DECmau 900TH

Installation and Configuration

Part Number: EK–DTMXM–IN. A01

This manual describes how to install and configure the DECmau 900TH module.

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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.

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 29 and 33.]

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 pro-cessus DLU. Ne mettez pas l'unité hors tension et n'exé-cutez 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 firm-ware. No se debe apagar la unidad ni realizar ninguna operación que pueda causar una interrupción del sumi-nistro de la unidad durante la Etapa 3 del mencionado proceso.

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Introduction

The DECmau 900TH (also referred to in this manual as the module) is a high-density 24-port Token Ring multistation access unit (MAU) that can be configured into the DEChub 900 MultiSwitch (also referred to in this manual as the DEChub 900).

The module can also serve as a standalone unit when configured with a DEChub ONE[1] docking station. As standalone units, the modules can be stacked into equipment racks to allow for economical network growth and for remote access to local area networks (LANs).

The DECmau 900TH is an intelligent MAU that controls station access to the main ring. The DECmau 900TH checks the station operating speed. If the station is operating at the same speed as the main ring, the DECmau 900TH gives the station access.

Features

The DECmau 900TH includes the following features:

- 24 lobe ports connecting stations to the ring.

- 2 trunk ports connecting MAUs together to form larger rings.

- Integral Simple Network Management Protocol (SNMP) network management.

- Supports Serial Line Internet Protocol (SLIP).

- Token Ring services, including:

    - Ring speed detect on both lobe and trunk ports.

    - Autopartitioning (refer to page 44 for a detailed description).

    - Ring recovery that automatically removes beaconing nodes from the ring.

    - Ring mapping that builds a database of logical station MAC addresses.

    - Ring error monitor that provides error status information.

    - Ring event logging provides log events on the ring.

---

[1] Throughout this manual, the term DEChub ONE refers to the DEChub ONE or the DEChub ONE–MX docking station, unless otherwise specified. See the appropriate installation manual for product-specific information.

Introduction (Cont.)

- Downline-upgradable firmware.

- Integral STP ring-in/ring-out repeater using DB9 shielded connectors.

- Standalone operation with a DEChub ONE docking station.

- IP services for the Hub Manager.

- CSNMP gateway services in standalone mode.

- Hot-swap capability allows you to install and remove the module without turning off power to the DEChub 900.

- Setup port for the initial setup of the module using a setup port device (a terminal or personal computer).

- Module self-test.

- Stores management information base (MIB) settings.

- Built-in SNMP agent supports the following:

    - RFC 1213 – MIB (MIB II)

    - RFC 1231 – MIB (802.5 MIB)

    - DEChub 900 – Common MIB

    - DEChub 900 – PTAM MIB

    - DEChub 900 – PTRM MIB

- Manageability using any generic SNMP management application that supports the MIBs listed above.

- User-friendly advanced graphical user interface (GUI) manageability with Digital's HUBwatch network management station (NMS) application.

Front Panel

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

2) **Module OK** ↻ **LED** — Lights when the module passes self-test. If the module fails self-test, the Module OK LED remains off.

3) **Ring A LED** — Lights when the module is connected to token ring A in a DEChub 900. This LED is always off when configured in a DEChub ONE.

4) **Ring B LED** — Lights when the module is connected to Token Ring B in a DEChub 900. This LED is always off when configured in a DEChub ONE.

5) **Speed LED** — Lights when the ring speed is operating at 16 MHz.

6) **Speed LED** — Lights when the ring speed is operating at 4 MHz.

7) **Lobe LEDs** — Lights when a station has access to the network.

8) **Partition LEDs** — Lights when the status for the associated partition is displayed.

   NOTE: For more information about the module's LEDs, refer to the section titled LED Descriptions.

9) **Partition cycle switch** — Stops and starts the LED status scanning of the partition LEDs during operation.

10) **Ring In port and associated LED** — DB9 shielded connector connecting the Ring In trunk port to the Ring Out trunk port of a MAU or repeater.

11) **Ring Out port and associated LED** — DB9 shielded connector connecting the Ring Out trunk port to the Ring In trunk port of a MAU or repeater.

12) **Lobe ports** — 8-pin MJ shielded connectors connecting stations to the network using UTP 100-ohm cable.

13) **Station Address label** — Displays the MAC address of the DECmau 900TH.
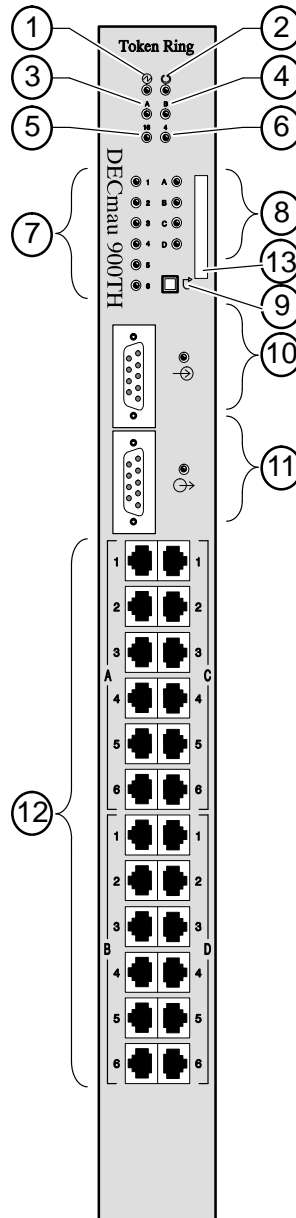
LKG-9241-93I

Back Panel

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 DEChub ONE docking station.

3) **Grounding bolt** — Provides a chassis grounding connection between the module and a DEChub 900 or a 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 a DEChub ONE docking station.

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

7) **Grounding fingers** — Provides additional chassis grounding between the module and a DEChub 900 or a DEChub ONE docking station.
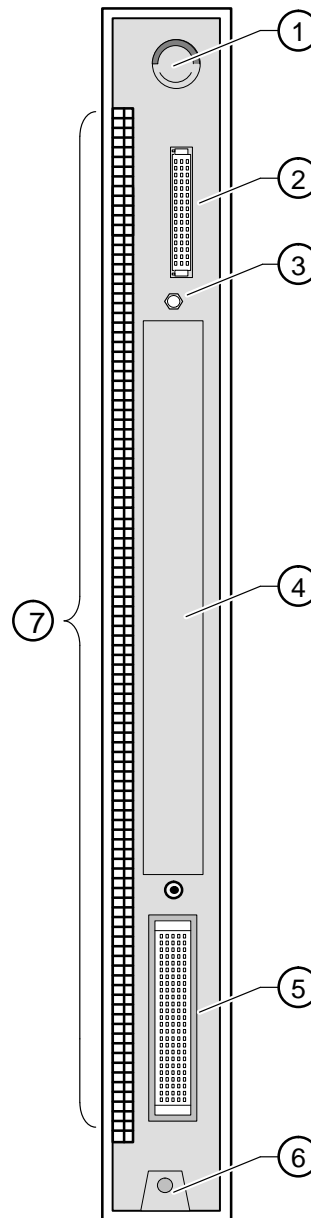
LKG-09724-94I

Installing the Module

The DECmau 900TH 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 module power-up sequence if enough power is available.

