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**LAN
BRIDGE
150**

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LAN Bridge™ 150

Installation

November 1989

This guide explains how to install the LAN Bridge 150 and how to verify its operation. It also describes the LAN Bridge 150 controls and indicators. This document is intended for the hardware installer and the system/network manager.

Supersession/Update Information:

This is a revised manual. Changes were made on pages 3-5, 3-6, 3-7, 4-17, 4-18, A-4, A-7, B-2, B-4.

digital™

Order Number: **DK-LB150-IN-002**

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Preface

This guide explains how to install the LAN Bridge 150 hardware unit and how to verify its operation.

The LAN Bridge 150 is similar in performance to the LAN Bridge 100 with the exception that the LAN Bridge 150 accommodates IEEE 802.1 Spanning Tree as well as Digital Equipment Corporation's proprietary "XLII" Spanning tree and has access protection (password).

The only tool required for installation is a #2 phillips-head screwdriver. It is used when installing the unit on a wall/rack mount.

Keep this guide with your LAN Bridge 150 unit.

Intended Audience

- **Hardware installer**
- **System/network manager**

How to Use This Guide

Before you install the LAN Bridge 150 unit, it is recommended that you read Chapters 1, 2, and 3. These chapters provide a functional overview of the LAN Bridge 150 unit and the installation process including important site preparation information. Chapter 4 provides the procedures to install and verify the LAN Bridge 150 unit. If problems occur during verification, refer to the troubleshooting procedures in Chapter 5. The appendixes offer additional information that may be useful during installation.

This guide contains five chapters and two appendixes, as follows:

- **Chapter 1 introduces the LAN Bridge 150 from a functional point of view and describes the software requirements.**
- **Chapter 2 describes the contents of the LAN Bridge 150 shipment and provides instructions for getting help if the equipment is damaged.**
- **Chapter 3 discusses important site preparation information that must be considered before the installation.**
- **Chapter 4 provides illustrated procedures for installing and verifying the operation of the LAN Bridge 150 unit.**
- **Chapter 5 provides help in isolating problems that can occur during the installation and provides procedures to correct them.**
- **Appendix A describes the LAN Bridge 150 unit's controls, status LEDs, and connectors.**
- **Appendix B provides the LAN Bridge 150 product specifications.**

Related Documents

Additional information about the LAN Bridge 150 product can be found in the following documents. Ordering information is provided at the back of this guide.

- ***LAN Bridge 150 Installation (Order No. EK-LB150-IN)***
Provides installation procedures for the LAN Bridge 150 unit and information on unit verification and proper operation.
- ***LAN Bridge 150 Technical Manual (Order No. EK-LB150-TM)***
Provides a general description of the LAN Bridge 150 unit at the functional component level.
- ***DECconnect System Planning and Configuration Guide (Order No. EK-DECSY-CG)***
Contains planning requirements and guidelines for configuring DECconnect networks and networks that use DECconnect products. The guide also contains detailed product information for all DECconnect System components.
- ***Remote Bridge Management Software Use (Order No. AA-FY93C-TE)***

Provides the information needed to monitor and control the LAN Bridge 150 product through the use of the Remote Bridge Management Software (RBMS).

- ***LAN Traffic Monitor Installation Guide (Order No. AA-JP15A-TE)***

Describes the installation of the LAN Traffic Monitor software on a VAX/VMS system, and tells how to down-line load the LTM Listener software to a LAN Bridge 150 hardware unit. Installation verification and problem determination procedures are also provided.

- ***LAN Traffic Monitor User's Guide (Order No. AA-JP16A-TE)***

Describes how to use the LAN Traffic Monitor, the menus, and the informational displays. It provides an overview of the LTM user interface and LTM Listener software.

- ***LAN Traffic Monitor Identification Card (Order No. EK-LANTM-IC)***

Provides space to record unique identification data for each LAN Traffic Monitor Listener.

- ***Bridge and Extended LAN Reference (Order No. EK-DEBAM-HR)***

Describes how bridges are used to create extended local area networks (LANs). The descriptions include the use of bridges in extended LAN configurations, information on LAN interconnections, overall bridge operation, spanning tree, bridge management, and solving bridge-related problems in a network.

LAN Bridge 100-to-150 Upgrade Information

If you are upgrading a bridge from a LAN Bridge 100 to a LAN Bridge 150, in accordance to the agreement with Digital Equipment Corporation, you must return any LAN Bridge 100 that is replaced by a LAN Bridge 150 to Digital. An information sheet containing return instructions and a stick-on label are provided in the LAN Bridge 150 shipping box.

Upgrade kit order numbers are included in the following table:

Model	Version	Power Requirements	Product Labelling
DEBET-AU	Local	120 Vac Nominal	U.S.
DEBET-AG	Local	240 Vac Nominal	Non-U.S.
DEBET-RU	Remote	120 Vac Nominal	U.S.
DEBET-RG	Remote	240 Vac Nominal	Non-U.S.

Introduction to the LAN Bridge 150

1.1 General Description

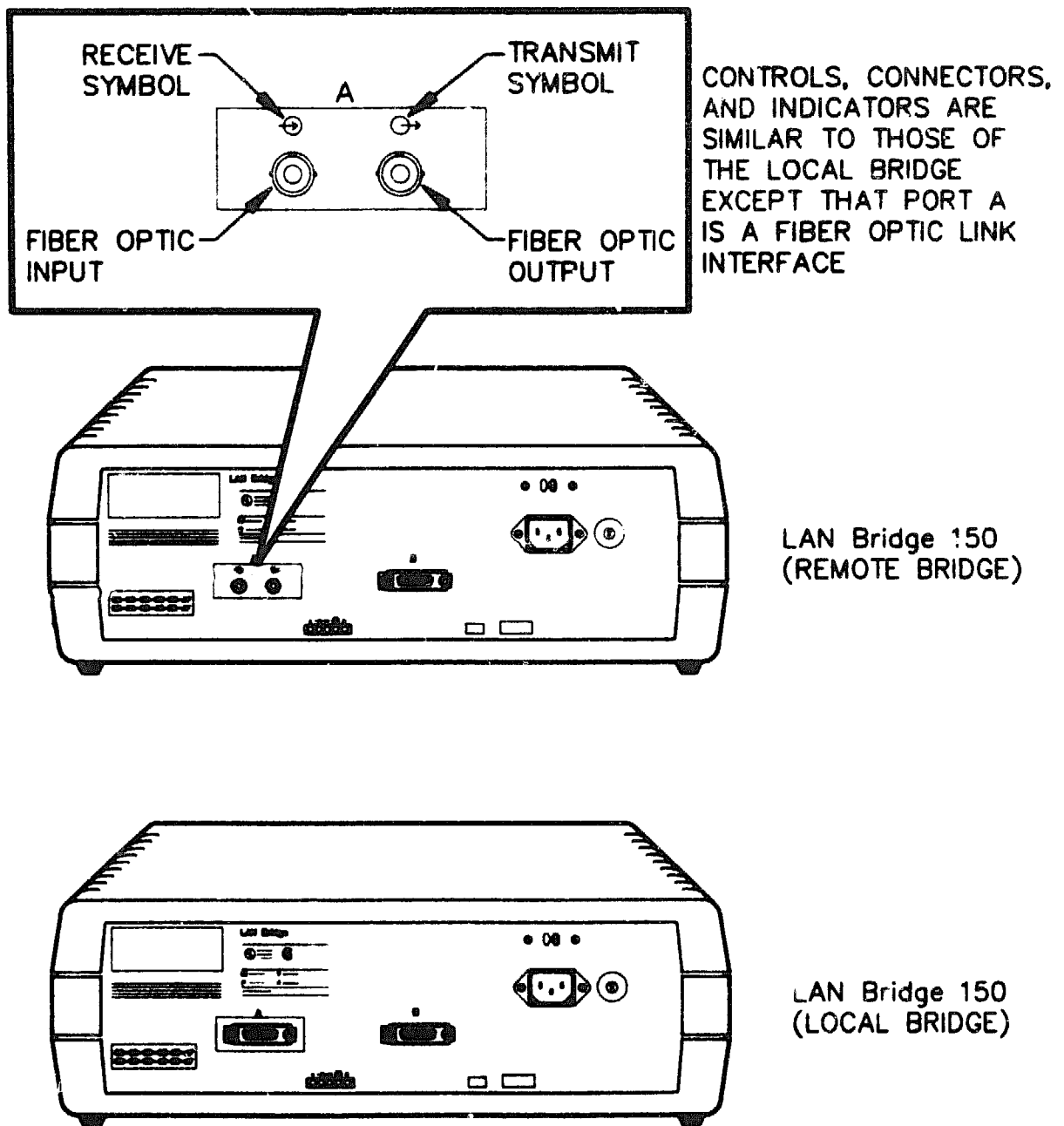
The LAN Bridge 150 hardware unit, also referred to in this guide as the bridge, is a specialized local area network (LAN) station that connects multiple Ethernet networks to form a single extended local area network. You can use the bridge with baseband networks, broadband networks, or a combination of both. The stations connected within the extended LAN communicate with one another as if they were all on the same LAN. The connected LANs can be either Ethernet or IEEE 802.3 specification LANs or a combination of both.

There are two versions of the LAN Bridge 150 product: the local bridge version and the remote bridge version. Table 1-1 describes the two versions. Both versions are shown in Figure 1-1.

Table 1-1: Versions of the LAN Bridge 150

Version	Description
Local Bridge	The local bridge connects LANs separated by 100 meters (328 feet) or less. The distance from the bridge to either LAN cannot exceed the maximum allowable transceiver cable length of 50 meters (164 feet).
Remote Bridge	The remote bridge connects LANs separated by more than 100 meters (328 feet) or where fiber optic cable capabilities are needed. A fiber optic cable is used either to connect two remote bridges or to connect a remote bridge and a remote repeater. A fiber optic cable can be up to 3000 meters (9842 feet) in length when connecting two remote bridges or up to 1500 meters (4921 feet) when connecting a remote bridge and a remote repeater.

Figure 1-1: Local and Remote LAN Bridge 150 Units



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There are four model designations of the LAN Bridge 150 unit (as shown in Table 1-2). Note that the only difference between U.S. and European versions is the product labeling. The voltage select switch is used to set the LAN Bridge 150 unit's input voltage to the range required for operation in your country. This switch is factory set for the correct power source for your country.

CAUTION

Do not change the voltage select switch setting unless you are sure that the switch setting is incorrect (see your electrician if you are not sure). Section 4.2.1 provides the information for changing the switch setting, if necessary.

Table 1-2: LAN Bridge 150 Product Designations

Model	Version	Power Requirements	Product Labelling
DEBET-AC	Local, AUI to AUI	120 Vac Nominal	U.S.
DEBET-AD	Local, AUI to AUI	240 Vac Nominal	Non-U.S.
DEBET-RP	Remote, AUI to 3 km fiber	120 Vac Nominal	U.S.
DEBET-RQ	Remote, AUI to 3 km fiber	240 Vac Nominal	Non-U.S.

1.2 Features

The following sections discuss the major features of the LAN Bridge 150 unit.

1.2.1 Localizing Traffic

The bridge is a packet store-and-forward device that receives all Ethernet packets and, if necessary, forwards them from the network on one side of the bridge to the network on the other side. The bridge acts as a packet filter and forwards only those packets that are destined for the other side. Packets with local destination addresses are not forwarded. 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 off the main LAN.

1.2.2 Self-Learning

While filtering the packets, the bridge dynamically learns the locations of the nodes in the network and uses this information to build its database of station addresses that are associated with each of its ports.

1.2.3 Network Interface

A transceiver cable connects the bridge to the LANs. The transceiver cable can be connected to any of the following:

- Another transceiver cable section. This section can be secured in an Etherjack junction box.
- A DELNI local network interconnect.
- A transceiver on a standard Ethernet coaxial cable for Digital base-band networks, or to a DECOM for Digital broadband networks.
- A ThinWire Ethernet Station Adapter (DESTA) on a ThinWire Ethernet coaxial cable.
- A standard rack cabinet in a Satellite Equipment Room (SER) for DECconnect systems. See the *DECconnect Planning and Configuration Guide* for installing the LAN Bridge 150 unit in DECconnect systems.

The LAN Bridge 150 unit can be connected to any of the above devices in various combinations and configurations. Sections 1.7 and 1.9 of this guide provide configuration examples. Chapter 3 of this guide describes cable types that can be used with your LAN Bridge 150 unit and provides basic configuration rules governing their use.

For a summary of all the configuration guidelines to follow when configuring either DECnet networks or networks that use DECconnect products, see the *DECconnect System Planning and Configuration Guide*.

1.2.4 Transparent Operation

Bridge operation is transparent to other stations on the LAN, and no special software is required on any station unless the LAN Bridge 150 unit is configured to operate as a LAN Traffic Monitor (more information on the LTM feature is provided in the following sections). Remote Bridge Management Software (RBMS) is available for VMS hosts. RBMS allows you to observe and control any LAN Bridge 150 unit in the network.

1.2.5 Loop Detection and Automatic Back Up

A loop is a condition that exists when bridges provide multiple paths between two LANs. Loops could cause the network to become saturated with the same packet repeatedly sent around the loop. By communicating with other bridges in the network, the LAN Bridge 150 unit determines if there are any loops. If a loop is detected, one of the bridges becomes the designated packet forwarder, and the other bridge automatically enters the back-up state. When in the back-up state, a bridge does not forward any packets. Instead, the back-up bridge constantly monitors the designated bridge. When a back-up bridge detects a failure, it automatically begins a procedure to take over packet forwarding.

NOTE

The back-up bridge used in this configuration should be a Digital bridge since non-Digital bridges may have differences in protocols. Contact your Digital representative for more details regarding proper configuration of bridges.

1.2.6 Network Traffic Monitor

This optional feature allows the LAN Bridge 150 unit to be used as a network traffic monitor. When used as a monitor, it gathers traffic data in the form of counters, and periodically forwards them to a VAX/VMS system for compilation and analysis. More detailed information on this optional feature is provided in the following section.

1.3 LAN Traffic Monitor (LTM) Option

The LAN Traffic Monitor (LTM) is an Ethernet/IEEE 802.3 LAN monitor that uses the LAN Bridge 150 unit as a hardware base. Either version of the LAN Bridge 150 unit (local or remote) supports the LTM option. When the LAN Bridge 150 unit is configured to operate as a LAN Traffic Monitor, bridge operations are suspended until the unit is reconfigured for bridge operation. The LAN Bridge 150 hardware unit processes 48-bit Ethernet addresses, and the LTM software calculates the statistics. The statistics are periodically reported to a host system that performs additional data reduction, such as averaging and peak traffic analysis. LTM has two components:

- The LTM Listener—a LAN Bridge 150 hardware unit that is down-line loaded with LTM monitoring software.

- **The LTM User Interface (UI)**—remote application software that is installed on any DECnet VAX/VMS system with an Ethernet controller and associated driver.

For more information about the LAN Traffic Monitor, refer to the *LAN Traffic Monitor User's Guide* or contact your Digital field service representative.

1.4 LAN Traffic Monitor Software

The basic software required for installing and operating the LTM includes:

- **LAN Traffic Monitor distribution software**—installed on each LTM load host.
- **DECnet Phase IV software**, running on VMS Version 4.4 or later – installed on each LTM load host.

You must install the distribution software on a load host that runs DECnet Phase IV software and that is connected to the same extended LAN as the LTM Listener. Digital recommends that you install the LTM Listener software on a load host that is on the same LAN as the LTM Listener. Doing so avoids the possibility of segmenting the load host from the LTM Listener due to a bridge failure. The distribution software includes an LTM Listener software image file that is down-line loaded to the LTM Listener. All software must be installed and verified before you can operate the LTM.

1.5 Remote Bridge Management Software (RBMS)

Remote Bridge Management Software (RBMS) is an optional product available for VMS hosts. RBMS significantly enhances the network's operation by allowing you to observe and control bridges in the network. RBMS allows you to:

- **Understand and modify your network topology** by displaying and modifying the bridge forwarding database.
- **Evaluate network performance** by displaying bridge counters, status, and characteristics.
- **Troubleshoot network problems** by understanding your network topology, disabling selected bridges to segment your network, and signaling selected bridges to run their built-in self-test diagnostics.
- **Save your configuration data** in the bridge's nonvolatile RAM (NVRAM) so that it is not lost during a power failure.

- Remotely switch the LAN Bridge 150 unit between bridge usage and LTM Listener.
- Remotely determine whether the LAN Bridge 150 unit is operating as an LTM Listener or a bridge.

For more information on RBMS, refer to the *Remote Bridge Management Software Guide*.

1.6 LAN Bridge 150 Operation

When the LAN Bridge 150 unit is powered up, it runs its built-in diagnostic self-test. This procedure lasts about 15 seconds. The bridge then spends approximately 30 seconds communicating with other bridges in the network to determine if there are loops. The bridge also spends this time watching network message traffic and building its initial database of forwarding addresses.

If a bridge is in a loop with another bridge in an extended LAN, the bridge with the higher Ethernet physical-address number enters the back-up state. Instead of forwarding messages, the back-up bridge constantly monitors the designated bridge. If a failure of the other bridge is detected, the back-up bridge automatically begins the procedure to take over packet forwarding. If a bridge is configured in a loop in the same LAN, the bridge enters the back-up state and continues to check the loop through the LAN about once a second. If any failure partitions the LAN, the back-up bridge automatically begins the procedure to take over packet forwarding.

Avoid configuring a bridge in a loop with a router. The bridge cannot detect such a loop, and degradation of network performance could result.

