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*Professional*TM
325/350

Pocket Service Guide

Digital Equipment Corporation

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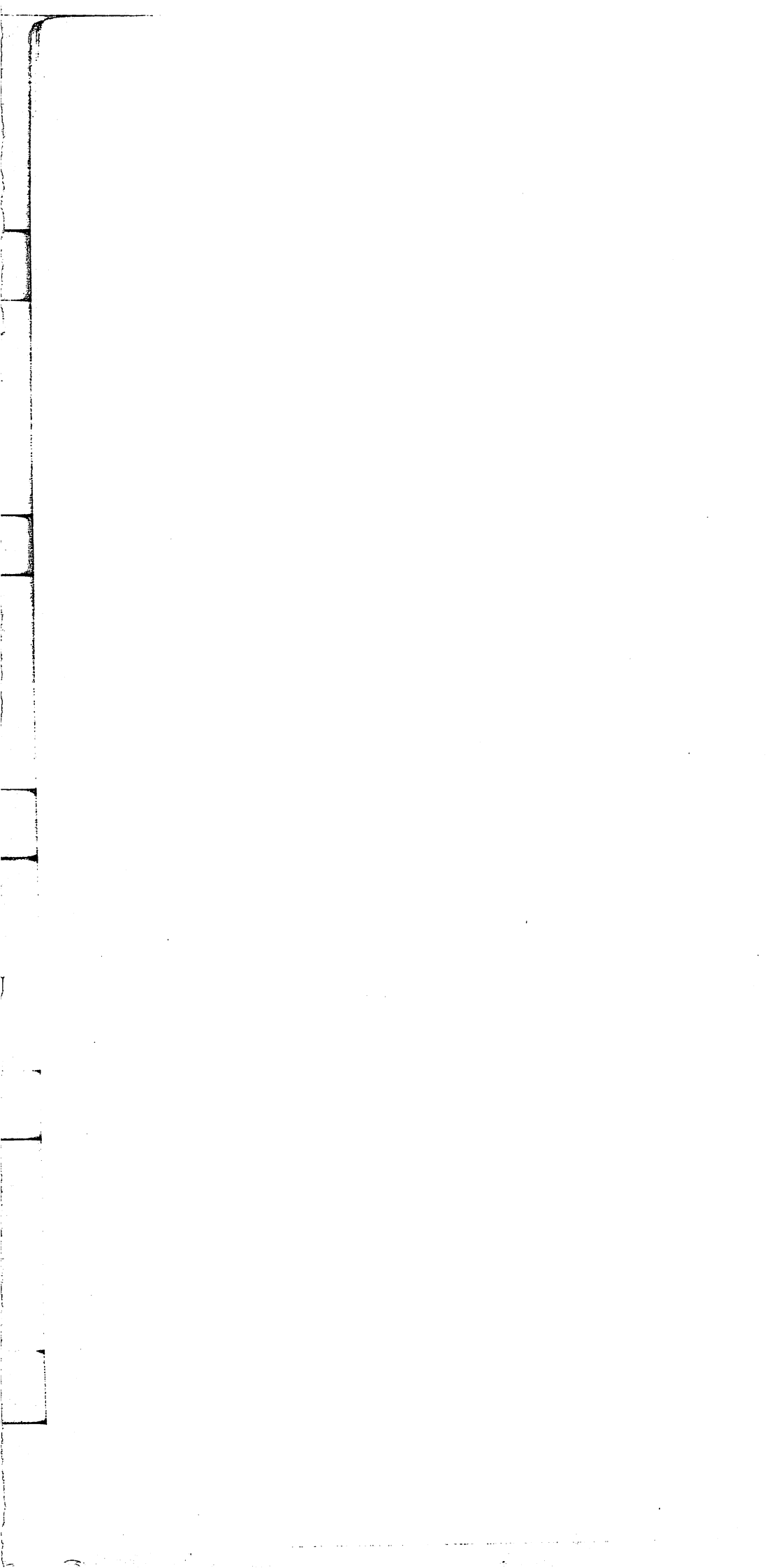
A RELATED DOCUMENTATION**B FRU EXPLODED VIEW DRAWINGS****C PHYSICAL/FUNCTIONAL DIAGRAMS**

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INTRODUCTION

PURPOSE

This pocket service guide describes the following topics for the Professional 325 and 350 systems.

- Troubleshooting to the field replaceable unit (FRU)
- FRU removal and replacement
- Monochrome monitor adjustments

NOTES, CAUTIONS, AND WARNINGS

Notes, Cautions, and Warnings appear throughout the pocket service guide. Their definitions are as follows.

- Note** Contains general information you should know.
- Caution** Contains information to prevent damage to the equipment and software.
- Warning** Contains information to prevent personal injury.

TOOLS REQUIRED

You need the following tools to service the Professional 325 and 350 systems.

Tool	Part Number
Volt ohmmeter (VOM)	29-13510-00
1/4-inch slotted screwdriver	29-10983-00
No. 2 phillips screwdriver	29-11005-00
Keycap removal tool	74-27314-01
Hex-core alignment tool	29-23190-00
Video alignment template	29-24371-00
Color bar chart	29-24661-00
Screen cleaner	29-24791-00

1.2 TROUBLESHOOTING WITH TESTS

The Professional computer has a series of internal power-up self-tests and a diskette containing additional maintenance test programs. These tests help you isolate failures to the FRU. If a test indicates a failure, adjust or replace the FRU indicated by the test. When you adjust or replace an FRU, perform all tests to ensure correct system operation.

1.3 POWER-UP SELF-TEST

The Professional computer has an internal power-up self-test that checks all major system components. The self-test also determines what options are present and if each option can operate correctly. The self-test runs automatically every time you turn on system power.

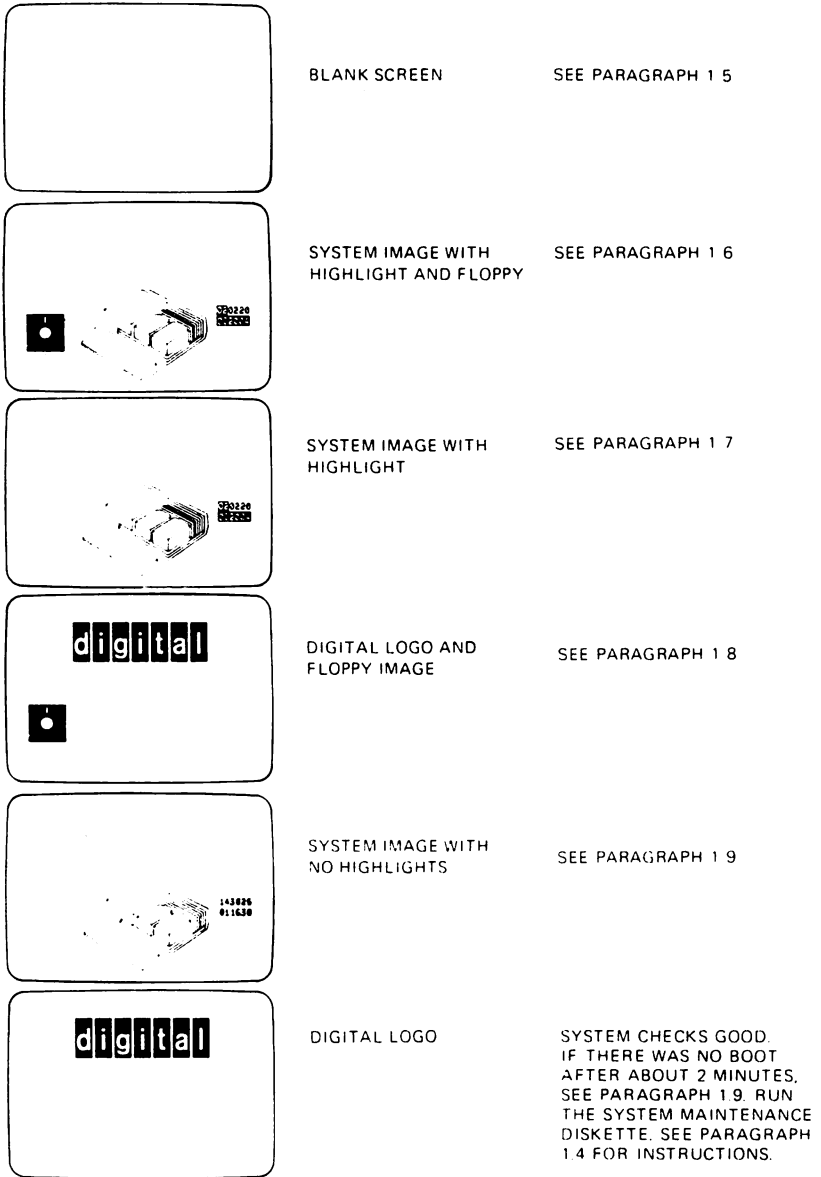
The results of the power-up self-test appear as a graphic display on the screen. These displays let you quickly identify power-up problems. Figure 1-1 shows these displays and directs you to the correct troubleshooting procedure.

CAUTION

Turn off or disconnect any equipment attached to the real-time interface, if installed, before turning on the system. Let the power-up self-test run to completion before turning on the equipment attached to the real-time interface.

1.4 MAINTENANCE SERVICES TESTS

The Professional system comes with a maintenance diskette. The *maintenance application diskette* contains a complete set of test programs. You can run the diskette as an application on the diskette based operating system. Press the **Help** key for information about maintenance services and the tests.



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Figure 1-1 Power-Up Troubleshooting Diagram

1.4.1 Running the Maintenance Application Diskette

You can run the maintenance application diskette on a diskette or hard disk based system with the following procedure. The diskette runs only on the Professional operating system (P/OS).

NOTE

If you are using a Professional 300 computer without mass storage that loads its operating system from a central file server, you must first install a diskette drive and controller. See Paragraph 2.4, RX50 Diskette Drive, and Paragraph 2.12, I/O Boards, for removal and replacement instructions.

CAUTION

Turn off or disconnect all equipment attached to the real-time interface, if installed, before running tests. Let the tests run to completion before turning on equipment attached to the real-time interface.

1. Turn power off.
2. Remove any diskette(s) in the drives.
3. Insert the P/OS system diskette in drive 1.
4. Turn power on.
5. At the prompt, insert the maintenance application diskette in drive 1, the test diskette in drive 2, and press **Resume**.
6. Select the test(s) you want to run.

1.4.2 Customer Mode and Service Mode

You can use the maintenance application diskette in two modes, customer mode and service mode. Customer mode contains seven tests and programs.

- System unit test
- Keyboard test
- Printer test
- Configuration display program
- Bar pattern program
- Update maintenance services
- Bigdisk block check

The system always enters customer mode when you select the maintenance services menu.

Service mode allows you to run all or part of the system unit test. You can also repeat each test automatically. Service mode has eight tests and programs.

- System unit test
- Keyboard test
- Printer test
- Configuration display program
- Bar pattern program
- Video alignment pattern program
- Update maintenance services
- Bigdisk block check

The system enters service mode only after you type the correct key sequence on the keyboard.

The following paragraphs describe the use of each test in both modes. The keyboard key test, printer test, and bar pattern program are the same for both modes. The update maintenance services program allows you to add test programs for new options; it is also the same in both modes. The video alignment pattern program works only in service mode.

1.4.3 System Unit Test

This is a general test for all system unit components. The system unit test has six sections.

Diskette drive checks the drive read/write circuits.

Hard disk checks the drive read/write circuits. This test is only for systems with a hard disk drive.

Printer port internally loops back the system printer circuits. This test does not send data to the printer.

Floating point processor checks the floating point processor chip.

Communications port internally loops back the system communications circuits. This test does not send or receive data.

All other options tests each option connected to the system and those that have had their test added with the update maintenance services program.

The system unit test works in customer and service mode.

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1.4.3.1 Running the System Unit Test in Customer Mode – Run the system unit test in customer mode as follows.

1. Select the maintenance services menu.
2. When the maintenance services menu appears on the screen, select the system unit test with the cursor keys.
3. Press the **Do** key.
4. The test runs for about 2-1/2 minutes. While the test is running, the following message appears on the screen.

```
SYSTEM UNIT UNDER TEST
                XX
```

In the upper-left corner the word *working* flashes. As the test runs, the number *XX* counts down to 0.

5. A test summary appears at the end of the test.

1.4.3.2 Running the System Unit Test in Service Mode – Run the system unit test in service mode as follows.

1. Select the maintenance services menu. Press **Do**.
2. Press the **F12**, **F19**, and **F5** keys in that sequence. This places the test in service mode.
3. When the maintenance services menu appears on the screen, select the system unit test with the cursor keys. Press **Do**.
4. Select the test or tests you want to run. If you want to run loopback tests, be sure the printer and communications port loopback connectors are installed before running that test. Press **Do**.

NOTE

Individual system option tests appear on the menu only if that option is in the system and its test has been added with the update maintenance services program. See Paragraph 1.16 for information about tests for specific options.

5. From the new display, select either a single or multiple test pass. If you select multiple passes, press **Interrupt** and **Do** to stop the test early. Make at least two complete passes for accurate results. While the test is running, a summary of the components being tested and their current status appears on the screen.

1.4.3.3 System Unit Test Results – The system unit test displays its results on the screen. Press **Help** for more information and corrective action you can take if errors have occurred. Press **Exit** to return to the maintenance services menu.

1.4.4 Keyboard Test

This test lets you verify that each key on the keyboard is working correctly.

NOTE

For this test to operate correctly, the keyboard must be set for United States/Canada (LK201-AA). If you have a different setting, first enter set-up mode (press Set-Up), move the cursor to Change Keyboard, and press Do. Remember to return the correct setting to your keyboard when you finish.

1.4.4.1 Running the Keyboard Test – Run the keyboard test as follows. The keyboard test is the same in customer and service mode.

1. Select the keyboard test with the cursor keys.
2. Press **Do**.
3. Wait about 5 seconds for the keyboard diagram to appear on the screen.
4. Press each key on the keyboard at least twice. The first time you press a key, the corresponding key on the diagram should change color. The second time, the key should return to the original color.

NOTE

The keys marked X cannot be tested.

5. Press **Exit** five consecutive times to end the program and return to the maintenance services menu.

1.4.4.2 Keyboard Test Results – The keyboard diagram tells you if a key has failed. The test indicates a key failure when you press a key and the corresponding key on the diagram does not change color. If the test finds a bad key, replace the keyboard.

1.4.5 Printer Test

This test lets you send data to the printer.

1.4.5.1 Running the Printer Test – Run the printer test as follows. The printer test is the same in customer and service mode.

1. Make sure the printer's power is on and the controls are set to match the system. Refer to the printer's pocket service guide for controls.
2. Select the printer test with the cursor keys.
3. Press **Do**.
4. Wait about 15 seconds for the test to print a short pattern on the printer and the screen. The pattern is less than a page long.
5. Press **Resume** to return to the maintenance services menu.

1.4.5.2 Printer Test Results – The pattern on the screen should match the pattern printed on the printer. Refer to Paragraph 1.12 if the printer does not print the same pattern or does not print at all.

1.4.6 Configuration Display Program

This program lists the components connected to the system. Use the configuration display program to determine what modules are connected to the system, the system identification (ID) number, and service information. This test works in customer and service mode. However, in service mode, it shows additional data.

1.4.6.1 Running the Configuration Display Program in Customer Mode – Run the configuration display program in customer mode as follows.

1. Select the configuration display program with the cursor keys.
2. Press **Do**.
3. Wait about 5 seconds for the screen display. (See the following example.)
4. Press **Resume** to return to the maintenance services menu.

*Typical Screen Display**

Identification number: 000000155069
 Duty Cycle Start Date: 2 May 83
Cumulative P/OS Run Time: 954 hours

System Module:

Keyboard interface
 Communication interface
 Printer interface
 Clock
 Processor
 Memory management
 Floating point adapter

512 kilobytes of memory (system total)

Option slot 1: Hard disk x megabyte --
(xxxx read/writes)
 Option slot 2: Diskette controller --
(xxxxx read/writes)
 Option slot 3: Video controller
 Option slot 4: Extended bit map
 Option slot 5: Memory module 256 kilobytes
 Option slot 6: EMPTY

Keyboard LK201 -- (xxxxx keystrokes)

The Identification number is the system identification number programmed into the system.

The Duty Cycle Start Date and Cumulative P/OS Run Time appear only in service mode and only if the duty cycle has been set.

System Module lists all standard and optional equipment connected to the system. In this case, the system has the standard printer, communications, and keyboard interfaces; processor; memory management; and clock. The floating point adapter and 512K bytes of memory are also connected.

Option Slot lists the boards connected to the system along with the location of each board. The number of read/writes performed by the disk drives appears only in service mode.

Keyboard shows the type of keyboard connected to the system. The number of keystrokes appears only in service mode.

* The underlined information appears only in service mode.

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1.4.6.2 Running the Configuration Display Program in Service Mode – Run the configuration display program in service mode as follows.

1. Select the maintenance services menu.
2. Press **F12**, **F19**, and **F5** in that sequence. This places the program in service mode.
3. When the maintenance services menu appears on the screen, select the configuration display program with the cursor keys. Press **Do**.
4. Press **Resume** to return to the maintenance menu or press **F20** to set or reset the duty cycle start date.

NOTE

Pressing F20 erases all present duty cycle data.

1.4.7 Bar Pattern Program

This program lets you place a bar pattern on the screen. Use this program to adjust the operator monitor controls. This program works with black-and-white (monochrome) and color monitors.

The bar pattern is made up of eight bars. Each bar is a different color or shade of grey. If you have a color monitor, the colors are as follows (from left to right).

(dark)								(light)
Black	Blue	Red	Magenta	Green	Cyan	Yellow	White	

NOTE

You must have the extended bit map option installed to use this program.

1.4.7.1 Running the Bar Pattern Program – Run the bar pattern program as follows.

1. Select the bar pattern program with the cursor keys.
2. Press **Do**.
3. Wait for the bar pattern to appear on the screen. This takes about 5 seconds.
4. Adjust the operator monitor controls.
5. Press **Resume** to return to the main menu.

1.4.7.2 Bar Pattern Program Results – The bar pattern program is not a test. This program helps you adjust your monitor for the best possible screen display.

1.4.8 Alignment Pattern Program

This program runs only in service mode and it places another menu on the screen. You can select the universal alignment pattern to align black-and-white (monochrome) and color monitors. The alignment pattern program also lets you select red, green, or blue screens to make color monitor adjustments (the extended bit map module must be present for color), or a white screen to check purity.

1.4.8.1 Running the Alignment Pattern Program – Run the alignment pattern program as follows. This program works only in service mode.

1. Select the maintenance services menu.
2. Press **F12**, **F19**, and **F5** in that sequence. This places the program in service mode.
3. When the maintenance services menu appears on the screen, select alignment patterns with the cursor keys.
4. Select the desired pattern.
5. Press **Resume** to return to the main menu.

1.4.9 Update Maintenance Services

A software diagnostic diskette is shipped with most options. This diskette contains software that runs as part of the system unit test, supplied with P/OS. You must first use the update maintenance services program to make this software a part of the system unit test. The program installs the option's diagnostics on the test diskette. The procedure must be done only once. After updating, that option's diagnostics run every time the system unit test is run.

For a diskette based system, update the system unit test to include an option's diagnostics as follows.

NOTE

The update procedure must be done only once. After you update the system unit test, it automatically tests the new option.

1. Boot the system with the P/OS system diskette.
2. When prompted to load an application program, remove the P/OS system diskette and place the maintenance applications diskette in drive 1 and press **Resume**.
3. When prompted, insert the test diskette in drive 2 and press **Resume**.

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4. Select **Update Maintenance Services** from the maintenance services menu. When prompted, place the option's diagnostic diskette in drive 2. Follow the directions on the screen.

After the update program is finished, the diagnostics are part of the system unit test. You do not need to run the update procedure again. The diagnostics will now run every time the system unit test is run.

1.5 BIGDISK BLOCK CHECK

This test determines if there are new bad blocks on the hard disk. It runs only if P/OS is installed on the hard disk. The test reads data. It does not write data, so no data is destroyed.

NOTE

If the test fails, back up all important customer files before reinstalling P/OS or they will be lost.

The test is the same in customer and service mode, although the screen display for the results is different. In customer mode, the results summary tells you if no corrupt blocks have been found. It also tells you if new corrupt blocks have been found and P/OS must be reinstalled to update the P/OS bad block file. Press **Help** for more information.

In service mode, the results appears as follows.

FOUND ON HEAD:	0	1	2	3
P/OS BAD BLOCK FILE:	XX	XX	XX	XX
NEW CORRUPT BLOCKS:	XX	XX	XX	XX

Run the test at least two more times to make sure the results are consistent. If the disk is corrupt, back up the files and reinstall P/OS. If the results are inconsistent, the fault may be in the hard disk controller or the read/write module within the drive.

1.6 NO RESPONSE AT POWER-UP

If this display remains on the screen for more than 2 minutes, restart the system by turning the system power switch off and on.

Use Table 1-1 and the indicators on the rear of the system unit to troubleshoot this problem. Table 1-2 lists the indicator error codes and related FRUs.

Table 1-1 No Response at Power-Up

Symptom	Additional Checks	Corrective Action
No response when power switch is turned on.	Check power cord connection to system and wall outlet.	Reconnect power cord to system and wall outlet.
	Circuit breaker tripped.	Reset circuit breaker by pushing it in.
	No power at wall outlet.	Check power with your VOM.
	Power cord shorted or opened.	Check power cord for continuity with your VOM and replace if needed.
No response when power switch is turned on, but fan is running.		Check power cable connection from power supply to system module.
	Green indicator on back of system unit is off.	Check power cable connection from power supply to system module.
		Replace system power supply.
	Green indicator is on and four red indicators are off.	Check monitor cable connections and adjust monitor controls.
		Reset system memory boards.
		Replace monitor.
	Green indicator is on and any or all red indicators are on.	System has failed. See Table 1-2 for the indicator error and related FRU.

