



Digital AlphaStation™ 200 4/166

CPU Upgrade Information

Order Number: EK-PCDTA-PU. A01

Digital Equipment Corporation
Maynard, Massachusetts

December 1995

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FCC Information - Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

The user may find the following booklet prepared by the Federal Communications Commission helpful: *How to Identify and Resolve Radio-TV Interference Problems*. This booklet is available from the U.S. Government Printing Office, Washington, D.C., 20402. Stock No. 004-00398-5.

All external cables connecting to this basic unit need to be shielded. For cables connecting to option boards, see the option manual or installation instructions.

This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the radio interference regulations of the Canadian Department of Communications.

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Preface

The Digital AlphaStation 200 4/166 CPU Upgrade

This booklet guides you through the upgrade of your Digital AlphaStation 200 Series system to a Model 4/166.

Audience

The information included here is intended for anyone upgrading the performance of a Digital AlphaStation 200 Series system.

Abbreviations

This guide uses the following abbreviations:

Abbreviation	Meaning
CPU	Central processing unit
DROM	Diagnostic read only memory
ESD	Electrostatic discharge
LED	Light emitting diode
MHz	Megahertz
PAL	Programmable array logic
SROM	Serial read only memory

Preface

Special Notices

This guide uses the following notices to emphasize specific information.

CAUTION

A CAUTION indicates the presence of a hazard that can damage hardware or that might corrupt software.

NOTE

A NOTE provides information on general topics, such as compatibility with other products, or pointers to other sources.

Additional Information Resources

You may wish to consult the following resources for information on your Digital AlphaStation 200 Series system:

- *Digital AlphaStation™ 200 Series Installation Information* (order number EK-PCDTA-II) presents a graphical overview of the Digital AlphaStation 200 Series installation.
- *Digital AlphaStation™ 200 Series User Information* (order number EK-PCDTA-UI). This manual contains information to start, use, update, troubleshoot, and configure your Digital AlphaStation 200 Series system. You can also find general system information such as console commands and system care here.

Contact your distributor or Digital representative for other available product-related information.

Upgrading to a 4/166

Introduction

Upgrading the performance of your AlphaStation 200 Series system is a relatively simple procedure. Upgrading from a 4/100 to a 4/166 requires two main tasks:

1. Replace the oscillator chip.
2. Replace the Programmable Array Logic (PAL) chip.

CAUTIONS

While performing the upgrade, you must touch some electronic components. Treat these high performance components with care:

- To prevent damage to components from electrostatic discharge (ESD), use the wrist strap included in the upgrade kit.
 - Insert and remove components gently. The pins on the components and the sockets in which they fit are delicate. Make sure the component and socket are properly lined up before inserting.
-

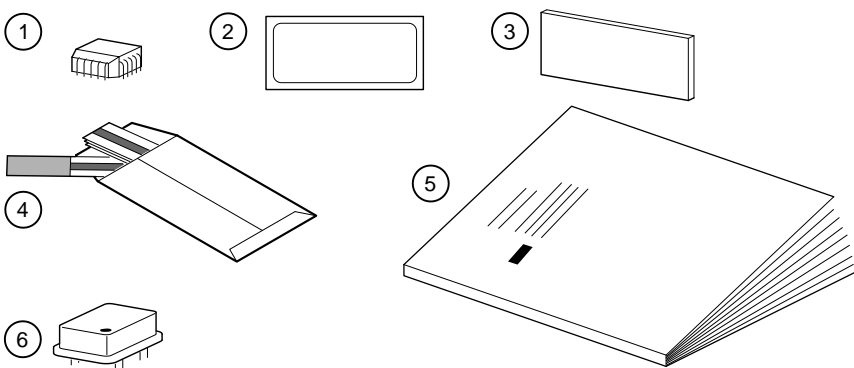
Upgrading to a 4/166

Upgrade Kit Inventory

The AlphaStation 200 4/166 upgrade kit contains the following items, shown in Figure 1:

- ① PAL chip
- ② Conversion label
- ③ Medallion
- ④ Antistatic wrist strap
- ⑤ Documentation
- ⑥ Oscillator

