

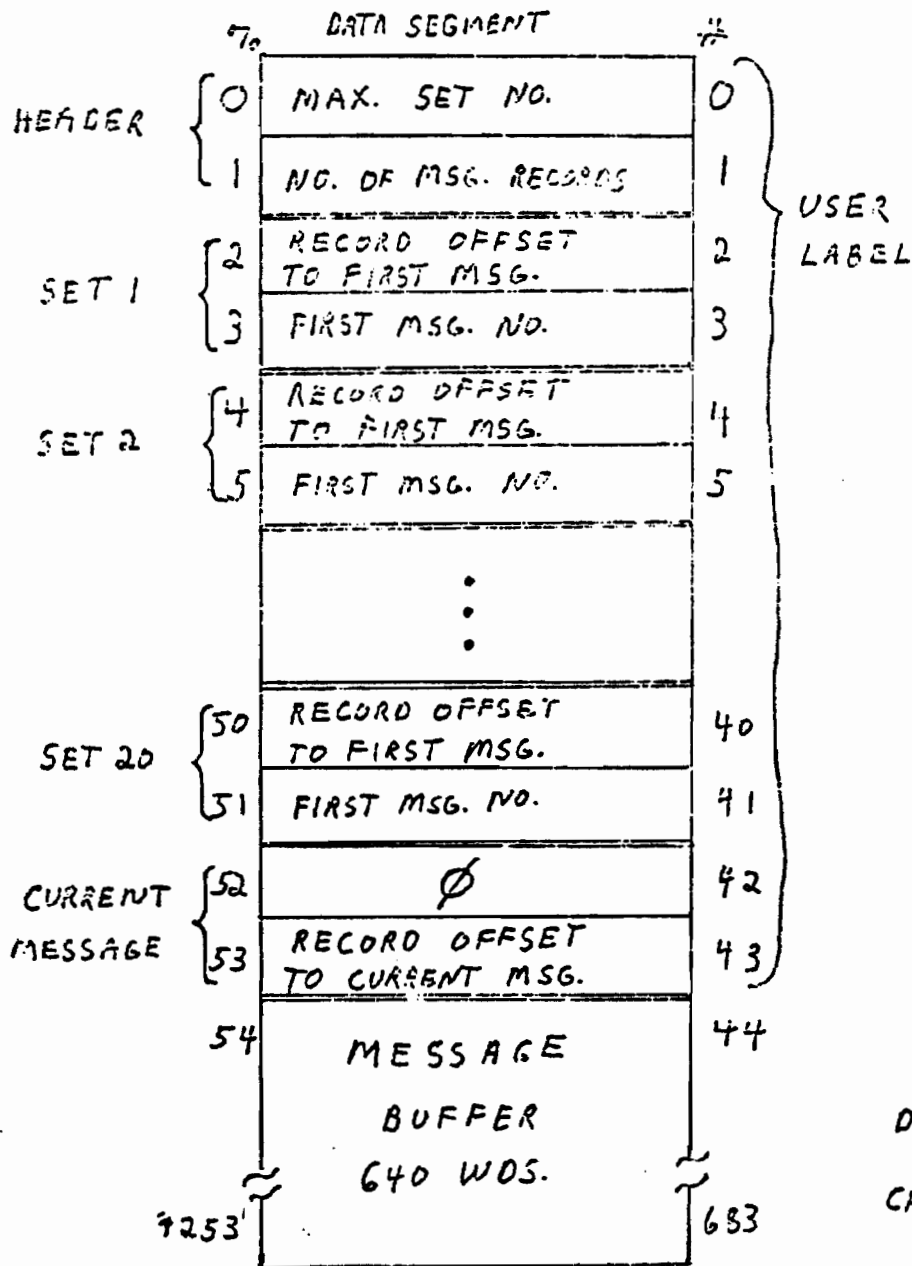
MESSAGE SYSTEM

MESSAGE SET DIRECTORY



* DIRECTORY CREATED BY RUNNING MAKECAT.PUB.SYS

* KEPT IN A DATA SEGMENT AND IN A USER LABEL



EMPTY ENTRY:

RECORD OFFSET OF NEXT IN-USE SET
-1

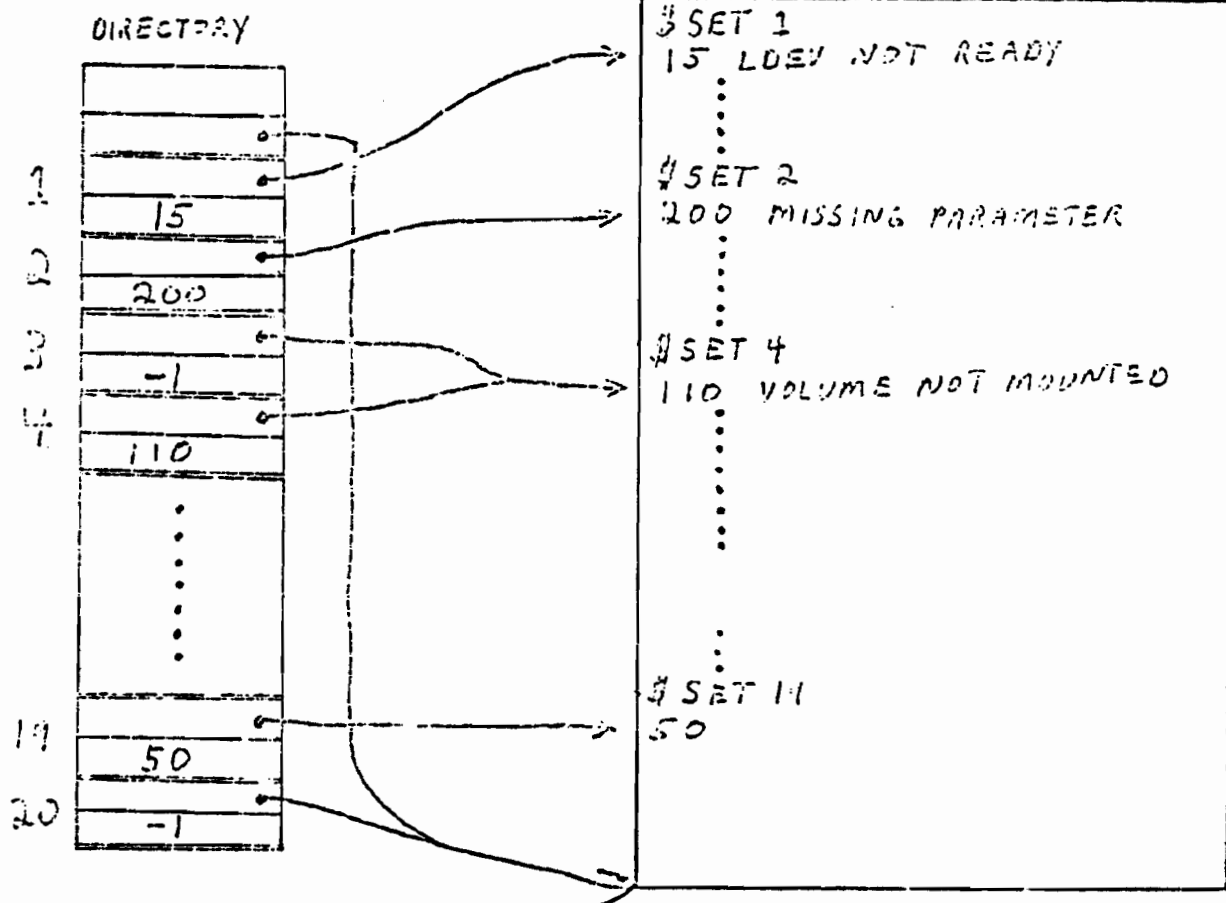
DST NO. IN SYSGLOB 70373

CAT. DISC ADDR. IN SYSGLOB 70371-372

MESSAGE SYSTEM

MESSAGE SET DIRECTORY (CONT.)

CATALOG



ALGORITHM FOR FINDING MESSAGE:

- A. $\text{SEARCH REC.NO.} = \text{RECORD OFFSET} + (\text{SEARCH MSG.NO.} - \text{1ST MSG.NO.})$
- B. IF NOT FOUND, DO A BINARY SEARCH, USING
 LOW VALUE = RECORD OFFSET OF THIS SET
 HIGH VALUE = RECORD OFFSET OF NEXT SET

MESSAGE SYSTEM

MAKECAT (40)

- * READS A SPECIFIED FILE (FORMALDESIGNATOR = "INPUT")
AND BUILDS A MESSAGE DIRECTORY INTO THE USERLABEL
- * HAS FOUR ENTRY POINTS: (RUN MAKECAT,PUB,SYS,_____)
 - . NONE SPECIFIED - CREATES A MESSAGE DIRECTORY
FROM "INPUT"
 - BUILDS TEMP FILE,"CATALOG"
 - CAN BE RUN BY ANYONE TO CREATE
A USER MESSAGE CATALOG
 - . BUILD
 - MUST BE LOGGED ON UNDER PUB.SYS
WITH SM OR OP CAPABILITY
 - CREATES A MESSAGE DIRECTORY
FROM "INPUT"
 - BUILDS A NEW CATALOG,PUB.SYS
 - PUTS DST AND DISC ADDRESS IN
SYSGLOB
 - . DIR
 - MUST BE LOGGED ON UNDER PUB.SYS
WITH SM OR OP CAPABILITY
 - READS FROM CATALOG,PUB.SYS ONLY
 - DOES NOT CREATE A DIRECTORY,
ASSUMES ONE ALREADY BUILT
 - PUTS DISC ADDRESS IN SYSGLOB
 - . HELP
 - CREATES A HELP DIRECTORY FROM INPUT
 - BUILDS A PERMANENT FILE,"HELPCAT"

MESSAGE SYSTEM

USER (85)

- * HANDLES GENMESSAGE INTRINSIC FOR USER MESSAGE CATALOGS.
- * USER CATALOG CREATED BY RUNNING MAKECAT.PUB.SYS.
- * TO USE GENMESSAGE, USER MUST FOPEN CATALOG WITH
FOPTIONS = 5, AOPTIONS = %420.
- * USER'S MESSAGE DIRECTORY READ ONTO USER'S STACK.

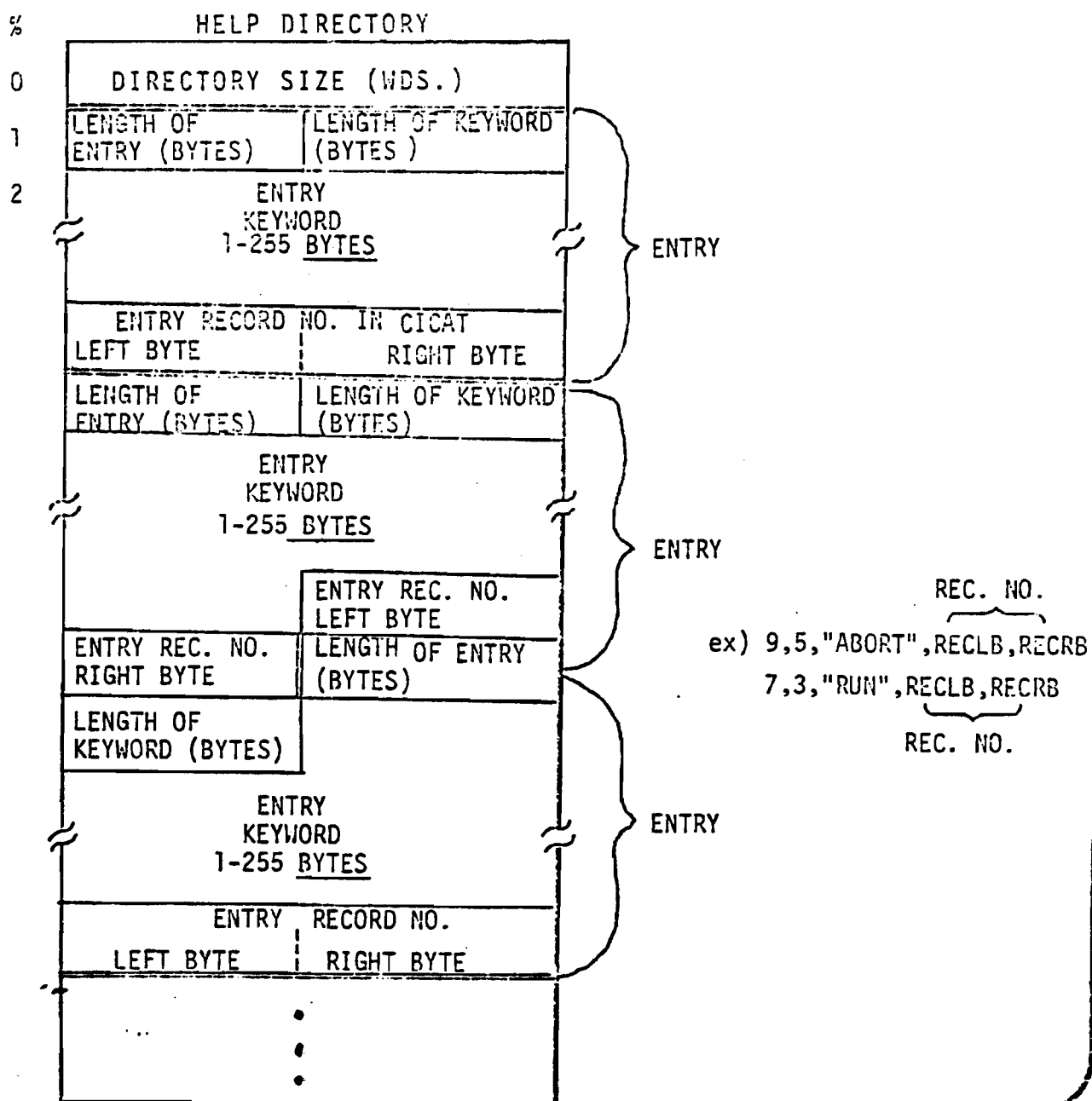
HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

HELP SUBSYSTEM

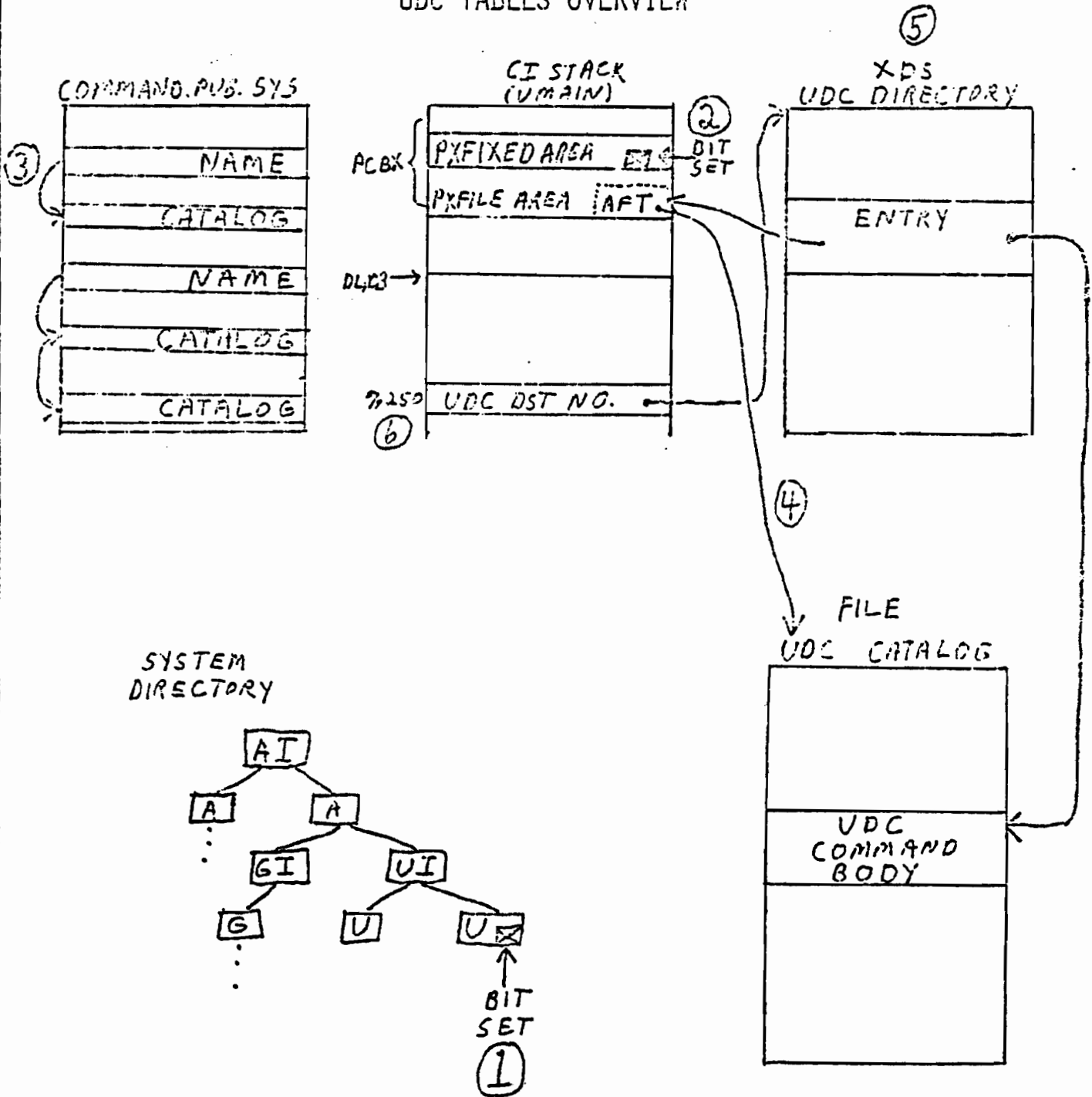
CICAT.PUB.SYS (CONT.)

- HELP DIRECTORY - KEPT AS A USER LABEL.
- READ ONTO USER'S STACK.
 - USES SEARCH INTRINSIC FORMAT (BECAUSE IT USES THE SEARCH INTRINSIC).
 - VARIABLE ENTRY SIZE.



USER DEFINED COMMANDS

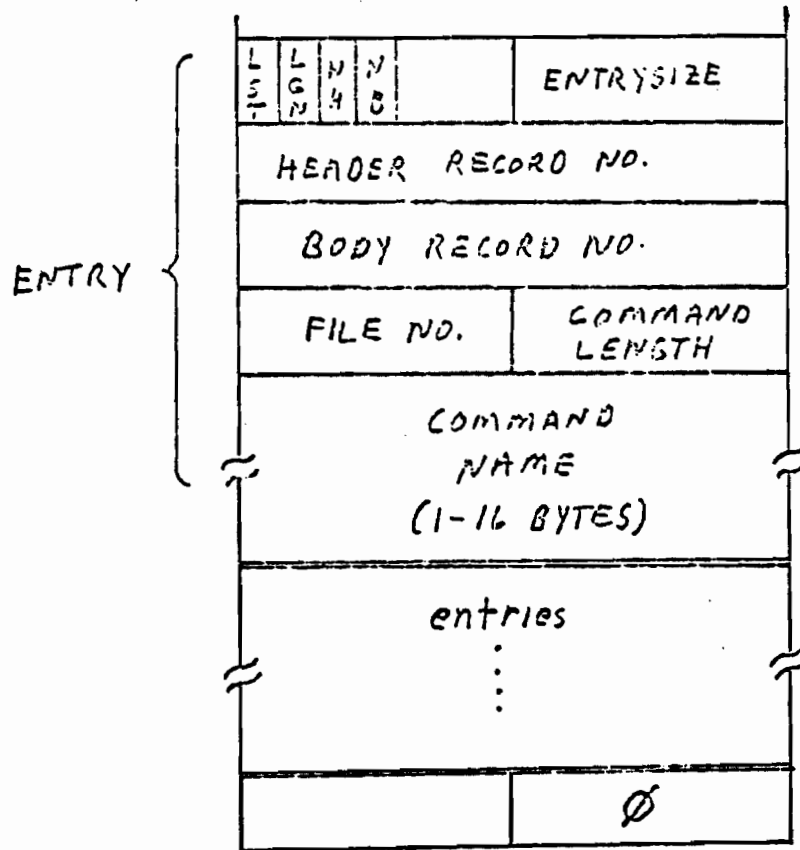
UDC TABLES OVERVIEW



USER DEFINED COMMANDS

UDC DIRECTORY

- * EXTRA DATA SEGMENT - DST NO. IN DB+250 OF UMAIN STACK.
- * BUILT BY INITUDC.



LST - OPTION LIST
LGN - OPTION LOGON
NH - OPTION NOHELP
NB - OPTION NOSREAK

← ENTRY SIZE = Ø
TERMINATES
DIRECTORY

USER DEFINED COMMANDS

COMMAND.PUB.SYS

- * RECORD SIZE = 20 WORDS, 6 RECORDS/BLOCK.
- * KEEPS TRACK OF WHO IS USING WHAT UDC CATALOG.
- * CAN BE PURGED TO DISABLE UDC'S.
- * CAN BE BUILT TO REENABLE UDC'S.

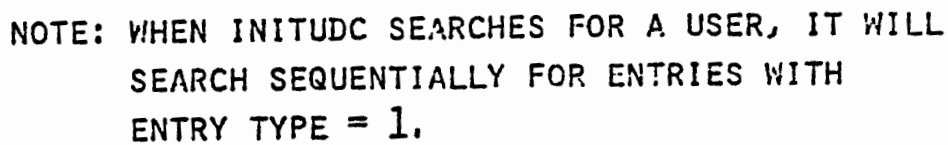
RECORD 0		#
0	FIRST FREE ENTRY NO.	0
1	not used	1
2	MAX. IN USE	2
3	NO. IN USE	3
4	not used	4
5		5
6		6
7		7
8		8
9		9
10		10
11		11
12		12
13		13
14		14
15		15
16		16
17		17
18		18
19		19

FREE ENTRY		#
0	NEXT FREE ENTRY NO.	0
1	ENTRY TYPE = 0	1
2	not used	2
3		3
4		4
5		5
6		6
7		7
8		8
9		9
10		10
11		11
12		12
13		13
14		14
15		15
16		16
17		17
18		18
19		19

USER ENTRY		#
0	CATALOG ENTRY NO.	0
1	ENTRY TYPE = 1	1
2	USER	2
3		3
4		4
5		5
6		6
7	ACCOUNT	7
8		8
9		9
10	not used	10
11		11
12		12
13		13
14		14
15		15
16		16
17		17
18		18
19		19

FILE ENTRY		#
0	NEXT CATALOG ENTRY NO.	0
1	ENTRY TYPE = 2	1
2	FILE NAME	2
3		3
4		4
5	FOPEN FORMAT:	5
6		6
7		7
8	FILE [LOCKWORD] GROUP.	8
9		9
10		10
11	ACCT Ø	11
12		12
13		13
14	(UP TO 36 BYTES)	14
15		15
16		16
17		17
18		18
19		19

COMMAND.PUB.SYS (CONT.)

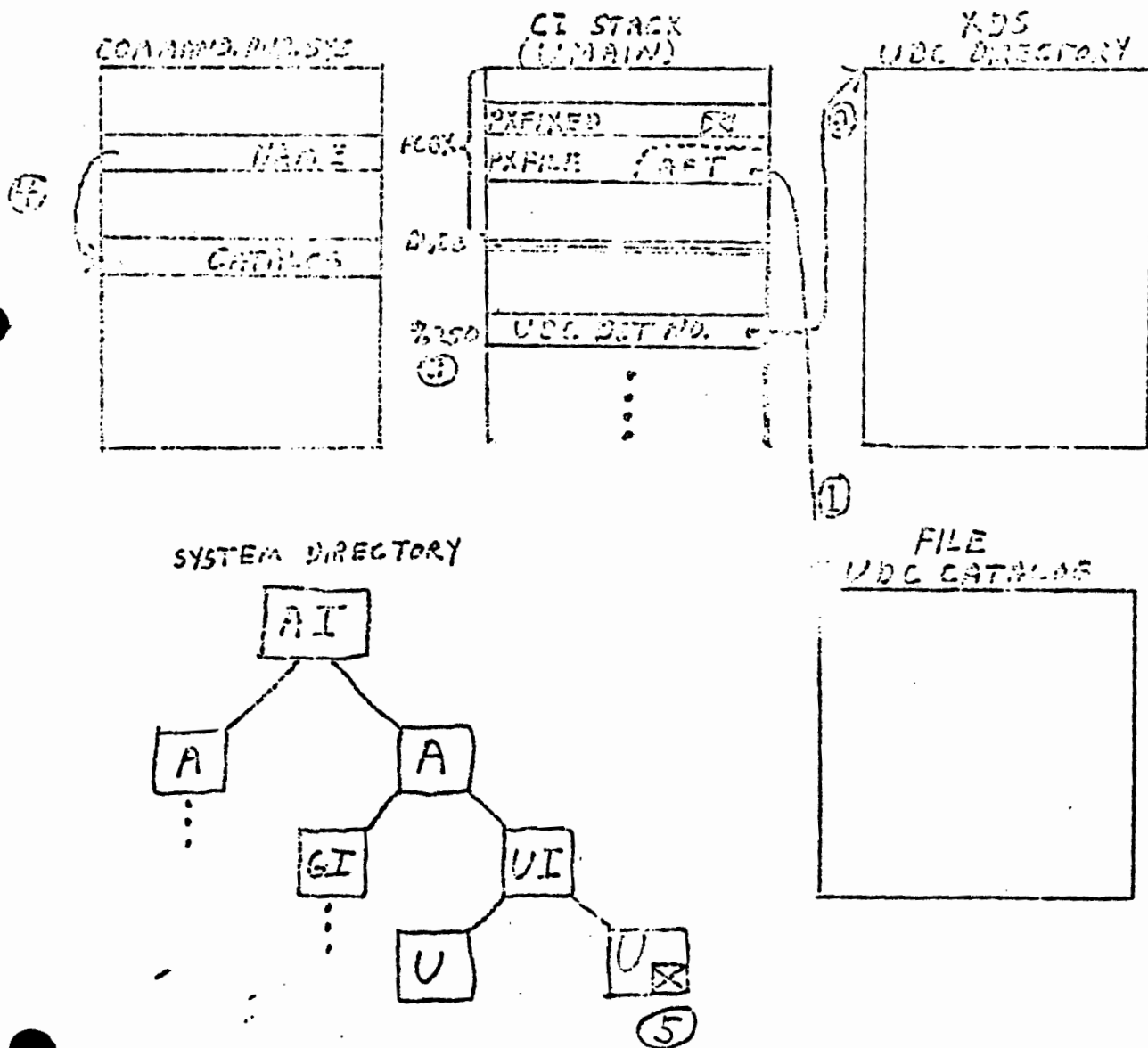


USER DEFINED COMMANDS

:SETCATALOG (OFF)

* WHAT HAPPENS:

- 1) CATALOG(S) FCLOSED.
- 2) XDS RELEASED.
- 3) UDC DST NO. = 0 (UMAIN STACK DB+7250).
- 4) ENTRY REMOVED FROM COMMAND.PUB.SYS.
- 5) BIT IN SYSTEM DIRECTORY USER ENTRY TURNED OFF.



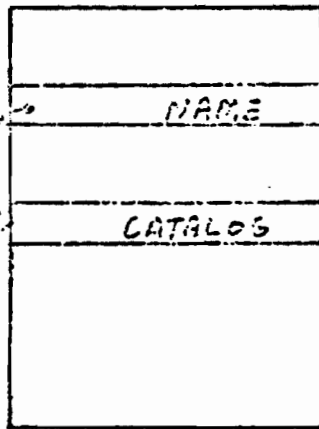
USER DEFINED COMMANDS

:SETCATALOG (ON)

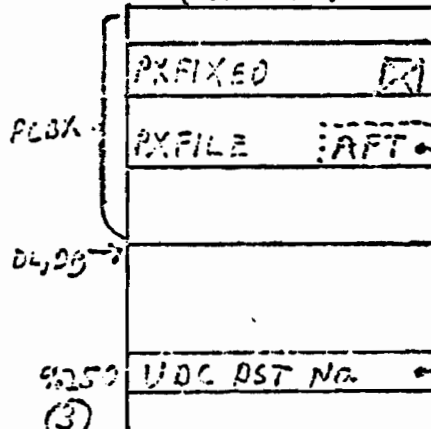
* WHAT HAPPENS:

- 1) TURN ON BIT IN SYSTEM DIRECTORY USER ENTRY.
- 2) PUT ENTRY INTO COMMAND.PUB.SYS.
- 3) CALL INITUDC.

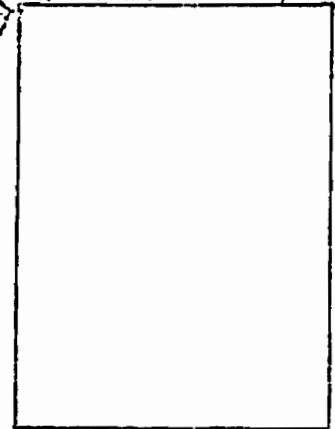
COMMAND.PUB.SYS



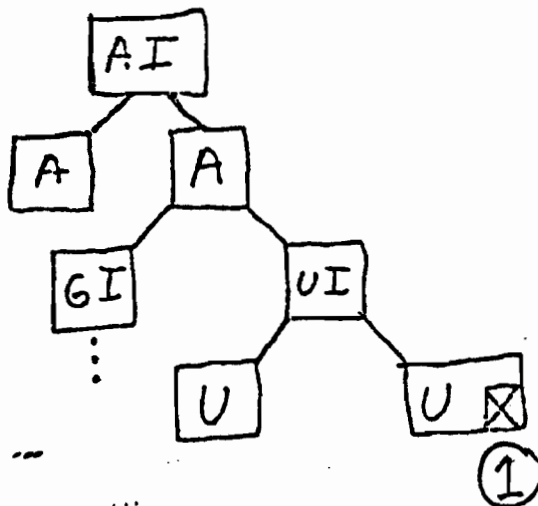
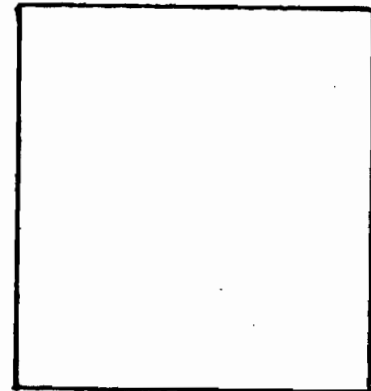
CI STACK
(U MAIN)



XDS
UDC DIRECTORY

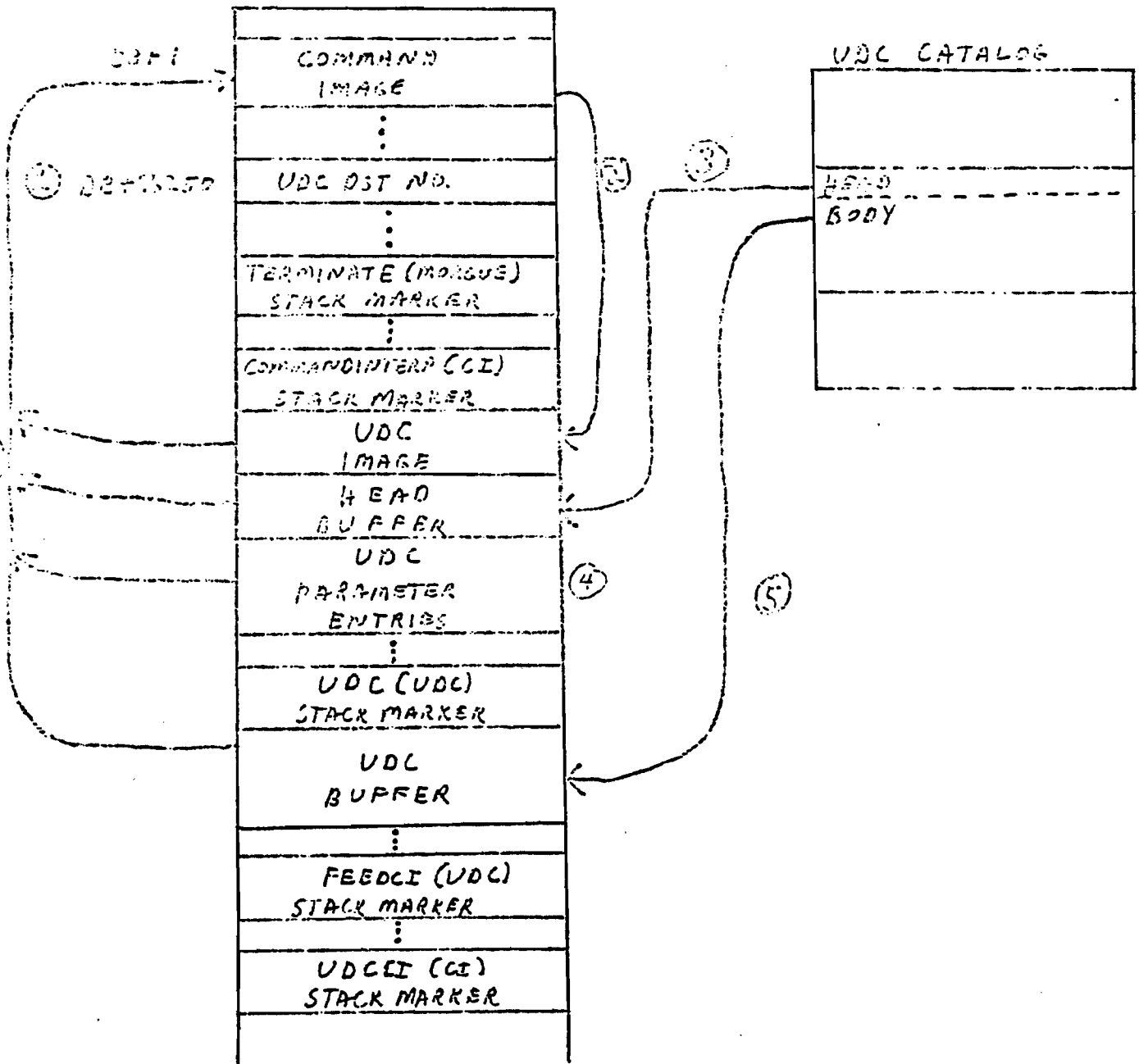


FILE
UDC CATALOG



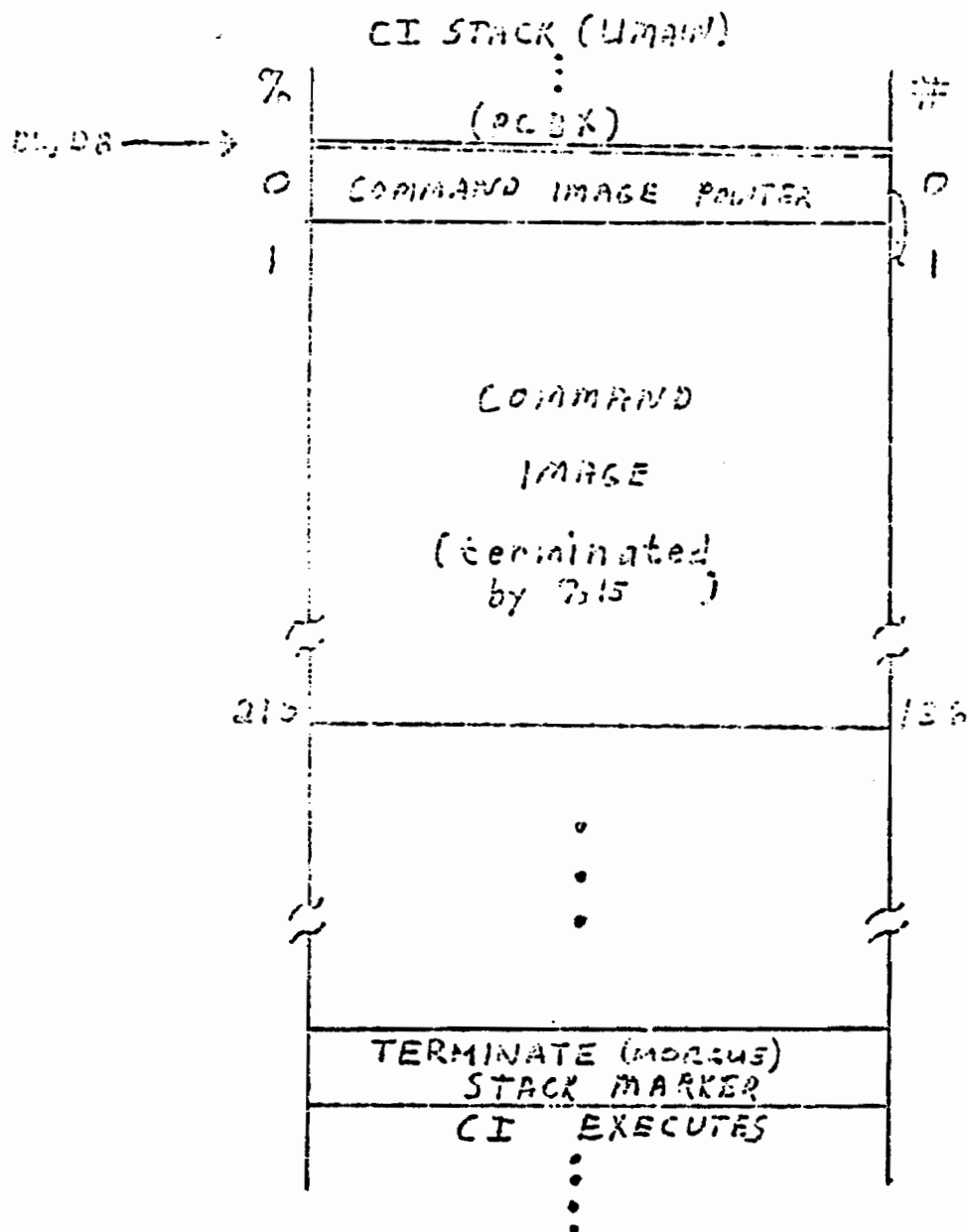
USER DEFINED COMMANDS

EXECUTION SUMMARY



USER DEFINED COMMANDS

EXECUTION STRATEGY



STRATEGY: INTERCEPT COMMAND IMAGE AREA AFTER
CI READS INTO IT BUT BEFORE CI PARSES
IT.

USER DEFINED COMMANDS

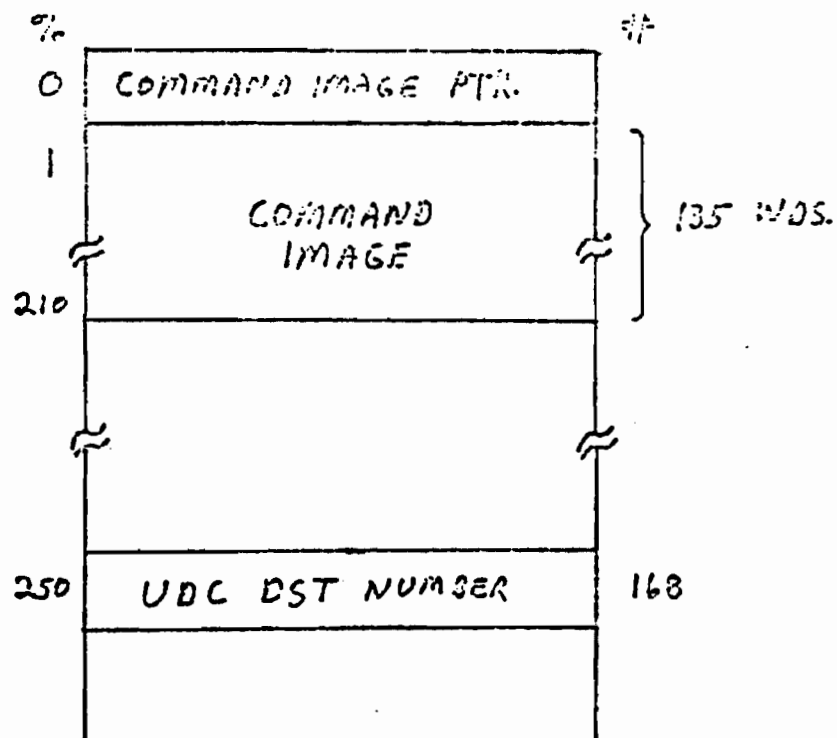
EXECUTION

COMMANDINTERP:

- . CHECK UDC DST NO. (DB+250).
- . IF = 0, UDC'S NOT IN EFFECT.
- . IF $\neq$ 0, CALL PROCEDURE UDC WITH STRING IN COMMAND IMAGE AREA.

UDC:

- . EXECUTES THE USER'S COMMANDS.
- . IF UDC EXECUTED, DON'T PARSE COMMAND IMAGE.



USER DEFINED COMMANDS

EXECUTION (CONT.)

UDC PARAMETER ENTRIES:

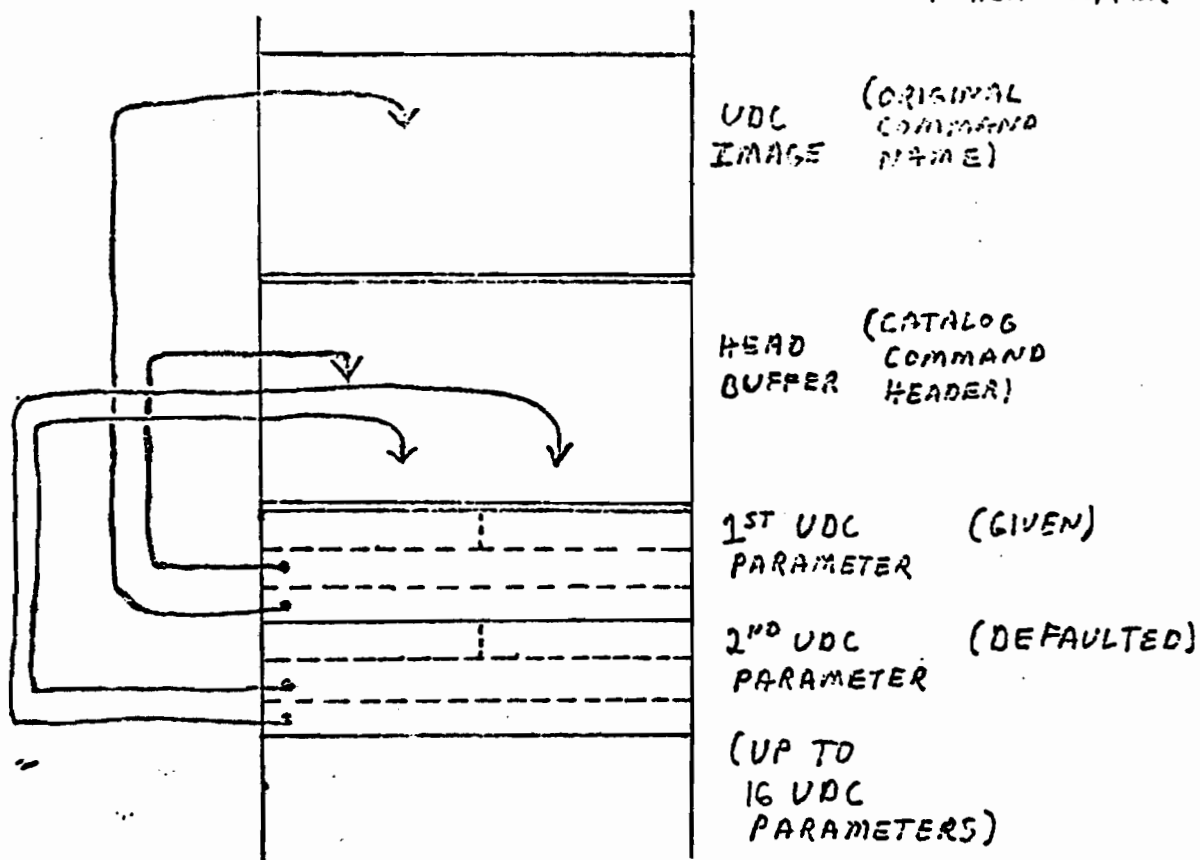
- 3 WORDS PER ENTRY.
- UP TO 16 ENTRIES.
- USED TO INSERT PARAMETERS AND/OR DEFAULTS INTO USER COMMANDS.

LENGTH OF
PARAMETER IN
HEAD BUFFER

PARAMETER LENGTH (BYTES)	DEFAULT LENGTH (BYTES)
PARAMETER PTR	
DEFAULT PTR	

LENGTH OF PARAM DEFAULT
IN HEAD BUFFER
IF NO DEFAULT
BYTE PTR TO PARAMETER
IN HEAD BUFFER

BYTE PTR:
IF PARAM GIVEN, PTR TO
UDC IMAGE
IF PARAM DEFAULTED, PTR
TO HEAD BUFFER



USER DEFINED COMMANDS

EXECUTION (CONT.)

UDC:

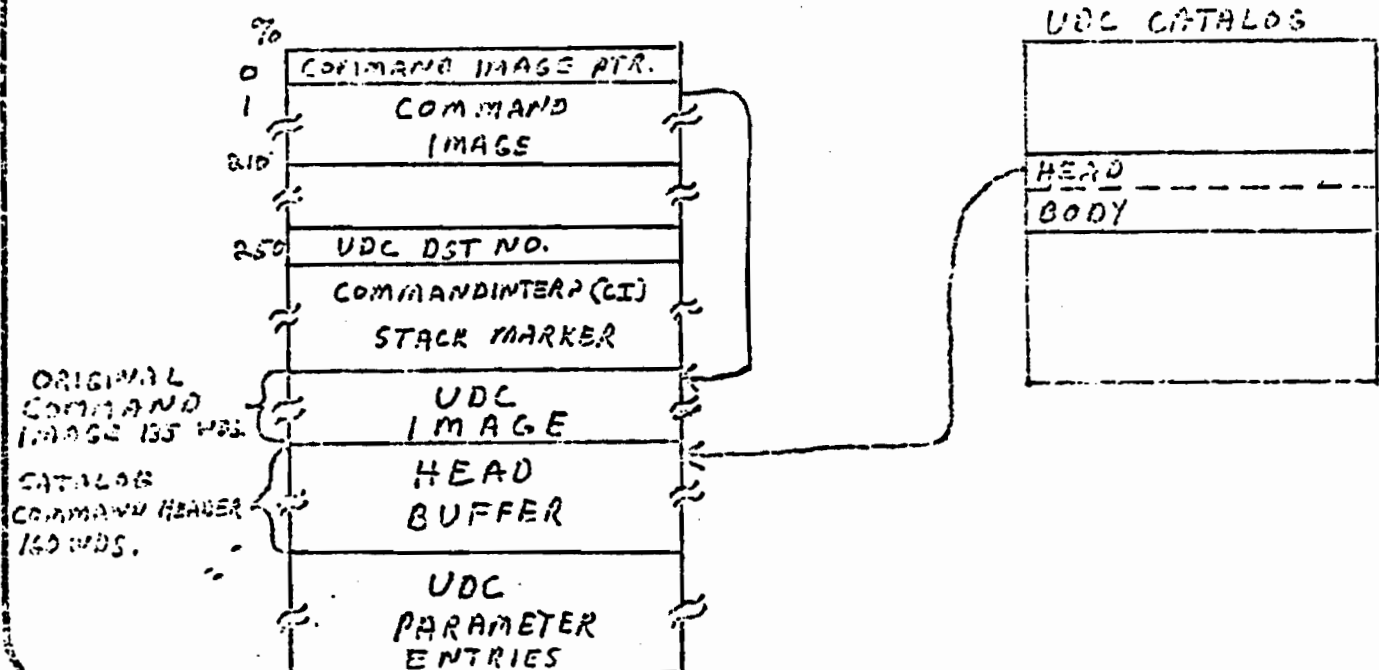
- . COPY THE COMMAND IMAGE INTO A UDC IMAGE AREA.
- . CALL PROCEDURE SEARCHUDC.

SEARCHUDC:

- . CHECK IF COMMAND IS USER DEFINED, RETURN UDC DIRECTORY INFORMATION.
- . IF NOT USER DEFINED, RETURN TO CI FOR NORMAL EXECUTION.
- . READ THE CATALOG COMMAND HEAD INTO A HEAD BUFFER.
- . SET UP UDC PARAMETER ENTRIES.
- . CALL FEEDCI.

FEEDCI:

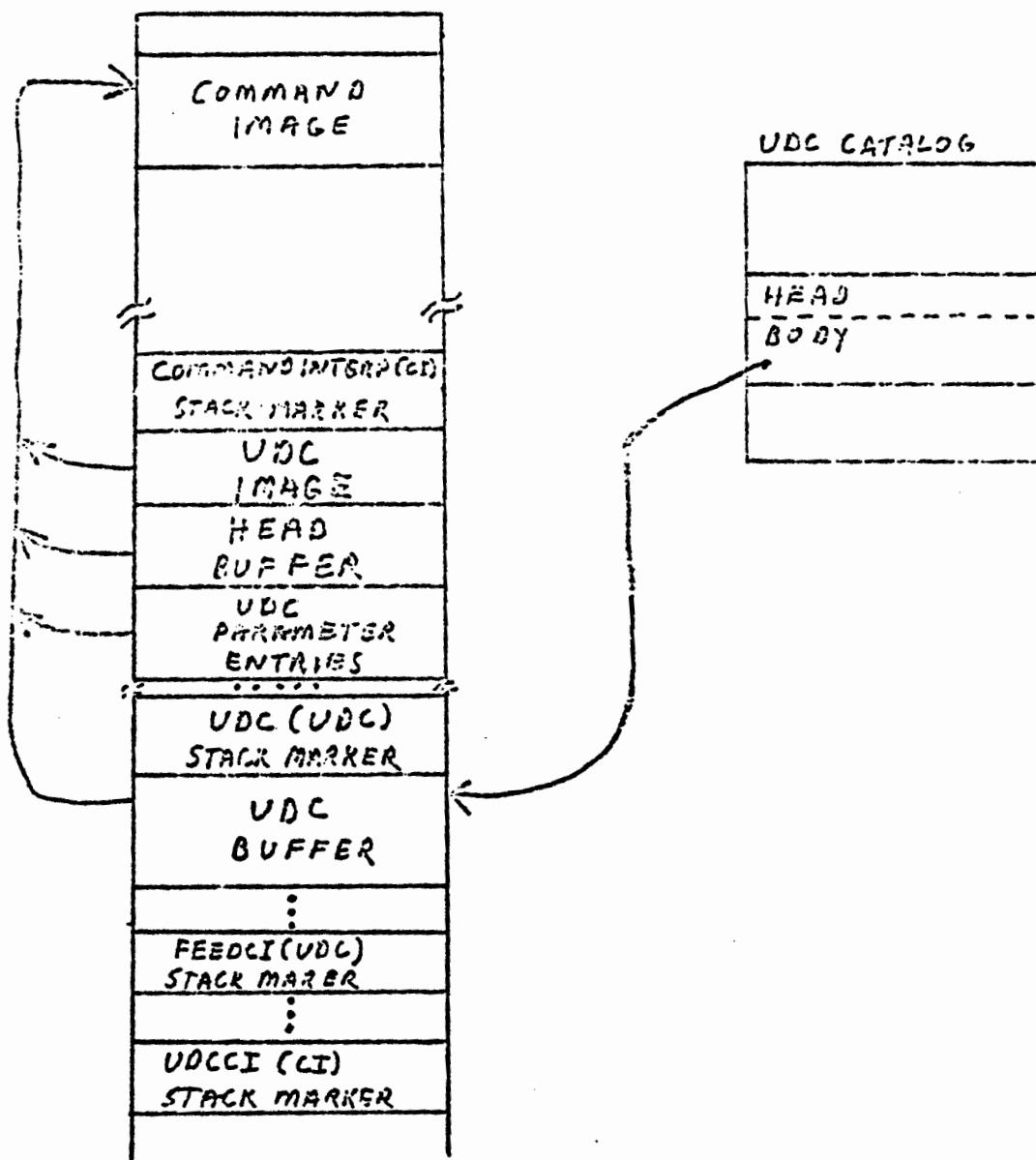
- . SENDS UDC BODY COMMANDS TO CI FOR EXECUTION, ONE BY ONE.
- . RETURN TO COMMANDINTERP.



USER DEFINED COMMANDS

EXECUTION (CONT.)

FEEDCI (CONT.)



USER DEFINED COMMANDS

EXECUTION (CONT.)

PARAMETER EXAMPLE

DEFAULT:

UDC IMAGE: LF
HEAD BUFFER: LF P=\$STDLIST

UDC
PARAMETER
ENTRY

PARAMNAME PTR	
DEFAULT PTR	

CATALOG COMMAND BODY: LISTF !P

GIVEN:

UDC IMAGE: LF *LP
HEAD BUFFER: LF P=\$STDLIST

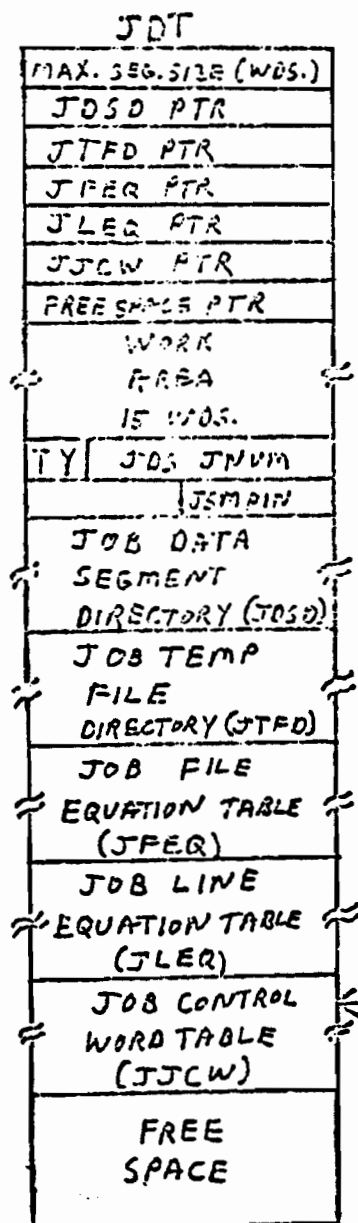
UDC
PARAMETER
ENTRY

PARAMNAME PTR	
DEFAULT PTR	

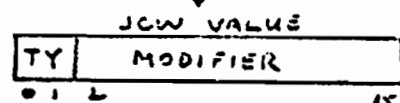
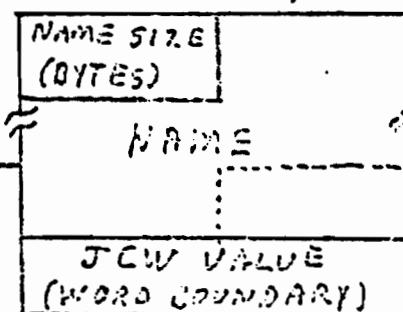
CATALOG COMMAND BODY: LIST !P

JOB CONTROL WORDS (JCW)

- * SYSTEM/USER FLAGS.
- * GLOBAL TO PROCESS.
- * CONTROLLED WITH INTRINSICS FINDJCW, PUTJCW, GETJCW, SETJCW AND COMMANDS SETJCW, SHOWJCW.
- * JCW TABLE (JJCW) KEPT IN JOB DIRECTORY TABLE (JDT).



JJCW ENTRY



TY: 00 = OK
 01 = WARN
 10 = FATAL
 11 = SYSTEM

USING PRIVATE VOLUMES VINIT SUBSYSTEM

* REQUIRES SM OR OP CAPABILITY.

* COMMANDS:

> FORMAT <ldv> FORMATS A PACK, INITIALIZES DTT.
DRIVE MUST BE =DOWN.

> INIT <vol.name>, <ldv>, <vset name.group.acct>[:GEN=<index>]
INITIALIZES A PACK: VOLUME LABEL, DTT,
FST, DIRECTORY. DRIVE MUST BE A
SCRATCH PACK OR =DOWN.

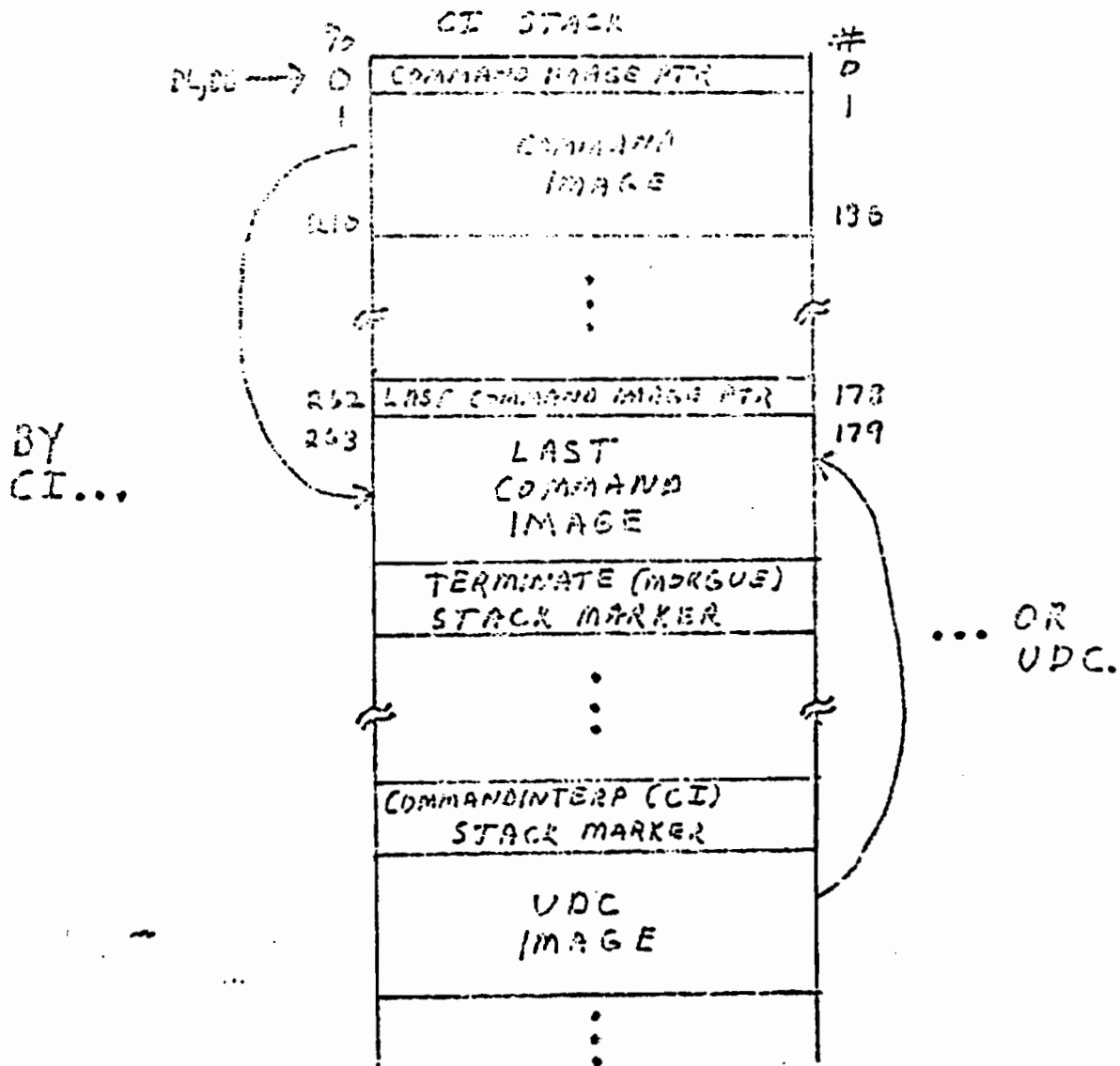
> SCRATCH <ldv>[:RESET] MAKES A PACK A
SCRATCH PACK. RESET PARM RESTORES
A SCRATCH PACK. DRIVE MUST BE =DOWN.

> DSTAT [<ldv>] SAME AS :DSTAT.
ALL

> PDEFN [#.g.a.] PRINTS THE VOLUME SET
vset.g.a. DEFINITION FROM THE
SYSTEM DIRECTORY.

REDO

- * ALLOWS USERS TO EDIT AND RETRY THEIR PREVIOUS COMMAND.
- * INVOKED BY :REDO.
- * USES EDITOR MODIFY COMMANDS: D, I, R PLUS U (UNDO)..
- * PREVIOUS COMMAND KEPT IN LAST-COMMAND-IMAGE AREA BY CI OR UDC, DEPENDING ON WHO PARSED PREVIOUS COMMAND.



HEWLETT ^{PACKARD}

PVUSER
DST 266

LIST OF ALL ACTIVE PV USERS
1) USER PIN
2) DST NO. OF SEQ. CONTAINING MOUNTED GROUP LIST

MVTAB
DST 268

TABLE OF ALL MOUNTED VSETS & MEMBER VOLUMES
1) VSET INDEX
2) LDEV

VTTAB
DST 269

TABLE OF ALL ON-LINE VOLUMES
1) HVINDEX (IF ANY)
2) LDEV

LPDPT
DST 275

DEVICE INDEX
1) PV/SERIAL DISC FLAGS

SEE ALSO:
.FCB
.FILE
.LABEL
.SYSGLIB
7363-365

<group
names>

DSEG.

PCBX

JIT DST

LOGON GROUPS HOME VSET (IF ANY):
1) BIND FLAG
2) PTR TO SYS. SINGLE FILE INDEX (NOT MOUNTED)
3) PTR TO PV SINGLE FILE INDEX (MOUNTED)

LOGON GROUPS HOME VSET (IF ANY):
1) BIND FLAG
2) PTR TO SYS. SINGLE FILE INDEX (NOT MOUNTED)
3) PTR TO PV SINGLE FILE INDEX (MOUNTED)

DIRECTORY
VS VTTAB
1) VTTAB OF ALL MEMBER VOLUMES

VLDDEV

PRIVATE VOLUME

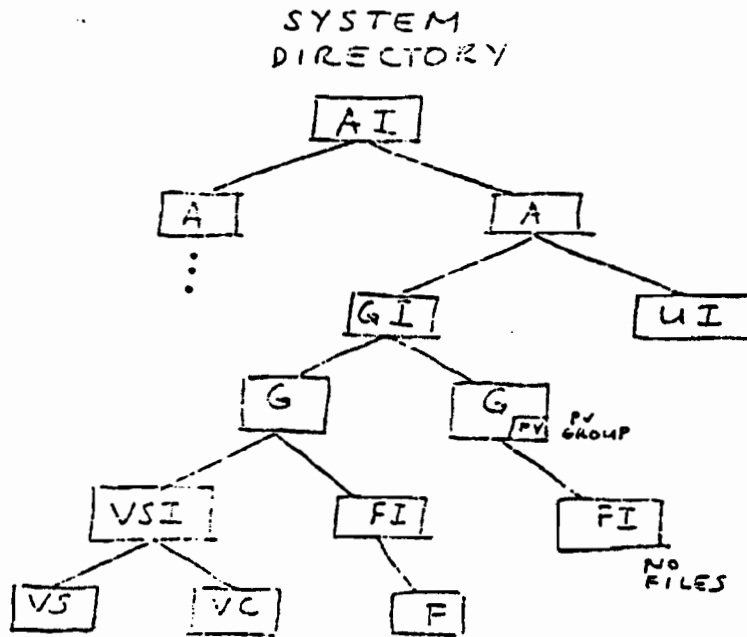
SYSTEM
VOLUME

USING PRIVATE VOLUMES

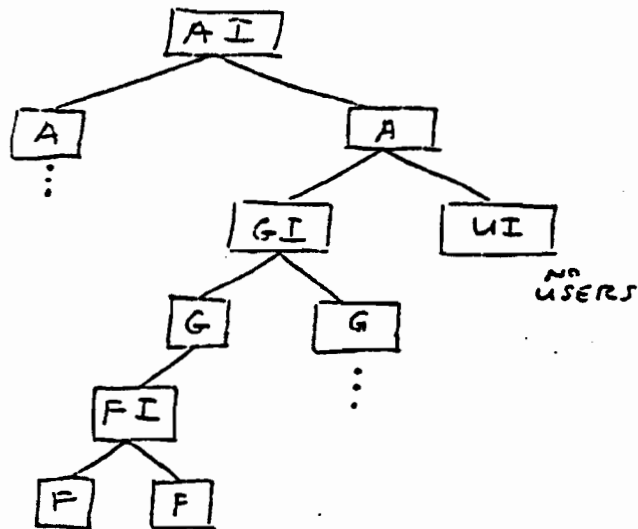
VINIT SUBSYSTEM (cont.)

- > PLABEL <Idcv> PRINTS THE VOLUME LABEL.
- > PFSPACE <Idcv> PRINTS THE FREE SPACE TABLE.
- > DTRACK <Idcv> ALLOWS DEFECTIVE TRACK PROCESSING.
DRIVE MUST BE =DOWN.
- > PDTRACK <Idcv>
- > SERIAL <Idcv> MARKS THE PACK AS A SERIAL
DISC. DRIVE MUST BE A
SCRATCH PACK OR =DOWN.
- > COPY <from Idcv>, <to Idcv> PACK-TO-PACK COPY.
DRIVES MUST BE IDENTICAL
TYPE-SUBTYPE AND =DOWN.
- > COND <Idcv> [: SIZE = n
ALL] CONDENSES THE DISC
FREE SPACE. ALL FREE
AREAS > n ARE CONDENSED.
ALL: n = 0
DEFAULT: n = 50

PRIVATE VOLUMES DIRECTORY



VOLUME SET DIRECTORY



PRIVATE VOLUMES
= VMOUNT

* HANDLED BY PROGEN.

* SETS BITS IN SYSGLOB 2365.



SYSGLOB

:

% 363

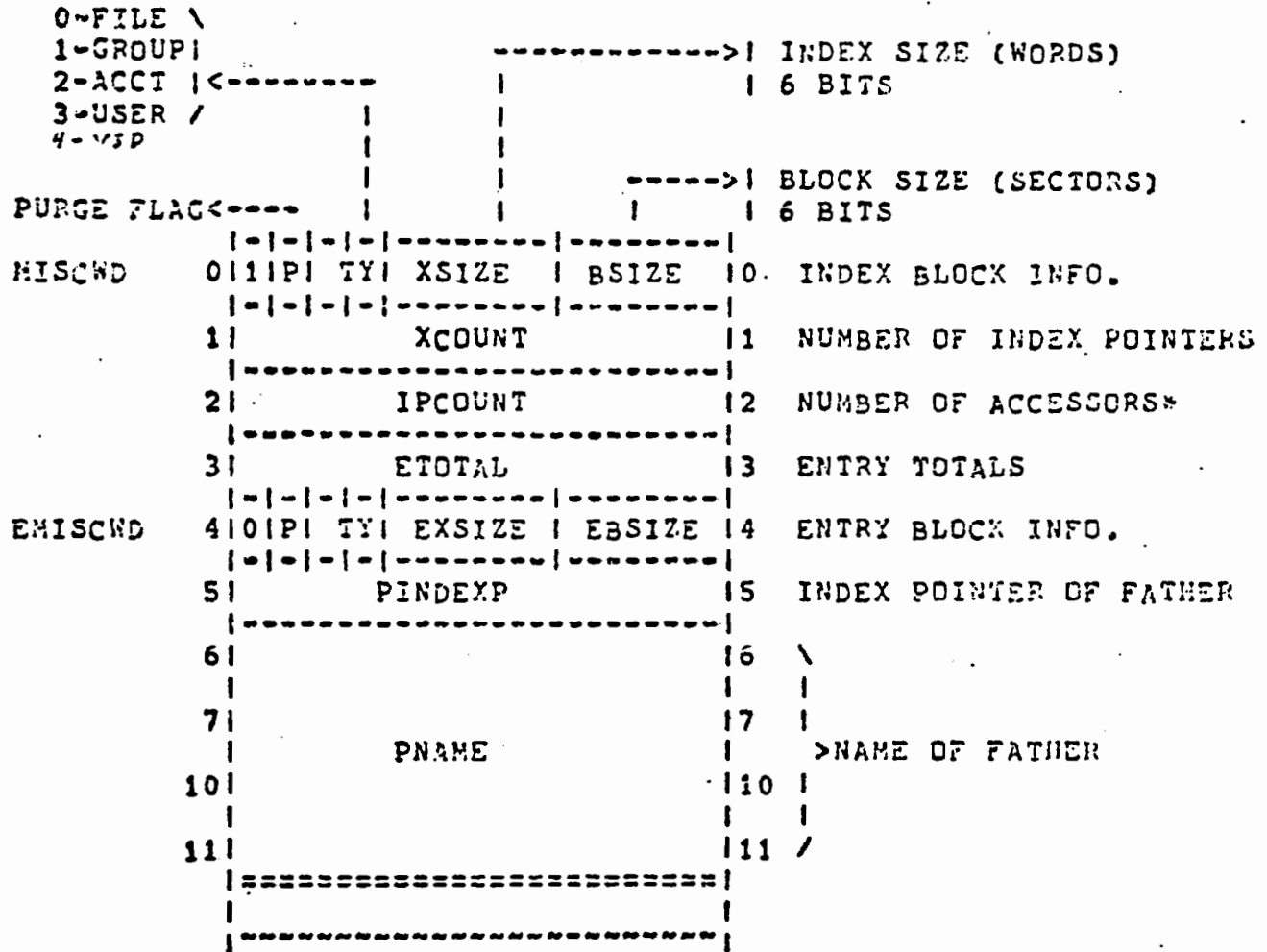
364

365

PVPROC PIN			
VOLUME RECOGNITION COUNT (DEVREL INTERRUPTS)			
	NO	YES	NO

:

INDEX BLOCK PREFIX (10 WORDS)



*The count is incremented by each access that uses and relies upon a pointer to the index block, ie, it is guaranteed not to be purged while the count is not = 0.

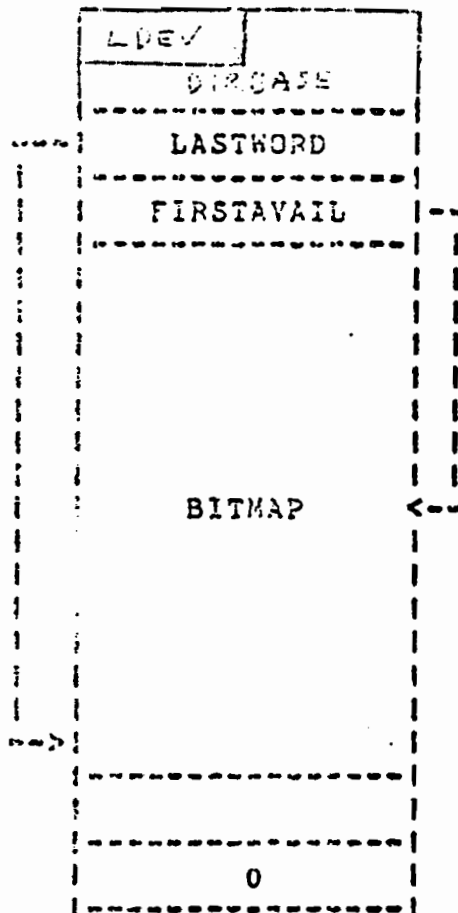
DIIRECTORY SPACE DATA SEGMENT (DIRSDS)

DST=21

10

SIR=8

10



DIIRECTORY ADDR. FOR SYSTEM/PRIVATE VOLUME SET

defines last word of bit map

defines next word to be examined

The bitmap defines the available/used sectors in the directory. Bit 0 word 0 corresponds to DIRBASE; bit 1 word 0 to DIRBASE+1 etc. 1=>available 0=>used. [NOTE: bitmap(0).(0:4)=0 always.]

ACCOUNT ENTRY (29 WORDS)

0		10	
1		11	ACCT.NAME
2	ANAME	12	
3		13	
4	AGIPNTR	14	ACCT.GROUP INDEX POINTER
5	AUIPNTR	15	ACCT.USER INDEX POINTER
6			
7	ACAP	17	CAPABILITY
10		18	
11	ALATTR	19	LOCAL ATTRIBUTES
12		10	PASSWORD
13		11	
14	APASS	12	
15		13	
16		14	
17	ADFSCOUNT	15	DISC FILE SPACE COUNT (SECTORS)
20		16	
21	ADFSLIMIT	17	DISC FILE SPACE LIMIT (SECTORS)
22		18	
23	ACPUCOUNT	19	CPU TIME COUNT (SECONDS)
24		20	
25	ACPULIMIT	21	CPU TIME LIMIT (SECONDS)
26		22	
27	ACONTIMECOUNT	23	CONNECT TIME COUNT (MINUTES)

2/7/77

0		0
1	GNAME	1
2		2
3		3
4	GFIPNTR	4
5		5
6	G PASS	6
7		7
10		8
11		9
12	GDFSCOUNT	10
13		11
14	GDFSLEMIT	12
15		13
16	GCPUCOUNT	14
17		15
20	GCPULEMIT	16
21		17
22	GCONTRIMECOUNT	18
23		19
24	GCONTRIMELEMIT	20
25		21
26	GSEC	22
27	G CAP	23
28	GLINKAGE	24
31	GVSDIPNTR	25
32	GHYSNAME	26
33	G H V S A N A M E	27
34		28
35		29
36	G H V S G N A M E	30
37		31
40		32
41		33
42	G H V S V S N A M E	34
43		35
44		36
45		37
46	GSAVEFIPNTR	38
47	GMOUNTREFCNTR	39
50	GSPARE	40

Group Name

Group File Index Pointer

Password

Disc File S. Count (seconds)

Disc File Space Limit (seconds)

CPU Time Count (seconds)

CPU Time Limit (seconds)

Connect Time Count (minutes)

Connect Time Limit (minutes)

Group Security

Group Capability

Group Directory Base Linkage

Group Volume Set Definition Index

Group Home Volume Set Name

(Definition's Account Name)

(Definition's Group Name)

(Definition's Volume Set Name)

CONTAINS OF GFIPNTR WHEN IT IS 0
AND MUTABX IS 0

MOUNT USE COUNTER

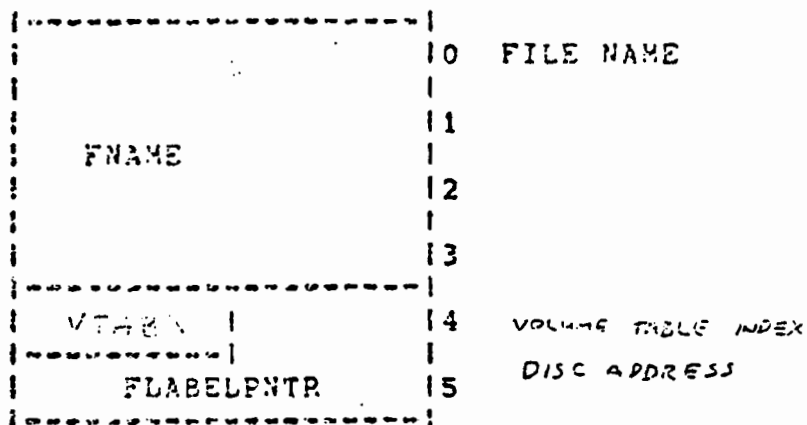
PV	MUTABX
----	--------

PV=0 : SYSTEM GROUP

PV=1 : PV GROUP--

MUTABX=0 : HOME VSET
NOT MOUNTED
MUTABX≠0 : HOME VSET
MOUNTED

FILE ENTRY (FILE POINTER) (6 WORDS)



7			10
6			10
1	GVSNAME		1
2			2
3			3
4	TY 1	MVTABX	4
5	VOL COUNT 14	VMASK	5
6			6
7	GVSVOLNAME		7
10			8
11			9
12	° 14 M		10
13	SUB-TYPE	VTABX	11
14			12
:	:		:
:	:		:
65			53
66	⊙		54
67	⊙		55

GV:VOLINFO

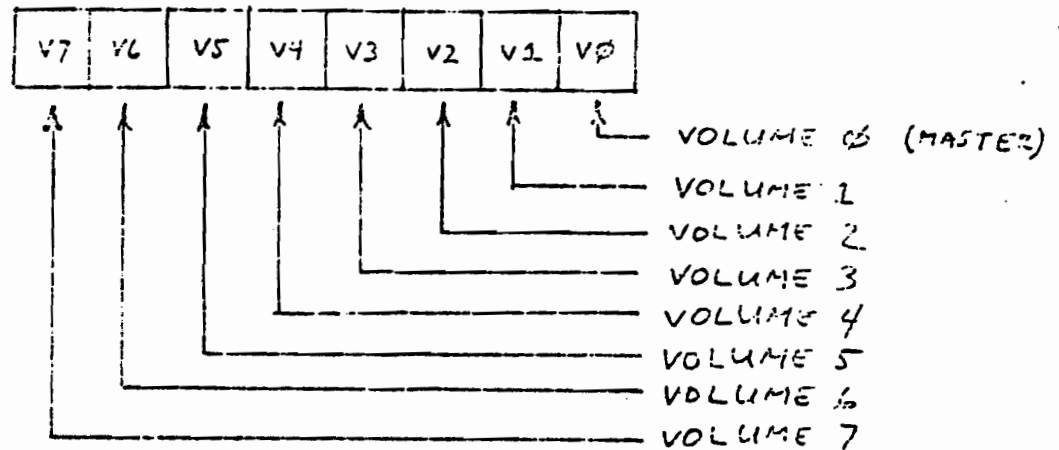
VTABX : VOLUME TABLE INDEX

USER ENTRY (19 WORDS)

0		0	USER NAME
1		1	
2	UNAME	2	
3		3	
4		4	CAPABILITY
5	UCAP	5	
6		6	LOCAL ATTRIBUTES
7	ULATTR	7	
8		8	PASSWORD
9		9	
10		10	
11	UPASS	11	
12		12	
13		13	
14		14	HOME GROUP (MAY BE NULL)
15		15	
16	UHGROUP	16	
17		17	
18		18	
19	ULOGCOUNT	19	LOGON COUNT (#OF USERS LOGGED ON)
20		20	
21	P U // // // // JOBPRI	21	MAX.JOB PRIORITY
22	NOT USED	22	
			P = PURGE FLAG U = UDC EXIST FLAG

VOLUME MASK FORMAT

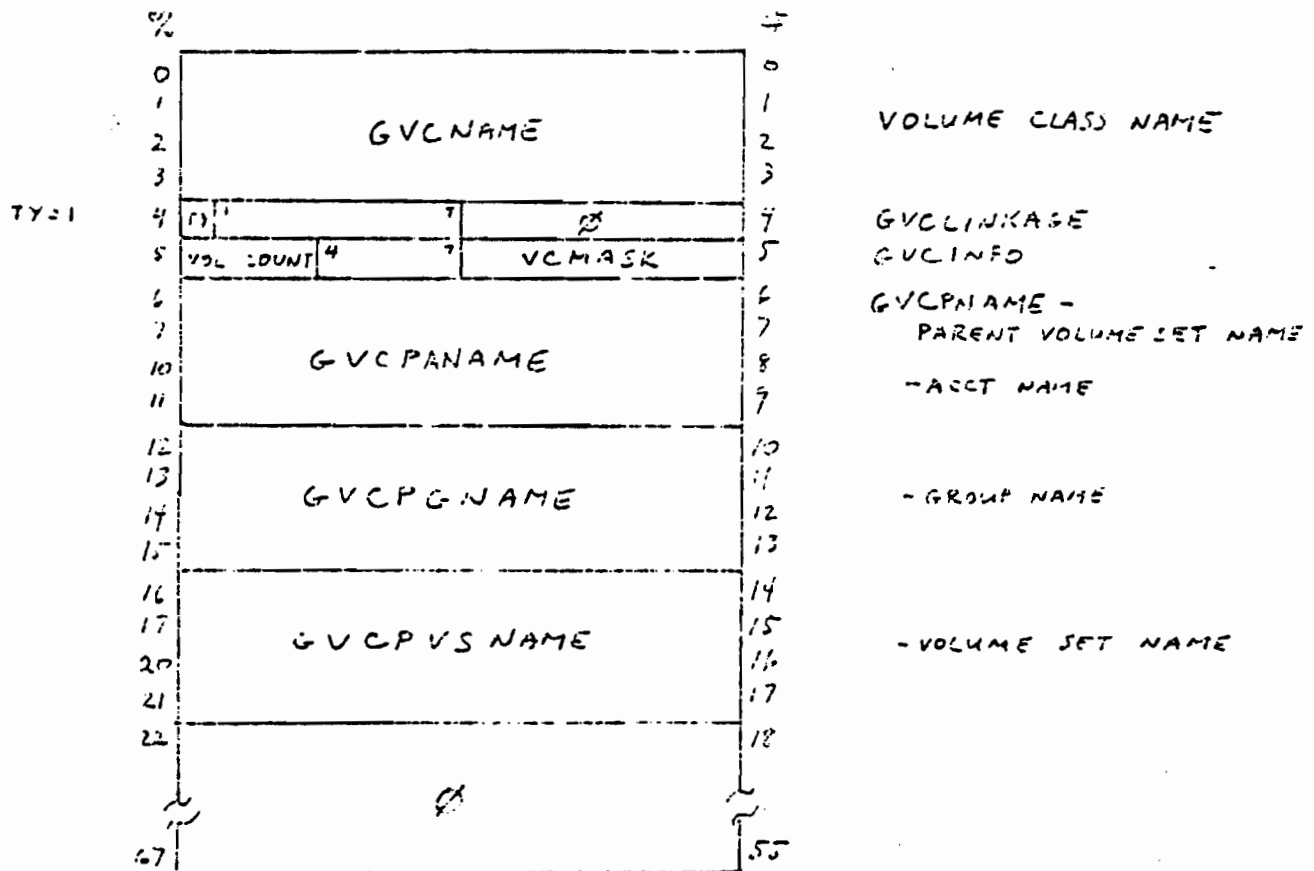
- USED IN MVTAB, PVUSER, FILE LABEL, FILE CONTROL BLOCK (FCB), VOLUME SET/CLASS DEFINITION, VOLUME SET VTAB.
- 8 BIT (OR 16 BIT) MASK.



