HP-PB 100Base-T Network Adapter Installation and Service

HP 3000 MPE/iX Computer Systems

Edition 1

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HP-PB 100Base-T Network Adapter Installation at a Glance

The following figure shows how to install the HP-PB 100Base-T Network Adapter.
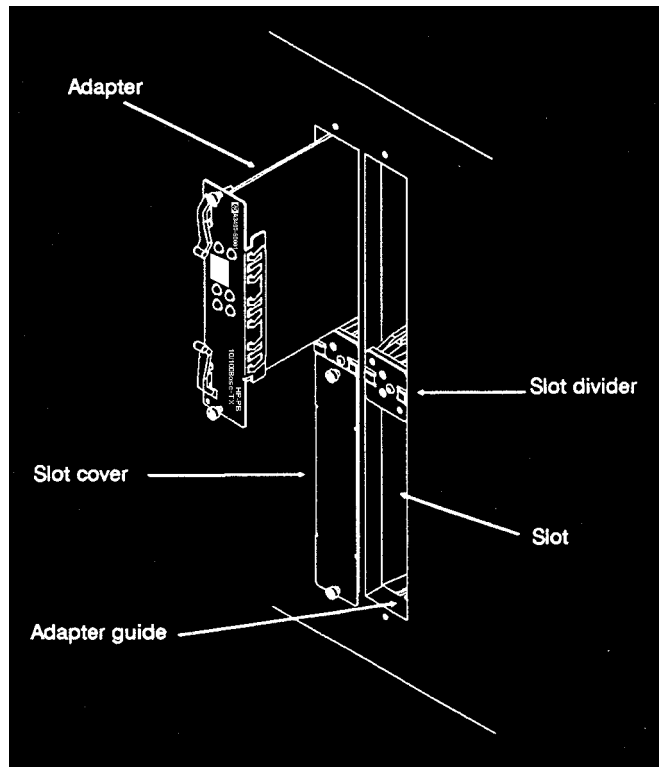
Installation Overview

The installation procedure includes the following major steps:

1. Prepare to install the adapter.
2. Shut down the operating system and switch off the power to the computer.
3. Install the adapter.
4. Attach the adapter to the network.
5. Configure the adapter.
6. Verify operation.

Product Description

The HP-PB 100Base-T Network Adapter provides the hardware needed to interface an HP-PB backplane to a 100Base-T Network.

The HP-PB 100Base-T Network Adapter has the following features:

- one built-in RJ-45 connector, for attachment to the hub
- 10 or 100-Mbit per second operation
- single-high form factor

Product Contents

- HP-PB 10/100Base-TX Network Adapter — A3495-60001
- *Installation and Service* Manual — B5427-90001

Tools and Accessories

Before installation, gather these tools and accessories:

- screwdrivers necessary for opening your computer and installing adapters
- grounding wrist strap
- cable for attachement to network (UTP category 5, not supplied)

In This Book

This book is the installation and service manual for the HP-PB 100Base-T Network Adapter that connects an HP 3000 computer using the HP-PB backplane to a 100Base-T network.

The installation procedure section contains the installation instructions. It explains in detail the steps necessary to install the adapter into your computer.

The service information section defines the steps and procedures to follow if you experience trouble with the adapter. It explains diagnostics to be used for troubleshooting, removal/replacement instructions, reshipment guidelines, and technical specifications.

NOTE   This manual is limited to installation of the HP-PB 100Base-T Network Adapter only. It is assumed network hubs and cabling are in place and the appropriate HP-PB 100Base-T network software and operating system have already been installed on the computer.

1   Installation Procedure

This section contains installation instructions for the HP-PB 100Base-T Network Adapter. The instructions are organized into six primary steps listed below. Each step is described in detail in this section. If the adapter has already been installed at the factory, you may proceed directly to step 4.

1. Prepare to install the adapter.

2. Shut down the operating system and switch off the computer.

3. Install the adapter.

4. Attach the adapter to the network.

5. Configure the adapter into the system.

6. Verify operation.

1. Prepare to Install the Adapter

Before installing the adapter, you should perform the following steps:

1. Observe antistatic precautions.

2. Verify product contents.

3. Record adapter identification information.

4. Gather tools and accessories.

Observe Antistatic Precautions

This product contains electronic components that can easily be damaged by small amounts of static electricity. To avoid damage, follow these guidelines:

- Store adapters in their conductive plastic bags until you are ready to install them.

- If possible, work in a static-free area.

