DEC FDDIcontroller/FUTUREBUS+

Installation

August 1993

This manual describes how to install and verify the operation of the DEC FDDIcontroller/FUTUREBUS+ controller.

Supersession/Update Information: This is a new manual.

Order Number: EK-DEFAA-IN.A01

August 1993

This manual was produced by Telecommunications and Networks Publications.

Contents

Figures

Tables

Safety ⚠

Warnings and cautions that appear in this manual are defined as follows:

WARNING ⚠	Contains information to prevent personal injury.
CAUTION ⚠	Contains information to prevent damage to equipment.
VORSICHT	Enthält Informationen, die beachtet werden müssen, um den Benutzer vor Schaden zu bewahren.
ACHTUNG	Enthält Informationen, die beachtet werden müssen, um die Geräte vor Schaden zu bewahren.
DANGER	Signale les informations destinées à prévenir les accidents corporels.
ATTENTION	Signale les informations destinées à prévenir la détérioration du matériel.
AVISO	Contiene información para evitar daños personales.
PRECAUCIÓN	Contiene información para evitar daños al equipo.

The warnings and cautions you must observe for the hardware described in this manual appear below in English, German, French, and Spanish. The pages on which these safety messages appear are also listed.

CAUTION ⚠

Static electricity can damage modules and electronic components. Digital Equipment Corporation recommends using a grounded antistatic wrist strap and a grounded work surface when handling any modules. A wrist strap, ground wire, and table pad are included in a field device kit (P/N 29-11762-00). (Page 2-1, 3-2, 4-5)

ACHTUNG

Statische Elektrizität kann elektronische Bauteile beschädigen. Digital Equipment empfiehlt daher das Anlegen einer geerdeten antistatischen Gelenkmanschette und die Arbeit auf einer geerdeten Arbeitsfläche. Der Kit P/N 29–11762–00 enthält eine antistatische Gelenkmanschette, ein Erdungskabel und eine geerdete Arbeitsfläche.

ATTENTION

L'électricité statique risque d'endommager modules et composants électriques. Digital conseille de porter un bracelet antistatique mis à la terre et de manipuler les modules sur une surface de travail mise à la terre. Le kit P/N 29–11762–00 inclut un bracelet antistatique, un câble avec terre et une tablette de travail.

PRECAUCIÓN

La electricidad estática puede dañar modulos y componentes electrónicos. Digital Equipment Corporation recomienda el uso de una muñequera antiestática y una superficie de trabajo conectadas a tierra cuando se manejen los módulos. El juego de mantenimiento (referencia 29–11762–00) incluye la muñequera, el cable de tierra y el tapete de mesa.

WARNING ⚠ Some fiber optic equipment can emit laser light that can injure your eyes. Never look into an optical fiber, cable connector, or port connector. Always assume the cable is connected to a light source. (Page 3-5)

VORSICHT Schauen Sie niemals direkt in ein Glasfaserkabel oder ei nen Glasfaseranschluß. Die Laserstrahlen in faser-optischen Geräten können Augenverletzungen verursachen.

DANGER Certains équipements utilisant les fibres optiques peuvent émettre des rayonne-ment laser dangereux pour les yeux. Ne vous avisez jamais de regarder par l'extrémité d'une fibre optique ou dans l'ouverture d'un connecteur. Considérez toujours que le câble est relié à une source lumineuse.

AVISO Algunos equipos de fibra óptica pueden emitir luz láser que da ña los ojos. No sedebe mirar en una puerta de conector o fibra óptica. Siempre se debe suponer que el cable está conectado a la luz.

WARNING ⚠ To prevent personal injury or equipment damage, DO NOT insert telecommunications cabling into the optical bypass relay connector. (Page 3-9)

VORSICHT Um Personen– oder Geräteschäden zu vermeiden, dürfen Sie das Telefonkabel AUF KEINEN FALL am Anschluß des optischen Bypass–Relais anschließen.

DANGER Pour éviter tout risque d'accident corporel ou de dommage matériel, NE BRANCHEZ PAS de câble de télécommunication sur le connecteur de relais sélectif optique (optical bypass relay connector).

AVISO Para evitar daños personales o al equipo, NO se debe introducir cableado de telecomunicaciones en el conector óptico de relés de derivación.

CAUTION ⚠	Make sure that the bend radius of any fiber optic cable is 2.5 centimeters (1 inch) or greater. (Page 3-5)
ACHTUNG	Der Biegungsradius von faseroptischen Kabeln muß mindestens 2,5 cm betragen.
ATTENTION	Assurez-vous que le rayon de courbure des fibres optiques n'est jamais inférieur à 25 mm.
PRECAUCIÓN	Hay que comprobar que el radio de inclinación de cualquier cable óptico defibra es de es de 2,5 centímetros o mayor.

Preface

This manual describes how to install the DEC FDDIcontroller/FUTUREBUS+ (controller). It also shows how the controller connects to the FDDI network.

Intended Audience

This manual assumes that you understand the basic concepts and uses of an FDDI network.

Structure of This Manual

This guide has four chapters and four appendixes:

Chapter 1	Contains an overview and description of the DEC FDDIcontroller/FUTUREBUS+.
Chapter 2	Contains shipping package contents and unpacking information.
Chapter 3	Explains installation and cabling procedures.
Chapter 4	Explains troubleshooting procedures.
Appendix A	Contains the DEC FDDIcontroller/FUTUREBUS+ specifications. It also lists the patch cable purchasing information.
Appendix B	Explains removal and replacement procedure for the PMD cards.
Appendix C	Contains connector keying information.
Appendix D	Contains a list of related documents.

The postage-paid **Reader's Comments** form on the last page of this document requests your critical evaluation to assist us in preparing future documentation.

1

Introducing the DEC FDDIcontroller/FUTUREBUS+

This chapter describes the single-slot option DEC FDDIcontroller/FUTUREBUS+. It provides a direct connection between the FUTUREBUS+ Profile B slot on a system unit and the Fiber Distributed Data Interface (FDDI) network. The remainder of this document refers to the DEC FDDIcontroller/FUTUREBUS+ controller as the DEC FDDIcontroller/FUTUREBUS+ or the controller.

1.1 Overview

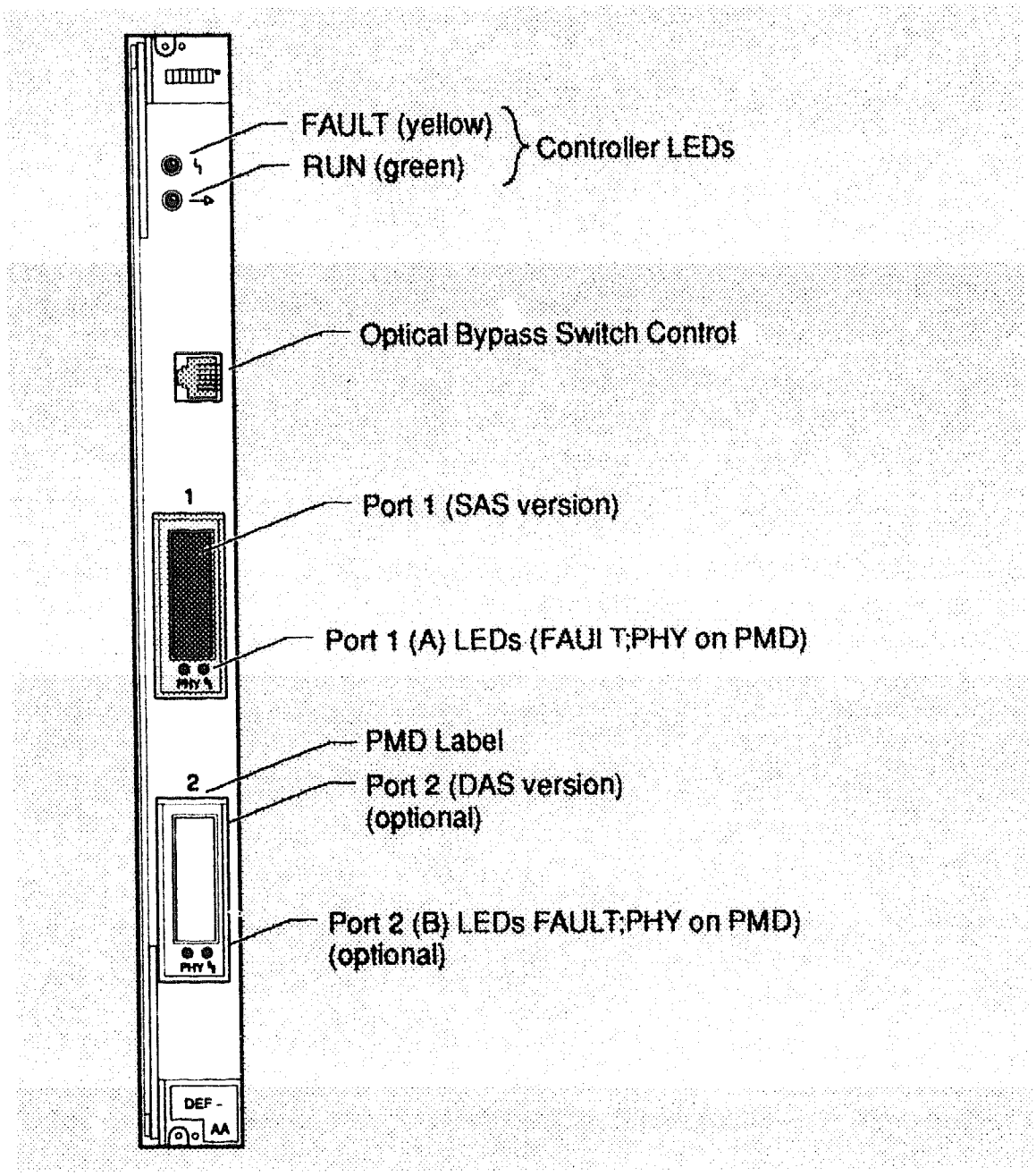
The DEC FDDIcontroller/FUTUREBUS+ connects as a Single Attachment Station (SAS) to an FDDI ring through a concentrator, such as the DECconcentrator 500, or connects directly to the ring as a Dual Attachment Station (DAS). An optical bypass switch control connector is available for use (optional) on the DAS multimode version of the controller. You can install up to four controllers in one system unit.

