

HP MICRO 3000LX/GX

USER'S MANUAL



Manual Part No.
32520-90003

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Hiermit wird bescheinigt, daß das Gerät/System HP MICRO 3000LX und HP MICRO 3000GX in Übereinstimmung mit den Bestimmungen von Postverfügung 1046/84 funktentstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes/Systems angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.



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1

How to Use this Manual

This manual contains information about the HP MICRO 3000LX and GX systems. It also has information about the disc drives and cartridge tape drives that are installed in the system cabinet. These are the embedded peripherals.

The contents of this manual are:

- CHAPTER 1 - describes the contents of the manual.
- CHAPTER 2 - provides cautionary statements about the handling of disc drives.
- CHAPTER 3 - describes the location and function of the controls and lights of the HP MICRO 3000LX and GX systems. It describes how to start the system and verify it operates correctly. It also provides detailed MPE system configuration information.
- CHAPTER 4 - describes cartridge tape care, how to load and unload cartridges, and how to write-protect cartridges.
- CHAPTER 5 - provides tape drive maintenance information. It describes how the tape drive monitors the cartridge tape, provides an overview of the self-test facility, and describes how to clean the tape head.
- CHAPTER 6 - describes how to identify tape drive problems and what actions to take.
- APPENDIX A - provides additional cartridge guidelines which include temperature specifications and conditions that should be avoided.
- APPENDIX B - lists supplies and accessories, with part numbers, for cartridges and tape head cleaning.

2

About Your System

The HP MICRO 3000LX system is the entry level HP 3000 system. Two or four megabytes of memory can be accessed by up to eight point-to-point terminals. The system has an embedded cartridge tape drive. It also has an embedded disc drive with up to 304 megabytes of storage. The entire system is housed in a cabinet that fits under a desk.

The HP MICRO 3000GX system is a low-end HP 3000 system. Two or four megabytes of memory can be assessed by up to 16 point-to-point terminals. The system has an embedded cartridge tape drive. It also has one or two embedded disc drives with a total storage capacity of up to 608 megabytes. The entire system is housed in a cabinet that fits under a desk.

Caution



Do not move the computer system while it is powered up. Damage to the disc drive(s) can result.

Do not move the system for five minutes AFTER power is turned off.

Do not put your hands in the cartridge slot of the Cartridge Tape Drive.

When your system is fully operational, it should not be moved unless absolutely necessary. The disc drives used in the system, while highly reliable, **MUST NOT** be moved when operating. Unnecessary movement can result in loss of data or damage to the disc drive.

3

System Power-up and Verification

Introduction

This chapter:

1. Shows the location of the controls and lights of the system, and describes their function,
2. Shows you how to start the system and verify that it operates correctly, and
3. Provides detailed MPE system and I/O configuration information so you can ensure that the system is configured correctly.

Note



If a power failure occurs during normal operation, both the **ACTIVITY** and **FAULT** indicators will light. This action indicates that battery power is retaining memory.

SPU Keyswitch Positions

The keyswitch positions and their functions are described below. See figure 3-1.

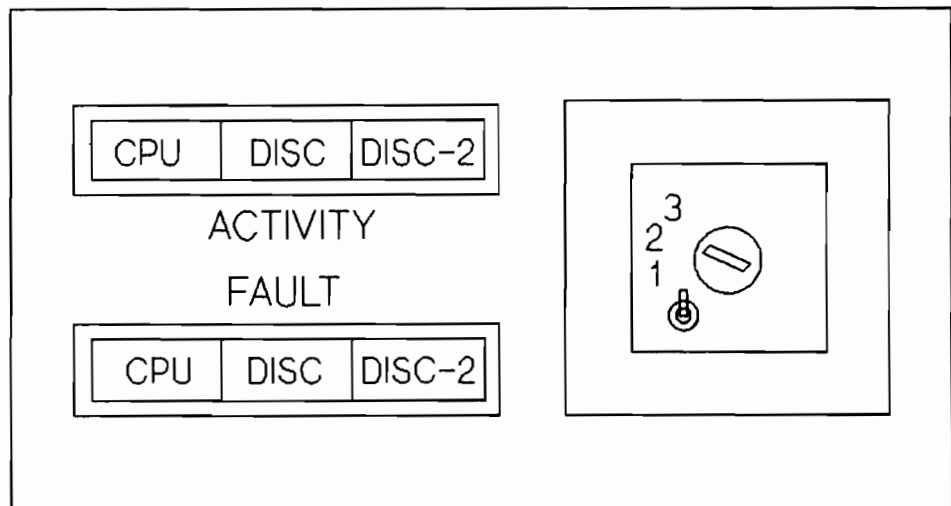


Figure 3-1. System Keyswitch and Indicator Lights

0--STANDBY MODE

In this position AC power is still supplied to the computer, but the processor, embedded discs and embedded cartridge tape drive are not running. DC power is off and battery power is off.

1--NORMAL MODE

Selecting 1 turns the computer on and initially lights all of the **ACTIVITY** and **FAULT** indicators on the system front panel.

These lights indicate that the computer self-test is executing.

2--LOCAL SERVICE MODE

Selecting this position allows the execution of individual self-test diagnostics when directed by qualified service personnel.

3--REMOTE SERVICE MODE

This position allows your HP service representative to run diagnostic tests on your HP MICRO 3000LX/GX via a modem (allows all console commands to be executed remotely).

CPU Activity and Fault Indicators

FAULT--the **FAULT** LED will be out during normal operation.

ACTIVITY--the **ACTIVITY** LED will be on or flash quickly when the computer is busy.

IDLE--the **ACTIVITY** LED will flash at a rate of one blink per second when the computer is idle (paused, waiting for instructions) if MPE is operational.

Disc Activity and Fault Indicators

FAULT--the **FAULT** LED will be out during normal operation.

ACTIVITY--the **ACTIVITY** LED will be on or flash quickly when the computer is busy.

Cartridge Tape Front Panel

The Cartridge Tape Drive front panel has an **UNLOAD** button, an **EJECT** button, a **Busy** lamp, a **Protect** lamp, and a **Fault** lamp. See figure 3-2.

The **Busy** lamp is lit when the tape drive is active.

The **Protect** lamp is lit when a write-protected cartridge has been inserted or after a write operation has been attempted to a tape which is nearing the end of its useful life.

The **Fault** lamp is lit when the drive or cartridge has failed.

Refer to Chapters 5 and 6 for more detailed information about cartridge tape drive maintenance and fault analysis.

