DECrepeater 90T Owner's Manual

Order Number   EK–DETMR–OM.001

Digital Equipment Corporation

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About This Manual

This guide describes how to install, operate, and maintain the Digital Ethernet Twisted Pair Multiport Repeater - the DECrepeater 90T. The DECrepeater 90T is a 9-port repeater designed for standalone operation or as a managed repeater in the DEChub 90 Ethernet backplane.

Organization

This manual contains five chapters and three appendices.

- Chapter 1 provides an overview of the Ethernet Twisted Pair Multiport Repeater and briefly describes the product's features.

- Chapter 2 describes the configuration rules and conditions of operation for the Ethernet Twisted Pair Multiport Repeater in a ThinWire Ethernet system or standard Ethernet network.

- Chapter 3 provides instructions for installing the Ethernet Twisted Pair Multiport Repeater.

- Chapter 4 provides information on managing the Ethernet Twisted Pair Multiport Repeater on a network.

- Chapter 5 provides basic troubleshooting information.

- Appendix A details the system specifications and the parts list.

- Appendix B provides a list of related documents to help you become more familiar with your new system.

- Appendix C provides more detailed information on management issues.

Conventions

Convention	Meaning
NOTE	Provides general information.
❶	A number in a black circle in text refers to the corresponding number in an accompanying illustration.
SHOW ADDRESS	In text, commands are shown in all upper case letters to differentiate them from regular text. For the VMS operating system, you can enter commands in either upper case or lower case letters. For the ULTRIX operating system, commands must be entered as indicated in the examples.
`DECbridge>`	Text that the system displays on the screen is shown in monospaced type.
`SHOW REPEATER 1`	Text that you enter is shown in bold monospaced type.

1
INTRODUCTION

This chapter describes the DECrepeater 90T features and summarizes the installation procedures.

Features

The DECrepeater 90T has the following features:

- Eight twisted pair ports

- One ThinWire port

- Operates as a standalone unit or as a managed repeater in a DEChub 90 with a DECbridge 90

- Backplane installable

The DECrepeater 90T is a 9-port repeater designed for the IEEE 802.3 CSMA/CD networks. The DECrepeater 90T has one ThinWire port and eight twisted pair ports. The ThinWire port complies with the IEEE 802.3 standard for 10Base2 networks. The twisted pair ports comply with the same standard for 10BaseT.

The repeater can be used in a standalone configuration or as a managed repeater when it is installed in a Digital DEChub 90 Ethernet backplane with a DECbridge 90. When operating as a standalone repeater, it is a 9-port unmanaged repeater with a separate power supply connected to the unit by a cable with a 7-pin connector. The power supply is modular and accommodates either a North American 120 Volt or an international auto-ranging 240 Volt wall outlet. The following figure shows a typical configuration of the DECrepeater 90T in an Ethernet Local Area Network (LAN).

