DECbridge™ 500/600 Series

digital ™

Installation and Upgrade

DECbridge™ 500/600 Series

Installation and Upgrade

March 1993

Supersession/Update Information: This is a revised manual.

digital™

This manual was produced by Telecommunications and Networks Publications.

Contents

Safety

Preface

1   Installing the Bridge

2 Installing a New Module to Upgrade the Bridge

3 Connecting Communications Cables and Verifying Bridge Operation

4 Using Local Console Management

5 Solving Problems

A DECbridge 500/600 Series Models

B Switches and Indicators

C Specifications

D Hardware Upgrade Options

E Related Documents

Index

Examples

Figures

Tables

Safety ⚠

Any warning or caution that appears in this manual is 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 that must be observed for the hardware described in this manual are listed below in English, German, French, and Spanish. The pages on which these safety messages appear are also listed.

WARNING ⚠	To prevent bodily injury or equipment damage, **DO NOT** connect the bridge power cord until instructed. [Page 1-7]
VORSICHT	Schließen Sie das Netzkabel erst an, wenn Sie dazu aufgefordert werden.
DANGER	Afin d'éviter tout risque d'accident corporel, NE RACCORDEZ PAS le cordon d'alimentation du DECbridge avant d'en avoir reçu l'instruction.
AVISO	Para evitar daños personales, NO conecte el cable de alimentación del puente hasta que se le indique.

WARNING ⚠	When performing any removal or replacement procedures, always remove the ac power cord from the ac power source. [Page 2-5]
VORSICHT	Ziehen Sie immer zuerst das Netzkabel aus der Steckdose, wenn Sie Teile austauschen oder entfernen müssen.
DANGER	Au moment de retirer ou de remplacer des composants internes, débranchez toujours le cordon d'alimentation de la prise.
AVISO	Siempre que se sustituya o se quite algo, saque el cable de alimentación de corriente alterna de la toma.

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. [Pages 2-6, 3-7]
VORSICHT	Schauen Sie niemals direkt in ein Glasfaserkabel oder einen Glasfaseranschluß. Die Laserstrahlen in faseroptischen Geräten können Augenverletzungen verursachen.
DANGER	Certains équipements utilisant les fibres optiques peuvent émettre des rayonnement 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 emiten radiaciones láser que pueden dañar la vista. Nunca mire directamente a un conector o puerta de conector de fibra óptica.

CAUTION ⚠   Modules in the bridge can be damaged by electrostatic discharges (ESD). When working inside the unit, always use a grounded wrist strap (ESD strap) and a grounded work surface. A wrist strap, ground wire, and table pad are included in the field service kit (P/N 29-11762-00). [Page 2-6]

ACHTUNG   Die Module können durch elektrostatische Entladungen beschädigt werden. Benutzen Sie immer eine antistatische Gelenkmanschette und eine geerdete Arbeitsunterlage, wenn Sie am offenen Gerät arbeiten. Der Antistatikkit für das Wartungspersonal enthält eine antistatische Gelenkmanschette, Schutzleiterdraht und eine Antistatikmatte. Ein Antistatikkit ist bei DECdirekt unter der Bestellnummer 29-11762-00 erhältlich.

ATTENTION   Les charges excessives d'électricité statique peuvent endommager les modules et les composants électroniques. Lors de la manipulation des modules et des composants internes, utilisez toujours le bracelet de masse et le plan de travail antistatique livrés avec le kit d'entretien (Réf. 29-11762-00).

PRECAUCIÓN   Los módulos del puente pueden ser dañados por descargas electroestáticas (ESD). Cuando se trabaje dentro de la unidad, use una muñequera antiestática y una superficie de trabajo conectadas ambas a tierra. En el juego de reparación (P/N29-11762-00) se incluye una muñequera antiestática, un cable de tierra y una tabla.

CAUTION ⚠   DECbridge 500/600 series modules have components on both sides of a module. Remove or insert a module straight (not at an angle) to prevent damage. [Page 2-6]

ACHTUNG   Auf Modulen der Serie DECbridge 500/600 befinden sich auf beiden Seiten Bauteile. Entfernen und installieren Sie Module absolut waagrecht, damit sie nicht beschädigt werden.

ATTENTION   Les cartes du DECbridge 500/600 comportent des composants sur les deux faces. Afin d'éviter tout risque de détérioration, veillez à respecter l'alignement lors des opérations de retrait ou de remplacement d'une carte.

PRECAUCIÓN   Los módulos de las series DECbridge 500/600 tienen componentes a ambos lados. Inserte o retire los módulos derechos, no en ángulo, para evitar deterioros.

CAUTION ⚠   Trying to force a module into the wrong slot may damage the keys. [Page 2-8]

ACHTUNG   Bringen Sie ein Modul nicht mit Gewalt in einem anderen als dem vorgesehenen Steckschlitz an. Andernfalls können die Steckzungen beschädigt werden.

ATTENTION   L'insertion forcée d'une carte dans la mauvaise fente risque d'endommager les guides.

PRECAUCIÓN   Si se fuerza un módulo para que entre en una ranura inadecuada se pueden dañar las llaves.

CAUTION ⚠   Ensure that the bend radius of any fiber optic cable is 2.5 centimeters (1 inch) or greater. [Page 3-7]

ACHTUNG   Der Biegungsradius von faseroptischen Kabeln muß mindestens 2.5 cm betragen.

ATTENTION   Assurez-vous que le rayon de courbure de tout câble à fibres optiques est égal ou supérieur à 2.5 centimètres.

PRECAUCIÓN   Compruebe que el radio de curvatura de cualquier cable de fibra óptica es 2.5 centímetros (1 pulgada) o mayor.

CAUTION ⚠   Do not touch fiber ends; doing so may cause optical power loss. [Page 3-9]

ACHTUNG   Berühren Sie keine freiliegenden Faserenden. Andernfalls können optische Übertragungsverluste auftreten.

| **ATTENTION** | Ne touchez pas aux extrémités des fibres, car cela peut causer la perte de puissance du signal optique. |
| **PRECAUCIÓN** | Evite tocar los extremos de la fibra, porque podría originar pérdida de capacidad óptica. |

WARNING ⚠	Be sure to connect the power cord to a grounded wall outlet. [Page 3-13]
VORSICHT	Schließen Sie das Netzkabel nur an eine geerdete Steckdose an.
DANGER	Assurez-vous que la prise à laquelle est raccordé le DECbridge est munie d'une mise à la terre.
AVISO	Asegúrese de conectar el cable de alimentación a una toma de pared (tierra).

WARNING ⚠	To prevent personal injury or equipment damage, **do not** insert telecommunications cabling into the optical bypass relay connector. (Page 5-8, B-8)
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** ⚠ | The air inside a rack can be hotter than the ambient room temperature. Make sure the air entering the bridge does not exceed the maximum inlet temperature of 50° C (122° F). [Page C-1] |
| **ACHTUNG** | Die Lufttemperatur im Gehäuse kann beträchtlich höher sein als die umgebende Raumtemperatur. Achten Sie darauf, daß die maximale Einlaßtemperatur nicht höher als 50 Grad Celsius ist. |

ATTENTION   La température de l'air circulant à l'intérieur d'une baie fermée peut être supérieure à celle de la pièce. Assurez-vous que la température à la prise d'air du DECbridge n'excède pas 50° C.

PRECAUCIÓN   El aire que se encuentra dentro de la carcasa puede estar más caliente que la temperatura ambiente de la habitación. Asegúrese de que el aire que penetra en el puente no supera una temperatura máxima de 50 grados centígrados (122° F).

Preface

This manual explains how to install or upgrade a DECbridge 500/600 series bridge and how to verify its operation once installed or upgraded.

If you are installing the bridge, follow the instructions in Chapter 1, then proceed to Chapter 3 to install communications cabling and verify unit operation. If you are upgrading the bridge, follow the instructions in Chapter 2, then proceed to Chapter 3 to install communications cabling and verify unit operation.

Intended Audience

This manual is intended for the following audience:

- Hardware installer

- System/network manager

Document Structure

This manual contains five chapters and five appendixes:

Chapter 1	Provides illustrated procedures for installing a DECbridge unit.
Chapter 2	Provides illustrated procedures for upgrading a DECbridge unit.
Chapter 3	Provides communications cabling instructions and information to verify proper operation of the bridge.

Chapter 4   Describes the Local Console Manager (LCM). Also describes how to use LCM to access out-of-band management (OBM).

Chapter 5   Provides general solutions and help in isolating problems that may occur during installation.

Appendix A   Lists the models in the DECbridge 500/600 Series bridges. Also includes an overview of the bridge modules.

Appendix B   Provides information on bridge switches and indicators.

Appendix C   Provides specifications on the bridge.

Appendix D   Provides upgrade options information.

Appendix E   Lists related documentation.

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

Installing the Bridge

This chapter provides instructions for installing the DECbridge 500/600 Series bridges. After installing a bridge, follow the procedures in Chapter 3 for connecting communications cables and verifying the unit's operation. If you are performing an upgrade to an installed bridge, refer to Chapter 2.

1.1 Introduction

The DECbridge 500/600 Series bridges, also referred to in this manual as the bridges or units, are FDDI-to-IEEE 802.3/Ethernet-transparent translating bridges. They provide the interconnection between a high-speed (100-Mb/s) Fiber Distributed Data Interface (FDDI) network backbone and up to three midspeed (10-Mb/s) IEEE 802.3/Ethernet LAN network segments.

The Single Attachment Station (SAS) version of DECbridge units has one FDDI connector on the Fiber Interface (FI) module. The Dual Attachment Station (DAS) version of DECbridge units has two FDDI connectors on the FI module. Figure 1–1 shows components on the bridge.

Figure 1–1:   A DECbridge 500/600 Series Unit (I/O Panel)
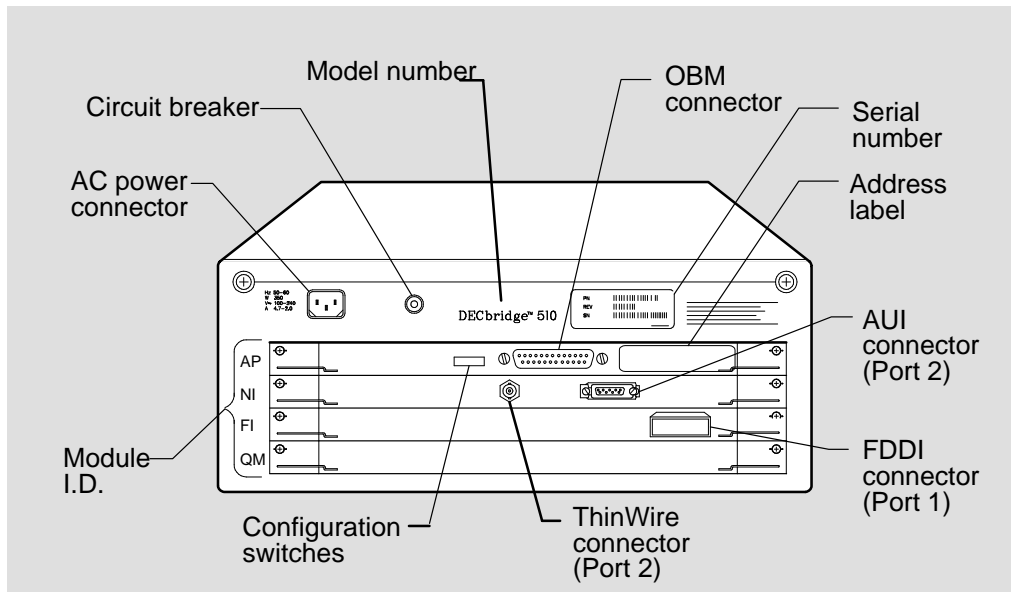
LKG-7321-92I

1.1.1   DECbridge 500/600 Series Features

All DECbridge 500/600 Series models share the following features:

- An AP3 module with out-of-band management (OBM) support (all models except the DECbridge 500 model)

NOTE

You need Version 1.3 (or higher) bridge firmware if your unit has an AP3 module.

- A Local Console Manager (LCM)

- Rate limiting

- Station Management (SMT) support

- Bridge Management Information Base (Bridge MIB)

- FDDI MIB

1.1.2   DECbridge 500 Series Features

The DECbridge 500 Series models have the following features:

- One-port NI module that provides connection for either a ThinWire or AUI (also known as thickwire) Ethernet network connection

- One-port FI module that has one or two connectors, depending on the type of FDDI interface connection—either a SAS or DAS connection

1.1.3   DECbridge 600 Series Features

The DECbridge 600 Series models have the following features:

- Three-port NI module that provides for up to three AUI Ethernet network connections

- One-port FI module that has zero, one, or two FDDI connectors, depending on the type of interface connection — either a SAS connection or DAS connection (a DECbridge 600 unit has no FDDI interface)

1.2   Site Verification

Before installing a DECbridge 500/600 Series unit, ensure that all cables for the site configuration are installed and labeled properly. Refer to the *DECconnect System Fiber Optic Installation* manual for information regarding DECconnect System fiber optic installations (refer also to the *Fiber Distributed Data Interface Network Configuration Guidelines* manual for FDDI network configuration rules and cable-plant specifications). For information regarding satellite equipment room (SER) installations, consult the *DECconnect System Satellite Equipment Room Installation Guide.*

The DECbridge 500/600 Series unit can be placed in open office areas and computer rooms. The environmental requirements (in Appendix C) can assist you in determining the proper location. You can install the bridge on a tabletop, desktop, or in a rack.

A DECbridge 500/600 Series unit is connected to an FDDI ring through a concentrator (SAS bridge), such as the DECconcentrator 500, or is directly connected using a DAS bridge. The bridge connects to IEEE 802.3/Ethernet LANs through a transceiver or ThinWire cabling. For more information on FDDI network configurations and bridge connections, refer to the *Fiber Distributed Data Interface Network Configuration Guidelines* manual (refer to Appendix E for more documentation information).

1.2.1 Site Verification Checklist

Use the following checklist to make sure a site is ready for installation of the DECbridge 500/600 Series unit:

❏ Ensure that a concentrator, such as the DECconcentrator 500, is installed if you are connecting your bridge to an FDDI ring through a concentrator.

❏ Ensure that the AUI or ThinWire cabling is available in the required length.

❏ Ensure that the AUI or ThinWire cabling is installed, tested, and tagged. Tagging is especially important when an NI(3) module is installed.

❏ Ensure that the FDDI fiber optic cabling is available in the required length.

❏ Ensure that the FDDI fiber optic cabling is installed, tested, and tagged.

❏ Ensure that the ac power outlet is grounded and working properly. The outlet location should be within 1.8 meters (6 feet) of the installation site for U.S. sites and 2.5 meters (8.2 feet) for international sites.

❏ Ensure that the voltage and amperage at the ac wall outlet are correct for installing the bridge.

❏ Verify that the temperature, altitude, and humidity for the site are with in the specified ranges (refer to Appendix C).

❏ If planning to use LCM, ensure that your video terminal passes self-test.

❑ Ensure that there is a minimum of 7.6 centimeters (3 inches) on the sides of the unit for ventilation and a minimum of 17.8 centimeters (7 inches) of vertical mounting space in a rackmount.

❑ Ensure that the extended LAN is properly configured in regards to IEEE 802.1d and Digital spanning tree loop detection modes (refer to the *Bridge and Extended LAN Reference* manual for more information).

1.2.2 Service

Optional on-site and remote Digital services are available. Call your Digital Services representative for information regarding hardware and software services that are available to support your DECbridge 500/600 Series unit.

1.3 Unpacking and Inspecting the Shipping Package

The DECbridge 500/600 Series unit is shipped in one box (see Figure 1–2 for contents). Remove the bridge from the box and place it on a flat surface until you are ready to install it.

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.

NOTE

Communications cables (ThinWire, AUI, and FDDI) for this product are ordered and shipped separately, and are not included in the DECbridge 500/600 Series unit shipping box. A power cord ships with U.S./Canada versions of the bridge (for example, DEFEB-AC). Power cord kits are available from Digital for bridges shipped to other countries (refer to Appendix A for a list of power cord kits).

Once you have unpacked the bridge, follow the instructions for setting bridge switches (if applicable) and installing the unit included in this chapter.

Figure 1–2: Shipping Package Contents

☐ Power cord
(U.S. only)
P/N BN20A-2E

☐ ThinWire
T-Connector
P/N 12-25869-01
(500 series only)

☐ T-connector
terminators
P/N 12-26318-01
(500 series only)

☐ AUI loopback
P/N 12-22196-01
(1 or 3 provided
depending on model)

☐ FDDI loopback
P/N 12-32005-01
(0, 1, or 2 provided
depending on model)

☐ Single-mode loopback
P/N 12-34830-01
(0, 1 or 2 provided
depending on model)

☐ Rack U-nuts
P/N 90-07786-00

☐ Rack screws
P/N 90-00063-39

☐ Mounting bracket
screws
P/N 90-08404-02

☐ Mounting brackets
P/N 74-39897-01

☐ License, software
product description,
release notes, *Configuring
the SNMP Agent* manual
P/N QC-018AA-GZ

☐ *DECbridge 500/600 Series
Installation and Upgrade*
manual (this manual)
P/N EK-DEFEB-IN

☐ *FDDI Network Configuration
Guidelines* manual
P/N EK-DFDDI-CG

(DECbridge 510 shown)

LKG-7315-92I

1.4 Setting Configuration Switches

A DECbridge 500/600 Series unit is shipped from the factory with the configuration switches preset in the OFF position (default settings). If you have a DECbridge 500 Series unit, set switch 8 to the proper setting for AUI or ThinWire interface (this switch does not apply for DECbridge 600 Series units). Otherwise, use the default settings for normal operation. To perform remote management on the bridge, set the write access switches on the bridge to ON. Refer to Appendix B for more information on switch settings.

1.5 Automatic Voltage Setting

The DECbridge 500/600 Series units automatically adjust to a voltage range of 88 to 264 Vac. Therefore, the bridges have no voltage-select switch.

1.6 Locations for Installing the DECbridge 500/600 Series Unit

You can install a DECbridge 500/600 Series unit on a tabletop, desktop, or in a standard 48-centimeter (19-inch) rack. The shipping contents include a set of mounting brackets and screws for use in a rackmount installation (refer to Section 1.6.2). Follow the instructions for the type of installation at your site.

WARNING ⚠

To prevent bodily injury or equipment damage, **DO NOT** connect the bridge power cord until instructed.

