DECrepeater 90FS

Installation and Configuration

Part Number: EK–DEFMI–IN. B01

Copyright

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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.

Safety ⚠ (Cont.)

CAUTION ⚠ You must configure the links using HUBwatch before connecting the cables. Failure to do so can seriously impair performance on that segment of the LAN. [Pages18 and 66.]

ACHTUNG Sie müssen die aufgebauten Verbindungen zuerst mit HUBwatch konfigurieren, bevor Sie die Kabel anschließen. Andernfalls ist die volle Leistungsfähigkeit dieses LAN–Segments nicht gewährleistet.

ATTENTION Vous devez configurer les liens à l'aide HUBwatch avant de connecter les câbles. En cas d'omission, les performances de ce segment du LAN risque d'être gravement affectées.

PRECAUCIÓN Los enlaces que utilizan HUBwatch deben configurarse antes de conectar los cables. Si se omite la configuración, el funcoinamiento de este segmento de LAN puede deteriorarse gravemente.

Safety ⚠ (Cont.)

The 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 ⚠   Some fiber optic equipment can emit laser or infrared light that can injure your eyes. Never look into an optical fiber or connector port. Always assume the cable is connected to a light source. [Pages 19 and 21.]

VORSICHT   Bestimmte Lichtleitergeräte können für die Augen gefährliches Laser– oder Infrarotlicht abstrahlen. Vermeiden Sie es daher unter allen Umständen, direkt in ein Lichtleiterkabel oder einen Lichtleiteranschluß zu schauen. Gehen Sie immer davon aus, daß Lichtleiterkabel mit einer Lichtquelle verbunden sind.

DANGER   Certains équipements à fibre optique peuvent émettre un rayonnement laser ou infra–rouge pouvant provoquer des troubles oculaires. Ne regardez jamais à l'intérieur d'une fibre optique ou d'un port de connecteur. Considérez que le câble est connecté en permanence à une source lumineuse.

AVISO   Ciertos equipos de fibras ópticas pueden emitir luz lasérica o infrarroja con riesgos de lesiones en los ojos. No se debe nunca mirar en una fibra óptica o una puerta de conexión. Siempre hay que suponer que el cable está conectado a una fuente luminosa.

Safety ⚠ (Cont.)

CAUTION ⚠   This action deletes all configured settings and replaces them with factory default values. All configuration settings will be lost. [Page 29.]

ACHTUNG   Bei diesem Vorgang werden alle Konfigurationseinstellungen gelöscht und die Werkseinstellungen wieder eingesetzt. Alle Konfigurationsdaten gehen verloren.

ATTENTION   Cette action supprime tous les paramètres de configuration et les remplace par des valeurs prédéfinies. Tous les paramètres de configuration seront perdus.

PRECAUCIÓN   Esta intervención borrará todos los parámetros de configuración y los sustituirá por valores por defecto definidos de fábrica. Se perderán todos los parámetros de configuración.

Safety ⚠ (Cont.)

CAUTION ⚠
If power is interrupted during Stage 3 of the DLU process, the firmware image can become corrupted. Do not turn off power to the unit or perform any action that can cause the unit to lose power during Stage 3 of the DLU process. [Pages 40, 41, 43 and 45.]

ACHTUNG
Sollte während der Phase 3 des DLU–Prozesses eine Unterbrechung der Stromversorgung eintreten, kann das Firmwareprogramm zerstört werden. Aus diesem Grunde wird dringend empfohlen, Vorkehrungen zu treffen, daß während der Durchführung dieser Phase 3 die System-einheit weder ausgeschaltet noch die Stromversorgung unterbrochen werden kann.

ATTENTION
L'image du microprogramme risque d'être corrompue, en cas de coupure de courant au cours de l'étape 3 du processus DLU. Ne mettez pas l'unité hors tension et n'exécutez aucune action risquant d'entraîner une coupure d'alimentation au cours de cette étape.

PRECAUCIÓN
Si se interrumpe el suministro eléctrico durante la Etapa 3 del proceso DLU, puede dañarse la imagen del firmware. No se debe apagar la unidad ni realizar ninguna operación que pueda causar una interrupción del suministro de la unidad durante la Etapa 3 del mencionado proceso.

Introduction

Overview

The DECrepeater 90FS (also referred to in this manual as the module) is an Ethernet[1] repeater that provides two external 10BaseFL[2] fiber-optic ports and one external AUI port.

To give your workgroup LAN media flexibility and connectivity, the module can be configured into a DEChub 900 MultiSwitch (also referred to in this manual as the DEChub 900), into a DEChub 90, into a Digital MultiStack System, or as a standalone unit. One or more (up to eight) can be installed into a DEChub 900.

The module provides a side-panel ThinWire port connector, used when the module is installed as a standalone unit or in a stack. The module provides a ThinWire port connection to the backplane when the module is installed in a DEChub 900 or a DEChub 90.

The module's front panel provides two fiber-optic ports that can operate independently or as a redundant pair, and one attachment unit interface (AUI) port. The front panel also provides light-emitting-diodes (LEDs) that indicate the status of the module, the ports, and the network.

The module includes a serial port on the front panel that can be used as an installation setup port when the module is installed into a DEChub 90, installed as a standalone unit, or installed in a stack. Using the setup menu, you can enable the module's front panel serial port for out-of-band management (OBM).

> **NOTE:** When the module is installed in a DEChub 900, you must use the Hub Manager setup port on the DEChub 900 instead of the module's setup port.

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[1] In this manual, the term Ethernet is Digital's term for its product compatibility with the ISO 8802-3/ANSI/IEEE 802.3 standards and the Ethernet standards for Carrier Sense Multiple Access with Collision Detection (CSMA/CD) LANs.

[2] In this manual, the term 10BaseFL refers to the International Standards Organization (ISO) 8802-3/ANSI/IEEE 802.3 fiber-optic local area networks (LAN) standards.

Introduction (Cont.)

Used in a Digital MultiStack System

The DECrepeater 90FS can be used in Digital MultiStack System (a stackable hub), which includes a Digital 90-series module and a stacking unit. Up to 16 devices can be connected in the stack and one of these can be the stack manager (management agent). The DECrepeater 90FS can serve as a management agent for the stack. With the DECrepeater 90FS as management agent, up to 15 other devices can be managed as a single management domain. For further information refer to the Digital MultiStack System documentation.

Features

Your DECrepeater 90FS module includes the following features:

- Operates in the Digital MultiStack System, DEChub 90, DEChub 900, and as a standalone repeater.

- Manageable through the built-in SNMP agent supporting the following MIBs:
    - Ethernet MIB (RFC 1398)
    - Repeater MIB (RFC 1516)
    - Digital Extended Repeater MIB
    - DEChub 900 Public Common MIB
    - MIB II (RFC 1213)

- Out-of-Band Management (OBM) by using SNMP over Serial Line Internet Protocol (SLIP) provides an additional path to the normal in-band management as follows:
    - Through the OBM connector on the DEChub 900 Hub Manager.
    - Through the front-panel serial port on the module when the module is installed in a DEChub 90 or as a standalone unit or in a stack.

- Manageable by HUBwatch, Digital's SNMP-hub management application featuring a user-friendly GUI (graphical user interface).

- Upgradeable device firmware (using the HUBloader application).

- Can serve as a stack manager and SNMP proxy agent for other repeaters.

- Built in access to ThinWire 10Base2 media segments in a DEChub900 or DEhub 90.

DECrepeater 90FS Installation and Configuration

Introduction (Cont.)

- ThinWire 10Base2 port connector (ThinWire) on the side panel (when the module is installed as a standalone unit or in a stack).

- When used in a DEChub 900 MultiSwitch, a second Ethernet LAN is available.

- Hot swap capability allows the module to be installed or removed from the DEChub 90 or DEChub 900 without turning off power.

- Automatic module self-test at power-up.

- Security and statistics capability.

- Dual-port redundancy.

Front Panel

1) **Power** ⊘ **LED** — Lights when the module has 5 volts of power.

2) **Module OK** ↻ **LED** — Lights when the module passes self-test.

3) **Network Activity** --> **LED** — Indicates network traffic level.

4) **Network OK** ⌗ **LED** — Indicates the status of either the side panel or backplane ThinWire, 10Base2 port.

5) **Redundancy Enabled** ⌘ **LED** — Lights when the fiber-optic ports are operating as a redundant pair.

6) **Port State LEDs** — (Labeled **1** through **3**) show the attachment status of the associated port to a LAN.

7) **Port Link LEDs** — Light when the fiber-optic cables of the associated port are properly connected to a functional remote fiber-optic device.

   NOTE: Refer to the section titled LED Descriptions for more information about LED operation.

8) **Ethernet address label** — Shows the Ethernet address of the module.

9) **Fiber-optic TX** ⊖→ **port ST-type connectors** — Connect the fiber-optic cables to the receive ports of the remote fiber-optic device.

10) **Fiber-optic RX** →⊗ **port ST-type connectors** — Connect the fiber-optic cables to the transmit ports of the remote fiber-optic device.

11) **Ethernet AUI (15-pin D-Sub) port connector** (Used only when the module is configured as a standalone unit) — connects to an external medium attachment unit (MAU) directly or by using an AUI cable.

12) **Serial port (8-pin MJ) connector** — Multiplexed port can be used as a setup port or for OBM.

13) **Cooling fan unit** — Provides air circulation.

14) **ThinWire port connector** — Connects through a T-connector when the module is operating as a standalone unit or in a Digital MultiStack System.
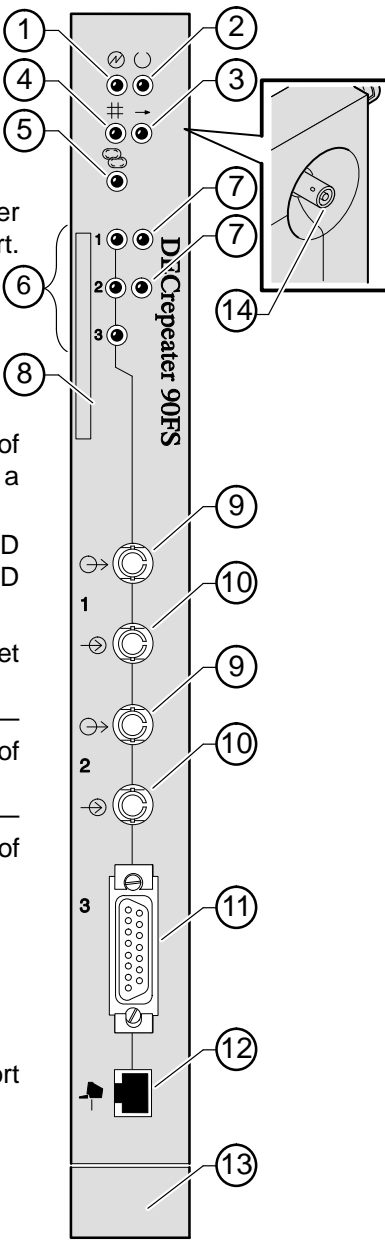
LKG-8817-93I

Back Panel

1) **Locking tab** — Locks the module into a DEChub 900 or DEChub 90 backplane.

2) **48-pin connector** — Provides network and power connections to the module when the module is installed into a DEChub 900 or a DEChub 90.

3) **Grounding bolt** — Provides a chassis grounding connection to the module when the module is installed into a DEChub 900 or a DEChub 90.

4) **Power connector** — Receives dc current from the power supply. This feature is used for standalone operation only.

5) **Manufacturing label** — Lists the module part number, serial number, revision level, and power requirements.

6) **Mounting tab** — Secures the module to the backplane when the module is installed into a DEChub 900 or a DEChub 90.

7) **Cooling fan unit** — Provides air circulation.

8) **Back cover** — The back cover is used only when the module is a standalone unit.

NOTE: To view the standalone back cover refer to the *Digital MultiStack System Stacking Unit Installation and Configuration* manual.
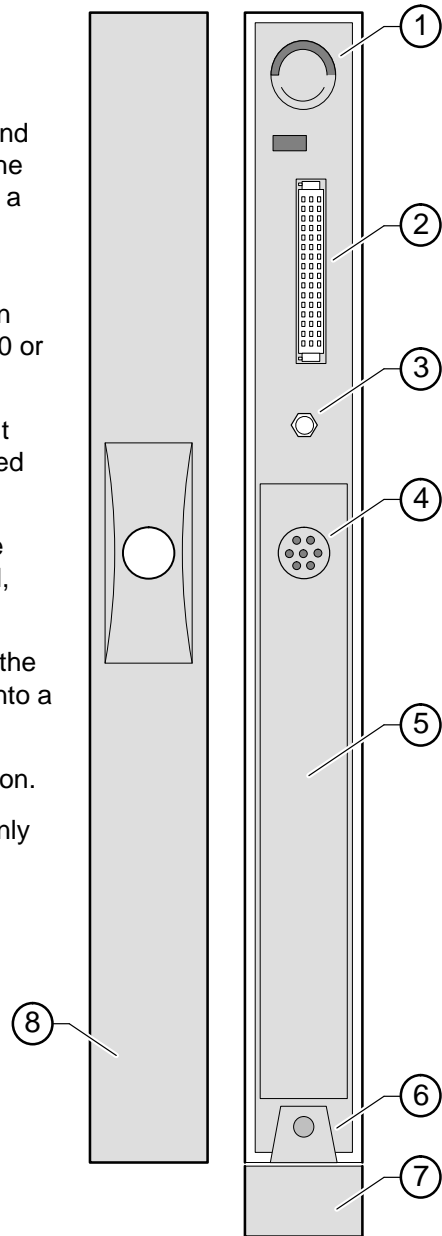
LKG-8881-93I

Installing the Module

You can install the DECrepeater 90FS as a standalone unit, as part of a managed stack, or into a DEChub 900 Multiswitch or DEChub 90. If you are using the DECrepeater 90FS as a standalone unit, you can place it on a table, mount it onto a wall, or install it into a standard 19-inch rack by using a shelf assembly kit (Digital Part Number: H9544–MS).

For installation instructions, refer to the following table:

If...	And...	Then...
You are installing the module as part of a Digital MultiStack System	—	Go to the section titled Installing the Module into a Digital MultiStack System
You are installing the module as a standalone unit	—	Go to the section titled Installing the Module as a Standalone Unit
You are installing the module into a DEChub 900 or a DEChub 90	Your module has a a standalone back cover	Go to the section titled Removing the Back Cover
You are installing the module into a DEChub 900	Your module does not have a standalone back cover	Go to the section titled Installing the Module into a DEChub 900
You are installing the module into a DEChub 90	Your module does not have a standalone back cover	Go to the section titled Installing the Module into a DEChub 90

Installing the Module (Cont.)

Installing the Module into a Digital MultiStack System

The Digital MultiStack System provides a flexible low-cost networking solution without sacrificing network performance and functionality. The system consists of a stackable hub which includes a Digital-90-series module and a stacking unit.

For detailed information about installing a DECrepeater 90FS in the MultiStack System refer to the *Digital MultiStack System Stacking Unit Installation and Configuration* manual.

Configuring the Module as a Stack Manager

When the DECrepeater 90FS is installed in the Digital MultiStack System it can be configured as the stack manager.

