DIGITAL MultiSwitch Hub 624T

Installation and Configuration

Part Number: EK-DLMR2-IN. A01

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This book describes how to install, cable and configure the DIGITAL MultiSwitch Hub 624T when residing in a DIGITAL MultiSwitch 600 System (Stack Director or Stack Station) or a DEChub 900 MultiSwitch.

Revision/Update Information: This is a new document.

FCC Notice — Class A Computing Device:
This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC rules, which are designed to provide reasonable protection against such radio frequency interference. Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference. Any modifications to this device - unless expressly approved by the manufacturer - can void the user's authority to operate this equipment under part 15 of the FCC rules.

VCCI Notice — Class 1 Computing Device:
This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in commercial and/or industrial areas. Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers. Read the instructions for correct handling.

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Warning!
This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.
Achtung!
Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.
Attention!
Ceci est un produit de Classe A. Dans un environment domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

Contents

Preface

Part I DIGITAL MultiSwitch Hub 624T

1 Product Description

2 Option Card Installation and Cabling

3 Module Installation and Cabling

4 Module Configuration

5 Redundant-Link Configuration

6 Module Management

7 Removing a Module and Option Cards

Part II DIGITAL MultiSwitch 600 System

8 Stack Description

9 Assembling a Stack

10 Managing a Stack

11 Removing or Replacing a Level on the Stack

Part III Reference Information

A Problem Solving

B Connectors and Pin Assignments

C Product Specifications

D Ordering Options

E Associated Documentation

F Service Information/Support

G Accessing and Configuring RMON Groups

Glossary

Index

Figures

Tables

Preface

Overview

About this Manual

This manual describes how to install, cable and configure the DIGITAL MultiSwitch Hub 624T in a DIGITAL MultiSwitch 600 System, or in a DEChub 900 MultiSwitch.

The DIGITAL MultiSwitch Hub 624T is a 24-port Ethernet Hub. It can include an optional expansion card with 12 Ethernet ports, or it can include an optional carrier card with two modular media interface slots that can be configured with AUI, Reverse AUI, 10BaseFL, 10Base2, and 10BaseT modular media interface cards (MM-10s).

The DIGITAL MultiSwitch Hub 624T can be installed in a DIGITAL MultiSwitch 600 stack or a DEChub 900 MultiSwitch chassis.

Intended Audience

This manual is intended for use by personnel who will install, set up, cable and configure the DIGITAL MultiSwitch Hub 624T in a DEChub 900 MultiSwitch, or DIGITAL MultiSwitch 600 System (with Stack Director and/or Stack Stations).

Organization

This manual is organized as follows:

Chapter/ Appendix	Description
Part I	**DIGITAL MultiSwitch Hub 624T**
1	Describes the technology, and front and back panels of the DIGITAL MultiSwitch Hub 624T module, MM-10s, and the DIGITAL MultiSwitch 600 system.
2	Provides instructions for installing and cabling the MM-10s.
3	Provides instructions for installing and cabling the DIGITAL MultiSwitch Hub 624T module.
4	Provides instructions for configuring the DIGITAL MultiSwitch Hub 624T in a DIGITAL MultiSwitch 600 System and a DEChub 900 MultiSwitch.
5	Provides instructions for configuring DIGITAL MultiSwitch Hub 624T ports as redundant-link pairs.
6	Provides instructions for managing the DIGITAL MultiSwitch Hub 624T in a DIGITAL MultiSwitch 600 System and a DEChub 900 MultiSwitch.
7	Provides instructions for removing the DIGITAL MultiSwitch Hub 624T from a DIGITAL MultiSwitch 600 System and a DEChub 900 MultiSwitch.
Part II	**DIGITAL MultiSwitch 600 System**
8	Provides an overview, describes features, and describes the front and back panels of the Stack Director and the Stack Station.
9	Provides instructions for assembling the DIGITAL MultiSwitch 600 Stack Director and Stack Stations.
10	Provides instructions for managing the DIGITAL MultiSwitch 600 System.
11	Provides instructions for removing or replacing a level from a DIGITAL MultiSwitch 600 System.

Chapter/ Appendix	Description
Part III	**Reference Information**
A	Provides installation-specific troubleshooting information using the LEDs.
B	Provides connector and pin assignment information.
C	Provides product specifications.
D	Lists product ordering options and defines the part list for the product.
E	Lists associated documents and provides ordering information.
F	Lists service and support information for the DIGITAL MultiSwitch Hub 624T
G	Provides information about accessing and configuring RMON groups.
Glossary	Provides a glossary of terms and acronyms.
Index	Provides an index for the manual.

Conventions

This book uses the following conventions.

Convention	Description
Bold Type	Indicates user input.
`Monospaced Type`	Indicates system output.
<Return>	Indicates that you press the Return Key.

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 Gerate vor Schaden zu bewahren.
DANGER	Signale les informations destinées à prévenir les accidents corporels.
ATTENTION	Signale les informations destinées à prévenir la détérioration du matériel.
AVISO	Contiene información para evitar daños personales.
PRECAUCIÓN	Contiene información para evitar daños al equipo.

Safety

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

CAUTION	This action deletes all configured settings and replaces them with factory default values. All configuration settings will be lost.
ACHTUNG	Bei diesem Vorgang werden alle Konfigurationseinstellungen gelöscht und die Werkseinstellungen wieder eingesetzt. Alle Konfigurationsdaten gehen verloren.
ATTENTION	Cette action supprime tous les paramètres de configuration et les remplace par des valeurs prédéfinies. Tous les paramètres de configuration seront perdus.
PRECAUCIÓN	Esta intervención borrará todos los parámetros de configuración y los sustituirá por valores por defecto definidos de fábrica. Se perderán todos los parámetros de configuración.

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.
VORSICHT	Bestimmte Lichtleitergeräte können für die Augen gefährliches Laser- oder Infrarotlicht abstrahlen. Vermeiden Sie es daher unter allen Umständen, direkt in ein Lichtleiterkabel oder einen Lichtleiteranschluß zu schauen. Gehen Sie immer davon aus, daß Lichtleiterkabel mit einer Lichtquelle verbunden sind.
DANGER	Certains équipements à fibre optique peuvent émettre un rayonnement laser ou infra-rouge pouvant provoquer des troubles oculaires. Ne regardez jamais à l'intérieur d'une fibre optique ou d'un port de connecteur. Considérez que le câble est connecté en permanence à une source lumineuse.
AVISO	Ciertos equipos de fibras ópticas pueden emitir luz lasérica o infrarroja con riesgos de lesiones en los ojos. No se debe nunca mirar en una fibra óptica o una puerta de conexión. Siempre hay que suponer que el cable está conectado a una fuente luminosa.

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.
ACHTUNG	Solite während der Phase 3 des DLU-Prozesses eine Unterbrechung der Stromversorgung eintreten, kann das Firmwareprogramm zerstört verden. 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 corrumpue, 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 course de cette étape.
PRECAUCIÓN	Si se interrumpe el suministro eléctrico durante la Etapa 3 del proceso DLU,. puede dañarse la imagen del firmware. No se debe apagar la unidad ni realizar ninguna operación que pueda causar una interrupción del suministro de la unidad durante la Etapa 3 del mencionado proceso.

WARNING	Always make sure this unit is adequately grounded. Do not connect more than five Stack Stations into a single power strip unless the power strip is protected by a GFCI device.
VORSICHT	Stellen Sie in jedem Falle sicher, daß dieses Gerät vorschriftsmäßig geerdet ist. An einen Stromversorgungskreis dürfen nur dann mehr als fünf Stack Stations angeschlossen werden, wenn der Stromkreis durch einen Schutzschalter abgesichert ist.
DANGER	DANGER : vérifiez toujours que cette unité est correctement reliée à la terre. Ne connectez pas plus de cinq stations empilables sur une même lisière électrique, sauf si la lisière est protégée par un dispositif GFCI.
AVISO	ADVERTENCIA - Asegúrese siempre de que esta unidad esté puesta a tierra adecuadamente. No conecte más de cinco estaciones en pila en una platina de alimentación a menos que esté protegida por un dispositivo GFCI.

Safety

CAUTION	Static electricity can damage modules and electronic components. DIGITAL recommends using a grounded antistatic wrist strap and a grounded work surface when handling any modules.
ACHTUNG	Module und elektronische Komponenten können durch elektrostatische Entladungen beschädigt werden. Benutzen Sie immer eine antistatische Gelenkmanschette und eine geerdete Arbeitsunterlage, wenn Sie am offenen Gerät arbeiten.
ATTENTION	Les charges excessives d'électricité statique peuvent endommager les modules et les composants électroniques. DIGITAL conseille l'utilisation d'un bracelet de masse et d'un plan de travail mis à la terre lors de la manipulation des modules.
PRECAUCION	La electricidad estática puede dañar los componentes electrónicos y los módulos. DIGITAL recomienda que se utilicen cintas de pasadores y superficies de trabajo conectadas a tierra al trabajar con cualquier módulo.

Part I

DIGITAL MultiSwitch Hub 624T
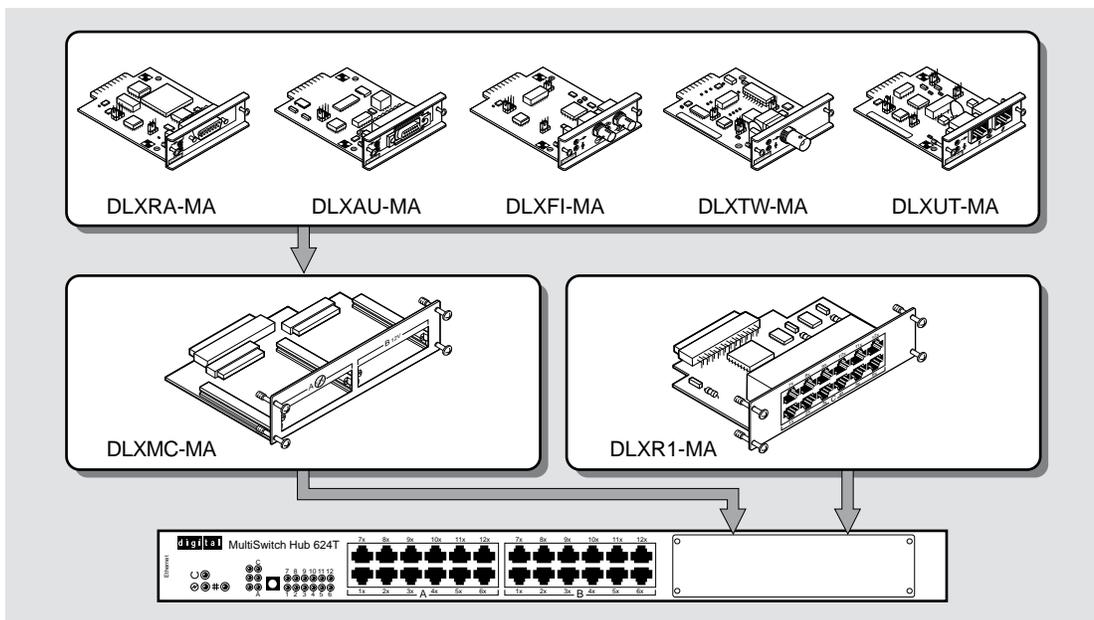
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This illustration shows the DIGITAL MultiSwitch Hub 624T module and the 12-Port Expansion Group, Carrier Card, and MM-10 cards that it supports.The DIGITAL MultiSwitch Hub 624T is a 24-port Ethernet Hub that can include an optional 12-port card or two MM-10 option slots. The option slots can be configured with AUI, Reverse AUI, 10BaseFL, 10Base2 and 10BaseT MM-10 cards.

The DIGITAL MultiSwitch Hub 624T can be installed in a DIGITAL MultiSwitch 600 System or a DEChub 900 MultiSwitch chassis.

Chapter 1

Product Description

Overview

Introduction

This chapter contains a technological overview of the DIGITAL MultiSwitch 600 System and a description of the DIGITAL MultiSwitch Hub 624T. For detailed information about the DIGITAL MultiSwitch 600 System, refer to Part II. For additional information about the DEChub 900 MultiSwitch, refer to the *DEChub 900 MultiSwitch Owner's Manual*.

In This Chapter

Technology Overview

This section describes the technology you should be familiar with to use these products effectively.

Ethernet

Ethernet is a 10 Mb/s network communications system developed and standardized by DIGITAL, Intel, and Xerox. It uses baseband transmission, CSMA/CD (carrier sense multiple access with collision detection) access, and logical bus topology. This industry-standard protocol is specified by ISO 802-3 ANSI/IEEE Standard 802.3.

Shared Hubs

A shared hub provides a collection of LAN ports all of which belong to a single collision domain. A shared hub does not allow simultaneous transmissions of multiple packets. The total bandwidth of the LAN, for example, 10Mb/s or 100Mb/s, is shared among the attached stations.

What is the DIGITAL MultiSwitch 600 System?

The DIGITAL MultiSwitch 600 System is DIGITAL's integrated workgroup switching system into which the DIGITAL MultiSwitch Hub 624T can be installed. The DIGITAL MultiSwitch 600 System components provide a complete system of Ethernet shared hubs and switches. DIGITAL MultiSwitch 600 System modules **(1)** are attached to either a Stack Station **(2)** or a Stack Director **(3)** for power and backplane access (see Figure 1-1). Stack Director and Stack Stations are interconnected with cable-free stack interconnect cards allowing connections (to Ethernet LAN channels) for easy installation, use and management. Only one Stack Director is needed to manage a stack of up to 8 hubs and/or switches. The Stack Director attaches to an optional Mounting Tray **(4)**.

Figure 1-1: DIGITAL MultiSwitch 600 System
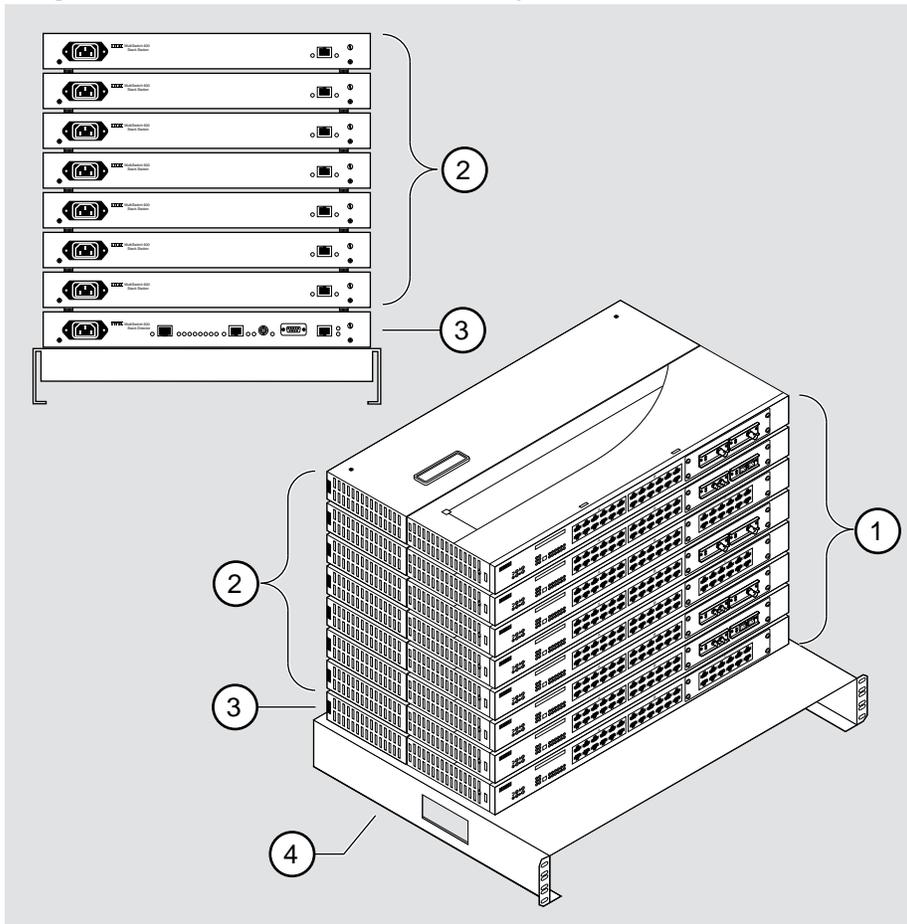
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After a stack is assembled, hubs and switches can be managed via the Stack Director by the clearVISN Stack Manager or the clearVISN MultiChassis Manager network management software applications. The clearVISN Stack Manager provides a Graphical User Interface (GUI) that allows you to manage the DIGITAL MultiSwitch 600 System. The clearVISN MultiChassis Manager also provides a GUI that allows you to manage both the DEChub 900 MultiSwitch and GIGAswitch product families in addition to the DIGITAL MultiSwitch 600 System.

DIGITAL MultiSwitch 600 Features

When assembled, the DIGITAL MultiSwitch 600 System can include the following features:

- Modular architecture.

- Choice of 10 Mb/s hub and switches integrated as single SNMP management domain.

- Cable-free stack interconnect for seven internal LAN and management channels.

- Ability to create a stack of up to eight network devices.

- Functional modules that are hot-swappable to eliminate network downtime during network changes.

- A Stack Director that contains SNMP management agent with one IP address manages all modules in the stack.

- Support for four RMON groups.

- Modular Media Interface (MMI) and port expansion options, specific to the functional modules.

- Rack mountable.

For a complete description of the DIGITAL MultiSwitch 600 System, including planning and configuration information, refer to Part II, DIGITAL MultiSwitch 600 System.

Using DIGITAL MultiSwitch 600 System Modules in a DEChub 900 MultiSwitch

The DIGITAL MultiSwitch 600 System modules, such as the DIGITAL MultiSwitch Hub 624T, may also be used in the DEChub 900 MultiSwitch. Power and backplane connections are implemented using the common 48-pin connector. DIGITAL MultiSwitch 600 System modules are fully managed and are hot swappable, both in the DIGITAL MultiSwitch 600 System platform and in the DEChub 900 MultiSwitch. However, there are functional differences when using a DIGITAL MultiSwitch 600 System module in a DEChub 900 MultiSwitch.

The DIGITAL MultiSwitch 600 System uses advanced technology to implement Ethernet backplane channels. In the DIGITAL MultiSwitch 600 System, 2-wire mode is used to create three Ethernet LAN segments on each of two flex channels on the Backplane, giving six Ethernet LAN segments. There is also a 10Base2 Ethernet LAN segment available, adding up to a total of seven Ethernet LAN segments.

The DEChub 900 MultiSwitch recognizes a different implementation of backplane channels. There is an identical 10Base2 Ethernet segment on the DEChub 900 MultiSwitch backplane. However, there is only one flex channel available to the 48-pin connector. Using 6-wire mode, one Ethernet LAN segment can be created on the flex channel for a total of two backplane Ethernet LAN segments. Therefore, a DIGITAL MultiSwitch 600 System module used in a DEChub 900 Multiswitch has two backplane Ethernet channels available (10Base2 and one flex channel). The DIGITAL MultiSwitch 600 System modules are backplane compatible with all DEChub 900 MultiSwitch modules on the 48-pin connector.

DIGITAL MultiSwitch 600 System modules do not provide the IP services function. A DEChub 900 MultiSwitch requires the use of an IP services module for in-band access to the SNMP Management Agent through an In-Band connection. When using DIGITAL MultiSwitch 600 System modules in a DEChub 900 MultiSwitch at least one module supporting IP services is needed if using In-Band Management.

What is the DIGITAL MultiSwitch Hub 624T?

The DIGITAL MultiSwitch Hub 624T (also referred to in this document as the module) is an Ethernet hub with 24 fixed 10BaseT ports. It also has an expansion slot that can be used to add a 12-port 10BaseT Expansion Group (DLXR1-MA) or two modular media interface cards via a Carrier Card (DLXMC-MA). The module uses MM-10 type modular interface cards.You can combine any of the following MM-10 options into the expansion slots.

- AUI (DLXRA-MA)
- Reverse AUI (DLXAU-MA)
- 10Base2 (DLXTW-MA)
- 10BaseFL (DLXFI-MA)
- 10BaseT (DLXUT-MA)

Figure 1-2: DIGITAL MultiSwitch Hub 624T
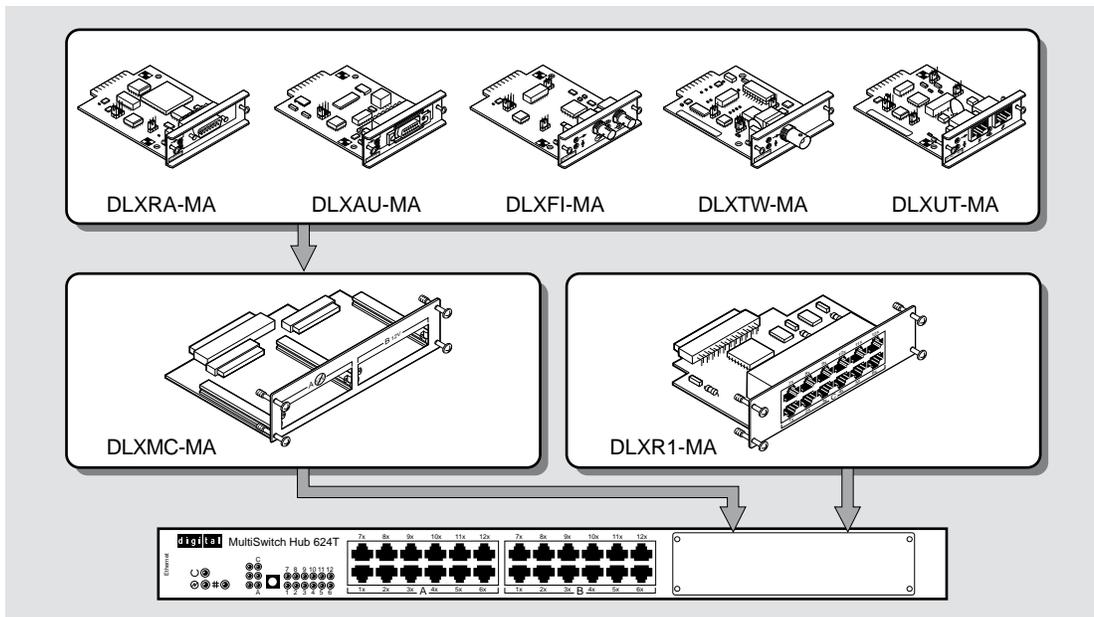
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The DIGITAL MultiSwitch Hub 624T module can be installed in a Stack Director or Stack Station in a DIGITAL MultiSwitch 600 System or in a DEChub 900 MultiSwitch, both of which supply power and mechanical support to the module.

The Stack Director and the DEChub 900 MultiSwitch provide the ability to manage the module using SNMP (Simple Network Management Protocol).

DIGITAL MultiSwitch Hub 624T Features

The DIGITAL MultiSwitch Hub 624T includes the following features:

- Up to three internal LANs.

- Fault-tolerant redundant link capabilities.

- Two port groups named A and B, each with 12 10BaseT ports for 10Mb/s Ethernet connections (24 10BaseT ports total). The 10BaseT ports support redundant-link configuration.

- Expansion slot that can be populated with

  A 12-port 10BaseT Expansion Port Group card, providing 12 additional 10BaseT ports (port group C). These ports support redundant-link configuration

  or

  A Carrier Card with two modular media interface slots that can contain any of these MM-10 modular media interface cards:

  — AUI connection

  — Reverse AUI connection

  — 10Base2 - 10Mb/s, ThinWire coaxial connection

  — 10BaseFL - 10Mb/s, Fiber Optic connection

  — 10BaseT - 10Mb/s twisted pair connection

  The port(s) supplied by the MM-10s are included in port groups A and B.

  The 10BaseFL and 10BaseT MM-10s support redundant-link configuration.

- Ability to hot-swap modules in a DIGITAL MultiSwitch 600 System or DEChub 900 MultiSwitch.

- Alarms, Events, Statistics and History RMON group support in a DIGITAL MultiSwitch 600 System (requires a Stack Director).

- Port-level statistics for monitoring performance on every port.

- Port-level security to prevent unauthorized access to the network, including automatic and manual authorization of secure addresses.The DIGITAL MultiSwitch Hub 624T offers the following two security features:

  — *Eavesdrop prevention*. When enabled, this feature prevents unauthorized monitoring of network traffic. Only packets destined for authorized stations are transmitted on the port.

— *Intrusion protection.* When enabled, this feature prevents unauthorized stations from successfully transmitting data into a DIGITAL MultiSwitch Hub 624T port. The module compares the source address of the packets received on a port to the list of authorized addresses assigned to that port. If the addresses do not match, the DIGITAL MultiSwitch Hub 624T logs an intrusion violation and can take one of the following actions:

- Converts the remainder of this packet to a jam pattern as it is repeated.

- Disables the port that detected violation.

- Ability to connect the port groups to any of seven software controlled Ethernet backplane LANs in a DIGITAL MultiSwitch 600 System; ability to connect to either of two software controlled Ethernet backplane LANs in a DEChub 900 MultiSwitch.

- Port State and Module State LEDs for visual monitoring and troubleshooting.

- Compliance with the IEE 802.3 standard.

- Upgradeable device firmware (in nonvolatile flash memory) using Trivial File Transfer Protocol (TFTP) with Flash Loader or through the setup port with any TFTP server. An IP address is not necessary for the module to upgrade.

- Advanced Graphical User Interface (GUI) manageability with DIGITAL's clearVISN MultiChassis Manager application.

MIB Support

The module provides SNMP agent support for the following management information bases (MIBs) when used in a managed stack or a DEChub 900 MultiSwitch:

- MIB II (RFC 1213)

- DEChub 900 Public Common MIB

- Extended Repeater MIB (RFC)

- DIGITAL Extended Repeater MIB

- Internet Engineering Task Force (IETF) Repeater MIB (RFC 1516)

- RMON MIB (alarms, events, statistics, and history)

For information on how to access DIGITAL MIBs, follow the procedures in the Release Notes for this product.

Remote Monitoring (RMON)

The DIGITAL MultiSwitch Hub 624T supports sophisticated Ethernet monitoring with the Remote Network Monitoring Information Base (RMON-MIB). The following RMON features and options are available:

- RMON functions are performed concurrently with the switching function.

- Multiple RMON monitors within the module (one for each Ethernet) are accessible by multiple managers.

- Basic RMON capability at the LAN level for the following groups:

  — *Statistics.* Various statistics measured by the probe for the monitored Ethernet, including utilization, packet rates, broadcast and multicast rates, and error information.

  — *History.* Capturing of periodic statistical samples for later retrieval and analysis by the manager.

  — *Alarms.* Specification of thresholds for various monitored variables, in order to generate events.

  — *Events.* Controls the generation and notification of events from the probe.

- GUI Management with clearVISN RMON Manager/Probe Watch

The following two features are optional upgrades. For more information about these features, refer to *ethernet Switch Enterprise RMON Upgrade Configuration.*

- Enhanced RMON capability for the following five groups of the standard RMON MIB:

  — *Host Table.* Statistics by specific MAC address.

  — *Host Top N.* Statistics for the top N addresses, ordered by one of their statistics.

  — *Traffic Matrix.* Traffic patterns between pairs of nodes.

  — *Filters.* A set of user-defined preconditions for packet capture or events.

  — *Packet capture.* Stores packets that meet the filter criteria for later retrieval. Allows examination of individual packets or sequence of packets to help identify and isolate problems.

- RMON capability for a variety of network protocols and applications.

For information on how to access and use the basic RMON features, refer to Appendix G.

DIGITAL MultiSwitch Hub 624T Front Panel

Table 1-1 describes the DIGITAL MultiSwitch Hub 624T front panel components and Figure 1-3 shows their location. For detailed information about the LEDs, refer to Appendix A.

Figure 1-3: DIGITAL MultiSwitch Hub 624T Front Panel
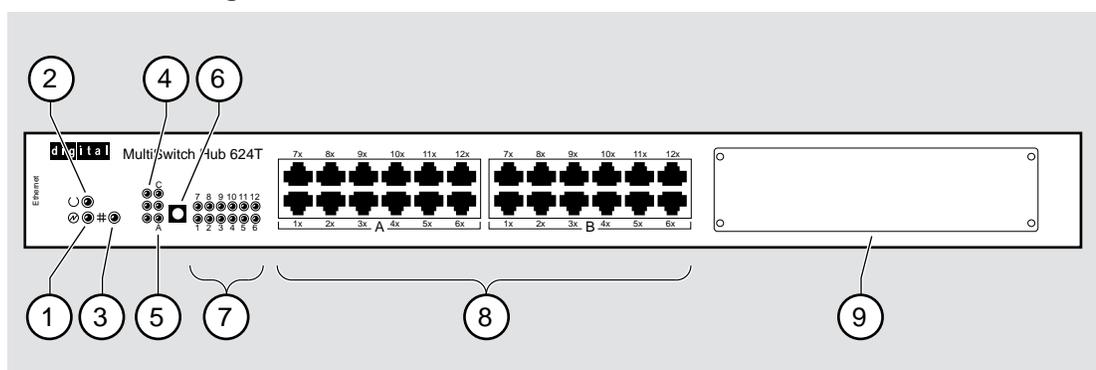
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Table 1-1: DIGITAL MultiSwitch Hub 624T Front Panel Features

Item	Icon	Name	Description
1		Power OK LED	Indicates that the module has sufficient power.
2		Module OK LED	Indicates that the module passed self-test.
3		10Base2 Port Status LED	Indicates whether the 10Base2 port is connected to the backplane 10Base2 LAN or the port is disabled by network management.
4		Network Activity LEDs	Indicate the level of network traffic for each internal LAN
5		Port Group Select LEDs A, B, C	The port group (A, B, or C) for which the Port Status LEDs display status.
6		Port Group Select Pushbutton	Freezes the scanning of the Port Group Select LEDs. The Port Group Select LEDs briefly light up one at a time, indicating the port group for which the 12 Port Status LEDs are showing status. LED C will light only if the 10BaseT Expansion Port Group is installed.

DIGITAL MultiSwitch Hub 624T Features

Item	Icon	Name	Description
7		Port Status LEDs 1 - 12	Provide the status of the port connections for the DIGITAL MultiSwitch Hub 624T port group that is indicated by the Port Group Select LEDs.
8		10BaseT, 8-pin MJ port connectors	Used to connect end devices such as PCs, workstations, hubs (repeaters), and switches.
9		Expansion slot	Holds optional media including one 12-port 10BaseT Expansion Port Group or one Carrier Card with up to two MM-10s.

DIGITAL MultiSwitch Hub 624T Back Panel

Table 1-2 describes the DIGITAL MultiSwitch Hub 624T back panel components and Figure 1-4 shows their location.

Figure 1-4: DIGITAL MultiSwitch Hub 624T Back Panel
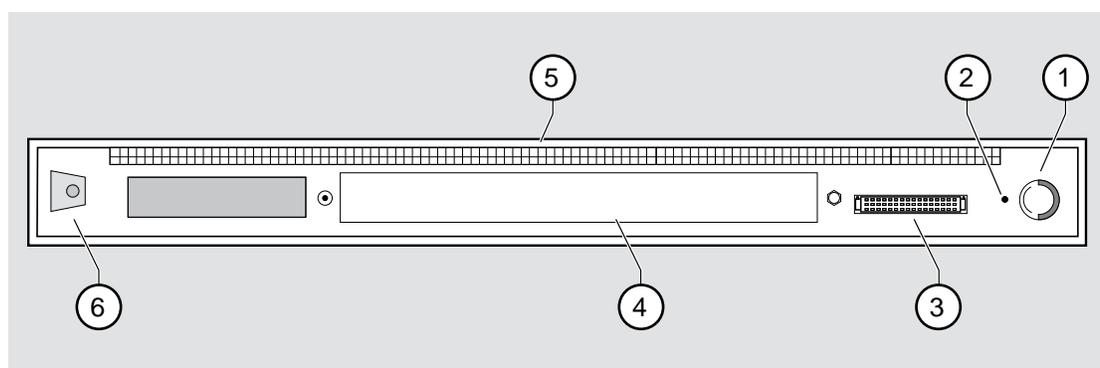
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Table 1-2: DIGITAL MultiSwitch Hub 624T Back Panel Features

Item	Name	Description
1	Locking Tab	Secures the DIGITAL MultiSwitch Hub 624T to a DEChub 900 MultiSwitch chassis.
2	Opening for slotted thumbscrew	Secures the module to a Stack Station or Stack Director.
3	48-pin Connector	Provides network and power connections to the DIGITAL MultiSwitch Hub 624T when it is connected to a Stack Station or the DEChub 900 MultiSwitch chassis.
4	Manufacturing Label	Lists the DIGITAL MultiSwitch Hub 624T module part number, serial number, revision level, and power requirements.
5	Grounding Fingers	Provide chassis grounding between the Hub 624T and the Stack Station.
6	Mounting Tab	Attaches the DIGITAL MultiSwitch Hub 624T to a MultiStack 600 Stack Station or a DEChub 900 MultiSwitch locking receptacle.

DIGITAL MultiSwitch Hub 624T Optional Media

The DIGITAL MultiSwitch Hub 624T has an expansion slot that accepts either a 12-port 10BaseT Expansion Port Group or a Carrier Card that can hold up to two MM-10 modular media interface cards. Chapter 2 provides the procedures for installing these options.

10BaseT Expansion Port Group

The 10BaseT Expansion Port Group (Figure 1-5) provides 12 additional 10BaseT ports. This expands the DIGITAL MultiSwitch Hub 624T to 36 ports. This optional module uses 8-pin MJ port connectors. When installed, the 10BaseT Expansion Port Group operates as port group C.

The 10BaseT Expansion Port Group is not hot swappable. The DIGITAL MultiSwitch Hub 624T must be powered off by unplugging the Stack Station/Stack Director *or* removing the module from the DIGITAL MultiSwitch 600 System or DEChub 900 MultiSwitch in order to install the expansion group.

Figure 1-5: 10BaseT Expansion Port Group
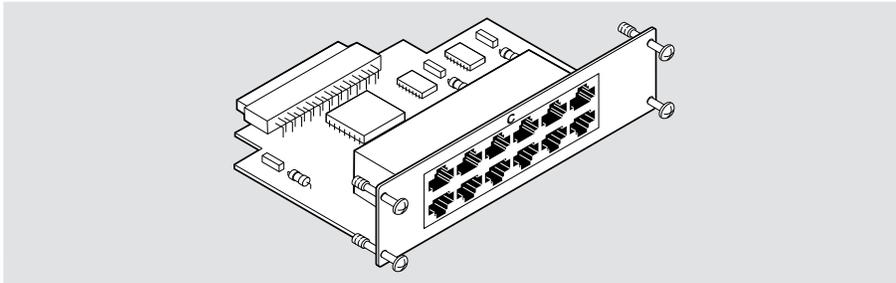
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Carrier Card

The DIGITAL MultiSwitch Hub 624T Carrier Card inserts into the expansion slot in the front of the DIGITAL MultiSwitch Hub 624T. The Carrier Card provides the module with two slots for holding 10 Mb/s Ethernet modular media interfaces (MM-10s). The MM-10s provide connectivity between the module and other network devices using 10Base2, 10BaseT, 10BaseFL, AUI, and Reverse AUI.

The Carrier Card is not hot swappable. The DIGITAL MultiSwitch Hub 624T must be powered off by unplugging the Stack Station/Stack Director *or* removing the module from the DIGITAL MultiSwitch 600 System or DEChub 900 MultiSwitch in order to install the Carrier Card.

NOTE

The Carrier Card is intended for use only in the DIGITAL MultiSwitch Hub 624T.

If installed, the port on an MM-10 inserted in the left-side slot of the Carrier Card will be included in port group A. The port on an MM-10 inserted in the right-side slot of the Carrier Card will be included in port group B.

Figure 1-6: Carrier Card
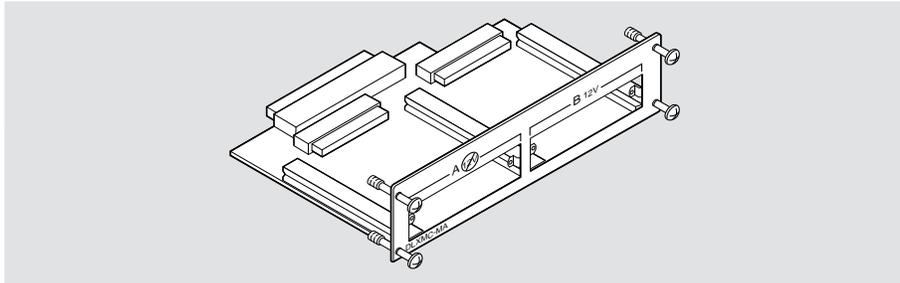
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MM-10 Modular Media Interface Options

The DIGITAL MultiSwitch Hub 624T has two modular media interface (MMI) option slots when the Carrier Card is installed. The types of MMI cards used with this product are called MM-10s. The DIGITAL MultiSwitch Hub 624T supports the following types of MM-10 cards:

- AUI

- Reverse AUI

- 10Base2

- 10BaseFL

- 10BaseT

The MM-10 cards are front-insertable, single-slot option cards. The MM-10 cards are hot-swappable so that you do not have to power down the system to install the card, provided the Carrier Card is already installed. The host module provides the power, initialization, and control for the MM-10 cards. The MM-10s have jumper settings that control the MM-10 configuration, such as enabling SQE tests or monitoring transmit or receive data.

