DECbridge 90

Owner's Manual

Order Number: EK-DEWGB-OM. B01

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About This Manual

This manual provides an overview of the DECbridge 90 unit and describes how to configure, install, operate, manage, and troubleshoot the DECbridge 90. This manual also provides the specifications and lists the related documentation for the DECbridge 90.

In this manual, the DECbridge 90 unit may be referred to as the *DECbridge 90*, *work group bridge*, *bridge*, or *WGB*.

Organization

This manual has five chapters and two appendices.

Chapter	Description
1	Provides an overview of the DECbridge 90, including features, description of front panel indicators, and configurations.
2	Provides configuration rules for the DECbridge 90.
3	Describes how to install the DECbridge 90.
4	Describes how to manage the DECbridge 90 through the Maintenance Operations Protocol (MOP) or Network Control Program (NCP).
5	Describes how to troubleshoot the DECbridge 90.
Appendix A	Describes the physical dimensions; the environmental, electrical, and power specifications; and provides a parts list.
Appendix B	Provides a list of related documentation and ordering information.

Conventions

The following conventions are used in this manual:

Convention	Meaning
Note	Provides general information.
boldface type	Boldface type in examples indicates user input. For example: `DECbridge>` **SET PROTOCOL**
parameters	Parameters are italicized. For example: **SHOW PORT** *slot number*
[ ]	Characters within brackets represent optional parameters. For example: **SHOW PORT** [*hub number, slot number*]

1
Overview

The DECbridge 90 unit offers a reliable, high-performance, easy-to-install means of connecting two local area networks (LANs). Configured as a standalone unit or in the DEChub 90 backplane, the DECbridge 90 provides greater network reliability and efficiency by allowing the local area network to be partitioned into a number of smaller LANs.

Features

The following list summarizes the main features of the DECbridge 90:

- Easy-to-use

- Plug-and-go installation

- Activity LEDs for easy diagnosis

- Small size

- Rack-mountable in DEChub 90 backplane

- Frame filtering and frame forwarding at full network throughput

- Protocol filtering

- Support of spanning tree algorithm

- Management through Maintenance Operations Protocol (MOP) console carrier

- Support of Remote Bridge Management Software (RBMS)

- ThinWire and 15-pin AUI Ethernet interfaces

Description

The DECbridge 90 is a specialized LAN device that connects two Ethernet or IEEE 802.3 LANs to form a single extended local area network (Figure 1–1). One LAN, referred to as the **backbone**, can consist of an unrestricted number of stations. The other LAN, referred to as the **work group**, is usually the smaller of the two LANs and is optimized for LANs of fewer than 200 stations. When the work group consists of fewer than 200 stations, the DECbridge 90 automatically prevents unnecessary traffic from being transmitted from one LAN to the other.

When there are more than 200 stations in the work group, the DECbridge 90 enters **flood mode**, which reduces the effectiveness of the traffic isolation, but ensures full connectivity across the bridge. (Refer to Chapter 4 for more information about flood mode.)

The DECbridge 90 provides the network manager with additional control over traffic distribution through protocol filtering and repeater management features.

All stations connected within the extended LAN communicate with one another as if they were all on the same LAN. The connected LANs will work in networks using equipment designed to be compatible with the Ethernet or IEEE 802.3 standards. The DECbridge 90 connects to the work group using a ThinWire (10Base2) integral transceiver. The backbone connections are made through a 15-pin AUI Ethernet (10Base5) interface.

Figure 1–1 shows a sample DECbridge 90 connection.

Figure 1–1 Sample DECbridge 90 Connection
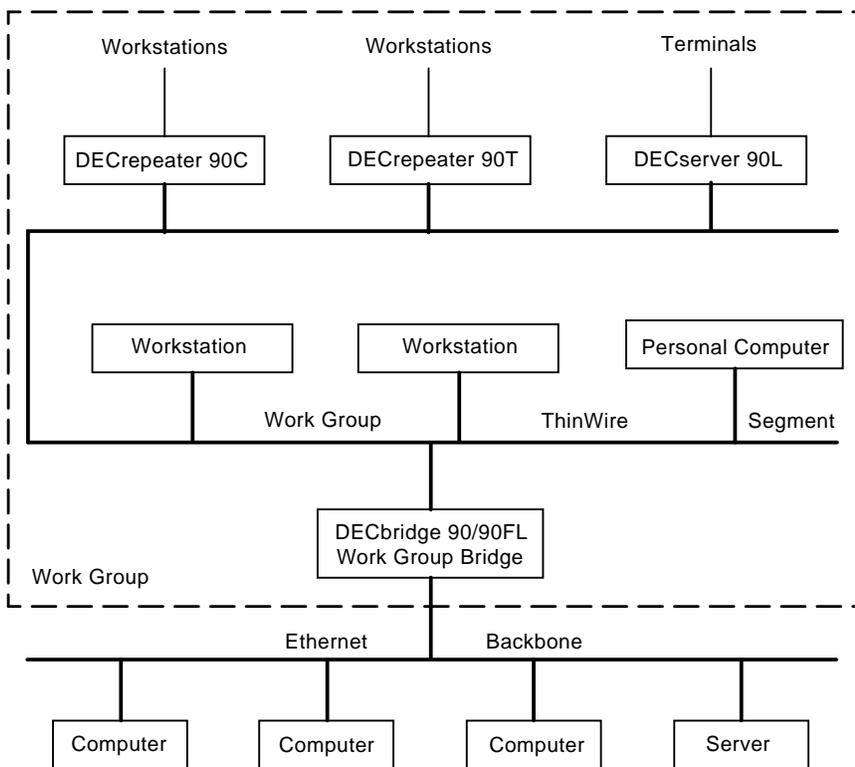
LJ-02073-TI0

DECbridge 90 Front Panel Lights and Switches

The front panel of the DECbridge 90 contains several indicator lights and two switches (Figure 1–2). The lights (LEDs) indicate the status of the DECbridge 90. One of the switches is used to select ThinWire or AUI connection; the other switch is used to reset the DECbridge 90 password. When you push the reset button, any existing password is nullified and the DECbridge 90 is accessible without a password until you define a new password. For an explanation of the DEFINE BRIDGE PASSWORD command, refer to the Description of Commands section in Chapter 4.

Figure 1–2 shows the DECbridge 90 indicators and connectors.

Figure 1–2 Indicators and Connectors
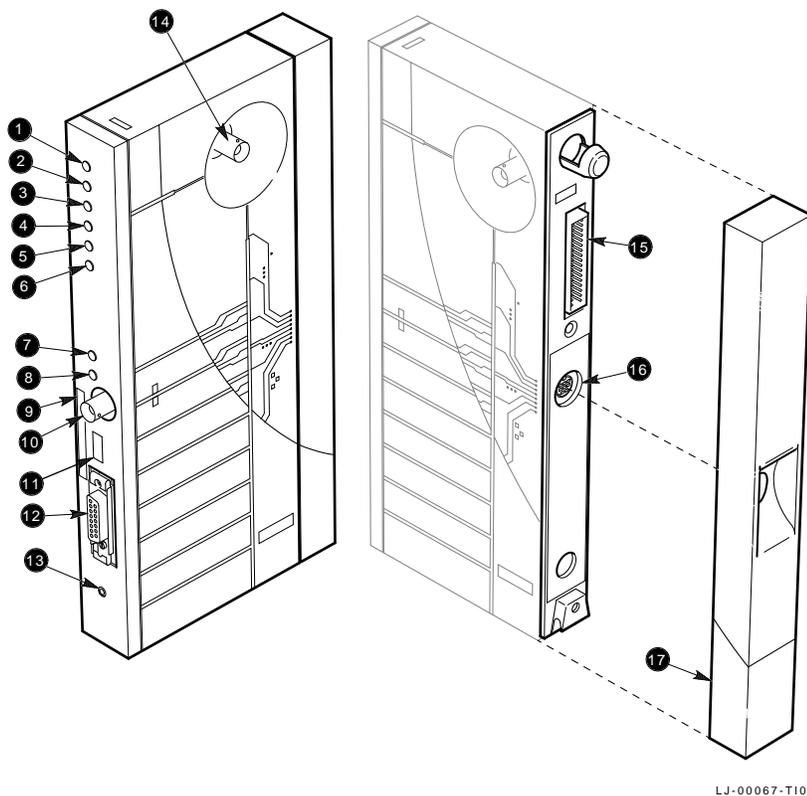
LJ-00067-TI0

❶ ⊘ **DC OK Indicator -** (Green) Turns on when power supply is providing
power to the bridge.

❷ ◯ **System OK Indicator -** (Green) Turns on when bridge is powered up and
reset and has successfully completed self-test.

❸ **Work Group Port OK Indicator -** (Green) Turns on when bridge is powered up and reset and has successfully completed work group port self-test. Will turn off whenever a fault is detected on the port; turns on when the fault has been cleared.

❹ **Work Group Port Activity Indicator -** (Green) Blinks when the LAN connected to the work group port is receiving messages; does not blink when transmitting messages.

❺ **Bridge Forwarding State -** (Yellow) Turns on when bridge is not forwarding messages. Turns on for a short period of time during power up. Remains off during normal operation.

❻ **Maximum Work Group Size Exceeded Indicator -** (Yellow) Turns on when the recommended maximum size (200) of the work group has been exceeded.

❼ **Backbone Port OK Indicator -** (Green) Turns on when the bridge is powered up and reset and has successfully completed backbone port self-test. Will turn off whenever a fault is detected on the port; turns on when the fault has been cleared.