The DEC FDDIcontroller/FUTUREBUS+ has changeable PMDs that allow you to accommodate changes to your network. You can change one (or both) PMD cards on the controller. Refer to Appendix B for a list of PMD card types available from Digital Equipment Corporation. Contact Digital Services to order PMDs.

Figure 1–1 shows the DEC FDDIcontroller/FUTUREBUS+ PMD label, connectors, and light emitting diodes (LEDs).

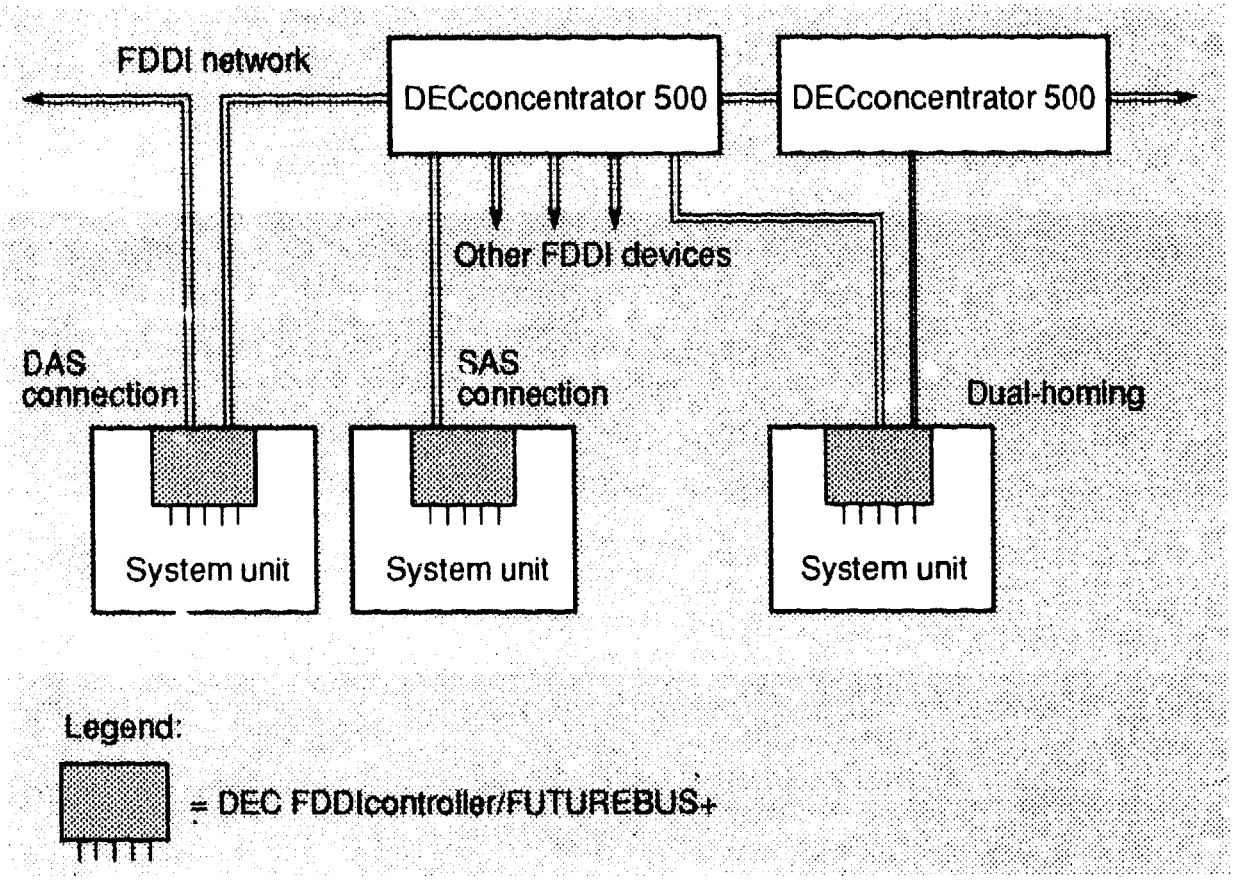
Figure 1–2 shows how a system unit containing the DEC FDDIcontroller/FUTUREBUS+ connects to the FDDI network. You can use this figure to verify your network configuration and physical connections.

Figure 1–1: DEC FDDIcontroller/FUTUREBUS+



LKG–8106-93I

Figure 1–2: Connecting the DEC FDDIcontroller/FUTUREBUS+ to the FDDI Network



1.2 DEC FDDIcontroller/FUTUREBUS+ Models Available from Digital

Table 1–1 lists and describes the DEC FDDIcontroller/FUTUREBUS+ models available from Digital Equipment Corporation.

Table 1–1: Controller Models

Part Number	Description
DEFAA-AA	One module, Single Attachment Station (SAS) controller with multimode optics for 1 ANSI MIC connector (in Port 1).
DEFAA-DA	One module, Dual Attachment Station (DAS) controller with multimode optics for 2 ANSI MIC connectors.
DEFAA-YA	One module, no connectors installed. Add the single-mode PMD to this module.*

* Refer to Appendix B for more information about PMDs. Order PMDs by contacting your Digital Services representative.

2

Unpacking the DEC FDDIcontroller/FUTUREBUS+

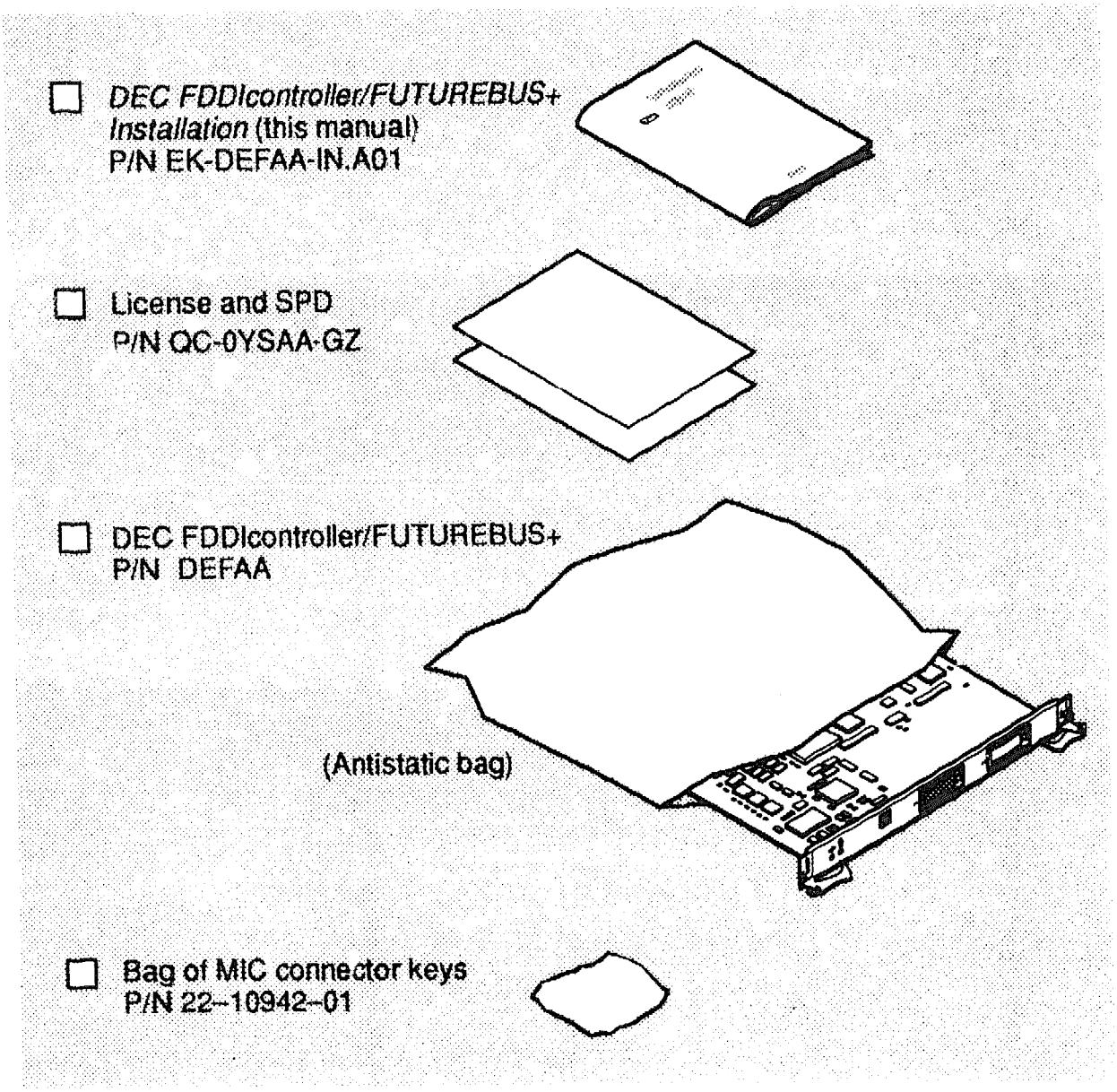
The DEC FDDIcontroller/FUTUREBUS+ is shipped in one box (see Figure 2–1 for contents). Remove the items from the box, and place them nearby on an antistatic mat until you are ready to install them.