NOTE

A minimum of 7.6 centimeters (3 inches) of free air space is required on each side of the unit.

1.6.1 Installing the DECbridge 500/600 Series Unit on a Tabletop or Desktop

To install a DECbridge 500/600 Series unit on a tabletop or desktop, remove it from the shipping box, remove any packaging, and place it on the surface where you will use it. After you install the bridge, proceed to Chapter 3 for instructions on installing communications cables and verifying bridge operation.

1.6.2 Installing the DECbridge 500/600 Series Unit in a Rackmount

Rackmount installation of the bridge involves installing u-nuts on the rack rails, attaching the mounting brackets to the sides of the bridge, and installing the bridge in the rack.

NOTE

Two people are required to install the DECbridge 500/600 Series unit in a rack. When positioning the bridge in the rack, one person should hold the unit while the other installs the screws.

Before installing the bridge in the rack, determine where the unit will be placed in the rack and perform the following steps:

1. Attach four u-nuts to the rails of the rack (see Figure 1–3). Hold a mounting bracket up to the rack rail where it will be positioned when installed. This helps identify the proper holes for placing the u-nuts.

Figure 1–3:   Installing U-Nuts on Rack
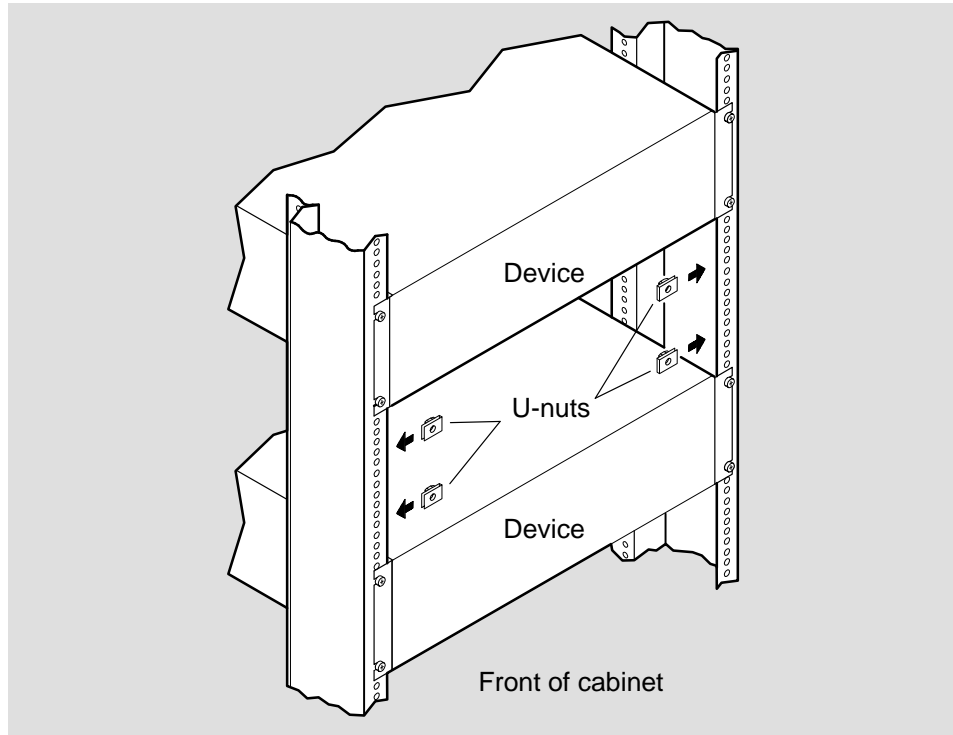
LKG-3962-91I

2. Attach the mounting brackets (one on each side) to the bridge using the six flathead screws supplied in the shipping box (see Figure 1–4).

Figure 1–4:   Attaching Mounting Brackets
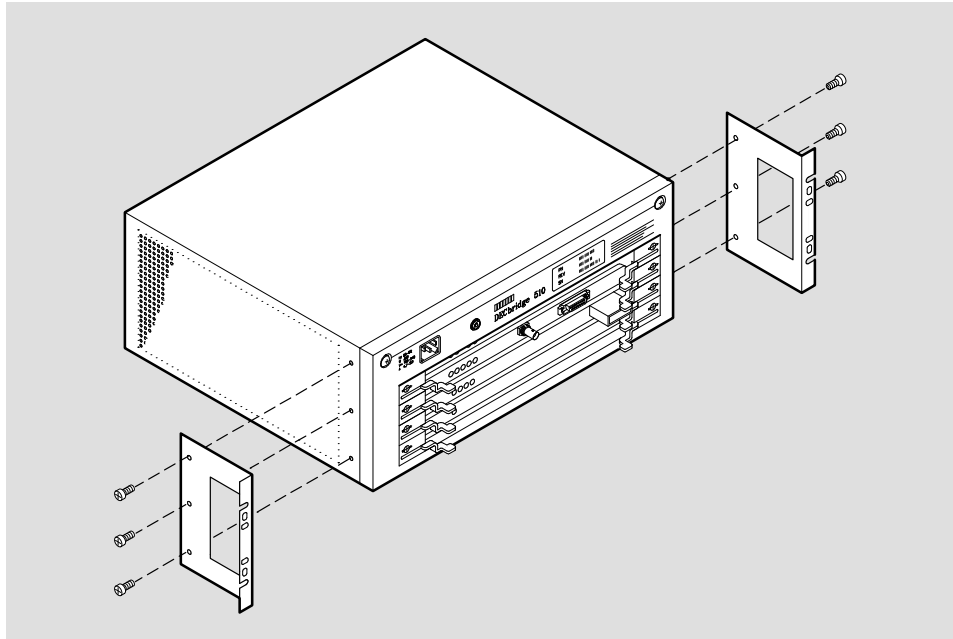
LKG-4858-93I

3. Install the bridge in the rack with the I/O panel visible (see Figure 1–5). Secure the bridge to the rack rail with the four screws provided in the shipping box.

   Proceed to Chapter 3 to install communications cables and verify bridge operation.

Figure 1–5:   Installing a Bridge in a Rack

LKG-4859-93I

2
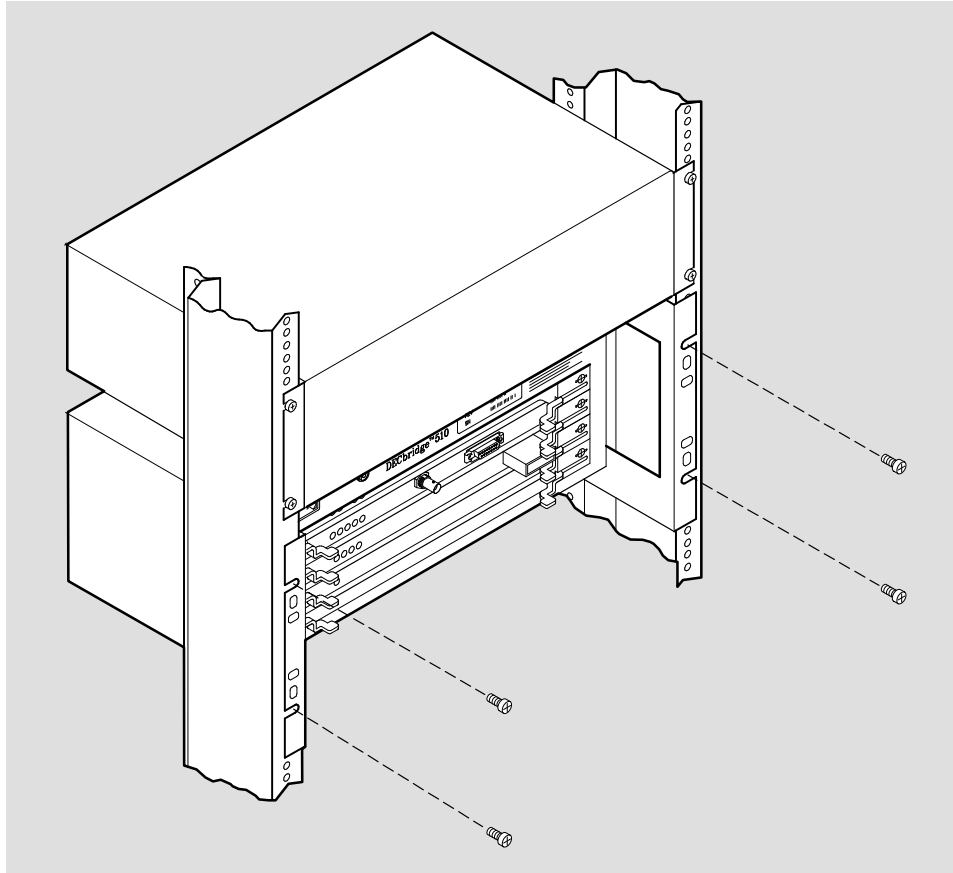
Installing a New Module to Upgrade the Bridge

This chapter provides instructions for upgrading your DECbridge 500/600 Series unit to another model in the DECbridge 500/600 Series. If you are performing a bridge installation, follow the installation procedures in Chapter 1. Upgrading your bridge to another model includes:

1. Replacing the current module(s) in the bridge with upgrade module(s)

2. Installing new model number labels

3. Connecting communications cables and verifying bridge operation by following the procedures in Chapter 3

2.1 Introduction

Upgrading modules on the DECbridge 500/600 Series of bridges allows you to increase interface connections to accommodate growing networks without purchasing new units.

For DECbridge 500 Series units, you can add two more AUI interface connections. For both DECbridge 500 and 600 Series units, you can add another FDDI connection that allows you to use dual homing on your bridge, connect your bridge directly to an FDDI ring (DAS connection), and connect to networks up to a distance of 40 kilometers (24.8 miles). Refer to Appendix D for more information on upgrade possibilities.

2.2 DECbridge 500/600 Series Technical Information

The appendixes at the back of this manual contain all technical information pertaining to DECbridge units, such as model numbers, module descriptions, unit specifications, LED indicators, and configuration switches.

2.3 Unpacking and Inspecting Upgrade Kits

Each DECbridge 500/600 Series upgrade kit (Digital offers three kits) is shipped in its own box. Figure 2–1, Figure 2–2, and Figure 2–3 illustrate the contents of the shipping boxes.

Check the shipment for damaged or missing parts. If parts are damaged, contact your delivery agent and your Digital sales representative. If parts are missing, contact your Digital sales representative.

Figure 2–1:   DEFEB-UP Upgrade Kit Contents
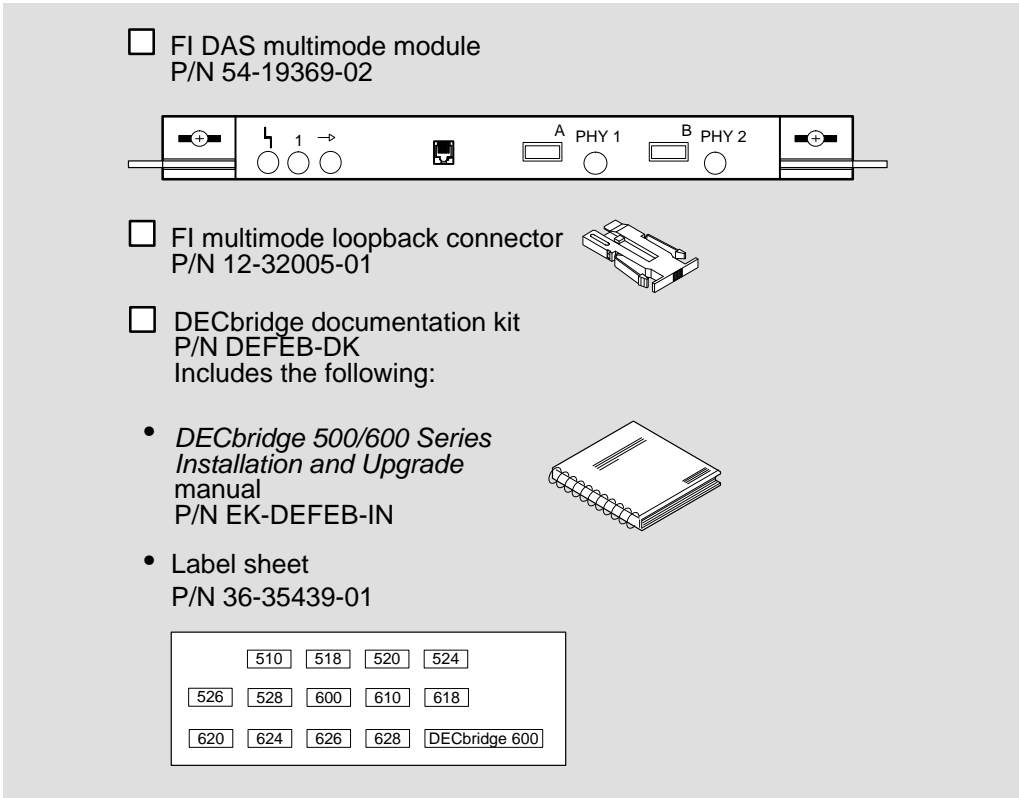
LKG-7326-92I

Figure 2–2: DEFEB-UG Upgrade Kit Contents

☐ AP3 module
P/N 54-19375-02

☐ NI(3) module
P/N 54-19409-01

☐ Two Ethernet (AUI) loopback connectors
P/N 12-22196-01

☐ License, software
product description,
release notes, *Configuring
the SNMP Agent* manual
P/N QC-018AA-GZ

☐ DECbridge documentation kit
P/N DEFEB-DK
Includes the following:

• *DECbridge 500/600 Series
Installation and Upgrade*
manual
P/N EK-DEFEB-IN

• Label sheet
P/N 36-35439-01

510	518	520	524	
526	528	600	610	618
620	624	626	628	DECbridge 600

LKG-7328-92I

Figure 2–3: DEFEB-UR Upgrade Kit Contents

☐ AP 3module
P/N 54-19375-03

☐ License, software
product description,
release notes, *Configuring
the SNMP Agent* manual
P/N QC-018AA-GZ

☐ DECbridge documentation kit
P/N DEFEB-DK
Includes the following:

• *DECbridge 500/600 Series
Installation and Upgrade*
manual
P/N EK-DEFEB-IN

• Label sheet
P/N 36-35439-01

510	518	520	524	
526	528	600	610	618
620	624	626	628	DECbridge 600
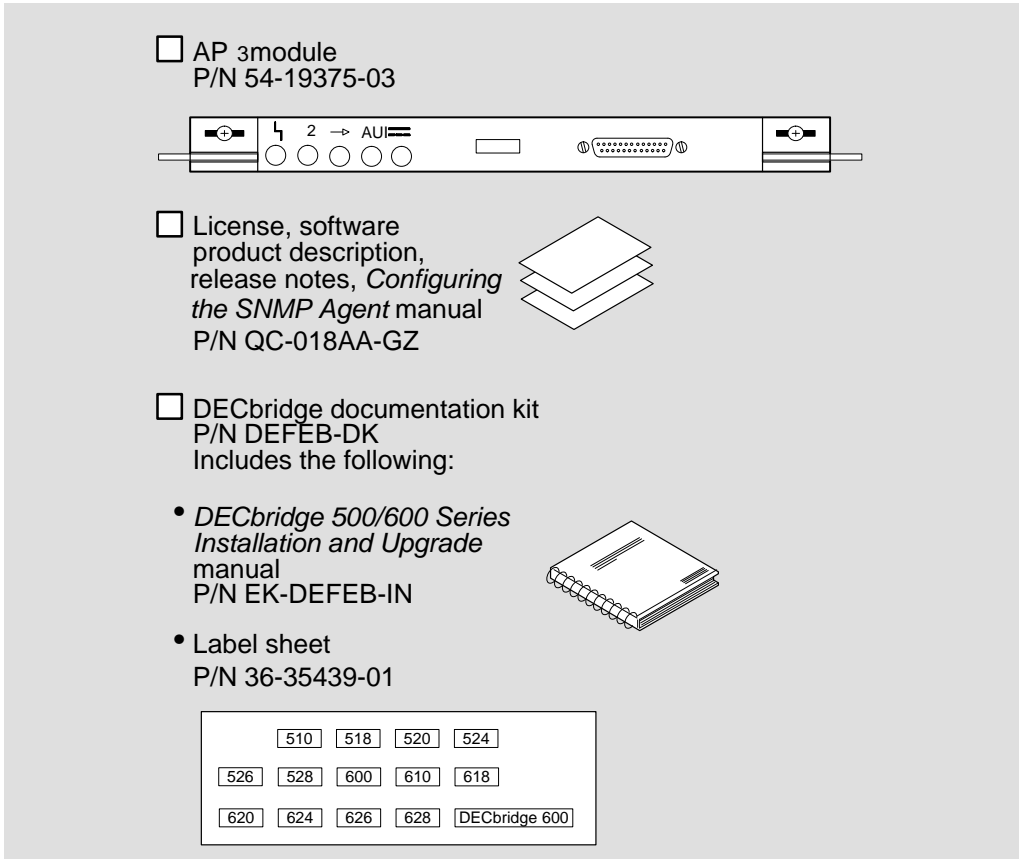
LKG-7318-92I

2.4 Site Verification

Before upgrading the DECbridge 500/600 Series unit, ensure that all cables for the upgraded site configuration are installed and labeled properly. Refer to the *DECconnect System Fiber Optic Installation* manual for information regarding DECconnect System fiber optic installations. For information regarding SER installations, consult the *DECconnect System Satellite Equipment Room Installation Guide.*

2.4.1 Site Verification Checklist

Use the following checklist to prepare the site for an upgrade to your DECbridge 500/600 Series unit:

❑ Ensure that a concentrator, such as the DECconcentrator 500 unit, is installed if you are connecting to an FDDI ring through a concentrator.

❑ Ensure that the AUI or ThinWire cabling is available in the required length.

❑ Ensure that the AUI or ThinWire cabling is installed, tested, and tagged.

❑ Ensure that the FDDI fiber optic cabling is available in the required length.

❑ Ensure that the FDDI fiber optic cabling is installed, tested, and tagged.

2.4.2 Service

Digital offers optional on-site service agreements. Call your Digital sales representative for information about the hardware and software services that are available for your DECbridge 500/600 Series unit.

2.5 Preparing the Bridge for Upgrade

You can access the bridge modules from the I/O panel.

WARNING ⚠️

When performing any removal or replacement procedures, always remove the ac power cord from the ac power source.