- Handle adapters only by the edges. Do not touch electronic components or electrical traces. We strongly recommend that you use a grounding wrist strap that is connected to the metallic chassis of the computer. If you do not have a wrist strap, touch the chassis before handling adapters, and frequently or continuously thereafter, to equalize any static charge.

Verify Product Contents

Unpack and identify all items supplied with the products:

	Part Numbers
• HP-PB 10/100Base-TX Network Adapter	A3495-60001
• *Installation and Service* Manual	B5427-90001

Record Adapter Information

Record the relevant information from the card here for future reference. If your adapter requires service in the future this information will be needed by HP service personnel.

Information to Record	Card Information	Example
Motherboard Model and Revision number	_____	H05000-003, REVB02
Daughter Card Model and Revision number	_____	H04524-007, REVC02
Daughter Card Serial number	_____	615385
Daughter Card Station Address	_____	0060B0D52EFC

This information is provided on stickers affixed to various locations on the adapter cards. Use Figure 1-1, for the locations of the relevant information.

Figure 1-1   Address Location
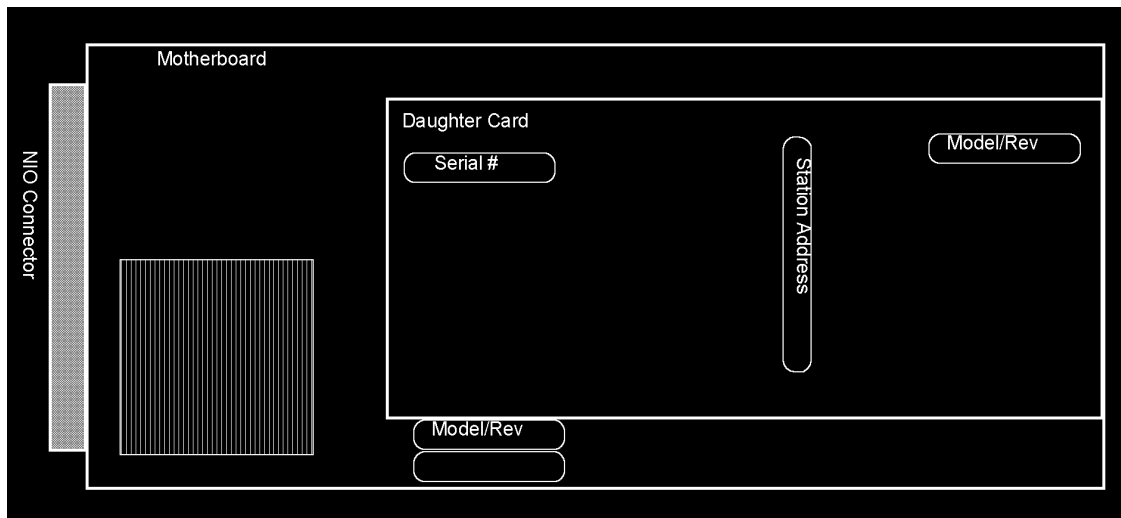
Gather Tools and Accessories

Check the hardware installation manual of your computer model for special tools and accessories required to access the I/O adapter slot(s). The following common tools are helpful:

- screwdrivers necessary for opening your computer and installing adapters

- grounding wrist strap

NOTE   You should have all of your system and peripheral device manuals available for reference. There may be special system or device dependent requirements that are not noted here.

2. Shut Down the Operating System and Switch Off the Computer

1. Before installing the HP-PB 100Base-T Network Adapter, ensure that the operating system is shut down. Refer to your computer system manuals for proper shutdown procedures to avoid corruption or loss of data.

2. Ensure that power to the host computer is switched off and disconnected from the source power supply.

WARNING   **Unless otherwise noted in your computer system manuals, failure to properly shut down the system and remove power may create a personnel hazard, or may result in hardware damage or data corruption.**

3. Install the Adapter

To install the adapter in the host computer, perform the following steps:

a. Access the adapter slot(s).

b. Select an available adapter slot.

c. Insert the adapter into the slot.

d. Switch on the power to the computer.

a. Access the adapter slot(s)

Because computer models vary, there may be different procedures to access and select an adapter slot. Before you install the adapter, you should refer to the manuals that apply to your particular computer for instructions. Identify the following information:

• authorized or recommended adapter configurations and limitations, if any

• how to access the computer's adapter slot(s)

• proper orientation of the adapter in its slot

b. Select an available slot

Select an available HP-PB adapter slot. Remove the slot cover for that slot. Refer to your computer system administrator's documentation.

