

PORTswitch 900FP

Installation and Configuration

Order Number: EK-DEFMM-IN. C01

August 1995

This manual describes how to install and configure the PORTswitch 900FP module.

Revision/Update Information: This is a revised manual.

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Contents

Preface

About this Manual	ix
Safety	xv

1 PORTswitch 900FP Description

Overview	1-1
Module Features	1-2
Module Components.....	1-4

2 Installing the Module

Overview	2-1
Installing the Module.....	2-2
Before Connecting the Cables.....	2-5
Configuring the Ports	2-6

3 Configuring the Module

Overview	3-1
Setup Port Description.....	3-2
Accessing the Setup Port	3-5
DEChub 900 MultiSwitch Installation Menu.....	3-6
PORTswitch 900FP Installation Menu (DEChub 900 Options)	3-8
PORTswitch 900FP Installation Menu (DEChub ONE Options).....	3-9

Description of Menu Options 3-10

4 Removing the Module

Overview 4-1
How to Remove the Module 4-2

5 Problem Solving

Overview 5-1
LED Descriptions 5-2
Problem Solving Using the LEDs 5-6

A Redundant-Link Configuration

Overview A-1
Major Components A-2
Redundant-Link Components A-3
Redundant-Link Operation..... A-5
Configurations..... A-6
Fault Detection..... A-8

B Fiber-Optic Loss Budget

Overview B-1
10BaseFL Loss Budget..... B-2
FOIRL Compatibility..... B-4
Maximum Launch Power B-6

C Connector Pin Assignments

Overview C-1
Adapters C-2

D Remote Monitor Alarms and Events

Overview D-1
Alarms and Events Description D-2
Configured Alarms and Events..... D-3

E Product Specifications

OverviewE-1
Operating Environment SpecificationsE-2
Connector and Physical SpecificationsE-3
Acoustical Specifications.....E-5

Figures

Figure 1-1	PORTswitch 900FP Front Panel.....	1-5
Figure 1-2	PORTswitch 900 FP Back Panel.....	1-7
Figure 2-1	Installing the module	2-3
Figure 2-2	Initial LED Operation	2-4
Figure 2-3	Redundant-Link Pairs.....	2-8
Figure 2-4	Separate Independent Ports.....	2-9
Figure 3-1	Setup Port Cabling	3-4
Figure 4-1	Disconnect the Cables	4-2
Figure 4-2	Remove the Module	4-3
Figure A-1	Simple Redundant-Link Configuration Example.....	A-6
Figure A-2	Complex Redundant-Link Configuration Example.....	A-7
Figure A-3	Partial Fault Detection Configuration Example	A-9
Figure A-4	Full Fault Detection Configuration.....	A-10
Figure C-1	H8571-J Adapter (6-pin MMJ to 9-pin D-Sub connector)	C-2
Figure C-2	H8575-A adapter (6-pin MMJ to 25-pin D-Sub connector)	C-3

Tables

Table 1-1: Front Panel Components	1-4
Table 1-2: Back Panel Components	1-6
Table 3-1: Effects of Reset with Factory Defaults	3-11
Table 3-2: DLU Process Description	3-28
Table 5-1: Module LED States	5-2
Table 5-2: Port LEDs.....	5-3
Table 5-3: Problem Solving Using the LEDs	5-6
Table A-5: Comparison of Partial Fault Detection to Full Fault Detection	A-11
Table B-1: 10BaseFL Worst-Case Loss Budget (0°C to 50°C, End of Life)	B-3
Table B-2: FOIRL Worst-Case Loss Budget (0°C to 50°C, End of Life)	B-5
Table B-3: PORTswitch 900FP Best-Case Maximum Launch Power	B-6
Table D-1: Configured RMON Alarms and Events	D-3

Table E-1: PORTswitch 900FP Operating Specifications..... E-2
Table E-2: Connectors E-3
Table E-3: PORTswitch 900FP Physical Specifications..... E-4
Table E-4: Acoustical Specifications..... E-5

Preface

About this Manual

Manual Contents

This manual describes how to install and configure the PORTswitch 900FP.

Intended Audience

This manual is intended for use by personnel who will install and set parameters for the PORTswitch 900FP.

Structure of this Manual

This manual is organized as follows:

Section	Description
Chapter 1	Provides an overview of the PORTswitch 900FP and describes its features.
Chapter 2	Provides instructions for installing the module.
Chapter 3	Provides instructions for configuring the module.
Chapter 4	Provides instructions for removing the module.
Chapter 5	Describes the module LED states and provides troubleshooting information.
Appendix A	Describes the configuration of the redundant-link pair (RLP) of Ethernet 10BaseT links.
Appendix B	Describes the fiber-optic loss budget.
Appendix C	Contains illustrations of the connectors, cables, and adapters used on the PORTswitch 900FP.
Appendix D	Remote Monitor Alarms and Events
Appendix E	Lists operating environment, physical and acoustical specifications.

Conventions Used in this Manual

The following conventions are used in this manual:

Convention	Meaning
Monospaced type	Indicates a literal example of system output.
Boldface type	In examples, indicates user input.
<i>Italics</i>	In examples, indicates a variable. In text, indicates emphasis or a book title.
[]	Contain default responses to the installation menu prompts.
<Return>	Indicates that you press the Return key.
Ethernet	The Digital term for its product's 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) local area networks (LANs).
00.00.00.00	This format represents an Internet Protocol (IP) address in examples and figures.
08-00-2B-A3-00-00	This format represents a Media Access Control (MAC) address in examples and figures.
Ethernet	In this manual, the term Ethernet is Digital Equipment Corporation'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) local area networks (LANs).
10BaseFL	In this manual, the term 10BaseFL refers to the International Standards Organization (ISO) 8802-3/ANSI/IEEE 802.3 fiber-optic local area network (LAN) standards.

Associated Documents

The following documents provide related information about the module. To order any of these documents use the directions provided in the following page.

Title and Order Number	Description
<i>DEChub 900 MultiSwitch Owner's Manual</i> EK-DH2MS-OM	Provides installation, use, security, and troubleshooting information for the DEChub 900 MultiSwitch.
<i>DEChub ONE-MX Installation</i> EK-DEF1H-IN	Provides installation and operation guidelines for standalone module configuration, including mounting options and cabling.
<i>DEChub ONE Installation</i> EK-DEHU2-IN	Provides installation and operation guidelines for standalone module configuration, including mounting options and cabling.
<i>HUBwatch Installation and Configuration</i> AA-Q3S8D-TE	Provides information for installing and configuring HUBwatch for Windows V4.0.
<i>HUBwatch Use</i> AA-PW4BC-TE	Provides network management and DEChub 900, DEChub 90 and DEChub ONE functionality information for HUBwatch for Open VMS V3.0.
<i>HUBwatch for Windows Use</i> AA-Q3S3A-TE	Provides network management and DEChub 900 functionality information for HUBwatch for Windows V2.0.
<i>OPEN DECconnect Applications Guide</i> EC-G2570-42	Contains general descriptions to help plan and install networking systems based on Digital Equipment Corporation's OPEN DECconnect system and networking products.

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Firmware Updates

Because Digital continuously improves the quality of the DEChub product family, periodic releases of firmware will become available. To find information about the latest firmware releases:

- Contact your local Digital reseller or your local Digital sales office.
- Read the README file found in the /pub/DEC/hub900 directory at ftp.digital.com.

Firmware updates are customer installable. To register for automatic notification of new firmware releases, return the Business Reply Card supplied with this product, or send your name, title, and mailing address to dechub_notice@lkg.dec.com.

Documentation Comments

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

FAX: (508) 486-6093

Attention: Documentation Project Manager

E-mail DOC_QUALITY@LKG.MTS.DEC.COM

Safety

The cautions that must be observed for the hardware described in this manual are listed below in English, German, French, and Spanish.

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.
PRECAUCION	Contiene información para evitar daños al equipo.

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 2-5 and 4-2.]
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 láserica 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.

CAUTION	This action deletes all configured settings and replaces them with factory default values. All configuration settings will be lost. [Pages 3-10.]
ACHTUNG	Bei diesem Vorgang werden all 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.
PRECAUCION	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.

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 3-27 and 3-35.]
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 Systemeinheit 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.
PRECAUCION	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

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. [Page 2-7 and A-1.]
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.
PRECAUCION	Los enlaces que utilizan HUBwatch deben configurarse antes de conectar los cables. Si se omite la configuración, el funcionamiento de este segmento de LAN puede deteriorarse gravemente.

Chapter 1

PORTswitch 900FP Description

Overview

Introduction

This chapter describes the features and components of the PORTswitch 900FP.

The PORTswitch 900FP (also referred to in this manual as the module) is a 12-port, 10BaseFL, fiber-optic, Ethernet repeater.

In This Chapter

This chapter includes the following topics:

Topic	See Page
Module Features	1-2
Module Components	1-4

Module Features

Introduction

This section lists the features of the PORTswitch 900FP module.

How to Configure the Module

To give your workgroup LAN media flexibility and connectivity, you can configure the module into a DEChub 900 MultiSwitch (also referred to in this manual as the DEChub 900). You can install one or more PORTswitch 900FP modules (up to 8) into the DEChub 900. The module can also serve as a standalone unit when configured with a DEChub ONE¹ docking station (see the *DEChub ONE Installation* manual).

Hot-swap Capability

When the module is installed into a DEChub 900 or into a DEChub ONE, the module's hot-swap capability allows you to install or remove the module without turning off power.

Front Panel

The front panel provides 12 fiber-optic ports that can operate independently on one LAN or can operate as up to 6 separate port pairs. The port pairs can be assigned independently to any of six backplane LANs. In addition, using HUBwatch or any SNMP-based management tool, you can assign the port pairs as redundant links to other devices. The front panel also contains light-emitting diodes (LEDs) that indicate the status of the module, the ports, and the network.

¹ In this manual, the term DEChub ONE refers to the DEChub ONE or to the DEChub ONE-MX docking station unless otherwise specified.

List of Features







Your PORTswitch 900FP module includes the following features:

- Automatic module self-test at powerup.
- Port-level packet address security.
- In-band Simple Network Management Protocol (SNMP).
- Backplane access to multiple LANs through one of six flexible channels in the DEChub 900.
- Access to ThinWire 10Base2 segment in the DEChub 900 or to the AUI port in the DEChub ONE docking station that is also assignable to any LAN that is mapped to a fiber-optic port.
- Out-of-Band Management (OBM) using SNMP over Serial Line Internet Protocol (SLIP) through the OBM connector on the DEChub 900 or the DEChub ONE docking station.
- Built-in SNMP agent supports the following management information bases (MIBs):
 - Repeater MIB (RFC 1516)
 - Ethernet MIB (RFC 1398)
 - Digital Extended Repeater MIB
 - DEChub 900 Public Common MIB
 - Remote MONitoring (RMON) alarms and events (RFC 1271).
 - MIB II (RFC 1213)
- Manageability using any generic SNMP management application that supports the MIBs listed above.
- Upgradeable device firmware (in nonvolatile Flash memory) with the HUBloader utility or through the setup port with any Trivial File Transfer Protocol (TFTP) server.
- User-friendly advanced Graphical User Interface (GUI) manageability with Digital's HUBwatch Network Management Station (NMS) application.

