HUBwatch

Use

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This manual explains how to use the HUBwatch network management software.

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Preface

Introduction

This book tells you how to use the HUBwatch™ network management software in an OpenVMS ™ or DEC OSF/1™ (Digital UNIX) operating system environment. You use this software to manage:

- A DEChub™ 90 and installed modules

- A DEChub 900 MultiSwitch and installed modules

- A DEChub ONE (low-end docking station)

- A DEChub ONE-MX (high-end docking station)

- Standalone modules (such as the DECrepeater 90FS and 90TS)

- Stackable 90-series modules

- A GIGAswitch/FDDI system - the existing product renamed from GIGAswitch to GIGAswitch/FDDI.

Intended Audience

This book is intended for network managers who are using the HUBwatch application to manage the network components described above.

You should have a basic understanding of the OpenVMS and DEC OSF/1 (Digital UNIX) operating systems and the Motif™ Windows interface. It would also be helpful if you know how to use the EDT or EMACS editor (for OpenVMS) or vi or xedit (for DEC OSF/1).

What Is in This Book

This book contains the following:

- Conceptual information common to all network modules being managed through HUBwatch software.

- Information for using the HUBwatch graphical user interface (GUI).

- Information for using the HUBloader utility.

- Information for using the GIGAswitch/FDDI system.

- An overview of HUBwatch management tasks and the windows you use in performing the tasks.

What Is Not in This Book

This book does not contain detailed procedural instructions for performing all HUBwatch device configuration and network management tasks. You can find such information in the HUBwatch online help. The online help complements this book and provides the step-by-step instructions necessary for using HUBwatch and its associated network modules.

Structure of This Book

This book is structured as follows:

- Part I presents introductory information and concepts common to all devices managed with HUBwatch.

  - Chapter 1 introduces HUBwatch software and its features.

  - Chapter 2 describes HUBwatch management methods.

  - Chapter 3 describes how HUBwatch uses the Simple Network Management Protocol (SNMP) in performing its functions. It tells you how communities are defined and managed in configurations with multiple hubs and SNMP agents. This chapter also describes the tasks associated with managing SNMP agents.

  - Chapter 4 tells you how to use alarms and handle traps. It also explains how to run the poller and view the alarm message log file. The alarm facility is available only in the OpenVMS release of HUBwatch software.

  - Chapter 5 describes how to start the HUBwatch software.

- Part II contains information applicable to hubs and modules.

  - Chapter 6 describes how to use new HUBloader application. This application performs firmware upgrades for hubs, hub modules, and the GIGAswitch /FDDI system.

  - Chapter 7 provides an overview of LAN interconnect functionality and presents examples of typical LAN segment configurations available to you when using the DEChub 900 MultiSwitch.

  - Chapter 8 describes the HUBwatch graphical user interface (GUI) for hubs and network modules.

  - Chapter 9 describes hub management tasks associated with hubs and modules.

- Part III contains information applicable to the GIGAswitch /FDDI system.

  - Chapter 10 describes the HUBwatch GUI in managing the GIGAswitch/FDDI system.

  - Chapter 11 describes the tasks associated with managing the GIGAswitch/FDDI system.

- Appendix A provides troubleshooting information for network problems.

- Appendix B contains illustrations of the summary windows used in managing hubs and network modules.

- A Glossary provides definitions of terms common to the HUBwatch product documentation.

Conventions   The following conventions are used in this manual:

Convention	Meaning
Special type	Indicates a literal example of system output or user input.
lowercase italics	Indicate a variable.
Monospaced type	Indicates the names of commands, utilities, files, directories, node names, and specific terms to be defined.
[ ]	Brackets contain default responses to the installation procedure prompts. To accept the default response to a prompt, simply press the Return key.
Return	Indicates that you press the Return key.
Click button	Indicates that you use the mouse to point to the HUBwatch window button named in the box and click mouse button 1 (MB1). MB1 is used for all clicking functions unless MB2 is specified.
Ctrl/*x*	Indicates that you press the Control key at the same time you press the key denoted by *x*.
Ethernet	Refers to the IEEE 802.3 standard.
Token Ring	Refers to the IEEE 802.5 standard.
HUBwatch	Refers to the HUBwatch software.
Hub Manager	Refers to the DEChub 900 MultiSwitch Manager.
00.00.00.00	Represents an Internet Protocol (IP) address in examples and figures.
08-00-2B-00-00-00	Represents a Media Access Control (MAC) address in examples and figures.

Firmware Updates

Digital continuously improves the quality of DEChub products through periodic firmware releases. To ensure the high quality and interoperability of HUBwatch products, you should always use the latest available version of DEChub firmware.

FTP Location

You can get information about the latest firmware releases from your local Digital Reseller or the local Digital Sales Office. You can also get this information by reading the `README` file found in the `/pub/DEC/hub900` directory at `ftp.digital.com`.

How to Register for Release Notification

Firmware updates are customer installable. To register for automatic notification of new firmware releases, return the Business Reply Card supplied with this product. Alternatively, you can use the Internet by sending your Name, Title, and Mailing Address to `dechub_notice@lkg.dec.com`.

Documentation Comments

If you have comments or suggestions for this book or any of the HUBwatch documents, you can submit them in either of two ways:

- Mail the Reader's Comment form on the last page of this document to the address on the reverse side of the form.

- If you have access to the Internet, mail your comments electronically to the HUBwatch writing group within Digital at `doc_quality@lkg.mts.dec.com`.

Part I

HUBwatch Concepts

Part I presents the following topics:

- HUBwatch Introduction
- Management Methods
- SNMP Concepts
- Using Alarms (OpenVMS only)
- Starting HUBwatch

This information is common to all devices managed with HUBwatch.

1
HUBwatch Introduction

What Is HUBwatch?

Introduction   HUBwatch is a flexible, network configuration and management application that you access by means of a graphical user interface (GUI). HUBwatch manages network modules installed in a hub as well as the hub itself; it also manages other network facilities, such as the GIGAswitch/FDDI system.

To communicate configuration and management commands to network modules, HUBwatch sends Simple Network Management Protocol (SNMP) commands to SNMP management agents in the network modules or in the hub itself.

Definitions   A **hub** is a central device, usually configured in a star topology local area network (LAN), in which network modules are installed. When you install Digital's network modules in a DEChub 90 or a DEChub 900 MultiSwitch chassis, the chassis becomes a hub.

A **network module** is a hardware device that occupies a slot in the hub. It provides network infrastructure services by connecting other devices like terminals, workstations, and host systems to the hub. A network module may include front panel status indicators, diagnostic LEDs, connections to the hub, a serial service port, and a media access control (MAC) interface.

The **GIGAswitch/FDDI** system is an intelligent multiport switch that forwards packets among a set of connected FDDI data links.

Who Uses HUBwatch?

Network managers responsible for configuring and maintaining a hub and its installed modules use the HUBwatch product. Additionally, the graphic presentation of SNMP information and the extensive online help information allow non-technical personnel to use HUBwatch.

What You Can Do with HUBwatch

You use HUBwatch software to:

- View the status and activity of network modules and ports.

- Configure virtual LANs on the hub backplane.

- Monitor the flow and accuracy of network data.

- Configure network modules.

HUBwatch Software Environment

The current release of the HUBwatch network management application runs on the DEC OSF/1® (Digital UNIX) and OpenVMS ™ VAX ™ operating systems in a Motif® windows environment. HUBwatch also runs on the MS–DOS® operating system in an MS-Windows environment. A separate *HUBwatch for Windows Use* manual is available for the PC version of HUBwatch.

The HUBwatch functionality described in this manual assumes that you have installed the latest firmware version in DEChub hardware and associated network modules.

Related Manuals

The following information may be useful.

For Information About...	See...
HUBwatch software	*HUBwatch Installation and Configuration* HUBwatch Tutorial.
HUBwatch use of SNMP	Chapter 3 of this manual.

How You Use HUBwatch

Introduction
You can configure HUBwatch software to run as a standalone application on a network management station or as an add-on application to the POLYCENTER network management software.

Using HUBwatch
You perform the general steps outlined in the table below in using HUBwatch to manage a DEChub 90 with installed modules or a DEChub 900 MultiSwitch with installed modules.

Step	Action	Result
1	Run the application.	HUBwatch displays the Hub Front Panel window. This window shows the modules installed in the hub and indicates their status. It also provides selectable items in a menu bar across the top of the window.
2	Click on an item on the Hub Front Panel menu bar.	HUBwatch presents options in a pulldown menu, enabling you to choose an option applicable to the management task that you wish to perform.
3	Click on an option from the pulldown menu.	HUBwatch presents a window in which you can perform the desired management tasks. For example, you can invoke the HUBloader utility in this manner from the Applications pulldown menu to update DEChub firmware.
		Alternatively, double click on a displayed module or one of its ports.

Step	Action	Result
4	Click on an icon displayed in a summary window.	HUBwatch displays a subordinate window that allows you to perform additional management tasks for the selected module.

Related Information

The following information may be useful.

For Information About...	See...
Configuring the HUBwatch application	*HUBwatch Installation and Configuration* manual.
Starting the HUBwatch software	Chapter 5 of this manual.
Using the HUBloader	Chapter 6 of this manual.
Using the GUI for hubs and modules	Chapter 8 of this manual.
Managing hubs and network modules	Chapter 9 of this manual.
Using the GUI for GIGAswitch/FDDI	Chapter 10 of this manual.
Managing GIGAswitch/FDDI	Chapter 11 of this manual.

Products That HUBwatch Manages

Introduction

The HUBwatch application allows you to manage:

- Network modules installed in a DEChub 90
- Network modules installed in a DEChub 900 MultiSwitch
- Standalone modules installed in DEChub ONE
- Standalone modules installed in DEChub ONE-MX
- GIGAswitch/FDDI systems
- Digital's stackable products

DEChub 90 Description

The DEChub 90 is an Ethernet backplane that provides mounting facilities, power, and ThinWire ™ Ethernet connections for up to eight 90-series modules. Note that you can interconnect two DEChub 90s to provide a double DEChub 90 for up to 16 90-series modules.

The chassis provides all the power and signals to each module through a DIN-style connector. You can install and remove network modules with the power on (a feature called *hot-swapping*). This feature allows updates, modifications, or replacement of modules without affecting other modules in the hub.

DEChub 900 MultiSwitch Description

The DEChub 900 MultiSwitch is a high density hub that provides support for multiple network technologies. It uses a flexible channel architecture to support Ethernet, token ring, and Fiber Distributed Data Interface (FDDI) technologies.

The DEChub 900 MultiSwitch uses the industry standard Simple Network Management Protocol (SNMP) and a network management station (NMS) with native SNMP to manage the hub with in-band management and out-of-band management (OBM) facilities.

The DEChub 900 MultiSwitch backplane contains one dedicated Ethernet channel, two independent token ring channels, and one flexible channel on an upper row of connectors. The bottom row of connectors provides 14 flexible channels for full-height

DEChub 900 modules. These flexible channels can be used to create independent LAN segments within the hub.

The DEChub 900 MultiSwitch complements Digital's DEChub 90 family of products, since it provides complete backward compatibility with 90-series network modules.

The DEChub 900 MultiSwitch, commonly referred to as the DEChub 900MS, accommodates either 90- or 900-series modules to form an integral part of a distribution subsystem in a structured wiring environment. The DEChub 900MS is a higher density hub capable of supporting multiple network technologies.

DEChub ONE Description

When combined with a DEChub 900 full-height module, the DEChub ONE forms a single slot docking station. This allows a network module to operate in a standalone configuration, independently from the DEChub 900 MultiSwitch.

DEChub ONE-MX Description

The DEChub ONE-MX is a single-slot docking station that provides standalone or redundant power for DEChub 900 full-height modules. Using an optional medium attachment unit (MAU), the DEChub ONE-MX can adapt an attached module to a fiber optic, ThinWire, or twisted pair Ethernet LAN connection.

In addition, the DEChub ONE-MX provides an out-of-band management port for remote network management support.

To accommodate network growth, the DEChub ONE-MX also supports tabletop and rack mounting. By stacking DEChub ONE-MX single-slot hubs in 19-inch racks, you can configure DEChub 900 modules in a small LAN to meet current needs. Later, you can use the same modules as building blocks in upgrading your network to an enterprise-wide LAN.

Digital's Stackable Products (90-Series Only)

Digital's stackable products are 90-series modules that can be physically dispersed within an organization to form a *distributed stackable hub*. Any 90-series module can be part of the stackable array. For example, you can stack 90-series modules in a configuration involving a combination of tabletop modules, wall-mounted modules, or rack-mounted modules.

Once interconnected, the stackable modules appear on the Hub
Front Panel display and you can manage them with HUBwatch.
However, you need one module in the interconnected stacked
array to act as a management agent.

When you use 90-series modules in a stacked configuration,
each module requires the attachment of a snap-on rear cover to
provide the following:

- A power input connector

- Two connectors for serial line management cables between
  stacked modules

- A 16-position rotary switch that enables you to interconnect
  up to 16 90-series modules in a stacked configuration.

Note

The DECrepeater 90T-16 requires a specialized snap-on
rear cover that provides an AUI port connector.

The 16-position rotary switch on the rear cover enables you to
select:

- A dedicated slot for the module that will act as the
  designated management agent for other modules in the
  stack

- A dedicated slot for a DECbridge 90 module that you may
  include in the stacked configuration

- A unique slot for each of up to 14 additional 90-series
  modules that you may include in the stacked configuration

Digital's stackable products are oriented toward repeaters. A
typical stackable configuration consists of an intelligent repeater
(such as a DECrepeater 90TS or DECrepeater 90FS) serving as
the management agent for the stacked array. The advantage
in having an intelligent repeater in the dedicated management
agent slot is that it can provide not only normal repeater
functionality, but management agent functionality as well.

Note, however, that an intelligent repeater can function as a management agent only for other repeaters. If the stacked configuration contains non-repeater modules, then an appropriate 90-series module (such as a DECagent 90 with an integral SNMP agent) must be used to function as the management agent.

GIGAswitch/FDDI System Description

The GIGAswitch/FDDI system is an intelligent FDDI bridge consisting of a 14-slot passive backplane mounted in a 19-inch rack-mountable cabinet. The GIGAswitch/FDDI system currently supports up to 22 ports, each of which can form connections independently and forward data at speeds of 290,000 packets per second. This yields total throughput of up to 3.4 Gbit/sec and 6.25 million dynamic connections per second.

The GIGAswitch/FDDI system conforms to ISO/ANSI FDDI and IEEE 802.1 bridging standards, enabling it to be used in any FDDI environment. The system supports up to 11 FDDI line cards and is designed to support seamless integration of future line cards, such as T3/E3 and ATM. Conformance to SNMP standards allows the GIGAswitch/FDDI system to be managed by any SNMP-compliant network management station.

Network Building Blocks

Network modules are key elements in any hub or networking configuration. It is through such modules that information is moved from one segment of the network to another or from one network to another.

Types of Network Modules

The DEChub product family includes the following types of network modules.

- **Repeaters and PORTswitches**

  Operating on the physical layer of the OSI model, you use these modules to act on bits transferred between LAN segments of the same physical layer. These modules amplify and re-time bits to allow the distance between adjacent nodes to be extended.

- **FDDI Concentrators**

  FDDI concentrators are physical layer concentrators that you use to provide connection points to FDDI LANs for end-stations or other FDDI devices.

- **Switches**

  Effectively, switches are media access control (MAC) layer bridges that you use to segment the network, reduce traffic congestion, and increase network bandwidth.

- **Bridges**

  You use bridges to connect LANs at the data link layer of the OSI model. Ordinarily, you incorporate bridges in a hub configuration to split or combine existing networks. In addition, sophisticated bridges can be configured to filter specific addresses and protocols at both the data link layer and the network layer of the OSI model.

- **Routers**

  Similar to bridges, you use routers to connect separate LANs at the routing layer of the OSI model. A router is specifically addressed by another node to request routing services. In handling traffic, routers refer to internal routing tables to determine how to forward a frame to its intended destination.

- **Access servers**

  You use access servers to connect asynchronous devices, such as terminals, printers, modems, or personal computers to a LAN. Access servers support multiple protocols, sessions, and line speeds. They can connect local devices and provide remote access (dial-in) and modem poll (dial-out) support for PC users.

- **Probes**

  Probes are dedicated hardware modules that you use as distributed network performance monitors to gauge LAN traffic and error levels. Probes implement the Simple Network Management Protocol (SNMP) and the Remote Monitoring (RMON) Management Information Base (MIB) in performing their functions.

**Supported
Modules List**

HUBwatch software manages the following network modules:

- Management Agents/Modules
  - Hub Manager
  - DECagent™ 90
  - DECpacketprobe 90
  - DECpacketprobe 90RR
- Access Server Modules (90-series)
  - DECserver™ 90L
  - DECserver 90L+
  - DECserver 90M
  - DECserver 90TL
- Access Server Modules (900-series)
  - DECserver 900GM
  - DECserver 900TM
- Bridge Modules
  - DECbridge ™ 90
  - DECbridge 90FL
  - DECbridge 900MX
  - RoamAbout Access Point
- FDDI Concentrator Modules
  - DECconcentrator 900MX
  - DECconcentrator 900TH
- Token Ring MAU Modules
  - DECmau 900TH
  - DECmau 900TL
- GIGAswitch Systems
  - GIGAswitch/FDDI
- PORTswitch Modules
  - PORTswitch 900CP

- – PORTswitch 900FP
- – PORTswitch 900TP
- Ethernet Repeater Modules (90-series)
  - – DECrepeater ™ 90C
  - – DECrepeater 90FA
  - – DECrepeater 90FL
  - – DECrepeater 90FS
  - – DECrepeater 90T
  - – DECrepeater 90T+
  - – DECrepeater 90TS
  - – DECrepeater 90T-16
- Ethernet Repeater Modules (900-series)
  - – DECrepeater 900FP
  - – DECrepeater 900GM
  - – DECrepeater 900TM
- Token Ring Repeater Modules
  - – DECrepeater 900FL
  - – DECrepeater 900SL
  - – DECrepeater 900TL
- Brouter modules
  - – DECbrouter 90T1
  - – DECbrouter 90T2
  - – DECbrouter 90T2A
- Remote Access Routers
  - – RouteAbout 90 Remote Access Server
- Switch Modules
  - – DECswitch 900EE
  - – DECswitch 900EF

– PEswitch 900TX

More Modules

You can also use HUBwatch to display the following modules: the DECwanrouter 90, the DECpacketprobe 90, and the DECpacketprobe 90RR. HUBwatch recognizes and displays these modules in the Hub Front Panel window, but HUBwatch provides no management facilities for these devices. However, in the case of the DECpacketprobe 90 and 90RR, HUBwatch has the ability to launch the PROBEwatch software application, if available, to manage these devices.

Related Information

For more complete information about the DECagent 90, the DEChub 90, the DEChub 900 MultiSwitch, the GIGAswitch system, or the associated network modules, refer to the online help for the desired topic. The following related information also may be useful.

For Information About...	See...
DEChub Firmware Updates	`/pub/DEC/hub900/README` at `ftp.digital.com`
DECagent 90	*DECagent 90 User's Information*
Hub Manager	*DEChub 900 MultiSwitch Owner's Manual*
GIGAswitch System	*GIGAswitch/FDDI System Manager's Guide* *GIGAswitch/FDDI System Out-of-Band Management (OBM) Guide* *GIGAswitch/FDDI System SNMP Guide* *GIGAswitch/FDDI Installation Service Guide* *GIGAswitch/FDDI Special Features Guide*
DECbridges	*DECbridge 90 Owner's Manual* *DECbridge 90FL Owner's Manual* *DECbridge 900MX Owner's Manual* *RoamAbout Access Point Owner's Manual* *RoamAbout Access Point Installation*

For Information About...	See...
DECswitches	*DECswitch 900EE Installation* *DECswitch 900EF Installation* *PEswitch 900TX Installation*
DECrepeaters	*DECrepeater 90C Owner's Manual* *DECrepeater 90T Owner's Manual* *DECrepeater 90TS Installation and Configuration* *DECrepeater 90FA Owner's Manual* *DECrepeater 90FS Installation and Configuration* *DECrepeater 90FL Owner's Manual* *DECrepeater 900FP Installation and Configuration* *DECrepeater 900GM Installation and Configuration* *DECrepeater 900TM Installation and Configuration*
PORTswitches	*PORTswitch 900CP Installation and Configuration* *PORTswitch 900TP Installation and Configuration*
Access Servers	*DECserver 90L+ Owner's Manual* *DECserver 90L Owner's Manual* *DECserver 90TL and 90M Owner's Manual* *DECserver 900TM Owner's Manual* *DECserver 900TH Installation and Configuration*
DECconcentrators	*DECconcentrator 900MX Installation and Configuration* *DECconcentrator 900TH Installation and Configuration*
Token Ring MAUs	*DECmau 900TH Installation and Configuration*
DECwanrouters	*DECwanrouter 90/150/250 Management*

Network Building Blocks

For Information About...	See...
Miscellaneous	*OPEN DECconnect Applications Guide* *DECconnect System Planning and Configuration Guide* *Network Buyer's Guide*

2
Management Methods

Types of Management Methods

Introduction

You can manage the DEChub and its installed modules in several different ways using the same graphical user interface. This chapter describes these management methods.

Definitions

The **DECagent 90** is a proxy agent for 90-series network modules that do not have a built-in SNMP agent. The DECagent 90 is a self-contained module that uses a Motorola™ 68000 CPU with two ports: a ThinWire port for 10Base2 networks and an asynchronous RS-232 standard port.

The DECrepeater 90TS and DECrepeater 90FS also are proxy agents, but only for other 90-series repeater modules that do not have a built-in SNMP agent.

The DEChub 900 MultiSwitch **Hub Manager** is a microprocessor-based controller used to monitor, configure, and control the DEChub 900 MultiSwitch. The Hub Manager is built into the DEChub 900 MultiSwitch backplane.

In-band management is the normal, network-based method of managing the hub. The hub can be accessed over a LAN or WAN connection.

Out-of-band management (OBM) provides slower access to the hub and is intended for use when the in-band method is not available. Therefore, OBM access to the hub should be over a different network than the in-band management connection. The OBM method allows local or remote access to the hub using the **Serial Line Internet Protocol** (SLIP) through an access server port or a direct connection to the OBM port on a DECagent

90 module or a DEChub 900 MultiSwitch. SLIP is used for transmitting IP packets across serial lines.

The DEChub 900 MultiSwitch Hub Manager does not have an in-band connection for directly communicating with a network management system. Instead, a module in the hub is set up to forward management packets to the Hub Manager via a device feature called **IP Services**.

Note that the device defined as the IP Services module continues to perform its normal network functions. For example, the intelligent DECrepeater 90TS continues to repeat and amplify data, even though it may also be defined as the primary path for performing in-band management functions.

In-Band Management

Introduction
You can perform in-band management functions for both 90-series and 900-series modules installed in the DEChub 900 MultiSwitch. Generally, you perform these functions using the HUBwatch network management application. You can, however, accomplish in-band management functions for the DEChub 90 and installed modules, as well as for the the DEChub 900 MultiSwitch and installed modules, using any network management facility that supports native SNMP.

Management Options
Three methods exist for in-band management of network modules:

• **Using the in-band address of a DEChub 900 MultiSwitch Manager**

This is the preferred method for managing a DEChub 900 MultiSwitch that contains either 90-series network modules or 900-series network modules. This method requires the presence of an IP services module, such as the DECrepeater 900TM. The IP Services module is assigned during the setup of the DEChub 900 MultiSwitch.

However, several 90-series modules cannot be managed through an IP Services module in this way. For example, the following modules require the use of the DECagent 90 as an in-band proxy SNMP agent:

- DECbridge 90

- DECbridge 90FL

- DECserver 90L

- DECserver 90L+

- **Using the in-band address of a module**

  Many DEChub modules have their own built-in SNMP agents. You can manage these modules directly by supplying the IP address of each module.

- **Using the in-band address of a DECagent 90, DECrepeater 90TS, and DECrepeater 90FS**

  This is the required management method for DEChub 90 modules and stacked modules. It is also the required method if you want to manage a DEChub 900 MultiSwitch populated with 90-series modules, among which there is no IP services module. Note that the DECrepeater 90TS and DECrepeater 90FS can only manage other 90-series repeaters.

The differences in these management methods are reflected in the HUBwatch windows and in the MIB objects that you can access.

Using IP Addresses

DEChub 900 MultiSwitch Hub Manager IP Address

To manage the DEChub 900 MultiSwitch with an IP address, you must define a module to provide IP services. You install into a slot of the DEChub 900 MultiSwitch chassis a module that provides IP services (for example, the DECrepeater 900TM). Then, you use the Hub Setup menu to define an IP address for the Hub Manager and identify the hub slot that contains the IP services module. This address serves as the IP address of the hub, allowing communication with the hub. Note that the IP

Services module may have two IP addresses: one for the hub, and one for itself.

The combination of the IP address and the slot location establishes the primary in-band management path to the network modules. If you move the IP Services module to another slot in the hub, you must use the Hub Setup menu to define the appropriate slot for the relocated module.

For more information about setting up an IP Services module, see the *DEChub 900 MultiSwitch Owner's Manual*.

90-Series Agent IP Address

To manage DEChub 90 modules or stacked 90-series modules with an IP address, you designate a DECagent 90, a DECrepeater 90TS, or a DECrepeater 90FS to act as a proxy agent. This proxy agent sends and receives SNMP messages on behalf of other 90-series modules.

You can use these agents to manage 90-series modules in a DEChub 900 MultiSwitch, allowing such modules to take advantage of DEChub 900 MultiSwitch features, such as redundant power and Hub status display messages.

In addition, you can use the DECagent 90 with 90-series modules that do not support the SNMP protocol (such as the DECbridge 90, the DECbridge 90FL, the DECserver 90L, and the DECserver 90L+). In these cases, the DECagent 90 translates protocol messages into SNMP messages.

Standalone Module IP Address

You can directly manage modules that have their own built-in SNMP agent. Such modules may be installed in a DEChub ONE, a DEChub 90, a DEChub 900 MultiSwitch, or configured in a stacked array. You can also manage the modules installed in the DEChub 900 MultiSwitch through the DEChub 900 MultiSwitch Hub Manager.

Out-of-Band Management

Overview

You can use out-of-band management (OBM) facilities to manage 90- and 900-series network modules installed in a DEChub ONE, DEChub ONE-MX, or DEChub 900 MultiSwitch. These hubs have an OBM port that provides an alternative path to in-band management products. Thus, if the main network goes down, you can use SNMP over SLIP on another network connection to run HUBwatch.

Note that OpenVMS systems do not support SLIP connections directly. Such connections must be made through an access server (DECserver).

The out-of-band management method offers the same functionality as in-band management, except that it is slower and you assign an OBM IP address and the OBM port speed via the Hub Setup menu. If you want to switch from managing in-band to managing out-of-band, you select the OBM IP address in HUBwatch.

OBM Port and SLIP

The OBM port allows you to manage network modules with HUBwatch through the Serial Line Internet Protocol (SLIP) using a modem or a direct connection to the OBM port. If your network management application supports PING echo, you can use it to verify the SLIP connection. Typically, you use PING echo to verify that your network connection is operational.

You can also manage DEChubs by establishing a connection from HUBwatch to an access server that supports SLIP. If you have a DECserver 900GM, DECserver 900TM, DECserver 90TL, or a DECserver 90M installed in your hub, you can establish a SLIP connection between one of the access server ports and the Hub Manager OBM port. All full height (900-series) network modules, except the DECserver 900GM and the DECserver 900TM, also have an OBM port.

References   Refer to Appendix B of the *HUBwatch Installation and Configuration Manual* and the access server documentation for instructions on setting up SLIP connections. Refer to the *DEChub 900 MultiSwitch Owner's Manual* for cable and adapter information.

3

SNMP Concepts

How HUBwatch Uses SNMP Agents

Introduction   HUBwatch is a network management application used to manage the DEChub product family. It is a flexible tool that uses Simple Network Management Protocol (SNMP) commands to perform basic network management operations on MIB values of network modules.

Types of SNMP Agents   To monitor the status and activity of installed modules, HUBwatch sends SNMP management commands to the following types of SNMP agents:

- DECagent 90

- DECrepeater 90FS

- DECrepeater 90TS

- DEChub 900 MultiSwitch Hub Manager

- Network modules with built-in SNMP agents

- GIGAswitch/FDDI systems

Definitions   **Simple Network Management Protocol** (SNMP) is a high-level, standards-based protocol used in managing networks. It is implemented on a wide range of hardware and software platforms across numerous vendor product lines. SNMP provides a formal, structured mechanism for communicating network management information between an SNMP manager and an SNMP agent.

An **SNMP agent** is a background task that runs in a managed object, such as a DEChub network module, to carry out SNMP requests issued from a network management station (NMS) or SNMP manager.

The **Management Information Base (MIB)** is a structured database in a managed network object that contains SNMP variables essential to managing that object.

Types of SNMP Operations

The SNMP agent performs requested SNMP operations, generates appropriate traps, and provides appropriate access control to MIB tables. Four basic type of operations can be performed on the MIB data structure:

- **GET**—Retrieve specific management information from the MIB.

- **GET NEXT**—Retrieve management information from the MIB by traversing the MIB table.

- **SET**—Manipulate specific variables in the MIB.

- **TRAP**—Report unusual events or conditions about SNMP operations by generating traps.

90-Series Agents

The **DECagent 90** is a self-contained module that acts as a proxy agent for 90-series modules that do not have a built-in SNMP agent.

You can install and use the DECagent 90 as a standalone unit, or install it in the DEChub 90 chassis, the DEChub 900 MultiSwitch chassis, or include it in a stacked configuration with other 90-series modules.

Acting as a proxy SNMP agent, the DECagent 90 accepts SNMP messages on behalf of 90-series modules, sends an appropriate command to the queried module, and awaits an appropriate response. Upon receipt of a response, the DECagent 90 sends an SNMP packet to the querying HUBwatch software.

The DECagent 90 has a single Internet Protocol (IP) address and implements the protocols required for SNMP-based access. It uses the following protocols:

- ARP

- IP

- UDP

- SNMP

- BootP

The DECrepeater 90FS and DECrepeater 90TS, besides providing repeater functionality, can act as a proxy agent for 90-series repeater modules. They can be installed and used like the DECagent 90.

Managing the DEChub 900 MultiSwitch

The DEChub 900 MultiSwitch **Hub Manager** is a microprocessor-based controller used to monitor, configure, and control the DEChub 900 MultiSwitch. The Hub Manager is built into the DEChub 900 MultiSwitch backplane.

Using either remote management control or default local control, the Hub Manager provides a central control point for the DEChub 900 MultiSwitch and installed modules. It also allocates hub resources to installed network modules.

For more information about the Hub Manager, refer to the *DEChub 900 MultiSwitch Owner's Manual*.

Managing GIGAswitch/FDDI Devices

The GIGAswitch/FDDI system has a built-in SNMP agent and can be managed directly.

Managing Modules with Built-In Agents

The following network modules each have their own built-in SNMP agent and can be managed as a standalone unit through that agent or the Hub Manager:

- DECbridge 900MX

- DECconcentrator 900MX

- DECrepeater 90FS

- DECrepeater 90TS

- DECrepeater 900TM, 900FP, and 900GM

- DECswitch 900EE

- DECswitch 900EF

- PEswitch 900TX

- RoamAbout Access Point

- DECmau 900TH

The following network modules each have their own built-in SNMP agent and have to be configured with their own IP address:

- DECbrouter 90T1

- DECbrouter 90T2

- DECbrouter 90T2A

- DECserver 90M

- DECserver 90TL

- DECserver 900GM

- DECserver 900TM

Using the Agent File

The Agent File contains a list of SNMP agents that you use to manage hubs and network modules. When you use the Agent File, you can display a specific hub or module by selecting the agent and designating it as the *current* agent. With the *Agent File*, you can also start HUBwatch by specifying an agent's name for a specific hub or module instead of using its IP address.