After a bridge starts to forward messages, it continues to watch network message traffic and update its database of addresses. The bridge also continues to check for loops by monitoring the other bridges in the network.

1.7 LAN Bridge 150 Configurations

For message traffic purposes, LANs connected by bridges are considered one extended LAN. For all other configuration purposes, LANs connected by bridges are considered separate; therefore, each of these LANs can be configured up to the normal maximums for length, number of stations, and other LAN related specifications.

NOTE

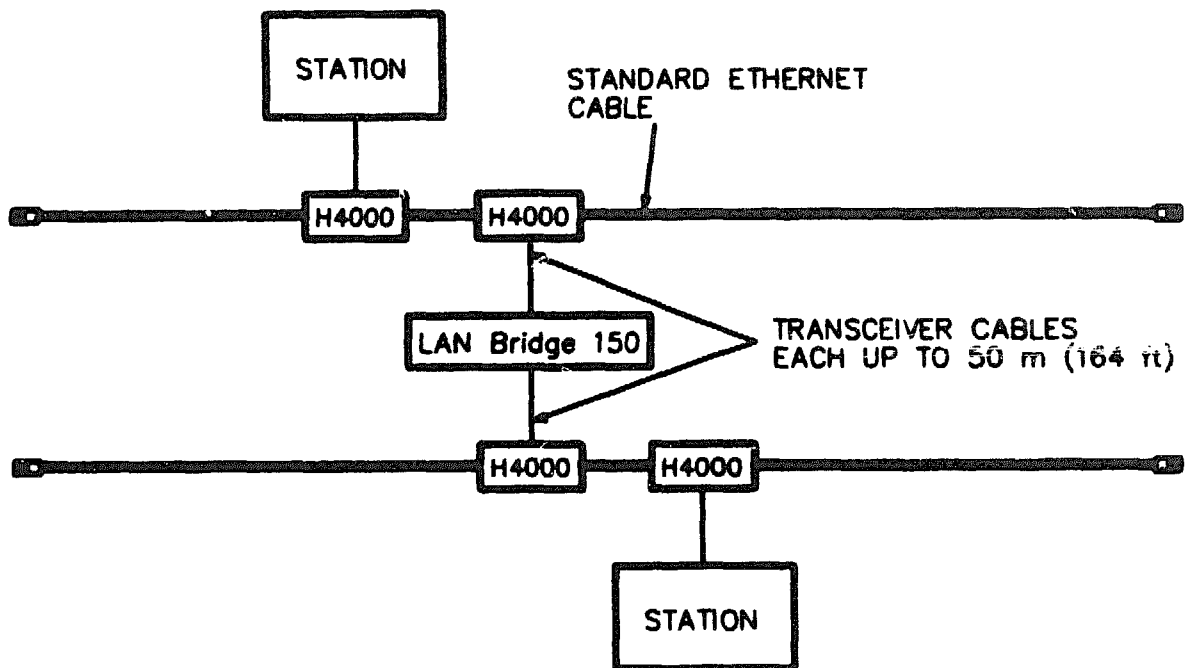
When routers are connected to an extended LAN, ensure that the total number of routers in the extended LAN does not exceed the maximum allowed for a single LAN.

The following sections provide examples of configurations that utilize both versions of the LAN Bridge 150 product. Chapter 3 of this guide describes the cables that are available to support your configuration, and also provides cable configuration rules for their use. For more information about configuring bridges and LANs, refer to the *DECconnect System Planning and Configuration Guide*.

1.7.1 Local LAN Configuration

Figure 1-2 shows a local LAN Bridge 150 (DEBET-AC or -AD) unit connecting two LANs that are separated by fewer than 100 meters (328 feet). This is the maximum combined length of the local LAN Bridge 150 unit's transceiver cables, each of which can measure up to 50 meters (164 feet).

Figure 1-2: DEBET-AC or -AD Configuration

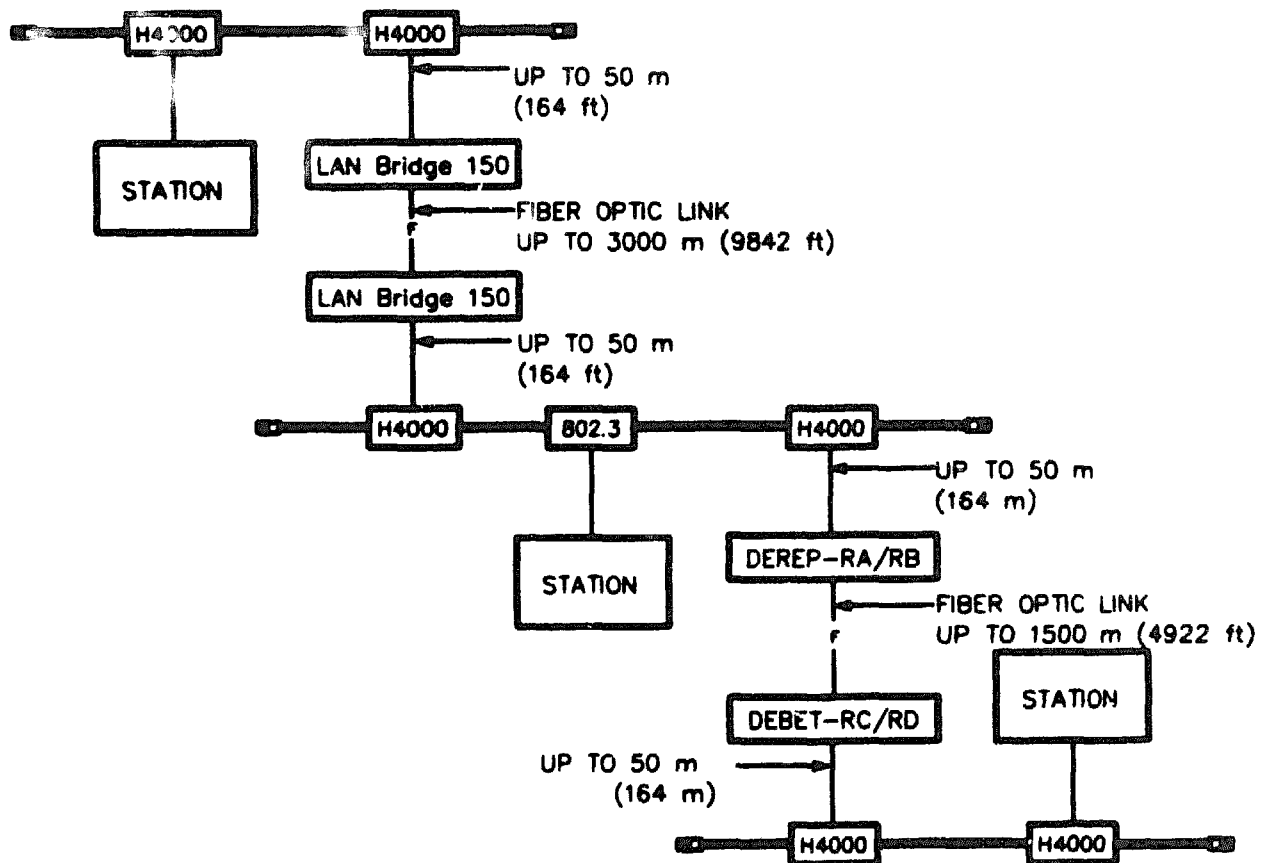


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1.7.2 Remote LAN Configuration

Figure 1-3 shows a remote LAN Bridge 150 (DEBET-RP or -RQ) unit connecting two LANs by means of a transceiver cable and a fiber optic cable. The fiber optic cable connects to another remote bridge or to a remote repeater (DEREP-RC/-RD).

Figure 1-3: DEBET-RP or -RQ Configuration

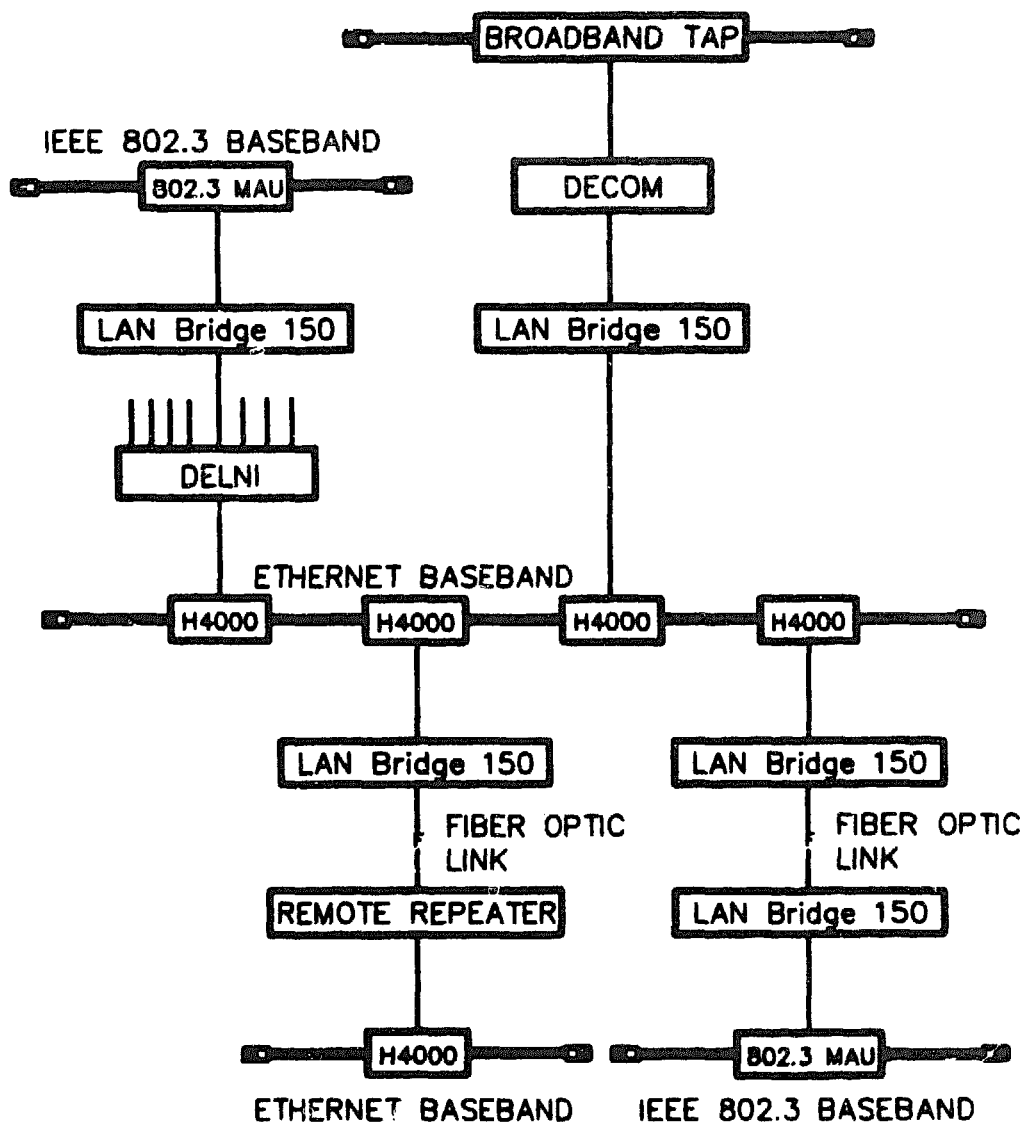


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1.7.3 Mixed Media Configuration

Figure 1-4 shows transceiver cables connecting bridges to H4000 base-band transceivers, local network interconnects (DELNIs), and to broadband modems (DECOMs).

Figure 1-4: LAN Bridge 150 Connections



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The fiber optic link between the remote bridge and the remote repeater should not exceed 1500 meters (4922 feet). Note that the length of the fiber optic link depends on the total length of the network on the repeater side of the link. (This length includes the fiber optic cable between the bridge and the repeater.) The maximum network length on the repeater side of the

link is 2800 meters (9187 feet). For more information on bridge-to-repeater configurations, refer to the *DECconnect System Planning and Configuration Guide*.

1.7.4 Performance Consideration

There is no physical limit to the number of bridges that a packet can travel through before reaching its destination station. If a packet must travel through many bridges, however, network performance can be poor. Poor network performance is particularly noticeable with interactive tasks, such as character echoing for users on terminal servers. A guideline for networks with typical packet traffic loading (less than 40% maximum) is to limit the number of bridges between any two stations to seven or less. This guideline is a compromise of the many different protocols offered and used on Ethernet and IEEE 802.3 LANs.

1.8 LAN Traffic Monitor Operation

When the LAN Bridge 150 unit is configured to operate as a LAN Traffic Monitor, the LTM Listener software image must be down-line loaded from a load host. The LTM does not operate without software.

When the LAN Bridge 150 unit is powered up, the DC OK LED illuminates and the unit performs a diagnostic self-test. The diagnostic self-test normally takes about 15 seconds to complete and, if successful, causes the Self-Test OK LED to illuminate.

When configured as an LTM Listener, the unit then initiates a request for a down-line load of the LTM Listener software image from a load host. The down-line loading of the LTM Listener software image could take up to 2 minutes if the network is busy.

NOTE

The LAN Bridge 150 hardware unit is configured to operate as an LTM when the software down-line load flag in NVRAM is set using RBMS, or by setting the hardware Down-Line Load Enable switch (Switch 5 - see Chapter 5) to ON. Note that when using RBMS a user can override Switch 5. Doing so allows the LAN Bridge 150 unit to power up in either configuration (as a bridge or as an LTM Listener) as defined by the user.

After the LTM Listener software image is successfully down-line loaded, the On-Line LED flashes twice, then waits 2 seconds before flashing twice again. The LTM Listener then waits for a Start Request from an LTM host. The Start Request contains the initialization information for the LTM Listener, and requests the Listener to begin monitoring.

After receiving a Start Request, the LTM Listener enters the monitoring mode; the On-Line LED flashes once every second. Note that if the On-Line LED remains on without blinking, it indicates the unit is operating as a bridge, not as an LTM.

1.9 LAN Traffic Monitor Configurations

The following sections describe several ways for configuring the LAN Bridge 150 hardware unit as an LTM Listener unit. For more information about the LAN Traffic Monitor, refer to the *LAN Traffic Monitor User's Guide*.

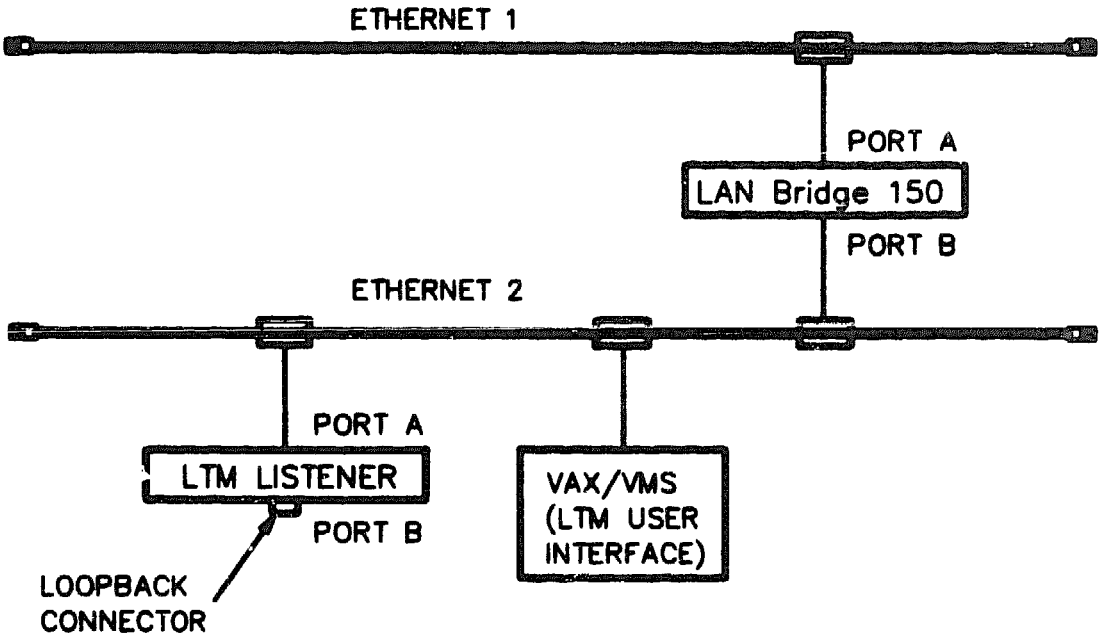
1.9.1 Single Port Configuration with Loopback Connector Installed

As shown in Figure 1-5, the LTM Listener always monitors Ethernet 2 and sends statistics to the user interface on Ethernet 2. The LTM Listener can send statistics to a user interface on Ethernet 1 also, as long as the LAN Bridge 150 unit connects the two Ethernets. Note that port B has a loopback connector installed and is not in operation.

NOTE

The LAN Bridge 150 unit fails self-test if an unused port is left disconnected unless the unused port is the fiber optic port used with the remote version (DEBET-RP/RQ). A loopback connector (shipped with the unit) must be connected to the unused port. Do NOT install a fiber optic loopback connector to an unused fiber optic port.