1 **To configure the module as the stack manager, perform the following steps from the DECrepeater 90FS Installation Menu:**

    a. Set the IP address for the module (Option `[4] Set-In-Band Interface IP Address`).

    b. Enable Hub Mastership for the module (Option `[8] Module-Specific Options`, Submenu Option `[2] Enable Hub Mastership`).

    c. Set the Hub Mastership Configuration (Option `[8] Module-Specific Options`, Submenu Option `[3] Set Hub Mastership Configuration`, Submenu Option `[4] Set Configuration to DECstack 90`).

    d. Reset the module to activate the changes (Option `[2] Reset with Current Settings`).

Installing the Module (Cont.)

Installing the Module as a Standalone Unit

1 **Connect the ThinWire T-connector:**

a. Attach the ThinWire T-connector to the BNC connector (1), and turn the connector one-quarter turn to the right until the connector locks into place (1).

b. Attach the ThinWire backbone cable segment to one of the BNC connectors on the T-connector.

c. Attach either a terminator or a ThinWire cable to the other connector. (The illustration shows a terminator attached to the connector.)

If you attach a ThinWire cable, ensure that the cable is properly terminated or connected to a 10Base2 device.
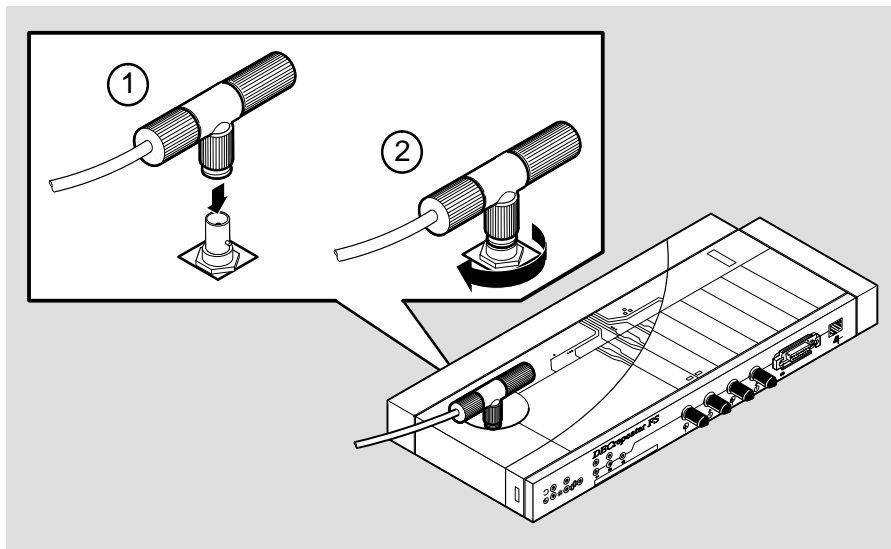
LKG–10052–93I

NOTE: To disconnect the ThinWire T-connector, turn the connector one-quarter turn to the left until the connector clears the BNC connector stem; then disconnect the cable or cables.

Installing the Module as a Standalone Unit (Cont.)

2 **Connect the power supply:**

    a. Connect the cable (1) from the power supply (Digital Part Number: H7867-AA or H7827-BA) to the power connector on the back of the module.

    b. Plug the ac power supply cable (2) into the power supply, then into a wall outlet (3).
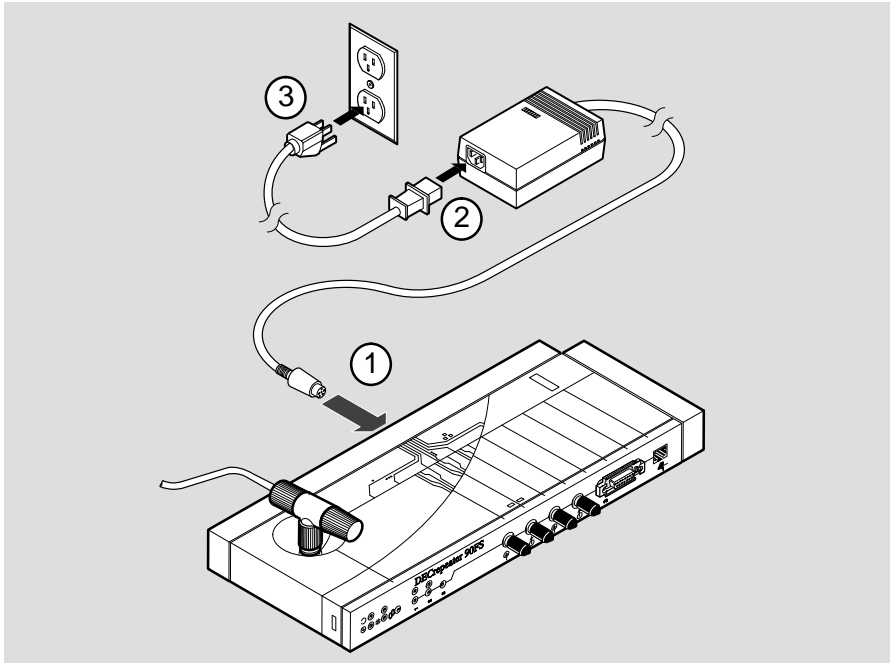
LKG-9174-93I

Installing the Module (Cont.)

Installing the Module as a Standalone Unit (Cont.)

❸ Verify that the module's Power ⊘ LED lights immediately and that the Module OK ☼ LED lights within 1 minute

a. The Power ⊘ LED lights when power is applied; then the module performs a self-test.

b. After the module completes the self-test, the Module OK ☼ LED lights and remains lit.

c. Go to the section titled Connecting the Cables, on page 18.

> **NOTE:** If the LEDs do not operate as described, refer to the section titled Problem Solving Using the LEDs.
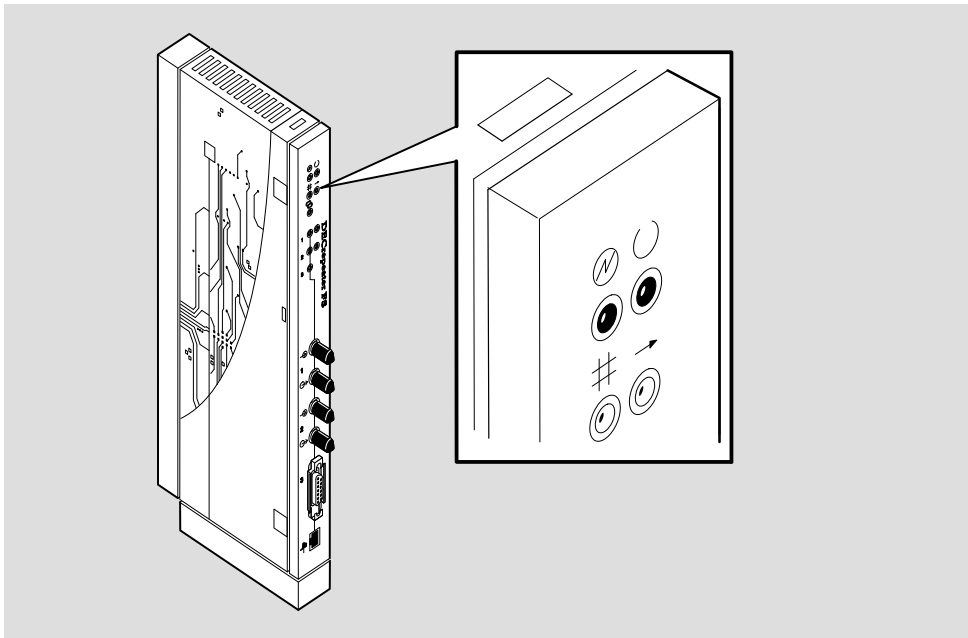
LKG–9550-95I

Installing the Module (Cont.)

Removing the Back Cover

Remove the back cover if you are installing a module into a DEChub 900, a DEChub 90, or a Digital MultiStack System.

1 **Remove the back cover**

    a. Lift up the latch on the back cover by inserting a flat-blade screwdriver into the top mounting hole.

    b. With the latch up, pull the top of the back cover away, pivoting at the bottom of the module.
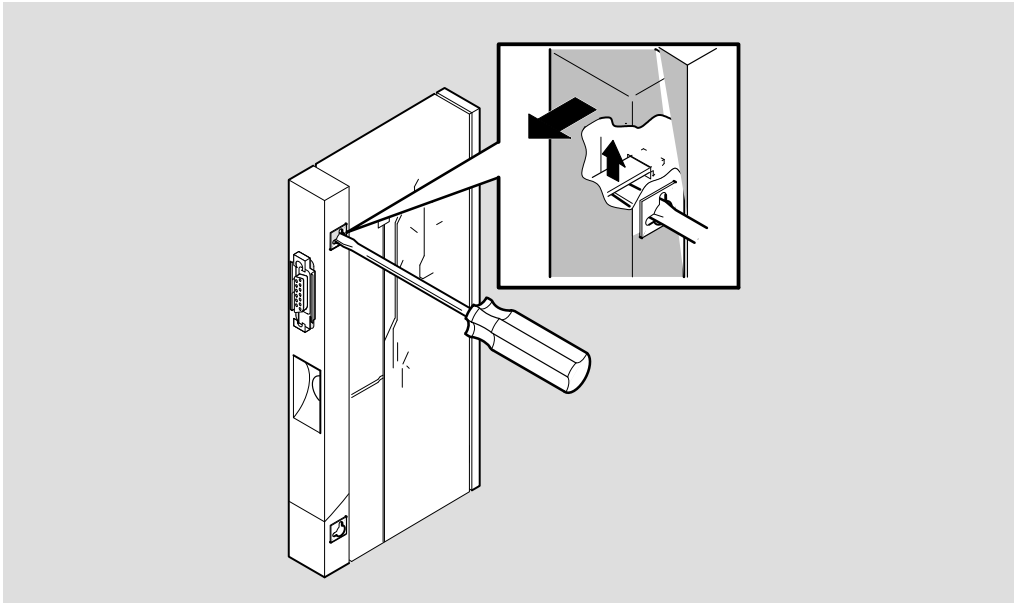
NPG-0217-95I

2 **To install the module:**

    a. Into a DEChub 900, go to the section titled Installing the Module into a DEChub 900.

    b. Into a DEChub 90, go to the section titled Installing the Module into a DEChub 90.

    c. Into a Digital MultiStack System, go to the section titled Installing the Module into a Digital MultiStack System

Installing the Module (Cont.)

Installing the Module into a DEChub 900

The DECrepeater 90FS hot-swap feature allows you to install the module into the DEChub 900 or DEChub 90 without turning off power. Seating the module initiates the power-up sequence.

❶ Compare your module's power ratings (1) with the values shown in the Hub Manager status display (2) as shown below.

> **NOTE:** The 12V power in the DEChub 900 is derived from the 15V power source. Although 12V current requirements are listed separately in the module specifications, all 12V current is drawn from the 15V supply.

> If any of the module's power requirements exceed the values shown in the status display, add another power supply (see the *DEChub 900 MultiSwitch Owner's Manual).*

**Module's Manufacturing
Label (Example)**

PN   −DEFMI−M
REV   B01
SN   AS41601069
FTZ   C−208/90
5Vdc,1.5; 12Vdc, .5A, 15W

**Hub Manager Status
Display (Example)**

Available: 90.5 W
5V: 13.0 A, 15V: 3.5 A
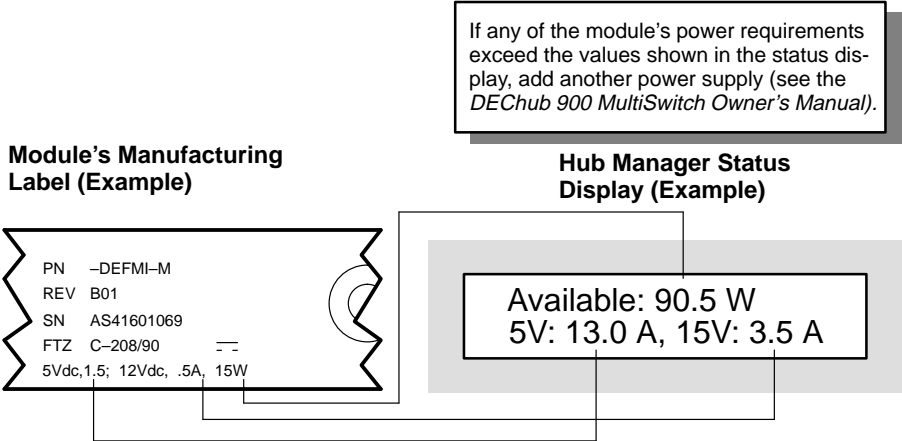
LKG−9540−94I

Installing the Module (Cont.)

Installing the Module into a DEChub 900 (Cont.)

2 **Seat the module into the DEChub 900.**

    a. Place the module's mounting tab into a mounting slot on the DEChub (1).

    b. Pull up on the release lever to its unlocked position (2).

    c. Pivot the module on the mounting tab and align the connectors.

    d. Firmly push the module onto the backplane connectors.

    e. Press down on the release lever to ensure that the module is locked (3).
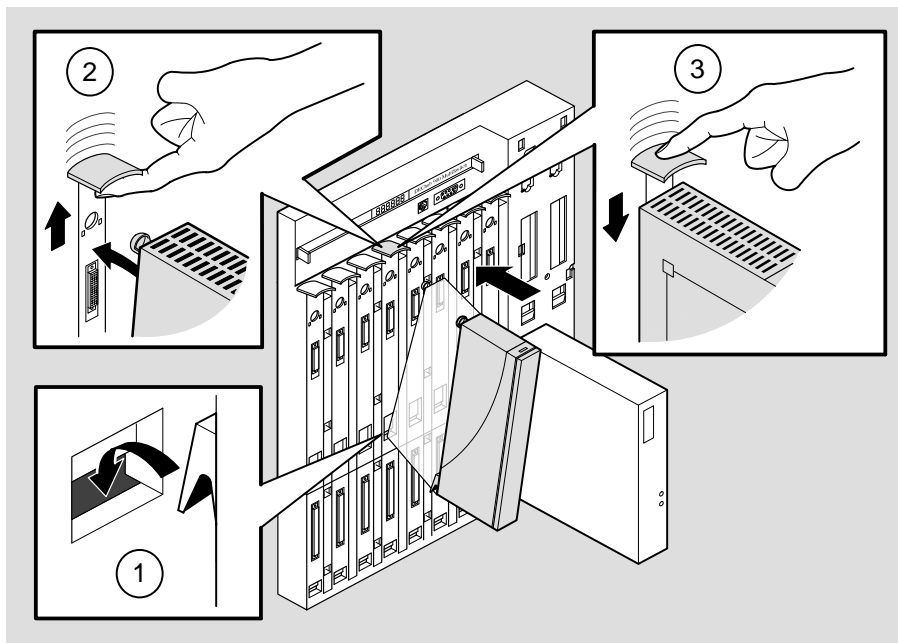
NPG-0026-95I

Installing the Module (Cont.)

Installing the Module into a DEChub 900 (Cont.)

