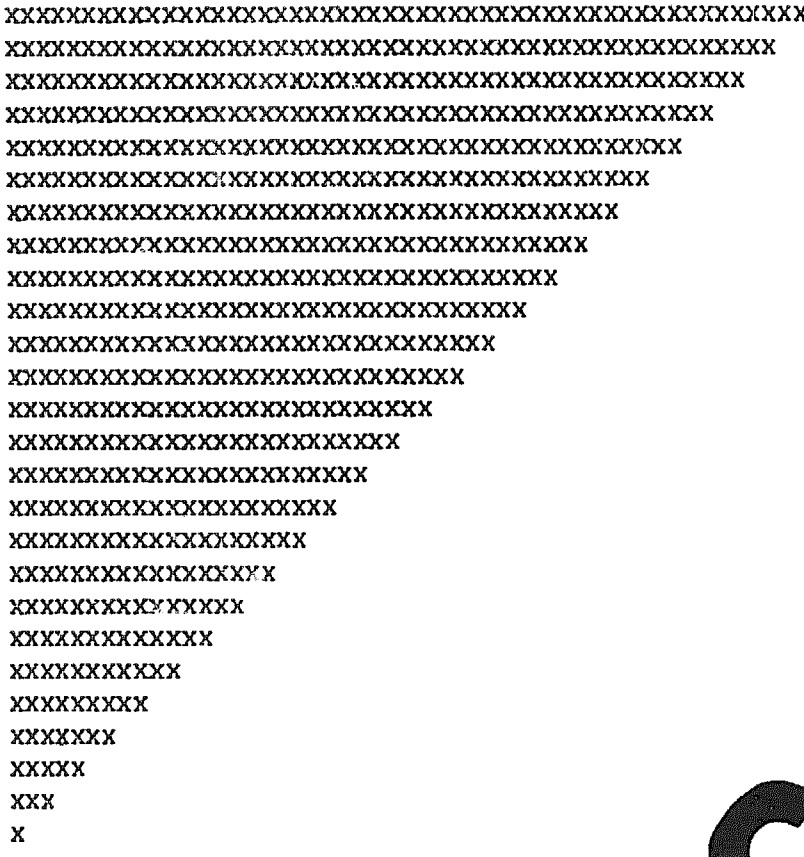

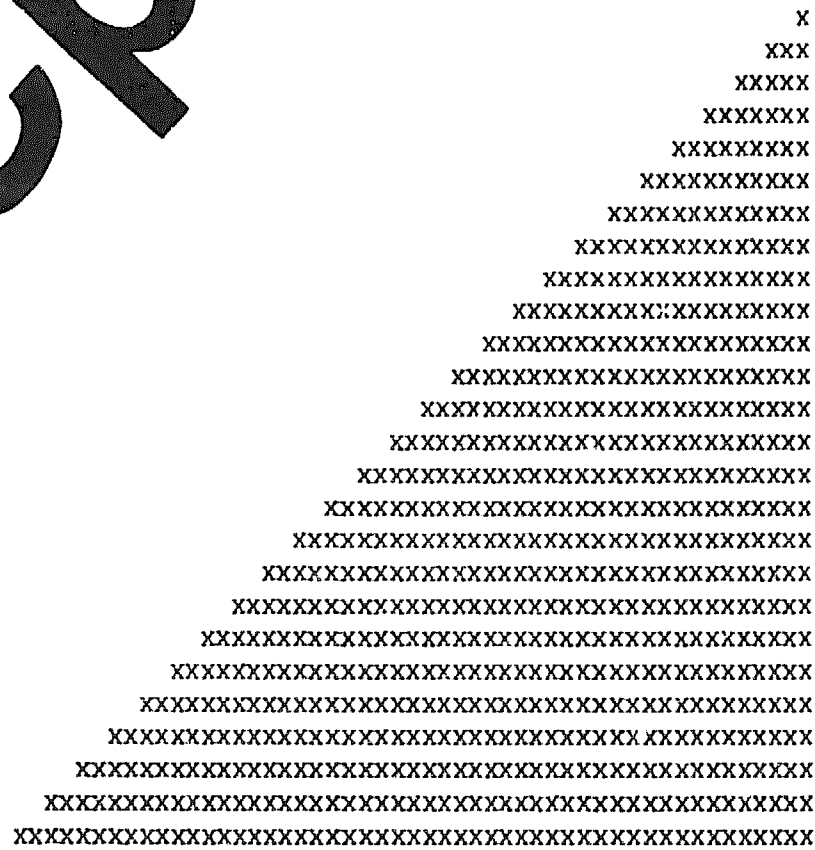

DECpc 433

DECpc™ 433 Workstation
Service Guide

Order Number ER-PCW10-SV-001

digital equipment corporation
maynard, massachusetts

June 1991

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This equipment has been tested for radio frequency emissions and has been verified to meet VDE 0871 Class B.

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The marketing and sale of the equipment was reported to the German Postal Service.

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About This Guide

Purpose

This service guide is designed to help you diagnose faulty components and repair the DECpc 433 Workstation and the optional SCSI Expansion Box. This guide only contains information servicing the base system and expansion box. Specific information on configuring and installing mass storage options is covered in the individual option installation guides supplied with those products. Information on troubleshooting and repairing video monitor options is also covered in separate service documentation.

Audience

This guide is written specifically for an authorized repair technician. It also assumes a familiarity with the general terminology associated with personal computers.

Organization

This service guide is organized as follows:

Chapter 1	System Description — briefly describes the workstations major components.
Chapter 2	Troubleshooting — provides troubleshooting information for the system box and SCSI expansion box.
Chapter 3	System Box FRU Replacement — describes how to remove and replace system box FRUs.
Chapter 4	SCSI Expansion Box FRU Replacement — describes how to remove and replace SCSI expansion box FRUs.

Appendix A	Power Consumption — provides power consumptions specifications for the system box and SCSI expansion box.
Appendix B	Interface Connectors — lists interface information for all system connectors.
Appendix C	ROM-Based Setup — describes the Setup utility and system configuration information.
Appendix D	Device Mapping — provides tables listing the system memory map, I/O address map, interrupt map, LAN memory map, and DMA map.
Index	Index — an index of service guide information.

Notational Conventions

Notational conventions used throughout this guide include:

*	In connector pinout listings, the asterisk (*) indicates an active low signal, for example, IOCHCK*
H	An H suffix to a numerical value denotes hexadecimal numbers, for example, 0F8H equals 0F8 (hexadecimal).
Kb	A Kb suffix to a numerical value indicates size in kilobits, for example, 512 Kb. A kilobit equals 1024 bits.
KB	A KB suffix to a numerical value indicates size in kilobytes, for example, 640 KB. A kilobyte equals 1024 bytes.
Mb	An Mb suffix to a numerical value indicates size in megabits, for example, 4 Mb. A megabit equals 1,048,576 bits.

MB	An MB suffix to a numerical value indicates size in megabytes, for example, 1 MB. A megabyte equals 1,048,576 bytes.
GB	A GB suffix to a numerical value is used to indicate size in gigabytes, for example, 1 GB, 256 GB, etc. A gigabyte equals 1,073,741,824 bytes.

An italicized word or phrase is used to represent a variable or to lend emphasis in textual descriptions. File names, path names, and directories are also italicized.

Three kinds of special notices are used throughout this guide to emphasize specific information:

WARNING
WARNING indicates the presence of a hazard that can cause personal injury if the hazard is not avoided.

CAUTION
CAUTION indicates the presence of a hazard that might cause damage to hardware or corrupt software.

NOTE
Notes are used to provide important or explanatory information.

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P.O. Box CS2008
Nashua NH 03061

Related Documentation

The following documents are available as supplements to the information provided in this service guide.

Document	Part Number
DECpc 433 Workstation User's Guide	ER-PCW10-UG
DECpc SCSI Expansion Box Installation Guide	ER-PCWXE-IG
DECpc 433 Workstation Technical Reference Manual	PCW1Y-AA
MS-DOS Supplemental Kit Installation Guide	PCWXQ-XA
OS/2 Supplemental Kit Installation Guide	PCWXQ-XB

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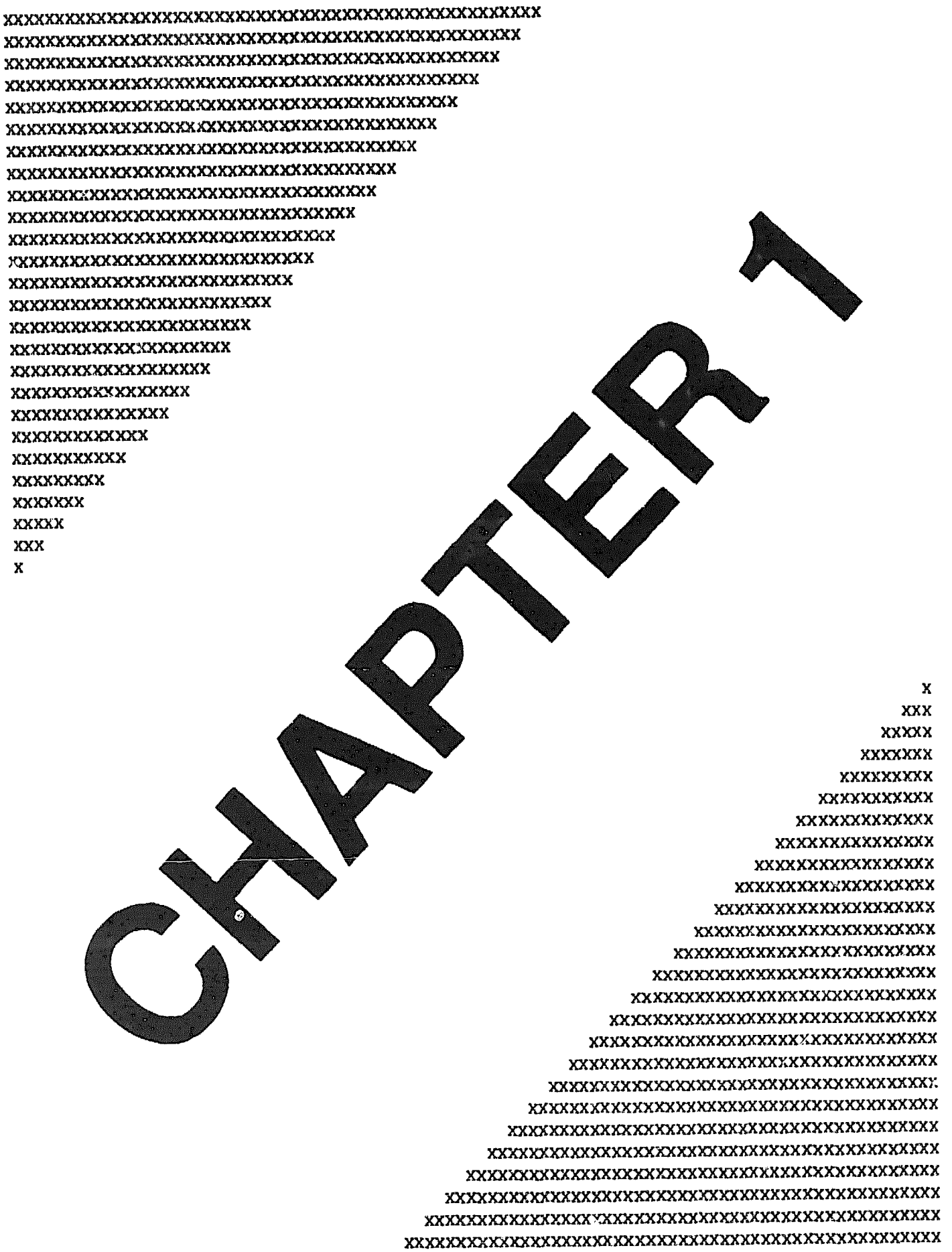
CHAPTER 1

1
System Description

Introduction

The DECpc 433 Workstation (see Figure 1-1) is a highly-integrated i486™ based desktop computer. Its high integration increases reliability and reduces the number of service actions that can be done in the field. In general, service actions are removing and replacing field replaceable units (FRUs).

The remainder of this chapter briefly describes the FRUs of each DECpc 433 Workstation's major components. Major workstation components include:

- System box
- SCSI expansion box
- Monitor
- Keyboard
- Mouse

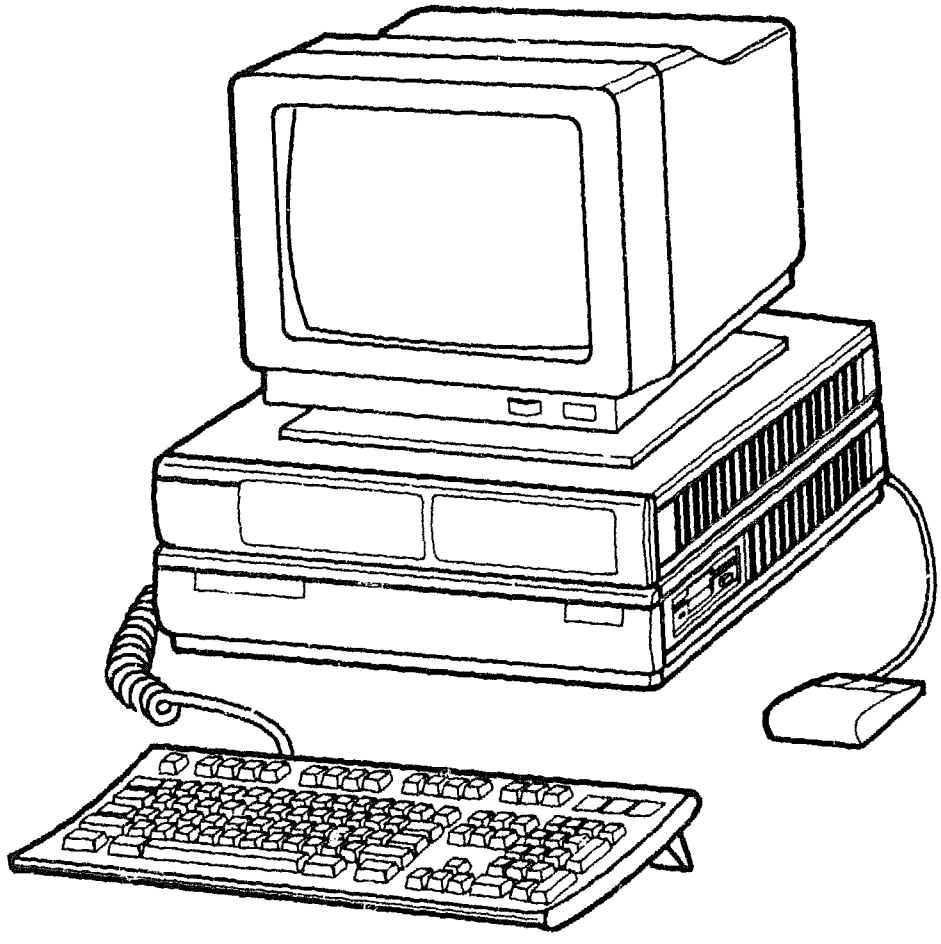

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Figure 1-1. DECpc 433 Workstation

System Box

System box FRUs include a system board, a power supply, an intelligent graphics controller, an optional 3.5-inch floppy disk drive or 3.5-inch IDE hard drive, and an optional 2.5-inch IDE hard drive.

System Board

System board FRUs include Single In-line Memory Modules (SIMMs) and an external cache. All other system board components are soldered in place, making field replacement impractical.

SIMMs

There are three SIMM banks on the system board. Each bank has four SIMM sockets. Either 1 MB × 9 or 4 MB × 9 SIMMs can be installed in each socket. Both SIMM sizes can be used at the same time; however, SIMM types within a bank must be identical. The system also requires SIMMs having an access time of 80 ns or faster.

The base system is shipped with 8 MB (eight 1 MB × 9 SIMMs). The customer might have installed additional SIMMs. If a system board needs to be replaced, the original 8 MB of SIMMs should remain with the system board when returned to the factory. The additional SIMMs should be reinstalled on the replacement system board.

External Cache

The external cache is an option. When installed it provides either 64 KB or 128 KB of external cache memory.

Power Supply

The power supply is capable of supplying 105 Watts of power. It supplies power to system box components. The optional 3.5-inch disk drives receive power directly from the power supply. The optional 2.5-inch IDE hard drive receives power from the system board.

3.5-Inch Disk Drives

Two 3.5 inch disk drives are optional. Either a 3.5-inch floppy disk drive or a 3.5-inch IDE hard disk drive can be installed.

2.5-Inch IDE Disk Drive

The 2.5-inch IDE hard disk drive is optional.

Intelligent Graphics Controller

The intelligent graphics controller supports both monochrome and color monitors and has four SIMM sockets that support 1 MB or 4 MB SIMMs.

The base system is shipped with no SIMMs installed on the intelligent graphics controller. If the intelligent graphics controller needs to be replaced and if the customer has SIMMs installed, the four SIMMs should be reinstalled on the replacement intelligent graphics controller.

Battery

The battery provides power for non-volatile memory when power is removed from the workstation. Non-volatile memory contains system configuration information. The battery receives charge current when power is applied.

SCSI Expansion Box

The SCSI expansion box is a DECpc 433 Workstation option that provides a housing and power supply for up to three SCSI devices. It has two 5.25-inch peripheral device bays that accept 5.25-inch peripheral devices and one 3.5-inch peripheral bay that accepts 3.5-inch peripheral devices. The internal supply provides 63 Watts of power.

Monitors

The DECpc 433 Workstation supports the following Digital VR series high-resolution fixed-frequency (66/72 Hz) workstation monitors. Contact your Digital Sales Representative for a current list of monitors supported (refer to Table 1-1.

Monitor service information in this guide is limited to a typical monitor. Refer to any service documentation shipped with the supported monitors.

Table 1-1. Optional Monitors

Model	Size	Type	Resolution	Vert Freq
VR320-DA	19 inch	Color	1280 × 1024	72 Hz
VR319-DA	19 inch	Monochrome	1280 × 1024	72 Hz
VR320-CA	19 inch	Color	1280 × 1024	66 Hz
VR319-CA	19 inch	Monochrome	1280 × 1024	66 Hz
VRT19	19 inch	Color	1280 × 1024	66 Hz
VRT16	17 inch	Color	1280 × 1024	66 Hz
ISM†		Color	1280 × 1024	60 Hz

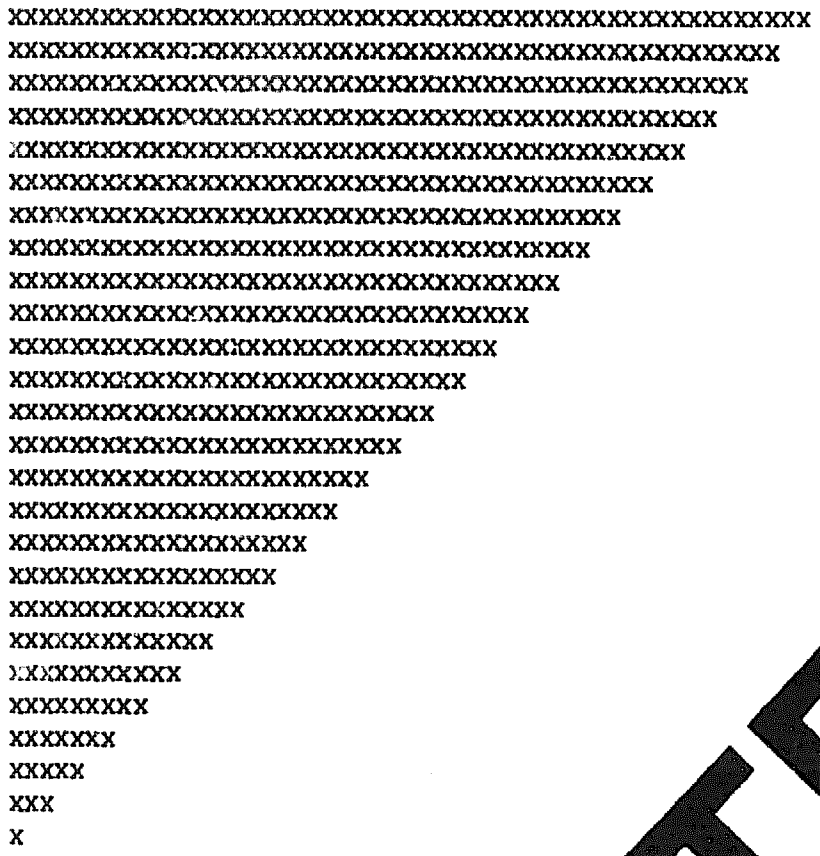
† Industry Standard Monitor (ISM) represents most common 1280 × 1024 monitors (Mitsubishi Model 6905, NEC 5D, etc.).

Keyboard

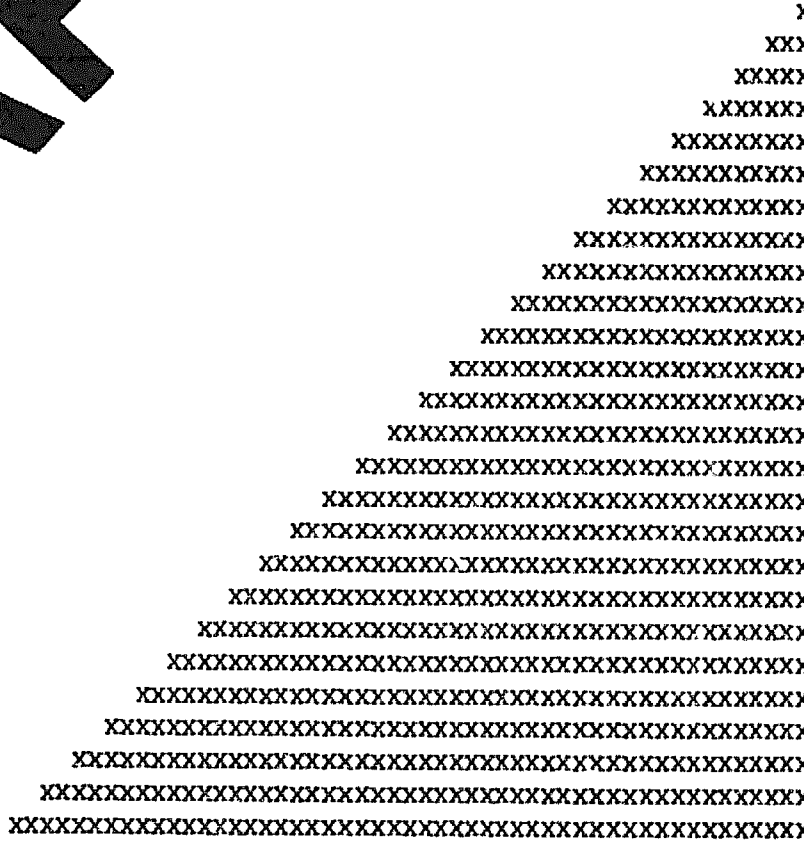
There are no service procedures for the keyboard other than replacement.

Mouse

Service procedures for the mouse is limited to cleaning the mouse ball and tracking mechanism. Refer to the appropriate documentation supplied with the mouse.