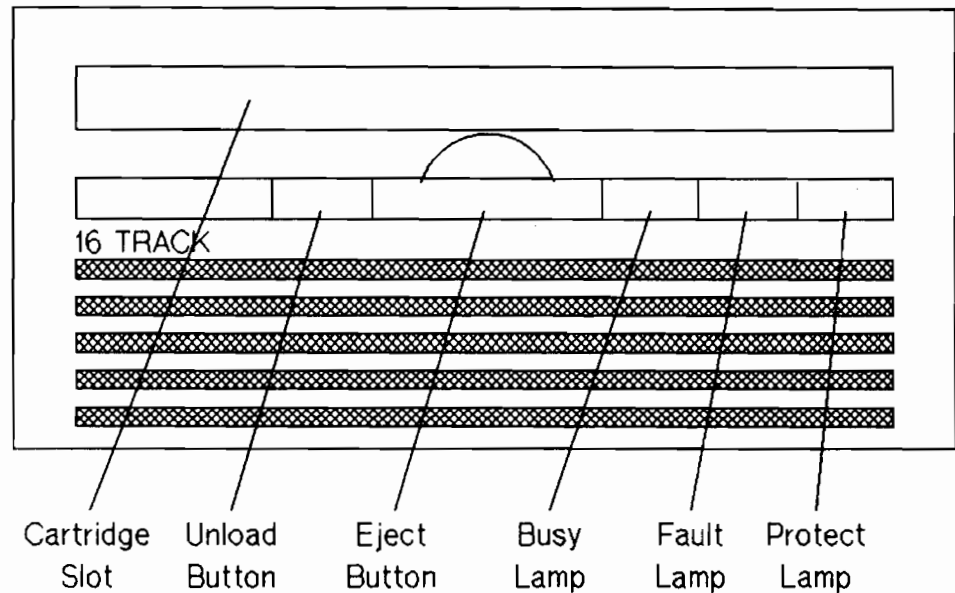


Figure 3-2. Cartridge Tape Drive

Power Control

The plug on the power cord is intended to serve as the disconnect device. To remove power from the HP MICRO 3000LX/GX, unplug the power cord.

System Self-test

The CPU, embedded discs, and embedded cartridge tape drive are tested by self-test when the following steps are performed.

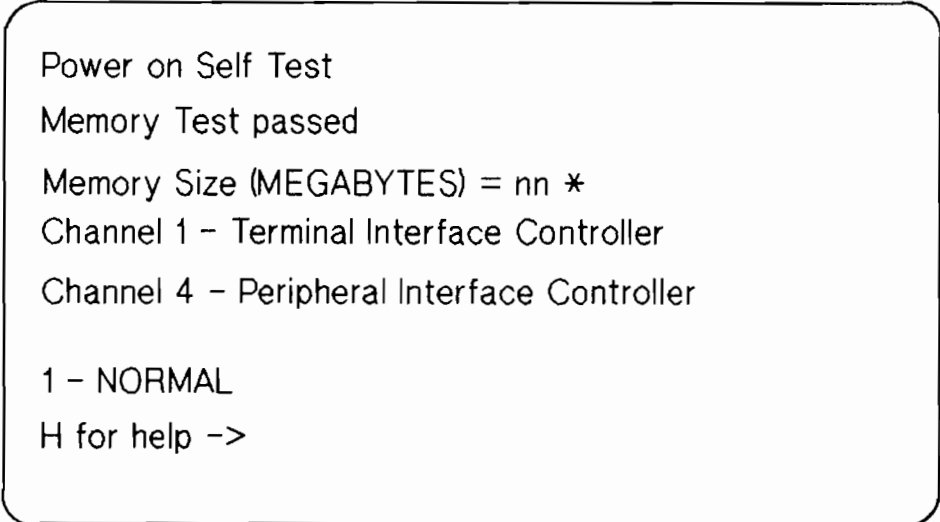
1. Check that the system power cord and any external peripheral power cords are connected to the AC power outlets. Check that the console power switch is ON.
2. Ensure that the console is in the REMOTE position. Move the keyswitch on the system from position 0 to position 1. This turns on system power and starts the system self-test. Self-test takes about 30 seconds for a 2-Mbyte system and about one minute for a 4-Mbyte system.

Check the following:

- A. The CPU ACTIVITY and FAULT indicators are lit;
- B. The DISC ACTIVITY and FAULT indicators are flashing;
- C. The DISC-2 ACTIVITY and FAULT indicators are flashing if a second disc is installed;
- D. The Cartridge Tape BUSY indicator is lit if a cartridge tape is installed.

When self-test has completed, the CPU ACTIVITY indicator, the DISC ACTIVITY indicator, the DISC-2 ACTIVITY indicator (if installed), are lit. All Cartridge Tape Drive indicators should be off.

The following screen is then displayed on the console:



```
Power on Self Test
Memory Test passed
Memory Size (MEGABYTES) = nn *
Channel 1 - Terminal Interface Controller
Channel 4 - Peripheral Interface Controller

1 - NORMAL
H for help ->
```

*nn = 2 or 4

Figure 3-3. Self-test Passed Display

At this point you can start the system from either a disc or tape. You will know that the start was successful when you receive the appropriate option response, for example "COOLSTART/WARMSTART".

Self-test from Console

The following specific tests allow you to run the individual portions of self-test.

You can start self-test in two ways.

1. You can run self-test as described in the paragraphs above,

OR

1. If the MPE operating system is running, you can perform an orderly system shutdown by simultaneously pressing the **CTRL** and **A** keys and typing SHUTDOWN.
2. Turn the keyswitch to position 2.
3. Type TEST on the console keyboard. You will see this menu displayed:

```
ROM Versions:

AL [ 1 ] [ count ]
CH [ an ] [ count [ ,chan ] ]
CP [ u ] [ count ]
E [ xit ]
I [ omap ] [ count ]
M [ emory ] [ count ]
PON [ count ]

2 - LOCAL ( from NORMAL )
Test ->
```

Figure 3-4. Diagnostic Display

4. The prompt Test-> is displayed at the bottom of the menu.

At this point, you can execute any or all of the tests.

Note



The information in the examples below will vary, depending on the configuration of the system.

CPU Test

Type CP.

The following information should be displayed:

```
TOC RAM
Addr Data
000E 00C2
000F 00F5
0010 000F
0011 0021
0012 0023
0013 0054
0014 00FF
0015 00FF
CPU test passed
```

If the system does not pass the CPU test, call your HP service representative.

I/O Map

Type I

A listing of the system I/O configuration will be displayed. This is not a system test.

System I/O Configuration

```
-----
Memory Size (MEGABYTES) = 4
Load:
Channel 4 Device 3
Start/Dump:
Channel 4 Device 1
-----
Channel 1 ID=4 - Terminal Interface Controller
-----
Channel 4 ID=2 - Peripheral Interface Channel
Device 1 ID=022E - HPIB peripheral device
Device 2 ID=022E - HPIB peripheral device
Device 3 ID=0260 - 9144 Cartridge Tape Unit
-----
```

Memory Test

Type M .

The following message is displayed if the system passes the test.

Memory Test passed

If this message is not displayed, call your HP service representative.

Channel Test

Type CH 1,4 .



The following message should be displayed:

Channel 4 -Peripheral Interface Channel
Test Passed
Count (hex)=0000

If the system does not pass the test, call your HP service representative.

Test All of System

Type ALL

The following information should be displayed:

```
TOC RAM
Addr Data
000E 00C2
000F 00F5
0010 000F
0011 0021
0012 0023
0013 0054
0014 00FF
0015 00FF
CPU test passed
Memory Test passed
```

```
Channel 1 -Terminal Interface Controller
Channel 4 -Peripheral Interface Channel
Test Passed
```

System I/O Configuration

```
-----
Memory Size (MEGABYTES) = 4
Load:
Channel 4 Device 3
Start/Dump:
Channel 4 Device 1
-----
```

```
Channel 1 ID=4 - Terminal Interface Controller
-----
```

```
Channel 4 ID=2 - Peripheral Interface Channel
Device 1 ID=022E - HP-IB peripheral device
Device 2 ID=022E - HP-IB peripheral device
Device 3 ID=0260 - 9144 Cartridge Tape Unit
-----
```

Notice that there is a CPU test passed message, a Memory Test passed message, and a Test Passed message following the I/O Channel messages. If the system does not display all of these Pass messages and the System I/O Configuration, call your HP service representative.