Before performing upgrade procedures on the bridge, perform the following steps:

1. Remove power to the bridge by unplugging the power cord from the ac outlet.

2. Disconnect the AUI or ThinWire interface cable from the NI module. A slide latch locks the AUI cable connector locks into place. To remove the AUI cable, push the slide latch to the right to unlock the connector. To remove the ThinWire cable, push in and rotate the connector a quarter-turn counterclockwise.

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.

3. Remove the fiber optic cable from the FI module. If you have a protective cover, place it on the fiber optic connector to protect it against dust.

2.6 Tools Required

You need a #2 Phillips-head screwdriver and an electrostatic discharge (ESD) strap to remove and replace modules.

CAUTION ⚠

Modules in the bridge can be damaged by electrostatic discharges (ESD). When replacing modules in the unit, always use a grounded wrist strap (ESD strap) and a grounded work surface. A wrist strap, ground wire, and table pad are included in the field service kit (P/N 29-11762-00).

2.7 Removing a DECbridge Module

To remove a module, refer to Figure 2–4 and perform the following steps:

CAUTION ⚠

DECbridge 500/600 Series modules have components on both sides of a module. Remove or insert a module straight (not at an angle) to prevent damage.

1. Using network management software, record bridge parameter settings and the firmware version.

2. Before removing an AP module, record the existing switch settings on that module so that they can be used as reference to configure the new AP3 module.

3. Ensure the power is turned off and interface cables are disconnected (refer to Section 2.5).

4. Attach the ESD ground strap around your wrist and clip the other end of the strap to the ejector lever on a module you are not removing, such as the QM module.

5. Using a #2 Phillips-head screwdriver, loosen the quarter-turn fastener on each end of the module by pushing it in and turning it a quarter turn counterclockwise. The fastener pops out when unlocked.

6. Swing the two ejector levers on the module to the unlock (outward) position.

7. Carefully slide the module straight out of the card cage to remove it. Do not let the components on the bottom of the module scrape against the ejector levers of the module below.

Figure 2–4: Module Removal and Replacement

Quarter-turn

Quarter-turn
fastener (2)

Ejector
lever (2)

Locked   Unlocked

AP module

NI module
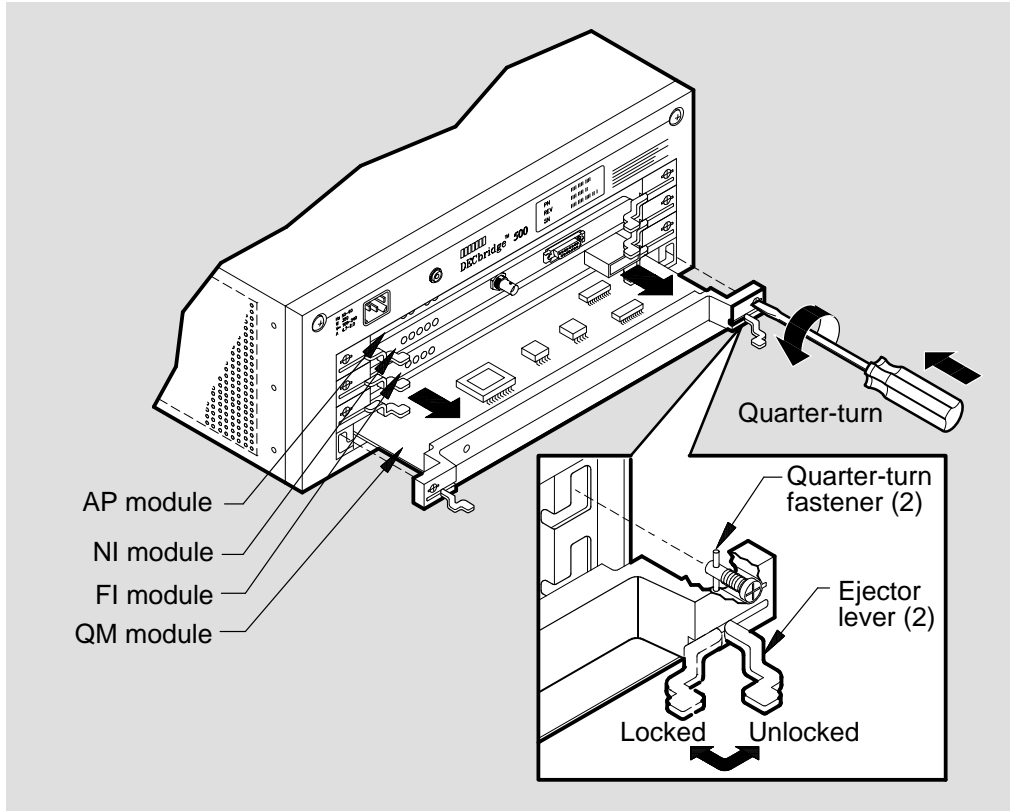
FI module

QM module

LKG-7323-92I

2.7.1 Installing a DECbridge 500/600 Series Module

Follow this procedure for any of the modules. Verify that you have the correct re-
placement module by checking the name of that module on the left side of the module
handle. (The revision level is shown on the right side of the handle.) The card cage
slots are also labeled, as shown in Figure 2–4. Each module is keyed so that it can
lock into place only if it is in the proper slot.

CAUTION⚠

Trying to force a module into the wrong slot may
damage the keys.

NOTE

Ensure that the switches on a replacement AP3 module
are set to the proper positions for the new configuration.
Refer to Appendix B for switch descriptions.

NOTE

Because the AP module contains the address ROM for
the bridge, the physical addresses of the bridge change
when you replace the AP module. An address label on
the new AP3 module lists the new addresses.

To install a module, refer to Figure 2–4 and perform the following steps:

1. Verify that the replacement module is correct (the name is on the left side of
   the module handle).

2. Verify that the module ejector levers are in the unlock position (swung out-
   ward). Hold the replacement module component side up and carefully slide it
   into the appropriate card cage slot until it makes contact with the backplane
   connector. Do not let the components on the bottom of the module scrape
   against the ejector levers of the module below it.

3. Firmly push the ejector levers inward until the module is fully seated into the
   connector. (Note that when all modules are properly inserted, all the ejector
   levers should be aligned.)

4. Using the Phillips-head screwdriver, tighten the two quarter-turn fasteners
   that attach the module to the card cage (by pushing in and turning the screw-
   driver clockwise).

2.8 Updating Labels

Update the labels that appear on the outside of the bridge once you have completed
the module upgrade. A peel-and-stick label sheet is provided in the shipping pack-
age. Replace two labels:

1. If an NI(3) module has been installed, peel the DECbridge front panel label
   from the label sheet (located on the bottom right side of the sheet) and place
   it directly over (covering) the DECbridge model number located on the front
   panel of the unit (see Figure 2–5). Line up the new DECbridge label with the
   top of the existing label and press firmly so that the label stays in place.

2. Peel the specific DECbridge model number from the label sheet and place it directly over (covering) the DECbridge model number located on the I/O panel (see Figure 2–5). Press firmly so that the label stays in place.

3. Once the two labels have been updated, use a pen or permanent marker to update the DEFEB part number (located on the I/O panel serial number label) to the model you are upgrading to. Cross out the last two digits of the part number and write the new numbers to the right of the crossed-out numbers.

   For example, if you have model DEFEB-AC (DECbridge 510) and are upgrading to model DEFEB-LA (DECbridge 620), cross out the letters *AC* and write in letters *LA*. Refer to Appendix A for a list of model numbers.

The DECbridge 500/600 Series unit is now ready for cabling. Refer to Chapter 3 for cabling instructions.

Figure 2–5:   Locations for Applying Upgrade Labels

LKG-7320-92I

3
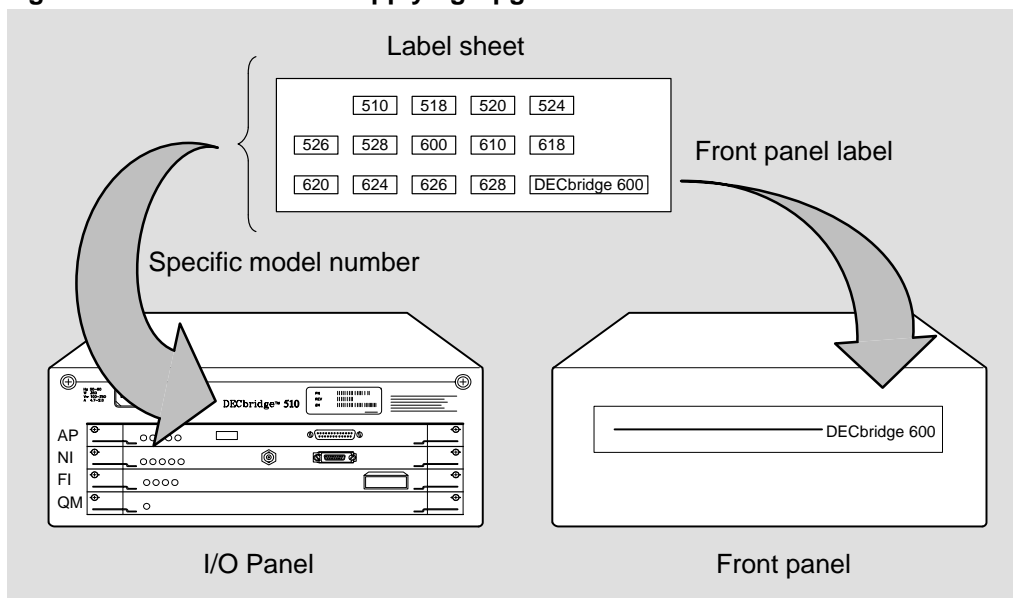
Connecting Communications Cables and Verifying Bridge Operation

This chapter provides instructions for connecting communications cables and verifying proper bridge operation.

3.1 Introduction

To connect communications cables, follow the instructions in the following sections for the cables you are connecting:

- Connecting the ThinWire Cable — Section 3.2

- Connecting the AUI Cable — Section 3.3

- Connecting the FDDI Cable — Section 3.4

- Connecting the OBM Cable — Section 3.5

NOTE

Verify that the site is prepared for cable installation. Refer to the site verification checklist in Chapter 1 for more information on site requirements.

When connecting communications cables, verify that
you are connecting the correct cable to the proper con-
nector on the I/O panel by reading the label and noting
the type of connector on the cable.

If you have a DECbridge 600 Series unit, the NI module has three AUI connectors
and no ThinWire connector (Port 2). If you have a DAS configuration, the FI module
has two FDDI connectors (Port 1). Figure 3–1 shows connector locations on the I/O
panel for all cables.

Figure 3–1:   ThinWire, AUI, FDDI, and OBM Connectors
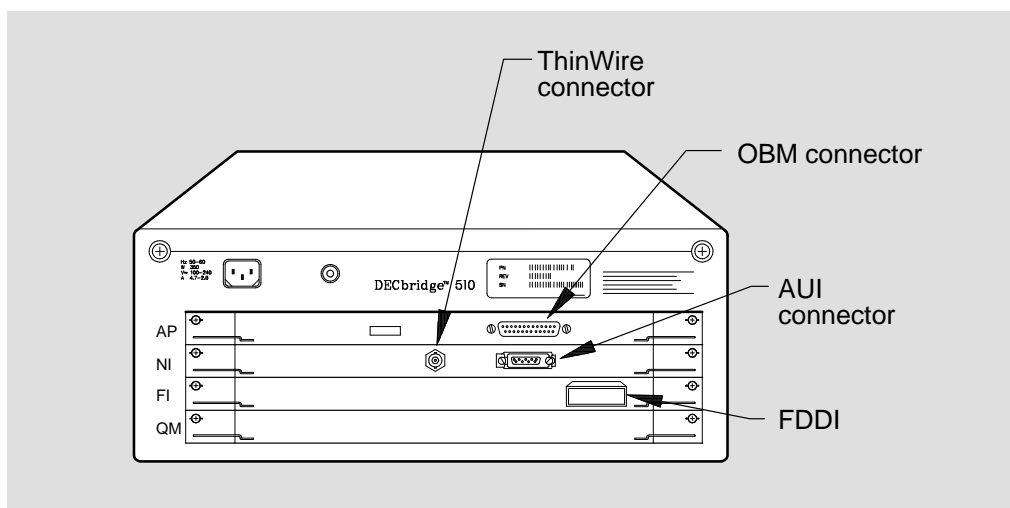
LKG-7319-92I

3.2 Connecting the ThinWire Cable

The ThinWire connector on the bridge (models in the DECbridge 500 Series) is lo-
cated on the NI module. To install the ThinWire cable, determine whether your
bridge is installed in the middle of a ThinWire segment or at the end of a segment and
follow the procedures in Section 3.2.1 (for the middle of a segment) or Section 3.2.2
(for the end of a segment).

3.2.1   Connecting to the Middle of a ThinWire Segment

To connect the DECbridge 500/600 Series unit to the middle of a ThinWire segment, perform the following steps:

1. Set configuration switch 8 on the AP module to OFF. This selects the ThinWire connection for Port 2. Refer to Appendix B for more switch information.

2. Locate the T-connector supplied in the shipping package and install it on the NI module connector. Push down and turn the collar on the cable connector a quarter turn clockwise to secure the connector in place.

3. Attach both ThinWire cables to the T-connector. Note the alignment slots on the end of the cable connector and align them with the tabs on the T-connector. Secure the connection for each cable by turning the collar on the connector a quarter turn.

4. Verify that the other ends of these cables are properly terminated (connected to a terminator, Digital Multiport Repeater (DEMPR), or equivalent device). If it is not connected, refer to the appropriate device documentation for connection information.

3.2.2   Connecting to the End of a ThinWire Segment

To connect the DECbridge 500/600 Series unit to the end of a ThinWire segment, perform the following steps:

1. Set configuration switch 8 on the AP module to OFF. This selects the ThinWire connection for Port 2. Refer to Appendix B for more switch information.

2. Remove and save the terminator from the T-connector attached to the last station on the existing ThinWire segment.

3. Attach one end of the new ThinWire cable to the T-connector on the last station. Attach the other end of the cable to the T-connector for your bridge (supplied in the shipping package).

4. Attach the 50-ohm terminator to the T-connector on your bridge (see Figure 3–2). Note the alignment slots on the end of the cable connector and align them with the tabs on the T-connector. Secure the connection by turning the collar on the connector a quarter turn.

5. Install the ThinWire cable (with T-connector) onto the NI module connector. Push down and turn the collar on the cable connector a quarter turn clockwise to secure the cable in place. Your unit is now the last station on the ThinWire segment.

Figure 3–2:   ThinWire Cable Connector
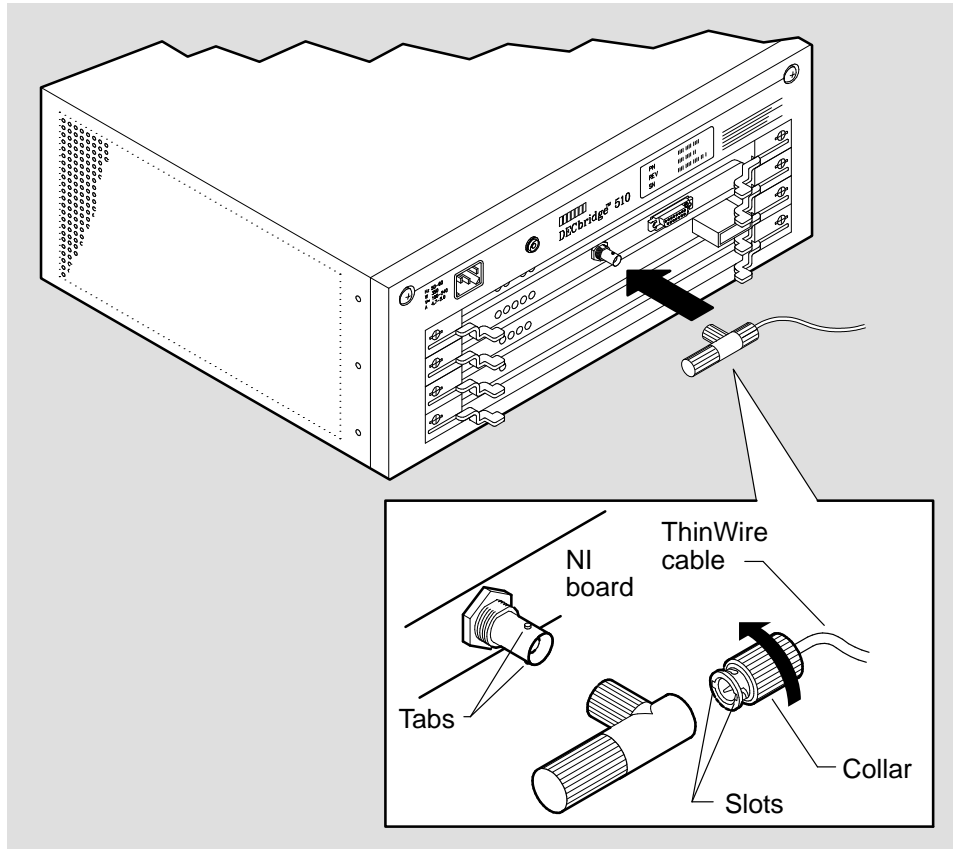
LKG-4861-93I

3.3 Connecting the AUI Cable

The NI module has the AUI connector(s) for a DECbridge 500/600 Series unit (see Figure 3–1). If you have a DECbridge 600 Series unit, the NI module has three AUI connectors and no ThinWire connector.

To install the AUI cable(s):

1. For DECbridge 500 Series units with one AUI connector on the NI module, verify that switch 8 on the AP module is set to ON to select AUI interface for Port 2. For DECbridge 600 Series units with three AUI connectors on the NI(3) module, switch 8 does not apply. Refer to Appendix B for more switch information.

2. Push the AUI connector slide latch on the NI module to the right to unlock the latch.

3. Plug the AUI cable connector into the AUI connector on the NI module (see Figure 3–3).

NOTE

The AUI cable connector can be installed in only one position. Check the alignment of the AUI connector before plugging in the cable.

4. Push the slide latch to the left until it snaps into the locking position, securing the connector.

Figure 3–3:   AUI Connector Slide Latch

Push slide latch
firmly to left
to lock cables
in place.