The following sections describe the MM-10 cards. Chapter 2 describes how to install and configure each of the MM-10s in the DIGITAL MultiSwitch Hub 624T.

MM-10	Page
AUI MM-10 (DLXAU-MA)	1-17
Reverse AUI MM-10 (DLXRA-MA)	1-18
10Base2 MM-10 (DLXTW-MA)	1-19
10BaseFL MM-10 (DLXFI-MA)	1-20
10BaseT MM-10	1-21

AUI MM-10 (DLXAU-MA)

The AUI MM-10 connects the host DIGITAL MultiSwitch Hub 624T module to a standard 12-volt Media Attachment Unit (MAU) or to an end device using an Ethernet cable with a DB-15 connector (AUI cabling). The cable can be up to 50 meters long.

Table 1-3 describes the front panel components on the AUI MM-10 shown in Figure 1-7. For troubleshooting information using the LEDs, refer to Appendix A.

Only the right-side slot of the Carrier Card provides power to an AUI MM-10. Install an AUI MM-10 in the right slot in order to supply 12V power to the attached device. An AUI MM-10 installed in the left slot can be used with devices that do not require 12V power, or are externally powered.

Figure 1-7: AUI MM-10 Components
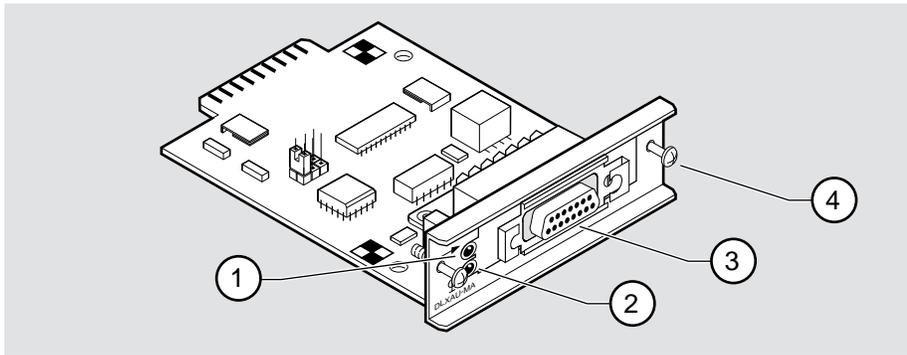
NPB-0547-96F

Table 1-3: AUI MM-10 Components Descriptions

Item	Icon	Name	Description
1	→	Activity LED	When blinking, traffic on this link has been detected.
2	⏚	Port Status LED	Indicates that the port is OK, has been partitioned by network management, or a loopback test has failed.
			When blinking at startup, indicates module is seated correctly.
			If MM-10 is in left slot of Carrier Card, indicates 12V power is not available.
3		DB-15 Connector	Connects the AUI port to a MAU or to an end device via Ethernet cabling.
4		Captive screws	Attach MM-10 to Carrier Card.

Reverse AUI MM-10 (DLXRA-MA)

The Reverse AUI MM-10 connects a host DIGITAL MultiSwitch Hub 624T module to an end device using an Ethernet cable with a DB-15 connector (AUI) cabling. The cable can be up to 50 meters long.

Table 1-4 describes the front panel components on the Reverse AUI MM-10 shown in Figure 1-8.   For troubleshooting information using the LEDs, refer to Appendix A.

Figure 1-8: Reverse AUI MM-10 Components
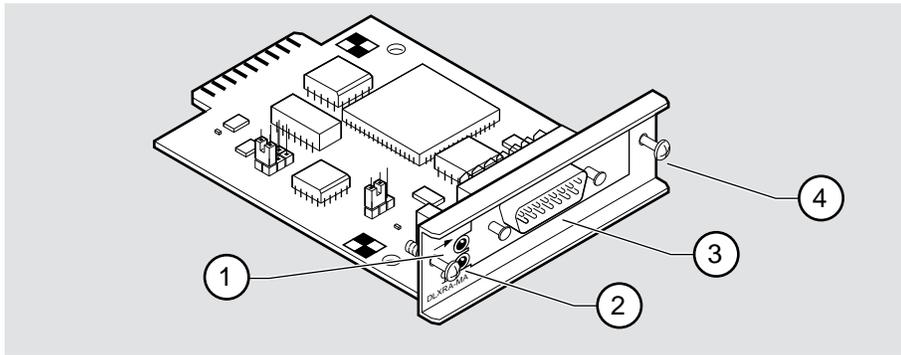
NPB-0769-96F

Table 1-4: Reverse AUI MM-10 Component Descriptions

Item	Icon	Name	Description
1	→	Activity LED	When blinking, traffic on this link has been detected.
2	⌀	Port Status LED	Indicates that the port is OK, has been partitioned by network management, or a loopback test has failed.
			When blinking at startup, indicates module is seated correctly.
3		DB-15 Connector	Connects the Reverse AUI port to an end device via Ethernet cabling.
4		Captive screws	Attach MM-10 to Carrier Card.

10Base2 MM-10 (DLXTW-MA)

The 10Base2 MM-10 is a single-port device that connects to standard, 50-ohm ThinWire coaxial cable. 10Base2 connections require termination at each end of the cable. The port has an optional, 50-ohm internal terminator that is enabled by the TERM jumper.

Table 1-5 describes the components on the 10Base2 MM-10 shown in Figure 1-9. For troubleshooting information using the LEDs, refer to Appendix A.

Figure 1-9: 10Base2 MM-10 Components

NPB-0576-96F
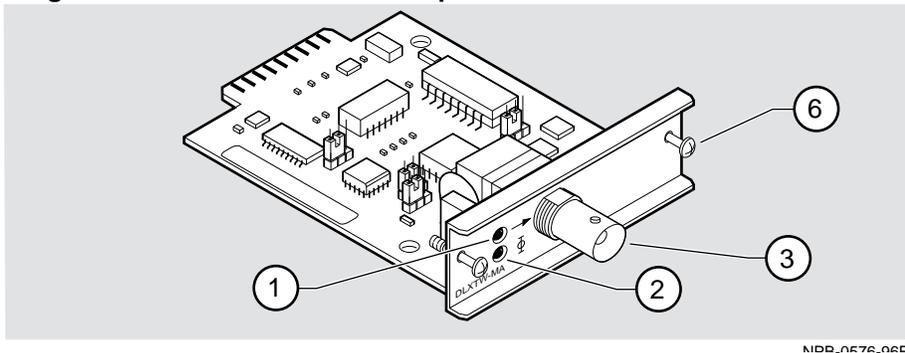
Table 1-5: 10Base2 MM-10 Components

Item	Icon	Name	Description
1	→	Activity LED	When blinking, traffic on this link has been detected.
2	⌽	Port Status LED	Indicates that the port is OK, has been partitioned by network management, or a loopback test has failed.
			When blinking at startup, indicates module is seated correctly.
3		BNC Connector	A 10Base2 connector that connects to an Ethernet device.
4		Captive screws	Attach MM-10 to Carrier Card.

10BaseFL MM-10 (DLXFI-MA)

The 10BaseFL MM-10 is a single-port 10 Mb/s Ethernet fiber optic port that operates in the 850 nm window over 10BaseFL media at distances up to two km. It is 10BaseFL compliant and is compatible with FOIRL standards. The 10BaseFL MM-10 supports redundant-link (RDP) configuration. See Chapter 5, Redundant-Link Configuration, for further information. Table 1-6 describes the front panel components on the 10BaseFL MM-10 and Figure 1-10 shows their location. For troubleshooting information using the 10BaseFL MM-10's LEDs, refer to Appendix A.

Figure 1-10: 10BaseFL MM-10 Components
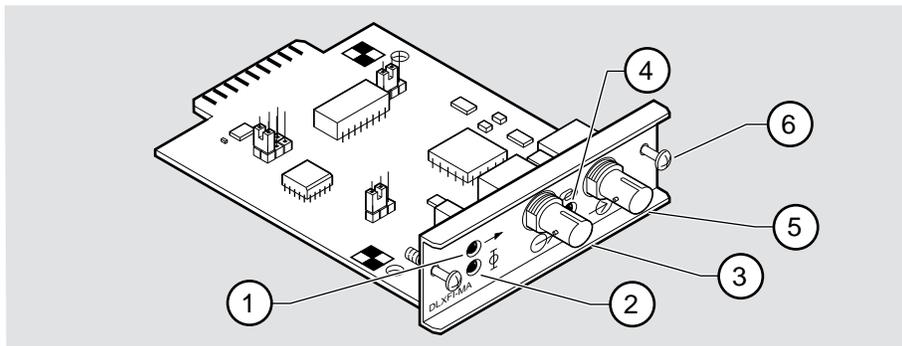
NPB-0578-96F

Table 1-6: 10BaseFL MM-10 Component Descriptions

Item	Icon	Name	Description
1	→	Activity LED	When blinking, traffic on this link has been detected.
2		Port Status LED	Indicates that the port is OK, has been partitioned by network management, or a loopback test has failed. When blinking at startup, indicates module is seated correctly.
3		Transmit Connector	An ST-type connector for multimode fiber (MMF) connections.
4		Link Status LED	On when idle signal is detected between the port and the attached station
5		Receive Connector	An ST-type connector for MMF connections.
6		Captive screws	Attach MM-10 to Carrier Card.

10BaseT MM-10

The 10BaseT MM-10 is a single port device that is compatible with category 3, 4, and 5 UTP cabling. It has a straight-through wired (//) and a crossover wired (X) connector.

The 10BaseT MM-10 supports redundant-link (RDP) configuration. See Chapter 5, Redundant-Link Configuration, for configuration information.

The 10BaseT MM-10 can be jumper-enabled to work with legacy devices that do not emit link pulses. Table 1-7 describes the components on the 10BaseT MM-10 shown in Figure 1-11. For troubleshooting information using the LEDs, refer to Appendix A.

NOTE

While there are two connectors, there is only one active port. Only one of the connectors can be used at a time.

Figure 1-11: 10BaseT MM-10 Components
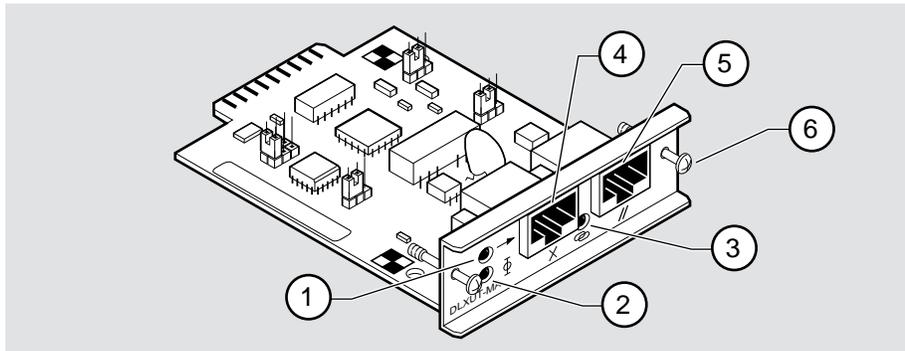
NPB-0577-96F

Table 1-7: 10BaseT MM-10 Components

Item	Icon	Name	Description
1	→	Activity LED	When blinking, traffic on link has been detected.
2	⌀	Port Status LED	Indicates that the port is OK, has been partitioned by network management, or a loopback test has failed.
			When blinking at startup, indicates module is seated correctly.
3	⟳	Link Status LED	On when idle signal is detected between port and attached station, or when 10BaseT MM-10 is jumpered to enable manual link
4	**X**	8-Pin MJ Crossover Connector[1]	A crossover wired port connector.
5	//	8-Pin MJ Standard Connector[1]	A straight-through wired port connector that implements a reversed transmit/receive pinout.
6		Captive screws	Attach MM-10 to Carrier Card.

[1]The standard and crossover pinout connectors attach the DIGITAL MultiSwitch Hub 624T to end stations, switches, and other hubs. To determine the correct cable and connector to use, refer to Chapter 2 and Appendix B of this manual.

Chapter 2

Option Card Installation and Cabling

Overview

This chapter describes how to install the 10Base2 Expansion Group and MM-10 cards in the DIGITAL MultiSwitch Hub 624T module.

In This Chapter

Installing DIGITAL MultiSwitch Hub 624T Options

The DIGITAL MultiSwitch Hub 624T (Figure 2-1) has an option slot (**1**) that accepts either a 10BaseT Expansion Group card or a Carrier Card with up to two MM-10 option cards.The following sections provide instructions for installing these options.

Figure 2-1: DIGITAL MultiSwitch Hub 624T Option Slot

NPB-0757-96F

Removing the Dust Cover from the Expansion Slot

Figure 2-2 shows the dust cover location. Use the following procedure to remove the cover.

Figure 2-2: Dust Cover Removal

NPB-0523-96F

Step	Action
1	Remove the dust cover by loosening the four captive screws on the dust cover (**1**).
2	Save the dust cover with attached captive screws.

Installing the 10BaseT Expansion Port Group

The 10BaseT Expansion Group provides 12 additional 10BaseT ports. To install the card, complete the following steps, which are illustrated by Figure 2-3. A Phillips-head screwdriver is required.

NOTE

Before you install the 10BaseT Expansion Port Group, make sure that the module *has no power connected to it*. The 10BaseT Expansion Port Group *is not hot-swappable*.

Figure 2-3: 12-Port Expansion Group Card Insertion

NPB-0524-96F

Step	Action
1	Make sure that power to the DIGITAL MultiSwitch Hub 624T is off by unplugging the module from the DIGITAL MultiSwitch 600 System or DEChub 900 MultiSwitch.
2	Loosen the four screws and remove the dust cover from the module's expansion slot.
3	Hold the 10BaseT Expansion Port Group by its bezel and align its edges (**1**) with the card guides (**2**) in the module's expansion slot.
4	Push the 10BaseT Expansion Port Group into the slot until it is firmly seated inside the module.
5	Align and securely fasten the four screws.

Step	Action
6	Connect the 10BaseT cables.
7	Power up the DIGITAL MultiSwitch Hub 624T by re-inserting it into the DIGITAL MultiSwitch 600 System or DEChub 900 MultiSwitch.
	The following LED states occur:
	a The Power OK LED $\odot$ lights.
	b The module completes self-test and the Module OK LED $\bigcirc$ lights.
	c The Port Group Select LEDs flash repeatedly from A to B to C for a few seconds (Figure 2-4).
	If the LEDs do not light as described, refer to the troubleshooting information in Appendix A of this manual.

Figure 2-4: 10BaseT Expansion Port Group Card Port Group Select LEDs
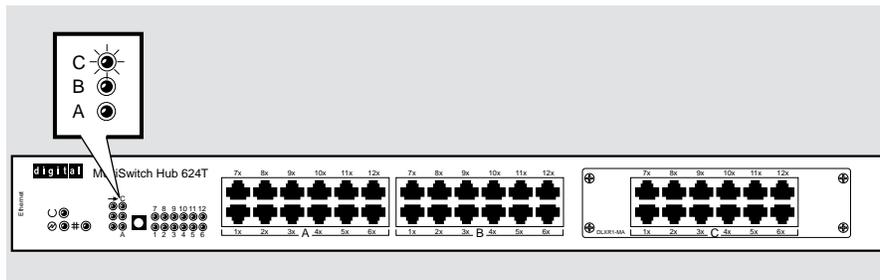
NPB-0527-96F

Installing the Carrier Card

The Carrier Card must be installed in the DIGITAL MultiSwitch Hub 624T to accept the MM-10s. To install the Carrier Card, complete the following steps, which are illustrated by Figure 2-5. A Phillips-head screwdriver is required.

NOTE

Before you install the DIGITAL MultiSwitch Hub 624T Carrier Card, make sure that the module *has no power connected to it*. The Carrier Card *is not hot-swappable*.

Figure 2-5: Carrier Card Insertion

NPB-0550-96F

Step	Action
1	Make sure that power to the DIGITAL MultiSwitch Hub 624T is off by unplugging the module from its DIGITAL MultiSwitch 600 System or DEChub 900 MultiSwitch.
2	Loosen the four screws and remove the dust cover from the module's expansion slot.
3	Hold the DIGITAL MultiSwitch Hub 624T Carrier Card by its bezel and align its edges **(1)** with the card guides **(2)** in the module's expansion slot.
4	Push the Carrier Card into the slot until it is firmly seated inside the module.

Step	Action
5	Align and securely fasten the four screws.
6	Power up the DIGITAL MultiSwitch Hub 624T by re-inserting it into the DIGITAL MultiSwitch 600 System or DEChub 900 MultiSwitch.
	The following LED states occur:
	a The Power OK LED ⊘ lights.
	b The DIGITAL MultiSwitch Hub 624T completes self-test and the Module OK LED ○ lights.
	c The Port Group Select LEDs flash repeatedly from A to B.
	If the LEDs do not light as described, refer to the troubleshooting information in Appendix A.

Configuring and Installing the MM-10 Option Cards

Up to two MM-10 cards can be installed into the option slots provided by the Carrier Card installed in the DIGITAL MultiSwitch Hub 624T. You can install any mix of MM-10 cards. MM-10s are hot-swappable. The DIGITAL MultiSwitch Hub 624T does not have to be powered off in order to install the MM-10 option cards.

The MM-10s have jumper settings that control the MM-10 configuration, such as enabling SQE tests or monitoring transmit or receive data. The jumpers are set to configurations that are most likely to be used. For special applications or for troubleshooting, you may wish to reconfigure the jumpers. If you change the jumper configuration, you must do so before installing the MM-10 card into the module.

Most of the MM-10 jumpers are three-pin jumpers with two settings (such as SQE Test): one setting is defined by tying together the middle and left-side pins, the other is defined by tying together the middle and right-side pins. Six-pin jumpers (such as ACT) have two rows of three pins, and three settings, defined by tying together the two left, two middle, or two right pins. Jumper settings are listed next to the jumpers themselves. The following sections describe the jumper configuration and location on each MM-10 card.

Configuring Jumpers on the AUI MM-10

Figure 2-6 shows the location of the jumpers on a AUI MM-10. The figures shows the jumpers set to default settings. Table 2-1 describes the jumpers and their default settings.

Figure 2-6: AUI MM-10 Jumper Locations
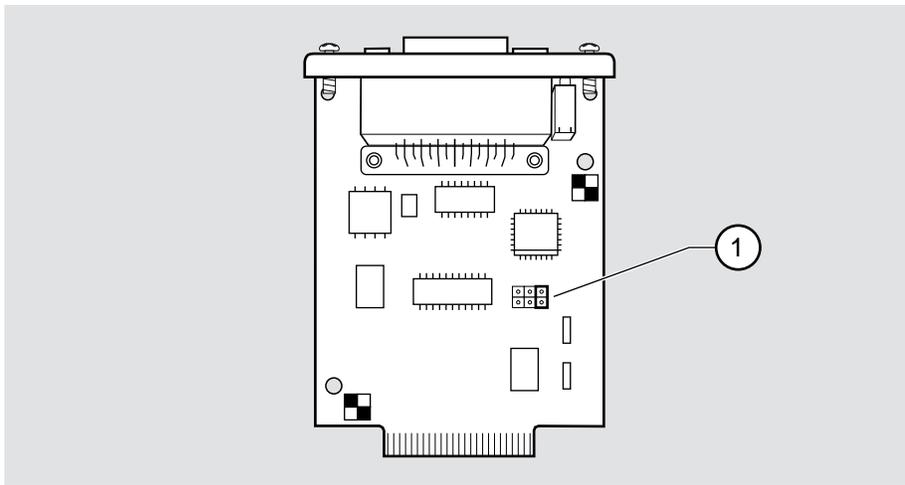
NPB-0804-97F

Table 2-1: AUI MM-10 Jumper Configuration

Item	Jumper	Description	Default
1	ACT ->	Sets Activity LED to blink on for: • RX = receive packets only • TX = transmit packets only • BOTH = all packets	BOTH

Configuring Jumpers on the Reverse AUI MM-10

Figure 2-7 shows the location of the jumpers on a Reverse AUI MM-10. The figure shows the jumpers set to default settings. Table 2-2 describes the jumpers and their default settings.

Figure 2-7: Reverse AUI MM-10 Jumpers
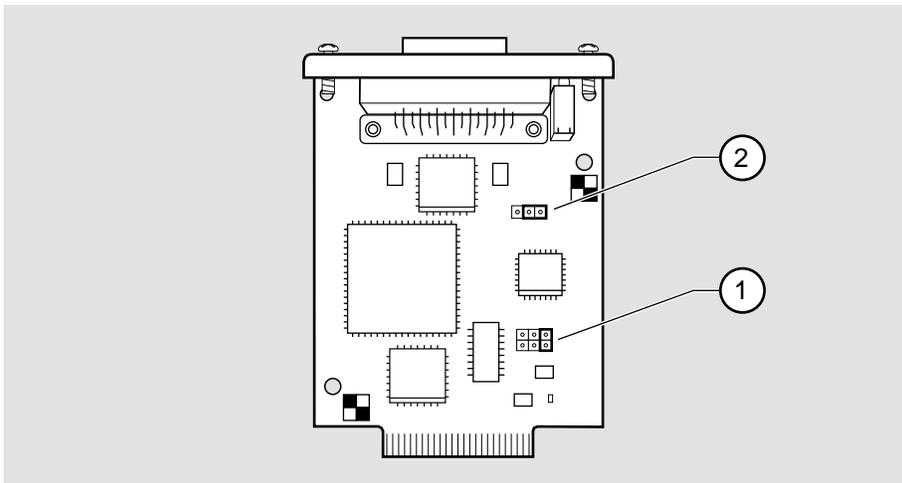
NPB-0806-97F

Table 2-2: Reverse AUI MM-10 Jumper Configuration

Item	Jumper	Description	Default
1	ACT ->	Sets Activity LED to blink on for: • RX = receive packets only • TX = transmit packets only • BOTH = all packets	BOTH
2	SQE Test	Enables SQE Test 0 = Disable; 1 = Enable	Disable

Configuring Jumpers on the 10Base2 MM-10

Figure 2-8 shows the location of the jumpers on a 10Base2 MM-10. The figure shows the jumpers set to default settings. Table 2-3 describes the jumpers and their default settings.

NOTES

If the MM-10 is *not* at the end of a cable segment, then set the TERM jumper to 0 (external termination).

If the MM-10 is at the end of a cable segment, then the TERM jumper must be set to either internal or external termination. Set to 1 (internal termination) unless you are using an external terminator.

If the cable segment is not grounded elsewhere, then you must ground the cable at the DIGITAL MultiSwitch Hub 624T by setting the COAX GND jumper to 1 (ground coaxial shell). If you are not sure the cable is grounded, ask your network manager for help.

Figure 2-8: 10Base2 MM-10 Jumpers

NPB-0803-97F
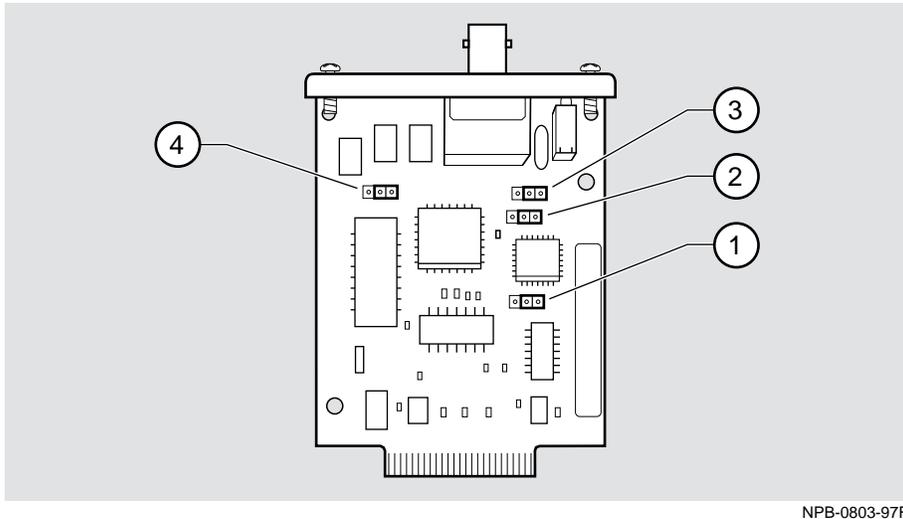
Table 2-3: 10Base2 MM-10 Jumper Configuration

Item	Jumper	Description	Default
1	ACT ->	Sets Activity LED to blink on for: • TX = transmit packets only • BOTH = all packets	BOTH
2	SQE Test	Enables SQE Test 0 = Disable; 1 = Enable	Disable
3	COAX GND	Enables grounding of coaxial cable 0 = Coaxial shell not grounded; 1 = Ground coaxial shell	Coaxial shell not grounded
4	TERM	Determines whether internal or external 50-ohm terminator is used 0 = External; 1 = Internal	External

Configuring Jumpers on the 10BaseFL MM-10

Figure 2-9 shows the location of the jumpers on a 10BaseFL MM-10. The figure shows the jumpers set to default settings. Table 2-4 describes the jumpers and their default settings.

Figure 2-9: 10BaseFL MM-10 Jumper Locations
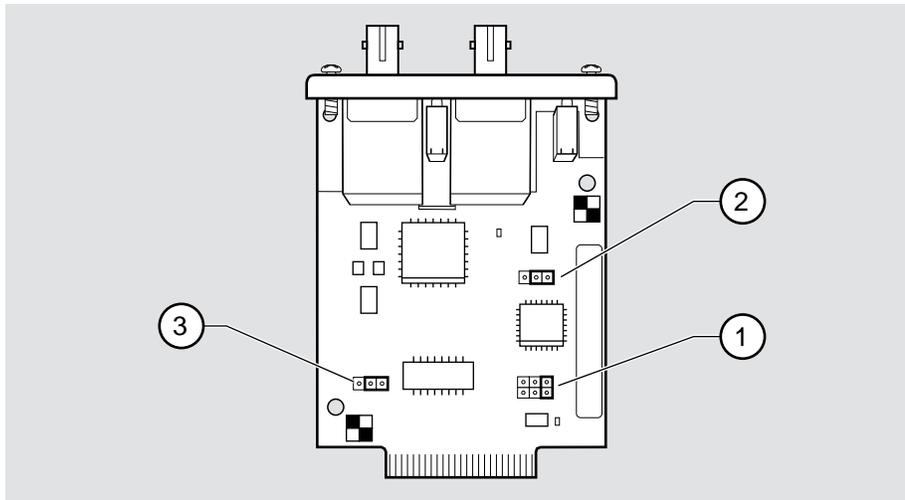
NPB-0801-97F

Table 2-4: 10BaseFL MM-10 Jumper Configuration

Item	Jumper	Description	Default
1	ACT ->	Sets Activity LED to blink on for: • RX = receive packets only • TX = transmit packets only • BOTH = all packets	BOTH
2	SQE Test	Enables SQE Test 0 = Disable; 1 = Enable	Disable
3	FDX	Full Duplex operation 0 = Half Duplex, 1 = Full Duplex	Half Duplex

Configuring Jumpers on the 10BaseT MM-10

Figure 2-10 shows the location of the jumpers on a 10BaseT MM-10. The figure shows the jumpers set to default settings. Table 2-5 describes the jumpers and their default settings.

Figure 2-10: 10BaseT MM-10 Jumpers
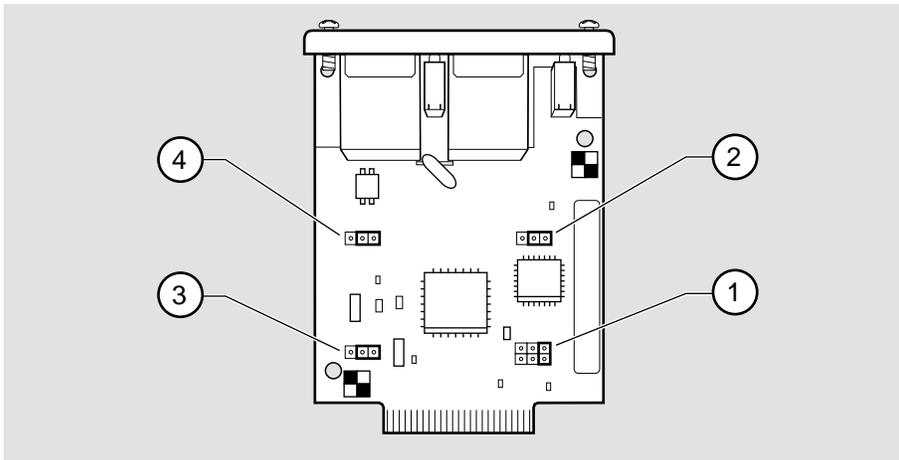
NPB-0774-97F

Table 2-5: 10BaseT MM-10 Jumper Configuration

Item	Jumper	Description	Default
1	ACT —>	Sets Activity LED to blink on for: • RX = receive packets only • TX = transmit packets only • BOTH = all packets	BOTH
2	SQE Test	Enables SQE test 0 = Off; 1 = On	Off
3	FDX	Full Duplex operation 0 = Half Duplex, 1 = Full Duplex	Half Duplex
4	Manual Link Enable	Allows operation with legacy devices that do not emit link pulses. 0 = Off; 1 = On	Off

Installing an MM-10 Card

To install an option card, complete the following steps, which are illustrated by Figure 2-11.

NOTE

AUI MM-10s only provide 12V power when installed in slot B, the right-side slot.

Figure 2-11: MM-10 Installation
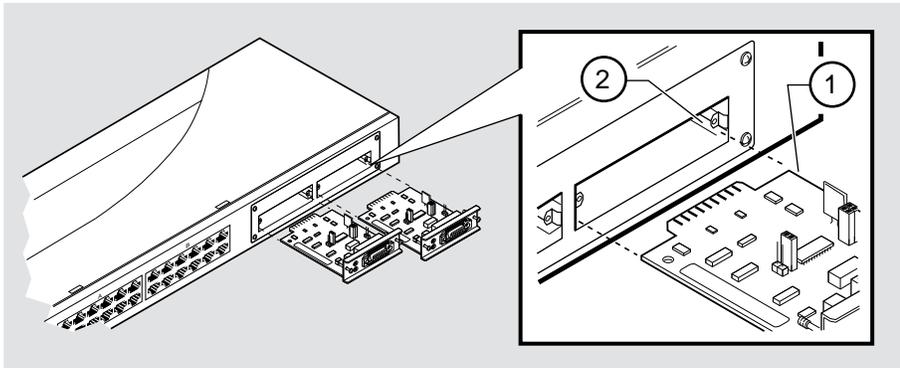
NPB-0548-96F

Step	Action
1	Hold the MM-10 by its bracket and position it so that it is parallel with a media expansion slot opening on the DIGITAL MultiSwitch Hub 624T module.
2	Insert the MM-10 and align its sides (**1**) with the card guide (**2**) on the slot of the DIGITAL MultiSwitch Hub 624T Carrier Card.
3	Push in the connector until it is seated in the option slot.
4	Secure the MM-10 to the DIGITAL MultiSwitch Hub 624T module using the two screws shipped with the MM-10.
5	To install an additional MM-10, repeat steps 1 through 4.

Prior to cabling MM-10s and the DIGITAL MultiSwitch Hub 624T, install the DIGITAL MultiSwitch Hub 624T in a DEChub 900 or in a DIGITAL MultiSwitch 600 Stack System (Stack Director or Stack Station) as described in Chapter 3.

Connecting Cables to the MM-10 Ports

Connect cables to the MM-10 ports after you have installed the MM-10s into the
DIGITAL MultiSwitch Hub 624T and installed the module into a DEChub 900 or in a
DIGITAL MultiSwitch 600 Stack System.

This section describes how to connect cables to the MM-10.

Action	See Page
Connecting Cables to the AUI MM-10 Port	2-16
Connecting Cables to the Reverse AUI MM-10 Port	2-17
Connecting Cables to the 10Base2 MM-10 Port	2-18
Connecting Cables to the 10BaseFL MM-10 Port	2-18
Connecting Cables to the 10BaseT MM-10 Port	2-20

If you need help determining the appropriate cable type to use, refer to Appendix B,
Connector and Pin Assignments.

Connecting Cables to the AUI MM-10 Port

The AUI MM-10 card uses a standard 15-pin DB port connector. Complete the
following steps in order to connect the AUI port cable. Figure 2-12 illustrates this
procedure.

Figure 2-12: Connecting AUI MM-10 Cables
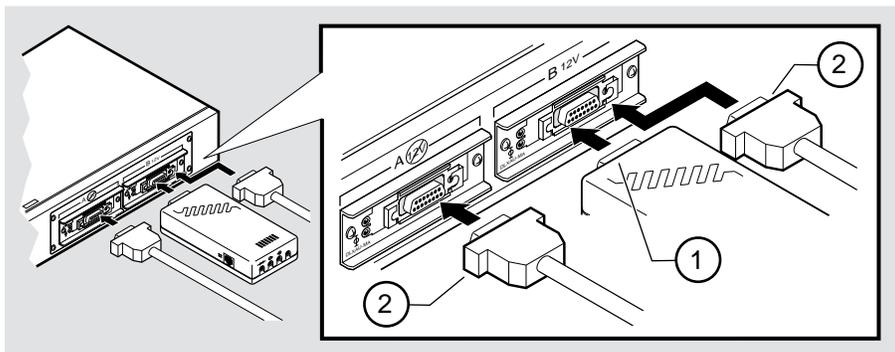
NPB-0758-96F

Step	Action
1	Slide the AUI port connector latch to the unlocked position.
2	Insert the AUI cable (**2**) or MAU (**1**) into the AUI port.
3	Slide the AUI port connector latch to the locked position.

Connecting Cables to the Reverse AUI MM-10 Port

The Reverse AUI MM-10 card uses a standard 15-pin DB port connector. Avoid right-angle cables; only straight cables are recommended. Complete the following steps to connect the Reverse AUI port cable, shown in Figure 2-13.

Figure 2-13: Connecting Reverse AUI MM-10 Cables
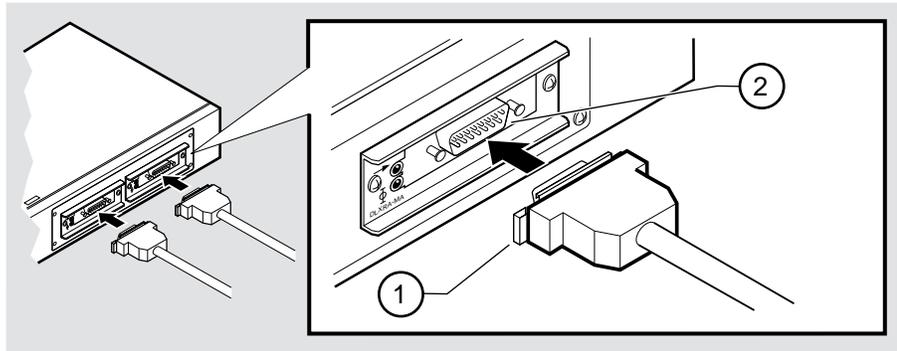
NPB-0655-96F

Step	Action
1	Insert the AUI cable (**1**) into the Reverse AUI port (**2**).
2	Slide the latch on the AUI cable to the locked position.

Connecting Cables to the 10Base2 MM-10 Port

The 10Base2 MM-10 module uses a BNC port connector. If you do not use an external connector, the TERM jumper must be set to internal terminator.

Complete the following steps to connect the 10Base2 cable, shown in Figure 2-14.

Figure 2-14: 10Base2 MM-10 Cable Connector
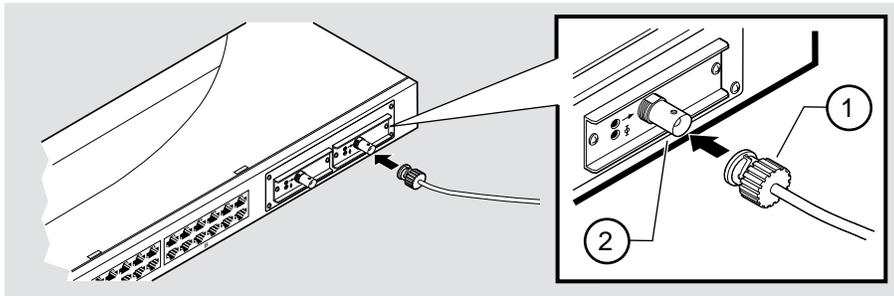
NPB-0651-96F

Step	Action
1	Align the cable **(1)** with the connector **(2)**.
2	Turn the connector one-quarter to the right until the connector locks.