----

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

If any of the module's power ratings 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.
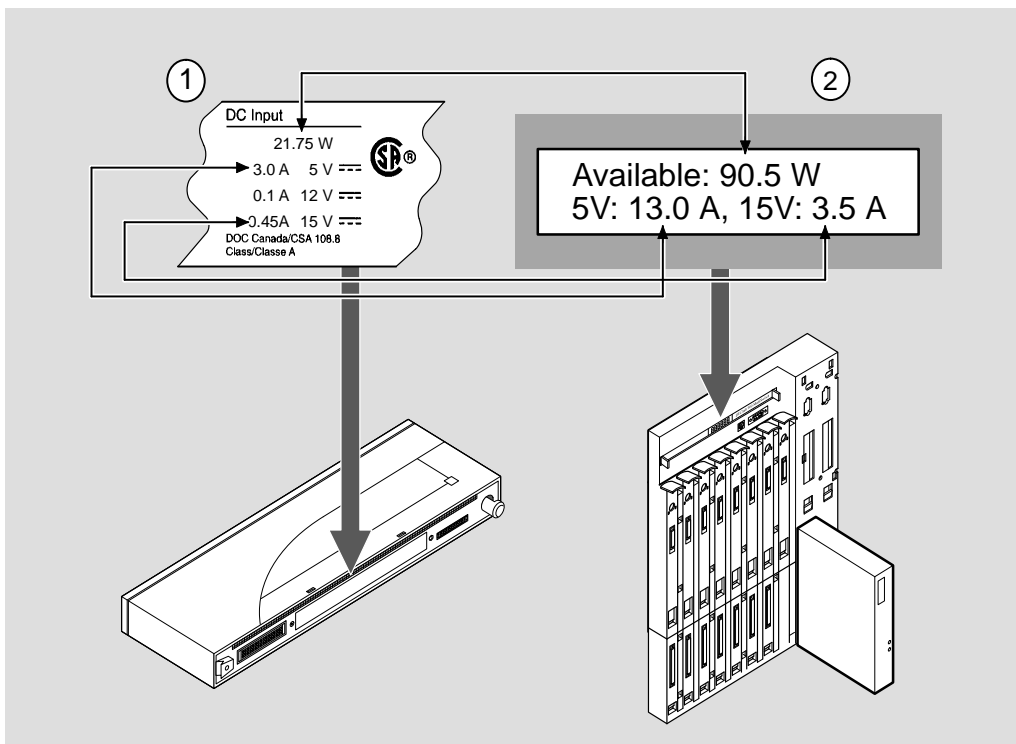
MPG-0003-95I

Installing the Module

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

    a. Place the module's mounting tab into a mounting slot on the
        DEChub 900 **(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)**.
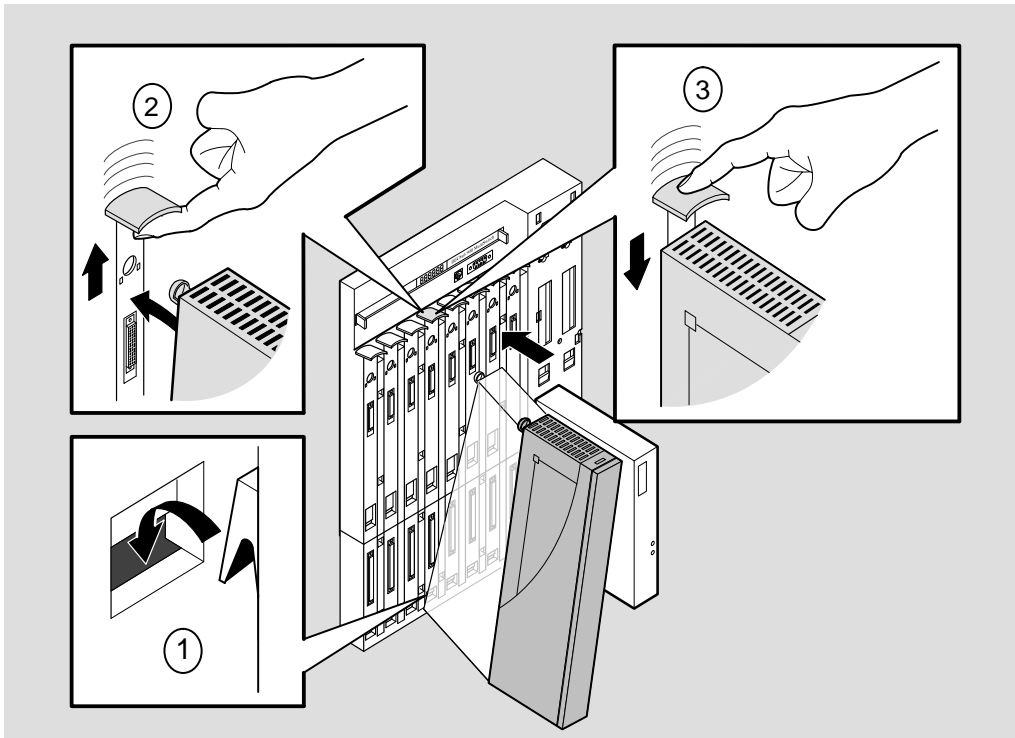
MPG-0004-95I

Installing the Module (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:

```
DECmau 900TH
up.
```

    NOTE: Refer to the section titled Problem Solving Using the LEDs if the LEDs do not operate as described.
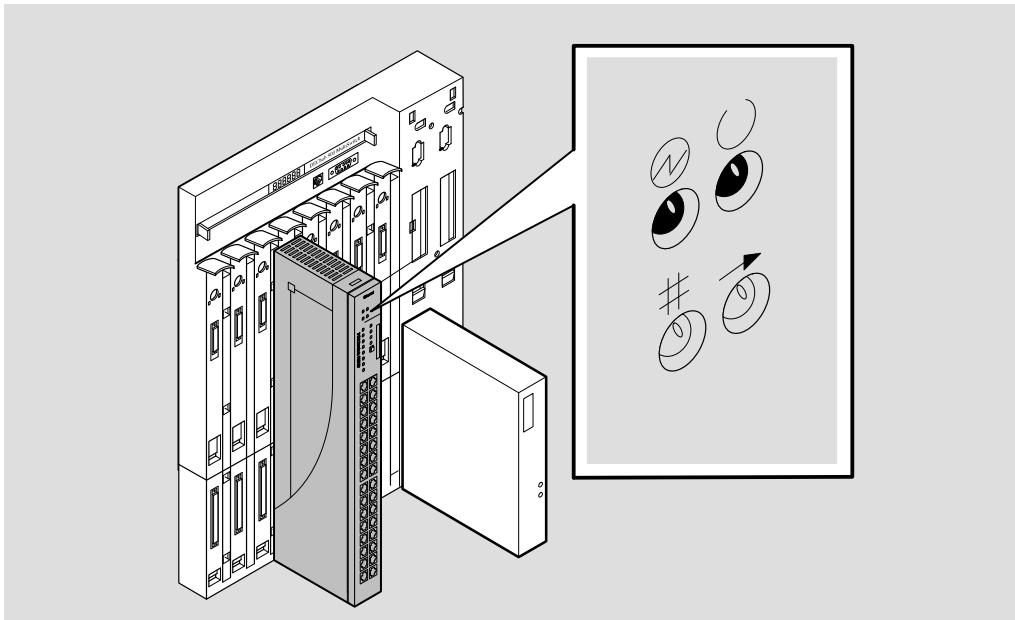
MPG-0005-95I

Installing the Module (Cont.)