AUI
connector
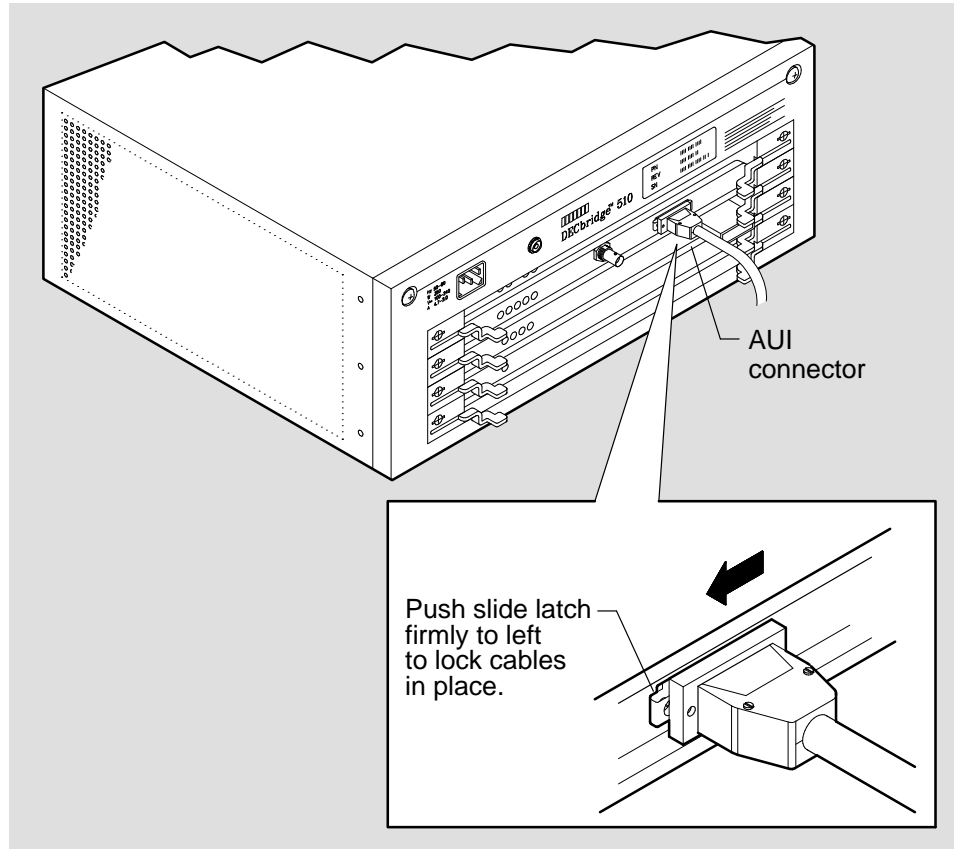
LKG-4862-93I

5. Verify that the other end of this cable is connected to an H4000, H4005, or equivalent transceiver. If it is not connected, refer to the appropriate device documentation for connection information.

6. Repeat steps 2 through 5 for each AUI cable/connector. All AUI cable-connections are complete.

    If you are connecting the bridge to an FDDI network, proceed to Section 3.4 to install the FDDI fiber cable. If you do not have an FDDI interface (Model 600), all cables to the DECbridge unit, except the ac power cord, are now installed. Proceed to Section 3.6 for power-cord installation and unit-verification procedures.

3.4 Connecting the FDDI Cable

The DECbridge 500/600 Series units have zero (null), one, or two FDDI connectors, depending on the model. The connectors are located on the FI module (see Figure 3–1). A single connector (SAS version of the bridge; S-type connector) is called Port 1. Two connectors (DAS version of the bridge) are called Port 1, connector type A (Port 1 [A]) and Port 1, connector type B (Port 1 [B]) (see Figure 3–4). The connector interface types are multimode, single-mode, or a combination of multimode and single-mode. Appendix B contains FDDI connector keying guidelines.

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.

CAUTION⚠

Ensure that the bend radius of any fiber optic cable is 2.5 centimeters (1 inch) or greater.

NOTE

Digital recommends you use Digital's multimode FDDI-to-FDDI patch cables (BN24B-nn) or FDDI-to-2.5-mm ST-type connector patch cables (BN24D-nn) for multimode connections.

NOTE

The FDDI multimode connector receptacles are keyed. Determine proper alignment of the connectors before attempting cable installation. Refer to Appendix B for more information on connector keying.

3.4.1 Connecting an FDDI Cable with a Multimode Connector

To install an FDDI cable with a multimode connector:

1. Remove the protective device from the FDDI connector receptacle by squeezing the locking clips on the sides of the insert and pulling it out (see Figure 3–4).

2. Insert the FDDI cable connector into the module receptacle (with proper keying), ensuring the locking clips on the sides snap into the locked position (see Figure 3–4)**.**

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

NOTE

A DECbridge unit can be cabled to a patch panel first but must then be cabled from the panel to the appropriate concentrator or connected directly to an FDDI ring to complete proper connection of the bridge.

3.4.1.1   Installing the Optical Bypass Switch

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

All cables to the DECbridge unit, except the ac power cord, are now installed. Proceed to Section 3.6 to install the power cord and verify unit operation.

3.4.2   Connecting an FDDI Cable with a Single-mode Connector

To install an FDDI cable with a single-mode connector:

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

CAUTION ⚠

> Do not touch fiber ends; doing so may cause optical
> power loss.

2. Connect the fiber optic cable 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).

3. Verify that the other end of this cable is connected to a concentrator, such as
    the DECconcentrator 500 unit or connected to the dual ring. If it is not con-
    nected, refer to the appropriate concentrator manual or the *Fiber Distributed
    Data Interface Network Configuration Guidelines* manual for connection in-
    formation.

Figure 3–4: FDDI Cable Connectors

Port 1 (B)

Port 1 (A)

Multimode connector

Single-mode connectors
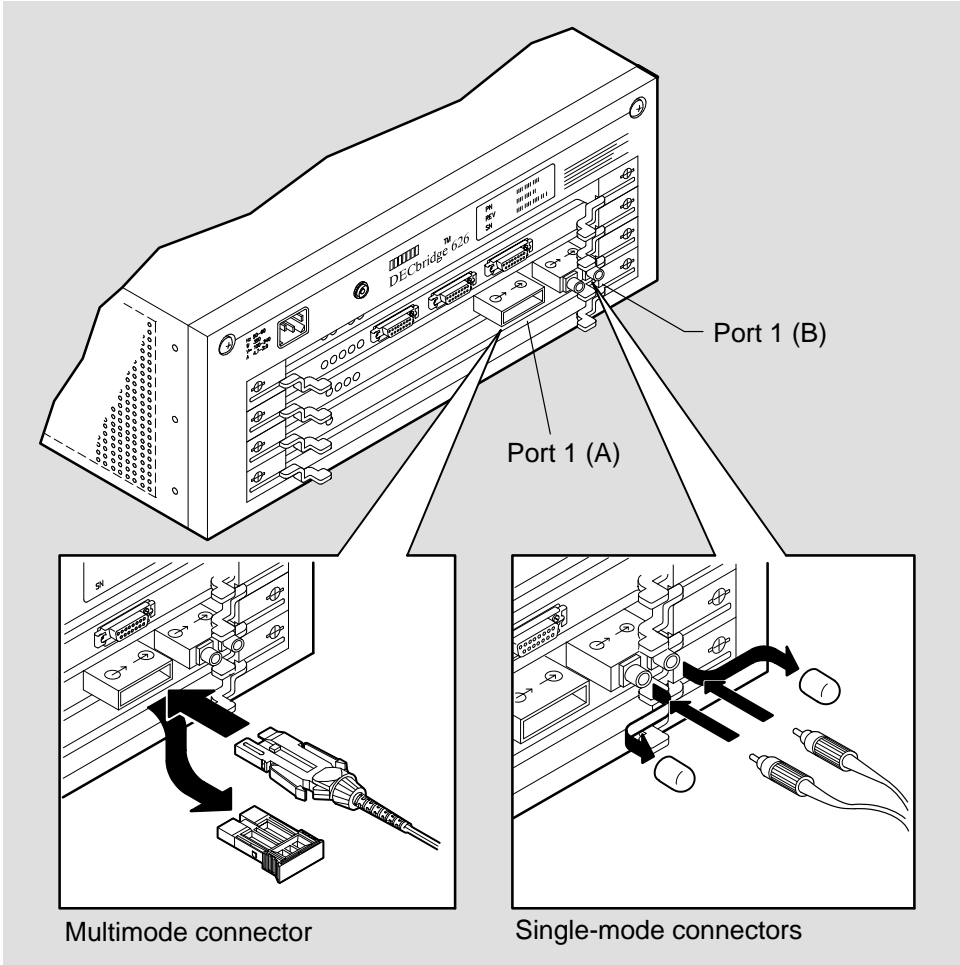
LKG-4864-93I

3.5 Connecting the OBM Cable

You need to install the Out of Band Management (OBM) cable when you want to use LCM and OBM. You can connect the OBM cable either directly to a terminal or through a Scholar modem (or equivalent device). You do not need this cable for normal unit operation. If you do not intend to use LCM and OBM, proceed to Section 3.6. Refer to Chapter 4 for information on using LCM.

Recommended cables and passive adapters are provided in the following list and shown in Figure 3–5.

- **For VT100 or VT200 Series** — Digital recommends using P/N BC22D-*xx* cables with 25-pin connectors at each end. If you use P/N BC16E-*xx* cables, use a passive adapter (P/N H8575A) at each end of the cable.

- **For VT300 or VT400 Series** — Digital recommends using the standard six-pin modular jack (MJ6) connector cable P/N BC16E-*xx*. Use the passive adapter H8575A on the bridge end of the cable.

Figure 3–5: Recommended Connections for the OBM Cable
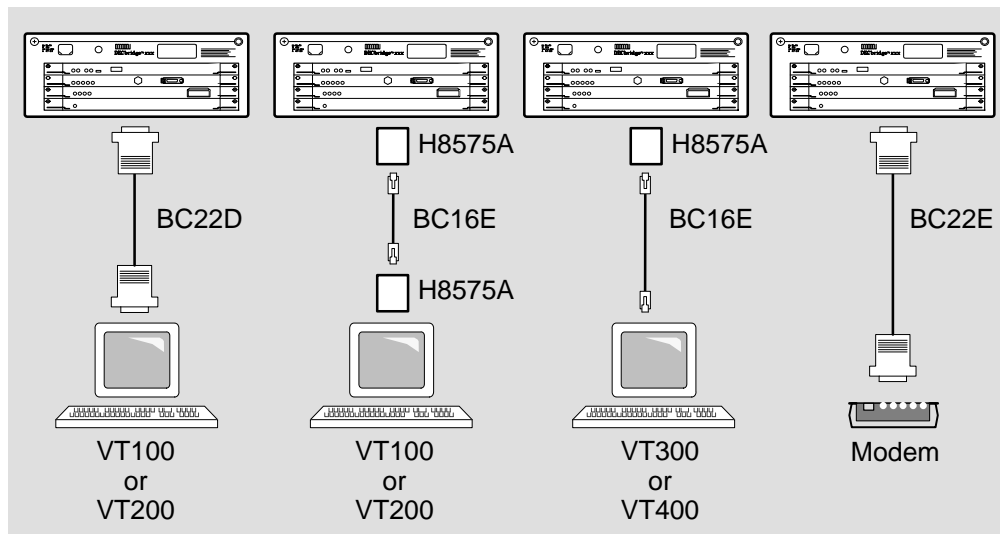
LKG-7314-92I

3.5.1 Connecting the OBM Cable Directly to a Terminal

To connect the OBM cable directly to a terminal, perform the following steps:

1. Connect one end of the cable between the terminal and bridge to the 25-pin OBM connector on the AP3 module (see Figure 3–6). Secure the connector by tightening the screws on both sides of the connector.

2. Connect the other end of the cable to the terminal.

Figure 3–6:   Connecting the OBM Cable

OBM
connector
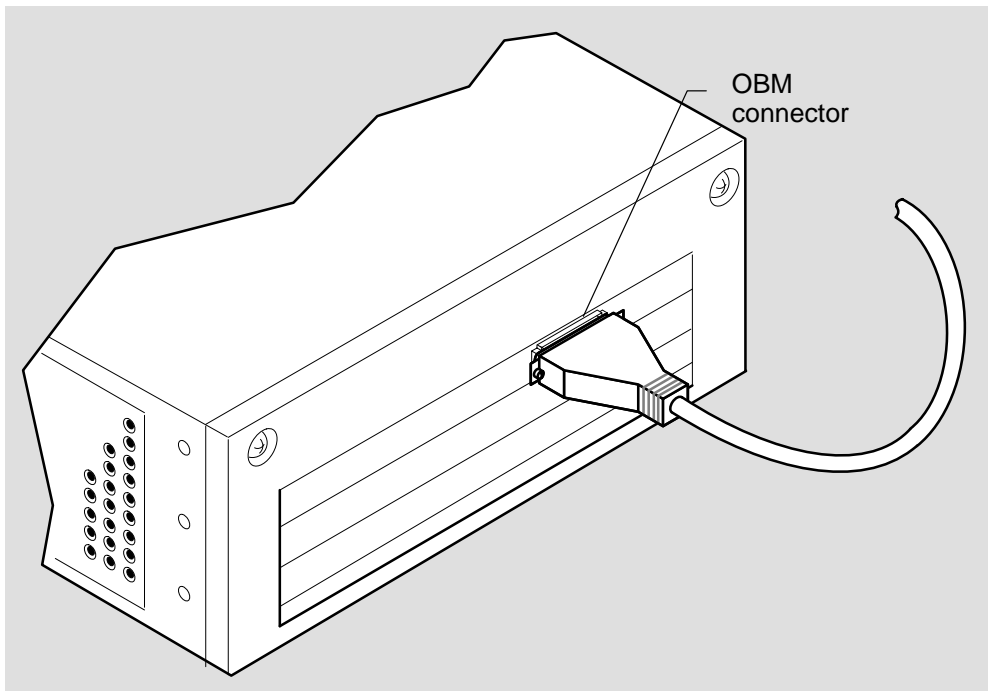
LKG-7409-92I

3.5.2 Connecting the OBM Cable Through a Modem to a Terminal

To connect the OBM cable through a modem to a terminal, perform the following steps:

1. Connect the cable between the modem and bridge to the 25-pin OBM connector on the AP3 module (see Figure 3–6). Secure the connector to the port by tightening the screws on both sides of the connector.

2. Connect the other end of the cable to the modem.

3. Ensure that the remote modem is connected to the terminal.

4. Ensure that both modems are connected to the telephone network.

All cables to the DECbridge unit, except the ac power cord, are now installed. Proceed to Section 3.6 to install the power cord and verify unit operation.

3.6 Verifying Bridge Operation

Verifying the bridge operation after installation or upgrade consists of powering up the bridge and observing the LED indicators. If the LEDs indicate a normal condition, your unit is working properly. If the LEDs indicate a problem, refer to the problem-solving procedures in Chapter 5.

All communications cables should now be installed. If not, refer to the appropriate cable installation instructions (for your configuration) in this chapter.

NOTE

> The DECbridge 500/600 Series units do not have a power ON/OFF switch. When the power cord is plugged in, power is applied directly to the bridge.

3.6.1 Powering Up

When the power cord is first plugged in, all of the bridge LED indicators light for a 2-second lamp check. The bridge then performs internal self-test to verify that the unit is operating properly. The indicator LEDs turn on and off during this testing, according to the internal testing sequence.

Be prepared to observe the LEDs on the I/O panel when plugging in the power cord to ensure the unit is working properly.

To connect the bridge power cord, perform the following:

WARNING ⚠

> Be sure to connect the power cord to a grounded wall outlet.

1. Connect one end of the bridge power cord into the DECbridge unit ac power connector (see Figure 3–7).

2. Connect the other end of the power cord into the ac wall outlet.

3. Observe the indicator LEDs and, once testing is complete (about 1 minute), compare the LEDs to those shown in Figure 3–7. The following LED states should appear and indicate that the unit is working properly:

NOTE

Wait until testing is complete before viewing the LEDs.
FWD LEDs take longer to light than the other LEDs.

- No LEDs are lit RED. A red LED indicates an error condition.

- MODE on the AP3 module is ON (SOLID GREEN).

- DC_OK on the AP3 module is ON (SOLID GREEN).

- EXT_PWR on the NI or NI(3) module is ON (SOLID GREEN).

- FWD2 (also FWD3 and FWD4 if applicable) on the NI or NI(3) module is ON (solid green). If a port is in backup state, the LED remains OFF.

- AUI_SELECT on the NI module is ON (SOLID GREEN) for DECbridge 500 Series units if configuration switch 8 is selected to ON (AUI connection to network), or the LED is OFF if configuration switch 8 is selected to OFF (ThinWire connection to network). There is no AUI_SELECT LED for DECbridge 600 Series units (NI(3) module is installed).

- FWD1 on the SAS and DAS versions of the FI module is ON (SOLID GREEN). If the port is in backup state, the LED remains OFF.

- PHY (on FI module) for Port 1 on SAS versions of the bridge and PHY 1 for Port 1 (A) and PHY 2 for Port 1 (B) on DAS versions of the bridge blinks GREEN until fiber interface connection is made and then turns ON (SOLID GREEN).

- ACT2 (also ACT3 and ACT4 if applicable) on the NI or NI(3) module and ACT1 on the SAS and DAS versions of the FI module flash ON and OFF (YELLOW) as packets are transmitted and received.

- If the bridge is in a dual homing configuration, PHY1 blinks GREEN and RED.

If the LEDs do not match (another condition appears), refer to the troubleshooting procedures in Chapter 5.