Module Components

Table 1-1 describes the front-panel components that are illustrated in Figure 1-1.

Table 1-1: Front Panel Components

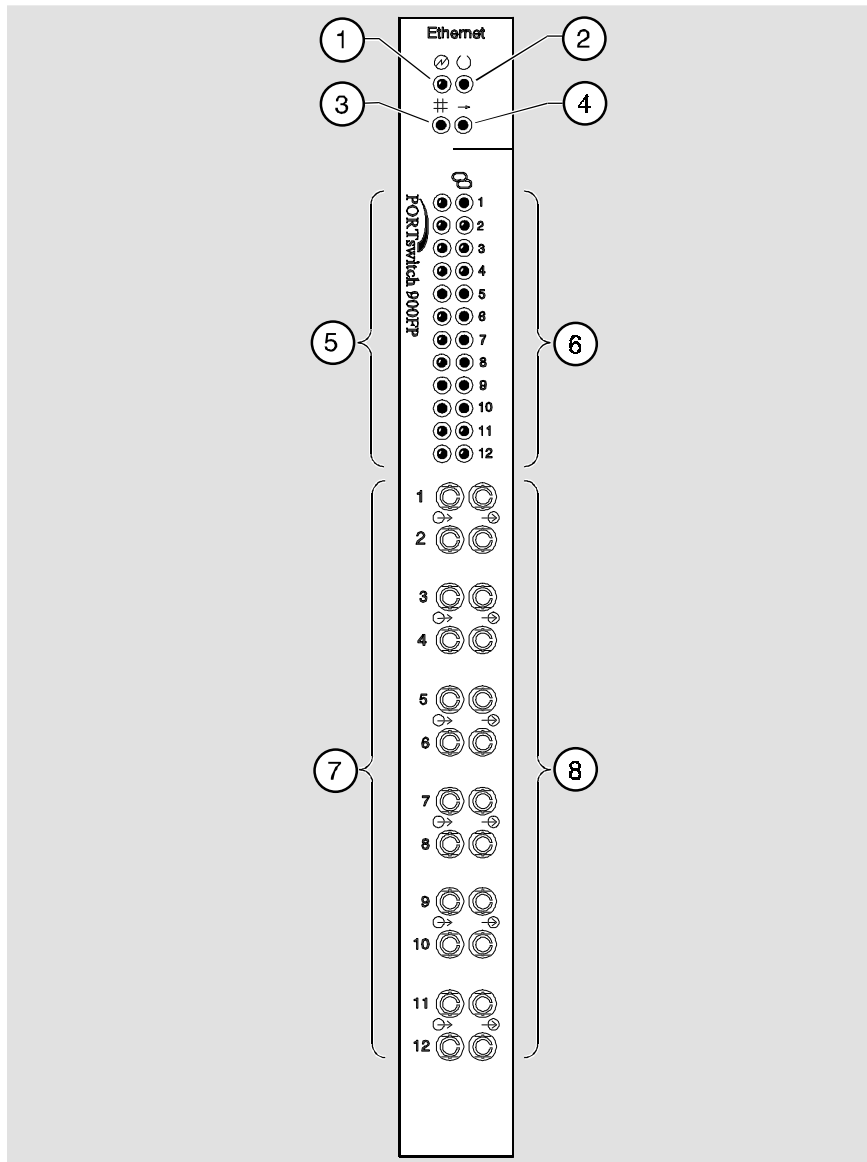
Item	Icon	Name	Description
1		Power LED	Lights when the module has power.
2		Module OK LED	Lights when the module passes self-test.
3		Network OK LED	Indicates the status of the backplane ThinWire port on the DEChub 900 or of the AUI port on the DEChub ONE docking station.
4		Network Activity LED	Indicates network traffic level of the backplane ThinWire port on the DEChub 900 or the AUI port on the DEChub One.
5		Port State LEDs	The LEDs (labeled 1 through 12) show the attachment status of the associated port to a LAN.
6		Port Link LEDs	Indicate the attachment status of the port.
7		Fiber-optic TX port ST-type connectors	Connect fiber-optic cables to the receive ports of the remote fiber-optic device.
8		Fiber-optic RX port ST-type connectors	Connect fiber-optic cables to the transmit ports of the remote fiber-optic device.

Note

For more information about LED operation, refer to Chapter 5, Problem Solving.

Front Panel

Figure 1-1 PORTswitch 900FP Front Panel



LKG-8828-95F

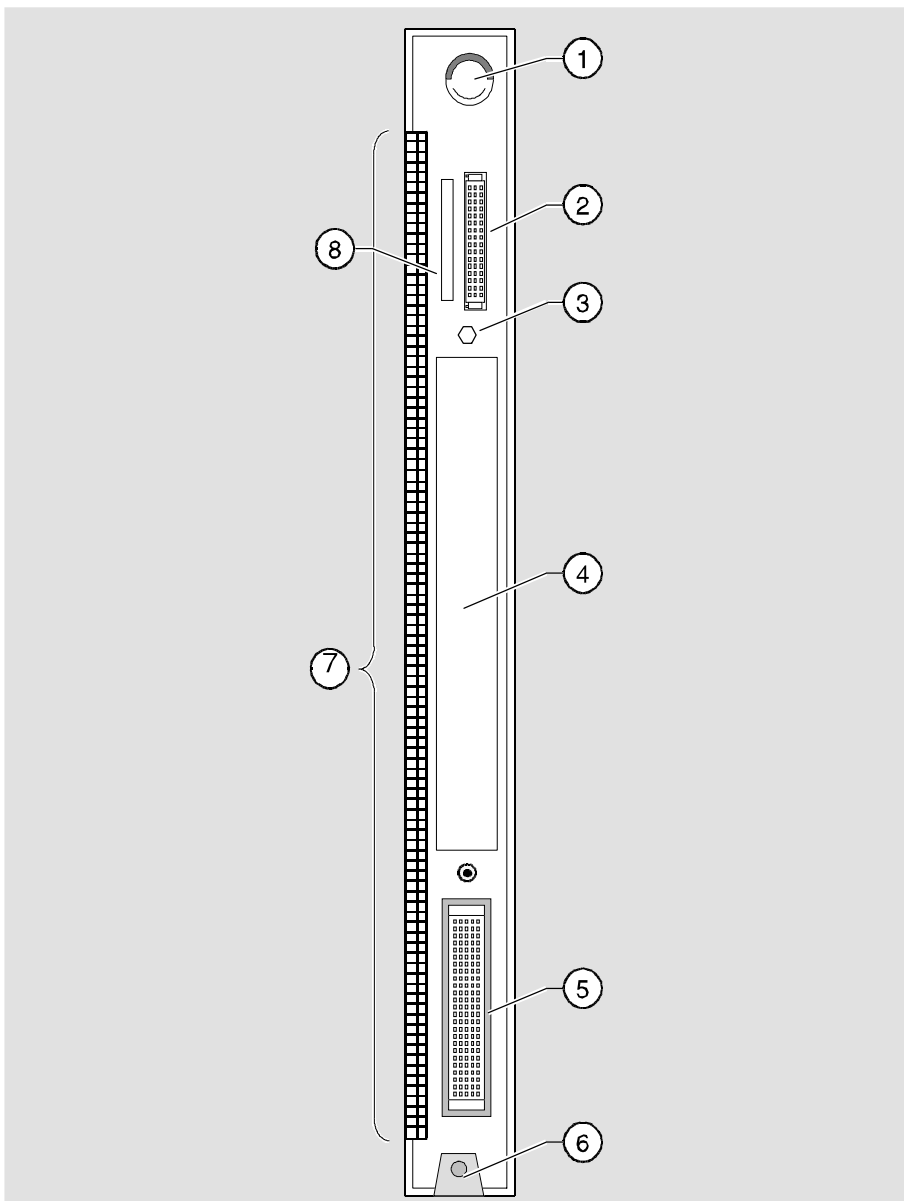
Back Panel

Table 1-2 describes the back-panel components that are illustrated in Figure 1-2.

Table 1-2: Back Panel Components

Item	Name	Description
1	Locking tab	Locks the module into a DEChub 900 backplane or into the DEChub ONE docking station. It also contains the hot-swap switch lever.
2	48-pin connector	Provides network and power connections to the module when the module is installed into a DEChub 900 or a DEChub ONE docking station.
3	Grounding bolt	Provides a chassis grounding connection between the module and a DEChub 900 or DEChub ONE docking station.
4	Manufacturing label	Lists the module part number, serial number, revision level, and power requirements.
5	160-pin connector	Provides network and power connections to the module when the module is installed into a DEChub 900 or DEChub ONE docking station.
6	Mounting tab	Secures the module to the backplane when the module is installed into a DEChub 900 or DEChub ONE docking station.
7	Grounding fingers	Provides additional chassis grounding between the module and a DEChub 900 or DEChub ONE docking station.
8	Address label	Contains the module's 48-bit Ethernet hardware address.

Figure 1-2 PORTswitch 900 FP Back Panel



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Chapter 2

Installing the Module

Overview

Introduction

This chapter describes the tasks necessary to install the module.

What do I Need to Know?

The PORTswitch 900FP hot-swap feature allows you to install the module into the DEChub 900 or DEChub ONE docking station without turning off power. Seating the module initiates the powerup sequence if enough power is available.

