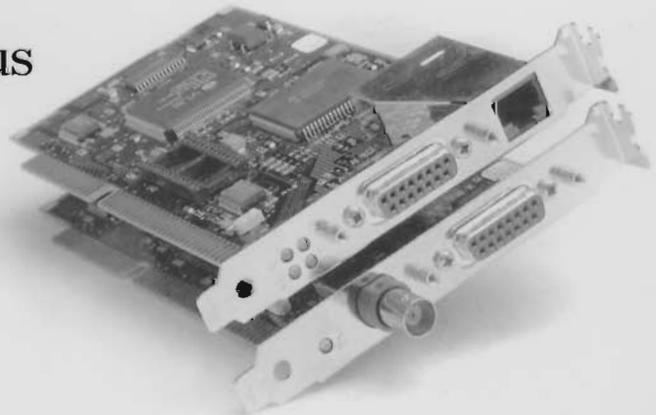


**Installation and
Reference Guide**



HP PC LAN Adapter/16 Plus



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HP PC LAN Adapter/16 Plus



Installation and Reference Guide

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HP 27247B
HP 27252A

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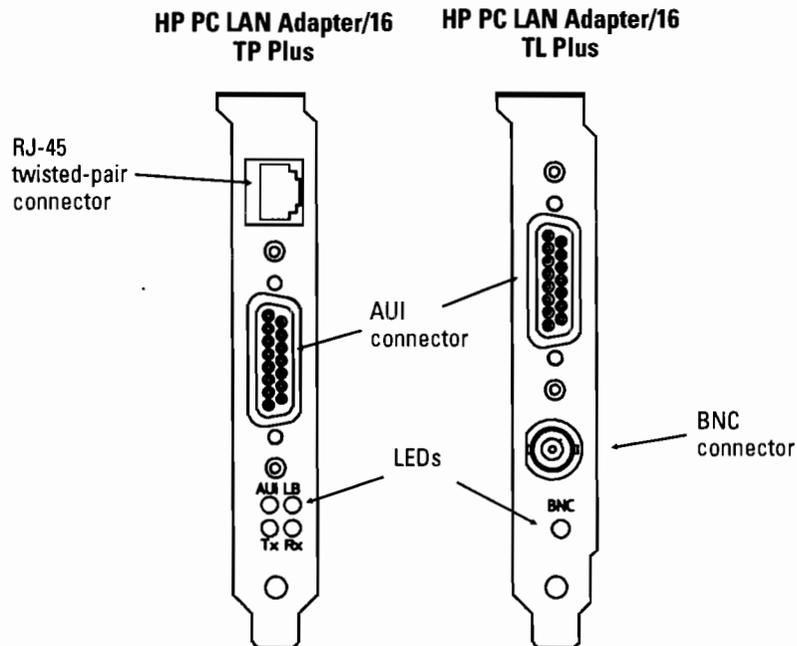
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HP PC LAN Adapter/16 Plus

At A Glance

The HP PC LAN Adapter/16 TP Plus (HP 27247B) and the HP PC LAN Adapter/16 TL Plus (HP 27252A) are 16-bit LAN adapters used in personal computers to connect a computer to an IEEE 802.3/Ethernet network. The two adapters are referred to throughout this manual as the LAN Adapter/16 TP Plus and the LAN Adapter/16 TL Plus respectively. Together, the adapters will be referred to as the LAN Adapter/16 Plus cards.



Features

Both cards:

- have a boot ROM socket to support remote booting from a server; HP boot ROMs are purchased separately
- are fully software configurable; no switches or jumpers
- can automatically detect which LAN port is being used when the LAN cable is attached
- come with an easy-to-use configuration and diagnostic program (HPLANSet)
- support two modes of data transfer with the computer: I/O-mapped mode for simple configuration, and memory-mapped mode for maximum performance
- support a wide selection of interrupts: IRQs: 3, 4, 5, 6, 7, 9, 10, 11, 12, 15
- have a large onboard packet buffer: 32 Kbytes
- offer high performance (at or near the theoretical limit of data transfer onto an Ethernet/IEEE 802.3 network)
- are compliant with IEEE 802.3 and Ethernet standards

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Setting Up Your Card and LAN Connection

Network Installation Checklist

The instructions to install your LAN adapter card on a twisted pair or thin LAN network are described in the following paragraphs.

Twisted Pair

Use the following checklist to install a card on a 10Base-T, twisted-pair network:

- Verify that the cabling infrastructure meets the IEEE 802.3 10Base-T network specifications. For details, see appendix A, “Cables and Connectors”.
- Obtain the required 10Base-T network hardware components:
 - LAN Adapter/16 TP Plus. A card is needed for each end node in the 10Base-T network.
 - 10 Base-T hub(s) such as HP AdvanceStack 10Base-T. The number of hubs needed depends on the number of end nodes to be networked and the number of ports per hub. (For example, the HP AdvanceStack 10Base-T Hub-24 provides 24 end-node ports plus a transceiver module port that can also be used to connect an end node.)
- Install your HP LAN Adapter/16 TP Plus network hardware using the installation instructions in this manual.
- Install the hub.
- Connect all network cabling.
- Verify that the network operates properly using any available network test or application that allows you to test the communications between end nodes or devices.

Thin LAN

Use the following checklist to install a card on an IEEE 802.3 Type 10Base2 network:

- Verify that the cabling infrastructure meets the 10Base2 network specifications.
- Obtain the HP LAN Adapter/16 TL Plus. A card is needed for each end node in the 10Base2 network.
- Install your HP LAN Adapter/16 TL Plus network hardware using the installation instructions in this manual.
- Connect all network cabling and ensure that the thin LAN cable segment is terminated with a 50-ohm terminator. Also make sure that adding your computer to the network does not cause the allowable number of devices on a thin coax segment to exceed 30 devices.
- Verify that the network operates properly using any available network test or application that allows you to test the communications between end nodes or devices.

Included Parts

These items are included with your LAN product:

- Either:
 - the HP PC LAN Adapter/16 TP Plus (HP 27247B), or
 - the HP PC LAN Adapter/16 TL Plus (HP 27252A)
- AUI retainer (5602-3351)
- 3.5-inch Support Disk

The disk includes:

- SETUP.EXE, a utility that allows you easy access to information files on the disk including the driver setup instructions, a list of network operating system drivers compatible with HP LAN adapters, and instructions on how to install the drivers
- HPLANSet, the DOS-based configuration and diagnostic utility for the LAN adapters. HPLANSet can be run from within SETUP.EXE.
- a table displaying network operating system driver compatibility for all HP PC LAN Adapters (DRIVERS.TXT)
- The *HP PC LAN Adapters Installation Guide* (this manual) - part number 5181-8630
- Warranty and Customer Reply Card

Computer Requirements

Hardware

- an IBM AT-compatible computer (286, 386, 486, or later)
- a 16-bit ISA or a 32-bit EISA bus expansion slot

Note

The LAN Adapter/16 TP Plus and the LAN Adapter/16 TL Plus are both ISA cards that will fit in either an ISA or EISA expansion slot.

Software

DOS 3.1 or later to run HPLANSet

Setup Summary

1. **Prepare the computer.**
2. **Install the card.**
3. **Configure and test the card.**
4. **Attach the network cables.**
5. **Install the network drivers.**

The details for these steps are provided in the rest of this chapter.

1. Prepare the Computer

ISA Computer

No preparation is needed for ISA computers. Proceed to “2. Install the Card”.

EISA Computer

If you have an EISA computer, you must add the LAN Adapter/16 Plus to your computer’s configuration by using the EISA configuration utility. If you add the card to your computer’s configuration before you install the card, the utility can help you select which accessory slot to use, and which I/O base address to use to avoid conflicts with other adapter cards already installed. The utility will also identify an available interrupt channel (IRQ).

Note that the I/O base address and IRQ values that you select with the EISA configuration utility must be the same values that you configure on the card itself. Try using the factory default values listed on the page 1-10. The EISA utility will tell you if there are conflicts. These same values must be used when configuring your network operating system software.

The LAN Adapter/16 Plus cards are ISA cards. *As with any ISA card, the EISA configuration utility will not actually read or set any of the card’s configuration values.* The utility will simply identify which system resources (accessory slot, I/O base address, and IRQ) are available. For the card to operate properly, you must follow the instructions on page 1-10 to configure the card, and you must configure the IRQ into the network operating system software. It’s really quite simple, just make the values match everywhere. By adding the card to the computer’s configuration with the EISA configuration utility, you ensure that the system resources allocated to your card will not be given to other cards.

The basic steps to add the LAN Adapter/16 Plus to your EISA computer’s configuration are:

1. Run the EISA configuration utility supplied with the computer.

Follow the steps on the screen to add cards to the computer (note that the utility might refer to the cards as “accessory boards”).

