

Digital MultiStack System Stacking Unit

Installation and Configuration

Part Number: EK-DETXX-IN. A01

August 1995

This manual describes how to install the Digital MultiStack System Stacking Unit to configure and monitor a fully-managed Ethernet network with up to 16 devices.

Revision/Update Information: This is a new manual.

August, 1995

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Preface

This manual describes how to install the Digital MultiStack System Stackable Hub to configure and monitor a fully-managed Ethernet network with up to 16 devices.

Intended Audience

This manual is intended for the user who has some technical background and will be installing stackable hubs or equivalent networking devices.

Documentation Comments

If you have any comments or suggestions to improve the quality and usability of this manual, please send them to the Network Information Products Group.

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Preface

Document Structure

This manual is structured as follows:

Chapter	Description
1	Provides an overview of the Digital MultiStack System Stacking Unit.
2	Provides information about planning for and configuring a stackable hub.
3	Describes how to install the Digital MultiStack System Stacking Unit.
4	Provides troubleshooting information for the Digital MultiStack System Stacking Unit.
Appendix A	Provides information about assembling and disassembling an existing Digital 90-series module into a Digital MultiStack System stacking unit.
Appendix B	Describes electrical and physical specifications.
Appendix C	Provides cable lengths and part numbers.
Appendix D	Provides connector and pin assignment information.

Preface

General Terms Used in This Manual

Term	Definition
AUI	Attachment unit interface, used to connect devices to backbone networks. Connector accepts AUI cables or MAUs (media attachment units).
Ethernet	Digital's term for its product compatibility with ISO 8802-3/ANSI/IEEE 802.3 standards and the Ethernet standards for CSMA/CD local area networks (LANs).
HUBwatch	Management applications with a GUI (graphical user interface) which provides a graphical representation of Digital 90-series modules.
MAU	Media attachment unit. Connects to an AUI interface. It is used to convert to various segment media (UTP, fiber optic, or ThinWire).
Token Ring	Refers to the IEEE 802.5 standard.
ThinWire Cable	IEEE 10base2 Coaxial cable which carries Ethernet signals, used to form the stack's data network.
UTP	Unshielded twisted pair. Cables may be Category 3 or 5.

Preface

Stacking Unit Terms Used in This Manual

Term	Definition
Digital 90-series module	A functional networking device that is in a "half-height" form factor. These devices also operate in Digital's DEChub 90 and DEChub 900 MultiSwitch chassis hubs as well as in the stacking unit.
Digital MultiStack System	The components described in this manual used for installing, stacking, interconnecting and managing Digital stackable hubs.
Distributed Stack	Units interconnected as in a stack, but physically distributed.
Physical Stack	Stackable hubs stacked one on top of another.
Rack	Industry standard 19" rack.

Preface

Stacking Unit Terms Used in This Manual (Continued)

Term	Definition
Stack	A collection of stackable hubs.
Stackable Backplane	Attachment for a Digital 90-series module that supplies power and management connections. It is part of the stacking unit.
Stackable Hub	The combination of a Digital 90-series module and a stacking unit.
Stacking Unit	Components that enable a Digital 90-series module to be implemented as a stackable hub. These components include a stackable backplane, shelf unit, power supply, and cables.
Preassembled Unit	Digital MultiStack System stacking unit preassembled at the factory.

Preface

Network Management Terms Used in This Manual (Continued)

Term	Definition
Management Domain	A set of stackable hubs defined and cabled to be managed by one stack manager. One management domain may span multiple LAN data segments.
Stack Manager	A Digital 90-series module that is functioning as a managing agent for a stack.
SNMP	Simple Network Management Protocol, an industry standard protocol for network management.
SNMP Proxy Agent	Management agent function that translates between SNMP and another protocol for the purpose of module management.

Introducing the Digital MultiStack System Stacking Unit

- ❑ **Overview**
- ❑ **Product Features**
- ❑ **Digital MultiStack System Physical Description**
 - ❑ **Stacking Unit**
 - ❑ **Stackable Backplane**
 - ❑ **Optional Stackable Backplane with AUI Port**
- ❑ **Unpacking the Digital MultiStack System Stacking Unit**
- ❑ **5 Easy Steps for Building a Stackable Ethernet Network**

1-2 Introducing the Digital MultiStack System Stacking Unit

Overview

Configure a fully-managed Ethernet stackable network using Digital 90-series modules: access servers, bridges, routers, and wireless bridges.

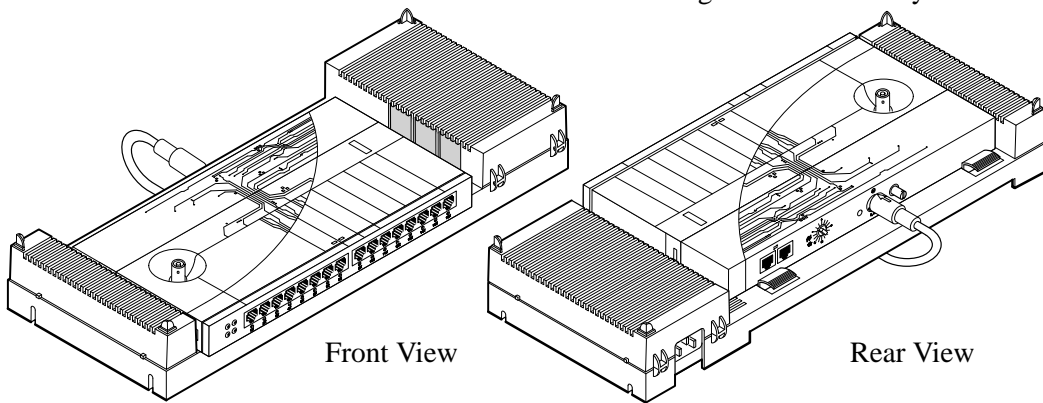
A stackable hub configuration provides a flexible low-cost networking solution without sacrificing networking performance and functionality, including network management, typically found in chassis-based hubs.

The Digital MultiStack System consists of a stackable hub which includes a Digital 90-series module and a stacking unit. With a management agent, all devices in the stack can be managed as a single management domain using SNMP (Simple Networking Management Protocol).

The Digital MultiStack System uses any Digital 90-series module: Ethernet repeater hub, access server, bridge, router, wireless bridge or RMON in a stackable Ethernet LAN (local area network) configuration. Many modules come preassembled as a stackable hub. Only the Digital 90-series module may be used within this system.

Up to 16 devices can be connected in a single physical stack, a distributed stack, or in a rack or cabinet configuration.

The following illustration shows the DECrepeater 90T-16 as a Digital MultiStack System stacking unit.



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Introducing the Digital MultiStack System Stacking Unit 1-3

Product Features

The Digital MultiStack System offers low-cost flexibility in a stackable configuration.

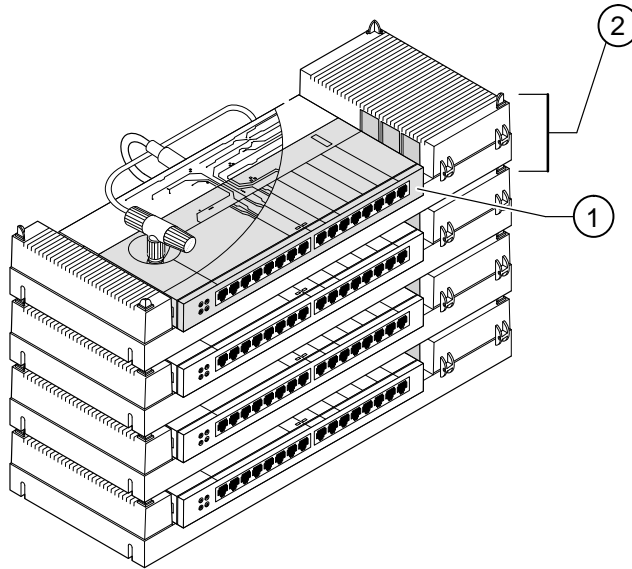
The Digital MultiStack System stacking unit supports the following features:

- Desktop connectivity, internetworking, switching and management in a single stack environment.
- Configuration of up to 16 managed or unmanaged Digital 90-series modules in a single physical stack, a distributed stack, or in a rack or cabinet.
- A single management agent can manage up to 15 other devices in a stack.
- Multiple LAN segments can be configured in a stack, and managed by one management agent.
- The management channel can be configured in a ring topology, enhancing the resiliency of the management channel.
- Modules can be hot swapped.
- Manageable by HUBwatch, Digital's SNMP-based hub management application, featuring a user friendly GUI (graphical user interface).
- An optional stacking unit provides an AUI (attachment unit interface) network connection (currently for use with the DEC repeater 90T-16).
- Digital 90-series modular design allows use of Digital 90-series networking modules in the Digital MultiStack System, in a DEChub 90, or in a DEChub 900 MultiSwitch.