0 : NOT MOUNTED

1 : MOUNTED

VOLUME CLASS DEFN ENTRY



TY: =0 VOLUME SET
=1 VOLUME CLASS

VOL COUNT: NO. OF VOLUMES
VCMASK: VOLUME CLASS MASK

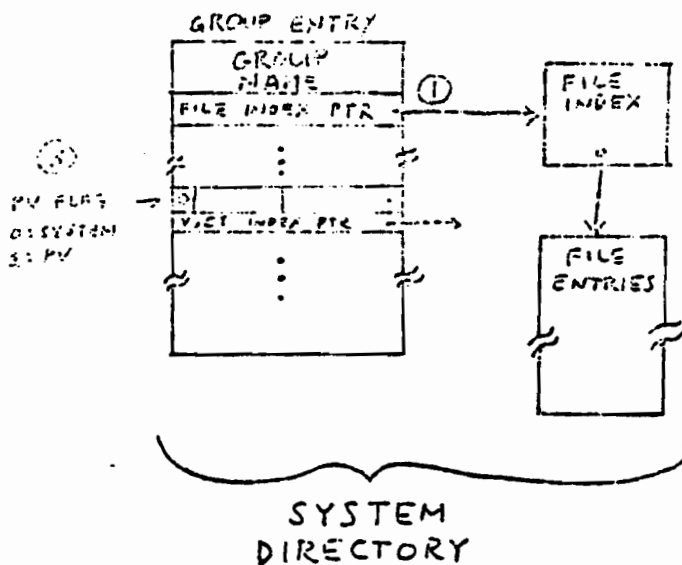
PRIVATE VOLUMES BINDING

GROUP ENTRY:

- 1) POINTS TO A FILE INDEX
- 2) POINTS TO A VSET INDEX
- 3) CONTAINS A FLAG SIGNIFYING SYSTEM/PV GROUP
- 4) IF PV GROUP, CONTAINS HOME VSET NAME

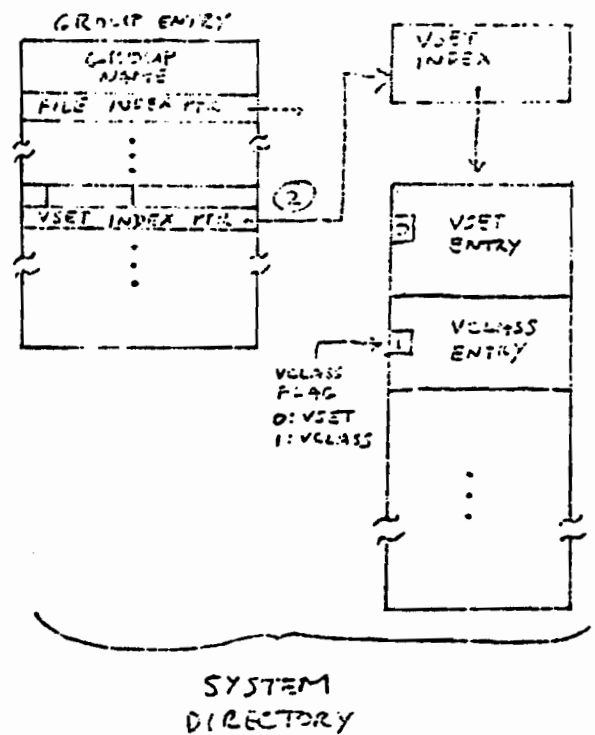
EXAMPLE

SYSTEM GROUP:



EXAMPLE

SYSTEM GROUP W/ VSET DEFIN:



PRIVATE VOLUMES BINDING (Cont.)

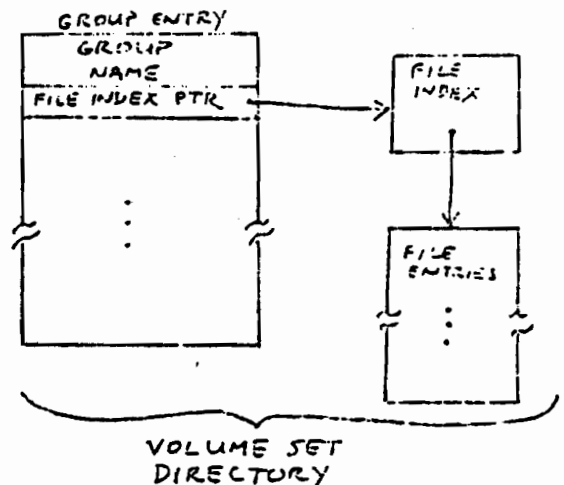
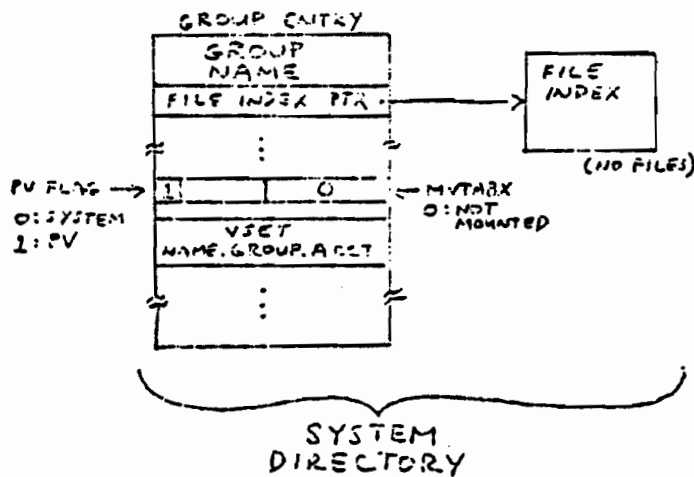
GROUP ENTRY (cont.):

WHEN A PV GROUP IS BOUND,

- 1) MUTABX UPDATED
- 2) FILE INDEX PTR UPDATED

EXAMPLE

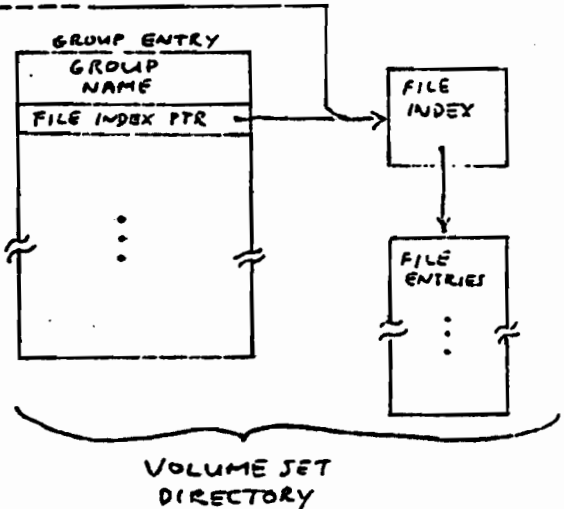
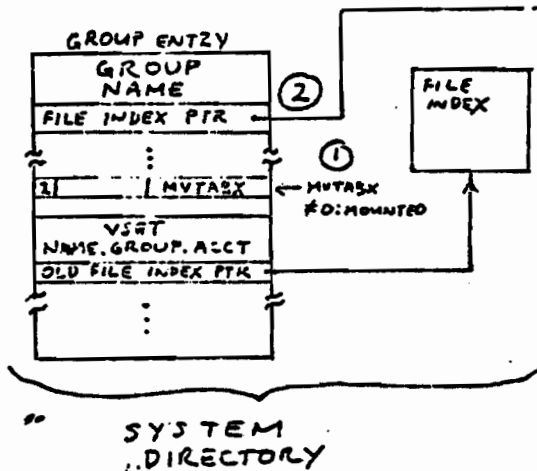
PV GROUP, NOT BOUND:



EXAMPLE

PV GROUP, BOUND:

(MUTABX POINTS TO DIRBASE)

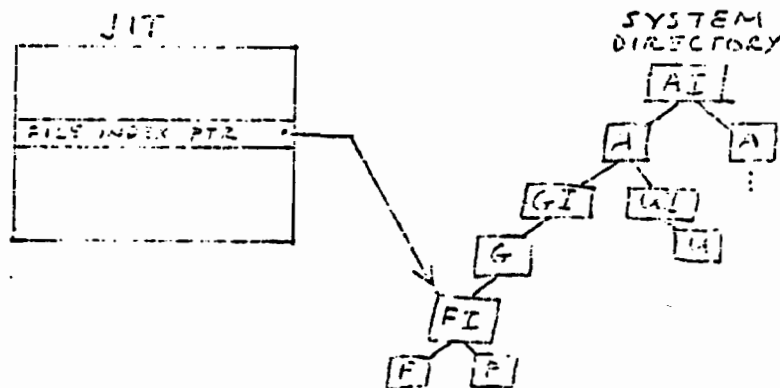


PRIVATE VOLUMES

BINDING (Cont.)

JOB INFORMATION TABLE (JIT):

JUST TO MAKE THINGS INTERESTING, THE JIT WAS DESIGNED TO CONTAIN A POINTER DIRECTLY TO THE FILE INDEX OF THE LOGON GROUP. THIS ALLOWS QUICK FILE ACCESS WITHOUT TRAVERSING THE DIRECTORY AGAIN.

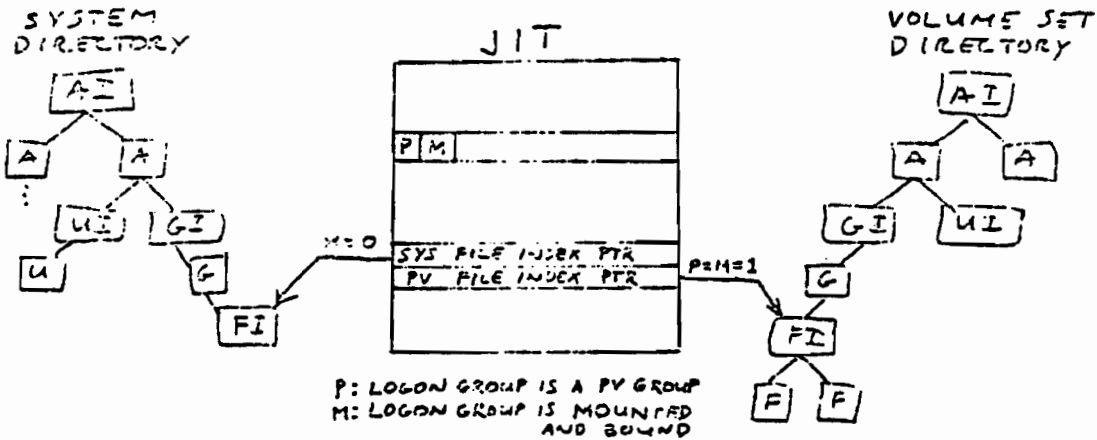


NOW! WHAT HAPPENS IF THE GROUP IS A PV GROUP?

PRIVATE VOLUMES

JIT (Cont.):

THE JIT WILL NOW CONTAIN TWO FILE INDEX POINTERS,
ONE TO THE SYSTEM DIRECTORY AND ONE TO THE LOGON
GROUP'S HOME VOLUME SET DIRECTORY. PV & BIND FLAGS
IN THE JIT DETERMINE WHICH POINTER TO USE.



P: LOGON GROUP IS A PV GROUP
M: LOGON GROUP IS MOUNTED
AND BOUND

SIR #27 = 2.33

DST #53 = 2.65

MVTAB

2 MOUNTED VOLUME TABLE

28

HEADER

0	ENTRY SIZE		MAX NO. ENTRIES	0
1	NO. MOUNTED VOLUME SETS			1
2	LDEV			2
3	SYSTEM DIRBASE			3
4				4
24				20
0	U	CYCLIC PTR	DOWN MASK	0
1	HVOL	NVOL	UCOUNT	1
2	LDEV			2
3	VSET DIRBASE			3
4	GEN			4
5	LDEV		VTABX	5
6			VCOUNT	6
...	...			...
23	LDEV		VTABX	17
24			VCOUNT	20

MVTABX
= 0MVTABX
= 1VOLUME
ENTRY
5VOLUME
ENTRY
7

U - IN-USE FLAG

HVOL - HIGHEST VOL. NO.

NVOL - NO. OF VOLUMES

VCOUNT - NO. OF USERS (VOLUME SET)

VCOUNT - NO. OF USERS (VOLUME)

DOWN - DOWN PENDING MASK

CYCLIC PTR - POINTER USED TO
ALLOCATE FILES TO
DEVICE CLASS

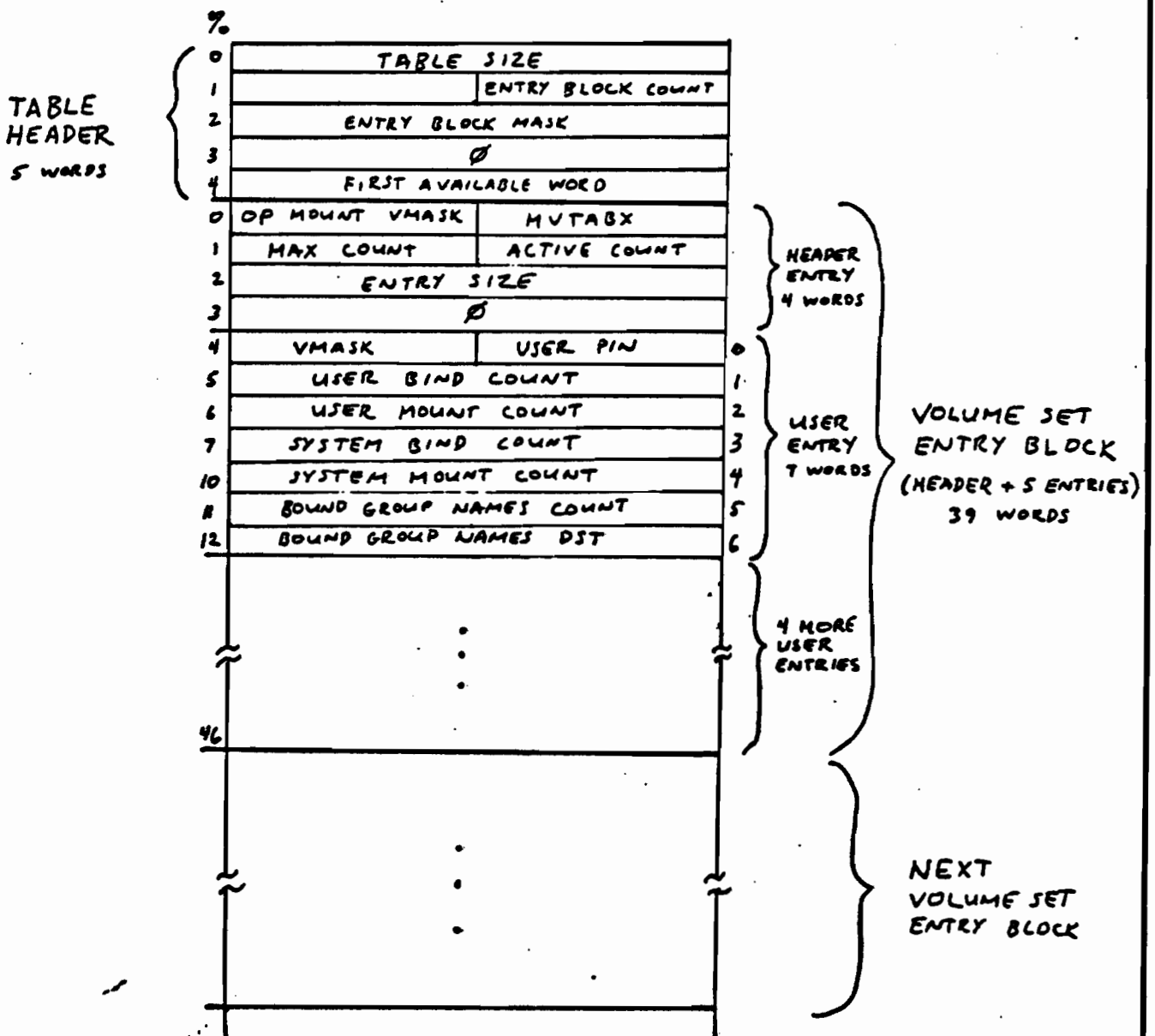
PRIVATE VOLUMES PVUSER

DST 7.66
SIR 7.35

* TABLE SHOWING WHO IS USING MOUNTED VOLUMES AND
WHAT GROUPS ARE BOUND.

* GROUP NAMES KEPT IN A DATA SEGMENT.

* SPACE ALLOCATED BY ENTRY BLOCKS.

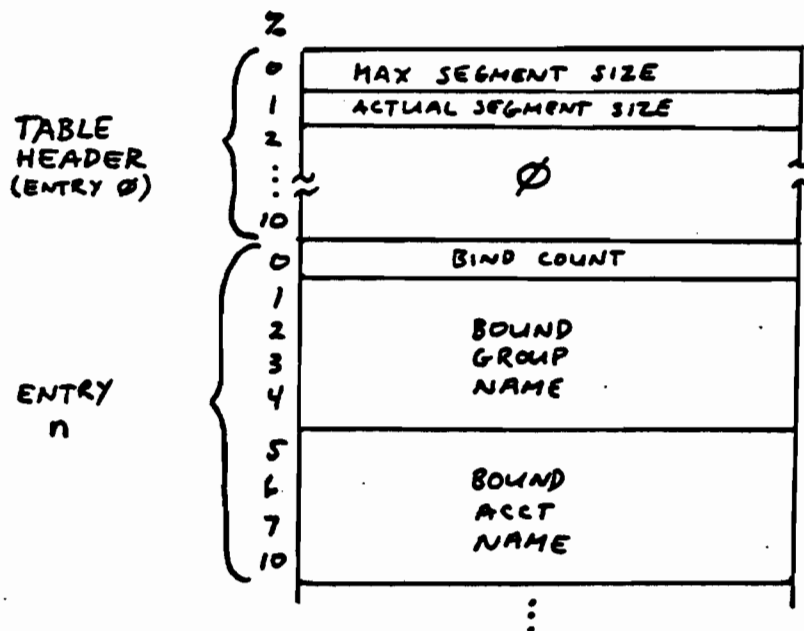


PRIVATE VOLUMES PVUSER (cont.)

* BOUND GROUP NAMES DATA SEGMENT -

CONTAINS LIST OF BOUND GROUPS FOR A USER.

* POINTED TO BY USER ENTRY OF PVUSER.



DISC LABELS

SECTOR Ø

%	SYSTEM VOLUME	#
0	CONTROL ORDER	0
1		1
2		2
3	READ ORDER	3
4		4
5	SIO JUMP ORDER	5
6		6
7	TYPE	12
8	SUB-TYPE	15
9	COLD LOAD ID	7
10	"3"	8
11	"Ø"	9
12	VOLUME NAME	10
13		11
14		12
15		13

DISC BOOTSTRAP
 SIO PROGRAM.
 (SYSTEM OR
 SERIAL DISC ONLY)

IF NON-SYSTEM
 VOLUME

SC = SCRATCH
VOLUME

MV = MASTER
VOLUME

SR = SERIAL
VOLUME = 1

%	SERIAL VOLUME	#
0	Ø (:STORE) OR SIO PROGRAM (:SYSDUMP)	0
1		1
2		2
3		3
4		4
5	SC MV SR	5
6		6
7	TYPE	12
8	SUB-TYPE	15
9	GENERATION INDEX	7
10	Ø	8
11	"S"	9
12		10
13		11
14		12
15	"C"	13

VOLUME NAME
 "SERDISC "

DISC LABELS (Cont.)

SECTOR 0

SC = SCRATCH
VOLUME
MV = MASTER
VOLUME = 0
SR = SERIAL
VOLUME

#	SLAVE VOLUME	#
0		0
1		1
2		2
3		3
4		4
5		5
6	SC MV SR TYPE SUB-TYPE	6
7	GENERATION INDEX	7
10		8
11		9
12		10
13	VOLUME NAME	11
14		12
15		13
16	INITIAL DATE	14
17		15
20		16
21		17
22	ACCT NAME	18
23		19
24		20
25		21
26	GROUP NAME	22
27		23
30		24
31		25
32	VOLUME SET NAME	26
33		27
34		28

DISC LABELS (Cont.)

SECTOR 0

SC = SCRATCH
VOLUME

MV = MASTER
VOLUME = 1

SR = SPECIAL
VOLUME

MASTER VOLUME									
0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

0 IF NOT
MASTER VOLUME

HEADER

VOLUME
ENTRY
0

VOLUME
ENTRY
7

VS VTAB

HEADER +
8 ENTRIES

COPIED FROM
VSAT DEFN IN
SYS. DIRECTORY

JIT - JOB INFORMATION TABLE

JIT DST IS WORD 6 IN PXCLOS

		1	1	1	1	1	1
		0\1:2:3\4:5:6\7:8:9\0:1:2\3:4:5					
0\	NOT USED - 0						6
1\	6 : JIT DST						1
2\	POINTER TO JOB INFO	8					2
3\	POINTER TO ACCT INFO	48					3
4\	POINTER TO RESERVED AREA	59					4
5\							5
6\	NOT USED						6
7\							7
10\		7					8
11\	TY : JOB NUMBER						9
12\	JITMAXP : JITMPN						10
13\	EOF: NOT USED						11
14\	NOT USED						12
15\	JITASEC						13
16\	JITGSEC						14
17\	GROUP SECURITY						15
20\							16
21\	JITHAN						17
22\	ACCOUNT NAME						18
23\							19
24\							20
25\	JITHGN						21
26\	HOMG GROUP						22
27\							23
30\							24
31\	JITLGN						25
32\	LOG-ON GROUP						26
33\							27
		0\1:2:3\4:5:6\7:8:9\0:1:2\3:4:5					
			1	1	1	1	1

TY - 1 = SESSION
2 = JOB

JITMAXP - MAXJOBPRJ CAPABILITY
JITMPN - JOB MAIN PIN.
JITEOF

JIT - CONTINUED

1 1 1 1 1 1
0\1:2:3\4:5:6\7:8:9\0:1:2\3:4:5

34\ \28
35\ JIUN \29
36\ USER NAME \30
37\ \31

40\ POINTER TO JITAIP 53 \32

41\ PNM: POINTER TO JITGIP 55 \33

42\ LATR \34

43\ LOCAL ATTRIBUTES \35

44\ PASSP \36

45\ PASSED FILE POINTER \37

46\ UCAP \38

47\ USER CAPABILITY \39

50\ \40

51\ NOT USED \41

52\ \42

53\ LOCAL WIN POINTER \43

54\ \44

55\ JIUN \45

56\ JOB NAME \46

57\ \47

+ +
0\1:2:3\4:5:6\7:8:9\0:1:2\3:4:5
1 1 1 1 1 1

P - GROUP'S HOME VOLUME IS
A PRIVATE VOLUME
M - PRIVATE VOLUME MOUNTED

JIT - CONTINUED

```

      1 1 1 1 1 1
0\1:2:3\4:5:6\7:8:9\0:1:2\3:4:5
\-----\
60\                                     3 \48
\-----\
61\ JITREC - # OF CREATIONS          \49
\-----\
62\          JITCPOC                  \50
63\          CPU MILLISECUNDS        \51
\-----\
64\  NOT USED      :      HIPRI      \52
\-----\
65\          JITAIP                    \53
66\                                     \54
\-----\
67\          JITGIP                    \55
70\          SYSTEM VOLUME SET        \56
\-----\
71\          JITGIP                    \57
72\  MOUNTED PRIVATE VOLUME SET      \58
\-----\
73\                                     1 \59
\-----\
74\                                     0 \60
\-----\
0\1:2:3\4:5:6\7:8:9\0:1:2\3:4:5
      1 1 1 1 1 1

```

ACCOUNTING INFO

HIPRI - HIGHEST JOB PRIORITY

Computer
Museum

DST ALLOCATION

OCTAL		DECIMAL	TABLE NAME
0		0	
1	CST	1	CST
2	DST	2	DST
3	PCB	3	PCB
4	CSTX	4	CSTX
5	SYSTEM GLOBAL AREA	5	SYS
6	CORE	6	CORE
7	ICS	7	ICS
10	SYSTEM BUFFERS	8	SBUF
11	UCOF REQUEST QUEUE	9	UCRG
12	PROCESS-PROCESS COMMUNICATION TABLE	10	PPCOM
13	I/O QUEUE	11	IOG
14	TERMINAL BUFFERS	12	TBUF
15	LOGICAL-PHYSICAL DEVICE TABLE	13	LPDT
16	LOGICAL DEVICE AND CLASS TABLE	14	LDT
17	DRIVER LINKAGE TABLE	15	DLT
20	I/O RESOURCE TABLES	16	BUSY, HEAD, TAIL
21	DISC FREE SPACE	17	
22	LOADER SEGMENT TABLE	18	
23	TIMEP REQUEST LIST	19	TRL
24	DIRECTORY	20	DOS
25	DIRECTORY SPACE	21	
26	RIN TABLE	22	

27	WORKING SET TABLE	23	WSTAB
30	JOB PROCESS COUNT	24	JPCNT
31	JOB MASTER TABLE	25	JMAT
32	TAPE LABEL TABLE	26	
33	*free*	27	
34	PEPLY INFORMATION TABLE	28	PJT
35	VOLUME TABLE	29	VTAB
36	BREAKPOINT TABLE	30	STOP
37	LOG BUFFER1	31	
40	LOG BUFFER2	32	
41	*free*	33	
42	*free*	34	
43	CST BLOCK	35	CSTBLK
44	JOB CUTOFF TABLE	36	JCUT
45	SYSTEM JIT	37	SJIT
46	MAN TABLE	38	MTAB
47	VIRTUAL DISC SPACE BIT MAP	39	VDSMAP
50	VIRTUAL DISC SPACE LOCATOR	40	VDSL
51	PANK TABLE	41	PANKTAB
52	ILT-DIT	42	ILTDIT
53	SJR TABLE	43	STR
54	FMAVT	44	FMAVT
55	INPUT DEVICE DIRECT	45	IDD
56	OUTPUT DEVICE DIRECT	46	ODD
57	WELCOME MESSAGE #1	47	LOGONDSTN1

60	WELCOME MESSAGE #2	48	LOGONDSTN2
61	CS DATA SEGMENT	49	CSTAB
62	PROCESS-JOB CROSS REFERENCE	50	PUXREF
63	SYSTEM JBT	51	SYSJBT
64	COMMAND LOGON DST	52	CILOGDST
65	MOUNTED VOLUME TABLE	53	MV TAB
66	PRIVATE VOLUMES USER TABLE	54	PVUSER

DISC COLD LOAD INFORMATION TABLE

0	pointer to table information	TABPTR
1	pointer to temporary CST info	TCSTPTR
2	# of entries to read on disc cold load	NREAD
3	# of code segments in INITIAL	NUMCST
4	INITIAL's DB value	INITDB
5	INITIAL's DL value	INITDL
6	INITIAL's Z value	INITZ
7	INITIAL's Q value	INITQ
8	INITIAL's S value	INITS
9	1 SYSDISC type 1 subtype	DISCTST
10	cold load ID	COLD'LOAD'ID
11	log file number	LOG'FILE'NUM
12	directory disc	DIRADR
13	address	
14	virtual memory	
15	disc address	VIRMEMADR
16	*free*	
17		
18	RIN table	
19	disc address	RINADR
20	directory size	DIRSECT
21	virtual memory size	VIRMEMSECT
22	message table size	MESSECT
23	RIN table size	RINSECT
24	# of RINS	RINS

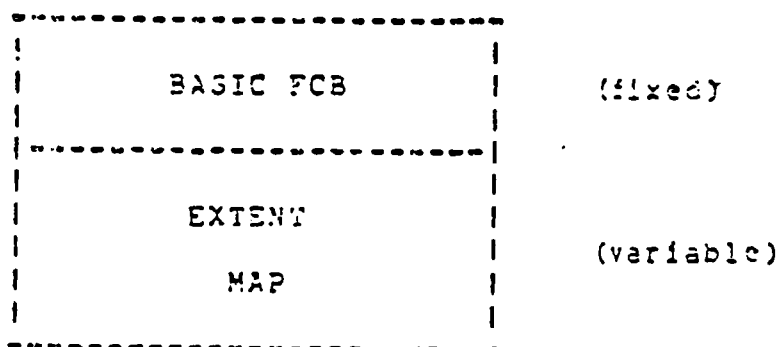
25	* of global RINS	GRINS
25	ITLIRLIRY	TL=Tape cold LOAD MODE load
27	HIGHEST VOL #	RL=Reload H*VOL/RY=recover
28	disc cold load entry point	DISCENTRY
29	system disc DRT number	SYSDISCDRT
30	Job Master Table	JMATLOC
31	Disc Address	
32	IDD Disc Address	IDDLOC
34	ODD Disc Address	ODDLOC
36	Welcome Message (DST 47 10)	LOGONLOC1
37	Disc Address	
38	Welcome Message (DST 48 10)	LOGONLOC2
39	Disc Address	
40	SIZ IN WORDS	
41	MEMORY ADDRESS	*DRIVER
42	DISC ADDRESS	TABLE
44	SIZE IN WORDS	
	MEMORY ADDRESS	*CTABO
	DISC ADDRESS	
48	SIZE IN WORDS	
	MEMORY ADDRESS	*CTAB
	DISC ADDRESS	

File Control Block (FCB)

The function of the FCB is to coordinate access to a file on a sharable device. At present the only sharable device is a disc. Hence the only files that have FCBs are disc files.

The information contained in an FCB is derived from the file label. The FCB is used to hold this information, rather than the file label, since it is quicker to access.

The overall structure of the FCB is:



The basic FCB has the following format:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
COMPLETE FCB SIZE															0
NEW FCB VECTOR															1
FOPTIONS															2
DEVICE SPECIFICATION															3
PREV. LOCK		DEVICE TYPE			1		DEVICE SUB-TYPE								4
NR. OPENS FOR OUTPUT						1		NR. OPENS FOR ANY MODE							5
CREATOR ACB VECTOR															6
RIN NUMBER															7
EXCLUSIVE STATUS															8
VC		MVTABX				VMASK									9
FILE LIMIT IN BLOCKS															10
															11
															12

VC: VOLUME CLASS FLAG

RESERVED FOR IMAGE			13
-----			14
END OF DATA POINTER			15
-----			16
NR. USER LABELS WRITTEN		NR. USER LABELS AVAILABLE	16
-----			17
EXTENT SIZE IN SECTORS			17
-----			18
BLOCKING FACTOR		SECTORS PER BLOCK	18
-----			19
SECTOR OFFSET TO DATA		PENDING FILE DISK. NR. EXTENTS - 1	19
-----			20
LAST EXTENT SIZE IN SECTORS			20
-----			21
		NR. OPENS INPUT MODE	21
-----			22
GROUP NAME - 1ST CHAR.		GROUP NAME - 2ND CHAR.	22
-----			23
GROUP NAME - 3RD CHAR.		GROUP NAME - 4TH CHAR.	23
-----			24
GROUP NAME - 5TH CHAR.		GROUP NAME - 6TH CHAR.	24
-----			25
GROUP NAME - 7TH CHAR.		GROUP NAME - 8TH CHAR.	25
-----			26
ACCOUNT NAME - 1ST CHAR.		ACCOUNT NAME - 2ND CHAR.	26
-----			27
ACCOUNT NAME - 3RD CHAR.		ACCOUNT NAME - 4TH CHAR.	27
-----			28
ACCOUNT NAME - 5TH CHAR.		ACCOUNT NAME - 6TH CHAR.	28
-----			29
ACCOUNT NAME - 7TH CHAR.		ACCOUNT NAME - 8TH CHAR.	29
-----			30
LOGICAL DEVICE NUMBER			30
-----			31
FIRST EXTENT SECTOR NUMBER			31

.			
.			
.			

LOGICAL DEVICE NUMBER			

LAST EXTENT SECTOR NUMBER			

In general the following identifiers are used when referring to an FCB.

```

DEFINE
FCBSIZE      = FCB.(2:14)*,      <<SIZE IN WORDS>>
FCBNEWFCBV   = FCB(1)*,         <<NEW FCB VECTOR>>

```


Table Formats - FLAB/

File Label (FLAB)

Some significant features of file labels are:

- * Since extents can be on different volumes the high byte of an extent descriptor contains a volume table index.
- * There can be up to 32 extents, longer.
- * Since the extents are constrained to a single logical device or to members of a single device class the device specification used at creation is recorded in the label.
- * The size of the last extent is not calculated each time; instead it is recorded in the label.

The file label has the following format:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
FILE NAME - 1ST CHAR.									FILE NAME - 2ND CHAR.						0
FILE NAME - 3RD CHAR.									FILE NAME - 4TH CHAR.						1
FILE NAME - 5TH CHAR.									FILE NAME - 6TH CHAR.						2
FILE NAME - 7TH CHAR.									FILE NAME - 8TH CHAR.						3
GROUP NAME - 1ST CHAR.									GROUP NAME - 2ND CHAR.						4
GROUP NAME - 3RD CHAR.									GROUP NAME - 4TH CHAR.						5
GROUP NAME - 5TH CHAR.									GROUP NAME - 6TH CHAR.						6
GROUP NAME - 7TH CHAR.									GROUP NAME - 8TH CHAR.						7
ACCOUNT NAME - 1ST CHAR.									ACCOUNT NAME - 2ND CHAR.						8
ACCOUNT NAME - 3RD CHAR.									ACCOUNT NAME - 4TH CHAR.						9
ACCOUNT NAME - 5TH CHAR.									ACCOUNT NAME - 6TH CHAR.						10
ACCOUNT NAME - 7TH CHAR.									ACCOUNT NAME - 8TH CHAR.						11
CREATOR NAME - 1ST CHAR.									CREATOR NAME - 2ND CHAR.						12
CREATOR NAME - 3RD CHAR.									CREATOR NAME - 4TH CHAR.						13
CREATOR NAME - 5TH CHAR.									CREATOR NAME - 6TH CHAR.						14

CREATOR NAME - 7TH CHAR.		1	CREATOR NAME - 8TH CHAR.		15					
LOCKWORD - 1ST CHAR.		1	LOCKWORD - 2ND CHAR.		16					
LOCKWORD - 3RD CHAR.		1	LOCKWORD - 4TH CHAR.		17					
LOCKWORD - 5TH CHAR.		1	LOCKWORD - 6TH CHAR.		18					
LOCKWORD - 7TH CHAR.		1	LOCKWORD - 8TH CHAR.		19					
SECURITY MATRIX					20					
					21					
					22					
CREATION DATE					23					
LAST ACCESS DATE					24					
LAST MODIFICATION DATE					25					
FILE CODE					26					
FCB VECTOR					27					
S	R	L	X	SUB-TYPE	1	DISC TYPE	1	R/W	28	
NR. USER LABELS WRITTEN					1	NR. USER LABELS AVAILABLE				29
FILE LIMIT IN BLOCKS					30					
					31					
					32					
VC					33					
MVTABX					34					
CHECKSUM					35					
COLD LOAD ID					36					
FOPTIONS					37					
RECORD SIZE IN BYTES					38					
BLOCK SIZE IN WORDS					39					
SECTOR OFFSET TO DATA					1	1	#EXTINT-1		40	
LAST EXTENT SIZE IN SECTORS					41					
EXTENT SIZE IN SECTORS					42					

VC = VOLUME CLASS FLAG

END OF DATA POINTER		42
		43

VOLUME TABLE INDEX	1	44

1ST EXTENT SECTOR NUMBER		45

:		
:		
:		

VOLUME TABLE INDEX	1	

LAST EXTENT SECTOR NUMBER		

:		
:		
:		

DEVICE NAME - 1ST CHAR.	1	DEVICE NAME - 2ND CHAR. 124

DEVICE NAME - 3RD CHAR.	1	DEVICE NAME - 4TH CHAR. 125

DEVICE NAME - 5TH CHAR.	1	DEVICE NAME - 6TH CHAR. 126

DEVICE NAME - 7TH CHAR.	1	DEVICE NAME - 8TH CHAR. 127

In general the following identifiers are used when referring to a file label:

```

DEFINE
FLLOCNAME      = FLAB#,          <<LOCAL FILE NAME>>
FLGRPNAME      = FLAB(4)#,       <<GROUP NAME>>
FLACCTNAME     = FLAB(8)#,       <<ACCOUNT NAME>>
FLUSERID       = FLAB(12)#,      <<CREATOR NAME>>
FLLOCKWORD     = FLAB(16)#,      <<LOCKWORD>>
FLSECMX        = FLABDBL(10)#,   <<SECURITY MATRIX>>
FLSECURE       = FLAB(22).(15:1)#, <<FILE SECURE BIT>>
FLCREATE       = FLAB(23)#,      <<CREATION DATE>>
FLLASTACC      = FLAB(24)#,      <<LAST ACCESS DATE>>
FLLASTMOD      = FLAB(25)#,      <<LAST MODIFICATION DATE>>
FLFILECODE     = FLAB(26)#,      <<FILE CODE>>
FLFCBVECT      = FLAB(27)#,      <<FCB VECTOR>>
FLLOCK         = FLAB(28)#,      <<LOCK BITS, ETC.>>
FLSTORE        = FLAB(28).(0:1)#, <<FILE BEING STORED>>
FLRESTORE      = FLAB(28).(1:1)#, <<FILE BEING RESTORED>>
FLLOAD         = FLAB(28).(2:1)#, <<FILE LOADED>>
FLEXCL         = FLAB(28).(3:1)#, <<EXCLUSIVE ACCESS>>
FLSR           = FLAB(28).(0:2)#, <<S & R BITS>>
FLSRL          = FLAB(28).(0:3)#, <<S, R & L BITS>>
FLSRLX         = FLAB(28).(0:4)#, <<S, R, L & X BITS>>
FLSUBTYPE      = FLAB(28).(4:4)#, <<DEVICE SUB-TYPE>>

```

CTAB0 (Memory Size Independent Configuration Values)

blank or shaded areas reserved for future use.

record 0 of CONFDATA file

0	MEMORY SIZE IN K WORDS	10
1	CORE SIZE INDEX	11
2	STANDARD STACK SIZE	12
3	HIGHEST DRT #	13
4	TERMINAL BOUND PRIORITY	14
5	NORMAL PRIORITY	15
6	CPU BOUND PRIORITY	16
7	# OF SECONDS TO LOG-ON	17
10	LOG FILE RECORD SIZE (SECTORS)	18
11	LOG FILE SIZE (RECORDS)	19
12	LOG FILE #	10
13	LOG BITS (ONLY 11 USED)	11
14		12
15	<<DEFINES WHAT IS BEING LOGGED>>	13
16		14
17		15
20	DEFAULT JOB/SESSION CPU TIME LIMIT	16
21	FILES DUMPED	17
22	HIGHEST LOGICAL DEVICE #	18
23	HIGHEST VOL # # OF VOLS	19
24	DEVICE CLASS TABLE SIZE	20
25	FIX LEVEL	21

LOGICAL PHYSICAL DEVICE TABLE (LPDT)

DST=315

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	1
0	V	I														
	IFLAG															
	DR	A	A	CY	DUP	INTR	EOF				BRK	LT	SUBTYPE			
	ISTATE	IJOBS	DATA	PV	SCR	RV						SD				

There is one two-word entry in the LPDT for each Logical Device. The base of the entry for a given Logical Device is equal to the Logical Device number multiplied by two. The physical device characteristics are maintained in the DIT and ILT.

- DITP - SYSDB relative pointer to the DIT.
- SUBTYPE - Type of device as specified in the MPE ERS.
- EOF - End of File condition
 - 0-No EOF
 - 1-HARDWARE EOF
 - 2-:DATA
 - 3-:EOD
 - 4-:HELLO
 - 5-:BYE
 - 6-:JOB
 - 7-:EOJ
- BREAK - Break detected or ignore break if main running
- CONTROL - Control Y is allowed and has been detected.
- DUPLIC - Duplicative
- INTERACT - Interactive
- AJOBS - Accepting Jobs or Sessions
- ADATA - Accepting Data
- DRSTATE - Device Recognition State
 - 0-Not owned
 - 1-Owned or recognized
 - 2-Service requested
 - 3-Service granted
- VFLAG - If set then a virtual device.
 - LT - Labeled tape
 - PV - Private Volume
 - SCR - Scratch Volume
 - RV - Reserved Volume (Serial)
 - SD - Serial Disc, loaded

Private <
Volumes

MESSAGE
SYSTEM

347			
350			
351			
352			
353	MEASUREMENT & TUNING		
354			
355			
356			
357			
360	MESSAGE LABEL		
361	OPHEAD		
362	OPPINX		
1363	(PVPROC PINX)	PVPROC PIN	
1364	(PVRECG CNT)	VOLUME RECOGNITION COUNT (DEVREC INTL)	
1365	(VMOUNT INFO)		[0] [1] [0]
366			
367			
370			
371	MSG CATALOG LDEV		
372	MSG CATALOG DISC ADDRESS		
373	MSG DSTN		
374	CONSHRLINE PLABEL		
375	CONSMRJE PLABEL		
376			
377	RESERVED FOR FUTURE EXPANSION		

<-used by M

<-chain old

discard

processes

VOLUME TABLE

R #22=26(8)

T #29=35(8)

zero entry																
word	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	# OF ENTRIES															
0	(NOT COUNTING ZERO)							ENTRY SIZE=16(8)								
1	COLD LOAD ID															
.	SYSVOLNUM															
15	////////////////////////////////////															

typical entry															
0															
1															
2	VOLUME NAME														
3															
4															
5															
6	GROUP NAME														
7															
10															
11															
12	ACCOUNT NAME														
13															
14	LOGICAL DEVICE # (=0 IF NOT MOUNTED)										U	N	S		
											N	S	C		
15	VOLUME INDEX					MYTAB INDEX									

indexed by
volume #

zeroes
for
system
volumes

UN = UNREPAIRABLE/
UNFORMATTED

NS = NON-SYSTEM
DOMAIN

SC = SCRATCH
VOLUME

IOCDPNS (PROGRAMATIC)

CARD RDR

* READS *
CARDS *
DISPLAYS

? 10 L 5
? 20 C 40
? 30 B
? 40 I
? 50 F 0
? 60 E
? 70 DA
? R (count) # of times you want to R

MAG TAPE

* WRITE ASCII *
TO TAPE *

? 10 L 7
? 20 C 4096
? 30 A "DATA" writes whatever is
in " "
? 40 F 1
? 50 E
? 60 DA
? 70 R (count)

* READS ASCII *
FROM TAPE *

? 10 L 7
? 20 C 4096
? 30 A
? 40 F 0
? 50 E
? 60 DA
? R (count)

IOCDPNØ

MAG TAPE :

* WRITES 1s
TO TAPES *

? L 7
? C 4096
? B (%177777), 4096
? F 1 (write)
? E (count) # of times you want to

LINE PRINTER :

* WRITES ASCII
STRING TO LP *

? L 6
? C 66
? A
? F 1
? E (count)

CARD RDR. :

* READ CARD
{ DISPLAY *

? L 5
? C 40
? B
? F Ø (read)
? E
? DA << TO DISPLAY WHAT WAS READ >>

FOR TIO :

? DRT (#)
? TIO or DD for display dit

TERMINAL :

* WRITES TO
TERMINAL *

? L 20
? C 40
? A
? F 1
? E (count)

TITLE	SECTION
INTRODUCTION	1
CODE	1
CST	1
LST	1
DATA	1
DST	1
DIRECTORY	2
DDS	2
DSDS	2
SYSTEM	2
XDD	2
FILE	3
ACB	4
FCR	4
FILE LABEL	4
FILE SEGMENT	4
FMAVT	4
USL	5
PROGPAM	6
SL	6,7
RL	7,8
LOW FIXED CORE	8
GENERAL LAYOUTS	8
MAIN MEMORY	8
DISC	8
BANKTABLE	8
MEMORY LINKS	8
WSTAB	9
MTAB	9
INITIAL	10
DRIVER TABLE	10
CTAB	10
CIARQ	10
DISC LABEL	10
DEFECTIVE TRACKS LABEL	10
DISC COLD LOAD INFO	10
INITIAL PROGPAM CST MAP	10
INPUT/OUTPUT	10
DRT	10
LPDT	10
LDT	10
ILT	10
DIT	10,11
IOO	11
DLT	12
TAPE LABELS TABLE	12
TRUF & SBUF	12
JOB TABLES	12
JMAT	12
JPCNT	12
JCUT	12

JIT	12
JDI	12
MISC	12
FLUT	13
BREAKPOINT	13
VTAB	13
DISC FREE SPACE	13
PROCESS	13
PCB	13
PCBX	13
PTOP COMMAND	13
ICS GLOBAL	13
STACK	13
RESOURCE	13
SIR	13
RIN	13
UCOP	13
REQUEST QUEUES	14
MAKE PRESENT	14
TRL	14
SYSTEM DB	14
SYSTEM MESSAGES	14
MESSAGE CATALOG	15
RIT	15
MESSAGE STORAGE AREA	15

MPE TABLES BOOK CROSS REFERENCE

MPE TABLE

PROGRAM FILE

RIN

RIT

RL

SIR

SL

STACK

SYS DB

SYSTEM

TBUF

TRL

UCOP

USL

VDD

VTAB

WSTAR (WORKING SET TABLE)

MAJOR TAB DIVISION

FILE

RESOURCE

SYSTEM MESSAGE

FILE

RESOURCE

FILE

PROCESS

SYSTEM DB

DIRECTORY

INPUT/OUTPUT

REQUEST QUEUES

REQUEST QUEUES

FILE

DIRECTORY

MISC. TABLES

GENERAL LAYOUTS

MPE TABLES BOOK CROSS REFERENCE

MPE TABLE

MAJOR TAB DIVISION

ACB	FILE
BANK TABLE	GENERAL LAYOUTS
BKPT	MISC. TABLES
CST	CODE
CSTX	CODE
CTAB	GENERAL LAYOUTS
CTABO	GENERAL LAYOUTS
DDS	DIRECTORY
DEFECTIVE TRACKS	GENERAL LAYOUTS
DISC	GENERAL LAYOUTS
DISC COLD LOAD INFORMATION	GENERAL LAYOUTS
DISC FREE SPACE TABLE	MISC. TABLES
DISC LABEL	GENERAL LAYOUTS
DIT	INPUT/OUTPUT
DLT	INPUT/OUTPUT
DRIVER TABLE	GENERAL LAYOUTS
DRT	INPUT/OUTPUT
DSDS	DIRECTORY
DST	DATA
DST ALLOCATION	DATA
FCB	FILE
FILE LABEL	FILE
FILE SEGMENT	FILE
FLUT	MISC. TABLES
ICS GLOBAL	PROCESS
ILT	INPUT/OUTPUT
INITIAL CST	GENERAL LAYOUTS
IOCO	GENERAL LAYOUTS
IOQ	INPUT/OUTPUT
JCUT	JOB TABLES
JDT	JOB TABLES
JIT	JOB TABLES
JMAT	JOB TABLES
JPCNT	JOB TABLES
LDT	INPUT/OUTPUT
LOCQ/OLSO	GENERAL LAYOUTS
LOW FIXED MEMORY	LOW FIXED MEMORY
LPDT	INPUT/OUTPUT
LST	CODE
MAIN MEMORY	GENERAL LAYOUTS
MAKE PRESENT	REQUEST QUEUES
MEMORY LINKS	GENERAL LAYOUTS
MESSAGE CATALOGUE	SYSTEM MESSAGE
MESSAGE STORAGE	SYSTEM MESSAGE
MRQ	GENERAL LAYOUTS
MTAB	GENERAL LAYOUTS
PCB	PROCESS
PCBX	PROCESS
PROCESS TO PROCESS COMMUNICATION TABLE	PROCESS

DEFINITION OF TERMS USED AND A COMMENT

- 1 .DFC Displacement from base of DST to base of CST.
DFC=(#CST-#DST).
- 2 .DFS Displacement from base of DST to first block
of assignable program entries. The CST entry
number for the start of each block is %300.

COMMENT

The relationship of the DST and CST in memory must be as shown. The DST will immediately precede the CST in memory. Immediately following the CST in main memory is the CST extension.

The value of DFC and DFS are stored when the system is loaded into the sysglob locations %32 and %33 respectively.

TABLE FORMAT-CSTBLK-

CSTBLK(0)	-----
0	*
* NUMBER OF ENTRIES IN TABLE	*
-----	-----
1	*
* ANY UNASSIGNED ENTRY = -1	*
-----	-----
2	*
* ANY ASSIGNED ENTRY > 0	*
-----	-----
* REMAINING CSIBLE TABLE ENTRIES	*
* -----	*

COMMENTS-

The table is initialized to minus one in each entry. When selected, the entry is replaced by a DS1-relative index into the CST extension block.

MEMORY MANAGEMENT TABLES

TABLE STRUCTURES DST AND CST

DST(0)	-----	
	* NUMBER OF ENTRIES IN DST *	

	* ENTRY SIZE *	

	* NUMBER OF UNASSIGNED ENTRIES *	

	* INDEX OF FIRST UNASSIGNED ENTRY *	

	* * * TABLE * * * * * *	
CST(0)	-----	
	* NUMBER OF ENTRIES IN CST *	:=DFC

	* ENTRY SIZE *	

	* NUMBER OF UNASSIGNED SL ENTRIES *	

	* INDEX OF FIRST UNASSIGNED SL ENTRY *	

	* * PERMANENT, PRE-ASSIGNED SYSTEM * ENTRIES * * * * * * *	

	* * DYNAMICALLY ASSIGNED SI ENTRIES * * * * * * * *	

	* 0 *	

	* 0 *	

	* NUMBER OF UNASSIGNED CST BLOCK ENTRIES *	

	* INDEX TO UNASSIGNED BLOCK ENTRY *	

	* * * CST EXTENSION BLOCK * * * * * *	:=DES

The following format is typical of a CST extension block entry.

ENTRY FORMAT-CST EXTENSION BLOCK-

```
CSTBLK(CIX)-----> ----- 0 * M=# OF CST'S IN
                        BLOCK *
                        -----
1 * VALIDITY=#125252 *
                        -----
2 * # OF USEPS SHARING BLOCK *
                        -----
3 * 0 *
                        -----
%301 -----> * HAS CST ENTRY FORMAT *
                        -----
%302 -----> * HAS CST ENTRY FOFMAT *
                        -----
                        .
                        .
                        -----
%300+M -----> * HAS CST ENTRY FORMAT *
```

COMMENT

The value of CIX is established when a CST extension block is allocated. This index into the array CSTBLK is maintained in the PCB of each process sharing the block.

ENTRY FORMAT-CODE SEGMENT TABLE-

1. PRESENT

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

* 0* M* R* 1*			LENGTH/4										*	0	

*			REFERENCE SHIFT COUNTER										*	1	

*CR*LR*LU*			* C* L* F* I* S* BN										*	2	

*			MEMORY ADDRESS										*	3	

2. ABSENT 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

* 1*	M*	R*	T*	LENGTH/4						*	0	

LK	LINK									*	1	

*	LDEV					*	*MI*IM*	S*	HODA		*	2

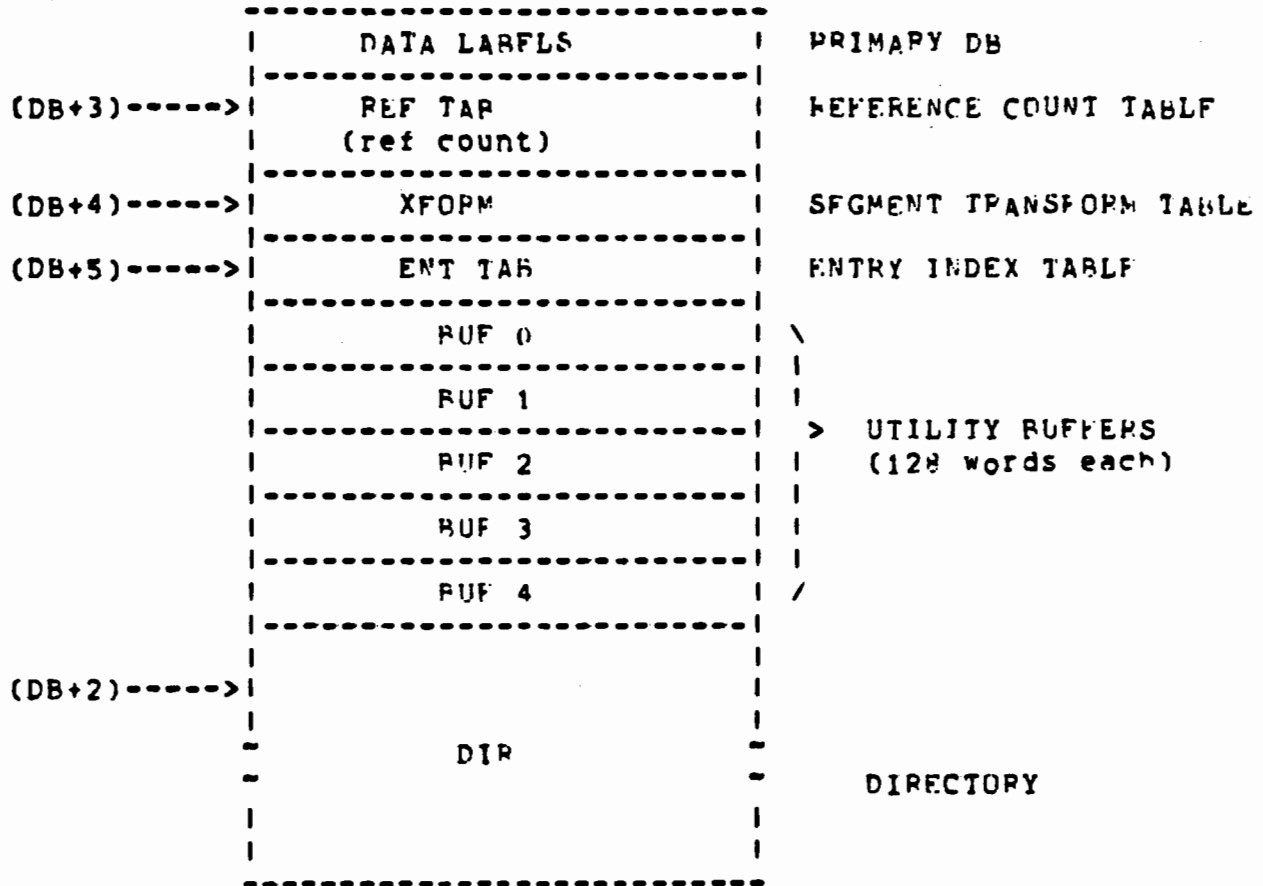
*	LOW ORDER DISK ADDRESS										*	3

DEFINITION OF TERMS USED

1. R SEGMENT REFERENCE BIT
2. M SEGMENT MODF BIT
3. T SEGMENT TRACE BIT
4. LDEV LOGICAL DEVICE NUMBER
5. F FREEZE BIT
6. C CORE RESIDENT BIT
7. L LOCK BIT
8. I I/O FREEZE BIT
9. S SYSTEM SEGMENT BIT
10. BN BANK NUMBER (BITS 14 & 15)
11. HODA HIGH ORDER DISK ADDRESS
12. CR CHANGE REQUEST BIT
13. IM=I "BUSY" SEMAPHORE
14. MI=F "REQUEST" SEMAPHORE
15. (LK, LINK)=(0, 0) THE SEGMENT IS ABSENT.
 =(0, > 0) THE SEGMENT IS LINKED INTO THE
 OVERLAY SELECTION QUEUE.
 =(1, >=0) THE SEGMENT IS BEING LOCKED. ANY
 INTERVENING REQUESTS WILL BE LINKED
 INTO THE LOCK REQUEST QUEUE.
16. LR =1 SEGMENT IS REQUIRED TO SATISFY A LOCK
 REQUEST. AREA WILL BE OVERLAYED.
17. LU USED IN CONJUNCTION WITH L. ZERO
 IMPLIES LOWER BOUND, ONE IMPLIES
 UPPER BOUND.

LOADER SEGMENT ALLOCATION

The order in which storage is allocated for arrays is arbitrary, with one exception: The storage for array DIR must be last in the data segment. This allows the data segment expansion/contraction intrinsics to be applied so that DIR storage may be dynamically allocated.



MPE LOADER

The split CST of the Series 11 requires a different approach to CST allocation. Segmented Library segments may only reside in the CST pointed to by location 0. Programs may reside in either CST. However, there is no point in putting program files in the library area as users share all or none of the program's segments.

The first area of the CST, pointed to by absolute 0, contains system and library segments. Its size is configurable but it may not contain more than 191 entries. This area is assigned CST numbers 1-#277. The second area is used for programs. The total number of entries in this area is not hardware limited. This area is allocated a block at a time with one program per block. A block may contain from 1 to 63 segments, which will be assigned CST entry numbers #301-#377. The maximum number of segments in a program file is 63 and segments of different programs will have the same CST number. Thus both a block number and a CST# are required to uniquely identify a program segment. A fallout of this is that logical segment=physical CST-#301.

The loader is now a system process which will do loads sequentially. If a process needs code to be loaded, it will get the load process' SIR, fill a communication data segment and then awake the loader. Upon completion, the loader will return its status through the communication data segment and then activate the waiting process.

27	-----	SS
	"	
30	-----	S1
	"	

LOADER SEGMENT TABLE PRIMARY DB

0	UTILITY INTEGER	S0
1	DIRECTORY LENGTH	DIRLEN
2	ENTPY TABLE POINTER	DIP
3	REFERENCE COUNT TABLE POINTER	REFCOUNT
4	CST TO LCST AND FLAG TABLE POINTER	XFORM
5	CST TO ENTPY INDEX TABLE POINTER	ENTTAB
6	SECONDARY ENTTAB POINTER	ENTP2
7	ENTRY POINTER	ENIP
10	SECONDARY ENTRY POINTER	FNIP1
11	SECOND RECORD DISC BUFFER POINTER	SBUF0
12	"	SBUF1
13	"	SBUF2
14	"	SBUF3
15	"	SBUF4
16	UTILITY INTEGER	SI
17	"	SJ
20	"	SK
21	"	SL
22	"	SM
23	"	SN
24	"	SP
25	"	SQ
26	"	SR

DIRECTORY

(DB + 2)



Accessed by entry key - contains variable length entries, each entry describing a set of CST numbers.

The directory is completely filled with variable length entries. The empty state is represented by a single garbage entry. It is accessed by a sequential search using a double word entry key, or by direct indexing using ENTAB.

The first word of each entry has the same format and includes an entry type number. In addition, most entries (all entries except type garbage) have an implicit double word entry key. Those entries that have an explicit single word key have an additional word that is implicitly 0. The entry key immediately follows the entry descriptor (first) word.

For file entries, the key is the double word sector number of the file label with the first byte of the double word replaced with the logical device number. For process entries, the key is the single word PIN with the first byte of the single word replaced with the extension number (LOADPROC id number).

REFERENCE COUNT TABLE

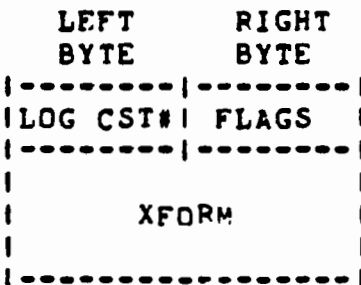
(DR + 3)



Indexed by CST number; contains the reference count for each code segment. Contains -1 if the CST entry is not allocated.

SEGMENT TRANSFORM TABLE

(DB + 4)



Indexed by CST number; contains the file-relative (logical) segment number and segment attributes.

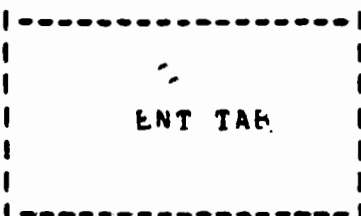
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SEG#								T	A	C	X	////////			

T-Segment type: System SL =0
 Public SL =1
 Group SL =2
 Program Seq =3

A-Perm.Allocated Segment (1/0)
 C-Core Resident Segment (1/0)
 X-System (MFE) Segment (1/0)

ENTRY INDEX TABLE

(DB + 5)



Indexed by CST number; contains the directory index of the file entry corresponding to the CST number.

SRUFO (DB + 9)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
0	F	I	N	I	Z	/	/	/	/	/	/	/	/	/	/	/	SFAGS
1	Number segments																SNRSEGS
2	Global area size																SGLOBALSIZE
3	PEC. NR. of global area																SGLOBALRECD
4	Rec. nr. of segment list																SSEGMENTRECD
5	Stack size																SSTACKSIZE
6	DL size																SLLSIZE
7	Max. data seq. size																SMAXDATA
10	Rec. nr. of entry point list																SENTRYRECD
11	Starting segment nr.																SSTARTINGSEG
12	Starting DB address																SSTARTINGADR
13	Starting address of STLT																SSASTLT
14	Starting address of FLUT																SSAFLUT
15	Rec. Nr. of external list																SEXTERNALRECD
16	Starting SST Nr.																SSTARTINGSST
17	Starting address of trapcom.																SSATRAPCOM

F = Fatal Error
N = Non-fatal Error
Z = Zero DB

ENTP

(DB + 7)



	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
0									A	LS	F	P				ET	
1																	ENWG,EFID*,EFID1
2																	EF102
3																	EWSP
4																	ECST
5																	ESHP
6																	ESEG

A = Program Allocated
 LS = Library Search
 F = File Mode
 P = Program Mode
 ET = Entry Type

*EPID

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

EFID1 = First word of file ID

.....

GARBAGE(0)

SL FILE(1)

Indicates which CSTs are being used for the segments of the SI file.

Program File Directory

Indicates which CST's
are being used for the
segments of the program
file and its internal

DEFINITIONS

NWG - #words in garbage entry.

FID - file ID.

word 1-(0:8)=log dev#

word 1-(8:16)=msb of disc address

word 2-=lsb of disc address

LIB - 0=SSL, 1=PSL, 2=GSL.

F - CST array format (0=list, 1=bit map)

-

M - executing mode. indicates whether the segments for the file
- have been copied onto the system disc (1=fast) or not (slow).

T - entry type

0	GARBAGE	self explanatory
1	SL	indicates which CST's are being used for segments of the file. Currently F=1 and M=0 for all SL entries.
2	PROGRAM	indicates which CST's are being used for segments of the file and all its externals. Currently M=0 for all program entries.
3	LOADING	indicates that a program file (FID) is being loaded on behalf of a process (PIN).
4	WAITING	indicates that a process (PIN) is waiting for a program file (FID) to be loaded.
5	LOADED	transformed entry of type 4 that is used to return status of load.
6	SHARER	indicates that a process (PIN) is currently running a program file (FID).
7	EXTENSION	indicates that a process (PIN) has LOADPPUCed a procedure (1<=EXT<=225).

P - program mode bit=0 (normal) everything that should be in priv is in priv mode and likewise for non-priv mode.
=1 (NOPPRIV) everything in non-priv mode.

2	LOAD MAP FLAG	TRUE IF LMAP PROVIDED
3	LDEV	\
4	DISC	LOAD MAP DISC FILE DISCRIPTOR
5	ADDRESS	/

DST ALLOCATION

OCTAL		DECIMAL	TABLE NAME
0	-----	0	
1	CST	1	CST
2	DST	2	DST
3	PCB	3	PCB
4	CSTX	4	CSTX
5	SYSTEM GLOBAL AREA	5	SYS
6	CORE	6	CORE
7	ICS	7	ICS
10	SYSTEM BUFFERS	8	SBUF
11	UCOF REQUEST QUEUE	9	UCRG
12	PROCESS-PROCESS COMMUNICATION TABLE	10	PPCOM
13	I/O QUEUE	11	IOQ
14	TERMINAL BUFFERS	12	TBUF
15	LOGICAL-PHYSICAL DEVICE TABLE	13	LPDT
16	LOGICAL DEVICE AND CLASS TABLE	14	LDT
17	DRIVER LINKAGE TABLE	15	DLT
20	I/O RESOURCE TABLES	16	BUSY, HEAD, TAIL
21	DISC FREE SPACE	17	
22	LOADER SEGMENT TABLE	18	
23	TIMER REQUEST LIST	19	TRL
24	DIRECTORY	20	DOS
25	DIRECTORY SPACE	21	
26	RIN TABLE	22	

TABLE STRUCTURES DST AND CST

DST (0)	-----	
	* NUMBER OF ENTRIES IN DST *	

	* ENTRY SIZE *	

	* NUMBER OF UNASSIGNED ENTRIES *	

	* INDEX OF FIRST UNASSIGNED ENTRY *	

	* *	
	* *	
	* TABLE *	
	* *	

CST(0)	-----	
	* NUMBER OF ENTRIES IN CST *	:=DFC

	* ENTRY SIZE *	

	* NUMBER OF UNASSIGNED SL ENTRIES *	

	* INDEX OF FIRST UNASSIGNED SL ENTRY *	

	* *	
	* PERMANENT, PRE-ASSIGNED SYSTEM *	
	* ENTRIES *	
	* *	

	* *	
	* DYNAMICALLY ASSIGNED SL ENTRIES *	
	* *	

	* *	
	* *	

	* NUMBER OF UNASSIGNED CSI BLOCK ENTRIES *	

	* INDEX TO UNASSIGNED BLOCK ENTRY *	

	* *	:=DFS
	* *	
	* CST EXTENSION BLOCK *	
	* *	

60	-----		
	WELCOME MESSAGE #2	48	LOGONDSTN2

61	CS DATA SEGMENT	49	CSTAB

62	PPROCESS-JOB	50	FJXREF
	CROSS REFERENCE		

63	SYSTEM JDT	51	SYSJDT

64	COMMAND LOGON DST	52	CILOGDST

17. LU

request. Area will be overlayed.
Used in conjunction with L. Zero implies
lower bound. One implies upper bound.

LOADER COMMUNICATION TABLE (LCT) SYSDB + 220

Form incoming to Loader

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
0	CMD		LIB		MI		LI		PROG		PIN						COMMAND	
1	LOGICAL DEVICE #								DISC								PROGRAM FILE	
2	ADDRESS																DESCRIPTOR	
3	# CHARS IN NAME																	
4																	CMD=loader	
5	PROCEDURE OR																command	
6																	LIB=library	
7	FILE NAME																scratch	
8																	0=SYS	
9																	1=PUB	
10																	2=GROUP	
11	WAITER PCB INDEX																M=NONPRIV MODE	
12	I R A I I A I P M I I M R I I D S I P H I																L=LOAD MAP REQ.	
13																		
14	GROUP																	
15	NAME																	
16																		
17																		
18	ACCOUNT																	
19	NAME																	
20																		

Form returned to WAITER

0	F.S. ERROR OR STARTING CST #															
1	LOAD PROCESS ERROR NUMBER															

27	WORKING SET TABLE	23	WSTAB
30	JOB PROCESS COUNT	24	JPCNT
31	JOB MASTER TABLE	25	JMAT
32	VIRTUAL DEVICE DIRECTORY	26	VDD
33	MESSAGE CATALOG	27	
34	REPLY INFORMATION TABLE	28	RIT
35	VOLUME TABLE	29	VTAB
36	BREAKPOINT TABLE	30	STOP
37	LOG BUFFER1	31	
40	LOG BUFFER2	32	
41	PREEMPTIVE MESSAGES	33	
42	STANDARD MESSAGES	34	
43	CST BLOCK	35	CSTBLK
44	JOB CUTOFF TABLE	36	JCUT
45	SYSTEM JIT	37	SJIT
46	MAM TABLE	38	MTAB
47	VIRTUAL DISC SPACE RIT MAP	39	VDSMAP
50	VIRTUAL DISC SPACE LOCATOR	40	VDSL
51	PANK TABLE	41	PANKTAB
52	ILT-DIT	42	ILTDIT
53	SJR TABLE	43	STR
54	FMAVT	44	FMAVT
55	INPUT DEVICE DIRECT	45	IDD
56	OUTPUT DEVICE DIRECT	46	ODD
57	WELCOME MESSAGE #1	47	LOGONDSTN1

ENTRY FORMAT-DATA SEGMENT TABLE -

1. Present

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

* O*CL* R*		LENGTH/4										* 0				

*		REFERENCE SHIFT COUNTER										* 1				

*CR*LR*LU*		EXDRC		* C*		L* F*		I* S*		BN		* 2				

*		MEMORY ADDRESS										* 3				

2. Absent

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

* 1*CL* R*		LENGTH/4										* 0				

LK		LINK										* 1				

*		LDEV(=SYSDISK_*		*MI*IM*		S*		HODA		* 2						

*		LOW ORDER DISK ADDRESS										* 3				

DEFINITION OF TERMS USED

1. R Segment reference bit
2. IM=1 "Busy" semaphore
3. EXDBC Exchange DR counter
4. F Freeze bit
5. C Core resident bit
6. L Lock bit
7. I I/O freeze bit
8. S System segment bit
9. BN Bank number (bits 14 & 15)
10. HODA High order disk address
11. CP Change request bit
12. MI=1 "Request" semaphore
13. LDEV Logical device no. of sys disk
14. CL =0 Segment is dirty
=1 Segment is clean
15. (LK, LINK)=(0, 0) The segment is absent.
Overlay selection queue.
=(1, >=0) The segment is being locked. Any
intervening requests will be linked
into the lock request queue.
16. LR =1 Segment is required to satisfy a lock

SYSFEBSIZE
SYSMAXBSIZE

File entry block size (sectors)
Maximum of above. (used to initialize DDS.)

*These values are used once for the creation of the (root) system,
account index or new systems. This root index is always at address
DIRBASE+3.

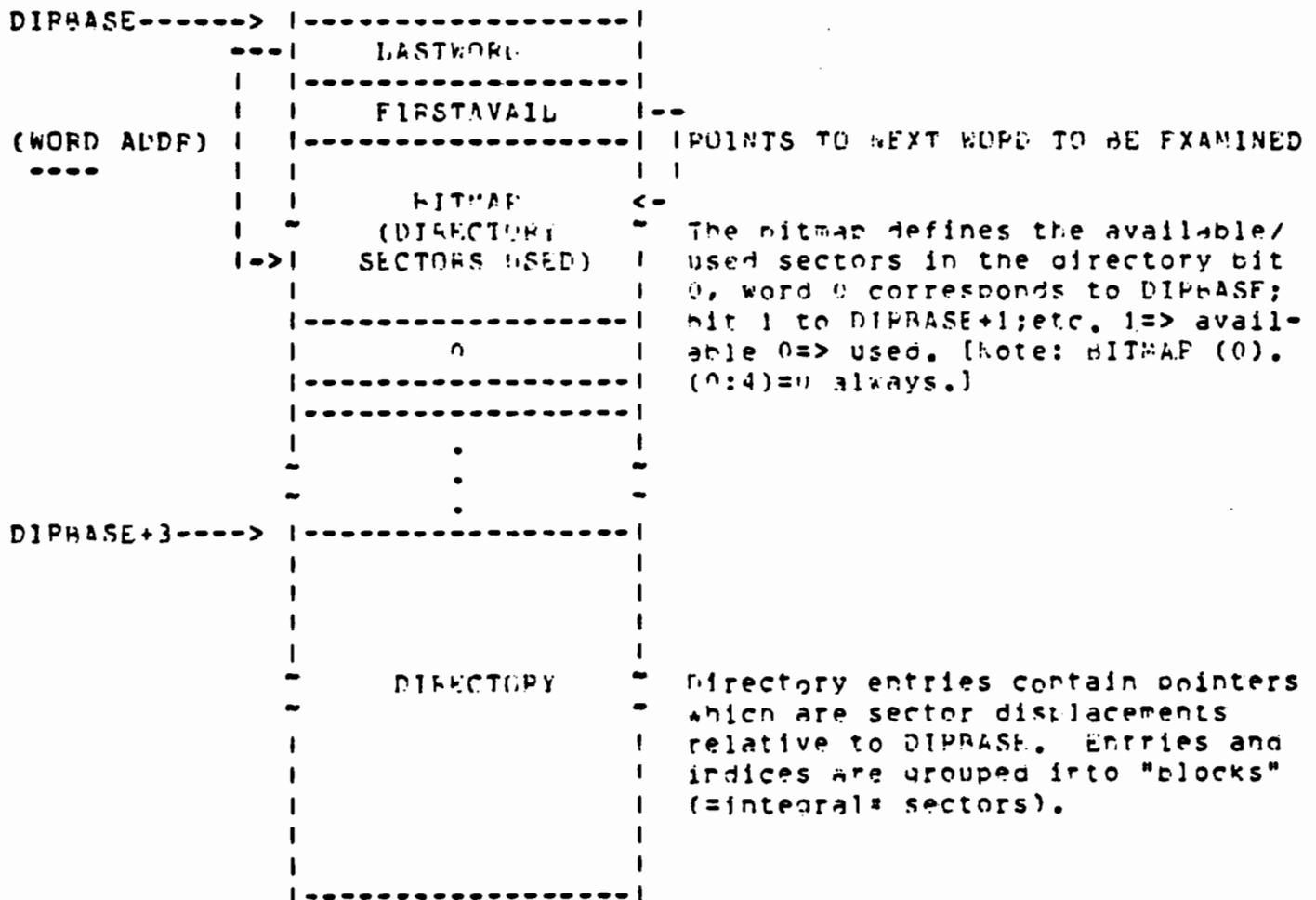
DIRECTORY

Directory on disc consists of a contiguous area

SYSGLUB cells:

DIRIOADDR<-----[DISKDEV:SYSGLUB+62(10)]

DIRBASE<-----absolute disk addr of base [SYSGLUB+%130 AND %131]



The capacities for accounts/groups/users/files are dependent on their block sizes, described in the directory data segment.

- * SYSSAHSIZE System acct index block size (sectors)
- * SYSAUISIZE Acct. user index block size (sectors)
- * SYSAGISIZE Acct. group index block size (sectors)
- * SYSGFHSIZE Group file index block size (sectors)
- * SYSAERSIZE Acct. entry block size (sectors)
- * SYSUERSIZE User entry block size (sectors)
- * SYSGERSIZE Group entry block size (sectors)

FEB=2	FILE ENTRY BLK SIZE	191
DDSB*SIZE=3	MAX.SIZE DIRECTORY BLOCK	192
DDSB*SIZE=1600	DDSP*SIZE*128	193
	DISTRIBUTION	194
GOODPERCENT=.85	-	-
303	FACTOR	195
304	BASE	196
305		197
	DA AREA	DDSR*SIZE

	WORK AREA	
	(SIZE OF LARGEST ENTPY)	MAX

1141		609
	DB AREA	DDSB*SIZE

DIIRECTORY DATA SEGMENT

0	-----	0
.		.
.		.
.		.
.		.
.		.
177	-----	127
200	ADJUST (DB-DL)	128
201	XTYPE (INPUT PARM)	129
202	XINDEXP (FINAL INDEX PRT)	130
203	XANAME (DB REL ADDR)	131
204	XGNAME (DB REL ADDR)	132
205	XFNAMF (DB REL ADDR)	133
206	XASEC (ACCT SEC)	134
207		135
210	XGSEC (GF SEC)	136
211	SIPPETURE (FROM GETSIP)	137
212-237	DIRECTORY POINTER "A"	138-150 \
240-265	DIRECTORY POINTER "B"	160-181 /
266	DIRECTORY	182
267	DISC ADDRESS	183
SYSSAIBSIZE=3	SYS.ACCT.INDEX BLK SIZE	184
AU1=1	ACCT.USER INDEX BLK SIZE	185
AGI=1	ACCT.GRP INDEX BLK SIZE	186
GFI=2	GPP FILE INDEX BLK SIZE	187
AEB=3	ACCT ENTRY BLK SIZE	188
UEB=2	USER ENTRY BLK SIZE	189
GEB=2	GPP ENTRY BLK SIZE	190

> SEE Directory
Pointer Area

.....

10

SIR=2

10



FIRSTAVAIL

BITMAF

The bitmap defines the available/used sectors in the directory. Bit 0 word 0 corresponds to DIPBASE; bit 1 word 0 to DIPBASE+1 etc. 1=>available 0=>used. [NOTE: bitmap(0).(0:4)=0 always.]

DST=20(10)
STR=8

DIRECTORY POINTER AREA (DA OR DP)			

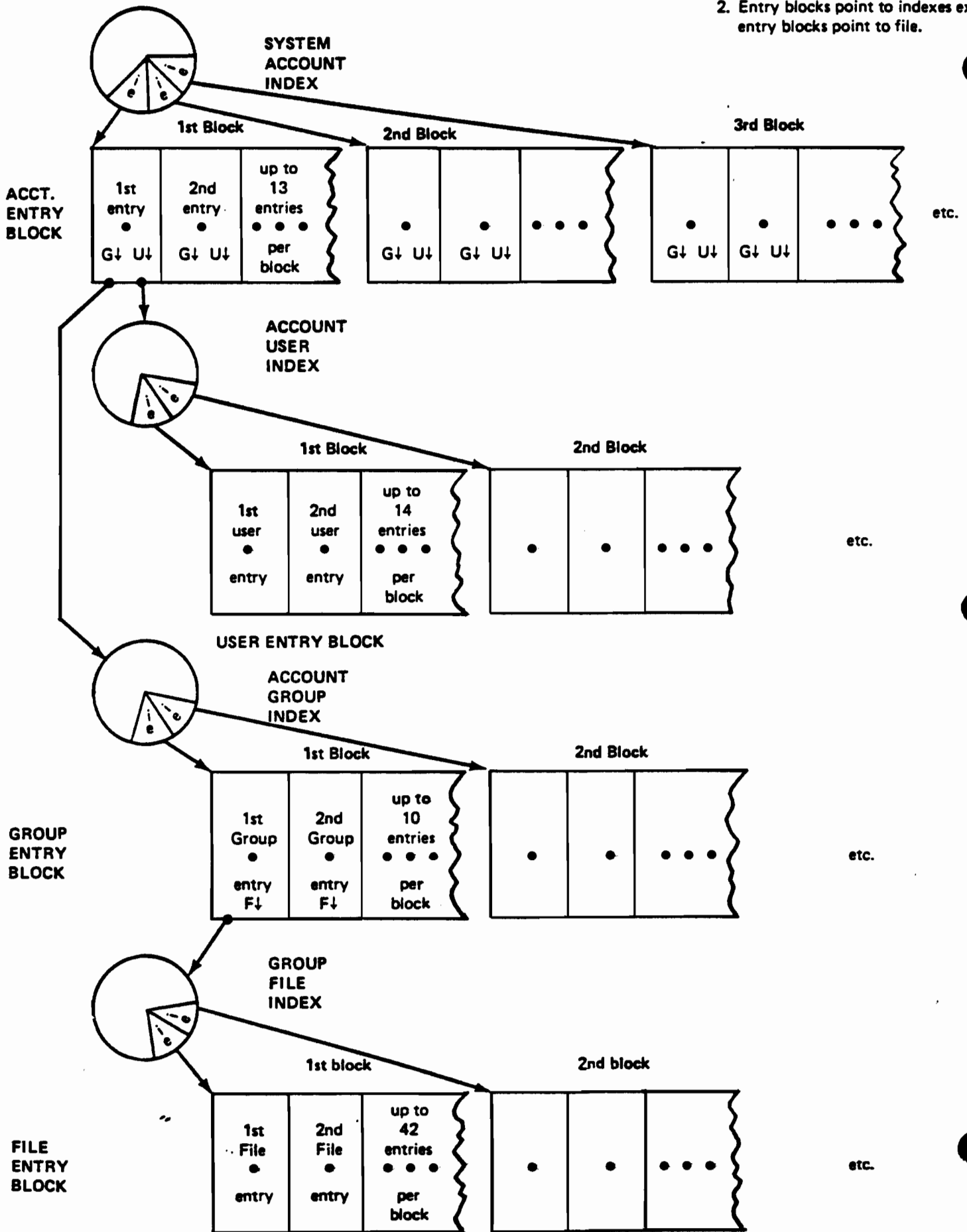
+	-----	134/	
	DIRECTORY PAGE IN BUFFER	160	CONTENTS
	-----	139/	
	OR ADDRESS OF 1ST ELEMENT	161	LPNTR
	-----	140/	
	STARTING ADDRESS OF BUFFER	162	IOPNTR
	-----	141/	
	* VALID PAGES IN BUFFER	163	NUMVALID
	-----	142/	
	DIRTY FLAG	164	DIRTY
	-----	143/	
	ELEMENT SIZE	165	XSIZE
	-----	144/	
	* WORDS USED IN BLOCK	166	USED
	-----	145/	
	BLOCK SIZE (SECTORS)	167	BFSIZE
	-----	146/	
	BLOCK SIZE (WORDS)	168	BWSIZE
	-----	147/	
	MAX * ELEMENTS/BLOCK	169	BFACTOR
	-----	148/	
	I/IPI TYELEMENT SIZE BLOCK SIZE	170	MISCWD
	I I I I I (WORDS) I (SECTORS)		
	-----	149/	
	NUMBER OF ELEMENTS	171	XCOUNT
- \	-----	150/	
*	NUMBER OF ACCESSORS	172	PCOUNT
	-----	151/	
	ENTRY TOTAL	173	ETOTAL
	-----	152/	
	I/IPI TYENTRY SIZE BLOCK SIZE	174	EMISCWD
	I I I I I (WORDS) I (SECTORS)		
	-----	153/	
	FATHER INDEX POINTER	175	PINDEXP
	-----	154/	
	F	176	+INDEXES OR ENTRIES-*INDEXES 0
	-----	155/	
	T N	177	PNAME
	-----	156/	
	H A	178	
	F V		
	-----	157/	
	P E	179	
	-----	158/	
	////////////////////	180	
	-----	159/	
- \	////////////////////	181	

TY = 0-FILE
1-GROUP
2-ACCT
3-USER
F = PURGE FLAG
I = 0-ENTRY BLOCK
1-INDEX BLOCK

DETAILED DIRECTORY STRUCTURE

1. Indexes point to entry blocks.

2. Entry blocks point to indexes except file entry blocks point to file.

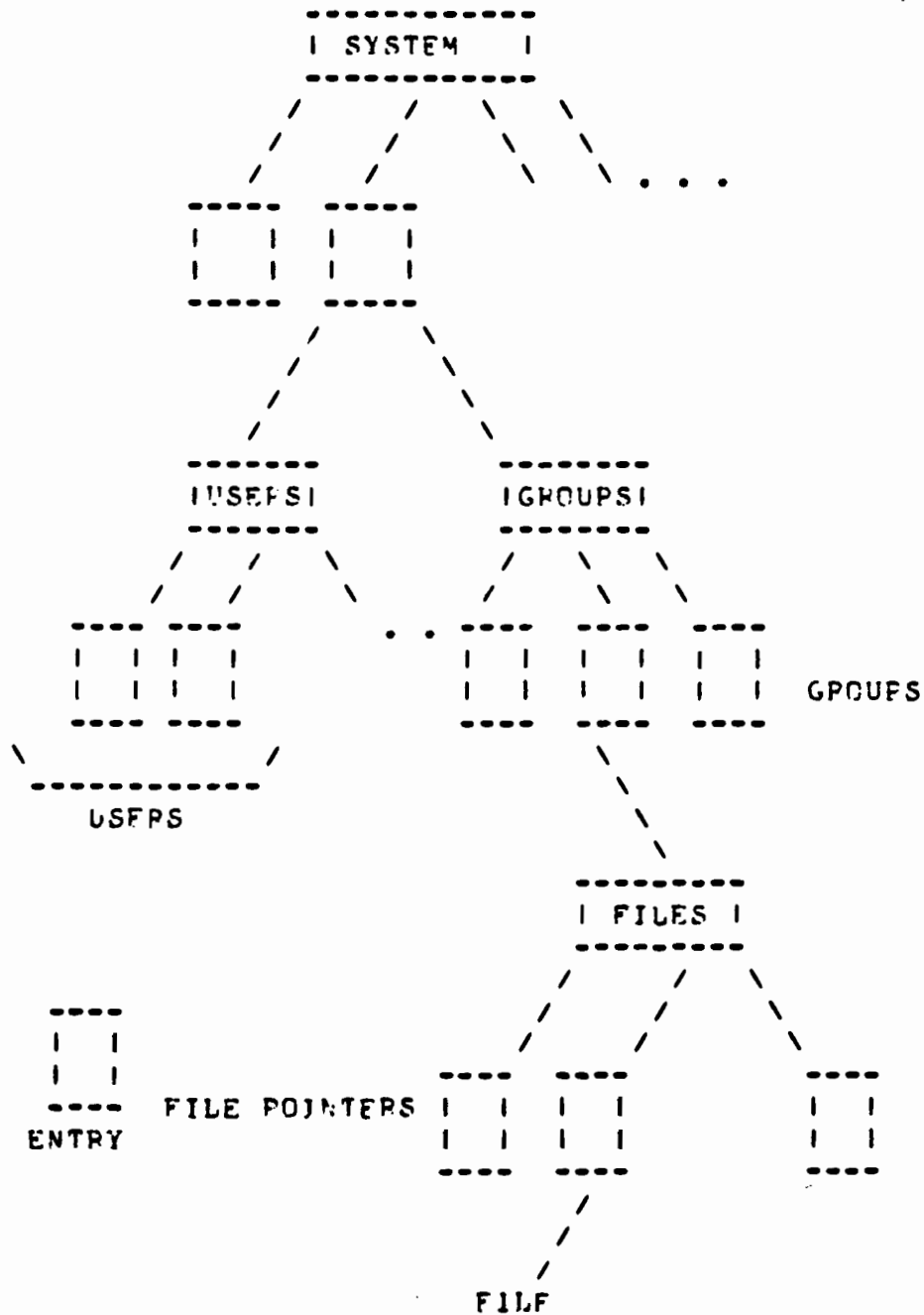


ie = index entry

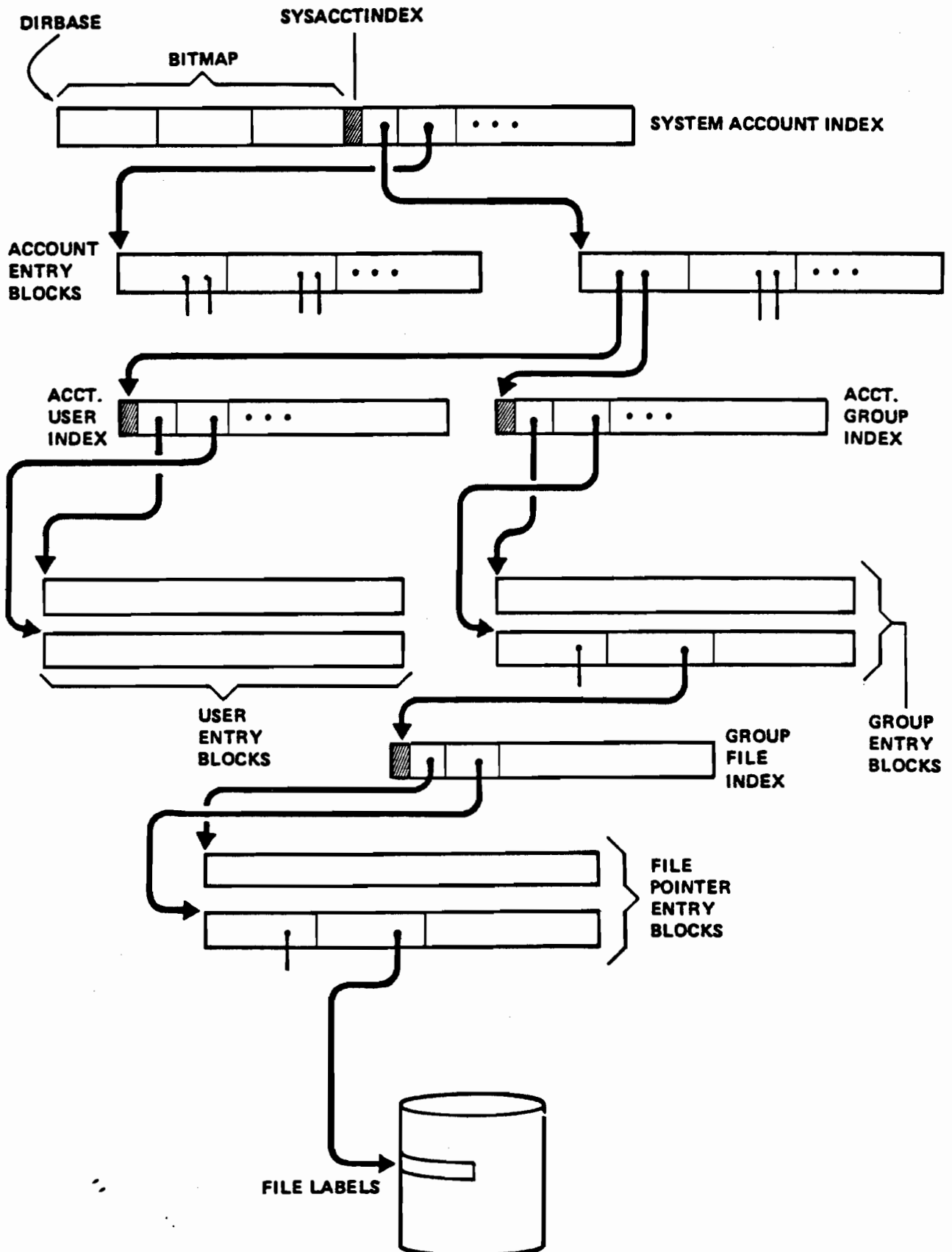
OVERVIEW OF DIRECTORY -----

OVERVIEW OF DIRECTORY

ACCOUNTS



DIRECTORY STRUCTURE



[illegible]

.....