Figure 1. Kit Contents



Upgrading to a 4/166

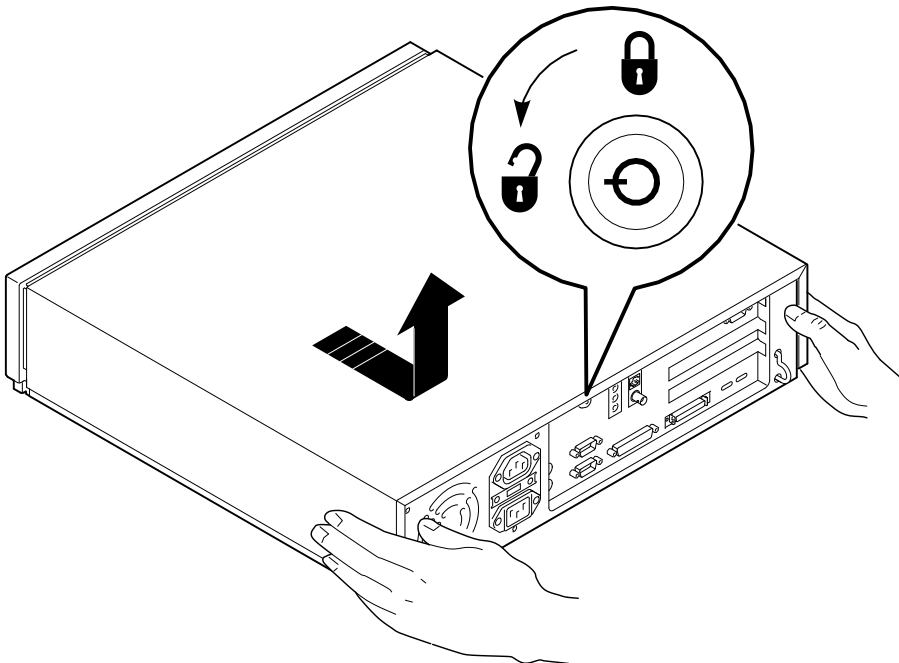
To prepare your system for the upgrade:

1. Back up your hard disk(s).
2. Shut down the operating system using the appropriate command.
3. Turn off the power and unplug the power cable.
4. Remove the system cover by first unlocking the top cover. Then, place your thumbs on the upper corners of the rear panel, pull back on the cover sides, and lift the cover off, as shown in Figure 2.

NOTE

Occasionally, the top cover is pushed back during shipping, causing binding of the locking mechanism. As a remedy, push the top cover toward the bezel to realign the lock.

Figure 2. Unlocking and Removing System Cover



Remove the Components

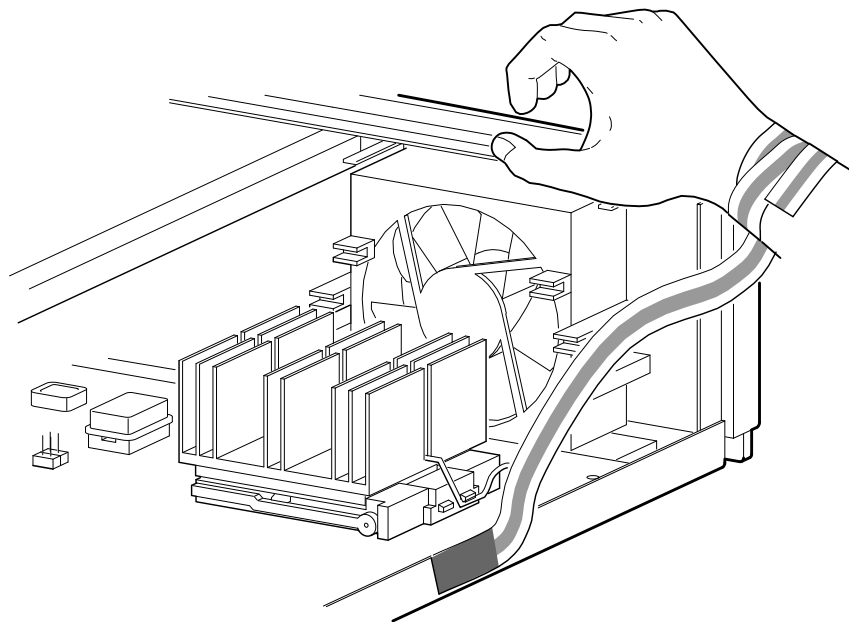
This section takes you through the steps to remove the components. Exercise care when removing the components.