Digital MultiStack System Physical Description

The Digital MultiStack System stacking unit includes the following components:

Item	Description
1	Digital 90-series module
2	Stacking unit which contains a stackable backplane and power supply



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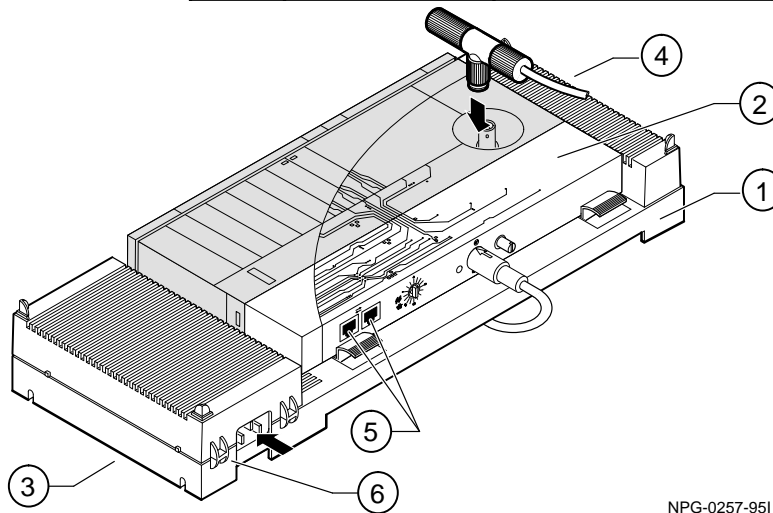
Introducing the Digital MultiStack System Stacking Unit 1-5

Digital MultiStack System Physical Description (Continued)

Stacking Unit

The stacking unit components are listed in the following table and illustrated on the following page.

Item	Component	Description
1	Shelf	Plastic base
2	Stackable Backplane	Connects the Digital 90-series module to the Digital MultiStack System.
3	Power Supply	Supplies power to the module.
4	ThinWire Cable and T-connector	Provides a ThinWire data network connection between stackable hubs.
5	Management Cables	Provide a management channel between stackable hubs.
6	Cable Ties	Used to neatly dress cables. Located on the front and rear of the shelf.

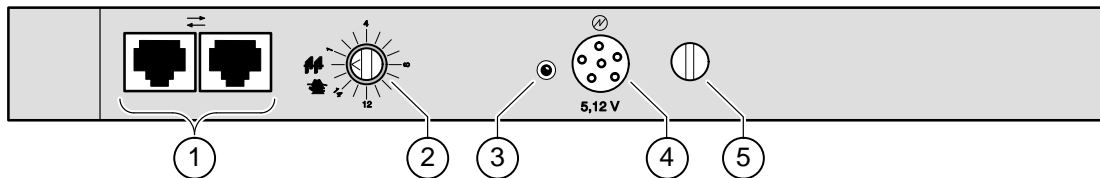


Digital MultiStack System Physical Description (Continued)

Stackable Backplane

The stackable backplane components are listed in the following table.

Item	Component	Description
1	MJ-8 Management Channel Connectors	Provides the serial line management channel.
2	Position Identifier Dial	Assigns a logical position to the device. Each hub in the stack must be set to a unique position. (Refer to Chapter 3.)
3	Power LED	Lights when the power supply is connected and operational.
4	DIN Power Jack	Transfers power from the 5,12V power supply to the Digital MultiStack System stacking unit circuitry and to the attached Digital 90-series module.
5	Retaining Screw	Secures the module to the stackable backplane.



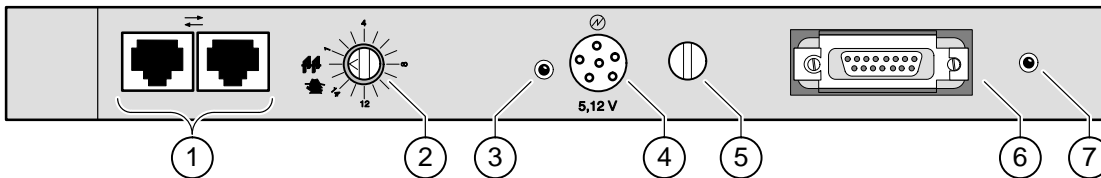
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Digital MultiStack System Physical Description (Continued)

Optional Stackable Backplane with AUI Port

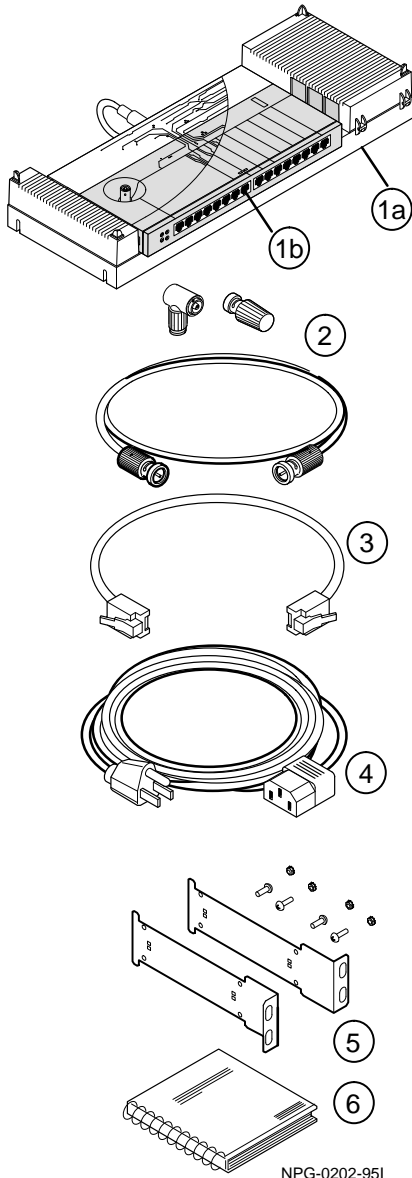
The stackable backplane with an AUI port is available for the DECrepeater 90T-16; its components include an AUI port and AUI LED. Items 1 to 5 of the stackable backplane (shown on the previous page) are included in this optional stackable backplane. Items 6 and 7 are unique to the stackable backplane with an AUI port and are listed in the following table.

Item	Component	Description
6	AUI Port Connector	Provides an AUI connection, typically to a backbone network segment or additional port.
7	AUI LED	Lights to indicate a valid AUI port connection.



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Unpacking the Digital MultiStack System Stacking Unit









Step	Action
1	Remove the contents of the shipping container and be sure to keep all original packing materials.
2	Check the contents for damage and missing parts. In case of damage, contact your delivery agent and your Digital sales representative. If parts are missing, contact your Digital sales representative.

The Digital MultiStack System stacking unit includes the following:

Item	Description
1	Digital's MultiStack System stackable hub (if supplied as a preassembled unit) 1a. Stacking unit 1b. Digital 90-series module (included if the hub is preassembled at the factory)
2	ThinWire coaxial cable for the network connection: BC16K-02 (0.2 m), 1 Terminator: H8225, and 1 T-connector: H8223
3	Unshielded Twisted-pair cable for the management connection: BN25G-0B, 7.8 inches (0.2 m)
4	Power cord
5	Rack mounting assembly brackets, screws and nuts
6	Documentation (this manual)

5 Easy Steps for Building a Stackable Ethernet Network

The following table and illustration on page 1–13 provide an overview of the procedures for building a stackable Ethernet network. Detailed installation information is provided in Chapter 3.