Figure 1-5: LTM Single Port Configuration

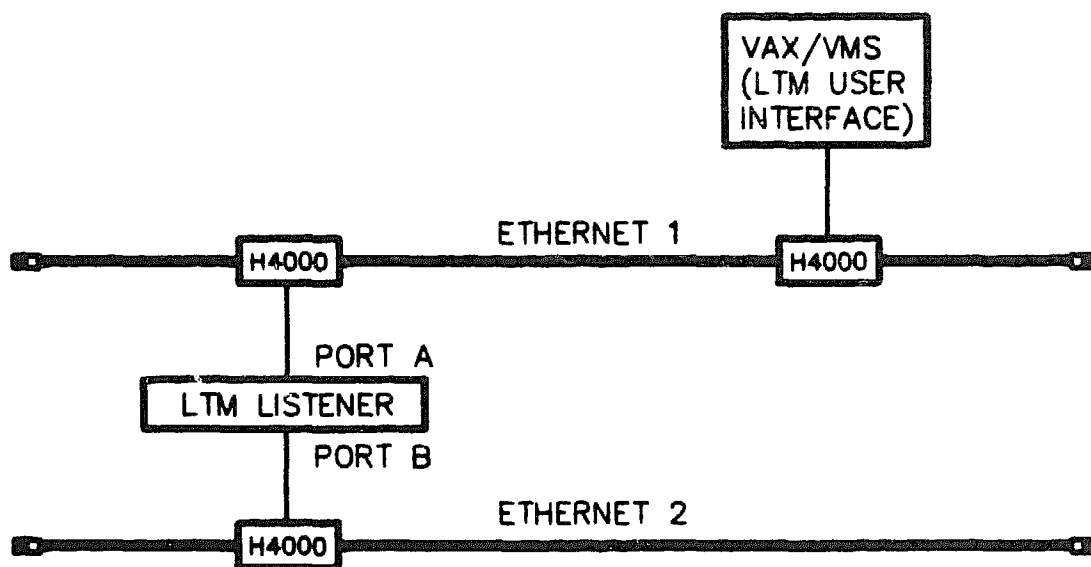


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1.9.2 Dual Port Connections Between Two Ethernets

As shown in Figure 1-6, the LTM Listener is connected to two completely separate Ethernets. In this case, the LAN Traffic Monitor can monitor either Ethernet 1 or 2 but must report to the LTM user interface on Ethernet 1.

Figure 1-6: LTM Connected to Two Separate Ethernets

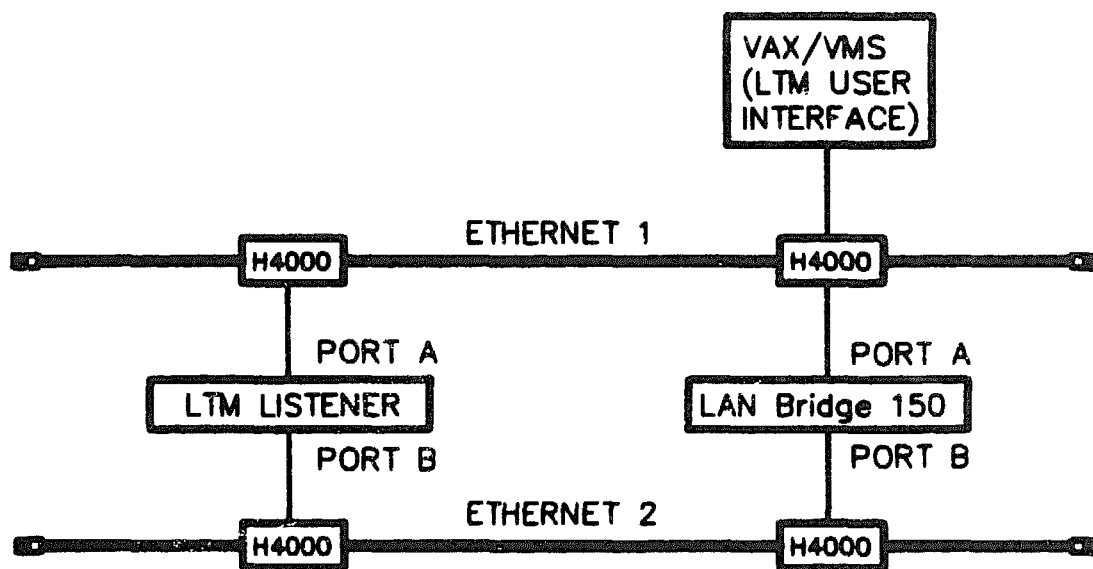


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1.9.3 Dual Port Connections With Bridged Ethernet

The configuration shown in Figure 1-7 describes two Ethernet LANs bridged together, forming a single extended LAN. The LTM Listener can monitor either Ethernet 1 or 2 and can report to either port.

Figure 1-7: LTM on Two Connected Ethernet



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NOTE

Digital recommends that you configure the LTM Listener to report on the port that has the least number of intervening bridges between it and the LTM user interface host(s). Doing so minimizes the impact of a possible bridge failure.

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CHAPTER 2

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Contents of Shipment

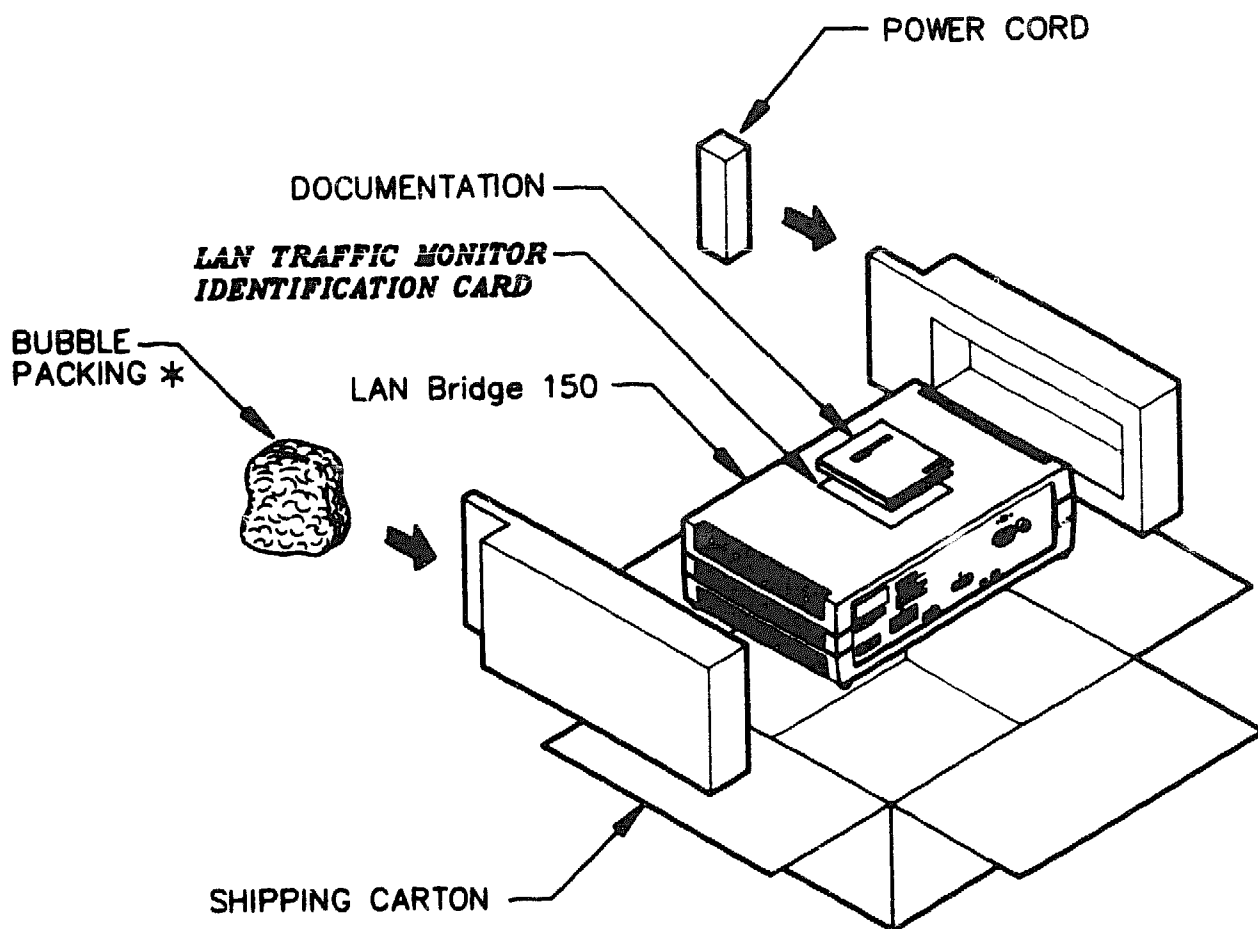
2.1 Contents of the LAN Bridge 150 Shipping Box

A single LAN Bridge 150 shipment consists of one or more boxes, depending on the optional equipment ordered. Be sure you received all your ordered equipment. The LAN Bridge 150 unit is packaged as shown in Figure 2-1.

2.2 Checking Contents of Shipment

Check the shipment for damage and missing parts (see Figure 2-2). In case of damage, contact your delivery agent and your Digital sales representative. In case of missing parts, contact your Digital sales representative.

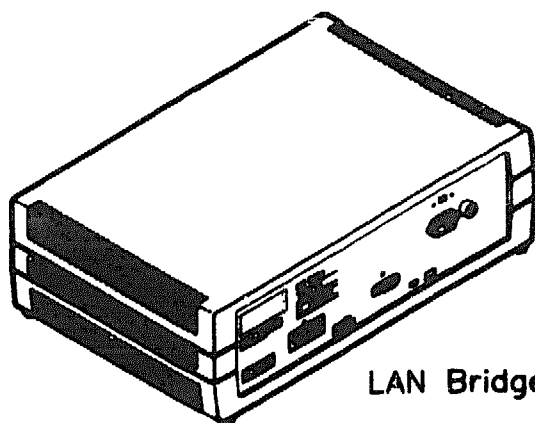
Figure 2-1: LAN Bridge 150 Shipping Box Contents



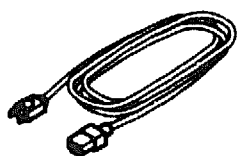
*** BUBBLE PACKING CONTAINS LOOPBACK CONNECTORS,
MOUNTING BRACKETS AND SCREWS**

LKG-2821-89

Figure 2-2: Checking Contents of Shipment



LAN Bridge 150



- POWER CORD



- *LAN Bridge 150 INSTALLATION
LAN TRAFFIC MONITOR IDENTIFICATION CARD*



- LOOPBACK CONNECTOR
P/N 12-22196-01
2 FOR DEBET-AC AND -AD
1 FOR DEBET-RP AND -RQ



- MOUNTING BRACKETS



- SCREWS

LKG-2822-89

Site Preparation

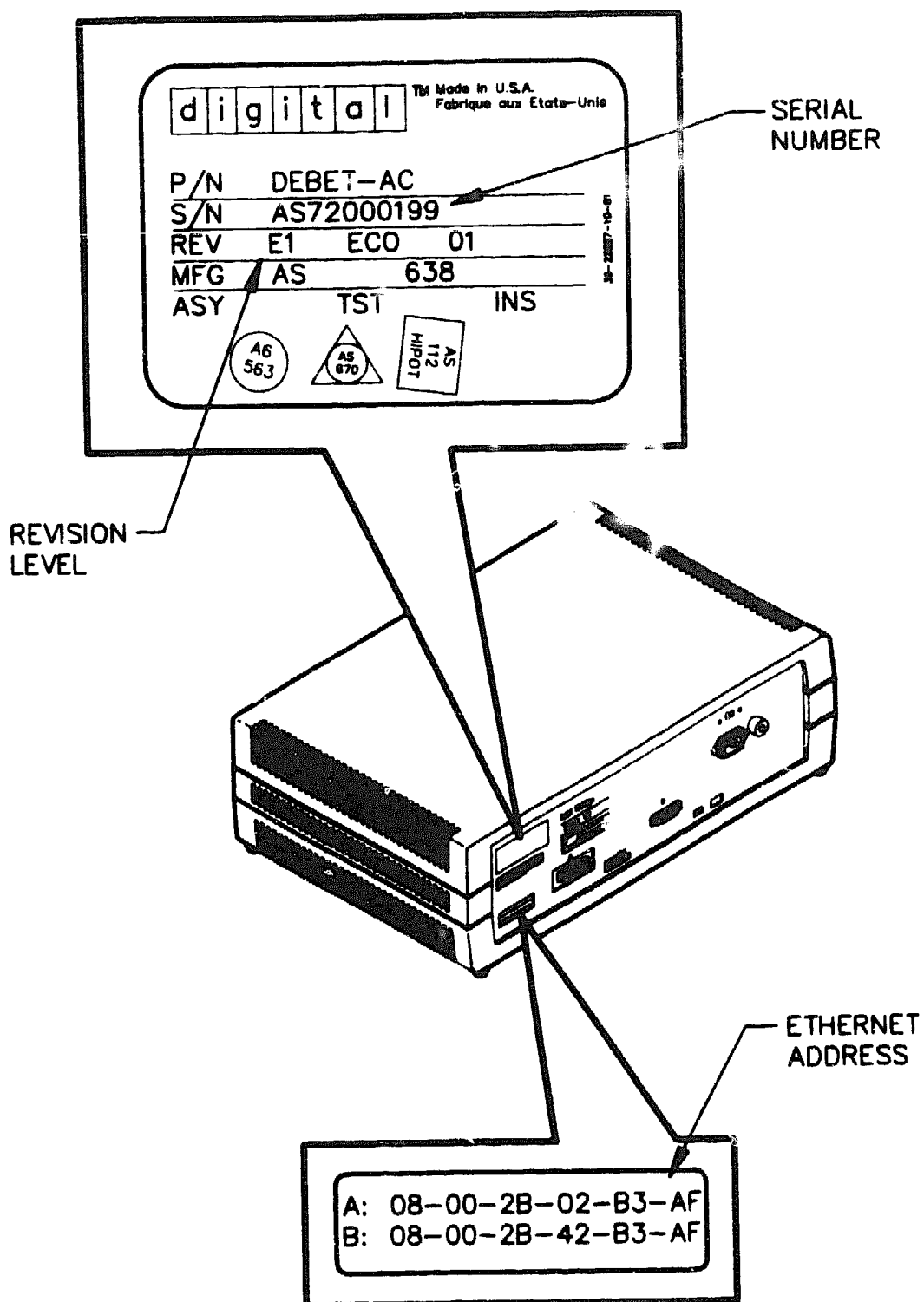
3.1 Arranging for Software Installation

If you are installing the LAN Bridge 150 unit as a bridge, software installation is not required. Go to Section 3.2.

If you are installing the LAN Bridge 150 unit to operate as an LTM Listener, arrange to have the LTM distribution software installed on a load host while you install the hardware.

The identification card (ID card) supplied with the unit provides information required for the person installing the software. This information includes the LAN Bridge 150 serial number, Ethernet addresses (2 addresses - see Figure 3-1), where the device is to be located, and the installer's name. Fill in this information at the top portion of the ID card, and give the card and any software cartons received with the shipment to the system/network manager. The system/network manager can then fill in the required information as described on the ID card and arrange for the software installation.

Figure 3-1: Location of Serial Number and Ethernet Address



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Ask to be notified when the LTM distribution software is installed on a load host and when the LAN Bridge 150 unit is configured in the load host database. The hardware installation can be continued but do NOT power up the unit until notified that software installation is complete and the bridge is configured in the load host database.

3.2 Installation Locations

The LAN Bridge 150 can be placed in various locations including offices and computer rooms, as long as the environmental requirements are met (refer to Appendix B). If installed in an office environment, the bridge can be installed on a desktop or installed on a wall/partition using a mounting kit. If installed in a computer room environment, the unit is rack mounted.

3.2.1 Offices

The bridge can be installed on a desk or table, with at least 45 centimeters (18 inches) above the floor and 15 centimeters (6 inches) of airspace around the air vents. This provides adequate ventilation for cooling fans and reduces exposure to excess dust from foot traffic.

The bridge can also be mounted on a wall/partition using a mounting bracket kit available from Digital (Order Code H039).

3.2.2 Satellite Equipment Room

The Satellite Equipment Room (SER) is a component of Digital's DECconnect System. It provides a central location for communications devices (such as LAN Bridge 150s) that connect ThinWire Ethernet and twisted-pair cable to a standard Ethernet network. The SER can also be configured as the center of a stand-alone network and can provide a base from which to expand as network requirements increase. The unit is rack mounted when installed in this environment. Requirements and instructions are provided in Chapter 4 of this manual. If the bridge is installed in this environment or as part of a DECconnect System installation, refer to the *DECconnect System Planning and Configuration Guide* for detailed information.

If you are installing the LAN Bridge 150 unit as an LTM Listener, arrange to have the LTM distribution software installed on a load host while you continue with the hardware portion of the installation.

3.3 Cable Configuration Rules

Ensure that the transceiver cables, fiber optic cables, and the bridge power cable do not exceed the maximum lengths described in Table 3-1 and in the configuration rules that follow.

Table 3-1: Maximum Cable Lengths

From	To	Maximum Cable Length	Cable Type
Transceiver	Bridge	50 m (164 ft) See rules 1 through 5	BNE3x-xx* Transceiver Cable
Transceiver	Bridge	12.5 m (41 ft) See rules 1 through 5	BNE4x-xx* Office Transceiver Cable
Bridge	Bridge	3000 m (9842 ft) See rule 6	Fiber Optic Cable (see Appendix B)
Bridge	Repeater	1500 m (4921 ft) See rule 6	Fiber Optic Cable
Wall outlet	Bridge	1.8 m (6 ft)	Bridge Power Cable (Included in shipment)

*BNE4x-xx office transceiver cable can be interconnected. However, the cable attenuation (signal loss) for the office transceiver cable is greater than that of BNE3x-xx transceiver cable by a factor of four. For example, 2 meters (6.6 feet) of office transceiver cable is electrically equivalent to 8 meters (26.2 feet) of BNE3x-xx transceiver cable.