3 **Verify that the module's Power ⊘ LED and the Module OK ♻ LED light (within 1 minute).**

    a. The Power ⊘ LED lights when power is applied; then the module performs a self-test.

    b. After the module completes self-test, the Module OK ♻ LED lights and remains lit; then the Hub Manager status display shows:

```
DECrepeater 90FS
up.
```

    NOTE: Refer to the section titled Problem Solving Using the LEDs if the LEDs do not operate as described.
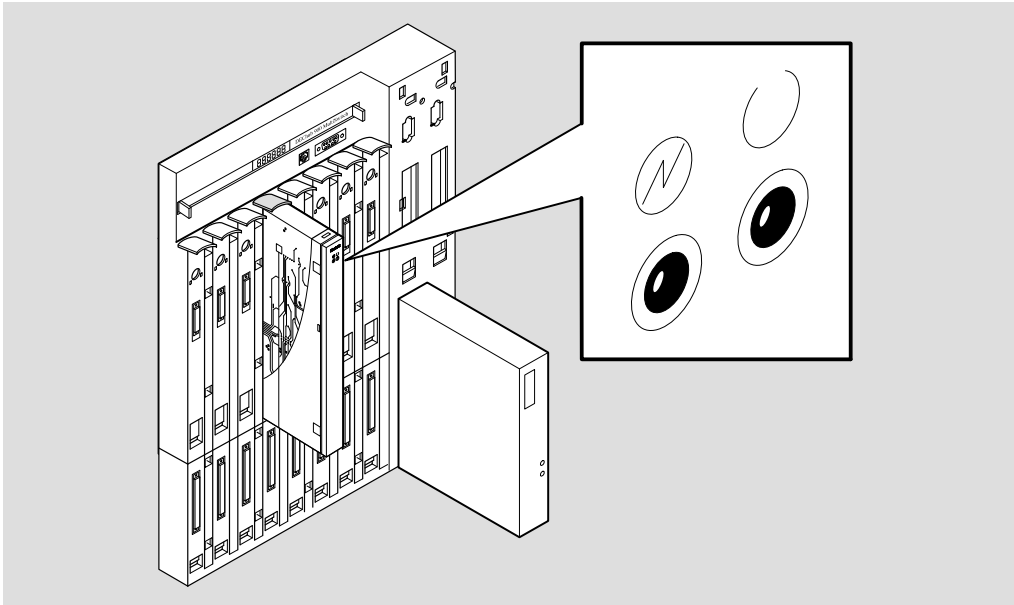
NPG-0224-95I

Installing the Module (Cont.)

Installing the Module into a DEChub 90

The DECrepeater 90FS hot-swap feature allows you to install the module into the DEChub 90 without turning off power. Seating the module initiates the power-up sequence.

> **NOTE:** When installed into a DEChub 90, the DECrepeater 90FS must be located in slot 7 or slot 8.

1 **Seat the module into the DEChub 90.**

    a. Place the module's mounting tab into a mounting slot on the DEChub 90 (1).

    b. Pull up on the release lever to its unlocked position (2).

    c. Pivot the module on the mounting tab and align the connectors.

    d. Firmly push the module onto the backplane connectors.

    e. Press down on the release lever to ensure that the module is locked (3).
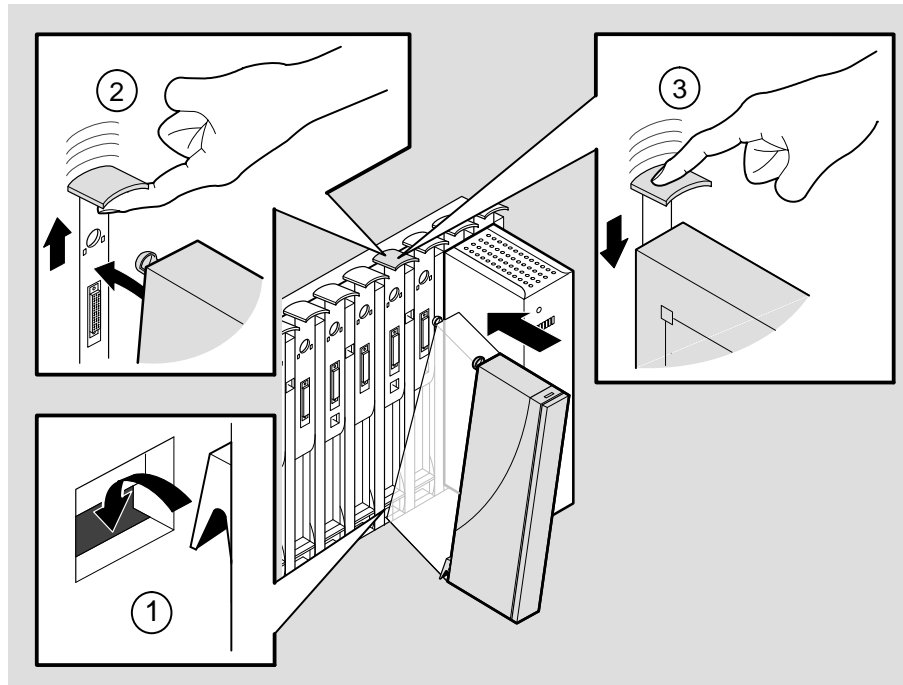
NPG-0056-95I

Installing the Module into a DEChub 90 (Cont.)

2 **Verify that the module's Power** ⊘ **LED lights immediately and that the Module OK** ↻ **LED lights within 1 minute**

    a. The Power ⊘ LED lights when power is applied, then the module performs a self-test.

    b. After the module completes self-test, the Module OK ↻ LED lights and remains lit .

      NOTE: If the LEDs do not operate as described, refer to the section titled Problem Solving Using the LEDs, on page 60.
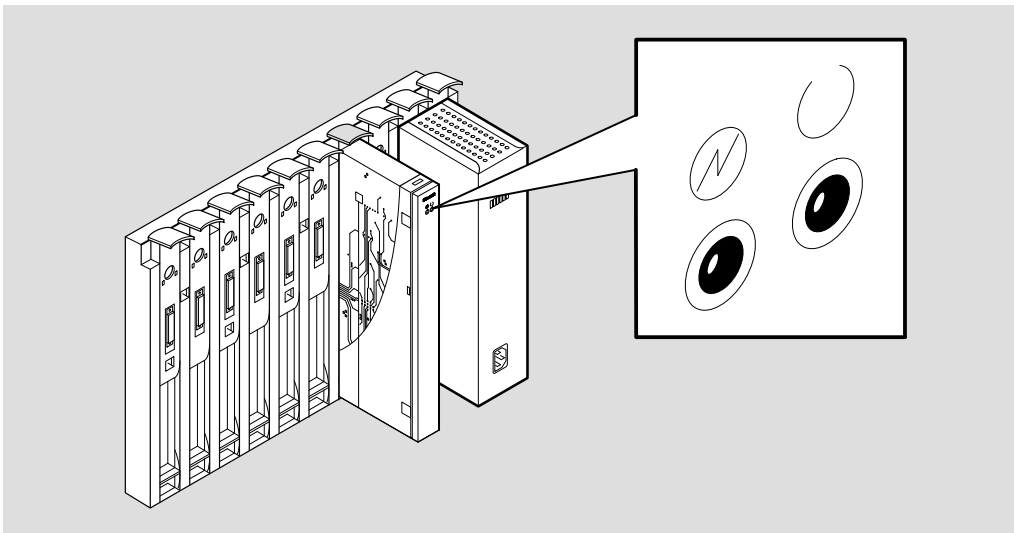
NPG-0225-95I

Go to the section titled Connecting the Cables on the following page.

Installing the Module (Cont.)

Connecting the Cables

This section details connecting the AUI cable and the fiber optic cables.

Connecting the AUI Cable

❶ Connect the AUI cable or MAU to the AUI port.

    a. Push the module's AUI connector slide latch to the unlocked (1) position.

    b. Insert the AUI cable plug into the AUI connector.

    c. Push the module's AUI connector slide latch to the locked (2) position.
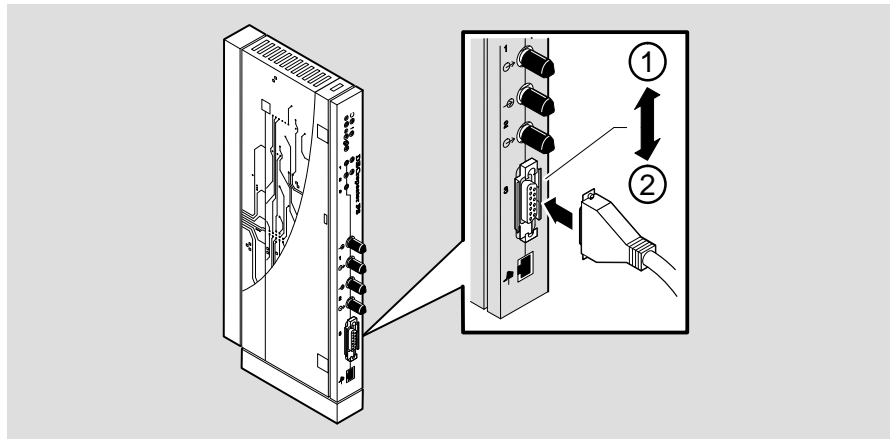
NPG-8819–95I

    NOTE: To disconnect the cable, push the connector slide latch to the unlocked position, then disconnect the cable.

Installing the Module (Cont.)

Connecting the Cables (Cont.)

Connecting the Fiber Optic Cables

Perform the following steps to connect the fiber optic cables.

1 **Determine the fiber-optic port configuration**

Before connecting the fiber-optic cables, determine whether the ports are to be configured as redundant pairs or as separate independent ports. The default configuration is separate independent ports.

Refer to the section titled Redundant Fiber-Optic Link Configuration for more information. (Refer also to *HUBwatch Online Help.)*

If you are configuring the fiber-optic ports as:

- Redundant pairs, go to step 2.

- Separate independent ports, go to step 3.

- -

2 **Connect the fiber-optic cables for redundancy**

CAUTION ⚠ You must configure the links using HUBwatch before connecting the cables. Failure to do so can seriously impair performance on that segment of the LAN.

  a. Select the module and ports to use as the master, and the modules and ports to use as the responders or non-responders.

  b. Using HUBwatch, assign the master ports and the responder ports.

  c. Following the procedure in step 3, connect the master's primary port cables to the master's primary port.

  d. Connect the other end of those cables to the remote primary port.

  e. Connect the master's secondary port cables to the master's secondary port.

  f. Connect the other end of those cables to the remote secondary port.

Installing the Module (Cont.)

Connecting the Cables (Cont.)

If your site is prewired, the fiber-optic cables should be labeled with information on size and attenuation characteristics. Digital recommends that you use 62.5/125-micron multimode graded index fiber-optic cable with the DECrepeater 90FS. Refer to the section titled Fiber-Optic Loss Budget for more information.

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

> **NOTE:** To prevent cable damage, avoid making sharp bends and kinks in the cable.

Connecting the Cables (Cont.)

3 **Connect the fiber-optic cables.**

   a. Remove the dust caps from the ST-type connectors on the ports that you are connecting.

   b. Align the tab (1) and slot (2) of the transmit cable plug with the slot (4) and tab (3) of the transmit port connector (labeled ⊖→).

   c. Insert the plug; then push the plug sleeve (5) in and turn it to the right, locking it in place.

   d. In the same way, connect the receive cable to the receive port connector (labeled →⊗).

After all cables are connected, go to the section titled Configuring the Module.
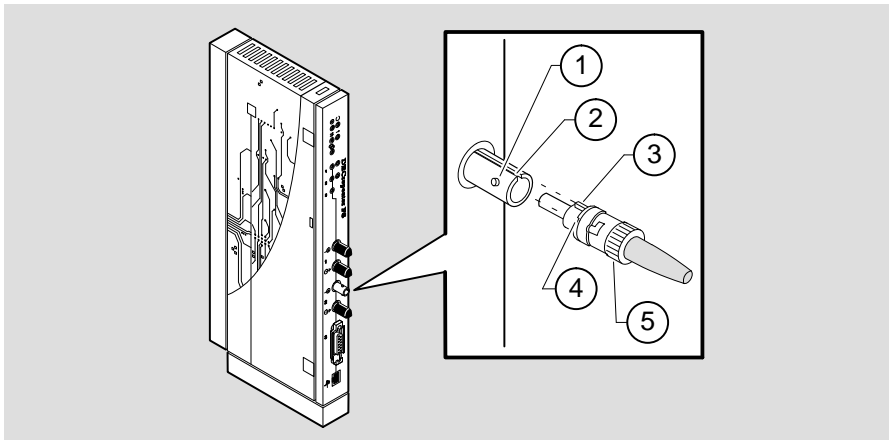
LKG–8836-93I

   NOTE: To disconnect the cables, push the plug's sleeve in and turn it to the left; then disconnect the cable.

Removing the Module

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

1 **Disconnect the cables from the module.**

   a. To disconnect the fiber-optic cables, push the plug's sleeve (1) in and turn it to the left; then disconnect the cable.

   b. To disconnect the AUI connector, push the connector slide latch to the unlocked position (2); then disconnect the cable.
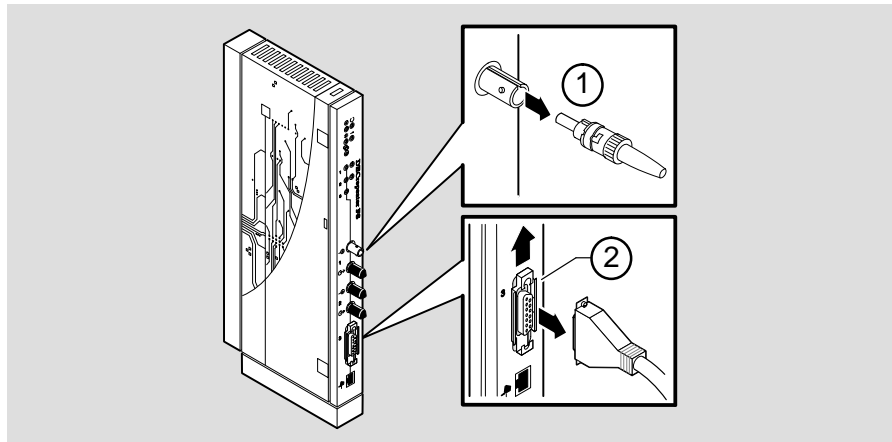
LKG–8822-93I

Removing the Module (Cont.)

- -

2 **Removing from a DEChub 90 or DEChub 900**

    a. Lift the release lever located on the top of the DEChub 900 slot or the DEChub 90 slot (1).

    b. While holding up the release lever, pivot the module back on its bottom mounting tab (2).

    c. Lift the module from the backplane (3).

      NOTE: The figure below details removal from the DEChub900. Removal from the DEChub 90 is essentially the same.