2. Insert the HP Support Disk when the EISA configuration utility asks for the vendor diskette. Select the proper configuration from the selections displayed:

!HWP1832.CFG for the TP Plus
!HWP18A0.CFG for the TL Plus

Note

If the card selections are not displayed and the EISA configuration utility did not prompt for the vendor diskette (the HP Support Disk), exit the EISA configuration utility. Copy the HP EISA configuration files to the directory or diskette containing the EISA configuration utility. For example, if the HP Support Disk is in drive A, with the EISA configuration directory as the working directory, execute the command:

`COPY A:*.CFG`

Then restart the EISA configuration utility from step 1 above.

3. Use the EISA utility to view the card configuration details. Use the "View or edit details" selection to view the configuration details that were chosen for each adapter you will install. In this screen you can modify the configuration values. For example, you can select a value for the boot ROM address for each of the adapters, as needed.

For the card, if the "I/O Address Range" is not "300 - 31FH (Factory Default)", see the item "Resolving Base I/O Address Conflicts" on page 1-9.

Record each adapter's configuration (I/O Address, IRQ, slot) for future use with HPLANSet, and when configuring the network operating system driver.

4. Configure Boot ROM address range, if needed.

If a Boot ROM is to be installed on the adapter, select an address range from the choices presented under the "Boot ROM" parameter.

5. Save the configuration.

Follow the instructions given by the EISA configuration utility to save the configuration. When instructed, turn off the power to the computer, and then proceed to installing the card. See the instructions on the next page.

2. Install the Card

Caution

When installing the card in your computer, use antistatic handling procedures:

- Handle the card by the edges and avoid touching the components.
 - Equalize any static charge on your body and your computer by using a grounded wrist strap or by touching the chassis of the computer frequently while you are installing the card.
-

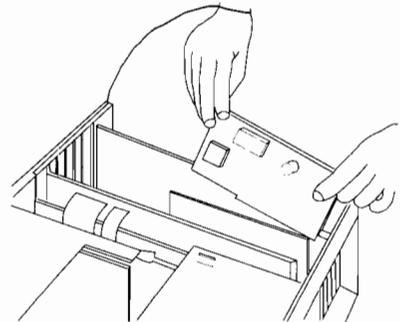
To install the card, follow these steps:

1. Turn off the computer's power and disconnect the power cord from the computer.
2. Remove the computer's cover to access the expansion slots. Refer to your computer documentation for instructions.
3. Select a 16-bit ISA slot or an EISA bus slot and remove the slot cover. Save the cover's retaining screw.
4. Insert the LAN Adapter/16 Plus card into the expansion slot connector and press in firmly until the card is fully seated.

Caution

The LAN Adapter/16 TP has a metal shield over some of the components. When you install that card, make sure the shield is not in contact with any other card or with the computer's chassis.

5. Reinstall the retaining screw.
6. Reassemble the computer if there are no other cards to install, plug in the computer's power cord, and restart the computer.



3. Configure and Test the Card

The LAN Adapter/16 Plus card has no switches or jumpers to configure; all the configuration information is stored in non-volatile memory (EEPROM) on the card. All changes to the configuration are performed through HPLANSet. Additionally, HPLANSet includes easy-to-run diagnostics for testing the card and the network links to other devices.

Before Running HPLANSet:

Observe the following conditions before you run HPLANSet to configure the card:

- **Run HPLANSet under DOS.** HPLANSet is designed to run in a native DOS environment, not under Windows or OS/2 or other operating environment. For more information, see chapter 3, “Overview of HPLANSet”.
- **Unload Network Software and Drivers.** Make sure your network software and drivers are *not* running when you start HPLANSet. See chapter 3, “Overview of HPLANSet” for more information.
- **Resolving Base I/O Address Conflicts.** If any of your computer’s peripherals, including any other LAN adapters already installed, are using I/O addresses in the 300-31Fh range, HPLANSet will not be able to find your LAN adapter card. You must first change the I/O address used by the conflicting peripheral, or configure the LAN adapter in another system that has no conflict, so that HPLANSet can find it, then transfer the card to your computer.

To configure the card, use one of the following methods:

- **take the factory default configuration** – most of the time these values will work:

Configuration Parameter	Factory Default Setting
Interrupt channel	IRQ 3
I/O address range	300 – 31Fh
Boot ROM support	disabled
I/O or memory mapped	I/O mapped
LAN connector	auto select
Link beat (TP card only)	enabled

- If you can use these values, go directly to “Card Test” (an optional but recommended step) in HPLANSet. The above parameters are described in more detail in chapter 3, “Overview of HPLANSet”.
- **run the “Auto configuration” option from HPLANSet** – use this method if you are uncertain whether the default values will work. Auto configuration automatically selects an available IRQ. The instructions for this option are on page 1-10.
- **run the “Manual configuration” option from HPLANSet** – use this method if you want to change more than just the IRQ or if your card is in an EISA system and you do not want to use the card defaults specified in the EISA configuration utility. You can also use this option to make the card configuration match the EISA configuration utility. The instructions for this option are under “Using Manual Configuration” on page 1-11.

Using Auto Configuration

To configure the card automatically, follow these steps:

1. Insert the LAN Adapter/16 Plus Support Disk in the floppy disk drive.
2. Change to the floppy disk drive and, at the prompt, enter HPLANSET.
3. From HPLANSet's Main Menu, select "Auto configuration".

An available IRQ is selected and configured on the card, and some basic tests are automatically performed on the card.

Auto configuration also detects the presence and size of a boot ROM on the card and automatically assigns it a memory address. More information on using a boot ROM is included in chapter 2, "Special Setup Tasks".

4. Auto configuration informs you of its actions:

If Auto configuration does not have to change the existing configuration, a message is displayed indicating that the card is ready to be used.

If Auto configuration had to make any changes to the configuration, you will first see a message indicating that changes were made and that those changes were saved to the card.

5. Select "Card test".

At this point, the "Exit program" option is highlighted. Optionally, before exiting the program, it's a good idea to select the "Card test" option for the most complete verification that the card's hardware and configuration are OK. For more information, see "Running the Diagnostics" in chapter 4, "Troubleshooting".

6. Exit from HPLANSet.

The configuration is complete, so you can select the "Exit program" option.

If you need to make other changes to the configuration, you can instead select the "Manual configuration" option. See "Using Manual Configuration" on page 1-11.

Now you can proceed to "Attach the Network Cables" later in this chapter.

Using Manual Configuration

Most of the time the auto configuration process should work. The following few conditions require you to use manual configuration:

- You want to use the LAN Adapter/16 Plus card in memory-mapped mode to get maximum performance.
- You are setting up several LAN Adapter/16 Plus cards with the identical configuration for use in other computers.
- You are installing more than one LAN Adapter/16 Plus card in your computer.

See chapter 2, “Special Setup Tasks”, for more information on configuring the card for these situations. To use manual configuration, follow these steps:

1. Insert the LAN Adapter/16 Plus' Support Disk in the floppy disk drive.
2. Change to the floppy disk drive and, at the prompt, enter HPLANSET.
3. From HPLANSet's Main Menu, select “Manual configuration”.
4. Select any item on the menu and either a list of options is presented (for example, all the supported IRQs), or a prompt for input is presented (for example, the file name if you select the “Write configuration to disk file” option).
5. When you have completed the configuration changes, exit from the Manual Configuration Menu.
6. Optionally, select “Card test”.
Run “Card test” from the Main Menu to verify that your configuration changes are OK. For more information, see “Running the Diagnostics” in chapter 4, “Troubleshooting”.
7. When the card test completes successfully, from the Main Menu select “Save configuration to card”.
8. Exit from HPLANSet.

Manual Configuration Options

The manual configuration options are listed and briefly described in chapter 3, “Overview of HPLANSet”, under “Manual Configuration Options”.

Note

You can get more detailed information on each option within HPLANSet by highlighting the option and pressing **[F1]**. **[F1]** help is available throughout the HPLANSet program.

4. Attach the Network Cables

Use only one of the LAN connectors on each card.

The default configuration allows the card to automatically detect which connector is being used. You just have to connect a viable network to the card. The connector is selected when the network operating system driver initializes the card. You can also manually configure which connector you want to be active from the “Manual configuration” option in HPLANSet.

The rest of this section shows you how to use the LAN connectors on the card.

Note

Testing the network connection:

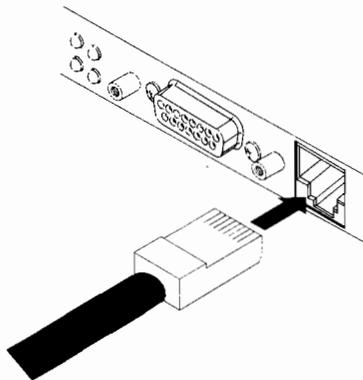
Once the network cable is attached to the card (and before you load your network operating system), you can verify that the card can communicate with another device on the network by running “Link test” from the HPLANSet Main Menu. Link test is described in detail in chapter 4, “Troubleshooting” under “Running the Diagnostics”.