CHAPTER 2



2
Troubleshooting

Introduction

This chapter provides troubleshooting instructions for the DECpc 433 Workstation. It is divided into the following sections:

- Specal tools
- Power-on Self Test (POST)
- Initial troubleshooting
- System box troubleshooting
- Disk drives
- Monitor
- SCSI expansion box

Special Tools

A standard field service tool kit and the special tools (listed in Table 2-1) are needed to troubleshoot and repair the DECpc 433 Workstation.

Table 2-1. Special Tools

Tool	Part Number	Description
Diagsoft QA Plus/FE	TBD	Standalone diagnostics available separately. Documentation included with software kit.
Tri-wrap Loopback connector	FD-1016 4-00	This triple connector is used to test 25-pin and 9-pin serial ports, and 25-pin parallel ports.
MS-DOS Supplemental Kit	PCWXQ-XA	This software kit contains MS-DOS SCSI device drivers, base video drivers, and graphics application drivers needed for the DECpc 433 Workstation.
MS OS/2 Supplement 1 Kit	PCWXQ-XB	This software kit contains replacement MS OS/2 Ver 1.21 diskettes that support SCSI hard disk drive installation, and a presentation manager driver needed for the DECpc 433 Workstation.

POST

Before your DECpc 433 Workstation can be used, all system components must be initialized and tested, and the operating system loaded into memory. The basic input/output system (BIOS) that is stored in ROM controls this sequence of actions. A portion of the BIOS contains a Power-on Self Test (POST). POST is responsible for initializing and testing system components each time power is applied or when the system boots. The remainder of the BIOS loads the operating system and specific applications.

POST consists of a set of tests used to check the condition of the system circuitry and report system malfunctions. The organization of POST allows testing to progress from the lowest level of hardware to the initialization of external peripherals e.g., disk drives, keyboard, monitor, etc.

There are two types of POST tests: system board hardware and peripheral hardware.

System Board Hardware Tests

POST checks the system board hardware first. If any of these tests fail, a fatal error condition exists and further testing and initialization is not possible. You are notified that an error condition exists by the lighted fault LEDs on the system board and/or intelligent graphics controller, an error message displayed on the monitor screen, or beeps from the system speaker. Refer to the lists of POST error messages and beep codes provided at the end of this chapter. The following identifies the system hardware tests and their order of execution:

- Programmable Interrupt Controller (PIC)
- 82340 chip set
- CPU

- Keyboard controller
- CMOS RAM
- ROM BIOS (checksum)
- Programmable Interrupt Timer (PIT)
- DMA controller
- Base 64 KB system RAM
- Cache controller

Peripheral Hardware Tests

The first peripheral hardware test procedure verifies that the system configuration data stored in CMOS RAM matches the hardware present. Then, the procedures continue to test and initialize other peripheral hardware. A test failure generally results in an error message on the monitor screen. The following list identifies the peripheral hardware tests and their order of execution:

- CMOS RAM configuration data
- RAM memory above 64 KB
- Keyboard
- Serial/parallel interface circuitry
- Floppy disk controller
- Hard disk controller
- Intelligent graphics controller

POST Sequence

While POST is running, a numeric countdown (240 to 000) is displayed on the monitor screen as it sequences through the test procedures.

> **NOTE**
> During the POST memory test, the system displays the amount of memory being tested. The amount of installed memory determines the memory test duration. It can take up to 60 seconds to complete.

If POST does not find any error conditions, the system board speaker beeps once and displays a message. If you do not enter Setup, the system attempts to boot the operating system in about 10 seconds. When POST completes, a message similar to the following appears:

```
Phoenix 80486 ROM BIOS PLUS Version 1.10.31.POF
Copyright (C) 1985-1990 Phoenix Technologies Ltd.
All  Rights Reserved

  640K Base Memory
07168K Extended Memory

100

       To enter Setup press:       F1
```

If POST finds an error condition, the system board speaker beeps twice and then POST displays an error message on the monitor screen. For more information, refer to the POST Error Messages and Beep Codes at the end of this chapter. The following is an example of a screen display for an error condition:

```
Phoenix 80486 ROM BIOS PLUS Version 1.10.31.POF
Copyright (C) 1985-1990 Phoenix Technologies Ltd.
All  Rights Reserved

  640K Base Memory
07168K Extended Memory

150 (0017):  Time-of-day clock stopped.
```

POST Error Messages

POST tries to notify you of the error conditions it has found. If the monitor is initialized, POST displays an error message on the monitor screen and beeps the system board speaker twice. If an error occurs before the monitor is initialized, a beep code sounds (refer to Beep Code lists at the end of this chapter). Table 2-2 lists, by countdown number, the POST error messages. It also describes each message and, in most cases, a recommended solution.

> **NOTE**
> Xs in the message column indicates that this portion of the message depends on an actual error condition.

Table 2-2. POST Error Messages

POST Countdown No.	Error Message No.	Message	Solution
240	0007	No timer tick	Replace system board.
200	0001	Gate A20 failure	Replace system board.
190	0009	Timer 2 failure	Replace system board.
180	0010	Keyboard stuck key Keyboard controller Keyboard clock line Keyboard data line Keyboard failure	Check the keyboard connection. Look for stuck key. Replace keyboard.
170	0041	Pointing device failure	Check mouse connection. Replace mouse.
160		640 KB base memory 0 KB extended memory	Replace system board.
150	0017	Time-of-day clock stopped	Replace system board.
100	0018	Invalid configuration information	Run Setup.

Table 2-2. POST Error Messages *(continued)*

POST Countdown No.	Error Message No.	Message	Solution
090	0011	Floppy disk drive failure	Check all connections. Replace floppy disk drive.
080	0015	Hard disk controller failure	Check all connections. Replace hard disk.
080	0016	Hard disk 0 failure	Check all connections. Replace hard disk.
070	43	No SCSI BIOS found at xxxx	Check all SCSI connections. Replace system board.
	215	Target 0: disk format not 512 bytes/block	Non-standard SCSI hard disk drive installed. Replace SCSI drive with standard SCSI drive.
	214	Target 0: disk drive ready, but read capacity failed	SCSI hard disk drive failure. Replace SCSI drive.

Table 2-2. POST Error Messages *(continued)*

POST Countdown No.	Error Message No.	Message	Solution
070	213	Target 0: disk drive connected, but not ready	SCSI hard disk drive failure. Replace SCSI drive.
	212	Target 0: target connected, but is not a disk drive	SCSI ID conflicts. Set correct SCSI ID number. Refer to your SCSI Expansion Box Installation Guide .
	211	Target 0: target connected, but has a fault	SCSI hard disk drive failure. Replace SCSI drive.
	210	Target 0: target not connected	SCSI expansion box not connected, loose connections, or SCSI ID conflicts. Connect the SCSI expansion box, check connections, and run Setup.
	200	Host adapter diagnostic failure	SCSI hardware failure. Replace SCSI device.
060	0021	xxxx0h optional ROM bad checksum = xx	Correct the address conflict or replace the ROM chip.

Table 2-2. POST Error Messages *(continued)*

POST Countdown No.	Error Message No.	Message	Solution
060	83,82,80	LAN memory failure	Replace system board.
	8A,8B,8C, 89,87,85, 84,81,74, 73,71	LAN hardware failure	Replace system board.
	86	LAN I/O failure	Replace system board.
	88	LAN interrupt failure	Replace system board.
	72	LAN mouse interrupt failure	Replace system board.
050	0019	Time-of-day not set	Run Setup and set the time and date.
040	0020	Keyboard is locked	Unlock the keyboard.
030	0022	To continue press: Esc To enter Setup press: Fx	
020		Enable NMI	
010		Enable cache	
000		Boot	

Beep Codes

If POST finds an error condition and cannot display a message, the system board speaker emits a series of beeps to indicate the error condition. It also writes a value into I/O port 80H for both fatal and not-fatal errors. No value is written to I/O port 80H for intelligent graphics controller error conditions. Beep codes are either fatal and not-fatal. Fatal errors prevent the system from booting. Non-fatal errors allow the system to attempt a boot. For example, if the speaker emits a 2-1-4 beep code (a burst of two beeps, a single beep, and a burst of four beeps), bit three of the first 64 KB of DRAM failed its test. Table 2-3 lists the beep codes for fatal errors and the values written to I/O port 80H. Table 2-4 lists the beep codes for non-fatal errors and the values written to I/O port 80H.

Beep codes for the intelligent graphics controller are different in that only long and short beeps are emitted. It is the number of each that identifies the error condition. Table 2-5 lists the intelligent graphics controller beep codes.

Table 2-3. Fatal Error Beep Codes

Beep Code	Error	Port 80H
1-1-3	RTC write/read failure	02H
1-1-4	ROM BIOS checksum failure	03H
1-2-1	Programmable interval timer failure	04H
1-2-2	DMA initialization failure	05H
1-2-3	DMA page register write/read failure	06H
1-3-1	DRAM refresh verification failure	08H
1-3-3	1st 64 KB DRAM chip or data line failure	0AH
1-3-4	1st 64 KB DRAM odd/even logic failure	0BH
1-4-1	1st 64 KB DRAM address line failure	0CH
1-4-2	1st 64 KB DRAM parity test in progress/failure	0DH
2-1-1	Bit 0 1st 64 KB DRAM failure	10H
2-1-2	Bit 1 1st 64 KB DRAM failure	11H
2-1-3	Bit 2 1st 64 KB DRAM failure	12H
2-1-4	Bit 3 1st 64 KB DRAM failure	13H
2-2-1	Bit 4 1st 64 KB DRAM failure	14H
2-2-2	Bit 5 1st 64 KB DRAM failure	15H

Table 2-3. Fatal Error Beep Codes *(continued)*

Beep Code	Error	Port 80H
2-2-3	Bit 6 1st 64 KB DRAM failure	16H
2-2-4	Bit 7 1st 64 KB DRAM failure	17H
2-3-1	Bit 8 1st 64 KB DRAM failure	18H
2-3-2	Bit 9 1st 64 KB DRAM failure	19H
2-3-3	Bit A 1st 64 KB DRAM failure	1AH
2-3-4	Bit B 1st 64 KB DRAM failure	1BH
2-4-1	Bit C 1st 64 KB DRAM failure	1CH
2-4-2	Bit D 1st 64 KB DRAM failure	1DH
2-4-3	Bit E 1st 64 KB DRAM failure	1EH
2-4-4	Bit F 1st 64 KB DRAM failure	1FH
3-1-1	Slave DMA register failure	20H
3-1-2	Master DMA register failure	21H
3-1-3	Master interrupt mask register failure	22H
3-1-4	Slave interrupt mask register failure	23H
3-2-4	Keyboard/mouse controller test failure	27H

Table 2-4. Non-Fatal Beep Codes

Beep Code	Error	Port 80H
3-3-4	Screen memory test failure	2BH
3-4-1	Screen initialization failure	2CH
3-4-2	Screen retrace test failure	2DH

Table 2-5. Intelligent Graphics Controller Beep Codes

Long Beeps	Short Beeps	Failed Test	Test Description
1	1	VGA RAMDAC	R/W to palette registers
1	2	Monitor detection	Incorrect loading on RGB lines or BT459 test circuit failed
1	3	VGA display memory	R/W test to display memory failed
1	4	VGA retrace	No vertical retrace detected
1	5	Other adapter	If CGA or MDA is installed, POST tests and reports an error if either fails
1	6	Xilinx programming	Xilinx components failed
2	1	Program freq synth	SC22318 failed to program; a R/W test performs
2	2	BT459 RAMDAC	Register R/W test failed
2	3	GSP POST timeout	GSP self test failed to complete
2	4	Register R/W	R/W test to i486 registers and GSP external configuration register
2	5	Frame grab HW	Test is made on full frame-grab hardware; a known set of data is placed in the VGA display memory and a frame is caught on the GSP side and compared
2	6	GSP memory	R/W test on VRAM and DRAM on the GSP side
3	1	Intelligent graphics controller disabled	Reserved video switch selected

Initial Troubleshooting

Follow this general procedure to initially troubleshoot components of your DECpc 433 Workstation:

1. Verify that power is applied by checking the power on indicators (system box, SCSI expansion box, monitor, and connected peripherals).

2. Check for loose cables and connections.

3. Turn the system on. If the system fails to boot, turn it off, wait 20 seconds, and then turn it back on.

4. Observe any POST messages. Refer to Chapter 2, "Power-on Self Test", for a listing of POST messages and beep codes. Take corrective action.

5. Seek assistance. Contact your system administrator or network coordinator for LAN related problems.

6. Seek assistance. Contact Digital Customer Service for software and hardware problems.

7. If you need to return a failed part, pack it in its original container and return it to Digital for service.

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P.O. Box CS2008
Nashua, NH 03061

System Box Troubleshooting

Table 2-6 lists some possible problems, causes, and corrective actions for troubleshooting the system box.

Table 2-6. System Box Troubleshooting

Problem	Possible Cause	Action
No response when the system is turned on	System is not plugged in	Turn off the system, plug it in, and then turn it back on again
	No power at the wall outlet	Use another wall outlet
Power is on, but there is no monitor display	Video select switch is in the wrong position for the installed monitor	Check video select switch positions
	Monitor is off	Turn on the monitor
	Monitor cable is incorrectly installed	Check all monitor connections
Power is on, your Ethernet address is installed on the server, but the system hangs	The correct software is not installed on the server	Contact your system administrator or network coordinator

Table 2-6. System Box Troubleshooting *(continued)*

Problem	Possible Cause	Action
Power is on, your Ethernet address is installed on the server, but the system hangs	Network failure	Contact your system administrator or network coordinator
	Network select switch is in the wrong position	Correctly set the network select switch
System does not boot from the IDE hard disk drive	Operating software is not installed on the IDE hard disk drive	Install the operating system
	IDE hard disk is not properly formatted or the requested partition does not exist	Format the IDE hard disk drive or correctly partition the IDE hard disk drive using the operating system
	IDE hard disk drive jumpers incorrectly set	Refer to the supplied vendor documentation
	IDE drive type incorrect	Run Setup to identify the correct drive type
	Loose cables	Check all cable connections
System does not boot from the floppy disk	Drive ID incorrectly set	Make sure the drive ID is set to 1
	Floppy disk does not contain start-up files	Insert floppy disk with start-up files
	Floppy disk is worn or damaged	Try another floppy disk
	Loose cables	Check all cable connections

Table 2-6. System Box Troubleshooting *(continued)*

Problem	Possible Cause	Action
No response to keyboard commands	Keyboard is password protected	Enter the keyboard password
	Keyboard is not connected	Connect the keyboard
	Keyboard is connected to the mouse port	Connect the keyboard to keyboard port

Disk Drives

Table 2-7 lists some possible problems, causes, and corrective actions for troubleshooting the system box disk drives.

Table 2-7. Disk Drive Troubleshooting

Problem	Possible Cause	Action
IDE hard disk drive cannot read or write information	Incorrect jumper settings	Refer to the supplied vendor documentation
	IDE hard disk drive is not properly formatted or partitioned	Format as required by supplied operating system
	IDE drive type incorrect	Run Setup to identify the correct drive type
Floppy disk cannot read or write information	Floppy disk is not formatted	Format the floppy disk
	Floppy disk is worn or damaged	Try another floppy disk
	Floppy disk is write-protected	Slide the write-protect switch so the hole is not visible

Monitor

Table 2-8 lists some possible problems, causes, and corrective actions for troubleshooting the monitor.

Table 2-8. Monitor Troubleshooting

Problem	Possible Cause	Action
Monitor power indicator is not on	Monitor is turned off	Turn on the monitor
	Power cord is not connected	Connect the power cord to the system box (or SCSI expansion box, if applicable)
	Power indicator is defective	Contact your local Digital service representative
No monitor display	Video select is in the wrong position	Check the video switch position
	Configuration error	Run Setup
Screen displays partially highlighted characters	Video select switch is in the wrong position	Check video switch position
Distorted, rolling, or flickering screen display, or wrong/uneven color	Monitor incorrectly adjusted	Adjust accordingly
	Video select switch is in the wrong position	Check the video switch position
	Monitor signal cable incorrectly installed	Straighten any bent connector pins and then reseat
Color monitor displaying monochrome	System was turned on before the monitor was turned on	Turn off the system box, turn on the monitor, then turn the system box back on

SCSI Expansion Box

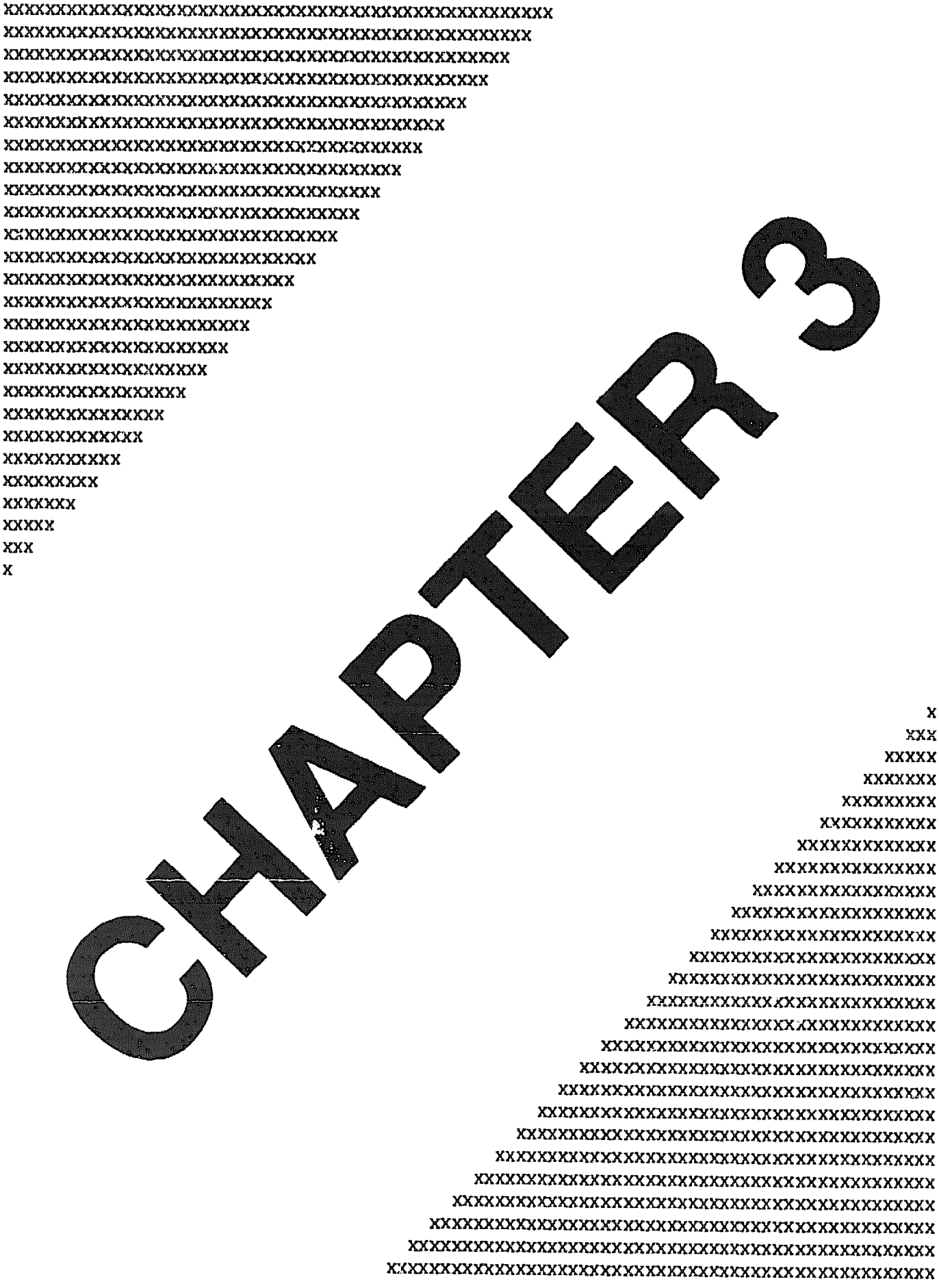
Table 2-9 lists some possible problems, causes, and corrective actions for troubleshooting the SCSI expansion box.

Table 2-9. SCSI Expansion Box Troubleshooting

Problem	Possible Cause	Action
No response when the system is powered up	System box is not plugged in	Turn off the system box, plug it in, and then turn it back on again
	SCSI expansion box power cord is not plugged into the system box	Turn off the system box, plug in the SCSI expansion box, and then turn the system box back on
	No power at the wall outlet	Use another wall outlet
SCSI expansion box power-on indicator does not light	SCSI expansion box is not plugged in	Turn the system box off, plug the SCSI expansion box into the system box, and then turn the system box back on
	Power supply failed	Contact Digital or an authorized Digital dealer

Table 2-9. SCSI Expansion Box Troubleshooting (*continued*)

Problem	Possible Cause	Action
System does not boot from a SCSI hard disk drive	Operating system software is not installed on the SCSI hard disk drive	Install the operating system
	Requested partition does not exist	Partition the SCSI hard disk drive and then reload the operating system
	SCSI hard disk drive jumpers incorrect	Refer to the device installation kit instructions
	SCSI ID conflicts	Refer to the device installation kit instructions on setting SCSI ID's
	Terminating resistors not removed from the SCSI hard disk drive	Remove terminating resistors. Refer to the supplied installation kit instructions
	External SCSI terminator not installed	Install the supplied external SCSI terminator
	System not configured for SCSI hard disk operation	Run Setup


CHAPTER 3

3
System Box FRU Replacement

Introduction

This chapter contains a list of system box FRUs, FRU removal and replacement instructions, and information regarding electrical shock and electrostatic discharge (ESD) that should be read before beginning any procedure.

System Box FRUs

Table 3-1 lists the available FRUs for the DECpc 433 Workstation.

Table 3-1. System Box FRUs

FRU	Digital PN#
Top cover, plastic	74-43364-01
Front bezel, plastic	74-43363-01
Bottom cover, plastic	74-43361-01
3.5" filler panel, plastic	74-43362-01
Stand-off, metal	74-43545-01
Chassis base, metal	74-43546-01
Carrier, 3.5" peripheral device	74-43547-01
Bracket, 2.5" drive	74-43781-01
EMI shield, top (metal)	74-43548-01
Lite pipe 1 (disk activity)	74-43551-01
Lite pipe 2 (power on/off)	74-43550-01
Spacer, top shield (spider web), plastic	74-43693-01
Chassis base assembly with I/O shield	29-28945-01
Panel, peripheral filler, metal	29-28945-01

Table 3-1. System Box FRUs *(continued)*

FRU	Digital PN#
Mother board/riser/8 MB	29-28952-01
Intelligent Graphics Controller	29-28953-01
Power supply assembly (105 Watt)	29-28939-01
SIMM, 1 MB × 9	29-28940-01
SIMM, 4 MB × 9	29-28941-01
Battery, 4.5 V dc	29-28951-01
Fastener, tuflock	29-28947-01
Knob, video select, plastic	29-28948-01
Key, w/keylock (20 variations)	511111-01/-20
Floppy disk drive, 1.44 MB 3.5-inch	RX23-AA
IDE hard disk drive, 52 MB 3.5-inch	PCWXR-BA
IDE hard disk drive, 105 MB 3.5-inch	PCWXR-BB
IDE hard disk drive, 40 MB 2.5-inch	PCWXR-CA
External cache module, 64 KB	PCWXM-AA
External cache module, 128 KB	PCWXM-AB
Ribbon cable, IDE 40-pin to 40-pin	17-03151-01
Ribbon cable, floppy disk drive (molded)	17-03152-01
Cable, IDE 44-pin to 40-pin	17-03173-01
Cable, IDE 44-pin to 44-pin	17-03184-01
Cable, video (color)	17-03183-01
Cable, video (monochrome)	17-03172-01
Cord, power, 120 V ac, 15 A, US/Canada/Japan	17-00083-39
Cord, power, 240 V ac, 10 A, Europe	17-00199-21
Cord, power, 240 V ac, 10 A, United Kingdom	17-00209-15
Cord, power, 240 V ac, 10 A, Danish	17-00310-08
Cord, power, 240 V ac, 10 A, Italian	17-00364-18

Table 3-1. System Box FRUs *(continued)*

FRU	Digital PN#
Cord, power, 240 V ac, 10 A, Israeli	17-00457-16
Cord, power, 240 V ac, 10 A, Swiss	17-00210-13
Cord, power, 240 V ac, 10 A, India	17-00456-16
Cord, power, 240 V ac, 10 A, Austrian	17-00198-14
Cord, power, auxiliary, IEC pig-tail, US	17-00442-25
Cord, power, auxiliary, IEC pig-tail, International	17-00365-19

Before You Begin

WARNING
Risk of electrical shock. Failure to disconnect the source of power before opening the covers can result in personal injury.