❹ Connect the port cables.

Connect the appropriate cables; then go to the section titled Configuring the Module. See your network manager if you are not sure which cables to connect.

> **NOTE:** All cables should be installed, tested, and tagged at the site, prior to this installation.

a. Align the release tab on the cable plug with the keyway **(1)** on the module's 8-pin MJ connector.

b. Insert the plug into the connector, ensuring that the release tab **(2)** snaps into the locked position.

After all cables are installed, go to the section titled Configuring the Module.

> **NOTE:** To disconnect the port cable, press the release tab on the 8-pin MJ connector; then disconnect the cable.
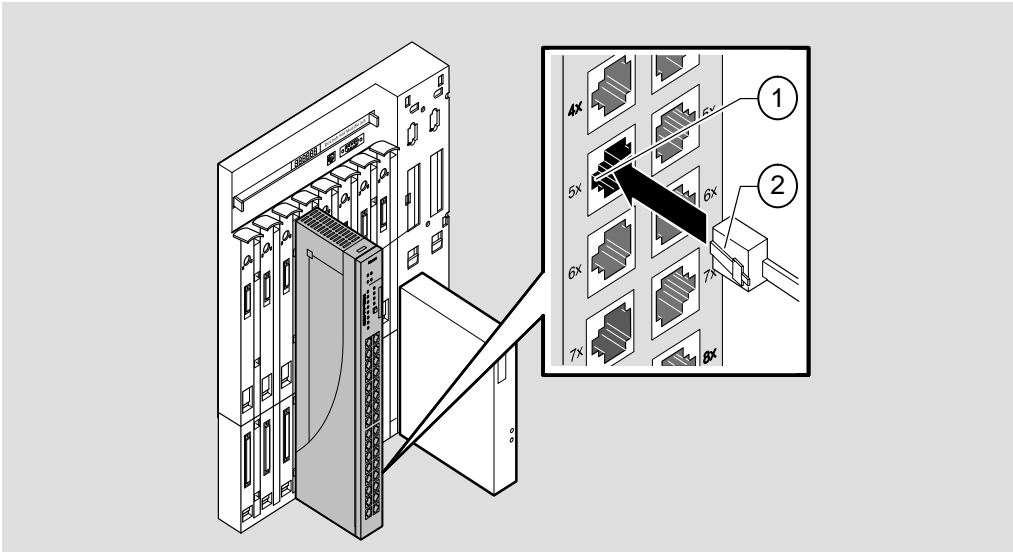
MPG-0006-95IX

Removing the Module

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

To disconnect, press the release tab on the 8-pin MJ connector **(1)**; then disconnect the cable.
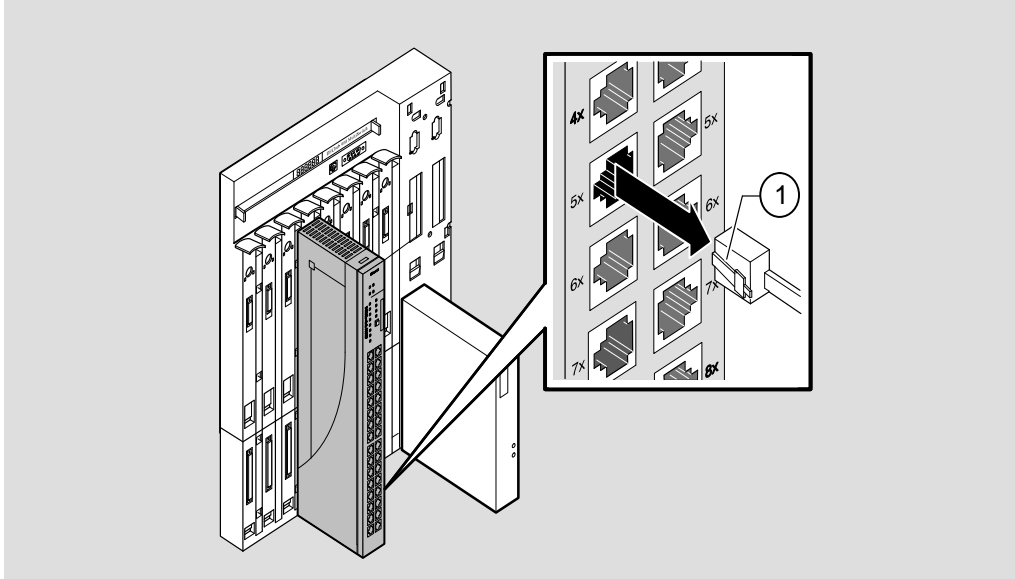
MPG-0007-95I

Removing the Module

2 **Unseat the module from the DEChub 900.**

   a. Lift the release lever located on the top of the DEChub 900 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)**.
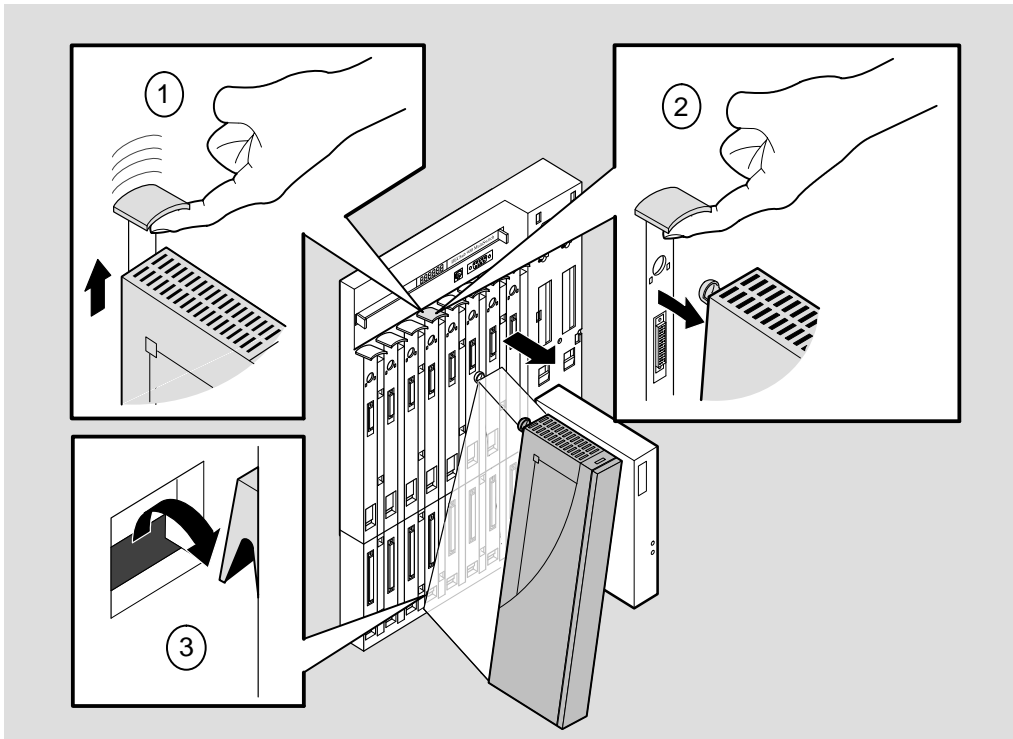
MPG-0008-95I