RJ-45 Twisted-Pair Connector

This description applies to the LAN Adapter/16 TP Plus card only.

Attach the 8-pin (RJ-45) plug on your twisted-pair LAN cable into the RJ-45 jack on the card. Push the plug into the jack until the plug clicks into place.

Attach the other end of the LAN cable to a hub (or into a wall jack that is connected to a hub). See the *Designing HP AdvanceStack Workgroup Networks Guide* for more information about network topologies.

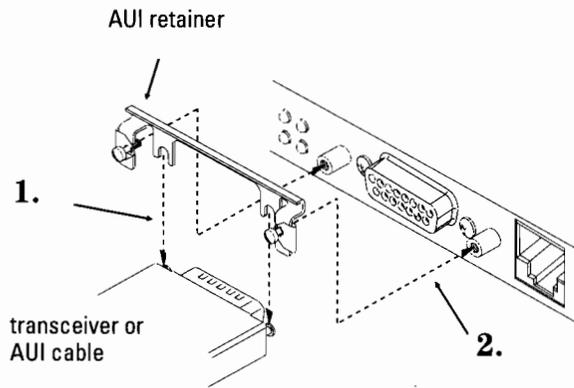


AUI Connector

This description applies to both of the LAN Adapter/16 Plus cards.

To attach a transceiver or an AUI cable to the AUI connector:

1. Slide the AUI retainer (included) onto the connector posts on the transceiver or AUI cable.
2. Plug the transceiver or AUI cable into the AUI port on the card and secure it with the retainer's screws. Tighten the screws until they are snug; *do not overtighten them.*



3. Attach the network cable to the transceiver.

Note

Hewlett-Packard offers a set of compact transceivers that attach directly to the AUI connector on the card:

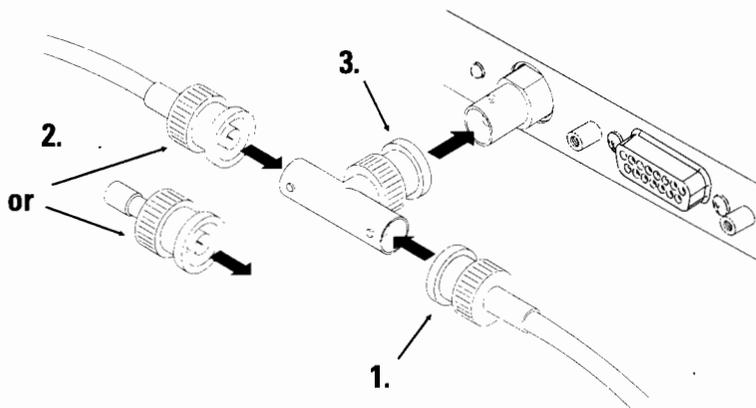
- HP 28685B EtherTwist Transceiver (for twisted-pair networks)
 - HP 28641B ThinLAN Transceiver (for thin coax networks)
 - HP 28683A Fiber-Optic Transceiver (for fiber-optic networks)
-

Thin LAN Connector

This description applies to the LAN Adapter/16 TL Plus card only.

To attach the card into a thin coaxial cable network, follow these steps:

1. Attach a properly terminated thin coaxial cable section to one side of a BNC "T" connector.
2. Attach another properly terminated thin coaxial cable section to the other side of the "T" connector if your computer is being attached in the middle of a thin LAN cable segment
or
attach a 50-ohm terminator to the other side of the "T" connector if your computer is at the end of the thin coaxial cable segment.



3. Attach the "T" connector to the card's BNC connector.

Note

If a non-conductive cover was supplied with your BNC "T" connector, you should attach the cover over the "T" connector now.

5. Install the Network Drivers

The HP Support Disk that came with your LAN Adapter/16 Plus card contains the driver files that allow the card to be used with your network operating system.

The contents of the directories on the Support Disk are described in the README file in the root directory on the disk. The README file is an ASCII file that can be displayed on your computer's monitor or printed out on a printer attached to your computer. Additionally, the Support Disk contains a utility, SETUP.EXE that allows you to easily view or print out the driver installation instructions. To run Setup, follow these step:

1. Insert the HP Support Disk in the floppy disk drive.
2. Change to the floppy disk drive and, at the prompt, enter the command:

SETUP
3. Follow the directions on the screen. Press **[F1]** to get help information. Press **[F2]** to print any of the readme files that you are viewing.

•



- Using Memory-Mapped Mode
- Setting Up a Remote-boot Client Node
- Configuring Multiple Cards With the Same Configuration
- Configuring Multiple Cards in the Same Computer

Special Setup Tasks

This chapter contains information on how to configure your LAN Adapter/16 Plus card for use in the following situations:

- **Using Memory-Mapped Mode** – you want to maximize your card's performance by dedicating a block of your computer's memory address space for communication with the card (memory-mapped mode).
- **Setting Up a Remote-boot Client Node** – you have installed a boot ROM on your card and want to set up your computer to boot from a remote server.
- **Configuring Multiple Cards With the Same Configuration** – you want to configure several cards with the same configuration (a task frequently performed by a network administrator when setting up the network connection for multiple computers) and you are looking for an efficient way to do it.
- **Using Multiple LAN Adapters in the Same Computer** – you want to configure more than one network card to be used in the same computer (usually a server connected to more than one network).

The rest of this chapter provides the details for these setup tasks.

Using Memory-Mapped Mode

The LAN Adapter/16 Plus cards are designed to provide outstanding performance using I/O-mapped mode, the default mode of data transfer between the card and the CPU. I/O-mapped mode uses the computer's standard I/O channels for communication.

For even better performance, you can configure the card to run in memory-mapped mode. In this mode a specific block of the computer's memory address space is dedicated for communicating with the card. The LAN Adapter/16 Plus cards use only 2 Kbytes *of the computer's memory address space*.

The setup procedure for memory-mapped mode is slightly more complex than for I/O-mapped mode. You should know about your computer's memory allocation before choosing this option.

Note**Driver support for memory mapped mode:**

Not all the drivers supplied on the Support Disk with your LAN Adapter/16 Plus card support memory-mapped mode. The file /ADAPTER/MEMMAP.TXT on the Support Disk, contains the latest information on driver support for memory-mapped mode.

Configuring Memory-Mapped Mode

1. From HPLANSet's Manual Configuration Menu, select "I/O or Memory mapped".
2. Use the up and down arrows to highlight the address you want to use and press Enter. HPLANSet warns you if the address you have selected conflicts with other memory assignments in the computer. Select another address if you get such a warning. If you consistently get a conflict, see the precautions on the next page.
3. Exit from the Manual Configuration Menu, and run "Card test" to verify the configuration. Then, you can exit from the HPLANSet program.

Precautions

Make sure that the address range you select does not conflict with other memory assignments in your computer. Conflicts can arise, for example, if a memory manager is running, or if memory caching is enabled. You should also know if memory is dedicated for use by other devices in your computer, for example video cards.

Note

For systems with Microsoft Windows 3.x and MS DOS 6.x, use the Microsoft diagnostic utility “MSD”, located in the Windows directory or in the MS-DOS 6.x directory, to display the computer’s memory map.

If you are using a memory manager:

The block of memory address space that you select for use by the card must be excluded from the memory manager’s control. This is usually accomplished in your computer’s CONFIG.SYS file in the DEVICE statement for the memory manager. You must add an “exclusion” option that specifies the block of memory that you want to configure for the LAN Adapter/16 Plus. You need to exclude a 2 KByte block. *Note that if you modify the CONFIG.SYS file, you must then reboot your computer to activate the changes.*

Examples:

If, for example, you select the address D000 from the HPLANSet list of addresses, the following table shows how, for some commonly used memory managers, you would exclude the 2 KByte block starting at address D000:

Memory Manager	Exclusion Statement
EMM386 for DOS	in the CONFIG.SYS file, add the “X” option: DEVICE=EMM386.EXE X=D000-D07F
EMM386 for Microsoft Windows	in the Windows SYSTEM.INI file, add the statement: EMMExclude=D000-D07F
QEMM386 from Quarterdeck	in the CONFIG.SYS file, add the “EXCLUDE” option: DEVICE=QEMM386.SYS EXCLUDE=D000-D07F

If you are using memory caching:

In a 386, 486, or later computer, blocks of your computer's memory may be allocated to be used for memory caching. You may have to disable caching for a memory block that you want to use for your LAN Adapter/16 Plus in memory-mapped mode. You do not need to turn off all caching, only for the address block used by the LAN adapter. See your computer's documentation for information on how to disable memory caching.