CAUTION⚠

Static electricity can damage modules and electronic components. Digital recommends using a grounded antistatic wrist strap and a grounded work surface when handling any modules. A wrist strap, ground wire, and table pad are included in a field service kit (P/N 29-11762-00).

Check the shipment for damage and missing parts. In case of damage, contact your delivery agent and your Digital sales representative. If parts are missing, contact your Digital sales representative.

Figure 2–1: Shipping Contents



LKG–8108-93I

3

Installing the DEC FDDIcontroller/FUTUREBUS+

This chapter explains how to install the DEC FDDIcontroller/FUTUREBUS+. Procedures for verifying the operation and checking the communications are also included.

NOTE

Ensure that you meet the power and environmental specifications listed in Appendix A before installing the controller.

3.1 Overview

Installation of the controller involves the following procedures:

- Changing the PHY port key (optional)
- Removing and replacing PMD card(s) (if necessary)
- Preparing the system for installation
- Installing the controller
- Connecting FDDI communications cables
- Connecting the optical bypass relay (optional)
- Verifying the controller installation
- Verifying communications

CAUTION⚠

Static electricity can damage modules and electronic components. Digital recommends using a grounded antistatic wrist strap and a grounded work surface when handling any modules. A wrist strap, ground wire, and table pad are included in a field service kit (P/N 29-11762-00).

3.2 Required Tools

To install the controller or change PMD cards, you need the following items:

- Flat-blade screwdriver
- Phillips-head screwdriver
- Antistatic (ESD) wrist strap kit (field service P/N 29-11762-00)

3.3 Changing the PHY Port Key

The DEC FDDIcontroller/FUTUREBUS+ ships with S-type keys installed. You can change the key on the MIC multimode connector. To change the PHY Port key and for keying information, refer to Appendix C.

3.4 Removing and Replacing PMD Cards

The DEC FDDIcontroller/FUTUREBUS+ has changeable physical media dependent (PMD) interface(s) that allow you to accommodate changes to your network. You can change one (or both) PMD cards on the controller.

If you are changing the PMD(s), refer to Appendix B for the PMD card removal and replacement procedures. Once you complete the changes to the PMD cards, go to Section 3 5 and continue with the installation.

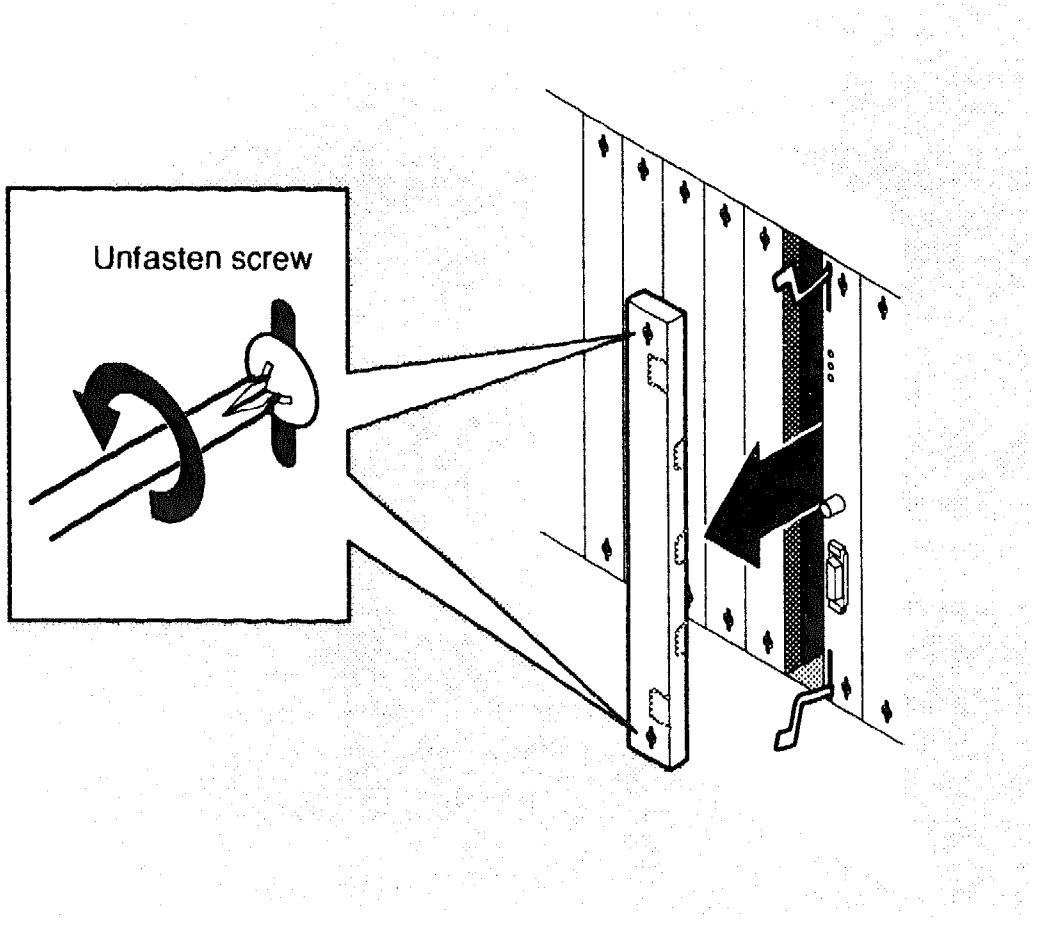
If you are not changing the PMD(s), continue to Section 3.5 to prepare the system for installation.

3.5 Preparing the System for Installation

To prepare the system for installation, perform steps 1 through 4.

1. Turn off the power to the system.
2. Open the cover of the system unit to access the card cage area. If necessary, refer to your system documentation for instructions.
3. Determine which option slot to use in the system where you are installing the DEC FDDIcontroller/FUTUREBUS+. Your system documentation should provide information about which slot(s) can be used.
4. Remove the slot cover for the selected slot (see Figure 3–1). Use a Phillips-head screwdriver to remove the two screws that hold the slot cover in place. Save this cover in case you remove the controller from the system later.