Basic configuration rules:

1. If the bridge connects to an IEEE 802.3 transceiver, such as the DESTA, the transceiver cable must be an IEEE 802.3 compliant transceiver cable (BNE3H/K/L/M or BNE4C/D).
2. If the bridge connects to a non-IEEE 802.3 transceiver, such as the H4000, the transceiver cable can be either Ethernet or IEEE 802.3 compliant.
3. IEEE 802.3 transceiver cables and Ethernet transceiver cables cannot be interconnected.

4. **Maximum length for the transceiver cable cannot exceed 50 meters (164 feet). This maximum length can be reduced due to the internal cabling equivalency of a device (such as a DELNI) that is connected between the bridge and the transceiver, or due to the use of office transceiver cable. For example:**
 - **Cabling equivalency is a measure of the internal timing delay of a device, expressed in meters of transceiver cable. This cabling equivalency must be subtracted from the 50-meter maximum. For example, if a device has a 5-meter cabling equivalency, then its maximum allowable transceiver cable length is (50 m - 5 m) or 45 meters.**
 - **Office transceiver cable (BNE4x-xx), due to its smaller diameter, has a signal loss that is four times that of the (BNE3x-xx) transceiver cable. Therefore, if office transceiver cable is used, the maximum transceiver cable distance must be divided by four. This means the maximum office transceiver cable length allowed is 12.5 meters.**

If the configuration includes a device and the device has any internal cabling equivalency, this should be subtracted from the 50-meter maximum before dividing by four. For example, if a device has a 10-meter cabling equivalency and is attached to its transceiver using office transceiver cable, then the maximum allowable transceiver length is (50 m - 10 m)/4 or 10 meters.
5. **When connecting the bridge to a configuration that includes a DELNI, allow 5-meters cabling equivalency loss for the DELNI.**
6. **If remote (fiber optic) bridges are used, they can be used in one of two ways:**
 - **A bridge-to-bridge link—When configured in this manner, the fiber path between the bridges can be a maximum of 3000 meters (9842 feet) in length.**
 - **A bridge-to-repeater link—When configured in this manner, the fiber path can be 500 meters (1640.4 feet) in length plus any available fiber length not used under the 1000-meter (3280.8 feet) limitation for remote repeaters. This allows a bridge-to-repeater link to reach up to 1500 meters (4921.1 feet).**

NOTE

More information about this subject is provided in Section 3.4

7. Digital recommends you configure your networks so that station-to-station paths contain no more than seven bridges in order to ensure acceptable message transmit time between stations.

3.4 Fiber Optic Cables

Detailed information regarding fiber optic cables is beyond the scope of this manual. The fiber optic cables required for the installation of your LAN Bridge 150 should have been installed, tested, and tagged along with the other appropriate network interfaces that support your installation. Information for connecting the fiber optic cable to the bridge is provided in Chapter 4.

If you are reconfiguring or installing additional cables, refer to the *DECconnect Planning and Configuration Guide* before you begin. The guide contains all of the information you need to plan, configure, and install your network, including the fiber optic installation.

If you need more detailed information regarding fiber optic cables, you can order the *LAN Bridge 150 Technical Manual*. The technical manual has a section dedicated to fiber optic link analysis which can be useful if you are designing, repairing, or troubleshooting the fiber optic portion of your network.

Information for ordering additional documents is provided at the back of this guide.

The following sections provide some basic guidelines regarding fiber optics.

3.4.1 Fiber Optic Cables Between Bridges

WARNING

When exposed, optical fibers (contained within the fiber optic cable) are extremely brittle and fragments from the fiber can easily penetrate the skin or eyes. Wear protective goggles and clothing when working with the optical fibers.

Fiber optic equipment also emits laser light that can injure your eyes. Never look into an optical fiber.

In a bridge-to-bridge configuration, the dual-cable fiber optic link that connects the bridges does not affect the cable configuration guidelines of either LAN connected to the bridges. The length of fiber optic cable between the two bridges must not exceed 3000 meters (9842 feet).

The end-to-end light loss of the cable must not exceed the allowable optical loss limit. The type of optical fiber used affects these numbers. An initial 12.5 dB loss budget is based on using 62.5/125 optical fiber cable with a bandwidth of 160 MHz/km measured at 850 nm, for cable lengths up to 1000 meters (3280.8 feet).

Refer to the *LAN Bridge 150 Technical Manual* for detailed information regarding differences in transmission characteristics among the various types of fiber used in fiber optic cables.

CAUTION

Exceeding the 3000 meter (9842 feet) limit and/or exceeding the allowable optical loss limit causes the fiber optic link to fail.

For longer distances, particularly beyond 1500 meters (4922 feet), the fiber optic cable installation must be carefully planned. The type and quality of the cable's optical fiber, the cable repair strategy, and the cable's total end-to-end light loss are important considerations when planning a successful bridge installation.

The end-to-end cable light loss depends on the quality of the fiber, the number and quality of the splices required for installation, and the number and quality of the connectors used. The cable repair strategy also affects the optical loss budget because damaged cable is repairable. The repair typically consists of replacing a section of cable. This procedure requires two splices. The repaired link must remain under the allowable end-to-end light loss budget. If your initial installation uses the entire optical loss budget, a repair would not be possible. Therefore, plan for a minimum of two splices, or approximately 1.0 dB, for repair.

For longer cable runs or for installations requiring more splices, request a lower loss fiber optic cable from your cable vendor. Cables with less than 3.75 dB/km (measured at 850 nm) are available.

3.4.2 Digital Fiber Optic Cables

Digital Equipment Corporation sells the BN25B-xx and BN25C-xx fiber optic cables. These are indoor, general purpose, dual-fiber cables using Corning 1508 type optical fiber. The BN25C-xx cable is not recommended for use with the bridge because a lower bandwidth (100 MHz minimum) optical fiber is used in its construction. The BN25B-xx cable cannot be exposed in an environmental airspace or used outdoors. Digital does not sell a cable that can be used in outdoor applications. For assistance, contact your local Digital network design service.

3.5 Preinstallation Checks

Before beginning the bridge installation, use the following checklists to ensure that site preparation is complete:

Hardware

- Ensure the transceiver cables are available in the required lengths.
- Ensure the appropriate baseband or broadband network interface (for example, an Etherjack junction box, a DELNI, a DECOM, a DESTA, or Ethernet transceiver) is installed; and the required transceiver cabling is installed, tested, and tagged. If the device is not installed, ensure that arrangements for the installation are made before the bridge installation begins.
- If you are installing a remote bridge, ensure the fiber optic cables are installed, tested, and tagged.
- Ensure arrangements were made to connect the bridge's transceiver cable to the appropriate baseband or broadband network interface.
- The wall/partition mounting bracket kit is installed (if required) as described in the Chapter 4.

Software

This portion of the checklist is required only if you configure the LAN Bridge 150 as a LAN Traffic Monitor.

- Ensure the LAN Traffic Monitor Identification card was filled out (as described in Section 3.1) and given to the system/network manager.
- Ensure the system/network manager installed or will install the distribution software on the load host(s).

Suitable Environment

The items listed in this checklist must conform to the specifications described in Appendix B of this guide.

- Ensure the power outlet matches the power requirements of the bridge you ordered and is within 1.8 meters (6 feet) of the installation site.
- Ensure the temperature, altitude, and humidity ranges are correct.
- Ensure the space is adequate for ventilation and for maintenance access.
- Ensure the location is at least 45 centimeters (18 inches) above the floor surface.

Service

Ensure the service contracts (optional) are in place. Call your Digital sales representative for information on hardware and software services that are available to support your LAN Bridge 150 unit.

LAN Bridge 150 Installation

4.1 Introduction

This chapter explains how to install, power up, and verify the operation of the LAN Bridge 150 unit. Before you begin these procedures, read and follow the instructions in Chapter 3.

WARNING

To avoid bodily injury or damage to the equipment, DO NOT connect the bridge's power cord until instructed in the following procedures.

4.2 Verifying Switch Settings

The LAN Bridge 150 unit is shipped from the factory with all switches preset for basic bridge operations and for the voltage range of your country. Appendix A provides a full description of all switch functions and also describes the controls, status LEDs, and connectors used on the LAN Bridge 150 unit. The following sections provide information for verifying and resetting the switches (if necessary).

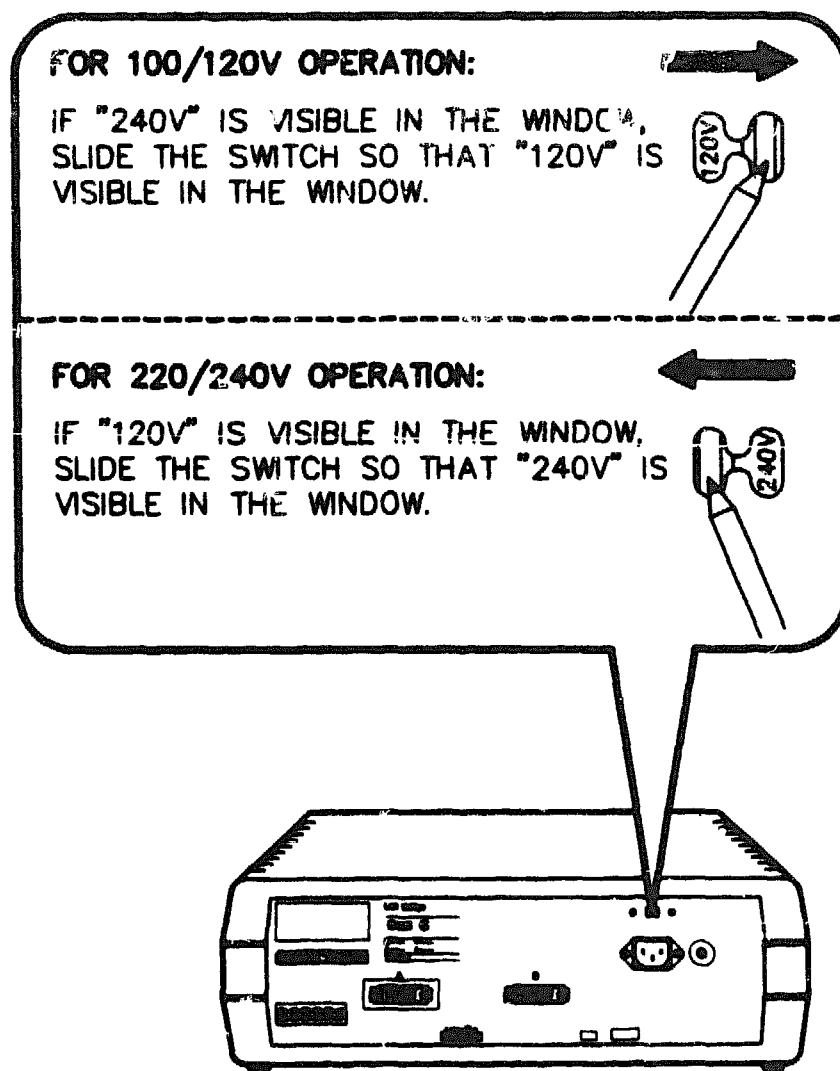
4.2.1 Verifying the Voltage Select Switch Setting

Check to see that the voltage select switch matches the voltage requirements of the power cord you are using (Figure 4–1).

CAUTION

An incorrect voltage setting can damage the bridge.

Figure 4-1: Verifying the Voltage Select Switch Setting



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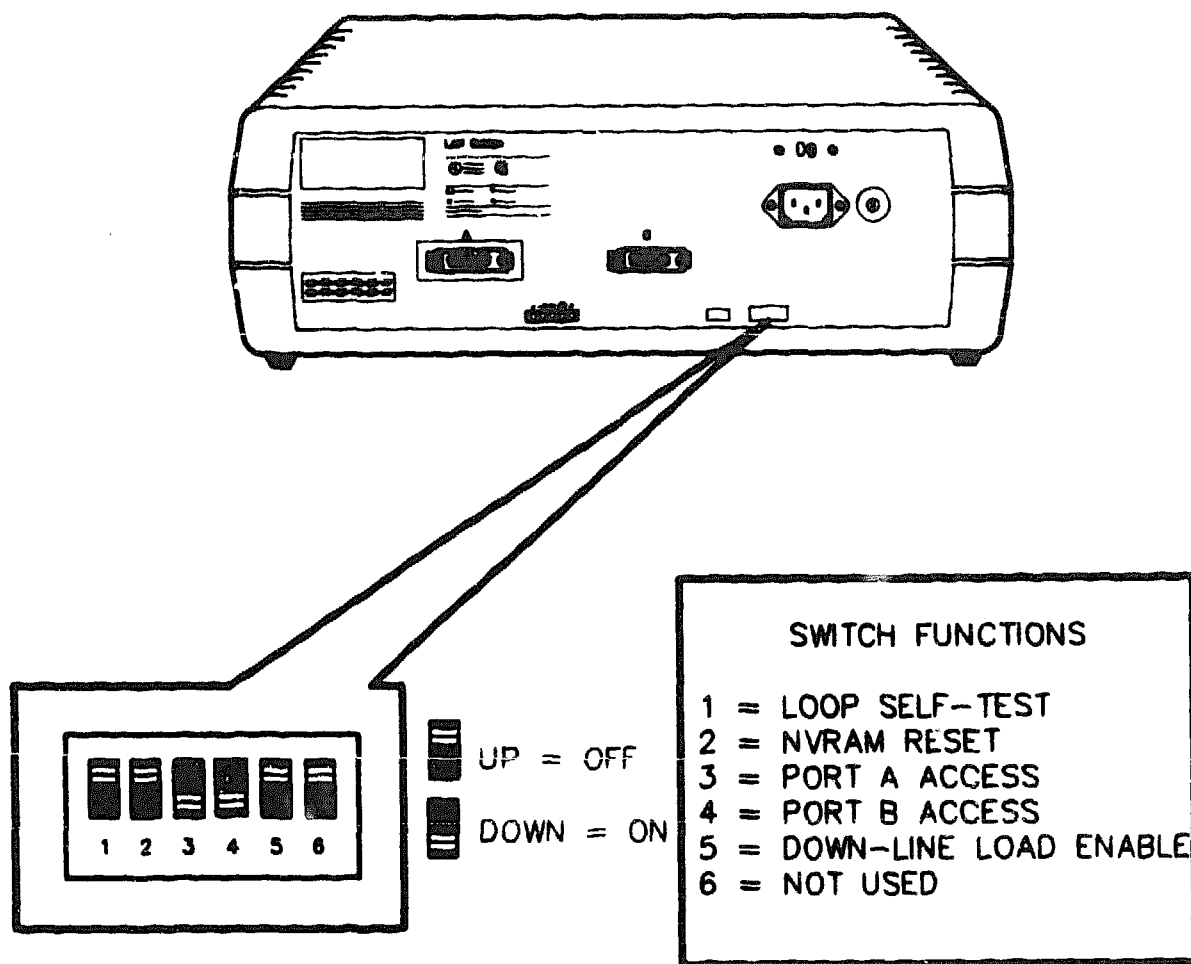
4.2.2 Verifying Configuration Switch Settings

Check to see that your configuration switch settings are properly set, as shown in Figure 4-2.

NOTE

If you are installing the LAN Bridge 150 unit as a LTM Listener, set Switch 5, Down-Line Load Enable, to ON (down = ON).

Figure 4-2: Verifying Configuration Switch Settings



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4.3 Placement of the LAN Bridge 150

The LAN Bridge 150 unit is housed in a plastic table top enclosure that allows for placement on a table or desk. This plastic enclosure can be removed for wall mounting the unit or mounting the unit in a standard 48-centimeter (19-inch) rack. A set of mounting brackets is included for rack mounting or wall mounting the unit without the plastic enclosure.

CAUTION

Whichever installation you choose, leave enough clearance around the bridge's air inlets and outlets to ensure optimal air flow.

4.3.1 Table Top Installation

Allow 15 centimeters (6 inches) of airspace around the bridge air vents, and place the bridge on a table or desk that is at least 45 centimeters (18 inches) above the floor. This allows adequate ventilation for cooling fans, and reduces exposure to excess dust from foot traffic. Also, place the bridge so that the I/O panel is always visible, enabling you to monitor the bridge status LEDs.

Do not remove the plastic table top enclosure when installing the bridge in an office environment.