Configuring the Module

Setup Port Description

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

Examples of the actual 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 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.

The DEChub 900 Hub Manager setup port is 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 DEChub ONE docking station 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 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.)

DEChub 900 MultiSwitch

DEChub ONE

DEChub ONE-MX

H8571-J

BN24H

H8575-A
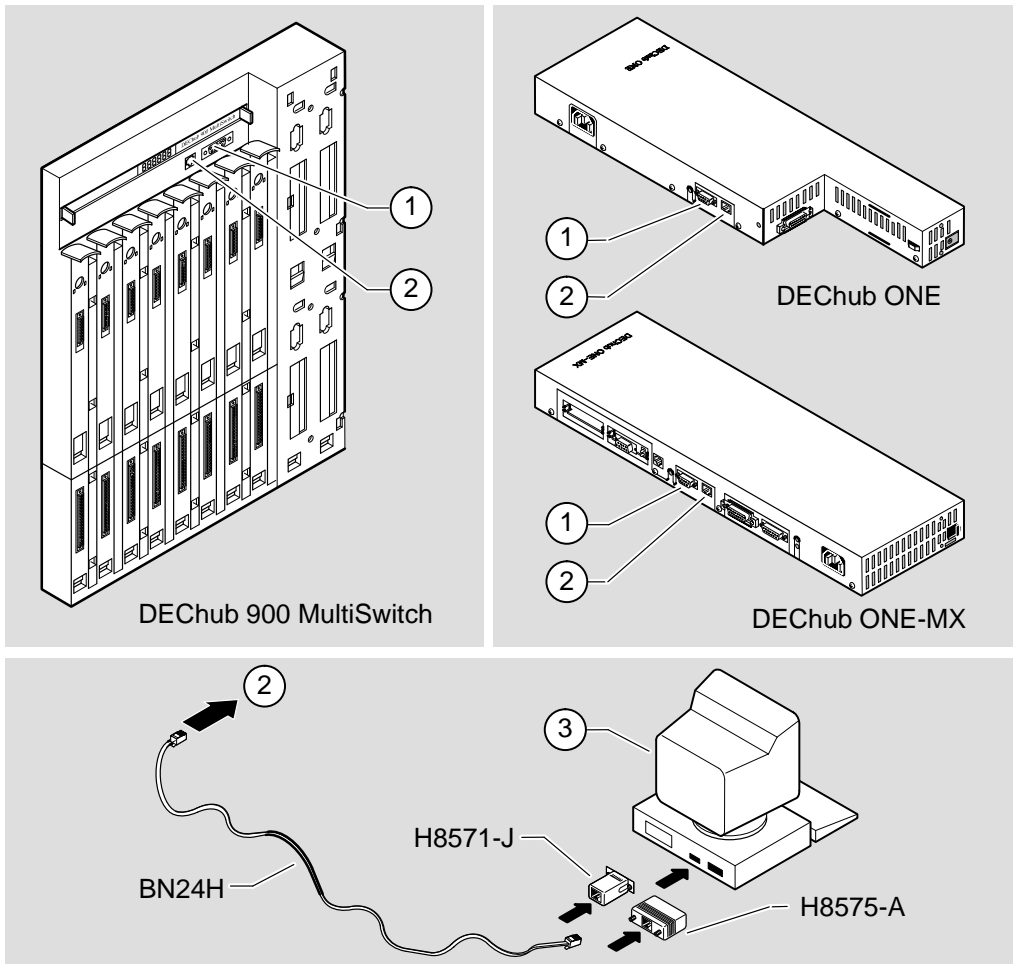
NPG-0020-95I

Item	Description
1	OBM Port
2	Setup Port
3	Setup Port Device

Configuring the Module (Cont.)

Connecting to the Setup Port

To connect to the setup port on the DECmau 900TH 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 the DEChub ONE docking station.

Accessing the Setup Port

To access the setup port on the DECmau 900TH 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 the setup port on the DEChub ONE, the DECmau 900TH Installation Menu appears. Go to the section titled DECmau 900TH Installation Menu (DEChub ONE Options).

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

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 DECmau 900TH) 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):  3  Return
Console redirected to 3: DECmau 900TH
Attempting connection [Ctrl/C to abort]...
```

After you press Return, the `DECmau 900TH Installation` Menu appears on your screen.

Configuring the Module (Cont.)

DECmau 900TH Installation Menu (DEChub 900 Options)

This section shows the options available from the DECmau 900TH 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 where the module is installed is shown at the top of the menu.

The following example shows the DECmau 900TH Installation Menu operating in a DEChub 900 configuration:

```
DECmau 900TH – slot 3
================================
     DECmau 900TH 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]  Module-Specific Options . . .

[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.)

DECmau 900TH Installation Menu (DEChub ONE Options)

This section shows the options available from the DECmau 900TH Installation Menu when the module is installed standalone in the DEChub ONE docking station.

The following example shows the DECmau 900TH Installation Menu operating in a DEChub ONE configuration:

```
DECmau 900TH

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

     DECmau 900TH 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...


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

     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 DECmau 900TH 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 docking station).

[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

 DECmau 900TH – 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 ...
```

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

DECmau 900TH – 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 ...
```

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

   DECmau 900TH – slot 3
====================================
DECmau 900TH, Token Ring Management Agent, HW=v1/0,RO=v.1,SW=v1.0
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
Token Ring  16.20.156.24 0.255.255.255 16.20.157.25 10:00:D4:A5:63:63
OBM Port    16.20.158.26 255.0.0.0              Speed 9600 bps
Ring Speed                              : 16 Mb/Sec
Ring In Port Autowrap                   : Enabled                     ②
Ring Out Port Autowrap                  : Enabled

====================================
             Press Return for Main Menu ...
```

Item	Description
1	Appears only when the module is connected to a DEChub ONE
2	If the module is connected to a DEChub ONE, "Not Configured" is replaced with the current OBM port speed (for example, "Speed 9600 bps").