Note that HPLANSet will automatically detect when the block you attempt to select is cached, and will give you a message indicating that the block you selected is not available.

Setting Up a Remote-Boot Client Node

You can configure your computer to boot as a client node from code stored on a network server rather than from code on a floppy disk or hard disk in the computer itself.

Note

About Boot ROMs:

To use the remote boot option, you must first purchase a boot ROM and install it on your LAN Adapter/16 Plus. Boot ROMs are not generic; they are specific to the vendor of the card and to the network operating system. Purchase the Novell boot ROM (HP 27260A). To order a boot ROM, contact your HP-authorized LAN dealer or your HP sales representative .

What to do on the server

To support the clients that will be booting remotely, a boot image file must be created on the server. The boot image file contains information that will be accessed by the remote-boot client (including information usually contained in AUTOEXEC.BAT and CONFIG.SYS on the client computer). The name of the boot image file and the process for creating it vary between network operating systems. See your network operating system documentation for information on how to create the boot image file.

What to do on the client

The procedures for setting up your client computer for remote boot differ slightly depending on whether or not your computer has a floppy disk drive from which you can run HPLANSet.

If Your Computer Has a Floppy Disk Drive:

1. Install the boot ROM on your LAN Adapter/16 Plus card. For details, see the document that comes with the boot ROM.
2. Install the card in your computer. See chapter 1 for installation information.
3. Run HPLANSet from the card's Support Disk.

4. From the Main Menu, select “Auto configuration”.
HPLANSet automatically detects the presence and size of the boot ROM.
5. Optionally, return to the Main Menu and select “Card test” to verify that the hardware (card and boot ROM), and configuration are OK.
6. Exit from the HPLANSet program.

If Your Computer Has No Floppy Disk Drives:

1. Install the boot ROM on the card.
2. Install the card in a substitute computer that has at least a floppy disk drive.
3. Insert the Support Disk in the substitute computer’s floppy disk drive, change to that drive, and run HPLANSet.
4. From the Main Menu, select “Manual configuration”.
5. From the Manual Configuration Menu, select “Boot ROM”, then enable the boot ROM and select an I/O address range and IRQ that you know will not conflict other devices in the computer into which the card will be installed. (HPLANSet warns you if the address you select conflicts with resources in the substitute computer, but allows you to select the address anyway since you are installing the card in another computer.)
6. Exit from the HPLANSet program.
7. Remove the card from the substitute computer and install it in your diskless computer.

Configuring Multiple Cards With the Same Configuration

A common task for a network administrator is to configure the network cards to be installed in the various computers at the site. To simplify this task, an option in the HPLANSet Manual Configuration Menu allows you to save the configuration you have just created to a file. Then you can load that file to a card without having to go through the configuration process again.

Creating a Configuration File

1. Configure the LAN Adapter/16 Plus card that is in your computer. See the procedures in chapter 1 under “Configure the Test the Card”.
2. While still in the HPLANSet program, select “Manual configuration” from the Main Menu.
3. From the Manual Configuration Menu, select “Save configuration to a file”.
4. You will be prompted for the name of the file. Enter the full path and name of the file. The extension .SET will automatically be added to the file name unless you specify a different extension.

Using a Saved File to Configure a Card

There are two ways you can load a configuration on to a LAN Adapter/16 Plus card from a configuration file that you have saved:

- from the HPLANSet command line using the /C option
- from the HPLANSet Manual Configuration Menu

From the HPLANSet command line, using the /C option:

1. Insert the Support Disk that came with your card into the floppy disk drive and change to that drive.
2. From the DOS prompt, enter the command:

```
hplanset /c config_name [ i/o_base_address ]
```

where:

- *config_name* is the name of the file that you previously saved, and
- *i/o_base_address* is an optional parameter that you would use only if there are multiple LAN Adapter/16 Plus cards in your computer. Use this parameter to specify the I/O base address of the card you want to configure.

The configuration stored in the specified file is automatically loaded onto the card.

From the HPLANSet Manual Configuration Menu:

1. Run HPLANSet, and from the Main Menu, select “Manual configuration”.
2. From the Manual Configuration Menu, select the option “Read configuration from a disk file”.
3. In the space provided, enter the name of the file you previously saved and press Enter.
4. After the file is read in, if needed, you can use the other options on the Manual Configuration Menu to modify the configuration.
5. Exit the Manual Configuration Menu.
6. From the Main Menu, select the option “Save configuration to the card”.
7. Optionally, run “Card test” from the Main Menu. If all tests pass, the card is ready to use. If any test fails, follow the instructions on the error message to resolve the problem.
8. Exit from the HPLANSet program.

Configuring Multiple Cards in the Same Computer

Computers that are functioning as network servers often need to be connected to multiple networks. For each network, a separate LAN Adapter/16 Plus card must be installed in the computer.

Unique Configuration Needed for Each Card

Because the LAN Adapter/16 Plus cards all come with the same factory default configuration, a conflict for computer resources will exist if two or more of these cards are installed without configuration change. The following configuration items must be unique for each card:

- **The I/O address range.** If two or more LAN Adapter/16 Plus cards have the same I/O address, or I/O addresses that conflict with any other card in the computer, HPLANSet cannot communicate with them.
- **The interrupt level (IRQ).** Each card in the system must have a unique IRQ.

The Procedure

In order for HPLANSet to communicate with the cards, you must install and configure one card at a time.

1. Turn off the computer's power and install a LAN Adapter/16 Plus card. (See chapter 1 for the installation details).
2. Turn the computer's power back on and run HPLANSet from the Support Disk.

3. From the Main Menu, select “Manual Configuration”. Then from the Manual Configuration Menu:
 - Select “I/O Address range” and choose a range that is different than 300-31Fh.
 - Select “Interrupt level” and choose a unique IRQ.
 - Be sure the selected values match those selected in the EISA configuration utility if the card or cards are installed in an EISA system.
4. Optionally, select “Card test” to verify that the configuration causes no conflicts. When all the tests pass, you can exit from the HPLANSet program.
5. If there are more cards to install, return to step 1. Otherwise, you can proceed to installing the network cables and network drivers for all the LAN Adapter/16 Plus cards. See chapter 1 for details.

Note

If you are using memory-mapped mode for two or more LAN Adapter/16 Plus cards, one of the features of these cards is that they can all share the same 2 Kbyte memory address space assignment.

- Running HPLANSet
- HPLANSet Screen Features
- What You Can Do With HPLANSet
- Manual Configuration Options

Overview of HPLANSet

Running HPLANSet

After you have installed the card in your computer, you are ready to run HPLANSet. HPLANSet is the interactive configuration and diagnostics program on the Support Disk that came with your LAN Adapter/16 Plus card. The LAN Adapter/16 Plus cards have no switches or jumpers to configure; all the configuration information is stored in non-volatile memory (EEPROM) on the card. All changes to the configuration are performed through HPLANSet. Additionally, HPLANSet includes easy to run diagnostics for testing the card and the network links to other devices.

Note

Before Running HPLANSet, verify the following is true:

- **Your network software and drivers are not running.** You can do this step by booting your system from a DOS diskette that does not have either a CONFIG.SYS or an AUTOEXEC.BAT file on it, or, if booting from MS-DOS 6.0 or later, press **[F5]** when you see the text 'Starting MS-DOS...'.

Alternatively, if you understand how your network software and drivers are activated, you can modify the CONFIG.SYS and AUTOEXEC.BAT files in your computer so the software and drivers do not execute. If you are configuring Boot ROMs, skip EMM386.EXE (or your memory manager) too.

- **You are running MS-DOS.**
You must have booted the computer under DOS; HPLANSet will not run under another operating system, or in a DOS session under another operating system. If you are running Microsoft Windows, you must exit to DOS before running HPLANSet. Do *not* attempt to run HPLANSet from a DOS window within Microsoft Windows. If you are running OS/2, you can run HPLANSet to configure your card by booting your computer from a DOS floppy disk and then run HPLANSet under DOS. After completing the configuration, reboot your computer under OS/2.

After you have installed the LAN Adapter/16 Plus card in your computer, run HPLANSet by following these steps:

1. Insert the Support Disk that came with your card into your computer's floppy-disk drive.
2. Change to that drive, and from the prompt, enter **HPLANSET**.

HPLANSet automatically detects the presence of the LAN Adapter/16 Plus card and its current configuration, and then presents a screen like figure 3-1.