Figure 3–1: Removing the Slot Cover



LKG-7989-93I

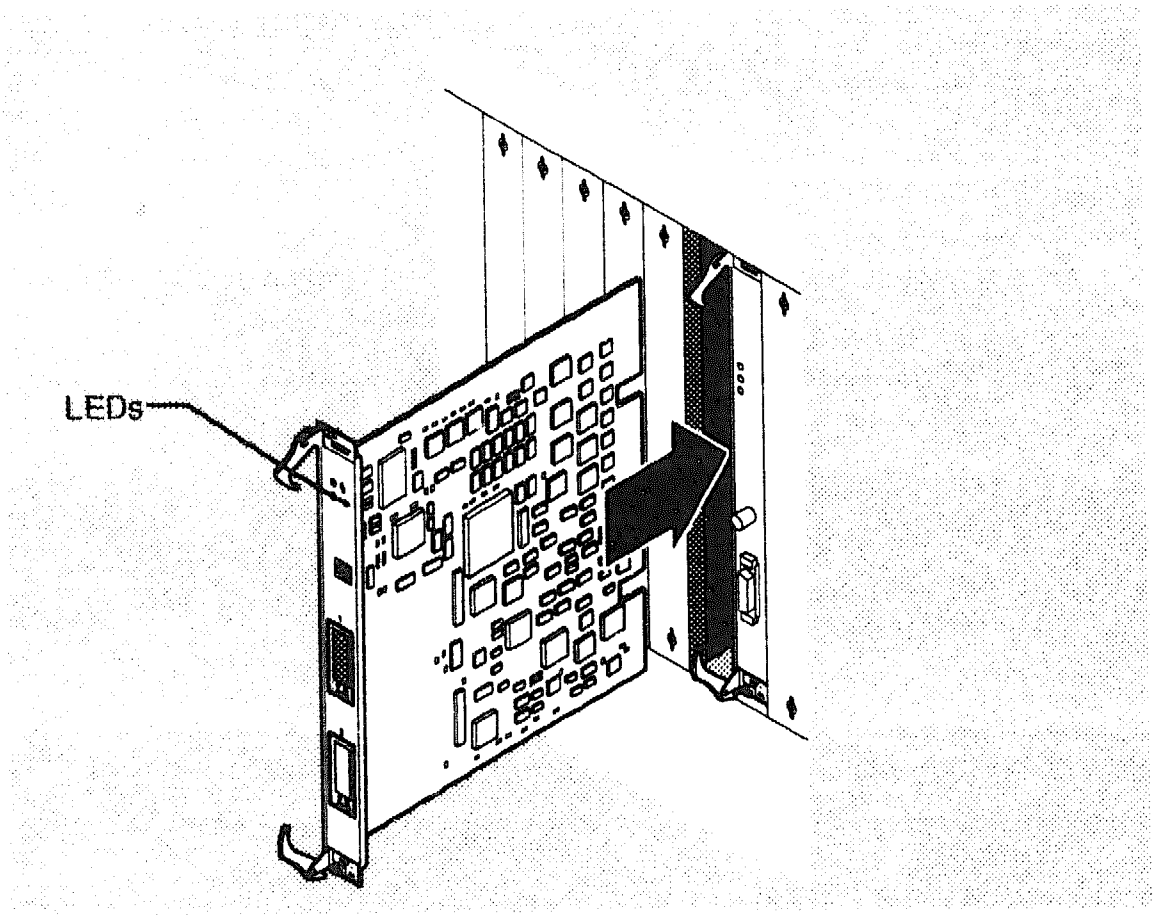
3.6 Installing the DEC FDDIcontroller/FUTUREBUS+

Once the system and the controller are prepared for installation, perform steps 1 through 4.

1. Attach one end of the ESD wrist strap to your wrist and the other end to the grounded system.

2. Hold the controller by the handles, and insert it into the selected slot with the RUN and FAULT LEDs at the top. Firmly push it in until it seats in the FUTUREBUS+ connector inside the unit (see Figure 3–2). Use the ejector levers to secure the controller firmly in place.

Figure 3–2: Installing the Controller



LKG–8109-93I

3. Secure the controller in the system by tightening the two screws that secured the slot cover in place.

4. Remove the antistatic wrist strap from your wrist and the system unit. Do not close up the unit until you connect communications cables and verify controller operation.

3.7 Connecting FDDI Communications Cables

To connect FDDI cables, follow the instructions provided in the following sections:

- Connecting FDDI cables with multimode connector(s) – Section 3.7.1
- Connecting FDDI cables with single-mode connectors – Section 3.7.2

WARNING

Some fiber-optic equipment can emit laser light that can injure your eyes. Never look into an optical fiber, cable connector, or port connector. Always assume the cable is connected to a light source.

CAUTION

Make sure the bend radius of any fiber optic-cable is 2.5 centimeters (1 inch) or greater.

NOTE

Digital recommends using Digital Equipment's multimode FDDI-to-FDDI patch cables or FDDI-to-2.5-mm ST-type connector patch cable for multimode connections. Refer to Appendix A for patch cable part numbers.

The FDDI multimode connector receptacles are keyed. Refer to Appendix C for detailed information and guidelines about connector keying.

3.7.1 Connecting FDDI Cables with Multimode Connector(s)

NOTE

If you are installing a DAS controller and you are using the optical bypass feature, refer to the installation instructions included with the optical bypass unit to install the switch.

NOTE

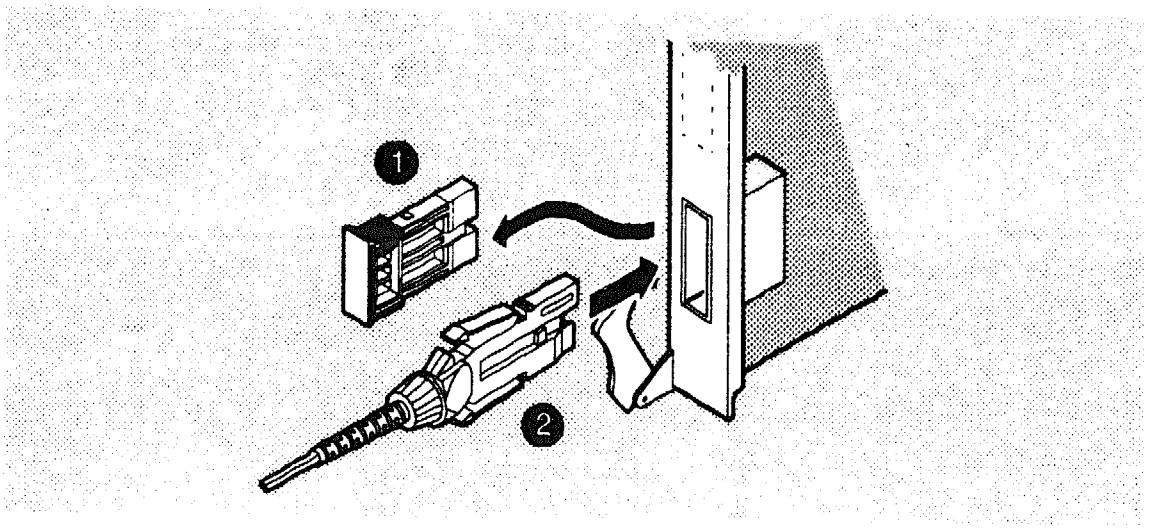
A controller can be cabled to a patch panel device first but must then be cabled from the panel to the appropriate concentrator. It can also connect directly to a ring to complete proper connection of the controller to an FDDI ring.

To install the FDDI cable(s) with multimode connector(s), perform steps 1 through 3.

1. Remove the protective dust cover ❶ from the FDDI connector receptacle by squeezing the locking clips on the sides and pulling it out of the slot (see Figure 3–3).

2. Insert the FDDI cable connector ❷ into the receptacle (with proper keying), making sure the locking clips on the sides lock into place (see Figure 3–3).

Figure 3–3: Connecting FDDI Multimode Cables



LKG–8250–93I

3. If you are connecting to the dual ring through a concentrator, verify that the other end of this cable is connected to the concentrator (such as the DECconcentrator 500). If it is not connected, refer to the appropriate concentrator manual or *Fiber Distributed Data Interface (FDDI) Network Configuration Guidelines* for connection information.

Installation of the multimode cable is complete.

3.7.2 Connecting FDDI Cables with Single-Mode Connector(s)

Table 3–1 defines the minimum attenuation and system power budget for Digital devices used on a single-mode fiber-optic cable link. Refer to Table 3–2 to determine whether an inline loss element needs to be installed on the cable. The cable requires an inline loss element if it has less than 12 dB of loss.

Refer to Appendix B in the *DECconcentrator 500 Single-Mode Option Card Installation* manual for the Single-Mode Relative Relative Test Procedure.

Table 3–1: System Power Budget for 1300 nm

Product Family	Minimum Attenuation	System Power Budget
Digital FDDI	12 dB[1]	22 dB at 1300 nm

[1]If attenuation is less than this value, use the appropriate inline loss element to induce the required loss (refer to Table 3–2).

Table 3–2: Cable Loss Range and Inline Loss Element to Use

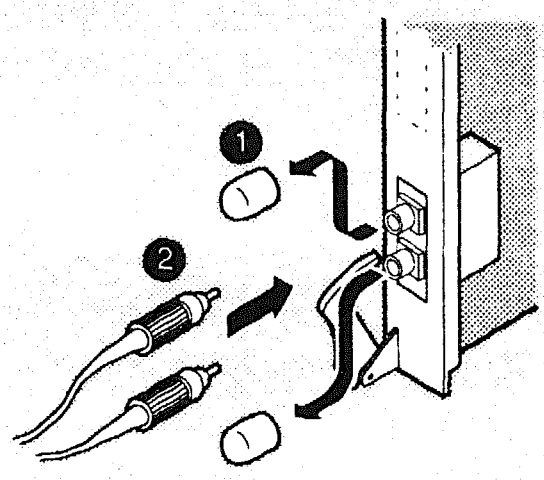
Wavelength Corrected Cable Loss Range	Inline Loss Element to Use
0 dB–6 dB	12 dB–16 dB
6 dB–12 dB	6 dB–10 dB
12 dB–22 dB	None needed

To install the FDDI cable(s) with single-mode connectors, perform steps 1 through 3.

1. Remove the two protective caps ❶ from the controller connectors and from the end of the FDDI cable by turning them counterclockwise (see Figure 3–4).

2. Connect the fiber-optic cable ❷ to the appropriate connectors and secure them by turning the collar on each connector clockwise. Transmit and receive icons are marked on the handle of single-mode connectors (see Figure 3–4).