PON - Power-on Self-test

Type PON.

Entering the PON command starts the Power-on Self-test as if you had turned the keyswitch to position 1.

The following information should be displayed:

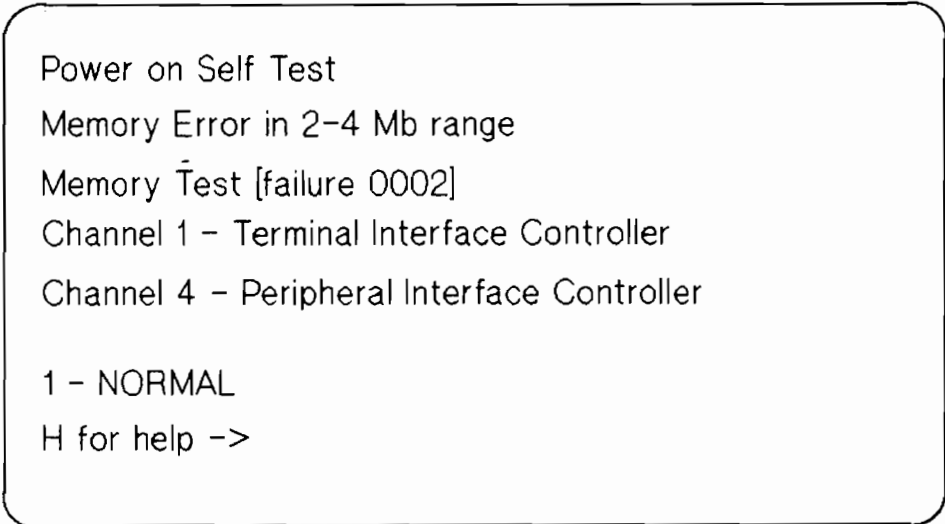
```
Power on Self Test
Memory Test passed
Memory Size (MEGABYTES) = 4
Channel 1 - Terminal Interface Controller
Channel 4 - Peripheral Interface Channel

1 NORMAL
H for help ->
```

Self-test Fault Analysis

SELFTEST FAILURE--If the FAULT indicator stays on or continually blinks while self-test is running, it means there is a problem that needs to be fixed. (Refer to table 3-1).

MEMORY FAILURE--If you get the message in figure 3-5, reconfigure the system for two megabytes, restart the system and call your HP service representative. You can continue to use the system until repairs are made.



```
Power on Self Test
Memory Error in 2-4 Mb range
Memory Test [failure 0002]
Channel 1 - Terminal Interface Controller
Channel 4 - Peripheral Interface Controller

1 - NORMAL
H for help ->
```

Figure 3-5. Self-test Failed Display

Table 3-1 shows the states of the CPU ACTIVITY and FAULT indicators. It also shows the associated interpretation and corrective action for the fault conditions.

Table 3-1. CPU Activity and Fault Self-test Indicators

ACTIVITY	FAULT	MEANING	ACTION
OFF	OFF	No AC input power No DC voltage CPU chip defective	Check that system is plugged in Call HP service representative Call HP service representative
OFF	ON CONTINUOUSLY	CPU or MEMORY failed	Call HP service representative
OFF	BLINKING	Illegal hardware configuration	Call HP service representative
OFF	FLASHING DOUBLE BLINK	ATP slot 3 failed SIMB slow-to-fast interface failed	Call HP service representative Call HP service representative
OFF	FLASHING TRIPLE BLINK	Console didn't speed sense	Console cable disconnected Console not in remote mode. Console misconfigured. Console cable defective or wrong cable. Console inoperative. Call HP service representative
ON	ON	System in battery back-up mode	Restore AC power
ON	OFF	Normal completion state	None

Note

If during normal operation a power failure occurs, both the **ACTIVITY** and **FAULT** indicators will light. This action indicates that battery power is retaining memory.

Table 3-2 shows the states of the **DISC** and **DISC-2** **ACTIVITY** and **FAULT** indicators. It also shows the associated interpretation and corrective action for the fault indicators.

Table 3-2. DISC and DISC-2 Activity and Fault Self-test Indicators

ACTIVITY	FAULT	MEANING	ACTION
ON	ON	On for 5 seconds at power-on while disc controller runs self-test and disc spins up. Both LEDs remain on if disc fails self-test.	None Call HP service representative
FLASHING	OFF	Disc being accessed by CPU	None
OFF	ON	Disc drive failed mechanism self-test.	Call HP service representative
ON	OFF	Disc drive is in a ready state	None

Cartridge Tape Self-test

The cartridge tape self-test checks the major assemblies in the cartridge tape drive. It displays the HP-IB address in the LEDs on the right side of the system cabinet rear panel. The LEDs, Display Selftest Results (DR) button, and Initiate Selftest button are shown in figure 3-6.

The cartridge tape self-test can be initiated in two ways:

1. by moving the system keyswitch from 0 to 1, or
2. by pressing the Initiate Selftest button.

If the selftest routine finds a fault, the front panel **Fault** lamp lights and remains lit until another self-test is initiated or the system is turned off.

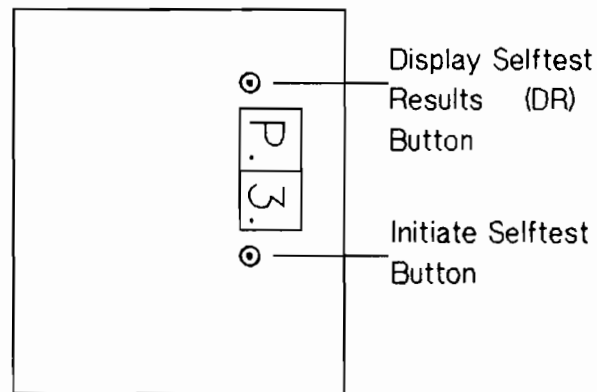


Figure 3-6. Cartridge Tape Drive Backpanel LEDs and Buttons

While the self-test is taking place, the LED displays on the upper right rear panel show the following sequence:

- A. Both displays are off.
- B. All segments are turned on for a moment **8.8.**
- C. The LEDs are turned off except for the decimal points.
- D. A pass or fail indication **P** or **F** shows in the upper display, with the HP-IB address 3 appearing in the lower display. For example **P.3.** indicates the cartridge tape drive passed self-test.

Fundamental Operating System

The MPE Fundamental Operating System (FOS) is installed on the embedded disc(s) at the factory and Autowarmstart is enabled.

