

DIGITAL MultiSwitch 612EX

Installation and Configuration

Part Number: EK-DLMWL-IN. B01

March 1997

This book describes how to install, cable and configure the DIGITAL MultiSwitch 612EX in a DIGITAL MultiSwitch 600 System (Stack Director or Stack Station) or a DEChub 900 MultiSwitch.

Revision/Update Information: This is a revised document.

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This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio and television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: (1) Reorient or relocate the receiving antenna. (2) Increase the separation between. (3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. (3) Consult the dealer or an experienced radio/TV technician for help.

CE Notice — Class A Computing Device:

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.

Avertissement!

Cet appareil est un appareil de Classe A. Dans un environnement résidentiel cet appareil peut provoquer des brouillages radioélectriques. Dans ce cas, il peut être demandé à l'utilisateur de prendre les mesures appropriées.

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Preface

Overview

About this Manual

This manual describes how to install, cable and configure the DIGITAL MultiSwitch 612EX in a DIGITAL MultiSwitch 600 System, or in a DEChub 900 MultiSwitch.

The DIGITAL MultiSwitch 612EX is a 12-port Ethernet Switch, with two option slots. The option slots can be configured with 10BaseFL, 100BaseFX, or 100BaseTX modular media interfaces (Mod-MACs). When both option slots contain Mod-MACs, the DIGITAL MultiSwitch 612EX provides a total of 14 ports. The DIGITAL MultiSwitch 612EX can be installed in a DIGITAL MultiSwitch 600 System 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 612EX 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 612EX
1	Describes the technology, the front and back panels of the DIGITAL MultiSwitch 612EX module, Mod-MACs, and the DIGITAL MultiSwitch 600 system.
2	Provides instructions for installing and cabling the 10BaseFL, 100BaseFX and 100BaseTX Mod-MACs.
3	Provides instructions for installing and cabling the DIGITAL MultiSwitch 612EX module.
4	Provides instructions for configuring the DIGITAL MultiSwitch 612EX installed in a DIGITAL MultiSwitch 600 System and a DEChub 900 MultiSwitch.
5	Provides instructions for managing the DIGITAL MultiSwitch 612EX in a DIGITAL MultiSwitch 600 System or a DEChub 900 MultiSwitch.
6	Provides instructions for removing the DIGITAL MultiSwitch 612EX from a DIGITAL MultiSwitch 600 System and a DEChub 900 MultiSwitch.
Part II	DIGITAL MultiSwitch 600 System
7	Provides an overview, describes features, and describes the front and back panels of the Stack Director and the Stack Station.
8	Provides instructions for assembling the DIGITAL MultiSwitch 600 Stack Director and Stack Stations.
9	Provides instructions for managing the DIGITAL MultiSwitch 600 stack.
10	Provides instructions for removing or replacing a level from a DIGITAL MultiSwitch 600 stack.

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	Provides service and support information.
G	Provides detailed information on Port Switching Modes.
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 Geräte vor Schaden zu bewahren.
DANGER	Signale les informations destinées à prévenir les accidents corporels.
ATTENTION	Signale les informations destinées à prévenir la détérioration du matériel.
AVISO	Contiene información para evitar daños personales.
PRECAUCIÓN	Contiene información para evitar daños al equipo.

Safety

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 láserica o infrarroja con riesgos de lesiones en los ojos. No se debe nunca mirar en una fibra óptica o una puerta de conexión. Siempre hay que suponer que el cable está conectado a una fuente luminosa.

Safety

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 werden. Aus diesem Grunde wird dringend empfohlen, Vorkehrungen zu treffen, daß während der Durchführung dieser Phase 3 die Systemeinheit weder ausgeschaltet noch die Stromversorgung unterbrochen werden kann.
ATTENTION	L'image du microprogramme risque d'être corrompue, en cas de coupure de courant au cours de l'étape 3 du processus DLU. Ne mettez pas l'unité hors tension et n'exécutez aucune action risquant d'entraîner une coupure d'alimentation au cours de cette étape.
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.

CAUTION	Be sure to remove the module from its power source (the DEChub 900 MultiSwitch or the DIGITAL MultiSwitch 600 System) before performing any Mod-MAC removal and replacement procedures.
ACHTUNG	Achten Sie darauf, daß das Modul von seiner Energiequelle abgetrennt wurde (DEChub 900 MultiSwitch oder DIGITAL MultiSwitch 600 System), bevor Sie das Mod-MAC entfernen oder auswechseln.
ATTENTION	Assurez-vous que vous avez débranché le module de sa source d'alimentation (interrupteur multiple DEChub 900 ou DIGITAL MultiSwitch 600 System) avant de retirer ou de remplacer le Mod-MAC.
PRECAUCIÓN	Es preciso cerciorarse de retirar el módulo de la fuente de energía (Conmutador múltiple DEChub 900 o DIGITAL MultiSwitch 600 System) antes de realizar cualquier procedimiento de cambio y replazo del Mod-MAC.

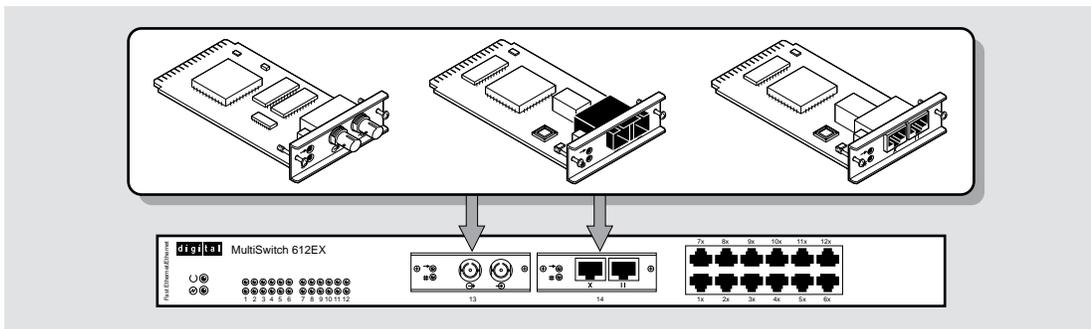
Safety

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.

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 612EX



NPB-0663-96F

This illustration shows the DIGITAL MultiSwitch 612EX module and the Mod-MAC types that it supports.

The DIGITAL MultiSwitch 612EX is a 12-port Ethernet Switch, with two option slots. The option slots can be configured with 10BaseFL, 100Base FX, or 100Base TX modular media interfaces (Mod-MACs). When both option slots contain Mod-MACs, the DIGITAL MultiSwitch 612EX provides a total of 14 ports.

The DIGITAL MultiSwitch 612EX can be installed in a DIGITAL MultiSwitch 600 System or a DEChub 900 MultiSwitch chassis.

Chapter 1

Product Description

Overview

Introduction

This chapter contains brief technological definitions, an overview of the DIGITAL MultiSwitch 600 System, and a description of the DIGITAL MultiSwitch 612EX and its modular interface options. 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

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Technological Overview

This section describes the technology you should be familiar with to use the DIGITAL MultiSwitch 612EX and related products effectively.

Ethernet

Ethernet is a 10 Mb/s local area network technology 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 8802-3 ANSI/IEEE Standard 802.3.

Fast Ethernet

Fast Ethernet is a 100 Mb/s extension to Ethernet and is referred to as 100BaseT. Fast Ethernet uses ISO/IEC8802-3 CSMA/CD MAC protocol, but implements the protocol at 100 Mb/s. MAC frame formats and sizes are however identical to those used by 10 Mb/s Ethernet.

The 100BaseT standard currently includes the following subsets, collectively known as 100BaseX:

- 100BaseTX. A standard that specifies baseband operation over two pairs of category 5 unshielded twisted pair (UTP) cable, or two pairs of type-1 shielded twisted pair (STP) cable. One pair of wires is for receiving and the other pair is for transmitting.
- 100BaseFX. A standard that specifies baseband operation over two strands of fiber optic cable.

Shared Hubs

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

Switching

A switch is a network device that switches data traffic between two or more attached LANs or devices. A switch allows simultaneous transmissions of multiple packets on multiple ports using internal buffering. Unlike a shared hub, each port on a switch belongs to an independent collision domain. Thus a switch makes full media bandwidth available to each port.

Technological Overview

The learning function in a switch creates associations between source addresses and the port numbers on which packets with these source address were received. These learned associations enable the switch to make intelligent packet forwarding decisions resulting in efficient use of available bandwidth. For example, if the destination address of a packet was learned on the port on which the packet was received, the packet is not forwarded at all. If the destination address was learned on a different port, the packet is transmitted to that port only.

There are two major types of switches; store-and-forward and cut-through.

- A store-and-forward switch receives an entire packet, verifies that the packet has been received without error, processes the destination address (and optionally other fields), and then forwards the packet.
- A cut-through switch reads the packet's destination address, and immediately forwards the packet. While this can be advantageous, bad packets can be propagated throughout the network as a result.

The DIGITAL MultiSwitch 612EX is a store-and-forward switch with 12 Ethernet ports and up to two Fast Ethernet ports.

What is the DIGITAL MultiSwitch 600 System?

After a stack is assembled, hubs and switches are 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 provides a GUI that allows you to manage both the DEChub 900 MultiSwitch and the GIGAswitch product families, in addition to the DIGITAL MultiSwitch 600 System.

What is the DIGITAL MultiSwitch 600 System?

DIGITAL MultiSwitch 600 System Features

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

- Modular architecture.
- Choice of 10 Mb/s and 100 Mb/s hubs and switches integrated into a 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 are hot-swappable to eliminate network down time during network changes.
- A Stack Director that contains the 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 modules, such as the DIGITAL MultiSwitch 612EX, may also be used in the DEChub 900 MultiSwitch. Power and backplane connections are implemented using the common 48-pin connector. DIGITAL MultiSwitch 600 modules are fully managed and are hot swappable, both in the DIGITAL MultiSwitch 600 platform and in the DEChub 900 MultiSwitch. However, there are some functional differences when using a DIGITAL MultiSwitch 600 module in a DEChub 900 MultiSwitch.

The DIGITAL MultiSwitch 600 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. As in the DIGITAL MultiSwitch 600 System, there is a 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. Therefore, a DIGITAL MultiSwitch 600 module used in a DEChub 900 MultiSwitch has two backplane Ethernet channels available (10Base2 and one flex channel). The DIGITAL MultiSwitch 600 modules are backplane compatible with all DEChub 900 MultiSwitch modules on the 48-pin connector.

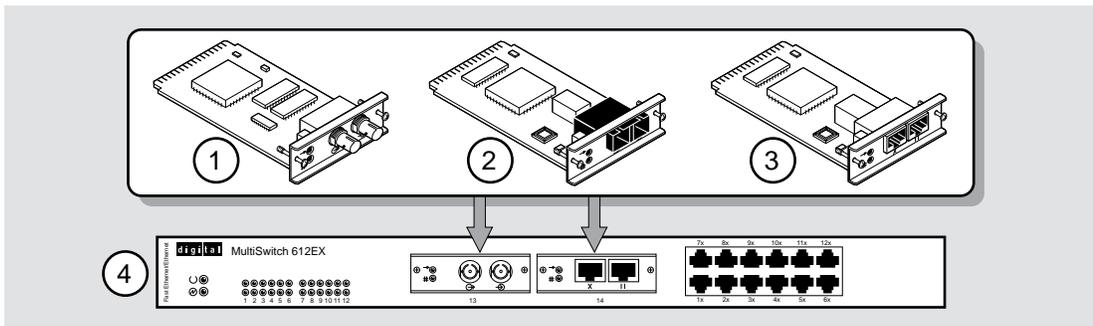
DIGITAL MultiSwitch 600 modules do not provide the IP services function. A DEChub 900 MultiSwitch requires the use of an IP services module for in-band access to the SNMP Management Agent through an In-Band connection. When using DIGITAL MultiSwitch 600 modules in a DEChub 900 MultiSwitch at least one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

What is the DIGITAL MultiSwitch 612EX?

What is the DIGITAL MultiSwitch 612EX?

The DIGITAL MultiSwitch 612EX (4) (also referred to in this document as the module) is an Ethernet switch with 12 fixed 10BaseT ports. It also has media expansion slots that can accommodate Mod-MACs. You can combine any of the following Mod-MAC options into the expansion slots. The three supported Mod-MAC options are as follows:

- 10BaseFL (1)
- 100BaseFX (2)
- 100BaseTX (3)



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The DIGITAL MultiSwitch 612EX can be installed in a Stack Director or in a 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 the Simple Network Management Protocol (SNMP).

What is the DIGITAL MultiSwitch 612EX?

DIGITAL MultiSwitch 612EX Features

The DIGITAL MultiSwitch 612EX includes the following features:

- Twelve 10BaseT switched ports for 10 Mb/s Ethernet connections
- Two modular ports, which can be populated with any combination of the following types of Mod-MACs:
 - 10BaseFL - 10 Mb/s, Fiber Optic
 - 100BaseFX - 100 Mb/s, Fiber Optic
 - 100BaseTX - 100 Mb/s Twisted pair (operates at 10 Mb/s also)
- Ability to install the module in a DIGITAL MultiSwitch 600 System or DEChub 900 MultiSwitch
- Line speed forwarding and destination address filtering
- Alarms, Events, Statistics and History RMON group support in a DIGITAL MultiSwitch 600 System (requires a Stack Director)
- Ability to hot-swap module in and out of a stack or DEChub 900 MultiSwitch
- Store-and-Forward switching to ensure error free packet processing
- An address database that holds up to 1023 learned addresses and management-specified address filters; up to 256 filters can be saved in Nonvolatile Random Access Memory (NVRAM)
- Support for half-duplex mode or full-duplex mode operation on all 10 Mb/s and 100 Mb/s ports
- Port-level statistics for monitoring performance on every port
- Port-level security to prevent unauthorized access, including automatic and manual authorization of secure addresses
- Up to seven software controlled Ethernet Backplane LANs in a DIGITAL MultiSwitch 600 System
- Broadcast and/or multicast storm control with support for various policies
- Port State and Module State LEDs for visual monitoring and troubleshooting
- Compliance with the following standards:
 - IEEE 802.3 (including IEEE 802.3u)
 - IEEE 802.1D

What is the DIGITAL MultiSwitch 612EX?

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
- Ethernet MIB (RFC 1398)
- Bridge MIB (RFC 1493)
- DEC StackSwitch MIB
- IETF MAU MIB (Draft 3)

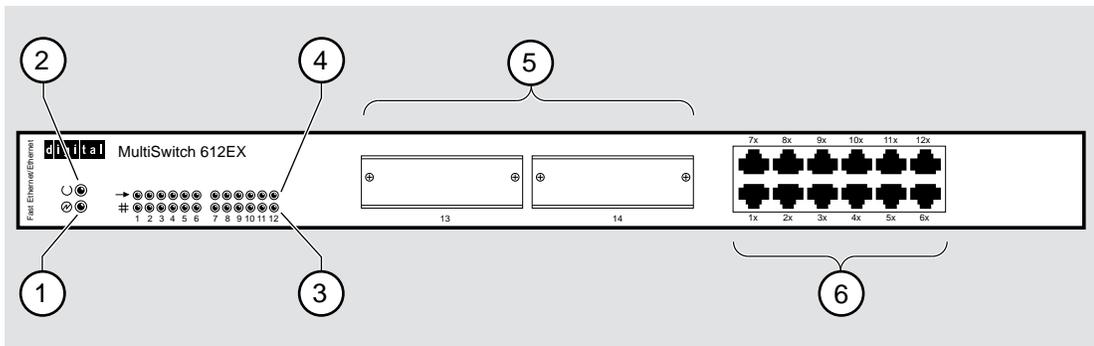
For information on how to access DIGITAL MIBs, follow the procedures in the DIGITAL MultiSwitch 612EX Release Notes.

What is the DIGITAL MultiSwitch 612EX?

DIGITAL MultiSwitch 612EX Front Panel

Table 1-1 describes the DIGITAL MultiSwitch 612EX front panel components and Figure 1-1 shows their location. For detailed information about the LEDs, refer to Appendix A.

Figure 1-1: DIGITAL MultiSwitch 612EX Front Panel Components



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Table 1-1: DIGITAL MultiSwitch 612EX Front Panel Component Descriptions

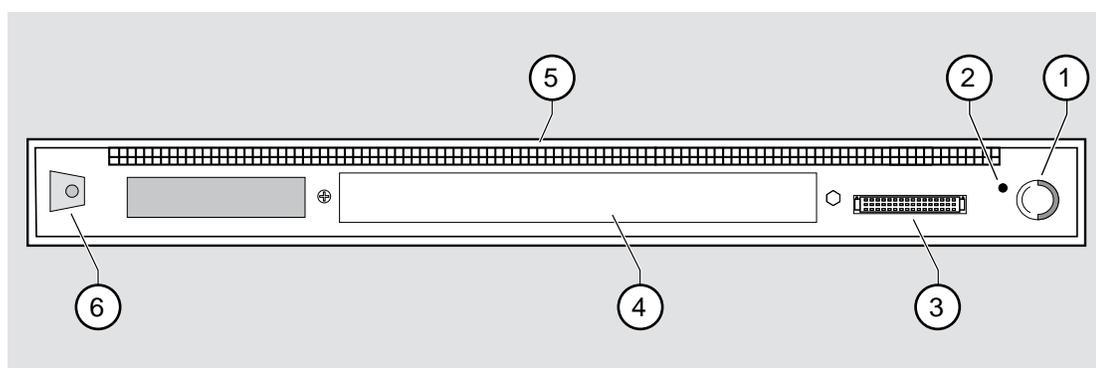
Item	Icon	Name	Description
1		Power OK LED	Indicates the module has power.
2		Module OK LED	Indicates self-test status.
3		Port Status LEDs	Indicate connection status.
4		Port Activity LEDs	Indicate traffic level through the front panel or backplane.
5		Modular Media Interfaces (Mod-MAC) slots	Two optional Mod-MAC slots into which you can install a 100BaseFX, 100BaseTX, or 10BaseFL Mod-MAC option.
6		10BaseT (8-pin MJ) ports	Ports for connecting network devices (PCs, workstations, hubs or switches).

What is the DIGITAL MultiSwitch 612EX?

DIGITAL MultiSwitch 612EX Back Panel

Table 1-2 describes the DIGITAL MultiSwitch 612EX back panel components and Figure 1-2 shows their location.

Figure 1-2: DIGITAL MultiSwitch 612EX Back Panel Components



NPB-0458-96F

Table 1-2: DIGITAL MultiSwitch 612EX Back Panel Component Descriptions

Item	Name	Description
1	Locking Tab	Secures the DIGITAL MultiSwitch 612EX to a Stack Station or the DEChub 900.
2	Slotted Thumbscrew Receptacle	Slotted Thumbscrew secures the Stack Director or Stack Station to the DIGITAL MultiSwitch 612EX.
3	48-pin Connector	Provides network and power connections to the DIGITAL MultiSwitch 612EX when it is connected to a Stack Director, Stack Station or the DEChub 900 backplane.
4	Manufacturing Label	Lists the DIGITAL MultiSwitch 612EX module part number, serial number, revision level, and power requirements.
5	Grounding Fingers	Provide chassis grounding between the DIGITAL MultiSwitch 612EX and the Stack Station.
6	Mounting Tab	Attaches the DIGITAL MultiSwitch 612EX to a Stack Director or a Stack Station or a DEChub 900 mounting slot.

Mod-MACs

The DIGITAL MultiSwitch 612EX supports up to three modular media interface options known as Mod-MACs. The DIGITAL MultiSwitch 612EX supports the following types of Mod-MAC cards:

- 10BaseFL
- 100BaseFX
- 100BaseTX

CAUTION

Be sure to remove the module from its power source (the DEChub 900 MultiSwitch, or the Stack Director, or the Stack Station) before performing any Mod-MAC removal and replacement procedures.

The following sections describe each Mod-MAC. (Chapter 2 describes how to install these Mod-MACs in the DIGITAL MultiSwitch 612EX.)

Mod-MAC	Page
10BaseFL Mod-MAC	1-15
100BaseFX Mod-MAC	1-16
100BaseTX Mod-MAC	1-17

10BaseFL Mod-MAC

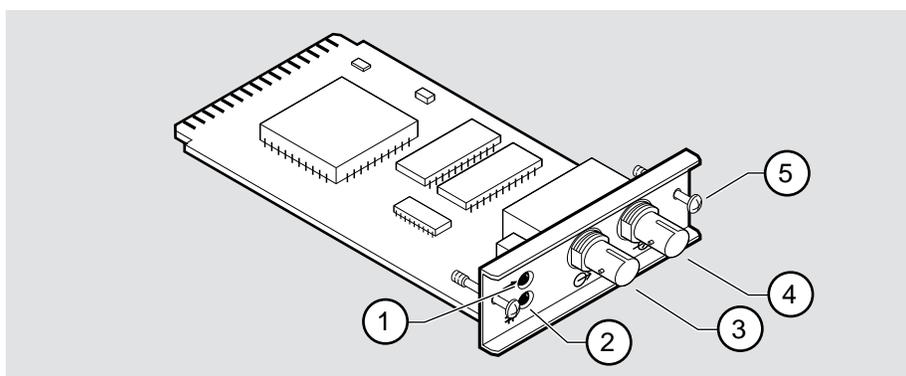
The 10BaseFL Mod-MAC card is a single-port 10 Mb/s Ethernet port that operates in the 850 nm window over 10BaseFL media at distances up to 2 km. It is 10BaseFL compliant and is compatible with FOIRL standards. Table 1-3 describes the components on the 10BaseFL Mod-MAC and Figure 1-3 shows their location.

CAUTION

Be sure to remove the module from its power source (the DEChub 900 MultiSwitch, or the DIGITAL MultiSwitch 600 System) before performing any Mod-MAC removal and replacement procedures.

For information on troubleshooting the Mod-MAC's LEDs, refer to Appendix A.

Figure 1-3: 10BaseFL Mod-MAC Components



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Table 1-3: 10BaseFL Mod-MAC Component Descriptions

Item	Icons	Name	Description
1	→	Activity LED	When on, network traffic has been detected.
2	⊕	Port Status LED	Indicates whether the port is connected, or has been shut down by management or, if a diagnostic test failed.
3	⊕	Transmit Connector	A ST type connector for multimode fiber (MMF) connections.
4	⊕	Receive Connector	A ST type connector for MMF connections.
5		Captive Screw	Secures the Mod-MAC to the module.

Mod-MACs

100BaseFX Mod-MAC

The 100BaseFX Mod-MAC card contains a Fast Ethernet (IEEE 802.3u standard) port that is compliant with the 100BaseFX standard. The 100BaseFX Mod-MAC is capable of half or full duplex mode of operation at 100 Mb/s. The default mode of operation is half-duplex.