NOTE

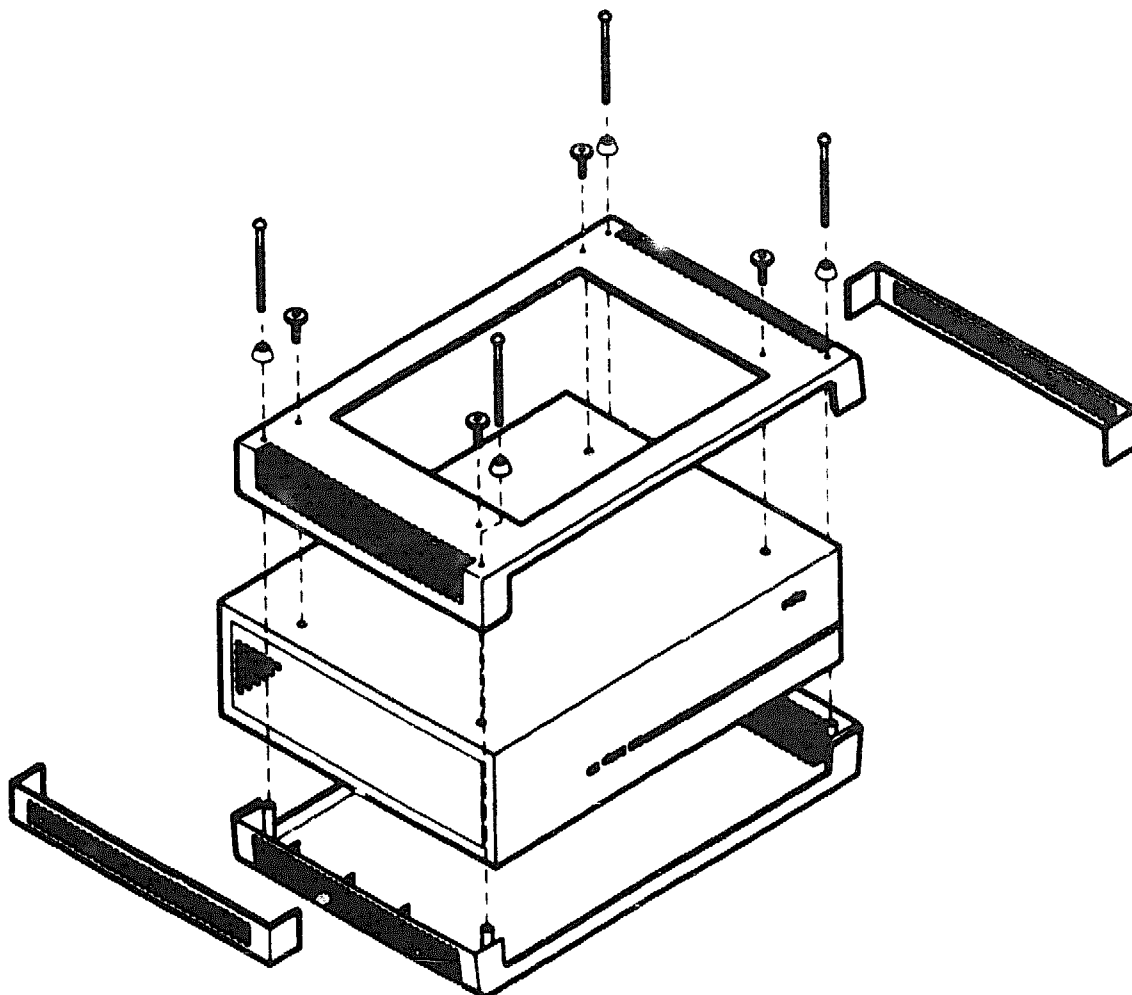
A wall/partition mounting kit is also available from Digital that allows you to mount the bridge directly to a wall or to suspend it from partitioned office walls. Installation instructions are provided with the installation kit (Order Code H039).

4.3.2 Removing the Plastic Enclosure

Rack mounting requires removal of the bridge's plastic enclosure. For wall mounting, the bridge can be installed with or without its plastic enclosure. To mount the LAN Bridge 150 with the plastic enclosure on a wall or partition, order the special wall/partition mounting kit (Order Code H039).

To remove the plastic enclosure from the LAN Bridge 150 unit (see Figure 4-3), remove the eight screws from the bottom of the unit, and then remove the plastic enclosure.

Figure 4-3: Removing the Plastic Enclosure



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CAUTION

Do not reinstall screws in the bridge's metal casing. Doing so could damage the bridge.

4.3.3 Rack Mount Installation

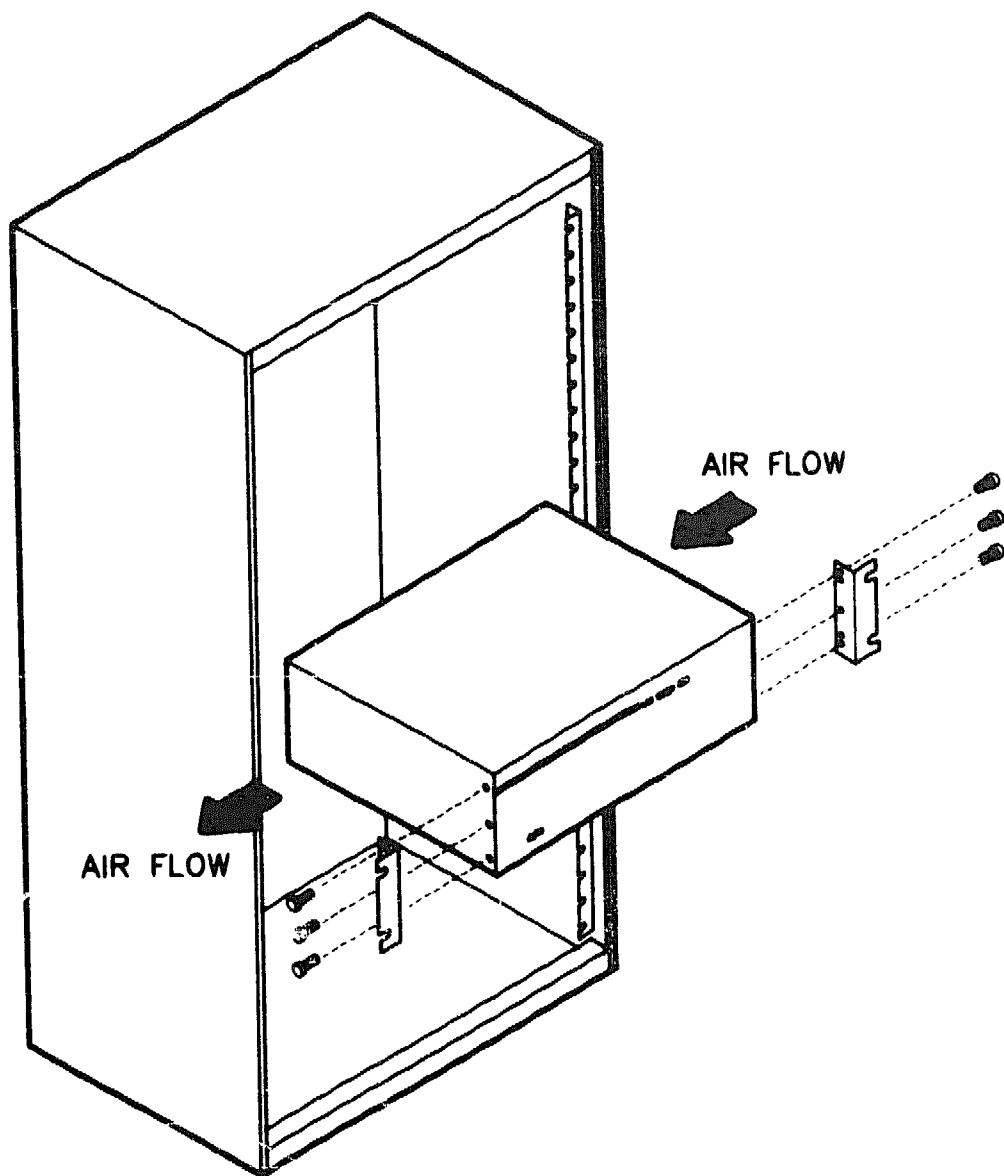
Before rack mounting the bridge, be sure that you remove the bridge's plastic enclosure, as shown in Figure 4-3.

CAUTION

- 1. The air inside the rack is hotter than the ambient room temperature. Therefore, ensure that the air entering the bridge's air inlet does not exceed the bridge's maximum temperature of 50° C (122° F).**
- 2. Ensure that all cables connecting to a rack mounted bridge are secured to one side of the rack. If any fiber optic cables are used, these cables must not exceed their 15 centimeter (6 inch) bend radius.**

Fasten the mounting brackets to the bridge with the screws provided (Figure 4-4 then fasten the bridge to the rack (screws not provided).

Figure 4-4: Rack Mounting the LAN Bridge 150 Unit



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4.3.4 Wall Mount Installation

To wall mount the bridge without the plastic enclosure, do the following:

1. **Fasten the mounting brackets to the bridge with the screws provided (Figure 4-5).**
2. **Fasten the brackets to the wall as shown in Figure 4-6 (screws not provided).**

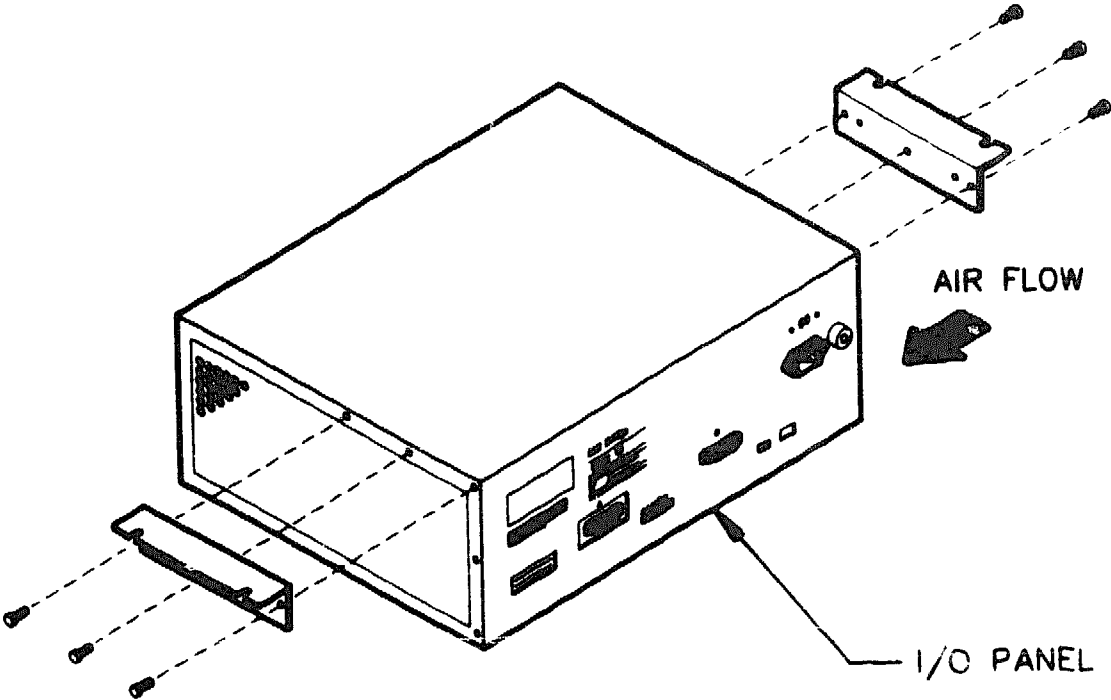
WARNING

To meet federal safety codes, never install a bridge with the I/O panel facing down.

CAUTION

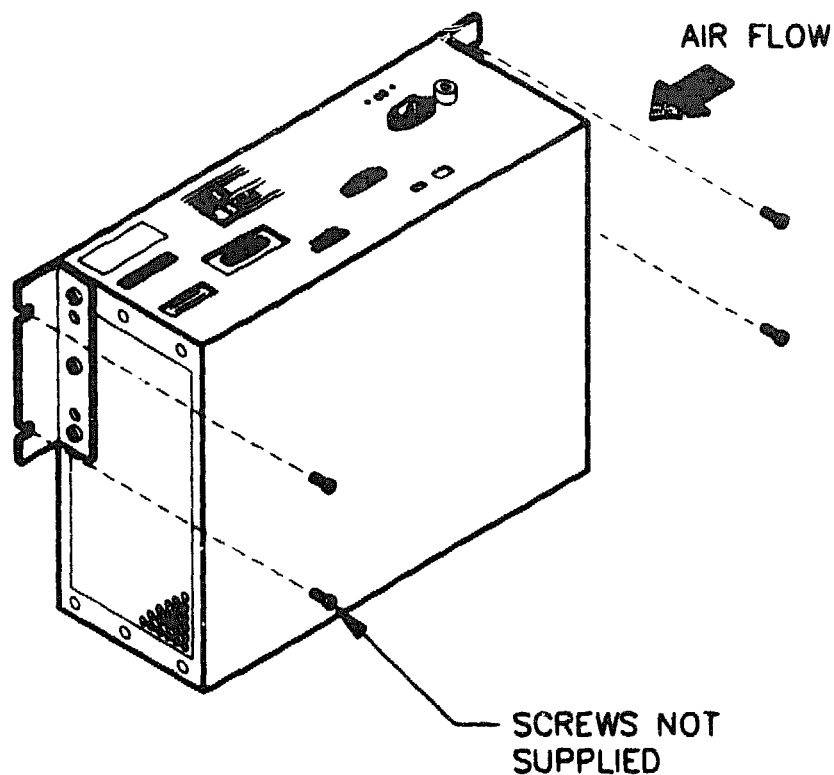
The air entering the bridge's air inlet must not exceed the bridge's maximum temperature of 50° C (122° F). If two bridges are mounted side-by-side, one bridge receives the heated exhaust air from the other. This usually does not cause a problem unless the ambient air temperature is close to 50° C (122° F). Do not mount several bridges side-by-side.

Figure 4-5: Fastening Wall Mounting Brackets



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Figure 4-6: Fastening Unit to Wall



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4.4 Connecting the Transceiver Cables

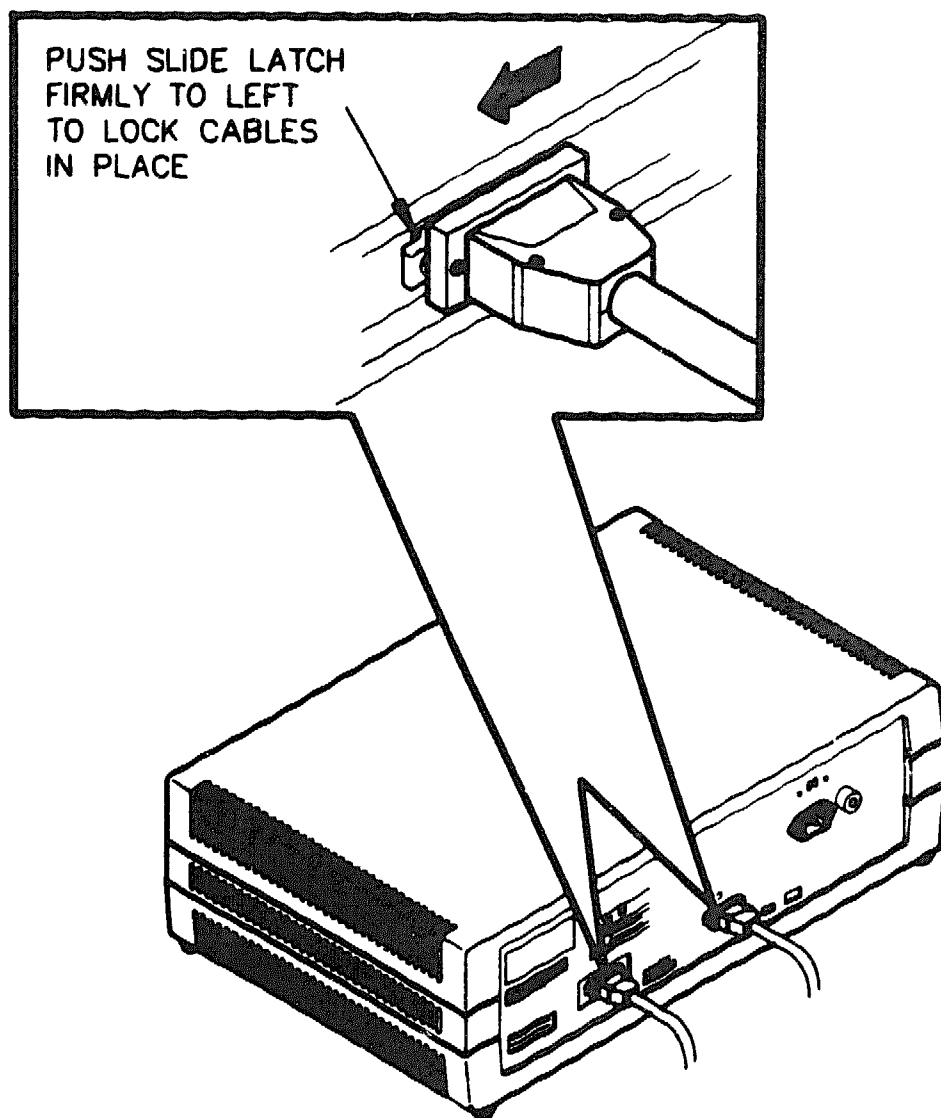
This section explains how to connect transceiver cables to a local LAN Bridge 150 unit. Note that if you are installing a remote LAN Bridge 150 (DEBET-RP or -RQ) unit with a fiber optic cable, there will be only one transceiver cable to install at Port B.

To install the transceiver cable(s), proceed as follows:

1. Push the slide latch to the right.
2. Plug the transceiver cable into the jack.

3. Push the slide latch to the left until it snaps into the locking position, securing the connector (Figure 4-7).
4. Gently pull on each connector to make sure that the latch is secure.

Figure 4-7: Connecting Transceiver Cables



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4.5 Connecting the Fiber Optic Cable

This section provides steps for installation of fiber optic cables to the LAN Bridge 150. Care should be taken when working with these cables to prevent both physical and equipment damage. Note that the fiber optic cable will be damaged by sharp bends. The maximum bend radius is 15 centimeters (6 inches). For additional fiber optic installation information, refer to Chapter 9 of the *DECconnect System Facilities Cabling Installation Guide (EK-DECSY-FC)*.

WARNING

Never look into a fiber optic connector or cable. High intensity light can damage your eyes.