2   INTRODUCTION

```
┌ ─  ─  ─  ─  ─  ─  ─  ─  ─  ─  ─  ─  ─  ┐
│                                                                      │
│  ┌──────────────┐  ┌─────────┐  ┌──────────────┐  ┌─────────────┐  │
│  │ WORKSTATION  │  │   PC    │  │ WORKSTATION  │  │  DECSERVER  │  │
│  └──────────────┘  └─────────┘  └──────────────┘  └─────────────┘  │
│                                                                      │
│  ┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐ │
│  │ DECrepeater 90T  │   │ DECrepeater 90C  │   │  DECserver 90L  │ │
│  └──────────────────┘   └──────────────────┘   └──────────────────┘ │
│          Work Group    ThinWire      Segment                        │
│                                                                      │
│                   ┌──────────────────────┐                          │
│                   │    DECbridge 90      │                          │
│                   │  Work Group Bridge   │                          │
│                   └──────────────────────┘                          │
│ Work Group                                                          │
└ ─  ─  ─  ─  ─  ─  ─  ─  ─  ─  ─  ─  ─  ┘
                 Ethernet         Backbone

  ┌──────────────┐   ┌──────────────┐   ┌──────────────┐
  │  COMPUTER 1  │   │  COMPUTER 2  │   │    SERVER    │
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```
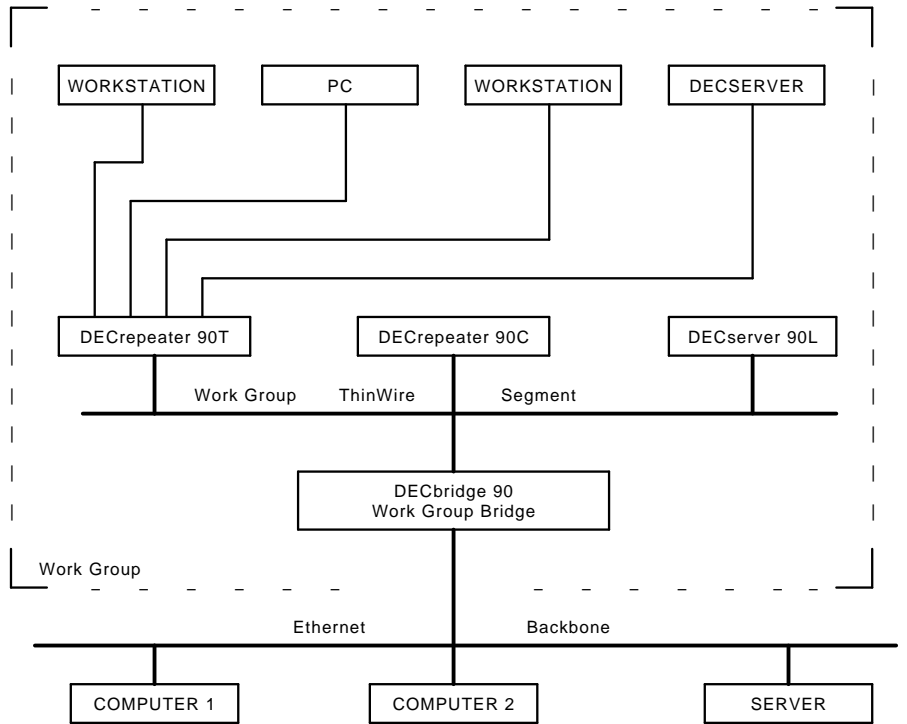
Quick Start

The DECrepeater 90T is easy to install and use. It does not require any programming or other assistance from system management. After unpacking the unit:

1. Plug the connector from the power supply into the DECrepeater 90T, then plug the power supply into a working ac wall outlet.

   All LED indicators should be on. Only the Network Activity LED turns on and then off.

2. Connect the unit to a properly terminated ThinWire Ethernet segment.

3. Connect any personal computers, workstations, or other 10BaseT devices using a straight-through pin-to-pin cable to each of the ports you plan to use.

   The Port Status Activity LEDs for unconnected ports should be off when network traffic is established.

For more detailed information on configuring the DECrepeater 90T refer to Chapter 2. For more detailed information on installing and using the DECrepeater 90T refer to Chapter 3.

LEDs and Connectors

The next table describes the DECrepeater 90T LEDs and connectors, shown in the illustration following the table.

Table 1–1 Status LEDs

❶	⊘	**DC OK** - When on, this LED indicates that the +5.0 VDC voltage is normal. When off, the LED indicates that the voltage is abnormal (for example, in a power failure.)
❷	◯	**NETWORK ACTIVITY** - This LED is on when network traffic is being repeated. The LED is off when there is no network activity.
❸	⊞	**PORT 0 STATUS** - When on, this LED indicates that the functional status of PORT 0 is operational. When off, it indicates that Port 0 has failed or a partitioned port condition exists. If the LED is blinking the port has been partitioned by management.
❹		**Port Status Activity Indicator** - There are eight green Port Status Activity LEDs that are used to monitor the port activity. The top Port Status Activity LED represents Port 1 and the bottom LED represents Port 8. When on, the LEDs indicate that the functional status of the represented port is operational. If the LED is blinking the port has been partitioned by management.
❺		**Port 0 Network Connector (BNC)** - This connects the DECrepeater 90T to the work group ThinWire segment. It is not used when the unit is installed in the DEChub 90 backplane.
❻	**X**	**Port Connector (MJ)** - These eight connectors are used to connect workstations and PCs to the DECrepeater 90T. These connectors have internal crossovers (indicated by the **X**.)
❼		**Power Connector** - Receives +5 volts from the DECrepeater 90T power supply. It is not used when the unit is installed in the DEChub 90 backplane.
❽		**Backplane Connector** - This provides network and power connections to the DECrepeater 90T when it is installed in the DEChub 90 backplane.
❾		**Back Cover** - This is used with standalone units only. It covers the backplane connector and mounting assembly.
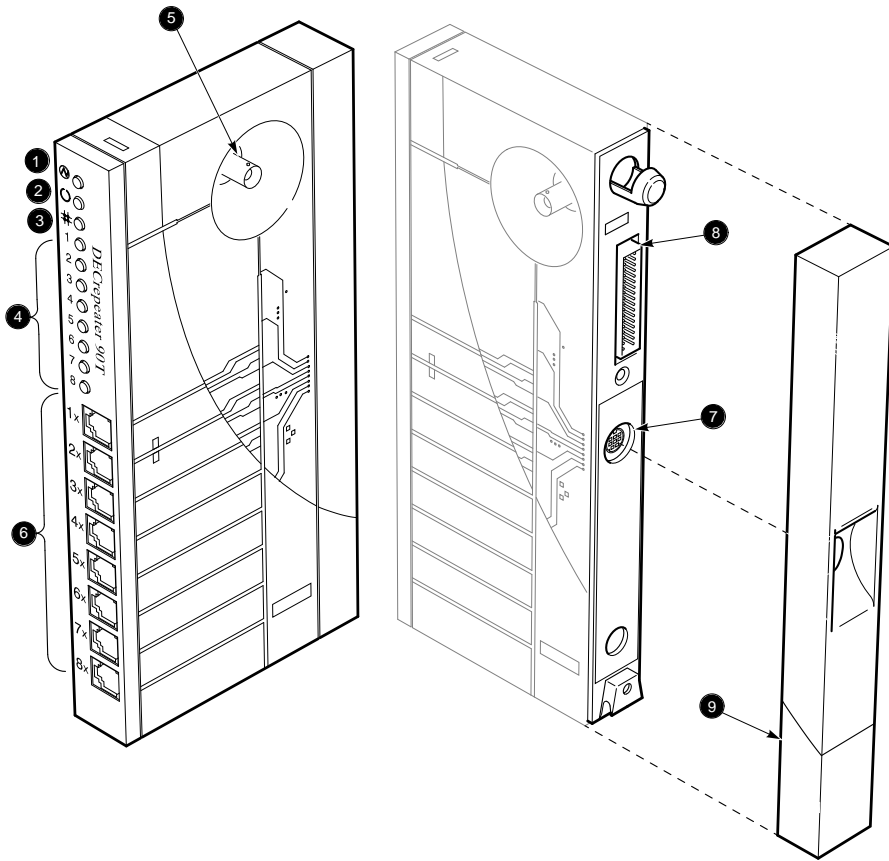
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2
Configuration

This chapter contains the configuration rules you must follow for correct installation of the DECrepeater 90T.

This chapter also contains information on port partitioning and the different operations that cause the ports to partition. The DECrepeater 90T does not require any special instructions for it to operate correctly.

Configuration Rules

The following table contains the basic rules for ThinWire and Twisted Pair segments.

Table 2–1   Basic Configuration Rules

Segment	Rule
ThinWire	Maximum length: 185 Meters. Each ThinWire segment must always be terminated with a 50 ohm terminator at each end.
Twisted Pair	Maximum length: 100 Meters. Twisted pair segments do not require termination. The 10BaseT standard specifies the Twisted Pair cabling performance requirements for applications of single and multiple 10BaseT services in a single cable, and specifies the allowable attenuation (loss) between the 10BaseT transmitter and receiver. Digital supports multiple 10BaseT services in a single cable that meet the 10BaseT requirements for cable performance and end-to-end loss. Contact your local Digital Authorized Sales Representative for information about support for other shared services.

Port Partitioning

Any messages or data packets received from any port by the repeater
are transmitted to all ports. The corresponding LED displays the port
status and the port partition activity. The LED is on when the port is
either active or not partitioned, and it is off when nothing is connected to
the port or the port is autopartitioned. When the port is partitioned by
management, the LED flashes approximately twice a second, independent
of any other partitioning.

The DECrepeater 90T status LEDs show the status of the repeater. The
status may or may not be a fault of the repeater. Table 2–2 contains
both repeater fault and non-repeater fault conditions. Each port is
automatically controlled and can be partitioned for any of the reasons
in the following table:

Table 2–2   DECrepeater 90T Fault and Non-fault conditions

LED	Fault	Non-fault
Port 0 Off	Open or shorted cables, or cables incorrectly terminated or connected without a T-connector	Nothing connected to the port
Port 0-8 Flashing	—	Partitioned by management
Port 1-8 Off	Open or shorted cables, or cables improperly terminated	Nothing connected to the port

3
INSTALLATION

The DECrepeater 90T can be placed on a table, mounted to a wall, or installed in a DEChub 90 Ethernet backplane. Refer to the standalone installation procedure to mount the unit to a wall. Refer to the backplane installation procedure to install the unit in a DEChub 90 Ethernet backplane.