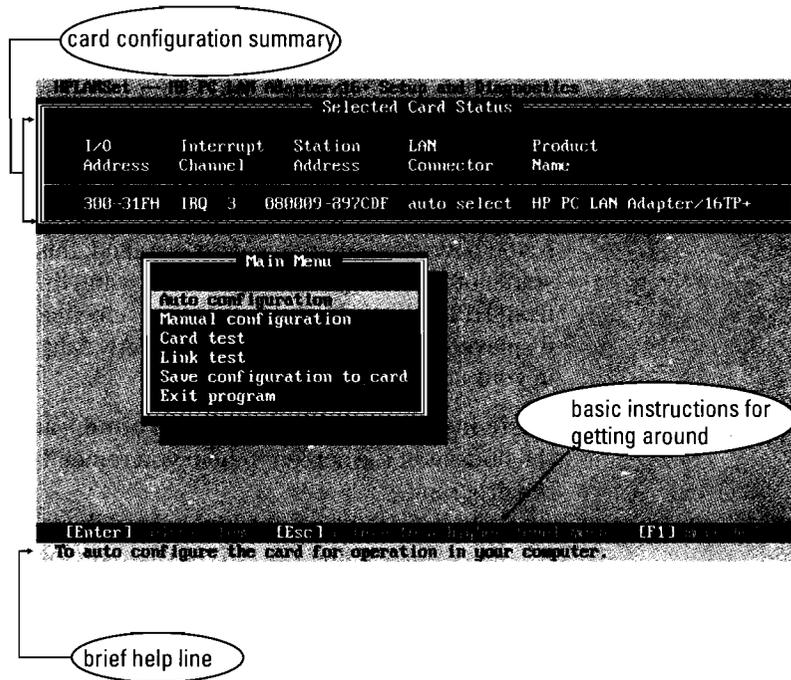


Figure 3-1. HPLANSET Main Menu Screen

Automatic conflict checking:

HPLANSet automatically checks for conflicts in your computer when you select an IRQ, an I/O address range, and the memory address space for memory-mapped mode. In some rare circumstances, the HPLANSet program may fail to detect a conflict. This failure may be caused by conflicting hardware that is disabled, or inactive at the time HPLANSet is run, but is later installed, enabled, or activated by its controlling software. Occasionally, a conflicting interface card may be completely overdriven by the LAN Adapter/16 Plus card making the hardware conflict undetectable.

If one of these conflicts exists, it may not be detected except by subsequent failure of either the networking software, the conflicting interface card software, or both.

HPLANSet Screen Features

- **Card configuration summary** – is found in the area at the top of the screen labeled “Selected Card Status”. It displays the current configuration of a LAN Adapter/16 Plus card installed in the computer. If you make changes to the configuration, the changes will be reflected in this area.

If you have more than one card installed, this window displays the status of the card you have selected using the “select card” option from HPLANSet’s Main Menu. The “select card” option is only displayed if there is more than one LAN Adapter/16 Plus card installed in your computer.

- **Basic instructions for getting around** – are always displayed near the bottom of the screen to help you remember how to get around in the program:
 - press **Enter** to select the highlighted item,
 - press **Esc** (escape key) to return to the previous menu,
 - press **F1** to get detailed help information on the highlighted item.
- **Brief help line** – is the bottom line of the screen. It contains a brief help message about the item that is highlighted in the forward-most window.
- **Selecting an item** – is performed by either using the up and down arrow keys to highlight the item, then press Enter; or you can just press the hot key for that item. On a color screen, the hot key is the yellow upper-case letter.

What You Can Do With HPLANSet

The main functions of HPLANSet are all listed on the Main Menu shown in figure 3-1. The options are listed and described in the table below. For each of the options, the “hot key”, which can be pressed to select the item, is shown in the following table.

Main Menu Option	Hot Key	Description
Auto configuration	A	Automatically selects an available IRQ for the card, detects the presence and size of a boot ROM if one is installed and selects an available memory location for the boot ROM.
select card	D	When you have multiple LAN Adapter/16 Plus cards installed in your computer, use this option to select the card you want to configure or test. This option is displayed only if you have multiple cards installed.
Manual configuration	M	Allows you to change every configuration option on the card. See “Manual Configuration Options” on the next page for more information.
Card test	C	Quickly tests the card’s hardware and configuration. Does not send packets on the network, so the network cable does not have to be attached.
Link test	L	Tests the card’s ability to send and receive packets over the network. The card can either be designated as the initiator of the test packets, or the responder. HPLANSet can automatically find a responder on the network.
Save configuration to card	S	Causes the configuration that you see on the HPLANSet screen to be written to the card’s non-volatile memory.
Exit program	E	Terminates the HPLANSet session.

Note

You can get more detailed information on each option from within HPLANSet. From the Main Menu, just highlight the option and press **[F1]**. A help window pops up with the information you need. **[F1]** help is available throughout the HPLANSet program.

Manual Configuration Options

All the configuration options for the LAN Adapter 16/Plus cards are accessible from HPLANSet's Manual Configuration Menu, shown in figure 3-2. The configuration shown in the figure is the factory default. The options are listed and described in the table on page 3-7. For each of the options, the "hot key", which can be pressed to select the item, is shown in the table.

```
Manual Configuration Menu
Interrupt channel ..... IRQ 3
I/O Address range ..... 300-31FH
Boot ROM ..... disabled
I/O or Memory mapped ..... I/O mapped
LAN Connector ..... auto select
Link beat ..... enabled
restore Factory default configuration
Read configuration from disk file
Write configuration to disk file
Exit menu
```

Figure 3-2. HPLANSet Manual Configuration Menu

Manual Configuration Option	Hot Key	Description
Interrupt channel	I	Specifies an IRQ if needed. You can instead select "Auto configuration" from the Main Menu and an available IRQ is automatically selected for your LAN Adapter/16 Plus card. HPLANSet automatically verifies that your selection does not conflict with any other IRQ assignment in your computer. The default value is 3.
I/O Address range	A	Specifies an I/O address range. Use this option if the factory default, 300-31Fh, cannot be used. HPLANSet automatically verifies that your selection does not conflict with any other I/O address assignment in your computer.
Boot ROM	B	Specifies an address for a boot ROM installed on the card, if needed, or disables the boot ROM if needed. You can instead select "Auto configuration" from the Main Menu to automatically detect the presence and size of the boot ROM and assign an available address range for its use.
I/O or Memory Mapped	M	Selects the method by which data is transferred between the network and the CPU through the card, either I/O mapped or memory mapped. See "Using Memory-Mapped Mode" in chapter 2 for more information.
LAN Connector	C	Specifies which LAN connector the card is to use, or, if you choose "auto select", the card automatically detects which connector has the network cable attached to it.
Link Beat	L	Enable link beat if your LAN Adapter/16 TP Plus card is attached to a 10Base-T network. Disable link beat if it is attached to a non-10Base-T network device (for example, a StarLAN 10 hub).
Restore Factory Default Configuration	F	Restores the card's configuration to the values it had when shipped from the factory. These values are shown in figure 3-2.
Read configuration from disk file	R	Brings a configuration into HPLANSet from a disk file. The configuration can then be saved to the card that you are configuring.
Write configuration to disk file	W	Writes the displayed configuration to a disk file that you can subsequently use to configure cards. See "Configuring Multiple Cards With the Same Configuration" in chapter 2.



- Gathering data
- Basic Troubleshooting Tips
- Interpreting the LEDs
- Running the Diagnostics
- Card Test
- Link Test
- Symptoms
- Solutions
- Before Calling for Help
- Customer Support Services

Gathering Data

To resolve any problems you are having with your LAN Adapter/16 Plus card, you first need to gather some symptomatic data:

1. First, check the basic items listed under “Basic Troubleshooting Tips” on the next page.
2. Then if necessary, run the diagnostic tests of the card and the network that are available in the HPLANSet program.
3. The data that you collect from these observations and diagnostic tests can then be compared with the symptom table in this chapter. Once you find the symptom that matches what you have observed, go to the solutions table to find how to resolve the problem.

Basic Troubleshooting Tips

- **Check the LEDs** – the four LEDs on the TP Plus card and the LED on the TL Plus card can be used to help identify the problem. See the table on the next page to interpret the LED display.
- **Check the network cables** – make sure the network cable connections are secure and that the cables are not damaged. If you find any connections that are loose, or cables that are damaged, fix the problem and then see if your computer can communicate on the network.
- **Check for I/O address conflicts** – make sure the I/O address range configured on your LAN Adapter/16 Plus card does not conflict with the address used by any other card in your computer. The default I/O address range is 300-31Fh. Run HPLANSet and select “Manual configuration” to configure the I/O address.
- **Check for IRQ conflicts** – make sure the IRQ configured on your LAN Adapter/16 Plus card does not conflict with the IRQ used for any other card in your computer. The default interrupt is IRQ 3. Run HPLANSet and select “Manual configuration” to configure the IRQ.
- **Check the link beat setting (TP Plus card only)** – make sure the link beat setting is appropriate for the network type that you are using. Link beat should be set ON if you are using a Type 10Base-T network; and it should be set OFF for non-Type 10Base-T networks like StarLAN 10. Run HPLANSet and select “Manual configuration” to configure the link beat setting.