Connecting Cables to the 10BaseFL MM-10 Port

The 10BaseFL Fiber Optic MM-10 uses multimode fiber (MMF) connections. Complete the following steps to install the cables and loopback connectors shown in Figure 2-15.

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 2-15: Connecting Fiber Optic MM-10 Cables
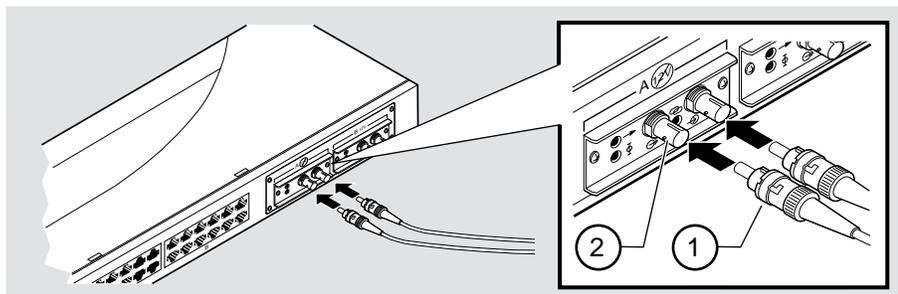
NPB-0650-96F

Step	Action
1	Remove the protective caps from the module's 10BaseFL connector and from the 10BaseFL cable plug, if applicable.
2	Ensure that the key is correctly positioned while aligning the transmit cable connector **(1)** with the transmit port **(2)** and the receive cable connector with the receive port.
3	Turn the connector clockwise to lock into position.
4	Connect the other end of the cable to a network device (PC, workstation, switch, or hub).

NOTES

The bend radius of any fiber-optic cable is 1.5 inches (3.8 cm) or greater.
To avoid optical power loss, do not touch the fiber ends.

Connecting Cables to the 10BaseT MM-10 Port

The 10BaseT MM-10 card is a single-port module that provides both crossover and straight-through 8-pin MJ port connectors. *Use only one connector at a time.* The cable type depends on the end device to which you are connecting. Use the following table to ensure that the module's transmit/receive signals connect correctly to the transmitter/receiver of the connected device.

If you have this cable type . . .	and the device you are connecting has this connector . . .	use this connector[1] on the 10BaseT MM-10
Straight-through cable[1]	Straight-through connector[1]	Crossover connector
Straight-through cable[1]	Crossover connector[1]	Straight-through connector
Crossover cable [1]	Straight-through connector[1]	Straight-through connector
Crossover cable [1]	Crossover connector[1]	Crossover connector

[1]DIGITAL's straight-through cables are marked (=); crossover connectors (and cables) are marked (X).

If you need help determining the appropriate cable type to use, refer to Appendix B, Connector and Pin Assignments.

Complete the following steps to connect the UTP cables, shown in Figure 2-16.

Figure 2-16: Connecting UTP MM-10 Cables

NPB-0652-96F
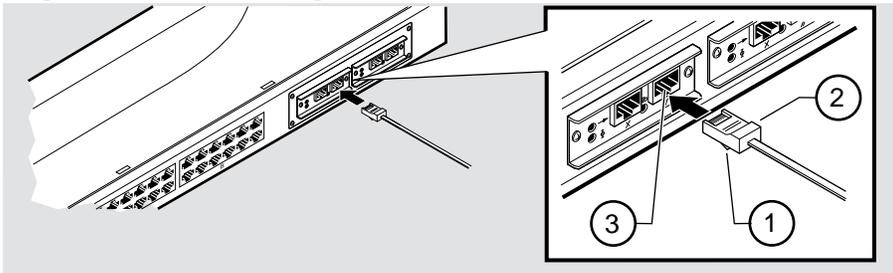
Step	Action
1	Align the release tab (**1**) on the cable plug (**2**) with the port connector (**3**) on the module's UTP port connector.
2	Insert the plug into the connector until the release tab snaps into the locked position.
3	Connect the other end of the cable to an end device (PC, workstation, or repeater)

Chapter 3

Module Installation and Cabling

Overview

This chapter describes how to install the module in a DIGITAL MultiSwitch 600 System and in a DEChub 900 MultiSwitch.

In This Chapter

Installing a DIGITAL MultiSwitch Hub 624T in a Stack Director or Stack Station

Before you cable the DIGITAL MultiSwitch Hub 624T or any of its MM-10s, you need to install the module into a Stack Director, Stack Station, or DEChub 900 MultiSwitch. This section describes how to attach a DIGITAL MultiSwitch Hub 624T to a Stack Director. You will need a flat-blade screwdriver for the installation.

Part II of this manual explains the features of the Stack Director and Stack Station and how to build a stack using the Stack Director and Stack Stations.

NOTES

MultiSwitch 600 modules are fully managed and are hot-swappable, in both the MultiSwitch 600 platform and in the DEChub 900 MultiSwitch.

The MM-10s are hot swappable. You may install the MM-10's before or after installing the module in a stack or a hub.

The 10BaseT Expansion Port Group and the Carrier Card are *not* hot-swappable. You must remove power to the module before installing these option cards.

Hot-swapping is the removal or insertion of a module into either the DIGITAL MultiSwitch 600 System or the DEChub 900 MultiSwitch without disrupting power to the unit. Do not simultaneously hot-swap more than one module. Simultaneously inserting or removing more than one module can cause problems with the operation of other installed modules.

Complete the following steps to attach a DIGITAL MultiSwitch Hub 624T to the Stack Director, as shown in Figure 3-1.

Figure 3-1: Attaching the Module to the Stack Director
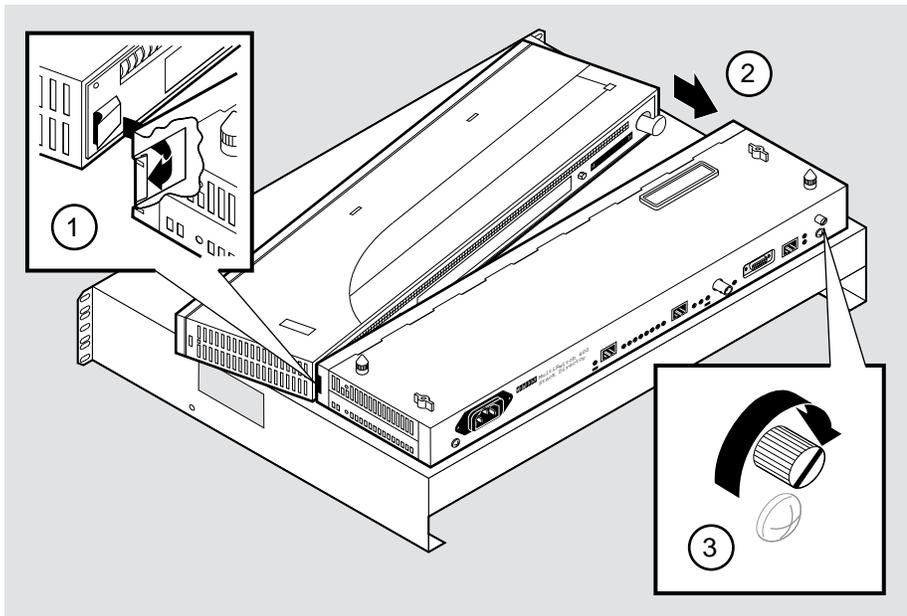
NPB-0499-96F

Step	Action
1	Refer to Part II for instructions on mounting the Stack Director to a mounting tray.
2	Place the mounting tab (**1**) on the DIGITAL MultiSwitch Hub 624T module into the mounting slot on the Stack Director or Stack Station.
3	Push the DIGITAL MultiSwitch Hub 624T securely against the Stack Director or Stack Station (**2**).
4	Securely tighten the slotted thumbscrew on the Stack Director or Stack Station (**3**).

Installing the DIGITAL MultiSwitch Hub 624T in a DEChub 900

The DIGITAL MultiSwitch Hub 624T hot-swap feature allows you to install the module into the DEChub 900 without turning off power. If you are using MM-10s, you may install them in the module before or after installing the module in the DEChub 900 because they are hot-swappable. Seating the module initiates the module's powerup sequence.

NOTES

MultiSwitch 600 modules are fully managed and are hot-swappable, both in the MultiSwitch 600 platform and in the DEChub 900 MultiSwitch.

The MM-10s are hot swappable. You may install the MM-10's before or after installing the module in a stack or a hub.

The 10BaseT Expansion Port Group and the Carrier Card are *not* hot-swappable. You must remove power to the module before installing these option cards.

Hot-swapping is the removal or insertion of a module into either the DIGITAL MultiSwitch 600 System or the DEChub 900 MultiSwitch without disrupting power to the unit. Do not simultaneously hot-swap more than one module. Simultaneously inserting or removing more than one module can cause problems with the operation of modules.

The following table describes the tasks necessary for installing the module in a DEChub 900.

Task	Description
1	Compare the power ratings.
2	Seat the module into the DEChub 900.
3	Verify initial LED operation.
4	Configure the Ports as Redundant-Link Pairs.
5	Connect the setup-port cables.

Task 1: Compare the Power Ratings

Compare the DIGITAL MultiSwitch Hub 624T power ratings **(1)** with the available power value shown in the DEChub 900 Manager Status display **(2)** (see Figure 3-2). For the DEChub 900, the 12V power is derived from the 15V power source. Although it is listed separately in the DIGITAL MultiSwitch Hub 624T's product specification, the 12V requirements are included in the DEChub 900 15V power total.

If any of the module's power requirements exceed the available power value shown in the status display, add another power supply (see the *DEChub 900 MultiSwitch Owner's Manual*). If you do not, the module enters a low power mode and disables the ports.

Figure 3-2: Module Power Ratings

31.8 W
4.8 A   5 V
0.65 A   12 V
0.0 A   15 V

Available: 90.5 W
5V: 13.0 A, 15V: 3.5 A
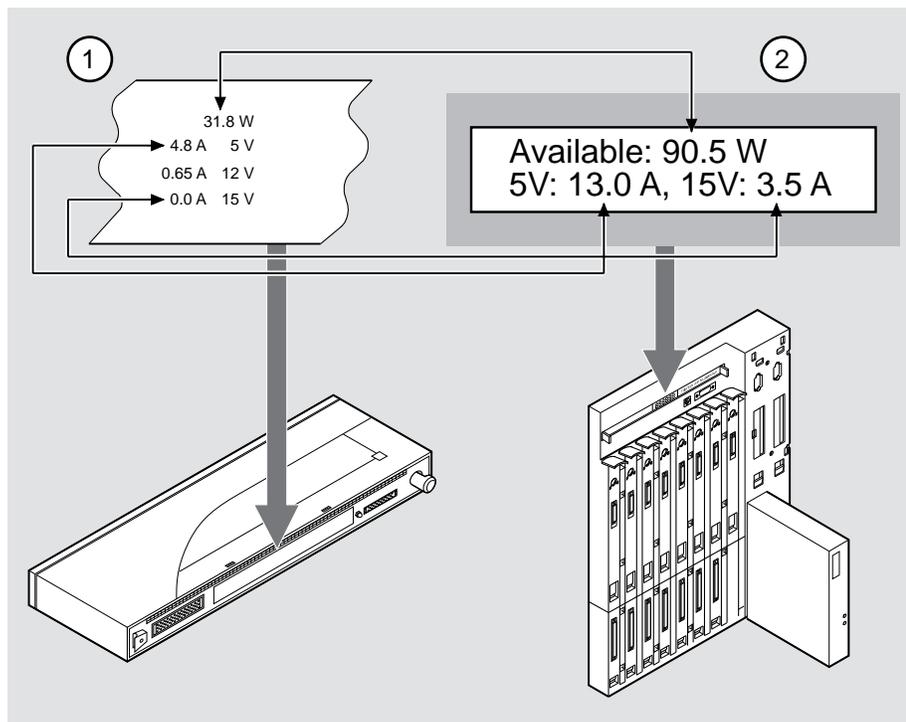
NPG-0107-95F

Task 2: Seat the Module into the DEChub 900

Complete the following steps in order to seat the module in a DEChub 900 as shown in Figure 3-3.

Figure 3-3: Seating the Module
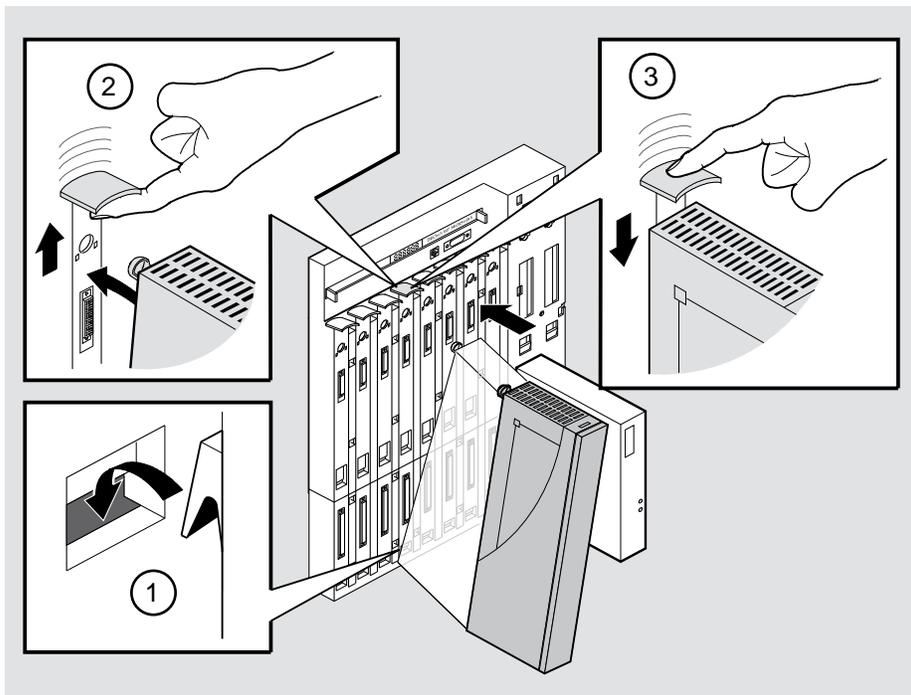
NPG-0004-95F

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

Task 3: Verify Initial LED Operation

Verify that the module's Power LED and the Module OK LED light within 1 minute. The following table describes the LEDS shown in Figure 1-3.

Stage	Description
1	The Power LED lights when power is applied to the module, then the module performs a self-test. During the self-test, the port status LEDs display the various patterns that reflect Diagnostic tests.
2	After the module completes self-test, the Module OK LED lights and remains lit. The Hub Manager identifies the module as the DIGITAL MultiSwitch Hub 624T.

NOTE

Refer to Appendix A, Problem Solving, if the LEDs do not operate as described.

Task 4: Connect the Setup-Port Cables to the DEChub 900

If you have not installed or cabled MM-10s, install and cable MM-10s according to the instructions provided in Chapter 2. See your network manager if you are not sure which cables to connect.

Connect the setup port on the DEChub 900 to a setup port device (terminal or PC). Once connected, you can use the DEChub 900 MultiSwitch setup port or clearVISN to configure parameters.

To connect the DEChub 900 setup port to a setup port device, use the following cables and adapters:

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

[1] xx indicates cable length in meters.

For information on Pinout assignments, refer to Appendix B.

To connect the DEChub 900 setup port to a setup port device, complete the following steps.

Step	Action
1	Configure the setup-port device (terminal or PC) as follows: • 9600 baud • 8 bits • no parity • 1 stop bit
2	Connect the setup-port device cable to the setup port connector on the DEChub 900 (refer to Figure 3-4).

Figure 3-4 shows setup port location.

Figure 3-4: Setup-Port Cabling

DEChub 900 MultiSwitch
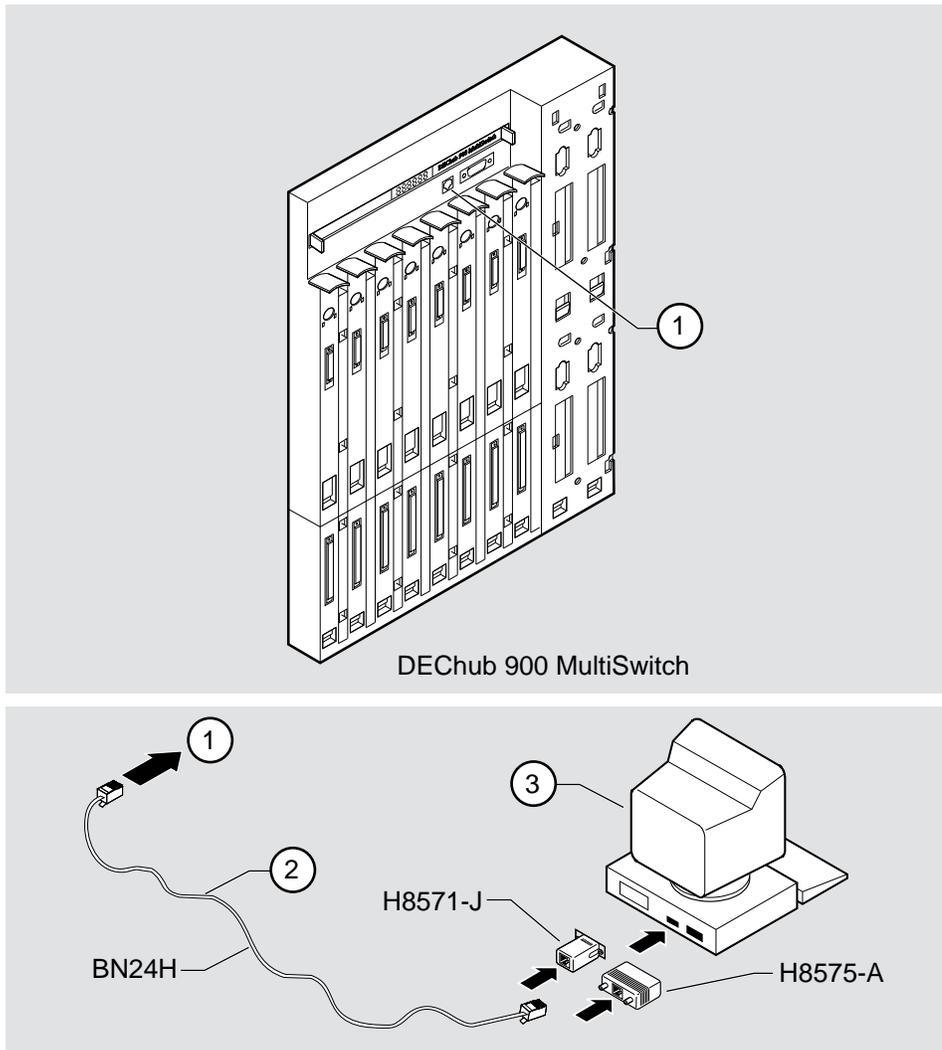
NPB-0510-95

Item	Description
1	Setup port
2	Setup-port cable
3	Setup-port device

Connecting Cables to 10BaseT Ports on the DIGITAL MultiSwitch Hub 624T

This section describes how to connect cables to the 10BaseT ports on the DIGITAL MultiSwitch Hub 624T.

The DIGITAL MultiSwitch Hub 624T 12-Port Switch modules use crossover, 10BaseT, 8-pin MJ port connectors. Use the appropriate cable type (crossover or straight-through) to ensure that the module's transmit/receive signals connect correctly to the transmitter/receiver of the connected device.

Before connecting the cables to the port, note the following rules:

If the device you are connecting has this connector . . .	use this cable type . . .
Straight-through connector	Straight-through cable[1]
Crossover connector	Crossover cable[1]

[1]DIGITAL's straight-through cables are marked (=); crossover connectors (and cables) are marked (X).

These rules ensure that the sum of crossovers always equal an odd number which is required for proper operation.

Complete the following steps to connect the 10BaseT cable, as shown in Figure 3-5.

Figure 3-5: 10BaseT Cable Connections.
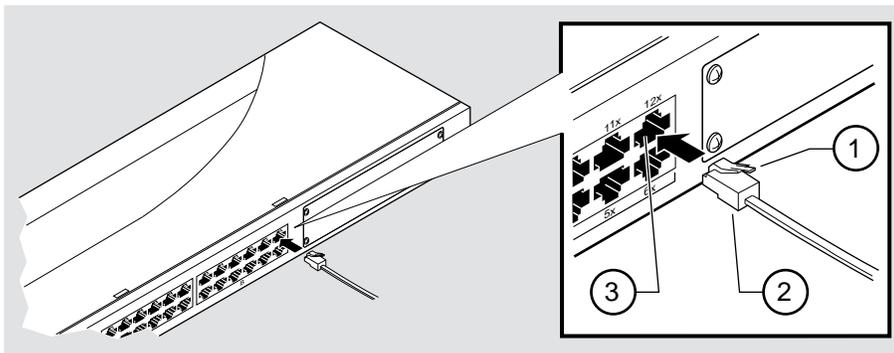
NPB-0623-96F

Step	Action
1	Align the release tab **(1)** on the cable plug **(2)** with the connector **(3)** on the module's 10BaseT port connector.

Connecting Cables to 10BaseT Ports on the DIGITAL MultiSwitch Hub 624T

Step	Action
2	Insert the plug **(2)** into the connector **(3)** until the release tab snaps into the locked position.
3	Connect the other end of the cable to a network device (PC, workstation, switch or hub).

Chapter 4

Module Configuration

Overview

Introduction

This chapter describes how to configure the module in a DIGITAL MultiSwitch 600 System with a Stack Director and Stack Stations, or as a standalone module with a Stack Station, or in DEChub 900 MultiSwitch.

The module must be installed and cabled prior to configuration.

In This Chapter

Configuring the Module in a Stack Director or DEChub 900

This section describes how to configure the module in a DIGITAL MultiSwitch 600 System or a DEChub 900 MultiSwitch. The following screen is an example of the MS 624T INSTALLATION MENU when the DIGITAL MultiSwitch Hub 624T module is installed in a DIGITAL MultiSwitch 600 System. If the module is installed in a DEChub 900 MultiSwitch, the screen will display the DEChub 900 MultiSwitch INSTALLATION MENU.

For DIGITAL MultiSwitch 600 System setup port cabling, refer to Chapter 9, Task 5: Cabling the Stack Director and Stack Station. For DEChub 900 setup port cabling refer to Chapter3, Task 4: Connect the Setup-Port Cables to the DEChub 900.

NOTE

Periodically, upgrades to the firmware are released. If you need to upgrade the firmware of an existing module, use the DownLine Upgrade procedures provided in Chapter 9.

To access the module's setup screen, you must choose option [9] Start Redirect Mode.

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

        DIGITAL MultiSwitch 600 INSTALLATION MENU

        [1] Restart with Factory Defaults
        [2] Restart 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>
```

Examples of the setup screen displays are provided in this chapter 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.

[9] Start Redirect Mode

The Start Redirect Mode option redirects the DIGITAL MultiSwitch 600 setup port or the DEChub 900 MultiSwitch Hub Manager setup port to the module that is installed in the requested slot. Choosing this option allows you to configure an installed module or to obtain its status by accessing the specified network module's installation menu.

After you choose the Start Redirect Mode option from the DIGITAL MultiSwitch 600 INSTALLATION MENU, the screen display prompts you for a slot number. Type the slot number in which the DIGITAL MultiSwitch Hub 624T resides. Slot number (8) is used in the following example. After you enter the module's slot number, the console is redirected to that slot.

NOTE

In the DIGITAL MultiSwitch 600, Slot 1 is the bottom slot (which has the Stack Director).

The following example shows the dialog associated with this option.

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

    Enter the slot number for redirection (1-8): 8
    Console redirected to 8: MS Hub 624T

    Attempting connection [Ctrl/C to abort]...
```

If the redirection is successful, after you press <**Return**>, the MS Hub 624T INSTALLATION MENU appears on your screen.

Using the Module's Menus

This section describes the options that are available from the MS Hub 624T INSTALLATION MENU.

When your module is installed in either a DIGITAL MultiSwitch 600 System or a DEChub 900 MultiSwitch, the slot number in which the DIGITAL MultiSwitch Hub 624T is installed appears at the top of the menu.

The following example shows the dialog associated with this option.

```
MS Hub 624T - slot 8
=====================================================================
               MS Hub 624T INSTALLATION MENU

          [1] Restart with Factory Defaults
          [2] Restart with Current Settings
          [3] Show Current Settings
          [4] Dump Error Log


          [Ctrl/C] Return to Hub Manager Installation Menu
=====================================================================

                   Enter selection:  n    <Return>
```

The installation menu options are as follows:

Topic	Page
[1] Restart with Factory Defaults	4-5
[2] Restart with Current Settings	4-6
[3] Show Current Settings	4-7
[4] Dump Error Log	4-8

[1] Restart with Factory Defaults

This option reboots the module, causing its configured Non-Volatile Random Access Memory (NVRAM) parameters to be cleared and reinitialized to factory default values. If you need to reboot the module and retain the current settings, choose option `[2] Restart with Current Settings` from the `MS Hub 624T INSTALLATION MENU`. Allow approximately one minute for the module to reboot and complete self-test.

CAUTION

`[1]Restart with Factory Defaults` deletes all configured settings and replaces them with factory default values. All configuration settings will be lost.

The following example shows the dialog associated with this option.

```
                    Enter selection: 1

MS Hub 624T - slot 8
==================================================================

               RESTART 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]: Y  <Return>
              Press Return for Main Menu ...
```

[2] Restart with Current Settings

This option restarts the module but leaves its configured NVRAM configuration parameters at their current values and saves in NVRAM. Allow approximately one minute for the module to restart.

The following example shows the dialog associated with this option.

```
                      Enter selection:  2

MS Hub 624T - slot 8
==================================================================
                RESTART WITH CURRENT SETTINGS

   This selection will reset your system with the current

   configuration settings.

==================================================================
                Press Y to confirm [N]: Y  <Return>

                Press Return for Main Menu ...
```

[3] Show Current Settings

This option shows the module's current settings. If the module is being configured for the first time, some fields will be blank. If the module was upgraded, the Software (SW) version number will reflect the current version. The hardware ID and ROM (Boot) code versions are displayed.

The following is an example screen and the fields included in it.

```
                     Enter selection : 3
 MS Hub 624T - slot 8                                             1
 =====================================================================
 MS Hub 624T, HW=V2,RO=V1.04,SW=V1.0                              2
 Last Firmware Upgrade  V1.0        -->   V1.1    @7 resets       3
 SysUpTime                             : 00:31:18  8 resets       4


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

Line	Field	Description
1	MS Hub 624T	The name of the module.
	slot 8	The slot number where the module is located (1 through 8).
2	HW=V2	The hardware version.
	RO=V1.04	The boot ROM version.
	SW=V1.1	The current software version number.
3	Last Firmware Upgrade V1.0	Provides details about the last firmware upgrade. These lines will not be displayed if a DownLine Upgrade has never been performed.
	@7 resets	The reset count at the time that the last DownLine Upgrade was performed.
4	SysUpTime 00:31:18	The time since the last reset.
	Resets	The total resets for the module.

[4] 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: 4

MS Hub 624T - slot 8
=====================================================================
                          DUMP ERROR LOG
                      Current Reset Count: 8
=====================================================================
Entry        = 3
Time Stamp   = 0      0      1c7
Reset Count  = 8
Firmware Rev.= V1.0
Backplane Clock Failure

Dump another entry [Y]/N?   <Return>
=====================================================================
No more Error Log entries
                    Press Return for Main Menu ...
```

NOTE

The format for some entries in the error log may be different from those shown here.

Use the clearVISN MultiSwitch Manager or clearVISN MultiChassis Manager (refer to the *clearVISN User's Guide* for a description of how to access online help) to manage each module in the DIGITAL MultiSwitch 600 System.

Configuring the Module in a Stack Station

This section describes how to configure your DIGITAL MultiSwitch Hub 624T when the module is installed either as a standalone device or in an unmanaged Stack. For cabling and setup port information refer to Chapter 3.

The following example shows the dialog associated with this option.

```
MS Hub 624T
==================================================================
                MS Hub 624T INSTALLATION MENU

        [1] Restart with Factory Defaults
        [2] Restart with Current Settings
        [3] Show Current Settings
        [4] Dump Error Log


      [Ctrl/C] Return to Hub Manager Installation Menu
==================================================================
                    Enter selection:  n    <Return>
```

The installation menu options are as follows:

Topic	Page
[1] Restart with Factory Defaults	4-10
[2] Restart with Current Settings	4-11
[3] Show Current Settings	4-12
[4] Dump Error Log	4-13

[1] Restart with Factory Defaults

This option reboots the module, causing its configured Non-Volatile Random Access Memory (NVRAM) parameters to be cleared and reinitialized to factory default values. If you need to reboot the module and retain the current settings, choose option `[2] Restart with Current Settings` from the `MS Hub 624T INSTALLATION MENU`. Allow approximately one minute for the module to reboot and complete self-test.

CAUTION

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

The following example shows the dialog associated with this option.

```
                    Enter selection: 1

MS Hub 624T
======================================================================

                 RESTART 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] Restart with Current Settings

This option restarts the module but leaves the module's configured (NVRAM) storage parameters at their current values. Allow approximately one minute for the module to restart.

The following example shows the dialog associated with this option.

```
                  Enter selection: 2

MS Hub 624T
 ================================================================
                 RESTART WITH CURRENT SETTINGS

   This selection will reset your system with the current

   configuration settings.

 ================================================================
              Press Y to confirm [N]:  Y  <Return>

              Press Return for Main Menu ...
```

[3] Show Current Settings

This option shows the module's current settings. If the module is being configured for the first time, some fields will be blank. If the module was upgraded, the Software (SW) version number will reflect the current version. The hardware ID and ROM (Boot) code versions are displayed.

The following example shows the display associated with this option and its fields are defined following the screen.

```
                        Enter selection : 3
MS Hub 624T
=====================================================================
MS Hub 624T, HW=V2,RO=V1.04,SW=V1.1                                 1
Last Firmware Upgrade  V1.0              -->   V1.1    @7 resets     2
SysUpTime                                  : 00:31:18  8 resets      3


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

Line	Field	Description
1	MS Hub 624T	The name of the module.
	HW=V2	The hardware version.
	RO=V1.04	The boot ROM version.
	SW=V1.1	The current software version number.
2	Last Firmware Upgrade V1.0	Provides details about the last firmware upgrade. These lines will not be displayed if a DownLine Upgrade has never been performed.
	@7 resets	The reset count at the time that the last DownLine Upgrade was performed.
3	SysUpTime 00:31:18	Indicates how long the system has been up since the last reset.
	Resets	The total resets for the module.

[4] 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: 4

MS Hub 624T
=====================================================================
                          DUMP ERROR LOG
                       Current Reset Count: 8
=====================================================================
Entry       = 3
Time Stamp  = 0       0       1c7
Reset Count = 8
Firmware Rev.= V1.0
Backplane Clock Failure