DEChub 900 Module Removal
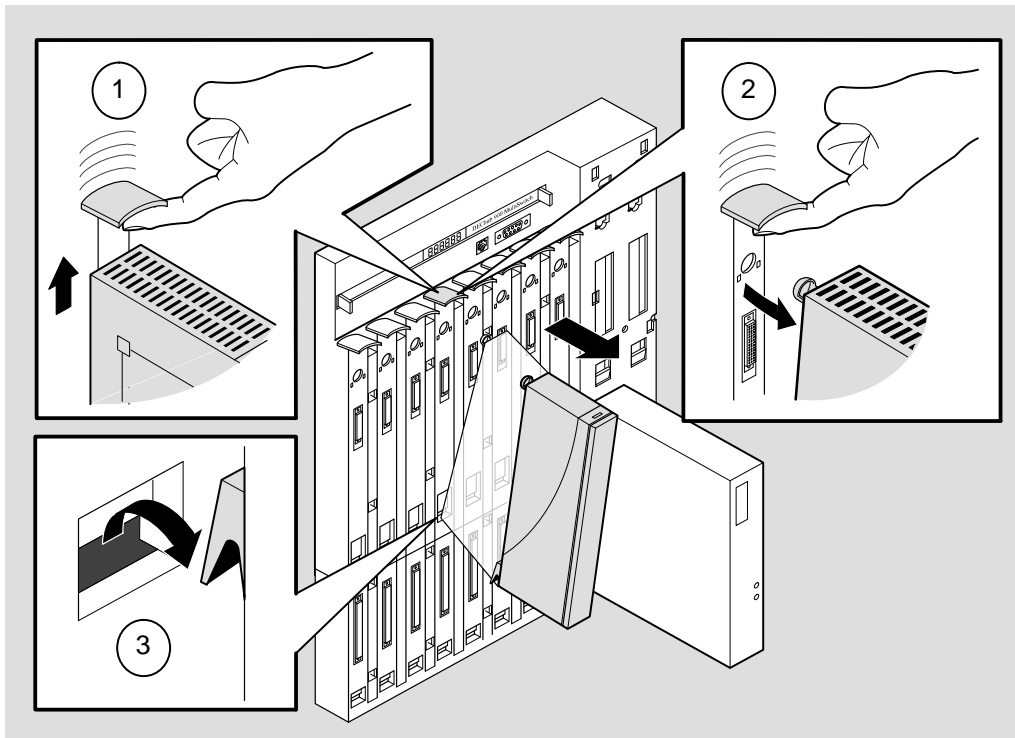
NPG-0028-95I

Configuring the Module

Setup Port Description

The setup port (on the DEChub 900 or module) allows you to access and set DECrepeater 90FS parameters. This section describes how to access the module from either port and how to set those parameters.

Examples of the setup screen displays are provided in this section to aid in the description of the setup port and to display the options that are available. Because they are examples only, the displays can vary slightly from the actual screen displays on your setup port device. **Boldface type** in the screen display examples indicate user input.

The format of an IP address is the standard 4-octet dotted decimal notation, where each octet of the address is represented as a decimal value, separated by a decimal point (.). The following is an example of an IP address: `16.20.54.156`

Signaling Standards

Signals from the DEChub 900 Hub Manager setup port and from the module setup port conform to the EIA-232D signaling standard at 9600 baud. To the user, the port appears as a data terminal equipment (DTE) device.

The DEChub 900 Hub Manager setup port is also compatible with devices that use the EIA-423 signaling standard.

Setup Port Device Cabling

The setup port (see illustration on the next page) on the DEChub 900 MultiSwitch or the module can be connected to a setup port device (a terminal or personal computer) by using the following cables and adapters:

If the setup port device is a...	Then use this cable...	With this adapter...
PC with a 9-pin D-Sub communications port	BN24H-xx[1]	H8571-J
Terminal with a 25-pin D-Sub connector	BN24H-xx[1]	H8575-A
Terminal with a 6-pin MMJ connector	BN24H-xx[1]	Not required

[1] xx indicates cable length in meters.

Configuring the Module (Cont.)

Connecting to the Setup Port

To connect to the setup port on the DECrepeater 90FS module, do the following:

1. Ensure that the transmit and receive baud rates on the setup port device are set to 9600 baud.

2. Connect the setup port device to the setup port connector on either the DEChub 900 or to the module's front-panel serial port.
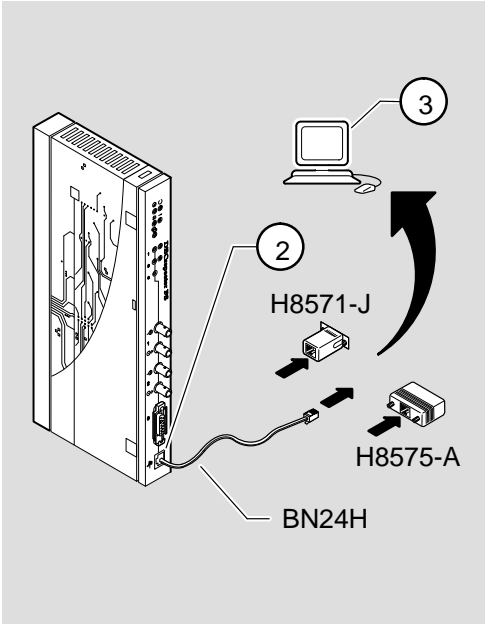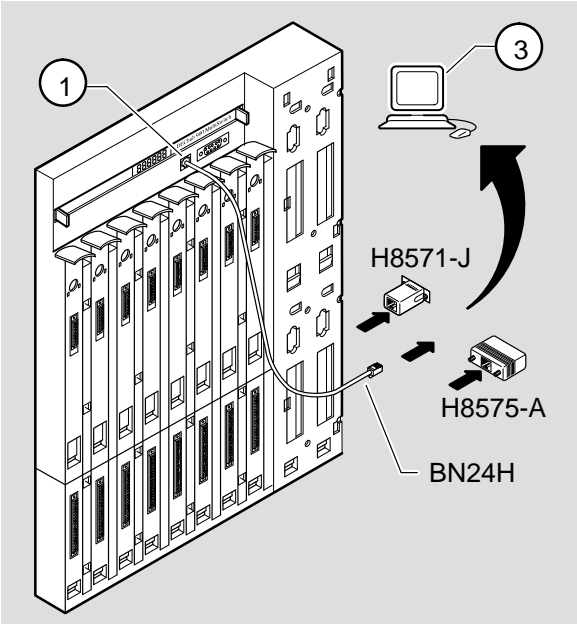
NPG-0247-95

Item	Description
1	DEChub 900 setup port
2	DEChub 90 front panel serial (setup) port
3	Setup port device (terminal or PC)

DECrepeater 90FS Installation and Configuration

Configuring the Module (Cont.)

Accessing the Setup Port

To access the setup port on the DECrepeater 90FS module, do the following:

1. Press Return on the setup port device a few times until a menu appears.

    a. If the module is connected to a DEChub 90 or is a standalone unit, the DECrepeater 90FS Installation Menu appears. Go to the section titled DECrepeater 90FS Installation Menu (Digital MultiStack System/ DEChub 90/Standalone Options).

    b. If the module is connected to the Hub Manager setup port on the DEChub 900, the Hub Manager Installation Menu appears (below).

2. Choose option 9; then go to the section titled Start Redirect Mode.

The following example shows the DEChub 900 MultiSwitch INSTALLATION MENU:

```
DEChub 900 MultiSwitch

=================================

DEChub 900 MultiSwitch INSTALLATION MENU

[1]  Reset with Factory Defaults
[2]  Reset with Current Settings
[3]  Show Current Settings
[4]  Configure IP...
[5]  Dump Error Log
[6]  Downline Upgrade
[7]  Configure Out-of-Band Port...
[8]  Start Event Display Mode
[9]  Start Redirect Mode...

=================================

     Enter selection number: 9 Return
```

Configuring the Module (Cont.)

Start Redirect Mode

The Start Redirect Mode option redirects the DEChub 900 Hub Manager setup port to the setup port of any network module (such as the DECrepeater 90FS) that is installed into the DEChub 900. Choosing this option allows you to configure or obtain status of an installed network module by accessing the module's installation menu.

After you choose the Start Redirect Mode option from the DEChub 900 MultiSwitch Installation Menu, the screen prompts you for a slot number as shown in the following example.

The following example shows you how to select a slot number:

```
                    Enter selection: 9
     ==============================
     Enter the slot number for redirection (1-8):  [n] Return
     Console redirected to 3: DECrepeater 90FS
     Attempting connection [Ctrl/C to abort]...
```

After you press Return, the DECrepeater 90FS Installation Menu appears on your screen.

DECrepeater 90FS Installation and Configuration

Configuring the Module (Cont.)

DECrepeater 90FS Installation Menu (DEChub 900 Options)

This section shows the options available from the DECrepeater 90FS Installation Menu when the module is installed in the DEChub 900 MultiSwitch.

Also, when your module is installed in the DEChub 900, the slot number in which the module is installed is shown at the top of the menu.

The following example shows the DECrepeater 90FS Installation Menu operating in a DEChub 900 configuration:

```
DECrepeater 90FS – slot 3
================================
      DECrepeater 90FS INSTALLATION MENU

[1]  Reset with Factory Defaults
[2]  Reset with Current Settings
[3]  Show Current Settings
[4]  Configure IP . . .
[5]  Dump Error Log
[6]  Downline Upgrade

[Ctrl/C] Return to Hub Manager Menu

================================
     Enter selection number : [n] Return
```

Go to the section titled Description of Menu Options.

Configuring the Module (Cont.)

DECrepeater 90FS Installation Menu
(Digital Multistack System/DEChub 90/Standalone Options)

This section shows the options available from the DECrepeater 90FS Installation
Menu when the module is installed in a DEChub 90 or as a standalone unit.

The following example shows the DECrepeater 90FS Installation Menu operating in
a DEChub ONE configuration:

```
     DECrepeater 90FS
     ==================================
         DECrepeater 90FS INSTALLATION MENU

     [1]  Reset with Factory Defaults
     [2]  Reset with Current Settings
     [3]  Show Current Settings
     [4]  Configure IP...
     [5]  Dump Error Log
     [6]  Downline Upgrade
     [7]  Configure Out-of-Band Port...
     [8]  Module Specific Options

         [Ctrl/C] Return to Hub Manage Installation Menu

     ==================================
         Enter selection number : [n] Return
```

Go to the section titled Description of Menu Options.

Configuring the Module (Cont.)

Description of Menu Options

This section describes the options that are available from the DECrepeater 90FS Installation Menu.

> **NOTE:** Note that the Out-of-Band and module specific menus do not apply when the module is installed in a DEChub 900.

[1] Reset with Factory Defaults

This option reboots the module, causing the module's configured NVRAM parameters to be initialized to factory default values.

If you want to reboot the module and retain the current settings, choose option 2, Reset With Current Settings.

> **CAUTION** ⚠ This action deletes all configured settings and replaces them with factory default values. All configuration settings will be lost.

> **NOTE:** Allow approximately 1 minute for the module to reset and complete self-test.

The following example shows the dialog associated with this option.

```
                        Enter selection : 1

 DECrepeater 90FS – slot 3
===========================================
                RESET WITH FACTORY DEFAULTS
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
    *    IMPORTANT!         IMPORTANT!          IMPORTANT!     *
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
    *  This selection will delete the current configuration   *
    *  settings and reset the system with the factory default *
    *  settings. All configuration settings will be lost.     *
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
===========================================

        Press Y to confirm [N] : Return
```

Configuring the Module (Cont.)

[2] Reset with Current Settings

This option reboots the module but leaves the module's configured NVRAM parameters at their current values.

> **NOTE:** Allow approximately 1 minute for the module to reset and complete self-test.

The following example shows the dialog associated with this option.

```
                      Enter selection : 2

  DECrepeater 90FS – slot 3
  =================================

                    RESET WITH CURRENT SETTINGS
       This selection will reset your system with the current
       configuration settings.

  =================================

       Press Y to confirm [N] :  Return
```

Configuring the Module (Cont.)

[3] Show Current Settings

This option shows the module's current settings.

> **NOTE:** If the module is being configured for the first time, some fields will be blank.

The following example shows the display associated with this option.

```
                    Enter selection : 3

   DECrepeater 90FS – slot 3
=======================================

DECrepeater 90FS, 2 port FO Ethernet Rptr SNMP, HW=v3,RO=v.01,SW=v2.0
SysUpTime                            : 01:39:11    14 resets
SNMP Read/Write Community            : public
SNMP Trap Addresses                  : Not Configured
Status of Last Downline Upgrade      : TFTP Read
                                       00:00:44  28 resets
                                       Transfer Complete.
Out-of-Band Management RTS           : Disabled                    1
BootP                                : Disabled
Interface    IP Address    Subnet Mask   Def.Gateway   Other Info
Ethernet Port 16.20.156.24 0.255.255.255 16.20.157.25  08-00-2B-A4-97-D3
OBM Port      16.20.158.26 255.0.0.0                    Speed 9600 bps
Hub Mastership Enable     : Off
Hub Master Configuration  : Not Configured

=======================================                            2

             Press Return for Main Menu ...
```

Item	Description
1 and 2	OBM port not displayed when in DEChub 900

Configuring the Module (Cont.)

[4] Configure IP

This option provides you with six IP configuration selections. The following six pages describe the IP Configuration menu.

The following example shows the dialog associated with this option.

```
========================================
                 Enter selection : 4

DECrepeater 90FS – slot 3
========================================

                 IP CONFIGURATION

        [1]  Set SNMP Read/Write Community
        [2]  Add SNMP Trap Addresses
        [3]  Delete SNMP Trap Addresses
        [4]  Set In-Band Interface IP Address
        [5]  Set Out-of-Band Interface IP Address
        [6]  Enable/Disable BootP
        [7]  Return to Main Menu

========================================


        Enter selection number : [n] Return
```

DECrepeater 90FS Installation and Configuration

Configuring the Module (Cont.)

[4] Configure IP (Cont.)

Option [1] Set SNMP Read/Write Community

This option prompts you to enter the community name. The community name can be used for read/write access control.

The factory default of this menu option sets the read/write community name to `public`.

The following example shows the dialog associated with this option.

```
=========================================

                 Enter selection : 1

DECrepeater 90FS - slot 3
=========================================

               SET SNMP READ/WRITE COMMUNITY

    Format:    The format for a community name is a string,
               consisting of 4 to 31 printable ASCII characters,
               that describes the relationship between an SNMP
               agent and one or more SNMP managers. The string
               defines the authentication mechanism that is employed
               to validate the use of the community by the sending
               SNMP entity.

=========================================


Enter the community string [public] : Engineering   Return

               SNMP Read/Write community string set.

               Press Return for IP Configuration Menu ...
```

Configuring the Module (Cont.)

[4] Configure IP (Cont.)

Option [2] Add SNMP Trap Addresses

This option prompts you to enter IP addresses to which SNMP traps will be sent from the DECrepeater 90FS.

If an SNMP trap address was previously configured, the screen displays the SNMP trap address.

The factory default of this menu option deletes all SNMP trap addresses.

> **NOTE:**   You can configure up to 8 SNMP trap addresses.

The following example shows the dialog associated with this option.

```
========================================
                 Enter selection : 2

DECrepeater 90FS
========================================
                ADD SNMP TRAP ADDRESSES

    Format:   The standard 4 octet dotted decimal notation in which
              each octet of the address is represented as a decimal
              value, separated by '.' character.

                        example: 16.20.40.156

========================================


    Trap address [ ] : 16.20.40.157   Return

Trap address added!  Enter a Trap Address [none] :   Return

    Press Return for IP Configuration Menu ...
```

DECrepeater 90FS Installation and Configuration

Configuring the Module (Cont.)

[4] Configure IP (Cont.)