Retain the cover for possible future use.

Verify you can see an adapter connector at the back of the slot.

Record the slot number for future reference. If there are no other adapters to install, reassemble the computer.

c. Insert the adapter into the slot

Insert the adapter into the adapter slot connector and press in firmly until the adapter is fully seated into the connector. Refer to Figure 1-2.

1. With both hands, grasp the adapter by its edges or faceplate. Do not touch electronic components or electrical traces.

2. Insert the adapter into the slot. Be sure the contacts and adapter guides are properly aligned.

3. Fold in the extractor levers.

4. Press the adapter firmly until you feel the connector mate fully.

5. Secure the adapter in its slot by securing the retaining screws.

Figure 1-2   **Inserting and Securing Adapter**
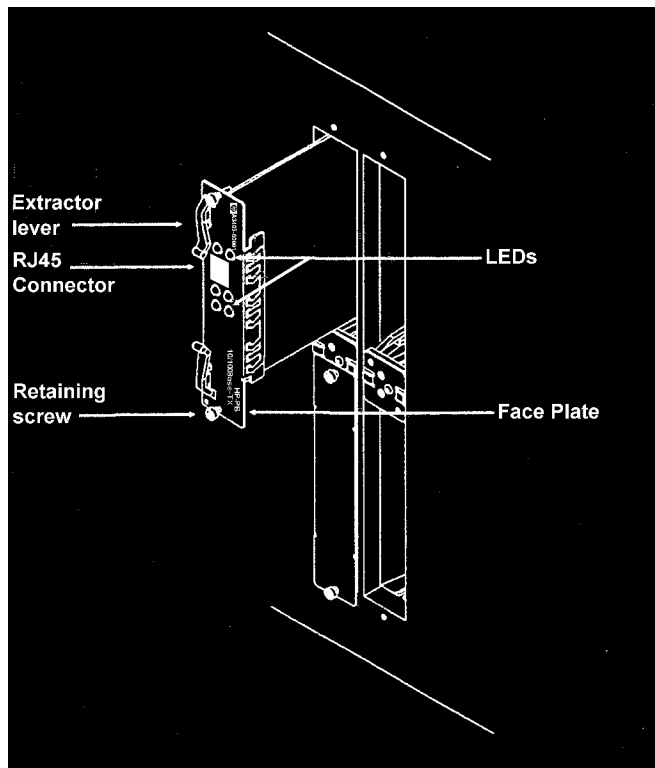
d. Switch on the power to the computer.

1. Reconnect the source power supply to the computer.

2. Switch on the computer power switch.

4. Attach the Adapter to the Network

Use the RJ-45 connector for connecting a UTP category 5 cable (not
supplied) to a 100Base-T or 10Base-T hub/switch. Refer to Figure 1-3.

Figure 1-3   **Port Connection**
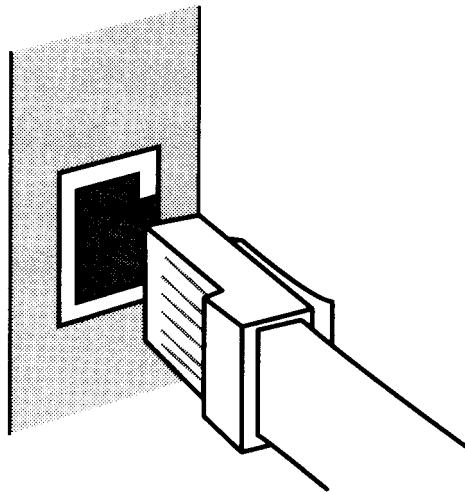
Attach the cable to the RJ-45 connector by following these steps:

a. Plug the cable into the RJ-45 connector.

b. Secure the other end of the cable to the 100Base-T or 10Base-T
   hub/switch.

c. If necessary, reconfigure the hub/switch port to operate at the desired
   auto-negotiation, speed, and duplex settings.

NOTE   All of the LEDs on the adapter (except the Power LED) are initialized by
                       software when the link is started on the system. Therefore, until
                       software initializes the adapter, the state of the LEDs cannot be reliably
                       interpreted.