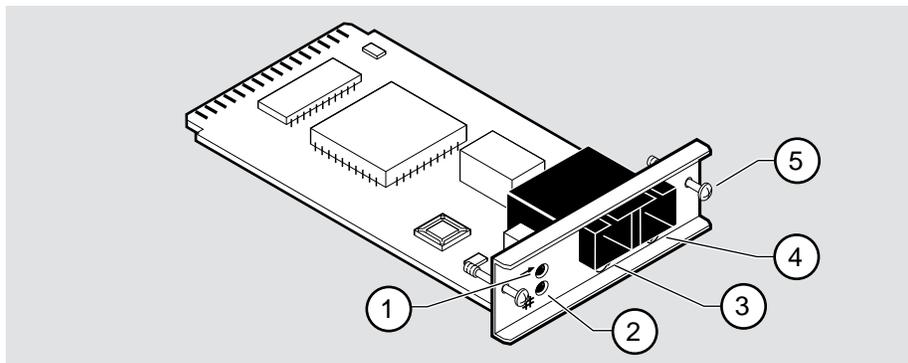
Table 1-4 describes the components on the 100BaseFX Mod-MAC and Figure 1-4 shows their location.

CAUTION

Be sure to remove the module from its power source (the DEChub 900 MultiSwitch, or the DIGITAL MultiSwitch 600 System) before performing any Mod-MAC removal and replacement procedures.

For troubleshooting information using the Mod-MAC LEDs, refer to Appendix A.

Figure 1-4: 100BaseFX Mod-MAC Components



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Table 1-4: 100BaseFX Mod-MAC Component Descriptions

Item	Icons	Name	Description
1	→	Activity LED	When on, network traffic has been detected.
2	⊕	Port Status LED	Indicates whether the port is connected, or has been shut down by management, or if a diagnostic test failed.
3	⊕	Transmit Connector	Multimode Fiber (MMF) SC type connector.
4	⊖	Receive Connector	Multimode Fiber (MMF) SC type connector.
5		Captive Screw	Secures the Mod-MAC to the module.

100BaseTX Mod-MAC

The 100BaseTX Mod-MAC card contains a Fast Ethernet (IEEE 802.3u standard) port that is compliant with the 100BaseTX standard. It provides both a straight-through connector and a crossover connector (see NOTE below). The 100BaseTX Mod-MAC is capable of dual speed (10/100 Mb/s) operation, half/full duplex mode of operation and auto-negotiation. Auto-negotiation of speed and duplex-mode is enabled by default. Table 1-5 describes the components on the 100BaseTX Mod-MAC and Figure 1-5 shows their locations.

CAUTION

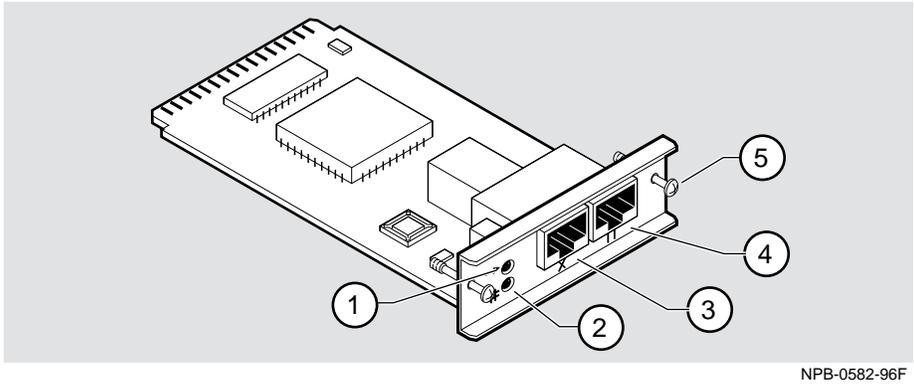
Be sure to remove the module from its power source (the DEChub 900 MultiSwitch, or the DIGITAL MultiSwitch 600 System) before performing any Mod-MAC removal and replacement procedures.

NOTE

Do not simultaneously connect a crossover connector and a straight-through connector on the same Mod-MAC. Only one 100BaseTX port per Mod-MAC can be used at a time.

Mod-MACs

Figure 1-5: 100BaseTX Mod-MAC Components



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Table 1-5: 100BaseTX Mod-MAC Component Descriptions

Item	Icons	Name	Description
1	→	Activity LED	When on, network traffic has been detected.
2	⊕⊕	Port Status LED	Indicates whether the port is connected, or has been shut down by management, or if a diagnostic test failed.
3	X	8-pin MJ Connector, Reversed RX/TX	A crossover wired port connector. Cable connections are defined in Chapter 2.
4	//	8-pin MJ Connector, Standard Pinout	A straight-through wired port connector. Cable connections are defined in Chapter 2.
5		Captive Screw	Secures the Mod-MAC to the module.

Chapter 2

Mod-MAC Installation and Cabling

Overview

Introduction

This chapter describes how to install the Mod-MACs in the DIGITAL MultiSwitch 612EX.

In This Chapter

Topic	Page
About Mod-MACs	2-2
Removing the Dust Covers from the DIGITAL MultiSwitch 612EX	2-3
Installing the Mod-MACs in the DIGITAL MultiSwitch 612EX	2-4
Connecting Cables to the Mod-MAC Ports	2-6
Connecting Cables to the 10BaseFL Mod-MAC Port	2-7
Connecting Cables to the 100BaseFX Mod-MAC Port	2-8
Connecting Cables to the 100BaseTX Mod-MAC Port	2-9

About Mod-MACs

Mod-MACs are *not* hot-swappable, therefore, the module *must* be powered off via the Stack Station/Stack Director *or* removed from the DIGITAL MultiSwitch 600 System or DEChub 900 MultiSwitch prior to installing Mod-MACs.

If you are installing optional Mod-MACs into the DIGITAL MultiSwitch 612EX (10BaseFL Mod-MACs, 100BaseFX Mod-MACs or 100BaseTX Mod-MACs), complete the tasks in this section.

CAUTION

Be sure to remove the module from its power source (the DEChub 900 MultiSwitch, or the DIGITAL MultiSwitch 600 System) before performing any Mod-MAC removal and replacement procedures.

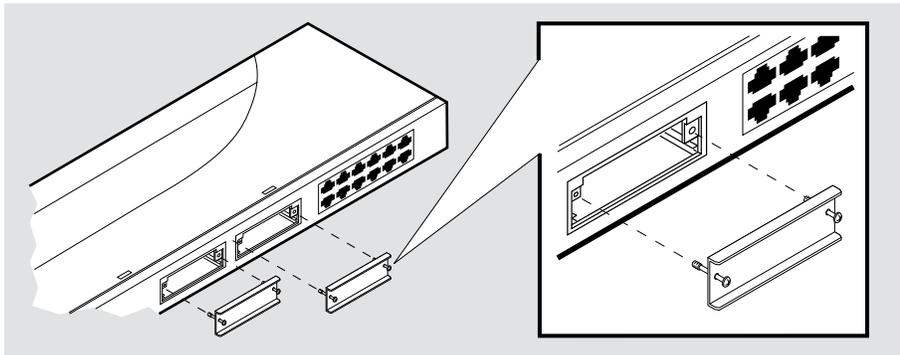
CAUTION

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.

Removing the Dust Covers from the DIGITAL MultiSwitch 612EX

Figure 2-1 shows dust cover location and the table describes how to remove the cover(s).

Figure 2-1: Dust Cover Removal



NPB-0544-96F

Step	Action
1	Remove the dust cover(s) by loosening but not removing the two captive screws on the dust cover.
2	Remove and save the dust cover with attached captive screws.

Installing the Mod-MACs in the DIGITAL MultiSwitch 612EX

Up to two Mod-MACs of the same type or mixed, can be installed in a DIGITAL MultiSwitch 612EX (one in each slot).

When installing Mod-MACs, the Mod-MAC LEDs should be facing in the same direction as the DIGITAL MultiSwitch 612EX Power OK LED. Figure 2-2 shows the Mod-MAC location and the table describes how to insert any Mod-MACs.

CAUTION

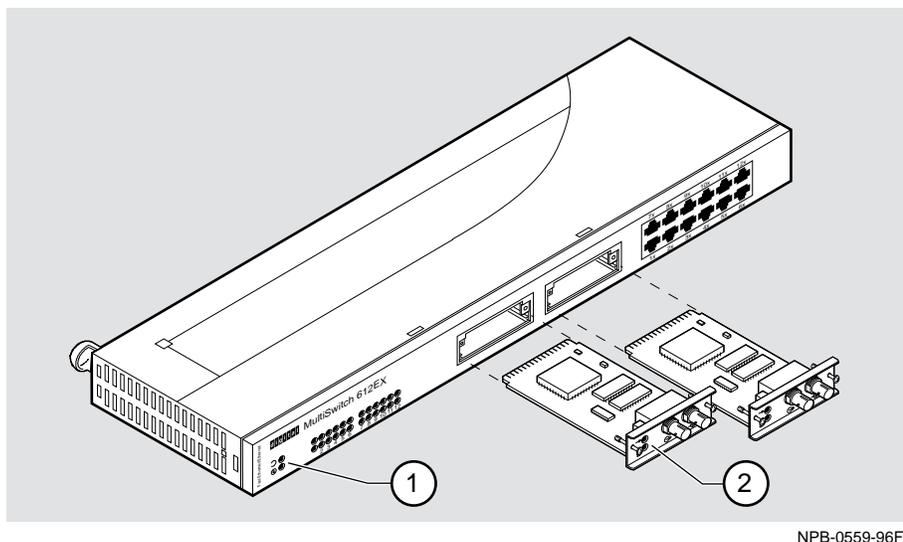
Be sure to remove the module from its power source (the DEChub 900 MultiSwitch or the DIGITAL MultiSwitch 600 System) before performing any Mod-MACs removal and replacement procedures.

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.

Installing the Mod-MACs in the DIGITAL MultiSwitch 612EX

Figure 2-2: Mod-MAC Locations



Step	Action
1	When installing Mod-MACs, the Mod-MAC LEDs (2) should be facing in the same direction as the DIGITAL MultiSwitch 612EX Power OK LED (1). Hold the Mod-MAC by its bracket and position it so that it is parallel with a media expansion slot opening on the DIGITAL MultiSwitch 612EX module.
2	Insert the Mod-MAC and align its sides with the card guide on the slot of the DIGITAL MultiSwitch 612EX module.
3	Push in the connector until it is seated in the option slot.
4	Secure the Mod-MAC to the DIGITAL MultiSwitch 612EX module using the two screws shipped with the Mod-MAC.

Prior to cabling Mod-MACs and the DIGITAL MultiSwitch 612EX, you need to install the DIGITAL MultiSwitch 612EX module in a DEChub 900 or in a DIGITAL MultiSwitch 600 as described in Part II.

Connecting Cables to the Mod-MAC Ports

This section describes how to connect cables to the Mod-MAC.

Action . . .	See Page . . .
Connecting Cables to the 10BaseFL Mod-MAC Port	2-7
Connecting Cables to the 100BaseFX Mod-MAC Port	2-8
Connecting Cables to the 100BaseTX Mod-MAC Port	2-9

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

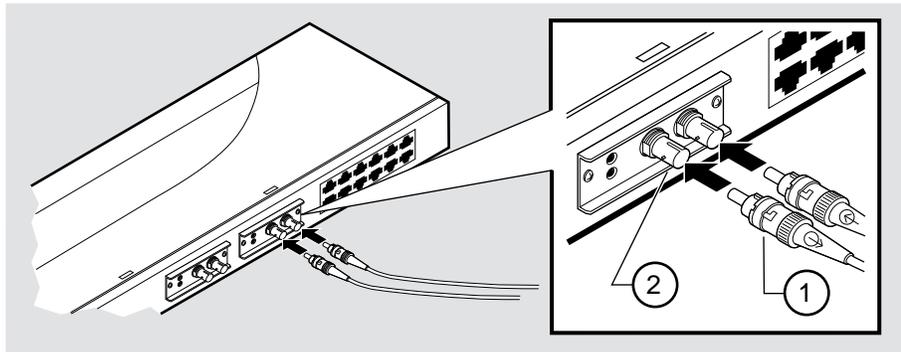
Connecting Cables to the 10BaseFL Mod-MAC Port

Figure 2-3 shows how to cable 10BaseFL Mod-MACs and the following table describes the process.

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 2-3: 10BaseFL Mod-MAC Connectors



NPB-0566-96F

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).

NOTE

The bend radius of any fiber-optic cable is 1 inch (2.5 cm) or greater. To avoid optical power loss, do not touch the fiber ends.

Connecting Cables to the Mod-MAC Ports

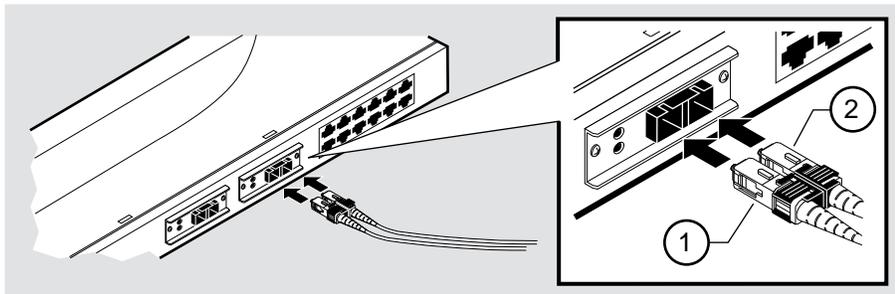
Connecting Cables to the 100BaseFX Mod-MAC Port

The following table describes how to cable the 100BaseFX Mod-MACs as shown in Figure 2-4.

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 2-4: 100BaseFX Mod-MAC Connection



NPB-0610-96F

Step	Action
1	Line up the transmit cable connector (1) with the transmit port and the receive cable connector (2) with the receive port.
2	Insert the 100BaseFX connectors ensuring that the connector is correctly positioned.
3	Connect the other end of the cable to a network device (PC, workstation, switch or hub).

NOTE

The bend radius of any fiber-optic cable is 1 inch (2.5 cm) or greater. To avoid optical power loss, do not touch the fiber ends.

Connecting Cables to the Mod-MAC Ports

Connecting Cables to the 100BaseTX Mod-MAC Port

The following table describes cabling the 100BaseTX Mod-MACs as shown in Figure 2-5. Use the following table to ensure that the module's transmit/receive signals connect correctly to the transmitter/receiver of the connected device.

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

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

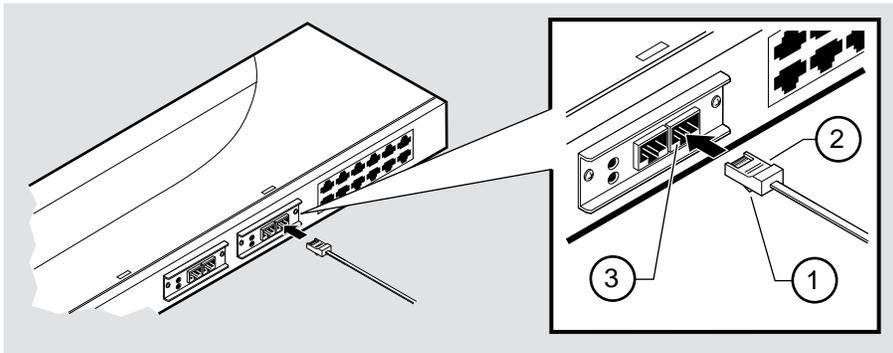
If you have this cable type . . .	and the device you are connecting has this connector . . .	use this connector on the 100BaseTX . . .
Straight-through cable ¹	Straight-through connector ¹	Crossover port
Straight-through cable ¹	Crossover connector ¹	Straight-through port
Crossover cable ¹	Straight-through connector ¹	Straight-through port
Crossover cable ¹	Crossover connector ¹	Crossover port

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.

Connecting Cables to the Mod-MAC Ports

Figure 2-5: 100BaseTX Cable Connection



NPB-0565-96F

Step	Action
1	Align the release tab (1) on the cable plug (2) with the port connector (3) on the module's 100BaseTX Mod-MAC.
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 a network device (PC, workstation, switch or hub).

Chapter 3

Module Installation and Cabling

Overview

Introduction

This chapter describes how to install the DIGITAL MultiSwitch 612EX in a DIGITAL MultiSwitch 600 System and in a DEChub 900 MultiSwitch.

In This Chapter

Topic	Page
Installing the DIGITAL MultiSwitch 612EX in a Stack Director or Stack Station	3-2
Installing the DIGITAL MultiSwitch 612EX in a DEChub 900	3-4
Task 1: Compare the Power Ratings	3-5
Task 2: Seat the Module into the DEChub 900	3-6
Task 3: Verify Initial LED Operation	3-7
Task 4: Connect Necessary Cables	3-8
Connecting Cables to 10BaseT Ports on the DIGITAL MultiSwitch 612EX	3-10

Installing the DIGITAL MultiSwitch 612EX in a Stack Director or Stack Station

Prior to cabling the DIGITAL MultiSwitch 612EX including Mod-MACs, you need to install the DIGITAL MultiSwitch 612EX module in either a Stack Director or Stack Station. This section describes how to attach a DIGITAL MultiSwitch 612EX to a Stack Director or a Stack Station. You will need a flat-blade screwdriver for the installation.

Part II of this manual explains the features of a Stack Station and how to attach the Stack Director to a tray and how to build a stack with one Stack Director and seven Stack Stations.

NOTE

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

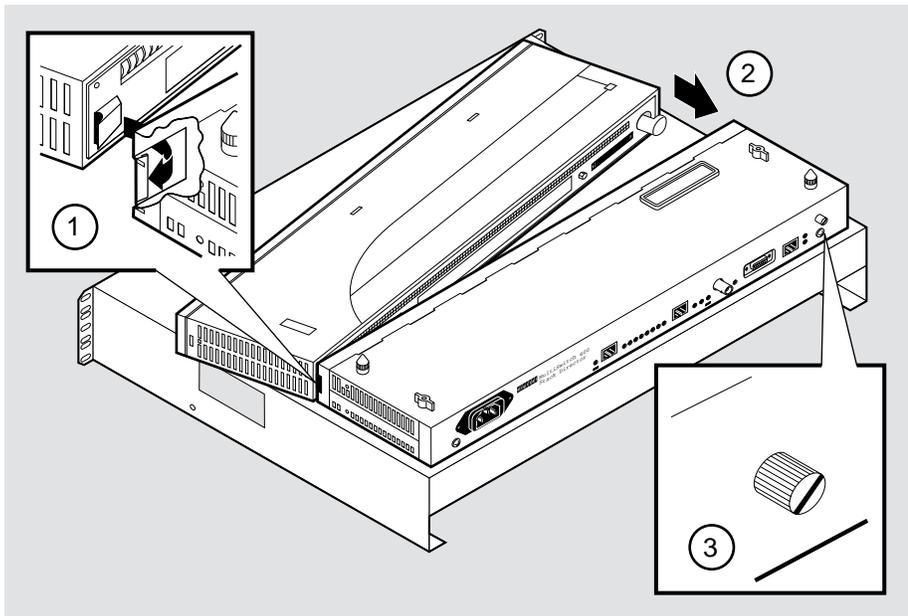
CAUTION

Be sure to remove the module from its power source (the DEChub 900 MultiSwitch or the DIGITAL MultiSwitch 600 System) before performing any Mod-MAC removal and replacement procedures.

Figure 3-1 shows the DIGITAL MultiSwitch 612EX being attached to the Stack Director. The following table describes the process.

Installing the DIGITAL MultiSwitch 612EX in a Stack Director or Stack Station

Figure 3-1: Attaching the Module to the Stack Director or Stack Station



NPB-0499-96F

Step	Action
1	Place the mounting tab on the DIGITAL MultiSwitch 612EX module into the mounting slot on the Stack Director or Stack Station (1).
2	Push the DIGITAL MultiSwitch 612EX securely against the Stack Director or Stack Station (2).
3	Tighten the slotted thumbscrew on the Stack Director or Stack Station (3).

Installing the DIGITAL MultiSwitch 612EX in a DEChub 900

The DIGITAL MultiSwitch 612EX hot-swap feature allows you to install the module into the DEChub 900 without turning off power. However, if you are using Mod-MACs, you must install them in the module first because they are not hot-swappable. Seating the module initiates the module's powerup sequence.

CAUTION

Be sure to remove the module from its power source (the DEChub 900 MultiSwitch or the DIGITAL MultiSwitch 600 System) before performing any Mod-MAC removal and replacement procedures.

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	Connect necessary cables.

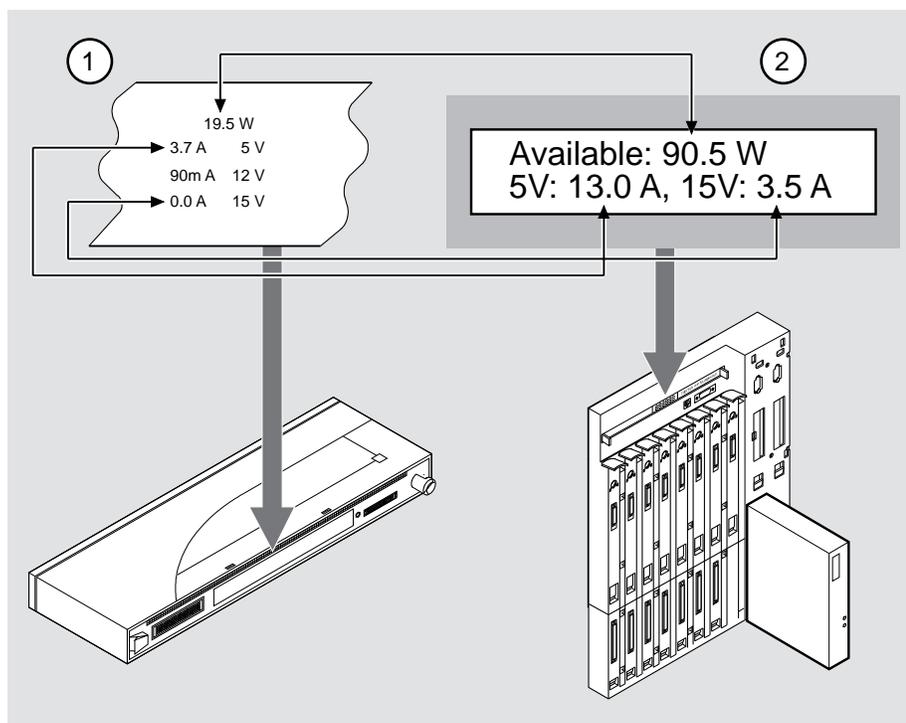
Installing the DIGITAL MultiSwitch 612EX in a DECHub 900

Task 1: Compare the Power Ratings

Compare the MultiSwitch 612EX 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 product specification, the 12V requirements are included in the 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*).