Standalone Installation

Table Mounting

When you place the DECrepeater 90T on a table top, your only requirement to follow the environmental specifications found in Appendix A.

Wall Mounting

Select a location for the unit. The location should have access to a wall outlet to supply the required voltage.

To wall-mount the unit, perform the following procedure:

1. Remove the back cover of the unit.

   a. Insert a small screwdriver into the top mounting hole located on the cover.

   b. Lift the internal latch with the screwdriver and pull the cover away and down from the top of the unit.
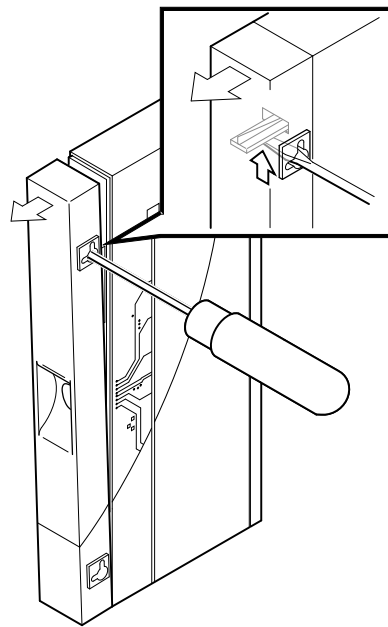
LJ-00320-TI0

2. Locate the placement for the mounting screws.

3. Secure the cover to the wall using the mounting screws.

    The screws should be tight enough to provide resistance if you try to
    remove the back cover from the wall. Do not make them so tight that
    the cover is distorted or cannot be removed from the wall.

4. Remove the back cover from the wall.

5. Attach the back cover to the repeater.

6. Mount the repeater onto the mounting screws.
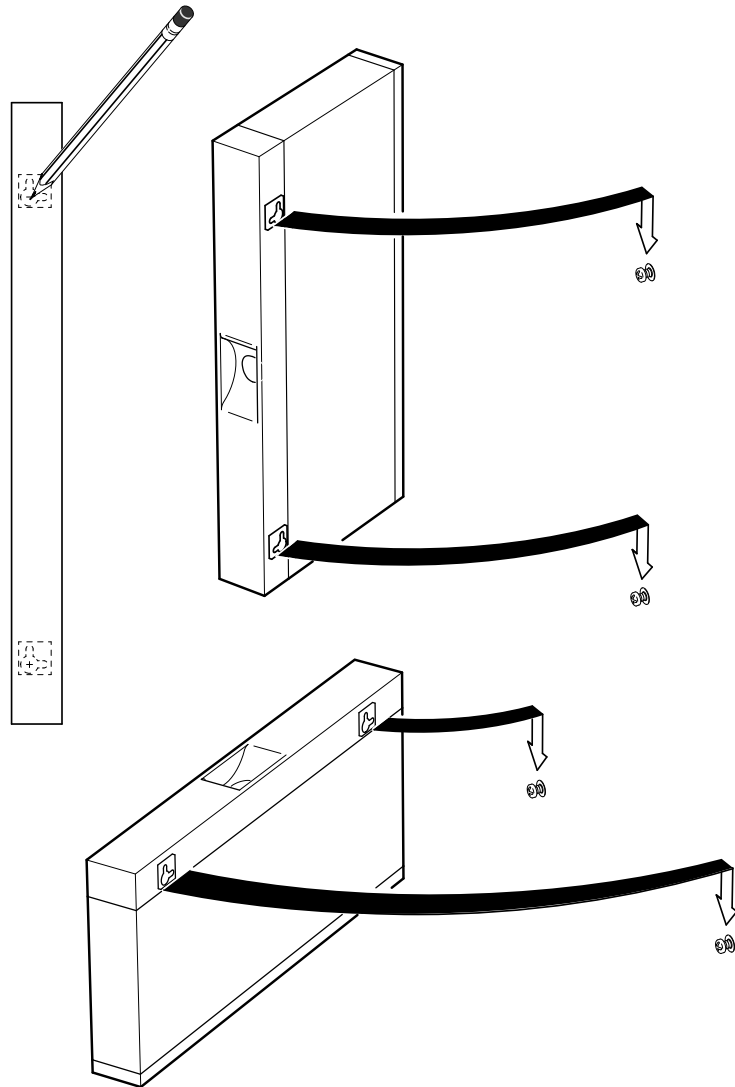
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Connect the cables.

1. Connect the cable from the power supply to the 7-pin power connector on the DECrepeater 90T. Align the power symbol on the dc power connector with the power symbol on the DECrepeater 90T and push straight in.

2. Connect the DECrepeater 90T to the power supply.

    *   For a 240-volt wall outlet, connect the power supply cord to the modular power supply, then to the wall outlet.

    *   For a 120-volt wall outlet, connect the power supply directly to the wall outlet.

3. All the LED indicators turn on for approximately one-half second of initial power up, then only the Network Activity LED turns off.

4. Connect the Ethernet ThinWire T-connector to the Port 0 BNC Network connector. Terminate the T-connector with a 50 ohm terminator or extend the Ethernet segment to the next device.

5. The Port 0 Status Activity LED should be on at varying intensities or blinking to indicate the amount of traffic on the network.

6. Connect the Twisted Pair cables to ports 1-8.

50 Ohm
Terminator

T-Connector

DECrepeater 90T

PC
or
Workstation
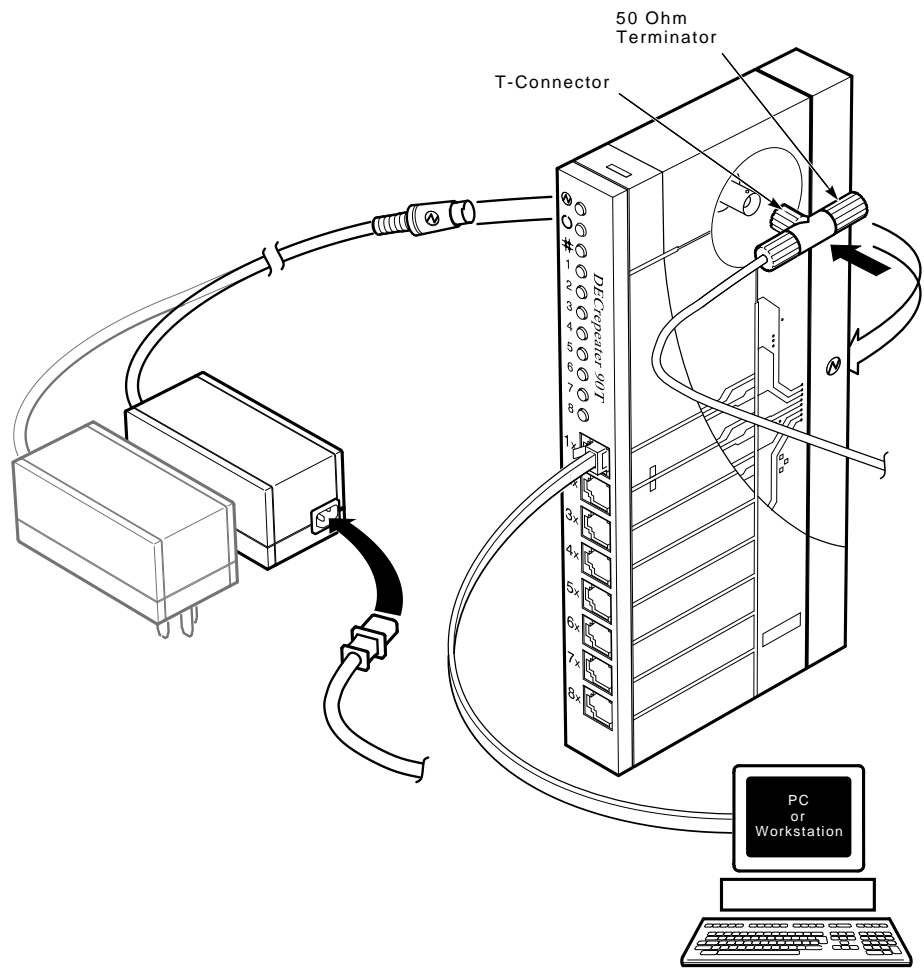
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Install and Verify Devices.

> **NOTE**
> **The DECrepeater 90T performs the crossover twisted pair cable function internal to the unit. Point-to-point wiring is used when connecting a device to any of the twisted pair ports.**

1. Connect devices to the repeater ports using the 8-pin MJ Connectors. The port LEDs illuminate.

> **NOTE**
> **When the repeater port is properly terminated and network activity is first received the port LED illuminates.**

2. Verify the operation of each port by sending information to the device being tested.

Backplane Installation

To install the DECrepeater 90T in the DEChub 90 Ethernet backplane, perform the following procedure:

1. Remove the back cover of the unit.

    a. Insert a small screwdriver into the top mounting hole located on the cover.

   b. Lift the internal latch with the screwdriver and pull the cover away and down from the top of the unit.
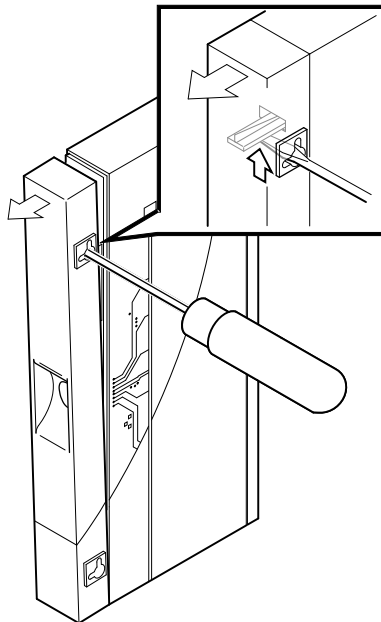
LJ-00320-TI0

2. Install the unit in the backplane. Place the lower mounting tab,
    located on the back of the DECrepeater 90T, into the correct mounting
    slot on the backplane.

3. Rock the unit into place. An audible "click" is heard when the unit
    securely latches in place.

    NOTE
    **The DECrepeater 90T can be installed into or removed from
    the DEChub 90 Ethernet backplane while power is supplied to
    the backplane (hot-swap).**

4. Supply power to the backplane (new installations only).

5. All LEDs turn on at either initial power up or when the DECrepeater
    90T is initially plugged into the backplane. After approximately
    one-half second the Port 0 Status LED turns on with intensity
    proportionally to the amount of activity on the port. The Port Status
    LEDs will also turn on.

NOTE
The Port Status LEDs that indicate unconnected ports should be off when network traffic is established.
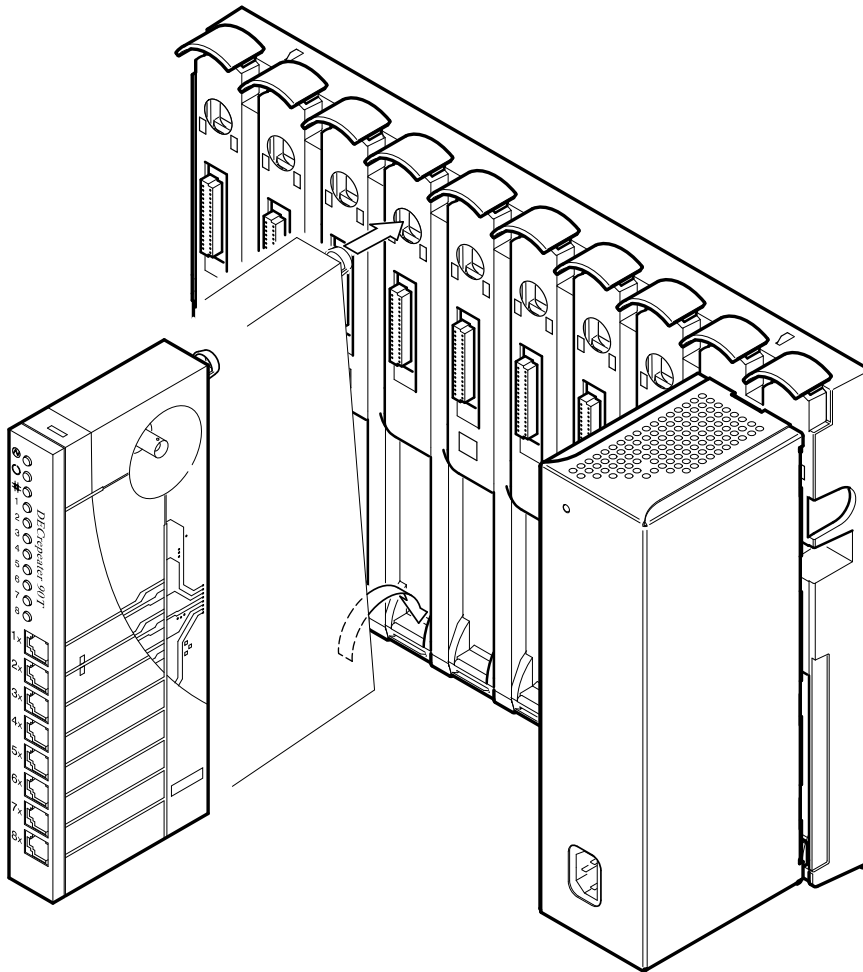
LJ-00704-TI0

Install and verify devices.

1. Connect devices to the repeater ports using the 8-pin MJ connectors. The LEDs illuminate.

    NOTE
    The DECrepeater 90T performs the twisted pair crossover cable function internal to the unit. Point-to-point wiring is used when connecting a device to any of the twisted pair ports.

2. Verify the operation of each device you plan to use by connecting and sending information to the each port you have connected.

4
Management

Managing the DECrepeater 90T

The DECrepeater 90T is managed on-line using a DECbridge 90 in a DEChub 90. All commands that affect the DECrepeaters are part of the DECbridge 90 command set.

Functions

On-line management allows you to perform the following functions on the DECrepeater 90:

- Identify all repeaters in the DEChub 90.

- Examine port status (enabled, disabled, properly operating, or inoperative) of repeater ports that share the DEChub 90 backplane with a bridge.

- Examine the work group address database entries 1 to 200, annotated with the repeater port to which each is attached, if any.

- Reset any repeater in the DEChub 90 backplane.

- Enable or disable a repeater port.

- Define the bridge password.

Refer to the section Command Descriptions, in this chapter, for additional information on command syntaxes.

Components Needed

The following are the necessary components for on-line management of a DECrepeater 90T.

- DEChub 90

- DECbridge 90

- DECrepeater 90T

Accessing the Maintenance Operations Protocol from VMS

On the VMS operating system, the Maintenance Operations Protocol (MOP) console carrier is included as part of the Network Control Program (NCP) facility, which requires a DECnet license.

You do not need increased user privileges to use NCP. To establish a console carrier session, you must know the Ethernet address of the bridge that is to be managed and the Ethernet name of the circuit that contains the bridge. A VMS system may have more than one Ethernet interface, therefore the circuit name is needed. The Ethernet address should be on the label on the front panel of the DECbridge 90. The following Ethernet circuit names, based on system type, apply:

- VAX 6000 and 9000 computers XMI = MNA-0

- BI-based systems (VAX 6300 and VAX 6400 computers) = BNA-0

- VAX 4000 computer series = ISA-0

- MicroVAX computer and VAX 3600 and 3900 computers = QNA-0

- VAXstation 2000 and 3000 system series = SVA-0

- VAX–11/780 and VAX–11/785 computers (Unibus) = UNA-0

If the bridge address is 08-00-2B-01-23-45 and the Ethernet circuit name is SVA-0, a typical VMS system command line to establish the session from a VAXstation 3100 computer would be:

```
$  MCR NCP CONNECT VIA SVA-0 PHYSICAL ADDRESS 08-00-2B-01-23-45
```

When you have established connection, the screen displays the following:

```
Console connected (press CTRL/D when finished)
```

NOTE
**If you need to access a specific bridge repeatedly, you can enter
the Ethernet address for it in the NCP database. This is usually
done by choosing an arbitrary address in area 13. Bridge names
entered in the NCP database may be a maximum of six characters.
The following is an example of the NCP definition if you call your
bridge DBRG1 on address 13.87 and access it from a VAX 6400
computer (where the Ethernet circuit name is bna-0).**

```
$  NCP
NCP>  DEFINE NODE DBRG1 ADDRESS 13.87 HARDWARE 08-00-2b-01-23-45
SERVICE CIR BNA-0
NCP>  SET NODE DBRG1 ALL
```

To access the bridge, type:

```
$  NCP CONNECT NODE DBRG1
```

Accessing the Maintenance Operations Protocol from ULTRIX

On the ULTRIX operating system, the console carrier is a separate utility
included as part of the Maintenance Operations Protocol (MOP) option.
This option comes as part of the regular distribution, but is not selected
by default and is not included in the "Basic Installation." It may, however,
be installed from the original distribution media with the Setld utility.
You must have superuser privileges to invoke console carrier.

Once the MOP option is installed, each bridge to be managed must be
given a name and a dummy node number with the Addnode utility:

```
#  addnode 13.1 DBRG1
```

Once that is done, the link may be established at any time with the CCR
command:

```
#   ccr -n DBRG1 -h 08-00-2b-01-23-45 -c sva-0
```

In this example, the -h qualifier is followed by the station address of the
DECbridge unit to be attached. The -c qualifier is followed by the name
of the Ethernet circuit to use for the connection. Ethernet circuit names,
according to system type, are as follows:

- VAX 6000 and 9000 computers XMI = mna-0

- BI-based systems (VAX 6300 and VAX 6400 computers) = bna-0

- VAX 4000 computer series = isa-0

- MicroVAX systems and VAX 3600 and 3900 computers = qna-0
- VAXstation 2000 and 3000 computer series = sva-0
- VAX–11/780 and VAX–11/785 computers (Unibus) = una-0

Console Carrier User Interface

The DECbridge 90 is not shipped with a pre-set password, therefor no password prompt displays when you connect for the first time. For secure operation of the DECbridge 90, you should define a password (with the Define Bridge Password command).

The password prompt is represented by the pound sign (#). If you do not define a password, the password prompt does not display when you log in.

You may make three attempts to enter a password; if all three attempts fail, you must disconnect and try again.

Once the correct password is entered, or if there is no password, the DECbridge console carrier management banner and prompt appear on the screen:

```
Copyright © Digital Equipment Corporation 1991.

DECbridge 90 V1.0 25-JAN-1991 08-00-2B-01-23-45
Flash EPROM V1.0 31-JAN-1991
DECbridge>
```

Console Carrier Command Language

You can display a list of the available options on the screen by typing a question mark (?) at any point in the command line. Unique command abbreviations are accepted.

Table 4–1 summarizes DECbridge commands that apply to the DECrepeaters. For a complete list of commands refer to the DECbridge 90 manual.

Table 4–1   Summary of DECrepeater 90 Commands

Command	Argument and Parameter

DEFINE[1]	BRIDGE HUB_MANAGEMENT
	    ENABLE
	    DISABLE

	BRIDGE PASSWORD *string*
LIST	BRIDGE

SET*	BRIDGE HUB_MANAGEMENT
	    ENABLE
	    DISABLE

	PORT *port number*
	    ENABLE
	    DISABLE

	REPEATER *hub slot number* RESET
SHOW	ADDRESS *start index*
	PORT *port number*
	REPEATER *hub slot number*

[1]Changes made with the DEFINE command change only the default settings, which are assumed on power up or reset. DEFINE commands do not change the currently active values with the exception of the DEFINE BRIDGE PASSWORD. DEFINE BRIDGE PASSWORD takes effect immediately. The SET commands change only the currently active values, but do not effect the defaults that are assumed on power up or reset.

Command Parameters Description

ADDRESS *start index* is a decimal index into the work group forwarding database in the range of 1 through 200.

A *hub slot number* is either one of the following:

- A single number ranging from 1 through 8 that identifies a hub slot containing a DECrepeater 90

- A pair of numbers, the first being the hub number of 1 through 2, and the second the slot number within the hub of 1 through 8, when two DEChub units are connected together. For example:

  In the pair of numbers *2,4*, the fourth slot from the left in the second DEChub is designated. This is the hub that does not contain the DECbridge 90.

A *password string* is a string of up to 16 characters.

A *port number* is either a DECbridge 90 port, or the number of a port on a DECrepeater installed in the DEChub backplane with the bridge. The DECbridge backbone port is the single digit 1. The work group port is 2. A repeater port is identified by a *hub slot number* as described above, and the port number within the slot of 0 to 8. For example, 2,4 designates the fourth port on a repeater in slot 2, in the same hub as the DECbridge 90, and 2,4,1 refers to the first port on a repeater in the fourth slot of the second hub.

Command Descriptions

DEFINE BRIDGE HUB_MANAGEMENT DISABLE
SET BRIDGE HUB_MANAGEMENT DISABLE

Disables all repeater management through the DECbridge 90 unit for DECrepeater 90 units in the DEChub 90 backplane. When disabled, you receive an error message with the SHOW REPEATER, SET PORT, or SHOW PORT commands on repeater ports. You do not receive port number information from the SHOW ADDRESS command.

DEFINE BRIDGE HUB_MANAGEMENT ENABLE
SET BRIDGE HUB_MANAGEMENT ENABLE

Reverses the affect of the SET or DEFINE BRIDGE HUB_ MANAGEMENT DISABLE commands.

DEFINE BRIDGE PASSWORD

Changes the password string. You are prompted twice for a new password. The password may be a maximum of 16 characters and does not display on the screen. The change survives a reset. There is no corresponding SET command because the DEFINE BRIDGE PASSWORD takes effect immediately.

MOP provides a mechanism for setting and checking passwords. This mechanism is only intended to provide protection against accidental tampering with parameters and is not intended as a security feature. No attempt is made to prevent compromise of the password by malicious users. The DECbridge 90 should not be used in applications that absolutely depend on the prevention of any unauthorized modifications to the parameters.

LIST BRIDGE

Displays the non-volatile bridge-wide parameters.

SET PORT [*hub number,*] *slot number,port number* **DISABLE**

Disables the attachment of a specific repeater port in the DEChub backplane. The port status indicator on the selected DECrepeater 90 flashes, indicating that the port was disconnected by the network manager. There is no equivalent DEFINE command for disabling repeater ports.

The following example displays the expected response to a SET PORT DISABLE command.

```
DECbridge>SET PORT 1,3,2 DISABLE
Hub 1 slot 3 port 2 segment counter 0 status: disabled
```

SET PORT [*hub number,*] *slot number, port number* **ENABLE**

Reverses the effect of SET PORT DISABLE for DECrepeater 90 ports.

The following example displays the expected response to a SET PORT ENABLE command.