❽ **Backbone Port Activity Indicator -** (Green) Blinks when there is received activity on the LAN connected to the backbone port; does not blink for transmitted messages.

❾ **Ethernet Address -** Unique physical address of the bridge, comprised of six 2-digit hexadecimal numbers.

❿ **Backbone Port ThinWire Connector -** Provides ThinWire connection to backbone port of the DECbridge 90.

⓫ **ThinWire/AUI Selector -** Selects ThinWire or AUI connection to the backbone.

⓬ **Backbone Port AUI Connector -** Provides AUI connection to the backbone port of the DECbridge 90.

⓭ **Password Reset Switch -** Nullifies the password for the DECbridge 90. The bridge is accessible without a password until a new password is defined.

⓮ **Work Group Port ThinWire Connector -** Provides ThinWire connection to the work group port of the DECbridge 90.

⓯ **Backplane Connector -** Provides work group network connection to the DECbridge 90 when it is installed in the DEChub backplane.

⓰ **Power Connector -** Provides +5.0 V and +12.0 V from the DECbridge 90 power supply (standalone) or the DEChub 90 power supply (mounted).

⓱ **Cover -** Covers the backplane connector and mounting assembly.

2
Configuring the DECbridge 90

The DECbridge 90 unit has several configuration rules and guidelines that must be followed during installation and use.

Each LAN connected by the DECbridge 90 is required to be an Ethernet or IEEE 802.3 compliant CSMA/CD LAN. The backbone port of the DECbridge 90 provides both ThinWire Ethernet (10Base2) and AUI (10Base5) connections, as shown in Figure 2–1 and Figure 2–2. The work group port provides only a ThinWire Ethernet (10Base2) connection.

Figure 2–1 shows the DECbridge 90 configured to a ThinWire backbone.

Figure 2–1 DECbridge 90 Configured to ThinWire Backbone
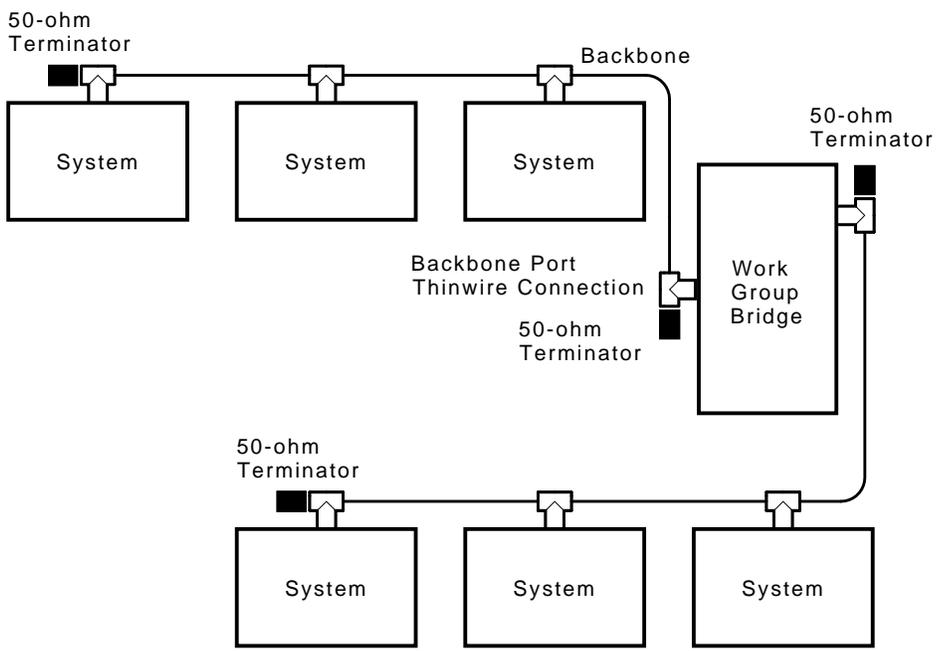
LJ-00247-TI0

Figure 2–2 shows the DECbridge 90 configured to an AUI backbone.

Figure 2–2 DECbridge 90 Configured to AUI Backbone
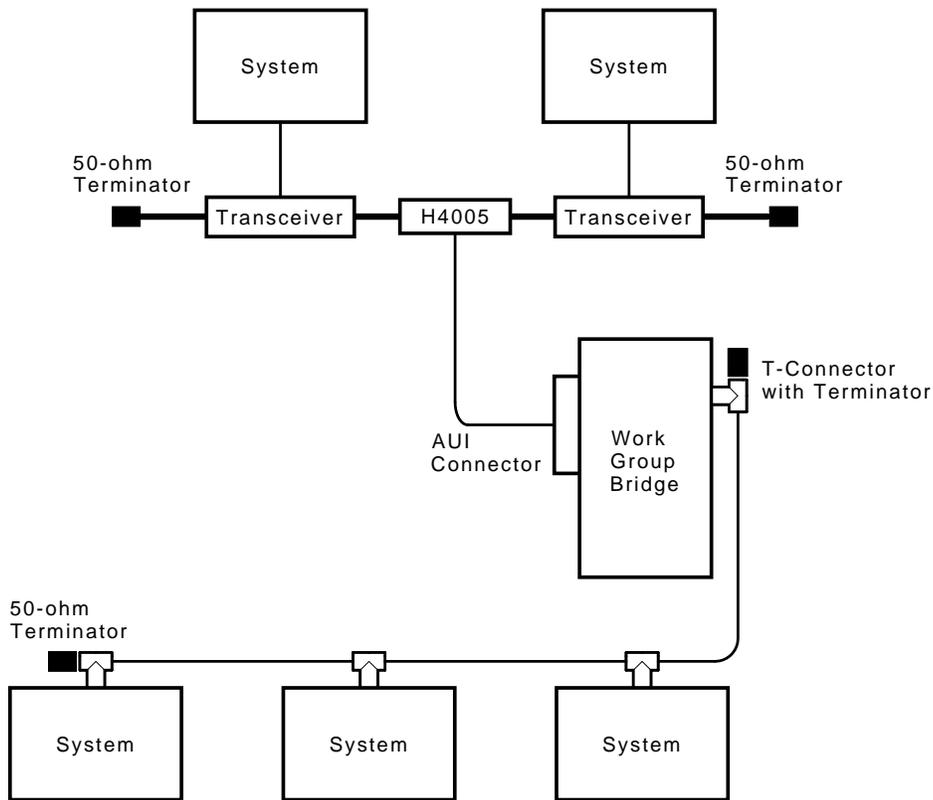
LJ-00244-TI0

Supported Configurations

There are several reasons to configure bridges into an extended LAN:

- To connect different media types.

- To extend the range of the LAN. (For example, to attach a DEChub 90 to an AUI backbone.)

  Cable length and repeater configuration rules are considered separately in each LAN.

- To control traffic by protocol type, by separating the LAN into networks for selected protocols. (For example, to keep VAXcluster traffic confined within a work group.)

- To automatically control traffic by keeping messages between stations on the same LAN from being retransmitted on the other LAN.

The following network configurations may require special consideration:

- **Work group size**

  To automatically isolate traffic, the work group should consist of less than 200 stations. When the number of stations in a work group exceeds 200, the Work Group Size Exceeded light will come on indicating that flood mode is enabled (indicator light number 6 shown in Figure 1-2). Refer to Chapter 4 for further information about flood mode.

  To avoid enabling flood mode when a work group consists of more than 200 stations, separate the work group into smaller groups of less than 200 stations each with its own DECbridge 90.

Figure 2–3 shows a configuration for a work group with more than 200 stations.

Figure 2–3 Work Group With More Than 200 Stations


```
                    Ethernet Backbone
   ─────────────────────────────────────────────
          │                      │
       ┌──────┐              ┌──────┐
       │ WGB  │              │ WGB  │
       └──────┘              └──────┘
          │                      │  Work Group
    ┌─────┴───────┐       ┌──────┴──────┐
    │             │       │             │
┌────────┐  ┌────────┐  ┌────────┐  ┌────────┐
│ System │  │ System │  │ System │  │ System │  < 200
└────────┘  └────────┘  └────────┘  └────────┘  Stations
```
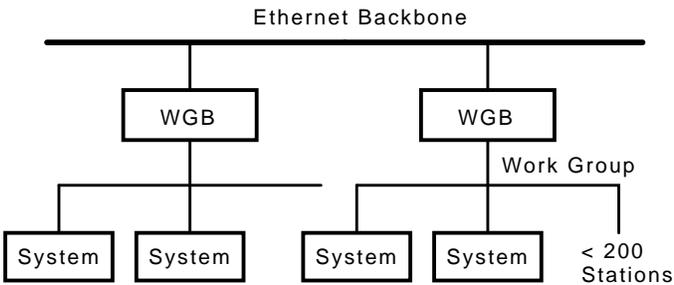
If there are more than 200 stations in a work group, separate into two work groups.

LJ-02229-TI0

- **Redundant connections to the backbone**

  If two DECbridge 90 units are configured into a redundant connection to the backbone, the spanning tree algorithm will allow only one bridge to forward traffic at a time. However, if a failure occurs in the backbone that causes the connection to be separated into two LANs, the spanning tree may reconfigure to pass all backbone traffic through your work group. When this occurs, the work group side of the bridge may see more than 200 stations and enter flood mode.

Figure 2–4 shows redundant connections to the backbone.