Figure 3-2: Module Power Ratings



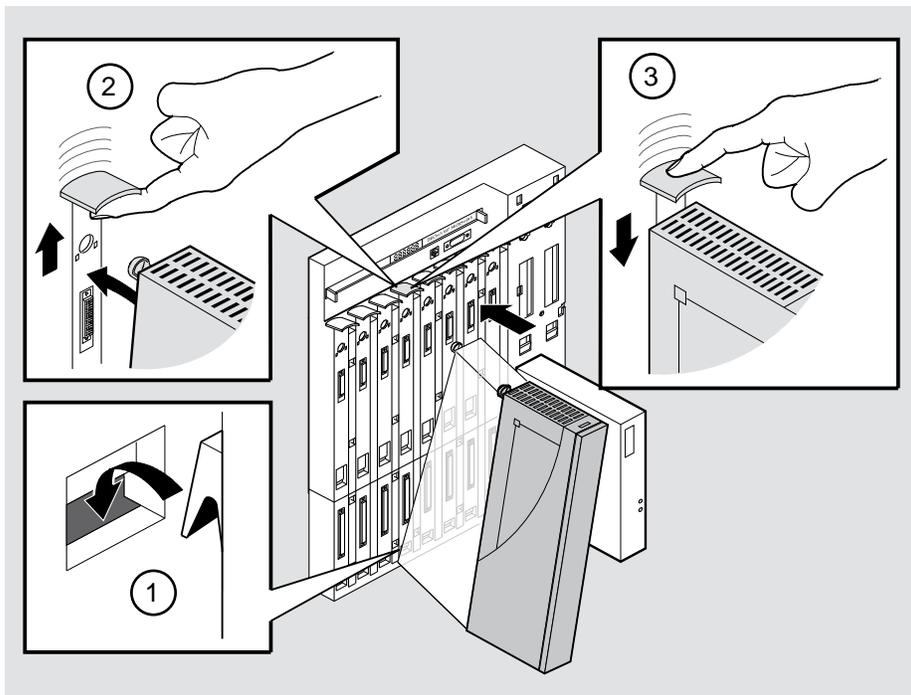
NPG-0107-95F

Installing the DIGITAL MultiSwitch 612EX in a DEChub 900

Task 2: Seat the Module into the DEChub 900

The following table describes how to seat the module in a DEChub 900 and Figure 3-3 shows the location.

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 1-1.

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 traffic LEDs display various patterns that reflect the Diagnostic tests run by the module.
2	After the module completes self-test, the Module OK LED lights and remains lit. The Hub Manager identifies the module as the module.

NOTE

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

Installing the DIGITAL MultiSwitch 612EX in a DEChub 900

Task 4: Connect Necessary Cables

Depending on your network configuration requirements, connect the appropriate 10BaseFL, 100BaseFX, and 100BaseTX cables. If you have not installed or cabled Mod-MACs, install and cable Mod-MACs according to the instructions provided in Chapter 2. See your network manager if you are not sure which cables to connect.

clearVISN or the DEChub 900 MultiSwitch setup port can be used to configure parameters. The setup port on the DEChub 900 must be connected to a setup port device (terminal or PC).

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.

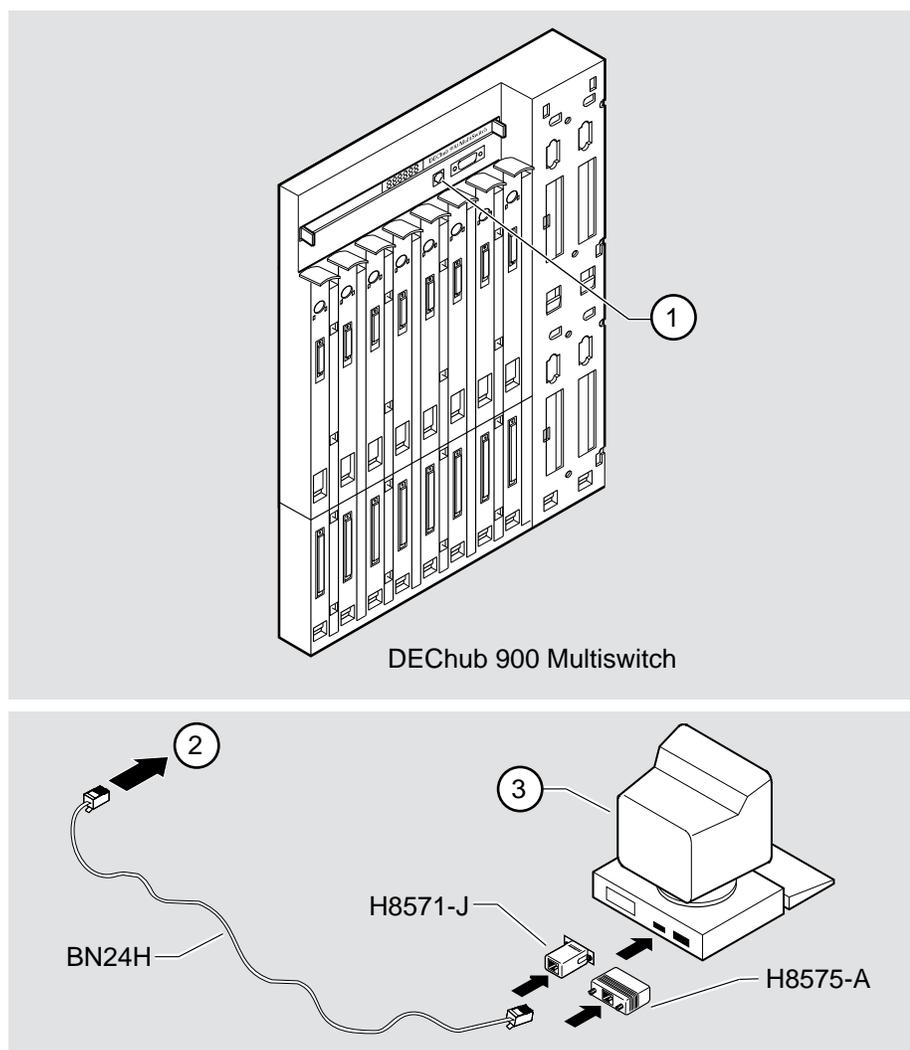
To connect the DEChub 900 setup port to a setup port device, complete the following steps.

Step	Action
1	Configure the setup-port device (terminal or PC) as follows: <ul style="list-style-type: none">• 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).

Installing the DIGITAL MultiSwitch 612EX in a DEChub 900

Figure 3-4 shows setup-port location.

Figure 3-4: Setup-Port Cabling



NPB-0510-96F

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

Connecting Cables to 10BaseT Ports on the DIGITAL MultiSwitch 612EX

This section describes how to connect cables to the 10BaseT ports on the DIGITAL MultiSwitch 612EX.

The DIGITAL MultiSwitch 612EX 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 then use . . .
to the module uses . . .**

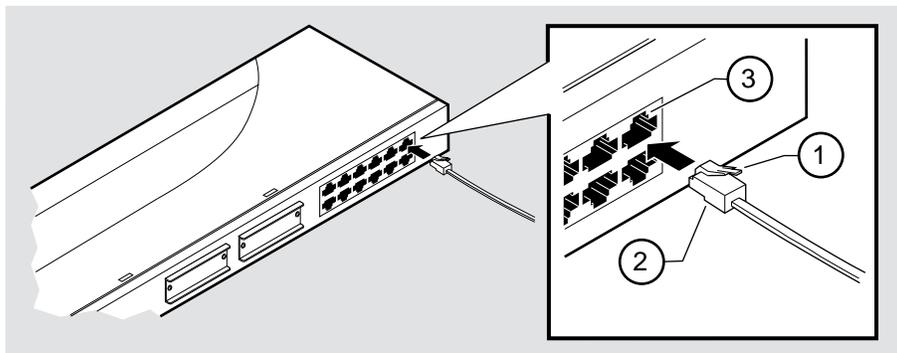
Straight-through connector	Straight-through cable ¹
Crossover connector	Crossover cable ¹

¹DIGITAL'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.

Figure 3-5 shows the cable location and the table describes how to connect them.

Figure 3-5: 10BaseT Cable Connections



NPB-0564-96F

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

Topic	Page
Configuring the Module in a Stack Director or DEChub 900	4-2
[9] Start Redirect Mode	4-3
Using the Module's Menus	4-4
[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
Configuring the Module in a Stack Station	4-9
[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
[5] Product-Specific Options	4-14

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 DIGITAL MS 600 Stack Director INSTALLATION MENU which appears when the DIGITAL MultiSwitch 612EX is installed in a DIGITAL MultiSwitch 600 System containing a Stack Director. 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 Part II, Chapter 8, Task 5: Cabling the Stack Director and Stack Station. For DEChub 900 setup port cabling refer to Part I, Chapter 3, Task 4: Connect Necessary Cables.

NOTE

Periodically, upgrades to the Firmware are released via the Internet. If you need to upgrade the firmware of your module, use the Downline Upgrade procedures provided in Appendix D.

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

```
=====
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 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 (such as the DIGITAL MultiSwitch 612EX) 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 Start Redirect Mode option from the installation menu, the screen display prompts you for a slot number. Type the slot number or level number where the DIGITAL MultiSwitch 612EX resides. In the DIGITAL MultiSwitch 600 System, slot 1 is the bottom level (which accommodates the Stack Director). 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 differ from the number used in the example below, depending on the slot number in which your module is installed.

The following example shows the dialog associated with this option.

```
=====
Enter the slot number for redirection (1-8): 1
Console redirected to 1: MS 612EX
Attempting connection [Ctrl/C to abort]...
```

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

Using the Module's Menus

This section describes the options that are available from the MS 612EX INSTALLATION MENU.

When your module is installed in either a DIGITAL MultiSwitch 600 System or a DEChub 900 MultiSwitch, the slot number where the DIGITAL MultiSwitch 612EX is installed appears at the top of the menu.

The following example shows the dialog associated with this option.

```
MS 612EX - slot 1
=====
                MS 612EX 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 configuration parameters saved in Non-volatile Random Access Memory (NVRAM) to be reinitialized to factory default values. If you need to reboot the module and retain the current settings, choose option [2] from the MS 612EX INSTALLATION MENU. Allow approximately 1 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 612EX - slot 1
=====
                        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

[2] Restart with Current Settings

This option restarts the module but leaves the configuration parameters saved in the module's NonVolatile Random Access Memory (NVRAM) at their current values. Allow approximately 1 minute for the module to restart.

The following example shows the dialog associated with this option.

```
Enter selection: 2
MS 612EX - slot 1
=====
                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. The hardware, boot ROM, and firmware versions are displayed, in addition to the system up time (time since booting) and information about the last firmware upgrade. If the module is being configured for the first time, some fields will be blank.

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

```

Enter selection : 3
MS 612EX - slot 1
=====
MS 612EX, Digital MultiSwitch 612EX, HW=C/D,RO=J,SW=V1.0
Last Firmware Upgrade V1.0,8 --> V1.0 @7 resets
SysUpTime 00:31:18: 8 resets
=====
Press Return for Main Menu ...
  
```

Line	Field	Description
①	slot 1	The slot number where the module is located.
②	MS 612EX, 12-port 10/100 Switch	The name and description of the module.
	HW=C/D	The hardware version.
	RO=J	The boot ROM version.
	SW=V1.0	The current firmware version.
③	Last Firmware Upgrade V1.0.8 --> V1.0	The current firmware upgrade version 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.
	8 resets	The total resets for the module.

[4] Dump Error Log

[4] Dump Error Log

This option displays error log dumps for use by DIGITAL support personnel when analyzing system faults. Up to eight error log dumps can be stored, and the most recent dump is displayed first. Firmware upgrades are also recorded in the error log.

The following example shows the display associated with this option:

```
Enter selection: 4
MS 612EX - slot 1
=====
DUMP ERROR LOG
Current Reset Count: 8
=====
Entry          = 3
TimeStamp      = 0      0      1c7
Reset Count    = 8
Firmware Rev. = V.1.0
V1.0 --> V1.1 Cleared config
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 612EX when the module is installed as an unmanaged standalone unit in a DIGITAL MultiSwitch 600 Stack Station. For cabling and setup port information refer to Chapter 3.

The following example shows the dialog associated with this option.

```

MS 612EX
-----
      MS 612EX INSTALLATION MENU

      [1] Restart with Factory Defaults
      [2] Restart with Current Settings
      [3] Show Current Settings
      [4] Dump Error Log
      [5] Product-Specific Options ...

-----

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
[5] Product-Specific Options . . .	4-14

[1] Restart with Factory Defaults

[1] Restart with Factory Defaults

This option reboots the module, causing its configuration parameters saved in Non-volatile Random Access Memory (NVRAM) to be reinitialized to factory default values. If you need to reboot the module and retain the current settings, choose option [2] from the MS 612EX INSTALLATION MENU. Allow approximately 1 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 612EX
=====
                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 the configuration parameters saved in the module's NonVolatile Random Access Memory (NVRAM) at their current values. Allow approximately 1 minute for the module to restart.

The following example shows the dialog associated with this option.

```
Enter selection: 2
MS 612EX
=====
                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

[3] Show Current Settings

This option shows the module's current settings. The hardware, boot ROM, and firmware versions are displayed, in addition to the system up time (time since booting) and information about the last firmware upgrade. If the module is being configured for the first time, some fields will be blank.

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

```
Enter selection : 3
MS 612EX
=====
MS 612EX, Digital MultiSwitch 612EX,   HW=C/D,RO=J,SW=V1.0      ①
Last Firmware Upgrade V1.0.8   -->  V1.0   @7 resets           ②
SysUpTime                       00:31:18: 8 resets           ③
=====
Press Return for Main Menu ...
```

Line	Field	Description
①	MS 612EX, 12-port 10/100 Switch	The name and description of the module.
	HW=C/D	The hardware version.
	RO=J	The boot ROM version.
	SW=V1.0	The current firmware version.
②	Last Firmware Upgrade V1.0.8 --> V1.0	The current firmware upgrade version 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:	The time since the last reset.
	8 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 eight error log dumps can be stored, and the most recent dump is displayed first. Firmware upgrades are also recorded in the error log.

The following example shows the display associated with this option

```
Enter selection: 4
MS 612EX
=====
DUMP ERROR LOG
Current Reset Count: 8
=====
Entry      = 3
TimeStamp  = 0      0      1c7
Reset Count = 8
Firmware Rev. = V.1.0
V1.0 --> V1.1 Cleared config
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.

[5] Product-Specific Options

[5] Product-Specific Options

These options are available using a setup port on the Stack Station. This option allows you to configure options for Security, Storm Control and Port Switching Mode.

The following example shows the dialog associated with this option.

```
Enter selection: 5

MS 612EX
=====
                PRODUCT-SPECIFIC OPTIONS
[1] Security
[2] Storm Control
[3] Port Switching Mode
[4] Return to Main Menu
=====
Enter selection: n <Return>

Press Return for Main Menu ...
```

[1] Security

This option allows you to enable or disable security on a port. Security is disabled on all ports by default.

The DIGITAL MultiSwitch 612EX provides various security options that allow you to restrict stations that may source packets on a port. When the module is installed in a stack that includes a Stack Director or in a DEChub 900, the full set of options is available for configuration via clearVISN MultiChassis Manager. If the module is installed in a stack that does not include a Stack Director or is in standalone mode, the module provides for some limited configuration of security via the Security selection in the Product-Specific option menu.

You can select the auto-authorize mode of Security for a port by selecting option [1]. In this mode, the first source address detected by the switch on the port is authorized on the port automatically. Subsequently, it discards any packet with a source address that does not match this address.

You can disable Security on a port by selecting option [2]. This option deletes any address that was authorized on that port. Subsequently, packets from any station are accepted on that port.

NOTE

Security is not supported on fast Ethernet (100BaseTX or 100BaseFX) ports.

[5] Product-Specific Options

The following example shows a security configuration.

```
Enter selection: 1
MS 612EX
=====
                        SECURITY
=====
Port  1: Disabled      Port  2: Disabled      Port  3: Disabled
Port  4: Disabled      Port  5: Disabled      Port  6: Disabled
Port  7: Disabled      Port  8: Disabled      Port  9: Disabled
Port 10: Disabled      Port 11: Disabled      Port 12: Disabled
Port 13: Not Present    Port 14: Not Supported

      [1] Enable 'auto-authorize' mode of security on a port
      [2] Disable security on a port
      [3] Return to previous menu
=====
Enter selection:  n  <Return>
Enter Port number (1...14)::  n <Return>
```

In the above example, there is no Mod-MAC installed in port 13. A 100BaseTX or 100BaseFX Mod-MAC is installed in port 14.

To enable or disable a port:

To	Step	Action
Enable	1	Enter 1 .
	2	Select a port number 1 through 14. The following message appears: Security enabled on port [n]
Disable	1	Enter 2 .
	2	Select a port number 1 through 14. The following message appears: Security disabled on port [n]

[2] Storm Control

Storm control operates by limiting the average rate of received broadcast/multicast traffic. The level of broadcast/multicast forwarded onto any port could be higher than 200 packets per second, since rate limited traffic from several ports could be aggregated onto a single output port.

The DIGITAL MultiSwitch 612EX provides various options for the regulation of broadcast and/or multicast storm control. These options allow you to configure the following:

- The type of packets (broadcast, multicast, or both) regulated
- The rate limit (the average rate to which the forwarding of regulated packets is limited)
- The resumption policy (the policy that the DIGITAL MultiSwitch 612EX uses to stop storm control and return to normal operation).

When the module is installed in a stack that includes a Stack Director or a DEChub 900, the full set of options are available for configuration via clearVISN. When installed in a stack that does not include a Stack Director or in a standalone mode, the module provides for some limited configuration of storm control via the storm control selection in the Product-Specific options menu.

When you enable storm control via this menu, the module starts monitoring all the ports for a broadcast/multicast storm. When more than 20 broadcast/multicast packets are detected on a port during a 100 millisecond interval (more than 200 packets per second) the DIGITAL MultiSwitch 612EX suspends the forwarding of broadcast/multicast packets received on that port until one of the following conditions is met:

- The rate of broadcast/multicast traffic falls below 200 packets per second, *or*
- The suspension interval has lasted long enough for the average rate of forwarded broadcast/multicast traffic to fall below 200 packets per second)

For example, if 200 packets were received during a 100 millisecond polling interval, the suspension interval can last up to 900 millisecond. This ensures that an average of no more than 200 packets are forwarded in 1 second.

When you disable storm control, the DIGITAL MultiSwitch 612EX does not respond in any special manner to broadcast/multicast storms. All received traffic is forwarded normally.

Storm control is disabled by default.

[5] Product-Specific Options

Enabled

The following example shows the dialog associated with this option when storm control is enabled.

```
Enter selection: 2

MS 612EX
=====
STORM CONTROL
Storm Control is currently enabled.
=====
Disable Storm Control? (Y/N)?: [N]: Y <Return>

Storm control disabled on module.

Press Return for Main Menu ...
```

Disabled

The following example shows the dialog associated with this option when storm control is disabled.

```
Enter selection: 2

MS 612EX
=====
STORM CONTROL
Storm Control is currently disabled.
=====
Enable Storm Control? (Y/N)?: [N]: Y <Return>

Storm control enabled on module.

Press Return for Main Menu ...
```

[3] Port Switching Mode

This selection allows you to configure a port for switching operation. Four modes of operation are possible; standard, workgroup, backbone, and manual. These modes of operation are described in Appendix G.

In standard and workgroup modes, the DIGITAL MultiSwitch 612EX learns node location information from source addresses of packets received on this port. In backbone and manual modes, the DIGITAL MultiSwitch 612EX *does not* learn node location information from source addresses of packets received on this port.

In standard and backbone modes, packets with unknown destination addresses received on other ports are flooded out this port. In workgroup and manual modes, packets with unknown destination addresses received on other ports are *not* flooded out this port.

This screen indicates the current Port Switching mode of operation configuration.