5. Configure the Adapter into the System

On MPE systems you will need to configure the adapter into the system. In particular you must specify link auto-negotiation, speed, and duplex settings to match those of the network hub/switch port to which you attached the adapter. For more information on MPE systems, refer to:

- *NS3000/iX NMMGR Screens Reference Manual* (36922-61003)

- *HP3000/iX Network Planning and Configuration Guide* (36922-61023)

- *System Startup, Configuration, and Shutdown Reference Manual* (32650-90042)

6. Verify Operation

Verify proper operation of the HP-PB 100Base-T Network Adapter by checking the LEDs on the card. When the computer is switched on, the Power LED will come on. At this point, the rest of the LEDs are in an uninitialized state, and cannot be used until the driver on the system has been started. After the driver has been started, the following Table 1-1, may be used to interpret the LED patterns.

Table 1-1   **LED Patterns**

LED	LED on	LED off
Test	Driver has detected a fatal condition and is no longer operating.	Adapter is functioning correctly.
10	Adapter is operating at 10Mbps.	Adapter is not operating at 10Mbps.
100	Adapter is operating at 100Mbps.	Adapter is not operating at 100Mbps.
Link	Adapter is correctly receiving a link signal from the hub/switch.	Adapter is not receiving a link signal from the hub/switch.
Activity	Adapter is sending or receiving a packet to/from the hub/switch.	No packet is currently being transferred to/from the hub/switch.
Power	Adapter is receiving power from the system.	The system is not supplying power, or the adapter is not seated properly in the slot.

2   Service Information

This section provides the following service information:

- Field Replaceable Units
- Troubleshooting Tools
- Removal/Replacement Instructions
- Reshipment Guidelines
- Technical Specifications

Field Replaceable Units

Field Replaceable Units (FRUs) are assemblies or components that are authorized for field replacement.

There are no FRUs on this adapter. If there should be a problem the entire adapter is replaceable.

Exchange Assembly

The HP-PB 100Base-T Network Adapter may be replaced under the HP board exchange program. Adapter part numbers are listed below:

New Adapter   A3495-60001

Exchange Adapter   A3495-69001

Troubleshooting Tools

Troubleshooting tools are used to identify faulty adapters. For this product, the following tools are available:

- troubleshooting checklist (see Table 2-1)

- VGPBA online diagnostic (has online help)

Card LEDs

The six LEDs on the back of the card can be used to determine the state of the adapter while the driver on the system is running.

NOTE
All of the LEDs on the card (except the Power LED) are initialized by the driver when the link is started on the system. Therefore, until the driver initializes the card, the state of the LEDs cannot be reliably interpreted.

The Power LED will be on at any time power is applied to the system. To interpret the other LEDs, the driver must be running. The following Table 2-1, can be used to determine a possible problem.

Table 2-1   **Troubleshooting Checklist**

LED state	Possible cause	Solution
Power LED off	No power applied to card	Check power to HP-PB bus/system, verify adapter is properly seated in its slot.
	Blown fuse	Replace the adapter
Test LED on	Driver has detected a fatal hardware or software condition	Consult console and/or log files for error messages. Retry the operation. If necessary, contact HP or replace the adapter.
Link LED off	Card is not receiving link signals from hub/switch	Verify link has been started by the operator. If so, verify proper configuration of the link and the hub/switch port. Check/replace the cable.
Activity LED off	Card is not sending or receiving data to/from the hub/switch	This condition is normal when the link LED is off or when the hub is not sending or receiving data to/from the adapter. If you believe data is being sent/received, check the hub/switch port configuration, and also the network and/or MAC address configuration for the link.

Removal/Replacement Instructions

This section describes removal and replacement for the HP-PB 100Base-T Network Adapter.

WARNING   **Unless otherwise noted in your system manuals, removal of the network adapter should only be done with power removed from the host computer. Failure to comply may result in an electrical shock hazard, or in damage to the hardware.**

CAUTION   The adapter contains electronic components that can be damaged by static electricity. To avoid damage, follow these guidelines:

- Store adapters in their conductive plastic bags.

- If possible, work in a static-free area.

- Handle adapters only by the edges. Do not touch electronic components or electrical traces. We strongly recommend that you use a grounding wrist strap that is connected to the metallic chassis of the computer. If you do not have a wrist strap, touch the chassis before handling adapters, and frequently or continuously thereafter, to equalize any static charge.

Removal/Replacement of the Adapter

For adapter removal, follow the procedures below:

1. Before removing the card, ensure that the operating system is shut down and power to the host computer is switched off. Consult your computer documentation for proper shutdown procedures to avoid file corruption or loss of data.