Sample MPE Starting Sequence

This is an example of the display you see when the system is started.

```
Warmstart? (Y/N) y
*** Auto Warmstart ***
HP32033.02.04
** PERFORMING A WARMSTART **

**WARNING** AFTER THIS POINT DO NOT INTERRUPT THE STARTUP
PROCESS UNTIL AFTER THE MESSAGE " *WELCOME* " APPEARS

DIRECTORY MAINTENANCE COMPLETED
PART 1 OF 6 COMPLETED - MEMORY RESIDENT TABLES SET UP
PART 2 OF 6 COMPLETED - SL BINDING
PART 3 OF 6 COMPLETED - SYSTEM I/O PROCESS CREATION
PART 4 OF 6 COMPLETED - DRIVER LOADING
PART 5 OF 6 COMPLETED - DISC RESIDENT TABLES SET UP
PART 6 OF 6 COMPLETED - SYSTEM PROCESS CREATION
FRI, JAN 29, 1988, 8:47AM? (Y/N)
LOG FILE NUMBER 23 ON
*WELCOME*
8:49/14/SP#6/SPOOLED OUT
:HELLO OPERATOR.SYS;HIPRI
8:49/#S1/16/LOGON FOR: OPERATOR.SYS,PUB ON LDEV #20
HP 3000 / MPE V G.02.04 (BASE G.02.04). FRI, JAN 29, 1988,
file l;dev=lp
file t;dev=ctape
:
```

System Table Default Values

The default MPE system table sizes configured at the factory are listed in table 3-3.

Table 3-3. System Table Default Values

ITEM	CONFIGURED VALUES
MAX # OF OPEN SPOOLFILES	32
CODE SEGMENT TABLE	192
EXTENDED CST	512
DATA SEGMENT TABLE	384
PROCESS CONTROL BLOCK	96
INPUT/OUTPUT QUEUE	96
DISC REQUEST QUEUE	256
TERMINAL BUFFERS PER PORT	7
SYSTEM BUFFERS	16
SWAP TABLE	768
PRIMARY MESSAGE TABLE	96
SECONDARY MESSAGE TABLE	96
SPECIAL REQUEST TABLE	96
INTERRUPT CONTROL STACK	1024
LOADER SEGMENT TABLE	8192
UCOP REQUEST QUEUE	96
TIMER REQUEST LIST	96
BREAKPOINT TABLE	96
# OF USER LOGGING PROCESSES	6
USERS PER LOGGING PROCESS	32
# OF RINS	1024
# OF GLOBAL RINS	96
SECONDS TO LOGON	120
MAX # OF SESSIONS	32
MAX # OF JOBS	32
DEFAULT JOB CPU LIMIT	0
LOGGING EVENTS	all ON
LOG RECORD SIZE	2
LOG FILE SIZE	1023
DIRECTORY	1536
VIRTUAL MEMORY	32K / disc
SPOOLFILE K-SECTORS	128 default
SECTORS PER SPOOLFILE EXTENT	512
MAX # RUNNING PROGRAMS	256
MAX CODE SEGMENT SIZE	16384
MAX CODE SEGMENTS/PROCESS	128
MAX STACK SIZE	31232
MAX EXTRA DATA SEGMENT SIZE	32764
MAX EXTRA DATA SEGMENTS/PROCESS	255
STANDARD STACK SIZE	1200

MPE I/O Device Configuration Parameters

The MPE I/O device configuration parameters are listed in table 3-4. This is only a partial list of the supported device configurations.

Table 3-4. MPE I/O Configuration Parameters

DEVICE NAME	CHAN	TYPE	SUB TYPE	TERMINAL TYPE	SPEED	REC WIDTH	DRIVER NAME	DEVICE CLASSES
HP7961*	0	3	13			128	HIOMDSC2	DISC
HP7962*	0	3	14			128	HIOMDSC2	DISC
HP7963*	0	3	15			128	HIOMDSC2	DISC
HP9144	0	3	3			128	HIOCTAP1	CTAPE SDISC DDUMP
HPPCLATP**	0	32	14	***	240	66	HIOASLP0	LP
HPTERMATP	0	16	0	10	960	40	HIOTERM1	TERM

* The HP 7961/2/3 device names are also used for the HP 97961/2/3 M internal disc drives in the HP MICRO 3000LX and HP MICRO 3000GX.

** This configuration supports the following printers:

HP 2932A
 HP 2934A
 HP 2563A
 HP 2564B
 HP 2684A
 HP 2686A/D

*** Type TTPCL22.PUB.SYS for this entry.

Sample MPE I/O Device Configuration

An example of a typical MPE I/O device configuration is shown in table 3-5.

Table 3-5. Typical MPE I/O Device Configuration Parameters

LOG DEV #	DRT #	U N I T	C H A N	T Y P E	SUB TYPE	TERMINAL TYPE	WIDTH	OUTPUT DEV	MODE	DRIVER NAME	DEVICE CLASS
1	33	0	0	3	15		128	0		HIOMDSC2	DISC
7	35	0	0	3	3		128	0		HIOCTAP1	CTAPE
10	36	0	0	24	0		128	LP	JA	HIOTAPE0	DDUMP
20	8	0	0	16	0	10 960	40	20	JAID	HIOTERM1	JOBTAPE
21	8	1	0	16	0	10 960	40	21	JAID	HIOTERM1	TERM
22	8	2	0	16	0	10 960	40	22	JAID	HIOTERM1	TERM
23	8	6	0	32	14(TTPCL22)	120 66	26		S	HIOASLP0	LP
24	8	3	0	16	0	10 960	40	23	JAID	HIOTERM1	TERM
25	8	4	0	16	0	10 960	40	24	JAID	HIOTERM1	TERM
26	8	5	0	16	0	10 960	40	25	JAID	HIOTERM1	TERM
27	8	7	0	16	1	10 240	40	27	JAID	HIOTERM1	MODEM

PDP Port/MPE Unit Cross Reference

The Passive Distribution Panel (PDP) is located at the lower rear of the system cabinet. It is used to connect terminals and other peripherals to the HP MICRO 3000LX/GX.

The information below is contained in the I/O Configuration Display. Other essential information is included in the display.

Table 3-6 shows the relation between the recommended Logical Device number (LOG DEV), DRT number, UNIT number, and the associated PDP port for the five-port PDP.

Table 3-6. Five-Port PDP/MPE UNIT Cross Reference

LOG DEV #	DRT #	UNIT	PDP PORT
20	8	0	P0
24	8	4	P4
25	8	5	P5
26	8	6	P6
27	8	7	P7



Table 3-7 shows the relation between the recommended Logical Device number (LOG DEV), the DRT number, UNIT number, and the associated PDP port for the eight-port PDP.

Table 3-7. Eight-Port PDP/MPE UNIT Cross Reference

LOG DEV #	DRT #	UNIT	PDP PORT
20	8	0	P0
21	8	1	P1
22	8	2	P2
23	8	3	P3
24	8	4	P4
25	8	5	P5
26	8	6	P6
27	8	7	P7

Table 3-8 shows the relation between the recommended Logical Device number (LOG DEV), the DRT number, UNIT number, and the associated PDP port for the 16-port PDP.

Table 3-8. 16-Port PDP/MPE UNIT Cross Reference

LOG DEV #	DRT #	UNIT	PDP PORT
20	8	0	P0
21	8	1	P1
22	8	2	P2
23	8	3	P3
24	8	4	P4
25	8	5	P5
26	8	6	P6
27	8	7	P7
30	24	0	P20
31	24	1	P21
32	24	2	P22
33	24	3	P23
34	24	4	P24
35	24	5	P25
36	24	6	P26
37	24	7	P27

4

Using Tape Cartridges

This chapter covers:

- Cartridges and their care.
- Loading and unloading cartridges.
- Protecting cartridges from accidental erasure of data.

Cartridges and Their Care

Tape cartridges for the cartridge tape drive are available in two capacities:

Type L 67.1-Mbyte 600 ft. part no. 88140LC (box of 5)

Type S 16.7-Mbyte 150 ft. part no. 88140SC (box of 5)

When you receive cartridges, they are in hard plastic cases wrapped in cellophane. You should always store cartridges in their plastic cases when they are not in use.