In this Chapter

This chapter includes the following topics:

Topic	See Page
Installing the Module	2-2
Before Connecting the Cables	2-5
Configuring the Ports	2-6

Installing the Module

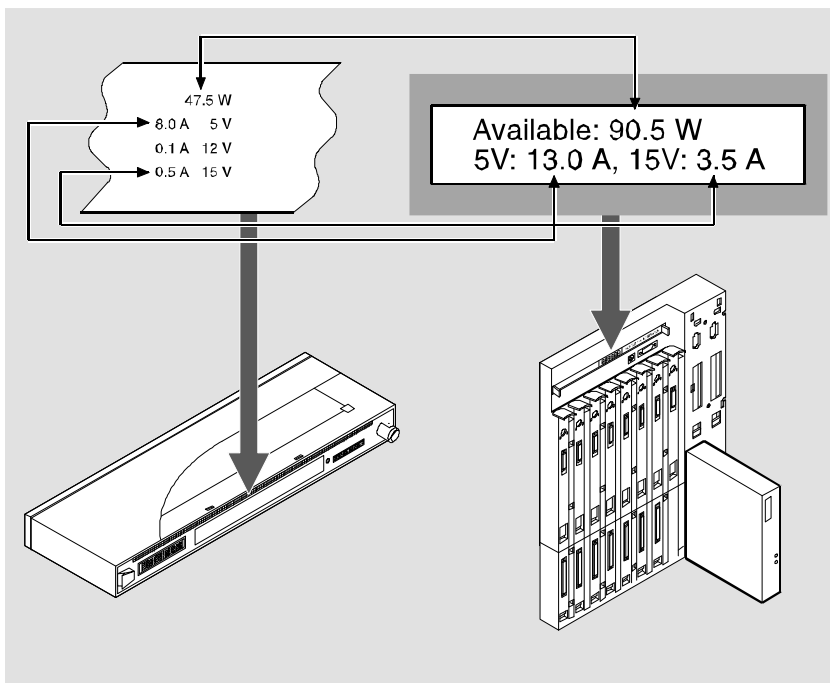
Task 1: Compare the power requirements

Compare your module's power requirements with the values shown in the Hub Manager status display (see examples).

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*).

Note

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.



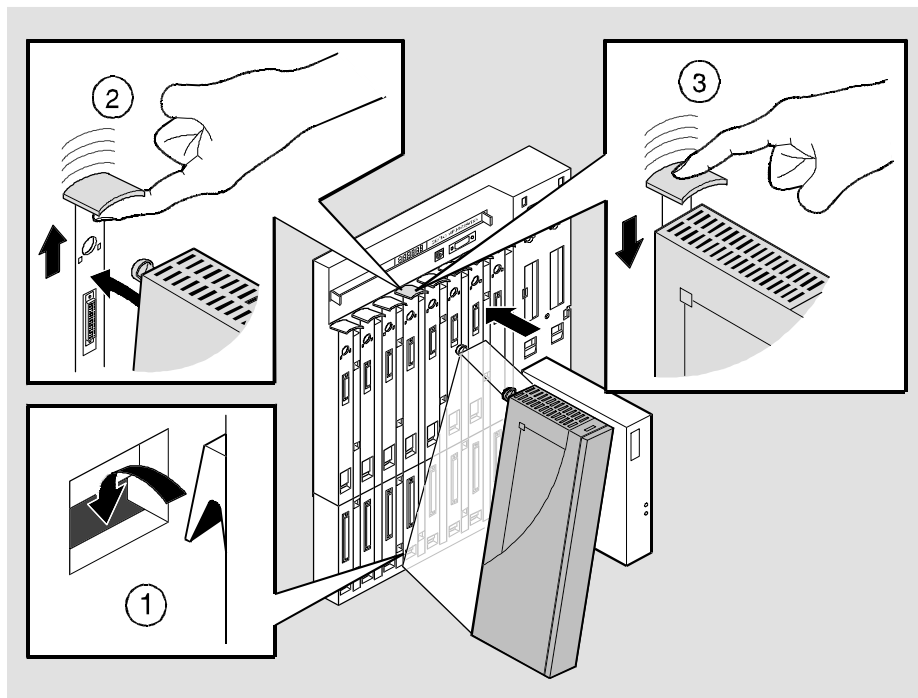
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Task 2: Install the module into the DEChub 900.

To install the module, complete the following steps:

Step	Action
1	Place the module's mounting tab into a mounting slot (1) on the DEChub 900.
2	Pull up on the release lever (2) to its unlocked position.
3	Pivot the module on the mounting tab and align the connectors.
4	Firmly push the module onto the backplane connectors.
5	Press down on the release lever (3) to ensure that it is locked.

Figure 2-1 Installing the module



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Installing the Module

Task 3: Verify initial LED operation

Verify that the module's Power  LED and the Module OK  LED light (within 1 minute):

Stage	Description
-------	-------------



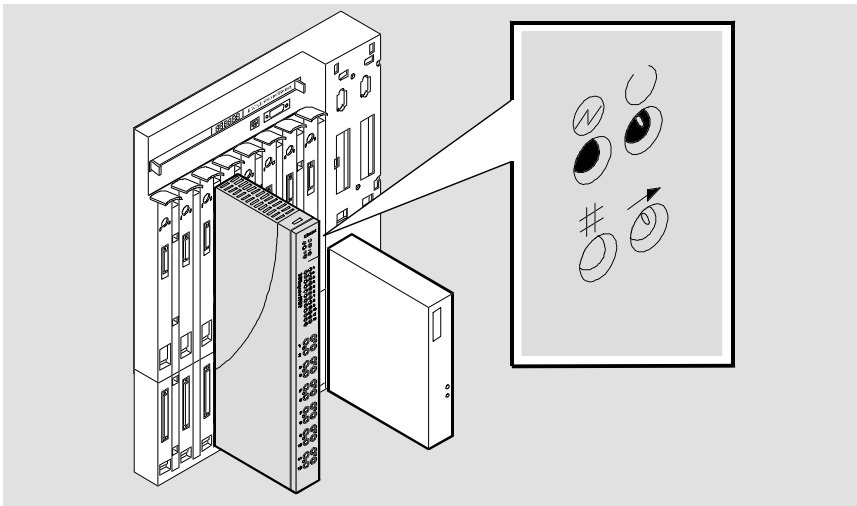
- | | |
|---|---|
| 1 | The Power LED  lights when the power is applied, then the module performs a self-test. |
| 2 | After the module completes the self-test, the Module OK  LED lights within 1 minute and remains lit. |
| 3 | The Hub Manager status display shows:
PORTswitch 900FP
up |
-

Figure 2-2 Initial LED Operation



NPG-0261-95F

Note

If the LEDs do not operate as described, refer to the Chapter 5, Problem Solving.

Before Connecting the Cables

What Type of Cables Should I Use?

Digital recommends that you use 62.5/125-micron multimode graded index fiber-optic cable with the PORTswitch 900FP. If the fiber-optic cables that you are using are not the recommended size, refer to the Appendix B, Fiber-Optic Loss Budget for more information.

If your site is prewired, the fiber-optic cables are labeled with information on size and attenuation characteristics. All of the cables should be installed, tested, and tagged at the site prior to this installation.

See your network manager if you are not sure which cables to connect.

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 damage to the cables, avoid making sharp bends and kinks.

Configuring the Ports

Determine the Configuration

Before you connect the fiber-optic cables, determine whether you are configuring the ports as redundant-link pairs² or separate independent ports (default configuration).

If you are configuring the ports as...	Then go to this section
Redundant-link pairs	Connecting Redundant-Link Pairs
Separate independent ports	Connecting Separate Independent Ports.

Connecting Redundant-Link Pairs

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.

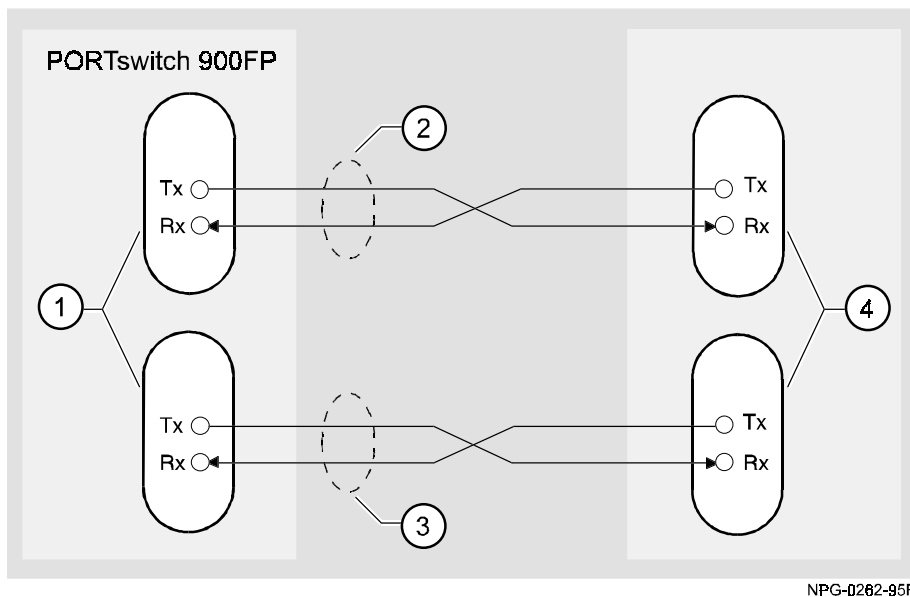
After you have configured the ports using HUBwatch, complete the following (refer to Figure 2-3 on the next page) steps to connect redundant-link pairs:

Step	Action
1	Identify the ports that you have assigned as the primary and secondary master port pairs, and the ports that are assigned as responders or non-responder ports.
2	Connect the port cables to the primary master port.
3	Connect the other end of the port cables to the primary responder port, or to the primary non-responder port.
4	Connect the secondary master port cables to the secondary master port.
5	Connect the other end of that cable to the secondary responder port, or to the secondary non-responder port.
6	Repeat this procedure for all the remaining ports.
7	After all cables are installed, go to Chapter 3, Configuring the Module.

Connecting Redundant-Link Pairs (Cont.)

Item	Description
1	Primary and secondary master port pair ²
2	Primary link
3	Secondary link
4	Responder or non-responder port ³

Figure 2-3 Redundant-Link Pairs



² Primary and secondary master port pair must be on the same module.

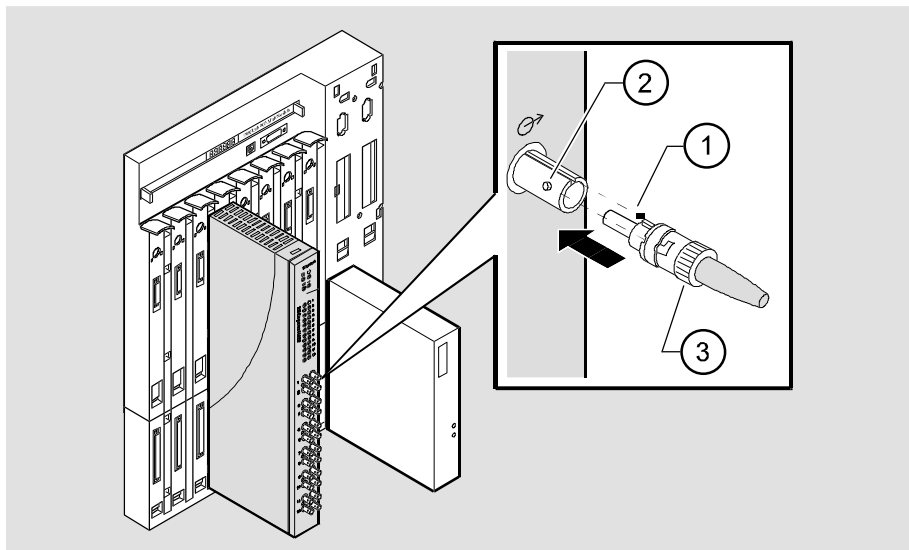
³ Responder ports and non-responder ports can be on the same module as each other or on separate modules.