```

MS 612EX
=====
PORT SWITCHING MODE
Port 1: Workgroup      Port 2: Workgroup      Port 3: Workgroup
Port 4: Workgroup      Port 5: Workgroup      Port 6: Workgroup
Port 7: Workgroup      Port 8: Workgroup      Port 9: Workgroup
Port 10: Workgroup     Port 11: Workgroup     Port 12: Workgroup
Port 13: Backbone     Port 14: Backbone

      [1] Configure port for standard mode
      [2] Configure port for workgroup mode
      [3] Configure port for backbone mode
      [4] Configure port for manual mode
      [5] Return to previous menu

=====
Enter selection: n <Return>

Enter Port number (1...14): n <Return>

```

The following table describes how to select port switching mode on individual ports. The factory default settings for the port switching mode is as follows:

- Ports 1 through 12: Workgroup
- Ports 13 and 14: Backbone

[5] Product-Specific Options

To set the port-switching mode complete the following steps:

Step	Action
1	Type the number of the Mode you want to use: 1 = Standard 2 = Workgroup 3 = Backbone 4 = Manual
2	Type the number of the port on which you want port switching (1 - 14). The following message appears: <code>Switching Mode enabled on Port [n]</code> Note: A response of <code>Not Present</code> indicates the Mod-MAC port is not installed.

For additional information about each of the modes, refer to Appendix G.

Chapter 5

Module Management

Overview

Introduction

This chapter describes how to use clearVISN to manage the DIGITAL MultiSwitch 612EX.

In This Chapter

Topic	Page
What is clearVISN?	5-2
Requirements for Managing the Module	5-3
Managed Functions	5-4
clearVISN Switch Management Windows	5-5
DIGITAL MultiSwitch 600 Interconnect Guidelines	5-17
DEChub 900 MultiSwitch Configuration Guidelines	5-18
MIBs Supported by the DIGITAL MultiSwitch 612EX	5-20

What is clearVISN?

What is clearVISN?

clearVISN is an integrated family of software applications for managing a network using policy-based techniques. 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.

Use the clearVISN Stack Manager or the clearVISN Stack 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, DIGITAL MultiStack System, DIGITAL MultiSwitch 600 System, DEChub ONE, DEChub 900 MultiSwitch, GIGAswitch/FDDI, and GIGAswitch/ATM families of devices. MultiChassis Manager displays a GUI 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 System, and the DIGITAL MultiSwitch 600 System. Stack Manager displays a GUI 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 612EX 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 may be powered by Stack Stations and will be managed by the Stack Director.

DIGITAL MultiSwitch 600 System

- Stack Director configured with a IP address (see Part II)
- clearVISN Stack Manager or MultiChassis Manager Software Application (recommended)
- In-Band access to the Stack Director's management MAC *or* an external connection to the management access port *or Out-of-Band* OBM port using SLIP (For further information on how to connect to the MAC, refer to Part II, Chapter 9).

DEChub 900 MultiSwitch

- DEChub 900 MultiSwitch configured with an IP address and optionally an IP services module.
- clearVISN MultiChassis Manager (recommended)
- In-band access to the Management Agent via the IP services module, or Out-of-Band (OBM) access via the OBM port on the DEChub 900 MultiSwitch.

Managed Functions

clearVISN and DIGITAL MultiSwitch 612EX provide support for the following managed functions. (The tables in this section appear in clearVISN online help and are printed here for your convenience.)

- DIGITAL MultiSwitch 600 System and DEChub 900 MultiSwitch Backplane assignments. (See section titled DIGITAL MultiSwitch 600 LAN Interconnect Guidelines):
 - DEChub 900
 - DIGITAL MultiSwitch 600
- Temperature Sensing
- Downline Upgrade
- Fast Ethernet Ports (no backplane connections)
- Address Table (See Tables 5-3, 5-6)
- Reset the Switch to the last saved NVRAM
- Port Control
 - On/Off (See Table 5-2)
 - Security (See Tables 5-8, 5-9)
 - Counters (See Table 5-6, 5-7)
 - Switching Mode (See Table 5-2)
 - Speed and Duplex Mode (See Table 5-2)
 - Filtering (See Table 5-3)
 - Storm Control (See Table 5-2)
- Broadcast Storm (See Tables 5-1 and 5-5)
- Module Summary Information (See Table 5-5)

clearVISN Switch Management Windows

This section lists and defines functions managed by the clearVISN Switch Management Windows. Table 5-1 lists parameters on the Module Summary Window, which provides Broadcast Storm Information and is used to monitor the DIGITAL MultiSwitch 612EX.

Table 5-1: Module Summary Window, Broadcast Information

Selection	Description
Storm Regulation	<p>Indicates the types of frames with group destination addresses that are currently being regulated. Only the specified class of traffic is considered in detecting the presence of storms, and only this class of traffic is regulated when a storm is detected. The types of frames can be one of the following:</p> <ul style="list-style-type: none"> • None • Broadcast • Multicast • Broadcast & Multicast
Polling Interval (sec)	<p>The length of the interval between successive instances when the storm control process examines the broadcast/multicast received frame counters to detect the presence or end of a storm.</p> <p>The interval is measured in seconds.</p>
Rate Limit (packets)	<p>The maximum number of regulated group address frames that may be received on a port during a polling interval before the storm control process decides that storm conditions exist on the port.</p> <p>The default rate limit is 200 packets per second.</p>
Control Action	<p>The action that the storm control process should take when storm conditions are detected on a port. The action can be one of the following:</p> <ul style="list-style-type: none"> • Frame Suppression (see clearVISN online help) • Port Isolation (see clearVISN online help)

clearVISN Switch Management Windows

Selection	Description
Port Resumption	<p>The policy used by the storm control process to resume normal operation after the storm control action has been initiated. The storm control process policy can be one of the following:</p> <ul style="list-style-type: none">• Continue Control• Auto Interval• Rate Limit• Responsive Rate Limit
Auto Interval (sec)	<p>The time (in seconds) for automatic resumption of normal operations after storm control is initiated. This parameter is used when the Port Resumption parameter value is specified as Auto Interval.</p>
Total Actions Initiated	<p>The number of times that storm control action was initiated on any port on the switch.</p>
Total Frames Lost	<p>The number of regulated frames received on any port that were dropped by the switch as a result of storm control action.</p>

clearVISN Switch Management Windows

Table 5-2 lists parameters on the Module Summary Window, Port Configuration Information which is used to monitor the DIGITAL MultiSwitch 612EX.

Table 5-2: Module Summary Window, Port Configuration Information

Selection	Description
Port	The number of the port
Port Type	An icon indicating the port connector type.
Status	Indicates that the port is enabled or disabled.
Capability	Indicates the port's speed and duplex mode capability.
Mode	Sets the current filtering configuration. Possible modes are: <ul style="list-style-type: none">• Standard• Workgroup• Backbone• Manual
Auto Negotiate	Indicates current auto-negotiation status.
Security	Displays the Security Summary Window.
Storm Control	Indicates the current status of the port.
Frames In/Sec	Indicates the number of frames received per second.
Frames Out/Sec	Indicates the number of frames sent per second.

clearVISN Switch Management Windows

Table 5-3 lists parameters on the Switch Port Information Window, Bridge Information Counters.

Table 5-3: Switch Port Window, Bridge Information Counters

Selection	Description
Storm Actions Initiated	The number of times that storm control action was initiated on any port on the switch.
Storm Frames Lost	The number of regulated frames (broadcast, multicast or both, depending on the value of the object received on any port that were dropped by that switch as a result of storm control action).

Table 5-4 lists parameters on the Switch Port Information, Port Information Counters.

Table 5-4: Switch Port Information, Port Information Counters

Selection	Description
Addresses Active	This is not supported for the DIGITAL MultiSwitch 600 products.
Addresses Discarded	This is not supported for the DIGITAL MultiSwitch 600 products.

Table 5-5 lists parameters on the Ethernet counters and descriptions.

Table 5-5: Ethernet Counters and Descriptions

Selection	Description
Alignment Errors	The number of frames received on the port that are not an integral number of octets in length and do not pass the FCS check.
CRC Errors	The number of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check.
Single-collision frames	The number of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision.
Multiple-collision frames	The number of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision.
Deferred Transmissions	The number of frames for which the first transmission attempt on a particular interface is delayed because the medium is busy.
Late Collisions	The number of times a late collision was detected. A late collision is a collision detected after 64 byte times from a packet transmit.
Excessive Collisions	The number of frames for which transmission on a particular interface fails due to excessive collisions.
Carrier Sense Errors	The number of times that the carrier sense condition was lost or never asserted when attempting to transmit a frame on a particular interface.
Oversize Frames	The number of frames received that exceeded the maximum permitted frame size.

Table 5-6 lists parameters on the Security Summary Window selections and descriptions.

Table 5-6: Security Summary Window Selections and Descriptions

Selection	Description
Apply to all ports	Select the Apply to all ports check-box to apply the security information values to all ports on the switch.
Show all ports	Toggle the Show all ports check-box to show log entries for only the current port or all ports.
Selecting Port	<p>When you enter the Security Summary window by selecting the security icon in the Tool Bar, you can select a port for which to display security information. Use the scrolling bar to scroll the port selection window.</p> <p>When you enter the Security Summary window by selecting the security icon in the Port Information box, the Select Port box is grayed out. You are limited to viewing only information associated with the currently selected port.</p>
Mode	<p>Possible Modes are:</p> <ul style="list-style-type: none"> • None • Manual • Auto
Violation Response	<p>The policy for handling security violations on this switch port. A security violation is considered to have occurred when a frame with an unauthorized source address is received on a port.</p> <ul style="list-style-type: none"> • Filter. Indicates that frames with source addresses that are not authorized on the port will be filtered. • Filter and Log. Indicates that bad frames will be filtered and logged in the Security Log table. • Shutdown and Log. Indicates that the port is entirely shut down when a frame with an unauthorized source address is received on a port. The port remains shut down until management brings up the port. The violation will be logged in the Security Log table.
Max Auto Address	<p>The maximum number of addresses that may be authorized on this port when the port is in the auto-authorize secure mode.</p> <p>If the port is currently in the auto-authorize secure mode, any addresses already authorized on this port are purged whenever the value of this object is decreased from its current value.</p>
Authorized Stations	A list of authorized MAC address.
Violations	A number of security violations.

clearVISN Switch Management Windows

Table 5-7 lists parameters on the Security Summary Window, Security log descriptions.

Table 5-7: Security Log Descriptions

Selection	Description
Resets	The reset count when the entry was logged.