```
DECbridge>SET PORT 1,3,2 ENABLE
Hub 1 slot 3 port 2 segment counter 0 status: no carrier loopback
```

SET REPEATER [*hub number*,] *slot number* **RESET**.

Resets a specific repeater. There is no output response to this command.
All disabled ports are enabled.

SHOW ADDRESS [*start index*[, *stop index*]]

Displays the station address in a selected range of entries in the address
database. The indexes range from 1 to 200. The start index always
displays, but other entries in the range only display if they are not empty.
Addresses in this database are all in the work group. If indexes are
omitted, the addresses of all stations in the work group are listed. When
the DECbridge 90 is used with a DECrepeater 90C or 90T, the hub slot
number and repeater port to which each station is attached also display.
Note that it may take several minutes for the SHOW ADDRESS command
to accurately reflect the correct repeater port number for stations recently
added to the network or moved from one port to another. See Appendix C
for further details on SHOW ADDRESS.

The following example displays all addresses contained within the hub
configuration. Address 5 and address 7 display the same hub, slot, and
port because both devices are daisy chained on the same port.

```
DECbridge>SHOW AD
Address 1: 08-00-2B-0F-19-23
Address 2: 08-00-2B-10-20-30 hub 2 slot 8 port 4
Address 5: 08-00-2B-10-6A-31 hub 2 slot 3 port 3
Address 6: 08-00-2B-A6-43-17 hub 1 slot 3 port 5
Address 7: 08-00-2B-16-23-4C hub 2 slot 3 port 3
```

The following example displays the expected response to a SHOW
ADDRESS command to a nonexisting address.

```
DECbridge>SHOW AD 3
Address 3: unused address
```

The following example displays the expected response of a SHOW
ADDRESS command to a valid address.

```
DECbridge>SHOW AD 2
Address 2: 08-00-2B-10-20-30 hub 2 slot 8 port 4
```

The following example displays the expected response of a SHOW
ADDRESS command for a range of addresses.

```
DECbridge>SHOW AD 2,6
Address 2: 08-00-2B-10-20-30 hub 2 slot 8 port 4
Address 5: 08-00-2B-10-6A-31 hub 2 slot 3 port 3
Address 6: 08-00-2B-A6-43-17 hub 1 slot 3 port 5
```

SHOW PORT [*hub number,*] *slot number*, *port number*

Shows whether the port is enabled or disabled and the operational status of the port. Hub numbers can be 1 or 2; slot numbers can be 1 through 8. For the DECrepeater 90T, port numbers are 1 through 8; for the DECrepeater 90C, port numbers are 1 through 6.

The following example displays the expected response to a SHOW PORT command. Notice that the hub was not defined in the command so the default (1) was used.

```
DECbridge>SHOW PORT 3,2
Hub 1 slot 3 port 2 segment counter 0 status: disabled-no carrier loopback
```

The following example displays a SHOW PORT command for hub 2.

```
DECbridge>SHOW PORT 2,3,2
Hub 2 slot 3 port 2 segment counter 0 status: operational
```

SHOW REPEATER [[*hub slot number,*] *slot number*]

Shows the type of repeater and the port status for each port on that repeater. The hub number may be 1 or 2, and slot numbers are in the range of 1 through 8. If no parameters are given, information displays for all repeaters in both hubs.

The following example displays the expected response to a SHOW REPEATER command. Notice both DECrepeater 90T and DECrepeater 90C repeaters are installed in the hub.

```
DECbridge>SHOW REP
Hub 1 slot 3 twisted pair, repeater, rev.1, 8 ports.
Hub 1 slot 4 ThinWire repeater, rev.1, 6 ports.
Hub 2 slot 3 ThinWire repeater, rev.1, 6 ports.
Hub 2 slot 6 twisted pair repeater, rev.1, 8 ports.
Hub 2 slot 8 twisted pair repeater, rev.1, 8 ports.
```

The following example displays the response to a SHOW REPEATER command to a slot that contains a device other than a repeater.

```
DECbridge>SHOW REPEATER 1
No repeater responds.
```

The following example displays the response to a SHOW REPEATER command to an empty slot.

```
DECbridge>SHOW REPEATER 7
No repeater responds.
```

The following example displays the response to a SHOW REPEATER command for a particular repeater.

```
DECbridge>SHOW REP 3
Hub 1 slot 3 twisted pair, rev.1, 8 ports.
Hub 1 slot 3 port 0 segment counter 0 status: operational
Hub 1 slot 3 port 1 segment counter 1 status: no carrier loopback
Hub 1 slot 3 port 2 segment counter 0 status: disabled
Hub 1 slot 3 port 3 segment counter 0 status: operational
Hub 1 slot 3 port 4 segment counter 1 status: no carrier loopback
Hub 1 slot 3 port 5 segment counter 1 status: no carrier loopback
Hub 1 slot 3 port 6 segment counter 1 status: no carrier loopback
Hub 1 slot 3 port 7 segment counter 1 status: no carrier loopback
Hub 1 slot 3 port 8 segment counter 1 status: no carrier loopback
```

The following example displays the response to a SHOW REPEATER command for hub 2 slot 3.

```
DECbridge>SHOW REP 2,3
Hub 2 slot 3 ThinWire, rev.1, 6 ports.
Hub 2 slot 3 port 0 segment counter 0 status: operational
Hub 2 slot 3 port 1 segment counter 1 status: no carrier loopback
Hub 2 slot 3 port 2 segment counter 1 status: no carrier loopback
Hub 2 slot 3 port 3 segment counter 1 status: no carrier loopback
Hub 2 slot 3 port 4 segment counter 1 status: no carrier loopback
Hub 2 slot 3 port 5 segment counter 0 status: operational
Hub 2 slot 3 port 6 segment counter 1 status: no carrier loopback
```

The following example displays the response to a SHOW REPEATER command when the DECbridge 90 is not the hub manager or the DECbridge 90 is still in the power-up stage. There is a 60 second delay after power-up before the DECbridge takes control of the hub.

```
DECbridge>SH RE
The DECbridge 90 is not the designated hub manager.
```

Typical Management Techniques

The DECrepeater 90T can be managed using LEDs as a stand-alone unit, or on-line within a group of repeaters installed in a DEChub 90. The DECrepeater 90T comes with LEDs for system status when in a stand-alone configuration. In a DEChub 90 environment the LEDs may be utilized as well as on-line management using a DECbridge 90.

Whether your configuration is a stand-alone or a DEChub 90 you should create a network topology map. The map will help facilitate management tasks.

Remote Network Management Using the DECbridge 90

Remote management of a DECrepeater 90T is performed using a DECbridge 90 and a DEChub 90. The DECbridge 90 communicates across the DEChub 90 backplane to any DECrepeaters that are located in the DEChub. It is also possible to connect 2 DEChub 90 backplanes together and manage the repeaters in both DEChubs with one DECbridge 90. The DECbridge 90 communicates to the DECrepeater 90T units using private signals on the DEChub backplane. The two HUB units are connected with ThinWire coax cable to carry the work group Ethernet signals, and DECconnect Office cable to carry the management signals.
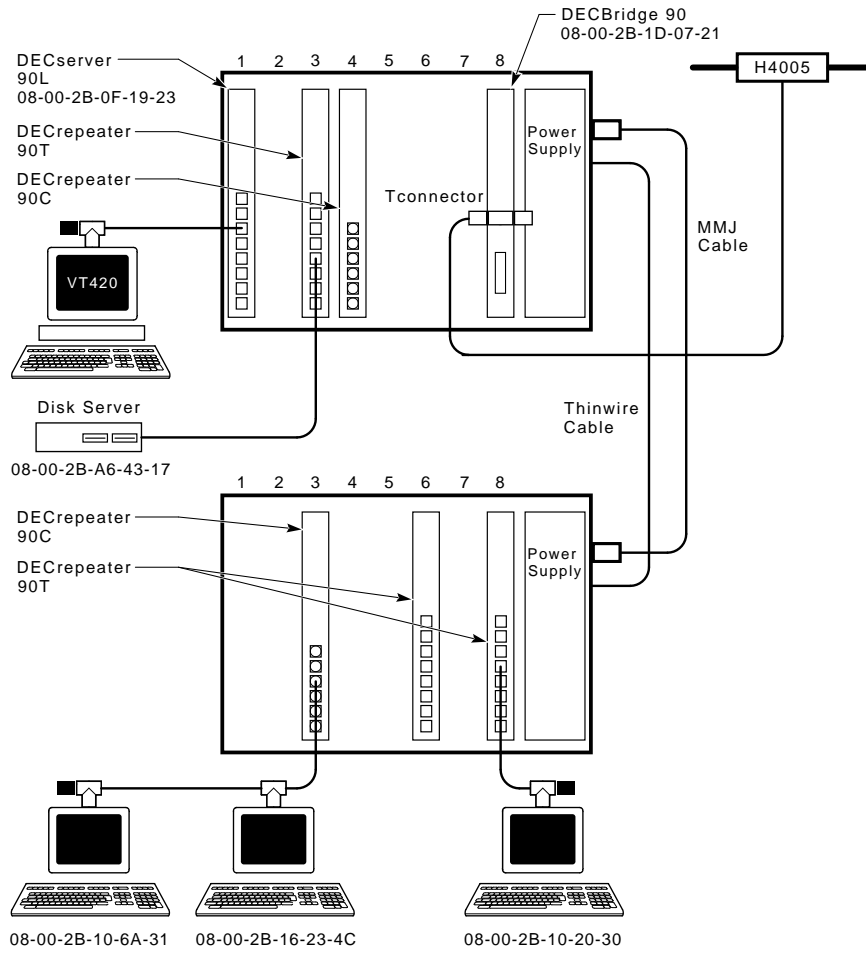
Management Disconnect

A port can be partitioned at any time by the management protocol. The management protocol can only be used for the repeater ports mounted in the DEChub 90 backplane and connected to a DECbridge 90. When a port is disconnected by the management protocol, it can be reconnected by either turning the power off and then on again, or by using the management protocol. If the port LED flashes approximately twice a second, the port is partitioned by the management protocol.

NOTE
If two DEChub backplanes are being managed by one bridge, the backplanes must be connected with both ThinWire cable (BNC to BNC - PN BC16M-xx) and a DECconnect Office cable (PN BC16E-xx).

DECBridge 90
08-00-2B-1D-07-21

H4005

DECserver
90L
08-00-2B-0F-19-23

1   2   3   4   5   6   7   8

DECrepeater
90T

Power
Supply

DECrepeater
90C

Tconnector

MMJ
Cable

VT420

Disk Server

08-00-2B-A6-43-17

Thinwire
Cable

1   2   3   4   5   6   7   8

DECrepeater
90C

Power
Supply

DECrepeater
90T

08-00-2B-10-6A-31   08-00-2B-16-23-4C   08-00-2B-10-20-30

LJ-00947-TI0

	DEChub 90				
Slot 1	DECrepeater 90T	Slot 2	DECrepeater 90C	Slot 8	DECBridge 90
Port 1	Node - Address - Username	Port 1	Node - Address - Username	Port 1	Address
Port 2	Node - Address - Username	Port 2	Node - Address - Username		
Port 3	Node - Address - Username	Port 3	Node - Address - Username		
Port 4	Node - Address - Username	Port 4	Node - Address - Username		
Port 5	Node - Address - Username	Port 5	Node - Address - Username		
Port 6	Node - Address - Username	Port 6	Node - Address - Username		
Port 7	Node - Address - Username				
Port 8	Node - Address - Username				

LJ-00956-TI0

Management is accomplished by establishing a MOP Console Carrier session with the bridge from any remote node.

Once connected to the bridge, the following prompt displays:

```
DECbridge>
```

Whenever a bridge goes through a power cycle or is reset, the bridge begins to poll repeaters for status. This includes a special algorithm for determining the ports on repeaters to which particular stations are attached. This algorithm takes a varied amount of time to complete. The time depends on the number of repeaters and the network activity. For this reason, time should be allowed to elapse before proceeding from this point to manage the hub. Also, for this reason, when stations or repeaters are moved in the hub, it may take time before they are reported. See Appendix C for further details.

Example of a typical management scenario

1. Determine what repeaters are in the hub as follows:

   ```
   DECbridge>SHOW REPEATER
   Hub 1 slot 5 ThinWire repeater, rev.0, 6 ports.
   ```

   In this case, there is a ThinWire repeater (DECrepeater 90C) in the same hub as the bridge (if this was a 2 hub configuration) in slot 5 with 6 ThinWire ports.

2. Determine what stations are connected to the repeaters in the hub by entering the following command:

   ```
   DECbridge>SHOW ADDRESS
   Address 1: 08-00-2B-19-94-FB
   Address 2: 08-00-2B-1E-2D-0C hub 1 slot 5 port 3
   ```

This indicates that a station with address 08-00-2B-1E-2D-0C is connected to the repeater in slot 5 on port 3. At this point, without physical examination, you have enough information to construct a network map.

If a problem is reported, usually by a particular user, there are several commands available to solve the problem. Using the previous process, you can determine what port on what repeater connects the user.

Then you proceed as follows to display the status of all ports on the repeater.

```
DECbridge> SHOW REPEATER 5
Hub 1 slot 5 twisted pair, rev.1, 6 ports.
Hub 1 slot 5 port 0 segment counter 0 status: operational
Hub 1 slot 5 port 1 segment counter 0 status: excessive collisions
Hub 1 slot 5 port 2 segment counter 0 status: excessive length collision
Hub 1 slot 5 port 3 segment counter 0 status: operational
Hub 1 slot 5 port 4 segment counter 0 status: excessive length collision
Hub 1 slot 5 port 5 segment counter 0 status: excessive length collision
Hub 1 slot 5 port 6 segment counter 0 status: excessive length collision
Hub 1 slot 5 port 7 segment counter 0 status: excessive length collision
Hub 1 slot 5 port 8 segment counter 0 status: excessive length collision
```

The following table describes possible status messages and their usual interpretation.

Message	Most Common Cause
Operational	Cable connected, everything OK
Excessive length collision or Excessive collisions	Cable fault, usually a port which is not connected to anything or an open cable, in the case of 10BaseT the remote station may be powered down (no link beat.)
No carrier loopback or Transmit Carrier drop out	Cable fault, usually a shorted cable.
Jabber	Station(s) connected to this port continue to transmit, expect a faulty station.

All these conditions, except operational, cause the repeater to automatically partition the port. When the condition clears, the repeater automatically reconnects the port and reports it again as operational.

To help solve intermittent problems, the repeater reports a segmentation count. This count runs from 0 to 15 and then latches at 15. Every time you enter the SHOW REPEATER command, this count is set to zero.

If this count is non-zero, you can tell that a port has partitioned since the last show repeater command. This partitioning occurs normally if users turn stations on and off, or if cables are connected and disconnected from the repeater during installation and reconfiguration. If none of these normal causes have occurred, suspect an intermittent problem with cabling or attached stations as indicated.

There are two more commands that are useful in managing repeater networks.

```
DECbridge>SET PORT 5,1 DISABLE
Hub 1 slot 5 port 1 segment counter 0 status: disabled-no carrier loopback
```

This command allows the manager to disable a particular port on a repeater. This may be useful if station(s) attached to that port are causing network difficulties.