Connecting Separate Independent Ports

Complete the following steps to connect the cables:

Step	Action
1	Remove any dust caps from the ST-type connectors on the ports that you are connecting.
2	Align the tab and slot (1) of the transmit cable plug with the slot and tab (2) of the transmit port connector.
3	Insert the plug, then push the plug sleeve (3) in and turn it to the right, locking it into place.
4	Connect the receive cable, in the same way, to the receive port connector.
5	After all cables are installed, go to Chapter 3, Configuring the Module.

Figure 2-4 Separate Independent Ports



NPG-0263-95F

Chapter 3

Configuring the Module

Overview

Introduction

This chapter describes how to access the setup port to configure the module. It discusses the configuration options that you can use.

In This Chapter

This chapter includes the following topics:

Topic	See Page
Setup Port Description	3-3
Accessing the Setup Port	3-6
DEChub 900 MultiSwitch Installation Menu	3-7
PORTswitch 900FP Installation Menu (DEChub 900 Options)	3-9
PORTswitch 900FP Installation Menu (DEChub One Options)	3-10
Description of Menu Options	3-11

Setup Port Description

Introduction

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

The setup screen displays illustrate in this manual can vary slightly from the actual screen displays on your setup port device.

Signaling Standards

The signals from the DEChub 900 Hub Manager setup port and from the DEChub ONE docking station 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.

Devices that use the EIA-423 signaling standard are compatible with the DEChub 900 Hub Manager setup port.

Setup Port Cabling

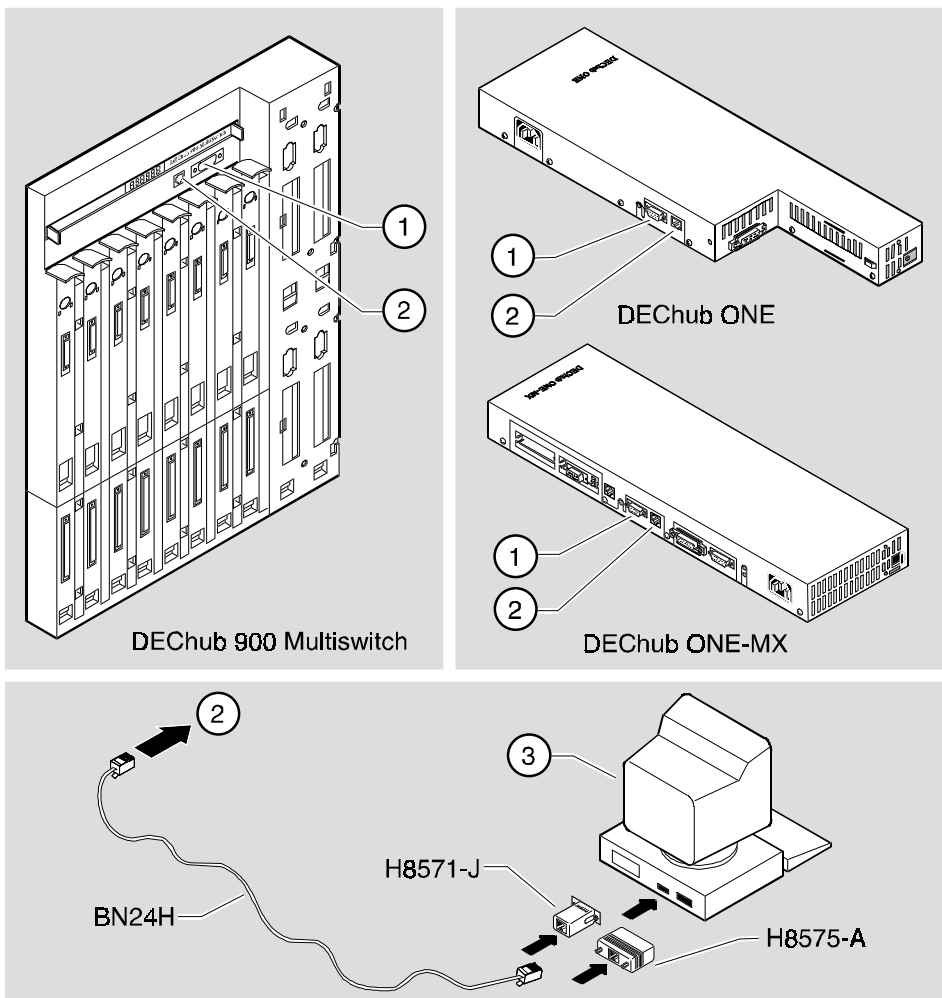
The setup port on the DEChub 900 or the DEChub ONE can be connected to a setup port device (a terminal or personal computer), using the following cables and adapters.

If the setup port device is...	Then use this cable...	With this adapter...
A PC with a 9-pin D-Sub communications port	BN24H-xx ⁴	H8571-J
A terminal with a 25-pin D-Sub connector	BN24H-xx ⁴	H8575-A
A terminal with a 6-pin MMJ connector	BN24H-xx ⁴	Not required

⁴ Refer to the *DEChub Multiswitch Owner's Manual* for more information.

Setup Port Description

Figure 3-1 Setup Port Cabling



NPG-0020-95F

Accessing the Setup Port

Steps to Access the Setup Port

To access the setup port on the PORTswitch 900FP module, complete the following steps:

Step	Action
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 cable to the setup port connector on either the DEChub 900 or the DEChub ONE.
3	Press <Return> on the setup port device a few times until a menu appears.
4	Go to the installation menu: <ul style="list-style-type: none">• If the module is connected to the setup port on the DEChub ONE docking station, the PORTswitch 900FP INSTALLATION MENU appears. Go to the section titled PORTswitch 900FP Installation Menu (DEChub ONE Options).• If the module is connected to the Hub Manager setup port on the DEChub 900, the DEChub 900 MultiSwitch INSTALLATION MENU appears. Go to the section titled DEChub 900 MultiSwitch INSTALLATION MENU.

DEChub 900 MultiSwitch Installation Menu

Example of Menu

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 : 9 <Return>
```

The Start Redirect Mode Option

The `Start Redirect Mode` option redirects the DEChub 900 Hub Manager setup port to any network module (such as the PORTswitch 900FP) that is installed into the DEChub 900. Choosing this option allows you to configure or obtain the status of an installed network module by accessing the specified network 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.

Example of Slot Number Selection

The example shows how to select a slot number:

```
Enter selection: 9
=====
Enter the slot number for redirection (1-8): [n] <Return>
Console redirected to 3: PORTswitch 900FP
Attempting to connect [Ctrl/C to abort]...
=====
Connection successful!
```

After you press `<Return>`, the console redirects to the PORTswitch 900FP `INSTALLATION MENU`.

PORTswitch 900FP Installation Menu (DEChub 900 Options)

Introduction

This section shows the options available from the PORTswitch 900FP INSTALLATION MENU when the module is installed into the DEChub 900. The indication at the top of the screen, slot 3, refers to the DEChub 900 slot number where the module is installed.

Example of Menu

The following example shows the PORTswitch 900FP INSTALLATION MENU operating in a DEChub 900 configuration:

```
PORTswitch 900FP - slot 3
=====
PORTswitch 900FP 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 Installation Menu
=====
Enter selection : [n] <Return>
```

Go to the section titled Description of Menu Options.

PORTswitch 900FP Installation Menu (DEChub ONE Options)

Introduction

This section shows the options available from the PORTswitch 900FP INSTALLATION MENU when the module is installed standalone into the DEChub ONE.

Example of Menu

The following example shows the PORTswitch 900FP INSTALLATION MENU operating in a DEChub ONE configuration:

```
PORTswitch 900FP
=====
PORTswitch 900FP 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...

=====
Enter selection : [n] <Return>
```

Description of Menu Options

Introduction

This section describes the options that are available from the `PORTswitch 900FP INSTALLATION MENU`. Note that the out-of-band menu options apply to the module only when it is in standalone mode (configured in a DEChub ONE).

[1] Reset with Factory Defaults

This option reboots the module, causing the module's configured nonvolatile random access memory (NVRAM) parameters to be initialized to factory default values.

CAUTION

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

If you need to reboot the module and retain the current settings, choose **Option [2]** from the `PORTswitch 900FP INSTALLATION MENU`.

The following table shows some examples of the module's configured NVRAM parameters and tells how the selection of this option affects each parameter:

[1] Reset with Factory Defaults (Cont.)**Table 3-1: Effects of Reset with Factory Defaults**

Parameter	Effect
SNMP read/write community	Name reset to PUBLIC
SNMP trap addresses	Deleted
In-band interface IP address	Deleted
In-band interface default gateway address	Deleted
Out-of-band interface IP address	Deleted
Out-of-band interface port speed	Reset to 9600
Serial number	No effect ⁵
Reset count	No effect ⁵
Error log data	No effect ⁵
RTS	Set to Disabled

Note

Allow approximately 1 minute for the module to reset and complete self-test.

⁵ These are the *only* parameters that are *not* reset.

Description of Menu Options

[1] Reset with Factory Defaults (Cont.)

Example of Dialog

The following example shows the dialog associated with this option (user response is shown in boldface type):

```
Enter selection : 1
PORTswitch 900FP - 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>
Press <Return> for Main Menu ...
```


[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.

Example of Dialog

The following example shows the dialog associated with this option:

```
Enter selection : 2
PORTswitch 900FP - slot 3
=====

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

Press Y to confirm [N] : <Return>

Press Return for Main Menu ...
```

Description of Menu Options

[3] Show Current Settings

This option shows the module's current settings. If your hardware revision is v 2.0 or less, PORTswitch 900FP is replaced with DECrepeater 900FP.

Note

If the module is being configured for the first time, some fields are blank.

Example of Display

The following example shows the display associated with this option:

```
Enter selection : 3
PORTswitch 900FP - slot 3

=====
PORTswitch 900FP, 12-Port Ethernet Rptr SNMP, HW=v2,RO=v00.03,SW=v2.0
SysUpTime                : 01:39:11    14 resets
SNMP Read/Write Community : public
SNMP Trap Addresses      : Not Configured
Status of Last Downline Upgrade : No Status
                                00:00:44  28 resets
In-Band Interface Hardware Address : 08-00-2B-A3-4C-70
In-Band Interface IP Address   : 16.20.216.181
In-Band Interface Default Gateway Address : Not Configured
Out-of-Band (OBM) Management RTS : Disabled
BootP                       : Disabled
Interface  IP Address  Subnet Mask  Def.Gatewa  Other Info
Ethernet 16.20.156.24  0.255.255.255 16.20.157.25  08-00-2B-B1-4D-C7
OBM Port 16.20.158.26                               Speed 9600 bps
=====
Press Return for Main Menu ...
```

Out-of-Band (OBM) Management RTS appears only when the module is installed into a DEChub ONE.

OBM Port information including port Speed appears only when the module is installed into a DEChub ONE

[4] Configure IP

This option provides you with IP configuration selections.

DEChub 900 Configure IP Options Menu

The following example displays the options available when the module is installed into a DEChub 900.