You can add an agent to the Agent File by using the Manage Table pulldown option in the Community Table window. See the Agent List Box section in this chapter and the SNMP Communities and Agents section in Chapter 9 for more information.

Agents Must Have an IP Address

Each SNMP agent that you want to use must have an associated IP address. Typically, you assign this address when you configure the module or the hub. You do this through a console connected directly to the module or, alternatively, with remote assignment using a boot-tab file. Once you associate an agent's name with an IP address, you can start HUBwatch using the name of the agent.

See *HUBwatch Installation and Configuration* or the installation manual for the module for more information.

Agent File Location (OpenVMS)

You can find the Agent File in the following location:

`HUBWATCH$LIBRARY:HUBWATCH_AGENTS.DAT`

You can change the location of this file by setting the `HUBWATCH$LIBRARY` logical. By default, `HUBWATCH$STARTUP.COM` defines `HUBWATCH$LIBRARY` as `SYS$LOGIN`, but the installation program will ask you where you want to define it.

Agent File Location (Unix Platforms)

You can find the Agent File in the following location:

`$HUBWATCH_LIBRARY/hubwatch_agents`

You can change the location of this file by setting the `HUBWATCH_LIBRARY` environment variable. This environment variable is not set by the installation procedure. Rather, HUBwatch users should define `HUBWATCH_LIBRARY` in their `.login`, `.cshrc`, or other login script file. `HUBWATCH_LIBRARY` must be defined as the directory which contains, or will contain, the HUBwatch agents file.

The installation procedure provides an informational file describing the contents of the Agent File. This file is located in the following file:

`/usr/kits/HUBwatch/hubwatch_agents`.

HUBwatch SNMP Communities

Definition
A **community** is one or more modules that you manage as a group. Each community is uniquely identified on the network by an IP address and a community name.

The structure of an SNMP community and how you manage it differ, depending on whether you are using the DECagent 90, the Hub Manager, a GIGAswitch system, or a built-in agent as the SNMP agent.

Community Names Control Access
You use community names to control access to an SNMP community. Each request for access to the community contains a community name that the agent uses in the manner of a password. Thus, the community name serves to verify that the requester is authorized to access the agent's management information base (MIB).

A community can have three names: a read-only name, a read-write name, and a trap name. As implemented, these names allow broad access to module status information, but provide limited access to module management functions. For example, for a GET NEXT operation, the agent accepts either the read-only or the read-write community name. For a SET operation, the agent accepts only the read-write community name.

DECagent 90 Community Description
When you manage communities with the DECagent 90, a community can be:

- A single hub

- A double hub - two DEChub 90 units daisy-chained together that you manage as a single community (with 16 available slots)

- A standalone module, such as the DECbridge 90 or the DECserver 90L+

- A single LAN segment on the DEChub 900 MultiSwitch

- A stacked configuration of 90-series modules (requires Version 3.0 of DECagent 90 firmware)

When using a DECagent 90, one community always exists, namely, the community to which the DECagent 90 itself belongs. This community name is always the first entry in the Communities list box.

Management Recommendations—Note that a single DECagent 90 can manage from 1 to 16 communities. However, in actual practice, this range may be limited due to performance dependencies. For hubs that contain only bridge and repeater modules, Digital recommends that there be one DECagent 90 for every eight single hubs, or one DECagent 90 for every four double hubs. For hubs that contain access servers, the maximum number of modules managed by a single DECagent 90 should not exceed 64 (for Version 2.1 firmware) or 48 (for Version 3.0 firmware).

DEChub 900 MultiSwitch Manager Community Description

When you manage communities with the DEChub 900 MultiSwitch Hub Manager, a community cannot extend beyond the hub backplane.

A single hub can have up to nine communities. The DEChub 900 MultiSwitch assigns a community to each slot in the backplane and one community for the Hub Manager. For example, a DEChub 900 MultiSwitch that contains eight DECrepeater 900TM modules must have nine communities—one for each DECserver module, and one for the Hub Manager. HUBwatch automatically translates agent assignments from the backplane to the Hub Front Panel.

DECagent 90 Community in DEChub 900 MultiSwitch

Important community considerations apply when you use a DECagent 90 in a DEChub 900 MultiSwitch. For example, if you want to manage a DECbridge 90 with a DECagent 90 in a DEChub 900 MultiSwitch, you must first create a standalone community on the DECagent 90 and then add the DECbridge 90 to it. For more information on this and other important community tasks, see the *HUBwatch Installation and Configuration* manual.

GIGAswitch Community Description

The GIGAswitch/FDDI system has a built-in SNMP agent for self management. Hence, the only community the system knows about is its own.

**Built-In Agent
Community
Description**

Generally, if a module has a built-in SNMP agent, it can manage only itself.

Autodiscovery

Definition

Autodiscovery refers to the ability of the DEChub 900 MultiSwitch, the DECagent 90, the DECrepeater 90TS, and the DECrepeater 90FS to detect, identify, and configure certain network modules when they are installed in a hub. Such modules automatically appear in the Hub Front Panel window.

**Autodiscovery
Rules**

Modules that cannot be autodiscovered by the DEChub 900 MultiSwitch or a DECagent 90 must be added manually via HUBwatch. You use the HUBwatch Add Module window for this task.

The DECrepeater 90TS and DECrepeater 90FS can only manage other 90-series repeaters, all of which can be autodiscovered.

**DEChub 900
MultiSwitch
Autodiscovery**

The DEChub 900 MultiSwitch autodiscovers most network modules. However, it does not autodiscover the following modules:

- DECserver 90L

- DECserver 90L+

- DECbridge 90

- DECbridge 90FL

**DECagent 90
Autodiscovery**

Autodiscovery requires Bus Master services, such as those found in a DECagent 90 operating with Version 2.0 or later firmware. If you use an earlier version of DECagent 90 firmware, you need a DECbridge 90 in the configuration in order to use the autodiscovery feature.

The DECagent 90 is capable of autodiscovering the following
90-series modules:

- DECagent 90

- DECrepeater 90T

- DECrepeater 90C

- DECrepeater 90FA

- DECrepeater 90FL

- DECrepeater 90FS

- DECrepeater 90T+

- DECrepeater 90TS

- DECserver 90L+2

- DECserver 90M

- DECserver 90TL (running the DECserver Network Access
  Software)

Note that the DECrepeater 90T-16 can be autodiscovered by
DECagent 90 Version 3.0 firmware.

The HUBwatch Community Table Window

Introduction   You use the Community Table window to manage SNMP agents and their associated SNMP communities.

Community Table Window Figure

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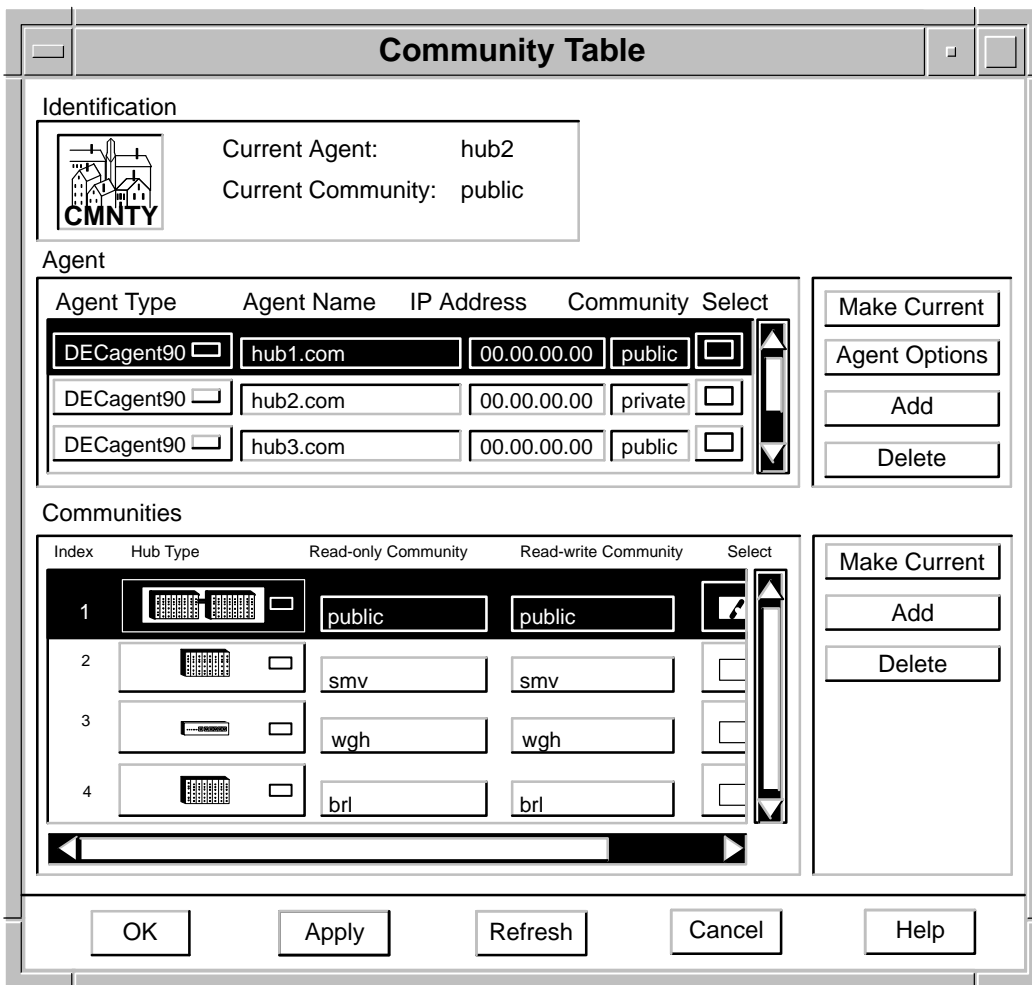
Parts of the Community Table Window

Introduction

The Community Table window has three main sections:

- Identification list box
- Agent list box
- Communities list box

Identification List Box

The Identification list box contains two items:

- **Current Agent**

  This entry is the agent that you are using to manage a particular community. The entry for the current agent is highlighted in the Agent list box.

- **Current Community**

  This entry is the community string (i.e., the name) of the community that you are managing. If the current agent is a DECagent 90, the current community entry is highlighted in the Communities list box.

  If the current agent is a DEChub 900 MultiSwitch Hub Manager, a module with its own built-in SNMP agent (such as a DECserver 90TL or a GIGAswitch/FDDI system), the Communities list box is grayed out in the Community Table window.

Agent List Box

The Agent list box reflects the contents of the Agent File. You maintain this file as you add agents to or delete agents from your network.

The Agent list box contains the following information about each agent:

- The type of agent (for example, DEChub 900)
- The name of the agent
- The IP address of the agent

- The agent's community string, or password, for the particular community being managed by the agent. HUBwatch software uses this community string in all SNMP requests generated while this community is current. Therefore, access control will vary depending on the type of string you use.

Communities List Box

DEChub 900 MultiSwitch Hub Manager—If the DEChub 900 MultiSwitch Hub Manager is the current SNMP management agent, the Communities list box is grayed out to indicate that it is not functioning. The Hub Manager cannot manage multiple communities. Thus, you need not switch from one community to another. You can do all the community management tasks in the Agent list box by selecting and modifying the agent.

DECagent 90—If a DECagent 90 is the current SNMP management agent, the Communities list box shows the communities that you can manage. The following information about each community is displayed:

- A numeric Index entry, whether that community is a managed hub or a standalone module.

- A Hub Type indicator that defines the type of hub being managed by the agent. The following types of hub configurations are supported:

  - Standalone—a standalone module.

  - DEChub 90—8-slot

  - DEChub 90—16-slot (two 8-slot hubs daisy-chained together to create a 16-slot hub. Only the DEChub 90 supports this configuration.)

  - Stacked 90-series modules—16-slot

  - DEChub 900 MultiSwitch—8-slot

- The Read-only Community string used for GET NEXT SNMP operations.

- The Read-Write Community string used for SET SNMP operations.

Standalone Modules—If a standalone module is the current SNMP management agent, the Current Agent list box is grayed out to indicate that it not applicable. Standalone modules can manage only their own community. Accordingly, you can do all the community management tasks in the Agent list box by selecting and modifying the agent.

Using the Community Table Window

Introduction
You use the Community Table window to manage SNMP agents and communities.

Management Tasks
You can perform the following management tasks from the Community Table window:

- Adding or deleting agents

- Adding or deleting communities

- Modifying agent or community information

- Changing the current agent or community

Reference
See Opening Hub Management Windows in Chapter 8 for instructions about opening this window. See the SNMP Communities and Agents section in Chapter 9 to do these tasks.

Related Information
The following related information may be useful.

For Information About...	See...
SNMP management concepts	*The Simple Book—An Introduction to Management of TCP/IP-Based Internets* by Marshall T. Rose

4
Using Alarms

Alarms

Restrictions The alarms facility is supported only on the OpenVMS system.

Introduction HUBwatch allows you to specify agents that can be monitored by the alarms facility. You can enable or disable the alarm software for each agent. Similarly, for each alarmed agent, you can enable or disable trap functions.

How Alarms Work The alarms software allows you to monitor traps that occur on the hub. A **trap** is a message generated by firmware in the SNMP agent hardware.

What Gets Alarmed? See the Supported Modules List in Chapter 1 for the devices that can have alarmed agents.

How Traps Work Traps occur when the firmware monitors the hardware for certain events, conditions, or faults and sends messages to the monitoring HUBwatch software. For example, cold starts and warm starts are examples of events that generate traps monitored by the alarm software.

What Gets Trapped?

Trap conditions are of two types:

- Device-specific traps
- Generic traps, applicable to all hardware devices

HUBwatch supports the following generic traps:

- ColdStart
- WarmStart
- LinkUp
- LinkDown
- AuthenticationFailure
- egpNeighborLoss
- EnterpriseSpecific

See RFC 1157 for details about these trap conditions. For information about vendor-specific trap conditions for a particular device, see the MIB for that device.

**Alarm Setup
Window Figure**

HUBwatch: Alarm Setup

Identification

Alarm Agent File: hubwatch_alarmed_agents.dat

Alarmed Agents

Agent Name	IP Address	Community	Poll interval	Traps	Select
algash	00.00.00.00	public	2:10.00	OFF	
penobs	00.00.00.00	public	1:00.00	OFF	
kenbec	00.00.00.00	public	10:00.00	OFF	

Add...   Delete

OK   Apply   Refresh   Viewer   Start Poller   Stop Poller   Cancel   Help

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**Using the
Alarm Poller**

The alarm poller sets up traps on the alarmed agents. When you enable the poller, it communicates with the SNMP agents in a hub or a community and sends notification of network events to the network management station running HUBwatch.

You can start the alarm poller in one of three ways:

• By using the HUBwatch Alarm Setup window.

• By clicking on the Options pulldown menu on the Hub Front Panel and then clicking on the Polling option.

• By initiating the Alarms application from the OpenVMS command line.

For information about these methods, see the section Starting the Viewer and Poller in this chapter.

You can run only one instance of the poller on a network management system. When polling traps, a module remains set to send traps until traps are explicitly disabled.

You cannot disable traps through HUBwatch; traps must be disabled through the module's console. You can cause HUBwatch to ignore traps by setting the trap button for the module to Off.

Selecting Traps
You use the HUBwatch Alarm Setup window to monitor traps from network modules. From this window, you select the agent for a module and toggle its Traps button by clicking on it. If the agent you want is not displayed in the Alarmed Agents box, use the Add button to include it in the Alarmed Agent File.

After you select the agent for a device, you must start the poller, if it is not already running, in order to begin recording events for the module.

Alarm Viewer
The alarm viewer lets you see the messages generated by traps as they occur. You can also use the alarm viewer to traverse the log file, which provides a historical record of traps. However, the HUBwatch start-up command does not invoke the alarm viewer; you must execute a separate command from the OpenVMS command line to start the viewer.

Starting the Viewer and Poller
You can start and stop the viewer and poller from the Alarm Setup window by clicking on appropriate buttons. You can also start the viewer and poller from the Hub Front Panel window by choosing the Applications pulldown and selecting the appropriate option from the Alarms menu. Additionally, you can run the viewer and poller as separate applications from the OpenVMS command line.

- Start viewer command:

  `$ WATCH/VIEWER`

- Start poller command:

  `$ WATCH/POLLER START`

- Start poller and save data to file command:

  `$ WATCH/POLLER/FILE=`*hubwatch_alarmed_agents.dat*` START`

  The traps are logged to `HUBWATCH_ALARMED_AGENTS.DAT` by default. You can modify the name of this file.

You must stop the poller from the OpenVMS command line.

- Stop poller command:

  $ WATCH/POLLER STOP

Poller Log File Locations

The location of HUBWATCH$ALARMS_FILES defaults to the value of SYS$MANAGER. This value is defined during HUBwatch installation.

HUBwatch Library Location

The location of HUBWATCH$LIBRARY defaults to the value of SYS$LOGIN. This value is defined during HUBwatch installation.

Alarmed Agents File

This file contains the Agent Name, IP Address, and Community name of each SNMP agent entry in the Alarmed Agents list of the Alarm Setup window. This file is updated each time you add, delete, or modify an SNMP agent entry. When you refresh the Alarm Setup window, the Alarmed Agent File is used to restore SNMP agent entries to their last saved state.

The Alarmed Agent File is named as shown below:

HUBWATCH$LIBRARY:HUBWATCH_ALARMED_AGENTS.DAT

Note

Agents that do not appear in the Alarmed Agent File are added to the HUBWATCH$LIBRARY:HUBWATCH_ALARMED_AGENTS.DAT file automatically whenever you open the Alarm Setup window with traps disabled. If the logical name HUBWATCH$AGENTS_NOREAD is defined as "TRUE", then the HUBwatch alarms component will not read the Agents file. Otherwise, if the HUBWATCH$AGENTS_NOREAD logical is not defined (the default state), then the Alarmed Agents File will be read and used as the source file for HUBwatch alarmed agents.

Managing Alarms

Managing alarms includes the following tasks:

- Enabling and disabling traps
- Adding alarmed agents
- Deleting alarmed agents
- Modifying alarmed agent information
- Starting the alarm viewer
- Viewing traps
- Reviewing the alarm log file
- Starting the alarm poller
- Stopping the alarm poller

See the Alarms section in Chapter 9 of this manual to learn how to do these tasks.

5
Starting HUBwatch

HUBwatch Startup

Introduction

This chapter tells you how to start the HUBwatch application. It can be run in the following ways:

- As a standalone application in an OpenVMS or Unix operating system environment.

- As an add-on application with the POLYCENTER Network Manager in an OpenVMS operating system environment.

- As an add-on application with POLYCENTER NetView in a DEC OSF/1 (Digital UNIX) operating system environment.

- Using a SLIP connection.

When You Start HUBwatch

When you first start HUBwatch, you must supply either the name of the requested agent or the IP address of that agent. HUBwatch will use default values for the remaining parameters for the selected agent, such as "public" for the default community name. However, if the requested agent has a community name other than "public," you must specify that name for the agent.

Adding Agents

Once you start HUBwatch, you should add entries to the Agent File list of the Community Table window for those agents you want to use. Thereafter, you can run HUBwatch by specifying the name of an agent, rather the IP address of the agent. If you added agents to the Agent File list in a previous HUBwatch session, you can run HUBwatch by specifying the name of one of those agents.

Agent File Compatibility

HUBwatch Version 3.0 and later versions use a different Agent file format than earlier versions. HUBwatch Version 2.0 Agent files are upwardly compatible and are converted automatically to the new format. However, Version 3.0 and later Agent files are not backwardly compatible with HUBwatch Version 2.0 and, therefore, will not work with HUBwatch Version 2.0.

Reference

Use this table to find more information about adding agents.

Section	Chapter
Community Table Window Figure	Chapter 3 in this book.
Opening Hub Management Windows	Chapter 8 in this book.
SNMP Communities and Agents	Chapter 9 in this book.

Starting HUBwatch Standalone - OpenVMS

This section tells you how to start the HUBwatch application in an OpenVMS environment.

Starting HUBwatch

To start HUBwatch as a standalone DEC OpenVMS application, perform the steps described in the table below.

Step	Action
1	Define the logical name `HUBWATCH$LIBRARY` as the directory containing the Agents File `HUBWATCH_AGENTS.DAT`. By default, the HUBwatch installation procedure defines the system logical name `HUBWATCH$LIBRARY` **as** `SYS$LOGIN.`

2	Enter the start command. You must enter either the name of the desired management agent or the IP address of that agent. **Examples:**
	 `$ WATCH/AGENT Agent1`
	 `$ WATCH/AGENT 20.40.32.00`

Complete Command Line Syntax

The example below shows the complete HUBwatch DCL command line syntax.

```
$ WATCH/AGENT  [<agent_name or ip_address>]
  [/COMMUNITY=<community_string>]
  [/RETRIES=nn]
  [/TIMEOUT=nn]
  [/VIEW=<view_type> Return ]
```

**HUBwatch
Start Command
Parameters**

The following table defines the HUBwatch start command parameters:

Parameter	Value
agent_name	The agent name parameter identifies the agent to be managed.
	Example: agent1
	HUBwatch provides a name server lookup facility. This facility first looks in the Agents file for the specified agent name. If found, the IP address of that agent is used to start HUBwatch. If the agent name is not found in the Agents file, an IP name server lookup is initiated. If successful, HUBwatch is started using the IP address of that named entity. If unsuccessful, the lookup process terminates with an error message.
ip_address	The Internet Protocol address of the agent in the form n.n.n.n, with n being a decimal number less than 256.

HUBwatch Start Command Qualifiers

You can use the command line qualifiers shown in the table below in conjunction with the `WATCH/AGENT` start command. All these qualifiers are optional.

Qualifier	Value
`/COMMUNITY= <comm_string>`	The community string of the agent to be managed.
	Note that the community string in the `/COMMUNITY` qualifier is case sensitive. You must use double quotes to distinguish case, as shown in the example below:
	Example: `/COMMUNITY="public"`
`/RETRIES=nn`	An integer that sets the number of SNMP retries allowed.
`/TIMEOUT=nn`	An integer that sets the SNMP timeout period in seconds.
`/VIEW=<type>`	Determines the display type that HUBwatch presents.
	The `type` variable can be either `PHYSICAL` or `LOGICAL`.

HUBwatch Poller and Alarms Viewer

The HUBwatch network management poller and alarms viewer can be invoked through the commands shown in the table below. Note that these commands are not qualifiers to the WATCH/AGENT startup command. Rather, you can issue these commands separately and independently from the HUBwatch startup command to invoke additional HUBwatch functions.

The network management poller is a background process that queries DEChubs and associated modules for selected MIB information used by the DEC OpenVMS alarms facility. The HUBwatch alarms viewer allows you to view this MIB information.

Command	Description
WATCH/POLLER	This command invokes the HUBwatch network management poller. Only one poller can be running on the system at a time.
	To disable the poller, enter the WATCH/POLLER STOP command.
	You can use the /FILE=<alarmed_agents_file_name> qualifier with the WATCH/POLLER command to select the alarmed agents file. This qualifier causes the poller to read the file automatically without displaying the Alarms Setup window.
WATCH/VIEWER	This command invokes the HUBwatch alarms viewer.

Starting HUBwatch Standalone in Unix Environments

This section tells you how to start the HUBwatch application in a Unix environment.

Setting HUBwatch Environment Variable

Before entering the HUBwatch start command, you must set the environment variable HUBWATCH_LIBRARY to the directory where the hubwatch_agents file resides. Use the *set* command that is appropriate for your shell. For example, the C shell uses the setenv command, and the Bourne shell uses the set command.

The following is an example of the *set* command in the C shell:

```
# setenv HUBWATCH_LIBRARY /usr/users/xyz
```

Start Command Syntax

To start HUBwatch as a standalone application in a Unix environment, use the following command syntax:

```
# hubwatch -x IP-address -c comm-string \
> -a agent-name -r retry-count -t timeout -1
```

Command Line Variables

The command lines variables for the HUBwatch start command for a Unix environment are defined in the table below.

Variable	Definition
-x ip-address	The Internet Protocol address in the form n.n.n.n, with n being a decimal less than 256.
-c comm-string	The name assigned to the community. When you enter the community name, use quotation marks, as shown in the following example: **Example:** "public"

Variable	Definition
`-a agent-name`	The name assigned to the agent module, as shown in the following example: **Example:** `agent1` HUBwatch provides a name server lookup facility that first looks in the Agents File for the specified agent name. If found, the IP address of that agent is used to start HUBwatch. If the agent name is not found in the Agents File, an IP name server lookup is initiated. If successful, HUBwatch is started using the IP address of that named entity. If unsuccessful, the lookup process terminates with an error message.
`-r retry-count`	An integer that sets the number of retries allowed.
`-t timeout`	An integer that sets the timeout period in seconds.
`-l`	Starts HUBwatch using the logical front panel view. The default is the physical front panel view.

Starting HUBwatch from POLYCENTER

Introduction   You can start HUBwatch as a POLYCENTER application from the following platforms:

- POLYCENTER Network Manager for OpenVMS

- POLYCENTER NetView for DEC OSF/1

Starting Network Manager on OpenVMS   Complete the steps shown in the table below to start HUBwatch from the POLYCENTER Network Manager for OpenVMS.

Step	Action
1	Start the POLYCENTER Network Manager by entering the appropriate command, as shown below. **Example:** `$ MANAGE/ENTERPRISE/INTERFACE=DECWINDOWS` `Return` **Result:** The POLYCENTER Map window appears.
2	Click on the File menu and choose an existing domain or open a new domain. (The following instructions assume you have opened a new domain.) **Result:** The New Domain window appears.
3	Enter the domain name in the New Domain window and click on `OK`.
4	Return to the POLYCENTER Map window and click on the Lock icon in the menu bar to unlock the window.
5	Click on the Edit menu and choose Toolbox. **Result:** The POLYCENTER Toolbox window appears.
6	Click on the SNMP icon. **Result:** The Add Entity - Enter Entity Information window appears.
7	Click on the desired Hub icon. **Result:** The Hub icon is highlighted.

Step	Action
8	At the SNMP entry box, enter the IP name of the hub and click on Apply. **Result:** A more detailed version of the Add Entity—Enter Entity Information window appears.
9	In the Add Entity window: a. Enter the IP address, for example, `12.14.213.56`. b. Enter the Read Community Name, for example, `"public"`. c. Enter the Write Community Name, for example, `"public"`. d. Click on OK to apply the information.
10	Move the pointer to the POLYCENTER Map window and click MB2 to populate the map.
11	Click on the Hub icon in the POLYCENTER Map window.
12	Click on the Applications menu and choose HUBwatch. **Result:** The Hub Front Panel window appears. (This may take several seconds.)

Adding HUBwatch to POLYCENTER

For information about adding the HUBwatch application to POLYCENTER, see *HUBwatch Installation and Configuration*.

**Starting
NetView for
DEC OSF/1
(Digital UNIX)**

To start HUBwatch from POLYCENTER NetView for DEC
OSF/1, the hubwatch_agents file is *always* required. Therefore,
you must set HUBWATCH_LIBRARY to point to the hubwatch_agents
file. Each hub in the NetView map that you wish to launch
HUBwatch against must have an entry in the hubwatch_agents
file.

When you run NetView, you can select HUBwatch from two
places:

- As a pulldown application selection under the Monitor entry
  in the Menu Bar.

- As a pulldown application selection under the Monitor when
  clicking mouse button 3 (MB3) over a symbol in the map.

Note that the HUBwatch application will be grayed out and,
therefore, will not be selectable. To start HUBwatch against
a particular symbol in the NetView map, NetView must be
instructed that the symbol is a hub and, therefore, is an
acceptable device to launch HUBwatch against.

HUBwatch defines a particular field (IsDEChub) in NetView. To
start HUBwatch for a particular hub on your NetView map, you
must set this field. If this field is not set, HUBwatch is grayed
out as an application selection. Once set, however, HUBwatch
becomes selectable for that particular hub.

To set the IsDEChub field, complete the steps in the table below.

Step	Action
1	In NetView, select the symbol representing the hub. Choose the Edit, Modify/Describe, Object options.

_____ **Note** _____

Observe the SelectionName in this window. NetView
passes SelectionName as an input parameter
when attempting to launch HUBwatch. The
SelectionName must *exactly* match the name field in
the hubwatch_agents file entry for that hub. Even if the
SelectionName looks like an IP address, the name field
must be the actual IP address.

_____

Step	Action
2	Double click on General Attributes and scroll down to the IsDEChub field. Click on True. Click on OK on the various windows until you are back to the NetView map. At this point, HUBwatch should be blackened, indicating that it is launchable.

_____ **Note** _____

The SelectionName of a hub will be different, based on what NetView map it is in when you start HUBwatch. For example, you may have a network map where the hub is one of many devices. In this case, the SelectionName may take the form "test.www.xyz.com". If you double click on that hub, you may get an expanded map with just two symbols: the hub itself, and the OBM (out-of-band management) port. For this map, the hub SelectionName may take the form "test.www.xyz.com:hub". You can launch HUBwatch from the first map, but not the second, because only one of the SelectionName(s) will match the name field in the hubwatch_agents file.

Starting HUBwatch Using SLIP

Starting HUBwatch Using SLIP Connection

For instructions on starting HUBwatch while using a SLIP connection, see *HUBwatch Installation and Configuration.*

_____ **Note** _____

OpenVMS does not support a direct SLIP connection from a management station to the DEChub OBM port. You need another device, like an access server, to run SLIP for you.

_____

Part II

Managing Hubs and Modules

Part II presents the following topics:

- The HUBloader Application
- Using Backplane LAN Segments
- The HUBwatch GUI for Hubs and Modules
- Managing DEChubs and Modules

This information applies to modules and hubs managed with HUBwatch.

6

The HUBloader Application

HUBloader Overview

Introduction

You use the HUBloader application to perform firmware upgrades on hubs, hub modules, and the GIGAswitch/FDDI system. The device to be loaded is referred to as the *agent* throughout this description.

This chapter describes the HUBloader application and tells you how to access the HUBloader window. However, it does not include detailed information about performing specific HUBloader tasks.

HUBloader Prerequisite

HUBloader works hand-in-hand with the DEChub Consolidated Firmware Kit. Therefore, the DEChub Consolidated Firmware Kit must be be installed. You receive an error status message if the Consolidated Firmware Kit is not installed.

HUBloader Restriction

HUBloader does not support loading devices using the MOP protocol. Devices using the MOP protocol include the DECbridges 90 and 90FL and the DECagent 90, Version 1.1 or earlier. HUBloader will not work with such devices.

**Accessing
HUBloader Help**

HUBloader online help has instructions for performing specific HUBloader tasks.

To access the HUBloader Help, perform the steps in the table below.

Step	Action
1	From the HUBwatch Front Panel Window menu, click on the Applications pull-down.
	The Applications menu appears.
2	Click on HUBloader.
	The HUBloader window appears.
3	On the HUBloader window, click on the Help button.
	The first HUBloader help window appears.

HUBloader Window Figure

This figure shows the HUBloader Window.

NPG-0104-95I

HUBloader Tasks

Introduction

You can perform the following tasks with HUBloader:

- Show information about an agent

- Load an agent

- Load a list of agents

- Edit the file used to load a list of agents

- Set the maximum time HUBloader will poll an agent to determine if the load task has completed

- Write status messages that are returned to a log file

Showing Agent Information

By using the agent's IP address in the Agent to be Loaded field of the HUBloader window's Identification box, the SHOW task returns the following information used for loading the agent:

- Whether the agent is loaded through a DEChub 900 MultiSwitch, a GIGAswitch/FDDI, or directly

- The current version of the firmware in the agent

- The latest version of the firmware available for the agent

- The name of the file containing the latest firmware to be loaded

- The IP address of the system containing the TFTP Server that will perform the load

- The agent's community string

Loading an Agent

HUBloader can load the agent specified in the Agent to be Loaded field of the HUBloader window's Identification box.