Option [3] Delete SNMP Trap Addresses

This option prompts you to select SNMP trap addresses and delete them from the community trap address table.

The following example shows the dialog associated with this option.

```
========================================
                 Enter selection : 3

DECrepeater 90FS – slot 3
========================================
                 DELETE SNMP TRAP ADDRESSES

     Format:    The standard 4 octet dotted decimal notation in which
                each octet of the address is represented as a decimal
                value, separated by '.' character.

                      example: 16.20.40.156


========================================


     Configured SNMP Trap Addresses: 16.20.40.156

              Enter a Trap address [ ] : 16.20.40.156   Return

Trap address deleted.  Enter a Trap Address [none] : Return

              Press Return for IP Configuration Menu ...
```

Configuring the Module (Cont.)

[4] Configure IP (Cont.)

Option [4] Set In-Band Interface IP Address

This option prompts you for an IP address, subnet mask address, and a default gateway address. If an address was previously configured, the screen displays an in-band address. To remove an address, enter **0** in the appropriate address field.

The factory default of this menu option is no in-band addresses. The following example shows the dialog associated with this option.

```
=========================================
                  Enter selection : 4

DECrepeater 90FS – slot 3
=========================================
               IN-BAND IP ADDRESS CONFIGURATION

    Format:   The standard 4 octet dotted decimal notation in which
              each octet of the address is represented as a decimal
              value, separated by '.' character.

                     example: 16.20.40.156

    To delete the address, enter 0 in the appropriate address
    field.
Interface      IP Address    Subnet Mask   Def.Gateway   Other Info
Ethernet Port 16.20.156.24  0.255.255.255 16.20.157.25  08-00-2B-A4-97-D3
OBM Port      16.20.158.26  255.0.0.0     16.20.159.27  Speed 9600 bps

=========================================
        Enter the IP address  : 16.20.54.155   [Return]
        Enter the Subnet Mask : 255.255.0.0    [Return]              (1)
        Enter the Default Gateway  : 16.20.54.156   [Return]
              Press Return for IP Configuration Menu ...
```

Item	Description
1	Does not appear when the module is installed in a DEChub 900.

Configuring the Module (Cont.)

[4] Configure IP (Cont.)

Option [5] Set Out-of-Band Interface IP Address (Standalone Configuration)

This option prompts you for an IP address and a subnet mask address. If an address was previously configured, an out-of-band address is displayed.

The OBM feature allows you to manage your DECrepeater 90FS through the OBM port in addition to normal in-band management. To enable out-of-band management, you need to assign an OBM IP address and select an OBM port speed from the DECrepeater 90FS Installation Menu.

The factory default of this menu option is no out-of-band address.

The following example shows the dialog associated with this option.

```
============================================
                    Enter selection : 5

DECrepeater 90FS – slot 3
============================================
              OUT–OF–BAND IP ADDRESS CONFIGURATION

    Format:   The standard 4 octet dotted decimal notation in which
              each octet of the address is represented as a decimal
              value, separated by '.' character.

                       example: 16.20.40.156

    To delete the address, enter 0 in the appropriate address
    field.
 Interface     IP Address    Subnet Mask   Def.Gateway   Other Info
 Ethernet Port 16.20.156.24  0.255.255.255 16.20.157.25  08–00–2B–A4–97–D3
 OBM Port      16.20.158.26  255.0.0.0     16.20.159.27  Speed 9600 bps
============================================
        Enter the IP address  : 16.20.54.155  [Return]
        Enter the Subnet Mask : 255.255.0.0   [Return]
             Press Return for IP Configuration Menu ...
```

Configuring the Module (Cont.)

[4] Configure IP (Cont.)

Option [6] Enable/Disable BootP

This option allows you to enable/disable sending bootp requests.

The factory default of this menu option is `Disabled`.

The following example shows the dialog associated with this option.

```
=========================================
                   Enter selection : 6

DECrepeater 90FS – slot 3
=========================================


                   ENABLE/DISABLE BOOTP

     BOOTP is the IP bootstrap protocol.  BOOTP may be used
     to obtain the module's IP address, subnet mask, and default
     gateway.  When BOOTP is Enabled and the module is not configured
     with an IP address the module will send out BOOTP requests
     until it receives a response or is manually configured with
     an IP address.  When BOOTP is disabled, no BOOTP requests will
     be sent.

     The BOOTP server must be properly configured to return the
     address information.

=========================================

The BOOTP process is DISABLED
Would you like to ENABLE BOOTP Y/[N]
                   Press Return for Main Menu ...
```

DECrepeater 90FS Installation and Configuration

Configuring the Module (Cont.)

[5] Dump Error Log

This option displays error log dumps for use by Digital support personnel when analyzing system faults. Up to four error log dumps can be stored, and the most recent dump is displayed first.

The following example shows the display associated with this option.

```
                    Enter selection : 5

  DECrepeater 90FS – slot 3
 ===================================
                    DUMP ERROR LOG
            Current Reset Count: 14

 ===================================

        Entry       = 3
        Timestamp   =   0  32069352
        Reset Count = 13
        Watch Dog Interrupt!

Dump another entry Y/[N]? N  Return
 ===================================
No more Error Log entries.

                 Press Return for Main Menu ...
```

Configuring the Module (Cont.)

[6] Downline Upgrade

This option allows you to upgrade the module firmware (in nonvolatile flash memory). It prompts you to enter the load image file name and the IP address of your Trivial File Transfer Protocol (TFTP) load host.

Before initiating this option, be sure that the module that you are upgrading has been configured with an IP address (refer to option 4).

> **NOTE:** The module's IP address is retained at the completion of the downline upgrade process.

The following example shows an image file name and an IP address:

```
defmi110.bin and 16.20.54.156
```

The format of the image file name is specified according to the conventions used by your TFTP load host.

CAUTION ⚠ If power is interrupted during Stage 3 of the DLU process, the firmware image can become corrupted. Do not turn off power to the unit or perform any action that can cause the unit to lose power during Stage 3 of the DLU process.

The Downline Upgrade (DLU) Process

The DLU process consists of four stages:

- Stage 1 — Transferring firmware image

- Stage 2 — Verifying firmware image

- Stage 3 — Writing new firmware image into nonvolatile flash memory

- Stage 4 — Module reset and self-test

Table 1 describes what happens during each stage of the DLU Process.

DECrepeater 90FS Installation and Configuration

Configuring the Module (Cont.)

[6] Downline Upgrade (Cont.)

Table 1: DLU Process Description

Stage	What Happens
1	**The new firmware image from the TFTP load host is transported across the network and placed into a temporary storage buffer in the module.** Indications that this stage is in progress include: • Module status — functional and manageable. • Module can respond to management requests. • LED display — Module OK Off and Redundancy Enabled On. • HUB Manager display — `DECrepeater 90FS` `up` Typical time to complete this stage — approximately 1 minute. However, because of variations in network configurations (load path, bit rate, and traffic levels), this stage of the DLU process can take up to 10 minutes to complete.
2	**The module verifies that the firmware image is correct after Stage 1 is complete.** Indications that this stage is in progress include: • Module status — functional. • Module can respond to management requests. • LED display — Module OK On and Redundancy Enabled Off. • HUB Manager display — `DECrepeater 90FS` `up` Typical time to complete this stage — 15 seconds.
3	**The new firmware image is transferred from the module's temporary storage buffer to the flash RAM, overwriting the old firmware image.** **CAUTION** ⚠ If power is interrupted during Stage 3 of the DLU process, the firmware image can become corrupted. Do not turn off power to the unit or perform any action that can cause the unit to lose power during Stage 3 of the DLU process.

[6] Downline Upgrade (Cont.)

Table 1 (Cont.)   DLU Process Description

Stage	What Happens
	Indications that this stage is in progress include:
	• Module status — functional but not manageable.
	• Module cannot respond to management requests.
	• LED display — Module OK On and Redundancy Enabled On.
	• HUB Manager display — `DECrepeater 90FS` `unknown`
	Typical time to complete this stage — approximately 3 minutes.
4	**The module resets, runs self-test, and then begins executing the new firmware image.**
	Indications that this stage is in progress include:
	• Module status — not functional during reset and self-test.
	• Module cannot respond to management requests.
	• LED display — (standard self-test pattern) LEDs flash, indicating various subroutines are running.
	• HUB Manager display — `DECrepeater 90FS` `unknown`
	Typical time to complete this stage — 1 minute.
	After the successful completion of self-test, the Module OK↺ LED lights and the module becomes fully manageable. Note also that the HUB Manager display indicates:
	`DECrepeater 90FS` ` up`

Configuring the Module (Cont.)

[6] Downline Upgrade (Cont.)

Update the Firmware from the DECrepeater 90FS Installation Menu

When you select this option, the initial setup screen display appears (see the following example display). This screen identifies the option and alerts you not to interrupt power during the downline load.

The following example shows the dialog associated with this option.

```
         Enter selection : 6

    DECrepeater 90FS

=======================================

                  DOWNLINE UPGRADE

      This process upgrades the device's firmware (in
      nonvolatile flash memory). Enter the IP address of
      your TFTP (Trivial File Transfer Protocol) load host
      and the image file name when prompted.

    * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
    *      IMPORTANT!        IMPORTANT!        IMPORTANT!     *
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
    *   If power is interrupted during the downline load, the   *
    *   firmware image can be corrupted. Do not turn off power  *
    *   to the unit or perform any action that can cause the    *
    *   unit to lose power during a downline upgrade.           *
    * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

=======================================

            ... Press Return Key to Continue ...
```

Configuring the Module (Cont.)

[6] Downline Upgrade (Cont.)

After you press $\boxed{\text{Return}}$, the screen display prompts you to `Enter  the  Load Filename`:

- If the firmware image load file is located in the default TFTP directory, enter only the firmware image load filename.

- If the firmware image load file is not located in the default TFTP directory, enter the complete pathname along with the firmware image load filename.

The following screen display example shows the entry of a firmware image load file that is located in the default TFTP directory (pathname not required):

```
Enter the Load Filename []  defmi110.bin  Return
```

After you enter the firmware image load filename and press $\boxed{\text{Return}}$, the screen prompts you to enter the IP address of the TFTP server (load host):

```
Enter the Load Host IP Address []  :16.20.54.156  Return
```

The following screen and dialog appear when the module is installed into a DEChub 900:

```
Load will be initiated over the Ethernet Port network interface.

The device becomes nonfunctional for up to 10 minutes during the
time that the flash load is in progress.

When the load is complete the screen displays the message:
(Module not Responding!) This is normal.

   ... Press Return Key to Start Load [Ctrl/C to abort]...
```

If you press $\boxed{\text{Return}}$, the DLU process is initiated over the Ethernet Port network interface. If you pressed $\boxed{\text{Return}}$ for this selection go to the section titled Start the DLU Process.

Configuring the Module (Cont.)

[6] Downline Upgrade (Cont.)

Start the DLU Process

CAUTION ⚠ If power is interrupted during Stage 3 of the DLU process, the firmware image can become corrupted. Do not turn off power to the unit or perform any action that can cause the unit to lose power during Stage 3 of the DLU process.

NOTE: Because of variations in network configurations (load path and traffic levels), this initial stage of the DLU process can take up to 10 minutes to complete.

Initiate the process by pressing ⎡Return⎤ at the screen prompt. The screen displays the following message:

```
    DLU process started!
```

The firmware image is loaded into the module's temporary storage buffer, and the new firmware image is validated. The DLU process overwrites the old firmware image in the module's nonvolatile flash memory with the new firmware image.

Because the module is nonfunctional during the flash load process, communications between the module and the Hub Manager cannot take place. Therefore, the Hub manager status display and the setup screen display show the following messages:

NOTE: The following screen displays do not appear if you are initiating the load process from a DEChub 90 or a standalone unit.

Configuring the Module (Cont.)

[6] Downline Upgrade (Cont.)

Hub Manager Status Display

```
4: DECrepeater 90FS
unknown
```
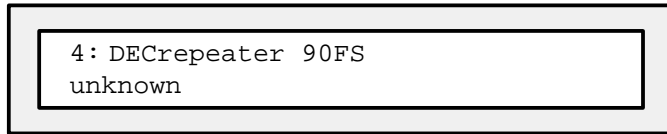
This is normal.

The following setup screen displays the message (only if the module is installed into a DEChub 900):

```
Module removed!   Connection closed!
```

This is normal.

When the the screen displays the following:

```
Module removed!   Connection closed!
```

Pressing Return displays the DEChub 900 Multiswitch Installation Menu

If the module is installed in a Digital MultiStack System, a DEChub 90, or as a standalone unit, the screen displays nothing automatically. After the load is completed, pressing Return displays the DECrepeater 90FS Installation Menu.

DLU Process Completion

When the DLU process is complete, the module resets and initiates self-test. After self-test completes successfully, the module exits from the DLU process and begins the execution of the new firmware image. The Module OK ↻ LED lights and the module becomes fully operational.

Configuring the Module (Cont.)

[7] Configure Out Of Band Port (Standalone only)

This option provides you with two configuration selections — set port speed and enable/disable RTS.

The following example shows the dialog associated with this option.

```
========================================
                 Enter selection : 7

DECrepeater 90FS – slot 3
========================================

                OUT-OF-BAND PORT CONFIGURATION

        [1]  Set Port Speed
        [2]  Enable/Disable RTS
        [3]  Return to Main Menu

========================================


        Enter selection number : [n] [Return]
```

Configuring the Module (Cont.)

[7] Configure Out Of Band Port (Standalone only) (Cont.)

Option [1] Set Port Speed

This option prompts you to select and enter the speed of your out-of-band management (OBM) port.

NOTE

The port speeds at each end of the communications link must be identical.

The factory default of this menu option sets the out-of-band port speed to `9600`.

The following example shows the dialog associated with this option.

```
========================================
                Enter selection : 1

DECrepeater 90FS
========================================
       SET OUT-OF-BAND MANAGEMENT INTERFACE PORT SPEED

                      [1]  2400 baud
                      [2]  9600 baud
                      [3] 19200 baud
                      [4] 38400 baud

========================================

           Enter selection [2] (9600) :4   Return
                  OBM port speed set.

              Press Return for Main Menu ...
```

Configuring the Module (Cont.)

[7] Configure Out Of Band Port (Standalone only) (Cont.)

Option [2] Enable/Disable Out-Of-Band Port RTS

This option allows you to enable/disable request to send (RTS) for additional control to modem communications. When you enable this option, the RTS signal on the OBM port is active only when data, such as an SNMP trap, is being transmitted to the OBM port. When you disable this option, RTS is always active. RTS is automatically disabled upon the completion of module self-tests.

NOTE

The port speed at each end of the communications link must be identical.

The factory default of this menu option is disabled.

The following example shows the dialog associated with this option.

```
========================================
                 Enter selection : 2

DECrepeater 90FS
========================================

                    ENABLE/DISABLE RTS

     Enable/Disable Request To Send (RTS) allows additional
     control to modem communications. When the RTS option is
     Disabled the RTS signal on the OBM port is asserted after
     self-test is completed and left asserted.  When the RTS
     option is Enabled the RTS signal is asserted only when there
     is data to be transmitted and deasserted after the data has
     been transmitted.

========================================


  RTS is Disabled. Would you like to Enable RTS? [N]

                 Press Return for Main Menu ...
```

Configuring the Module (Cont.)