CAUTION
Equipment damage. Electrostatic discharge (ESD) can damage disk drives, other peripherals, integrated circuits, and circuit boards. It is strongly recommended that all removal and replacement be done at an approved ESD workstation. If one is not available, you can provide minimum ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling any internal system part.

Outside Cover

To remove the outside cover, see Figure 3-1 and do the following:

1. Turn off power to all devices connected to the system box.
2. Turn off power to the system box.
3. Tag and disconnect all cables connected to external devices.
4. Disconnect all system box power cords.
5. Unlock the system box outside cover.
6. Locate the two locking tabs below the outside cover lock. Push in on the tabs to release the outside cover while lifting.
7. Raise the outside cover to disengage the hinges from the chassis and then remove the outside cover.

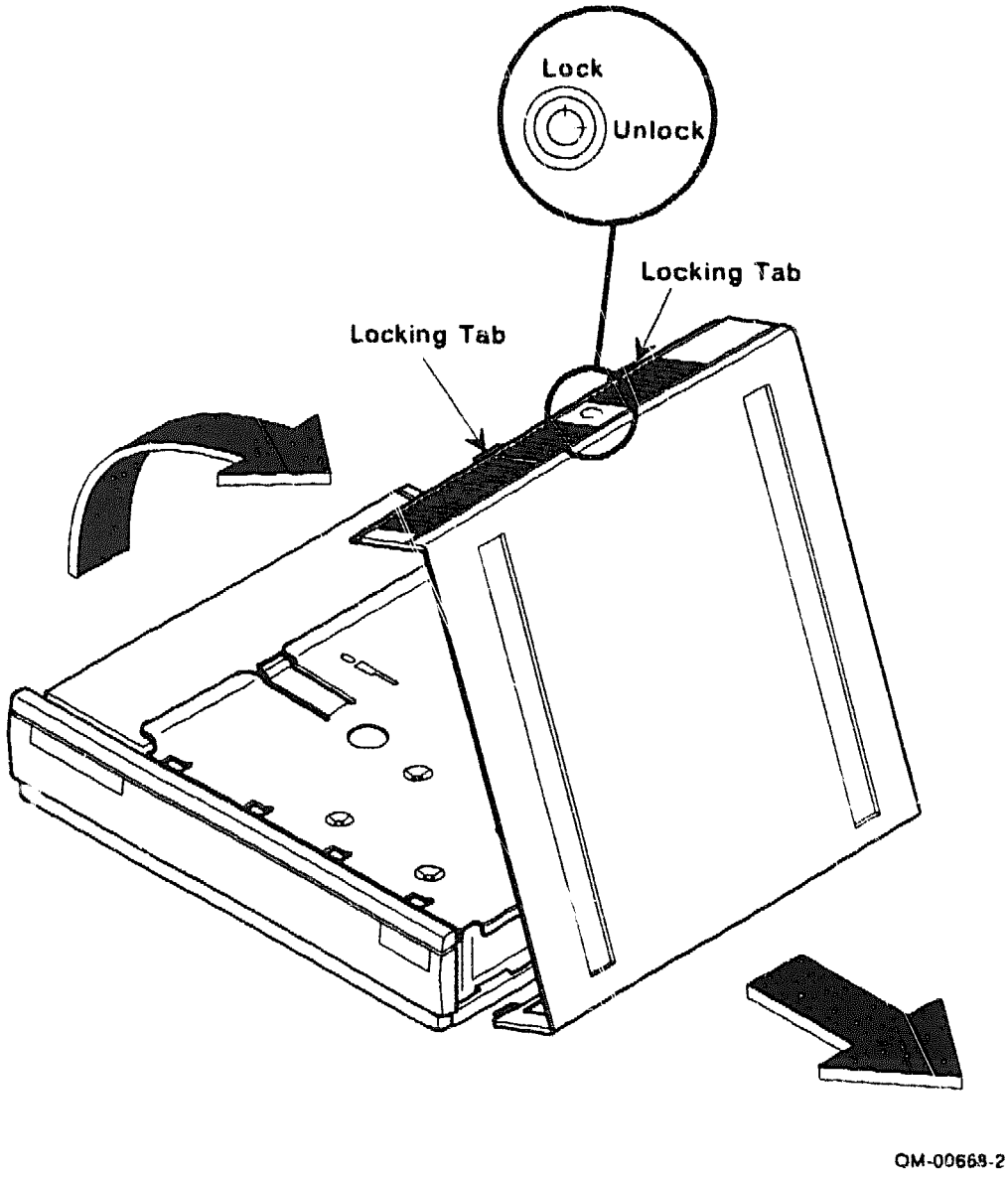


Figure 3-1. Removing the System Box Cover

To replace the outside cover, see Figure 3-2 and do the following:

1. Make sure no tools or loose parts are left inside or around the chassis.

2. Position the outside cover over the chassis, then lower the side opposite the locking tabs to engage the outside cover hinges with the chassis.

3. Carefully lower the outside cover (making sure the safety loop fits between the power supply and the rear panel),until it engages the locking tabs (see Figure 3-3).

4. Push down on the outside cover until you hear the locking tabs snap into place.

5. Push down on the front of the outside cover (above the front panel) to seat the two locking detents.

6. Push down on the outside cover (above the rear panel) to seat the rear locking detent.

7. Lock the system box outside cover.

8. Connect all previously removed external cables and power cables and then remove identification tags.

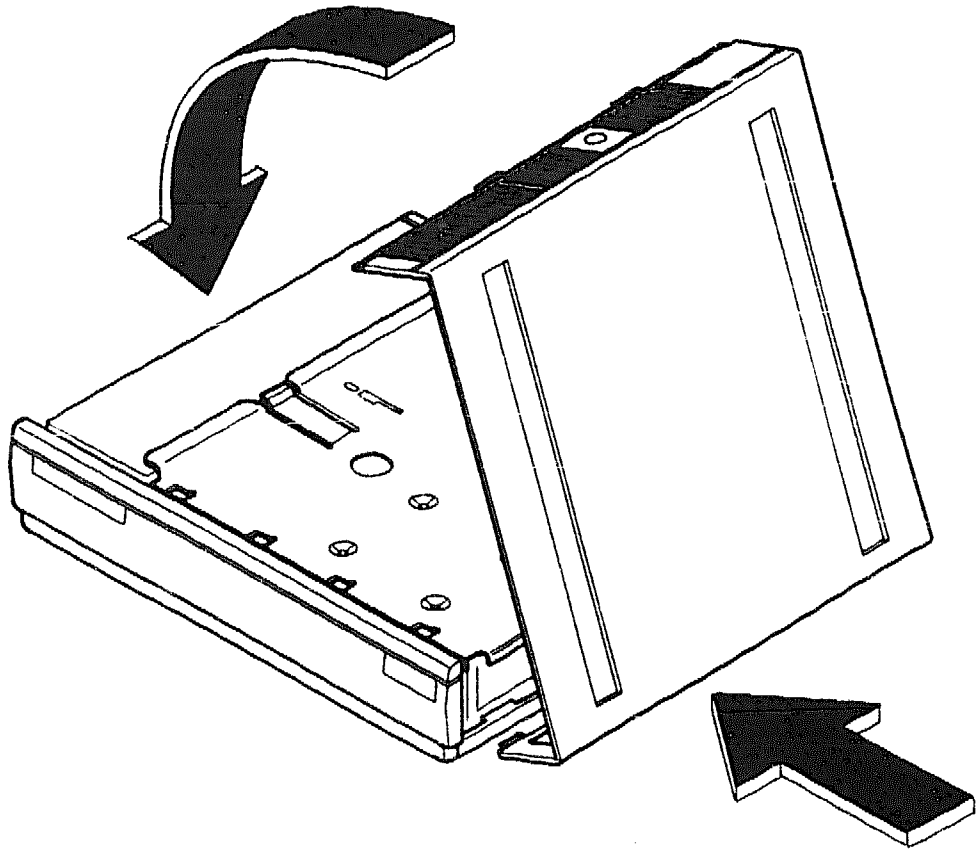


Figure 3-2. Replacing the System Box Cover

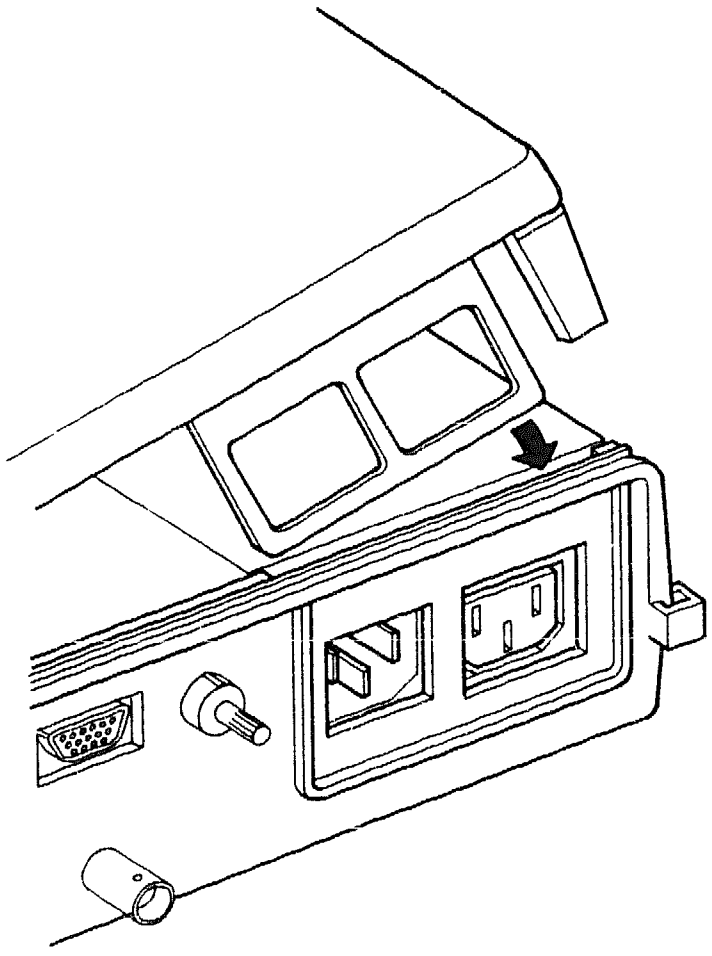


Figure 3-3. Power Cord Safety Loop Location

Chassis Inner Cover

To remove the chassis inner cover, see Figure 3-4 and do the following:

1. Remove the system box cover.
2. Remove the five screws that secure the chassis inner cover to the intelligent graphics controller.
3. Lift the locking tab and then pull the inner cover toward the power supply to free the locking tabs.
4. Remove the inner cover from the chassis.

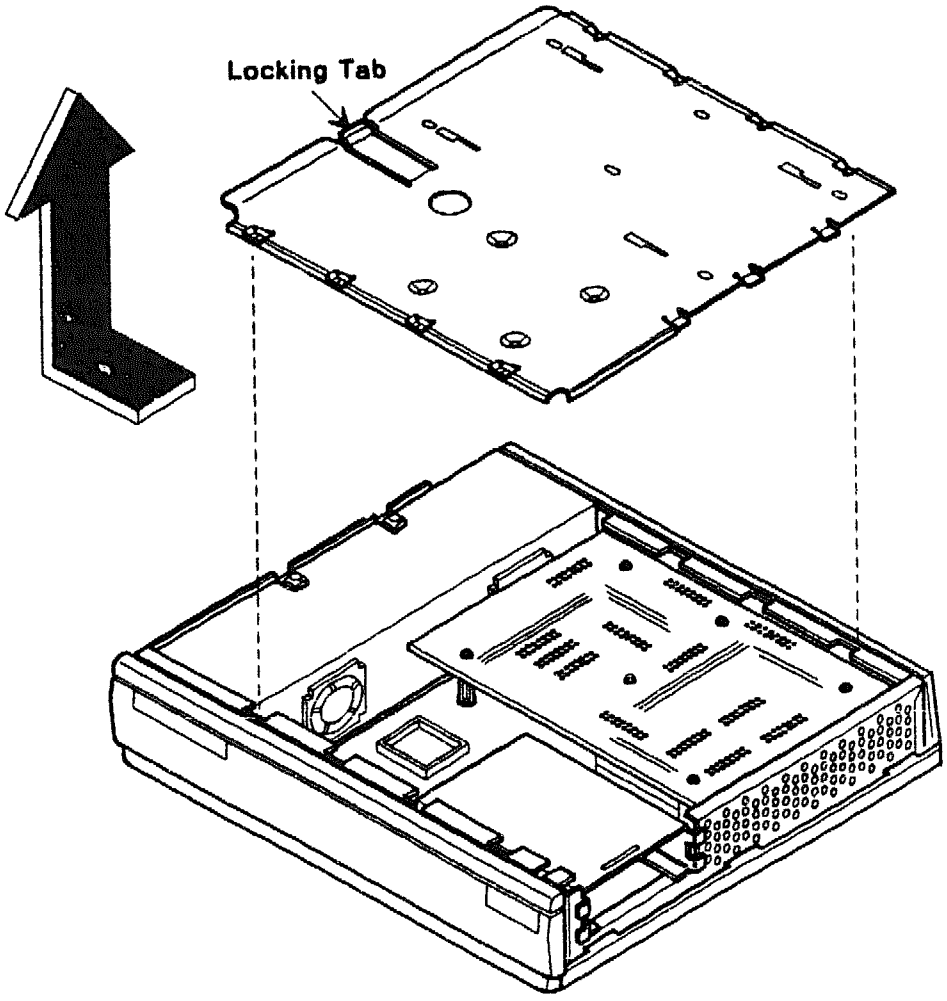


Figure 3-4. Removing the Chassis Inner Cover

To replace the chassis inner cover, see Figure 3-5 and do the following:

1. Place the chassis inner cover over the front and back locking tab openings and then slide the cover away from the power supply to mate locking tabs.

2. Secure the chassis inner cover to the intelligent graphics controller using the five previously removed screws.

3. Replace the system box cover.

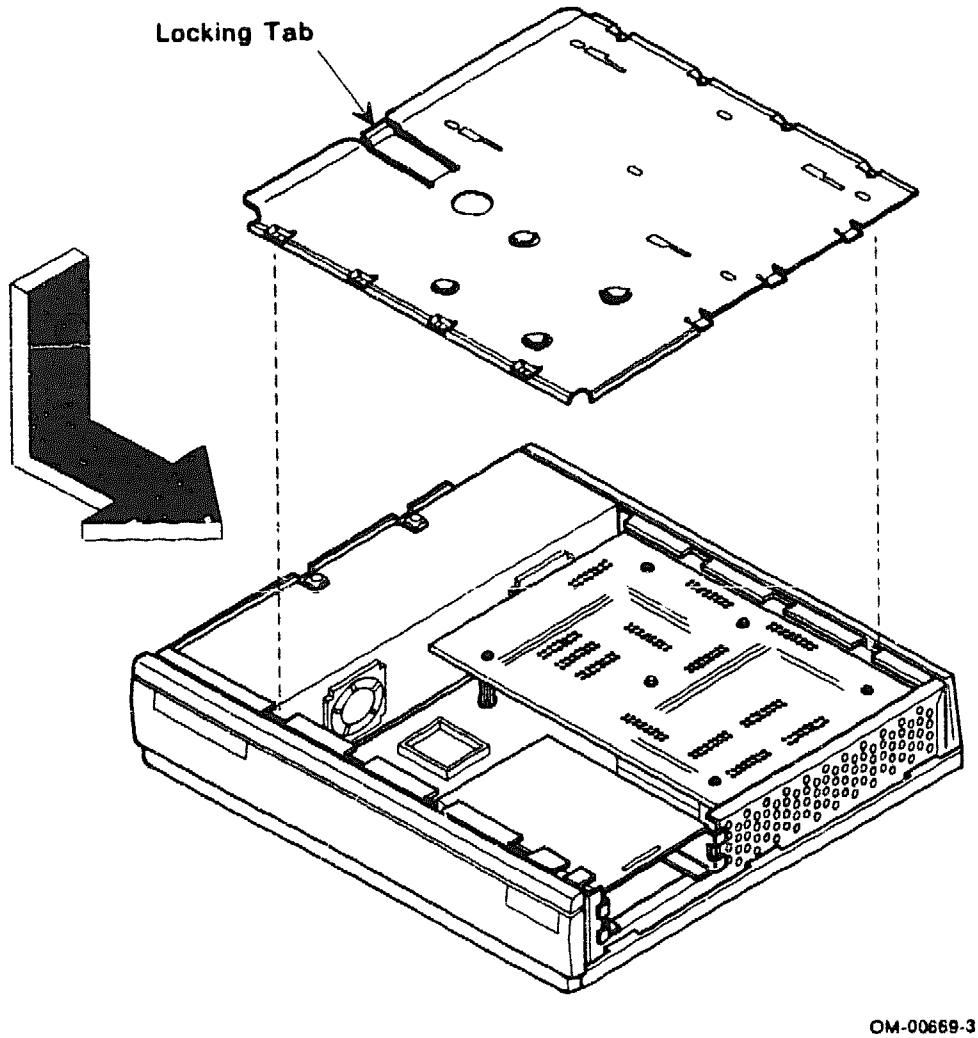


Figure 3-5. Replacing the Inner Cover

2.5-Inch Hard Disk Drive

To remove the 2.5-inch hard disk drive, do the following:

1. Remove the system box outside cover.
2. Remove the chassis inner cover.
3. Tag and disconnect the interface cable to the 2.5-inch hard disk drive. Note pin 1 locations and the red cable stripe location (see Figure 3-6).
4. Lift the 2.5-inch mounting tray and remove it from the chassis (see Figure 3-6).

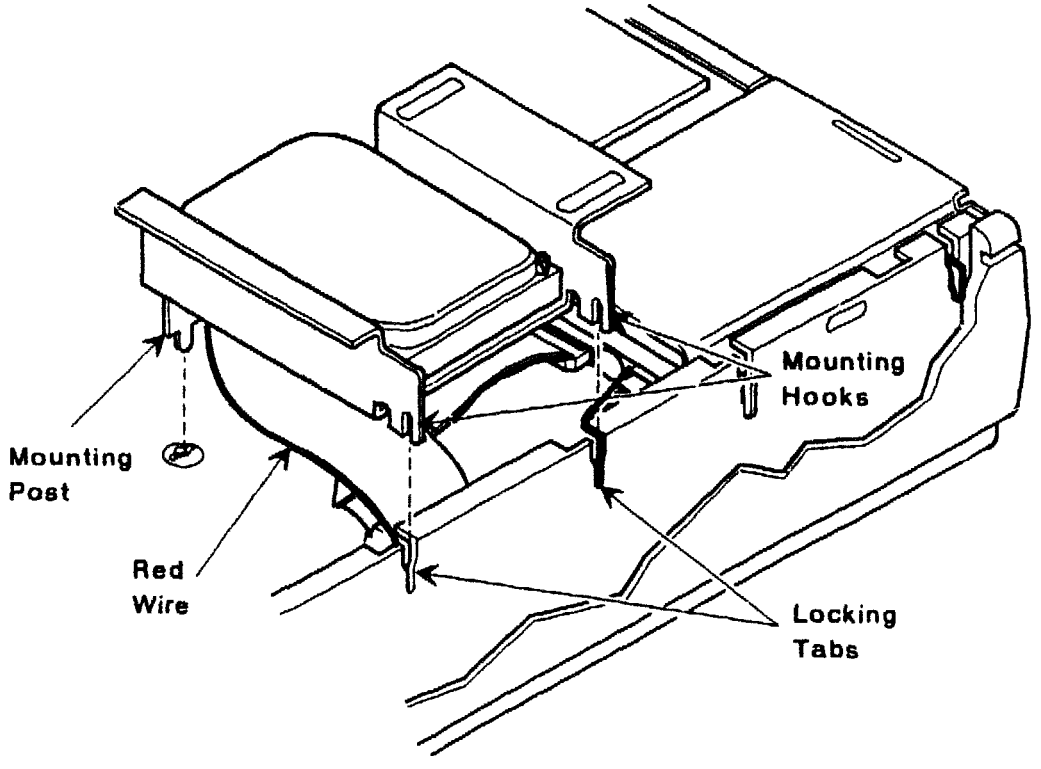


Figure 3-6. Removing the 2.5-Inch Hard Disk Drive

5. Remove the mounting tray screws, and then remove the 2.5-inch hard disk drive (Figure 3-7).

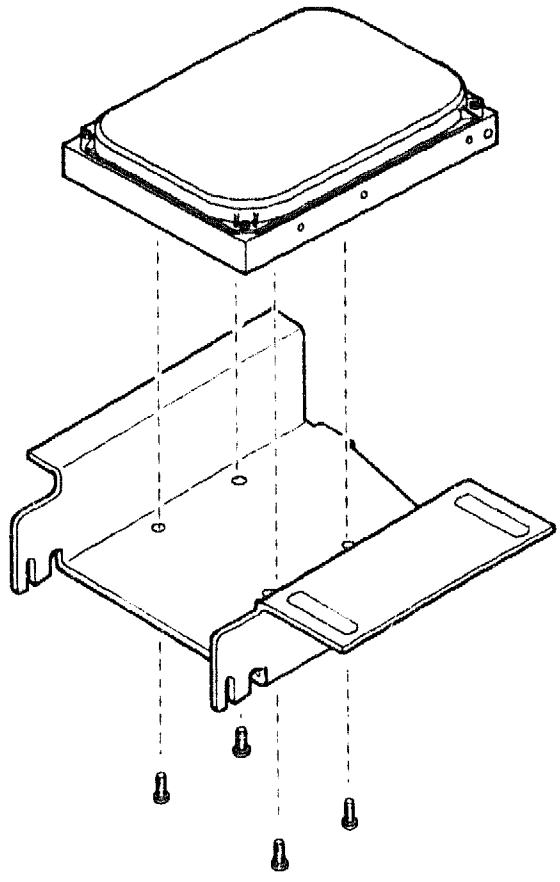


Figure 3-7. Removing the 2.5-Inch Hard Disk Drive From the Mounting Tray

To replace the 2.5-inch hard disk drive, do the following:

1. Attach the 2.5-inch hard disk drive to its mounting tray. Make sure the drive connector faces away from the two mounting hooks (Figure 3-7).