Loading a List of Agents

HUBloader can load the agents listed in HUBloader's editable agents file.

Editing List of Agents

HUBloader lets you edit the agents listed in an editable agents list file. The file contains the following information for each agent.

- Agent's IP address

- Agents name

- Agent type (directly loaded, loaded through a DEChub 900 MultiSwitch, or a GIGAswitch/FDDI load)

- Associated slot number (0 is required for the Direct load type)

- TFTP Server IP address

- Firmware load file name

On the HUBloader window, use the Edit List button in the User Options box to edit the Agents List File.

Setting Maximum Polling Time

HUBloader determines that a load has completed by polling the agent and checking the agent's firmware version at the time of the polling operation.

In the HUBloader window, use the Max Poll Time button in the User Options box to set polling to last for up to 120 minutes. The default is 20 minutes.

Writing Status Message File

The HUBloader window displays messages in the Status Message box. To write the message to a file, click on a User Options Log File radio button to select either On/New or On /Append.

7
Using Backplane LAN Segments

LAN Segments

Introduction

The DEChub 900 MultiSwitch backplane has multiple, flexible channels that you can use to create internal LAN segments in the hub environment. You can connect network modules to these segments so they can exchange data as if they were on external LANs. You can use HUBwatch software to create and delete LAN segments and create and delete connections to the segments. All these tasks can be performed remotely without interacting directly with network hardware.

Hardware Overview

The DEChub 900 MultiSwitch backplane consists of:

- **One dedicated Ethernet ThinWire segment**

  The dedicated Ethernet ThinWire segment provides backward compatibility for DEChub 90 modules. The ThinWire segment in the hub configuration always exists; you cannot delete it.

- **Two dedicated token ring segments**

  The token ring segments provide support for token ring network modules. With this release of HUBwatch, you can now display and manage token ring segments.

- **Multiple flexible LAN segments**

  These segments are the internal Ethernet and FDDI LAN segments that modules use to share data.

LAN Interconnect Functionality

HUBwatch uses SNMP to direct the DEChub 900 MultiSwitch Hub Manager to create or delete LAN segments on the backplane. You use the interconnect functionality just as you would use cables to connect module ports to different backplane LAN segments. However, with HUBwatch, you set up these configurations and connections without directly manipulating hub hardware.

You can configure backplane resources into Ethernet, token ring, or FDDI LAN segments, depending on the type of LAN segment you need. You access all the LAN interconnect functionality through the LAN Interconnect window.

How You Manage LAN Segments

Introduction   The DEChub 900 MultiSwitch Hub Manager displays the
backplane port-to-LAN-segment connections in the LAN
Interconnect window.

**LAN
Interconnect
Window Figure**
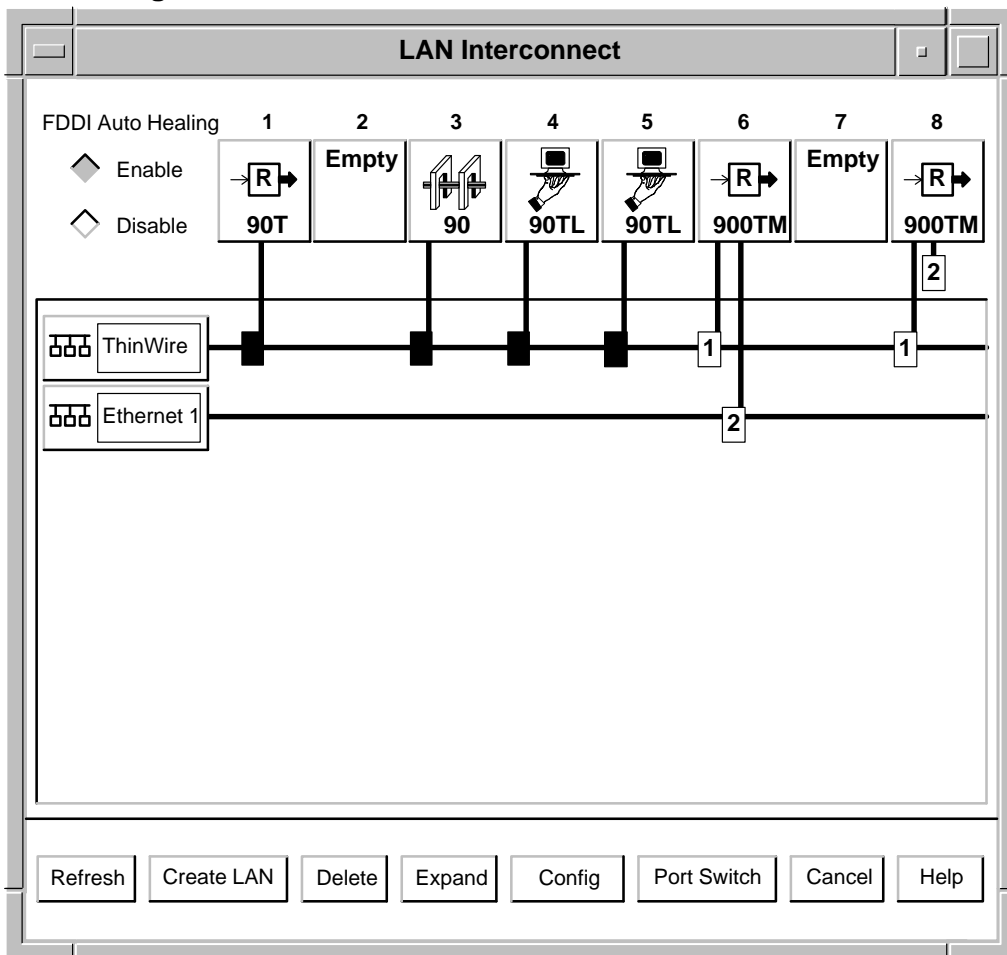
LKG-8388-94I

LAN Interconnect Window Parts

Introduction   The following sections describe the different features of the LAN
Interconnect window and how you use them.

LAN Segments   The LAN segments appear along the left side of the window. An
icon with an enclosed name identifies each LAN segment. When
you display the LAN Interconnect window for a hub that uses the
factory defaults, only the default dedicated Ethernet ThinWire
segment appears, unless you have a token ring module installed
in the hub, in which case, two token ring LAN segments appear.
For example, if you have a DECrepeater 900FL (token ring
repeater) module installed in the hub, a token ring A segment,
as well as a token ring B segment, appear along the left side of
the LAN Interconnect window. Note that you can neither create
nor delete a token ring LAN segment.

Note that you cannot delete the ThinWire Ethernet segment.
This segment remains a fixed part of the LAN Interconnect
window. Additional LAN segments appear below the ThinWire
segment as you create them, including segments for token ring
modules as mentioned above.

**Network
Modules**   The network modules appear across the top of the LAN
Interconnect window. A number indicating the slot position in
the hub and a module icon identify each module. You can access
a management summary window for a particular LAN module
by double clicking on its icon.

For most network modules, connection pulldowns identify the
backplane ports. There is one connection pulldown for each
backplane port. For FDDI modules (for example, the DECswitch
900EF), one common pulldown represents either the one or
two backplane ports actually in use when one or both the A
and B ports are on the backplane. This common pulldown lets
you make one logical connection to an FDDI backplane LAN
segment.

Port Colors   When you click on a port, all LAN segments that will not accept
a connection to that port will be grayed out.

The following table lists the port colors.

Port Color	LAN Segment Type
Blue	ThinWire Ethernet
Green	Flexible Ethernet
Purple	FDDI ring
White	FDDI tree
Yellow	Multiple types
Orange	Token ring (802.5)

Port Connector Stars

A star (asterisk) in the port connection pulldown for a device indicates that the device has multiple ports. With certain devices, insufficient space exists in the LAN Interconnect window to display all available ports. Thus, the star alerts you to the presence of such a device. You can display all the available ports for the device by clicking on the Expand button in the LAN Interconnect window.

LAN Segment Names

Note the following when using the Create LAN button in the LAN Interconnect window to create LAN segments:

- LAN segment names must be 31 characters or less in length.

- LAN segment names are case sensitive. For example, "Mylan" and "mylan" refer to different LAN segments. Therefore, it is recommended that you avoid LAN segment names that differ only relative to upper/lower case.

_____ **Note** _____

The Token Ring LANs have the fixed names "Token Ring A" and "Token Ring B" and cannot be changed.

_____

**FDDI Auto
Healing Radio
Buttons**

Two radio buttons in the upper-left corner of the LAN
Interconnect window (see the LAN Interconnect illustration
above) allow you to enable and disable FDDI Auto Healing.
When Auto Healing is enabled, the DEChub 900 MS Hub
Manager will automatically "patch-out" and "patch-in" FDDI
modules to maintain connectivity in your FDDI tree or ring
networks.

The Hub Manager will patch-out an FDDI module that ceases to
function properly by connecting that module's FDDI upstream
neighbor to its downstream FDDI neighbor. Conversely, the
Hub Manager will patch-in an FDDI module when it resumes
normal operation. The Hub Manager does this by restoring that
module to its previous status in the FDDI ring or tree prior to
the patch-out operation.

For example, assume that you have an FDDI tree network
consisting of FDDI modules in slots 1, 2, 3, 4, and 5. Assume
further that the module in slot 5 is configured as AB-front
/M-back (the start of the tree), and that the other modules
are configured as SM-back. If, for some reason, the module
in slot 4 ceases to function properly, the Hub Manager will
patch-out module 4 by connecting its upstream neighbor (slot
3) to its downstream neighbor (slot 5). Thus, the Hub Manager
guarantees that the modules in slots 1, 2, and 3 are still
reachable. When the module in slot 4 resumes normal operation,
it will be reinstated into the FDDI tree network between the
modules in slots 3 and 5.

If Auto Healing were disabled, slots 1, 2, and 3 would be
connected together, but they would not be connected to slot 5 or
to the ring to which slot 5 is connected.

Note

For the impact of patching on Auto Healing Ethernet
ports, refer to the *HUBwatch Release Notes*.

If Auto Healing is enabled, the following events cause a module
to be patched out:

1. Removing a module while the hub is powered up

2. Removing a module while the hub is powered down

3. Powering down a module by the Hub Manager due to insufficient power in the hub

4. A module "going to sleep" due to an FDDI trace event, an overheating condition, or other similar conditions

Even with Auto Healing disabled, the Hub Manager will patch-out modules in the first two cases above.

If FDDI Auto Healing is enabled and a module is currently patched-out, HUBwatch shows that connection as a dashed double-line. When patched-out connections exist, you cannot add or delete connections, or delete segments. You should first determine why modules are patched-out, restore them to patched-in status, and then perform the desired add or delete operation.

The Auto Healing state (either enabled or disabled) is stored in the Hub Manager. If Auto Healing is enabled, the Hub Manager continues to perform patch-in and patch-out operations, even if HUBwatch is not running.

Additional LAN Interconnect Buttons

Introduction Some modules, such as the DECswitch 900EF and the DECconcentrator 900MX, have features that are available from the Expand , Config , or Port Switch buttons.

In general, the following table shows the devices by category that make use of the additional LAN Interconnect buttons.

Device Category	Button
Concentrators	Config
Bridges and Switches	Config , Expand , but not Port Switch
Repeaters	Port Switch , Expand , but not Config

Expanded View   Some modules have more than four backplane ports, such as the
DECswitch 900EF and the DECrepeater 900FP. However, the
LAN Interconnect window can display, at most, only four ports
per module. To perform LAN interconnect functions on modules
with more than four ports, you must open the Expanded View
window. You open this window by selecting a module with more
than four ports and clicking on the [Expand] button.

Station   Some modules, such as the DECswitch 900EF and the
Configuration   DECconcentrator 900MX, have ports that you can configure
between the front panel and the backplane. By default, these
ports are active on the front panel; so you do not see them in the
LAN Interconnect window until you move them to the backplane.
The LAN Interconnect window does not display any unusable
backplane ports. To move these ports to the backplane, open the
Station Configuration window by selecting a module and clicking
on the [Config] button.

The Station Configuration window includes text in the
Identification box that indicates where port configurations
are stored.

Port Configuration Choices

You use the Station Configuration window to make port configuration choices in the situations described below.

- **Making selections for module in DEChub 900 MultiSwitch**

  Select which port(s) to bring to the front panel of the device, and which port(s) to direct to the hub backplane. (Note that no connections are made to the backplane segments until you make the connections in the LAN Interconnect window.) These port selections are stored in the **hub's** non-volatile memory (NVRAM). If the module is moved to a different hub slot, these port configurations are erased.

- **Making selections for module in DEChub ONE or DEChub ONE-MX docking station**

  Select which port(s) to bring to the module's front panel, and which port(s) to direct to the docking station's FDDI ports (if any). These port selections are stored in the **module's** non-volatile memory.

  Moving a module between the following environments causes the module's port configurations to be erased:

  - A hub

  - A DEChub ONE (low-end docking station)

  - A DEChub ONE-MX (high-end docking station)

  If the module is in a DEChub ONE-MX docking station, and if the docking station does not have both FDDI medium attachment units (FDDI MAUs), you will be offered port configurations that cannot be achieved on this particular docking station due to the missing FDDI MAUs.

- **Reaching Station Configuration window from DECrepeater 90TS Module Summary window**

  If the DECrepeater 90TS is configured standalone and has the AUI rear cover in place, you can make one of the following choices:

  - Select the ThinWire port on the side of the DECrepeater 90TS module

  - Select the AUI port on the DECrepeater 90TS rear cover

> – Allow the DECrepeater 90TS to automatically select between the AUI port and the ThinWire port. The DECrepeater 90TS continually switches between the AUI and the Ethernet ports until it finds one of the two ports connected to a network.
>
> If the DECrepeater 90TS is in a hub or does not have its AUI rear cover in place, no port choices will be displayed.

Port Switching

Most network modules have one ThinWire port that is connected via hardware to the dedicated Ethernet ThinWire segment on the DEChub 900 MultiSwitch backplane. This is a hard-wired connection that you cannot change using HUBwatch.

Some newer network modules have one ThinWire connection that you can disconnect from the backplane, as well as a second port that you can connect to the backplane. Such network modules comprise a class of port switching repeaters, which include the following:

- PORTswitch 900CP
- PORTswitch 900FP
- PORTswitch 900TP
- DECrepeater 900FP

These particular devices support the switching of ports onto different LAN segments. In addition, they support port grouping, which allows you to connect multiple ports to LAN segments using a single connection pulldown rail.

You access these functions through the Port Switching window. To open this window, you select the appropriate repeater module and click on the ⎡Port Switch⎤ button. Note that the LAN Interconnect window does not display any unusable repeater backplane ports.

Port Switching Notes

Note the following regarding port switching functions:

1. The Port Switching window displays the grouping of the module's ports.

2. The LAN Interconnect window displays the connections of the module's ports to LAN segments.

3. The 90-series repeater modules do not support port switching functions.

4. The DECrepeater 90TS and the DECrepeater 90FS each have a second port that connects to the flexible Ethernet channel.

Connecting Modules

Introduction

This section provides information about connecting module backplane ports to LAN segments. You can find additional instructions in the online help.

How to Connect a Module

To connect a module to a segment, click on the backplane port and drag the connection pulldown to the desired LAN segment. When you click on a port, all LAN segments to which the module cannot be connected are grayed out. HUBwatch will not let you make an inappropriate connection to a LAN segment.

90-Series Modules

As a general rule, 90-series network modules only have one port, and this port is connected to the dedicated Ethernet ThinWire segment. This is a hard-wired connection that cannot be changed with HUBwatch.

However, some newer 90-series modules, such as the DECrepeater 90FS and the DECrepeater 90TS, have one port that may be disconnected from the ThinWire LAN segment, as well as a second (green IMB) port that can be connected to one of the flexible LAN segments. All DECrepeater 90FS and DECrepeater 90TS modules must be connected to the same flexible LAN segment.

900-Series Modules	All 900-series network modules have one or more backplane ports. You can connect 900-series modules to backplane LANs of the same LAN type as that of the module's backplane port (Ethernet, FDDI, or token ring).

LAN Interconnect Tasks

Using LAN Interconnect Window	You can do the following management tasks from the LAN Interconnect (or the Expanded View) window:

- Create a LAN segment.

- Connect a module to a LAN segment.

- Disconnect a module from a LAN segment.

- Delete a LAN segment.

- Modify some of a network segment's characteristics.

- Expand the LAN Interconnect window.

- Configure a module's ports between the front panel and the backplane.

- Logically group some of a module's front panel ports (or port groups) and treat them as a single backplane connection.

- Turn Auto Healing on or off.

Reference	See Backplane LAN Segments in Chapter 9 for instructions about accessing this window.

Configuration Example 1

Introduction
The following configuration example shows you how you might use HUBwatch to create LAN segments and connect repeater modules to them.

Configuration 1 Figure
This figure shows repeaters configured on two LAN segments.
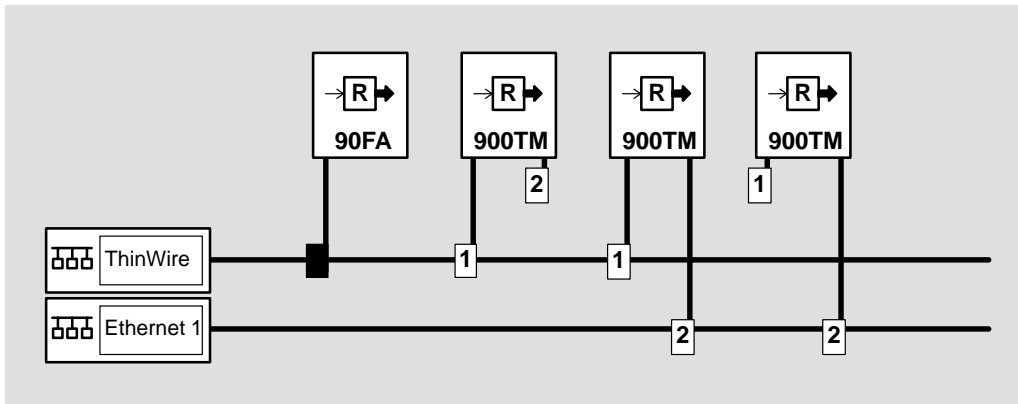
LKG-8412–93I

Configuration 1 Description
The configuration in this example shows how you can integrate 90-series repeaters into the DEChub 900 MultiSwitch environment. By default, the DEChub 900 MultiSwitch connects 90-series repeaters to its dedicated Ethernet LAN ThinWire segment, as indicated by the solid black connector. You cannot change these connections with HUBwatch.

Similarly, the DEChub 900 MultiSwitch connects port 1 of 900-series repeaters to the dedicated Ethernet LAN ThinWire segment. You can, however, use the LAN Interconnect window to disconnect port 1, but you cannot connect port 1 to any of the flexible Ethernet LAN segments.

Configuration Example 1

The remaining ports of 900-series repeaters are flexible channel ports. They are not connected by default to any LAN segment. Therefore, you can connect them to any of the flexible Ethernet LAN segments (also referred to as backplane Ethernet LAN segments). However, you cannot connect these ports to the dedicated Ethernet LAN ThinWire segment. HUBwatch does not let you connect repeater ports 1 and 2 to the same type of LAN segment because each port supports a different network technology.

When you use the flexible channel port over port 1 for network communications, you reduce the number of hops by 50 percent, minimizing the number of repeater hops in the network configuration.

Extended LAN   Note that by connecting port 1 of a DECrepeater 900TM to the dedicated ThinWire Ethernet LAN segment, all 90-series repeaters installed in the hub gain access to the flexible LAN segment to which repeater port 2 is connected. In effect, the two LAN segments become an extended LAN.

Caution   Do not disconnect the IP services module from a LAN segment if the Network Management Station uses that segment to reach the IP services module. For more information on IP services, see DEChub 900 MultiSwitch Hub Manager IP Address in Chapter 2.

Configuration Example 2

Introduction   This configuration is an example of an external FDDI backbone
connected to bridged Ethernet Workgroups.

**Configuration 2
Figure**
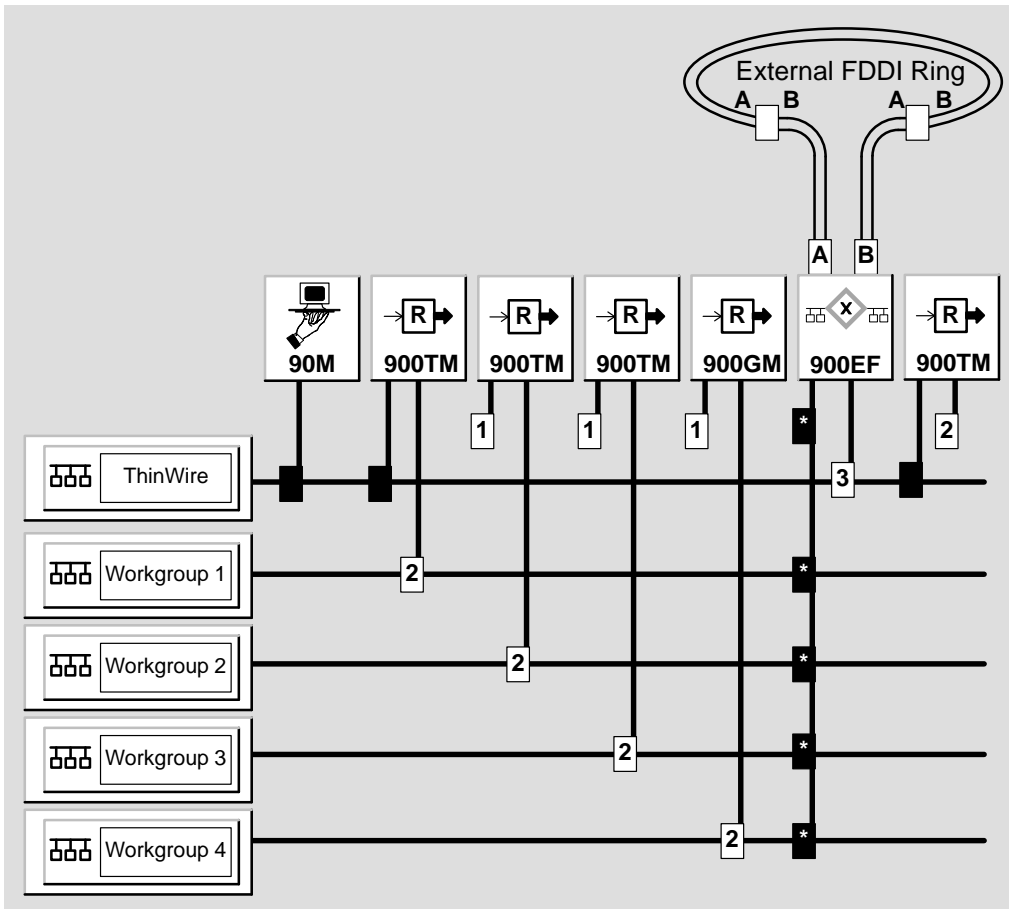
LKG-9457–94I

Configuration 2 Description

Configuration 2 presents an FDDI ring that is external to the hub. The ring represents the backbone of the network. The hub is used to connect the ring to end stations. Each repeater or access server connects end users to their own LAN segment to form a Workgroup. These LANs, or Workgroups, are then connected to one another through the DECswitch 900EF. The bridge not only provides connectivity, but also allows you to filter user defined traffic if a Workgroup is not interested in such traffic.

Single Rail

Note that the DECswitch 900EF shows multiple connections on a single pulldown connection rail. Each connection is black with a star in the box. This single rail notation indicates that you cannot display or move the individual connections from this particular window.

To view or move the individual connections, select the DECbridge 900MX module and click on the Expand button. This action opens the Expanded LAN Interconnect window for the DECswitch 900EF (see the following Expanded LAN Interconnect Window Figure as an example).

**Expanded LAN
Interconnect
Window Figure**

You use the expanded LAN Interconnect window to display
modules that have more than four ports.
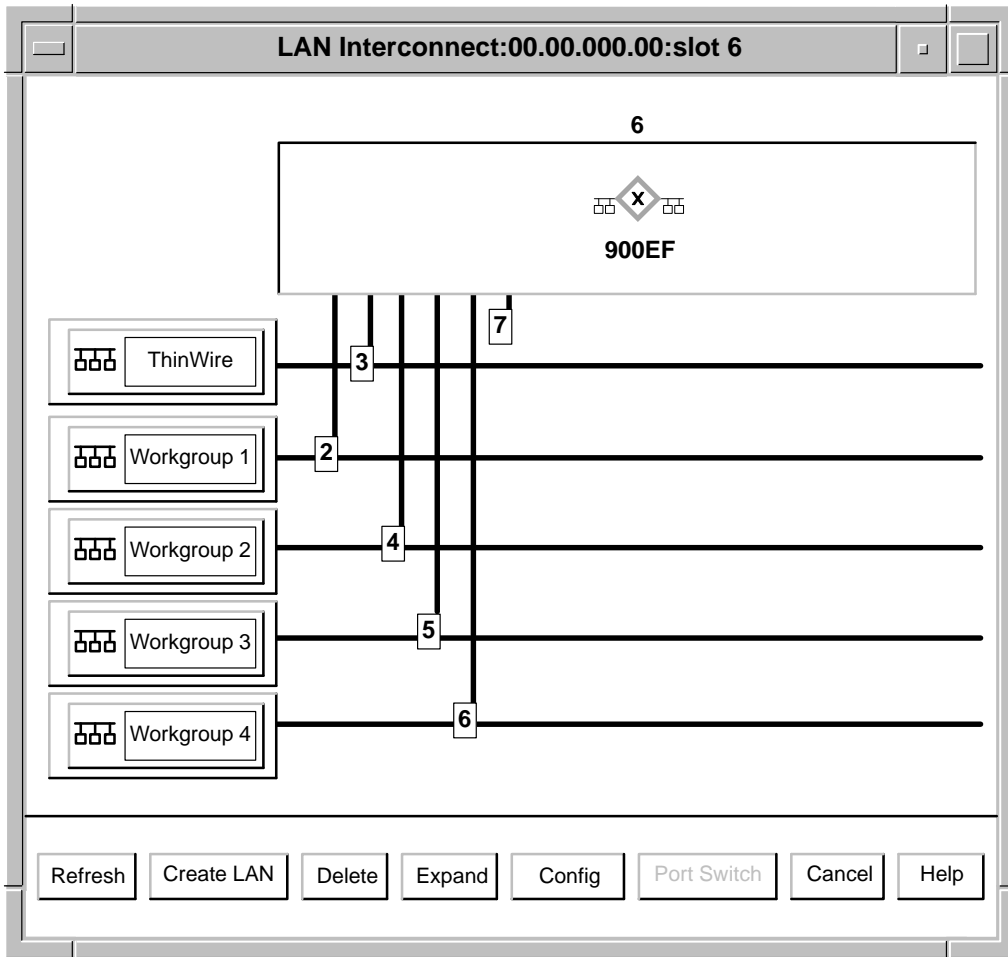
LKG-9110-94I

Steps for Building Configuration 2

You build this configuration in two stages. In the first stage, you create LAN segments. In the second stage, you connect modules to the LAN segments.

Creating LAN Segments

Complete the following steps to create LAN segments.

Step	Action
1	Select the [Create LAN] button on the LAN Interconnect window. **Result:** An Ethernet workgroup LAN appears (like Workgroup 1 in the figure).
2	Repeat this step for the other three LAN segments.

The 90-series modules are automatically displayed as connected to the ThinWire segment. You cannot move these modules. However, you must configure the remaining modules as described below.

Connecting Modules

Complete the following steps to connect the modules.

Step	Action
1	Disconnect the first port of the DECrepeater 900TM and the DECrepeater 900GM from the ThinWire LAN segment. **Result:** This action isolates these Workgroups from traffic on the ThinWire LAN segment. Drag the second port connection down to the appropriate Workgroup.
2	Drag both port connections of the DECserver 900TM down to the appropriate Workgroup.
3	Select the DECswitch 900EF icon.
4	Click on the [Config] button to open the Station Configuration window.
5	Configure ports 2 through 6 to the backplane.
6	Return to the LAN Interconnect window.

Step	Action
7	Click on the ⌈Expand⌋ button to go into the Expanded LAN Interconnect window.
8	Drag connector 3 down to the ThinWire connection.
9	Drag connectors 2, 4, 5, and 6 down to Workgroups 1 through four, respectively.

Finishing—The backplane connections are now complete and the hub is ready for cables to be connected to the front panel.

Connecting FDDI Devices—You must physically connect the A port from the hub neighbor on the external FDDI ring to the B port of the DECswitch 900EF. You must physically connect the B port from hub neighbor on the external FDDI ring to the A port of the DECswitch 900EF.

Configuration Example 3

Introduction   This configuration is an example of an FDDI backbone ring as part of a Hub backplane.

Configuration 3 Figure
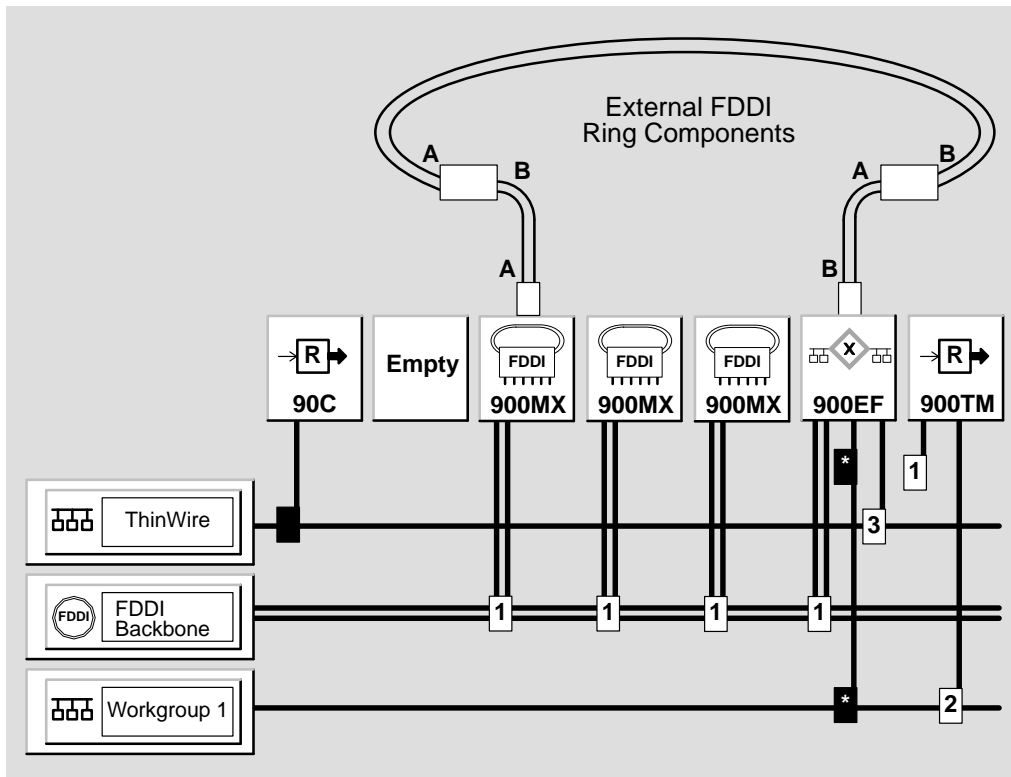
LKG-9111–94I

Configuration 3 Description

Configuration 3 presents an external FDDI dual ring that is connecting hub concentrator and switch modules using the backplane FDDI segment. The primary ring enters the hub using the front panel A port of the concentrator in slot 3. The ring exits the hub using the front panel B port of the switch in slot 6.