Figure 2–4 Redundant Connections
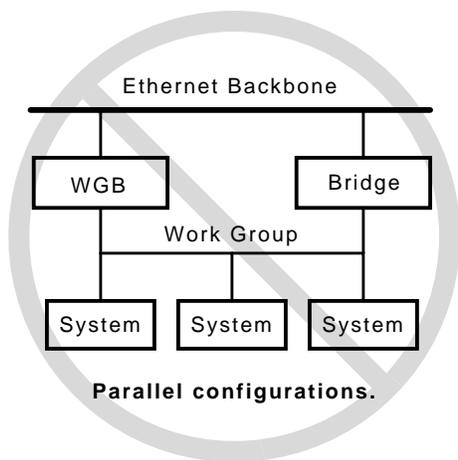
LJ-02232-TI0

- **Bridges in the work group**

  If there are additional bridges on the work group side of the DECbridge 90, be sure to count the stations on all LANs in the work group against the 200-station limit and count each bridge as two against the total. In addition, if any of these bridges lead back to the backbone, the redundant connection may lead to spanning trees that exceed 200 stations on the work group side of the DECbridge 90.

Figure 2–5 shows bridges in the work group.

Figure 2–5   Bridges in Work Group
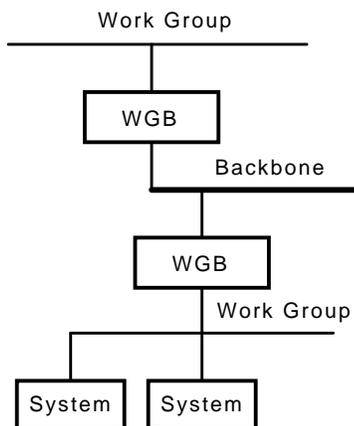
Bridge in work group.

LJ-02233-TI0

- **Number of bridges**

  The number of bridges between any two stations is limited to seven or less.
  This guideline for networks with typical packet traffic loading is a compromise
  of the many different protocols offered and used on Ethernet and IEEE 802.3
  LANs.

Figure 2–6 shows multiple bridges in the work group.

Figure 2–6 Multiple Bridges in a Work Group

**More than seven bridges between stations
on the Network.**
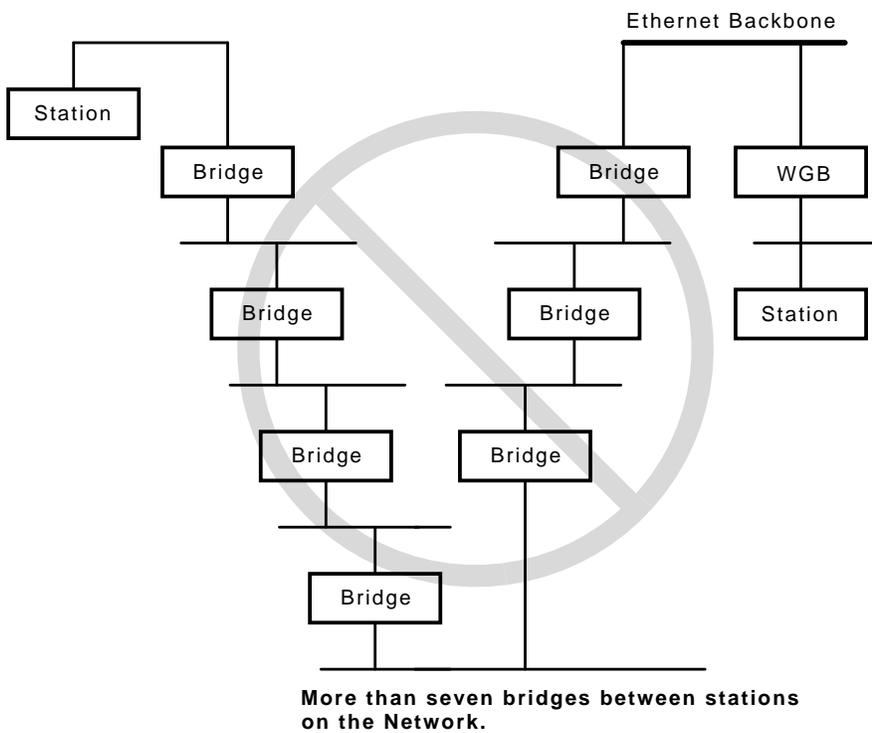
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3

Installation

Before you install the DECbridge 90 unit, it is recommended that you read this entire manual to become familiar with the features and configuration rules and guidelines of the DECbridge 90. If problems occur during installation, refer to Chapter 5, Troubleshooting. Appendix A, Specifications and Parts List, provides additional information that may be useful during installation.

The DECbridge 90 may be installed on a desk top or table, mounted on a wall by its back cover, or installed in the DEChub 90 backplane. The only tool required for installation is a screwdriver. The screwdriver is used to remove the back cover, which covers the backplane connector and mounting assembly, and to mount the bridge or the power supply on the wall.

Power Supply

The power supply (used only in standalone installations) is intended to be wall-mounted but may be used as a floor unit. The auto-ranging power supply supports voltages worldwide when the proper ac power cord is used. The ac power cord and its length will vary depending on the country package ordered.

Site Considerations

The DECbridge 90 and its power supply can be placed in various locations, including office areas, computer rooms, or wiring closets, as long as the environmental requirements are met. These requirements are provided in Table A–2 in Appendix A.

To install the DECbridge 90 on a desk top or table, make sure that the air circulation around the DECbridge 90 does not become obstructed by papers or other materials. The DECbridge 90 is convectively cooled and requires a minimum of 10 centimeters (4 inches) of space at both ends for adequate air flow.

Standalone Installation

To install the DECbridge 90 as a standalone installation, use the DECbridge 90 kit, order number DEWGB-AA. The kit contents are listed in Appendix A.

_____ **Note** _____

The ThinWire ports of the DECbridge 90 are not terminated internally. External 50-ohm terminations are required.

_____

When you choose a location, make sure that the power supply can be placed within 1.8 meters (6 feet) of the DECbridge 90 and that the distance from the power supply to the ac outlet does not exceed 2.4 meters (8 feet).

Figure 3–1 shows the DECbridge 90 in a standalone installation.

Figure 3–1 Standalone Installation

Switch
Selection
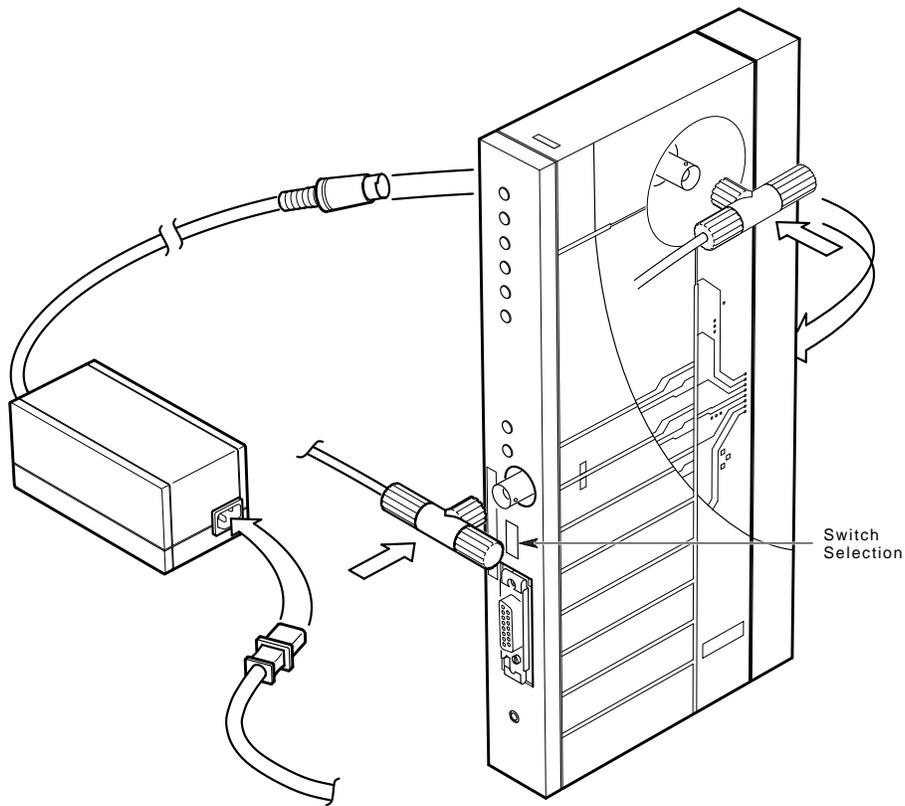
LJ-00068-TI0

Mount DECbridge 90 on a Wall

To install the DECbridge 90 as a standalone unit, refer to Figure 3–1 and follow
this procedure:

1. Remove the back cover of the DECbridge 90 (Figure 3–2).

    a. Insert a small screwdriver into the top mounting hole in the cover.

    b. Lift up on the latch and pull the top of the cover away and down from the
        unit.