2. Position the 2.5-inch hard disk in the chassis. Make sure the mounting post and mounting hooks are correctly positioned (Figure 3-6).

3. Press the mounting tray into its seated position.

4. Connect the interface cable. Make sure pin 1 and the red cable stripe are in the position noted during removal.

5. Replace chassis inner cover.

6. Replace the system box outside cover.

7. Run Setup if the drive type changed.

3.5-Inch Mass Storage Device

To remove a 3.5-inch mass storage device, do the following:

1. Remove the system box outside cover.

2. Remove the chassis inner cover.

3. If installed, remove the 2.5-inch hard disk drive.

4. Tag and disconnect all cables to the mass storage device. Note the pin 1 location and the red cable stripe location (Figure 3-8).

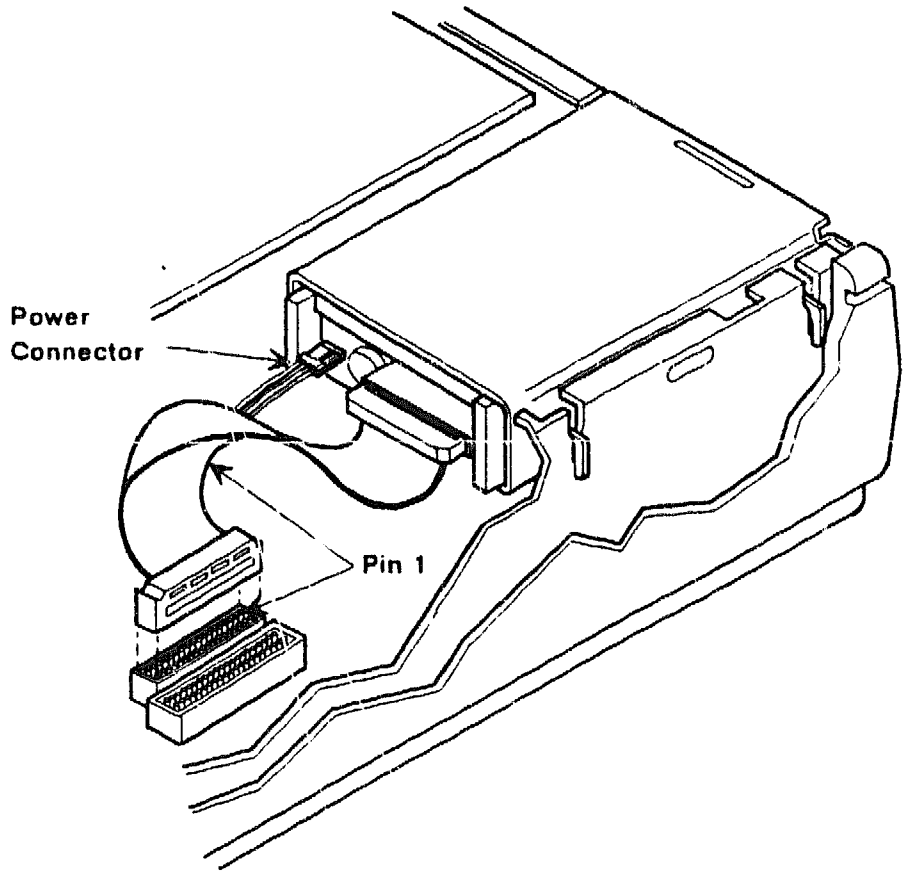


Figure 3-8. Floppy Disk Drive Rear Connections

5. Lift up on the disk drive mounting tray and remove it from the chassis (Figure 3-9).

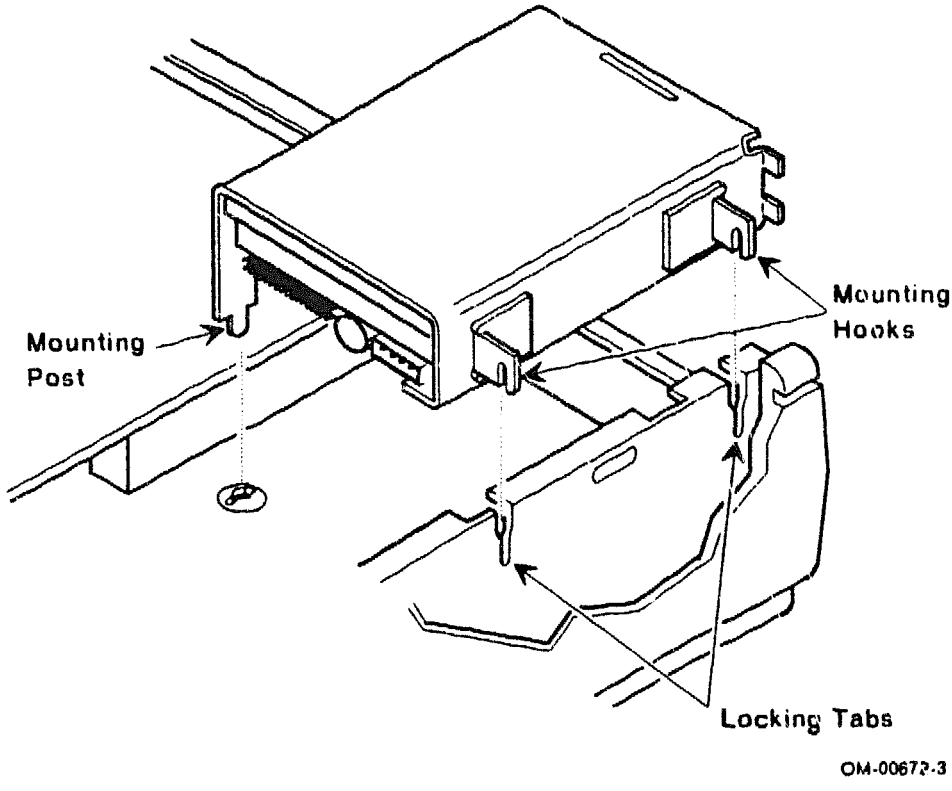


Figure 3-9. Removing a 3.5-Inch Mass Storage Device

6. Remove the mounting tray screws, and then remove the mass storage device (see Figure 3-10).

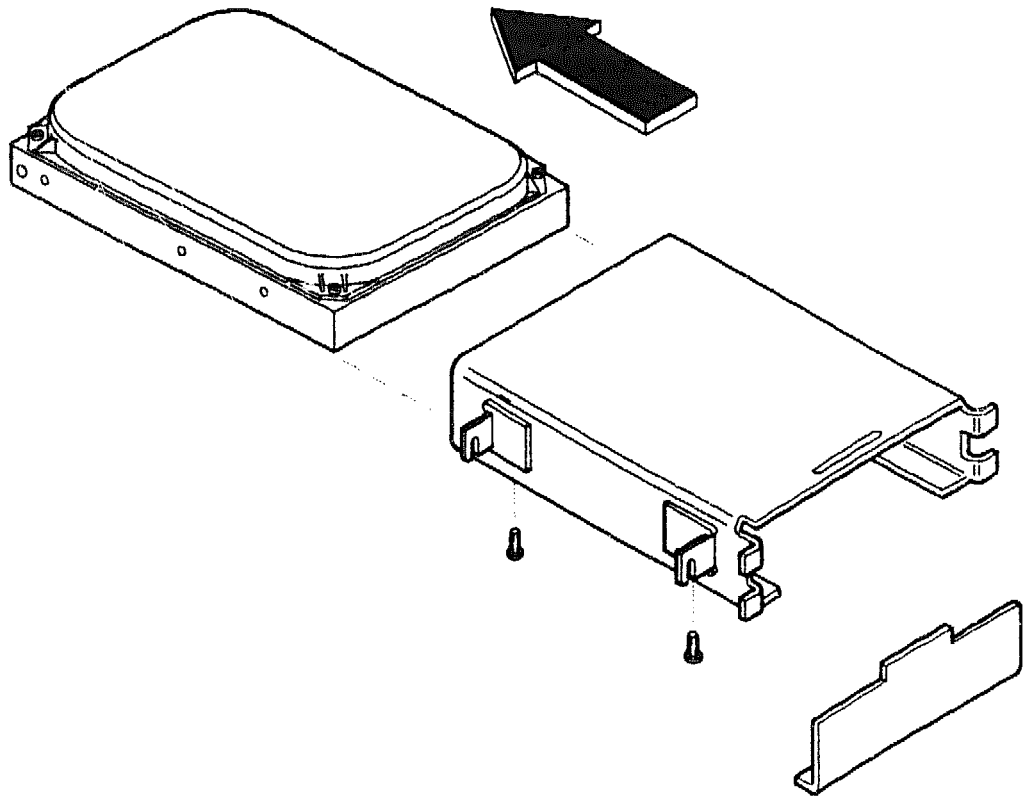


Figure 3-10. Removing a 3.5-Inch Mass Storage Device From a Mounting Tray

To replace a 3.5-inch mass storage device, do the following:

1. If your are replacing a 3.5-inch floppy disk drive, set the drive ID switch to 1 (see Figure 3-11).

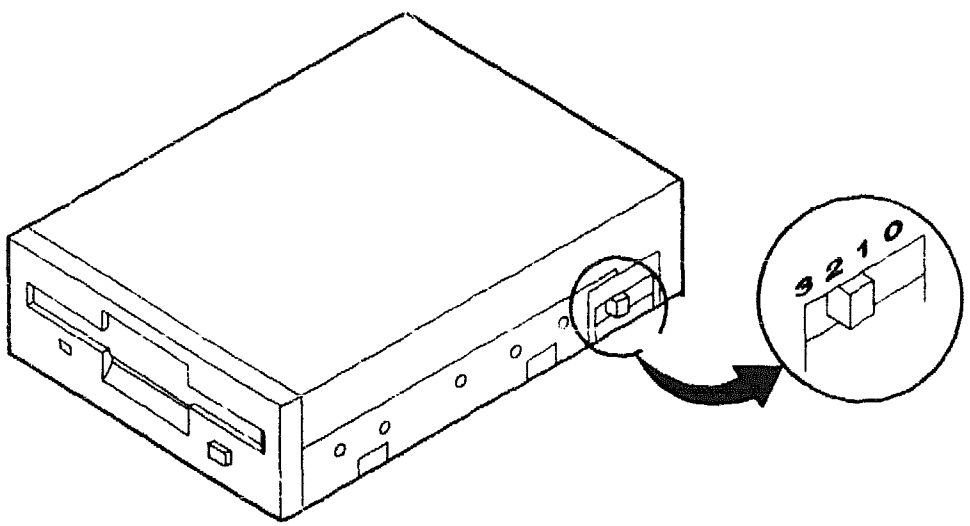


Figure 3-11. Setting the Floppy Disk ID Select Switch

2. Attach the mass storage device to the mounting tray (see Figure 3-10).

3. Position the mass storage device mounting tray inside the chassis. Make sure the mounting post and mounting hooks are correctly positioned (Figure 3-9).

4. Press the mounting tray into its seated position.

5. Connect all cables and remove tags. Make sure pin 1 and the red cable stripe are in the position noted during removal. See Figure 3-8 to connect a floppy disk drive and Figure 3-12 to connect a hard disk drive.

6. Replace the 2.5-inch hard disk drive.

7. Replace the inner chassis cover.

8. Replace the system box outside cover.

9. Run Setup if the installed mass storage device is a different drive type.

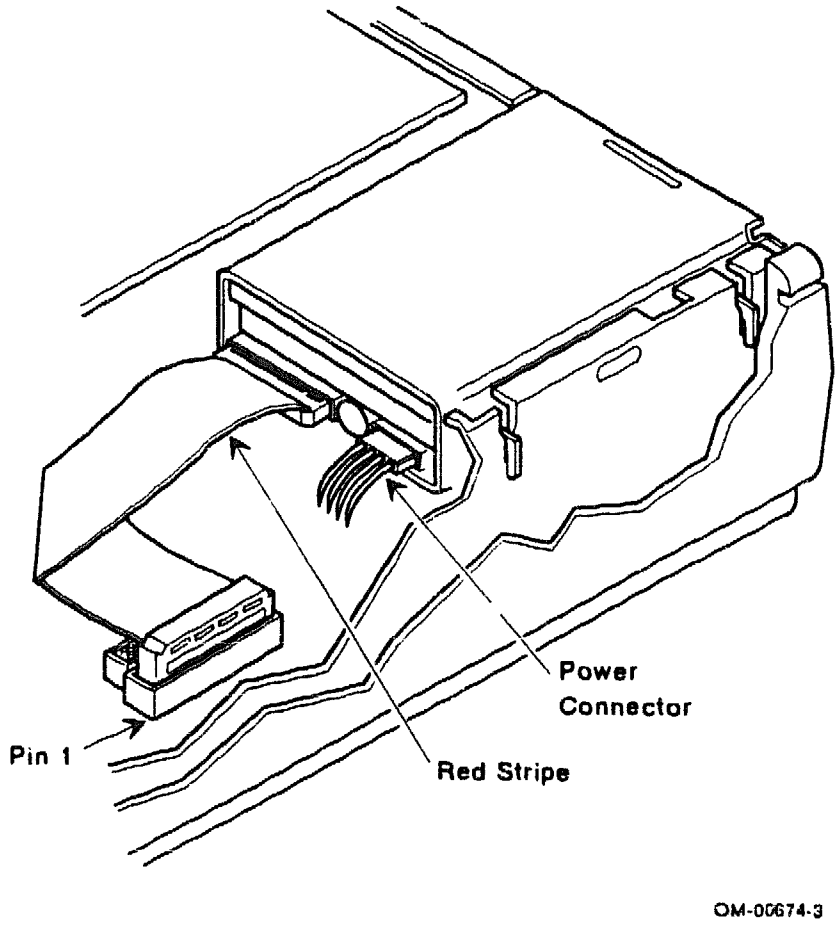
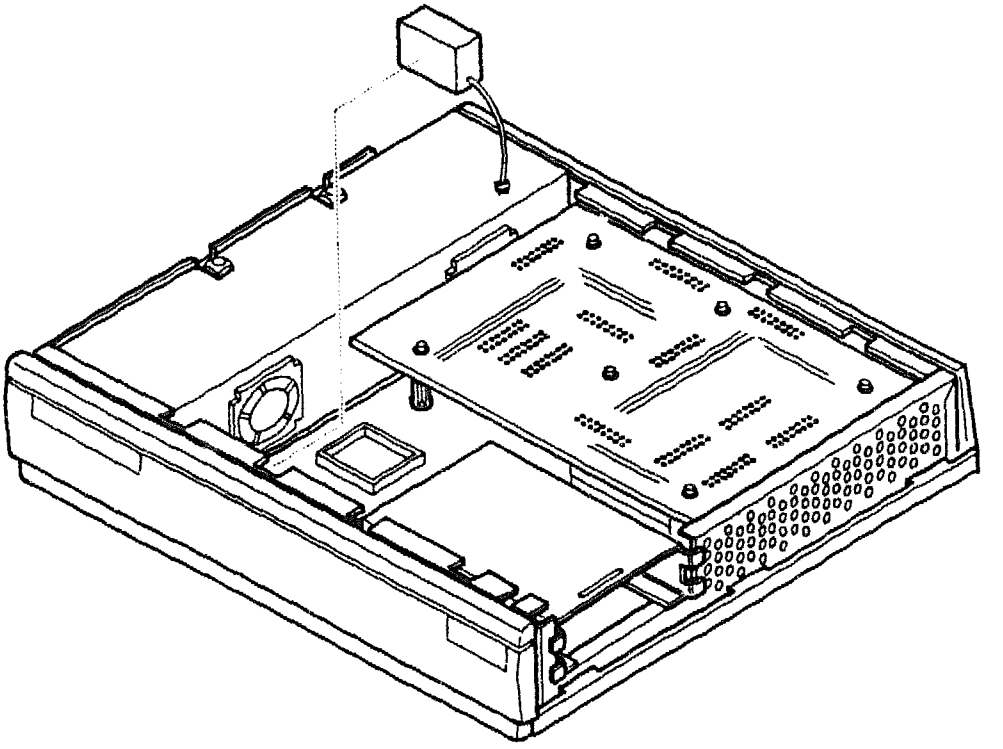


Figure 3-12. IDE Hard Drive Rear Connections

System Battery

To remove the system battery, see Figure 3-13 and do the following:



OM-00649

Figure 3-13. Removing and Replacing the System Battery

1. Enter Setup and record all system configuration information settings.
2. Remove the system box outside cover.
3. Remove the chassis inner cover.
4. Remove the 2.5-inch hard disk drive (if applicable).
5. Disconnect the battery cable from header J8.
6. Pull the battery from its mounting pad (Velcro fastener) located inside the chassis front panel.

To replace the system battery do the following:

1. Place the replacement battery on the mounting pad.
2. Connect the battery cable to header J8.
3. Replace the 2.5-inch hard disk drive (if applicable).
4. Replace the chassis inner cover.
5. Replace the system box outside cover
6. Run Setup to restore all system configuration information.

Intelligent Graphics Controller

To remove the intelligent graphics controller, see Figure 3-14 and do the following:

1. Remove the system box outside cover.
2. Remove the chassis inner cover.
3. Lift up on the intelligent graphics controller until its connector is free of system board connector. There is an interconnect board (riser card) located between the controller and the system board. Make sure you retain it.

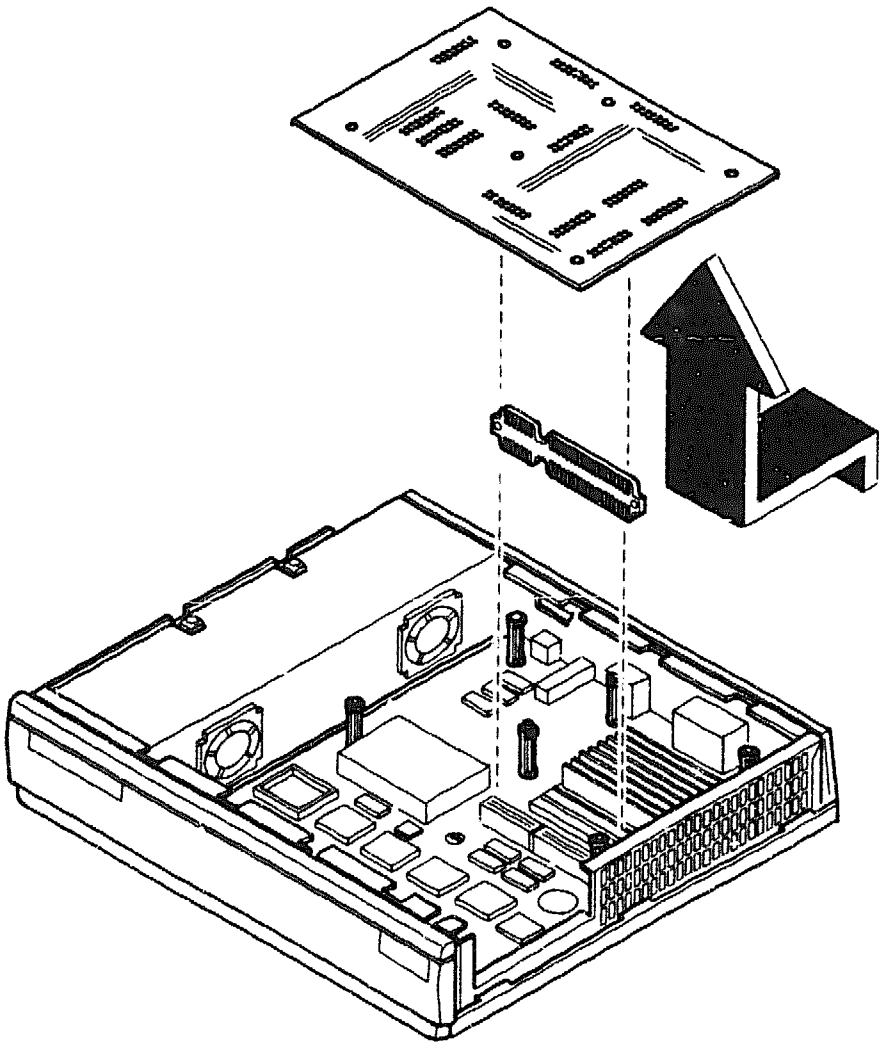


Figure 3-14. Removing the Intelligent Graphics Controller

To replace the intelligent graphics controller, see Figure 3-15 and do the following:

1. Install the interconnect board (riser card) into the system board connector.
2. Position the intelligent graphics controller over mounting standoffs and interconnect board (riser card).
3. Gently press down on the intelligent graphics controller until its connector seats.
4. Replace the inner chassis cover.
5. Replace the system box outside cover.

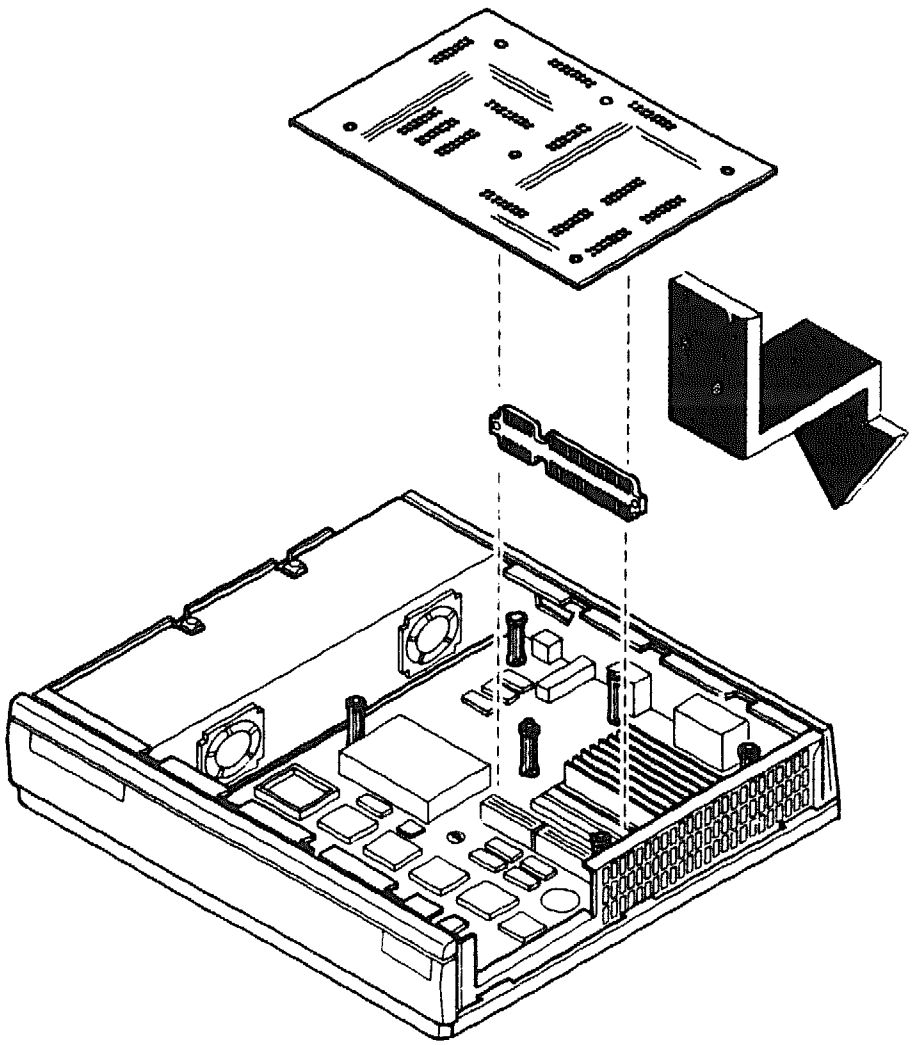


Figure 3-15. Installing the Intelligent Graphics Controller

External Cache

To remove the external cache, do the following:

1. Remove the system box outside cover.
2. Remove the chassis inner cover.
3. Remove intelligent graphics controller (Figure 3-14).
4. Carefully remove the external cache module and place it in a suitable antistatic package (Figure 3-16).