Steps for Building Configuration 3

You create this configuration in two stages. The first stage involves hardware steps. The second stage consists of software steps.

Hardware Step—Insert the FDDI connectors from the external ring into port A in slot 3 and port B in slot 6.

When you insert an FDDI module into the hub, both A and B ports in the module are on the front panel, indicating that the backplane FDDI ports are unused. HUBwatch does not display such ports in the LAN Interconnect window.

Hardware Hint—To keep the external ring closed, you may want to close the external ring on the outside of the hub by connecting port B in slot 3 with port A in slot 6 using a temporary external fiber cable.

Software Steps—You use HUBwatch for all subsequent LAN interconnect operations.

_____ **Note** _____

The steps in the following table assume that you have implemented the hardware hint described above.

_____

To build the configuration for example 3, complete the steps in the following table.

Step	Action
1	Create a backplane FDDI segment.
2	Select the slot 3 concentrator icon and click on the Config button to display the Station Configuration window (see the following illustration of this window).
	Port configuration choices are stored in the **hub's** non-volatile (NVRAM) memory. For more information about making port configuration choices, see the section entitled *Port Configuration Choices* on page 7-9 of this chapter.
3	Change the station type to A-front/B-back.
	Result: The dual ring is now wrapped in both slot 3 and 6 modules. The backplane FDDI port (port B) for slot 3 now appears in the LAN Interconnect window.
4	Go into the Station Configuration window for slot 6 and change the station type to B-front/A-back.
	Result: The backplane FDDI port (port A) for slot 6 now appears in the LAN Interconnect window.
5	Connect the FDDI backplane ports for slots 3 and 6 to the backplane FDDI segment by dragging the FDDI connection pulldown rails to the segment.
	Result: The FDDI ring is now closed using the hub backplane.
	Note—You can now disconnect the temporary fiber cable.
6	Change the module's station configuration so that both A and B ports are on the backplane. After you change the station configuration, you can connect the modules to the ring in the usual way.
7	Insert any other desired FDDI modules into the ring.

**Station
Configuration
Window Figure**

You use the Station Configuration window to change the station type. You do this by clicking on the Network Building Block icon in the window and selecting a different station type from the menu.
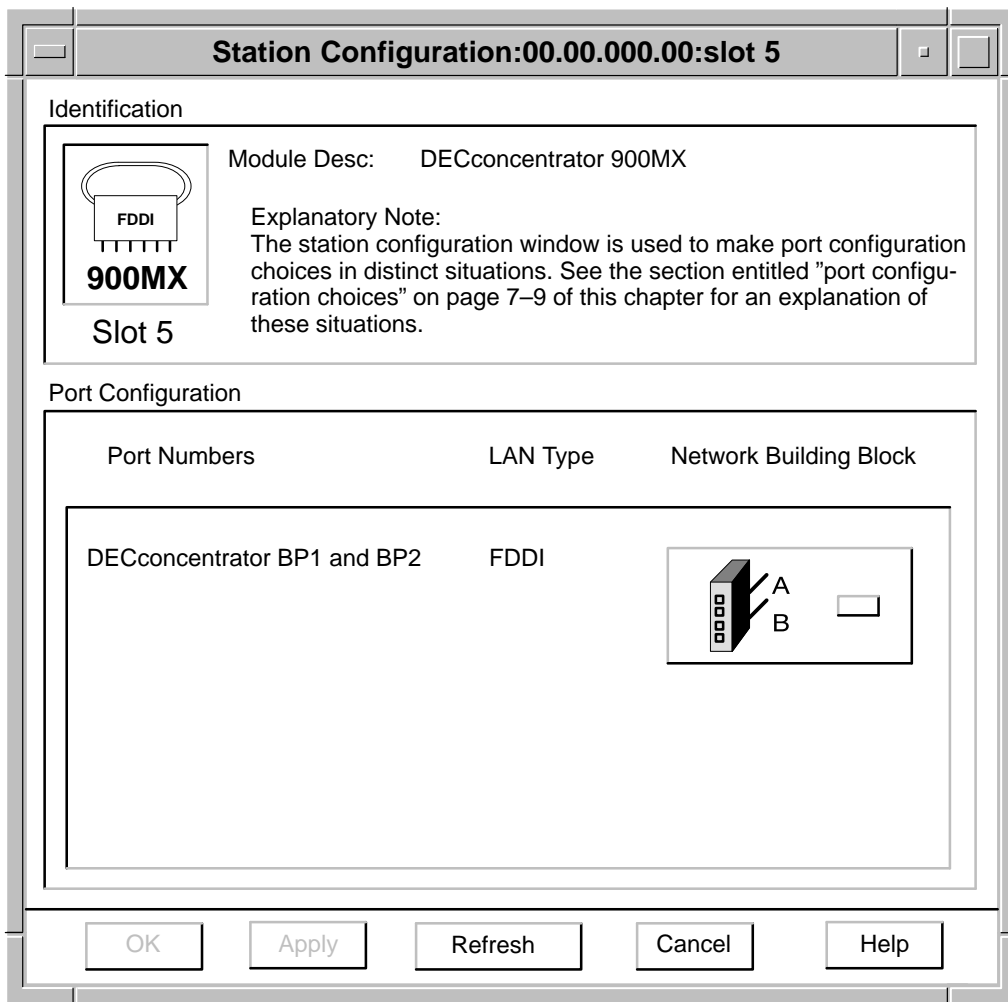
LKG-9112-94I

Unlit LEDs   Note in configuration example 3 that a module is logically
                        isolated from any external FDDI ring connected to its front panel
                        FDDI A/B ports. The LEDs for these ports will be unlit.

Other   Configuration example 3 shows Workgroup 1 connected to the
Connection   FDDI backbone using a repeater in slot 7 and the DECbridge
Options   900MX in slot 6. You can also connect other Workgroups to the
                        FDDI backbone using either the bridge front panel Ethernet
                        ports or slave (M) ports on the FDDI concentrator front panels.

Configuration Example 4

Introduction   This section shows FDDI concentrators and switches configured
                        in a hub in the following ways:

                        • **Configuration 4A** - FDDI concentrators and a switch
                          configured as a dual-homed tree

                        • **Configuration 4B** - FDDI concentrators configured in a tree

                        • **Configuration 4C** - FDDI concentrators and a switch
                          configured in the same hub as follows:

                          – FDDI concentrators as a tree

                          – FDDI concentrators and a switch as a dual ring

                        • **Configuration 4D** - FDDI concentrator in a dual-ring using
                          the DEChub ONE-MX docking station

Dual-Homed Tree Configuration Figure 4A

This figure shows FDDI concentrators and a switch in a dual-homed tree configuration.
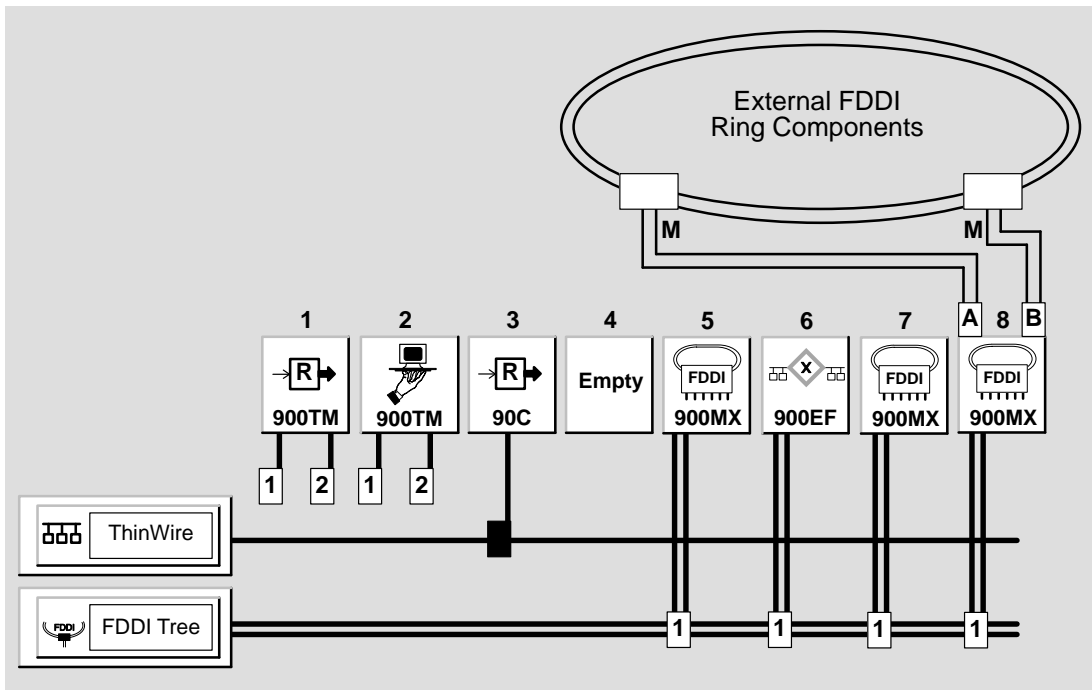
NPG-0120-95I

Steps for Building Configuration 4A

To set up configuration 4A, complete the steps in the following table.

| Step	Action
1	Using HUBwatch, create an FDDI LAN segment on the hub backplane.
2	Select the slot 8 module icon and click on Config to open the Station Configuration window for slot 8. Click on the Network Building Block option button and select the A-B front/M-back configuration.
3	Click on Apply to make the change and close the window.
	FDDI ports A and B are now switched to the module front panel, and the M port is switched to the backplane. The M port now appears in the LAN Interconnect window.
4	Open the Station Configuration window for slot 7 and change the Network Building Block option button to S-M back. The backplane FDDI port (ports S and M) for slot 7 now appears in the LAN Interconnect window.
5	Repeat step 4 for the concentrator module in slot 5 and the switch module in slot 6.
6	Connect the backplane ports for slots 5, 6, 7, and 8 to the backplane FDDI segment by dragging the FDDI connection pull-downs to the FDDI segment.
7	Insert the FDDI connectors from the M ports on devices on the external ring into ports A and B of the FDDI concentrator module installed in slot 8 of the hub.
	The FDDI dual-homed tree is now connected on the hub backplane.
8	If you want to insert other FDDI modules into the ring, you first have to change their station configuration to the S and M ports on the backplane.

**Tree
Configuration
Figure 4B**

This figure shows an FDDI tree configuration in a hub.
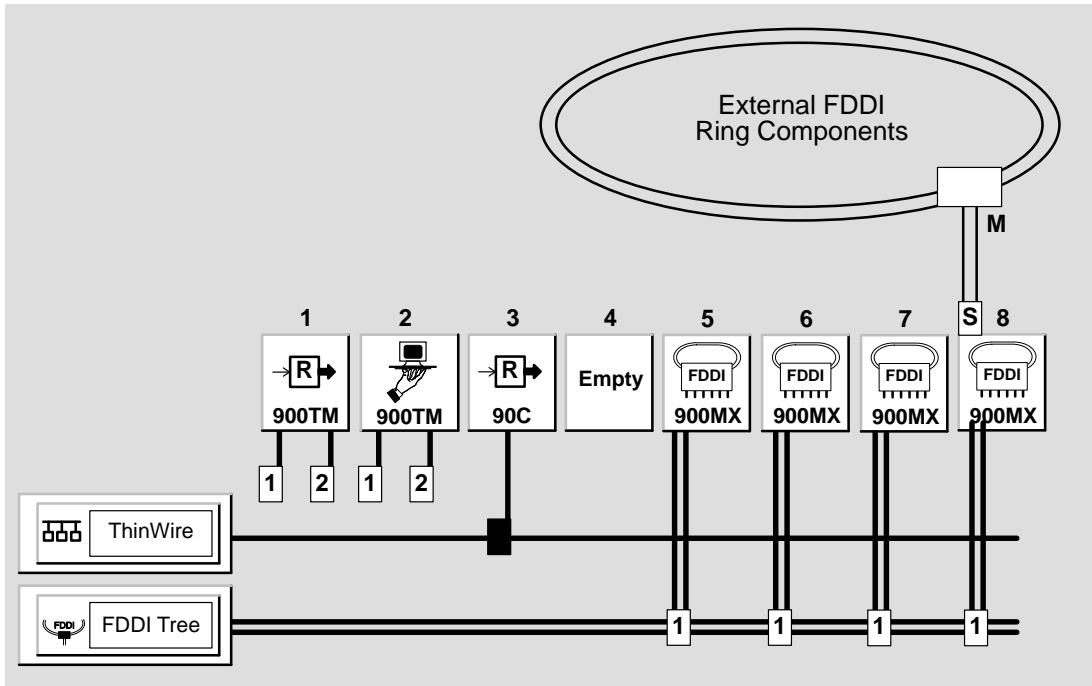
NPG-0121-95I

**Steps for
Building
Configuration
4B**

To set up configuration 4B, complete the steps in the following
table.

Step	Action
1	Using HUBwatch, create an FDDI LAN segment on the hub backplane.
2	Select the slot 8 module icon and click on `Config` to open the Station Configuration window for slot 8. Click on the Network Building Block option button and select the S-front/M-back configuration.
3	Click on `Apply` to make the change and close the window. The FDDI S port is now switched to the module front panel and the M port is switched to the backplane. The M port now appears on the LAN Interconnect window.

---------------------------- **Note** ----------------------------

The module in slot 8 can be an FDDI bridge or
concentrator.

Step	Action
4	Open the Station Configuration window for slot 7 and change the Network Building Block option button to S-M back. The backplane FDDI port (ports S and M) for slot 7 now appears on the LAN Interconnect window.
5	Repeat step 4 for the concentrator modules in slots 5 and 6.
6	Connect the FDDI backplane ports for slots 5, 6, 7, and 8 to the FDDI LAN segment by dragging the FDDI connection pull-downs to the segment.
7	If you want to insert other FDDI modules into the ring, you first have to change their station configuration so that the S and M ports are on the backplane.
8	Insert the FDDI connectors from an M port on a device on the external ring into the S port of the FDDI concentrator or bridge module installed in slot 8 of the hub. The tree configuration is now complete.

Dual-Ring and Tree Configuration Figure 4C

This figure shows FDDI concentrators and a switch in the same hub configured as follows:

- FDDI concentrators configured in a tree

- An FDDI concentrator and a switch configured in a dual ring
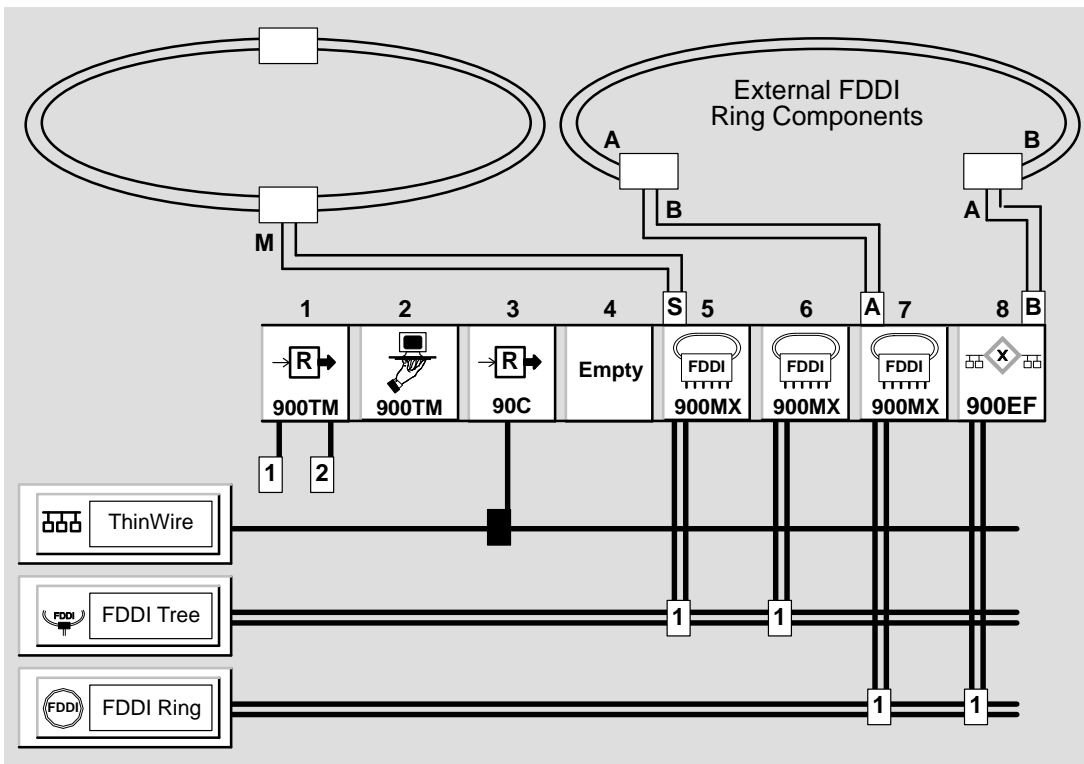
NPG-0122-95I

Steps for Building Configuration 4C

To set up configuration 4C, complete the steps in the following table.

Step	Action
1	Using HUBwatch, create a backplane FDDI segment.
2	Select the slot 5 module icon and click on Config to open the Station Configuration window for slot 5. Click on the Network Building Block option button and select the S-front/M-back configuration.
3	Click on Apply to make the change and close the window.
	The FDDI S port is now switched to the module front panel, and the M port is switched to the backplane. The M port now appears in the LAN Interconnect window.
4	Open the Station Configuration window for slot 6 and change the Network Building Block option button to S-M back. The backplane FDDI port (ports S and M) for slot 6 now appears in the LAN Interconnect window.
5	Open the Station Configuration window for the module in slot 7 and change the Network Building Block option button to A-Front/B-back.
	The backplane FDDI port B for slot 7 now appears in the LAN Interconnect window.
6	Open the Station Configuration window for the module in slot 8 and change the Network Building Block option button to B-Front/A-back.
	The backplane FDDI port A for slot 8 now appears in the LAN Interconnect window.
7	Connect the FDDI backplane ports for the modules in slots 5 and 6 to the backplane FDDI segment by dragging the FDDI connection pull-downs to the segment.
8	To connect the tree, insert the FDDI connector from an M port on a device on the external ring into the S port of the FDDI concentrator module installed in slot 5 of the hub.

Step	Action
9	To connect the dual-ring: a. Insert the FDDI connector from a B port on a device on the external ring into the A port of the FDDI concentrator module installed in slot 7 of the hub. b. Insert the FDDI connector from an A port on a device on the external ring into the B port of the switch module installed in slot 8 of the hub.

DEChub ONE-MX Configuration 4D

This figure shows an FDDI concentrator in a dual-ring configuration using the DEChub ONE-MX (high-end docking station).
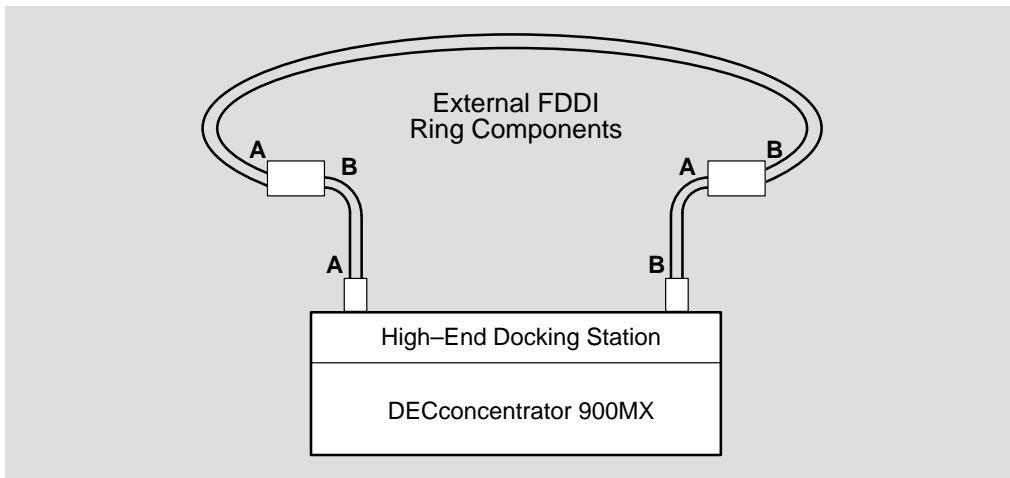
NPG-0119-95I

Steps for Building Configuration 4D

Note

When a module is installed in a high-end docking station, the FDDI module port configurations are saved in NVRAM. Thus, if you remove the module from one docking station and install it in another, the port configurations remain in effect. However, if the module is moved to a different environment, such as a hub or a DEChub ONE docking station, the port configurations are erased.

To set up configuration 4D, complete the steps in the following table.

Step	Action
1	When an FDDI module is installed in a high-end docking station, both A and B ports in the module are switched by default to the front panel.
2	Using an OBM connection to the high-end docking station, start up HUBwatch. The module's front panel appears.
3	Double click on the module. The FDDI Summary window appears. Note that the physical location of the module A, B, M, and S ports, as well as the current configuration of the module, are shown in the diagram on the Configuration push button.
4	Click on the Configuration push button. The Station Configuration window appears.
5	Click on the Network Building Block option button and switch the A and B ports to the backplane.

6   Click on ⌗Apply⌗ to make the change and close the window.

---------- **Note** ----------

It is recommended that you use an OBM connection to perform this task. If you used an in-band management connection to start HUBwatch and switch the A and B ports, you lose your network connectivity to the module. HUBwatch then returns a "SET Failed" message. Consequently, the ports switch, but you do not get a confirmation message to that effect.

---

7   Insert the FDDI connectors from the A and B ports on devices on the external ring into the A and B ports of the high-end docking station.

The concentrator is now connected to an FDDI dual-ring.

Configuration Example 5

Introduction   This configuration is an example of a collapsed Ethernet backbone connecting hubs in a star configuration.

**Configuration 5
Figure**
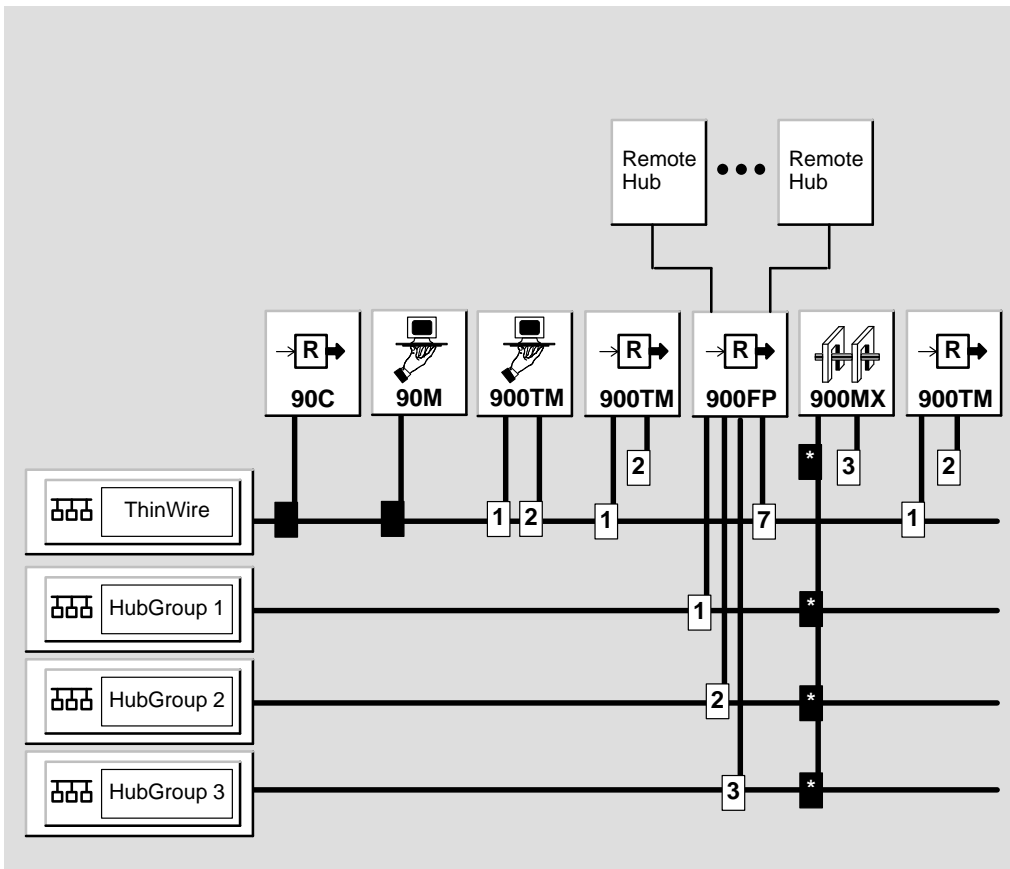
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Configuration 5 Description

Configuration example 5 represents a collapsed Ethernet backbone in a central DEChub 900 MultiSwitch backplane. Its purpose is to connect multiple hubs around a campus into a star configuration. The hubs connect to the star using a DECrepeater 900FP repeater in the central DEChub 900 MultiSwitch.

The DECrepeater 900FP ports are segmented or grouped onto three different LANs in the DEChub 900 MultiSwitch backplane, thus isolating the hubs into different Ethernet segments. These segments are then bridged together by a DECbridge 900MX, which is also located in the central DEChub 900 MultiSwitch backplane.

Steps for Building Configuration 5

You build this configuration in two stages. In the first stage, you create LAN segments. In the second stage, you connect modules to the LAN segments.

Creating LAN Segments

Complete the following steps to create LAN segments.

Step	Action
1	Open the LAN Interconnect window from the HUBwatch front panel.
2	Click on the `Create LAN` button to create an Ethernet hub group LAN. Repeat this step for the other two hub group Ethernet segments.

Important Information—Any older 90-series modules are automatically shown as connected to the ThinWire segment. You cannot change these connections with HUBwatch. However, you must configure the remaining modules using the following steps.

Configuration Example 5

Connecting Modules

Complete the following steps to connect modules.

Step	Action
1	Select the DECrepeater 900FP module and click on the Group button to open the Group window (see the following Port Switching Window Figure for an example).
2	Follow these instructions: a. Put ports 1-2 into a group labeled *1*. b. Put ports 3-8 into a group labeled *2*. c. Put ports 9-12 into a group labeled *3*.
3	Use the ThinWire drop down list box to group the ThinWire port with ports 1 and 2. This provides connectivity for the 90-series modules in the DEChub 900 MultiSwitch that connect only to the ThinWire port. You must group one of the six pairs of front panel ports with the ThinWire segment.
4	Return to the LAN Interconnect window. Drag down backplane connectors 1 through 3 on the DECrepeater 900FP to HubGroup Ethernet LANs 1 through 3, respectively. **Result:** These connectors represent repeater port groups 1 through 3 created in steps 1 through 3. Leave connector 7 (the ThinWire connector) on the ThinWire segment. This action provides connectivity for the older 90-series modules in the hub that connect only to the ThinWire segment.
5	Select the DECbridge 900MX icon.
6	Click on the Config button and go into the Station Configuration window.
7	From this window, configure ports 2 through 4 to the backplane.
8	Return to the LAN Interconnect window.
9	From this window, click on the Expand button and go into the Expanded LAN Interconnect window.

Step	Action
10	Drag connectors 2 through 4 down to HubGroup Ethernet LANs 1 through 3, respectively.

The backplane connections are now complete and the hub is now ready for the external wiring of hubs to the DECrepeater 900FP front panel ports.

Configuration Example 5

Port Switching
Window Figure
You use this window to assign the ports into different port groups.

Port Switching:00.00.000.00:slot 5

Ports

	1-2	3-4	5-6	7-8 9-10	11-12	MAC

1

2

3

Port Switch 4

5

6

ThinWire   Port 1–2

Loop Protection   ◆ Check   ◇ Don't Check

Refresh   Cancel   Help
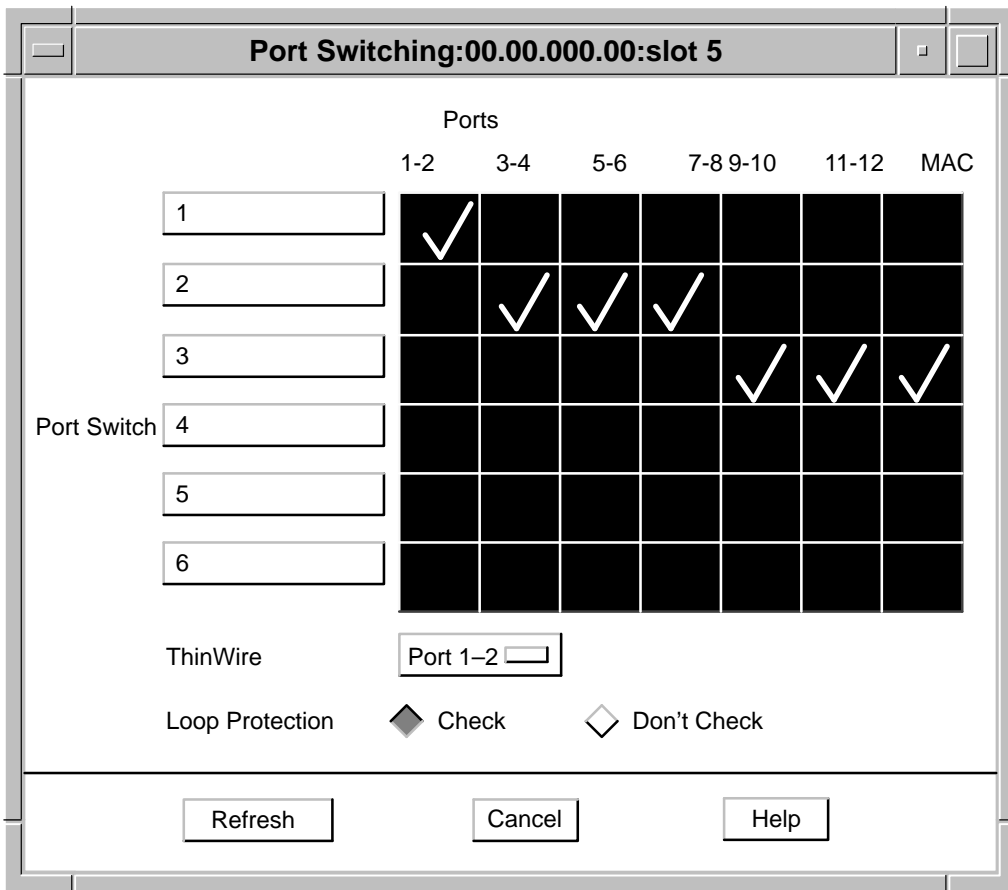
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ThinWire Port Drop-Down List Box

The Port Switching window incorporates a ThinWire drop-down list box that allows you the following options:

- For DECrepeater 900FP and PORTswitch 900CP:

  - Select a port

- For PORTswitch 900CP or PORTswitch 900TP:

  - Select a group, or

  - Make no connection to the ThinWire LAN segment

Loop Protection Checking

The Port Switching window incorporates loop protection radio buttons that allow you to:

- Enable loop protection checking

- Disable loop protection checking

If you enable loop protection by clicking on the Enable radio button, loop checking will be done by HUBwatch on your behalf, but you will notice a slowdown in operations due to the overhead associated with the loop checking code. Conversely, if you disable loop protection by clicking on the Disable radio button, no loop checking is done for you by HUBwatch.

By default, HUBwatch checks for loops. Thus, if HUBwatch detects a potential loop, a pop-up message box appears with the following message:

```
A possible loop exists. Do you want to continue?
```

If you reply **yes**, the requested operation continues. If you reply **no**, HUBwatch ignores the requested operation.

Note that the pop-up message box is activated only if you enable loop protection checking and you perform an operation that might result in a loop.

For more information about recognizing repeater loops and how to prevent them, refer to the section later in this chapter entitled Preventing Repeater Loops.