CAUTION

Do not touch any electronic component unless you are wearing the antistatic wrist strap and the strap is attached to the system. A static discharge can permanently damage electronic components.

1. Put the antistatic strap around your bare wrist, and attach it to the system, as shown in Figure 3 .

Figure 3. Using the Antistatic Wrist Strap



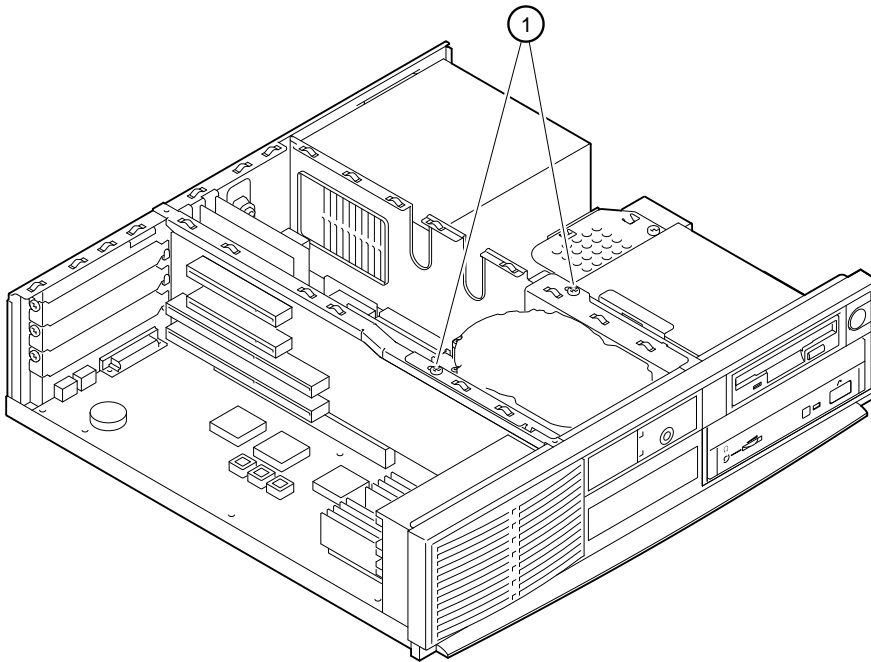
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2. In order to access the components to be replaced, you need to remove the drive bracket. Remove the two screws ① holding the drive bracket, as shown in Figure 4. Set the screws aside for reuse. Lift the rear of the bracket, slide the bracket to the rear slightly (Figure 5), and lift it out, leaving the drive cables attached. Set the drive bracket atop the power supply (Figure 6), until you have finished adding components.

CAUTION

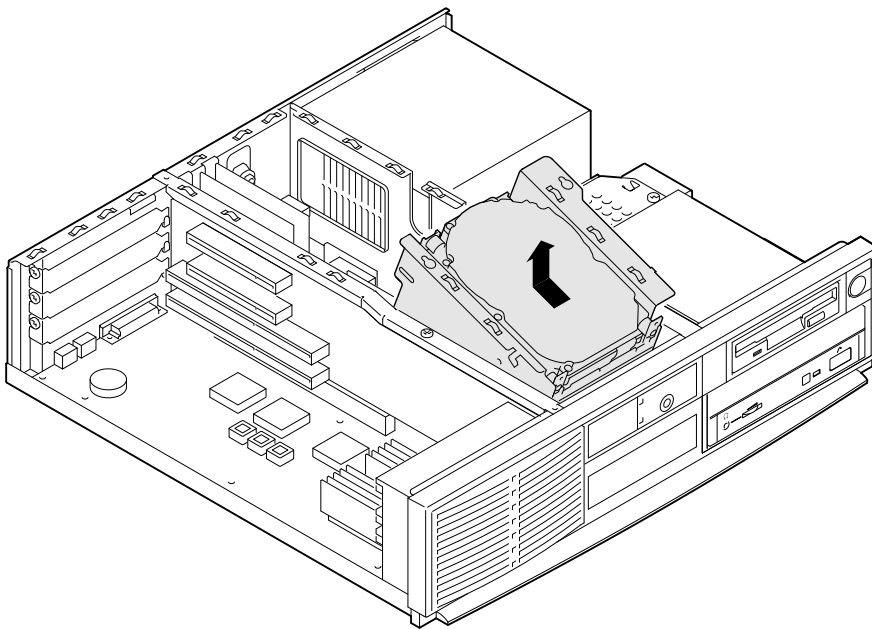
Carefully guide the cables as you remove the drive bracket to avoid any interference.