To replace the external cache, do the following:

1. Remove the external cache from its antistatic package, being careful not to touch the pins on the chip.
2. Align the external cache's pins with the socket contacts. Make sure the external cache's guide pin is at the position shown in Figure 3-16.
3. Press down on the external cache until it firmly seats in the socket.
4. Replace the intelligent graphics controller (Figure 3-14).
5. Replace the chassis inner cover.
6. Replace the system box outside cover.

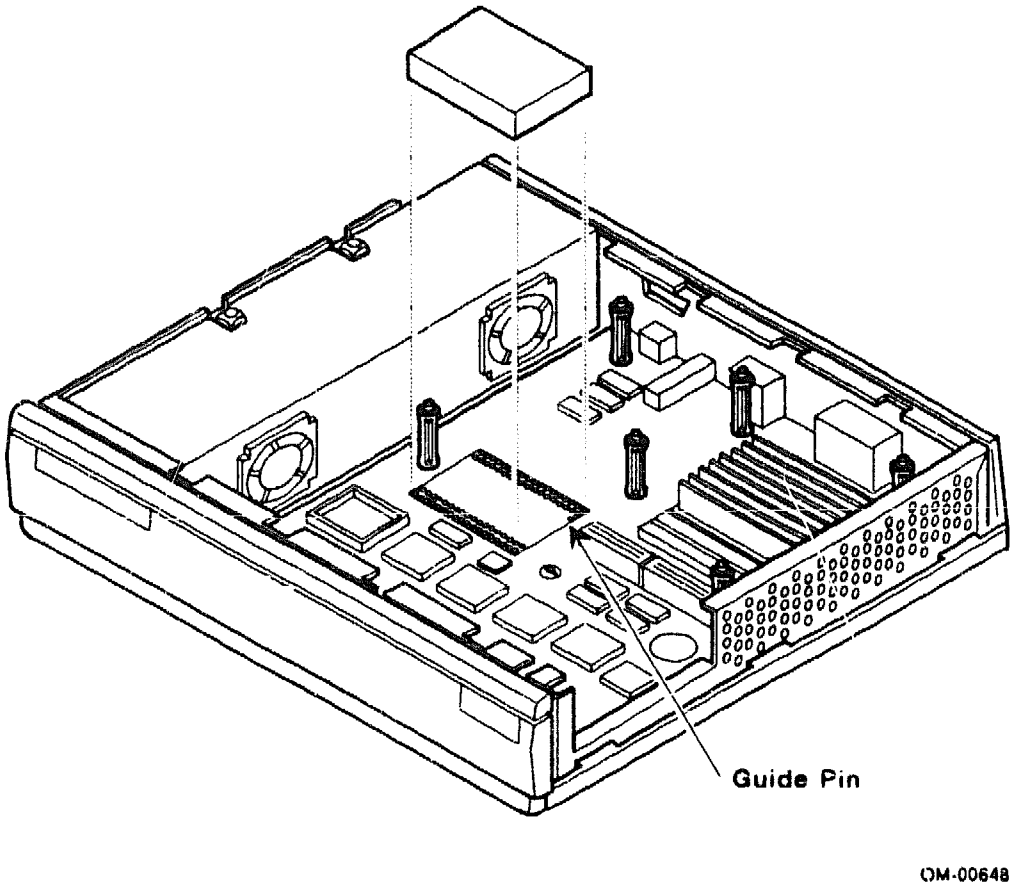


Figure 3-16. Removing and Replacing the External Cache

Power Supply

To remove the power supply, see Figure 3-17 and do the following:

1. Remove the system box outside cover.
2. Remove the chassis inner cover.
3. Remove the intelligent graphics controller.
4. Tag and disconnect the power supply connectors from all mass storage devices and the system board.
5. Loosen the two securing fasteners.
6. Using a flat-blade screwdriver, pry at the position shown in Figure 3-17 until the two fasteners are free of chassis.
7. Using a flat-blade screwdriver, gently pry directly beneath each fastener to remove them from the power supply
8. Carefully tilt the power supply toward the intelligent graphics controller's standoffs and then lift it from the chassis.

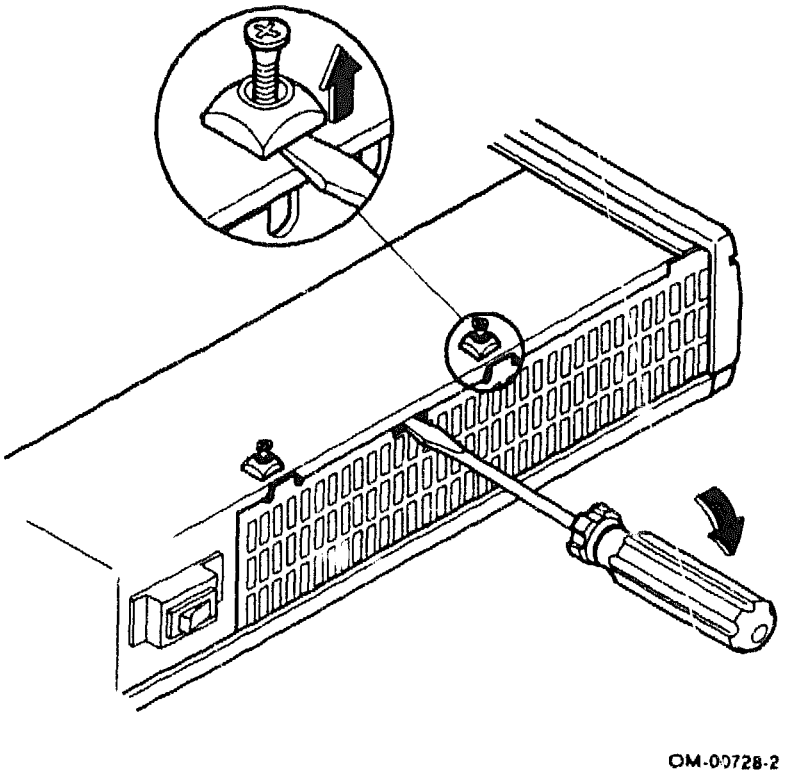


Figure 3-17. Removing the Power Supply

To replace the power supply, see Figure 3-18 and do the following:

1. Set the power supply under the tabs at the bottom of the chassis.

2. Rotate power supply into the two fastener holes line up. Make sure the positioning tab is between the power supply chassis and system box chassis. Also, make sure no cables are being pinched.

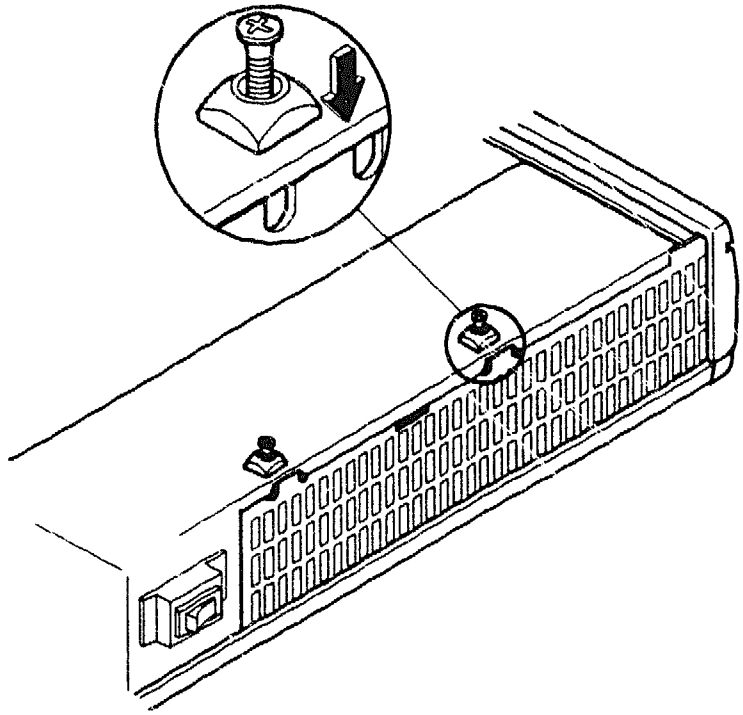


Figure 3-18. Replacing the Power Supply

3. Press both fasteners into place and then fully tighten the two screws.

4. Connect all previously removed power cables to the mass storage devices and the system board. Remove all identification tags.

5. Replace the intelligent graphics controller.

6. Replace the chassis inner cover.

7. Replace the system box outside cover.

SIMMs

Both the system board and the intelligent graphics controller contain SIMMs. Removing and replacing the SIMMs on either the system board or the intelligent graphics controller is the same. It might be necessary to remove additional SIMMs to get sufficient clearance to pull the SIMM from its socket. To remove SIMMs, see Figure 3-19 and do the following:

> **CAUTION**
> Apply only enough pressure on the retaining clips to release the SIMM. Too much pressure can break the retaining clips or damage the socket slot.

1. Remove the system box outside cover.

2. Remove the chassis inner cover.

3. Remove the intelligent graphics controller.

4. Open the retaining clips to free the SIMM.

5. Lift the SIMM from its socket slot.

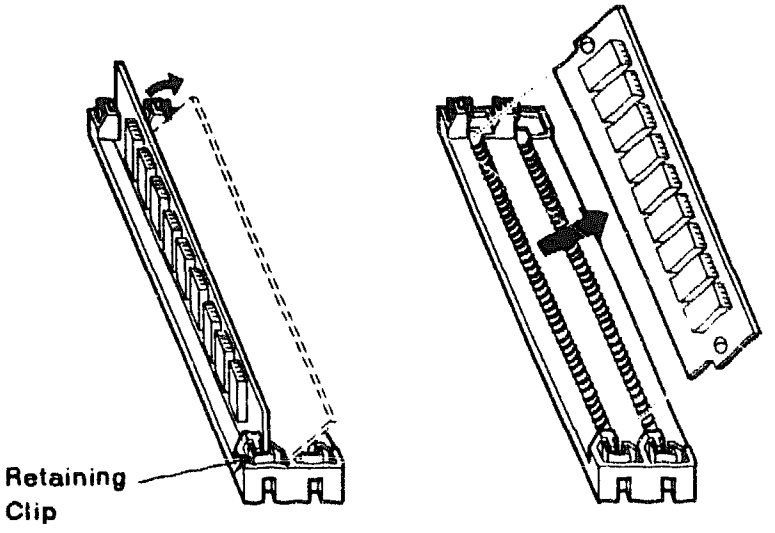


Figure 3-19. Removing a SIMM

To replace a SIMM, see Figure 3-20 and do the following:

1. Insert the SIMM into the socket slot and press down firmly while maintaining the proper insertion angle.

2. When the SIMM seats, hold it at each end and gently push the top edge toward the retaining clips until it snaps into place.

3. If the SIMM does not seat, gently spread the retaining clips enough to pull the top edge of the SIMM away from the clips and then reseat.

4. Replace the intelligent graphics controller.
5. Replace the chassis inner cover.
6. Replace the system box outside cover.

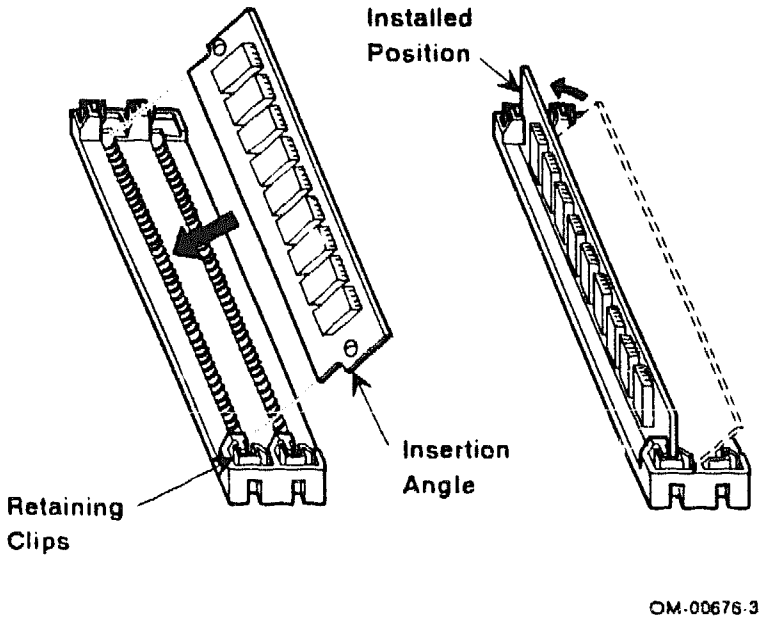


Figure 3-20. Replacing a SIMM

System Board

To remove the system board, see Figure 3-21 and do the following:

1. Run Setup and record the system configuration settings.
2. Remove system box outside cover and inner chassis cover.
3. Remove the intelligent graphics controller.
4. Remove the 2.5-inch hard disk and the 3.5-inch mass storage device (if applicable).
5. Remove the six standoffs.
6. Tag and disconnect the power supply cable to the system board.
7. Tag and disconnect the system battery connector.
8. Carefully pry the system board at the three snap standoffs. Pry at the end snap standoff first, and then the center snap standoff.
9. Lift the system board from the chassis and place it in an anti-static container.

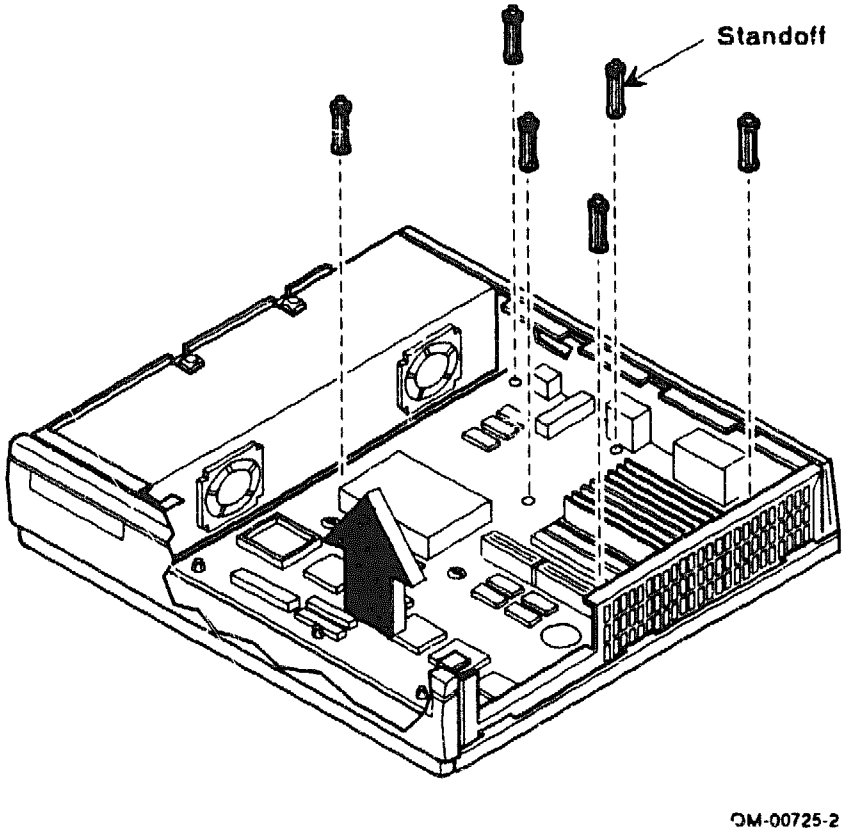


Figure 3-21. Removing the System Board

To replace the system board, see Figure 3-22 and do the following:

1. Set the system board in position over the snap standoffs and then press down on the system board around the standoffs.

2. Connect the system battery and power supply connectors. Remove all identification tags.

3. Replace the six standoffs.

4. Replace the 3.5-inch and 2.5-inch mass storage device (if applicable).

5. Replace the intelligent graphics controller.

6. Replace the inner chassis cover and system box outside cover.

7. Run Setup to configure the system board. Refer to Appendix C, "ROM-based Setup" for details on running Setup.

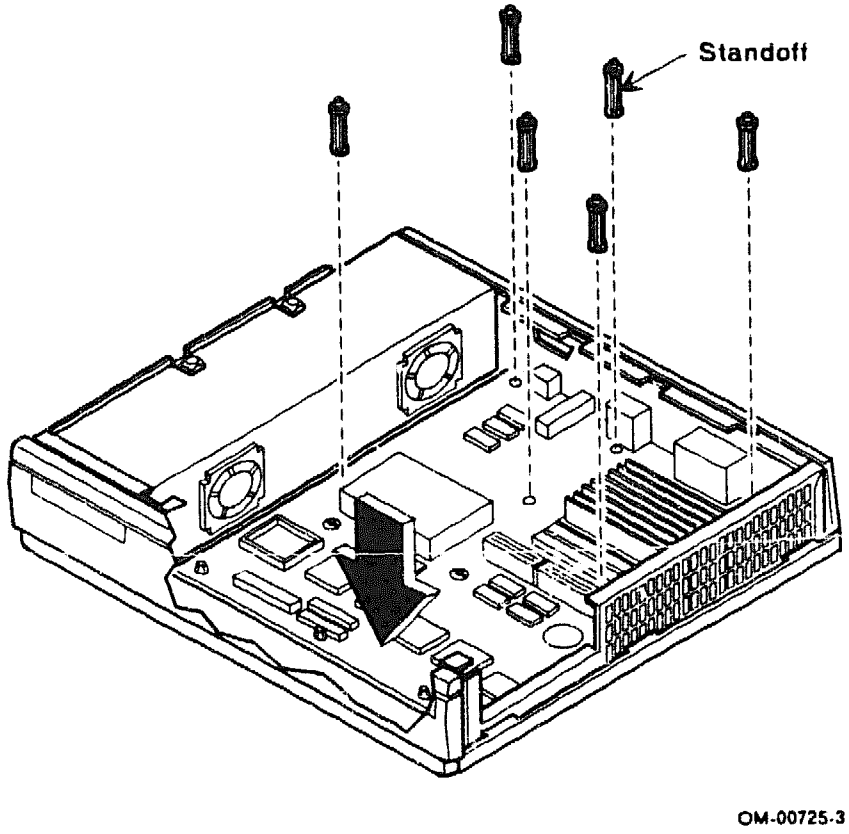
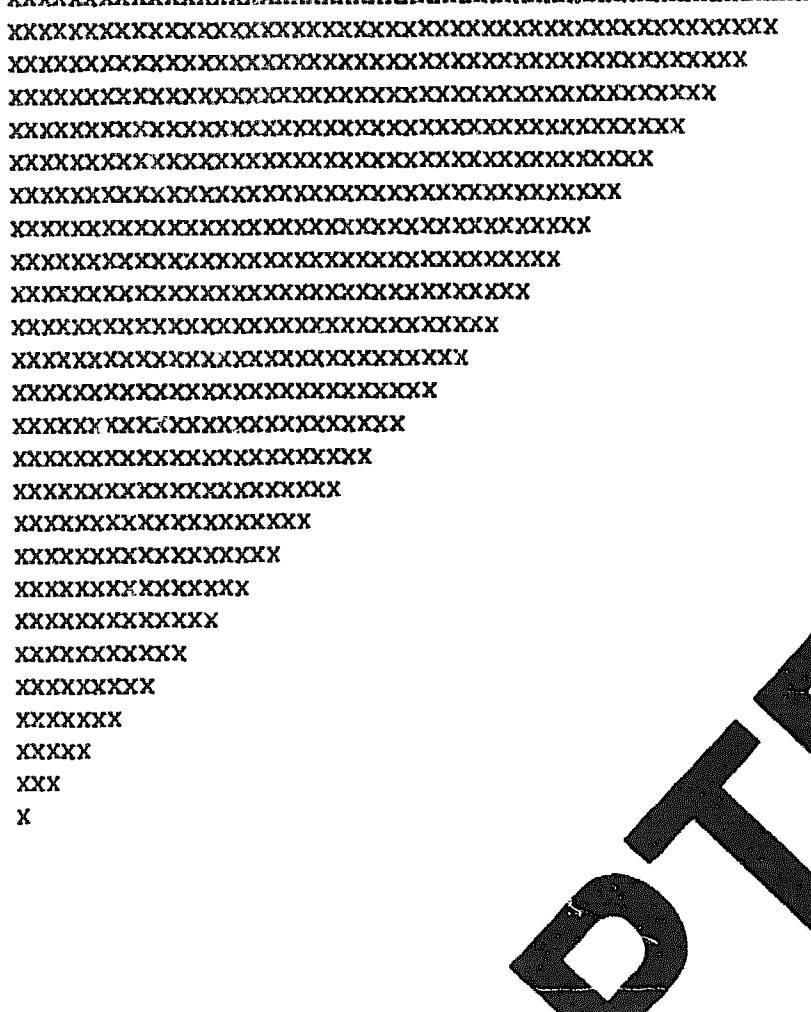
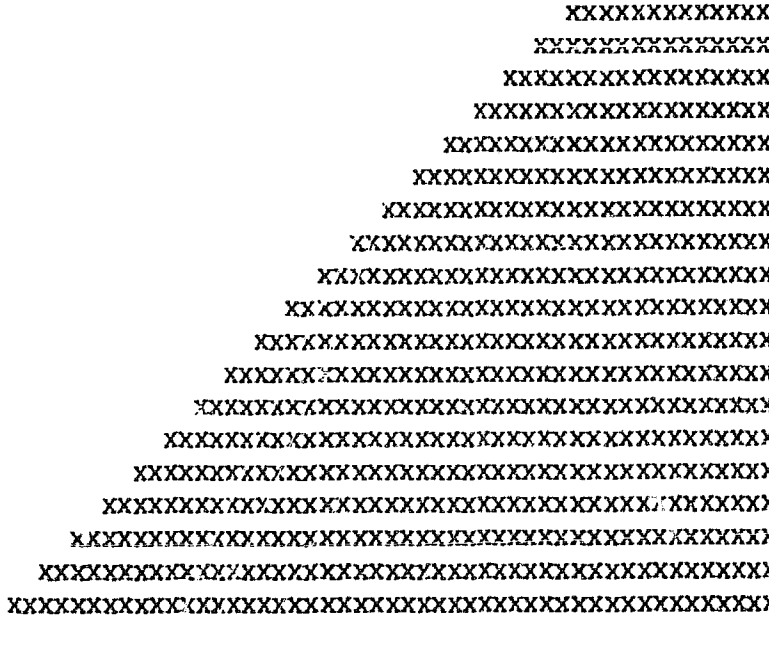


Figure 3-22. Replacing the System Board



CHAPTER 4



4
SCSI Expansion Box FRU Replacement

Introduction

This chapter contains a list of SCSI expansion box FRUs, FRU removal and replacement instructions, and information regarding electrical shock and electrostatic discharge (ESD) that should be read before beginning any procedure.