Backplane LAN Segment Configuration Guidelines

This section presents backplane LAN segment configuration guidelines.

Configuring Backplane LAN Segments

Follow these guidelines when using the LAN Interconnect window to configure LAN segments in the hub backplane.

- Do not create more than six Ethernet LAN segments. Repeaters cannot be connected to more than six Ethernet LAN segments in the hub backplane.

- If you have two or more DECrepeater 90FS or DECrepeater 90TS modules in your hub and you want to connect them to a flexible LAN segment, you must connect port 2 on all of them to the same Ethernet flexible LAN segment. DECrepeater 90FS and DECrepeater 90TS modules are half-height modules; therefore, the Hub Manager can only connect port 2 of these modules to a single flexible LAN segment.

------------------------------ **Note** ------------------------------

If you have connected port 2 of one DECrepeater 90FS or DECrepeater 90TS module to a backplane flexible LAN segment and you attempt to connect port 2 of a different DECrepeater 90FS or DECrepeater 90TS to a different backplane flexible LAN segment, the Hub Manager rejects the connection.

DECrepeater Configuration Guidelines

Introduction   This section presents DECrepeater configuration guidelines.

Repeater Configuration Guidelines

You can integrate both 90-series and 900-series repeaters in the DEChub 900 MultiSwitch environment, subject to certain configuration guidelines and restrictions.

Note the following guidelines when configuring repeaters in your network:

- By default, the DEChub 900 MultiSwitch Hub Manager connects 90-series repeaters to its dedicated Ethernet LAN channel. These connections cannot be changed.

- By default, the DEChub 900 MultiSwitch HUB Manager connects the ThinWire port on each 900-series repeater to the dedicated Ethernet ThinWire LAN segment. You can, however, use the LAN Interconnect window to disconnect the ThinWire ports, but you cannot connect them to any of the flexible LAN segments available in the DEChub 900 MultiSwitch backplane.

- The remaining backplane ports on 900-series repeaters are flexible LAN segment ports. They are not connected by default to any segments, and you can connect them to any of the flexible Ethernet LAN segments (also referred to as *IMB LAN segments*.) Note, however, that you cannot connect these ports to the dedicated Ethernet ThinWire LAN segment.

- HUBwatch software does not allow you to connect the repeater ThinWire port and the other repeater ports to LAN segments of the same type, since the respective ports support different network technologies.

- A benefit of using the flexible LAN segment ports, i.e., the IMB ports, for network communications, rather than the ThinWire port, is that the IMB ports reduce the number of repeater hops by 50 percent within the hub. Thus, the number of repeater hops in the network configuration is significantly reduced.

- By connecting the ThinWire port of a DECrepeater 900TM to the ThinWire segment, all 90-series repeaters installed in the hub gain access to the flexible LAN segment to which port 2 of the DECrepeater 900TM is connected. In effect, the two LAN segments become a single LAN.

Preventing Repeater Loops

Introduction   This section describes repeater loops and how you can avoid forming them.

What Are Repeater Loops?   Generally, a repeater loop forms when two ports of the repeater are connected to the same LAN segment. A repeater loop can cripple the network on which it forms.

On the DEChub 900 MultiSwitch backplane, a repeater loop forms only when the 900-series repeaters are connected on the backplane to both the ThinWire segment and the same flexible LAN segment.

Backplane loops within a single repeater are avoided automatically, since both HUBwatch and DEChub 900 MultiSwitch firmware would not allow you to connect a backplane port to a LAN segment of incompatible type.

Repeater Loop Figure

This illustration shows an example of a repeater loop.
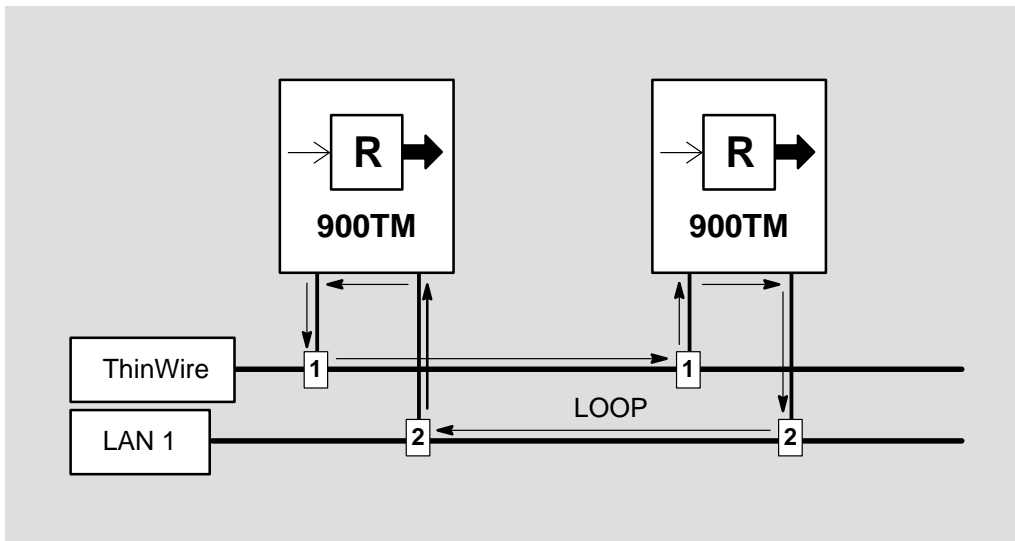
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Kinds of Repeater Loops Prevented

For most repeaters, the DEChub 900 MultiSwitch firmware and HUBwatch software prevent repeater loops by applying the following restriction to repeater connections:

Loops Between Multiple Repeater Modules — The DEChub 900 MultiSwitch firmware does not allow you to connect the flexible channel ports of multiple repeaters to the same flexible LAN segments if the ThinWire ports of these repeaters are currently connected to the ThinWire LAN segment.

What Happens

For all repeaters except the PORTswitch 900CP, 900FP, 900TP, and the DECrepeater 900FP, if you select a backplane port to connect to a LAN segment, HUBwatch will gray out all the LAN segments that could lead to a repeater loop, preventing you from making such a port selection.

Preventing Repeater Loops with Port Switching Modules

In port switching modules, such as the PORTswitch 900CP, 900FP, 900TP, and the DECrepeater 900FP, potential exists for a repeater loop to form when a ThinWire port is being switched inside the module. See the section earlier in this chapter entitled Port Switching for a description of loop prevention in this instance.

Access Server Configuration Guidelines

Introduction

This section presents access server configuration guidelines.

DECserver 900GM and 900TM Ports

Two ports are displayed for each DECserver 900GM or DECserver 900TM module installed in a DEChub 900 MultiSwitch. Port 1 is the operational port used by the DECserver 900GM and DECserver 900TM for sessions and service connections. Port 2 is the maintenance port used by DECserver 900GM and DECserver 900TM firmware for downline loading and upline dumping operations.

When configuring a DECserver 900GM or 900TM in the DEChub 900 MultiSwitch, note the following guidelines:

- A DECserver 900GM or 900TM can operate only one backplane port at a time. The difference between the operational and maintenance ports is a logical distinction only. A single DECserver 900TM module cannot be connected to more than one Ethernet LAN segment at a time.

- Within the DECserver 900GM or 900TM, there are no restrictions on port assignments between the operational and maintenance ports. They can be the same port, or different ports at the discretion of the network manager.

DECserver Load Host

When you initially apply power to the hub, all repeater and access server modules are, by default, connected to the dedicated ThinWire LAN segment. Therefore, if the DECserver 900GM or 900TM needs to access a remote load host, it does so by way of port 2 through the ThinWire LAN segment. When the load is complete, port 2 is deactivated, and port 1 becomes operational.

Rule   If you want to connect the DECserver 900GM or 900TM to a
flexible LAN segment, you must move the port 1 connection
pulldown to that segment. The only reason to ever move port
2 to a flexible LAN segment would be to keep it on a segment
that has access to the remote load host if the hub reboots. On
reboot, the DEChub 900 MultiSwitch Hub Manager saves the
configuration of the backplane LAN segments and ensures that
port 2 on the DECserver 900GM or 900TM is connected to the
same LAN segment.

DECbridge and DECswitch Configuration Guidelines

Introduction   This section presents DECbridge and DECswitch configuration
guidelines.

Restrictions   On the following devices, the port specified in the table below
may be connected to the ThinWire channel or to any of the
Ethernet flexible channels.

Module	Port Assignment
DECbridge 900MX	Port 3
DECswitch 900EE	Port 2
DECswitch 900EF	Port 3
PEswitch 900TX	Port 3

The other Ethernet ports of these devices can be connected
ONLY to the Ethernet flexible channels.

Token Ring Configuration Guidelines

Introduction   This section presents token ring configuration guidelines.

Token Ring Configuration Guidelines

Follow the guidelines below when configuring token ring segments in the hub backplane.

- You do not have to create token ring LAN segments. HUBwatch automatically displays two token ring LAN segments if a token ring module is installed in the hub.

- A token ring module can be connected to only one token ring LAN segment at a time.

- When you make a backplane connection between a token ring module and one of the two token ring LAN segments, the box at the connection contains either a T or a W.

  - T - Indicates that the token ring is properly connected to the backplane LAN.

  - W - Indicates that the connection is in a wrapped state. This may result from mismatched ring speed, long timers, or other events.

  Since token ring products have lengthy timers for ring connection or wrap, the T or W may not necessarily have the most up-to-date value of the connection.

- Using HUBwatch, you can change the speed of either of the two token ring LAN segments. Legal speeds are 4 Mbps and 16 Mbps. The ring speed is indicated in the token ring icons at the left side of the LAN Interconnect window.

- The following token ring modules can use the two backplane token ring LANs:

  - DECrepeater 900FL

  - DECrepeater 900SL

  - DECrepeater 900TL

  - DECmau 900TH

  - DECmau 900TL

FDDI Configuration Guidelines

Introduction   This section presents guidelines for configuring FDDI LAN modules.

Rules   All FDDI LAN configurations on the hub backplane must comply with the following rules:

- Any FDDI network, whether configured as a ring or tree, can have only one "in" connection and one "out" connection.

- Dual-ring and tree connections cannot be mixed on the same LAN segment.

- If FDDI Auto Healing is enabled and an FDDI module is currently patched out, you cannot perform the following operations until the module is restored to normal operation:

  a. Add a connection

  b. Delete a connection

  c. Delete a LAN segment

8

HUBwatch GUI for Hubs and Modules

Using the HUBwatch GUI

Introduction

HUBwatch software is designed to make managing the hub and its installed modules easy. The graphical user interface (GUI) reflects this approach. When you run HUBwatch, the software displays a window containing a realistic diagram of the hub configuration. This window is called the Hub Front Panel window.

The menu bar on the Hub Front Panel window allows you to access other windows that you use to manage the hub configuration, SNMP communities, backplane configurations, polling, and other applications. You use a set of standard buttons to select options in a particular window.

You access summary windows for the network modules and their ports from the Hub Front Panel window by double clicking on a module or one of its ports.

Hub Front Panel Window

Introduction   The Hub Front Panel window provides a graphic representation
of your hub configuration. On HUBwatch startup, a physical
view of the Hub Front Panel is displayed. By clicking on View in
the menu bar, you gain access to pulldown options that allow you
to toggle between a *physical view* and a *logical view* of the Hub
Front Panel window.

In the physical view for the DEChub 900 MultiSwitch,
HUBwatch displays the LED states shown in the table below for
each of the power supplies.

_____ **Note** _____

The colors of the HUBwatch LEDs do not necessarily
match the actual power supply LEDs.

_____

Top LED	Bottom LED	Power Supply State
Green	Green	Normal operating state.
Green	Blinking Green	Power supply has been administratively disabled.
Green	Yellow	Power supply is in warning state.
Blinking Green	Off	The switch on the power supply is turned off.
Green	Blinking Red	The power supply is bad.
Off	Off	The power supply is not returning status or is unknown.

You navigate to all other HUBwatch windows from the Hub
Front Panel window. From this window, you can select a

pulldown menu option or double click on a module or a module port to access additional module management windows.

**How to Open
Hub Front
Panel Window**

The Hub Front Panel window is displayed when you first start HUBwatch. See Chapter 5 for instructions on starting HUBwatch.

Hub Front Panel Window Figure

This is the DEChub 900 MultiSwitch Front Panel view.

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Types of Views

Introduction   HUBwatch provides either a physical view or a logical view of the hub chassis in the Hub Front Panel window. Either view allows you to double click on a module or a module port to access additional module management windows.

Physical View   The physical view is an exact representation of the hub's front panel. This view is useful when a strong visual correlation to the hub is needed and when troubleshooting the hub over the network.

Logical View   The logical view displays the same technical data as the physical view. However, the logical view uses a standard module template with labels and icons to distinguish among module types. The logical view repaints the screen faster since it presents less detail. The logical view is also easier to use in selecting individual ports, since the ports are larger in this view.

Physical View Figure

This is the DEChub 90 Front Panel physical view.
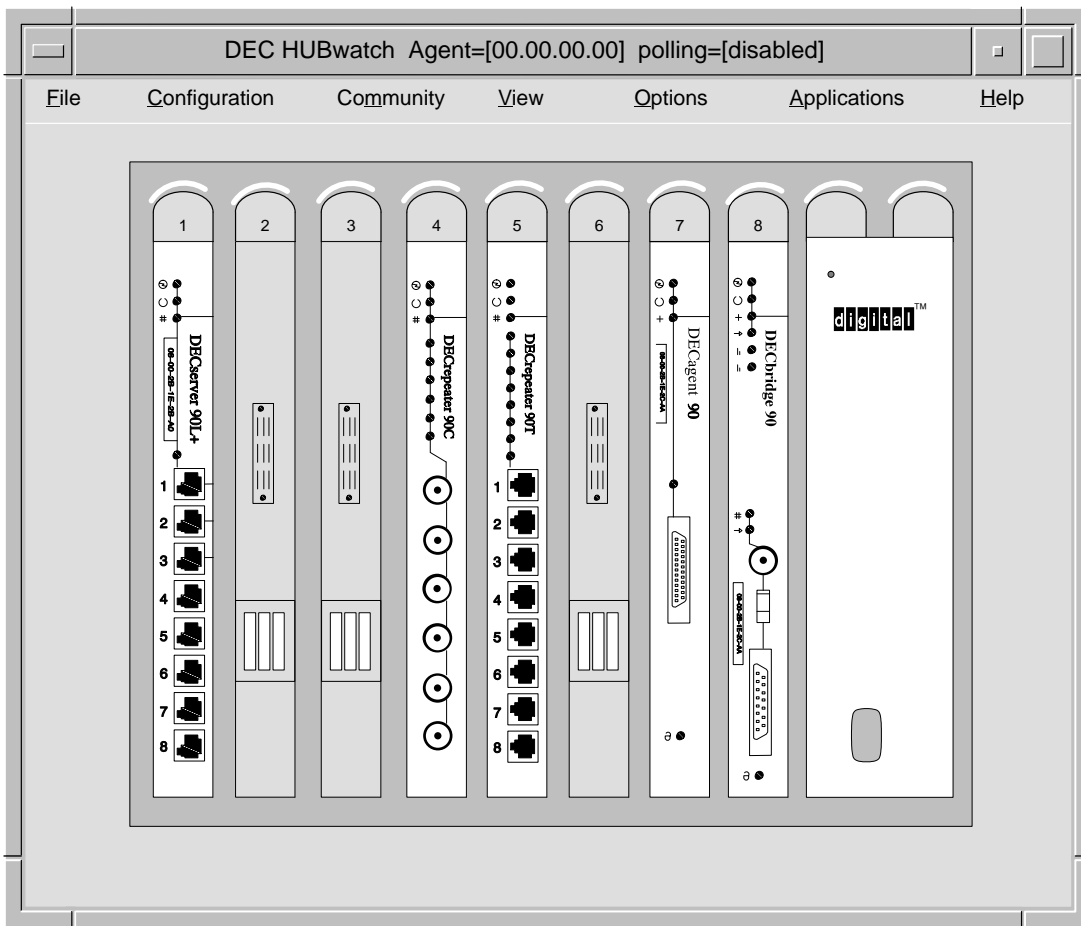
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Logical View Figure

This is the double (16-slot) DEChub 90 Front Panel logical view.
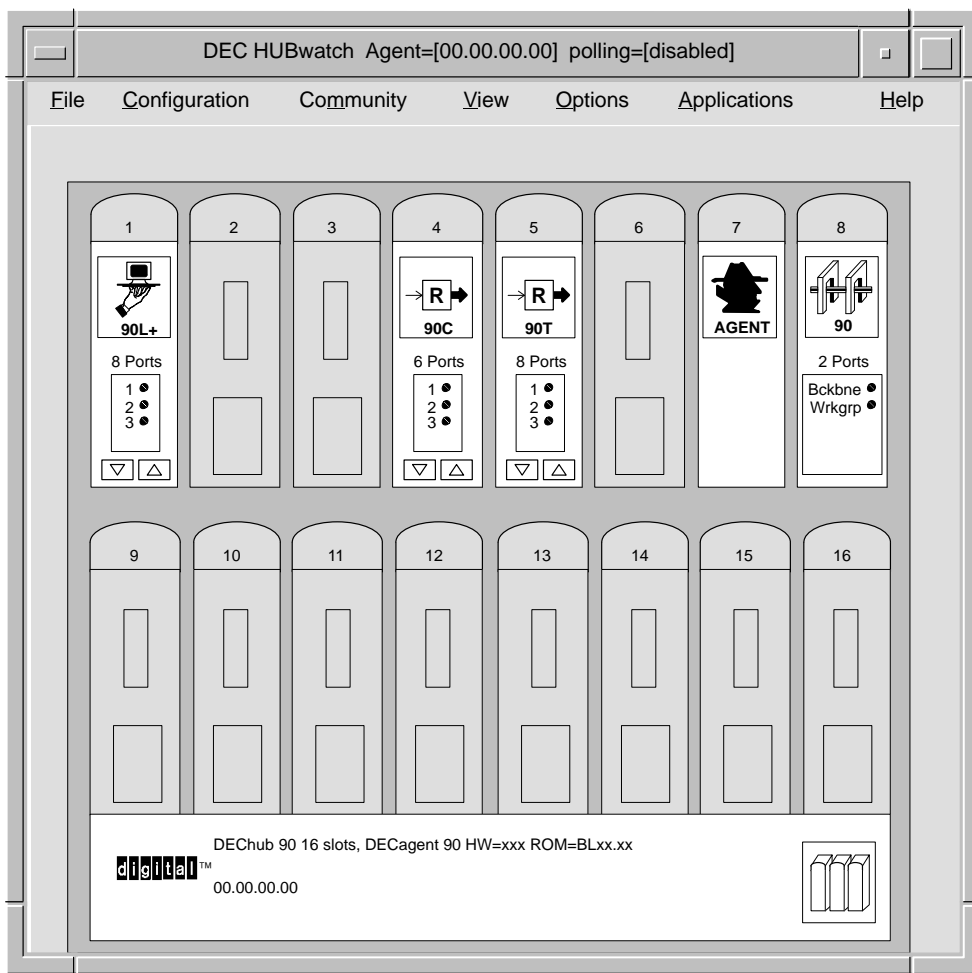
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Hub Management Windows

When You Use Them

You use the hub management windows to:

- Add modules to or delete modules from the hub

- Manage SNMP agents and community information

- Change the view (logical or physical) of the Hub Front Panel window

- Create or delete backplane LAN segments and their connections

- Monitor the physical environment of the hub

- View and manage the message log

- Set polling

- Set up and manage alarms (OpenVMS only)

- Find Ethernet stations (including duplicate addresses)

- Get Help

- Exit HUBwatch

Hub Management Window Figure

This figure shows you the hierarchy of the hub management windows.
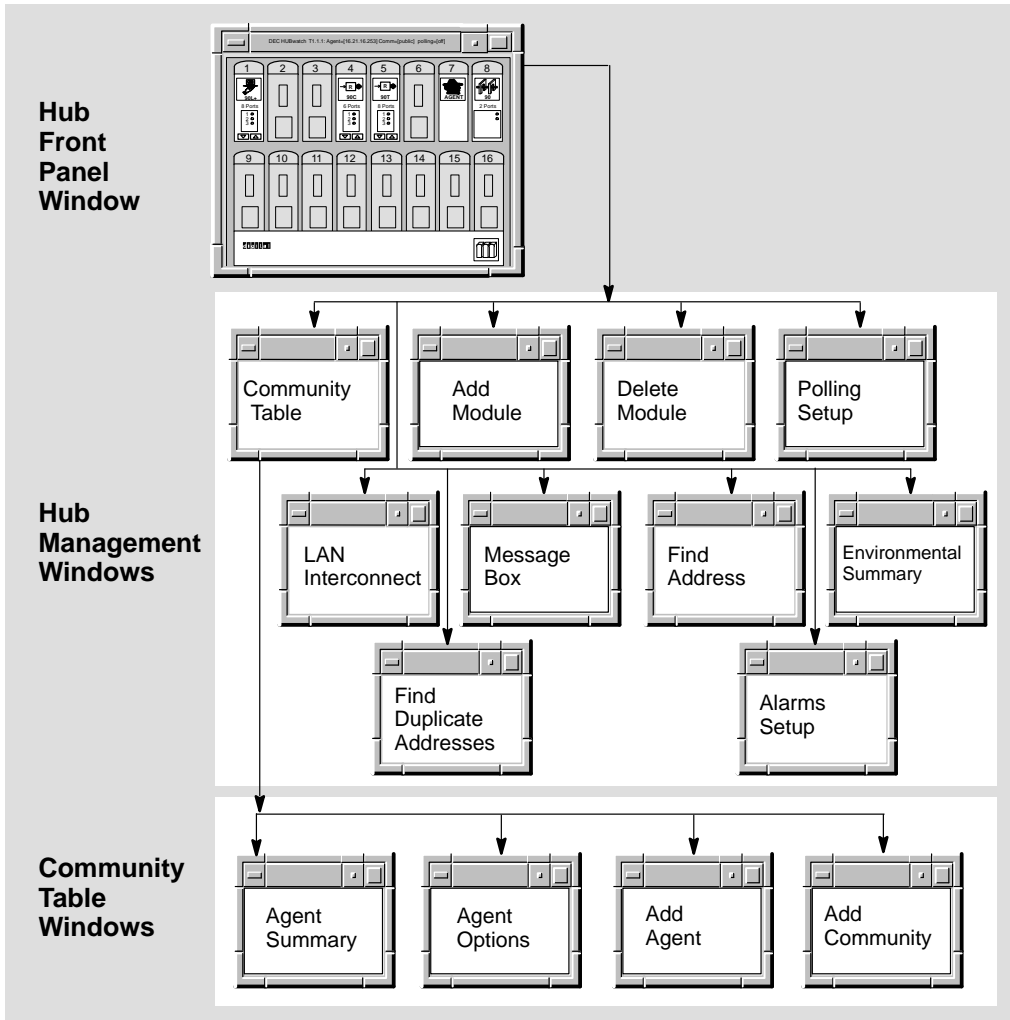
Hub Front Panel Window

Hub Management Windows

| Community Table | Add Module | Delete Module | Polling Setup |

| LAN Interconnect | Message Box | Find Address | Environmental Summary |

| Find Duplicate Addresses | | Alarms Setup | |

Community Table Windows

| Agent Summary | Agent Options | Add Agent | Add Community |

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Opening Hub Management Windows
You open HUBwatch management windows by pulling down options from the menu bar across the top of the Hub Front Panel window. Some of the menu options have keyboard accelerators.

Menu Options
The following table presents the menus, their options, and keyboard accelerators.

_____ **Note** _____

You must type the keyboard accelerator as a lowercase letter.
_____

Menu	Option	Keyboard Accelerator	Function
File	Exit	Ctrl/x	Closes HUBwatch.
Configuration	Add	None	Adds a module.
	Delete	None	Deletes a module.
Community	Manage Table	None	Displays the list of available SNMP agents and their communities. Used to add, delete, and modify agents and communities.
	Manage Current	None	Allows access to a summary window for the current agent.
View	Logical	None	Displays a logical representation of the DEChub and its installed modules. The view is displayed in the Hub Front Panel window.
	Physical	None	Displays a physical representation of the DEChub and its installed modules. The view is displayed in the Hub Front Panel window.
	LAN Interconnect	Ctrl/l	Displays the LAN Interconnect window. You use this window to create LAN segments and connect modules to them. Options include Expanded View, Station Configuration, and Group View.

Menu	Option	Keyboard Accelerator	Function
	Message Box	Ctrl/m	Displays a log file of error, warning, and informational messages. Allows you to modify message log file parameters.
	Environmental Summary	Ctrl/w	Displays chassis power and status information (DEChub 900 only).
Options	Polling	None	Offers four options: Refresh, Enable, Disable, and Set Up.
Applications	Find Address	Ctrl/f	Searches the SNMP agent's database for a particular Ethernet station.
	Find Duplicates	Ctrl/d	Searches the SNMP agent's database for duplicate Ethernet addresses.
	Alarms	None	Options include Alarm Setup, Start Polling, Stop Polling, and Viewer. These options are supported by OpenVMS only.
Help		None	Accesses online help.

Help Menu   This table lists and describes the Help options available to you.

Option	Keyboard Accelerator	Function
Context Sensitive	Ctrl/h	Provides context-sensitive Help for various objects in a HUBwatch open window or dialog box (such as menus, window objects, and dialog box fields).
Window Info	None	Provides information about the HUBwatch windows and describes the tasks performed in each window. It also explains how the HUBwatch application is organized.
Index	Ctrl/i	Provides a list of Help topics similar to index entries in a book. Also provides a table of contents through the View option on the Help Index window menu bar.
Glossary	Ctrl/g	Provides a list of terms and definitions related to HUBwatch software.
Tutorial	None	Describes key features of the HUBwatch application.
Management	None	Describes the GUI and the management tasks that you can perform with HUBwatch.
Troubleshooting	Ctrl/t	Lists the HUBwatch error messages and suggests recovery procedures.
Product Info	None	Provides a product overview, the software version and its date, copyright information, the release notes, information about new features, and a list of management Help topics.
Using Help	None	Provides Help information.

Context-Sensitive Help   You can get context sensitive Help for any window object by positioning the cursor on the object and pressing F1.

Reference   See Chapter 9 in this manual for instructions about using hub management windows.

Module Management Windows

When You Use Them   You use module management windows to manage:

- The DECagent 90 or the DEChub 900 MultiSwitch Hub Manager

- Access servers

- Bridges

- Brouters

- FDDI concentrators

- PORTswitches

- Repeaters

- Switches

- Token ring modules

How to Open Module Management Windows   To open a particular module management window, double click on the module or one of its ports in the Hub Front Panel window.

To open the Agent Summary window for the Hub Manager, select the Manage Current option from the Community menu on the Hub Front Panel window.

**Module
Management
Window Figure**
This figure shows the types of modules you can manage with HUBwatch.
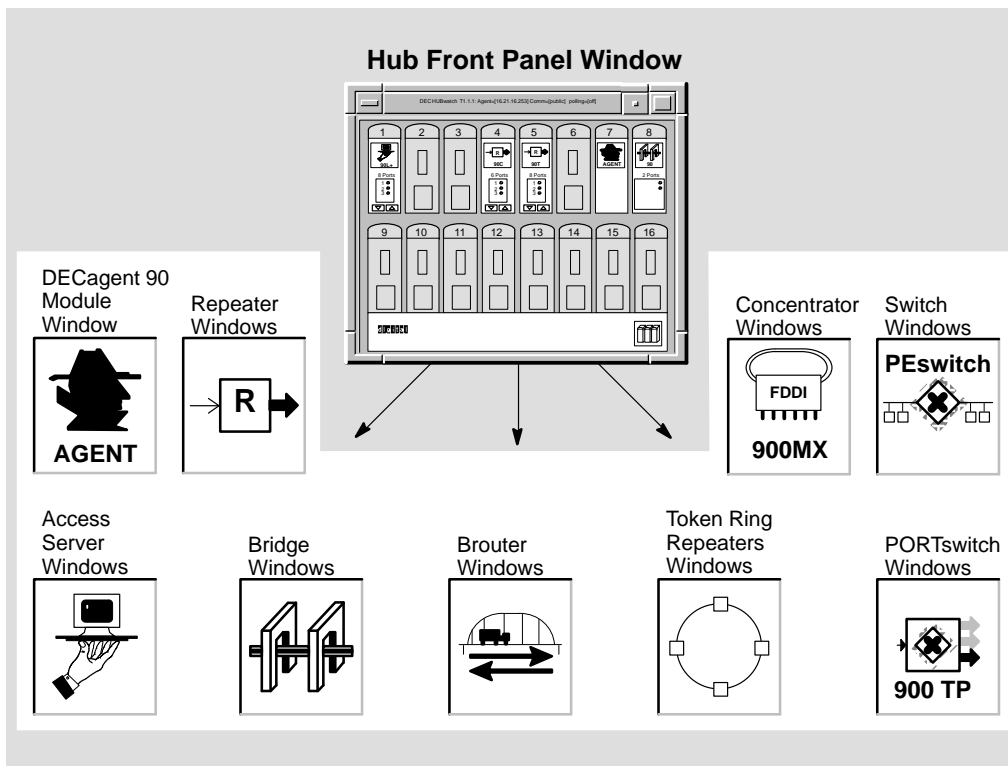
NPG-0145-95I

Reference
See Chapter 9 for instructions about using the module management windows.

**Network
Module Icons**

Each module management window has its own icon that identifies the network module that the window manages. The network module icons are listed below.

AGENT

Agent Icon—Designates the Agent Summary window, which is used to display and manage the agent module.

R
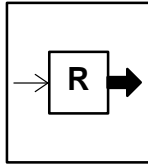
Repeater Icon—Designates all windows used to display or manage repeater modules.
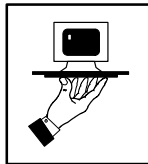
Access Server Icon—Designates all windows used to display or manage access server modules.
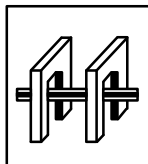
Bridge Icon—Designates all windows used to display or manage bridge modules and the RoamAbout Access Point module.
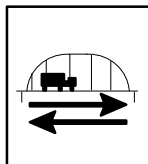
Brouter Icon—Designates all windows used to display or manage brouter modules.

FDDI

900MX
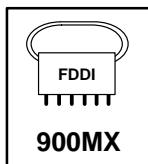
Concentrator Icon—Designates all windows used to display or manage FDDI concentrator modules.

Module Management Windows
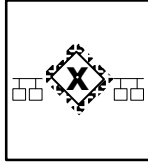
Switch Icon—Designates all windows used to display or manage switch modules.
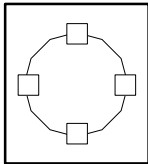
Token Ring Icon—Designates all windows used to display or manage token ring modules.
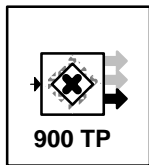
PORTswitch Icon—Designates all windows used to display or manage PORTswitch repeater modules.

Standard Buttons

HUBwatch windows have a series of standard pushbuttons along
the bottom of the window. The following table lists the buttons
and their functions.

Button	Function
OK	Executes requested changes and closes the current window.
Apply	Executes requested changes.
Refresh	Causes the HUBwatch software to poll the network modules for updated information. Some information is continuously updated if polling is enabled. See the Help text for the individual items to determine which items need to be refreshed.
Cancel	Closes the current window and ignores requested changes.
Help	Opens an online Help window that provides a brief description of major areas on the current window with cross references to context-sensitive help. The help information also includes a list of management tasks that you can perform using the window with cross reference hotspots to detailed descriptions of each task.

9

Managing DEChubs and Modules

Using HUBwatch Windows

Chapter Structure

This chapter describes hub and module management tasks from a conceptual point of view and tells you how to navigate the management windows. However, it does not include detailed information about performing specific HUBwatch management tasks.