If the problem is not resolved by these basic steps, run the diagnostic tests described on page 4-6 and use the symptom and solution tables starting on page 4-9 to help guide you. If the more thorough testing does not resolve the problem, contact your HP-authorized LAN dealer or HP representative for assistance. See “Before Calling for Help” on page 4-11.

Interpreting the LEDs

For the LAN Adapter/16 TP Plus

If the RJ-45 connector is selected *		
Tx	Flashing	The card is transmitting packets. This is the normal display.
	Off	No transmit activity is occurring.
Rx	Flashing	The card is receiving packets from the network. This is normal.
	Off	No network traffic is being received.
AUI	Off	Indicates that the RJ-45 connector is selected by the card's configuration, and has been activated by the NOS driver.
LB (with link beat enabled)		
	On	A good twisted-pair cable is attached to the RJ-45 port, and the hub is on and is sending link beat signals.
	Off	One or more of these conditions exists: – the network cable is not connected properly or is faulty – your computer is off – the hub is off or the hub's port for your connection is disabled – the hub is malfunctioning – the LAN Adapter/16 Plus is faulty – the hub is not sending link beat – the AUI port is being used
LB (with link beat disabled)		
	On	The card is receiving power.
	Off	You computer may be off. If the computer is on, the LAN Adapter/16 Plus may be faulty.
* The connector is selected when the network operating system driver initializes the card.		

For the LAN Adapter/16 TP Plus (continued) •

If the AUI connector is selected *		
Tx	Flashing	The card is transmitting packets. This is the normal display.
	Off	No transmit activity is occurring. If this LED is off when the card should be transmitting, the card may be faulty.
Rx	Flashing	The card is receiving packets from the network. This is normal.
	Off	No network traffic is being received. The way this connector works, for each packet that is transmitted from the card, the Rx LED should also flash. If this is not occurring, the external transceiver attached to the AUI port may be faulty.
AUI	On	Indicates that the AUI connector is selected by the card's configuration, and has been activated by the NOS driver.
LB	This LED is meaningless if the AUI connector is selected.	
* The connector is selected when the network operating system driver initializes the card.		

For the LAN Adapter/16 TL Plus

If the BNC connector is selected *		
BNC	On	Indicates that the BNC connector is selected by the card's configuration, and has been activated by the NOS driver.
If the AUI connector is selected *		
BNC	Off	Indicates that the AUI connector is selected by the card's configuration, and has been activated by the NOS driver.
* The connector is selected when the network operating system driver initializes the card.		

Running the Diagnostics

The Card test and Link test diagnostic tests are run from the HPLANSet Main Menu. The procedures are:

1. **Make sure your network drivers are not running.** You can do this step by booting your system from a DOS diskette that does not have either a CONFIG.SYS or an AUTOEXEC.BAT file on it. Or, if you understand how your network drivers are activated, you can modify the CONFIG.SYS and AUTOEXEC.BAT files in your computer so the drivers do not execute.
2. Insert the Support Disk that came with your LAN Adapter/16 Plus card into the floppy disk drive.
3. Change to that drive and enter HPLANSET.
4. From the Main Menu, select “Card test” or “Link test”. These tests are described next.

Card test

This tests the card's circuitry all the way out to the LAN connectors. *No LAN cables need to be attached to the card for this test.*

The list of tests is displayed, followed by a pass or fail indication as each test is completed. If any of the tests fails, the testing process stops at that test. Press **[F1]** (help) to get more information on what you can do to correct the problem.

We recommend that you run card test the first time you run HPLANSet and any time you change the card's configuration. The test takes very little time to run and provides a complete verification that the card's hardware and configuration are OK.

Link test

This option tests the card's ability to send and receive packets over the network. For this test, the cable from the network must be attached to the card. The test sends standard IEEE 802.2 test packets out on the network.

Overview – a quick test

HPLANSet makes the link test an easy process because it can automatically find a responder to the test packets. To quickly test the card's ability to communicate on the network:

1. Press "L" from HPLANSet's Main Menu to select "Link test".
2. Press Enter to select "Initiate test packets" as the role for the card.
3. From the Link Test Initiator Menu, press Enter to automatically find a responder. This usually takes less than three seconds.
4. When the responder's station address is displayed (and "Start test" is highlighted), press Enter to start the test. The window labeled Link Test Statistics (Initiator) pops up showing you the test counters. The test runs continually until you stop it.
5. Press Enter again (or any other key) to stop the test.
6. Interpret the results as described on the next page under "Interpreting the Results".

Some Details on Link Test

The card can either be designated as the initiator of the test packets, or the responder. You are prompted to pick the role for your card.

Setting Up the Card as an Initiator: Select "Initiate test packets" and your card will send the Test packets. Another node on the network must then act as the responder.

Other combinations of counter values are open to interpretation. If you get other results, you may want to contact your HP-authorized LAN dealer or HP representative for help.

Finding a responder: To be a responder, the node must be able to respond to the IEEE 802.2 Test packets with IEEE 802.2 Test Response packets. Any HP SNMP-managed hub, HP SNMP-managed bridge, or HP router will respond correctly, or you can easily set up a computer that has an HP LAN Adapter (such as HP LAN Adapter/16 Plus, HP 10/100VG ISA LAN Adapter using 10 Mbit mode, or HP LAN Adapter NC/16 TP) as a responder.

HPLANSet offers two ways to select a responder:

- **Automatic responder selection** – from the Link Test Initiator Menu, select “Find a responder” and HPLANSet will automatically find a responder on the network.
- **Manual responder selection** – if HPLANSet cannot find a responder, or if you want to test a particular path, you can enter the station address of a specific responder. Select “Manually enter responder address” and you will be prompted to enter the 12-digit hexadecimal station address of the responder.

Running the test: When the responder has been found, select “Start test”. A window is displayed showing the test statistics. You can stop the test by pressing any key.

Setting Up the Card as a Responder: Select “Respond to test packets” and your card will return an IEEE 802.2 Response packet for each Test packet it sees from a network node that is acting as the initiator. A window is displayed showing the test statistics. When the initiator node starts the test, you can see the counters change on your screen.

Interpreting the Results

It is easiest to interpret the test results under the two extreme conditions—when the test runs perfectly, and when the test absolutely fails:

- **when the test runs perfectly** – two of the counters increment the same: “Test packets transmitted” and “Good test packets received”. “Packets received” will also have the same value (or higher).
- **when the test absolutely fails** – only the “Test packets transmitted” counter increments, and it does so very slowly. In this case, when you stop the test, you get an error message. Press **[F]** to get help on the possible causes for the test failure.

Symptoms

In the table below, find the symptom you are noticing and then check the corresponding solutions in the table on the next page. Notice that the solution numbers are listed in the suggested sequence of what to check first.

Symptom	Solution Numbers
When you run HPLANSet, no LAN Adapter/16 Plus cards are detected.	1, 2, 3, 4, or 5
When you run Card test from HPLANSet, one or more of the tests fail.	11, 2, or 5
Card test passes but Link test fails.	6, 7, 8, or 12
Both of the diagnostic tests pass but the computer will still not communicate on the network.	9, 10, or 11
The LAN Adapter/16 Plus card stopped working when another card was added to the computer.	2, 6, 11, 13, 14, or 15
The LAN Adapter/16 Plus stopped working for no apparent cause.	6, 15, or 5
NOS software/driver will not start, does not find the card, or gives start-up error messages.	9, 2, or 11
NOS software/driver is initially unable to connect or communicate with a remote node.	9, 2, or 11
NOS communication with a remote node fails after working previously.	15, 12, 6, or 5

Solutions

1 Check to make sure the LAN Adapter/16 Plus card is installed in your computer.
2 There could be an I/O address conflict with another card in your computer. The default I/O address range for the LAN Adapter/16 Plus card is 300-31Fh. Either remove the other card that conflicts, then run HPLANSet to select a different I/O address range for the LAN Adapter/16 Plus card, and then reinstall the other card, or move the LAN Adapter/16 Plus to another system and run HPLANSet on that system to select a different I/O address range for the LAN adapter. If you change the I/O address on the LAN Adapter/16 Plus, make sure you also change the value in your network driver configuration.
3 The LAN Adapter/16 Plus may not be completely seated in the expansion slot. Try re-seating the card and running HPLANSet again.
4 The expansion slot may be defective. Try a different slot.
5 The LAN Adapter/16 Plus may be defective. Try a different one.
6 Verify that the network cable is firmly attached to the LAN Adapter/16 Plus and that the other end of the cable is firmly attached to the hub or other network device.
7 Verify that the LAN Adapter/16 Plus has been configured with the correct connector type by running HPLANSet.
8 Verify the network cable is attached to the correct LAN Adapter/16 Plus.
9 Make sure that the network drivers are loaded, and that the driver parameters match the configuration on your card.
10 Make sure that the LAN Adapter/16 Plus card has been configured for your computer. If not, run HPLANSet on your computer and make the necessary configuration changes.
11 The LAN Adapter/16 Plus card's interrupt channel or memory may overlap another card's configured values. This is especially likely if the other card was installed after the card you are testing. Run HPLANSet and reconfigure your LAN Adapter/16 Plus card to resolve the conflict.
12 Verify the integrity of the network cable and the connectors on both ends of the cable.
13 Verify that LAN Adapter/16 Plus card's drivers were not accidentally deleted when the drivers for the new card were installed.
14 Make sure that the LAN Adapter/16 Plus was not nudged from its expansion slot when the new card was installed.
15 The files containing the network drivers may have become corrupted. Re-install the network drivers from the Support Disk and try again.