Step	Action								
1	Unpack and inspect the Digital MultiStack System Stacking Unit, which includes a Digital 90-series module and a stacking unit with a backplane and power supply.								
2	<p>Set a unique position identifier for each stackable hub included in the stackable management domain.</p> <p>To manage a stack, set the position identifier dial (located on the back of your hub) so that the arrowhead on the dial points to the module's unique logical position in the stack. Set the position identifier as follows:</p> <table border="0"> <thead> <tr> <th>Device</th> <th>Position Identifier</th> </tr> </thead> <tbody> <tr> <td>Management agent</td> <td></td> </tr> <tr> <td>Bridge</td> <td></td> </tr> <tr> <td>Any other Digital 90-series module</td> <td>1 to 14</td> </tr> </tbody> </table>	Device	Position Identifier	Management agent		Bridge		Any other Digital 90-series module	1 to 14
Device	Position Identifier								
Management agent									
Bridge									
Any other Digital 90-series module	1 to 14								

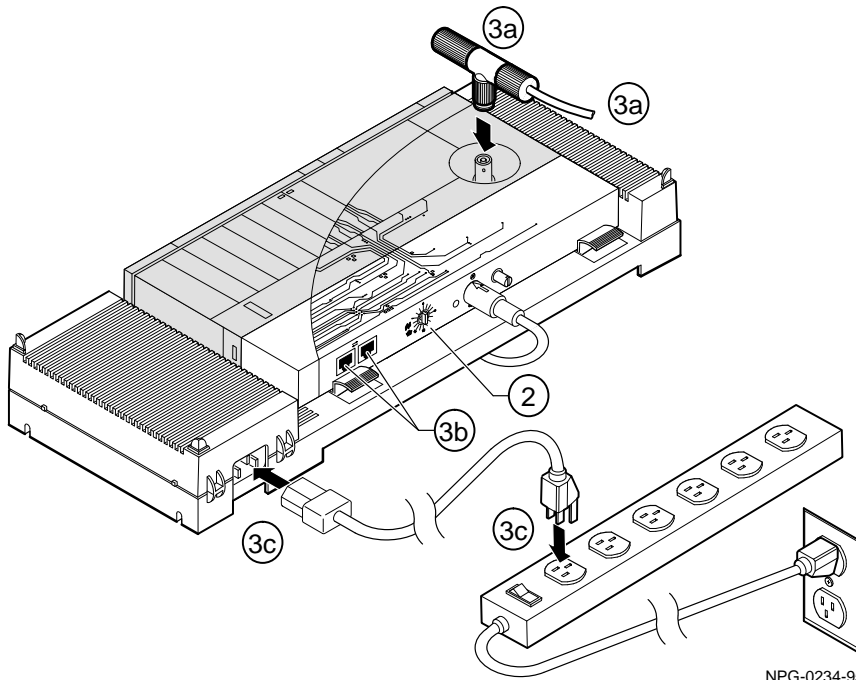
Continued on the next page.

5 Easy Steps for Building a Stackable Ethernet Network (Continued)

Step	Action
3	<p data-bbox="735 472 1255 562">Connect the cabling on the Digital MultiStack System Stacking Unit as follows:</p> <p data-bbox="735 600 1255 856">3a. Connect a T-connector to each module's ThinWire BNC port (located on the top of the stackable hub), starting with the first hub in the stack. Both the first and last device in a ThinWire LAN segment must be terminated. Attach the ThinWire cabling to the T-connector connecting each module in the stack.</p> <p data-bbox="735 894 1255 1182">3b. If using management, connect the hub's management cable (UTP) to one of the MJ-8 management channel connectors, beginning with the first hub in the stack. Connect the other end of that management cable to either of the MJ-8 management channel connector on the second hub in the stack. Continue this sequence up the stack to create a management domain.</p> <p data-bbox="735 1220 1255 1373">To add to the management network's resiliency, connect the last device in the stack to the first device in the stack, creating a ring. DO NOT create a ring with the ThinWire data network.</p> <p data-bbox="735 1411 1255 1539">3c. Connect the power cord to the power supply connector on the rear of each stacking unit and to the AC wall outlet or power strip. Power-up.</p>

5 Easy Steps for Building a Stackable Ethernet Network (Continued)

Step	Action
4	Set up the management agent to implement the stack manager. Refer to the management agent's documentation for more information.
5	Verify the operation of each hub and its network connections using the LEDs (power, self-test, and network connectivity) located on the stackable hub's modules.



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Configuring a Stackable Ethernet Network

- Configuration Overview**
- Single Physical Stack**
- Distributed Stack**
- Rack or Cabinet**
- Configuring for Network Management**

Configuration Overview

Digital 90-series modules provide configuration scalability and flexibility.

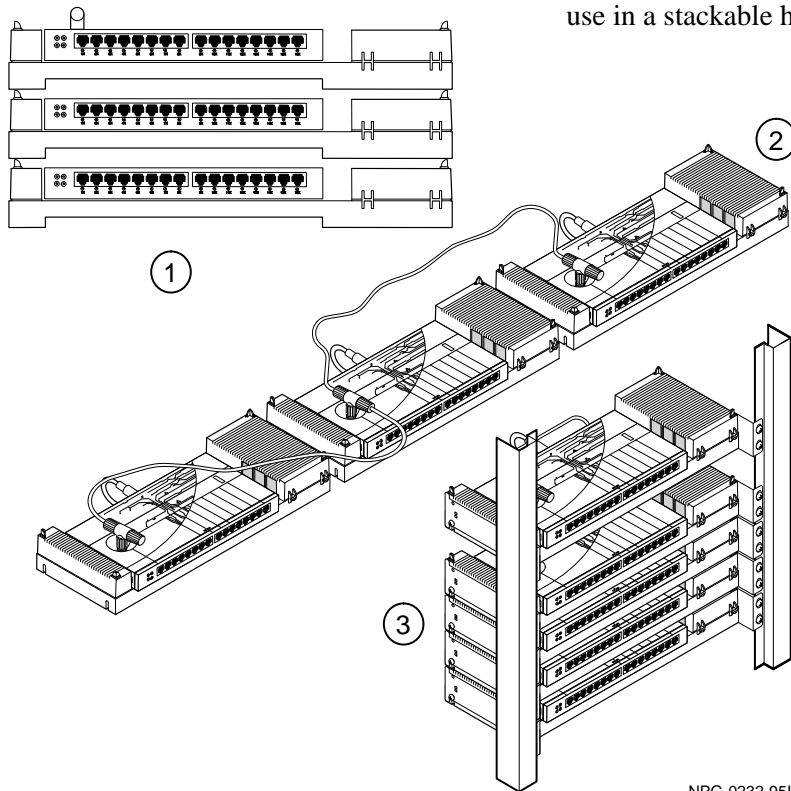
You must plan the location and configuration of your stackable hub(s) before configuring your hub(s) for network management.

There are three supported configurations for the Digital MultiStack System stacking unit, they are:

1. Single physical stack
2. Distributed stack
3. Rack or cabinet

All of these configurations can be managed in a single management domain.

NOTE: To assemble a Digital 90-series module for use in a stackable hub, refer to Appendix A.



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Single Physical Stack

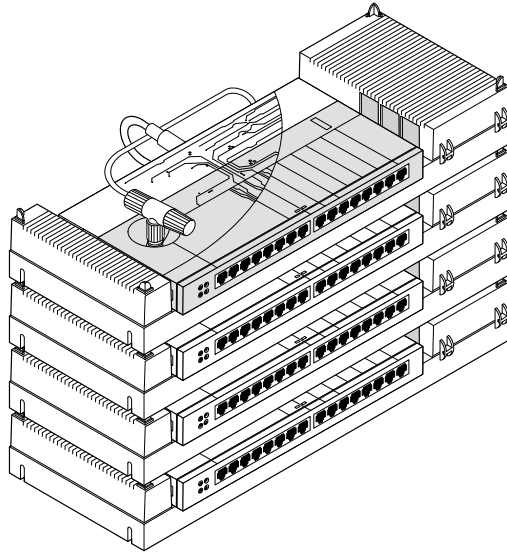
A single physical stack configuration can include:

- 1 management agent module (stack manager)
- 1 bridge module
- 1 to 12 additional Digital 90-series modules

A stack can include only one device acting as a management agent and only one bridge.

You may physically stack up to 14 hubs in this configuration. For stability, no more than 14 hubs should be assembled one on top of another. To configure a single physical stack, perform the following steps:

Step	Action
1	Place the first Digital MultiStack System stacking unit on a table or other surface.
2	Build your stackable Ethernet network one hub at a time. (Refer to Chapter 3.)