Task Instructions

Step-by-step instructions for performing specific HUBwatch management tasks can be found in the *How to* section of the HUBwatch online Help. You can access Help from one of the HUBwatch windows.

HUBwatch Management Windows

Introduction   HUBwatch management windows enable you to manage:

- The hub and its configuration
- SNMP communities and agents
- Alarms (OpenVMS only)
- Configuration changes and traps
- Backplane LAN segments
- Hub environmental sensors
- HUBwatch messages
- Brouters
- 900-series concentrators (DECconcentrator 900MX and 900TH)
- 90-series repeaters (except the DECrepeater 90FS and 90TS)
- 900-series repeaters (including the DECrepeater 90FS and 90TS)
- DECserver 90L and 90L+ access servers
- DECserver 90TL, 90M, 900GM, and 900TM access servers
- 90-series bridges
- 900-series bridges and switches (including RoamAbout Access Point)
- Token ring modules
- PORTswitches
- GIGAswitch/FDDI systems

Refer to the following tables for more information about accessing the different types of HUBwatch management windows.

Hub Management

Opening Hub Management Windows

To open a hub management window, you first click on an item in the Hub Front Panel menu bar to activate a pulldown menu. You then click on a specific option in the pulldown menu to display its associated management window.

The left-hand column in the table below lists the menu items that you can select from the Hub Front Panel, while the right-hand column shows the management tasks that become available when you select the item.

Menu item	Management task
File	Exit from HUBwatch.
Configuration	Add or delete network modules.
Community	Add or delete communities or agents.
	View or change current agent information.
View	Select physical or logical view of Hub Front Panel.
	Display and manage backplane LAN segments.
	Display the HUBwatch Message Box window and modify the message log file defaults.
	Display Chassis Environmental Summary window to show status information about hub power supplies and environmental sensors.
Options	Enable or disable polling.
	Set the polling interval.
	Refresh displayed polling information.
Applications	Display the Find Address window.
	Display the Find Duplicates window.
	Set up, poll, and view alarms (OpenVMS only).
	Invoke the HUBloader utility.

References   The following table tells you how to find more information about
                        each hub management task.

Hub management task	See
Add and delete modules.	Online Help.
Add, delete, and modify communities or agents.	Online Help.
View agent information.	Chapter 9 in this book.
Select physical or logical views.	Chapter 8 in this book.
Manage backplane LAN segments.	Online Help.
	Chapter 7 in this book.
Display HUBwatch messages.	Online Help.
Display environmental information.	Online Help.
Enable or disable polling. Set the polling interval.	Online Help.
Modify message file defaults.	Online Help.
Use traps.	Online Help and Chapter 4 in this book.
Find Ethernet address.	Online Help.
Find duplicate Ethernet addresses.	Online Help.
Invoke the HUBloader utility.	Chapter 6 in this book.

SNMP Communities and Agents

Introduction
You manage SNMP communities and agents through the Manage Table and Manage Current options in the Community pulldown menu on the Hub Front Panel. The Manage Table option displays the Community Table window, and the Manage Current option displays the Agent Summary window.

Window Task Table

Use this window	To
Community Table	Add or delete an agent.
	Add or delete a community.
	Modify agents.
	Change the current agent or community.
	Modify community information.
	Change the agent's hub type.
	Access remote agents.
Agent Summary	Display agent information for the current agent.
	Change the agent's location and contact.

For instructions on performing the Community Table or Agent Summary tasks, see the online Help topic for that task.

Opening Agent Summary Window
The way you access an Agent Summary window depends on the type of SNMP agent module you wish to access. Basically, there are two types of agents:

- Modules with built-in SNMP agents, such as the DECagent 90 module or the DECserver 90TL module.

- The DEChub 900 MultiSwitch Hub Manager.

Complete the following steps to display the Agent Summary window for a module with a built-in SNMP agent.

Step	Description
1	From the Hub Front Panel Window, click on the desired module to highlight it.
2	Click on the Community pulldown menu to display its options.
3	Click on the Manage Current option to display the Agent Summary window for the selected module.

Complete the following steps to display the Agent Summary window for the Hub Manager.

Step	Description
1	When no module is highlighted, from the Hub Front Panel window, click on the Community pulldown menu to display its options.
2	Click on the Manage Current option to display the Agent Summary window for the Hub Manager.
3	If a network module is highlighted when you want to display the Agent Summary window for the Hub Manager, click on the blue background in the Hub Front Panel window to deselect the module.
4	Click on the Manage Current option in the Community pulldown menu.

Alarms

Introduction

The following table lists the alarms tasks. You perform the tasks from the Alarm Setup window. (This information applies only to the OpenVMS operating system.)

Window-Task Table

Use this window	To
Alarm Setup	Enable and disable traps.
	Add alarmed agents.
	Delete alarmed agents.
	Modify alarmed agent information.
	Start the alarm viewer.
	View alarms, traps, and configuration changes.
	Review the alarm log file.
	Start the alarm poller.
	Stop the alarm poller.

For instructions on performing alarm tasks, see the online Help topic for that task.

Opening Alarm Setup Window

To open this window	Follow these steps
Alarm Setup	From the Hub Front Panel window, click on the Applications pulldown menu to display its options.
	Click on the Alarms option; then click on Alarm Setup.

Backplane LAN Segments

Introduction

You use the LAN Interconnect window to manage backplane LAN segments. The following table lists the available tasks and the windows through which you perform the tasks.

Window-Task Table

Use this window	To
LAN Interconnect	Create a LAN segment.
	Connect a module to a LAN segment.
	Disconnect a module from a LAN segment.
	Delete a LAN segment.
	Modify a network segment's characteristics.
LAN Interconnect Expanded View	Same options as for the LAN Interconnect window, but this window is used for modules having more than four ports.
Station Configuration	Configure module ports between the front panel and the backplane.
Group View	Group module ports on PORTswitches and repeaters. You can group ports on DECrepeater 900FP, PORTswitch 900CP, PORTswitch 900FP, and PORTswitch 900TP modules only.

For instructions on performing a LAN interconnect task, see the online Help topic for that task.

Opening Backplane Management Windows

You use the following windows to manage the backplane: LAN Interconnect, Station Configuration, Expanded View, and Group View.

To open this window	Follow these steps
LAN Interconnect	Click on the View menu from the Hub Front Panel window.
	Click on the LAN Interconnect option.
Station Configuration	Open the LAN Interconnect window.
	Select a DECswitch 900EF, DECswitch 900EE, DECconcentrator 900MX, or DECconcentrator 900TH.
	Click on the $\boxed{\text{Config}}$ button.
	You can also reach this window by clicking on the Station Configuration icon on the module's Summary window.
Expanded View	Open the LAN Interconnect window.
	Click on the module you want to expand.
	Click on the $\boxed{\text{Expand}}$ button.
	You can also reach this window by clicking on the LAN Interconnect icon on the DECswitch 900EF, DECswitch 900EE, PORTswitch 900CP, PORTswitch 900FP. PORTswitch 900TP, or DECrepeater 900FP Summary window.
Group View	Open the LAN Interconnect window.
	Click on the DECrepeater 900FP, PORTswitch 900CP, PORTswitch 900FP, or PORTswitch 900TP.
	Click on the $\boxed{\text{Group}}$ button.
	You can also reach this window by clicking on the Group icon in the module's Summary window.

DECconcentrator 900MX and DECconcentrator 900TH

Introduction   You use the windows listed in the table below to manage the DECconcentrator 900MX and the DECconcentrator 900TH. For instructions on performing concentrator management tasks, see the online Help topic for that task.

Window-Task Table

Use this window	To
Hub Front Panel	Interpret concentrator LEDs.
Concentrator Summary	Display or assign the concentrator description.
	Configure the concentrator.
	Disable the concentrator.
	Display configuration information.
	Enable or disable concentrator ports.
	Display port information.
	Display network utilization.
	Display station information.
	Display MAC information.
	Reset the concentrator.
	Reset the concentrator to factory defaults.
Concentrator MAC Summary	Display MAC status.
	Configure token timer.
	Enable and disable the ring purger.
	Display port information.
	Display MAC information.
Concentrator MAC Counters	Display MAC counter information.
Concentrator Port Details	Display port information.
	Enable and disable ports.
Station Configuration	Configure ports between the backplane and the front panel.

Opening Concentrator Windows

To open this window	Follow these steps
Concentrator Summary	Double click on the concentrator module in the Hub Front Panel window.
Concentrator MAC Summary	Click on Summary in the Concentrator Summary window.
Concentrator MAC Counters	Click on Counters in the Concentrator Summary window.
Concentrator Port Details	Double click on the port PMD you want from the Port table in the Concentrator Summary window.
	Another method is to double click on a port on a Concentrator module from the Hub Front Panel window.
Station Configuration	Click on the Station Configuration icon in the DECconcentrator 900MX or DECconcentrator 900TH Summary window.

90-Series Repeaters

Introduction   You use three windows to manage 90-series repeaters, except for the DECrepeater 90FS, DECrepeater 90TS, and DECrepeater 90T-16 (which are managed in the same way as 900-series repeaters).

Window-Task Table

Use this window	To
Hub Front Panel	Interpret repeater LEDs
Repeater Summary	Interpret repeater port connections
	Display repeater summary information
	Display port information
	Assign the repeater description
	Name repeater ports
	Enable and disable repeater ports
Repeater Port Summary	Display port information
	Name repeater ports
	Enable and disable repeater ports
	Display connected stations

For instructions on performing repeater tasks, see the online Help topic for that task.

Opening 90-Series Repeater Windows

To open this window	Follow these steps
Repeater Summary	From the Hub Front Panel window, double click on a repeater module.
Repeater Port Summary	From the Hub Front Panel window, double click on a port on the repeater module.
	Another method is to open the Repeater Summary window and double click on a Port icon in the Port table.

900-Series Repeaters and PORTswitches

Introduction

You use the windows listed in the table below to manage 900-series repeaters and PORTswitches. You can also use these windows to manage the following 90-series repeater modules: the DECrepeater 90FS and DECrepeater 90TS.

The icon associated with each module indicates whether the module is a repeater or a PORTswitch.

Window-Task Table

Use this window	To
Hub Front Panel	Interpret repeater LEDs
Repeater Summary	Interpret repeater port connections
	Display port information
	Display repeater summary information
	Assign the repeater description
	Name repeater ports
	Enable and disable repeater ports
	Enable and disable repeater modules
	Reset repeater modules
	Display repeater port performance statistics
	Configure repeater modules
Repeater Port Summary	Display port information
	Name repeater ports
	Enable and disable repeater ports
	Display repeater port performance statistics
	Display Connected Stations
Repeater Port Details	Enable and disable repeater ports
	Enable or disable Link Test
	Display repeater port counters
	Display port status information
	Name repeater ports
	Display repeater MAU information
Dual Port Redundancy (DECrepeater 90FS, 90TS, 900FP, 900TP and PORTswitch 900FP only)	Set up redundant master and responder links
	Display redundant link status
	Modify redundant links
	Remove redundant links

Use this window	To
Repeater Security Summary	Set up repeater port security
	Display repeater port security
	Add or remove port authorization stations
	Set up Address Learning
	Display Address Learning Status
Repeater Security Intrusions Log	Display security intrusions for the Repeater module
	Display security intrusions for a single repeater port
LAN Interconnect	Create a LAN segment
	Connect a module to a LAN segment
	Disconnect a module from a LAN segment
	Delete a LAN segment
	Modify a network segment's characteristics
Port Switching	Group module ports
	This release supports only these port switching modules: DECrepeater 900FP, PORTswitch 900CP, PORTswitch 900FP, and PORTswitch 900TP.

For instructions on performing 900-series repeater or PORTswitch tasks, see the online Help topic for that task.

**900-Series
Repeater and
PORTswitch
Window Icons**

The 900-series DECrepeater and PORTswitch windows include the following icons.
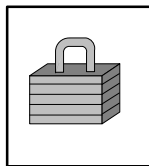
Security—click on this push button to open the Repeater Security Summary window. The Repeater Summary window and the Repeater Port Summary window have this push button.
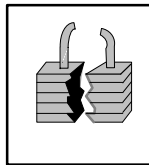
Security Intrusions—click on this push button to open the Repeater Security Intrusions Log window. The Repeater Summary window and the Repeater Port Summary window have this push button.
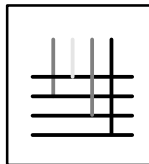
LAN Interconnect—click on this push button to open the LAN Interconnect window. The Repeater Summary window has this push button.
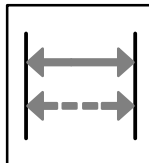
Dual-Port Redundancy—click on this push button to open the Dual-Port Redundancy window. The Repeater Summary window and the Repeater Port Summary window have this push button.
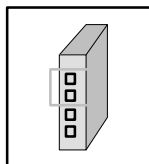
Port Grouping—click on this push button to open the repeater's Port Switching window. The Repeater Summary window has this push button.

**Opening
900-Series
DECrepeater
and
PORTswitch
Windows**

To open this window	Follow these steps
Repeater Summary	From the Hub Front Panel window, double click on a Repeater module.
Repeater Port Summary	From the Hub Front Panel window, double click on a port on the Repeater module.
	Another method is to open the Repeater Summary window and click on a Port icon in the Port table.
Repeater Port Details	Open the Repeater Port Summary window and click on Details .
Repeater Security Summary	Open the Repeater Summary window and click on the Security icon either in the Port table or in the Configuration list.
	Another method is to open the Repeater Port Summary window and click on the Security icon in the Security box.
Repeater Security Intrusions Log	Open the Repeater Summary or Repeater Ports Summary window and click on the Security Intrusions Log icon in the Configuration list box.
	Another method is to open the Repeater Security Summary window and click on the Security Intrusions Log icon in the Security Functions box.
Dual Port Redundancy	Open the Repeater Summary or Repeater Port Summary window and click on the DPR icon.
LAN Interconnect Expanded View	Open the Repeater Summary window and click on the LAN Interconnect icon.
Port Grouping	Open the Repeater Summary window and click on the Group icon.

DECserver 90L and DECserver 90L+ Access Servers

Introduction   You use the windows in the following table to manage the DECserver 90L and DECserver 90L+ access servers.

Window-Task Table

Use this window	To
Hub Front Panel	Interpret LEDs.
Access Server Summary	Interpret port connector colors.
	Display port information.
	Assign the access server's description.
	Modify the 90L+ session prompt.
	Select a port.
	Select the device type.
	Name the port.
	Set the port speed.
Access Server Port Summary	Select a port.
	Select the device type.
	Name the port.
	Enable and disable autoconfigure.
	Modify <Break> Passthru.
	Enable and disable remote modify.
	Enable and disable DECserver 90L+ on-demand load.
	Display Port counters.
Access Server Counter	Display access server counters.

For instructions on performing access server tasks, see the online Help topic for that task.

Opening DECserver 90L and 90L+ Access Server Windows

To open this window	Follow these steps
Access Server Summary	From the Hub Front Panel window, double click on the access server module you want to use.
Access Server Counters	Open the Access Server Summary window and click on the Counters push button.
Access Server Port Summary	From the Hub Front Panel window, double click on the access server port you want to use.
	Another method is to open the Access Server Summary window and click on the MMJ connector of the port you want to use.

DECserver 90TL, 90M, 900GM, and 900TM Access Servers

Introduction

You use the windows listed in the following table to manage the DECserver 90TL, DECserver 90M, DECserver 900TM, and DECserver 900GM access servers. The table describes these windows and their associated tasks.

Window-Task Table

Use this window	To
Hub Front Panel	Interpret LEDs.
Access Server Summary	Interpret port connector colors.
	Display port information.
	Display session summary information.
	Enable and disable ports.
	Set IP forwarding.
	Assign the access server's description.
	Select a port.
	Select the admin origin.
	Name the port.
	Set the port speed.
	View maximum number of sessions.
	View input and output flow control.
Access Server Port Summary	Display port counters.
	Select the admin origin.
	Name the port.
	Set the port speed, with split speeds.
	Set maximum number of sessions.
	Set input and output flow control type.
	Set bits per character.
	Select parity.
Access Server Session	Display access server session information.
	Disconnect a session.
Access Server Counters	Display Access Server counters.

For instructions on performing access server tasks, see the online Help topic for that task.

Opening DECserver 90TL, 90M, 900GM, and 900TM Access Server Windows

To open this window	Follow these steps
Access Server Summary	From the Hub Front Panel window, double click on the access server module you want to use.
Access Server Counters	Open the Access Server Summary window and click on the Counters icon.
	Telnet Connection: You can click on the Telnet icon adjacent to the Counters icon in the Access Server Summary window to open a DECterm window. From the DECterm window, you can initiate a Telnet session that allows you to connect directly to the access server.
Access Server Port Summary	From the Hub Front Panel window, double click on the server port you want to use.
	Another method is to open the Access Server Summary window and click on the RJ45 connector of the port you want to use.
Access Server Session Detail	From the Access Server Summary window, click on a port's Session Information push button in the Port table.

90-Series Bridges

Introduction
You use the windows listed in the table below to manage 90-series bridges. This table describes the windows and lists their associated tasks.

Window-Task Table

Use this window	To
Bridge Summary	Display port information.
	Assign the bridge description.
	Disable bridge ports.
	Display spanning tree attributes.
Bridge Port Summary	Show status.
	Disable bridge ports.
	Display spanning tree attributes.
Bridge Port Detail	Show traffic statistics and Error counters.
	Disable bridge ports.
Bridge Filtering	Set protocol filtering.
	Add Ethernet protocols.
	Delete protocols.
Bridge Spanning Tree	Display spanning tree attributes.
Bridge Forwarding	Display forwarding database.
	Set forwarding database.
Bridge Traffic	Display traffic statistics in bar graph form.

For instructions on performing bridge management tasks, see the online Help topic for that task.

**90-Series
Bridge
Summary
Window Icons**

The Bridge Summary window uses icons to label push buttons in the More Information box. Clicking on these push buttons activates other bridge management windows. The Bridge Summary icons are listed and described below.

Bridge Forwarding—click on this icon in the Bridge Summary window to open the Bridge Forwarding window.
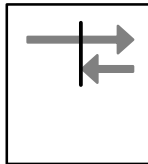
Bridge Filter—click on this icon in the Bridge Summary window to open the Bridge Filtering window.
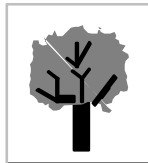
Bridge Spanning Tree—click on this icon in the Bridge Summary window to open the Bridge Spanning Tree window.
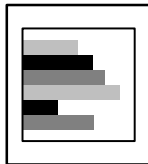
Bridge Traffic—click on this icon in the Bridge Summary window to open the Bridge Traffic window.

Opening 90-Series Bridge Windows

To open this window	Follow these steps
Bridge Summary	From the Hub Front Panel window, double click on a Bridge module.
Bridge Forwarding	From the Bridge Summary window, click on the Forwarding icon in the More Information box.
Bridge Filtering	From the Bridge Summary window, click on the Protocol Filter icon in the More Information box.
Bridge Spanning Tree	From the Bridge Summary window, click on the Spanning Tree icon in the More Information box.
Bridge Traffic	From the Bridge Summary window, click on the Traffic Detail icon in the More Information box.
Bridge Port Summary	From the Hub Front Panel window, double click on a bridge port. Another method is to open the Bridge Summary window and click on a port in the Port Information box.
Bridge Port Detail	Open the Bridge Port Summary window and click on Details .

900-Series Bridges and Switches (Including RoamAbout Access Point)

Introduction You use the windows listed in the table below to manage 900-series bridges and switches, including the RoamAbout Access Point. The table describes the windows and their associated tasks.

Window-Task Table

Use this window	To
Hub Front Panel	Interpret bridge LEDs.
Bridge Summary	Display or assign the bridge description.
	Display bridge status information.
	Display management agent information.
	Display spanning tree attributes.
	Display port attributes and status.
	Enable or disable forwarding on a port.
	Reset the bridge.
	Reset the bridge to factory defaults.
Bridge Port Information	Display Port counters.
	Display bridge configuration changes.
Address Filter	Create address filters.
	Modify address filters.
	Delete address filters.
	Create a default filter.
	Write a list of filters to a file.
	Display the last port seen for each filter.

900-Series Bridges and Switches (Including RoamAbout Access Point)

Use this window	To
Protocol Filter	Create protocol filters.
	Modify protocol filters.
	Delete protocol filters.
	Create default protocol filters.
	Write a list of filters to a file.
Forwarding Database	Display forwarding database status information.
	Locate specific database entries.
	Write the contents of the forwarding database to a file.
LAN Interconnect Expanded View	Create a LAN segment.
	Connect bridge ports to LAN segments.
	Disconnect bridge ports from LAN segments.
	Delete a LAN segment.
	Modify a network segment's characteristics.
Station Configuration	Configure bridge and FDDI concentrator ports between the front panel and the backplane (DECswitch 900EF, DECswitch 900EE, and DECbridge 900MX only).
Bridge Configuration	Set bridge configuration parameters.
	Add and remove entries from the Bridge Trap Address table.
FDDI Summary	Access any of the FDDI windows (DECbridge 900MX, DECswitch 900EF, and PEswitch 900TX only).

For instructions on performing bridge management tasks, see the online Help topic for that task.

900-Series Bridge and Switch Summary Window Icons

The Bridge Summary window uses icons to label push buttons in the More Information box. Clicking on these push buttons activates other bridge and switch management windows. The Bridge and Switch Summary icons are listed and described below.

Forwarding—click on this icon in the Bridge Summary window to open the Forwarding window.
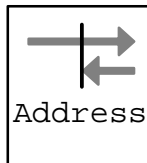
Address Filtering—click on this icon in the Bridge Summary window to open the Address Filtering window.
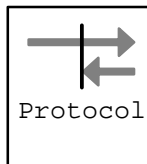
Protocol Filtering—click on this icon in the Bridge Summary window to open the Protocol Filtering window.
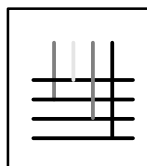
LAN Interconnect Expanded View— click on this icon in the Bridge Summary window to open the LAN Interconnect Expanded View window.
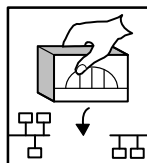
Configuration—click on this icon in the Bridge Summary window to open the Bridge Configuration window.
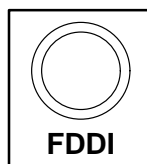
FDDI Summary—click on this icon in the Bridge Summary window to open the FDDI Summary window.
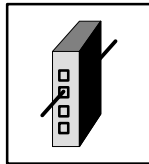
Station Configuration—click on this icon in the Bridge Summary window to open the Station Configuration window.

Opening 900-Series Bridge and Switch Windows

To open this window	Follow these steps
Bridge Summary	From the Hub Front Panel window, click on a Bridge module.
Bridge Port Information	From the Bridge Summary window, click on a port connector.
	Also, from the Hub Front Panel physical view, double click on a port connector.
	From the Hub Front Panel logical view, click on the Port button.
Bridge Forwarding	From the Bridge Summary window, click on the Forwarding icon in the More Information box.
Bridge Address Filtering	From the Bridge Summary window, click on the Address Filtering icon in the More Information box.
Bridge Protocol Filtering	From the Bridge Summary window, click on the Protocol Filtering icon in the More Information box.
Bridge Configuration	From the Bridge Summary window, click on the Bridge Configuration icon in the More Information box.
LAN Interconnect Expanded View	From the Bridge Summary window, click on the LAN Interconnect icon in the More Information box.
Station Configuration	From the Bridge Summary window, click on the Station Configuration icon in the More Information box.

To open this window	Follow these steps
Any FDDI Window	From the Bridge Summary window, double click on the FDDI icon. The FDDI Summary window allows you to reach the other FDDI windows.

Brouters

Introduction

You use the windows listed in the table below to manage brouters. The table describes these windows and their associated tasks.

Window-Task Table

Use this window	To
Hub Front Panel	Interpret brouter LEDs.
Brouter Console	Configure the brouter.
Brouter Summary	Display port status. Assign brouter name. Select a port. Name a brouter port.
Brouter Port Summary	Display port status. Display port protocol information. Name a brouter port.
Brouter Health Counters	Display brouter counters.
TELNET Console Window	Access Brouter Console Control functions.

For instructions on performing brouter management tasks, see the online Help topic for that task.

Brouters

Brouter Icons   Brouter icons label push buttons in the More Information box on
the Brouter Summary window. Clicking on these push buttons
activates other brouter windows. The Brouter icons are listed
and described below.
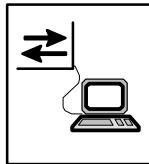
     Brouter Console—click on this icon in
the Brouter Summary window to open
the Brouter TELNET Console window.
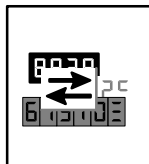
     Brouter Counters—click on this icon in
the Brouter Summary window to open
the Brouter Counters window.

**Opening
Brouter
Windows**

To open this window	Follow these steps
Brouter Summary	From the Hub Front Panel window, double click on a Brouter module.
Brouter Port Summary	From the Hub Front Panel window, double click on a brouter port.
	Another method is to open the Brouter Summary window and double click on a Port icon in the Port table.
Brouter Console	From the Brouter Summary window, click on the Console icon in the More Information box.
Brouter Health Counters	From the Brouter Summary window, click on the Counters icon in the More Information box.

Token Ring Modules

Introduction

You use the windows in the table below to manage token ring MAUs and token ring repeaters.

Window-Task Table

Use this window	To
Token Ring Summary	Display port information.
	Assign the MAU or the repeater description.
	Enable and disable ports.
	Display port information.
	Display ring status.
	Reset the device.
	Set the ring speed.
	Set the Autowrap switches.
	Enable and disable the ring poller process.
	Enable and disable the autopartition process.
	Enable and disable the MAU's participation in the active monitor process.
Ring Map (DECmau 900TH only)	Display the token ring map list.
	Enable and disable the ring poller process.
	Enable and disable the autopartition process.
	Set the autopartition timer.
	Write the contents of the ring map to a file.
	Force node to non-autopartition state.

Use this window	To
Ring Error Monitor (DECmau 900TH only)	Display ring error monitor statistics.
	Enable and disable the ring poller process.
	Write the contents of the ring error monitor to a file.
MAC Counters (DECmau 900TH only)	Display MAC counters.
	Display ring status.

For instruction on performing token ring management tasks, see the online Help topic for that task.

Token Ring Summary Window Icons

The Token Ring Summary window displays icons in the More Information box. By clicking on these icons, you can activate other token ring management windows. These Token Ring Summary window icons are described below.
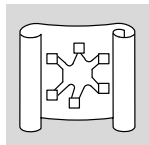
Ring Map—click on this icon to open the Ring Map list window.
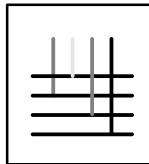
LAN Interconnect—click on this icon to open the LAN Interconnect window.
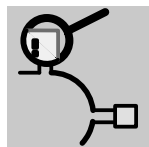
Ring Error Monitor—click on this icon to open the Ring Error Monitor window.

MAC Counters—click on this icon to open the MAC Counters window.

Opening Token Ring Windows

To open this window	Follow these steps
Token Ring Summary	From the Hub Front Panel window, double click on a token ring module.
Ring Map	From the Token Ring Summary window, click on the Ring Map icon in the More Information box. (DECmau 900TH only.)
Ring Error Monitor	From the Token Ring Summary window, click on the Ring Error Monitor icon in the More Information box. (DECmau 900TH only.)
MAC Counters	From the Token Ring Summary window, click on the MAC Counters icon in the More Information box. (DECmau 900TH only.)

Part III

Managing the GIGAswitch/FDDI System

Part III presents the following topics:

- The HUBwatch GUI for the GIGAswitch/FDDI System
- Managing the GIGAswitch/FDDI System

Part III describes the HUBwatch graphical user interface (GUI) and how you use it to manage the GIGAswitch/FDDI system.

10

HUBwatch GUI for GIGAswitch/FDDI System

Using the GUI

This chapter describes the HUBwatch graphical user interface (GUI) used for managing the GIGAswitch/FDDI system.

Introduction

When you start up HUBwatch to manage the GIGAswitch /FDDI system, the software displays a representation of the configuration in the GIGAswitch/FDDI Front Panel window.

The HUBwatch GUI for the GIGAswitch/FDDI system differs from the interface you use to manage hubs and modules. The GIGAswitch/FDDI Front Panel window looks like the GIGAswitch backplane, but the available management options are different from other network modules.

GIGAswitch/FDDI Front Panel Window

Introduction   This window provides a graphical representation of your GIGAswitch/FDDI system configuration and all the other HUBwatch windows. The GIGAswitch/FDDI system displays a physical view only.

Uses of GIGAswitch/FDDI Front Panel Window   The menu bar on the GIGAswitch/FDDI Front Panel window provides access to other windows that you use to manage the GIGAswitch/FDDI configuration and its SNMP agent and communities. You use a set of standard buttons to select options in a particular window. You access summary windows for the system cards or the line cards and their ports from the GIGAswitch/FDDI system by double clicking on parts of the Front Panel window.

**GIGAswitch/FDDI
Front Panel
Window Figure**

This figure illustrates the GIGAswitch/FDDI system Front Panel
window.
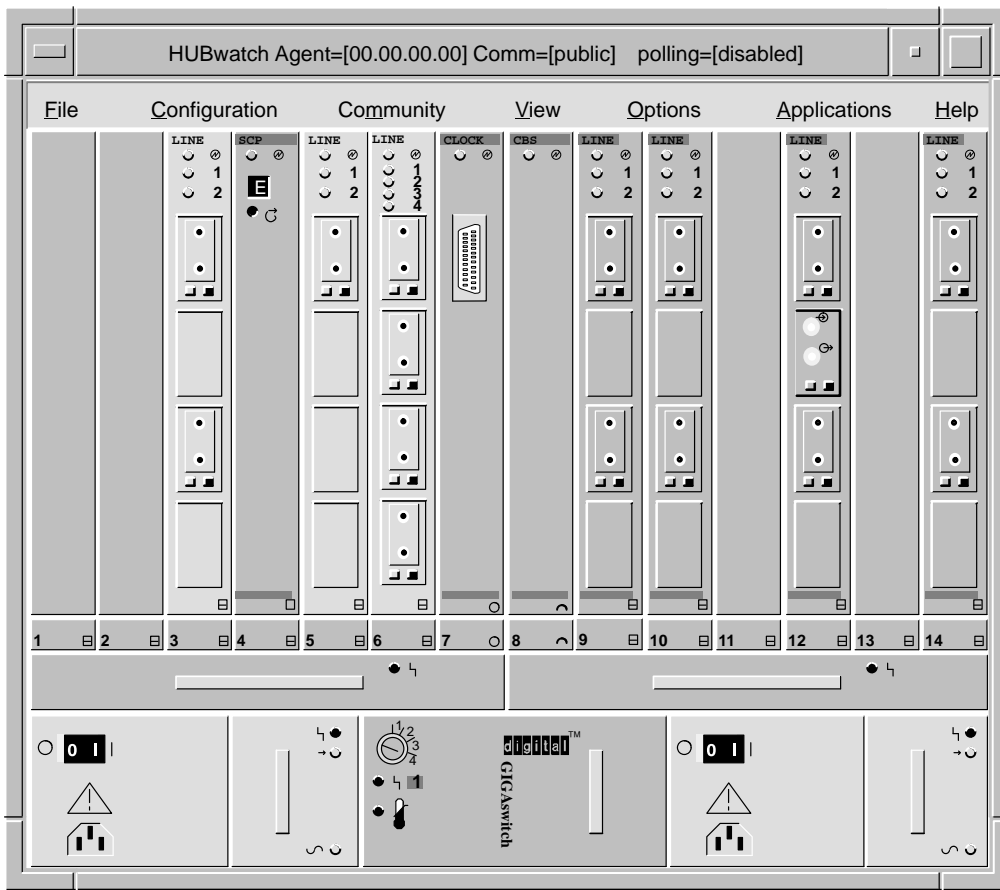
NPG-0162-95I

HUBwatch Management Windows

When You Use HUBwatch Management Windows

You use HUBwatch management windows to:

- Exit HUBwatch
- Manage an SNMP agent and community information
- View and manage the message log
- Set polling
- Manage alarms (for OpenVMS only)
- Get Help

HUBwatch Management Window Figure

This figure shows the hierarchy of HUBwatch management windows.