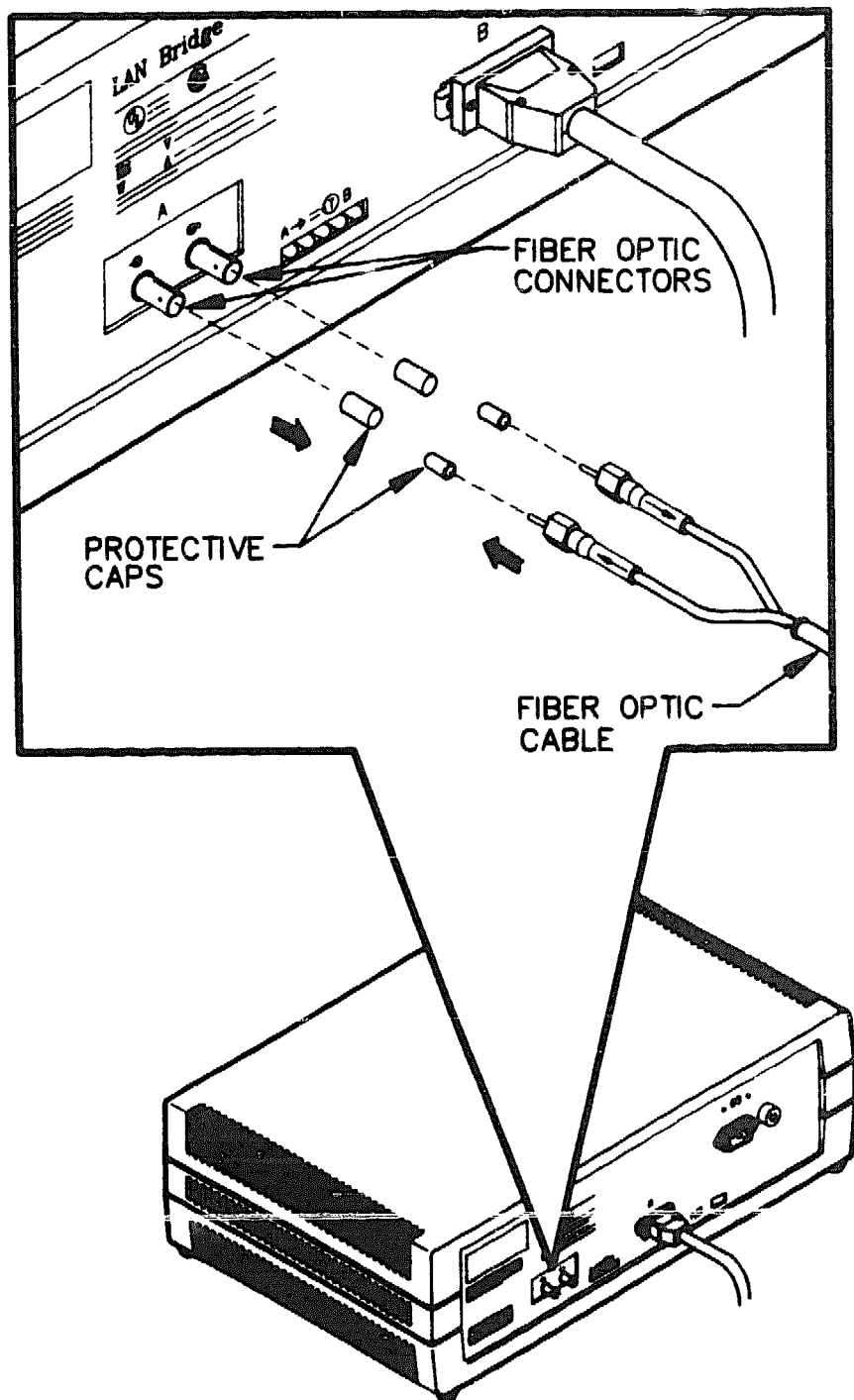
Figures 4-8 and 4-9 show how to install a remote LAN Bridge 150 (DEBET-RP or -RQ) unit using a fiber optic cable.

1. Pull the protective caps (see Figure 4-8) from the fiber optic connectors.
2. Connect the fiber optic cable and tighten the connectors finger tight.

NOTE

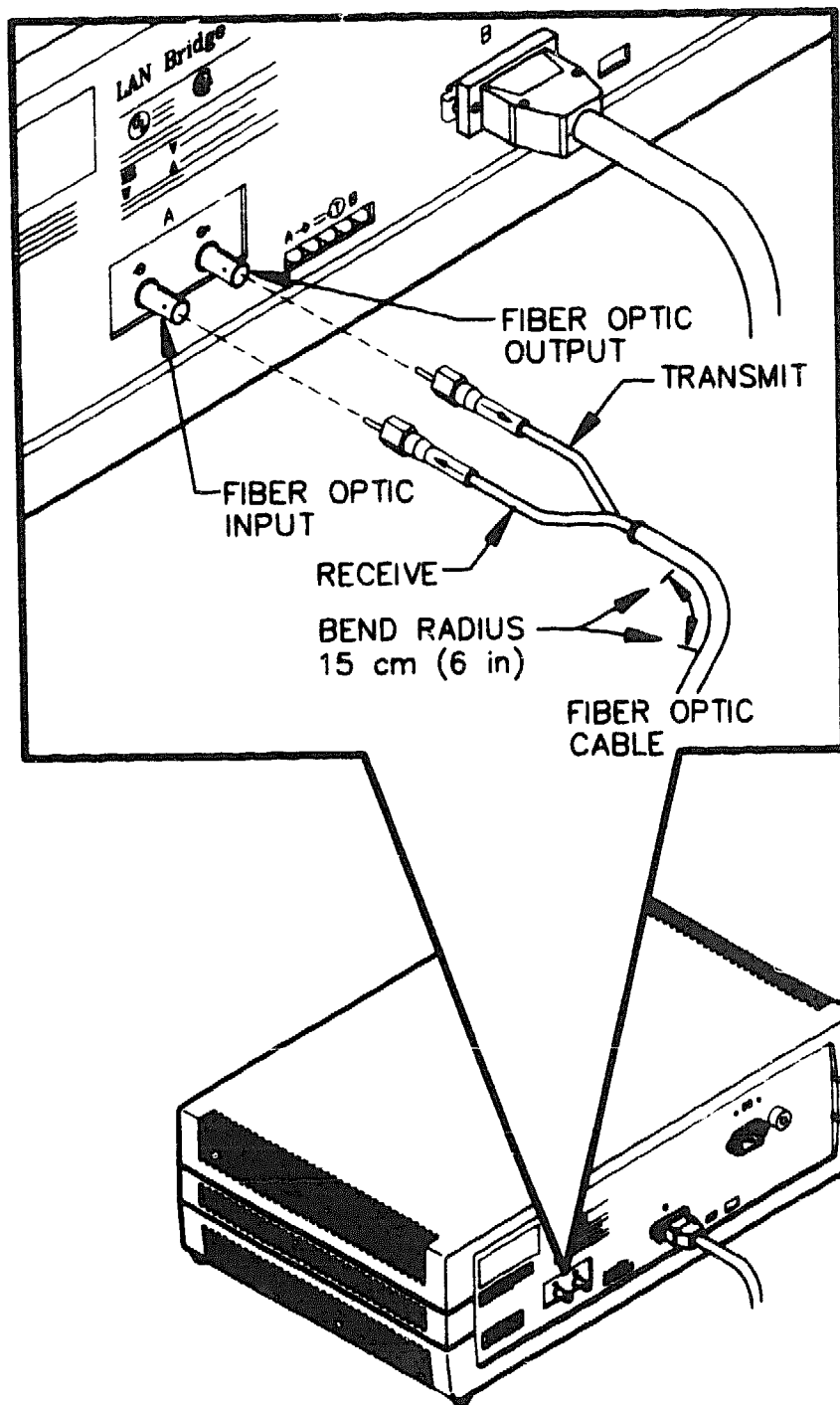
The transmit connector of the first bridge (fiber optic output) must be connected to the receive connector (fiber optic input) of the other bridge (or repeater). Figure 4-9 shows the cable connections and polarity (input/output) of the Port A connectors.

Figure 4-8: Removing the Fiber Optic Protective Caps



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Figure 4-9: Connecting the Fiber Optic Cable Connectors



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4.6 Before Connecting Power

Make sure the transceiver cable connections (and fiber optic cable connections, if required) are secure at both ends of the cable. If the cables are not connected when you plug in the power cord, the LAN Bridge 150 unit fails the diagnostic self-test.

If you are installing the LAN Bridge 150 unit as an LTM Listener, check with your system manager that the software installation and LTM configuration are complete before connecting the power cord.

NOTE

If the distribution software installation is not complete, the load host cannot send the LTM Listener software image to the LAN Bridge 150 unit. The LTM Listener does not operate without software. Wait for notification that the software installation is completed.

4.7 Connecting Power

The LAN Bridge 150 unit does not have a power ON/OFF switch. Plugging in the bridge power cord applies power directly to the bridge, illuminates the DC OK Status LED, and starts the bridge's self-test. The self-test will fail if the transceiver cables are not connected.

NOTE

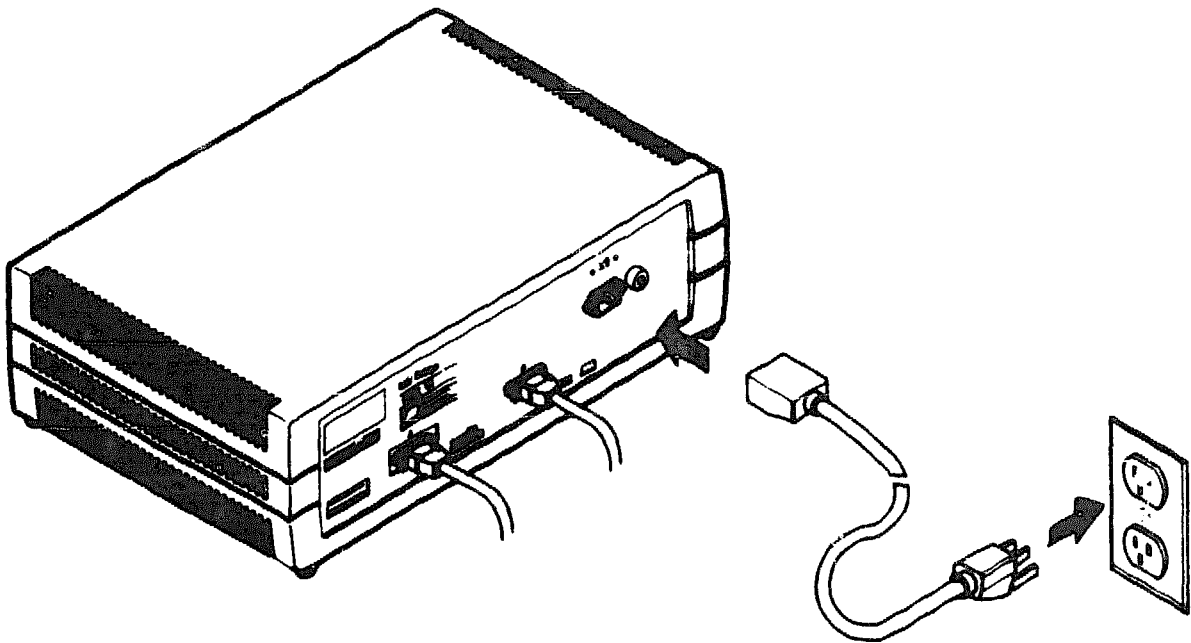
The LAN Bridge 150 unit fails self-test if an unused port is left disconnected, unless the unused port is the fiber optic port used with the remote version (DEBET-RP/RQ). A loopback connector (shipped with the unit) must be connected to the unused port. Do NOT install a fiber optic loopback connector to an unused fiber optic port.

To connect the bridge power cord (Figure 4-10), proceed as follows:

1. Connect one end of the power cord into the LAN Bridge 150 power receptacle.

2. Plug the other end of the power cord into the wall outlet.

Figure 4-10: Connecting the LAN Bridge 150 Power Cord



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4.8 Verifying the Installation

Proper installation of the LAN Bridge 150 unit is verified by the state of the status LEDs on the I/O panel. The LED states vary depending whether the LAN Bridge 150 hardware unit is configured to operate as a bridge or as a LAN Traffic Monitor.

If you are installing the LAN Bridge 150 unit to operate as a bridge, go to Section 4.8.1 to verify correct installation.

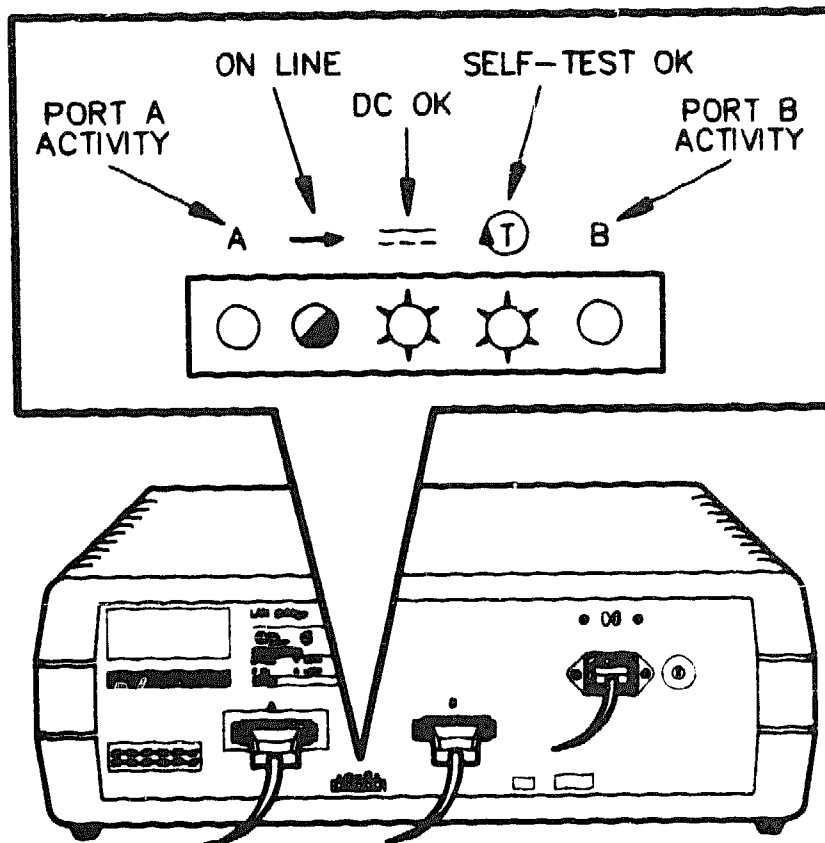
If you are installing the LAN Bridge 150 unit to operate as a LAN Traffic Monitor, go to Section 4.8.2 to verify correct installation.

4.8.1 Verifying the Bridge Installation

Whenever power is applied to the unit, the bridge performs its diagnostic self-test. The bridge's self-test normally takes about 15 seconds to complete. The bridge then spends about 30 seconds communicating with other bridges in the network to determine if there are loops and at the same time builds its initial database of forwarding addresses.

Allow up to 45 seconds for the bridge's self-test and communications tasks to complete, then compare the state of the five status LEDs on the bridge with those shown in Figure 4-11. If the DC OK LED, Test LED, and Port A and B LEDs are lit, the unit is operating properly and the logical link can be checked. If another condition appears, follow the simple troubleshooting procedures in Chapter 5.

Figure 4-11: Bridge Hardware Verification



★ = ON

○ = ON OR OFF OR BLINKING
(INDICATING NETWORK TRAFFIC)

◐ = EITHER OF TWO STATES:
ON=DESIGNATED BRIDGE
OFF=BACK-UP BRIDGE

IF:

THE STATUS LEDS MATCH THOSE SHOWN HERE.

THE STATUS LEDS **DO NOT** MATCH THOSE SHOWN HERE.

THEN:

THE LAN Bridge 150 HARDWARE IS FUNCTIONAL. GO TO SECTION 4.9

GO TO CHAPTER 5.

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NOTE

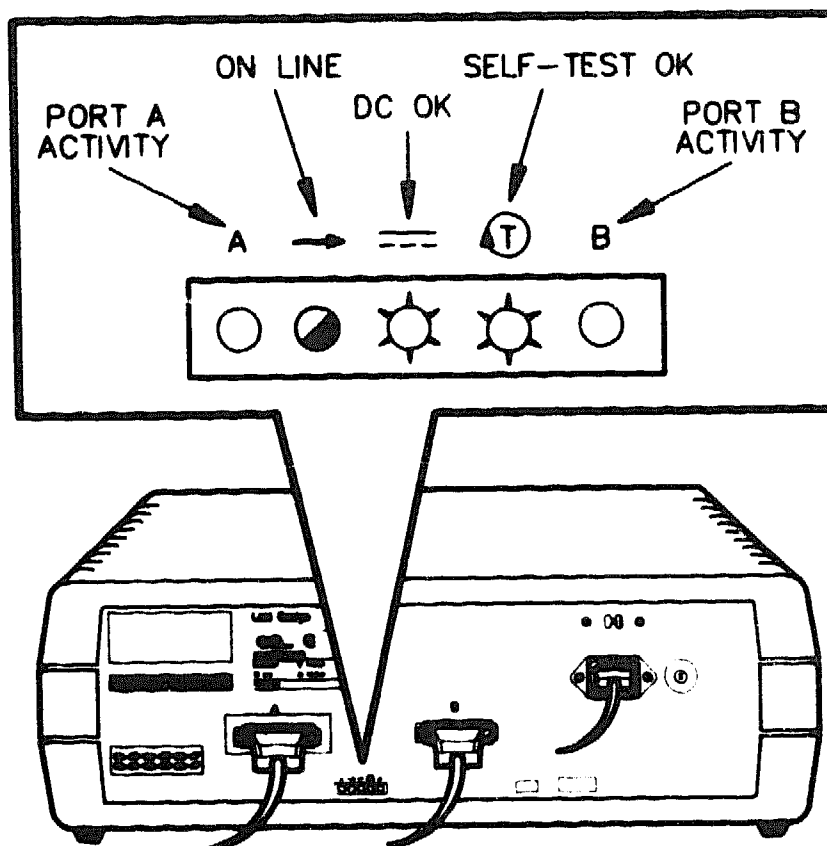
For definitions of the status LEDs on the bridge, refer to Appendix A.