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Distributed Stack

A distributed stack configuration can include:

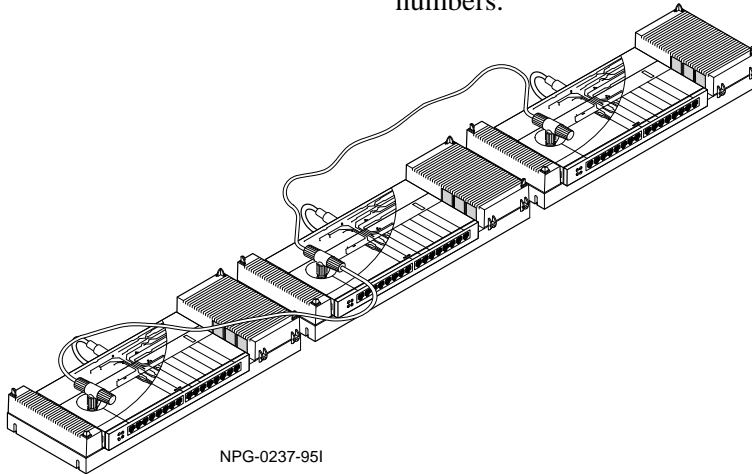
- 1 management agent module (stack manager)
- 1 bridge module
- 1 to 14 additional Digital 90-series modules

A stack can include only one device acting as a management agent and only one bridge.

You may distribute up to 16 devices in this configuration. To configure a distributed stack, perform the following steps:

Step	Action
1	Position the Digital MultiStack System module on a table or other surface.
2	Build your distributed Ethernet network. See Chapter 3 Installing the Digital MultiStack System Stacking Unit.

NOTE: Distributing your hubs may require longer ThinWire coaxial and management UTP cables than are supplied with the unit. See Appendix D for management port pin connectors and Appendix C for cable part numbers.



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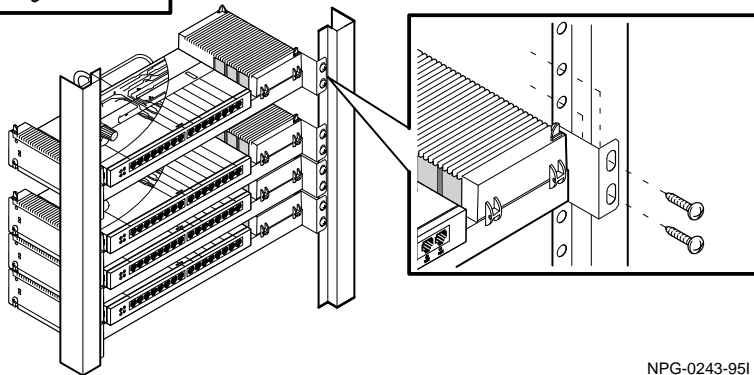
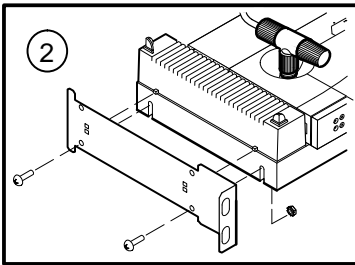
Rack or Cabinet

A rack- or cabinet-mounted configuration can include:

- 1 management agent module (stack manager)
- 1 bridge module
- 1 to 14 additional Digital 90-series modules

A stack can include only one device acting as a management agent and only one bridge. You may configure up to 16 devices in this configuration. To configure a hub in a rack or cabinet, perform the following steps:

Step	Action
1	Secure the rack or cabinet to ensure its stability.
2	Attach rack mounting brackets to the stacking unit shelf.
3	Attach the stackable hub to the rack by the mounting brackets. Insert the screws into the both holes on each side of the rack and secure locking nuts (not supplied).
4	Build your stackable Ethernet network. (Refer to Chapter 3.)



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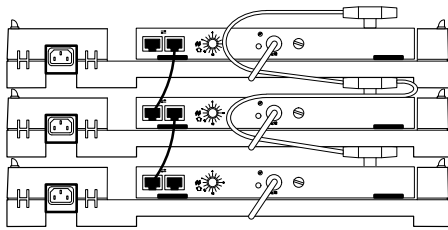
Configuring for Network Management

Management Connections

The Digital MultiStack System offers a wide range of networking functionality to the end user. One of the design considerations was to incorporate the entire breadth of the popular Digital 90-series modules in a stackable environment. The implementation of stack management is simple, and consistent with earlier products. This section details management configuration in the stack.

The Digital MultiStack System can support up to 16 stackable hubs in a single SNMP-managed stack. The stackable hubs are connected through the MJ-8 management channel connectors, located on the back of the stackable backplane, using "straight through" UTP cables. This management connection creates a serial line management bus between the stackable hubs, which serves as the management channel.

Continued on the next page.



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Configuring for Network Management (Continued)

Management Connections (Continued)

A short length of UTP cable is provided with each Digital MultiStack System. However, longer cable lengths may be used. The total cable length of the management channel for the stack may not exceed 420 meters.

The UTP cable is connected to either of the stacking unit's management connectors. The other end of the UTP cable is connected to either one of the MJ-8 management connectors on the next stacking unit. The second connector is then used to cascade the management network to the third stacking unit, and so on until all units are connected. UTP cabling may be Category 3 or Category 5.

For added resiliency of the management channel, the last hub in the stack may be connected back to the first device, creating a management channel ring. With this technique, the failure of any one management cable will not impact the manageability of the stack.

NOTE: Do not create a ring with the ThinWire data network. The network will not operate properly.

Since the management channel and the ThinWire coaxial data networks are separate, a stack may also be configured to have distinct LAN segments (for example, connected by a LAN switch) and one management channel. With this technique, a single management agent can manage a stack with multiple LAN segments. However, the bridge or switch used to interconnect these LAN segments will be managed separately.

Continued on the next page.

Configuring for Network Management (Continued)

Management Connections (Continued)

The Digital MultiStack System can be managed by Digital's SNMP-based HUBwatch network device management application (V4.1 or later). The application features a user friendly GUI (graphical user interface) that facilitates stack configuration and management.

Digital 90-series modules without integral SNMP agents can be managed in a stackable configuration using a management proxy agent. These management agents include the DECagent 90 (V3.0), DECrepeater 90TS (V2.0), and DECrepeater 90FS (V2.0). A management agent is assigned an IP address, which is used to manage the stack.

The DECrepeater 90TS and 90FS modules can serve as management agents for DECrepeaters. Backplane management, through the stacking unit's management channel, is used to manage the DECrepeaters.

The DECagent 90 can serve as an SNMP-proxy agent for the DECbridge 90, DECbridge 90FL, and DECserver 90L+, in addition to managing the DECrepeaters. The DECagent 90 must be installed in the same stack to manage repeaters. Since the DECagent 90 uses in-band proxy to manage the DECbridge 90 and the DECserver 90L+, it may be installed anywhere on the same LAN to manage these devices.

Devices with integral SNMP agents are still managed by their own IP address, even when installed in a stack configuration.

3

Installing the Digital MultiStack System Stacking Unit

- Installation Overview**
- Setting the Position Identifier Dial**
- Connecting the ThinWire Cable**
- Connecting the Management Cables**
- Connecting the Optional AUI Cable or MAU**
- Connecting the Power Supply**
- Verifying Stackable Hub Operation and Configuration**
 - Digital MultiStack System Stacking Unit LED States**
 - Digital 90-Series Device LED Status**

3-2 Installing the Digital MultiStack System Stacking Unit

Installation Overview

The combination of Digital 90-series modules provides solutions to virtually any networking need.

After you have planned the location and configuration of your stackable hub, you are ready to begin the installation of the Digital MultiStack System Stacking Unit.

To install a Digital MultiStack System hub, perform the following steps:

Step	Refer to this chapter's section called...
1	Setting the Position Identifier Dial
2	Connecting the ThinWire Cable
3	Connecting the Management Cables
4	Connecting the Optional AUI Cable or MAU
5	Connecting the Power Supply
6	Verifying Stackable Hub Operation – Digital MultiStack System stacking unit LED Status – Digital 90-Series Module LED Status

NOTE: To assemble a non-preassembled hub, refer to Appendix A for assembly instructions.

1	Setting the Position Identifier Dial
2	Connecting the ThinWire Cable
3	Connecting the Management Cables
4	Connecting the AUI Cable or MAU
5	Connecting the Power Supply
6	Verifying Stackable Hub Operation

Setting the Position Identifier Dial

If implementing a managed stack, each hub in the stack must be set to a unique position identifier. The position identifiers do not need to be sequential, but they must be unique.

If the stack is unmanaged, this step is not necessary. However, Digital recommends that you set the position identifier to a unique position in the event the stack becomes managed.