*The count is incremented by each access that uses and relies upon a pointer to the index block, ie, it is guaranteed not to be purged while the count is not = 0.

DIRECTORY DEFINITIONS

- >PAGE - smallest allocatable record ("phys.recd")-currently sector.
- >BLOCK - integral# of pp. contains contiguous indices or entries.
- >INDEX - pointer to entry block, containing name of 1st entry.
- >ENTRY - information-containing "object" may contain pointer to an index block.
- >POINTER - 15-bit positive relative page number (relative to directory base).
- >DDS - directory data segment.
- >ELEMENT - a generic name for index or entry.

ACCOUNT ENTRY (29 WORDS)

0		10	
1		11	ACCT.NAME
2	ANAME	12	
3		13	
4	AGIPNTR	14	ACCT.GROUP INDEX POINTER
5	AUIPNTR	15	ACCT.USER INDEX POINTER
6			
7	ACAP	17	CAPABILITY
10		18	
11	ALATTR	19	LOCAL ATTRIBUTES
12		110	PASSWORD
13		111	
14	APASS	112	
15		113	
16		114	
17	ADFSCOUNT	115	DISC FILE SPACE COUNT (SECTORS)
20		116	
21	ADFSLIMIT	117	DISC FILE SPACE LIMIT (SECTORS)
22		118	
23	ACPUCOUNT	119	CPU TIME COUNT (SECONDS)
24		120	
25	ACPULIMIT	121	CPU TIME LIMIT (SECONDS)
26		122	
27	ACONTIMECOUNT	123	CONNECT TIME COUNT (MINUTES)

INDEX ENTRY (6 WORDS)

1E1STNAME	10	1st NAME OF ENTRY BLOCK
	11	
	12	
	13	
1EPNTR	14	POINTER TO ENTRY BLOCK
1ECOUNT	15	NUMBER OF ENTRIES IN e BLOCK

GROUP ENTRY (25 WORDS)

0		10	GROUP NAME
1		11	
2	GNAME	12	
3		13	
4	GFIPNTR	14	GROUP FILE INDEX POINTER
5		15	
6		16	PASSWORD
7	GPASS	17	
10		18	
11	GDFSCOUNT	19	DISC FILE SPACE COUNT (SECTORS)
12		110	
13	GDFSLIMIT	111	DISC FILE SPACE LIMIT (SECTORS)
14		112	
15	GCPUCOUNT	113	CPU TIME COUNT (SECONDS)
16		114	
17	GCPULIMIT	115	CPU TIME LIMIT (SECONDS)
20		116	
21	GCONTIMECOUNT	117	CONNECT TIME COUNT (MINUTES)
22		118	
23	GCONTIMELIMIT	119	CONNECT TIME LIMIT (MINUTES)
24		120	
25	*PI	121	GROUP SECURITY (SEE BELOW)---
26	GSEC		*P = PURGE FLAG
27	GCAPABILITY	123	GROUP CAPABILITY

FILE ENTRY (FILE POINTER)(6 WORDS)

-----		10	FILE NAME
FNAME		11	
		12	
		13	
		14	

FVOLPNTN		14	VOLUME TABLE INDEX/

FLABELPNTR		15	FILE LABEL POINTER

30|////////////////////|24
|-----|

	P	///	P	P	P	R	P	A	A	A	A	A	W	W	W	W																				
25		///	I	A	N	Y	I	A	C	I	A	L	I	G	U	I	G	L	I	A	N	Y	I	A	C	I	A	L	I	G	U		21			
	W	L	L	L	L	L	X	X	X	X	X	S	S	S	S	S																				
26	G	L	I	A	N	Y	I	A	C	I	A	L	I	G	U	I	G	L	I	A	N	Y	I	A	C	I	A	L	I	G	U	I	G	L		22

USER ATTRIBUTES/CAPABILITY

FILE-ACCESS ATTRIBUTES < / NON-SHARABLE DEVICES-----
 \ SAVE---
 COMMUNICATIONS-----

```

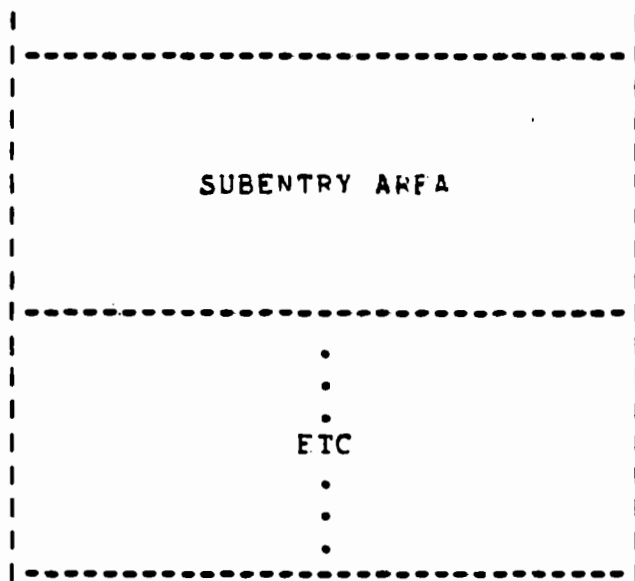
-----SYSTEM MGR \
| -----ACCOUNT MGR | USEP
| | -----ACCOUNT LIBRN >ATTRI-
| | | -----GROUP LIBRN | BUTES
| | | | -----DIAGNOSTICIAN |
| | | | | --SYSTEM SUPVSR /
| | | | |
| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
|SMIAMIALIGLIDIOP|//|//|//|//|//|//|//|//|//|CS|SFIND|
|-----|-----|-----|-----|-----|-----|-----|-----|
  
```

```

      0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
|-----|-----|-----|-----|-----|-----|-----|-----|
|//|//|//|//|//|//|//|//|//|//|//|//|//|//|//|
|-----|-----|-----|-----|-----|-----|-----|-----|
\SPACE 2
/ batch access (9)-| | |
|interactive access (8)---| |
ACCESS | privileged mode (7)-----|
TO <
GENERAL | multiple RINS (4)-----|
RESOURCES|extra data segment (2)-----|
\ process handling (1)-----|
  
```


USER ENTRY (19 WORDS)

0		10	USER NAME
1		11	
2	UNAME	12	
3		13	
4		14	CAPABILITY
5	UCAP	15	
6		16	LOCAL ATTRIBUTES
7	ULATTR		
10		18	PASSWORD
11		19	
12	UPASS	110	
13		111	
14		112	HOME GROUP (MAY BE NULL)
15		113	
16	UHGROUP	114	
17		115	
20	ULOGCOUNT	116	LOGON COUNT (#OF USERS LOGGED ON)
21	*PI/////////1 JOBPRI	117	MAX.JOB PRIORITY
22	NOT USED	118	*P = FORGE FLAG



INPUT DEVICE DIRECTORY/OUTPUT DEVICE DIPECTORY

IDD/ONDD



26	NUMBER OF EXTENTS	I	LDEV	122
27	LAST EXTENT SIZE			123
30	///I//IRST FI SI/////I		NUMCOPIES	124
31	LINK POINT			125
32	NUMBER OF IMAGES			126
33				127
34	TIME MADE READY			128
35				129

ST-STATE OF ENTRY

0=ACTIVE
1=READY
2=OPENED
3=IGNORE

C-DEVICE IS A CLASS INDEX TO DEVICE
CLASS TABLE

TY-JOB TYPE

0=SESSION* (SPOOK)
1=SESSION
2=JOB
3=JOB* (SPOOK)

TF-1=THERE EXISTS FORMS

DA-1=:DATA CREATED INPUT FILE

HEADX-INDEX OF HEAD ENTRY FOR
THIS CHAIN OF SUBENTRIES

RS-1=RESTART IS REQUESTED IF WARM-
START WAS NECESSARY

F-1=NON-STANDARD FORM CONTROL
ON DEVICE

S-1=FAILURE DURING ALLOCATION
OF NEW EXTENT

NOTE 1 - SPOOLFILE EXTENSION
OR LABEL EXTENSION

XDD (1DD/0DD) SUBENTRY FORMAT

EACH DDN SYSTEM
 DDN NAME
 DDN NUMBER

--->BIT RESERVED FOR TAPE LABELS

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	IST		OUTPP1				CI									
1	TY						JNUMBER									
2																
3																
4																
5																
6																
7																
10																
11																
12																
13																
14																
15																
16																
17																
20																
21																
22																
23	TFIDAI	/	/	/	/	/	/	/	/	/	/	/	/	/	/	
24																
25																

When a control block table is created the initial control block area is completely allocated by a single control block of type garbage. When space is requested for a new control block the control block area is scanned (using a first fit algorithm) for a garbage control block that is as large as the size requested. The space for the new control block is taken from this garbage control block and the space remaining becomes the new garbage control block size.

When space is returned it becomes a new garbage control block. To prevent fragmentation the new garbage control block is combined with either of the two neighboring control blocks if they are of type garbage.

If space is requested and no garbage control block is large enough to contain the new control block then the control block area and control block table is expanded by a sufficient amount.

Access Control Block (ACB)

In order to implement multi-access the ACB had to be cleaved into two parts: the Physical ACB (PACB) and the Logical ACB (LACB).

The PACB is a skeleton ACB and holds information that is global to all accessors of the file. The LACB holds information that is local to each accessor of the file.

The unique ACB for each accessor is constructed by overlaying the common PACB with the information contained in the individual LACB. Thus, for a multi-access file, there is exactly one PACB for all accessors and one LACB for each accessor.

The term ACB is temporal and is applied to a PACB only when it has been overlayed with the appropriate LACB. If the file is not multi-access then the ACB is the same as the PACB (an LACB does not exist).

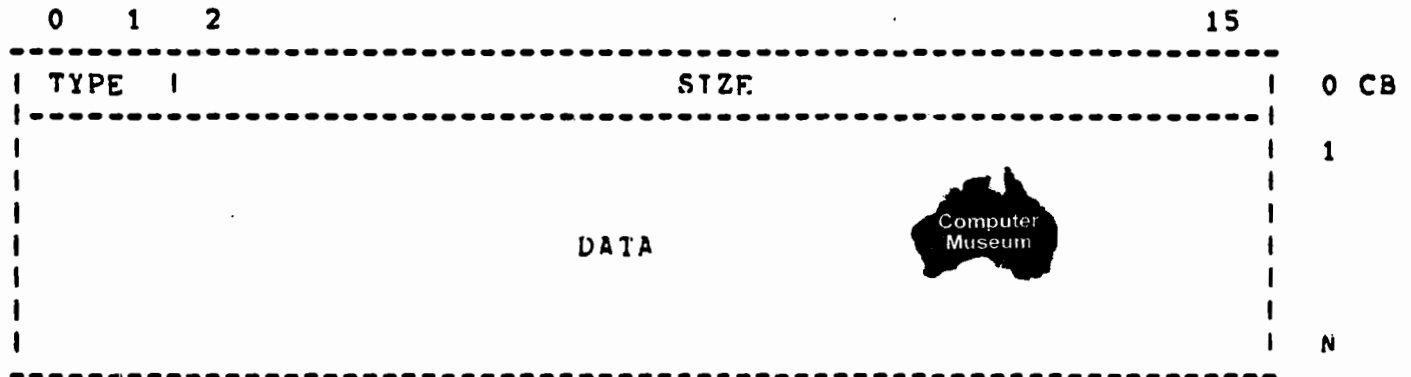
The different forms of control blocks can be distinguished by the following:

WORD 0.(0:2) = 0 FREE BLOCK
 = 1 FILE CONTROL BLOCK
 = 2 PHYSICAL ACCESS CONTROL BLOCK
 = 3 LOGICAL ACCESS CONTROL BLOCK

Control Block Area

The part of the PXFILE labeled CONTROL BLOCK AREA contains the control blocks used by the file system.

All control blocks have the same overall structure:



where $N = \text{SIZE} - 1$. Since all control blocks have a common structure this facilitates storage management within the control block table.

In general the following identifiers are used when referring to this part of a control block table:

```

DEFINE
CBDESCRIP      = CB#,          <<CONTROL BLOCK DESCRIPTOR>>
CBTYPE         = CB.(0:2)*,    <<CONTROL BLOCK TYPE NR.>>
CBSIZE         = CB.(2:14)*;   <<CONTROL BLOCK SIZE>>
  
```

The following is an alphabetized list of the above identifiers along with a discussion of their meaning.

CBDESCRIP This is the first word of a control block; the format is common for all control blocks.

CBSIZE This is the size (in words) of the control block. The size includes the descriptor word.

CBTYPE This is the type number of the control block. At present there are only four types of control blocks:

- 0 - GARRAGE
- 1 - FCB
- 2 - PACB
- 3 - LACB

In general the following identifiers are used when referring to a LACB:

DEFINE		
LACBSIZE	= LACB.(2:14)*,	<<SIZE IN WORDS>>
LACBPACB	= LACB(1)*,	<<PACB VECTOR>>
LACBFNUM	= LACB(2)*,	<<FILE NUMBER>>
LACBFOPTIONS	= LACB(3)*,	<<FOPTIONS>>
LACBAOPTIONS	= LACB(4)*,	<<AOPTIONS>>
LACBSTATE	= LACB(5)*,	<<STATE FLAGS>>
LACBCTL	= LACB(6)*,	<<CONTROL WORD>>
LACBMODE	= LACB(7)*,	<<MODE SETTING>>
LACBERPOR	= LACB(8)*,	<<EPPOR CODE>>
LACBTLOG	= LACB(9)*,	<<LAST I/O TLOG>>
LACBNAME1	= LACB(10)*,	<<FILE NAME>>
LACBNAME2	= LACB(11)*,	<<FILE NAME>>
LACBNAME3	= LACB(12)*,	<<FILE NAME>>
LACBNAME4	= LACB(13)*,	<<FILE NAME>>
LACBRSIZE	= LACB(14)*,	<<RECORD SIZE - POS. BYTES>>
LACBRSIZE	= LACB(15)*;	<<BLOCK SIZE - POS. WORDS>>

Logical Access Control Block (LACB)

The LACB is unique to the Series II. Its function is to support the multi-access.

Under multi-access each accessor shares a single ACP. However each accessor is permitted to view the shared file in a slightly different manner than the other accessors. For example one accessor may access the file in a read only mode while the other accessors may access the file in a read/write mode. This necessitates that each accessor must have a slightly different ACB.

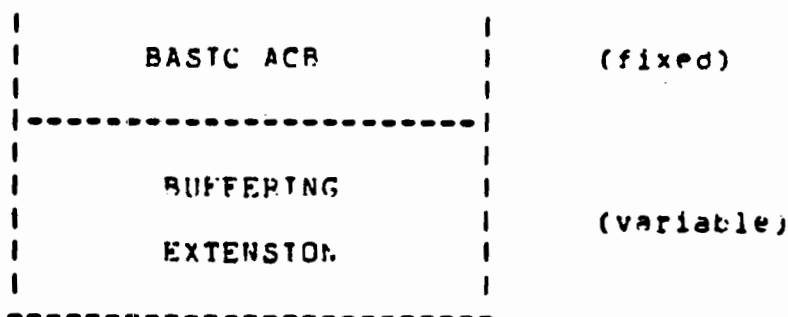
The LACB is used to hold the fields of the common ACB that are unique to each accessor. When an accessor locks the common ACB, the LACB is used to overlay the ACB with the data that is unique to that accessor; this is done within the intrinsic LOCACB. Similarly, when an accessor unlocks the common ACB, the LACB is updated since some of the fields may have been modified due to the access; this is done within the intrinsic UNLOCACB.

All LACBs have the same overall structure:

0	1	2	7	8	15
3	1			16	0
PACB VECTOR					1
FILE NUMBER					2
FOPTIONS					3
AOPTIONS					4
STATE FLAGS					5
CONTROL WORD					6
MODE FLAGS					7
ERROR NUMBER					8
LAST I/O TRANSMISSION LOG					9
FILE NAME - 1ST CHAR.		1	FILE NAME - 2ND CHAR.		10
FILE NAME - 3RD CHAR.		1	FILE NAME - 4TH CHAR.		11
FILE NAME - 5TH CHAR.		1	FILE NAME - 6TH CHAR.		12
FILE NAME - 7TH CHAR.		1	FILE NAME - 8TH CHAR.		13
RECORD SIZE (POSITIVE BYTES)					14

S I B I	DEVICE TYPE	I	LAST LOGICAL I/O STATUS	11
RECORD SIZE IN BYTES				12
BLOCK SIZE IN WORDS				13
FCB VECTOR				14
I B I N I P				15
CARRIAGE CONTROL CODE				16
ACCESS BIT MAP	I	LOGICAL DEVICE NUMBER		17
VOLUME TABLE INDEX				18
FOPTIONS				19
LAST I/O TRANSMISSION LOG				20
NAME TYPE	I	FILE DISPOSITION		21
MODE SETTING	I	BLOCKING FACTOR		22
CURRENT VARIABLE BLOCK NUMBER				23
FILE NAME - 1ST CHAR.				24
FILE NAME - 2ND CHAR.				25
FILE NAME - 3RD CHAR.				26
FILE NAME - 4TH CHAR.				27
FILE NAME - 5TH CHAR.				28
FILE NAME - 6TH CHAR.				29
FILE NAME - 7TH CHAR.				30
FILE NAME - 8TH CHAR.				31
TERMINAL STOP CHARACTER	I A I M I B I H I	SEOFs I	EOFS	32
LAST NO-WAIT I/O FILE POINTER				33
NR. INPUT LACB'S	I	TOTAL NR. LACB'S		34
FMAVT INDEX				35
XDD INDEX				36
S I M I	I	VIRTUAL LOGICAL DEVICE NR.		37

.....



The buffering extension is optional; it is present if and only if the file is accessed with buffering. The buffering extension has two formats: one for ACB buffers and the other for system buffers. As a result there are exactly three possible formats for an ACB:

1. No buffers; the buffering extension is not present.
2. ACR buffers; the buffering extension is present and the buffers are in an extension of the PACH to form a physically contiguous PACH as shown above.
3. System buffers; the buffering extension is present and the buffers are in the system buffers to form a logically contiguous PACH as shown above.

The basic ACB (or NOBUF ACB) has the following format:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	1	COMPLETE ACH SIZE													0
FILE NUMBER				1											1
RECORD TRANSFER COUNT															2
BLOCK TRANSFER COUNT															3
FILE POINTER															4
1 E 4 P 1 L 1 S 1 F 1 T 1 B 1 E 1 C 1 D 1 F O F T 1 E D F M 1															5
OPTIONS															6
ERROR CODE															7

ACBDISP	= ACB(22).(8:8)*,	<<FILE DISPOSITION>>
ACBMODE	= ACB(23).(0:8)*,	<<MODE FLAGS>>
ACBTAPERROR	= ACB(23).(4:1)*,	<<REPORT RECOVERED TAPE ERRORS>>
ACBINHIBITCRLF	= ACB(23).(5:1)*,	<<INHIBIT TERMINAL CR/LF>>
ACBQUIESCE	= ACB(23).(6:1)*,	<<CRITICAL OUTPUT VERIFICATION>>
ACBBLKFACT	= ACB(23).(8:8)*,	<<BLOCKING FACTOR>>
ACBBLK	= ACBDEL(12)*,	<<CURRENT VARIABLE BLOCK NR.>>
ACBNAME	= ACB(26)*,	<<LOCAL FILE NAME>>
ACBSTOPCHAR	= ACB(30).(0:8)*,	<<TERMINAL STOP CHARACTER>>
ACBNOWAITEOF	= ACB(30).(8:1)*,	<<EOF ADVANCED FLAG>>
ACBNOWAITMODE	= ACB(30).(9:1)*,	<<LAST NO-WAIT I/O MODE>>
ACBABORTREAD	= ACB(30).(10:1)*,	<<ABORT BROKEN RE-READ FLAG>>
ACBHIT	= ACB(30).(11:1)*,	<<BUFFER HIT FLAG>>
ACBSAVEEOFs	= ACB(30).(12:2)*,	<<EOF SAVING ACBEOFs>>
ACBEOFs	= ACB(30).(14:2)*,	<<EOF FLAGS>>
ACBTEMP2	= ACB(31)*,	<<TEMP CELL>>
ACBNOWAITFPTP	= ACBDHL(16)*,	<<LAST NO-WAIT FPTP>>

ACBSHCNTS	= ACB(34)*,	<<IACH COUNTS>>
ACBSHCNTIN	= ACB(34).(0:8)*,	<<NR. INPUT LACB'S>>
ACBSHCNT	= ACB(34).(8:8)*,	<<NP. LACB'S>>
ACBFMAVTX	= ACB(35)*,	<<FMAVT INDEX>>
ACBSPXDDX	= ACB(36)*,	<<XDD INDEX>>
ACBSPool	= ACB(37).(0:1)*,	<<SPOOLFD DEVICE FLAG>>
ACBSPoolIO	= ACB(37).(0:2)*,	<<SPOOLED IN/OUT>>
ACBSPVDEV	= ACB(37).(8:8)*,	<<SPOOLED VIRTUAL DEVICE>>
ACBSFFOPT	= ACB(38)*,	<<SPOOLED DEVICE FUPTIONS>>
ACBSFAOPT	= ACB(39)*,	<<SPOOLED DEVICE ADOPTIONS>>
ACBSFTYPE	= ACB(40)*,	<<SPOOLED DEVICE TYPE/RECSIZE>>
ACBSPTYPE	= ACB(40).(0:6)*,	<<SPOOLED DEVICE TYPE>>
ACBSPREC	= ACB(40).(6:10)*,	<<SPOOLED DEVICE RECSIZE>>
ACBXXXX	= ACB(41)*,	<<TEMP CELL>>

ACBHIBLK	= ACBDEL(21)*,	<<HIGHEST BLOCK STARTED>>
ACBCURRBUF	= ACB(44).(4:4)*,	<<CURRENT BUFFER NR.>>
ACBNUMBUFS	= ACB(44).(12:4)*,	<<NP. OF BUFFERS LESS 1>>
ACBBUFSIZE	= ACB(45)*,	<<BUFFER SIZE>>
ACBRECPIR	= ACB(46)*,	<<RECORD BYTE POINTER>>
ACBBUFUSFD	= ACB(47)*,	<<USED BLOCK BYTE COUNT>>
ACBBUFDISP	= ACB(48)*,	<<BUFFER BYTE DISPLACEMENT>>
ACBBUFPool	= ACB(49)*,	<<FIRST BLOCK BUFFER>>

ACBBOT	= ACBGSTATE.(13:1)*,	<<BEGINNING OF MAG. TAPE>>
ACBNEWEOF	= ACBGSTATE.(14:1)*,	<<NEW EOF NEEDED - M.T. ONLY>>
ACBPPIV	= ACBGSTATE.(15:1)*,	<<PPRIVILEGED FILE>>

ACBEOF	= ACBLSTATE.(1:1)*,	<<END OF FILE SENSED>>
ACBLPCTL	= ACBLSTATE.(2:2)*,	<<PAGE AND LINE CONTROL>>
ACBPAGFCTL	= ACBLSTATE.(2:1)*,	<<PAGE CONTROL>>
ACBLINECTL	= ACBLSTATE.(3:1)*,	<<LINE CONTROL>>
ACBSTREAM	= ACBLSTATE.(4:1)*,	<<STREAM I/O>>
ACBFKEYS	= ACBLSTATE.(5:1)*,	<<RESTORE FUNCTION KEYS>>
ACBXMITCRLF	= ACBLSTATE.(6:1)*,	<<TRANSMIT CR,LF TO USER>>
ACBTBLOCK	= ACBLSTATE.(7:1)*,	<<DISABLE BLOCK MODE>>

SPOOLED DEVICE OPTIONS	38
SPOOLED DEVICE OPTIONS	39
SPOOLED DEVICE TYPE SPOOLED DEVICE RECORD SIZE	40
	41
HIGHEST BLOCK NUMBER STARTED	42
	43
CURRENT BUFFER NR. BUFFERS	44
BUFFER SIZE	45
CURRENT RECORD BYTE POINTER	46
CURRENT RECORD LOGICAL BYTE INDEX	47
CURRENT BUFFER BYTE DISPLACEMENT	48

In general the following identifiers are used when referring to an ACF:

```

DEFINE
ACBSIZE      = ACR(12:14)*,    <<SIZE IN WORDS>>
ACBFNUM      = ACR(1).(0:6)*,  <<FILE NUMBER>>
ACBRTRFCT    = ACRDHL(1)*,    <<RECORD TRANSFER COUNT>>
ACBRTRFCT    = ACRDHL(2)*,    <<BLOCK TRANSFER COUNT>>
ACRFBPT      = ACRDHL(3)*,    <<RECORD POINTER>>
ACRHLSTATE   = ACR(8)*,       <<LOCAL STATE FLAGS>>
ACBAOPTIONS  = ACR(9)*,       <<OPTIONS>>
ACBERROF     = ACR(10)*,      <<ERROR CODE>>
ACRSYSBUF    = ACR(11).(0:1)*, <<SYSTEM BUFFER FLAG>>
ACBBREAK     = ACR(11).(1:1)*, <<BREAK MODE FLAG>>
ACRDTYPE     = ACR(11).(2:6)*, <<DEVICE TYPE>>
ACRACCCL     = ACR(11).(2:3)*, <<DEVICE ACCESS CLASS>>
ACRSUBCL     = ACR(11).(5:3)*, <<DEVICE SUB-CLASS>>
ACBSTATUS    = ACR(11).(8:8)*, <<LAST I/O STATUS>>
ACRQSTATUS   = ACR(11).(8:5)*, <<QUALIFYING STATUS PART>>
ACRGSTATUS   = ACR(11).(13:3)*, <<GENERAL STATUS PART>>
ACBPSIZE     = ACR(12)*,      <<RECORD SIZE - BYTES>>
ACRBSIZE     = ACR(13)*,      <<BLOCK SIZE - WORDS>>
ACBFCH       = ACR(14)*,      <<FCH VECTOR>>
ACBGSTATE    = ACR(15)*,      <<GLOBAL STATE FLAGS>>
ACRTEMP1     = ACR(16)*,      <<TEMP CELL>>
ACBCTL       = ACR(17)*,      <<CARRIAGE CONTROL CODE>>
ACRACCESS    = ACR(18).(0:6)*, <<ACCESS BIT MAP>>
ACBDADDR     = ACR(18).(8:8)*, <<LOGICAL DEVICE NR.>>
ACRVADDR     = ACR(19)*,      <<VOLUME TABLE INDEX>>
ACRFOPTIONS  = ACR(20)*,      <<FOPTIONS>>
ACBITLOG     = ACR(21)*,      <<LAST I/O TRANSMISSION LOG>>
ACBDNTYPE    = ACR(22).(0:6)*, <<NAME TYPE FOR DIRECTORY>>

```

ACBBLKFACT

This is the blocking factor for the file. It is the number of records in a block. Legal values range from 1 to 255.

ACBBOT

This flag is used to indicate the position of a mag tape. If not set then the tape is not on the load point; if set then the tape is at the load point. Note that this flag is applicable only to mag tape files.

ACBBREAK

This is the break mode flag. It is applicable iff the ACB is the one for sSTDIN/sSTDLIST. If set it means that the BREAK key has been hit and that the CI should have high priority access to the ACB. The flag will be cleared when a RESUME or ABORT is issued.

ACBBSIZE

This is the block size, in words, of the file.

ACBBTFRCT

This is the total number of blocks transferred to and from the file. The initial value is 00.

ACBBUFDISP

This is the physical byte displacement, relative to the base of the buffer, corresponding to ACBRECPTP. If ACB buffers are used then the value is the same as ACBPUFUSED. If system buffers are used the value will range from 0 to 255 and is the displacement corresponding to ACBRECPTP from the base of the physical system buffer. It is needed because system buffers are discontinuous; otherwise it could be calculated from ACBRECPTP. Note that this is applicable iff the file access is buffered.

ACBPUFSIZE

This is the size, in words, of the complete block buffer. This includes the block buffer control block, which is 9 words long. If system buffers are used then the value is 9; otherwise ACB buffers are used and the value is the block size plus 9. Note that this is applicable iff the file access is buffered.

ACBPUFUSED

This is the logical byte index, relative to the base of the buffer, corresponding to ACBRECPTP. Note that the value will be the same regardless as to whether ACB or system buffers are used. It is needed because system buffers are discontinuous; otherwise it could be calculated from ACBRECPTP. Note that this is applicable iff the file access is buffered.

ACBBINARYIO = ACBLSTATE.(8:1)*, <<EIGHT BIT TERM. TRANSFERS>>
 ACBCARRIAGE = ACBLSTATE.(9:1)*, <<CARRIAGE CONTROL FLAG>>
 ACBDEFBLOCK = ACBLSTATE.(10:1)*, <<DEFAULT BLOCKING>>
 ACBREADCODE = ACBLSTATE.(11:4)*, <<INPUT EOF CHECK>>
 ACBREADTYPE = ACBLSTATE.(11:2)*, <<INPUT EOF TYPE>>
 ACBREADMODE = ACBLSTATE.(13:2)*, <<INPUT EOF MODE>>

The following is an alphabetized list of the above identifiers along with a discussion of their meaning:

ACBABORTREAD

This flag is used to abort a broken terminal re-read. The flag is set via the ABOPT parameter to FUNBREAK. If the flag is set then the READ PENDING message will be aborted along with the re-read. This feature is needed to handle the BREAK...:ABOPT, etc. situation.

ACBACCCL

This is the access class part of the device type number. The following are the legal values:

0 - direct (e.g. disc) 1 - serial input (e.g. card reader) 2 -
 parallel input/output (e.g. terminal) 3 - serial input/output (e.g.
 mag tape) 4 - serial output (e.g. line printer)

ACBACCESS

This is the access bit map for the file. The following is the bit definitions of this eight-bit field:

(0:1) - undefined
 (1:1) - undefined
 (2:1) - read
 (3:1) - append
 (4:1) - write
 (5:1) - lock (6:1) - execute (7:1) - save

This access security is determined by the ACCCHECK intrinsic and enforced by the file system.

ACBAOPTIONS

This is the AOPTIONS in effect for this file access.

ACBBINARYIO

This bit controls full eight bit transfers on the 2644 page mode terminal. This bit is adjusted by FCONTROL(26) and FCONTROL(27).

ACBBLK

This is the block number of the current variable record format block. Note that this is applicable iff the record format is variable.

- 0 - moving head disc
- 1 - fixed head disc
- 8 - card reader
- 9 - paper tape reader
- 16 - terminal
- 20 - card reader/interpreter/punch
- 22 - SSLC
- 23 - programmable controller
- 24 - magnetic tape
- 32 - line printer
- 33 - card punch
- 34 - paper tape punch
- 35 - CALCOMP 500 plotter
- 36 - CALCOMP 600 plotter
- 37 - CALCOMP 700 plotter

ACBEOF This bit is set when EOF has been sensed.

ACBEOFS

This is the type of EOF detected on SSTDIN(X). This field consists of two bits:

- (0:1) - super colon (i.e. EOF for SSTDINX)
- (1:1) - regular colon (i.e. EOF for SSTDIN)

Note that this is applicable for multi-access to SSTDIN(X) only.

ACBERROW

This is the error number for the file. It is used by all intrinsics except FOPEN. When an error is detected the error number is placed in this cell. The error number should not be explicitly cleared; instead it persists until it is overlaid by the next error number.

ACBFCE

This is the FCB vector for the file. Note that this is applicable iff the file is a disc file.

ACHFKEYS

This bit controls the definition of the f1 and f2 function keys on the 2644 page mode terminal. This bit is adjusted by FCONTROL(32) and FCONTROL(33).

ACBFNUM

This is the file number, the range of which is from 1 to 255. This number is used by the file system as an entry index into the AFT so that the ACH may be located.

ACBFOPTIONS

ACBCARRIAGE

This bit signifies that the file has carriage control. I think it is redundant; ACBFUNCTIONS already has a carriage control bit.

ACBCTL

This is the CONTROL parameter from the last FWRITE. Note that this value is pertinent iff the file was opened with carriage control.

ACBCURPRUF

This is the buffer number (0-relative) containing the most recently referenced record. Note that this is applicable iff the file access is buffered.

ACBDADDR

This is the logical device number of the file. In the case of a disc file this is the logical device number of the first extent.

ACBDEFBLOCK

This bit signifies that the file is to be accessed with default blocking. The bit is initialized from the FOPEN stateword STATE. It does not need to be in the ACB; it is mentioned here only to signify that the bit is effectively used due to the way ACBLSTATE is initialized from STATE.

ACBDISP

This is the file close disposition derived from the FOPEN call. Note that the only way this can be specified is via a file equation. The legal values are the same as those for FCLOSE.

ACBDNTYPE

This is the file reference format type number and is derived from the FOPEN call. The following are the legal values:

- 0 - full name
- 1 - account name absent
- 2 - group and account name absent
- 3 - null name

This information is needed by FPENAME.

ACBDTYPE

This is the device type number of the file. The following are the legal values:

This is the line control bit. If not set then each line is post-spaced; if set then each line is pre-spaced. This is used line printers and terminals only. This bit is adjusted by FCONTROL(1) and FWRITE with the appropriate carriage control.

ACBLPCTL

This are the line and page control bits, each of which is described separately.

ACBLSTATE

These are miscellaneous state flags. They are "local" in nature in that they may be different for each accessor in a multi-access environment. Bits (9:6) are initialized from the stateword local variable called STATE in FOPEN; the remaining bits are initialized individually. The constituent bits are described individually.

ACBMODE

These are miscellaneous mode flags. The constituent bits are described individually.

ACBNAME

The is the local file name. The name is eight bytes in length with trailing blanks added.

ACBNEWEOF

This flag is used to indicate that a new tape mark should be written before the tape is rewound or backspaced. If not set then a tape mark is not needed; if set then a tape mark is needed. Note that this flag is applicable only to mag tape files.

ACBNOWAITEOF

This bit is used to save the value of the local EOF advanced flag NEWEOF in FNRBUF between the I/O initiation and I/O completion calls. Note that this flag is applicable iff the file is accessed in no-wait I/O mode.

ACBNOWAITPTP

This cell is used to save the file pointer between no-wait I/O initiation and completion calls. Note that this cell is pertinent iff the file is accessed in no-wait I/O mode.

ACBNOWAITMODE

This cell is used to save the I/O mode between no-wait I/O initiation and completion calls. If the bit is set then the last I/O request was a write; otherwise it was a read. Note that this cell is pertinent

This is the FOPTIONS in effect for this file access.

ACBFPTP

This is the sequential access record pointer; it contains the next sequential record number. The initial value is 00. Note that this value is applicable only for the FREAD, FWRITE and FUPDATE intrinsics. However the value is maintained by all data transferring file system intrinsics.

ACBFMAVTX

This is entry index into the file multi-access vector table (FMAVT). Note that this is valid iff the file access is multi-access.

ACBGSTATE

These are miscellaneous state flags. These are "global" in nature in that they are the same for all accessors in a multi-access environment. The constituent bits are described individually.

ACRGSTATUS

This is the general part of the last I/O status for the file. The following are the legal values:

- 0 - pending
- 1 - successful
- 2 - end of file
- 3 - unusual condition
- 4 - irrecoverable error

ACBHBLK

This is the highest block number for which an anticipatory read has been issued. Note that this is applicable iff the file access is buffered. The initial value is -10.

ACHHIT

This is the buffer hit flag. If set it indicates that the last read or write request was serviced without any physical I/O required. This flag is used only for performance measurement. The code which manipulates it is optional to the file system, and is controlled by compiler toggle X3.

ACBINHIBITCRLF

This bit controls the termination of lines written to the terminal. If not set then each line is terminated with a CR and LF; if set then no line termination characters are used. Note that this is valid iff the file is a terminal file. This bit is adjusted by FSETMODE.

ACBLINECTL

system buffer data segment; otherwise ACB buffers are used and the pointer is relative to the base of the block buffer. Note that this is applicable iff the file access is buffered.

ACBRSIZE

This is the record size, in positive bytes, for the file.

ACBRTFRCT This is the total number of records transferred to and from the file. The initial value is 00.

ACBSAVEEOPS

This field is used to save the contents of ACBEOPS during BREAK mode processing.

ACBSHCNT

This is the total number of LACBs that exist for this PACB. Note that this is valid iff the file access is multi-access.

ACBSHCNTIN

This is the total number of input-only LACBs that exist for this PACB. Note that this is valid iff the file access is multi-access.

ACBSHCNIS

This is the total LACB and total input-only LACB counts, each of which is described separately.

ACBSIZE

This is the size, in words, of the complete ACB. It includes the buffering extension, if present.

ACBSPAOPT

This is the AOPTIONS for the spooled device. Note that this is applicable iff the file access is to a spooled device.

ACBSPFOPT

This is the FOPTIONS for the spooled device. Note that this is applicable iff the file access is to a spooled device.

ACBSPool

This is the spooled device flag. If set then the file access is to a spooled device; if not set then the file access is not to a spooled device.

ACBSPoolIO

iff the file is accessed in no-wait I/O mode.

ACBNUMBUFS

This is the number of buffers, less one, used for the file access. Note that this is applicable iff the file access is buffered.

ACBPAGECTL

This is the page control bit. If not set then a page is assumed to consist of 60 lines (auto page eject); if set then a page is assumed to consist of 66 lines (no auto page eject). This is used primarily for line printers but is also valid for terminals; and these are the only devices for which this is valid. This bit is adjusted by FCONTROL(1) and FWRITE with the appropriate carriage control.

ACBPRIV

This flag is used to indicate that the file is privileged in that it has a negative file code. If not set then the file is not privileged; if set then the file is privileged and the user must be in privileged mode to open it.

ACBSTATUS

This is the qualifying part of the last I/O status for the file. Note that the values are unique for each general status part. See I/O System I45 for all legal values.

ACHQUIESCE

This bit controls critical output verification. If not set the buffered output is not guaranteed to be written to the device when control is returned to the user; if set then buffered output is guaranteed to have been written to the device when control is returned to the user. This bit is adjusted by FSETMODE.

ACBREADCODE

This field consists of the input EOF checking type and mode. These fields are described individually.

ACBREADMODE

This field controls the input EOF checking mode.

ACBREADTYPE

This field controls the input EOF checking type.

ACBRECPT

This is a relative byte pointer to the current record. If system buffers are used then the pointer is relative to the base of the

This is the sub-class part of the device type number. Note that the sub-class is unique for each access class. The following are the legal sub-class values for each device class:

- 0 - direct
 - 0 - moving head disc
 - 1 - fixed head disc
- 1 - serial input
 - 0 - card reader
 - 1 - paper tape reader
- 2 - parallel input/output
 - 0 - terminal
 - 4 - card reader/punch
 - 6 - SSLC
 - 7 - programmable controller
- 3 - serial input/output
 - 0 - mag tape
- 4 - serial output
 - 0 - line printer
 - 1 - card punch
 - 2 - paper tape punch
 - 3 - CALCOMP 500 plotter
 - 4 - CALCOMP 600 plotter
 - 5 - CALCOMP 700 plotter

ACBSYSBUF

This is the system buffer flag. If set it means that the file access is buffered and that system buffers are used instead of ACR buffers. Note that this flag is valid iff the file access is buffered.

ACBTAPEERROP

This bit controls the reporting of recovered mag tape errors. If not set the recovered errors are not reported to the user; if set then recovered errors are reported to the user by returning CCL and error number 39. Note that this is valid iff the file is a mag tape file. This bit is adjusted by FSETMODE.

ACBTBLOCK

This bit controls block mode transfers on the 2644 page mode terminal. This bit is adjusted by FCONTROL(28) and FCONTROL(29).

ACBTEMP1

This cell is unassigned.

ACBTEMP2

This cell is unassigned.

ACBTLOG

This field is a combination of the spooled device flag and the input/output mode of the spooled device. Legal values are:

00 - not spooled
01 - illegal
10 - input spooling
11 - output spooling

ACBSPREC

This is the record size, in bytes, of the spooled device. Note that this is applicable iff the file access is to a spooled device.

ACBSPIYPE

This is the device type (from the LDT) of the spooled device. Note that this is applicable iff the file access is to a spooled device.

ACBSPIYRC

This is the cell that contains the spooled device type and record size, each of which is described separately.

ACBSPVDEV

This is the logical device number of the spooled device. Note that this is applicable iff the file access is to a spooled device.

ACESPXDDX

This is the index into the XDD for a spoolfile. Note that this is applicable iff the file access is to either a spooled device or a spoolfile.

ACBSTATUS

This is the last I/O status for the file. It comes from the I/O status part of the IOCB returned by ATTACHIO. Note that not all ATTACHIO calls update this cell.

ACBSTOFCHAR

This is the record termination character used for terminal reads. This character can be changed via FCONTROL(25).

ACBSTREAM

This bit signifies inter-block garbage for disc files. If set then the block size is a multiple of 128 words and therefore there is no garbage data between blocks. This fact is used to improve multi-record I/O by mapping the request into as few ATTACHIOs as possible.

ACBSUBCL

```

DEFINE
BLKIOQX          = BLK*,          <<IOQ ENTRY INDEX>>
BLKSYSBUFEX      = BLK(1)*,       <<SYSTEM BUFFER INDEX>>
BLKIOCB          = BLKDEL(1)*,    <<IOCB>>
BLKLSTAT        = BLK(2)*,       <<IOCB - STATUS>>
BLKTLOG          = HLF(3)*,       <<IOCB - TRANSMISSION LOG>>
BLKBLOCK        = BLKDHL(2)*,     <<BLOCK NUMBER>>
BLKDADDR        = BLKDRL(3)*,     <<BLOCK SECTOR NUMBER>>
BLKLDEV         = BLK(6).(0:8)*,  <<BLOCK LOGICAL DEVICE NP.>>
BLKSYSBUFDISP    = BLK(8).(0:7)*, <<SYS. BUF. DISPLACEMENT>>
BLKFLAGS        = BLK(8).(13:3)*, <<BLOCK I/O FLAGS>>
BLKIOOUT        = BLK(8).(13:1)*, <<LAST I/O WAS WRITE?>>
BLKDIRTY        = BLK(8).(14:1)*, <<BUFFER MODIFIED?>>
BLKIOPEND       = BLK(8).(15:1)*, <<I/O IN PROGRESS?>>
BLKIOCOMP       = BLK(8).(14:2)*, <<I/O COMPLETE - NOT DIRTY>>
BLKBUFFER       = BLK(9)*;       <<BLOCK BUFFER>>

```

The following is an alphabetized list of the above identifiers along with a discussion of their meaning:

BLKBLOCK

This is the block number of the data contained in the buffer. A value of -1D indicates that the buffer is empty.

BLKBUFFER

This is the block buffer. Note that this is valid iff the buffer is in the ACB; otherwise system buffers are used and the location of the buffer is given by BLKSYSBUFEX and BLKSYSBUFDISP.

BLKDADDR

This is logical device number and sector number of the block.

BLKDIRTY

This is the buffer modified flag. It is set if the contents of the buffer has been modified. When the block buffer is re-used this flag is checked to see if the block needs to be written to the device.

BLKFLAGS

These are the miscellaneous flags associated with the block, each of which is described separately.

BLKIOCB

This is the IOCB returned by the I/O system when the block I/O has completed. On a blocked I/O request this is obtained from the ATTACHIO call; on an unblocked I/O request this is obtained from WAITFORIO.

This is the last I/O transmission log for the file. It comes from the I/O transmission log part of the IOCB returned by ATTACHIO. Note that not all ATTACHIO calls update this cell.

ACBVDADDR

This is the volume table index for the file. Note that this value is applicable iff the file is a disc file.

ACBXMITCRLF

This bit controls CR and LF insertion into the user buffer on the 2644 page mode terminal. This bit is adjusted by FCONTPOL(30) and FCONTROL(31).

ACBXXXX

This cell is unassigned.

The buffering extension has the following format:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
IOCB ENTRY INDEX																0
SYSTEM BUFFER INDEX																1
IOCB - STATUS																2
IOCB - TRANSMISSION LOG																3
BLOCK NUMBER																4
BLOCK LOGICAL DEVICE NUMBER																5
BLOCK SECTOR NUMBER																6
SYSTEM BUFFER DISPLACEMENT																7
I W I M I P																8
BUFFER																9

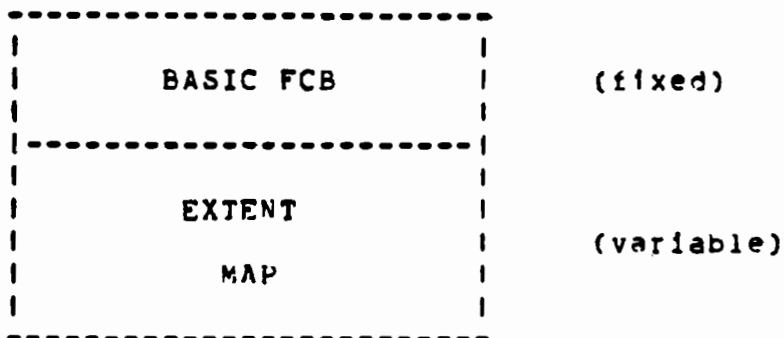
In general the following identifiers are used when referring to buffering extension part of the ACB:

File Control Block (FCB)

The function of the FCB is to coordinate access to a file on a sharable device. At present the only sharable device is a disc. Hence the only files that have FCBs are disc files.

The information contained in an FCB is derived from the file label. The FCB is used to hold this information, rather than the file label, since it is quicker to access.

The overall structure of the FCB is:



The basic FCB has the following format:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

1		COMPLETE FCB SIZE														0

NEW FCB VECTOR																1

FOPTIONS																2

DEVICE SPECIFICATION																3

PREV. LOCK		DEVICE TYPE				1		DEVICE SUB-TYPE								4

NR. OPENS FOR OUTPUT						1		NR. OPENS FOR ANY MODE								5

CREATOR ACB VECTOR																6

RIN NUMBER																7

EXCLUSIVE STATUS																8

PEND. DISP.		1														9

FILE LIMIT IN BLOCKS																10

																11

																12

BLKINCOMP

This is the buffer modified flag (BLKDIRTY) and the I/O in progress flag (BLKIOPEND), each of which is described separately. This field is usually interrogated to see if it contains the value 2, which means that the buffer has been modified but not yet written to the device.

BLKIOUW

This is the mode of the I/O operation for the block. It is set if the operation was a write; it is cleared if the operation was a read.

BLKIOPEND

This is the I/O in progress flag. It is set if the I/O is pending; it is cleared when the I/O has completed.

BLKIOGX

This is the IOG index of the unblocked I/O request for the block. This is used as the argument to WAITFORIO, which insures the completion of the I/O request.

BLKLDEV This is the logical device number of the block.

BLKLSTAT

This is the I/O status part of the IOCH. It consists of the PCB number and the error code for the completed I/O request.

BLKSYSBUFDISP

This is the word displacement of the block buffer from the beginning of the system buffer. Generally this is zero since most blocks begin at the start of a system buffer. However when more than one block will fit into a system buffer this cell indicates the blocks displacement. Note that this is valid iff system buffering is used.

BLKSYSBUFX

This is the system buffer index of the block buffer. Note that this does not completely specify the location of the block buffer; BLKSYSBUFDISP is needed also. Also this cell is valid iff system buffering is used.

BLKTLOG

This is the transmission log part of the IOCH. It is the number of words/bytes transferred by the I/O request.

FCBFOPTIONS	= FCB(2)#,	<<FOPTIONS>>
FCBDEVICE	= FCB(3)#,	<<LDEV OR DEVICE CLASS>>
FCBLKST	= FCB(4).(0:2)#,	<<PREVIOUS LOCK STATE>>
FCBDTYPE	= FCB(4).(2:6)#,	<<DEVICE TYPE>>
FCBSUBTYPE	= FCB(4).(12:4)#,	<<DEVICE SUB-TYPE>>
FCROCNTOUT	= FCB(5).(0:8)#,	<<NR. ACCESSORS - OUTPUT>>
FCBOCNT	= FCB(5).(8:8)#,	<<NR. ACCESSORS>>
FCBACB	= FCB(6)#,	<<CREATOR ACH VECTOR>>
FCBRIN	= FCB(7)#,	<<PIN NUMBER>>
FCBEXCLSTAT	= FCB(8)#,	<<EXCLUSIVE STATUS>>
FCBDISP	= FCB(9).(0:3)#,	<<PENDING DISPOSITION>>
FCBFLIM	= FCBDL(5)#,	<<FILE LIMIT>>
FCBIMAGE	= FCBDL(6)#,	<<RESERVED FOR IMAGE>>
FCBEOF	= FCBDL(7)#,	<<END OF FILE POINTER>>
FCBUSERLBL	= FCB(16)#,	<<USER LABEL INFO>>
FCBLRLEOF	= FCB(16).(0:8)#,	<<NR. LABELS WRITTEN>>
FCBLBL	= FCB(16).(8:8)#,	<<NR. LABELS AVAILABLE>>
FCBEXTSIZE	= FCB(17)#,	<<EXTENT SIZE>>
FCBBLKFACT	= FCB(18).(0:8)#,	<<BLOCKING FACTOR>>
FCBSECTPBLK	= FCB(18).(8:8)#,	<<SECTORS PER BLOCK>>
FCBSECTOFF	= FCB(19).(0:8)#,	<<SECTOR OFFSET TO DATA>>
FCBNUMEXTS	= FCB(19).(11:5)#,	<<NR. EXTENTS LESS 1>>
FCBLASTEXTSIZE	= FCB(20)#,	<<LAST EXTENT SIZE>>
FCBOCNTIN	= FCB(21).(8:8)#,	<<NR. ACCESSORS - INPUT>>
FCBGN	= FCB(22)#,	<<GROUP NAME>>
FCBAN	= FCB(26)#,	<<ACCOUNT NAME>>
FCBLABEL	= FCBDL(15)#,	<<LABEL LDEV AND SECTOR>>
FCBLDEV	= FCB(30).(0:8)#,	<<LABEL LDEV>>
FCBLXTMAP	= FCB(30):,	<<EXTENT MAP>>

The following is an alphabetized list of the above identifiers along with a discussion of their meanings:

FCBACB

This is the vector of the ACR that was created at the same time as the FCB. This is used in conjunction with FCBNEWFCRV when relocating the FCB.

FCBAN

This is the account name of the file. It is eight bytes in length with trailing blanks added.

FCBBLKFACT

This is the blocking factor of the file. It is the number of logical records in a physical block. Legal values range from 1 to 255.

FCBDEVICE

This specifies the device on which the file resides. If it is positive then it represents a logical device number; if it is negative then it represents a (negative) device class index.

RESERVED FOR IMAGE			13
-----			14
END OF DATA POINTER			15
-----			16
NR. USER LABELS WRITTEN	1	NR. USER LABELS AVAILABLE	16
-----			17
EXTENT SIZE IN SECTORS			17
-----			18
BLOCKING FACTOR	1	SECTORS PER BLOCK	18
-----			19
SECTOR OFFSET TO DATA	1	NR. EXTENTS - 1	19
-----			20
LAST EXTENT SIZE IN SECTORS			20
-----			21
	1	NR. OPENS INPUT MODE	21
-----			22
GROUP NAME - 1ST CHAP.	1	GROUP NAME - 2ND CHAP.	22
-----			23
GROUP NAME - 3RD CHAP.	1	GROUP NAME - 4TH CHAP.	23
-----			24
GROUP NAME - 5TH CHAP.	1	GROUP NAME - 6TH CHAP.	24
-----			25
GROUP NAME - 7TH CHAP.	1	GROUP NAME - 8TH CHAP.	25
-----			26
ACCOUNT NAME - 1ST CHAP.	1	ACCOUNT NAME - 2ND CHAP.	26
-----			27
ACCOUNT NAME - 3RD CHAP.	1	ACCOUNT NAME - 4TH CHAP.	27
-----			28
ACCOUNT NAME - 5TH CHAP.	1	ACCOUNT NAME - 6TH CHAP.	28
-----			29
ACCOUNT NAME - 7TH CHAP.	1	ACCOUNT NAME - 8TH CHAP.	29
-----			30
LOGICAL DEVICE NUMBER	1		30
-----			31
FIRST EXTENT SECTOR NUMBER			31

.			
.			
.			

LOGICAL DEVICE NUMBER	1		

LAST EXTENT SECTOR NUMBER			

In general the following identifiers are used when referring to an FCB.

DEFINE
FCBSIZE = FCB.(2:14)*, <<SIZE IN WORDS>>
FCBNEWFCBV = FCB(1)*, <<NEW FCB VECTOR>>

FCBFOPTIONS

This is the FOPTIONS in effect for the file.

FCBGN

This is the group name of the file. It is eight bytes long with trailing blanks added.

FCBIMAGE

This cell is reserved for use by IMAGE. The data is accessed via special privileged mode calls to FLOCK and FUNLOCK.

FCBLABEL

This is the logical device number and sector number of the file label, which is the same as the first extent descriptor.

FCBLASTEXTSIZE

This is the size, in sectors, of the last extent in the file. If the file has one extent then this is the same as FCBEXTSIZE; if the file has more than one extent then this value may be different from FCBEXTSIZE. Note that this is the size of the last physical extent for the file; it is not the size of the last allocated extent.

FCBLBL

This is the number of user labels allocated for the file. Since each label is a sector long, this is also the number of sectors allocated for user labels.

FCBLBLEOF

This is the end-of-data pointer for the user labels. It is analogous to FCBEOF in that it represents the number of labels written. The initial value is 0.

FCBLDEV

This is the logical device number of the first extent of the file.

FCBLKST

This is the previous lock state of the file and is derived from the file label. Legal values are:

FCBDISP

This is the pending FCLOSE disposition for the file. Legal values are:

- (0:1) - crunch file space
 - 0 - no change
 - 1 - return disc space beyond file limit
- (1:3) - domain disposition
 - 0 - no change
 - 1 - save permanent
 - 2 - save temporary and rewind
 - 3 - save temporary but do not rewind
 - 4 - release
 - 7 - invalid file (file label access error)

FCBDTYPE

This is the device type number of the first extent of the file. See ACBDTYPE for a list of legal values.

FCBEOF

This is the end-of-file pointer for the file. It is a double word integer representing the number of records in the file. Alternatively it can be viewed as the record number of the next record past EOF.

FCBEXCLSTAT

This is the exclusive status of the file access. If -1 then the file is being accessed exclusively; otherwise it is the number of semi-exclusive accessors.

FCBEXTMAP

This is the extent map of the file. The number of extents is specified by FCBNUMEXTS; a 0D extent descriptor indicates that the extent has not been allocated.

FCBEXTSIZE

This is the extent size, in sectors, of the file. All extents in the file, with the exception of the last extent, have this extent size. This is a logical value, and legal values range from 1 to 65535 sectors. This restricts the maximum file size to 2097120 sectors.

FCBFLIM

This is the end-of-space pointer for the file. It is a double word integer representing the maximum number of records (fixed length record format) or blocks (undefined or variable length record format) in the file.

FCBSUBTYPE

This is the device sub-type number of the first extent of the file.

FCBUSEPLBL

This field describes the user labels for the file. It consists of FCBLBL and FCBLBLEOF, each of which is described separately.

0 - no accessors
1 - read
2 - write
3 - read/write

FCBNEWFCBV

This is the vector of the new FCB for the file. This is used in conjunction with FCRACB to move the FCB to the system (shared FCB) control block table when the second accessor is established. If this value is zero then there is no new FCB; if non-zero then a new FCB has been created.

FCBNUMEXTS

This is the number of extents, less one, allowed for the file. Note that it is not the number of extents allocated.

FCBOCNT

This is the number of accessors for the file. Alternatively it can be viewed as the number of ACHs created for the file.

FCBOCNTIN

This is the number of accessors that have input access to the file.

FCBOCNTOUT

This is the number of accessors that have output access to the file.

FCBRIN

This is the RIN number used to support dynamic locking (i.e. FLOCK and FUNLOCK) for the file. If there is no dynamic locking then this number is zero.

FCBSECTOFF

A1363.1

This is the sector offset from the file label to the first block of the file. Note that this is not necessarily equal to FCBLBL+1 since an integral number of blocks are allocated for the file and user labels.

FCBSECTPBLK This is the number of sectors in a block for the file.

FCBSIZE

This is the size, in words, of the complete FCB. It includes extent map.

CREATOR NAME - 7TH CHAR.		I	CREATOR NAME - 8TH CHAR.		15								
LOCKWORD - 1ST CHAR.		I	LOCKWORD - 2ND CHAR.		16								
LOCKWORD - 3RD CHAR.		I	LOCKWORD - 4TH CHAR.		17								
LOCKWORD - 5TH CHAR.		I	LOCKWORD - 6TH CHAR.		18								
LOCKWORD - 7TH CHAR.		I	LOCKWORD - 8TH CHAR.		19								
SECURITY MATRIX					20								
					21								
					22								
CREATION DATE					23								
LAST ACCESS DATE					24								
LAST MODIFICATION DATE					25								
FILE CODE					26								
FCB VECTOR					27								
S	I	R	I	L	I	X	I	SUB-TYPE	I	DISC TYPE	I	R/W	28
NR. USER LABELS WRITTEN		I	NR. USER LABELS AVAILABLE		29								
FILE LIMIT IN BLOCKS					30								
					31								
					32								
					33								
CHECKSUM					34								
COLD LOAD ID					35								
FOPTIONS					36								
RFCORD SIZE IN BYTES					37								
BLOCK SIZE IN WORDS					38								
SECTOR OFFSET TO DATA		I	I	#EXTN1-1		39							
LAST EXTENT SIZE IN SECTORS					40								
EXTENT SIZE IN SECTORS					41								

File Label (FLAB)

- * Since extents can be on different volumes the high byte of an extent descriptor contains a volume table index.
- * There can be up to 32 extents.
longer.
- * Since the extents are constrained to a single logical device or to members of a single device class the device specification used at creation is recorded in the label.
- * The size of the last extent is not calculated each time; instead it is recorded in the label.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
FILE NAME - 1ST CHAR.								1	FILE NAME - 2ND CHAR.								0
FILE NAME - 3RD CHAR.								1	FILE NAME - 4TH CHAR.								1
FILE NAME - 5TH CHAR.								1	FILE NAME - 6TH CHAR.								2
FILE NAME - 7TH CHAR.								1	FILE NAME - 8TH CHAR.								3
GROUP NAME - 1ST CHAR.								1	GROUP NAME - 2ND CHAR.								4
GROUP NAME - 3RD CHAR.								1	GROUP NAME - 4TH CHAR.								5
GROUP NAME - 5TH CHAR.								1	GROUP NAME - 6TH CHAR.								6
GROUP NAME - 7TH CHAR.								1	GROUP NAME - 8TH CHAR.								7
ACCOUNT NAME - 1ST CHAR.								1	ACCOUNT NAME - 2ND CHAR.								8
ACCOUNT NAME - 3RD CHAR.								1	ACCOUNT NAME - 4TH CHAR.								9
ACCOUNT NAME - 5TH CHAR.								1	ACCOUNT NAME - 6TH CHAR.								10
ACCOUNT NAME - 7TH CHAR.								1	ACCOUNT NAME - 8TH CHAR.								11
CREATOR NAME - 1ST CHAR.								1	CREATOR NAME - 2ND CHAR.								12
CREATOR NAME - 3RD CHAR.								1	CREATOR NAME - 4TH CHAR.								13
CREATOR NAME - 5TH CHAR.								1	CREATOR NAME - 6TH CHAR.								14

FLDTYPE	=	FLAB(28).(8:6)*, <<DEVICE TYPE>>
FLSTATUS	=	FLAB(28).(14:2)*, <<WRITE/READ STATUS>>
FLUSERLBL	=	FLAB(29)*, <<USER LABEL INFO>>
FLBLEOF	=	FLAB(29).(0:8)*, <<NR. LABELS WRITTEN>>
FLBL	=	FLAB(29).(8:8)*, <<NR. LABELS AVAILABLE>>
FLFLIM	=	FLABDL(15)*, <<FILE LIMIT>>
FLCHECKSUM	=	FLAB(34)*, <<LABEL CHECK SUM>>
FLCLID	=	FLAB(35)*, <<COLD LOAD ID>>
FLFOPTIONS	=	FLAB(36)*, <<FOPTIONS>>
FLRECSIZE	=	FLAB(37)*, <<RECORD SIZE>>
FLBLKSIZE	=	FLAB(38)*, <<BLOCK SIZE>>
FLSECTOFF	=	FLAB(39).(0:8)*, <<SECTOR OFFSET TO DATA>>
FLNUMEXTS	=	FLAB(39).(11:5)*, <<NR. EXTENTS LESS 1>>
FLLASTFXTSIZE	=	FLAB(40)*, <<LAST EXTENT SIZE>>
FLEXTSIZE	=	FLAB(41)*, <<EXTENT SIZE>>
FLEOF	=	FLABDL(21)*, <<END-OF-DATA POINTER>>
FLLABEL	=	FLABDL(22)*, <<LABEL VTABLE AND SECTOR>>
FLVTAB	=	FLAB(44).(0:8)*, <<LABEL VTABLE INDEX>>
FLEXTMAP	=	FLAB(44)*, <<EXTENT MAP>>
FLDEVNAME	=	FLAB(124)*; <<DEVICE SPECIFICATION NAME>>

The following is an alphabetized list of the above identifiers along with a discussion of their meanings:

FLACCTNAME

This is the account name of the file. It is eight bytes in length with trailing blanks added.

FLBLKSIZE

This is the block size, in sectors, of the file.

FLCHECKSUM

This is the check sum of the file label and is used for error detection. Each time the file label is read from disc the check sum is calculated and compared against the value recorded in the file label. Similarly, each time the file label is written to the disc the check sum is calculated and inserted into the file label.

FLCLID

This is the cold load number in effect the last time that the file was accessed. This should always be the current cold load number. If it is not it means that the system crashed while the file was open and that the data in the file label should be "reset" (principally the FCB vector FLFCBVECT).

FLCREATE

This is the creation date of the file. It is in the format defined by the intrinsic CALENDAR.

END OF DATA POINTER			42
			43

VOLUME TABLE INDEX	1		44

1ST EXTENT SECTOR NUMBER			45

VOLUME TABLE INDEX	1		

LAST EXTENT SECTOR NUMBER			

DEVICE NAME - 1ST CHAR.	1	DEVICE NAME - 2ND CHAR.	124

DEVICE NAME - 3RD CHAR.	1	DEVICE NAME - 4TH CHAR.	125

DEVICE NAME - 5TH CHAR.	1	DEVICE NAME - 6TH CHAR.	126

DEVICE NAME - 7TH CHAR.	1	DEVICE NAME - 8TH CHAR.	127

In general the following identifiers are used when referring to a file label:

DEFINE		
FLLOCNAME	= FLAB#,	<<LOCAL FILE NAME>>
FLGRPNAME	= FLAB(4)#,	<<GROUP NAME>>
FLACCTNAME	= FLAB(8)#,	<<ACCOUNT NAME>>
FLUSERID	= FLAB(12)#,	<<CREATOR NAME>>
FLLOCKWORD	= FLAB(16)#,	<<LOCKWORD>>
FLSECMX	= FLAB(16)(10)#,	<<SECURITY MATRIX>>
FLSECURE	= FLAB(22).(15:1)#,	<<FILE SECURE BIT>>
FLCREATE	= FLAB(23)#,	<<CREATION DATE>>
FLLASTACC	= FLAB(24)#,	<<LAST ACCESS DATE>>
FLLASTMOD	= FLAB(25)#,	<<LAST MODIFICATION DATE>>
FLFILECODE	= FLAB(26)#,	<<FILE CODE>>
FLFCBVECT	= FLAB(27)#,	<<FCB VECTOR>>
FLLOCK	= FLAB(28)#,	<<LOCK BITS, ETC.>>
FLSTORE	= FLAB(28).(0:1)#,	<<FILE BEING STORED>>
FLRESTORE	= FLAB(28).(1:1)#,	<<FILE BEING RESTORED>>
FLLOAD	= FLAB(28).(2:1)#,	<<FILE LOADED>>
FLEXCL	= FLAB(28).(3:1)#,	<<EXCLUSIVE ACCESS>>
FLSR	= FLAB(28).(0:2)#,	<<S & R BITS>>
FLSRL	= FLAB(28).(0:3)#,	<<S, R & L BITS>>
FLSRLX	= FLAB(28).(0:4)#,	<<S, R, L & X BITS>>
FLSUBTYPE	= FLAB(28).(4:4)#,	<<DEVICE SUB-TYPE>>

1030 STAR file
 1031 SL file
 1040 Cross Loader ASCII file (SAVE)
 1041 Cross Loader relocatable binary file
 1042 Cross Loader ASCII file (DISPLAY)
 1050 EDITOR KEEPO file (non-COBOL)
 1051 EDITOR KEEPO file (COBOL)
 1060 RJE punch file
 1069 RSAM (Bob Strand's ISAM) file
 1070 QUERY procedure file
 1071 QUERY work file
 1072 QUERY work file
 1080 KSAM key file
 1081
 to Reserved for KSAM
 1089

FLFLIM

This is the end-of-space pointer for the file. It is a double word integer representing the maximum number of records (fixed length record format) or blocks (undefined or variable length record format) in the file.

FLFOPTIONS

This is the FOPTIONS of the file.

FLGRPNAME

This is the group name of the file. It is eight bytes long with trailing blanks added.

FLLABEL

This is the volume table index and sector number of the file label, which is the same as the first extent descriptor.

FLLASTACC

This is the last access date of the file. It is in the format defined by the intrinsic CALENDAR.

FLLASTMOD

This is the last modification date of the file. It is in the format defined by the intrinsic CALENDAR.

FLLASTEXTSIZE

This is the size, in sectors, of the last extent in the file. If the file has one extent then this is the same as FLEXTSIZE; if the file has more than one extent then this value may be different from FLEXTSIZE. Note that this is the size of the last physical extent for

FLDEVNAME

This is the FOPEN device specification that was used when the file was created. This information is needed when new extents are allocated.

FLDTYPE

This is the device type number of the first extent of the file. See ACBDTYPE for a list of legal values. This value is determined by configuration.

FLEOF

This is the end-of-file pointer for the file. It is a double word integer representing the number of records in the file. Alternatively it can be viewed as the record number of the next record past EOF.

FLEXCL

This is the exclusive access flag for the file. If set it means that the file has been opened exclusively by a single accessor. If not set then the file is potentially accessible.

FLEXTMAP

This is the extent map of the file. The number of extents is specified by FLNUMEXTS; a 00 extent descriptor indicates that the extent has not been allocated.

FLEXTSIZE

This is the extent size, in sectors, of the file. All extents in the file, with the exception of the last, have this extent size. This is a logical value, and legal values range from 1 to 65535 sectors. This restricts the maximum file size to 2097120 sectors.

FLFCBVFCT

This is the vector of the FCB for the file. If zero it indicates that the file is not being accessed; if non-zero it indicates that the file is being accessed.

FLFILECODE

This is the file code of the file. Known values are:

-401	IMAGE data set
-400	IMAGE root file
1024	USL file
1025	BASIC data file
1026	BASIC program file
1027	BASIC fast program file
1028	RL file
1029	program file

This is the security matrix of the file. The individual bits are described on page IV-3.3 in the MPE/20 Tables book.

FLSECTOFF

This is the sector offset from the file label to the first block of the file. Note that this is not necessarily equal to FLLPL+1 since an integral number of blocks are allocated for the file and user labels.

FLSECURE

This is the file security enforcement flag for the file. If not set then the file has been RELEASED and the security matrix FLSECMX should be ignored. If set then secured as specified by the security matrix.

FLSR

This is the STORE and PESTOPE flags for the file, each of which is described separately.

FLSRL

This is the STORE, PESTOPE and LOADED flags for the file, each of which is described separately.

FLSRLX

This is the STORE, RESTORE, LOADED and exclusive flags for the file, each of which is described separately.

FLSTATUS

This is the read/write status of the file. Legal values are:

- 0 - no accessors
- 1 - read
- 2 - write
- 3 - read/write

FLSTORE

This is the STORE flag for the file. If set it means that the file is being STORED and cannot be modified. Note that this flag is set and cleared by STORE, not the file system.

FLSUBTYPE

This is the device sub-type number of the first extent of the file. This value is determined by configuration.

FLUSERID

This is the creating user name of the file. It is eight bytes long with trailing blanks added.

the file; it is not the size of the last allocated extent.

FLLRL

This is the number of user labels allocated for the file. Since each label is a sector long, this is also the number of sectors allocated for user labels.

FLLBLEOF

This is the end-of-data pointer for the user labels. It is analogous to FLEOF in that it represents the number of labels written.

FLLOAD

This is the LOADED flag for the file. If set it means that the file is a loaded program or SL file and cannot be modified except by a privileged accessor. Note that this flag is set and cleared by the loader, not the file system.

FLLOCK

This is the identifier of the word containing the lock bits, each of which are described separately.

FLLOCKWORD

This is the lock word of the file. It is eight bytes long with trailing blanks added. If it is all blanks then the file does not have a lockword.

FLLOCNAME

This is the local name of the file. It is eight bytes long with trailing blanks added.

FLNUMEXTS

This is the number of extents, less one, allowed for the file. Note that it is not the number of extents allocated. Legal values range from 0 to 31, which corresponds to from 1 to 32 extents.

FLRECSIZE

This is the record size, in positive bytes, of the file.

FLRESTORE

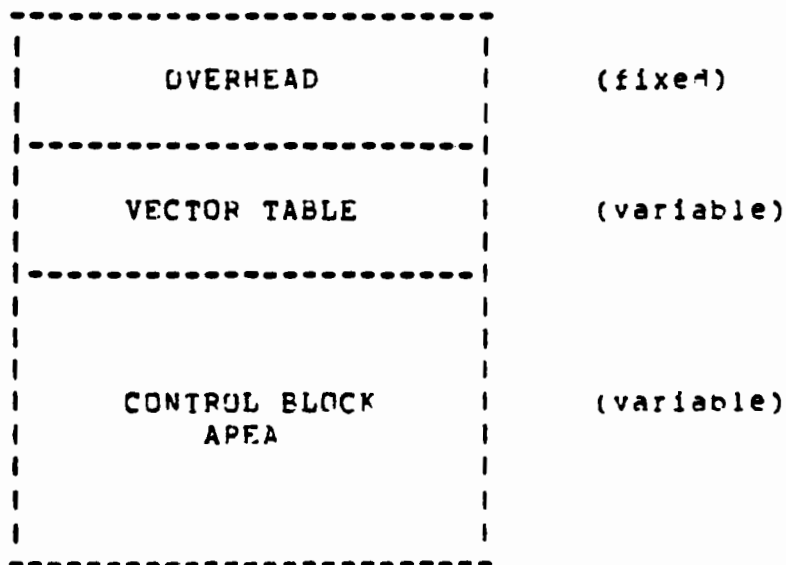
This is the RESTORE flag for the file. If set it means that the file is being RESTORED and cannot be accessed. Note that this flag is set and cleared by RESTORE, not the file system.

FLSECMX

File Control Block Table (CBTAB)

A file control block table can be located in two places: (a) as a sub-part of the PXFILE area; (b) totally contained in a data segment. The purpose of a file control block table is to facilitate the management of (you guessed it) control blocks.

The overall structure of a control block table is:



FLUSERLBL

This field describes the user labels of the file. It consists of FLLBL and FLLbLEOF, each of which is described separately.

FLVTAB

This is the volume table index of the first extent of the file.

This is the impeded queue for the table and has the same format as the impeded queue for a control block in the table. There is no second impeded queue because that is a facility which is used exclusively for BREAK requests against the ACH for \$STDIN/\$STDLIST.

CBTSIZE

This is the size in words of the table. It is initialized when the table is created and changed when the table is expanded. Note that at present a table is never contracted, even though this is possible.

CBTVTSIZE

This is the size, in words, of the vector table area in the control block table. Note that this is the length of the vector table area and does not reflect the number of entries used or unused.

Overhead

The part labeled OVERHEAD contains information that is pertinent to the entire table.

0	15
TABLE SIZE IN WORDS	0
DST NUMBER CONTAINING TABLE	1
VECTOR TABLE SIZE IN WORDS	2
LOCK WORD	3
IMPEDED QUEUE	4

In general the following identifiers are used when referring to this part of a control block table:

```

DEFINE
CBTSIZE      = CBTAB#,          <<TABLE SIZE>>
CBTDSTX      = CBTAB(1)#,      <<DST NUMBER>>
CBTVISIZE    = CBTAB(2)#,      <<VECTOR TABLE SIZE>>
CBTLOCK      = CBTAB(3)#,      <<LOCK WORD>>
CBTQUEUE     = CBTAB(4)#;      <<IMPEDED QUEUE>>
  
```

The following is an alphabetized list of the above identifiers along with a discussion of their meaning.

CBTDSTX

This is the DST number of the data segment that contains the control block table. If the table is contained in a stack, i.e. in the PXFILE area, then this is the DST number of the stack and not 0.

CBTLOCK

This is the lock word for the table and has the same format as the lock word for a control block in the table. The table is locked, thus insuring exclusive access, whenever (a) a control block is being created or destroyed; (b) a control block is being locked or unlocked. Note that the table is not locked after a control block has been locked.

CBTQUEUE

The following is an alphabetized list of the above identifiers along with a discussion of their meaning.

VTADR

This is the table relative address of the control block associated with the vector table entry. It is a word displacement from the beginning of the control block table.

VTCONTROL

This is the control word used to coordinate the access to the control block. It contains a bit which indicates that the control block is being accessed, and therefore "locked", and a byte which contains the PIN of the process which has exclusive access to the control block.

VTQUEUE

This is a byte pair of PINs that are the head and tail of the impeded queue of processes waiting for access to the control block. Processes are impeded and unimpeded by the file system using the normal mechanisms available under MPE.

VTSAVEDQUEUE

This is a byte pair of PINs and has the same format as VTQUEUE. The only time this word is used is when the control block is in BREAK mode, which can only happen to an ACR corresponding to \$STDIN/\$STDLIST. It is used to save the current VTQUEUE when the control block goes into BREAK mode and to restore VTQUEUE when the control block goes back into non-BREAK mode.

More specifically the last three words of a vector table entry compose a control sub-block that is used to coordinate the access to a general control block in the control block area of the control block table.

The structure of the vector table entry control sub-block is:

0	1	2	7	8	15	

1	L	B	1	LOCK COUNT	1	LOCK PIN
-----						0
1	HIGH PRIORITY TAIL PIN				1	HIGH PRIORITY HEAD PIN
-----						1
1	LOW PRIORITY TAIL PIN				1	LOW PRIORITY HEAD PIN
-----						2

In general the following identifiers are used when referring to this part of a vector table entry:

```

DEFINE
CBLCONTROL      = CBL#,          <<CONTROL WORD>>
  
```

CBLLOCK	= CBL.(0:1)*,	<<LOCK BIT>>
CBLBREAK	= CBL.(1:1)*,	<<BREAK BIT>>
CBLCOUNT	= CBL.(2:6)*,	<<LOCK COUNT>>
CBLPIN	= CBL.(8:8)*,	<<PIN HOLDING LOCK>>
CBLQUEUE	= CBL(1)*,	<<HIGH PRIORITY IMPEDED QUEUE>>
CBLTAIL	= CBL(1).(0:8)*,	<<HIGH PRIORITY TAIL PIN>>
CBLHEAD	= CBL(1).(8:8)*,	<<HIGH PRIORITY HEAD PIN>>
CBLSAVEDQUEUE	= CBL(2)*,	<<LOW PRIORITY IMPEDED QUEUE>>
CBLSAVEDTAIL	= CBL(2).(0:8)*,	<<LOW PRIORITY TAIL PIN>>
CBLSAVEDHEAD	= CBL(2).(6:8)*;	<<LOW PRIORITY HEAD PIN>>

The following is an alphabetized list of the above identifiers along with a discussion of their meaning.

CBLBREAK

This is the BREAK bit and is used only for the ACB corresponding to SSTDIN/\$SDTLIST.

CBLCONTROL

This identifier is used when referring to the first word of the vector table control sub-block.

CBLCOUNT

This is a count of the number of times that the control block is locked by CBLPIN. It is 0 if the control block is not locked and is greater than 0 if the control block is locked.

CBLHEAD

This is the PIN of the process at the head of the high priority impeded queue.

CBLLOCK

This is the lock bit for a control block. If it is 0 then the control block is not locked; if it is 1 then the control block is locked.

CBLPIN

This is the PIN of the process which has locked the control block and has exclusive access to it. If the control block is not locked then this field is 0.

CBLQUEUE

This identifier is used when referring to the second word of the vector table control sub-block.

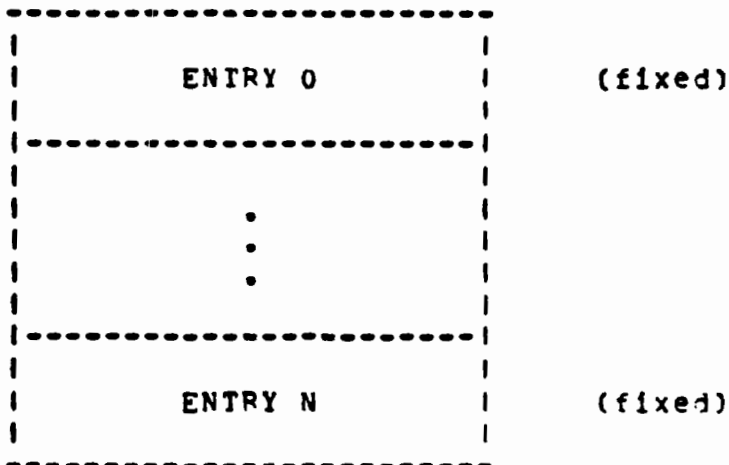
CBLSAVEDHEAD



Vector Table

The part labeled VECTOR TABLE contains information used to locate and lock/unlock control blocks in the control block table.

