS
WARMSTART

HP32033G.02.00
WHICH OPTION <WARMSTART/COOLSTART>? WARMSTART

**WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS
UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS

    •
    •
    •
```

10. If your serial storage medium is a reel tape, remove the write ring; if your storage medium is a cartridge tape, turn the arrow on the tape toward SAFE.

11. If you want to format and print the dump to a line printer, run the DPAN/DPAN5 utility program immediately after restarting the system. DPAN/DPAN5 is described in the MPE V Utilities Reference Manual (32033-90008).

NOTE

If a DPAN version older than G.02.00 of DPAN5 is run on a virtual memory dump, the virtual memory will be overwritten and lost. Real memory will still be formatted.

Performing a Backup Software Dump

When executing a backup software dump, you perform essentially the same functions as in a standard software dump, except that a serialized disc or cartridge tape is accessed rather than the system disc.

Note that once a software dump has failed, it may not be possible to get an accurate memory dump. If the backup software dump also fails, call your Hewlett-Packard Customer Engineer.

To perform a backup software dump, proceed through the following steps:

1. Mount the backup SDF storage medium on the appropriate drive. If necessary, put the drive on line.

2. Initiate the memory dump as follows:

   Series 37

   If the DCU prompt is not displayed on the System Console, turn keyswitch to position 2 or 3, then enter B^C. When the prompt `H for help->` appears, enter:

   DU[mp] [*channel, device*]

   The optional parameters specify the channel number and device number from which the SDF will be loaded (the serial disc or cartridge tape drive).

   Series 39/40/42/52 & 44/48/58

   On the System Control Panel, set the DUMP thumbwheel switches to the channel and the HP-IB device address of the drive. (Refer to Section XI for more information on thumbwheel switch settings.)

   Enable the CMP by entering B^C. When you see the CMP prompt character (->), enter DUMP on the System Console or press the DUMP key on the control panel.

   Series 64/68/70

   If the DCU prompt (C>) is not already present on the System Console, enter B^C. When the prompt appears, enter:

   DUMP *imb,channel,device*

   The parameters specify the Intermodule Bus (IMB) number, channel number, and device number from which you want to load the SDF; i.e., the serial disc or cartridge tape drive.

3. If SDF is loaded correctly, the following message appears on the Console:

```
***SOFTWARE DUMP FACILITY (VER XX.XX/XX)***
```

Because you are performing a backup rather than a regular software dump, SDF automatically enters interactive mode. The following question will appear on the System Console:

```
System Disc DRT?
```

Reply with a (RETURN), then enter:

```
DUMPDEV nnn
```

where *nnn* is the DRT number of the device you wish to dump to. If no DUMPDEV command is entered, the SDF will dump to the device from which the SDF is loaded when the DUMP command is issued.

Now enter the following:

```
DUMP DSEG=ALL
```

NOTE

The DSEG=ALL option of the SDF DUMP command enables you to dump virtual memory onto the serial storage media.

4. If the system halts while attempting to load the SDF, the following error message may appear on the Console:

```
***DUMP FAILED
```

If this happens, call your Hewlett-Packard Customer Engineer.

5. Enter the WARMSTART command. (Any of the system startup options described in the five startup procedures in Section IV can be used.)

6. If your serial storage medium is a reel tape, remove the write ring; if your storage medium is a cartridge tape, turn the arrow on the tape toward SAFE.

7. If you want to format and print the dump to a line printer, run the DPAN/DPAN5 utility program immediately after restarting the system. DPAN/DPAN5 is described in the MPE V Utilities Reference Manual (32033-90008).

NOTE

If a DPAN version older than G.02.00 of DPAN5 is run on a virtual memory dump, the virtual memory will be overwritten and lost. Real memory will still be formatted.

Changing the SDF Command File

There are times when you may wish to change the records (SDF commands) in your SDF command file; for example, you might want to change the default SDF command file so that it will operate in interactive mode. Or, after taking a dump, you might want to restart your system with some option other than WARMSTART. (Refer to Table 10-1 for an explanation of the SDF commands.)

To make changes to SDFCOM, proceed as follows:

1. Use EDIT/3000 (or equivalent) to edit the existing SDFCOM file or to create a new file.

2. Keep the file (unnumbered) to a unique file name.

3. Enter this file name in response to the question SOFTDUMP COMMAND FILE NAME? in the following SYSDUMP dialog:

```
:SYSDUMP *dumpfile
ANY CHANGES? YES
SYSTEM ID-32033G.02.00? [RETURN]
MEMORY SIZE=xxxx? [RETURN]
I/O CONFIGURATION CHANGES? [RETURN]
SYSTEM TABLE CHANGES? [RETURN]
MISC CONFIGURATION CHANGES? YES
LIST GLOBAL RINS? NO
DELETE GLOBAL RINS? NO
# OF RINS MIN=yy,MAX=xxxx? [RETURN]
# OF GLOBAL RINS USED=yy, MAX=xxxx? [RETURN]
# OF SECONDS TO LOG ON=xxxx? [RETURN]
MAX # OF CONCURRENT RUNNING SESSIONS=xxxx? [RETURN]
MAX # OF CONCURRENT RUNNING JOBS=xxxx? [RETURN]
DEFAULT JOB CPU TIME LIMIT=xxxxx? [RETURN]
MESSAGE CATALOG CHANGES? [RETURN]
SOFTDUMP COMMAND CHANGES? YES
SOFTDUMP COMMAND FILENAME? filename
```

   At this point, the SYSDUMP Program runs a utility program (SDFCHECK), which checks the syntax of the input file. If there are no errors, the contents of the file specified by *filename* overwrite the contents of SDFCOM.

4. Continue the SYSDUMP Program as follows:

```
NEW COMMAND FILE CREATED
LOGGING CHANGES? [RETURN]
DISC ALLOCATION CHANGES? [RETURN]
SCHEDULING CHANGES? [RETURN]
SEGMENT LIMIT CHANGES? [RETURN]
SYSTEM PROGRAM CHANGES? [RETURN]
SYSTEM SL CHANGES? [RETURN]
ENTER DUMP DATE? [RETURN]
END OF SUBSYSTEM
```

   The new command file is written on the device you specified in the SYSDUMP file equation.

5. Perform an UPDATE with the tape or disc created by the above SYSDUMP to incorporate the new SDF command file into your system.

Table 10-1. Software Dump Facility Commands

COMMAND SYNTAX	FUNCTION
DUMP [DSEG=ALL]	Dumps main memory to the dump device. The parameter DSEG=ALL enables you to dump virtual memory onto the serial storage media.
COMMENT *string*	Defines the comment string.
CONSOLE *drt*	Changes the Console's channel address and device address.
DEBUG	Causes SDF to enter the HELP debugging routine. (Valid only in interactive mode, and is not supported with version G.02.00.)
DUMPDEV *drt*[,*unit*]	Changes the dump device's channel address and device address. If this command is not entered, SDF will dump to the device class DDUMP, except in backup mode.
HALT	Causes SDF to halt its execution. (The execution of the SDF may be continued either by pressing the RUN key or by issuing the :RUN command to the CMP or DCU.)
HELP [*command name*] [,*command name*]	Prints a brief explanation and syntax of the specified commands. Default: If no command name is input, all commands will be explained.
INTERACTIVE	Obtains any remaining SDF commands from the Console. The SDF prints the interactive prompt character (>) when it is ready for another Console command. Commands which cause output to either the dump device or the line printer may require you to change volumes or paper. The SDF will prompt you by issuing the appropriate message on the System Console. **NOTE** When in interactive mode, the DUMP command parameter DSEG=ALL needs to be entered for virtual memory to be dumped. Otherwise, only real memory is dumped.
IOMAP	Displays the system I/O configuration. If your dump device is not connected to the system, you are automatically entered into the IOMAP facility. You are shown a device list and are prompted for a selection number.

Table 10-1. Software Dump Facility Commands (continued)

COMMAND SYNTAX	FUNCTION
PROMPT *string*	Prints string on Console then waits for operator to press RETURN before continuing.
WARMSTART	Executes the microcode WARMSTART instruction. This SDF command cannot be executed when SDF has been loaded from backup media. Manually start the system using any of the system startup options described in Section IV.

THE DIAGNOSTIC UTILITY SYSTEM (DUS)

The Diagnostic Utility System (DUS) is memory resident and allows you to run diagnostic and utility programs such as SADUTIL and SLEUTHSM (which is discussed later in this section). Refer to the MPE V Utilities Reference Manual (32033-90008) for more information. The DUS is on a stand-alone serial medium and is loaded onto a shut down system. The following steps show you how to load the DUS.

1. Mount the medium containing the Diagnostic Utility System on the appropriate drive and place the drive online, if applicable.

2. Series 37/ MICRO 3000/ MICRO 3000XE

   Enter B^C on the System Console to enter Control-B mode.

   Enter the LOAD command in response to the > prompt. Specify the channel and device on which the medium is mounted.

   Series 39/40/42/52 & 44/48/58

   On the System Control Panel, set the LOAD thumbwheel switch to the channel address and device address of the drive containing the DUS. Refer to SYSTEM CONTROLS AND SPECIAL FUNCTIONS, Section XI, for more information on thumbwheel switch settings.

   On the System Control Panel: Press the HALT key, then press the LOAD key.

   or

   From the CMP: Press RETURN. When the CMP prompt (->) appears on the System Console, enter "HALT". When another prompt is printed, enter "LOAD".

   Series 64/68/70

   If the DCU prompt (C>) is not already present on the system Console, depress RETURN. When you see the prompt, enter "HALT". When another prompt appears, enter "LOAD".

   If you wish to cold load from a device other than the present default device, enter the IMB number, channel number, and the device number, separated by commas after "LOAD"; e.g.:

   C>LOAD *imb,channel,device*

   Once you have overridden the default cold load device in this way, however, the new values become the default until power is cycled on the system. In this case, the default values initially set by the factory take effect.

3. At this point the medium containing the DUS is read into memory, and the following message appears on the System Console:

```
DIAGNOSTIC/UTILITY SYSTEM   REVISION xx.xx
ENTER YOUR PROGRAM NAME     (Type HELP for program information.)
:
```

USING SLEUTHSM TO FORMAT SYSTEM PACKS

The following procedure describes how to use SLEUTHSM (the SLEUTH SiMulator), which is part of the Diagnostic Utility System (DUS), to format system disc packs. As previously mentioned, the DUS is on a standalone serial medium and is loaded onto a shut down system.

The HP 7911, 7912, and 7914 Integrated Tape Cartridge Unit and 7933 and 7935 disc drives have an internal mechanism for flagging defective tracks. SLEUTHSM can be used to format these discs, but not to flag defective tracks.

1. Load the Diagnostic Utility System as previously described. All entries for SLEUTHSM must be in upper case.

2. Enter "AID" on the Console and press (RETURN).

   The following message will appear on the Console:

   ```
   AID xx.xx
   >10
   ```

3. As an optional step, enter "LOAD IOMAP" on the Console; to execute, press (RETURN). This enables you to determine the channel number, the device number, and, for Series 64/68/70, the IMB number of the discs to be formatted in Steps five and seven.

4. Enter "LOAD SLEUTHSM" on the Console and press (RETURN).

   SLEUTHSM is loaded into memory. The System Console displays the next line number in the program, and you are ready to enter the dialog necessary to format a disc pack.

5. Enter the following statements to format any disc on the HP 3000 (in line 5000, you must supply the channel number, the device number, the maximum number of errors to observe before the program terminates (designated "20" in this example), the unit number of the drive, and, for Series 64/68/70, the Intermodule Bus number of the drive on which the disc pack is mounted):

   Series 37/MICRO 3000/ MICRO 3000XE, 39/40/42/52 & 44/48/58

   ```
   >5000 DEV 0,channel,device,20, unit
   >5010 FMT 0
   >5020 RUN
   ```

   Series 64/68/70

   ```
   >5000 DEV 0,channel,device,20, unit,imb
   >5010 FMT 0
   >5020 RUN
   ```

6. After the disc is formatted, SLEUTHSM again prompts for input (>).

7. For flagging defective tracks, enter the program which corresponds to the type of disc pack you wish to flag:

Series 39/40/42/52, 44/48/58

7920 Disc Pack

```
>5000 DEV 0,channel,device,10,0
>5010 DB AA,6144,0
>5011 DB &BB,4
>5100 INPUT &BB(2,3)
>5110 If &BB(2,3,) = "YES" THEN 5020
>5020 RC0
>5030 PRINT "CYLINDER # TO BE FLAGGED DEFECTIVE?"
>5040 INPUT A
>5050 PRINT "HEAD #?"
>5060 INPUT B
>5070 SEEK 0,A,B,0
>5080 IDI 0,AA(0),3,D
>5090 PRINT "CONTINUE? (YES/NO)"
>5110 INPUT &BB
>5110 IF &BB="YES" THEN 5020
>5120 RUN
```

7925 Disc Pack

```
>5000 DEV 0,channel,device,10,0
>5010 DB AA,8192,0
>5011 DB &BB,4
>5100 INPUT &BB(2,3)
>5110 If &BB(2,3,) = "YES" THEN 5020
>5020 RC 0
>5030 PRINT "CYLINDER # TO BE FLAGGED DEFECTIVE?"
>5040 INPUT A
>5050 PRINT "HEAD #?"
>5060 INPUT B
>5070 SEEK 0,A,B,0
>5080 IDI 0,AA(0),3,D
>5090 PRINT "CONTINUE? (YES/NO)"
>5100 INPUT &BB
>5110 IF &BB="YES" THEN 5020
>5120 RUN
```

Series 64/68/70

7920 Disc Pack

```
>5000 DEV 0,channel,device,10,0,imb
>5010 DB AA,6144,0
>5011 DB &BB,4
>5100 INPUT &BB(2,3)
>5110 If &BB(2,3,) = "YES" THEN 5020
>5020 RC0
>5030 PRINT "CYLINDER # TO BE FLAGGED DEFECTIVE?"
>5040 INPUT A
>5050 PRINT "HEAD #?"
>5060 INPUT B
>5070 SEEK 0,A,B,0
>5080 IDI 0,AA(0),3,D
>5090 PRINT "CONTINUE? (YES/NO)"
>5110 INPUT &BB
>5110 IF &BB="YES" THEN 5020
>5120 RUN
```

7925 Disc Pack

```
>5000 DEV 0,channel,device,10,0,imb
>5010 DB AA,8192,0
>5020 RC 0
>5030 PRINT "CYLINDER # TO BE FLAGGED DEFECTIVE?"
>5040 INPUT A
>5050 PRINT "HEAD #?"
>5060 INPUT B
>5070 SEEK 0,A,B,0
>5080 IDI 0,AA(0),3,D
>5090 PRINT "CONTINUE? (YES/NO)"
>5100 INPUT &BB
>5110 IF &BB="YES" THEN 5020
>5120 RUN
```

The programs ask three questions for each defective track: In response to the first, "CYLINDER # TO BE FLAGGED DEFECTIVE?", enter the cylinder number of the defective track; in response to the second, "HEAD #?", enter the head number of the defective track (the cylinder and head numbers of defective tracks are listed on the "List of Defective Tracks" supplied with each new disc); to the third question, "CONTINUE? (YES/NO)", enter "YES" until you have entered all defective tracks, and then enter "NO".

8. After the defective tracks have been flagged, SLEUTHSM again prompts for input (>). Enter another program or halt the computer.

SYSTEM CONTROLS AND SPECIAL FUNCTIONS

SECTION XI

The system controls for the HP 3000 may consist of hardware controls, software controls, security level controls, and status indicator lights. While the MPE operating system and related software are common to the entire family of HP 3000 computers, different control and monitoring functions may exist for each of the major subsets. The high-end Series 64/68/70 implement most of the controls exclusively in software. The mid-range Series 39/40/42/52, and Series 44/48/58 implement controls via both software and mechanical switches. The Series 37 implements most controls in software.

This section deals with the different control and monitoring functions of each subset of the HP 3000 computer system family.

SERIES 37/MICRO 3000/MICRO 3000XE

These systems are the entry-level members of the HP 3000 family. For the purposes of this manual, MICRO 3000XE is identical to Series 37. MICRO 3000 is similar (but not identical) to the Series 37 and the MICRO 3000XE. The keyswitch functions for the three systems are the same. However, the MICRO 3000 front panel is not the same as the Series 37 and MICRO 3000XE front panels. The other relevant differences between MICRO 3000 and the two other systems are noted in this section. For all three systems, you access most system controls and special functions through "Control-B Mode."

Series 37 and MICRO 3000XE Front Panel Controls

The four position keyswitch used to select the control modes and the power distribution of the SPU is shown in Figure 11-1. Indicator lights display which power configuration is active, and in which mode the system is running. The single-digit LED in the lower left-hand corner of the SPU Front Panel displays MPE status codes when MPE is running (Table 11-1) and self-test and error detection codes when self tests are being executed. The display is blank when the system is executing operational software.

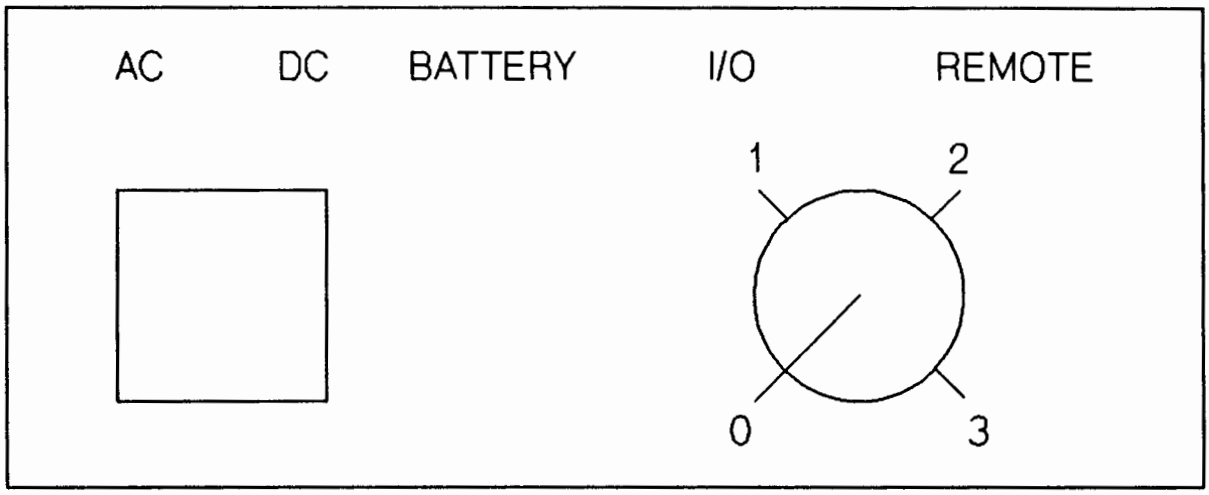


Figure 11-1. Series 37 Front Panel

The front panel status indicators display the state of the SPU:

AC — Lit if AC power is applied to the SPU. Power is always applied to the battery charger. This indicator is lit in all keyswitch positions.

DC — Lit if DC power is applied to the SPU. It is normally lit in keyswitch positions 1, 2 or 3.

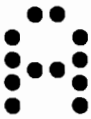
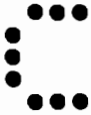
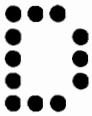
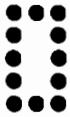
BATTERY — Lit if the SPU is operating on battery backup power, and if AC power is not present. This condition can occur when the keyswitch is in position 1, 2 or 3.

I/O — Lit only when the Channel Program Service Request (CSRQ) signal is asserted. It is not lit if TIC or memory operations are being executed. During normal operation, it will flicker when TIC or memory diagnostics are run. It can be lit when the keyswitch is in position 1, 2 or 3.

REMOTE — Lit when a remote Console is in use. This allows a terminal connected to port 7 via a modem to control the system as a remote Console.

When MPE is running, codes are displayed on the SPU front panel:

Table 11-1. MPE Status Code (Series 37 and MICRO 3000XE only)

	Run Mode. Not processing interrupts and not executing the Pause instructions.
	Processing interrupts on the interrupt Control Stack (ICS).
	Executing the Pause instruction (idle).
	Looping between the conditions that display the A and C codes.
	Looping between the conditions that display the A and D codes.
	Looping among the conditions that dislplay the A, C, and D codes.
	Looping between the conditions that display the C and D codes.

Series 37 amd MICRO 3000XE Selftest Error Codes

When the system is in self-test mode, the front panel LED displays a single hexadecimal error code that indicates which components are failing. There are two test modes: self-test and error detection. Self-test is run. If an error is detected, the error detection loop is executed.

The normal sequence of LED codes displayed is:

```
0, 1, 5, B, C, A
```

Valid hexadecimal codes and their meanings are shown in Table 11-2:

Table 11-2. Series 37 and MICRO 3000XE Front Panel LED Codes

ERROR CODE LED DISPLAY	WHAT THE ERROR CODE MEANS
Steady "0"	Processor not executing micro-instructions or looping on first ones.
Steady "1"	Processor hung in initial WCS bootup from ROM.
Steady "2"	Initial WCS bootup from ROM failed data integrity test. A retry is being attempted.
Flashing "5" or Steady "5"	CPU PCA failed.
Flashing "B"	Memory test failed. Check memory processor. MICRO 3000XE also displays three numbers that identify the board/test/function.
Flashing "C"	Console failed to speed sense. Check Console, cable, RS-232 module.
Flashing "C" followed by Flashing "1"	Console TIC failed. Check TIC RS-232 module, processor.
Steady "D"	IOMAP is executing.
Flashing "n"	PCA in slot "n" failed in SPU.
Flashing "E" followed by Flashing "n"	Occurs for each PCA slot n of the failing extender.
Steady "F"	Cache test is executing. (MICRO 3000XE only)
Flashing "F"	Cache test failed. (MICRO 3000XE only)
Steady "A"	All tests passed.

One digit at a time is displayed. If a two-digit error code is displayed, the digits of the code flash alternately.

If no error code is displayed, the SPU is executing operational software.

MICRO 3000 Front Panel Indicator

Two indicator lights display the state of the CPU after selftest completes execution. If the selftest is successful, the FAULT LED goes off and the ACTIVITY LED remains on. If the selftest detects an error, the ACTIVITY LED goes out and the FAULT LED display identifies the error.

The MICRO 3000 front panel indicators are:

ACTIVITY (green)	Lights during selftest to indicate SPU active. Remains lit if selftest is successful. Goes off if selftest detects an error.
FAULT (yellow)	Lights during selftest. Goes off if test is successful. If test is not successful, display identifies source of error.

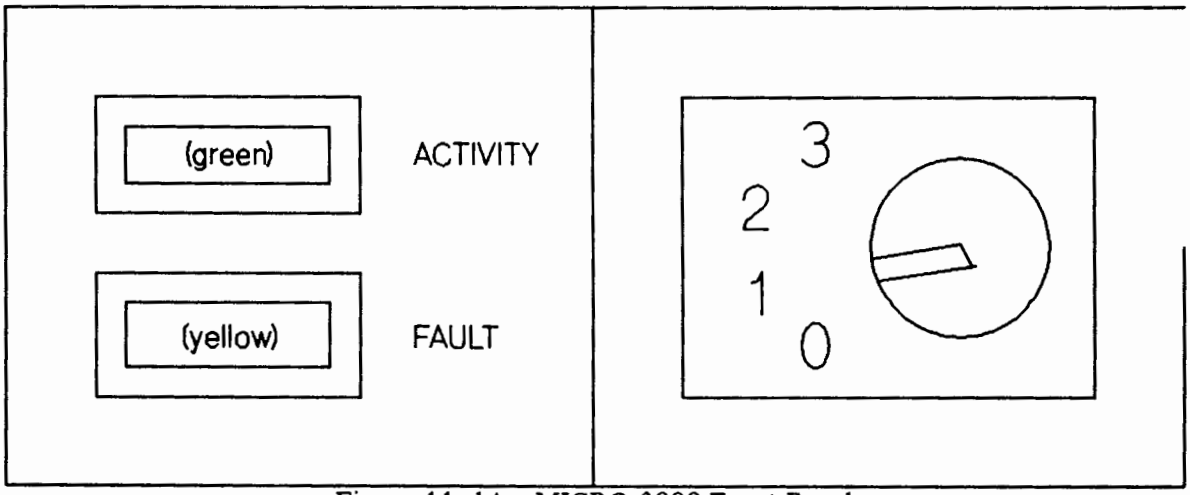


Figure 11-1A. MICRO 3000 Front Panel

The interpretation of the MICRO 3000 selftest FAULT indicator display is shown in Table 11-2A below.

Table 11-2A. MICRO 3000 Front Panel LED Codes

ACTIVITY LED	FAULT LED	LED INTERPRETATION	ACTION TO TAKE
OFF	OFF	No power. Processor completely dead.	Check for AC. Measure DC supply output. Replace processor.
ON	ON	Executing selftest. System in battery backup mode.	Wait for selftest completion. Wait for AC power return.
OFF	ON	CPU or 0-2 memory failed.	Replace processor PCA.
OFF	Flashing single blink	Unsupported ATP detected. (Only two ATPs are supported.)	Remove unsupported ATP.
OFF	Flashing double blink	Console ATP failed. Fast/slow SIMB I/F failed.	Replace ATP in slot 1 or Replace processor PCA.
OFF	Flashing triple blink	Console failed to speed sense.	Check cable connection between Console and ATP. Check that Console is in REMOTE mode. Console may be defective. Attempt loopback datacomm test. Replace ATP.
ON	OFF	Selftest execution complete. "H for help" prompt displayed.	

The positions of the keyswitch have the following meanings for all three systems:

Table 11-3. Series 37/MICRO 3000/MICRO 3000XE Keyswitch Functions

#	Condition	Meaning
0	Off	Power off.
1	Normal	Local Mode Console, B^C (Control-B Maintenance Mode) disabled. When the keyswitch is turned to this position, the modem port is a regular MPE port. Operator initiated self-test looping is disabled in this position.
2	Local	Local Mode Console. This position has two states: "From Normal" and "From Remote". From Normal: Same as normal except that B^C and operator initiated Self Test mode looping are enabled. From Remote: The modem port is now a Remote Operator Port that echoes all local Console commands and responses so that a remote operator can observe them. B^C and Self Test mode looping are enabled.
3	Remote	Remote Mode Console, B^C, and Self Test mode looping are enabled. The modem port is now a Remote Operator Port. The local Console port echoes all commands and responses. (As the keyswitch is turned from position 2 to position 3, any previously existing MPE session on the modem port will be logged off for security reasons.)

NOTE

When the keyswitch is set at 3, a regular terminal will be dropped to accommodate a modem. This modem port may be used as a regular terminal port with the keyswitch set at 1 or 2.

When the keyswitch is turned "OFF", leave it in this position for a minimum of 5 seconds. This will allow the system memory to reset to an unpowered state.

Calculating a DRT Number and Channel Number

During a system startup (START or LOAD), or during a system dump (DUMP), it is sometimes necessary to know the channel and device address numbers of the device that you are starting, loading, or dumping from.

The combination of the channel and device address numbers is called the DRT (Device Reference Table) number of the device. The DRT number for a device on the Series 37 is calculated as described in "HOW TO CALCULATE A DRT NUMBER" at the end of this section. The channel number, however, is determined differently. For channel number, cards in the Main card cage have the same channel number as their slot number (1=bottom slot, 5= top slot). Cards in the Extended card cage have a channel number equal to their slot number plus 8. For example, bottom slot = 9, top slot = 14).

While the method for calculating the DRT number is identical for all three systems, you should be aware of the following differences between MICRO 3000 and Series 37/MICRO 3000XE:

1. MICRO 3000 has no extended card cage.

2. MICRO 3000 has four card slots, not five.

3. MICRO 3000 supports only one HPIB channel (Peripheral Interface Controller or PIC). It is hardwired to channel 4.

Control-B Mode

Control-B is used to access maintenance commands available when the keyswitch is set at 2 or 3:

Table 11-4. Control-B Mode Commands

Command	Function
AR	Reattempt Auto Restart.
COL[start]	Perform COLDSTART with no dialog.
COO[start]	Perform COOLSTART with no dialog.
DI[sc]	Start from Disc. Same as Start with no parameters.
DU[mp] [*chan*,*dev*]	Performs a dump to the specified device.
DW	Disable Auto WARMSTART.
EW	Enable Auto WARMSTART.
H[elp]	Display available commands, parameters, effects.
L[oad][*chan*,*dev*[,{*P*[*erm*]]], *C*[*hange*]}	Asks, WHICH OPTION <COLDSTART/RELOAD/ UPDATE>? and enters INITIAL dialog.
NEW[system]	Perform a RELOAD, option SPREAD, with no dialog. This command assigns a volume name and virtual memory to the system disc. It is valid only for initial software installations on new systems.
PA[nel]	Enters the soft panel to allow debugging of the system. Allows the user to look at memory and software registers, and use the optional memory breakpoint board.
REL[oad]	Perform a RELOAD, option SPREAD, with no dialog.
RUN	Run system after B^C halt.
SP[eed]	Allow System Operator to change Console speed.
ST[art][*chan*,*dev*[,{*P*[*erm*]]], *C*[*hange*]}	Asks, WHICH OPTION <WARMSTART/COOLSTART>? and enters INITIAL dialog.
TA[pe]	LOAD from tape. Same as Load with no parameters.
TE[st]	Go to Self Test Mode.
UPD[ate]	Perform UPDATE with no dialog.
WAR[mstart]	Perform WARMSTART without dialog.

It is recommended that you check the default addresses for the [ST[art], L[oad] and DU[mp] devices before you boot or dump the system using the above commands. The default chan(nel) and dev(ice) can be obtained by entering Control-B Mode and entering TE[st] followed by IO[map]. This will show the channel and device for the connected ST[art] [L[oad] and DU[mp] devices. The addresses listed are stored in memory and will be used by the INITIAL Program for booting the system. If the address is specified with ST[art], L[oad] or DU[mp], it is temporary unless P[erm] or C[hange] is also specified as described below for L[oad].

There are four possible ways to enter the L[oad] or ST[art] command. The L[oad] command is used for purposes of illustration here. Remember that the first two examples would also apply to DU[mp].

LOAD	Loads the system from the current system default load device.
LOAD chan, dev	Loads from the specified load device; does not change the system default. The next load is not affected by this command.
LOAD chan, dev,C	Changes the system default load device by writing the given channel, device and unit to the memory. This command does not invoke a load; the next LOAD command, used without parameters, will load from this device.
LOAD chan, dev,P	Changes the system default load device by writing the given channel, device and unit to the CPU memory, and loads from this device.

NOTE

The Operator can specify a dump device other than the default, but cannot selectively change the default dump device. The default dump device will always be the same as the start device thus, changing the channel and device for the start device will also change the channel and device for the dump device.

More information on Control-B commands can be found in the subsection entitled "DIAGNOSTICS".

Automatic WARMSTART

Automatic WARMSTART is available on the Series 37. To enable Auto WARMSTART in all key-switch positions, enter the Control-B command EW (Enable WARMSTART). A prompt, "WARMSTART? (Y/N)" appears when the system is powered on. The user has 15 seconds to enter Y (RETURN), (RETURN), or nothing for the system to WARMSTART automatically. To abort the Auto WARMSTART, the user must enter a "N" (RETURN) or anything besides a (RETURN) within 15 seconds after the prompt appears.

Auto WARMSTART is disabled by entering DW (Disable WARMSTART). When Auto WARMSTART is disabled, H for help -> will be displayed when the system is powered on.

NOTE

The Auto WARMSTART feature is independent of the keyswitch position.

The Time of Century Clock

The HP 3000 Series 37 Processor contains a Time of Century (TOC) clock which is set when the system first runs MPE, and continues running even after the system is shut down or powered off.

This clock allows MPE to determine the date and time as it is starting up, thus simplifying the startup procedure by eliminating the need for operator intervention. Intervention is required only if the given date and time are unacceptable.

The Time of Century clock is accurate to the nearest second, whereas other system clocks are accurate to within milliseconds. However, The Time of Century clock has its own battery backup, so it will survive powerfails as well as any kind of extended shutdown.

NOTE

MPE clocks are not reset after a powerfail recovery. If power is OFF for 15 minutes, the clock will also be off by 15 minutes. This is done to ensure consistency in session accounting information for all HP 3000 series. The correct time can be reset by doing a WARMSTART.

In order to correct the clock for inaccuracies, shipment to other time zones, or failure of the internal battery, the Operator will be given an opportunity to reset the date and time. Just before the system comes up, the date and time will be displayed on the Console for the Operator to verify:

```
WED, SEP 5, 1985 AM? (Y/N)
```

When this message is displayed, the Operator has three options:

1. The Operator can accept the given date and time by responding "YES" (or "Y", "y", or "yes") or a [RETURN]. The system will start up with the given date and time.

2. The Operator can ignore the prompt. After sixty seconds the system will automatically start up with the given date and time.

3. The Operator can reject the given date and time and enter "NO" (or "N", "n", or "no"). The standard dialog for specifying the date and time will then be displayed. The Time of Century clock will be updated and the system will start up with the corrected time.

NOTE

The Time of Century clock is a hardware feature. Microcode has been written to allow MPE to communicate with this clock, which will not be accessible to user programs or other system code.

SERIES 39/40/42/52, 44/48/58

This series of computers represents the mid-range of the HP 3000 line. Most controls and special functions are made available within the Control and Maintenance Processor and as physical switches on the machine.

The System Control Panel

The following text explains system controls and special functions on the Series 39/40/42/52 and 44/48/58. Since the Series 39/40/42/52 systems are similar in appearance and function, and the Series 44/48/58 systems are likewise similar to each other, each subset is discussed separately, where applicable.

SERIES 39/40/42/52. The System Control Panel is located behind the non-lockable, magnetic-latch door on the right front side of the System Processor Unit (SPU) (Figure 11-2).

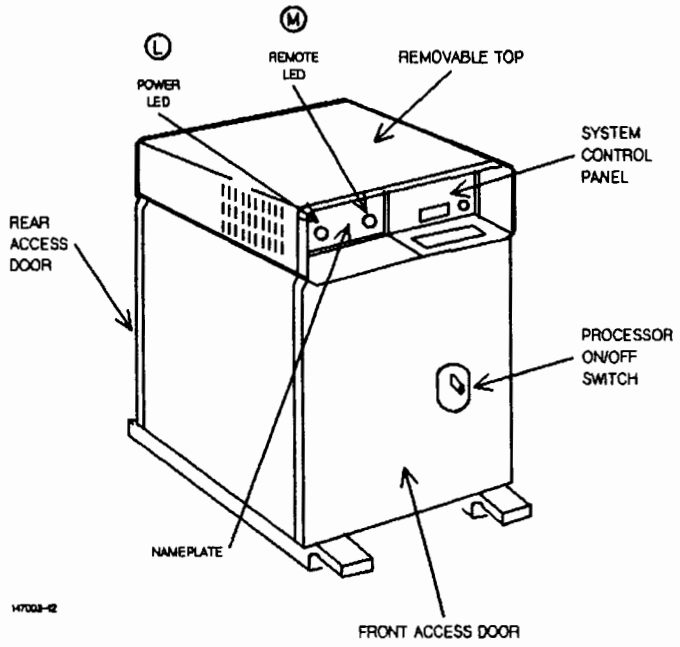


Figure 11-2. Series 39/40/42/52 System Processor Unit (SPU)

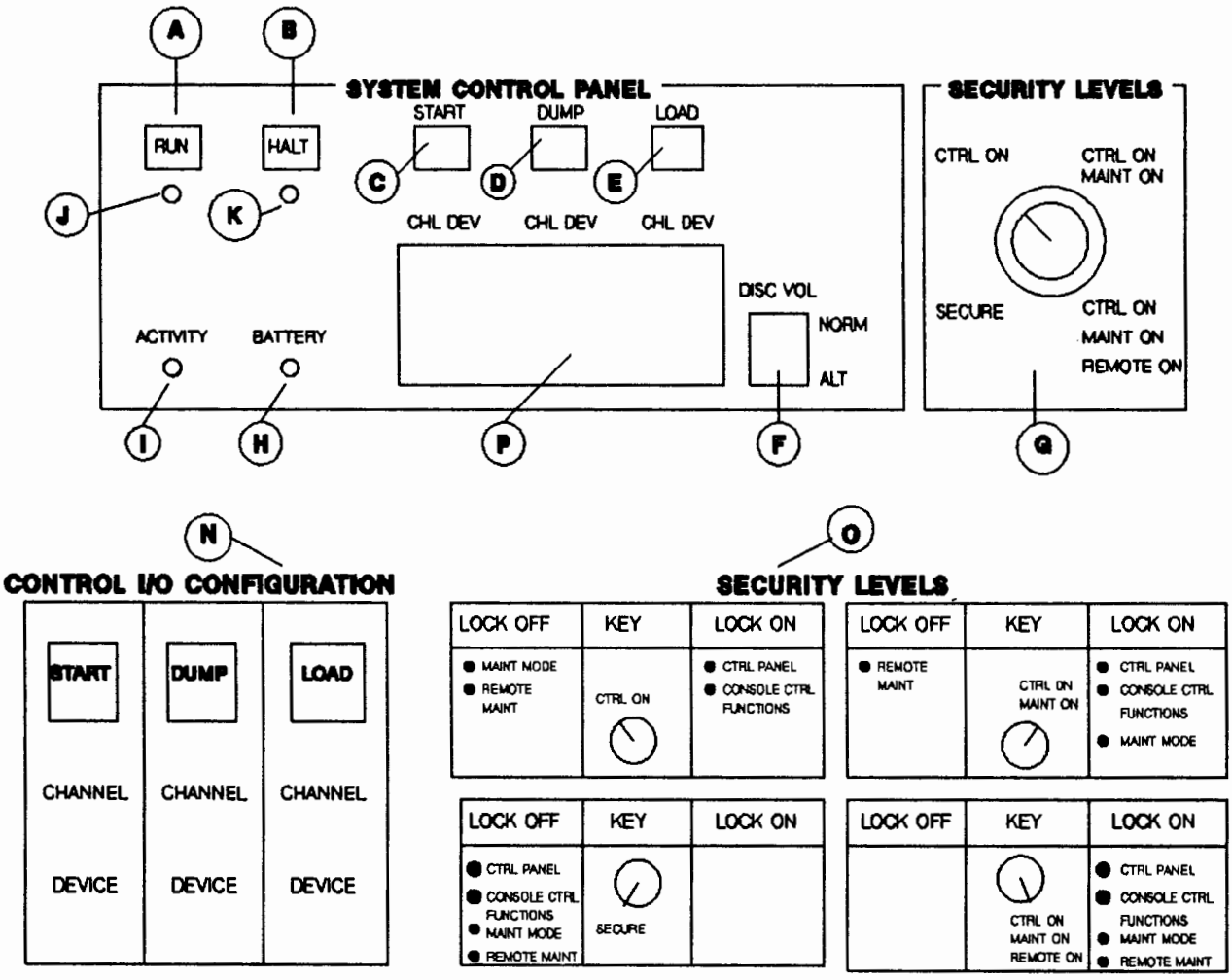


Figure 11-3. Series 39/40/42/52 System Control Panel Switch/Indicator Function

Hardware Related Controls. The hardware related controls are the RUN and HALT switches. See Figure 11-3 for an illustration of each of the System Control Panel's switches and indicator lights.

(A) RUN — Pressing this switch causes the CPU to enter the RUN state from the HALT state. The switch has no effect when the CPU is already in the RUN state.

(B) HALT — Pressing this switch causes the CPU to enter the HALT state from the RUN state. The switch has no effect when the CPU is already in the HALT state.

Software (MPE) Related Controls. The software (MPE) related controls are the START, DUMP, and LOAD switches. The DISC VOL switch is used in conjunction with the START switch to configure the system disc. The thumbwheel switches, located directly below the START, DUMP, and LOAD switches on the System Control Panel, set the CHL (hardware channel) and DEV (HP-IB device) addresses, and are enabled when the respective switch is pressed.

(C) START — Pressing this switch initiates either a COOLSTART or a WARMSTART of the system. The CHL and DEV address are set in the thumbwheel switches directly below the START switch (Figure 11-3.)

(D) DUMP — Pressing this switch initiates a dump of the system's memory to a serial disc, cartridge tape, or magnetic tape. The CHL and DEV address of the system disc are set in the thumbwheel switches below the DUMP switch.

(E) LOAD — Pressing this switch initiates a cold load from the DEV and CHL address set in the thumbwheel switches directly below the LOAD switch. The COLDSTART, UPDATE, and RELOAD operations are initiated with this switch.

(F) DISC VOL — This switch selects the NORMAL or ALTERNATE disc volume. The switch should always be in the "NORM" position.

Security Level Control Switch. The SECURITY LEVEL CONTROL SWITCH is a four-position keylock switch which controls the operational security of the system. The four levels are: SECURE, CTRL ON, CTRL ON/MAINT ON, and CTRL ON/MAINT ON/REMOTE ON. Each level is attained by turning the keyswitch to the desired position; the setting can be locked by removing the key. The magnetic-latch door cannot be closed while the key is in place.

(G) SECURITY LEVELS

The functions of the four positions are as follows:

1. SECURE: Disables the System Control Panel and the CMP. Maintenance Mode functions and the Tele-Support facility are also disabled.

2. CTRL ON: Enables the System Control Panel and allows use of CMP commands from the console with the exception of the DISPLAY command. Maintenance Mode functions and the Tele-Support facility are disabled.

3. CTRL ON/MAINT ON: Enables the System Control Panel and allows use of CMP commands from the console. Maintenance Mode capability from the console is also enabled. The Tele-Support facility from the remote console remains disabled.

4. CTRL ON/MAINT ON/REMOTE ON: Enables the System Control Panel, the CMP console control functions, Maintenance Mode functions, and the Tele-Support capability.

Status Indicator Lights. The System Control Panel has six status indicator lights. The RUN, HALT, ACTIVITY, and BATTERY LEDs are located on the System Control Panel (Figure 11-3). The POWER and REMOTE CONSOLE LEDs are located in the nameplate on the front panel (Figure 11-2).

(H) BATTERY LED	This is a red LED that indicates a power failure has occurred, and memory is being sustained by the backup battery.
(I) ACTIVITY LED	This yellow LED provides visual indication that the CPU is active.
(J) RUN LED	This yellow LED denotes that the CPU is in the RUN state.
(K) HALT LED	This red LED comes on when the CPU is halted. It indicates any of several conditions: the HALT switch was pressed, the =SHUTDOWN command was executed, the CPUHALT instruction was executed, or a hardware problem exists.
(L) POWER LED	This yellow LED is visible when the power supplies are on.
(M) REMOTE LED	This yellow LED indicates when the SECURITY switch is set to enable the use of a remote console.

Decals. The System Control Panel has two decals attached to the inside door. These decals indicate security levels or provide space for configuration information.

(N) CONTROL I/O CONFIGURATION	This is a decal attached to the inside of the System Control Panel door with space in which to write the CHL and DEV number settings for the START, DUMP and LOAD thumbwheel switches.
(O) SECURITY LEVELS	This is a decal attached to the inside of the System Control Panel door which indicates the various security functions enabled or disabled by the four different positions of the security level control switch.

Thumbwheel Switches. The thumbwheel switches are set to the hardware CHL and DEV addresses of the devices selected to perform a START, DUMP, or LOAD.

(P) THUMBWHEEL SWITCHES	These switches are composed of two elements, the hardware CHL and the DEV address.

SERIES 44/48/58. The System Control Panel is located behind the lockable front door on the right-front side of the System Processor Unit (SPU) (Figure 11-4). Refer to Figure 11-5 for an illustration of each of the System Control Panel's switches and lights.

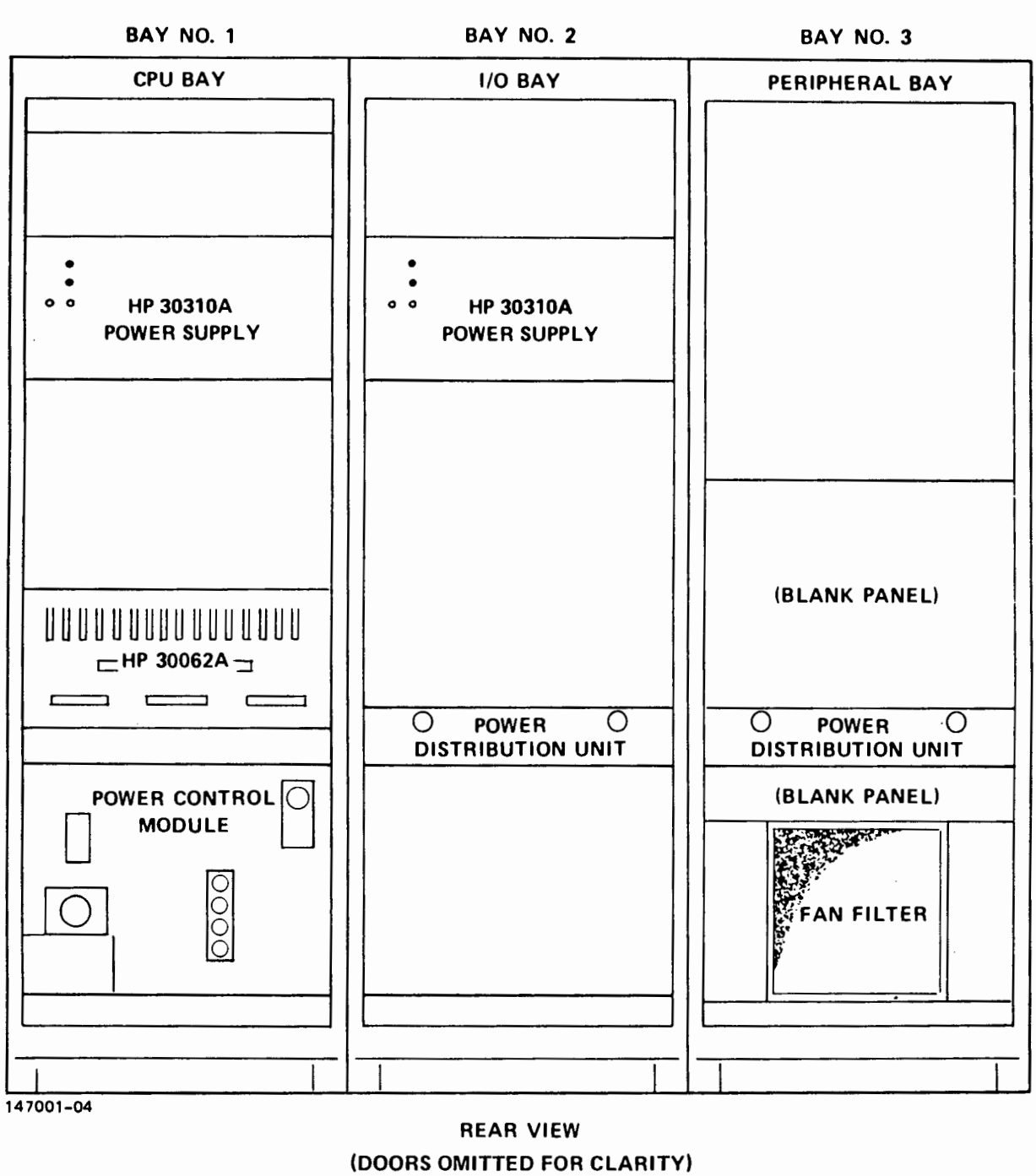


Figure 11-4. Series 44/48/58 System Processor Unit (SPU)

Hardware Related Controls. The hardware related controls are the RUN and HALT switches and the REMOTE CONSOLE switch. While the system is running, the CPU responds only to the HALT switch, not to the RUN switch.

(A) RUN and HALT — Pressing the RUN switch causes the CPU to enter the RUN state from the HALT state. Pressing the HALT switch causes the CPU to enter the HALT state from the RUN state.

(B) REMOTE CONSOLE — This switch, when ON, indicates that the remote console (the terminal connected to Channel 1, Port 1) is in parallel with the System Console. This connection can be hardwired, or made over a dial-up modem. It is usually used for maintenance and diagnostics.

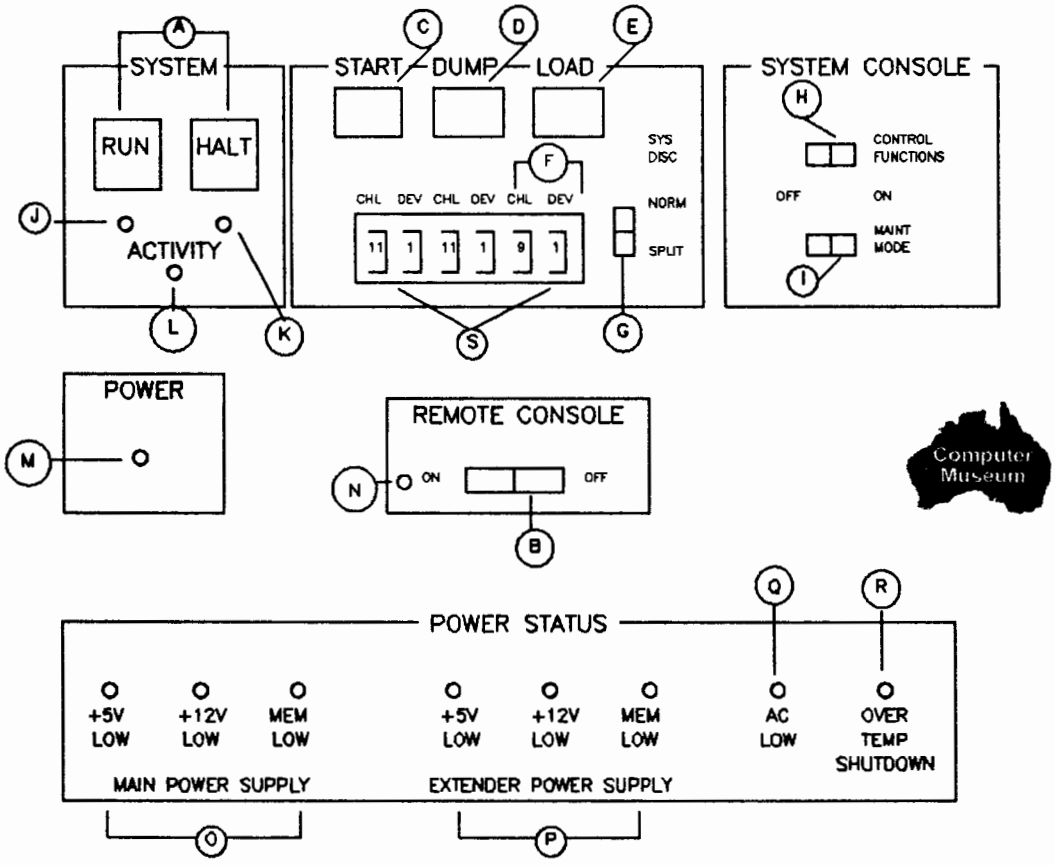


Figure 11-5. Series 44/48/58 System Control Panel Switch/Indicator Function

Software (MPE) Related Controls. The software (MPE) related controls are the START, LOAD and DUMP switches. COOLSTART and WARMSTART operations are performed via steps involving the START switch. Other system startup options utilize the LOAD switch. The SYS DISC switch is used in conjunction with the START switch to configure the system disc. The three pairs of thumbwheel switches, (each pair is labeled CHL and DEV) are located directly beneath the software related controls. They set the channel and device addresses that are enabled when the respective switch is pressed. (Figure 11-5.)

(C) START — Pressing this switch initiates either a COOLSTART or WARMSTART of the system. The device and channel address of the device from which the operation is to be performed are set in the thumbwheel switches directly below the START switch. Refer to "THUMBWHEEL SWITCH SETTINGS" in this section.

(D) DUMP — Pressing this switch initiates a dump of the system's memory to serial disc, cartridge tape, or magnetic tape. The channel and device address of the system disc (or other device from which the Software Dump Facility is being loaded) are set in the thumbwheel switches below the DUMP switch. Refer to "THUMBWHEEL SWITCH SETTINGS" in this section.

(E) LOAD — Pressing this switch initiates a cold load from the device and channel set in the thumbwheel switches directly below the LOAD switch. The COLDSTART, UPDATE, and RELOAD operations are initiated with this switch. Refer to "THUMBWHEEL SWITCH SETTINGS" in this section.)

(F) CHL and DEV — Enables the channel (CHL) and device (DEV) addresses set into the thumbwheel switches and initiates COLDLOAD, WARMSTART, or DUMP.

(G) SYSTEM DISC (NORMAL or SPLIT) — This rocker switch allows either a LOAD or START to be performed from discs which have both fixed and removable portions, and from such discs such as the HP 7925, which is entirely removable without a fixed portion.

1. When the system disc has both fixed and removable portions, use the NORMAL position if (a) the disc is configured as one device, or (b) the disc is configured as two devices with COOLSTART or WARMSTART occurring from the removable portion. If the system disc is entirely removable without a fixed portion, or entirely fixed without a removable portion, the NORMAL position must be used.

2. If the system disc is configured as two devices with COOLSTART or WARMSTART occurring from the fixed portion, then the SPLIT position must be used.

Security Level Control Switches. The security level controls are the CONTROL FUNCTIONS and MAINT MODE switches. These provide for system operation, system maintenance, and modification control by enabling or disabling the Control and Maintenance Processor (CMP). Once set, these controls can be secured by locking the panel door.

(H) CONTROL FUNCTIONS — This switch, when set to the ON position, enables the Control and Maintenance Processor (CMP), which allows you to enter commands which correspond to the controls on the System Control Panel via the System Console.

(I) MAINT MODE — This switch, when set to the ON position, enables the System Console Maintenance Mode.

Status Indicator Lights. The Status Indicator Lights are the RUN light, HALT light, and ACTIVITY light. Other indicator lights include the POWER indicator and MAIN and EXTENDER POWER SUPPLY failure indicators. System warning lights include the AC LINE LOW indicator which shows a low AC power level, and OVERTEMP SHUTDOWN indicator, which warns the operator that the system has automatically shut down.

(J) RUN LED	This yellow LED indicates the CPU is in the RUN mode.
(K) HALT LED	This red LED indicates any of several conditions: the HALT switch was pressed, the =SHUTDOWN command (or CMP HALT command) was executed, the CPU HALT instruction was executed for the CPU to enter the HALT state, an overtemperature condition was sensed, or a hardware problem exists.
(L) ACTIVITY LED	This yellow LED provides a visual indication of CPU/BUS activity.
(M) POWER LED	This yellow LED indicates DC power integrity. If the LED is off, there may be a failure in one or more of the individual power supplies, an AC power failure, or an overtemperature condition.
(N) REMOTE CONSOLE LED	This yellow LED indicates that the REMOTE CONSOLE switch is set to enable use of the remote console.
(O) MAIN POWER SUPPLY LEDs	This group of red LEDs indicate status of the power supply for the main card cage. If a failure occurs in this particular power supply, the corresponding LED lights.
(P) EXTENDER POWER SUPPLY LEDs	This group of red LEDs indicate status of the power supply for the extender card cage. If a failure occurs in this particular power supply, the corresponding LED lights.
(Q) AC LOW LED	This red LED indicates a low AC line condition that will cause the power supplies to shut down. The LED lights when the system switches to battery backup power.
(R) OVERTEMP SHUTDOWN LED	This red LED indicates that the internal temperature has exceeded the threshold (approximately 135 degrees F or 57.3 degrees C) of any temperature transducer located across the top of either card cage. This indicator will remain lit until the overtemperature condition no longer exists, and power is cycled. The LED is reset by momentarily turning the AC circuit breaker off, then on. The AC circuit breaker is located at the bottom right rear of the computer. It is not the processor ON-OFF switch.

Thumbwheel Switches. The three pairs of thumbwheel switches (each pair is labeled CHL and DEV) are set to the channel and device addresses of the devices selected to perform a START, DUMP, or LOAD.

(S) THUMBWHEEL SWITCHES	These switches are composed of two elements, the CHL (channel) and the DEV (device) address.

Device Reference Table (DRT) Number and Channel Number

The three pairs of thumbwheel switches located on the front panel, correspond with the START, DUMP, and LOAD functions of the machine. Each pair contains a hardware channel number (CHL) and an HP-IB device (DEV) address setting for the corresponding START, DUMP, and LOAD devices. See Figures 11-3(C, D, E) and 11-5(C, D, E). These switches are initially set by your Hewlett-Packard Customer Engineer when your system is installed.

The thumbwheel switches must be set to the hardware channel number and the HP-IB device address of the device selected to perform the START, DUMP or LOAD. If incorrectly set, the system is unable to execute the desired function. You must reset the thumbwheel switches to the correct setting and press the START, DUMP, or LOAD button, or re-enter the command via the Control Maintenance Processor (CMP). The following discussion will help you to determine the correct settings. The address for each of the three sets of thumbwheel switches is composed of two elements:

- CHL references the number assigned to the channel Printed Circuit Assembly (PCA) in the main cabinet of the system.

- DEV refers to the number assigned to the physical device controller which is connected via cables to the hardware channel board.

The hardware channel boards are numbered 4 through 11. Each board may have as many as eight device controllers connected to it; the first is 0, the last is 7.

If the system disc is connected to Channel 11, the CHL thumbwheel switch under the START button is set to 11. If the disc is wired to Device 0, the DEV thumbwheel switch is set to 0. Therefore, the address of the system disc which is accessed by the START button is 110. The DRT number is eight times the channel number, plus the device number; so, in this case, it would be 88.

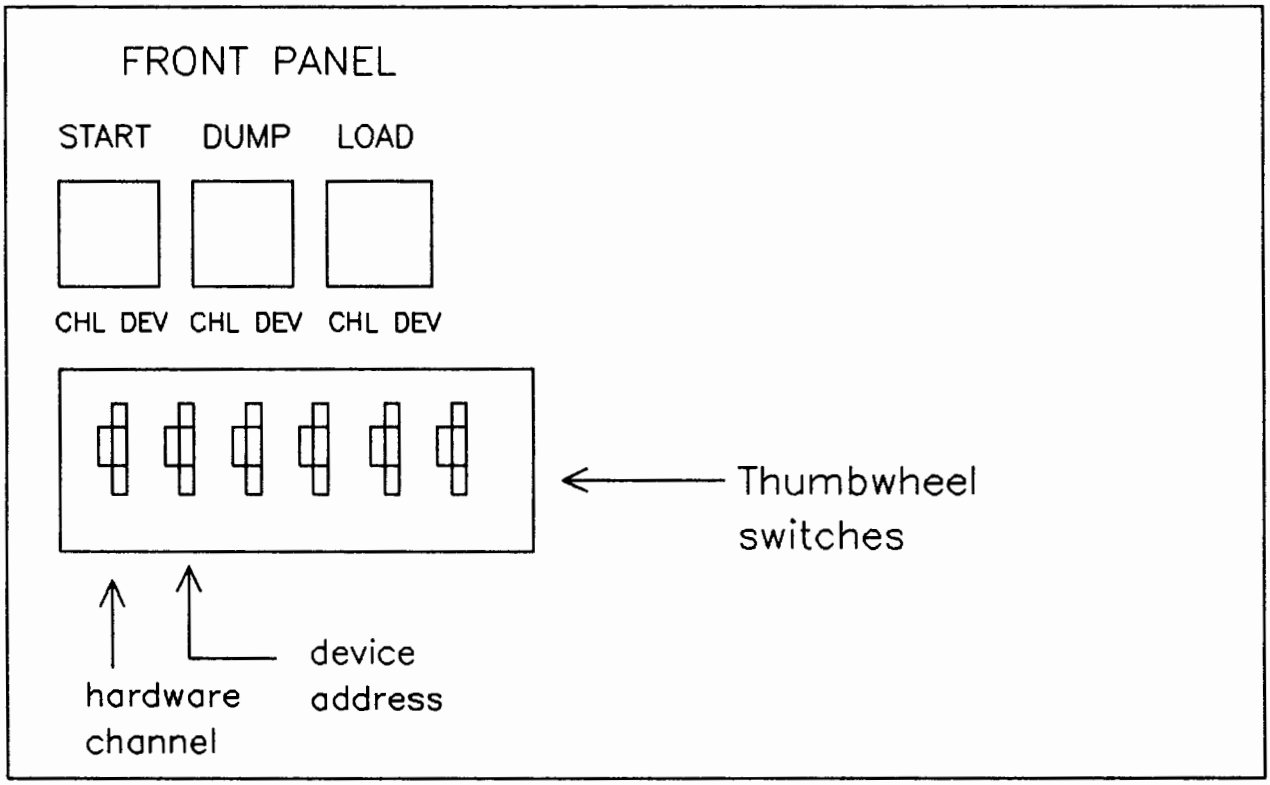


Figure 11-6. Series 39/40/42/52, 44/48/58 Thumbwheel Switches

The Control and Maintenance Processor (CMP)

The Control Maintenance Processor (CMP) allows the System Operator to duplicate the function of the switches located on the System Control Panel on the System Console. The CMP makes control functions available to the System Operator to perform system startup, halt and memory dump and system maintenance aids to initiate a system self-test and a maintenance display. It provides an acceptable level of system security because the System Control Panel remains behind the front door where the power and remote lights and switches are located. The System Operator is therefore able to perform system startup (HALT, RUN and DUMP) functions without accessing the front panel if the System Manager has set the CMP control functions switch to the ON position.

All communication with the CMP must take place from the terminal originally configured as the System Console (Channel 1, Device 0). When the system is running, the CMP will usually be inactive, and commands are entered via MPE in the usual manner (with the exception of the :SPEED command - refer to the CMP commands). However, if you are unable to communicate with the operating system (MPE) by entering a B^C from the System Console, the CMP is enabled and automatically prompts you for a CMP command (->). In the event that the operating system is not functioning (as in the case of a System HALT), the CMP is accessed by simply entering a RETURN.

NOTE

When the CMP is enabled while MPE is operational (via the B^C character), any messages from users or from MPE which would normally be displayed on the System Console (such as :TELLOP , device status messages, etc.) are lost. This is because MPE has no way of knowing that the CMP has control, and messages are not saved. It is therefore advisable to perform all CMP functions either before MPE is operational, or after a =SHUTDOWN of MPE.

The following list gives the commands accepted by the CMP Operating System. CMP maintenance display commands are not included, since these commands are intended for use by HP service personnel only. (Refer to Diagnostics in this section for a discussion on Maintenance commands).

HELP — Lists the CMP commands. In Maintenance Mode it also lists the Maintenance Display commands.

HALT — Halts the system. Causes the CPU RUN/HALT flip-flop to be set to HALT. (Performs the same function as the HALT button on the System Control Panel.)

RUN — Causes the CPU RUN/HALT flip-flop to be set to RUN. (Performs the same function as the RUN button on the System Control Panel.)

DUMP — Performs a dump of main memory to the device specified by the classname DDUMP in the system's configuration. (If using the interactive mode of the Software Dump Facility, any classname may be specified.) If the system is in the run state when this command is entered, the message "IS IT OK TO ABORT THE SYSTEM? " will be displayed. You must enter YES to perform a dump.

LOAD — Performs a COLDLOAD (COLDSTART, RELOAD, or UPDATE), from the serial storage device whose channel and device address are set in the thumbwheel switches on the System Control Panel. If the system is in the run state when the command is entered, the message "IS IT OK TO ABORT THE SYSTEM? " will be displayed. You must enter YES to perform a load.

START — Initiates a WARMSTART or COOLSTART from the device specified by the control panel START thumbwheel switches. If the system is in the run state when the command is entered, the message " IS IT OK TO ABORT THE SYSTEM? " will be displayed. You must enter YES to perform a start.

SELFTEST — Initiates a selftest of the system. If the system is running when the command is entered, the message "IS IT OK TO ABORT THE SYSTEM?" will be displayed. You must enter "YES" to continue the selftest. Note that if the system is running when the command is entered, only the CMP test is performed. (Refer to Series 37 Self Test in this section for more detailed information on SELFTEST).

CAUTION

This test should not be run when MPE is operating, as the system will halt after the test is performed. Data may be lost in this way.

LOG This command displays a log of actions performed or detected by the CMP. The items which are entered in the log are:

DISPLAY ON	DISPLAY command entered.
SELFTEST OK	CMP/SYSTEM SELFTEST passed.
SELFTEST FAILED	CMP/SYSTEM SELFTEST failed.
LOAD	LOAD command entered.
START	START command entered.
DUMP	DUMP command entered.
HALT	CPU went to HALT.
HALT command	HALT command was entered.
IOMAP	IOMAP command entered.
RUN	CPU went to RUN.
SHUTTEST	Power shutdown test performed.
SHUTTEST FAILED	Power shutdown test failed.
POWER ON	Power-on reset to CMP when battery power was lost.
POWERFAIL/RESET	A powerfail occurred or the PON signal went low without loss of memory backup power.

These events are listed, along with the elapsed time (not including power off time). The last 63 events are shown in the event log. This log is retained during a power failure since it is stored in memory, which is on battery backup. An example event log is:

Event Log

Days	Hrs	Min	Since Event
2	23	05	Power On
	3	20	Overtemp Shutdown
	3	20	Power On
	2	25	System Halted
	2	20	Start Failed
	2	05	System Halted
	2	03	Load Failed
	1	51	System Halted
	1	50	Cold Load
	1	50	Selftest Failed
		03	Load

DISPLAY This command causes the maintenance display to appear on the screen. (Refer to "DIAGNOSTICS" in this section for further information.)

SPEED This command allows the user to change the system console baud rates when MPE is not running. The receive and transmit baud rates are specified in the command, and must be identical. This command is identical in operation to the MPE :SPEED command. (Refer to the :SPEED command in the MPE V Commands Reference Manual (32033-90006).)

:SPEED When a colon (:) is entered before the CMP SPEED command, the speed is simultaneously changed for the CMP and MPE. This is used when MPE is running. Note that the CMP baud rate and the MPE baud rate must be the same in order for certain CMP failure messages to be printed. Also, this command should always be used when changing the speed at the System Console. Do not use the MPE :SPEED command.

Invalid command names will cause the message "INVALID COMMAND, USE HELP FOR INFO" to be displayed. Any equal signs or commas are treated as blanks. Both uppercase and lowercase characters are accepted.

SERIES 64/68/70

In the high-end Series 64/68/70, most controls and special functions are made available within the Diagnostic Control Unit (DCU).

System Status and Display Panel

A Series 64/68/70 computer system, unlike the Series 37,39/40/42/52, and 44/48/58 systems, has no System Control Panel. All communication with the system is done through the Diagnostic Control Unit (DCU). However, the Series 64/68/70 has a System Status and Display Panel (SSDP) which shows the operating status of the system. The SSDP informs the user through several indicator LEDs, what the current system status is: run or halt, overtemperature, battery condition, and current instruction.

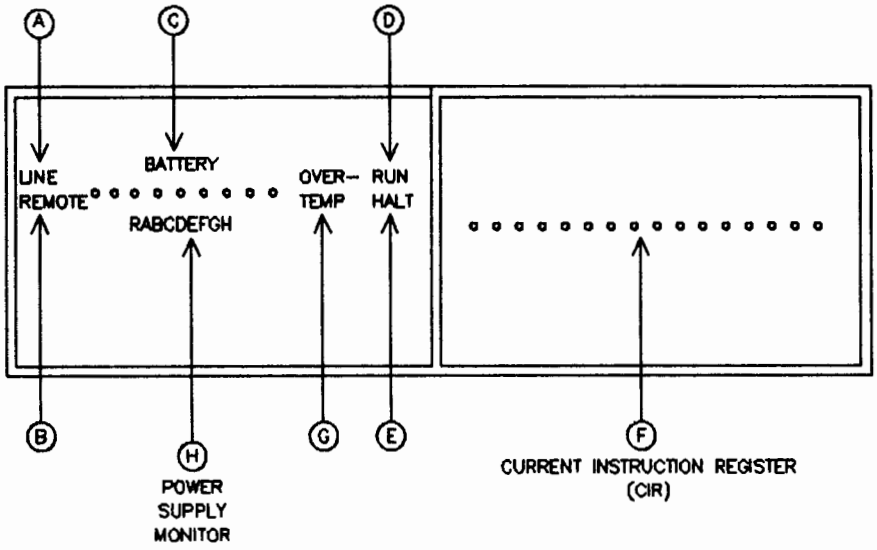


Figure 11-7. Series 64/68/70 System Status and Display Panel (1 of 2)

The System Status and Display Panel is located on the front of the system below the system name plate (Figure 11-7).

(A) LINE — The LED, when lit, indicates that AC power is being supplied to the system.

(B) REMOTE — This LED, when lit, indicates MAINTENANCE switch is set to REMOTE and the remote mode is enabled.

(C) BATTERY — This is a three-mode LED (off, slow flash, and fast flash). Under normal conditions, the batteries are fully charged and the LED is off. The slow flash indicates batteries are being charged. Fast flash indicates batteries are being discharged.

(D) RUN — When LED is lit, the CPU is in the RUN state.

(E) HALT — When LED is lit, the CPU has halted.

(F) 16-bit LED readout — This indicates the contents of the Current Instruction Register (CIR).

(G) OVERTEMP — This is a warning LED. When lit, internal temperature of system has exceeded exhaust temperature of 40 degrees C. An overtemperature warning message is also displayed on the System Console.

On some models, the overtemperature LED on SSDP is battery backed-up until AC power is renewed.

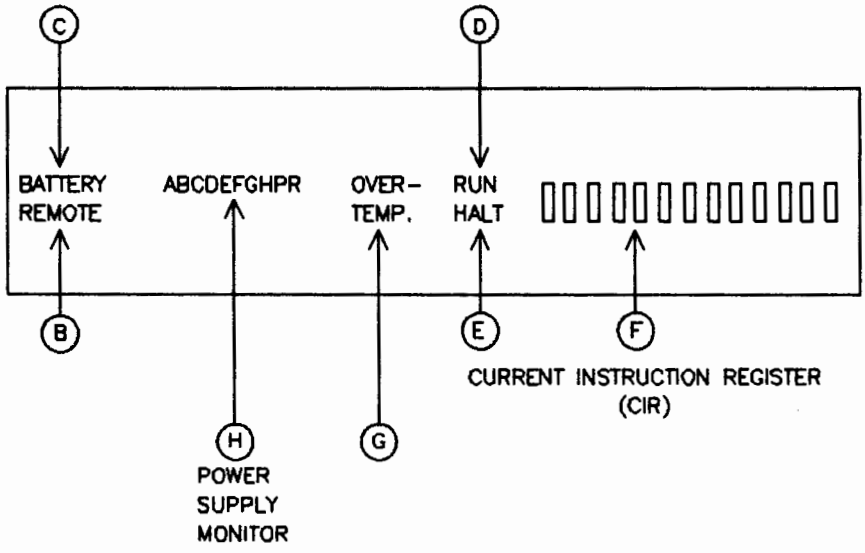


Figure 11-7. Series 64/68/70 System Status and Display Panel (2 of 2)

(H) POWER SUPPLY MONITOR

Each power supply is monitored by a corresponding LED. Supplies one through eight have a corresponding A-H LED display. Supply nine has an R LED which corresponds to the DCU RESET. (See Figure 11-6 and 11-7). When the LED is lit, the following condition exists:

A: Power Module A failure.
B: Power Module B failure or a power failure (a low PON).
C: Power Module C failure.
D: Power Module D failure.
E: Power Module E failure. (Aux I/O Bay)
F: No. +5VB available; battery voltage is available.
G: DCU, PDM pair not communicating for more than 10 seconds.
H: Transformer overtemperature, rectifier failure, or fan failure.
P: Power ON (PON) is down.
R: DCU is at reset; initial power up reset, AC low with PON set low.

CAUTION

Observe the G and H LEDs. If the G or H LED should turn on at any time, the operating system will continue to function normally. However, damage may eventually result.

The Diagnostic Control Unit (DCU)

The DCU is a microprocessor-controlled board which interfaces the System Console to the Series 64/68/70. It provides access to all Printed Circuit Assemblies (PCAs) connected to the CPU Bay card cage backplane. The DCU has two ports which connect to the System Console and to an optional modem for remote diagnostics.

The DCU performs a variety of functions. Some of the major functions are:

- Performs self-test of the DCU board. A firmware program on the DCU is run to verify DCU operation. If a failure is detected, the DCU will output the error to the System Console, if possible will be displayed on the DCU PCA LED's.
- Checks for DCU commands from the Console (if in the Maintenance Mode or Control Mode), or monitors the Console commands for $\underline{B}^{C}$, date commands, and SPEED commands if in System Console mode.
- Checks to see if the system has gone into a diagnostic halt by asserting SYSSTOP.

- Monitors the power system via the Power Supply Control (PSC) or the Power Distribution Monitor (PDM).

- Runs Fault Locating Diagnostics (FLDs) if in the Maintenance Mode with diagnostics invoked.

When the system is running, the DCU will usually be inactive, and commands are entered via MPE in the usual manner. However, if you are unable to communicate with the operating system (MPE), or any other time you want to execute a DCU function, you can enable the DCU by entering a B^C from the System Console. The DCU will then prompt you with a " C> " (Control Mode only), or "M>" (Maintenance Mode), depending on the position of the REMOTE/CONTROL/MAINT keyswitch. In the event of certain types of failures, such as a system halt, the DCU is accessed by simply entering a (RETURN).

NOTE

When the DCU is enabled while MPE is operational (via the B^C character), any messages from users or from MPE which would normally be displayed on the System Console (such as :TELLOP , device status messages, etc.) are lost. This is because MPE has no way of knowing that the DCU has control and messages are not saved. It is therefore advisable to perform all DCU functions either before MPE is operational, or after a =SHUTDOWN command has been entered.

DCU OPERATION MODES. The DCU operates in four modes: Initialization, Control, Maintenance, and Idle.

The Initialization Mode occurs at auto-restart (following a power failure) or at power-on. In this mode, the DCU initializes itself, does a self-test on the DCU and shift strings, and checks for a power failure. The DCU then enters the Control or Maintenance Mode; this depends on the setting of the REMOTE/CONTROL/MAINT keyswitch which is located in the PCM or in the junction panel. When auto-restarting (after a power failure), the DCU enters the Idle Mode once the system is successfully restarted. If the auto-restart is unsuccessful, error messages are displayed on the console, and the DCU enters the Control or Maintenance Mode. If a power failure had not occurred, the DCU would have displayed a CONTROL or MAINTENANCE Mode prompt. The Remote Maintenance Mode provides full system control plus remote dial-up capabilities.

The Control Mode is enabled when the REMOTE/CONTROL/MAINT keyswitch is in the CONTROL position. When the System Operator types B^C on the System Console, the DCU sends the " C> " prompt. The System Operator then enters one of the Control Mode commands. The Control Mode is also enabled after the Initialization Mode self-test. In the Control Mode, the System Operator can initiate command functions such as RUN, HA LOAD, START, or DUMP. The System Operator can also control the status display and console speed, as well as display the DCU Log and all Control Mode commands. All communication with the DCU in Control Mode must take place from the terminal originally configured as the System Console (Channel 1, Port 0).

The Maintenance Mode is enabled when the REMOTE/CONTROL/MAINT keyswitch is in the MAINT position. The Remote Maintenance operation is enabled when in the REMOTE position (refer to the Remote Maintenance set-up later in this Section). Maintenance Mode is entered on initial power-on or when the System Operator types B^C on the System Console, and the keyswitch is in either the REMOTE or MAINT position. When MAINT mode is entered, the "M>" prompt is displayed on the Console. Maintenance Mode is a superset of the Control Mode command, and allows for greater control of the hardware. The system diagnostics are also run in this mode. Maintenance Mode should be entered only when it is permissible to shutdown the system. Many of the commands in this mode automatically micro-halt the system as part of their operation.

The Idle Mode is enabled whenever the System Operator exits the Control or Maintenance Mode via one of the terminating commands (RUN/LOAD, etc.) or exits from either the Control or Maintenance Mode via the EXIT command. In the Idle Mode, the DCU continually executes a DCU self-test, monitors the power system status, looks for the B^C interrupt that calls for one of the active modes, and checks to see if the DCU has been interrupted due to an error condition. If the DCU is interrupted after the cause of the interrupt is determined, then an error interrupt handler reads the appropriate shift strings so the source of the interrupt is communicated to the System Operator. The DCU then returns either to the Control or Maintenance Mode depending on the position of the REMOTE/CONTROL/MAINT keyswitch.

CAUTION

When you are finished using the Control or Maintenance Mode, use an EXIT command before leaving the computer. The EXIT command will put the DCU in Idle Mode. If left in the Control or Maintenance Mode, MPE cannot output to the console, and the computer will eventually hang up.

DCU CONTROL MODE COMMANDS. The following list gives the commands accepted by the DCU in Control Mode. You are only required to enter the first two characters of any command. Maintenance Mode commands are not included here, as these commands should only be used under the direction of HP service personnel. Refer to Diagnostics in this Section for a discussion of Maintenance Mode.

C>HElp — Lists all of the commands valid for the Control Mode.

```
AR - retry auto-start
DI - write console display heading
DU - dump from disc

DU[MP][=][imb,]chan,device] (RETURN)
   [:=]
```

imb - DUMP device imb # (0-2). The default is 0.
channel - DUMP device channel # (1-15).
unit - DUMP device unit # (0-7).

NOTE

DU:=[*imb*,]*channel*,*device* changes the DUMP device without actually doing a DUMP. This should not be done on a system running MPE, since it will cause a microhalt. It should only be done after a system failure or a =SHUTDOWN.

```
EX - exit control mode
HA - halt system
HE - help
LD - set DCU log -> MPE dump parameters
     LD time[,count]
LG - [= type] - list DCU status or Event log
LO - load from tape

LO[AD][=][imb,]chan,device] (RETURN)
   [:=]
```

imb - LOAD device imb # (0-2). The default is 0.
channel - LOAD device channel # (1-15).
unit - LOAD device unit # (0-7).

NOTE

LO:=[*imb*,]*channel*,*device* changes the LOAD device parameters without actually doing a LOAD. This should not be done on a system running MPE.

```
PA - list DCU ROM part & new codes
RU - run system
ST - start from disc

ST[ART][=][imb,]chan,device] (RETURN)
    [:=]
```

imb - START device imb # (0-2). The default is 0.
channel - START device channel # (1-15).
unit - START device unit # (0-7).

NOTE

ST:=[*imb*,]*channel*,*device* changes the START device parameters without actually doing a START. This should not be done on a system running MPE.

```
SW - switch reg command
SW[:]= nnn set switch register to nnn
SWn[:]=x set bit n to 0/1

Maintenance mode help facility no longer on line
```

C>AR

The AUTO RESTART command is valid only after the automatic auto-restart has failed. It allows the System Operator to try to bring up the system after an auto-restart attempt fails due to a disc drive problem. The System Operator may enter the AUTO RESTART command after the disc drive problem is corrected to continue with the auto-restart.

C>DIsplay

The DISPLAY command writes the System Status Display (sometimes referred to as the Console Banner) on the System Console. The status display consists of one line at the top of the System Console screen that is displayed in inverse video. The status display is protected by an automatic memory lock, so a manual memory lock should not be used by the System Operator when the display is on. The System Status Display is updated only when the DCU is in the Control or Maintenance Mode. The display is turned off when the Maintenance Mode displays strings, memory, or screens. The System Status Display has five fields: RUN/HALT, the octal display of the START, DUMP, and LOAD settings, and the 20-byte message window which contains messages such as OVERTEMP, REMOTE ENABLED, DCU SELFTEST FAILURE, etc. An example on the Console Banner of the default condition is:

```
RUN   START 0,2,1    DUMP 0,3,1,    LOAD 0,3, 1
```

C>DUmp

The DUMP command causes the Software Dump Facility to be loaded. When loaded, the commands in the SDF command file (SDFCOM) are executed, and the system is dumped on the indicated dump device. If the system is running when this command is entered, the message "IS IT OK TO ABORT THE SYSTEM?" will be displayed. You must answer YES to continue. The DCU does not generate any messages on completion of a successful DUMP, but will generate error messages if the DUMP is not successful. Refer to the System Load (MPL) Error Messages in this Section. The system remains in the Control Mode upon completion. Set the DUMP device address and perform a SYSTEM DUMP, as follows:

```
C>DU
```

This will perform a DUMP using current parameters.

C>EXit

The EXIT command exits Control Mode and puts the DCU in IDLE mode along with turning off the memory lock.

C>HAlt

The HALT command causes the system to execute internal machine instructions to bring the system to a halt state. When the system is halted, the DCU remains in the Control or Maintenance Mode.

C>LD

The LOG DUMP command allows the System Operator to set up the parameters for dumping the DCU log to MPE. The System Operator sets the interval parameters as follows:

C>LD *dump interval* [*min log size*]

The *dump interval* is the minimum time between dump of the DCU log to MPE. Entering a zero value disables all dumping of the log to MPE. (Default is 12 hours.)

The *min log size* is the minimum number of entries which must be in the DCU log in order to transmit the log to MPE, 0-128, a zero value transmits all entries in the DCU log. (Default is 2 entries.)

C>LG

The LOG command displays the current contents of the DCU Event Log containing the last 128 events and the times they occurred. For the Series 64A, there is also a DCU Status Log which displays temperature status and most recent power system voltages. The time stamp for the DCU Event Log will differ from the MPE connect time after a powerfail. The DCU maintains events in real time, while MPE does not update the connect time when the system is down.

C>LG [*type*]

The value for the ***type*** parameter is either STATUS or EVENT.

STATUS — Displays current hardware status for the Series 64A only. For the Series 64B/68/70, the LG status command will refer the System Operator to the SSDP LEDs, which displays the power system status.

EVENT — This is command default. It displays the DCU Event Log and the time the events occurred. The following events are logged in the DCU logging RAMs:

RUN
SELFTEST
LOAD
START
DUMP
HALT
POWER (ON/FAIL/AUTO-RESTART))
OVERTEMP WARNING
MODE CHANGE (MAINT, CONTROL, ETC.)
SYSTEM HALT
POWER SUPPLY FAULT (DC OVER/UNDER VOLTAGE,
OVERCURRENT, AC OVER/UNDER VOLTAGE)

C>LOad

The LOAD command loads the MPE operating system from the indicated (or saved) LOAD device. This command requires the System Operator to HALT the system using the HALT command, before the LOAD command. If the system is running when the command is entered, the message " IS IT OK TO ABORT THE SYSTEM? " will be displayed. You must enter YES to perform the LOAD. The DCU does not generate any messages on completion of a successful LOAD, but will generate error messages if the load is not successful. Refer to the System Load (MPL) Error Messages in this Section. The LOAD command enables the DCU to set its internal timer to the DATE/TIME entered when MPE is loaded. The System Operator sets the LOAD device address to LOAD MPE as follows:

The command C> LO:=[*imb*,]*channel*,*device* changes the LOAD device unit number without actually doing a LOAD.

C>PArt

The PART/REVISION command allows the System Operator to display the part numbers and revision level of all ROMs in the DCU.

C>RUn — The RUN command causes the system to execute internal machine instructions to bring the system to a run state. The RUN command causes the system to exit Control Mode and returns control to MPE.

C>STart — The START command loads MPE from the indicated (or saved) device. To use WARMSTART or COOLSTART requires the System Operator to HALT the system using the HALT command before the START command. If the system is running when this command is entered, the message "IS IT OK TO ABORT THE SYSTEM?) will be displayed. You must enter YES to perform the START. The DCU does not generate any messages on successful completion, but error messages are displayed if the START is not successful. Refer to the System Load (MPL) Error Messages in this Section. The START command enables the DCU to set its internal timer to the DATE/TIME entered when MPE is started. The System Operator sets the START device address and loads MPE as follows:

The command ST:=[*imb*,]*channel*,*device* changes the START device unit number without doing a START.

C>SW — The SWITCH REGISTER command allows the System Operator to alter the contents of the 16-bit Switch Register. This command sets or clears the 16-bit LOAD switches. Note that the load device number is destroyed when the Switch Register is altered. The system must be in microrun mode for this command to work. The operating system may also be halted. The System Operator sets or clears the Switch Register as follows:

C>SW[:]=*nnnn*

The "***nnnn***" represents the Switch Register contents.

C>SW*n*[:] — This command allows the System Operator to alter the content of an individual bit in the 16-bit Switch Register.
The System Operator sets or clears an individual bit in the following manner:

C>SW*n*[:]=*x*

The "***n***" represents an individual bit in the 16-bit Switch Register. It is the number of the bit to be altered or cleared. The number ranges from the most significant bit,0, to the least significant bit, 15. The "***x***" represents the state or status of the bit, 0 (OFF) or 1 (ON).

DEFAULT PARAMETER VALUES. Default parameter values for the START, LOAD, and DUMP commands are preset at the factory before the system is shipped. These values are:

DEVICE	IMB#	CHANNEL#	DEVICE#
START Device	0	3	1
LOAD Device	0	2	1
DUMP Device	0	3	1

When using the START, DUMP, and LOAD commands, you may override the default values for the device from which the function is to be performed by entering (in decimal) the Inter-Module Bus

(IMB) number, channel number and device number of the new START, DUMP, or LOAD device after the command, e.g.:

C> LO[AD][:] = [*imb*,]*channel*,*device*

where the parameters have the following meanings:

imb	A number (0-2) indicating the IMB number of the START, LOAD, or DUMP device. (Default is 0.)
channel	A number (1-15) indicating the channel number of the START, LOAD, or DUMP device.
device	A number (0-7) indicating the device number of the START, LOAD, or DUMP device.

Note that when you override the default values for the START, LOAD or DUMP devices, the new values are saved and become the new defaults unless a battery powerfail should occur. In this case, the default values that are initially set by the factory will take effect.

SYSTEM LOAD (MPL) ERRORS (DCU ROM DATE CODE EARLIER THAN 2403). These are error messages which can be received on system load or micro-program load (LOAD, START, DUMP) commands. They apply only to DCU ROM date codes earlier than 2403. Use the PART command (refer to "DCU CONTROL MODE COMMANDS" in this section) to find out the DCU ROM date codes. Each error is described along with possible clues to the problem:

- INIT/IDENT FAILED Was not able to successfully initialize memory or identify a device for the loading operation.
- BAD INIT/IDENT DEVICE TYPE Device specified was not a proper MPL device (HP 792X disc, 797X tape or 7933 disc).
- DCU received no response from CPU (TIMEOUT).
- MPL FAILED Could not load system microcode from specified device.

MICROCODE PROGRAM LOAD (MPL) ERROR MESSAGES (DCU ROM DATE CODE EARLIER THAN 2403) . These error messages from the DCU are printed on the System Console when loading system microcode. Table 11-5 applies only to DCU ROM date codes earlier than 2403.

Table 11-5. MPL Error Codes (DCU ROM Date Code Earlier Than 2403)

ERROR CODE	DESCRIPTION	ACTIONS
A001	Message timeout: either the message cannot be sent because the receiving module (IOA) is busy, or there is no response from receiving module.	1) Check cables between IOB and IMBI of the cold load device. 2) Run I/O microdiagnostics.
A002	Disc status not ready.	1) Check cold load device connected to proper channel. 2) Check system disc powered up and ready.
A003	The cold load channel cannot be brought on line as a controller-in-charge.	1) Check if right channel number is set on the channel. 2) Check if "SYS CTRL" is set on cold load channel. 3) Run I/O microdiagnostics. Run IOMAP and Loopback test of cold-load device to check if channel is responding.
A004	WCS/LUT checksum error.	1) Check if correct system firmware is installed on the cold load device 2) Run CPU microdiagnostics to check WCS/LUT RAMs.
A005	CSRQ timeout after DMA completion.	1) Check switch on channel is set to "CPP PROCESSOR". 2) Run DMA exerciser.
A006	Abnormal DMA termination, or disc drive is off. WCS was not loaded correctly from disc, probably because disc data is not there, or is corrupt. DMA transfer is halted because of memory error or hardware timeout.	1) Run I/O microdiagnostic. 2) Run DMA exerciser.
A007	No WCS/LUT on tape.	1) Check tape drive unit 0 is selected and on line. 2) Check if proper magnetic tape is mounted on the drive.
A008	Device Specified Jump Response not equal to zero.	1) Run loopback test of the device. 2) Run DMA exerciser.

SYSTEM LOAD (MPL) ERRORS (DCU ROM DATE CODE 2403 AND LATER). These are error messages which can be received on a system load (LOAD or START commands); they apply only to ROM date codes 2403 and later. Use the PART command (refer to "DCU CONTROL MODE COMMANDS" in this section) to find out the date codes for the DCU ROMS. Each error is described along with possible clues to the problem:

- INIT/IDENT FAILED Was not able to successfully complete the INITIALIZATION/ IDENTIFICATION part of MPL.
- BAD INIT/IDENT DEVICE TYPE Device specified was not a proper MPL device (The proper devices are: HP 7914 disc, HP 792X disc, HP 797X tape or HP 793X disc).
- MPL FAILED Could not load system microcode from specified device.
- DCU RECEIVED NO RESPONSE FROM CPU Timeout.
- MPL ERROR CODE = Annn System microcode bootstrap loader has detected a problem; error codes follow.

MICROCODE PROGRAM LOAD (MPL) ERROR MESSAGES (DCU ROM DATE CODE 2403 AND LATER). These error messages are printed on DCU console when loading system microcode. Table 11-6 applies only to DCU ROM date codes 2403 and later.

Table 11-6. MPL Error Codes (DCU ROM Date Code 2403 and Later)

ERROR CODE	DESCRIPTION	ACTIONS
A001	Message timeout - either the message cannot be sent because the receiving module (IOA) is busy, or because there is no response from the receiving module.	1. Check the cables between the IOB and IMBI of the cold load channel. 2. Run I/O microdiagnostics.
A002	Disc status not ready.	1. Check if the system disc is powered up and is ready. 2. Check HP-IB cables from GIC to the coldload disc. 3. Check the IMB number, channel number, and device number used to specify the coldload device. 4. Check if correct channel number is set on the coldload channel GIC. 5. Check if correct HP-IB address is set on the coldload device. 6. Run I/O microdiagnostics. Run IOMAP and DUS device diagnostics on the coldload disc.
A003	The coldload channel cannot be brought on line as a controller-in-charge.	1. Check if correct channel number is set on the coldload channel GIC. 2. Check if "SYS CTRL" is set on the coldload channel. 3. Run I/O microdiagnostics. Run IOMAP and DUS GIC diagnostics on the coldload channel.
A004	WCS/LUT checksum error.	1. Check to make sure the correct system firmware is installed on the coldload device. 2. Try another copy of the operating system if loading from tape. 3. Clean the heads on the coldload device if loading from tape. 4. Run DUS device diagnostics on the coldload device. 5. Run DMA exerciser. 6. Run FLDs to locate possible hardware error condition.
A005	No WCS/LUT on the tape.	1. Check if the tape drive unit 0 is selected, and on line. 2. Check if the proper magnetic tape is mounted on the drive.

Table 11-6. MPL Error Codes (DCU ROM Date Code 2403 and Later) (continued)

ERROR CODE	DESCRIPTION	ACTIONS
A006	Device Specified Jump Response not equal to zero. The coldload device has detected an error in the data sent to the system Possible errors include parity, drive fault, power-fail, illegal disc address and read requested past end of file.	1. Check to make sure the correct system firmware is installed on the coldload device. 2. If loading from a tape, verify that the tape is at the load point before attempting to load the system. 3. Check HP-IB cables to coldload device. 4. Clean the heads on the coldload device if loading from tape. 5. Run DUS device diagnostics on the coldload device. 6. Run DMA exerciser.
A007	CSRQ timeout after SIOP command. The channel program has not completed within the allowed time limit.	1. Check if the switch on channel is set to "CPP PROCESSOR". 2. Run I/O microdiagnostics. 3. Run DMA exerciser.
A008	Channel Program Abort. The channel program used to read from the coldload device has aborted due to an error condition that it encountered. The reason for the abort is indicated by the error code in CPVA [0], the first channel program variable word in main memory at location 034C Hex.	1. Check if the system coldload device is powered up and on line. 2. Check HP-IB cables to coldload device. 3. Run I/O microdiagnostics. 4. Run DUS device diagnostics on the coldload device. 5. Run DMA exerciser.
A009	CSB I/O ERROR. An error has been detected on a data transfer across the Central System Bus.	1. Run FLDs to locate possible hardware error condition.

Table 11-6. MPL Error Codes (DCU ROM Date Code 2403 and Later) (continued)

ERROR CODE	DESCRIPTION	ACTIONS
A00A	Invalid module number. The MPL microcode has detected an attempt to access a module that does not exist.	1. Check the IMB number used to specify the coldload device. 2. Run FLDs to locate possible hardware error condition.
A00B	Nonresponding module. The MPL microcode has detected an attempt to access a module that does not respond.	1. Check the IMB number used to specify the coldload device. 2. Run FLDs to locate possible hardware error condition.
A00C	Unimplemented channel opcode. The channel program interpreter has encountered an illegal channel program opcode while executing the channel program used to read from disc or tape.	1. Run FLD memory diagnostics or DUS main memory diagnostics to test main memory banks zero and one. 2. Execute DCU self-test command ZS to verify that the DCU ROMs still checksum properly. 3. Run FLDs to locate possible hardware error condition.
A00D	Coldload device won't IDENT. The coldload device won't respond to an IDENT request with a valid identification code.	1. Check if the system coldload device is powered up and ready. 2. Check HP-IB cables from GIC to the coldload device. 3. Check the IMB number, channel number, and device number used to specify the coldload device. 4. Check if correct channel number is set on the coldload channel GIC. 5. Check if correct HP-IB address is set on the coldload device. 6. Run I/O microdiagnostics. Run IOMAP and DUS device diagnostics on the coldload disc.

SYSSTOP ERROR MESSAGES (PRINTED ON DCU CONSOLE). The error messages described in Table 11-7 indicate a specific hardware problem as detected by the DCU during normal startup and system operation. These errors are referred to as DCU hardware halts, but when these halts occur, the DCU enters the Maintenance Mode. Some of the errors can be caused by software, usually an address to non-existent memory. This forces an "INVALID ADDRESS" error message. Other errors can be forced by bad hardware, such as a double-bit memory error (an uncorrectable memory error). Run Fault Locating Diagnostics (FLDs) to further isolate the problem.

Table 11-7. SYSSTOP Error Messages

Hardware CBI Error n (n = 1/2/3/5/7)
Catastrophic hardware fault, as detected by the indicated CBI. The receiving CBI module is not necessarily the cause of the error.

WCS Parity Error
Catastrophic single-bit parity error. Generally caused by a faulty WCS PCA, which may be encountered when loading system microcode.

CPU Timeout
CPU has not received a required response from one of the other CSB modules in the allotted time.

CAC Error
The cache array controller has detected one or more cache conditions. In most conditions, I/O will be allowed to complete.

CMA Error
Single-bit cache memory array parity error.

Multi Bit Error
Multiple-bit memory errors have been detected in system memory. These errors are uncorrectable.

Invalid Address Module n (n = 1/2/3/5/7)
Detected by receiving CBI. Caused by a module (ie; I/O, CBI) sending an illegal memory address.

Invalid Address - CAC
Illegal addressing of CMA, as detected by the CAC.

Continuous DCUSTOR Error
Series 64/68/70 is generating continuous DCUSTOR interrupt to the DCU. The system is in an abnormal state, and the DCU had to disable this interrupt line.

LUT Parity Error
The system microcode LookUp Table has a parity error. Generally, this is caused by a faulty CIR PCA.

Unexpected Debug
This usually results from attempting to run diagnostics without the ED command. A special diagnostic microcode command "DEBUG" has been encountered. The DCU is not prepared to handle this.

Diag Stop Error
A hardware failure has forced the microcode to do "panic stop".

Mem Breakpoint at nnnn.nnnn
WCS Breakpoint at nnnn.nnnn
A memory or WCS breakpoint previously set in Maintenance Mode, has been reached.

SYSTEM HALT CONDITIONS. System Halt conditions listed in Table 11-8, are output to the DCU Console in the format of "SYSTEM HALT *number*". These are microcode halts; the DCU is responsible for printing the HALT number and message on the console. When a system halt occurs:

1. Record the HALT number and message.
2. If you are using a Series 64/68/70 system, perform a shift string dump.
3. Perform a memory dump.
4. Contact your Hewlett-Packard Customer Engineer. Your Customer Engineer will use the HALT message and dump data to diagnose your system's failure.

Table 11-8. System Halt Conditions

HALT #	CONDITIONS
0	Unknown system halt
1	STT violation in Segment #1
2	Absent code segment while on ICS
3	Absent segment or trace in Segment #1
4	Stack overflow on ICS
5	CST length violation
6	Channel program timeout
7	Bootstrap channel program checksum
8	Bootstrap channel program abort
9	Pseudo-Enable violation (Q1-18) less than 0
10	Module send message timeout
11	Invalid module responding
12	Channel not system controller
13	Code segment violation in Segment #1
14	No channel responding
15	Channel 0 responding
16	Message interrupt w/o IRQ or CSRQ
17	Not able to put it to controller-in-charge
18	Receive message timeout
19	I/O error, parity/timeout
20	WCS checksum error
21	LUT checksum error
22	Bad DCU Command Code

DRT Calculation

The Series 64/68/70 uses dual IMBs. Consequently, a nine bit Device Reference Table (DRT) number is required. To calculate the DRT number, use the following formula:

```
IMB1 = IMB#0
IMB2 = IMB#1
IMB3 = IMB#2

DRT# = (IMB# x 128) + (channel# x 8) + HP-IB Device #
```

Using an HP 150 as the System Console

This subsection describes the use of the HP 3000 Series 64/68/70 DCU (Diagnostic Control Unit) to HP 150 Communication Program (32342-13402). With the Communication Program, the HP 150 Personal Computer can be used as a System Console for the HP 3000 Series 64/68/70 Computer System.

The Communication Program employs the HP 150 function keys in connection with a dual disc drive to emulate a partial set of cartridge tape functions of the previous Series 64/68/70 Console, the HP 2647F terminal. These function keys enable the HP 150 to perform standard tape functions such as REWIND, FORMAT, SHOW FILES, etc.

Diskettes on the HP 150 can be used to load Fault Locating Diagnostics (FLDs) (32342-13403), and can also be used to store String Dumps of the Series 64/68/70 shift strings for diagnostic purposes.

The Communication Program (distributed on a standard HP Micro Diskette) together with the following hardware comprise the Communication package:

- An HP 150 Touchscreen II Personal Computer (45851A) (U.S. and all localized versions supported as of May 1, 1985.)
- An HP 9123D Dual Double-Sided Disc Drive configured with the left disc as Drive A and the right disc as Drive B.
- One of the following cables:

  13242N U.S. Modem cable RS-232C
  13242M European Modem cable RS-232C
  13242P RS-422 cable (25 pin to 5 pin)
  13242X RS-232C cable (25 pin to 3 pin)

- The following supported printers are optional:

  HP 2934A opt. 046 (HP-IB) Serial Dot Matrix Printer
  HP 2225A Think Jet (HP-IB) Printer

A further hardware requirement for the Communication Program is a Diagnostic Control Unit (30140-60001) with a ROM date code of 2522 or later.* These ROMs have the modifications necessary to work with the Communication Program on the HP 150.

A further software requirement is the MPE V/P Delta 1 Operating System (Version E/F.00.01) or the MPE V/E (or later) Operating System (Version G.00.00 or later).

HOW COMMUNICATION PROGRAM MENU KEYS DIFFER FROM USER AND SYSTEM KEYS. The function keys on the HP 150 operate in three mutually exclusive modes: as System Keys, User Keys, or Communication Program Menu Keys.

System Keys are used to access the HP 150 internal system functions such as Device Configuration and Device Control. For example, these keys are used to reconfigure a serial port or to begin logging (with a printer) all characters displayed on the screen.

User Keys operate in the same manner as "soft keys" on the previous Series 64/68/70 Console, the HP 2647F. These keys are user-definable and serve to execute complex commands with any one keystroke. Note that Communication Program Menu Keys and corresponding virtual cartridge tape functions are not accessible when in the User Key mode.

Communication Program Menu Keys are used to control the Communication Program running on the HP 150.

MOVING BETWEEN MENUS. The MPE Operating System and the Diagnostic Control Unit respond only to user-defined User Keys. The following are considerations when moving between function key modes:

- To access the System Keys, press the User/System key twice. When you are in the System Key mode, User Keys and Communication Program Menu Keys are not available.
- To access the Communication Program Menu keys, hold down the SHIFT key and press the User/System key. When you are in the Communication Program Menu Key mode, the virtual cartridge tape function keys are displayed and are available for use. System Keys and User Keys are not available in this mode.
- To access the User Keys, hold down the CONTROL key and press the User/System key. When you are in the User Key mode, the function keys operate similarly to the soft keys on the HP 2647F. Console Menu Keys and System Keys are not available.

---

* To display the date code for the ROMs currently in your system use the DCU Control Mode command PA (for detailed instructions refer to the heading entitled "THE DIAGNOSTIC CONTROL UNIT (DCU)" in this section).

COMMUNICATION PROGRAM MENUS. To use these keys press one of the function keys (f1 through f8) on the keyboard.

Main Menu

f1	f2	f3	f4	f5	f6	f7	f8
set	copy	help & utility	MARK FILE	REWIND	disc	find	

set	Move to set menu.
copy	Move to copy menu.
help & utility	Move to help menu.
MARK FILE	Mark end of file on virtual cartridge tape.
REWIND	Rewind virtual cartridge tape.
disc	Move to disc menu.
find	Move to find menu.

Set Menu

SET TIME				SET DATE			main menu

SET TIME	Set the time on the HP 150.
SET DATE	Set the date on the HP 150
main menu	Return to the main menu.

Copy Menu

READ LINE	READ FILE	READ ALL	

COPY LINE	COPY SCREEN		main menu

READ LINE — Reads one line from virtual cartridge tape file to screen.

READ FILE — Reads one file from virtual cartridge to screen.

READ ALL — Reads all files from virtual cartridge to screen.

COPY LINE — Copies one line (at the cursor position) from screen to virtual cartridge tape file.

COPY SCREEN — Copies entire screen to virtual cartridge tape file.

main menu — Return to the main menu.

Help and Utility Menu

utility		CONSOLE HELP	

	DCU HELP		main menu

utility — Move to utility menu.

CONSOLE HELP — Prints a list of the Communication Program Menu keys and a short description of their functions.

DCU HELP — Prints a list of the DCU commands and a short description of each command.

main menu — Return to the main menu.

Utility Menu

		MAKE CON DISC	

	MAKE UPD DISC		main menu

MAKE CON DISC — Formats a blank diskette in Drive B, copies the MS-DOS operating system from Drive A to the diskette in Drive B, and copies all of the files necessary to make a communication Program Disc from the master distribution disc in Drive A to Drive B.

MAKE UPD DISC — Takes a formatted diskette in Drive B containing HP 3000 files and makes an updated master Communication Program Disc. (Also copies the MS-DOS operating system from the disc in Drive A to Drive B.)

main menu — Return to the main menu.

Disc Menu

FORMAT FLOPPY		PURGE FILE	

SHOW STATUS	SHOW FILES		main menu

FORMAT FLOPPY — Formats a diskette in Drive B for the virtual cartridge tape.

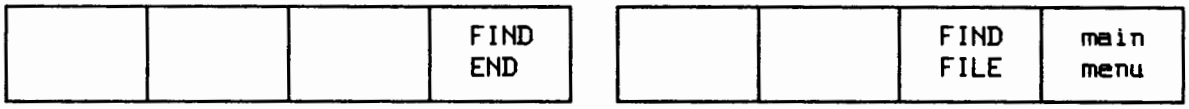
PURGE FILE — Purge a file on the virtual cartridge tape.

SHOW STATUS — Shows a status information of the virtual cartridge tape.

SHOW FILES — Shows a list of the files on the virtual cartridge tape.

main menu — Return to the main menu.

Find Menu



FIND END	Finds end of data on virtual cartridge tape.
FIND FILE	Finds file number *n* on virtual cartridge tape.
main menu	Return to main menu.

PRINTER LOGGING CONSIDERATIONS. The following are important considerations when using a printer to log Console messages:

1. If printer logging is enabled and the power fails (or the HP 150 is reset), the HP 150 will DISABLE printer logging.

2. If printer logging is enabled, and the printer baud rate is considerably slower than the DCU to HP 150 link, the keyboard will be "locked" during logging from the HP 150 to the printer. While the keyboard is locked you will be unable to use the (BREAK) key to abort long listings such as produced with "LISTF @.@.@,2". The keyboard will remain locked until the command terminates.

COMMUNICATION PROGRAM ERROR MESSAGES. The following is a list of error messages that you may see displayed and the appropriate action to take:

Message: PRESS <RETURN> TO CONTINUE

Cause: The virtual cartridge tape status or an error message has been displayed on the graphics screen and the program is waiting for you to press (RETURN) before continuing.

Remedy: Press (RETURN)

Message: ERROR WRITING TO FLOPPY OR OUT OF DISC SPACE

Cause: The Communication Program encountered an error while writing to the diskette. The diskette may be improperly inserted in the disc drive, write-protected, full of files, or damaged.

Remedy: Verify that the floppy is properly inserted into the disc drive. Remove and check the diskette to see if it is write-protected. Check to see if the disc is full by listing its files. To do this press the disc key and then the SHOW FILES key. If there are a large number of files, purge some files by pressing PURGE FILE.

Message: ERROR, END OF DATA ON FLOPPY

Cause: You attempted to read data beyond the END OF DATA on the virtual tape cartridge.

Remedy: Rewind the virtual cartridge tape by pressing the REWIND key.

Message: FIRMWARE ERROR, CANNOT FIND MESSAGE -- NOTIFY H.P.

Cause: The Communication Program could not access one of the messages contained in CON_MSG.MSG when the Communication Program was loaded. This is a FATAL error.

Remedy: Perform a "hard reset" (simultaneously press the Shift, CTRL, and Reset keys; or you can turn off and then turn on the HP 150). If the Communication Program does not start properly, insert another copy of the Console Disc in Drive A and perform another hard reset. If the Communication Program still does not start properly then there may be a fault in the HP 150.

Message: NUMBER OUT OF RANGE OR ERROR IN INPUT

Cause: You specified an illegal file number when using the FIND FILE key.

Remedy: Try the operation again with a valid file number (1 to 99).

Message: ERROR IN READING SCREEN

Cause: An HP 150 firmware routine returned an error status indication when the communication program used it to read the screen. This is a FATAL error.

Remedy: Perform a "hard reset" (simultaneously press the Shift, CTRL, and Reset keys; or you can turn off then turn on the HP 150). If the Communication Program does not start properly, insert another copy of the Communication Program Disc in Drive A and perform another hard reset. If the Communication Program still does not start properly then there may be a fault in the HP 150.

Message: ERROR IN OPENING DATACOM PORT

Cause: The Communication Program tried to open the devicefile COM1 for serial communications with the physical serial PORT 1 and received a failure status. This is a FATAL error.

Remedy: Perform a "hard reset" (simultaneously press the Shift, CTRL, and Reset keys; or you can turn off then turn on the HP 150). If the Communication Program does not start properly, insert another copy of the Communication Program Disc in Drive A and perform another hard reset. If the Communication Program still does not start properly then there may be a fault in the HP 150.

Message: ERROR IN OPENING CONSOLE HELP FILE

Cause: The Communication Program could not open the file CONSOLE.HLP for reading.

Remedy: Verify that the Communication Program Disc is properly inserted in Drive A. If this check does not prove fruitful, press the Shift and Reset keys simultaneously to cause a "soft" reset. If this does not help the problem, try another copy of the Communication Program Disc.

Message: ERROR IN OPENING DCU HELP FILE

Cause: The Communication Program could not open the file DCU.HLP for reading.

Remedy: Verify that the Communication Program Disc is properly inserted in Drive A. If this check does not prove fruitful, press the Shift and Reset keys simultaneously to cause a "soft" reset. If this does not help the problem, try another copy of the Communication Program Disc.

Message: ERROR IN DATE/TIME FORMAT

Cause: You specified an illegal date or time in response to the TIME or DATE prompt.

Remedy: Try the operation again with a valid file time or date. Time should be specified HH:MM:SS (where HH is the current hour in 24-hour time, MM is the current minute, and SS is the current second). Dates should be specified as MM-DD-YYYY (where MM is the month, DD is the day of the month, and YYYY is the year).

Message: ERROR IN OPENING FILE TO GENERATE NEW CONSOLE DISC

Cause: The Communication Program could not open the file MAKECON.BAT for reading.

Remedy: Verify that the Communication Program Disc is properly inserted in Drive A. If this check does not prove fruitful, press the Shift and Reset keys simultaneously to cause a "soft" reset. If this does not help the problem, try another copy of the Communication Program Disc (remember to hard reset the HP 150 changing to a new disc).

Message: ERROR IN OPENING FILE TO UPDATE DISC

Cause: The Communication Program could not open the file MAKEUPD.BAT for reading.

Remedy: Verify that the Communication Program Disc is properly inserted in Drive A. If this check does not prove fruitful, press the Shift and Reset keys simultaneously to cause a "soft" reset. If this does not help the problem, try another copy of the Communication Program Disc (remember to hard reset the HP 150 when changing to a new disc).

Message: WARNING! A FATAL DISC ERROR HAS OCCURRED. IT IS RECOMMENDED THAT THE CONSOLE PROGRAM BE RE-BOOTED BY SIMULTANEOUSLY PRESSING THE <SHIFT> <CTRL> AND <RESET> KEYS.
PRESS <RETURN> TO CONTINUE

Cause: The Communication Program encountered an error while reading or writing to the floppy disc. Either the floppy disc is write-protected (if writing), is bad, is full, or is not properly inserted in the disc drive.

Remedy: Remove the write-protect from the floppy disc if it is write-protected and you are writing. Make sure that the floppy disc is good (compare it to another disc). Check to see if the disc is full by listing its files press the disc key and then the SHOW FILES key. If there are a large number of files, purge some files by pressing PURGE FILE. Verify that your Global Configuration has not been changed.

MS-DOS ERROR MESSAGES. Please refer to Appendix B of Using Your HP Touchscreen II Personal Computer (45847-90005) and Appendix E of Using Your HP Touchscreen II Personal Computer As A Terminal Manual (45848-90001) for information on MS-DOS error messages.

TELE-SUPPORT

Tele-Support increases the quality and productivity of the HP 3000 computer service by facilitating remote diagnosis of system problems and remote predictive support of the system for potential problems. With Tele-Support, Hewlett-Packard Service Representatives are able to examine memory locations, run diagnostics, down-load software patches, diagnostic or utility programs and maintain and distribute hard copy records from a remote location.

If a service call is necessary, the Hewlett-Packard Service Engineer (SE) can determine in advance what parts are needed at the customer site. Once there, the Hewlett-Packard Customer Engineer (CE) also has immediate access, via Tele-Support, to backup support from the Hewlett-Packard Technical Service Engineer (TSE). This is especially helpful when the CE is repairing particularly complex hardware problems or attempting to determine the cause of software failures.

Hardware Requirements

Hardware requirements for Tele-Support are:

- Two telephone lines: one voice line, and one voice grade data line dedicated to the Support Link modem.
- Support Link modem, or a previously qualified modem.

- Dedicated modem port which must be connected to Channel 1, Port 1 of the ADCC for Series 39/40/42/52 and 44/48/58; any ATP modem port on the Series 64/68/70, or a DCU modem port if there is no ATP port. The modem in a Series 37 is connected to channel 1, port 7. If a modem is not connected, port 7 may be used as a terminal port.

- Flexible disc drive, 1600 bpi mag tape drive or cartridge tape drive, used to load HP Diagnostic/Utility programs to the system.

- A Series 64/68/70 needs a disc drive configured to the System Console. This may be either a floppy disc drive unit (for the HP 2647F), or a hard disc drive (for the HP 150).

Software Requirements

Tele-Support software requirements are:

- A Diagnostic Utility System (DUS) tape/disc.

- A Series 64/68/70 needs Fault Locating Diagnostics (FLDs) on a disc.

Series 37/MICRO 3000/MICRO 3000XE

The Series 37/MICRO 3000/MICRO 3000XE uses the modem port on the first TIC to provide the means for tele-support. The state of the hardware is controlled by the remote signal from the keyswitch and by the microcode control of the modem port.

To set up Tele-Support:

1. Do an MPE speed change to 1200 baud on the local Console to match the speed of the remote Console. If MPE is not up, the Control Module will initialize the TIC and display the `H for help->` prompt. The B^C speed command can then be used to adjust the local Console speed to 1200 baud.

2. Move the keyswitch on the SPU front panel to position 2 to enable the remote Console. If there is an MPE session on port 7, it will be suspended while in remote mode.

3. Once the modem answers, the connect sequence is completed, the modem is downed, the REMOTE LED on the Series 37 or the MICRO 3000XE SPU front panel is lit, and control passes from the local to the remote keyboard. All input/output of the remote Console is echoed on the local Console, which becomes an output device. The MICRO 3000 does not have a REMOTE LED. Check the modem indicators for MICRO 3000.

   Messages can be sent to and from both Consoles by toggling the keyswitch between LOCAL and REMOTE positions. Changing from the REMOTE to the LOCAL position, enables the local Console keyboard, and output is sent to both Consoles. The modem line connection is not affected.

   Turning the keyswitch to NORMAL disconnects the remote Console and disables the two-way conversation capability.

4. To exit remote mode, set the keyswitch to the NORMAL position. Remote mode has been aborted, and the original modem connection has been aborted. Port 7 is no longer a remote Console.

Series 39/40/42/52, 44/48/58

The remote Console operates in parallel with the local console. The Control and Maintenance Processor (CMP) firmware makes no distinction between remote and local commands. All events are displayed on both consoles. The modem must be connected to Channel 1, Port 1 of the ADCC as shown in Figures 11-8 and 11-9. To use remote:

1. Make sure the baud rate of the System Console is the same as the baud rate of the modem. Use the MPE :SPEED command to set the baud rate. Refer to the MPE :SPEED command in the MPE V Commands Reference Manual, (32033-90006). If MPE is not operational, use the CMP ->SPEED command; refer to "DIAGNOSTICS" in this section.

2. Turn the keyswitch on the System Console Panel to the REMOTE position (Series 39/40/42/52). In a Series 44/48/58 system, three switches must be set to ON: REMOTE CONSOLE CONTROL FUNCTIONS and MAINT MODE.

3. Use the modem phone to call the CE, or wait for the CE to call into the modem. The modem LED will light to indicate when the connection is established.

4. To exit remote, reset the keyswitch to the original position (Series 39/40/42/52). In the Series 44/48/58, set the REMOTE CONSOLE switch to OFF, and set the CONTROL FUNCTIONS and MAINT MODE switches to their original positions. The baud rate may also need to be reset.

The operators for both the local and the remote site can communicate over the data link by sending messages from one terminal to the other. Respond to the CMP prompt with a question mark "? " followed by the message. For example:

```
-> ?THIS IS AN EXAMPLE
```

Messages sent this way are not transmitted to the system.

Series 64/68/70

When using the Tele-Support facility on a Series 64/68/70:

The modem must be connected to the top RS-232 port connection of the DCU Junction Panel (located on the right side of the Series 64/68/70), as shown in Figure 11-10.

The remote Console operates in parallel with the local console. The Diagnostic Control Unit (DCU) firmware makes no distinction between remote and local commands. All events are displayed on both consoles. To use remote:

1. Make sure the baud rate of the System Console is the same as the baud rate of the modem (300 or 1200 baud). If MPE is running, use the MPE :SPEED command to set the baud rate properly; refer to MPE V Commands Reference Manual, (32033-90006). If MPE is not operational, use the DCU SPEED command; refer to "DIAGNOSTICS" in this section.

2. For Series 64/68/70, turn the keyswitch, which is located in the Power Control Module (PCM), to the MAINT/REMOTE position for the HP 32460A, or on the DCU junction panel from the HP 32460B or HP 32468B.

3. Enter the RM command and (RETURN) following the DCU prompt (M>). The System Console Banner displays "REMOTE ENABLED".

4. Use the modem phone to call the SE, or wait for the SE to call into the modem, if it is auto-answer. When the connection is made, the System Console Banner will display "REMOTE ESTABLISHED" and the REMOTE LED on the SSDP and the DTR LED on the modem will light. (Figure 11-6 or 11-7).

5. To exit remote, either the local or remote operator enters BYE in response to the DCU prompt. Reset the keyswitch to the original position. The baud rate may also need to be reset.

The operators for both the System Console and the remote site can communicate over the data link by sending messages from one terminal to the other. This is accomplished by preceding the message with the word TELL , at the DCU prompt, as shown below:

```
M> TELL THIS IS AN EXAMPLE
```

Without the word TELL, any input will be interpreted as a command.

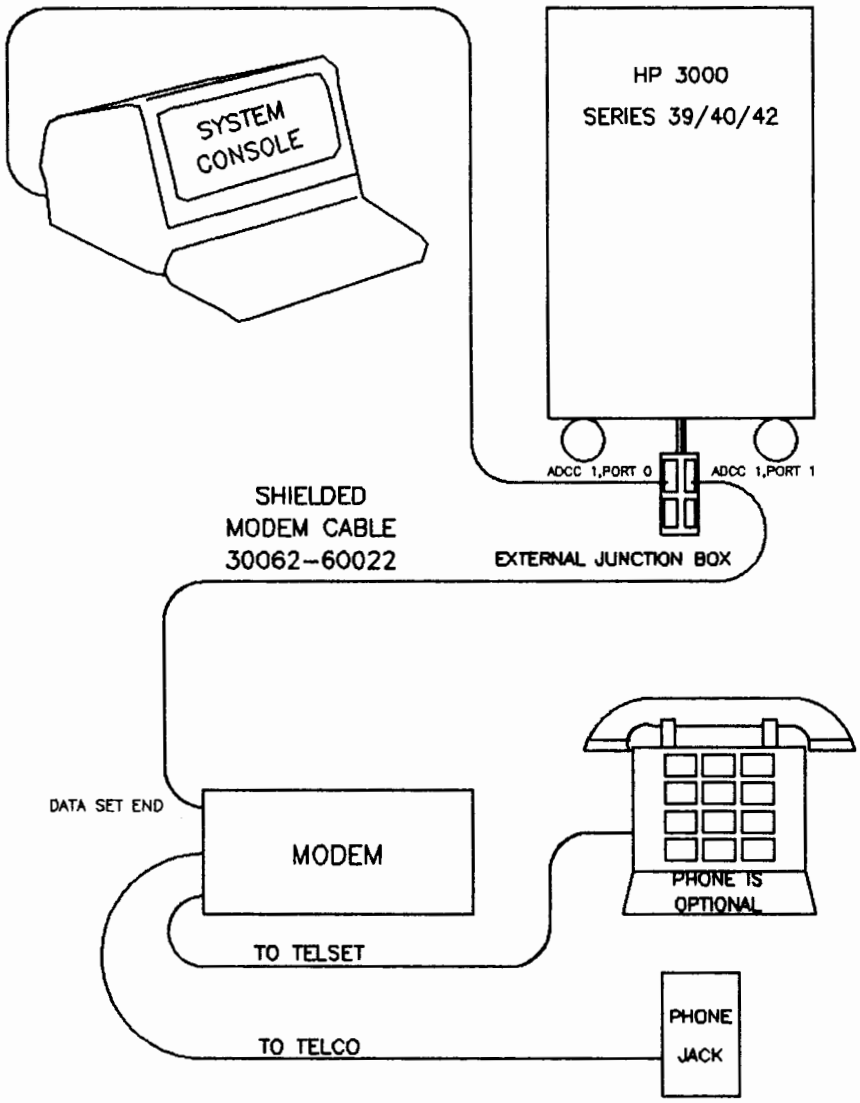


Figure 11-8. Local to Remote Cable Connections for Series 39/40/42/52

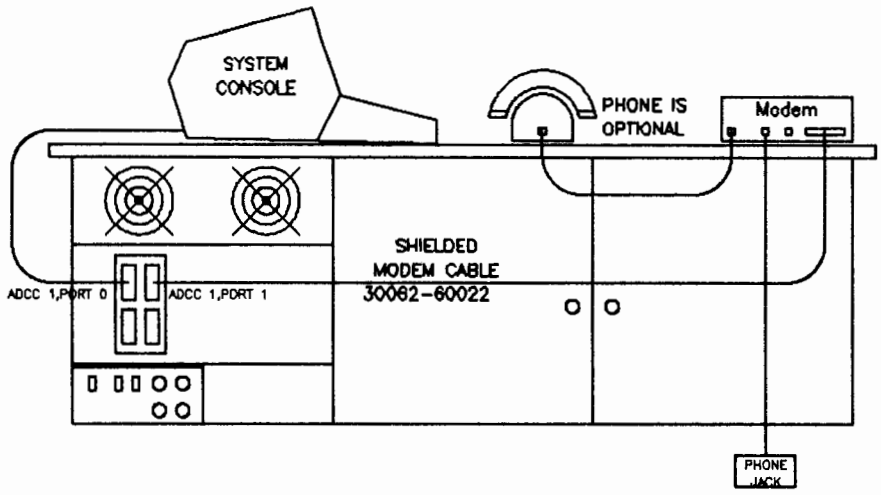


Figure 11-9. Local to Remote Cable Connections for Series 44/48/58

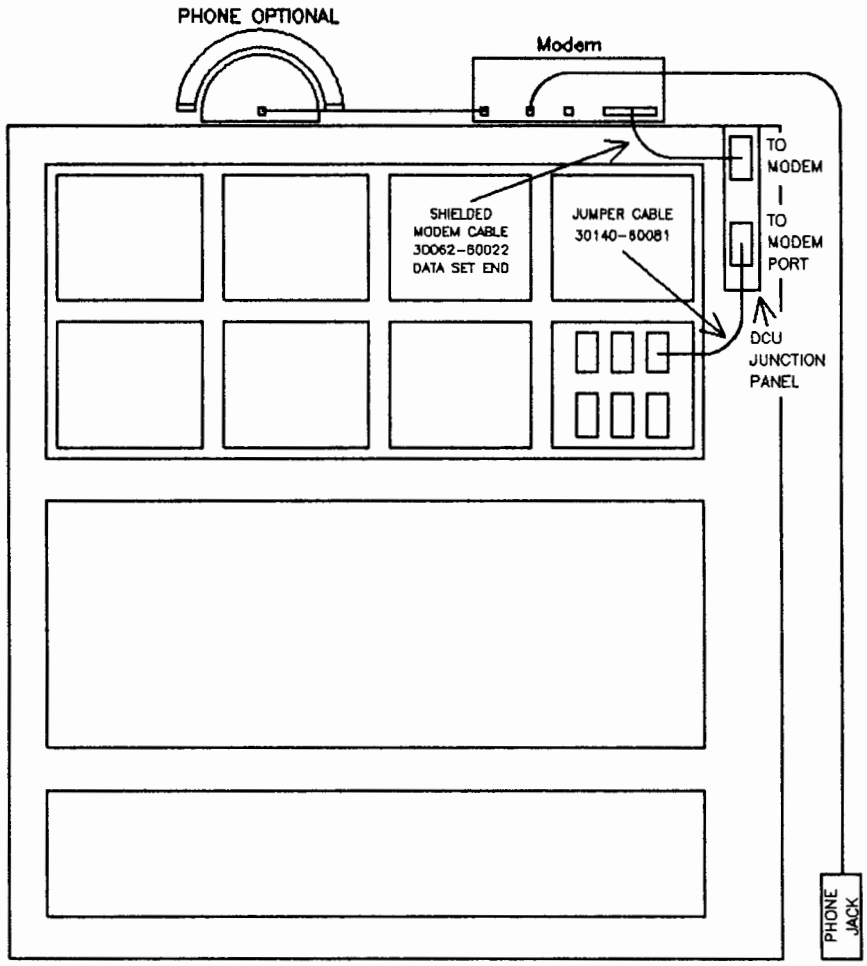


Figure 11-10. Local to Remote Cable Connections for Series 64/68/70

AUTOMATIC POWER FAILURE RECOVERY

All HP 3000 systems are capable of automatically recovering from a power failure. This section describes the recovery procedures of the different models.

The Series 64/68/70

When the system high DC voltage drops below 80% of rated voltage, the system initiates a powerfail warning. During the powerfail warning the system writes all register contents to a reserved section of main memory, completes critical system activities, and then shuts itself down. The battery backup power supply refreshes main memory and ensures its validity for at least 15 minutes, depending on memory size and battery condition.

The system automatically restarts when the high DC voltage level reaches 80% of rated voltage. It automatically restores all register values and resumes processing.

The Series 37/MICRO 3000/MICRO 3000XE, Series 39/40/42/52, and Series 44/48/58

When the system AC line voltage falls below 90% of rated voltage, the system initiates a powerfail warning. It writes all register contents to a reserved section of main memory, completes system activities, and then shuts down. The battery backup power supply refreshes main memory and ensures its validity for up to 15 minutes, depending on memory size and battery condition.

When the power supply voltages reach 90% of their rated values, the system automatically restarts. It first restores register values and then resumes processing.

OVERTEMPERATURE SHUTDOWN

A built-in safety feature of all HP 3000 computer systems is the overtemperature shutdown facility, which may prevent serious damage to the components and other electronic equipment in the computer due to overheating.

Series 37/MICRO 3000/MICRO 3000XE

When the internal temperature of a Series 37 reaches 51°C (+ or -) 4°, the OVERTEMP warning appears on the System Console in inverse video every 25 seconds. When the temperature drops to 43°C (+ or -) 4°, the system recovers and the OVERTEMP warning is turned off.

If the internal temperature reaches 66°C (+ or -) 4°, the OVERTEMP SHUTDOWN message appears only once on the System Console.

CAUTION

If there is a remote Console running at less than 1200 baud, the OVERTEMP SHUTDOWN message will not be displayed on the System Console.

Contact your Hewlett-Packard Customer Engineer (CE) before restoring power to the system. It is possible that some internal failure has caused the system to overheat. Your CE will instruct you in the steps to take.

Series 39/40/42/52

When the computer's internal temperature reaches approximately 55° C (131° F), a power failure is automatically simulated and the system is shut down. Power is still applied to the memory boards, memory controller, and mainframe fans. When an overtemperature shutdown takes place, the red BATTERY light on the System Control Panel (Figure 11-3) is lit until complete power is restored to the system. This feature protects all user files, spool files, and executing processes until the system is brought up again.

It is important to contact your Hewlett-Packard Customer Engineer (CE) before restoring power to the system, because it is possible that some internal failure has caused the system to overheat. Your CE will instruct you in the steps to take.

To return to a normal operating state after an overtemperature shutdown, power can be momentarily interrupted at the external power source outside the system (i.e., cycle the main power circuit for your installation by turning it off, then on; or disconnect the AC power cord from the wall socket, then reconnect it).

CAUTION

DO NOT turn off the SPU power switch located on the front of the Series 39/40/42/52 system cabinet (Figure 11-2), or the contents of main memory and the operating environment which existed prior to the shutdown will be lost.

Series 44/48/58

The red OVERTEMP SHUTDOWN LED indicates that the temperature has exceeded the threshold (approximately 57.3° C or 135° F) of any temperature transducer located across the top of either card cage ("R" in Figure 11-5). This indicator is continually monitored by the Control and Maintenance Processor (CMP). If an overtemperature condition occurs, the CMP displays a message on the System Console stating that the system is being shut down because of overheating. Power to main memory is maintained to preserve the operating environment which existed prior to the shutdown. This ensures ensures that there will be no significant loss of data when power is restored.

It is important to contact your Hewlett-Packard Customer Engineer before restoring power to the system, as it is possible that some internal failure has caused the system to overheat. Your CE will instruct you in the steps to take.

Power can be restored to the system by cycling the main power switch, that is, turning the switch to the OFF position, and then to the ON position. The main power switch is located at the bottom right rear of the system (Figure 11-4). This step initiates the internal powerfail recovery routines, which brings the system back to the operating environment that existed before the shutdown occurred.

Series 64/68/70

The Series 64/68/70 has two sets of overtemperature sensors designed for either "low" (40° C/104° F) or "high" (50° C/122° F) overtemperature conditions. When a "low" switch opens, the following happens:

1. OVERTEMP LED on the front display lights. (Figure 11-7.)
2. OVERTEMP message is displayed on the System Console Banner.
3. The System Console "beeps" every ten seconds until the temperature drops below 30° C.

When a "high" overtemp switch opens, the following occurs:

1. OVERTEMP LED on the front display lights.
2. OVERTEMP message is sent to the System Console.
3. The System Console will "beep" once each second.
4. After one minute, the banner "OVERTEMP SHUTDOWN" flashes on the screen.
5. After 15 seconds, the system will automatically shut down. At this time, power to the overtemp LED is interrupted, and the LED turns off. On some models this is backed up by battery.

Some models will signal an overtemperature failure by lighting the OVERTEMP LED on the System Status and Display Panel (SSDP); others signal an overtemperature failure by lighting the OVERTEMP LED or the "H" LED on the SSDP.

If your system overheats, you should immediately check for obstructions around the system. If the temperature continues to rise to 50° C, you should warn all users of the impending shutdown.

It is important to remember to contact your Hewlett-Packard Customer Engineer (CE) before restoring power to the system, because it is possible that some internal failure has caused the system to overheat. Your CE will instruct you in the steps to take.

The system will not restart until the temperature reaches normal and power is cycled (off, then on).

DIAGNOSTICS

Your Hewlett-Packard Customer Engineer (CE) or Systems Engineer (SE) may request that you run certain diagnostics on your system and report the results in order to assist in troubleshooting. These tests are available via Control-B Mode on the Series 37, via the CMP on the Series 39/40/42/52 and Series 44/48/58 systems, and via the DCU on the Series 64/68/70.

Series 37/MICRO 3000/MICRO 3000XE - Control-B Mode Selftest

Control-B allows the System Operator to perform several functions. The major functions are LOAD, START, DUMP and Self Test. Table 11-4 contains the complete list of Control-B commands.

LOAD and START load MPE from tape and disc respectively, and DUMP loads the dump software from the indicated device. The TEST command allows the System Operator to run the Power On Self Tests with failures displayed on the System Console. Tests can be looped with the count parameter. Count must be an integer between 1 and 9999, with 1 being the default.

Self Test checks for a functioning CPU, Memory, TIC, PIC, and Synchronous Intermodule Bus (SIMB), and verifies the cold load path in power-on (PON) mode and maintenance mode (Control-B Mode). The commands available in Self Test Mode are listed in Table 11-9.

Self Test executes:

- At power-on via the keyswitch.
- When initiated from the Console in Maintenance Mode.
- Restarting after power failure.

Table 11-2 lists the LED status codes and error conditions.

When all tests have been successfully completed, Control-B mode is entered. The following prompt is displayed:

```
H for help->
```

Table 11-9. Self Test Mode Commands

ALL	Run all self tests 1-9999 times.
CHANNEL	Loop test of channel 1-9999 times.
CPU	Loop CPU test 1-9999 times
EXIT	Return to Control mode.
IOMAP	Loop IOMAP 1-9999 times.
MEMORY	Loop memory test 1-9999 times.
PON	Run (or loop) Power On Selftest.

Self Test mode is entered with the Control-B mode TEST command. The Self Test mode allows each self test to be directed.

AL[L] [*count*]

All runs all of the manually directed self tests except the Power On (PON) self test in order:

1. CPU test.
2. Memory test.
3. Channel test.
4. IOMAP.

The test may be looped by specifying the desired number of loops in count, an integer between 1 and 9999. The default is 1. A space is required before specifying count:

CH[an] [*count*[,*channel*]]

The appropriate test (TIC, PIC, or none) is run for each card installed in the CPU. If a failure occurs, the failure code and the card description are printed on the System Console.

The test may be looped by specifying the desired number of loops in count, an integer between 1 and 9999. The default is 1. A space is required before specifying *count*. Whenever a specific channel is selected with *channel*, *count* must be specified. At the conclusion of the test, the Self Test prompt comes up.

CPU [*count*]

The CPU command executes tests of the CPU not run at Power ON. The following tests are run by this CPU test:

- P, D, S, A bank register testing
- LED display testing
- TOC RAM testing
- MPE timer counting verified.
- Watchdog Timer Force Condition verified.

The test may be looped by specifying the desired number of loops in count, an integer between 1 and 9999. The default is 1. A space is required before specifying count.

E[XIT]

The Self Test EXIT command returns execution to the Control-B mode and displays the "H for help->" prompt.

HELP

The HELP command displays the full set of Control-B mode commands.

I[omap] [*count*]

The IOMAP command executes a version of IOMAP which is contained in the Self Test ROM. This version of IOMAP displays the number of banks of memory physically installed in the system, and identifies all I/O cards installed in the system. All supported HP-IB devices attached to the PIC are identified and their ID code is displayed with a device description.

This command runs the memory size portion of the memory test and displays the size of memory, lists the LOAD, START, and DUMP devices, and then displays the types of cards installed in the system.

The test may be looped by specifying the desired number of loops in count an integer between 1 and 9999. The default is one. A space is required before specifying count.

M[emory] [*count*]

The Self Test MEMORY command executes the Power On Memory Test, which first determines the amount of memory installed, initializes the memory, performs an Address Test, performs an Error detection and Correction Test (EDAC).

The full memory test is displayed, and a pass/fail message is sent to the System Console. If a failure occurs, the numbers of the failing section is displayed.

The test may be looped by specifying the desired number of loops in count, an integer between 1 and 9999. The default is 1. A space is required before specifying count.

At the conclusion of this test, the Self Test prompt is displayed.

```
1-NORMAL
Self Test ->
```

```
PON [count]
```

The Self Test PON command executes the Power On Self Test *count* times. This command is similar to the ALL command, except that the manually directed CPU test and IOMAP are not executed. The PON test is initiated by toggling the PON line, not by jumping to address 0000 (hex) in WCS.

Series 39/40/42/52, 44/48/58 - CMP Diagnostic Commands

The CMP is connected directly to the configured System Console at the lowest address (Channel 1, Device 0), and is the standard device for use by all diagnostics. If, under MPE, the console has been switched to a terminal other than the configured console, you must be aware that all communication and diagnostics with the CMP takes place from the terminal set at Channel 1, Device 0.

Prior to invoking the CMP, =SHUTDOWN the system to ensure that no data will be lost. If MPE is operational, you can transfer control to the CMP by simultaneously depressing the CONTROL and B keys. The B^C character causes the CMP to print a prompt (->) on the system console. When you enter the desired Maintenance or Diagnostic command, the CMP will respond with the question "IS IT OK TO ABORT THE SYSTEM?" If MPE has not been previously =SHUTDOWN you must answer YES. When the =SHUTDOWN command is entered, the CMP prints the HALT message, and the prompts you for further input. MPE must not be operational when using the CMP for Maintenance and Diagnostics.

NOTE

The CMP will print the message "DISABLED" on the System Console if a CMP command is entered before the CONTROL FUNCTIONS switch on the System Control panel is set in the ON position, or if the CMP Maintenance functions are disabled when the DISPLAY or SHUTTEST command is entered. In this case, set the MAINT MODE switch on the System Control Panel to the ON position before re-entering the command.

SELFTEST

This command initiates the CMP/System Self-Test. If the CPU is in the RUN state when the command is entered, the message "IS IT OK TO ABORT THE SYSTEM?" will be displayed after the CMP portion of the test. Enter YES to continue the system portion of the test.

If the system is not aborted, only the sections of SELFTEST which do not affect the CPU operation will be performed. If the system is running, use the MPE =SHUTDOWN command to halt all current jobs/sessions and to ensure the system will halt without damaging files on disc.

To run SELFTEST, the function switch on the System Control Panel should be set to enable the CMP for testing to begin. Enter B^C to receive the CMP prompt (->), then enter the SELFTEST command.

A parameter may be specified with the SELFTEST command. The parameter is a decimal number, and is assigned a certain meaning. Your Hewlett-Packard Service Representative will let you know what, if any, parameter to use with the SELFTEST command. The use of parameters causes looping of any of the specified tests. Looping will continue until you type any character on the console keyboard, or a failure is detected in SELFTEST.

This command performs tests of the basic system. The selftest will display messages as it tests the various subsystems to indicate whether the test passed or failed:

"*test description* test passed"

"*test description* test failed"

Some tests will also display error numbers or messages.

The messages printed in a successful test are:

```
-> SELFTEST
CMP TEST
RAM test passed
ROM test passed
UART test passed

CMP-CPU Interface
SWITCH=00
 test passed

CPU TEST
0000
0400
0800
0000
1000
1400
E000
E400
E800
 test passed

CONTROL PANEL
STATUS=06 SYS DISC=NORM
 test passed

ADCC TRANSMIT test passed
ADCC RECEIVE test passed
GIC TEST CHL=05 test passed
GIC TEST CHL=06 test passed

SYSTEM TEST passed
->
```

SHUTTEST (Series 44/48/58 systems only)

This command tests the powerfail and overtemperature shutdown circuits on the CMP and in the power supply. The message "CYCLE POWER TO RESTART SYSTEM" is printed, then all power to the system is shut off, except the memory supply. When the system shuts down, the OVERTEMP LED and the MEMORY LED on the backplane should be on. The POWER LED should be off. To bring the system back up after this test, cycle (turn off, then on) the main power breaker located at the right rear of the system. If the test fails, the CMP will print the message " TEST FAILED " on the console.

NOTE

The power failure and overtemperature protection systems cannot be tested on the Series 39/40/42/52 by using the CMP SHUTTEST command. Use of the SHUTTEST command on these systems is not recommended. However, if the command is entered, the resulting failure message should not be interpreted as an error in the system.

DCTEST

This command will invoke the RS-232 C signals on the CMP to be tested. The test requires that the Data Comm Test Adapter (30090-60052) be installed on the system between J3 of the CMP and the CMP cable. The test can only be performed when this adapter is present.

Enter DCTEST command to invoke this test. This test cannot be run in Remote Mode.

Error messages are in the form:

ERROR IN STEP *test# expected data actual data*

DISPLAY

This command causes the Maintenance Display to appear on the screen. The following table shows an example of the Maintenance Display. If your Hewlett-Packard Service Representative requests information from this display, you will be given detailed instructions for reading the Maintenance Display. This command is intended for maintenance use only.

SPEED

This command allows the user to change the system console baud rates when MPE is not running. The receive and transmit baud rates are specified in the command, and must be identical. This command is identical in operation to the MPE :SPEED command. (Refer to the :SPEED command in the MPE V Commands Reference Manual (32033-90006).)

```
RA   2024    PR    000C        MAINTENANCE DISPLAY 1.0        NIR   EC8A0571AFFF
RB   1A4F     P    0AB3              DL   1BDA ABNK 0000   CSAR   1861
RC   31FA    PL    10AF              DB   1C58 BBNK 0001   UBUS   0000
RD   0006  PBNK    0001              Q    2A91 DBNK 0001   RUN    MHALT
R4   31FA  R16 0000   R28  0008     SM   3554 SBNK 0001   PARITY UPDATE OFF
R5   0000  R17 2698   R29  0020     Z    3AA9             TIMEOUT DISABLED
R6   297F  R18 0001   R30  FFFF     SWCH 0231
R7   297F  R19 0503   R31  36B8     STA  44DE          mitroCel
R8   000F  R20 10AF   R32  0023     SIR  200E     CSRQ irq nrdi dotn diep ICS SS
R9   00FF  R21 0200   R33  0000     SRR  1A5B
R10  0080  R22 0000   R34  A000     CIR  2138
R11  10A3  R23 36E8   R35  0002     CTR  0003                f1 f2 f3 f4
R12  2429  R24 0020   R36  FFFF     SPO  FFFF   MODE: WW
R13  3555  R25 0024   R37  000A     X    0000   STOPBP   STOP
R14  0000  R26 0020   R38  FFCF     SR   0004   IMB:  013555
R15  0000  R27 3555   R39  4000     OPND 0006   BP   000000    BPTYPE:  CSARBP
```

Figure 11-11. Maintenance Display

IOMAP

This command prints the current system configuration. The memory size, control panel switch settings, and all channels and devices in the system are identified. Invalid command names will cause the following message to be displayed "INVALID COMMAND, USE HELP FOR INFO". If you follow the IOMAP command with a parameter of 0 (IOMAP 0), looping will continue until you type any character on the System Console. If errors are detected, error messages are printed in inverse video. If error messages are printed, the data shown may be incorrect. Note that to invoke this microdiagnostic, the CMP must be enabled. The following is an example of an IOMAP display:

```
-> IOMAP
I/O CONFIGURATION
                    1024KB MEMORY
                    START 110
                    DUMP 110
                    LOAD 91
                    CHL=01    ID#8011    ADCC/EXTENDER
                    CHL=02    ID#8001    ADCC
                    CHL=10    ID#0000    GIC
                      DEVICE#01    ID#2001    2608
                    CHL=11    ID#0002
                      DEVICE#00    ID#0002    DISC(S)
                      DEVICE#01    ID#4002    INP
                      DEVICE#02    ID#2003    2617
                    CHL=09    ID#0000    GIC
                      DEVICE#01    ID#0183    7970E
```

The following error messages may be generated during system self-tests. Generally, serious error messages are shown in inverse video by the CMP. You may be requested to relay this information to your Hewlett-Packard Customer Engineer to aid in diagnosing problems on your system.

Table 11-10. General CMP Error Messages

ERROR MESSAGE	EXPLANATION
CAN'T MHALT	CPU cannot be microhalted.
CAN'T MS	CPU is frozen.
CAN'T READ	The CMP cannot read the channel or device switches on the System Control Panel.
CAN'T PS	The CPU cannot be program stepped because it is microhalted or program running.
CAN'T SET	The register specified cannot be set.
CMP FAILURE	A failure has been detected that is probably on the CMP. Additional information will be printed to further describe the source of the failure.
CPU BAD	During the CPU PROM test, the CPU did not execute NOP microinstructions properly.
CPU FROZEN	The CPU cannot execute NOP microinstructions.
CSRQ	While performing the GIC test, the GIC did not assert CSRQ properly.
DISABLED	The function requested has been disabled on the System Control Panel. Change the enable switches on the System Control Panel and re-enter the command.
DMA	While performing the GIC test, the GIC did not perform a good DMA transfer into memory.
DNV	While performing the GIC test, the GIC did not assert DNV correctly.
IRQ	While executing the GIC test, an error was found in the GIC'S assertion of IRQ.
NO ADCC	Channel 1 is not an ADCC. Consequently the ADCC loopback test cannot be performed.
NO IMB DEV	A timeout occurred on the IMB while reading/writing to memory or I/O.
NOT CONTROLLER	While performing the GIC test, the GIC was found to be configured not to be a controller. Therefore, the test was aborted.
NOT VERIFIED	The baud rate was not changed because the letters "MPE" were not read at the new baud rate.
OVER-TEMP SHUTDOWN	The System Control Panel indicates the system is overheating. Therefore, the CMP will assert PFW to cause main power supplies to turn off. (Does not apply to Series 39/40/42 systems.)
REG	During the GIC test, the pattern test of registers found a failure on the GIC.
SELFTEST FAILED	Somewhere during execution of self-test, a failure was found. Examination of prior messages should give a more specific message.
SYSTEM HALTED	The CPU is halted. The parameter printed, if present, gives the system halt or CPU self-test parameter.
TEST FAILED	The self-test step under execution failed.
TIMER FAILED	The CMP timer is not functional. The CMP will probably be unable to function properly.

Series 64/68/70 - DCU Maintenance Mode and Diagnostics

Your Hewlett-Packard Customer Engineer (CE) or Systems Engineer (SE) may request that you run certain diagnostics or perform certain maintenance functions and report the results in order to assist in troubleshooting. These tests are available via the DCU's Maintenance Mode. Your Hewlett-Packard Service Representative will tell you what steps to take to run these diagnostics. This section includes non-MPE error messages for the DCU, self-test error messages, System Load (Micro-Program, or MPL) errors, and SYSSTOP (hardware) errors.

MAINTENANCE MODE COMMANDS. The DCU is connected directly to the configured System Console at the lowest address (Channel 1, Port 0), and is the standard device for use by all diagnostics. If, under MPE, the console has been switched to a terminal other than the configured console, you must be aware that all communication with the DCU takes place from the terminal that is set to Channel 1, Port 0.

The Maintenance Mode is enabled when the REMOTE/CONTROL/MAINTENANCE keyswitch, which is located in the Power Control Module at the rear of the Series 64A, or the DCU junction panel of the Series 64B/68B/70 is in the MAINT position. Maintenance Mode is entered on initial POWER ON, or when the operator enters a B^C character on the System Console providing that the keyswitch is in either the MAINT or MAINT/REMOTE position. The Maintenance Mode commands are a superset of the Control Mode commands, and allow greater control of the Series 64/68/70 system. In Maintenance Mode, you can perform certain maintenance functions and run diagnostics as directed by your Hewlett-Packard Customer Engineer. All Control Mode commands can be executed in Maintenance Mode as well.

Prior to invoking the DCU, perform an MPE SHUTDOWN on the system to ensure that no data will be lost. If MPE is operational, you can transfer control to the DCU by simultaneously depressing the CONTROL and B keys. The B^C character causes the DCU to print a prompt (M> in Maintenance Mode) on the System Console. If the system is running when the command is entered, the DCU may respond with the question "IS IT OK TO ABORT THE SYSTEM?". If MPE has not been previously =SHUTDOWN, you must answer YES. When the =SHUTDOWN command is entered, the DCU prints the HALT message, then prompts you for further input. MPE must not be operational when using the DCU for Maintenance and Diagnostics.

CAUTION

Not all of the available Maintenance Mode commands are listed in this section. This is because those commands which are not listed are potentially destructive to the operating system, and must be used with extreme caution under the supervision of a Hewlett-Packard Service Representative who has been trained in their use. The HELP command (shown below) lists Control Mode commands. Consult your Hewlett-Packard Customer Engineer for instructions if you need to use other Maintenance Mode commands.

The Maintenance Mode commands available for use without the assistance of a Hewlett-Packard Service Representative are listed in the order they appear here. Any command may be entered with the first two characters of the command.

M>HELP — The HELP command lists all of the valid Control Mode commands. When entered in the Maintenance Mode, the HELP command lists Control Mode commands. The Maintenance Mode facility is no longer on line. For available Maintenance Mode commands, contact your Hewlett-Packard Systems Engineer.

M>RX — The RX (reset DCU hardware) command is equivalent to powering on after a power failure without doing an auto-restart. All of the DCU's internal status bytes and buffer pointers are initialized except the DCU Event Log.

M>RM — The RM (remote) command enables and tests the Tele-Support Facility.

M>SPEED — The SPEED command changes the DCU input and output speeds. The syntax for this command is as follows:

M>SPEED *inspeed, outspeed*

where *inspeed* and *outspeed* are the number of characters per second. Acceptable speeds are 10, 14, 15, 30, 60, 120, 240, 480, or 960.

M>BYE — The BYE command disables/disconnects the Tele-Support Facility.

SHIFT STRING DUMP. The operator performs a shift string dump whenever a system failure occurs resulting in a system halt. A DCU prompt is displayed on the System Console. DCU Maintenance Mode commands are used to store the contents of specific CPU registers on the Floppy Disc Unit of the HP 3000 Series 64/68/70 System Console. Refer to Appendix A, "Quick Reference Guide" for the step-by-step procedure.

HOW TO CALCULATE A DRT NUMBER

The combination of the channel and device address numbers is called the DRT (Device Reference Table) number of the device. This DRT number is expressed in two different ways on the system:

- The decimal representation is the number which identifies the device's DRT number in the system configuration listing.
- The "pseudo-octal" representation of the decimal DRT number of the device is the number on the thumbwheel switches. It is referred to as "pseudo-octal", since true octal (base eight) is represented as 0-7; the hardware channel boards and the channel address numbers range from 4 through 11.

You can easily convert one representation to another if you use the following formula:

Pseudo-octal to Decimal

1. Determine the Channel and Device numbers.
2. Multiply the channel number by eight.
3. Add the device to the result of Step 2. This is the decimal equivalent of the value on the thumbwheel switches.

For example:

```
DRT# = (Channel#2 x 8) + HP-IB Device#3

DRT# = (16) + 3

DRT# = 19
```

Decimal to Pseudo-octal

1. Check the system I/O configuration listing to find the decimal DRT number of the device.
2. Divide this number by eight to produce the channel number.
3. The remainder from Step 2 is the device number.
4. The combination of the channel number and the device number is the pseudo-octal DRT# of the device. This number is entered on the thumbwheel switches.

For example, the decimal DRT number is 19, using the formula:

```
(decimal DRT#) / 8 (controllers) = (Channel#2)

(19) / 8 = 2

remainder: 3 (HP-IB Device#) = 23 on thumbwheel switches
```

To simplify conversion, refer to Table 11-11.

Table 11-11. Decimal/Pseudo-Octal Conversion of DRT Numbers

CH \ DEV	0	1	2	3	4	5	6	7
1	8	9	10	11	12	13	14	15
2	16	17	18	19	20	21	22	23
3	24	25	26	27	28	29	30	31
4	32	33	34	35	36	37	38	39
5	40	41	42	43	44	45	46	47
6	48	49	50	51	52	53	54	55
7	56	57	58	59	60	61	62	63
8	64	65	66	67	68	69	70	71
9	72	73	74	75	76	77	78	79
10	80	81	82	83	84	85	86	87
11	88	89	90	91	92	93	94	95
12	96	97	98	99	100	101	102	103
13	104	105	106	107	108	109	110	111
14	112	113	114	115	116	117	118	119
15	120	121	122	123	124	125	126	127

QUICK REFERENCE GUIDE

APPENDIX
A

This Appendix describes frequently used procedures. Use the list below to quickly look up a procedure.

Computer Museum

TITLE Page

GENERAL INSTRUCTIONS A-1
CHANGING FORMS A-2
SYSTEM BACKUP WITH THE SYSDUMP PROGRAM A-3
RESTORING FILES A-6
ENABLING/DISABLING SYSTEM LOGGING A-8
RESTART USER LOGGING A-10
SERIALIZING A DISC PACK A-11
POWER DOWN A-12
POWER UP A-13
SYSTEM SHUTDOWN A-14
STARTUP STATE CONFIGURATOR A-15
SERIES 37 - WARMSTART A-17
SERIES 37 - COOLSTART A-20
SERIES 37 - UPDATE A-22
SERIES 37 - COLDSTART A-24
SERIES 37 - RELOAD A-26
SERIES 37 - ADDING I/O DEVICES A-28
SERIES 37 - DELETING I/O DEVICES A-30
SERIES 37 - SOFTWARE DUMP A-32
SERIES 37 - LOADING THE DUS A-35
SERIES 39/40/42, & 44/48/52/58 - WARMSTART A-36
SERIES 39/40/42, & 44/48/52/58 - COOLSTART A-38
SERIES 39/40/42, & 44/48/52/58 - UPDATE A-40
SERIES 39/30/42, & 44/48/52/58 - COLDSTART A-43
SERIES 39/40/42, & 44/48/52/58 - RELOAD A-45
SERIES 39/40/42, & 44/48/52/58 - ADDING I/O DEVICES A-49
SERIES 39/40/42, & 44/48/52/58 - DELETING I/O DEVICES A-51
SERIES 39/40/42, & 44/48/52/58 - SOFTWARE DUMP A-53
SERIES 39/40/42, & 44/48/52/58 - LOADING THE DUS A-56
SERIES 39/40/42, & 44/48/52/58 - FORMATTING SYSTEM PACKS A-57
SERIES 64/68/70 - WARMSTART A-59
SERIES 64/68/70 - COOLSTART A-61
SERIES 64/68/70 - UPDATE A-63
SERIES 64/68/70 - COLDSTART A-66
SERIES 64/68/70 - RELOAD A-69
SERIES 64/68/70 - ADDING I/O DEVICES A-73
SERIES 64/68/70 - DELETING I/O DEVICES A-75
SERIES 64/68/70 - SOFTWARE DUMP A-76
SERIES 64/68/70 - LOADING THE DUS A-79
SERIES 64/68/70 - FORMATTING SYSTEM PACKS A-80
SERIES 64/68/70 - SHIFT STRING DUMP (HP 2647F Console Terminal) A-82
SERIES 64/68/70 - SHIFT STRING DUMP (HP 150 System Console) A-85

GENERAL INSTRUCTIONS

OPERATOR FUNCTION: SYSTEM STARTUP (FOR SYSTEMS CONFIGURED WITH SINGLE DISC CONTROLLER.)

DESCRIPTION: These instructions apply to systems that are configured with only one disc controller.

A COLDSTART, UPDATE, OR RELOAD from a serial disc requires these standard instructions,when it is necessary to configure both the system disc and the start-up serial disc on the same controller.

STEP	PROCEDURE
1	Mount the MPE system disc on logical device number one (*ldev* 1). Set the unit number of *ldev* 1 to an unused value. Place the drive on line.
2	Mount the serial disc on logical device number *n* (*ldev n*). Set the unit number of *ldev n* to zero (Unit 0). Place the drive on line.
3	Load the system using the opening steps of the COLDSTART, UPDATE, or RELOAD startup procedure, whichever is appropriate.
4	The INITIAL Program checks the system volume table and finds that the system disc is not mounted on *ldev* 1. It then prompts with the questions: **WARNING** SYSTEM DISC AND COLD LOAD DEVICE ARE ON SAME DRT SYSTEM DISC MUST BE ONLY UNIT ZERO ON THIS DRT MAKE DISC UNIT # CHANGES NOW READY? NEW SERIAL DISC UNIT #? Before you respond to this prompt, follow Steps 5 and 6 below:
5	Set the number of *ldev n* back to its correct unit number, according to the MPE I/O configuration.
6	Set the unit number of *ldev* 1 back to "0", as specified in the MPE I/O configuration.
7	Now, reply YES to the "READY?" prompt, and reply with the new unit number of *ldev n*.
8	The INITIAL Program continues with progress messages, and the "DATE?" and "TIME?" prompts described in later steps of the COLDSTART, UPDATE, and RELOAD procedures.

CHANGING FORMS

OPERATOR FUNCTION: CHANGING FORMS ON A LINE PRINTER.

DESCRIPTION: This procedure describes how to respond to special forms messages on the console. A user's forms message is printed, along with requests to mount the forms and reply. Please note, the forms should be mounted before the reply is made.

Messages in the description are only examples, as they differ according to system configuration and each user's request.

STEP	PROCEDURE
1	10:50/#S93/22/FORMS; PLEASE MOUNT MAILING LABELS ?10:50/#S93/22/SP#12/LDEV# FOR #S93; OUTFILE ON LP (NUM)? The first message includes instructions from the programmer. The second is a request from the system and requires a :REPLY.
2	:REPLY *pin,ldev* Allocates the output device.
3	?10:51/#S93/22/LDEV# 12 FORMS ALIGNED OK (Y/N)? This message gives the opportunity to mount a form and align it for printing. Each NO response causes a test line of characters to be printed on the line printer. When the test line is printed in the correct position, respond YES, and output to special forms begins.
4	:REPLY *pin*, NO or :REPLY *pin*, YES
5	11:15/22/STANDARD FORMS ?11:15/#S98/22/SP#12/LDEV# FOR #S98;L ON LP (NUM)? The system displays forms messages when the spool file requesting them becomes ACTIVE. After special forms have been printed, the next spool file to become ACTIVE, which requests no special forms, will cause a "MOUNT STANDARD FORMS" message to be generated on the console. This occurs at the beginning of printing the next spool file, which could be some time after the special forms have finished printing.
6	:REPLY *pin,ldev*

COMMENTS

For additional information on changing forms, refer to the Forms Message in Section IX.

SYSTEM BACKUP WITH THE SYSDUMP PROGRAM

OPERATOR FUNCTION: FILE AND SYSTEM BACKUP

DESCRIPTION: This procedure copies the operating system, the current directory and accounting information, and users' files to backup media.

STEP	PROCEDURE
1	Log onto the system: :HELLO MANAGER.SYS
2	Check for logged-on users: :SHOWJOB
3	Warn sessions of impending dump, and restrict new jobs/sessions: :WARN@;*message* :LIMIT0,0
4	After a reasonable length of time, abort any jobs in the "EXEC" state and abort any remaining sessions: :ABORTJOB #J*nnn* :ABORTJOB #S*nnn*
5	Clear all outstanding allocation messages: :REPLY *pin*,0 or :REPLY *pin*,N
6	Define the output for the dump and list files: :FILE *dumpfile*;DEV=*devclass* :FILE *auxlistfile*;DEV=*devclass*
7	Initiate the dump and respond to the prompts: :SYSDUMP **dumpfile, [*auxlistfile]* ANY CHANGES? NO ENTER DUMP DATE? RETURN — Dumps the I/O configuration and MPE, but not the accounting structure or files. When this copy is used for a COLDSTART, the accounting structure and all files remain intact; when used for a RELOAD, the accounting structure and all files are lost.

STEP	PROCEDURE	
7 (cont)	*future date*	Dumps the I/O configuration, MPE, and the accounting structure, but no files.
	backup date	(The date of the most recent SYSDUMP.) Dumps the I/O configuration, MPE, the accounting structure, and all files that have been modified since the specified date.
	0	Dumps the entire system.
	ENTER DUMP FILE SUBSET(S)? RETURN (or any valid list of file subsets)	
	LIST FILES DUMPED? YES or NO.	
8	You are now requested to allocate the output device. After you reply, the system is copied to the backup medium. If multiple volumes are required, you receive mount requests at the appropriate times.	
9	END OF SUBSYSTEM	
	After termination of the SYSDUMP Program, label the backup copy (or copies) clearly and store in a safe place.	

COMMENTS

In the :SYSDUMP command, each file name is preceded by an asterisk (*) to indicate a back-referenced :FILE command.

When prompted to "ENTER DUMP FILE SUBSET(S)", entering a RETURN is equivalent to entering @.@.@, which is equivalent to a :FULLBACKUP command if "0" dump date is entered, i.e., all files in all accounts are dumped.

NOTE

Beginning with MPE version G.02.00, the SYSDUMP Program can inform you of any errors and warnings that may occur during a batch job. SYSDUMP does this by accepting messages from STORE, the process used to back up user files, and by setting the job control words JCW, CIERROR, and, most of the time, STOREJCW. (Refer to Section VII, "DETERMINING THE ERRORS FOR A SYSDUMP BATCH JOB", for more information.)

When the SYSDUMP Program is complete, carefully and clearly label the backup volumes with volume names, volumes set names, generation date, etc., or develop your own numbering system to reference this information.

MPE provides three methods for backing up disc files: the SYSDUMP Program, the :STORE command, and the VINIT subsystem's >COPY command, both of which are explained in Section IV under "SYSTEM BACKUP AND RECOVERY". In general, the following are suggested:

- Use the SYSDUMP Program for daily system backup, because it provides a record of the latest accounting information.
- Use :STORE to back up only those files that belong to a particular set of groups or accounts.
- Use the >COPY command in the VINIT subsystem to create a copy of a particular private volumes disc.

NOTE

Do not use the ;LABEL= parameter with the :FILE command during a backup. An attempt to use this parameter on MPE version G.02.00 will terminate the SYSDUMP Program. An attempt to use this parameter on any other MPE version will not terminate the SYSDUMP Program; however, you will be unable to successfully load the tape onto your system with the INITIAL Program.

RESTORING FILES

OPERATOR FUNCTION: RESTORING FILES FROM A BACKUP COPY

DESCRIPTION: This procedure retrieves users' files from SYSDUMP and STORE tape volumes. The volumes may be either magnetic tapes or a serial disc. The procedure allows you to restore specific files of a particular group or account, or to restore all the files from the backup copy.

STEP	PROCEDURE
1	Log on to the system: :HELLO MANAGER.SYS
2	Define the tape or disc drive where the backup copy is mounted: :FILE *restorefile*;DEV=*devclass*
3	Define the standard :RESTORE list file as the desired list output device: :FILE SYSLIST;DEV=*devclass*
4	Restore the files and print a listing: :RESTORE **restorefile*[;*filename.group.acct*][;SHOW][;KEEP][;CREATE][;CREATOR]
5	Respond to the System Console message which requests device allocation: =REPLY *pin,ldev* The system restores users' files, requesting that you mount additional volumes, as required.

COMMENTS

At times, you may want to restore a file having a group name, account name, or creator that is not in your system's directory. The determining factor for whether or not you can restore the file depends on the MPE version on your system. There are two scenarios, as follows:

- On systems with an MPE version prior to G.00.00: A file having a group name, account name, or creator that is not in the directory cannot be restored onto your system. (In addition, a file will be restored to a private volume only if the home volume for the group in which the file resides is physically mounted.)

- On systems with an MPE version G.00.00 or later: Any file can be restored onto your system, even if it was created in a group, account, or creator which does not currently exist in the directory. To restore such a file, however, you must have the necessary capabilities, and you must also use the ;CREATE option of the :RESTORE command to build the necessary groups, accounts, or creators which do not currently exist in the directory. (For more information on the ;CREATE option of :RESTORE, refer to the MPE V Commands Reference Manual (32033-90006).)

NOTE

If you are on MPE version G.00.00 or later, the ;CREATOR (not ;CREATE) option of the :RESTORE command can be used to restore a file whose creator is not in the directory into a creator already in the directory. To do so, specify:

```
;CREATOR=username      ** username must
                       be in directory **
```

Restoring a file with this option is the opposite of using ;CREATE, which creates a new creator in the directory in order to restore the file.

Files currently opened, loaded into memory, or being stored or restored, cannot be acted upon by a :RESTORE command.

Users with System Manager (SM) or System Supervisor (OP) capability can restore any file into any group and account. Users without SM and OP capability can only restore files to which they have WRITE access, if the file exists. They can only restore files into groups to which they have SAVE access, if the file does not exist. In addition, these users must have Privileged Mode capability (PM) in order to restore files with negative file codes (i.e., IMAGE databases).

ENABLING/DISABLING SYSTEM LOGGING

OPERATOR FUNCTION: TURNING LOGGING ON AND OFF

DESCRIPTION: This procedure initiates the SYSDUMP Program and, during the ensuing dialog, turns logging on or off.

STEP	PROCEDURE
1	Log on to the System Manager's account: :HELLO MANAGER.SYS
2	Define the output file(s) where the system is to be copied: :FILE *dumpfile*;DEV=*devclass* :FILE *auxfile*;DEV=*devclass*
3	Initiate the SYSDUMP Program and respond to prompts: :SYSDUMP **dumpfile* [,**auxfile*] ANY CHANGES? YES SYSTEM ID = HP32033G.02.00? RETURN MEMORY SIZE = 512 (MIN=256, MAX-4096)? RETURN I/O CONFIGURATION CHANGES? RETURN SYSTEM TABLE CHANGES? RETURN MISC CONFIGURATION CHANGES? RETURN LOGGING CHANGES? YES LIST LOGGING STATUS? YES TYPE EVENT STATUS 1 LOGGING ENABLED ON 2 JOB INITIATION ON 3 JOB TERMINATION ON 4 PROCESS TERMINATION ON 5 FILE CLOSE ON 6 SYSTEM SHUTDOWN ON 7 POWER FAIL ON 8 SPOOLING ON 9 LINE DISCONNECTION ON 10 LINE CLOSE ON 11 I/O ERROR ON 12 VOLUME MOUNT OFF 13 VOLUME SET MOUNT OFF 14 TAPE LABELS OFF 15 CONSOLE ON 16 PROGRAM FILE EVENT ON 17 CALL PROGRESS SGNLS OFF 18 DCE PROVIDED INFO OFF 19 SYSTEM SOFTWARE TRACER OFF

STEP	PROCEDURE
3 (cont)	36 RESTORE OFF 37 PRINTER ACCESS FAILURE OFF 38 ACD CHANGES OFF 39 STREAM INITIATION OFF 40 USER LOGGIN OFF 41 PROCESS INITIATION OFF *42 SECURITY CONFIG CHGS OFF *44 FILE OPEN LOGGING *45 COMMAND ACCESS * Displayed only if HP Security Monitor (HP 30392) has been installed. STATUS CHANGES? YES ENTER TYPE, ON/OFF? 1,ON or 1,OFF (Turns logging on or off.) ENTER TYPE, ON/OFF? RETURN LIST LOGGING STATUS? NO LOG FILE RECORD SIZE (SECTORS) = 2 (MIN=1, MAX=8)? RETURN LOG FILE SIZE (RECORDS) = 1023 (MIN=16, MAX=32767)? RETURN DISC ALLOCATION CHANGES? RETURN SCHEDULING CHANGES? RETURN SEGMENT LIMIT CHANGES? RETURN SYSTEM PROGRAM CHANGES? RETURN SYSTEM SL CHANGES? RETURN ENTER DUMP DATE? RETURN (Dumps only MPE and the I/O configuration. When this copy is used for system startup, all files and the accounting structure remain unchanged.)
4	You are now requested to allocate the output device. After your reply, the system is copied to the backup media.
5	When the backup media has been created, perform a COLDSTART from tape to incorporate the changes.

COMMENTS

There are two ways to disable logging: during the SYSDUMP Program and during the INITIAL Program. During SYSDUMP, logging can be disabled by answering YES to STATUS CHANGES?; you may then specify number, OFF for all logging events (types 1 through 18), except for type 11. During INITIAL, logging can be disabled by answering YES to the DISABLE LOGGING? prompt. For additional information on logging, refer to Sections V and VII.

RESTART USER LOGGING

OPERATOR FUNCTION: RESTARTS THE USER LOGGING PROCESS

DESCRIPTION: This procedure is used to restart a user logging process.

STEP	PROCEDURE
1	11:06/#S8/14/FROM/LC.SMITHCO/;START LOG PROCESS WITH LOGID SMITHCO. The message is a request from LC.SMITHCO to start the log process with logging identifier SMITHCO.
2	List the current logging identifiers on the system to determine the log filename for logging identifier SMITHCO: :LISTLOG LOGID CREATOR LOGFILE SMITHCO MGR.SMITHCO LGFILE01.PUB.SMITHCO
3	List the file to determine if the log file LGFILE01 is a new or existing file: :LISTF LGFILE01.PUB.SMITHCO,2 The current end-of-file location is displayed. It shows that the file already contains data: ACCOUNT= SMITHCO GROUP= PUB FILENAME CODE ----------LOGICAL RECORD---------- ----SPACE---- SIZE TYP EOF LIMIT R/P SECTORS #X MX LGFILE01 254W VB 7257 1022 1 2046 16 16
4	RESTART the logging process for logid SMITHCO. (If the file had been empty, the START option should have been selected.) :LOG SMITHCO;RESTART The following message will be printed on the System Console: USERLOG SMITHCO RESTARTED (ULOGMSG 16)
5	Inform LC.SMITHCO that user logging is running: :TELL LC.SMITHCO;LOG PROCESS SMITHCO STARTED.
6	To stop the logging process, enter: :LOG SMITHCO;STOP The following message will be displayed on the System Console: USER LOGGING PROCESS SMITHCO IS TERMINATED (ULOGMSG 11)

SERIALIZING A DISC PACK

OPERATOR FUNCTION: SERIALIZING A DISC PACK ONLY

DESCRIPTION: This procedure allows you to serialize a disc pack by using the VINIT subsystem. It is not used for cartridge tape.

STEP	PROCEDURE
1	Remove the disc you want serialized from normal system use (off line): :DOWN *ldev*
2	Log onto an account with System Manager (SM) or System Supervisor (OP) capability: :HELLO MANAGER.SYS
3	Invoke the VINIT subsystem: :VINIT
4	Change the volume label to indicate that the disc is a serial disc: >SERIAL *ldev*
5	Exit from the VINIT subsystem: >EXIT
6	Allow the disc you serialized to function again: :UP *ldev*

POWER DOWN

OPERATOR FUNCTION: SYSTEM POWER-DOWN

DESCRIPTION: This procedure describes how to power-down the entire system.

STEP	PROCEDURE
1	Shut down the MPE operating system, as described previously in "SYSTEM SHUTDOWN".
2	Set all disc drive RUN/STOP switches to STOP or power off (HP 7945). Allow time for discs to stop rotating. Turn off all peripheral devices.
3	Series 37/MICRO 3000/MICRO 3000XE: Turn keyswitch to 0. Series 39/40/42/52: Turn off the POWER switch, located on the front of the system cabinet (see Figure 11-1). Printed circuit boards may now be removed without damage. Series 44/48/58: Turn off the processor ON/OFF switch (see Figure 11-3). Turn off the MAIN POWER switch, located at the lower left rear of the computer. Printed circuit boards may now be removed without damage. Series 64/68/70: Turn off the MAIN POWER switch located in the Power Control Module at the lower left rear of the computer. Printed circuit boards can now be removed without damage.

NOTE

Hewlett-Packard recommends maintaining your system in a POWER ON operating state at all times, due to the potential impact to system reliability that may be experienced in frequent power down and power up situations. Component failures have been shown to be directly proportional to the amount of stress caused by power cycling. For example, the energy savings realized by powering off your system on nights and weekends, can be offset by reduced system reliability.

If your operation requires frequent power shutdowns, it is essential that the power down and power up procedures documented in this manual be followed exactly.

POWER UP

OPERATOR FUNCTION: SYSTEM POWER-UP

DESCRIPTION: This procedure describes how to turn on the system power.

STEP	PROCEDURE
1	Series 37/MICRO 3000/MICRO 3000XE: Turn keyswitch to position 2. Series 39/40/42/52: Turn on the POWER switch, located on the front of the system cabinet. Series 44/48/58: Turn on the MAIN POWER switch, located at the lower-left rear of the computer. (Figure 11-3.) Turn on the PROCESSOR ON/OFF switch, located on the front of the system cabinet. Series 64/68/70: Turn on the MAIN POWER switch, located in the Power Control Module at the lower rear of the computer.
2	For all Systems: Turn on the peripheral devices, and place them on line. Note that moving-head discs perform a head load cycle each time the AC power to the drive is removed and then restored. This will also occur whenever the RUN/STOP front panel switch on the drive is cycled (e.g., RUN-STOP-RUN). This takes about one minute.
3	Start up the MPE Operating System, using one of the system startup procedures described in this appendix.
4	Run the MEMLOGAN utility program by entering: :RUN MEMLOGAN.PUB.SYS;PARM=1. This utility clears all previously recorded memory errors.

Computer Museum

SYSTEM SHUTDOWN

OPERATOR FUNCTION: SYSTEM SHUTDOWN

DESCRIPTION: This procedure shuts down the operating system in an orderly manner. Before using this procedure, it is your responsibility to warn all logged-on users and shut all communications lines.

STEP	PROCEDURE
1	Store any spool files you wish to preserve, using the SPOOK5 utility program.
2	Inhibit new users from logging on: :LIMIT 0,0
3	Check for logged on users. If none exist, go to Step 7. :SHOWJOB
4	Warn sessions of impending shutdown: :WARN@;*message*
5	After a reasonable length of time, abort any remaining sessions and jobs: :ABORTJOB#S*nnn* :ABORTJOB#J*nnn*
6	Clear all outstanding allocation messages: :RECALL :REPLY *pin*,0 or =REPLY *pin*,0
7	Shut any communication lines on the system: :MPLINE *ldev*;SHUT :DSCONTROL *ldev*;SHUT
8	Close down the operating system: =SHUTDOWN The system should print a shutdown message and then halt. Occasionally, a pending I/O operation prevents the orderly halt, making it necessary for you to manually halt the computer. If the system continues to run for more than two minutes after the :SHUTDOWN command, press the RUN/HALT switch, which is located on the System Control Panel, or enter HALT at the H for help -> prompt on a Series 37/MICRO 3000/MICRO 3000XE, the CMP prompt (->) on a Series 39/40/42/52 and Series 44/48/58, or the DCU prompt (M>) on a Series 64/68/70.

STARTUP STATE CONFIGURATOR

OPERATOR FUNCTION: RESET ANY SYSTEM-DEFINED DEFAULTS, STREAM SPECIAL JOBS, OPEN DS LINES, CREATE PROGRAMMATIC USER SESSIONS.

DESCRIPTION: This Startup State Configurator is maintained by the System Manager in a file, SYSSTART.PUB.SYS. System Manager capability is necessary to create this file. Startup commands supported include WARMSTART, COOLSTART, COLDSTART, UPDATE, and RELOAD.

Only the G.01.00 or later software release includes a Startup State Configurator.

Operation

The Startup State Configurator processing is done after the date and time dialog, but before a session is logged onto the Console.

NOTE

If no SYSSTART.PUB.SYS file exists, no processing occurs.

If SYSSTART exists, but its format is incorrect, the contents will be ignored, and an error message will be displayed. The startup will skip SYSSTART, and continue execution.

If a correctly formatted SYSSTART file exists, the following operations occur:

1. The type of startup is determined (e.g., WARMSTART, UPDATE).
2. The file is searched for two sections: the STARTUP section and the section whose name corresponds to the current startup method.
3. For a given startup, zero, one, or two sections are processed concurrently, depending on whether they exist in the file. If they exist, the STARTUP section, then the section corresponding to the current startup method are processed. Progress messages are printed on the Console as each section begins and completes processing.

The basic process consists of a loop:

1. Read a record from the startup file.
2. Remove passwords and lockwords from this record.
3. Echo the record without passwords and lockwords to the Console.

4. Check to ensure that the command is allowed. If it is not allowed, print a message and return to the top of the loop. The commands allowed in a SYSSTART file are listed below:

```
:ACCEPT              :GIVE              :STARTCACHE
:ALLOCATE            :HEADOFF           :STARTSESS
:ALLOW               :HEADON            :STARTSPOOL
:ALTLOG              :IMFCONTROL        :STOPCACHE
:CACHECONTROL        :JOBFENCE          :STOPSPOOL
:COMMENT             :JOBPRI            :STREAM
:CONSOLE             :JOBSECURITY       :STREAMS
:DEALLOCATE          :LDISMOUNT         :SUSPENDSPOOL
:DISALLOW            :LIMIT             :TAKE
:DISCRPS             :LMOUNT            :TELL
:DOWN                :LOG               :TELLOP
:DOWNLOAD            :MPLINE            :TUNE
:DSCONTROL           :MRJECONTROL       :UP
:FOREIGN             :OUTFENCE          :VMOUNT
                     :REFUSE
```

5. Pass the record, including passwords and lockwords, to the COMMAND intrinsic for execution.

6. Check for an error. If one occurred, print an error message.

7. Return to Step 1.

Example SYSSTART File

```
1        STARTUP
2        STREAMS 10
3        ALLOW @.@;COMMANDS=REPLY
4        ALLOCATE COBOLII.PUB.SYS
5        LIMIT 4, 16
6        JOBFENCE 4
7        OUTFENCE 5
8        OUTFENCE 12;LDEV=14
9        COMMENT A continuation record follows:
10       DSCONTROL 90;OPEN;RETRY=10;&
11       TRACE,ON,ALL,,60,WRAP
12       ***
13       WARMSTART
14       STARTSESS 20;MGR.ACCT;HIPRI;NOWAIT
15       STARTSESS 21;USER.ACCT
16       STARTSESS 22;USER.ACCT
17       STARTSESS 23;USER.ACCT
18       ***
19       COOLSTART
20       STARTSESS 20;MGR.ACCT;HIPRI;NOWAIT
21       STARTSESS 21;USER.ACCT
22       STARTSESS 22;USER.ACCT
23       STARTSESS 23;USER.ACCT
24       ***
```

In this example, commands in the STARTUP block will be executed every time the system is started. In addition to these commands, when a WARMSTART or COOLSTART is performed, the commands in the appropriate block are executed.

SERIES 37/MICRO 3000/ MICRO 3000XE - WARMSTART

OPERATOR FUNCTION: SYSTEM STARTUP (WARMSTART)

DESCRIPTION: This procedure loads the system from the system disc. It is the only restart procedure which results in recovery of incompletely processed spooled jobs and spooled device files.

WARMSTART should only be used to recover spool files and IMAGE transaction logging magnetic tape buffers.

STEP	PROCEDURE
1	Turn keyswitch to 2.
2	If Automatic WARMSTART is enabled, the WARMSTART? (Y/N) prompt will appear on the Console. Enter Y: WARMSTART? (Y/N) Y *** Auto Warmstart *** HP32022G.02.00 ** PERFORMING A WARMSTART ** **WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS DIRECTORY MAINTENANCE COMPLETED PART 1 OF 6 COMPLETED - MEMORY RESIDENT TABLES SET UP PART 2 OF 6 COMPLETED - SL BINDING PART 3 OF 6 COMPLETED - SYSTEM I/O PROCESS CREATION PART 4 OF 6 COMPLETED - DRIVER LOADING PART 5 OF 6 COMPLETED - DISC RESIDENT TABLES SET UP PART 6 OF 6 COMPLETED - SYSTEM PROCESS CREATION MON, DEC 17, 1984, 10:39 AM? (Y/N) Y LOG FILE NUMBER 183 ON 10:40/2/LDEV #3 NOT READY *WELCOME* **NOTE** If the user enters anything other than Y (RETURN) or (RETURN), the system will abort the Automatic WARMSTART. If the user does not enter Y (RETURN) or (RETURN), the system will do an Automatic WARMSTART after 15 seconds. The Automatic WARMSTART is independent of the keyswitch position.
3	If Automatic WARMSTART is not enabled, the Control-B Mode prompt will appear on the Console. Enter START*: H for help-> START

STEP	PROCEDURE
4	When you are asked which option, enter WARMSTART: HP32033G.02.00 WHICH OPTION <WARMSTART/COOLSTART>? WARMSTART **WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS DIRECTORY MAINTENANCE COMPLETED PART 1 OF 6 COMPLETED - MEMORY RESIDENT TABLES SET UP PART 2 OF 6 COMPLETED - SL BINDING PART 3 OF 6 COMPLETED - SYSTEM I/O PROCESS CREATION PART 4 OF 6 COMPLETED - DRIVER LOADING PART 5 OF 6 COMPLETED - DISC RESIDENT TABLES SET UP PART 6 OF 6 COMPLETED - SYSTEM PROCESS CREATION BANK 0 DEPENDENT MEMORY USED *nnnnn* WED, SEP 19, 1984, 7:22 PM? (Y/N) Y LOG FILE NUMBER 793 ON *WELCOME* :HELLO OPERATOR.SYS;HIPRI 19:23/#S1/15/LOGON FOR: OPERATOR.SYS,PUB ON LDEV #20 :
*	Another option for Step 3 is to enter WAR after the Control-B Mode prompt: H for help-> WAR HP32033G.02.B0 ** PERFORMING A WARMSTART ** The dialog then continues with the warning message as listed in Step 4.

COMMENTS

After a WARMSTART the following conditions exist: STREAMS=OFF, JOBFENCE=14, OUTFENCE=14, JLIMIT=0, and SLIMIT=0.

If User Logging was taking place prior to the WARMSTART, the system will print the following message:

time/pin/RECOVERING USER LOGGING PROCESS *logid*

If the process associated with *logid* is a tape file, the next request will be to mount the tape associated with the process. This will be a standard mount request.

After the User Logging files have been recovered, the following message will be printed:

time/pin/USER LOGGING FILE *logfile* RECOVERED INCLUDING
xxxx OPENS AND *xxxx* CLOSES

If there was an error during recovery, an error message will be printed.

Always be sure to enter the correct date and time on the system startup to assure the proper execution of functions related to the system clock (i.e. the SYSDUMP Program).

On the Series 37, the date and time are preset in the computer. A prompt will be displayed, asking you if the date and time are correct; for example:

```
TUE, OCT 15, 1985, 12:05 PM? (Y/N)
```

If the displayed date and time are correct, enter YES; if they are incorrect, enter NO, in which case you will be prompted to enter the correct date and time.

SERIES 37/MICRO 3000LX/ MICRO 3000GX - WARMSTART

OPERATOR FUNCTION: SYSTEM STARTUP (WARMSTART)

DESCRIPTION: This procedure loads the system from the system disc. It is the only restart procedure which results in recovery of incompletely processed spooled jobs and spooled device files.

WARMSTART should only be used to recover spool files and IMAGE transaction logging magnetic tape buffers.

STEP	PROCEDURE
1	Turn keyswitch to 2.
2	If Automatic WARMSTART is enabled, the WARMSTART? (Y/N) prompt will appear on the Console. Enter Y: WARMSTART? (Y/N) Y *** Auto Warmstart *** HP32022G.02.00 ** PERFORMING A WARMSTART ** **WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS DIRECTORY MAINTENANCE COMPLETED PART 1 OF 6 COMPLETED - MEMORY RESIDENT TABLES SET UP PART 2 OF 6 COMPLETED - SL BINDING PART 3 OF 6 COMPLETED - SYSTEM I/O PROCESS CREATION PART 4 OF 6 COMPLETED - DRIVER LOADING PART 5 OF 6 COMPLETED - DISC RESIDENT TABLES SET UP PART 6 OF 6 COMPLETED - SYSTEM PROCESS CREATION MON, DEC 17, 1984, 10:39 AM? (Y/N) Y LOG FILE NUMBER 183 ON 10:40/2/LDEV #3 NOT READY *WELCOME* **NOTE** If the user enters anything other than Y (RETURN) or (RETURN), the system will abort the Automatic WARMSTART. If the user does not enter Y (RETURN) or (RETURN), the system will do an Automatic WARMSTART after 15 seconds. The Automatic WARMSTART is independent of the keyswitch position.
3	If Automatic WARMSTART is not enabled, the Control-B Mode prompt will appear on the Console. Enter START*: H for help-> START

NOTE

Beginning with MPE version G.03.02, the Series 37/MICRO 3000LX/MICRO 3000GX will maximize the number of modem ports. The current eight port ATP is pre-configured to use only five ports, which makes the five ports non-contiguous (0,4,5,6,7). For more information, refer to the HP MICRO 3000LX/MICRO 3000GX User's Manual (32520-90004).

The table below indicates the recommended LDEV number, DRT number, UNIT number, and the associated PDP port for five port pre-configuration.

Table A-1. Five Port PDP/MPE UNIT Cross Reference

LOG DEV #	DRT #	UNIT #	PDP PORTS
20	8	0	P0
24	8	4	P4
25	8	5	P5
26	8	6	P6
27	8	7	P7

Table A-2 shows the recommended LDEV number, DRT number, UNIT number, and the associated PDP port for eight port configuration. To upgrade your PDP panel for eight port configuration, contact your Customer Engineer.

Table A-2. Eight Port PDP/MPE UNIT Cross Reference

LOG DEV #	DRT #	UNIT #	PDP PORTS
20	8	0	P0
21	8	1	P1
22	8	2	P2
23	8	3	P3
24	8	4	P4
25	8	5	P5
26	8	6	P6
27	8	7	P7

SERIES 37/MICRO 3000/ MICRO 3000XE - COOLSTART

OPERATOR FUNCTION: SYSTEM STARTUP (COOLSTART)

DESCRIPTION: This procedure loads the system from the system disc. This is the standard way to restart the system after a routine shutdown. COOLSTART deletes all spooled jobs and all input and output spool files. These can be preserved by doing a WARMSTART. The SPOOK5 utility may be used to store large spool files for subsequent processing. After spool files have been stored, the =SHUTDOWN command should be given, and a COOLSTART initiated.

STEP	PROCEDURE
1	Turn keyswitch to 2.
2	If Automatic WARMSTART is enabled, the WARMSTART? (Y/N) prompt will appear on the Console. Enter N: WARMSTART? (Y/N) N
3	When the Control-B Mode prompt appears, enter START*: H for help-> START
4	When you are asked which option, enter COOLSTART: HP32033G.02.00 WHICH OPTION <WARMSTART/COOLSTART>? COOLSTART ANY CHANGES? n **WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS DIRECTORY MAINTENANCE COMPLETED PART 1 OF 6 COMPLETED - MEMORY RESIDENT TABLES SET UP PART 2 OF 6 COMPLETED - SL BINDING PART 3 OF 6 COMPLETED - SYSTEM I/O PROCESS CREATION PART 4 OF 6 COMPLETED - DRIVER LOADING PART 5 OF 6 COMPLETED - DISC RESIDENT TABLES SET UP PART 6 OF 6 COMPLETED - SYSTEM PROCESS CREATION BANK 0 DEPENDENT MEMORY USED - *nnnnn* MON, DEC 17, 1984, 10:48 AM? (Y/N) Y LOG FILE NUMBER 185 ON 10:48/2/LDEV #3 NOT READY *WELCOME*
*	Another option for Step 3 is to enter COO after the Control-B Mode prompt: H for help-> COO HP32033G.02.B0 **PERFORMING A COOLSTART** The dialog then continues with the warning message as listed in Step 4.

COMMENTS

After a COOLSTART the following conditions exist: STREAMS=OFF, JOBFENCE=0, and OUTFENCE=1; JLIMIT and SLIMIT are set to the values specified during system configuration.

You can make changes to the system configuration during a COOLSTART. Respond YES to the "ANY CHANGES?" prompt in Step 1 of the INITIAL Program in Section VII, and this program begins.

Always be sure to enter the correct date and time on the system startup to assure the proper execution of functions related to the system clock (i.e. the SYSDUMP Program).

On the Series 37, the date and time are preset in the computer. A prompt will be displayed, asking you if the date and time are correct; for example:

```
TUE, OCT 15, 1985, 12:05 PM? (Y/N)
```

If the displayed date and time are correct, enter YES; if they are incorrect, enter NO, in which case you will be prompted to enter the correct date and time.

SERIES 37/MICRO 3000/ MICRO 3000XE - UPDATE

OPERATOR FUNCTION: SYSTEM STARTUP (UPDATE)

DESCRIPTION: This procedure cold loads the system from magnetic or cartridge tape, or from a serial disc. This is the standard procedure used when starting the system with an updated MPE operating system from Hewlett-Packard or an MPE backup copy prepared on a different HP 3000 system.

STEP	PROCEDURE
1	FOR STARTUP FROM MAGNETIC OR CARTRIDGE TAPE: Mount the MPE backup tape on the Unit 0 magnetic tape drive and place the device on line, or insert the cartridge tape into the drive. FOR STARTUP FROM A SERIAL DISC: **NOTE** The instructions given here apply to computers with more than one disc controller. If your system has a serial disc and system disc configured on one controller, read "GENERAL INSTRUCTIONS" in this appendix before doing an UPDATE from serial disc. Mount the MPE backup serial disc pack on any drive that does not share the controller on *ldev* 1. Set the drive to Unit 0, being sure no other drives on the same controller are also set to Unit 0. (The INITIAL Program dynamically allocates this drive to the nonsystem domain, making it available for private volume use once the startup is complete.)
2	When the Control-B Mode prompt appears, enter LOAD*: H for help-> LOAD
3	When you are asked which option, enter UPDATE: HP32033G.02.00 WHICH OPTION <COLDSTART/RELOAD/UPDATE>? UPDATE SYSTEM DISC DRT = *xx* (MIN=8, MAX=511)? *xx* ANY CHANGES? n

STEP	PROCEDURE
3 (cont)	**WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS. DIRECTORY MAINTENANCE COMPLETED LOADING OF SYSTEM FILES IN PROGRESS LOADING OF SYSTEM FILES COMPLETED PART 1 OF 6 COMPLETED - MEMORY RESIDENT TABLES SET UP PART 2 OF 6 COMPLETED - SL BINDING PART 3 OF 6 COMPLETED - SYSTEM I/O PROCESS CREATION PART 4 OF 6 COMPLETED - DRIVER LOADING PART 5 OF 6 COMPLETED - DISC RESIDENT TABLES SET UP PART 6 OF 6 COMPLETED - SYSTEM PROCESS CREATION BANK 0 DEPENDENT MEMORY USED - *nnnnn* WED, SEP 19, 1984, 7:22 PM? (Y/N) Y LOG FILE NUMBER 793 ON *WELCOME* :HELLO OPERATOR.SYS;HIPRI 19:23/#S1/LOGON FOR: OPERATOR.SYS,PUB ON LDEV #20 :
*	Another option for Step 2 is to enter UPD after the Control-B Mode prompt: H for help-> UPD HP32033G.02.00 ** PERFORMING AN UPDATE ** The dialog then continues with the warning message as listed in Step 3.

COMMENTS

After an UPDATE, the following conditions exist: STREAMS=OFF, JOBFENCE=0, and OUTFENCE=1; JLIMIT and SLIMIT are set to the values specified during system configuration.

You can change the system configuration during an UPDATE. Respond YES to the "ANY CHANGES?" prompt in Step 1 of the INITIAL Program in Section VII, and this program begins.

Always be sure to enter the correct date and time on the system startup to assure the proper execution of functions related to the system clock (i.e. the SYSDUMP Program).

On the Series 37, the date and time are preset in the computer. A prompt will be displayed, asking you if the date and time are correct; for example:

```
TUE, OCT 15, 1985, 12:05 PM? (Y/N)
```

If the displayed date and time are correct, enter YES; if they are incorrect, enter NO, in which case you will be prompted to enter the correct date and time.

SERIES 37/MICRO 3000/ MICRO 3000XE - COLDSTART

OPERATOR FUNCTION: SYSTEM STARTUP (COLDSTART)

DESCRIPTION: This procedure cold loads the system from a magnetic or cartridge tape, or from serial disc. In each case, the procedure allows you to modify the system configuration while retaining users' information. COLDSTART is commonly used when an installation maintains several backup versions, each with a different configuration.

STEP	PROCEDURE
1	FOR STARTUP FROM MAGNETIC OR CARTRIDGE TAPE: Mount the MPE backup tape on the Unit 0 magnetic tape drive, and place the device on line, or insert the cartridge tape into the drive. FOR STARTUP FROM A SERIAL DISC: **NOTE** The instructions given here apply to computers with more than one disc controller. If your system has a serial disc and system disc configured on one controller, read "GENERAL INSTRUCTIONS" in this appendix before doing a COLDSTART from serial disc. Mount the MPE backup serial disc pack on any drive that does not share the controller on *ldev* 1. Set the drive to Unit 0, being sure no other drives on the same controller are also set to Unit 0. (The INITIAL Program dynamically allocates this drive to the nonsystem domain, making it available for private volume use once the startup is complete.)
2	When the Control-B Mode prompt appears, enter LOAD*: H for help-> LOAD
3	When you are asked which option, enter COLDSTART: HP32033G.02.00 WHICH OPTION <COLDSTART/RELOAD/UPDATE>? COLDSTART ANY CHANGES? n

STEP	PROCEDURE
3 (cont)	**WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS DIRECTORY MAINTENANCE COMPLETED LOADING OF SYSTEM FILES IN PROGRESS LOADING OF SYSTEM FILES COMPLETED PART 1 OF 6 COMPLETED - MEMORY RESIDENT TABLES SET UP PART 2 OF 6 COMPLETED - SL BINDING PART 3 OF 6 COMPLETED - SYSTEM I/O PROCESS CREATION PART 4 OF 6 COMPLETED - DRIVER LOADING PART 5 OF 6 COMPLETED - DISC RESIDENT TABLES SET UP PART 6 OF 6 COMPLETED - SYSTEM PROCESS CREATION BANK 0 DEPENDENT MEMORY USED - *nnnnn* WED, SEP 19, 1984, 7:22 PM? (Y/N) Y LOG FILE NUMBER 793 ON *WELCOME* :HELLO OPERATOR.SYS;HIPRI 19:23/#S1/LOGON FOR: OPERATOR. SYS,PUB ON LDEV #20 :
*	Another option for Step 2 is to enter COL after the Control-B Mode prompt: H for help-> COL HP32033G.02.00 ** PERFORMING A COLDSTART ** The dialog then continues with the warning message as listed in Step 3.

COMMENTS

After a COLDSTART, the following conditions exist: STREAMS=OFF, JOBFENCE=0, and OUTFENCE=1; JLIMIT and SLIMIT are set to the values specified during system configuration.

You can change the system configuration during a COLDSTART. Respond YES to the "ANY CHANGES?" prompt in Step 1 of the INITIAL Program in Section VII, and this program begins.

Always be sure to enter the correct date and time on the system startup to assure the proper execution of functions related to the system clock (i.e. the SYSDUMP Program).

On the Series 37, the date and time are preset in the computer. A prompt will be displayed, asking you if the date and time are correct; for example:

```
TUE, OCT 15, 1985, 12:05 PM? (Y/N)
```

If the displayed date and time are correct, enter YES; if they are incorrect, enter NO, in which case you will be prompted to enter the correct date and time.

SERIES 37/MICRO 3000/ MICRO 3000XE - RELOAD

OPERATOR FUNCTION: SYSTEM STARTUP (RELOAD)

DESCRIPTION: This procedure cold loads the entire system, including all system files and configuration information. The system is reloaded from backup media.

CAUTION

A RELOAD DESTROYS ANY FILES WHICH MAY BE ON ANY OF THE SYSTEM DISC VOLUMES.

STEP	PROCEDURE
1	FOR STARTUP FROM MAGNETIC OR CARTRIDGE TAPE: Mount the MPE backup tape on the Unit 0 tape drive and place the device on line, or insert the cartridge tape into the drive. FOR STARTUP FROM A SERIAL DISC: **NOTE** The instructions given here apply to computers with more than one disc controller. If your system has a serial disc and system disc configured on one controller, read "GENERAL INSTRUCTIONS" in this appendix before doing a RELOAD from serial disc. Mount the MPE backup serial disc pack on any drive that does not share the controller on *ldev* 1. Set the drive to Unit 0, being sure no other drives on the same controller are also set to Unit 0. (The INITIAL Program dynamically allocates this drive to the nonsystem domain, making it available for private volume use once the startup is complete.)
2	When the Control-B Mode prompt appears, enter LOAD*: H for help-> LOAD
3	When you are asked which option, enter RELOAD: HP32033G.02.00 WHICH OPTION <COLDSTART/RELOAD/UPDATE>? RELOAD WHICH OPTION <SPREAD, COMPACT, RESTORE, ACCOUNTS, NULL>? *option* ANY CHANGES? n

STEP	PROCEDURE
3 (cont)	**WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS. DIRECTORY MAINTENANCE COMPLETED INITIALIZATION OF DISC FREE SPACE MAPS COMPLETED RELOAD OF USER FILES IN PROGRESS RELOAD OF USER FILES COMPLETED PART 1 OF 6 COMPLETED - MEMORY RESIDENT TABLES SET UP PART 2 OF 6 COMPLETED - SL BINDING PART 3 OF 6 COMPLETED - SYSTEM I/O PROCESS CREATION PART 4 OF 6 COMPLETED - DRIVER LOADING PART 5 OF 6 COMPLETED - DISC RESIDENT TABLES SET UP PART 6 OF 6 COMPLETED - SYSTEM PROCESS CREATION BANK 0 DEPENDENT MEMORY USED - *nnnnn* WED, SEP 19, 1984, 7:22 PM? (Y/N) Y LOG FILE NUMBER 791 ON *WELCOME* :HELLO OPERATOR.SYS;HIPRI 19:23/#S1/15/LOGON FOR: OPERATOR.SYS,PUB. ON LDEV #20
*	Another option for Step 2 is to enter REL after the Control-B Mode prompt: H for help-> REL HP 32033G.02.00 ** PERFORMING A RELOAD ** The dialog then continues with the warning message as listed in Step 3.

COMMENTS

SPREAD is the default type of RELOAD.

After a RELOAD, the following conditions exist: STREAMS=OFF, JOBFENCE=0, and OUTFENCE=1; JLIMIT and SLIMIT are set to the values specified during system configuration.

You can change the system configuration during a RELOAD. Respond YES to the "ANY CHANGES?" prompt in Step 1 of the INITIAL Program in Section VII, and this program begins.

Always be sure to enter the correct date and time on the system startup to assure the proper execution of functions related to the system clock (i.e. the SYSDUMP Program).

On the Series 37, the date and time are preset in the computer. A prompt will be displayed, asking you if the date and time are correct; for example:

```
TUE, OCT 15, 1985, 12:05 PM? (Y/N)
```

If the displayed date and time are correct, enter YES; if they are incorrect, enter NO, in which case you will be prompted to enter the correct date and time.

SERIES 37/MICRO 3000/ MICRO 3000XE - ADDING I/O DEVICES

OPERATOR FUNCTION: ADDING STANDARD I/O DEVICES

DESCRIPTION: This procedure describes one method for adding input/output devices to the system. The description is a summary intended to illustrate a general technique. Complete instructions and guidelines must be obtained from Section VII of this manual.

STEP	PROCEDURE
1	Turn keyswitch to position 2.
2	Enter START.
3	The INITIAL Program begins execution and prints: HP32033G.02.00 (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press [RETURN].) Respond to the program prompts: WHICH OPTION <WARMSTART/COOLSTART>? COOLSTART ANY CHANGES? YES LOAD MAP? [RETURN] MEMORY SIZE=*xxx*? (MIN=256, MAX=4096)? [RETURN] I/O CONFIGURATION CHANGES? yes I/O MAP? y (I/O data then supplied.) LIST I/O DEVICES? YES (I/O devices then listed.) LIST DEVICE DEFAULTS? YES (Device defaults then listed.) HIGHEST DRT?=*nn* (MIN=8. MAX=511)? [RETURN] or higher number LOGICAL DEVICE #? *LDEV#* DEVICE NAME? *devname* DRT #? *drt#* UNIT #? *unit#* SOFTWARE CHANNEL # = *n*? *channel#* TYPE = *n*? *type* SUB TYPE = *n*? *subtype* RECORD WIDTH = *n*? *recwidth* OUTPUT DEVICE = *n*? *outdev* ACCEPT JOBS/SESSIONS = N? YES or NO ACCEPT DATA = N? YES or NO INTERACTIVE = N? YES or NO DUPLICATIVE = N? YES or NO INITIALLY SPOOLED = N? YES or NO INPUT OR OUTPUT? IN or OUT (Spooled devices only) AUTO REPLY = N? YES or NO DRIVER NAME = *driver* ? *driver*

STEP	PROCEDURE
3 (cont)	DEVICE CLASSES = *devclasses* ? *devclasses* IS *devclass* A SERIAL DISC CLASS? YES or NO IS *devclass* A FOREIGN DISC CLASS? YES or NO LOGICAL DEVICE #? MAX # OF OPEN SPOOLFILES = 30 (MIN=0, MAX=1010)? LIST I/O DEVICES? TERMINAL TYPE CHANGES? CLASS CHANGES? LIST I/O DEVICES? I/O CONFIGURATION CHANGES? **WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS. DISC VOLUME CHANGES? VIRTUAL MEMORY CHANGES? DISABLE LOGGING? SYSTEM TABLE CHANGES? MAX # OF SPOOLFILE KILOSECTORS = 256 (MIN=0, MAX=777777)? # OF SECTORS PER SPOOLFILE EXTENT = 1024 (MIN=128, MAX 32767)? RECOVER LOST DISC SPACE? DIRECTORY MAINTENANCE COMPLETED PART 1 OF 6 COMPLETED - MEMORY RESIDENT TABLES SET UP PART 2 OF 6 COMPLETED - SL BINDING PART 3 OF 6 COMPLETED - SYSTEM I/O PROCESS CREATION PART 4 OF 6 COMPLETED - DRIVER LOADING PART 5 OF 6 COMPLETED - DISC RESIDENT TABLES SET UP PART 6 OF 6 COMPLETED - SYSTEM PROCESS CREATION BANK 0 DEPENDENT MEMORY USED - 14103 MON, DEC 17, 1984, 11:29 AM? (Y/N) LOG FILE NUMBER 189 ON 11:30/1/LDEV #3 NOT READY *WELCOME*

SERIES 37/MICRO 3000/ MICRO 3000XE - DELETING I/O DEVICES

OPERATOR FUNCTION: DELETING I/O DEVICES

DESCRIPTION: This procedure describes one method for deleting input/output devices from the system. You may only delete a system domain disc during a RELOAD. The description below is a summary intended to illustrate a general technique. Complete instructions and guidelines must be obtained from Section VII of this manual.

STEP	PROCEDURE
1	Turn keyswitch to position 2.
2	Enter LOAD.
3	The INITIAL Program begins execution and prints: HP32033G.02.00 (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press [RETURN].) Respond to the program prompts: WHICH OPTION <COLDSTART/RELOAD/UPDATE>? COLDSTART ANY CHANGES? YES LOAD MAP? [RETURN] MEMORY SIZE = 512 (MIN=256, MAX=4096)? I/O CONFIGURATION CHANGES/ YES I/O MAP? y (I/O Map data then given.) LIST I/O DEVICES? y (I/O Devices then listed.) LIST DEVICE DEFAULTS? y (Device defaults then given.) HIGHEST DRT = 103 (MIN=8, MAX=511)? LOGICAL DEVICE #? *n* (LDEV# of device being deleted) DEVICE NAME? DRT#? 0 LOGICAL DEVICE #? MAX # OF OPEN SPOOLFILES = 30 (MIN=0, MAX=1010)? LIST I/O DEVICES? TERMINAL TYPE CHANGES? CLASS CHANGES? LIST I/O DEVICES? I/O CONFIGURATION CHANGES? **WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS

STEP	PROCEDURE
3 (cont)	SYSTEM TABLE CHANGES? MAX # OF SPOOLFILE KILOSECTORS = 256 (MIN=0, MAX=777777)? # OF SECTORS PER SPOOLFILE EXTENT = 1024 (MIN=128, MAX=32767)? RECOVER LOST DISC SPACE? DIRECTORY MAINTENANCE COMPLETED PART 1 OF 6 COMPLETED - MEMORY RESIDENT TABLES SET UP PART 2 OF 6 COMPLETED - SL BINDING PART 3 OF 6 COMPLETED - SYSTEM I/O PROCESS CREATION PART 4 OF 6 COMPLETED - DRIVER LOADING PART 5 OF 6 COMPLETED - DISC RESIDENT TABLES SET UP PART 6 OF 6 COMPLETED - SYSTEM PROCESS CREATION BANK 0 DEPENDENT MEMORY USED - 14103 MON, DEC 17, 1984, 11:29 AM? (Y/N) LOG FILE NUMBER 189 ON 11:30/2/LDEV #3 NOT READY *WELCOME*

SERIES 37/MICRO 3000/ MICRO 3000XE - SOFTWARE DUMP

OPERATOR FUNCTION: DUMPING MAIN MEMORY

DESCRIPTION: The Software Dump Facility (SDF) operates in a standalone environment after a system failure has occurred or a system halt has been performed. The SDF enables you to store information onto serial storage media so that you can later format the media with the DPAN utility and obtain information about a system failure.

It is a wise precaution to have one or more backup copies of the SDF on serial storage media. Remember that a backup SDF cannot be created after a software dump has failed; you already must have one on hand. A backup SDF should be created when the system is initially configured, and you should create a new backup SDF each time you receive a software update. This will ensure that you have the correct version of the SDF on your backup copy at all times. (If necessary, refer to "Performing a Backup Software Dump" in Section X.)

STEP	PROCEDURE
1	Mount a serial storage medium (write-enabled) on a logical device specified by the device class DDUMP, then place the drive on line.
2	If the `H for help->` prompt is not displayed on the System Console, turn the keyswitch to position 2 or 3, then enter B^C. If the `H for help->` prompt is still not displayed on the System Console, enter A^C to get the = prompt, then enter B^C. **CAUTION** If you cannot get the = prompt after entering A^C, Maintenance Mode must be entered by using a special switch on the ATP board. This should be done only in consultation with a Hewlett-Packard AEO or CE, as it involves opening the SPU box. Following the `H for help->` prompt, enter DUMP*.
3	If a system failure has occurred or a system halt has been performed prior to beginning this memory dump, the following message will appear: `OK to dump the system? (Y/N)` To access the SDF, answer Y.

STEP	PROCEDURE
4	The SDF is now loaded. If it is loaded correctly, the following message will appear on the System Console**: ***SOFTWARE DUMP FACILITY (VER *XX.XX/XX*)***
5	The system will now begin a serial execution of the SDFCOM file, which contains SDF commands and is located on the system disc. Assuming that your system is using the default SDFCOM file, the following messages will appear (respond as indicated): MOUNT DUMP MEDIA, AND PLACE DRIVE ON-LINE. PRESS THE RETURN KEY TO CONTINUE EXECUTION OF SOFTDUMP.RETURN DUMP DSEG=ALL
6	If your dump device is not connected to the system, you are automatically entered into the IOMAP facility. This facility will show you a device list and prompt you for a selection number. If you are entered into the IOMAP facility, connect the device and respond appropriately.
7	The rest of the SDFCOM file will execute, and progress messages will appear (respond as indicated): DUMP OF REAL MEMORY STARTED. DUMP OF REAL MEMORY FINISHED. DUMP OF VIRTUAL MEMORY STARTED. DUMP OF VIRTUAL MEMORY FINISHED. DUMPING FILE: LOADMAP.PUB.SYS DUMPING FILE: MPECHECK.PUB.SYS DUMPING FILE: CONFDATA.PUB.SYS DUMPING FILE: HPPMAP.PUB.SYS WARMSTART HP32033G.02.00 WHICH OPTION <WARMSTART/COOLSTART>? WARM **WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS • • •
8	If your serial storage media are reel tapes, remove the write rings; if your storage media are cartridge tapes, turn the arrows on the tapes toward SAFE.

STEP	PROCEDURE
*	If the system halts while loading the SDF, the following error message will appear on the System Console: ***DUMP FAILED This message indicates that an error has been detected, and the SDF is unable to execute. A backup software dump must be performed. Refer to "Performing a Backup Software Dump" in Section X.
**	If the SDFCOM file does not exist or has been corrupted, or if your serial storage media are flawed, the following message may appear on the System Console: SERIAL DEVICE I/O ERROR - You are now in SOFTWARE INTERACTIVE MODE. Please mount new media, then type "DUMP" in response to the prompt "SOFTDUMP COMMAND>" If you receive the SDF interactive prompt, SOFTDUMP COMMAND>, enter any of the SDF commands listed in Table 10-1. When you are finished entering SDF commands (at which time your dump should have been successfully performed and your system will be operational), advance to Step 8 to conclude this procedure.

COMMENTS

Entering a $\underline{Y}^{C}$ from the System Console at any time while the SDF file is executing may cause SDF to abort the current command and place the user in interactive mode.

The SDF command file may be modified when the system is operational. Instructions for modifying this file are presented in "Changing the SDF Command File" in Section X.

Cartridge tapes must be serialized before being used as dump media. Using nonserialized cartridge tapes will cause the dump to fail.

If you want to format and print the dump to a line printer, run the DPAN/DPAN5 utility program immediately after restarting the system. DPAN/DPAN5 is described in the MPE V Utilities Reference Manual (32033-90008).

NOTE

If a DPAN version older than G.02.00 of DPAN5 is run on a virtual memory dump, the virtual memory (which with G.02.00 is now dumped onto the storage media) will be overwritten and lost. Real memory will still be formatted.

SERIES 37/MICRO 3000/ MICRO 3000XE - LOADING THE DUS

OPERATOR FUNCTION: COLDLOADING THE DIAGNOSTIC UTILITY SYSTEM (DUS)

DESCRIPTION: The Diagnostic Utility System (DUS) is memory resident and allows you to run diagnostic and utility programs. The DUS is on a standalone magnetic tape and is loaded onto a shut down system.

STEP	PROCEDURE
1	Mount the medium containing the Diagnostic Utility System (DUS) on the appropriate drive and place the drive on line.
2	On the Console, press the CNTL and B keys simultaneously to enter the Control-B Mode of operation.
3	When the H for help-> prompt is displayed, enter the LOAD command and specify the channel and device on which the medium is mounted. The DUS is now loaded into memory and the following message is displayed on the Console: DIAGNOSTIC/UTILITY SYSTEM REVISION XX.XX ENTER YOUR PROGRAM NAME :

SERIES 39/40/42/52, & 44/48/58 - WARMSTART

OPERATOR FUNCTION: SYSTEM STARTUP (WARMSTART)

DESCRIPTION: This procedure loads the system from the system disc. It is the only restart procedure which results in recovery of incompletely processed spooled jobs and spooled device files.

WARMSTART should only be used to recover spool files and IMAGE transaction logging magnetic tape buffers.

STEP	PROCEDURE
1	On the System Control Panel, set the START thumbwheel switch to the channel address and device address of your system disc. The system disc is always configured as logical device number one (*ldev* 1).
2	For startup from the System Control Panel, press the START key. For startup from the CMP. If the system is already running, simultaneously press the CONTROL key and B (B^C). If the system is not running, press RETURN. When you see the CMP prompt character (->), enter START on the System Console.
3	The INITIAL Program begins execution and prints: HP32033*v.uu.ff* In the message, *v* is the current version of MPE, *uu* is the present update-level number, and *ff* is the fix-level number. (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press RETURN.)
4	WHICH OPTION <WARMSTART/COOLSTART>? WARMSTART If your system is running on an MPE version prior to G.01.00, there is a one or two minute delay while the INITIAL Program confirms that the configured memory size can be supported on the available physical memory and tests to make sure that the DRTs have been handled correctly. The system then prints the message BANK 0 DEPENDENT MEMORY USED - *nnnnn*, where *nnnnn* is the number of words (in decimal) used by the INITIAL Program in constructing the operating system. If your system is running on an MPE version G.01.00 or later, messages will be displayed, informing you of the INITIAL Program's progress.
5	DATE (M/D/Y)? Enter the current date in the form *mm/dd/yy*.
6	TIME (H:M)? Enter the time (24-hour clock) as *hh:mm*. The system prints the day, date, and time. If the date or time is incorrect, type NO and the system will repeat the date and time prompts. If the date/time message is correct, press RETURN to continue the WARMSTART.

STEP	PROCEDURE
6 (cont)	You now receive the *WELCOME* message. The system automatically logs on as OPERATOR.SYS. The user OPERATOR must exist in the SYS account (with OP or SM capability) prior to system startup in order to accomplish the automatic logon.
7	The system will now print one or more of the following, depending upon the system configuration: *time/pin*/MEMORY ERROR LOGGING INITIATED *time/pin*/SP# *n*/SPOOLED IN *time/pin*/SP# *n*/SPOOLED OUT *time/#Snnn/pin*/LOGON FOR: OPERATOR.SYS,PUB ON LDEV *#nn*

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COMMENTS

After a WARMSTART the following conditions exist: STREAMS=OFF, JOBFENCE=14, OUTFENCE=14, JLIMIT=0, and SLIMIT=0.

If User Logging was taking place prior to the WARMSTART, the system will print the following message:

time/pin/RECOVERING USER LOGGING PROCESS *logid*

If the process associated with *logid* is a tape file, the next request will be to mount the tape associated with the process. This will be a standard mount request.

After the User Logging files have been recovered, the following message will be printed:

time/pin/USER LOGGING FILE *logfile* RECOVERED INCLUDING
xxxx OPENS AND *xxxx* CLOSES

If there was an error during recovery, an error message will be printed.

When prompted with "DATE(M/D/Y)?", if RETURN is entered instead of an actual date, the system will assume the default date/time of WED NOV 1, 1972 12:00 AM. Always be sure to enter the correct date and time on system startup to assure proper execution of functions (i.e., the SYSDUMP Program) related to the system clock.

SERIES 39/40/42/52, & 44/48/58 - COOLSTART

OPERATOR FUNCTION: SYSTEM STARTUP (COOLSTART)

DESCRIPTION: This procedure loads the system from the system disc. This is the standard way to restart the system after a routine shutdown.

A COOLSTART deletes all spooled jobs and all input and output spool files. These can be preserved by doing a WARMSTART. The SPOOK5 utility may be used to store large spool files for subsequent processing. After spool files have been stored, the =SHUTDOWN command should be given, and a COOLSTART initiated.

STEP	PROCEDURE
1	On the System Control Panel, set the START or LOAD thumbwheel switch to the channel address and device address of your system disc. The system disc is always configured as logical device number one (*ldev* 1).
2	For startup from the System Control Panel, press the START or LOAD key. For startup from the CMP, if the system is already running, simultaneously press the CONTROL key and B (B^C). If the system is not running, press RETURN. When you see the CMP prompt character (->), enter START on the System Console.
3	The INITIAL Program begins execution and prints: HP32033*v.uu.ff* In the message, *v* is the current version MPE, *uu* is the present update-level number, and *ff* is the fix-level number. (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press RETURN.)
4	WHICH OPTION <WARMSTART/COOLSTART>? COOLSTART
5	ANY CHANGES? RETURN (Return implies NO.) If your system is running on an MPE version prior to G.01.00, there is a one or two minute delay while the INITIAL Program confirms that the configured memory size can be supported on the available physical memory and tests to make sure that the DRTs have been handled correctly. If your system is running on an MPE version G.01.00 or later, messages will be displayed, informing you of the INITIAL Program's progress. The system then prints the message BANK 0 DEPENDENT MEMORY USED - *nnnnn*, where *nnnnn* is the number of words (in decimal) used by the INITIAL Program in contructing the operating system.
6	DATE (M/D/Y)? Enter the current date in the form *mm/dd/yy*.
7	TIME (H:M)? Enter the time (24-hour clock) as *hh:mm*.

STEP	PROCEDURE
7 (cont)	The system prints the day, date, and time. If the date or time is incorrect, type NO and the system will repeat the date and time prompts. If the date/time message is correct, press RETURN to continue the COOLSTART. You now receive the *WELCOME* message. The system automatically logs on OPERATOR.SYS. The user OPERATOR must exist in the SYS account (with OP or SM capability) prior to system startup in order to accomplish the automatic logon.
8	The system will now print one or more of the following, depending upon the system configuration: *time/pin*/MEMORY ERROR LOGGING INITIATED *time/pin*/SP# *n*/SPOOLED IN *time/pin*/SP# *n*/SPOOLED OUT *time*/Sn*#nn/pin*/LOGON FOR: OPERATOR.SYS,PUB ON LDEV *#nn*

COMMENTS

After a COOLSTART the following conditions exist: STREAMS=OFF, JOBFENCE=0, and OUTFENCE=1; JLIMIT and SLIMIT are set to the values specified during system configuration.

You can make changes to the system configuration during a COOLSTART. Respond YES to the "ANY CHANGES?" prompt in Step 1 of the INITIAL Program in Section VII, and this program begins.

When prompted for "DATE(M/D/Y)?", if a RETURN is entered, instead of an actual date, the system will assume the default date/time of WED NOV 1, 1972 12:00 AM . Always be sure to enter the correct date and time at system startup to ensure proper execution of functions (i.e., the SYSDUMP Program) related to the system clock.

SERIES 39/40/42/52, & 44/48/58 - UPDATE

OPERATOR FUNCTION: SYSTEM STARTUP (UPDATE)

DESCRIPTION: This procedure cold loads the system from magnetic or cartridge tape, or from a serial disc. This is the standard procedure used when starting the system with an updated MPE operating system from Hewlett-Packard or an MPE backup copy prepared on a different HP 3000 system.

STEP	PROCEDURE
1	FOR STARTUP FROM MAGNETIC OR CARTRIDGE TAPE: Mount the MPE backup tape on the Unit 0 magnetic tape drive and place the device on line, or insert the cartridge tape into the drive. FOR STARTUP FROM A SERIAL DISC: **NOTE** The instructions given here apply to computers with more than one disc controller. If your system has a serial disc and system disc configured on one controller, read "GENERAL INSTRUCTIONS" in this appendix before doing an UPDATE from serial disc. Mount the MPE backup serial disc pack on any drive that does not share the controller on *ldev* 1. Set the drive to Unit 0, being sure no other drives on the same controller are also set to Unit 0. (During startup, the INITIAL Program dynamically allocates this drive to the nonsystem domain making it available for private volume use once the startup is complete.)
2	On the System Control Panel, set the START or LOAD thumbwheel switch to the channel address and device address of the cold load device.
3	For startup from the System Control Panel, press the START or LOAD key. For startup from the CMP, if the system is already running, simultaneously press the CONTROL key and B (B[C]). If the system is not running, enter RETURN. When you see the CMP prompt character (->), enter LOAD on the System Console.
4	The INITIAL Program begins execution and prints: HP32033*v.uu.ff* In the message, *v* is the current version MPE, *uu* is the present update-level number, and *ff* is the fix-level number. (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press RETURN).

STEP	PROCEDURE
5	WHICH OPTION <COLDSTART/RELOAD/UPDATE>? UPDATE
6	SYSTEM DISC DRT=*nn*? (RETURN) or input the correct number.
7	ANY CHANGES? (RETURN) (Return implies NO). The tape is read and rewound. If your system is running on an MPE version prior to G.01.00, there is a one or two minute delay while the INITIAL Program confirms that the configured memory size can be supported on the available physical memory and tests to make sure that the DRTs have been handled correctly. If your system is running on an MPE version G.01.00 or later, messages will be displayed, informing you of the INITIAL Program's progress. The system then prints the message BANK 0 DEPENDENT MEMORY USED - *nnnnn*, where *nnnnn* is the number of words (in decimal) used by the INITIAL Program in constructing the operating system.
8	DATE (M/D/Y)? Enter the current date in the form *mm/dd/yy*.
9	TIME (H:M)? Enter the time (24-hour clock) as *hh:mm*. The system prints the day, date, and time. If the date or time is incorrect, type NO and the system will repeat the date and time prompts. If the date and time are correct, press (RETURN) to continue the dialog. You now receive the *WELCOME* message. The system automatically logs on OPERATOR.SYS. The user OPERATOR must exist in the SYS account (with OP or SM capability) prior to system startup in order to accomplish the automatic logon.
10	The system will now print one or more of the following, depending upon the system configuration: *time/pin*/MEMORY ERROR LOGGING INITIATED *time/pin*/SP#*n*/SPOOLED IN *time/pin*/SP#*n*SPOOLED OUT *time*/S#*nnn*/*pin*/LOGON FOR: OPERATOR SYS,PUB ON LDEV #*nn*

COMMENTS

After an UPDATE, the following conditions exist: STREAMS=OFF, JOBFENCE=0, and OUTFENCE=1; JLIMIT and SLIMIT are set to the values specified during system configuration.

You can change the system configuration during an UPDATE. Respond YES to the "ANY CHANGES?" prompt in Step 1 of the INITIAL Program in Section VII, and this program begins.

When prompted for "DATE (M/D/Y)?", if a RETURN is entered instead of an actual date, the system will assume the default date/ time of WED NOV 1, 1972 12:00 AM. Always be sure to enter the correct date and time on system startup to ensure proper execution of functions (i.e., the SYSDUMP Program) related to the system clock.

SERIES 39/40/42/52, & 44/48/58 - COLDSTART

OPERATOR FUNCTION: SYSTEM STARTUP (COLDSTART)

DESCRIPTION: This procedure cold loads the system from a magnetic or cartridge tape, or from serial disc. In each case, the procedure allows you to modify the system configuration while retaining users' information. COLDSTART is commonly used when an installation maintains several backup versions, each with a different configuration.

STEP	PROCEDURE
1	FOR STARTUP FROM MAGNETIC OR CARTRIDGE TAPE: Mount the MPE backup tape on the Unit 0 magnetic tape drive, and place the device on line, or insert the cartridge tape into the drive. FOR STARTUP FROM A SERIAL DISC: **NOTE** The instructions given here apply to computers with more than one disc controller. If your system has a serial disc and system disc configured on one controller, read "GENERAL INSTRUCTIONS" in this appendix before doing a COLDSTART from serial disc. Mount the MPE backup serial disc pack on any drive that does not share the controller on *ldev* 1. Set the drive to Unit 0, being sure no other drives on the same controller are also set to Unit 0. (The INITIAL Program dynamically allocates this drive to the nonsystem domain, making it available for private volume use once the startup is complete.)
2	On the System control panel, set the START or LOAD thumbwheel switch to the channel address and device address of the cold load device.
3	For startup from the System Control Panel, press the START or LOAD key. For startup from the CMP, if the system is already running, simultaneously press the (CONTROL) key and B (B^C). If the system is not running, press (RETURN). When you see the CMP prompt character (->), enter LOAD on the System Console.
4	The INITIAL Program begins execution and prints: HP32033*v.uu.ff* In the message, *v* is the current version MPE, *uu* is the present update-level number, and *ff* is the fix-level number. (If the message does not appear after one minute, or if the Console is not an HP26XX-type terminal, press (RETURN).)

STEP	PROCEDURE
5	WHICH OPTION <COLDSTART/RELOAD/UPDATE>? COLDSTART ANY CHANGES? (RETURN) (Return implies NO.)
6	The tape is read and rewound. If your system is running on an MPE version prior to G.01.00, there is a one or two minute delay while the INITIAL Program confirms that the configured memory size can be supported on the available physical memory and tests to make sure that the DRTs have been handled correctly. If your system is running on an MPE version G.01.00 or later, messages will be displayed, informing you of the INITIAL Program's progress. The system then prints the message BANK 0 DEPENDENT MEMORY USED - *nnnnn*, where *nnnnn* is the number of words (in decimal) used by the INITIAL Program in constructing the operating system.
7	DATE (M/D/Y)? Enter the current date in the form *mm/dd/yy*.
8	TIME (H:M)? Enter the time (24-hour clock) as *hh:mm*. The system prints the day, date, and time. If the date or time is incorrect, type NO and the system will repeat the date and time prompts. If the date and time are correct, press (RETURN) to continue the dialog.
9	You now receive the *WELCOME* message. The system automatically logs on OPERATOR.SYS. The user OPERATOR must exist in the SYS account (with OP or SM capability) prior to system startup in order to accomplish the automatic logon. The system may now print one or more of the following, depending on your system's configuration: *time/pin*/MEMORY ERROR LOGGING INITIATED *time/pin*/SP# *n*/SPOOLED IN *time/pin*/SP# *n*/SPOOLED OUT *time*/#S*nnn*/*pin*/LOGON FOR: OPERATOR.SYS,PUB ON LDEV# *nn*

COMMENTS

After a COLDSTART, the following conditions exist: STREAMS=OFF, JOBFENCE=0, and OUTFENCE=1; JLIMIT and SLIMIT are set to the values specified during system configuration.

You can change the system configuration during a COLDSTART. Respond YES to the "ANY CHANGES?" prompt in Step 1 of the INITIAL Program in Section VII, and this program begins.

When prompted for "DATE (M/D/Y)?", if a (RETURN) is entered instead of an actual date, the system will assume the default date/time of WED NOV 1, 1972 12:00 AM. Always be sure to enter the correct date and time on system startup to assure proper operation of functions (i.e., the SYSDUMP Program) related to the system clock.

SERIES 39/40/42/52, & 44/48/58 - RELOAD

OPERATOR FUNCTION: SYSTEM STARTUP (RELOAD)

DESCRIPTION: This procedure cold loads the entire system, including all system files and configuration information. The system is reloaded from a backup copy which was produced by the SYSDUMP Program to magnetic tape, cartridge tape, or serial disc.

CAUTION

A RELOAD DESTROYS ANY FILES WHICH MAY BE ON ANY OF THE SYSTEM DISC VOLUMES.

STEP	PROCEDURE
1	FOR STARTUP FROM MAGNETIC OR CARTRIDGE TAPE: Mount the MPE backup tape on the Unit 0 tape drive and place the device on line, or insert the cartridge tape into the drive. FOR STARTUP FROM A SERIAL DISC: **NOTE** The instructions given here apply to computers with more than one disc controller. If your system has a serial disc and system disc configured on one controller, read "GENERAL INSTRUCTIONS" in this appendix before doing a RELOAD from serial disc. Mount the backup serial disc pack on any drive that does not share the controller on *ldev* 1. Set the drive to Unit 0, being sure no other drives on the same controller are also set to Unit 0. (During startup, the INITIAL Program dynamically allocates this drive to the nonsystem domain making it available for private volume use once the startup is complete.)
2	On the System Control Panel, set the START or LOAD thumbwheel switch to the channel address and device address of the cold load device.
3	For startup from the System Control Panel, press the START or LOAD key. For startup from the CMP, if the system is already running, simultaneously press the CONTROL key and B (B^C). If the system is not running, depress RETURN. When you see the CMP prompt character (->), enter START or LOAD on the System Console.

STEP	PROCEDURE
4	The INITIAL Program begins execution and prints: HP32033*v.uu.ff* In the message, *v* is the current version MPE, *uu* is the present update-level number, and *ff* is the fix-level number. (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press RETURN.)
5	WHICH OPTION <COLDSTART/RELOAD/UPDATE>? RELOAD
6	WHICH OPTION <SPREAD/COMPACT/RESTORE/ACCOUNTS/NULL? Press RETURN to select SPREAD (default). The reload options are described following this table.
7	ANY CHANGES? RETURN (Return implies NO.) The tape is read and rewound; additional volumes of tape reels may be requested. If your system is running on an MPE version prior to G.01.00, there is a one or two minute delay while the INITIAL Program confirms that the configured memory size can be supported on the available physical memory and tests to make sure that the DRTs have been handled correctly. If your system is running on an MPE version G.01.00 or later, messages will be displayed, informing you of the INITIAL Program's progress. The system then prints the message BANK 0 DEPENDENT MEMORY USED - *nnnnn*, where *nnnnn* is the number of words (in decimal) used by the INITIAL Program in constructing the operating system.
8	DATE (M/D/Y)? Enter the current date in the form *mm/dd/yy*.
9	TIME (H:M)? Enter the time (24-hour) clock as *hh:mm*. The system prints the day, date, and time. If the date or time is incorrect, type NO and the system will repeat the date and time prompts. If the date and time are correct, press RETURN to continue the dialog. You now receive the *WELCOME* message. The system automatically logs on OPERATOR.SYS. The user OPERATOR must exist in the SYS account (with OP or SM capability) prior to system startup in order to accomplish the automatic logon.
10	The system may now print one or more of the following, depending on your system's configuration: *time/pin*/MEMORY ERROR LOGGING INITIATED *time/pin*/SP# *n*/SPOOLED IN *time/pin*/SP# *n*/SPOOLED OUT *time/#Snnn/pin*/LOGON FOR: OPERATOR.SYS,PUB ON LDEV *#nn*

COMMENTS

After a RELOAD, the following conditions exist: STREAMS=OFF, JOBFENCE=0, and OUTFENCE=1; JLIMIT and SLIMIT are set to the values specified during system configuration.

You can change the system configuration during a RELOAD. Respond YES to the "ANY CHANGES?" prompt in Step 1 of the INITIAL Program in Section VII, and this program begins.

When prompted for "DATE (M/D/Y)?", if RETURN is entered instead of the true date, the system will assume the default date/time of WED NOV 1, 1972 12:00 AM. Always be sure to enter the correct date and time on system startup to ensure proper execution of functions (i.e., the SYSDUMP Program) related to the system clock.

RELOAD OPTIONS

Your response in Step 6 selects the algorithm the system will use to reload the discs. The algorithm determines on which system disc a file is stored, and whether the *user.group.account* structure is placed in the appropriate directory area. RELOAD options are:

SPREAD — MPE attempts to place the file back on a disc of the device class as it was originally created. If this fails, MPE attempts to replace the file on a disc of the same type and sub-type as the disc on which it was previously located (for example, on a cartridge disc). If this fails, MPE attempts to place it on a disc of the same type (for example, a moving-head disc). If this fails, MPE attempts to place the file on any disc in device class DISC. If this fails, a message is printed and the file is not reloaded. In each of these attempts, the files are spread among similar discs, if possible. For instance, suppose that when the system was dumped, there was one cartridge disc that was full, and when it is reloaded there are two cartridge discs. In this case, each disc will be approximately half full. The advantages of the SPREAD option are reduced disc seeking (since files are spread out), and reduced fragmentation (since the disc is repacked). The disadvantage is that if the discs are nearly full, it may not be possible to restore all files that were previously stored on the discs. This situation very rarely occurs. In this case, one of the other options may be used.

COMPACT — MPE attempts to place the file back on the same volume from which it came. If this fails, the SPREAD option is used. The major advantage of COMPACT is that if there are no new deleted tracks, and the same discs are used, reloading of the system is guaranteed, no matter how full the discs are. In addition, each disc is compacted within the area between deleted tracks. If there are n deleted tracks, there will be at most $(n+1)$ fragments.

RESTORE — MPE attempts to place the files back on the same volume at the same locations from which they came. If this fails, MPE attempts to place the files anywhere on the volume from which they came. If this fails, the SPREAD option is used. The advantages to RESTORE are that it offers the same guarantee made in COMPACT for reloading the system, and that the same files that were previously using alternate tracks are still using them. The disadvantage is that no compacting of the discs is done so that the same fragmentation still exists.

ACCOUNTS

This option loads the system, creates a directory from the backup copy, and loads the system files which reside in the PUB group of the SYS account. No user files are loaded onto the system.

The directory which is created will consist of all accounts, groups, and user structures which were current at the time the backup copy was written (by the SYSDUMP Program).

This option is useful in that files saved by the SYSDUMP Program are compatible with files stored using the :STORE command. In this way you could, for example:

1. Create a new directory structure if the previous directory was destroyed.

2. Conserve vital disc space by selectively loading files into certain accounts with the :RESTORE command (after the system is operational).

NULL

MPE creates a null directory with MANAGER.SYS,PUB as the only user and no user files are copied to the disc.

NOTE

To perform a RELOAD, Hewlett-Packard recommends the following: Use the ACCOUNTS option; after the system is operational, use the :RESTORE command to restore user files into the accounts.

SERIES 39/40/42/52, & 44/48/58 - ADDING I/O DEVICES

OPERATOR FUNCTION: ADDING STANDARD I/O DEVICES

DESCRIPTION: This procedure describes one method for adding input/output devices to the system. The description is a summary intended to illustrate a general technique. Complete instructions and guidelines must be obtained from Section VII of this manual.

STEP	PROCEDURE
1	On the System control panel, set the START thumbwheel switch to the channel address and device address of the system disc.
2	For startup from the System Control Panel, press the START key. For startup from the CMP, if the system is already running, simultaneously press the (CONTROL) key and B(B^C). If the system is not running, press (RETURN). When you see the CMP prompt character (->), enter START on the System Console.
3	The INITIAL Program begins execution and prints: HP32033*v.uu.ff* (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press (RETURN).) Respond to the INITIAL Program prompts: WHICH OPTION <WARMSTART/COOLSTART>? COOLSTART ANY CHANGES? YES LOAD MAP? (RETURN) MEMORY SIZE=*xxxx*? (RETURN) I/O CONFIGURATION CHANGES? YES LIST I/O DEVICES? YES LIST CS DEVICES? YES HIGHEST DRT?=*nn*? (RETURN) or higher number LOGICAL DEVICE #? *LDEV#* DEVICE NAME? *devname* DRT #? *drt#* UNIT #? *unit#* SOFTWARE CHANNEL # = *n*? *channel#* TYPE = *n*? *type* SUB TYPE = *n*? *subtype* RECORD WIDTH = *n*? *recwidth* OUTPUT DEVICE = *n*? *outdev* ACCEPT JOBS/SESSIONS = N? YES or NO ACCEPT DATA = N? YES or NO INTERACTIVE = N? YES or NO DUPLICATIVE = N? YES or NO INITIALLY SPOOLED = N? YES or NO INPUT OR OUTPUT? IN or OUT (Spooled devices only) AUTO REPLY = N? YES or NO

STEP	PROCEDURE
3 (cont)	DRIVER NAME = *driver*? *driver* DEVICE CLASSES = *devclasses*? *devclasses* IS *devclass* A SERIAL DISC CLASS? YES or NO IS *devclass* A FOREIGN DISC CLASS? YES or NO LOGICAL DEVICE #? RETURN MAX # OF OPEN SPOOLFILES=*xxx*? RETURN LIST I/O DEVICES? RETURN LIST CS DEVICES? RETURN CLASS CHANGES? RETURN LIST I/O DEVICES? RETURN ADDITIONAL DRIVER CHANGES? RETURN I/O CONFIGURATION CHANGES? RETURN DISC VOLUME CHANGES? RETURN VIRTUAL MEMORY CHANGES? RETURN DISABLE LOGGING RETURN MAX # OF SPOOLFILES KILOSECTORS=*xxxxxxx*? RETURN # OF SECTORS PER SPOOLFILE EXTENT=*nnn*? RETURN RECOVER LOST DISC SPACE? RETURN DATE (M/D/Y)? *mm/dd/yy* TIME (H:M)? *hh:mm* (24-hour clock)

SERIES 39/40/42/52, & 44/48/58 - DELETING I/O DEVICES

OPERATOR FUNCTION: DELETING I/O DEVICES

DESCRIPTION: This procedure describes one method for deleting input/output devices from the system. You may only delete a system domain disc during a RELOAD. The description below is a summary intended to illustrate a general technique. Complete instructions and guidelines must be obtained from Section VII of this manual.

STEP	PROCEDURE
1	On the System control panel, set the START thumbwheel switch to the channel address and device address of the cold load device.
2	For startup from the System Control Panel, press the START key. For startup from the CMP, if the system is already running, simultaneously press the [CONTROL] key and B(B^{C}). If the system is not running, press [RETURN]. When you see the CMP prompt character (->), enter START on the System Console.
3	The INITIAL Program begins execution and prints: HP32033*v.uu.ff* (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press [RETURN].) Respond to the INITIAL Program prompts: WHICH OPTION <COLDSTART/RELOAD/UPDATE>? COLDSTART ANY CHANGES? YES LOAD MAP? [RETURN] MEMORY SIZE=*nnn*? [RETURN] I/O CONFIGURATION CHANGES? YES LIST I/O DEVICES? YES LIST CS DEVICES? YES HIGHEST DRT?=*nn*? [RETURN] LOGICAL DEVICE #? *n* (LDEV# of device being deleted) DEVICE NAME? DRT #? 0 LOGICAL DEVICE #? [RETURN] MAXIMUM # OF OPEN SPOOLFILES=*nn*.? [RETURN] LIST I/O DEVICES? [RETURN] LIST CS DEVICES? YES CLASS CHANGES? [RETURN] LIST I/O DEVICES? YES ADDITIONAL DRIVER CHANGES? [RETURN] I/O CONFIGURATION CHANGES? [RETURN] DISC VOLUME CHANGES? [RETURN] VIRTUAL MEMORY CHANGES? [RETURN] DISABLE LOGGING? [RETURN] MAX # OF SPOOLFILE KILOSECTORS=*xxxxxx*? [RETURN] # OF SECTORS PER SPOOLFILE EXTENT=*nnn*? [RETURN]

STEP	PROCEDURE
3 (cont)	RECOVER LOST DISC SPACE? RETURN DATE (M/D/Y)? *mm/dd/yy* TIME (H:M)? *hh/mm* (24-hour clock)

SERIES 39/40/42/52, & 44/48/58 - SOFTWARE DUMP

OPERATOR FUNCTION: DUMPING MAIN MEMORY

DESCRIPTION:

The Software Dump Facility (SDF) operates in a standalone environment after a system failure has occurred or a system halt has been performed. The SDF enables you to store information onto serial storage media so that you can later format the media with the DPAN utility and obtain information about a system failure.

It is a wise precaution to have one or more backup copies of the SDF on serial storage media. Remember that a backup SDF cannot be created after a software dump has failed; you already must have one on hand. A backup SDF should be created when the system is initially configured, and you should create a new backup SDF each time you receive a software update. This will ensure that you have the correct version of the SDF on your backup copy at all times. (If necessary, refer to "Performing a Backup Software Dump" in Section X.)

NOTE

For a base system configuration consisting of a single HP 7906A disc drive operating in split mode (i.e., the system on the fixed disc, and the cartridge as a private volume/serial disc), performing a backup software dump is the only method of obtaining a dump.

STEP	PROCEDURE
1	Mount a serial storage medium (write-enabled) on a logical device specified by the device class DDUMP, then place the drive on line.
2	On the System Control Panel, set the DUMP thumbwheel switches to the channel and device address of the system disc. (Refer to Section XI for more information on thumbwheel switch settings.) Enable the CMP by entering B^C. When you see the CMP prompt character (->), enter DUMP on the System Console or press the DUMP key on the System Control Panel*.
3	If a system failure has occurred or a system halt has been performed prior to beginning this memory dump, the following message will appear: OK to dump the system? (Y/N) To access the SDF, answer Y.

STEP	PROCEDURE
4	The SDF is now loaded. If it is loaded correctly, the following message will appear on the System Console**: ***SOFTWARE DUMP FACILITY (VER *XX.XX/XX*)***
5	The system will now begin a serial execution of the SDFCOM file, which contains SDF commands and is located on the system disc. Assuming that your system is using the default SDFCOM file, the following messages will appear (respond as indicated): MOUNT DUMP MEDIA, AND PLACE DRIVE ON-LINE. PRESS THE RETURN KEY TO CONTINUE EXECUTION OF SOFTDUMP.(RETURN) DUMP DSEG=ALL
6	If your dump device is not connected to the system, you are automatically entered into the IOMAP facility. This facility will show you a device list and prompt you for a selection number. If you are entered into the IOMAP facility, connect the device and respond appropriately.
7	The rest of the SDFCOM file will execute, and progress messages will appear (respond as indicated): DUMP OF REAL MEMORY STARTED. DUMP OF REAL MEMORY FINISHED. DUMP OF VIRTUAL MEMORY STARTED. DUMP OF VIRTUAL MEMORY FINISHED. DUMPING FILE: LOADMAP.PUB.SYS DUMPING FILE: MPECHECK.PUB.SYS DUMPING FILE: CONFDATA.PUB.SYS DUMPING FILE: HPPMAP.PUB.SYS WARMSTART HP32033G.02.00 WHICH OPTION <WARMSTART/COOLSTART>? WARM **WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS • • •
8	If your serial storage media are reel tapes, remove the write rings; if your storage media are cartridge tapes, turn the arrows on the tapes toward SAFE.

STEP	PROCEDURE
*	If the system halts while loading the SDF, the following error message will appear on the System Console: ***DUMP FAILED This message indicates that an error has been detected, and the SDF is unable to execute. A backup software dump must be performed. Refer to "Performing a Backup Software Dump" in Section X.
**	If the SDFCOM file does not exist or has been corrupted, or if your serial storage medium is flawed, the following message may appear on the System Console: SERIAL DEVICE I/O ERROR - You are now in SOFTWARE INTERACTIVE MODE. Please mount new media, then type "DUMP" in response to the prompt "SOFTDUMP COMMAND>" If you receive the SDF interactive prompt, SOFTDUMP COMMAND>, enter any of the SDF commands listed in Table 10-1. When you are finished entering SDF commands (at which time your dump should have been successfully performed and your system will be operational), advance to Step 8 to conclude this procedure.

COMMENTS

Entering a Y^C from the System Console at any time while the SDF file is executing may cause SDF to abort the current command and place the user in interactive mode.

The SDF command file may be modified when the system is operational. Instructions for modifying this file are presented in "CHANGING THE SDF COMMAND FILE" in Section X.

If you want to format and print the dump to a line printer, run the DPAN/DPAN5 utility program immediately after restarting the system. DPAN/DPAN5 is described in the MPE V Utilities Reference Manual (32033-90008).

NOTE

If a DPAN version older than G.02.00 of DPAN5 is run on a virtual memory dump, the virtual memory (which with G.02.00 is now dumped onto the storage media) will be overwritten and lost. Real memory will still be formatted.

SERIES 39/40/42/52, & 44/48/58 - LOADING THE DUS

OPERATOR FUNCTION: COLD LOADING THE DIAGNOSTIC UTILITY SYSTEM (DUS)

DESCRIPTION: The Diagnostic/Utility System (DUS) is memory resident and allows you to run diagnostic and utility programs. The DUS is on a standalone serial medium and is loaded onto a shut down system.

STEP	PROCEDURE
1	Mount the medium containing the Diagnostic Utility System on the appropriate drive and place the drive on line, if applicable.
2	On the System Control Panel, set the LOAD thumbwheel switch to the channel address and device address of the drive containing the DUS.
3	From the System Control Panel: press the HALT key, then press the LOAD key. From the CMP: press (RETURN). When the CMP prompt (->) appears on the system console, enter HALT. When another prompt is printed, enter LOAD. At this point the medium containing the DUS is loaded into memory, and the following message appears on the system console: DIAGNOSTIC/UTILITY SYSTEM REVISION *xx.xx* ENTER YOUR PROGRAM NAME (Enter HELP for program information.) :

SERIES 39/40/42/52, & 44/48/58 - FORMATTING SYSTEM PACKS

OPERATOR FUNCTION: FORMATTING SYSTEM DISC PACKS

DESCRIPTION: This procedure describes how to use the Sleuth Simulator (SLEUTHSM), which is part of the Diagnostic Utility System (DUS), to format system disc packs. The DUS is on a standalone serial medium and is loaded onto a shutdown system.

STEP	PROCEDURE
1	Load the Diagnostic/Utility System as described in "LOADING THE DUS", in this appendix. (Note that all entries must be in upper case.)
2	Type AID on the System Console and press (RETURN). The following message will be displayed: AID *xx.xx* >10
3	Type LOAD SLEUTHSM and press (RETURN). The Sleuth Simulator is then loaded into memory. The System Console displays the next line number in the program, and you are ready to enter the dialog necessary to format a disc pack.
4	Enter the following statements to format any disc. >5000 DEV 0,*channel*,*device*,20,*unit* >5010 FMT 0 >5020 RUN
5	After the disc is formatted, SLEUTHSM again prompts for input (>). For flagging defective tracks, enter the program which corresponds to the type of disc pack you wish to flag: **7906,7920 Disc Pack** >EP >5000 DEV 0,*channel*,*device*,10,0 >5010 DB AA,6144,0 >5020 RC 0 >5030 PRINT "CYLINDER # TO BE FLAGGED DEFECTIVE?" >5040 INPUT A >5050 PRINT "HEAD#?" >5060 INPUT B >5070 SEEK 0,A,B,0 >5080 IDI 0,AA(0),3,D >5090 PRINT "CONTINUE? (YES/NO)" >5100 INPUT &BB >5110 IF &BB="YES" THEN 5020 >5120 RUN

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STEP	PROCEDURE
5 (cont)	**7925 Disc Pack** >EP >5000 DEV 0,*channel*,*device*,10,0 >5010 DB AA,8192,0 >5020 RC 0 >5030 PRINT "CYLINDER # TO BE FLAGGED DEFECTIVE?" >5040 INPUT A >5050 PRINT HEAD#?" >5060 INPUT B >5070 SEEK 0,A,B,0 >5080 IDI 0,AA(0),3,D >5090 PRINT CONTINUE? (YES/NO)" >5100 INPUT &BB >5110 IF &BB="YES" THEN 5020 >5120 RUN In line 5000 of the above programs, you must supply the channel number and the device number of the drive on which the disc pack is mounted. The programs ask three questions for each defective track. In response to the first, enter the cylinder number of the defective track; in response to the second, enter the head number of the defective track. The cylinder and head numbers of defective tracks are listed on the "List of Defective Tracks" supplied with each new disc. To the third question, "CONTINUE? (YES/NO)", enter NO until you have entered all defective tracks, then enter YES.
6	After the defective tracks have been flagged, SLEUTHSM again prompts for input (>). Enter another program or halt the system.

NOTE

The HP 7911, HP 7912, HP 7914, HP 7933, and HP 7935 disc drives have an internal mechanism for flagging defective tracks. SLEUTHSM can be used to format discs, but not to flag defective tracks.

SERIES 64/68/70 - WARMSTART

OPERATOR FUNCTION: SYSTEM STARTUP (WARMSTART)

DESCRIPTION: This procedure loads the system from the system disc. It is the only restart procedure which results in recovery of incompletely processed spooled jobs and spooled device files.

WARMSTART should only be used to recover spool files and IMAGE transaction logging magnetic tape buffers.

STEP	PROCEDURE
1	If the system is already running, simultaneously depress the CONTROL key and B (B^C). If the system is not running, press RETURN. When you see the DCU prompt (M>), enter START on the System Console.
2	The INITIAL Program begins execution and prints the following message: HP 32033*v.uu.ff* In the message, *v* is the current version of MPE, *uu* is the present update-level number, and *ff* is the fix-level number. (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press RETURN.)
3	WHICH OPTION <WARMSTART/COOLSTART>? WARMSTART If your system is running on an MPE version prior to G.01.00, there is a one or two minute delay while the INITIAL Program confirms that configured memory size can be supported on the available physical memory and tests to make sure that the DRTs have been handled correctly. If your system is running on an MPE version G.01.00 or later, messages will be displayed, informing you of the INITIAL Program's progress. The system then prints the message BANK 0 DEPENDENT MEMORY USED - *nnnnn*, where *nnnnn* is the number of words (in decimal) used by the INITIAL Program in constructing the Operating System.
4	DATE (M/D/Y)? Enter the current date in the form *mm/dd/yy*. TIME (H:M)? Enter the time (24-hour clock) as *hh:mm*.
5	The system prints the day, date, and time. If the date or time is incorrect, type NO and the system will repeat the date and time prompts. If the date/time message is correct, press RETURN to continue the WARMSTART. You now receive the *WELCOME* message. The system automatically logs on as OPERATOR.SYS. The user OPERATOR must exist in the SYS account (with OP or SM capability) prior to system startup in order to accomplish the automatic logon.

STEP	PROCEDURE
6	The system may now print one or more of the following, depending upon the system configuration: *time/pin*/MEMORY ERROR LOGGING INITIATED *time/pin*/SP# *n*/SPOOLED IN *time/pin*/SP# *n*/SPOOLED OUT *time/#Snnn/pin*/LOGON FOR OPERATOR.SYS,PUB ON LDEV *#nn*

COMMENTS

After a WARMSTART, the following conditions exist: STREAMS=OFF, JOBFENCE=14, OUTFENCE=14, JLIMIT=0, and SLIMIT=0.

If User Logging was taking place prior to the WARMSTART, the system will print the following message:

time/pin/RECOVERING USER LOGGING PROCESS *logid*

If the process associated with *logid* is a tape file, the next request will be to mount the tape associated with the process. This will be a standard mount request.

After the User Logging files have been recovered, the following message will be printed:

time/pin/USER LOGGING FILE *logfile* RECOVERED INCLUDING
xxx OPENS AND *xxx* CLOSES

If there was an error during recovery, an error message will be printed.

When prompted for "DATE (M/D/Y)?", if RETURN is entered instead of an actual date, the system will assume the default date/time of WED NOV 1, 1972 12:00 AM. Always be sure to enter the correct date and time on system startup to ensure proper execution of functions (i.e., the SYSDUMP Program) related to the system clock.

SERIES 64/68/70 - COOLSTART

OPERATOR FUNCTION: SYSTEM STARTUP (COOLSTART)

DESCRIPTION: This procedure loads the system from the system disc. It is the standard way to restart the system after a routine shutdown.

A COOLSTART deletes all Spooled Jobs and all Input and Output Spool files. These can be preserved by doing a WARMSTART. The SPOOK5 utility may be used to store large spool files for subsequent processing. After all spool files have been stored, the =SHUTDOWN command should be given, and a COOLSTART initiated.

STEP	PROCEDURE
1	If the system is already running, simultaneously press the CONTROL key and B (B^C). If the system is not running, press RETURN. When you see the DCU prompt (M>), enter START on the System Console.
2	The INITIAL Program begins execution and prints the following message: HP 32033*v.uu.ff* In the message, *v* is the current version of MPE, *uu* is the present update-level number, and *ff* is the fix-level number. (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press RETURN.)
3	WHICH OPTION <WARMSTART/COOLSTART>? COOLSTART
4	ANY CHANGES? RETURN (Return implies NO) If your system is running on an MPE version prior to G.01.00, there is a one or two minute delay while the INITIAL Program confirms that configured memory size can be supported on the available physical memory and tests to make sure that the DRTs have been handled correctly. If your system is running on an MPE version G.01.00 or later, messages will be displayed, informing you of the INITIAL Program's progress. The system then prints the message BANK 0 DEPENDENT MEMORY USED - *nnnnn*, where *nnnnn* is the number of words (in decimal) used by the INITIAL Program in constructing the Operating System.
5	DATE (M/D/Y)? Enter the current date in the form *mm/dd/yy*.
6	TIME (H:M)? Enter the time (24-hour clock) as *hh:mm*. The system prints the day, date, and time. If the date or time is incorrect, type NO and the system will repeat the date and time prompts. If the date/time message is correct, press RETURN to continue the COOLSTART. You now receive the *WELCOME* message. The system automatically logs on as OPERATOR.SYS.

STEP	PROCEDURE
6 (cont)	The user OPERATOR must exist in the SYS account (with OP or SM capability) prior to system startup in order to accomplish the automatic logon.
7	The system may now print one or more of the following, depending upon the system configuration: *time/pin*/MEMORY ERROR LOGGING INITIATED *time/pin*/SP# *n*/SPOOLED IN *time/pin*/SP# *n*/SPOOLED OUT *time*/#S*nn*/*pin*/LOGON FOR OPERATOR.SYS,PUB ON LDEV #*nn*

COMMENTS

After a COOLSTART the following conditions exist: STREAMS=OFF, JOBFENCE=0, and OUTFENCE=1; JLIMIT and LIMIT are set to the values specified during system configuration.

You can make changes to the system configuration during a COOLSTART. Respond YES to the "ANY CHANGES?" prompt in Step 1 of the INITIAL Program in Section VII, and this program begins.

When prompted for "DATE (M/D/Y)?", if RETURN is entered instead of an actual date, the system will assume the default date/time of WED NOV 1, 1972 12:00 AM. Always be sure to enter the correct date and time on system startup to ensure proper execution of functions (i.e., the SYSDUMP Program) related to the system clock.

SERIES 64/68/70 - UPDATE

OPERATOR FUNCTION: SYSTEM STARTUP (UPDATE)

DESCRIPTION: This procedure cold loads the system from magnetic tape or from serial disc. This is the standard procedure used when starting the system with an updated MPE operating system from Hewlett-Packard, or an MPE backup copy prepared on a different HP 3000 system.

STEP	PROCEDURE
1	FOR STARTUP FROM MAGNETIC TAPE: Mount the MPE backup tape on the Unit 0 magnetic tape drive. Place the device on line.
2	FOR STARTUP FROM A SERIAL DISC: **NOTE** The instructions given here apply to computers with more than one disc controller. If your system has a serial disc and system disc configured on one controller, read "GENERAL INSTRUCTIONS" in this appendix before doing a UPDATE from serial disc. Mount the MPE backup serial disc pack on any drive that does not share the controller on *ldev* 1. Set the drive to Unit 0, being sure no other drives on the same controller are also set to unit 0. (During startup, the INITIAL Program dynamically allocates this drive to the nonsystem domain, making it available for private volume use once the startup is complete.)
3	If the system is already running, simultaneously press the CONTROL key and B (B^C). If the system is not running, press RETURN. When you see the DCU prompt (M>), enter LOAD on the System Console. If you wish to cold load from a device other than the preset default device, enter the IMB number, channel number and device number, separated by commas, after LOAD, e.g.: LOAD *imb,channel,device* It is important to note that once you have overridden the default cold load device in this way, the new values become the default until power is cycled on the system. In this case the default values initially set by the factory take effect. When the system finishes accessing the cold load medium, the INITIAL Program begins execution and prints: HP 32033*v.uu.ff* In this message, *v* is the current version of MPE, *uu* is the present update-level number, and *ff* is the fix-level number. (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press RETURN.)