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

DECmau 900TH – 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
```

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

DECmau 900TH – 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] : public1  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 DECmau 900TH.

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.

The following example shows the dialog associated with this option.

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

DECmau 900TH
=========================================
                  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 ...
```

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

DECmau 900TH – 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 ...
```

[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 Y in the appropriate address field.

The slot number you select for in-band management must contain a network module that supports IP services.

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

DECmau 900TH – 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
Token Ring  16.20.156.24  0.255.255.255  16.20.157.25  10:00:D4:A5:63:63
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
       Enter the Default Gateway  : 16.20.54.156   Return
            Press Return for IP Configuration Menu ...
```

Configuring the Module (Cont.)

[4] Configure IP (Cont.)

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

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

The OBM feature allows you to manage your DECmau 900TH 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 DECmau 900TH Installation Menu.

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

The following example shows the dialog associated with this option.

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

DECmau 900TH – 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
Token Ring  16.20.156.24  0.255.255.255  16.20.157.25  10:00:D4:A5:63:63
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 a bootstrap protocol (BootP) server.

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

The following example shows the dialog associated with this option.

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

                  Enter selection : 6

DECmau 900TH – 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 ...
```

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

  DECmau 900TH – slot 3
 ===================================
                    DUMP ERROR LOG
             Current Reset Count: 14
 ===================================
        Entry       = 3
        Timestamp   =   0    0    791
        Reset Count = 13

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). If the module is not configured with an IP address, you can still upgrade the module by selecting the `Downline Upgrade` option from the `DEChub 900 MultiSwitch INSTALLATION MENU`. Refer to the *DEChub 900 MultiSwitch Owner's Manual* for more information.

> **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:

`dtmxm100.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.

DECmau 900TH 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 — normal operational.
	• HUB Manager display — ` DECmau 900TH ` `    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 — normal operational.
	• HUB Manager display — ` DECmau 900TH ` `    up `
	Typical time to complete this stage — normally 1 second.
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.

Configuring the Module (Cont.)

[6] Downline Upgrade (Cont.)

Table 1 (Cont.)   DLU Process Description

Stage	What Happens
	Indications that this stage is in progress include:
	• Module status — functional.
	• Module cannot respond to management requests.
	• LED display — The LEDs that are lit during stage 2 will remain lit during this stage.
	• HUB Manager display — `DECmau 900TH` `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.
	• Module cannot respond to management requests.
	• LED display — (standard self-test pattern) LEDs flash, indicating various subroutines are running.
	• HUB Manager display — `DECmau 900TH` `unknown`
	Typical time to complete this stage — normally 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:
	`DECmau 900TH` ` up`

Configuring the Module (Cont.)

[6] Downline Upgrade (Cont.)

Update the Firmware from the DECmau 900TH 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 : 7

    DECmau 900TH

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

                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 `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 []  dtmxm100.bin  Return
```

After you enter the firmware image load 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
```

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

```
 Load will be initiated over the Token Ring network interface.

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

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

If you press `Return`, the DLU process is initiated over the Token Ring network interface.

If you pressed `Return` for this selection go to the section titled Starting 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 series of dots (. . . . . .) indicates that the load is in progress.

When the series of dots ends, the screen displays the following message:

```
Transfer complete.
```

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 ONE docking station.

Configuring the Module (Cont.)

[6] Downline Upgrade (Cont.)

Hub Manager Status Display

```
4: DECmau 900TH
unknown
```
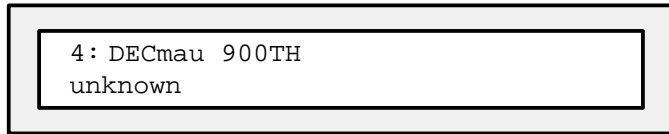
This is normal.

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

```
    Device not Responding!   Connection closed!
```

This is normal.

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.

The screen displays one of the following:

- If the module is installed into a DEChub ONE docking station, the screen displays the `DECmau 900TH INSTALLATION MENU`.

- If the module is installed into a DEChub 900, the screen displays the following message:

```
                 Press Return for Main Menu ...
```

When you press ⎡Return⎤, the screen displays the `DEChub 900 MultiSwitch INSTALLATION MENU`.

DECmau 900TH Installation and Configuration

Configuring the Module (Cont.)

[7] Configure Out Of Band Port
(DEChub ONE)

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

DECmau 900TH – 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 (Cont.)
(DEChub ONE)

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

DECmau 900TH
=========================================

        SET OUT-OF-BAND MANAGEMENT INTERFACE PORT SPEED

                        [1]  1200 baud
                        [2]  2400 baud
                        [3]  4800 baud
                        [4]  9600 baud
                        [5] 19200 baud
                        [6] 38400 baud

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


          Enter selection [3] (9600) :4  Return
                  OBM port speed set.

             Press Return for Main Menu ...
```

DECmau 900TH Installation and Configuration

Configuring the Module (Cont.)

[7] Configure Out Of Band Port (Cont.)
(DEChub ONE)

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

DECmau 900TH
=========================================

                     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

> **NOTE:** This option appears as menu selection [7] when the module is installed in the DEChub 900.

This option provides you with three module-specific Token Ring configuration selections. When selected, the option allows you to set the ring speed, and enable or disable Ring In and Ring Out Autowrap. Selecting option 4 returns you to the DECmau 900TH Installation menu.

The following example shows the dialog associated with this option.

```
                  Enter selection : 7

DECmau 900TH – slot 3
===================================
          DECmau 900TH RING CONFIGURATION

          [1] Set Ring Speed
          [2] Set Ring In Port Autowrap
          [3] Set Ring Out Port Autowrap
          [4] Return to Main Menu

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

          Enter selection number : 1  Return
```

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

> **NOTE:** This option appears as menu selection [7] when the
> module is installed in the DEChub 900.

Option [1] Set Ring Speed

This option allows lets you select the ring speed for either 4Mb/Sec or 16 Mb/Sec.
The factory default setting for this option is `16 Mb/Sec`.

The following example shows the dialog associated with this option.

```
                    Enter selection : 1

 DECmau 900TH – slot 3
 ================================:
                     SET RING SPEED

                  [1] 4 Mb/Sec
                  [2] 16 Mb/Sec

 ================================:

        Enter selection [2] (16 Mb/Sec) :    Return
```

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

> **NOTE:** This option appears as menu selection [7] when the module is installed in the DEChub 900.

Option [2] Set Ring-In Port Autowrap

This option allows lets you enable or disable the Ring In port autowrap. When autowrap is enabled, phantom current must be present on the Ring In port in order for the port to connect to the ring. The factory default setting for this option is `enabled`.

NOTE: If the Ring In port connects to a device without Digital's Autowrap, select option `[2] Disabled`.

The following example shows the dialog associated with this option.