4.8.2 Verifying LAN Traffic Monitor (LTM) Installation

Whenever power is applied to the unit, the bridge performs its diagnostic self-test and, if successful, initiates a request for a down-line load of the LTM Listener software image from a load host. The bridge's self-test normally takes about 15 seconds to complete, but the down-line loading of the software image could take longer if the network is busy.

Allow up to 2 minutes for the bridge's self-test and down-line loading of the LTM Listener software image to complete. Then compare the state of the five status LEDs on the unit with those shown in Figure 4-12. If the DC OK LED, Test LED, and Port A and B LEDs are lit, the unit is operating properly and the logical link can be checked. If another condition appears, follow the simple troubleshooting procedures in Chapter 5.

Figure 4-12: LTM Hardware Verification



☀ = ON

○ = ON OR OFF OR BLINKING
(INDICATING NETWORK TRAFFIC)

◐ = FLASHES AT 2-SECOND INTERVALS
(INDICATING OPERATING AS LTM)

IF:

THE STATUS LEDS MATCH THOSE SHOWN HERE.

THE STATUS LEDS **DO NOT** MATCH THOSE SHOWN HERE.

THEN:

THE LTM LISTENER IS OPERATIONAL. NOTIFY THE SYSTEM MANAGER.

GO TO CHAPTER 5.

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NOTE

For definitions of the status LEDs on the bridge, refer to Appendix A.

4.9 Checking the Logical Link

Send a message from a station on one side of the bridge to a station on the other side of the bridge. This is done by creating a logical link to a station on the other side of the bridge as a virtual terminal. On a VAX/VMS host running DECnet, this is done using the SET HOST command. If you have problems sending the message, go to Chapter 5 for help.

Installation is now complete.

What To Do If You Have Problems

5.1 Introduction

This chapter helps you identify and correct problems that you could have during the initial installation of the LAN Bridge 150 hardware unit. The troubleshooting procedures are for diagnosing and correcting hardware-related problems only.

After diagnosing and correcting the problem, return to Section 4.8 to verify the correct operation of the LAN Bridge 150 unit.

NOTE

Notify the system/network manager if the troubleshooting procedures indicate that the problem is software related or if the procedures do not correct the problem.

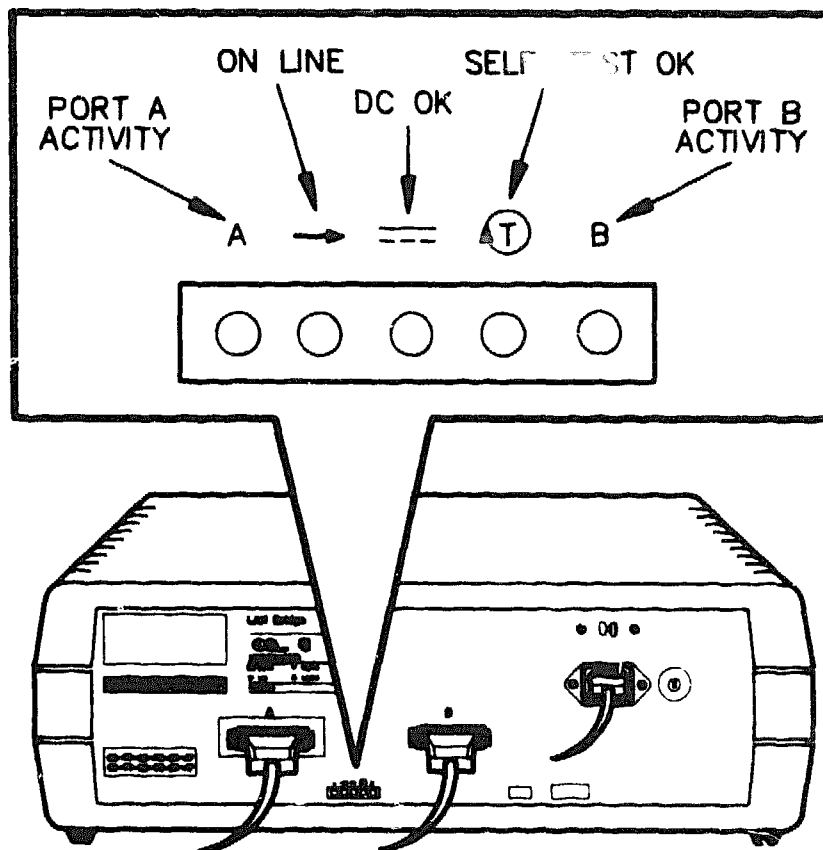
5.2 Diagnosing Problems

The bridge's five status LEDs (Figure 5-1) indicate the status of the unit and are also used for diagnosing problems. All five status LEDs illuminate for a 2-second lamp check whenever the bridge is powered up from a powered-off state.

After powering up the bridge, allow up to 2 minutes to elapse before determining the state of the status LEDs. Compare the state of the status LEDs with those shown in Table 5-1, then go to the section indicated for problem resolution.

If the bridge's status LEDs do not indicate a problem with the unit and you cannot create a logical link from a station on one side of the bridge to a station on the other side, refer to Table 5-11.

Figure 5-1: Status LEDs



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Table 5-1: Status LEDs/Indications

LED Symbol	LED Definition	State	Indications	Corrective Action
A	Port A activity	ON*	Indicates activity on the network	-
→	On-Line	ON	Bridge is operational and forwarding messages	-
		OFF	Conditional	Go to Table 5-5, Table 5-6, Table 5-7
		Blinking	Conditional	Go to Table 5-8
---	DC OK	ON	The bridge's DC voltages are correct	-
		OFF	The bridge's DC voltages are NOT correct	Go to Table 5-2
Ⓣ	Self-Test OK	ON	Self-test passed	-
		OFF	Fatal error if LED remains OFF within 2 minutes after power up	Go to Table 5-3
		Blinking	Non-fatal error	Go to Table 5-4
B	Port B activity	ON*	Indicates activity on the network	-

*Can be on, off or blinking depending on the amount of network traffic.

5.3 Problem Solving

Table 5-2 through Table 5-11 provide help to solve simple problems that can occur during installation of the LAN Bridge 150. To begin problem solving, determine the symptom of the problem by looking at the I/O panel LEDs and then, refer to the appropriate table provided.

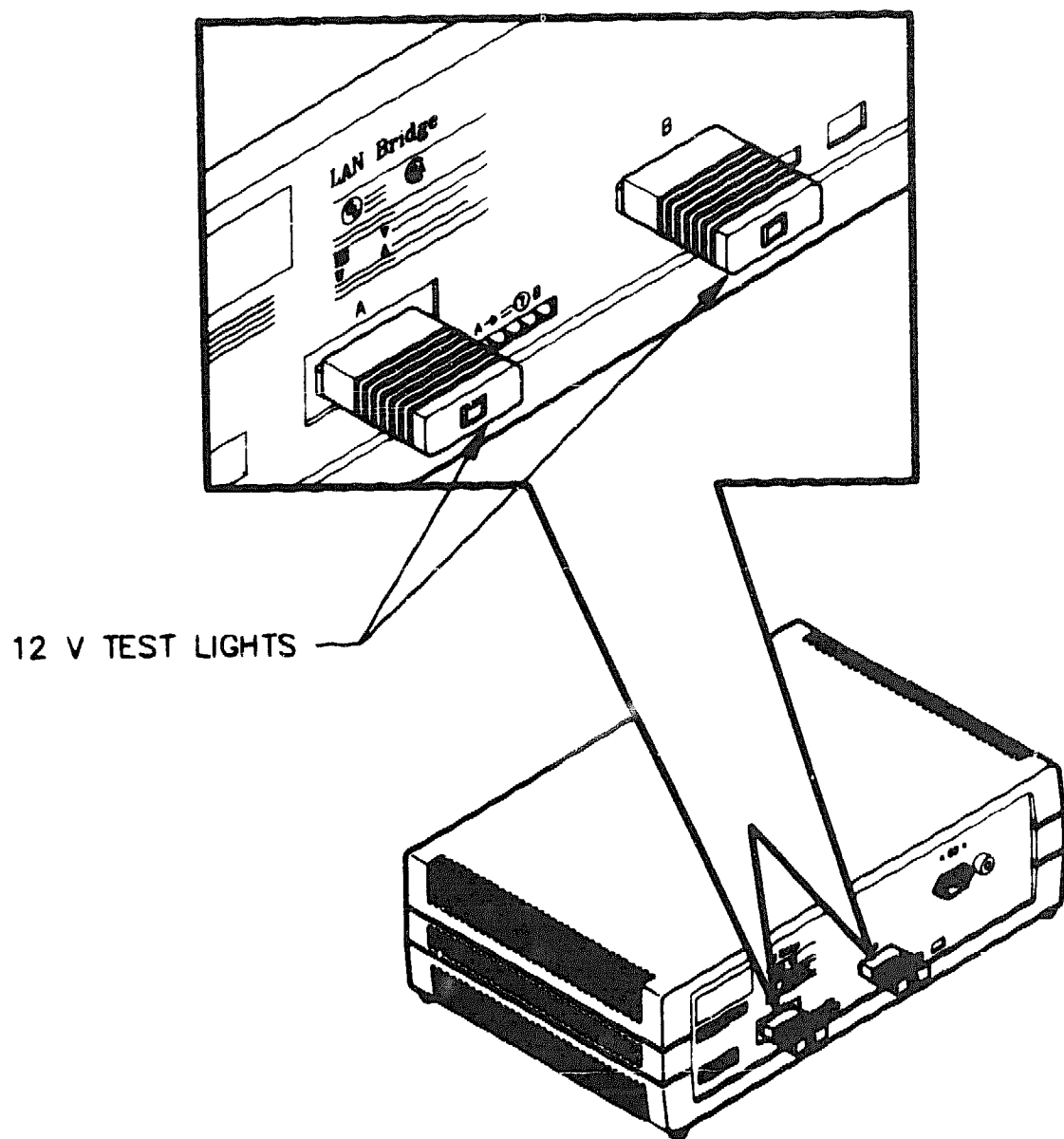
Table 5-2: DC OK LED Remains Off

Problem	Solution
<i>Power is not reaching the LAN Bridge 150</i>	Ensure that the voltage select switch is set to the correct voltage for your country. Section 4.2 in this guide provides information about changing the voltage setting, if necessary. 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. Determine if the bridge's circuit breaker has tripped (refer to Appendix A). If it has, press in the white button to reset the breaker. If the circuit breaker trips more than once, notify the system/network manager that the bridge must be returned to Digital for repair or replacement. Replace a defective bridge power cable with a new cable. Check for a short circuit in the transceiver cables by disconnecting them one at a time. If there is a short circuit, the DC OK LED will light when the faulty transceiver cable is disconnected. If the above actions do not correct the problem, call Digital field service.

Table 5-3: Self-Test OK LED Remains Off

Problem	Solution
<i>The bridge has failed self-test. It will retry self-test every 15-30 seconds and flash all the status LEDs again for 2 seconds each time it retries self-test</i>	Check that the transceiver cables are connected securely at both ends of the cable. (For remote bridges, only one transceiver cable is connected.) Self-test performs external loopback tests to the transceivers. If the transceiver cables are not connected properly, self-test will fail. The LAN Bridge 150 unit fails self-test if an unused port is left disconnected, unless the unused port is the fiber optic port (Port A) used with the remote version (DEBET-RP/RQ). A loopback connector (shipped with the unit) must be connected to the unused port. Do NOT install a fiber optic loopback connector to an unused fiber optic port. Check for other external loopback problems by removing the transceiver cables and installing the loopback connectors, as shown in Figure 5-2. If you have a DEBET-RP or -RQ bridge with the fiber optic cable, leave the fiber optic cable in place and test only the transceiver port (Port B). Check that the Loop Self-Test switch is in the OFF position (up = OFF). If the switch is in the ON position (down = ON), switch it to OFF. Initialize the bridge by unplugging the power cord from the wall outlet then reinserting it. Check that the NVRAM Reset switch is in the OFF position (up = OFF). If the NVRAM Reset switch is in the OFF position, and the NVRAM fails during power up, self-test fails. Set the NVRAM Reset switch to the ON position (down = ON). Initialize the bridge by unplugging the power cord from the wall outlet then reinserting it. Check that the green +12 V Test lights in the loopback connectors are on. These lights test the +12 V power to the transceivers. If either light is off, swap the loopback connectors to ensure that the light itself is not defective. If the swapped connector fails to light, call Digital field service. If the Self-Test OK LED does not turn on after running self-test with the loopback connectors installed, call Digital field service. If self-test passes with the loopback connectors installed, the problem is external to the unit. Determine which transceiver has the problem by connecting one transceiver cable at a time and waiting for self-test to run again. The problem could be the transceiver, transceiver cable, or an open or short circuit in the network coaxial cable. This problem can also effect all other stations on that network cable.

Figure 5-2: Installed Loopback Connectors



LKG-2898-89

Table 5-4: Self-Test OK LED Blinking

Problem	Solution
<i>The unit's non-volatile RAM (NVRAM), used to store station addresses and parameters set by RBMS, has failed*</i>	Check that the factory set defaults are in effect. The unit will not operate properly otherwise. If this does not correct the problem, call Digital field service.
*Although the LTM Listener cannot be loaded using RBMS when this condition occurs, you can still load the LTM Listener by setting the Down-Line Load Enable switch (Switch 5) to the ON position (down = ON).	

Table 5-5: On-Line LED Off

Problem	Solution
<i>The Self-Test OK LED turns on, but the On-Line LED does not turn on</i>	The state of the On-Line LED depends on the configuration of the LAN Bridge 150 unit. Proceed as follows: ■ If the LAN Bridge 150 is configured as a bridge, go to Table 5-6. ■ If the LAN Bridge 150 is configured as a LTM Listener, go to Table 5-7.

Table 5-6: On-Line LED Off, Unit Configured As Bridge

Problem	Solution
<i>The Self-Test OK LED turns on, but the On-Line LED does not turn on</i>	Determine if the bridge is in a loop configuration with another bridge or a repeater. If so, the bridge enters the back-up state and the On-Line LED does NOT turn on (refer to Section 1.6). Be sure that the Down-Line Load Enable switch (refer to Appendix A) is set to the OFF position (up = OFF). Be sure that the NVRAM software switch is disabled. Disabling NVRAM ensures that the LAN Bridge 150 unit powers up as a bridge and does not request a down-line load. To do this, activate the NVRAM Reset switch (refer to Appendix A) as follows: 1. Unplug the bridge power cord from the wall outlet. 2. Set the NVRAM Reset switch to ON (down = ON). 3. Power up the bridge by plugging the bridge power cord into the wall outlet. 4. Be sure to set the NVRAM Reset switch to OFF (up = OFF) after powering up the unit. If the preceding suggestions do not resolve the problem, call Digital field service.

Table 5-7: On-Line LED Off, Unit Configured As an LTM Listener

Problem	Solution
<i>The request for the down-line load of the LTM Listener software image from the load host has failed</i>	Be sure that the LTM Listener is connected to the same Ethernet segment as the designated load host. Check with your system manager that the software installation and LTM configuration are complete (see Section 3.1).

Table 5-8: On-Line LED Blinking

Problem	Solution
<i>The unit passed self-test, but the On-Line LED blinks at 2-second intervals</i>	The On-Line LED is indicating the successful down-line load of the LTM Listener software image (Section 1.8)

Table 5-9: DC OK LED On, All Other LEDs Fail to Turn On

Problem	Solution
<i>The LAN Bridge 150 unit is defective</i>	Notify the system manager that the bridge must be returned to Digital for repair or for replacement.

Table 5-10: All LEDs (Except Self-Test OK) Blink Once Every 15 Seconds

Problem	Solution
<i>The Loop Self-test switch is enabled (switch 1). When enabled (down position), the Loop Self-Test switch causes the bridge to self-test continuously after power up. This switch is for manufacturing and field test use only; it should otherwise be left in the disabled (up) position</i>	Disable this switch by moving it to the up position. After disabling the switch, initialize the bridge by removing the bridge power cord at the wall outlet, then reinsert it. If the problem continues, call Digital field service.

Table 5-11: Unable to Create a Logical Link

Problem	Solution
<i>A logical link cannot be created from a station on one side of a remote bridge to a station on the other side</i>	There may be a problem with the fiber optic link. The bridge's self-test does not check the optical circuitry inside the bridge unit nor does it test the fiber optic cable itself. Digital field service has special equipment to test the bridge's optical circuitry. If you have a fiber optic link from a bridge to a repeater, the repeater's self-test performs a loopback through the fiber optic cable. The loopback tests both the cable and the bridge's optical circuitry. Run the repeater's self-test by pressing the Tst button on the repeater unit. This test takes about 0.5 seconds. If self-test fails, the Tst LED remains on after this 0.5 second test. If the B side (right side) Err LED is also on, the repeater has failed the fiber optic cable external loopback test. The problem is with any of the following: ■ The fiber optic cable ■ The bridge's optical circuitry ■ The repeater's optical circuitry

There is no simple procedure for testing the fiber optic link between bridges. If the preceding suggestions do not resolve the problem, call Digital field service.