The overall structure of the vector table is:



where $N = (CBTVTSIZE/4) - 1$. A vector table is restricted to no more than 64 entries; this is due to the addressing limitation inherent in the control block vector format.

The general structure of a vector table entry is:

0		15
CONTROL BLOCK ADDRESS		0
CONTROL WORD		1
HIGH PRIORITY IMPEDED QUEUE		2
LOW PRIORITY IMPEDED QUEUE		3

In general the following identifiers are used when referring to this part of a control block table:

DEFINE		
VTADR	= VT*,	<<CONTROL BLOCK ADDRESS>>
VICONTROL	= VT(1)*,	<<CONTROL WORD>>
VTQUEUE	= VT(2)*,	<<HIGH PRIORITY IMPEDED QUEUE>>
VTSAVEDQUEUE	= VT(3)*;	<<LOW PRIORITY IMPEDED QUEUE>>

This is the PIN of the process at the head of the low priority impeded queue.

CBLSAVEDQUEUE

This identifier is used when referring to the third word of the vector table control sub-block.

CBLSAVEDTAIL

This is the PIN of the process at the tail of the low priority impeded queue.

CBLTAIL

This is the PIN of the process at the tail of the high priority impeded queue.

FMAVT

FMAVTDST = 44
FMAVTSIR = 16

SEG SIZE				
ENTRY SIZE (≅4)				
MAX SEG SIZE				
0				
				> FREE
11 01 GI	I		JIT	> DISK(+SPOOLFILE)
LOG DEV	I		LABEL....	
DISK ADDRESS				
PACB VECTOR				
11 11 GI	I		JIT	> DEVICE
LOG DEV				
0				
PACB VECTOR				

121	SAAD	10	S.A. AVAIL. DIR.
131	ADL	11	AVAIL. DIR. LENGTH
141	SAI	12	S.A. INFO BLOCK
151		13	
161	IL	14	INFO BLOCK LENGTH
171		15	
201	SAAI	16	S.A. AVAIL. INFO
211		17	
221	AIL	18	AVAIL. INFO LENGTH
231		19	
241	SUM IG	20	
251		21	
261	NIG	22	NR. INFO GAPB. ENTRIES
271		23	
301		24	
311		25	
321		26	
331		27	
341		28	
351		29	
361		30	
371		31	
401		32	
411	HL	33	
	0		
	.		
	.		
	.		
1771	HL	127	
	94		

USL FILES - GENERAL INFO

* USL record length 129 words always.

* Layout of doubleword disc addresses

25-BIT RECORD #		1	WORD #
		1	WITHIN RECORD

0	24	25	31

* Hash links join all entries with the same hash key regardless of type.

* Linear lists terminate with a zero link

* Circular lists containing only the list head point directly to themselves.

* Single-word disc addresses

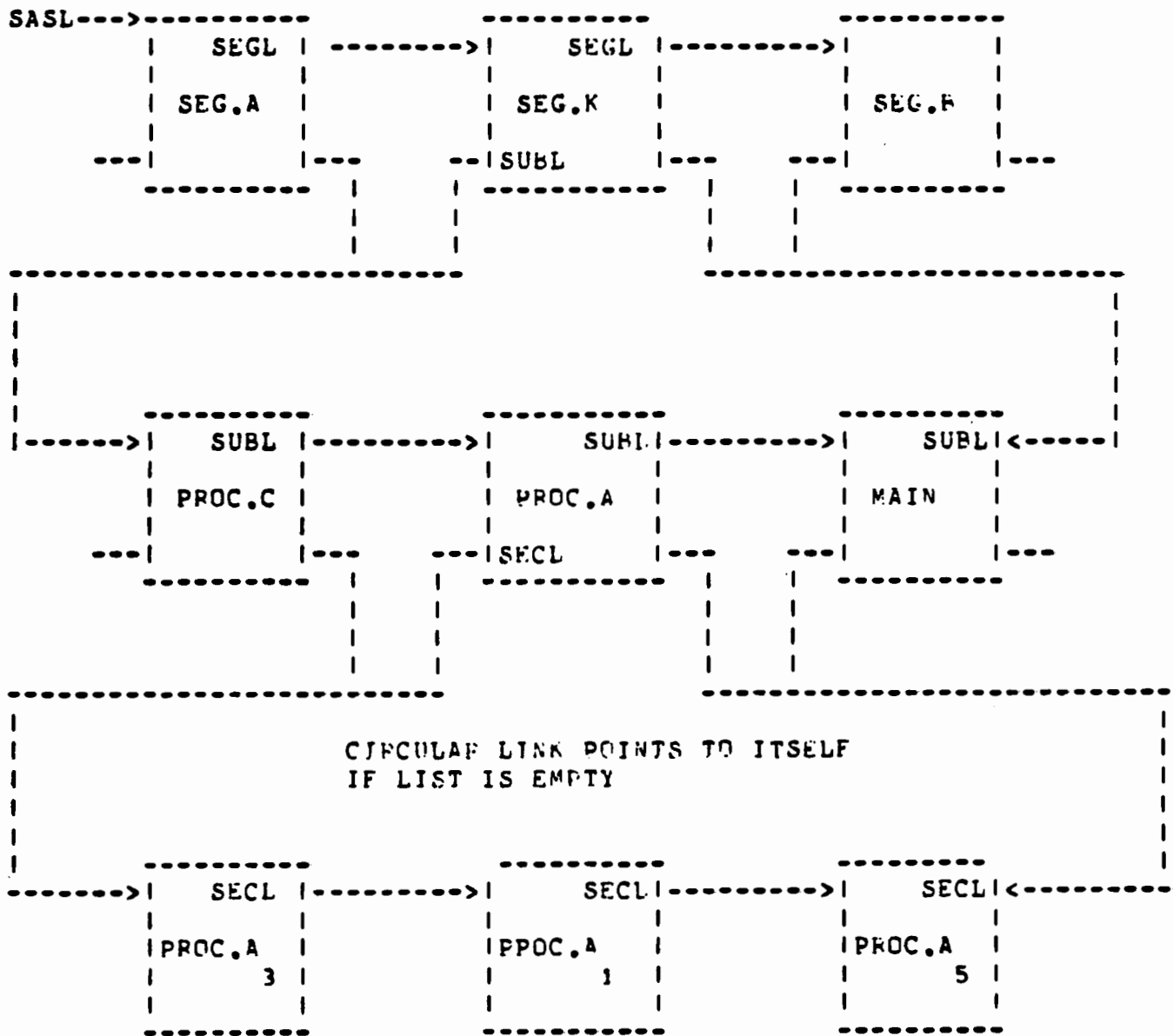
9-BIT RECORD #		1	WORD #
		1	WITHIN RECORD

0	8	9	15

Shaded and uninitialized fields are reserved for future use and should be set to zero.

RECORD 0 AND OVERALL USL FILE FORMAT

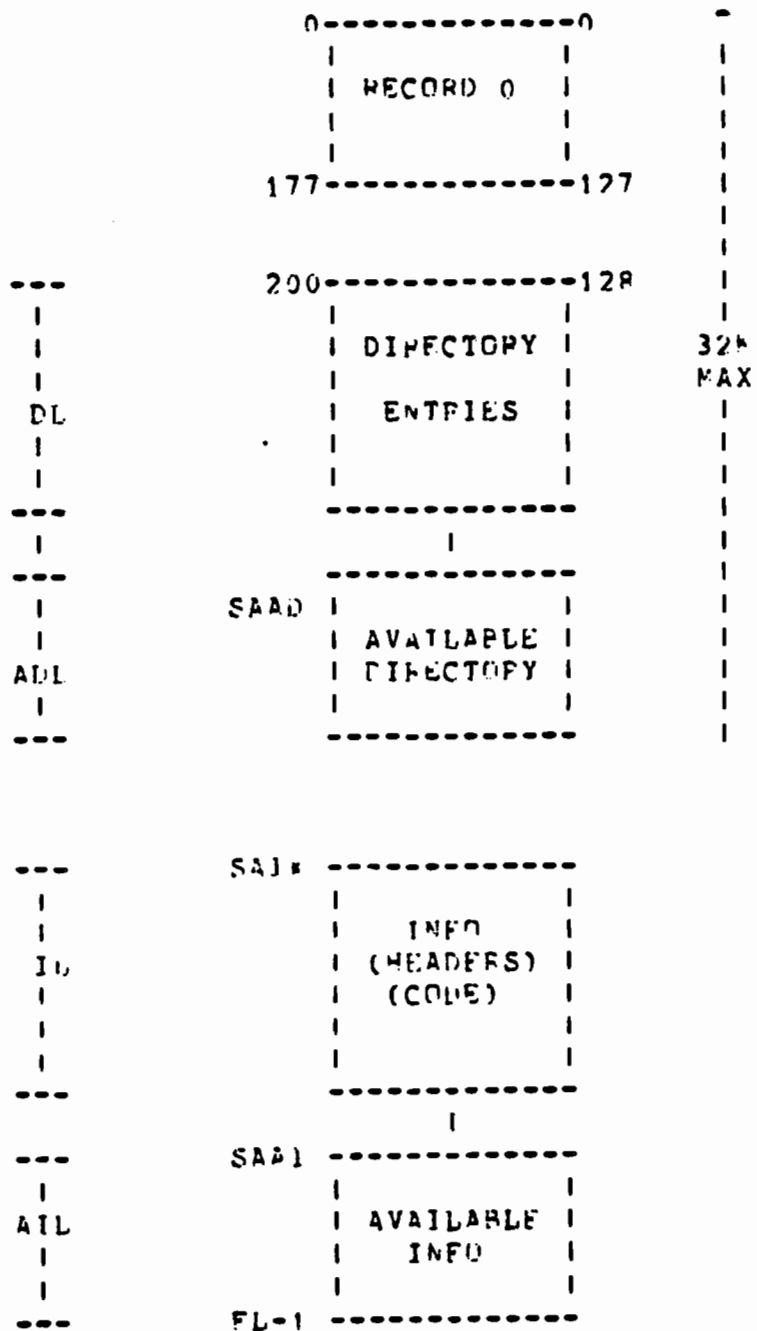
01	LID	0	LOADER ID
11	NE	1	NR. DIRECTORY ENTRIES
21	DL	2	DIF. LENGTH
31	SUMDG	3	TOTAL DIF. GARBAGE
41	NDG	4	NP. DIF. GARB. ENTRIES
51	SARDL	5	S.A. BLOCK DATA LIST
61	SAIPL	6	S.A. INTERRUPT PROC. LIST
71	SASL	7	S.A. SEGMENT LIST
101	FL	8	FILE LENGTH
111		9	FILE LENGTH



A \
K >SEGMENT NAME ENTRIES
B /

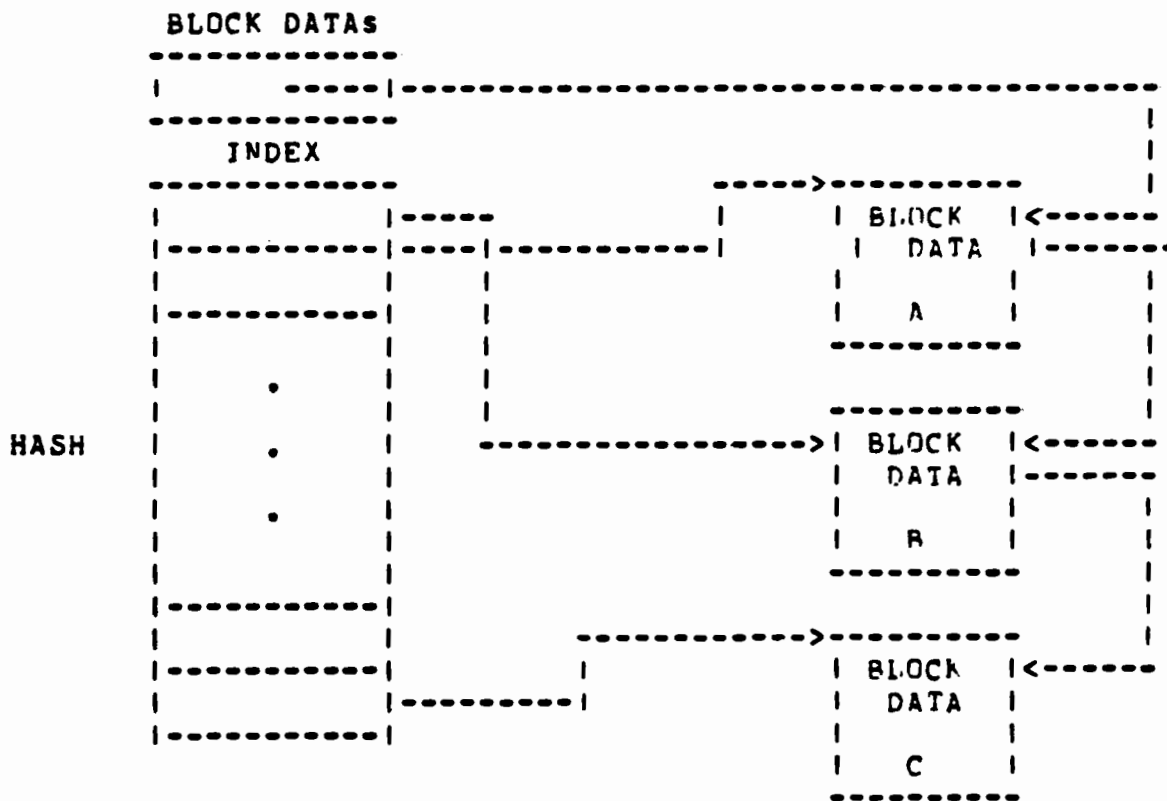
PROC C \
PROC A >SUBPROGRAM
MAIN / ENTRIES

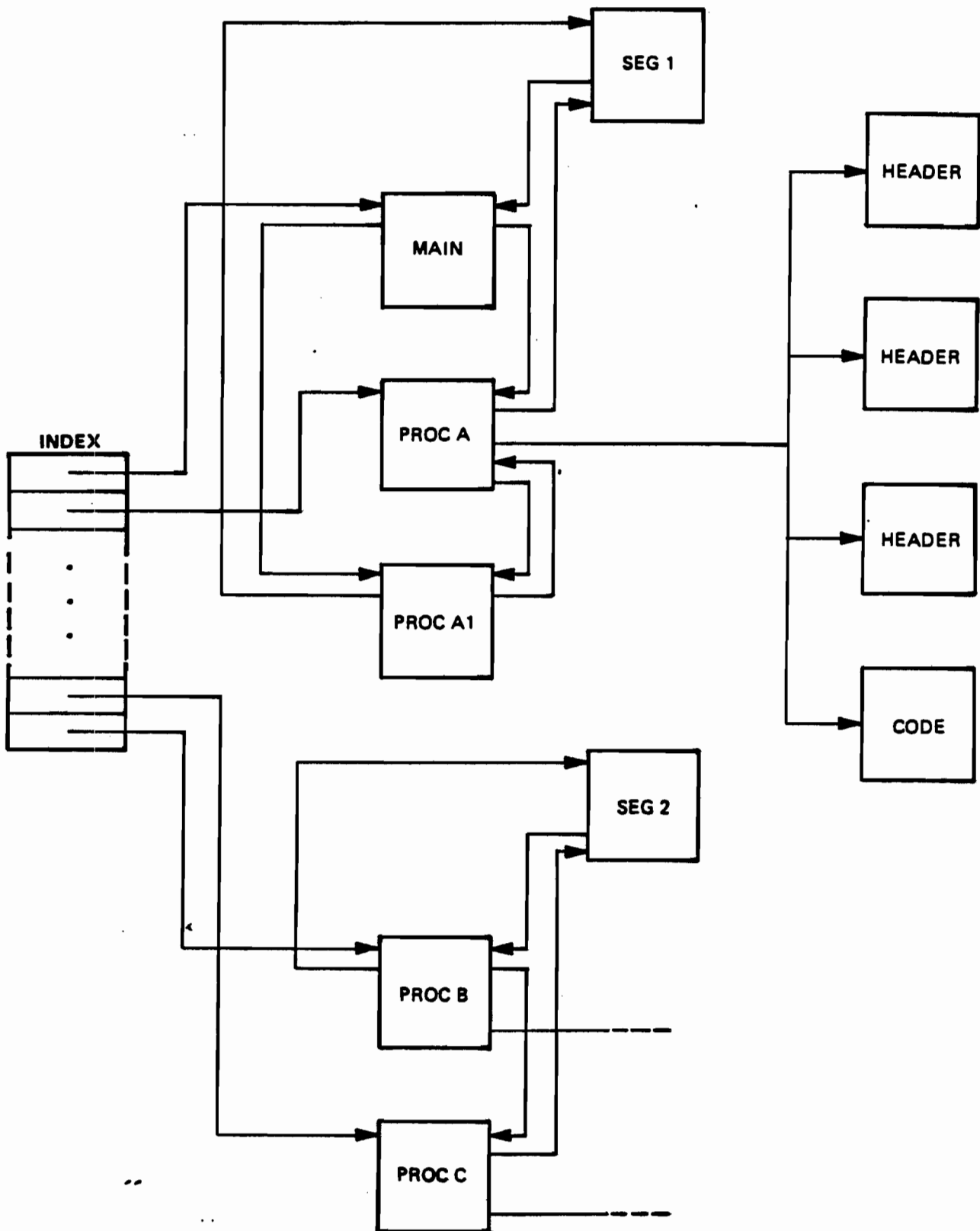
A \
3 |
A |
1 } SECONDRY ENTRY POINT ENTRIES
-A |
5 /



*SAI MUST BE ON A RECORD BOUNDARY

NOTE: ALL ADDRESSES IN RECORD 0 ARE WORD ADDRESSES.





DATA DESCRIPTORS

```

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MODE | | STRUCTURE | | | | | | | | | | | | | | | |
-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

```

TYPE	WORDS	CODE
NULL		0
LOGICAL	1	1
INTEGER	1	2
BYTE	1/2	3
REAL	2	4
DOUBLE	2	5
LONG	3	6
COMPLEX	4	7
LABEL (SPL)		10
CHARACTER	N/2	11
LABEL (FORTRAN)		12
UNIVERSAL (MATCHES ANY TYPE)		13

STRUCTURE

SIMPLE VARIABLE	0
POINTER	1
ARRAY	2
PROCEDURE	3

MODE

NULL	0
VALUE	1
REFERENCE	2
NAME	3

NOTE: A descriptor of 0 results in an automatic match.

ENTRY TYPE 0

GARBAGE

0	1	10	11	15
1	1	1	0	1
GARBAGE				

Nw - Number of words in this block

0	1					7	8			10	11			15

I	/	/	I			NW				I		1		I

I						H	L							I

IA	I	/	/	/	/	/	/	I	NC			CHAR1		I

I						.								I
I		(	VARIABLE	*		CHAR.		SEE	NC)					I
I						:								I
I						.								I

I		CHAR.	NC			I	/	/	/	/	/	/	/	I

I						SEGL								I

I	L	I				SUBL								I

HL - Hash link - points to next entry having the same hash code

A - Activity bit
0 if active
1 if inactive
(initialize to 0)

Note: An inactive segment implies that all entry points are inactive

NC - Number of characters in name. Max is 16

CHAR. 1 - First character in variable field

CHAP. NC - Last character in
variable field

SEGL - Segment link - points to
next segment name
entry

SUBL - Subprogram link - points to next entry having the same segment name

L - Last entry in list
0 if not last
1 if last

CLARIFICATION NOTES ON ENTRY TYPES 2 AND 4
WITH RESPECT TO SPL AND FORTRAN

*ENTRY TYPE 2 SPL O.B.	**ENTRY TYPE 4 SPL PROC	*ENTRY TYPE 2 FORTRAN MAIN	**ENTRY TYPE 4 FORTRAN SUB.
TPDB	0	0	0
1,5 TSDR	1 TSDR	1,2,3,4 TSDR	1,2,3,4 TSDR
NWPUS ⁵	NWPUS ⁵	NWPUS ⁵	NWPUS ⁵
NWSDR	NWDR	NWD	NWD

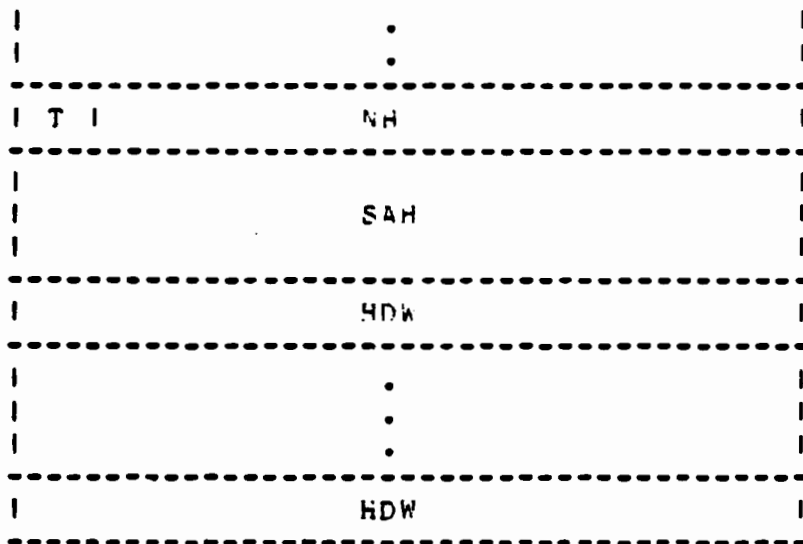
WHERE: TPDB = Total primary DB length in words
TSDR = Total secondary DB length in words
NWPUS = Number of words in "TRACE" array
NWSDR = Number of words in secondary DB array
NWD = Number of words in own array
NWD = Number of words in data array

- Notes:
1. Does not include the length of the SILT
 2. Does not include the length of the FLUT
 3. Does not include the length of any common array
 4. Includes the length of any DB-allocated format array
 5. Are not necessarily equal

In general TPDB and TSDR are summations of storage allocated in the global area or the program's data segment. They are not, however, complete since the compilers are not aware of all storage actually allocated! The SILT and FLUT are examples of this since these tables are constructed by the segmenter. Common arrays also present a problem since their inclusion in TPDB and TSDR might cause their storage requirements to be counted more than once.

0 1 2 3 4 5 6 7 8 10 11 15





- NW - Number of words in entry block.
- HL - Hash link - points to next entry with same hash code.
- A - Activity bit. 0 if active, 1 if inactive outer block.
- C - Callability bit set if entry point is uncalleable.
- I - Priv mode bit - set if program unit is to be executed in priv mode..
- NC - Number of characters in name. Max is 16.
- CHAR. 1 - First character in variable field.
- CHAR. NC - Last character in variable field.
- L - Last entry in list.
0 if not last
1 if last
- SUBL - Subprogram link - points to next entry Entry having the same segment name.
- SECL - Secondary entry point list link.
- SSA - Program unit starting PB address.
- SAC - Starting 8FILE9 address of code module

F - Set if fatal error

W - Set if non-fatal error

NWC - Number of words in code module.

SE - Stack size estimate

TPDB - Total number of words of primary
DB to be allocated

TSDB - Total number of words of secondary
DB to be allocated.

NWPUST - Number of words in trace array
(PUST)

NWD - Number of words in data array
(FORTRAN)

NWSDB - Number of words in secondary
DB array (SPL)

T - Terminating bit - set if last set of
headers in entry

NH - Number of headers

SAH - Starting address of header (relative
to SAI)

HDW - Header (pointer)

ENTRY TYPE 3

OUTER BLOCK - SECONDARY ENTRY POINT

0	1	2	3	4	5	6	7	8	10	11	15
1	/	/	1					NW		1	3
1								HL			
1	A	1	C	1	/	/	1	NC	1	CHAP	1
1								(VARIABLE * CHAP.SFF NC)			
1											
1								CHAP NC	1	/	/
1	L	1						SECL			
1								SSA			

.....

```

0      1      2      3 4567 8      10 11      15
-----|-----|-----|-----|-----|-----|-----|-----|
|//|                                     |         4
-----|-----|-----|-----|-----|-----|-----|-----|
|                                     HL
-----|-----|-----|-----|-----|-----|-----|-----|
|A | C| I| H| NC |                 CHAP.1
-----|-----|-----|-----|-----|-----|-----|-----|
|                                     .
|      (VARIABLE # CHAP. SEE NC)
|                                     .
-----|-----|-----|-----|-----|-----|-----|-----|
|  CHAP.NC      |/////////////////////////
-----|-----|-----|-----|-----|-----|-----|-----|
|IL |          |  SUBL
-----|-----|-----|-----|-----|-----|-----|-----|
|IL |          |  SECL
-----|-----|-----|-----|-----|-----|-----|-----|
|          |  SSA
-----|-----|-----|-----|-----|-----|-----|-----|
|          |  SAC
-----|-----|-----|-----|-----|-----|-----|-----|
|F | W|          |  NWC
-----|-----|-----|-----|-----|-----|-----|-----|
|          |  SE
-----|-----|-----|-----|-----|-----|-----|-----|
|          |  TPDR
-----|-----|-----|-----|-----|-----|-----|-----|
|          |  TSDB
-----|-----|-----|-----|-----|-----|-----|-----|
|          |  NWPUST
-----|-----|-----|-----|-----|-----|-----|-----|
|          |  NWD/NWO
-----|-----|-----|-----|-----|-----|-----|-----|
|  P | I      |  NP | I          |  CN
-----|-----|-----|-----|-----|-----|-----|-----|
|          |  TN
-----|-----|-----|-----|-----|-----|-----|-----|
|          |  PARM.1
-----|-----|-----|-----|-----|-----|-----|-----|
|          |  .
|      (VARIABLE # OF FARMS. SEE CN)
|          |  .
-----|-----|-----|-----|-----|-----|-----|-----|
|          |  PARM. NP
-----|-----|-----|-----|-----|-----|-----|-----|
|  TI          |  NH

```

SAH
HDW
:
:
:
HDW
:
:
:
ETC

NW - Number of words in entry block

HL - Hash link - points to next entry with same hash code

A - Activity bit. 0 if active, 1 if inactive entry point

C - Callability bit set if entry point is uncallable

I - Priv mode bit. Set if procedure is to be executed in priv mode.

H - Hidden entry point. Set if entry point will not be in library directory.

NC - Number of characters in name. Max is 16.

CHAR1 - First character in variable field.

CHAR NC - Last character in variable field.

L - Last entry in list

0 if not last

1 if last

SUBL - Subprogram link. Points to next entry having the same segment Name

SECL - Secondary entry point list link.

SSA - Unit starting PB address

SAC - Starting (file) address of code module

F - Set if fatal error

W - Set if non-fatal error

NWC - Number of words in code module

SE - Stack size estimate

TPDB - Total number of words of primary DB to be allocated.

TSDB - Total number of words of secondard DB to be allocated.

NWPUST - Number of words in trace array (PUST)

NWD - Number of words in data array (FORTRAN)

NWO - Number of words in own array (SPL)

P - Parm checker

00 no checking. (Implies NP undefined, FN and PARM's absent)

01 check procedure type. (Implies NP is undefined and PARM's absent)

10 check procedure type and number of PARM's (implies PARM's absent).

11 check procedure type, number of PARM 's and type of each PARM.

NP - Number of PARM's

CN - Character count of PARM's

TN - Terminating bit. Set if last set of headers in entry.
NH - Number of headers
SAH - Starting address of header
HDW - Header (pointer)

ENTRY TYPE 5

PROCEDURE - SECONDARY ENTRY POINT

0	1	2	3	4	5	6	7	8	10	11	15

//				NW				5			

								HL			

A		C		//		H		NC		CHAR. 1	

(VARIABLE #CHAR. SEE NC)											

CHAR. NC								////////////////			

L		SECL									

SSA											

NW - Number of words in entry block

HL - Hash link - points to next entry with same hash code

A - Activity bit. 0 if active, 1 if inactive entry point

C - Callability bit set if entry point is uncallable.

H - Hidden entry point set if entry point will not be in library directory

NC - number of characters in name, max is 16

CHAR 1 - First character in variable field.

L - Last entry in list
0 if not last
1 if last

SECL - Secondary entry point list link

SSA - Unft starting PB* address

ENTRY TYPE 6

INTERRUPT PROCEDURE

1	011	12	13	14	56	718	10111	151

1	/	/	1	NW			1	1

1						HL		1

1	A	1	IT	1	/	/	1	NC 1

1						(VARIABLE # CHAR. SEE NC)		1

1	A	1	IT	1	/	/	1	NC 1

1						(VARIABLE # CHAR. SEE NC)		1

1	CHAR.	NC	1					

1						IPL		1

1						DRS		1

1						SSA		1

1						SAC		1

1	F	1	WI			NWC		1

1	T	1				NH		1

1						SAH		1

1						HDW		1

1						.		1

1						.		1

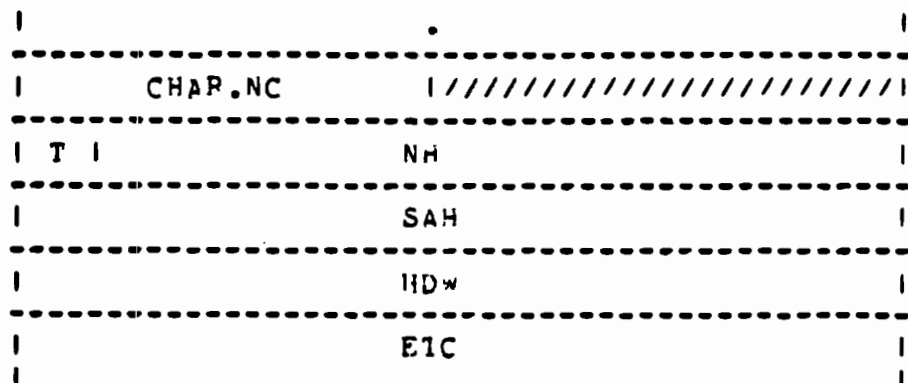
1						HDW		1

NW - Number of words in entry block
 HL - Hash link. Points to next entry with same hash code
 A - Activity bit. 0 if active, 1 if inactive entry.
 IT - Interrupt procedure type number
 NC - Number of characters in name
 A - Activity bit. 0 if active, 1 if inactive entry.
 IT - Interrupt procedure type number
 NC - Number of characters in name.
 CHAR 1 - First character in variable field.
 CHAR NC Last Character in variable field
 IPL Interrupt procedure link
 DBS Number of words of DB storage required.
 SSA Unit starting PB' address
 SAC Starting (file) address of code module.
 F Set if fatal error
 W Set if non-fatal error
 NWC Number of words in code module
 T Terminating bit. Set if last set of headers in entry.
 NH Number of headers
 SAH Starting address of header.
 HDW Header (pointer)

.....

• • • • •

5-27



NW	Number of words in block
HL	Hash link. Points to next entry with same hash code.
A	Activity bit. 0 if active, 1 if inactive block.
F	Set if fatal error.
W	Set if non-fatal error.
CHAR 1	First character in variable field.
CHAR NC	Last character in variable field.
BDL	Block data link
CAL	Common array length
T	Terminating bit. Set if last set of headers in entry.
NH	Number of headers.
SAH	Starting address of headers.
HDW	Header (pointer)



ENTRY TYPE 8

PROCEDURE - SECONDARY ENTPY POINT

0	1	2	3	4	5	6	7	8	10	11	15	
///I			NW						I		R	
HL												
A	I	C	I	I	H	I	NC	I	CHAR. 1			
(VARIABLE #CHAR. SEE NC)												
CHAR. NC												
L I SECL												
SSA												
P I		NP		I		CH						
TN												
PAPM. 1												
PAPM. NP												

NW - NUMBER OF WORDS IN ENTRY BLOCK

HL - HASH LINK - POINTS TO NEXT ENTRY
WITH SAME HASH CODE

A - ACTIVITY BIT. 0 IF ACTIVE, 1 IF INACTIVE
ENTRY

C - CALLABILITY BIT SET IF ENTRY POINT IS
UNCALLABLE

H - HIDDEN ENTRY POINT. SET IF ENTRY
POINT WILL NOT BE IN LIBRARY
DIRECTORY

NC - NUMBER OF CHARACTERS IN NAME. MAX
IS 16

CHAR 1 - FIRST CHARACTER IN VARIABLE LIST

CHAR NC - LAST CHARACTER IN VARIABLE
LIST

L - LAST ENTRY IN LIST
0 IF NOT LAST
1 IF LAST

SECL - SECONDARY ENTRY POINT LIST LINK

SSA - UNIT STARTING PH' ADDRESS

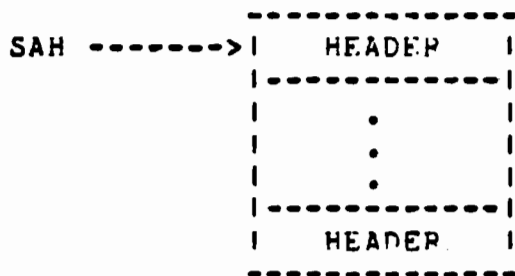
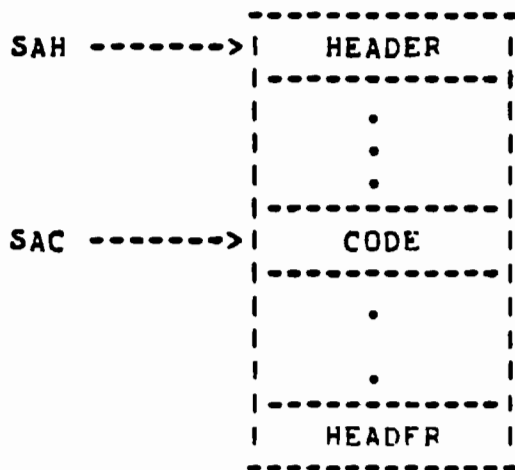
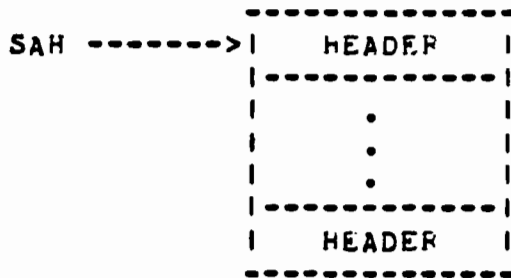
P - PARM CHECKER
00 NO CHECKING (IMPLIES NP UNDEFINED,
TN AND PARMS ABSENT)
01 CHECK PROCEDURE TYPE (IMPLIES NP
IS UNDEFINED AND PARMS ABSENT)
10 CHECK PROCEDURE TYPE AND NUMBER
OF PARMS. (IMPLIES PARMS ABSENT)
11 CHECK PROCEDURE TYPE, NUMBER OF
PARMS AND TYPE OF PARM.

NP - NUMBER OF PARMS

CN - CHARACTER COUNT OF PARMS

TN - PROCEDURE TYPE

ENTRY HEADER FORMAT



EACH ENTRY (EXCEPT SECONDARY ENTRY POINT ENTRIES) MAY DESCRIBE N > 0 SETS OF HEADERS. THE HEADERS IN EACH SET MUST BE CONTINUOUS AND IN THE SAME ORDER AS THE HOW LIST DESCRIBING THE SET.

THE CODE MODULE MAY BE PLACED IN ANY POSITION IN A HEADER SET. NOTE THAT IF THE CODE MODULE IS AT THE BEGINNING OF A SET, SAC = SAH.

IF THE ENTRY HAS NO HEADER SET, THEN NH, SAH SEQUENCE IS ABSENT.

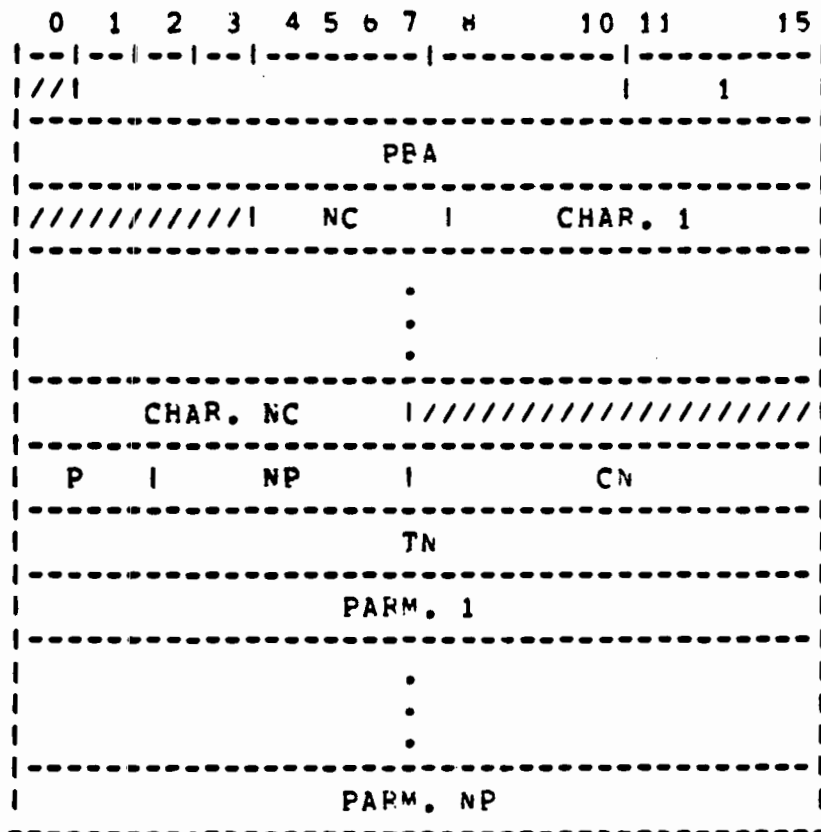
HEADER TYPE 0

GARBAGE

0	1	10	11	15
///	lw	1	0	
GARBAGE				

HEADER TYPE 1

PCALs



PBA - PB' ADDRESS OF LINKED LIST OF PCAL INSTRUCTIONS TO BE REPAIRED - LOWER 14 BITS USED AS NEGATIVE DISP. - BIT 0 SET MEANS THAT WORD IS NOT A PCAL INSTRUCTION BUT A POINTER TO A SST LABEL OF "EXTERNAL" FORMAT - A LINK OF 0 TERMINATES THE LIST - BIT 1 SET MEANS THAT THE WORD IS TO BE INITIALIZED WITH THE PB ADDRESS OF THE PROCEDURE.

HEADER TYPE 2

PB ADDRESSES

0	1	10	11	15
///	NW	I	2	
PRA				
:				
PBA				

PBA - PB ADDRESS OF PB ADDRESS
TO BE CORRECTED

HEADER TYPE 3

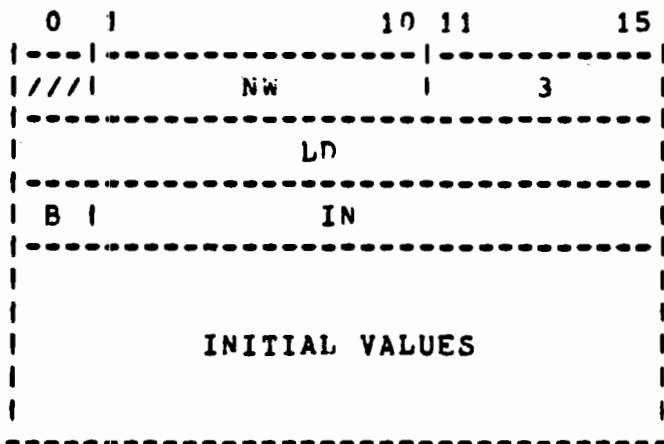
OWN/DATA VARIABLES

0	1	10	11	15
///	w	I	3	
BI	PRA			
:				
BI	PBA			

PBA - PB ADDRESS OF OWN VARIABLE
POINTED TO BE CORRECTED

HEADER TYPE 4

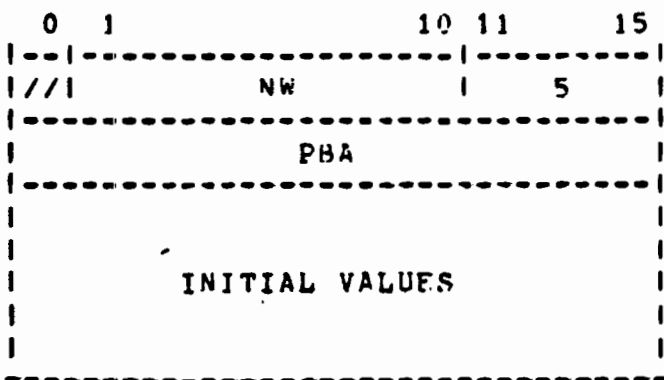
DSDB/DWN/DATA/VALUES



- LD - LOGICAL WORD DISPLACEMENT
IN OWN ARRAY FOR INITIAL VALUES
- B - BYTE BIT-SET IMPLIES THAT LD IS
TYPE BYTE AND THAT THE FIRST
WORD OF THE INITIAL VALUE BLOCK
IS A COUNT OF THE NUMBER OF BYTES
IN THE INITIAL VALUE BLOCK
- IN - INTERATION NUMBER - NUMBER OF
TIMES THE BLOCK OF INITIAL VALUE
IS TO APPEAR IN THE SECONDARY BD -
1->NO DUPLICATION,
2->DUPLICATION, ETC

HEADER TYPE 5

PUST



PBA - PB' ADDRESS OF LINKED LIST OF
POINTERS TO BE INITIALIZED WITH
DB ADDRESS OF PUST (SAME LIST
FORMAT AS FOR FORMAT STRINGS)
A PBA of -1 INDICATES NO FIX-UPS.

NOTE: ALL REFERENCES TO THE PUST INCLUDE THE FOUR-WORD HEADER
THAT IS APPENDED BY THE SEGMENTER. THESE WORDS ARE NOT
PRESENT IN THE HEADER; THEY ARE AUTOMATICALLY
ALLOCATED AND INITIALIZED BY THE SEGMENTER.

HEADER TYPE 6

GLOBAL VARIABLES

0	1	7	8	10	11	15
///		NW			6	
		TN				
	DBA	////////			NC	
	CHAR.1			CHAP. 2		
		.				
		.				
		.				
	CHAR. NC	////////				

HEADER TYPE 7

EXTERNAL VARIABLES

0	1	2	3	4	5	6	7	8	10	11	15
///						NW				7	
						TN					
	MI	////			NC			CHAP. 1			
						.					
						.					
						.					
	CHAR. NC					////////					
						DA					
						PBA					
						.					
						.					
						.					
						PBA					

PBA - PB* ADDRESS OF LINKED LISTS OF INSTRUCTIONS TO BE REPAIRED - LOWER 8 BITS OF INSTRUCTION USED AS A NEGATIVE DISPLACEMENT TO NEXT INSTRUCTION - A LINK OF 0 TERMINATES THE LIST.

M - MONITORED VARIABLE BIT - SET IF VARIABLE IS BEING MONITORED BY DEBUG.

DA - LOGICAL WORD DISP. IN PUST - LOWER 8 BITS OF WORD WILL BE INIT. WITH PRIM.DB ADDRESS OF VARIABLE - NOTE DA IS PRESENT IF M=1.

NOTE: A PBA OF -1 IMPLIES A NULL LIST.

HEADER TYPE 8

PRIMARY DB

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	/					N							8		
	U		U		U		U		U		U		U		U
	0	1	1	2	1	3	1	4	1	5	1	6	1	7	1
	:														
	U		U		U		U		U		U		U		U
	N-5		N-4		N-3		N-2		N-1		U		U		U
	INITIAL VALUES														

U - ADDRESS BITS
 00 IF NO ADDRESS
 01 IF NO ADDRESS
 10 IF WORD ADDRESS IN SECONDARY DB
 11 IF BYTE ADDRESS IN SECONDARY DB

N - NWPDB

NOTE: INITIAL ADDRESSES THAT ARE
 SECONDARY DB ADDRESSES ARE 0
 RELATIVE (I.E., THEY ARE
 LOGICAL DISPLACEMENTS IN
 SECONDARY DB).

HEADER TYPE 9

COMMON VARIABLES

0	1	2	3	4	5	6	7	8	10	11	15
-	-	-	-	-	-	-	-	-	-	-	-
/	/					NW				9	

NWC											

/	/	/	/	/	/	/	NC			CHAR. 1	

.											
.											
.											

CHAR. NC											
/											

BI MI											
NL											

LD											

DA											

PBA											

.											
.											
.											

PBA											

.											
.											
.											

BI MI											
NL											

LD											

DA											

PBA											

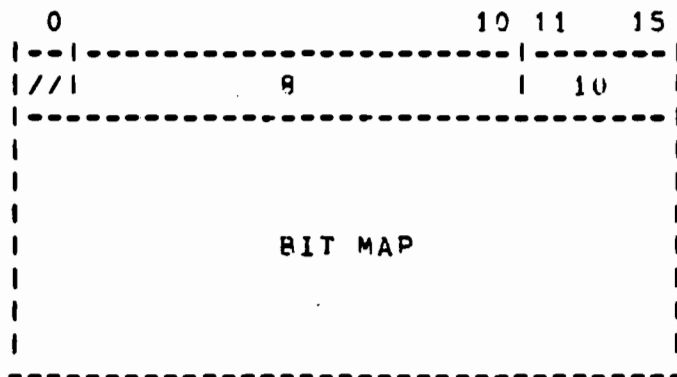
.											
.											
.											

PBA											

NWC - NUMBER OF WORDS IN COMMON ARRAY
 NC - NUMBER OF CHARACTERS IN COMMON
 NAME- IF BLANK COMMON 4 COM'
 DA - LOGICAL WORD DISP. IN PUST - LOWER
 8 BITS OF WORD WILL BE INIT. WITH
 PRIM. DB ADDRESS OF VARIABLE - NOTE
 DA IS PRESENT IF M = 1
 B - BYTE BIT
 0 IF THE PRIMARY DB POINTER TO BE
 ALLOCATED AND INITIALIZED AND LD
 ARE OF TYPE WORD
 1 IF TYPE BYTE
 M - MONITORED VARIABLE BIT - SET IF
 VARIABLE IS BEING MONITORED BY
 DEBUG
 NL - NUMBER OF ADDRESS LISTS FOR
 VARIABLE
 LD - LOGICAL DISPLACEMENT OF VARIABLE
 IN COMMON ARRAY
 PBA - PB' ADDRESS OF LINKED LISTS OF
 INSTRUCTIONS TO BE REPAIRED
 LOWER 8 BITS USED AS NEGATIVE
 DISPLACEMENT TO NEXT INSTRUCTION
 A LINK OF 0 TERMINATES THE
 LIST
 PBA = -1 INDICATES NO FIX-UPS

HEADER TYPE 10

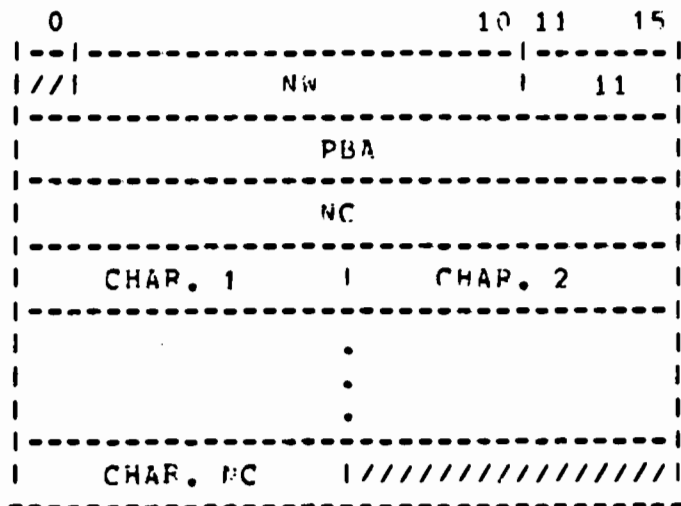
LOGICAL UNITS



BIT MAP - BIT MAP OF LOGICAL UNITS
 REFERENCED; BIT 0
 CORRESPONDS TO LU 0, ETC.
 (1 LESS THAN OR EQUAL TO LU
 LESS THAN OR EQUAL TO 99)

HEADER TYPE 11

FORMAT STRING



PBA - PR ADDRESS OF LINKED LIST OF
 POINTERS TO BE INITIALIZED
 LOWER 14 BITS OF WORD USED
 AS NEGATIVE DISPLACEMENT TO
 NEXT POINTER - BIT 0 SET
 MEANS THAT THE POINTER IS TO
 BE TYPE BYTE - A LINK OF 0
 TERMINATES THE LIST.

PROGRAM FILE FORMAT

0	-----	
0	FLAGS	0
1	-----	
1	NS	1
2	-----	
2	GS	2
3	-----	
3	SAG	3
4	-----	
4	SAS	
5	-----	
5	ISS	5
6	-----	
6	IDLS	6
7	-----	
7	MAXD	7
10	-----	
10	SAE	18
11	-----	
11	SSEG	19
12	-----	
12	SADP	110
13	-----	
13	SASTLT	11
14	-----	
14	SAFLUT	12
15	-----	
15	SAX	13
16	-----	
16	SSTT	14
17	-----	
17		15
20	-----	
20		16
21	-----	
21		17
22	-----	
22		19
23	-----	
23		19
24	-----	
24		20
25	-----	
25		21
26	-----	
26		22

NUMBER OF CODE SEGMENTS

GLOBAL SIZE (DB TO QI) IN WORDS

GLOBAL AREA RECORD #

SEGMENT SET RECORD # (EACH SEG. STARTS IN NEW RECORD)

INITIAL STACK SIZE IN WORDS

INITIAL DL SIZE IN WORDS

MAX. DATA SEGMENT SIZE (DL TO Z) IN WORDS

ENTRY POINT LIST RECORD #

STARTING SEGMENT #

PRIN. ENTRY PT PB ADDRESS

DB ADR. OF STLT (-1 IF NO STLT)

DB ADR. OF FLUT (-1 IF NO FLUT)

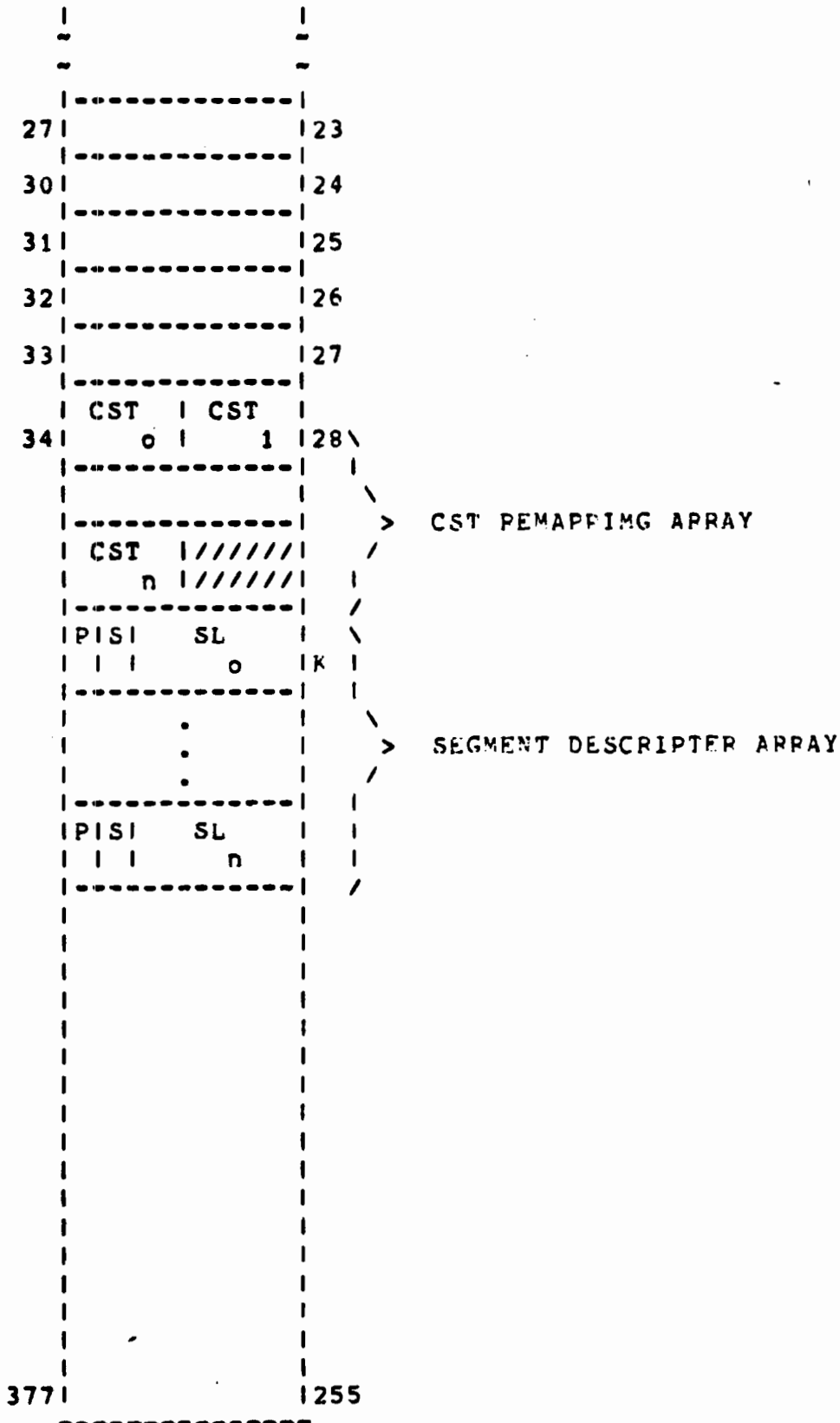
EXTERNAL LIST RECORD #

PRIN. ENTRY PT SST #

NOTE: UNINITIALIZED FIELDS ARE
RESERVED FOR FUTURE USE AND
SHOULD BE ZERO.

NOTE: SHADED AND UNINITIALIZED FIELDS ARE RESERVED
FOR FUTURE USE AND SHOULD BE ZERO.

PROGRAM FILE FORMAT (CON1)



P-PRIVILEGED MODE

S-SPARE

N=NS -1

K=28 + (NS +1) & LSR (1)

THE MAX. # OF SEGMENTS IN A PROGRAM
FILE IS 152. THIS ALLOWS ALL DESCRIPTIVE
INFORMATION TO BE CONTAINED IN 2
RECORDS (RECORDS 0 AND 1). IF THE PROGRAM
HAS 66 OR FEWER SEGMENTS, ALL
INFORMATION IS CONTAINED IN A SINGLE
RECORD (RECORD 0). THE PROGRAM FILE
THEN STARTS IN RECORD 1.

FLAGS

```

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
|F|W|I|Z|I|P|I|I|      C A P A B I L I T Y   L I S T      |

```

F - FATAL ERROR IN PROGRAM
W - NON-FATAL ERROR IN PROGRAM
Z - ZEPO UNIT DL AREA
P - SET IF ANY SEG IS PPRIV. (IF NOT SET NORMAL=NONPRIV MODE)

```

0  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15
|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|-|
|/|/|/|/|/|/|/|/|/|INS|BA|IA|PM|CR|RT|MP|///|DS|PH

```

```

/ NON-STANDARD SUB-QUEUE ACCESS (10) [NS]
|
| BATCH ACCESS (9) [BA]
|
| INTERACTIVE ACCESS (8) [IA]
|
| PRIVILEGED MODE (7) [PM]
|
|
ACCESS TO / CORP RESIDENCY (6) [CR]
GENERAL < NOT USED <
RESOURCES \ REAL TIME (5) [RT]
|
| MULTIPLE RINS (4) [MP]
|
|
| EXTRA DATA SEGMENT (2) [DS]
|
\ PROCESS HANDLING (1) [PH]

```

CST REMAPPING ARRAY

CONTAINS THE LAST CST NUMBERS ASSIGNED TO THE SEGMENTS; INDEXED BY SEGMENT NUMBER. WHEN A PROGRAM FILE IS PREPARED, THE ARRAY IS INITIALIZED TO 0, 1...,N. THIS ARRAY IS USED TO RE-ESTABLISH INTRA-PROGRAM LINKAGE WHEN THE PROGRAM IS LOADED.

SEGMENT DESCRIPTOR ARRAY

CONTAINS THE SEGMENT LENGTH AND A FLAG INDICATING IF THE SEGMENT IS TO BE LOADED IN PRIV. MODF. INDEXED BY SEGMENT NUMBER. ALL SEGMENTS BEGIN ON A RECORD BOUNDARY. THE NUMBER OF RECORDS FOR A GIVEN SEGMENT IS (SL + 127) & LSP(7). THE RECORD NUMBER, SAS, OF SEGMENT N IS

```
SAS:=0
FOR I=0 TO N-1
  BEGIN
    SAS:=SAS + (SL(I) + 127)&LSP(7)
  END
```

GLOBAL AREA FORMAT

A SET OF RECORDS CONTAINING THE INITIAL VALUES FOR THE GLOBAL AREA OF THE DATA SEGMENT. THIS SET BEGINS AT RECORD SAG AND CONSISTS OF (GS + 127) & LSP(7) RECORDS.

EXTERNAL LIST

0 7 8 15

///INC CHAR 1		

:		

CHAR NC ////////		

NR		

STT # SEG #		

:		

STT # SEG #		

LC NP CN		

TN		

PARM 1		

:		

:		

:		

PARM NP		

:		

:		

:		

0		

TYPICAL ENTRY

> NR

LIST TERMINATOR

LC (0:2) = LEVEL OF CHECKING
 0 = NO CHECKING
 1 = CHECK FOR PROCEDURE TYPE
 2 = CHECK FOR # PARAMETERS
 3 = CHECK FOR PARAMETER TYPE
 NP (2:6) IS # PARAMETERS

ENTRY POINT LIST

```

-----
|/////| NC | CHAP 1 |
|-----|
|      |      |      |
|      |      |      |
|-----|
| CHAR NC |////////|
|-----|
|      P.B. ADR      |
|-----|
|      STT #         |
|-----|

```

.
 :
 .

```

-----
|/////| NC | CHAP 1 |
|-----|
|      |      |      |
|      |      |      |
|-----|
| CHAR NC |////////|
|-----|
|      P.B. ADR      |
|-----|
|      STT #         |
|-----|
|      0              |
|-----|

```

LIST TERMINATOR

NOTE THAT THE ENTRY POINT LIST MUST IMMEDIATELY FOLLOW THE EXTERNAL LIST.

SL FILE FORMAT

```

01 LID 10
1 FL 11 FILE LENGTH (IN RECORDS)
2 EL 12 EXTENT LENGTH (IN RECORDS)
3
4 NSEG 14 # SEGMENTS
5
6
7 FRTL 17 S.A. OF FREE R.T. ENTRY LIST (-1 IF NONE)
10
11 NRT 19 # REFERENCE TABLE ENTRIES
12
13 NS 11 # SECTIONS
14
41 HLO 133
.
.
.
177 HL94 1127

```

NOTE:
SHADED AND UNINITIALIZED FIELDS ARE
RESERVED FOR FUTURE USE AND
SHOULD BE ZERO.

0-----
| RECORD |
0

1-----
| RECORD |
1

2-----
| FREE MAP |
0

⋮

NS+1-----
| FREE MAP |
NS-1

NS+2-----
| AVAILABLE |
| |

STORAGE MANAGEMENT

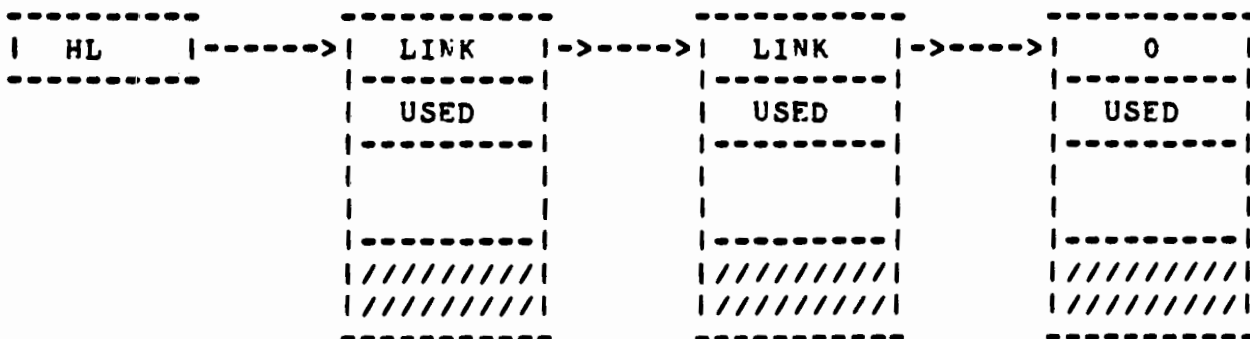
FILE SPACE IS MANAGED IN TERMS OF 128 WORD BLOCKS (1 BLOCK PER 128 WORD RECORD).

FREE SPACE (BLOCKS) IS ACCOUNTED FOR IN A BIT MAP, WHICH IS PARTITIONED INTO RECOPDS (2K BLOCKS PER SECTION). A 0 INDICATES THAT A BLOCK IS USED; A 1 INDICATES THAT IT IS FREE.

FILE SPACE IS ALSO PARTITIONED INTO 2048 RECORD SECTIONS (16 MAX. SECTIONS, 2K BLOCKS PER SECTION 1 MAP PER SECTION). THE NUMBER OF SECTIONS IN A FILE IS $NS = (FL + 2047) \& LSR(7)$. THE FIRST NS RECORDS FOLLOWING RECORDS 0, 1 (RECORDS 2 TO NS+1) ARE RESERVED FOR THE SECTION MAPS.

IF THE SECTION MAPS SPECIFY MORE SPACE THAN IS POTENTIALLY AVAILABLE, THOSE RECORDS BEYOND FLIMIT ARE MARKED AS "USED".

ENTRY POINT DIRECTORY



THE DIRECTORY IS PARTITIONED INTO 95 HASH LISTS (SAME HASH FUNCTION AS USL); EACH HASH LIST IS A LINKED LIST OF RECORDS.

EACH RECORD CONTAINS A SUCCESSOR LINK (RECORD #) AND A USED SPACE COUNT. A LINK OF 0 TERMINATES A LIST. WHEN A RECOPD IS VOID OF ENTRIES (USED=2), ITS SPACE IS RETURNED TO THE FREE STORAGE AREA.

TYPICAL DIRECTORY ENTRY

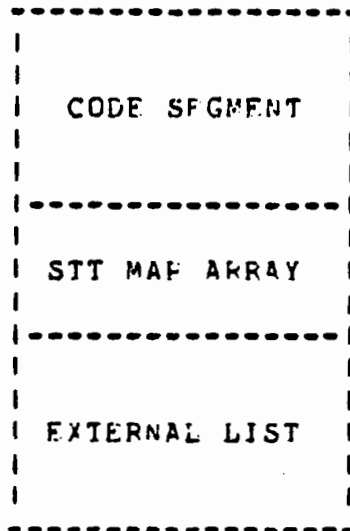
0	1	2	3	4	5	6	7	8	15
//// U				NC				1	CHAR 1
								:	
								:	
				PARM. 1.					
								:	
								:	
*				PARM. NP					

U - UNCALLABLE
BIT - SET IF
ENTRY POINT
IS UNCALLABLE

LC is (0:2)...Level of Checking
0 = No checking
1 = Check for procedure type
2 = Check for # parameters
3 = Check for parameter type

N
NP is (2:6) is # parameters

CODE SEGMENT STRUCTURE



EACH CODE SEGMENT OCCUPIES AN INTEGRAL NUMBER OF RECORDS. THIS BLOCK OF INFORMATION CAN BE SUB-DIVIDED INTO THREE TABLES: THE CODE SEGMENT PROPER, AN STT SEGMENT MAP ARRAY, AND AN EXTERNAL LIST.

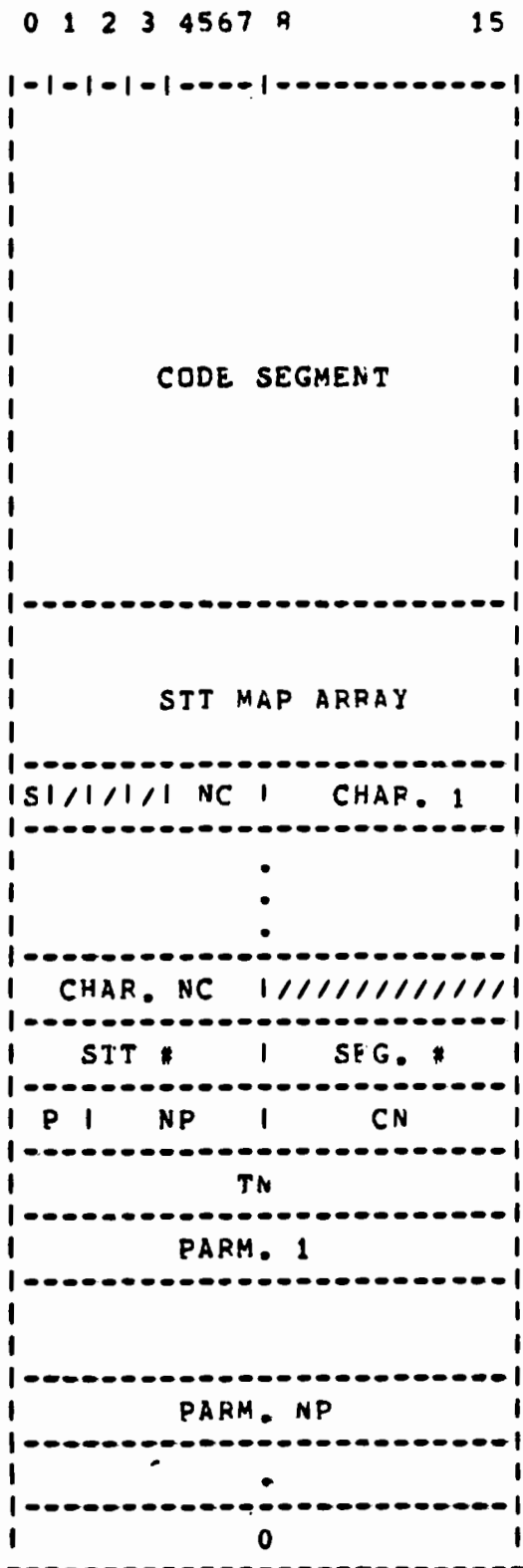
STT MAP ARRAY

A 1 BYTE X 256 BYTE ARRAY. IT IS INDEXED BY STT NUMBER AND RETURNS (IF THE STT CORRESPONDS TO AN EXTERNAL OF THE SEGMENT) THE SEGMENT NUMBER OF THE EXTERNAL AND 255 OTHERWISE. THIS ARRAY IS USED WHENEVER THE SEGMENT IS LOADED AND IS UPDATED WHENEVER THE SL IS BOUND BY THE SEGMENTER.

EXTERNAL LIST

A SYMBOLIC LIST OF THE EXTERNALS OF THE SEGMENT. EACH ENTRY CONTAINS INFORMATION ABOUT THE EXTERNAL: PARAMETER CHECKING LEVEL AND PARAMETER MATCHING INFORMATION, AND THE SEGMENT NUMBER AND STT NUMBER IF THE EXTERNAL IS SATISFIED WITHIN THE SL.

CODE SEGMENT STRUCTURE



S - SATISFIED BIT - SET IF EXTERNAL IS SATISFIED WITHIN SL

EXTERNAL LIST TERMINATOR

REFERENCE TABLE STRUCTURE

FOR EACH SEGMENT THERE IS A REFERENCE TABLE ENTRY OF 32 WORDS. THE REFERENCE TABLE ENTRIES ARE PACKED FOUR TO A RECORD. THE RECORDS CONTAINING THE REFERENCE TABLE ENTRIES ARE LISTED IN RECORD 1. THE RECORD CONTAINING REFERENCE TABLE ENTRY N IS REC 1 (N.(0 : 14)); THE FIRST WORD OF THE ENTRY IS REFTAB (P.(14 : 2) & LSL (5)).

WHEN A SEGMENT IS DELETED, THE REFERENCE TABLE ENTRY CORRESPONDING TO THE SEGMENT IS RELEASED. THESE FREE ENTRIES ARE LINKED TOGETHER IN A LIST; THE SEGMENT # IS USED AS A LINK AND IS PLACED IN THE FIRST WORD OF THE ENTRY.

WHEN A SEGMENT IS ADDED IT IS ASSIGNED A SEGMENT NUMBER (0 LESS THAN/EQUAL TO N LESS THAN/EQUAL TO 254); THE NUMBER IS THAT OF THE FIRST FREE REFERENCE TABLE ENTRY, OR, IF NONE ARE FREE, THE NEXT AVAILABLE REFERENCE TABLE ENTRY (CAUSING SPACE ALLOCATION FOR THE ENTRY).



REFERENCE TABLE

TYPICAL ENTRY

[illegible]

SEG. NAME - 16 BYTE ARRAY WITH NO
CHARACTER COUNT AND TRAILING
BLANKS ADDED

REF. MAP - 256 BIT ARRAY (INDEXED BY
SEG. #) - BIT SET IF SEG. IS
REFERENCED DIRECTLY OR INDIRECTLY

F SEGMENT DELETED
S EXTERNAL SATISFIED
A PERMANENTLY ALLOCATED
C CORE RESIDENT SEGMENT
X MPE SEGMENT
P PRIV. INST. IN SEGMENT



PL FILE FOPMAT

0	LID	10	LOADER ID
1	FL	11	FILE LENGTH (IN RECORDS)
2	NS	12	NR. SECTIONS
3		13	
4	SAXL	14	S.A. EXTERNAL SET LIST
5		15	
6		16	
7		17	
10		18	
11		19	
12		110	

0	RECORD
	0

1	FREE MAP
	0

NS	FREE MAP
	NS-1

NOTE: SHADED AREA AND
UNINITIALIZED FIELDS ARE
RESERVED FOR FUTURE USE AND
SHOULD BE ZERO.

NS+1	AVAILABLE
------	-----------

41 | HL | 33 S.A. HASH LIST 0

0

.

.

.

177 | HL | 127 S.A. HASH LIST 94

94

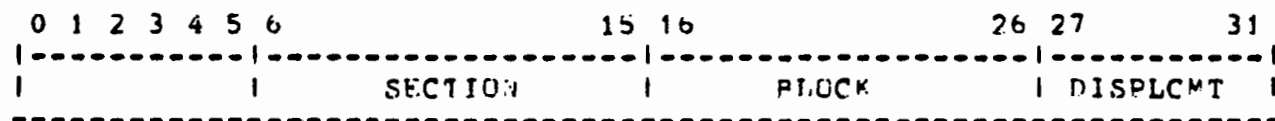
STORAGE MANAGEMENT

FILE SPACE IS MANAGED IN TERMS OF 32 WORDS BLOCKS (4 BLOCKS PER 128 WORD RECORD).

FREE SPACE (BLOCKS) IS ACCOUNTED FOR IN A BIT MAP, WHICH IS PARTITIONED INTO RECORDS (2K BLOCKS PER SECTION). A 0 INDICATES THAT A BLOCK IS USED, A 1 INDICATES THAT IT IS FREE.

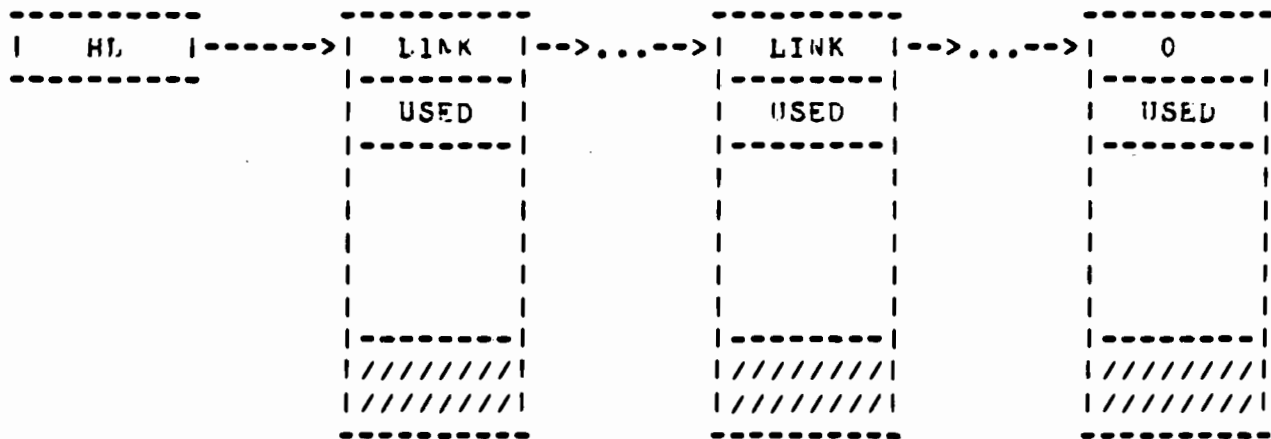
FILE SPACE IS ALSO PARTITIONED INTO 512 RECORD SECTIONS (64 MAX. SECTIONS, 2K BLOCKS PER SECTION, 1 MAP PER SECTION). THE NUMBER OF SECTIONS IN A FILE IS $NS = (FL + 511) \& LSR(9)$. THE FIRST NS RECORDS FOLLOWING RECORD 0 (RECORDS 1 TO NS) ARE RESERVED FOR THE SECTION MAPS.

A COMPLETE FILE ADDRESS WOULD HAVE THE FOLLOWING CONFIGURATION:



FILE (WORD) ADDRESS
DOUBLE WORD

ENTPY POJNT DIRECTORY



THE DIRECTORY IS PARTITIONED INTO 95 HASH LISTS (SAME HASH FUNCTION AS USL); EACH HASH LIST IS A LINKED LIST OF RECORDS.

EACH RECORD CONTAINS A SUCCESSOR LINK (RECORD #) AND A USED SPACE COUNT. A LINK OF 0 TERMINATES A LIST. WHEN A RECORD IS VOID OF ENTRIES (USED=2), ITS SPACE IS RETURNED TO THE FREE STORAGE AREA.

TYPICAL DIPECTOY ENTRY

0 1 2 3 4567 8 15

S	U	I	///	NC	CHAP. 1										

:															
:															

CHAR. NC				////////////////////											

S.A. INFO BLOCK															

S.A. ENTRY															

F I W I				NW CODE											

LC		I	NP			I	CN								

IN															

PARM. 1.															

:															
:															

PARM. NP															

S - SECONDARY ENTRY POINT BIT - SET IF THE ENTRY POINT WAS ORIGINALLY A SECONDARY ENTRY POINT.

U - UNCALLABLE BIT - SET IF ENTRY POINT IS UNCALLABLE.

I - PRIVILEGED MODE BIT - SET IF CODE MODULE IS TO BE RUN IN PRIV. MODE.

LC is (0:2)...Level of Checking
 0 = No checking
 1 = Check for procedure type
 2 = Check for # parameters
 3 = Check for parameter type
 NP is (2:6) is # parameters

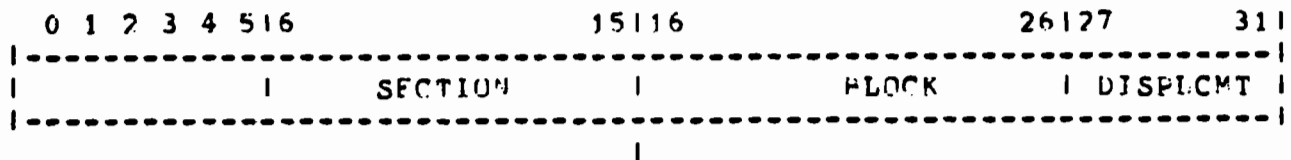
STORAGE MANAGEMENT

FILE SPACE IS MANAGED IN TERMS OF 32 WORD BLOCKS (4 BLOCKS PER 128 WORD RECORD).

FREE SPACE (BLOCKS) IS ACCOUNTED FOR IN A BIT MAP, WHICH IS PARTITIONED INTO RECORDS (2K BLOCKS PER SECTION). A 0 INDICATES THAT A BLOCK IS USED; A 1 INDICATES THAT IT IS FREE.

FILE SPACE IS ALSO PARTITIONED INTO 512 RECORD SECTIONS (64 MAX. SECTIONS, 2 BLOCKS PER SECTION, 1 MAP PER SECTION). THE NUMBER OF SECTIONS IN A FILE IS $NS = (FL + 511) \& LSR(9)$. THE FIRST NS RECORDS FOLLOWING RECORD 0 (RECORDS 1 TO NS) ARE RESERVED FOR THE SECTION MAPS.

A COMPLETE FILE ADDRESS WOULD HAVE THE FOLLOWING CONFIGURATION AS DEFINED ABOVE.



FILE (WORD) ADDRESS
 DOUBLE WORD

PROCEDURE INFO BLOCK

0	15
NW INFO	
NW CODE	.
* ENTRY POINTS	
CODE MODULE	I NWC I
EXTN LINK	
TPDB	
TSDB	
NWSDR	NWI
HEADER	
HEADER	
.	
.	
HEADER	
-1	

ALL HEADERS FOR THE PROCEDURE ARE APPENDED TO THE INFO BLOCK. THE
 HEADER SETS (EXTERNAL LISTS) ARE LINKED BY INCREASING FILE
 ADDRESS; A LINK OF \$1777777777D TERMINATES THE LIST.

HEADERS

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
///I								NW			I			1	
F	I	W	I					NW CODE							
S.A. INFO BLOCK															
S.A. ENTRY															
PBA															
S	I	U	I	I	///I			NC	I					CHAR. 1	
:															
:															
:															
CHAR. NC															
F . NP I CN															
TN															
PARM. 1															
:															
:															
:															
PARM. NP															

S - SATISFIED BIT - SET IF EXTERNAL IS SATISFIED WITHIN RL.

ALL HEADERS ARE THE SAME AS IN A USL EXCEPT FOR THE PCAL HEADER.

FIXED LOW CORE

ABSOLUTE CORE LOC	01	CSTB (BASE OF CST TABLE)	10	
	11	XCSTB	11	
	21	DSTB	12	
	31	PCBb	13	
	41	CPCB (CURRENT PCB POINTER)	14	
	51	Q1 (INITIAL Q FOR ICS)	15	
	61	Z1 (INITIAL Z FOR ICS)	16	> CPU #1
	71	MASK WORD	17	/
	101	RESERVED	18	\
	111	RESERVED	19	
	121	RESERVED	1101	> CPU #2
	131	RESERVED	1111	/

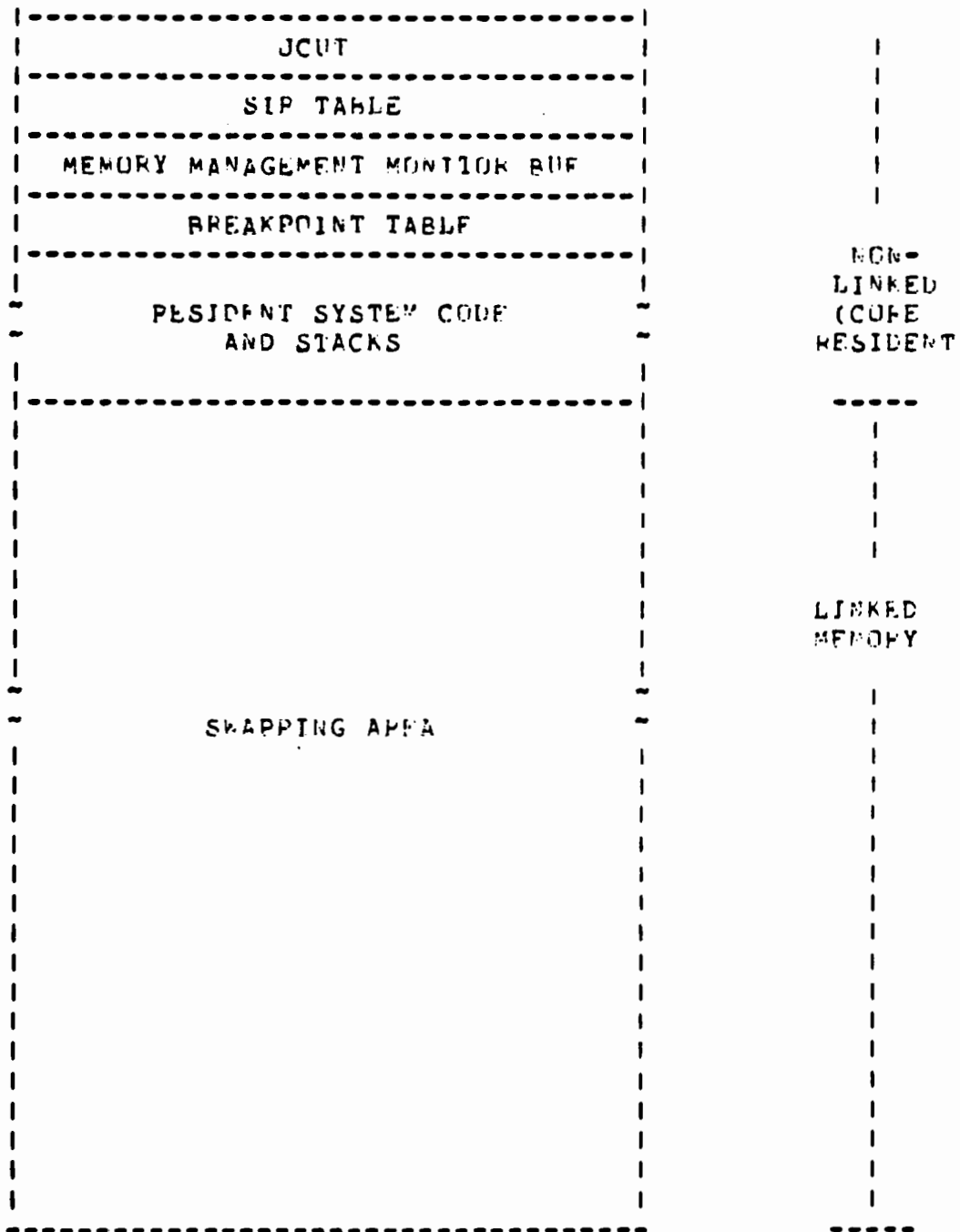
NOTE: ALL POINTERS ARE ABSOLUTE ADDRESSES.