2. Use the mounting holes on the cover to determine the placement for the
    mounting screws on the wall.

3. Attach the screws to the wall, leaving enough clearance to hang the bridge.

4. Attach the cover to the bridge and hang the unit on the wall.

Figure 3–2 Removing the Back Cover
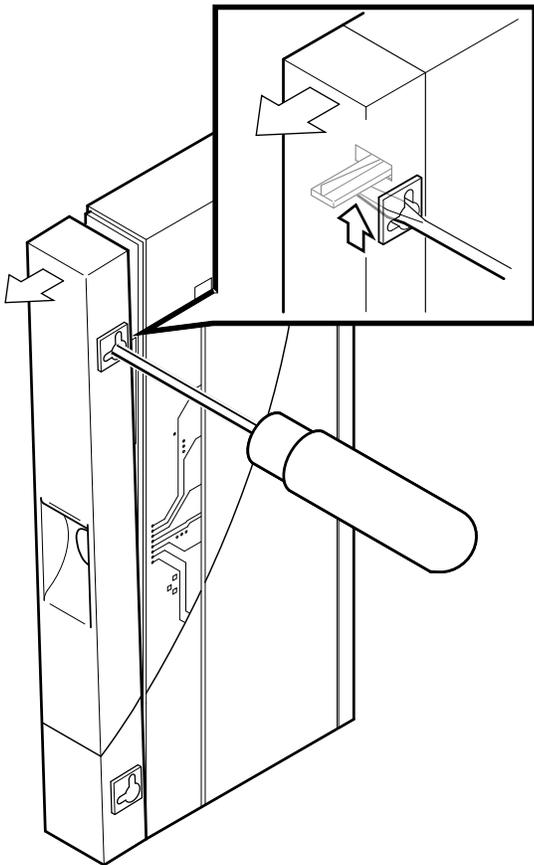
LJ-00320-TI0

Make Connections for Standalone Installations

AUI Backbone Connection

Select the AUI backbone connection by sliding the ThinWire/AUI selector switch on the front panel toward the backbone port AUI connector.

When the AUI port is attached to a 10Broad36 modem, the modem should be configured for local echo of transmissions.

To connect the transceiver cable, follow this procedure:

1. Push the slide latch to the unlocked position.

2. Plug the transceiver cable into the connector.

3. Push the slide latch down until it snaps into the locking position, to secure the connector (Figure 3–3).

4. Gently pull on the cable to make sure that the latch is secure.

_____ **Note** _____

The DECbridge 90 does not detect a collision presence test failure in the transceiver that is connected to the AUI port.

_____

Figure 3–3 shows the proper connection of the transceiver cable.

Figure 3–3 Connecting Transceiver Cables
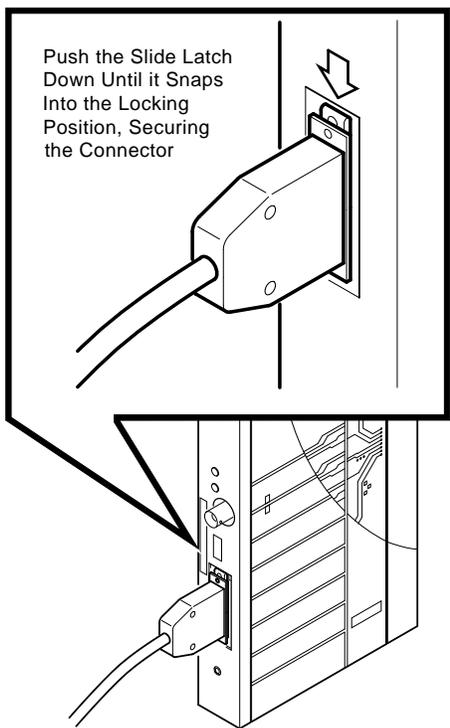
LJ-02157-TI0

ThinWire Backbone Connection

Select the ThinWire connection by sliding the ThinWire/AUI selector switch on the front panel toward the backbone port ThinWire connector. When you connect to the ThinWire cable, make sure that the cables are properly terminated. Refer to Figure 3–4 and Figure 3–5 for guidelines on terminating cables.

Figure 3–4 shows how to connect to the middle of a ThinWire segment.

Figure 3–4 Connecting to the Middle of a ThinWire Segment

LJ-00243-TI0
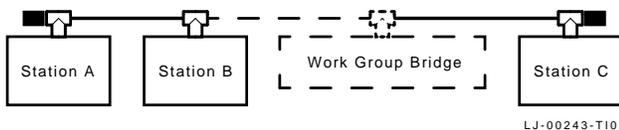
Figure 3–5 shows how to connect to the end of a ThinWire segment.

Figure 3–5 Connecting to the End of a ThinWire Segment

LJ-00242-TI0
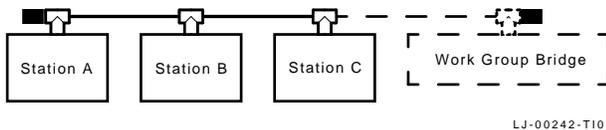
Work Group Connection

Connect the work group by attaching a segment of ThinWire cable to the
ThinWire connector on the DECbridge 90.

When connecting to a ThinWire cable, make sure that the cables are properly
terminated (Figure 3–4 and Figure 3–5).

Power Supply Connection

To connect the power supply to the DECbridge 90, place the power supply within
1.1 meters (4.3 feet) of the DECbridge 90, and follow this procedure:

1. Attach the ac power cord to the power supply.

2. Plug the power supply into an ac outlet.

    The DECbridge 90 will run a 10-second self-test during which all front panel
    lights will turn on.

    On successful completion of the test, the following lights will remain on: DC
    OK, System Port OK, Work Group Port OK, and Backbone Port OK. The
    Bridge Forwarding State indicator will remain on for 30 seconds as the bridge
    learns the network configuration, and then the indicator will turn off.

    Refer to Chapter 5, Troubleshooting, if the DECbridge 90 indicators do not
    turn on.

Backplane Installation

To install the DECbridge 90 in the DEChub 90 backplane, use the DECbridge 90 kit, order number DEWGB-MA. The kit contents are listed in Appendix A.

Figure 3–6 shows the DECbridge 90 in a DEChub 90 backplane.

Figure 3–6   Installing the DECbridge 90 into DEChub 90 Backplane Slot 8
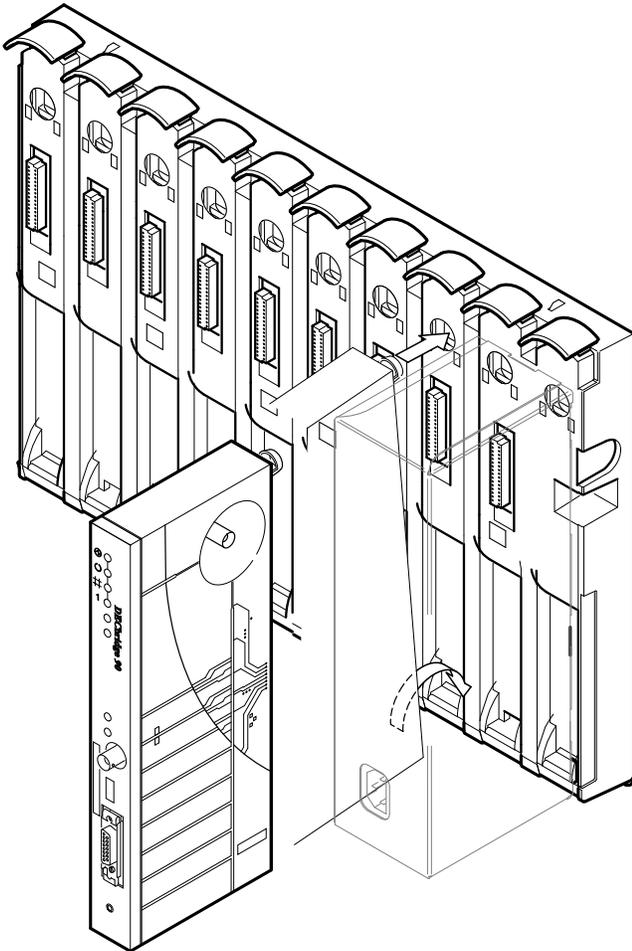
LJ-02081-TI0

Install the DECbridge 90 in the DEChub 90 Backplane

To install the DECbridge 90 in the DEChub 90 backplane, refer to Figure 3–6 and follow this procedure:

1. Remove the back cover of the DECbridge 90.

    a. Insert a small screwdriver into the top mounting hole in the cover.

    b. Lift up on the latch with the screwdriver and pull the top of the cover away and down from the unit.

2. Place the lower mounting tab, located on the back of the DECbridge 90, into slot 8 of the backplane.

3. Rock the bridge into place. You will hear a click when the bridge is secured in the slot.

Make Connections for Backplane Installations

1. Select the AUI or ThinWire connection by sliding the AUI/ThinWire selector switch on the front panel toward the backbone port AUI or ThinWire connector.

    When the AUI port is attached to a 10Broad36 modem, the modem should be configured for local echo of transmissions.

2. Make the selected backbone connection (AUI or ThinWire). Refer to the Make Connections for Standalone Installations section, for information about how to connect the transceiver cables.

    The work group port is automatically connected once the DECbridge 90 is installed in the DEChub 90 backplane. The backplane provides power to the bridge; therefore, no other power supply is needed. Any other unit installed in the backplane is bridged automatically and is part of the work group.

3. Power up the backplane if power is not already on.

    The DECbridge 90 will run a 10-second self-test during which all front panel lights will turn on.

    On successful completion of the test, the following indicators will remain on: DC OK, System Port OK, Work Group OK, and Backbone Port OK. The Bridge Forwarding State indicator will remain on for 30 seconds as the bridge learns the network configuration, and then the indicator will turn off.

    Refer to Chapter 5, Troubleshooting, if the DECbridge 90 indicators do not turn on.

4
Managing the DECbridge 90

The DECbridge 90 unit is managed by Maintenance Operations Protocol (MOP), which allows advanced bridge features, such as protocol filtering, to be set up without any additional management software. Host system support, which is standard on all VMS installations, is required for MOP console carrier operation. On ULTRIX installations, the MOP option is a separate utility that may be installed from the original distribution media.