SCSI Expansion Box FRUs

Table 4-1 lists the available FRUs for the SCSI expansion box.

Table 4-1. SCSI Expansion Box FRUs

FRU	Digital PN#
Front bezel, plastic	74-43560-01
Top cover, plastic	74-43561-01
Bottom cover, plastic	74-43552-01
5.25-inch filler panel, plastic	74-43565-01
EMI top cover, metal	74-43553-01
3.5-inch drive carrier	74-43556-01
Key, w/keylock (20 variations)	511111-01/-20
Chassis base, metal	74-43558-01

Table 4-1. SCSI Expansion Box FRUs *(continued)*

FRU	Digital PN#
5.25-inch drive bracket	74-43359-01
Lite pipe (power on/off)	74-43562-01
Power supply assembly 63 W	29-29179-01
SCSI cable, external	17-03153-01
SCSI cable, internal	17-03149-01
External SCSI terminator/connector	12-35759-01
Auxiliary power cord, IEC pig-tail, US	17-00442-30
Auxiliary power cord, IEC pig-tail, International	17-00365-22

Before You Begin

WARNING
Risk of electrical shock. Failure to disconnect power before opening the covers can result in personal injury.

CAUTION
Equipment damage. Electrostatic discharge (ESD) can damage disk drives, other peripherals, integrated circuits, and circuit boards. It is strongly recommended that all removal and replacement be done at an approved ESD workstation. If one is not available, you can provide minimum ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling any internal system part.

Cover

To remove the cover, see Figure 4-1 and do the following:

1. Turn off the power to all devices connected to the system box.
2. Turn off the power to the system box.
3. Disconnect the internal SCSI cable connected to the SCSI expansion box.
4. Disconnect the SCSI expansion box power cord.
5. Unlock the cover.
6. Locate the two locking tabs below the cover lock. Push in on the tabs to release the cover while lifting.
7. Raise the cover to disengage hinges from the chassis and then remove the cover.

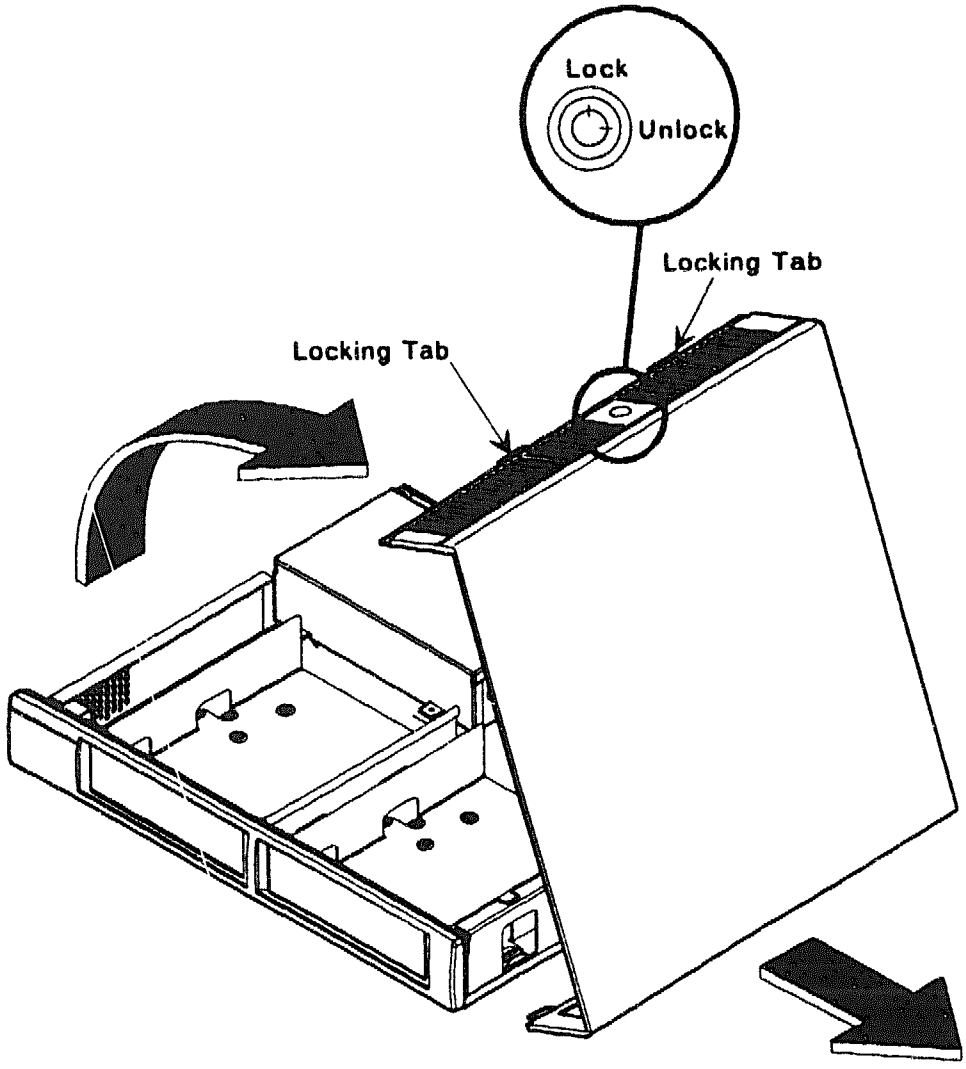


Figure 4-1. Removing the SCSI Expansion Box Cover

To replace the cover, see Figure 4-2 and do the following:

1. Make sure no tools or loose parts are left around or inside the chassis.

2. Position the cover over the chassis, then lower the side opposite the locking tabs to engage the cover hinges with the chassis.

3. Carefully lower the cover until it engages the locking tabs.

4. Push down on the cover until you hear the locking tabs snap into place.

5. Push down on the cover (above the front panel) to seat the two front locking detents.

6. Push down on the cover (above the rear panel) to seat the rear locking detent.

7. Lock the cover.

8. Connect all previously removed external cables and power cables. Remove all identification tags.

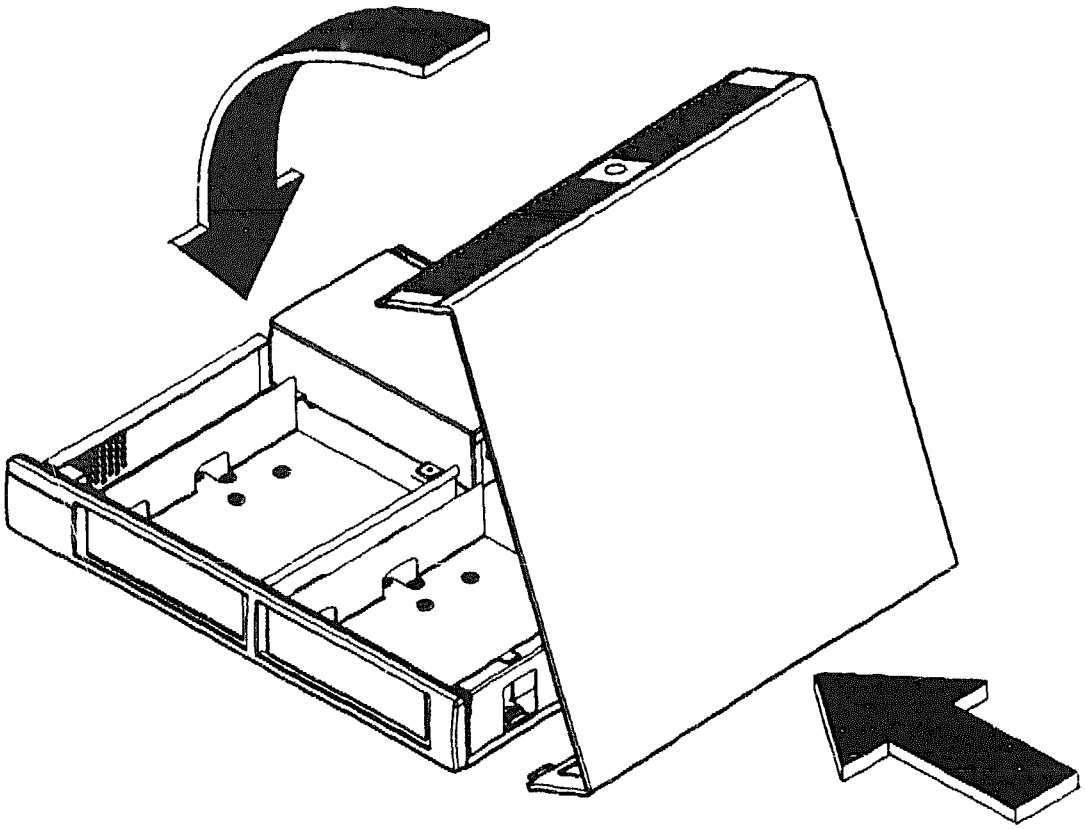


Figure 4-2. Replacing the SCSI Expansion Box Cover

Removing SCSI Devices (5.25-Inch Mounting Trays)

Both 5.25-inch mounting trays can hold either a 5.25-inch SCSI device or a 3.5-inch SCSI device. The removal and replacement procedures for either is the same, only the mounting position in the mounting tray is different.

To remove a SCSI device, do the following:

1. Remove the cover.

2. Tag and disconnect the power cable and internal SCSI cable (see Figure 4-3).

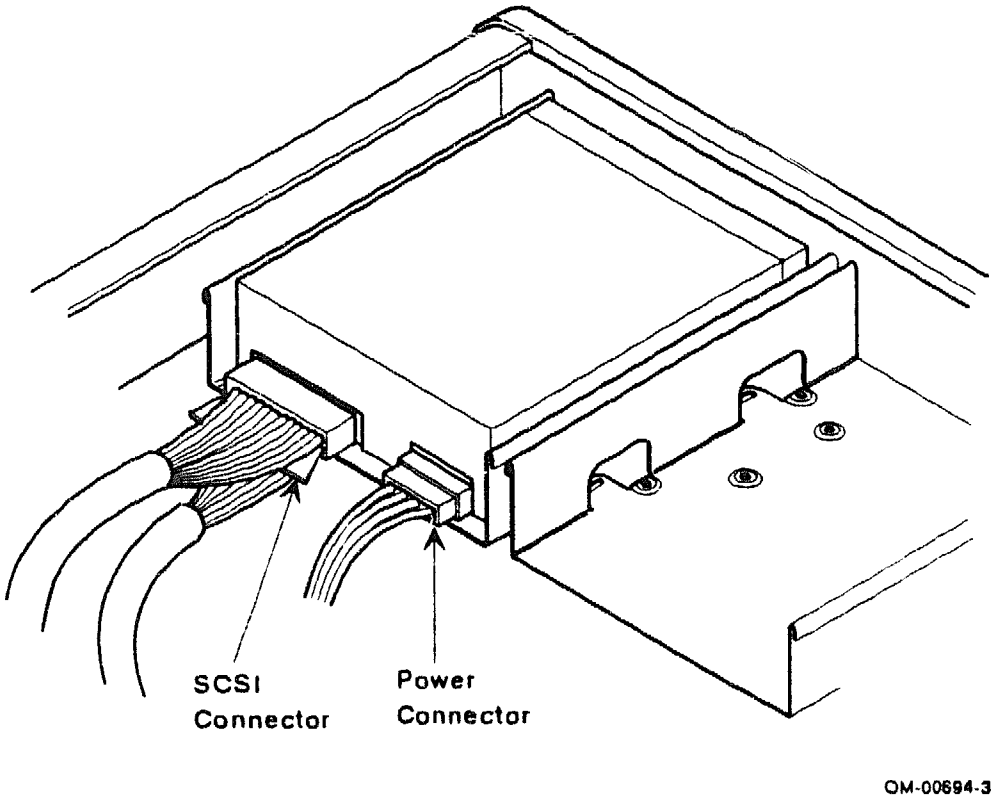


Figure 4-3. SCSI Device Rear Connections (5.25-Inch Mounting Tray)

3. Remove the mounting tray screws and then lift the mounting tray from the chassis (see Figure 4-4).

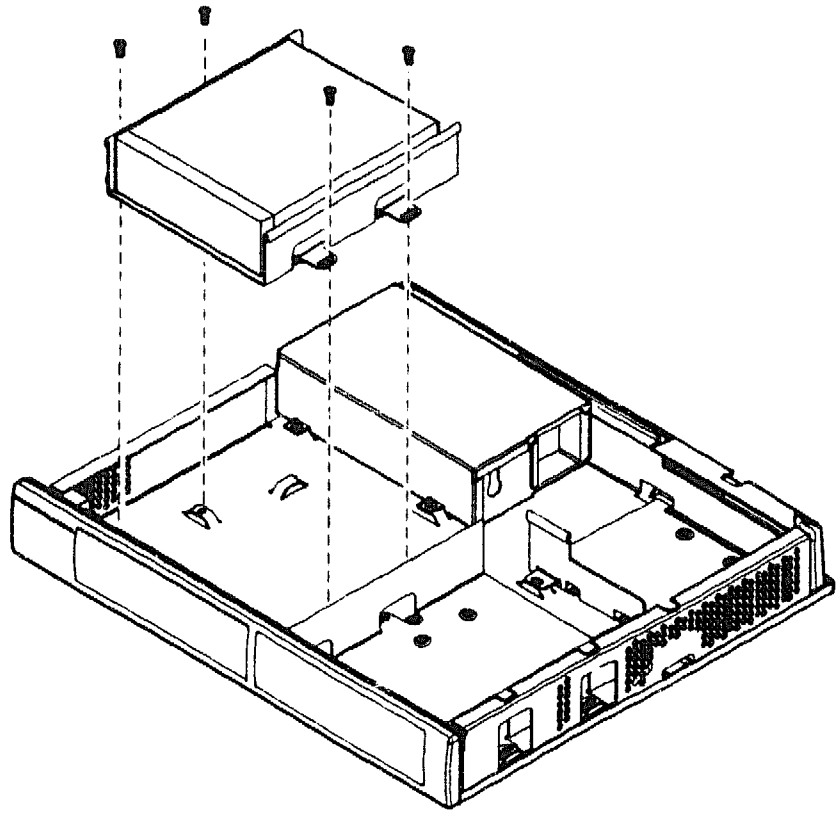


Figure 4-4. Removing a SCSI Device (5.25-Inch Mounting Tray

4. Remove the SCSI device from the mounting tray (see Figure 4-5).

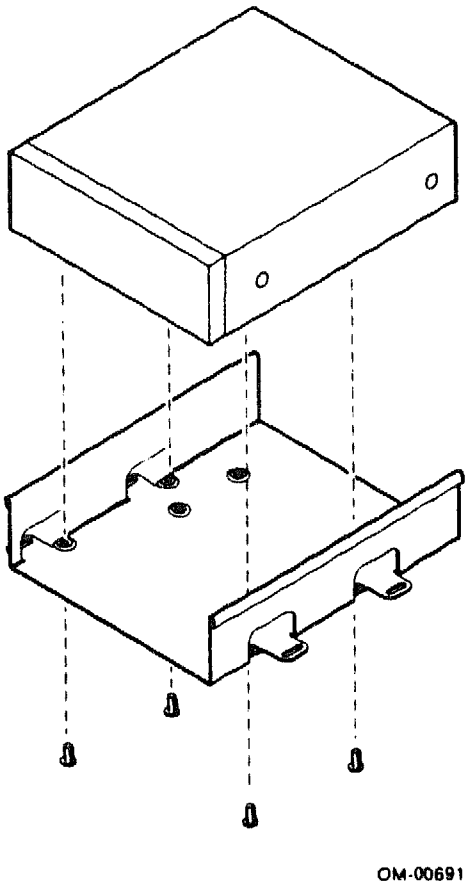


Figure 4-5. Removing a SCSI Device from a 5.25-Inch Mounting Tray

To replace a SCSI device, do the following:

1. Attach the SCSI device to the mounting tray (see Figure 4-5 if you are mounting a 5.25-inch SCSI device and Figure 4-6 if your are mounting a 3.25-inch SCSI device in a 5.25-inch tray.

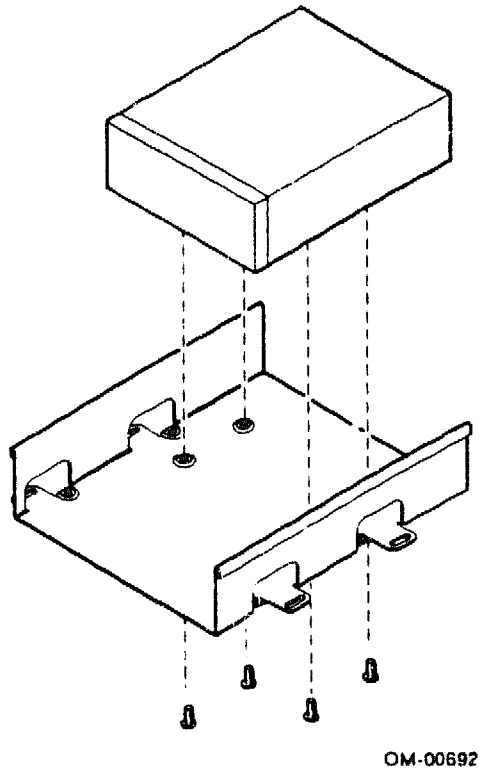


Figure 4-6. Attaching a 3.5-Inch SCSI Device to a 5.25-Inch Mounting Tray

2. Position the mounting tray in the chassis and secure it with the mounting screws previously removed.

3. Connect the power and internal SCSI connectors and then remove all identification tags (see Figure 4-3).

4. Replace the cover.

Removing SCSI Devices (3.5-Inch Mounting Tray)

The following procedures provide instructions for removing and replacing a 3.5-inch SCSI device.

To remove a 3.5-inch SCSI device, do the following:

1. Remove the cover.

2. Tag and disconnect the power cable and internal SCSI cable (see Figure 4-7).

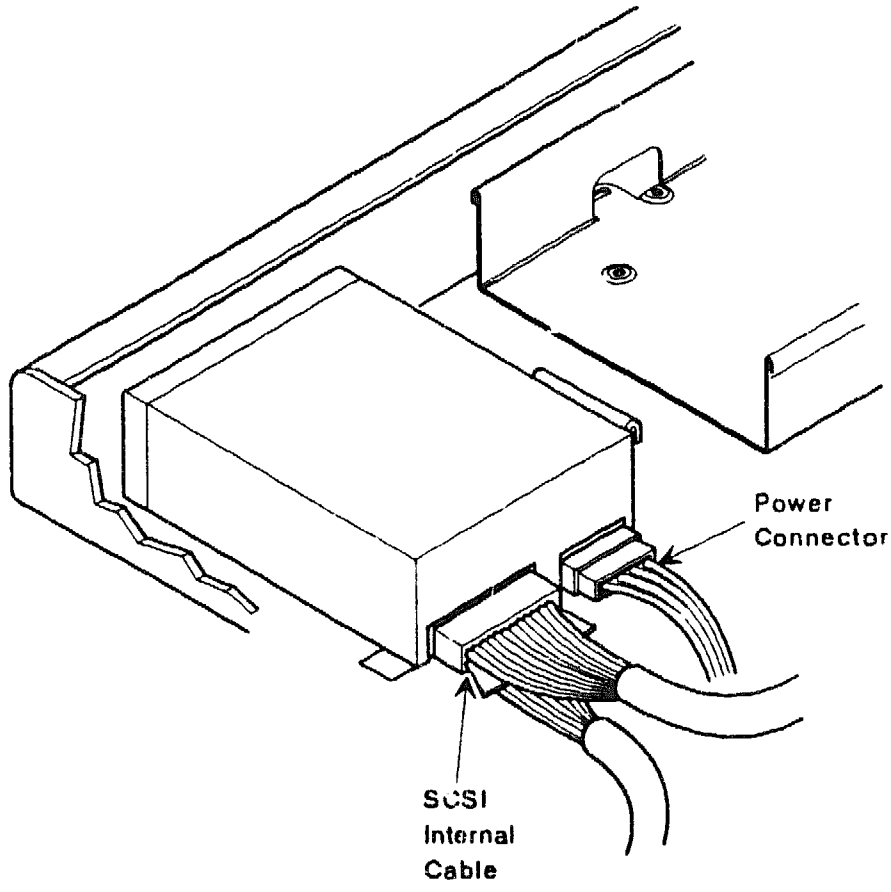


Figure 4-7. SCSI Device Rear Connections (3.5-Inch Mounting Tray)

3. Remove the mounting tray screw and then lift the mounting tray from the chassis (see Figure 4-8).

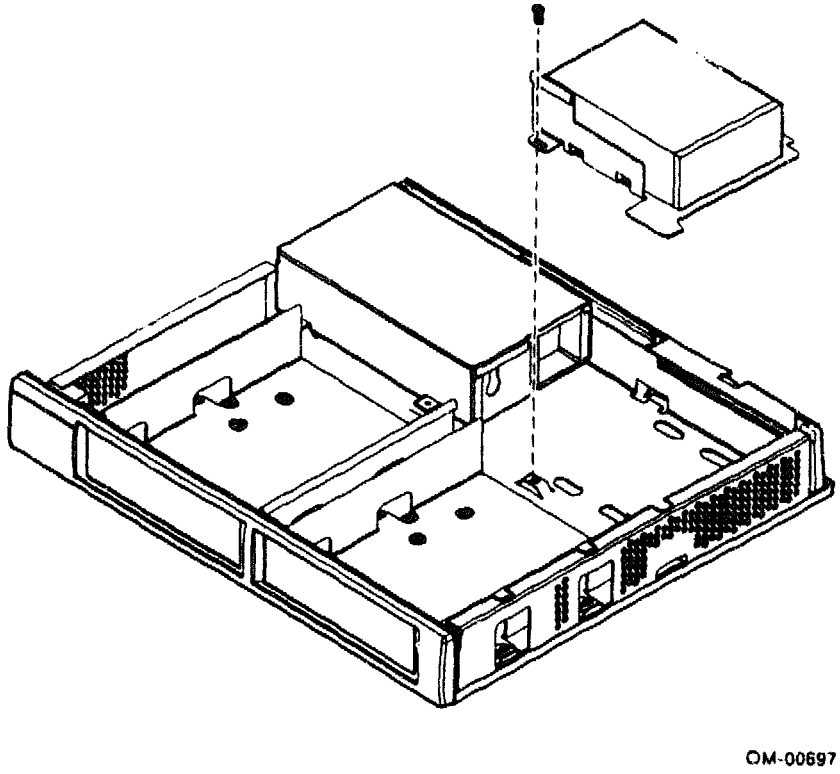


Figure 4-8. Removing a SCSI Device (3.5-Inch Mounting Tray)