The two types of cartridge listed above are formatted and certified at the factory before you buy them.

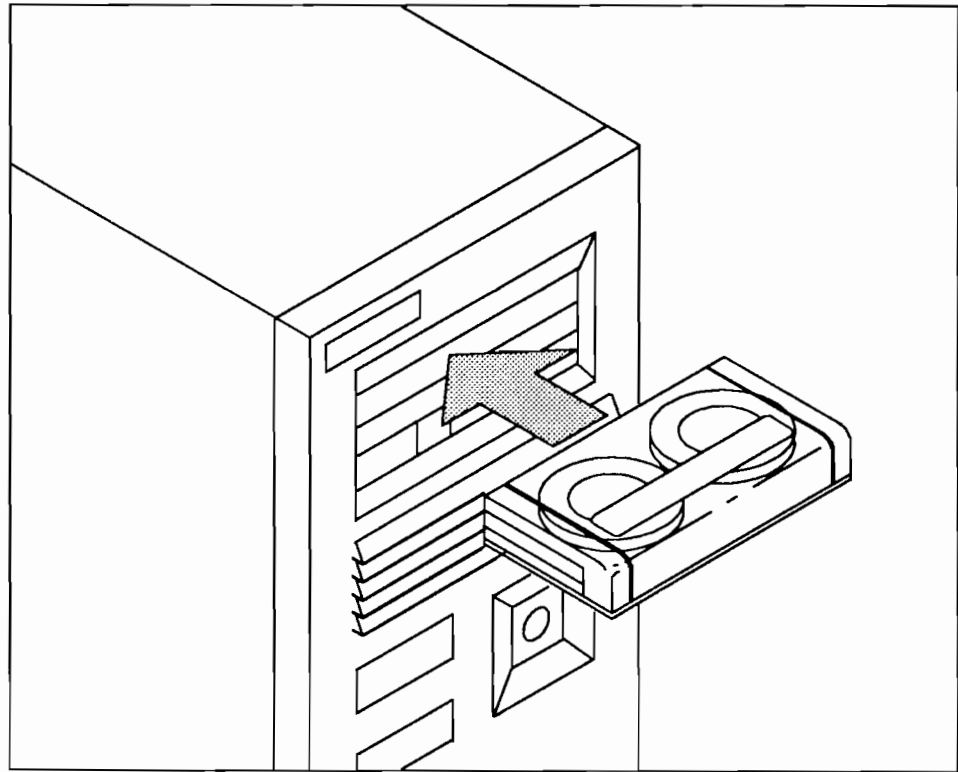
Looking After the Cartridges

In addition to the following guidelines, please see *Appendix A* for guidelines about conditions where the temperature varies.

- Do not touch the tape, or attempt to clean the tape path or tape guides inside the cartridge.
- Do not leave cartridge tapes in excessively dry or humid conditions.
- Do not leave tapes in direct sunlight or in places where magnetic fields are present (e.g. under telephones, near transformers, motors etc.).
- Do not drop cartridges or handle them roughly.
- Do not stick extra labels onto cartridges; they could cause the cartridges to jam in the tape drive.
- Store cartridges in their plastic cases when not in use.
- Always keep the cartridges in a clean environment.
- To prevent overwriting data stored on the cartridge, use the

write-protect switch on the cartridge. See *Write-Protecting Cartridges*, later in this chapter.

Loading and Unloading the Cartridge



LG200076_001

Figure 4-1. Inserting the Cartridge

Inserting the Cartridge

Insert a cartridge into the cartridge slot with the label saying **CERTIFIED DATA CARTRIDGE** facing upwards.

When a cartridge is inserted, the load sequence begins. The load sequence takes 1 minute 15 seconds for a 16.7-Mbyte cartridge, or 2 minutes 25 seconds for a 67.1-Mbyte cartridge.

Initializing

Initializing sets up a volume label and file directory on the tape. You **MUST** initialize a cartridge before you use it for the first time. Refer to the *System Operation and Resource Management Reference Manual*, P/N 32033-90005, for more information.

Caution



Once data has been stored on a tape, initializing the tape a second time will destroy the data.

A cartridge tape is also considered to be a serial disc. Initialize a cartridge tape as follows:

1. Install a tape in the cartridge tape drive.

The following information is displayed:

```
:  
8:51/7/Vol (unlabelled) mounted on LDEV# n  
8:51/7/SERIAL DISC ON LDEV# n
```

2. Enter:

`DOWN n`, where `n` is the LDEV number.

`VINIT`

The following is displayed:

```
VINIT G.02.B0 (C) HEWLETT-PACKARD CO., 1978
```

3. Enter:

`>FORMAT n`

The following is displayed:

```
A SERIAL DISC WITH GENERATION = 0  
TO BE FORMATTED ? (Y/N) Y  
Format Retaining All Spares
```

4. Enter:

`>SERIAL n`

`>EXIT`

The following is displayed:

```
END OF SUBSYSTEM
```

5. Enter:

`>UP n`

Removing the Cartridge

- A. Press the Unload button.

This starts a sequence which unlocks the cartridge to allow you to remove it. The unload sequence takes about two and a half minutes for a 67.1-Mbyte cartridge or about one and a half minutes for a 16.7-Mbyte cartridge.

During the unload sequence the **Busy** lamp is illuminated. Towards the end of the sequence the tape drive can produce a clattering sound which lasts for two or three seconds; this is normal, and indicates that the tape drive has unlocked the cartridge.

After the **Busy** lamp goes out...

- B. Press the EJECT button and remove the cartridge.
C. Store the cartridge in its plastic case after use.

Write-Protecting Cartridges

If you want to protect the data on a cartridge from being altered or overwritten you can write-protect the cartridge.

To write-protect a cartridge, rotate the write-protect switch with a screwdriver or coin until the arrow points towards the word **SAFE**. The switch clicks into place when it is in the correct position.