Table 1-2 Indicator Error Codes

Indicator*				Error	Corrective Action
4	3	2	1		
o	o	o	o	None (test passed)	<ol style="list-style-type: none"> 1. Adjust contrast and brightness controls on monitor. 2. Check video cable connections at monitor. 3. Check video alignment (Chapter 3). 4. Replace monitor board. 5. Replace monitor. 6. Replace system module.
o	o	o	•	I/O	<ol style="list-style-type: none"> 1. Check all cables connected to I/O board in slot 1. 2. Reseat I/O board in slot 1. 3. Replace I/O board in slot 1. 4. Replace device connected to I/O board in slot 1.
o	o	•	o	I/O	<ol style="list-style-type: none"> 1. Check all cables connected to I/O board in slot 2. 2. Reseat I/O board in slot 2. 3. Replace I/O board in slot 2. 4. Replace device connected to I/O board in slot 2.
o	o	•	•	I/O	<ol style="list-style-type: none"> 1. Check all cables connected to I/O board in slot 3. 2. Reseat I/O board in slot 3. 3. Replace I/O board in slot 3. 4. Replace device connected to I/O board in slot 3.
o	•	o	o	I/O	<ol style="list-style-type: none"> 1. Check all cables connected to I/O board in slot 4. 2. Reseat I/O board in slot 4. 3. Replace I/O board in slot 4. 4. Replace device connected to I/O board in slot 4.
o	•	o	•	I/O	<ol style="list-style-type: none"> 1. Check all cables connected to I/O board in slot 5. 2. Reseat I/O board in slot 5. 3. Replace I/O board in slot 5. 4. Replace device connected to I/O board in slot 5.

* A • means indicator is on.

Table 1-2 Indicator Error Codes (Cont)

Indicator*				Error	Corrective Action
4	3	2	1		
o	•	•	o	I/O	<ol style="list-style-type: none"> 1. Check all cables connected to I/O board in slot 6. 2. Reseat I/O board in slot 6. 3. Replace I/O board in slot 6. 4. Replace device connected to I/O board in slot 6.
o	•	•	•	System	<ol style="list-style-type: none"> 1. Restart system by turning system power switch off and on. 2. Run system unit test on maintenance application diskette. 3. If error remains, replace system module.
•	o	o	o	System	<ol style="list-style-type: none"> 1. Restart system by turning system power switch off and on. 2. Run system unit test on maintenance application diskette. 3. If error remains, replace system module.
•	o	o	•	Keyboard	<ol style="list-style-type: none"> 1. Check keyboard cable and connections at keyboard and monitor. 2. Check video cable at monitor and system unit. Right angle end of cable should be connected to video monitor. 3. Replace keyboard. 4. Replace monitor. 5. Replace system board.
•	o	•	o	No boot	<ol style="list-style-type: none"> 1. Reboot from P/OS system diskette. 2. If reboot is good, check RD hard disk subsystem. 3. If still no boot, check for bad diskette. 4. Check cables on RX50 and RD hard disk subsystems from the controller(s) to their drives. 5. Replace system module. 6. Refer to Paragraph 1.9.

Table 1-2 Indicator Error Codes (Cont)

Indicator* 4 3 2 1	Error	Corrective Action
• 0 • •	Monitor not present	<ol style="list-style-type: none"> 1. Check video cable and connections at monitor and system unit. Right angle end of cable should be connected to video monitor. 2. Replace monitor. 3. Replace system module.
• • 0 0	System memory	<ol style="list-style-type: none"> 1. Restart system by turning system power switch off and on. 2. If error disappears, run system unit test on maintenance application diskette. 3. If error remains, replace system module. 4. If error still remains, replace both memory modules.
• • 0 •	System memory	<ol style="list-style-type: none"> 1. Restart system by turning system power switch off and on. 2. If error disappears, run system unit test on maintenance application diskette. 3. If error remains, replace bank 1 memory board.
• • • 0	System memory	<ol style="list-style-type: none"> 1. Restart system by turning system power switch off and on. 2. If error disappears, run system unit test on maintenance application diskette. 3. If error remains, replace bank 0 memory board.
• • • •	System	<ol style="list-style-type: none"> 1. Restart system by turning system power switch off and on. 2. If error remains, replace bank 0 memory board. 3. If error remains, replace memory module (in card cage). 4. If error remains, replace system module. 5. If error still remains, remove option boards one at a time until error changes. Replace last board removed when error changes.

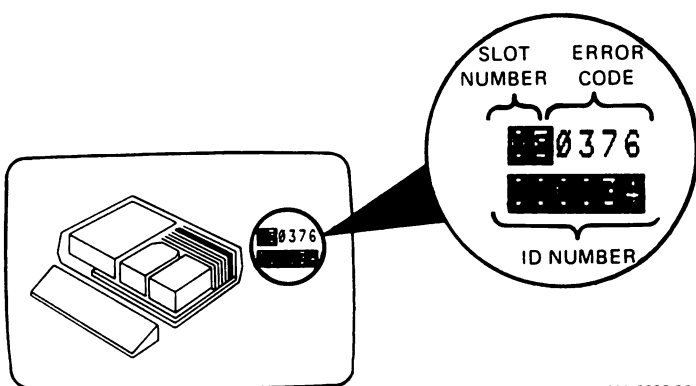
* A • means indicator is on.

1.7 SYSTEM AND BOOT PROBLEMS

This display means the power-up self-test found a problem and the system cannot boot. Troubleshoot this problem as a system hardware error. Refer to Paragraph 1.8.

1.8 SYSTEM FAILURE WITH BOOT

This display means the power-up self-test found a problem, but the system booted. To troubleshoot, find the identification (ID) number and error code in the message. Figure 1-2 shows the location of the codes. Table 1-3 lists each ID number, the error codes for that ID, and the corrective action to take.



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Figure 1-2 Self-Test Diagram

Table 1-3 Error Codes

ID Number	Error Code	Problem Area	Corrective Action
Any ID	0374	Slot shown on screen	<ol style="list-style-type: none"> 1. Reseat board in slot shown on screen. 2. Replace board in slot shown on screen. 3. Replace system module.
Any ID	0376	Slot shown on screen	<ol style="list-style-type: none"> 1. Replace board in slot shown on screen.
00001	0060	Keyboard	<ol style="list-style-type: none"> 1. Replace keyboard.
	0075	Keyboard	<ol style="list-style-type: none"> 1. Run keyboard key test. 2. Replace keyboard.
	0076	Keyboard	<ol style="list-style-type: none"> 1. Replace keyboard.

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Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
000012	Any code	Floating point	1. Replace floating point adapter chip. If FPP is not on an adapter, go to step 2. Replace system module.
000014	Any code	Keyboard port	1. Replace system module.
000017	Any code	Printer port	1. Replace system module. 2. Replace keyboard.
000021	Any code	Communications port	1. Replace system module.
000023	Any code	Time of day	1. Replace system module.
000024	Any code	Nonvolatile RAM	1. Replace system module.
	22	Floating point processor	1. Replace floating point processor. 2. Replace system module.
000025	Any code	Interrupts	1. Replace system module. 2. Disconnect any devices from COMM1 and PTR1 connectors. a. Remove all options except video controller (ID 0010002). b. Turn power back on. c. If failure again, replace video controller. d. If failure goes away, install each option one at a time until symptom reappears. Replace last board inserted.
000034	0002	Memory module	1. Memory exceeds 3 megabytes. Remove memory modules until no error.
	Any code	Memory module	1. Replace board in slot shown on screen.

Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
000041	0001	DTMF loopback	1. Replace TMS controller.
	0002	CODEC loopback failure	1. Replace TMS controller.
	0003	DTMF loopback and CODEC loopback failure	1. Replace TMS controller.
	0004	Dial tone detect failure	1. Replace TMS controller.
	0005	Dial tone detect and DTMF loopback failure	1. Replace TMS controller.
	0006	Dial tone detect and CODEC loopback failure	1. Replace TMS controller.
	0007	Dial tone detect, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller.
	0010	7910 modem analog loopback failure	1. Replace TMS controller.
	0011	7910 modem analog loopback and DTMF loopback failure	1. Replace TMS controller.
	0012	7910 modem analog loopback and CODEC loopback failure	1. Replace TMS controller.
	0013	7910 modem analog loopback, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller.
	0014	7910 modem analog loopback, and dial tone detect failure	1. Replace TMS controller.

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Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
000041	0015	7910 modem analog loopback, dial tone detect, and DTMF loopback failure	1. Replace TMS controller.
	0016	7910 modem analog loopback, dial tone detect, and CODEC loopback failure	1. Replace TMS controller.
	0017	7910 modem analog loopback, dial tone detect, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller.
	0020	Modem analog loopback failure	1. Replace TMS controller.
	0021	Modem analog loopback and DTMF loopback failure	1. Replace TLI. 2. Replace TMS controller.
	0022	Modem analog loopback and CODEC loopback failure	1. Replace TMS controller.
	0023	Modem analog loopback, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller.
	0024	Modem analog loopback and dial tone detect failure	1. Replace TMS controller.
	0025	Modem analog loopback, dial tone detect, and DTMF loopback failure	1. Replace TMS controller.

Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
000041	0026	Modem analog loopback, dial tone detect, and CODEC loopback failure	1. Replace TMS controller.
	0027	Modem analog loopback, dial tone detect, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller.
	0030	Modem analog loopback and 7910 modem analog loopback failure	1. Replace TMS controller.
	0031	Modem analog loopback, 7910 modem analog loopback, and DTMF loopback failure	1. Replace TLI. 2. Replace TMS controller.
	0032	Modem analog loopback, 7910 modem analog loopback, and CODEC loopback failure	1. Replace TMS controller.
	0033	Modem analog loopback, 7910 modem analog loopback, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller.
	0034	Modem analog loopback, 7910 modem analog loopback, and dial tone detect failure	1. Replace TMS controller.

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Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
000041	0035	Modem analog loopback, 7910 modem analog loopback, dial tone detect, and DTMF loopback failure	1. Replace TMS controller.
	0036	Modem analog loopback, 7910 modem analog loopback, dial tone detect, and CODEC loopback failure	1. Replace TMS controller.
	0037	Modem analog loopback, 7910 modem analog loopback, dial tone detect, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller.
	0040	VU status request failure	1. Replace voice unit. 2. Replace TLI 3. Replace TMS controller.
	0041	VU status request and DTMF loopback failure	1. Replace TMS controller and voice unit.
	0042	VU status request and CODEC loopback failure	1. Replace TMS controller and voice unit.
	0043	VU status request CODEC loopback, and DTMF loopback failure	1. Replace TMS controller and voice unit.
	0044	VU status request and dial tone detect failure	1. Replace TMS controller and voice unit.
	0045	VU status request, dial tone detect, and DTMF loopback failure	1. Replace TMS controller and voice unit.

Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
000041	0046	VU status request, dial tone detect, and CODEC loopback failure	1. Replace TMS controller and voice unit.
	0047	VU status request, dial tone detect, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller and voice unit.
	0050	VU status request and 7910 modem analog loopback failure	1. Replace TMS controller and voice unit.
	0051	VU status request, 7910 modem analog loopback, and DTMF loopback failure	1. Replace TMS controller and voice unit.
	0052	VU status request, 7910 modem analog loopback, and CODEC loopback failure	1. Replace TMS controller and voice unit.
	0053	VU status request, 7910 moem analog loopback, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller and voice unit.
	0054	VU status request, 7910 modem analog loopback, and dial tone detect failure	1. Replace TMS controller and voice unit.
	0055	VU status request, 7910 modem analog loopback, dial tone detect, and DTMF loopback failure	1. Replace TMS controller and voice unit.

Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
000041	0056	VU status request, 7910 modem analog loopback, dial tone detect, and CODEC loopback failure	1. Replace TMS controller and voice unit.
	0057	VU status request, 7910 modem analog loopback, dial tone detect, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller and voice unit.
	0060	VU status request and modem analog loopback failure	1. Replace TMS controller and voice unit.
	0061	VU status request, modem analog loopback, and DTMF loopback failure	1. Replace TLI and voice unit. 3. Replace TMS controller.
	0062	VU status request, modem analog loopback, and CODEC loopback failure	1. Replace TMS controller and voice unit.
	0063	VU status request, modem analog loopback, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller and voice unit.
	0064	VU status request, modem analog loopback, and dial tone detect failure	1. Replace TMS controller and voice unit.
	0065	VU status request, modem analog loopback, dial tone detect, and DTMF loopback failure	1. Replace TMS controller and voice unit.

Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
000041	0067	VU status request, modem analog loopback, dial tone detect, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller and voice unit.
	0070	VU status request, modem analog loopback, and 7910 modem analog loopback failure	1. Replace TMS controller and voice unit.
	0071	VU status request, modem analog loopback, 7910 modem analog loopback, and DTMF loopback failure	1. Replace TLI and voice unit. 2. Replace TMS controller.
	0072	VU status request, modem analog loopback, 7910 modem analog loopback, and loopback failure	1. Replace TMS controller and voice unit.
	0073	VU status request, modem analog loopback, 7910 modem analog loopback, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller and voice unit.
	0074	VU status request, modem analog loopback, 7910 modem analog loopback, and dial tone detect failure	1. Replace TMS controller and voice unit.

Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
000041	0075	VU status request, modem analog loopback, 7910 modem analog loopback, dial tone detect, and DTMF loopback failure	1. Replace TMS controller and voice unit.
	0076	VU status request, modem analog loopback, 7919 modem analog loopback, dial tone detect, and CODEC loopback failure	1. Replace TMS controller and voice unit.
	0077	VU status request, modem analog loopback, 7910 modem analog loopback, dial tone detect, CODEC loopback, and DTMF loopback failure	1. Replace TMS controller and voice unit.
	0201	ROM failure	1. Replace TMS controller.
	0202	RAM failure	1. Replace TMS controller.
	0204	Fraudulent interrupt	1. Replace TMS controller.
	0210	Interrupt failure – acknowledge now	1. Replace TMS controller.
000042	0220	Interrupt failure – kill	1. Replace TMS controller.
	0110 or less	DECNA module	1. Replace DECNA module. 2. Replace system module.

Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
000043	Any code	CP/M module	1. Replace board in slot shown on screen.
	0111 or more		1. Test network hardware (Paragraph 1.14.4).
000046	0001	Real-time interface (RTI) – serial line unit 1	1. Reseat cables and board in slot 6. 2. Replace module in slot 6.
CAUTION			
Turn off all devices attached to RTI cables before turning system on again.			
	0002	RTI – serial line unit 2	1. Reseat cables and board in slot 6. 2. Replace module in slot 6.
	0003	RTI – parallel I/O	1. Reseat cables and board in slot 6. 2. Replace module in slot 6.
	0004	RTI – IEEE port	1. Reseat cables and board in slot 6. 2. Replace module in slot 6.
	0005	RTI – interrupt logic	1. Reseat cables and board in slot 6. 2. Replace module in slot 6.
000401	0001	RD subsystem	1. Replace board in slot shown on screen. 2. Run RD hard disk diagnostics on maintenance application diskette.
	0002	RD subsystem	1. Replace board in slot shown on screen. 2. Replace RD hard disk drive. Verify that either the read/write board or complete disk drive failed.

Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
000401	0003	RD subsystem	1. Replace board in slot shown on screen.
	0004	RD subsystem	1. Check cables.
	0005		2. Replace board in slot shown on screen.
	0006		3. Replace RD hard disk drive. Verify that either the read/write board or complete disk drive failed.
	0007		
	0010		
	0011		
	0012		
	0013	RD subsystem	1. Check cables. 2. Replace board in slot shown on screen. 3. Replace RD hard disk drive. Verify that either the read/write board or complete disk drive failed. 4. Reload operating system.
	0374	System	1. Replace board in slot shown on screen. 2. Replace system module.
001002	Any code	Basic video	1. Replace board in slot shown on screen.
	0374	System	1. Replace board in slot shown on screen. 2. Replace system module.
001403	Any code	Extended bit map	1. Check cable between basic video and extended bit map boards. 2. Replace board in slot shown on screen.
	0374	System	1. Replace board in slot shown on screen. 2. Replace system module.

Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
002004	0001	RX subsystem	1. Replace board in slot shown on screen.
	0003		
	0210		2. Replace RX drive.
	0300		
	0310		
	0360		
	0370		
	0010	RX subsystem	1. Insert initialized diskette.
	0020		2. Check RX drive cables.
	0030		3. Replace RX drive.
	0040		4. Replace board in slot shown on screen.
	0050		
	0060		
	0070		
	0100		
	0110		
	0120		
	0130		
	0140		
	0150		
	0160		
	0170		
	0200		
	0220		
	0230		
	0240		
	0250		
	0260		
	0270		
	0320		
	0330		
	0340		
	0350		
	0374		System
			2. Replace system module.

Table 1-3 Error Codes (Cont)

ID Number	Error Code	Problem Area	Corrective Action
177776	0375	System	<ol style="list-style-type: none"> 1. Check internal cables. 2. Replace board in slot shown on screen. 3. Replace any device connected to that board.
	0376	System	<ol style="list-style-type: none"> 1. Check internal cables. 2. Replace board in slot shown on screen. 3. Replace any device connected to that board.
	0377	System	<ol style="list-style-type: none"> 1. Check internal cables. 2. Replace board in slot shown on screen. 3. Replace any device connected to that board.

NOTE 1

Serial data mode requires that modem analog loopback, 7910 modem analog loopback (in non-U.S. version of product), and dial tone detect test pass.

CODEC mode requires that CODEC loopback test passes. If voice unit is used to dictate and store voice, VU status request test must also pass.

DTMF mode requires that DTMF loopback test passes. This applies to dialing functions and data transfers using DTMF tones. *Attended voice mode*, at a minimum, requires that dial tone detect test passes. The telephone set (supplied by customer) always operates normally with no intervention from TMS. Even a complete failure of entire option does not disable use of telephone.

NOTE 2

Error codes between 0001 and 0077 represent nonfatal errors and indicate that parts of TMS can still be used. Check error code problem area. If customer must wait for a replacement FRU, explain which functions are still usable. See note 1 for details.

1.9 BOOT PROBLEMS

This display indicates the system could not find a self-starting program on any system device. The system first looks at the diskette drive, then the hard disk, and the options (in slot order) for a self-starting program.

To troubleshoot this problem, place a P/OS system diskette in a diskette drive. The system should erase the diskette image from the screen and boot the program. Use Table 1-4 if the problem remains.

Table 1-4 Boot Problems

Symptom	Additional Checks	Corrective Action
An image of a diskette is on the screen under the word DIGITAL.	-	<p>Place a self-starting software diskette in one of the diskette drives and restart system.</p> <p>If problem remains, check all RX cables and reseal RX I/O (controller) board.</p> <p>Replace I/O board.</p> <p>Replace RX drive.</p> <p>Replace system module.</p> <p>If problem goes away, check primary boot device (Paragraph 1.9).</p>

1.10 SYSTEM SOFTWARE ERROR

This display means the system is functioning correctly, but found an operating system error.

Note the two 6-character error codes on the screen, and restart the system by turning the system power off and on. These characters are software status codes. Do not read them the way you read hardware error codes. If the problem continues, try a different software diskette. The diskette you have may be worn.

Sometimes a hardware failure produces a software code. For this error, the top number in the display is 000300 or 000400.

Table 1-5 lists software status codes and corrective action. *These software status codes are for P/OS only.*

Table 1-5 System Software Problems

Code	Problem Area	Corrective Action
Top Line Status Codes		
000100	P/OS keyboard handler	<ol style="list-style-type: none"> 1. Check cables and connections. 2. Replace keyboard. 3. Replace system module. 4. Reload operating system.
000200	Terminal driver (video subsystem and printer port)	<ol style="list-style-type: none"> 1. Check cables and connections. 2. Reseat option modules in card cage. 3. Reset all ICs in sockets on system module. 4. Replace system memory boards. 5. Replace system module. 6. Reload operating system.
000300	Executive/general	<p>If error occurred on first access of RX or RD subsystem, check that subsystem in this order:</p> <ol style="list-style-type: none"> 1. Check cables and reseat controller in card cage. 2. Replace drive. 3. Replace RX or RD subsystem controller. <p>If error was not on first access of mass storage, go to 000200 corrective action.</p>

Table 1-5 System Software Problems (Cont)

Code	Problem Area	Corrective Action
000400	System start-up processing	Verify write-protect tab is not on diskette. Go to 000300 corrective action.
100400	Terminal driver (video subsystem and printer port)	Go to 000200 corrective action.
Second Line Error Codes		
000000	IOT in system state	-
000001	Stack overflow or cannot install task CBOOT	-
000002	Trace trap or breakpoint or cannot spawn task CBOOT	-
000003	Illegal instruction trap or cannot spawn task CMAIN	-
000004	Odd address or other trap to 4	-
000005	Segment fault	-
000006	A task on P/OS without a parent aborted	-
000007	EMT trap or required file not found	-
000010	TRAP trap	-

1.11 KEYBOARD PROBLEMS

Table 1-6 lists possible keyboard problems and corrective action.

1.12 PRINTER PROBLEMS

Table 1-7 helps isolate problems between the printer and the system. Use this table if the printer does not print.

1.13 COMMUNICATIONS PROBLEMS

Table 1-8 helps isolate problems between the communications device connected to the system and the system unit. Use this table if the system has trouble using the communications port.

Table 1-6 Keyboard Problems

Symptom	Additional Checks	Corrective Action
Keyboard does not work.	Check cables between keyboard and monitor, and monitor and system unit.	Replace keyboard.
Some keyboard keys do not work.	Check software program manuals. These keys may not work with this program.	This is not a problem.
	Run keyboard test on maintenance application diskette.	Replace keyboard. Replace system module.

Table 1-7 Printer Problems

Symptom	Additional Checks	Corrective Action
Printer does not work when you try to print.	Check cable between printer and system unit.	Replace cable.
	Check printer controls.	Reset controls if needed.
	Run any printer diagnostic programs. Refer to printer's pocket service guide for more information.	If test fails, follow steps in printer's pocket service guide.
	Run system unit test in service mode on maintenance application diskette. Use loopback connector.	If test fails replace system module.