```
=====
                                Enter selection : 4
PORTswitch 900FP - 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] Enable/Disable BootP
[6] Return to Main Menu
=====
Enter selection number : [1] <Return>
```

Description of Menu Options

[4] Configure IP (Cont.)

DEChub ONE Configure IP Options Menu

The following example displays the options available when the module is installed into a DEChub ONE standalone configuration. Note that option [7] is available only when the module is in the standalone configuration

```
=====
                          Enter selection : 4
PORTswitch 900FP
=====
                          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 : [1] <Return>
```

The following nine pages describe the IP configuration options.

[4] Configure IP (Cont.)

[1] Set SNMP Read/Write Community

This option prompts you to enter the module's read/write community name.

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

Example of Dialog

The following example shows the dialog associated with this option:

```

=====
                                Enter selection : 1
PORTswitch 900FP - slot 3

=====
SET SNMP READ/WRITE COMMUNITY

Format:  The format for a community name is a string,
         consisting of four to thirty-one 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] : markd56 <Return>

        SNMP Read/Write community string set.
        Press <Return> for IP Configuration Menu ...

```

Description of Menu Options

[4] Configure IP (Cont.)

[2] Add SNMP Trap Addresses

This option prompts you to enter IP addresses to which the PORTswitch 900FP module will send SNMP traps.

SNMP trap address must be set to enable the alarms and events group of the Remote MONitoring (RMON) MIB.

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.

Example of Dialog

The following example shows the dialog associated with this option:

```
Enter selection : 2
PORTswitch 900FP - slot 3
=====
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 a '.' character.
       example: 16.20.54.156
=====
Enter a Trap address [ ]: 16.20.40.157 <Return>
Trap address added! Enter a Trap address [ ] : <Return>
Press Return for IP Configuration Menu ...
```

[4] Configure IP (Cont.)

[3] Delete SNMP Trap Addresses

This option prompts you to select SNMP trap addresses for deletion from the community trap address table.

Example of Dialog

The following example shows the dialog associated with this option:

```
=====
                          Enter selection : 3
PORTswitch 900FP - 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 a '.' 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 [ ] : <Return>

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

Description of Menu Options

[4] Configure IP (Cont.)

[4] Set In-Band Interface IP Address

This option prompts you to enter the module's in-band IP address.

If an IP address was previously configured, the screen displays the in-band IP address, subnet mask, and default gateway.

The factory default setting is no IP address.

Example of Dialog

The following example shows the dialog associated with this option:

```
=====
Enter selection : 4
PORTswitch 900FP - slot 3
=====

                IN-BAND INTERFACE 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 a '.'
        character.

                example: 16.20.40.156

To delete the IP address, enter 0 in the appropriate
address field.

Interface  IP Address  Subnet Mask  Def.Gatewa  Other Info
Ethernet Port                                     08-00-2B-B1-4D-C7
=====

Enter the IP address [ ] : 16.20.54.156 <Return>
Enter the Subnet Mask [ ] : <Return>
Enter the Default Gateway [ ] : <Return>
Press Return for IP Configuration Menu ...
```


[4] Configure IP (Cont.)

[5] Set Out-of-Band Interface IP Address

This option prompts you to enter an out-of-band IP address and a subnet mask.

Note

This selection is operational only when the module is in standalone mode (when it is installed into a DEChub ONE).

If an IP address was previously configured, the screen displays the out-of-band IP address and subnet mask.

The factory default setting is no IP address.

Description of Menu Options

[4] Configure IP (Cont.)

[5] Set Out-of-Band Interface IP Address (Cont.)

Example of Dialog

The following example shows the dialog associated with this option:

```
=====
                                Enter selection :5
PORTswitch 900FP
=====

                                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 a '.'
        character.

        example: 16.20.40.156
        To delete the address, enter 0 in the
        appropriate address field.

=====

Interface  IP Address  Subnet Mask  Def.Gatewa  Other Info
Ethernet   16.20.156.24          08-00-2B-B1-4D-C7
OBM Port   16.20.158.26          Speed 9600 bps

=====

Enter IP address [] : 16.20.54.155 <Return>
Enter Subnet Mask   : <Return>
Press Return for IP Configuration Menu ...
```

[4] Configure IP (Cont.)

[5] Set Out-of-Band Interface IP Address (Cont.)

Note

To enable out-of-band management, you must also select an out-of-band management (OBM) port speed from

PORTswitch 900FP INSTALLATION MENU

Option [7] Configure Out-of-Band Port

Submenu option [1] Set Port Speed

Reference

See the *DEChub ONE Installation* manual or the *DEChub ONE-MX Installation* manual for OBM port cabling information.

Description of Menu Options

[4] Configure IP (Cont.)

[6] Enable/Disable BootP

This option prompts you to enable or disable Bootstrap Protocol (BootP) requests from the module.

Note

This selection appears as submenu option [5] when the module is installed into a DEChub 900.

The factory default setting is DISABLED.

[4] Configure IP (Cont.)

[6] Enable/Disable BootP (Cont.)

Example of Dialog

The following example shows the dialog associated with this option:

```
=====
                          Enter selection : 6
PORTswitch 900FP
=====
                          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...
```

Description of Menu Options

[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. The most recent dump is displayed first.

When the firmware has been upgraded to a new version, the version number is entered into the error log.

Example of Display

The following example shows the display associated with this option:

```
Enter selection : 5
PORTswitch 900FP - slot 3

=====
                          DUMP ERROR LOG
                          CURRENT RESET COUNT: 14
=====

Entry #           = 3
Timestamp         =  0   0
Reset Count       = 13
FW upgraded:      to v2.0
Dump another entry Y/[N]?   N <Return>

=====

No more Error Log entries

                          Press <Return> for Main Menu ...
```

[6] Downline Upgrade

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

The Downline Upgrade (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.



The DLU process consists of four stages:

Stage	Description
1	Transferring firmware image
2	Verifying firmware image
3	Writing new firmware image into nonvolatile flash memory
4	Module reset and self-test

Table 3-2 explains what happens during each stage of the DLU process:



[6] Downline Upgrade (Cont.)

Table 3–2: DLU Process Description

Stage	What Happens
1	<p data-bbox="378 800 1105 898">The new firmware image from the TFTP load host is transported across the network, and placed into a temporary storage buffer in the module.</p> <p data-bbox="378 900 1198 999">This stage normally takes 1 minute to complete. However, due to variations in network configurations (load path and traffic levels), this stage can take 10 minutes or more.</p> <p data-bbox="378 1031 1105 1062">The following states indicate that this stage is in progress:</p> <ul data-bbox="378 1083 1198 1381" style="list-style-type: none"><li data-bbox="378 1083 1019 1115">• Module status – functional but not manageable.<li data-bbox="378 1136 1045 1167">• Module can not respond to management requests.<li data-bbox="378 1188 1198 1287">• LED display – the Power LED  and the Module OK  LED remain on. All other LEDs remain in the state they were in before the DLU process began<li data-bbox="378 1308 995 1381">• HUB Manager display – PORTswitch 900FP up.

(continued on next page)



[6] Downline Upgrade (Cont.)**Table 3–2: DLU Process Description (Cont.)**

Stage	What Happens
2	<p>The module verifies that the firmware image is correct after Stage 1 is complete.</p> <p>This stage normally takes 10 seconds to complete. The following states indicate that this stage is in progress:</p> <ul style="list-style-type: none"> • Module status – functional but not manageable. • Module can not respond to management requests. • LED display –The Power LED  and the Module OK  LED remain on. All other LEDs remain in the state they were in before the DLU process began. • HUB Manager display – PORTswitch 900FP up

(continued on next page)




[6] Downline Upgrade (Cont.)

Table 3-2: DLU Process Description (Cont.)

Stage	What Happens
3	The new firmware image is transferred from the module's temporary storage buffer to the NVRAM, 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.
	This stage normally takes less than 1 minute to complete. The following states indicate that this stage is in progress:
	<ul style="list-style-type: none">• Module status – functional, but not manageable.• Module cannot respond to management requests.• LED display – the Power LED  and the Module OK  LED remain on. The #3 Port State LED turns off. The #4 Port State LED lights.• HUB Manager display – PORTswitch 900FP unknown
	After the transfer is complete, the #5 port state LED lights for up to 22 seconds while the module awaits a reset.

(continued on next page)

[6] Downline Upgrade (Cont.)**Table 3-2: DLU Process Description (Cont.)**

Stage	What Happens
4	<p>The module resets, runs self-test, and then begins executing the new firmware image.</p> <p>This stage normally takes 1 minute to complete. The following states indicate that this stage is in progress:</p> <ul style="list-style-type: none"> • Module status – not functional during reset and self-test. • Module cannot respond to management requests. • The power LED  remains on. The module OK LED  and the #5 port state LED turn off. The LEDs display the self-test sequence. • HUB Manager display – PORTswitch 900FP unknown <p>After the successful completion of self-test, the module OK LED  turns on and the module becomes fully operational and manageable. Note also that the HUB Manager display indicates:</p> <pre>PORTswitch 900FP up</pre>

[6] Downline Upgrade (Cont.)

Using 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.

Before initiating this option, be sure that the module that you are upgrading has been configured with an IP address. If the module is not configured with an IP address, select the Set In-Band Interface IP Address option (Option [4], Submenu option [4]) from the PORTswitch 900FP Installation Menu to set an IP address.

Do not use the DEChub 900 MultiSwitch Hub Manager's IP address to upgrade the PORTswitch 900FP.

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

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

[6] Downline Upgrade (Cont.)

Example of Display

```

Enter selection : 6
PORTswitch 900FP slot - 3

=====

                                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> to Continue...
    
```

When you press <Return>, the screen prompts you to Enter the Load Filename in the following format:

If the file is...	Then enter...
Located in the default TFTP directory	Only the filename.
Not located in the default TFTP directory	The complete pathname along with the filename.

The following example shows a firmware image load filename and an IP address:

defmm20.bin and 16.20.54.156

Description of Menu Options

[6] Downline Upgrade (Cont.)