Dump another entry [Y]/N?   <Return>
=====================================================================
No more Error Log entries
                    Press Return for Main Menu ...
```

NOTE

The format for some entries in the error log may be different from those shown here.

Chapter 5

Redundant-Link Configuration

Overview

This chapter describes the configuration and implementation of the redundant-link pair (RLP) of Ethernet 10BaseT links.

Redundant-link configuration refers to two Ethernet links that are configured on a single LAN to provide greater fault tolerance than a single port-to-port configuration provides.

NOTE

You must configure the links using clearVISN before connecting the cables. Failure to do so can lead to a configuration, such as a repeater loop, that seriously impairs the performance on that segment of the LAN.

In This Chapter

Basic Configuration

Introduction

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

  — Provides full fault detection

- a nonresponder port

  — Provides only partial fault detection

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

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 (MCA). One link of the master port pair is the primary link; the other is the secondary link. Use clearVISN to designate the primary and secondary links.

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 in a redundant-link pair provide full fault detection.

Nonresponder Ports

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

NOTES

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

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

Master Control Algorithm

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

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

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

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

Primary Link

The primary link, 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 initialization time and after a reset. The secondary link becomes active if the MCA detects a failure in the primary.

Redundant-Link Operation

Introduction

The master control algorithm (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, the MCA does the following tasks:

Task	Description
1	Disables the primary link.
2	Enables the secondary link.
	This typically occurs within 3 to 6 milliseconds (10 milliseconds maximum).

Once the primary link is repaired, it remains inactive until one of the following events occurs:

- The MCA detects a failure in the secondary link.

- The secondary port is internally partitioned or disabled.

- The module is rebooted.

Simple Redundant-Link Configuration

Introduction

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. The remote module is another module in a remote site in the building that is linked using any Ethernet cabling medium, such as fiber-optic links (see Figure 5-1).

NOTE

Use crossover (x) cables when connecting two DIGITAL MultiSwitch Hub 624T modules.

Figure 5-1: Simple Redundant-Link Configuration

NPB-0794-97F

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 or separate modules.

Complex Redundant-Link Configuration

Introduction

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 show in Figure 5-2.

Figure 5-2: Complex Redundant-Link Configuration
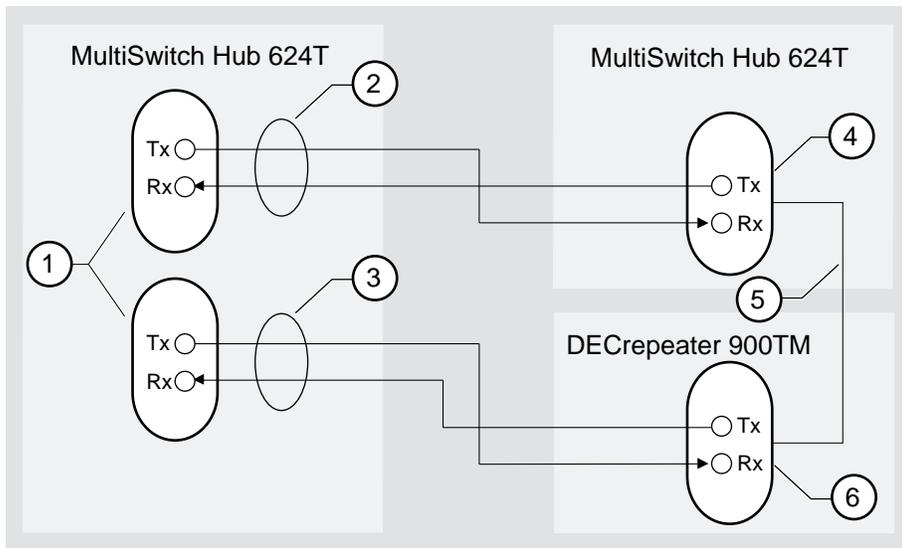
NPB-0795-97F

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

Partial Fault Detection

Introduction

Partial fault detection allows the DIGITAL MultiSwitch Hub 624T to achieve limited fault tolerance with connections to nonresponder repeaters, such as the DECrepeater 900TM, DECrepeater 90TS, DECrepeater 90T-16, or to any IEEE compliant 10BaseT repeaters or hubs.

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 internally detected failures, such as

  — 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.

See the following section, Full Fault Detection, for a comparison of partial fault detection to full fault detection.

Figure 5-3: Partial Fault Detection Configuration

NPB-0796-97F
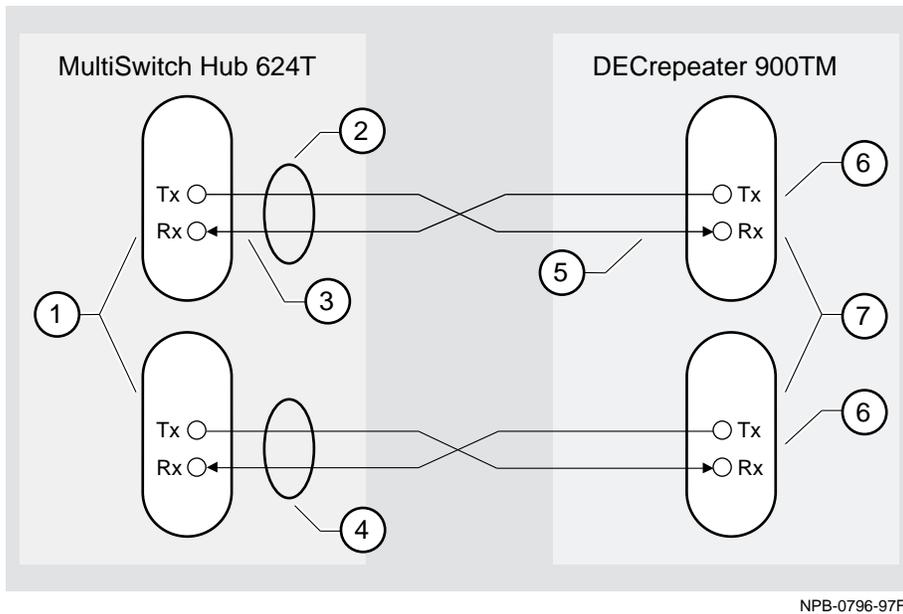
Item	Description
1	Master Port Pair
2	Primary link (initially active).
3	The master can detect a link failure on its receiver (Rx).
4	Secondary link (initially standby and disabled).
5	The master cannot detect a link failure on non-responder receiver (Rx).
6	Single nonresponder ports (always enabled).
7	These ports may be on the same module or separate modules.

Full Fault Detection

Introduction

The DIGITAL MultiSwitch Hub 624T supports full fault detection. When the module's ports are connected to the ports of another repeater that supports this feature, such as another DIGITAL MultiSwitch Hub 624T, failures are detected at either end of the receive or transmit link (Figure 5-4).

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

Figure 5-4: Full Fault Detection Configuration
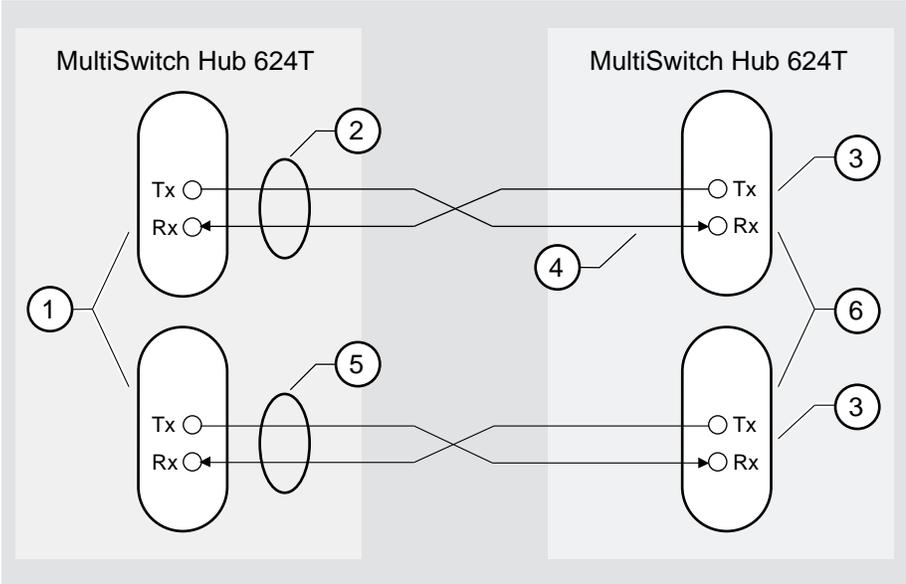
NPB-0797-97F

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

Fault Detection Comparison

Table 5-1 shows the difference in failure detection between partial fault detection and full fault detection.

Table 5-1: 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

Introduction

The following recommendations should be considered when configuring the DIGITAL MultiSwitch Hub 624T with 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.

- If possible, 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.

Chapter 6

Module Management

Overview

Introduction

This chapter describes how to manage the DIGITAL MultiSwitch Hub 624T using clearVISN.

In This Chapter

What is clearVISN?

clearVISN is an integrated family of software applications for managing a network using policy-based techniques. clearVISN manages DIGITAL networking products. Each clearVISN application has a Graphical User Interface (GUI) and supports Simple Network Management Protocol (SNMP).

The use of clearVISN is recommended to gain the full benefit of SNMP management, including backplane LAN management, on MultiSwitch 600 and DEChub 900 modules.

Use the clearVISN Stack Manager or clearVISN MultiChassis Manager (refer to the *clearVISN User's Guide* for a description of how to access online help) to manage each module in the DEChub 900 MultiSwitch.

MultiChassis Manager

The MultiChassis Manager manages the DEChub 90, the DIGITAL MultiStack 90 System, and the DIGITAL MultiSwitch 600 System, DEChub ONE, DEChub 900 MultiSwitch, GIGAswitch/FDDI, and GIGAswitch/ATM families of devices. MultiChassis Manager displays a GUI menu detailing the actual configuration, and allows users to manage the modules and ports with point-and-click ease.

Stack Manager

The Stack Manager manages the DEChub 90, DIGITAL MultiStack 90, and DIGITAL MultiSwitch 600 System. Stack Manager displays a GUI menu detailing the actual configuration, and allows users to manage the modules and ports with point-and-click ease.

Requirements for Managing the Module

The following configurations are required for managing the DIGITAL MultiSwitch Hub 624T in either a DIGITAL MultiSwitch 600 System or a DEChub 900 MultiSwitch.

Only one Stack Director is required to manage a stack. All other functional DIGITAL MultiSwitch 600 System modules (such as the DIGITAL MultiSwitch Hub 624T) in the same stack may be powered by Stack Stations and will be managed by the Stack Director.

DIGITAL MultiSwitch 600 System

To manage a DIGITAL MultiSwitch 600 System, you need the following components.

- Stack Director configured with a IP address (see Part II)

- clearVISN Stack Manager or MultiChassis Manager Software Application

- In-Band access to the Stack Director's management MAC via the 10Base2 connection *or* an external connection to the management access port *or* Out-of-Band OBM port using SLIP.

DEChub 900 MultiSwitch

To manage a DEChub 900 MultiSwitch, you need the following components.

- DEChub 900 MultiSwitch configured with an IP address.

- clearVISN MultiChassis Manager

- In-band access to the DEChub Management Agent via the IP services module, or Out-of-Band (OBM) access via the OBM port using SLIP on the DEChub 900 MultiSwitch.

Managed Functions

clearVISN and DIGITAL MultiSwitch Hub 624T provide support for the following managed functions. The tables that follow list and define functions managed by the clearVISN management windows.

- Port Control for the 24 fixed 10BaseT ports and the ports that populate the Expansion slot; including

  — Up to two 10Mb/s MM-10s for station connections or links to other stacks or hubs. The MM-10s include AUI, 10BaseFL, 10Base2, 10BaseT, and Reverse AUI.

  — A 10BaseT expansion port group that expands the DIGITAL MultiSwitch Hub 624T to 36 ports and acts as a third port group.

- Port-level intrusion and eavesdrop security.

- Assignment of port groups to separate collision domains.

- Assignment of port groups to the backplane of a MultiSwitch 600 or DEChub 900 MultiSwitch.

- Hot-swapping of modules in a MultiSwitch 600 or DEChub 900 MultiSwitch.

- Auto-discovery of stations connected to each managed port.

- DownLine Upgrade of Firmware Revisions.

NOTE

In this chapter only, the DIGITAL MultiSwitch Hub 624T is referred to as a repeater. All Repeater windows apply to the DIGITAL MultiSwitch Hub 624T.

The following pages describe functions of these Repeater windows. This information is also available in clearVISN online help.

Repeater Summary Window

The clearVISN Repeater Summary Window displays repeater status in summary form. Use this window to modify repeater management information and to monitor port information. The following table lists functions of the Repeater Summary Window.

Selection	Description
Status	Displays the current operational state of the repeater. The status is one of the following:
	• Disabled
	• Enabled
	• Fatal Failure
	• General Failure
	• Group Failure
	• Non-Fatal Failure
	• Port Failure
	• Repeater Failure
	• Initializing
	• Loading
	• Needs Program Load
	• OK
Partitioned Ports	The number of repeater ports that are partitioned.
Media Unavail(able) Ports	The number of repeater ports with media unavailable. This status indicates link loss, low light, or no loopback.
Transmit Collisions	The number of repeater transmission collisions for all ports.
Port Table	A graphical representation of the status of a port and a list of Ethernet stations attached to the port.
LAN/Group	The name of the LAN to which the port is connected or the logical group of which this port is a member.

Selection	Description
Port Status	The color of the port connector icon indicates the operational, or current state, of the port. The status is determined by examining these three objects: • Port administration status • Port auto-partition state • MAU media availability
Port Name	The user-assigned name of the port. A port name can have up to 80 characters and must be unique within the repeater. Valid characters are any printable character. DIGITAL recommends setting the port name to reflect the repeater's position in the hub chassis and the port's number.
Offered Load	This monitor displays the offered load into this port as a percentage of the total bandwidth. The monitor display is a logarithmic scale (base 10).
Collisions	This monitor displays the percentage of total transmission attempts to this port that result in collisions. The monitor display is a logarithmic scale (base 10).
Invalid Frames	This monitor displays the percentage of total transmission attempts into this port that are invalid frames. The monitor display is a logarithmic scale (base 10).

Repeater Port Summary Window

The clearVISN Repeater Port Summary Window displays port status, performance, and security information in summary form. Use this window to monitor performance, security, and connected stations information on a per-port basis. The following table lists functions of the Repeater Port Summary Window.

Selection	Description
Identification (Port)	Displays information identifying the repeater being managed.
LAN Segment	The backplane LAN segment to which the port is connected.
Group	The logical group of which this port is a member.
Status (900-Series Port Summary)	Displays the condition of the port.
Status	The color of the port connector icon indicates the operational, or current, state of the port. The status is determined by examining these three objects: • Port administration status • Port auto-partition state • MAU media availability
Operational State	Indicates the state of the port. A port can be in one of the following operational states: • Operational • Not Operational • Not Present
Media State	The status of the MAU, or transceiver, and the cable, or link, that connects the MAU to the repeater. MAU and cable failures are indicated by this status. If the MAU is a link type (FOIRL, 10BASE-T, or 10BASE-F), then this status is equivalent to the link test fail state/low light function. For an AUI or a coaxial MAU including broadband, this status indicates whether or not a loopback is detected on the DI circuit.

Selection	Description
Auto-Partition State	The auto-partitioned state flag. The flag can be in one of two states: Not Auto-partitioned or Auto-partitioned. When a port is auto-partitioned, packets from the connected station are blocked. The repeater uses the auto-partition algorithm to determine when a port should be auto-partitioned.
Partitions	The number of times that the port has been partitioned.
Partition Reason	The reason that the port was partitioned. If the port is not partitioned, this field displays "Not Partitioned."
	The following reasons can appear:
	• Unknown
	• Management Partitioned
	• Security Violation
	• Excessive Collisions
	• Jabber
	• No Carrier Loopback
	• Transmit Carrier Dropout
	• Forced Reconnection
	• Consecutive Collisions
SQE Test Error	The SQE test error. This MIB object indicates whether or not SQE test messages are being detected and what, if any, action is being taken. The network transceiver generates these messages to indicate that the collision detection circuitry is working. According to IEEE 802.3 specifications, all transceivers that are connected to repeaters must have this function turned off or disabled.
Performance	Displays performance statistics for the port.
Units	Selects the units of statistical measurements on the performance monitors: Rate/sec or Percent.
Octets/Sec	This monitor displays either the octets per second on this port or the offered load on this port as a percentage of the total bandwidth. The monitor display is a logarithmic scale (base 10).
Frames/Sec	This monitor displays either the valid frames per second or the percentage of the total transmission attempts that are valid frames. The monitor display is a logarithmic scale (base 10).

Repeater Port Summary Window

Selection	Description
Collisions/Second	This monitor displays either the collisions per second or the percentage of the total transmission attempts that result in collisions. The monitor display is a logarithmic scale (base 10).
Errors/Second	This monitor displays either the errors per second or the percentage of the total transmission attempts that are invalid frames. The monitor display is a logarithmic scale (base 10).
Security	Displays security information about the port.
Eavesdrop Prev(ention)	Indicates the eavesdrop mode to which the port is set: Enabled or Disabled. When this function is enabled, the repeater restricts the port's outgoing traffic to the authorized stations.
Intrusion Detect(ion)	Indicates the intrusion mode to which the port is set.
Intrusions	Lists the number of unauthorized transmissions on this port.
Connected Stations	Displays information about the stations connected to this port.
IP Name	The IP name of the connected station, if available.
Total	The total number of stations connected to this port.
Last Source Address Seen	The last source address seen on this port.

Repeater Port Details Window

The clearVISN Repeater Port Details Window displays port counters, MAU information, and Port Administration status. Use this window to view counters and MAU information and to enable or disable ports on a per-port basis. The following table lists functions of the Repeater Port Details Window.

Selection	Description
Status (900-Series Port Details)	Displays the condition of the port.
Auto-Partition State	The auto-partitioned state flag. The flag can be in one of two states: Not Auto-partitioned or Auto-partitioned. When a port is auto-partitioned, packets from the connected station are blocked. The repeater uses the auto-partition algorithm to determine when a port should be auto-partitioned.
Partitions	The number of times that the port has been partitioned.
Partition Reason	The reason that the port was partitioned. If the port is not partitioned, this field displays "Not Partitioned."
	The following reasons can appear:
	• Unknown
	• Management Partitioned
	• Security Violation
	• Excessive Collisions
	• Jabber
	• No Carrier Loopback
	• Transmit Carrier Dropout
	• Forced Reconnection
	• Consecutive Collisions
Media State	The status of the MAU, or transceiver, and the cable, or link, that connects the MAU to the repeater. MAU and cable failures are indicated by this status. If the MAU is a link type FOIRL, 10BASE-F, or 10BASE-T this status is equivalent to the link test fail state/low light function. For an AUI, or a coaxial MAU including broadband, this status indicates whether or not loopback is detected on the DI circuit.

Repeater Port Details Window

Selection	Description
SQE Test Error	The SQE test error. This MIB object indicates whether or not SQE test messages are being detected and what, if any, action is being taken. The network transceiver generates these messages to indicate that the collision detection circuitry is working. According to IEEE 802.3 specifications, all transceivers that are connected to repeaters must have this function turned off or disabled.
Counters	Displays the content of the port counters.
Readable Frames	The number of frames of valid frame length that have been received on this port. This counter is incremented by one for each frame received on this port whose OctetCount is greater than or equal to minFrameSize and less than or equal to maxFrameSize (refer to Section 4.4.2.1, IEEE 802.3 Std) and for which the FCSError and CollisionEvent signals are not asserted.

This statistic provides one of the parameters necessary for obtaining the packet error rate. The approximate minimum time for rollover of this counter is 80 hours. |
| **Readable Bytes** | The number of octets contained in valid frames that have been received on this port. This counter is incremented by OctetCount for each frame received on this port that has been determined to be readable.

This statistic provides an indicator of the total data transferred. The approximate minimum time for rollover of this counter is 58 minutes. |
Collisions	This counter is incremented by one for any CarrierEvent signal on any port for which the CollisionEvent signal on this port is asserted.
Total Errors	The total number of errors that have occurred on this port.
Frame Check Sequence Errors	This counter is incremented by one for each frame received on this port with the FCSError signal asserted and the FramingError and CollisionEvent signals not asserted, and whose OctetCount is greater than or equal to minFrameSize and less than or equal to maxFrameSize (refer to Section 4.4.2.1, IEEE 802.3 Std).

Selection	Description
Frame Alignment Errors	This counter is incremented by one for each frame received on this port with the FCSError and FramingError signals asserted and CollisionEvent signal not asserted, and whose OctetCount is greater than or equal to minFrameSize and less than or equal to maxFrameSize (refer to Section 4.4.2.1,IEEE 802.3 Std). If this counter is incremented, then the Frame Check Sequence Errors counter is not incremented for the same frame.
Frame Too Long	This counter is incremented by one for each frame received on this port whose OctetCount is greater than maxFrameSize (refer to Section 4.4.2.1, IEEE 802.3 Std). If this counter is incremented, then neither the Frame Alignment Errors counter nor the Frame Check Sequence Errors counter is incremented for the frame.
Short Events	This counter is incremented by one for each CarrierEvent on this port with ActivityDuration less than ShortEventMaxTime. ShortEventMaxTime is greater than 74 bit times and less than 82 bit times. A bit time is equal to 100 nanoseconds. ShortEventMaxTime has tolerances included to provide for circuit losses between a conformance test point at the AUI and the measurement point within the state machine.
Late Events	This counter is incremented by one for each CarrierEvent on this port in which the CollIn(X) variable changes to the value SQE (refer to Section 9.6.6.2, IEEE 802.3 Std) while the Activity Duration is greater than the LateEventThreshold. Such a CarrierEvent is counted twice, as both a Collision and as a LateEvent.
Very Long Events	This counter is incremented by one for each CarrierEvent on this port whose ActivityDuration is greater than the MAU Jabber Lockup Protection timer TW3 (refer to Sections 9.6.1 and 9.6.5, IEEE 802.3 Std). Other counters may be incremented as appropriate.

Repeater Port Details Window

Selection	Description
Data Rate Mismatches	This counter is incremented by one for each frame received on this port that meets all of the following conditions: • The CollisionEvent signal is not asserted. • The ActivityDuration is greater than ValidPacketMinTime. • The frequency (data rate) is detectably mismatched from the local transmit frequency. The exact degree of mismatch is vendor specific and is to be defined by the vendor for conformance testing.
Runts	This counter is incremented by one for each CarrierEvent on this port that meets one of the following two conditions. Only one test need be made. The conditions are: • The ActivityDuration is greater than ShortEventMaxTime and less than ValidPacketMinTime, and the CollisionEvent signal is deasserted. • The OctetCount is less than 64, the ActivityDuration is greater than ShortEventMaxTime and the CollisionEvent signal is not asserted. ValidPacketMinTime is greater than or equal to 552 bit times and less than 565 bit times.
Auto-Partitions	This counter is incremented by one for each time the repeater automatically partitions this port. The conditions that cause port partitioning are specified in the partition state machine in Section 9 of the IEEE 802.3 Std. They are not differentiated here.
MAU Information	Displays information about the repeater's MAU characteristics.
Media Availability Changes	The number of times that the repeater's MAU media-available object for this port leaves the available state.
Link Test Administration Status	This object is used to manage link type MAUs that implement a link test function (for example, 10BASE-T, 10BASE-F, and FOIRL). Setting this object to Enabled causes the MAU to turn on its link test function. This object can be Enabled or Disabled, using the buttons. Setting this object to Disabled causes the MAU to turn off its link test function.

Repeater Security Summary Window

The clearVISN Repeater Security Summary Window displays repeater and port security information. Use this window to set up and manage security for the repeater and for individual repeater ports. The following table lists functions of the Repeater Security Summary Window.

Selection	Description
Port Information	Displays information about the selected port. This box does not display current data until you select a particular port.
Port	The port number as seen from the repeater front panel.
Port Name	The name of the port.
Group	The logical group for this port.
LAN	The name of the LAN to which the port is connected.
Security Status	The port's security status.
Select Port	Use this information to select the repeater port or ports whose security functions you want to set up. You can select one port or all ports.
Port/Group	Allows you to select a port whose security functions will be modified when you click on OK or Apply.
All Front Panel Ports	Click on this button to select all ports.
Security Functions	Use this information to set up security for the selected port or ports.
Prevent Eavesdropping	A port's eavesdrop mode. There are two states: • **Enabled**--The level of security imposed in this mode depends on whether you designated authorized stations for the port. • **Disabled**--All packets received on all other ports are transmitted on this port.

Repeater Security Summary Window

Selection	Description
Intrusion Mode	The port's intrusion mode. The port can be in one of four intrusion modes: • Disabled • Pass Unauthorized Packets • Jam Unauthorized Packets • Disable Port On Intrusion
Disabled	When this mode is selected, the repeater allows unrestricted incoming traffic on the port.
Pass Unauthorized Packets	When this mode is selected, the repeater allows unrestricted incoming traffic on the port but records all port violations in the Repeater Security Intrusions log. Violations are defined as packets received from stations other than those displayed in the Authorized Stations list.
Jam Unauthorized Packets	When this mode is selected on a port, the repeater jams any unauthorized packets received on the port before repeating those packets onto other repeater ports.
Disable Port On Intrusion	When this mode is selected on a port, the repeater disables the port whenever any unauthorized traffic is detected on the port. The port remains disabled until it is re-enabled using this application or other network management software.
Intrusions	The number of unauthorized packets received from this port.
Address Learning	Use this information to enable and disable address learning for a selected port and to create and modify the port's Authorized Stations list.
Learned Stations	Lists the addresses learned by the port you selected in the Select Port box and allows you to select addresses for the port's Authorized Stations list.
Learning Status	This field displays one of the following address learning status values: • **Active** - Learning is enabled and active. • **Full** - Learning is enabled, but the number of entries in the Learned Stations list has reached the maximum allowed on the repeater. • **Disabled** - Learning is disabled. There may still be addresses in the list.

Selection	Description
Address Authorization	Displays the addresses of the authorized stations attached to a selected port and allows you to specify addresses to be added or removed from the repeater's list of authorized addresses.
Authorized Stations	Displays the addresses of the authorized stations attached to a selected port.
Address	Use this box to register the addresses of stations you plan to connect to this port or remove from this port. Stations using DECnet require two types of addresses: an Ethernet physical address and a DECnet physical address that is calculated using the Ethernet physical address.

Repeater Security Intrusion Log Window

The clearVISN Repeater Security Intrusion Log Window displays the contents of repeater security violations logs. Use this window to display the intrusion log for the entire repeater or a particular repeater port.

When you open this window, the information displayed is determined by the context in which it is opened. If you access this window from the Repeater Port Summary window or from the Port Table in the Repeater Summary window, in which case you have already selected a port, this window displays security information for the selected port. The following table lists functions of the Repeater Security Intrusion Log Window.

Selection	Description
Intrusions	Displays a row of information about each security violation.

Dual-Port Redundancy Window

The Dual-Port Redundancy Window displays summary information about ports that are configured as redundant master pairs or as responder pairs. This window is used to actually configure the ports. The following table lists functions of the Dual-Port Redundancy Window.

Selection	Description
Dual-Port Redundancy	Lists the repeater ports that are configured as redundant master pairs or as responder ports.
Link Name	The user-assigned name of the link. Link names must be strings of 1 to 16 characters, and any printable characters are valid including a space.
Link Type	This field indicates the type of port configuration, either Master mode or Responder mode.
Master Mode	Designates a pair of repeater ports (primary and secondary) that control a redundant link. Because the remote ports, or responder ports, to which the master ports are connected must be on the same LAN or are otherwise bridged together, only one of the master ports may be enabled at a time. Responder mode designates a repeater port that is connected to either a master primary port or a master secondary port on another repeater.
	When two repeater ports are initially configured for dual-port redundancy, the primary port (master) is in the active state (transmitting and receiving data) and the secondary port (responder) is in the standby state (idle). In operation, the primary port communicates with its responder port until its MAU detects a link failure signal from the responder port. At this point, if the standby link is good, the primary port is disabled (switched to Standby state), the secondary port is enabled (switched to Active state), and the communication resumes over the secondary link. Should the secondary port detect a link failure, communication reverts back to the primary link, assuming it has recovered from its failure.
	Master ports can also attach to normal repeater ports with partial redundancy. For example, master ports can attach to DECrepeater 90FA and 90FL ports.

Dual-Port Redundancy Window

Selection	Description
Responder Mode	This mode designates ports that are connected to master mode ports. Responder ports are always enabled but are active only when their master port is active. A key function of the responder port, other than receiving and transmitting data, is to report link failures to the master port. When the master port detects a link failure, it causes the link to failover to the standby link. If the standby link is not available when the active link fails, the failover process waits until it is available. If the previously active link becomes available during this waiting period, the master returns to using it. Otherwise, the failover to the standby link takes place as soon as the standby link is good. By using failover, the highest utilization possible on a dual-port redundant link is achieved.
Master Primary or Responder LAN/Group	The LAN to which the port is connected or the logical group of which the port is a member.
Master Primary or Responder Port	The number of the repeater port (for example 1, 2, and so on).
Master Secondary LAN/ Group	The LAN to which the port is connected or the logical group of which the port is a member.
Master Secondary Port	The number of the repeater port (for example 1, 2, and so on).
Link State Changes	The number of times the operational status of the primary, secondary, or responder port has changed between Active and Standby.
Select	Click on this button to select a port for deletion.

Dual-Port Redundancy Add Window

The Dual-Port Redundancy Add Window displays fields used to configure redundant port. The following table lists functions of the Dual-Port Redundancy Add Window.

Selection	Description
Available Ports	A list of ports that have not been configured as redundant ports. Initially, this list contains all the ports on the repeater.
Configuration	Contains the buttons and fields used to configure a redundant port.
Master Pair	Click on this button to configure a pair of redundant ports.
Responder	Click on this button to configure a port as a responder port. A responder port connects to either a Master Primary port or a Master Secondary port that is located on a different repeater.
Primary Port	This box identifies the primary port by number (for example, 3 or 4). The port must be selected from the list of ports in the Available Ports box.
Secondary Port	This box identifies the secondary port by number (for example, 3 or 4). The port must be selected from the list of ports in the Available Ports box
Responder Port	Use this box to identify the responder port by number (for example, 3 or 4). The port identity is restricted to the list of ports in the Available Ports box.
Link Name	Use this box to enter a name for the link. The user-assigned link name must be a string of 1 to 16 characters. Any printable characters are valid including a space.

DIGITAL MultiSwitch 600 System Interconnect Guidelines

The DIGITAL MultiSwitch 600 System has one 10Base2 backplane LAN. The 10Base2 backplane LAN exists by default and cannot be deleted or renamed. You can create from one-to-six additional flexible Ethernet LANs.

You can configure DIGITAL MultiSwitch Hub 624T and DIGITAL MultiSwitch 612EX modules for use in the DIGITAL MultiSwitch 600 backplane, as explained in the following sections.

Using the DIGITAL MultiSwitch Hub 624T in a DIGITAL MultiSwitch 600 System

The DIGITAL MultiSwitch Hub 624T can operate as one collision domain, or be segmented into port groups.

A DIGITAL MultiSwitch Hub 624T with 24, 25, or 26 ports has two internal Ethernet LANs. The module also has two port groups:

- Port Group A, consisting of ports 1 through 12 and, if present, the MM-10 in slot A of the Carrier Card

- Port Group B, consisting of ports 13 through 24 and, if present, the MM-10 in slot B of the Carrier Card

The module can accept an optional 12-port 10BaseT Expansion Port Group card, for a total of 36 ports. A 36-port DIGITAL MultiSwitch Hub 624T has three internal LANs and three port groups:

- Port Group A, consisting of ports 1 through 12

- Port Group B, consisting of ports 13 through 24

- Port Group C, consisting of ports 25 through 36

Each port group of a DIGITAL MultiSwitch Hub 624T can connect to any, but not more than one, of the module's internal LANs. Each internal LAN has a flexible Ethernet backplane port that can connect to any one of the six DIGITAL MultiSwitch 600's flexible Ethernet backplane LANs.

DIGITAL MultiSwitch Hub 624T modules have a 10Base2 backplane port that can connect to the 10Base2 backplane LAN of a DIGITAL MultiSwitch 600 System. Only one module port group at a time can connect to this 10Base2 backplane port.

DEChub 900 MultiSwitch Configuration Guidelines

If you have two or more DECrepeater 90FS, DECrepeater 90TS, DIGITAL
MultiSwitch Hub 624T, or DIGITAL MultiSwitch 612EX modules in your hub and
you want to connect them to a flexible Ethernet LAN segment, you must connect all
of them to the same Ethernet flexible LAN segment.

NOTE

The Hub Manager will reject the connection, if you have connected a
DECrepeater 90FS, DECrepeater 90TS, DIGITAL MultiSwitch Hub 624T, or
DIGITAL MultiSwitch 612EX module to a backplane flexible LAN segment and
you attempt to connect a different DECrepeater 90FS, DECrepeater 90TS,
DIGITAL MultiSwitch Hub 624T, or DIGITAL MultiSwitch 612EX module to
another backplane flexible LAN segment.

You can configure DIGITAL MultiSwitch Hub 624T, DIGITAL MultiSwitch 612EX,
DECrepeater, access server, DECbridge, and DECswitch modules for use in the
DIGITAL MultiSwitch 900 backplane, as explained in the following sections.

Using the DIGITAL MultiSwitch Hub 624T in a DEChub 900 MultiSwitch

A DIGITAL MultiSwitch Hub 624T with 24, 25, or 26 ports has two internal Ethernet
LANs. The module also has two port groups:

- Port Group A, consisting of ports 1 through 12 and, if present, the MM-10 in slot
  A of the Carrier Card

- Port Group B, consisting of ports 13 through 24 and, if present, the MM-10 in slot
  B of the Carrier Card

The module can accept an optional 12-port 10BaseT Expansion Port Group card, for a
total of 36 ports. A 36-port DIGITAL MultiSwitch Hub 624T has three internal LANs
and three port groups:

- Port Group A, consisting of ports 1 through 12

- Port Group B, consisting of ports 13 through 24

- Port Group C, consisting of ports 25 through 36

Each port group of a DIGITAL MultiSwitch Hub 624T can connect to any, but not
more than one, of the module's internal LANs.

The flexible Ethernet backplane port can connect to any DEChub 900 MultiSwitch backplane flexible Ethernet LAN.

NOTES

Only the first of the internal LANs has a flexible Ethernet backplane port; the other internal LANs cannot be accessed outside of the module. (The first internal LAN is the top group in the clearVISN Port Switching window).

If the DEChub 900 MultiSwitch has DECrepeater 90TS, DECrepeater 90FS, DIGITAL MultiSwitch 612EX, or other DIGITAL MultiSwitch Hub 624T modules connected on a backplane Ethernet LAN, the DIGITAL MultiSwitch Hub 624T can connect only on that same Ethernet LAN.

DIGITAL MultiSwitch Hub 624T modules have a 10Base2 backplane port that can connect to the 10Base2 backplane LAN of a DEChub 900 MultiSwitch. Only one module port group at a time can connect to this 10Base2 backplane port.

MIBs Supported by the DIGITAL MultiSwitch Hub 624T

MIBs supported by the DIGITAL MultiSwitch Hub 624T are as follows.

- MIB II (RFC 1213)

- DEChub 900 Public Common MIB

- Extended Repeater MIB (RFC)

- DIGITAL Extended Repeater MIB

- Internet Engineering Task Force (IETF) Repeater MIB (RFC 1516)

For information on how to access DIGITAL MIBs, follow the procedures in the DIGITAL MultiSwitch Hub 624T Release Notes.

Chapter 7

Removing a Module and Option Cards

Overview

This chapter describes how to remove a module and MM-10s from the DIGITAL MultiSwitch 600 System.

In This Chapter

Removing a Module from the DIGITAL MultiSwitch 600 System (Hot-Swappable)

This section describes how to remove a module from the DIGITAL MultiSwitch 600 System on a hot-swap basis. You will need a flat-blade screwdriver for the removal.

NOTE

Hot-swapping is the removal or insertion of a module into either the DIGITAL MultiSwitch 600 System or the DEChub 900 MultiSwitch without disrupting power to the unit. Do not simultaneously hot-swap more than one module. Simultaneously inserting or removing more than one module can cause problems with the operation of other installed modules.

Complete the following steps to remove a module from the Stack Director (shown in illustration) or Stack Station as shown in Figure 7-1.

Figure 7-1: Removing the Module from a DIGITAL MultiSwitch 600
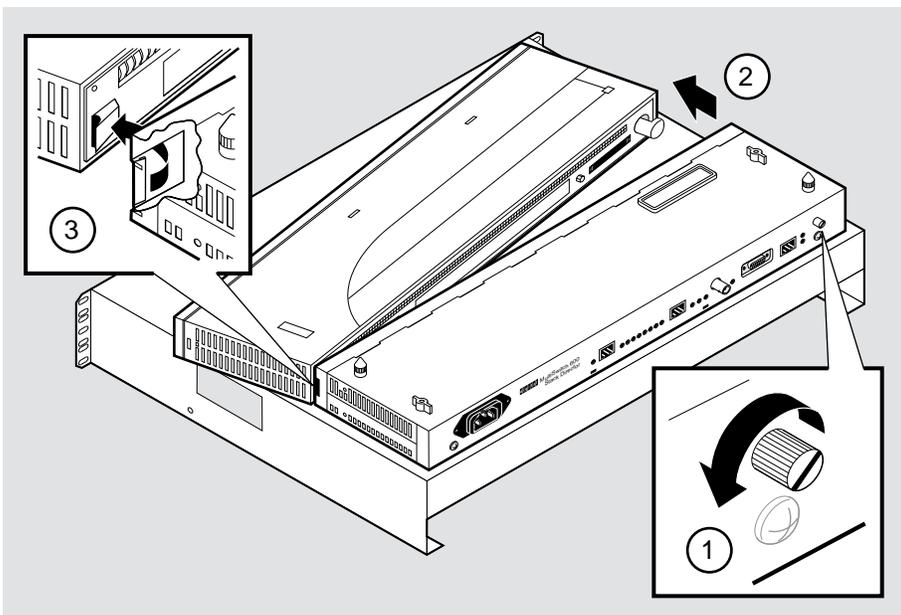
NPB-0593-96F

Removing a Module from the DIGITAL MultiSwitch 600 System (Hot-Swappable)

Step	Action
1	Using a flat-blade screwdriver, loosen the slotted thumbscrew **(1)** on the Stack Director or Stack Station module by turning it counterclockwise.
2	Pull the top of the module (the end with the locking tab) **(2)** away from the Stack Director or Stack Station.
3	Unseat the module from the Stack Director or Stack Station **(3)**.

Removing Modules from the DEChub 900 (Hot-Swappable)

To remove the module from the DEChub 900, complete the following steps (see Figure 7-2).

NOTE

Hot-swapping is the removal or insertion of a module into either the DIGITAL MultiSwitch 600 System or the DEChub 900 MultiSwitch without disrupting power to the unit. Do not simultaneously hot-swap more than one module. Simultaneously inserting or removing more than one module can cause problems with the operation of modules.

Figure 7-2: Removing the Module from a DEChub 900
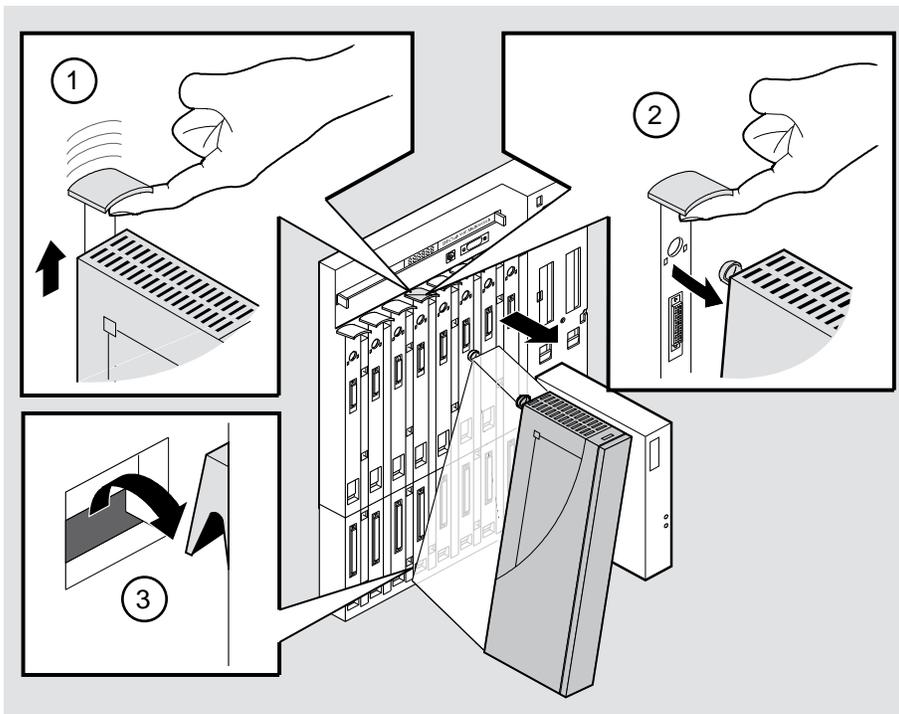
NPG-0008-95F

Removing Modules from the DEChub 900 (Hot-Swappable)

Step	Action
1	Lift the release lever **(1)** located at the top of the DEChub 900 slot.
2	While holding up the release lever **(2)**, pivot the module back on its bottom mounting tab **(3)**.
3	Remove the module.

Removing Cables from the 10BaseT Ports

Complete the following steps to remove 10BaseT cables as shown in Figure 7-3.

Figure 7-3: 10BaseT Cable Removal
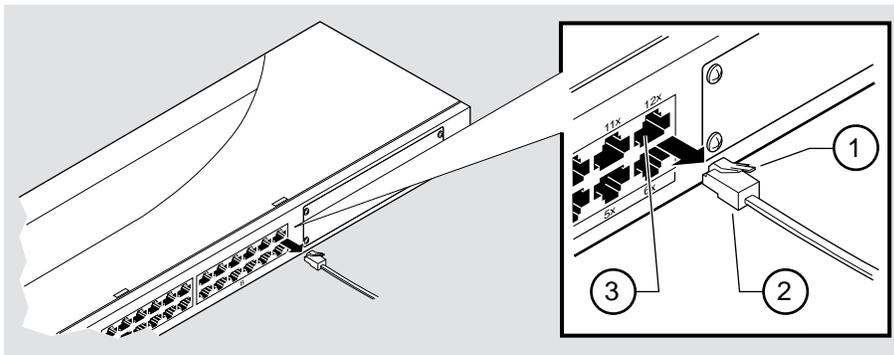
NPB-0759-96F

Step	Action
1	Push down on the release tab **(1)** and remove the connector **(2)** from the module's 10BaseT port **(3)**.
2	Remove the other end from the cable to an network device (PC or workstation), if needed.
3	Repeat steps 1 and 2 for additional 10BaseT connectors.

Removing Cables from the MM-10 Ports

This section describes how to remove cables from the MM-10.

Action . . .	See Page . . .