MAIN MEMORY GENERAL LAYOUT

FIXED LOW CORE	
DRT	
SYSTEM DB	%1000
DST	
CST	
CSTX	
PCB	
ICS	
TBUF	
SBUF	
IOQ	
I/O TABLES AREA (ILT, DITS, DLT) (DLT may precede SYSDB)	
WST	
CST Block Table	
MAM	
(most likely will precede SYS DB) VIRTUAL MEMORY BIT MAP	
VIRTUAL PAGE COUNT TABLE	
BANK TABLE	
LPDT	
TRL	
JFCT	

NON-
LINKED
(CORE
RESIDENT)

GENERAL LAYOUT (CONTINUED)



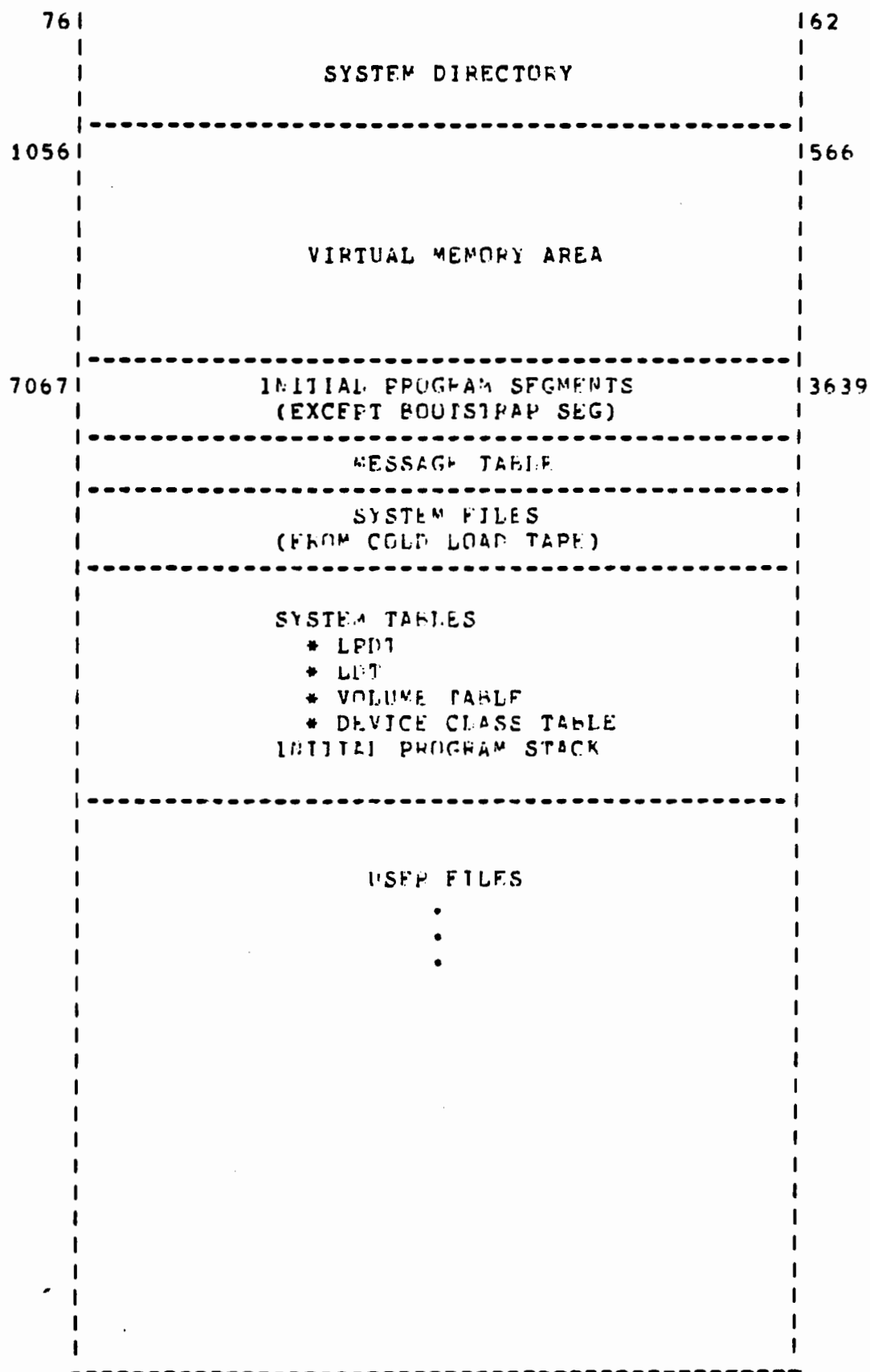
SYSTEM DISC LAYOUT
(Default 65K System)

SECTOR #		SECTOR #
0	DISC LABEL	10
1	DEFECTIVE TRACKS TABLE	11
2		12
3		13
4		14
5		15
6		16
7	CODE FOR INITIAL PROGRAMS	
10	"BOOTSTRAP" SEGMENT	
11		
.		
.		
.		
.		16
21		17
22	DISC COLD LOAD INFORMATION TABLE	18
23	DISC COLD LOAD INFORMATION TABLE	19
24	LOW CORE (CST POINTER, QI, ZI, POINTER)	20
25	TEMPORARY CST (INITIAL PROGRAM)	21
26	INTERNAL INTERRUPT HALTS	22
27	BOOTSTRAP STACK	23
30	REMAINDER OF SIO COLD LOAD PROGRAM	24
31		25

129

SECTION 4
130

MB
47E



TYPE	SUBTYPE	n
-----		-
	1-0	33
	1-1	35
	1-2	37
	0-0	41
	0-1	41
	0-2	45
	0-3	61
	0-4	49
	0-5	45
	0-6	53
	0-7	45
	0-8	61

TABLE STRUCTURE-VDSMAP-

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
VDSMAP(0)	1	01	01	01	01	01	11	11	11	11	11	01	01	01	01	11
	1	11	11	11	11	01	01	01	01	01	01	01	11	11	11	11
	:															:
	1	11	11	11	11	11	11	11	11	01	01	01	01	01	01	01
	:															:

THE FOLLOWING SYSTEM DB-RELATIVE VALUES ARE REQUIRED IN THE ALLOCATION AND DEALLOCATION OF VIRTUAL DISK SPACE-VDS.

VDSMAP POINTER TO PIT MAP-THE VDSMAP TABLE-

VDSTART SECTOR ADDRESS OF THE FIRST ASSIGNABLE AREA ON THE SYSTEM DISK USEABLE FOR VDS.

SCANEND THE UPPER BOUND OF THE BITMAP VDSMAP. THE CLOSED SET [0,SCANEND] REPRESENT THE USEABLE BITS OF THE MAP.

SCANWALL THE BIT POSITION WHERE THE NEXT BITMAP SEARCH WILL START. THIS VALUE IS SET TO THE POSITION IMMEDIATELY FOLLOWING THE LAST BIT ASSIGNED ON THE LAST VDS ALLOCATION. THE POSITION WILL WRAP AROUND TO ZERO WHEN THE UPPER BOUND,SCANEND,IS REACHED.

VDSPAGE THE SIZE,IN WORDS,OF A VDS PAGE. EACH BIT IN THE BITMAP,VDSMAP,REPRESENTS ONE PAGE. A PAGE MUST BE AN INTEGRAL MULTIPLE OF 128 WORDS. THE MINIMUM SIZE IS 256 WORDS.

VDSL THE VDS PAGE ALLOCATION TABLE. ONE WORD IS REQUIRED FOR EACH DST ENTRY CONFIGURED.

*NOTE EACH BIT IN THE BIT MAP REPRESENTS ONE PAGE. IF A BIT POSITION IS ON(=1),THE PAGE IS FREE, IF THE BIT POSITION IS OFF(=0),THE PAGE IS ASSIGNED.

TABLE STRUCTURE-VDSL-

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
VDSL(0)	I	D	I	R	I	S				N	P					I
	I	D	I	R	I	S				N	P					I
	I							:								I
	I							:								I

DEFINITION OF TERMS USED

- 1 . D =1 SEGMENT IS REQUESTED BY MAM. INDICATES RCNT IN MAM WILL BE DECREMENTED WHEN REQUEST IS COMPLETED.
- 2 . 0 =1 AN I/O ENTRY HAS ALREADY BEEN QUEUED FOR A WRITE REQUEST REFERENCING THIS DATA SEMENT. THIS IS VALID FOR A WRITE REQUEST ONLY.
- 3 . R =1 RESTART THIS REQUEST WHEN THE CURRENT I/O IS COMPLETED.
- 4 . S =1 SEGMENT IS A STACK
=0 SEGMENT IS AN FDS
- 5 . NP THE NUMBER OF VDS "PAGES" ASSIGNED THIS ENTRY

NOTE* THE ENTRIES CONTAIN A ZERO IS UNASSIGNED

TABLE STRUCTURE-BANKTAB-

BANKTAB(0)	* FIRST	*
1	* LAST	*
2	* #LOCKS (LB)-BANK 0	*
3	* SUM LOCK SPACE (LB)	*
4	* #LOCKS (UP)-BANK 0	*
5	* SUM LOCK SPACE (UP)	*

A SIX WORD ENTRY IS SET UP FOR EACH MEMORY BANK CONFIGURED ON THE SYSTEM. THE MAXIMUM LENGTH OF THE BANKTAB TABLE IS 24 WORDS. WORDS 2-5 OF EACH ENTRY ARE INITIALIZED TO ZERO. LINKED MEMORY IN EACH BANK IS BOUNDED BY THE FOUR WORD MARKER (\$100000,-4,0,\$100001). IN BANK ZERO, THE LOWER BOUND MARKER IMMEDIATELY FOLLOWS COPE RESIDENT MEMORY. THESE MARKERS ARE USED TO GUARANTEE THAT BANK OVERFLOWS DO NOT OCCUR. FIRST AND LAST CONTAIN THE ADDRESS OF THE MARKER ON THE LOWER AND UPPER BANK BOUNDARIES RESPECTIVELY.

NOTE* A POINTER TO BANKTAB(0) IS LOCATED IN SYSGLOB(\$50).
 THE NUMBER OF CONFIGURED MEMORY BANKS IS CONTAINED
 IN THE PARAMETER NBANKS LOCATED IN SYSGLOB(\$47).
 THE VALUE OF NBANKS MUST BE IN THE RANGE [0,3].
 THE ACTUAL NUMBER OF BANKS IS NBANKS+1.

MEMORY LAYOUT AT COLD LOAD

BANK 0

CORE
RESIDENT
AREA

FREEHEAD

//////// ML ////////// <--MMFIRST

FREE
AREA

//////// ML //////////

BANK 1

//////// ML //////////

FREE
AREA

//////// ML //////////

BANK 2

//////// ML //////////

FREE
AREA

//////// ML //////////

BANK 3

//////// ML //////////

FREE
AREA

//////// ML ////////// <--MMLASI

*NOTE ML=1%100000, -4, 0, %1000011

MEMORY LINK FORMAT-ASSIGNED-

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

* R*	*BL*							FORM							* 0

*								SIZE OF AREA ALLUCATED							* 1

*				LDEV			*			* S*			HODA		* 2

*								LOW ORDER DISK ADDRESS							* 3

*				RESERVED			*			LOCK COUNTER					* 4

*				RESERVED			*			FREEZE COUNTER					* 5

*				RESERVED			*			I/O FREEZE COUNTER					* 6

*								RESERVED							* 7

DEFINITION OF TERMS USED

1 .	LDEV	LOGICAL DEVICE NUMBER OF DISK
2 .	HODA	HIGH ORDER DISK ADDRESS
3 .	LODA	LOW ORDER DISK ADDRESS
4 .	S	SYSTEM SEGMENT IF = 1
5 .	R	=0 AREA IS ASSIGNED
		=1 AREA IS RESERVED FOR A LOCK OR
		MAM REQUEST.
6 .	BL	=0 THEN FORM IS A DST-RELATIVE INDEX
		=1 THEN FORM IS A BLOCK LABEL HAVING
		THE FOLLOWING FORMAT:
		(3:7)=CSTELK INDEX
		(10:6)=EN-300, WHEN EN IS THE CST
		INDEX.

MEMORY LINK FORMAT-UNASSIGNED-

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
* R*								0									* 0
* SIZE OF UNASSIGNED AREA																	* 1
* LDEV																	* 2
* LOW ORDER DISK ADDRESS-LAST ASSG																	* 3
* LBN																	* 4
* LADR																	* 5
* NBN																	* 6
* NADP																	* 7

MEMORY LINK FORMAT-BACK LINK -

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
*UL*AU*																	*
(AREA SIZE+8)/4																	

DEFINITION OF TERMS USED

1. LBN BANK NUMBER OF LAST FREE AREA
2. LADP BANK ADDRESS OF LAST FREE AREA
3. NBN BANK NUMBER OF NEXT FREE AREA
4. NADR BANK ADDRESS OF NEXT FREE AREA
5. HODA HIGH ORDER DISK ADDRESS
6. LDEV LOGICAL DEVICE NUMBER OF DISK
7. R =0 AREA IS LINKED INTO FREE LIST
=0 AREA IS RESERVED FOR A LOCK OR
MAM REQUEST.
8. LDEV LDEV WHEN LAST ASSIGNED
9. HODA HODA WHEN LAST ASSIGNED
10. U REQUIRED BY LOCKSEG CALL
11. AU =0 AREA IS FREE
12. UL =1 AREA IS ASSIGNED
=0 AREA IS A SPECIFIED BY AU
=1 AREA IS RESERVED FOR A LOCK OR
MAM REQUEST.



TABLE STRUCTURES-WSTAB-

```

WSTAB(0) -----
*   NUMBER OF ENTRIES IN WSTAB TABLE   *
-----
*   ENTRY SIZE                           *
-----
*   NUMBER OF UNASSIGNED ENTRIES         *
-----
*                                           *
*   REMAINING WSTAB ENTRIES              *
-----
*                                           *
-----

```

ENTRY FORMAT-WSTAB TABLE-

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	0	*	RESERVED FOR LATER USE													*	
	1	*	VIRTUAL TIME SINCE REF CTR UPDATE													*	
	2	*	CRITICAL-INTER-SEG-ABSENCE-TIME													*	
WSX--	3	*	MAXNE					*	NE					*			
	4	*	*BL*		FORM										*		
			:														
			:														
NE+3		*	*BL*		FORM										*		

DEFINITION OF TERMS USED

- 1 . WSX WORKING SET INDEX IN PCR POINTS HERE
- 2 . MAXNE MAXIMUM NUMBER OF ENTRIES ALLOWED
IN PROCESS WORKING SET
- 3 . NE CURRENT NUMBER OF ENTRIES IN WORKING
SET
- 4 . BL =0 FORM IS A DST-RELATIVE INDEX TO THE SEGMENT
ENTRY.
=1 FORM IS A BLOCK LABEL HAVING THE FOLLOWING

(3: 7) FORMAT:
 (10: 6) CST BLOCK INDEX
 EN-%300, WHERE EN IS A CST ENTRY NUMBER > %300

TABLE FORMAT-MTAB-

MTAB.....			
0 *	INDEX TO NEXT FREE-INITIALLY=15		*
1 *	INDEX TO HEAD OF MAM REQUEST QUEUE		*
2 *	INDEX TO TAIL OF MAM REQUEST QUEUE		*
3 *	INDEX TO HEAD OF OVERLAY SELECTION QUEUE		*
4 *	INDEX TO TAIL OF OVERLAY SELECTION QUEUE		*
5 *	INDEX TO HEAD OF MAM I/O COMPLETION QUEUE*		
6 *	INDEX TO TAIL OF MAM I/O COMPLETION QUEUE*		
7 *	INDEX TO HEAD OF LOCK REQUEST QUEUE		*
8 *	INDEX TO TAIL OF LOCK REQUEST QUEUE		*
9 *	INDEX TO HEAD OF DEFERRED REQUEST QUEUE		*
10 *	INDEX TO TAIL OF DEFERRED REQUEST QUEUE		*
11 *	RESERVED		*
12 *	RESERVED		*
13 *	CURRENT MTAB ENTRIES IN USE		*
14 *	MAX MTAB ENTRIES USED		*
15 *	FIRST FREE MTAB ENTRY		*

COMMENTS-

THE TABLE WILL CONTAIN (M) 1 WORD ENTRIES WHERE M IS A CONFIGURATION CONSTANT. THE FIRST THREE ENTRIES ARE RESERVED FOR USE AS SPECIFIED IN THE ABOVE TABLE DESCRIPTION

ENTRY FORMAT-(AREQ) MAIN REQUEST QUEUE- \

-(DREQ) DEFERRED REQUEST QUEUE-

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	*															*
1	*															*
2	*		*BL*													*
3	*															*
4	*															*

- 1 . OPTIONAL-2 THIS PARAMETER IS REQUIRED IN THOSE OPERATIONS WHERE THE PCBX MUST BE RELOCATED FOLLOWING THE POLL OPERATION. IN THESE CASES, ITS VALUE REPRESENTS A MOVE COUNT.
- 2 . C WAKE PROCESS BIT OR "DONE" BIT
- 3 . PIN PROCESS IDENTITY NUMBER
- 4 . RT REQUEST INITIATED TO PROCESS:
- = 0 ABSENCE THAT
 - = 1 I/O SYSTEM REQUEST
 - = 2 EXCHANGE REQUEST
 - = 3 DL EXPANSION REQUEST
 - = 4 Z EXPANSION REQUEST
 - = 5 EXTRA DATA SEGMENT EXPANSION REQUEST
 - = 6 STACK OVERFLOW EXPANSION REQUEST
 - = 7 PCBX FREE SPACE EXPANSION REQUEST
 - = 8 PXFILE SPACE EXPANSION REQUEST
 - = 9 LOCK REQUEST-FORCED OVERLAY OF SEGMENT PARKED IN AREA REQUIRED BY LOCK.
 - =10 LOCK REQUEST-COMMUNICATION TO MAIN WHEN AREA FOR LOCK WAS INITIALLY FREE.
 - =11 LOCK REQUEST-LOCK AREA IS FREE. ALLOCATE THE AREA TO THE LOCK REQUEST.
 - >11 TO BE ASSIGNED
- 5 . U UNBLOCKED REQUEST BIT
- 6 . F FREEZE SEGMENT BIT
- 7 . P =1 PROCESS PREPARATION REQUEST. WHEN ON, WORKING SET TESTS AND ADJUSTMENTS WILL BE IGNORED.
- 8 . BL =0 LABEL FORM IS A DST-RELATIVE INDEX TO SEG ENTRY
- =1 LABEL FORM IS A BLOCK LABEL WITH THE FOLLOWING

FIELD DEFINITIONS:

(3: 7) CSTBLK INDEX

(10: 6) EN-#300, WHERE EN IS A CSI ENTRY NUMBER > #300

- 9 . THE FOLLOWING TABLE DEFINES THE MEANING OF THE OPTIONAL-1 AND OPTIONAL-2 PARAMETER FOR ALL REQUESTS. THEY GENERALLY SPECIFY A MOVE COUNT AND OFFSET FROM SEGMENT BASE WHERE THE PULL OPERATION WILL START. WHEN A MOVE COUNT IS SPECIFIED, A MOVE OF THE STACK FROM THE BASE PEAD ADDRESS TO THE SEGMENT BASE ADDRESS WILL BE PERFORMED WHEN THE PULL OPERATION IS COMPLETED. THIS COMPLETES THE ADJUSTMENT OF THE PCBX (OR A PART OF IT) AS SPECIFIED BY THE EXPANSION.

RT * OPTIONAL-1	* OPTIONAL-2
0 * 0	* 0
1 * POINTER TO IOO OR DIT	* 0
2 * 0	* 0
3 * SIZE OF DL EXPANSION	* LENGTH OF PCBX
4 * SIZE OF Z EXPANSION	* 0
5 * SIZE OF EDS EXPANSION	* 0
6 * SIZE OF Z EXPANSION	* 0
7 * 128 (EXPANSION SIZE)	* THE LENGTH (C-A) IN PCBX
8 * SIZE OF PXFILE EXPANSION	* LENGTH OF PCBX-4
9 * 0	* 0/1
10 * 0	* 0/1
11 * 0	* 0

ENTRY FORMAT-(I/O) MAN I/O COMPLETION QUEUE-

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	*															*
1	*LF*															*
2	*RW*															*
3	*															*
4	*															*

DEFINITION OF TERMS USED

- 1 . RW =0 READ
 =1 WRITE
- 2 . BN BANK NUMBER
- 3 . THE MEMORY ADDRESS SPECIFIED IS THE LOCATION OF THE SEGMENT LINK. THE DISK ADDRESS FOR THE SEGMENT IS IN THE 3RD AND 4TH WORDS OF THE LINK-SEG ASSIGNED LINK FORMAT FOR FURTHER DESCRIPTION. THE STARTING ADDRESS FOR THE I/O TRANSFER IS THE MEMORY ADDRESS SPECIFIED PLUS THE VALUE OF THE DISPLACEMENT FIELD.
- 4 . LF =1 THE I/O WAS INITIATED TO CLEAR THE AREA FOR A PENDING LOCK REQUEST.
- 5 . DA =1 INDICATES THE WRITE WAS INITIATED BY A CALL TO WRITEDSEG. WORD(1).(2:14) WILL CONTAIN A PCB RELATIVE INDEX OF THE REQUESTING PROCESS. THE PROCESS WILL BE IMPEDED UNTIL THE WRITE IS COMPLETED.

ENTRY FORMAT-(LCKQ) LOCK/UNLOCK REQUEST QUEUE-

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	*															*
1	*				0											*
2	*	1*														*
3	*				0											*
4	*				0											*

DEFINITION OF TERMS USED

1 . PINX A PCB RELATIVE PROCESS INDEX.

NOTE* THIS FORM OF REQUEST IS ENTERED WHEN A PROCESS PREP WAS ABORTED BECAUSE OF A SEGMENT TO BE PREPFD WAS IN THE PROCESS OF BEING LOCKED. THE PROCESS INDEXED BY PINX WILL BE IMPEDED UNTIL THE LOCK IS COMPLETED.

ALL OTHER REQUESTS LINKED IN THE LCKQ LIST HAVE A FORM IDENTICAL TO THE ENTRY FORMAT FOR AREQ ELEMENTS. WHEN THE LOCK IS COMPLETED, THE ENTRIES WILL BE LINKED INTO THE AREQ QUEUE.

ENTRY FORMAT-(OLSQ) OVERLAY SELECTION QUEUE-

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	*															*
	*															*
	*	T*	*BL*													*
	*															*
	*															*

DEFINITION OF TERMS USED

1 . T

=0 SEG SELECTED FROM WORKING SET
=1 SEG SELECTED FROM FCB. IMPLIES
STACK OR XDS.

2 . BL

=0 FORM IS A DST-RELATIVE INDEX TO SEG ENTRY.
=1 FORM IS A BLOCK LABEL WITH THE FOLLOWING
FORMAT:
(3:7) CSTBLK INDEX
(10:6) EN-3300, WHERE EN IS THE CST ENTRY
NUMBER.



DRIVER TABLE

The Dirver Table consists of 6 word entries, in correspondence to the LDEV entries, up to the highest LDEV used, entry zero is a dummy entry.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DSI			DRT #								UNIT #				
CR	CHAN #										MASTER LDEV				
			D								R				
			I								V				
			N								A				
			M								E				

TYPICAL ENTRY
FORMAT

DS DS DEVICE (if set DRT is zero)
 CR CORE RESIDENT
 CHAN # CHANNEL #
 MASTER LDEV LDEV of device which this DS device is linked to.

words 2-6 contain the driver name.

CTAB (Memory Size Dependent Configuration Values)

Records 1-8 of CONFDATA

record	memory size k words
1	64
2	80
3	96
4	128
5	160
6	192
7	224
8	256

This table describes the CTAB format in detail and is typical of any record (1-8)

0	# OF CST ENTRIES	10
1	# OF DST ENTRIES	11
2	# OF PCN ENTRIES	12
3	# OF IOG ENTRIES	13
4	# OF TERMINAL BUFFERS	14
5	# OF CST EXTENSION ENTRIES	15
6	INTERUPT CONTROL STACK SIZE (01 to 21)	16
7	# UCOP REQUEST QUEUE ENTRIES	17
10	# BREAKPOINT ENTRIES	18
11	# TRL ENTRIES	19
12	# LOCAL FINS	110
13	# GLOBAL FINS	111
14	# OF SYSTEM BUFFERS	112
15	# OF CONCURRENT PROGS	113
16	# OF NAM TABLE ENTRIES	114
////////////////////		
////////////////////		
////////////////////		
24	VIRTUAL MEMORY SIZE (SECTORS)	120

25	DIRECTORY SIZE (SECTORS)	121

	////////////////////	.
	////////////////////	.
	////////////////////	.

36	MAXIMUM CODE SEGMENT SIZE	130

37	MAXIMUM # OF CODE SEGMENTS/PROCESS	131

40	MAXIMUM STACK SIZE (MAXDATA)	132

41	MAXIMUM EXTRA DATA SEGMENT SIZE	133

42	MAXIMUM # OF EXTRA DATA SEGMENTS/PROCESS	134
	////////////////////	.
	////////////////////	.
	////////////////////	.

50	MAXIMUM # RUNNING SESSIONS	140

51	MAXIMUM # OF PUNNING JOBS	141

CTAR (Memory Size Independent Configuration Values)

blank or shaded areas reserved for future use.

record 0 of CONFDATA file

0	MEMORY SIZE IN K WORDS	10
1	CORE SIZE INDEX	11
2	STANDARD STACK SIZE	12
3	HIGHEST PFT #	13
4	TERMINAL ROUND PRIORITY	14
5	NORMAL PRIORITY	15
6	CPU ROUND PRIORITY	16
7	# OF SECONDS TO LOG-ON	17
10	LOG FILE RECORD SIZE (SECTORS)	18
11	LOG FILE SIZE (RECORDS)	19
12	LOG FILE #	110
13	LOG BITS (ONLY 11 USED)	111
14		112
15	<<DEFINES WHAT IS BEING LOGGED>>	113
16		114
17		115
20	DEFAULT JOB/SESSION CPU TIME LIMIT	116
21	FILES DUMPED	117
22	HIGHEST LOGICAL DEVICE #	118
23	HIGHEST VOLUME #	119
24	DEVICE CLASS TABLE SIZE	120
25	FIX LEVEL	121

26	COLD LOAD COUNT	122
27	MAX INITIAL SEGMENT SIZE	123
30	DISC COLD LOAD ENTRY POINT	124
31	SIZE OF OLD VOLUME TABLE	125
32	SIZE OF OLD INFO TABLE	126
33	TIME QUANTUM	127
34	MAXIMUM OPEN SPOOL FILES	128
35	CSTAB SIZE	129
36	MAXIMUM # OF SPOOL FILES (KILO SECTORS)	130
37		131
40	# OF ADDITIONAL CS DRIVERS	132
	# SECTORS PER SPOOL EXTENT	133
	UPDATE LEVEL	134
	VEPSION	135
	////////////////////////////////////~.	
	////////////////////////////////////~.	
	////////////////////////////////////~.	
	////////////////////////////////////~.	
177	RESERVED 124(10)-127(10)	127

DISC LABEL (Sector 0 of disc)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
0	CONTROL ORDER																10
1	<<CYL/ARC #>>																11
2	READ ORDER																12
3	<<MEM ADDRESS>>																13
4	SIO JUMP ORDER																14
5	<<MEM ADDRESS>>																15
6	DISK TYPE DISKSURTYPE																16
7	COLD LOAD ID																17
10	"3" 1 "0"																18
11	"0" 1 "0"																19
12																	10
13																	11
14	VOLUME NAME																12
15																	13
16																	14
175																	125
176																	126
177																	127

DISC BOOTSTRAP
SIO PROGRAM
(SYSTEM DISC ONLY)

DEFECTIVE TRACKS TABLE (Sector 1 of Disc)

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
0	# OF DEFECTIVE TRACK ENTRIES (N)																10
1	DEFECTIVE TRACK NUMBER																11
2	DEFECTIVE TRACK NUMBER																12
3	DEFECTIVE TRACK NUMBER																13
4	DEFECTIVE TRACK NUMBER																14
5																	15
6																	16
7																	17
10																	18
11																	19
12																	110
.																	.
.																	.
.																	.
.																	.
.																	.
.																	.
.																	.
.																	.
165	DEFECTIVE TRACK NUMBER																117
166	DEFECTIVE TRACK NUMBER																118
167	DEFECTIVE TRACK NUMBER																119
170	DEFECTIVE TRACK NUMBER																120
171																	121
172																	122

120 DEFECTIVE
TRACKS MAXIMUM

173	RESERVED FOR FUTURE USE	1123
174		1124
175		1125
176	NEXT AVAILABLE ALTERNATE TRACK	1126
177	LOGICAL DISC PACK SIZE (CYLINDERS)	1127
	OR # OF TRACKS IF FH DISC	

DTC	(DEFECTIVE TRACK CODE)
0	suspect
1	suspect alternate
2	deleted
3	reassigned

NOTE:

Two entries for the same track, n, one having a DTC of 0 (suspect) and the other having a DTC 3 (reassigned).

Results from a situation where the disc driver could not "read" (unreadable) the address of the particular track.

SECTOR
#28 (%34)



DISC COLD LOAD INFORMATION TABLE

0	pointer to table information	FAEFTP
1	pointer to temporary CSI info	TCSTPTR
2	# of entries to read on disc cold load	NREAD
3	# of code segments in INITIAL	NVTCST'
4	INITIAL's DB value	INITDB
5	INITIAL's DL value	INITDL
6	INITIAL's Z value	INITZ
7	INITIAL's Q value	INITQ
8	INITIAL's S value	INITS
9	SYSDISC type subtype	DISCTST
10	cold load ID	COLD'LOAD'ID'
11	log file number	LOG'FILE'NUM'
12	directory disc	
13	address	DIRADP
14	virtual memory	
15	disc address	VIF MEMALR
16	message table	
17	disc address	MESADP
18	FIN table	
19	disc address	RINADR
20	directory size	DIRSECT
21	virtual memory size	VIRMEMSECT
22	message table size	MESSECT
23	RIN table size	RINSECT
24	# of PINS	PINS

25	# of global RINS	GRINS
26	ITLIRLIPY	TL=Tape cold LOAD MODE load
27	highest volume number	FL=Pe load H'VOL' RY=recovery
28	disc cold load entry point	DISCENTPY
29	system disc DRI number	SYSDISCDRT
30	Job Master Table	JMATLOC
31	Disc Address	
32	IDD Disc Address	IDDLOC
33		
34	ODD Disc Address	ODDLOC
35		
36	Welcome Message (DST 47 10)	LOGONLOC1
37	Disc Address	
38	Welcome Message (DST 48 10)	LOGONLOC2
39	Disc Address	
40	SIZE IN WORDS	
41	MEMORY ADDRESS	*DRIVER
42		TABLE
43	DISC ADDRESS	
44	SIZE IN WORDS	
	MEMORY ADDRESS	*CTABO
	DISC ADDRESS	
48	SIZE IN WORDS	
	MEMORY ADDRESS	*CTAB
	DISC ADDRESS	

52	SIZE IN WORDS	*
	-----	COMMUNICA-
	MEMORY ADDRESS	TION SUB-
	-----	SYSTEM
	DISC ADDRESS	DRIVER
		TABLE
56	SIZE IN WORDS	*
	-----	COMMUNICA-
	MEMORY ADDRESS	TION SUB-
	-----	SYSTEM
	DISC ADDRESS	DEFINITION
		TABLE
60	SIZE IN WORDS	
	-----	COMMUNICA-
	MEMORY ADDRESS	SUBSYSTEM
	-----	TABLE
	DISC ADDRESS	
64	SIZE IN WORDS	
	-----	LOGICAL-
	MEMORY ADDRESS	PHYSICAL
	-----	DEVICE
	DISC ADDRESS	TABLE
68	SIZE IN WORDS	
	-----	LOGICAL-
	MEMORY ADDRESS	DEVICE
	-----	TABLE
	DISC ADDRESS	
72	SIZE IN WORDS	
	-----	DEVICE
	MEMORY ADDRESS	CLASS
	-----	TABLE
	DISC ADDRESS	
76	SIZE IN WORDS	
	-----	VOLUME
	MEMORY ADDRESS	TABLE

	DISC ADDRESS	

76
4
2

#76 = 76/14

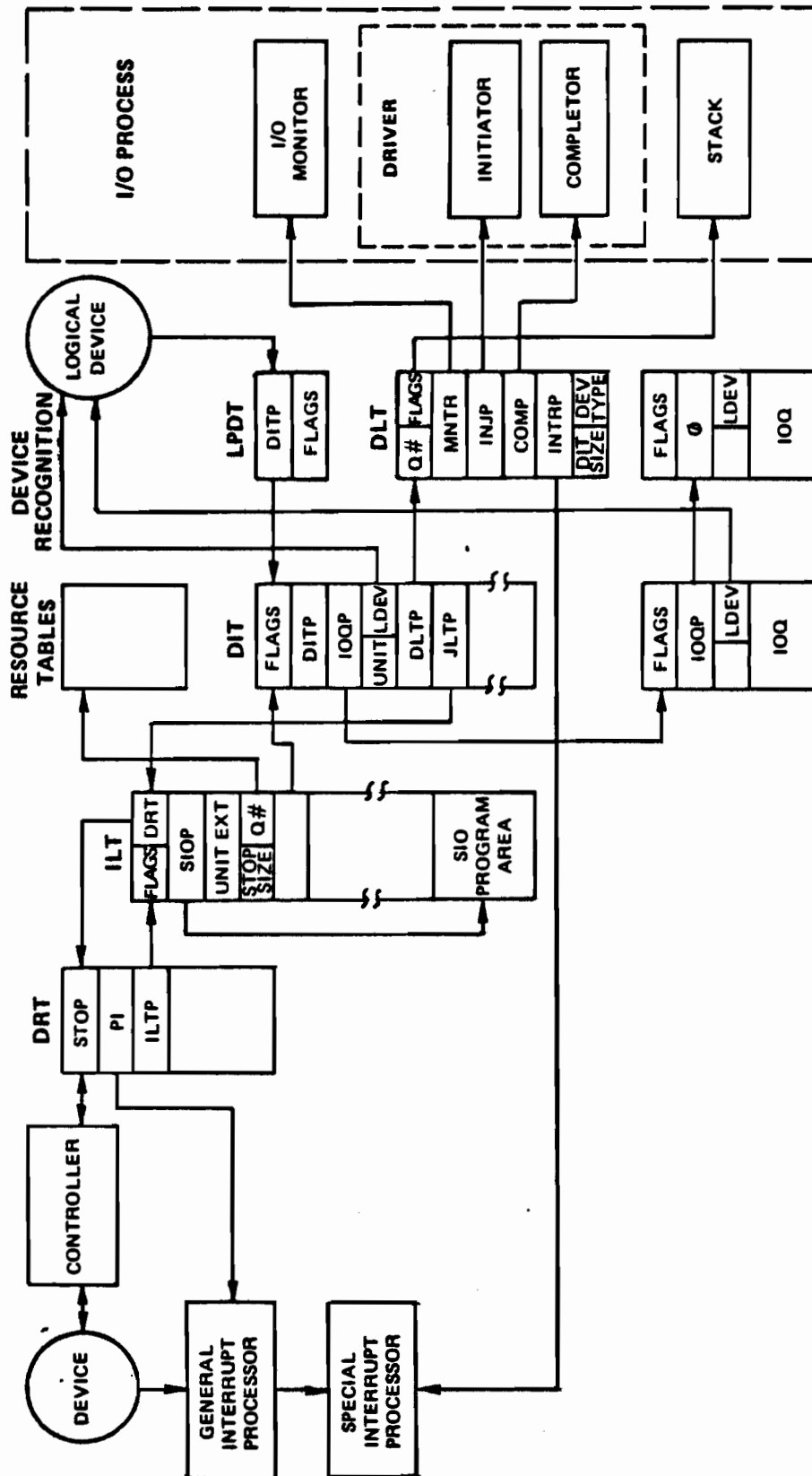
80	SIZE IN WORDS	LOGICAL
	MEMORY ADDRESS	DEVICE
		TABLE

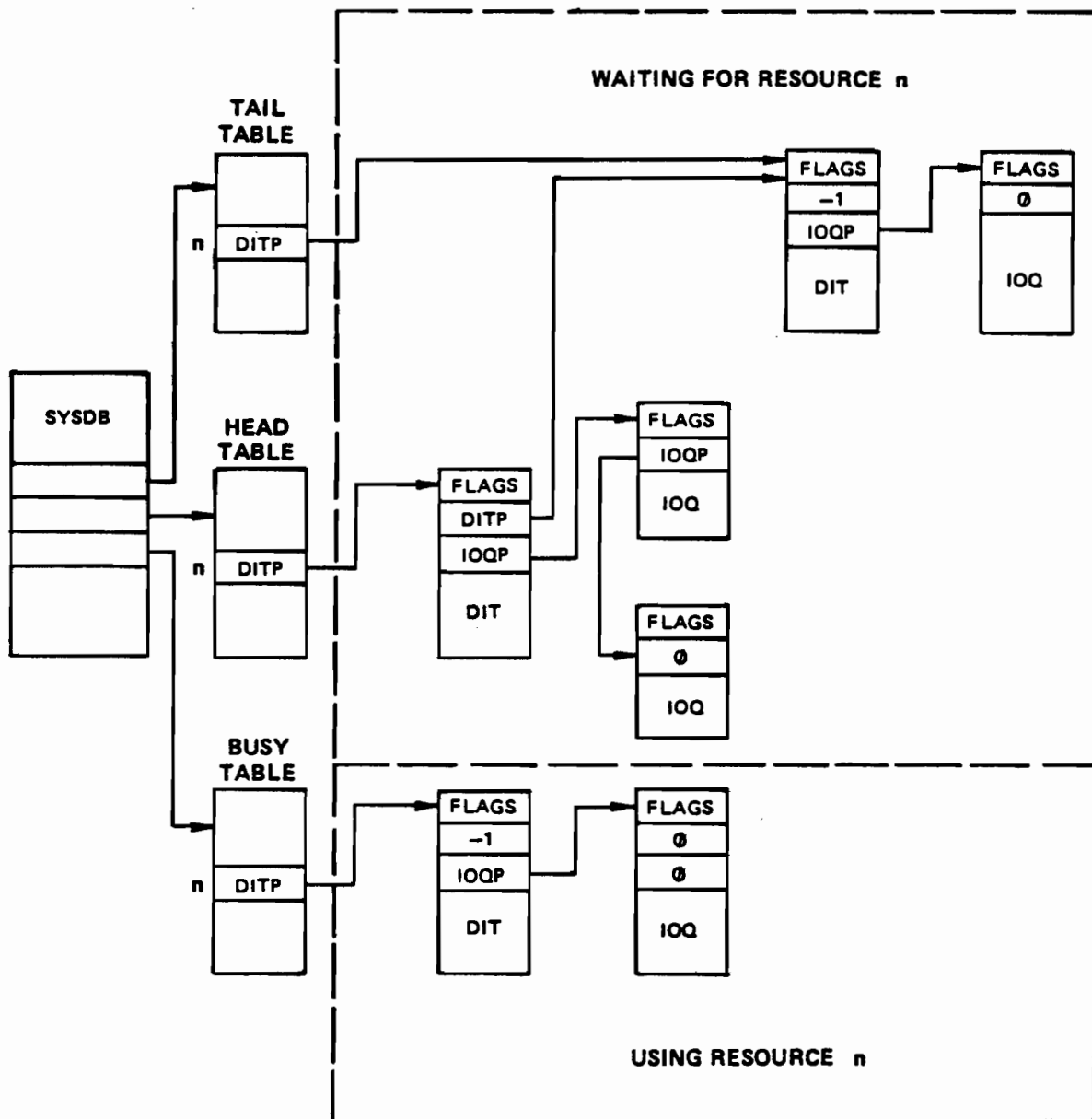
INITIAL PROGRAM CST MAP

LOGICAL CST#	PHYSICAL CST#	SEGMENT NAME
16	37	BOOTSTRAP I
15	36	RESIDENT I----> core resident
14	35	MAINSEG1 \
13	34	CONFIGURE I non-core resident
12	33	DEFCTRACKSI but present in core
11	32	SETUP I----- at completion of
10	31	FILEIO I cold load
7	30	DISKSPACE I
6	27	DIPECTORY1I
5	26	DIRECTORY2/
4	25	SL PROGRAM
3	24	PROCESS
2	23	MAINSEG2
1	22	MAINSEG3
0	21	MAINSEG4

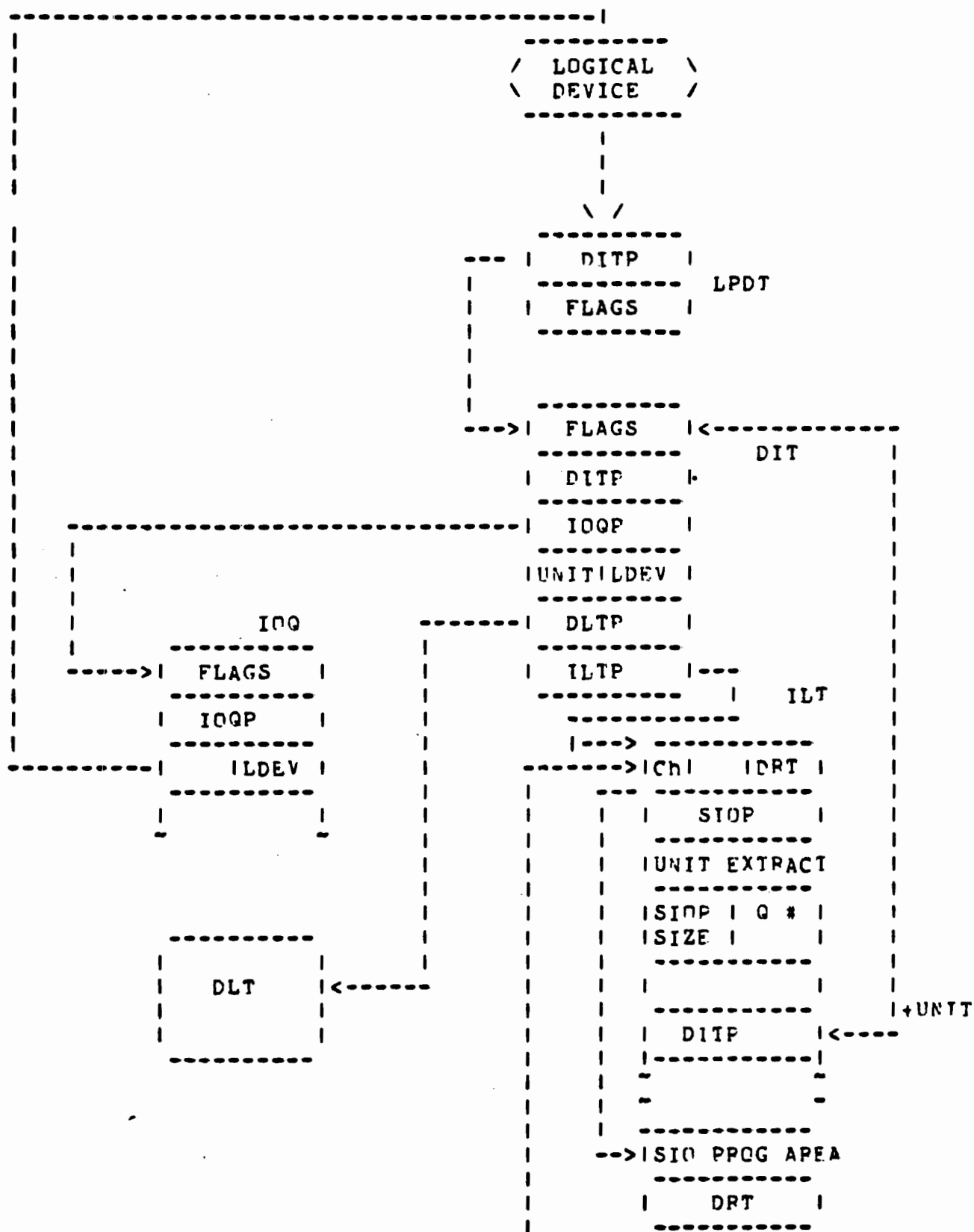
*code segment swapping starts at completion of MAINSEG1

I/O TABLE RELATIONSHIPS





I/O TABLE LINKAGE



		SIOP	

		PI	

----->		ILTP	

I/O TABLE LINKAGE

DEVICE REFERENCE TABLE (DPT)

	SIOP	

	PI	

	DBI	

	RESERVED	

SIOP - absolute address of SIO program
PI - interrupt handler label
DBI - this is the absolute address of the ILT

DRIVER LINKAGE TABLE (DLT)

	QUEUE #	

	MONITOR LABEL	

	INITIATOR LABEL	

	COMPLETOR LABEL	

	SPEC INT LABEL	

	DLT SIZE	

	DEV TYPE	

LOGICAL PHYSICAL DEVICE TABLE (LPDT)

DST=%15

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	V	I														
	DITP/VIRTUAL DEVICE INFORMATION															
	IFLAGI															
	DR		A	A		CYIDUP	I	INTR		EOF		IBRN		ISUBTYPE		
	STATE		IJOBS	DATA												

There is one two-word entry in the LPDT for each Logical Device. The base of the entry for a given Logical Device is equal to the Logical Device number multiplied by two. The physical device characteristics are maintained in the DIT and ILT.

- DITP - SYSDB relative pointer to the DIT.
- SUBTYPE - Type of device as specified in the MPE ERS.
- EOF - End of File condition
 - 0-No EOF
 - 1-HARDWARE EOF
 - 2-:DATA
 - 3-:EOD
 - 4-:HEILO
 - 5-:BYE
 - 6-:JOB
 - 7-:EOL
- BPEAK - Break detected or ignore break if main running
- CONTROL - Control Y is allowed and has been detected.
- DUPLIC - Duplicative
- INTERACT - Interactive
- AJOBS - Accepting Jobs or Sessions
- ADATA - Accepting Data
- DPSTATE - Device Recognition State
 - 0-Not owned ⇒ WHEN DETECTED
 - 1-Owned or recognized ⇒ WHEN ALLOCATED
 - 2-Service requested
 - 3-Service granted
- VFLAG - If set then a virtual device.

LPDI

```

0
|-----|
| 1 V=0 then DITPOINTER |
0| V1 V=1 then Virtual Device Entry Info. |
|-----|
|
1| -- as before -- |
|-----|

```

The first word of each entry in the LPDI has changed to reflect the addition of Virtual Devices.

A "real" log device (ie. one on which an ATTACHIO call may be performed) has the sign bit set to "zero".

A "virtual" log device has the sign bit set to "one". Thus anyone who loads the DIT pointer for use must check this sign bit.

LPDT

LPD1DST=13 (10)
LPDTS1R=9

HIGH ENTRY # 1		ENTRY SIZE
SERV. REQ INT		
111	XDD INDEX	
1101		
-- same --		
11	0	
-- same --		

VIRTUAL DEVICE ENTRY-ASSIGNED
= 0 1DD
IO = 1 ODD

VIRTUAL DEVICE FREE ENTRY

LOGICAL DEVICE TABLE (LDT)

LDIDST=14

LDTSTR=10

HIGH ENTRY #	ENTRY SIZE	10
DEV CLASS PTR		11
DEV CLASS ENTRY #		12
DEV CLASS TABLE SIZE		13
1	STREAM DEV	14
FILE USE COUNT		
VOL INDEX	1	
MAIN PIN	1	CONTROL PIN
PEC WIDTH	1	DEV TYPE
SPIFIMIRH	1	DEF. OUTPUT
TERM TYPE	1	XDDHCADK

FO = 0 SID FRMS
 = 1 SPECIAL FORMS
 H = 1 IMPLIES HEADERS TURNED OFF
 SP = 0 UNSPOOLED (NO RUNNING SPOOLER)
 = 1 INPUT SPOOLER (INPUT SPOOLS RUNNING)
 = 2 OUTPUT SPOOLER (OUTPUT SPOOLS RUNNING)
 SO = 1 SPOOLING ENABLED (OUTPUT)
 T = 1 IMPLIES TRAILERS TURNED OFF

TERM TYPE = default used if not specified at load time.

(Indexed by Log Dev#)

ZERO ENTRY FORMAT

TYPICAL ENTRY FORMAT

->when not term-
type TLT index

10-21

C . . . default device is class index
F . . . avail to system
M . . . avail to diagnostics
R . . . =down requested
D . . . duplicative
I . . . interactive
TERM TYPE. . . default used when not specified in hello command.

TYPICAL ENTRY FORMAT

1. logical device table and
2. device class table
3. LDT Extension

LOGICAL DEVICE TABLE EXTENSION

DST 16 = 14
8 10

SIP 12 = 10
8 10

ZERO ENTRY

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	HIGHEST ENTRY #								1	ENTRY SIZE						
1																
2																
3																
4																

TYPICAL ENTRY

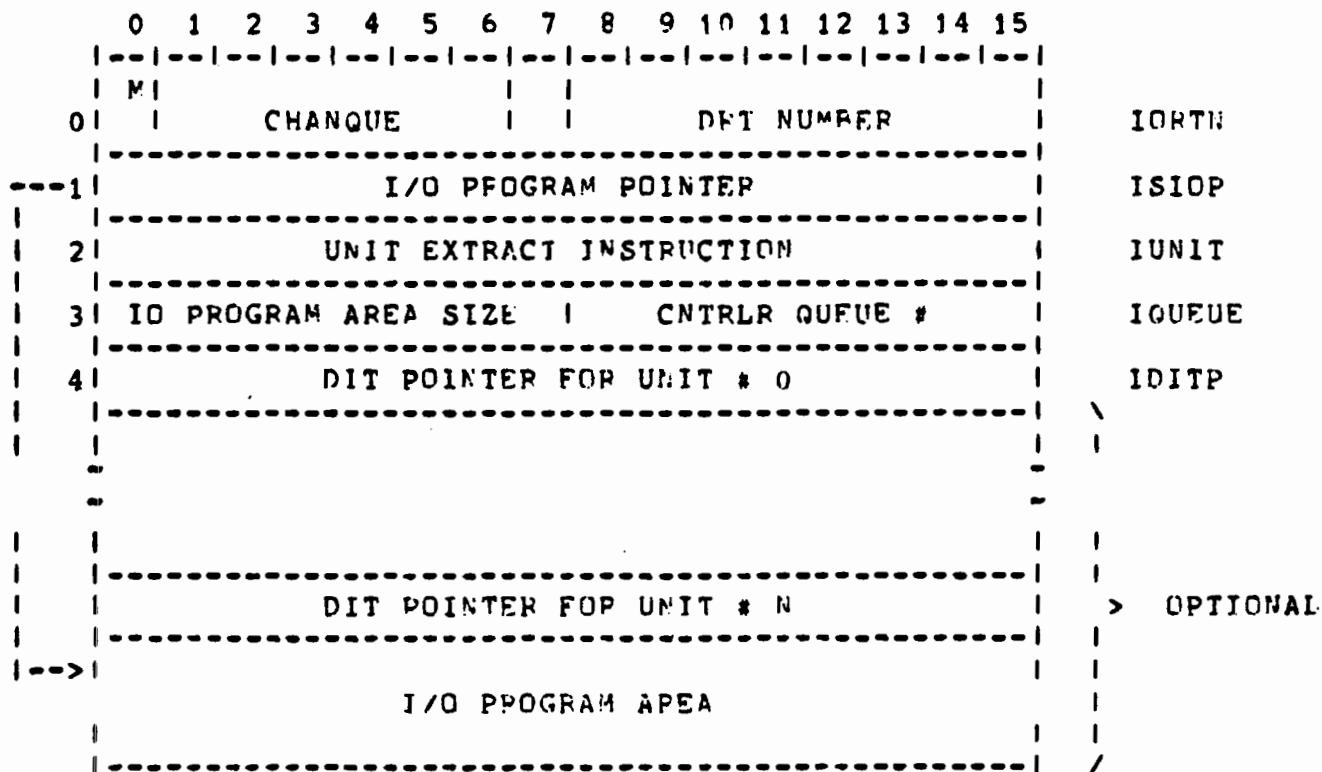
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	EXTRA DATA SEGMENT # FOR SERIAL DISC															

TBRC....Terminal's baud rate code

NOTE: The LDTX is in same DS1 as LDT and device class table.
There are three tables in DS1 16 .

1. LOGICAL DEVICE TABLE
2. DEVICE CLASS TABLE
3. LDT EXTENSION

.....



There is one I/O for each controller or DRT. For multi-unit devices, the controller, and hence, the I/O program area is shared among all the units. The I/O program area may also be used for any controller related permanent storage.

- ```

IDRTN.MCHAN - if set then this controller is sharing a channel or
 resource with other controllers.
.CHANQUE - queue number of channel or resource being shared by
 this controller is not zero.
ISIOP - SYSDS relative pointer to the I/O program area.
 NOTE: for terminals, this would hold the last
 main unit in the speed sensing mode which
 interrupted.
IUNIT - an extract field instruction to be used to extract
 the unit number from interrupt status.
ITYPE.SIOPSIZE - the length in words of the I/O program area.
.CNTRLRQ - the I/O resource number of this controller or zero
 if the controller is only servicing one unit.
IDIIP - SYSDS relative pointer to the DIT for unit #0 or
 the only unit on this controller. For multi-unit
 controllers, DIT's for units one through N follow
 in sequence without gaps.

```

.....

Although details of DIT's vary with device, the following structure is common to all:

```

DFLAG.(0:1) - set if device is a terminal.
DFLAG.(1:1) - set if device is a desk.
DFLAG.(2:1) - set if a monitor is currently servicing this device.
DFLAG.(3:1) - service requested while monitor is active.
DFLAG.(4:1) - use special interrupt handler.
DFLAG.(5:11) - device dependent flags describing the current state
 of the device.
DFLAG.DSTATE - this quantity specifies the next action to be taken
 in servicing the request. State conventions differ
 depending on whether the device is STD or terminal.
DLINK - a SYSDB relative pointer to the next DII requesting
 this resource or service.
DIOQP - a SYSDB relative pointer to the first IOO in the
 request list for this device.
DLDEV.(8:8) - logical device number
DLDEV.(0:8) - unit number of this device zero if a single unit

```

controller.

- DLTP - a SYSDB relative pointer to DLT.
  - ILTP - a SYSDB relative pointer to ILT.
  - DPCBN - the PCB number of the process to be awoken when service for this device is required. for type 3 drivers only.
- DFLAG.STATE - this quantity specifies the next action to be taken in servicing the request.



5-complete request  
 6-device recognition  
 7-start operator intervention wait (%10)  
 %10-restart request on interrupt  
 %11-wait for data to be frozen then state 2  
 %12-wait for driver code to be frozen then state 2  
 %13-call completor on interrupt  
 %14-wait for device controller  
 %15-not used  
 %16-wait for initiator make present then state 2  
 %17-wait for completor make present then state 3

|              |   |                                                                                                                                                                                                                      |
|--------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DLINK        | - | SYSDB relative pointer to the DIT for the next device requesting this resource or service.                                                                                                                           |
| DIOQP        | - | SYSDB relative pointer to the first IOG in the request list for this device                                                                                                                                          |
| DLDEV, LDEVN | - | Logical Device Number                                                                                                                                                                                                |
| UNIT         | - | unit number of the physical device.                                                                                                                                                                                  |
| DDLTP        | - | SYSDB relative pointer to the DLT.                                                                                                                                                                                   |
| DILTP        | - | SYSDB relative pointer to the ILT.                                                                                                                                                                                   |
| DSTAT        | - | interrupt status for this device. Set each time the device interrupts.                                                                                                                                               |
| DSERR        | - | Hardware Device Controller Status. Set when the driver detects an error. whenever not zero SIODB logges an I/O error and clears this word.                                                                           |
| DTIME        | - | time out completed flags. If a timeout occurs in response to a timer request type %20 (I/O request), the sign bit is set in this word. The IA bit in DFLAG is also set, and the monitor for this device is awakened. |

# FIXED HEAD DISK DEVICE INFORMATION TABLE

|                           | 0                        | 1 | 2 | 3   | 4   | 5 | 6 | 7 | 8     | 9 | 10 | 11 | 12    | 15    |        |
|---------------------------|--------------------------|---|---|-----|-----|---|---|---|-------|---|----|----|-------|-------|--------|
|                           | 0                        | 1 | 1 | ACT | REQ | 0 | 0 | 0 | 1     | 0 | 1  | 0  | 0     | STATE | DFLAG  |
| 1                         | NEXT DTTP                |   |   |     |     |   |   |   |       |   |    |    |       |       | DLINK  |
| 2                         | IOOP                     |   |   |     |     |   |   |   |       |   |    |    |       |       | DIOOP  |
| 3                         | 0                        |   |   |     | 1   |   |   |   | LDEVN |   |    |    |       |       | DLDEV  |
| 4                         | DLTP                     |   |   |     |     |   |   |   |       |   |    |    |       |       | DDLTP  |
| 5                         | ITTP                     |   |   |     |     |   |   |   |       |   |    |    |       |       | DILTP  |
| 6                         | DEVICE STATUS            |   |   |     |     |   |   |   |       |   |    |    |       |       | DSTAT  |
| 7                         | DEVICE STATUS (ERROR)    |   |   |     |     |   |   |   |       |   |    |    |       |       | DSEPP  |
| 8                         | MAM REQUEST QUE POINTER  |   |   |     |     |   |   |   |       |   |    |    |       |       | DMAMQT |
| 9                         | MAM REQUEST TAIL POINTER |   |   |     |     |   |   |   |       |   |    |    |       |       | DMAMQT |
| 10                        | XFER COUNT               |   |   |     |     |   |   |   |       |   |    |    |       |       | DXFER  |
| 11                        | LOGICAL DISK ADDR        |   |   |     |     |   |   |   |       |   |    |    |       |       | DDADR  |
| 12                        | SYSBUF ADDRESS           |   |   |     |     |   |   |   |       |   |    |    |       |       | DSYSFA |
| ERROR & RETRY INFORMATION |                          |   |   |     |     |   |   |   |       |   |    |    |       |       |        |
|                           |                          |   |   |     |     |   |   |   |       |   |    |    | RETRY |       | GMISC  |
|                           | B                        | w |   |     |     |   |   |   |       |   |    |    | COUNT |       | OF IOQ |

B - modify bad track table  
W - write bad track table

7900A & 2888A MOVING HEAD DISC  
DEVICE INFORMATION TABLE

|    | 0                           | 1 | 2   | 3   | 4    | 5 | 6    | 7 | 8     | 9 | 10 | 11 | 12    | 15 |          |
|----|-----------------------------|---|-----|-----|------|---|------|---|-------|---|----|----|-------|----|----------|
|    | 0                           | 1 | ACT | REQ | 0    | M | 0    | 1 | 0     | 1 | 0  | 0  | STATE |    | DFLAG    |
|    |                             |   |     |     | UNIT |   | PROG |   |       |   |    |    |       |    |          |
| 1  | NEXT DITP                   |   |     |     |      |   |      |   |       |   |    |    |       |    | DLINK    |
| 2  | IOQP                        |   |     |     |      |   |      |   |       |   |    |    |       |    | DIOQP    |
| 3  | UNIT                        |   |     |     |      |   |      | I | LDEVN |   |    |    |       |    | DLDEV    |
| 4  | DLTP                        |   |     |     |      |   |      |   |       |   |    |    |       |    | DOLTP    |
| 5  | ILTP                        |   |     |     |      |   |      |   |       |   |    |    |       |    | DILTP    |
| 6  | CURRENT DEVICE STATUS       |   |     |     |      |   |      |   |       |   |    |    |       |    | DSTAT    |
| 7  | DEVICE ERROR STATUS         |   |     |     |      |   |      |   |       |   |    |    |       |    | DSERR    |
| 8  | MAM REQUEST HEAD POINTER    |   |     |     |      |   |      |   |       |   |    |    |       |    | DMAMQ    |
| 9  | MAM REQUEST TAIL POINTER    |   |     |     |      |   |      |   |       |   |    |    |       |    | DMAMOT   |
| 10 | CURRENT DISC                |   |     |     |      |   |      |   |       |   |    |    |       |    | DADR     |
| 11 | ADDRESS                     |   |     |     |      |   |      |   |       |   |    |    |       |    |          |
| 12 | ALTERNATE TRACK             |   |     |     |      |   |      |   |       |   |    |    |       |    | DALTADR  |
| 13 | DISC ADDRESS                |   |     |     |      |   |      |   |       |   |    |    |       |    |          |
| 14 | CURRENT CYLINDER            |   |     |     |      |   |      |   |       |   |    |    |       |    | CURCYL   |
| 15 | CURRENT DATA BUFFER ADDRESS |   |     |     |      |   |      |   |       |   |    |    |       |    | DBUFF    |
| 16 | NEXT DATA BUFFER ADDRESS    |   |     |     |      |   |      |   |       |   |    |    |       |    | DNXTBUFF |
| 17 | WORD COUNT REMAINING        |   |     |     |      |   |      |   |       |   |    |    |       |    | WCR      |
| 18 | CURRENT WORD COUNT          |   |     |     |      |   |      |   |       |   |    |    |       |    | CWC      |
| 19 | SYSBUF ADDRESS              |   |     |     |      |   |      |   |       |   |    |    |       |    | DSYSBA   |

LEPRO & RETRY INFORMATION

|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13    | 14 | 15 |              |
|--|---|---|---|---|---|---|---|---|---|---|----|----|----|-------|----|----|--------------|
|  | M | R | W | T | A | X | C | S | 0 | 0 | 0  | 0  |    | RETRY |    |    | QMISC OF 100 |
|  |   |   |   |   |   |   |   |   |   |   |    |    |    | COUNT |    |    |              |

M - handling defective track map  
R - read defective track map  
W - write defective track map  
T - track to track xfer  
A - reading alt track  
X - xfer from alt track  
C - recalibration done  
S - seek or recalibrate in progress



# 7905/7920 DIT

|    | 0                           | 1 | 2 | 3   | 4   | 5    | 6 | 7    | 8 | 9 | 10 | 11 | 12     | 15  |   |   |   |       |             |
|----|-----------------------------|---|---|-----|-----|------|---|------|---|---|----|----|--------|-----|---|---|---|-------|-------------|
|    | 0                           | 1 | 1 | ACT | REQ | 0    | 1 | 4    | 1 | 0 | 1  | 0  | 1      | AKI | 1 | 0 | 0 | STATE | DFLAG       |
|    | 1                           | 1 | 1 | 1   | 1   | UNIT | 1 | PROG | 1 | 1 | 1  | 1  | 1      |     |   |   |   |       |             |
| 1  | NEXT DITP                   |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | DLINK       |
| 2  | IOGP                        |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | DIOGP       |
| 3  | UNIT                        |   |   |     |     |      | I |      |   |   |    |    | LDEVN  |     |   |   |   |       | DLDEV       |
| 4  | DLTP                        |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | DDLTP       |
| 5  | ILTP                        |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | DILTP       |
| 6  | CURRENT DEVICE STATUS       |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | DSTAT       |
| 7  | ERROR DEVICE STATUS         |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | DSERR       |
| 8  | MAM REQUEST HEAD POINTER    |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | DMAMQ       |
| 9  | MAM REQUEST TAIL POINTER    |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | DMAMQT      |
| 10 | CURRENT LOGICAL             |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       |             |
| 11 | DISK ADDRESS                |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | CLDA        |
| 12 | CURRENT PHYSICAL            |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       |             |
| 13 | DISK ADDRESS                |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | CURCUL CPDA |
| 14 | CURRENT DATA BUFFER ADDRESS |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | CDBA        |
| 15 | WORD COUNT REMAINING        |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | WCR         |
| 16 | CURRENT WORD COUNT          |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | CWC         |
| 17 | SYSBUF ADDRESS              |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | SYSBUFA     |
| 18 | STATUS 1 RETURN             |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | STAT1       |
| 19 | STATUS 2 RETURN             |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | STAT2       |
| 20 | CYL                         |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       | CEDA        |
| 21 | HEAD                        |   |   |     |     |      | I |      |   |   |    |    | SECTOR |     |   |   |   |       |             |
| 22 | STATUS 1 RETURN             |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       |             |
| 23 | CYL                         |   |   |     |     |      |   |      |   |   |    |    |        |     |   |   |   |       |             |
| 24 | HEAD                        |   |   |     |     |      | I |      |   |   |    |    | SECTOR |     |   |   |   |       |             |

|    |              |                     |
|----|--------------|---------------------|
| 25 | DISPLACEMENT | REQUEST<br>SYNDROME |
| 26 | PATT 1       |                     |
| 27 | PATT 2       |                     |
| 28 | PATT 3       |                     |

# ERROR & RETRY INFORMATION

|   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |   |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |   |
|   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |   |
|   | D | S | E | M | W | O | O | C | O | O  | O  | O  | O  | O  | O  | O |
|   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |   |

QMISC OF IOQ

D - retry determination  
 S - request syndrome  
 E - request error info  
 M - update track map  
 W - writing track map  
 C - issued a recalibration

# 7970 MAG TAPE DIT

|   | 0               | 1 | 2 | 3 | 4   | 5   | 6    | 7 | 8 | 9    | 10 | 11 | 12 | 15 |   |   |   |   |       |        |
|---|-----------------|---|---|---|-----|-----|------|---|---|------|----|----|----|----|---|---|---|---|-------|--------|
|   | 0               | 1 | 0 | 1 | ACT | REQ | 0    | M | 0 | 1    | 0  | 1  | AK | 1  | 0 | 1 | 0 | 1 | STATF | DFLAG  |
|   |                 | 1 |   | 1 |     | 1   | UNIT |   | 1 | PROG |    |    | 1  |    | 1 |   | 1 |   |       |        |
| 1 | NEXT DITP       |   |   |   |     |     |      |   |   |      |    |    |    |    |   |   |   |   |       | DLINK  |
| 2 | IOQP            |   |   |   |     |     |      |   |   |      |    |    |    |    |   |   |   |   |       | DIOQP  |
| 3 | UNIT I LDEV #   |   |   |   |     |     |      |   |   |      |    |    |    |    |   |   |   |   |       | DLDEV  |
| 4 | DIT PTP         |   |   |   |     |     |      |   |   |      |    |    |    |    |   |   |   |   |       | DDLTP  |
| 5 | ILT FIP         |   |   |   |     |     |      |   |   |      |    |    |    |    |   |   |   |   |       | DILTP  |
| 6 | HARDWARE STATUS |   |   |   |     |     |      |   |   |      |    |    |    |    |   |   |   |   |       | DSTAT  |
| 7 | EPROR STATUS    |   |   |   |     |     |      |   |   |      |    |    |    |    |   |   |   |   |       | DSEFP  |
| 8 | REWIND FLAG     |   |   |   |     |     |      |   |   |      |    |    |    |    |   |   |   |   |       | DDFLAG |

| QMISC |   |   |   |   |   |   |         |   |         |      |         |    |    |    |    |
|-------|---|---|---|---|---|---|---------|---|---------|------|---------|----|----|----|----|
| 0     | 1 | 2 | 3 | 4 | 5 | 6 | 7       | 8 | 9       | 10   | 11      | 12 | 13 | 14 | 15 |
|       |   |   |   |   |   |   |         |   | FORWARD | BACK |         |    |    |    |    |
| P     | B | F | G | E | S | U | SPACE   |   | SPACE   |      | PTRY    |    |    |    |    |
|       |   |   |   |   |   |   | COUNTER |   | COUNTER |      | COUNTER |    |    |    |    |

## Where

- R - retry in progress
- B - backspace in progress
- F - forward space in progress
- G - gap in progress
- E - backspace on data end-of-file
- S - short read in progress
- U - unload tape for write ring installation



# TERMINAL DEVICE INFORMATION TABLE

|     |                                             |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    |       |                  |
|-----|---------------------------------------------|--------------|----------------|--------------|------------|--------------|--------------|-------------------|-------------------------|--------------|---------------|-------------|----------|--------------|----|----|-------|------------------|
|     | 0                                           | 1            | 2              | 3            | 4          | 5            | 6            | 7                 | 8                       | 9            | 10            | 11          | 12       | 13           | 14 | 15 |       |                  |
| 0   | Term                                        | UP           | Act<br>ive     | Req<br>uest  | Spec<br>IH | Spool<br>ing | WRT<br>Wait  | Pair              | New<br>Line             | PTY<br>Chk   | Term<br>Char  | Bin<br>Read | DSTATE   |              |    |    | 0     | DFLAG (reading)  |
| 1   | SYS I/O PROC NEXT DIT POINTER               |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 1     | DLINK            |
| 2   | FIRST REQUEST IOQ POINTER                   |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 2     | DIOQP            |
| 3   | FLU<br>SH                                   | Ndex<br>Echo |                | UNIT         |            |              |              |                   | LOGICAL DEVICE #        |              |               |             |          |              |    | 3  | DLDEV |                  |
| 4   | DLT POINTER                                 |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 4     | DDLTP            |
| 5   | ILT POINTER                                 |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 5     | DILTP            |
| 6   | Hang<br>UpTo                                | Dis<br>con   | Cfail<br>To    | Turn<br>To   | 2640<br>To |              | Spool<br>End | Spool<br>SW       | Read<br>To              | On<br>Line   | Dset<br>Rdy   | Log<br>Onto | BRK      | ESC          |    |    | 6     | DRQST            |
| 7   | Tim<br>ing                                  | Time<br>Read | Delete<br>Echo | Form<br>Feed | TTYE       |              |              |                   |                         | ETX<br>Sent  | Cons<br>Intrp | PAIR CODE   |          |              |    | 7  | DTYPE |                  |
| %10 | Prem<br>PT                                  | MTYPE        |                |              | CF         | CB           | SB           | No<br>Sync        | RD<br>Ct                | WRT<br>Ct    | Pri<br>Med    | TMode       | LP Level |              |    |    | 8     | DMODEM           |
| 11  | Tape<br>Mode                                | RE<br>Strt   | Sync           | Echo         | SPD<br>Sns | ESC<br>OK    | OUT SPEED    |                   |                         |              | Fill<br>ing   | Brk<br>OK   | IN SPEED |              |    |    | 9     | DSPEED           |
| 12  | 0                                           | 0            | UNIT           |              |            |              |              | Pty<br>Ctrl       | Par<br>ity              | NEXT D STATE |               |             |          | Prsp<br>Last | 1  | 0  | 10    | DCNTRL           |
| 13  | REQUESTED COUNT IN BYTES                    |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 11    | DRBCT            |
| 14  | READ/WRITE BYTE COUNT                       |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 12    | DBCNT            |
| 15  | WAITED STATE                                |              |                |              | H STATE    |              |              | Turn<br>to<br>WRT | TURN CHAR               |              |               |             |          |              |    |    | 13    | DSAVE            |
| 16  | SUB SYS BREAK CHAR                          |              |                |              |            |              |              |                   | EOR CHAR                |              |               |             |          |              |    |    | 14    | DSTOP            |
| 17  | NEXT DITP OF BANDWIDTH WAITED DEVICE        |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 15    | DWAIT            |
| %20 | WRITE BYTES TRANSFERRED SO FAR              |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 16    | DXCNT            |
| 21  | BYTE COUNT OF EOF SAVED READ                |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 17    | DRCNT            |
| 22  | COUNT TO END OF READ/WRITE TBUF             |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 18    | DCNT (DTBUF)     |
| 23  | HEAD POINTER TO READ/WRITE TBUF's           |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 19    | DHEAD            |
| 24  | TAIL POINTER TO READ/WRITE TBUF's           |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 20    | DTAIL (DTBIF2)   |
| 25  | BYTE POINTER TO NEXT READ/WRITE BYTE        |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 21    | DPNTR            |
| 26  | HEAD POINTER TO EOF SAVED READ TBUF's       |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 22    | DRPTR            |
| 27  | TERMINAL TYPE                               |              |                |              |            |              | Bin<br>WRT   | Parity<br>Save    | MCODE                   |              |               |             |          |              |    | 23 | DLAST |                  |
| %30 | POINTER TO NEXT DIT IN TBUF WAIT LIST       |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 24    | DTBLK            |
| 31  | POINTER TO SAVED TBUF AFTER TBUF WAIT       |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 25    | DNXTB            |
| 32  | READ TIME / 1ST WORD OF DOUBLE TIMERS       |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 26    | DTRIME (DRTIMED) |
| 33  | 2ND WORD OF DOUBLE READ START TIMER READING |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 27    |                  |
| 34  | MAXIMUM READ TIME IN SECONDS                |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 28    | DRTMAX           |
| 35  | LF SYNCS                                    |              |                |              | CR SYNCS   |              |              |                   |                         |              | SYNC COUNT    |             |          |              |    |    | 29    | DSYNC            |
| 36  | IOQP TO BROKEN READ SAVED DATA              |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 30    | DBREAK           |
| 37  | 2640/SPEED TR LX                            |              |                |              |            |              |              |                   | LOGON/HANGUP/READ TR LX |              |               |             |          |              |    |    | 31    | DTRLX            |
| 40  | CFAIL TR LX                                 |              |                |              |            |              |              |                   | TURN TR LX              |              |               |             |          |              |    |    | 32    | DDSET            |
| 41  | MCODE                                       |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    |       |                  |
| 0   | Term                                        | Up           | Act<br>ive     | Req<br>uest  | Spec<br>IH |              | WRT<br>Wait  |                   | New<br>Line             |              |               | ACK<br>Wait | DSTATE   |              |    |    | 0     | DFLAG (writing)  |
| %35 | BYTE COUNT TO ADD NEXT ENG                  |              |                |              |            |              |              |                   |                         |              |               |             |          |              |    |    | 29    | DSYNC (2640)     |

## TERMINAL DIT FIELDS AND DEFINITIONS

### DFLAG - FLAGS AND DEVICE STATE

|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| .TERMINAL   | Device is a terminal                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| .UP         | If set, device is on line, has been speed sensed or has been initialized and can do I/O. If clear then in speed sense mode.                                                                                                                                                                                                                                                                                                                                         |
| .ACTIVE     | If set, monitor is currently active servicing this device.                                                                                                                                                                                                                                                                                                                                                                                                          |
| .REQUEST    | Service for this device was requested while the monitor was active.                                                                                                                                                                                                                                                                                                                                                                                                 |
| .SPECIH     | Use special interrupt handler.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| .SPOOLING   | Input has been requested through the PTAPE procedure.                                                                                                                                                                                                                                                                                                                                                                                                               |
| .WRTWAIT    | A character or sync is in the process of being output and a completion interrupt is expected.                                                                                                                                                                                                                                                                                                                                                                       |
| .PAIR       | Pair is set whenever no read is in progress or when the action on the next character is dependent on the previous character input or the previous state. See paircode for details on the various pair conditions.                                                                                                                                                                                                                                                   |
| .NEWLINE    | A linefeed was the last character input or output. Used to determine if a CR/LF is necessary on mode changes or at FOPEN time.                                                                                                                                                                                                                                                                                                                                      |
| .PTYCHK     | Read data is to be checked for correct parity, and if incorre a parity error indication is to be returned to the caller.                                                                                                                                                                                                                                                                                                                                            |
| .TERMCHAR   | A special read termination character has been specified. The read data is to be checked and if the termination character is found the read will be terminated and the character set in the buffer. If the binaryread bit is set then this bit indicates a "transparent" read is in progress with sub system break and EOR characters in DSTUP. Both a termchar and a transparent read may be in progress simultaneously if the termchar field of OPAR2 is not zero. |
| .BINARYREAD | A binary or transparent read was specified. If TERMCHAR is clear then a binary read is in progress. All 8 bits are transferred and no editing takes place. A binary read is terminated only when the count is satisfied. If termchar is set, then a transparent read is in progress.                                                                                                                                                                                |

No editing takes place but only 7 bits are transferred.  
An EOR and sub system break character are held in DSTOP.

**.ACKWAIT** An ENQ was sent to a 2640/44. waiting for an ack or time out before continuing the write. Has this meaning during write operations only. This bit is also set when a write is paused by a CONTROL "S".

**.DSTATE** Device state. Specifies the current device activity and is used to determine the next state.

- 0 - null or no activity.
- 1 - writing.
- 2 - reading.
- 3 - XON write, reading next.
- 4 - turning 202 modem to write state, next state in NXTDSTA
- 5 - wait for less terminal activity to start read/write
- 6 - end of record (EOR) LF in progress, null state next.
- 7 - EOR CR in progress, EOR CR state next.
- %10 - EOR sync in progress, EOR CR state next.
- %11 - write being waited for a break allowed check by term.
- %12 - delete LF or delete echo character being written or start read next. Send XON to start read next.
- %13 - delete CR being written, delete LF state next.
- %14 - "!!!" or syncs being written. Next state is delete CR or saved in WAITEDSTATE if sync set.
- %15 - 1st character of a termtype 11 read is being echoed.
- %16 - have TIP start a read operation.
- %17 - finish up read then do DSTATE operation held in NXTDSTATE.

**DLINK** - Link word for linked list of the devices waiting for service by the system IO process. If not zero or -1 (end of list) then a DIT pointer to the next device waiting.

**DINQP** - SYSDB relative pointer to the first INQ element in the request list for this device.

**DLDEV** - Logical device number and unit number.

**.FLUSH** This flag is set whenever a break has been detected and accepted. While it is set, writes are returned completed without any I/O being done. Reads are returned with an unusual condition status, %173. It also holds off any further break service requests. It is reset with a function code 25 operation.

**.NO'CX'ECHO** if set, then "!!!" is not to be echoed when a control X is detected to delete a line.

**.UNIT** unit number of device.

.LDEVN            Logical device number.

DDLTP - SYSDB relative pointer to driver linkage table (DLT).

DILTTP - SYSDB relative pointer to interrupt linkage table (ILT).

DROST - Monitor service request flags. The requests are serviced in a left to right order. The bit position determines the priority with which the request is serviced.

.HANGUPTO        Hangup timeout has been completed.

.DISCNCT        Dataset has disconnected (dataset ready has dropped).

.CFAILTO        Timeout started when carrier failed has completed. If 103 then hangup else try to turn 202 around again.

.TURNTO         CB or SB is not true 5 seconds after starting the read to write turnaround on the 202. Hangup device.

.HP2640TO       A 2640/44 block mode read has timed out before completion. The read is now treated as a normal read. An ACKWAIT from an FNO to 2640/44 has timed out. The ACKWAIT is terminated and the write restarted.

.SPOOLEND       A control Y has been detected terminating PTAPF input.

.SPOOLSW        Switch PTAPE input buffers.

.READTO         A read operation has been timed out.

.ONLINE         A colon has been input and the device speed sensed. If not connected through a dataset, initiate a log on time out.

.DSETRDY        Dataset ready has been detected. Initiate a log on time out.

.LOGONTO        A log on time out has occurred. The caller has not logged on. The device is hungup.

.BRK            A break has been detected or SB has dropped while writing.

.ESC            A control Y has been detected.

DTYPE - Terminal type and other flags.



**.TIMING** A request to measure the time taken to complete a read operation has occurred and the time at the initiation of the read has been saved in DPTIME. When the read is completed, the time taken will be saved in DPTIME.

**.TIMERREAD** The time required to complete a read operation is to be monitored and saved in DPTIME.

**.DELECHO** This field contains a code which specifies the character to be output when a delete character (control H) is input. Different characters are output if the word count is zero to keep the carriage at the proper place.

| CODE | INPUT<>0  | INPUT=0 | COMMENT                   |
|------|-----------|---------|---------------------------|
| 0    | nothing   | space   | terminal backspaces       |
| 1    | "/"       | nothing | hard copy no backspace    |
| 2    | line feed | space   | hard copy backspaces      |
| 3    | control Y | nothing | 2600 control Y backspaces |

**.FORMFEED** If set then a form feed is output when the form feed character (914) is to be output. If clear a LF is output in place of the form feed character. In either case, the character is preceded by an XOFF and carriage return. Usually clear for terminals which do not respond to a form feed.

**.TTYPL** terminal type as specified in the MPE ERS.

|                |                                        |
|----------------|----------------------------------------|
| 0 - ASK 33     | 6 - terminet                           |
| 1 - ASK 35     | 7 - 2741 call 360                      |
| 2 - ASK 37     | 8 - 2741 P1TC/ENCODIC                  |
| 3 - executport | 9 - mini bee (HP2615)                  |
| 4 - datapoint  | 10 - HP2640/44                         |
| 5 - MEMOREXX   | 11 - HP2640/44 & auto enter capability |

**.CONSTRTP1** If set then Control A on the Console will cause PRUGFN to be awoken. If clear, then Control A is ignored.

**.ETXSENT** End of Text (ETX) character has been sent to a 2640X on a 702 to stop the terminal from listening. Carrier may now be dropped.

**.CA.(11:1)** 0 = Disallow control A; 1 = Allow control A.

**.PAIRCODE** when the action to be taken on the next character is dependant on the previous state or character input then this field contains a code specifying the previous character or condition.

|                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 - no read in progress                                                                                                                               |
| 1 - XOFFPAIR. Last character input was an XOFF during a tapemode read on a terminator. EOR has been returned and if the next char is a Ch then ignore |

- it.
- 2 - DELETEPAIR. A LF was echoed on a char delete. No LF echo is needed if next char is a control H.
  - 3 - ESCPAIR. Last character was an escape. Check next character for an escape sequence.
  - 4 - NODATAYET. A "NONSYNC" terminal read has been started with echo on but no data has been input yet. If the first character is a DC2 then paircode is set to enter (the DC2 is not saved) otherwise process as a regular character.
  - 5 - NOECHO. A termtype 11 read has been started with echo off. If first char is a DC2 then set paircode to enter (1st char not saved) otherwise write character.
  - 6 - CRWAIT. A 2640/44 block mode read has been satisfied and stopped and waiting for a CR to complete the read. No Control X checks are made to restart read.
  - 7 - CRWAITLF. Same as CRWAIT but an LF is to be echoed if requested after the CR is detected. Continue read with echo on.
  - 8 - ENTER. First character of a noecho read was a DC2. If next character not a CR then set Data Lost status, else set PRIMED and if Reading then restart read to input data.
  - 9 - DC2PAIR. Last character read was a DC2 from a 2640/44. If the next character is a CR then set primed, delete all data input and restart read.

DMODEM - Modem state and control flags

.PREMPT      When set indicates that at least one request is preemptive. In this case a scan of the request list is made to determine which request should be processed first and if the current request is to be stopped.

.MTYPE      Modem Type  
             0 - hardwired              2 - 202C  
             1 - 103                      3 - 2002

.CF      Carrier detected status from dataset.

.CB      Clear to send status from dataset. Request to send delayed.

.SB      Secondary receive status. Senders CB when writing.

.NOSYNC      If set specifies that no delays are used by this terminal. Instead an ENQ is sent after 80 characters and the write doesn't continue until an ACK is received or a timeout occurs. Set for 2640/44 terminals.

**.RDCOUNTED** When set, indicates the "number of terminals doing block mode reads counter" has been incremented and when this operation completes the counter is to be decremented.