4. Remove the SCSI device from the mounting tray (see Figure 4-9).

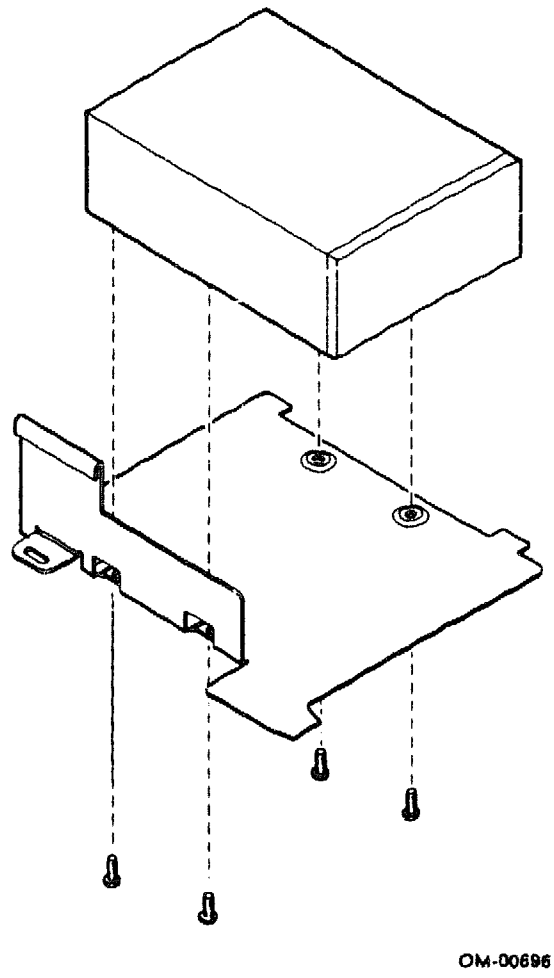


Figure 4-9. Removing a SCSI Device From a 3.5-Inch Mounting Tray

To replace a 3.5-inch SCSI device, do the following:

5. Attach the SCSI device to the mounting tray (see Figure 4-9.

6. Position the mounting tray in the chassis and secure it with the mounting screw previously removed (see Figure 4-8.

7. Connect the power and internal SCSI connectors and then remove all identification tags (see Figure 4-7).

8. Replace the cover.

Power Supply

To remove the power supply, do the following:

1. Remove the cover.

2. Tag and disconnect the power supply cables to all SCSI devices.

3. See figure 4-10 and remove the two power supply retaining screws.

4. Carefully lift the power supply from the chassis.

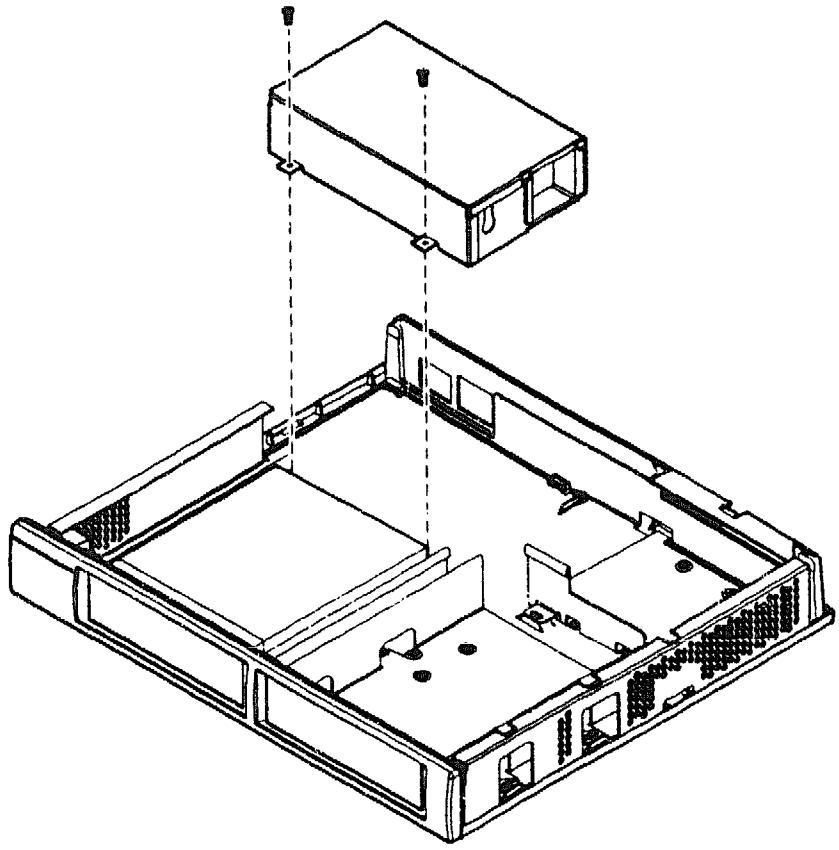


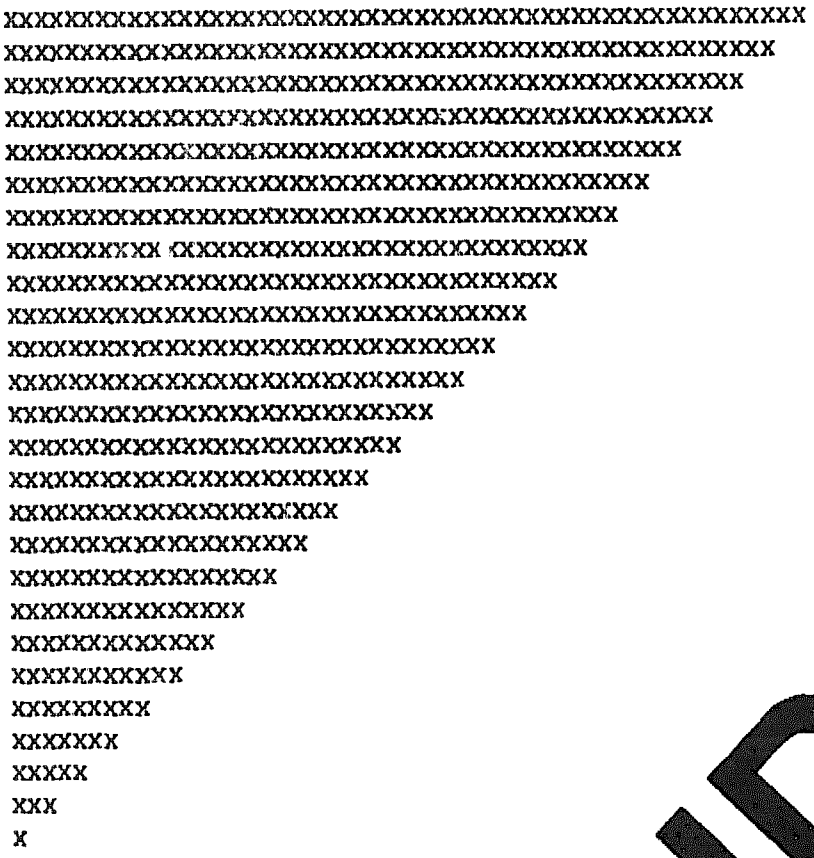
Figure 4-10. SCSI Power Supply Mounting

To replace the power supply, do the following:

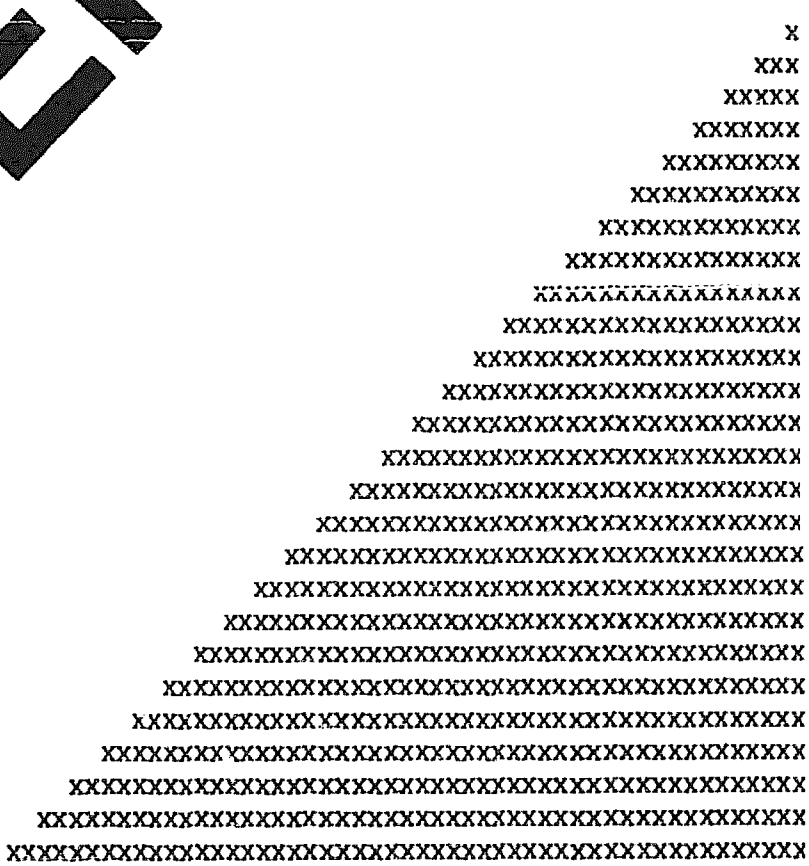
1. Set power supply in the mounting position and replace both retaining screws (see Figure 4-10).

2. Connect the power cables and data cables to the SCSI devices and then remove all identification tags.

3. Replace the cover.



APPENDIX A



A
Power Consumption

Introduction

This appendix contains power requirement information for the system box and the SCSI expansion box. Also included are current requirements for the system board and components that obtain power from the system board.

Power Requirements

Table A-1 lists the power requirements for the system box and the SCSI expansion box.

Table A-1. Power Requirements

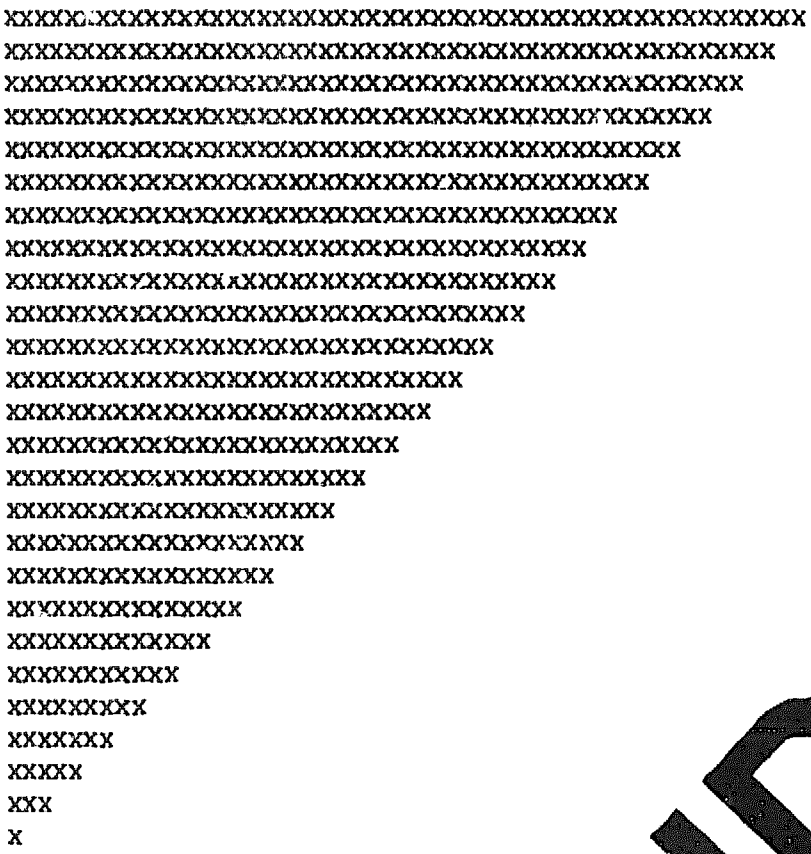
Voltage Source	Maximum Range	Input Current	Frequency Limits
100-120 V ac	90 - 132 V ac	10 A	47 - 63 Hz
200-240 V ac	180 - 264 V ac	5 A	47 - 63 Hz

System Board Current Requirements

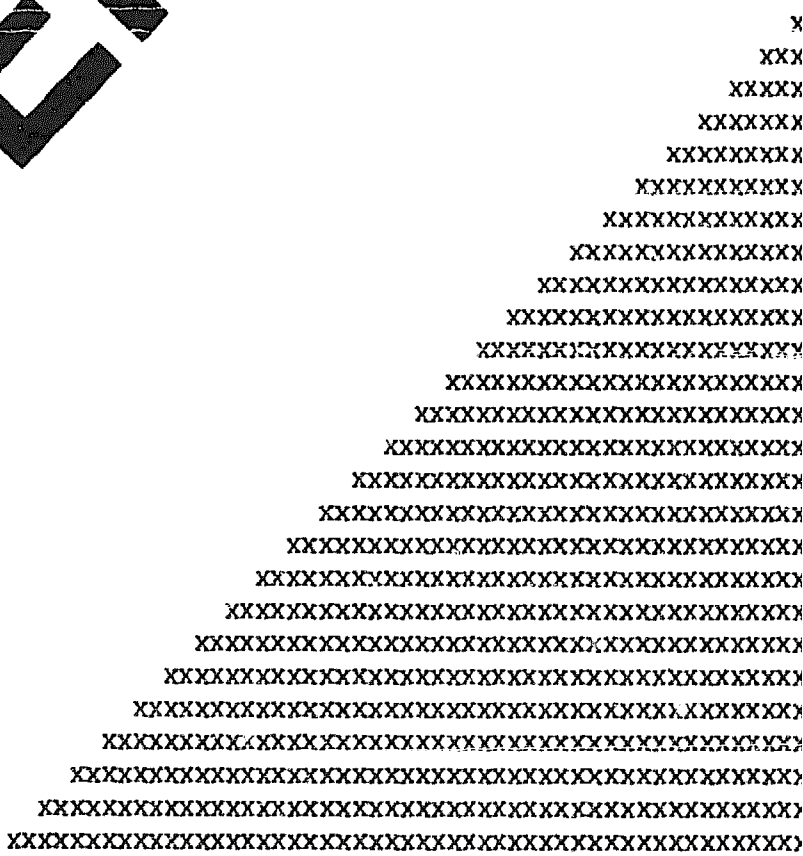
Table A-2 lists the nominal current requirements for the system board and the components that obtain power from the system board.

Table A-2. Current Requirements

Assemblies	+5.0 V dc	+12.0 V dc	-12.0 V dc
System board with 8 MB of system memory	5.3 A	2.5 A	2.5 A
Intelligent graphics controller	5 A	0.14 A	0 A
1.44 MB floppy disk drive	0.15 A	0.3 A	0 A
IDE fixed disk drive	0.3 A	0.3 A	0 A



APPENDIX B



B
Interface Connectors

Introduction

This appendix contains interface information for these system connectors:

- System box
- Serial ports
- Parallel port
- Keyboard/mouse
- Monitor
- SCSI box

System Box Connectors

The system box has seven external connectors: two 9-pin D-type serial connectors (J2A, J2B), one 25-pin D-type parallel printer connector (J10), one 6-pin mini-DIN keyboard connector (J7), one 6-pin mini-DIN mouse connector (J8), one 15-pin D-type video connector (P1), and one 50-pin SCSI-2 interface connector (J6). Figure B-1 shows the locations of pin 1 for each of these connectors.

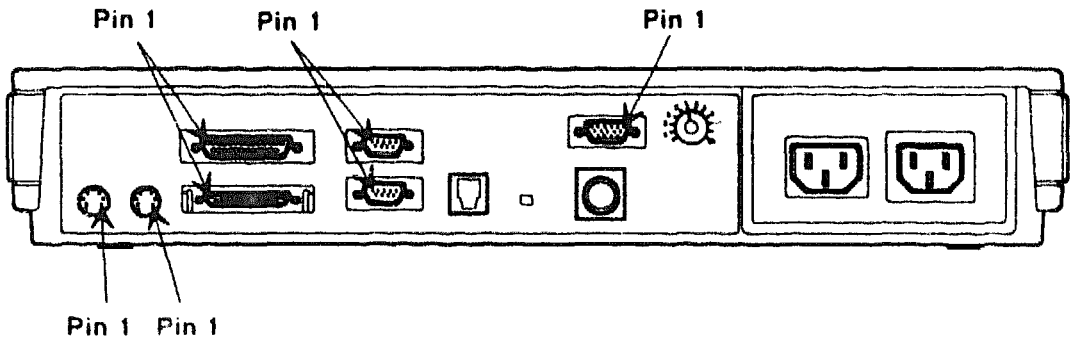


Figure B-1. External Connector Pin 1 Locations

Serial Ports

Table B-1 lists the pin assignments for the serial ports.

Table B-1. Serial Port Pinouts (J2A, J2B)

Pin No.	Signal	Function
1	DCD	Data carrier detect
2	RXD*	Receive data
3	TXD	Transmit data
4	DTR*	Data terminal ready
5	GND	Ground
6	DSR	Data set ready
7	RTS*	Request to send
8	CTS	Clear to send
9	RING	Ring indicator

Parallel Port

Table B-2 lists the pin assignments for the parallel port.

Table B-2. Parallel Port Pinouts (J10)

Pin No.	Signal	Function
1	STB-R	Strobe
2	PRD0R	Printer data bit zero
3	PRD1R	Printer data bit one
4	PRD2R	Printer data bit two
5	PRD3R	Printer data bit three
6	PRD4R	Printer data bit four
7	PRD5R	Printer data bit five
8	PRD6R	Printer data bit six
9	PRD7R	Printer data bit seven
10	ACK*	Acknowledge
11	BUSY	Busy
12	PE	Paper end
13	SLCT	Select
14	AFD-R	Auto feed
15	ERR*	Error
16	INIT-R	Initialize printer
17	SLIN-R	Select input
18-25	GND	Ground

Keyboard and Mouse

Table B-3 lists the pin assignments for the keyboard and mouse connectors.

Table B-3. Keyboard/Mouse Pinouts (J7, J8)

Pin No.	Signal
1	Data
2	Reserved
3	Ground
4	+5 V dc
5	Clock
6	Reserved

Monitor Connector

Table B-4 lists pin assignments for the monitor connector.

Table B-4. Monitor Connector Pinouts (P1)

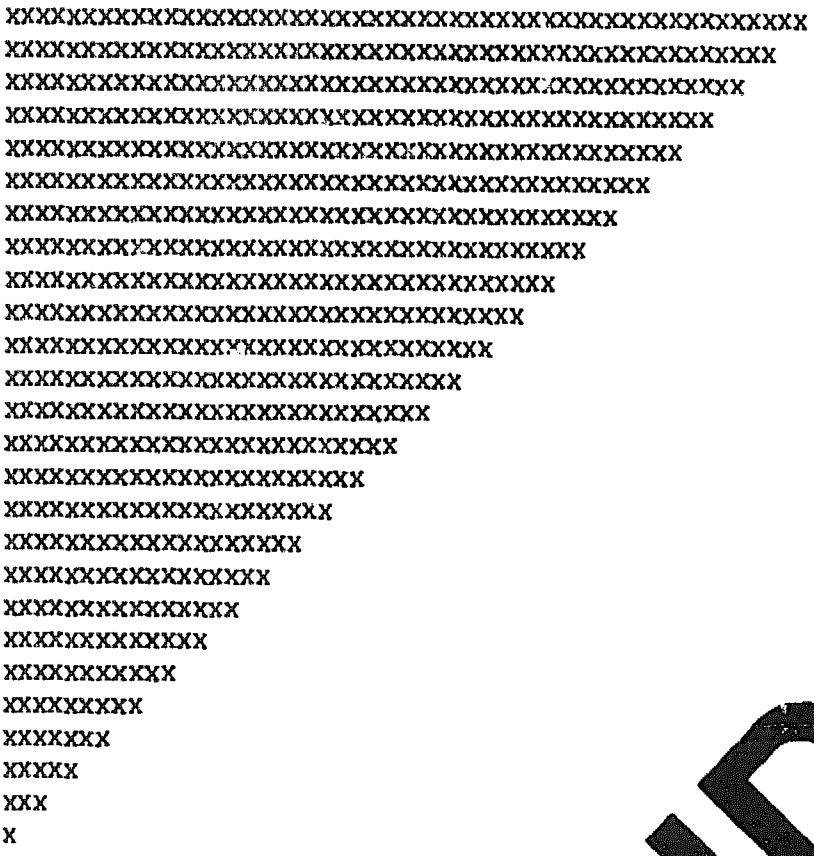
Pin No.	Function
1	Red video
2	Green video
3	Blue video
4	Monitor ID bit 2
5	Ground
6	Red return (ground)
7	Green return (ground)
8	Blue return (ground)
9	Key position (no pin)
10	Sync return (ground)
11	Monitor ID bit 0
12	Monitor ID bit 1
13	Horizontal sync
14	Vertical sync
15	Not used

SCSI Connector

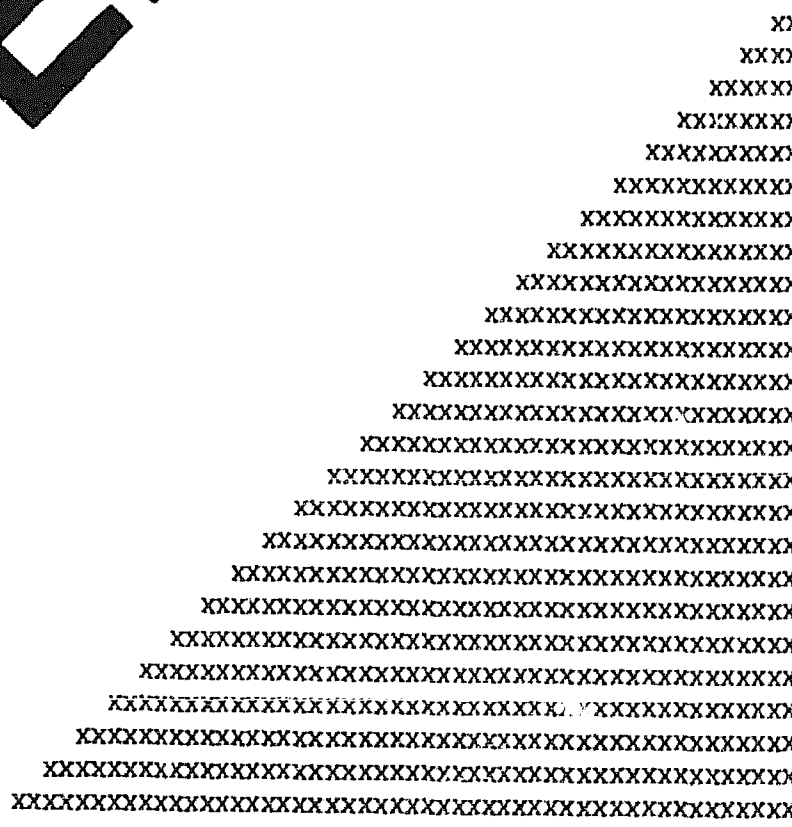
Table B-5 lists the pin assignments for the SCSI connector.