Removing Cables from the AUI MM-10 Port	7-7
Removing Cables from the Reverse AUI MM-10 Port	7-8
Removing Cables from the 10Base2 MM-10 Port	7-8
Removing Cables from the 10BaseFL MM-10 Port	7-9
Removing Cables from the 10BaseT (UTP/UTP Crossover) MM-10 Port	7-10

Removing Cables from the AUI MM-10 Port

Complete the following steps to remove the AUI port cable from the AUI MM-10 as shown in Figure 7-4.

Figure 7-4: Removing AUI MM-10 Cables
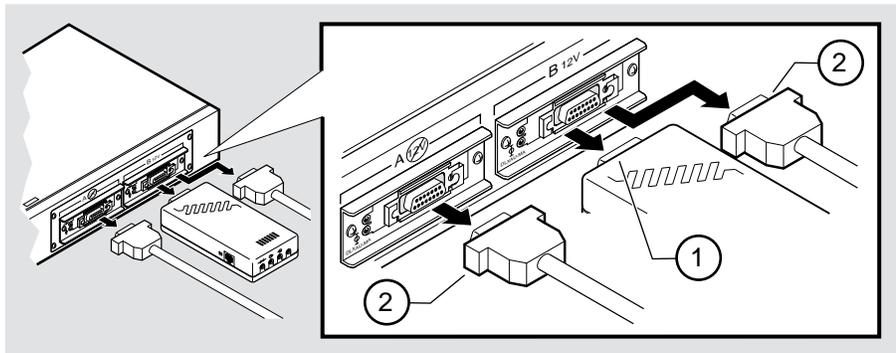
NPB-0760-96F

Step	Action
1	Slide the AUI port connector latch to the unlocked position to the left.
2	Remove the MAU (**1**) or AUI cable (**2**) from the AUI port.

Removing Cables from the Reverse AUI MM-10 Port

Figure 7-5 shows how to remove the cable from the reverse AUI MM-10 and the following table describes how to remove the AUI port cable.

Figure 7-5: Removing Reverse AUI MM-10 Cables
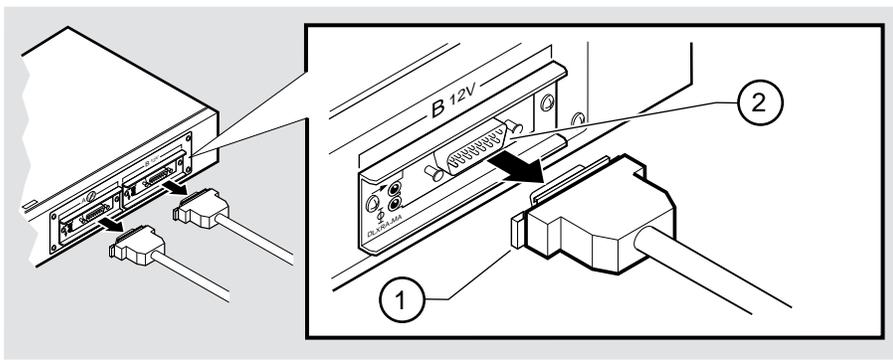
NPB-0762-96F

Step	Action
1	Slide the latch on the AUI cable **(1)** to the unlocked position.
2	Remove the AUI cable from the reverse AUI port **(2)**.

Removing Cables from the 10Base2 MM-10 Port

Complete the following steps to remove the 10Base2 cable from the 10Base2 MM-10s as shown in Figure 7-6.

Figure 7-6: Removing 10Base2 MM-10 Cable Connector

NPB-0763-96F

Step	Action
1	Turn the connector (**1**) one-quarter turn to the left until the connector unlocks.
2	Remove the 10Base2 connector from the BNC connector (**2**).

Removing Cables from the 10BaseFL MM-10 Port

Complete the following steps to remove the cables from the 10BaseFL MM-10 as shown in Figure 7-7.

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 7-7: Removing Fiber Optic MM-10 Cables
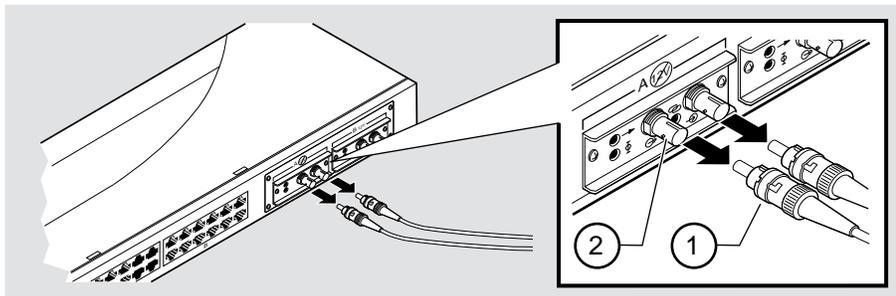
NPB-0761-96F

Step	Action
1	Turn the connector counterclockwise to loosen the connector.
2	Remove the transmit cable connector (**1**) from the transmit port (**2**) and the receive cable connector from the receive port.

NOTES

The bend radius of any fiber-optic cable is 1.5 inches (3.8 cm) or greater.
To avoid optical power loss, do not touch the fiber ends.

Removing Cables from the 10BaseT (UTP/UTP Crossover) MM-10 Port

Complete the following steps to remove the UTP cables from the 10BaseT MM-10s as shown in Figure 7-8.

Figure 7-8: Removing UTP MMI Cables

NPB-0764-96F
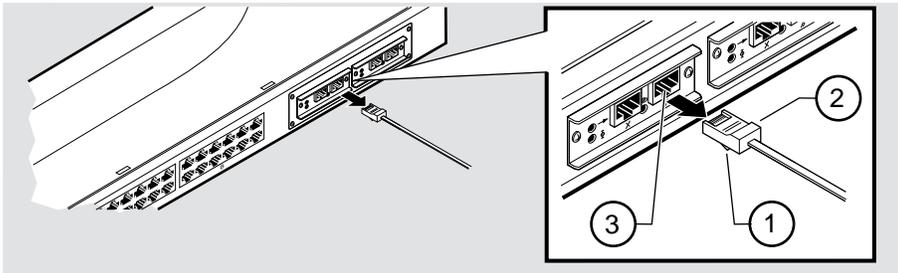
Step	Action
1	Push the release tab (**1**) on the cable plug (**2**) to free the cable connector.
2	Remove the cable connector from the port (**3**).

Removing MM-10s from the Module

The MM-10s are hot swappable, therefore you do not need to power down the module.

CAUTION

Static electricity can damage modules and electronic components. DIGITAL recommends that you use a grounded antistatic wrist strap and a grounded work surface when handling any modules.

Complete the following steps to remove MM-10s from the module as shown in Figure 7-9.

Figure 7-9: Removing MM-10 Modular Media Interface Cards
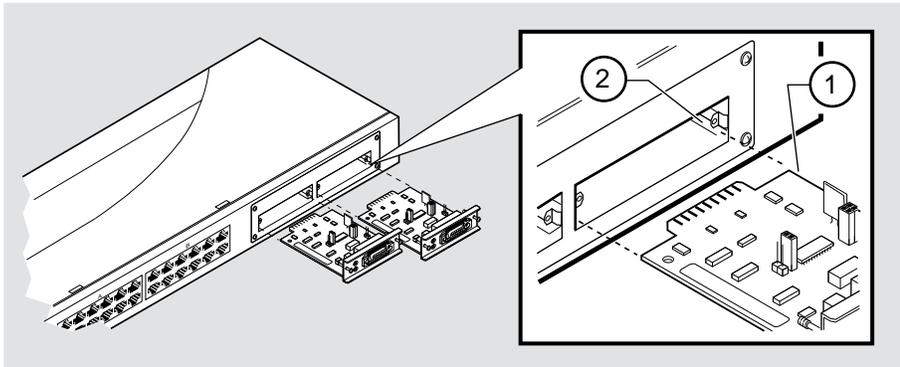
NPB-0548-96F

Step	Action
1	Loosen the captive screws from the MM-10 on the front panel of the module.
2	Carefully pull out the MM-10 (**1**) along the entire length of the card guides (**2**).

Removing the Carrier Card

Complete the following steps to remove the Carrier Card as shown in Figure 7-10.

NOTE

Before you remove the DIGITAL MultiSwitch Hub 624T Carrier Card, make sure that the module *has no power connected to it*. The Carrier Card *is not hot-swappable*.

Figure 7-10: Carrier Card Removal

NPB-0550-96F

Step	Action
1	Make sure that power to the DIGITAL MultiSwitch Hub 624T is off by unplugging the module from its DIGITAL MultiSwitch 600 System or DEChub 900 MultiSwitch.
2	Loosen the four screws.
3	Carefully pull out the DIGITAL MultiSwitch Hub 624T Carrier Card **(1)** along the entire length of the card guides **(2)**.

Removing the 10BaseT Expansion Port Group

To remove the card, complete the following steps, which are illustrated by Figure 7-11. A Phillips-head screwdriver is required.

NOTE

Before you remove the 10BaseT Expansion Port Group, make sure that the module *has no power connected to it*. The 10BaseT Expansion Port Group *is not hot-swappable*.

Figure 7-11: 12-Port Expansion Group Card Removal

NPB-0524-96F

Step	Action
1	Make sure that power to the DIGITAL MultiSwitch Hub 624T is off by unplugging the module from the DIGITAL MultiSwitch 600 System or DEChub 900 MultiSwitch.
2	Loosen the four screws.
3	Carefully pull out the 12-Port Expansion Group card (**1**) along the entire length of the card guides (**2**).

Replacing the Dust Cover on the DIGITAL MultiSwitch Hub 624T

Figure 7-12 shows dust cover location and the table describes how to replace the cover(s).

Figure 7-12: Dust Cover Replacement
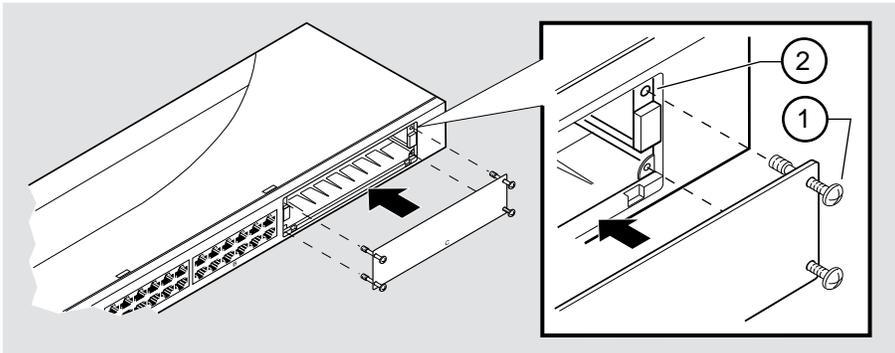
NPB-0765-96F

Step	Action
1	Align the four captive screws **(1)** with the threaded holes **(2)** in the module.
2	Tighten the captive screws.

Part II

DIGITAL MultiSwitch 600 System
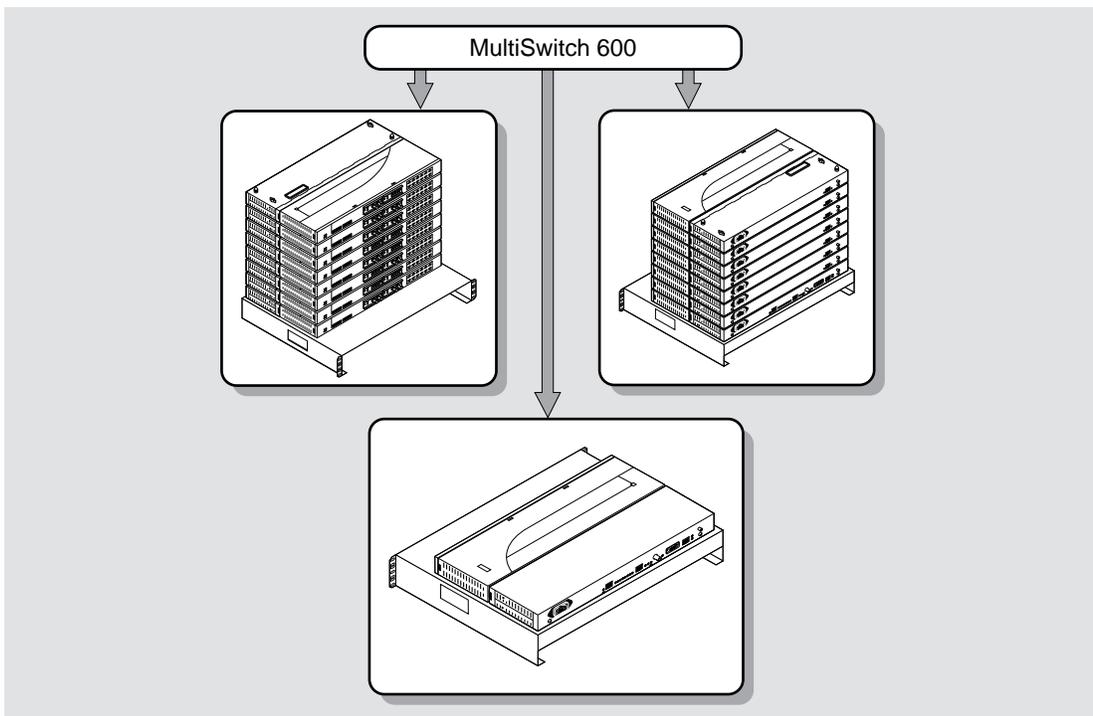
NPB-0664-96F

This illustration shows two DIGITAL MultiSwitch 600 System configurations.

Chapter 8

Stack Description

Overview

Introduction

The DIGITAL MultiSwitch 600 is a shared-to-switch workgroup system with modular components. This chapter describes the DIGITAL MultiSwitch 600 Stack Station and Stack Director, which provide power, backplane interconnect and SNMP management to a DIGITAL MultiSwitch 600 system in a stack configuration. The DIGITAL MultiSwitch 600-series functional modules (hubs and switches) which attach to the Stack Station and Stack Director, are described in the documentation that accompanies the functional module.

In This Chapter

What is the DIGITAL MultiSwitch 600 System?

The DIGITAL MultiSwitch 600 family is the first, integrated workgroup switching system for Ethernet and Fast Ethernet workgroup environments. The MultiSwitch 600 System provides scalability to increase bandwidth from shared-to-switched 10 Mb/s and 100 Mb/s modules in a scalable, integrated system, and offers customers the ability to:

- Triple the bandwidth of each group-switching hub from 10 Mb/s to an aggregate of 30 Mb/s (DIGITAL MultiSwitch Hub 624T)

- Microsegment and assign a total of 24 port-group switched LAN segments across up to 7 Ethernet backplane channels

- Build up to 8 switches and hubs in stack — up to 288 shared Ethernet ports and 208 switched Ethernet ports using a single IP address in one single management domain

- Build workgroups cost-effectively and easily with a state-of-the-art cable-free stack interconnection and port and media expansion capabilities

- Manage and monitor the stack using SNMP management and RMON via clearVISN Stack Manager or MultiChassis Manager, a single, integrated PC-based manager

- Cost-effective integration of high performance networks with the multi-technology, multi-gigabit DEChub 900 MultiSwitch

The key DIGITAL MultiSwitch 600 products include:

- DIGITAL MultiSwitch Hub 624T — 24-port group switching 10BaseT hub module

- DIGITAL MultiSwitch 612EX — 12-port 10-to-100 Mb/s Ethernet/Fast Ethernet switch module

- DIGITAL MultiSwitch 624EX — 24-port 10-to-100 Mb/s Ethernet/Fast Ethernet switch module

- DIGITAL MultiSwitch Hub 612TX — 12-port 100 Mb/s Fast Ethernet hub module

- DIGITAL MultiSwitch 600 Stack Station — power supply for MultiSwitch hub and switch modules

- DIGITAL MultiSwitch 600 Stack Director — power supply and SNMP manager for MultiSwitch 600 hub and switch modules

Built with the uniquely modular and flexible DEChub 900 MultiSwitch design, all MultiSwitch 600 products are hot-swappable, operate and are managed in both the MultiSwitch 600 System and DEChub 900 MultiSwitch.

The DIGITAL MultiSwitch 600 system is a modular stacking system for network devices. A DIGITAL MultiSwitch 600 network device consists of a DIGITAL MultiSwitch 600-series functional module (hub or switch) attached to and interconnected with a Stack Station or Stack Director.

A DIGITAL MultiSwitch 600 stack can consist of 2-8 devices (stack levels) interconnected with the cable-free Stack Interconnect Card. The Stack Interconnect Card provides the ability to create a stack backplane, which can be configured into a management channel and several internal LAN channels.

Figure 8-1 shows a DIGITAL MultiSwitch 600 stack front view **(A)** and back view **(B)**. One Stack Director **(1)** and Seven Stack Stations **(2)** are shown mounted on a mounting tray **(3)**. The DIGITAL MultiSwitch 600-series functional modules needed to create a stackable device are represented as phantom boxes **(4)** in the illustration.

The DIGITAL MultiSwitch 600 system can serve as a managed or as an unmanaged stack:

- A managed stack includes one Stack Director on the bottom of the stack and up to seven Stack Stations. The Stack Director contains the SNMP management agent for the stack and controls the stack backplane.

- An unmanaged stack can include up to eight Stack Stations without a Stack Director. There is no access to the backplane in an unmanaged stack.

DIGITAL recommends that a mounting tray be used with stacks of more than one level. The mounting tray provides stability to the stack when hot-swapping functional modules in the lower levels of the stack. The mounting tray is included with the Stack Director, or may be purchased separately. Refer to Ordering Options in Appendix D for the order part number.

What is the DIGITAL MultiSwitch 600 System?

Figure 8-1: Typical DIGITAL MultiSwitch 600 Configuration
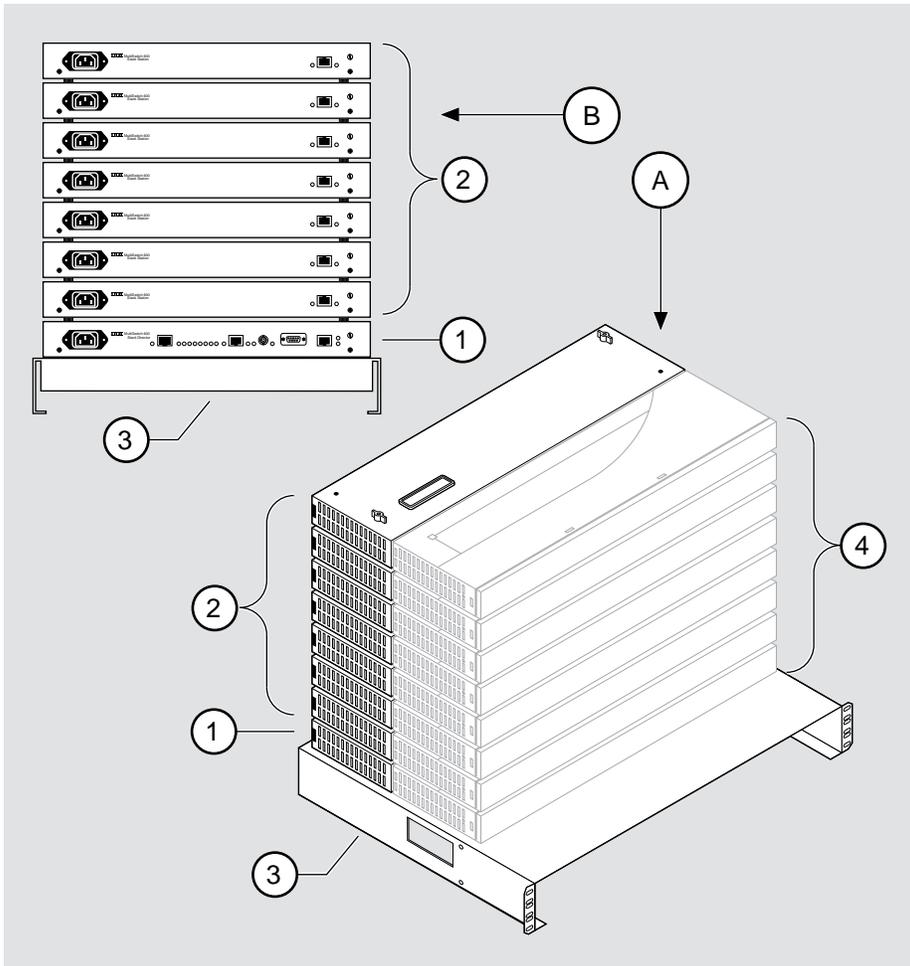
NPB-0658-96F

DIGITAL MultiSwitch 600 Features

The DIGITAL MultiSwitch 600 system includes the following features:

- Modular architecture.

- Choice of 10 Mb/s and 100 Mb/s hub and switches integrated as single SNMP management domain.

- Cable-free stack interconnect for seven internal LAN and management channels.

- An ability to create a stack of up to eight network devices.

- Functional modules are hot-swappable to ensure network uptime and facilitate network changes.

- Only one Stack Director that contains SNMP management agent with one IP address is needed to manage a stack.

- Support for four RMON groups.

- Modular Media Interface (MMI) and port expansion options, specific to the functional modules.

- Rack mountable

The following sections describe the Stack Director and the Stack Station. Functional modules are described in their associated documentation.

What is a Stack Director?

The Stack Director provides power to the attached functional module and contains the SNMP agent for a DIGITAL MultiSwitch 600 stack. The Stack Director communicates with the functional module at each level of the stack and controls the stack backplane resources. Only one Stack Director can be installed in a DIGITAL MultiSwitch 600 stack. The Stack Director must be located at the bottom of the stack.

Stack Director Features

The Stack Director includes the following features:

- A built-in SNMP Agent that manages up to eight functional modules as a single domain using a single IP address within a stack.

- Cable-free stack interconnect slot on the Stack Director.

- Manages up to seven internal Ethernet LAN channels for seven segments.

- Hot swap autosensing informs the Stack Director when a functional module is inserted or removed from the stack.

- Backplane Auto Healing restores backplane connections for a re-inserted functional module of the same type as previously removed.

- In-band management communications through a module connection or a direct connection to a UTP/ScTP 10BaseT or 10Base2 port.

- Autodetect capabilities automatically select the in-band management port.

- Out-of-band management via SLIP.

- A serial setup port to setup and configure the Stack Director and functional modules in the stack.

- Load services which allow you to upgrade firmware of functional modules in the stack using the TFTP protocol.

- Support for the BootP protocol for IP address configuration.

- LEDs for determining the status of the stack.

- Alarm and Event capability to monitor functional modules in the stack and report events to an NMS when thresholds are reached.

- Ethernet Statistics and History information (on the in-band management port) on functional modules in the stack.

- Temperature sensor and thermal shutdown protection.

- Rack mountable.

Supported MIBs

The Stack Director supports the following Management Information Bases (MIBs):

- MIB-II (RFC 1213)

- RMON Alarms and Events (RFC 1757)

- Ethernet MIB (RFC 1643)

- DIGITAL Chassis MIB

- DIGITAL Public Common MIB

- Management Agent Module Private MIB

Stack Director Front Panel

Table 8-1 describes the front panel components on the Stack Director and Figure 8-2 shows their location. For detailed information about the LEDs, refer to Appendix A.

Figure 8-2: Stack Director Front Panel Components
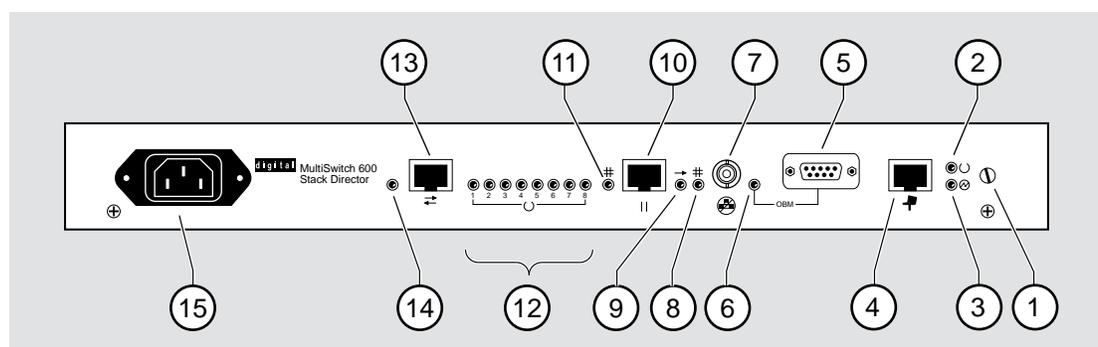
NPB-0684-96F

Table 8-1: Stack Director Front Panel Component Descriptions

Item	Icon	Name	Description
1		Slotted Thumbscrew	Locks the functional module and Stack Director together.
2		FRU OK LED	Lights when the Stack Director passed self-test.
3		Power OK LED	Lights when the Stack Director has sufficient power.
4		Setup Port	A port to connect a terminal and configure the attached functional module. Can also be used to configure other functional modules in a managed stack.
5		OBM Port	An RS-232 port for out-of-band management (OBM) communication.
6		OBM Port LED	When on, SLIP is available through this interface. When blinking, there is SLIP activity on the port.

What is a Stack Director?

Table 8-1: Stack Director Front Panel Component Descriptions

Item	Icon	Name	Description
7		10Base2 Port	A10Base2 port for connecting to the internal 10Base2 network of the DIGITAL MultiSwitch 600. This port can also be used for in-band management. This port must be externally terminated if it is not used. A T-connector can not be used on this port.
8		10Base2 Port Status LED	The port is available and can be connected to an operational LAN.
9		Network Activity LED	Indicates network traffic on the management access or the 10Base2 ports.
10		Management Access Port	A UTP/ScTP port dedicated to in-band management. This is the default port for management if connected to an active 10BaseT link.
11		Management Access Status LED	The port is available and can be connected to an operational LAN.
12		Stack Level Management LEDs	The module at this level is functional and is communicating with the Stack Director.
13		Reserved	Reserved
14		Reserved	Reserved
15		IEC Power Connector	The input connector to the unit's power supply.

Stack Director Back Panel

Table 8-2 describes the back panel components on the Stack Director and Figure 8-3 show their location. For detailed information about the LEDs, refer to Appendix A.

Figure 8-3: Stack Director Back Panel Components
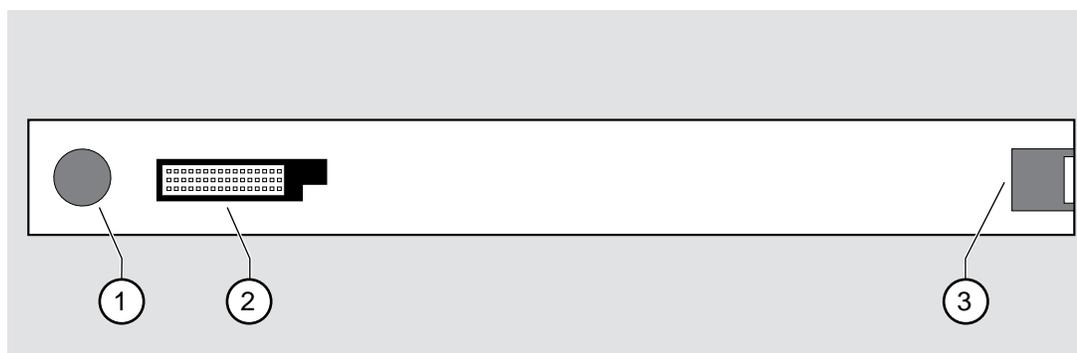
NPB-0463-96F

Table 8-2: Stack Director Rear Panel Component Descriptions

Item	Name	Description
1	Clearance Hole	Allows insertion of functional module locking tab.
2	48-pin Connector	Enables signaling between the functional module and Stack Director.
3	Locking Receptacle	Secures the functional module to the Stack Director.

What is the Stack Station?

The Stack Station provides power to the attached functional module and extends the internal management channel and LAN channels one level for a managed DIGITAL MultiSwitch 600 stack. In a managed stack an attached functional module can be managed only if a Stack Director is included at the bottom of the stack and is interconnected. Figure 8-4 and Figure 8-5 show the Stack Station Front and Back Panels.

Stack Station Features

The Stack Station includes the following features:

- Provides power to the attached functional module.

- Hot swap circuitry for functional modules.

- A serial setup port to setup and configure the functional module in an unmanaged stack.

- Stack interconnect slot on the top and bottom for cable-free stack interconnect card.

Stack Station Front Panel

Table 8-3 describes the front panel components on the Stack Station and Figure shows their location. For detailed information about the LEDs, refer to Appendix A.

Figure 8-4: Stack Station Front Panel Components
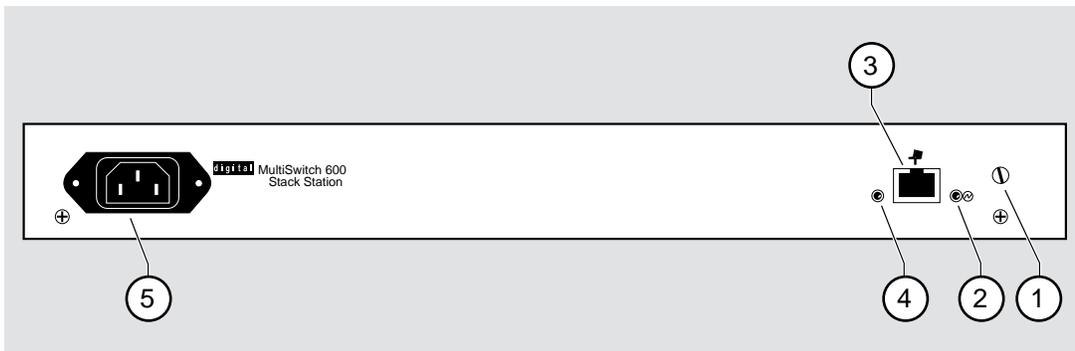
NPB-0464-96F

Table 8-3: Stack Station Front Panel Component Descriptions

Item	Icon	Name	Description
1		Slotted Thumbscrew	Locks the functional module and the Stack Station together.
2		Power OK LED	Indicates the Stack Station has sufficient power.
3		Setup Port	A port to connect a terminal and configure the attached functional module. Note: This port is only active when the stack does not contain a Stack Director.
4		Setup Port LED	Indicates the setup port is active.
5		IEC Power Connector	The input connector to the unit's power supply.

Stack Station Back Panel

Table 8-4 describes the back panel components on the Stack Station and Figure 8-5 shows their location. For detailed information about the LEDs, refer to Appendix A.

Figure 8-5: Stack Station Back Panel Components
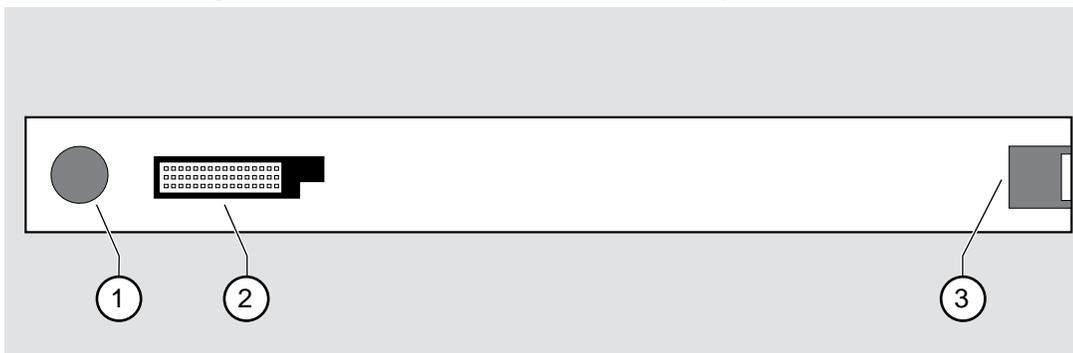
NPB-0463-96F

Table 8-4: Stack Station Back Panel Component Descriptions

Item	Name	Description
1	Clearance Hole	Allows insertion of a functional module locking tab.
2	48-pin Connector	Enables signaling between the functional module and the Stack Station.
3	Locking Receptacle	Secures the functional module to the Stack Station

Chapter 9

Assembling a Stack

Overview

Introduction

This chapter describes how to assemble a DIGITAL MultiSwitch 600 stack.

In This Chapter

Planning the Configuration

This section discusses considerations you should take into account when planning the DIGITAL MultiSwitch 600's configuration.

Planning Considerations

Keep the following in mind when planning your configuration:

- A Stack Director is required to manage a DIGITAL MultiSwitch 600 system. In a managed DIGITAL MultiSwitch 600 system, the Stack Director must be the bottom level of the stack.

- A DIGITAL MultiSwitch 600 system can have a maximum of eight DIGITAL MultiSwitch 600-series functional modules.

- A stack can contain any combination of DIGITAL MultiSwitch 600-series functional modules (Hubs and Switches).

- DIGITAL MultiSwitch 600-series functional modules are hot-swappable in the DIGITAL MultiSwitch 600 system.

- DIGITAL recommends that all configurations use the mounting tray for stability. The tray is supplied with the Stack Director. It can also be ordered separately. Refer to Appendix D for the order part number.

- The mounting tray is required for rack mounting.

- When you are using the mounting tray, the first step in building a stack is to attach the Stack Director or a Stack Station to the mounting tray.

- Install the modular media interfaces (MMI) in the DIGITAL MultiSwitch 600-series functional modules before you install the functional modules in the DIGITAL MultiSwitch 600 Stack.

- There are three types of configurations: Standard 19-inch rack mount (Figure 9-3), relay rack mount (Figure 9-4), and table top (Figure 9-10).

Cable Restrictions

The 10Base2 port on the Stack Director can be used to extend the internal 10Base2 LAN channel of the MultiSwitch 600 system. An external 10Base2 segment attached to the 10Base2 port can be a maximum of 120 meters with a maximum 15 stations or nodes attached. A T-connector is not allowed on the Stack Director's 10Base2 port. If you want to connect two MultiSwitch 600 systems together with a 10Base2 segment, they must be at each end of the segment. For example, you can use this configuration:

stack — node — node— node — stack

but you cannot use this configuration:

stack — node — node— stack — node

Because each MultiSwitch 600 stack director is the electrical equivalent of 65 meters of cable, the 10Base2 cable between the two MultiSwitch 600 systems can not be greater that 55 meters.

CAUTION

Always make sure this unit is adequately grounded. Do not connect more than five Stack Stations into a single power strip unless the power strip is protected by a GFCI (Ground Fault Circuit Interrupt) device.

Building a DIGITAL MultiSwitch 600 Stack

To build a managed stack, complete the tasks in this section. You will need Phillips-head and flat-blade screwdrivers for the installation.

Task 1: Securing a Stack Director or Stack Station to Mounting Tray

DIGITAL recommends that a mounting tray be used with stacks of more than one level. The mounting tray provides stability to the stack when hot swapping functional modules in the lower levels. This tray is supplied with the Stack Director and can be ordered separately. Refer to Appendix E for the part number.

NOTE

The Stack Director must be at the bottom of the stack (on the mounting tray) for management. If you are building an unmanaged stack, install a Stack Station on the mounting tray.

CAUTION

Static electricity can damage modules and electronic components. It is recommended that you use a grounded antistatic wrist strap and a grounded work surface when handling any circuit cards.

Securing a Stack Director to Mounting Tray

To attach a Stack Director to the tray, perform the procedure in the following table. Figure 9-1 shows installation details.

Figure 9-1: Stack Director Mounting Tray Attachment

NPB-0739-96F

Step	Action
1	Align the holes on the bottom of the Stack Director with the mounting holes on top of the tray (Figure 9-1).
2	Mounting holes: **For desk top configuration**, use any one of the three sets of two mounting holes **(4), (5),** and **(6)** to mount the Stack Director on the mounting tray. **For 19" rack mount configuration (for hot-swapping modules),** use the set of holes closest to the edge of the tray **(6).** **For relay rack configuration,** use the mounting holes farthest from the edge of the tray **(4)**.Attach mounting tray to relay rack using two front angle brackets **(3)** and using two # 6 mounting screws **(1)**.
3	Secure the Stack Director onto the tray using the two 6-32 machine screws **(2)**.

Securing a Stack Station to Mounting Tray

To attach a Stack Station to the tray, perform the procedure in the following table. Figure 9-2 shows installation details.

Figure 9-2: Stack Station Mounting Tray Attachment

NPB-0741-96F

Step	Action
1	Install the mounting plugs to the bottom of the Stack Station (**7**).
2	Align the holes on the bottom of the Stack Station with the mounting holes on top of the tray (Figure 9-2).
3	Mounting holes:
	For desk top configuration, use any one of the three sets of two mounting holes (**4**), (**5**), and (**6**) to mount the Stack Station on the mounting tray.
	For 19" rack mount configuration (for hot-swapping modules), use the set of holes closest to the edge of the tray (**6**).
	For relay rack configuration, use the mounting holes farthest from the edge of the tray (**4**). Attach mounting tray to relay rack using two front angle brackets (**3**) and using two # 6 mounting screws (**1**).
4	Secure the Stack Station onto the tray using the two 6-32 machine screws (**2**).

Task 2: Securing the Mounting Tray to the Rack Mount

Figure 9-3 shows a standard 19-inch rack mount configuration and Figure 9-4 shows a relay rack mount configuration. Tables following figures describe the procedures.

Figure 9-3: Standard 19" Rack Mount Configuration
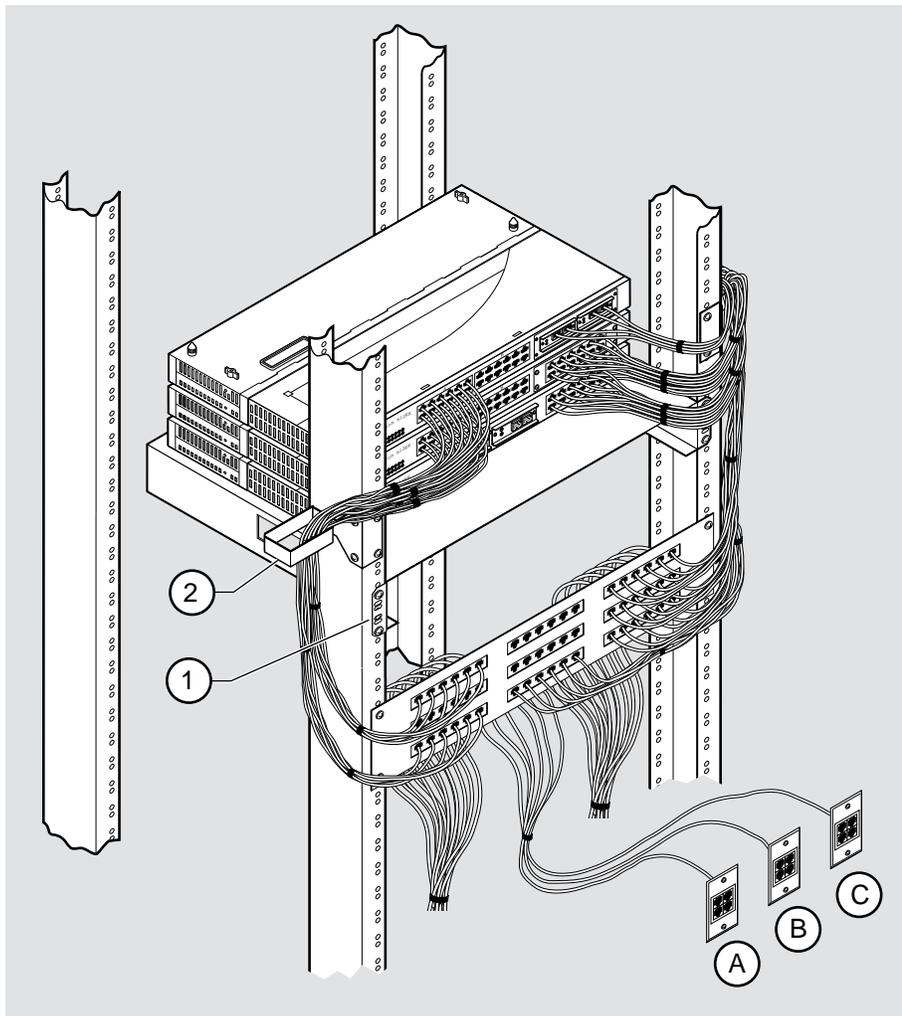
NPB-0740-96F

Step	Action
1	Secure the mounting flange **(1)** on the tray to the mounting rails of the standard 19" rack using the mounting screws.
2	Attach the cable harness bracket **(2)** and office attachment connectors **A, B and C**.

Figure 9-4: Relay Rack Mount Configuration

NPB-0725-96F
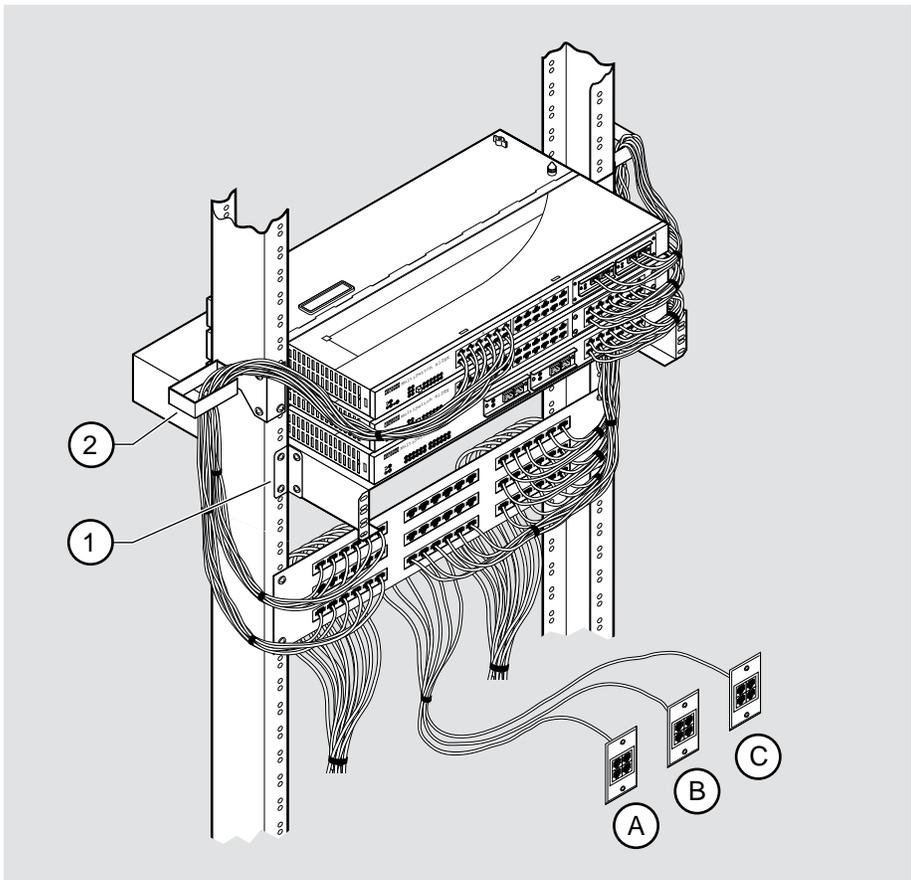
Step	Action
1	Attach the mounting tray to the rack **(1)** using the four 10-32 screws and U-nuts (if needed).
2	Attach the cable harness bracket (see Figure 9-4) **(2)** and office attachment connectors **A, B and C**.

Task 3: Inserting the Stack Interconnect Card and Functional Module

A Stack Interconnect Card is located in each box that contains a Stack Director or a Stack Station. To insert the Stack Interconnect Card, perform the following procedure. Figure 9-5 shows installation details.

Figure 9-5: Stack Interconnect Card Attachment

NPB-0665-96F

Step	Action
1	Remove the dust cap (**1**) from the vertical connector on the Stack Director.
2	Holding the Stack Interconnect Card by its sides (**2**), place it into the vertical connector.
	Note: The Stack Interconnect Card is notched so that it will be inserted into the vertical connector properly. Align the notch in the card with the corresponding key in the connector which is identified by the line next to the connector slot.
3	Press down on the Stack Interconnect Card until it is fully seated being careful not to damage the strip metal gaskets (copper fingerstocks).
4	Insert and tighten wing nuts (**3**). These are placed at offset locations indicated by the wing guide symbol. When fully seated, the wing nuts must be within wing guides.
5	Install pylons (**4**) if they are not already installed. Pylons are normally installed in the factory.
6	Attach a functional module (**5**) to the Stack Director (See appropriate functional module Installation and Configuration manual for details).

Task 4: Attaching the Next Level in the Stack

To remove the mounting plugs, perform the following step. See Figure 9-6.

Figure 9-6: Mounting Plug Location
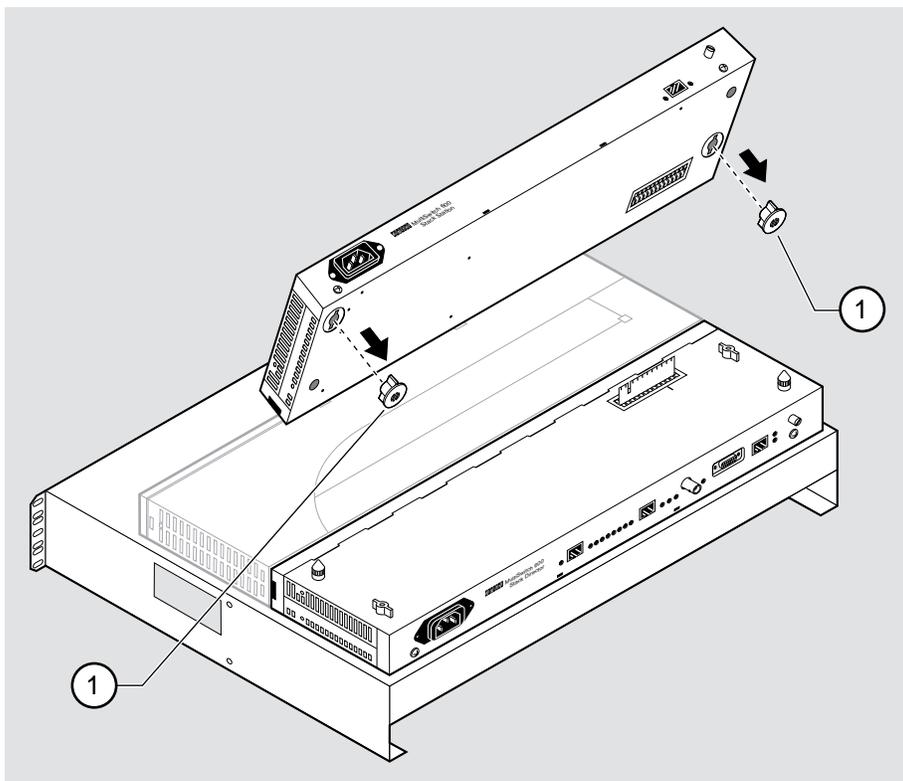
NPB-0734-96F

Step	Action
1	Prior to seating the next level's Stack Station on the previous level, remove the mounting plugs **(1)**, if present (Figure 9-6).

To add a second level to a stack, perform the following steps. Figure 9-7 illustrates installation details.

Figure 9-7: Next Stack Station Attachment
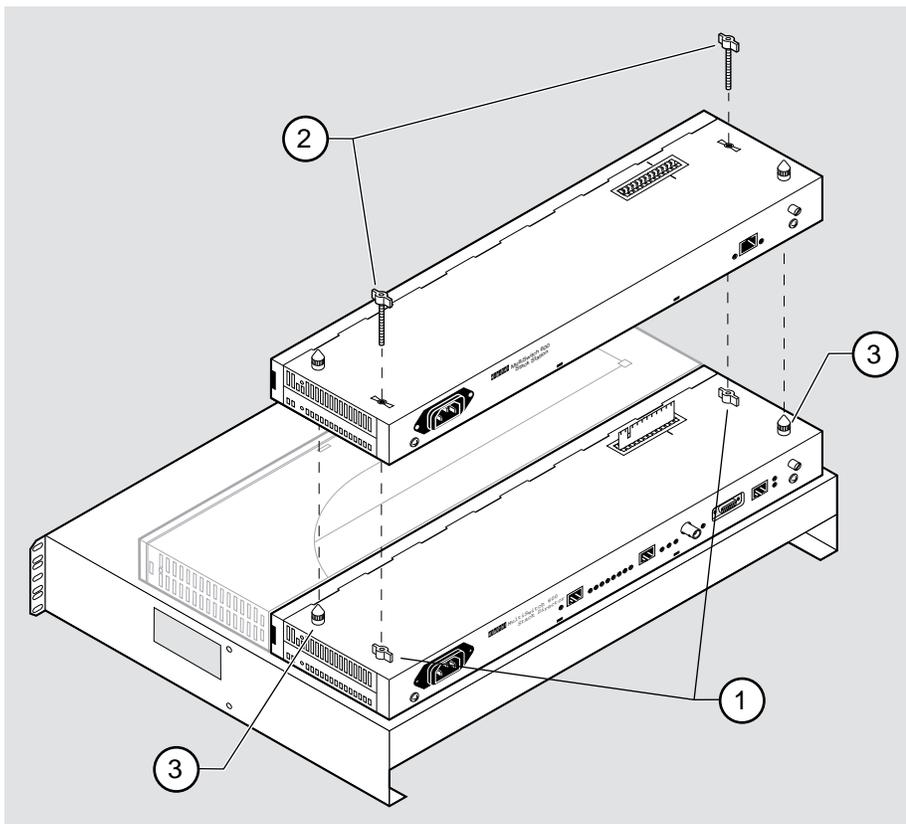
NPB-0660-96F

Step	Action
1	On the previously installed level, align the wings on the wing nuts **(1)** within the wing guide symbol on the Stack Station or the Stack Director (See Figure 9-5 for wing guide symbol location.)
2	Align the alignment pylons **(3)**.
3	Press down on the corners of the Stack Station until it snaps into place.
4	Insert and finger tighten two wing nuts **(2)** to the Stack Station. Align the wings on the wing nuts within the wing guide on the Stack Station.
5	Attach a functional module to the Stack Station (See appropriate functional module Installation and Configuration manual).
6	To continue adding levels to the stack, repeat steps 1 through 5 of this task.
	Note: The Stack Station at the top of the stack should have the dust cap installed on its vertical slot connector.

Task 5: Cabling the Stack Director and Stack Station

Figure 9-8 shows the Stack Director interface ports.

Figure 9-8: Stack Director Port Connections
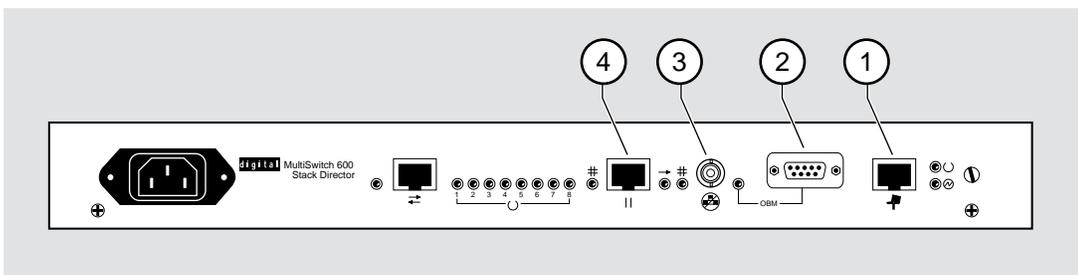
NPB-0512-96F

The setup port (**1**) on the Stack Director is used to set initial configuration parameters, including the assignment of an IP address for the stack. It is also used to perform basic management operations such as: resetting the functional module, upgrading the functional module and redirecting to another functional module for setup operations.

Use the OBM port (**2**) on the Stack Director for out-of-band management.

Use the 10Base2 port (**3**) on the Stack Director to extend the internal 10Base2 LAN channel of the MultiSwitch 600 system. The 10Base2 cable must be plugged directly into the Stack Director BNC 10Base2 port connector. A T-connector can not be used.

If you do not extend the internal 10Base2 LAN channel, you must terminate the channel (**3**) using an H8225 50-ohm terminator supplied.

Use the management access port (**4**) on the Stack Director to redirect the SNMP management agent from the internal 10Base2 assignment to this port. A network management station can be connected directly to this port or this port can be cabled to another network segment.

NOTE

If a 10BaseT cable is attached to the management access port, and a 10Base2 cable is attached to the 10Base2 port, the 10BaseT port will be utilized by the Stack Director and the 10Base2 port will be ignored. However, data is still passed on the 10Base2 segment for use by other stations.

Figure 9-9 shows the Stack Station interface port.

Figure 9-9: Stack Station Port Connection
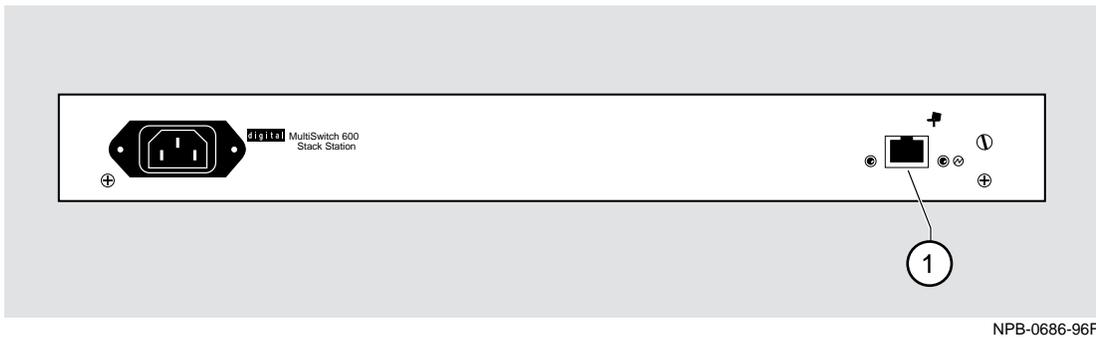
NPB-0686-96F

The setup port on the Stack Station **(1)** is used to set initial configuration parameters in an unmanaged stack.

Refer to Appendix B for the pin assignments for the ports, cables and adapters.

Setup Procedures

To connect and setup the Stack Director and Stack Station ports, follow the procedure in the following table.

Step	Action
1	Each setup port uses a standard 8-pin MJ connector. To connect a setup device (terminal or PC) to the setup port, use the following cables and adapters:

If the device connecting to the setup port is:	Use this cable	With this adapter
A PC with a 9-pin D-Sub communications port	BN24H-*xx*[1]	H8571-J
A terminal with a 25-pin D-Sub connector	BN24H-*xx*[1]	H8575-A
A terminal with a 6-pin MMJ connector	BN24H-*xx*-X [1, 2]	Not required

[1] *xx* indicates cable length in meters.

[2] this is a crosswired cable.

Step	Action
2	Configure the setup port device (terminal or PC) as follows: • 9600 baud • 8 bits • no parity • 1 stop bit
3	Connect a modem or access service to the Stack Director OBM port using a 9-pin D-sub connector. See Appendix B for pin assignments.
4	Connect the Stack Director 10Base2 port to a 10Base2 cable with a BNC connector. If you are not using this port, you MUST attach a 50-ohm terminator (H8225). See Appendix B for pin assignments.
5	Connect the Stack Director Management Access port using a straight-through cable with an 8-pin MJ port connector. See Appendix B for pin assignments.

Task 6: Connecting Power

The Stack Director and each Stack Station has its own power supply. This requires the connection of an AC power line cord to each IEC power connector.

CAUTION

Always make sure this unit is adequately grounded. Do not connect more than five Stack Stations into a single power strip unless the power strip is protected by a GFCI (Ground Fault Circuit Interrupt) device.

To connect the power supplies, follow the procedure in the following table. Figure 9-10 shows their location.

Figure 9-10: IEC Power Connector Locations

NPB-0662-96F

Step	Action
1	Connect the supplied AC line cord to the IEC power connector (**1**) on each Stack Station. Then, connect each AC line cord into an AC outlet or power strip.
	The following states occur:
	The Stack Station Power OK LED should be on. Refer to Stack Station Front Panel on page 8-13.
2	Connect an AC line cord into the IEC power connector of the Stack Director (at the bottom of the stack) and into an AC outlet or power strip.
	The following states occur:
	The Stack Director Power OK LED should be on. Refer to Stack Director Front Panel on page 8-9.

Task 7: Adding a Stack Level after Initial Installation

To add a level to a stack after the initial installation, perform the procedure in the following table. Figure 9-6 and Figure 9-7 illustrate installation details.

NOTE

DIGITAL recommends that a stack level not be removed or added to a live stack. If you must remove or add a stack level, the stack must be powered down.

Step	Action
1	If available, use clearVISN Recovery Manager to backup current settings for each device (including the Stack Director) on the stack.
2	Remove power from every level. Refer to Chapter 11 Task 1: Removing Power Cords and Cables.
3	Remove the dust cap from the vertical connector on the top level Stack Station or Stack Director.
4	Perform steps 1 through 5 of Task 4: Attaching the Next Level in the Stack Note: Inserting a stack interconnect card in a live stack will disrupt the backplane configuration. Performing step 8 re-establishes the configuration.
5	Repeat steps 3 and 4 as needed.
6	Replace the dust cap in the vertical connector slot on the top level remaining in the stack.
7	Perform Task 5: Cabling the Stack Director and Stack Station and Task 6: Connecting Power.

Step	Action
8	If available, use clearVISN Recovery Manager to restore settings for each device on the stack that may have lost its settings.
	Functional modules that are in the same slot when the stack is powered up as they were when the stack was powered down will be automatically reconfigured with their previous backplane settings by the Stack Director.
	Functional modules that are not in the same slot, but are the same type (that is DIGITAL MultiSwitch 612EX, DIGITAL MultiSwitch Hub 624T, etc.) as the module that was previously in the slot, will be reconfigured with the backplane settings used by the previous module. However, Port Switch group configuration is saved in the non-volatile memory of the DIGITAL MultiSwitch Hub 624T, and thus stays with the module, not the slot.
	For example, if you have a stack with slot 2 and slot 3 each containing a DIGITAL MultiSwitch Hub 624T, and the slot 2 level is removed and the DIGITAL MultiSwitch Hub 624T formerly in slot 3 is now in slot 2, it will be reconfigured with its own Port Switch groups but with the backplane settings previously used for slot 2.
	Functional modules that are not the same type as the module previously in the slot will not be automatically configured.

Chapter 10

Managing a Stack

Overview

Introduction

This chapter describes how to manage the DIGITAL MultiSwitch 600 system.

In This Chapter

Topic	Page
In-Band and Out-of-Band Management	10-2
Connecting to a Network Management Station	10-3
SNMP Management Applications	10-4
Backplane Auto Healing	10-5
Installation Menu Introduction	10-6
Installation Menu Description	10-7

In-Band and Out-of-Band Management

The DIGITAL MultiSwitch 600 system can be managed through in-band management or out-of-band SNMP management.

To utilize SNMP management for a single device or for a stack, you need one Stack Director configured with an in-band or out-of-band IP address (or both).

Stacks may also be unmanaged. When used as unmanaged single devices or unmanaged stacks, there is no connection available to the stack backplane. The interconnect riser card may or may not be used, but it has no functional benefit in the unmanaged configuration.

Some control parameters are available to the network manager, even on unmanaged devices. These parameters can be accessed via a local connection to the device's setup port.

Connecting to a Network Management Station

The Stack Director communicates with a network management station (NMS) via its SNMP management agent. The channel between the Stack Director's SNMP management and the NMS is defined by a combination of the user-defined IP address and the internal MAC (media access control) facility.

The NMS can access the MAC in the following ways:

- Through the 10Base2 LAN channel. The Stack Director assigns the stack's 10Base2 LAN channel to the MAC as its default connection. The NMS must reside on the Ethernet LAN segment that has access to this 10Base2 LAN channel. Or, the NMS can be attached to a switch or hub port that has access to the 10Base2 channel; in this case the NMS must have switched access to the 10Base2 channel.

- Connect the NMS directly to the BNC 10Base2 port on the rear of the Stack Director.

- Connect the NMS directly to the 8-pin MJ 10BaseT management access port on the rear of the Stack Director. A valid connection to the management access port automatically reassigns the internal MAC to this port.

- Connect an UTP cable to the management access port and a LAN segment where the NMS resides. A valid connection to the management access port automatically reassigns the internal MAC to this port.

    Note that using the UTP management access port precludes the use of the 10Base2 LAN segment for management traffic. However, the 10Base2 LAN segment is still active for use by other stations.

- For out-of-band management, use the 9-pin OBM port on the rear of the Stack Director to connect to the NMS. The OBM port is a serial communications port that uses SLIP to communicate with an NMS.

SNMP Management Applications

Any standards-based SNMP management application can manage the DIGITAL MultiSwitch 600 system. However, to gain full benefit from the internal stack backplane, you should use the clearVISN Stack Manager or MultiChassis Manager applications. These applications provide an intuitive graphical user interface (GUI), which enables the full benefit of point and click management.

Other benefits of SNMP management include:

- Assignment of switch and hub ports to the stack backplane.

- Definition of up to seven 10 Mb/s Ethernet backplane channels.

- Auto-restoration of backplane connections in the event a functional module is hot-swapped and replaced with the same module or a same type module.

The Stack Director's setup port enables configuration, reset, and downline upgrade features from a locally attached terminal or terminal emulator. Except for the assignment of an IP address, the functions are also available through clearVISN applications.

The Stack Director's setup port menus are described in the following section.

Backplane Auto Healing

Part of the installation process for a managed DIGITAL MultiSwitch 600 system may be to connect the functional module ports to the internal Ethernet LAN channels. This is generally done to create individual shared and switched Ethernet segments conforming to the desired network topology. clearVISN Multichassis Manager (MCM) or clearVISN Stack Manager is used to set up the initial connections after the DIGITAL MultiSwitch 600 system is built. Swapping or removing functional modules in a DIGITAL MultiSwitch 600 stack is sensed by the Stack Director to update the stack's internal Ethernet LAN channel connections. Backplane Auto Healing must be enabled using clearVISN Multichassis Manager or Stack Manager for this feature to be activated. This feature allows you to remove, replace and/or swap functional modules of the same type without having to re-configure the internal LAN connections with clearVISN.

When a functional module is removed from a stack level, any connections to the internal Ethernet LAN channels are deleted. However, with Backplane Auto Healing enabled, connections are restored when a functional module of the same type is re-inserted in that level. If another type of functional module is inserted into the stack level the connections are not restored and are permanently deleted. You must then use clearVISN Multichassis Manager or Stack Manager to make the desired connections.

Installation Menu Introduction

Using the Setup Ports

The setup ports on the Stack Director and Stack Stations allow you to set parameters when the DIGITAL MultiSwitch 600 system is initially installed. Once the system is configured, you can perform routine network management tasks over the network and the setup port is no longer needed.

Modes of Operation

The hub setup port supports the following modes:

- Installation menu

- Redirect

- Event display

These modes assume only ANSI/ASCII or PC-based terminal interface. Cursor control, screen management escape sequences, or flow control are not supported. The setup console may be attached to any ASCII device, including hardcopy terminals and printers.

Connecting a Terminal to the Setup Port

To connect a terminal to the setup port, ensure that the following terminal setup parameters are in effect (see Table 9-1).

Table 10-1: Terminal Setup Parameters

Parameter	Setting
Transmit speed	9600 baud
Character format	8 bits, no parity
Stop bits	1

Installation Menu Description

The Digital MS 600 Stack Director INSTALLATION MENU provides you with 9 menu options. Some of these options contain additional submenu options.When the MultiSwitch 600 setup port is in default mode, the Digital MS 600 Stack Director INSTALLATION MENU appears. The user response for all menu selections is shown in boldface type.

The format for an SNMP 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 (.).

You can exit from any of the menu options and return to the Digital MS 600 Stack Director INSTALLATION MENU by pressing <Ctrl/C> on the setup port device.

Menu Options

NOTE

The `Digital MS 600 Stack Director INSTALLATION MENU`
screen displays illustrated in this manual may vary slightly from the actual
screen displays on your setup port device.