[8] Module-Specific Options

This option provides module-specific selections. The sub-menu includes options to switch to OBM, to enable Hub Mastership mode (or disable, if Hub Mastership mode is already enabled), and to set Hub Mastership configuration. If the DECrepeater 90FS is operating in Hub Mastership mode, the sub-menu on page 56 is displayed.

The following example shows the dialog associated with this option.

```
DECrepeater 90FS
===================================
              DECrepeater 90FS Installation

              [1]  Switch to OBM
              [2]  Enable Hub Mastership Mode
              [2]  Set Hub Mastership Configuration
              [2]  Return to Main Menu
===================================
              Enter selection number : [n] Return
```

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

Option [1] Switch to OBM

This selection allows you to switch from setup mode to OBM mode.

NOTE

> The port speeds at each end of the communications link must be identical.

The following example shows the dialog associated with this option.

```
DECrepeater 90FS
===================================
              DECrepeater 90FS Installation

              [1]  Switch to OBM
              [2]  Enable Hub Mastership Mode
              [3]  Set Hub Mastership Configuration
              [4]  Return to Main Menu
===================================
               Enter selection number : 1  Return
              Press Y to confirm [N] : y  Return
              Press Return for Main Menu ...

Switching Console port to Out of Band Management mode

              Press Return for Main Menu ...
```

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

Option [1] Switch to OBM (Cont.)

After selecting the option to switch to OBM mode, do the following:

1. Change the cable at either the front-panel serial port on the module or at the OBM device by using one of the pair of cable/adapter pairs listed in the following table.

    a. If the OBM device uses the **same** cable as the setup port device, disconnect the cable from the setup port device, and install it into the OBM device (see illustration on the next page).

    b. If the OBM device uses a **different** cable than that used for the the setup port device, disconnect the cable from the front-panel serial port of the module, and connect the cable from the OBM device into the front-panel serial port of the module (see illustration on the next page).

Cable/Adapter Type	Connecting OBM Device
BN25G-xx[1]/H8585-AC[2]	A modem with a 25-pin D-Sub connector
BN25G-xx[1]/8585-AA	A PC with a 9-pin D-Sub communications port
BN24H-xx[1]/8584-AA	An 8-pin MJ terminal server

[1] xx indicates cable length in meters.

[2] Not for connection to public networks in Sweden, Germany, or Japan.

DECrepeater 90FS Installation and Configuration

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

Option [1] Switch to OBM (Cont.)

H8585-AA

H8585-AC *

H8545-AA

BN25G

BN24H

LKG-8991-94I
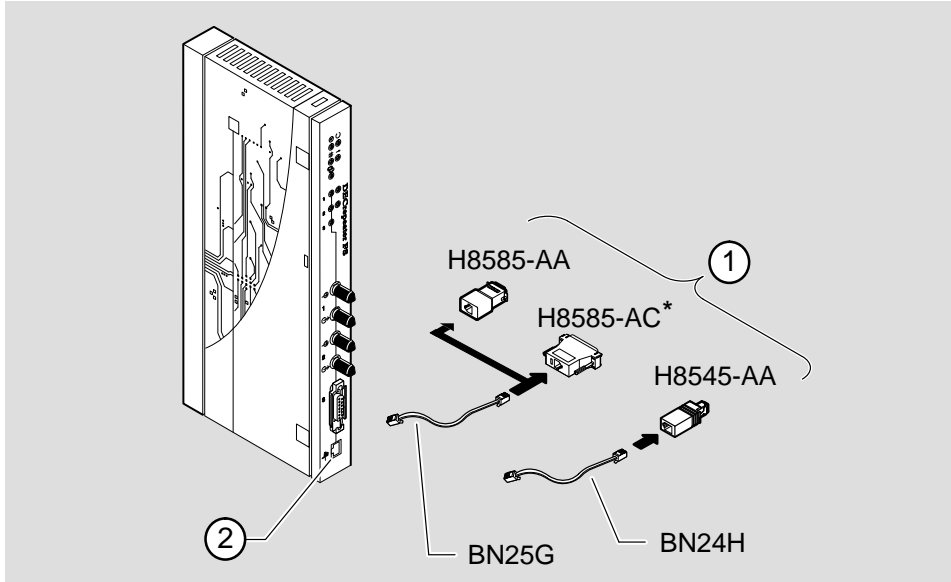
* Not for connection to public networks in Sweden, Germany, or Japan.

Item	Description
1	To OBM device
2	Front panel serial port

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

Option [1] Switch to OBM (Cont.)

    2. To end OBM mode and return to setup mode, do the following:

        a. Connect the cable from the front-panel serial port to a setup port device. (See the section titled Setup Port Device Cabling for more information.)

        b. Recycle the power to the module.

The setup port device displays the following message:

```
Type ctrl-C to end Out of Band Management mode.
```

        c. Press `Ctrl/C` on the setup port device within 30 seconds after the message is displayed on the setup port device to end the OBM session.

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

Option [2] Enable Hub Mastership Mode

The following example shows the dialog associated with this option when the IP address has not been previously set.

```
DECrepeater 90FS
====================================
                DECrepeater 90FS Installation

                [1]  Switch to OBM
                [2]  Enable Hub Mastership Mode
                [3]  Set Hub Mastership Configuration
                [4]  Return to Main Menu
====================================
                 Enter selection number : 2 [Return]

                Hub Mastership enabled!
                Please Return to Main Menu and set your IP address!

                Press Return for Main Menu ...
```

The following example shows the dialog associated with this option when the IP address has already been set.

```
DECrepeater 90FS
====================================
                DECrepeater 90FS Installation

                [1]  Switch to OBM
                [2]  Enable Hub Mastership Mode
                [3]  Set Hub Mastership Configuration
                [4]  Return to Main Menu
====================================
                 Enter selection number : 2 [Return]

                Hub Mastership enabled!
                Press Return for Main Menu ...
```

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

Option [2] Disable Hub Mastership Mode

If Hub Mastership Mode is already enabled, the following sub-menu is displayed. The following example shows the dialog associated with this option.

```
DECrepeater 90FS
===================================
              DECrepeater 90FS Installation

           [1]   Switch to OBM
           [2]   Disable Hub Mastership Mode
           [3]   Set Hub Mastership Configuration
           [4]   Return to Main Menu
===================================

            Enter selection number : 2  Return

           Hub Mastership disabled!
           Press Return for Main Menu ...
```

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

Option [3] Set Hub Mastership Configuration

This option provides you with four configuration selections. The following four pages describe the Hub Mastership configuration menu.

The following example shows the dialog associated with this option.

```
========================================
              Enter selection number : 3

 DECrepeater 90FS
 ========================================

              DECrepeater Hub Configuration


              Current Configuration:  Not Configured

              [1]  Set Configuration to Standalone
              [2]  Set Configuration to Single DEChub 90
              [3]  Set Configuration to DEChub 90 Pair
              [4]  Set Configuration to DECstack 90
              [5]  Return to Main Menu


 ========================================


              Enter selection number : [n] Return
```

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

Option [3] Set Hub Mastership Configuration (Cont.)

Option [1] Set Configuration to Standalone

This option configures your module to standalone.

The following example shows the dialog associated with this option.

```
========================================
              Enter selection number : 3

 DECrepeater 90FS
 ========================================

              DECrepeater Hub Configuration


              Current Configuration:  Not Configured

              [1]  Set Configuration to Standalone
              [2]  Set Configuration to Single DEChub 90
              [3]  Set Configuration to DEChub 90 Pair
              [4]  Set Configuration to DECstack 90
              [5]  Return to Main Menu

 ========================================


              Enter selection number : [1] Return

              Hub Configuration set to Standalone!

              Press Return for Main Menu ...
```

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

Option [3] Set Hub Mastership Configuration (Cont.)

Option [2] Set Configuration to Single DEChub 90

This option configures your module to a single DEChub 90.

The following example shows the dialog associated with this option.

```
========================================
                Enter selection number : 2

 DECrepeater 90FS
 ========================================

                DECrepeater Hub Configuration


                Current Configuration:  Not Configured

                [1]  Set Configuration to Standalone
                [2]  Set Configuration to Single DEChub 90
                [3]  Set Configuration to Pair of DEChub 90s
                [4]  Set Configuration to DECstack 90
                [5]  Return to Main Menu


 ========================================



                Enter selection number : [2] Return

            Hub Configuration set to Single DEChub 90!
            You will have to reset to current settings before this
            selection will take effect.

            Press Return for Main Menu ...
```

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

Option [3] Set Hub Mastership Configuration (Cont.)

Option [3] Set Configuration to Pair of DEChub 90 devices

This option configures your module to manage the modules in a pair of DEChub 90s.

The following example shows the dialog associated with this option.

```
==========================================
                Enter selection number : 2

 DECrepeater 90FS
 ==========================================

                DECrepeater Hub Configuration


                Current Configuration:  Not Configured

                [1]  Set Configuration to Standalone
                [2]  Set Configuration to Single DEChub 90
                [3]  Set Configuration to Pair of DEChub 90s
                [4]  Set Configuration to DECstack 90
                [5]  Return to Main Menu


 ==========================================


                Enter selection number : [3] Return

            Hub Configuration set to Pair of DEChub 90s!
            You will have to reset to current settings before this
            selection will take effect.

            Press Return for Main Menu ...
```

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

Option [3] Set Hub Mastership Configuration (Cont.)

Option [4] Set Configuration to DECstack 90

This option configures your module to a manage a DIgital MultiStack System.

The following example shows the dialog associated with this option.

```
========================================
               Enter selection number : 2

 DECrepeater 90FS
 ========================================

              DECrepeater Hub Configuration


              Current Configuration:  Not Configured

              [1]  Set Configuration to Standalone
              [2]  Set Configuration to Single DEChub 90
              [3]  Set Configuration to Pair of DEChub 90s
              [4]  Set Configuration to DECstack 90
              [5]  Return to Main Menu


 ========================================


               Enter selection number : [4] Return

          Hub Configuration set to DECstack 90!
          You will have to reset to current settings before this
          selection will take effect.

          Press Return for Main Menu ...
```

LED Descriptions

The module LEDs provide dynamic indications of module status. Flashing LEDs indicate special situations.

Table 2 shows the static states that are possible for each of the module LEDs.

Table 2   Module LED States

LED Name	Icon	Off	On	Flashing
Power	⊘	No power to module.	Module receiving power.	Faulty power connection or insufficient power.
Module OK	↻	After 1 minute, self-test failed.	Module passed self-test.	N/A
Network OK	⊞	ThinWire 10Base2 port not connected to a properly terminated and operational LAN.	ThinWire 10Base2 port connected to a properly terminated and operational LAN	ThinWire 10Base2 port is disabled by network management.
Network Activity	-->	No network activity.	Heavy traffic.	Flashes more rapidly and appears brighter as network traffic increases.
Redundancy Enabled	◔	The fiber-optic ports operating as independent ports.	The fiber-optic ports operating as a redundant port pair in master mode.	One or both of the fiber-optic ports on the module operating as a redundant responder.
Port State		Associated port not properly connected to another operational network device.	Associated port properly connected to another operational network device.	Flashing once per second — the associated port disabled by network management.
Port Link		Associated fiber-optic receiver not detecting sufficient light or not connected.	Associated fiber-optic receiver detecting sufficient light.	An intermittent connection on associated fiber-optic port.

Problem Solving Using the LEDs

When diagnosing a problem with the module, note that the problem is often indicated by the *combined* states of the module LEDs. Table 3 lists the states of the LEDs for various error conditions that can occur during initial installation of the device, along with probable causes and corrective actions to take.

Normal Powerup

When power to the module is initially turned on, the following events occur:

1. The Power ⌿ LED lights and stays lit. All other LEDs light for a few seconds, then turn off. This verifies that the individual LEDs are operational (defective LEDs do not light.

2. The module initiates its built-in self-test.

3. After the successful completion of self-test (within 1 minute), the Module OK ⟳ LED lights, and remains lit.

4. The remaining LEDs indicate their operational status.

Table 3   Problem Solving Using the LEDs

Symptom	Probable Cause	Corrective Action
All LEDs are off.	The module does not have power.	**If the module is installed as a standa-lone unit or in a stack:**
		Secure the power cable at the back cover and between the power supply and the wall outlet.
		Check the wall outlet using another appliance or light, or plug the power cord into another outlet. If no power is available, check the wall outlet's circuit breaker.
		If the problem persists, replace the power supply or the module.
		If the module is installed into either the DEChub 900 or the DEChub 90:
		Reseat the module.

Table 3 (Cont.)   Problem Solving Using the LEDs

Symptom	Icon	Probable Cause	Corrective Action
All LEDs are off.		The module does not have power.	Remove the module and inspect the module's 48-pin connector for bent, broken, or dirty pins.
			If any pins are broken or bent, replace the module.
			If no pins are broken or bent, reinstall the module.
			If the problem persists, replace module.
Power LED is off.	⊘	Faulty power LED.	Replace the module.
Power LED is flashing.	⊘	Faulty power LED.	Replace the module.
		Faulty DEChub 900 or DEChub 90 slot connection.	Reinstall the module into another slot of the DEChub 900, or into the other slot (either 7 or 8) or the DEChub 90.
		Power supply is faulty.	Replace the appropriate power supply.
Module OK LED is off.	↻	Module does not have sufficient power.	Ensure Power LED is on.
		Self-test is in progress.	Wait up to 1 minute for self-test to complete.

Problem Solving Using the LEDs (Cont.)

Table 3 (Cont.) **Problem Solving Using the LEDs**

Symptom	Icon	Probable Cause	Corrective Action
Module OK LED is off.	↻	Self-test failed.	If the LED does not light after 1 minute, reseat the module to repeat the self-test.
			If the self-test fails again, replace the module.
Port Link LED is off.		Associated port connection is faulty.	Check that the fiber-optic cables and connections are properly installed.
Port 1 or 2 State LED is off.		Associated port is not properly connected to another operational network device.	Ensure that the port link LED is on.
			If not, properly connect the associated port to network or station.
			Reseat the cable.
			If problem persists, replace the cable.
		Associated port is autopartitioned.	N/A.
Port 3 state LED is off.		AUI port has no connection or the connection is faulty.	If the module is installed into a DEChub 90, ensure that the module is installed into either slot 7 or 8.
			Verify that the MAU (if one is installed) and connectors are installed correctly and operating properly.
Port state LED is flashing.		Associated port is disabled by network management.	Enable the associated port.

Redundant Fiber-Optic Link Configuration

Introduction

This section describes the configuration and implementation of the redundant-link pair (RLP) of Ethernet 10BaseFL links. Redundant-link configuration refers to two Ethernet links that are configured on a single LAN to provide greater fault tolerance than a single port-to-port configuration provides.

CAUTION ⚠ You must configure the fiber-optic links by using HUBwatch before connecting the cables. Failure to do so can seriously impair performance on that segment of the LAN.

Major Components

Redundant links consist of the following major components:

- Redundant-Link Pair

- Master port pair

- Responder ports

- Nonresponder ports

- Master control algorithm (MCA)

- Primary link

- Secondary link

Redundant-Link Pair

The redundant-link pair (RLP) is a pair of links that provide fault-tolerant communication in the event of transmitter, receiver, or cable failures.