Setting the Position Identifier Dial

To set a Digital MultiStack System hub to its unique position identifier, perform the following steps:

Step	Action
1	Determine a unique position identifier for each stackable hub.
2	Set the position identifier dial so that the arrowhead on the dial points to the module's logical position. Refer to the following table for identifier positions.



Continued on the next page.

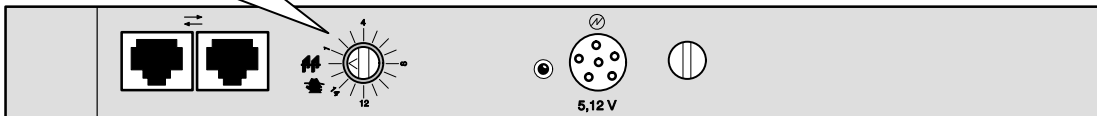
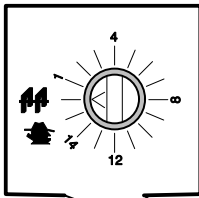
1	Setting the Position Identifier Dial
2	Connecting the ThinWire Cable
3	Connecting the Management Cables
4	Connecting the AUI Cable or MAU
5	Connecting the Power Supply
6	Verifying Stackable Hub Operation

Setting the Position Identifier Dial (Continued)

Setting the Position Identifier Dial (Continued)

Set the following position identifiers for Digital 90-series modules:

Position Identifier	Icon	Appropriate Devices
Management Agent		DECagent 90 (V3.0) DECrepeater 90TS (V2.0) DECrepeater 90FS (V2.0) Configured as stack manager. (Only one module in a stack can be a stack manager. Refer to the management agent's documentation for set up information related to implementing the stack manager.)
Bridge		DECbridge 90 DECbridge 90FL (only 1 bridge allowed per stack)
1 to 14 (unique)	(1 to 14)	Any Digital 90-series module (except the DECbridge 90 or DECbridge 90FL)



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1	Setting the Position Identifier Dial
2	Connecting the ThinWire Cable
3	Connecting the Management Cables
4	Connecting the AUI Cable or MAU
5	Connecting the Power Supply
6	Verifying Stackable Hub Operation

Setting the Position Identifier Dial (Continued)

Setting the Position Identifier Dial (Continued)

To change the position identifier dial on a device that is running, perform the following steps:

Step	Action
1	Set the position identifier to a new selection.
2	Using HUBwatch, select Reset on the Digital 90-series module's summary screen. (Refer to Chapter 3, step 6.), or
3	Power down the unit by detaching the AC power cord. Reconnect the AC power cord.

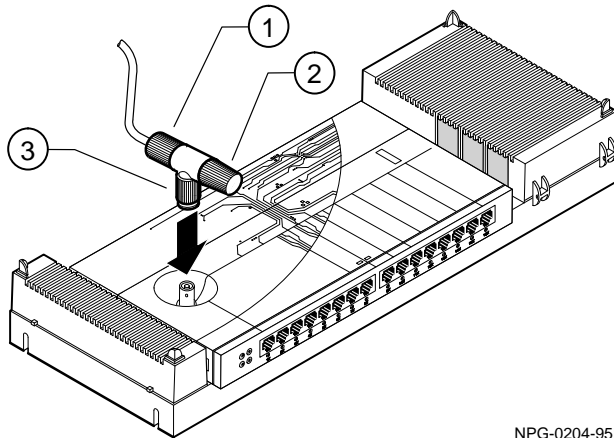
1	Setting the Position Identifier Dial
2	Connecting the ThinWire Cable
3	Connecting the Management Cables
4	Connecting the AUI Cable or MAU
5	Connecting the Power Supply
6	Verifying Stackable Hub Operation

Connecting the ThinWire Cable

To connect the ThinWire cable, perform the following steps:

NOTE: A T-connector **MUST** be used to connect to the hub's ThinWire interface.

Step	Action
1	Connect the ThinWire cable to one side of the T-connector.
2	Connect another ThinWire cable to the other side of the T-connector or attach a terminator. Both the first and last device in a ThinWire LAN segment must have a terminator attached to the T-connector. The total cable length must not exceed 185 meters, end-to-end.
3	Connect the T-connector to the BNC port on the Digital MultiStack System stacking unit, starting with the first hub in the stack.



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1	Setting the Position Identifier Dial
2	Connecting the ThinWire Cable
3	Connecting the Management Cables
4	Connecting the AUI Cable or MAU
5	Connecting the Power Supply
6	Verifying Stackable Hub Operation

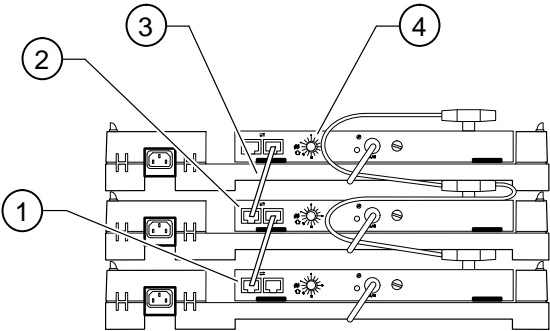
Connecting the Management Cables

The Digital MultiStack System allows the establishment of a separate management channel, in addition to the ThinWire data network. To establish the management channel, connect the management cables using the following steps.

Step	Action
1	Connect the UTP cable into one of the MJ-8 management channel connectors on the back of the stackable hub.
2	Connect the other end of that UTP cable to either of the MJ-8 management channel connectors on the next stackable hub.
3	Continue this sequence up the stack until all of the stackable hubs are connected.
4	As you proceed, check to ensure that the Position Identifier Dial is set to a unique setting on each hub. Ensure that the stack manager is set to position "agent."



Continued on the next page.



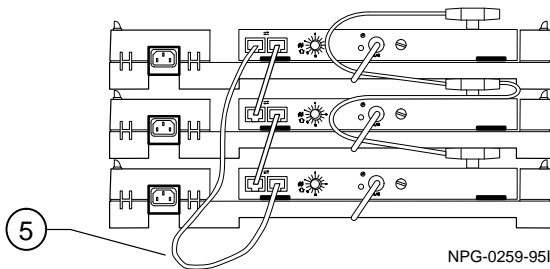
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1	Setting the Position Identifier Dial
2	Connecting the ThinWire Cable
3	Connecting the Management Cables
4	Connecting the AUI Cable or MAU
5	Connecting the Power Supply
6	Verifying Stackable Hub Operation

Connecting the Management Cables (Continued)

To create a management network ring, and complete the cable connections, perform the following steps:

Step	Action
5	For added resiliency, the last device may be connected to the first device, creating a management channel ring. If any one of the network management cables fail, the management channel remains intact. DO NOT create a ring with the ThinWire network. Improper Ethernet operation will result.
6	Refer to the management agent's documentation for setup information related to implementing the stack manager. Management agents include the DECrepeater 90TS (V2.0), DECrepeater 90FS (V2.0) and DECagent 90 (V3.0).



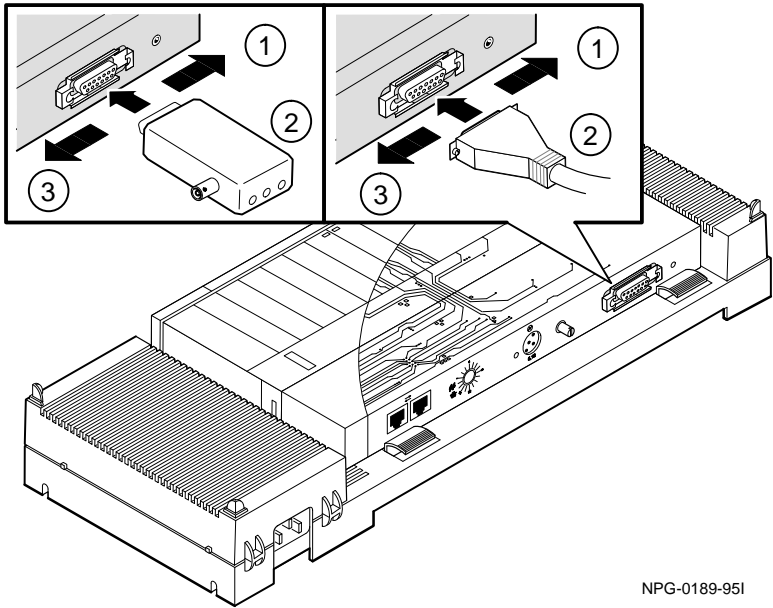
1	Setting the Position Identifier Dial
2	Connecting the ThinWire Cable
3	Connecting the Management Cables
4	Connecting the AUI Cable or MAU
5	Connecting the Power Supply
6	Verifying Stackable Hub Operation

Connecting an AUI Cable or MAU to the Optional AUI Port

To connect the stacking unit's optional AUI port, perform the following steps:

Step	Action
1	Slide the Digital MultiStack System hub's AUI cable connector latch to the unlocked position (right).
2	Insert the AUI cable or MAU into the AUI port and secure with the slide latch, as shown here.
3	Slide the AUI cable connector latch to the locked position (left).