Table 1-8 Communications Problems

Symptom	Additional Checks	Corrective Action
Communications line is not working correctly.	Check cable between system unit and communications device.	Replace cable.
	Make sure communications feature settings match settings at other device.	Correct settings.
	Run system unit test in service mode on maintenance application diskette. Use loopback connector.	If test fails, replace system module.

Table 1-9 Diskette Problems

Symptom	Additional Checks	Corrective Action
System has trouble reading and writing diskettes.	Check diskette. Is it the correct one to use with your system?	Use a Digital diskette formatted for the Professional system.
	Diskette may be worn.	Try a new diskette.
	Run system unit test on maintenance application diskette.	If test fails, troubleshoot according to test results (Paragraph 1.4.3). If test runs correctly, check customer's media for wear, defects, and compatibility.

1.14 DISKETTE PROBLEMS

Table 1-9 helps isolate diskette problems. Use this table if the system has trouble reading and writing on the diskette after the RX50 subsystem checks out.

1.15 HARD DISK PROBLEMS

Hard disk problems appear as data error on erratic operation. Run the bigdisk block check (Paragraph 1.5) to test for bad blocks on a hard disk. This test works only if P/OS is installed on the hard disk.

1.16 TESTS FOR OPTIONS

This section provides special information for servicing different options. Refer to Table 1-3 for error codes and corrective action. Remember to press **Help** for additional information.

1.16.1 CP/M Option

For this option, P/OS must be version 1.5 or later.

1.16.2 Real-Time Interface

For the power-up self-test, turn off or disconnect all equipment connected to the real-time interface's internal cable. *Do not turn on other equipment until tests are complete.*

CAUTION

For the real-time interface test (service mode), disconnect all equipment connected to the real-time interface's internal cable. Test signals may damage attached equipment.

P/OS must be version 1.7 or later. Errors with one port on the module do not usually affect other ports.

In service mode, the real-time interface test can be selected and run like other tests in the system unit test (if installed with the update program). See Paragraph 1.4.3 for information on how to run the test.

In service mode, press **F12**, **F19**, **F5**. Follow the menu on the screen to select and run the the real-time interface test.

CAUTION

Disconnect all equipment attached to the internal cable connector on the rear panel. If you attach the loopback connector, select Loopback Connector Installed from the real-time interface test menu.

1.16.3 Telephone Management System

The telephone management system (TMS) requires version 1.7 or later of P/OS and the maintenance application diskette. TMS has two diagnostic tests: the telephone management system test under the maintenance services menu (Paragraph 1.16.3.1) and the PRO/TMS communications test services (Paragraph 1.16.3.2)

1.16.3.1 Telephone Management System Test – If the diagnostic program has been installed, this test runs when you select the system unit test in customer mode. You can select the test by itself in service mode from the system unit test menu.

Test results are displayed like other test results in customer and service modes. Press **Help** for information and corrective action.

1.16.3.2 PRO/TMS Communications Test Services –

This test has two parts: voice unit keypad test and remote data loopback tests. Run this test as an application as described in Paragraph 1.4.1.

The *voice unit keypad test* works only with the optional voice unit. It verifies each key on the voice unit keypad. Follow the instructions on your screen. Press **Help** at any time.

If you have an external microphone with or without a foot switch, press the button to highlight the large part of the footswitch diagram.

Replace the voice unit and any of its accessories until error indications are gone.

NOTE

Turn the power off before removing or connecting the voice unit or you will reboot the computer.

The *remote data loopback tests* exercise TMS by transferring data between your system and the Digital Customer Services support system or any other system with TMS installed.

Follow the instructions on your screen. Press **Help** for information. You will have to make a telephone call to the customer support system, where you will receive more information.

There are three kinds of tests in this group: data loopback, interactive, and long loopback.

The data loopback test is a continuity test for TMS and the telephone line.

The interactive test shows keyboard input on local and remote units. It is useful for testing a system with one phone line.

If any errors are detected in either of these tests, rerun the tests two times. If errors continue, do the long loopback test.

The long loopback test is a long test for TMS and phone line integrity. It displays bit error rate in service mode.

In service mode, if the bit error rate at the end of the test is less than or equal to 1.000 bit errors per 10^5 , then the telephone lines are valid. If the bit error rate is greater than 1.000 bit errors per 10^5 , perform the following procedure. (You must run this test four more times.)

1. Press **Print Screen** to get a copy of the screen display. Write the date and time on the printout.
2. Run the test again.

3. Continue until you have five printouts or copies of the screen display.
4. If at least two of the five tests show a bit error rate greater than 1.000 bit errors per 10^5 , then replace the TMS controller in the card cage and the telephone line interface (TLI) on the rear of the card cage (Paragraph 2.12).
5. Run the test five more times and get five more printouts.
6. If at least two of the five tests show a bit error rate greater than 1.000 bit errors per 10^5 , then there is a problem with the telephone line. Leave the printouts with the customer.
7. Tell the customer to call the telephone company to report the problem with the telephone line.

NOTE

The telephone company guarantees telephone lines that do not exceed 1.000 bit errors per 10^5 bits 80 percent of the time. The printouts are evidence that this rate has not been met. Your customer can order a conditioned data line at additional cost from the telephone company.

1.16.4 DECNA Controller

The Digital Ethernet CTI BUS network adapter (DECNA) uses the PRO/DECNA maintenance services. The DECNA module works only with version 2.0 or later of P/OS.

1. Remove the transceiver cable and connect the loop-back connector to the NET1 connector on the rear panel.

CAUTION

Do not connect or disconnect cables while the test is running. You may damage the system module.

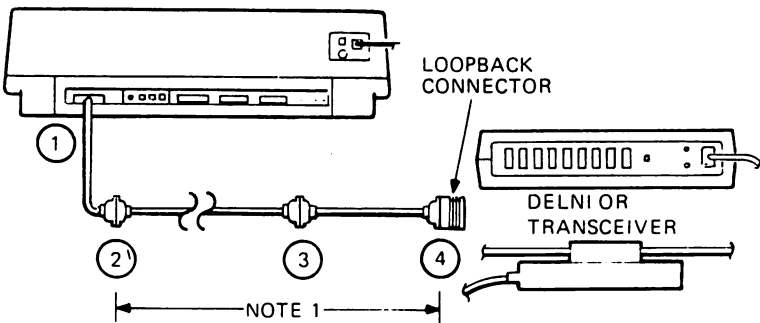
2. Select service mode from the maintenance services menu by pressing **F12**, **F19**, and **F5** in order.
3. Select the system unit test. Press **Do**.
4. Select DECNA. Press **Do**.
5. Select a single pass test. Press **Do**.
6. Wait for the test results.

Press **Help** for information on errors and corrective action. If the test passes, reconnect the transceiver cable and perform the procedure for additional network devices in sequence (Figure 1-3).

NOTE

If the DECNA controller fails the power-up self-test, leave the computer turned on for at least 2 minutes. Then turn the power off and on. If it fails the power-up self-test again, replace the DECNA controller and retest.

See Chapter 4 for information about testing the Digital Ethernet local network interconnect (DELNI) with PRO/DECNA maintenance services.



NOTE 1: DO NOT EXCEED 20 METERS. TEST CABLE LENGTHS IN SEGMENTS IF NECESSARY.

MA-0305-84

Figure 1-3 DECNA Loopback Connector Test Points

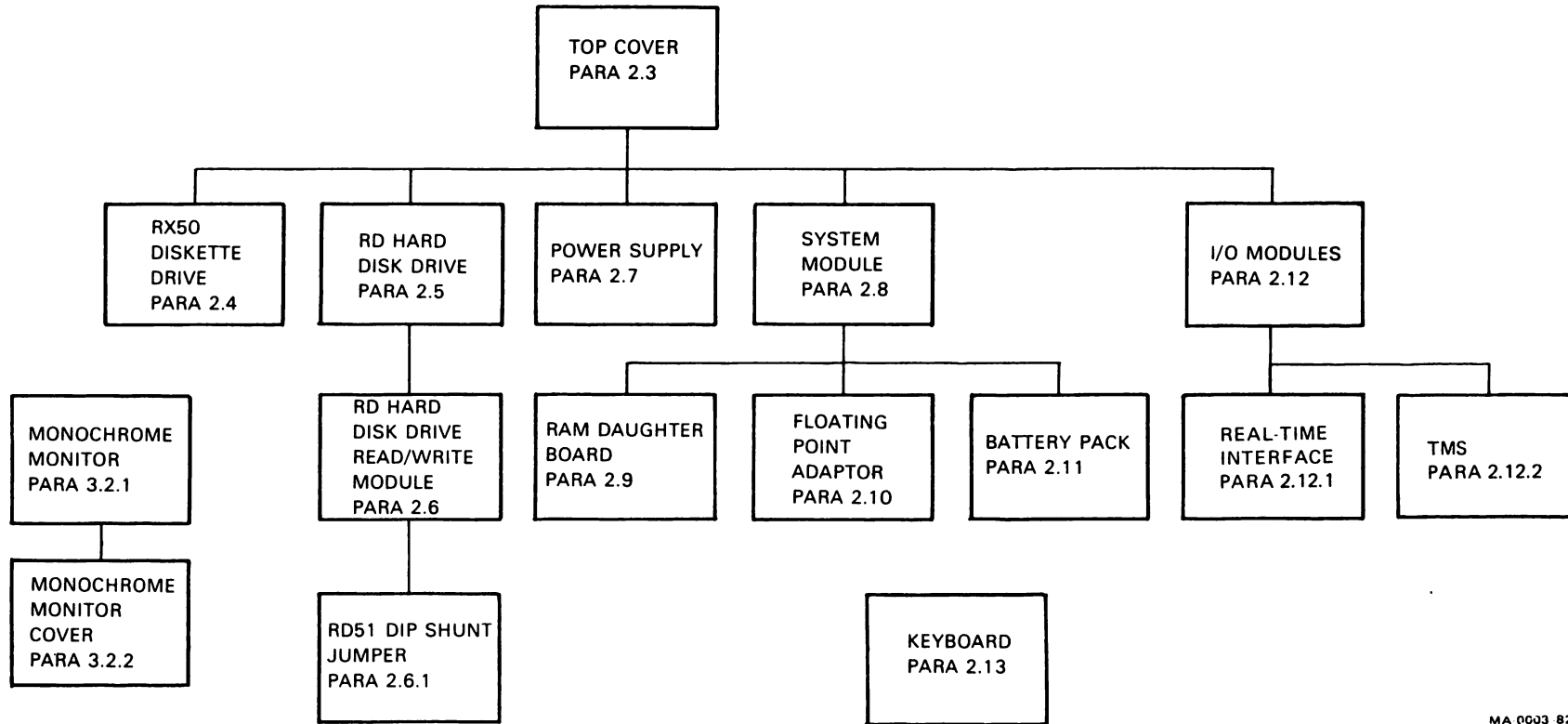
2 REMOVAL AND REPLACEMENT

2.1 GENERAL

This chapter tells you how to remove and replace the field replaceable units (FRUs) in the Professional system. Paragraph 2.14 provides the Recommended Spares List (RSL). Appendix B contains exploded views of the FRUs. The exploded view drawings provide the following information for each FRU: location, part name, and part number.

2.2 REMOVAL AND REPLACEMENT PROCEDURES

Figure 2-1 shows all FRU removal procedures and the sequence you must use. For example, to remove any I/O board from the system, you must remove the top cover first. To replace an FRU, perform the removal steps in reverse.



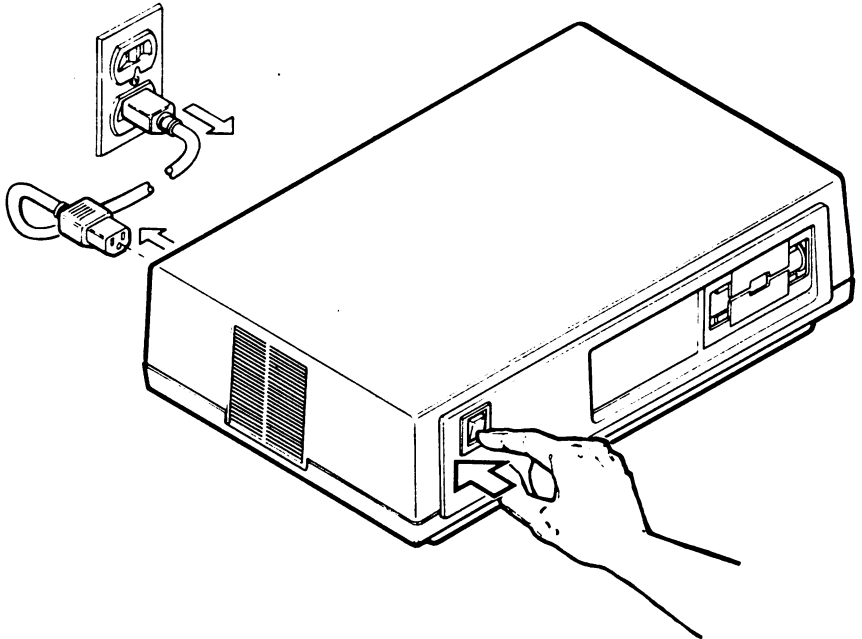
MA 0003 82

Figure 2-1 FRU Removal Sequence

2.3 TOP COVER

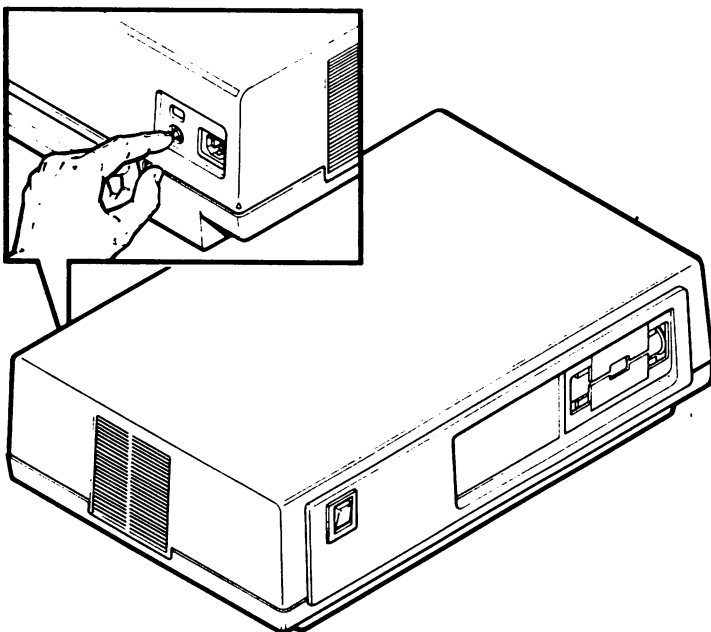
Remove the top cover as follows.

1. Turn the system unit power switch off and remove the ac power cord from the wall outlet and the power receptacle on the rear of the system unit.



MA-0004A82

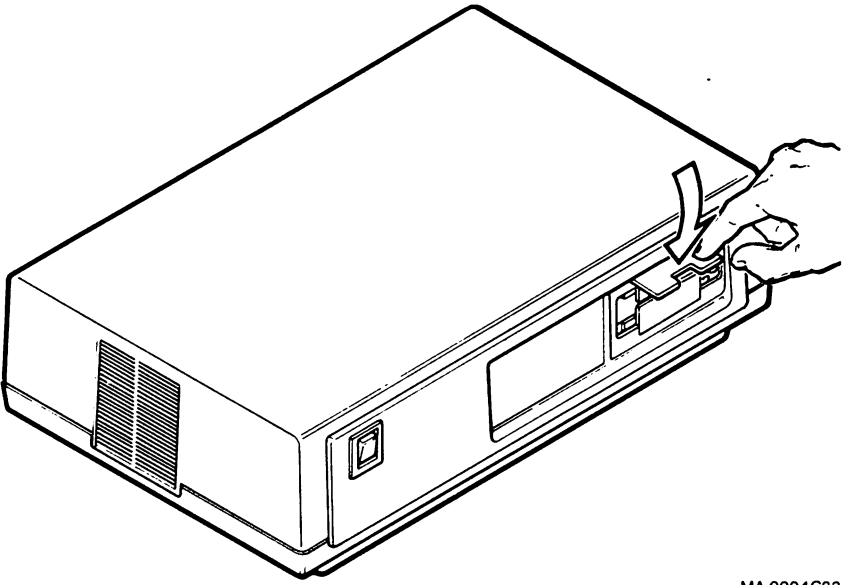
2. If the circuit breaker tripped, reset the circuit breaker by pushing it in.



MA-0004B82

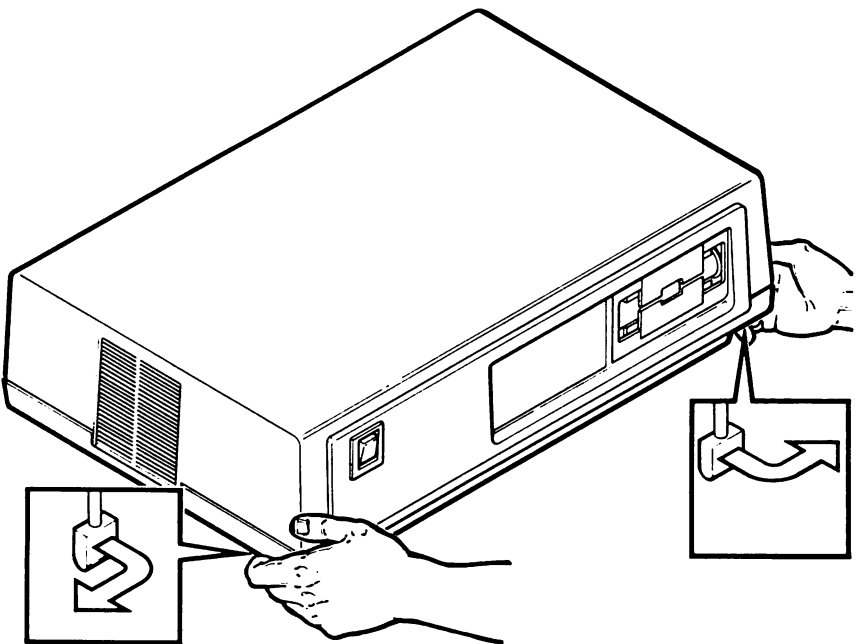
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3. Close the two diskette drive doors.



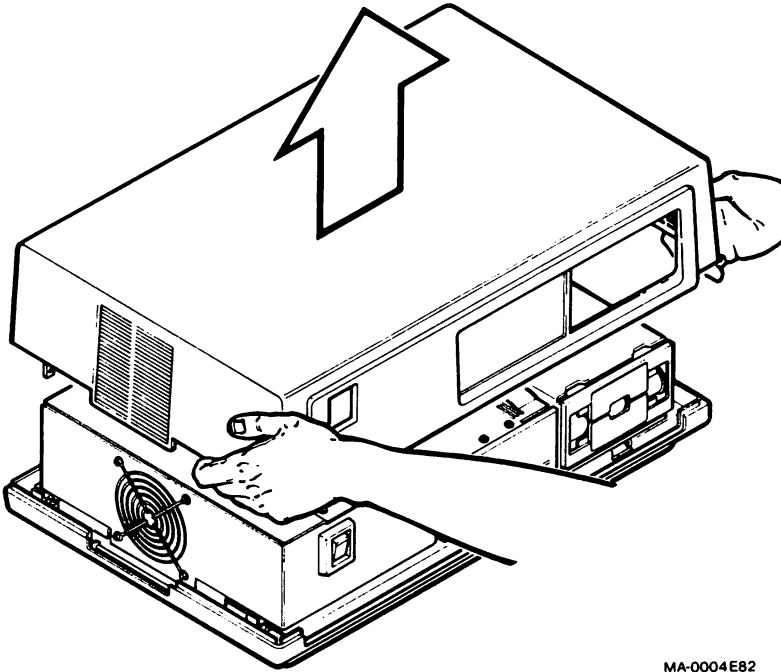
MA-0004C82

4. Find the two top cover releases. Pull each release to the front of the unit. The release should move about 1/2 inch. To hold the release open, move the pin into the locked position.



MA-0004D82

5. Grasp the top cover on each side and lift the cover straight up.



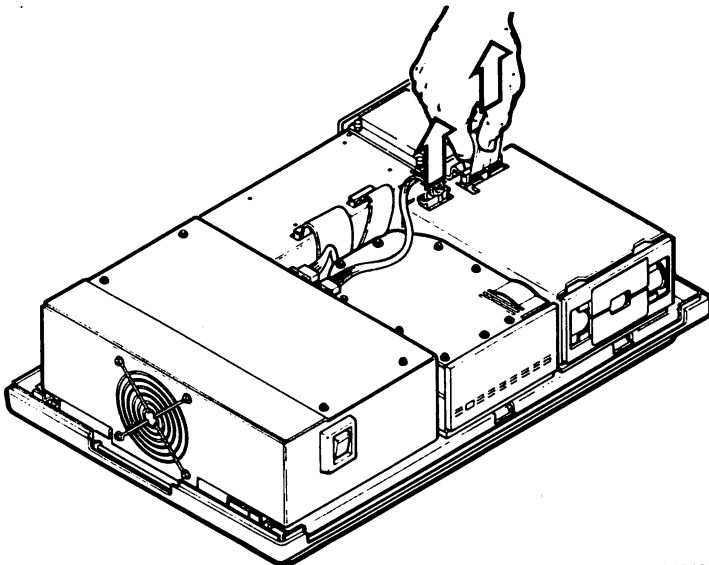
MA-0004E82

2.4 RX50 DISKETTE DRIVE

Remove the diskette drive as follows. You need a pen or similar object. First remove the following FRU.