**.WRTCOUNTED** When set, indicates that the "number of terminals doing writes" has been incremented and when this unit completes its operation the counter is to be decremented.

**.PRIMED** When set indicates an "ESC D" sequence has been written or a DC2 has been received by a NOSYNC terminal. Before any read operation is initiated to a primed terminal to do a block mode read, the number of terminals doing I/O must be less than 13. If it is greater then a request to start the read is queued.

**.TMODE** Terminal Mode.  
 0 - normal  
 1 - break mode  
 2 - console mode  
 3 - console mode and return to break mode

**.LPLEVEL** Preempt level of last request. If preempt level of new request is higher then generate a CR/LF.  
 0 - normal request  
 1 - Not Used  
 2 - normal request with terminal in console mode  
 3 - soft preempt (preempt reads with no input yet)  
 4 - hard preempt (preempt all requests)

**DSPEED** - Multiplexor speed and other flags.

**.TAPEMODE** Input from paper tape. No characters are emitted in response to delete commands or at end of record.

**.RESTART** If set indicates that a write completion interrupt has occurred while the terminal buffers were being filled. The filling procedure restarts the write by issuing a SYNC. During a read if this bit is set, the read is to be restarted when a CK is detected because a control X deleting the line was detected.

**.SYNC** If set and DSTATE=Repeating then SCOUNT contains the number of SYNC characters to be output after the completion of the current operation. If clear and DSTATE=Repeating, then SCOUNT contains the number of "!" remaining to be output in response to a Control X.

**.ECHO** If set specifies that characters read during input are to be echoed if the device is operating full duplex.

**.SPDSENSING** If set indicates that the device is in the speed sensing mode. When in the speed sensing mode a control has been

sent to the multiplexor connecting the main channel to the diagnostic channels.

**.ESC** Control Y breaks have been enabled through an FCONTROL call.

**.OUTSPEED** A code used to determine the baud rate and character size of the data output.

|                                     |            |
|-------------------------------------|------------|
| 0 - 240 CPS or not determined       | 4 - 30 CPS |
| 1 - 240 characters per second (CPS) | 5 - 15 CPS |
| 2 - 120 CPS                         | 6 - 10 CPS |
| 3 - 60 CPS                          | 7 - 14 CPS |

**.FILLING** Set when IOTEPMO is putting data into TRUFS. If the last TRUF is to be returned by TIP when this flag is set then the write is waited and DCNT is set to -2 by TIP to indicate TIP is waiting.

**.BRKOK** If set then break is allowed otherwise break is ignored. Set and cleared through FCONTROL calls.

**.INSPEED** A code used to determine the baud rate and character size to be used to input data. The codes have the same meaning as those specified in outspeed above.

**DCNTPL** - This is a control word output to the multiplexor board to send control and data to the particular channel. It also contains other information in the unused areas.

**.PARITY** This bit is OR'ED into the eighth bit position on all characters output. If the eighth bit is zero it represents the parity of the character output if the parity control option is selected, otherwise it represents the sense of the eighth bit output. Also represents the parity expected during a read. Set when speed sensed or by function 21.

**.NXTDSTATE** This is the next DSTATE to be set after a 202 modem turnaround is completed. Also contains the next DSTATE after a FINISHREAD (DSTATE=17) operation is completed.

**.PPRESPLAST** If set then the last write operation was a PRESPLAST. If next write is a postspace and newline is not set then a CR/LF is output to clean up the carriage.

**DRPCT** - For read and write request, this word holds the requested transfer count in bytes.

**DBCNT** - During reads this word contains the number of characters input. During writes it contains the number of characters remaining

to be written, including any already written from the current TRUEF.

DSAVE - Holds next DSTATE after waiting and repeating DSTATES and also the next byte to be output after a 202 turnaround is completed.

.WAITEDS        Holds the current DSTATE when a break is detected and an operation is suspended in order that term may check that break is allowed. It also holds the next DSTATE after "SYNC's" are output in the repeating DSTATE.

.HSTATE        Hangup state.  
                0 - null or hangup  
                1 - on line or normal operating condition  
                2 - log on time out in progress  
                3 & 5 - INITWAIT. Speed sense failed, disconnected speed  
                4 - DCLOSE issued, disconnect next.  
                6 - hangup turn to read is in progress. the 202 dataset needed to be put in read state before hanging up.  
                7 - hang up settling timeout is in progress. sensing delay, then reinitialize channel.

.TURNIOVRT      If DSTATE is TURN202, then if set indicates a turn to write else the turn is a turn to read.

.TURNCHAP      Holds the character to be output after the 202 is turned around from read to write.

DSTUP - Holds the subsystem break and end of record characters if not zero indicating no editing is to be applied to a read. If not zero then no editing is to be applied to the characters input except for the following characters.

.BREAKCHAP     Detection of this character causes the same action as the detection of control V for a normal read.

.EORCHAP        Detection of this character terminates input. If the device is in tapemode or 264X doing block mode input, the read is not terminated until a CR is detected.

DWAIT - Link word for a linked list of the devices waiting to be started when the terminal activity decreases. If not zero then a DIT pointer of the next device waiting. If -1 then signifies that this device is the last one in the list.

DXCNT - Holds the number of bytes transferred so far to the TRUEF during a spacing or user's data transfer operation. Used to

restart the TBUF fill operation after a wait because more than 270 bytes have already been tanked.

- DRCNT - When read data has been saved because an EOF was returned this word contains the byte count of the saved data.
- DCNT - During a write, this word contains the number of characters remaining to be written from the current TBUF. During a read it contains the number of characters remaining to fill the current TBUF or to satisfy the read count. Set to -2 to indicate a write completed during a fill operation. When -1 then new TBUF need to get next byte from.
- DHEAD - A SYSDB relative pointer to the current TBUF being written from or the first TBUF of a linked list during a read.
- DTAIL - A SYSDB relative pointer to the current TBUF being read into or the last TBUF of a linked list during a write.
- DPNTR - A SYSDB relative byte index to the last byte written or to last byte read. During a read if a new buffer is to be gotten to save the current byte input then this pointer is set to -1.
- DPPTR - When not zero, this word points to a linked list of TBUFs which contain the data saved from a read which returned an EOF requesting the read to be saved.
- DLAST - Holds the default terminal type, parity save data and preconfigured speed code.
- .TERMT            Default terminal type. The terminal is set to this type when it is speed sensed.
- .BWRITE           If set the last write was in binary mode and PTYSAVE contains the original parity control and sense bits.
- .PTYSAVE          Holds the PRYCNTRL and parity bits during a binary write when parity generation is disabled and the parity sense is set to zero.
- .MCODE            Monitor function and control code.  
                  .(13:5) - Function  
                  0 - Null or no monitoring  
                  1 - Call help  
                  2 - Monitor activity

- 3 - Form Delta time histogram
- 7 - Monitor calls/counts/initiations
- .(10:1) - Apply above to DSET1,DSF12 and DSE1CONTROL
- .(11:1) - Apply above to TIP
- .(12:1) - Apply above to TERM

.DSPEED        Preconfigured default speed code. See DUTSPEED for definition.

DTBLK - Link word for a linked list of the devices waiting for a TBUF to be available. If not zero or -1 (end of list) then a DITP pointer of the next device waiting.

DNXTB - Holds the pointer to a TBUF allocated to a device which has been waiting. Used to insure that a waiting device gets at least one TBUF when it comes to the top of the TBUF waiting list.

DRTMAX- When a read operation time out is requested, this quantity represents the maximum time in seconds allowed for the read to be completed.

DRTIME- During a times read, this is the reading of the timer at the initiation of the read. After a timed read is completed, the time in 1/100 of a second is saved in DRTIME as a single word. If it is -1 then the time was greater than 32K.

DSYNC - CP and LF SYNC counts and the current SYNC count

.LFSYNC        Contains the number of SYNCs to be issued after a carriage return is output. If >7, then actual count will be (N-6)\*5

.CRSYNC        Contains the number of SYNCs to be issued after a carriage return is output. If >7, then actual count will be (N-6)\*5.

.SCOUNT        SYNC COUNTER. Represents the number of SYNCs remaining to be issued after the current SYNC character is completed. This field also holds the number of "!"'s remaining to be echoed after a control X is input.

NOTF - Holds 80 minus the number of characters written since the last read or ENG for 2640/44 terminals. When this count goes to zero, an ENG is inserted in the write stream.

DBREAK- On broken reads, this word holds a pointer to an I/O

element which contains the count, head, tail and DPNTR pointers used to restart the broken read.

DTRLX - Holds read and data set time out request indexes.

.2640TRLX holds the timer request index for 2640/44 block mode reads and ENQ/ACK time outs.

.READTRLX holds loqon, hangup and read time out request indexes.

DDSET - Holds the TRLX indexes for the timeouts associated with the data set control operations.

.CFAILTRLX Holds the TRLX index to time out loss of carrier detect

.TURNTRLX Holds the TRLX index to time out turn the 202 to write

DMONTR Hold monitoring control code.

During PTAPE reads, several of the DITP words are used for different purposes than those in a normal read. The words and their use are listed below.

DRCNT - A 16 bit logical quantity representing the total number of characters input during this PTAPE read.

DCNT - SYSDB relative pointer to the base of the SBUF currently being used to hold the data as it is input.

DHEAD - SYSDB relative pointer to the base of the SBUF to be written to virtual, memory or the pointer to the buffer to be used when the current one is full.

DTAIL/

DPNTR- Double word logical disc address to the area where the next SBUF is to be written in virtual memory when it is full or the PTAPE read is terminated.

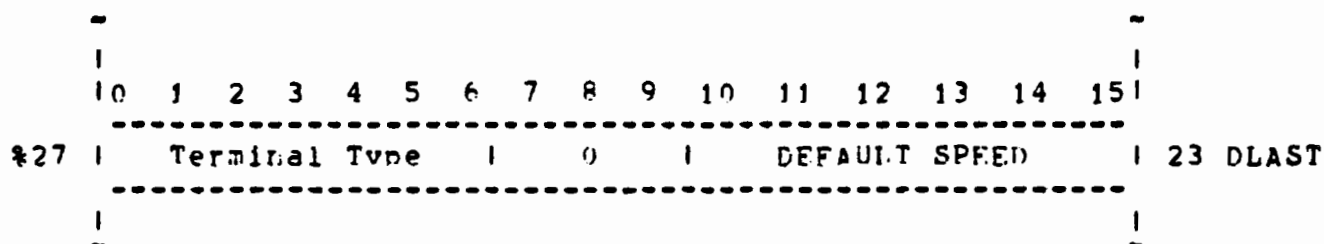
#### TERMINAL SPEED ENCODING

The default speed code set in the DIT will be used to initialize both the input and output speeds. This parameter will be used to determine the speed when an FCONTROL 37 (Allocate Terminal) is issued which does not specify a speed.



| CODE (Future rel) | SPEED (Baud)                  | CODE (SERIES II) |
|-------------------|-------------------------------|------------------|
| 0                 | Undefined                     | 0                |
| 1                 | Externally Clocked            |                  |
| 2                 | 50                            |                  |
| 3                 | 75                            |                  |
| 4                 | 110                           | 6                |
| 5                 | 134.5                         | 7                |
| 6                 | 150                           | 5                |
| 7                 | 200                           |                  |
| 8                 | 300                           | 4                |
| 9                 | 600                           | 3                |
| 10                | 1200                          | 2                |
| 11                | 4800                          |                  |
| 13                | 7200                          |                  |
| 14                | 9600                          |                  |
| 15-63             | Reserved for future expansion |                  |

The default speed code will be set in word %27 bits 10 thru 15 of the terminal DIT.



.MCODE

Monitor Function and Control Code.

.(13:3) - function

0 - null or no monitoring

1 - call help

2 - monitor activity

3 - form delta time histogram

7 - monitor calls/counts/initiations

.(10:1) - apply above to DSET1, DSET2 and DSETCONTROL

.(11:1) - apply above to TIP

.(12:1) - apply above to TERM

# CARD READER DIT

|    | 0 | 1 | 2   | 3   | 4 | 5 | 6 | 7    | 8  | 9    | 10  | 11 | 12     | 13 | 14 | 15 |       |
|----|---|---|-----|-----|---|---|---|------|----|------|-----|----|--------|----|----|----|-------|
|    | 0 | 0 | ACT | REQ | 0 | 0 |   | I/O  | AK | READ | NRI |    | MSTATE |    |    |    | DFLAG |
|    |   |   |     |     |   |   |   | PROG |    | MSG  |     |    |        |    |    |    |       |
| 1  |   |   |     |     |   |   |   |      |    |      |     |    |        |    |    |    | DLINK |
| 2  |   |   |     |     |   |   |   |      |    |      |     |    |        |    |    |    | DIOQP |
| 3  |   |   |     |     |   |   |   |      |    |      |     |    |        |    |    |    | DLDEV |
| 4  |   |   |     |     |   |   |   |      |    |      |     |    |        |    |    |    | DDLTP |
| 5  |   |   |     |     |   |   |   |      |    |      |     |    |        |    |    |    | DILTP |
| 6  |   |   |     |     |   |   |   |      |    |      |     |    |        |    |    |    | DSTAT |
| 7  |   |   |     |     |   |   |   |      |    |      |     |    |        |    |    |    | DSERR |
| 10 |   |   |     |     |   |   |   |      |    |      |     |    |        |    |    |    | DWCNT |

DSTAT bits:

BIT0=SIU OK  
 BIT1=0  
 BIT2=INT PENDING  
 BIT3=TIMING  
 BIT4=LIGHT DARK  
 BIT5=PACKED  
 BIT6=ASCII  
 BIT7=COMPLETE  
 BIT8=EOF  
 BIT9=STACKED  
 BIT10=HOPPER/STACK  
 BIT11=HOLLERITH  
 BIT12=PICK FAIL OR MOTOR CHECK  
 BIT13=TEST  
 BIT14=TROUBLE  
 BIT15=NOT READY

## CARD READER DIT AND IOG FIELD DEFINITIONS

DFLAG - Flags and device state

|            |                                                                                                                                                                 |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| .ACTIVE    | Monitor is currently active servicing this device.                                                                                                              |
| .REQUEST   | Service for this device was requested while the monitor was active.                                                                                             |
| .IOPROG    | SIO program in progress.                                                                                                                                        |
| .IAK       | Interrupt occurred or request aborted or preempted.                                                                                                             |
| .READDONE  | Previous read resulted in an EOF with a backup save requested. The data has been saved in an auxiliary buffer and will be passed back on the next read request. |
| .NRMESSAGE | Set when a not ready message has been issued, and cleared when the reader is found ready. Used to prevent multiple Not Ready messages when power is turned on.  |
| .MSTATE    | Monitor State. See SIOBM specifications for details.                                                                                                            |

DLINK - SYSDB relative pointer to the DIT for the next device requesting service for this resource.

DIDOP - SYSDB relative pointer to the first IOG element in the request list for this device.

DLDEV - Logical device number and unit number.

|       |                        |
|-------|------------------------|
| .UNIT | Unit number of device. |
|-------|------------------------|

|        |                        |
|--------|------------------------|
| .LDEVN | Logical device number. |
|--------|------------------------|

DDLTP - SYSDB relative pointer to driver linkage table (DIT).

DILTP - SYSDB relative pointer to interrupt linkage table (ILT).

DSTAT - Device interrupt status. Contains the device interrupt status at the last interrupt. See hardware FRS for details.

DSERP - Device interrupt error status. If not zero, then holds the

device interrupt status from an operation with an erroneous completion status. Causes SIUDM to log an error.

DWCNT - Holds the requested transfer count in words.

# LINE PRINTER DIT

|                     | 0 | 1                               | 2 | 3 | 4 | 5                | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 15 |                |
|---------------------|---|---------------------------------|---|---|---|------------------|---|---|---|---|----|----|----|----|----------------|
|                     |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |
|                     |   | 0                               | 1 | 0 | 1 | 0                | 1 | 0 | 1 | 0 | 1  | 0  | 1  | 0  | DFLAGS         |
| 0                   |   | 1                               | 1 | 1 | 1 | 1                | 1 | 1 | 1 | 1 | 1  | 1  | 1  | 1  |                |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| 1                   |   | DITP LINK TO NEXT DIT           |   |   |   |                  |   |   |   |   |    |    |    |    | DLINK          |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| 2                   |   | IOPQ POINTER TO 1st REQUEST     |   |   |   |                  |   |   |   |   |    |    |    |    | DIOQP          |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| 3                   |   | UNIT                            |   |   |   | LOGICAL DEVICE # |   |   |   |   |    |    |    |    | DLDEV          |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| 4                   |   | DIRVER LINKAGE TABLE POINTER    |   |   |   |                  |   |   |   |   |    |    |    |    | DDLTP          |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| 5                   |   | INTERRUPT LINKAGE TABLE POINTER |   |   |   |                  |   |   |   |   |    |    |    |    | DILTP          |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| 6                   |   | (SEE BELOW)                     |   |   |   |                  |   |   |   |   |    |    |    |    | DSTAT(CDC)     |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| 7                   |   | DEVICE ERROR STATUS             |   |   |   |                  |   |   |   |   |    |    |    |    | DSERR          |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
|                     |   | TIM                             |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| %10                 |   | ED 1                            |   |   |   |                  |   |   |   |   |    |    |    |    | DTIME          |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| %11                 |   | VERTICAL FORMAT CODE            |   |   |   |                  |   |   |   |   |    |    |    |    | DSPACE         |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| %12                 |   | LAST BYTE IF ODD BYTE COUNT     |   |   |   |                  |   |   |   |   |    |    |    |    | DLAST          |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| %13                 |   | SIO SETTling DELAY TFLX         |   |   |   |                  |   |   |   |   |    |    |    |    | DTRLX          |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| %14                 |   | NEXT REQUEST STATE              |   |   |   |                  |   |   |   |   |    |    |    |    | DSAVE          |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| %15                 |   | NUMBER OF LINES TO BE PRINTED   |   |   |   |                  |   |   |   |   |    |    |    |    | DLINES         |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| %16                 |   | NUMBER OF LINES PRINTED SO FAR  |   |   |   |                  |   |   |   |   |    |    |    |    | DPRNTD         |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
|                     |   | -----                           |   |   |   |                  |   |   |   |   |    |    |    |    |                |
|                     |   | (SEE BELOW)                     |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| 61                  |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    | DSTAT (TALLEY) |
| DSTAT(CDC)          |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| BIT0-SIO OK         |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| BIT1-WIO OK         |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| BIT2-INT PENDING    |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| BIT3,4-UI STATE     |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| BIT7-DEV FLAG       |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| BIT6-0              |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| BIT7-0              |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| BIT8-LINE RDY       |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| BIT9-READY          |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| BIT10-NOT READY     |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |
| BIT11-XFER COMPLETE |   |                                 |   |   |   |                  |   |   |   |   |    |    |    |    |                |

BIT12-CLEAR INTERFACE  
BIT13-I/O  
BIT14-XFER ERROR  
BIT15-TIMER

DSTAT(TALLY)  
BIT0-SIO OK  
BIT1-WIO OK  
BIT2-INT PENDING  
BIT3,4-UI STATE  
BIT5-DEV FLAG  
BIT6,7,8-0  
BIT9-ON LINE  
BIT10-OFFLINE  
BIT11-XFER COMPLETE  
BIT12-CLEAR INTERRUPT  
BIT13-I/O  
BIT14-XFER ERROR  
BIT15-TIMER

## LINE PRINTER DIT AND IOQ FIELD DEFINITIONS

DFLAG - Flags and device state.

|          |                                                                                             |
|----------|---------------------------------------------------------------------------------------------|
| .ACTIVE  | Monitor is currently active servicing this device.                                          |
| .REQUEST | Service for this device was requested while the monitor was active.                         |
| .IOPFOG  | SIO program in progress.                                                                    |
| .IAK     | Interrupt occurred or request aborted or preempted.                                         |
| .PPELAST | Last request specified pre spacing.                                                         |
| .FULL    | Line printer buffer contains characters from a previous prespace operation or %320 request. |
| .TOP     | Last operation was a space to top of form.                                                  |
| .MSTATE  | Monitor State. See SIOQ <sup>M</sup> specifications for details.                            |

DLINK - SYSDR relative pointer to the DIT for the next device requesting service or this resource.

DIOQP - SYSDR relative pointer to the first IOQ element in the request list for this device.

DLDEV - Logical device number and unit number.

|       |                        |
|-------|------------------------|
| .UNIT | Unit number of device. |
|-------|------------------------|

|        |                        |
|--------|------------------------|
| .LDEVN | Logical device number. |
|--------|------------------------|

DDLTP - SYSDR relative pointer to driver linkage table (DLT).

DILTP - SYSDR relative pointer to interrupt linkage table (ILT).

DSTAT - Device interrupt status. Contains the device interrupt status at the last interrupt. See hardware FRS for details.

DSEPR - Device interrupt error status. If not zero, then holds the device interrupt status from an operation with an erroneous

completion status. Causes SIO DM to log an error.

DTIME - Time out request completed word.  
.TIMED when set an SIO settling delay time out has completed.

DSPACE- Holds the vertical spacing format control code which is output by the "PPINT" part of the SIO program.

DLAST - Holds the last byte, right justified, when an odd byte count has been specified.

DTRLX - Holds the time out request entry index during an SIO settling delay time out.

DSAVE - Holds the state of the request when the current operation is successfully completed. This word is set into the POSTATE field of QMISC when the operation has been successfully completed.

DLINES- Number of lines to space for this request.

DPRNTD- Number of line spaces for this request so far.



# 30119 CARD READER/PUNCH

Everything is the same as the SIO DIT and standard IOQ except as noted below:

## 1. DIT (9)

|    | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12,13 | 14 | 15 |   |
|----|----|----|----|----|----|----|----|----|----|----|----|----|-------|----|----|---|
|    | IC | IS | IS | IH | IT | IE | IJ | IP | IP | IS | IE | IS | IM    | IC | IT | I |
| 11 | B  | I  | I  | I  | I  | I  | C  | I  | I  | I  | P  | I  | I     | O  | I  | I |
|    | F  | C  | S  | S  | F  | F  | B  | P  | N  | D  | C  | m  | D     | I  | N  | R |
|    | I  | I  | I  | I  | I  | I  | I  | I  | I  | I  | I  | I  | E     | I  | I  | I |

|              |     |                                                                                                                                                             |
|--------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DIT(9).(0:1) | CBF | Clear Buffer Full - 0= the next card leaving the hopper will be read by the device.<br>1= the read buffer will be cleared when next card leaves the hopper. |
| DIT(9).(1:1) | SC  | Stacker Control - 0=all cards are stacked in right hopper until device goes not ready.<br>1= cards are stacked per bit 2.                                   |
| DIT(9).(2:1) | SS  | Stacker Select - 0=Right stacker (stacker 1)<br>1= Left Stacker (stacker 2).                                                                                |
| DIT(9).(3:1) | HS  | Hopper Select - 0= Pick from rear hopper (primary hopper). 1= Pick from front hopper (secondary hopper).                                                    |
| DIT(9).(4:1) | IIF | Inhibit Input Feed - Inhibit picking a card when card currently in wait station is eject to a hopper.                                                       |
| DIT(9).(5:1) | EOF | End Of File has been detected on a read oper                                                                                                                |
| DIT(9).(6:1) | IB  | Internal Buffer - An internal buffer is bein used. The buffer is the SIO area in the ILT.                                                                   |
| DIT(9).(7:1) | PR  | Print - Print on the next card to pass the print station.                                                                                                   |
| DIT(9).(8:1) | PN  | Punch - Punch 80 columns of data on the next card to pass the punch station.                                                                                |
| DIT(9).(9:1) | SPD | Separate Print Data - Print data other than that being punched on the next card to pass the punch and print station.                                        |

DIT(9).(10:1)      EC      Eject Card - Eject on a write after a read. Used when reading one card then punching one card (last card was read).

DIT(9).(11:1)      Sm      Stacker Mode - Saved staker mode on last read

DIT(9).(12:2)      MODE      Access Mode -  
                                          0= File opened for Read only  
                                          1= File opened for Write only  
                                          2= File opened for Read/Write

DIT(9).(14:1)      CON      Control - 0= no FCONTROL has occurred for this file (use default settings). 1= FCONTROL has been done on this file (use settings in this DIT word for controlling this device).

DIT(9).(15:1)      TR      Timer Request - A timer request is pending. Timer request index is in word %12.

2. DIT(10)    Timer request index (see DIT(9).(15:1)).

### 3. QMISC{IOQ(4)}

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| I | I | N | I | W | I |   |   |   |   |    |    |    |    |    |    |
| I | I | R | I | I |   |   |   |   |   |    |    |    |    |    |    |
| I | O | I | I | P | I |   |   |   |   |    |    |    |    |    |    |

IOQ(4).(0:1)      IO      I/O initiated - waiting for completion interrupt.

IOQ(4).(1:1)      NRI      Waiting for a "Not Ready Interrupt" to bring the device back online.

IOQ(4).(2:1)      WR      Write - current operation is a write operation.

IOQ(4).(3:13)      Not Used

# BINARY SYNCHRONOUS COMMUNICATION FOR CS DIT/30

|        | 0                      | 1 | 2 | 3 | 4 | 5      | 6            | 7 | 8 | 9 | 10 | 11 | 12  | 13 | 14 | 15 |       |
|--------|------------------------|---|---|---|---|--------|--------------|---|---|---|----|----|-----|----|----|----|-------|
| 0      |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 10    |
|        | FLAGS                  |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| 1      |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 11    |
|        | NEXT DITP              |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| 2      |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 12    |
|        | INCP                   |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| 3      |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 13    |
|        | UNIT                   |   |   |   |   |        | DI DEVN      |   |   |   |    |    |     |    |    |    |       |
| 4      |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 14    |
|        | DLTP                   |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| 5      |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 15    |
|        | ILTP                   |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| 6      |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 16    |
| 7      |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 17    |
|        |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| 10     |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 18    |
|        | PCB NUMBER             |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| 11     |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 19    |
|        | CONTROL P              |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| 12     |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 10    |
|        | LCM' DITE              |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| 13     |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 11    |
|        | EDIT' DITP             |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| 14     |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 12    |
|        | PD' DITP               |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| (0)15  |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 13(0) |
| (2)16  |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 14(1) |
| (3)17  |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 15(2) |
|        | SUBTYPE                |   |   |   |   |        | DEV. TYPE    |   |   |   |    |    | LCM |    |    |    |       |
| (3)20  |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 16(3) |
|        | DVR. INDEX             |   |   |   |   |        | CSLDTX INDEX |   |   |   |    |    |     |    |    |    |       |
| (4)21  |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 17(4) |
|        | LAST RECOVERABLE FRPOP |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| (5)22  |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 18(5) |
|        | ERRPOP                 |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| (6)23  |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 19(6) |
|        |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
| (7)24  |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 20(7) |
|        | PROTOCOL               |   |   |   |   | IDIAL  |              |   |   |   |    |    |     |    |    |    |       |
|        |                        |   |   |   |   | I TYPE |              |   |   |   |    |    |     |    |    |    |       |
| (10)25 |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    | 21(8) |
|        | DOPTIONS               |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
|        |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |
|        |                        |   |   |   |   |        |              |   |   |   |    |    |     |    |    |    |       |



(SUPERVISED MODE)  
(DRIVER DEFINED)

LINE CONTROL MONITOR (LCM)  
(DRIVER DEFINED)

PHSICAL DRIVER (PD)  
(DRIVER DEFINED)

LENGTH SIO PGRM (??)

SIO PGRM (??)

|         |   |           |
|---------|---|-----------|
| TOTAL # | 1 | PRIMARY # |
|---------|---|-----------|

|                        |   |            |
|------------------------|---|------------|
| IMPEDED<br>PROCESS PCB | 1 | ENTRY SIZE |
|------------------------|---|------------|

HEAD INDEX

TAIL INDEX

|                      |   |                   |
|----------------------|---|-------------------|
| MAXIMUM OF<br>IN USE | 1 | CURRENT<br>IN USE |
|----------------------|---|-------------------|

OVERFLOWS

TOTAL  
REQUESTS

INDEX OF 5

ENTRY 1

0

ENTRY 2

TSIZE

THEAD

TTAIL

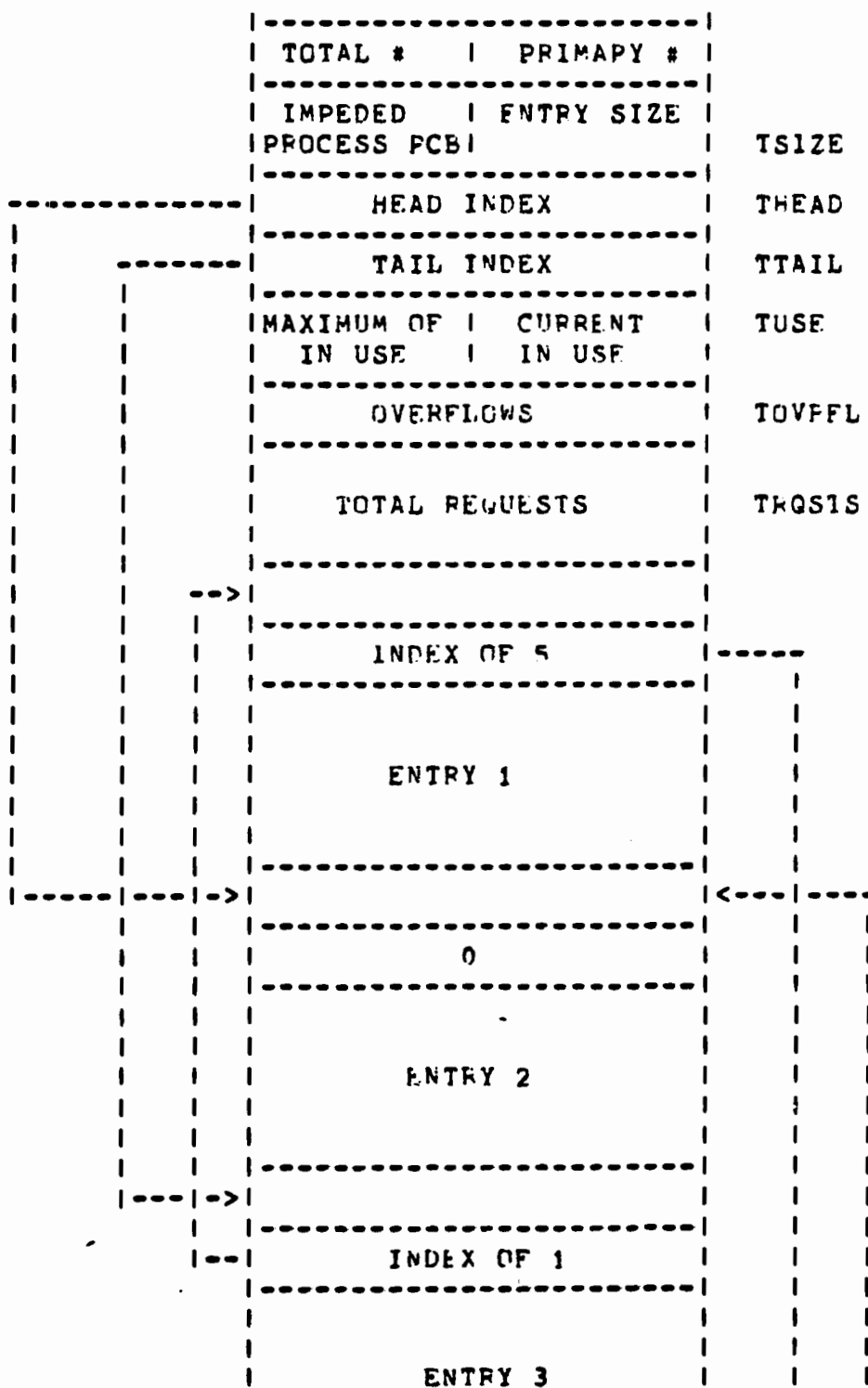
TUSE

TOVFFL

TQSTS

|                     |
|---------------------|
| INDEX OF 1          |
| ENTRY 3             |
| ?                   |
| ENTRY 4<br>(IN USE) |
| INDEX OF 2          |
| ENTRY 5             |

# 100 TABLE LAYOUT



|                     |       |
|---------------------|-------|
|                     |       |
|                     |       |
| ?                   |       |
|                     |       |
| ENTRY 4<br>(IN USE) |       |
|                     |       |
|                     | <---  |
| INDEX OF 2          | ----- |
|                     |       |
| ENTRY 5             |       |
|                     |       |



# I/O QUEUE ELEMENT (IOQ)

|    | 0   | 1                          | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9         | 10 | 11 | 12 | 13       | 14 | 15 |  |                                                              |
|----|-----|----------------------------|---|---|---|---|---|---|---|-----------|----|----|----|----------|----|----|--|--------------------------------------------------------------|
|    |     |                            |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
|    |     | REQUEST DEPENDENT FLAGS    |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
| 0  |     |                            |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  | QFLAG                                                        |
|    |     | -----                      |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
| 1  |     | IOO POINTEP                |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  | OLINK                                                        |
|    |     | -----                      |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
| 2  |     | UNIT #                     |   |   |   | I |   |   |   | OLDEVN    |    |    |    |          |    |    |  | OLDEV                                                        |
|    |     | -----                      |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
| 3  |     | MISCELLANEOUS              |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  | QMISC                                                        |
|    |     | -----                      |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
| 4  | S I | DATA SEGMENT DST NUMBER    |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  | QDSTN S(Word 4(0:1)<br>Stackflag If set,<br>QADDR is DB rel. |
|    |     | -----                      |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
|    |     |                            |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
| 5  |     | ADDRESS                    |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  | QADDR                                                        |
|    |     | -----                      |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
| 6  |     |                            |   |   |   | I |   |   |   | FUNCTION  |    |    |    |          |    |    |  | QFUNC                                                        |
|    |     | -----                      |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
| 7  |     | COUNT/XLOG/CONTROL RETURNS |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  | QWRET                                                        |
|    |     | -----                      |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
| 8  |     | P1                         |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  | GPAP1                                                        |
|    |     | -----                      |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
| 9  |     | P2                         |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  | GPAP2                                                        |
|    |     | -----                      |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |
| 10 |     | PCRN                       |   |   |   | I |   |   |   | QUALIFIER |    |    |    | I STATUS |    |    |  | GSTAT                                                        |
|    |     | -----                      |   |   |   |   |   |   |   |           |    |    |    |          |    |    |  |                                                              |

QFLAG - Request dependent flags

|       |            |                                                                                                        |
|-------|------------|--------------------------------------------------------------------------------------------------------|
| Bit 0 | .ABORT     | Request has been aborted externally.                                                                   |
| Bit 1 | .SPECIAL   | Special handling is to be applied to this request.<br>For disc, indicates a memory management request. |
| Bit 2 | .DIAG      | Diagnostic request (not used).                                                                         |
| Bit 3 |            | System buffer.                                                                                         |
| Bit 4 | .IOWAKE    | Wake caller on completion of request.                                                                  |
| Bit 5 | .BLOCKED   | blocked I/O. Caller is waited in ATTACHIO until re is completed.                                       |
| Bit 6 | .COMPLETED | Request has been completed and caller woken if he h specified.                                         |
| Bit 7 | .DATAFRZN  | Data segment has been made present and is frozen.                                                      |

Bit 8        .MAMERPORD      MAM error on data segment make present.  
 Bit 9        .PREG            This request has been started but was preempted by  
                                  MAM request.  
 Bit 10       .SFAIL          Start SIO failure in GIP.  
 Bit 11       .PFAIL          The I/O has been aborted because of a powerfail.  
 Bits12-13   .PREMPT        Preemptive type code: 1-soft, 2-hard.  
 Bit 15       .MSGDONE        A message request reply has completed.

QLINK - SYSDB relative pointer to next IOQ element. Points to first word of element.

QLDEV,QLDEVN - Logical Device Number

QMISC - Device dependent.

QDSTN - If SYSBUFPs is clear then this is the DST number of the target data segment.

QADDR - Offset in data segment or sys buff table to target data buffer.

OFUNC,FUNC - Function code and qualifiers as specified by driver.

QWBCT - On initiation specifies the word count if positive or byte count if negative. At completion of the request this location contains the actual transmission count in the same units as the call. Certain control requests return data through this location.

QPAR1 - Parameter one, defined by driver

QPAR2 - Parameter two, defined by driver

QMISC - Miscellaneous request dependent storage available to driver.

QSTAT.PCBN - PCB Number of process which made this request. Zero if not associated with any process and IOQ is to be returned by the system.

.QUALIFIER - A code which further defines or qualifies the  
general status. Defined by driver.  
.STATUS - General Status. Indicates current and result state of  
the request according to the following codes.  
0 - not started or awaiting completion.  
1 - successful completion.  
2 - end of file detected.  
3 - unusual condition.  
4 - irrecoverable error.

# TERMINAL IOO ELEMENT

|     | 0 | 1                                | 2  | 3  | 4  | 5  | 6                         | 7  | 8  | 9  | 10 | 11        | 12 | 13 | 14 | 15 |  |       |
|-----|---|----------------------------------|----|----|----|----|---------------------------|----|----|----|----|-----------|----|----|----|----|--|-------|
|     |   | --                               | -- | -- | -- | -- | --                        | -- | -- | -- | -- | --        | -- | -- | -- | -- |  |       |
|     |   | REQUEST DEPENDENT FLAGS          |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  |       |
| 0   |   |                                  |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  | QFLAG |
|     |   | -----                            |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  |       |
| 1   |   | NEXT IOQP                        |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  | QLINK |
|     |   | -----                            |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  |       |
| 2   |   | UNIT #                           |    |    |    |    | LOGICAL DEVICE NUMB.      |    |    |    |    |           |    |    |    |    |  | QLDEV |
|     |   | -----                            |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  |       |
|     |   | I                                |    |    |    |    | IPEADSTOP I REQUEST STATE |    |    |    |    |           |    |    |    |    |  | QMISC |
|     |   | -----                            |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  |       |
| 4   |   | DATA SEGMENT NUMBER              |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  | QDSTN |
|     |   | -----                            |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  |       |
| 5   |   | TARGET ADDRESS OFFSET            |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  | QADDR |
|     |   | -----                            |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  |       |
| 6   |   | I                                |    |    |    |    | FUNCTION CODE             |    |    |    |    |           |    |    |    |    |  | QFUNC |
|     |   | -----                            |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  |       |
| 7   |   | COUNT/XLOG/CONTROL RETURNS       |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  | QWECT |
|     |   | -----                            |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  |       |
| %10 |   | PARAMETER 1 (FUNCTION DEPENDENT) |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  | QPAR1 |
|     |   | -----                            |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  |       |
| %11 |   | PARAMETER 2 (FUNCTION DEPENDENT) |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  | QPAR2 |
|     |   | -----                            |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  |       |
|     |   |                                  |    |    |    |    | I QUALIFYING              |    |    |    |    | I GENERAL |    |    |    |    |  |       |
| %12 |   | PCRN                             |    |    |    |    | I STATUS                  |    |    |    |    | I STATUS  |    |    |    |    |  | QSTAT |
|     |   | -----                            |    |    |    |    |                           |    |    |    |    |           |    |    |    |    |  |       |

BIT0 ABOPT  
 BIT1 SPECIAL  
 BIT2 DIAGNOSTIC  
 BIT3 SYS BUFFER  
 BIT4 IO WAKE  
 BIT5 BLOCKED  
 BIT6 COMPLETED  
 BIT7 DATA FREEZE  
 BIT8 MAM ERROR  
 BIT9  
 BIT10-12 READ ERRORS  
 BIT13-15 RPLEVEL

## TERMINAL IOG FIELDS AND DEFINITIONS

OFLAG - Flags and request state.

- .ABORT            Abort this request and return an error indication to the caller.
- .SPECIAL        Special handling is to be applied to this request. Has no meaning for terminal requests.
- .DIAGNOSTIC     This is a request from a diagnostic subsystem. Not used by terminal system.
- .SYSBUFRS       Target is an index relative to the SBUF table of the data buffer.
- .IOWAKE          Wake caller on completion of request.
- .BLOCKED        Blocked I/O. The caller is waited in ATTACHIO until the request is completed. Implies wake.
- .COMPLETED     Request has been completed and caller woken if requested.
- .DATAFRZN       If set then the data segment has been frozen in memory. Set by MAM when a MAKEPRESENT request is successfully completed.
- .MAMERRD        An error has occurred in trying to make the target data segment present and freeze it in core.
- .READERRORS     This field contains a code specifying the resulting status on a read termination.
  - 0 - no error
  - 1 - read terminated on special read termination character
  - 2 - read completed because break was enabled and detected and allowed.
  - 3 - read data lost because of no TBUFs available, PLAPB swing buffer write not completed in time or term=11 and char following DC2 was not a CR.
  - 4 - character lost because interrupt not service before next character was input
  - 5 - read parity error occurred and parity checking enabled
  - 6 - read timed out
- .RPLEVEL        Request preempt level. If the preempt type of the request was zero then this is the value of TMODE when the request was queued, otherwise it is the preempt type of the request.
  - 0 - terminal in normal mode and non preemptive request

- 2 - normal request, terminal was in console mode when the request was queued
- 3 - soft preemptive, preempt reads with no data input
- 4 - hard preemptive, preempt all non preemptive requests

QLINK - SYSDB relative pointer to the next IOQ element. Points to the first word of the next element.

QLDEV - Logical device number.

.QLDEVN            Logical device number

QMISC - Request state and flags

.FLUSH            This flag is set when a control Y is detected and accepted while this request was waiting or being processed. Causes reads and writes to be successfully completed, although no I/O takes place.

.READSTOP        Stop read operation if not zero.

- 0 - null or no stop
- 1 - break has been detected and is allowed
- 2 - subsystem break has been detected and is allowed
- 3 - request has been preempted
- 4 - read operation has been timed out
- 5 - request has been aborted

.RSTATE          Request state. Any codes not described below are unused.

- 0 - Request not started or new.
- 1 - Request has been started. Reads or writes may be waiting for the current write to finish to be continued.
- 2 - A read operation is in progress.
- %43 - A read operation has been completed but the data has not been transferred to the callers buffer.
- %44 - A read operation has been stopped. The cause and corresponding action to be taken is identified by the STOPREAD field in QMISC.
- 5 - Read initiation conditions have been checked and the read can be started as soon as the current operation (usually a write) is completed.
- %30 - Waiting (because 270 bytes tanked or no TBUFs) to enter a CRLF because a post space write follows a previous prespace write.
- %31 - Waiting (because 270 bytes tanked or no TBUFs) to enter prespace carriage control bytes.
- %32 - Waiting (because 270 bytes tanked or no TBUFs) to enter callers data into terminal buffers.
- %33 - Waiting (because 270 bytes tanked or no TBUFs) to

enter post space carriage control bytes.  
 %34 - %37 Correspond to states %30 - %33 but waiting to  
 enter an ENQ for the 2640/44. When the ENQ  
 has been entered into the TBUF, the state  
 reverts to the current state -4.

.STACKFLAG If the QADDR is the offset from DB to target  
 address, otherwise QADDR is offset from DST base.  
 QDSTN - Contains the data segment number of the target data area.

QADDR - Offset to the target data area in the data segment or bank.  
 For PTAPE reads, this word contains an SBUF index to the  
 first of a pair of SBUFs used to read the data into.

QFUNC - Function code. See ATTACHIO description for details.

|       |                        |                                 |
|-------|------------------------|---------------------------------|
| .FUNC | Function code field.   |                                 |
|       | 0 - read               | %17 - enable tapemode           |
|       | 1 - write              | %20 - disable timer             |
|       | 2 - file open          | %21 - enable timer              |
|       | 3 - file close         | %22 - read timer                |
|       | 4 - device close       | %23 - disable parity            |
|       | 5 - set timeout        | %24 - enable parity             |
|       | 6 - set inspeed        | %25 - loaded on                 |
|       | 7 - set outspeed       | %26 - set parity                |
|       | %10 - echo on          | %27 - set terminal type         |
|       | %11 - echo off         | %30 - allocate terminal         |
|       | %12 - disable break    | %31 - clear flush and write     |
|       | %13 - enable break     | %32 - enable control X !!! echo |
|       | %14 - disable escape   | %33 - disable control X !!! ech |
|       | %15 - enable escape    | %34 - not used                  |
|       | %16 - disable tapemode | %35 - PTAPE read                |
|       |                        | %36 - set/reset break mode      |
|       |                        | %37 - set/reset console mode    |

QWBCT - Word or byte count and control returns. On initiation specifies  
 a word count if positive or a byte count if negative. At  
 completion of the request this location contains the actual  
 transmission count in the same units as the call specified.  
 Certain control requests return information through this  
 location.

QPAR1 - Parameter one. See first page of driver listing for details.

QPAR2 - Parameter two. See first page of driver listing for details.

NOTE: During PTAPE reads, QPAR1 and QPAR2 contain a double  
 word disc base address of the virtual memory area  
 where the spooled data is saved temporarily.

QSTAT - Request completion status and PCB number associated with this request.

.PCBN            PCB number associated with request. If zero this 100 element is returned by the system when the request is completed.

.QUALIFIER       A code which further defines or qualifies the general status. See ATTACHIO description for details.

.STATUS           General status. Indicates the current or resultant status of the request according to the following codes.

- 0 - not started or awaiting completion
- 1 - successfully completed
- 2 - end of file detected
- 3 - unusual condition
- 4 - irrecoverable error



# LINE PRINTER IOQ

|     | 0                                                                                               | 1 | 2 | 3 | 4                     | 5 | 6     | 7 | 8             | 9 | 10 | 11     | 12 | 13    | 14 | 15 |       |       |
|-----|-------------------------------------------------------------------------------------------------|---|---|---|-----------------------|---|-------|---|---------------|---|----|--------|----|-------|----|----|-------|-------|
|     | ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- |   |   |   |                       |   |       |   |               |   |    |        |    |       |    |    |       |       |
|     | (SEE BELOW)                                                                                     |   |   |   |                       |   |       |   |               |   |    |        |    |       |    |    |       |       |
| 0   |                                                                                                 |   |   |   |                       |   |       |   |               |   |    |        |    |       |    |    | QFLAG |       |
| 1   | IOQP POINTER TO NEXT REQUEST                                                                    |   |   |   |                       |   |       |   |               |   |    |        |    |       |    |    | QLINK |       |
| 2   | UNIT #                                                                                          |   |   |   | LOGICAL DEVICE NUMBER |   |       |   |               |   |    |        |    |       |    |    | QLDEV |       |
| 3   |                                                                                                 |   |   |   | WAIT                  |   | FIELD |   | REQUEST STATE |   |    |        |    |       |    |    | QMISC |       |
| 4   | DST NUMBER OR 0                                                                                 |   |   |   |                       |   |       |   |               |   |    |        |    |       |    |    | QDSTM |       |
| 5   | OFFSET IN DST OR BANK 0                                                                         |   |   |   |                       |   |       |   |               |   |    |        |    |       |    |    | QADDP |       |
| 6   |                                                                                                 |   |   |   | FUNCTION CODE         |   |       |   |               |   |    |        |    |       |    |    | QFUNC |       |
| 7   | WORD(+) BYTE(-) COUNT                                                                           |   |   |   |                       |   |       |   |               |   |    |        |    |       |    |    | QWBCT |       |
| %10 | CARRIAGE CONTROL SPECIFICATION                                                                  |   |   |   |                       |   |       |   |               |   |    |        |    |       |    |    | QPAR1 |       |
| %11 |                                                                                                 |   |   |   |                       |   |       |   |               |   |    | IND    |    | I     |    |    |       |       |
|     |                                                                                                 |   |   |   |                       |   |       |   |               |   |    | I AUTO |    | I PRE |    |    |       | QPAR2 |
| %12 | PCB NUMBER                                                                                      |   |   |   | QUALIFIER             |   |       |   | STATUS        |   |    |        |    |       |    |    | QSTAT |       |

BIT0 ABORT  
 BIT1 SPECIAL  
 BIT2 DIAGNOSTIC  
 BIT3 SYS BUFFER  
 BIT4 IO WAKE  
 BIT5 BLOCKED  
 BIT6 COMPLETED  
 BIT7 DATA FREEZE  
 BIT8 MAM ERROR  
 BIT9 0  
 BIT 10 S FAIL  
 BIT 11 PFAIL

**QFLAG - Flags and request state**

- .ABORT**            Abort this request and return an error indication to the caller.
- .SPECIAL**        Special handling is to be applied to this request. Has no meaning for line printer requests.
- .DIAGNOSTIC**     This is a request from a diagnostic subsystem. Not used by line printer.
- .SYSBUFRS**      Target is an index relative to the SBUF table of the data buffer.
- .IOWAKE**        Wake caller on completion of request.
- .BLOCKED**        Blocked I/O. The caller is waited in ATTACHIO until the request is completed. Implies wake.
- .COMPLETED**    Request has been completed and caller woken if requested.
- .DATAFRZN**      If set then the data segment has been frozen in memory. Set by MAM when a MAKEPRESENT request is successfully completed.
- .MAMERRD**        An error has occurred in trying to make the target data segment present and freeze it in core.
- .SFAIL**         SIO program failed to start because:
  - a. device didn't respond, or
  - b. request was queued because device was busy.
- .PFAIL**         This request has been aborted because of a power failure.

**QLINK** - SYSDB relative pointer to the next IOQ element. Points to the first word of the next element.

**QLDEV** - Logical device number.

**.QLDEVN**        Logical device number.

**QMISC** - Request state and flags.

- .WAITFIELD**     This field contains a code describing the type of wait currently taking place.
  - 0 - new request or no wait in progress.
  - 1 - normal interrupt completion wait for a print or

- fill operation.
- 2 - SIO was in progress when an interrupt occurred so a 2 second software delay is taking place to insure that no control operations are done while the SIO program is in progress.
  - 3 - a not ready condition has been detected and the request will be continued when the printer goes ready.
  - 4 - A Talley printer is not ready and the SIO program is still pending. SIO program will be continued when line printer does ready.

.RQSTATE      request state.

- 0 - new request.
- 1 - pre to post spacing buffer; clear print in progress.
- 2 - post space buffer fill only.
- 3 - pre space buffer fill.
- 4 - post space print, with/without buffer fill.
- 5 - pre space print, pre fill next
- 6 - post spacing multi lines. state 4 next.
- 7 - pre spacing multi lines. state 5 next.
- 8 - same as state 4, but top of form print operation.
- 9 - same as state 5, but top of form print operation.

QDSTN - Contains the data segment number of the target data area.

QADDF - Offset to the target data area in the data segment or bank.

QFUNC - Function code. See ATTACHID description for details.

.FUNC            function code field.

- 1 - print
- 2 - file open
- 3 - file close
- 4 - device close

QWBCT - Word or byte count and control returns. On initiation specifies a word count if positive or a byte count if negative. At completion of the request this location contains the actual transmission count in the same units as the call specified. The count is truncated to produce a maximum of 132 printed characters.

QPAR1 - Parameter one. Carriage control specification; see first page of listing for details.

QPAR2 - Parameter two. Spacing mode control.

**.NOAUTO** If set, then single and double spacing is to be done without automatic forms step over. If clear, then single and double spacing is to be done with forms step over.

**.PRESpace** Prespace flag. If set, then print and space before filling line printer buffer. If clear, fill line printer buffer, then print and space.

**QSTAT** - Request completion status and PCB number associated with this request.

**.PCBN** PCB number associated with request. If zero this IOQ element is returned by the system when the request is completed.

**.QUALIFIER** A code which further defines or qualifies the general status. See first page of driver listing for details.

**.STATUS** General Status. Indicates the current or resultant status of the request according to the following codes.

- 0 - Not started or awaiting completion
- 1 - Successfully completed
- 2 - End of file detected
- 3 - Unusual condition
- 4 - Irrecoverable error

# CARD READER IOQ

|     | 0 | 1                            | 2 | 3 | 4 | 5 | 6                | 7 | 8 | 9 | 10 | 11     | 12 | 13 | 14 | 15 |  |        |
|-----|---|------------------------------|---|---|---|---|------------------|---|---|---|----|--------|----|----|----|----|--|--------|
|     |   | -                            | - | - | - | - | -                | - | - | - | -  | -      | -  | -  | -  | -  |  |        |
| 0   |   | (SEE BELOW)                  |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  | QFLAGS |
|     |   | -----                        |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  |        |
| 1   |   | IOQP POINTER TO NEXT REQUEST |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  | QLINK  |
|     |   | -----                        |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  |        |
| 2   |   | UNIT #                       |   |   |   |   | LOGICAL DEVICE # |   |   |   |    |        |    |    |    |    |  | QLDEV  |
|     |   | -----                        |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  |        |
| 3   |   | AUXILIARY BUFFER FLAG        |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  | QMISC  |
|     |   | -----                        |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  |        |
| 4   |   | DST NUMBER OR 0              |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  | QDSTN  |
|     |   | -----                        |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  |        |
| 5   |   | OFFSET IN DST OR BANK 0      |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  | QADDR  |
|     |   | -----                        |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  |        |
| 6   |   |                              |   |   |   |   | FUNCTION CODE    |   |   |   |    |        |    |    |    |    |  | QFUNC  |
|     |   | -----                        |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  |        |
| 7   |   | WORD(+) OR BYTE(-) COUNT     |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  | QWBCT  |
|     |   | -----                        |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  |        |
| %10 |   |                              |   |   |   |   |                  |   |   |   |    | FOF    |    |    |    |    |  | QPAR1  |
|     |   | -----                        |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  |        |
| %11 |   |                              |   |   |   |   |                  |   |   |   |    | BINARY |    |    |    |    |  | QPAR2  |
|     |   | -----                        |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  |        |
| %12 |   | PCR NUMBER                   |   |   |   |   | STATUS           |   |   |   |    |        |    |    |    |    |  | QSTAT  |
|     |   | -----                        |   |   |   |   |                  |   |   |   |    |        |    |    |    |    |  |        |

BIT0 ABORT  
 BIT1 SPECIAL  
 BIT2 DIAGNOSTIC  
 BIT3 SYS BUFFER  
 BIT4 IO WAKE  
 BIT5 BLOCKED  
 BIT6 COMPLETED  
 BIT7 DATA FREEZE  
 BIT8 MAM ERROR  
 BIT9 0  
 BIT10 SFAIL  
 BIT11 PFAIL

OFLAG - Flags and request state.

.ABORT            Abort this request and return an error indication to the caller.

.SPECIAL        Special handling is to be applied to this request. Has no meaning for card reader requests.

.DIAGNOSTIC     This is a request from a diagnostic subsystem. Not used by card reader driver.

.SYSBUFERS      Target is an index relative to the SBUF table of the data buffer.

.IOWAKE         Wake caller on completion of request.

.BLOCKED        Blocked I/O. The caller is waited in ATTACHIO until the request is completed. Implies wake.

.COMPLETED     Request has been completed and caller woken if requested.

.DATAFRZN       If set then the data segment has been frozen in memory. Set by MAM when a MAKEPRESENT request is successfully completed.

.MAMERPD        An error has occurred in trying to make the target data segment present and freeze it in core.

.SFAIL          SID program failed to start because a) device didn't respond, or b) request has queued because device was busy.

.PFAIL          This request has been aborted because of a power failure.

QLINK - SYSDB relative pointer to the next IOQ element. Points to the first word of the next element.

QLDEV - Logical device number.

.QLDEVN         Logical device number.

QMISC - Auxiliary buffer flag. When odd. Data is being read into an auxiliary buffer because the requested count is less than 40 words.

QDSTN - Contains the data segment number of the target data area.

QADDR - Offset to the target data area in the data segment or bank.

QFUNC - Function code. See ATTACHIO description for details.

.FUNC           Function code field.  
          0 - read  
          2 - file open               (no operation)  
          3 - file close             (no operation)  
          4 - device close           (clear EOF field in LPDT)

QWBCT - Word or byte count and control returns. On initiation specifies a word count if positive or a byte count if negative. At completion of the request this location contains the actual transmission count in the same units as the call specified. Odd counts are rounded up to produce reads of an even number of bytes. All counts are truncated to produce maximum reads of 40 words for ASCII or 80 words for column binary.

QPAR1 - End of file specification. See EOFCHK write up for details.

QPAR2 - Binary/ASCII specification.

.BINARY        If 0 then ASCII code conversion; 40 words maximum read.  
                If not 0 then column binary read; 80 words maximum read.

QSTAT - Request completion status and PCR number associated with this request.

.PCBN          PCR number associated with request. If zero this IDQ element is returned by the system when the request is completed.

.QUALIFIED     A code which further defines or qualifies the general status of the request according to the following codes.  
          0 - not started or awaiting completion  
          1 - successfully completed  
          2 - end of file detected  
          3 - unusual condition  
          4 - irrecoverable error

# DATA COMMUNICATIONS IOO ENTRY

|    | 0 | 1                         | 2 | 3          | 4        | 5 | 6 | 7      | 8 | 9 | 10 | 11 | 12 | 13     | 14 | 15 |  |
|----|---|---------------------------|---|------------|----------|---|---|--------|---|---|----|----|----|--------|----|----|--|
| 0  |   |                           |   |            |          |   |   |        |   |   |    |    |    |        |    |    |  |
| 1  |   | (SEE BELOW)               |   |            |          |   |   |        |   |   |    |    |    |        |    |    |  |
| 2  |   | NEXT IOOP                 |   |            |          |   |   |        |   |   |    |    |    |        |    |    |  |
| 3  |   | UNIT #                    |   |            | I        |   |   | OLDEVN |   |   |    |    |    |        |    |    |  |
| 4  |   | IOO STATN/LAST STATN PEF  |   |            |          |   |   |        |   |   |    |    |    |        |    |    |  |
| 5  |   | S                         | I | BUFFER DST |          |   |   |        |   |   |    |    |    |        |    |    |  |
| 6  |   | BUFFER1 ADDR              |   |            |          |   |   |        |   |   |    |    |    |        |    |    |  |
| 7  |   | I                         |   |            | FUNCTION |   |   |        |   |   |    |    |    |        |    |    |  |
| 8  |   | COUNT/ILOG                |   |            |          |   |   |        |   |   |    |    |    |        |    |    |  |
| 9  |   | BUFFER2 ADDR/CONTROL CODE |   |            |          |   |   |        |   |   |    |    |    |        |    |    |  |
| 10 |   | TCOUNT2/PARAMETER         |   |            |          |   |   |        |   |   |    |    |    |        |    |    |  |
| 11 |   |                           |   |            |          |   |   |        |   |   |    |    |    |        |    |    |  |
| 12 |   | USEP PCBN                 |   |            | I        |   |   | I/O QS |   |   | I  |    |    | I/O GS |    |    |  |
| 13 |   |                           |   |            |          |   |   |        |   |   |    |    |    |        |    |    |  |

S=STACKFLAG

QS=QUALIFIED STATUS  
GS=GENERAL STATUS

BIT0 ABOPT  
 BIT3 SYS BUFFER  
 BIT4 IO WAKE  
 BIT5 BLOCKED  
 BIT6 COMPLETED  
 BIT7 BUFFER FROZEN  
 BIT8 MAM ERROR  
 BIT 10 SFAIL  
 BIT11 PFAIL  
 BIT14 TIMER  
 BIT15 MSG ERROR

GS 0=PENDING  
 GS 1=SUCCESSFUL  
 GS 2=END OF TRANSMISSION  
 RECEIVED  
 GS 3=UNUSUAL CONDITION

|        |            |                                                      |
|--------|------------|------------------------------------------------------|
| Word 0 | .ABORT     | - Abort this I/O request                             |
|        | .SYSBUF    | - Data is in system buffers                          |
|        | .IOWAKE    | - wake caller upon completion                        |
|        | .BLOCKED   | - Blocked I/O, do blocked AWAKE when I/O is complete |
|        | .COMPLETE  | - Request has been completed                         |
|        | .DATAFRZN  | - The DST has been frozen                            |
|        | .MAMERRORD | - MAM failed to freeze the DST                       |
|        | .SFAIL     | - The I/O program failed to start due to no SIO OK   |



.PFAIL - The Abort bit was set because  
of a power failure  
.TIMED - An I/O timeout request has completed  
.MSGDONE - A message reply has been completed





# DRIVER LINKAGE TABLE (DLT)

|   | 0                       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9           | 10 | 11 | 12 | 13 | 14 | 15 |       |
|---|-------------------------|---|---|---|---|---|---|---|---|-------------|----|----|----|----|----|----|-------|
| 0 | QUEUE NUMBER            |   |   |   |   |   |   |   | 1 | (SEE BELOW) |    |    |    |    |    |    | DPROC |
| 1 | MONITOR PLABEL          |   |   |   |   |   |   |   |   |             |    |    |    |    |    |    | DMNTP |
| 2 | INITIATOR PLABEL        |   |   |   |   |   |   |   |   |             |    |    |    |    |    |    | DINIT |
| 3 | COMPLETOR PLABEL        |   |   |   |   |   |   |   |   |             |    |    |    |    |    |    | DCOMP |
| 4 | INTERPUPT PLABEL        |   |   |   |   |   |   |   |   |             |    |    |    |    |    |    | DINTP |
| 5 | DIT SIZE                |   |   |   |   |   |   |   | 1 | DEVICE TYPE |    |    |    |    |    |    | DIYPE |
| 6 | CS DRIVER EDITOR PLABEL |   |   |   |   |   |   |   |   |             |    |    |    |    |    |    |       |
| 7 | INITIALIZATION PLABEL   |   |   |   |   |   |   |   |   |             |    |    |    |    |    |    |       |

BIT8 DRV FRZN  
 BIT9 MAM C  
 BIT10 CORE RES  
 BIT13 0  
 BIT14-15 DRIVER TYPE

There is one DLT for each type of driver. A pointer in the DIT allows different devices on a controller to have different drivers and interrupt handlers.

- DPROC.QNUMB - This field contains the I/O process request queue number for type 2 drivers. Zero for all other types.
- .DRVFRZN - Driver code frozen. Set by MAM when then the driver code segment has been made present and frozen from a request from SJUDM.
- .MAMERRORC - MAM Error on Code Makepresent
- .CORERES - If set both initiator and completor code are core resident.
- .DRVRTYPE - Driver type  
 0 - not used  
 1 - driver can be executed on any stack  
 2 - driver can be executed in the user process or in the I/O process identified by IDNUMB

3 - run only in process whose PCB number is in  
IDNUMB

DMNTR - I/O Monitor Plabel.

DINIT - Driver Initiator Procedure Plabel.

DCOMP - Driver Completor Procedure Plabel.

DINTF - Special interrupt hanler Plabel. This procedure is called  
by GIP if ISPEC is set DFLAG. No other action is taken by  
GIP except to set the Interunt Status in DSTAT.

DTYPE.DITSIZE - The length of the DIT in words for this driver.

```

POINTER TO NEXT IN USE
SIZE OF THIS ENTRY

JOB #

FILE #

FILE SEQ #	SEQ	TY	M	A	L	W
	TYPE					

PIN	VOL SEQ #

EXPIRATION DATE

FILE NAME
FROM/FOR
TYPE 1 LABEL
17 BYTES
.
.
.
.
.
.
.
.

LOCKWORD

VALID (FIRST VOL)

VALID (NTH VOL)

```

R = 1 RECOGNIZED RS = 1 WAITING FOR REEL SWITCH  
TY = 0 NO TAPE MOUNTED  
= 1 NO LABEL  
= 2 ANSI  
= 3 IBM

SQ TY = 0 SEARCH FOR MATCH ON FILE NAME  
= 1 NEXT OR DEFAULT  
= 2 ADDF  
= 3 SPECIFIED FILE SEQ #

W = 1 WAITING FOR MOUNT  
L = 1 JOB ENTRY LINKED TO LDEV  
A = 1 USER HEADER LABEL  
TM = 1 USER TRAILER LABEL

TAPE LABEL TABLE DST 26

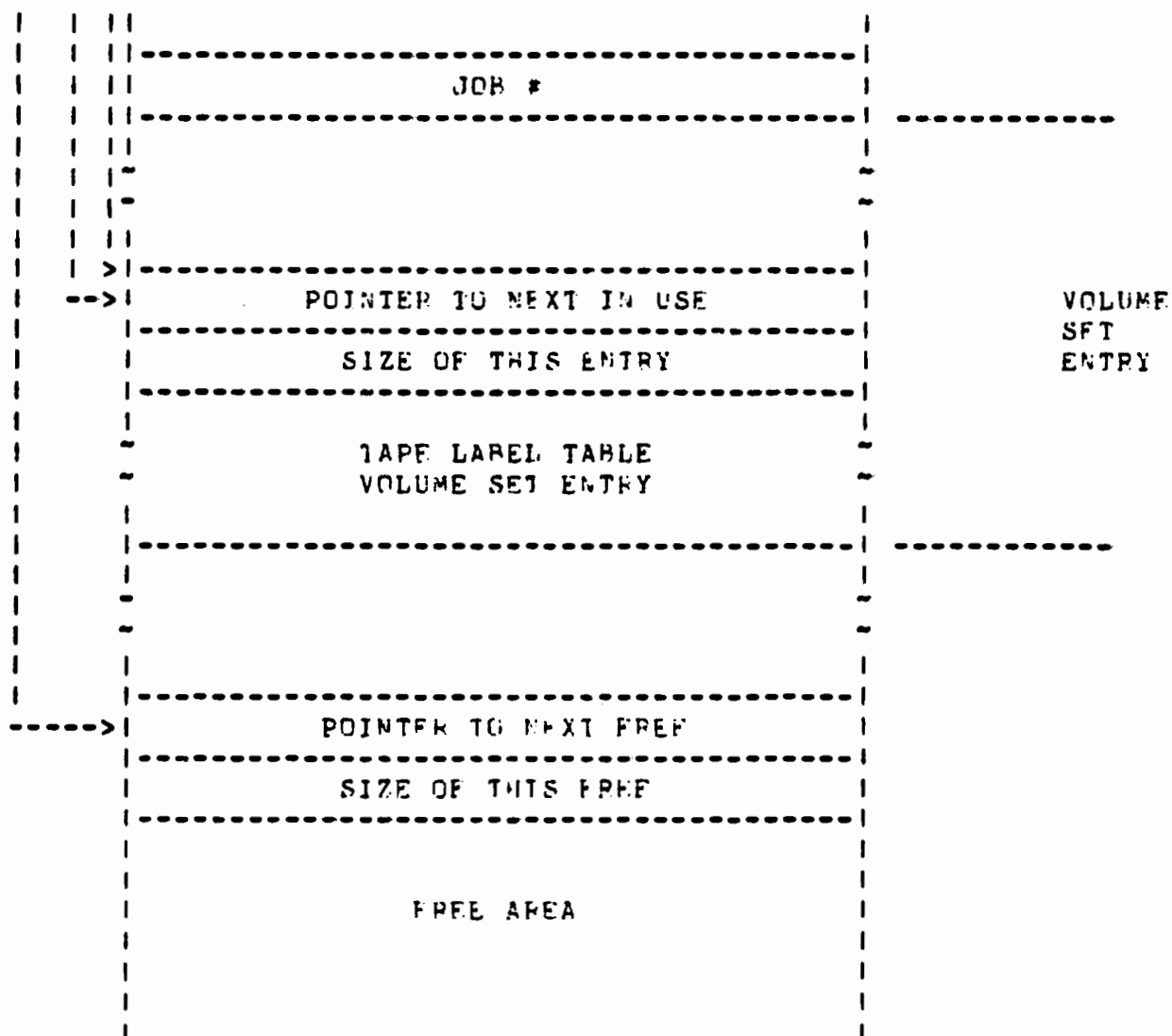
10

|  |  |                          |  |            |        |
|--|--|--------------------------|--|------------|--------|
|  |  | # TAPE UNITS             |  | ENTRY SIZE |        |
|  |  | POINTER TO FIRST IN USE  |  |            |        |
|  |  | POINTER TO FIRST FREE    |  |            |        |
|  |  | CURRENT TABLE SIZE       |  |            |        |
|  |  | MAX TABLE SIZE           |  |            |        |
|  |  |                          |  |            |        |
|  |  |                          |  |            |        |
|  |  |                          |  |            |        |
|  |  |                          |  |            |        |
|  |  |                          |  |            |        |
|  |  |                          |  |            |        |
|  |  | LDEV #                   |  | TY         | FS   R |
|  |  | FILE SFG #               |  | REEL #     |        |
|  |  | VOLUME SET ENTRY POINTER |  |            |        |
|  |  | VOLID IN ASCII/EBCDIC    |  |            |        |
|  |  | VOLID IN ASCII/EBCDIC    |  |            |        |
|  |  | OF                       |  |            |        |
|  |  | FIRST VOLUME IN SET      |  |            |        |
|  |  |                          |  |            |        |
|  |  | JOB #                    |  |            |        |
|  |  |                          |  |            |        |
|  |  | LDEV #                   |  | TY         |        |
|  |  | FILE SEQ #               |  | REEL #     |        |
|  |  | VOLUME SET ENTRY POINTER |  |            |        |
|  |  |                          |  |            |        |
|  |  | VOLID IN ASCII/EBCDIC    |  |            |        |
|  |  |                          |  |            |        |
|  |  | VSETID IN ASCII/EBCDIC   |  |            |        |

HEADER

DEVICE  
ENTRY

DEVICE  
ENTRY



.DEVTYPE - Device type as defined in the MPE EHS for which this driver was designed to control.



# SBUF TABLE LAYOUT

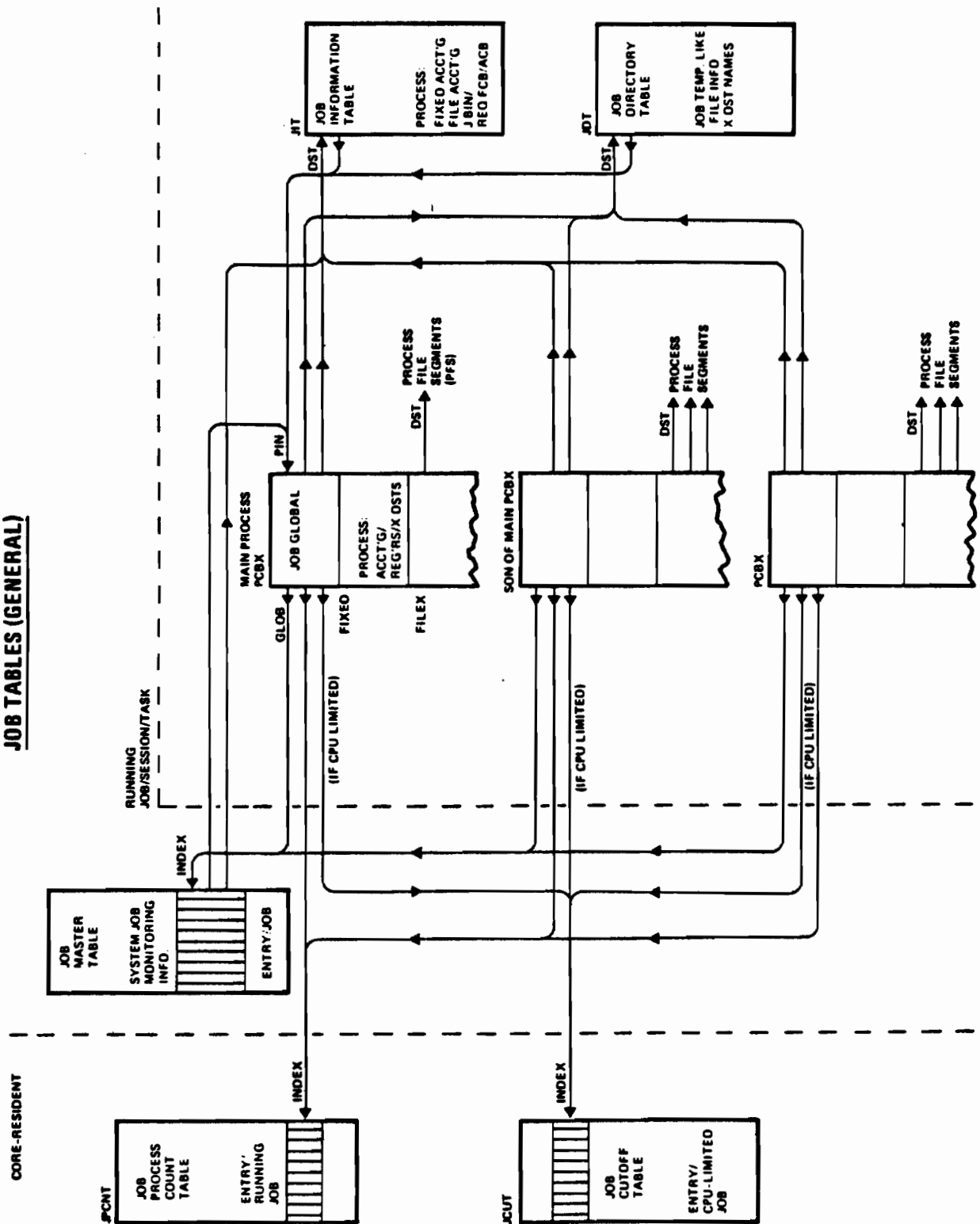
|    |                      |   |                |        |
|----|----------------------|---|----------------|--------|
|    | SECONDARY #          | 1 | PRIMARY #      |        |
|    | IMPEDED PROCESS PCB  | 1 | ENTRY SIZE     | TSIZE  |
|    | HEAD INDEX           |   |                | THEAD  |
|    | TAIL INDEX           |   |                | TTAIL  |
|    | MAXIMUM OF IN USE    | 1 | CURRENT IN USE | TUSE   |
|    | OVERFLOWS            |   |                | TOVRFL |
|    | TOTAL REQUESTS       |   |                | TROSTS |
|    | INDEX OF 5           |   |                |        |
| -> | ENTRY 1              |   |                |        |
|    | 0                    |   |                |        |
| -> | ENTRY 2              |   |                | <---   |
| >  | INDEX OF 1           |   |                |        |
| -> | ENTRY 3              |   |                |        |
|    | ?                    |   |                |        |
|    | ENTRY 4<br>(IN USE ) |   |                |        |
|    | INDEX OF 2           |   |                |        |
|    | ENTRY 5              |   |                |        |

# SBUF TABLE LAYOUT

|  |                      |   |                |        |
|--|----------------------|---|----------------|--------|
|  | SECONDARY #          | 1 | PRIMARY #      |        |
|  | IMPEDED PPROCESS PCB | 1 | ENTRY SIZE     | TSIZE  |
|  | HEAD INDEX           |   |                | THEAD  |
|  | TAIL INDEX           |   |                | TTAIL  |
|  | MAXIMUM OF IN USE    | 1 | CURRENT IN USE | TUSE   |
|  | OVERFLOWS            |   |                | TOVRFL |
|  | TOTAL REQUESTS       |   |                | TROSTS |
|  | INDEX OF 5           |   |                |        |
|  | ENTRY 1              |   |                |        |
|  | 0                    |   |                |        |
|  | ENTRY 2              |   |                |        |
|  | INDEX OF 1           |   |                |        |
|  | ENTRY 3              |   |                |        |
|  | ?                    |   |                |        |
|  | ENTRY 4<br>(IN USE ) |   |                |        |
|  | INDEX OF 2           |   |                |        |
|  | ENTRY 5              |   |                |        |

# TBUF TABLE LAYOUT

## JOB TABLES (GENERAL)



# JMAT - JOB MASTER TABLE STRUCTURE

DST = 25(10)  
SIR = 15(10)

| 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|---------------------------------------|------------|--|--|--|--|--|--|--|----|-------------------------|--|--|--|--|--|----|--------------------------------------------------------|--|
| -----                                 |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
| 0                                     | MAXSIZE    |  |  |  |  |  |  |  | 1  | CURSIZE                 |  |  |  |  |  | 10 | max JMAT size (words/128)                              |  |
| 1                                     | ////////// |  |  |  |  |  |  |  | 1  | ENTRY SIZE              |  |  |  |  |  | 11 | current JMAT size (words/128)                          |  |
| 2                                     |            |  |  |  |  |  |  |  | 12 | ENTRY POINTER           |  |  |  |  |  | 12 | JMAT entry size (26)                                   |  |
| 3                                     |            |  |  |  |  |  |  |  | 13 | ENTRY POINTER           |  |  |  |  |  | 13 | DB pointer to first entry (26)                         |  |
| 4                                     |            |  |  |  |  |  |  |  | 14 | SCHEDULING HEAD POINTER |  |  |  |  |  | 14 | DB pointer to word 0 of head entry in scheduling queue |  |
| 5                                     |            |  |  |  |  |  |  |  | 15 | SCHEDULING TAIL POINTER |  |  |  |  |  | 15 | DB pointer to word 0 of tail entry in scheduling queue |  |
| 6                                     | TY1        |  |  |  |  |  |  |  | 16 | SCOUNTER                |  |  |  |  |  | 16 | next assignable session#, TY=1                         |  |
| 7                                     | TY1        |  |  |  |  |  |  |  | 17 | JCOUNTER                |  |  |  |  |  | 17 | next assignable batch#, TY=2                           |  |
| 10                                    | ////////// |  |  |  |  |  |  |  | 18 | JOB FENCE               |  |  |  |  |  | 18 | defer job/sessions whose JNPRI<=this value             |  |
| 11                                    |            |  |  |  |  |  |  |  | 19 | SLIMIT                  |  |  |  |  |  | 19 | maximum number sessions                                |  |
| 2                                     |            |  |  |  |  |  |  |  | 20 | SNUM                    |  |  |  |  |  | 20 | current number sessions                                |  |
| 13                                    |            |  |  |  |  |  |  |  | 21 | JLIMIT                  |  |  |  |  |  | 21 | maximum number batch jobs                              |  |
| 14                                    |            |  |  |  |  |  |  |  | 22 | JNUM                    |  |  |  |  |  | 22 | current number batch jobs                              |  |
| 15                                    |            |  |  |  |  |  |  |  | 23 |                         |  |  |  |  |  | 23 |                                                        |  |
| 16                                    |            |  |  |  |  |  |  |  | 24 |                         |  |  |  |  |  | 24 |                                                        |  |
| 31                                    |            |  |  |  |  |  |  |  | 25 |                         |  |  |  |  |  | 25 |                                                        |  |
| =====                                 |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
| -----                                 |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |
|                                       |            |  |  |  |  |  |  |  |    |                         |  |  |  |  |  |    |                                                        |  |

ENTRY 1 SCHEDULING

WAITING SESSIONS  
 FIFO WITHIN  
 HIPRI/INPUT  
 PRIORITY  
 ERROR JOBS  
 FIFO  
 WAITING JOBS  
 FIFO WITHIN  
 HIPRI/INPUT  
 PRIORITY

LAST  
 ENTRY

# JMAT - JOBNMASTER TABLE LEGEND

## Entry Types [(entry word 0-(0:6))]

0 unused entry  
 1 job introduced\*  
 %40 job waiting  
 %60 job being initialized (CI)  
 2 job executing  
 3 job terminated or terminating

## Definitions

0 D - JIN/JLIST duplicative  
 I - JIN/JLIST interactive  
 G - Group  
 A - Account  
 U - User  
 C - ORIGJLIST is class index  
 Q - 0=job not quiet  
 1=job is quiet messages  
 INPRI - input priority of job  
 1 TY - type  
 1=session  
 2=job  
 JNUMBER - job number  
 18 JIN - current job input device  
 JLIST - current job list device  
 19 STAPTIME - starting time stamp (CHRONOS)  
 22 XPRI - executing priority requested  
 MAIN PIN - main pin  
 23 TIMELIMIT - job cpu time limit in seconds  
 0=>omitted, default  
 1=>unlimited  
 24 SPOOLED - origin is spooled  
 RESTART - restart is requested  
 P - xpri requested was not granted; max permissible used  
 OUTPRI - output spool priority  
 NUMCOPIES - number of copies to be output  
 F - non standard forms control on device  
 25 SCHEDLINK - DE pointer to word 0 of next entry on scheduling  
 queue;  
 0=>last  
 25 ORIGJIN - original job input device  
 ORIGJLIST - requested job list device

# JMAT - JOB MASTER TABLE ENTPY

(State %1 - Introduced)

|    | 0 | 1  | 2 | 3   | 4 | 5 | 6 | 7  | 8  | 9  | 10 | 11    | 12 | 13 | 14    | 15   |     |
|----|---|----|---|-----|---|---|---|----|----|----|----|-------|----|----|-------|------|-----|
| 0  |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      |     |
| 0  |   |    |   | 1   |   |   | I | DI | II | GI | AI | UI    | CI |    | INPRI |      | 10  |
| 1  |   | TY |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 11  |
| 2  |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 12  |
| 3  |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 13  |
| 4  |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 14  |
| 5  |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 15  |
| 6  |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 16  |
| 7  |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 17  |
| 10 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 18  |
| 11 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 19  |
| 12 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 110 |
| 13 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 111 |
| 14 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 112 |
| 15 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 113 |
| 16 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 114 |
| 17 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 115 |
| 20 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 116 |
| 21 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 117 |
| 22 |   |    |   | JIN |   |   |   | I  |    |    |    | JLIST |    |    |       |      | 118 |
| 23 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 119 |
| 24 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 120 |
| 25 |   |    |   |     |   |   |   |    |    |    |    |       |    |    |       |      | 121 |
| 26 |   | /  | / | /   | / | / | / | /  | /  | /  | /  | /     | /  | /  | /     | XPRI | 122 |

```

271 JOB TIME LIMIT (CPU-SEC) 123
|-----|
301SIPIPI/////////I OUTPRI 1 NUMCOPIES 124
|-----|

```

C = device class-specified  
U = user            0-password validated  
A = acct  
G = group           1-no password supplied,  
                    i.e., C.I. must check for no pass  
                    req'd or prompt user

I = interactive  
D = duplicative

JIN - current job input device  
JLIST - current job list device

EXECUTING PRIORITY REQUESTED  
0 if omitted  
-1 if unlimited

SPOOLED - origin is spooled  
RESTART - requested  
P - xpri requested not granted, max allowed used  
OUTPRI - output spool priority  
NUMCOPIES - number of copies output



# JMAT - JOB MASTER TABLE ENTRY

(State %40 = Job waiting)

|    | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |  |
|----|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|--|
| 0  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 0  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 1  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 1  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 2  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 3  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 4  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 5  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 6  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 7  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 10 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 11 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 12 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 13 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 14 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 15 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 16 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 17 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 20 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 21 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 22 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 23 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 24 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 25 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |
| 26 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |  |

|    |                                     |    |                |
|----|-------------------------------------|----|----------------|
| 27 | JOB TIME LIMIT (CPU-SEC)            | 23 | -0 if omitted  |
|    | -----                               |    | 1 if unlimited |
| 30 | SIRIPI/////X///  OUTPRI 1 NUMCOPIES | 24 |                |
|    | -----                               |    |                |
| 31 | SCHEDLINK                           | 25 |                |
|    | -----                               |    |                |

C = device class-specified  
 U = user        0=password validated  
 A = acct  
 G = group        1=no password supplied,  
                   ie, c.i. must check for no pass  
                   req'd or prompt user

I = interactive  
 D = duplicative  
 SCHEDLINK - DB pointer to word 0 of next entry  
                   on scheduling queue. 0=last

JMAT - JOB MASTER TABLE ENTRY  
 -----  
 (State %60 - Job Being Initialized By C.I.)

|    | 0                                | 1 | 2       | 3 | 4 | 5 | 6     | 7 | 8  | 9  | 10 | 11 | 12    | 13 | 14 | 15 |
|----|----------------------------------|---|---------|---|---|---|-------|---|----|----|----|----|-------|----|----|----|
| 0  | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 0  |
|    | %60                              |   |         | I |   |   | DI    | I | GI | AI | UI | CI | INPRI |    |    |    |
| 1  | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 1  |
|    | TY                               | I | JNUMBER |   |   |   |       |   |    |    |    |    |       |    |    |    |
| 2  | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 2  |
| 3  | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 3  |
|    | USER NAME                        |   |         |   |   |   |       |   |    |    |    |    |       |    |    |    |
| 4  | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 4  |
| 5  | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 5  |
| 6  | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 6  |
| 7  | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 7  |
|    | ACCOUNT NAME                     |   |         |   |   |   |       |   |    |    |    |    |       |    |    |    |
| 10 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 10 |
| 11 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 11 |
| 12 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 12 |
| 13 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 13 |
|    | JOB NAME                         |   |         |   |   |   |       |   |    |    |    |    |       |    |    |    |
| 14 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 14 |
| 15 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 15 |
| 16 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 16 |
| 17 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 17 |
|    | GROUP LOG-ON NAME                |   |         |   |   |   |       |   |    |    |    |    |       |    |    |    |
| 20 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 20 |
| 21 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 21 |
| 22 | JIN                              |   |         | I |   |   | JLIST |   |    |    |    |    |       |    |    | 22 |
| 23 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 23 |
| 24 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 24 |
|    | STARTING TIME STAMP<br>(CHRONOS) |   |         |   |   |   |       |   |    |    |    |    |       |    |    |    |
| 25 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 25 |
| 26 | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    | 26 |
|    | MAIN PIN                         |   |         | I |   |   |       |   |    |    |    |    |       |    |    |    |
|    | -----                            |   |         |   |   |   |       |   |    |    |    |    |       |    |    |    |

|       |                          |    |   |       |        |           |            |
|-------|--------------------------|----|---|-------|--------|-----------|------------|
| 27    | JOB TIME LIMIT (CPU-SEC) |    |   |       | 123    | -0        | if omitted |
| ----- |                          |    |   |       |        |           |            |
| 30    | SI                       | RI | I | FI//I | OUTPRI | I         | NUMCOPIES  |
| ----- |                          |    |   |       |        |           |            |
| 31    | ORIGJIN                  |    |   |       | I      | ORIGJLIST | 125        |
| ----- |                          |    |   |       |        |           |            |

C = device class-specified  
 U = user            0-password validated  
 A = acct  
 G = group           1-no password supplied,  
                       ie, c.i. must check for no pass  
                       req'd or prompt user

I = interactive  
 D = duplicative  
 ORIGJIN - original jin device  
 ORIGJLIST - requested jlist device

# JMAT - JOB MASTER TABLE ENTRY

(State %2 - Job Running)  
(State %3 - Job Terminating)

-----QUIET BIT  
1 - DON'T PERMIT  
=TELL OF :TELL TO  
THIS JOB

|    | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|----|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 0  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 0  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 0  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 1  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 1  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 2  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 2  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 3  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 3  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 4  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 4  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 5  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 5  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 6  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 6  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 7  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 7  |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 10 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 10 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 11 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 11 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 12 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 12 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 13 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 13 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 14 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 14 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 15 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 15 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 16 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 16 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 17 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 17 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 20 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 20 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 21 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 21 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 22 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 22 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 23 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 23 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |

|    |                          |   |           |                 |
|----|--------------------------|---|-----------|-----------------|
| 24 | STARTING TIME STAMP      |   |           | 120             |
|    | (CHRONOS)                |   |           |                 |
| 25 |                          |   |           |                 |
| 26 | MAIN PTM                 | I | XFRI      | 122             |
| 27 | JOB TIME LIMIT (CPU-SEC) |   |           | 123             |
|    |                          |   |           | 0 if omitted    |
| 30 | SI RI PI/////I           | I | NUMCOPIES | 124             |
|    |                          |   |           | -1 if unlimited |
| 31 | ORIGIN                   | I | ORIGJLIST | 125             |
|    |                          |   |           |                 |

I = interactive  
 D = duplicative  
 C = origjlist is class index

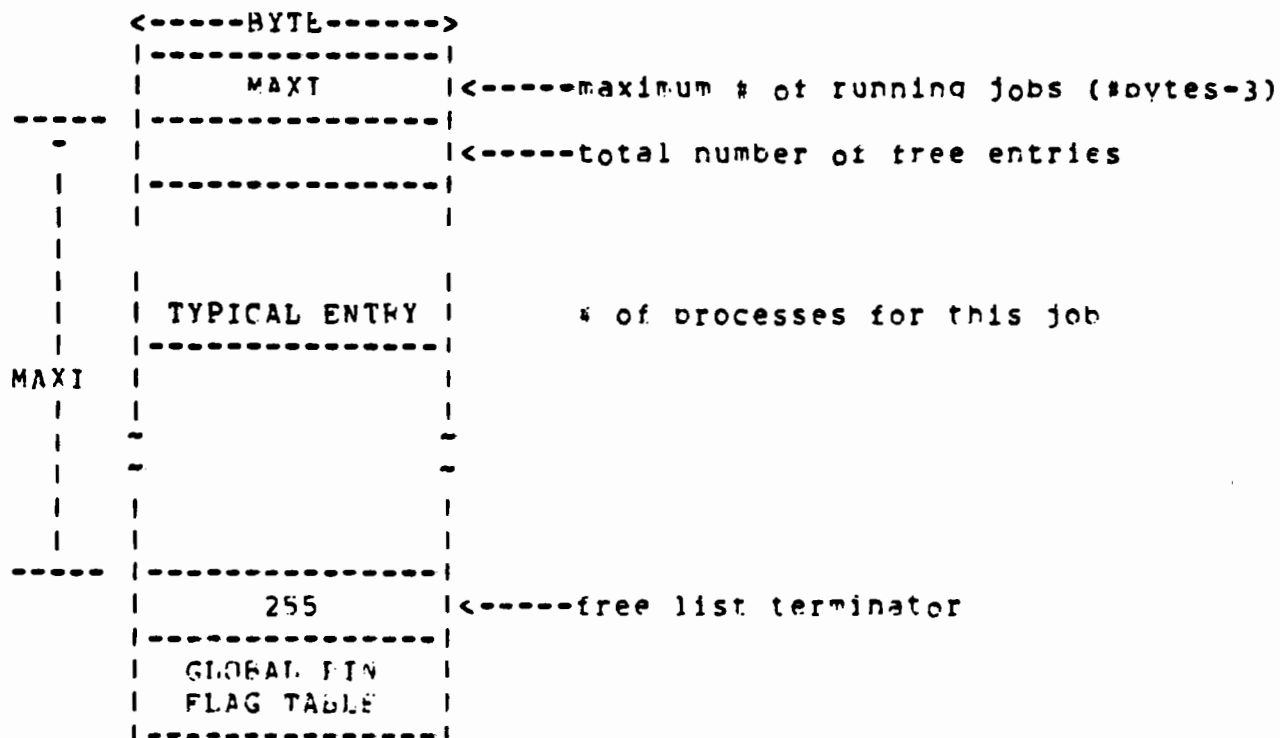
# JMAT - JOB MASTER TABLE ENTRY

(State %50 - Error)

|    | 0    | 1 | 2 | 3 | 4                 | 5 | 6 | 7 | 8      | 9 | 10 | 11 | 12 | 13             | 14 | 15 |  |
|----|------|---|---|---|-------------------|---|---|---|--------|---|----|----|----|----------------|----|----|--|
| 0  | %50  |   |   |   | IJHI CI           |   |   |   | JLIST  |   |    |    | 10 | J/H 0-job      |    |    |  |
| 1  | PARM |   |   |   | I                 |   |   |   | FPRNUM |   |    |    | 11 | 1-hello        |    |    |  |
| 2  |      |   |   |   |                   |   |   |   |        |   |    |    | 12 | for "err n,p"  |    |    |  |
| 3  |      |   |   |   |                   |   |   |   |        |   |    |    | 13 | JLIST is class |    |    |  |
| 4  |      |   |   |   |                   |   |   |   |        |   |    |    | 14 | index          |    |    |  |
| 5  |      |   |   |   |                   |   |   |   |        |   |    |    | 15 |                |    |    |  |
| 6  |      |   |   |   | 1st 49 CHARACTERS |   |   |   |        |   |    |    | 16 |                |    |    |  |
| 7  |      |   |   |   | OF COMMAND IMAGE  |   |   |   |        |   |    |    | 17 |                |    |    |  |
| 10 |      |   |   |   |                   |   |   |   |        |   |    |    | 18 |                |    |    |  |
| -  |      |   |   |   |                   |   |   |   |        |   |    |    | -  |                |    |    |  |
| -  |      |   |   |   |                   |   |   |   |        |   |    |    | -  |                |    |    |  |
| 31 |      |   |   |   |                   |   |   |   |        |   |    |    | 25 |                |    |    |  |

(1 Entry/Funnina Job)

**S1P = 13(10)**



The job SIP (PXGJSIP)=some base+JPCNT index.