The DECbridge 90 also supports Remote Bridge Management Software (RBMS). RBMS allows similar bridge management through the use of additional Digital management software. Refer to the Remote Bridge Management Software section in this chapter for further information.

DECbridge 90 Operation

The DECbridge 90 is a packet store-and-forward device that receives all IEEE 802.3 and Ethernet packets and, if necessary, forwards them from one port to the other. This capability enables the bridge to isolate high-traffic areas from the rest of the LAN. For example, if the systems and servers in a cluster usually communicate with each other and rarely communicate with other systems on the LAN, the bridge keeps that traffic local, that is, off the main LAN.

The decision to filter or forward packets is determined by the packet's destination address or protocol type as follows:

- **Destination Address Filtering** - The bridge, on receiving a packet, scans its address database, which contains node addresses from the work group port that are dynamically learned by the bridge. The destination address of the packet is compared with known addresses in the work group. If no protocol-type filters are enabled for the packet, the bridge makes its decision to filter the packet based on the destination address. Otherwise, the packet is subjected to protocol-type filtering.

- **Protocol Filtering** - The bridge may be configured to filter selected protocols so that user-selected protocols can be isolated within or outside a specific work group.

- **Flood Mode** - The bridge forwards all packets from the backbone to the work group subject only to protocol filtering. When flood mode is disabled, a station in the work group must have its address in the address table to receive messages from the backbone LAN. When flood mode is enabled, the backbone traffic is forwarded to the work group subject only to the protocol filters, and not subject to the address filters. This is useful in the following situations:

  - A work group that exceeds 200 stations cannot be accommodated in the DECbridge 90 address table. Flood mode allows full connectivity with more than 200 stations by eliminating the automatic traffic isolation between the work group and the backbone LANs.

  - If a station in the work group does not transmit messages before the *address age time* expires, or if the station never transmits, it will not be in the address table. Flood mode must be enabled to reach these stations from the backbone LAN. Flood mode will be enabled automatically whenever the DECbridge 90 detects more than 200 stations in the work group. When enabled automatically, it will also be disabled automatically approximately 10 minutes after the bridge discovers that the work group no longer exceeds the 200-station limit.

  Flood mode can be enabled or disabled manually by using the SET BRIDGE command. When enabled manually, flood mode remains enabled regardless of the work group size. Refer to the Description of Commands section in this chapter for information about the SET and DEFINE BRIDGE FLOOD DISABLE commands.

  Flood mode reduces the traffic isolation features of the bridge; therefore, it should be enabled *only* when necessary.

DECbridge 90 Functions

- **Protocol-transparent, multivendor communications** - The DECbridge 90 provides connectivity between two network segments regardless of vendor hardware or software, provided that the hardware and software conform to IEEE 802.3 and Ethernet compliance requirements.

- **Connectivity** - The DECbridge 90 can be used on both IEEE 802.3 and Ethernet networks.

- **Backbone connection** - The DECbridge 90 provides switch-selectable AUI or ThinWire connection to the backbone.

- **Automatic self-test** - The DECbridge 90 automatically initiates a 10-second self-test of the basic functions of the DECbridge 90 when the bridge is powered up.

- **Online diagnostics** - The DECbridge 90 has automated continuous testing of the DECbridge 90 hardware.

- **Loop detection** - The DECbridge 90 determines if there are any loops by communicating with other Digital or IEEE 802.1 compliant bridges in the network and it configures appropriately to eliminate loops.

Spanning Tree Algorithm

The spanning tree is an automatic process used by all bridges in an extended LAN configuration to create a logical, loop-free network. The spanning tree is determined automatically by an algorithm resident in each bridge. No user action or network management is required to configure the network. If a loop is detected, the process computes and implements a loop-free network topology. This process prevents packets from circulating through the network indefinitely.

Spanning Tree Algorithm Properties

Although the bridges in an extended network can be placed in an arbitrary fashion, the logical network that bridges automatically create (due to the algorithm) is always a spanning tree with the following properties:

- No loops

- Only one path between any two bridges

- All LANs are connected

Refer to the *Bridge and Extended LAN Reference* for detailed information about the spanning tree process.

MOP

Maintenance Operations Protocol (MOP) is a host-based protocol. Console carrier is a component of MOP that accesses the user interface command language embedded in the DECbridge 90. Console carrier provides the ability to establish a single conversational terminal line link between a terminal or workstation on the LAN and the DECbridge 90. This link transmits and receives keystrokes.

MOP Functions

MOP console carrier management allows you to perform the following functions:

- Examine the bridge characteristics of address entry age, forwarding state, firmware version, name of flash ROM image, and uptime.

- Examine the port characteristics of backbone and work group ports (hardware address, MOP counters, and bridge counters).

- Examine port status (management connected, management disconnected, properly operating, or broken) of both bridge ports and of repeater ports that share the DEChub 90 backplane with the bridge.

- Examine the work group address database entries 1 to 200.

- Examine the current or permanent protocol filter entries 1 to 16.

- Set protocol filters.

- Reset the bridge.

- Connect or disconnect a port (work group or backbone, or repeaters in the backplane).

- Set the bridge maximum address entry age, current or permanent.

- Define the bridge password.

- Enable and disable flood mode.

Refer to the Description of Commands section in this chapter for additional information about command syntax.

Accessing MOP from VMS Systems

On a VMS operating system, the 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 following:

- The Ethernet address of the bridge that is to be managed

- 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 can be found on the label on the DECbridge 90 front panel. The following Ethernet circuit names, based on system type, apply:

Table 4–1 Ethernet Circuit Names for Systems

System	Circuit Name
VAX 6000 and VAX 9000 XMI computers	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 VAX 3900 computers	qna-0
VAXstation 2000 and VAXstation 3000 computer series	sva-0
VAX–11/780 and VAX–11/785 computers (UNIBUS)	una-0

Example:

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

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

When you have established connection, the following appears on the screen:

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

Accessing a Bridge Repeatedly

If you need to access a specific bridge repeatedly, you can enter the Ethernet address for that bridge 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.

Example:

If you call your bridge DBRG1 on address 13.87 and access it from a VAX 6400 system (where the Ethernet circuit name is bna-0), you can use the following commands:

```
$ NCP
```

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

You can then enter the following:

```
$ NCP CONNECT NODE DBRG1
```

Accessing MOP from ULTRIX Systems

On the ULTRIX operating system, the console carrier is a separate utility included as part of the MOP option. This option is part of the regular distribution, however, it is not selected by default and is not included in the basic installation. You can install the MOP from the original distribution media using the **setld** utility. You must have superuser privileges to invoke the console carrier.

Once the MOP option is installed, each bridge to be managed must be given a name and a dummy node number using the **addnode** utility. For example:

```
# addnode 13.1 DBRG1
```

Once the name and node number are assigned, you can establish the link at any time using 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, based on system type, apply. Refer to Table 4-1 for circuit names.

When you have established connection, the following appears on the screen:

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

Console Carrier User Interface

The DECbridge 90 is not shipped with a preset password; therefore, no password prompt appears when you connect for the first time. For secure operation of the DECbridge 90, you should define a password using the DEFINE BRIDGE PASSWORD command.

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

You have three attempts to enter a password. If all three attempts fail, then you must disconnect and try again.

If you have defined a password for the DECbridge 90, then the following appears on the screen after the network connection to the bridge is established:

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

You must now enter the bridge password to access the console carrier. The password you enter will not appear on the screen.

After you successfully enter the password, or if no password is defined, the following appears on the screen:

```
DEWGB V2.0 08-00-2B-2D-9B-81 © Digital Equip Corp
FPROM V2.5f ©1991,92 Digital Equip Corp 25-JUN-92
DECbridge>
```

Console Carrier Command Language

With the exception of the help facility, the console carrier command language is similar to the DECserver command language. Type a question mark (?) at any point in the command line to see a list of the options that are available to you at that point in the command line. Unique abbreviations of commands are accepted. The command options are:

> DEFINE
> DISPLAY
> LIST
> SET
> SHOW
> TEST (for manufacturing use only)

Table 4–2 provides a summary of the DECbridge 90 commands.

Table 4–2   Summary of DECbridge 90 Commands

Command	Argument and Parameter
DEFINE[1]	BRIDGE AGE *age*

	BRIDGE FLOOD
	      ENABLE
	      DISABLE

	BRIDGE HUB_MANAGEMENT
	      ENABLE
	      DISABLE

	BRIDGE PASSWORD

	BRIDGE SPANNING TREE
	      ENABLE
	      DISABLE

[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.

Table 4–2 (Cont.)   Summary of DECbridge 90 Commands

Command	Argument and Parameter
	PORT *port number* 　　ENABLE 　　DISABLE
	PROTOCOL *protocol number* 　　FILTER ALL *protocol identifier* 　　FILTER BACKBONE *protocol identifier* 　　FILTER GROUP *protocol identifier* 　　FILTER WORKGROUP *protocol identifier* 　　FORWARD *protocol identifier* 　　NONE
DISPLAY	No arguments or parameters are needed
LIST	BRIDGE
	PROTOCOL *protocol number*
SET[2]	ALL
	BRIDGE AGE *age*
	BRIDGE FLOOD 　　ENABLE 　　DISABLE
	BRIDGE RESET
	BRIDGE HUB_MANAGEMENT 　　ENABLE 　　DISABLE
	BRIDGE SPANNING TREE 　　ENABLE 　　DISABLE
	PORT *port number* 　　ENABLE 　　DISABLE
	PROTOCOL *protocol number* 　　FILTER ALL *protocol identifier* 　　FILTER BACKBONE *protocol identifier* 　　FILTER GROUP *protocol identifier* 　　FILTER WORKGROUP *protocol identifier* 　　FORWARD 　　NONE

[2]The SET commands change only the currently active values, but do not affect the defaults that are assumed on power up or reset.