Time	The time in centisecond-clock ticks since the switch was last reset, when this entry was logged.
Port	The port number of the switch port on which this violation occurred.
Unauthorized Address	The violating address that caused this entry to be logged.

Table 5-8 displays information from and about the forwarding database.

Table 5-8: Switch Forwarding Database Window Information and Descriptions

Selection	Description
Identification	<p>Displays the following information about the switch being managed.</p> <ul style="list-style-type: none"> • Description • Type • Revision • Slot
Status	<p>Displays information about the current state of the forwarding database.</p> <ul style="list-style-type: none"> • Current Entries (not supported on the MS 612EX) • Active Entries (not supported on the MS 612EX) • Inactive Entries (not supported on the MS 612EX) • Learned Entry Discards - The number of entries that were learned or would have been learned, but were discarded for lack of space in the forwarding database.
Aging Time	<p>Time (in seconds) before a learned entry in the forwarding database becomes inactive. Length of time interval in seconds after which a learned entry is deleted from the forwarding database.</p>
Configuration	<p>Displays information about the configuration.</p>
Locate	<p>Allows you to find the number of the port from which the switch connects with an address, to find the status of a forwarding database entry, and to write the contents of the forwarding database to a file. See the following topics for more information available from this box:</p> <ul style="list-style-type: none"> • MAC Address, DECnet, and IP <p>These buttons specify the type of identifier you will enter in the Address text box to find a forwarding database entry. If you specify a DECnet address, the software uses the corresponding MAC address entry to search the database. IP addresses are not supported at this time.</p>

clearVISN Switch Management Windows

Selection	Description
	<ul style="list-style-type: none">• Address Use this text box to specify the forwarding database entry you want to find. Enter the type of address you selected with the MAC Address or DECnet button. If you enter a DECnet address, the software uses the corresponding MAC address entry to search the database.• Learned Port The number of the port where the switch has seen frames originating from the specified address. The address of the station originating the frames resides on this port. If no entry is found for that address, the software displays a message that the entry was not found.• Status Indicates whether and how messages with the specified address are being forwarded. Possible values are as follows:<ul style="list-style-type: none">Learned - The address was learned by the switch, and messages with the address are being forwarded to the appropriate port.Management-specified - Network management has created a filter for this address specifying that messages are forwarded on this port.
Find	Click on Find to start the search for the forwarding database entry that you specify in the Name or Address text box.
File	Click on File to write the contents of the forwarding database to a file. When you click on File, a File Selection window appears.

clearVISN Switch Management Windows

Table 5-9 displays the address filtering window defined for specific addresses.

Table 5-9: Address Filtering Window

Selection	Description
Current Static Entries	The current number of static address filter entries on the switch.
Maximum Static Entries	The maximum number of static address filter entries that can be supported in the filtering database of the switch.
Current Non-Volatile Entries	The current number of address filter entries stored in non-volatile memory.
Maximum Non-Volatile Entries	The maximum number of address filter entries that can be accommodated in non-volatile memory.

Table 5-10 displays the address filtering window's filtering definitions.

Table 5-10: Address Filtering Window, Filtering Definitions

Selection	Description
Port Mask	Shows the port or ports to which an address is forwarded. Green arrows indicate that the specified frames are allowed on the port. Red arrows tipped with a black horizontal bar indicate the specified frames are not allowed on the port.
Address	The MAC address of the interface for which the filter is defined. When you create or edit a filter, you can enter the MAC address, the DECnet or IP name, or the DECnet or IP address. The software translates other identifiers into the MAC address.
Select	Click on Select in a filter's row to select the filter for modifying or deleting. When you click on the button, a check mark appears in the button to confirm your selection. When you double click on the button, the Modify Filter box appears.

clearVISN Switch Management Windows

Table 5-11 lists selections on the Address Filters window that allow you to create and modify the address filters on the DIGITAL MultiSwitch 612EX.

Table 5-11: Address Filters Window Selections and Descriptions

Selection	Description
Create Address Filters	Allows you to create filters for specific addresses.
Modify Address Filters	Allows you to modify the MAC address and modify the port mask.
Delete Address Filters	Allows you to delete the MAC address and delete the port mask.
Save Address Filters	Allows you to save the MAC address and save the port mask.

clearVISN Switch Management Windows

Table 5-12 lists selections on the Ethernet Building Block Window.

Table 5-12: Ethernet Building Block Window

Selection	Description
Front Panel	Switches the Ethernet port to the module's front panel. In this configuration, Ethernet connections can be made to the module's front panel.
Backplane	Switches the Ethernet port to the module's backplane. In this configuration, Ethernet connections can be made between the module's backplane Ethernet port and the hub's backplane LAN segments.

DIGITAL MultiSwitch 600 System Interconnect Guidelines

The DIGITAL MultiSwitch 600 has one 10Base2 backplane LAN and as many as six additional flexible Ethernet LANs. 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 612EX in a DIGITAL MultiSwitch 600

In a DIGITAL MultiSwitch 600, ports 1-7 of the DIGITAL MultiSwitch 612EX's can be used either on the front panel of the device or on the DIGITAL MultiSwitch 600 backplane. To configure ports for the front panel of the device or for the DIGITAL MultiSwitch 600 backplane, use the Config button on the Expanded LAN Interconnect window (Figure 4-5). The default configuration is front panel access.

Port 1, if configured on the DIGITAL MultiSwitch 600 backplane, can connect only to the 10Base2 backplane LAN. Ports 2-7, if configured on the backplane, can connect only to the flexible Ethernet backplane LANs.

NOTES

Ports 2, 3, and 4 are called low ports (due to their low port numbers). A low port cannot be connected to a backplane LAN that already has high ports from this module or from other modules connected to the backplane LAN.

Ports 5, 6, and 7 are called high ports. A high port cannot be connected to a backplane LAN that already has low ports from this module or from other modules connected to it.

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 612EX in a DEChub 900 MultiSwitch

In a DIGITAL MultiSwitch 600, ports 1-4 of the DIGITAL MultiSwitch 612EX module's 12 ports can be used either on the front panel of the device or on the DIGITAL MultiSwitch 900 backplane. To configure ports for the front panel of the device or for the DIGITAL MultiSwitch 900 backplane, use the Config button on the Expanded LAN Interconnect window (Figure 4-5). The default is front panel access.

Port 1, if configured on the DIGITAL MultiSwitch 900 backplane, can connect only to the 10Base2 backplane LAN. Ports 2-4, if configured on the backplane, can connect only to the flexible Ethernet backplane LANs. While any or all three ports can be configured to the DIGITAL MultiSwitch 900 backplane, only one can be connected on the DIGITAL MultiSwitch 900 backplane at a time.

NOTE

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

MIBs Supported by the DIGITAL MultiSwitch 612EX

MIBs Supported by the DIGITAL MultiSwitch 612EX

MIBs supported by the DIGITAL MultiSwitch 612EX are as follows.

- MIB II (RFC 1213)
- DEChub 900 Public Common MIB
- Ethernet MIB (RFC 1398)
- Bridge MIB (RFC 1493)
- DEC StackSwitch MIB
- IETF MAU MIB (Draft 3)

For information on how to access DIGITAL MIBs, follow the procedures in the DIGITAL MultiSwitch 612EX Release Notes.

Chapter 6

Removing a Module and Mod-MACs

Overview

Introduction

This chapter describes how to remove a module and Mod-MACs from the Digital MultiSwitch 600 System.

In This Chapter

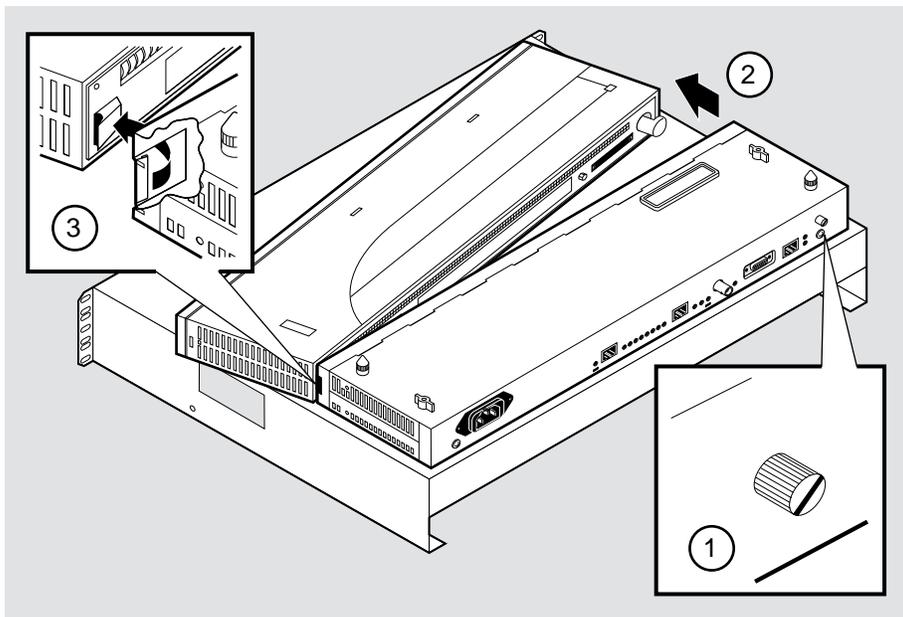
Topic	Page
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Removing a Module from the Stack (Hot-Swappable)	6-2
Removing a Module from the DEChub 900 (Hot-Swappable)	6-3
Removing Cables from the 10BaseT Ports	6-4
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Removing a Module from the Stack (Hot-Swappable)

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

The following table describes how to remove one module from the Stack Director as shown in Figure 6-1. The same procedure applies to removing a module from a Stack Station.

Figure 6-1: Removing the Module from a Digital MultiSwitch 600



NPB-0593-96F

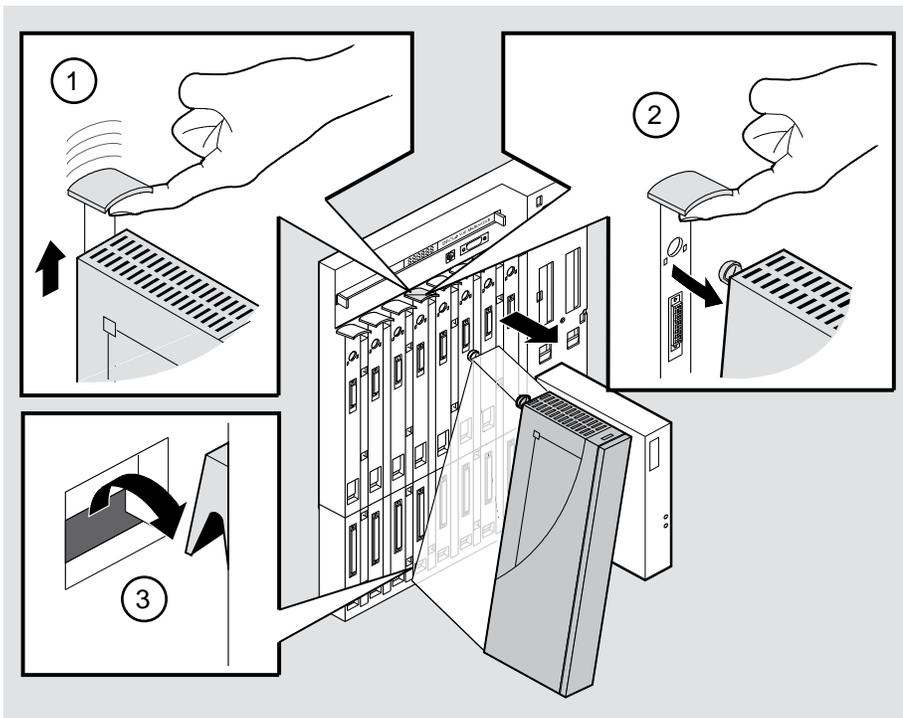
Step	Action
1	Using a flat-blade screwdriver, loosen the slotted thumbscrew (1) on the Stack Director or Stack Station module by turning it counterclockwise.
2	Push back to the right side of the module of the module (2).
3	Unseat the module from the Stack Director or Stack Station (3).

Removing a Module from the DEChub 900 (Hot-Swappable)

Removing a Module from the DEChub 900 (Hot-Swappable)

To remove the module from the DEChub 900, complete the following steps (see Figure 6-2).

Figure 6-2: Removing the Module from a DEChub 900



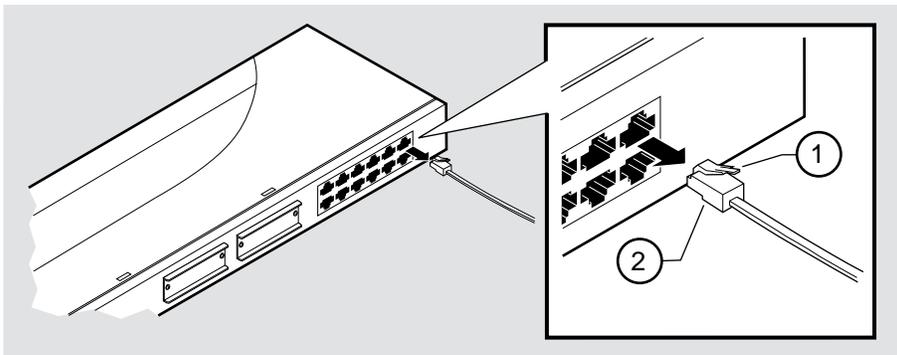
NPG-0008-95F

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

The following table describes how to remove 10BaseT cables as shown in Figure 6-3.

Figure 6-3: 10BaseT Cable Removal



NPB-0588-96F

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

Removing Cables from Mod-MACs

This section describes how to remove cables from the Mod-MACs.

Task	Description
1	Removing cables from the 10BaseFL Mod-MAC port.
2	Removing cables from the 100BaseFX Mod-MAC port.
3	Removing the cable from the 100BaseTX Mod-MAC port.

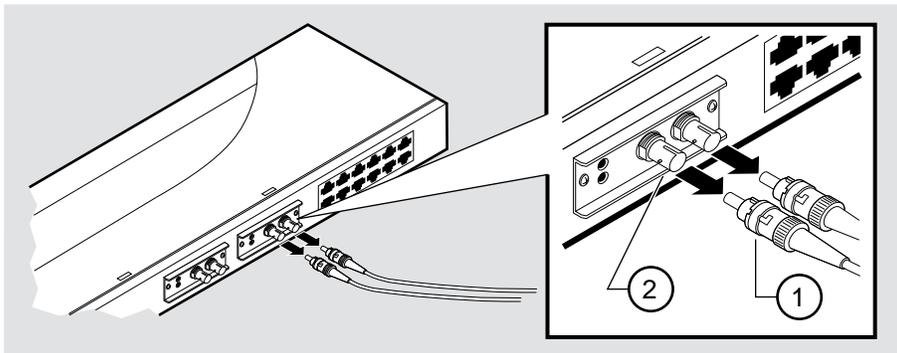
Removing Cables from the 10BaseFL Port

The following table describes how to remove 10BaseFL Mod-MAC cable, and Figure 6-4 shows their location.

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 6-4: 10BaseFL Cable Removal



NPB-0589-96F

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

NOTE

The bend radius of any fiber-optic cable is 1 inch (2.5 cm) or greater. To avoid optical power loss, do not touch the fiber ends.

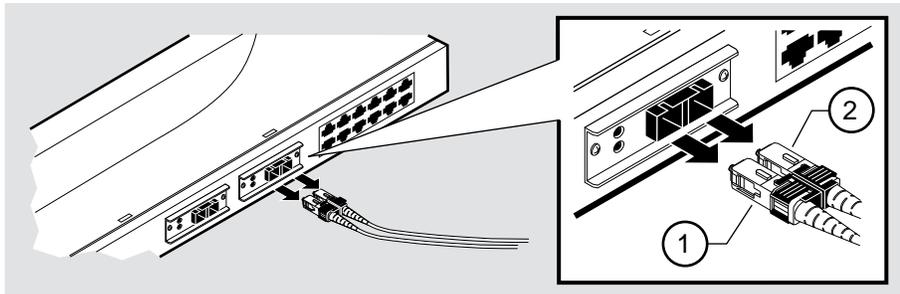
Removing Cables from the 100BaseFX Port

The following table describes how to remove the 100BaseFX Mod-MAC cables, Figure 6-5 shows their location.

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 6-5: 100BaseFX Cable Removal



NPB-0702-96F

Step	Action
1	Pull the transmit cable (1) and the receive cable (2) from the ports.

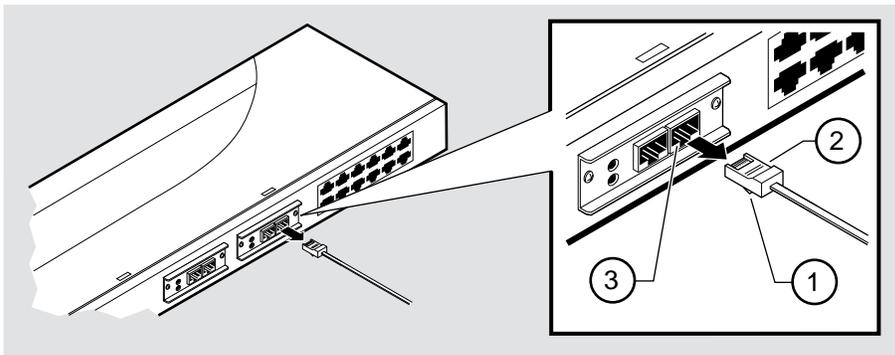
NOTE

The bend radius of any fiber-optic cable is 1 inch (2.5 cm) or greater. To avoid optical power loss, do not touch the fiber ends.

Removing Cables from the 100BaseTX Port

The following table describes how to remove the 100BaseTX Mod-MAC cable, Figure 6-6 shows the location.

Figure 6-6: 100BaseTX Cable Removal



NPB-0590-96F

Step	Action
1	Push up on the release tab (1) and remove the connector (2) from the module's 100BaseTX port.

Removing Mod-MACs from the module (Not Hot-Swappable)

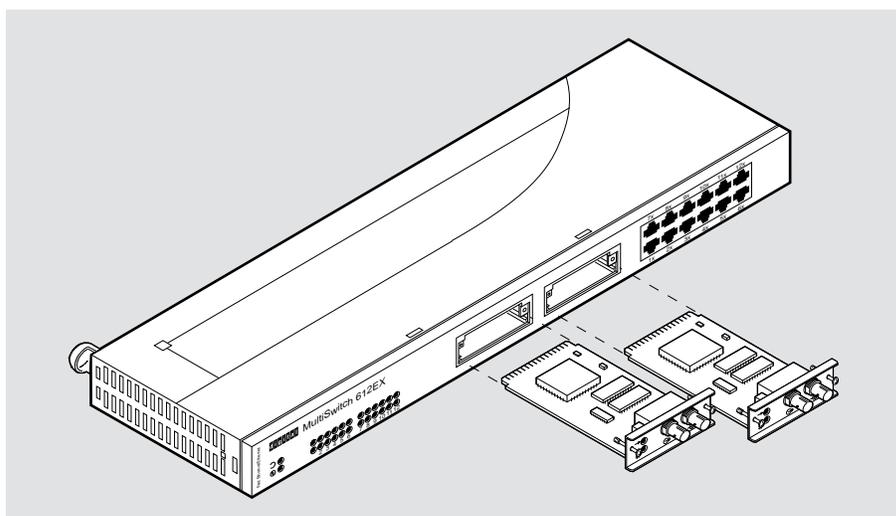