NOTE: This optional AUI port is currently available only on the DECrepeater 90T-16. Order DETML-U* for the complete stackable hub with AUI or DETAX-U* for optional stackable backplane with AUI port only.



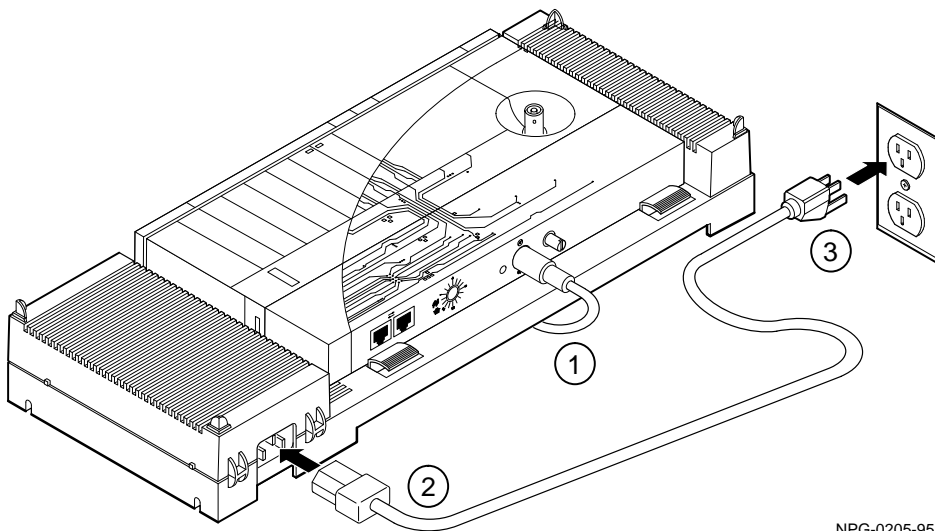
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1	Setting the Position Identifier Dial
2	Connecting the ThinWire Cable
3	Connecting the Management Cables
4	Connecting the AUI Cable or MAU
5	Connecting the Power Supply
6	Verifying Stackable Hub Operation

Connecting the Power Supply

To connect the power supply, perform the following steps:

Step	Action
1	Connect the power supply cable to the DIN power jack located on the stackable backplane (if not already connected).
2	Plug the AC power cord into the power supply.
3	Plug the AC power supply cable into a wall outlet. Doing so will power-up the Digital MultiStack System Stacking Unit.



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1	Setting the Position Identifier Dial
2	Connecting the ThinWire Cable
3	Connecting the Management Cables
4	Connecting the AUI Cable or MAU
5	Connecting the Power Supply
6	Verifying Stackable Hub Operation


Verifying Stackable Hub Operation and Configuration

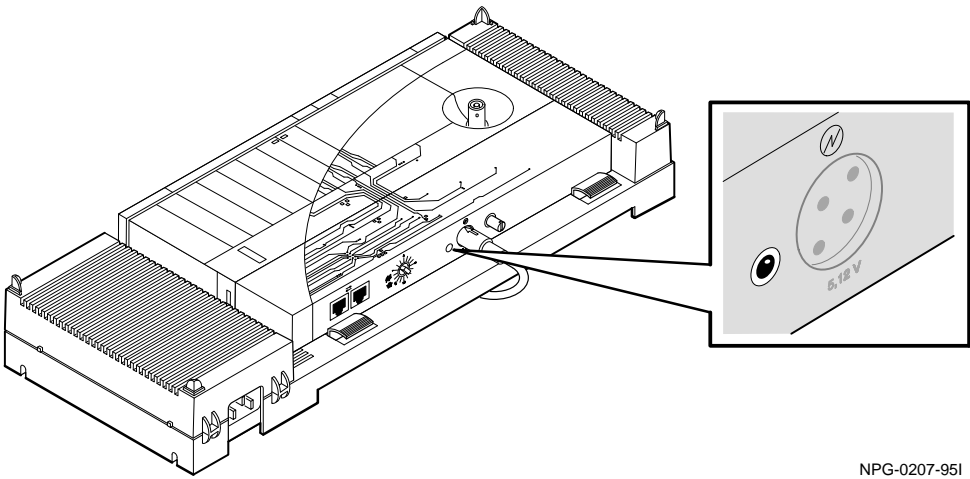
A self-test of your stackable hub's operation is performed upon power-up. LEDs located on the Digital 90-series module's front panel indicate the operational status of the module at power-up. The stackable hub's configuration can be verified using the HUBwatch GUI (graphical user interface).

For information about troubleshooting using LEDs, see Chapter 4, Troubleshooting a Stackable Hub.

Digital MultiStack System Stacking Unit LED Status

The following LED patterns indicate the operational state of a Digital MultiStack System stackable backplane.

LED	On	Off
Power 	Digital MultiStack System stackable backplane is receiving power.	Digital MultiStack System stackable backplane is not receiving power.








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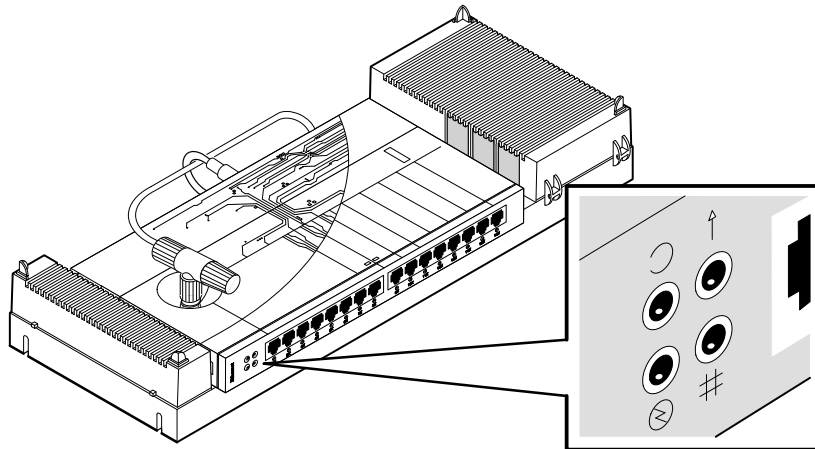
- 1 Setting the Position Identifier Dial
- 2 Connecting the ThinWire Cable
- 3 Connecting the Management Cables
- 4 Connecting the AUI Cable or MAU
- 5 Connecting the Power Supply
- 6 **Verifying Stackable Hub Operation**

Verifying Stackable Hub Operation and Configuration (Continued)

Digital 90-Series Module LED Status

The following LED patterns indicate the operational state of a Digital 90-series module.

LED	On	Off
Power 	Module receiving power	Module is not receiving power
Module OK 	Module passed self-test	Module failed self-test after one minute
Network OK 	Connected to network	No network connection
Network Activity  	Traffic on network	No network activity



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1	Setting the Position Identifier Dial
2	Connecting the ThinWire Cable
3	Connecting the Management Cables
4	Connecting the AUI Cable or MAU
5	Connecting the Power Supply
6	Verifying Stackable Hub Operation

Verifying Stackable Hub Operation and Configuration(Continued)