Figure 4. Loosening Drive Bracket Screws



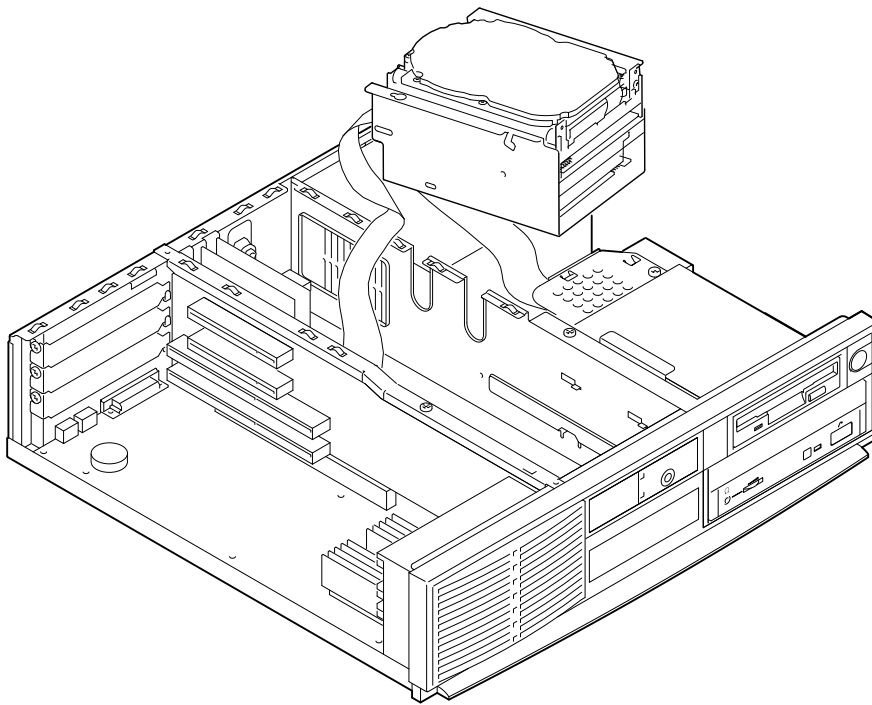
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Figure 5. Removing the Drive Bracket



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Figure 6. Setting Aside the Drive Bracket



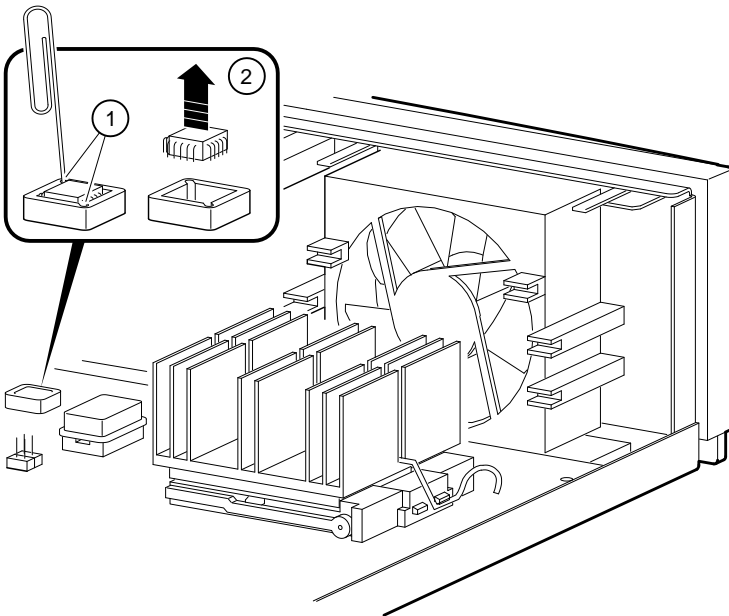
Upgrading to a 4/166

3. At the location shown in Figure 7 (labeled "E4" on the motherboard), remove the IRQ PAL chip. To remove the chip, carefully pry it from the socket at the two cut-away corners shown ①, using the straightened end of a *large* paper clip. Insert the end of the clip at an angle, and pry first one corner, then the other until the chip is free ②.