- Top cover (Paragraph 2.3)

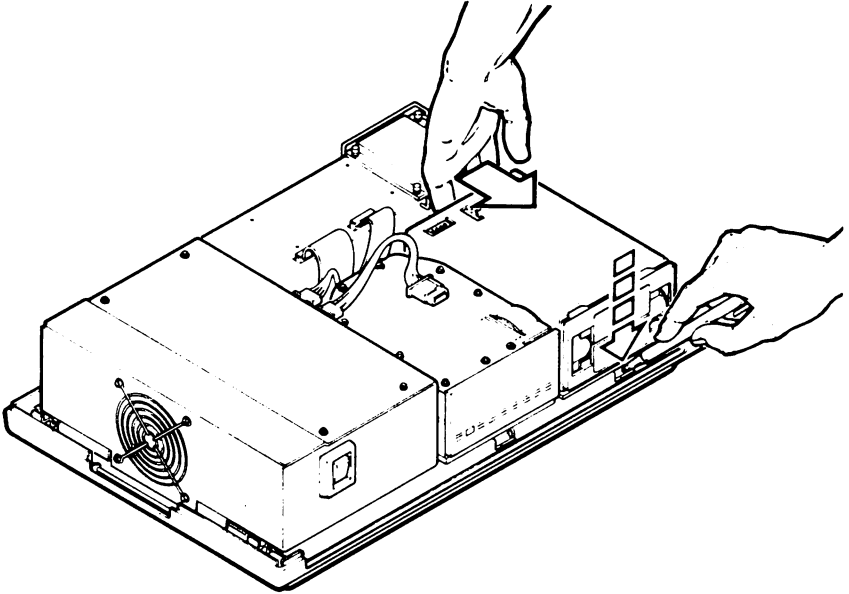
1. Disconnect the I/O cable and dc power cable from the diskette drive. You can disconnect the I/O cable by pulling straight up on the white cable pull.



MA-0005A82

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2. Find the release tab at the front center of the diskette drive. Use a pen or similar object to push down on the release tab, then slide the diskette drive assembly to the front of the system unit.

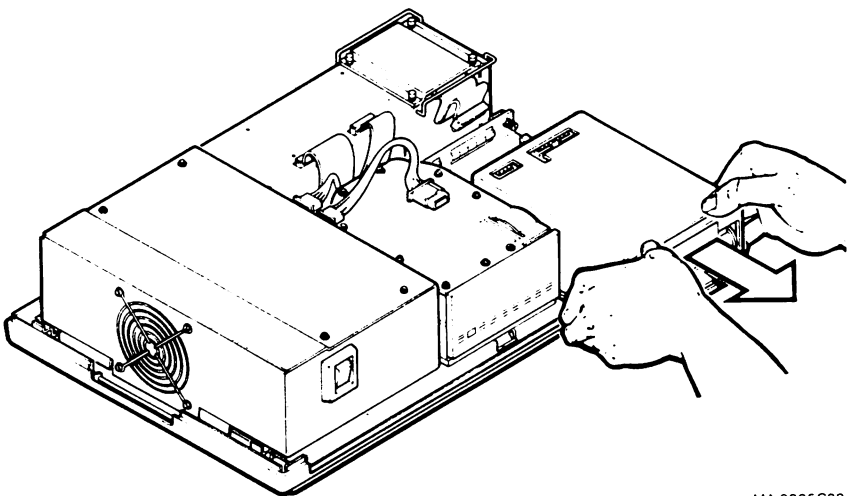


MA-0005B82

3. Remove the diskette drive.

NOTE

The diskette drive is a single FRU. Do not disassemble the diskette drive or remove any printed circuit boards. All adjustments must be made in a special test configuration.

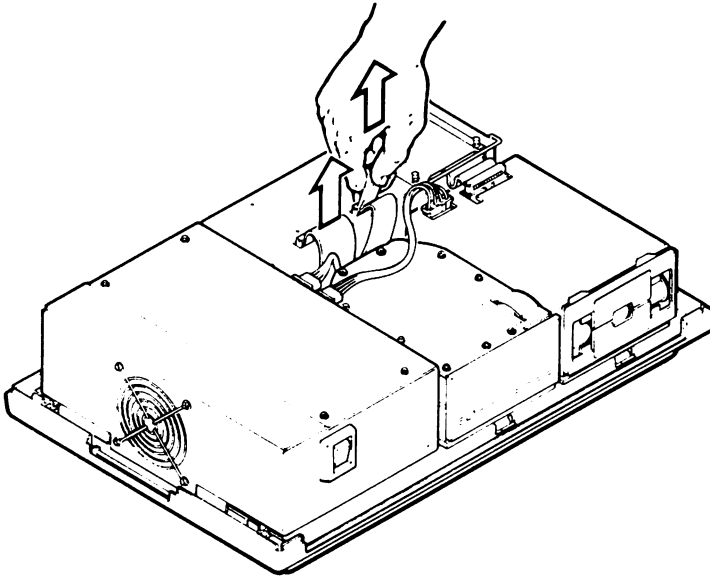


MA-0005C82

2.5 RD HARD DISK DRIVE

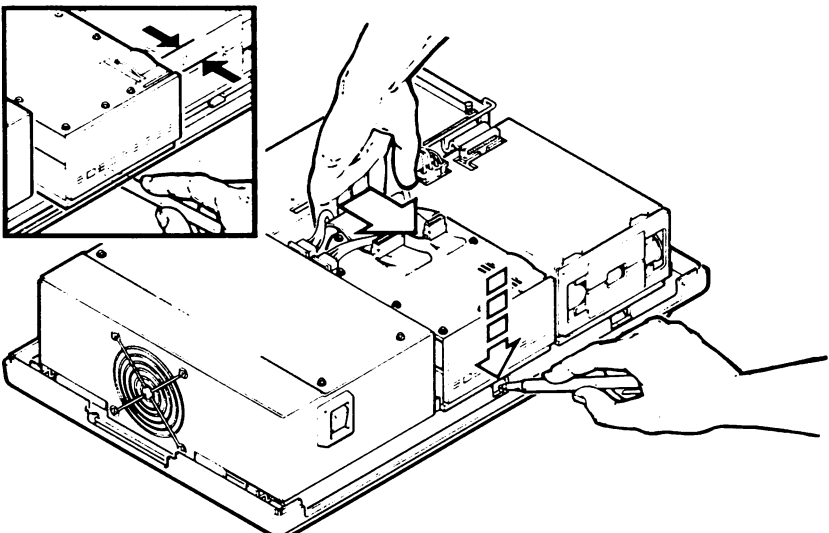
Remove the RD hard disk drive as follows. You need a pen or similar object. First remove the following FRU.

- Top cover (Paragraph 2.3)
1. Disconnect the two I/O cables from the I/O board. You can disconnect each cable by pulling straight up on the white cable pull.



MA-0005D82

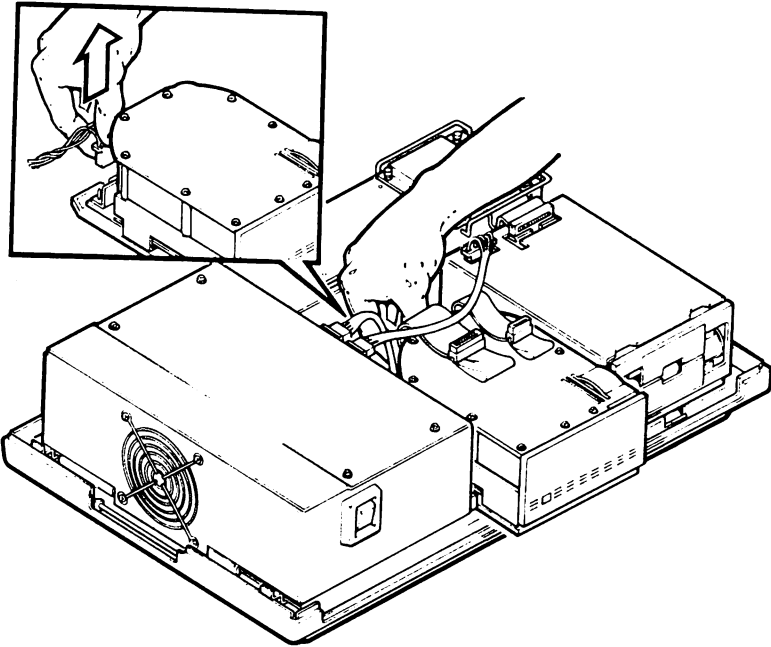
2. Locate the release tab below the front of the hard disk drive. Use a pen or similar object to push down on the release tab, then slide the hard disk drive assembly about 2 inches to the front of the system unit.



MA-0005E82

48 REMOVAL AND REPLACEMENT

3. Disconnect the 4-wire dc power cable from the rear of the hard disk drive.

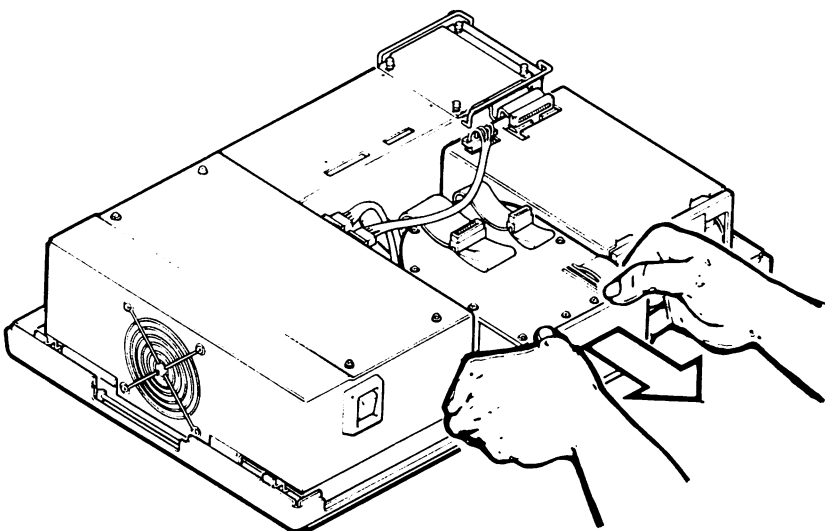


MA-0005F82

4. Remove the hard disk drive by sliding it out of the system unit.

NOTE

Replace the RD hard disk drive with the same kind of hard disk drive (RD50, 5 megabytes, or RD51, 10 megabytes).



MA-0005G82

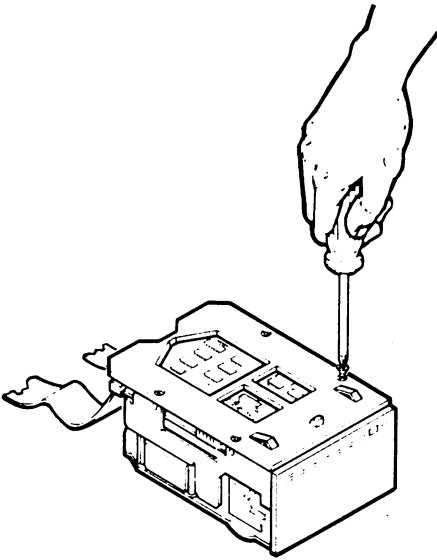
2.6 RD HARD DISK DRIVE READ/WRITE BOARD

Remove the RD hard disk drive read/write board as follows. You need the following tools.

- Small phillips screwdriver
- Small blade screwdriver

First remove the following FRUs in order.

- Top cover (Paragraph 2.3)
 - Hard disk drive (Paragraph 2.5)
1. Use a small phillips screwdriver to remove the four screws holding the drive skid plate to the drive. Remove the drive skid plate.



MA-0006-B2

2.6.1 DIP Shunt Replacement (RD51 Hard Disk Drive)

The read/write board on the RD51 hard disk drive has a dual in-line package (DIP) shunt. Be sure the shunt is in place and looks like the one in Figure 2-2.

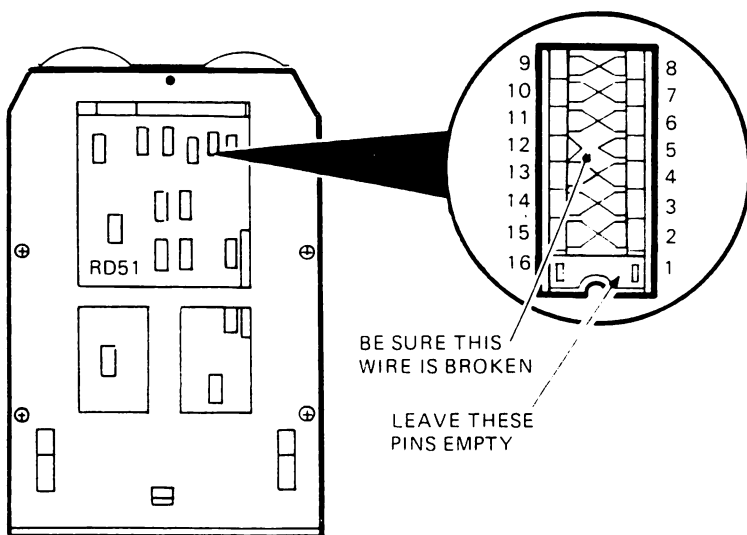
You can exchange the shunt from one RD51 read/write board to another (Paragraph 2.6). Use a small blade screwdriver to lift the shunt.

CAUTION

Be sure the 14-pin jumper shunt is positioned as shown in the 16-pin socket.

WARNING

Be careful. The shunt pins are sharp.



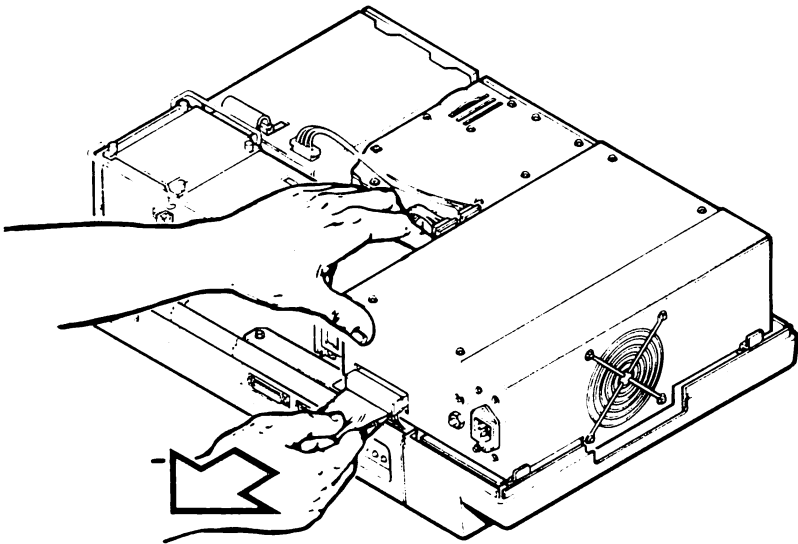
DA 0047-84

Figure 2-2 DIP Shunt Location

2.7 POWER SUPPLY

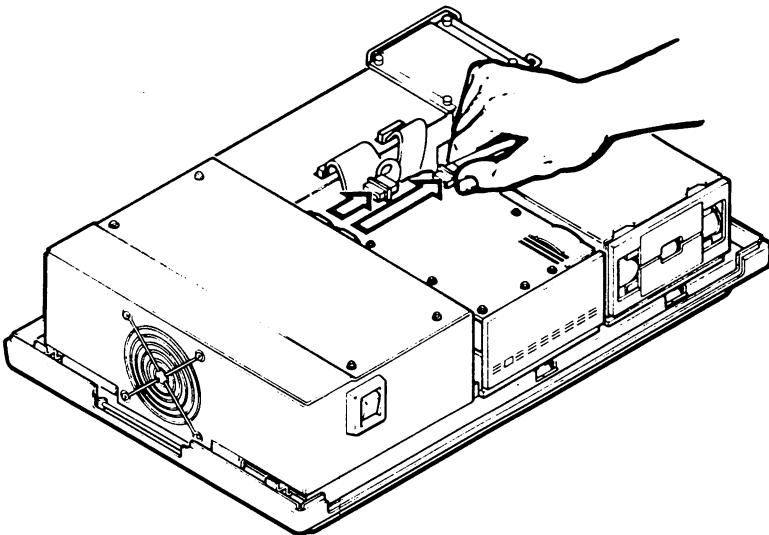
Remove the power supply as follows. First remove the following FRU.

- Top cover (Paragraph 2.3)
1. Disconnect the 16-pin system module power connector from the rear of the power supply. You can disconnect the cable by pulling straight back on the white cable pull.



MA-0008A82

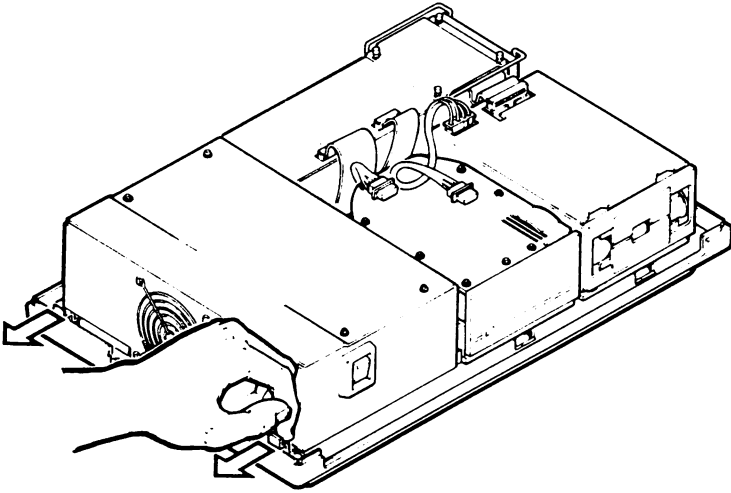
2. Disconnect the 4-pin mass storage device power connectors from the side of the power supply.



MA-0005H82

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3. Find the two release clips on the side of the power supply near the fan assembly. Pull each clip out.



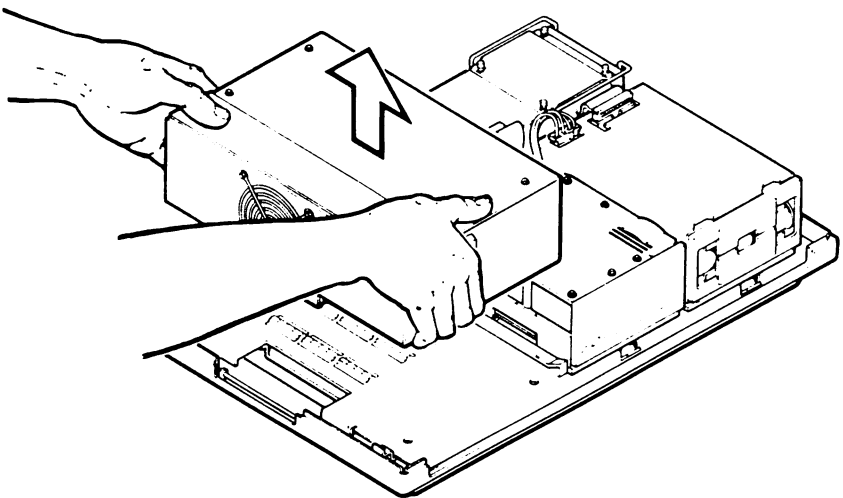
MA-0005182

4. Lift the power supply assembly out of the system unit.

NOTE

The power supply is a single FRU. The power supply is not adjustable and does not contain replaceable circuit boards.

When you replace the power supply on the system chassis, push down in the center to latch it in place.

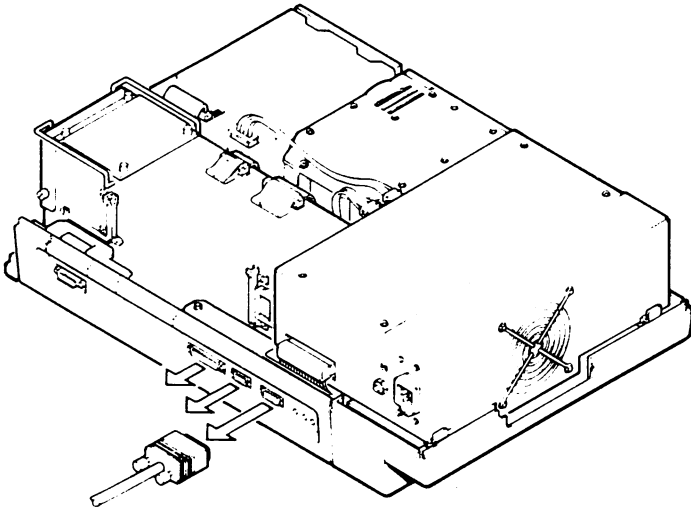


MA-0005J82

2.8 SYSTEM MODULE

Remove the system module as follows. You need a pen or similar object. First remove the following FRU.

- Top cover (Paragraph 2.3)
1. Disconnect any cables connected to the rear of the system unit.

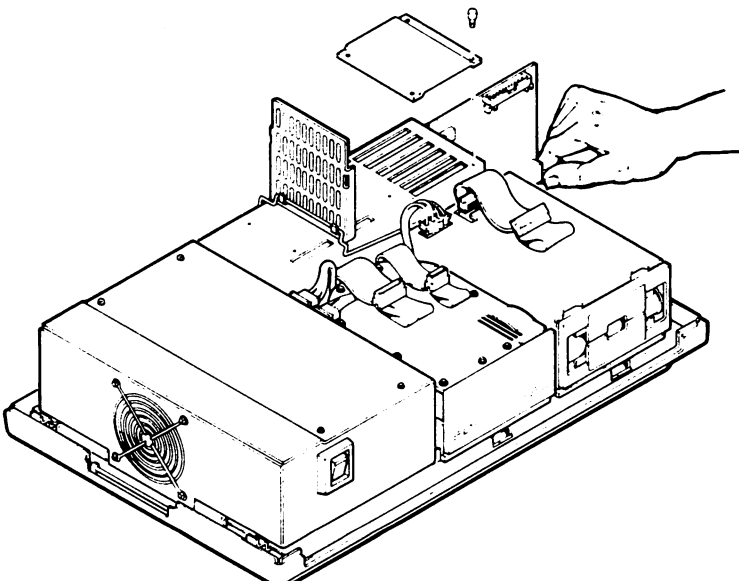


MA-0008B82

2. *Perform this step only if you are replacing the system module.* Remove all I/O option boards from the card cage (Paragraph 2.12).