Prior to removing Mod-MACs, ensure that the module has no power applied or is removed from the Stack or DEChub 900, refer to the section titled “Removing a Module from the Stack”. The module should be disconnected from any power source.

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 modules.

The following table describes how to remove Mod-MACs from the module, Figure 6-7 shows their location.

Figure 6-7: Removing Mod-MAC Interfaces



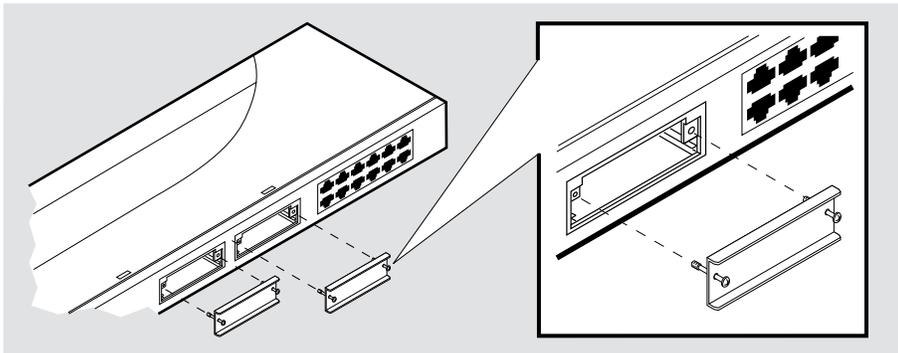
NPB-0754-96F

Step	Action
1	Loosen the captive screws from the Mod-MAC on the front panel of the module (Figure 6-7).
2	Carefully slide the Mod-MAC from the module.

Replacing the Dust Covers on the Digital MultiSwitch 612EX

Figure 6-8 shows dust cover location and the table describes how to replace the cover(s).

Figure 6-8: Dust Cover Replacement

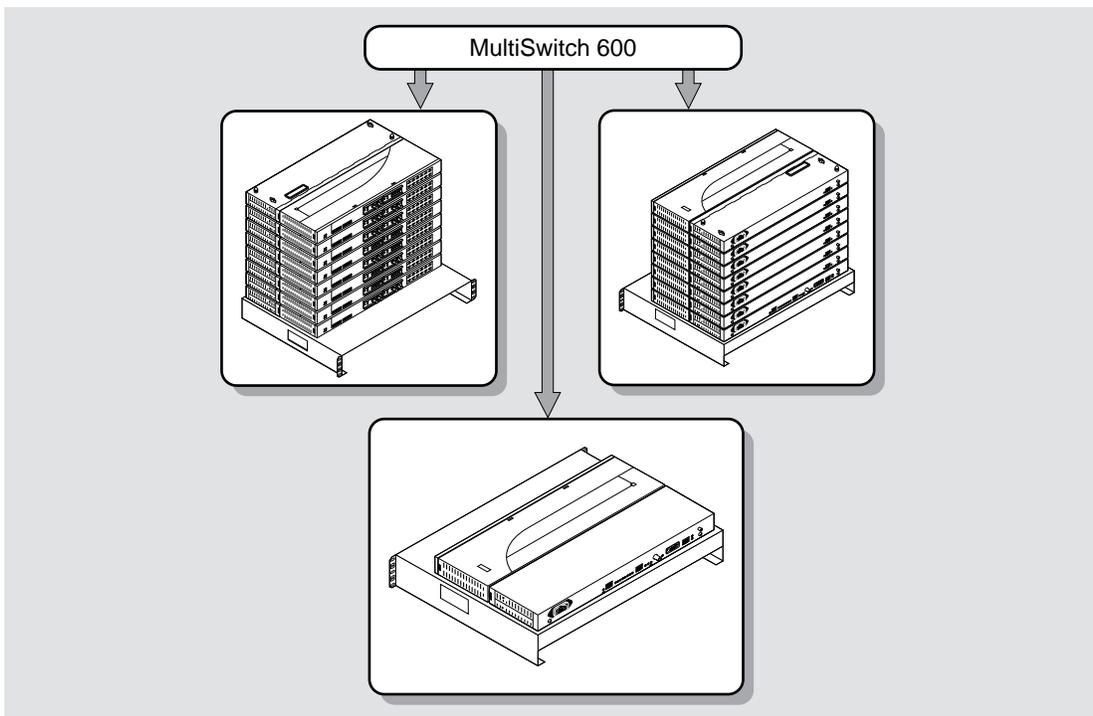


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Step	Action
1	Replace the dust cover and tightening with the two captive screws attached to the dust cover.
2	Repeat steps 1 and 2 for the replacement of an additional dust cover.

Part II

DIGITAL MultiSwitch 600 System



NPB-0664-96F

This illustration shows two DIGITAL MultiSwitch 600 System configurations.

Chapter 7

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

Topic	Page
What is the DIGITAL MultiSwitch 600 System?	7-2
What is a Stack Director?	7-6
What is the Stack Station?	7-11

What is the DIGITAL MultiSwitch 600 System?

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

What is the DIGITAL MultiSwitch 600 System?

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 7-1 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.

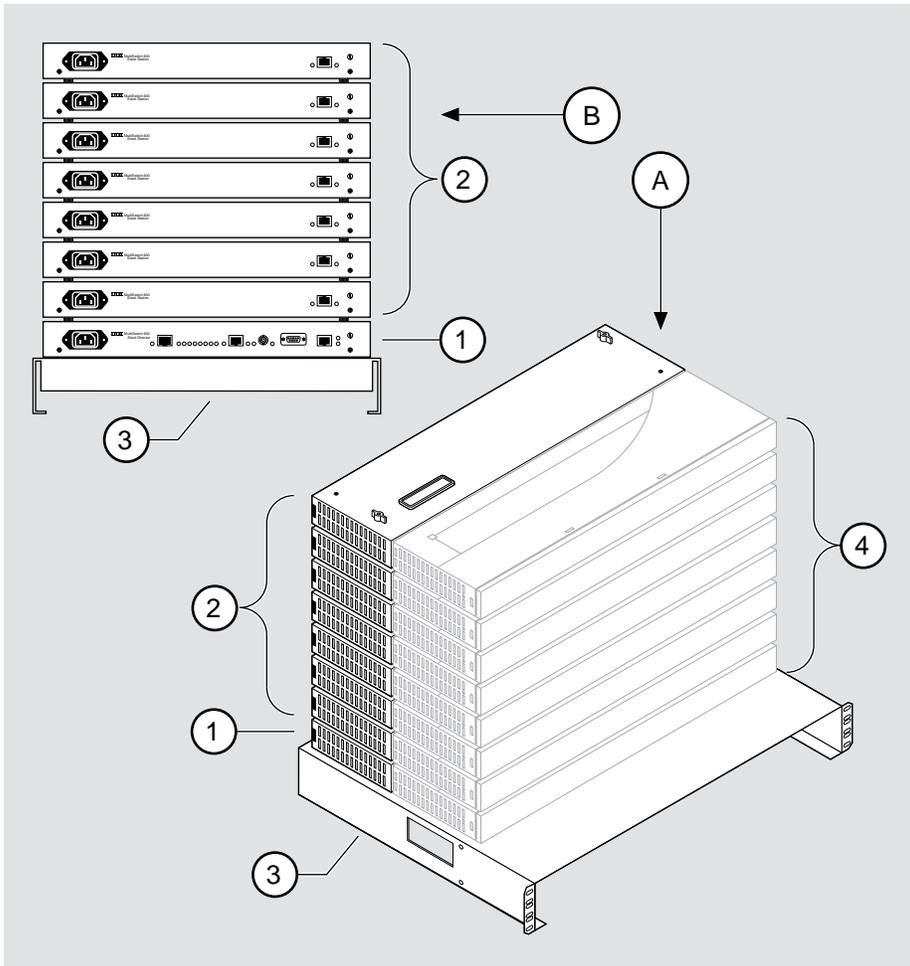
The DIGITAL MultiSwitch 600 system can serve as a managed or as an unmanaged stack:

- 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 7-1: Typical DIGITAL MultiSwitch 600 Configuration



NPB-0658-96F

What is the DIGITAL MultiSwitch 600 System?

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?

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.

What is a Stack Director?

Supported MIBs

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

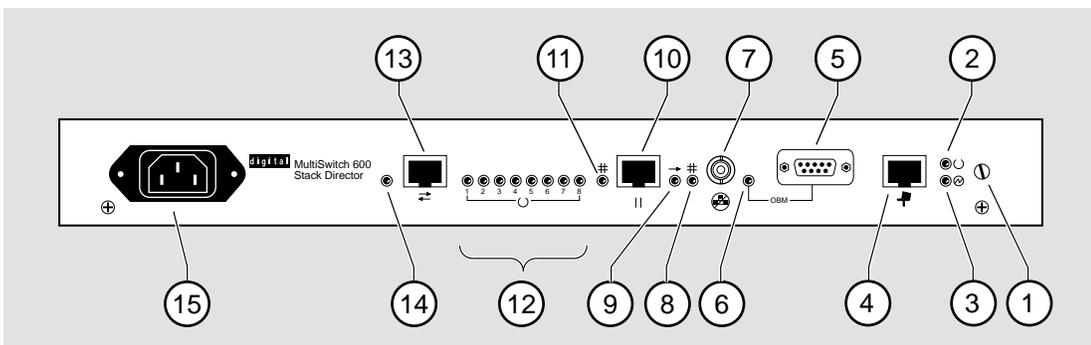
- MIB-II (RFC 1213)
- RMON Alarms and Events (RFC 1757)
- Ethernet MIB (RFC 1643)
- DIGITAL Chassis MIB
- DIGITAL Public Common MIB
- Management Agent Module Private MIB

What is a Stack Director?

Stack Director Front Panel

Table 7-1 describes the front panel components on the Stack Director and Figure 7-2 shows their location. For detailed information about the LEDs, refer to Appendix A.

Figure 7-2: Stack Director Front Panel Components



NPB-0684-96F

Table 7-1: 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?

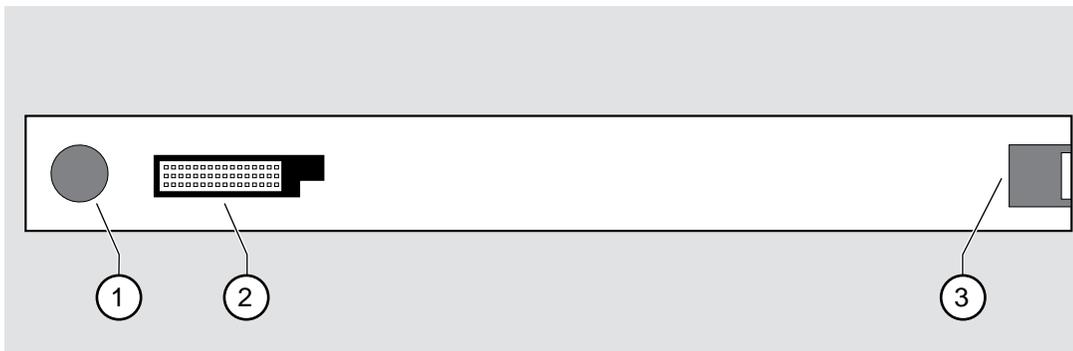
Item	Icon	Name	Description
7		10Base2 Port	A 10Base2 port for connecting to the internal 10Base2 network of the DIGITAL MultiSwitch 600. This port can also be used for in-band management. This port must be externally terminated if it is not used. A T-connector can not be used on this port.
8		10Base2 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.

What is a Stack Director?

Stack Director Back Panel

Table 7-2 describes the back panel components on the Stack Director and Figure 7-3 shows their location. For detailed information about the LEDs, refer to Appendix A.

Figure 7-3: Stack Director Back Panel Components



NPB-0463-96F

Table 7-2: Stack Director Back 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 7-4 and Figure 7-5 show the Stack Station Front and Back Panels.

Stack Station Features

The Stack Station includes the following features:

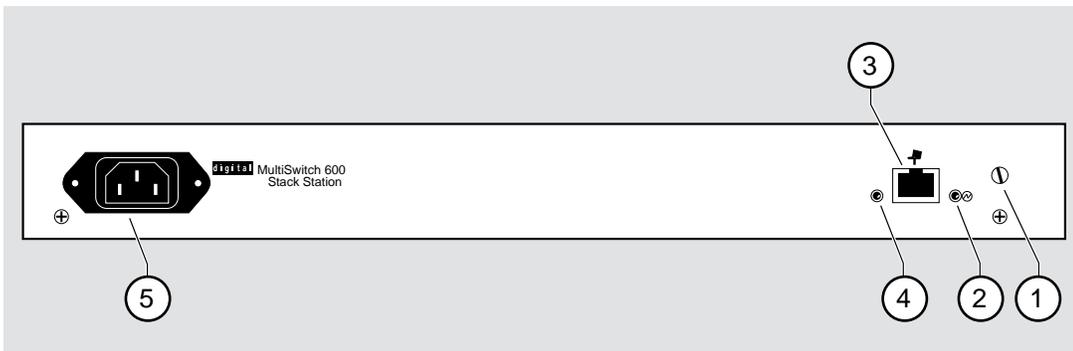
- Provides power to the attached functional module.
- Hot swap circuitry for functional modules.
- A serial setup port to setup and configure the functional module in an unmanaged stack.
- Stack interconnect slot on the top and bottom for cable-free stack interconnect card.

What is the Stack Station?

Stack Station Front Panel

Table 7-3 describes the front panel components on the Stack Station and Figure 7-4 shows their location. For detailed information about the LEDs, refer to Appendix A.

Figure 7-4: Stack Station Front Panel Components



NPB-0464-96F

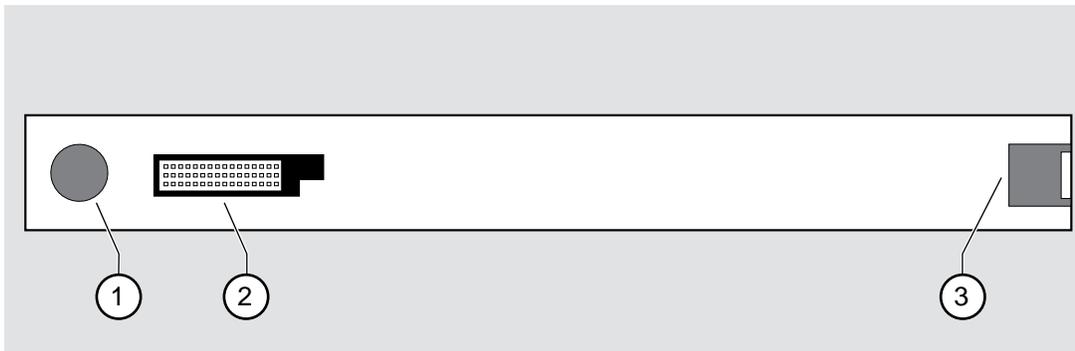
Table 7-3: Stack Station Front Panel Component Descriptions

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. <u>Note:</u> 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 7-4 describes the back panel components on the Stack Station and Figure 7-5 shows their location. For detailed information about the LEDs, refer to Appendix A.

Figure 7-5: Stack Station Back Panel Components



NPB-0463-96F

Table 7-4: 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 8

Assembling a Stack

Overview

Introduction

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

In This Chapter

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Task 1: Securing a Stack Director or Stack Station to Mounting Tray	8-4
Task 2: Securing the Mounting Tray to the Rack Mount	8-8
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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 8-3), relay rack mount (Figure 8-4), and table top (Figure 8-10).

Cable Restrictions

The 10Base2 port on the Stack Director can be used to extend the internal 10Base2 LAN channel of the DIGITAL 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 DIGITAL 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 DIGITAL MultiSwitch 600 systems can not be greater than 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.

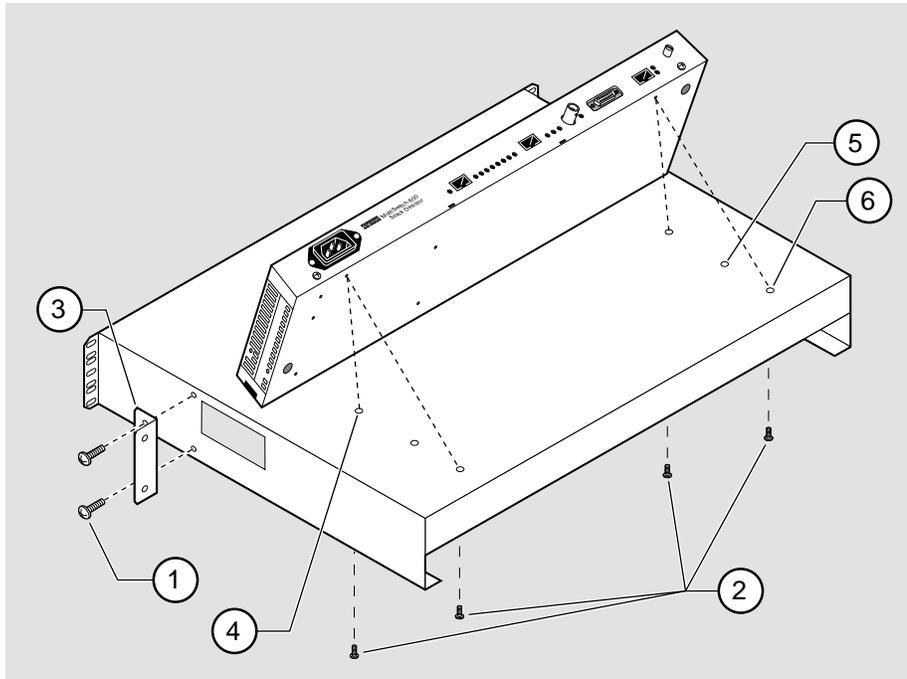
CAUTION

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 8-1 shows installation details.

Figure 8-1: Stack Director Mounting Tray Attachment



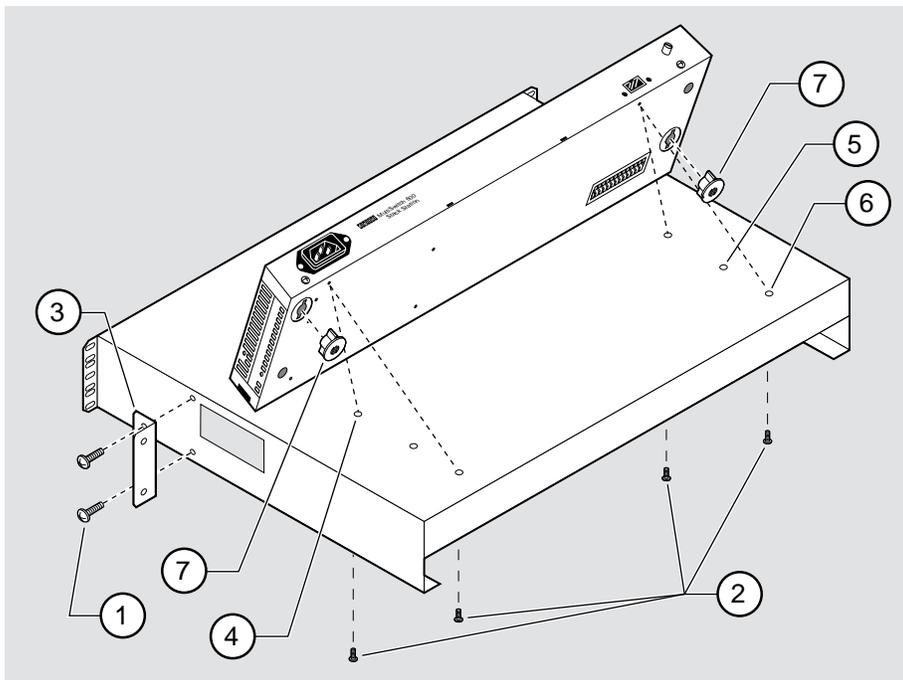
NPB-0739-96F

Step	Action
1	Align the holes on the bottom of the Stack Director with the mounting holes on top of the tray (Figure 8-1).
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 8-2 shows installation details.

Figure 8-2: Stack Station Mounting Tray Attachment



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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 8-2).
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).

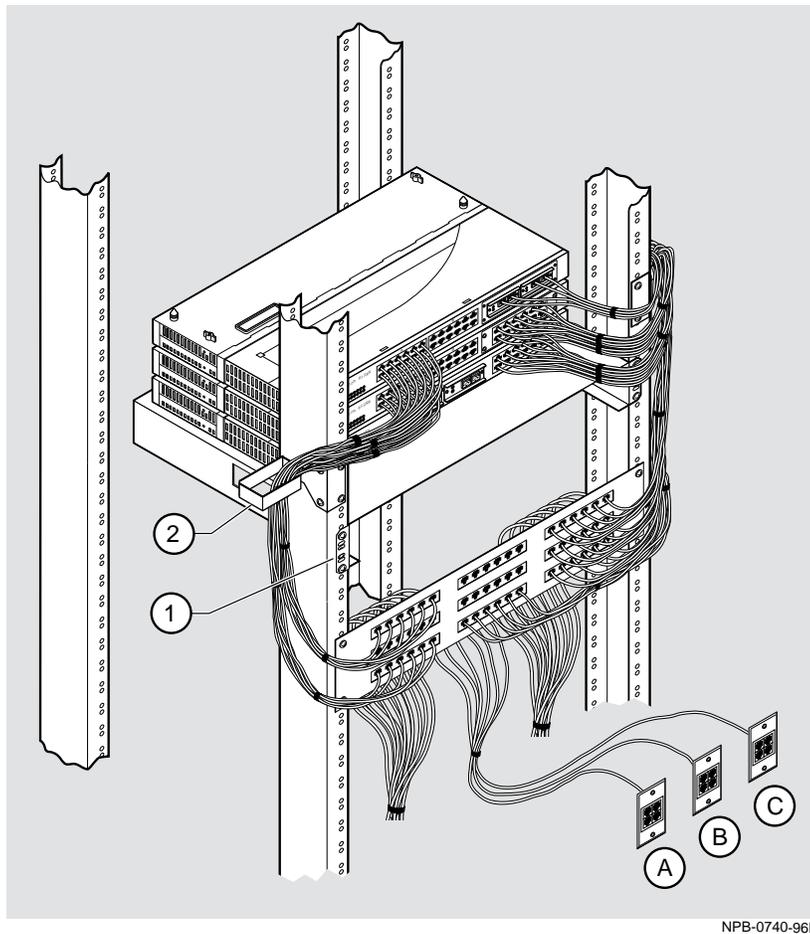
Building a DIGITAL MultiSwitch 600 Stack

Step	Action
4	<p>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).</p> <p>Secure the Stack Station onto the tray using the two 6-32 machine screws (2).</p>

Task 2: Securing the Mounting Tray to the Rack Mount

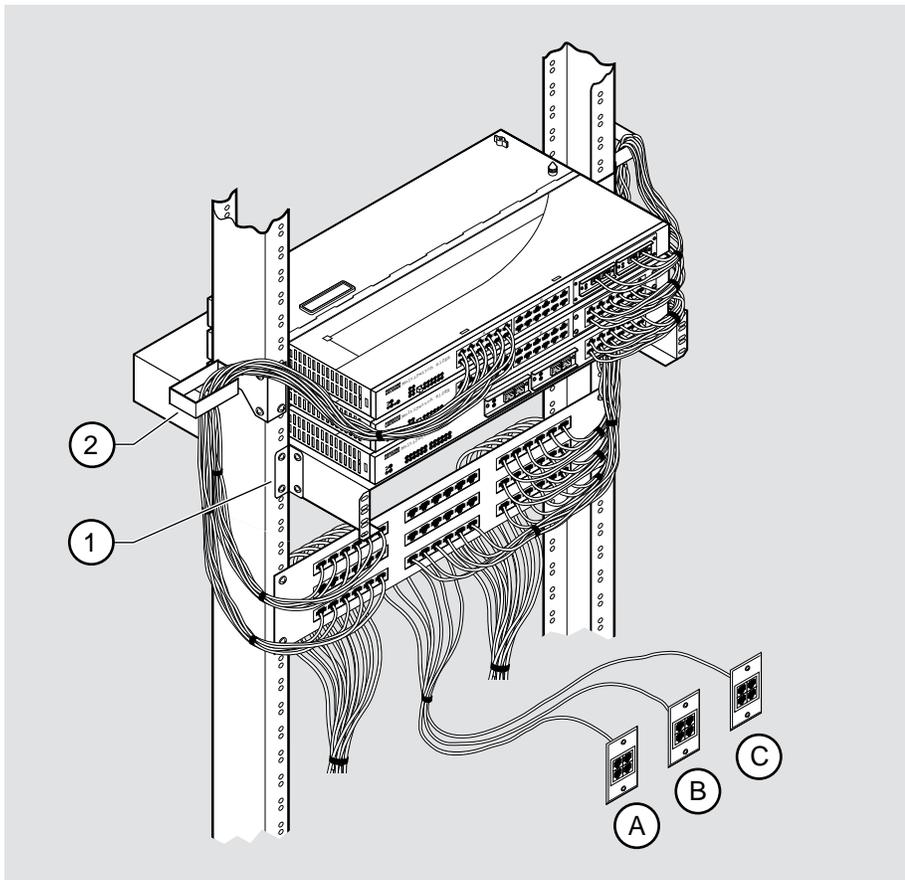
Figure 8-3 shows a standard 19-inch rack mount configuration and Figure 8-4 shows a relay rack mount configuration. Tables following figures describe the procedures.

Figure 8-3: Standard 19" Rack Mount Configuration



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 8-4: Relay Rack Mount Configuration

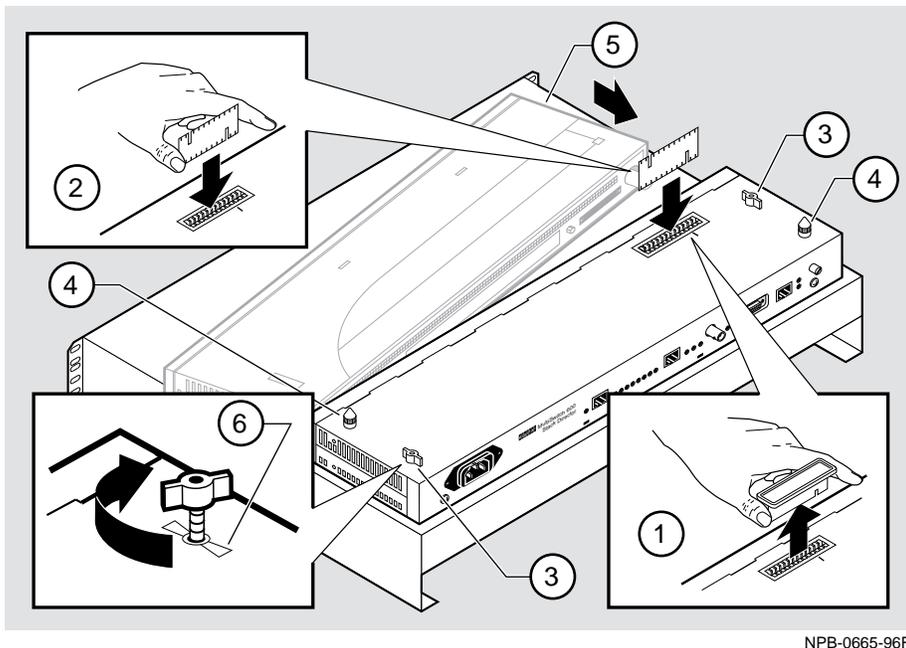


Step	Action
1	Attach the mounting tray to the rack (1) using the four 10-32 screws and U-nuts (if needed).
2	Attach the cable harness bracket (see Figure 8-4) (2) and office attachment connectors A, B and C.

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 8-5 shows installation details.

Figure 8-5: Stack Interconnect Card Attachment



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. <i>Note:</i> 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.

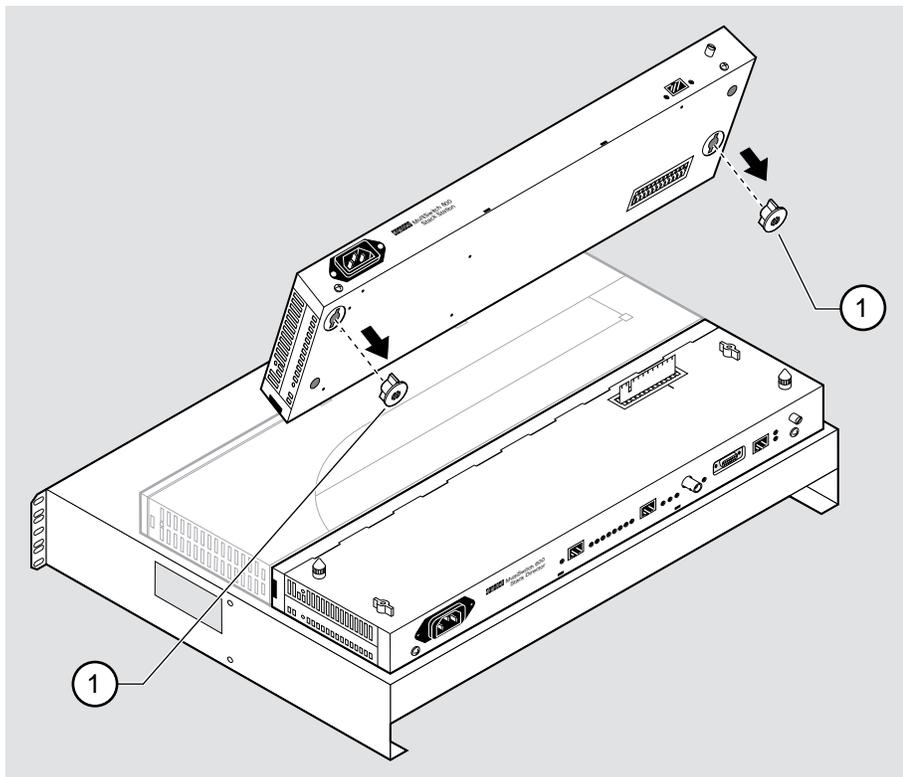
Building a DIGITAL MultiSwitch 600 Stack

Step	Action
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 8-6.

Figure 8-6: Mounting Plug Location



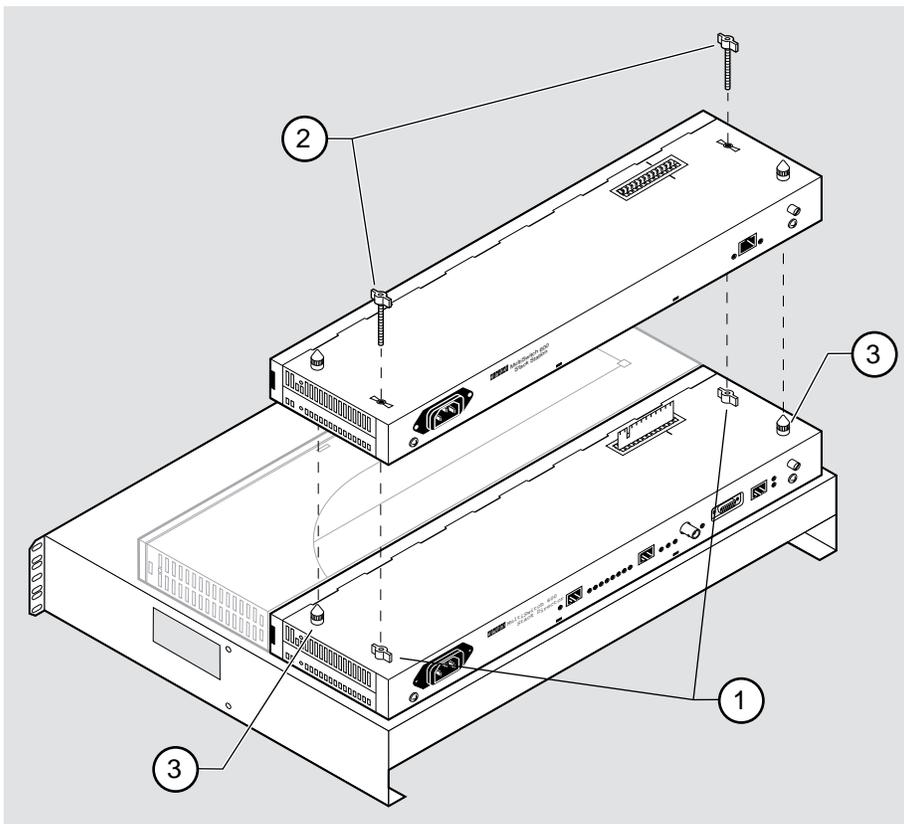
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Step	Action
1	Prior to seating the next level's Stack Station on the previous level, remove the mounting plugs (1), if present (Figure 8-6).

Building a DIGITAL MultiSwitch 600 Stack

To add a second level to a stack, perform the following steps. Figure 8-7 illustrates installation details.

Figure 8-7: 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 8-5 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.

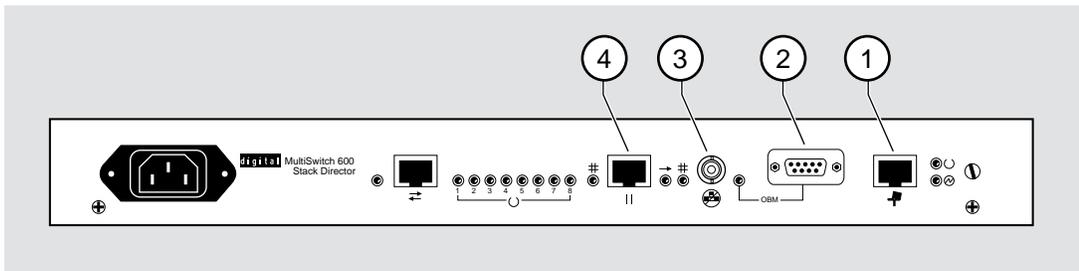
Building a DIGITAL MultiSwitch 600 Stack

Step	Action
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. <u>Note:</u> 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 8-8 shows the Stack Director interface ports.

Figure 8-8: 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.

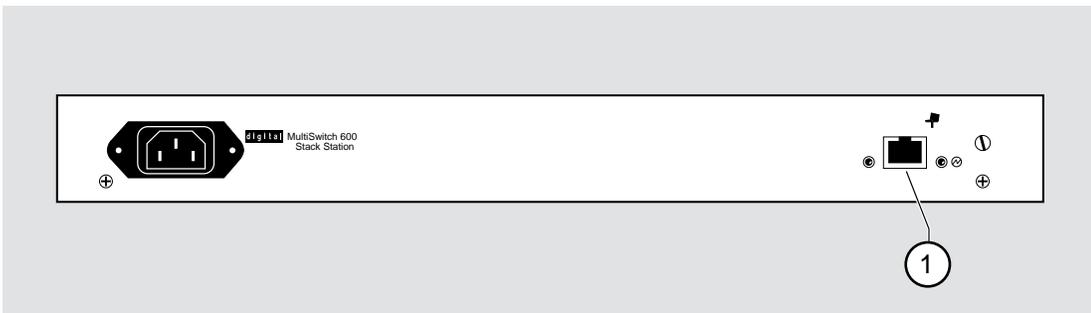
Building a DIGITAL MultiSwitch 600 Stack

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 8-9 shows the Stack Station interface port.

Figure 8-9: 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:												
	<table border="1"> <thead> <tr> <th>If the device connecting to the setup port is:</th> <th>Use this cable</th> <th>With this adapter</th> </tr> </thead> <tbody> <tr> <td>A PC with a 9-pin D-Sub communications port</td> <td>BN24H-xx¹</td> <td>H8571-J</td> </tr> <tr> <td>A terminal with a 25-pin D-Sub connector</td> <td>BN24H-xx¹</td> <td>H8575-A</td> </tr> <tr> <td>A terminal with a 6-pin MMJ connector</td> <td>BN24H-xx-X^{1,2}</td> <td>Not required</td> </tr> </tbody> </table>	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
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.												
2	Configure the setup port device (terminal or PC) as follows: <ul style="list-style-type: none"> • 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.												

Building a DIGITAL MultiSwitch 600 Stack

Task 6: Connecting Power

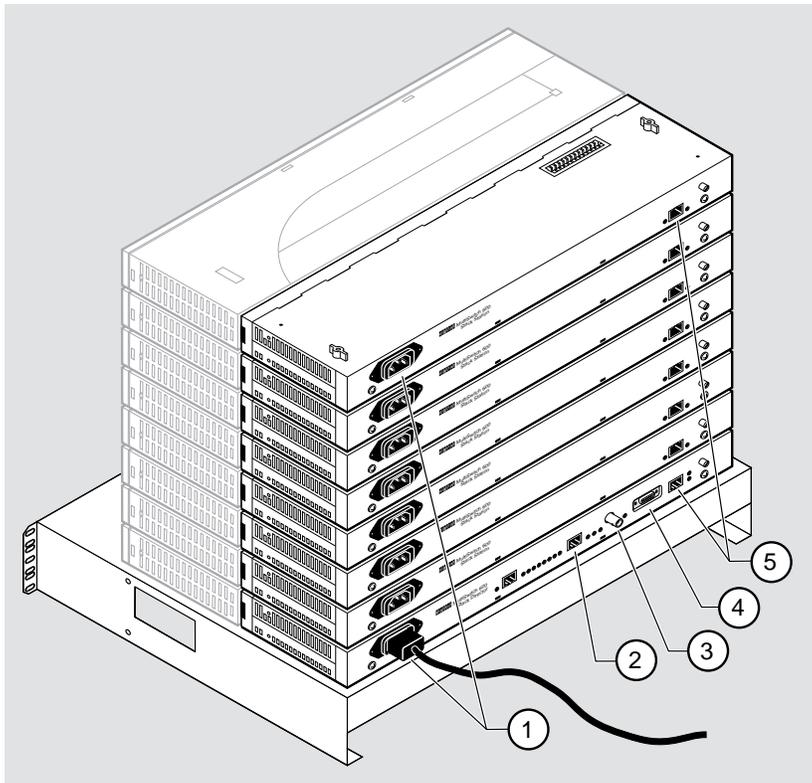
The Stack Director and each Stack Station has its own power supply. This requires the connection of an AC power line cord to each IEC power connector.

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 8-10 shows their location.

Figure 8-10: IEC Power Connector Locations



NPB-0662-96F

Building a DIGITAL MultiSwitch 600 Stack

Step	Action
1	<p>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.</p> <p>The following states occur:</p> <p>The Stack Station Power OK LED should be on. Refer to Stack Station Front Panel on page 7-12.</p>
2	<p>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.</p> <p>The following states occur:</p> <p>The Stack Director Power OK LED should be on. Refer to Stack Station Front Panel on page 7-12.</p>

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 8-6 and Figure 8-7 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	<p>Perform steps 1 through 5 of Task 4: Attaching the Next Level in the Stack</p> <p>Note: Inserting a stack interconnect card in a live stack will disrupt the backplane configuration. Performing step 8 re-establishes the configuration.</p>

Building a DIGITAL MultiSwitch 600 Stack

Step	Action
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.
8	<p>If available, use clearVISN Recovery Manager to restore settings for each device on the stack that may have lost its settings.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>Functional modules that are not the same type as the module previously in the slot will not be automatically configured.</p>

Chapter 9

Managing a Stack

Overview

Introduction

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

In This Chapter

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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 9-1: 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

[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

[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 SerialNumber   :
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	9-12
[2] Add SNMP Trap Addresses	9-13
[3] Delete SNMP Trap Addresses	9-14
[4] Set In-Band Interface IP Address	9-15
[5] Set Out-of-Band Interface IP Address	9-16
[6] Enable/Disable BootP	9-17

[4] Configure IP

[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 octet dotted decimal notation in which
each octet of the address is represented as a decimal
value, separated by '.' character.
example: 16.20.40.156
=====
Enter Trap addresses [ ]: 16.20.40.156
Trap address added! Enter a Trap Address [none] : <Return>
Press Return for IP Configuration Menu...
```