```
DECbridge>SET REPEATER 5 RESET
```

This command resets the repeater to power up condition. This includes restoring any ports that have been partitioned by the manager, and resets the segmentation counters.

Messages

Table 4–2 lists the DECrepeater 90T messages and a description of each message. For a complete list of messages refer to the DECbridge 90 owners manual.

Table 4–2   DECbridge 90 Messages

Message	Description
Address *n*: unused address	Indicates that the address number *n* does not contain a station address.
Confirmation error - password not changed.	Indicates that the second entry or verification of the new password given to DEFINE BRIDGE PASSWORD did not match the first entry.

Table 4–2 (Cont.)   DECbridge 90 Messages

Message	Description
DECbridge 90 is not the designated hub manager	Indicates that the DECbridge 90 was not the designated hub manager when the SHOW PORT or SHOW REPEATER command was issued. This occurs when:
	• The bridge is reset and, for 60 seconds, the DECbridge is not the hub manager.
	• Another DECbridge unit is acting as the current hub manager.
	• A fault exists in the MMJ cable or in the connections between two DEChub backplanes.
	• A fault exists in the power supply of one of the DEChub units. This prevents repeater management communication.
	• A fault exists in the serial port transceivers in the DEChub 90.
Hub management disabled	Indicates that SHOW PORT or SHOW REPEATER was issued to a DECbridge 90 for which repeater management is disabled. Enable repeater management with the SET BRIDGE HUB_MANAGEMENT ENABLE command before trying again.
Hub number and slot number [[hub], slot]. Hub is 1 or 2, slot is 1-15	Indicates one or more parameters provided to SHOW REPEATER was out of range. Hub number must be either 1 or 2; slot number must be between 1 and 15.
Hub h slot s - port number out of range	Indicates the port number given to SHOW PORT was out of range for the device in hub n slot s. Use SHOW REPEATER to determine the number of ports for the device, and specify a port number within that range.
Hub h slot s not a repeater	Indicates that the device does not use the same management protocol as the DECrepeater 90C and DECrepeater 90T, and its ports, if any, cannot be managed by the DECbridge 90.
Hub h slot s unrecognized type	Indicates that repeater type in hub h slot s is not known to the DECbridge 90, but the repeater ports can still be managed with the DECbridge 90.

Table 4–2 (Cont.)   DECbridge 90 Messages

Message	Description
No repeater responds	Indicates there is no repeater installed in the requested hub slots, or the repeater is not functioning.
No such port	Indicates bridge port number provided to SHOW PORT was out of the parameter of 1 to 2.
Password too long - not changed	Indicates that a password of more than 16 characters was given to the DEFINE BRIDGE PASSWORD command.
Port number [[hub,]slot,]port	Indicates one of the parameters to a SET PORT or DEFINE PORT command was not a valid hub, slot, or port number.
Station address number [first [,last]] in range 1-200	Indicates one or more parameters provided to the SHOW ADDRESS command was out of the range 1 to 200.
???	Indicates that a command or parameter was not recognized. Type ? to display valid commands.
180501	Appears whenever a loopback diagnostic is run and passed on the backbone port. If the backbone port is not receiving any messages, this diagnostic is run every 10 minutes.
180201	Appears whenever a loopback diagnostic is run and passed on the work group port. If the work group port is not receiving any messages, this diagnostic is run every 10 minutes.
1805:00-00-00-00 01	Appears whenever a loopback diagnostic is run and fails on the backbone port. The diagnostic is tried every five seconds until the test passes.
1802:00-00-00-00 01	Appears whenever a loopback diagnostic is run and fails on the work group port. The diagnostic is tried every five seconds until the test passes.

Stand-alone Configuration Management

The recommended process for managing a small stand-alone network is:

• Maintain records indicating which station(s) are connected to each port on each repeater. It may be desirable to draw a network map.

• Observe the LEDs on the DECrepeater for network status.

DECrepeater 90C T

Port 1	Node - Address - Username
Port 2	Node - Address - Username
Port 3	Node - Address - Username
Port 4	Node - Address - Username
Port 5	Node - Address - Username
Port 6	Node - Address - Username
Port 7	Node - Address - Username
Port 8	Node - Address - Username

LJ-00957-TI0

Table 4–3 describes each LED and its function.

Table 4–3   DECrepeater Status LEDs

LED	Function
Power	When illuminated, Indicates normal voltage levels are present.
Network Activity	During network activity this LED will flicker. If there is no network activity the LED will be out. The brightness of the LED is directly proportional to the level of network activity.
Port 0 Status	This LED indicates the status of the ThinWire input to the repeater. It is illuminated to indicate functional status of the port. It is extinguished to indicate that the port has failed or has been partitioned.
Port 1-8 Status	These LEDs indicate the status of each port. They are illuminated to indicate a connection and are extinguished to indicate no connection or the port has been partitioned.

NOTE
Upon power-up, if there are no active connections, or hardware or network activity, all LEDs stay illuminated except the network activity LED. This is normal. Once an active station is connected to one of the ports the LED for the active port(s) stays on and all other ports extinguish.

5
Troubleshooting

This chapter provides troubleshooting information for the DECrepeater 90T when it is used as a stand-alone unit or when it is installed in the DEChub 90 backplane. Before you begin you should:

1. Verify the installation of the unit. Does the installation of the unit meet the configuration rules given in Chapter 2.

2. Note the fault condition.

3. Isolate the problem. Use Table 5–1 to troubleshoot a DECrepeater 90T in a stand-alone configuration or Table 5–2 to troubleshoot a DECrepeater 90T installed in a DEChub 90 configuration.

DECrepeater 90T Standalone Troubleshooting

The following table troubleshooting information for a DECrepeater 90T in a standalone configuration.

Table 5–1 Troubleshooting a DECrepeater 90T Standalone Unit

| If...	Then...	Do this...
All LEDs are off.	Check the ac power connection.	Check that the power supply is properly plugged into the power outlet. Check the power to the power outlet.
	Check the power supply.	Check the 7-pin connector to the power supply. If the connections are okay replace either the power supply (for 120 V operation) or both the power supply cord and power supply (for 220 V operation).

Table 5–1 (Cont.)   Troubleshooting a DECrepeater 90T Standalone Unit

If...	Then...	Do this...
The network activity LED is off.	There is low network activity or no network activity.	Ensure that network activity is present.
	If the network activity LED still fails to illuminate	Turn the unit off an on by unplugging and plugging the power supply in. Check that the network activity LED comes on momentarily.
	If the network activity LED illuminates momentarily, the network activity LED portion of testing has passed. If the network LED fails to illuminate	Replace the repeater.
Port status LED is off	Ensure that the cable has activity on it. If the LED still fails to illuminate	Switch to an unused port or replace the repeater.
All port LEDs are off	A connection has not been made.	Remove all network connections. Turn the unit off and on by unplugging and plugging the power supply. All LED indicators turn on. Only the network activity LED turns off.
	If any LED other than the network activity LED turns off, the DECrepeater 90T has failed this part of the self-test.	Replace the DECrepeater 90T.

Table 5–1 (Cont.)   Troubleshooting a DECrepeater 90T Standalone Unit

If...	Then...	Do this...
	If all LEDs except the network activity LED are on, this portion of the self-test has passed.	Connect a known active ThinWire network segment to the unit. The status LED for the connected port will stay on while all status LEDs for the unconnected ports should turn off as soon as the first connection to the active segment is made.
	If the status LED for the connected port stays on and the status LED for the unconnected ports stay off, then the connected port is okay.	Continue installing the other network cables for each port that you are going to use.
	If the status LED for the unconnected ports do not turn off while the LED for the connected port remains on, there is a possible problem with the cable or that port.	Try another port. If the same conditions exist, check for a cable problem by connecting a good cable with a good device at the other end.
	If the same condition exists when a good cable is plugged in.	Replace the DECrepeater 90T.
	Continue installing other network cables for each port that you are going to use.	The indicator LED for each properly terminated port should turn on.
	If the LED for each properly terminated port remains off when a cable is connected, the DECrepeater 90T is defective.	Replace the DECrepeater 90T.
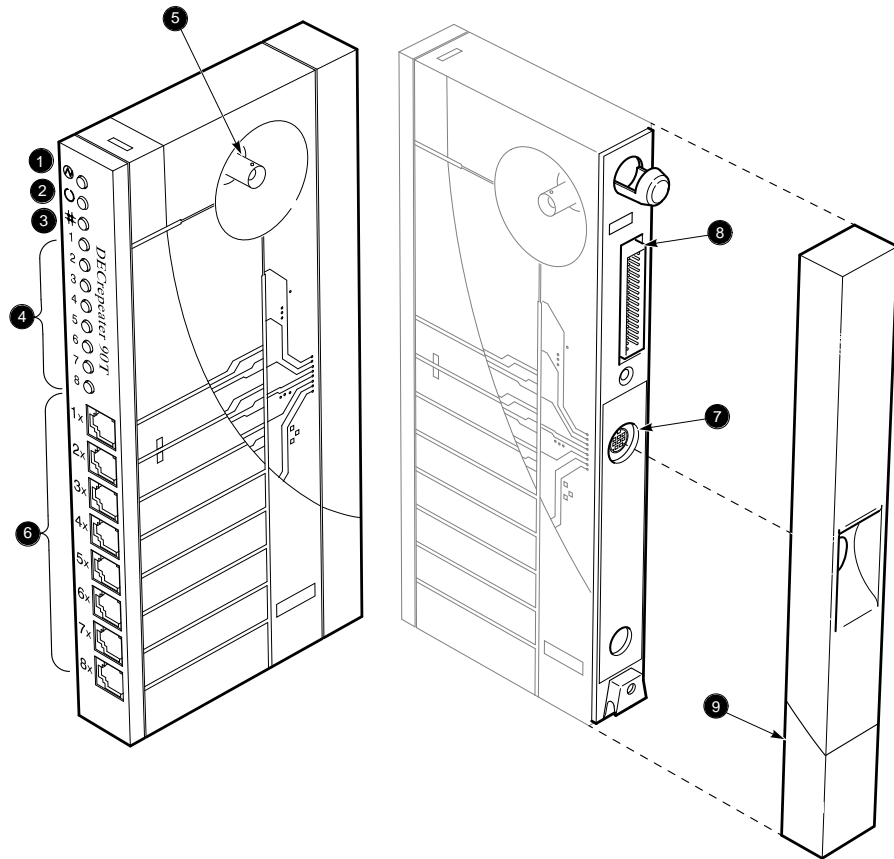
LJ-00543-TI0

DECrepeater 90T Backplane Configuration Troubleshooting

The following table contains information for troubleshooting a DECrepeater 90T while installed in a DEChub 90.

Table 5–2 Troubleshooting a DECrepeater 90T in a DEChub 90 Backplane

If...	Then...	Do this...
The power LED is off.	The DECrepeater 90T is not receiving +5 V.	Check the power LED on the DEChub 90 power supply.
	If the power LED on the DEChub 90 is off, there is a problem with the DEChub 90 power supply.	See the troubleshooting procedures in the *DEChub90 Owner's Manual*.
	If the power LED on the DEChub 90 power supply is on, are other component power LEDs off? If other components are on, the DECrepeater 90T has a power problem.	Try reseating the DECrepeater 90T in either the same slot or another slot.
	If the power LED on the DEChub 90 power supply is on, are other component power LEDs off. If other components are off, the DEChub 90 has a power problem.	See the troubleshooting procedures in the *DEChub 90 Owner's Manual*.

Table 5–2 (Cont.)   Troubleshooting a DECrepeater 90T in a DEChub 90 Backplane

If...	Then...	Do this...