Table 4–2 (Cont.)   Summary of DECbridge 90 Commands

Command	Argument and Parameter
	REPEATER
SHOW	ADDRESS *start index*
	BRIDGE
	PORT *port number*
	PROTOCOL *protocol number*
	REPEATER *hub slot number*

Description of Command Parameters

An *address number* is an index into the work group address database. The valid range is 1 to 200.

An *age* is an address database lifetime entry. The valid range, in seconds, is 0 to 32767.

A *hub slot number* is a single number, in the range of 1 to 8, that identifies a hub slot containing a DECrepeater 90. When two DEChub units are connected together, a *hub slot number* is a pair of numbers; the first is the hub number of 1 to 2, and the second is the slot number within the hub of 1 to 8. For example, the numbers 2,4 designate the fourth slot from the left, in the second DEChub, which is the hub that does not contain the DECbridge 90.

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

A *protocol identifier* is a string of either two hex digit pairs (60-00) to specify an Ethernet protocol, or a string of five hex digit pairs (08-00-2B-60-00) to specify an IEEE 802.3 SNAP SAP protocol ID.

A *protocol number* is a decimal index into the protocol database. The valid range is 1 to 16.

A *port number* is either a DECbridge 90 port, or the number of a port on a repeater 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. The numbers 2,4,1 refer to the first port on a repeater in the fourth slot of the second hub.

Description of Commands

The following section describes the DECbridge 90 commands. The commands are listed in alphabetical order.

DEFINE BRIDGE AGE *age*
SET BRIDGE AGE *age*

Changes the maximum allowable age of an address entry. An address in the work group address database will be removed if no messages are received from the node for the amount of time specified by the age. The *age* parameter is in seconds. Setting the age to 0 will prevent any addresses from being removed. These addresses will remain until the bridge is powered down or reset.

Changes made with the DEFINE command will survive a reset or power failure; changes made with the SET command will not.

DEFINE BRIDGE FLOOD DISABLE
SET BRIDGE FLOOD DISABLE

Disables flood mode in the DECbridge 90. Attempting to disable flood mode with a work group larger than 200 stations (that is, when the Work Group Size Exceeded light is on) will not be successful.

Flood mode is a feature that, when enabled, does not filter traffic from the backbone to the work group based on destination address. All messages that pass protocol filters are passed to the work group, regardless of destination address. This feature is useful when a station within the work group is not receiving messages from the backbone for either of the following reasons:

a. The station has not transmitted any packets, therefore, the bridge is unaware that the station exists within the work group.

b. The bridge is unaware of the station because the 200-station work group limit has been exceeded. In this case, flood mode is automatically enabled and all stations in the work group will be able to receive packets from the backbone.

When enabled, flood mode disables destination address filtering and introduces more traffic into the work group. However, protocol filtering will still be in effect and packets from the work group will still be subject to full filtering when passing to the backbone.

DEFINE BRIDGE FLOOD ENABLE
SET BRIDGE FLOOD ENABLE

Enables flood mode in the bridge. Refer to the DECbridge 90 Operation section
and the previous flood commands for a description of flood mode.

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 will
not be able to use SHOW REPEATER, SET PORT, or SHOW PORT commands
on repeater ports, and you will not get port number information from the SHOW
ADDRESS command.

DEFINE BRIDGE HUB_MANAGEMENT ENABLE
SET BRIDGE HUB_MANAGEMENT ENABLE

Reverses the effect of the SET or DEFINE BRIDGE HUB_MANAGEMENT
DISABLE commands.

DEFINE BRIDGE PASSWORD
SET BRIDGE PASSWORD

Changes the password string. You are prompted twice for a new password. The
password may be up to 16 characters long and is not displayed on the screen.
This change will survive a reset. There is no corresponding SET command.

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.

DEFINE BRIDGE SPANNING_TREE DISABLE
SET BRIDGE SPANNING_TREE DISABLE

Disables the use of the bridge spanning tree autoconfiguration algorithm for your DECbridge 90 unit and prevents forwarding of any spanning tree network messages. If spanning tree is disabled, the DECbridge 90 will not detect loops in the network bridge topology. If a loop is configured while the spanning tree algorithm is disabled, the network will be quickly saturated by the forwarding of messages around this loop. For this reason, Digital Equipment Corporation recommends that the spanning tree algorithm be enabled at all times.

DEFINE BRIDGE SPANNING_TREE ENABLE
SET BRIDGE SPANNING_TREE ENABLE

Reverses the effect of the SET or DEFINE BRIDGE SPANNING_TREE DISABLE commands.

DEFINE PORT *port number* **DISABLE**
SET PORT *port number* **DISABLE**

Disables the ability to forward packets through the bridge by disabling the specified port. The DEFINE command changes only the nonvolatile database; the SET command changes only the current state. Both ports must be enabled before the bridge can begin forwarding messages. The port numbers are 1 for the backbone port, and 2 for the work group port.

DEFINE PORT *port number* **ENABLE**
SET PORT *port number* **ENABLE**

Reverses the effect of the SET or DEFINE PORT DISABLE command. Both ports must be enabled before the bridge can begin forwarding. In new units, the ports default to enabled.

DEFINE PROTOCOL *protocol number* **FILTER ALL** *protocol identifier*
SET PROTOCOL *protocol number* **FILTER ALL** *protocol identifier*

Sets the specified protocol identifier to be one of a limited number of protocol types that are filtered, where all others are forwarded. All messages of the given protocol identifier are filtered. (Refer to Table 4–3 for a list of the protocol type codes and names.) If this command is accepted, the bridge invert protocol filter mode is disabled, and the SET PROTOCOL FORWARD command may no longer be used until all of these entries are deleted with the SET PROTOCOL NONE command.

DEFINE PROTOCOL *protocol number* **FILTER BACKBONE** *protocol identifier*
SET PROTOCOL *protocol number* **FILTER BACKBONE** *protocol identifier*

Sets the specified protocol type such that messages individually addressed to
stations are forwarded, and group-addressed messages from the work group port
are forwarded; however, group-addressed messages of this protocol will not enter
the work group from the backbone. This command is not affected by the bridge
invert protocol filter mode.

DEFINE PROTOCOL *protocol number* **FILTER GROUP** *protocol identifier*
SET PROTOCOL *protocol number* **FILTER GROUP** *protocol identifier*

Sets the specified protocol type such that messages individually addressed to
stations are forwarded; however, broadcast and group-addressed messages of this
protocol are filtered. This command is not affected by the bridge invert protocol
filter mode.

DEFINE PROTOCOL *protocol number* **FILTER WORKGROUP** *protocol
identifier*
SET PROTOCOL *protocol number* **FILTER WORKGROUP** *protocol identifier*

Sets the specified protocol type such that messages individually addressed to
stations are forwarded, and group-addressed messages from the backbone port
are forwarded; however, group-addressed messages of this protocol will not enter
the backbone from the work group. This command is not affected by the bridge
invert protocol filter mode.

DEFINE PROTOCOL *protocol number* **FORWARD** *protocol identifier*
SET PROTOCOL *protocol number* **FORWARD** *protocol identifier*

Sets the specified protocol type to be one of a limited number of protocol types
that are forwarded, where all others are filtered. If this command is accepted,
the bridge is placed into the bridge invert protocol filter mode. This means
that the SET PROTOCOL FILTER ALL command may no longer be used until
all forwarded protocol entries are removed. Use the SET PROTOCOL NONE
command to delete protocol filters. Generally, use the SET PROTOCOL FILTER
ALL command to stop unwanted protocols rather than to list explicitly the
permitted protocols.

DEFINE PROTOCOL *protocol number* **NONE**
SET PROTOCOL *protocol number* **NONE**

Deletes a protocol filter entry from the protocol filter database. Note that if the last FORWARD protocol is deleted, the bridge will go back to forwarding all protocols.

DISPLAY

The continuous port counter display toggles on and off. The screen is cleared and the numbers are re-displayed every 10 seconds thereafter, until the DISPLAY command is issued again. The DISPLAY command output appears as follows:

```
DECbridge 08-00-2B-1E-2C-0F  Uptime: 109,929.66 seconds
System buffer unavailable: 0         Work group size exceeded: 0
Backbone side:                       Work group side:
Frames received: 266,788             Frames received: 3,233
Relayed to work group: 178,640       Relayed to backbone: 1
Received frame too long: 0           Received frame too long: 0
Frames sent: 7                       Frames sent: 182,476
Sent, initially deferred: 1          Sent, initially deferred: 96
Sent, single collision: 0            Sent, single collision: 2
Sent, multiple collisions: 0         Sent, multiple collisions: 0
Unsent, excessive collisions: 0      Unsent, excessive collisions: 0
Unsent, carrier check failed: 0      Unsent, carrier check failed: 0
Unsent, lifetime exceeded: 0         Unsent, lifetime exceeded: 0
Received block check error: 0        Received block check error: 0
Received framing error: 0            Received framing error: 0
Unsent, remote failure to defer: 0   Unsent, remote failure to defer: 0
DECbridge>
```

LIST BRIDGE

Displays the nonvolatile bridge-wide parameters.