GIGAswitch Front Panel Window

Hubwatch Management Windows

Community Table

Message Box

Help

Polling Setup

Alarms

Community Table Windows

Manage Current

Add Agent

Agent Options

Agent Summary
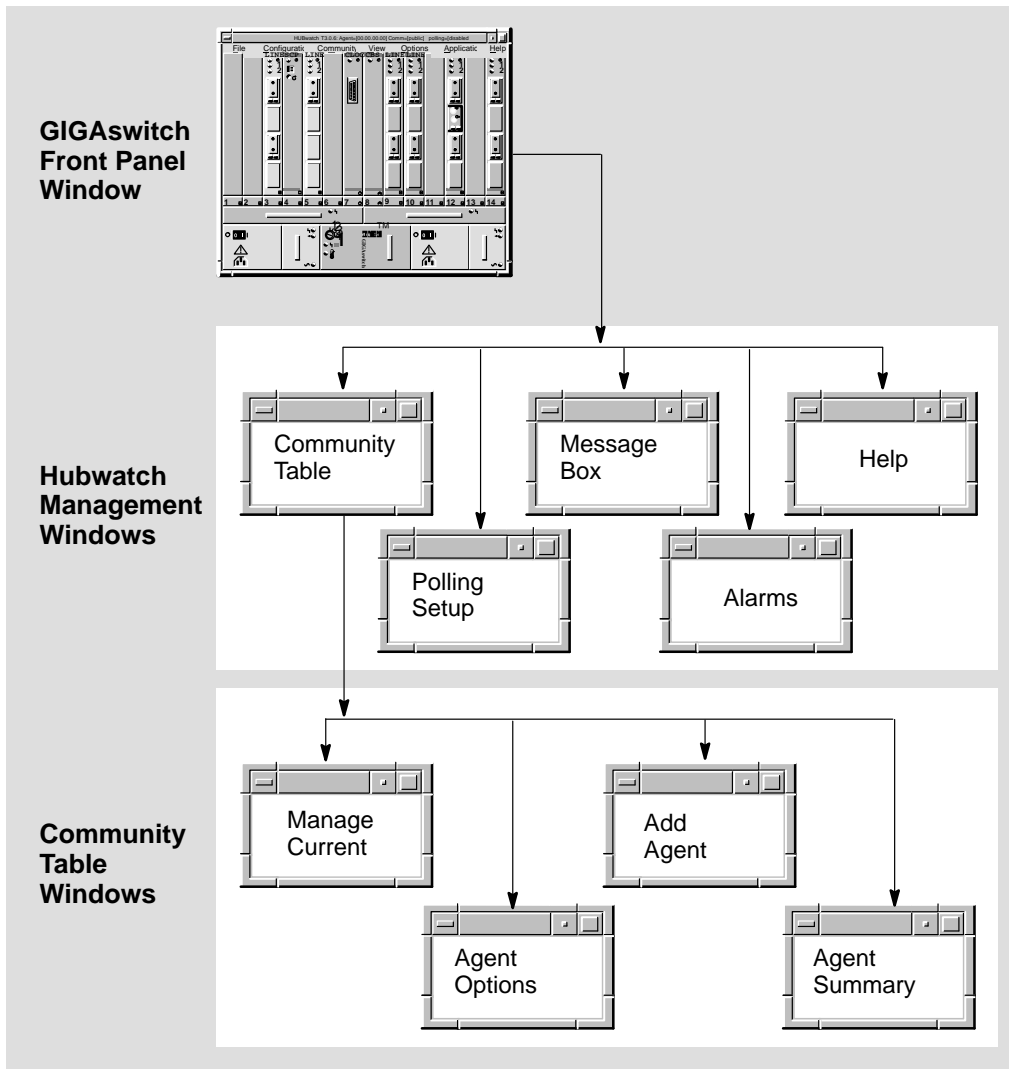
LKG-9082-94I

How You Open HUBwatch Management Windows

You open HUBwatch management windows by pulling down options from the menu bar of the Hub Front Panel window. Some of the menu options have keyboard accelerators. The following table presents the menus, their options, and keyboard accelerators.

Menu	Option	Keyboard Accelerator	Function
File	Exit	Ctrl/x	Closes HUBwatch.
Community	Manage Table	None	Displays the list of available SNMP agents and their communities. Used to add, delete and modify agents and communities.
	Manage Current	None	Allows access to a system summary window for the current agent.
View	Message Box	None	Displays a log file of error, warning, and informational messages.
Options	Polling	Alt/o	Polling offers four options: Refresh, Enable, Disable, and Set Up.
	Message Setup	None	Allows you to modify message log file parameters. (OpenVMS only)
Applications	Alarms (OpenVMS only)	Alt/a	Options include Alarm Setup (OpenVMS only), Start Polling, Stop Polling, and Viewer.
Help		None	Accesses online Help.

———————— **Note** ————————

You must type the keyboard accelerator as a lowercase letter.

Help Menu   The following table explains Help options:

Option	Keyboard Accelerator	Function
Context Sensitive	Ctrl/c	Provides context-sensitive Help for various objects in a HUBwatch open window or dialog box (such as menus, window objects, and dialog box fields.)
Window Info	Ctrl/w	Provides information about the HUBwatch windows and a description of tasks performed at each window. This topic also explains how the HUBwatch application is organized.
Index	Ctrl/e	Provides a list of Help topics similar to index entries in a book. Also provides a table of contents through the View option on the Help Index window menu bar.
Glossary	Ctrl/l	Provides a list of terms and definitions related to the HUBwatch software.
Tutorial	Ctrl/i	Describes key functions of the HUBwatch application.
Management	Ctrl/n	Describes the GUI and the management tasks performed with HUBwatch.
Troubleshooting	Ctrl/t	Lists GIGAswitch/FDDI system error messages and provides suggested recovery procedures.

Option	Keyboard Accelerator	Function
Product Info	Ctrl/p	Provides the following:
		GIGAswitch/FDDI system overview
		Software version and date
		Copyright information
		Release notes
		Information about new features
		List of management Help topics
Using Help	Ctrl/u	Provides Help information

Reference See *GIGAswitch/FDDI System Management Windows* in Chapter 11 in this manual for information about the GIGAswitch /FDDI management windows.

GIGAswitch/FDDI System Management Windows

When You Use Them

You use the GIGAswitch/FDDI system management windows to manage:

- The GIGAswitch/FDDI system
- Line cards
- Bridging functions
- The forwarding database
- MAC information
- MAC counters
- Port details
- Main filtering

GIGAswitch/FDDI System Management Windows Figure

This figure shows the hierarchy of GIGAswitch/FDDI system management windows.

GIGAswitch Front Panel Window

System Summary

LineCard Summary

Bridge Summary

Port Details

MAC Information

Forwarding Database

MAC Counters

Filtering
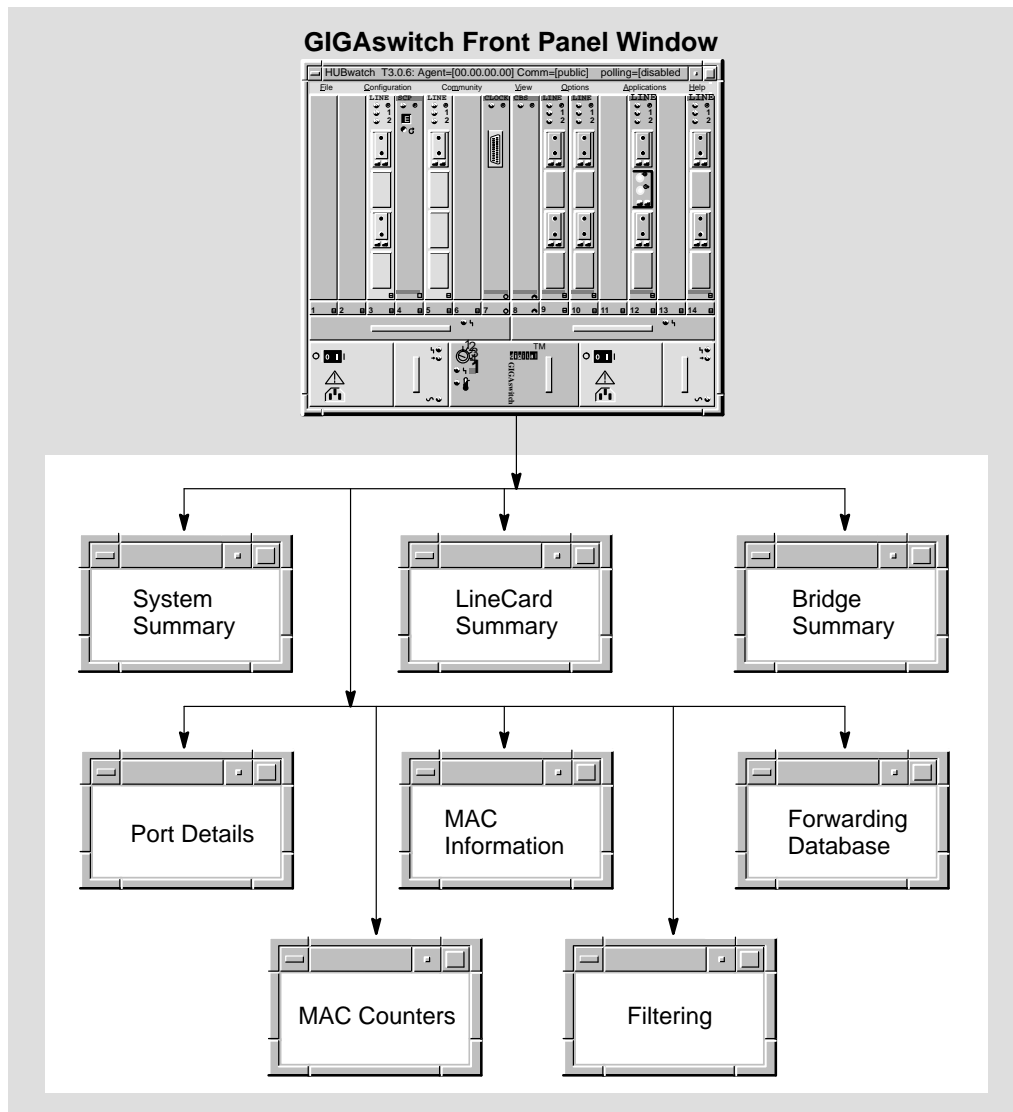
LKG-9036-94I

How to Open GIGAswitch/FDDI System Summary Window

To open a system summary window, double click on the power supplies, fans, clock, or SCP cards.

To open a particular line card Management Window, double click on the line card.

Reference

See Chapter 11 in this manual for instructions on using the GIGAswitch/FDDI System Management windows. You can find detailed instructions about performing a specific task in the online Help for that task.

11

Managing the GIGAswitch/FDDI System

GIGAswitch/FDDI System Management Windows

Introduction

You use the windows described in the table below to manage the GIGAswitch/FDDI system. The table lists the windows and describes the related tasks you can perform in the windows. For detailed instructions on performing these management tasks, see the online Help topic for that task.

Window-Task Table

Use This Window	To
System Summary	Display management information
	Display system card information
	Display system security and status information
	Provide access to bridging information
Line Card Summary	Display line card information
	Display station and port information
	Display MAC information
	Enable or disable a port
	Set connection policy for a port
	Set trace time
Bridge Summary	Display port information
	Display spanning tree information
	Display port information
	Enable or disable forwarding on a port

Use This Window	To
Bridge Port Information	Display port information
	Display bridge configuration changes
Forwarding Database	Display forwarding database status information
	Locate specific database entries
	Write the contents of the forwarding database to a file
MAC Information	Configure the token timer
	Enable and disable the ring purger
MAC Counters	Display MAC counter information
Port Details	Display information about a port
	Enable or disable a port
Main Filtering	Create a filter
	Modify a filter

GIGAswitch/FDDI System Bridging Window Icons

The GIGAswitch/FDDI system uses icons to label push buttons in the More Information box. Clicking on these push buttons activates bridge management windows. The following are the GIGAswitch/FDDI system bridge management icons:
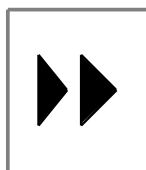
Forwarding Icon—Click on this icon in the Bridge Summary window to open the Bridge Forwarding Database window.
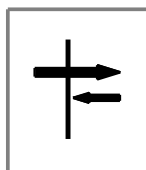
Filtering Icon—Click on this icon in the Bridge Summary window to open the Bridge Filtering window.

Opening GIGAswitch/FDDI System Windows

The following table tells you how to open the GIGAswitch/FDDI system windows.

To open this window	Follow these steps
System Summary	From the GIGAswitch/FDDI system Front Panel window, double click on: • The right or left power supply • The right or left fan tray • The SCP, CBS, or Clock card
Line Card Summary	From the GIGAswitch/FDDI system Front Panel window, double click on a line card.
Bridge Summary	Open the GIGAswitch/FDDI System Summary window and click on Bridging. Another method is to open the GIGAswitch/FDDI Line Card Summary window and click on Bridging.
Bridge Port Information	From a Line Card Summary window, click on Bridging. From the Bridge Summary window, double click on a port icon in the Port Information box.
Port Details	From the GIGAswitch/FDDI system Front Panel window, double click on a GIGAswitch/FDDI port. Another method is to open the GIGAswitch/FDDI system Line Card Summary window and double click on a port icon.
MAC Details	Open the GIGAswitch/FDDI system Line Card Summary window and click on Summary.
MAC Counters	Open the GIGAswitch/FDDI system Line Card Summary window and click on Counters.

GIGAswitch/FDDI System Management Windows

To open this window	Follow these steps
Forwarding Database	From the Bridge Summary window, click on the Forwarding icon in the More Information box.
Main Filtering	From the Bridge Summary window, click on the Filtering icon in the More Information box.

A
Troubleshooting Tips

Troubleshooting

In This Appendix

This appendix contains some solutions to the following types of problems:

- General display problems
- Access server problems
- Community problems
- Agent problems
- Performance problems

Other Troubleshooting Information

Refer to your hub or module owner's manuals for additional information.

General Display Problems

Incorrect Displays with New Hub Installation

Problem:

You installed a new hub, but when you started the HUBwatch software and displayed the Hub Front Panel window, one or more of the modules installed in the hub either did not display or were not manageable.

Solution:

Refer to the *HUBwatch Installation and Configuration* manual and follow the instructions therein to ensure that you perform all required configuration procedures correctly.

Display Problems with New Module Installation

Problem:

You installed additional modules standalone or in an existing hub, but when you started the HUBwatch software and displayed the Hub Front Panel window, one or more of the modules installed in the hub either did not display or were not manageable.

Solution:

Refer to the *HUBwatch Installation and Configuration* manual and follow the instructions to ensure that you perform all required configuration procedures correctly.

Access Server Problems

Incorrect Display with New Access Server

Problem #1:

You added an access server to your hub configuration, but when you accessed the Access Server Summary window, the connectors were shown in black. (The ports were enabled, but no devices were attached to the port.)

Problem #2:

You added an access server, but when you tried to access the Access Server Summary window, you got a pop-up warning that the module was being polled or managed by another user.

Solution:

You need to verify the MAC address of the access server. An incorrect MAC address can cause either of these conditions. If the MAC address is correct, reload or update the device firmware.

Access Server Display Disappears

Problem:

You added a DECserver 90TL to the hub configuration and, at first, it appeared on the screen as though it were in the hub, but then it disappeared.

Solution:

When a DECserver 90TL first boots, it operates using its own PROMs, and it responds to DECagent 90 backplane identification commands. The PROMs then receive a downline load image, and control is transferred to the new image. The new image does not respond to the backplane identification commands, making it seem to the DECagent 90 that the DECserver 90TL has been removed.

Although the DECserver is removed from the screen, it is functional. You must add the 90TL module to the hub manually using the Add Module window and being sure to set Polling status to Disabled. Refer to *Opening Hub Management Windows* in Chapter 9 for instructions about using the Add Module window. Additionally, you must add the DECserver 90TL to the

Agents file. See *SNMP Communities and Agents* in Chapter 9 for instructions on adding an agent.

Disconnecting Ports Causes Warning

Problem:

You added an access server, but when you attempted to disconnect a port, you kept getting a pop-up warning about the server being polled or managed by another user.

Solution:

1. Be sure the DECserver 90L or 90L+ module is not in the Authorized/Manager mode.

2. You may not have the correct module installed. Make sure that the module is a DECserver 90L or 90L+.

Access Server Parameters Not Taking Effect

Problem:

Sometimes when you set parameters on an access server, they do not take effect.

Solution:

It is possible to issue a SET request followed closely by a GET request. When using access servers, these two commands generate a large amount of communications activity. The GET requests may happen faster than the SET requests in the access server, giving the appearance of a SET request failure. If you wait a few seconds and click on Refresh or Apply, you will probably find that the SET has worked.

Also, remember to click either on Apply to execute any change or on OK to execute the change and close the window.

Community Problems

Community Strings Not Displayed

Problem:

When you accessed the Community Table window and selected an agent, you did not see any community strings.

Solution:

Check the following items:

- Your agent may be unreachable. Check the network connections.

- You may have set a filter on the bridge that prevents access to the agent.

- Another hub could be using that agent for management.

- You could have accidentally deleted the agent from the community.

- The name of the default community could be entered incorrectly. Check the Community Name field of the agent. (The default community is usually named "public.") Try using "public" as the community name.

If none of these conditions applies, and you still do not have any community strings, try the following steps:

1. Try a soft reset of the DECagent 90.

   Turn off power to the agent, then turn it on again.

2. Try a factory reset.

   Attach a terminal to the agent console port. From the Console menu, select the [21] Restore Factory Settings option. This reset makes the agent forget everything it knows about any communities except for itself in the community "public."

New Community Strings Discarded

Problem:

You accessed the Community Table window, but when you attempted to add a new community, the new community string was discarded.

Solution:

Be sure you are entering a unique community string. If you attempt to create a new community using a name that already exists in another community, HUBwatch ignores your request.

Agent Problems

New Agent Does Not Appear in Community Table

Problem:

You added a new agent to the Agent list on the Community Table window. You exited the window and when you opened the Community Table window again, the new agent was gone.

Solution:

Remember to click on either $\boxed{\text{Apply}}$ to execute any change or on $\boxed{\text{OK}}$ to execute the change and close the window.

Agents Not Remembered

Problem:

The HUBwatch software did not remember all of its agents automatically.

Solution:

HUBwatch stores the agent list in the Agent File. Currently, there is no way to add an agent automatically to the file and to the Agent table in the Communities Table window. Therefore, this information must be added manually to the HUBwatch software.

Performance Problems

HUBwatch Runs Slowly

Problem:

The HUBwatch software runs slowly.

Solution:

The following conditions can cause poor HUBwatch performance:

- Heavy network traffic can cause a slowdown. HUBwatch needs to use the network to communicate with each module. To improve performance, keep the station running HUBwatch in the same bridge Workgroup as the agent and use the bridge to filter all unnecessary traffic from the Workgroup side.

- Make sure that you configure your management station with the appropriate system parameters. See *HUBwatch Installation and Configuration* for system configuration information.

Hint

Managing a hub full of repeaters can slow down the network. Every time you poll the hub, HUBwatch must ask for and receive many variables. This is especially true if there are many stations connected to the repeaters.

HUBwatch Shows An Empty Hub

Problem:

When the network was busy, the HUBwatch software showed you a view of an empty hub, even though a short time before a populated hub was displayed.

Solution:

When your network is very busy, you may want to increase the agent's Retry or Timeout values. The agent will be more persistent in its attempts to get the information that you need, but HUBwatch performance may suffer.

B

HUBwatch Summary Windows

Summary Window Figures

In This Appendix   This appendix contains example figures of the summary windows you use to manage hubs and their modules.

Figure B–1   90-Series Repeater Summary Window

LKG–7428–93I

Figure B–2 900-Series Repeater and PORTswitch Summary Window
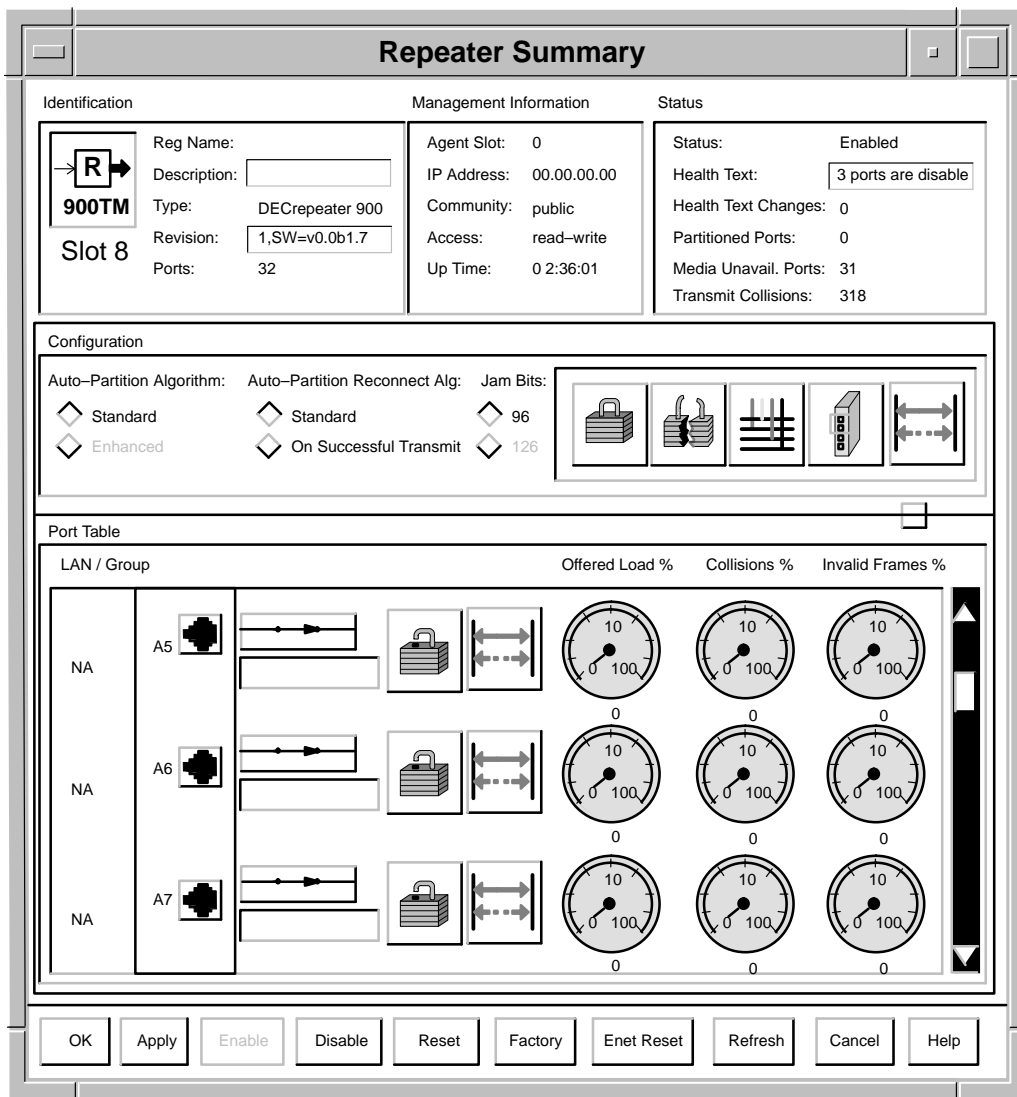
LKG-8395-93I

Figure B–3 90L and 90L+ Access Server Summary Window
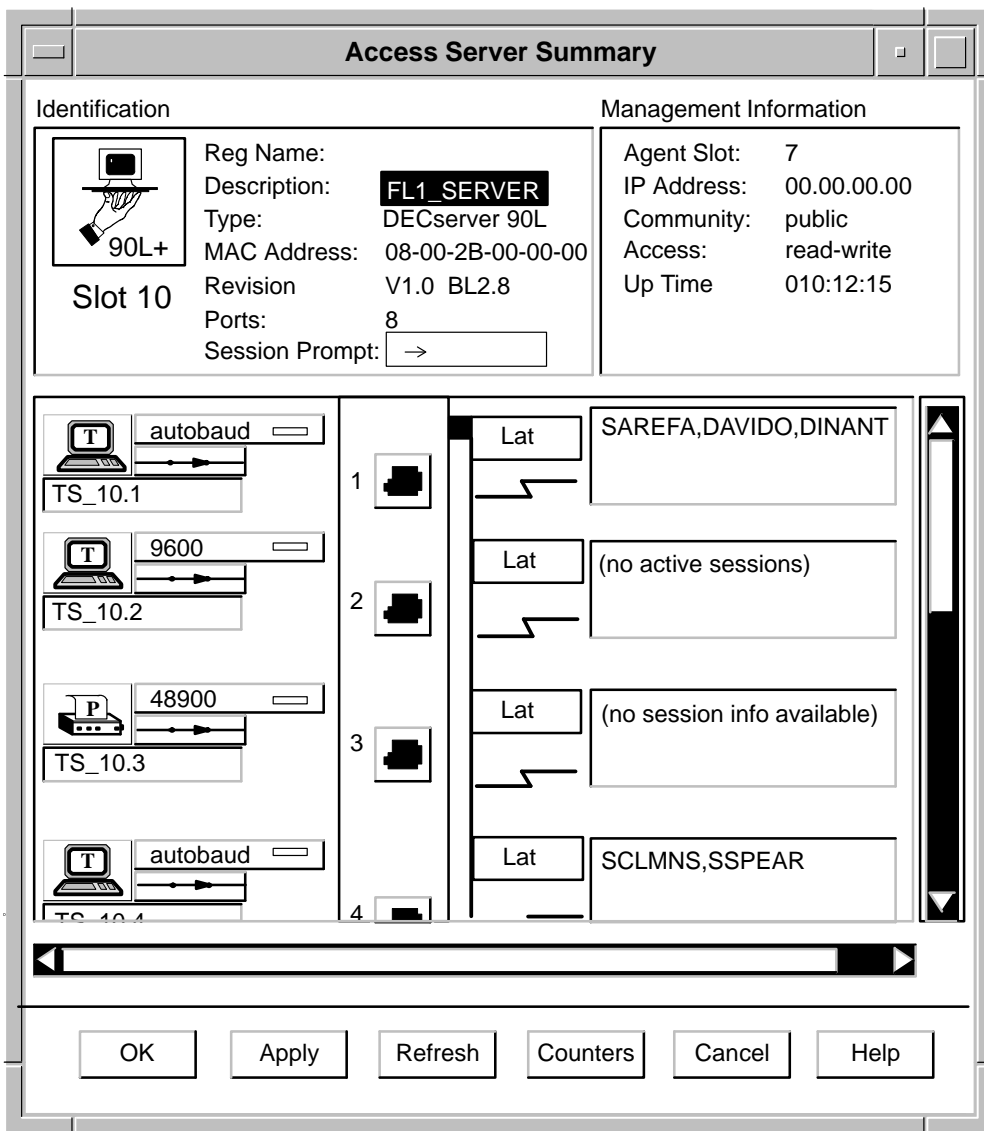
LKG–7432–93I
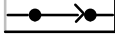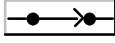
Figure B–4   90-Series Bridge Summary Window

LKG-7438-93I

Figure B–5   Brouter Summary Window

LKG-8389-93I

**Figure B–6 900-Series Bridge, Switch, and RoamAbout
Summary Window**

NPG-0163-95I

Figure B–7 DECconcentrator Summary Window

NPG-0164-95I

Figure B–8   GIGAswitch/FDDI System Summary Window

GIGAswitch System Summary:

Identification

Reg Name: jig7
SysObjectID: 1.3.6.1.4.1.36.2.15.3.3
Contact: Mike Smith
Location: West Lab–II

GIGA

Management Information

IP Address:
Community: public
Access: read-write
Up Time: 420:14:55

Status

Num of Resets: 0
Power Ups: 1

World-Access   Okay   Normal

System Cards

Slot Number	Module Type	Slot Number	Slot Number	Slot Number
3	FGL–2	Online	B	1.72
4	SCP	Online/Elected	H	0.02DLL.00BB1.00
5	FGL–2	Online	B	1.72
7	Clock	Online	B03	1.00
8	CBS	Online	Not available	Not apply

OK   Apply   Refresh   Bridging   Cancel   Help

NPG-0165-95I

Figure B–9   GIGAswitch/FDDI Line Card Summary Window
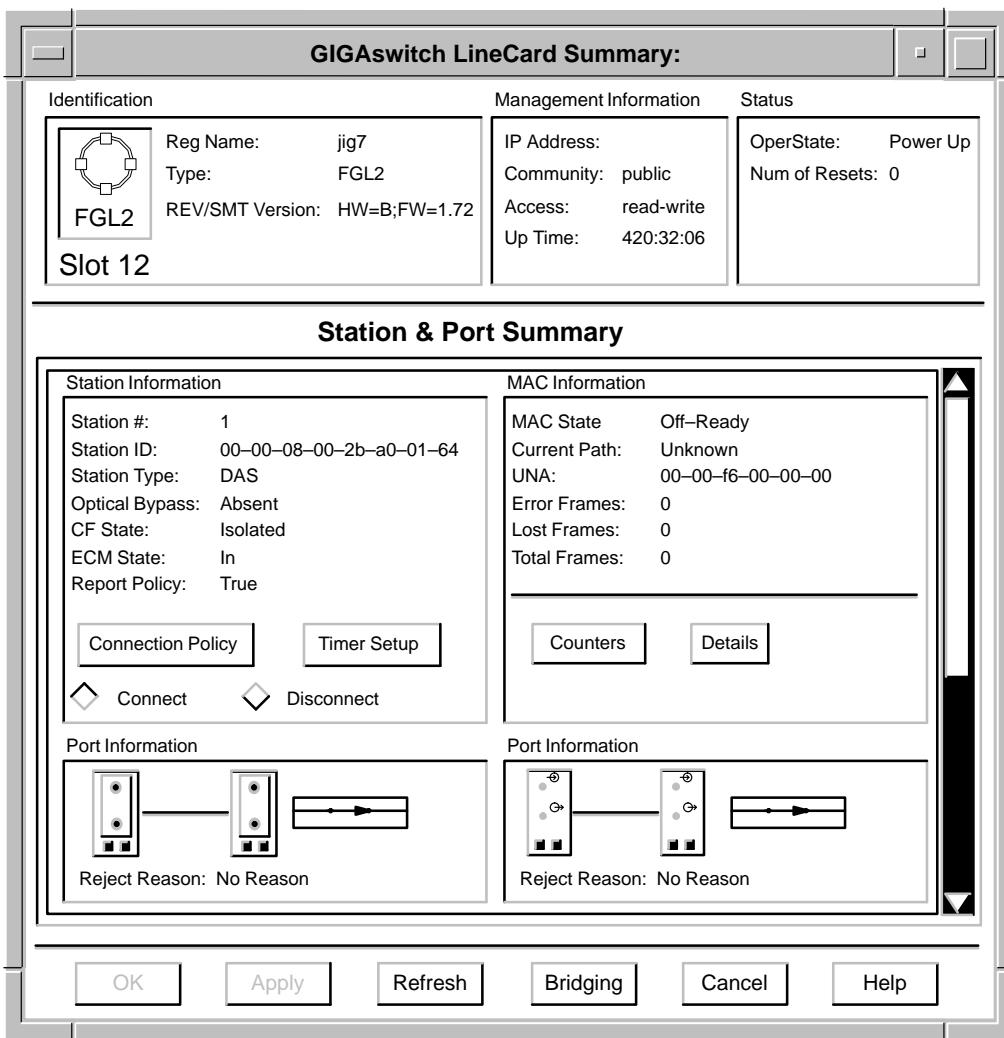
NPG-0166-95I

Figure B–10   GIGAswitch/FDDI Bridge Summary Window

NPG-0167-95I
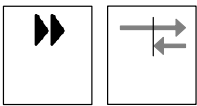
Glossary

This glossary is a comprehensive source of definitions for HUBwatch terms and acronyms.

access server

A module that allows a terminal to connect to a network node.

active port

A redundant repeater port over which communication is currently taking place. An active port is enabled and handles any communication between the connected repeater ports.

address filtering

A feature that allows you to prevent, on a per-port basis, a bridge from forwarding multicast messages specified by source and destination addresses.

administration status

The desired state. In contrast, the operational state is the current state.

agent

A background task running on the object being managed. The agent responds to requests for information by the network management station (NMS). The agent is responsible for performing get and set operations, for generating the appropriate traps, and for controlling access.

agents file

Contains a list of Simple Network Management Protocol (SNMP) agents that can be used to manage hubs and network modules.

aging time

A spanning tree parameter that controls how long a bridge keeps each "learned" entry in the forwarding database. If an entry is stored longer than the aging time, the bridge marks that entry as inactive and allows it to be overwritten.

alarms

Conditions in a hub or a community that the alarms software monitors. The conditions are detected by polling a predetermined list of MIBs on each type of network module. When a MIB value changes, the alarms software generates an alarm.

alarms agent file

Contains a list of Simple Network Management Protocol (SNMP) agents that are polled for alarm events. For each agent, the file contains the agent name, IP address, community name, polling interval, and the types of events that are enabled. Each time you add, delete, or modify entries in the Alarms Agents list box and apply the change, this file is updated. Each time you refresh the Alarms Setup window by clicking on the Refresh button, this file is used to restore entries in your Alarms Setup window to their last saved conditions.