STEP	PROCEDURE
4	WHICH OPTION <COLDSTART/RELOAD/UPDATE>? UPDATE
5	SYSTEM DISC DRT=*nnn*? RETURN (or input correct DRT#).
6	ANY CHANGES? RETURN (Return implies NO.)
7	The tape is read and rewound. If your system is running on an MPE version prior to G.01.00, there is a one or two minute delay while the INITIAL Program confirms that the configured memory size can be supported on the available physical memory and tests to make sure that the DRTs have been handled correctly. If your system is running on an MPE version G.01.00 or later, messages will be displayed, informing you of the INITIAL Program's progress. The system then prints the message BANK 0 DEPENDENT MEMORY USED - *nnnnn*, where *nnnnn* is the number of words (in decimal) used by the INITIAL Program in constructing the operating system.
8	DATE(M/D/Y)? Enter the current date in the form *mm/dd/yy*.
9	TIME(H:M)? Enter the time (24-hour clock) as *hh:mm*. The system prints the day, date and time. If the date or time is incorrect, type NO and the system will repeat the DATE and TIME prompts. If the date and time are correct, press RETURN to continue the dialog. You will now receive the *WELCOME* message. The system automatically logs on as OPERATOR.SYS. The user OPERATOR must exist in the SYS account (with OP or SM capability) prior to system startup in order to accomplish the automatic logon.
10	The system may now print one or more of the following, depending upon the system configuration: *time/pin*/MEMORY ERROR LOGGING INITIATED *time/pin*/SP# *n*/SPOOLED IN *time/pin*/SP# *n*/SPOOLED OUT *time*/#S*nnn*/*pin*/LOGON FOR: OPERATOR.SYS,PUB ON LDEV #nn

COMMENTS

After an UPDATE, the following conditions exist: STREAMS=OFF, JOBFENCE=0, and OUTFENCE=1; JLIMIT and SLIMIT are set to the values specified during system configuration.

You can change the system configuration during an UPDATE. Respond YES to the "ANY CHANGES?" prompt in Step 1 of the INITIAL Program in Section VII, and this program begins.

When prompted for "DATE(M/D/Y)?", if a RETURN is entered instead of an actual date, the system will assume the default date/time of WED NOV 1, 1972 12:00 AM. Always be sure to enter the correct date and time on system startup to ensure proper execution of functions (i.e., the SYSDUMP Program) related to the system clock.

SERIES 64/68/70 - COLDSTART

OPERATOR FUNCTION: SYSTEM STARTUP (COLDSTART)

DESCRIPTION: This procedure cold loads the system from magnetic tape or from serial disc. In each case, the procedure allows you to modify the system configuration while retaining users' information. COLDSTART is commonly used when an installation maintains several backup versions, each with a different configuration.

STEP	PROCEDURE
1	FOR STARTUP FROM MAGNETIC TAPE: Mount the MPE backup tape on the Unit 0 magnetic tape drive and place the device on line.
2	FOR STARTUP FROM A SERIAL DISC: **NOTE** The instructions given here apply to computers with more than one disc controller. If your system has a serial disc and system disc configured on one controller, read "GENERAL INSTRUCTIONS" in this appendix before doing a COLDSTART from serial disc. Mount the MPE backup serial disc pack on any drive that does not share the controller on *ldev* 1. Set the drive to Unit 0, being sure no other drives on the same controller are also set to Unit 0. (During startup, the INITIAL Program dynamically allocates this drive to the nonsystem domain, making it available for private volume use once the startup is complete.)
3	If the system is already running, simultaneously press the CONTROL key and B (B^C). If the system is not running, press RETURN. When you see the DCU prompt (M>), enter LOAD on the System Console. If you wish to cold load from a device other than the preset default device, enter the IMB number, channel number and device number, separated by commas, after LOAD, e.g.: LOAD *imb,channel,device* Note however, that once you have overridden the default cold load device in this way, the new values become the default until power is cycled on the system. In this case the default values initially set by the factory take effect.

STEP	PROCEDURE
4	When the system finishes accessing the cold load medium, the INITIAL Program begins execution and prints: HP 32033*v.uu.ff* In this message, *v* is the current version of MPE, *uu* is the present update-level number, and *ff* is the fix-level number. (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press RETURN.)
5	WHICH OPTION <COLDSTART/RELOAD/UPDATE>? COLDSTART
6	ANY CHANGES? RETURN (Return implies NO.) The tape is read and rewound. If your system is running on an MPE version prior to G.01.00, there is a one or two minute delay while the INITIAL Program confirms that the configured memory size can be supported on the available physical memory and tests to make sure that the DRTs have been handled correctly. If your system is running on an MPE version G.01.00 or later, messages will be displayed, informing you of the INITIAL Program's progress. The system then prints the message BANK 0 DEPENDENT MEMORY USED - *nnnnn*, where *nnnnn* is the number of words (in decimal) used by the INITIAL Program in constructing the operating system.
7	DATE(M/D/Y)? Enter the current date in the form *mm/dd/yy*.
8	TIME(H:M)? Enter the time (24-hour clock) as *hh:mm*. The system prints the day, date and time. If the date or time is incorrect, type NO and the system will repeat the date and time prompts. If the date and time are correct, press RETURN to continue the dialog. You now will now receive the *WELCOME* message. The system automatically logs on OPERATOR.SYS. The user OPERATOR must exist in the SYS account (with OP or SM capability) prior to system startup in order to accomplish the automatic logon. The system may now print one or more of the following, depending upon the system configuration:
9	*time/pin*/MEMORY ERROR LOGGING INITIATED *time/pin*/SP# *n*/SPOOLED IN *time/pin*/SP# *n*/SPOOLED OUT *time/#Snnn/pin*/LOGON FOR: OPERATOR.SYS,PUB ON LDEV #*nn*

COMMENTS

After a COLDSTART, the following conditions exist: STREAMS=OFF, JOBFENCE=0, and OUTFENCE=1; JLIMIT and SLIMIT are set to the values specified during system configuration.

You can change the system configuration during a COLDSTART. Respond YES to the "ANY CHANGES?" prompt in Step 1 of the INITIAL Program in Section VII, and this program begins.

When prompted for "DATE(M/D/Y)?", if RETURN is entered instead of an actual date, the system will assume the default date/time of WED NOV 1, 1972 12:00 AM. Always be sure to enter the correct date and time on system startup to ensure proper execution of functions (i.e., the SYSDUMP Program) related to the system clock.

SERIES 64/68/70 - RELOAD

OPERATOR FUNCTION: SYSTEM STARTUP (RELOAD)

DESCRIPTION: This procedure cold loads the entire system including all system files and configuration information. The system is reloaded from a backup copy which was produced by the SYSDUMP Program on magnetic tape or serial disc.

A RELOAD DESTROYS ANY FILE WHICH MAY BE ON ANY OF THE SYSTEM DISC VOLUMES.

STEP	PROCEDURE
1	FOR STARTUP FROM MAGNETIC TAPE: Mount the MPE backup tape on the Unit-0 magnetic tape drive. Place the device on line.
2	FOR STARTUP FROM A SERIAL DISC: **NOTE** The instructions given here apply to computers with more than one disc controller. If your system has a serial disc and system disc configured on one controller, read "GENERAL INSTRUCTIONS" in this appendix before doing a RELOAD from serial disc. Mount the MPE backup serial disc pack on any drive that does not share the controller on *ldev* 1. Set the drive to Unit 0, being sure no other drives on the same controller are also set to Unit 0. (During startup, the INITIAL Program dynamically allocates this drive to the nonsystem domain, making it available for private volumes use once the startup is complete.)
3	If the system is already running, simultaneously press the CONTROL key and B (B^C). If the system is not running, press RETURN. When you see the DCU prompt (M>), enter LOAD on the System Console. If you wish to cold load from a device other than the preset default device, enter the IMB number, channel number, and device number, separated by commas, after LOAD, e.g.: LOAD *imb,channel,device* However, it is important to note that once you have overridden the default cold load device in this way, the new values become the default until power is cycled on the system. In this case the default values initially set by the factory take effect.

STEP	PROCEDURE
3 (cont)	When the system finishes accessing the cold load medium, the INITIAL Program begins execution and prints: HP 32033*v.uu.ff* In this message, *v* is the current version of MPE, *uu* is the present update-level number, and *ff* is the fix-level number. (If the message does not appear after one minute, or if the Console is not an HP 26XX-type terminal, press (RETURN).)
4	WHICH OPTION <COLDSTART/RELOAD/UPDATE>? RELOAD
5	WHICH OPTION <SPREAD/COMPACT/RESTORE/ACCOUNTS/NULL>? The reload options are described following this table. Press (RETURN) to select SPREAD (default).
6	ANY CHANGES? (RETURN) (Return implies NO.) The tape is read and rewound; additional volumes or tape reels may be requested. If your system is running on an MPE version prior to G.01.00, there is a one or two minute delay while the INITIAL Program confirms that the configured memory size can be supported on the available physical memory and tests to make sure that the DRTs have been handled correctly. If your system is running on an MPE version G.01.00 or later, messages will be displayed, informing you of the INITIAL Program's progress. The system then prints the message BANK 0 DEPENDENT MEMORY USED - *nnnnn*, where *nnnnn* is the number of words (in decimal) used by the INITIAL Program in constructing the operating system.
7	DATE(M/D/Y)? Enter the current date in the form *mm/dd/yy*.
8	TIME(H:M)? Enter the time (24-hour clock) as *hh:mm*. The system prints the day, date and time. If the date or time is incorrect, type NO and the system will repeat the date and time prompts. If the date and time are correct, press (RETURN) to continue the dialog. You will now receive the *WELCOME* message. The system automatically logs on as OPERATOR.SYS. The user OPERATOR must exist in the SYS account (with OP capability) prior to system startup in order to accomplish the automatic logon.
9	The system may now print one or more of the following, depending on your system's configuration: *time/pin*/MEMORY ERROR LOGGING INITIATED *time/pin*/SP #*n*/SPOOLED IN *time/pin*/SP #*n*/SPOOLED OUT *time*/#S*nnn*/*pin*/LOGON FOR: OPERATOR.SYS,PUB ON LDEV #*nn*

COMMENTS

After a RELOAD, the following conditions exist: STREAMS=OFF, JOBFENCE=0, and OUTFENCE=1; JLIMIT and SLIMIT are set to the values specified during system configuration.

You can change the system configuration during a RELOAD. Respond YES to the "ANY CHANGES?" prompt in Step 1 of the INITIAL Program in Section VII, and this program begins.

When prompted for "DATE(M/D/Y)?", if (RETURN) is entered instead of an actual date, the system will assume the default date/time of WED NOV 1, 1972 12:00 AM. Always be sure to enter the correct date and time on system startup to ensure proper execution of functions (i.e., the SYSDUMP Program) related to the system clock.

RELOAD OPTIONS

Your response in Step 5 selects the algorithm the system uses to RELOAD the disc. The algorithm determines on which system disc a file is stored and whether the *user.group.account* structure is placed in the appropriate directory area. RELOAD options are:

SPREAD — MPE attempts to place the file back on a disc of the device class as it was originally created. If this fails, MPE attempts to replace the file on a disc of the same type and sub-type as the disc on which it was previously located (for instance, on a cartridge disc). If this fails, MPE attempts to place it on a disc of the same type (for example, a moving-head disc). If this fails, MPE attempts to place the file on any disc in device class DISC. If this fails, a message is printed and the file is not reloaded. In each of these attempts, the files are spread among similar discs, if possible. For example, suppose that when the system was dumped, there was one cartridge disc that was full, and when it is reloaded there are two cartridge discs. In this case, each disc will be approximately half full. The advantages of the SPREAD option are reduced disc seeking (since files are spread out), and reduced fragmentation (since the disc is repacked). The disadvantage is that if the discs are nearly full, it may not be possible to restore all files that were previously stored on the discs. This situation is rarely occurs. In this case, one of the other options may be used.

COMPACT — MPE attempts to place the file back on the same volume from which it came. If this fails, the SPREAD option is used. The major advantage of COMPACT is that if there are no new deleted tracks and the same discs are used, reloading of the system is guaranteed, no matter how full the discs are. In addition, each disc is compacted within the area between deleted tracks. If there are n deleted tracks, there will be at most $(n+1)$ fragments.

RESTORE — MPE attempts to place the files back on the same volume at the same locations from which they came. If this fails, MPE attempts to place the files anywhere on the volume from which they came. If this fails, the SPREAD option is used. The advantages to the RESTORE option are that it offers the same guarantee made as COMPACT for reloading the system, and that the same files that were previously using alternate tracks are still using them. The disadvantage is that no compacting of the discs is done, so that the same fragmentation still exists.

ACCOUNTS

This option loads the system, creates a directory from the backup copy, and loads the system files which reside in the PUB group of the SYS account. No user files are loaded onto the system.

The directory which is created will consist of all accounts, groups, and user structures which were current at the time the backup copy was written (by the SYSDUMP Program).

This option is useful in that files saved by the SYSDUMP Program are compatible with files stored using the :STORE command. In this way you could, for example:

1. Create a new directory structure if the previous directory was destroyed.

2. Conserve disc space by selectively loading files into certain accounts with the :RESTORE command (after the system is operational).

NULL

MPE creates a null directory with MANAGER.SYS,PUB as the only user, and no user files are copied to disc.

NOTE

To perform a RELOAD, Hewlett-Packard recommends the following: use the ACCOUNTS option; after the system is operational, use the :RESTORE command to restore user files into the accounts.

SERIES 64/68/70 - ADDING I/O DEVICES

OPERATOR FUNCTION: ADDING STANDARD I/O DEVICES

DESCRIPTION: This procedure describes one method for adding input/output devices to the system. The description is a summary intended to illustrate a general technique. Complete instructions and guidelines must be obtained from Section VII in this manual.

STEP	PROCEDURE
1	If the system is already running, simultaneously press the CONTROL key and B (B^C). If the system is not running, press RETURN. When you see the DCU prompt (M>), enter START on the System Console.
2	The INITIAL Program begins execution and prints: HP 32033*v.uu.ff* (If the message does not appear after one minute, or if the console is not an HP 26XX-type terminal, press RETURN.) WHICH OPTION <WARMSTART/COOLSTART>? COOLSTART ANY CHANGES? YES LOAD MAP? RETURN MEMORY SIZE=nnn? RETURN I/O CONFIGURATION CHANGES? YES LIST I/O DEVICES? YES LIST CS DEVICES? YES HIGHEST DRT?=*nnn*? RETURN or higher number. LOGICAL DEVICE #? *LDEV#* DEVICE NAME? *devname* DRT #? *drt#* UNIT #? *unit#* SOFTWARE CHANNEL # = *n*? *n channel#* TYPE = *n*? *type* SUB TYPE = *n*? *subtype* RECORD WIDTH = *n*? *recwidth* OUTPUT DEVICE = *n*? *outdev* ACCEPT JOBS/SESSIONS = N? YES or NO ACCEPT DATA = N? YES or NO INTERACTIVE = N? YES or NO DUPLICATIVE = N? YES or NO INITIALLY SPOOLED = N? YES or NO INPUT OR OUTPUT? IN or OUT (Spooled devices only) AUTO REPLY = N? YES or NO DRIVER NAME = *driver* ? *driver* DEVICE CLASSES = *devclasses* ? *devclasses* IS *devclass* A SERIAL DISC CLASS? YES or NO IS *devclass* A FOREIGN DISC CLASS? YES or NO LOGICAL DEVICE #?

STEP	PROCEDURE
2 (cont)	MAX # OF OPEN SPOOLFILES=*nn*? RETURN LIST I/O DEVICES? RETURN LIST CS DEVICES? RETURN CLASS CHANGES? RETURN LIST I/O DEVICES? YES ADDITIONAL DRIVER CHANGES? RETURN I/O CONFIGURATION CHANGES? RETURN DISC VOLUME CHANGES? RETURN VIRTUAL MEMORY CHANGES? RETURN DISABLE LOGGING RETURN MAX # OF SPOOLFILE KILOSECTORS=*nnn*? RETURN # OF SECTORS PER SPOOLFILE EXTENT=*nnn*? RETURN RECOVER LOST DISC SPACE? RETURN DATE(M/D/Y)? *mm/dd/yy* TIME(H:M)? *hh:mm* (24-hour clock)

SERIES 64/68/70 - DELETING I/O DEVICES

OPERATOR FUNCTION: DELETING I/O DEVICES

DESCRIPTION: This procedure describes one method for deleting input/output devices from the system. You may only delete a system domain disc drive during a RELOAD. The description below is a summary intended to illustrate a general technique. Complete instructions and guidelines must be obtained from Section VII of this manual.

STEP	PROCEDURE
1	If the system is already running, simultaneously press the CONTROL key and B (B^C). If the system is not running, press RETURN. When you see the DCU prompt (M>), enter LOAD on the System Console.
2	The INITIAL Program begins execution and prints: HP 32033*v.uu.ff* In this message, *v* is the current version of MPE, *uu* is the present update-level number, and *ff* is the fix-level number. WHICH OPTION <COLDSTART/RELOAD/UPDATE>? COLDSTART ANY CHANGES? YES LOADMAP? RETURN MEMORY SIZE=nnn? RETURN I/O CONFIGURATION CHANGES? YES LIST I/O DEVICES? YES LIST CS DEVICES? YES HIGHEST DRT?=nnn? RETURN (or input correct DRT#) LOGICAL DEVICE #? *n* (LDEV# of device being deleted) DEVICE NAME? DRT#? 0 LOGICAL DEVICE #? RETURN MAX # OF OPEN SPOOLFILES=*nn*? RETURN LIST I/O DEVICES? RETURN LIST CS DEVICES? RETURN CLASS CHANGES? RETURN LIST I/O DEVICES? RETURN ADDITIONAL DRIVER CHANGES? RETURN I/O CONFIGURATION CHANGES? RETURN DISC VOLUME CHANGES? RETURN VIRTUAL MEMORY CHANGES? RETURN DISABLE LOGGING? RETURN MAX # OF SPOOLFILE KILOSECTORS=*nnn*? RETURN # OF SECTORS PER SPOOLFILE EXTENT=*nnn*? RETURN RECOVER LOST DISC SPACE? RETURN DATE(M/D/Y)? *mm/dd/yy* TIME(H:M)? *hh:mm* (24-hour clock)

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SERIES 64/68/70 - SOFTWARE DUMP

OPERATOR FUNCTION: DUMPING MAIN MEMORY

DESCRIPTION: The Software Dump Facility (SDF) operates in a standalone environment after a system failure has occurred or a system halt has been performed. The SDF enables you to store information onto serial storage media so that you can later format the media with the DPAN utility and obtain information about a system failure.

It is a wise precaution to have one or more backup copies of the SDF on a serial storage medium. Remember that a backup SDF cannot be created after a software dump has failed; you already must have one on hand. A backup SDF should be created when the system is initially configured, and you should create a new backup SDF each time you receive a software update. This will ensure that you have the correct version of the SDF on your backup copy at all times. (If necessary, refer to "Performing a Backup Software Dump" in Section X.)

STEP	PROCEDURE
1	Mount a serial storage medium (write-enabled) on a logical device specified by the device class DDUMP, then place the drive on line.
2	If the DCU prompt (M>) is not already present on the System Console, enter B^C. When the prompt appears, enter DUMP*.
3	If a system failure has occurred or a system halt has been performed prior to beginning this memory dump, the following message will appear: OK to dump the system? (Y/N) To access the SDF, answer Y.
4	The SDF is now loaded. If it is loaded correctly, the following message will appear on the System Console:** ***SOFTWARE DUMP FACILITY (VER XX.XX/XX)***

STEP	PROCEDURE
5	The system will now begin a serial execution of the SDFCOM file, which contains SDF commands and is located on the system disc. Assuming that your system is using the default SDFCOM file, the following messages will appear (respond as indicated): MOUNT DUMP MEDIA, AND PLACE DRIVE ON-LINE. PRESS THE RETURN KEY TO CONTINUE EXECUTION OF SOFTDUMP.(RETURN) DUMP DSEG=ALL
6	If your dump device is not connected to the system, you are automatically entered into the IOMAP facility. This facility will show you a device list and prompt you for a selection number. If you are entered into the IOMAP facility, connect the device and respond appropriately.
7	The rest of the SDFCOM file will execute, and progress messages will appear (respond as indicated): DUMP OF REAL MEMORY STARTED. DUMP OF REAL MEMORY FINISHED. DUMP OF VIRTUAL MEMORY STARTED. DUMP OF VIRTUAL MEMORY FINISHED. DUMPING FILE: LOADMAP.PUB.SYS DUMPING FILE: MPECHECK.PUB.SYS DUMPING FILE: CONFDATA.PUB.SYS DUMPING FILE: HPPMAP.PUB.SYS WARMSTART HP32033G.02.00 WHICH OPTION <WARMSTART/COOLSTART>? WARM **WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS • • •
8	If your serial storage media are reel tapes, remove the write rings; if your storage media are cartridge tapes, turn the arrows on the tapes toward SAFE.

STEP	PROCEDURE
*	If the system halts while loading the SDF, the following error message will appear on the System Console: ***DUMP FAILED This message indicates that an error has been detected, and the SDF is unable to execute. A backup software dump must be performed. Refer to "Performing a Backup Software Dump" in Section X.
**	If the SDFCOM file does not exist or has been corrupted, or if your serial storage medium is flawed, the following message may appear on the System Console: SERIAL DEVICE I/O ERROR - You are now in SOFTWARE INTERACTIVE MODE. Please mount new media, then type "DUMP" in response to the prompt "SOFTDUMP COMMAND>" If you receive the SDF interactive prompt, SOFTDUMP COMMAND>, enter any of the SDF commands listed in Table 10-1. When you are finished entering SDF commands (at which time your dump should have been successfully performed and your system will be operational), advance to Step 8 to conclude this procedure.

COMMENTS

Entering a $\underline{Y}^{C}$ from the System Console at any time while the SDF file is executing may cause SDF to abort the current command and place the user in interactive mode.

The SDF command file may be modified when the system is operational. Instructions for modifying this file are presented in "Changing the SDF Command File" in Section X.

If you want to format and print the dump to a line printer, run the DPAN/DPAN5 utility program immediately after restarting the system. DPAN/DPAN5 is described in the MPE V Utilities Reference Manual (32033-90008).

NOTE

If a DPAN version older than G.02.00 of DPAN5 is run on a virtual memory dump, the virtual memory (which with G.02.00 is now dumped onto the storage media) will be overwritten and lost. Real memory will still be formatted.

SERIES 64/68/70 - LOADING THE DUS

OPERATOR FUNCTION: COLD LOADING THE DIAGNOSTIC UTILITY SYSTEM

DESCRIPTION: The Diagnostic Utility System (DUS) is memory resident and allows you to run diagnostic and utility programs. The DUS is on a standalone magnetic tape and is loaded onto a shut down system.

STEP	PROCEDURE
1	Mount the tape containing the Diagnostic Utility System on the tape drive and place the drive on line.
2	If the DCU prompt (M>) is not already present on the system console, press RETURN. When you see the prompt, enter HALT. When another prompt appears, enter LOAD. If you wish to cold load from a device other than the preset default device, enter the IMB number, channel number, and the device number, separated by commas, after LOAD, e.g.: >LOAD *imb,channel,device* Note, however, that once you have overridden the default coldload device in this way, the new values become the default until power is cycled on the system. In this case, the default values initially set by the factory take effect.
3	At this point the tape containing the DUS is loaded into memory, and the following message appears on the System Console: DIAGNOSTIC/UTILITY SYSTEM REVISION *xx.xx* ENTER YOUR PROGRAM NAME (Type HELP for program information.) :

SERIES 64/68/70 - FORMATTING SYSTEM PACKS

OPERATOR FUNCTION: FORMATTING SYSTEM DISC PACKS

DESCRIPTION: This procedure describes how to use the Sleuth Simulator (SLEUTHSM), which is part of the Diagnostic Utility System (DUS), to format system disc packs. The DUS is on a standalone serial medium and is loaded onto a shut down system.

STEP	PROCEDURE
1	Load the Diagnostic/Utility System as described in "LOADING THE DUS" in this appendix. Note that all entries must be in uppercase.
2	Type AID on the System Console and press (RETURN). The following message will be displayed: AID *xx.xx* >10
3	Type LOAD SLEUTHSM on the console and press (RETURN). The Sleuth Simulator is loaded into memory; the System Console will display the next line number in the program. You are now ready to initiate the dialog necessary to format a disc pack.
4	Enter the following data to format any disc on the HP 3000 Series 64/68/70: >5000 DEV 0,*channel*,*device*,20,*unit*,*imb* >5010 FMT 0 >5020 RUN
5	After the disc is formatted, SLEUTHSM again prompts for input (>). To flag defective tracks, enter the program which corresponds to the type of disc pack you wish to flag. **7920 Disc Pack** >EP >5000 DEV 0,*channel*,*device*,10,0,*imb* >5010 DB AA,6144,0 >5020 RC 0 >5030 PRINT CYLINDER # TO BE FLAGGED DEFECTIVE? >5040 INPUT A >5050 PRINT HEAD#? >5060 INPUT B >5070 SEEK 0,A,B,0 >5080 IDI 0,AA(0),3,D >5090 PRINT CONTINUE?(YES/NO) >5100 INPUT &BB >5110 IF &BB=YES THEN 5020 >5120 RUN

STEP	PROCEDURE
5 (cont)	**7925 Disc Pack** >EP >5000 DEV 0,*channel*,*device*,10,0 >5010 DB AA,8192,0 >5020 RC 0 >5030 PRINT "CYLINDER # TO BE FLAGGED DEFECTIVE?" >5060 INPUT B >5070 SEEK 0,A,B,0 >5080 IDI 0,AA(0),3,D >5090 PRINT CONTINUE? (YES/NO)" >5100 INPUT &BB >5110 IF &BB="YES" THEN 5020 >5120 RUN In line 5000 of the above programs, you must supply the channel number and device number of the drive on which the disc pack is mounted. The programs ask three questions for each defective track. In response to the first, enter the cylinder number of the defective track; in response to the second, enter the head number of the defective track. The cylinder and head numbers of defective tracks are listed on the "List of Defective Tracks" supplied with each new disc. To the third question, "CONTINUE? (YES/NO)", enter NO until you have entered all defective tracks, then enter YES.
6	After the defective tracks have been flagged, SLEUTHSM again prompts for input (>). Enter another program or halt the system.

NOTE

The HP 7911, HP 7912, HP 7914, HP 7933, and HP 7935 disc drives have an internal mechanism for flagging defective tracks. SLEUTHSM can be used to format discs, but not to flag defective tracks.

SERIES 64/68/70 - SHIFT STRING DUMP (HP 2647F CONSOLE TERMINAL)

OPERATOR FUNCTION: PRE-SYSTEM STARTUP (AFTER SYSTEM FAILURE)

DESCRIPTION: This procedure is used to obtain a shift string dump whenever a system failure occurs which results in a system halt (DCU maintenance prompt comes up on System Console). Through DCU maintenance mode commands, the contents of specific CPU registers are stored on the Floppy Disc Unit of the HP 2647F Console. The procedure consists of two parts: formatting and labeling the diskette and obtaining the shift string dump itself.

STEP	PROCEDURE
1	Insert a diskette in the floppy disc drive. Ensure that the HP label is up and in the front right corner.
2	Set REMOTE key to up position.
3	Press (RETURN) key; then press CLEAR DISPLAY key.
4	Press the COMMAND key, then press the SHOW function key (F3), and then press the VOLUMES (F2) function key. Press (RETURN). You will see a message similar to the following: VOLUME NAME HP-IB ADDRESS Local Volume / Disc Type#Unit / Start of Free Space / Space Left / Write Protect DUMP01 / nfD#1 / 32 / 1024 / NO
5	If the write protect tab is on (YES in the write protect column), remove the diskette from the drive, remove the tab covering the notch on the left front of its cover, and reinsert the diskette. Otherwise, continue to Step 6.
6	If the volume name is in lowercase letters, such as "nonfmt" or "nonsif", it has not been labeled. Skip Steps 7-8 and create the volume as described in Step 9. Otherwise, continue to Step 7.
7	If the volume name is in uppercase letters and the start of free space is at 32, the label is okay and the diskette may be used as is. If a different volume label is wanted or free space is not at 32, perform Steps 8-10. Otherwise, skip to Step 11.
8	To purge an old volume label, type PURGE VOLUME <filename>, followed by (CONTROL) COMMAND (hold the (CONTROL) key down and simultaneously press the COMMAND key). This operation takes approximately two seconds (the light on the floppy disc unit will flash momentarily; no message is displayed on the Console). Example: PURGE VOLUME DUMP01

STEP	PROCEDURE
9	Press the DISC (F8) function key. Press the CREATE (F5) function key, then press the VOLUME (F6) function key. Type the volume name, for example DUMP 02. (The volume name can be up to eight characters long and must begin with an alphabetic character.) Press the ON (F2) function key, and type 1. Press (RETURN).
10	To verify the new volume name, type SHOW VOLUMES, followed by (CONTROL) COMMAND (hold the (CONTROL) key down and simultaneously press the COMMAND key). The volume name should be in uppercase letters and the start of free space at 32. VOLUME NAME / HP-IB ADDRESS Local Volume / Disc Type#Unit / Start of Free Space / Space Left / Write Protect DUMP02 nfD#1 32 1024 NO
11	Reset the terminal, then set the REMOTE MODEM key to the DOWN position.
12	Get the Maintenance Prompt (M>) on the HP 2647F System Console by pressing (RETURN). If neither "C>" nor "M>" is returned, hold the (CONTROL) key down and type "B". If "C>" prompt comes up, turn the CONTROL/MAINT/REMOTE keyswitch to MAINT or REMOTE position.
13	In response to "M>" prompt, type the following: M>BA=OCT (RETURN) M>DS;WS;LG;RFLAG=0;XA;XB;RFLAG=1;XA;XB (RETURN)
14	The system will respond with the following header and series of questions. Enter appropriate responses for each line, followed by (RETURN). Be as accurate as possible in supplying this information, as it will assist the Customer Engineer (CE) or Technical Support Engineer (TSE) in locating the cause of the system failure. GEMINI BOARD STRING & REGISTER DUMP FILE 0 1 2 3 4 5 6 7 8 9 0 DESC FIRM SOFT CTLA CTLB SKSP RAL0 RAL1 RAL2 10 RAL3 VBUS CIR CAC MCS MMC CBI1 CBI2 CBI3 CBI5 20 CBI7 IOB1 IOB2 IOB3 WCS0 WCS1

STEP	PROCEDURE
14 (cont)	DATE: TIME: OPERATOR: SYSTEM: MEMORY SIZE: HOW LONG WAS SYSTEM RUNNING? WHAT WAS RUNNING? DESCRIBE WHAT HAPPENED. <CNTL-G CR TO TERMINATE> The DCU automatically loads the contents of the shift string registers for each PCA into the floppy disc unit. This operation takes approximately 2-3 minutes. When the "M>" prompt returns, perform the following steps to write the remainder of the data on the screen to the diskette:
15	a. Set REMOTE key to down position. b. Press RETURN to get "M>" prompt.
16	Remove diskette and save for CE or TSE.
17	Proceed with Memory Dump and/or System Startup procedures.

SERIES 64/68/70 - SHIFT STRING DUMP (HP 150 SYSTEM CONSOLE)

OPERATOR FUNCTION: PRE-SYSTEM STARTUP (AFTER SYSTEM FAILURE)

DESCRIPTION: This procedure is used to obtain a shift string dump whenever a system failure/hang occurs. Through DCU maintenance mode commands, the contents of specific CPU registers are stored on the diskette in Drive B of the HP 150 Console.

STEP	PROCEDURE
1	Insert a blank diskette into Drive B. (Make sure that the diskette is not write-protected and slide the write-protect tab towards the diskette disc hub as shown in Figure 6-1.) This diskette will now be referred to as the String Dump diskette.
2	From the main menu, press the disc function key [f6].
3	Press the FORMAT FLOPPY function key [f1]. The following message will be displayed: WARNING! THIS FUNCTION WILL FORMAT THE FLOPPY IN DRIVE B. ALL FILES (IF ANY) CURRENTLY STORED ON THE FLOPPY DISC IN DRIVE B WILL BE LOST. DO YOU WANT TO CONTINUE? (Y/N)
4	Enter Y and press (RETURN). Wait for the "FORMAT DONE! PRESS <RETURN> TO CONTINUE"
5	In response to the "M>" prompt, enter the following: M> BA=OCT (RETURN) M> DS;WS;LG (RETURN)
6	The system will respond with the following header and series of questions. Enter appropriate responses for each line, followed by (RETURN). Be as accurate as possible in supplying this information as it will assist the Customer Engineer (CE) or Technical Support Engineer (TSE) in locating the cause of the system failure. GEMINI BOARD STRING & REGISTER DUMP FILE 0 1 2 3 4 5 6 7 8 9 0 DESC FIRM SOFT CTLA CTLB SKSP RALO RAL1 RAL2 10 RAL3 VBUS CIR CAC MCS MMC CBI1 CBI2 CBI3 CBI5 20 CBI7 IOB1 IOB2 IOB3 WCS0 WCS1

STEP	PROCEDURE
6 (cont)	DATE: TIME: OPERATOR: SYSTEM: MEMORY SIZE: HOW LONG WAS SYSTEM RUNNING ? WHAT WAS RUNNING ? DESCRIBE WHAT HAPPENED (CNTL-G CR TO TERMINATE)
7	Hold down the CTRL key and enter the letter G.
8	Press (RETURN). The DCU will automatically load the contents of the shift string registers for each PCA onto the diskette in Drive B. This operation takes approximately ten minutes.
9	When M> prompt appears, press the main menu key (f8).
10	Press the copy key (f2).
11	Press the COPY SCREEN key (f6). The contents of the screen display will be copied to the diskette.
12	Press the "home" key (this key is found directly above the cursor control arrow keys on the keyboard; it has a small triangle printed on it).
13	Press the Clear Display key.
14	Enter RFLAG=0;XA;XB and press (RETURN).
15	Repeat Steps 11, 12, and 13.
16	Enter RFLAG=1;XA;XB and press (RETURN).
17	Repeat Steps 11, 12, and 13.
18	Press the main function key (f8).
19	Press the REWIND function key (f5). (You must do this before removing the String Dump diskette as this closes the last string dump file.)
20	Remove, date, and label the String Dump diskette from Drive B. (Write-protect the diskette by sliding the write-protect tab away from the diskette hub.)

GLOSSARY

A^C	Control A. A character entered by simultaneously pressing the CONTROL key and an A key on the Console keyboard. Generates an equals sign ("= ") prompt, used to perform selected Console commands. A^C has no meaning on non-Console keyboards. To terminate a current process or operation. This is accomplished via the :ABORT command, which is only available in session or in break.
Access	The process of obtaining data from files or acquiring the use of a device. "Access" implies an input/output (I/O) operation, and is used as a synonym for I/O.
Account	MPE's method of organizing users and files and allocating the use of system resources such as central processor time, online connect time, and file space. Accounts are also the principal billing entity for the use of these resources. Every user must specify an account to gain access to the system.
Account Level Security	The types of file access assigned by the System Manager to the account when it is created. The types of access are: Read, Lock, Append, Write, and Execute, abbreviated R, L, A, W, and X, respectively. They may be assigned to any user ("ANY") or members of the specified account only ("AC"). The file access permitted the account are the first level of security since the Account Manager may further restrict groups and users by assigning them a more limited set of file access modes.
Account Librarian	A user who is granted special file access modes to maintain files within the account. The Account Manager may assign Account Librarian (AL) capability to more than one user.
Account Manager	The person responsible for managing an account by defining groups and users and specifying capabilities (i.e., IA, BA, ND, SF), file access modes (i.e., Read, Lock, Write), and resource-use limits (i.e., CPU processing time or disc space) for each. The System Manager assigns Account Manager (AM) capability to a single user name within the account when it is first created.
Account Member	Any person who has been granted access to the system through the use of a valid user name within an account. Account members are created by the Account Manager, who defines the user name and assigns the user appropriate capabilities and security restrictions.
ACTIVE State	The condition of an input or output spool file, defined differently for each. During input spooling, an ACTIVE file is a spool file being created, indicating that the input spooler is still collecting data from the input device (which is usually a terminal or tape drive). An ACTIVE output spool file is the only file being output to a device. When the standard output device is the system printer, for example, the file being printed is ACTIVE.
Actual File Designator	The file name resulting from a resolution of the formal file designator with file equations and other file system functionality. This name resolution occurs only when the file is opened or created.
ADCC	Asynchronous Data Communications Controller. A terminal controller, functionally similar to a GIC, that serves as the hardware interface

	between the CPU and terminals connected to the system (either directly or via modem). Each Main ADCC supports four terminals and an Extender ADCC; the Extender adds an additional four ports, for a combined maximum of eight terminals supported per ADCC.
Address	A number which identifies a exact location in memory to which a process may send data or from which a process may retrieve data.
AIB	Asynchronous Interface Board. A controller board used to manage data transfer to and from terminals. Refer to SIB, ATP.
AL Capability	Account Librarian. A capability assigned to a user name within the account. The person who logs onto the system as Account Librarian is allowed special file access modes to maintain specified files within the account. More than one person may be assigned AL Capability.
Allocate	Locating and reserving disc space for a particular file. Also, loading a program into memory with the :ALLOCATE command. Such programs remain in memory until unloaded with the :DEALLOCATE command, or until the system is halted.
Alphanumeric Character	May be either a letter of the alphabet (A-Z) or the digits 0 through 9. Letters may be upper or lower case. In most cases, MPE does not distinguish upper case from lower case letters; it usually shifts letters to upper case.
ALU	Arithmetic Logic Unit. Component which performs arithmetic and logic operations as part of the Central Processing Unit. The CPU may contain one or more Arithmetic Logic Units.
AM Capability	Account Manager. A capability assigned by the System Manager to a user within an account. The person assigned AM capability is responsible for establishing users and groups, assigning resource use limits and capabilities to each, and maintaining account security.
Analog	Data which varies continuously rather than in discrete steps. When used in reference to circuits, those circuits that produce an output varying as a continuous function of the input. The opposite of digital.
Arithmetic Logic Unit	Refer to ALU.
ASCII	American Standard Code for Information Interchange. When used to describe a file or format, it refers to the standard method of representing binary data (7 bits plus a parity bit) agreed upon by the United States Standards Institute. Also called USASCII.
Associated Device	A device class that has been assigned to a user with the :ASSOCIATE command. Thereafter, the user has Operator control of the designated device until the user logs off, or gives up control of the device, or the Operator regains control with the :DISASSOCIATE command.
Asynchronous Interface Board	Refer to AIB.
ATP	Advanced Terminal Processor. An intelligent hardware interface between the terminals and the CPU. The ATP supports up to 96 terminals, handles character processing, eliminates CPU interrupts, supports full-duplex asynchronous modems, and direct memory access of user data.

BA Capability	Batch Access. Default capability assigned to accounts and user names that permits users to submit batch jobs.
Backplane	Wiring blocks or units which provide most of the interconnecting circuits of a system. Individual printed-circuit boards plug into the backplane. Every card cage used with the HP 3000 uses one or more backplanes.
Back-Reference	The technique of using an asterisk before a formal file designator to indicate that it has been previously defined during the current session or job with the :FILE command.
Backup	The process of storing computer data onto an off line media, such as magnetic tape or serial disc. Also used to describe the data, such as "backup files", or media, such as "backup tape".
Batch Access	A processing mode that allows users to submit data and program files to the computer as a single entity, called a job. Jobs also contain MPE, subsystem, or utility commands which control the execution of the job. The principle difference between batch and interactive access is that a batch job does not require continuous input or supervision. Once entered, MPE processes a job independently of the user who submitted it.
Baud Rate	In data transmission, baud is a unit of signaling speed equal to the number of discrete conditions or signal events per second. Baud is the same as "bits per second" only if each signal event represents exactly one bit. The most familiar reference to Baud Rate is terminal speed settings. Most terminals have a baud rate switch on the keyboard; in addition, the baud rate is either "sensed" by the system and/or set with the :SPEED command.
BCD	Binary Coded Decimal. A decimal notation in which individual decimal digits are each represented by a group of four binary digits.
Binary	The base 2 numbering system which uses only two digits, 0 and 1, to express numeric quantities. Binary is the basic method of representing numbers, alphabetic characters, and symbols in digital computers.
Binary Coded Decimal	Refer to BCD.
Bit	A contraction of BInary digiT. A two-state signal, expressed in binary notation as the characters 0 or 1, which represent an ON or OFF signal respectively. All alphanumeric characters and symbols used by digital computers are unique combinations of bits.
Bit Bucket	A slang expression which refers to a nonexistent computer storage area, used when the system-defined "$NULL" file appears in a command line. Data sent to the bit bucket is thrown away, allowing users to examine system parameters without actually changing or storing any information. For example, when the System Supervisor wants to check current SYSDUMP Program parameters, he or she can enter "SYSDUMP $NULL" at the colon prompt, respond to the SYSDUMP dialog as though an actual dump were being taken, but make no changes to the system.
Bits Per Inch	Refer to BPI.
Block	A group of one or more logical records transmitted to or from a file in a single input/output operation. Programs executed during a session, using a terminal as the I/O device, use different block sizes to facilitate data entry and update.

Block Mode	A processing mode that transmits groups of characters instead of sending data one bit at a time.
Blocking Factor	The number of logical records transmitted as a single physical block of data. A large blocking factor (several logical records treated as a unit) will require fewer I/O operations to transfer a given amount of data. Although this reduces the load on the disc and usually improves system response time, large data blocks require more main memory.
BPI	Bits Per Inch. Used for measuring density of data on a recording medium.
Board	Refer to Card.
Booting	To bring the system on line, or "boot" the system. Booting is a slang expression, derived from the phrase "pulling yourself up by your bootstraps".
Break	An operation that both interrupts (suspends or aborts) an executing process and allows the user to initiate some other operation. Executed by pressing the BREAK key on the terminal or calling the CAUSEBREAK intrinsic. If a process is only suspended, the user may resume it with the :RESUME command.
Break Mode	A processing mode in which you interact with the Command Interpreter after pressing the (BREAK) key to suspend the currently executing program. Commands that are "breakable" will be listed as such in the USE matrix included in each command specification in the MPE V Commands Reference Manual (32033-90006).
Buffer	Temporary storage area that is used to compensate for different data transmission or processing speeds between two devices. Also used to compensate for asynchronous occurrences of an event between two devices which must communicate synchronously.
Bus	One or more conductors used as a path to transmit information (data address and control signals) between the CPU, memory, and I/O card cages of the computer.
Byte	A combination of 8 bits treated as a unit. One-half of an HP 3000 word.
Cache, Disc	Refer to Disc Caching.
Capabilities	Assigned to accounts, groups, and users to control access to MPE. Capabilities determine which commands account members may execute, whether they can initiate sessions or jobs, save files, use extra data segments, etc. The System Manager assigns each account a capability list when the account is created. These capabilities, or a subset of them, are are assigned to each group and user within the account by the Account Manager.
Capability Class	The combination of capabilities that determine the user's role, such as Account Manager (AM capability) or Group Librarian (GL capability), the user's ability to execute commands, and their degree of influence over system operation. Also referred to as capability set.
Card	A printed-circuit board onto which components (such as microprocessors, memory, and other integrated circuits) are mounted. One or more cards are used to control hardware, store data, and allow communication between the various computer devices. "Card" may also refer to a punched card containing input or output data from a keypunch machine.

Card Cage	The structure used to hold cards in their proper place inside the computer. Card cage and "I/O Bay" are sometimes used interchangeably, although the latter usually refers to the entire cabinet containing one or more card cages used to store the cards which control I/O devices.
Card Image	The representation of data stored on a punched card, usually in binary or ASCII. A fixed-length record of 80 characters.
CBI	Common Bus Interface. Unit which serves as the interface between the Central System Bus (CSB) and an Intermodule Bus (IMB).
CCTL	Carriage Control. A parameter of the :BUILD and :FILE commands that tells MPE that the program will provide carriage control information.
CE	Customer Engineer. Your Hewlett-Packard representative responsible for the installation, troubleshooting, and maintenance of your computer hardware.
Central Processing Unit	CPU. The arithmetic-logic unit, stack registers, and control logic of the computer. The CPU is responsible for executing program instructions, making calculations, and initiating I/O.
Central System Bus	Refer to CSB.
Channel Number	The number assigned to the device controller board in the I/O card cage. Used to calculate the logical address of the device, or DRT number.
Characters Per Inch	Refer to CPI.
Circular Subqueue	The CS, DS, or ES subqueues, referred to as circular since processes executing in these subqueues share the CPU in a round-robin schedule for a specified fraction of time. Since CPU time is allocated among several processes, more than one time period is usually required to complete a process.
Class Name	A label that is either unique to or associated with one or more devices in the system's I/O configuration, used to reference a particular device or class of devices. Device class names may be up to eight alphanumeric characters long, beginning with a letter. A single logical device may have multiple device class names. The HP 2680 Laser Printer, for example, is usually referred to as EPOC (Electrophotographic Output for Computers), PP (Page Printer), or FLP (Fast Line Printer), yet directing output to any of these class names will send the output to a Laser Printer.
Closing A File	Terminating access to a file after completing all input/output operations to it. Accomplished by calling the FCLOSE intrinsic or terminating process execution.
CMP	Control and Maintenance Processor. A diagnostic tool that allows users to duplicate the functions of the switches located on the System Control Panel of the computer. Specifically, the CMP provides control functions to perform system startup, halt, memory dump, and aids in system maintenance. It is available only on Series 39/40/42/44/48/52/58 systems.
Code	A language that can be understood and used by computers. A set of precise rules specifying how data may be represented. In data communications, a system of rules and conventions in which the signals representing data can be transmitted, received, and processed.

Code Segments	Instructions to the CPU contained in a single logical module; one or more code segments comprise a complete program or subprogram. Code segments remain unchanged during program execution, and may be overwritten with a new code segment once the current segment has executed completely. In this way, programs larger than the maximum code segment size will execute without user intervention or a large amount of memory.
Code Segment Table	CST. A table that contains a list of permanently allocated MPE and subsystem code segments and code segments that come from any Segmented Library (SL). Each four-word entry in the CST contains, among other information, the address and length of a single code segment, whether it can run in Privileged Mode, and whether it has been accessed. The size of the Code Segment Table can be modified during the SYSDUMP dialog. If the CST is too small, programs will not run when the system is heavily loaded. If it is too large, main memory space is wasted.
Cold Dump	The process of storing the contents of memory on magnetic tape after a system failure or a system halt. Sometimes called Memory Dump, or simply Dump.
Cold Load	The process of loading MPE from system disc or magnetic tape into memory. following a system failure or planned shut down. The five types of cold loads are: WARMSTART, COOLSTART, COLDSTART, UPDATE, and RELOAD.
COLDSTART	To cold load the entire operating system and I/O configuration from magnetic tape or serial disc. A COLDSTART is commonly used when changing the system configuration, when a COOLSTART has failed, when starting a new system, or when the integrity of MPE (and the system disc) is in doubt.
Collating Sequence	The sequence into which characters are sorted or ordered.
Command	A key word that directs MPE, a subsystem, or a utility program to perform a specific operation.
Command Interpreter	C.I. The part of MPE which analyzes and processes commands entered during a session or submitted as part of a job.
Common Bus Interface	Refer to CBI.
Compiler	A program which translates source code written by a programmer into machine-readable format.
Configuration	The layout of the computer system, including MPE table, memory, and buffer sizes, which peripheral devices are connected to the computer, and how they may be accessed. The system is configured by the System Supervisor, who works in tandem with a Hewlett-Packard Systems Engineer (SE).
Connect Time	The duration, in minutes, of a session or job.
Console	The terminal used by the Operator to execute specific commands for the purpose of managing sessions, jobs, and system resources. The Console can be moved from LDEV 20, where it normally resides, to another terminal with the :CONSOLE command.

Console Command	A command which can only be executed from the Console at the "=" prompt (generated by pressing CONTROL and the A key on the Console keyboard). Console commands, unlike other commands executed by the Operator, cannot be distributed to MPE users since A^C has no meaning on a standard terminal's keyboard.
Console Logging	One of the system logging events that causes console commands to be recorded in the system log file.
Console Messages	A message sent to the System Console by the system or a user.
Console Operator	Refer to System Operator.
Control A	Refer to A^C.
Control and Maintenance Processor	Refer to CMP.
Control Key	A key on the terminal, usually labeled "CNTL" or "CTRL", which is used in combination with other keys to send a special ASCII character to the CPU. Simultaneously pressing the Control Key and an "S" (expressed "S^C") for example, will freeze the terminal display. "Q^C" will restart the terminal's scrolling.
Control Y	A character entered by simultaneously pressing the CONTROL key and a Y on a terminal's keyboard. Appears as Y^C in reference text. It is typically a subsystem break and will not affect MPE commands.
COOLSTART	A type of cold load in which MPE programs, configuration data, accounting information, the file directory, volume table, and users files are loaded from the system disc rather than from tape. A COOLSTART is generally used following a routine system shutdown. In the case of system failure, a COOLSTART is recommended after any spool files are recovered with a WARMSTART, and if the integrity of the system disc is not suspect.
CPI	Characters Per Inch. Used for measuring data density on magnetic tapes. On nine-track tapes, corresponds to BPI , since each character is eight bits plus a parity bit.
CPU	Refer to Central Processing Unit.
CPU Time	The amount of time, in milliseconds, that a user, group, or account has used the Central Processing Unit, or CPU.
Crash	Also called a head crash or disc crash. This occurs when the read/write heads on a disc drive (which normally ride on a thin cushion of air above the disc) make physical contact with the disc surface, destroying data and the disc track. The extent of damage to the system depends on which disc crashed and how much of the disc was corrupted. A crash of the system disc is very serious, since it contains the directory of user files as well as MPE programs, the I/O configuration, and accounting structure. Crash is also used to refer to a system failure.
Creator, File	User who creates a file with the :BUILD command, the FOPEN intrinsic, EDIT/3000, or another subsystem.
CRT	Cathode Ray Tube. Generally used as an abbreviation for a video computer terminal.

CSB	Central System Bus. A high-speed bus used on the HP 3000 Models 68 and 70 which provides communication pathway between the CPU module, the Main Memory Module, and one or more Intermodule Buses (which transmit information to and from I/O device controllers).
CS Capability	A capability assigned to accounts and users which permits access to MPE's communications subsystems.
CST	Refer to Code Segment Table.
Cursor	A position indicator on a video terminal, used to identify a single character or space where text or data may be entered, changed, or deleted.
Customer Engineer	Refer to CE.
CV Capability	Create Volume Capability. The ability to define and access private volumes (nonsystem domain discs) with the :NEWVSET command. UV capability is automatically given to users and accounts assigned CV capability.