LIST PROTOCOL *protocol number*[, *protocol number*]

Shows either "unused," or the protocol type value, for every entry in the nonvolatile protocol database. This filter becomes the active filter when the DECbridge 90 is reset.

SET ALL

Resets the protocol filters and bridge-wide parameters from the nonvolatile database. This affects maximum age, preforwarding/blocking delay, all protocol filters, and port state.

SET BRIDGE RESET

Performs the equivalent of turning the bridge off and back on again.

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 will flash, indicating that the port was disconnected by the network manager. There is no equivalent DEFINE command for disabling repeater ports. Disabling port 0 on a repeater will disconnect the repeater from the hub.

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

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

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

Displays the station address for the selected range of entries in the address database. The indexes range from 1 to 200. The start index is always displayed; other entries in the range are only displayed 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 repeaters, the hub slot number and repeater port to which each station is attached are also displayed. 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.

SHOW BRIDGE

Displays bridge firmware revision numbers, station address, uptime, current maximum age, current console carrier owner, bridge state, system buffer unavailable count, work group size, the number of times the flash EPROM has been erased, flood mode status, and all bridge-wide spanning tree parameters.

The bridge states are listed in the following table:

Bridge State	Meaning
1F,3F	Forwarding, flood mode enabled
17,37	Forwarding
16,36,1E	Preforwarding
15,35,1D	Blocking (configuration error)
12,32,1A	Disabled (one or both ports disabled)
13,33,1B	Broken (one or both ports failing loopback test)

The first digit is 1 when the bridge state is normal. If the first digit is 3, then the bridge is using invert protocol filter mode. If the last digits are A through F, then flood mode is physically enabled.

_____ **Note** _____

When flood mode is automatically enabled after the 200 station limit is reached, it will not be reflected in the user flood mode status in the SHOW BRIDGE command. It will, however, be reflected in the bridge state.

_____

Refer to the DEFINE PROTOCOL command descriptions for more details.

SHOW PORT *port number*

Displays all the MOP counters, bridge counters, and spanning tree state kept by the DECbridge 90. Port 1 is the backbone port; port 2 is the work group port.

The spanning tree port states are listed in the following table:

Port State	Meaning
0	Disabled
1	Listening
2	Learning
3	Forwarding
4	Blocking
5	Broken

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

Shows whether the port is enabled or disabled and shows the operational status of the port. Hub numbers may be 1 or 2; slot numbers may be 0 to 8. For the DECrepeater 90T, port numbers are 0 to 8; for the DECrepeater 90C, port numbers are 0 to 6, for the DECrepeater 90A, port numbers are 0 and 1.

SHOW PROTOCOL [*start number*[, *stop number*]]

Shows either EMPTY, or the current protocol type, value, and current forwarding status of each entry in the range given. Numbers range from 1 to 16. If numbers are omitted in the command, all 16 protocol filters are displayed. The LIST command shows the filters that are loaded when the DECbridge 90 is reset.

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 to 8. If no parameters are given, the status is displayed for all repeaters in both hubs.

TEST *test number*

Invokes a set of self-tests (manufacturing use only).

Protocol Filtering Examples

The following examples show some of the ways protocol filtering can be used with the DECbridge 90. Table 4–3 lists some of the Digital Ethernet protocol type codes that are used to establish protocol filters.

Table 4–3 Protocol Type Codes and Names

Type Code	Name
60-01	MOP remote boot
60-02	MOP console carrier, counters, and system identification
60-03	DECnet
60-04	LAT
60-05	Diagnostics
60-06	Customer-specific
60-07	Local Area VAXcluster
80-38	Bridge management

Example 1: Keeping VAXcluster traffic out of your work group.

If you have an entire Local Area VAXcluster (LAVc) on the work group side of the DECbridge 90, you can define the filtering with the following command:

```
DECbridge>  DEFINE PROTOCOL 0 FILTER ALL 60-07
```

This prevents any cluster traffic from entering or leaving the work group. Specifically, this means your cluster traffic will not be seen on the backbone, and no other cluster traffic will be seen on your own work group.

If the external cluster traffic is substantial, this could improve your local network performance. This also makes it more difficult for others on the network to monitor your cluster traffic and eliminates the need to make your cluster ID different from others on the same extended LAN.

Example 2: Keeping boot requests of other groups out of your group.

MOP remote boot requests come from LAVc satellite systems, DECserver terminal servers, VAXELN systems, and other sources, when they need to have their software reloaded from a boot server. Boot request messages begin with group-addressed messages. If line service is enabled in NCP, this creates extra processes on VMS systems which, if your node is not a designated boot node for the requester, slow down your system. This is particularly true after a building-wide power shutdown. It is desirable to filter out these boot requests but still be able to boot nodes in your own work group.

To stop all boot requests enter the following command:

```
DECbridge>  DEFINE PROTOCOL 1 FILTER ALL 60-01
```

This command would not work if you had DECserver terminal servers or other systems inside your work group, and the designated boot servers are outside your work group. To accommodate this situation, you can enter the following command:

```
DECbridge>  DEFINE PROTOCOL 1 FILTER BACKBONE 60-01
```

Now nodes inside your work group may issue boot requests and have them forwarded to a boot server outside the work group. Additionally, the boot requests from outside will be blocked at the bridge and will not slow down nodes inside the work group.

Example 3: Controlling LAT access

The LAT protocol uses a group-addressed message for service nodes to announce their availability to the DECserver units. The one-way group address filter in the bridge allows additional control to access nodes in the work group. To allow users in your work group to access all network-wide services but to limit access within the work group to only those servers that are in the same work group, enter the following command:

```
DECbridge>  DEFINE PROTOCOL 2 FILTER WORKGROUP 60-04
```

Service announcements that are generated by nodes in the work group are blocked by the DECbridge, and will not be seen by DECserver units on the rest of the network. Service announcements arriving from the outside network are allowed into the work group; therefore, your own servers can still connect to services offered by others.

Remote Bridge Management Software (RBMS)

RBMS is a Digital proprietary network management protocol which, similar to MOP, allows the bridge to be managed remotely. Unlike MOP, however, RBMS is neither directly accessible nor visible to the user. RBMS is used by the DECagent 90 management agent, DECmcc management software, and other Digital products. The DECagent 90 uses RBMS to provide Simple Network Management Protocol (SNMP) management of the bridge. DECmcc provides a user interface to complex network management tasks.

A detailed discussion of RBMS features is beyond the scope of this manual; the user needs only to be aware that the DECbridge 90 may be managed by software using the RBMS protocol. Refer to Appendix B, Related Documentation, for further information about ordering the *Remote Bridge Management Software Guide*.

Error Messages

Table 4–4 describes the DECbridge 90 error messages.

Table 4–4 DECbridge 90 Error Messages

Error 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 the DEFINE BRIDGE PASSWORD command did not match the first entry.
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 90 is not the hub manager. • Another DECbridge unit is acting as the current hub manager. • A fault exists in the MMJ cable or connections between two DEChub backplanes, or in the power supply of one of the DEChub units, that prevents repeater management communication.
EEPROM failure, SET ALL not performed	Indicates that EEPROM did not pass the self-test diagnostic. The DECbridge 90 unit should be serviced. Information in the permanent configuration database may not be valid and DEFINE commands may not have the intended effect. The unit will continue to operate using the default parameters, or with parameters issued with the SET command.
Enter maximum address age from 2 to 65534 seconds	Indicates that invalid address age was entered with the SET BRIDGE AGE or DEFINE BRIDGE AGE commands. Enter a number between 2 and 65534 seconds.
Ethernet protocol xx-xx or IEEE PID xx-xx-xx-xx-xx	Indicates that the protocol type parameter entered with the SET PROTOCOL or DEFINE PROTOCOL command was not a sequence of either two or five hexadecimal digit pairs.

(continued on next page)

Table 4–4 (Cont.) DECbridge 90 Error Messages

Error Message	Description
FILTER ALL protocols must be removed before defining any FORWARD command	Indicates an attempt to configure contradictory protocol filtering rules in the permanent database. Before the DECbridge 90 will accept a filter request, you must enter the LIST PROTOCOL command to identify protocol filters marked as FILTER ALL, and remove them with the DEFINE PROTOCOL *n* NONE command.
FILTER ALL protocols must be removed before setting any FORWARD command	Indicates an attempt to configure contradictory protocol filtering rules in the permanent database. Before the DECbridge 90 will accept a filter request, you must enter the LIST PROTOCOL command to identify protocol filters marked as FILTER ALL, and remove them with the SET PROTOCOL *n* NONE command.
FORWARD protocols must be removed defining any FILTER ALL command	Indicates an attempt to configure contradictory protocol filtering rules in the current database. Before the DECbridge 90 will accept a filter request, you must enter the SHOW PROTOCOL command to identify protocol filters marked as FORWARD, and remove them with the DEFINE PROTOCOL *n* NONE command.
FORWARD protocols must be removed setting any FILTER ALL	Indicates an attempt to configure contradictory protocol filtering rules in the current database. Before the DECbridge 90 will accept a filter request, you must enter the SHOW PROTOCOL command to identify protocol filters marked as FORWARD, and remove them with the SET PROTOCOL *n* NONE command.
Hub management disabled	Indicates that the SHOW PORT or SHOW REPEATER command 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 that one or more parameters provided to the SHOW REPEATER command was out of range. Hub number must be either 1 or 2; slot number must be between 1 and 15.