Figure 3–7:   DECbridge Unit Indicator LEDs After Power Up
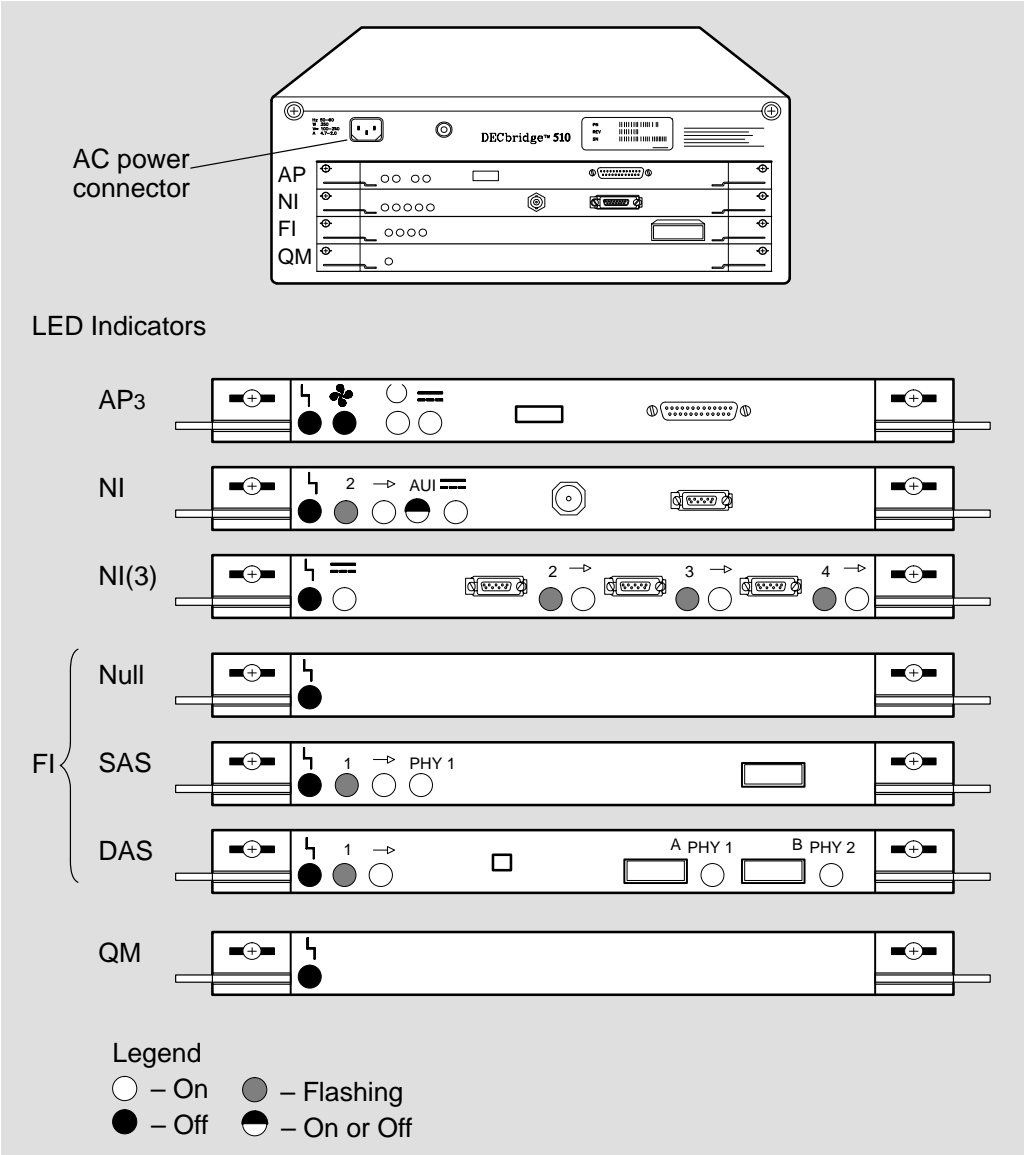
LKG-7331-92I

3.7 Checking the Logical Link

To check the logical link, connect a host station on one side of the bridge to a host station on the other side of the bridge. On a VMS host running DECnet, use the **SET HOST** command. On an ULTRIX/UNIX host, use the **rlogin** command. In a TCP/IP environment, ping a station on the other side of the bridge. On an MS-DOS, Windows NT, or OS/2 PC running Novell NetWare as a network client, use the **slist** command. If you have problems connecting, refer to Chapter 5 for additional information.

3.8 Final Procedures

Before leaving the site, perform the following:

1. Have the system/network manager record and save address information about the bridge (bridge location and bridge addresses). This information is helpful should a network problem occur.

2. Have the system/network manager record the current bridge parameters using your Network Management Software (NMS) and save them for future reference. When configuration switch 2 (Restore Default Parameters) is selected to ON, current bridge parameters are discarded and default bridge parameters are restored on power up. Refer to your network management software (NMS) manual for more information on retrieving current parameters from the bridge.

3. If you performed an upgrade of the AP module, remember to load previously saved parameters.

4. Dress the cables in a rackmount by using the guidelines supplied in the *DECconnect System Fiber Optic Installation* manual.

5. Verify that the site is clean. Remove or store all boxes and packaging materials.

6. Verify that all paperwork is completed.

Installation or upgrade of the DECbridge unit is now complete.

4

Using Local Console Management

This chapter describes Local Console Management (LCM) and shows how to access and display the LCM menu. It also explains how to use LCM to set attributes in the bridge, and how to change from the LCM interface to the Serial Line Internet Protocol (SLIP) interface to use network management software (NMS) for full bridge management. Any SNMP-compliant NMS which supports a SLIP connection can be used for full out-of-band management of the bridge.

4.1 Introduction

LCM is a terminal-based facility that allows limited management of the DECbridge 500/600 Series units. It requires no special management station or software. You can connect a terminal directly to the 25-pin OBM connector on the AP3 board or through a Scholar modem (or equivalent device). If your personal computer (PC) has terminal emulation, you can access LCM by connecting the PC directly to the OBM port.

NOTE

Using LCM is optional and is not necessary for the operation of the bridge.

You can also use the OBM port for full NMS bridge management. In this mode of operation, an SNMP network management system can communicate with the unit by using SLIP. This allows full management of the unit through a communication channel that is separate from the FDDI and NI data channels. To enter this mode of operation from LCM, use the SET SLIP MODE option on the LCM screen. Alternately, if LCM receives a SLIP packet (at the correct baud rate), the OBM port switches to SLIP MODE. Figure 4–1 shows the modes of operation and access methods for OBM.

Figure 4–1:   Access Methods for OBM
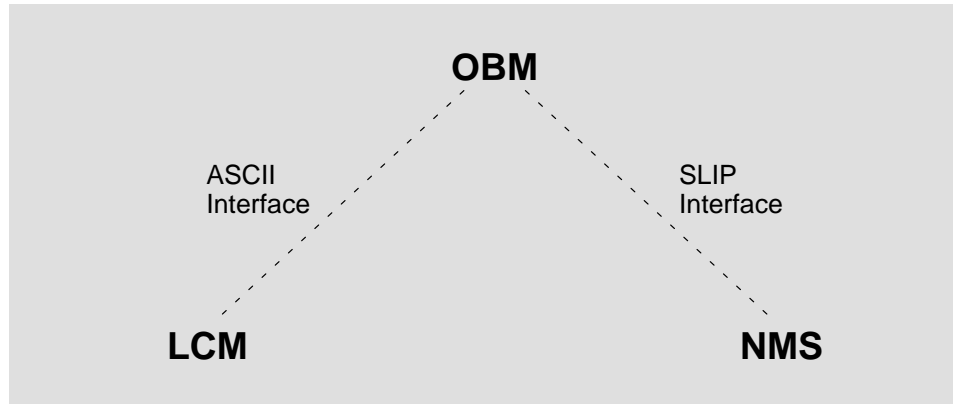
LKG-8041-93I

4.2 Accessing LCM

To access LCM, first connect a terminal to the bridge. Then, perform the following steps:

1. Set your terminal to a 9600-baud rate and 8 bits/no parity/1stop bit.

2. Ensure one end of the terminal or modem cable is connected to the 25-pin connector on the AP3 module.

3. Power up the bridge. After completing bridge self-test (about 1 minute), the terminal displays the LCM Menu (see Example 4–1). If the screen does not display the LCM menu, press ⎡ RET ⎤ .

Example 4–1:   Displaying the LCM Screen

```
                       DECbridge 500 Series        V1.3
                         Local Console Management


IP Address:          16.21.16.128          Default Gateway Address:  16.21.16.227


Trap Address Table: 16.21.16.200          0.0.0.0
                    16.21.16.225          0.0.0.0
                    0.0.0.0               0.0.0.0
                    0.0.0.0               0.0.0.0

Seconds Operating: 215                     Number of Resets:   14


FDDI Frame Count:  65237176
FDDI Error Count:  0
FDDI Ring Inits:   1


Set SLIP mode:     off
Current Baud Rate: 9600
Power-up Baud Rate: 9600
                        CTRL-R To Refresh Screen
 >IP Address: Enter new value or 0 to delete
```

4.2.1   Attributes Displayed When Using LCM

The LCM screen displays attributes and system messages. When you power up the bridge for the first time, the IP Address field, the Default Gateway Address field , and the Trap Address Table display all zeros. After you set the values, the screen displays set values when you recycle power. Refer to Section 4.4 for information on setting attribute values.

The screen displays the following attributes:

*   IP Address — The bridge's Internet Protocol address.

*   Default Gateway Address — The Internet address of the default IP gateway for the bridge.

- Trap Address Table — Displays the addresses to which the bridge sends SNMP traps. It displays up to eight trap addresses. When you enter a value into one of the eight fields, the screen displays the value in the first available field that contains a zero value.

- Seconds Operating — Number of seconds since the bridge was reset (read only).

- Number of Resets — Number of times the device has reset due to one or more of the following conditions (read only):

  – Power up

  – Internal reset due to an error condition

  – Command from network management

- FDDI Frame Count — Total number of FDDI frames received on the line, including those frames that were stripped from the ring and those that were merely repeated (read only).

- FDDI Error Count — Number of error frames detected by the line; that is, the number of times the FDDI MAC entity changed the E (error detected) field in a frame from R to S (set). This total does not include error frames that were previously detected by other stations on the ring (read only).

- FDDI Ring Initializations — The number of times the FDDI MAC entity attempted to connect to the logical ring (read only).

- Set SLIP MODE — Allows you to change from LCM to SLIP MODE to use NMS.

NOTE

Once you set SLIP MODE, you can return to LCM only by resetting the bridge through management or powering the bridge down and bringing it up again.

- Current Baud Rate — Allows you to set the currently active baud rate of the serial port. If you change this parameter, you must also change the terminal baud rate.

- Initial Baud Rate — Allows you to set the initial baud rate of the serial port when it is powered up or reset.

4.3 Messages Displayed

The following messages are displayed:

- $\boxed{\text{CTRL/R}}$ to Refresh Screen – Special key definition that allows you to re-fresh the screen. Pressing $\boxed{\text{CTRL/W}}$ also refreshes the screen.

- System messages appear at the bottom of the screen.

4.4 Setting the Attribute Values

When you power up the DECbridge 500/600 Series unit, the cursor appears in the Internet Protocol (IP) Address field. To change the attributes on the LCM screen, perform the following steps:

1. Move the cursor to the desired attribute field:

    – To move to the next field, press the down arrow key or the right arrow key on the keypad or press $\boxed{\text{RET}}$.

    – To move to the previous field, press the up arrow key or the left arrow key on the keypad.

2. Enter the data. If you enter incorrect data, press $\boxed{\text{DEL}}$ to erase it.

3. When the data in the field is correct, press $\boxed{\text{RET}}$. The screen displays the new data in the field (and updates NVRAM). If you enter invalid data, an error message appears at the bottom of the screen.

When you move the cursor through the attribute fields, it skips read-only fields. These fields automatically update every five seconds.

4.5 Switching from LCM to SLIP MODE

When you select SET SLIP MODE, the screen prompts you to ensure that you want to switch to this mode. Once you switch to SLIP MODE, you can return to LCM only by recycling bridge power or resetting the bridge through management.

To switch to SLIP MODE, perform the following steps:

1. Move the cursor to the SET SLIP MODE option on the screen. The field displays OFF.

2. Type ON, and press $\boxed{\text{RET}}$. The screen prompts you, ''Are you sure you want to switch to SLIP?''

3. Enter Y on the keyboard.

4. Disconnect the cable from the terminal to the bridge.

5. Connect the cable from the network management station to the bridge.

NOTE

If a SLIP packet arrives at the OBM port (in LCM mode), it automatically switches to SLIP MODE. Some packets may be lost in the switchover. Baud rates must be the same value for SLIP MODE and LCM.

5

Solving Problems

This chapter helps identify and correct problems you may have installing or upgrading the DECbridge 500/600 Series unit. The troubleshooting procedures provided are for diagnosing and correcting hardware-related problems only. After diagnosing and correcting a problem, return to Chapter 3 to verify that the unit is operating properly.

NOTE

Notify the system/network manager if the troubleshooting procedures indicate a problem related to the software or if the basic troubleshooting procedures do not correct the problem.

NOTE

You must use DECbridge firmware version 1.3 or higher when an AP3 module is installed in your bridge.

5.1 Basic Troubleshooting

The bridge LEDs show the status of the unit and help diagnose problems. After powering up and allowing time for the bridge to perform diagnostic testing, the LEDs indicate whether the unit is functioning properly.

When the self-test diagnostics detect a failure in the bridge (or you suspect a failure), rerun self-test to verify that the failure can be repeated. You can run self-test locally by unplugging the ac power cord and plugging it back in (recycles power and starts self-test).

5.1.1 Determining Symptoms and Following Corrective Actions

After determining the symptom of a problem, find the symptom listed in Table 5–1 and follow the steps for corrective action. After taking corrective actions, return to Chapter 3 and verify proper bridge operation.   If the problem is still not resolved, refer to the *DECbridge 500/600 Series Problem Solving* manual for additional help. If the problem exists after further troubleshooting, call your Digital Services representative.

Table 5–1:   LED Indicator Symptoms and Corrective Actions

Symptoms	Corrective Action
General	
All LEDs off.	Verify that the ac power cord is plugged in correctly at the ac connector on the bridge and the ac wall outlet.
	Verify that the ac wall outlet is working properly and is of the correct voltage.
	Determine whether the bridge's circuit breaker has tripped. If it has, press in the white center portion of the breaker to reset it. If the circuit breaker trips more than once, notify the system/ network manager.
	Check that the bridge's configuration switches are set correctly. Refer to Appendix B for switch descriptions.
	Ensure that the fans are running. If they are not, an overtemperature condition may have induced a logic module failure or a power-supply problem.
	Make sure all modules are installed properly, all ejectors secured, and all screws tightened.
	Consider possible environmental problems such as power fluctuations, high ambient temperature, interference from other equipment, and so on.

Table 5–1 (Cont.): LED Indicator Symptoms and Corrective Actions

Symptoms	Corrective Action
All LEDs remain on.	Verify that all modules are installed properly into the backplane connectors. Retry power-up procedures.
All FRU_BAD LEDs are blinking.	Improper upgrade of modules. Contact Digital Services for information on upgrades.
A logical link cannot be created.	Verify that all cables are installed and connected properly. Check switch settings. Verify that the node at the other end of the link is working.
AP Module LEDs	
AP BAD remains on.	Self-test failed. Retry bridge self-test. Incompatible firmware loaded. Call Digital Services to replace the AP3 module.
AP BAD blinking.	Incompatible firmware loaded. Call the system/network manager. Do not load the AP3 module with a previous version of firmware lower than Version 1.3. Call Digital Services to upgrade the incompatible module.
NI Module LEDs	
NI BAD remains on.	Self-test failed. Retry bridge self-test. Call Digital Services to replace the NI module.
FWD2 blinking.	Port 2 (AUI/ThinWire) in broken state. Check cable connections. If cable connections are not the problem, perform the loopback test in this chapter.
EXT PWR OK remains off.	Transceiver power failure. Check cable connections. Check cables for possible faulty wiring (shorts).

Table 5–1 (Cont.): LED Indicator Symptoms and Corrective Actions

Symptoms	Corrective Action
NI BAD blinking.	Incompatible firmware loaded. Call the system/network manager.
	Do not load the AP3 module with a previous version of firmware lower than Version 1.3. Call Digital Services to upgrade the incompatible module.

NI(3) Module LEDs

Symptoms	Corrective Action
NI BAD remains on.	Self-test failed. Retry bridge self-test. Call Digital Services to replace the module.
FWD2 blinking.	Port 2 (AUI) in broken state. Check cable connections. If cable connections are not the problem, perform the loopback test in this chapter.
FWD3 blinking.	Port 3 (AUI) in broken state. Check cable connections. If cable connections are not the problem, perform the loopback test in this chapter.
FWD4 blinking.	Port 4 (AUI) in broken state. Check cable connections. If cable connections are not the problem, perform the loopback test in this chapter.
EXT PWR OK remains off.	Transceiver power failure. Check cable connections. Check cables for possible faulty wiring (shorts).
NI BAD blinking.	Incompatible firmware loaded. Call Digital Services to upgrade the incompatible module.

Table 5–1 (Cont.): LED Indicator Symptoms and Corrective Actions

Symptoms	Corrective Action
SAS FI Module LEDs	
FI BAD remains on.	Self-test failed. Retry bridge self-test. Call Digital Services to replace the module.
FI BAD blinking.	Incompatible firmware loaded. Call the system/network manager.
	Do not load the AP3 module with a previous version of firmware lower than Version 1.3. Call Digital Services to upgrade the incompatible module.
FWD1 blinking.	Port 1 (FDDI) in broken state. Check all cable connections. If cable connections are not the problem, perform the loopback test in this chapter.
PHY 1 blinking (red).	Illegal topology. Check the configuraton setup and verify proper connections and cabling. Also notify the system manager.
PHY 1 ON (red) (and FI BAD LED on).	Port broken. Perform the loopback test in this chapter.
	If connection is OK with loopback test, check for cable problems at FDDI port or at other end of cable.
PHY 1 ON (red) (and FI BAD LED off).	Port failed Line Confidence Test. Perform the loopback test in this chapter.

Table 5–1 (Cont.): LED Indicator Symptoms and Corrective Actions

Symptoms	Corrective Action
DAS FI Module LEDs	
FI BAD remains on.	Self-test failed. Retry bridge self-test. Call Digital Services to replace the module.
FI BAD blinking.	Incompatible firmware loaded. Call the system/network manager.
	Do not load the AP3 module with a previous version of firmware less than Version 1.3. Call Digital Services to upgrade the incompatible module.
FWD1 blinking.	Port 1 (FDDI) in broken state. Check all cable connections. If cable connections are not the problem, perform the loopback test in this chapter.
PHY 1 blinking (red).	Illegal topology. Check the configuraton setup and verify proper connections and cabling. Also notify the system manager.
	Check that the loopback connector is removed and the FDDI cable is installed properly.
PHY 1 blinking (red/green).	Port is in standby mode as part of a dual-homed configuration. No corrective action is required.
	Check that the loopback connector is removed and the FDDI cable is installed properly.
PHY 1 on (red) (and FI BAD on).	Port broken. Perform the loopback test in this chapter.
	If connection is OK with loopback test, check for cable problems at FDDI port or at other end of cable.
PHY 1 on (red) (and FI BAD off).	Port failed Line Confidence Test. Perform the loopback test in this chapter.