CAUTION

Do not try to remove the chip by prying only from one corner; you may permanently damage the contacts on the edges of the chip and the socket.

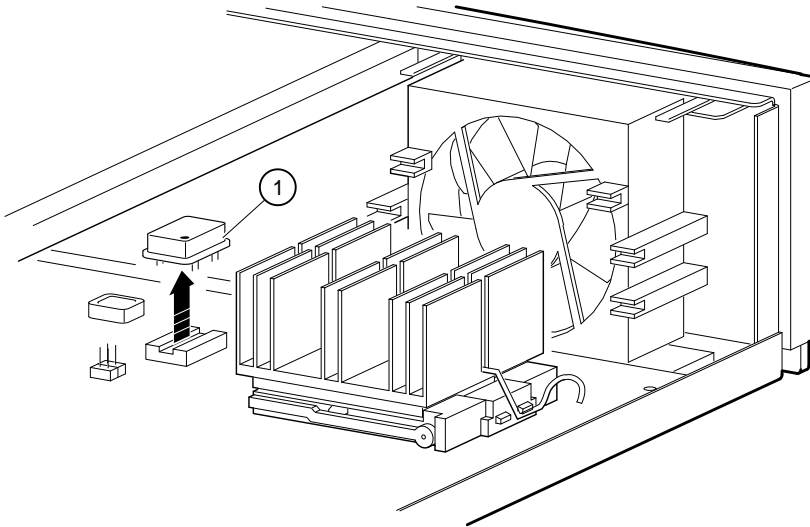
Figure 7. Removing the PAL Chip



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4. At the location shown in Figure 8, remove the oscillator ①, by *gently* pulling upward and rocking the oscillator until it is free.

Figure 8. Removing the Oscillator



Add the New Components

This section contains the steps you perform to add the new components and complete the upgrade.

When inserting the new components into the motherboard, keep these guidelines in mind:

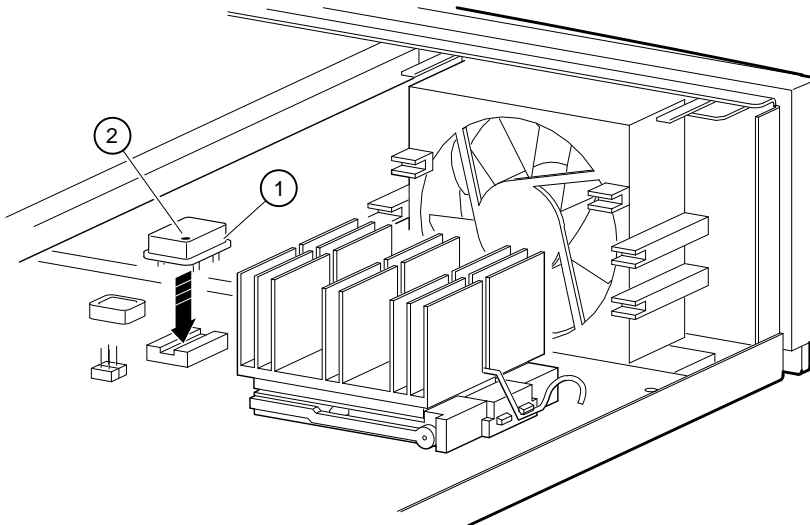
- Wear the antistatic wrist strap and keep it attached to the system while handling components.
- Be gentle. The pins and contacts of the components are fragile.
- Doublecheck that the components are oriented correctly.

CAUTION

Orientation of components is critical. Make sure the component is properly oriented to its socket before inserting it.