Figure 3–4: Connecting FDDI Single-Mode Cables



LKG–8251-93I

3. Verify that the other end of this cable is either connected to a concentrator, such as the DECconcentrator 500, or connected to the dual ring. If it is not connected, refer to the appropriate concentrator manual or *Fiber Distributed Data Interface (FDDI) Network Configuration Guidelines* for connection information.

   Installation of the single-mode cable is complete.

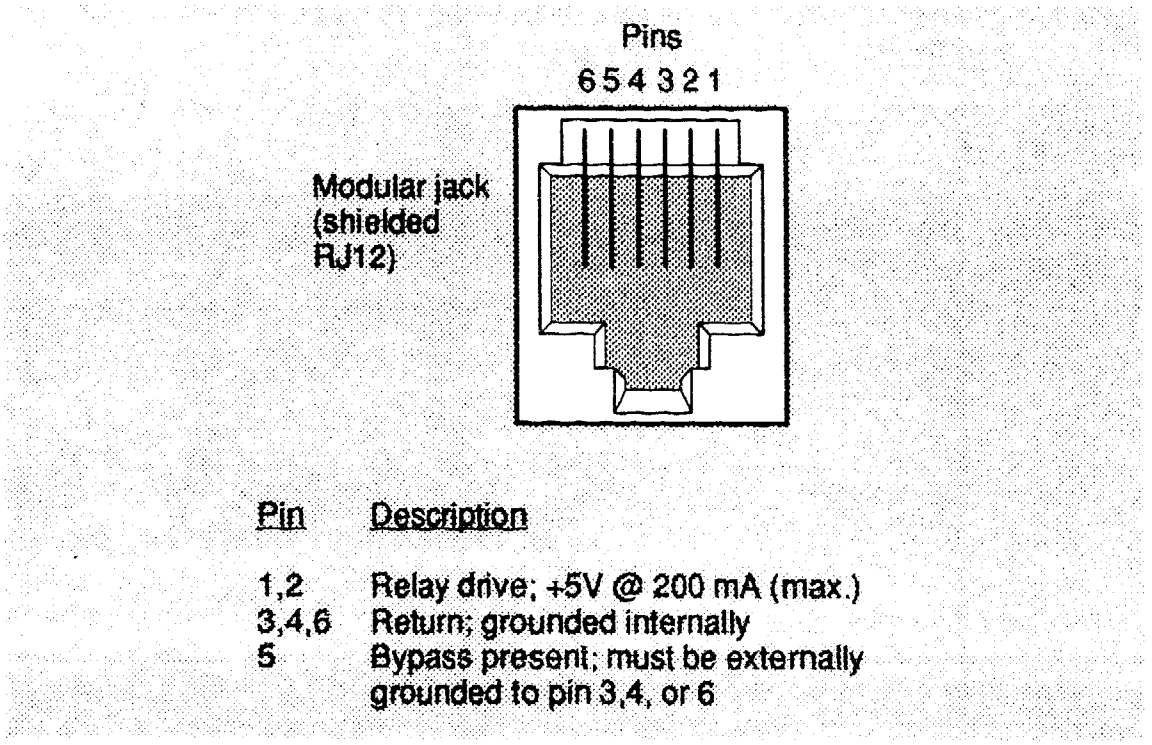
3.8 Connecting the Optical Bypass Relay (Optional)

The optical bypass relay feature on the controller maintains FDDI dual ring integrity if the controller becomes broken or is powered down. The optical bypass connector is used only on DAS multimode versions. Figure 3–5 shows the bypass connector, and provides a description of the connector pins. Refer to this information when selecting optical bypass devices.

WARNING

To prevent personal injury or equipment damage, **do not** insert telecommunications cabling into the optical bypass relay connector.

Figure 3–5: Optical Bypass Control Signals



LKG-7996-93I

3.9 Verifying Controller Operation Before Booting the System

To verify the controller operation before booting the system, perform the following:

NOTE

You do not need to install the FUTUREBUS+ driver. It is included in the operating system.

1. Turn on the power to the system unit. All LEDs light, and the system unit and controller perform a self-test.
2. After self-test completes, verify that the controller's RUN LED is ON (green) and the FAULT LED is OFF (yellow if on). If another condition exists, turn the system off and refer to Chapter 4 for problem-solving procedures.
3. Verify that the PMD(s) is working. Both the PHY LED(s) and FAULT LED(s) are OFF when operating properly. The FAULT LED lights if a problem exists. If a problem exists, turn the system off and refer to Chapter 4 for problem-solving procedures.

   If no problems exist, proceed to Section 3.10 and verify the FDDI communications connection.

3.10 Verifying Controller Operation After Booting the System

To verify the FDDI communications connection, perform the following:

1. Boot the system so that the operating system is working. If necessary, refer to your system documentation for instructions.
2. Verify that the PMD LEDs are working. When the controller is working properly, the PHY LED(s) is ON and the FAULT LED is OFF. If no FDDI cables are installed, the PHY LED blinks green indicating that the controller is working properly but there is no communication connection.

NOTE

In a dual homing configuration with a DAS controller (see Figure 1–1), the Port 1 (A) PHY LED blinks yellow and green; the Port 2 (B) PHY LED will be ON (green).

If the LEDs are working and you can send and receive communications (with cables installed), your controller installation is complete. Close the system.
If you cannot make a connection or are having problems with the connection, refer to Chapter 4 for problem-solving information.

4

Troubleshooting the Controller

This chapter explains how to troubleshoot the controller. It contains troubleshooting tables, LED displays, and other general information to help determine the source of a problem.

Perform troubleshooting for the controller in two steps:

1. Troubleshoot the controller by observing the module LEDs during system power up (before booting the system.)
2. Troubleshoot the FDDI communications connection for the controller by observing module LEDs and also PMD LEDs (after booting the system.)

4.1 Running Self-Test

Self-test is initiated at power up. It consists of a series of on-board diagnostic tests to verify the operation of the controller after installation. This ensures that the controller is working properly. If the controller is not working properly, it will be indicated by the LEDs on the module.

There are four methods to start self-test. They are listed below:

- Turn the system power off, wait 30 seconds, and then turn the power back on. This method resets the entire system and starts self-test.
- Using the system console, enter a reset command. This method resets the DEC FDDIcontroller/FUTUREBUS+ controller. Refer to your system documentation for specific command information.

- Using the system console, reset the controller by writing to the RESET_START control status register (CSR) as documented in IEEE Standard 896. Refer to your system documentation for specific command information.
- Using the system console, invoke extended diagnostics on the controller using the ARGUMENT and TEST_START CSR's as documented in IEEE Standard 896. Extended test numbers 0000 and FFFF are supported by the DEC FDDIcontroller/FUTUREBUS+ controller. You must allocate 4K blocks of system memory prior to running extended diagnostics. Refer to your system documentation for specific command information.

4.2 Troubleshooting the Controller Before Booting the System

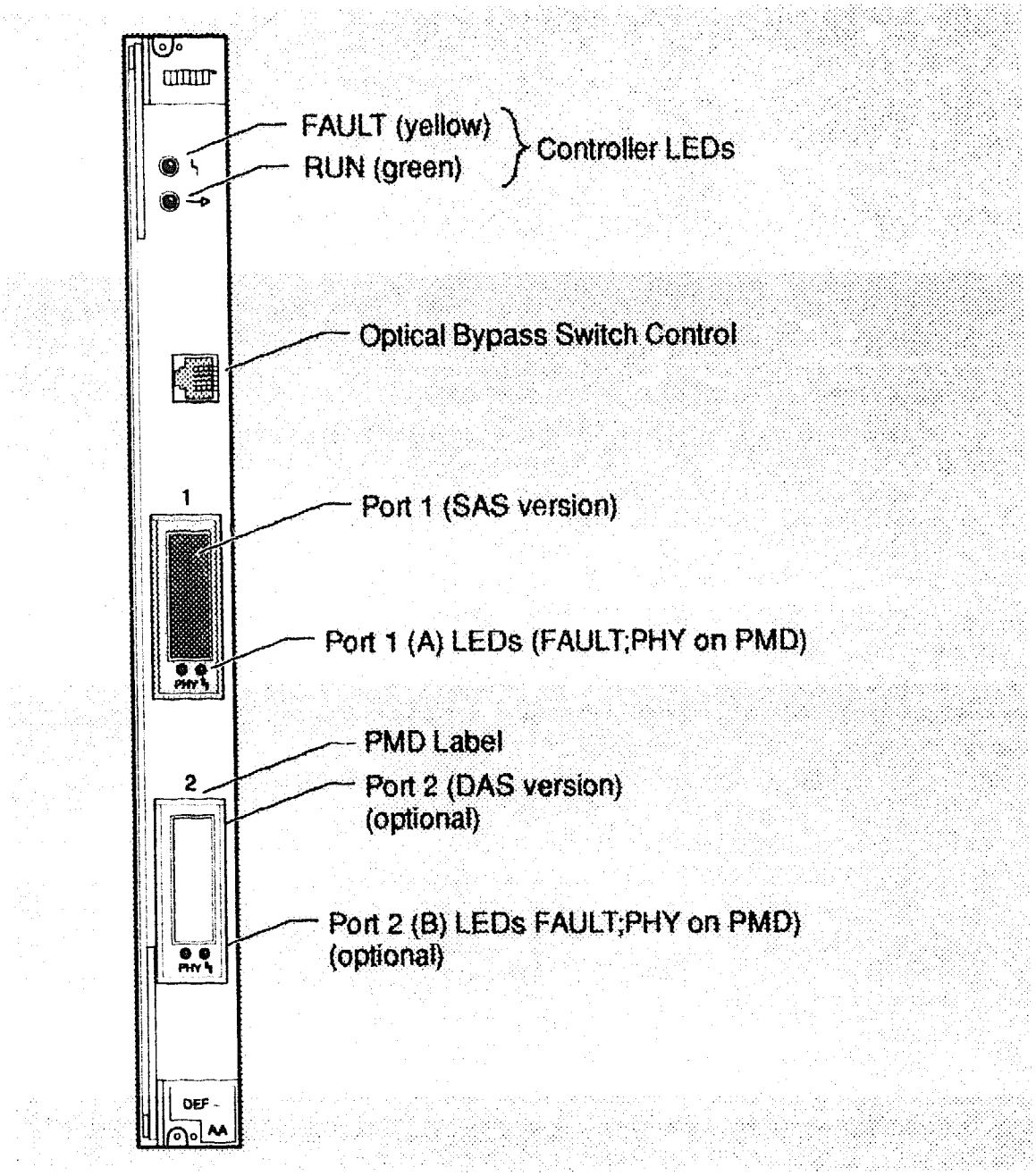
To determine if there is a problem with the controller, do the following three steps:

1. Start self-test by turning the system power off, wait 30 seconds, and then turn the power back on. This verifies that the problem with your controller still exists.
2. Refer to Table 4–1 to find the LED state your module is currently displaying. Follow the suggested corrective actions provided in Table 4–1. You do not need to check the PMD LEDs at this point. Figure 4–1 shows the controller LEDs.

Table 4–1: Controller FAULT and RUN LED Displays (Before System Boot)

RUN LED	FAULT LED	State Description	Correction
OFF	OFF	Not powered on.	Check cable connections. Turn power on.
ON (GREEN)	ON (YELLOW)	Activated. Testing in progress.	None.
ON (GREEN)	OFF	Normal operation.	None.
OFF	ON (YELLOW)	A problem exists with the controller.	Rerun self-test. Try reinstalling the controller. Check the system console for error messages.
		Module broken.	Contact your Digital services representative.

Figure 4–1: LED Display on the Controller



LKG–8106-93I

3. After determining the problem, if the module is not broken, turn off the power, return to Section 3.9 and retry the procedure.

   If your controller appears to be functioning properly but you still have problems with the communication link, proceed to Section 4.3 and Section 4.4 for more troubleshooting information.

4.3 Troubleshooting the Controller After Booting the System

To determine the source of a problem after powering up and booting the system, do the following:

1. Verify the state of the LEDs on the controller and the interface PMD(s).
2. Refer to Table 4–2 through Table 4–4 to find the LED states that your controller is currently displaying. Figure 4–1 shows the controller LEDs.

Table 4–2: Controller FAULT and RUN LED Displays (After System Boot)

RUN LED	FAULT LED	State Description	Correction
OFF	OFF	Not powered on.	Check cable connections. Turn power on.
ON (GREEN)	ON (YELLOW)	Soft reset by driver.	None.
ON (GREEN)	OFF	Normal operation.	None.
OFF	ON (YELLOW)	A problem exists with the controller.	Rerun self-test.
		Module broken.	Contact your Digital services representative.

Table 4–3: PMD PHY LED Displays (After System Boot)

PHY LED State	State Description	Correction
OFF	Port not available. Disconnected by software (management).	None.
ON (YELLOW)	Broken port or LCT* failure.	Run self-test.
ON (GREEN)	PMD is working properly.	None. Connection established.
ON (BLINKING YELLOW)	Illegal topology.	Cables not installed correctly.
ON (BLINKING GREEN)	Connection in progress or link available but cannot make a connection.	Wait for connection. Verify cable connections. Port not being used.

* Link Confidence Test

Table 4–4: PMD FAULT LED Displays (After System Boot)

FAULT LED	State Description	Correction
OFF	Normal operation. A good communications connection.	None.
ON (YELLOW)	A fault exists.	Cables not installed correctly. Wait for connection. Verify cable connections. Port not being used.

3. Follow the suggested corrective actions provided in the previous tables.

   If your controller appears to be functioning properly but you still have problems, proceed to Section 4.4 and perform general problem solving procedures. Your controller may not be the source of the problem.

4.4 Solving Hardware Problems

CAUTION

Static electricity can damage modules and electronic components. Digital recommends using a grounded antistatic wrist strap and a grounded work surface when handling any modules. A wrist strap, ground wire, and table pad are included in a field service kit (P/N 29-11762-00).

The following list provides possible solutions to hardware problems:

- Ensure that the controller is inserted tightly in its slot and that anything connected to it is connected correctly.
- If you have another controller that works, try it in that slot. If the test no longer fails, the problem is in the controller. If the test continues to fail, the problem is in the system.
- If you do not have another controller that works, move the controller to another slot. If the test no longer fails, the problem is in the system. If the test continues to fail, the problem is in either the controller or the system.

If the problem persists after trying these suggestions, contact your Digital service representative.

A

Specifications and Patch Cable Purchasing Information

This appendix describes the power and environmental requirements for the DEC FDDIcontroller/FUTUREBUS+ controller. It also lists the ANSI multimode patch cable part numbers.

A.1 Power Requirements

Table A–1 defines the power requirements for the controller.

Table A–1: Power Requirements

Module	+5 Volts (in Amps)	Power (Watts)
SAS	6.3	31.5
DAS	7.0	35

A.2 Environmental Requirements

Table A–2 defines the environmental requirements for the controller.

Table A–2: Environmental Requirements

Item	Operating	Nonoperative
Temperature	10° C to 45° C (50° F to 115° F)	-40° C to 85° C (-40° F to 185° F)
Relative Humidity	10% to 90%	10% to 95%
Altitude	2.4 km (1.49 miles)	9.1 km (5.65 miles)

A.3 Purchasing Patch Cables

Digital recommends using the patch cables listed in Table A–3 for connection of FDDI-to-FDDI and FDDI-to-2.5-mm ST-type.

Table A–3: ANSI Multimode Patch Cables

Cable Length	FDDI-to-FDDI Digital P/N	FDDI-to-2.5 mm ST-type Digital P/N
1 m (3.3 ft)	BN24B-01	BN24D-01
3 m (9.8 ft)	BN24B-03	BN24D-03
4.5 m (14.8 ft)	BN24B-4E	BN24D-4E
10 m (32.8 ft)	BN24B-10	BN24D-10
20 m (65.6 ft)	BN24B-20	BN24D-20
30 m (98.4 ft)	BN24B-30	BN24D-30

B

Replacing PMD Cards

This appendix describes the physical media dependent (PMD) interface(s) on the DEC FDDIcontroller/FUTUREBUS+, and includes the procedure for removing and replacing the PMDs.

B.1 Overview

The DEC FDDIcontroller/FUTUREBUS+ connects as a Single Attachment Station (SAS) to an FDDI ring through a concentrator, such as the DECconcentrator 500, or connects directly to the ring using a Dual Attachment Station (DAS). The FDDI connection can be multimode for distances of up to 2000 meters (6561 feet), single-mode up to 40 kilometers (24.8 miles), or a combination of multimode and single-mode connections.

The DEC FDDIcontroller/FUTUREBUS+ has changeable PMDs that allow you to accommodate changes to your network. You can change one (or both) PMD cards on the controller. Table B–1 lists the PMD card types available from Digital Equipment Corporation. Contact Digital Services to order PMDs.