NOTE

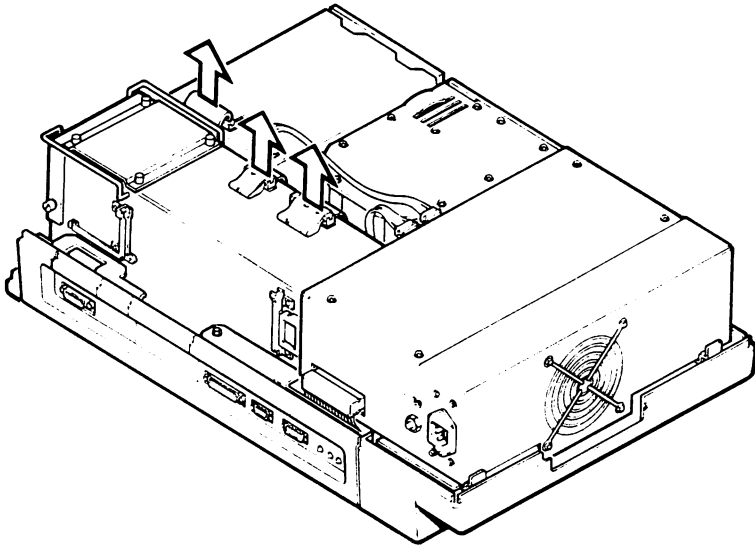
Disconnect any cables attached to option boards from the top of the card cage. Also remove the telephone line interface (TLI) board from the rear of the system module if the telephone management system (TMS) is installed.



MA-0005K82

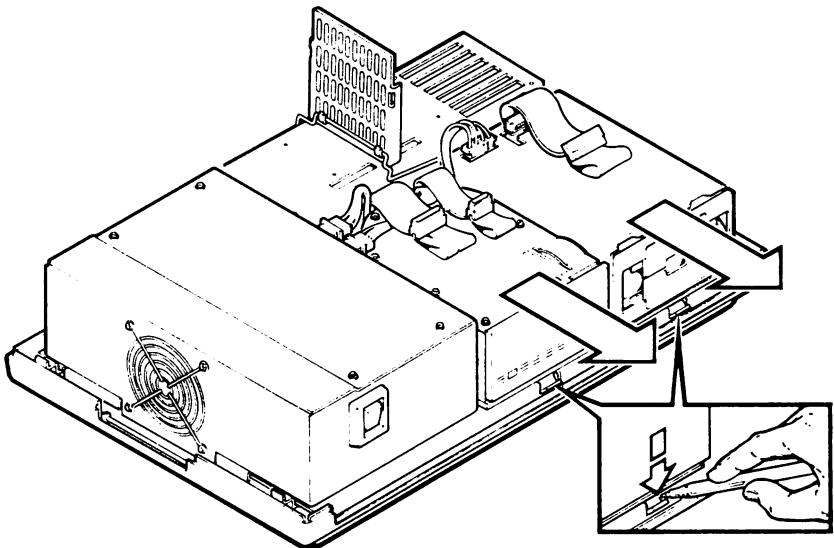
56 REMOVAL AND REPLACEMENT

3. Disconnect the diskette drive I/O cable from the diskette drive and the hard disk I/O cables from the hard disk drive I/O board.



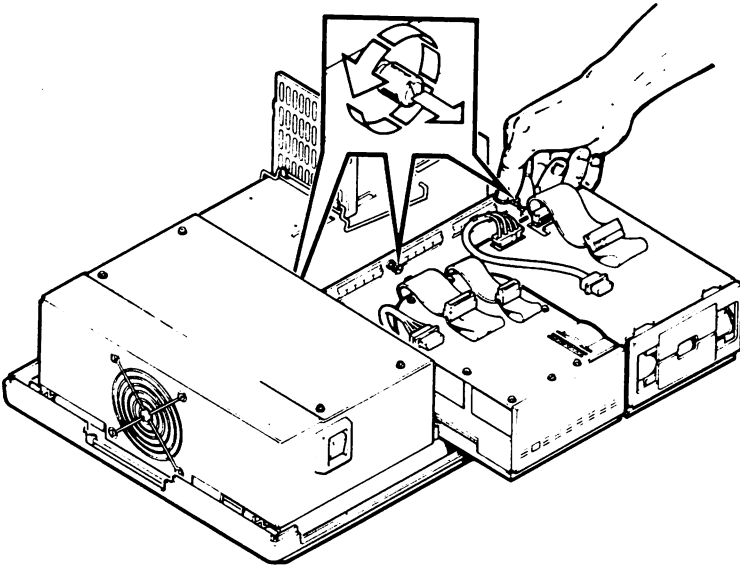
MA-0008C82

4. Find the release tab at the front center of each disk drive. Use a pen or similar object to push down the release tab, then slide each disk drive assembly about 2 inches to the front of the system unit.



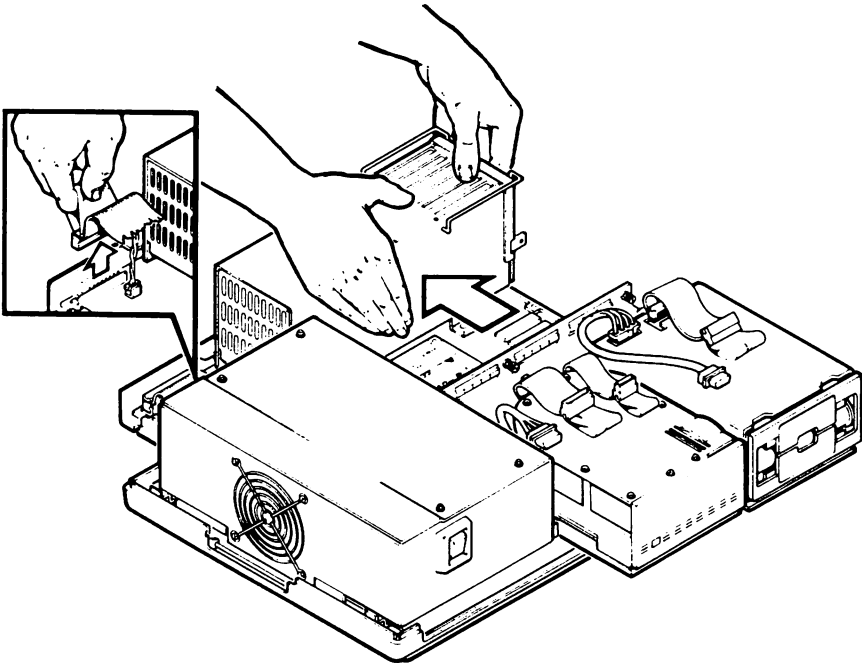
MA-0005L82

5. Loosen the three captive screws holding the system module to the chassis.



MA-0005M82

6. Slide the entire system module to the rear of the system cabinet about 2 inches. Disconnect the 16-pin power connector from the system module. You can disconnect the cable by pulling straight up on the white cable pull.



MA-0005N82

7. Remove the system module from the chassis.

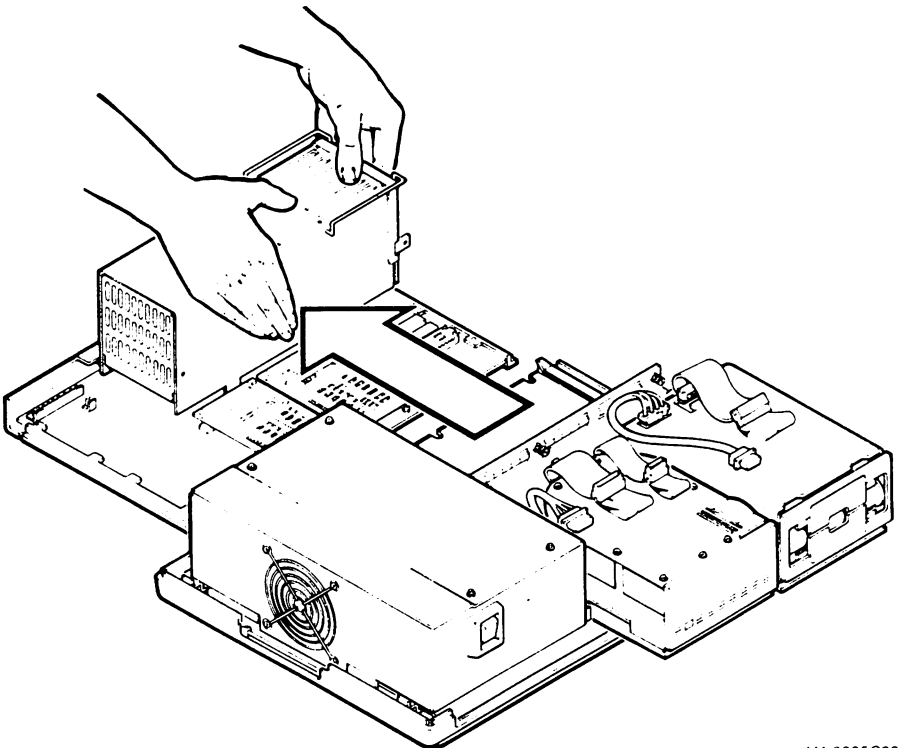
NOTES

The system module contains two memory boards. You must remove the memory boards from the system module before returning the module for repair (Paragraph 2.9).

Replace the system module only with the same kind of system module (Professional 325 or 350). See Paragraph 1.1.2 for the differences between modules.

If the customer has protected software, remove the ID ROM from the system module you are replacing. Then install the ID ROM on the new system module. Use the procedure in Paragraph 2.8.1.

Ask the customer to leave the system on for at least 48 hours. This fully charges the battery that powers the real-time clock and calendar on the system module.



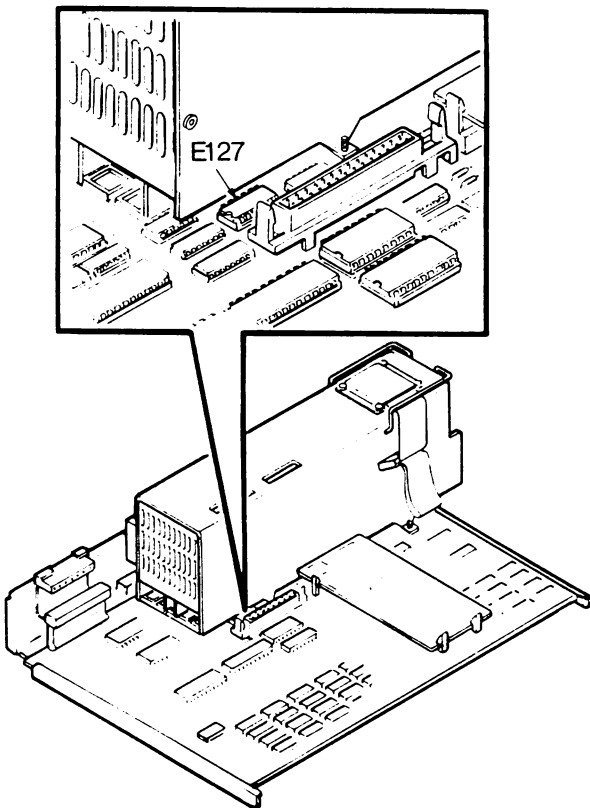
2.8.1 ID ROM

If the customer has protected software, transfer the ID ROM from the failing system module to the new system module as follows.

1. Using a Velostat Kit and a wrist strap, find the socketed ROM at location E127 on the system module.

NOTE

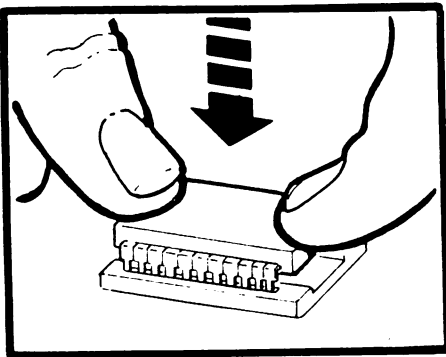
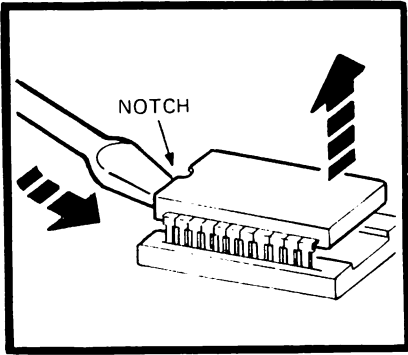
Older versions of the Professional 325 and 350 do not have socketed ROMs. If your computer does not have a socketed ROM, call the software support center for information on how to reload the protected software.



2. Lift out the ROM with a flat-blade screwdriver.
3. With the notch to the left, carefully press the ROM into the socket.

CAUTION

Press evenly; do not bend the pins.

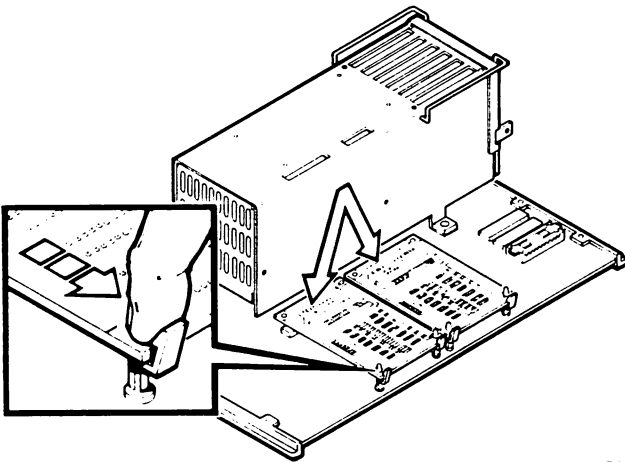


2.9 MEMORY BOARD

Remove either of the memory boards as follows. First remove the following FRUs in order.

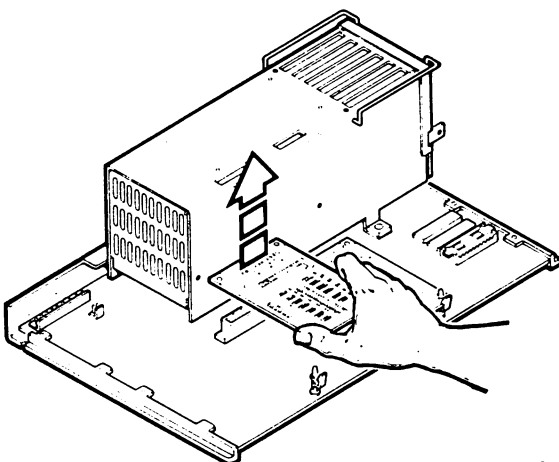
- Top cover (Paragraph 2.3)
- System module (Paragraph 2.8)

1. Release the memory board from the two plastic standoffs. The left board is bank 0 and the right board is bank 1.



MA-0005P82

2. Pull the memory board up and off the system module.



MA-0005Q82

2.10 FLOATING POINT ADAPTER

Remove the floating point adapter (FPA) chip as follows. First remove the following FRUs in order.

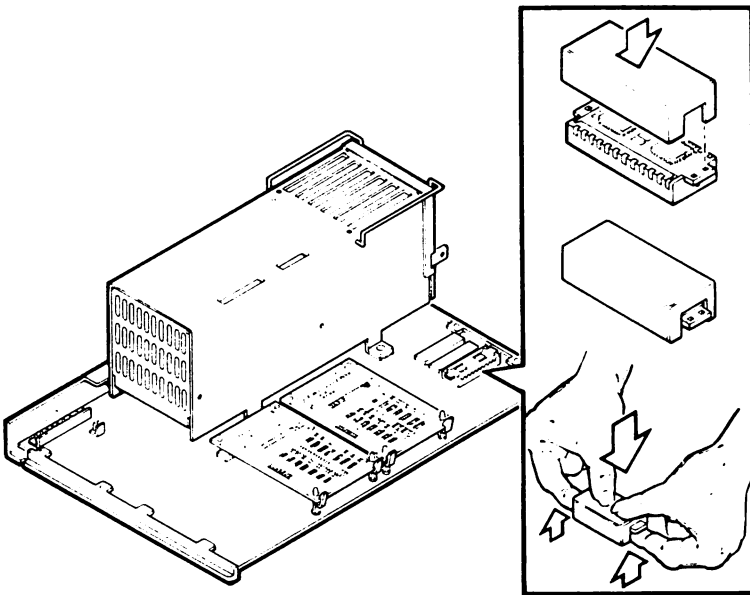
- Top cover (Paragraph 2.3)
 - System module (Paragraph 2.8)
1. Place the carrying package over the FPA chip. Remove the FPA chip by lifting up on the two ends of the chip. The figure shows the correct way to grasp the chip.

NOTE

If one FPA chip is in the special adapter socket, the entire system module must be replaced.

CAUTION

The FPA chip is static sensitive. Do not touch any metal parts on the chip. Do not use any carrying case other than the case supplied with the chip.



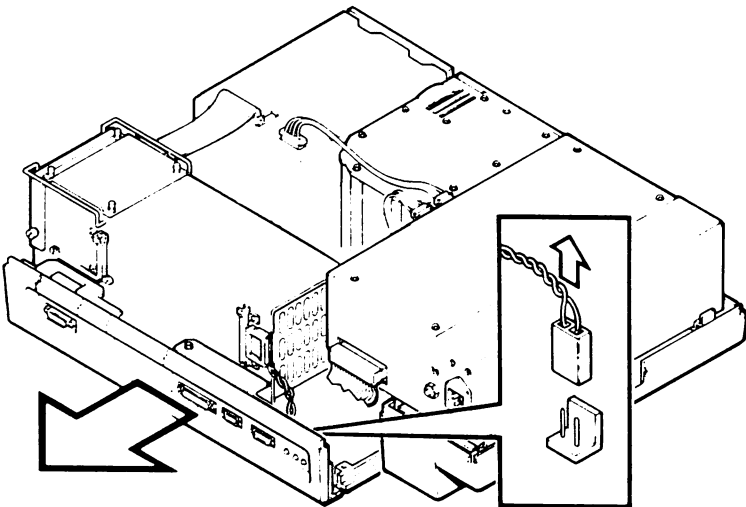
MA-0005R82

2.11 BATTERY PACK

Remove the battery pack as follows. First remove the following FRU.

- Top cover (Paragraph 2.3)

1. Slide the system module about 2 inches to the rear of the cabinet. Disconnect the 2-wire battery pack cable from the system module.

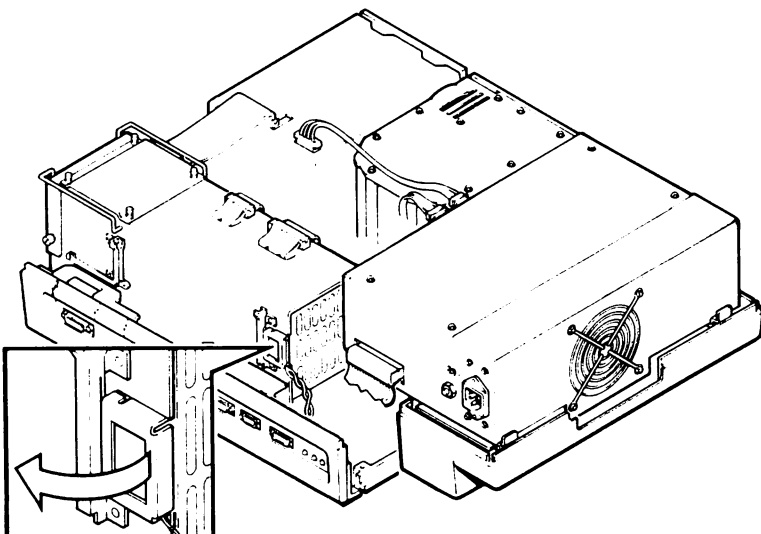


MA-0008D82

2. Open the battery pack holder and remove the battery pack. The battery pack is mounted on the rear of the card cage.

NOTE

Ask the customer to leave the system on for at least 48 hours. This fully charges the battery that powers the real-time clock and calendar on the system module.



MA-0008E82

2.12 I/O BOARDS

Remove any I/O board as follows. First remove the following FRU.

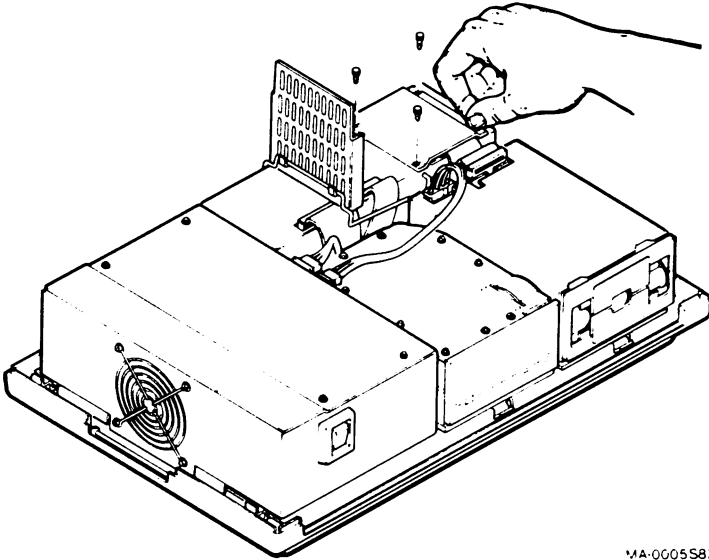
- Top cover (Paragraph 2.3)

NOTE

If you are removing the real-time interface (handle ID number 000046), go to Paragraph 2.12.1.