Table B-5. SCSI Connector Pinouts (J6)

Pin No.	Signal
1-11	Ground
12-14	Not connected
15-25	Ground
26-33	Data bits 0 through 7
34-35	Data bit parity
36	Ground
37	Not connected
38	Termination power
39	Not connected
40	Ground
41	Attention
42	Ground
43	Busy
44	Acknowledge
45	Reset
46	Message
47	Select
48	Control/data
49	Request
50	Input/output



APPENDIX C



C
ROM-Based Setup

Introduction

This appendix briefly describes the Setup utility and configuration settings it can change. Setup also displays information about configuration settings that you can not change.

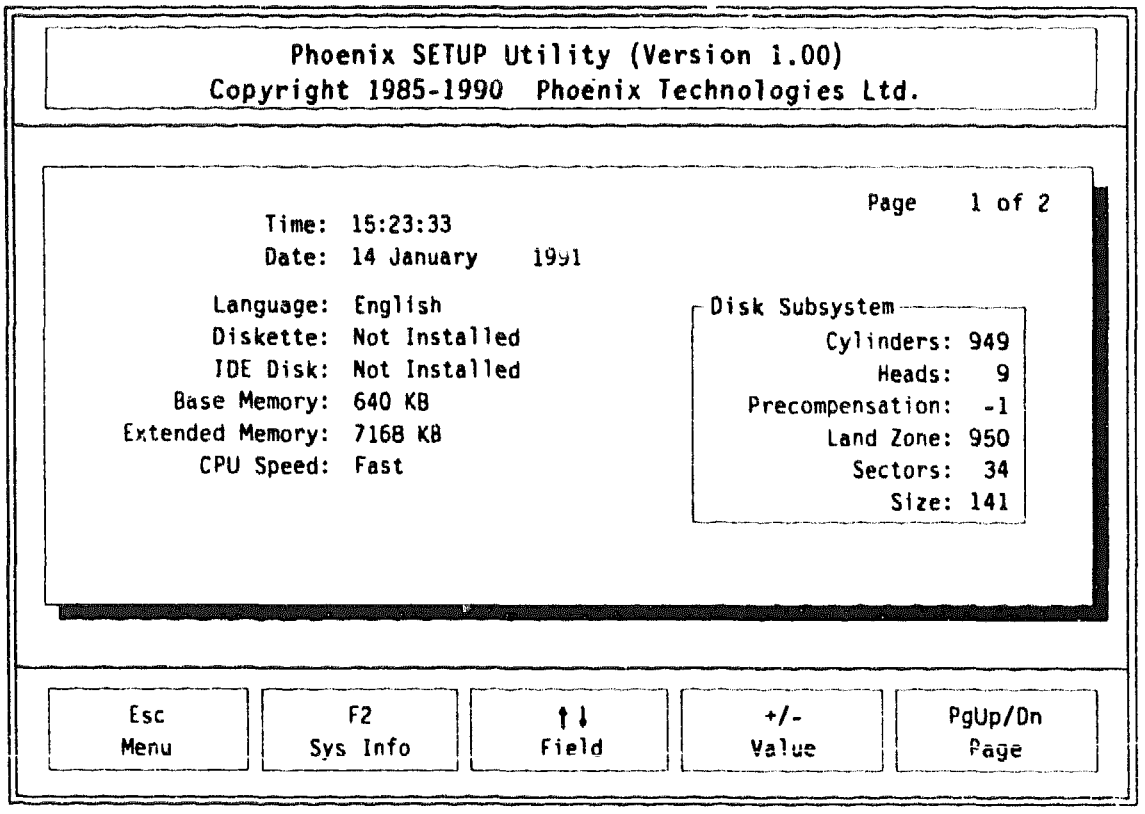
Setup is a ROM-based utility that modifies system configuration settings. The settings are stored in non-volatile RAM and take effect each time you boot the system. In addition, the Setup utility contains a system information menu that displays LAN and secondary cache information. The configuration settings include:

- Time and date
- Setup screen language
- Floppy disk and hard disk drive type
- Amount of base memory and extended memory
- CPU speed
- SCSI hard disk enable/disable
- User definable hard disk drives
- LAN boot enable/disable
- LAN timeout
- Shadow BIOS ROM enable/disable
- Cache enable/disable
- Password enable/disable

Running Setup

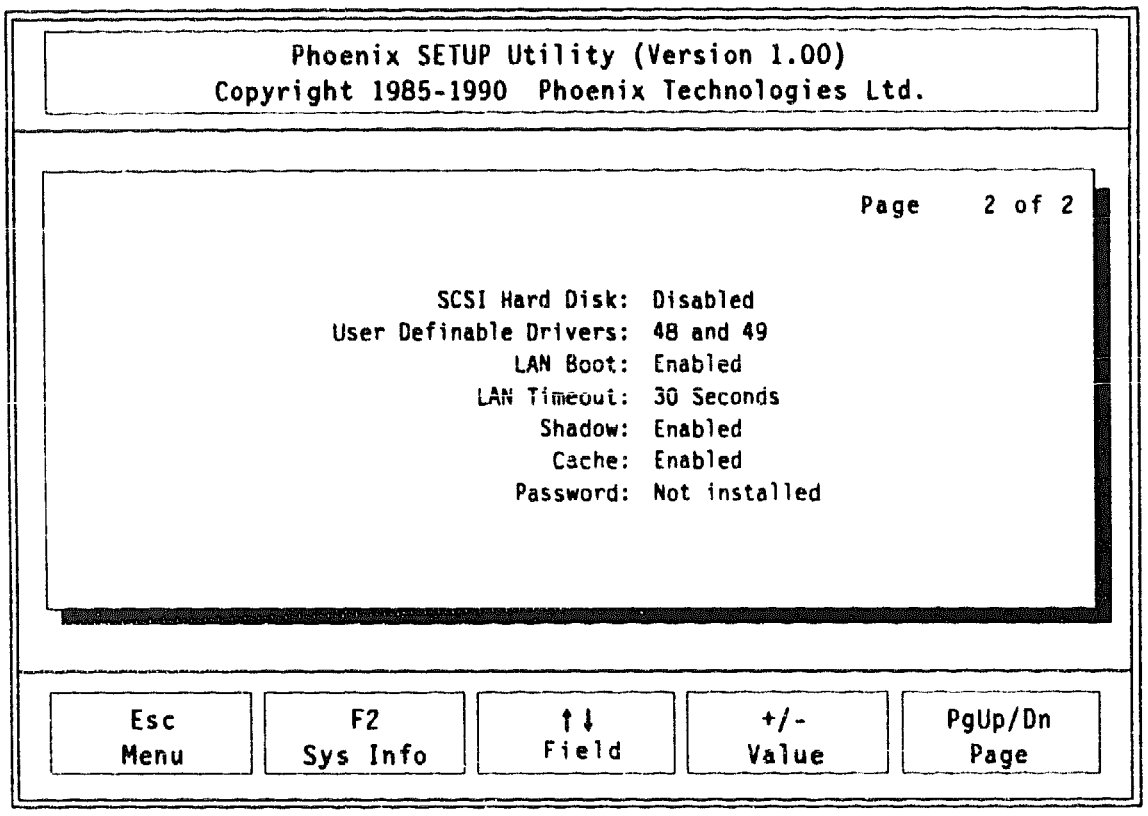
The Setup utility is permanently stored in ROM and can be run with or without the operating system and is entered during POST. To run the setup utility:

1. Remove power.
2. Apply power.
3. At POST numeric sequence 100, you are prompted to enter Setup. Press the appropriate function key.
4. The first of two Setup screens, Figure C-1, is displayed in the language stored in non-volatile RAM (you can change the language using Setup).
5. To display the second Setup screen (Figure C-2), press the Page Down key. To redisplay the first setup screen, press the Page Up key.



OM-00600

Figure C-1. Setup Screen One



OM-00599

Figure C-2. Setup Screen Two

Changing Configuration Settings

Fours keys change configuration settings: up arrow, down arrow, + and –. The up and down arrow keys select the configuration settings to change, the + and – keys select the configuration settings options. There are some configuration settings that you can not change; therefore, they are not selectable. To change configuration settings:

1. Press the Page Up and Page Down keys to display the Setup screen that contains the configuration settings you want to change.

2. Press the up and down arrow keys to select the configuration settings you want to change.

3. Press the + and – keys to select the configuration setting option. Each key press moves to the next option. You can hold down either key to change values continuously.

   or

4. Press the + and – keys to select the configuration setting option and enter the new configuration setting option.

Configuration Setting Descriptions

The following paragraphs briefly describe the configuration settings set by the Setup utility.

Time

This configuration setting specifies the current system time. It contains three changeable fields: hours, minutes, and seconds.

Date

This configuration setting specifies the current system date. It contains three fields: date of the month, month, and year.

Language

This configuration setting specifies the language in which the setup screens appear. Options are English, French, German, Italiar., and Spanish

Diskette

This configuration setting specifies the floppy disk drive type installed as drive A. There are two options: Not Installed and 3.5", 1.44 MB.

IDE Disk

This configuration setting specifies the IDE hard disk type. Once selected, the parameters for that drive type appear on the screen under Disk Subsystem. Refer to the hard disk drive manufacturer's documentation for drive type information.

> **CAUTION**
> The system BIOS cannot determine the type of IDE hard disk installed. If this configuration is not correct, the system BIOS can not recognize the installed IDE hard disk drive.

Base Memory

This configuration setting is always 640 KB unless an error is detected. If an error is detected, Setup determines the amount of actual base memory found and inserts this value.

Extended Memory

This configuration setting specifies the amount of extended memory on the system board. The amount is automatically determined and you cannot modify its size.

CPU Speed

This configuration setting selects CPU operating speed. There are two options: fast and slow. Fast is 33 MHz and slow is 8 MHz. You must also disable the cache prior to selecting slow mode. The cache is enabled/disabled with the Setup utility.

SCSI Hard Drive

This configuration setting enables or disables the SCSI BIOS. Enable the SCSI BIOS if a SCSI hard disk drive is installed.

User Definable Drivers

This configuration setting allows the user to define IDE hard disk parameters. There are two options: 48 and 49, and 2 and 3. Select 48 and 49, unless there is a conflict with your network. If you select 2 and 3, make sure to enable shadow. After selecting a type, return to setup screen 1 and enter the Disk Subsystem options.

LAN Boot

This configuration setting enables or disables the LAN boot process. There are two options: enabled and disabled.

> **NOTE**
> Unless your system is equipped with a floppy disk drive or a hard disk drive (IDE or SCSI), you will need to enable this option.

LAN Timeout

This configuration setting specifies LAN timeout values in seconds. There are two options: 150 and 30. Choose the 150 second timeout value if more than eight systems are on the network. Otherwise, choose the 30 second timeout value.

Shadow

This configuration setting enables or disables shadow memory. Shadow memory is a write-protected portion of DRAM that, when enabled, contains a copy of the system and SCSI BIOS, or the video BIOS. Shadow memory has the same addresses as the BIOS ROM locations. Shadow increases system performance because the BIOS instructions are in fast DRAM instead of ROM.

> NOTE
> You must enable shadowing before selecting user definable driver option 2 and 3.

Cache

This configuration setting enables or disables the i486 microprocessor internal cache and the optional external cache. Enabling the caches significantly improves system performance by reducing the average number of wait states seen by the i486 microprocessor.

Password

This configuration setting allows you to set a system password.

System Information Menu

Pressing the F2 function key displays the system information menu. This menu contains the LAN address, the type selected LAN media, and whether or not the system found a secondary cache. These configuration settings are not changeable.

Exiting Setup

After all configuration setting changes are entered, exit Setup by selecting one of the exit options displayed on the ** Exiting Setup ** menu (see Figure C-3). Press the Esc key to display the menu.

NOTE
After the system boots, make sure POST completed with no errors (000 will be displayed on the screen). If POST failed to complete, take the appropriate action to correct any errors.

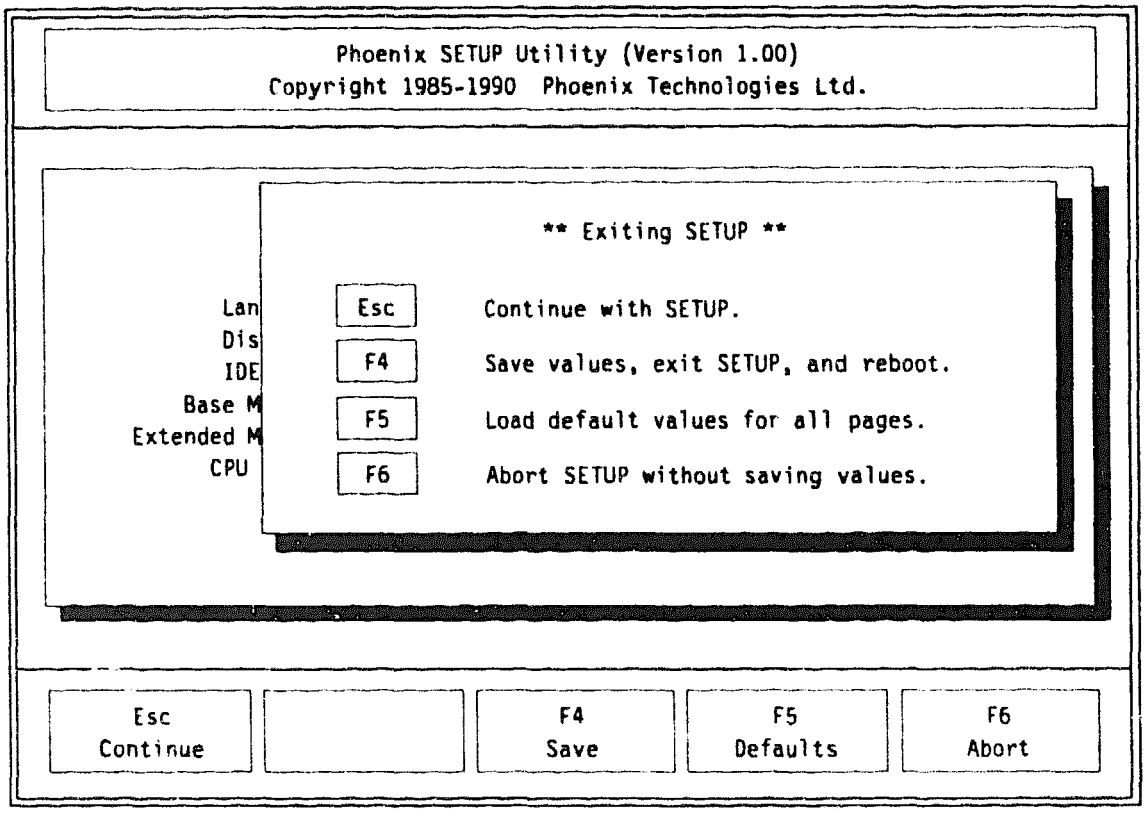
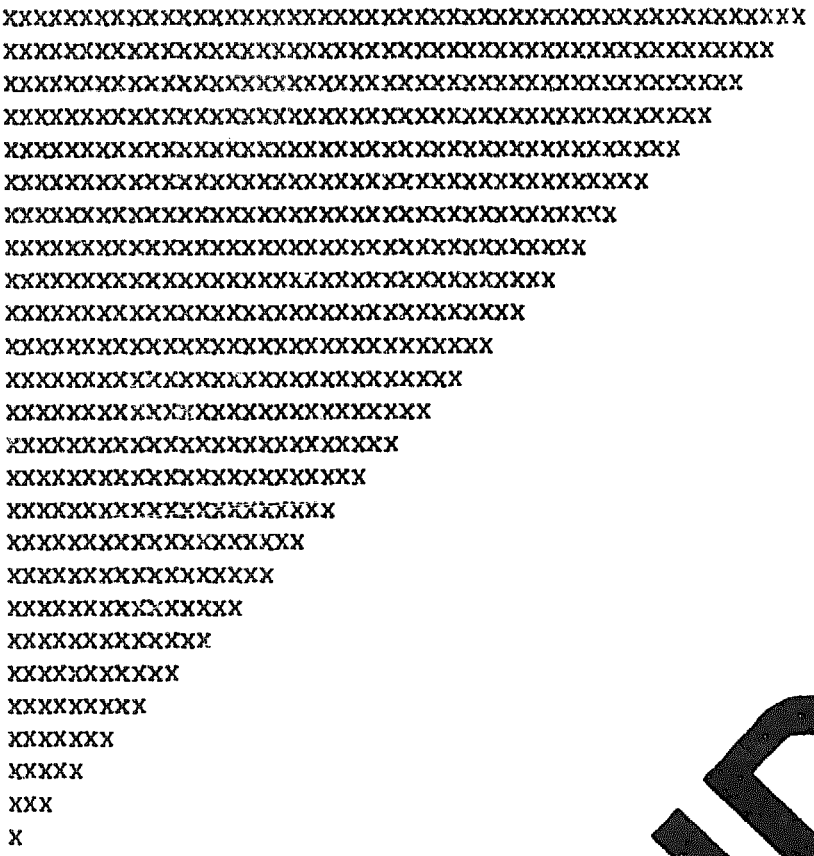
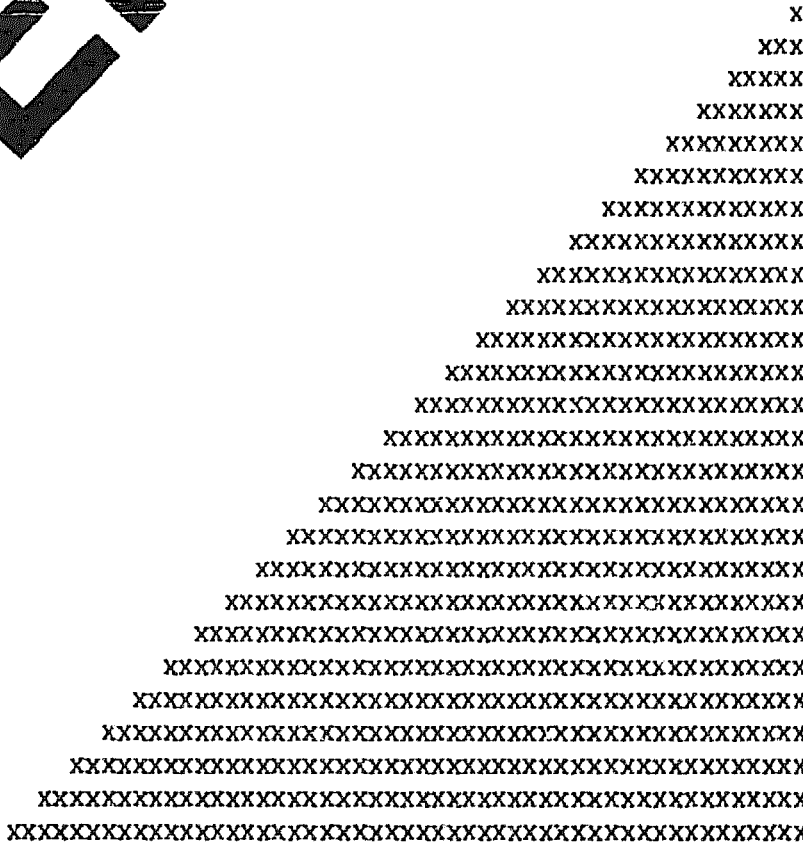


Figure C-3. Exiting Setup Menu



APPENDIX D



D
Device Mapping

Introduction

Tables D-1 through D-4 contain information about the memory map, I/O address map, interrupt map, and LAN memory map, respectively.

Table D-1. System Memory Map

Address Range (in hex)	Function	Size	Shadow	Cache	WP‡
0010 0000 to 02FF FFFF	Extended memory	47 MB	No	Yes†	No
000F 0000 to 000F FFFF	System BIOS/SCSI BIOS	64 KB	Yes†	Yes†	Yes
000E 0000 to 000E FFFF	System BIOS Setup/EMS	64 KB	No	Yes†	Yes
000D 8000 to 000D FFFF	LAN BIOS/RAM	32 KB	No	No	No
000D 0000 to 000D 7FFF	LAN RAM	32 KB	No	No	No
000C 8000 to 000C FFFF	Video buffer	32 KB	No	No	No
000C 0000 to 000C 7FFF	Video BIOS	32 KB	Yes†	Yes†	No
000A 0000 to 000B FFFF	Video RAM	128 KB	No	No	No
0000 0000 to 0009 FFFF	Base memory	640 KB	No	Yes†	No

† Can also be disabled

‡ Write protected (not cached in the i486)

Table D-2. I/O Address Map

Range (in hex)	Function
000:00F	DMA controller one
020:03F	Interrupt controller one
040:043	Programmable interval timer
060:06F	Keyboard (61 port B)
070:07F	Real-time Clock (RTC), NMI
080:09F	DMA page register
0A0:0BF	Interrupt controller two
0C0:0DF	DMA controller two
0EC	82340 configuration index register
0ED	82340 configuration data register
0EE	Fast A20
0EF	Fast reset
0F0	Clear numeric coprocessor busy
0F1	Reset numeric coprocessor
0F8	Numeric coprocessor
0F9	82340 configuration disable
0FA	Numeric coprocessor
0FB	82340 configuration enable

Table D-2. I/O Address Map *(continued)*

Range (in hex)	Function
0FC:0FF	Reserved for numeric coprocessor
170:171	Secondary RTC (not used)
1F0:1F8	IDE controller
200:20C	LAN registers
2B0:2BF	TIGA graphics video
2F8:2FF	COM2
340:35C	SCSI registers
278:37F	LPT1
3B0:3DF	Video (EGA, VGA, etc.)
3C0:3CF	Registers
3F0:3F7	Floppy disk controller
3F8:3FF	Corona configuration port 1 (COM1)
800	Corona configuration port A (write/read)
804	Corona configuration port B (read only)
808	Corona configuration port C (write/read)
80C	Corona configuration port D (write/read)
46E8	VGA

Table D-3. System Interrupt Levels

Priority	Interrupt Controller	Interrupt Number	Interrupt Source
1	1	IRQ0	Timer tick
2	1	IRQ1	Keyboard controller
	1	IRQ2	Cascade interrupt
3	2	IRQ8	Real-time Clock (RTC)
4	2	IRQ9	Reserved
5	2	IRQ10	TIGA video
6	2	IRQ11	SCSI interrupt
7	2	IRQ12	Mouse interrupt
8	2	IRQ13	Numeric coprocessor
9	2	IRQ14	Hard disk drive
10	2	IRQ15	Reserved
11	1	IRQ3	COM2
12	1	IRQ4	COM1
13	1	IRQ5	LAN interrupt
14	1	IRQ6	Floppy disk drive
15	1	IRQ7	LPT1

Table D-4. LAN Memory Map

Mnemonic	Function	R/W†	B/W‡	Address
BUF	Dual-port RAM in 64 KB mode	R/W	B/W	D0000:DBFFF
BUF	Dual-port RAM in 32 KB mode	R/W	B/W	D8000:DBFFF
ROM	Diagnostics/ remote boot	R	B/W	DC000:DFFFF

† Read/write
‡ Byte/word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