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

The following example shows the dialog associated with this option for a file that is located in the default directory:

```
Enter the Load Filename [ ] defmm20.bin <Return>
```

After you enter the firmware image filename and press <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>
```

Example of Dialog

After you enter the load host IP address, the following screen and dialog appear:

```
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:
(Device Not Responding!) This is normal.
... Press Return Key to Start Load [Ctrl/C to abort]...
```

[6] Downline Upgrade (Cont.)

When you press <Return>, the DLU process is initiated over the LAN that is connected to the load host.

Note

The PORTswitch 900FP is nonfunctional only during reset and self-test (about 1 minute of Stage 4) of the DLU process. During the first three stages of the process, the module continues to function as a repeater.

After you initiate the DLU process, the screen displays the following message:

```
DLU process started!
```

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

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.

Description of Menu Options

[6] Downline Upgrade (Cont.)

After 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 flash RAM with the new firmware image.

If your module is installed into a...	Then go to...
DEChub One	The section titled DLU Process Completion
DEChub 900	The following section, DEChub 900 Hub Manager Indications

DEChub 900 Hub Manager Indications

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

```
Module Removed!  connection closed!  
Press <Return> for Main Menu
```

This message is normal.

Hub Manager Status Display


The Hub Manager status display shows the following message:

```
3: PORTswitch 900FP  
unknown
```

This message is normal. The Hub Manager status display continues to display this message until the DLU process is complete.

[6] Downline Upgrade (Cont.)

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  turns on and the module becomes fully operational.

If the module is installed into a DEChub ONE, the setup port device displays the PORTswitch 900FP Installation menu.

If the module is installed into a DEChub 900, the Hub Manager status display shows the following message:

```
3: PORTswitch 900FP  
up
```

When you press <Return>, the screen displays the PORTswitch 900FP Installation menu.

Description of Menu Options

[7] Configure Out-of-Band Port

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

Note

This option is operational only when the module is in standalone mode (when it is installed into a DEChub ONE).

Example of Dialog

The following example shows the dialog associated with this option:

```
Enter selection : 7
PORTswitch 900FP
=====
                SET OUT-OF-BAND PORT CONFIGURATION
[1] Set Port Speed
[2] Enable/Disable RTS
[3] Return to Main Menu
=====
Enter selection number : [n] <Return>
```

[7] Configure Out-of-Band Port (Cont.)

[1] Set Port Speed

This option prompts you to select the speed of your OBM port.

Note

This option is operational only when the module is in standalone mode (when it is installed into a DEChub ONE).

The OBM port speed that you select must match the speed of your OBM device. The port speed must be the same at each end of the communications link.

The factory default for this option is 9600.

Example of Dialog

The following example shows the dialog associated with this option:

```
=====
Enter selection : 1
PORTswitch 900FP
=====

      SET OUT-OF-BAND MANAGEMENT INTERFACE PORT SPEED

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

=====

Enter selection number [2] (9600) : 4 <Return>
      OBM port speed set.
      Press <Return> for Main Menu ...
```

Description of Menu Options

[7] Configure Out-of-Band Port (Cont.)

[2] Enable/Disable RTS

This option prompts you to enable or disable the request-to-send (RTS) signal line on the OBM port.

Note

This option is operational only when the module is in standalone mode (when it is installed into a DEChub ONE).

When you enable this option, the RTS signal on the OBM port is active only when data is being transmitted to the OBM port. When you disable this option, RTS is always active.

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

[7] Configure Out-of-Band Port (Cont.)

Example of Dialog

The following example shows the dialog associated with this option:

```
=====
                          Enter selection : 2
PORTswitch 900FP
=====
                          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 ...
```


Chapter 4

Removing the Module

Overview

Introduction

This chapter describes the tasks necessary to disconnect the cables and remove the module.

In This Chapter

This chapter includes the following topic:

Topic	See Page
How to Disconnect the Fiber Optic Cables	4-2
How to Remove the Module	4-3

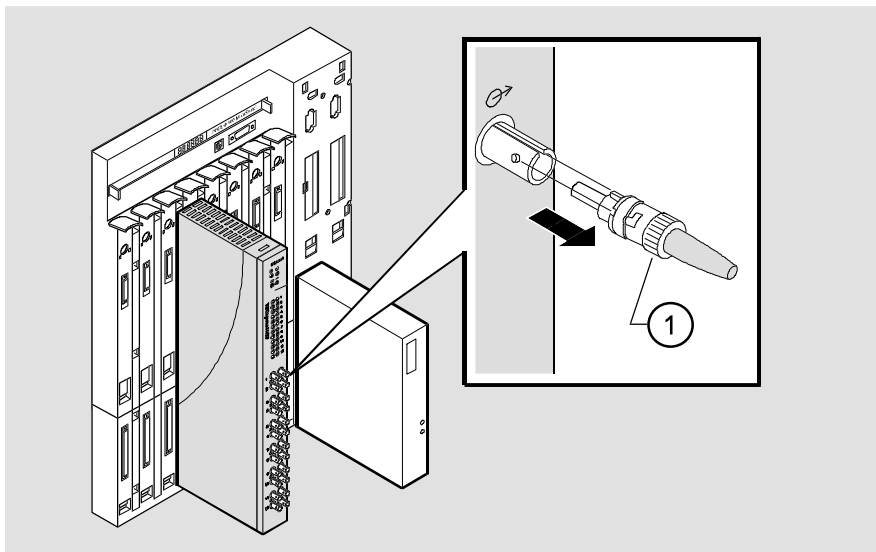
How to Remove the Module

Task 1: Disconnect all the cables from 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.

Figure 4-1 Disconnect the Cables

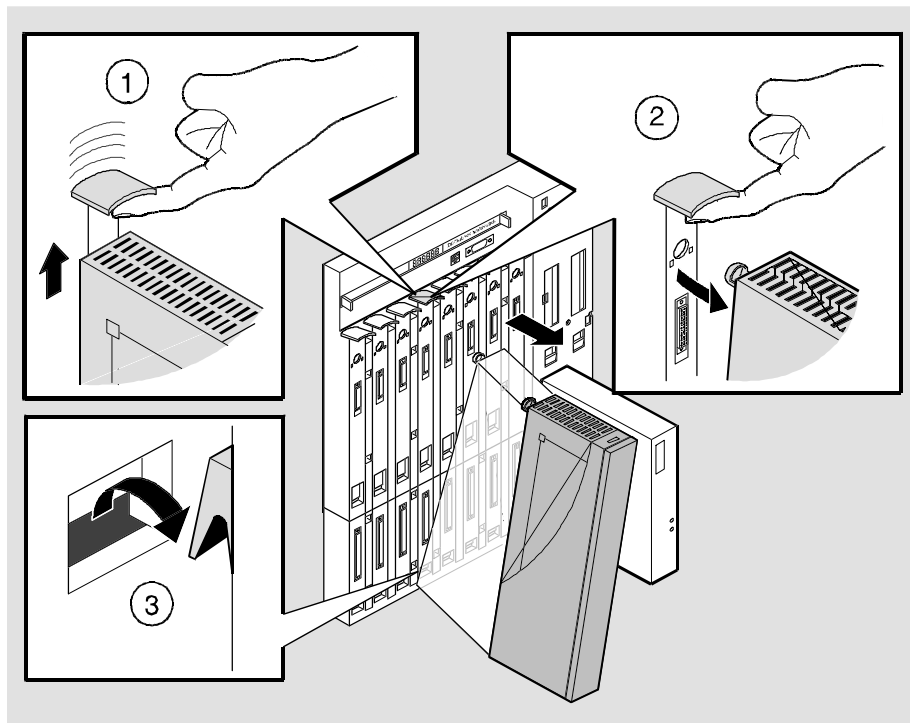


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Step	Action
1	To disconnect the cable, push the plug's sleeve in and turn it to the left.
2	Disconnect the cable.

Task 2: Remove the module from the DEChub 900

Figure 4-2 Remove the Module



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Step	Action
1	Lift the release lever (1) located on the top of the DEChub 900 slot.
2	Pivot the module back (2) on its bottom mounting tab, and disengage the module (3) from the backplane.

Chapter 5

Problem Solving

Overview

Introduction

This chapter describes the module LED states and provides troubleshooting information. The module LEDs provide dynamic indications of module status.

Topic	See Page
LED Descriptions	5-2
Problem Solving Using the LEDs	5-6




LED Descriptions

Static States for Module LEDs

Table 5-1 shows the static states that are possible for four of the module LEDs:

- Power
- Module OK
- Network OK
- Network Activity

Table 5–1: Module LED States

LED Name	Icon	Off	On	Flashing
Power		No power to the module.	Module receiving power.	Faulty power connection or insufficient power.
Module OK		After 1 minute, self test failed.	Module passed self-test.	Fan failure.
Network OK		Module is not connected to a properly terminated and operational LAN through the ThinWire Ethernet port on the DEChub 900 or through the AUI port on the DEChub ONE.	Module is connected to a properly terminated and operational LAN through the ThinWire Ethernet port on the DEChub 900 or through the AUI port on the DEChub ONE.	Network connection is disabled by network management.

(continued on next page)

Table 5-1: Module LED States (Cont.)

LED Name	Icon	Off	On	Flashing
Network Activity	→	No network activity.	Network has heavy traffic ⁶	Flashes more rapidly and appears brighter as network traffic increases.

Static States for Port LEDs

Table 5-2 shows the static states that are possible for the combination of two Port LEDs:

- Port State
- Port Link

Table 5-2: Port LEDs

Port State	Port Link	Condition
Off	Off	Associated Port connection is faulty. There is no link.
On	Off	Associated port is properly connected to another operational network device, but there is no network traffic.
On	On	Associated port is connected to another operational network device. The network has heavy traffic.

(continued on next page)

⁶ The Network Activity LED continues to indicate network traffic levels even when the port is disabled or partitioned.



LED Descriptions

Table 5-2: Port LEDs (Cont.)

Port State	Port Link	Condition
Off	Flashing	Associated port is auto-partitioned. The link is good. There is traffic on the network to which the associated port is connected, but traffic is not being received on that port. The Link LED flashes more rapidly and appears brighter as network traffic increases.
On	Flashing	Associated port is properly connected to another operational network device. The Link LED flashes more rapidly as network traffic increases.
Flashing	Off	Associated port is disabled by network management, or (if operating as a redundant pair) the associated port is operating as a standby port. There is no traffic on the network to which the associated port is connected.
Flashing	Flashing	Associated port is disabled by network management, or (if operating as a redundant pair) the associated port is operating as a standby port. There is traffic on the network to which the associated port is connected, but the traffic is not being transmitted on the associated port. The Link LED flashes more rapidly and appears brighter as network traffic increases.

Normal Powerup

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


Stage	What Happens
1	The Power LED  lights and remains lit. All other LEDs light for a few seconds and then turn off. This event 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 the self-test (within one minute), the Module OK LED  lights and remains lit.
4	The remaining LEDs indicate their operational status.

Problem Solving Using the LEDs

When diagnosing a problem with the module, note that the problem is often indicated by the states of the module LEDs.




Table 5-3 lists the states of the LED for various error conditions and suggests corrective actions.

Table 5–3: Problem Solving Using the LEDs

Symptom	Icon	Probable Cause	Corrective Action
All LEDs are off.		The module does not have power.	<p>If installing the module into a DEChub 900, check the power status on the Hub Manager status display.</p> <p>If enough power is available, lift the release lever, and reseal the module.</p> <p>If installing the module into a DEChub ONE, ensure that the locking L-bracket screw is locked securely.</p> <p>Remove the module and inspect the module's 48-pin and 160-pin connectors for bent, broken, or dirty pins.</p> <p>If any pins are broken or bent, replace the module.</p>
All LEDs are off.		The module does not have power.	<p>If no pins are broken or bent, reinstall the module.</p> <p>If the problem persists, replace the module.</p>
Power LED is off.		Faulty power LED.	Replace the module.

(continued on next page)

Table 5–3: Problem Solving Using the LEDs (Cont.)

Symptom	Icon	Probable Cause	Corrective Action
Power LED is flashing.		Faulty power LED.	Replace the module.
		Faulty DEChub 900 slot connection.	Reinstall the module into another slot.
		DEChub 900 or DEChub ONE power supply is faulty.	Replace the DEChub 900 power supply or the DEChub ONE.
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.
		Self-test failed.	If the LED does not light after 1 minute, reseal the module to repeat the self-test. If self-test fails again, replace the module.
Module OK LED is flashing.		Fan is faulty.	Contact your Digital service representative to replace the fan.

(continued on next page)

Problem Solving Using the LEDs

Table 5–3: Problem Solving Using the LEDs (Cont.)

Symptom	Icon	Probable Cause	Corrective Action
Port State LED is off.		Associated port is not properly connected to another operational network device.	Properly connect the associated port to network or station. Reseat the cable. If problem persists, replace the cable.
		Associated port is auto-partitioned.	N/A.
Port State LED is flashing about once per second.		Associated port is disabled by network management.	Enable the associated port, if necessary.
		Associated port is operating as a standby port in a redundant pair configuration.	N/A

Appendix **A**

Redundant-Link Configuration

Overview

Introduction

This appendix describes the configuration and implementation of the redundant-link pair (RLP) of links.

Redundant-link configuration refers to two 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 links 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:

- Master port pair
- Responder ports
- Nonresponder ports
- Master control algorithm (MCA)
- Primary link
- Secondary link

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.

Redundant-Link Components

Introduction

This section describes the components that make up a redundant-link configuration.

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.

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. Responder ports reside on a separate module from that of the master port.

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.

Redundant-Link Components

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, assigned by the MCA, is the active link at the module initialization time and after a reset.

Secondary Link

The secondary link, assigned by the MCA, is the inactive link at the module's 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 passive roles.

Redundant-Link Operation

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:
 1. Disables the primary link.
 2. Enables the secondary link.

This action 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:

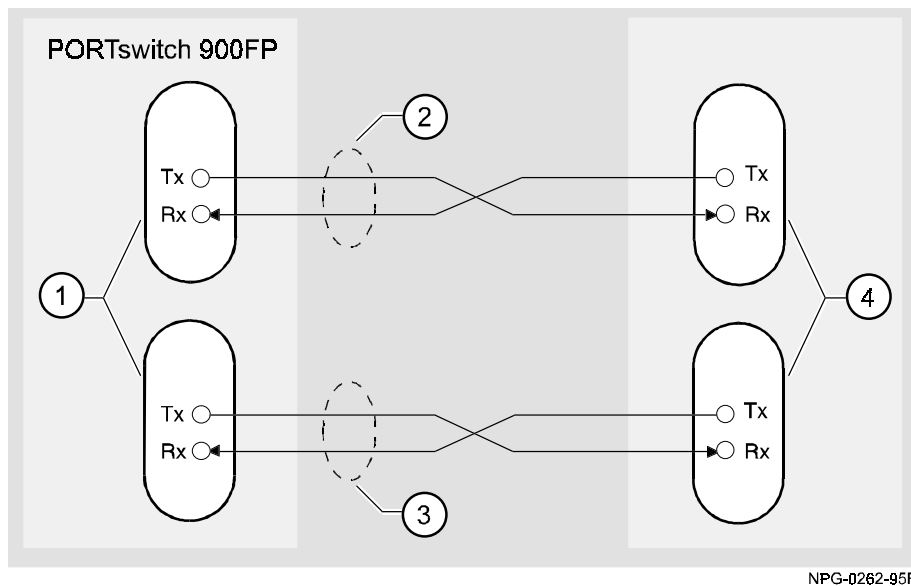
- The MCA detects a failure in the secondary link.
- The secondary port is internally partitioned or disabled.
- The module is rebooted.

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 Figure A-1.

Figure A-1 Simple Redundant-Link Configuration Example

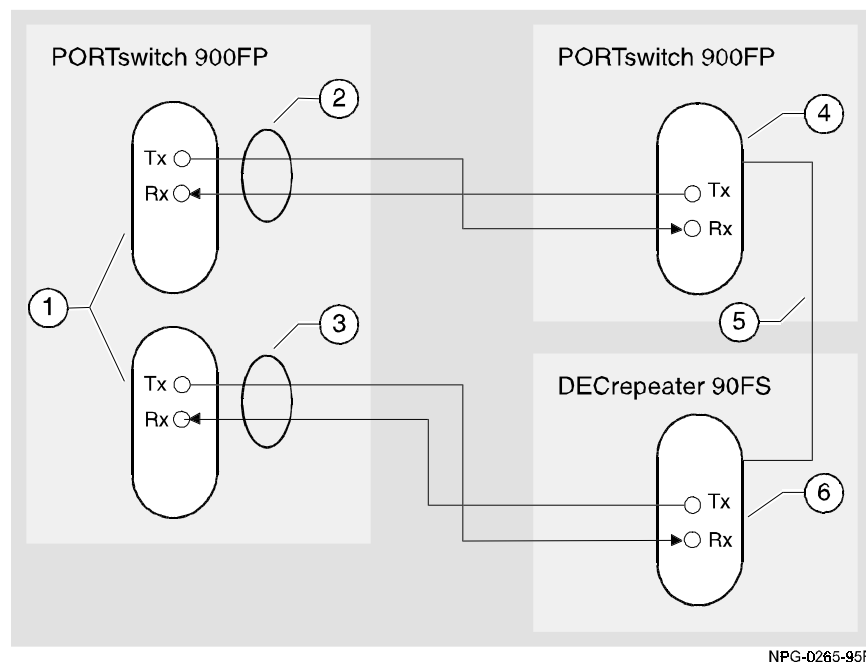


Item	Description
1	Master port pair.
2	Primary link.
3	Secondary link.
4	Single responder ports, nonresponder ports, or a combination. These ports may be on one module (as shown in Figure A-1) or separate modules.

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 Figure A-2.

Figure A-2 Complex Redundant-Link Configuration Example



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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.

Fault Detection

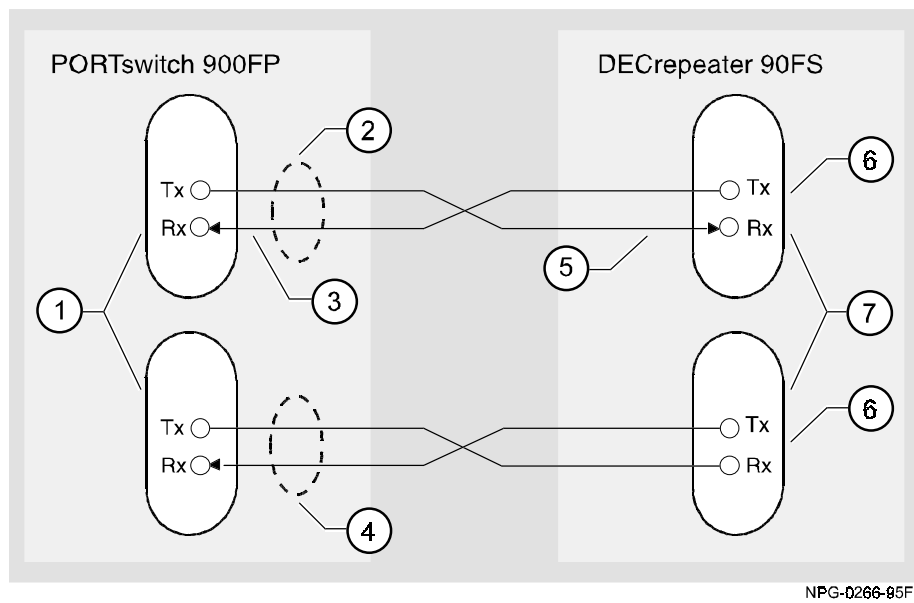
Partial Fault Detection

Partial fault detection allows the PORTswitch 900FP to achieve limited fault tolerance with connections to nonresponder repeaters such as the DEC repeater 90FA or any 10BaseFL repeater. See Figure A-3. 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.

Figure A-3 Partial Fault Detection Configuration Example



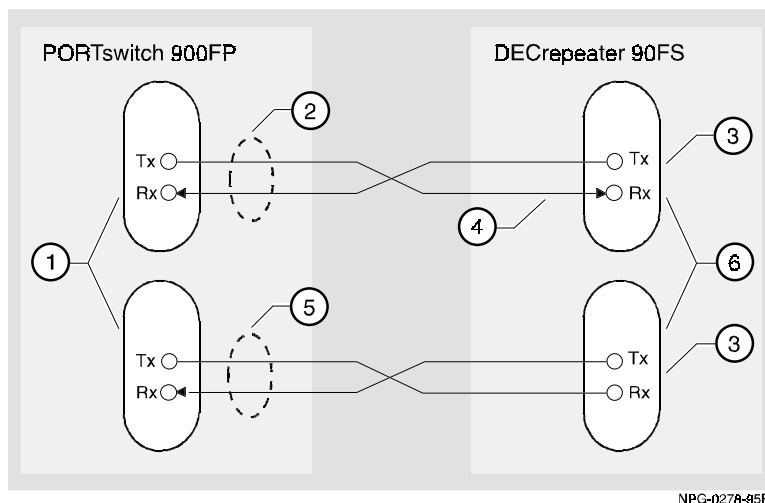
Item	Description
1	Master port pair.
2	Primary link (initially active).
3	The master can detect a link failure here.
4	Secondary link (initially standby and disabled).
5	The master cannot detect a link failure here.
6	Single nonresponder port (always enabled).