Master Port Pair

The master port pair is the pair of manageable ports that reside on the module that contains the master control algorithm. One link of the master port pair is the primary link; the other is the secondary link.

Redundant Fiber-Optic Link Configuration (Cont.)

Responder Ports

A responder port, (referred to as a responder) is a manageable port that can detect a failure on its receive link and signal the master port that there is a failure.

Responder ports enable full fault detection.

Nonresponder Ports

A nonresponder port is a port that cannot signal the master that there is a failure. Use of nonresponder ports in a redundant-link pair provides only partial fault detection.

Responder and nonresponder ports reside on a separate module from that of the master port, but must reside on the same LAN or extended LAN.

The responder and nonresponder ports can reside on the same module as each other or on separate modules.

Master Control Algorithm

The master control algorithm (MCA) resides within the module that is assigned as the master and contains the master port pair. The MCA does the following tasks:

- Controls the active and standby status of each of the two ports of the master port pair.

- Monitors and reports the states of both links, and stores the status information in a MIB.

- Counts the number of link state transitions and stores the information in a MIB.

Primary Link

The primary link is the active link at the module initialization time and after a reset. The user, via HUBwatch specifies which port of the master port pair is primary.

Secondary Link

The secondary link, assigned by the MCA, is the inactive link at the module initialization time and after a reset. The secondary link becomes active if the MCA detects a failure in the primary link.

The primary and secondary links retain their primary and secondary assignments. They change only their active and inactive roles.

Redundant Fiber-Optic Link Configuration (Cont.)

How does it work?

The MCA controls the redundant-link operation by:

- Enabling the primary link at initialization time (assuming that there are no failures on that link).

- Monitoring the primary link status for failures.

- When it detects a failure of the primary link, it does the following:

  - Disables the primary link.

  - Enables the secondary link.

  This typically occurs within 3 to 6 milliseconds (10 milliseconds maximum). Once the primary link is repaired, it remains inactive until one of the following events occur:

  - The MCA detects a failure in the secondary link.

  - The secondary port is internally partitioned or disabled.

  - The module is rebooted.

Basic Configuration

The basic redundant-link configuration consists of a pair of master ports on the same module and two remote ports on one module or on separate modules. These ports must reside on the same LAN or extended LAN.

> **NOTE:** This configuration does not result in a repeater loop because only one of the links is active at one time.

The remote ports can be one of two types: a responder port or a nonresponder port. A responder port provides full fault detection. A nonresponder port provides only partial fault detection.
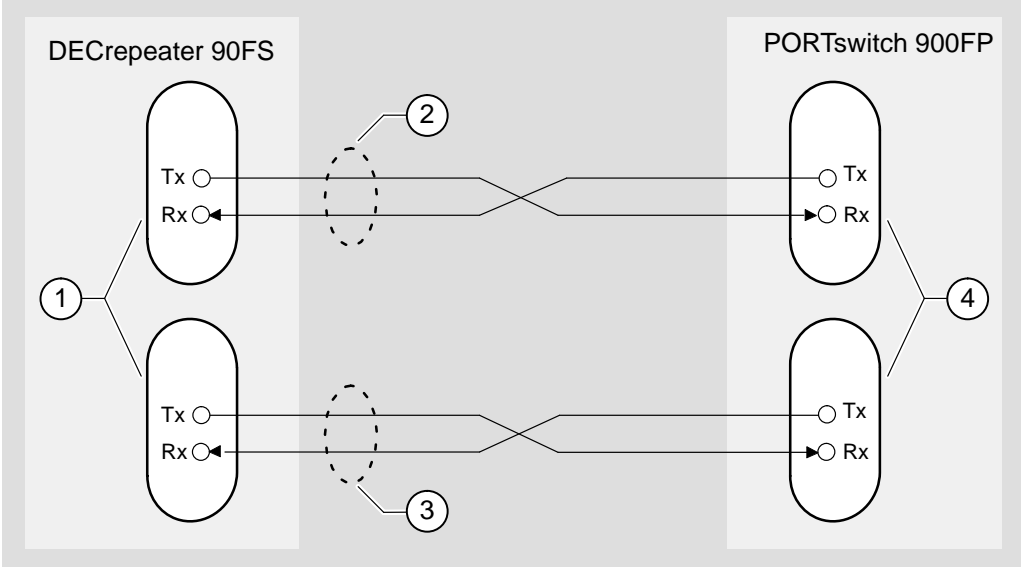
Configurations

Simple Redundant-link Configuration

In its simplest form, a redundant link consists of a pair of master ports that reside on one module, and a pair of responder or nonresponder ports on a remote module. (See the figure below.)

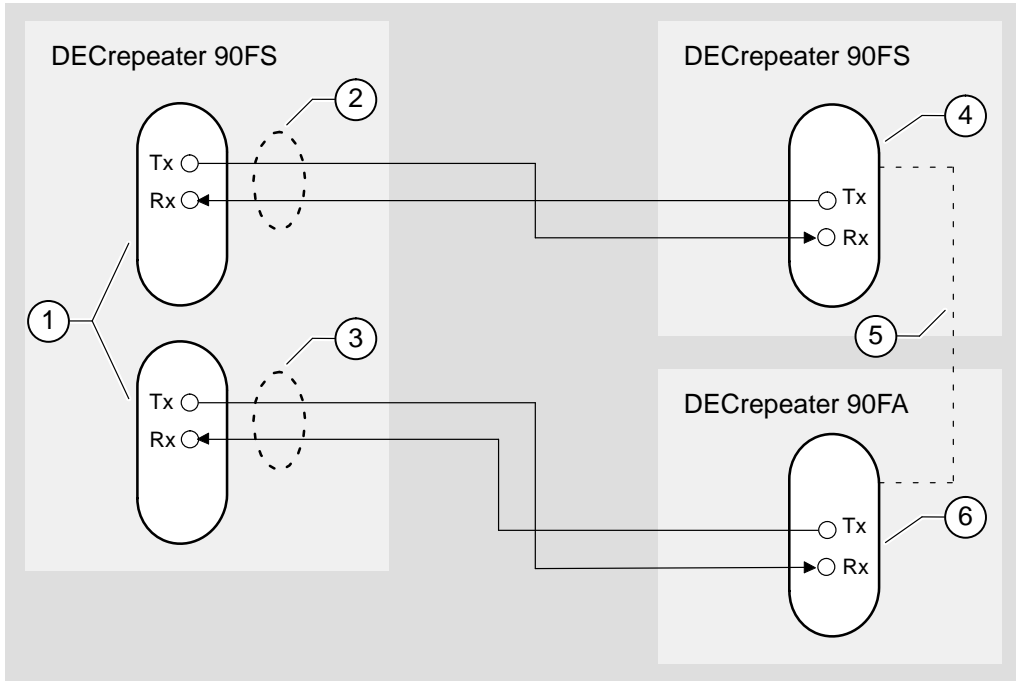### Simple Redundant-Link Configuration Example

NPG-0097-95I

Item	Description
1	Master port pair
2	Primary link
3	Secondary link
4	Single responder ports, nonresponder ports, or a combination.

Complex Redundant-link Configuration

A complex redundant-link configuration consists of a master port pair and responder ports, nonresponder ports, or a combination of the two. The responder or nonresponder ports reside on separate modules, as shown in the figure below.

Complex Redundant-Link Configuration Example

NPG-0098-95I

Item	Description
1	Master port pair
2	Primary link
3	Secondary link
4	Single responder port
5	A backbone link between these ports
6	Single nonresponder port

Redundant Fiber-Optic Link Configuration (Cont.)

Fault Detection

Partial Fault Detection

Partial fault detection allows the DECrepeater 90FS to achieve limited fault tolerance with connections to nonresponder repeaters such as the PORTswitch 900FP or the DECrepeater 90FS. (See the figure on page 72.) When the link is configured for partial fault tolerance, the MCA disables the primary port and enables the secondary port under the following circumstances:

- A link failure of the master's primary receive port

- Partitioning of the primary port

- One of the following internally detected failures:
    - An excessive number of collisions
    - An excessively long collision
    - Received jabbering
    - Internally detected MAU failure

Partial fault detection adequately detects most failure conditions. However, it cannot detect a link failure to the nonresponder receive port.

Redundant Fiber-Optic Link Configuration (Cont.)

Fault Detection (Cont.)

Partial Fault Detection Configuration Example
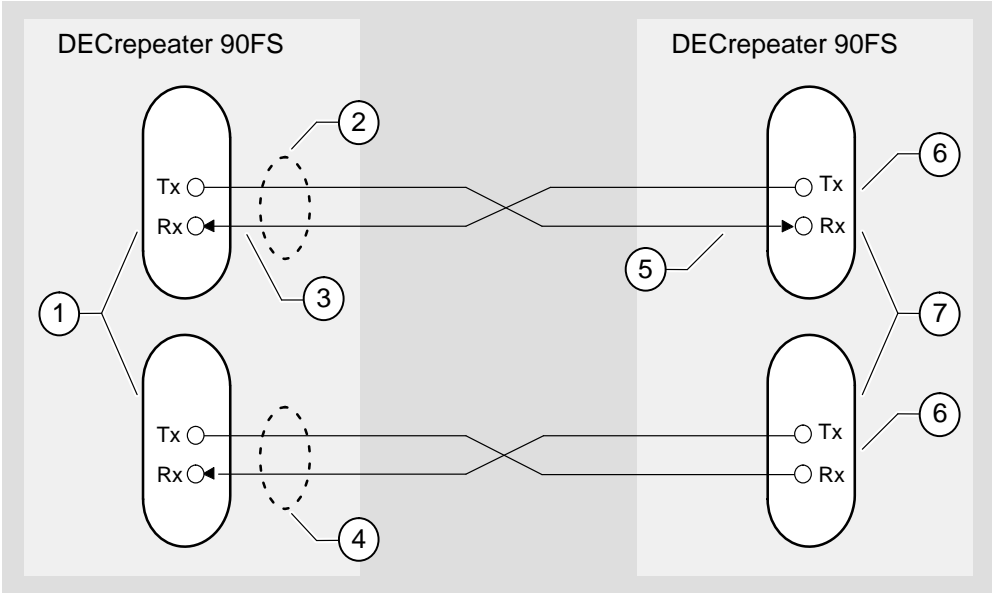
NPG-0099-95

Item	Description
1	Master port pair.
2	Primary link (initially active).
3	The master **can** detect a link failure here.
4	Secondary link (initially standby and disabled).
5	The master **cannot** detect a link failure here.
6	Single nonresponder port (always enabled).
7	These ports can be on the same module or separate modules.

Redundant Fiber-Optic Link Configuration (Cont.)

Fault Detection (Cont.)

Full Fault Detection

The DECrepeater 90FS supports full fault detection. When the DECrepeater 90FS ports are connected to the ports of another repeater that supports this feature, such as another DECrepeater 90FS, failures are detected at either end of the receive or transmit link. (See the figure on page 74.)

If the responder's receive port detects a link failure, the responder signals the MCA. This allows the MCA to disable the active port and enable the inactive port.

Fault Detection (Cont.)

Full Fault Detection Configuration Example
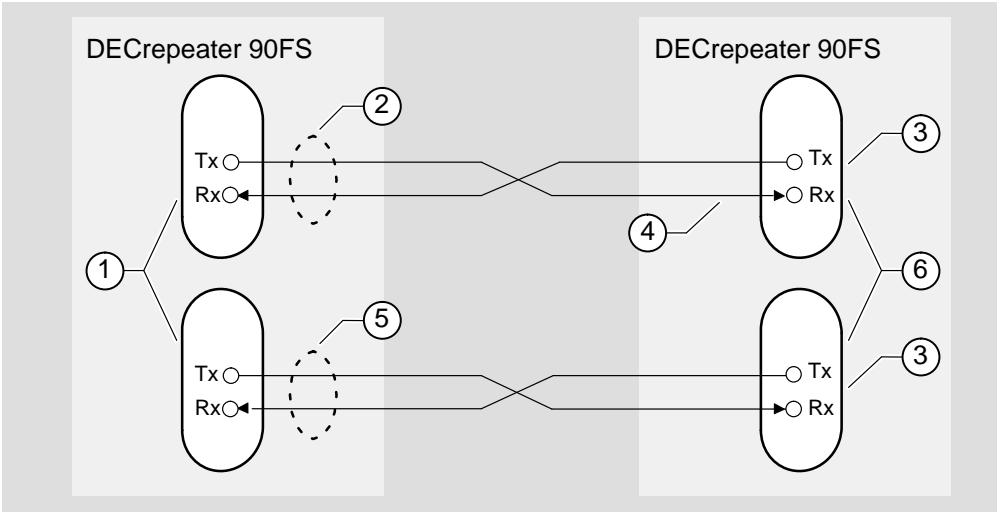
NPG-0100-9

Item	Description
1	Master port pair.
2	Primary link (initially active).
3	Single responder port (always enabled).
4	The master **can** detect a link failure here.
5	Secondary link (initially standby and disabled).
6	These ports can be on the same module or separate modules.

Fault Detection (Cont.)

Fault Detection Comparison

The table below shows the difference in failure detection between partial fault detection and full fault detection.

Table 4 Comparison of Partial Fault Detection to Full Fault Detection

If a link failure occurs in the master port's...	Then partial fault detection...	Then full fault detection...
TX Link	Does not detect the failure	Detects the failure
RX Link	Detects the failure	Detects the failure

Recommendations for Redundant-Link Configuration

Consider the following recommendations when configuring the DECrepeater 90FS as redundant links:

- Use responder ports (rather than nonresponder ports) whenever possible.

- If you use a combination of responder ports and nonresponder ports, assign the responder ports to the primary link and the nonresponder ports to the secondary link.

- Assign the remote ports (responder or nonresponder) to separate modules to ensure that one of the two remote ports is functional if a remote module fails.

- Whenever possible, configure primary and secondary link cables into separate pathways to avoid a single point of failure.
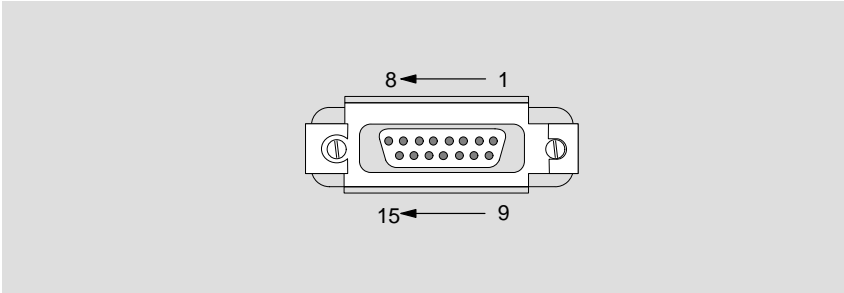
Connector Pin Assignments

This section illustrates connectors and their pin assignments.

> **NOTE:** The H8575-A and H8585-AC adapters cannot be used to connect public networks in Sweden, Germany, or Japan.

AUI (15-pin D-Sub) Connector

The following illustration shows a 15-pin AUI connector and its pin assignments:

LKG-0222-93I

Item	Description	Item	Description
1	Ground	9	CI–
2	CI+	10	DO–
3	DO+	11	Ground
4	Ground	12	DI–
5	DI+	13	Power (12V)
6	Power rtn	14	Ground
7	NC	15	NC
8	Ground		

Connector Pin Assignments (Cont.)