NOTE: This table is completely byte oriented with each entry made consisting of one byte. Entries are taken from available pool on a "first found" basis. 254 (376 octal) in a byte denotes a free entry. 255 (377 octal) denotes the last free entry.

12-22



**1 Entry/CPU - Limited Job**

\*\*\*\*\*

**SIR = 14(10)**

////////////////////

# JIT - JOB INFORMATION TABLE

DST # In PXGLOR

| 0   | 2       | 4 | 6 | 8 | 10                    | 12  | 14 |   |   |
|-----|---------|---|---|---|-----------------------|-----|----|---|---|
| 0   | 1       | 2 | 3 | 4 | 5                     | 6   | 7  | 8 | 9 |
| 1   | 6       | 1 |   |   | JITDST                | 1   |    |   |   |
| 2   |         |   |   |   | PNTR TO JOB INFO      | 12  |    |   |   |
| 3   |         |   |   |   | PNTR TO ACCT. INFO    | 13  |    |   |   |
| 4   |         |   |   |   | PNTR TO RESERVED AREA | 14  |    |   |   |
| 5   |         |   |   |   |                       |     |    |   |   |
| 6   |         |   |   |   |                       |     |    |   |   |
| 7   |         |   |   |   |                       |     |    |   |   |
| >10 |         |   |   |   | 7                     | 16  |    |   |   |
| *11 | TYI     |   |   |   | NUM                   | 19  |    |   |   |
| 12  | JITMAXP | 1 |   |   | JITMOR                | 110 |    |   |   |
| 13  | /11     |   |   |   | JITEDF                |     |    |   |   |
| 14  | **      |   |   |   | JITJCA                | 112 |    |   |   |
| 15  | ***     |   |   |   | JITASEC               | 113 |    |   |   |
| 16  |         |   |   |   | JITGSEC               | 114 |    |   |   |
|     |         |   |   |   | (GROUP SECURITY)      |     |    |   |   |
| 20  |         |   |   |   |                       | 116 |    |   |   |
|     |         |   |   |   | JITHAN                |     |    |   |   |
|     |         |   |   |   | (ACCT NAME)           |     |    |   |   |
| 24  |         |   |   |   |                       | 120 |    |   |   |
|     |         |   |   |   | JITHGN                |     |    |   |   |
|     |         |   |   |   | (HOME GROUP)          |     |    |   |   |
| 30  |         |   |   |   |                       | 124 |    |   |   |
|     |         |   |   |   | JITLGN                |     |    |   |   |
|     |         |   |   |   | (LOG-ON GROUP)        |     |    |   |   |

1/job

\*TY = job type  
1 = session  
2 = job  
3 = task

ACCOUNTING INFO

01 310<-----

1 JITCPEC 11 No. of pr  
creations

2 JITCPEC 12

3 JITCPEC 13

4 JITCPEC 14 Highest priori  
during job

5 JITCPEC 15

6 JITCPEC 16

7 JITCPEC 17

8 JITCPEC 18

9 JITCPEC 19

10 JITCPEC 20

11 JITCPEC 21

12 JITCPEC 22

13 JITCPEC 23

14 JITCPEC 24

15 JITCPEC 25

16 JITCPEC 26

17 JITCPEC 27

18 JITCPEC 28

19 JITCPEC 29

20 JITCPEC 30

21 JITCPEC 31

22 JITCPEC 32

23 JITCPEC 33

24 JITCPEC 34

25 JITCPEC 35

26 JITCPEC 36

27 JITCPEC 37

28 JITCPEC 38

29 JITCPEC 39

30 JITCPEC 40

31 JITCPEC 41

32 JITCPEC 42

33 JITCPEC 43

34 JITCPEC 44

35 JITCPEC 45

36 JITCPEC 46

37 JITCPEC 47

38 JITCPEC 48

39 JITCPEC 49

40 JITCPEC 50

41 JITCPEC 51

42 JITCPEC 52

43 JITCPEC 53

44 JITCPEC 54

45 JITCPEC 55

46 JITCPEC 56

47 JITCPEC 57

48 JITCPEC 58

49 JITCPEC 59

50 JITCPEC 60

51 JITCPEC 61

52 JITCPEC 62

53 JITCPEC 63

54 JITCPEC 64

55 JITCPEC 65

56 JITCPEC 66

57 JITCPEC 67

58 JITCPEC 68

59 JITCPEC 69

60 JITCPEC 70

61 JITCPEC 71

62 JITCPEC 72

63 JITCPEC 73

64 JITCPEC 74

65 JITCPEC 75

66 JITCPEC 76

67 JITCPEC 77

68 JITCPEC 78

69 JITCPEC 79

70 JITCPEC 80

71 JITCPEC 81

72 JITCPEC 82

73 JITCPEC 83

74 JITCPEC 84

75 JITCPEC 85

76 JITCPEC 86

77 JITCPEC 87

78 JITCPEC 88

79 JITCPEC 89

80 JITCPEC 90

81 JITCPEC 91

82 JITCPEC 92

83 JITCPEC 93

84 JITCPEC 94

85 JITCPEC 95

86 JITCPEC 96

87 JITCPEC 97

88 JITCPEC 98

89 JITCPEC 99

90 JITCPEC 100

91 JITCPEC 101

92 JITCPEC 102

93 JITCPEC 103

94 JITCPEC 104

95 JITCPEC 105

96 JITCPEC 106

97 JITCPEC 107

98 JITCPEC 108

99 JITCPEC 109

100 JITCPEC 110

101 JITCPEC 111

102 JITCPEC 112

103 JITCPEC 113

104 JITCPEC 114

105 JITCPEC 115

106 JITCPEC 116

107 JITCPEC 117

108 JITCPEC 118

109 JITCPEC 119

110 JITCPEC 120

111 JITCPEC 121

112 JITCPEC 122

113 JITCPEC 123

114 JITCPEC 124

115 JITCPEC 125

116 JITCPEC 126

117 JITCPEC 127

118 JITCPEC 128

119 JITCPEC 129

120 JITCPEC 130

121 JITCPEC 131

122 JITCPEC 132

123 JITCPEC 133

124 JITCPEC 134

125 JITCPEC 135

126 JITCPEC 136

127 JITCPEC 137

128 JITCPEC 138

129 JITCPEC 139

130 JITCPEC 140

131 JITCPEC 141

132 JITCPEC 142

133 JITCPEC 143

134 JITCPEC 144

135 JITCPEC 145

136 JITCPEC 146

137 JITCPEC 147

138 JITCPEC 148

139 JITCPEC 149

140 JITCPEC 150

141 JITCPEC 151

142 JITCPEC 152

143 JITCPEC 153

144 JITCPEC 154

145 JITCPEC 155

146 JITCPEC 156

147 JITCPEC 157

148 JITCPEC 158

149 JITCPEC 159

150 JITCPEC 160

151 JITCPEC 161

152 JITCPEC 162

153 JITCPEC 163

154 JITCPEC 164

155 JITCPEC 165

156 JITCPEC 166

157 JITCPEC 167

158 JITCPEC 168

159 JITCPEC 169

160 JITCPEC 170

161 JITCPEC 171

162 JITCPEC 172

163 JITCPEC 173

164 JITCPEC 174

165 JITCPEC 175

166 JITCPEC 176

167 JITCPEC 177

168 JITCPEC 178

169 JITCPEC 179

170 JITCPEC 180

171 JITCPEC 181

172 JITCPEC 182

173 JITCPEC 183

174 JITCPEC 184

175 JITCPEC 185

176 JITCPEC 186

177 JITCPEC 187

178 JITCPEC 188

179 JITCPEC 189

180 JITCPEC 190

181 JITCPEC 191

182 JITCPEC 192

183 JITCPEC 193

184 JITCPEC 194

185 JITCPEC 195

186 JITCPEC 196

187 JITCPEC 197

188 JITCPEC 198

189 JITCPEC 199

190 JITCPEC 200

191 JITCPEC 201

192 JITCPEC 202

193 JITCPEC 203

194 JITCPEC 204

195 JITCPEC 205

196 JITCPEC 206

197 JITCPEC 207

198 JITCPEC 208

199 JITCPEC 209

200 JITCPEC 210

201 JITCPEC 211

202 JITCPEC 212

203 JITCPEC 213

204 JITCPEC 214

205 JITCPEC 215

206 JITCPEC 216

207 JITCPEC 217

208 JITCPEC 218

209 JITCPEC 219

210 JITCPEC 220

211 JITCPEC 221

212 JITCPEC 222

213 JITCPEC 223

214 JITCPEC 224

215 JITCPEC 225

216 JITCPEC 226

217 JITCPEC 227

218 JITCPEC 228

219 JITCPEC 229

220 JITCPEC 230

221 JITCPEC 231

222 JITCPEC 232

223 JITCPEC 233

224 JITCPEC 234

225 JITCPEC 235

226 JITCPEC 236

227 JITCPEC 237

228 JITCPEC 238

229 JITCPEC 239

230 JITCPEC 240

231 JITCPEC 241

232 JITCPEC 242

233 JITCPEC 243

234 JITCPEC 244

235 JITCPEC 245

236 JITCPEC 246

237 JITCPEC 247

238 JITCPEC 248

239 JITCPEC 249

240 JITCPEC 250

241 JITCPEC 251

242 JITCPEC 252

243 JITCPEC 253

244 JITCPEC 254

245 JITCPEC 255

246 JITCPEC 256

247 JITCPEC 257

248 JITCPEC 258

249 JITCPEC 259

250 JITCPEC 260

251 JITCPEC 261

252 JITCPEC 262

253 JITCPEC 263

254 JITCPEC 264

255 JITCPEC 265

256 JITCPEC 266

257 JITCPEC 267

258 JITCPEC 268

259 JITCPEC 269

260 JITCPEC 270

261 JITCPEC 271

262 JITCPEC 272

263 JITCPEC 273

264 JITCPEC 274

265 JITCPEC 275

266 JITCPEC 276

267 JITCPEC 277

268 JITCPEC 278

269 JITCPEC 279

270 JITCPEC 280

271 JITCPEC 281

272 JITCPEC 282

273 JITCPEC 283

274 JITCPEC 284

275 JITCPEC 285

276 JITCPEC 286

277 JITCPEC 287

278 JITCPEC 288

279 JITCPEC 289

280 JITCPEC 290

281 JITCPEC 291

282 JITCPEC 292

283 JITCPEC 293

284 JITCPEC 294

285 JITCPEC 295

286 JITCPEC 296

287 JITCPEC 297

288 JITCPEC 298

289 JITCPEC 299

290 JITCPEC 300

291 JITCPEC 301

292 JITCPEC 302

293 JITCPEC 303

294 JITCPEC 304

295 JITCPEC 305

296 JITCPEC 306

297 JITCPEC 307

298 JITCPEC 308

299 JITCPEC 309

300 JITCPEC 310

301 JITCPEC 311

302 JITCPEC 312

303 JITCPEC 313

304 JITCPEC 314

305 JITCPEC 315

306 JITCPEC 316

307 JITCPEC 317

308 JITCPEC 318

309 JITCPEC 319

310 JITCPEC 320

311 JITCPEC 321

312 JITCPEC 322

313 JITCPEC 323

314 JITCPEC 324

315 JITCPEC 325

316 JITCPEC 326

317 JITCPEC 327

318 JITCPEC 328

319 JITCPEC 329

320 JITCPEC 330

321 JITCPEC 331

322 JITCPEC 332

323 JITCPEC 333

324 JITCPEC 334

325 JITCPEC 335

326 JITCPEC 336

327 JITCPEC 337

328 JITCPEC 338

329 JITCPEC 339

330 JITCPEC 340

331 JITCPEC 341

332 JITCPEC 342

333 JITCPEC 343

334 JITCPEC 344

335 JITCPEC 345

336 JITCPEC 346

337 JITCPEC 347

338 JITCPEC 348

339 JITCPEC 349

340 JITCPEC 350

341 JITCPEC 351

342 JITCPEC 352

343 JITCPEC 353

344 JITCPEC 354

345 JITCPEC 355

346 JITCPEC 356

347 JITCPEC 357

348 JITCPEC 358

349 JITCPEC 359

350 JITCPEC 360

351 JITCPEC 361

352 JITCPEC 362

353 JITCPEC 363

354 JITCPEC 364

355 JITCPEC 365

356 JITCPEC 366

357 JITCPEC 367

358 JITCPEC 368

359 JITCPEC 369

360 JITCPEC 370

361 JITCPEC 371

362 JITCPEC 372

363 JITCPEC 373

364 JITCPEC 374

365 JITCPEC 375

366 JITCPEC 376

367 JITCPEC 377

368 JITCPEC 378

369 JITCPEC 379

370 JITCPEC 380

371 JITCPEC 381

372 JITCPEC 382

373 JITCPEC 383

374 JITCPEC 384

375 JITCPEC 385

376 JITCPEC 386

377 JITCPEC 387

378 JITCPEC 388

379 JITCPEC 389

380 JITCPEC 390

381 JITCPEC 391

382 JITCPEC 392

383 JITCPEC 393

384 JITCPEC 394

385 JITCPEC 395

386 JITCPEC 396

387 JITCPEC 397

388 JITCPEC 398

389 JITCPEC 399

390 JITCPEC 400

391 JITCPEC 401

392 JITCPEC 402

393 JITCPEC 403

394 JITCPEC 404

395 JITCPEC 405

396 JITCPEC 406

397 JITCPEC 407

398 JITCPEC 408

399 JITCPEC 409

400 JITCPEC 410

401 JITCPEC 411

402 JITCPEC 412

403 JITCPEC 413

404 JITCPEC 414

405 JITCPEC 415

406 JITCPEC 416

407 JITCPEC 417

408 JITCPEC 418

409 JITCPEC 419

410 JITCPEC 420

411 JITCPEC 421

412 JITCPEC 422

413 JITCPEC 423

414 JITCPEC 424

415 JITCPEC 425

416 JITCPEC 426

417 JITCPEC 427

418 JITCPEC 428

419 JITCPEC 429

420 JITCPEC 430

421 JITCPEC 431

422 JITCPEC 432

423 JITCPEC 433

424 JITCPEC 434

425 JITCPEC 435

426 JITCPEC 436

427 JITCPEC 437

428 JITCPEC 438

429 JITCPEC 439

430 JITCPEC 440

431 JITCPEC 441

432 JITCPEC 442

433 JITCPEC 443

434 JITCPEC 444

435 JITCPEC 445

436 JITCPEC 446

437 JITCPEC 447

438 JITCPEC 448

439 JITCPEC 449

440 JITCPEC 450

441 JITCPEC 451

442 JITCPEC 452

443 JITCPEC 453

444 JITCPEC 454

445 JITCPEC 455

446 JITCPEC 456

447 JITCPEC 457

448 JITCPEC 458

449 JITCPEC 459

450 JITCPEC 460

451 JITCPEC 461

452 JITCPEC 462

453 JITCPEC 463

454 JITCPEC 464

455 JITCPEC 465

456 JITCPEC 466

457 JITCPEC 467

458 JITCPEC 468

459 JITCPEC 469

460 JITCPEC 470

461 JITCPEC 471

462 JITCPEC 472

463 JITCPEC 473

464 JITCPEC 474

465 JITCPEC 475

466 JITCPEC 476

467 JITCPEC 477

468 JITCPEC 478

469 JITCPEC 479

470 JITCPEC 480

471 JITCPEC 481

472 JITCPEC 482

473 JITCPEC 483

474 JITCPEC 484

475 JITCPEC 485

476 JITCPEC 486

477 JITCPEC 487

478 JITCPEC 488

479 JITCPEC 489

480 JITCPEC 490

481 JITCPEC 491

482 JITCPEC 492

483 JITCPEC 493

484 JITCPEC 494

485 JITCPEC 495

486 JITCPEC 496

487 JITCPEC 497

488 JITCPEC 498

489 JITCPEC 499

490 JITCPEC 500

491 JITCPEC 501

492 JITCPEC 502

493 JITCPEC 503

494 JITCPEC 504

495 JITCPEC 505

496 JITCPEC 506

497 JITCPEC 507

498 JITCPEC 508

499 JITCPEC 509

500 JITCPEC 510

501 JITCPEC 511

502 JITCPEC 512

503 JITCPEC 513

504 JITCPEC 514

505 JITCPEC 515

506 JITCPEC 516

507 JITCPEC 517

508 JITCPEC 518

509 JITCPEC 519

510 JITCPEC 520

511 JITCPEC 521

512 JITCPEC 522

513 JITCPEC 523

514 JITCPEC 524

515 JITCPEC 525

516 JITCPEC 526

517 JITCPEC 527

518 JITCPEC 528

519 JITCPEC 529

520 JITCPEC 530

521 JITCPEC 531

522 JITCPEC 532

523 JITCPEC 533

524 JITCPEC 534

525 JITCPEC 535

526 JITCPEC 536

527 JITCPEC 537

528 JITCPEC 538

529 JITCPEC 539

530 JITCPEC 540

531 JITCPEC 541

532 JITCPEC 542

533 JITCPEC 543

534 JITCPEC 544

535 JITCPEC 545

536 JITCPEC 546

537 JITCPEC 547

538 JITCPEC 548

539 JITCPEC 549

540 JITCPEC 550

541 JITCPEC 551

542 JITCPEC 552

543 JITCPEC 553

544 JITCPEC 554

545 JITCPEC 555

546 JITCPEC 556

547 JITCPEC 557

548 JITCPEC 558

549 JITCPEC 559

550 JITCPEC 560

551 JITCPEC 561

552 JITCPEC 562

553 JITCPEC 563

554 JITCPEC 564

555 JITCPEC 565

556 JITCPEC 566

557 JITCPEC 567

558 JITCPEC 568

559 JITCPEC 569

560 JITCPEC 570

561 JITCPEC 571

562 JITCPEC 572

563 JITCPEC 573

564 JITCPEC 574

565 JITCPEC 575

566 JITCPEC 576

567 JITCPEC 577

568 JITCPEC 578

569 JITCPEC 579

570 JITCPEC 580

571 JITCPEC 581

572 JITCPEC 582

573 JITCPEC 583

574 JITCPEC 584

575 JITCPEC 585

576 JITCPEC 586

577 JITCPEC 587

578 JITCPEC 588

579 JITCPEC 589

580 JITCPEC 590

581 JITCPEC 591

582 JITCPEC 592

583 JITCPEC 593

584 JITCPEC 594

585 JITCPEC 595

586 JITCPEC 596

587 JITCPEC 597

588 JITCPEC 598

589 JITCPEC 599

590 JITCPEC 600

591 JITCPEC 601

592 JITCPEC 602

593 JITCPEC 603

594 JITCPEC 604

595 JITCPEC 605

596 JITCPEC 606

597 JITCPEC 607

598 JITCPEC 608

599 JITCPEC 609

600 JITCPEC 610

601 JITCPEC 611

602 JITCPEC 612

603 JITCPEC 613

604 JITCPEC 614

605 JITCPEC 615

606 JITCPEC 616

607 JITCPEC 617

608 JITCPEC 618

609 JITCPEC 619

610 JITCPEC 620

611 JITCPEC 621

612 JITCPEC 622

613 JITCPEC 623

614 JITCPEC 624

615 JITCPEC 625

616 JITCPEC 626

617 JITCPEC 627

618 JITCPEC 628

619 JITCPEC 629

620 JITCPEC 630

621 JITCPEC 631

622 JITCPEC 632

623 JITCPEC 633

624 JITCPEC 634

625 JITCPEC 635

626 JITCPEC 636

627 JITCPEC 637

628 JITCPEC 638

629 JITCPEC 639

630 JITCPEC 640

631 JITCPEC 641

632 JITCPEC 642

633 JITCPEC 643

634 JITCPEC 644

635 JITCPEC 645

636 JITCPEC 646

637 JITCPEC 647

638 JITCPEC 648

639 JITCPEC 649

640 JITCPEC 650

641 JITCPEC 651

642 JITCPEC 652

643 JITCPEC 653

644 JITCPEC 654

645 JITCPEC 655

64

|    |                                |     |       |    |
|----|--------------------------------|-----|-------|----|
| 34 | JITUN<br>(USER NAME)           | 128 |       |    |
| 40 | **** JITAIF                    | 32  | ~ \ / |    |
| 41 | ***** JITGIP                   | 33  | 50    | 40 |
| 42 | LATTF<br>(LOCAL ATTRIBUTES)    | 34  |       |    |
| 44 | PASSF<br>(PASSED FILE POINTEP) | 36  |       |    |
| 46 | UCAP<br>(USER CAPABILITY)      | 38  | 53    | 43 |
|    |                                |     | 54    | 44 |
|    |                                |     |       |    |
|    |                                |     | 57    | 47 |

# JDT - JOB DIRECTORY TABLE

|         |                                 |                                                                                       |
|---------|---------------------------------|---------------------------------------------------------------------------------------|
|         | MAX SEG SIZE(WDS)               | 1 entry per job                                                                       |
|         | POINTER TO JDSD                 | DST # in PXGLOB                                                                       |
|         | POINTER TO JTFF                 |                                                                                       |
|         | POINTER TO JFEG                 |                                                                                       |
|         | POINTER TO JLEO                 |                                                                                       |
|         | POINTER TO UNUSED AREA          |                                                                                       |
|         | WORK AREA<br>(15 WDS)           |                                                                                       |
| JDSJNUM | TYI                  NUM        | job number                                                                            |
|         | ////////// JESMPH               | main process number                                                                   |
| JDSD    | JOB DATA<br>SEGMENT DIRECTORY   |                                                                                       |
| JTFF    | JOB TEMPORARY<br>FILE DIRECTORY | ENTRY                  I NAME<br>SIZE (WDS)      SIZE (WDS)<br>C1                  C2 |
| JFEG    | JOB FILE<br>EQUATION TABLE      | CR                  (%40)                                                             |
| JLEO    | JOB LINE<br>EQUATION TABLE      | ENTRY<br>INFORMATION                                                                  |
|         | //////////UNUSED//////////      |                                                                                       |
|         | //////////UNUSED//////////      |                                                                                       |
|         | //////////UNUSED//////////      |                                                                                       |

The name is a concatenation of up to 3 subnames. Bit 0 of the 1st character of each subname is 1.

# JOB DATA SEGMENT DIRECTORY ENTRY - (JN-JDT)

|                                                                                                 |   |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |    |
|-------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|-------------------|----|----|----|----|----|----|----|
| 0                                                                                               | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9                 | 10 | 11 | 12 | 13 | 14 | 15 |    |
| ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- |   |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |    |
| ENTRY SIZE (WORDS)                                                                              |   |   |   |   |   |   |   | 1 | NAME SIZE (WORDS) |    |    |    |    |    |    | 10 |
| ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- |   |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |    |
| "NAME"                                                                                          |   |   |   |   |   |   |   |   |                   |    |    |    |    |    | 11 |    |
| ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- |   |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |    |
| EXTRA DATA SEGMENT DST INDEX                                                                    |   |   |   |   |   |   |   |   |                   |    |    |    |    |    | 12 |    |
| ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- |   |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |    |
| #OF PROCESSES ACCESSING                                                                         |   |   |   |   |   |   |   |   |                   |    |    |    |    |    | 13 |    |
| ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- |   |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |    |

## JOB TEMPORARY FILE ENTRY - (IN JDT)

|                             |                    |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |  |
|-----------------------------|--------------------|---|---|---|---|---|---|---|-------------------|----|----|----|----|----|----|--|
| 0                           | 1                  | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9                 | 10 | 11 | 12 | 13 | 14 | 15 |  |
|                             | -                  |   | - |   | - |   | - |   | -                 |    | -  |    | -  |    | -  |  |
|                             | ENTRY SIZE (WORDS) |   |   |   |   |   |   |   | NAME SIZE (WORDS) |    |    |    |    |    |    |  |
|                             | -----              |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |  |
| NAME-ACTUAL FILE DESIGNATOR |                    |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |  |
|                             | -----              |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |  |
|                             | VOLUME POINTER     |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |  |
|                             | -----              |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |  |
|                             | FILE LABEL POINTER |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |  |
|                             | -----              |   |   |   |   |   |   |   |                   |    |    |    |    |    |    |  |

----- Name is a concatenation if up to three subnames. Bit 0 of the first character of each subname is 1.

# FILE EQUATION TABLE ENTRY - (IN JDT)

| 0                                              | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8                     | 9 | 10 | 11 | 12 | 13 | 14 | 15 |              |  |            |  |
|------------------------------------------------|---|---|---|---|---|---|---|-----------------------|---|----|----|----|----|----|----|--------------|--|------------|--|
| ENTRY SIZE (WORDS)                             |   |   |   |   |   |   |   | NAME SIZE (WORDS)     |   |    |    |    |    |    |    |              |  |            |  |
| NAME<br>(FORMAL DESIGNATOR)                    |   |   |   |   |   |   |   |                       |   |    |    |    |    |    |    |              |  |            |  |
| MASK                                           |   |   |   |   |   |   |   |                       |   |    |    |    |    |    |    |              |  |            |  |
| REF COUNT                                      |   |   |   |   |   |   |   | PTR                   |   |    |    |    |    |    |    |              |  |            |  |
| NAME LENGTH (BYTES)                            |   |   |   |   |   |   |   | DEVICE LENGTH (BYTES) |   |    |    |    |    |    |    |              |  |            |  |
| NAME-ACTUAL DESIGNATOR<br>(may not be present) |   |   |   |   |   |   |   |                       |   |    |    |    |    |    |    |              |  |            |  |
| DEVICE/CLASS NAME<br>(may not be present)      |   |   |   |   |   |   |   |                       |   |    |    |    |    |    |    |              |  |            |  |
| OPTIONS                                        |   |   |   |   |   |   |   |                       |   |    |    |    |    |    |    |              |  |            |  |
| ADDITIONS                                      |   |   |   |   |   |   |   |                       |   |    |    |    |    |    |    |              |  |            |  |
| #BUFFERS                                       |   |   |   |   |   |   |   | INIT ALLOC            |   |    |    |    |    |    |    | DISPOS       |  |            |  |
| RECORD SIZE                                    |   |   |   |   |   |   |   |                       |   |    |    |    |    |    |    | BIT13 DEL    |  |            |  |
| # EXTENTS                                      |   |   |   |   |   |   |   |                       |   |    |    |    |    |    |    | BLOCK FACTOR |  | BIT14 TEMP |  |
| FILE                                           |   |   |   |   |   |   |   |                       |   |    |    |    |    |    |    | BIT15 SAVE   |  |            |  |
| SIZE                                           |   |   |   |   |   |   |   |                       |   |    |    |    |    |    |    |              |  |            |  |
| FILE CODE                                      |   |   |   |   |   |   |   |                       |   |    |    |    |    |    |    |              |  |            |  |

# AOPTIONS FOPTIONS, AND PMASK WORD BREAKDOWN

-----

## OPTION WORD 2 (AOPTIONS)

|    |     |             |
|----|-----|-------------|
| 0  | --- |             |
|    | 0   |             |
|    | 0   |             |
|    | 0   |             |
|    | 0   |             |
|    | 0   |             |
|    | 0   |             |
|    | 0   |             |
|    | --- | inhibit     |
| 7  |     | buff.       |
|    | --- |             |
| 8  |     | exclusive   |
| 9  |     |             |
|    | --- |             |
| 10 | 0   | multi-      |
|    | --- | record      |
| 11 |     |             |
|    | --- |             |
| 12 |     | access type |
|    |     |             |
| 15 |     |             |
|    | --- |             |

## OPTION WORD 1 (FOPTIONS)

|    |     |               |
|----|-----|---------------|
| 0  | --- |               |
|    | 0   |               |
|    | 0   |               |
|    | 0   |               |
|    | 0   |               |
|    | 0   |               |
|    | 0   |               |
| 5  | 0   |               |
|    | --- |               |
| 6  |     | no label      |
|    | --- | carriage      |
| 7  |     | control       |
|    | --- |               |
| 8  |     | record format |
| 9  |     |               |
|    | --- |               |
| 10 |     | default       |
|    |     | designator    |
|    |     |               |
| 12 |     |               |
|    | --- |               |
| 13 |     | ascii/binary  |
|    | --- |               |
| 14 |     | domain        |
|    |     |               |
| 15 |     |               |
|    | --- |               |

## PMASK

|   |     |     |                   |
|---|-----|-----|-------------------|
|   | --- | --- | 0                 |
|   |     |     | block factor      |
| R | --- |     |                   |
| E |     |     | recsize           |
| F | --- |     |                   |
|   |     |     | disposition       |
| C | --- |     |                   |
| O |     |     | numbuffers        |
| U | --- |     |                   |
| N |     |     | inhibit buffering |

|               |   |   |   |                     |
|---------------|---|---|---|---------------------|
|               | 5 | 1 | 7 | exclusive           |
|               |   |   |   | multi-record        |
| pointer entry | 0 | 1 |   | access type         |
| wait,nowait   | 0 | 1 |   | no label            |
| multi access  | 0 | 1 |   | carriage control    |
| numcop.       | 0 | 1 |   | record format       |
| outpri.       | 0 | 1 |   | default designation |
| filecode      |   |   |   | ascii/binary        |
| filesize      |   |   |   | domain              |
| numexts       |   |   |   | device              |
| init alloc    |   |   |   | name                |
|               |   |   |   | 15                  |

1->info present  
0->info absent



# SUMMARY OF INTRINSIC CALLS

The intrinsic error-code number, which is the number that appears in the abort-error message generated when an error is encountered, can be categorized as follows:

| Error Number Range | Functional Category    |
|--------------------|------------------------|
| 1 - 29             | File Management        |
| 30 - 39            | Resource Management    |
| 40 - 49            | System Timer (Clock)   |
| 50 - 59            | Traps                  |
| 60 - 79            | Utility Routines       |
| 80 - 99            | Program Management     |
| 100 - 119          | Process Control        |
| 120 - 129          | Scheduling             |
| 130 - 149          | Data Segments          |
| 160 - 179          | DS                     |
| 180 - 199          | Input/Output Utilities |
| 200 - 209          | Special Utilities      |

| MSCNO<br>(INTRINSIC NO.) | MESSAGE<br>(NAME) | MSCNO<br>(INTRINSIC NO.) | MESSAGE<br>(NAME) |
|--------------------------|-------------------|--------------------------|-------------------|
| 1                        | FOPEN             | 70                       | SEARCH            |
| 2                        | FREAD             | 71                       | MYCOMMAND         |
| 3                        | FWRITE            | 72                       | SETJCW            |
| 4                        | FUPDATE           | 73                       | GETJCW            |
| 5                        | FSPACE            | 74                       | DBINARY           |
| 6                        | FPOINT            | 75                       | DASCIT            |
| 7                        | FREADDIR          | 76                       | QUIT              |
| 8                        | FCLOSE            | 77                       | STACKDUMP         |
| 10                       | FCHECK            | 78                       | SETDUMP           |
| 11                       | FGETINFO          | 79                       | RESETDUMP         |
| 12                       | FREADSEEK         | 80                       | LOADPROC          |
| 13                       | FCONTROL          | 81                       | UNLOADPROC        |
| 14                       | FSETMODE          | 82                       | INITUSLF          |
| 15                       | FLOCK             | 83                       | ADJUSTSLF         |
| 16                       | FUNLOCK           | 84                       | EXPANDUSLF        |
| 17                       | FRENAME           | 99                       | DEBUG             |
| 18                       | FRELATE           | 100                      | CREATE            |
| 19                       | FREADLABEL        | 102                      | KILL              |
| 20                       | FWRITELABEL       | 103                      | SUSPEND           |
| 21                       | PRINTFILEINFO     | 104                      | ACTIVATE          |
| 22                       | IOWAIT            | 105                      | GETORIGIN         |
| 30                       | GETLOCKIN         | 106                      | MAIL              |
| 31                       | FRELOCKIN         | 107                      | SENDMAIL          |
| 32                       | LOCKLOCKIN        | 108                      | RECEIVEMAIL       |
| 33                       | UNLOCKLOCKIN      | 109                      | FATHER            |

|    |              |      |             |
|----|--------------|------|-------------|
| 34 | LOCKGLOFIN   | 110  | GETPROCINFO |
| 35 | UNLOCKGLORIN | 112  | GETPROCID   |
| 40 | TIMER        | 120  | GETPRIORITY |
| 42 | PROCTIME     | 130  | GETDSEG     |
| 45 | PAUSE        | 131  | FREEDSEG    |
| 50 | XAPITRAP     | 132  | DMOVIN      |
| 51 | ARITRAP      | 133  | DMOVEOUT    |
| 52 | XLTBTRAP     | 134  | ALTDSEG     |
| 53 | XSYSTRAP     | 135  | DESIZE      |
| 54 | XCONTRAP     | 136  | ZSIZE       |
| 55 | RESETCONTROL | 139  | SWITCHDS    |
| 56 | CAUSEHREAK   | 191  | PIAPE       |
| 60 | TERMINATE    | 200  | GETPRIVMODE |
| 61 | CTPANSLATE   | 201  | GFTUSERMODE |
| 62 | BINARY       | 301  | FFINDN      |
| 63 | ASCII        | 302  | FFINDHYKEY  |
| 64 | PEAD,READX   | 303  | FGETKEYINFO |
| 65 | PRINT        | 304  | FREADBYKEY  |
| 66 | PRINTOP      | 305  | FREACC      |
| 67 | PRINTOREPLY  | 306  | FREMOVE     |
| 68 | COMMAND      | 400+ | SEE IMAGE   |
| 69 | WHO          |      |             |

# FORTRAN LOGICAL UNIT TABLE (FLUT) -----

The segmenter is responsible for the preparation and initialization of a Fortran logical unit table. This is done when a program is prepared if that program contains at least one program unit that references a logical unit. The location of the FLUT is in the secondary DB area and this location is contained in DB-1.

The FLUT is formatted as per the following example:

```

DB-1 |-----|
 | X |
 |-----|

DB+X |-----|
 | 3 | 0 |
 |---|---|
 | 4 | 0 |
 |---|---|
 | 5 | 0 |
 |---|---|
 | 7 | 0 |
 |---|---|
 |10 | 0 |
 |---|---|
 |255|///|
 |-----|
 | - |

```

## 1st BYTE

List of the logical unit numbers referred to in this Fortran-produced program.  
(255 terminates).

## 2nd BYTE

The MPE file number (as returned by FOPEN) used in accessing the file. Zero if file not open. Filled in by formatter as each l.u. is initially referenced.

# BREAKPOINT TABLE

-----

This table is allocated permanent storage in non-linked memory and is used by system debug in relation to "breakpoint" processing. Each entry is 4 words long. Entries are arranged in sequential order with the first entry located starting with first word of the table (i.e. there is no special "zeroth entry" or "linked list of free entries" as in most other MPF tables).

## ENTRY FORMAT

-----

|   | 0   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|-----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 0 | SDI |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|   |     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 1 |     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|   |     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 2 |     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|   |     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 3 |     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|   |     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |

blk label  
See MIAR for  
explanation.

S/D = 0 if breakpoint set from system debug  
      = 1 if breakpoint set from debug



VOLUME TABLE  
-----

SIR #22=26(8)  
DST #29=35(8)

| zero entry |                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|------------|----------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
|            | 0                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| word       |                      |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|            | # OF ENTRIES         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 0          | (NOT COUNTING ZERO)  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|            | ENTRY SIZE=16(8)     |   |   |   |   |   |   |   |   |   |    |    |    |    |    | 10 |
|            | -----                |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 1          | COLD LOAD ID         |   |   |   |   |   |   |   |   |   |    |    |    |    |    | 11 |
| .          | -----                |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| .          | SYSVOLNUM            |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| .          | -----                |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 15         | //////////////////// |   |   |   |   |   |   |   |   |   |    |    |    |    |    | 13 |
|            | -----                |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |

|               |                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |     |                                    |
|---------------|----------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|------------------------------------|
| typical entry |                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |     |                                    |
| 0             |                                              |  |  |  |  |  |  |  |  |  |  |  |  |  | 10  | indexed by<br>volume #             |
| 1             |                                              |  |  |  |  |  |  |  |  |  |  |  |  |  | 11  |                                    |
| 2             | VOLUME<br>NAME                               |  |  |  |  |  |  |  |  |  |  |  |  |  | 12  |                                    |
| 3             |                                              |  |  |  |  |  |  |  |  |  |  |  |  |  | 13  | zeroes<br>for<br>system<br>volumes |
| 4             |                                              |  |  |  |  |  |  |  |  |  |  |  |  |  | 14  |                                    |
| 5             |                                              |  |  |  |  |  |  |  |  |  |  |  |  |  | 15  |                                    |
| 6             | GROUP<br>NAME                                |  |  |  |  |  |  |  |  |  |  |  |  |  | 16  |                                    |
| 7             |                                              |  |  |  |  |  |  |  |  |  |  |  |  |  | 17  |                                    |
| 10            |                                              |  |  |  |  |  |  |  |  |  |  |  |  |  | 18  |                                    |
| 11            |                                              |  |  |  |  |  |  |  |  |  |  |  |  |  | 19  |                                    |
| 12            | ACCOUNT<br>NAME                              |  |  |  |  |  |  |  |  |  |  |  |  |  | 110 |                                    |
| 13            |                                              |  |  |  |  |  |  |  |  |  |  |  |  |  | 111 |                                    |
| 14            | LOGICAL DEVICE #<br>(=0 IF NOT MOUNTED)      |  |  |  |  |  |  |  |  |  |  |  |  |  | 112 |                                    |
| 15            | DIRECTORY ADDRESS<br>(=0 FOR SYSTEM VOLUMES) |  |  |  |  |  |  |  |  |  |  |  |  |  | 113 |                                    |

1201

SEE A-31

AUTO-300

WILL GET

SEE PAGE 3  
AUTOMATICALLY  
WILL SET

.....

DISCSPC can be called to:

.....

| word<br>index |                      | doubleword<br>index |
|---------------|----------------------|---------------------|
|               | -----                |                     |
|               | #ENTRIES IN TABLE    |                     |
| 0             | -----                | 0                   |
|               | TABLE SIZE(SECTORS)  |                     |
| 1             | -----                |                     |
|               | LOWER BOUND          |                     |
| 2             | FOR FREE SPACE       | 1 MIN               |
|               | (SECTOR#)            |                     |
| 3             | -----                |                     |
|               | UPPER BOUND          |                     |
| 4             | FOR FREE SPACE       | 2 MAX               |
|               | (SECTOR#)            |                     |
| 5             | -----                |                     |
|               | //////////////////// |                     |
| 6             | -----                | 3                   |
|               | //////////////////// |                     |
| 7             | -----                |                     |

MIN & MAX are disc addresses indicating the minimum and maximum disc addresses accountable by DISCSPC (i.e. no space which goes outside these bounds may be requested or returned).

entry format (4 words/entry)

| word<br>index |                     | doubleword<br>index |
|---------------|---------------------|---------------------|
|               | -----               |                     |
| 0             | SECTOR NUMBER WHERE | 0                   |
| 1             | SPACE STARTS        |                     |
|               | -----               |                     |
| 2             |                     |                     |
|               | #SECTORS AVAILABLE  | 1                   |
| 3             |                     |                     |
|               | -----               |                     |

# PCB TABLE, ENTRIES 0, 1 & 2

| Entry 0 |                    | Name     | Initial |
|---------|--------------------|----------|---------|
|         |                    | ----     | -----   |
| 0       | # REAL ENTRIES     |          | %20     |
| 1       | ENTRY SIZE         |          |         |
| 2       | # FREE ENTRIES     |          |         |
| 3       | FREE LIST HEAD     |          |         |
| 4       | TIME SHAPE QUANTUM | TSLICE   | 1000    |
| 5       | TERMINAL PRIORITY  | TERMINAL | 152     |
| 6       | NORMAL PRIORITY    | NORMPRI  | 155     |
| 7       | CPUPND PRIORITY    | CPUPRI   | 158     |
| 8       | MAM PCB WORD INDEX | MANX     |         |
| 9       |                    |          |         |
| 10      |                    |          |         |
| 11      |                    |          |         |
| 12      |                    |          |         |
| 13      |                    |          |         |
| 14      |                    |          |         |
| 15      |                    |          |         |

| Entry 1, Ready List, RL |                  |     |         |
|-------------------------|------------------|-----|---------|
|                         |                  |     |         |
| 0                       | 1 0 01 HEAD LINK | RLH | %100060 |
| 1                       |                  |     |         |
| 2                       |                  |     |         |
| 3                       |                  |     |         |
| 4                       |                  |     |         |
| 5                       |                  |     |         |



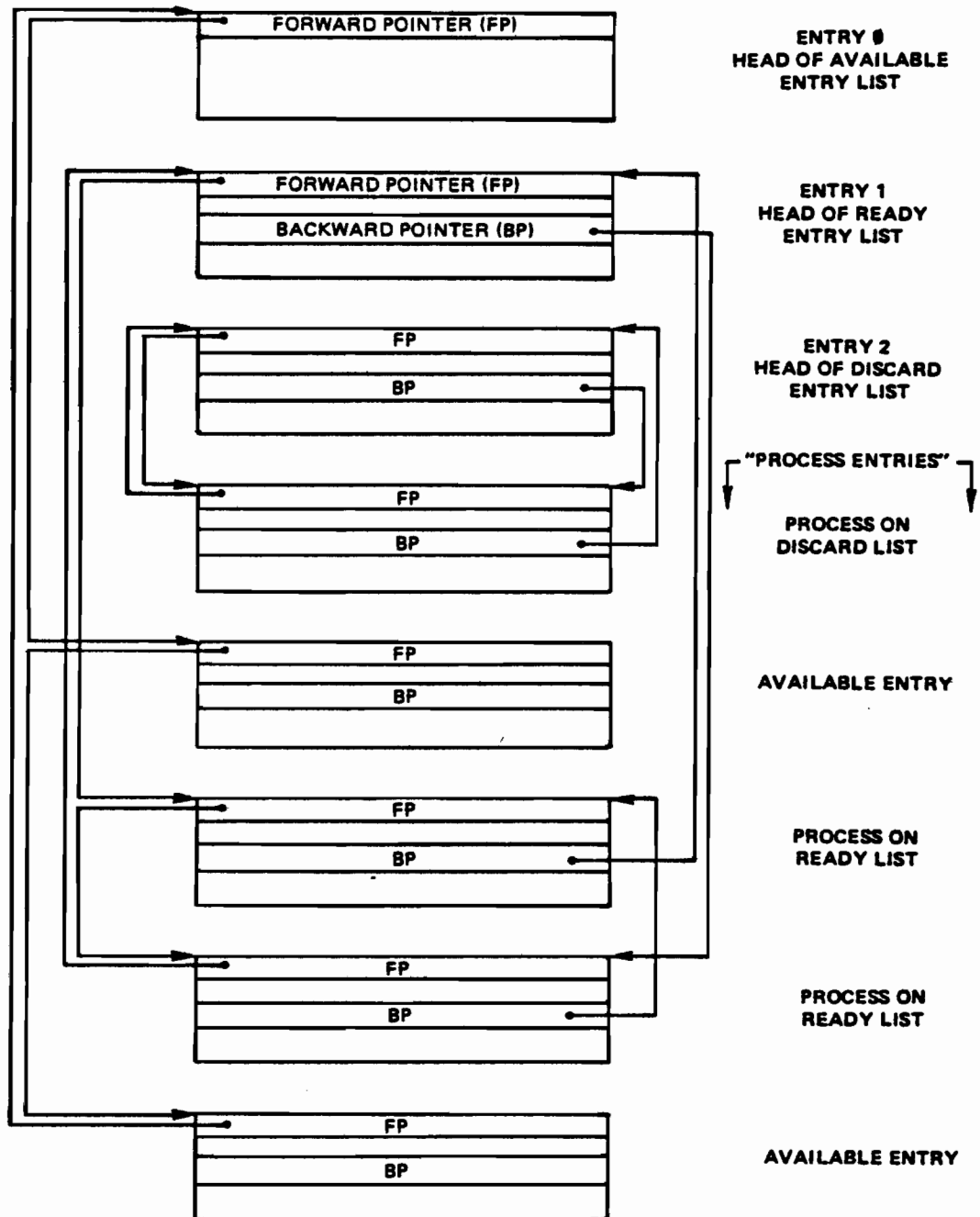


# PCB ENTRY #2

| Entry 2, Discard List, DL |   |   |    | Name      | Initial |
|---------------------------|---|---|----|-----------|---------|
|                           |   |   |    | ----      | -----   |
| 01                        | 0 | 0 | 01 | HEAD LINK | DLH 32  |
| 1                         |   |   |    |           |         |
| 2                         |   |   |    |           |         |
| 3                         |   |   |    |           |         |
| 4                         |   |   |    |           |         |
| 5                         |   |   |    |           |         |
| 6                         |   |   |    |           |         |
| 7                         |   |   |    |           |         |
| 8                         |   |   |    |           |         |
| 9                         |   |   |    |           |         |
| 10                        | 0 | 0 | 01 | TAIL LINK | DLT 32  |
| 11                        |   |   |    |           |         |
| 12                        |   |   |    |           |         |
| 13                        |   |   |    |           |         |
| 14                        |   |   |    |           |         |
| 15                        |   |   |    |           |         |

Entry 3 is the PROGENITOR'S PCB. It is linked into the RI.  
(links to 16) by INITIAL.

GENERAL LAYOUT OF PCB TABLE SHOWING READY AND DISCARD LISTS.



NOTE:

General layout of PCB table showing the available, READY, and DISCARD lists. The pointers are PCBB relative and point to the first word of an entry. Note that the READY and DISCARD lists are circular, doubly linked.

# PROCESS CONTROL BLOCK - TABLE ENTRY

|       | 0  | 1    | 2   | 3   | 4     | 5  | 6   | 7     | 8  | 9  | 10 | 11        | 12      | 13    | 14   | 15 |
|-------|----|------|-----|-----|-------|----|-----|-------|----|----|----|-----------|---------|-------|------|----|
| PCB00 | LT | 0    | 0   |     | FQP   |    |     |       |    |    |    |           |         |       |      |    |
| PCB01 | SW |      |     | ODP |       |    |     |       | I  |    | I  | MSTATE    |         |       |      |    |
| PCB02 | A  | I    |     |     |       |    |     |       |    |    |    |           | I       | MI    |      |    |
|       | D  | I    |     |     |       |    |     |       |    |    |    |           |         | EI    |      |    |
|       | B  | I    |     | XDS |       |    |     |       |    |    |    |           |         | FI    | OA   |    |
| PCB03 | W  | I    |     |     |       |    |     |       |    |    |    | I         | SI      |       |      | IO |
|       | W  | I    |     | STK |       |    |     |       |    |    |    | I         | CI      | PFC   |      | IV |
|       | S  | I    |     |     |       |    |     |       |    |    |    | I         | I       |       |      | IR |
| PCB04 |    | I    | I   | I   | BI    | I  | UI  | J     | T  | I  | I  | SI        | I       | AI    | I    | SI |
|       | MI | RI   | RI  | MI  | I     | I  | CI  | NI    | I  | NI | O  | FA        | I       | CI    | MI   | I  |
|       | I  | GI   | LI  | AI  | O     | O  | PI  | RI    | MI | T  | NI | I         | TI      | PI    | RI   |    |
| PCB05 |    |      |     |     | FPTR  |    |     |       | I  |    |    |           | SPTR    |       |      |    |
| PCB06 |    |      |     |     | BPTR  |    |     |       | I  |    |    |           | PRI     |       |      |    |
| PCB07 |    |      |     |     | PCST  |    |     |       | I  |    |    |           | BPTLINK |       |      |    |
| PCB08 |    | I    | I   | LI  | I     | I  | NI  | DI    | I  |    |    |           |         |       |      |    |
|       | O  | I    | E   | GI  | CI    | DI | LI  | EIF   | I  |    |    |           |         | IOPTH |      |    |
|       | I  | I    | I   | I   | I     | I  | AIA | I     |    |    |    |           |         |       |      |    |
|       | I  | I    | I   | I   | I     | I  | DIC | I     |    |    |    |           |         |       |      |    |
| PCB09 | L  | I    | BMS | I   | PPC   | IS | I   | PTYPE | I  |    |    | INKISKIST | I       | HRIC  | YIBK |    |
|       | I  | I    |     |     |       | IT | I   |       |    |    |    |           |         |       |      |    |
|       | IV | I    |     |     |       | IO | I   |       |    |    |    |           |         |       |      |    |
|       | I  | I    |     |     |       | IV | I   |       |    |    |    |           |         |       |      |    |
| PCB10 |    | PSIM | I   |     | BOP   |    |     |       |    |    |    |           |         |       |      |    |
| PCB11 |    |      |     |     | TLO   |    |     |       |    |    |    |           |         |       |      |    |
| PCB12 |    |      |     |     | PBX   |    |     |       |    |    |    |           |         |       |      |    |
| PCB13 |    |      |     |     | LAT   |    |     |       |    |    |    |           |         |       |      |    |
| PCB14 |    |      |     |     | WSP   |    |     |       |    |    |    |           |         |       |      |    |
| PCB15 |    |      |     |     | PRINX |    |     |       |    |    |    |           |         |       |      |    |

PCB = table name, system table 2  
PCBSIZE = entry size, 16  
PCBB = table base

Certain fields belong to classes:

OXDS, XDS, STK are DSI, data segment indices.  
 FOP, BOP are PLINK, process links.  
 M - FA are collectively known as WAIT  
 M - ACT are known as WAITA  
 IMP - CR are known as ISC  
 HK - BK are known as PSIF, pseudo interrupt field.

PCB00 .(0:1) LT, list type fro which list PCB is linked onto.  
           0: discard or no list  
           1: ready  
       .(1:2) Must be zero  
       .(3:13) FOP, forward queue ptr, PCBB relative.  
               <>0: on a list  
               =0: not on a list

PCB01 .(0:1) SW, set if process on a short wait.  
       .(1:8) ODP, Overlay Discard Pointer, used by MAM while  
               discarding.  
       .(9:2) Reserved  
       .(11:5) MSTATE, memory resources state  
               0: core resident  
               1: out of main memory  
               2: in core  
               3: absent segment

PCB02 .(0:1) ADB, set if DB pointing to an absolute address  
       .(0:10) XDS, DST index for extra data segment to which DB is set.  
               Zero if none.  
       .(11:8) Reserved  
       .(13:1) Main Error Flag, set on MAM errors for MAKEPRESENT.  
       .(14:2) OA, activation origin for the process.  
               0: other reason  
               1: FATHER  
               2: SON

PCB03 .(0:1) WWS, wake up waiting switch set if an awake is  
               missing.  
       .(1:10) STK, DST index for stack.  
       .(11:1) SC, set if executing system code.  
       .(12:3) PFC, counter for number of successive preparation  
               failures.  
       .(15:1) OVR, over-run bit for pseudo interrupt processing.

PCB04 .(0:1) M, mourning wait.  
       .(1:1) RG, global PIN wait.  
       .(2:1) RL, local PIN wait.  
       .(3:1) MA, mail wait.  
       .(4:1) BIO, blocked I/O wait.  
       .(5:1) IO, I/O wait.  
       .(6:1) UCP, UCOP wait.  
       .(7:1) JNK, junk wait.

.(8:1) TIM, timer wait.  
 .(9:1) INT, interrupt wait.  
 .(10:1) SON, son wait.  
 .(11:1) FA, father wait.  
 .(12:1) ACT, set if process is active.  
 .(13:1) IMP, set if process is impeded.  
 .(14:1) STR, set if process has a SIP.  
 .(15:1) CR, set if process is critical.

PCB05 .(0:8) FPTR, father pointer.  
 .(8:8) SPTR, son pointer.

PCB06 .(0:8) BPTR, brother pointer.  
 .(8:8) PRJ, process priority.

PCB07 .(0:8) PCST, requested code segment.  
 .(8:8) BPTLINK, breakpoint list for process.

PCB08 .(1:1) EQ, a special case of DQ.  
 .(2:1) LQ, set if process is scheduled in a linear manner.  
 .(3:2) C, D Scheduling Priority:  
         1 - D  
         2 - C  
         3 - temporarily C  
 .(5:1) KL, set if process is core resident.  
 .(6:1) DEAD, set during expiration.  
 .(7:1) FAC, if set, the father is to be activated on process  
 termination.  
 .(8:8) IOPTR, impeded queue pointer.

PCB09 .(0:1) LIV, set if process is alive.  
 .(1:2) BMS, block mail, valid if MA set  
         0: sent to father  
         1: rec from father  
         2: send to son  
         3: rec from son  
 .(3:2) PPC, process to process communication, set with  
 respect to son.  
         0: null  
         1: son to father  
         2: father to son  
         3: blocked  
 .(5:1) STOV, stack overflow bit  
 .(6:3) PTYPE, process type  
         0: user  
         1: user, son of main  
         2: user, main  
         3: user, main, task  
         4: system  
         5:  
         6: system, UCOP  
         7:  
 .(9:1) Reserved  
 .(10:1) Hk, hard kill pseudo interrupt

.(11:1) SK, soft kill pseudo interrupt  
 .(12:1) ST, stop pseudo interrupt  
 .(13:1) HB, hibernate pseudo interrupt  
 .(14:1) CY, control-y pseudo interrupt  
 .(15:1) BK, break pseudo interrupt

PCB10 .(0:3) PSIM, pseudo-interrupt mode  
           1: hard kill  
           2: soft kill  
           3: stop  
           4: hibernate  
           5: escape  
           6: break  
           7: normal  
       .(3:13) BQP, backwards queue pointer

PCB11 .(0:16) TLQ, time left in quantum, valid only if LQ=0.

PCB12 .(0:16) PBX, process block pointer index for sharable CST.

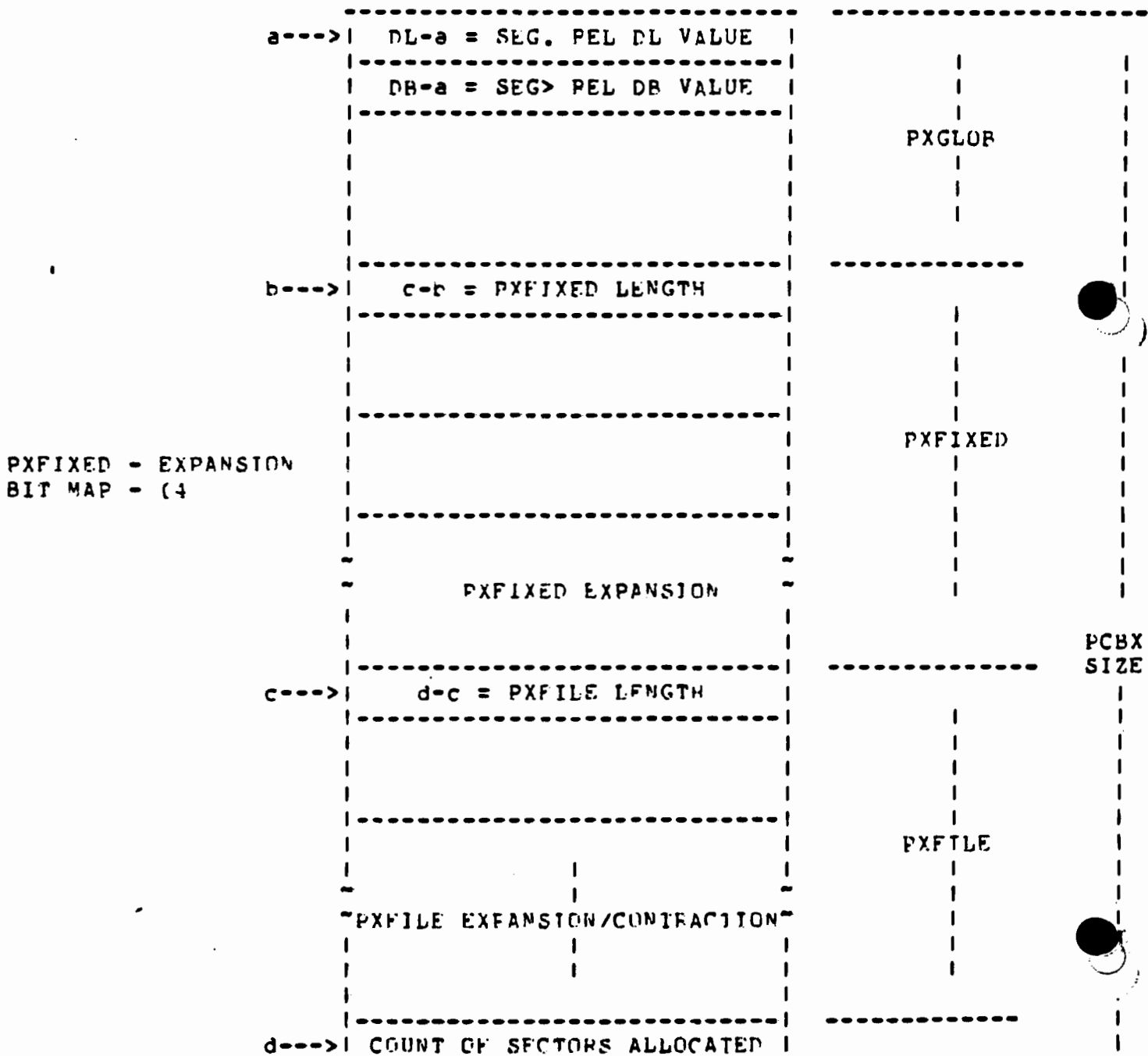
PCB13 .(0:16) LAT, time since last absence.

PCB14 .(0:16) WSP, working set pointer.

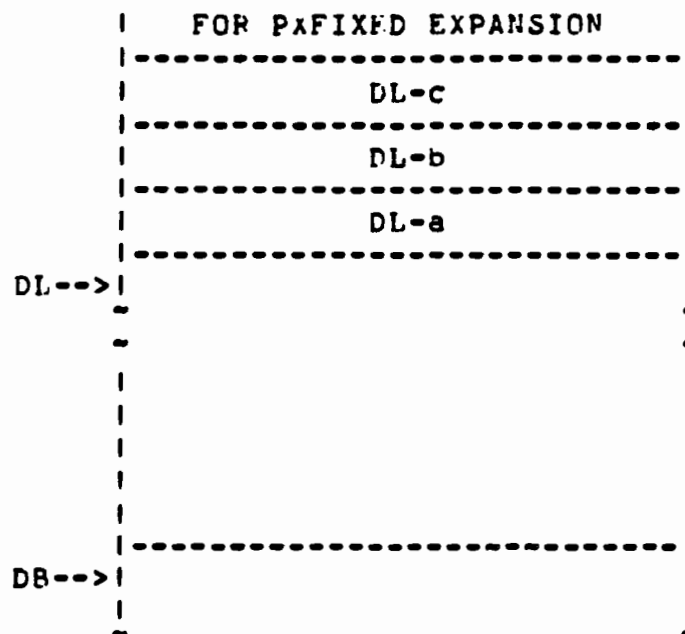
PCB15 .(0:16) PRINX, index to MAM presence request if <>0.

# PCBX GENERAL FORMAT

## PCBX GENERAL FORMAT







# PXGLOB FORMAT

-----

| 0                       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10                    | 11 | 12 | 13 | 14 | 15 |
|-------------------------|---|---|---|---|---|---|---|---|---|-----------------------|----|----|----|----|----|
| DL-a=SEG. REL DL VALUE  |   |   |   |   |   |   |   |   |   |                       |    |    |    |    | 10 |
| DB-a=SEG. REL DB VALUE  |   |   |   |   |   |   |   |   |   |                       |    |    |    |    | 11 |
| USER ATTRIBUTES         |   |   |   |   |   |   |   |   |   |                       |    |    |    |    | 12 |
| JMAT INDEX              |   |   |   |   |   |   |   |   |   | ACTUAL JOB INPUT LDN  |    |    |    |    | 13 |
| JPCNTINDEX(RelByteAddr) |   |   |   |   |   |   |   |   |   | ACTUAL JOB OUTPUT LDN |    |    |    |    | 14 |
| STACK DUMP FLAGS        |   |   |   |   |   |   |   |   |   | JIT DST INDEX         |    |    |    |    | 15 |
| TY   DI   I             |   |   |   |   |   |   |   |   |   | JIT DST INDEX         |    |    |    |    | 16 |
| JCUT INDEX              |   |   |   |   |   |   |   |   |   | ////////////////////  |    |    |    |    |    |

I = job in/list interactive  
 D = job in/list duplicative  
 TY = job type  
 0 = undefined  
 1 = session  
 2 = job  
 3 = task

Stack Dump Flags  
 Bit 0 = Armed  
 Bit 1 = Suppress traceback  
 Bit 2 = Suppress ASCII  
 Bit 3 = Q-63 to S  
 Bit 4 = QINIT to S  
 Bit 5 = DL to QINIT

PXFIXED

|    |                                                 |    |
|----|-------------------------------------------------|----|
| 0  | C-b PFXFIXED SIZE                               | 10 |
| 1  | RELATIVE S(S-DB)                                | 11 |
| 2  | RELATIVE Z(Z-DB)                                | 12 |
| 3  | INITIAL Q(Q-DB)                                 | 13 |
| 4  | RELATIVE DL(DB-DL)                              | 14 |
| 5  | GENERAL RESOURCE CAPABILITY(FROM PROG-FILE)     | 15 |
| 6  | ABORT X                                         | 16 |
| 7  | EXTRA DATA SEGMENT COUNT                        | 17 |
| 10 | PI SI EXTRA DATA SEGMENT DST INDEX              | 18 |
| 11 | PI SI EXTRA DATA SEGMENT DST INDEX              | 19 |
| 12 | PI SI EXTRA DATA SEGMENT DST INDEX              | 10 |
| 13 | PI SI EXTRA DATA SEGMENT DST INDEX              | 11 |
| 14 | ABORT Y I INITIAL CST INDEX                     | 12 |
| 15 | MAXIMUM STACK SIZE(MAXDATA LIMIT)               | 13 |
| 16 | APITHMETIC TRAP MASK                            | 14 |
| 17 | ARITHMETIC TRAP PLABEL                          | 15 |
| 20 | LIBRARY TRAP PLABEL                             | 16 |
| 21 | SYSTEM TRAP PLABEL                              | 17 |
| 22 | CONTROL Y PLABEL                                | 18 |
|    | JOB I                                           |    |
| 23 | TYPE I JOB#                                     | 19 |
| 24 | ACTUAL SIZE OF VIRTUAL SPACE ALLOCATED TO STACK | 20 |
| 25 | USER ABORT PLABEL                               | 21 |
| 26 | ////////////////////// LOAD PROCEDURE I.D.      | 22 |
| 27 | CURRENT MAX STACK SIZE(# WORDS IN VIR STORAGE)  | 23 |
| 30 | PROCESS CPU TIME                                | 24 |

|    |                                            |    |
|----|--------------------------------------------|----|
| 31 | (MSEC)                                     | 25 |
| 32 | MAXIMUM DATA SEG SIZE USED(IN SECTORS)     | 26 |
| 33 | TOTAL VIRTUAL STORAGE USED(IN SECTORS)     | 27 |
| 34 | CURRENT EXTRA DATA SEGMENT SPACE           | 28 |
| 35 | MAXIMUM EXTRA DATA SEGMENT SPACE           | 29 |
| 36 | ///////////////// STOV COUNT               | 30 |
| 37 | PROCESS EXECUTION TIME REMAINDER (IN MSEC) | 31 |
| 40 | SET TO-1 WHEN IN BREAK MODE*               | 32 |
| 41 | CONTINUE FLAG (:CONTINUE COMMAND)**        | 33 |
| 42 | IMAGE PLARL                                | 34 |
| 43 | ERROR LEVEL                                | 35 |
| 44 | INTRINSIC ERRORS                           | 36 |
| 45 | INTRINSIC ERRORS                           | 37 |
| 46 | INTRINSIC ERRORS                           | 38 |
| 47 | INTRINSIC ERRORS                           | 39 |
| 50 | INTRINSIC ERRORS                           | 40 |
| 51 | INTRINSIC ERRORS                           | 41 |

NOTES: P = 1 if opened by priv user  
S = 1 if data seg is sharable

\* SET TO COMMAND RECORD LENGTH WHEN COMMAND PENDING  
(I.E. COMMAND ENTERED DURING BREAK OR ENCOUNTERED  
DURING FLUSHING).

\*\* CONTINUE FLAG VALUES

0 = NO CONTINUE IN EFFECT  
1 = CONTINUE JUST ENCOUNTERED  
2 = CONTINUE IN EFFECT FOR THIS COMMAND

## File System Section of PCRX (PXFILE)

The PXFILE area is a sub-section of the PCRX. It is a contiguous, expandable and contractable block of storage that is managed by the file system primarily for its own use. Other sybsystems, namely CS and DS, also make use of the PXFILE section. In doing so they must conform to the conventions of the file system.

The overall structure of the PXFILE area is:

|                         |            |
|-------------------------|------------|
| OVERHEAD                | (fixed)    |
| CONTROL BLOCK<br>TABLE  | (variable) |
| AVAILABLE               | (variable) |
| AVAILABLE FILE<br>TABLE | (variable) |

# Overhead

The part labeled OVERHEAD contains information that is pertinent to the entire table.

| 0                                               | 1 | 7 | 8                       | 15 |   |
|-------------------------------------------------|---|---|-------------------------|----|---|
| -----                                           |   |   |                         |    |   |
| PXFILE SIZE IN WORDS                            |   |   |                         | 0  |   |
| -----                                           |   |   |                         |    |   |
| LAST DOPEN ERROR NUMBER                         |   | 1 | LAST COPEN ERROR NUMBER |    | 1 |
| -----                                           |   |   |                         |    |   |
| N 1                                             |   |   |                         |    | 2 |
| -----                                           |   |   |                         |    |   |
| LAST DF AFT                                     |   | 1 | SLAVE AFT NUMBER        |    | 3 |
| -----                                           |   |   |                         |    |   |
| LAST KOPEN ERROR NUMBER                         |   | 1 | LAST FOPEN ERROR NUMBER |    | 4 |
| -----                                           |   |   |                         |    |   |
| AFT SIZE IN WORDS                               |   |   |                         | 5  |   |
| -----                                           |   |   |                         |    |   |
| CS TRACE FILE INFO                              |   |   |                         | 6  |   |
| -----                                           |   |   |                         |    |   |
| LAST RESPONDING HO-WAIT I/O AFT ENTRY NUMBER    |   |   |                         | 7  |   |
| -----                                           |   |   |                         |    |   |
| 1st USER (NOBUF) CONTROL BLOCK TABLE DST NUMBER |   |   |                         | 8  |   |
| -----                                           |   |   |                         |    |   |
| 2nd USER (NOBUF) CONTROL BLOCK TABLE DST NUMBER |   |   |                         | 9  |   |
| -----                                           |   |   |                         |    |   |
| 3rd USER (NOBUF) CONTROL BLOCK TABLE DST NUMBER |   |   |                         | 10 |   |
| -----                                           |   |   |                         |    |   |
| 4th USER (NOBUF) CONTROL BLOCK TABLE DST NUMBER |   |   |                         | 11 |   |
| -----                                           |   |   |                         |    |   |
| 5th USER (NOBUF) CONTROL BLOCK TABLE DST NUMBER |   |   |                         | 12 |   |
| -----                                           |   |   |                         |    |   |
| 6th USER (NOBUF) CONTROL BLOCK TABLE DST NUMBER |   |   |                         | 13 |   |
| -----                                           |   |   |                         |    |   |
| 7th USER (NOBUF) CONTROL BLOCK TABLE DST NUMBER |   |   |                         | 14 |   |
| -----                                           |   |   |                         |    |   |
| 8th USER (NOBUF) CONTROL BLOCK TABLE DST NUMBER |   |   |                         | 15 |   |
| -----                                           |   |   |                         |    |   |

In general the following identifiers are used when referring to this part of the PXFILE area:

```

DEFINE
PXFSIZE = PXFILE#, <<PXFILE SIZE>>
PXDSOPENERR = PXFILE(1).(0:8)*, <<LAST DOPEN ERROR CODE>>
PXCOPENERR = PXFILE(1).(8:8)*, <<LAST COPEN ERROR CODE>>
PXFNOCB = PXFILE(2).(0:1)*, <<NO CB'S IN PXFILE CRT?>>
PXLASTDSAFT = PXFILE(3).(0:8)*, <<DSNUM OF LAST DS OPEN>>
PXSLAVEAFT = PXFILE(3).(8:8)*, <<DSNUM OF SLAVE FTOP DSOPEN>>
PXFKOPEN = PXFILE(4).(0:8)*, <<LAST KOPEN ERROR CODE>>
PXFFOPEN = PXFILE(4).(8:8)*, <<LAST FOPEN ERROR CODE>>
PXFAFTSIZE = PXFILE(5)*, <<AFT SIZE IN WORDS>>
PXFCTRINFO = PXFILE(6)*, <<CS TRACE FILE INFO>>
PXFLEFTOFF = PXFILE(7)*, <<LAST RESPONDING AFT NR.>>
PXFCBT1 = PXFILE(8)*, <<1ST USER CBT DST NR.>>

```

|         |                |                          |
|---------|----------------|--------------------------|
| PXFCBT2 | = PXFILE(9)#,  | <<2ND USER CBT DST NR.>> |
| PXFCBT3 | = PXFILE(10)#, | <<3RD USER CBT DST NR.>> |
| PXFCBT4 | = PXFILE(11)#, | <<4TH USER CBT DST NR.>> |
| PXFCBT5 | = PXFILE(12)#, | <<5TH USER CBT DST NR.>> |
| PXFCBT6 | = PXFILE(13)#, | <<6TH USER CBT DST NR.>> |
| PXFCBT7 | = PXFILE(14)#, | <<7TH USER CBT DST NR.>> |
| PXFCBT8 | = PXFILE(15)#; | <<8TH USER CBT DST NR.>> |

The following is an alphabetized list of the above identifiers along with a discussion of their meaning.

#### PXFAFTSIZE

This is the size (in words) of the Available File Table. Note that the size is in words and not in terms of number of entries. The reason for this is that it simplifies the calculation for the size of the available block.

#### PXFCBT1-8

These are the DST numbers of the user (NOBUF) control block tables. A DST number of 0 indicates that no data segment is allocated. Note that a DST number is representable with ten bits; a full word is used to simplify the code.

#### PXFCOPEN

This contains the last COPEN error number. It is not used by the file system; it is included here for completeness only.

#### PXFCTRINFO

This contains information pertinent to the CS trace file. It is not used by the file system; it is included here for completeness only.

#### PXFDOPEN

This contains the last DOPEN error number. It is not used by the file system; it is included here for completeness only.

#### PXFDSINFO

This cell is reserved for DS. It is not used by the file system; it is included here for completeness only.

#### PXFFOPEN

This contains the last FOPEN error number. If it is zero then the last FOPEN completed successfully; if it is non-zero then the last FOPEN completed unsuccessfully and the number represents the file system error number. Note that only eight bits are needed to hold the error number; a full word is used to simplify the code.

#### PXFKOPEN

This contains the last "KOPEN" error number. Since KSAM is imbedded in the file system, an FOPEN failure on a KSAM file can be caused by a failure to open either the key file or the data file. This error number is used in conjunction with PXFFOPEN to determine which file caused the KSAM open failure.

Note that this error number is not used by the file system; it is included here for completeness only.

#### PXFLEFTOFF

This is the AFT entry number of the last file/line that completed a no-wait I/O; if zero then no no-wait I/O has been completed. This cell is maintained solely by and for the IOWAIT intrinsic.

#### PXFNOCB

This bit is used to signify that no control blocks are to be created in the PXFILE control block table. This bit is set by the NOCB parameter to the CREATE intrinsic or the :RUN command. The reason for this feature is to permit the 3000/20 user to have as much stack space as possible; otherwise the MPE/30 file system will take away several hundred words of stack for the PXFILE control block table.

#### PXFSSIZE

This is the size (in words) of the complete PXFILE area. It is the sum of the overhead block, the control block table, the available file table and the available block.



## Control Block Table (PXFCBT)

The part labeled CONTROL BLOCK TABLE contains a file control block table. This is a new feature with MPE/30; it is not present under MPE/20.

The format of the control block table is the same as any other file control block table. The only difference is that addressing is slightly more complicated since the table does not begin at DB+0. As a result all pointers within the table are table relative; the starting address of the table must be added to a pointer to generate a final DB-relative address.

This addressing convention is consistently applied to all file control block tables.

When the control block table is expanded, space is taken from the AVAILABLE area. If no space is available then the PXFILE area is expanded and the acquired space is added to the AVAILABLE area.

The interested reader is referred to section 3.2 for a more detailed description of file control block tables.

|   |                             |    |
|---|-----------------------------|----|
| 0 |                             | 15 |
|   | TABLE SIZE IN WORDS         | 16 |
|   | DST NUMBER CONTAINING TABLE | 17 |
|   | VECTOR TABLE SIZE IN WORDS  | 18 |
|   | LOCK WORD                   | 19 |
|   | IMPEDED QUEUE               | 20 |
|   |                             | 21 |
|   | VECTOR TABLE                |    |
|   |                             |    |
|   | CONTROL BLOCK AREA          |    |

In general the following identifiers are used when referring to this part of the PXFILE area:

```

DEFINE
PXFCBTAB = PXFILE(16)%, <<CONTROL BLOCK TABLE>>
PXFCBTSIZE = PXFILE(16)%, <<TABLE SIZE IN WORDS>>

```

|           |                |                                |
|-----------|----------------|--------------------------------|
| PXFDSTX   | = PXFILE(17)#, | <<TABLE DST NUMBER>>           |
| PXFVTSIZE | = PXFILE(18)#, | <<VECTOR TABLE SIZE IN WORDS>> |
| PXFLOCK   | = PXFILE(19)#, | <<TABLE LOCK WORD>>            |
| PXFQUEUE  | = PXFILE(20)#, | <<TABLE IMPEDED QUEUE>>        |
| PXFVT     | = PXFILE(21)#, | <<VECTOR TABLE>>               |

The following is an alphabetized list of the above identifiers along with a discussion of their meaning.