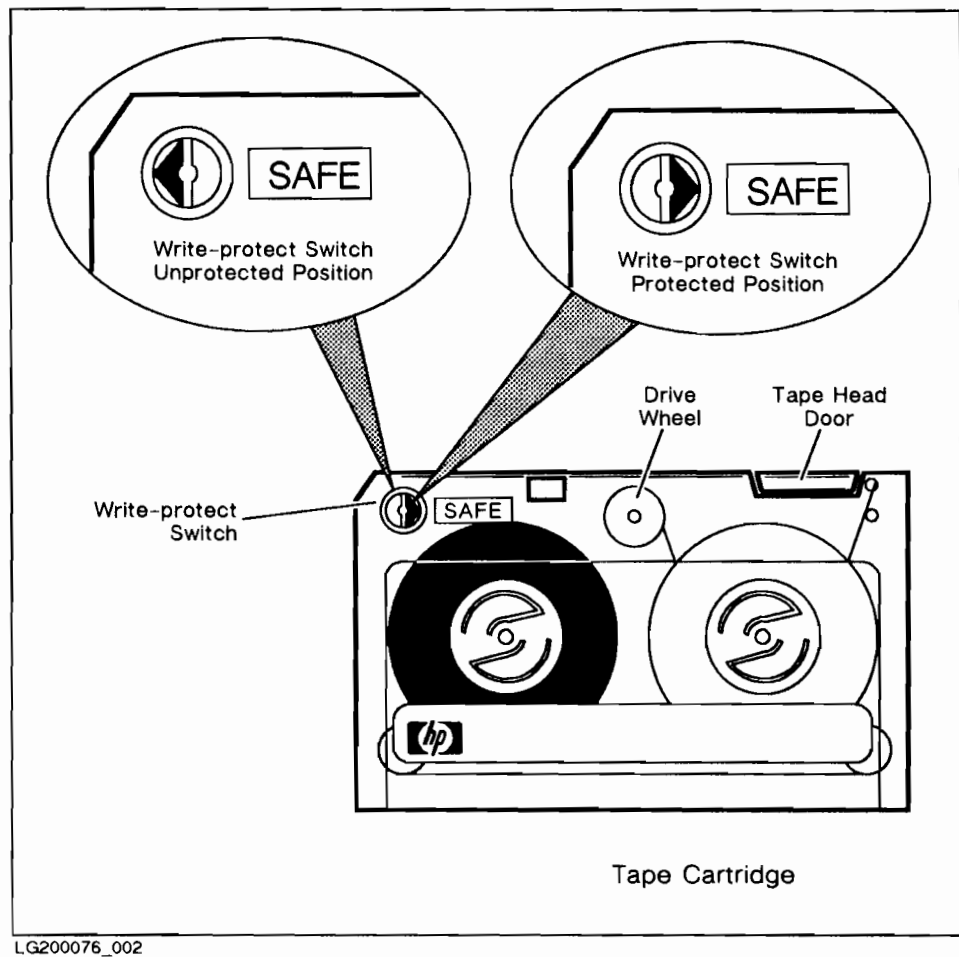
If a cartridge is write-protected, the **Protect** lamp will light when the cartridge is inserted into the drive.

Caution



When changing the position of the write-protect switch, make sure that the switch clicks into position with the arrow pointing directly towards or away from the word **SAFE**. If the switch is left in any other position it can damage the tape drive.

Write-protection will not prevent a cartridge being erased by bulk-erasure or degaussing.



LG200076_002

Figure 4-2. Write-Protecting a Cartridge



5

Cartridge Tape Drive Maintenance

This chapter covers:

- How the cartridge tape drive monitors the condition of your tape cartridges.
 - Cartridge Tape Load Verification
 - Cleaning the tape head.
-

Caution



There are no user-serviceable parts in the cartridge tape drive. Service must be carried out by Trained Service Engineers.

Media Monitor

The cartridge tape drive monitors the condition of your tape cartridges.

If the **Protect** lamp flashes at the end of an unload sequence (when the **Busy** lamp goes out) this means that the tape is nearing the end of its useful life.

When the **Protect** lamp flashes ...

- A. Copy the data from the existing cartridge onto disc.
- B. Copy the data from the disc onto a new cartridge.
- C. Discard the old cartridge.

Cartridge Tape Load Verification

Note



If the tape drive passes all the cartridge tape self-test and there is a cartridge in the drive, the load sequence starts.

If a cartridge is not in the drive and a pass condition is indicated, the next step is to insert a cartridge.

When a cartridge is inserted, the read and write part of the cartridge tape

self-test sequence is performed. If the cartridge is write-protected, only the read part of the cartridge tape self-test is done.

If the **Fault** lamp lights, but the LED display on the rear panel of the system cabinet shows a Pass condition, the most likely problem is a faulty tape cartridge. Try another tape cartridge to see if the **Fault** lamp lights again.

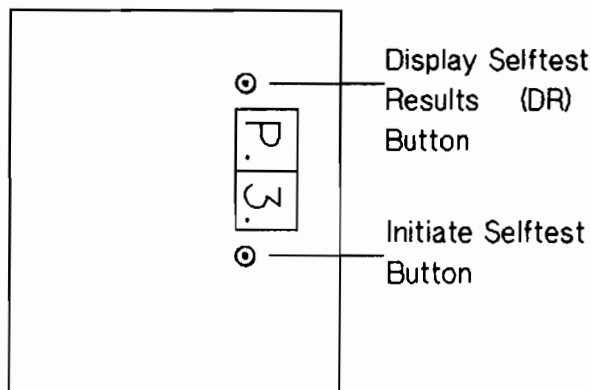


Figure 5-1. Cartridge Tape Drive Backpanel LEDs and Buttons

If your cartridge tape drive fails the cartridge tape load verification, it is possible to find out what has gone wrong by using the DR (Display SelfTest Results) push-button on the rear panel. Refer to figure 5-1.

For example:

If the LED display shows **F.3.** (Failed with HP-IB address 3). . . .

Press the DR button with the tip of a ball-point pen or similar object.

The LED display will then indicate which part of the tape drive has failed the self-test.

If, after pressing the DR button, **A.4.** is displayed, this means that the tape head is probably dirty. Clean the head and try the self-test again with a new tape cartridge.

If pressing the DR button gives any other display, contact your HP service representative, who will interpret the results and take the appropriate action.

Cleaning the Tape Head

HOW OFTEN?

The tape head needs to be kept clean, and should be cleaned....

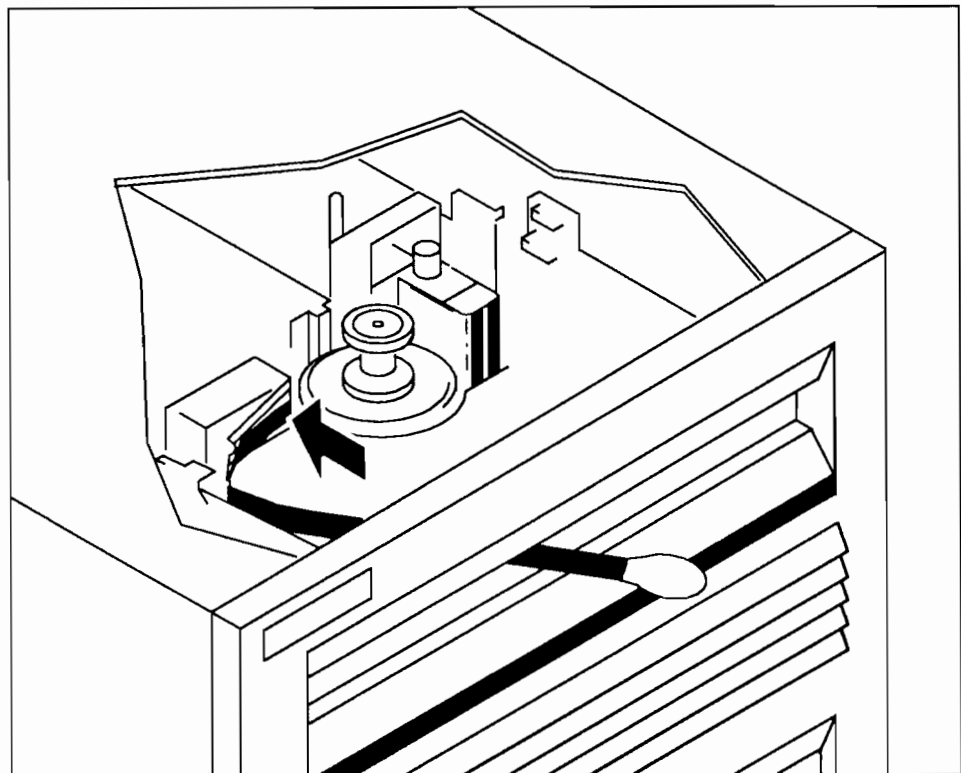
- At least once a week.
- After using a new cartridge for the first time.