Cylinder	A portion of a disc pack that consists of vertically aligned tracks on each disc platter within the pack. The first track on the first platter is directly above the first track on the second platter, which is aligned with the first track on the third platter, etc. These tracks, taken together, are considered a cylinder. Therefore, cylinder 1 refers to track 1 on each of the disc's platters.
Data Segment	A contiguous portion of memory allocated to a program, session, job, or MPE itself, to store text or data. Also referred to as the "Stack" or "Data Stack" if it is the first segment allocated to the program. Extra Data Segments are permitted a user who has DS capability.
Data Segment Table	DST. A main-memory resident table that contains a list of data segments currently in use by the operating system and user processes. Each segment is identified by a four-word entry recording its length, location, whether it currently resides in memory or has been swapped to disk, and other characteristics.
DCU	Diagnostic Control Unit. Provides control functions to perform system startup, halt, memory dump, control the status display, display the DCU log, control Console speed, and display all control mode commands. Supplied with the Series 64/68/70 HP 3000 computers in place of the System Control Panel used on other models of the HP 3000. It is accessed solely through the device configured as the System Console.
Defaults	Values for parameters or various system characteristics that take effect automatically unless the user specifies another value.
Delimiter	A character that marks the end of a string of characters. Common delimiters are , ; = and (RETURN).
Device Class Name	Refer to Class Name.
Device Controller	A board, either installed in the I/O card cage or part of the master peripheral device, that controls the device. "Intelligent" controllers handle many of the functions normally performed by the CPU, such as data blocking and deblocking, interrupt handling, and direct memory access.

Devicefile	Used as a synonym for spoolfile. When the commands :SHOWIN or :SHOWOUT are executed, input and output spool files are identified by an number listed in the column labelled "DFID" (Device File IDentification). A device file may also refer to any nondisc device, such as $STDIN and $STDLIST, the default input and output device files for a terminal.
Device-Independent	A characteristic of the operating system which allows users to selectively redirect input to and output from a program, session, or job. Input and output devices are defined with the FILE command; file equations created with this command take effect for the duration of the job or session in which they were defined.
Device Reference Table	Refer to DRT.
Device Subtype	A number ranging from 0 to 15, defining a specific device and its associated software driver. There can be several device subtypes within one basic type. For example, a graphics terminal and one without graphics capabilities would share the same device type, but would be assigned different subtype numbers.
Device Type	Device types are defined by number. For example, 0 represents a moving-head disc, 16 is the class type number assigned to line printers, etc.
DI Capability	DIagnostician. A capability usually assigned only to the Hewlett-Packard Customer Engineer (CE) which permits him or her to conduct certain CPU and diagnostic tests.
Diagnostic Control Unit	Refer to DCU.
Diagnostic Utility System	DUS. A set of utilities used to diagnose a system failure. The DUS is loaded from stand-alone serial storage media into main memory of the shutdown system.
Digital	A method of representing all information stored, processed, or transferred in discrete values or symbols. The opposite of analog.
Direct Access	Reading from or writing to a random access device (usually a disc) by addressing a specific logical record. Direct record access is not possible on serial storage media (such as magnetic tapes) since data can only be read sequentially, from the first record (or byte) to the *n*th record (or byte).
Direct Memory Access	Refer to DMA.
Directory	An area on the system disc reserved for account, group, user, private volume, and file information. MPE uses two directories to manage file access: The Job Temporary File Directory, which contains entries for all temporary files, and the System File Directory, which monitors system and permanent user files.
Disc	A circular plate of magnetically coated material used to store computer data. MPE differentiates between system domain discs, which by definition contain sharable files, and nonsystem domain discs, including Private Volumes, foreign discs, and Serial Discs, which are allocated to a single user at a time and therefore contain nonsharable files.

Disc Caching	An MPE facility which allows a portion of main memory to be used as a high-speed disc buffer. Disc caching can significantly improve system performance by storing frequently used programs and files in main memory, where they can be accessed by users much more quickly than if stored on disc. Note that the benefits of disc caching depend upon two conditions: first, whether the system is I/O bound (slowed down by frequent disc access); and second, if there is enough main memory to allocate part of it to a disc cache.
Disc Drive	A peripheral device which reads information from a disc volume and writes information to the disc.
Disc Files	Files stored on disc.
Disc Pack	Two or more disc platters plus a top and bottom cover mounted on a spindle. Hard disc drives for the HP 3000 use disc packs with five or more platters. Files are stored on five surfaces (read/write heads 0 through 4); the sixth surface (usually the top side of platter 2) contains directory information. One disc pack is mounted on a single drive which is referenced by a logical device number; it may be permanent or removable media.
Disc Platter	Refer to Platter.
Disc Swapping	Refer to Swapping.
Distributed Systems Network	A system of hardware and software data communication products that enables users to access the HP 3000 without direct (hard-wired) connection between the computer and their terminal. HP's distributed system network also allows communication between two HP 3000 computers.
DMA	Direct Memory Access. Hardware contained in the General Interface Channel (GIC) which allows large records of data to be transferred at the maximum speed on the HP-IB. DMA hardware directly places data into memory without assistance from the CPU.
DPAN	A memory DumP ANalysis program that produces a formatted listing of the contents of main memory saved with the Software Dump Facility after a system failure or shutdown. The formatted listing is used to determine the cause of any failure.
DRT	Device Reference Table. A table containing the logical address of disc, tape, and other peripheral devices.
DRT Number	Device Reference Table Number. The physical I/O address of a device controller, displayed in the second column of the I/O Configuration Table listed during the SYSDUMP dialog. An index into the DRT.
DS Capability	Extra Data Segment Capability. A capability assigned to users and accounts which allows an executing process to use extra data segments. DS capability is normally restricted to few users, since allowing many processes to use extra data segments can easily overload the system, requiring large amounts of main memory, a large virtual storage area on the system disc, frequent disc swapping, or all three.
DS Line	Distributed Systems communications line between a remote terminal and an HP 3000, controlled by the Distributed Systems Network.

DST	Refer to Data Segment Table.
DTE	Data Terminal Equipment. Any device equipped with the proper interface necessary to enter data into, or output data from, a communications system.
Dump Analyzer	Refer to DPAN.
DUS	Refer to Diagnostic Utility System.
EBCDIC	Extended Binary Coded Decimal Interchange Code. An 8-bit code which is an extension of Binary-Coded Decimal (BCD) notation. May represent up to 256 characters.
EDIT/3000	An HP 3000 text editor used to create and manipulate ASCII files.
Editor	A common operating system utility program used in the preparation and modification of text and program files. EDIT/3000 is one of the text editors used with the HP 3000.
Error Messages	Messages describing errors which occur either during an interactive session or a batch job. The messages are reported to the standard list device, which is usually a terminal (for a session) or a line printer (when a job executes).
Escape Key	A special terminal key, labelled "ESC", which is used in combination with other characters to modify a session or terminal. For example, when [ESCAPE] is followed by a semicolon, the MPE Echo Facility is disabled. This suppresses the display of any characters entered on the terminal. [ESCAPE] followed by a colon enables echoing.
ESD	ElectroStatic Discharge.
Exclusive Access	Restricts file access to one user at a time. Exclusive access is particularly important during file updates, when two or more people modifying the same record within a file could destroy critical information.
Executing State	The state of a job/session, displayed when the :SHOWJOB command is executed. Possible states are: INTRO, WAIT, INIT, EXEC*, EXEC, and SUSP.
Extent	A portion of a file consisting of physically contiguous sectors on the disc. One file may have as many as 32 extents. The file's creator may, however, set the maximum number of extents to fewer than 32. Default is 8.
FCOPY/3000	A subsystem supplied with the HP 3000's Fundamental Operating Software which provides the user with a selection of commands to copy, append, translate, verify, and compare files. Executed with the MPE command :FCOPY.
FID	Refer to File Information Display.
File	A group of related records that comprise a named collection of data. Files, which are created by users, are organized into groups. The complete file specification includes the name of the file's group and account in addition to the 8-character file name.

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File Code	A four-digit integer that identifies the special function of a file. Users may assign a file code between 0 and 1023 to a file they create to classify it according to its purpose.
File Directory	A catalog maintained by the system which records a file's name, who created the file, its location, and other defining characteristics.
File Equation	The result of using the MPE :FILE command to equate a file name to a device. Generally used to direct the input to or output from a program, job, or session to a particular device by referencing the device class, such as "TAPE " or "LP ".
File Information Display	FID. A display of file characteristics, an error message, an error number, and current FOPEN intrinsic parameters that is provided when certain file input/output errors occur.
File Labels	The first sector of a disc file containing the following file information: file name, file code, record size, file format, current end-of-file mark, maximum number of records, blocking factor, number of disc sectors in use, number of extents currently allocated, and maximum number of extents. This information may be displayed with the :LISTF,2 command.
File Level Security	The file access modes and types of users to whom they are available. These are set to default values when the file is created but may be changed by the file creator using the :ALTSEC command.
File Mark	A uniquely formatted area on a magnetic tape that is used to separate files; equivalent to the Tape Mark.
File Name	A label by which a file may be uniquely identified. Must be alphanumeric, beginning with a letter, and contain one to eight characters.
File Pointer	Logical record pointer kept by MPE to indicate the next sequential record to be accessed in a file. Pointer is set to the first record when the file is opened.
File State	The condition of a spooled file, which may be either OPEN, READY, ACTIVE, or LOCKED. An OPEN file, for example, is one currently being accessed by a user or program.
File System	The part of the MPE operating system that organizes data and programs. Automatically handles user access to input/output devices, data blocking, buffering, data transfers, and deblocking.
Firmware	Microcode instructions used to control a device or process which cannot be altered. Instructions stored in read-only-memory (ROM) or Writable Control Store (WCS) are considered firmware. Part of the CPU.
Fixed-Length Record	A record that always contains the same number of characters or words. Fixed-length records within a single file are always the same length.
Flexible Disc	A random storage device also called a diskette or floppy disc. Data may be written to or read from one or both sides with a special disc drive intended only for diskettes.
FLEXIBLE DISCCOPY/3000	An HP 3000 utility program that transfers IBM 3741-formatted flexible disc data sets into MPE standard formatted ASCII or binary disc files.

Foreign Disc	A nonsystem domain disc that MPE does not recognize as a Private Volume or Serial Disc. Foreign discs are nonsharable devices, and may be formatted either sequentially or for direct record access. Foreign discs, like Private Volumes and Serial Discs, do not have entries into the System Volume Table.
Formal File Designator	The name, supplied by a user or a program, used to open or create a file.
Formatting	Preparing a disc or tape volume so that files may be written to it. Also called "initializing".
FOS	Fundamental Operating Software. The collection of MPE programs, utilities, and subsystems bundled together for one price, and supplied on a Master Installation Tape.
Fully-Qualified File Name	A complete file description, including the file name, group to which the file belongs, and the account name. For example, the fully-qualified file name of the LETTER file in the PUB group of the SYS account would be expressed as LETTER.PUB.SYS.
Fundamental Operating Software	Refer to FOS.
General Interface Channel	GIC. Hardware I/O channel boards which fit into the I/O card cage and connect with the Intermodule Bus (IMB). Two high-speed "master" devices, listed as Unit 0 in the System Configuration Table, may be plugged directly into one GIC. Additional devices may be "slaved" off the master device, so that a single GIC can control two high-speed master devices and multiple slave devices. Also called General I/O Channel.
GIC	Refer to General Interface Channel.
GL Capability	A user attribute, assigned by the Account Manager, that grants a user special file-access modes for the maintenance of certain files within the user's home group.
Group	Used by MPE to partition an account and organize the account's files. Groups are the smallest entity for which filespace, CPU seconds, and connect minutes are reported, and, optionally, limited by the Account Manager. A PUB group is created for each account when the account is defined. Others are created as needed by the Account Manager.
Group Level Security	The file access modes and types of users to whom they are available as specified by the Account Manager when the group is created. Any file access modes not permitted the account may not be assigned to a group.
Group Librarian	The person whose user name has been assigned GL capability by the Account Manager. There may be more than one Group Librarian per account.
Handshaking	A term used to describe a communications protocol between devices, or between a device and the CPU.
Hardware	A general term describing all the physical components and devices connected to the computer, including the CPU cabinet, tape drives, disc drives, terminals, etc.

Hard-Wired Terminal	A terminal directly connected to the computer system by a length of cable.
Head	The mechanism on a disc or tape drive which reads data from, and writes data to, the disc or tape volume. The head on a disc drive does not normally make physical contact with the surface of the media, whereas the tape head will.
Header	The first page printed when output is directed to a line printer. Specifically, it is an identification page that prints, in four groups of three identical lines, the session name (if any), session number, logon identification, day of the week, date, and time. It may be suppressed by the :HEADOFF command.
Hexadecimal	A method of representing a single alphanumeric character with any combination of four binary digits (0 and 1). Hexadecimal also describes the base 16 numbering system, in which the first 10 digits are 0 through 9, and the last 6 are A through F.
Home Group	The group assigned to a user by the account manager when the user name is defined. This group is the user's default logon group if a group name is not specified with the :HELLO or :JOB command.
HPDraw	A software program available for the HP 3000 used to produce graphic designs and illustrations.
HP-IB	Hewlett-Packard Interface Bus. A high-speed (1 Megabyte/second) interface bus used in HP computer systems. The HP-IB is controlled by a single GIC, with up to fifteen devices interconnected on one HP-IB.
IA Capability	Interactive Access. A capability assigned to accounts and users which allows users to initiate sessions with the :HELLO command.
IMAGE/3000	A data base management system available on the HP 3000 consisting of a set of programs and procedures that can be used to define, create, access and maintain a data base.
IMB	InterModule Bus. Part of the internal circuitry of the HP 3000 and indirectly connected to the high-speed Central System Bus, or CSB. The IMB provides an interface between the CSB, terminals (via the Serial Interface Bus, or SIB) and nonterminal devices (via the GIC).
IMF/IML	Interactive Mainframe Facility/Interactive Mainframe Link. An MPE communications subsystem that permits users to access a mainframe computer in interactive mode using HP's Distributed Systems Network (DSN).
INP	Intelligent Network Processor. A communications input/output board used with HP data communications products.
INITIAL Program	Also called MPE Initiator, or the INITIAL dialog. A stand-alone program, executed during a cold load, that loads the MPE operating system, recovers spool files, handles disc errors, and reconfigures input/output devices and system parameters.
Initialization State	The state of a job/session when it begins to execute on its own stack. Indicated by "EXEC*" when the :SHOWJOB command is issued.
Initiator, MPE	Refer to the INITIAL Program.

Input	Refers to data to be processed, or the process of transferring data from external storage to the computer. Also defined as current, power, voltage, or other driving force applied to a device
Input/Output	Refers to the process of, or equipment used in, transmitting information to or from the computer.
Intelligent Network Processor	Refer to INP.
Interactive	The exchange of information and control between the user and a computer in real time. The opposite of batch mode processing.
Interactive Access	I.A. A processing mode, known as a session, that allows users at remote or local terminals to communicate directly with the computer and receive an immediate response.
Interactive Mainframe Facility/Link	Refer to IMF/IML
Interface	A general term describing the hardware, software, or firmware used to permit communication between devices, or between modules within a complex program.
Interleave	A method of writing data to a disc device for the purpose of improving data access speed.
Intermodule Bus	Refer to IMB.
Interprocess Communication	IPC. A facility of the MPE file system that permits processes to communicate with one another, without user intervention. In this way, one task may initiate or "spawn" another task, or several tasks.
Intrinsic	Procedure in MPE that may be used in user programs to perform common tasks such as file access, message formatting, data conversion, etc.
Intrinsic Call	Invocation of an MPE intrinsic from within a program.
Introduced State	The state of a batch job when it is first input to a spooled device. Displayed as "INTRO" when the :SHOWJOB command is executed.
I/O	Abbreviation for Input/Output.
I/O Bay	The cabinet which contains card cages and device controller boards for all peripherals connected to the HP 3000.
IPC	Refer to Interprocess Communication.
JCW	Job Control Word. A 16-bit logical word which resides in an MPE-managed table, used to pass information between processes. In addition to system-defined JCWs, users may define their own JCWs, both of which may be used by their job/session.

Job	A single file, submitted by the user, containing operating system and utility commands and references to the files they will manipulate. Once submitted, a job executes independently of the user or session that initiated it. Jobs are commonly used to compile source programs, modify files, or perform other functions that do not require user interaction. Submitting a job is also called "streaming" (from the :STREAM command) or batch processing.
Job Control Word	Refer to JCW.
:JOBFENCE	An Operator command that defines acceptable input priorities for jobs and sessions. The :JOBFENCE command is followed by a numerical parameter, *priorityfence*, that must be between 0 (the least limiting parameter) and 14 (the most limiting parameter). Jobs which have an input priority less than or equal to the current job fence will be deferred until their priority is raised or the fence is lowered. Sessions with a priority less than or equal to the current fence will be refused with the message "CAN'T INITIATE NEW SESSIONS NOW".
Job State	A generic term for the preliminary stages, excluding initial validation, that a new job or session must pass during its lifespan.
Junction Panel	Part of the I/O bay, junction panels provide a framework onto which peripheral and terminal connectors are mounted. A single junction panel is divided into sections; each section is used to mount one or more connectors of a single type. For example, one junction panel section will contain all modem ports. The five types of connectors which can be mounted on a junction panel are: direct connect, modem, printer, INP common, and HP-IB connectors.
K	A symbol representing the number 1024, or 2^{10}. Frequently used as a synonym for "thousand".
Keyed Files	Files whose records can be read in logical sequence or directly accessed by a key associated with each record.
Keyed Sequential Access Method	Refer to KSAM.
Keyword	A word that has been assigned a specific meaning by MPE, a subsystem, or utility.
Keyword Parameters	Words that have special meaning to the Command Interpreter and are used to modify the intent or effect of an MPE command. Keyword parameters, unlike positional parameters, may appear in any order after a command has been entered on the command line. An entire keyword parameter group, such as "PASS=*password*", must be separated from other keyword parameters by a ";".
KSAM	Keyed Sequential Access Method. A file access method supported on the HP 3000 (and included with the Fundamental Operating Software) in which records may be accessed either sequentially or randomly by primary or alternate record key.
LAN	Refer to Local Area Network

Laser Printing System	Refers to the production of documents using the model HP 2680A or 2687 Laser Printers with the HP 3000.
Linear Subqueue	Synonym for the AS and BS subqueues, which allocates CPU time to a process until it is complete, or gives up the queue. The AS subqueue is reserved for MPE programs, subsystems, and utilities, and is never available to user processes. The BS subqueue, which is available to user processes via the :HELLO command, allows users the highest execution priority; care should be used in assigning the BS subqueue because processes in this priority class may lock out other processes.
Loading	To prepare a program for execution by allocating entries in the Code Segment Table (CST) or Extended Code Segment Table (XCST). The CST and XCST contain information about the code segment, including its address, current location (on disc or in memory) and other information which facilitates program execution. "Loading" a program does not mean that the code segment itself is currently stored in main memory.
Local Area Network	Abbreviated LAN. A computer network confined to a single location. For example, connecting two or more computer systems within a single office together is considered a Local Area Network.
Locked State	The status of an output spool file when it is being accessed by the SPOOK utility, and therefore unavailable for printing.
Lockword	A word, assigned to a file when it is created or renamed, that must be supplied to regain access the file in any way. The word may be from one to eight alphanumeric characters long and must begin with an alphabetic character.
Log File	A disc file that maintains a running record of system events. Each event is recorded in a separate log record, and is correlated with the job or session that causes the event.
Logging Shutdown	A shutdown marking the end of the logging cycle. In most cases it is performed just prior to either system or database backup.
Logical Device Number	A unique number between 1 to 1024 that the System Manager assigns to each I/O device when the system is configured. Users, jobs, and programs may reference the physical device by its logical device number or by device class. Frequently abbreviated *ldev*.
Logical Record	A collection of fields or related data, treated as a unit, residing in a file.
Log Off	The termination of a session, accomplished by typing the command BYE and pressing RETURN. Log Off also refers to the termination of a job with the :EOJ command.
Log On	The process of initiating a session on the HP 3000 by using the :HELLO command. Logging on also refers to the initiation of a job with the :JOB command.
Logon UDC	A User-Defined Command, or UDC, that is automatically executed at logon. Specified with an OPTION LOGON statement within the UDC.
Log Records	Data sets that are written to the log file by MPE. A total of 21 types of log records may be accessed, manipulated, and displayed with the MPE utility LISTLOG5.

Machine Instruction	The smallest resolvable piece of a code segment. Machine instructions are used by the CPU to accomplish a single task, such as moving an item of data to the CPU, moving it from the CPU to memory, or performing a single calculation using data in the CPU.
Main Memory	Fast, random access storage that contains all currently executing code and data segments, including portions of MPE and any utilities in use. Main memory is volatile; if the system halts for any reason, any files not saved on disc or tape will be lost.
Master Device	A peripheral device, identified as Unit 0 in the "CHANNEL" column of the I/O configuration table. Master devices usually contain the device controller board used to control it and other "slave" devices.
Master Installation Tape	Refer to MIT.
Master Volume	Defined for Private Volumes, this is the volume that contains both the accounting directory and disc directory for the complete volume set. The Master Volume must be mounted in order to access any volume in a set (which can consist of up to 8 discs) and must have the same name as the Volume Set.
Memory Error Logging	A facility which records all memory errors, beginning automatically when the system is initialized.
MIT	Master Installation Tape. A tape that contains the MPE operating system, utilities, and subsystems for the HP 3000. It may either be a new version of the software, a backup of the user's system, or the original Installation Tape for a new site. MIT may also refer to a particular release of MPE.
Modem	MOdulator/DEModulator. A device that allows communication between computer systems without relying on direct (hard-wired) connection. At the site where the communication link is initiated, the modem converts digital signals generated by the computer into a form which can be transmitted via telephone (modulation). At the receiving facility, the telephone signal is reconverted into a digital signal (demodulation) and input to the computer.
Motherboard	A printed circuit assembly into which circuit boards are plugged. The motherboard provides an organized means to transmit data, control information, and power between the components and devices controlled by the circuit boards. Refer to Backplane.
MPE	Multi-Programming Executive. The operating system of the HP 3000 computer system. MPE monitors and controls program input, compilation, run preparation, loading, execution, and output.
MR Capability	A capability assigned to accounts and users which allows one user multiple RINs (Resource Identification Numbers) so that they may lock more than one resource or device at a time. Usually assigned to few people, since simultaneous resource locking can lock (or "hang") the entire system.
MRJE	Multileaving Remote Job Entry. A Distributed Systems Network (DSN) product that provides a link between an HP 3000 and a mainframe computer using Remote Job Entry communications protocol.
MTS	Multipoint Terminal Software. An HP product that allows you to connect several terminals to a single line.

Multileaving Remote Job Entry	Refer to MRJE.
Multipoint Terminal Software	Refer to MTS.
Multi-Programming Executive	Refer to MPE.
ND Capability	Nonsharable Device capability. A capability assigned to accounts and users which permits account members to own a nonsharable device, which includes unspooled tape drives and line printers, serial discs, private volumes, and foreign discs.
$NEWPASS	A system-defined file, only one of which may exist during a single job or session. $NEWPASS is the file name assigned to any file referenced by the name $OLDPASS .
NM Capability	Node Manager. A capability assigned to users allowing them to control communications subsystems at their node.
Node	One end of a communications link. For example, if two HP 3000 computers are connected together via a DS line, each is system is considered a node.
Nonsystem domain	One of the two configurations for disc drives. Disc information for nonsystem domain discs is not entered in the System Volume Table. They can be mounted and unmounted while the system is running without adversely affecting normal operation. Private Volumes, serial discs, and foreign discs are nonsystem domain disc drives.
$NULL	A system-defined file that can be opened for input or output, but is always treated as a nonexistent file. The $NULL file is typically opened as an output file by various MPE programs which do not need any output saved. For example, when used with the :SYSDUMP command, it allows the operator to step through the SYSDUMP dialog and alter system parameters without actually changing the system. Slang expression for the $NULL file is "Bit Bucket".
Octal	The base eight numbering system, in which alphanumeric characters are represented by a combination of three binary digits.
Offline State	The condition of a device when it is not available to the system, i.e. not under the direct control of the CPU.
$OLDPASS	A system-defined temporary file. The file recently closed with the name $NEWPASS is renamed $OLDPASS.
OP Capability	System Supervisor capability. A capability assigned to the System Supervisor's user name and account. He or she is responsible for performing backups, altering the system configuration, and in general, tuning the computer so that it continues to perform well and meet the needs of users.
OPEN State	The state of a spool file when it is being accessed by a user program or MPE. An OPEN input spool file occurs when data is being collected from the input device (usually a terminal or tape drive). An OPEN output spool file is the disc file being created by the output spooler.

Operator Command	MPE commands executed at the System Console by the Operator. Operator commands may be distributed to specific users at the Operator's discretion with the :ALLOW, :ASSOCIATE, and :JOBSECURITY commands.
OPERATOR.SYS	The user and account that MPE automatically logs onto at the Console when the system is started. OPERATOR.SYS may or may not be assigned special capabilities. Unlike the System Supervisor, who is assigned OP capability, or the System Manager, assigned SM capability, there is no mnemonic which entitles the Operator to execute a special subset of commands. The Operator's power and responsibilities derive solely from control of the System Console, and any capabilities assigned to it by the Account Manager of the SYS account.
OPT/3000	Online Performance Tool, a subsystem used to evaluate and improve system performance.
Optional Parameter	Parameter that is not required when entering a command or calling an intrinsic. In reference manuals, optional parameters are surrounded by brackets, [ ].
Output	Data transferred from internal to secondary (external) storage in a computer. Also, the process of transferring information from the computer to a peripheral device. Output is also current, voltage, power, or driving force delivered by a circuit or device.
Output Priority	A number in the range of 1 (lowest priority) to 13 (highest priority) assigned to an output spool file either by the system (a default value) or by a user. It is used by MPE to prioritize the order in which files will be printed.
Parameter	A variable assigned a constant value for a particular purpose or process. It is used in commands and procedure calls to request a specific action.
Password	A word assigned to an account, group, or user that must be supplied to log onto the account and group (if not the home group), to initiate a job/session as the specified user. Passwords may be up to eight alphanumeric characters, but must begin with a letter. Since they are not echoed to the screen when entered, and are known only to authorized individuals, passwords enhance system security.
PCB	Process Control Block. A main-memory resident table that contains status information for each process running on the system. Entries in the table are 21 words, and monitor memory management, dispatching, the stack number, what extra segments a process is using and their location, whether the process is waiting for a resource or waiting for a response from another process, and other information.
PDN	Refer to Public Data Network.
Peripherals	Refers to devices attached to a computer, such as terminals, tape and disc drives, and printers. Also called peripheral devices.
Permanent File	A file stored on disc with an entry into the system directory. To erase the file, it must be deliberately purged from the system with the :PURGE command or certain invocations of the FCLOSE intrinsic.

PH Capability	Process Handling. A capability optionally assigned to accounts, groups, and users that allows a currently executing process to create other processes. PH capability also permits process suspension, interprocess communication, and process deletion. Since the proliferation of processes results in heavy system resource usage, PH capability is typically assigned to few users.
Physical Record	One or more logical records, treated as a unit when transmitted to and from devices. The number of logical records contained in a single block is determined by the blocking factor, specified when the file is first created with the :BUILD command or the FOPEN intrinsic.
PIN	Process Identification Number. A number assigned to a process by MPE when the process is created. It is used internally by MPE (in the PCB table) and during requests for system resources at the Console (when the Operator responds to requests by referencing the PIN in the :REPLY command).
Platter	A single disc coated with magnetic material. One or more platters are mounted on a central spindle, and together they form a complete disc pack. Information may be recorded on one or both sides of each platter within the pack.
PM Capability	Privileged Mode. A capability assigned to accounts, groups, or users which allows unrestricted memory access, access to privileged CPU instructions, and the ability to call privileged procedures.
Positional Parameters	One or more terms appearing in a specific order on the command line which modify the intent or effect of the command. If a positional parameter is omitted, the user must supply a comma in its place.
Power Down	The procedure for turning off the system power.
Power Up	The procedure for turning on the system power.
Priority Request	The use of the optional parameter ;HIPRI in the :HELLO and :JOB commands. This capability, granted to System Supervisors and System Managers, will cause a job to be dispatched or a session to be initiated, overriding the current job fence or execution limit.
Private Volumes	Removable disc volumes that are not included in the System I/O Configuration table, and therefore must be brought online with an explicit :LMOUNT command. To access a private volume, a user's logon group and account must be assigned to a specific volume set with the VS parameter of the :ALTGROUP and :ALTACCT commands. Since private volumes are non-system domain devices (and do not have entries in the System Volume Table), they may be logically mounted and unmounted during normal system operation without disrupting the system.
Privileged Mode	Refer to PM.
Process	The unique execution of a program or procedure. If several users execute the same program, each is a separate process. Similarly, if the same user runs several programs, each execution is also considered a distinct process.
Process Control Block	Refer to PCB.
Process Handling	Refer to PH.

Process Identification Number	Refer to PIN.
Prompts	The specific characters used by MPE, subsystems, and utilities to indicate a request for the user to enter a command. Common prompts include :, /, and ?.
PUB Group	A special group, created when the account is created, whose files are usually accessible to all users within the account.
Purging	Deleting a permanent file from the system with the :PURGE command. Also used to delete an accounting entry like a user name, group name, or an entire account.
QUERY	A software utility that allows users to access data in an IMAGE data base.
Quiet Mode	A session mode in which messages sent from other jobs or sessions to a terminal are not displayed. Users enable Quiet Mode with the ":SETMSG OFF" command. To determine who is running "quietly", the Operator may execute the :SHOWJOB command: Those sessions not receiving messages are noted by the word "QUIET " in the third column of the listing. Since a :WARN message from the System Console will override Quiet Mode, it should be used for all critical communication, such as informing the user of a pending system shutdown.
Random Access	Direct access to data stored in a device. For example, if a user or program requires the 17th record in a file stored on random access media, that record may be selected for the read/write operation without scanning the preceding 16 records. Typical random access storage devices include main memory and disc drives.
READY State	The condition of an input spool file when it is available for access by the spooler program or user. READY output spool files are complete files waiting to be printed. They may also be manipulated with the SPOOK utility.
Record	A collection of fields or related data treated as a unit, residing in a file.
Record Width	The amount of data which is transmitted to and from a device at one time, which is a decimal value specified in words. For example, the standard record width for terminals is 40 words. The record width for disc devices is 128 words.
Register	A temporary storage device capable of containing one or more computer bits or words.
Relative I/O	RIO. A direct file access method that permits individual records to be deactivated. These inactive records remain on disc, but are ignored in a logical read operation.
Relative Record Number	A number that represents the position of a logical record in relation to the first record in the file. The first record is numbered either 0 or 1, depending on the subsystem or utility being used.
RELOAD	To cold load the entire system, including all MPE files, the accounting structure, I/O configuration tables, and user files from the backup medium. This option is normally used when no other cold load option has succeeded.

Remote Job Entry	RJE. An HP program, executed with the :RJE command, that provides an interface between the HP 3000 and other computers using the IBM 2780/3780 communications protocol. RJE makes the HP 3000 appear to be either an IBM 2780 or 3780 Data Transmission Terminal to the host system, and provides a complete multiprogramming environment.
Remote Terminal	A terminal that is indirectly connected to the computer, using a modem and telephone hook up.
Report	A display of information about accounts, groups, and users generated with the :REPORT command. The information, listed in columns, contains both the current value and maximum limit for the following: filespace (in sectors), CPU time (in seconds), and connect time (in minutes). System Managers may :REPORT on all groups in all accounts; Account Managers may :REPORT on all groups in their own account; standard users may only display information for their logon group.
Resource Identification Number	RIN. A number which identifies a user-defined resource. Users are normally assigned only a single RIN, which means they may have exclusive access to one resource, such as an I/O device, a file, or a program, at a time. Allowing an account, group, or user multiple RINs (by specifying MR capability with the :ALTACCT, :ALTGROUP, or :ALTUSER commands) allows users to lock more than one resource at a time, which can hang an application.
Restore	The process of retrieving user files from SYSDUMP and :STORE tapes or serial disc and writing them to disc. Executed with the :RESTORE command.
Resume	To begin execution of a procedure or program after it has been suspended. Also an MPE command (:RESUME).
RIN	Refer to Resource Identification Number.
RIO	Refer to Relative I/O.
RJE	Refer to Remote Job Entry.
Run	Begin the execution of a program.
Run-Time	The environment in which a process is running or executing.
SDF	Software Dump Facility. A facility that gives the System Operator the capability of storing all main memory to a serial storage medium. It operates in a stand-alone environment, and is used following a system failure or a system halt.
Sector	A portion of a track on a disc, and the smallest addressable piece of the disc. MPE-formatted discs use 128-word sectors (256 bytes).
Security	The provisions included in MPE to protect the system from unauthorized use. MPE offers several means to create a secure environment. At the most basic level this includes the organization of files into groups, and users into accounts, either of which may be assigned a password. Security also refers to the ability to read, write, append, lock, and execute files, optionally assigned to accounts by the System Manager, and to groups and users by the Account Manager.

Segmented Library	SL. Contains code segments which are sharable, general-use MPE, utility, and subsystem procedures that are not unique to a particular process. The three levels of SLs are: the Group Library SL, available to any user who can access the group, the Public Library SL, accessible to account users, and the System Library SL, used by all system users.
Segmenter	A subsystem of the MPE operating system that performs all intermediate functions between source code compilation and program execution. Its primary function is to gather and link into segments most of the resources needed to form an executable program file.
Sequential	Used to describe the manner in which information may be read from or written to a device. Sequentially accessed files are stored in such a way that the logical order of the file's records is identical to their physical layout on disc or tape.
Serial Disc	A sequentially-accessed disc that is treated like a magnetic tape. Flexible diskettes, disc packs, and cartridge tape may all be used as serial discs. They are designed to store system data (backups), load pertinent subsystems, and to perform stand-alone CPU and non-CPU diagnostics.
Serial Interface Board	SIB. A board which serves as an interface between the Intermodule Bus and one or more terminal controller boards.
Session	Using the HP 3000 interactively by entering commands and data through a terminal's keyboard and receiving immediate responses to input. A session is initiated with the :HELLO command and ends with a :BYE command, or another :HELLO command, which logs the user on again.
SF Capability	Save Files capability. The capability which permits users to save the files they create. Assigned by default to accounts and users.
HPSlate	An HP 3000 screen editor used to create and manipulate ASCII files.
Slave Device	A peripheral device not directly connected to the HP 3000 via a General Interface Channel (GIC). A slave device also does not have its own device controller, but instead is controlled through a master device. Slave devices are listed in I/O Configuration Table (listed during the SYSDUMP dialog) as nonzero units in the third ("UNIT ") column.
SM Capability	A capability assigned to the user name and account to which the person designated as System Manager logs on. The System Manager is responsible for the structure, security, and overall operation of the system by establishing accounts and assigning capabilities and resource-use limits to each.
Software Dump Facility	Refer to SDF.
SORT/MERGE/3000	A utility program which orders records in a file and merges the sorted files.
Source Code	The language programmers use to write a program, which must be translated, or compiled, into a machine-readable format before it can be executed by the computer.
SPL	Systems Programming Language. The only programming language available for the HP 3000 which allows users to control every machine instruction in a code segment. It is used for many applications, including MPE itself.

Spooler	A two-stage program that manages input and output to non-sharable devices so that they appear to be shared among several users. The input spooler collects data from an input device, which is usually a terminal or tape drive. The output spooler builds an output spool file on disc, and oversees the orderly selection and printing of READY spool files.
Spool File	A file on a mass storage device (usually a disc drive) that is either spooled from an input device or spooled to an output device. Spool files may be either OPEN, ACTIVE, READY, or LOCKED. These states describe different stages of the spooling process depending upon whether the file is an input or output spool file.
Spooling, Input	The first stage of the spooling process, in which data is collected from :JOB and/or :DATA accepting devices (such as terminals or tape drives). Once all of the data has been collected and the spool file is complete (the READY state), it may be opened by the spooler program (the OPEN state) to create an output spool file.
Spooling, Output	The second stage of the spooling process, in which an output spool file is created on the spooling disc. Once complete (the READY state), the file is placed in the queue to await printing. The currently printing output spool file is ACTIVE; only one such spool file may be ACTIVE at a time. Output spool files may also be accessed by the SPOOK utility, at which point they are LOCKED.
Status bits	Bits (or word, if status words are used) which indicate the condition of a device. The status bits or word can be checked by a program or microcode, and based upon the value, a specific sequence of instructions executed.
$STDIN	A system-defined file name that refers to the Standard Input device used to initiate a session or job; usually a terminal keyboard, card reader, or tape drive.
$STDINX	A system-defined file name that refers to the standard input device used to initiate a session or job. Unlike $STDIN , $STDINX treats the : prompt appearing in the first column as part of the data file, rather than an end-of-file indicator.
$STDLIST	A system-defined file name that refers to the standard session or job listing device. This is the terminal on which a session is initiated or the system line printer, tape drive, or card punch for a job.
Storage Device	A device (such as a disc pack, a disc cartridge, a flexible disc, magnetic tape, or cartridge tape) onto which data can be stored and subsequently retrieved.
Store	An operation in which data is saved in a known location. The unit of information may be as small as a single byte, such as the result of an assembler instruction, or the contents of several discs, which might be several hundred megabytes of data.
Stream	An MPE command (:STREAM) that allows users to spool batch jobs or data from a session or a job. Once a job is streamed, it will execute as a separate process without requiring input or supervision from the user who streamed it.

Subqueue Priority	The subqueue (BS, CS, DS, or ES) assigned to a process when it is initiated which determines how it will compete with other processes for CPU time. The highest subqueue that a job or session may be assigned is BS, specified with the ;HIPRI parameter of the :HELLO or :JOB command. The default subqueue is CS, although users may request a lower queue if they do not need output immediately. The ES subqueue, for example, is sometimes used to compile programs, since compilations are CPU-intensive, and can usually be deferred. To display the queue status of all executing processes, enter the SHOWQ command: those processes running in the AS subqueue (reserved for MPE processes) or BS subqueue are identified by an "L" in the left-hand column, since these queues are referred to as "linear" subqueues. When a C, D, or E appears in the left-hand column, the process is executing in the CS, DS, or ES subqueues, also called "circular" subqueues.
Subsystem	A software program that performs a specific function, such as compiling programs, copying files, or editing text. Subsystems are executed by entering a single command at the colon prompt. At that point a different prompt is displayed, and a set of commands specific to the subsystem are available to the user. In addition, the user must explicitly exit the subsystem, usually by typing "e" or "exit".
SYS account	A special account, included with the system when it is first installed, that contains all MPE files (stored in the Segmented Library) and supported subsystems, utility programs, and compilers.
SYSDUMP Program	An MPE program that copies the operating system, the current I/O configuration, the file directory, accounting information, and users' files onto magnetic tape or serial disc. Full SYSDUMPs should be done regularly to minimize the loss of data after a system failure. Partial SYSDUMPs, which typically copy only files that have been added or modified since the last full SYSDUMP are an equally important part of a regular backup schedule. SYSDUMPs are also used to change the system's I/O configuration, system tables, system logging, and other parameters.
System Buffers	An auxiliary data storage area that streamlines throughput for system messages displayed with the :HELLO, :BYE, :WARN, and :TELL commands, and also used by multipoint (MTS) lines. Each buffer is 128 words long. Since they reside in main memory, allocating too many buffers will waste memory; too few buffers, however, may degrade system response time.
System Catalog	A list of User-Defined Commands (UDCs) that are created by the System Manager for use by any user on the system.
System Configuration	Tailoring the operating system to accommodate the current physical layout and workload of a particular installation. The configuration is typically modified when new terminals, another line printer or a disc drive are added. The system also may be reconfigured to assign new class names to existing devices, change the size of system tables or virtual memory, modify system logging, or alter any other configuration parameter.
System Console	The terminal, usually logical device 20, that the System Operator uses to monitor system activity, respond to resource requests, and send messages to user's terminals. The Console (and its associated privileges and responsibilities) may be transferred to another logical device with the :CONSOLE command.

System Control Panel	A panel composed of control switches and status indicator lights found on the Series 39, 40, 42, 44, 48, and 58 computers.
System-Defined Files	Files defined by MPE and made available to all users to indicate standard input or output devices, special temporary files, and files opened for output which do not perform an actual write operation.
System Disc	The disc volume, mounted as logical device 1, which contains MPE, I/O configuration information, the accounting structure and file directory, and utilities and subsystems. It also contains an area reserved for virtual memory and may be used to store user files.
System Domain	One of the two configurations for disc drives. System domain discs contain only sharable files, and remain online until the system is shut down. Because information about all system domain discs is entered into the System Volume Table, a system domain disc may only be taken offline by altering the I/O configuration during the SYSDUMP dialog and cold loading the new configuration.
System Failure	An internally detected error from which recovery is not possible. Rather than continue to operate, risking data integrity, MPE halts.
System File Directory	A directory maintained by MPE that records the name, group, and account of each permanent file on the system. The directory also "knows" the size of each file, its location on the disc, who may access the file, and other information.
System Halt	The condition of MPE following a system shutdown or system failure, indicated by no response at the System Console or any user terminals. In addition, the system's HALT light will be on.
System Logging	A facility to record the occurrence of specific events and system resource usage by accounts, groups, and users on a job/session basis. The System Manager enables logging and selects which events will be recorded during the SYSDUMP dialog. The type of events which may be logged include: Job initiation and termination, file closing (and therefore opening), system shutdown, I/O errors, volume mounts, spooling, etc. The minimum logging events which should be "ON " are type 1 (LOGGING ENABLED), type 7 (POWER FAIL), and type 11 (I/O ERROR), which help your CE diagnose any system problems.
System Manager	The person who manages the computer installation, responsible for creating accounts and defining resource-use limits and capabilities for each. "System Manager" is also a capability (SM) assigned to the user name and account that the System Manager logs onto.
System Messages	Reports from the system that reflect its state at any given time. System messages address a variety of topics, including the status of jobs and sessions, peripherals, device files, and queues.
System Operator	The person who monitors the System Console and manages the computer on a daily basis. This includes establishing job and session limits, setting the output fence, responding to users' resource requests, cold loading the system after a shutdown or failure, and informing users of the system's status. Also called Console Operator, or just Operator.
Systems Programming Language	Refer to SPL.

System Prompt	The colon (:) which appears on the left side of the terminal display to inform the user that MPE is waiting for a command.
System Shutdown	Logging off all jobs and sessions and unloading the MPE operating system in an orderly manner.
System Startup	Loading the MPE operating system from either disc or tape by bringing a subset of the MPE INITIAL Program into memory.
System Status and Display Panel	A panel on the Series 64/68/70 that contains sets of light-emitting diodes, which indicate the status of the Current Instruction Register, AC power, RUN and HALT modes, battery, and internal temperature.