2. Disconnect all cabling from the adapter.

3. Consult your computer documentation for instructions on the best method for accessing the adapter slots.

4. Unscrew the two retaining screws and pull extractor levers out.

5. While holding extractor levers, slide the adapter out of its slot.

6. Place adapter in an antistatic bag.

7. Install a slot cover for proper cooling and RFI suppression.

To install a replacement adapter, follow the procedures described in the installation section.

Reshipment Guidelines

If any item of the product is to be returned to Hewlett-Packard for any reason, contact your HP Sales and Support Office to coordinate the return.

When returning the item, attach a tag that identifies the owner and indicates the reason for shipment. Include all relevant information, which includes model, serial, station, and revision numbers.

Pack the item in the original factory packaging material if available, or a suitable substitute. Provide antistatic protection to applicable components or assemblies.

Technical Specifications

The network adapter technical specifications are provided in Table 2-2.

Table 2-2   **100Base-T Network Adapter Technical Specifications**

Specifications	Safety	• UL 1950, 2nd Edition • CSA 22.2 No 950, 2nd Edition • IEC 950 (1991)/EN 60950 (1992)
	Communication Standards	• IEEE 802.3u (1995) 100 Mb/s • IEEE 802.3 Type 10Base-T 10 Mb/s
	Immunity Standards	• ESD: IEC 801-2: 1991 4kV CD, 8 kV AD • Radiated Immunity: IEC 801-3: 10 V/m • EFT/Burst: IEC 801-4: (1988) 0.5 kV signal lines, 1.0 kV power line
Electrical	Characteristics:	2.00 A @ 5 V typical; 2.10 A @ 5 V maximum
Physical	Dimensions:	18 cm. by 8.9 cm. (7.4 in. by 3.5 in.)
	Weight:	280 g. (9.9 oz.)
Environmental	Temperature	Operating: 0˚C (32˚ F) to 55˚C (131˚F)
		Storage: -40˚C (-40˚F) to 70˚C (158˚F)
	Humidity	Operating: 15% to 80% Relative, non-condensing
		Storage: 5% to 95% Relative, non-condensing
	Altitude:	Operating: 3,050 meters (10,000 feet)
		Storage: 4,600 meters (15,000 feet)
Emissions	Standards:	• FCC Class A • CISPR 22 (1993) Class A • VCCI Class A

Declaration of Conformity

A declalaration of conformity is shown in Figure 2-1.

Figure 2-1   **Declaration of Conformity**

DECLARATION OF CONFORMITY
according to ISO/IEC Guide 22 and EN 45014

Manufacturer's Name: Hewlett-Packard Company

Manufacturer's Address: 8000 Foothills Blvd.
Roseville, CA 95747
USA

declares, that the product

Product Name: HP NIO 100Base-T LAN Adapter

Model Number(s):   A3495A

Product Options: All

conforms to the following Product Specifications:

Safety: IEC 950:1991 + A1, A2, A3 / EN 60950:1992 + A1, A2, A3

EMC: CISPR 22:1993 / EN 55022:1994 - Class A[1]

EN 50082-1:1992, Generic Immunity, including:
    IEC 801-2:1991 / prEN 55024-2:1992, 4 kV CD, 8 kV AD
    IEC 801-3:1984 / prEN 55024-3:1991, 3 V/m
    IEC 801-4:1988 / prEN 55024-4:1992, 0.5 kV Signal Lines

Supplementary Information:

The product herewith complies with the requirements the EMC Directive 89/336/EEC and carries the CE marking accordingly.

1) The Product was tested in a typical configuration with a Hewlett-Packard computer system.

Roseville, January 28, 1996

Dan Blount, Quality Manager

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department TRE, Herrenberger Straße 130, D-71034 Böblingen (FAX: + 49-7031-14-3143)

Glossary

Numbers

10Base-T The name commonly used to refer to the older LAN technology which preceeded 100Base-T. Similar to 100Base-T, but running at 10MBit/s.

100Base-T Also known as Fast Ethernet. Refers to the 100MBit/s network technology over TUP cable that is compatible with the IEEE 802.3u standard. This is a collision-detect technology, i.e., a transmission that collides with another packet already on the LAN, requires retransmitting the new packet. Various physical layer specifications exist, such as 100Base-TX which uses 2 pairs of Category 5 UTP cable up to 100m in length.