[4] Configure IP

[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...

```

[4] Configure IP

[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...
```

[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

[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.

[6] Downline Upgrade

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] :
```

[6] Downline Upgrade

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 9-2 explains what happens during each stage of the download process.

Table 9-2: Download Process Description

Stage	Description
1	<p>The DLU Process transports the new firmware image across the network from the TFTP load host and places it into a temporary storage buffer.</p> <p>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:</p> <pre>DLU process started!</pre>

This screen is seen only when downloading a functional module in a stack.

[6] Downline Upgrade

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

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 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.

[6] Downline Upgrade

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
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.

[7] Configure Out-of-Band Port

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

[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 10

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
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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.

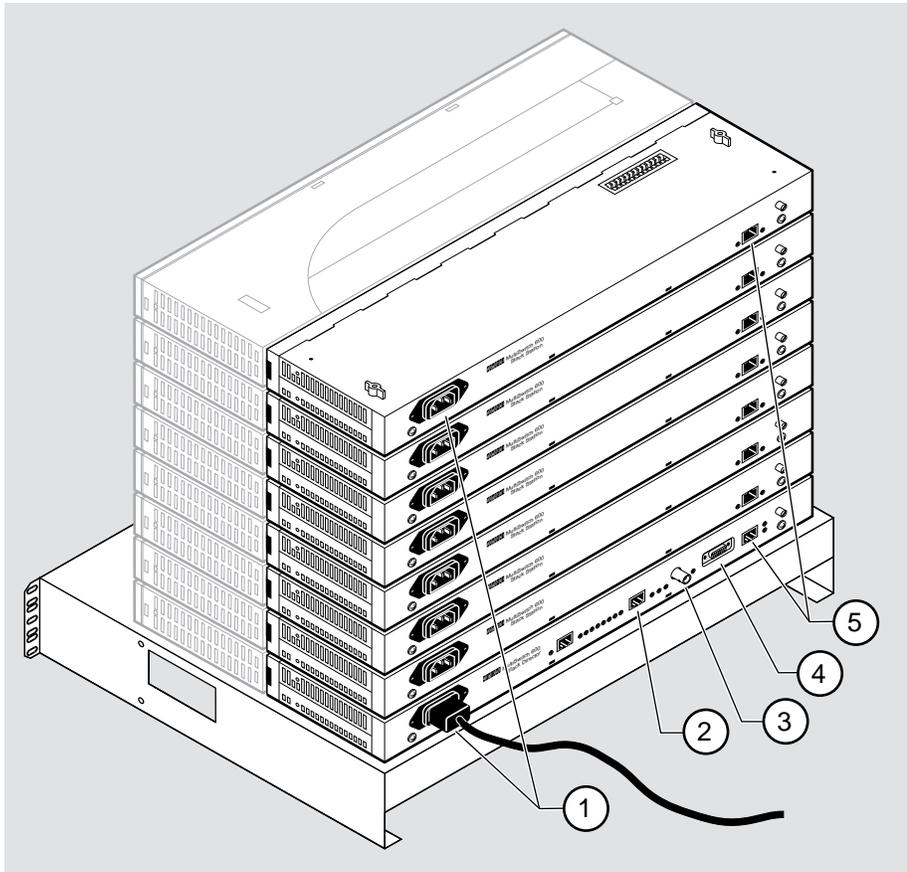
Task 1: Removing Power Cords and Cables

To disconnect power cords and cables from the DIGITAL MultiSwitch 600 stack, perform the procedure in the following table (See Figure 10-1).

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).

Removing or Replacing Components

Figure 10-1: Connector Locations



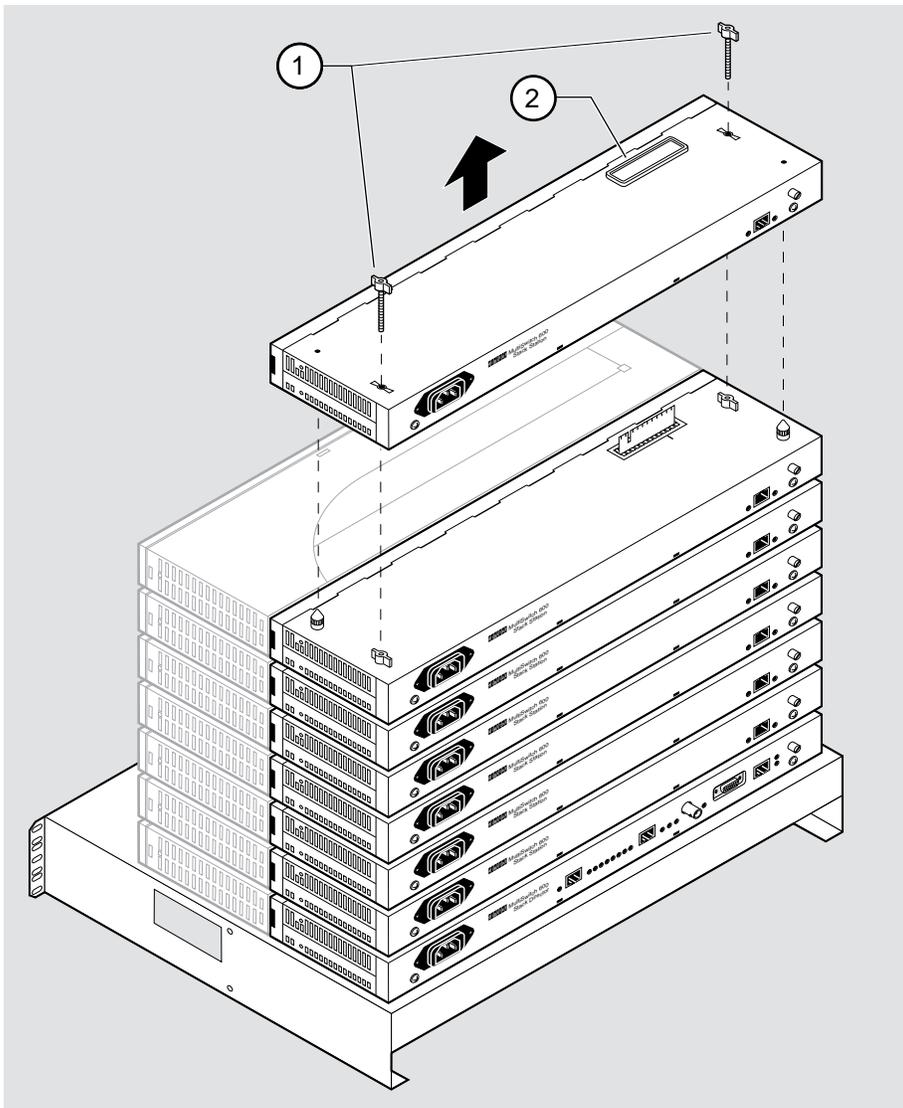
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Removing or Replacing Components

Task 2: Removing or Replacing the Levels

To remove a level from the stack, perform the procedure in the following table. Figure 10-2 shows removal details.

Figure 10-2: Removing a Stack Station



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Removing or Replacing Components

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.

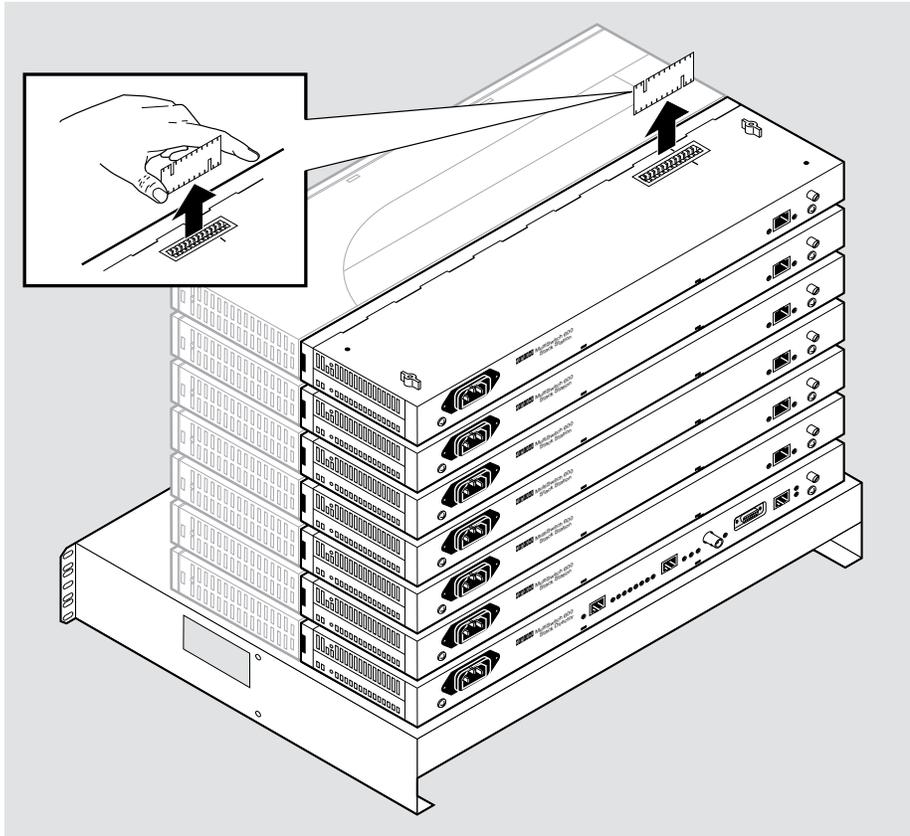
Step	Action
1	If available, use clearVISN Recovery Manager to backup current settings for each device (including the Stack Director) on the stack.
2	Remove power cords and cables. Refer to Task 1: Removing Power Cords and Cables
3	Remove the dust cap (2) from the vertical connector slot on the top level (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 10-3) 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 8 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 8 for more information.

Removing or Replacing Components

Step	Action
9	<p>If available, use clearVISN Recovery Manager to restore settings for each device on the stack that lost its settings.</p> <p>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.</p> <p>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.</p> <p>Functional modules that are not the same type as the module previously in the slot will not be automatically configured.</p>

Removing or Replacing Components

Figure 10-3: Stack Interconnect Card Removal



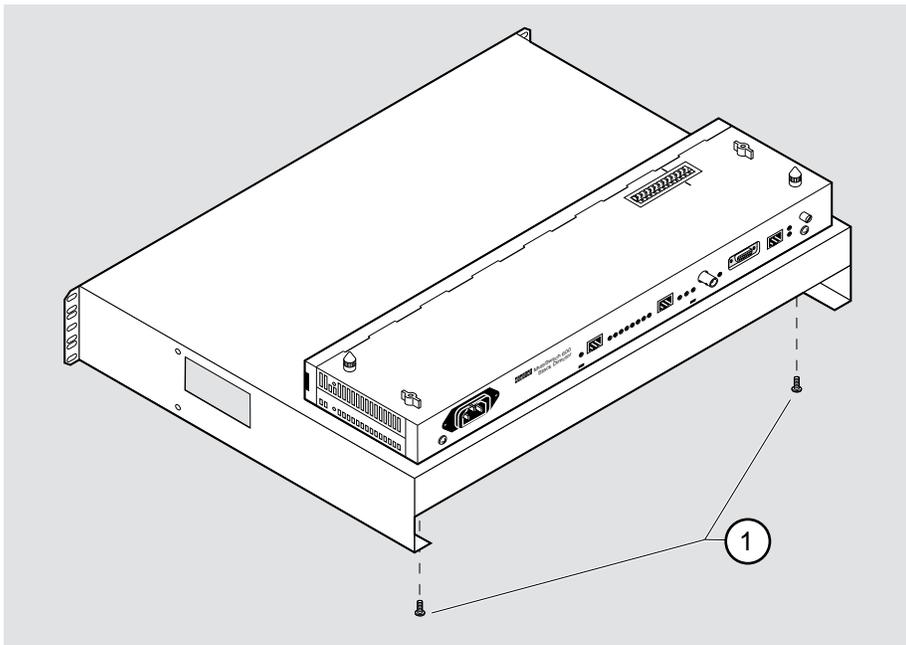
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Removing or Replacing Components

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 10-4 shows location of screws securing the Stack Director to the mounting tray.

Figure 10-4: Removing Stack Director or Stack Station from Mounting Tray



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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 612EX, Mod-MACs, Stack Director, and Stack Station.

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Stack Director LED States	A-4
Stack Station LED States	A-5
Mod-MAC LED States	A-6
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Stack Director Problem Solving Using the LEDs	A-10
Stack Station Problem Solving Using the LEDs	A-12

DIGITAL MultiSwitch 612EX LED States

Table A-1: DIGITAL MultiSwitch 612EX Module's LED States

LED Name	Off	Green On	Green Blinking	Yellow On	Yellow Blinking
Power OK LED 	DIGITAL MultiSwitch 612EX is not receiving power	DIGITAL MultiSwitch 612EX has power	Faulty power connection or insufficient power.	N/A	N/A
Module OK LED 	DIGITAL MultiSwitch 612EX failed self-test, or encountered an unsafe temperature condition during operation.	DIGITAL MultiSwitch 612EX passed self-test.	Non-fatal failure detected (for example, fan failure, or a bad port).	N/A	N/A
Port Status LED 	Nothing connected	Port connected	Port disabled by management or port is pointing to the stack backplane (but is not connected to a backplane channel), or port failed self test.	Port is connected to a backplane channel.	N/A
Port Activity LEDs 	No traffic	High traffic through the front panel	Traffic detected on front panel port connection	High traffic through the backplane	Traffic detected on backplane port connection

(continued on the next page)

DIGITAL MultiSwitch 612EX LED States

LED Name	Off	Green On	Green Blinking	Yellow On	Yellow Blinking
10BaseFL Port LED Status	No connection	Port connected	Port disabled by management or port failed self- test	N/A	N/A
10BaseFL Mod-MAC Port LED Activity	No traffic	High level of traffic on the port	Traffic detected on the port	N/A	N/A
100BaseFX/ 100BaseTX Mod-MAC Port LED Status	No connection	Port connected	Port disabled by manage- ment or port failed self- test	N/A	N/A
100BaseFX/ 100BaseTX Mod-MAC Port LED Activity	No traffic	High level of traffic on the port	Traffic detected on the port	N/A	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.

Mod-MAC LED States

Table A-4 describes Mod-MAC LED States for the 10BaseFL, 100BaseFX and 100BaseTX.

Table A-4: Mod-MAC LED States

LED Name	Off	Green On	Green Blinking
Activity	No traffic.	High level of traffic on the port.	Traffic detected on the port.
Port Status	Not connected.	Connected	Port is disabled by management, or port failed self-test.

DIGITAL MultiSwitch 612EX Problem Solving Using the LEDs

A problem is often indicated by the states of the DIGITAL MultiSwitch 612EX module'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 612EX that is operating in a DEChub 900 MultiSwitch, the DIGITAL MultiSwitch 612EX enters into a low power mode and suspends operations. This condition is displayed on the DEChub 900 MultiSwitch LCD as "Not Enough Power!". The LEDs on the DIGITAL MultiSwitch 612EX blink.

Table A-5: Typical Combined States of LEDs

Symptom	Probable Cause	Corrective Action
Power LED is off.	The DIGITAL MultiSwitch 612EX is not receiving +5Vdc.	<p>Check the power status on the DIGITAL MultiSwitch 612EX, Stack Director and Stack Station.</p> <p>If the DIGITAL MultiSwitch 612EX is installed in a DEChub 900 and the DEChub 900 indicates that power is available for this DIGITAL MultiSwitch 612EX, press the release lever and reseal the DIGITAL MultiSwitch 612EX.</p> <p>If the DIGITAL MultiSwitch 612EX is installed in a Stack Director or a Stack Station, remove and reseal the module.</p> <p>If the problem persists, either replace the DIGITAL MultiSwitch 612EX or contact your service representative to correct the problem.</p>

DIGITAL MultiSwitch 612EX Problem Solving Using the LEDs

Symptom	Probable Cause	Corrective Action
Module OK LED is off.	The DIGITAL MultiSwitch 612EX Self-test in progress.	Wait for self-test to complete.
	Self-test failed.	If the LED does not light within 60 seconds disconnect the DIGITAL MultiSwitch 612EX and plug it in again. If self-test fails again, replace the DIGITAL MultiSwitch 612EX. If the problem persists, contact your service representative to correct the problem.
The module OK LED is off and all the port status LED's flash.	An unsafe temperature condition encountered during operation.	Power off and on. Ensure that the module operates within a supported temperature range.
The DIGITAL MultiSwitch 612EX Module OK LED is flashing, and the module does not respond to management request and is not accessible through the setup port. If the module is installed in a DEChub 900, the DEChub 900 does not indicated that the module is in a low power mode.	The firmware image is corrupted.	Reload the firmware image as described in the Downline Upgrade section of Appendix D. If the problem still persists, contact your service representative to correct the problem.

DIGITAL MultiSwitch 612EX Problem Solving Using the LEDs

Symptom	Probable Cause	Corrective Action
Module OK LED is flashing and all the port state LEDs also flash. The module is installed in a DEChub 900, and the DEChub 900 indicates that the module is in a low power mode.	Insufficient power in the DEChub 900. The DIGITAL MultiSwitch 612EX has entered a low power mode.	Add additional power supplies to the DEChub 900.
Port State LED is off.	1. Connection is bad (loose, or incorrect cable). 2. Port not connected.	Correct the cable connection. None — normal operation.
Port State LED is blinking green and the module responds to management requests or is accessible through the setup port.	Port failure.	Either replace the DIGITAL MultiSwitch 612EX or contact your service representative to correct the problem.
Port State LED is blinking green and the module responds to management request or is accessible through the setup port.	Port is disabled (e.g., by management, security, or 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.
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-6 list possible error conditions for the Stack Director that are useful when troubleshooting the Stack Director.

Table A-6: 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

Stack Director Problem Solving Using the LEDs

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 particular Stack Level Management Status LED does not light.	Stack Director does not communicate with corresponding device.	Replace associated device.

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-7 list possible error conditions for the Stack Station that are useful when troubleshooting the Stack Station.

Table A-7: 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 device is connected. Note: The Setup Port LED should not light when the Stack Station is a member of a managed stack.	Device or Stack Station is Faulty	Replace Device 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 612EX module and DIGITAL MultiSwitch 600 System.

In This Appendix

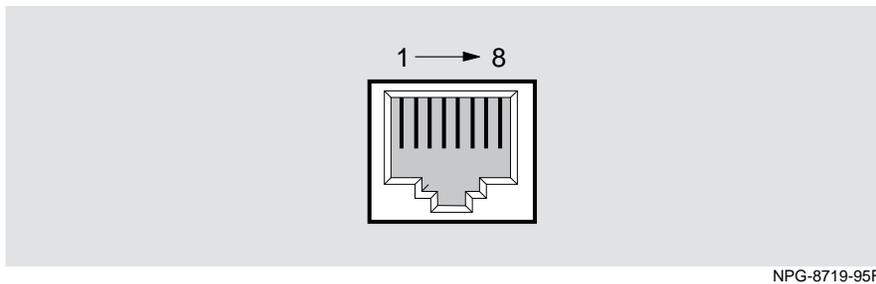
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Mod-MAC Connectors	B-3
10BaseFL Connectors (BN25J)	B-3
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100BaseTX Connector	B-4
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Stack Director and Stack Station Connectors and Pin Assignments	B-7
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MultiSwitch 612EX Connectors and Pin Assignments

10BaseT (8-pin MJ) Port Connector

The 10BaseT connector is used with the DIGITAL MultiSwitch 612EX. All twelve 10BaseT port connectors on the DIGITAL MultiSwitch 612EX are crossover connections. Table B-1 defines the 8-pin MJ connector pin assignments. Figure B-1 shows there location.

Figure B-1: 10BaseT (8-pin MJ) Connector



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

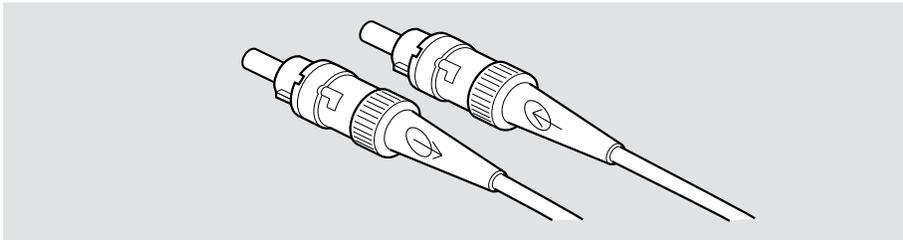
Pin No.	Assignment
1	RX+
2	RX-
3	TX+
4	Not Connected
5	Not Connected
6	TX-
7	Not Connected
8	Not Connected

Mod-MAC Connectors

10BaseFL Connectors (BN25J)

Figure B-2 shows the 10BaseFL transmit connector and receive (ST Type) connector used with the DIGITAL MultiSwitch 612EX.

Figure B-2: 10BaseFL Connectors

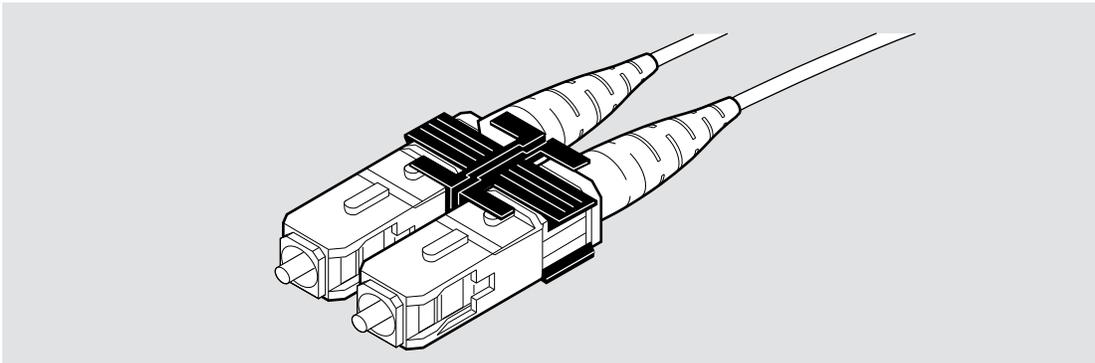


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100BaseFX Connectors (DFNR)

Figure B-3 shows the 100BaseFX transmit connector and receive (SC Type) connectors used with the DIGITAL MultiSwitch 612EX.

Figure B-3: 100BaseFX Connectors



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Mod-MAC Connectors

100BaseTX Connector

Figure B-4 shows the 100BaseTX connector used with the DIGITAL MultiSwitch 612EX.

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

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

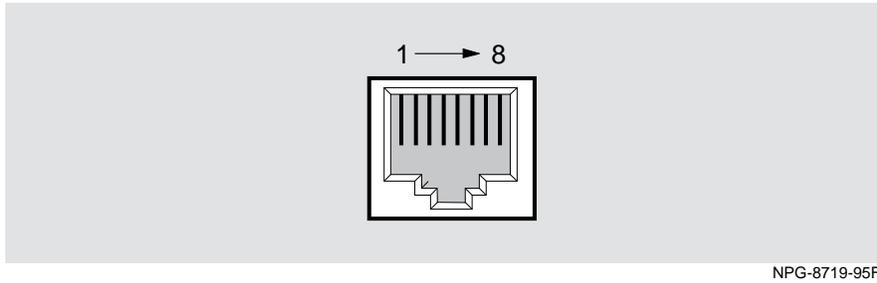
If you have this cable type . . .	and the device you are connecting has this connector . . .	use this connector on the 100BaseTX . . .
Straight-through cable ¹	Straight-through connector ¹	Crossover port
Straight-through cable ¹	Crossover connector ¹	Straight-through port
Crossover cable ¹	Straight-through connector ¹	Straight-through port
Crossover cable ¹	Crossover connector ¹	Crossover port

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

NOTE

One 100BaseTX port is a crossover the other port is a straight-through.

Figure B-4: 100BaseTX Connector



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Table B-2: 100BaseTX Connector Pin Assignments

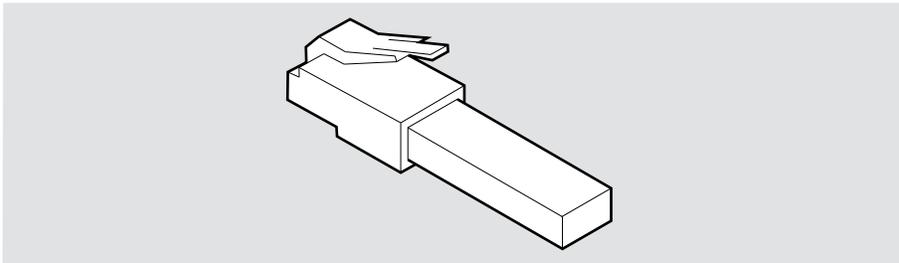
Crossover Connector		Straight-Through Connector	
Pin No.	Assignment	Pin No.	Assignment
1	RX+	1	TX+
2	RX-	2	TX-
3	TX+	3	RX+
4	Not Connected	4	Not Connected
5	Not Connected	5	Not Connected
6	TX-	6	RX-
7	Not Connected	7	Not Connected
8	Not Connected	8	Not Connected

Mod-MAC Connectors

Loopback Connector

Figure B-5 shows the loopback connector used when connecting to the 100BaseTX Mod-MAC port on the MultiSwitch 612EX. This connector is used to temporarily connect the output portion of a circuit back to the input portion of a circuit for the purpose of testing communication lines. This connector cannot be ordered through DIGITAL.

Figure B-5: Loopback Connector



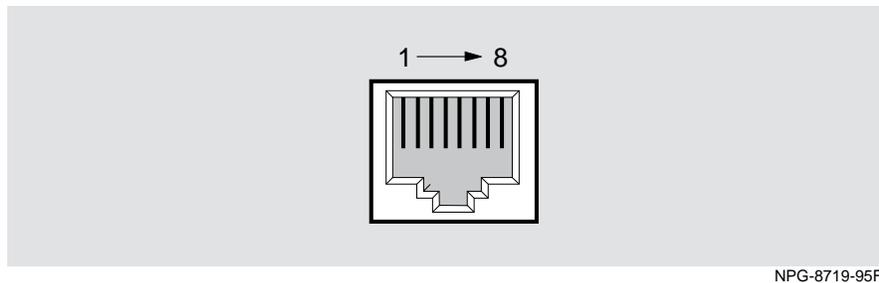
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Stack Director and Stack Station Connectors and Pin Assignments

Setup Port and Management Access Port Connector

The Setup Port connector is used with the Stack Director and Stack Station. The Management Access Port is available only on the Stack Director. Table B-3 defines the pin assignments as shown in Figure B-6.

Figure B-6: Stack Director and Stack Station Setup Port Connector



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Table B-3: Stack Director and Stack Station Setup Port Connector Pin Assignments

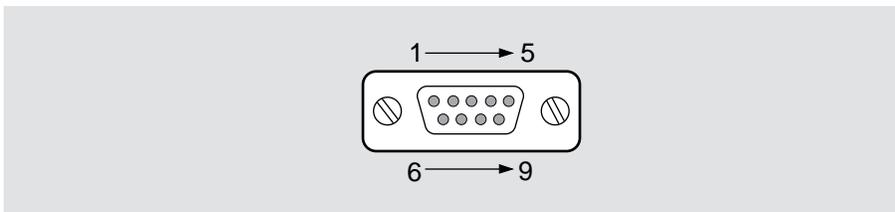
Pin No.	Assignment
1	Unused
2	RD
3	GND
4	Unused
5	Unused
6	TD
7	+5
8	GND

Stack Director and Stack Station Connectors and Pin Assignments

OBM Port (9-Pin) Connector

Table B-4 describes the OBM connector pin assignments used on the Stack Director and Figure B-7 shows there location.

Figure B-7: OBM Port (9-Pin) Connector



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Table B-4: OBM Port (9-Pin) Connector Pin Assignments

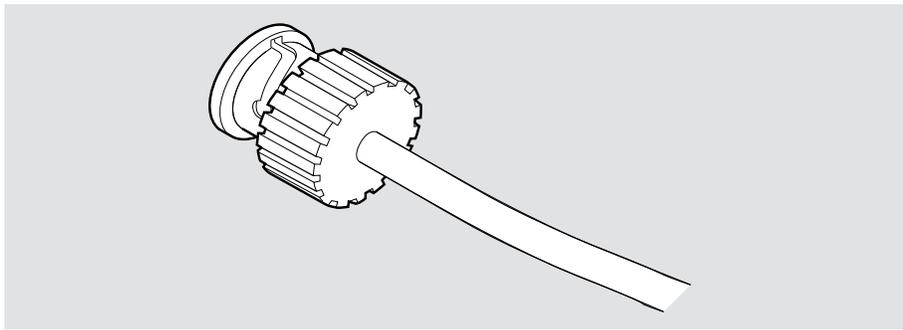
Pin No.	Assignment
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground
6	Data Set Ready (DSR)
7	Request To Send (RTS)
8	Clear To Send (CTS)
9	Not Connected

Stack Director and Stack Station Connectors and Pin Assignments

10Base2 Connector

Figure B-8 shows the 10Base2 connector used on the Stack Director.

Figure B-8: 10Base2 Connector

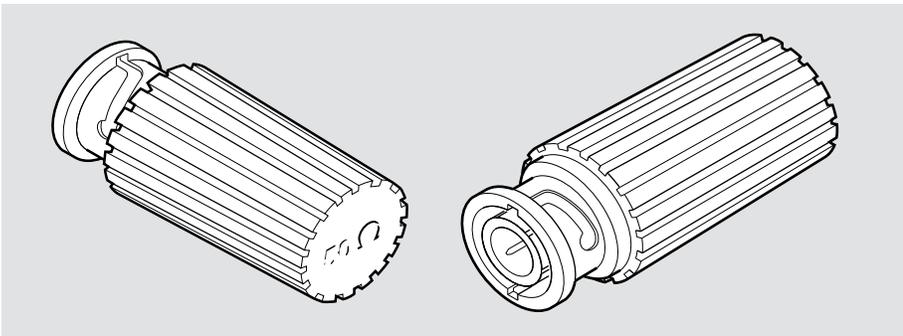


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H8225 50-Ohm Terminator

Figure B-9 shows the 50-ohm terminator needed to terminate the 10Base2 port on the Stack Director.

Figure B-9: 50-ohm Terminator



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Adapter

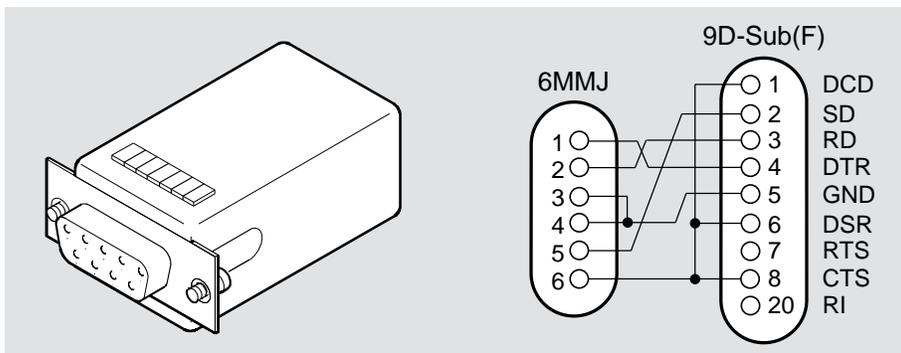
Adapter

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

H8571-J Adapter

Figure B-10 shows the H8571-J adapter (6-pin MMJ to 9-pin D-Sub connector).

Figure B-10: H8571-J Adapter



NPB-5342-95F

Appendix C

Product Specifications

Overview

Introduction

This appendix lists product and acoustical specifications for the DIGITAL MultiSwitch 612EX, Stack Director and Stack Station, and the connectors used with these products.

In This Appendix

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Product Specifications for the Stack Station	C-4
Acoustical Specifications	C-5