Table 5–1 (Cont.): LED Indicator Symptoms and Corrective Actions

Symptoms	Corrective Action
PHY 2 blinking (red).	Illegal topology. Check the configuraton setup and verify proper connections and cabling. Also notify the system manager.
	Check that the loopback connector is removed and the FDDI cable is installed properly.
PHY 2 ON (red) (and FI BAD on).	Port broken. Perform the loopback test in this chapter.
	If connection is OK with loopback test, check for cable problems at FDDI port or at other end of cable.
PHY 2 ON (red) (and FI BAD off).	Port failed Line Confidence Test. Perform the loopback test in this chapter.
Null FI Module LEDs	
FI BAD remains on.	Self-test failed. Retry bridge self-test. Call Digital Services to replace the module.
FI BAD blinking.	Incompatible firmware loaded. Call the system/network manager.
	Do not load the AP3 module with a previous version of firmware less than Version 1.3. Call Digital Services to upgrade the incompatible module.
QM Module LEDs	
QM BAD remains on.	Self-test failed. Retry bridge self-test. Call Digital Services to replace the module.
QM BAD blinking.	Incompatible firmware loaded. Call the system/network manager.
	Do not load the AP3 module with a previous version of firmware less than Version 1.3. Call Digital Services to upgrade the incompatible module.

5.1.2 Port Loopback Testing

If diagnostic results indicate a port interface problem, perform a loopback test on that interface to determine if the fault is in the bridge, in the interface cable, or in the device connected to the bridge.

When the Manufacturing Mode switch (configuration switch 1) and the Enable External Loopback switch (configuration switch 7) are both ON , the self-test diagnostics test both the FI module (SAS and DAS versions) and NI or NI(3) module ports (providing the loopback connectors are installed).   The diagnostics test the optical bypass relay driver but not the bypass switch.

WARNING⚠

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

If the FI module port fails self-test, the FI_BAD indicator turns on. If the NI or NI(3) module ports fail self-test, the NI_BAD indicator turns on.

5.1.2.1 Installing the Loopback Connectors

When performing port loopback testing, always place loopback connectors on both the FI module (Port 1) and NI module (Port 2) ports.

Perform loopback testing of the FI module port (SAS and DAS, multimode and single-mode) by using a simple fiber loop housed in an FDDI connector for multimode connectors or using a single-mode attenuated loopback for a single-mode connector. These loopback connectors route the output of the fiber optic transmitter in that port back into the fiber optic receiver.

External loopback testing of the NI port for DECbridge 500 Series units checks both the AUI and ThinWire interfaces but reports only the results of interface selected by the AUI/ThinWire switch (configuration switch 8). A detected failure in the selected interface lights the NI_BAD indicator. External loopback testing of the NI(3) ports for DECbridge 600 Series units checks the AUI interfaces. There is no ThinWire port and switch 8 has no effect on the results reported.

To install the loopback connectors on NI and FI ports and prepare the unit for loopback testing, perform the following four steps:

1. Remove power to the bridge by disconnecting the power cord from the ac outlet.

2. Ensure the Manufacturing Mode switch (configuration switch 1) is OFF (up) and the Enable External Loopback switch (switch 7) to the ON (down) position.

3. Remove the FDDI port cable(s) from the FI module and install the following loopback connector(s), as shown in Figure 5–1:

   – For FDDI multimode connector(s), install the multimode loopback connector (P/N 12–32005–01).

   – For FDDI single-mode connector(s), install the single-mode attenuated loopback connector(s) (P/N 12–34830–01).

   NOTE

   If a loopback connector is not installed or there is no 802.3/Ethernet network connection and the Enable External Loopback switch is ON, self-test fails.

4. Remove the AUI or ThinWire interface cable(s) from the NI or NI(3) module and install the following loopback connector(s), as shown in Figure 5–2:

   – For NI ThinWire connectors, install the T-connector (PN12-25869-01) and two terminators (P/N 12-26318-01) on the ThinWire port.

   – For NI or NI(3) AUI connector(s), install the AUI loopback connector(s) (P/N 12–22196–01).

   NOTE

   For DECbridge 500 Series models, make sure the AUI/ ThinWire switch (configuration switch 8) is in the correct position: ON (down) for testing the AUI interface and OFF (up) for testing the ThinWire interface.

Figure 5–1: Installing the FDDI Loopback Connectors

Single-mode attenuated loopback connector

Multimode loopback connector
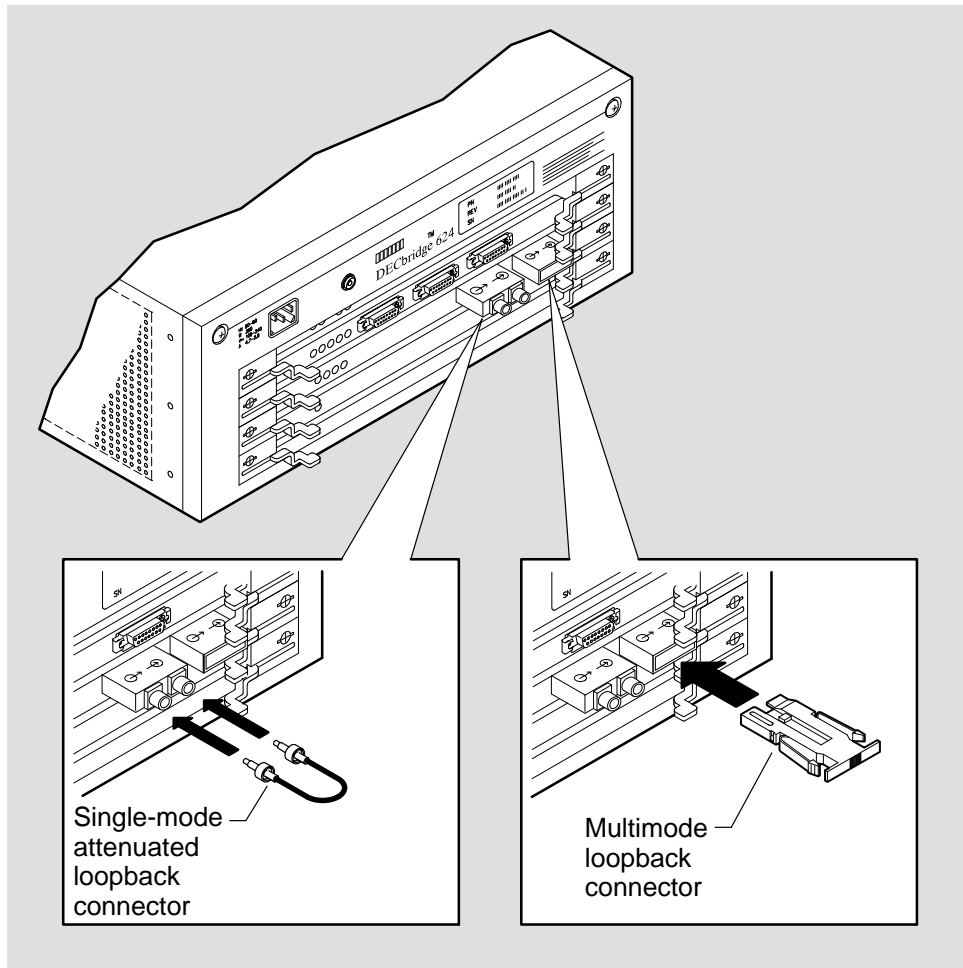
LKG-4867-93I

Figure 5–2:   Installing the NI Loopback Connectors

Push slide latch firmly in place to lock connector in place.

Tabs

Slots
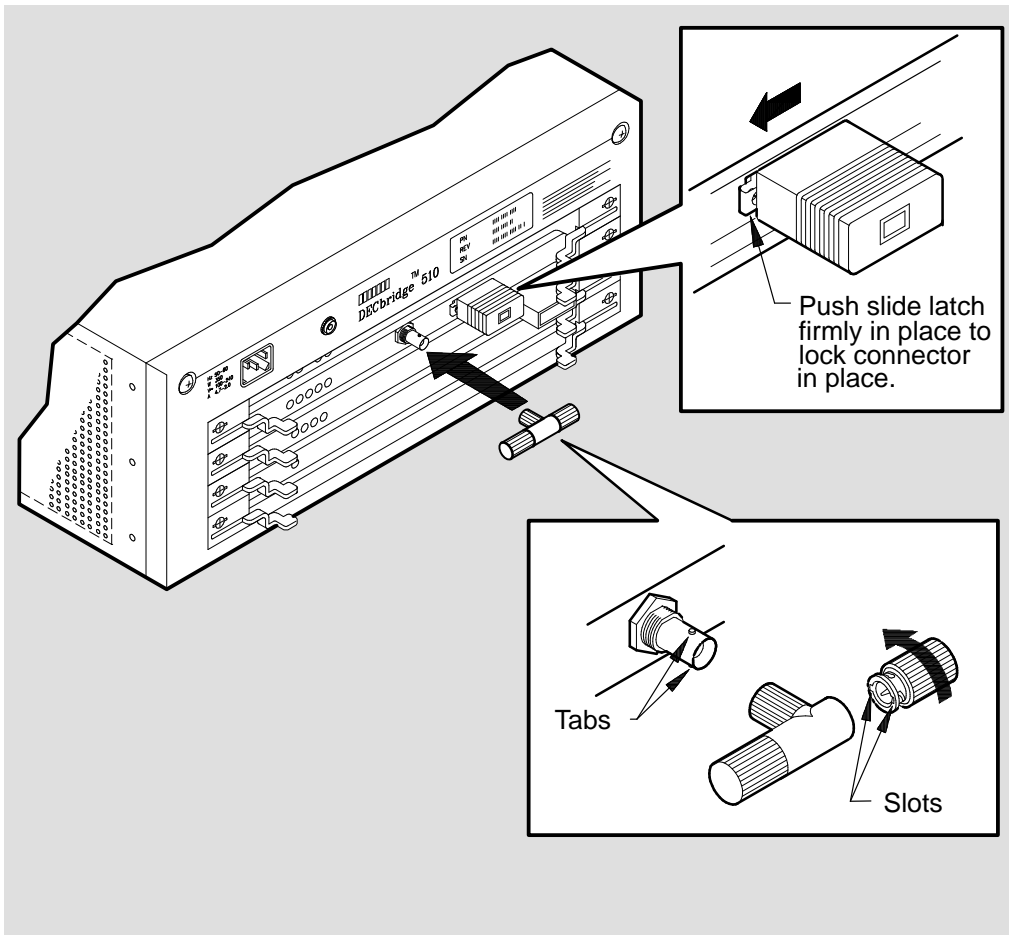
LKG-4868-91I

5.1.2.2 Running the Loopback Test and Observing the Results

To run the loopback test and observe results, perform the following three steps:

1. Reconnect the power cord to the ac outlet.

2. Observe the LED indicators on the FI module after the self-test diagnostic is complete (about 30 seconds) and loopback testing starts.

   – If the FDDI port fault does not light, the problem is probably external to the bridge. Check the interface cable and the device connected to the other end of the cable.

   – If the FDDI port fault indication (FI_BAD) still exists (SOLID RED) and the AP_BAD LED is flashing, the problem is in the bridge. It may indicate the FI module is bad. Verify that the FI module is properly installed. If the module is installed properly, refer to the *DECbridge 500/600 Series Problem Solving* manual for more information on troubleshooting.

3. Observe the NI_BAD indicator on the NI or NI(3) module.

   – If the NI_BAD indicator turns off, the problem is external to the bridge. Check the interface cable and the device connected to the other end of the cable.

   – If the NI_BAD indicator lights (the NI_BAD LED on the NI module flashes; the NI_BAD LED on the NI(3) module is SOLID RED) and the AP_BAD LED is flashing, the problem is in the bridge. It may indicate the NI module is bad. Verify that the NI or NI(3) module is properly installed before consulting the *DECbridge 500/600 Series Problem Solving* manual for more information on troubleshooting.

5.1.2.3 Returning to Normal Operation

When you have completed loopback testing of the ports, perform the following five steps to return the bridge to normal operation:

1. Disconnect the power cord from the ac outlet.

2. Set the Enable External Loopback switch (switch 7) to the OFF (up) position.

3. Remove the NI loopback connector(s) and reconnect the NI interface cable(s). Refer to Chapter 3 if necessary.

4. Remove the FDDI loopback connector(s) and reconnect the FDDI interface cable(s). Refer to Chapter 3 if necessary.

5. Reconnect the power cord to the ac outlet to resume normal operation.

A

DECbridge 500/600 Series Models

The models for the DECbridge 500/600 Series of bridges are listed in Table A–1.
The table includes a description of the modules and interface for each model. Note
that the U.S./Canada versions (for example, DEFEB-AC) are the only versions that
ship with a power cord included. The versions for other countries (for example, DE-
FEB-AD) require a separate power cord kit designed for specific country installa-
tions. These power cord kits are ordered separately. Table A–2 lists the power cord
kits.

Table A–1:   DECbridge 500/600 Series Models

Model Number	Part Number*	Description and Modules
DECbridge 500	DEFEB-AA/AB	Single Attachment Station unit with AP module, NI1 module, FI module with multimode optics, and QM module
DECbridge 500 Series		
DECbridge 510	DEFEB-AC/AD	Single Attachment Station unit with AP3 module, NI1 module, FI module with multimode optics, and QM module
DECbridge 518	DEFEB-AS/AT	Single Attachment Station unit with AP3 module, NI1 module, FI module with single-mode optics, and QM module
DECbridge 520	DEFEB-DA/DB	Dual Attachment Station unit with AP3 module, NI1 module, FI module with multimode optics and control for optical bypass relay, and QM module
DECbridge 524	DEFEB-DM/DN	Dual Attachment Station unit with AP3 module, NI1 module, FI module with single-mode (Port 1 A)/ multimode optics (Port 1 B), and QM module
DECbridge 526	DEFEB-DP/DQ	Dual Attachment Station unit with AP3 module, NI1 module, FI module with multimode (Port 1 A)/single-mode optics (Port 1 B), and QM module
DECbridge 528	DEFEB-DS/DT	Dual Attachment Station unit with AP3 module, NI1 module, FI module with single-mode optics, and QM module

Table A–1 (Cont): DECbridge 500/600 Series Models

Model Number	Part Number*	Description and Modules
DECbridge 600 Series		
DECbridge 600	DEFEB-UA/UB	Multiport Ethernet bridge with AP3 module, NI(3) module, Null FI module (no FI port), and QM module
DECbridge 610	DEFEB-TA/TB	Single Attachment Station unit with AP3 module, NI(3) module, FI module with multimode optics, and QM module
DECbridge 618	DEFEB-TS/TT	Single Attachment Station unit with AP3 module, NI(3) module, FI module with single-mode optics, and QM module
DECbridge 620	DEFEB-LA/LB	Dual Attachment Station unit with AP3 module, NI(3) module, FI module with multimode optics and control for optical bypass relay, and QM module
DECbridge 624	DEFEB-LM/LN	Dual Attachment Station unit with AP3 module, NI(3) module, FI module with single-mode (Port 1 A)/multimode optics (Port B), and QM module
DECbridge 626	DEFEB-LP/LQ	Dual Attachment Station unit with AP3 module, NI(3) module, FI module with multimode (Port 1 A)/single-mode optics (Port 1 B), and QM module
DECbridge 628	DEFEB-LS/LT	Dual Attachment Station unit with AP3 module, NI(3) module, FI module with single-mode optics, and QM module

*Part numbers indicate U.S./Canada model designations followed by the designations for other countries (for example, DEFEB-AC is designated for U.S./Canada and DEFEB-AD is designated for all other countries).

A.1 DECbridge Modules

The DECbridge units contain four modules that control the functions of the bridge: the AP module, NI module, FI module, and QM module.

The AP module (versions AP, AP2, and AP3) controls the transmission and reception of the IEEE 802.3/Ethernet packet flow, and coordinates various bridge-management tasks such as the spanning tree process.

The NI module provides the interface to the IEEE 802.3/Ethernet network. An NI module in the DECbridge 500/600 Series can have one or three AUI connectors, depending on the model. With three AUI connectors, there is no ThinWire connector.

The FI module provides a SAS or DAS connection to the FDDI network. The DAS connection is multimode, single-mode, or both. The DAS multimode version of the FI module also provides control for an optical bypass relay. The optical bypass relay helps maintain FDDI ring integrity if a bridge within the FDDI ring breaks down or is powered down. The bypass, if used, is automatically activated on a broken bridge within an FDDI ring, continuing communication.

The QM module services packets received from and transmitted to an FDDI network.