- After every three backup operations using the 67-Mbyte (600 ft.) data cartridges.
- After every ten backup operations using the 16-Mbyte (150 ft.) data cartridges.
- Most importantly, if data errors are experienced.

How Do I Clean the Tape Head?

- A. Switch the tape drive on.
- B. Depress the cartridge-in switch with a cleaning swab, which causes the tape head to rise.

The cartridge-in switch is the lower of the two micro-switches at the back of the cartridge slot towards the left side. See figure 5-2.



LG200076_003

Figure 5-2. Depressing the Cartridge-in Switch.

Caution

Take care not to press the switch in for too long. After about four seconds the load sequence starts. If this happens, turn the system off to stop the load sequence, then turn it back on and start again.

- C. Pour a small amount of cleaning fluid into a clean container, such as a small UNWAXED paper cup.

Dip a cleaning swab into the fluid.

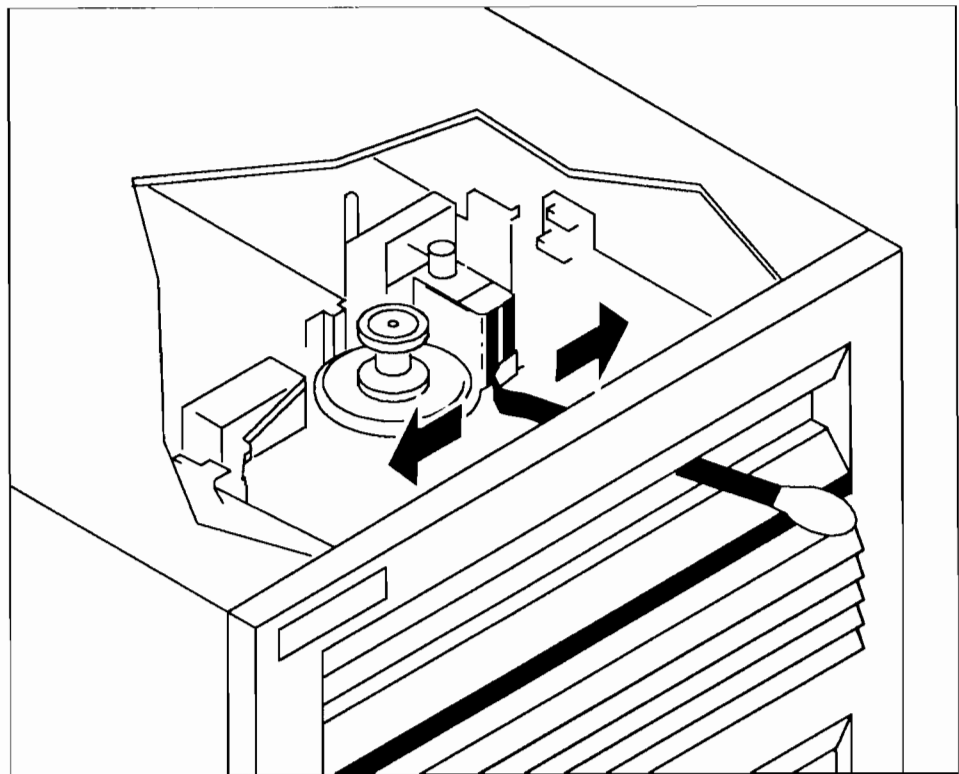


HP ONLY supports the use of LIQUID FREON TF (a Trademark of Dupont Corporation) as a tape path cleaning solvent. DO NOT USE ANY OTHER SOLVENT.

Freon TF dissolves wax. If a waxed cup is used, the wax will be transferred to the tape path.

- D. Applying gentle pressure, clean the following surfaces

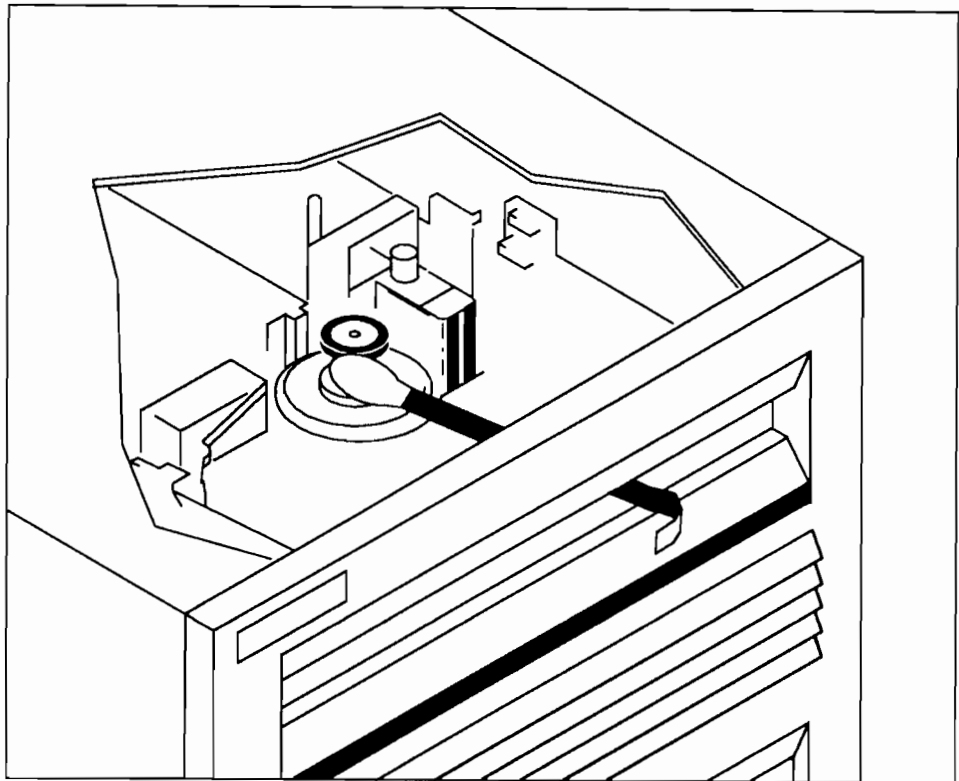
- The Tape Head (clean from side to side, NOT up and down)



LG200076_004

Figure 5-3. Cleaning the Tape Head.

- The Capstan (the black rubber drive wheel)



LG200076_005

Figure 5-4. Cleaning the Capstan.

- E. Throw away the swab after use.
- F. Load a cartridge in the normal way, the load sequence will automatically reset the position of the tape head.
- G. Press the Unload button to start the unload sequence. When the **Busy** lamp goes out, press the EJECT button to remove the cartridge.

The tape drive is now ready for use.

Using the Cleaning Cartridge

Tape head cleaning is simpler if you use the head cleaning cartridge kit (HP 92193E) which includes a cleaning cartridge, cleaning fluid and replaceable cleaning pads. Full instructions are provided with each kit.

Tape Drive Problems and Solutions

What if the **Fault lamp remains illuminated?**

This means that the tape drive has failed the self-test.

Take the following action:

- A. Turn off the system DC power by turning the keyswitch to 0.
- B. Then turn the keyswitch to 1.