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Product Specifications for the DIGITAL MultiSwitch 612EX

Table C-1 lists the product specifications for the DIGITAL MultiSwitch 612EX.

Table C-1: Product Specifications for the DIGITAL MultiSwitch 612EX

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	19.5W @ 1 amp, total power 3.7 A, 5 Vac 90m A, 12 Vac 0.0 A, 15 Vac
Physical	
Height (installed horizontally)	4.45 cm (1.75 in)
Height (installed vertically)	44.45 cm (17.5 in)
Width (installed horizontally)	44.45 cm (17.5 in)
Width (installed vertically)	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: Stack Director Specifications

Parameter	Specification
Environment	
Operating Temperature ¹	5° C to 50° C (4° 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	
	72 W total input power
• Input:	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 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: Stack Station Specifications

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	
• 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 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 Stack Director, Stack Station and the module in English.

Table C-4: Acoustical Specifications

Declared Values per ISO 9296 and ISO 7779¹

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* + DLMWL-MA Stack Director + MultiSwitch 612EX	5.6	40
DLSSU-U* Stack Station	No measurable noise emission	No measurable noise emission
DLSSU-U* + DLMWL-MA Stack Station + MultiSwitch 612EX	5.5	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.

Acoustical Specifications

Table C-5 lists the acoustical specifications for the Stack Director, Stack Station and the module in German.

Table C-5: German Acoustical Specifications

Schallemissionswerte Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779²

Produkt	Schalleistungsp egel $L_{WA,d}$, B	Schalldruckpege l L_{pAm} , dBA (Zuschauerpositi onen)
	Leerlauf/Betrieb	Leerlauf/Betrieb
DLSSM-S* Stack Director	5,2	37
DLSSM-S* + DLMWL-MA Stack Director + MultiSwitch 612EX	5,6	40
DLSSU-U* Stack Station	Keine meßbaren Geräuschemissionen	Keine meßbaren Geräuschemissionen
DLSSU-U* + DLMWL-MA Stack Station + MultiSwitch 612EX	5,5	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

This section lists connectors for the DIGITAL MultiSwitch 612EX, Stack Director, and the Stack Station.

Table C-6 provides a list connectors for DIGITAL MultiSwitch 612EX.

Table C-6: Connectors for the DIGITAL MultiSwitch 612EX

Connectors	Quantity
8-pin MJ Port Connector	12

Table C-7 provides a list connectors for Stack Director.

Table C-7: Connectors for the Stack Director

Connectors	Quantity
Setup Port Connector	1
OBM (RS-232) Port	1
10Base2 (ThinWire) Port Connector	1
Management Access (UTP/ScTP) Port	1
IEC Connector (Power)	1
Reserved	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 612EX.

In This Appendix

Topic	Page
Ordering Options	D-2
Ordering Notes	D-4
Parts List	D-5

Ordering Options

Ordering Options

Option	Name	Part Number
Basic Module	DIGITAL MultiSwitch 612EX, 12-port 10Mbps Switch with 2 option slots	DLMWL-MA
Stack Director	Stack Director	DLSSM-S*
Stack Station	Stack Station	DLSSU-U*
Expansion Slot Modular Media Options -- 10Mbps	10BaseFL	DLXFL-MA
Expansion Slot Modular Media Options --100Mbps	100BaseTX 100BaseFX	DLXTX-MA DLXFX-MA
<u>Note:</u> Order a mix of two per 100Mbps option.		
Rack Mounting Tray	DIGITAL MultiSwitch 600 Rack Mount Tray	H3108-MU
Accessory package ¹ includes:	<ul style="list-style-type: none">• Top Cap (1)• Mounting Plugs (2)• Stack interconnect card(4)• Stabilizer Screw (8)• Alignment Pylons (8)	DLSCC-M4
Straight-through Cable	Straight-through Cable	BN25G-xx (=)
Crossover Cable	Crossover Cable	BN24F-xx (X)
Adapter	Adapter	H8571-J

¹Accommodates four stack station levels. These parts are supplied as spares. All needed parts are supplied with the Stack Director or Stack Station.

Ordering Options

* 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

Ordering Notes

The following option notes should be considered when ordering DIGITAL MultiSwitch 600 System components.

Option	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 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.
4	Order necessary Expansion Slot Modular Media Interface Option.

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 Package¹:	DLSCC-M4
Top Cap (1)	
Mounting Plugs (2)	
Backplane Interconnect Riser Card (4)	
Stabilizer Screw (8)	
Alignment Pylons (8)	

¹Accessories Package is included with each Stack Station and Stack Director.

Parts List

* 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

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
<i>DIGITAL MultiSwitch 600 System Installation and Configuration</i> EK-DLSSM-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.
<i>DIGITAL MultiSwitch 600 System Quick Start</i> EK-DLSSM-QS	Provides a four page guide for installation and setup information for the DIGITAL MultiSwitch 600 System (Stack Director or Stack Station).
<i>DIGITAL MultiSwitch 612EX Quick Start</i> 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.
<i>DIGITAL MultiSwitch Hub 624T Installation and Configuration</i> EK-DLMR2-IN	Provides 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.
<i>DIGITAL MultiSwitch Hub 624T Quick Start</i> 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.
<i>DEChub 900 MultiSwitch Owner's Manual</i> EK-DH2MS-OM	Provides installation, use, security, and troubleshooting information for the DEChub 900 MultiSwitch.

Title and Order Number	Description
<i>clearVISN Installation</i>	Describes how to install clearVISN software. It includes a list of distribution kit contents, system requirements, pre-installation considerations, and the installation procedure.
<i>clearVISN Overview</i>	Provides an overview of clearVISN, an explanation of each clearVISN application, and descriptions of all concepts necessary to understand and use the application efficiently.
<i>clearVISN User's Guide</i>	Provides information for starting each application, configuring them (when necessary), and general use information.
<i>DEChub Network Modules 900-Series Switch Reference EK-SWTCH-HR</i>	Describes the functions and features of DIGITAL's HUB-based 900-Series switching products.
<i>Bridge and Extended LAN Reference EK-DEBAM-HR</i>	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 detail 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 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 function or malfunctioning.

Appendix G

Port Switching Modes

Overview

Introduction

This appendix describes in detail the port switching modes of operation. The switching mode of a port controls the learning and forwarding functions on the port and determines whether the switch will learn station location information from the source addresses of packets received on the port. It also determines whether the switch will forward packets received from other ports for whose destination addresses it has no entries in its filtering database.

The DIGITAL MultiSwitch 612EX provides the ability to individually configure each of its ports into one of the following four switching modes; Standard, Workgroup, Backbone, and Manual.

In This Appendix

Topic	Page
Modes of Operation	G-2
Standard Mode	G-3
Workgroup Mode	G-4
Backbone Mode	G-5
Manual Mode	G-6

Modes of Operation

The Digital MultiSwitch 612EX module supports four different switching modes for each port; Standard, Workgroup, Backbone, and Manual. These modes differ in how the learning and forwarding functions operate on the corresponding port. The Table below captures the differences between these 4 modes.

Switching Mode	Source Address Learning	Unknown Destination Address Forwarding
Standard	Enabled	Enabled
Workgroup	Enabled	Disabled
Backbone	Disabled	Enabled
Manual	Disabled	Disabled

When a port is configured to operate in the Standard and Workgroup modes, the DIGITAL MultiSwitch 612EX learns station location information from source addresses of packets received on this port. In the Backbone and Manual modes, station location information is not learned from source addresses of packets received on the port.

When a port is configured to operate in the Standard and Backbone modes, the DIGITAL MultiSwitch 612EX floods packets with unknown destination addresses received on other ports on this port. In the Workgroup and Manual modes, packets with unknown destination addresses received on other ports are not flooded on this port.

The factory default setting for the port switching mode is as follows:

- 10BaseT Ports (Ports 1 through 12): Workgroup
- 10BaseFL/100BaseTX/100BaseFX Ports (Ports 13 and 14): Backbone

The switching mode of a port may be configured using clearVISN (See Chapter 5). They may also be configured using SNMP by setting the following MIB object:

stackSwitchPortSwitchingMode (1.3.6.1.4.1.36.2.18.11.7.2.1.1.5.n)

to one of the following values:

- Standard(1)
- Workgroup(2)
- Backbone(3)
- Manual(4)

When the module is installed standalone in a stack station, the port switching mode may be configured using the setup menu (See Chapter 4).

Standard Mode

In standard mode, a port behaves exactly as specified in the IEEE 802.1D standard. It forwards unknown destination addresses, and learns source addresses. The standard mode of operation would be useful in the following situations:

- Efficient use of the bandwidth provided by the port is a critical requirement, but the number and the nature of the nodes does not result in too much wasted bandwidth operating in standard mode.

For example, if the number of nodes on the network is less than 1023, the DIGITAL MultiSwitch 612EX filtering database capacity, and the number of *reticent* nodes (that is, nodes that rarely transmit messages) in the network is small, most of the addresses will be learned by the DIGITAL MultiSwitch 612EX. In this case, only a very small number of irrelevant packets (packets addressed to reticent nodes not on this port) will be forwarded to a port operating in standard mode.

- Exact conformance to the IEEE 802.1D standard is required for source address learning and forwarding of unknown destination address's.

You cannot use the standard mode when the number of addresses that reside on the port exceeds the capacity of the DIGITAL MultiSwitch 612EX filtering data base. For example, a port that is used as an up link to connect a large backbone network should not be configured into standard mode.

Workgroup Mode

When a port is in workgroup mode, packets with unknown destination addresses received by the DIGITAL MultiSwitch 612EX on other ports, are not forwarded to this port. Before a port is placed in the workgroup mode, ensure that one the following conditions is met:

- Nodes that want to communicate with nodes attached to this port must use a static address resolution protocol, or a dynamic address resolution protocol based on broadcast or multicast addresses (for example, IP/ARP), to resolve network addresses into MAC addresses, before starting communication.
- Nodes connected to this port must be *loquacious*, that is, they must run some protocol that involves the transmission of unsolicited messages at a reasonable frequency.
- Nodes connected to this port must always speak up before they are spoken to, that is, they transmit a message before receiving messages from other nodes.

If none of the above three conditions are met and a port is placed in workgroup mode, the result may be lack of proper connectivity.

The workgroup mode of operation is useful in the following situations:

- The workgroup mode of operation on a port promotes efficient use of bandwidth by not forwarding packets with unknown destination addresses onto the port. Efficient use may be important in the following situations, for example:
 - The port is dedicated to running bandwidth-hungry applications.
 - The port is shared among multiple nodes using a repeater.
 - The port is connected to a shared server or server farm.

The workgroup mode of operation is not appropriate for the following situations:

- When exact conformance to the IEEE 802.1D standard is required for forwarding on unknown destination address.
- When the number of addresses that reside on the port exceeds the capacity of the DIGITAL MultiSwitch 612EX filtering data base. For example, a port that is used as an up link to connect to a large backbone network, should be configured into workgroup mode.

Backbone Mode

When a port is in backbone mode, address location information is *not* learned from the source addresses of packets received on this port. Packets with unknown destination addresses received by the DIGITAL MultiSwitch 612EX on other ports, are forwarded to this port.

The backbone mode of operation is useful when you use the port to connect to a larger network whose size exceeds the capacity of the DIGITAL MultiSwitch 612EX filtering database. For example, a port that is used as an up link to connect to the enterprise backbone will typically operate in backbone mode. A port that is used as a down link to link a large work group with other work groups connected to the DIGITAL MultiSwitch 612EX could operate in backbone mode.

The backbone mode of operation is not appropriate for use in the following situations:

- When exact conformance to the IEEE 802.1D standard is required, for source address learning.
- When efficient use of the bandwidth provided by the port is a critical requirement. The backbone mode of operation on a port introduces inefficiency by forwarding packets with unknown destination address onto the port.
- When the total number of addresses in the network is less than the capacity of the DIGITAL MultiSwitch 612EX filtering data base. Placing any port in the backbone mode will introduce avoidable inefficiency in this case.

Manual Mode

When a port is in manual mode, there are only two ways to forward packets to this port:

- By adding an appropriate static filter in the filtering database of the DIGITAL MultiSwitch 612EX
- By authorizing addresses of interest using the security features provided by the DIGITAL MultiSwitch 612EX

Forwarding of unknown destination address is disabled in this mode.

In addition, when a port is in manual mode, the DIGITAL MultiSwitch 612EX does *not* learn station location information from source addresses of packets received on this port.

The manual mode of operation would be useful in the following situations:

- When efficient use of the bandwidth provided by the port is a critical requirement. Manual mode forwards only packets belonging to stations that reside on the port.
- When one or more nodes on the port are *reticent*, that is, they rarely transmit messages.
- When security requirements dictate that packets addressed to nodes that reside on a port should never be forwarded to other ports.

A port providing connectivity to a shared server or server farm will typically be placed in manual mode. Efficient use of bandwidth will be required because the link to the server is a shared bottleneck. A server such as a printer server may have little reason to talk and hence could be classified as a reticent node.

The manual mode of operation is not appropriate for use in the following situations:

- When the number of addresses that reside on the port exceeds the capacity of the DIGITAL MultiSwitch 612EX filtering data base.
- When there is no restriction or a prior knowledge of what stations can be present on the network connected to a port. Thus the manual mode of operation will be unsuitable for connection to an enterprise backbone.

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).
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) which attach to the Stack Station and Stack Director.
Stack Director	Power supply, setup port, backplane, and SNMP agent interface for functional module and the MultiSwitch 600 system.
Stack Station	Power supply and setup port interface for functional module
ThinWire	10Base2 thin coaxial cable 10 Mb/s Ethernet connection.
Twisted Pair	Twisted pair cable 10 Mb/s Ethernet connection. 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	Thin coaxial cable 10 Mb/s Ethernet connection.
10BaseT	Twisted-pair cable 10 Mb/s Ethernet connection.

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