7	These ports may be on the same module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

Full Fault Detection

The PORTswitch 900FP supports full fault detection. When the PORTswitch 900FP ports are connected to the ports of another repeater that supports this feature, such as a DECrepeater 90FS, failures are detected at either end of the receive or transmit link. See Figure A-4.

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.

Figure A-4 Full Fault Detection Configuration



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

Fault Detection Comparison

Table A-5 shows the difference in failure detection between partial fault detection and full fault detection.

Table A-5: 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 PORTswitch 900FP 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.

Appendix **B**

Fiber-Optic Loss Budget

Overview

This appendix describes the calculated fiber-optic loss budget for the PORTswitch 900FP.

Note the labeling on the fiber-optic cable that is being installed with the PORTswitch 900FP. Cables are tagged according to fiber type. Some examples of micron fiber types are:

- 50/125
- 62.5/125
- 85/125
- 100/140

The attenuation of each cable is also characterized and recorded.

10BaseFL Loss Budget

Introduction

This section describes the loss budget for 10BaseFL fiber-optic segments.

Calculated Loss Budget

Table B-1 shows the calculated loss budget for 10BaseFL fiber-optic segments used to interconnect the PORTswitch 900FP with the cable plant. These measurements account for the connectors at either end of the segment. They 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 B-1: 10BaseFL Worst-Case Loss Budget (0°C to 50°C, End of Life⁷)

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

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 Appendix A, Redundant Link Configuration

⁷No additional degradation is used. It is included in the vendor's specified power calculations.

FOIRL Compatibility

Introduction

This section discusses the IEEE 802.3 standard for fiber-optic interrepeater link (FOIRL) devices that specifies peak power levels.

The standard specifies a -27.0 dBm minimum peak receive power ($P_{R(\text{avg})} = -30.0$ 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.

FOIRL Calculated Loss Budget

Table B-2 shows the calculated loss budget, in peak levels, for FOIRL-compliant fiber-optic segments.

Table B-2: FOIRL Worst-Case Loss Budget (0°C to 50°C, End of Life⁸)

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

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 PORTswitch 900FP, in conjunction with the increased launch power into the two largest fiber sizes (85/125 and 100/140 microns), does not overload the receivers.

⁸No additional degradation is used. It is included in the vendor's specified power calculations.

Maximum Launch Power

Introduction

The loss budget for fiber-optic devices should include the maximum launch power amounts as shown in Table B-3

Maximum Launch Power

Table B-3: PORTswitch 900FP Best-Case Maximum Launch Power

Measurement	Unit of Measure	Multimode, Graded Index Fiber Size (Microns)			
		50/125	62.5/125	85/125	100/140
Minimum 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

Additional Attenuation

When the PORTswitch 900FP 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, complete the following steps:

Step	Action
1	Subtract the cable's characterized attenuation value from the value listed in Table B-3.
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 PORTswitch 900FP and measure the actual power level at the opposite end of the cable to determine whether additional attenuation is required.

Appendix **C**

Connector Pin Assignments

Overview

Introduction

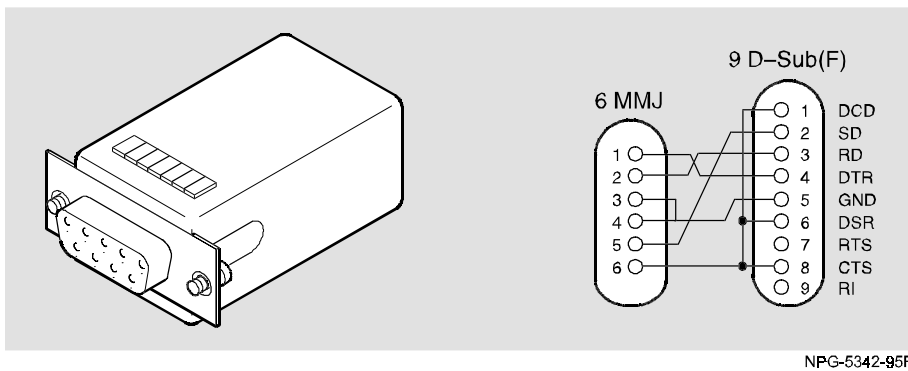
This appendix shows detailed illustrations of the connectors, cables, and adapters used on the PORTswitch 900FP.

Adapters

H8571-J Adapter

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

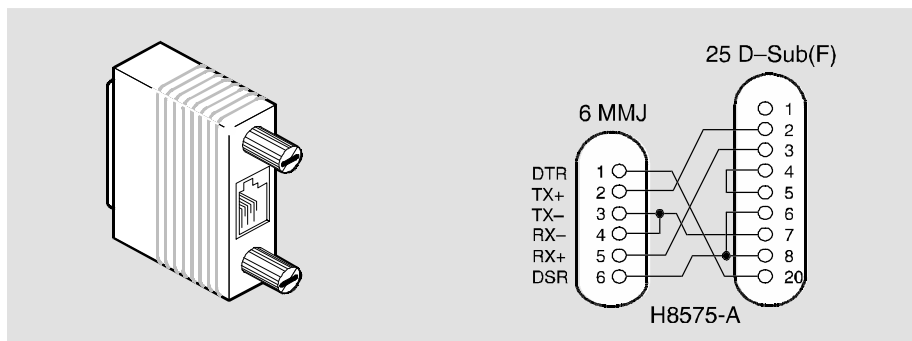
Figure C-1 H8571-J Adapter (6-pin MMJ to 9-pin D-Sub connector)



H8575-A Adapter

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

Figure C-2 H8575-A adapter (6-pin MMJ to 25-pin D-Sub connector)



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Note

EOS/ESD protection devices are not shown on diagram

Appendix **D**

Remote Monitor Alarms and Events

Overview

Introduction

This appendix provides an overview of the PORTswitch 900FP remote monitor (RMON) alarms and events feature.

RMON alarms and events implement a subset of the RMON management information base (MIB) groups based on the IETF draft standard MIB specified by RFC1757, where the primary purpose is to function within the PORTswitch 900FP, and not operate as an RMON probe. The RMON MIB groups include RMON Alarms and RMON Events.

Alarms and Events Description

The PORTswitch 900FP implements the RMON alarms and events groups. You can use the alarms and events to monitor MIB objects within the module. The alarms group specifies objects and thresholds you can sample. When the value of a MIB object reaches its threshold, an event is generated.

You can use an SNMP application to create alarm and event table entries. The module is configured with nine default alarms and events that you can modify or delete.

The following two sections describe the alarms and events groups.

Alarms and Events Groups

RMON Alarms Group

The RMON alarms group samples variables from the PORTswitch 900FP and compares them to preconfigured and configurable thresholds. An alarm table stores configuration values of MIB objects for the polling frequency, thresholds, alarm types, and the events to be generated when an alarm exceeds its threshold.

Using the RMON alarms group, you can selectively monitor any integer-like object associated with the PORTswitch 900FP.

RMON EventsGroup

The RMON events group controls the generation and notification of events of the PORTswitch 900FP. Each entry in the eventTable describes parameters of the event that can be activated. Events are activated by alarms configured in the alarms group. You can specify, at your option, that a log entry is created for each eventEntry whenever the event occurs. You can also specify event notification trap messages for each entry. The RMON events group supports the risingAlarm and fallingAlarm event traps.

Configured Alarms and Events

Default Alarms and Events

The PORTswitch 900FP RMON alarms and events MIB is configured with nine alarms and events. Table D-1 describes the PORTswitch 900FP configured alarms and events.

Table D-1: Configured RMON Alarms and Events

This Alarm Message...	Means...
An environmental change occurred	The module has a fan failure or overheating condition.
Port autopartitioned or operational	One or more ports has been autopartitioned, or a port that was previously autopartitioned is now operational.
NVRAM full	There is no more memory for nonvolatile parameters.
Health text changes	The module's operational state has changed.
Total ports events	The total number of times a port has become nonoperational, autopartitioned, or unavailable.
Total repeater errors	The total number of errors for this module.
Redundant-link state changes	The module's link state change has occurred while using redundant-link configuration.
Security violation	A security violation has occurred on one or more ports.
Media available or unavailable	One or more media have become available or unavailable.

Configured Alarms and Events

User-defined Alarms and Events

In addition to the nine default alarms and events, you can also configure RMON alarms and events on any integer-like object supported by the module.

Appendix **E**

Product Specifications

Overview

Introduction

This appendix lists PORTswitch 900FP operating environment, connector, physical, and acoustical specifications.

Operating Environment Specifications

Table E-1 lists the PORTswitch 900FP operating environment specifications.

Table E-1: PORTswitch 900FP Operating Specifications

Parameter	Specification
Operating Environment	
Operating Temperature ⁹	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) 8
Power	47.5 W, total power 8.0 A, 5Vdc, 0.1 A, 12Vdc ¹⁰ 0.5 A, 15Vdc

⁹ 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.

¹⁰ 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 total.

Connector and Physical Specifications

Table E-2 lists the PORTswitch 900FP connectors.

Table E-2: Connectors

Connectors

Fiber-optic ST-type

(DEChub ONE-MX has: one 8-pin MJ, one 6-pin MJ (OBR), one DB-9, one 15-pin D-sub, and one redundant power connector (D-Sub).)

Physical Specifications

Table E-3 lists the PORTswitch 900FP physical and certification specifications.

Table E-3: PORTswitch 900FP Physical Specifications

Parameter	Specification
Physical	
Height	44.45 cm (17.5 in)
Width	4.45 cm (1.75 in)
Depth	15.25 cm (6 in) 25.40 cm (10.0 in) with a DEChub ONE docking station. 30.24 cm (11.9 in) with a DEChub ONE-MX docking station.
Weight	1.8 kg (4 lb) 3.4 kg (7.5 lb) with a DEChub ONE docking station. 3.9 kg (8.63 lb) with a DEChub ONE-MX docking station.
Certification	
CE, CSA, FCC, TÜV, UL, VCCI	

Acoustical Specifications

Table E-4 lists the PORTswitch 900FP acoustical specifications.

Table E-4: Acoustical Specifications

Acoustics - Declared values per ISO 9296 and ISO 7779¹¹

Product	Sound Power Level L_{WAd} , B	Sound Pressure Level L_{pAm} , dBA (bystander positions)
	Idle/Operate	
DEFMM	5.1	37
DEFMM + DEHUA	5.4	40
DEFMM + DEF1H	5.4	40

¹¹ Current values for specific configurations are available from Digital Equipment Corporation representatives. 1 B = 10 dBA.

Schallemissionswerte - Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779¹²

Produkt	Schalleistungspegel	Schalldruckpegel
	L_{WAd} , B	L_{dAm} , dBA (Zuschauerpositionen)
	Leerlauf/Betrieb	Leerlauf/Betrieb
DEFMM	5,1	37
DEFMM + DEHUA	5,4	40
DEFMM + DEF1H	5,4	40

¹² Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen erhältlich. 1 B = 10 dBA