```
 Digital MS 600 Stack Director
==============================================================

          Digital MS 600 Stack Director INSTALLATION MENU

[1]    Restart with Factory Defaults
[2]    Restart 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:  n  <Return>
```

[1] Restart with Factory Defaults

This option reboots the DIGITAL MultiSwitch 600 Stack Director, initiating self-tests and causing its configured NVRAM parameters to be initialized to factory default values. All local nonvolatile settings except the Stack Director Serial Number, will be lost. To retain parameters, use option [2] Restart with Current Settings.

CAUTION

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

At the completion of the self-test, the DIGITAL MultiSwitch 600 Status Display displays the following message:

```
Selftest Complete
Start Main Firmware
```

Within a few seconds, the DIGITAL MultiSwitch 600 installation menu appears on your setup port screen. The following example shows the dialogue associated with this option:

```
                    Enter selection: 1
 Digital MS 600 Stack Director
 ============================================================

               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] Restart with Current Settings

This option reboots the DIGITAL MultiSwitch 600 Stack Director, but leaves the systems's configured NVRAM parameters at their current values.

Select Y to initiate the self-test. At the completion of self-test, the system's Status Display shows the following message:

```
Selftest Complete
Start Main Firmware
```

Within a few seconds, the Digital MS 600 Stack Director INSTALLATION MENU appears on your setup port screen.

The following example shows the dialogue associated with this option:

```
                    Enter selection:  2

Digital MS 600 Stack Director
=============================================================
            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...
```

[3] Show Current Settings

This option shows you the current settings of the Stack Director. If the DIGITAL
MultiSwitch 600 system is being configured for the first time, some fields are blank.

clearVISN MultiChassis Manager or another SNMP-based management application
can be used to set or modify these values.

The following example shows the dialogue associated with this option:

```
                       Enter selection : 3
Digital MS 600 Stack Director
======================================================================
Stack Director,Digital MS 600 Stack Director, HW=F,RO=V00.07,SW=V1.0.0
SysUpTime                                : 11 days 18:52:25   100 resets
SNMP Read/Write Community                : public
SNMP Trap Addresses                      : None Configured
Status of Last Downline Upgrade          :


Out-of-Band (OBM) Management RTS         : Disabled
BootP                                    : Disabled


Interface      IP Address    Subnet Mask   Def.Gateway   Other Info
---------      ----------    -----------   -----------   ----------
OBM Port       16.20.156.20  255.255.0.0                 Speed 9600 bps

EthernetPort   16.20.156.26  255.255.0.0   16.20.156.56  Active

======================================================================
              ...Press Return Key to Continue...

Digital MS 600 Stack Director
======================================================================
Hub Name                                 : Digital MS 600 Stack Director

Hub Serial Number                        :

Hub Contact                              :

======================================================================
Slot1, MS Hub 624T                 Status : up
Slot2, Empty
======================================================================
              ...Press Return Key to Continue...
```

[4] Configure IP

The Configure IP option provides you with five IP configuration selections.

IP Configure Selections

The following example shows the six configuration selections associated with this option:

```
                    Enter selection: 4
        Digital MS 600 Stack Director
        =======================================================
                      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: 4
```

The following pages describe the IP Configuration menu selections.

Topic	Page
[1] Set SNMP Read/Write Community	10-13
[2] Add SNMP Trap Addresses	10-14
[3] Delete SNMP Trap Addresses	10-15
[4] Set In-Band Interface IP Address	10-16
[5] Set Out-of-Band Interface IP Address	10-17
[6] Enable/Disable BootP	10-18

[1] Set SNMP Read/Write Community

This option prompts you to enter the SNMP read/write community name.

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

The following example shows the dialogue associated with this option.

```
                    Enter selection : 1

   Digital MS 600 Stack Director
 =================================================================
               SET SNMP READ/WRITE COMMUNITY

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

         SNMP Read/Write community string set.

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

NOTE

While a 31-character string is allowed, it is strongly recommended that you enter a maximum of 29 characters, because the Stack Director appends two characters to the string (a dash and a slot number) when passing SNMP management command to a module. The full string cannot exceed 31 characters.

---

[2] Add SNMP Trap Addresses

This option prompts you to enter IP addresses to which SNMP traps will be sent from the DIGITAL MultiSwitch 600 system. SNMP-managed devices are able to send trap messages to network management stations. You configure the IP addresses of NMS "trap sinks" that are to receive the trap messages. (For more information on traps, refer to RFC 1215.)

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

The following example shows the dialogue associated with this option.

```
                    Enter selection : 2

 Digital MS 600 Stack Director
 ================================================================
                   ADD SNMP TRAP ADDRESSES

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

                   example: 16.20.40.156

 ================================================================
                Enter Trap addresses [ ]:  16.20.40.156

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

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

[3] Delete SNMP Trap Addresses

This option prompts you to select SNMP trap addresses and delete them, one at a time, from the community trap address table.

The following example shows the dialogue associated with this option.

```
=================================================================
                    Enter selection : 3
Digital MS 600 Stack Director
=================================================================

                 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: 16.20.216.81
Enter a Trap address [ ] : 16.20.216.81:
Trap address deleted. Enter a Trap Address [] : <Return>
Press Return for IP Configuration Menu...
```

[4] Set In-Band Interface IP Address

This option prompts you for a slot number and an IP address for in-band configuration. If an IP address was previously configured for a slot, the screen displays an in-band IP address.

To remove an IP address, enter 0 in the appropriate address field.

The factory default of this menu option deletes all the in-band IP addresses.

The following example shows the dialogue associated with this option.

```
===========================================================
                     Enter selection: 4
 Digital MS 600 Stack Director
===========================================================
        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 address, enter 0 in the appropriate address
 field.
 Interface   IP Address  Subnet Mask  Def.Gateway Other Info
 OBM Port                                    Speed 38400 bps
 EthernetPort                             08-00-2B-B1-4D-C7
 ======================================================
 Enter the IP address [ ]: 16.20.156.54 <Return>

 Enter the Subnet Mask [ ]: 255.255.255.0 <Return>

 Enter the Default Gateway [ ]: <Return>

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

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

This option prompts you for an IP address for out-of-band configuration. If an IP address was previously configured, the screen displays an out-of-band (OBM) IP address.

To remove an OBM IP address, enter 0 in the appropriate address field.

The OBM feature allows you to manage your DIGITAL MultiSwitch 600 system through the OBM port as an alternative to normal in-band management. To enable out-of-band management, assign an OBM IP address and select an OBM port speed from the Digital MS 600 Stack Director INSTALLATION MENU.

The factory default of this menu option deletes the out-of-band IP address.

The following example shows the dialogue associated with this option.

```
                    Enter selection: 5
Digital MS 600 Stack Director
==============================================================
            OUT-OF-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 address, enter 0 in the appropriate address
field.
Interface IP Address Subnet Mask Def.Gateway Other Info

OBM Port                                 Speed 38400 bps
Ethernet Port                            08-00-2B-B1-4D-C7
==============================================================
      Enter the IP address [ ]: 16.20.54.156 <Return>
      Enter the Subnet Mask [ ]: 255.0.0.0 <Return>

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

[4] Configure IP

[6] Enable/Disable BootP

This option allows you to enable or disable the BootP IP bootstrap protocol. The
following example shows the dialogue associated with this option.

```
                        Enter selection : 6

   Digital MS 600 Stack Director
 ================================================================
                    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]
```

[5] Dump Error Log

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

The following example shows the dialogue associated with this option.

```
                     Enter selection : 5
Digital MS 600 Stack Director
========================================================
                      DUMP ERROR LOG
                  Current reset count: 115
================================================================
       Entry 49
.      Time Stamp 0 46235
       Reset Count 102
       Firmware Rev = T1.0.26
 Dump another entry [Y]/N? Return
       Entry 48
       Time Stamp 0 0
       Reset Count 98
       SW V4.2 -> V5.0 ; Config retained.
 Dump another entry [Y]/N? Return
 ==============================================================
 No more Error Log entries.
              Press Return for Main Menu...
```

[6] Downline Upgrade

This option allows you to upgrade firmware for the Hub Manager and network module in nonvolatile Flash memory.

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.

Approximate Downline Upgrade Completion Time

The downline upgrade process normally runs for approximately 4 minutes to completion. However, the entire process could take as long as 10 minutes to complete when network traffic is heavy.

Initial Setup Screen

When you select the [6] Downline Upgrade option from the Digital MS
600 Stack Director INSTALLATION MENU, the initial setup screen display
appears. This screen identifies the option and alerts you to be sure that the power to the
device is not interrupted during the downline load.

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

Digital MS 600 Stack Director
==================================================================
                      DOWNLINE UPGRADE
    This process upgrades the specified module'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      *

  *  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...
```

Selecting the Level to be Upgraded

The Stack Director prompts you for the level to which the upgrade will be downloaded.
The default is Slot 9 (the Stack Director).

```
    Enter the level to be upgraded [9] (Stack Director):
```

Enter the level number of the device to be upgraded or accept the default and press
<Return>.

Entering the Load File Name

The Stack Director prompts you for the load file name.

```
Enter the Load Filename [ ]  :
```

Enter the loadfile name using the following guidelines and press <Return>:

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

Load Host IP Address

The Stack Director prompts you for the Load Host IP Address. This is the IP address of the host from which the firmware upgrade will be downloaded.

```
Enter the Load Host IP Address [ }:.
```

Enter the address and press <Return>.

Choosing a Network Interface

If there is only one network interface for the Stack Director to choose from, the firmware upgrade download processing begins. Skip to the next section (Download Processing Stages) for a description of the messages that appear during the firmware upgrade download processing.

When both in-band and out-of-band IP addresses are assigned, you must choose from the multiple network interfaces that are available.

When more than one IP address (therefore, more than one network interface) is present, you are prompted to choose a network interface to use for the load request.