Table 4–4 (Cont.)   DECbridge 90 Error Messages

Error Message	Description
Hub *h* slot *s* - port number out of range	Indicates that the port number entered with the SHOW PORT command was out of range for the device in hub *h* slot *s*. Use the SHOW REPEATER command 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.
No repeater responds	Indicates that there is no repeater installed in the requested hub slots, or the repeater is not functioning.
No such port	Indicates that the bridge port number entered with the SHOW PORT command was out of the range. The valid range is 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 that one of the parameters to a SET PORT or DEFINE PORT command was not a valid hub, slot, or port number.
Protocol type number [first [,last]] in range 1-16	Indicates that one or more parameters entered with the SHOW PROTOCOL, SET PROTOCOL, and DEFINE PROTOCOL command was out of range. The valid range is 1 to 16.
Repeater port does not exist or is out of range	Indicates that the parameter entered with the SET PORT command was not a valid port number. Use the SHOW REPEATER command to determine which hub slots contain repeaters and to determine the number of ports on each repeater.
Station address number [first [,last]] in range 1-200	Indicates that one or more parameters entered with the SHOW PROTOCOL command was out of range. The valid range is 1 to 200.

(continued on next page)

Table 4–4 (Cont.)   DECbridge 90 Error Messages

Error Message	Description
Unsupported by this hardware revision	This occurs when you attempt to execute a SET or DEFINE BRIDGE FLOOD command on a bridge with a firmware revision of 1 (DECbridge 90 V1.4) but have loaded V2.5 flash EPROM. The old hardware revision does not support flood mode. These version numbers appear in the MOP console connection banner.
???	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.

5

Troubleshooting

This chapter describes how to troubleshoot the DECbridge 90 unit. The indicators
on the front panel of the DECbridge 90 are used to troubleshoot bridge and work
group problems. Figure 1–2 in Chapter 1 shows the location of the indicator
lights and connectors on the DECbridge 90. To troubleshoot a unit, follow this
procedure:

1. Verify the installation of the bridge.

   Ensure that the installation meets the configuration requirements provided in
   Chapter 2.

2. Check all power and Ethernet connections.

3. Isolate the problem. When isolating a problem, examine the following:

   - Backbone

   - Connection to the backbone

   - Work group

   - Connection to the work group

   - DECbridge 90

   - Power supply

Table 5–1 lists the state of the LEDs, the possible causes, and the corrective action.

Table 5–1 Activity Indicators (LEDs)

LED	State	Possible Cause	Corrective Action
DC OK	ON	Bridge's power supply is working.	None.
	OFF	Bridge's power supply is not working or there are transceiver problems.	Go to Table 5-2.
		Must be in slot 7 of hub.	
System OK	ON	Bridge is powered up and has passed the self-test.	None.
	OFF	Bridge is faulty.	Go to Table 5-2.
Work Group Port OK	ON	Bridge is powered up and has passed the self-test.	None.
	OFF	Cables are not properly terminated[1].	Refer to Chapter 2.
Work Group Port Activity	ON[2]	Indicates activity on the LAN.	None.
Bridge Forwarding State	ON	Bridge is not forwarding.	It is normal for this LED to remain on for 30 seconds after power up. However, if the LED remains on for longer than 30 seconds, or if the LED goes on any time during normal operation, then ensure that the configuration is correct and that all parts are properly connected.
	OFF	Bridge is forwarding.	None.

[1]ThinWire ports of the DECbridge 90 are not terminated internally. External 50-ohm terminations are required.

[2]Can be on, off, or blinking depending on the amount of network traffic.

Table 5–1 (Cont.) Activity Indicators (LEDs)

LED	State	Possible Cause	Corrective Action
Maximum Work Group Size Exceeded	ON	More than 200 stations are connected to the DECbridge 90.[3]	Review configuration rules in Chapter 2.
	OFF	Work group size is fine.	None.
Backbone Port OK	ON	Backbone port self-test is completed.	None.
	OFF	Cables are not properly terminated[1] or there is a network fault on the backbone wires.	Refer to backplane installation procedures in Chapter 3.
Backbone Port Activity	ON[2]	There is activity on the LAN.	None.

[1]ThinWire ports of the DECbridge 90 are not terminated internally. External 50-ohm terminations are required.

[2]Can be on, off, or blinking depending on the amount of network traffic.

[3]Light remains on for approximately 10 minutes after bridge discovers that the work group no longer exceeds the 200-station limit.

Table 5–2 lists some possible problems and the suggested corrective action.

Table 5–2 Simple Troubleshooting

Problem	Suggested Corrective Action
All LEDs off; power is not reaching the DECbridge 90	Secure the power cable at the bridge and at the wall outlet.
	Check the wall outlet using another appliance or light, or plug the bridge's power cord into another outlet. If no power is available, check the wall outlet's circuit breaker.
	Replace a defective bridge power cable with a new cable.
	Check for a short circuit in the AUI transceiver cable. Remove power from the DECbridge 90 and remove the transceiver cable, and reconnect power to the bridge. If the power light now comes on, repair the transceiver or transceiver cable.
	If the fault persists, more extensive troubleshooting is required. Notify the system or network manager.
DC OK off, any other LED on	If AUI cable is attached, check transceiver cable or transceiver for short circuits.
	If connected to the DEChub 90 backplane, make sure that the DECbridge 90 is in slot 8.
	If the problem still exists, notify the system or network manager that the power supply must be replaced.
Bridge Forwarding State LED on	Indicator normally remains on for 30 seconds after power up while bridge learns network configuration, and then the indicator turns off. If the indicator remains on, be sure both Work Group Port OK and Backbone Port OK indicators are on. If they are not on, verify cable terminations.
	Check the work group to be sure that there are no redundant paths into the work group; see the configuration rules in Chapter 2.

Table 5–2 (Cont.) Simple Troubleshooting

Problem	Suggested Corrective Action
Station in backbone cannot communicate to station in the work group	Be sure Bridge Forwarding State LED is off.
	Be sure the protocol in use is not being filtered.
	The receiving station has never transmitted a message, or has not transmitted a message in the last 15 minutes. Stations in the work group must transmit at least one message every 15 minutes to remain in the DECbridge 90 address table. This is the *address age* time, and may be lengthened with management. (All Digital stations transmit a periodic ID every 8 to 12 minutes.)
	If a station never transmits, you may wish to enable flood mode to allow the station to receive messages from the backbone. Refer to the Flood Mode section of Chapter 4.
A station in the work group cannot communicate to a station in the backbone	Be sure the Bridge Forwarding State LED is off.
	Be sure the protocol in use is not being filtered.
DECbridge 90 does not work in the backplane	Verify that the bridge is installed in slot 8 of the backplane.

Customer Services Option

If you need additional assistance in troubleshooting the DECbridge 90 or if you need to replace the unit, call your local Digital Services representative or vendor.

A
Specifications and Parts List

This appendix provides the specifications and parts list for the DECbridge 90 unit.

Specifications for the DECbridge 90 are divided into the following categories:

- Physical dimensions
- Environmental (operating and shipping) specifications
- Power specifications

Table A–1 lists the physical dimensions of the DECbridge 90.

Table A–1   Physical Dimensions

Dimension	Value
Height	3.18 cm (1.25 in)
Width	27.31 cm (10.75 in)
Depth	14.61 cm (5.75 in)
Weight	.45 kg (1 lb)

Table A–2 lists the operating environment specifications for the DECbridge 90.

Table A–2 Operating Environment

Item	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% (noncondensing)
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.

The DECbridge 90 is designed to operate in an office environment. It cannot be installed in an air plenum.

Table A–3 lists the shipping environment specifications for the DECbridge 90.

Table A–3 Shipping Environment

Item	Value
Temperature	-40°C to 66°C (-40°F to 151°F)
Relative humidity	10% to 95% (noncondensing)
Altitude	Sea level to 4.9 km (16,000 ft)

Table A–4 lists the power specifications for the DECbridge 90.

Table A–4 Power Specifications

Item	Value
Voltage (Domestic)	104 Vac to 128 Vac (nominal 120 Vac)
Voltage (International)	208 Vac to 256 Vac (nominal 240 Vac)
Current at 120 V	.77 A
Current at 240 V	.77 A
Frequency	50 Hz to 60 Hz
Power consumption	5.68 W

Parts List

Table A–5 lists the kit contents for a standalone installation.

Table A–5 Standalone Installation Kit Contents

Part	Order Number
DECbridge 90 kit:	DEWGB-AA
• Power supply with 2.4 m (8 ft) dc cable attached (H7827-AA)	
• AC power cord	
• DECbridge 90 (DEWGB-MA)	
• Owner's manual (EK-DEWGB-OM)	

Table A–6 lists the kit contents for the installation in a DEChub 90 backplane.

Table A–6 DEChub 90 Backplane Installation Kit Contents

Part	Order Number
DECbridge 90 kit:	DEWGB-MA
• DECbridge 90	
• Owner's manual (EK-DEWGB-OM)	

B

Related Documentation

This appendix lists related documentation and provides ordering information.

Document Title	Order Number
Bridge and Extended LAN Reference	EK-DEBAM-HR
DECconnect System Facilities Cabling Installation Guide	EK-DECSY-FC
DECconnect System Planning and Configuration Guide	EK-DECSY-CG
DEChub 90 Owner's Manual	EK-DEHUB-OM
Network Troubleshooting Guide	EK-339AA-GD
Networks and Communications Product Documentation	EK-NACPD-RE
Remote Bridge Management Software Guide	AA-FY93C-TE

Ordering Information

Customers may order documents by phone or mail.

Continental USA and Puerto Rico

Call 1-800-258-1710 or send mail to:

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

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 (NRO3/W3)
      Order Processing Section

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