The four module locations on the bridge are shown in Figure A–1. The module slots are labeled to help identify modules.
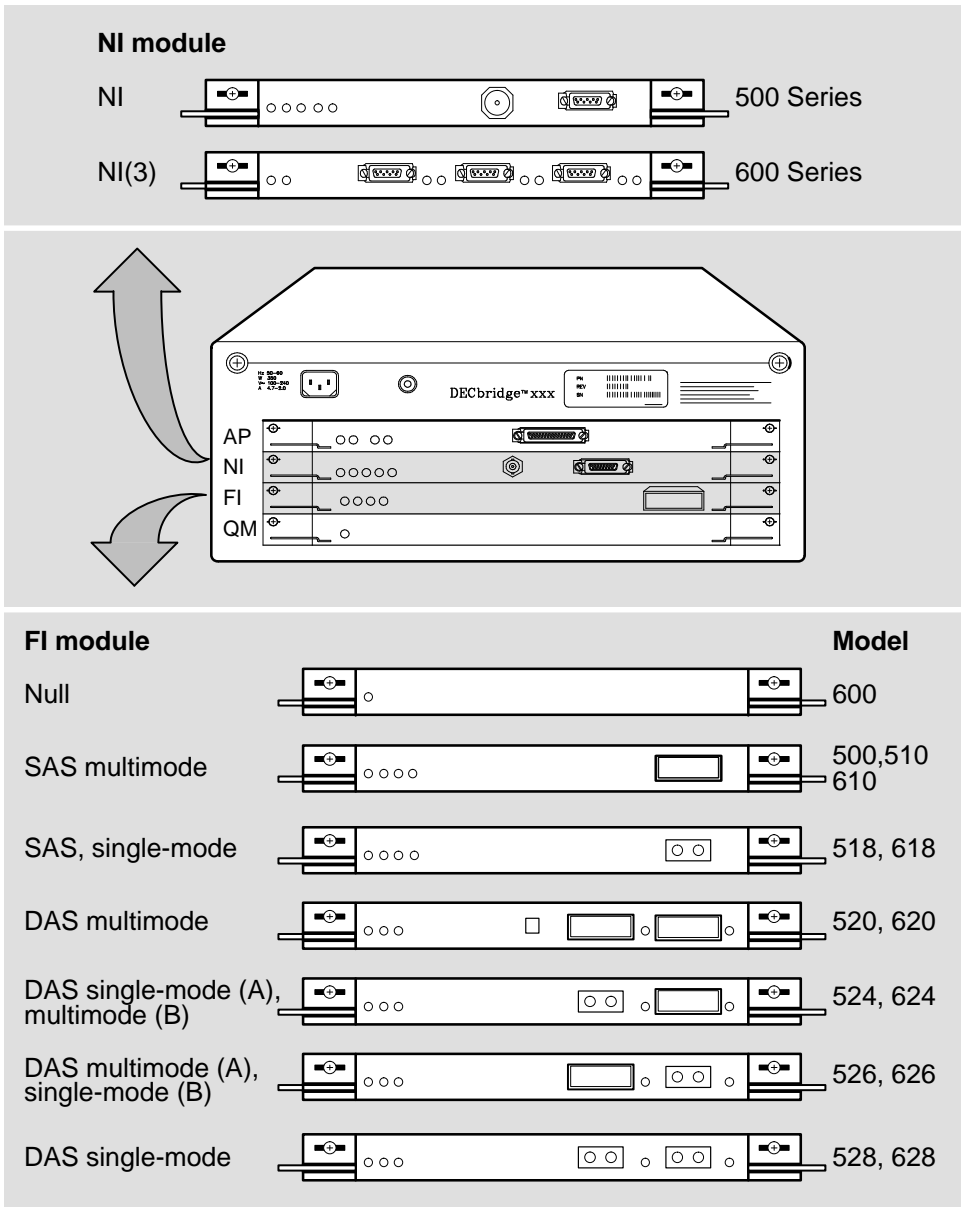
NOTE

The DECbridge 500 uses an AP module; all other models in the DECbridge 500/600 Series use an AP2 or AP3 module.

NOTE

You need bridge firmware version 1.3 or higher when using an AP3 module.

Figure A–1:   DECbridge 500/600 Series Modules

LKG-4855-93I

Table A–2: Power Cord Kits

Order Code	Country
BN20A-2E*	United States, Canada
BN20B-2E	Japan
BN20C-2E	Australia, New Zealand
BN20D-2E	Belgium, Finland, France, Germany, Holland, Norway, Spain, Sweden
BN20E-2E	United Kingdom, Ireland
BN20F-2E	Switzerland
BN20H-2E	Denmark
BN20J-2E	Italy
BN20K-2E	India, South Africa
BN20L-2E	Israel

*This kit ships with U.S./Canada models only. Power cord kits for units shipped to other countries are required for installation and must be ordered separately.

B

Switches and Indicators

The switches and indicators for the DECbridge 500/600 Series of bridges are located on the I/O panel of the bridge. Figure B–1 shows the switches and indicator LEDs on a bridge. Section B.1 and Section B.2 describe the switches and indicators and their functions.

B.1 Configuration Switches

The eight configuration DIP switches on the DECbridge 500/600 Series unit are located on the AP3 module (see Figure B–1). Switch 1 is the leftmost switch (as you face the I/O panel). These switches are set during installation of the bridge and control several settable functions of the bridge.

Figure B–1:   Configuration Switches and LED Indicators
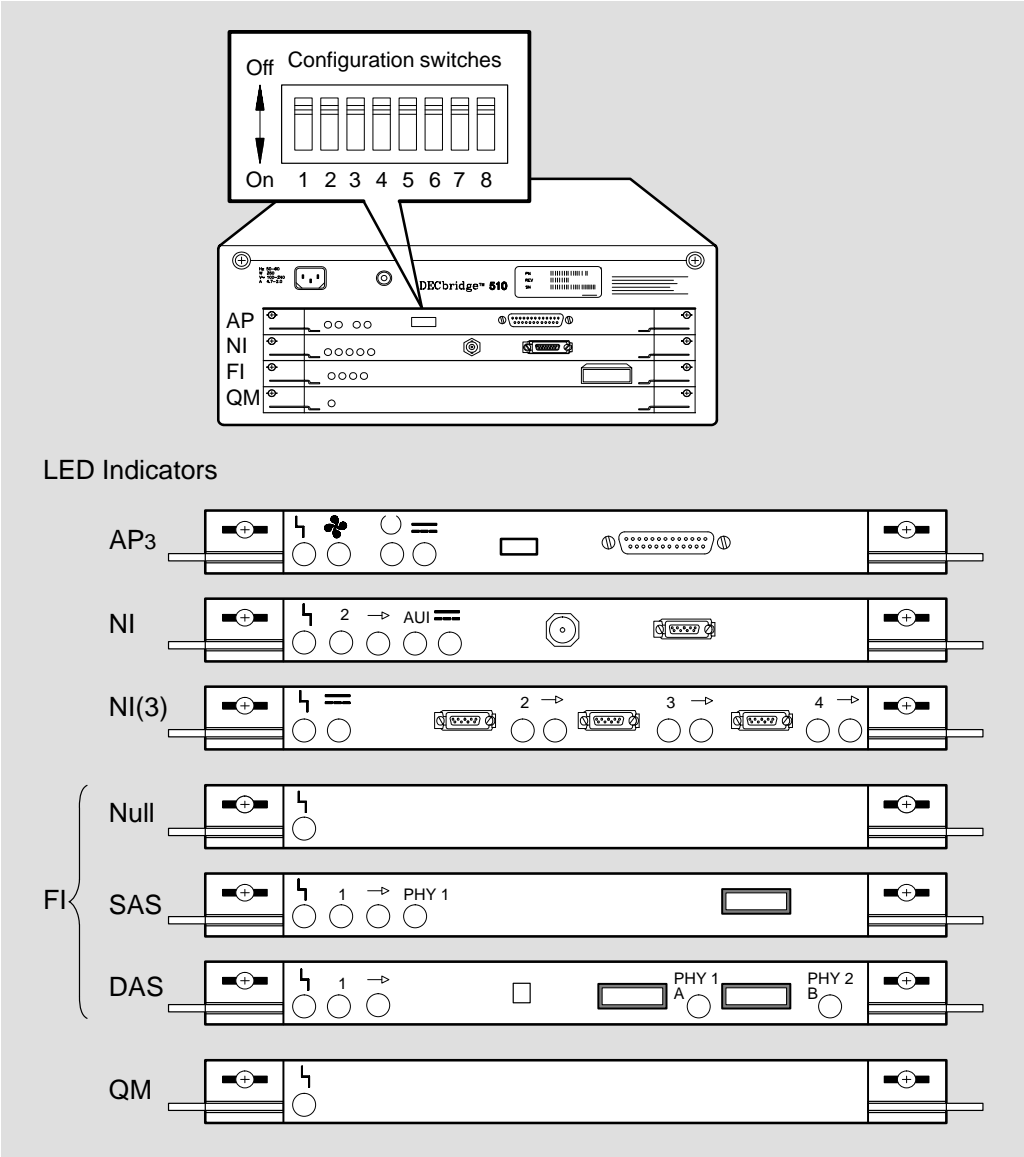
LKG-7324-92I

The configuration switches for the bridge (listed in Table B–1) have the following functions:

- **Manufacturing mode switch (Switch 1)** — This switch should always be in the OFF (up) position for normal operating mode. Manufacturing mode is only for use in a manufacturing environment or repair station. The firmware reads this switch only during initialization.

- **Restore default parameters switch (Switch 2)** — This switch is normally in the OFF (up) position. Turning it ON resets all parameters defined by bridge management and replaces them with the default factory settings. The firmware reads this switch only during initialization; therefore, you must recycle power to the bridge whenever you change the switch setting or wish to load default settings.

- **Write access switch - Port 1 (Switch 3)** — When this switch is ON, network stations connected to Port 1 (the IEEE 802.3/Ethernet port) that have bridge management capabilities are allowed to read and write (modify) bridge-management parameters. When this switch is OFF, those stations are allowed to read but cannot write bridge management parameters. The firmware checks the state of this switch whenever a write access to the bridge is attempted through Port 1. On the DECbridge 500 unit, this switch controls access to Port 2.

- **Write access switch - Port 2 (Switch 4)** — Performs the same function as described for switch 3, but for Port 2 (FDDI port connectors A and B). On the DECbridge 500 unit, this switch controls access to Port 1.

- **Write access switch - Port 3 (Switch 5)** — The setting for this switch applies only when a three-port NI(3) module is installed. It performs the same function as described for switch 3 (Port 1), but for Port 3.

- **Write access switch - Port 4 (Switch 6)** — The setting for this switch applies only when a three-port NI(3) module is installed. It performs the same function as described for switch 3 (Port 1), but for Port 4.

- **External loopback enable switch (Switch 7)** — This switch should be OFF during normal bridge operation. Turning it ON allows the self-test diagnostics to perform external loopback tests on both Ports 1 and 2 (providing the external loopback connectors are in place). It also applies to Ports 3 and 4 when a three-port NI(3) module is installed. Since the firmware reads this switch only during initialization, you must recycle power to the bridge whenever you change the switch setting.

- **AUI/ThinWire switch (Switch 8)** — The settings for this switch apply when a one-port NI module is installed. They do not apply when a three-port NI(3) module is installed. When a one-port NI module is installed, this switch must be in the ON (down) position if Port 2 is connected to an AUI interface, or in the OFF (up) position if Port 2 is connected to a ThinWire interface. The firmware checks the state of this switch on a regular basis; therefore, changing this switch setting does not require recycling power to the bridge.

Table B–1:   Configuration Switches

Switch	Name	Factory Setting	ON (Down)	OFF (Up)
1	Manufacturing mode	OFF	Select manufacturing mode	Select normal operating mode
2	Restore default parameters	OFF	Restore default parameters on power up	Use current parameters
3	Write access (Port 1)[1]	OFF	Allow management write access on Port 1	No management write access on Port 1
4	Write access (Port 2)[1]	OFF	Allow management write access on Port 2	No management write access on Port 2
5	Write access (Port 3)[2]	OFF	Allow management write access on Port 3	No management write access on Port 3
6	Write access (Port 4)[2]	OFF	Allow management write access on Port 4	No management write access on Port 4
7	External loopback enable	OFF	Enable External Loopback Test	Normal operation
8	AUI/ThinWire[3]	OFF	Select AUI connection for Port 2	Select ThinWire connection for Port 2

[1] These switches are reversed on the DECbridge 500 unit. Switch 3 is for Port 2; Switch 4 is for Port 1. Also, Switches 5 and 6 are not used on the DECbridge 500 unit.

[2] Not applicable when one-port NI module installed.

[3] Not applicable when three-port NI(3) module installed.

B.2 Bridge LED Indicators

The DECbridge 500/600 Series LED indicators are visible from the outside of the unit. Table B–2 describes the LEDs for all DECbridge 500/600 Series modules. The LEDS are located on each module to indicate functions associated with each module. The LEDs have the following meanings:

- A Green LED indicates the presence of power and also shows port state.

- A Red LED indicates a fault.

- A Yellow LED indicates the presence of activity on the communication link.

When the DECbridge 500/600 Series is first powered on (ac power cord plugged in), all LEDs light momentarily for a lamp check. The bridge then performs testing and the LEDs are turned off and on according to the testing sequence.

Table B–2:   LED Indicators

LED	Symbol	Color	Normal	Description		
AP3 or AP Module:						
AP BAD	⌐	Red	Off	On	--	Self-test failed
				Off	--	Self-test passed
				Blink	--	Incompatible firmware loaded
FAN BAD	♣	Red	Off	On	--	Fan failure
				Off	--	Fan OK
MODE	○	Green	On	On	--	Bridge operational
				Off	--	Self-test in progress
				Blink	--	Downline load in progress
DC OK	---	Green	On	On	--	DC power OK
				Off	--	DC power failure
QM Module:						
QM BAD	⌐	Red	Off	On	--	Self-test failed
				Off	--	Self-test passed
				Blink	--	Incompatible firmware loaded

Table B–2 (Cont): LED Indicators

LED	Symbol	Color	Normal	Description		
NI or NI(3) Module:						
NI BAD	⌐	Red	Off	On	--	Self-test failed
				Off	--	Self-test passed
				Blink	--	Incompatible firmware loaded
ACTn (n= 2, 3, or 4)	n	Yellow	On/Off	On	--	NI port(n) carrier present
				Off	--	NI port(n) carrier not present
FWDn	→▷	Green	On	On	--	NI port(n) in forwarding state
				Blink	--	NI port(n) in broken state
				Off	--	NI port(n) not forwarding, not broken (in preforwarding or backup state)
AUI SELECT (**DECbridge 500 Series only**)	AUI	Green	On/Off	On	--	NI port AUI interface selected
				Off	--	NI port ThinWire interface selected
EXT PWR OK	---	Green	On	On	--	AUI transceiver power OK (In DECbridge 500 Series, not affected by AUI/ThinWire switch)
				Off	--	AUI transceiver power failure
FI Module: (Note: FI Null Module has only the FI BAD indicator)						
FI BAD	⌐	Red	Off	On	--	Self-test failed
				Off	--	Self-test passed
				Blink	--	Incompatible firmware loaded
ACT1	1	Yellow	On/Off	On	--	Valid traffic present
				Off	--	Not transmitting/receiving valid packets
FWD1	→▷	Green	On	On	--	FDDI port in forwarding state
				Blink	--	FDDI port in broken state
				Off	--	FDDI port not forwarding, not broken (in preforwarding or backup state)

Table B–2 (Cont): LED Indicators

LED	Symbol	Color	Normal	Description		
PHY 1 (A)	PHY 1	Green	On	On	--	PHY connection complete
		Green		Blink	--	PHY connection in progress
		Red		On	--	Broken port or Link Confidence Test (LCT) failure retry loop
		Red		Blink	--	Illegal topology
				Off	--	Port disabled via management
		Red/green		Blink	--	Standby mode for this port when in a dual-homing connection to a concentrator
PHY 2 (B) **(Only on DAS models)**	PHY 2	Green	On	On	--	PHY connection complete
		Green		Blink	--	PHY connection in progress
		Red		On	--	Broken port or Link Confidence Test (LCT) failure retry loop
		Red		Blink	--	Illegal topology
				Off	--	Port disabled via management

B.3 Circuit Breaker

The circuit breaker provides overcurrent protection for the bridge. If an overcurrent condition causes the circuit breaker to trip, the white center portion of the breaker pops out as a visual indication of the overcurrent condition. When this occurs, ac power is cut off from the bridge. Reset the circuit breaker by pushing in the white center portion of the breaker.

B.4 Port Addressing

The DECbridge 500/600 Series port addresses are listed on the AP3 module and are assigned as follows:

- Address 1 — FDDI (Port 1)

- Address 2 — Ethernet (Port 2, either connector on the NI module; left connector on the NI(3) module)

- Address 3 — Ethernet (Port 3, middle connector on the NI(3) module)

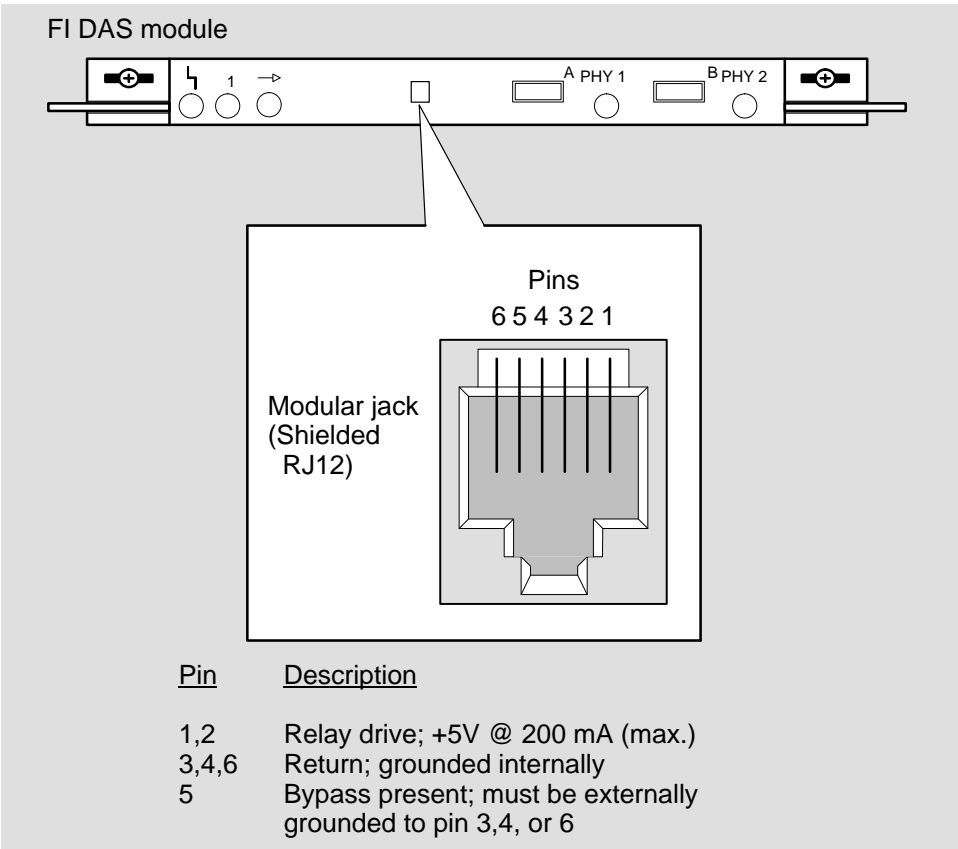- Address 4 — Ethernet (Port 4, right connector on the NI(3) module)

B.5 Optical Bypass Connector

The optical bypass relay feature on the bridge maintains FDDI dual ring integrity if the bridge breaks or is powered down. The optical bypass connector is available only on the DAS multimode version of the FI module. Figure B–2 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 cables into the optical bypass relay connector.