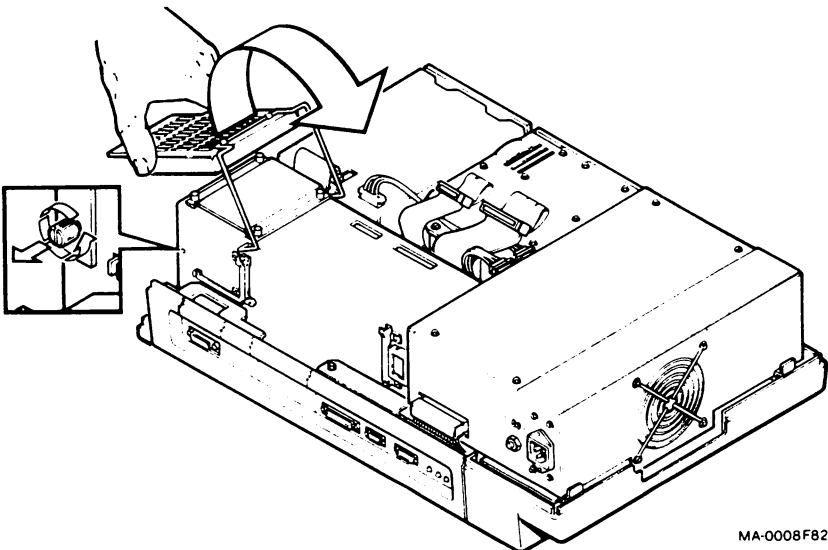
If you are removing the telephone management system (handle ID number 000041), go to Paragraph 2.12.2.

1. Remove the four screws holding the cable cover to the card cage and remove the cable cover.



MA-0005S82

2. Remove the screw holding the card cage door closed and open the door.

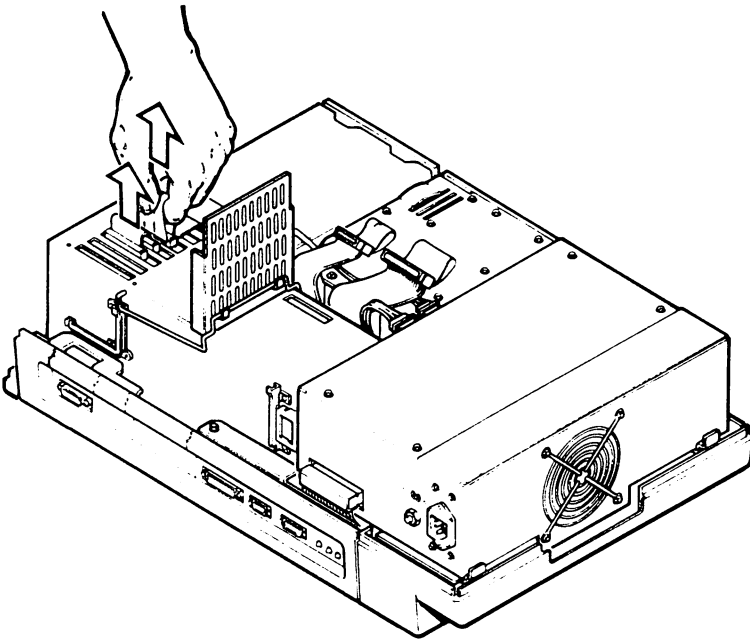


MA-0008F82

3. Disconnect any cables connected to the I/O board through the card cage slots. You can disconnect each cable by pulling straight up on the white cable pull.

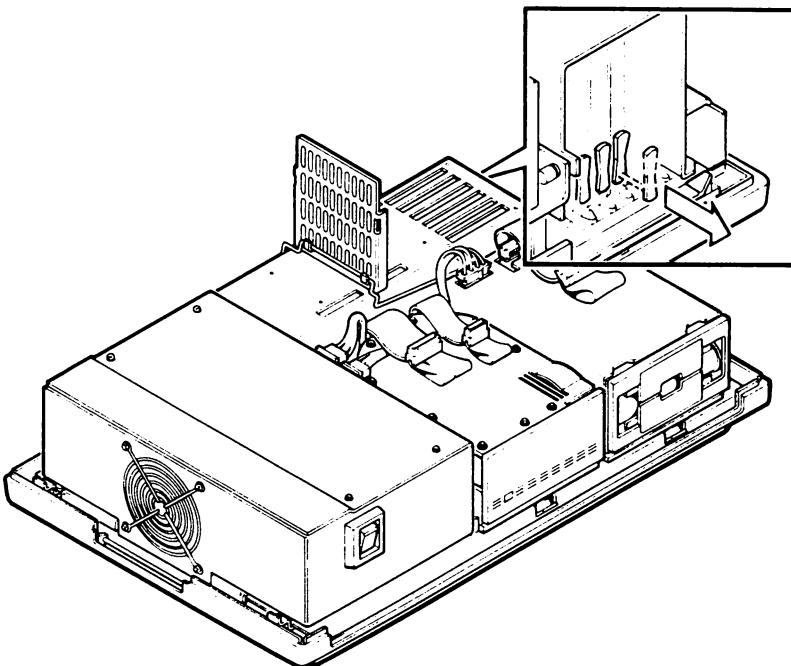
NOTE

The hard disk I/O board must go in slot 1. The real-time interface must go in slot 6.



MA-0008G82

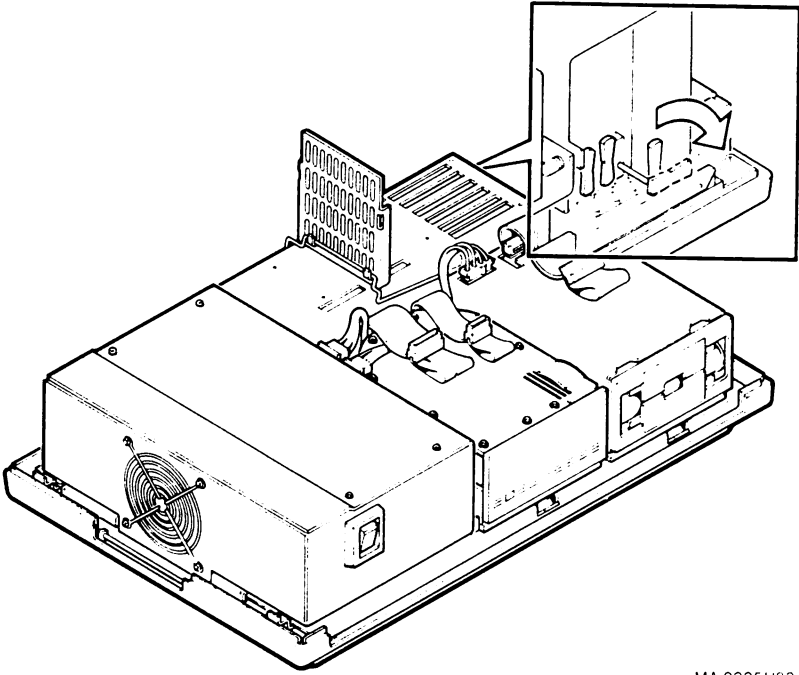
4. Pull the I/O board handle out. The handle slides out about 1 inch.



MA-0005T82

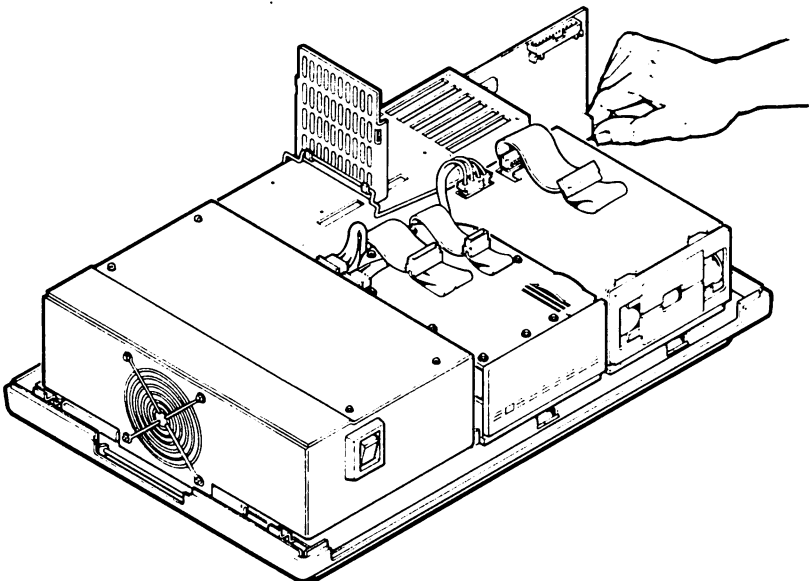
66 REMOVAL AND REPLACEMENT

5. Turn the handle to the right 90 degrees, toward the rear of the chassis. The pin-spreading sound is normal for this type of connector.



MA-0005U82

6. Slide the I/O board straight out.

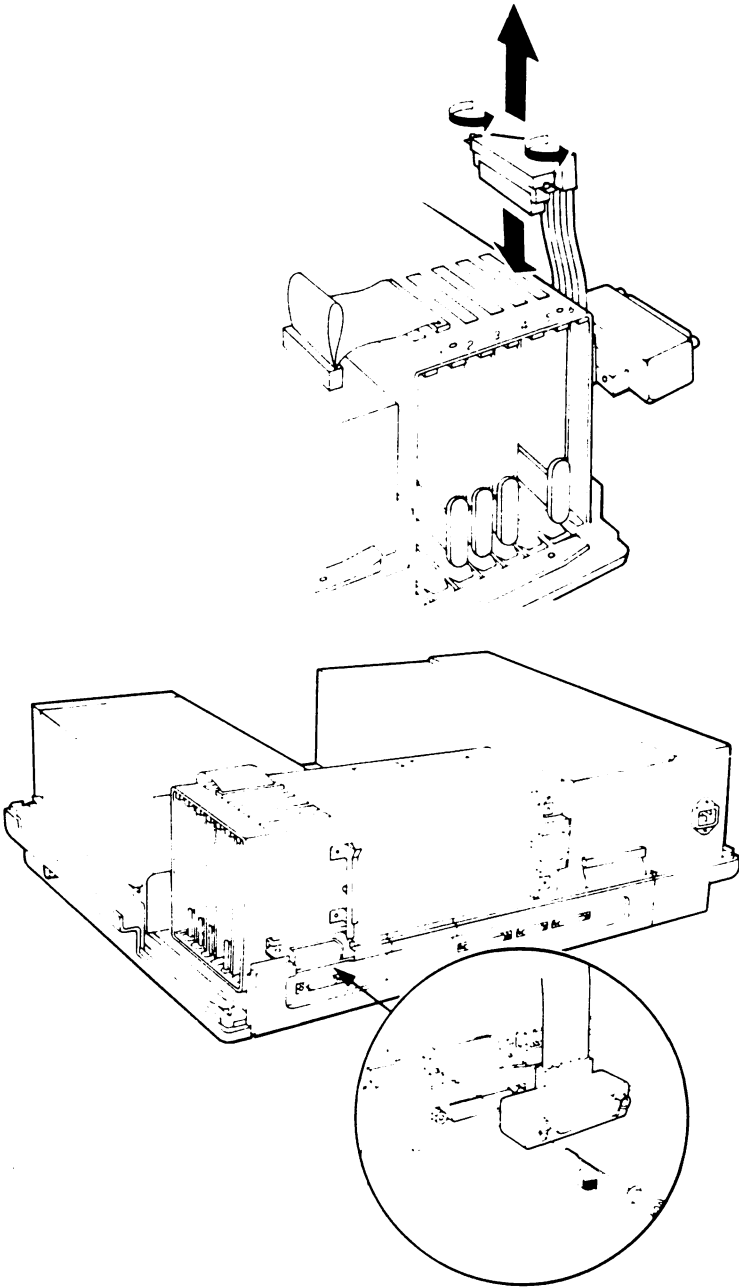


MA-0005V82

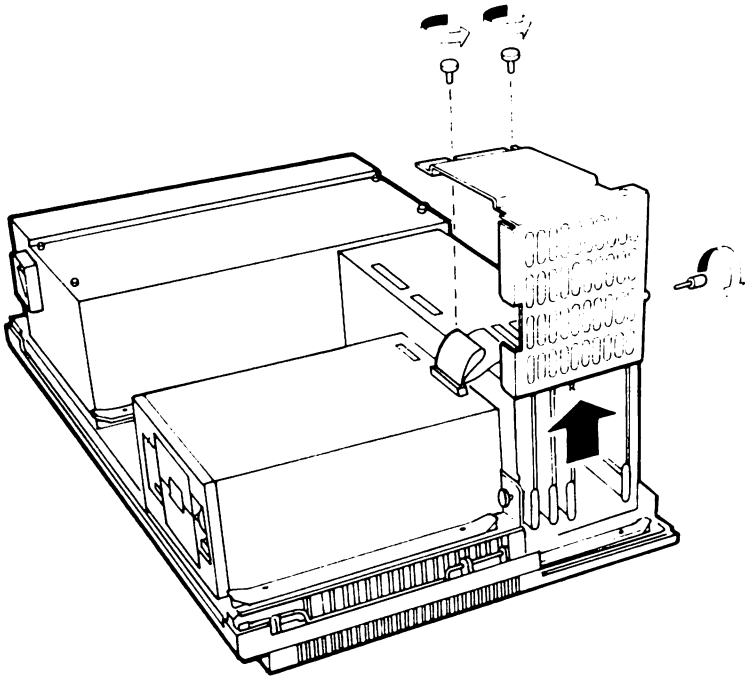
2.12.1 Real-Time Interface

Remove the real-time interface as follows.

1. Disconnect any device attached to the internal cable 62-pin connector. (This internal cable is only for the real-time interface.)
2. Remove the internal cable by unscrewing the two screws at the top of the cable and the two screws at the bottom connector.



3. Slide the internal cable up to disconnect it from the real-time interface.
4. Remove the three screws holding the combined card cage shield-door to the card cage. Remove the entire shield-door assembly by lifting it straight up.



MA-0044-84

5. Pull the I/O board handle out. The handle slides out about 1 inch (Paragraph 2.12).
6. Turn the handle to the right 90 degrees. The pin-spreading sound is normal for this type of connector.
7. Slide the real-time interface straight out.

Replace the real-time interface by following these steps in reverse. The real-time interface must go in slot 6.

Let the power-up self-test run to completion before connecting any external devices to the real-time interface.

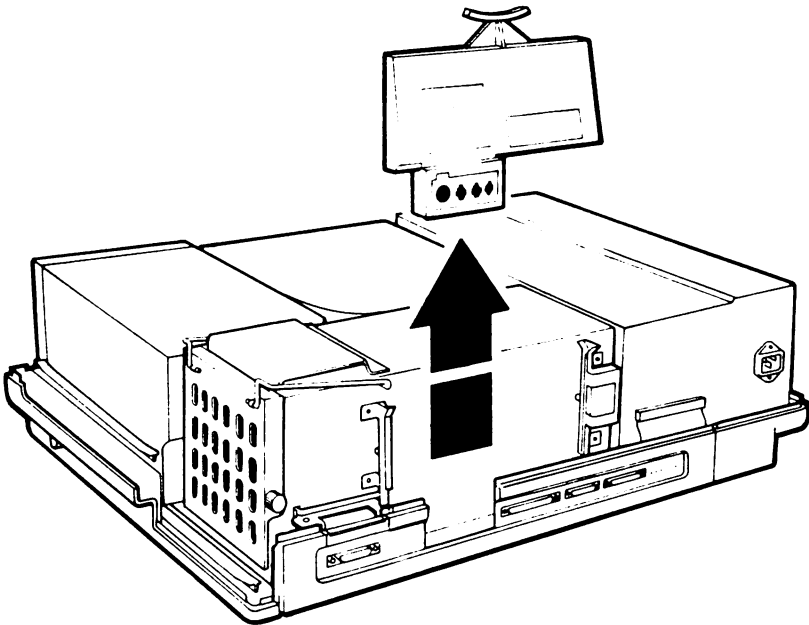
2.12.2 Telephone Management System (TMS)

TMS has two boards and may have accessories attached. The TMS controller is inside the card cage. The TMS telephone line interface (TLI) is mounted on the rear of the card cage; it lifts straight up. The optional voice unit connects to the TLI, and other accessories plug into the voice unit.

2.12.2.1 TMS Controller – Refer to Paragraph 2.12.

2.12.2.2 Telephone Line Interface – Remove the TLI as follows.

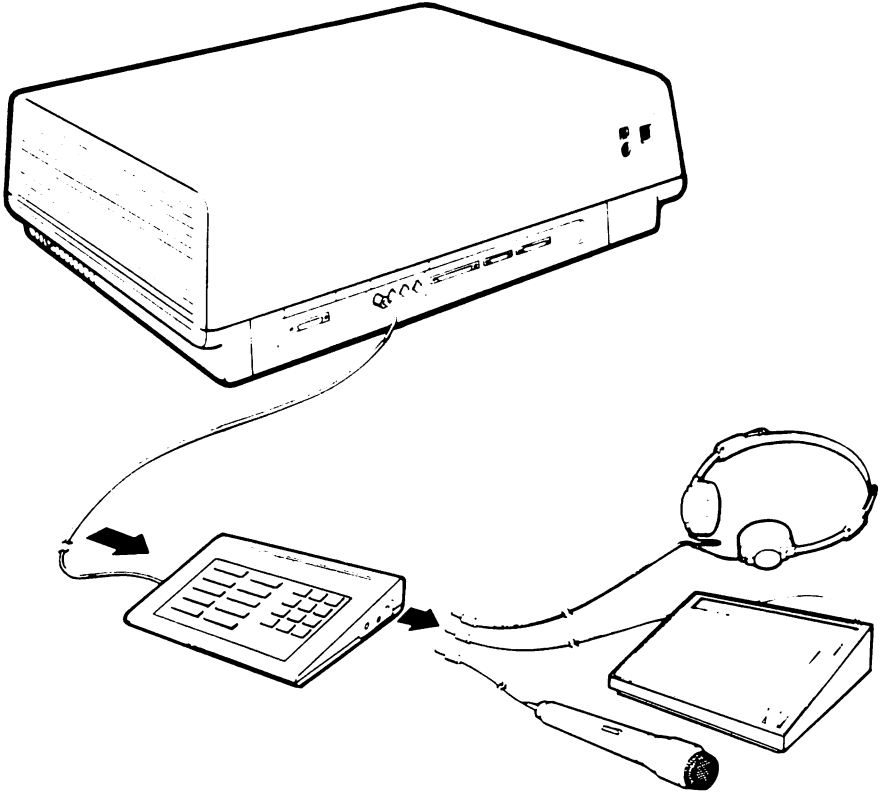
1. Disconnect any cables connected to the TLI.
2. Lift the TLI straight up.



MA-0048-84

2.12.2.3 Voice Unit and Accessories – Remove the voice unit and accessories as follows.

1. Disconnect the voice unit from the TLI.
2. Unplug the accessories from the voice unit.



MA-0049-84

2.13 KEYBOARD

Remove the keyboard as follows.

1. Turn system power off.
2. Disconnect the keyboard cable from the rear of the monitor.

NOTE

The keyboard is a single FRU; replace the entire keyboard.

2.14 RECOMMENDED SPARES LIST (RSL)

Table 2-1 is the recommended spares list for the basic Professional system.

Table 2-1 Recommended Spares List

Qty	Description	Part Number
PC300 Spares		
1	PC325 system module	KDF11-CB
1	PC350 system module	KDF11-CA
1	128K byte RAM board	54-15084-FA
1	Power supply	H7862
1	Video controller board	54-15138-00
1	RX50 diskette drive	RX50-AA
1	RX50 controller board	54-15058-00
1	RX50 diskette drive signal cable	17-00285-00
1	DC power cable (system board)	17-00280-00
1	DC power cable, RD drive (4 in)	17-00342-01
1	DC power cable, RX drive (6 in)	17-00342-02
1	Video cable (2-1/2 ft)	17-00283-01
1	Video cable (6 ft)	17-00283-00
1	Modem cable (10 ft)	17-00289-00
1	Modem cable (25 ft)	17-00289-01
1	Modem cable (50 ft)	17-00289-02
1	Printer cable (10 ft)	17-00300-00
1	Printer cable (25 ft)	17-00300-01
1	Printer cable (50 ft)	17-00300-02
1	Printer cable (100 ft)	17-00300-03
1	Console cable (10 ft)	17-00301-00
1	Console cable (25 ft)	17-00301-01
1	Console cable (50 ft)	17-00301-02
1	X.21 communications cable (10 ft)	17-00302-00
1	AC power cable (125 V)	17-00083-09
1	AC power cable (250 V)	17-00083-10
1	Professional 350 system unit enclosure	BA50-A
1	Floppy diskette kit	30-19448-02
1	Service kit suitcase	29-24198-00
1	Battery pack	12-19245-00
1	Communications port test connector	29-24795-00
1	Printer port test connector	29-24794-00
RDC50-A Spares		
1	RD50 disk drive	RD50-A
1	RD50 disk drive read/write board	29-24112
1	RD50 controller board	54-15134
1	RD50 disk drive cable (20 conductor)	17-00282
1	RD50 disk drive cable (34 conductor)	17-00286

Table 2-1 Recommended Spares List (Cont)

Qty	Description	Part Number
RD51-A Spares		
1	RD51 disk drive with slide plate	30-20004-02
1	RD51 disk drive read/write board	29-24665-00
1	DIP shunt (used on RD50 and RD51)	29-24115-00
1	Packaging container (used on RD50 and RD51)	99-90045-01
VC241-A Spares		
1	Extended bit map option (EBO) board	54-15146
1	Extended bit map option (EBO) cable	17-00303
1	Color monitor cable (6 ft)	17-00284-00
VR201 Spares		
1	Video monitor (white phosphor)	VR201-A
1	Video monitor (green phosphor)	VR201-B
1	Video monitor (amber phosphor)	VR201-C
LK201 Spares		
1	Keyboard (US)	LK201-AA
1	Keyboard (UK)	LK201-AE
1	Keyboard (Germany)	LK201-AG
1	Keyboard (Holland)	LK201-AH
1	Keyboard (France)	LK201-AP
1	Keyboard cable	17-00294-00
1	Keypac removal tool	74-27314-01
Memory Module Spares		
1	Memory module (256 KB)	54-15488-KA
CP/M Option Spares		
1	CP/M softcard	54-15641-AA
Telephone Management System (TMS) Spares		
DTC11-A		
1	TMS controller board	54-15215-00
1	TMS TL1 assembly	70-20405-00
1	Front plastic cover (for TL1)	74-28195-01
1	Rear plastic cover (for TL1)	74-28194-01
1	Telephone cable	17-00089-01
1	PRO/TMS Communications Test Services Diskette	ZBA-01-C3

Table 2-1 Recommended Spares List (Cont)

Qty	Description	Part Number
DTC11-B		
1	Voice unit	DTC11-B
Real-Time Interface Spares		
1	Real-time interface module (PC3XX-AA)	54-15539-01
1	Internal cable	17-00404-01
1	Loopback connector	12-21246-01
1	Connector pod (for PC3XX-AB)	70-20631-01
1	Connector cable (for PC3XX-AB)	70-00386-01
1	Serial line unit cable	17-00370-01
1	IEEE cable	17-00371-01
1	Parallel cable	17-00379-01
1	Card cage door-shield	74-28266-02
1	PRO/Real-Time Interface Maintenance Diskette	GL-X997A-BK
DECNA		
1	DECNA module	54-15987-01
1	Transceiver cable (16-1/2 ft)	17-00321-00
1	Loopback connector	12-22196-01
1	PRO/DECNA Maintenance Diskette	QBA-03-L3

3 VIDEO MONITOR ALIGNMENT

3.1 GENERAL

This chapter describes the alignment of the VR201 video monitor. Always check each adjustment, because many adjustments affect each other. However, if a check shows the correct indication, skip that adjustment and go to the next procedure.