Before Calling for Help

Before you contact your HP-authorized LAN dealer or HP representative, collecting the data listed below will help get your problem resolved quickly.

History of the problem:

- What symptoms did you notice?
- When did the symptoms appear; when the card was first installed, or after it was working for a while?
- Did you change the card's configuration just before the symptoms appeared?
- If you changed the card's configuration, did you also change the driver parameters to match?

Card configuration information:

- Run HPLANSet and select "Manual configuration". The card's complete configuration is displayed; write down the values for all the parameters.

Computer information:

- What kind of computer are you using (What vendor and model)?
- What is the bus speed?
- What operating system, and version are you using?
- What other cards are installed in your computer and how are they configured?
- What applications are you running on the computer?
- If you are using memory-mapped mode, are you also running an expanded memory manager or memory caching on your computer? Get a copy of the computer's memory map if you can. Most memory managers have that capability.
- List the contents of some key files: especially AUTOEXEC.BAT, AUTOEXEC.NCF, CONFIG.SYS, NET.CFG, PROTOCOL.INI, LANMAN.INI, and SYSTEM.INI.

Network information:

- What type of network medium are you using; twisted-pair, thin coax, etc.?
- If you are using the AUI connector, what type of external transceiver are you using, and how is that transceiver configured?
- Is the network Ethernet II, IEEE 802.3, or a combination?
- What network operating system are you using?

Customer Support Services

Hewlett-Packard offers PC LAN Adapter support 24 hours a day, seven days a week through the use of automated electronic services including:

- Hewlett-Packard Bulletin Board Service
- Hewlett-Packard FTP Library Service
- HP FIRST FAX Retrieval Service
- CompuServe

Hewlett-Packard Bulletin Board Service

The HP BBS provides the HP PC LAN Adapter user with the most up-to-date software fixes, patches, and new software. Complete imagines of the HP LAN Adapter Support Disks are available. In the U.S., to access the HP BBS, set your modem communication settings to

- parity = N
- data bits = 8
- stop bits = 1
- baud rates = 300, 1200, 2400, 4800, 9600, or 14400

The HP BBS telephone number is (208) 344-1691.

Hewlett-Packard FTP Library Service

The HP FTP Library provides the HP PC LAN Adapter user with the most up-to-date software fixes, patches, and new software. Complete imagines of the HP LAN Adapter Support Disk are available.

To access the HP FTP Library, follow these steps:

1. Using ftp, type this command:

```
ftp 192.6.71.2
```

The ftp> prompt appears.



2. At the user prompt, type:

```
anonymous
```

and then press Enter.

3. At the password prompt, press Enter or type your internet address.

4. Change the current directory to:

```
cd /pub/computer_products/network
```

5. Set the file type to binary:

```
binary
```

6. List the HP PC LAN Support Disks available:

```
dir
```

7. Retrieve the file:

```
get 27247b.exe
```

8. Quit the FTP session:

```
quit
```

HP FIRST FAX Retrieval Service

HP FIRST is an automated FAX Retrieval service that is available 24 hours a day, seven days a week. HP FIRST provides information on the following topics:

- Product information
- Troubleshooting instructions
- Technical reviews and articles
- Configuration information

To access HP FIRST, dial one of the following phone numbers from your touch-tone telephone:

Location	Phone Number
U.S. and Canada Only	(800) 333-1917 and press #1 for HP FIRST
Outside the U.S. and Canada	(208) 344-4809

To receive a list of currently available documents, enter document number 19941. The information you requested will be sent to you by return fax.

CompuServe

CompuServe is an electronic information and communication service run by an independent company. The service is typically accessed with a computer and modem and uses standard voice telephone lines for transmitting and receiving data. CompuServe is available 24 hours-a-day, seven days per week. The participants pay a monthly fee as well as an hourly connect charge for this service. To get the file from CompuServe, follow these steps:

1. Login to CompuServe.
2. Type: GO HP SYSTEMS.
3. Type: GO LIB 7.
4. Download the appropriate files.

A

- Twisted-Pair Connector
- Thin LAN BNC Connector
- AUI Connector

Cables and Connectors

Cables and Connectors

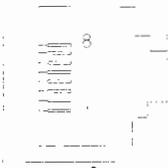
This appendix includes minimum pin-out information for the LAN connectors on the cards. Also included are lists of cables that are available from HP. Because the connectors on the cards adhere to the appropriate standards, you can also purchase cables from vendors like Black Box and Anexter.

Note

Incorrectly wired cabling is the most common cause of problems for LAN communications. HP recommends that you work with a qualified LAN cable installer for assistance with your cabling requirements.

Twisted-Pair Networks - RJ-45 Connector

Use unshielded twisted-pair cables that comply with the IEEE 802.3 Type 10Base-T standard.



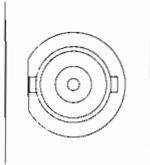
Pins	Signal
1	(transmit +)
2	(transmit -)
3	(receive +)
6	(receive -)

Available HP Cables

- HP 92268A – 4-meter with attached 8-pin connectors
- HP 92268B – 8-meter with attached 8-pin connectors
- HP 92268C – 16-meter with attached 8-pin connectors
- HP 92268D – 32-meter with attached 8-pin connectors
- HP 92268N – 300-meter (no connectors supplied)*

* The Ethernet 802.3 standard supports up to 100 meters only.

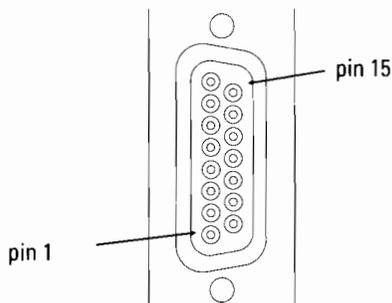
Thin Coax Networks - BNC Connector



The thin coaxial cables used with the LAN Adapter/16 card must comply with the IEEE 802.3 Type 10Base2 standard. Some RG-58 A/U or RG-58 C/U cables meet these requirements.

The maximum length of a single thin coaxial cable segment is 185 meters. The minimum length between nodes is one meter.

AUI Connector



Pins	Signal
2	(Control In circuit A
3	Data Out circuit A
4	Data In circuit Shield (common drain)
5	Data In circuit A
6	Voltage Common
9	Control In circuit B
10	Data Out circuit B
12	Data In circuit B
13	Voltage Plus

Available HP Cables

- HP 92264D (1-meter thin AUI extension, pin 4 not connected)
- HP 92254A through H (6-meter through 48-meter thick AUI cables)
- HP 92254J (5-meter thin AUI cable, pin 4 not connected)

Available HP Transceivers

HP offers a set of compact transceivers that attach directly to the AUI connector:

- HP 28685B EtherTwist Transceiver (for twisted-pair cabling)
- HP 28641B ThinLAN Transceiver (for thin coax cabling)
- HP 28683A Fiber-Optic Transceiver (for fiber-optic cabling)

B

Specifications

HP 27247B and HP 27252A LAN Adapter Specifications

Physical

	HP 27247B	HP 27252A
Dimensions:	18.0 cm by 8.9 cm (7.4 in by 3.5 in)	18.0 cm by 8.9 cm (7.4 in by 3.5 in)
Weight:	127 g (4.5 oz)	127 g (4.5 oz)

Electrical

0.3 A @ 5 V typical; 0.60 A @ 5 V maximum

Environmental

Operating temperature:	0°C to 55°C (32°F to 131°F)
Nonoperating temperature	-40°C to 70°C (-40°F to 158°F)
Relative humidity:	15% to 95% at 40°C (104°F) non-condensing
Maximum altitude:	4.6 km (15,000 feet)

Cable Interfaces

HP 27247B

The 8-pin 4J-45 twisted-pair port is compliant with IEEE 802.3 Type 10Base-T.

The AUI port is compliant with IEEE 802.3 standards.

HP 27252A

The BNC port is compliant with IEEE 802.3 Type 10Base2.

The AUI port is compliant with IEEE 802.3 standards.