HUBwatch GUI

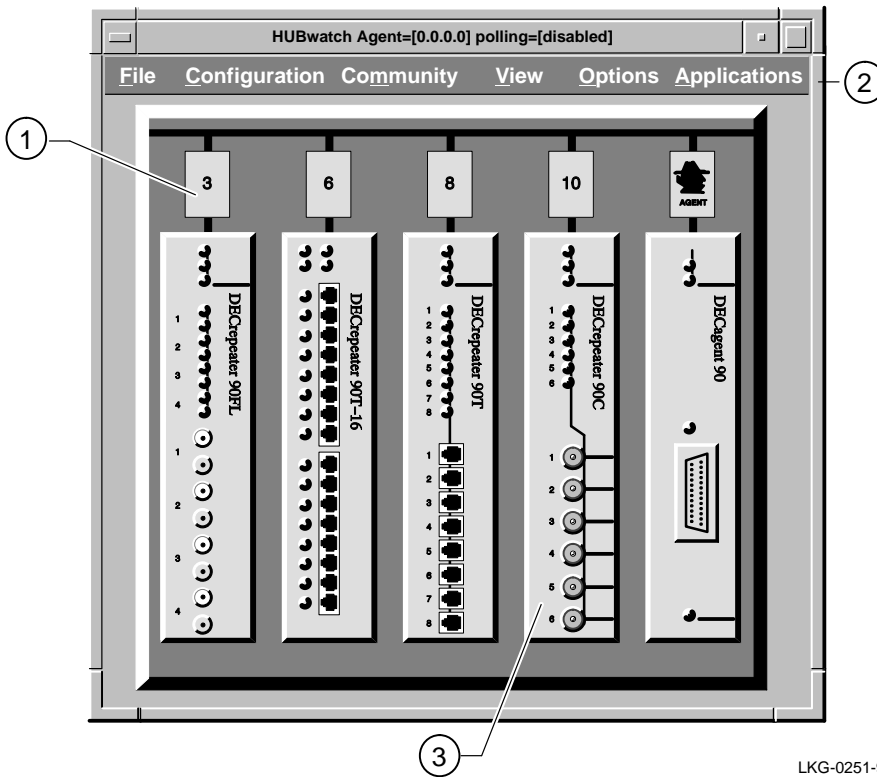
To verify the configuration of a stackable hub, use the HUBwatch GUI (graphical user interface), which provides a graphical representation of each Digital 90-series module in the stack. Use this information to confirm desired configuration of the module. This interface displays the type of module and the port status of each module in the stack. The illustration on the following page is an example of the HUBwatch Stack Management View.

- 1 Setting the Position Identifier Dial
- 2 Connecting the ThinWire Cable
- 3 Connecting the Management Cables
- 4 Connecting the AUI Cable or MAU
- 5 Connecting the Power Supply
- 6 **Verifying Stackable Hub Operation**

Verifying Stackable Hub Operation and Configuration(Continued)

HUBwatch GUI (Continued)

Item	Component	Description
1	Logical Position Identifier	Represents the logical position of a module in a stack.
2	Toolbar	Lists available options for configuring a stackable hub.
3	Graphical Display	A sample representation of Digital 90-series modules in the stack.



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1	Setting the Position Identifier Dial
2	Connecting the ThinWire Cable
3	Connecting the Management Cables
4	Connecting the AUI Cable or MAU
5	Connecting the Power Supply
6	Verifying Stackable Hub Operation

Verifying Stackable Hub Operation and Configuration(Continued)

HUBwatch GUI (Continued)

For more detail about a module, point and double click on that device. A detailed screen will appear.

If HUBwatch shows fewer modules than are in the stack, check to ensure that each hub has a unique position identifier.

If you change a hub's position identifier, **Reset** the module using HUBwatch, or power-cycle the hub (refer to Chapter 3, Setting the Position Identifier Dial, step 1) and refresh the HUBwatch screen.

To access the **Reset** option, select the module on the HUBwatch Stack Management View and double click. The next screen that appears is the Module Summary View. The **Reset** option is located at the bottom of the screen.

To refresh the HUBwatch screen, pull down **Options** from the main screen's toolbar, select **Refresh** or **Enable Polling** to have HUBwatch refresh on a continuous basis.

Refer to the HUBwatch user's guide for specific module management information.

Troubleshooting a Stackable Hub

- ❑ **Diagnosing with LEDs**
 - ❑ **Digital MultiStack System LED States**
- ❑ **Checking Cables**

Diagnosing with LEDs

LEDs provide easy-to-read hub status information and troubleshooting assistance.

To diagnose problems with the Digital MultiStack System, use the LEDs located on the functional module's front panel and on the stackable backplane.

Digital MultiStack System LED States

Symptom	Probable Cause	Corrective Action
Stackable Backplane Power LED off	No power to the stacking unit.	Check that power cables to the stacking unit and between the power supply and the wall outlet are secure. Check the wall outlet ensure there is power available. If not, check the outlet's circuit breaker. If the problem persists: <ul style="list-style-type: none">– try the power supply with another Digital 90-series module– replace the power supply, or– replace the stacking unit
Optional AUI LED is off	Invalid, or no AUI Connection.	Check the AUI connection to ensure good contact. Module cannot use AUI. Only the DECRepeater 90T-16 supports the AUI port.

Checking Cables

All cable connections should be checked to ensure they are properly connected. Proper cabling instructions are described in Chapter 3 Installing the Digital MultiStack System Stacking Unit.

Before connecting cables, ensure that the network configuration complies with the configuration guidelines in the Chapter 2 Configuring a Stackable Ethernet Network. Restrictions on cable types and lengths may apply.

A

Digital MultiStack System Assembly

- Assembling a Digital MultiStack System**
- Disassembling a Digital MultiStack System**

Assembling a Digital MultiStack System

Some Digital 90-series stackable hubs are preassembled at the factory. If your stackable hub is not preassembled, follow this procedure. If you are currently using your module in a standalone configuration, remove the module's power supply and standalone rear cover before you begin this procedure.

To attach a Digital 90-series module onto a Digital MultiStack System stackable hub, perform the following steps and refer to the illustration on page A-5.

Step	Action
1	Remove the untapped grounding screw from the module and replace it with the tapped grounding screw supplied.
2	Attach the Digital 90-series module by inserting the mounting tab on the rear of the Digital 90-series module into the slot on the rear of the Digital MultiStack System stackable backplane.
3	Align the 48-pin male connector on the Digital 90-series module with the 48-pin female connector on the Digital MultiStack stackable backplane and press together firmly.
4	Tighten the retaining screw on the Digital MultiStack System stackable backplane.

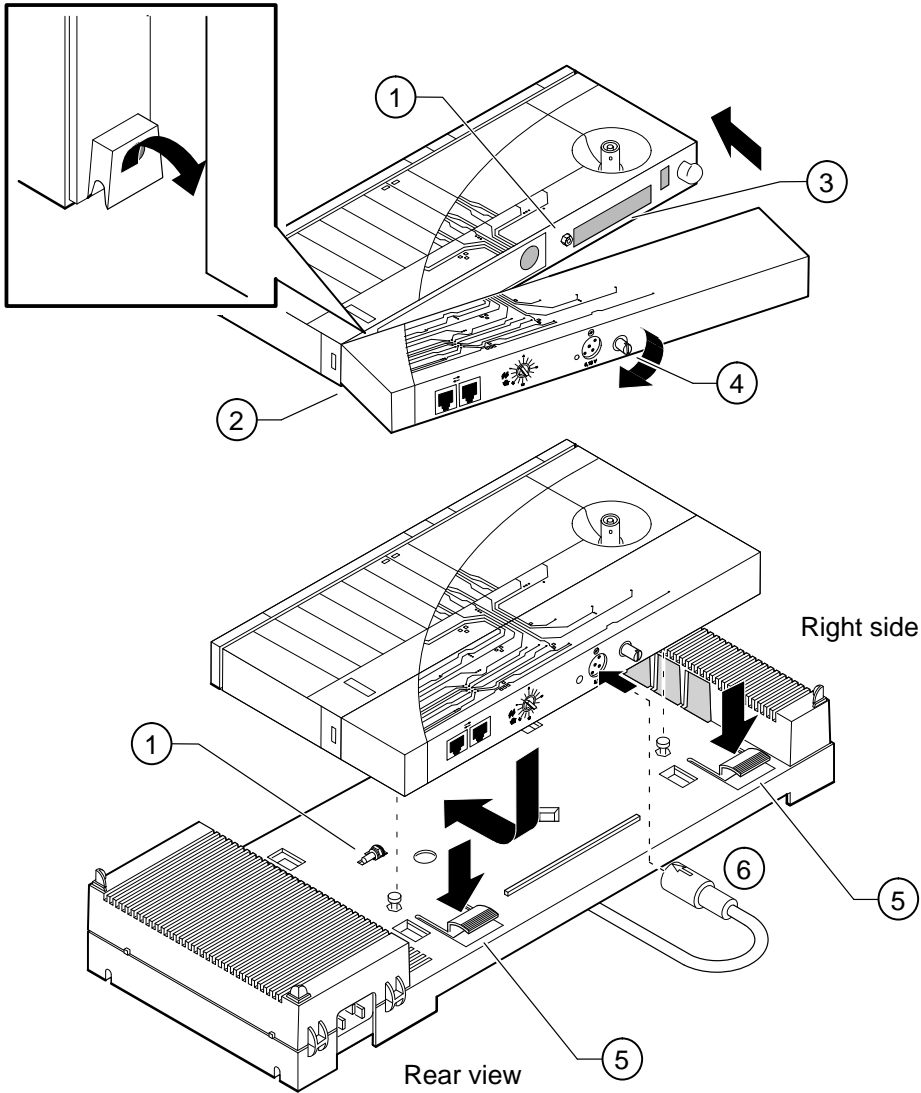
Continued on the next page.