	If the power LED turns on when reseated in the same slot, the DECrepeater 90T was not properly seated.	Make sure that the DECrepeater 90T is properly seated in the slot.
	If the power LED turns on when reseated in another slot, the problem is with the DEChub 90.	See the troubleshooting procedures in the *DEChub 90 Owner's Manual*.
	If the DECrepeater 90T does not turn on in a known good slot, the DECrepeater 90T is defective.	Replace the DECrepeater 90T.
The port 0 network activity LED is off.	The DECrepeater or any other unit in the DEChub 90 may not be connected to an active segment.	Connect a known active segment to any unit in the DEChub 90.
	If the DECrepeater 90T is connected to a known active segment and the port 0 LED is off the DECrepeater 90T is defective.	Replace the DECrepeater 90T.
The port 0 network activity LED is on.	This portion of the self-test ran successfully.	Check that the LED for each port with a connected cable is on.
The port 0 network activity LED is on. (Cont.)	If the LED for the connected cable is off, the DECrepeater 90T does not acknowledge the connection to its port.	Plug the cable into another port.

Table 5–2 (Cont.)   Troubleshooting a DECrepeater 90T in a DEChub 90 Backplane

If...	Then...	Do this...
	If the condition still exists, verify that the cable and station are good.	If the cable and station is good replace the DECrepeater 90T.
	If the port LED turns on, the port is okay.	No action required.

A
DECrepeater 90T Specifications

Specifications for the DECrepeater 90T are divided into the following categories:

- Physical dimensions
- Environmental specifications
- Electrical specifications
- Parts List

Physical Dimensions

The physical dimensions of the DECrepeater 90T are as follows:

Dimension	Measurement
Height	3.5 cm (1.4 in)
Width	28.0 cm (11.0 in)
Depth	14.0 cm (5.5 in)
Weight	.77 kg (1.7 lb)

Environmental Specifications

The DECrepeater 90T is designed to operate in an office environment or equipment room environment such as telephone closets or satellite equipment rooms. It is not intended to operate in an air plenum.

Operating Environment

The following table describes the operating conditions for the DECrepeater 90T.

Condition	Value
Temperature	5°C to 50°C (41°F to 122°F)
Maximum rate of change	20°C/hr (36°F/hr)
Relative humidity	10% to 95% (non-condensing)
Wet-bulb temperature	32°C (90°F) maximum
Dew point	2°C (36°F) minimum
Altitude	Sea level to 2.4 km (8000 ft)
Air flow	Convectively cooled. A minimum of 10 cm (4 in) of space must be provided on both ends of the unit for adequate air flow.

Shipping Environment Specifications

The shipping environment for the DECrepeater 90T is as follows:

Condition	Value
Temperature	-40°C to 66°C (-40°F to 151°F)
Relative humidity	10% to 95% (non-condensing)
Altitude	Sea level to 4.9 km (16000 ft)

Electrical Specifications

The DECrepeater 90T features either a self-contained power supply or self-contained power supply and power cord option. The following sections describe the power specifications for the DECrepeater 90T:

Power Supply

Specification	Value
Voltage (domestic)	104 Vac to 128 Vac (nominal 120 Vac)
Voltage (international)	208 Vac to 256 Vac (nominal 240 Vac)
AC cord length	6 feet
Current at 120 volts	.25 amps
Current at 240 volts	.125 amps
Frequency	50 Hz to 60 Hz
Power consumption	9 watts
Output voltage	5.1 Vdc
DC cord length	8 feet
Output current	1.8 A

DECrepeater 90T

Specification	Value
Input voltage	4.75 to 5.25 Vdc
Input current	1.0 A

MJ Pin Out

Table A–1 describes the pin out of the MJ connectors on the DECrepeater 90T.

Table A–1 MJ Pin Out

Pin	Signal
1	RD+
2	RD-
3	TD+
4	Not used
5	Not used
6	TD-
7	Not used
8	Not used

Parts List

Table A–2 Parts List

Replacement Part	Part Number
DECrepeater 90T	DETMR-MA
Power supply, 110 Vac	H7082-AA
Power supply, 220 Vac	H7082-BA

B
Related Documentation

Document Title	Order Number
DECbridge 90 Owner's Manual	EK-DEWGB-OM
DEChub 90 Owner's Manual	EK-DEHUB-OM
Open DECconnect Building Wiring Components and Application Catalog	EB-K2407-42
DECrepeater 90C Owner's Manual	EK-DECMR-OM
DECconnect System Planning and Configuration Guide	EK-DECSY-CG

Ordering Information

Customers may order documents by phone or by mail.

In the Continental USA and Puerto Rico

Call 800-DIGITAL or send mail to:

Digital Equipment Corporation
Peripherals and Supplies Group
P.O. Box CS2008
Nashua, NH 03061

In New Hampshire, Alaska, and Hawaii

Call 1-603-884-6660.

Outside the USA and Puerto Rico

Send mail to:

Digital Equipment Corporation
Attn: Accessories and Supplies Business Manager
c/o Local Subsidiary or Digital-Approved Distributor

Digital Personnel

Digital personnel may order these documents from:

Digital Equipment Corporation
444 Whitney Street
Northboro, MA 01532
Attn: Publishing and Circulation Services (NRO2-2/I5)
        Order Processing Section

C
Management Details

Designating a Hub Manager

The protocol used on the DEChub management bus allows for only a single manager unit to access the management bus. When a DECbridge 90 is first powered on or reset, it waits 60 seconds to be sure that there is no other manager unit in use in the hub, before it claims itself as the designated hub manager. For this reason, you will not be able to remotely manage the DECrepeater 90 units for 60 seconds following the power-on or reset of the DECbridge 90. This restriction does not apply to the repeaters themselves. A repeater inserted into the hub is immediately manageable by whatever unit is currently the designated hub manager.

If you receive the message "The DECbridge 90 is not the designated hub manager.", and the DECbridge 90 has been running for more than 60 seconds, there is something wrong.

> If using two hubs, be sure the MMJ cable is wired correctly, and it not shorted or broken.
> If using only one hub, the MMJ connector should be disconnected.
> Only one DECbridge 90 unit is allowed in the Hub. If more than one is inserted, only one of them will be able to manage the repeaters. The other unit will issue this message.

If for some reason you do NOT wish a specific DECbridge 90 unit to be the designated hub manager, you can disable the hub management features with the command DEFINE BRIDGE HUB_MANAGEMENT DISABLE.

Once the DECbridge 90 has become the designated hub manager, it can do SET or SHOW REPEATER and SET or SHOW PORT commands without restriction. There is, however, an additional delay before the SHOW ADDRESS command will have complete information. DEFINE commands do not take effect until the next SET ALL or RESET of the DECbridge 90. To have the command take effect immediately, you must also issue the corresponding SET command.

Digital Internal User Only

Annotating the Bridge Address Table

The DECbridge 90 SHOW ADDRESS command will list the DECrepeater slot number and port number for every station in the work group that is connected to the same DEChub via a DECrepeater. However, there is some time lag between when the time changes are made to the network topology, and the reflection of that information in the DECbridge 90 address table. The algorithm for creating this information proceeds as follows:

> For every station in the work group
> Tell the repeaters to wait for a message from this station.
> Wait (up to 90 seconds) for the station to transmit a message.
> Ask the repeaters what port it came from.

The algorithm will wait up to 90 seconds for a station to transmit a message, before it gives up and proceeds onto the next station. In a typical network situation, this information will be complete in a matter of minutes. After a bridge is newly installed or reset, you can expect this information to be complete after about 10 minutes of operation. However, if there are stations in the work group that do not often transmit messages, the DECbridge may hang on those stations for as long as 90 seconds each before giving up and going on to the next one. If you add a station, or move it to another port, you can expect it to take about 10 minutes before SHOW ADDRESS will recognize this move. If you remove a station from the network entirely, it will take a full address age time (default is 30 minutes) for the DECbridge 90 to notice. If you remove many stations at once, the DECbridge 90 will hang on each of these stations for 90 seconds at a time, until they age out of the bridge address database. In this case, it will usually take the full address age time (30 minutes) before the port number annotations are complete.

As a worst case example, if it takes 60 seconds for each of the allowed 200 stations to transmit a message, it could take 200 minutes to complete the address database annotations. However, the DECbridge will try to hurry things along. If after 30 seconds of waiting for a message, the station remains quiet, the DECbridge 90 will attempt to generate a response via the IEEE XID request. If that doesn't work, it will try a MOP System-ID request. Because of this, it will never hang for more than 30 seconds on an IEEE conforming station, nor more than 60 seconds on any DIGITAL station that predates the IEEE specifications. If you are monitoring messages and protocols on your work group Ethernet, you will occasionally see these messages.

Using the WGB Address Table for Work Group Management Documentation

The WGB Ethernet address table is dynamic. Ethernet addresses are added to the table when a device first transmits on the network and are removed when they do not retransmit for a user programmable period (from 1 to 32767 seconds (about 10 hours), factory default is 15 minutes). When a device is learned or relearned after it has timed out, its address is listed in the lowest empty entry of the address table.

This continuous learning, timeout, and relearning of the Ethernet addresses means that devices routinely residing in a particular work group may or may not be in the address table at any moment. If they are in the address table, they will not necessarily be in a consistent database location. PCs, laptops,... that are removed to be used at another location will certainly timeout from the address table and when reattached will be stored in a different address table location.

This means that the network manager cannot easily compare printouts of the WGB address table to determine workgroup changes from day-to-day or week-to-week.

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