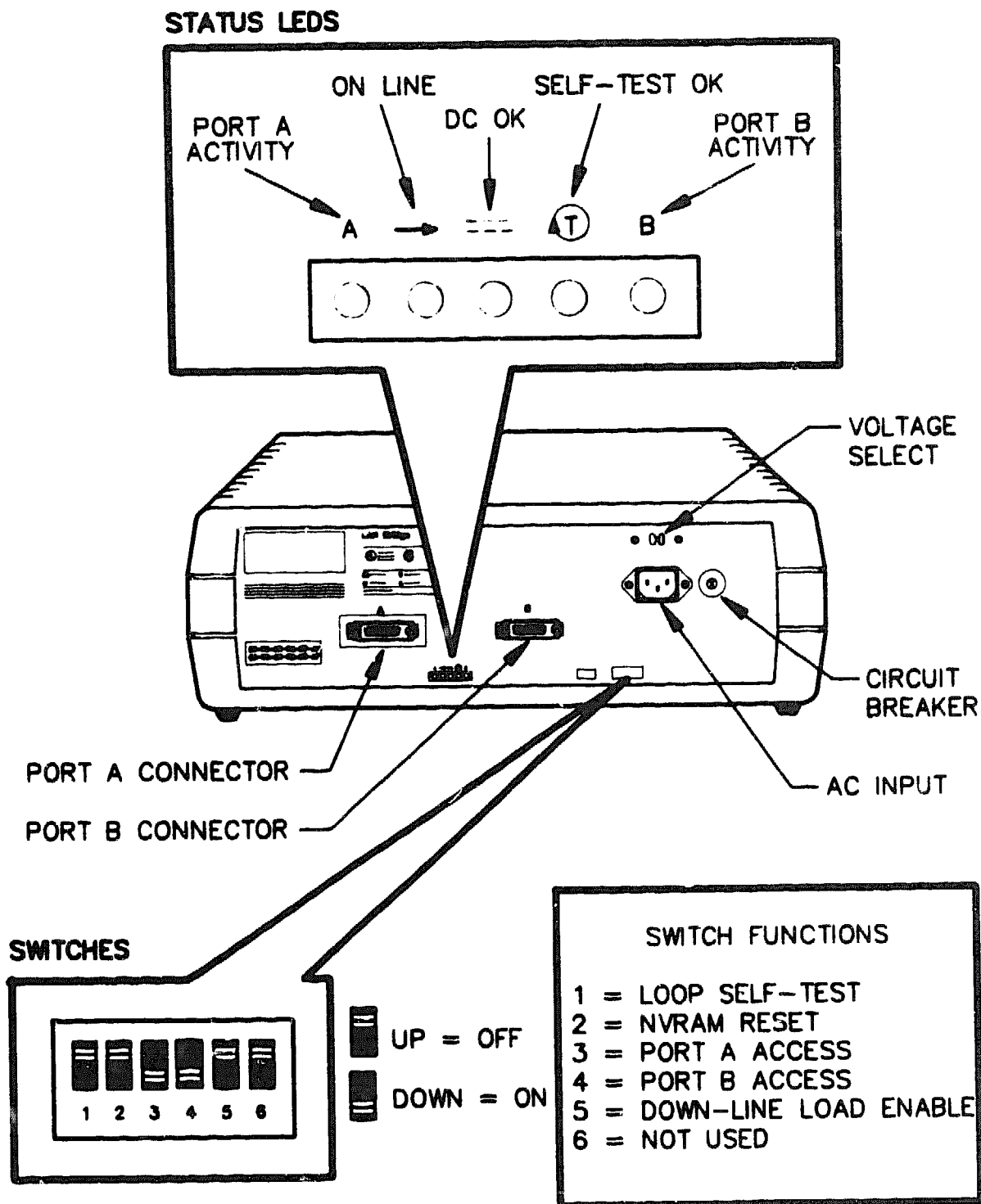
Controls, Status LEDs, and Connectors

This appendix identifies and describes the LAN Bridge 150 controls, status LEDs, and connectors.

A.1 General Description

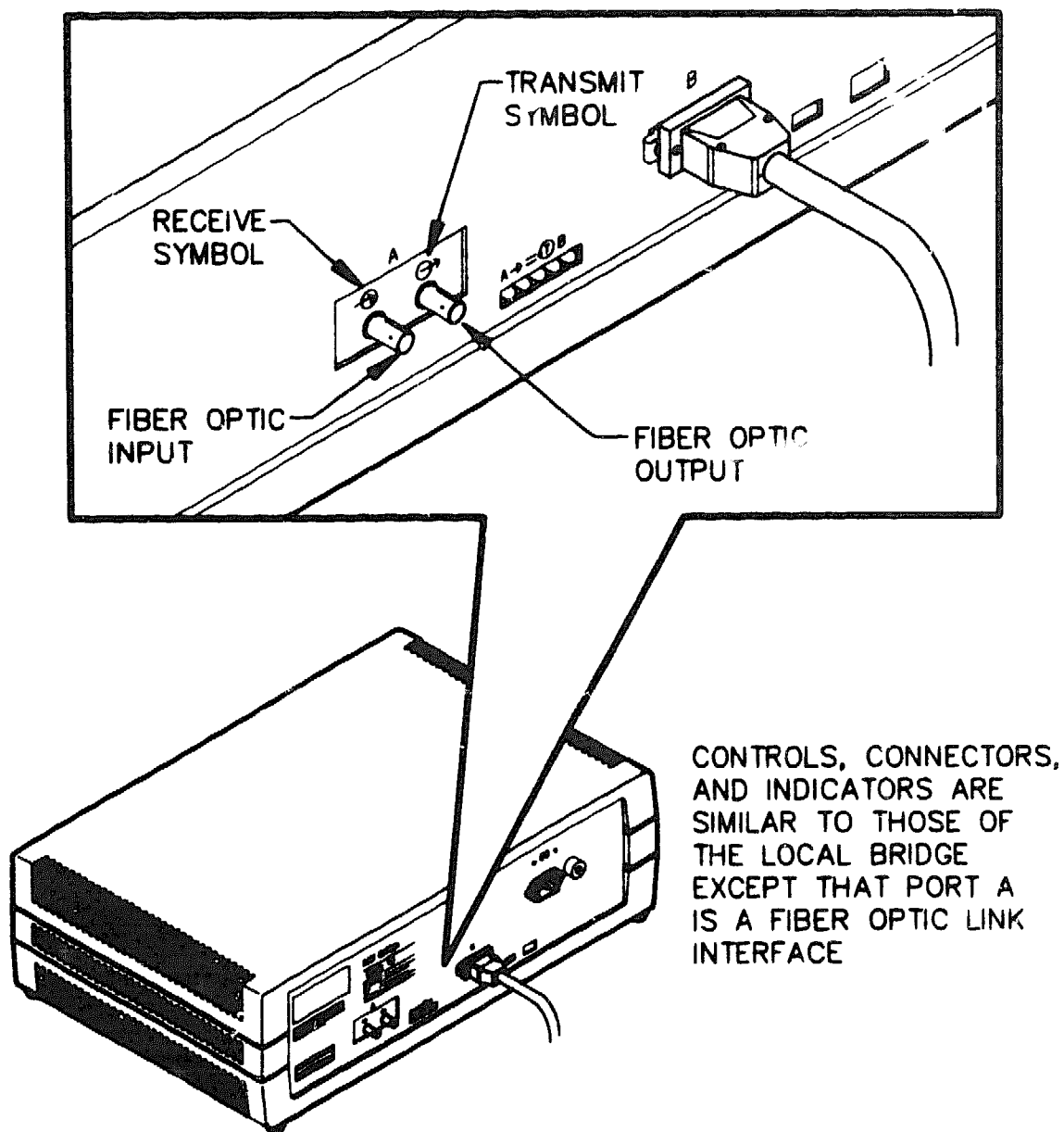
All the controls, status LEDs, and connectors are located on the I/O panel of the LAN Bridge 150 unit. The I/O panel of a local bridge is shown in Figure A-1, and the I/O panel of a remote bridge is shown in Figure A-2. Table A-1 through Table A-4 describe the controls, status LEDs, and connectors available on local and remote bridges.

Figure A-1: Local LAN Bridge 150 Controls, Status LEDs, and Connectors



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Figure A-2: Remote LAN Bridge 150 Controls, Status LEDs, and Connectors



LKG-2899-88

Table A-1: LAN Bridge 150 Controls

Control	Description
Voltage Select Switch	The voltage select switch is used to set the bridge input voltage to the range required for operation in your country. This switch was factory set for the correct power source for your country. Do not change this switch setting unless you are sure that the switch setting is incorrect (see your electrician if you are not sure). Section 4.2.1 provides information for changing the bridge input voltage setting (if necessary).
Circuit Breaker	The circuit breaker provides overcurrent protection for the bridge. If an overcurrent condition causes the circuit breaker to trip, the white center portion of the circuit breaker pops out as a visual indication, and the ac power is cut off from the bridge. The circuit breaker can be reset by pressing in on the white center portion of the circuit breaker.
Bridge Switches	These switches control the LAN Bridge 150 functions. Each switch is described in Table A-2.

Table A-2: LAN Bridge 150 Switches

Switch Number	Name	ON (Down)	OFF (Up)
1	Loop Self-Test ¹	The bridge loops self-test continuously after power up. Loopback terminators must be installed. This switch position is for manufacturing and field service use only.	Bridge runs self-test once powered up or reset.

¹Switch settings can be changed for port access while the bridge is operating. However, the switch settings for Loop Self-Test, NVRAM Reset and Down-Line Load Enable are read only during power up. Changing either of these switches while the bridge is operating has no effect on bridge operation. To change either of these switches, unplug the unit, change the setting, then plug the unit back in.

Table A-2 (Cont.): LAN Bridge 150 Switches

Switch Number	Name	ON (Down)	OFF (Up)
2	NVRAM Reset¹	NVRAM resets to factory default settings when the bridge is powered up. NVRAM Reset removes all bridge management configuration changes.	Prevents NVRAM from resetting to factory default settings when the bridge is powered up. This setting should be used to prevent the loss of parameters stored by RBMS during a power failure.
3	Port A Access²	Stations on the LAN connected to Port A that have bridge management capabilities are allowed to read and write (modify) bridge management parameters.	Stations on the LAN connected to Port A that have bridge management capabilities can read but cannot write bridge management parameters.
4	Port B Access²	Stations on the LAN connected to Port B that have bridge management capabilities are allowed to read and write (modify) bridge management parameters.	Stations on the LAN connected to Port B that have bridge management capabilities are allowed to read but cannot write bridge management parameters.

¹Switch settings can be changed for port access while the bridge is operating. However, the switch settings for Loop Self-Test, NVRAM Reset and Down-Line Load Enable are read only during power up. Changing either of these switches while the bridge is operating has no effect on bridge operation. To change either of these switches, unplug the unit, change the setting, then plug the unit back in.

²Port A and Port B access switches can prevent bridge management software from changing any of the bridge's internal parameters. If security is a concern at the site, set the bridge's parameters with RBMS and then disable one or both ports by putting one or both switches in the up position. Bridge management software can still read the bridge's counters and other parameters. Placing either switch in the down position enables bridge management software write access from stations on the LAN connected to that port of the bridge. Normally, both switches are placed in the down position to enable bridge management software write access from stations on either LAN.

Table A-2 (Cont.): LAN Bridge 150 Switches

Switch Number	Name	ON (Down)	OFF (Up)
5	Down-Line Load Enable ¹	Configures unit to operate as a LAN Traffic Monitor. Enables unit to down-line load the LTM Listener software image from load host.	Configures unit to operate as a bridge.
6	Not Used	-	-

¹Switch settings can be changed for port access while the bridge is operating. However, the switch settings for Loop Self-Test, NVRAM Reset and Down-Line Load Enable are read only during power up. Changing either of these switches while the bridge is operating has no effect on bridge operation. To change either of these switches, unplug the unit, change the setting, then plug the unit back in.

Table A-3: LAN Bridge 150 Status LEDs

Name	ON Steady	OFF	Blinking
Port A Activity	A message is being received or transmitted on Port A.	No message traffic on Port A	Short messages are being received or transmitted on Port A or the bridge is checking for loops (sending Hello messages) about once a second.

Table A-3 (Cont.): LAN Bridge 150 Status LEDs

Name	ON Steady	OFF	Blinking
On-line	Unit is configured as a bridge, is fully operational, and is forwarding messages.	When configured as a bridge, the unit is in the INITIALIZE, PREFORWARDING, BACKUP, or BROKEN state. When configured as an LTM Listener, the request for down-line load of the LTM Listener software image from a load host has failed.	The load host successfully down-line loaded the LTM Listener software image.
DC OK	Internal power supply is functioning properly.	Internal power supply is not functioning properly.	N/A
Self-Test OK	Passed self- test.	Running self-test.	NVRAM failed which requires replacement. This failure does not affect normal operation.*
Port B Activity	A message is being received or transmitted on Port B.	No message traffic on Port B.	Short messages are being received or transmitted on Port B or the bridge is checking for loops (sending Hello messages) about once a second.

*NVRAM stores network pointers, parameters, and addresses set by RBMS so that they are not lost in the event of a power failure. If the Self-test OK LED is blinking, you can bypass the fault by setting the NVRAM Reset switch (switch 2 on the I/O panel) to the down (on) position, and then turning the bridge power off and on. (See Chapter 5 for more information on troubleshooting.) Note that this causes the bridge to use default parameters.

Table A-4: LAN Bridge 150 Connectors

Connector	Description
AC Input	This connector accepts ac input voltages of 120 or 240 Vac, depending on the setting of the voltage selection switch (refer to Table A-1).
Port A	For local bridges, this 15-pin, female, D-type connector accepts a transceiver cable. A slide latch is provided for locking the transceiver cable in place. The pins have the following definitions: 1. Chassis ground 2. Collision presence + 3. Transmit + 4. Ground 5. Receive + 6. +12 volt return 7. No connection 8. Ground 9. Collision presence - 10. Transmit - 11. Ground 12. Receive - 13. +12 volts 14. Ground 15. Ground For remote bridges, Port A has two fiber-optic connectors. The left-hand connector (marked ) is for receiving optical data. The right-hand connector (marked ) is for transmitting optical data.

Table A-4 (Cont.): LAN Bridge 150 Connectors

Connector	Description
Port B	For local and remote bridges, this 15-pin, female, D-type connector accepts a transceiver cable. A slide latch is provided for locking the transceiver cable in place. The pins have the same definitions as for Port A.

APPENDIX B

APPENDIX B

LAN Bridge 150 Specifications

Specifications for the LAN Bridge 150 are divided into the following categories:

- **Physical dimensions**
- **Cable specifications**
- **Environmental specifications**
- **Electrical specifications**

B.1 Physical Dimensions

Dimension	With Enclosure	Without Enclosure*
Height	16.2 cm (6.4 in)	13.3 cm (5.3 in)
Width	49.4 cm (19.4 in)	43.6 cm (17.2 in)
Depth	31.3 cm (12.3 in)	29.8 cm (11.7 in)
Weight	6.7 kg (15 lb)	4.5 kg (10 lb)

*The plastic enclosure is easily removed, and brackets are provided to allow mounting of the unit on a wall or in a cabinet. An optional kit (part number H039) is available for mounting the bridge on a wall or partition without removing the plastic enclosure.

B.2 Cable Specifications

Item	Value
AC power cord length	U.S. 1.83 m (6 ft) Others 2.5 m (8.2 ft)
Transceiver cable length	BNE4 12 m (39 ft) maximum, BNE3 50 m (164 ft) maximum
Fiber optic cable	62 5/125
Minimum bandwidth	160 MHz measured at a wavelength of 850 nm; 500 MHz/km measured at a wavelength of 1300 nm
Fiber optic connectors	Stainless steel, Amphenol type 906, SMA style, or equivalent
Maximum attenuation	Less than 1.5 dB

B.3 Operating Environment Specifications

The LAN Bridge 150 is designed to operate in a non-air-conditioned environment or in an exposed area of an industrial site. However, 50° C (122° F) is the maximum ambient temperature that must not be exceeded at the air intake of the bridge. This applies even when the LAN Bridge 150 is mounted in a cabinet. The bridge is not intended to operate in an air plenum.

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% (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	37.5 CFM. Note that about 10 to 15 cm (4 to 6 in) of space must be provided on both ends of the unit for adequate air flow

B.4 Shipping Environment Specifications

Item	Value
Temperature	-40° C to 66° C (-40° F to 151° F)
Relative humidity	0% to 95% (non-condensing)
Altitude	Sea level to 9.1 km (30,000 ft)

B.5 Power Specifications

The LAN Bridge 150 unit features a self-contained power supply, power cord options for all major Digital markets, and adequate power to drive two external transceivers.

Item	Value
Voltage (Domestic)	88 Vac to 132 Vac (nominal 120 Vac)
Voltage (International)	176 Vac to 264 Vac (nominal 240 Vac)
Current at 120 volts	1.1 amps
Current at 240 volts	.7 amps
Frequency	47 Hz to 63 Hz
Power Consumption	168 watts
Heat Dissipation	574 BTU/hr

B.6 Fiber Cable Budgets

Fiber Type	Available Power (dB)	Minimum Attenuation (dB)	Minimum Cable that Provides Minimum Attenuation (km)
62.5/125	12	1	0.3
100/140	14	4	1
85/125	13	3	0.8
50/125	8	0	0