System Supervisor	The person assigned OP capability, and who is responsible for tuning the computer system so that it runs efficiently. The System Supervisor works with the System Manager and the Hewlett-Packard Systems Engineer (SE) to configure the system and determine resource-use needs of all accounts and users on the system.
System Volume Table	Refer to Volume Table.
Swapping	Also known as disc swapping, this is the method MPE uses to manage the transfer of programs and data files into and out of main memory. Processes which are waiting for a system resource to be available will be swapped out to an area on disc called "virtual memory". Another process, which does have the resources it needs to execute will be swapped from virtual memory into main memory, where it will begin processing. Disc swapping is handled entirely by MPE, and is transparent to users.
Tape Mark	A uniquely formatted area on a magnetic tape that is used to separate files; it also may be used to delimit the end of the tape (two file or tape marks). Also called File Mark.
TDP/3000	Text and Document Processor. An HP 3000 line editor (with a screen editor option) used to create and manipulate ASCII text files.
Temporary File	A file that exists only for the duration of a session or job. Also, a file opened by a program for access while the program is executing. For example, a work file is a temporary file created by the Editor. It will not become permanent until the user saves it to disc.
Terminal Buffer	An auxiliary data-storage area used to buffer all terminal I/O and improve data throughput to and from the display screen. The number of buffers allocated per terminal is a function of the type of terminal controller used by the system, the size of the data segment, the number of terminals supported, and their baud rate. With too few terminal buffers, the system's response time will be slow, and the display erratic.
Terminal Type	Hewlett-Packard's classification of the various terminal models. There are 19 groups with one or more models in each group.
Text and Document Processor	Refer to TDP/3000.

Thumbwheel	One or more dials on the 39/40/42/44/48/52/58 models of the HP 3000 used to set the hardware channel number and device address. These two settings can be used to determine the logical address of the device, or DRT number.
Track	A data area on disc that forms a concentric circle, divided into sectors. One full track passes under the disc head during each rotation of the disc.
Trailer	The last page printed every time output is directed to a line printer. The trailer is an identification page that prints, in four groups of three identical lines, the session number, session name, logon identification, day of the week, date, and time.
UDC	User-Defined Command. A command that is defined by a user to fit a specific need. A UDC typically executes one or more MPE commands in a format convenient for the user. For example, a long command name, such as :DELETESPOOLFILE may be abbreviated to :DSPF by defining the abbreviation in a UDC. Several UDCs are generally included in a single text file, with each UDC separated by a line of asterisks (*). Once defined, the UDCs must be enabled with the :SETCATALOG command.
Undefined-Length Records	Records whose length (in bytes or words) can vary and are only defined by a maximum allowable file size. Files with undefined length records must have a blocking factor of one, and are written without buffering.
UPDATE	A cold load option which loads MPE and all files in the PUB group of the SYS account from the backup media. I/O configuration data, the directory, and user files are loaded from the system disc. UPDATE is typically used to install a new version of system software, or to load MPE from another computer.
USASCII	United States of America Standard Code for Information Interchange. Refer to ASCII.
User	Anyone logged onto a session, using a local or remote terminal to interact with the computer. Each user is identified by a user and account name, and can access files owned by their logon group. The user's session is identified by a unique number, displayed with the :SHOWJOB command.
User-Defined Command	Refer to UDC.
User Logging	A facility that enables users and subsystems to record additions and modifications to files. If necessary, user logging also provides the means whereby recorded entries can be used to recover the files themselves.
User Name	The name by which the system identifies both a user and the capabilities and file access modes assigned the user. Also referred to as an account member.
User Level Security	The file access modes permitted the user, which must duplicate, or be a subset of, the file access permitted the user's account and group.
Use Volume Capability	Refer to UV Capability.

Utility Programs	MPE programs that perform specific functions such as file copying, sorting and merging, memory dump analysis, and monitoring available disc space.
UV Capability	Use Volume Capability. A capability assigned at the account and user level that enables users to access private disc volumes.
Variable-Length Records	Records that vary in size with respect to each other.
VINIT	A Volume INITialization subsystem (accessed with the :VINIT command) that contains several commands for online initialization and formatting of private volumes, serial discs, and foreign discs.
Virtual Memory	A term describing the allocation of disc space to save a segment of main memory temporarily. Virtual memory is an extension of main memory: When there is insufficient space for a user's stack in main memory, or if the stack is not being modified, MPE will swap out the stack (save it to the system disc in the area reserved as virtual memory) and load another stack, or reload the same stack, when space becomes available. In this way, many users can share main memory more efficiently than would be possible without virtual memory.
Volume	A single disc pack, referenced by a unique logical device number.
Volume Class	A subgroup of a volume set, and the smallest volume unit that can be referenced by a user. To access a volume class, all volumes within the class (the complete volume set) must be mounted in the non-system domain.
Volume Name	The name given to a volume set or volume class with the :NEWVSET command. The name may only be assigned by a user with CV (Create Volume) capability, usually the System or Account Manager. The volume name, like file, account, and group names, is an ASCII character string of up to eight alphanumeric characters, beginning with a letter.
Volume Set	No more than eight removable disc volumes that share a common file directory. Accounts and groups may be assigned to a volume set with the ;VS parameter of the :NEWACCT and :NEWGROUP commands. When users access volumes in a set, all the volumes need not be mounted for the I/O request to succeed.
Volume Table	A table that lists the disc volume names and corresponding logical device numbers of all system domain disc drives. Discs with entries in the Volume Table are available to all users. By contrast, those volumes on non-system domain drives (such as private disc volumes) do not have entries into the Volume Table, and may only be accessed after an explicit or implicit :MOUNT of the volume has been executed.
VPLUS	A comprehensive software system that implements and controls source data entry, and provides an interface between the terminal and any transaction processing program.
WARMSTART	To cold load the system from the system disc. This procedure is used if incompletely processed spooled jobs and spooled files must be recovered, since other startup options do not permit the recovery of spool files.

Word	Sixteen bits or 2 bytes of information in the HP 3000 system.
Work File	A temporary file created when the Editor is invoked. Once text is entered, the file must be saved with the KEEP Editor subcommand to become a permanent disc file. A work file is also defined as a copy (in memory) of a permanent disc file. Any changes to the work file will be lost unless the user saves the updated version of the file.
Write Ring	A plastic ring which must be placed on the inside of a magnetic tape reel before users or programs are allowed to write to it.
Write-Protect	Protecting data stored on a disc or tape so that it can not be overwritten, and the original information destroyed.
XCST	Extended Code Segment Table. Contains entries for all code segments which come from users' program files and all those segments that are assigned when the commands :RUN and :ALLOCATE are executed. Each entry in the Extended Code Segment Table, which resides in main memory, is 4 words long.
Y^C	Control Y. A character entered by simultaneously pressing the CONTROL key and Y on a terminal. Y^C interrupts the current program, and returns control to the calling program only if the program enables the trap.

System Control Panel	A panel composed of control switches and status indicator lights found on the Series 39, 40, 42, 44, 48, and 58 computers.
System-Defined Files	Files defined by MPE and made available to all users to indicate standard input or output devices, special temporary files, and files opened for output which do not perform an actual write operation.
System Disc	The disc volume, mounted as logical device 1, which contains MPE, I/O configuration information, the accounting structure and file directory, and utilities and subsystems. It also contains an area reserved for virtual memory and may be used to store user files.
System Domain	One of the two configurations for disc drives. System domain discs contain only sharable files, and remain online until the system is shut down. Because information about all system domain discs is entered into the System Volume Table, a system domain disc may only be taken offline by altering the I/O configuration during the SYSDUMP dialog and cold loading the new configuration.
System Failure	An internally detected error from which recovery is not possible. Rather than continue to operate, risking data integrity, MPE halts.
System File Directory	A directory maintained by MPE that records the name, group, and account of each permanent file on the system. The directory also "knows" the size of each file, its location on the disc, who may access the file, and other information.
System Halt	The condition of MPE following a system shutdown or system failure, indicated by no response at the System Console or any user terminals. In addition, the system's HALT light will be on.
System Logging	A facility to record the occurrence of specific events and system resource usage by accounts, groups, and users on a job/session basis. The System Manager enables logging and selects which events will be recorded during the SYSDUMP dialog. The type of events which may be logged include: Job initiation and termination, file closing (and therefore opening), system shutdown, I/O errors, volume mounts, spooling, etc. The minimum logging events which should be "ON " are type 1 (LOGGING ENABLED), type 7 (POWER FAIL), and type 11 (I/O ERROR), which help your CE diagnose any system problems.
System Manager	The person who manages the computer installation, responsible for creating accounts and defining resource-use limits and capabilities for each. "System Manager" is also a capability (SM) assigned to the user name and account that the System Manager logs onto.
System Messages	Reports from the system that reflect its state at any given time. System messages address a variety of topics, including the status of jobs and sessions, peripherals, device files, and queues.
System Operator	The person who monitors the System Console and manages the computer on a daily basis. This includes establishing job and session limits, setting the output fence, responding to users' resource requests, cold loading the system after a shutdown or failure, and informing users of the system's status. Also called Console Operator, or just Operator.
Systems Programming Language	Refer to SPL.

System Prompt	The colon (:) which appears on the left side of the terminal display to inform the user that MPE is waiting for a command.
System Shutdown	Logging off all jobs and sessions and unloading the MPE operating system in an orderly manner.
System Startup	Loading the MPE operating system from either disc or tape by bringing a subset of the MPE INITIAL Program into memory.
System Status and Display Panel	A panel on the Series 64/68 that contains sets of light-emitting diodes, which indicate the status of the Current Instruction Register, AC power, RUN and HALT modes, battery, and internal temperature.
System Supervisor	The person assigned OP capability, and who is responsible for tuning the computer system so that it runs efficiently. The System Supervisor works with the System Manager and the Hewlett-Packard Systems Engineer (SE) to configure the system and determine resource-use needs of all accounts and users on the system.
System Volume Table	Refer to Volume Table.
Swapping	Also known as disc swapping, this is the method MPE uses to manage the transfer of programs and data files into and out of main memory. Processes which are waiting for a system resource to be available will be swapped out to an area on disc called "virtual memory". Another process, which does have the resources it needs to execute will be swapped from virtual memory into main memory, where it will begin processing. Disc swapping is handled entirely by MPE, and is transparent to users.
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INDEX

A

Aborting a Program, 2-11
:ABORTJOB Command, 4-16
:ACCEPT Command, 4-12
Access Control Definitions, 4-22
Access (Default) Modes, Printer, 8-3
Access Modes
    FEATURE, 8-3
    TRANSPARENT, 8-3
ACDs, 4-22
AC LINE LOW Light (44/48/58), 11-17
Account
    Assignment, 10-14
    Creation, 6-1
Accounts
    ACCOUNTS (RELOAD), 7-62
    Billing, 6-4
    Reports, 6-4
    Resetting, 6-8
    Spanning, Two Directories, 10-15
    Spanning, Diagram, 10-17
ACTIVITY Light
    (39/40/42/52), 11-13
    (44/48/58), 11-17
ADCC Configuring, 7-86
:ALLOCATE Command, 5-32
:ALLOW Command, 4-45
Alter ACDs, 4-22a
:ALTLOG Command, 5-94
:ALTSEC Command, 4-22a
ASOCTABL5 Utility, 4-43
Association Table, Creating, 6-28
ATP Configuring, 7-87
Attribute
    Account Manager (AM), 6-2
    Process Handling (PH), 6-5
    System Manager (SM), 6-1
    System Supervisor (OP), 5-1
Attributes
    Capability-Class, 6-3
    User, 6-1

B

Backing Up The System, 5-3
Backspacing, 2-2
Backup Files, 1-3
    (See Saving Files, :STORE)
    How Frequently Made, 4-36
    Methods,SYSDUMP Program
    :STORE, 4-37
Batch Processing, 2-5
Battery Light
    Series 37, 11-12
    (39/40/42), 11-13
    (64/68), 11-23
Breakpoint Table, 5-26, 7-106
Buffer Configuration
    Primary Message Table, 5-26, 7-104
    Secondary Message Table, 5-26, 7-104
    Special Request Table, 5-26, 7-105
    System Buffers, 5-25, 7-103
    Terminal Buffers, 5-26, 7-103

C

:CACHECONTROL Command, 5-32
Capabilities, 6-1
    Account Manager, 6-1
    Operator, Distributing, 4-43
    System Manager, 6-16
Card Reader, Configuring, 7-94
Cartridge Tape
    Media Life, 8-16
    On line Formatting, 10-32
CATALOG.PUB.SYS, 5-27, 9-58
CATALOG.PUB.SYS Messages, 9-58
CATALOG.PUB.SYS Modification, 5-27
Catalogs
    Catalog Manager (MAKECAT), 9-59
    HELP Subsystem (CICAT), 9-61
    Messages (CATALOG.PUB.SYS), 5-27, 9-58
Channel Address, 11-17
Checkpoint Recovery, 8-2
Circuits, 4-48
Code Segment Table (CST), 5-23, 7-28, 7-101
Cold Load Error Messages, 9-41
Cold Load Startup, 4-4
COLDSTART, 7-56, 7-58
    Quick Reference, A-20, A-38, A-61
Colon Prompt, 2-6
Command Definitions, VINIT, 10-34, 10-35
Command Elements, 2-6

INDEX

Command Error1, 2-9
Command Files, User Defined (UDCs), 6-24
Command Interpreter, 2-1
Command Name 2-6
Command Sets
  CMP Commands, 11-20
  CMP Maintenance, 11-58
  Console Commands, 1-2, 2-5, 4-2
  Console Interrupt (A^C), 2-2
  Console/Operator, 4-2
  DCU Control Commands, 11-26
  DCU Maintenance, 11-25
  Differences, 4-2
  Distributing Operator Capabilities, 4-43
  Log File, 5-41
  Managing Private Volumes, 10-9
  Monitoring Jobs/Sessions, 4-11
  Operator, 2-5, 4-2
  Operator Commands, 1-2, 2-5, 3-2
  Peripheral Devices, 4-16
  Private Volumes, Operator, 10-23
  Software Dump Commands, 10-52
  System Manager, 1-2, 2-5, 6-16
  System Operator, 4-2
  System Supervisor (OP), 1-2, 2-5, 5-2
  User Mounts/Dismounts, 10-24
  User Private Volumes, 10-1
  VINIT, 10-27
Commands
  :ABORTJOB, 4-16
  :ACCEPT, 4-12
  :ALLOCATE, 5-32
  :ALLOW, 4-44
  :ALTACCT, 10-12
    6-20, 10-14, 10-15
  :ALTGROUP, 10-12, 10-18
    10-14, 10-15, 10-16
  :ALTSEC, 4-22a
  :ALTSPOOLFILE, 4-35
  :ALTVSET, 2-1, 10-14
  :CACHECONTROL, 5-32
  :CONSOLE, 4-45
  :DEALLOCATE, 5-31
  :DELETESPOOLFILE, 4-31
  :DOWN, 4-21, 10-9
  :DOWNLOAD, 4-28, 8-4, 8-5
  :FOREIGN, 4-24
  :GIVE, 4-21
  :HEADOFF, 4-29
  :HEADON, 4-29
  :JOBFENCE, 4-13
  :JOBSECURITY, 4-44
  :LDISMOUNT, 4-23, 10-9
  :LIMIT, 4-13, 5-29
  :LISTACCT, 2-10
  :LISTGROUP, 2-10
  :LISTUSER, 2-10
  :LMOUNT, 4-23, 10-8, 10-23
  :LOG, 5-94
  :LOGOFF, 5-26
  :LOGON, 5-26
  :NEWACCT, 10-12, 10-15
  :NEWGROUP, 10-12
  :NEWUSER, 2-1, 10-15
  :NEWVSET, 2-1, 10-9
  :OUTFENCE, 4-35
  :PURGEACCT, 10-12
  :PURGEGROUP, 10-12, 10-18
  :PURGEUSER, 2-1, 6-35
  :PURGEVSET, 2-1, 10-11a, 10-14
  :RECALL, 2-10,
  :REFUSE, 4-12
  :REPLY, 2-10, 4-20
  :REPORT, 2-1, 2-10,
    10-12
  :RESTORE, 2-10, 4-37,
    10-9
  :RESUMELOG, 5-42a
  :RESUMESPOOL, 4-34, 8-1,
    8-15
  :SHOWCACHE, 5-33
  :SHOWLOG, 5-42a
  :STARTCACHE, 5-32
  :STARTSPOOL, 4-11, 4-31
  :STOPCACHE, 5-32
  :STOPSPOOL, 4-31
  :STORE, 2-10, 4-37, 10-9
  :STREAMS, 4-11, 5-21
  :SUSPENDSPOOL, 4-34, 8-15
  :SWITCHLOG, 5-42a
  :SYSDUMP, 2-1, 4-37, 5-5
  :TAKE, 4-22
  :TUNE, 2-1, 5-31
  :UP, 4-22, 10-9
  :VINIT, 10-27, 10-41
  :VMOUNT, 4-10, 4-23, 10-23
  :WARN, 4-15, 4-16, 4-42, 5-26
  :WELCOME, 4-42
Commands, CMP
  DCTEST, 11-60
  DISPLAY, 11-60
  IOMAP, 11-61
  SELFTEST, 11-58
  SHUTTEST, 11-60

Commands, Console Operator
=ABORTJOB, 4-16
=LOGOFF, 4-16
=REPLY, 4-20
=SHUTDOWN, 4-16, 4-42, 8-16
Commands, DCU
C>AR, 11-28
C>DIsplay, 11-28
C>DUmp, 11-28
C>EXit, 11-28
C>HAlt, 11-28
C>HE[LP], 11-26
C>LD, 11-28
C>LG, 11-29
C>LOad, 11-29
C>PArt, 11-29
C>RUn, 11-29
C>STart, 11-30
C>SW<n>[;], 11-30
C>SW, 11-30
M>BY[E], 11-64
M>HE[LP], 11-64
M>RM, 11-64
M>RX, 11-64
M>SP[EED], 11-64
Commands Description, 2-5
Commands Sets Operator, 2-5
Commands, Help,
COMMENT, 10-52
CONSOLE, 10-52
DEBUG, 10-52
DUMP, 10-52
DUMPDEV, 10-52
HALT, 10-52
HELP, 10-52
INTERACTIVE, 10-52
IOMAP, 10-52
PROMPT, 10-53
VINIT, 10-34
WARMSTART, 10-53
Commands, User
:ABORT, 2-11
:ALTLOG, 5-94
:ASSOCIATE, 4-43
:BUILD, 2-10, 10-12, 10-25
:BYE, 2-10
:CONTINUE, 2-9
:DATA, 2-10, 4-12
:DISASSOCIATE, 4-43
:DISMOUNT, 10-12, 10-22, 10-25
:DSCONTROL, 4-42
:DSTAT, 4-25, 10-10, 10-23
:EDITOR, 10-12, 10-13, 10-25, 2-10
:FILE, 8-1, 8-4
:FORTRAN, 2-10
:GETLOG, 5-94
:HELLO, 4-11
:HELP, 2-9
:JOB, 4-11
:LISTF, 2-10
:LISTLOG, 5-94
:LISTVS, 2-10, 10-10, 10-20
=LOGOFF, 4-16
:MOUNT, 10-12, 10-20, 10-25
:NEWVSET, 10-13
:PREP, 2-8
:REDO, 2-9
:RELLOG, 5-94
:REPORT, 10-10
:RESTORE, 10-13
:RESUME, 2-10
:RUN, 2-10, 6-18, 10-26
:SAVE, 6-3
:SHOWDEV, 4-44
:SHOWIN, 4-17, 4-19
:SHOWJOB, 4-14, 4-42
:SHOWLOGSTATUS, 5-94
:SHOWOUT, 4-17, 4-21, 4-33
:STORE, 10-9, 10-12
:STREAM, 5-21
:TELL, 4-42, 5-26
:VSUSER, 10-23
Commands, User, VINIT SUBSYSTEM
>COPY, 10-29
>DSTAT, 10-31
>DTRACK, 10-32
>EXIT, 10-32
>FOREIGN, 10-32
>FORMAT, 10-3
>HELP, 10-34
>INIT, 10-34
>PDEFN, 10-35
>PDTRACK, 10-36
>PFSPACE, 10-36
>PLABEL, 10-37
>SCRATCH, 10-38
>SERIAL, 10-38
>VERIFY, 10-39
COMMENT, SDF Command, 10-52
Communications
Systems Devices, Changing, 7-9
Transmission Mode, 7-17
Communications, Data

Clustered Network, 4-46
Distributed Data Processing, 4-45
Documentation, 4-45
Local Area Network, 4-46
Networks, 4-45
Overview, 4-45
Telecommunications, 4-46
COMPACT (Reload), 7-60
Condense/Recover Sequence, VINIT, 10-28
Condensing Disc Free Space, VINIT, 10-28
Conditioning, Disc Volume, 5-34
Conditioning, System Volume, 10-7
Configuration
Device Default Config. Table, 5-20
I/O, 5-11
MPE Streaming, 5-21
Tables & Queues, 5-23
Configuring Buffers, 5-26
Configuring Non-I/O Values
Allocating RINs, 5-28
CPU Processing Limits, 5-30
Data Segment Limit Changes, 5-30
Disc Caching Subsystem, 5-32
Discussion, 5-27
Jobs/Sessions Limitations, 5-29
Logon Recognition Time, 5-29
Permanent Segment Allocations, 5-32
Scheduling Queues Alterations, 5-31
Segmented Library Changes, 5-31
Configuring Peripherals
Device Defaults, 7-85
Discussion, 7-83
Drivers, ADCC, 7-86
Drivers, ATP, 7-86,
Drivers, Card Reader, 7-94
Drivers, Cartridge Tape, 7-96, 7-97, 7-97a, 7-97b
Drivers, Disc, 7-99
Drivers, Disc, Flexible, 7-98,
Drivers, Laser Printer. 7-93
Drivers, Line Printer, 7-91
Drivers, Magnetic Tape Unit, 7-95
Drivers, Serial Appl'n Printers, 7-89
Drivers, Serial Spooled Printer, 7-90
Line Speeds (ATP/ADCC), 7-88
Port Speeds (ATP/ADCC), 7-88
Printers, 7-91, 7-92, 7-93
Tape Unit, 7-97
Terminal Subtypes (Type 16), 7-88
Terminal Types, 7-87
Configuring The System (OP), 5-10
Console Capabilities, Expanded, 6-28
:CONSOLE Command, 4-45
Console Commands, 2-2
Console Lock Up, 4-45
Console Messages, 9-26
Console Operator, 4-1
(See System Operator)
Operator Control, 4-45
SDF Command, 10-51
Console Operator Commands
(See Commands, Console Operator)
Console Prompt (=), 4-2
Console, Shift To Another Device, 4-45
Continuation Characters, 2-8
Control-B Mode, 11-1, 11-58
Control Device Access, ACDs, 4-22
CNTROL FUNCTIONS Switch, 11-16
Control Maintenance Processor (CMP)
Accessing, 11-19
Commands, 11-20
Diagnostic Commands, 11-58
Diagnostics, 11-58
Discussion, 11-58
Log Action Display, 11-21
Log, Example Event, 11-21
Maintenance Commands, 11-20
Selftest Results Listing, 11-59
Control Panel, System
Controls, Hardware (39/40/42/52), 11-11
Controls, Hardware (44/48/58), 11-15
Controls, Security (39/40/42/52), 11-12
Controls, Security (44/48/58), 11-16
Controls, Software (39/40/42/52), 11-12
Controls, Software (44/48/58), 11-15
Discussion, 11-1
Information Decals, 11-13
Physical Panel (39/40/42/52) 11-10, 11-11, 11-19
Physical Panel (Series 37), 11-1
Physical Panel (44/48/58) 11-14, 11-15, 11-19
Physical Panel (64/68/70), 11-23
Power Supply Failure List, 11-24
Status Lights (Series 37), 11-2
Status Lights (39/40/42/52), 11-13
Status Lights (44/48/58), 11-17
Status Lights (64/68/70), 11-22
Thumbwheel Switches (39/40/42/52), 11-13
Thumbwheel Switches (44/48/58), 11-17
COOLSTART, 7-55

Quick Reference, A-20, A-38, A62
Copying System
Quick Reference, A-3
Copying, Volume To Volume, VINIT, 10-29
CMP (Control Maintenance Processor), 11-19
CPU Time, 6-14
CST (Code Segment Table), 5-23, 7-28, 7-101
CST Block Table, 7-41

D

:DATA Command, 4-12
Data Communications, Overview, 4-45
Data Segment Table (DST), 5-24, 7-19, 7-101
DCTEST, CMP Command, 11-60
DCAT(Device Classes), 7-55
DCU (Diagnostics Control Unit), 11-24
DCU, Control Mode, 11-26
DCU, Default Parameters, 11-30
DCU, Diagnostics, 11-63
DCU, Discussion, 11-24
DCU, DRT Calculation, 11-39
DCU, Functions, 11-24
DCU, Maintenance Commands, 11-63
DCU, Maintenance ode, 11-63
DCU, Operating Modes, 11-25
DEBUG, SDF Command, 10-52
Defective Sectors Table (DSCT), 10-35
Defective Tracks List(printout), 10-35, 10-36
Defective Tracks Table (DTT), 7-69, 10-35
:DELETESPOOLFILE Command, 4-31
Deleting a Character, 2-2, 2-9
Deleting a Line, 2-3
Delimiters, 2-6, 2-7
Device Access Control, 4-22
Device Addresses, 11-18
Device Classes (DCAT), 7-66
Device Management (:ALLOW), 4-44
Device Management, System Operator, 4-16
Device Ref. Table (DRT), 7-12, 11-6, 11-18, 11-39
Device Type List, 7-13
Device, User Control, 4-44
Devices, Peripheral
Active Device Files, 4-17
Controlling Availability, 4-21
Data Device Files, 4-19
Device Classes, 4-17
Files Discussion, 4-16
I/O List, 7-64
Job/Session Input Files, 4-18
Listing Input Device Files, 4-19
Listing Output Device Files, 4-21
Magnetic Tapes, 4-26
Management, 4-16
Operator-Assigned Output Files, 4-20
Operator-Assigned, 4-19
Output Device File, 4-19
Printers, 4-28
Redirecting Output, 4-20
:SHOWIN User Command, 4-19
Using Disc Volumes, 4-22b
DFSM (Disc Free Space Map), 10-28
DFSM Listing, VINIT, 10-36
Diagnostic Control Unit (DCU), 11-24
Diagnostic Control Unit, Commands
C>AR, 11-28
C>Display, 11-28
C>DUmp, 11-28
C>EXit, 11-28
C>HAlt, 11-28
C>HElp, 11-26
C>LD, 11-28
C>LG, 11-29
C>LOad, 11-29
C>PArt, 11-29
C>RUn, 11-30
C>STart, 11-30
C>SW<n>[:], 11-30
C>SW[:], 11-30
Diagnostic Utilities; DUS
Quick Reference, A-35, A-56, A-79
Diagnostic Utility System (DUS), 10-54
DUS, Cold Loading
Quick Reference A-35, A-56, A-79
Diagnostics
(See CMP & Tele-Support)
(30/40/42/52, 44/48/58), 11-58
(64/68), 11-63
Remote, 11-47
Series 37, 11-55
Disabling/Enabling Logging
Quick Reference, A-8
:DISASSOCIATE Command, 4-43

Disc Conditioning
On line, VINIT, 10-7
Private Volumes, 4-23
Requirements, 4-23
System Volumes, 4-22b
Disc Domains, 10-2
Disc
Condensing Free Space, (VINIT), 10-28
Create A Foreign, VINIT, 10-32
Delete Tracks, 7-71
Description, 8-15
Drive, Configuring, 7-99
Drive, Status, 10-23
Drive, Status Display, VINIT, 10-31
Drives, Allocating, 10-3
Files, Serial Disc Backup, 6-37
Flexible, Care Of, 4-25
Flexible, Configuring, 7-98
Foreign, Creating A, 4-23
Foreign, Facility, 4-23
Format, 5-33
Formatting, 10-55
Free Space Map (DFSM), 10-28
Free Space Map Listing, 10-36
HP 7933& 7935, 8-15
Labeling, 5-34
Nonsystem Domain Devices, 10-3
On line Formatting, VINIT, 10-32
Pack, Care Of, 4-25
Pack Handling, 4-25
Pack Storage, 4-25
Private Volumes Applications, 10-1
Private Volumes Control, 4-23
Private Volumes, Overview, 10-1
Request Table, 5-26
Structure, 5-33
System Domain Devices, 10-3
System, Adding A, 10-4
System, The, 5-33
Tape Backup, 6-37
Volume Conditioning, 10-7
Volumes, Using, 4-22b
Disc Packs, Defective Tracks
Quick Reference, A-57, A-80
Disc Packs, Formatting
Quick Reference, A-57, A-80
Discs
As Serial Devices, 10-40
List Contents, VINIT, 10-37
Nonsystem Unloading, 8-16
Process Defective Tracks, VINIT, 10-32
System, Unloading, 8-16
Disc Request Table (DRQ), 5-25, 7-102
Disc Serializing
Quick Reference, A-11
DISC VOL Switch (39/40/42/52), 11-12
Disc Volume Changes
Add, 7-38
Delete, 7-38
List, 7-39
Diskette, On line Formatting, VINIT, 10-32
Dismount, Logical, 10-9
:DISMOUNT, Command, 10-22, 10-25
Dismount/Mount,Physical, 10-8
Display Accounting Information, 6-37
Display, CMP Command, 11-21, 11-60
Domain Devices, Nonsystem, 10-3
Domain Devices, System, 10-3
Domain Reassignment At Startup, 10-5
Domain, Nonsystem, Serial Discs, 10-40
Domains, Disc, 10-2
DOWN/SCRATCH, 10-35
Driver, 5-20, 7-85
HIOASLP0, 7-89, 7-90
HIOASLP2, 7-89, 7-90
HIOCIPR0, 7-92
HIOCRDR0, 7-94
HIOCTAP1, 7-97
HIOCTAP2, 7-97b
HIOCTAP3, 7-97a
HIOFLOP0, 7-98
HIOLPRT0, 7-91, 7-93
HIOLPRT1, 7-91
HIOLPRT2, 7-91
HIOMDSC1, 7-99
HIOMDSC2, 7-99
HIOPPRT0, 7-93
HIOTAPE0, 7-95, 7-96
HIOTAPE1, 7-95
HIOTAPE2, 7-95
HIOTERM0, 7-86, 7-89, 7-90
HIOTERM1, 7-86
HIOTERM2, 7-86
DRQ (Disc Request Table), 5-25, 7-102
DRT (Device Reference Table), 7-5,
11-6, 11-18, 11-39
DRT Numbers, Conversion Formula, 11-64
DRT Numbers, Conversion Table, 11-66
DRT Numbers, 11-6, 11-18, 11-39, 11-64
DRT, Series 37, 11-6
DST (Data Segment Table), 5-24, 7-28, 7-101
Dump
Main Mem. After System Failure, 10-43
Shift String (64/68/70), 11-64

Software, 10-43
To Disc/Tape, 10-43
DUMP, SDF Command, 10-51
DUMP Switch (39/40/42/52), 11-12
DUMP Switch (44/48/58), 11-16
DUMP, CMP Command, 11-20
DUMPDEV, SDF Command, 10-52
Dumping Main Memory
Quick Reference, A-32, A-53, A-76
Duplex Mode, Terminal, 2-3
DUS (Diagnostic Utility System) 10-54

E

Echoing, Terminal, 2-3
EDIT/3000, File, 8-5
Editor Files
MARGIN, 8-5
MODE=FEATURE, 8-5
MODE=TRANSPARENT, 8-5
Parameters Discussion, 8-5
Printer, 8-6
Special VFCs, 8-8
VFC, 8-5
VFC Examples, 8-6
Enabling/Disabling Logging
Quick Reference, A-8
Error Code (See Error Messages)
Error Messages
Cold Load, 9-41
Cold Load, Configuration, 9-42/9-56
Cold Load, Defective Tracks, 9-51, 9-52
Cold Load, Directory, 9-52
Cold Load, Disc Spc Mangmt, 9-54
Cold Load, File System, 9-56
Cold Load, I/O, 9-42, 9-43, 9-46
Cold Load, I/O Table Initialization, 9-51
Cold Load, Table, 9-53
Cold Load, Unnumbered, 9-57
Cold Load, Volume Table, 9-51
Console, 9-26
DCU Error Code, 11-32
DCU Hardware Halts, 11-36
Discussion, 9-1
DRT Use, 7-67
I/O Devices, 7-66, 7-67
Load, ROM Code, 11-39, 11-41
Memory Management, 9-55
Modification, 5-27
System Failure List, 9-3
System Halt Conditions, 11-38
System Stop (SYSSTOP), 11-36
Volumes Missing, 7-67
Exiting The VINIT Subsystem, 10-32
Extended Code Segment Table, 5-24, 7-101

F

Failure System What To Do, 9-2
Failures System Different Kinds Of, 9-1
Files
Designator Subsystem Formal, 7-88
Foreign Disc Facility, 4-23
Foreign Disc, Creating A, 4-23
Loading Messages, 7-79, 7-80, 7-81
Security, 5-43
System/User, Backup, 4-36
Files, Backup with :STORE, 4-37
Disc/Directory Errors, 4-40
Discussion, 4-37
Errors Cause Abort, 4-40
File Eligibility, 4-38
File Eligibility Chart, 4-39
Showing :STORE Results, 4-38
:STORE Tapes, 4-37
Tape Error Recovery, 4-40
Files, Restoring
Quick Reference, A-6
Flexible Disc Drive Configuring, 7-98
:FOREIGN Command, 4-23
Formatting Disc Packs
Quick Reference, A-57, A-80
Formatting, System Disc, 5-33
FORMS, Message, 8-4
FOS, Fundamental Operating Software, 1-1
Four Wire, 4-48
FSETMODE Intrinsic, 5-32
Full Duplex, 4-47

G

:GETLOG Command, 5-94
Getting Started
Quick Reference, A-1
:GIVE Command, 4-21
Group Assignment, 10-15

H

Half Duplex, 4-47
HALT Light (39/40/42/52), 11-13
HALT Light (44/48/58), 11-17
HALT Light (64/68/70), 11-23
HALT Switch (39/40/42/52), 11-11
HALT Switch (44/48/58), 11-15
HALT, CMP Command, 11-20
HALT, SDF Command, 10-52
Halting Execution, 2-10
Halting Nonprogram Commands, 2-10
:HEADOFF Command, 4-29
:HEADON Command, 4-29
Heat Shutdown, 11-53
    (See Overheating)
:HELLO Command, 4-11
HELP (Typical Entry), 9-61
HELP With VINIT Commands, 10-34
HELP, MPE Command Catalog, 9-61
HELP, SDF Command, 10-52
High Temperature, 11-53
    (See Overheating)
HIOASLP0, 7-89, 7-90
HIOASLP2, 7-89, 7-90
HIOCIPR0, 7-92
HIOCRDR0, 7-94
HIOCTAP1, 7-97
HIOCTAP2, 7-97b
HIOCTAP3, 7-97a
HIOFLOP0, 7-98
HIOLPRT0, 7-91, 7-93
HIOLPRT1, 7-91
HIOLPRT2, 7-91
HIOMDSC1, 7-99
HIOMDSC2, 7-99
HIOPPRT0, 7-93
HIOTAPE0, 7-95, 7-96
HIOTAPE1, 7-95
HIOTAPE2, 7-95
HIOTERM0, 7-86, 7-89, 7-90
HIOTERM1, 7-86
HIOTERM2, 7-86
HIPRI Parameter, 4-14
HP 2680A Auto Recovery, 8-1
HP 2680A Format Control, 8-1
HP 2680A Job Recovery, 8-1
HP 2680A Job-To-Job Integrity, 8-2
HP 2608A/S & 2563A Printer, 8-3
HP 2619 Printer, 8-15
HP 2688A Auto Recovery, 8-1
HP 2688A Format Control, 8-1
HP 2688A Job Recover, 8-1
HP 7933 & 7935 Disc Drives, 8-15

I

ICS (Interrupt Control Stack), 5-25, 7-30, 7-105
INITIAL Error Recovery, 5-36
INITIAL Program, beginning, 7-57
INITIAL, Starting Program, 4-5
Initiator/User Dialog, 7-38
INP, 4-47
Input/Output Queue, 7-29
IOMAP, CMP Command, 11-61
I/O (See Configuring Peripherals), 7-83
I/O Configuration
    Access Type For Device, 5-16
    Access Type, Definition, 5-17
    Access Type, Device Class, 5-17
    Access Type, Examples, 5-16
    Corresponding Output Device, 5-13
    Data Accepting Devices, 5-14
    Device Class List, 5-15
    Device Class Names, Repeated, 5-16
    Device Controller's Driver, 5-15
    Device Ref. Table (DRT), 5-12
    Duplicative (Echo) OOtion, 5-14
    Interactive Device Option, 5-14
    Job/Session Devices, 5-14
    Logical Device Number (ldev), 5-11
    Modes (Device Options), 5-14
    Record Width, 5-13
    Software Channel Number, 5-13
    Spooling Option, 5-15
    Table, 5-11
    Terminal Type/Speed, 5-13
    Type/Subtype, 5-13
    Unit Numbers, 5-12
I/O Devices (See Peripheral Device), 4-16
I/O Devices Setup (See Reconfiguring), 7-19
I/O Devices, Adding
    Quick Reference, A-28, A-49, A-73
I/O Devices, Changing, 7-7
I/O Devices, Deleting

Quick Reference, A-30, A-51, A-75
I/O Devices, Config./List, 7-64
I/O Queue (IOQ), 5-24, 7-29, 7-102
Inserting a Character, 2-9
Intelligent Network Processor (INP), 4-47
Interactive Processing, 2-3
INTERACTIVE, SDF Command, 10-52
Interrupt Control Stack (ICS), 5-25, 7-30, 7-105
Interrupting Execution, 2-10
Interrupting Nonprogram Commands, 2-10

J

Job Control By Users, 4-44
Job
Device Control, 4-12
Introducing A, 4-11
Limiting Execution, 4-12
Monitoring A, 4-14
States, 4-14
:JOB Command, 4-11
:JOBFENCE Command, 4-13
Jobs, Aborting, 4-16
:JOBSECURITY Command, 4-44
Jobs, Limiting Number Of, 4-13
Jobs, Status of (STATE), 4-14
DEFERRED, 4-15
EXEC, 4-15
INTRO, 4-15
SUSP, 4-15
WAIT, 4-15
Jobs/Sessions, System Operator, 4-11

K

Keyword Parameters, 2-8
Keyswitch, Series 37, 11-1

L

Label A Volume, 10-37
Label Change, To SERIAL, 10-38
Laser Printer
Configuring, 7-93
HP 2680A, 8-1
HP 2688A, 8-1
:LDISMOUNT Command, 4-23
Librarian
:LIMIT Command, 4-13, 5-29
LINE Light (64/68), 11-23
Line Printer
Editor File, 8-5
HP 2608A/S & 2563A, 8-3
HP 2619, 8-15
List ACDs, 4-22a
LISTLOG Utility, 5-93
List Output Spool Files, 4-33
:LMOUNT Command, 4-23
Load Map, 7-62
LOAD Switch (39/40/42/52), 11-12
LOAD Switch (44/48/58), 11-16
LOAD, CMP Command, 11-20
LOAD/UNLOAD Button, 8-16
Loader Segment Table (LST), 5-24, 7-106
LOG, CMP Command, 11-13
:LOG Command, 5-94
Logging
Changing Characteristics, 7-35
Event List, Logging, 7-35
Event Type List, 7-35
File Record Size, 7-37
List Status, 7-35, 7-36
Log File Size, 7-37
Status Changes, 7-35
Status Update, 7-36
Logging, Enabling/Disabling
Quick Reference, A-8
Log Files, 1-4
Log File Records, Reviewing, 5-93
Log File Records, System, 5-47
ACD Changes Log Record, 5-77
Call Process Signals Log Record, 5-69
Command Access Log Record, 5-89
Console Log Record, 5-68
DCE Provided Information Record, 5-70
DCU Log Record, 5-92
File Close Record, 5-55
File Open Log Record, 5-88

I/O Error Record, 5-63
Job Initiation Record, 5-51
Job Termination Record, 5-53
Line Close Record, 5-62
Line Disconnection Record, 5-61
Log Error Record, 5-49
Logical Mount/Dismount Record, 5-66
MPE Maintenance Request Log Record, 5-91
Physical Mount/Dismount Record, 5-65
Power Failure Record, 5-58
Printer Access Failure Record, 5-73
Process Initiation Record, 5-84
Process Termination Record, 5-54
Program File Event Record, 5-69
RESTORE Log Record, 5-73
Security Configuration Changes Record, 5-8
Spooler's Spoolfile Done Record, 5-59
Stream Initiation Record, 5-79
System Shutdown Record, 5-57
System Software Tracer Record, 5-72
System Up Record, 5-50
Tape Labels Log Record, 5-67
User Logging Record, 5-82
Logging Off, 2-5
Logging On, 2-3
Logging, System, 5-40
Creating/Naming Files, 5-42
Error Handling, 5-44
Error Messages, 5-44
Error Messages (Table), 5-45
File Security, 5-43
File Size, 5-43
File Status Messages, 5-44
Log File Commands, 5-42a
Log File Format, 5-46
Log Record Formats, 5-47
Reviewing Log Records, 5-93
What System Logging Is, 5-41
Logging, User
Processes, 5-94
Processes Per System, 5-94, 7-107
Recording Changes, 5-94
Logging, User, Restart
Quick Reference, A-10
Logical Dismount, 10-9
Logical Mount, 10-8
:LOGOFF Command, 5-26
:LOGON Command, 5-26
LST (Loader Segment Table), 5-24, 7-106

M

Magnetic Tapes
Care And Handling, 4-26
Cartridge Tape Care, 4-27
Operator Tasks, 4-26
MAINT MODE Switch (44/48/58), 11-16
MAKECAT
Catalog Manager, 9-60
Examples, 9-60
Procedure, 9-60
Memory, Main Changing CST (Code Segment Table), 7-28
Memory, Main, Changing, 7-28
(See Reconfiguring, Main Memory)
CST (Code Segment Table), 7-28
DST (Data Segment Table), 7-28
I/O Queue, 7-29
PCB (Process Control Block), 7-28
System Tables, 7-28
Memory, Virtual, Changes, 7-78
Messages, 2-2
CATALOG.PUB.SYS, 9-58
Console, 9-26
Error, 9-1
Error, Cold Load, 9-41
System Failure List, 9-3
Message Catalog, 9-58
Message Catalog Format, 9-58
Message Programs
Catalog Manager (MAKECAT), 9-59
HELP With Commands (CICAT), 9-61
Messages (CATALOG.PUB.SYS), 9-58
Modem Setup, 7-15
Mount
Logical, 10-8
Parameters, 10-21
User Command, 10-24
Mount/Dismount, Physical, 10-8
MPE
Codes, Series 37, 11-3
Installation Tape, 5-3
Logging, 5-40
Multi-Programming Executive, 1-1
Operational Supervision, 5-1
Streaming, Configuration, 5-21

MPE, Copying
Quick Reference, A-3
MPE System Shutdown
Quick Reference, A-12
MTS/3000, 4-47

N

Non-echoing, Terminal, 2-3
NULL (Reload), 7-60

O

Operational Supervision, MPE, 5-1
Operator Commands, 4-2
Operator Commands, Private Volumes, 10-23
Operator, System, 4-1
(See System Operator)
OPERATOR.SYS, 6-4
OVERTEMP Light (64/68/70), 11-23
OVERTEMP SHUTDOWN Light
(44/48/58), 11-15
Overheating
Shutdown Facility (Series 37), 11-53
Shutdown Facility (39/40/42/52), 11-53
Shutdown Facility (44/48/58), 11-54
Shutdown Facility (64/68/70), 11-54
Overtemperature Shutdown, 11-53

P

Paper Jam Recovery, 8-1
Parameter List, 2-7
Parameters
Editor File, Discussion, 8-5
Editor File, Format, 8-5
HIPRI, 4-14
Keyword, 2-8
Positional, 2-7
Parameters, Suggested
Breakpoint Table, 7-106
Code Segment, 7-110, 7-111
Concurrent Jobs/Sessions, 7-108
Concurrent Programs, 7-110
CPU Time Limit, 7-108
CST, 7-101
Defaults List, 7-117, 7-118
Directory, 7-109
Discussion, 7-100
DRQ, 7-102
DST, 7-101
Extra Data Segment, 7-111
ICS, 7-105
I/O Queue, 7-102
Log Files, 7-109
Logging Processes, 7-107
Logon Timeout, 7-108
LST, 7-106
Maximum Values, 7-113, 7-115
Message Tables, 7-104
Minimum Values, 7-113, 7-115
Parameter Defaults List, 7-117, 7-118
Parameter Min./Max. List, 7-113, 7-115
PCB, 7-102
RINs, 7-107
Special Request Table, 7-105
Spoolfiles, 7-100, 7-110
Stack Size, 7-111, 7-112
Swap Table, 7-104
System Buffers, 7-103
Terminal Buffers, 7-103
TRL, 7-106
UCOP Request Queue, 7-106
Virtual Memory, 7-109
XCST, 7-101
PCB (Process Control Block), 5-24, 7-19,
7-102
Peripheral Configuration, 7-83
Peripheral Devices
Active Device Files, 4-17
Controlling Availability, 4-21
Data Files, 4-19
Device Classes, 4-17
Files Discussion, 4-16
Job/Session Input Files, 4-20
Listing Input Files, 4-19
Listing Output Files, 4-21
Magnetic Tapes, 4-26
Management, 4-16
Operator-Assigned Input Files, 4-19
Operator-Assigned Output Files, 4-20
Printers, 4-28
Redirecting Output, 4-20
:SHOWIN User Command, 4-19

:SHOWOUT, User Command, 4-21
Using Disc Volumes, 4-22b
Physical Mount/Dismount, 10-8
Positional Parameters, 2-7
Power Down
Quick Reference, A-12
Power Failure Recovery, HP 2608A & HP 2688A, 8-2
POWER Light (39/40/42/52), 11-13
POWER Light (44/48/58), 11-17
POWER SUPPLY Light (64/68/70), 11-24
Power Up
Quick Reference, A-13
Primary Character Set, 8-2
Primary Message Table Configuring, 5-26
Printer Format
Eight Line Per Inch, 8-12
Six Line Per Inch, 8-12
Printer Software, CIPER/3000, 8-1
Printer, Configuring
HP 2608S/2563A, 7-92
HP 2680A/2631/261X, 7-91
Printer
Carriage Control Codes, 8-13
Defaults At Job Ends, 8-4
Editor File, 8-5
Environment File, 8-4
HP 2608A/2688A, 8-1
HP 2608A/S, 2563A, 8-3
HP 2619, 8-15
Laser, Configuring, 7-93
Preventing Data Loss, 8-15
Serial Application, Configuring, 7-89
Serial Spooled, Configuring, 7-90
Printers
Control Panel (Drawing), 4-29
Discussion, 4-28
Forms Message, 4-28
Header/Trailer Output, 4-29
Private Volumes
Adding A Disc, 10-3
Alteration, 10-14
Applications, 10-1
Assignment, 10-15, 10-19
Categories, 10-13
Classes, 10-12
Conditioning, Procedure, 10-41
Conditions, 10-20
Conversion To System Disc, 10-5
Creating/Accessing, 10-19
Creation (Definition), 10-13
Deletion (Purge), Sets, 10-14
Enable/Disable, 10-23
From System Disc, 10-4
Group Assignment, 10-15
Home Set, 10-12
Information Listing, 10-10
List Contents, 10-37
Logical Mount, 10-24
Managing, 10-9
Multiuse, 10-1
Operator Commands, 10-23
Overview, 10-1
Private Volume Conditioning, 10-34
Procedure, 10-19
Purge Accounts, 10-18
Purge Groups, 10-18
Sets, 10-11
User List, 10-23
User Mounts/Dismounts, 10-24
VINIT, 10-7, 10-35
Private Volume Set
Definition List, 10-22
Dismounting, 10-22
Mounting, 10-21
User List, 10-23
Process Control Block (PCB), 5-24, 7-19, 7-102
PROMPT, SDF Command, 10-53
Prompts, 2-2

Q

Queues/Tables, Changing, 5-23

R

Reconfiguration
Buffers, 5-26
I/O, 5-10
Non-disc I/O Requests, 5-24
Tables/Queues, 5-23
Reconfiguring The System (OP), 5-10
Acceptance Values, 7-18
Adding/Deleting Devices, 7-12
Automatic Answer, 7-16
Batch Job Headings, 7-40
Buffers, System, 7-29

Buffers, Terminal, 7-29
Catalog File Name, 7-34
Class Changes, 7-24
Class List, 7-24
Class, Access Type, 7-24
Class, Delete/Add, 7-24
Class, Foreign Disc, 7-26
Class, Serial Disc, 7-25
Code Segment Qty, 7-40
Code Segment Size, 7-41
Communications Buffer, 7-18
Communications Devices, 7-10
Concurrent Programs, 7-41
Concurrent Values, 7-34
Copy The Modified MPE, 7-46
Data Segments, Size, 7-42
Default Phone Number, 7-20
Device Classes, 7-21
Device Concurrency, 7-25
Device, I or O, 7-19
Device Spool Status, 7-19
Device Type, Subtype, 7-14
Dial And Answer, 7-16
Directory Size, 7-37
Disc Allocation, 7-37
Disc Class, 7-21
Disc Volume Changes, 7-38
Driver Add/Delete, 7-27
Driver Changes, 7-26
Driver List, 7-26
Driver Name, 7-19, 7-27
DRT Entry Numbers, 7-11
Dump Files, 7-51
Duplicative Status, 7-19
Foreign Disc, 7-26
ID, Local & Remote, 7-20
Interactive Status, 7-19
I/O Devices, 7-9, 7-22
Job CPU Time Limit, 7-34
Jobs/Sessions, 7-18
Ldev Numbers, 7-25
Line/Modem Speeds, 7-16
List Classes, 7-26
List I/O Devices, 7-26
Log On Time Change, 7-33
Logging, 7-35
Main Memory Size, 7-7
Main Memory, Changing, 7-27
Message Catalog, 7-34
Misc. Configuration Changes, 7-32
Output Device, Type, 7-18
Parameters, Default List, 7-117, 7-118
Parameters, Min/Max List, 7-113, 7-115
Parameters, Recommended, 7-100
Physical Unit Number, 7-13
Record Width, 7-18
RINs, Global, 7-33
Segment Limits, 7-41
Segmented Library, Add, 7-45
Segmented Library, Change, 7-43
Segmented Library, Delete, 7-43
Segmented Library, Listing, 7-13, 7-45
Segmented Library, Replace, 7-44
Segmented Library, Updated List, 7-45
Softdump, 7-34
Software Channel, 7-13
Spoolfile Sectors, 7-70
Spoolfiles, Maximum, 7-22
Stack Size, 7-42
:SYSUMP/Configurator Dialog, 7-1
System Program, Change, 7-42
System Tables, 7-27
Terminal Speed, 7-15
Terminal Type, 7-14
Terminal Type Files (MPE V/E), 7-23
Timeout Values, 7-15, 7-16
Transmission Mode, 7-17
User Stack Size, 7-41
Virtual Memory Allocation, 7-39
Virtual Memory Size, 7-39
Recover Lost Disc Space, VINIT, 10-28
RECOVER Option, 10-28
Recovery, 1-3
Checkpoint, 8-2
Paper Jam, 8-1
Power Failure, 8-1
:REFUSE Command, 4-12
Readout, 16-BIT LED (64/68/70), 11-23
RELOAD, 7-56
Reload From Backup
Quick Reference, A-26, A-45, A-69
Reload Options, A-42, A-47
ACCOUNTS, 7-49, A-72
COMPACT, 7-48, A-71
NULL, 7-49, A-72
RESTORE, 7-48, A-71
SPREAD, 7-48, A-71
Reload System
Quick Reference, A-20, A-45, A-69
:RELLOG Command, 5-94
Remote Console, 11-47
(See Tele-Support)
REMOTE CONSOLE Light (44/48/58), 11-15
REMOTE Light (39/40/42/52), 11-13

REMOTE Light (64/68/70), 11-23
Replacing a Character, 2-9
:REPLY Command, 4-20
Resetting Accounts, 6-8
Resource Accounting, 1-2
Resource Identification Number (RIN)
    Allocation, 5-28, 7-107
Restart After Shutdown
    Quick Reference, A-20, A-38, A-61
Restart User Logging
    Quick Reference, A-10
Restart, New System
    Quick Reference, A-24, A-43, A-66
Restart, Warmstart
    Quick Reference, A-17, A-36, A-59
:RESTORE Command, 4-37, 4-60, 5-5
RESTORE (Reload), 7-60
Restoring Files
    Quick Reference, A-6
:RESUMELOG Command, 5-42a
:RESUMESPOOL Command, 4-34
Retrieving Stored Files, 4-40
    :RESTORE, 4-40
RIN Allocating (OP), 5-28
RINs (Resource Identification Numbers), 7-32, 7-107
RINs, Global
    Change Number Of, 7-33, 7-107
    Delete, 7-32
    List, 7-32
    Updated, 7-33
RUN Light (39/40/42/52), 11-13
RUN Light (44/48/58), 11-17
RUN Light (64/68/70), 11-23
RUN Switch (39/40/42/52), 11-11
RUN Switch (44/48/58), 11-15
RUN, CMP Command, 11-20

S

SADUTIL, 10-54
Saving Files With :SYSDUMP Discussion, 4-41
Scratch, Set To, VINIT, 10-38
Secondary Character Set, 8-2
Secondary Message Table Configuring, 5-26
Security
    System Log File, 5-43
SECURITY Switch (39/40/42/52), 11-12
SECURITY Switch (44/48/58), 11-16
Segmented Library, 7-43
SELFTEST, CMP Command, 11-20
Selftest
    Control-B Mode, 11-4, 11-55
    Series 37, 11-55
Serial Disc Configuring, 10-41
Serial Discs
    Conditioning, VINIT, 10-41
    Create Foreign Disc, 10-42
    Description, 10-40
    Display Foreign Status, 10-42
    Foreign Discs, 10-42
    Initializing, 10-40
    Nonsystem Domain, 10-40
Serializing A Disc
    Quick Reference, A-11
Series 37
    Keyswitch Positions, 11-15
    SPU Front Panel, 11-1
    Time of Century (TOC) Clock, 11-9
Session
    Aborting, 4-16
    Device Control, 4-12
    EXEC, 4-15
    INTRO, 4-15
    Introducing A, 4-11
    Limiting Execution, 4-12
    Limiting Number Of, 4-13
    Monitoring A, 4-13
    Priority, 6-24
    Programmatic, 6-4
    Status Of (STATE), 4-14
    Totals, 6-16
Shift-out/Shift-in, Character Sets, 8-2
Shift String Dump
    (64/68/70), 11-64
    Quick Reference, A-82, A-85
:SHOWCACHE Command, 5-31
:SHOWDEV Command, 4-44
:SHOWIN Command, 4-17
:SHOWJOB Command, 4-14
:SHOWLOG Command, 5-42a
:SHOWLOGSTATUS Command, 5-94
:SHOWOUT Command, 4-17, 4-33
Shutdown, System Operator, 4-42
Shutting Down The System
    Quick Reference, A-14
Shutting System Down, 4-42
Simplex, 4-47

Sleuth Simulator, of DUS
Quick Reference, A-57, A-80
SLEUTHSM, 10-54
Program, 10-32
System Formatter, 10-6
SLEUTHSM, of DUS
Quick Reference, A-57, A-80
Software Dump
Quick Reference, A-33, A-53, A-76
Software Dump Facility (SDF)
Backup Dump Procedure, 10-49
Backup Software Dump, 10-49
Cannot Make A Copy, 10-43
Changing SDF Command File, 10-51
Creating An SDF Copy, 10-43
SDF Commands, 10-52
SDF Copy Procedure, 10-44
Store Main Memory, 10-43
Store To Disc On Tape, 10-43
To Run SDF, 10-44
Spanning
Account Diagram, 10-17
Accounts (Two Directories), 10-15
Capabilities, 10-15
Special Request Table Configuring, 5-26
SPEED, CMP Command, 11-21
Spinning Down A Disc, 8-16
Spool File Recovery
Quick Reference, A-17, A-36, A-59
Spool File Size Changes, 5-40
Spooling, Operator Control, 4-31
Spooling (START), 4-11
Spooling, Input
ACTIVE, 4-30
Description, 4-30
Devices, 4-30
Maintaining Job Sequence, 4-32
OPEN, 4-30
Operator Control, 4-31
READY, 4-30
Spool File Status, 4-33
Stopped Abnormally, 4-32
Spooling, Output
ACTIVE, 4-33
Altering One File, 4-35
Controlling Devices & Class, 4-34
Controlling Queues, 4-35
Description, 4-32
Going Back nnn Pages, 4-34
Listing Files, 4-33
OPEN, 4-33
READY, 4-33
Resuming The Spooler, 4-34
Setting The Fence, 4-35
Spool File States, 4-33
Suspending the Spooler, 4-34
SPREAD (Reload), 7-60
Standard Recovery, 9-2
:STARTCACHE Command, 5-31
Start Dialog WARMSTART, 7-39
START Switch (39/40/42/52), 11-12
START Switch (44/48/58), 11-16
START, CMP Command, 11-20
Starting The System (OP), 7-55
Cold Load (COLDSTART), 4-9
Cold Load (COOLSTART), 4-7
Cold Load Procedure, 4-6
Cold Load (RELOAD), 4-10
Cold Load (UPDATE), 4-7
Cold Load (WARMSTART), 4-6
Comparing The Cold Loads, 4-9
Discussion, 4-4, 5-8
Enabling Private Volumes, 4-10 (RESTART)
Enabling SREAMS Device, 4-11
Initiator Program INITIAL, 5-8
MPE Component Sources, 4-9
Quick Reference, A-2
Restart Procedure COLDSTART, 5-9
Restart Procedure COOLSTART, 5-9
Restart Procedure RELOAD, 5-10
Restart Procedure UPDATE, 5-9
Restart Procedure WARMSTART, 5-9
Series 37, 4-5
Series 39/40/42/52/44/48/58, 4-5
Series 64/68/70, 4-6
System Operator, 4-2
Using INITIAL Program, 4-5, 4-5a, 4-6
:STARTSPOOL Command, 4-32
Startup Dialog
CMP/DCU START Commands, 7-57
COOLSTART Option, 7-58
Date And Time Verification, 7-82
Disc Verification, 7-71
Disc Verification/Errors, 7-71
Disc, Defective Tracks Table, 7-69
Disc, Delete Tracks, 7-71
Disc, Directory Size, 7-79
Disc, Recover Lost Space, 7-78
Disc, Track Defect Status, 7-76
Error Messages, Disc, 7-81
Error Messages, DRT Use, 7-67
Error Messages, I/O Devices, 7-65
Error Messages, Volumes Missing, 7-67

Files Loaded, 7-79
Files, Loading Messages, 7-79, 7-80
Files, Lost Data 7-79
Files Purged, 7-79
Files Purged List, 7-79
Files Saved, 7-79
I/O Configuration Change, 7-64
I/O Devices, List, 7-64
List Classes & I/O Devices, 7-65
Load Map, 7-75
Load Map Request, 7-62
Main Memory, Changing, 7-78
Memory Size Values, 7-63
Memory, Bank 0 Used, 7-81
Reconfiguration Request, 7-62
RELOAD Options, 7-59
RELOAD Options, ACCOUNTS, 7-61
RELOAD Options, COMPACT, 7-61
RELOAD Options, NULL, 7-61
RELOAD Options, RESTORE, 7-61
RELOAD Options, SPREAD, 7-60
Spoolfile Sector Data, 7-78
Track, Defect Status, 7-76
Tracks Verification, 7-71
Tracks Verification/Errors, 7-71, 7-72
Tracks, Defect Status, 7-76
Tracks, Delete, 7-71
Virtual Memory Changes, 7-78
Volume, Delete, 7-69
Volumes Listing, 7-68
Volumes Verification/Errors, 7-71
Volumes, Add, 7-69
Volumes, Defect Status, 7-76
Volumes, Defective Tracks Table, 7-69
Volumes, Delete Tracks, 7-70, 7-71
Volumes, Mount, 7-68
Volumes, Verification, 7-73
Volumes, Verification/Errors, 7-74
WARMSTART Option, 7-58
Startup, Modification, 1-3
Startup State Configurator, A-15
Status, Disc Drives, 10-23
:STOPCACHE Command, 5-32
:STOPSPOOL Command, 4-32
:STORE Command, 4-40
Storage, Private Volumes Overview, 10-1
Streaming, 5-21
:STREAMS Command, 4-11, 5-21
Supervisor, System (OP), 5-1
:SUSPENDSPOOL Command, 4-34
Swap Table, 5-25, 7-104
:SWITCHLOG Command, 5-42a
:SYSDUMP Backup
Carriage Return, 7-50
Cold Load , 7-53
Full Backup, 7-54
Future Date, 7-51
Partial Backup, 7-52
Programmatic, 5-8
:SYSDUMP Command, 4-37
:SYSDUMP Description, 7-2
4-41, 5-4
System
Buffer Configuring, 5-26, 7-103
Configurator, 7-1
Directory Listing, VINIT, 10-35
Parameters Recommended, 7-92
User Files, Backup, 4-37
With Files, 7-54
System Backup, :SYSDUMP
Quick Reference, A-3
System COLDSTART
Quick Reference, A-24, A-43, A-66
System Control Panel, 11-1
(See Control Panel)
System Controls, 11-1
System COOLSTART
Quick Reference, A-20, A-38, A-61
System Disc
Adding A, 10-3
An Overview, 5-33
Error Handling Considerations, 5-37
Formatting, 5-34
INITIAL Error Recovery, 5-36
Initialization, 5-34
Labeling Volumes, 5-34
Memory Layout, 5-37
Physical Arrangement, 5-33
Physical Arrangement (Illus.), 5-35
Platter Format, 5-33
Platter Format (Illus.), 5-35
Private Conversion, 10-4
Track Reassignment, 5-34
Track Verification, 5-34
Volume Conditioning, 5-34
Volume Names, 5-36
Volume Table Check, 5-36
System Disc Domain, During Startup, 10-5
System, Disc Domain, 10-2
System Disc From Private Volume, 10-5
System Disc Layout Changes, 5-38
Directory, Size Changes, 5-39
Memory Layout (Illus.), 5-39

Spool File Size Changes, 5-40
Virtual Memory, Allocation, 5-38
Virtual Memory, Enlargement, 5-38
Virtual Memory, Size Changes, 5-38
SYSTEM DISC Switch (44/48/58), 11-16
System Domain Devices, 10-2
System Error Messages, 9-41
System Failure, What To Do, 9-1
System Failure List, 9-3
System Failures Different Kinds Of, 9-1
System Formatting, SLEUTHSM, 10-7
System Halt
Shift String Dump, A-82, A-85
System Halt Conditions, 11-38
System Manager (SM), 6-1
System Operating, Copying
List Files Dumped, 7-32
System Only, 7-31
System Plus Files, 7-31a
System Operator
Capabilities, Distribution, 4-43
Commands, 4-2
Device Availability, 4-21
Starting the System, 4-4
Tasks, 4-1
Using INITIAL Program, 4-5
System Pack Formatting, 10-55
System Peripheral Configuration, 7-83
System, Private Volumes Overview, 10-1
System Power Down
Quick Reference, A-12
System Power Up
Quick Reference, A-13
System Processor Unit, 11-1
Series 37, 11-1
(39/40/42/52), 11-10
(44/48/58), 11-13, 11-14
System Recovery
Pre-system Startup, A-82, A-85
System Reload From Backup
Quick Reference, A-26, A-45, A-69
System Segmented Library, 7-43
System Shutdown, 4-42
Quick Reference, A-14
System Startup
(See Startup Dialog), 4-4
COLDSTART, 7-38, 7-40, 7-56, 7-58
COOLSTART, 7-37, 7-39, 7-55
Quick Reference, A-20, A-28, A-61
RELOAD, 7-56
UPDATE, 7-56
UPDATE Option, 7-59
WARMSTART, 7-55, 7-58
With INITIAL, 4-5
System Startup And Modification, 7-55
(See Startup Dialog)
System Startup State Configurator, 6-1
System Supervisor (OP), 5-1
A Role Description, 5-1
Backing Up The System, 5-3
Changing Non-I/O Values, 5-27
Command Set, 5-2
Configuring The System, 5-10
I/O Configuration Table, 5-11
Logging Facilities, MPE, 5-40
Reconfiguring The System, 5-10
Starting The System, 5-8
System Disc Responsibilities, 5-33
System Volume Conditioning, 10-7
System Updated, Startup
Quick Reference, A-22, A-40, A-63
System/User Files, Backup, 4-36
(See Backup Files)
System WARMSTART
Quick Reference, A-17, A-36, A-59
System, Adding I/O
Quick Reference, A-28, A-49, A-73
System, Deleting I/O Devices
Quick Reference, A-30, A-51, A-75
System, Diagnostics, DUS
Quick Reference, A-35, A-56, A-79
System, Formatting Packs
Quick Reference, A-57, A-80
System, Updated, Startup
Quick Reference, A-22, A-40, A-63

T

Tables, Changing System
Breakpoint, 7-31
Disc Request, 7-29
Loader Segment, 7-30
Primary Message, 7-30
Secondary Message, 7-30
Special Request, 7-30
Swap, 7-29
Timer Request List, 7-30
UCOP Request Queue, 7-30
User Logging, 7-31
Tables/Queues Configuration

Configurator Dialog, 5-23
Queue, Controller Process, 5-25
Queue, Input/Output (IOQ), 5-24
Stack, Interrupt Control (ICS), 5-25
Table, Breakpoint, 5-26
Table, Code Segment (CST), 5-23
Table, Code Segment, Extended, 5-24
Table, Data Segment (DST), 5-24
Table, Disc Request, 5-25
Table, Process Control Block (PCB), 5-24
Table, Swap, 5-25
Tape Cartridge Unit, 8-17
Tape Drive, Cartridge, Configuring, 7-96
Tape Drive, Magnetic, Configuring, 7-95
Tape, Cartridge, On line Formatting, 10-32
Telecommunications
Circuits, 4-48
Communication Links, 4-47
Four Wire, 4-48
Full Duplex, 4-47
Half Duplex, 4-47
INP, 4-47
Leased Line, 4-48
Lines/Channels, 4-47
Modems, 4-47
Multipoint :MTS/3000, 4-47
Multipoint Networks, 4-47
Network Components, 4-46
Simplex, 4-47
Sub Voice Band, 4-48
Switched Network, 4-48
Terminals As I/O Devices, 4-47
Terminals, Local, 4-47
Terminals, Remote, 4-47
Transmission Modes, 4-47
Transmission Speed, 4-48
Two Wire, 4-48
Voice Band, 4-48
Wideband, 4-48
Tele-Support, Hardware Needs, 11-47
Tele-Support, Operation
(39/40/42/52, 44/48/58), 11-49
(64/68/70), 11-50
Tele-Support, Series 37, 11-48
Tele-Support, Software Needs
Series 37, 11-48
(39/40/42/52, 44/48/58), 11-49
(64/68), 11-50
General, 11-48
:TELL Command, 4-16, 5-26
Temperature, High, 11-54
(See Overheating)
Terminal Buffers, 5-26, 7-103
Terminal Subtypes, Configuring, 7-88
Terminal Type
List, 7-13
Thumbwheel Switches
(39/40/42/52), 11-13
(44/48/58), 11-17
Description, 11-18
Time of the Century (TOC) Clock,
Series 37, 11-9
Timer Request List (TRL), 5-25, 7-106
Tracks
Defect Status, 7-76
Defective, Table, 7-69
Delete, 7-71
Verification, 7-71
Verification/Errors, 7-71
Transmission Modes, 4-47
TRL (Timer Request List), 5-25, 7-106
:TUNE Command, 5-31
Two Wire, 4-48

U

UCOP, 5-25, 7-106
Undoing Edit (:REDO), 2-9
:UP Command, 4-22
UPDATE, 7-56, 7-59
Updated System, Startup
Quick Reference, A-22, A-40, A-63
User Controller Process Queue, 5-25, 7-106
User Defined Commands
(See UDCs)
User Job Control, 4-44

V

Verify Readability
Discs/Cartridge Tape, 10-39
Vertical Format Control (VFC)
Automatic, 8-3
HP 2608A/2563A, 8-4
VINIT Subsystem
Capabilities Needed, 10-27
Example, 10-40
Its Use, 10-39
Overview, 10-27

HP 2608A/2563A, 8-4
VINIT Subsystem
    Capabilities Needed, 10-27
    Example, 10-40
    Its Use, 10-39
    Overview, 10-27
Virtual Memory Changes, 7-78
:VMOUNT Command, 4-23
Volume Conditioning, 10-7
Volume Conditioning, Disc, 5-34
Volume Set Definition, 10-35
Volumes Verification, 7-73
Volumes Verification/Errors, 7-71
Volumes, Change
    (See Reconfiguring The), 7-38
    Copying, 10-30
Volumes, Defect Status, 7-76
Volumes, Disc, Changes
    Add, 7-38
    Delete, 7-38
    List, 7-38
    Relist, 7-39
Volumes
    Foreign Disc, Access/Alter, 4-23
    Private, Applications, 10-1
    Private, Overview, 10-1
    Using Discs, 4-22b
    Volumes, Private, Control, 4-23

W

Warmstart, 7-55, 7-58
    Quick Reference, A-17, A-36, A-59
WARMSTART, Series 37, 4-6, 11-8
WARMSTART, SDF Command, 7-55, 10-46
:WARN Command, 4-16, 5-26

X

XCST (Extended Code Segment Table), 5-24, 7-101

Part No. 32033-90005
Printed in U.S.A. 06/87
(U1088)

HEWLETT PACKARD