A

adapter An add-on computer interface card and circuitry that provides the physical connection and data translation between the host computers's I/O bus and external devices or networks.

adapter slot The location where adapters attach to the backplane.

auto-negotiation Uses a series of link pulses to encode hardware capability information, such that a hub and end node can agree upon the highest-performing configuration both are capable of using.

B

backplane For an I/O bus. The computer's circuitry and connectors to which adapter cards connect.

C

CAT Category A cable quality rating. 100Base-T requires CAT-5 cable. *See* LAN cable.

collision The result of two or more nodes on an 802.3 network transmitting at the same time, producing a garbled transmission.

D

driver A portion of system code that allows communication between the operating system and the network card.

Glossary

E

Ethernet A LAN that uses the CSMA/CD method of access and transmits at 10Mbit/s on a bus or star topology. The IEEE 802.3 standard evolved from Ethernet, but they are not exactly the same. Network devices based on both standards can co-exist on the same medium, but they cannot exchange data directly without special "bilingual" software that can decode packets of both types. The drivers for the HP3000 network cards fit this requirement if configured correctly.

Ethernet address *See* station address.

H

HP-PB HP Precision Bus. Refers to the hardware I/O architecture. The precision bus is the bus thru which these cards communicate with the CPU and memory.

I

IEEE 802.3u standard Part of the institute of Electrical and Electronics Engineers 802 family of LAN standards. The 802.3u standard extends the 802.3 MAC layer to 100MBit/s, and defines a new family of 100BBit/s physical layers (layer 1), such as 100Base-TX, 100Base-T4, or 100Base-FX. These are connected through a media independent access layer (MII).

L

LAN *See* local area network.

LAN cable The medium through which data moves in a LAN, LAN cables come in many types. For example, thick (10 mm) coaxial cable, thin (5 mm) coaxial cable, fiber-optic cable, and shielded or unshielded twisted-pair cable. The 100Base-T cables are UTP CAT-5 only, even for 10MBit/s operation.

LED *See* light emitting diode.

light emitting diode A small light on a device that is often used to provide status information.

link beat A periodic signal transmitted in Ethernet and IEEE 802.3 Type 10Base-T networks to inform one station of device of the presence of another. It also helps verify the integrity of the network link between them. (Also called "link test pulse".)

Glossary

local area network A general-purpose communications network that interconnects a variety of devices within a limited geographical area. A LAN might connect computers on adjacent desks, within a building, or within several buildings of a campus.

M

MAC address *See* station address.

Mbits/ Megabits per second defined as (1,000,000 bits per second).

medium, media The transmission connection between nodes. Most current LANs use cables (fiber-optic or copper), although radio and other broadcast media are possible.

N

node A station; a physical device that allows for the transmission of data within a network.

P

packet A bit stream consisting of predefined fields that contain data, addresses, and control information. In the IEEE 802.3 environment this structure is often referred to as the 'MAC frame". Packet is the more commonly used term, and originated in the Ethernet environment.

Precision Bus *See* HP-PB.

protocol The set of rules governing the operation of functional units of a communication system that must be followed if communication is to be achieved.

R

ring network A network configuration where a series of attaching devices are connected by unidirectional links to form a closed path.

ring topology A logically circular, unidirectional transmission path without defined ends. Control can be distributed or centralized. *See* topology.

RJ-45 A standard defining the pin assignments for an 8-pin modular plug for 4-pair twisted wire network cable.

Glossary

S

slot The physical place in the back of the computer where a card plugs in. Each slot has a number.

star topology A logically star-shaped network layout where all traffic is passed through a single point (usually a hub). Hubs can then be connected to form multiple starts.

Station address A 12-digit hexadecimal number that identifies a specific network node, and allows messages to be directed to that node only. The first 6 digits are the same for all cards from a particular manufacturer. Each manufacturer is assigned a different 6-digit value. Then each card produced by that manufacturer has a different last 6 digits. This ensures that all cards from all manufacturers have a unique station address. HP manufactures cards with the first 6 digits being 080009 or 0060B0. A default value is permanently coded into each card, but this default can be overridden by the configuration.

T

token ring A network with a ring topology that uses a token for the purpose of establishing control. Control of the network is passed with the token from one network device to another.

topology Topology can be physical or logical. Physical topology is the configuration of network nodes and links; a description of the physical geometric arrangement of the links and nodes. Logical topology is a description of the possible logical connections between network nodes indicating which pairs of nodes are able to communicate whether or not they have a direct physical connection.

U

UTP Unshielded Twisted Pair. *See* LAN cable.

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