1. Locate the new oscillator ①, and orient it to the socket using the dot ② (indicating pin 1), as shown in Figure 9. Insert the oscillator with a *gentle* downward pressure.

Figure 9. Replacing the Oscillator



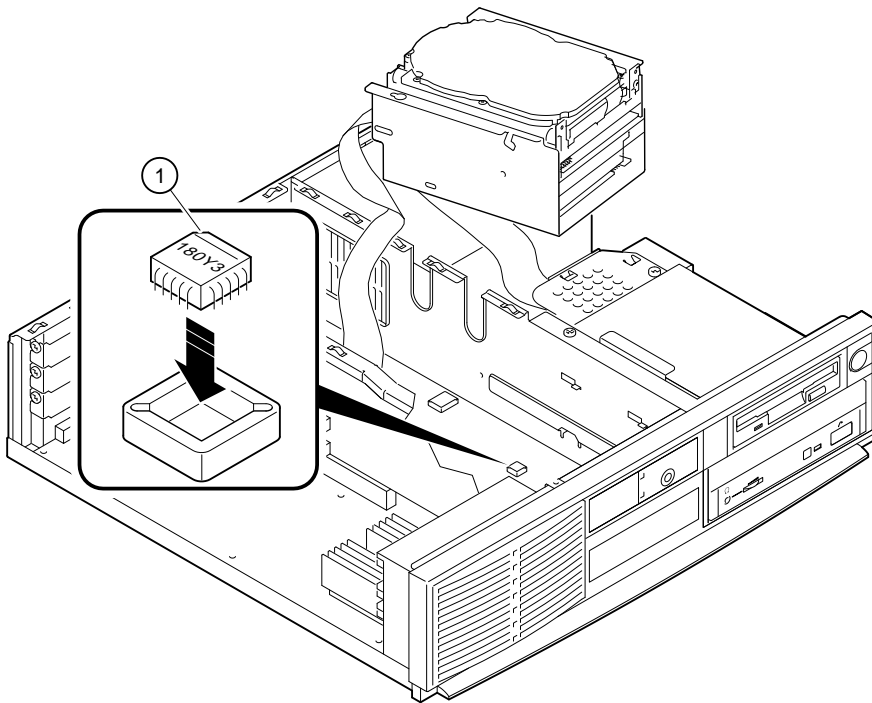
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2. In the upgrade kit, locate the PAL chip (part number 23-180Y3-00), and install it at position E4 on the motherboard. Orient the chip with the beveled corner ① as shown in Figure 10.

CAUTION

Make sure that the chip is level before you press down to seat it in its socket; otherwise you may damage the chip and socket.

Figure 10. Installing the PAL Chip



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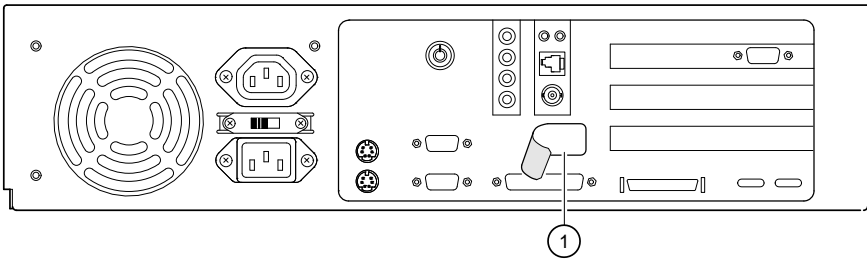
3. Replace the drive bracket, sliding it back into position. Replace the drive bracket screws. (See Figures 4 and 5.)

CAUTION

Carefully guide the cables as you replace the drive bracket to avoid any interference.

4. Disconnect the antistatic wrist strap from the system and remove it from your wrist.
5. Locate the conversion label ① in the upgrade kit and apply it to the rear connector bulkhead, as shown in Figure 11.

Figure 11. Conversion Label



6. Replace the system cover.
7. Locate the Model 4/166 medallion in the upgrade kit, peel off the backing, and place the medallion over the old model number just below the raised DIGITAL logo on the front of the system unit.
8. Replace the power cord and turn the power on.
9. Boot the operating system.

Troubleshooting

This section describes what to do if the system exhibits problems after the upgrade is completed.