```
                    Enter selection : 2

DECmau 900TH – slot 3
==============================
             SET RING IN PORT AUTOWRAP

                  [1] Enabled
                  [2] Disabled

==============================
       Enter selection [1] (Enabled) :    Return
```

Configuring the Module (Cont.)

[8] Module-Specific Options (Cont.)

> **NOTE:** This option appears as menu selection [7] when the module is installed in the DEChub 900.

Option [3] Set Ring-Out Port Autowrap

This option allows you enable or disable the Ring Out port autowrap. When autowrap is enabled, phantom current must be present on the Ring Out port in order for the port to connect to the ring. The factory default setting for this option is enabled.

NOTE: If the Ring Out port connects to a device without Digital's Autowrap, select option [2] Disabled.

The following example shows the dialog associated with this option.

```
                    Enter selection : 3

   DECmau 900TH – slot 3
   ==============================
                SET RING OUT PORT AUTOWRAP

                     [1] Enabled
                     [2] Disabled

   ==============================
          Enter selection [1] (Enabled) :    Return
```

LED Descriptions

The module LEDs provide dynamic indications of the status of the module. The module LEDs can be in various states (on, off, or flashing).

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

Table 2   Module LED States

LED Name	Off	On (Green)	Flashing (Green)
Power	No power to module.	Module receiving power.	Faulty connection.
Module OK	Self-test failed (if more than 60 seconds elapsed).	Module passed self-test.	Nonfatal error. (Fan failure.)
Ring A LED	Module is not con- nected to Ring A	Module is con- nected to Ring A.	With the Module OK LED off, the- firmware image is faulty.
Ring B LED	Module is not con- nected to Ring B	Module is con- nected to Ring B.	With the Module OK LED off, shows serial activity of the DEChub 900 back- plane, or the OBM port when in a DEChub ONE.
4 Mb/s LED	Ring speed is set to 16 Mb/s.	Ring speed is set to 4 Mb/s.	N/A.
16 Mb/s LED	Ring speed is set to 4 Mb/s.	Ring speed is set to 16 Mb/s.	N/A.
Bank A LED through Bank D LED	Associated bank is not currently dis- playing its port connection status on the 6 Port State LEDs.	Associated bank is currently dis- playing its port connection status on the 6 Port State LEDs.	N/A.

(continued on next page)

LED Descriptions

Table 2 (Cont.)   **Module LED States**

LED Name	Off	On (Green)	Flashing (Green)
Port State 1 LED through Port State 6 LED	Station is not inserted on the Token Ring for the associated port.	Station is inserted on the MAU ring for the associated port.	Continuous single flash indicates the associated station was disabled by network management.
			Continuous double flash indicates that the associated station is operating at a different speed than the MAU.
Ring In LED	The trunk port is not connected to another MAU.	The trunk port is connected to another MAU.	Continuous single flash indicates the trunk port is disabled by network management.
			Continuous double flash indicates the remote MAU connected to the trunk port is operating at a different speed.
Ring Out LED	The trunk port is not connected to another MAU.	The trunk port is connected to another MAU.	Continuous single flash indicates the trunk port is disabled by network management.
			Continuous double flash indicates the remote MAU connected to the trunk port is operating at a different speed.

Autopartitioning

The DECmau 900TH autopartitioning feature is a Token Ring service that specifies the ring recovery process. Ring recovery recognizes a ring beaconing condition and automatically partitions the ring to remove the condition.

The DECmau 900TH is able to monitor the status of the ring and remove stations that exhibit a hard error condition. Hard errors performed by the stations prevent ring recovery protocols from restoring the ring to normal operation. These errors include streaming errors, frequency errors, signal loss errors, and internal hardware errors.

To support its autopartitioning algorithm, the DECmau 900TH receives the ring poll frames sent by each station in the ring. The ring polling process is started every seven seconds by the station on the network that is acting as the active monitor. Using these ring polls, the DECmau 900TH builds a map of the stations on the ring, identifying the stations connected to its lobe ports. If a single station is inserted into a lobe part, the DECmau 900TH can make a one-to-one mapping of station address to port. Digital recommends wiring a single station to a lobe port to allow the autopartition algorithm to operate most efficiently.

When a station detects a hard error, it enters a state where it periodically transmits a beacon frame on the network. This condition identifies the transmitting station, the upstream neighbor, and the type of hard error. When the DECmau 900TH receives a beacon frame, it checks the neighbor address with the addresses in the map made from the last poll. If the address is in the map, the DECmau 900TH begins the ring recovery process.

With a one-to-one ring map relationship, the MAU wraps the port with the associated address. If the beaconing condition continues, the MAU reinserts the wrapped port into the ring and wraps the next active port on the MAU. The MAU continues this process until the beaconing condition is resolved.

If a one-to-one ring map relationship does not exist, the MAU starts a ring recovery algorithm with the MAU's first active port and continues wrapping consecutive ports until the beaconing condition is resolved. The beaconing port remains wrapped for 30 seconds and is then reinserted into the ring once the MAU detects phantom current and the correct operating speed. You can extend the 30-second duration by using HUBwatch or any network management station capable of sending SNMP commands.

If the MAU detects ring beaconing from a trunk port or from another MAU in the same DEChub, the MAU automatically partitions the ring to remove the conditions.

Problem Solving

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 typical combined 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 the module power is initially turned on, the following events occur:

1. The module Power ⌾ LED lights as soon as power is applied to the unit.