Notice that even though an SNMP agent is listed in the Alarmed agents file, if Traps is disabled for that agent, it is not polled.

_____ **Note** _____

For OpenVMS, the Alarmed Agents file is:
HUBWATCH$LIBRARY:HUBWATCH_ALARMED_
AGENTS.DAT

_____

algorithm

A computational algorithm that determines the values for a particular object.

Always Filter

Always Filter is the highest priority of the three priority states assigned to GIGAswitch filters. A state of Always Filter applies, explicitly, only to the black cells in a filter matrix. The state means: "Always and unconditionally block packets exhibiting the input/output pattern indicated by black cells." Since Always Filter is the highest state, no other filter can override this instruction.

Always Forward

Always Forward is the second of the three priority states assigned to GIGAswitch filters. A state of Always Forward applies, explicitly, only to white cells in a filter matrix. The state means: "Always allow packets to pass through the input/output pattern indicated by white cells — unless another filter with a state of Always Filter overrides this instruction."

attachment unit interface (AUI)

A 15-pin Ethernet or DIX connector through which an Ethernet station is sometimes connected to the network.

authorized station

An addressable node on a local area network (LAN) that is capable of transmitting, repeating, and receiving data.

autodiscovery

The capability of the hub chassis and its associated firmware to detect, identify, and configure certain networks modules when they are installed in the hub. Modules that the hub cannot autodiscover must be manually added to the hub's configuration using either the hub's console setup port or the HUBwatch Add Module window.

autopartition

To disable a repeater port automatically.

The autopartition algorithm protects the network from certain fault conditions that would halt all LAN communications (for example, a media short or break, a faulty connector, or faulty or missing media termination). If it detects such faults on any of its ports, the repeater isolates the faulty segment from the network.

A repeater does not respond to input received from an autopartitioned port, except to determine whether or not the fault condition has been removed. However, a repeater continues to transmit data to an autopartitioned port.

backbone

A core network (usually high speed) to which multiple local area networks (LANs) are connected using bridges or brouters and over which internetwork traffic can pass.

bad Hello

If a designated bridge receives a Hello message on the port on which it is designated, and the message contains worse root information than the bridge currently has, the message is called a Bad Hello message.

bandwidth

A measure of the amount of traffic the media can handle at one time. In digital communications, bandwidth describes the amount of data, in bits per second, that can be transmitted over the line.

BootP

A protocol that is used by a network node to determine the Internet Protocol (IP) address of its Ethernet interfaces used for network booting.

break character

A character that switches you from a service node session to the access server local mode. If you are using a modem to connect to a service node through an access server, and the modem interprets the break signal as a command to end a dial-in connection to the access server, you must specify a local switch character, or break character to use in place of your terminal's Break key when you want to return to the access server local mode.

<Break> Passthru

An access server port characteristic that determines whether or not the port responds to a local or remote break. A value of Local causes a Break signal to go to the access server. A value of Remote causes the Break signal to go to the service node.

bridge

An intelligent, protocol-independent, store-and-forward device that operates as a Data Link layer relay. Used to connect similar or dissimilar local area networks (LANs). A collection of LANs connected by bridges is referred to as and extended LAN.

brouter

A bridge with minimal routing capabilities. In general, a brouter can deliver least-cost routing; some can also deliver minimal load balancing.

CF state

The CF state displays the current path configuration of the A and B ports.

chassis

The physical housing of the hub.

click

Pressing and releasing the mouse button while the cursor is pointing at an object on the user interface.

clock card

The Clock card provides the clock signals for the GIGAswitch /FDDI System. It also performs these functions:

- Provides central arbitration of the backplane bus.

- Identifies the presence, model number, and type of modules in slots 1-6 and 9-14.

- Stores management parameters.

The Clock card contains the out-of-band management port. This card is always installed in slot 7 of the GIGAswitch/FDDI System.

community

A set of attributes that are managed as a group. Community names are used to control access. Each software request contains a community name that the agent uses as a password to verify that the requester is authorized to access the agent's management information base (MIB) or a subset of that MIB.

Community names indicate whether or not the requester has read-only or read-write authority.

In Digital's implementation, MIBs are defined by the agent.

community string

A text string, also referred to as a community name, that is used as a password by an SNMP agent to authenticate or verify that the network management station (NMS) making the request is allowed access to the contents of the agent's management information base (MIB).

concentrator

The FDDI concentrator is a Physical layer repeater that allows the attachment of multiple single attachment stations, dual attachment stations, or other concentrators to the FDDI network.

config(uration) changes

Changes to SNMP agents to affect how they are managed on the network. For example, SNMP agents have community strings, also referred to as community names, that are used as passwords by the SNMP agent to authenticate or verify that the network management station (NMS) making requests is allowed access to the contents of the agent's management information base (MIB). Agents can have read-only and read/write community strings. A change to either of these strings is considered a configuration change.

configuration management

Configuration Management is that portion of connection management that provides for configuration of PHY and MAC entities within a station.

context-sensitive help

A form of online documentation in which a program displays user information about the current command or operation. Because it provides details about the work at hand without requiring the user to leave the program, context-sensitive help is particularly useful for learning a new program or using an unfamiliar program feature.

crossbar switch card

The crossbar switch card provides interconnection between the ports on the GIGAswitch/FDDI, enabling multiple connections to exist simultaneously.

This card is always installed in slot 8 of the GIGAswitch/FDDI.

cyclic redundancy check (CRC)

A method of detecting errors in a frame by performing a mathematical calculation of the number of bits in the frame and appending the result to the end of the frame. The receiving station performs the same calculation on the frame and then checks that the result matches the CRC at the end of the frame.

datagram

A unit of data passed between the transport and the network services layers.

Data In circuit (DI)

Sourced by the MAU, the DI is a differential pair consisting of DI-A (Data In circuit A) and DI-B (Data In circuit B). A data receive circuit from the MAU to the DTE (for example, a repeater). For a complete description, refer to ISO 8802-3 ANSI/IEEE Standard 802.3.

Data Out circuit (DO)

Sourced by the DTE, the DO is a differential pair consisting of DO-A (Data Out circuit A) and DO-B (Data Out circuit B). A data transmit circuit from the DTE (for example, a repeater) to the media access unit (MAU). For a complete description, refer to standard ISO 8802-3 ANSI/IEEE Standard 802.3.

Data-Set-Ready (DSR)

When set, a control signal that indicates to the data terminal equipment that the local modem is connected to the channel and is ready to receive data or to accept a request to transmit.

Data-Terminal-Ready (DTR)

A control signal that enters a modem from the data terminal or communications device that is using the modem. When the signal is set, it informs the modem that the data terminal equipment is ready to receive and transmit data.

DECnet

The Digital networking software that runs on nodes in both local and wide-area networks.

DECnet address

A series of numbers that identifies a device's location in the DECnet network.

DECnet name

A unique alphanumeric string that identifies a device on the DECnet network.

DECwindows Motif

The environment used to run HUBwatch windows.

destination address

The field in a frame that contains the address of the station to which the frame is being sent.

Destination Service Access Point (DSAP)

Part of the IEEE 802.2 LLC (logical link control) header.

device

A network element that is external to the hub or computer equipment (such as a printer, terminal, or personal computer (PC) that is attached to an access server port.

dialog box

A window in which you enter or view information.

double click

Quickly pressing and releasing a mouse button twice.

double hub

Two DEChub 90 hubs daisy-chained together. A double hub is treated as a single hardware device and is represented by a single community.

downline load

The process of sending a software image from a load host to the bridge.

downstream neighbor address (DNA)

The MAC address that identifies the most recently known downstream neighbor. Stations determine the downstream neighbor by exchanging neighborhood information frames (NIFs) as part of the neighbor notification protocol. Stations also use the protocol to determine the existence of duplicate address conditions.

drag

Pressing and holding down the mouse button, then moving the mouse across a surface, carrying the cursor across the work area.

dual attachment station (DAS)

An FDDI station that offers two connections to the FDDI dual counter-rotating ring. FGL-2 cards can accommodate up to two dual attachment stations.

Entity Coordination Management (ECM) state

The ECM controls the optical bypass switch of the Physical Media Dependent (PMD) layer and signals the physical control management (PCM) when media is available. The ECM starts the PCMs for the A and B ports in the station when the optical bypass is complete. In concentrators, ECM also starts the PCMs associated with M ports.

Ethernet

A network communications system developed and standardized by Digital, Intel, and Xerox, using baseband transmission, CSMA /CD access, and logical bus topology. The industry-standard protocol is specified by ISO 8802-3 ANSI/IEEE Standard 802.3.

Ethernet station

An addressable node on an Ethernet network capable of transmitting, repeating, and receiving data.

exit

To end a session by clicking on the Exit push button.

failover

The feature that causes a failed link to automatically reconfigure to a redundant or "backup" link.

fan tray

The GIGAswitch/FDDI houses two fan trays. Each fan tray assembly contains two fans. Their purpose is to cool the system. If one fan tray fails, the switch will continue to operate. Like the power supply units the fan tray units can be hot swapped.

FDDI port connector type

A variable that specifies the type of port being managed by the GIGAswitch/FDDI port's physical connection management facility. The four different port connector types are:

> A — The port is a dual attachment station or concentrator that attaches to the primary in and the secondary out when attaching to the dual ring.
> B — The port is a dual attachment station or concentrator that attaches to the secondary in and the primary out when attaching to the dual ring.
> S — Either one port in a single attachment station, or one port in a single attachment concentrator.
> M — A port in a concentrator that serves as a master to a connected station or concentrator.

FDDI station

A node on an FDDI ring capable of transmitting, receiving, and repeating data. A station has one instance of SMT, at least one instance of PHY and PMD, and an optional MAC entity.

FGL-2 card

A type of line card containing four ports and two FDDI stations. FGL-2 cards can support both single attachment station (SAS) and dual attachment station (DAS) Physical Media Dependent (PMD) layer daughter cards.

If two PMDs are installed in a card, each has one A and one B port. If only one PMD is installed, it has either one S or one M port.

FGL-4 card

A type of line card containing (up to) four ports and four FDDI stations. FGL-4 Cards can only support single attachment station (SAS) Physical Media Dependent (PMD) layer daughter cards.

On an FGL4 Card, each SAS is normally connected to a different FDDI ring. Each station has one S port associated with it.

Fiber Distributed Data Interface (FDDI)

A set of ANSI/ISO standards that define a high-bandwidth (100-Mb/s), general-purpose, local area network (LAN) connection between computers and peripheral equipment in a timed-passing, dual ring-of-trees configuration.

filtering

Filtering allows you to prevent, on per-port basis, a bridge from forwarding multicast messages specified by multicast address or protocol.

filter state

Every GIGAswitch/FDDI filter has a state associated with it. Filter states determine how they will be applied by the switch, and ultimately determine how individual filters will work together to produce a combined result.

The priorities for GIGAswitch/FDDI filtering states are, in order of precedence:

- Always Filter
- Always Forward
- Filter

flow control

An access server port characteristic that allows an access server to start and stop data transfer between the access server port and the attached device.

FOIRL

Fiber-optic inter-repeater link.

forwarding database

A table maintained by a bridge that contains station addresses, the port on which the addresses are located, and the age of these entries. A bridge forwards or filters frames based on the information in the forwarding database. A bridge creates its forwarding database by "learning" the source line and source address of each incoming frame.

frame

A group of digits transmitted as a unit, over which a coding procedure is applied for synchronization.

front panel window

A graphic of the hub chassis (either the DEChub 90 or DEChub 900 MultiSwitch) and its installed network modules. The front panel window comes in two varieties: a physical view and a logical view.

- The physical view displays an exact representation of the hub chassis, the installed modules, and all the physical characteristics of the modules.

- The logical view displays a graphic representation of the modules and offers a consistent look for modules from different vendors.

FRU

Field Replaceable Unit.

GET

A Simple Network Management Protocol (SNMP) request in which the named instance is retrieved if the community string matches. If the community string does not match, an error is returned.

GIGAswitch/FDDI filters

GIGAswitch/FDDI filters are based on the source address, destination address, or Protocol ID of packets passing through the switch. The switch uses user-designed filters to determine whether to block or forward packets passing through it. In cases when the switch determines that a packet may be forwarded, the process determines what ports it may forward them through.

GIGAswitch/FDDI filter matrix

A user-designed, storable pattern of inputs and outputs that maps to GIGAswitch/FDDI ports. Each GIGAswitch/FDDI filter is based on one and only one matrix.

GIGAswitch/FDDI slot

The physical slot in the GIGAswitch/FDDI chassis. The GIGAswitch/FDDI contains 14 slots, 11 of which can accommodate FGL-2 line cards. The remaining 3 slots are reserved for the Clock Card, Crossbar Switch Card, and Switch Control Processor card.

GIGAswitch/FDDI system

An intelligent multiport FDDI bridge that forwards packets among a set of connected data links. The GIGAswitch is a standalone modular device that uses both distributed and centralized processing algorithms to perform these ANSI and IEEE 802.1d bridging functions:

- Forwarding.

- Filtering.

- Learning.

- Aging.

- Spanning tree.

graphical user interface (GUI)

A display format that enables the user to choose commands, start programs, and see lists of files and other options by pointing to icons and menu items on the screen. Choices can be generally activated either with the keyboard or with a mouse. The HUBwatch application uses graphical user interfaces.

grayed out

Indicates that a field or option is not available in a particular instance.

hello interval

A spanning tree parameter that controls how often a bridge sends a hello message.

hello message

A hello message determines which bridges are elected as designated bridges and which bridge becomes the root bridge. When the spanning tree computation is complete, the root bridge originates the hello message and the other bridges propagate it down the spanning tree.

hot swap

To "hot swap" a component means to remove and replace it while the system is in operation. Any of the GIGAswitch/FDDI line cards, the fan trays, and the power units can be hot swapped without affecting operation of the switch.

Modules that cannot be hot swapped are:

- Crossbar switch card

- Switch control processor card

- Clock card

hub

A central device, usually in a star topology local area network (LAN), to which each network module is attached.

Hub Manager

A microprocessor-based controller used to monitor, configure, and control the hub. Either under remote management control or default local control, the Hub Manager provides a central point for allocation of hub resources to hub-mounted network modules.

icon

A pictorial representation on a user interface used to indicate an object, for example, a network module.

Idle signal (IDL)

The media access unit (MAU) sends an input_idle message to the data terminal equipment (DTE) on the Data In circuit when the MAU does not have data to send. The physical realization of the input_idle message is the Idle signal. Thus, the Idle signal lets the DTE know that the MAU is functioning properly. For a complete description, refer to standard ISO 8802-3 ANSI/IEEE Standard 802.3.

IEEE

Institute of Electrical and Electronics Engineers.

in-band management

Managing a device over a network.

Internet Control Message Protocol (ICMP)

A simple reporting protocol for the Internet Protocol (IP).

Internet Protocol (IP)

The network protocol offering a connectionless-mode network service in the Internet suite of protocols.

Internet Protocol (IP) address

The address is a series of numbers that identifies a device's location on the Internet.

Internet Protocol (IP) forwarding

The forwarding of IP packets between interfaces (ports) on a DECserver 90TL, 90M, or 900TM.

Internet Protocol (IP) name

A unique alphanumeric string that identifies a device on the Internet.

label

An inactive windows symbol that identifies a control.

LAN

The local area network. A data communications network that spans a limited geographical area. The network provides high-bandwidth communication over coaxial cable, twisted-pair, fiber, or microwave media.

LAN segment

A portion of the DEChub 900 MultiSwitch backplane that is organized in a bus, a ring, or a point-to-point configuration.

LB100

The LANbridge 100.

learning mode

The state in which a bridge stores addresses it has received by listening in its forwarding database or, when the database has reached the maximum number of entries, in volatile RAM.

light-emitting diode (LED)

An indicator of status on a network module.

line card

GIGAswitch/FDDI line cards provide the packet input/output ports for the GIGAswitch/FDDI. These cards forward packets with known destination addresses. Multicast packets, and packets with unknown destinations, are forwarded to the switch control processor (SCP) card for further consideration.

link loss

A link-loss condition occurs when the keep-alive signals are no longer received between two media access units (MAUs).

list box

A window object that displays a list, such as available modules, from which a user can select. List boxes can include scroll bars to allow users to move through lists that are too big to be entirely visible in the list box.

listening mode

The state in which a bridge identifies the addresses of messages received from the network.

local area network (LAN)

A data communications network that spans a limited geographical area. The network provides high-bandwidth communication over coaxial cable, twisted-pair, fiber, or microwave media and is usually owned by the user.

Local area transport (LAT)

A communications protocol used in a local area network.

loopback

When it receives data on the Data Out circuit (DO), the media access unit (MAU) returns that data to the data terminal equipment (DTE) on the Data In circuit (DI). This action constitutes a loopback function.

low light

The intensity of the light detected by a a fiber-optic media access unit (MAU). When the intensity of the light drops to such a low level that the error rate reaches an unacceptable level, the low-light condition is said to exist.

MAC address

A unique 48-bit binary number (usually represented as a 12-digit hexadecimal number) encoded in a device's circuitry to identify it on a local area network.

Maintenance Operation Protocol (MOP) session

A logical connection using the Maintenance Operation Protocol (MOP).

management agent

See SNMP agent.

management information base (MIB)

A dynamic, virtual collection of data about a managed object. The managed object provides this data to the network management station (NMS) which gathers the values from the managed object and loads them into the MIB representing the object.

manual mode

The condition in which a bridge does not learn addresses but only uses addresses you specify, because you have created a filter for all unspecified addresses.

map

The file that contains all the pictures for one network.

master mode

A pair of repeater ports (primary and secondary) that control a redundant link. Because the remote ports, or responder ports, to which the master ports are connected must be on the same LAN or are otherwise bridged together, only one of the master ports may be enabled at a time.

matrix

A user-designed, storable pattern of inputs and outputs that maps to GIGAswitch ports. Each GIGAswitch filter is based on one and only one matrix.

MAU

When used in the context of network modules, such as repeaters and PORTswitches, this acronym stands for media access unit.

When used in the context of token ring LANs and modules, this acronym stands for multistation access unit.

HUBwatch supports token ring modules, or MAUs, installed in DEChub 900 MultiSwitch hubs and in standalone configurations. The standalone configuration requires the DEChub ONE docking station.

Media Access Control layer

In FDDI (and other types of shared-medium LANs) the Data Link layer sublayer responsible for scheduling, transmitting, and receiving data.

menu

List of options in a window.

menu item

An option that you can select from a menu.

MJ8 connector

A jack used for connecting a cable terminated with an MJ8-compatible (RJ45) plug.

MMJ connector

A jack used for connecting an EIA 423 data cable to a DECserver 90L or 90L+.

module

An interchangeable unit that provides functionality and interconnection to a local area network (LAN) through the hub.

See network modules.

mouse

The device used to move the cursor around the HUBwatch windows.

mouse button

One of the buttons on the mouse device, used for selecting, dragging, and pointing at objects.

multicast

A type of network addressing that enables a node to send messages or data packets to an address that represents a group of stations rather than a single station.

multiswitch backplane

A backplane that allows flexible allocation of its signals so that multiple local area network (LAN) segments can be managed. The DEChub 900 MultiSwitch has a multiswitch backplane.

network

A collection of computers, terminals, and other devices together with the hardware and software that enables them to exchange data and share resources over either short or long distances.

network layer

Layer 3 of the OSI model that permits communications between network nodes in an open network.

network management

In the OSI model, the five functional application areas of accounting management, configuration management, fault management, performance management, and security management.

network management application

A collection of software tools that provides information about the network by communicating with agent software in the managed objects

network management station (NMS)

A PC or workstation equipped with an Ethernet, FDDI, or Token Ring network module and HUBwatch software that enables it to communicate with and manage network modules.

network modules

Any modular devices that provide network connectivity or services that can be installed in a DEChub backplane or used standalone. These include, but are not limited to, repeaters, concentrators, bridges, brouters, access servers, switches, and SNMP agents.

no loopback

See loop.

NVRAM

Nonvolatile random access memory.

OID

The registered object identifier (OID) of the object. It provides a means of uniquely identifying the object regardless of the naming conventions used by the manufacturer to identify it. The OID is a sequence of non-negative integers that define a path through a tree starting from the root and ending at the object. A common format is the dotted notation (for example, 1.3.6.1.4...).

On-Demand Load (ODL)

An Asian terminal's use, through a DECserver 90L+, of the On-Demand Loading (ODL) font protocol to override flow control, while fonts are being downloaded to the terminal.

option button

A push button with a small rectangular box within a dialog box that presents choices to the user in the form of a menu. To make a selection, click on an option button, drag the mouse pointer to the desired menu item, and release the mouse button.

out-of-band management (OBM)

Management of a network module or the DEChub 900 MultiSwitch backplane over a telephone line or direct line to a console port rather than over the network.

partition

A repeater port is said to be partitioned when it is management disabled or autopartitioned.

PC

Personal computer.

Physical Layer Protocol

A Fiber Distributed Data Interface (FDDI) standard that defines symbols, line states, clocking requirements, and the encoding of data for transmission.

Physical Media Dependent layer

FDDI standards that define the media and protocols to transfer symbols between adjacent PHYs.

physical topology

The arrangement of cables and hardware that make up the network.

PMD class

The type of physical media associated with a port.

polling

The process of checking selected devices or nodes on the network at regular intervals. Using HUBwatch software, you can set the polling interval for checking the status of MIB objects on network modules.

primary port

A redundant master repeater port that is placed in the active state when redundant ports are configured.

protocol

A formal set of rules governing the format, timing, sequencing, and error control of exchanged messages on a data network. A protocol may also include facilities for managing a communications link or contention resolution.

A protocol may relate to data transfer over an interface, between two logical units directly connected, or on an end-to-end basis between two end users over a large and complex network. There are hardware protocols and software protocols

Protocol Data Unit (PDU)

A data object exchanged by protocol layers that contains both protocol control information and user data.

protocol filtering

A feature in some bridges that can be programmed to always forward or always reject transmissions that are originated under specified protocols.

proxy access

The way a proxy Simple Network Management Protocol (SNMP) agent provides requests to the network management station (NMS). A proxy agent acts on behalf of network devices that do not support SNMP. When such a network module is to be managed, the NMS contacts the proxy agent and indicates the identity of the network module. The proxy agent translates the protocol interactions it receives from the NMS into whatever interactions are supported by the network module.

pulldown menu

A menu that is displayed when a user presses a mouse button and the pointer is positioned on a menu name in the menu bar.

push button

A rounded box containing text. By clicking the mouse on the text, you select the function. For example, clicking on the Help push button takes you to the help for the current window.

radio button

One of a pair of diamond-shaped buttons adjacent to text that enables you to make a choice. By clicking on a particular button, you select the named option. You can select only one radio button at a time.

rate limit

The total number of frames on all ports allowed by a bridge per second.

registered name

The name by which the network management application recognizes a node, for example, POLYCENTER SNMP Manager.

release

Used in conjunction with drag. After dragging the mouse, you release the mouse button.

repeat

An action in which a station receives a frame or token from an upstream station, retimes it, and places it onto the ring for its downstream neighbor. The repeating station can examine, copy to a buffer, or modify control bits in the frame, as appropriate.

repeater

A level 1 hardware device that restores signal amplitude, waveform, and timing of signals before transmission to another network segment.

responder mode

This mode designates ports that connect to master mode ports. Responder ports are always enabled but are active only when their master port is active. A key function of the responder port, other than receiving and transmitting data, is to report link failures to the master port. When the master port detects a link failure, it causes the link to failover to the standby link. If the standby link is not available when the active link fails, the failover process waits until it is available. If the previously active link becomes available during this waiting period, the master returns to using it. Otherwise, the failover to the standby link takes place as soon as the standby link is good. Thus, the

highest utilization possible on a dual-port redundant link is achieved.

responder port

A redundant repeater port that connects to either a master primary or a secondary port. Because responder ports are always enabled, no action is taken to switch ports in case of link failure. However, a responder port does detect and report link failures to its partner (master primary or master secondary) port by continuously pulsing its fiber transmit LED on and off. If the master port connected to the responder port is active, the responder port treats this event as a link failure and causes a link failover. Link failures include the following conditions:

- Autopartitioning

- Management disable

- Carrier loss

ring

Connection of two or more stations in a circular logical topology. Information is passed sequentially between active stations, where each one, in turn, examines or copies the data, and returns it to the originating station, which removes the data from the network.

root bridge

In an extended local area network (LAN), the root bridge controls the network configuration by originating hello messages.

The spanning tree algorithm determines the root bridge by comparing the bridge IDs for all bridges in the extended LAN and by selecting the bridge with the lowest bridge ID (root priority and hardware address).

root priority

A spanning tree parameter that determines a bridge's priority for becoming the root of the logical spanning tree. The Root Priority parameter value is used as a prefix to the bridge's address to form the bridge's identification, for example, 128/08-00-2B-2C-08-21.

sash

A small box that resizes components in paned windows and that is positioned on the line separating panes in a paned window. To change the size of adjacent panes, click on and drag the sash up or down.

scroll bar

Used to move from left to right or up and down within a window or dialog box.

scroll box

The rectangular portion of the scroll bar that moves either up or down or right or left to indicate the direction you are scrolling.

secondary port

A redundant master repeater port that is placed in the standby state when redundant ports are configured.

select

Choosing a menu item or symbol by clicking on it.

Serial Line Internet Protocol (SLIP)

Used for transmitting Internet Protocol (IP) packets across serial lines.

server

A network node or specialized device that provides and manages access to shared network resources, such as hard disks, printers, and software.

service node

A node to which a terminal is able to establish a session through an access server port.

session

A logical connection between a terminal and a service node.

session origin

On a DECserver 90TL, 90M, or 900TM, the port characteristic that determines where a session on a port can originate.

SET

A Simple Network Management Protocol (SNMP) request in which the named instance is modified if the community string matches.

shielded twisted-pair

A cable composed of two insulated wires, twisted together and surrounded by a braided metal shield or foil under the outer insulation.

Simple Network Management Protocol (SNMP)

A high-level, standards-based protocol for network management, usually used in TCP/IP networks.

Simple Network Management Protocol (SNMP) agent

An entity in a hardware device that executes SNMP requests.

single attachment station (SAS)

An FDDI station that offers one S port for attachment to the FDDI ring. FGL-4 cards can accommodate up to four Single Attachment stations. On an FGL-4 card, each station maps to a single port.

single hub

An eight-slot hub. A double-hub is two single hubs daisy-chained together.

SNMP MIB-II

The Management Information Base (MIB-II) for use with network management protocols in TCP/IP-based internets. See Request for Comments (RFC) 1213.

source address

The network address of the station that transmitted the data to the network.

spanning tree

A method of creating a loop-free, logical topology on an extended local area network (LAN). Formation of a spanning tree topology for transmission of messages across bridges is based on the industry-standard spanning tree algorithm defined in IEEE 802.1d.

spanning tree algorithm

A computation that determines how a spanning tree topology is formed.

spanning tree mode

Determines whether or not a bridge is using a loop-free logical topology.

split speed

A DECserver 90TL's, 90M's, or 900TM's port characteristic of having different input and output speeds.

SQE

Signal quality error.

standalone module

A network module in a single configuration.

standby port

A redundant repeater port that is configured as a backup port to an active port. A standby port is disabled and is held in readiness in case the active port fails.

Station Management

The entity within a station on the FDDI ring that monitors and exercises overall control of station activity.

Switch Control Processor card

The GIGAswitch Switch Control Processor card performs various management and spanning tree functions. In addition, the card forwards multicast packets and packets with unknown destination addresses.

Telnet

The TCP/IP standard protocol for remote terminal connections. Using Telnet, a user at one site can connect to a timesharing system at another site as if the user's terminal is connected directly to the remote machine. The user invokes a Telnet application program that connects to a remote machine, prompts for a login ID and password, and then passes keystrokes from the user's terminal to the remote machine.

terminal server

A module that allows a terminal to connect to a network node. See access server.

text entry box

A window dialog box control that allows you to enter text in a structured area.

title bar

An area at the top of a windows display that contains the name of the application and sometimes additional information.

token ring

A network with a ring topology that passes data-bearing tokens from one attached station to the next. The original protocol developed by IBM was succeeded by the IEEE 802.5 standard for token ring network communications.

topology

The logical or physical arrangement of nodes on a network.

Transmission Control Protocol (TCP)

The transport protocol offering a connection-oriented transport service in the Internet suite of protocols.

trap

Messages generated by firmware in Simple Network Management Protocol (SNMP) agent hardware. The firmware monitors the hardware for faults and sends messages to monitoring software.

For the HUBwatch application, the Alarms Poller software communicates with the SNMP agents in a hub or a community and arranges for specific traps to be sent to the network management station running the HUBwatch application.

The trap table in the Alarms Definition file determines which traps to monitor. Cold start, warm start, and authentication failure are examples of traps monitored by the alarms software.

The Alarms Poller software uses Internet Protocol (IP) addresses and community names to communicate with specific SNMP agents, such as the DECagent 90, the Hub Manager, and modules with built-in SNMP agents.

unicast

A type of network addressing that enables a node to send messages or data packets to a single node on the network.

upstream neighbor address (UNA)

The MAC address that identifies the most recently known upstream neighbor. Stations determine the upstream neighbor by exchanging neighborhood information frames (NIFs) as part of the neighbor notification protocol. Stations also use the protocol to determine the existence of duplicate address conditions.

User Datagram Protocol (UDP)

The transport protocol offering a connectionless-mode transport service in the Internet suite of protocols.

window

A portion of the screen used for displaying information.

workgroup

A group that consists of a relatively small number of devices attached to a LAN that is isolated from the extended LAN backbone by a bridge or a brouter.

XOFF

A transmission control character indicating transmission off.

XON

A transmission control character indicating transmission on.

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