It is assumed that the system was functioning normally before the upgrade installation. Refer to Table 1 to identify and solve problems that occurred after the upgrade installation.

Table 1. System Troubleshooting

Problem	Possible Cause	Action
Power indicator not 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 supply failure.	Contact your service representative.
Power is on, but there is no screen display.	Brightness and contrast controls were inadvertently changed when moving the monitor.	Adjust the brightness and contrast controls.
	Monitor is off.	Turn on the monitor.
The ARC or SRM console does not start.	SROM test failing or DROM test failing	Check the upgrade components for proper orientation and seating. Look at the diagnostic LEDs (see Figure 12). Use Table 2 to decode the LED value. Call your Digital service representative.
System does not boot.	Loose cables.	Secure all cable connections.

Upgrading to a 4/166

Interpreting the LED Indicator Values

Figure 12 shows the locations of the diagnostic LED viewing ports①.

Figure 12. Diagnostic LEDs

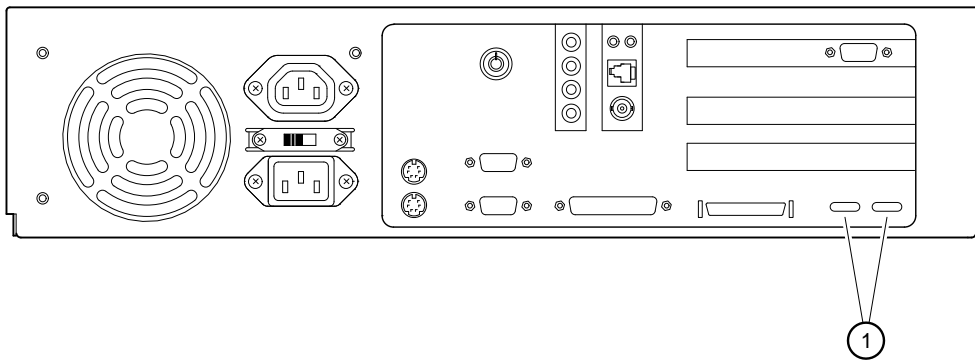


Table 2 lists the LED indicator values and their meanings. The meanings are valid when the LEDs have stopped sequencing through tests due to an error condition. The Indicator Values column of the table shows the LEDs viewed from the rear of the system.

Table 2. LED Codes

Indicator Values ¹ Bit 7	Bit 0	Hex Value	Meaning
● ● ● ● ● ○ ● ○		FA	Memory test 1 failure
● ● ● ● ● ○ ○ ●		F9	Memory test 2 failure
● ● ● ● ● ○ ○ ○		F8	Memory test 3 failure
● ● ● ● ● ○ ● ● ●		F7	Memory test 4 failure
● ● ● ● ● ○ ○ ● ○		F2	DROM and flashROM corrupted
● ● ○ ● ● ● ● ○		DE	Memory test failed
● ● ○ ● ● ● ○ ●		DD	FlashROM ID test failed
● ● ○ ● ● ● ○ ○		DC	NVRAM (nonvolatile random access memory) test failed
● ● ○ ● ● ○ ● ●		DB	SCSI controller test failed
● ● ○ ● ● ○ ● ○		DA	PCI/ISA bridge test failed
● ● ○ ● ● ○ ○ ●		D9	Realtime clock test failed
● ● ○ ● ● ○ ○ ○		D8	Keyboard controller test failed
● ● ○ ● ○ ● ● ●		D7	Floppy controller, bidirectional parallel port, or serial ports test failed
● ● ○ ● ○ ● ● ○		D6	Interrupts test failed
● ● ○ ● ○ ○ ○ ○		D0	Power on self test passed, DROM console running
● ● ● ○ ○ ○ ● ○		E2	Floppy load failed
● ● ● ○ ○ ○ ○ ●		E1	Flash load failed
○ ○ ● ○ ○ ○ ○ ○		20	Machine check occurred
● ● ● ● ● ● ○ ○		FC	Console initialized (final display if using ARC)
● ● ● ○ ○ ● ○ ●		E5	Console initialized (final display if using SRM)

¹The filled in circle (●) indicates that the LED is on; the open circle (○) indicates that it is off.