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

3. While the module is performing self-test, the Module OK ↻ LED remains off as each diagnostic test in the self-test routine runs.

4. After the successful completion of self-test, the Module OK ↻ LED lights, and remains lit.

Problem Solving Using the LEDs

Table 3 provides a list of symptoms indicated by the LED states and provides suggestions for corrective actions.

Table 3   Problem Solving Using the LEDs

Symptom	Probable Cause	Corrective Action
Power ⌾ LED is off.	The module is not receiving +5Vdc.	Check the power status on the Hub Manager status display.
		If the Hub Manager status display indicates that power is available for this module, press the release lever down and reseat or remove the module.
		Inspect the module's 48- or 160-pin connector for bent, broken, or dirty pins.
		If the problem persists, replace the module.

(continued on next page)

Problem Solving (Cont.)

Table 3 (Cont.)   Problem Solving Using the LEDs

Symptom	Probable Cause	Corrective Action
	Faulty Power LED.	Move the module to an operational hub slot. If the power LED does not light, replace module or contact your Digital service representative.
	Faulty slot connection.	Move the module to an operational slot. If the Power LED lights, the original DEChub 900 slot may be faulty. Refer to the problem solving section in the *DEChub 900 MultiSwitch Owner's Manual.*
Power ⊘ LED is flashing	Faulty module connection.	Reseat the module.
	Faulty slot connection.	Move the module to another slot.
	DEChub 900 power supply or DEChub ONE is faulty.	Replace the faulty DEChub 900 power supply or the DEChub ONE.
Module OK ↻ LED is off.	Self-test in progress.	Wait for self-test to complete.
	Self-test failed.	If the LED does not light after approximately 60 seconds, lift the release lever momentarily then press it down to repeat self-test. If self-test fails again, replace the module or contact your Digital service representative.

Problem Solving (Cont.)

Table 3 (Cont.)   Problem Solving Using the LEDs

Symptom	Probable Cause	Corrective Action
Module OK⟳ LED is off, and the module is cycling the partition LEDs.	Self-test has detected a fault. Module is not fully functional.	Some components of the module are operational. Use management features to determine the type of fault(s) preventing full functionality.
Ring A and Ring B LEDs are both off and the module is in a DEChub 900.	The module is not connected to the network.	Rerun self-test. Check the backplane ring speed is the same as the MAU speed. Check if management has configured the speed for the hub slot. Replace the module.
Ring A LED displays a continuous single flash and Module OK LED is off.	The module's firmware image is faulty.	Downline load a new firmware image using Hubloader, or by selecting `Downline Upgrade` from the Hub Manager's Installation Menu.
Port LED displays a continuous double flash pattern.	The station attached to the port is operating at a different speed than the MAU.	Set the speed of the station attached to the associated port to the speed indicated by the MAUs speed LEDs.
Bank LEDs are not cycling.	The Bank LED switch is in the stop mode.	Press the Bank LED switch.
Ring In and Ring Out LEDs display a continuous single flash pattern.	The trunk connection is disabled.	The trunk connection can be enabled using HUBwatch, or with SNMP network management commands.
Ring In and Ring Out LEDs display a continuous double flash pattern.	The remote MAU attached to the trunk port is operating at an incorrect speed.	Change the speed of the remote MAU to match the speed of the local MAU.
Ring In and Ring Out LEDs do not light.	The module is connected to a device that does not provide phantom current.	Disable Autowrap on both ports by selecting Module-Specific Options 2 and 3 from the DECmau 900TH Installation menu.

Problem Solving (Cont.)

Table 3 (Cont.)   Problem Solving Using the LEDs

Symptom	Probable Cause	Corrective Action
Network connection faulty	Faulty DECmau 900TH or DEChub 900	Proceed to *Problem Solving Faulty Communications* below.
Token Ring connection faulty	Faulty DECmau 900TH or DEChub 900	Proceed to *Problem Solving Faulty Communications* below.
Workstation connection faulty	Faulty DECmau 900TH or DEChub 900	Proceed to *Problem Solving Faulty Communications* below.

Problem Solving Faulty Communications

If you are experiencing faulty Token Ring communications, you may have a faulty electrical or mechanical connection associated with the DECmau 900TH or the DEChub 900. To determine if you have a problem with either of these devices, perform the following procedures:

Preparing To Test

Before you begin testing for faulty communications, follow these steps:

1. Disconnect all network modules from the DEChub 900.

2. Disconnect all cables attached to the DECmau 900TH.

3. Install the DECmau 900TH module into DEChub 900 slot 1.

4. Connect the setup port device and cable to the setup port on the DEChub 900.

5. Using the setup port device, set the DEChub 900 and the DECmau 900TH to factory defaults. This initializes both devices, runs self-tests, resets the Token Ring operating speed to 16Mb and connects the DECmau 900TH to Ring A. Check to ensure that the **A** and **16** LEDs are lit.

Testing Ring A

1. Check to ensure that the Module OK LED on the DECmau 900TH remains lit and the Hub Manager display indicates **UP**. If the LED does not light and the Hub Manager displays **Ring Beaconing,** a fault condition exists.

2. Repeat step 1 for the remaining seven slots in the DEChub.

3. Proceed to Testing Ring B.

Problem Solving (Cont.)

Testing Ring B

1. Install the DECmau 900TH module back into DEChub 900 slot 1.

2. Using the setup port device, set the DECmau 900TH ring speed to 4Mb. This connects the DECmau 900TH to Ring B. Check to ensure that the **B** and **4** LEDs are lit.

3. Check to ensure that the Module OK LED on the DECmau 900TH remains lit and the Hub Manager display indicates **UP**. If the LED does not light and the Hub Manager displays **Ring Beaconing,** a fault condition exists.

4. Repeat step 3 for the remaining seven slots in the DEChub.

Evaluating the Tests

If all the tests associated with Ring A and Ring B provide successful results, the DEChub 900 and the DECmau 900TH are operating properly.