Table B–1: DEC FDDIcontroller PMD Model Numbers

Model Number	Description
DEFXM-AA	Multimode PMD card
DEFXS-AA	Single-mode PMD card

NOTE

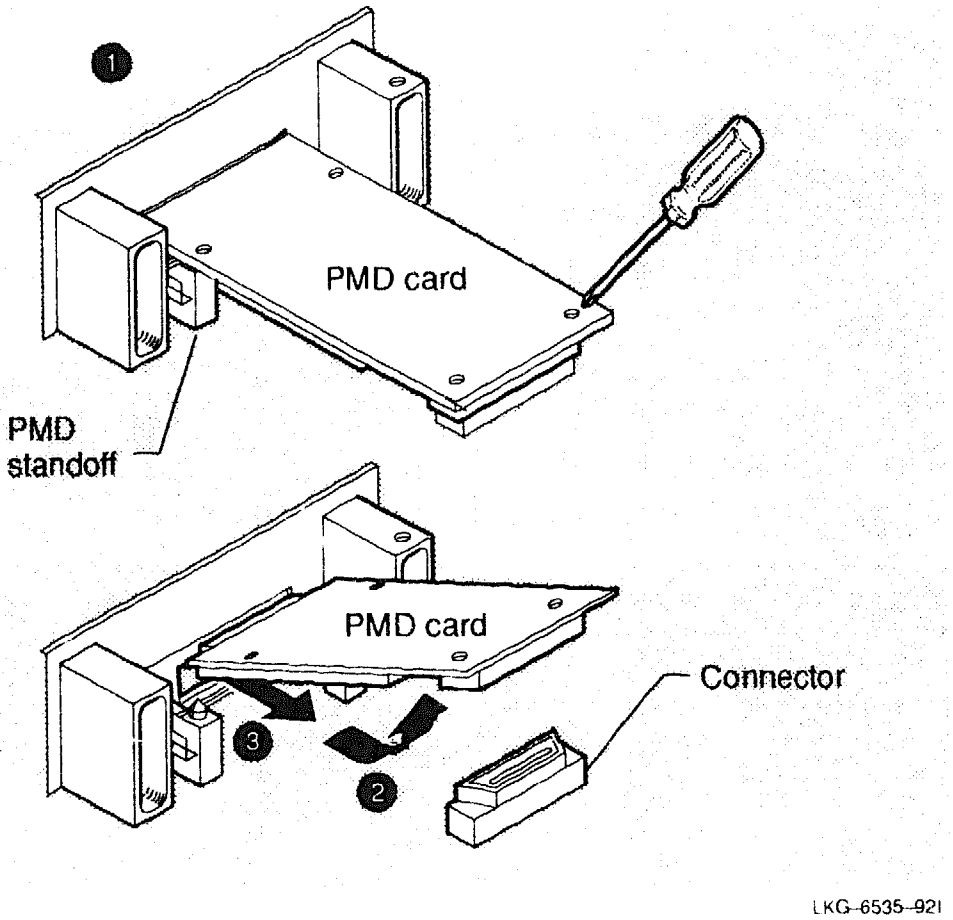
Illustrations in the following procedures show how to remove and replace a multimode PMD card. Other PMD cards have different physical appearances, but are performed in the same manner.

B.2 Removing the PMD Card

To remove a PMD card, refer to Figure B–1 and do the following:

1. Remove any screws ❶ (some PMDs are secured by screws).
2. Pull up the PMD card ❷ to disconnect the connector.
3. Lift the PMD card ❸ off the PMD standoffs and slide the card out of the bezel.

Figure B–1: Removing the PMD Card



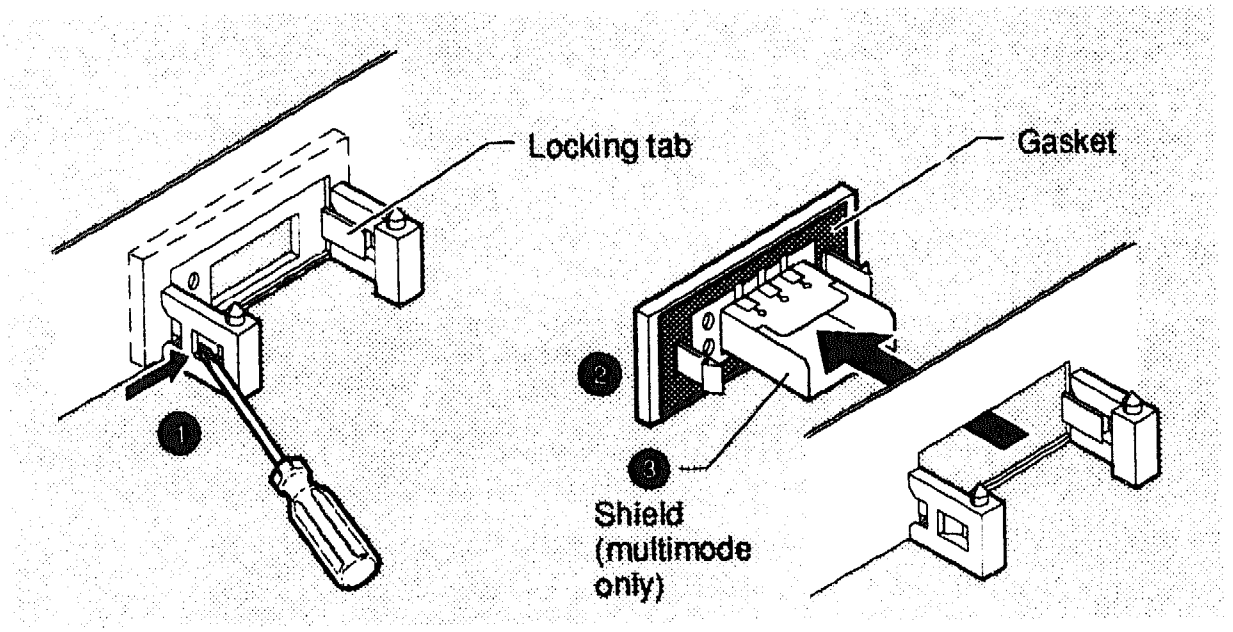
LKG-6535-92I

B.3 Removing the Bezel

Labels on the front of the bezel identify the PMD type and the revisions of the PMD card. To remove a bezel, refer to Figure B–2 and do the following:

1. Using a screwdriver, release the locking tabs ❶ on both sides of the bezel.
2. Remove the bezel ❷.
3. Remove the shield ❸ (multimode only) and keep it with the multimode PMD card.

Figure B–2: Removing the Bezel



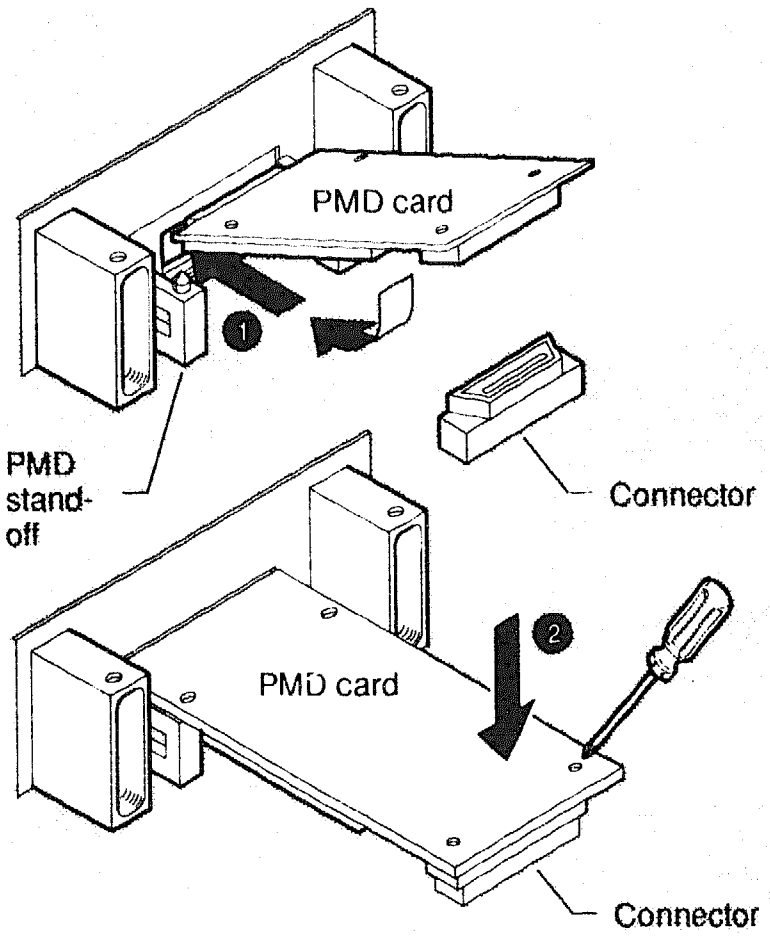
LKG–8122-93I

B.4 Installing the PMD Card

To install a PMD card, refer to Figure B–3 and do the following:

1. Tip the PMD card into the bezel ❶ and lower the card on the PMD stand-offs.
2. Align the PMD card connector with the connector on the module. Press the card ❷ firmly into place. (If your PMD is secured by screws, install and tighten them now.)