This repeats the tape drive self-test. The **Fault** lamp will light again if the self-test detects an internal error.

- C. If the tape drive still fails the self-test (the **Fault** lamp lights), contact your HP service representative.

What if the AC power fails with a cartridge in the tape drive?

If the AC power fails, the tape cartridge is locked into the drive until power is restored and you press the Unload button.

Take the following action:

- A. Wait for power to be restored.
- B. When the **Busy** lamp goes out, press the Unload button.
- E. When the **Busy** lamp goes out again, press the EJECT button and remove the cartridge.

What if the tape cartridge will not come out of the drive?

When the tape head is raised (for cleaning or reading the tape), the EJECT button is locked. If a cartridge is inserted into the drive with the tape head raised, it becomes locked in the drive. The only way to lower the tape head is to go through an unload sequence.

If you have just cleaned the tape head, insert a tape cartridge to begin the load sequence. Press the Unload button to start the unload sequence. When the **Busy** lamp stays off, you can remove the tape cartridge by pressing the EJECT button.

What do I do if the **Fault lamp lights when I put in a cartridge and the EJECT button is unlocked?**

This indicates a dirty tape head or a bad tape cartridge. Clean the head and try a new cartridge. If the problem continues, call your HP representative.

What if I get an error message saying:

TAPE OR DISC ERROR READING DRIVE _____

Your tape cartridge is probably worn or damaged. Try using other tapes to see if you get the same message. If you receive the message on only one tape cartridge, copy the tape immediately and discard the old one. (Please note that if the tape is worn or damaged, the copy might not work.)

If you get the same message with several tapes, contact your HP representative.

What if the computer displays a message saying

NO TAPES OR DISCS WERE FOUND... or

NO MASS STORAGE FOUND... or

TAPE OR DISC DRIVE IS EMPTY... or

TAPE OR DISC DRIVE IS OFF... or

TAPE OR DISC DRIVE IS UNDEFINED... ?

- A. Ensure that the **Fault** lamp is OFF.
- B. Ensure that there is a tape cartridge in the drive.
- C. Ensure that the tape cartridge has been initialized.
- D. Check that the LED display on the system rear panel shows **P3**, indicating a self-test pass and an HPIB address of 3.
- E. If all these things are correct, the cartridge itself might be faulty. Try using another tape cartridge.

How can I destroy or remove data from a cartridge?

Use the **Initialize** or **Format** command from your computer. This will destroy all the data on the cartridge, but leave the formatting blocks. Do NOT erase, bulk-erase, degauss your cartridge tapes, or otherwise destroy the formatting blocks, which would leave the cartridge useless.

A

Cartridge Guidelines

One of the advantages of cartridge tapes is that they are portable. Because of this, they may be exposed to rapid changes in environmental conditions. The guidelines in this appendix are recommended so that your HP 9144S Cartridge Tape Drive will continue to perform reliably and you can be confident of a high standard of data integrity.

Cartridge Specifications

The ANSI X3.55 - 1982 specification applies to the cartridge tapes used in an HP 9144S Cartridge Tape Drive. In part, this states:

Temperature. . . . 41 deg F to 113 deg F (5 deg C to 45 deg C)

Relative Humidity. . . . 20% to 80% non-condensing

Maximum Wet Bulb Temperature. . . . 79 deg F (26 deg C)

The cartridge shall be conditioned by exposure to the operating environment for a time equal to or greater than the time away from the operating environment (up to a maximum of 8 hours). If a user of a data cartridge knows or suspects that the cartridge has been exposed to a drop in temperature exceeding 30 deg F (16.7 deg C) since last used, it is recommended that the cartridge be rewound one complete cycle on the tape transport before it is used for data interchange.

This specifies the normal operating limits for cartridges, but does not clarify restrictions relating to changing conditions within those limits.

Hewlett-Packard has tested cartridges in order to determine conditions for reliable data recovery after temperature changes. Stable conditions will obviously help to ensure data integrity, but where they are not possible, the following precautions are recommended.

Format and Density

Encoding Technique:	MFM
Speed:	60 inches/sec reading and writing 90 inches/sec searching
Bit Density:	10,000 bits/inch (bpi)
Maximum Sustained Transfer Rate:	34 Kbytes/sec

Capacity

Bytes/Frame:	256
Frames/Block:	6 (4 blocks for user data - 2 blocks for error correction)
Tracks/Tape:	16
User Blocks/Track	
88140SC:	1024 maximum
88140LC:	4096 maximum

Temperature

Cartridges should only be used at temperatures between 5 deg. C (41 deg. F) and 40 deg. C (113 deg. F). You can, However, store them between -40 deg. C (-40 deg. F) and 40 deg. C (113 deg. F). If you store them at a temperature less than the lower operating limit (5 deg. C), you should stabilize them by leaving them in the operating temperature for eight hours before using them.

Similarly, if a cartridge is exposed to temperatures outside the operating limits, you should stabilize it for a time equal to the time it was outside the limits, up to a maximum of eight hours. So, for example, if the cartridge has been left in a car standing in bright sunlight for an hour, stabilize it for an hour.

To avoid temperature problems, observe these guidelines:

- Do not place the HP MICRO 3000LX/GX near the flow of air from a heater or air conditioner. The cycling of the heater or air conditioner can cause data recovery problems.
- Do not place the HP MICRO 3000LX/GX near a door which is often used, and which separates different temperature conditions. If the computer is placed near an outside door, for example, the blast of hot or cold air when the door is opened can affect data recovery.
- Avoid leaving cartridges in severe temperature conditions, for example in a car standing in the cold overnight.
- Avoid transferring data (reading from and writing to cartridges) when the temperature is changing by more than 3 deg. C per hour.

B

Supplies & Accessories

It is advisable to keep a supply of cartridges and cleaning materials in stock at all times. The following HP products are recommended for use with the HP 9144S Cartridge Tape Drive. They are listed with their part numbers:

Cartridges

16.7-Mbyte (150 ft.) Cartridge, formatted and certified (Box of 5), part no. HP 88140SC

67.1-Mbyte (600 ft.) Cartridge, formatted and certified (Box of 5), part no. HP 88140LC

Cleaning Supplies

Tape Head Cleaner, 6 x 4oz bottles, part no. HP 92193X

Foam Swabs (10 per packet) wooden shaft, part no. 9300-0468

Foam Swabs (10 per packet) plastic shaft, part no. 9300-0767

Lint-Free Wipes, part no. HP 92193W

Magnetic Head Cleaning Kit, part no. HP 92193H

Kit Contents:

2 x 4oz bottles of Tape Head Cleaner

50 Lint-Free Wipes

10 Foam Swabs with plastic shafts

1 easy-pour dispensing cap



Cleaning Accessories

Cleaning Cartridge Kit, part no. HP 92193E

Cleaning Cartridge Replenishment Kit (Foam pads and Cleaning fluid), part no. HP 92193P

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HP 3000 Computer Systems

HP MICRO 3000LX/GX
User's Manual

32520-90003 April 1988

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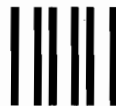
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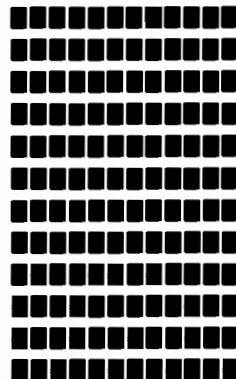
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