If the DECmau 900TH fails in every slot, the DECmau900TH is probably faulty. Repeat the entire test again with another DECmau 900TH to verify the problem.

If the test fails in only in one DEChub 900 slot, the DEChub 900 slot is faulty. Replace the DEChub 900 or avoid using the faulty slot.

If the test fails on only one ring (Ring A at 16Mb or Ring B at 4Mb), the problem is in the DEChub 900. Replace the DEChub 900 or avoid using the faulty ring.

Cables

This section describes some of the cables that are available for connecting your module to various network devices. Digital has cables that can satisfy most of your needs. Contact your Digital sales representative for additional information.

The cables described in this section include the following types:

- Unshielded Twisted-Pair Cables

- Shielded Twisted-Pair Cables

- Shielded IBM Type 1 Cables

Token Ring Building Wiring Cables

Table 4 lists the Token Ring building wiring cables available from Digital Equipment Corporation.

Table 4   Token Ring Building Wiring Cables

Cable Description	Order Number
Unshielded standard data grade cable, PVC, 305m (1,000 ft) roll (EIA/TIA Category 3)	H8245–A/CDB
Unshielded standard data grade cable, PVC, 305m (1,000 ft) roll (EIA/TIA Category 3)	H8246–A/CDB
Unshielded high-performance data grade cable, plenum, 305m (1,000 ft) roll (EIA/TIA Category 5)	H8246–C/CDB
Unshielded high-performance data grade cable, plenum, 305m (1,000 ft) roll (EIA/TIA Category 5)	H8246–C/CDB
Shielded high-performance data grade 100-ohm data cable, PVC, 305m (1,000 ft) roll (EIA/TIA Category 5)	H8245–D/CDB
Shielded high-performance data grade 100-ohm data cable, plenum, 305m (1,000 ft) roll (EIA/TIA Category 5)	H8246–D/CDB
Shielded IBM type 1	N/A
High-performance data grade patch cable 8-pin MP to 8-pin MP (EIA/TIA Category 5)	BN25G-*xx**

* *xx* represents the cable length in meters.

Cables (Cont.)

Cabling Guidelines

Table 5 lists the Token Ring industry guideline for the maximum lobe length of shielded twisted-pair (STP) and unshielded twisted-pair (UTP) cables.

Table 5   Industry Lobe Length Guideline

	UTP		STP
Speed	Category 3	Category 5	Category 5
4 Mb/s	100 m (327 ft)	100 m (327 ft)	100 m (327 ft)
16 Mb/s	65 m (213 ft)	100 m (327 ft)	100 m (327 ft)

Table 6 lists Digital's guideline for the maximum lobe length of shielded twisted-pair (STP) and unshielded twisted-pair (UTP) cables.

Table 6   Digital Lobe Length Guideline[1]

	UTP		STP
Speed	Category 3	Category 5	Category 5
4 Mb/s	100 m (327 ft)	200 m (655 ft)	376 m (1235 ft)
16 Mb/s	65 m (213 ft)	100 m (327 ft)	173 m (569 ft)

[1] All distances include patch cables and hub connectors.

Cables (Cont.)

Table 7 lists the total cable budget for UTP level 5 cables at 4 Mb/s. Using UTP level 5 cable at 4Mb/s, repeaters are not required with multiple wiring closets if the total cable budget is within these distances.

For the total cable budget of UTP level 3 cables at 4 Mb/s, divide the distances in Table 7 by 1.3.

Table 7   Total Cable Budget for UTP Level 5 Cable at 4 Mb/s[1]

| | | Wiring | Closets | | | | |
MAUs	0	1	2	3	4	5	6
1	210 m (689 ft)	206 m (675 ft)					
2	192 m (630 ft)	189 m (620 ft)	185 m (607 ft)				
3	175 m (574 ft)	171 m (561 ft)	168 m (551 ft)	164 m (538 ft)			
4	157 m (515 ft)	154 m (505 ft)	150 m (492 ft)	147 m (482 ft)	143 m (469 ft)		
5	140 m (459 ft)	136 m (446 ft)	133 m (436 ft)	129 m (423 ft)	126 m (413 ft)	122 m (400 ft)	
6	122m (400 ft)	119 m (390 ft)	115 m (377 ft)	112 m (367 ft)	108 m (354 ft)	105 m (344 ft)	101 m (331 ft)

[1] All distances include patch cables.

Connector Pin Assignments

This section provides a description of the connectors used on the module.
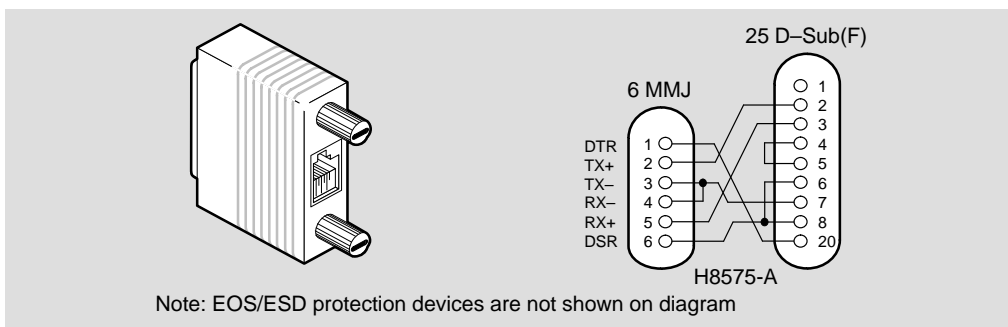
H8571-J Adapter

The following illustration shows the H8571-J adapter (6-pin MMJ to 9-pin D-Sub connector) and its pin assignments:
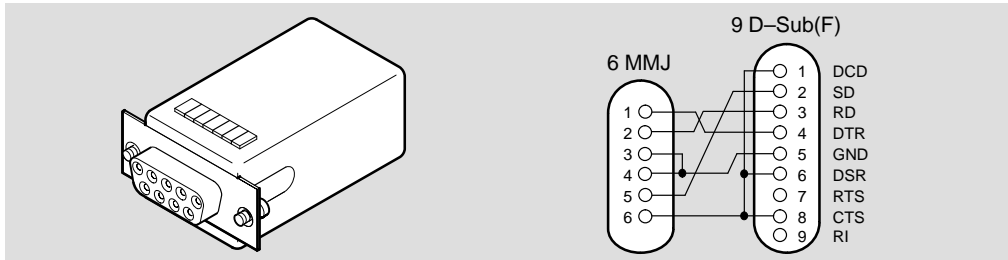
LKG-5342-91I

H8575-A Adapter

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

Note: EOS/ESD protection devices are not shown on diagram

LKG–8793–93I

Product Specifications

Operating specifications for the DECmau 900TH module are provided in Table 8.

The module's acoustical specifications are listed in Table 9.

Table 8   DECmau 900TH 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	21.75 W, total power 3.0 A, 5Vdc, 0.45 A, 15Vdc
Connectors	
One DB9 connector and 24 8-pin MJ connectors.	
(DEChub ONE has one 8-pin MJ, 1 DB-9, and 1 15-pin D-Sub AUI connector.)	
(DEChub ONE–MX has one 8-pin MJ, one 6-pin MJ (OBR), one DB-9, one 15-pin D-Sub AUI connector, and one redundant power connector (D-Sub).	
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.
Weight	1.8 kg (4 lb)[2]
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] Include an additional 1.59 kg (3.5 lb) when attached to a DEChub ONE; when attached to a DEChub ONE-MX, add 2.10 kg (4.63 lb).

Product Specifications (Cont.)

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*
DTMXM	4.8	34
DTMXM + DEHUA	5.2	39
DTMXM + DEF1H	5.2	38

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*
DTMXM	4,8	34
DTMXM + DEHUA	5,2	39
DTMXM + DEF1H	5,2	38

[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.

Document	Description
DEChub 900 MultiSwitch Owner's Manual EK-DH2MS-OM	Provides installation, use, security, and troubleshooting information for the DEChub 900 MultiSwitch.
DEChub ONE Installation EK-DEHU2-IN	Provides installation and operation guidelines for standalone module configuration, including mounting options and cabling.
DEChub ONE–MX Installation EK-DEF1H-IN	Provides installation and operation guidelines for standalone module configuration, including mounting options and cabling.
HUBwatch Installation and Configuration AA-QOFXB-TE	Provides information for installing and configuring HUBwatch for Open VMS V3.0 and HUBwatch for Windows V2.0.
HUBwatchUse AA-PW4BD-TE	Provides network management and DEChub 900 functionality information for HUBwatch for
HUBwatch for Windows Use AA-Q3S3A-TE	Provides network management and DEChub 900 functionality information for HUBwatch for Windows V2.0.
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.

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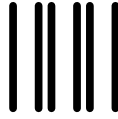Do you think the manual needs more illustrations?_____ Please give an example._____

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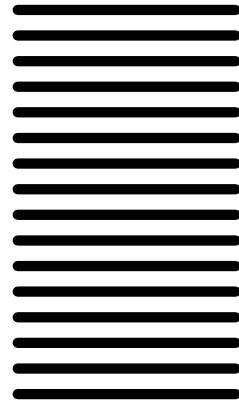NO POSTAGE
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