Serial Port (8-pin MJ) Connector

The following illustration shows the front-panel serial port 8-pin MJ connector and its pin assignments:
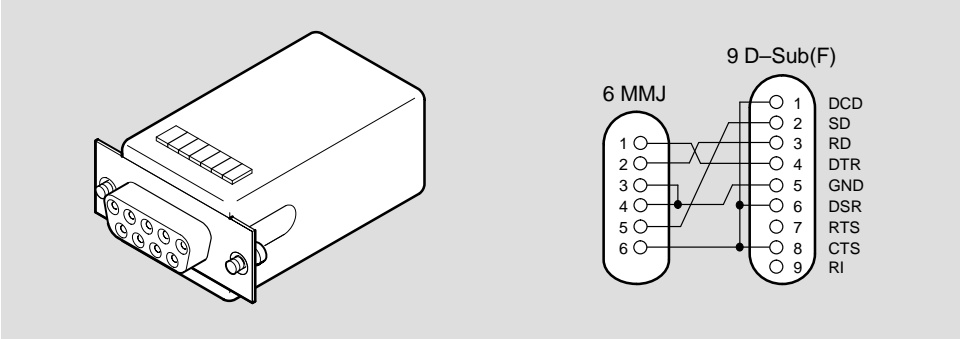
Pin   1 ——► 8
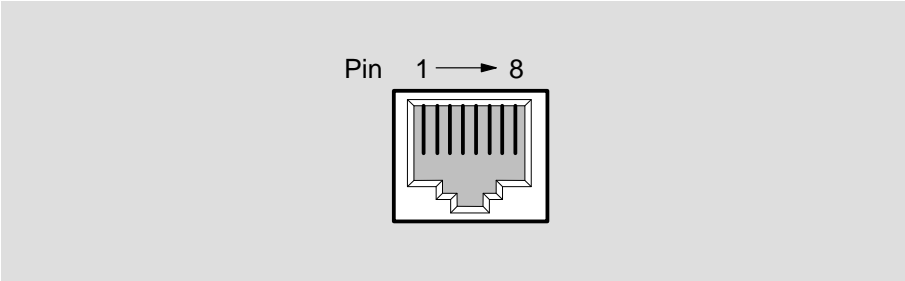
LKG-8719-93I

Item	Description	Item	Description
1	Ground	5	RTS
2	RX	6	TX
3	Ground	7	DTR
4	CTS	8	DSR

Connector Pin Assignments (Cont.)
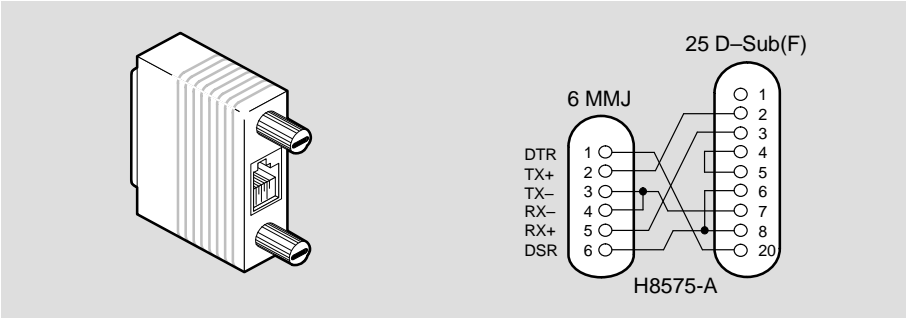
H8571-J Adapter

The following illustration shows the H8571-J adapter (6-pin MMJ to 9-pin D-Sub connector) and its pin assignments:

LKG-5342-91I

H8575-A Adapter

The following illustration shows the H8575-A adapter (6-pin MMJ to 25-pin D-Sub connector) and its pin assignments:

LKG–8793–93I

DECrepeater 90FS Installation and Configuration

Connector Pin Assignments (Cont.)

H8585-AC Adapter

The following illustration shows the H8585-AC adapter (8-pin MJ to 25-pin connector) and its pin assignments:

LKG–6975-92I

H8584-AA Adapter

The following illustration shows the H8584-AA adapter (8-pin MP to 6-pin MJ connector) and its pin assignments:
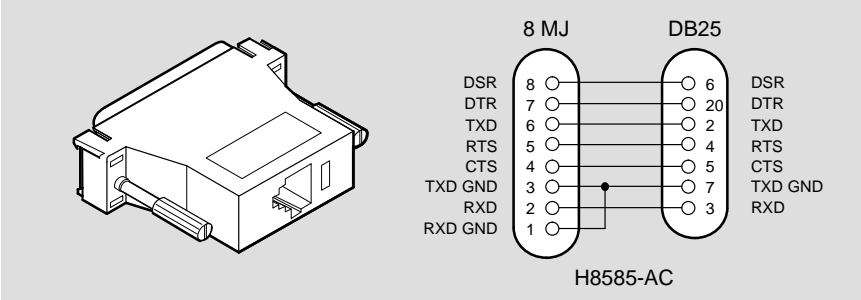

LKG–6972-92I

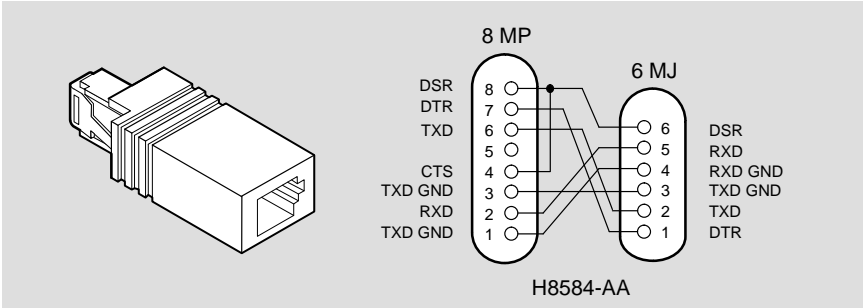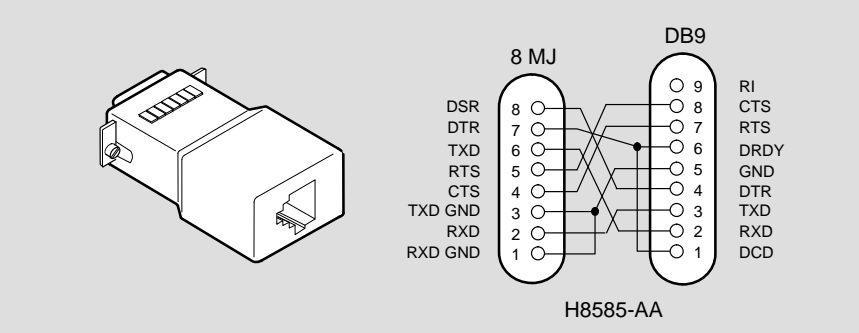# Connector Pin Assignments (Cont.)

H8585-AA Adapter

The following illustration shows the H8585-AA adapter (8-pin MJ to 9-pin DB connector) and its pin assignments:

LKG–6973-92I

DECrepeater 90FS Installation and Configuration

Fiber-Optic Loss Budget

This section describes the calculated fiber-optic loss budget for the DECrepeater 90FS.

Note the labeling on the fiber-optic cable that is being installed with the DECrepeater 90FS. Cables are tagged according to fiber type (for example, 50/125-, 62.5/125-, 85/125-, or 100/140-micron fiber), and the attenuation of each cable is also characterized and recorded.

10BaseFL Loss Budget

Table 5 shows the calculated loss budget for 10BaseFL fiber-optic segments used to interconnect the DECrepeater 90FS with the cable plant. These measurements account for the connectors at either end of the segment and are calculated using the transmit and receive optical power levels in decibels of optical power referenced to one milliwatt (dBm).

> **NOTE:** When connecting the cables to other devices, take into account the transmit and receive optical power levels of the other devices.

Table 5 10BaseFL Worst-Case Loss Budget (0ºC to 50ºC, End of Life[1])

Measurement	Unit of Measure	Multimode, Graded Index Fiber Size (Microns)			
		50/125	62.5/125	85/125	100/140
Numerical aperture	NA	0.2	0.275	0.26	0.3
Minimum average transmit power ($P_{T(avg)}$)	dBm	−22.8	−19.0	−16.8	−13.5
Minimum average receive sensitivity ($P_{R(avg)}$)	dBm	−32.5	−32.5	−32.5	−32.5
10BaseFL loss budget ($P_{T(avg)} - P_{R(avg)}$)	dB	9.7	13.5	15.7	19.0

[1] No additional degradation is used. It is included in the vendor's specified power calculations.

> **NOTE:** To ensure accurate measurements, do not measure optical power levels from cables connected to ports that are operating as responders in a redundant-link configuration. (Refer to the section titled Redundant Fiber-Optic Link Configuration.)

Fiber-Optic Loss Budget (Cont.)

FOIRL Compatibility

The IEEE 802.3 standard for fiber-optic interrepeater link (FOIRL) devices specifies *peak* power levels.

The standard specifies a −27.0 dBm minimum peak receive power ($P_{R(avg)} = -30.0$ dBm). This power level represents a 2.5 dB lower receive sensitivity. The worst-case loss budget for FOIRL-compliant devices should include this decrease in receive sensitivity.

Table 6 shows the calculated loss budget, in peak levels, for FOIRL-compliant fiber-optic segments.

Table 6 FOIRL Worst-Case Loss Budget (0ºC to 50ºC, End of Life[1])

Measurement	Unit of Measure	Multimode, Graded Index Fiber Size (Microns)			
		50/125	**62.5/125**	**85/125**	**100/140**
Minimum peak transmit power ($P_{T(peak)}$)	dBm	−19.8	−16.0	−13.8	−10.5
Minimum peak receive power ($P_{R(peak)}$)	dBm	−27.0	−27.0	−27.0	−27.0
FOIRL loss budget	dB	7.2	11.0	13.2	16.5

[1] No additional degradation is used. It is included in the vendor's specified power calculations.

The IEEE 802.3 standard specifies a maximum receive power level of −9.0 dBm peak or −12.0 dBm average for FOIRL and 10BaseFL devices, respectively.

When calculating the loss budget for fiber-optic devices, ensure that the higher output from the DECrepeater 90FS, in conjunction with the increased launch power into the two largest fiber sizes (85/125 and 100/140 microns), does not overload the receivers.

Fiber-Optic Loss Budget (Cont.)

The loss budget for fiber-optic devices should include the maximum launch power amounts, as shown in Table 7.

Table 7 DECrepeater 90FS Best-Case Maximum Launch Power

Measurement	Unit of Measure	Multimode, Graded Index Fiber Size (Microns)			
		50/125	62.5/125	85/125	100/140
Maximum peak transmit power	dBm	−12.8	−9.0	−6.8	−3.5
Maximum average transmit power	dBm	−15.8	−12.0	−9.8	−6.5

When the DECrepeater 90FS is connected to short lengths of 85/125-micron or 100/140-micron fiber-optic cable, the connection might require additional attenuation to prevent exceeding the −9.0 dBm peak (−12 dBm average) received power level. To make that determination, do the following:

1. Subtract the cable's characterized attenuation value from the value listed in Table 7.

2. If the result of this calculation is less negative than −9.0 dBm peak (−12.0 dBm average), connect the fiber-optic cable to the DECrepeater 90FS and measure the actual power level at the opposite end of the cable to determine whether additional attenuation is required.

If required, attenuators (such as Fotec part number A-450-A) can be obtained from Fotec, Inc. in Charlestown, Massachusetts, or contact other fiber-optic vendors for an equivalent part.

Product Specifications

Table 8 provides operating specifications for the DECrepeater 90FS module. Note the additional parameters (listed in the tables) to consider when the module is installed as a standalone unit.

Table 8   Operating Specifications

Parameter	Specification
Operating Environment	
Operating Temperature[1]	5° C to 50° C (41° F to 122° F)
Relative Humidity	10% to 95% noncondensing
Altitude	Sea level to 4900 m (16,000 ft)

Power	15.0 W, total power
	  1.5 A, 5Vdc,
	  0.5 A, 12Vdc[2]
	  0.0 A, 15Vdc

Connectors	
2 fiber-optic, 1 AUI, 1 MJ-8	
Physical	
Height	29.2 cm (11.5 in)
Width	3.2 cm (1.25 in)
Depth	11.2 cm (4.4 in); 13.5 cm (5.3 in) when installed as a standalone unit.
Weight	0.82 kg (1.5lb); 1.09 kg (2.0 lb) when installed as a standalone unit.
Certification	
CE, CSA, FCC,TÜV, UL, VCCI	

[1] For sites above 4900 m (16,000 ft), decrease the operating temperature specification by 1.8° C for each 1000 m or 3.2°F for each 3200 ft.

[2] The 12V power in the DEChub 900 is derived from the 15V power source. Although it is listed separately in the product specifications, the 12V requirements are included in the 15V power total.

Product Specifications (Cont.)

Table 9 provides acoustic specifications for the module.

Table 9   Acoustical Specifications

Acoustics — Declared values per ISO 9296 and ISO 7779[1]

Product	Sound Power Level L_{WAd}, B	Sound Pressure Level L_{pAm}, dBA (bystander positions)
	Idle/Operate	*Idle/Operate*
DEFMI	4.5	31
DEFMI + H7827–BA	4.5	32

Schallemissionswerte — Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779[2]

Produkt	Schalleistungspegel L_{WAd}, B	Schalldruckpegel L_{pAm}, dBA (Zuschauerpositionen)
	Leerlauf/Betrieb	*Leerlauf/Betrieb*
DEFMI	4,5	31
DEFMI + H7827–BA	4,5	32

[1] Current values for specific configurations are available from Digital Equipment Corporation representatives. 1 B = 10 dBA.

[2] Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen erhältlich. 1 B = 10 dBA.

Associated Documents

The following documents provide related information about the module. Ordering information is provided at the back of this manual.

Title and Order Number	Description
Digital MultiStack System Stacking Unit Installation and Configuration EK–DETXX–IN	Describes how to install, configure, and monitor a Digital MultiStack System.
DEChub 900 MultiSwitch Owner's Manual EK–DH2MS–OM	Provides installation, use, security, and troubleshooting information for the DEChub 900 MultiSwitch.
HUBwatch Installation and Configuration AA–Q3S8C–TE	Provides information for installing and configuring HUBwatch for Open VMS and HUBwatch for Windows.
HUBwatch for Windows Use AA–Q3S3E–TE	Provides network management and DEChub 900 functionality information for HUBwatch for Windows.
HUBwatch Use AA–PW4BE–TE	Provides network management and DEChub 900 functionality information for HUBwatch for OpenVMS and OSF.
DEChub 90 Owner's Manual EK-DEHUB-OM	Provides installation, use, security, and troubleshooting information.
Open DECconnect Applications Guide EC–G2570–42	Provides information to help plan and install networking systems based on Digital's OPEN DECconnect System and networking products.

Documentation Comments

If you have any comments or suggestions to improve the quality and usability of this book or any of the DECrepeater documents, please send them to the Network Integration Products Group.

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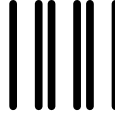
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