```
Load will be initiated over the Ethernet Port network interface.
Would you like to use a different interface?  Y/[N] :
```

If you choose the default [N], the setup screen displays the following message:

```
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]....
```

Pressing <Return> initiates the load over the in-band network interface.

If you choose **Y** at the screen prompt, the setup screen displays the following dialogue:

```
Interface          Description
----------         --------------
   1                  OBM Port
   2                  Ethernet
Enter the network interface to be used [2]:
```

Select the desired network interface, then press <Return>. The setup screen displays the following message:

```
...Press Return Key to Start Load [ctrl/c to Abort] ...
```

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

Pressing <Return> initiates the load over the selected network interface.

NOTE

The console will be disabled during downline load of the Stack Director.

TFTP Load Host and Image File Example

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

```
dlssm100.bin and 16.20.54.155
```

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

Download Processing Stages

The Download process consists of four stages:

Stage	Description
1	Transferring the image to the module's temporary storage buffer
2	Verifying the image
3	Writing the new image into nonvolatile flash memory
4	Module reset and self-test

Table 10-2 explains what happens during each stage of the download process.

Table 10-2: Download Process Description

Stage	Description
1	**The DLU Process transports the new firmware image across the network from the TFTP load host and places it into a temporary storage buffer.** After you initiate the process, the setup port screen displays the following message followed by a series of dots (. . . . . . .), indicating the downline upgrade is in progress: ``` DLU process started! .... ``` This screen is seen only when downloading a functional module in a stack.

Stage	Description
2	**The module verifies that the firmware image is correct. This stage normally takes 10 seconds to complete.**
	When the TFTP load transfer is complete and the TFTP image is verified, the device becomes nonfunctional, and the flash load process begins. (The flash load process can take up to 10 minutes to complete.)
	When the TFTP load transfer is complete, the Stack Director verifies the TFTP image.
3	**The DLU process transfers the new image from a temporary storage buffer to the nonvolatile flash memory, overwriting the old image.**
	After the Stack Director verifies the image, it writes the image into flash memory.
4	**The Stack Director resets, runs self-test, and then begins executing the new firmware image.**
	After the Stack Director stores the image into flash memory, it boots the new image.
	After the Stack Director completes booting the new image, it may need to reset the configuration settings.
	After the Stack Director resets the configuration, it initiates self-test. When self-test completes it starts the main firmware.

Download Processing for Network Modules

If you are initiating the load process to a network module, the Stack Director firmware attempts to communicate with the module. Because the module is nonfunctional during the flash load process, communications between the module and the Stack Director cannot take place.

The flash load takes up to 10 minutes to complete. Do not interrupt power to the module while the downline load is in progress.

You can perform network module firmware upgrades on up to eight slots concurrently. However, you cannot do multiple loads while you are upgrading the Stack Director firmware.

NOTE

During the download process for a network module, the messages may differ from those displayed during the download procedure for the Stack Director firmware (as shown in the preceding section of this manual).

Verifying the Upgrade

After the downline upgrade process has completed, you can verify the firmware upgrade as follows.

For the Stack Director:

Step	Action
1	Select Option `[3] Show Current Settings` from the `Digital MS 600 Stack Director INSTALLATION MENU`.
2	Press <Return>
3	Verify that the correct version was loaded.

For the For a functional module:

Step	Action
1	Select Option `[6] Downline Upgrade` from the `Digital MS 600 Stack Director INSTALLATION MENU`.
2	Press <Return>
3	Verify that the correct version was loaded.
4	Press <Ctrl/C> to return to Main Menu.

The screen displays the following text:

```
======================================================================
                         Enter selection : 3
Digital MS 600 Stack Director
======================================================================
Stack Director, Digital MS 600 Stack Director, HW=F,RO=V00.07,SW=V1.0.0
SysUpTime                              : 11 days 18:52:25  100 resets
SNMP Read/Write Community              : public
SNMP Trap Addresses                    : None Configured
Status of Last Downline Upgrade        :


Out-of-Band (OBM) Management RTS       : Disabled
BootP                                  : Disabled


Interface      IP Address      Subnet Mask    Def.Gateway   Other Info
---------      ----------      -----------    -----------   ----------
OBM Port       16.20.156.20    255.255.0.0                  Speed 9600 bps

EthernetPort   16.20.156.26    255.255.0.0    16.20.156.56  Active

======================================================================
              ...Press Return Key to Continue...


Digital MS 600 Stack Director
======================================================================
Hub Name                                :Digital MS 600 Stack Director
Hub Serial Number                       :
Hub Location                            :
Hub Contact                             :

======================================================================
Slot1, MS Hub 624T              Status : up
Slot2, Empty
======================================================================
              ...Press Return Key to Continue...
```

[7] Configure Out-of-Band Port

This option provides you with two configuration selections:

- Set Port Speed
- Enable/Disable RTS

Out-of-Band Port Configuration Menu Selections

The following example shows the menu selections associated with this option:

```
                    Enter selection : 7

Digital MS 600 Stack Director
=========================================================
              OUT-OF-BAND PORT CONFIGURATION


      [1]   Set Port Speed

      [2]   Enable/Disable RTS

      [3]   Return to Main Menu
=========================================================
            Enter selection: [n] <Return>
```

The following topics describe the Configure Out-of-Band Port Configuration menu selections.

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 baud.

The following example shows the dialogue associated with this option.

```
                 Enter selection : 1
    Digital MS 600 Stack Director
    =========================================================
                SET OUT-OF-BAND (OBM) PORT SPEED
                  [1]  1200  baud
                  [2]  2400  baud
                  [3]  9600  baud
                  [4] 19200  baud
                  [5] 38400  baud

    [=========================================================
                Enter selection : [3] (9600) : 5 <RETURN>
                       OBM port speed set.

                Press Return for OBM Configuration Menu...
```

[7] Configure Out-of-Band Port

Enable/Disable RTS Selection

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.

The factory default of this menu option is disabled.

The following example shows the dialogue associated with this option.

```
===================================================================
                     Enter selection : 2
Digital MS 600 Stack Director
===================================================================
             ENABLE/DISABLE OUT-OF-BAND PORT 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 Key to Continue...
```

[8] Start Event Display Mode

This option allows you to display events as they occur in the DIGITAL MultiSwitch 600 and displayed by the Stack Station.

When >> appears in the screen dialogue, it indicates a change in status.

You can return to the Digital MS 600 Stack Director INSTALLATION MENU any time by pressing <Ctrl/C> on the setup port device.

The following example shows the dialogue associated with this option.

```
=================================================================
                    Enter selection : 8

        Press return to start event log [CTRL/C to abort] ...

  4: Querying
  Status : Module Inserted

. 4: MS Hub 624T
 >> Description:  HW=V1,RO=V01.03,SW=V1.0.0
    Health-Text:
    Status     :

  4: MS Hub 624T
 >> Description:  HW=V1,RO=V01.03,SW=V1.0.0
    Health-Text:
    Status     :

  6: Querying
  Status : Module Inserted

  6: Unkown
  Status : Module Removed

  4: MS Hub 624T
  Status : Module Removed
```

[9] Start Redirect Mode

The [9] Start Redirect Mode option redirects the DIGITAL MultiSwitch 600 Stack Director setup port to the functional module (such as the DIGITAL MultiSwitch 612EX or DIGITAL MultiSwitch Hub 624T) that is installed in the requested slot. Choosing this option allows you to configure an installed module or obtain its status by accessing the specified network module's installation menu.

After you choose the [9] Start Redirect Mode option from the Digital MS 600 Stack Director INSTALLATION MENU, the screen display prompts you for a slot number. Type the slot number where the functional module resides. Slot number (8) is used in the following example. After you enter the number of the slot in which the module is installed, the console is redirected to that slot.

NOTE

The slot number may vary depending on the slot number in which your module is installed.

The following example shows the dialogue associated with this option.

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

      Enter the slot number for redirection (1-8): 8

Console redirected to 8: MultiSwitch 612EX

      Attempting connection [Ctrl/C to abort]...

      Connection Successful!
```

If the redirection is successful, after you press **<Return>**, the Digital MultiSwitch 612EX INSTALLATION MENU appears on your screen.

Chapter 11

Removing or Replacing a Level on the Stack

Overview

Introduction

This chapter describes how to remove and replace a level in the DIGITAL MultiSwitch 600 stack.

In This Chapter

Topic	Page
Removing or Replacing Components	11-2
Task 1: Removing Power Cords and Cables	11-2
Task 2: Removing or Replacing the Levels	11-4
Task 3: Removing a Stack Director or Stack Station from the Mounting Tray	11-8

Removing or Replacing Components

To remove or replace components in a stack, complete the tasks in this section. You will need Phillips-head and flat-blade screwdrivers for the removal.

NOTE

DIGITAL recommends that a stack level not be removed from or added to a live stack. If available, backup your current stack settings using clearVISN Recovery Manager, power down the stack, and reconfigure the stack.

Task 1: Removing Power Cords and Cables

To disconnect power cords and cables from the DIGITAL MultiSwitch 600 stack, perform the procedure in the following table (See Figure 11-1).

Step	Action
1	Remove the AC line cord from the IEC power connectors (**1**) of all Stack Stations and the Stack Director.
2	If used, remove the cable from the Stack Director Management Access port (**2**).
3	If used, remove the cable from the Stack Director 10Base2 port (**3**).
4	If used, remove the cable from the Stack Director OBM port (**4**).
5	If used, remove the setup port cable from the Stack Director and Stack Station setup ports (**5**).

Figure 11-1: Connector Locations
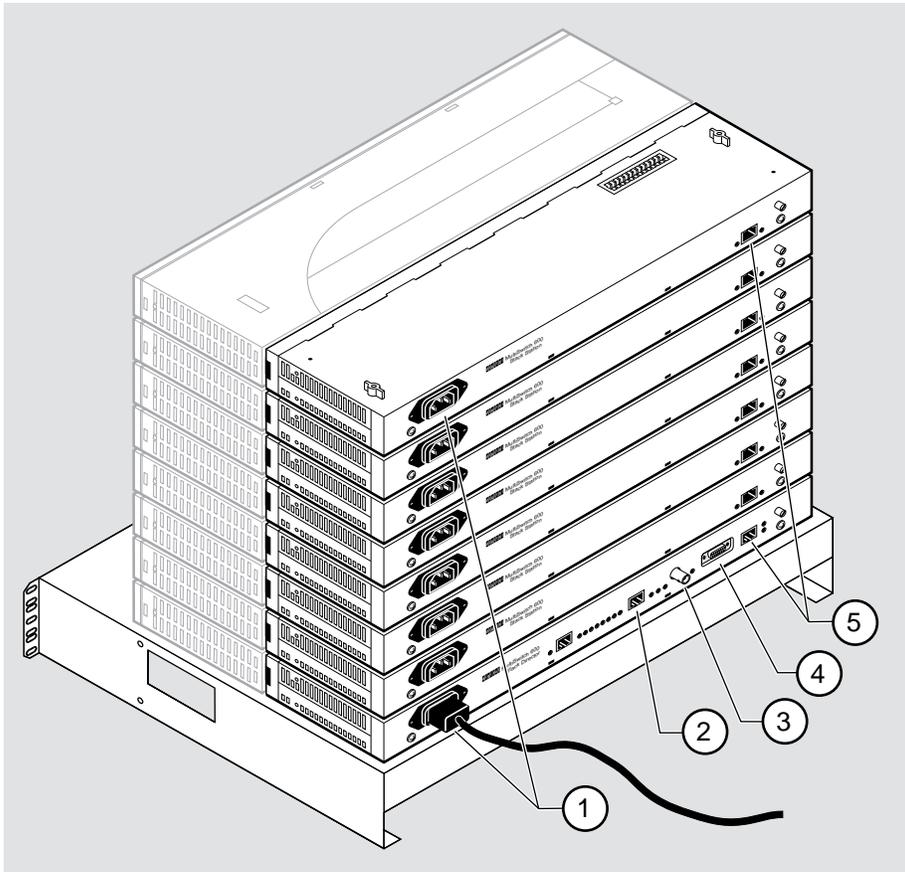
NPB-0662-96F

Task 2: Removing or Replacing the Levels

To remove a level from the stack, perform the procedure in the following table. Figure 11-2 shows removal details.

Figure 11-2: Removing a Stack Station
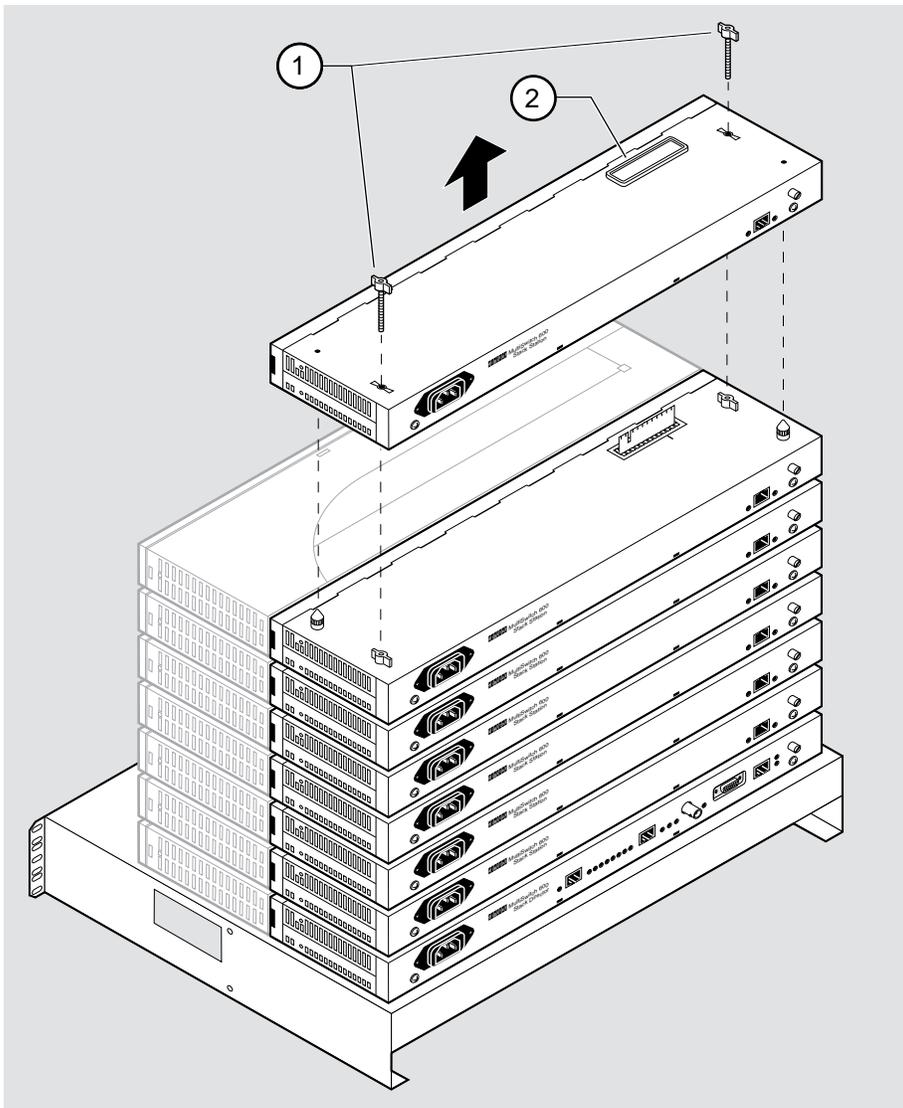
NPB-0688-96F

NOTE

DIGITAL recommends that a stack level not be removed from or added to a live stack. If you must remove or add a stack level, the stack must be powered down. If available, backup your current stack settings using clearVISN Recovery Manager.

.

Step	Action
1	If available, use clearVISN Recovery Manager to backup current settings for each device (including the Stack Director) on the stack.
2	Remove power cords and cables. Refer to Task 1: Removing Power Cords and Cables
3	Remove the dust cap **(2)** from the vertical connector slot on the top level (Stack Station) of the stack.
4	Loosen and remove the wing nuts **(1)** from the Stack Station by turning them counterclockwise.
5	Remove the Stack Interconnect Card from the Stack Station by holding the Stack Interconnect Card by its sides and pulling it up from the vertical connector (Figure 11-3) being careful not to damage the strip metal gaskets (copper fingerstocks).
6	To rebuild the stack, attach the next level on the stack. Refer to Task 4: Attaching the Next Level in the Stack in Chapter 9 for more information.
7	Replace the dust cap in the vertical connector slot on the top level of the stack.
8	Cable the Stack Director and Stack Station. Refer to Task 5: Cabling the Stack Director and Stack Station and Task 6: Connecting Power in Chapter 9 for more information.

Step	Action
9	If available, use clearVISN Recovery Manager to restore settings for each device on the stack that lost its settings.
	Functional modules that are in the same slot when the stack is powered up as they were when the stack was powered down will be automatically reconfigured with their previous backplane settings by the Stack Director.
	Functional modules that are not in the same slot, but are the same type (that is DIGITAL MultiSwitch 612EX, DIGITAL MultiSwitch Hub 624T, etc.) as the module that was previously in the slot, will be reconfigured with the backplane settings used by the previous module. However, Port Switch group configuration is saved in the non-volatile memory of the DIGITAL MultiSwitch Hub 624T, and thus stays with the module, not the slot.
	Functional modules that are not the same type as the module previously in the slot will not be automatically configured.

Figure 11-3: Stack Interconnect Card Removal
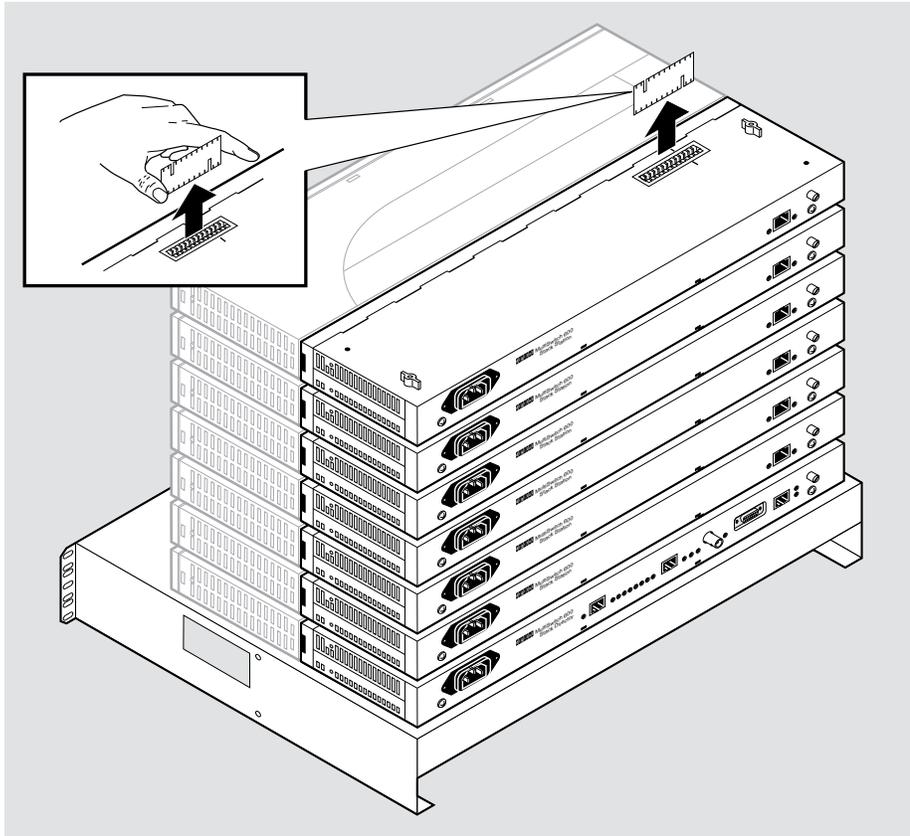
NPB-0659-96F

Task 3: Removing a Stack Director or Stack Station from the Mounting Tray

To remove a Stack Director or Stack Station from the mounting tray, perform the procedure in the following table. Figure 11-4 shows location of screws securing the Stack Director to the mounting tray.

Figure 11-4: Removing Stack Director or Stack Station from Mounting Tray
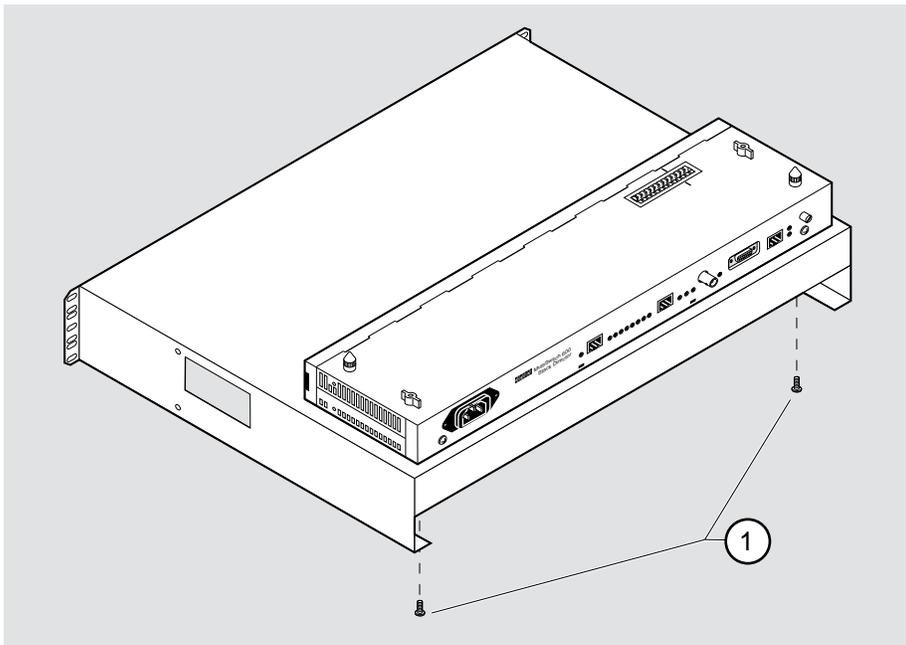
NPB-0513-96F

Step	Action
1	Remove the Stack Director or Stack Station from the mounting tray by removing the two 6-32 machine screws (**1**).
2	For a rack-mount configuration, remove the mounting tray from the rack.

Part III

Reference Information

Appendix A
Problem Solving

Overview

Introduction

This appendix describes the LED states and troubleshooting information for the
DIGITAL MultiSwitch Hub 624T and MM-10s.

In This Appendix

DIGITAL MultiSwitch Hub 624T LED States

Table A-1 describes the states indicated by the module's LEDs.

Table A-1: DIGITAL MultiSwitch Hub 624T LED States

LED Name	Off	Green On	Green Blinking	Yellow On
Power OK LED	Module is not receiving power.	Module has power.	Faulty power connection or insufficient power.	N/A
Module OK LED	Module failed self-test or module problem exists.	Module passed self-test.	Non-fatal failure (for example: bad fan).	N/A
10Base2 Port Status LED	Module is not connected to a properly terminated and operational LAN through the 10Base2 port on the DEChub 900 or the DIGITAL MultiSwitch 600 System.	Module is connected to a properly terminated and operational LAN through the 10Base2 port on the DEChub 900 or the DIGITAL MultiSwitch 600 System.	10Base2 port on the DEChub 900 or the DIGITAL MultiSwitch 600 System is disabled by network management.	N/A
Network Activity LEDs		Internal LAN exists only on module.		Internal LAN is connected to flex channel on Stack Director or DEChub 900.

Note: The Network Activity LEDs indicate which internal LANs are active. They do not indicate the mapping of the port groups (A, B, and C) to the internal LANs. For example, if port groups A, B, and C are mapped to LAN 1, then LED 1 will light. If A and B are mapped to LAN 1 and C is mapped to LAN 2, then LEDs 1 and 2 will light. If A and B are mapped to LAN 1 and C is mapped to LAN 3, then LEDs 1 and 3 will light.

LED Name	Off	Green On	Green Blinking	Yellow On
Port Group Select LEDs A, B, C	Associated port group is not currently displaying its port connection status on the 12 Port Status LEDs.	Indicates port group for which the 12 Port Status LEDs display status.	N/A	N/A
Port Status LEDs 1 - 12	Bad or no connection.	Port is connected to another operational network device.	The associated port is disabled by network management.	N/A

Stack Director LED States

This section describes the LEDs states for the Stack Director. Table A-2 list LED states for the Stack Director that are useful when troubleshooting the Stack Director.

Table A-2: Stack Director LED States

LED Name	Off	On	Blinking
Power OK	Stack Director is not receiving power.	Stack Director has power.	Faulty power connection or insufficient power.
FRU OK	Self test is executing or LED is bad.	Stack Director passed self-test.	Stack Director failed self-test.
OBM Port	SLIP is not available through this interface.	SLIP is available through this interface.	There is SLIP activity on this line.
10Base2 Port Status	The port is disabled by network management.	The port is available and can be connected to an operational LAN.	N/A
Network Activity	No network traffic on the 10Base2 port or 10BaseT port.	Network has heavy traffic on the 10Base2 port or 10BaseT port.	Blinks faster and brighter as traffic increases on the 10Base2 port or 10BaseT port.
Management Access Port Status	The port is disabled by network management.	The port is available and can be connected to an operational LAN.	N/A
Stack Level Management Status	The device at this level is not functional or not communicating with the Stack Director.	The device at this level is functional and is communicating with the Stack Director.	N/A

Stack Station LED States

This section describes the LEDs states for the Stack Station

Table A-3 list LED states for the Stack Station that are useful when troubleshooting the Stack Station.

Table A-3: Stack Station LED States

LED Name	Off	On	Blinking
Power OK	Stack Station is not receiving power.	Stack Station has power.	Faulty power connection or there is insufficient power.
Setup Port	Stack Station failed self-test.	Stack Station passed self-test.	Fan is faulty.

MM-10 LED States

AUI MM-10 LEDs States

Table A-4: AUI LED States

LED Name	Off	Green On	Green Blinking	Yellow On	Yellow Blinking
Activity	No activity.	Local traffic through front panel, link is functioning. If traffic is heavy, LED blinks so frequently that it appears continuously lit.		Local traffic through back-plane, link is functioning. If traffic is heavy, LED blinks so frequently that it appears continuously lit.	
Port Status	Not connected or not functioning.	Port is connected.	At startup, indicates MM-10 is seated correctly. During normal operation, indicates port is management partitioned.	Loopback test fails; MM-10 is broken.	Loopback test passes, but 12V power is not present.

Reverse AUI MM-10 LEDs States

Reverse AUI LED States

LED Name	Off	Green On	Green Blinking	Yellow On	Yellow Blinking
Activity	No activity.	Local traffic through front panel, link is functioning.		Local traffic through back-plane, link is functioning.	
		If traffic is heavy, LED blinks so frequently that it appears continuously lit.		If traffic is heavy, LED blinks so frequently that it appears continuously lit.	
Port Status	Not connected or not functioning.	Port is connected.	At startup, indicates MM-10 is seated correctly.	Loopback test fails; MM-10 is broken.	N/A
			During normal operation, indicates port is management partitioned.		

10Base2 MM-10 LEDs States

Table A-5: 10Base2 LED States

LED Name	Off	Green On	Green Blinking	Yellow On	Yellow Blinking
Activity	No activity.	Local traffic through front panel, link is functioning. If traffic is heavy, LED blinks so frequently that it appears continuously lit.		Local traffic through back-plane, link is functioning. If traffic is heavy, LED blinks so frequently that it appears continuously lit.	
Port Status	Not connected or not functioning.	Port is connected.	At startup, indicates MM-10 is seated correctly. During normal operation, indicates port is management partitioned.	Loopback test fails; MM-10 is broken.	N/A

10BaseFL MM-10 LED States

Table A-6: 10BaseFL LED States

LED Name	Off	Green On	Green Blinking	Yellow On	Yellow Blinking
Activity	No activity.	Local traffic through front panel, link is functioning. If traffic is heavy, LED blinks so frequently that it appears continuously lit.		Local traffic through back-plane, link is functioning. If traffic is heavy, LED blinks so frequently that it appears continuously lit.	
Port Status	Not connected or not functioning.	Port is connected.	At startup, indicates MM-10 is seated correctly. During normal operation, indicates port is management partitioned.	Loopback test fails; MM-10 is broken.	N/A
Link Status	Not connected or not functioning.	There is an idle signal between port and attached station.	N/A	N/A	N/A

10BaseT MM-10 LEDs States

Table A-7: 10BaseT LED States

LED Name	Off	Green On	Green Blinking	Yellow On	Yellow Blinking
Activity	No activity.	Local traffic through front panel, link is functioning. If traffic is heavy, LED blinks so frequently that it appears continuously lit. If port is the responder port in a redundant link and there is no data traffic or there is no cable attached to the port, LED flashes when link is checked periodically.		Local traffic through back-plane, link is functioning. If traffic is heavy, LED blinks so frequently that it appears continuously lit.	
Port Status	Not connected or not functioning.	Port is connected.	At startup, indicates MM-10 is seated correctly. During normal operation, indicates port is management partitioned.	Loopback test fails; MM-10 is broken.	N/A
Link Status	Not connected.	Link pulses detected between port and attached station.	N/A	N/A	N/A

DIGITAL MultiSwitch Hub 624T Problem Solving Using the LEDs

A problem is often indicated by the combined states of the DIGITAL MultiSwitch Hub 624T's LEDs. The following table lists the states of the LEDs for various error conditions, the probable causes, and corrective action to take.

NOTE

If sufficient power becomes unavailable to a DIGITAL MultiSwitch Hub 624T that is operating in a DEChub 900 MultiSwitch, the module enters into a low power mode and suspends operations. The DEChub 900 MultiSwitch LCD displays the message, "Not Enough Power!"

Table A-8: Typical Combined States of LEDs.

Symptom	Probable Cause	Corrective Action
Power LED is off.	The module is not receiving +5Vdc.	Check the power status on the module, Stack Director and Stack Station, or DEChub 900.
		If the module indicates that power is available for this module, press the release lever and reseat or remove the module.
		If the problem persists, either replace the module or contact your service representative to correct the problem.
Module OK LED is off.	The module Self-test in progress.	Wait for self-test to complete.
	Self-test failed.	If the LED does not light within 60 seconds disconnect the module and plug in again.
		If self-test fails again, replace the module. If the problem persists, contact your service representative to correct the problem.

DIGITAL MultiSwitch Hub 624T Problem Solving Using the LEDs

Symptom	Probable Cause	Corrective Action
The module OK LED is off and Ethernet Activity LED for Port 1 is blinking green (once every 8 seconds).	The module's firmware image is corrupted. Module failed diagnostics with a fatal error; or a fatal error was sensed during steady state operation.	Either replace the module or contact your service representative to correct the problem.
The module OK LED is blinking, but continues to operate normally.	A non-fatal error occurred. The module passed diagnostics with a non-fatal error; or a non-fatal error (fan failure) is being sensed currently, even though module passed diagnostics successfully when it was initialized.	Power off and on. If the problem persists, either replace the module or contact your service representative to correct the problem.
Port Status LED is off.	1. Connection is bad (loose or incorrect cable).	Correct the cable connection.
	2. Port not connected.	None — normal operation.
Port Status LED is blinking green.	Port is disabled (e.g., by management, security, or is isolated by storm control, or is pointed to the backplane, but not connected to any backplane LAN).	None — normal operation.
Port activity LED is flickering yellow	Traffic sensed on backplane LAN to which port is connected.	None.

DIGITAL MultiSwitch Hub 624T Problem Solving Using the LEDs

Symptom	Probable Cause	Corrective Action
Port activity LED is flickering green.	Traffic sensed on network connected to port.	None.
Port activity LED is off.	No traffic sensed.	None.

Stack Director Problem Solving Using the LEDs

A problem is often indicated by the states of the LEDs on the Stack Director. The following table lists the states of the LEDs for various error conditions, the probable causes, and corrective action you may take.

NOTE

During the power up reset sequence the Activity LED and the FRU OK LED do not light.

Table A-9 list possible error conditions for the Stack Director that are useful when troubleshooting the Stack Director.

Table A-9: Stack Director Error Conditions

Symptom	Probable Cause	Corrective Action
Power OK LED is off.	Stack Director is not receiving primary power.	Ensure that the power cord is properly plugged into the Stack Director and a working AC outlet. Replace the Stack Director.
FRU OK LED is off or blinking.	Stack Director self test failed.	Replace the Stack Director.
OBM Port Status LED does not light when self test completes.	OBM port is faulty.	Replace the Stack Director.
10Base2 Port Status LED does not light when self test completes.	Port is not enabled due to error.	Replace the Stack Director.
Network Activity LED does not light.	No network activity, cabling problem, or MAC is faulty on the Stack Director.	Check network connection or Replace Stack Director.

Symptom	Probable Cause	Corrective Action
Management Access Port Status LED does not light when self test completes.	Port is not enabled due to error.	Replace the Stack Director.
A Stack Level Management Status LED does not light for a particular module.	Stack Director does not communicate with corresponding module.	Replace associated module.

Stack Station Problem Solving Using the LEDs

A problem is often indicated by the states of the LEDs on the Stack Stations. The following table lists the state of the LEDs for various error conditions, the probable causes, and corrective action you may take.

NOTE

During the power up reset sequence the Activity LED and the FRU OK LED do not light.

Table A-10 list possible error conditions for the Stack Station that are useful when troubleshooting the Stack Station.

Table A-10: Stack Station Error Conditions

Symptom	Probable Cause	Corrective Action
Power OK LED is off.	Stack Station is not receiving primary power.	Check that the power cord is plugged in. Replace the Stack Station.
Setup Port LED does not light when a module is connected. Note: The Setup Port LED should not light when the Stack Station is a member of a managed stack.	Module or Stack Station is faulty.	Replace module or Stack Station.

Appendix B

Connectors and Pin Assignments

Overview

Introduction

This appendix shows the pin assignments of the connectors, cables, and adapters that are part of, or can be used with, the DIGITAL MultiSwitch Hub 624T module and DIGITAL MultiSwitch 600 System.

In This Appendix

Topic	**Page**
H8225 50-Ohm Terminator	B-11
Adapter	B-12

B-2 Connectors and Pin Assignments

DIGITAL MultiSwitch Hub 624T Connectors and Pin Assignments

10BaseT (8-pin MJ) Port Connector

The 10BaseT connector is used with the DIGITAL MultiSwitch Hub 624T. All twenty-four 10BaseT port connectors on the DIGITAL MultiSwitch Hub 624T are crossover connections. Table B-1 defines the 8-pin MJ connector pin assignments. Figure B-1 shows their location.

Figure B-1: 10BaseT (8-pin MJ) Connector
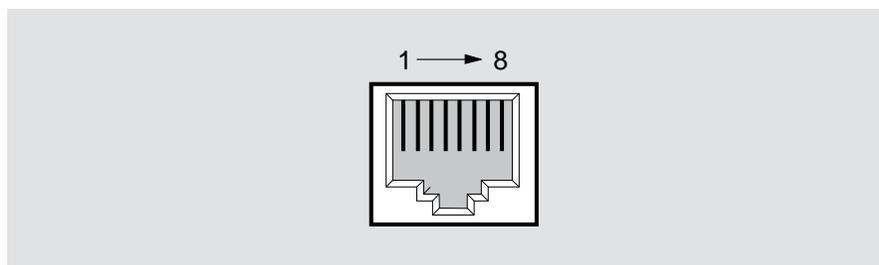
NPG-8719-95F

Table B-1: 10BaseT (8-pin MJ) Connector Pin Assignments

Pin No.	Assignment
1	RX+
2	RX-
3	TX+
4	Not Connected
5	Not Connected
6	TX-
7	Not Connected
8	Not Connected

MM-10 Connectors

10BaseFL Connectors (BN25J)

Figure B-2 shows the 10BaseFL transmit connector and receive connector used with the DIGITAL MultiSwitch Hub 624T fiber MM-10.

Figure B-2: 10BaseFL Connectors
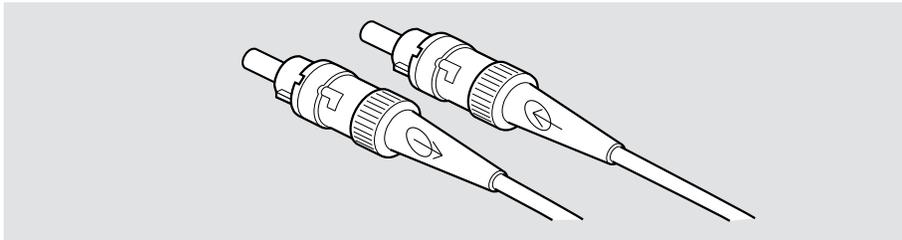
NPB-0601-96F

AUI (15-pin D-Sub) Port Connector

This section shows the 15-pin AUI connector and its pin assignments.