Figure B–3: Installing the PMD Card



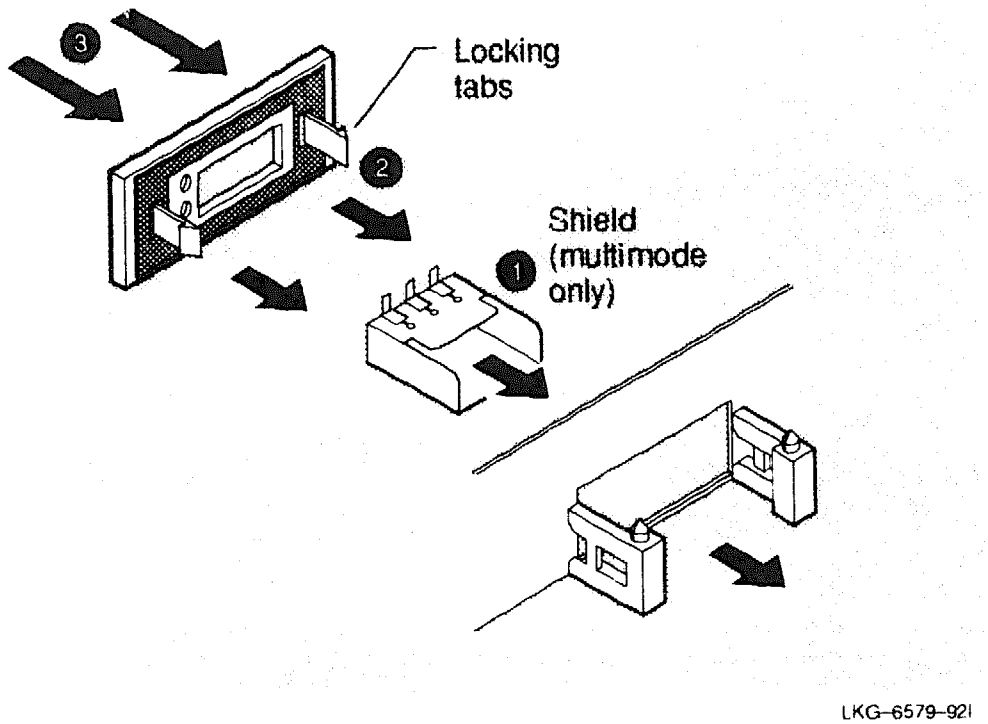
LKG-6537-92I

B.5 Installing the Bezel

A replacement bezel and gasket ships with the PMD card. To install a bezel, refer to Figure B–4 and do the following:

1. Slide the shield (multimode only) ❶ over the PMD card connector. If the card is a multimode PMD, you must slide the shield over the connector on the card.
2. Slide the bezel's locking tabs ❷ into the grooves in the handle.
3. Push the bezel ❸ firmly into place.

Figure B–4: Installing the Bezel



C

FDDI Connector Keying Information

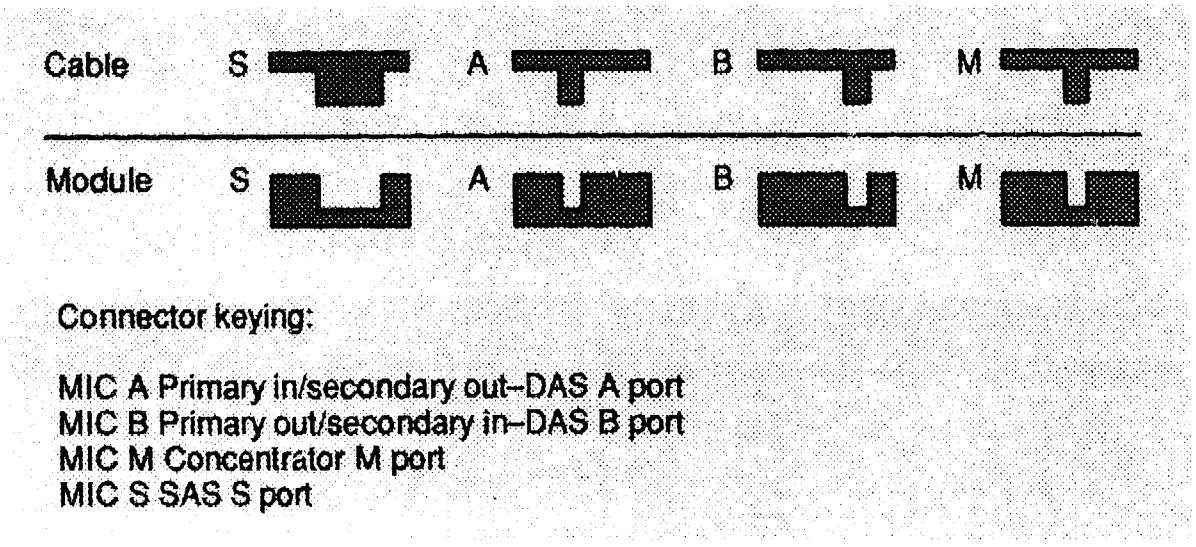
This appendix describes DEC FDDIcontroller/FUTUREBUS+ multimode and single-mode connectors. It also explains how to change the PHY port key.

C.1 FDDI Multimode Connector Keying

The MIC connectors are designed to align the fiber cable properly with the transmit and receive optics. They are keyed and must be aligned properly. The DEC FDDI-controller/FUTUREBUS+ ships with S-type keys installed. Other types available include MIC A and MIC B for DAS versions (see Figure C–1).

The position of the keyway on the MIC plug determines the type of receptacle to which it connects. All cable plugs fit into the MIC S receptacle. The other MIC plugs and receptacles (type A, B, and M) must match for proper installation.

Figure C–1: Controller MIC Receptacle Keying



LKG–5072-93I

C.2 FDDI Multimode and Single-mode Connector Keying

The connectors used on DEC FDDIcontroller/FUTUREBUS+ for FDDI network connection are:

- Media Interface Connectors (MIC) for multimode connections
- FC/PC for single-mode connections

The MIC connectors are designed to align the fiber cable properly with the transmit and receive optics. They are keyed and must be aligned properly. The three types of connectors used are MIC A and MIC B for DAS versions of the controller and MIC S for SAS versions of the controller (see Figure C–1). Note that the SAS version of the controller connects to a MIC M type connector on the DECconcentrator 500.

The position of the keyway on the MIC plug determines the type of receptacle to which it connects. A MIC S plug fits all receptacles. The other MIC plugs and receptacles (type A and B) must match for proper installation.

The FC/PC single-mode connectors are not keyed but are identified by transmit (⊖→) and receive (←⊖) icons.

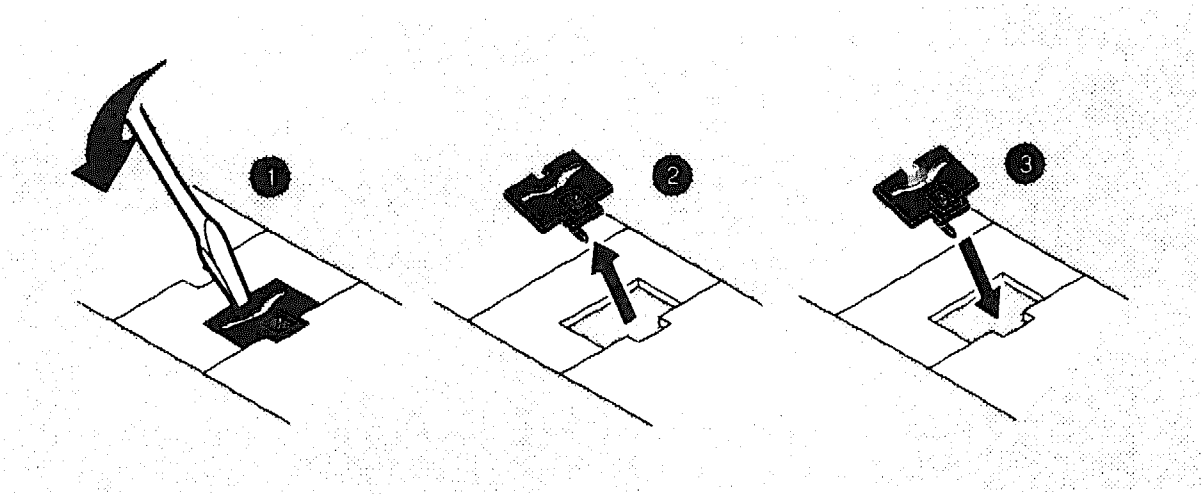
C.3 Installing an Optional PHY Port Key

You can change the key on the MIC multimode connector. Multimode PMD cards ship with a PHY S key installed. Optional PHY A, PHY B, and PHY M keys are in a bag included with the controller kit contents. The PHY key type is clearly marked on the top of each key.

To change the key, refer to Figure C-2 and do the following:

1. Using a screwdriver, release the edge of the PHY key ❶.
2. Slide the key forward ❷ and remove it.
3. Tip the replacement key in place ❸ and press down.

Figure C–2: Installing the PHY Port Key



LKG-6937-92I

D

Related Documentation

The following documents contain additional information. Refer to the back of this manual for ordering information.

- *Fiber Distributed Data Interface System Level Description*
  (Order No. EK-DFSLD-SD)

  This manual describes the FDDI system, how it works, and the role of the individual components.

- *Fiber Distributed Data Interface Network Configuration Guidelines*
  (Order No. EK-DFDDI-CG)

  This manual describes the guidelines for connecting devices to an FDDI network. It also includes network configuration examples.

- *DECconcentrator 500 Installation*
  (Order No. EK-DEFCN-IN)

  This manual describes how to install and verify the operation of the DECconcentrator 500 unit.

- *DECconcentrator 500 Single-Mode Option Card Installation*
  (Order No. EK-DEFCN-SM)

  This manual describes how to install and check the DECconcentrator 500 Single-Mode Option cards. It also describes the single-mode fiber optic system and how to perform the single-mode relative test procedure.

- *Networks Buyer's Guide*

  This guide describes Digital's networking products. Contact your local sales office to receive a copy.

- *Networks and Communication Product Documentation*

  This manual lists the title and order number for each publication associated with Digital Equipment Corporation's Networks and Communication products.

Index