Figure B–2: Optical Bypass Control Signals

FI DAS module

Pins

6 5 4 3 2 1

Modular jack
(Shielded
 RJ12)

| Pin	Description
1,2	Relay drive; +5V @ 200 mA (max.)
3,4,6	Return; grounded internally
5	Bypass present; must be externally grounded to pin 3,4, or 6

LKG-5186-93I

B.6 FDDI Connector Keying

The connectors used on DECbridge 500/600 Series bridges 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 — that is, they are keyed and must be aligned properly. The three types of connectors used on the bridge are MIC A and MIC B for DAS versions of the bridge and MIC S for SAS versions of the bridge (see Figure B–3). Note that the DECbridge units connect to a MIC M type connector on the DECconcentrator 500.

Figure B–3: DECbridge 500/600 Series MIC Receptacle Keying
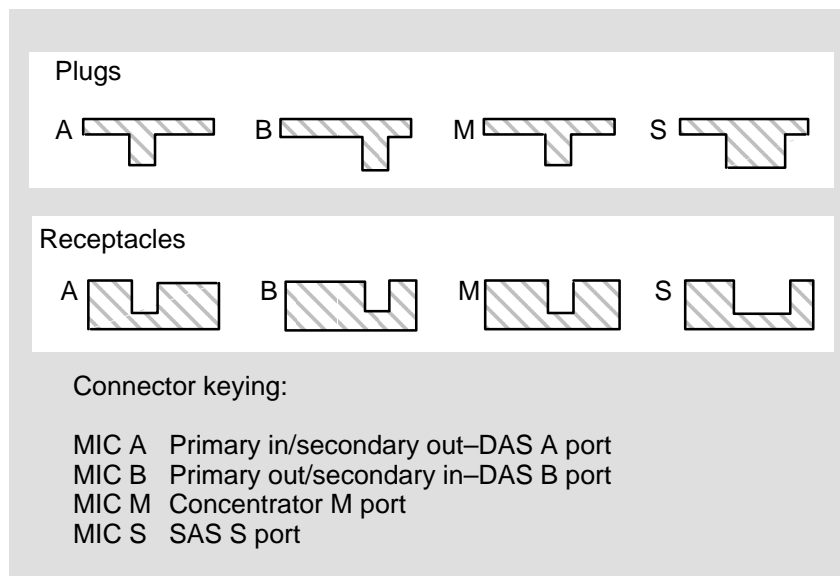
LKG-6859-92I

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 ($\ominus\!\!\rightarrow$) and receive ($\ominus$) icons.

B.7 FDDI Connection Rules

The FDDI connection rules are defined in Figure B–4. The table defines which port types (A, B, M, S) may be interconnected into legal topologies. In the figure, **This Node** is the reference point for all connection decisions.

Figure B–4: FDDI Connection Rules Matrix

		This Node			
	PHY port	A	B	M	S
Other Node	A	No	Rule 1	Yes	Yes
	B	Rule 2	No	Yes	Yes
	M	Rule 3	Yes Note 1	No	Yes
	S	Yes	Yes	Yes	Yes

Yes = Accepts this connection
No   = Does not accept this connection

LKG-4810-91I

Rule 1: PHY B of This Node accepts connection to PHY A of Other Node if:

- PHY A of This Node is not connected, or

- PHY A of This Node is connected to PHY B or PHY S of another node.

Rule 2: PHY A of This Node accepts connection to PHY B of Other Node if:

- PHY B of This Node is not connected, or

- PHY B of This Node is connected to PHY A or PHY S of another node.

- See Note 2.

Rule 3: PHY A of This Node accepts the connection to PHY M of Other Node if:

- PHY B of This Node is not connected, or

- PHY B of This Node is connected to PHY A or PHY S of another node.

- See Note 2.

Note 1: **Backup tree connection (dual homing)**

The connection of PHY B of This Node to PHY M of Other Node always takes precedence over the connection of PHY A of This Node to PHY M of another node.

A connection between PHY A of This Node and a PHY M or PHY B of another node is disabled when PHY B of This Node connects to PHY M of Other Node.

If the connection breaks between PHY B of This Node and PHY M of Other Node, the connection is reestablished between PHY A of This Node and PHY M of another node.

Note 2: **Tree connections are preferred over dual ring connections**

Tree connections are preferred over dual ring connections when only one of two connections can be accepted.

The connection of PHY A or B of This Node to PHY M of Other Node always takes precedence over the connection of the remaining PHY (A or B) of This Node to PHY A or PHY B of another node.

The connection is disabled between the remaining PHY (A or B) of This Node and PHY A or PHY B of another node when PHY A or PHY B of This Node connects to PHY M of Other Node.

C

Specifications

C.1 Specifications

Specifications for the DECbridge 500/600 Series of bridges are divided into the following categories and described in Table C-1 through Table C-5: physical, electrical, environmental, acoustic, and cable.

The DECbridge 500/600 Series is designed to operate in a satellite equipment room (SER), mounted on a table or desktop, or in a standard 48-centimeter (19-inch) rack.

CAUTION ⚠

The air inside a rack can be hotter than the ambient room temperature. Make sure the air entering the bridge does not exceed the maximum inlet temperature of 50° C $(122^{\circ}$ F).

Table C–1: Physical Specifications

Dimension	Value
Height	17.68 cm (6.96 in)
Width	44.20 cm (17.40 in)
Depth	36.53 cm (14.38 in)
Weight	14.51 kg (32 lbs)

Table C–2: Electrical Specifications

Parameter	Value
Voltage	88 to 264 Vac, single-phase, 3-wire
Frequency	47 Hz to 63 Hz
Input power	390 W (maximum)
Heat dissipation	1330 BTU/hr (maximum)
Amperage	3.9 at 100 V 1.7 at 240 V

Table C–3: Environmental Specifications

Parameter	Value
Operating Environment	
Temperature (at sea level)*	5° C to 50° C (41° F to 122° F)
Relative humidity	10% to 95% (non-condensing)
Wet-bulb temperature	32° C (90° F) maximum
Altitude	Sea level to 2.4 km (8000 ft)
Inlet air temperature	50° C (122° F) maximum
Nonoperating Environment	
Temperature	-40° C (-40° F) to 66° C (151° F)
Relative humidity	10% to 95% (noncondensing)
Altitude	Sea level to 9.1 km (30,000 ft)

*Reduce the maximum operating ambient temperature by 1.8° C per 1000 meters (1.0° F per 1000 ft) for operation at high-altitude sites.

Table C–4: Acoustic Values*

Product	Sound Power Level L$_{WAd}$, B	Sound Pressure Level L$_{pAm}$, dBA (bystander positions)
DECbridge 500/600 Series	Idle/Operate 6.6	Idle/Operate 52

* Declared values per ISO 9296 and ISO 7779. Current values for specific configurations are available from your Digital Services representative. (1 B = 10 dBA)

C.1.1 Cable Specifications

Table C–5 lists some of the specifications for the power cable, IEEE 802.3/Ethernet cable, and FDDI cable. For more information on cables, refer to the *Networks Buyer's Guide.*

Table C–5:   Cable Specifications

Item	Value
Power	
AC power cord length	U.S. -- 1.83 m (6 ft)
	Others -- 2.5 m (8.2 ft)
IEEE 802.3/Ethernet AUI Interface	
Transceiver cable length	50 m (164 ft) maximum
IEEE 802.3/Ethernet ThinWire Interface	
ThinWire cable length	185 m (606 ft) maximum

Table C–5 (Cont): Cable Specifications

Item	Value

Recommended Multimode Fiber Interface Cable

Item	Value
Cable length	2 km (6561 ft) maximum
Nominal core diameter	62.5 ± 3.0 μm
Cladding diameter	125.0 ± 2.0 μm
Numerical aperture	0.275 ± 0.015
Modal bandwidth minimum	500 MHz•km at 1300 nm, 160 MHz•km at 850 nm
Maximum attenuation rate	1.5 dB/km at 1300 nm, 3.5 dB/km at 850 nm
Power budget	11.0 dB at 1300 nm (for FDDI), varies by product at 850 nm
Fiber optic connector types	Approved MIC plug types A, B, and S; maximum attenuation is 1.0 dB.

Alternate Multimode Fiber Interface Cable

	100/140	**50/125**
Cable length	2 km (6561 ft) maximum	2 km (6561 ft) maximum
Nominal core diameter	100 μm* ± 4.0 μm	50 μm* ± 3.0 μm
Cladding diameter	140 μm* ± 6.0 μm	125 μm* ± 2.0 μm
Optical wavelength	1300 nm	1300 nm
Numerical aperture	0.290 ± 0.015	0.200 ± 0.015
Modal bandwidth minimum	500 MHz•km @ 1300 nm	500 MHz•km @ 1300 nm
Power budget for FDDI	9.0 to 13.0 dB	6.0 to 7.0 dB
Maximum distance	1.6 km (.96 mi)	2 km (1.2 mi)

(*Power budget contingent on core and cladding tolerances)

Table C–5 (Cont): Cable Specifications

Item	Value
Recommended Single-mode Fiber Interface Cable	
Cable length	40 km (24.8 miles) maximum
Mode field diameter	8.2 μm to 10.5 μm
Cladding diameter	125 μm ($\pm$ 2.0 μm)
Fiber cladding noncircularity	2% maximum
Core to cladding concentricity error	1 μm maximum
Nominal operating wavelength	1300 nm
Fiber cutoff wavelength	1270 nm maximum
Zero dispersion wavelength	1300 to 1322 nm
Zero dispersion slope	0.095 ps/(nm^{2}km) maximum
Optical power attenuation	$\leq$0.40 dB per km at 1310 nm
Minimum power budget	22 dB at 1300 nm
Minimum required loss	12 dB at 1300 nm
Fiber optic connector types	Approved FC/PC plug types
Recommended Out-of-Band Management Cable	
For VT100 or VT200 Series Terminals	BC22D-*xx* cables with 25-pin connectors at each end. If you use P/N BC16E-*xx* cables, use a passive adapter (P/N H8575A) at each end of the cable.
For VT300 or VT400 Series Terminals	Use the standard six-pin modular jack (MJ6) connector cable P/N BC16E-*xx*. Use the passive adapter H8575A on the bridge end of the cable.

D

Hardware Upgrade Options

You can upgrade the DECbridge 500 unit (as well as other models in the DECbridge 500/600 Series) to another model in the DECbridge 500/600 Series. To upgrade, you add new modules to your existing unit.

The three upgrade kits available from Digital provide modules that allow you to upgrade your DECbridge unit in one of the following ways:

- Upgrade from a DECbridge 500 (one FDDI connection and one AUI or Thin-Wire connection) to a DECbridge 610 (one FDDI connection and three AUI connections, no ThinWire connection). The kit used to perform this upgrade (P/N DEFEB-UG) contains:

    - AP3 module

    - NI(3) module

    - AUI testing loopbacks (2)

    - QC kit including release notes, license, software product description, and *Configuring the SNMP Agent* manual

    - Documentation kit (P/N DEFEB-DK) that includes:

        - Label sheet with new model numbers

        - Upgrade procedures (includes FDDI registration card)

- Upgrade from a DECbridge 510 (one FDDI connection and one AUI or ThinWire connection) to a DECbridge 520 (two FDDI connections and one AUI or ThinWire connection), upgrade from a DECbridge 600 to a DEC-bridge 620, and upgrade from a DECbridge 610 to a DECbridge 620. The kit used to perform these upgrades (P/N DEFEB-UP) contains:

    – FI DAS module (two FDDI connectors)

    – One multimode testing loopback (two loopbacks required when upgrading from a DECbridge 600 to DECbridge 620)

    – Documentation kit (P/N DEFEB-DK) that includes:

        - Label sheet with new model numbers

        - Upgrade procedures (includes FDDI registration card)

- Combine the two upgrade kits (DEFEB-UG and DEFEB-UP) and upgrade from a DECbridge 500 (one FDDI connection and one AUI or ThinWire connection) to a DECbridge 620 (two FDDI connections and three AUI connections, no ThinWire connection).

- Upgrade for a DECbridge 500/600 Series unit to a DECbridge 500/600 Series unit with out-of-band management. The kit used to perform this upgrade (P/N DEFEB-UR) contains:

    – AP3 module with OBM

    – QC kit including release notes, license, software product description, and *Configuring the SNMP Agent* manual

    – Documentation kit (P/N DEFEB-DK) that includes:

        - Label sheet with new model numbers

        - Upgrade procedures (includes FDDI registration card)

NOTE

The AP3 module ships with DECbridge version 1.3 firmware. Ensure that if you reload the AP3 module with firmware at a future date that the version is version 1.3 or higher.

E

Related Documents

Additional information on the DECbridge and FDDI can be found in the following documents:

- *Bridge and Extended LAN Reference* (Order No. EK-DEBAM-HR)

  Describes how bridges are used to create extended local area networks (LANs). Includes information on LAN interconnections, overall bridge operation, spanning tree, bridge management, and possible solutions to bridge-related problems in a network.

- *Configuring the SNMP Agent for DECconcentrator 500, DECbridge 500/600 Series, and LAN Bridge 200 Products* (Order No. AA-PR84A-TE)

  Describes how to configure the DECconcentrator 500, DECbridge 500/600 Series, and LAN Bridge 200 products as SNMP agents. It also includes troubleshooting information and tests to verify the configuration.

- *DECbridge 500/600 Series Problem Solving* (Order No. EK-DEFEB-PS)

  Explains how to troubleshoot and service the DECbridge 500/600 Series units. Information includes a product overview, problem-solving methods, removal and replacement procedures for field-replaceable units (FRUs), and configuration guidelines.

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

  Explains how to install a DECconcentrator 500 wiring concentrator and how to check its installation and operational status.

- *DECconcentrator 500 Problem Solving* (Order No. EK-DEFCN-PS)

  Explains how to troubleshoot and service the DECconcentrator 500 unit. Information includes a product overview, problem-solving methods, and removal and replacement procedures for field-replaceable units (FRUs).

- *DECconnect System Satellite Equipment Room Installation Guide* (Order No. EK-DECSY-SR)

  Provides all the steps and procedures for installing the satellite equipment room.

- *DECconnect System Fiber Optic Planning and Configuration* (Order No. EK-DECSY-FP)

  Provides an overview of Digital's structured wiring network along with guidelines for planning, configuring, and designing fiber optic subsystems within the network.

- *DECconnect System Fiber Optic Installation* (Order No. EK-DECSY-FI)

  Contains guidelines for installing fiber optic cables and passive equipment in a DECconnect System fiber optic structured wiring network, along with test procedures for certifying the installation.

- *DECconnect System Planning and Configuration Guide* (Order No. EK-DECSY-CG)

  Contains planning requirements and guidelines for configuring DECconnect System networks and other networks that use DECconnect System products.

- *DECconnect System Facilities Cabling Installation Guide*
  (Order No. EK-DECSY-FC)

  Provides procedures for properly installing Ethernet coaxial cables,
  twisted-pair cables, and ThinWire cables within a DECconnect System site.

- *DECmcc Bridge Access Module Use* (Order No. AA-PD1BC-TE)

  Describes how to use the DECmcc (Digital Management Control Center)
  Bridge Access Module to manage bridges.

- *DEFEB DECbridge 500/600 Series* (Order No. EK-DEFEB-IP)

  Contains the illustrated parts breakdown for the DECbridge 500/600 Series
  units.

- *FDDI System Level Description* (Order No. EK-DFSLD-SD)

  Describes Digital's Fiber Distributed Data Interface (FDDI) implementation,
  how it works, and the role of the individual FDDI components. The manual
  also discusses Digital's approach to network management and the facilities
  provided by network management software and ring-wide configuration is-
  sues.

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

  Describes the guidelines for connecting devices to an FDDI network. It also
  includes network configurations and examples.

- *Networks Buyer's Guide*

  Describes Digital's networking products. Contact your local Digital sales
  office to receive a copy.

Index

HOW TO ORDER ADDITIONAL DOCUMENTATION

DIRECT TELEPHONE ORDERS

In Continental USA	In Canada	In New Hampshire,
call 1-800-DIGITAL	call 800–267–6215	Alaska or Hawaii
(1-800–344-4825)		call 603–884–6660

ELECTRONIC ORDERS (U.S. ONLY)

Dial 800-dec-demo with any VT100 or VT200
compatible terminal and a 1200 baud modem.

If you need assistance, call 1-800-DIGITAL (1-800-344-4825)

DIRECT MAIL ORDERS (U.S. and Puerto Rico*)

DIGITAL EQUIPMENT CORPORATION
P.O. Box CS2008
Nashua, New Hampshire 03061

DIRECT MAIL ORDERS (Canada)

DIGITAL EQUIPMENT OF CANADA LTD.
940 Belfast Road
Ottawa, Ontario, Canada K1G 4C2
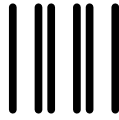Attn: A&SG Business Manager

INTERNATIONAL

DIGITAL EQUIPMENT CORPORATION
A&SG Business Manager
c/o Digital's local subsidiary
or approved distributor

Internal orders should be placed through Publishing and Circulation Services (P&CS),
Digital Equipment Corporation, 444 Whitney Street, NRO2, Northboro, Massachusetts 01532-2597

*Any prepaid order from Puerto Rico must be placed
with the Local Digital Subsidiary:
809–754–7575

DO NOT CUT – FOLD HERE AND TAPE

BUSINESS REPLY LABEL
FIRST CLASS PERMIT NO. 33 MAYNARD MASS.

POSTAGE WILL BE PAID BY ADDRESSEE

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

digital ™

**Telecommunications and
Networks Publications**
550 King Street
Littleton, MA 01460–1289
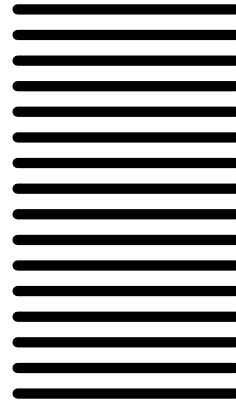
DO NOT CUT – FOLD HERE

Please return this card.

Your comments and suggestions will help us improve the quality and usefulness of our documentation.

Did you use the manual as a reference or as a step by step procedure to install the device?

_____

Were the instructions easy to follow?_____

Were the instructions complete?_____

Were they in the proper sequence?_____

Which chapters or sections were most helpful?_____

_____

Did you use the appendices? Which ones?_____

_____

Were the illustrations helpful? _____ All?_____ Some?_____ Which ones?_____

_____

Were some illustrations unnecessary?_____ Which ones?_____

Do you think the manual needs more illustrations?_____ Please give an example. _____

_____

Thank you.

Name _____ Date _____

Title _____ Department _____

Organization_____ Street _____

City_____ State/Country _____ Zip Code _____

d|i|g|i|t|a|l™