Assembling a Digital MultiStack System (Continued)

Step	Action
5	<p>Slide the Digital MultiStack System hub assembly into the plastic shelf to attach at the locking tabs.</p> <p>Align the hub assembly with the key studs, by keeping the hub assembly to the right (from the rear of the shelf).</p> <p>Press down and forward, as shown.</p>
6	<p>Connect the power supply cable to the DIN power jack. Use the power supply that was supplied with the stacking unit.</p>

Continued on the next page.

Assembling a Digital MultiStack System (Continued)



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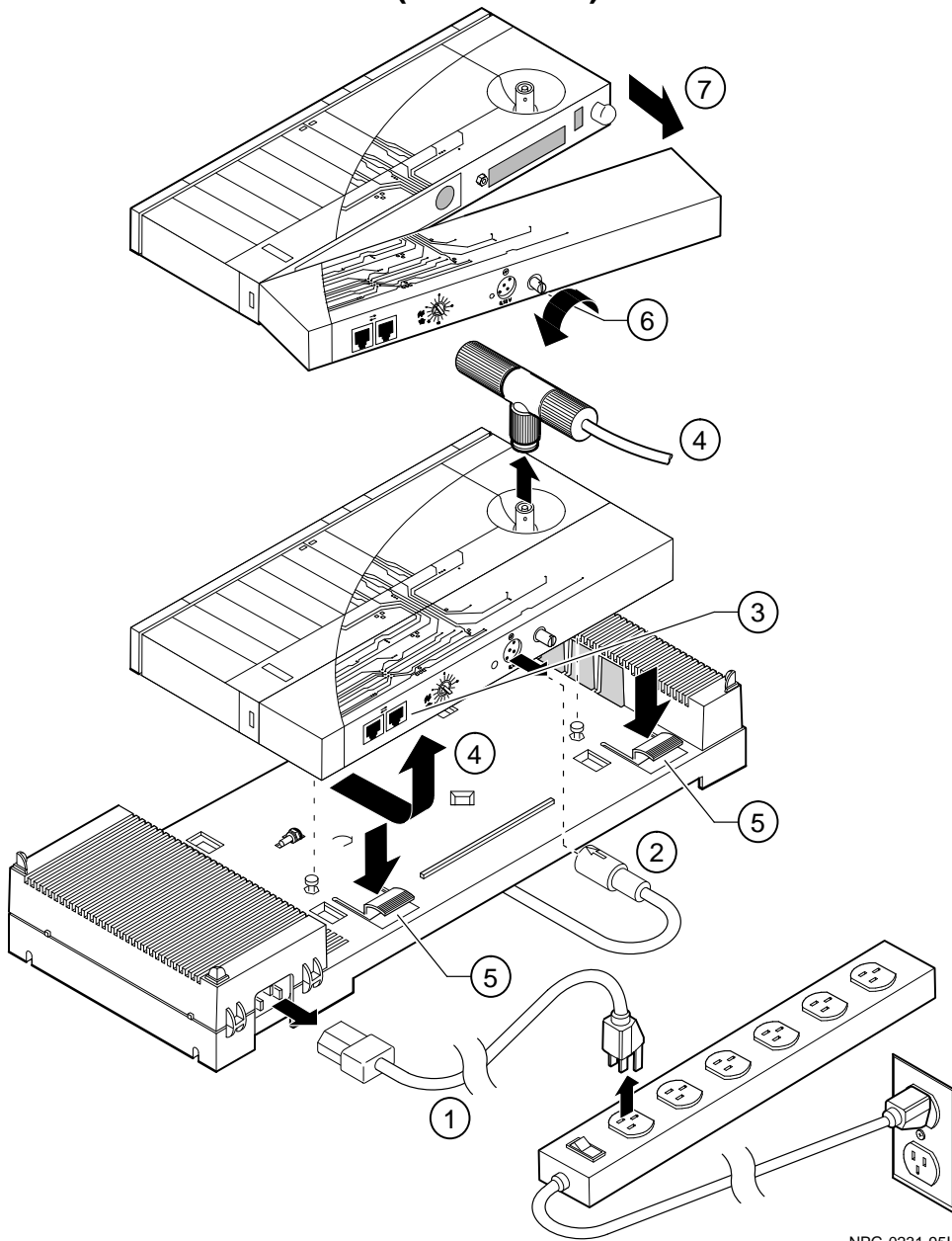
Disassembling a Hub

To disassemble a hub, perform the following steps:

Step	Action
1	Remove the power cable from the wall outlet, and the power supply.
2	Remove the DIN power plug from the stackable backplane.
3	Remove the management cabling.
4	Remove the T-connector and ThinWire cabling.
5	Depress the locking tabs. Pull the hub toward the rear of the stacking unit, and up to release from the locking tabs. Remove the Digital 90-series module with the stackable backplane from the stackable shelf.
6	Loosen the retaining screw.
7	Detach the Digital MultiStack System hub by separating the Digital 90-series module from the stackable backplane.

Continued on the next page.

Disassembling a Hub (Continued)



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B

Product Specifications

- Electrical Specifications**
- Physical Specifications**

Electrical Specifications Stackable Backplane

Module Backplane	Rating	Stackable Backplane with Digital 90-Series Module
DETRX Stackable Backplane	0.07 A @ 5V 0.00 A @ 12V (0.35 W)	Refer to the module's specifications.
DETAX Stackable Backplane with AUI	0.07 A @ 5V 0.50 A @ 12V (6.35 W) supplied for external AUI	Refer to the module's specifications.

NOTE: Power consumption will vary depending upon the type of Digital 90-series module that is connected to the stackable backplane. Total power consumption will be the total of the stackable backplane and the Digital 90-series module.

Physical Specifications

Stacking Unit

	Stacking Unit Rating	Maximum Rating with Module
Height	2.7 in (6.86 cm)	2.7 in (6.86 cm)
Width	17.5 in (44.45 cm)	17.5 in (44.45 cm)
Depth	7.9 in (20.07 cm)	7.9 in (20.07 cm)
Stackable backplane only	.5 lbs (.23 kg)	
Power Supply	1.0 lbs (.45 kg)	
Shelf only	1.5 lbs (.68 kg)	
Total Weight	3.0 lbs (1.36 kg)	* Refer to the module's specifications.

NOTE: * Add stacking unit weight to the module's weight for the total weight.

C

Cabling Specifications

- UTP Management Cables
- Ethernet ThinWire Coaxial Cables

The following table lists the Digital part numbers for cables used with stackable hubs:

UTP Management Cables

Part Number	Length
BN25G – 0E	0.5 m (.55 ft)
BN25G – 01	1.0 m (1.09 ft)
BN25G – 03	3.0 m (3.28 ft)
BN25G – 04	4.0 m (4.37 ft)
BN25G – 07	7.0 m (7.66 ft)

Ethernet ThinWire Coaxial Cables

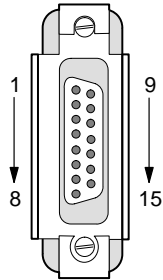
Part Number	Length
BC16K – 02	2.0 m (2.19 ft)
BC16K – 10	10.0 m (10.94 ft)

D

Connector Pin Assignments

- AUI Port Connector**
- Management Port Connector**

AUI (15-pin D-Sub) Port Connector

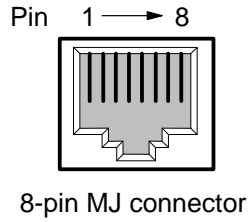


15-pin AUI
connector

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Pin	Ports
1	Ground
2	CI+
3	DO+
4	Ground
5	DI+
6	Power return
7	NC
8	Ground
9	CI-
10	DO-
11	Ground
12	DI-
13	Power (12V)
14	Ground
15	NC

Management Port Connector



Pin	Assignment
1	Command+
2	Command-
3	Response-
4	Unused
5	Unused
6	Response+
7	Unused
8	Unused