To perform the adjustments, you must use the video alignment pattern program on the maintenance application diskette. Make all adjustments under the following conditions.

- Normal video (white characters on dark background)
- 80 characters per line
- CRT alignment pattern on screen

If the Professional computer uses a VR241 color monitor, refer to the *VR241-A Color Video Monitor Pocket Service Guide* (EK-VR241-PS).

3.2 MONITOR ADJUSTMENTS

The following paragraphs list the alignment procedures for the VR201 video monitor. Figure 3-1 shows the location of all adjustments.

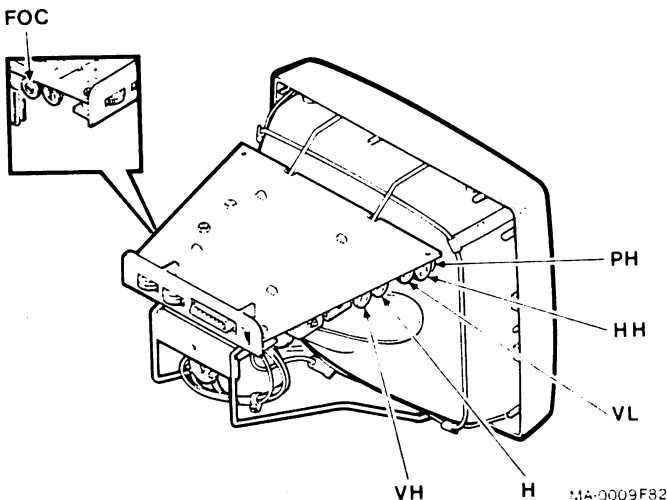


Figure 3-1 Video Adjustment Locations

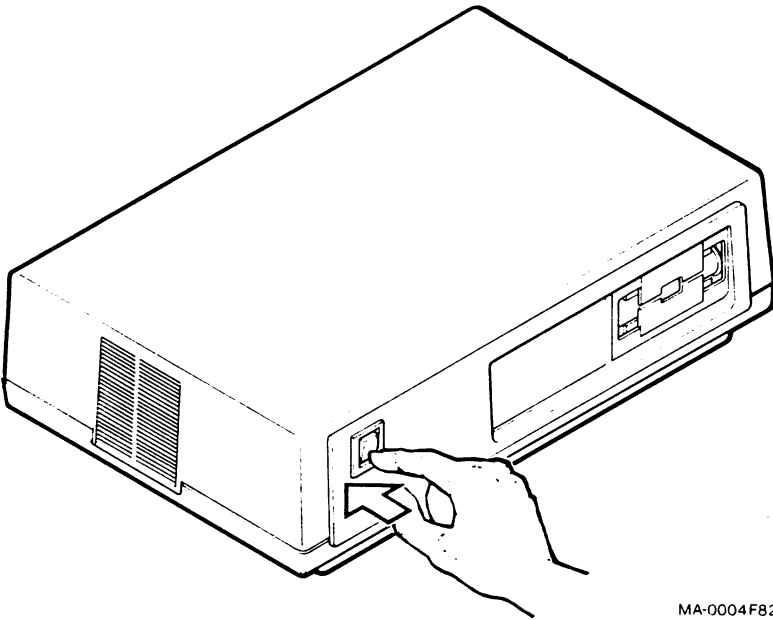
3.2.1 Removing the Monochrome Monitor

Remove the monochrome monitor as follows. (See Paragraph 3.2.3 for monochrome monitor alignment.)

1. Turn the system unit power switch off.

CAUTION

You must turn off the system unit power switch before disconnecting the video cable. The CRT anode will not discharge correctly if this step is not followed.

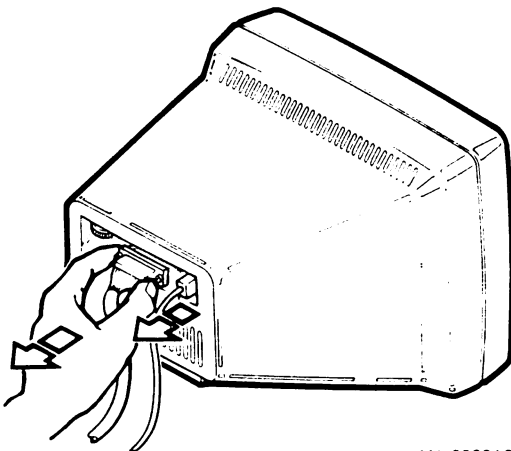


MA-0004F82

2. Disconnect the video and keyboard cables from the rear of the monitor.

NOTE

The face of the CRT must be cleaned after you finish with the monitor. Use the cleaning solution supplied with the monitor (PN 29-24791-00).



MA-0009A82

3.2.2 Removing the Monochrome Monitor Cover

Remove the monitor cover as follows. You need the following tools.

- Small blade screwdriver
- Small phillips screwdriver

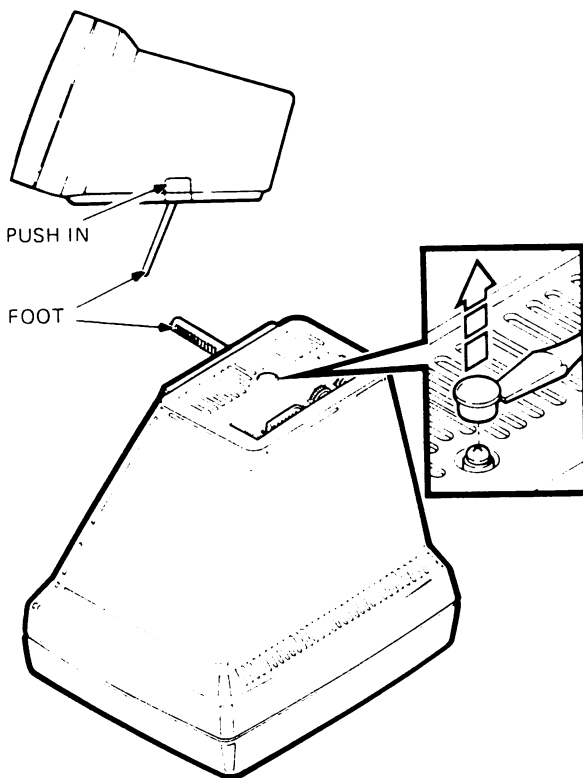
First remove the following FRU.

- Monochrome monitor (Paragraph 3.2.1)

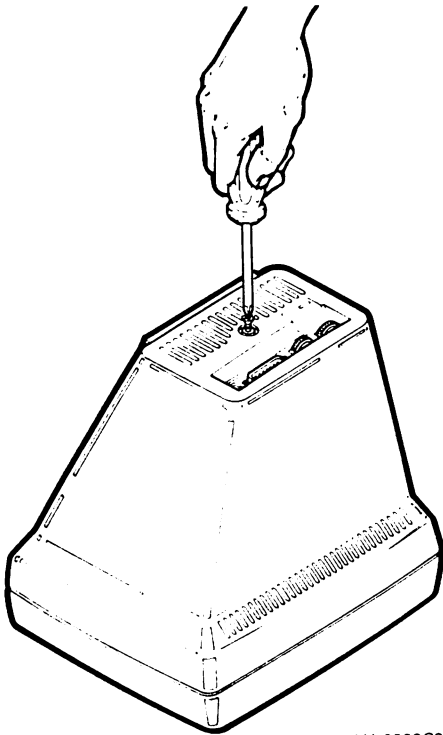
NOTE

In step 1, place a piece of paper under the monitor screen before turning it face down. This helps to prevent scratches.

1. Extend the tilt mechanism foot completely. Then carefully place the monitor face down on a flat surface. Use a small blade screwdriver to remove the plastic cap covering the retaining screw.



2. Use a phillips screwdriver to remove the screw holding the cover to the monitor chassis.

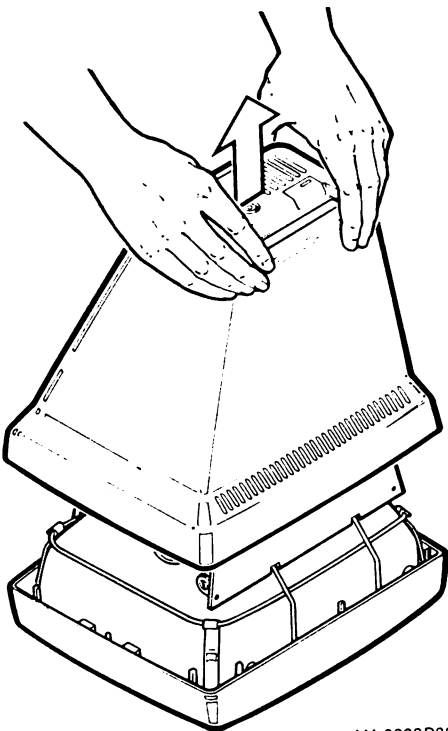


MA-0009C82

3. Remove the cover by sliding it straight up.

CAUTION

When replacing the monitor cover, make sure the tilt mechanism foot is fully extended.



MA-0009D82

3.2.3 Preparations for Alignment

Prepare the monitor for adjustment as follows.

NOTE

In step 1, place a piece of paper under the monitor screen before turning it face down. This helps to prevent scratches.

1. Place the monitor face down on a flat surface.
2. Remove the monitor cover (Paragraph 3.2.2).

CAUTION

High voltage is present in the monitor. Do not touch any components.

3. Return the monitor to its normal operating position. Make sure the monitor is on a nonconductive surface to avoid any electrical shorts.
4. Reconnect the video and keyboard cables to the monitor.
5. If you have a diskette based system, insert the P/OS system diskette in drive 1.
6. Turn the system power switch on.
7. Follow the instructions on the screen (Paragraph 1.4.7).
8. Turn the brightness and contrast controls to the minimum settings.
9. Increase the brightness control setting until the raster appears on the screen.
10. Decrease the brightness control setting until the raster just disappears from the screen.
11. Set the contrast control for the desired display intensity.
12. Remove the P/OS system diskette and insert the maintenance application diskette into drive 1.
13. Enter service mode from the maintenance services menu and select the alignment pattern (Paragraph 1.4.8).

3.2.4 Vertical Hold

Adjust the vertical hold as follows.

1. Examine the monitor display for rolling or any other sign of vertical instability.
2. If needed, adjust the vertical hold (VH) control to stabilize the display.

3.2.5 Horizontal Hold

Adjust the horizontal hold as follows.

1. Examine the monitor display for tearing or any other sign of horizontal instability.
2. If needed, adjust the horizontal hold (HH) control to stabilize the display.

3.2.6 Focus

Adjust the focus as follows.

1. Examine the crosshatch pattern at the four corners and in the center of the screen. Each line should be sharp and well defined.
2. If needed, adjust the focus (FOC) control for the best overall display.

3.2.7 Vertical Centering and Rotation

Check the vertical centering and rotation as follows.

1. Measure the distance in two places between the alignment pattern and the monitor bezel (Figure 3-2). Use the scale on the template for the measurements. Make a note of each measurement. Compare both measurements. The difference between the measurements should not be greater than ± 2 mm. If the difference is greater, go to step 4.

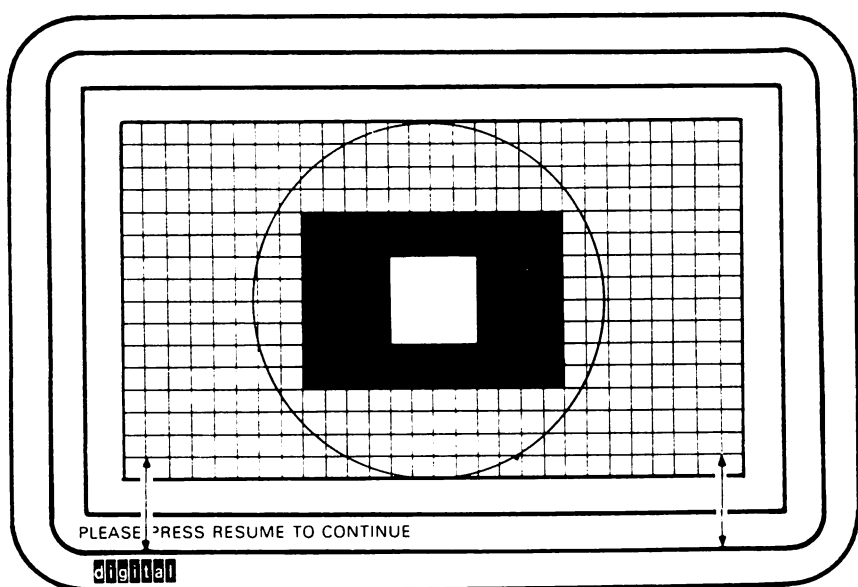


Figure 3-2 Rotation Check Points

2. Measure the distance between the top center edge of the alignment pattern and the monitor bezel. Also measure the distance between the bottom center edge of the alignment pattern and the monitor bezel. Use the scale on the template for the measurement.
3. Compare the measurements from step 2. The top measurement must be larger than the bottom. The difference between the two measurements must be from 2 mm to 14 mm. If either of these conditions is not met, go to step 4.

NOTE

The electrical center of the screen is not the same as the apparent physical center of the screen. When the monitor is adjusted correctly, the screen display is offset toward the bottom of the monitor screen.

4. If any of the measurements are out of tolerance, replace the monitor assembly.

3.2.8 Horizontal Centering

Adjust the horizontal centering as follows.

1. Measure the distance between the center left edge of the alignment pattern and the monitor bezel. Use the scale on the template for the measurement. Make a note of the measurement.
2. Measure the distance between the center right edge of the alignment pattern and the monitor bezel. Use the scale on the template for the measurement. Make a note of the measurement.
3. Compare the measurements from steps 1 and 2. If the difference between the two measurements is greater than 6 mm, adjust the horizontal phase (PH) control.
4. Perform steps 1 and 2 again to verify the adjustment.
5. If needed, check and adjust the aspect ratio (Paragraph 3.2.9).

3.2.9 Aspect Ratio (Horizontal Width and Height)

Adjust the aspect ratio as follows.

1. Place the alignment template over the center square of the alignment pattern.
2. Measure the bottom side of the center square. The bottom side should be $25 \text{ mm} \pm 2 \text{ mm}$. If needed, adjust the width coil until the bottom side is within this tolerance.
3. Measure the left side of the center square. The side should be within 1 mm of the width dimension you set in step 2. If the side is not within this range, adjust the height (H) control.
4. If needed, check and adjust the horizontal centering (Paragraph 3.2.8) and vertical linearity (Paragraph 3.2.10).

3.2.10 Vertical Linearity

Adjust the vertical linearity as follows.

1. Check the height of the crosshatch pattern near the four corners of the display. The pattern should have the same height in all four corners.
2. If needed, adjust the vertical linearity (VL) control until the pattern is the same height in all four corners.
3. If needed, check and adjust the aspect ratio (Paragraph 3.2.9).

4 TROUBLESHOOTING THE DELNI UNIT

4.1 GENERAL

This chapter tells you how to test a DELNI unit with the PRO/DECNA maintenance services and the loopback connector that comes with the DECNA controller. With this test, you can also test the Professional computer, the DECNA controller, a DELNI unit, and the transceiver cable if the DELNI unit is attached to another DELNI unit or transceiver. Use the test if the error code shown on the monitor screen, on power-up, is 0111 or greater.

See Paragraphs 1.4.1 and 1.16.4 for instructions on how to run the PRO/DECNA maintenance services. Before testing, be sure the green power-on indicator on the DELNI panel is on.

CAUTION

Tell everyone using the network that you are testing the DELNI unit and that they will be disconnected from the network until you are finished. They will not be able to transfer messages.

4.2 TESTING THE DELNI UNIT

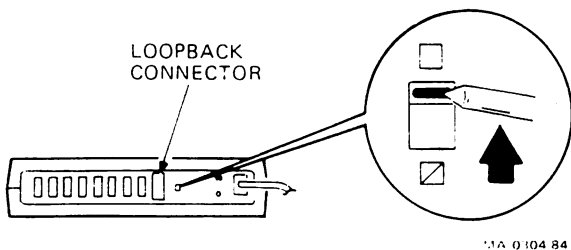
Use the following procedure to test the DELNI unit.

1. Disconnect all cables from the DELNI unit, including the one attached to the Professional computer. Keep aside the cable that goes to the Professional computer.

NOTE

If the DELNI unit uses the ninth connector, disconnect the ninth connector also.

2. Attach the DECNA loopback connector to connector 9 on the DELNI unit. Set the STANDALONE/CONNECTED switch in the connected position (up).



11A 0 104 84

- Using only the 5 meter (16.4 feet) cable attached to the Professional computer, connect the cable to each DELNI connector, in turn, and run the DECNA test.

CAUTION

Be sure the test is not running whenever you connect or disconnect the transceiver cable to or from the DELNI unit.

Any DELNI connector that indicates an error on the test summary is defective and should not be used. The DELNI unit can still be used except for the defective connector until a replacement can be made.

NOTE

If the DELNI unit connects to a H4000 transceiver, be sure the green indicator on the end of the loopback connector lights. If it does not, power is not reaching the transceiver, and the transceiver cannot operate.

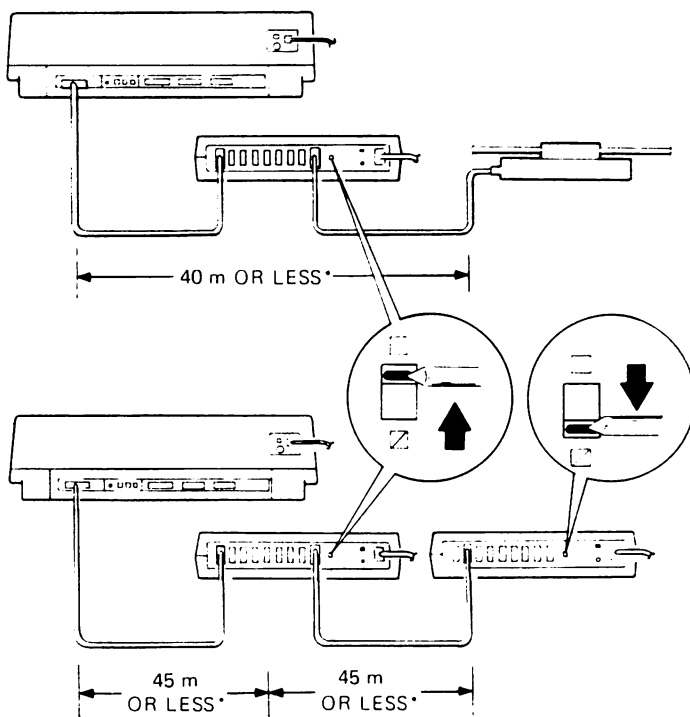
4.3 TESTING THE TRANSCEIVER CABLE

Use the following procedure if the DELNI unit is connected to another DELNI unit, or a transceiver, in a 2-tier or connected DELNI local area network (LAN).

If you get an error indication on the DECNA and DELNI tests, use the following procedure. It tests the transceiver cable that connects the first DELNI unit to another DELNI unit or transceiver.

Use only one Professional computer connected to the first DELNI unit.

- Set the STANDALONE/CONNECTED switch in the connected position (up).
- Remove the end of the transceiver cable from the second DELNI unit or the transceiver.



*TEST IN LENGTHS OF 25 m OR LESS.

11A 0 106-H4

3. Attach the loopback connector to this end of the cable and run the DECNA test.

NOTE

If the DELNI unit connects to a H4000 transceiver, be sure the green indicator on the end of the loopback connector lights. If it does not, power is not reaching the transceiver, and the transceiver cannot operate.

If the test runs successfully, the transceiver cable is good and the second DELNI unit or the transceiver is faulty.

You can test the second DELNI unit with the same procedure for a single DELNI unit. *Do not use the loopback connector.* The second DELNI unit acts as a loopback connector. Move the cable from one connector to the next. You can continue to use this DELNI unit with a defective connector until you get a replacement. If this test runs successfully, then the transceiver is faulty.

4.4 SOFTWARE PROBLEMS

In some situations, your network software may not be operating correctly. This may cause problems in transferring data and files. Be sure you have the latest version of your network software installed. Contact your network manager or Digital for assistance.

A RELATED DOCUMENTATION

The following is a list of related hardware documentation for the Professional 300 series.