Figure B-3: AUI Port Connector
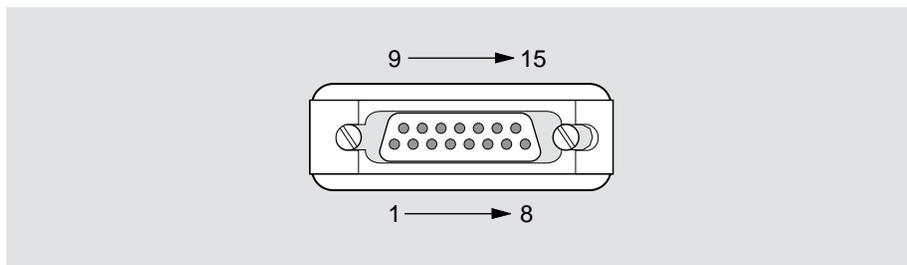
NPB-0807-97F

Table B-2: AUI Port Connector

Pin No.	Port
1	Ground
2	CI+
3	DO+
4	Ground
5	DI+
6	Power rtn
7	No connection
8	Ground
9	CI-
10	DO-
11	Ground
12	DI-
13	Power 12V
14	Ground
15	No connection

Reverse AUI (15-pin D-Sub) Port Connector

This section shows the 15-pin reverse AUI connector and its pin assignments.

Figure B-4: Reverse AUI Port Connector
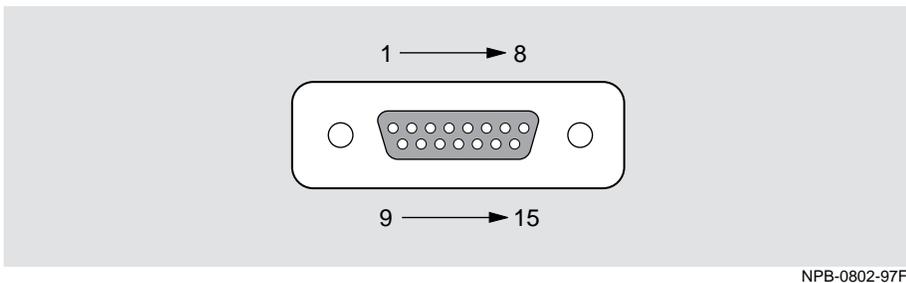
NPB-0802-97F

Table B-3: Reverse AUI Port Connector

Pin No.	Port
1	Ground
2	CI+
3	DO+
4	Ground
5	DI+
6	Power rtn
7	No connection
8	Ground
9	CI-
10	DO-
11	Ground
12	DI-
13	Power 12V
14	Ground
15	No connection

10Base2 Connector

Figure B-5 shows the 10Base2 connector used on the DIGITAL MultiSwitch Hub 624T.

Figure B-5: 10Base2 Connector for DIGITAL MultiSwitch Hub 624T
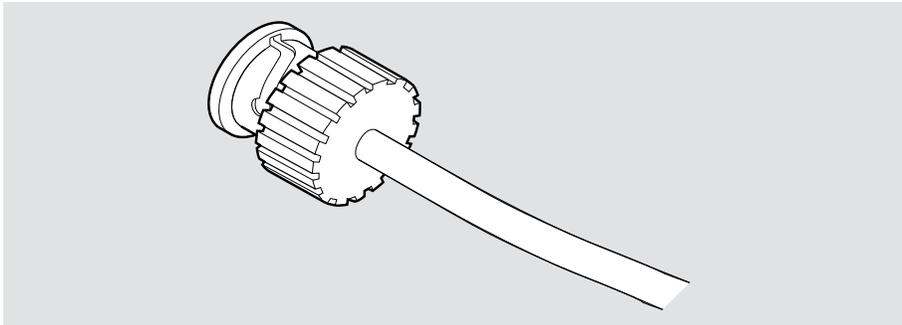
NPB-0626-96F

10BaseT (8-pin MJ) Port Connector

This section shows the 10BaseT 8-pin MJ connector, both straight-through and crossover, and their pin assignments.

Figure B-6: 10BaseT Port Connector,
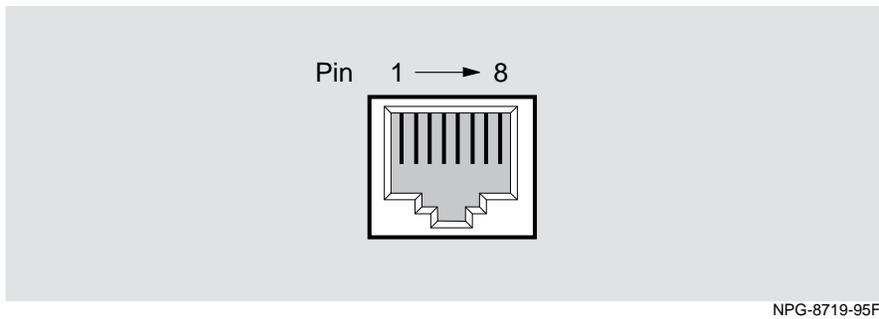
NPG-8719-95F

Table B-4: 10BaseT Connector Pin Assignments

Crossover Connector		Straight-Through Connector	
Pin No.	Assignment	Pin No.	Assignment
1	RX+	1	TX+
2	RX-	2	TX-
3	TX+	3	RX+
4	Not Connected	4	Not Connected
5	Not Connected	5	Not Connected
6	TX-	6	RX-
7	Not Connected	7	Not Connected
8	Not Connected	8	Not Connected

NOTE

Use only one of the 10BaseT connectors at a time.

Stack Director and Stack Station Connectors and Pin Assignments

Setup Port and Management Access Port Connector

This 8-pin MJ connector is used for the setup port on the Stack Director and Stack Station and for the management access port on the Stack Director only. **Table B-5 defines the pin assignments as shown in Figure** B-7.

Figure B-7: Stack Director and Stack Station Setup Port Connector
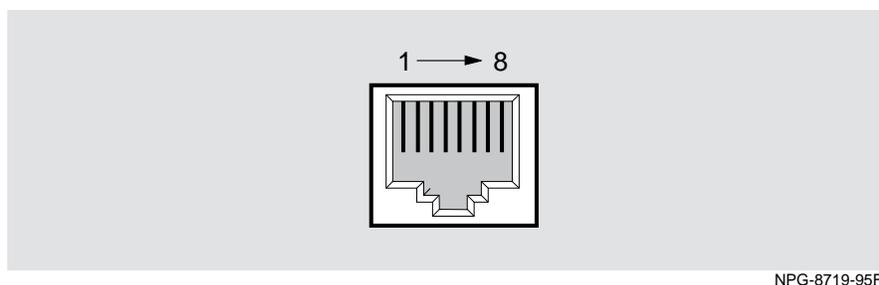
NPG-8719-95F

Table B-5: Stack Director and Stack Station Setup Port Connector Pin Assignments

Pin No.	Assignment
1	No Connect
2	RD
3	GND
4	Unused
5	Unused
6	TD
7	+5
8	GND

OBM Port (9-Pin) Connector

Table B-6 describes the OBM connector pin assignments used on the Stack Director and Figure B-8 shows their location.

Figure B-8: OBM Port (9-Pin) Connector
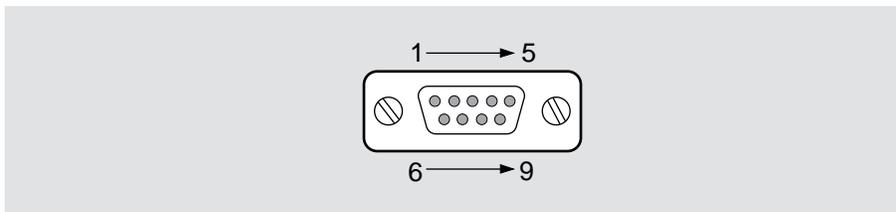
NPG-0299-95F

Table B-6: OBM Port (9-Pin) Connector Pin Assignments

Pin No.	Assignment
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground
6	Data Set Ready (DSR)
7	Request To Send (RTS)
8	Clear To Send (CTS)
9	Not Connected

10Base2 Connector

Figure B-9 shows the 10Base2 connector used on the Stack Director.

Figure B-9: 10Base2 Connector
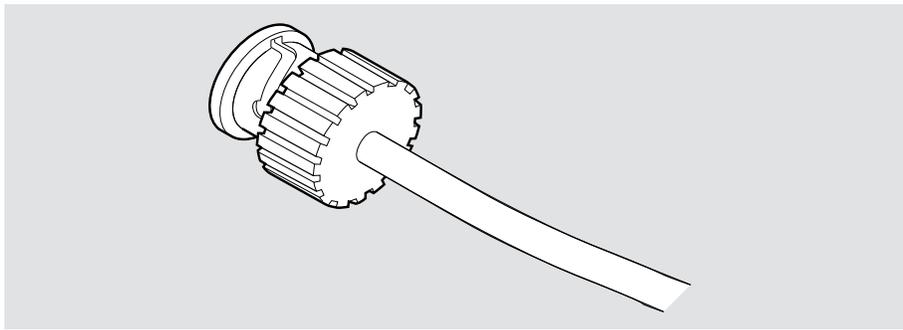
NPB-0626-96F

H8225 50-Ohm Terminator

Figure B-10 shows the 50-ohm terminator needed to terminate the 10Base2 port on the Stack Director.

Figure B-10: 50-ohm Terminator
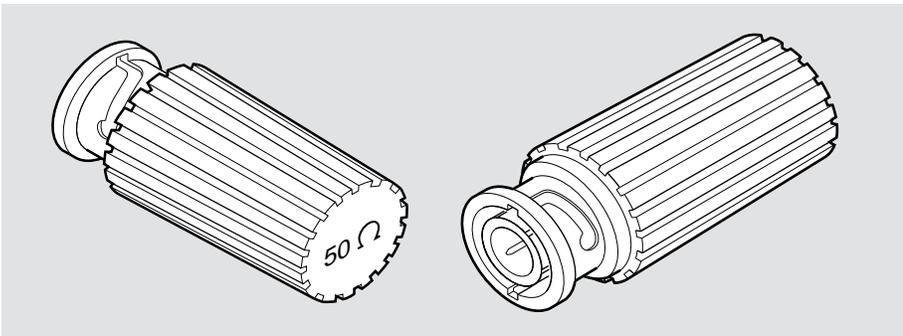
NPB-0594-96F

Adapter

The following adapter can be used when connecting to the OBM port on the Stack Director.

H8571-J Adapter

Figure B-11 shows the H8571-J adapter (6-pin MMJ to 9-pin D-Sub connector).

Figure B-11: H8571-J Adapter
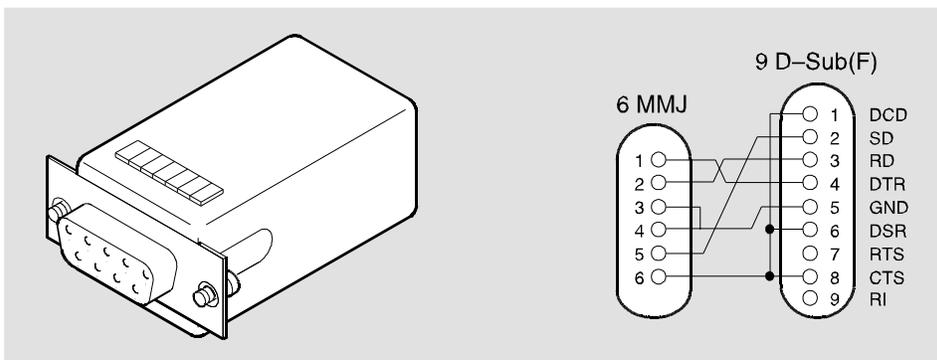
NPG-5342-95F

Appendix C

Product Specifications

Overview

This appendix lists product and acoustical specifications for the DIGITAL MultiSwitch Hub 624T, Stack Director and Stack Station and connectors used with these products.

In This Appendix

Product Specifications for the DIGITAL MultiSwitch Hub 624T

Table C-1 lists the product specifications for the DIGITAL MultiSwitch Hub 624T.

Table C-1: Product Specifications for the DIGITAL MultiSwitch 624T

Parameter	Specification
Environment	
Operating Temperature[1]	5° C to 50° C (41 ° F to 122 ° F)
Relative Humidity	10% to 95% noncondensing
Altitude	
• Operating	Sea level to 2400 m (8000 ft)
• Non-operating	Sea level to 4900 m (16000 ft)
Power	31.8 W total power
	4.8 A, 5 Vac 0.65 A, 12 Vac 0.0 A, 15 Vac
Physical	
Height (installed horizontally) Height (installed vertically)	4.45 cm (1.75 in) 44.45 cm (17.5 in)
Width (installed horizontally) Width (installed vertically)	44.45 cm (17.5 in) 4.45 cm (1.75 in)
Depth	15.25 cm (6.02 in)
Weight	1.40 kg (3.00 lb) **Include an additional 2.02 kg (4.45 lb) when attached to a Stack Director.** **Include an additional 1.80 kg (4.00 lb) when attached to a Stack Station.**
Shock (Class A/B for products weighing under 100 lbs)	10 G / 10 ms half sine pulse in three orthogonal axes
Vibration (Class C)	5 to 200 Hz sine sweep @ 0.25 G limited by 0.02" (0.5mm) displacement DA* 200 to 500 Hz sine sweep @ 0.10 G
Certification	CE, CSA, FCC, TÜV, UL, VCCI

[1] For sites above 2400 m (8,000 ft), decrease the operating temperature specification by 1.8° C for each 1000 m or 3.2°F for each 3200 ft.

Product Specifications for the Stack Director

Table C-2 lists the product specifications for the Stack Director.

Table C-2: Product Specifications for the Stack Director

Parameter	Specification
Environment	
Operating Temperature[1]	5° C to 50° C (4° F to 122° F)
Relative Humidity	10% to 95% noncondensing
Altitude • Operating • Non-operating	 Sea level to 2400 m (8000 ft) Sea level to 4900 m (16000 ft)
Power • Input:	72 W total input power 100 Vac - 120 Vac @ 1.8A 220 Vac - 240 Vac @ 1.0 A
• Output at 48-pin connector (max):	6.0 A @ 5.2 Vdc 0.7 A @ 12.0 Vdc
Physical	
Height	4.45 cm (1.75 in). The height of the mounting tray is 8.89 cm (3.5").
Width	44.45 cm (17.5 in)
Depth	12.65 cm (4.975 in); 27.9 cm (10.975 in) with a functional module attached.
Weight	2.02 Kg (4.45 lb.)
Shock (Class A/B for products weighing under 100 lbs)	10 G / 10 ms half sine pulse in three orthogonal axes
Vibration (Class C)	5 to 200 Hz sine sweep @ 0.25 G limited by 0.5mm (0.02") displacement DA* 200 to 500 Hz sine sweep @ 0.10 G
Certification	CE, CSA, FCC, TÜV, UL, VCCI

[1] For sites above sea level 2400 m (8,000 ft), decrease the operating temperature specification by 1.8° C for each 1000 m or 3.2°F for each 3200 ft.

Product Specifications for the Stack Station

Table C-3 lists the product specifications for the Stack Station.

Table C-3: Product Specifications for the Stack Station

Parameter	Specification
Environment	
Operating Temperature[1]	5° C to 50° C (41 ° F to 122 ° F)
Relative Humidity	10% to 95% noncondensing
Altitude • Operating • Non-operating	 Sea level to 2400 m (8000 ft) Sea level to 4900 m (16000 ft)
Power • Input:	72 W total input power 100 Vac - 120 Vac @ 1.8A 220 Vac - 240 Vac @ 1.0 A
• Output at 48-pin connector (max):	6.0 A @ 5.2 Vdc 0.7 A @ 12.0 Vdc
Physical	
Height	4.45 cm (1.75 in). The height of the Mounting Tray is 8.89 cm (3.5").
Width	44.45 cm (17.5 in)
Depth	12.65 cm (4.975 in); 27.9 cm (10.975 in) with a functional module attached.
Weight	1.75 kg (3.85 lb.)
Shock (Class A/B for products weighing under 100 lbs)	10 G / 10 ms half sine pulse in three orthogonal axes
Vibration (Class C)	5 to 200 Hz sine sweep @ 0.25 G limited by 0.5mm (0.02") displacement DA* 200 to 500 Hz sine sweep @ 0.10 G
Certification	CE, CSA, FCC, TÜV, UL, VCCI

[1] For sites above sea level 2400 m (8,000 ft), decrease the operating temperature specification by 1.8° C for each 1000 m or 3.2°F for each 3200 ft.

Acoustical Specifications

Table C-4 lists the acoustical specifications for the module with the Stack Station and Stack Director in English. Table C-5 lists the acoustical specifications for the module in German.

Table C-4: Acoustical Specifications

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
DLSSM-S* Stack Director	5.2	37
DLSSM-S* + DLMR2-MA Stack Director + DIGITAL MultiSwitch Hub 624T	5.5	40
DLSSU-U* Stack Station	no measurable noise emissions	
DLSSU-U* + DLMR2-MA Stack Station + DIGITAL MultiSwitch Hub 624T	5.3	37

* indicates one of the following:

Suffix	Country	Suffix	Country
-SA/-UA	United States	-ST/-UT	Israel
-SD/-UD	Denmark	-SX/-UX	Central Europe
-SE/-UE	United Kingdom	-SZ/-UZ	Australia
-SI/-UI	Italy	-S3/-U3	No Power Cord
-SK/-UK	Switzerland	-TJ/-VJ	India

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

Table C-5: German Acoustical Specifications

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

Produkt	Schalleistung-spegel L_{WAd}, B	Schalldruckpegel L_{pAm}, dBA (Zuschauerpositionen)
	Leerlauf/Betrieb	Leerlauf/Betrieb
DLSSM-S* Stack Director	5,2	37
DLSSM-S* + DLMR2-MA Stack Director + DIGITAL MultiSwitch Hub 624T	5,5	40
DLSSU-U* Stack Station	keine meßbaren Geräuschemissionen	
DLSSU-U* + DLMR2-MA Stack Station +DIGITAL MultiSwitch Hub 624T	5,3	37

* indicates one of the following:

Suffix	Country	Suffix	Country
-SA/-UA	United States	-ST/-UT	Israel
-SD/-UD	Denmark	-SX/-UX	Central Europe
-SE/-UE	United Kingdom	-SZ/-UZ	Australia
-SI/-UI	Italy	-S3/-U3	No Power Cord
-SK/-UK	Switzerland	-TJ/-VJ	India

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

Connectors

Table C-6 provides a list connectors for the DIGITAL MultiSwitch Hub 624T.

Table C-6: Connectors for the DIGITAL MultiSwitch Hub 624T

Connectors	Quantity
8-pin MJ Port Connector	24

Table C-7 provides a list connectors for Stack Director.

Table C-7: Connectors for the Stack Director

Connectors	Quantity
Console Port Connector	1
10Base2 (ThinWire) Port Connector	1
OBM (RS-232) Port Connector	1
UTP/ScTP (Screened Twisted Pair) Port Connector	1
Reserved Port Connector	1

Table C-8 provides a list connectors for Stack Station.

Table C-8: Connectors for the Stack Station

Connectors	Quantity
Setup Port Connector	1
IEC Connector (Power)	1

Appendix D

Ordering Options

Overview

Introduction

This appendix describes the ordering information for the DIGITAL MultiSwitch Hub 624T.

In This Appendix

Ordering Options

Option	Name	Part Number
Basic Module (see note 1)	DIGITAL MultiSwitch Hub 624T, 24-port 10 Mb/s Repeater	DLMR2-MA
Stack Station or Stack Director (see note 2)	Stack Station	DLSSU-U*
	Stack Director	DLSSM-S*
Expansion Slot 10BaseT Option (see note 3)	10BaseT Expansion Port Group	DLXR1-MA
Expansion Slot MM-10 Options (see note 3)	Carrier Card	DLXMC-MA
	10BaseFL	DLXFI-MA
	10BaseT	DLXUT-MA
	10Base2	DLXTW-MA
	AUI	DLXAU-MA
	Reverse AUI	DLXRA-MA
Rack Mounting Tray (see note 4)	DIGITAL MultiSwitch 600 Rack Mount Tray (included with Stack Director)	H3108-MU
Accessory package includes[1]:	• Dust Cap (1) • Mounting Plugs (2) • Cable-free stack interconnect card (4) • Stabilizer Screw (8) • Pylons (8)	DLSCC-M4

* indicates one of the following:

Suffix	Country	Suffix	Country
-SA/-UA	United States	-ST/-UT	Israel
-SD/-UD	Denmark	-SX/-UX	Central Europe
-SE/-UE	United Kingdom	-SZ/-UZ	Australia
-SI/-UI	Italy	-S3/-U3	No Power Cord
-SK/-UK	Switzerland	-TJ/-VJ	India

[1]Accommodates four stack station levels. These parts are supplied as spares. All needed parts are supplied with the Stack Director or Stack Station.

Ordering Notes

The following option notes should be considered when ordering DIGITAL MultiSwitch 600 components.

Note	Description
1	Order basic 600-series functional modules (hubs and/or switches) available for a DIGITAL MultiSwitch 600 system. It will work in a DIGITAL MultiSwitch 600 or in a DEChub 900.
2	Order one Stack Station or Stack Director to build a DIGITAL MultiSwitch 600 System. One Stack Director (DLSSM) is needed to manage a stack of up to eight modules. The Stack Director comes complete with a rack mount kit.
3	Order necessary Expansion Slot Modular Media Interface Options.
4	Order mounting tray if you are not ordering a Stack Director and you plan to build a stack of more than one level or you plan to install the stack in a standard 19-inch or relay rack.

Parts List

The following table provides a list of available parts and part numbers for the DIGITAL MultiSwitch 600 system.

Part	Part Number
Stack Director (includes):	DLSSM-S*
Stack Director	DLSSM-M
AC Power Cable	BN*
Quick Start Card	EK-DLSSM-QS
Installation Guide	EK-DLSSM-IN
Warranty Card	EK-NETWW-CM
MultiSwitch 600 Document Sub-Assembly (QC Kit)	QC-04RAA-GZ
Riser Card	50-24214-01
Terminator, 50 ohm	H8225-MU
Rack Mount Tray Kit	H3108-MU
Stack Station (includes):	DLSSU-U*
Stack Station	DLSSU-M
AC Power Cable	BN*
Quick Start Card	EK-DLSSM-QS
Installation Guide	EK-DLSSM-IN
Warranty Card	EK-NETWW-CM
MultiSwitch 600 Document Sub-Assembly (QC Kit)	QC-04RAA-GZ
Riser Card	50-24214-01
Stabilizer Screw (Wing Nuts) - (2)	74-51632-01
Wing Nut (Mounting plug) - (2)	74-51644-01
Accessories Package[1]:	DLSCC-M4
Dust Cap (1) Mounting Plugs (2) Backplane Interconnect Riser Card (4) Stabilizer Screw (8) Alignment Pylons (8)	

[1]Accessories Package is included with each Stack Station and Stack Director

* indicates one of the following:

Suffix	Country	Suffix	Country
-SA/-UA	United States	-ST/-UT	Israel
-SD/-UD	Denmark	-SX/-UX	Central Europe
-SE/-UE	United Kingdom	-SZ/-UZ	Australia
-SI/-UI	Italy	-S3/-U3	No Power Cord
-SK/-UK	Switzerland	-TJ/-VJ	India

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Appendix E

Associated Documentation

Overview

Introduction

This appendix describes the associated documentation, how to order additional documentation, and correspondence.

In This Appendix

Topic	Page
Documentation	E-2
How to Order Additional Documentation	E-4
Correspondence	E-5

Documentation

The following documents provide information relating to the DIGITAL MultiSwitch 612EX module. To order any of the following documents, refer to the section titled How to Order Additional Documentation.

Title and Order Number	Description
DIGITAL MultiSwitch 600 System Installation and Configuration EK-DLSSM-IN	Provides installation, setup, and configuration information for the DIGITAL MultiSwitch 600 System (Stack Director or Stack Station).
DIGITAL MultiSwitch 600 System Quick Start EK-DLSSM-QS	Provides a four page guide for installation and setup information for the DIGITAL MultiSwitch 600 System (Stack Director or Stack Station).
DIGITAL MultiSwitch Hub 624T Quick Start EK-DLMR2-QS	Provides a four page guide for installation, setup, and configuration information for the DIGITAL MultiSwitch Hub 624T installed in a DIGITAL MultiSwitch 600 System (Stack Director or Stack Station) or DEChub 900 MultiSwitch.
DIGITAL MultiSwitch 612EX Installation and Configuration EK-DLMWL-IN	Provides installation, setup, and configuration information for the DIGITAL MultiSwitch 612EX installed in a DIGITAL MultiSwitch 600 System (Stack Director or Stack Station) or DEChub 900 MultiSwitch.
DIGITAL MultiSwitch Hub 612EX Quick Start EK-DLMWL-QS	Provides a four page guide for installation, setup, and configuration information for the Digital MultiSwitch 612EX installed in a Digital MultiSwitch 600 System (Stack Director or Stack Station) or DEChub 900 MultiSwitch.
DEChub 900 MultiSwitch Owner's Manual EK-DH2MS-OM	Provides installation, use, security, and troubleshooting information for the DEChub 900 MultiSwitch.

Title and Order Number	Description
clearVISN Installation AA-QX86B-TK	Describes how to install clearVISN software. It includes a list of distribution kit contents, system requirements, pre-installation considerations, and the installation procedure.
clearVISN Overview AA-QX87B-TK	Provides an overview of clearVISN, an explanation of each clearVISN application, and descriptions of all concepts necessary to understand and use the application efficiently.
clearVISN User's Guide AA-QX88B-TK	Provides information for starting each application, configuring then (when necessary), and general use information.
DEChub Network Modules 900-Series Switch Reference EK-SWTCH-HR	Describes the functions and features of DIGITAL's HUB-based 900-Series switching products.
Bridge and Extended LAN Reference EK-DEBAM-HR	Describes how bridges are used to create extended local area networks (LANs). This includes the use of bridges in extended LAN configurations, information on LAN interconnections, overall bridge operation, spanning tree, and solving bridge-related problems in a network.

How to Order Additional Documentation

To order additional documentation, use the following information.

To Order:	Contact:
By Telephone	USA (except Alaska, New Hampshire, and Hawaii):
	1-800-DIGITAL (1-800-344-4825)
	Alaska, New Hampshire, and Hawaii: 1-603-884-6660
	Canada: 1-800-267-6215
Electronically (USA. only)	Dial 1-800-DEC-DEMO (For assistance, call 1-800-DIGITAL)
By Mail (USA and Puerto Rico)	DIGITAL EQUIPMENT CORPORATION P.O. Box CS2008 Nashua, New Hampshire 03061 (Place prepaid orders from Puerto Rico with the local DIGITAL subsidiary: 809-754-7575)
By Mail (Canada)	DIGITAL EQUIPMENT of CANADA LTD. 940 Belfast Road Ottawa, Ontario, Canada K1G 4C2 Attn.: A&SG Business Manager
Internationally	DIGITAL EQUIPMENT CORPORATION Attn.: A&SG Business Manager c/o local DIGITAL subsidiary or approved distributor
Internally	U.S. Software Supply Business (SSB) DIGITAL EQUIPMENT CORPORATION 8 Cotton Road Nashua, New Hampshire 03063

Correspondence

Documentation Comments

If you have comments or suggestions about this document, send them to the Network Products Business Organization.

Attn.:   Documentation Project Manager
FAX: (508) 486-6093
E-MAIL: doc_feedback@lkg.mts.dec.com

Online Services

To locate product specific information, refer to the following online services:

BBS   To read the Bulletin Board System, set your modem to 8 bits, no parity, 1 stop bit and dial 508-486-5777 (U.S.)

WWW   The DIGITAL Equipment Corporation Network Products Business Home Page on the World Wide Web is at the following addresses:

North America: http://www.networks.digital.com

Europe: http://www.networks.europe.digital.com

Australia: http://www.digital.com.au/networks

Appendix F

Service Information/Support

Overview

Introduction

This appendix provides service and support information for the Digital MultiSwitch 600 system.

In This Appendix

Topic	Page
Warranty Service	F-2

Warranty Service

This product has a limited one year RETURN TO DIGITAL WARRANTY. Please refer to the Network Products Warranty and Service Information Notice (EK-NETWW-CM) that accompanies the product for more detailed information.

Warranty support services include the product advisory assistance, available from Digital's Customer Support Centers. This support is designed to help customers who have questions regarding the use and setup of their networking product. This will include:

- Assistance in using the product documentation.

- Verifying that correct procedures or commands are being used.

- Answering general questions on such issues as product compatibility, configuration rules and guidelines, and software/firmware release levels.

- Assistance in verifying that product hardware is functioning correctly or malfunctioning.

Appendix G

Accessing and Configuring RMON Groups

Overview

Introduction

This appendix describes how to access the four RMON groups and how to configure the Alarms and Events groups.

In This Appendix

Topic	Page
What is RMON?	G-2
Groups Supported	G-3
How to Access RMON Groups	G-4

What is RMON?

RMON is a Remote Network Monitoring Management Information Base (RMON MIB). RMON gathers a wide variety of statistical information about network operation. A typical network consists of multiple network segments with one RMON agent connected to each segment. RMON gathers this information by examining each packet passed on a network segment. Segment statistics are stored in counters within the module. The counters are continuously updated and reset at powerup.

RMON also captures and stores network traffic information. RMON allows you to examine these captured packets or sequences of packets to identify and isolate network operational software or hardware problems.

A list of RMON features is described in Chapter 1.

NOTE

The online help includes management tasks and information for the RMON Manager application.

Groups Supported

The four RMON groups supported by this module are Statistics, History, Alarms, and Events. The following table defines these four groups:

This group...	Allows you to...
Statistics	Obtain an array of operational statistics including:
	• Packets
	• Octets
	• Broadcasts
	• Collisions
	• Dropped packets
	• Fragments
	• CRC alignment errors
	• Undersize/oversize packets
	• Multicasts
	• Jabbers
	• 64 octet packets
	• 65 to 127 octet packets
	• 128 to 255 octet packets
	• 256 to 511 octet packets
	• 512 to 1023 octet packets
	• 1024 to 1518 octet packets
History	Obtain a historical representation of statistics for individual ports for customized trend analysis.
Alarms	Set a wide variety of thresholds and sampling intervals on any statistic to create an alarm condition. An alarm will cause an event. You may set threshold values as:
	• An absolute value
	• A rising value
	• A falling value
	• A delta value
Events	Create entries in the monitor log and generate SNMP traps for selected events. You can initiate events by setting an alarm on any counter. The log includes a description and the time of each event.

How to Access RMON Groups

This section provides you with procedures that describe how to access the RMON Groups.

RMON Group	To Access/Use these Groups ...
Statistics and History	Use the clearVISN MultiChassis Manager
Alarms and Events	Use any SNMP network manager, as described later in this document

Accessing Statistics and History

To access the Statistics and History groups, you must use the clearVISN MultiChassis Manager as follows:

Step	Action
1	Run the clearVISN MultiChassis Manager.
2	Double-click on the DIGITAL MultiSwitch Hub 624T module. (The summary screen displays the module's summary.)
3	Click on the RMON button to display the Statistics screen.
4	Click on the HISTORY button on the Statistics screen.

For additional Statistics and History information refer to online help.

Accessing Alarms and Events

This section describes how to set up a condition to be monitored (an alarm) and an event to be generated once that condition has occurred. You use an SNMP network manager to set up conditions and events. For a more complete description of the alarmTable and eventTable, refer to RFC 1757: S. Waldbusser, "Remote Network Monitoring Management Information Base", 02/10/1995.

The event group consists of the eventTable and the logTable. The alarmTable contains configuration entries that define a variable, polling period, and threshold parameters.

If an entry is found to have crossed the threshold value, an event is generated that is processed as specified by your entries in the eventTable. Thus, the eventTable controls the generation and notification of events from the device.

The RMON Alarms and Events MIB objects eventDescription, alarmOwner, and eventOwner support up to 127 characters. MIB object eventCommunity supports up to 32 characters. The maximum number of entries that can be placed in the alarmTable is 20. For the eventTable, the maximum is 32.

Alarm and Event Table Entries

Alarm table entries can only be created for SNMP Integer MIB variables of the following types:

- INTEGER

- Counter

- Gauge

- TimeTicks

The following tables list and define the fields that make up an alarm table entry and an event table entry.

Table G-1: Alarm Table Entry Fields

Alarm Table Entry Fields	Definition
alarmIndex	An index that uniquely identifies an entry (see note below).
alarmInterval	The interval, in seconds, over which the data is sampled and compared with the rising and falling threshold.
alarmVariable	The object identifier of the particular variable to be sampled.
alarmSampleType	The method of sampling the selected variable and calculating the value to be compared against the thresholds.
alarmValue	The value of the statistic during the last sampling period (see note below).
alarmStartupAlarm	The alarm that may be sent when this entry is first set to valid.
alarmRisingThreshold	Rising (increasing) threshold for the sampled statistic.
alarmFallingThreshold	Falling (decreasing) threshold for the sampled statistic.
alarmRisingEventIndex	The index of the eventEntry that is used when a rising threshold is crossed.
alarmFallingEventIndex	The index of the eventEntry that is used when a falling threshold is crossed.
alarmOwner	The person who configured this entry and is therefore using the resources assigned to it.
alarmStatus	The status of this alarm entry.

NOTE

The alarmIndex and alarmValue objects are read-only. You cannot set these fields. The alarmIndex is implicitly specified when the entry is created. The alarmValue is made available after the current sampling period.

Table G-2: Event Table Entries

Event Table Entry Fields	Definition
eventIndex	An index that uniquely identifies an entry (see note below).
eventDescription	A comment describing this event.
eventType	The type of notification that will occur when the threshold is being reached.
eventCommunity	If an SNMP trap is to be sent, it will be sent to the SNMP community specified.
eventLastTimeSent	The value of sysUpTime at the time this event entry last generated an event. (see note below).
eventOwner	The person who configured this entry and is therefore using the resources assigned to it.
eventStatus	The status of this event entry.

NOTE

The eventIndex and eventLastTimeSent objects are read-only. You cannot set these fields. The eventIndex is implicitly specified when the entry is created. The eventLastTimeSent is made available after the current sampling period.

How Traps Work

SNMP-managed devices are able to send trap messages to network management stations. You configure the IP addresses of NMS "trap sinks" that are to receive the RMON trap messages. For additional information on traps, refer to RFC 1215: M. Rose, "A Convention for Defining Traps for use with the SNMP", 03/27/1991.

The trap IP address can be configured on all DEChub 900 modules through the device's set-up port. With the exception of the DECserver 900 products, the trap IP address can also be added via SNMP set-requests to the device's private MIB (pcomSnmpAuthTrapAddressTable).

You can specify that when an alarm condition is reached, a trap is generated and sent to the trap sinks specified. For additional information on how to specify trap generation, refer to eventType RFC 1757: S. Waldbusser, "Remote Network Monitoring Management Information Base", 02/10/1995.

Glossary

Overview

Introduction

This glossary lists and defines terms used in the DIGITAL MultiSwitch 600 system documentation.

In This Glossary

Topic	Page
Terms	Glossary-2

Terms

This manual uses the following terms

Terms	Descriptions
Ethernet	Local Area Network (LAN) compatible with the ISO 8801-3/ANSI/IEEE 802.3 standards and the Ethernet standards for Carrier Sense Multiple Access with Collision Detection (CSMA/CD) local area networks (LANs).
Hot-swappable	The removal or insertion of a module into either the DIGITAL MultiSwitch 600 System or the DEChub 900 MultiSwitch without disrupting power to the unit. Do not simultaneously hot-swap more than one module. Simultaneously inserting or removing more than one module can cause problems with the operation of other installed modules.
Internet Protocol (IP) Address	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 (.). For example, 16.20.54.156
Media Access Control (MAC) Address	The following format represents a Media Access Control (MAC) address in examples and figures: 08-00-2B-A3-00-00
DIGITAL MultiSwitch 600 System	The DIGITAL MultiSwitch 600 System is a shared-to-switch workgroup system with modular components. The DIGITAL MultiSwitch 600 System contains Stack Stations and a Stack Director which provide power, backplane interconnect and SNMP management to a DIGITAL MultiSwitch 600 System system in a stack configuration. The DIGITAL MultiSwitch 600-series functional modules (hubs and switches) attach to the Stack Station and Stack Director.
Stack Director	The power supply, setup port, backplane, and SNMP agent interface for a functional module and the MultiSwitch 600 system.
Stack Station	The power supply and setup port interface for functional module.
ThinWire	10Base2 coaxial cable 10 Mb/s Ethernet connection.

Terms	Descriptions
Twisted Pair	Twisted pair cable 10 Mb/s Ethernet connection.
	This is wiring similar to that found in the telephone system, consisting of two insulated wires loosely twisted around each other to help cancel out induced noise in balanced circuits.
10Base2	10Base2 coaxial cable 10 Mb/s Ethernet connection.
10BaseT	Twisted-pair cable 10 Mb/s Ethernet connection.

Index