#### PXFCRTAB

This is the first word of the control block table. In general this is used only when referring to the entire control block table.

#### PXFCBTSIZE

This is the size in words of the control block table. In general this is used only when calculating the size of the available block.

#### PXFDSTX

This is the DST number of the data segment that contains the control block table. This is the same as the DST number of the stack. Note that the convention of referring to the DST number of the stack as zero is not used. The reason for this is that the file system may refer to a PXFILE control block table in another stack. This would result in an ambiguity since that PXFILE control block table would also have a DST number of zero.

#### PXFLOCK

This is the lock word for the table and has the same format as the lock word for a control block in the table.

#### PXFQUEUE

This is the impeded queue for the table and has the same format as the impeded queue for a control block in the table.

#### PXFVT

This is the first word of the vector table. It is used when referring to the vector table in general.

#### PXFVTSIZE

This is the size, in words, of the vector table. Note that this is the length of the table and does not reflect the number of entries used or unused.

#### Available Block

-----  
The part labeled 'AVAILABLE BLOCK' is used to provide space when the Control Block Table or the Available File Table is expanded. These two tables grow towards each other, and when more space is needed it is simply taken from the Available Block.

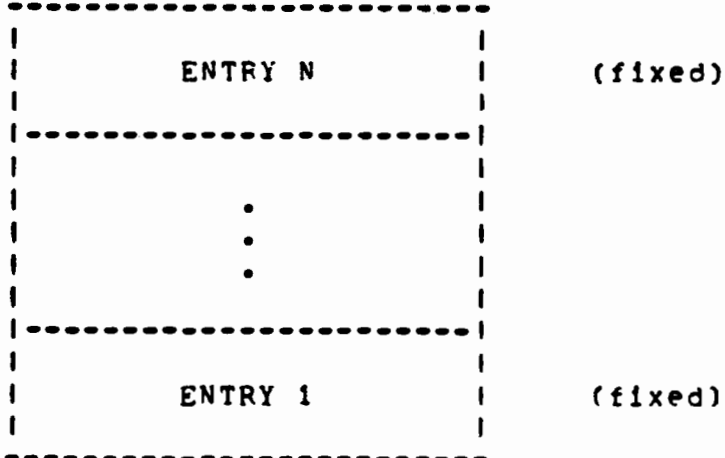
When the Available Block is exhausted, the PXFILE area is expanded, the AFT is relocated and the new space is added to the Available Block.

Note that currently the PXFILE area is only expanded; it is never contracted.

## Available File Table (AFT)

The part labeled AVAILABLE FILE TABLE contains information used by the file system (or CS, DS, etc.) to grossly characterize the file access and, most importantly, to give the location of the control blocks.

The overall structure of the AFT is:



where  $N = \text{PXFAFTSIZE}/4$ .

The AFT is as long as specified by PXFAFTSIZE. Unused entries are all zero's. When the table is full it is expanded by taking space from the AVAILABLE block.

The AFT is negatively indexed by file number: the entry at DL-8 corresponds to file number 1, the entry at DL-12 corresponds to file number 2, etc.

The structure of an AFT entry is:

| 0                   | 1 | 2 | 3 | 4 | 5               | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---------------------|---|---|---|---|-----------------|---|---|---|---|----|----|----|----|----|----|
| -----               |   |   |   |   |                 |   |   |   |   |    |    |    |    |    |    |
| ENTRY TYPE          |   |   | N |   | private volumes |   |   |   |   |    |    |    |    |    | 0  |
|                     |   |   |   |   | IMVTAB Index    |   |   |   |   |    |    |    |    |    |    |
| -----               |   |   |   |   |                 |   |   |   |   |    |    |    |    |    |    |
| PHYSICAL ACB VECTOR |   |   |   |   |                 |   |   |   |   |    |    |    |    |    | 1  |
| -----               |   |   |   |   |                 |   |   |   |   |    |    |    |    |    |    |
| LOGICAL ACB VECTOR  |   |   |   |   |                 |   |   |   |   |    |    |    |    |    | 2  |
| -----               |   |   |   |   |                 |   |   |   |   |    |    |    |    |    |    |
| NO-WAIT I/O IOGX    |   |   |   |   |                 |   |   |   |   |    |    |    |    |    | 3  |

Note that the entry format is dependent on the entry type. The one shown above is the one used by the file system.

In general the following identifiers are used when referring to an AFT entry:

```

DEFINE
AFTTYPE = AFT.(0:4)*, <<ENTRY TYPE>>
AFTNULL = AFT.(4:1)*, <<SNULL FILE>>

```

|          |            |                      |
|----------|------------|----------------------|
| AFTPACBV | = AFT(1)#, | <<PACB VECTOR>>      |
| AFTLACBV | = AFT(2)#, | <<LACB VECTOR>>      |
| AFTIOQX  | = AFT(3)#; | <<NO-WAIT I/O IOQX>> |

The following is an alphabetized list of the above identifiers along with a discussion of their meaning.

#### AFTIOQX

This is the IOQ index of the pending no-wait I/O (if any). Note that this is applicable iff the file was opened with the NOWAIT option specified. Also, CS and DS have the same capability and use this cell in a consistent manner. The reason for this is that the IOWAIT intrinsic services the file system as well as CS and DS, and is the principal user of this cell. If the cell is zero then there is no I/O pending; otherwise the cell contains the IOQ index corresponding to the pending I/O.

#### AFTLACBV

This is the vector of the Logical ACR (LACB) (if any). Note that this is applicable iff the file was opened with the multi-access option specified.

#### AFTNULL

This bit signifies that the file is SNULL and that there are no control blocks.

#### AFTPACBV

This is the vector of the Physical ACR (PACB). Note that a PACB exists for all files except SNULL.

#### AFTTYPE

This is the Aft entry type number. At present the following entry types are defined:

- 0 - file system
- 1 - remote file
- 2 - DS (no-wait I/O disallowed)
- 3 - DS (no-wait I/O allowed)
- 4 - CS
- 5 - CS (AUTO DIAL)
- 6 - KSAM

PCBX FOR CORE RESIDENT SYSTEM PROCESS STACKS  
-----  
(Micro-Mini PCBX)  
-----

|    |                                               |    |         |
|----|-----------------------------------------------|----|---------|
| 0  | DL-a (Seq Rel DL Value)                       | 10 |         |
| 1  | DL-a (Seq Rel DB Value)                       | 11 |         |
| 2  | USER ATTRIBUTES (always -1)                   | 12 |         |
| 3  | 0                    1        INPUT DEV LDEV  | 13 | PXGLOB  |
| 4  | 0                    1        OUTPUT DEV LDEV | 14 |         |
| 5  | 0                                             | 15 |         |
| 6  | 0    1 DI 11                    0             | 16 |         |
| 7  | 0                                             | 17 |         |
| 10 | PXFIXED SIZE (c-b)                            | 18 |         |
| 11 | RELATIVE S (S-DB)                             | 19 |         |
| 12 | RELATIVE Z (Z-DB)                             | 10 |         |
| 13 | INITIAL Q (Q-DB)                              | 11 |         |
| 14 | RELATIVE DL (DA-DL)                           | 12 | PXFIXED |
| 15 | GENERAL RESOURCE CAPABILITY(-1)               | 13 |         |
| 16 | ABORT X                                       | 14 |         |
| 17 | PCBX FREE SPACE POINTER (-1)                  | 15 |         |
| 20 | DL-b                                          | 16 |         |
| 21 | DL-a                                          | 17 |         |

- NOTES: 1. there is no PXFILE area.  
2. the PXFIXED area is much smaller than a normal PCBX.  
3. the PCBX FREE SPACE POINTER is -1 indicating that the PCBX cannot be expanded.

## PROCESS TO PROCESS COMMUNICATION TABLE

-----

This table is used as the communication link by which father and son processes communicate with one another via the mailbox scheme. This table contains two words per entry and is indexed by PCB# (entry index 0 is meaningless). Each two word entry of index N essentially relates where, as well as how much, mail may be found for a process N with respect to communications between N and his father process.

### ENTRY FORMAT

-----

|        |                   |
|--------|-------------------|
| word 0 | -----             |
|        | WORD COUNT        |
|        | -----             |
| word 1 | MAIL WORD OR DST# |
|        | -----             |

where word 0 = the # of mail words to be transferred.

word 1 = the only word of mail itself if word 0 = 1  
otherwise

it contains the DST# of the extra data segment where "word count" words of mail exist.

NOTE: Say process S is the son of process F. Then the process to process table index which will be used for mailbox communication between son S and father F will be that of the son (i.e. S).

# ICS GLOBAL

Q1 -

|    |                |                                         |
|----|----------------|-----------------------------------------|
| 18 | DISAP          | PSEN, PSDR counter                      |
| 17 | Reserved       |                                         |
| 16 | SDST           | process' stack DST#                     |
| 15 | PSTA           | pseudo-interrupt status                 |
| 14 | PADDR          | pseudo-interrupt address                |
| 13 | TRACE FLAG     | flag set non-zero on IXIT away from ICS |
| 12 | PFAIL          | PTR to powerfail PCP                    |
| 11 | JCUT           | absolute JCUT address                   |
| 10 | XP             | pointer to executing process PCP        |
| 9  | PCRA           | absolute stack address                  |
| 8  | Z              | stack DB relative Z                     |
| 7  | DL             | stack DB relative DL                    |
| 6  | S              | stack DB relative S                     |
| 5  | SHANK          | stack bank                              |
| 4  | STDB           | absolute stack DB                       |
| 3  | 0              |                                         |
| 2  | P              |                                         |
| 1  | STATUS         | > DISPATCH stack marker                 |
| 0  | P I 0          |                                         |
| +1 | DB BANK RETURN | > FOR DISPATCH                          |
|    | DB RETURN      |                                         |
|    | PARM           |                                         |

P=PSEUDO-DISABLED AND DISP INSTRUCTION EXECUTED.  
D=DISPATCHER INTERRUPTED.



## ICS GLOBAL CELLS, with initial values

STDB - absolute address of the currently running process's stack.  
SBANK - bank address for process' stack.  
S - stack DB relative  
DL - stack DB relative DL  
Z - stack DB relative Z  
PCBX - absolute stack address  
XP - PCB table relative pointer to word 0 of the running process' PCB.

The above cells are to be initialized for the PROGENITOR.

CPCB - absolute 4, is an absolute version of XP. If CPCB is zero, then the above cells are invalid. This will never be the case in a process. CPCB should also be set by INITIAL.  
SDST - DST# for running process' stack.  
JCUT - the bank zero absolute address of the JCUT table.  
PADDR - PB relative address for the procedure PSEUDOINT.  
PSTA - status value for PSEUDOINT,  $\$140000 + \text{CST\#}$ .  
DISAP - PSDB counter, initially 0.

INITIAL sets the above as described.

# SUB-SYSTEM RESERVED DL AREA

## REMAINING DL AREA

|       |                               |        |
|-------|-------------------------------|--------|
| DB-12 | RESERVED FOR SORT/MERGE       | IDB-10 |
| DB-11 | RESERVED FOR TRACE            | IDB-9  |
| DB-10 | EXTERNAL LABEL OF OUTER BLOCK | IDB-8  |
| DB-7  | RESERVED FOR TRACE            | IDB-7  |
| DB-6  | DB ADDRESS OF SILT            | IDB-6  |
| DB-5  | RESERVED FOR COBOL            | IDB-5  |
| DB-4  | RESERVED FOR COBOL            | IDB-4  |
| DB-3  | RESERVED FOR COBOL            | IDB-3  |
| DB-2  | RESERVED FOR FORMATTER        | IDB-2  |
| DB-1  | DB ADDRESS OF FLUT            | IDB-1  |

## DB AREA

# SIR# ALLOCATION

DST 353

| decimal<br>SIR #<br>----- | octal<br>SIR #<br>----- | SIR NAME<br>-----        |
|---------------------------|-------------------------|--------------------------|
| 1                         | 1                       | LOAD PROCESS SIR         |
| 2                         | 2                       | LOCK SEGMENT SIR         |
| 3                         | 3                       | IDD                      |
| 4                         | 4                       | ODD                      |
| 5                         | 5                       | PROCESS TREE STRUCTURE   |
| 6                         | 6                       | SCHEDULING QUEUE         |
| 7                         | 7                       | CST ENTRIES              |
| 8                         | 10                      | SYSTEM DIRECTORY         |
| 9                         | 11                      | LPDT                     |
| 10                        | 12                      | LDT                      |
| 11                        | 13                      | STORAGE IN OVERLAY AREA  |
| 12                        | 14                      | DISC FREE SPACE TABLE    |
| 13                        | 15                      | JPCNT                    |
| 14                        | 16                      | JCUT                     |
| 15                        | 17                      | JMAT                     |
| 16                        | 20                      | (FREE)                   |
| 17                        | 21                      | LOADER SEGMENT TABLE     |
| 18                        | 22                      | VDD                      |
| 19                        | 23                      | SPOOL                    |
| 20                        | 24                      | MESSAGE CATALOGUE        |
| 21                        | 25                      | PII                      |
| 22                        | 26                      | VOLUME TABLE             |
| 23                        | 27                      | MESSAGE QUEUE DST 33(10) |
| 24                        | 30                      | MESSAGE QUEUE DST 34(10) |
| 25                        | 31                      | CS ALLOCATE SIR          |
| 26                        | 32                      | LOGGING BUFFER           |
| 27-34                     | 33-42                   | (FREE)                   |
| 35                        | 43                      | SUB-QUEUE MAPPING TABLE  |
| 36                        | 44                      | CILOG                    |
| 37                        | 45                      | FILE INTEGRITY           |
| 38                        | 46                      | RIN                      |
| 39                        | 47                      | TAPE LABELS              |
| 40                        | 50                      | 1st JOB                  |
| 41                        | 51                      | 2nd JOB                  |
| .                         | .                       | .                        |
| .                         | .                       | .                        |
| .                         | .                       | .                        |
| .                         | .                       | .                        |

.....

```

LOWER->LOGICAL RANK->HIGHER
1. LDT(10)->LPDT(9)->VDD(18)
2. JMATSIR(15)->LPDT(9)->JPCNT(13)
3. FILESIP(37)->DIRECTORY(8)->DISC FREE SPACE TABLE(12)
4. FILESTR(37)->RINTABLE(36)

```

Never attempt a GETSIR of lower rank than the SIR currently held (if any).

For example: suppose two processes, A and B, required the SIRS for the LDT and LPDT. Deadlock would result if done as below due to process A not following the convention order.



# SIR ENTRY FORMATS

| 0     | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    | 13    | 14    | 15    |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
|       |       |       |       |       |       |       | 0     |       |       |       |       |       |       |       | 0     |
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
|       |       |       |       |       |       |       | 0     |       |       |       |       |       |       |       |       |
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |

free  
-----  
(not locked)

|       |       |       |       |       |       |       |               |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | -----         | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
|       |       |       |       |       |       |       | PIN of holder | 1     |       |       |       |       |       |       | 0     |
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | -----         | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
|       |       |       |       |       |       |       |               | 0     |       |       |       |       |       |       |       |
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | -----         | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |

SIR locked  
-----  
(no impeded processes)

|       |       |       |       |       |       |       |                         |       |       |       |       |       |       |       |                         |
|-------|-------|-------|-------|-------|-------|-------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------------------------|
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | -----                   | ----- | ----- | ----- | ----- | ----- | ----- | ----- | -----                   |
|       |       |       |       |       |       |       | PIN of holder           | 1     |       |       |       |       |       |       | COCOUNT                 |
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | -----                   | ----- | ----- | ----- | ----- | ----- | ----- | ----- | -----                   |
|       |       |       |       |       |       |       | TAIL OF IMPEDED LIST(P) |       |       |       |       |       |       |       | HEAD OF IMPEDED LIST(P) |
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | -----                   | ----- | ----- | ----- | ----- | ----- | ----- | ----- | -----                   |

SIR locked  
-----  
(impeded processes)

P = PIN#

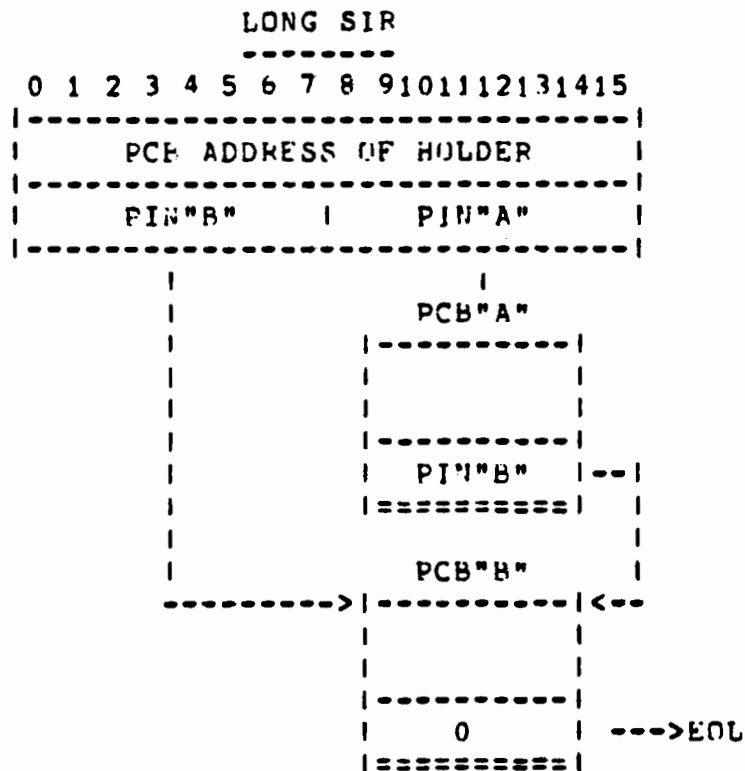
PIN = PCB table entry number

COCOUNT = number of C subqueue processes impeded on this resource.

# SIP ENTRY FORMATS (cont)

The SIR table is indexed by SIR#, each SIR# corresponding to a unique, preassigned system internal resource. Entry #0 is not used.

Impeded lists are established by using the SIR table entry (1). (8:8) as the head of the list and PCB(8). (8:8) for elements. Pin numbers are always used as pointers, with 0 indicating end of list.



## SIR TABLE INFORMATION

-----

The system internal resource table is located in non-linked memory (resident table). The SIR table is used to protect critical system elements against access by more than one process, i.e., it provides a "lock out" mechanism. Each critical system resource (usually a table) is assigned a specific SIR number. Procedures are provided within MPE to lock (GETSIR) and unlock (RELSIR) the SIR. Processes attempting to obtain a SIR that is not available are impeded by the system. The SIR table entries form the head of a linked list in this case. If more than one process becomes impeded, word 8 of the PCB entry is used to add the "new" process to the growing list. The method of disimpeding the process depends on the SIR type.

A SIR does not respect process priority and operates in a FIFO manner. As processes become impeded on behalf of a SIR the new entries are entered at the tail of the impeded list. When the current holder of the SIR releases it, only the first process in the list (pointed at by the head pointer) is dis-impeded. The linked list head and all pointers are then updated and the newly dis-impeded process will obtain the SIR.

.....

$$DST=22(10)=26(8)$$

|                            |      |                           |                      |
|----------------------------|------|---------------------------|----------------------|
|                            |      | INDEX OF FIRST FREE ENTRY |                      |
|                            |      | (# LOCAL+GLOBAL RINS)*2+2 |                      |
|                            | RT 1 | INDEX OF NEXT FREE        | FIRST FREE ENTRY     |
|                            |      | 0                         |                      |
|                            | RT 1 | INDEX OF NEXT FREE        |                      |
|                            |      | 0                         |                      |
| RT=RIN TYPE (WHEN ALLOWED) | RT 1 | INDEX OF NEXT FREE        |                      |
|                            |      | 0                         |                      |
| 1-LOCAL RIN                | RT 1 | INDEX OF NEXT FREE        |                      |
| 2-GLOBAL RIN               |      | 0                         |                      |
| 3-FILE RIN (ALWAYS 0 HERE) | RT 1 | INDEX OF NEXT FREE        |                      |
|                            |      | 0                         |                      |
|                            | RT 1 | INDEX OF NEXT FREE        |                      |
|                            |      | 0                         |                      |
|                            |      |                           |                      |
|                            | RT 1 | 0 (EOL)                   | LAST FREE ENTRY      |
|                            |      | 0                         |                      |
|                            |      |                           |                      |
|                            |      | FREE LIST POINTER         | SECONDARY TABLE OF   |
|                            |      | TOTAL #OF ENTRIES         | 12 WORD ENTRIES      |
|                            |      | NUMBER FREE ENTRIES       | FOR GLOBAL PINS ONLY |
|                            |      | RESERVED                  |                      |
|                            |      |                           |                      |
| LENGTH=                    |      |                           |                      |



# ALLOCATED  
GLOBAL RINS

#12

|10

|11

.....

RIN TABLE

$$(\text{NUMBER OF LOCAL+GLOBAL RINS}) \times 2$$

- RIN #1  
1 (UNLOCKED)

```

1<- LOCAL
1--PIN #2
1 1 (UNLOCKED)

```

```

1<- LOCAL
1 RIN #3
--1 (LAST)
1 (LOCKED)

```

PCB# PCB# of process  
that "holds" rin

P = PIN#

.....

**DST22(10)=26(8)**

# RIN TABLE

```

INDEX OF FIRST FPEE ENTRY

(NUMBER OF LOCAL+GLOBAL RINS)*2

1 11////////////////////////////////////

HEAD OF WAITING LIST(P) PIN OF HOLDER

```

PCB#

1     waiting processes

PCB#

**P=p1n#**

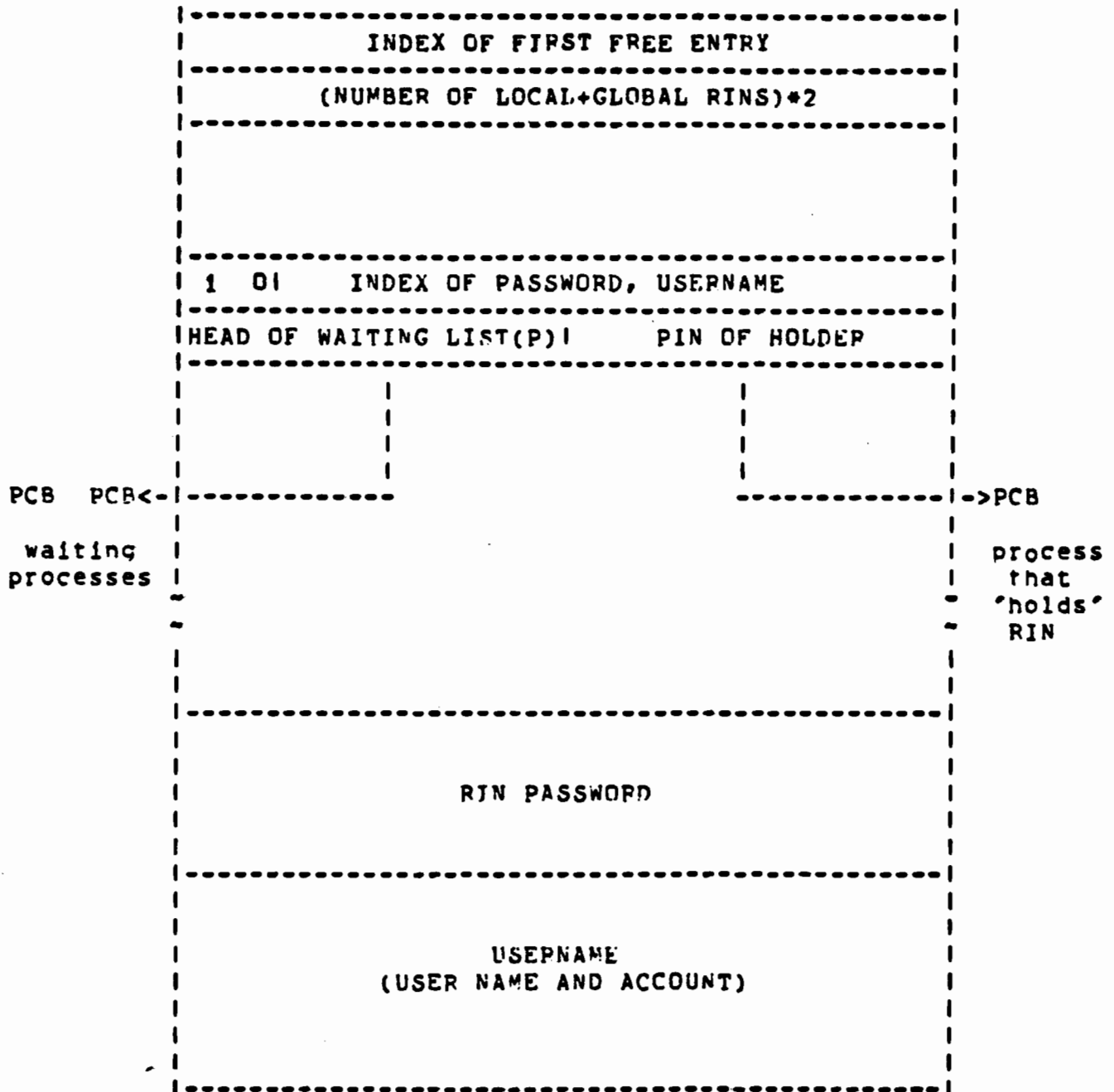
PCB#

PCB# process that  
"holds" rin

# ALLOCATION AND LOCKING OF GLOBAL RINS

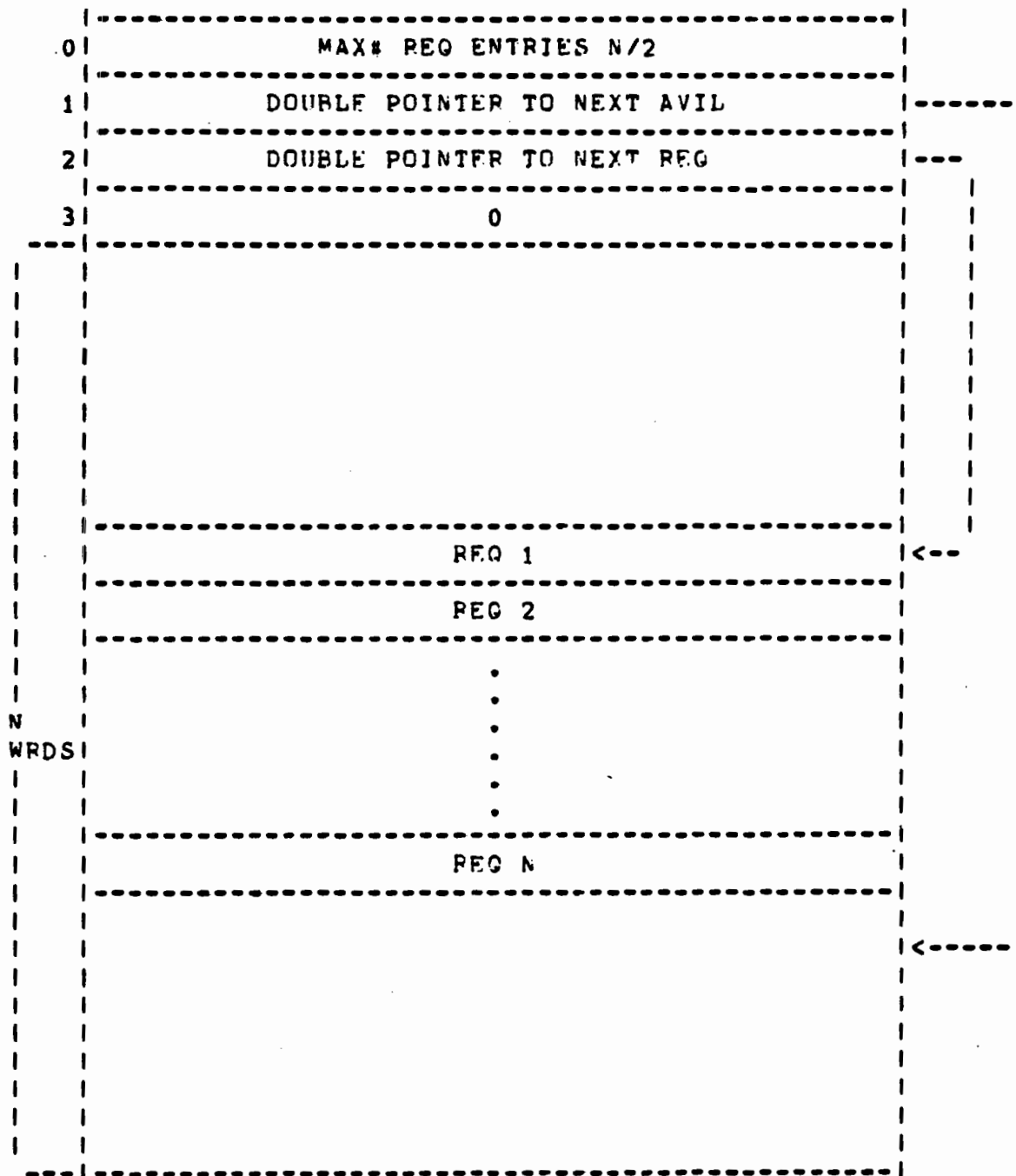
DST22(10)=26(8)

## RIN TABLE



P=pjn#

# UCOP REQUEST QUEUE (DST#9)



# ENTPY FORMAT

## Request Codes

0 null  
1 null

|                                      |       |
|--------------------------------------|-------|
| 0                                    | 12-15 |
| //////////////////////////////////// | 2     |
| //////////////////////////////////// | PIN   |
| 0-7                                  | 8-15  |

2 process deletion

|              |   |       |
|--------------|---|-------|
| 0            | 7 | 12-15 |
| RANK SQ      | 1 | 3     |
| NEW PRIORITY | 1 | PIN   |

3 priority change

|                                      |          |       |
|--------------------------------------|----------|-------|
| 0                                    | 8        | 12-15 |
| + -                                  | #SECTORS | 1     |
| //////////////////////////////////// | PIN      |       |

4 DL change

|                                      |          |       |
|--------------------------------------|----------|-------|
| 0                                    | 8        | 12-15 |
| + -                                  | #SECTORS | 1     |
| //////////////////////////////////// | PIN      |       |

5 Z change

|                                      |          |       |
|--------------------------------------|----------|-------|
| 0                                    | 8        | 12-15 |
| + -                                  | #SECTORS | 1     |
| //////////////////////////////////// | PIN      |       |

6 FCBX size change

# SYSTEM CLOCK

-----

The system clock is a clock/TTY card in DPT 3. It interrupts every 100 ms, with the CR being automatically cleared. The interrupt handler is the procedure CLOCK. On entry, DB is pointing to the timer request list. Besides timeout requests, the clock also controls time slicing and memory manager sampling.

| TIME REQUEST LIST (TRL)  |                            |            |
|--------------------------|----------------------------|------------|
| -----                    |                            |            |
| / 0                      | FREE LIST PTR              |            |
|                          | -----                      |            |
| ENT0   1                 | NR ENTRIES   ENTRY SIZE(4) |            |
|                          | -----                      |            |
| 2                        | TRACE WORD                 |            |
|                          | -----                      |            |
| \ 3                      | 0                          |            |
|                          | -----                      |            |
| / 4                      | QUANTUM/100 ms             | QTIME      |
|                          | -----                      |            |
| 5                        | TIME OF DAY                | DTIME      |
| ENT1   6                 |                            |            |
|                          | -----                      |            |
| \ 7                      | YEAR   JULIAN DAY          |            |
|                          | -----                      |            |
| / 8                      | PTR TO MOST ACTIVE REQUEST | HEAD       |
|                          | -----                      |            |
| 9                        | 0                          |            |
| ENT2                     | -----                      |            |
| 10                       | 0                          |            |
|                          | -----                      |            |
| \ 11                     | 0                          | dummy time |
|                          | -----                      | -----      |
| / 12   A                 | CODE   PTR TO NEXT         |            |
|                          | -----                      |            |
| 13                       | REQ                        |            |
| ENT3                     | -----                      |            |
|                          | TIME TO SERVICE AFTER      | assignable |
|                          | REQUEST IN FRONT           | entries    |
| \                        | -----                      |            |
| -----                    |                            |            |
| A: 0 if inactive request |                            |            |
| 1 if active request      |                            |            |

CODE & REQ indicate the type of request.



| CODE: | REQ:                     | TYPE:           |
|-------|--------------------------|-----------------|
| 0     | DITP                     | Hangup          |
| 1     | DITP                     | Carrier failure |
| 2     | DITP                     | 202 turnaround  |
| 3     | DITP                     | Read            |
| 4     | DITP                     | Logon           |
| 5     | PCAB index<br>to process | Delay           |
| 6     | DITP                     | LP not ready    |
| 7     | DITP                     | 2640            |

The list of pending requests is kept ordered by time with later entries at the tail.

|         |      |                                                                               |
|---------|------|-------------------------------------------------------------------------------|
| %20-%37 | DITP | STO device timeout:<br>DIT8. (code_1 on<br>expiration, cleared<br>on Timereq. |
|---------|------|-------------------------------------------------------------------------------|



# SYSTEM GLOBAL AREA

| octal |                                           | name                |
|-------|-------------------------------------------|---------------------|
| ----  |                                           | ----                |
| 0     | SYSGLOB - SYSBASE                         |                     |
| 1     | CST BASE - SYS BASE                       | SYSCST              |
| 2     | DST BASE - SYS BASE                       | SYSDST              |
| 3     | PCR BASE - SYS BASE                       | SYSPCB              |
| 4     | MTAB BASE - SYS BASE                      | SYSMTAB             |
| 5     | IOQ BASE - SYS BASE                       | SYSIQ               |
| 6     | SEUF BASE - SYS BASE                      | SYSEUF              |
| 7     | WSTAB BASE - SYS BASE                     | SYSWSTAB            |
| 10    | LPDT BASE - SYS BASE                      | SYSLPDT             |
| 11    | STOPS BASE - SYS BASE                     | SYSSTOPS            |
| 12    | TRL BASE - SYS BASE                       | SYSTRL              |
| 13    | JCUT BASE - SYS BASE                      | SYSSIR              |
| 14    | SIR BASE - SYS BASE                       | SYSSIR              |
| 15    | JPCNT BASE - SYS BASE                     | SYSJPCNT            |
| 16    | TBUF BASE - SYS BASE                      | SYSTBUF             |
| 17    | MONBUF BASE - SYS BASE                    | SMONBUF-(mor<br>buf |
| 20    |                                           |                     |
| 21    |                                           |                     |
| 22    |                                           |                     |
| 23    |                                           |                     |
| 24    |                                           |                     |
| 25    | TAU - WORKING SET PAPAM - IN MILLISECONDS | WSTAU               |
| 26    | HIGH ORDER VDS DISC ADDRESS               | VDSTART1            |

reserved  
for memory  
resident <  
tables

|    |                                                 |             |
|----|-------------------------------------------------|-------------|
| 27 | LOW ORDER VDS DISC ADDRESS                      | IVDSTART    |
| 30 | CURRENT CST BLOCK INDEX                         | ICSTRX      |
| 31 | PREPARATION POINTER                             | IMAMP       |
| 32 | DISPLACEMENT TO CODE = ACST(0) - ADST(0)        | IDFC        |
| 33 | DISPLACEMENT TO SHARABLE = ACST(LAST) - ADST(0) | IDFS        |
| 34 | VDS BIT MAP POINTER                             | IVDSMAP     |
| 35 | ABS ADDRESS (SYSDIT(8))                         | ISYSDIT8    |
| 36 | NUMBER OF LAST USABLE BIT IN VDS MAP            | ISCANEND    |
| 37 | STARTING POS IN VDS FOR NEXT SEARCH             | ISCANWALL   |
| 40 | VDS PAGE SIZE                                   | IVDSPAGE    |
| 41 | VDS PAGE COUNT TABLE                            | IVDSL       |
| 42 | EXTENDED MAIN MEMORY ADDRESS -                  | IFREEHEAD1  |
| 43 | OF FIRST FREE LINK +6                           | IFREEHEAD2  |
| 44 | NUMBER OF FREE LINKS                            | INFREF      |
| 45 | TEMP SPACE POINTER FOR SOCKSEG. INIT TO 0.      | ILOCKTANK   |
| 46 | USED IN CONJUNCTION WITH LOCKTANK               | ILOCKTANKOT |
| 47 | NUMBER OF MEMORY BANKS. CONFIGURED -1           | INBANKS     |
| 50 | MEMORY BANK SPECIFICATION TABLE                 | IBANKTAB    |
| 51 | POINTER TO CSIRLK TABLE                         | ICSTELK     |
| 52 | ANTICIPATORY WRITE ENABLE FLAG                  |             |
| 53 | ALLOW LOCAL COMPRESSION FLAG                    |             |
| 54 |                                                 |             |

# SYSTEM GLOBAL AREA (cont)

| octal                          |                              | name                              |
|--------------------------------|------------------------------|-----------------------------------|
| -----                          |                              | ----                              |
| /55                            | BUSY TABLE POINTER           | BUSY                              |
|                                |                              |                                   |
| 56                             | HEAD TABLE POINTER           | HEAD                              |
|                                |                              |                                   |
| 57                             | TAIL TABLE POINTER           | TAIL                              |
|                                |                              |                                   |
| 60                             | # OF SIO PROGRAMS EXECUTING  | SJOCOUNT                          |
|                                |                              |                                   |
| 61                             | PARITY ERROR FLAG (MEM PE)   | PARITY                            |
|                                |                              |                                   |
| 62                             | I/O MESSAGE QUEUE HEAD INDEX | IDMSGQX                           |
|                                |                              |                                   |
| 63                             | I/O LOG QUEUE HEAD INDEX     | ICLOGQX                           |
|                                |                              |                                   |
| reserved<br>for I/O<br>system  | 64                           | # OF TERMINALS READING            |
|                                | 65                           | # OF TERMINALS WRITING            |
|                                | 66                           | DSET B                            |
|                                | 67                           |                                   |
|                                |                              | ICPIO                             |
|                                |                              |                                   |
|                                | 70                           | LAST TIMER                        |
|                                |                              | ICRIO                             |
|                                |                              |                                   |
|                                | 71                           | HIGHEST DRT NUMBER                |
|                                |                              | IHSYSDRT                          |
|                                |                              |                                   |
|                                | 72                           | POWERFAIL                         |
|                                |                              | POWERFAIL                         |
|                                |                              |                                   |
|                                | 73                           | SYSTEM UP FLAG                    |
|                                |                              | ISYSUP                            |
|                                |                              |                                   |
|                                | 74                           | SYS CONSOLE LOGICAL DEVICE NUMBER |
|                                |                              | ICONSLDEV                         |
|                                |                              |                                   |
| /                              | 75                           | COLD LOAD COUNT                   |
|                                |                              | ICLOADIO                          |
|                                |                              |                                   |
|                                | 76                           | SHAPED FCB DST                    |
|                                |                              | ISHFCBDST                         |
|                                |                              |                                   |
|                                | 77                           | MONITORING FLAGS                  |
|                                |                              |                                   |
| reserved<br>for file<br>system | 100                          |                                   |
|                                |                              |                                   |
|                                | 101                          | MAX # OF SPOOL KILOSECTORS        |
|                                |                              | MAXSSECT                          |
|                                |                              |                                   |
|                                | 102                          |                                   |
|                                |                              |                                   |
|                                |                              | CURRENT # OF SPOOL KILOSECTORS    |
|                                |                              | NUMSSECT                          |
|                                | 103                          |                                   |
|                                |                              |                                   |
|                                | 104                          | # SECTOR/SPOOFLE EXTENT           |
|                                |                              | EXTSSECT                          |
|                                |                              |                                   |

|     |                                       |          |
|-----|---------------------------------------|----------|
| 105 | MAX CODE SEGMENT SIZE                 |          |
| 106 | MAX # OF CODE SEGMENTS/PROCESS        |          |
| 107 | MAX STACK SIZE (MAXDATA)              |          |
| 110 | DEFAULT STACK SIZE                    |          |
| 111 | MAX EXTRA DATA SEGMENT SIZE           |          |
| 112 | MAX # EXTRA DATA SEGMENTS/PROCESS     |          |
| 113 | C.I. WORKING SET PTP                  | ICIWSP   |
| 114 | UPDATE LEVEL                          | IUPDATEL |
| 115 | FIX LEVEL                             | IFIXL    |
| 116 | VERSION LEVEL                         | IVERSION |
| 117 | DEFAULT CPU TIME LIMIT                |          |
| 120 | # OF SECONDS TO LOGON                 |          |
| 121 | JOESYNCH BITS (13:3)                  |          |
| 122 | EXTERNAL PLABEL OF INITIATE           |          |
| 123 | INTERNAL PLABEL OF INITIATE           |          |
| 124 | (MESSAGE CATALOG)                     |          |
| 125 | (DISC ADDRESS)                        |          |
| 126 | SL.PUB.SYS I.DEV     1     SL.PUB.SYS |          |
| 127 | DISC ADDRESS                          |          |
| 130 | (DIRECTORY)                           |          |
| 131 | (DISC ADDRESS)                        |          |

# SYSTEM GLOBAL AREA (cont)

| octal               |                  | name                                 |
|---------------------|------------------|--------------------------------------|
| -----               |                  | ----                                 |
| 132                 | SPOOLINDEX       |                                      |
| /133                |                  |                                      |
| 134                 |                  |                                      |
| 135                 | CS IOWAIT PLABEL |                                      |
| reserved<<br>for CS | 136              | CS FIX LEVEL                         |
|                     | 137              | CS VERSION                           |
|                     | 140              | CCLOSE PLABEL                        |
|                     | 141              | LOGICAL PROCESS TABLE (PROGEN) 0     |
|                     | 142              | LOGICAL PROCESS TABLE (MAM) 1        |
|                     | 143              | LOGICAL PROCESS TABLE (UCOP) 2       |
|                     | 144              | LOGICAL PROCFSS TABLE (PFAIL) 3      |
|                     | 145              | LOGICAL PROCESS TABLE (DEVREC) 4     |
|                     | 146              | LOGICAL PROCESS TABLE (DRUSG) 5      |
|                     | 147              | LOGICAL PROCESS TABLE (STMSG) 6      |
|                     | 150              | LOGICAL PPROCESS TABLE (LOG) 7       |
|                     | 151              | LOGICAL PROCESS TABLE (LOAD) 8       |
|                     | 152              | LOGICAL PROCESS TABLE (IOMESSPROC) 9 |
|                     | 153              | LOGICAL PROCESS TABLE SYSIOPRDC 10   |
|                     | 154              | LOGICAL PROCESS TABLE MEMLOGP 11     |
|                     | 155              | EXTERNAL PLABEL OF "TERMINATE"       |
|                     | 156              | INTERNAL PLABEL OF "TERMINATE"       |
|                     | 157              | EXTERNAL PLABEL OF "COMMANDINTERP"   |
|                     | 160              | INTERNAL PLABEL OF "COMMANDINTERP"   |

|          |     |                                               |             |
|----------|-----|-----------------------------------------------|-------------|
|          | 161 | EXTERNAL LABEL OF "SPOOLIN"                   |             |
|          | 162 | INTERNAL LABEL OF "TRACE0"                    |             |
|          | 163 | EXTERNAL LABEL OF "TRACE0"                    |             |
|          | 164 | INTERNAL LABEL OF "SPOOLIN"                   |             |
|          | 165 | EXTERNAL LABEL OF "SPOOLOUT"                  |             |
|          | 166 | INTERNAL LABEL OF "SPOOLOUT"                  |             |
|          | 167 | 3 WORD                                        |             |
|          | 170 | LOGGING                                       |             |
|          | 171 | MASK                                          |             |
|          | 172 | //////////ISTATE 1      DST# - BUFFER 0       |             |
|          | 173 | //////////ISTATE 1      DST# - BUFFER 1       |             |
|          | 174 | BUFFER LENGTH (SECTORS)                       |             |
|          | 175 | FREE AREA POINTER                             |             |
|          | 176 | FLAGX                                         |             |
| reserved | 177 | # RECORDS WRITTEN IN BUFFER 0                 |             |
| for      | 200 | # RECORDS WRITTEN IN BUFFER 1                 |             |
| logging  | 201 | FILE SIZE (BLOCKS) - 1ST HALF                 |             |
|          | 202 | FILE SIZE (BLOCKS) - 2ND HALF                 |             |
|          | 203 | (LOG FILE SIZE)                               |             |
|          | 204 | (BLOCKS)                                      |             |
|          | 205 | LOG FILE NUMBER                               | LOGFILENAME |
|          | 206 | NUMBER OF LOGGING [BLOCKS WRITTEN (1ST HALF)] |             |
|          | 207 | BLOCKS WRITTEN [BLOCKS WRITTEN (2ND HALF)]    |             |

# SYSTEM GLOBAL AREA (cont)

|         | octal |                                                | name |
|---------|-------|------------------------------------------------|------|
|         | ----- |                                                | ---- |
|         | 210   | (TOTAL # LOG RECORDS MISSED)                   |      |
|         | 211   | (DUE TO LOG FAILURE)                           |      |
|         | 212   | TOTAL# RECORDS MISSED - "JOB INITIATION" LOSS  |      |
| logging | 213   | TOTAL# RECORDS MISSED - "JOB TERMINATION" LOSS |      |
|         | 214   |                                                |      |
|         | 215   |                                                |      |
|         | 216   |                                                |      |
|         | 217   |                                                |      |
|         | 220   |                                                |      |
|         |       |                                                |      |
|         |       | LOADER                                         |      |
|         |       | MESSAGE                                        |      |
|         |       | TABLE                                          |      |
|         |       |                                                |      |
|         | 250   | THIS BUFFER INDEX                              |      |
|         | 251   | CURRENT BUFFER INDEX                           |      |
|         | 252   | CURRENT BUFFER COUNT                           |      |
| segment | 253   | TOTAL BUFFER SIZE                              |      |
| trace   | 254   | FIRST SYSBUF INDEX                             |      |
|         | 255   | MAG TAPE LDEV                                  |      |
|         | 256   | FLAGS WORD                                     |      |
|         | 257   | TRACE SEGMENT EXT LABEL                        |      |
|         | 260   | MEASUREMENT TABLE COUNTER MONCNT               |      |

|                          |     |                                     |  |
|--------------------------|-----|-------------------------------------|--|
|                          | 261 | MEASUREMENT TABLE COUNTER MEASCNT   |  |
| measurement              | 62  |                                     |  |
|                          | 263 | MEASUREMENT LOGICAL DEVICE MEASLDEV |  |
|                          | 264 | MEASUREMENT SYS BUFF INDEX MEASIXD  |  |
|                          | 265 |                                     |  |
| measurement              | 266 | MEASUREMENT GROUP MASK MEASMSK0     |  |
|                          | 267 | MEASUREMENT GROUP MASK MEASMSK1     |  |
|                          | 270 | MEASUREMENT BUF POINTER MEASBUF     |  |
|                          | 271 | INDEX OF SEG BEING LOCKED LOKINX    |  |
|                          | 272 | PINX OF SEG BEING LOCKED LOKPINX    |  |
|                          | 273 | LOCK TEMPORARY LOKWENT              |  |
|                          | 274 | LOCK TEMPORARY LOKLINX              |  |
| misc                     | 275 |                                     |  |
|                          | 276 | HELP LOGICAL DEVICE NUMBER          |  |
|                          | 277 | CURRENT LOGON DST                   |  |
|                          | 300 | (STOP)                              |  |
|                          | 301 | (HITS)                              |  |
|                          | 302 | # PROCESS ENTRIES                   |  |
|                          | 303 |                                     |  |
|                          | 304 | DEVREC PIN 1 2                      |  |
|                          | 305 | %20                                 |  |
|                          | 306 | UCOP PIN 1 0                        |  |
|                          | 307 | %20                                 |  |
| process<br>stop<br>table | 310 | IOMESS PIN 1 3                      |  |
|                          | 311 | %20                                 |  |
|                          | 312 | LOG PIN 1 1                         |  |
|                          | 313 | %20                                 |  |

DSTLOGON



|        |               |    |                         |
|--------|---------------|----|-------------------------|
| 314    | MEMLOGP PIN   | 1  | 4                       |
| 315    |               | 20 |                         |
| 316    |               |    |                         |
| 317    |               |    |                         |
| 320    | DS PROCESS #  | 1  | DSXREF-SYSBASE REL      |
| 321    |               |    | DSCLOSE PLABEL          |
| 322    |               |    | SDSLDEV PLABEL          |
| 323    |               |    |                         |
| OS 324 |               |    |                         |
| 325    |               |    |                         |
| 326    |               |    |                         |
| 327    |               |    |                         |
| 330    |               |    | DISC STATUS             |
| 331    | LDEV          | 1  | DISC                    |
| 332    |               |    | ADNESS                  |
| 333    |               |    | MAXQUEUE                |
| 334    |               |    | DEFAULTQUEUE            |
| 335    |               |    | DSCHECK PLABEL          |
| 336    |               |    | DSUPEN PLABEL           |
| 337    |               |    | DSCLOSE PLABEL          |
| 340    |               |    | MANAGEWRITE CONV PLABFL |
| 341    |               |    | CONSDSLINF PLABEL       |
| 342    |               |    | CXREMOTE PLABEL         |
| 343    |               |    | CXDSLINE PLABEL         |
| 344    |               |    | CXPFA PLABEL            |
| 345    |               |    | DSIMAGF PLABEL          |
| 346    | DEFAULT LABEL | 1  |                         |
|        | TYPE          | 1  | AUTO REC FUNC.          |

LAST

DISC SI

ERROR

JOBPRI

JOBLIMIT  
(NURSERY)

Private  
Volumes

|     |                          |  |
|-----|--------------------------|--|
| 347 |                          |  |
| 350 |                          |  |
| 351 |                          |  |
| 352 |                          |  |
| 353 | MEASUREMENT & TUNING     |  |
| 354 |                          |  |
| 355 |                          |  |
| 356 |                          |  |
| 357 |                          |  |
| 360 | TSBFEAK LABEL            |  |
| 361 | ODHEAD                   |  |
| 362 | ODPINX                   |  |
| 363 | PV                       |  |
| 364 | PV                       |  |
| 365 | PV                       |  |
| 366 | PV                       |  |
| 367 | PV                       |  |
| 370 | PV                       |  |
| 371 | MSG CATALOG DISC ADDRESS |  |
| 372 | MSG CATALOG DISC ADDRESS |  |
| 373 | MSG DSTE                 |  |
| 374 | CONSMPLINE LABEL         |  |
| 375 |                          |  |
| 376 |                          |  |
| 377 |                          |  |

<-used by MA

<-chain old

discar  
processes

# **SYSDB WORDS**

| ADDRESS | NAME       | FUNCTION                                                                                                |
|---------|------------|---------------------------------------------------------------------------------------------------------|
| DB+61   | SLOWIO     | - # of requests for limited I/O Activity                                                                |
| DB+60   | STO COUNT  | - Number of I/O Programs currently executing                                                            |
| DB+55   | BUSY       | - SYSDB relative pointer to BUSY TABLE for I/O resources                                                |
| DB+56   | HEAD       | - SYSDB relative pointer to table containing head pointers to I/O resource queues                       |
| DB+57   | TAIL       | - SYSDB relative pointer to table containing head pointers to tail of I/O resource queues               |
| DB+72   | POWER FAIL | - 0-no power fail<br>1-system disc recovery<br>2-all other disc recovery<br>3-all other device recovery |
| DB+73   | SYSUP      | - System is up and operable                                                                             |
| DB+74   | CONSLDEVN  | - System console logical device number                                                                  |

**JOBSYNCH** job synchronization via jobsynch (sysglob+121(0))

(13:1) - JOBSREADY - set by DEVREC & MORGUE (via procedure STARTDEVICE) indicating a ready job. This prevents UCOP from going to a wait state when a job is just made ready.

(15:1) - DEVFREED - set by DEALLOCATE when device count goes to 0.

NOTE - Both bits above used for synchronization of job-made-ready or devicefreed when UCOP is running.

(14:1) - JOBSWAITING- set by UCOP just before waiting if any job is waiting for list device. Signals DEALLOCATE to awake UCOP when a device is freed.

# LOGGING RELATED LOCATIONS

SYSDB

|     | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|-----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 172 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| or  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| 173 |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |

STATE = 0 if respective buffer empty  
 1 if respective buffer is current  
 2 if respective buffer is full

FLAGX

-----

SYSDB

|     | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|-----|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 176 |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|     |   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |

SF = 1 if soft failure  
 HF = 1 if hard failure  
 BUF = 0 if current log buffer is buffer 0  
       = 1 if current log buffer is buffer 1  
 SL = 1 to indicate a switch in log buffers (from 0 to 1 or from 2 to 0)  
 SD = 1 to indicate shutdown in progress

# PROCESS STOP LIST GENERAL LAYOUT

SYSDB

300

STOP BITS REPRESENTING WHICH  
PROCESSES TO STOP ON "SHUTDOWN"

# PROCESS ENTRIES

////////////////////////////////////

1ST PROCESS ENTRY

2ND PROCESS ENTRY

.  
.  
.  
.  
.

317

LAST PROCESS ENTRY

## ENTRY FORMAT

|                    |   |   |   |   |   |   |   |            |   |    |    |    |    |    |    |
|--------------------|---|---|---|---|---|---|---|------------|---|----|----|----|----|----|----|
| 0                  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8          | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|                    |   |   |   |   |   |   |   |            |   |    |    |    |    |    |    |
| PROCESS PIN #      |   |   |   |   |   |   |   | STOP BIT # |   |    |    |    |    |    |    |
| -----              |   |   |   |   |   |   |   |            |   |    |    |    |    |    |    |
| PROCESS WAIT STATE |   |   |   |   |   |   |   |            |   |    |    |    |    |    |    |
| -----              |   |   |   |   |   |   |   |            |   |    |    |    |    |    |    |

## PPEASSIGNED ENTRIES

entry #

process

stop bit #

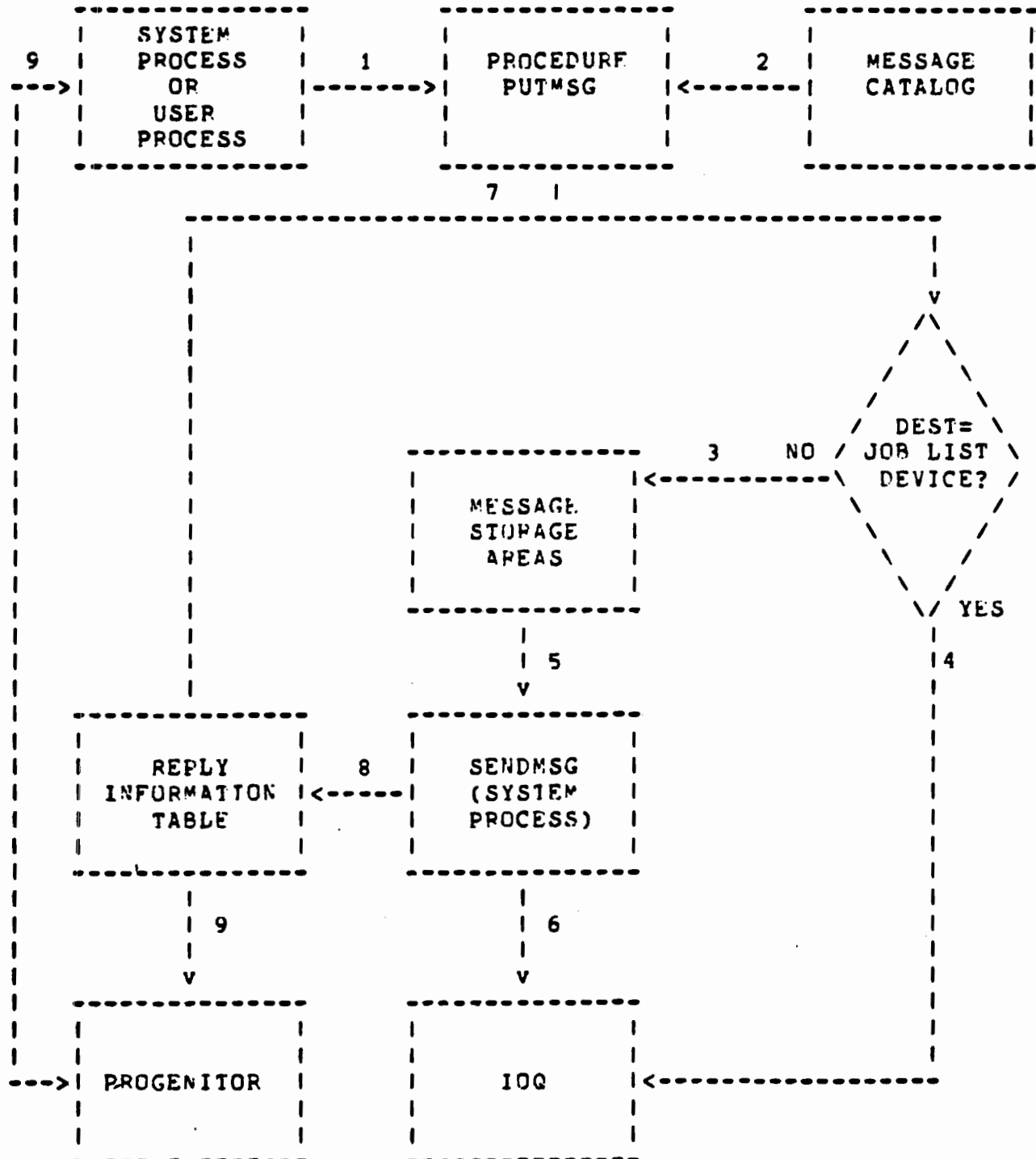
1  
2  
3

devrec  
ucop  
loa

2  
0  
1

# SYSTEM MESSAGES OVERALL DESIGN

## SYSTEM MESSAGES OVERALL DESIGN



In order to send a message, a process must call procedure PUTMSG (1). PUTMSG will fetch the appropriate message from the catalog (2), insert any parameters necessary and route the formatted message as follows: if the destination (DEST) was specified as the job list device (DEST<0), PUTMSG will call ATTACHIO directly and will be blocked until the message has been sent (4). If the destination is specified as anything other than the job list device (DEST>=0) the message will be put in the appropriate message storage area (3). PUTMSG will then awaken SENDMSG (5) and return control to the caller. SENDMSG sequentially sends messages from the storage area to their appropriate destinations by calling ATTACHIO without blocking (6). When no messages are left to be sent, SENDMSG sleeps. Any messages sent to operator which require a reply are handled in the same manner except for the following additions: PUTMSG puts an entry in the reply information table for this message (7) and sleeps the process, and SENDMSG time-stamps the entry (8).

Replies are handled by the progenitor which puts the reply into the user's buffer (9), removes the PII entry, and awakens the process.



# MESSAGE CATALOG TABLE DESCRIPTION

The message catalog resides on system disk and consists of one or more "pages" (a page is N-sectors N>0) which are read one at a time as needed into an extra data segment (DST %27). Currently a page is two sectors. The address of the message catalog is a double word in SYSGL0B (74) & (75).

The catalog creation program (MAKEMESS) works as follows: run MAKEMESS; this opens a new disk file & creates a catalog in it (input is from cards), the catalog address in SYSGL0B is updated, SYSDUMP should then be run immediately and the machine cold loaded. The new catalog will then be a permanent part of the system.

## MESSAGE CATALOG GENERAL LAYOUT

|     |                             |               |
|-----|-----------------------------|---------------|
|     |                             | page 1 format |
| 0   | # PAGES (N)                 |               |
| 1   | HIGHEST ENTRY # IN 1ST PAGE |               |
| .   | .                           |               |
| .   | .                           |               |
| .   | .                           |               |
| .   | .                           |               |
| N   | HIGHEST ENTRY # IN NTH PAGE | \             |
| N+1 | POINTER TO ENTRY #2 (M)     |               |
| N+2 |                             | >ENTRY        |
| .   |                             | #1            |
| .   |                             |               |
| .   |                             |               |
| .   |                             |               |
| .   |                             | /             |
| M   | POINTER TO ENTRY #3         | \             |
| M+1 |                             | ENTRY         |
| .   |                             | > #2          |
| .   |                             |               |
| .   |                             |               |
| .   |                             |               |
| .   |                             | /             |
|     | ETC.                        |               |

1644

# MESSAGE CATALOGUE ENTRY FORMAT

-----

| word#   | content                                     |
|---------|---------------------------------------------|
| 0.(0:1) | reply flag (on = reply required)            |
| .(1:2)  | reply type (0, 1, 2 or 3) Only for messages |
| .(3:5)  | max. string length Requiring replies        |
|         | (reply type 2 only) i.e., reply flag=1      |
| .(8:2)  | I/O type (0, 1 or 2)                        |
| .(10:3) | prefix #(0, 1, 2, 3, 4, 5, or 6)            |
| .(13:3) | format #(only for prefix numbers 0, 1 or 2) |
| 1       | I/O control parameter                       |
| 2.(0:6) | message length (without parameters) in byte |
| .(8:8)  | # parameters (4-max)                        |

|               |      |                                             |
|---------------|------|---------------------------------------------|
| parameter #1< | /--- |                                             |
| 3.(0:2)       |      | parameter type (0, 1 or 2)                  |
| \ .(2:14)     |      | parameter position (starts at which byte in |
| \---          |      | raw message).                               |

|               |      |                                             |
|---------------|------|---------------------------------------------|
| parameter #2< | /--- | NOTE: byte numbering starts with zero.      |
| 4.(0:2)       |      | parameter position (starts at which byte in |
| \ .(2:14)     |      | raw message)                                |
| \-            |      | NOTE: byte numbering starts with zero.      |

|   |   |         |
|---|---|---------|
| . |   |         |
| . |   |         |
| . |   |         |
| . |   |         |
| . |   |         |
| . | \ |         |
| M |   |         |
| . |   |         |
| . |   |         |
| . |   |         |
| . |   |         |
| N | / | message |

# MESSAGE CATALOGUE ENTRY FORMAT

-----

|                |                                                                                                    |
|----------------|----------------------------------------------------------------------------------------------------|
| REPLY TYPE     | 0 - number (num)                                                                                   |
|                | 1 - yes or not (y/n)                                                                               |
|                | 2 - string (sxx)-(xx is max. # char allowed in reply)                                              |
|                | 3 - yes, no or number (yn#)                                                                        |
| I/O TYPE       | 0 - standard                                                                                       |
|                | 1 - soft pre-emptive                                                                               |
|                | 2 - hard pre-emptive                                                                               |
| PARAMETER TYPE | 0 - octal number                                                                                   |
|                | 1 - decimal number                                                                                 |
|                | 2 - string                                                                                         |
| PREFIX NUMBER  | 0 - st                                                                                             |
|                | 1 - io console                                                                                     |
|                | 2 - ms                                                                                             |
|                | 3 - abort                                                                                          |
|                | 4 - from user                                                                                      |
|                | 5 - warn                                                                                           |
|                | 6 - no prefix (only the raw message is output - used<br>by command interpreter for error messages) |
| FORMAT NUMBER  | 0 - ?<prefix>/<time>/<pin>/<message>/<reply type>                                                  |
|                | 1 - <prefix>/<time>/<message>                                                                      |
|                | 2 - ?<prefix>/<time>/# J<br>S xxx/<pin>/<message><reply typ<br>T                                   |
|                | 3 - <prefix>/<time>/# J<br>S xxx/<message><br>T                                                    |

# CATALOG CREATION

Each catalog entry must be punched on cards, 2 cards per entry as follows:

Card 1 contains everything except the message itself. Format is free field with blanks as delimiters. Data must be punched in the following order.

|          | PARAMETER# | PARAMETER                                                                        |
|----------|------------|----------------------------------------------------------------------------------|
|          | -----      | -----                                                                            |
|          | 1          | reply type (0, 1, 2 or 3)                                                        |
|          | 2          | max. reply string length                                                         |
|          | 3          | I/O type (0, 1 or 2)                                                             |
|          | 4          | prefix# (0, 1, 2, 3, 4 or 5)                                                     |
|          | 5          | format# (0, 1, 2 or 3)                                                           |
|          | 6          | I/O control parameter                                                            |
|          | 7          | raw message length (in bytes)                                                    |
|          | 8          | # variables (4 max.)                                                             |
| variable | / 9        | parameter type (0, 1, 2)                                                         |
| #1       | \10        | parameter position (starts at which byte in raw message - numbering starts at 0) |
| variable | /11        |                                                                                  |
| #2       | \12        |                                                                                  |
|          | etc        |                                                                                  |

Card 2 contains the raw message. Every character from column #1 to column #(raw message length) is significant.

# EXAMPLE PAGE LISTING OF MESSAGE CATALOGUE

## CATALOGUE#

|                                        |      | REPLY<br>FLAG | REPLY<br>TYPE | MAX<br>STRING<br>LENGTH | I/O<br>TYPE | PREFIX | FORMAT | I/O<br>CONTROL<br>PARAMETER | MESSAGE<br>LENGTH | #<br>PARMS | PARAMETER<br>DESCRIPTION |    |   |   |
|----------------------------------------|------|---------------|---------------|-------------------------|-------------|--------|--------|-----------------------------|-------------------|------------|--------------------------|----|---|---|
| CAT#                                   | PNTR | RFLAG         | RTYPE         | MAXSL                   | IOTYPE      | PR#    | FMT#   | IOCONTR                     | MSGL              | #PAP       | T                        | P  | T | P |
| 26                                     | 163  | 0             | 0             | 0                       | 0           | 0      | 1      | %000000                     | 25                | 1          | 1                        | 24 |   |   |
| LOGON TIMED-OUT ON LDEV#               |      |               |               |                         |             |        |        |                             |                   |            |                          |    |   |   |
| 27                                     | 182  | 0             | 0             | 0                       | 1           | 0      | 1      | %000000                     | 29                | 0          |                          |    |   |   |
| VIRTUAL DEVICE DIRECTORY FULL          |      |               |               |                         |             |        |        |                             |                   |            |                          |    |   |   |
| 28                                     | 198  | 0             | 0             | 0                       | 1           | 0      | 1      | %000000                     | 22                | 1          | 2                        | 21 |   |   |
| JOB MASTER TABLE FULL                  |      |               |               |                         |             |        |        |                             |                   |            |                          |    |   |   |
| 29                                     | 204  | 0             | 0             | 0                       | 1           | 2      | 3      | %000000                     | 1                 | 1          | 2                        | 0  |   |   |
| 30                                     | 211  | 0             | 0             | 0                       | 1           | 4      | 0      | %000000                     | 2                 | 2          | 2                        | 0  | 2 | 1 |
| /                                      |      |               |               |                         |             |        |        |                             |                   |            |                          |    |   |   |
| 31                                     | 234  | 0             | 0             | 0                       | 0           | 6      | 0      | %000000                     | 38                | 0          |                          |    |   |   |
| COMMAND IGNORED - NOT ALLOWED IN BREAK |      |               |               |                         |             |        |        |                             |                   |            |                          |    |   |   |
| 32                                     | 249  | 0             | 0             | 0                       | 0           | 6      | 0      | %000000                     | 21                | 0          |                          |    |   |   |
| ONLY ALLOWED IN BREAK                  |      |               |               |                         |             |        |        |                             |                   |            |                          |    |   |   |

| CAT# | PNTR | RFLAG | RTYPE | MAXSL | IOTYPE | PR# | FMT# | IOCONTR | MSGL | #PAR | T | P | T | P | T | P |
|------|------|-------|-------|-------|--------|-----|------|---------|------|------|---|---|---|---|---|---|
| 33   | 17   | 0     | 0     | 0     | 0      | 6   | 0    | %000000 | 25   | 0    |   |   |   |   |   |   |

PREMATURE JOB TERMINATION

| CAT# | PNTR | RFLAG | RTYPE | MAXSL | IOTYPE | PR# | FMT# | IOCONTR | MSGL | #PAR | T | P | T | P | T | P |
|------|------|-------|-------|-------|--------|-----|------|---------|------|------|---|---|---|---|---|---|
| 34   | 25   | 0     | 0     | 0     | 0      | 6   | 0    | %000000 | 7    | 0    |   |   |   |   |   |   |

IGNORED

| CAT# | PNTR | RFLAG | RTYPE | MAXSL | IOTYPE | PR# | FMT# | IOCONTR | MSGL | #PAR | T | P | T | P | T | P |
|------|------|-------|-------|-------|--------|-----|------|---------|------|------|---|---|---|---|---|---|
| 35   | 36   | 0     | 0     | 0     | 0      | 6   | 0    | %000000 | 14   | 0    |   |   |   |   |   |   |

END OF SESSION

| CAT# | PNTR | RFLAG | RTYPE | MAXSL | IOTYPE | PR# | FMT# | IOCONTR | MSGL | #PAR | T | P | T | P | T | P |
|------|------|-------|-------|-------|--------|-----|------|---------|------|------|---|---|---|---|---|---|
| 36   | 45   | 0     | 0     | 0     | 0      | 6   | 0    | %000000 | 10   | 0    |   |   |   |   |   |   |

END OF JOB

| CAT# | PNTR | RFLAG | RTYPE | MAXSL | IOTYPE | PR# | FMT# | IOCONTR | MSGL | #PAR | T | P | T | P | T | P |
|------|------|-------|-------|-------|--------|-----|------|---------|------|------|---|---|---|---|---|---|
| 37   | 57   | 0     | 0     | 0     | 0      | 6   | 0    | %000000 | 16   | 0    |   |   |   |   |   |   |

INVALID RESPONSE

| CAT# | PNTR | RFLAG | RTYPE | MAXSL | IOTYPE | PR# | FMT# | IOCONTR | MSGL | #PAR | T | P | T | P | T | P |
|------|------|-------|-------|-------|--------|-----|------|---------|------|------|---|---|---|---|---|---|
| 38   | 68   | 0     | 0     | 0     | 0      | 6   | 0    | %000000 | 14   | 0    |   |   |   |   |   |   |

END OF PROGRAM

| CAT# | PNTR | RFLAG | RTYPE | MAXSL | IOTYPE | PR# | FMT# | IOCONTR | MSGL | #PAR | T | P | T | P | T | P |
|------|------|-------|-------|-------|--------|-----|------|---------|------|------|---|---|---|---|---|---|
| 39   | 84   | 0     | 0     | 0     | 0      | 6   | 0    | %000000 | 23   | 0    |   |   |   |   |   |   |

FILE EQUATION NOT FOUND

| CAT# | PNTR | RFLAG | RTYPE | MAXSL | IOTYPE | PR# | FMT# | IOCONTR | MSGL | #PAR | T | P | T | P | T | P |
|------|------|-------|-------|-------|--------|-----|------|---------|------|------|---|---|---|---|---|---|
| 40   | 95   | 0     | 0     | 0     | 0      | 6   | 0    | %000000 | 14   | 0    |   |   |   |   |   |   |

FILE NOT FOUND

.....

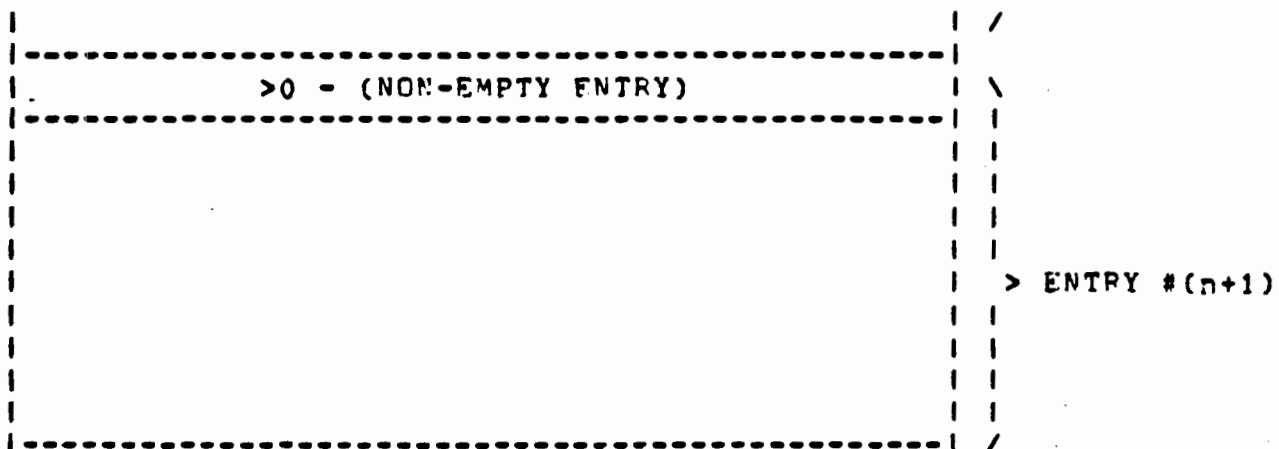
The reply information table is an extra data segment (EST#34(10)). Entries are of fixed length and no provision is made for overflow other than an error return. Every message requiring a reply sent via procedure PUTMSG will have an entry put in the RIT. Entries are removed by the progenitor when the reply is received.

.....

(6 words per entry)

|   |                                      |            |
|---|--------------------------------------|------------|
| 0 | # ENTRIES                            | \          |
| 1 | MAX# ENTRIES POSSIBLE                | \          |
| 2 | //////////////////////////////////// | HEADER     |
| 3 | MAX # OF ENTRIES #6                  | ENTRY      |
| 4 | //////////////////////////////////// |            |
| 5 | //////////////////////////////////// | /          |
|   |                                      | \          |
|   |                                      | > ENTRY #1 |
|   |                                      | /          |
|   |                                      |            |
|   |                                      |            |
|   | 0 - (EMPTY ENTRY)                    | \          |
|   |                                      |            |
|   |                                      | > ENTRY #n |





# REPLY INFORMATION TABLE ENTRY FORMAT

|   |                               |             |
|---|-------------------------------|-------------|
| 0 | PROCESS NUMBER (PIN)          |             |
| 1 | DST# (FOR REPLY)              |             |
| 2 | BUFFER ADDRESS (DST RELATIVE) |             |
| 3 | REPLY TYPE EXPECTED           |             |
| 4 | TIME STAMP                    | \           |
| 5 |                               |             |
| 6 | CONTROL WORD                  | >FROM TIMEK |
| 7 | # BYTES IN MESSAGE            | INTRINSIC   |
|   |                               | /           |
|   | MESSAGE IN ASCII              |             |

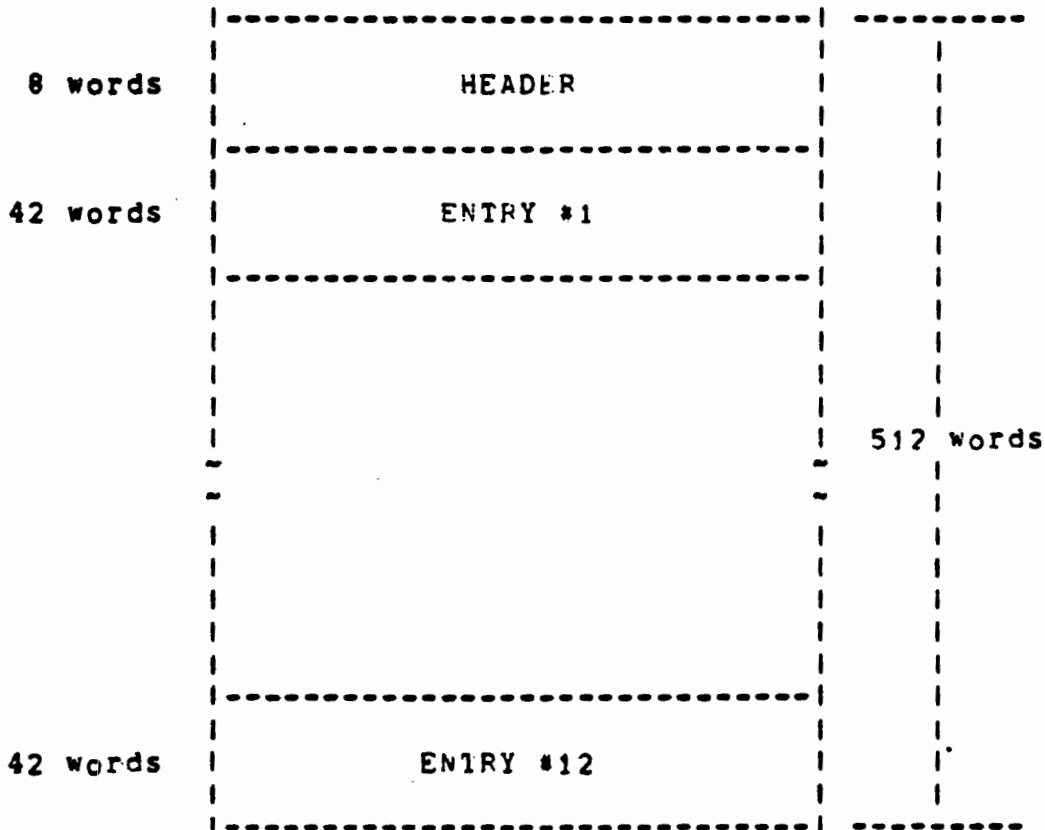
NOTE: Process Number = 0 means entry is empty

Reply Type = 0 for number (num)  
 = 1 for yes or no (y/n)  
 = 2 for string (sxx)  
 = 3 for yes, no, or number (yn#)

## MESSAGE STORAGE AREAS

There are two message storage areas (identical in length and format). One is for "standard" messages (DST# 42(10)) and the other is for "pre-emptive" messages (DST# 33(10)). Entries are of fixed length (42 words). Each table is 512(10) words long and can thus accommodate 12 entries plus a header which is 8 words long.

### GENERAL TABLE FORMAT

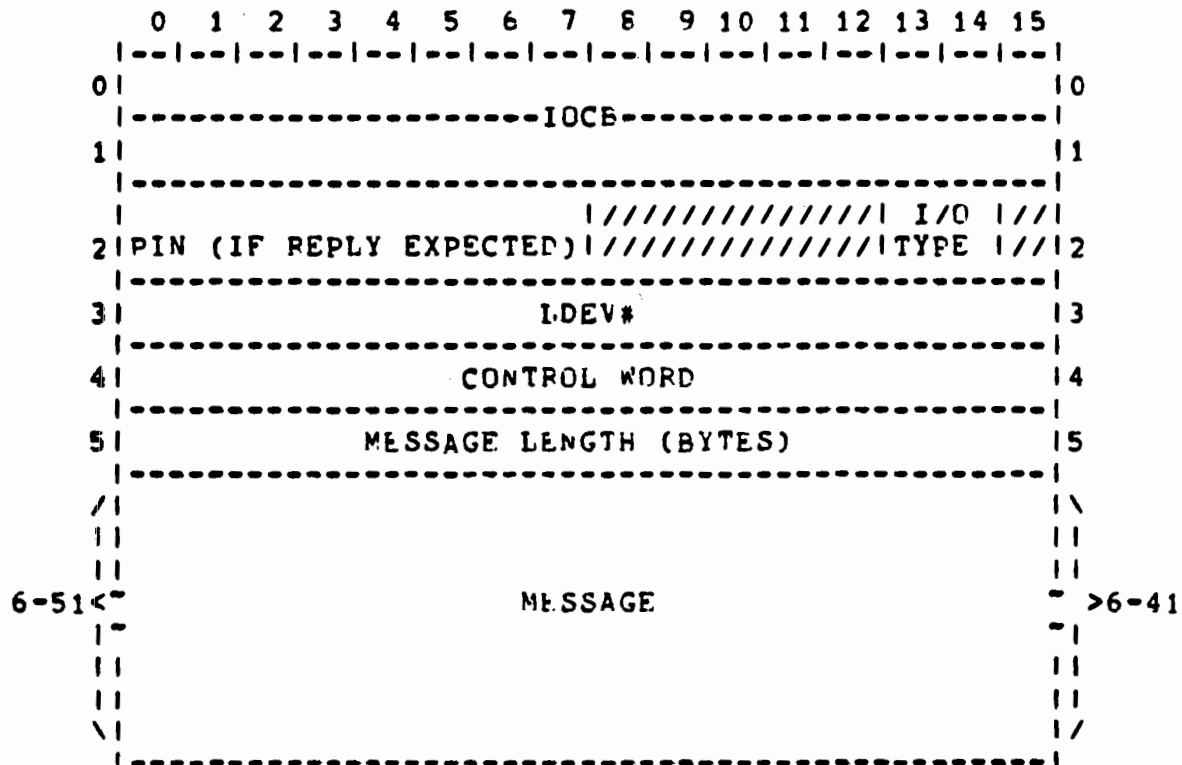


# HEADER FORMAT (MESSAGE STORAGE AREA)

|   |                                            |
|---|--------------------------------------------|
| 0 | ENTRIES TABLE CAN HOLD<br>(CURRENTLY = 12) |
| 1 | ////////////////////////////////////       |
| 2 | 1ST PROCESS IN WAITING LIST<br>(0 IF NONE) |
| 3 | ////////////////////////////////////       |
| 4 | ADR. OF 1ST POSSIBLE ENTRY                 |
| 5 | ADR. OF LAST POSSIBLE ENTRY                |
| 6 | ADDRESS OF 1ST ENTRY<br>IN QUEUE           |
| 7 | ADDRESS OF LAST ENTRY<br>IN QUEUE          |

- word 0 - capacity of this table in entries
- word 1 - not used
- word 2 - pin of 1st process in waiting list. If PUTMSG is called and no entries are available in the storage area, the calling process is impeded and added to a waiting list (linked via impeded queue pointer in PCB entry). When an entry becomes available, all waiting processes are un-impeded and allowed to compete for the available entry.
- word 3 - not used
- word 4 - segment relative address of 1st possible entry (currently 8).
- word 5 - segment relative address of last possible entry (currently 470)
- word 6 - address of first entry in queue
- word 7 - address of last entry in queue

# ENTRY FORMAT (MESSAGE STORAGE AREA)



- words 0,1 - IOCB word 0 is used to indicate whether or not the entry is available. This word is set to 0 by PUTMSG and non-zero by ATTACHIO. Word 1 is used as a pointer to the next entry in the queue (0 if none).
- word 2.(0:8) - process number if message requires a reply (0 otherwise)
- .(13:2) - I/O type
- word 3 - logical device number where message is to be sent
- word 4 - control word. This value is put in QPAR1 when ATTACHIO is called
- word 5 - message length in bytes
- words 6-51 - message in its final form