Professional 300 Series Technical Manual EK-PC350-TM

Describes the Professional computer system to a detailed block diagram level. This manual does not contain detailed schematic drawings. The *Professional 350 Field Maintenance Print Set* has detailed schematic drawings. It is ordered separately.

Professional 350 Illustrated Parts Breakdown (IPB) EK-SB350-IP

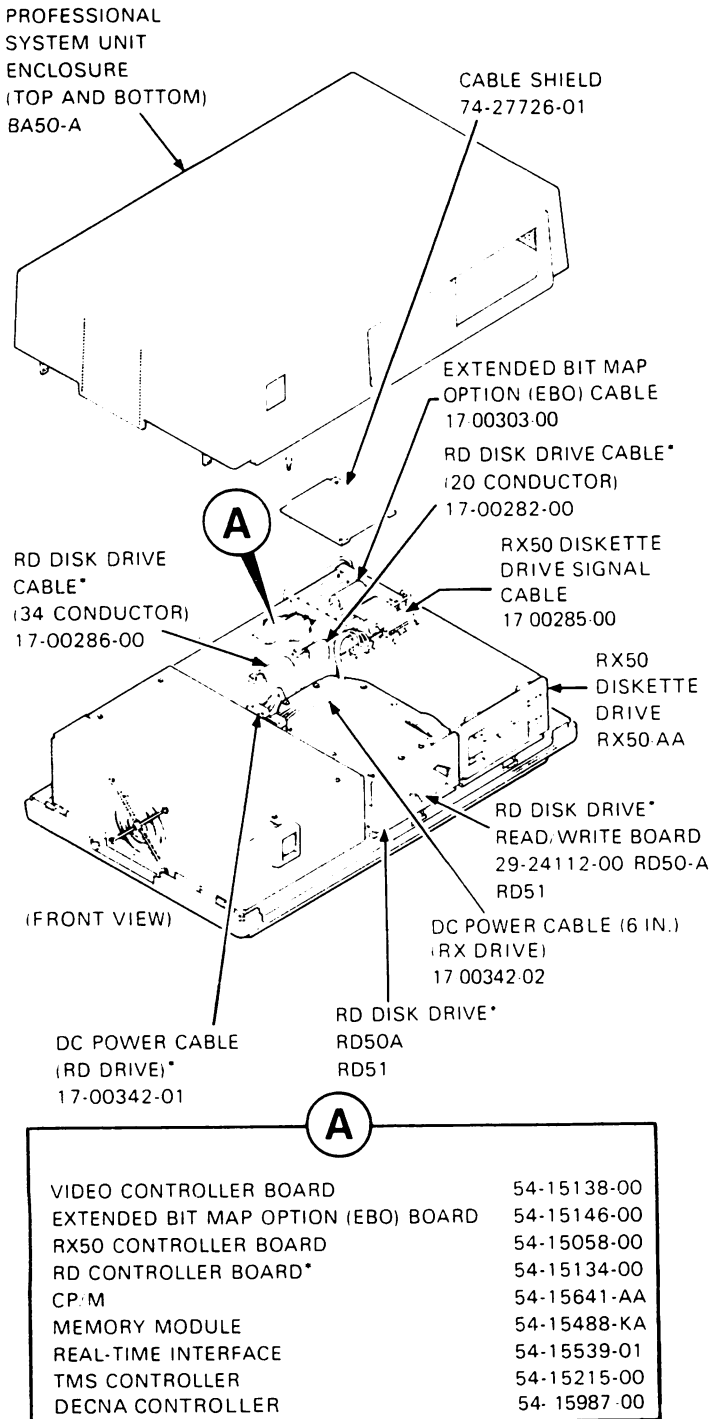
Provides a detailed parts breakdown of the Professional's field replaceable units (FRUs). These documents do not contain part numbers for components on the printed circuit boards. However, components are listed in the *Professional 350 Field Maintenance Print Set*. It is ordered separately.

DECNA Field Maintenance Print Set	MP-01895-01
KEF11 Field Maintenance Print Set	MP-01473-00
LK201 Keyboard Field Maintenance Print Set	MP-01395-00
MSC11 Memory Module Field Maintenance Print Set	MP-01601-00
PC3XS CP/M Softcard Field Maintenance Print Set	MP-01730-00
PC3XX Real-Time Interface Module Field Maintenance Print Set	MP-01713-00

Professional 350 Field Maintenance Print Set	MP-01394-00
Telephone Management System Field Maintenance Print Set	MP-01654-01
VC241 Extended Bit Map Option Field Maintenance Print Set	MP-01471-00
VR201 Monochrome Monitor Field Maintenance Print Set	MP-01410-00

Each print set provides a complete set of electrical and mechanical schematic drawings.

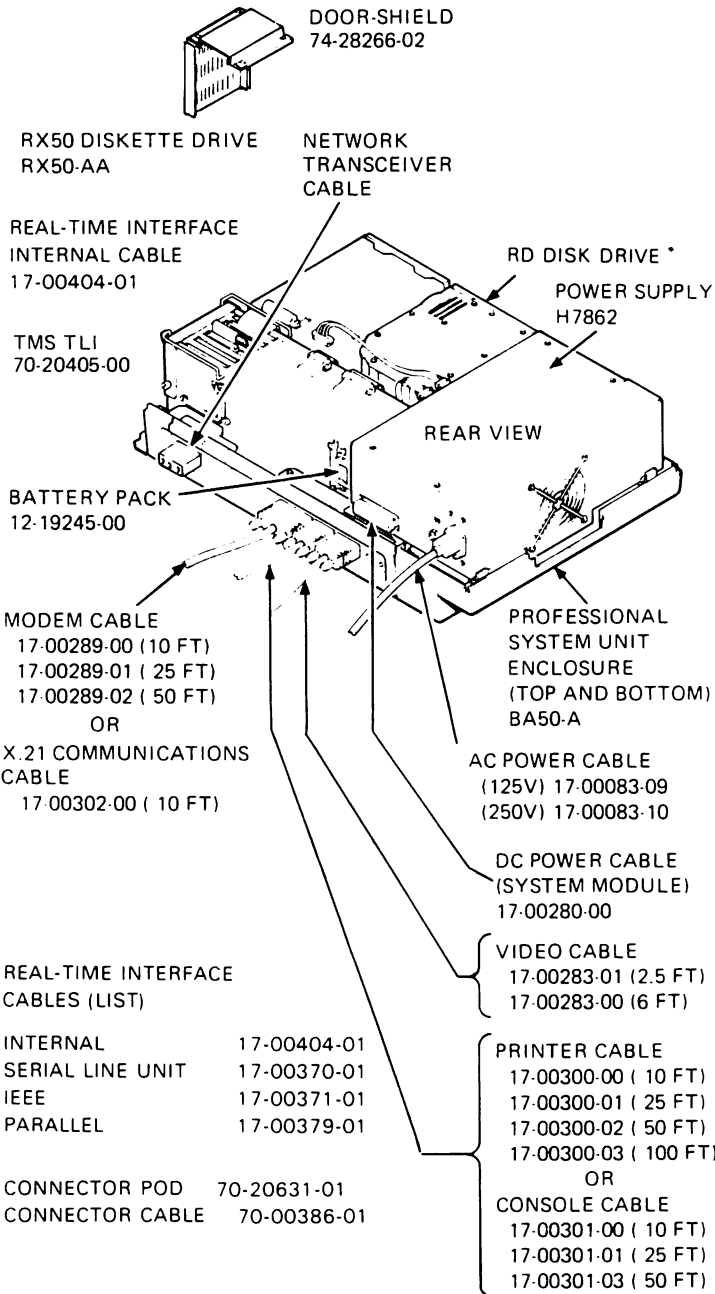
B FRU EXPLODED VIEW DRAWINGS



* PROFESSIONAL 350 ONLY

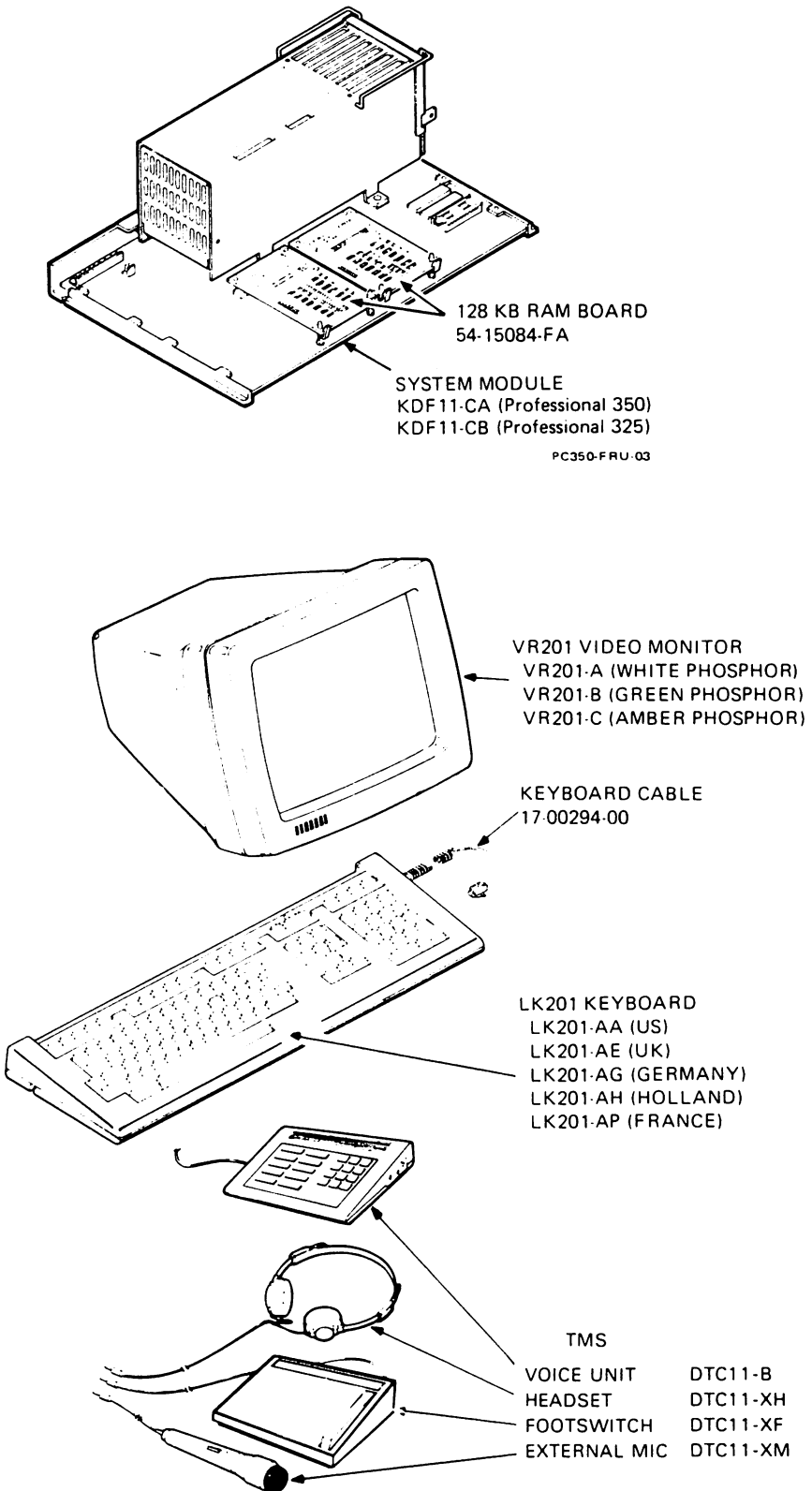
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Figure B-1 Professional 325/350 FRUs (Exploded View) (Sheet 1 of 3)



MA-0705-84

Figure B-1 Professional 325/350 FRUs
(Exploded View) (Sheet 2 of 3)



MA-0046-84

Figure B-1 Professional 325/350 FRUs
(Exploded View) (Sheet 3 of 3)

C PHYSICAL/FUNCTIONAL DIAGRAMS

SYSTEM MODULE CONNECTOR PINS AND SIGNALS

Battery Connector – J3

Pin 1 +3.6 V
2 Ground

DC Power Connector – J4

Pin 1 BDCOK
2 KEY
3 BPOK
4 –12 Vdc
5 +12 Vdc
6 +5 Vdc
7 +5 Vdc
8 +5 Vdc
9 +5 Vdc
10 Ground
11 Ground
12 Ground
13 Ground
14 Ground
15 Ground
16 Ground

VIDEO1 Video/Keyboard Interface – J5

Pin 1 Blue return
2 Green return
3 Red return
4 Mono return
5 Ground
6 Ground
7 +12 Vdc
8 +12 Vdc
9 Blue video signal

- 10 Green video signal
- 11 Red video signal
- 12 Mono video signal
- 13 Mon Present
- 14 KBD RDATA
- 15 KBD TDATA

PRT1 Serial Printer Interface Connector – J6

- Pin 1 Protective ground
- 2 Transmit data
- 3 Receive data
- 4 Not used
- 5 Data terminal ready
- 6 Data set ready
- 7 Signal ground
- 8 Ground
- 9 Terminal (L)

COMM1 Communications Interface – J7

- Pin 1 Protective ground
- 2 Transmit data
- 3 Receive data
- 4 Request to send (RTS)
- 5 Clear to send (CTS)
- 6 Data set ready (DSR)
- 7 Signal ground
- 8 Carrier detected (CD)
- 9 Not used
- 10 Not used
- 11 Not used
- 12 Speed mode indicator (SPDMI)
- 13 Not used
- 14 Not used
- 15 Transmit clock (STC)
- 16 Not used
- 17 Receive clock (RXC)
- 18 Local loopback (LL)
- 19 Not used
- 20 Data terminal ready (DTR)
- 21 Remote loopback (RL)
- 22 Ring indicator (RI)
- 23 Data signal rate select (DSRS)
- 24 Transmit clock (TXC)
- 25 Test indicator (TI)

NET1 Network Interface – J9

Pin	1	Shield
	2	Collision presence +
	3	Transmit +
	4	Not used
	5	Receive +
	6	Power return
	7	Not used
	8	Not used
	9	Collision presence –
	10	Transmit –
	11	Not used
	12	Receive –
	13	+12 Vdc
	14	Not used
	15	Not used

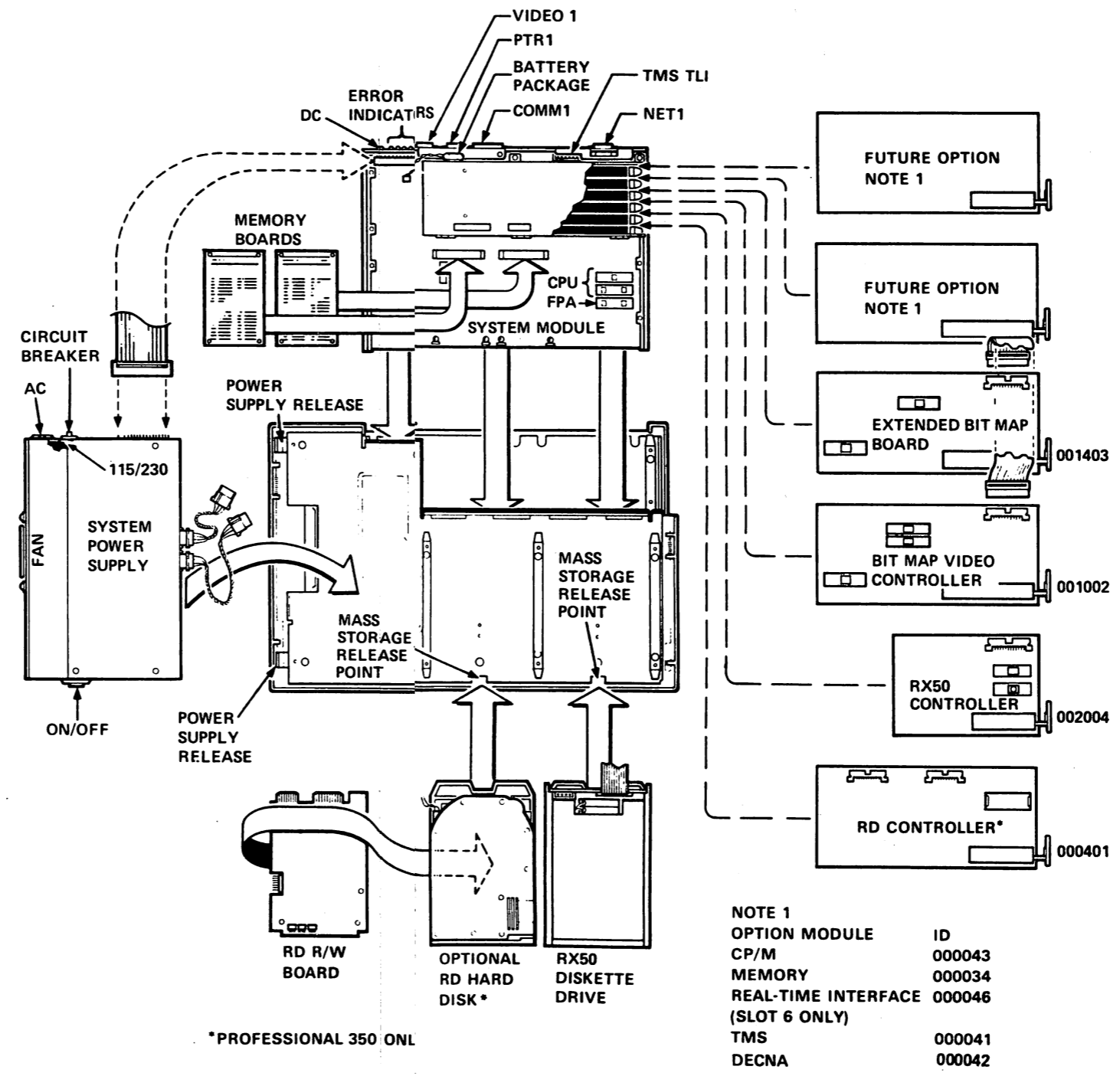
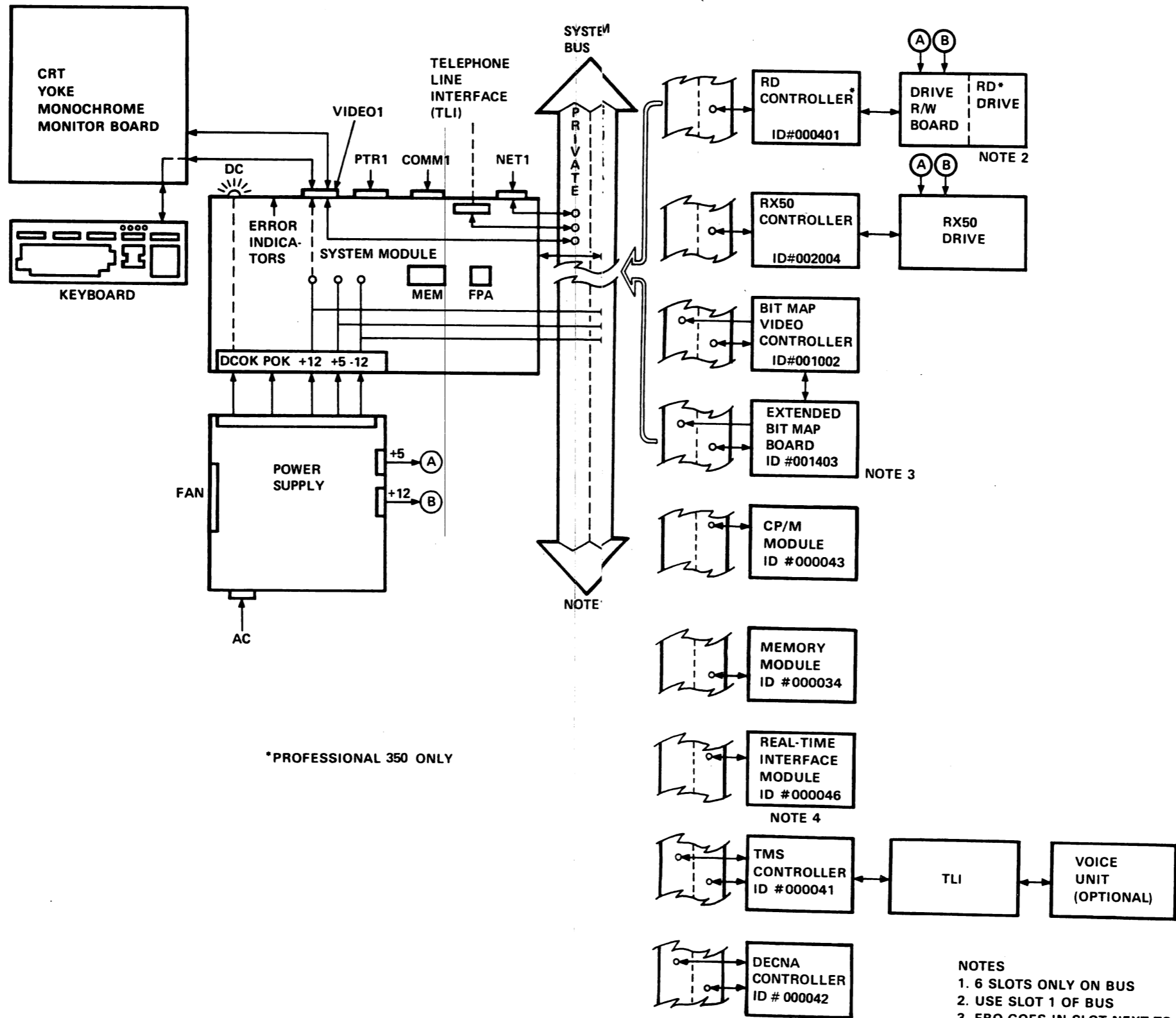


Figure C-1 Physical Block Diagram



*PROFESSIONAL 350 ONLY

- NOTES
1. 6 SLOTS ONLY ON BUS
 2. USE SLOT 1 OF BUS
 3. EBO GOES IN SLOT NEXT TO VIDEO CONTROLLER
 4. SLOT 6 ONLY