Communications Standards

- IEEE 802.3 Type 10Base-T
- IEEE 802.3 Type 10Base2

Electromagnetic

Emissions

FCC part 15 Class A
EN 55022 Class A / CISPR-22 Class A
VCCI Level 1

Immunity

(See the Declaration of Conformity at the end of this guide.)

Acoustic Noise

Not applicable

C

Glossary

Glossary

AUI cable	An attachment unit interface (AUI) cable. This cable connects the AUI port of a card to a transceiver. Some transceivers have a cable permanently attached, others require a separate cable. HP offers a set of compact transceivers that attach directly to the card's AUI port.
AUI port	The attachment unit interface (AUI) port on the card. The AUI port connects to a LAN cable through a transceiver. Often there is an AUI cable, although some transceivers attach directly to the AUI port.
BNC connector	Any of several connectors used for ThinLAN cable. There are male and female connectors used to connect sections of a LAN and the "T" connector used for attaching devices to the cable.
boot ROM	Read Only Memory (ROM), installed either on a LAN adapter or elsewhere in the computer, that implements a simple program to identify a server on the network from which the computer can get its boot information.
buffer RAM	Random Access Memory (RAM) on the LAN adapter that is used for temporary storage of data coming from and going to the LAN. The LAN Adapter/16 Plus cards have 32 Kbytes of buffer RAM.
cache	A high-speed memory between the CPU and system memory. The cache speeds up processing by keeping a copy of the most recently executed code or data.
collision	The result of two or more nodes on a LAN transmitting at the same time, producing a garbled transmission.
driver	A program that allows the LAN adapter to communicate with the network operating system.
EEPROM	Electrically Erasable Programmable Read Only Memory. This type of chip provides non-volatile memory that can be erased and rewritten by the computer. The LAN Adapter/16 cards' configuration is stored in an onboard EEPROM.
Ethernet	A LAN developed by Xerox Corp., Digital Equipment Corp., and Intel Corp. It uses the CSMA/CD method of access and transmits at 10 Mbit/s on a bus 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.

Ethernet address *See* station address

factory default configuration The configuration values stored in the card's non-volatile memory (EEPROM) at the factory. The values are:

Configuration Parameter	Factory Default Setting
Interrupt channel	IRQ 3
I/O address range	300 – 31Fh
Boot ROM support	disabled
I/O or memory mapped	I/O mapped
LAN connector	auto select
Link beat (TP card only)	enabled

50-ohm terminator A connector containing a 50-ohm resistor used to terminate the end of an IEEE 802.3 LAN coaxial cable segment. One is required on each end of the segment.

IEEE 802.3 standard Part of the Institute of Electrical and Electronics Engineers 802 family of LAN standards. The 802.3 standard defines the physical layer (layer 1) and part of the data link layer (layer 2) of the ISO OSI reference model for a CSMA/CD LAN. The IEEE 802.3 standard evolved from Ethernet, but the two networks are not fully compatible with each other.

Interrupt channel Also called an IRQ. Each peripheral is assigned a unique interrupt channel so that the computer knows which peripheral is requesting services. The factory default interrupt channel for the LAN Adapter/16 Plus cards is IRQ 3.

I/O base address The starting address of where the computer can find the card on its I/O bus. The values are depicted as a hexadecimal number. The LAN Adapter/16 Plus cards require 32 bytes of I/O address space. The factory default I/O base address for the LAN Adapter/16 Plus cards is 300h.

I/O mapped A mode of data transfer in which the computer moves data to and from the LAN adapter over the computer's I/O channel. This mode is the default mode for the LAN Adapter/16 Plus cards.

IRQ *See* interrupt channel.

Glossary

LAN local area network	A general-purpose communications network that interconnects a variety of devices within a limited geographical area. Two common LANs, IEEE 802.3 and Ethernet, have compatible cabling requirements, and can co-exist on a common installation, but have different protocols. A LAN might connect computers on adjacent desks, within a building, or within several buildings of a campus.
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 twisted-pair cable.
LED light emitting diode	A small light on a device that is often used to provide status information.
link beat	A periodic signal transmitted in IEEE 802.3 Type 10Base-T networks to inform one station or device of the presence of another. It also helps verify the integrity of the network link between them. (Also called “link test pulse”.)
link test	A test of the connection between two nodes on a network. It tests the network cabling between the two nodes, the connections from the nodes to the cabling, and the ability of the nodes to communicate on the network.
MAC address	<i>See</i> station address.
Mbit/s	Megabits per second (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.
memory manager	A program that provides and controls access to a particular type of memory in your computer; upper memory (between 640 Kbytes and one Mbyte), extended memory, or expanded memory.

memory mapped	A mode of data transfer in which the computer moves data to and from the LAN adapter using standard memory cycles. Memory cycles are faster than I/O cycles and therefore, using memory-mapped mode should improve the performance of a LAN adapter.
network operating system (NOS)	A control program that resides in a file server somewhere in the local area network. The NOS handles the requests for communication between all the stations on the network. A portion of the NOS must also reside on each of the client stations.
node	A computer or other addressable device on a network, including PCs, terminals, bridges, routers, and mainframes. Usually, a node has a station address.
non-volatile memory	The memory on the card that keeps its contents intact even when power is removed from the card (the computer's power is switched off). On the LAN Adapter/16 cards, the non-volatile memory is an EEPROM so the configuration data it contains can be changed.
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 <i>MAC frame</i> . Packet is used in the Ethernet environment and is used in this guide because it is the more commonly understood term. Different protocols have different packet and frame specifications.
protocol	A set of rules that governs data transfer among devices on a network. A protocol identifies the handshake type, packet size and format, timing, error recovery scheme, word size or other characteristics of each transfer, depending on the system of which it is a part.
remote boot client	A node on the network that has a boot ROM installed and which receives its boot information over the network from a remote file server.
RJ-45	A standard defining the pin assignments for an 8-pin modular plug for 4-wire, twisted-pair network cable.

**station
address**

A 12-digit hexadecimal number that identifies a specific network node and allows messages to be directed to that node only. These numbers are permanently coded in the circuitry of the node's hardware. Because the IEEE has assigned identifiers for each hardware manufacturer, no two pieces of equipment have the same address. The address assigned according to the IEEE plan is referred to as a device's globally-administered station address.

Some drivers (such as Novell and SCO) provide an option for the user to assign a different station address that will override the original. This type of address is referred to as a locally-administered station address. By default, the LAN Adapter/16 Plus card uses a globally-administered station address unless it is overwritten. The station address is also called a MAC address, Ethernet address, physical address, and by other names.

thick LAN

A local area network (LAN) operating over 10-mm diameter coaxial cable. HP thick LAN networks are compatible with the IEEE 802.3 Type 10Base5 standard.

thin LAN

A LAN operating over 5-mm diameter coaxial cable. HP thin LAN networks are compatible with the Type 10Base2 standard.

transceiver

The assembly used to provide the physical connection and access to a LAN. It is the device on the LAN that detects collisions. (A transceiver is also called a medium attachment unit or MAU in the IEEE 802.3 standard.)

wiring closet

An enclosed, central point for cabling to meet and where signal routing occurs. It is also called a telecommunications closet.

Regulatory Statements

Regulatory Statements

FCC Statement (For U.S.A. Only)

Federal Communications Commission Radio Frequency Interference Statement

Warning: This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

If this equipment causes interference to radio reception (which can be determined by unplugging the power cord from the equipment) try these measures: Re-orient the receiving antenna. Relocate the equipment with respect to the receiver. Plug the equipment and receiver into different branch circuits. Consult your dealer or an experienced technician for additional suggestions.

VCCI 1 (For Japan Only)

この装置は、第一種情報装置(商工業地域において使用されるべき情報装置)で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会(VCCI)基準に適合しております。

従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

European Community

Note

This is a class A product. In a domestic environment, this product may cause radio interference, in which case you may be required to take adequate measures.

Declarations of Conformity

The following Declarations of Conformity comply with ISO/IEC Guide 22 and EN 45014. They identify the product, the manufacturer's name and address, and the applicable specifications that are recognized in the European community. (See Declaration of Conformity letter on next page).

DECLARATION OF CONFORMITY

according to ISO/IEC Guide 22 and EN45014

Manufacturer's Name: Hewlett-Packard Company

Manufacturer's Address: 8000 Foothills Blvd.
Roseville, CA 95747
U.S.A.

declares that the product:

Product Name: PC LAN Adapter / 16 TL Plus
PC LAN Adapter / 16 TP Plus

Model Number: HP 27252A
HP 27247B

conforms to the following Product Specifications:

Safety: IEC 950:1991+A1,A2/EN60950 (1992)+A1,A2

EMC: EN 55022 (1988) / CISPR-22 (1985) class A
EN50082-1 (1992)
prEN 55024-2 (1990) / IEC 801-2 (1991) 4 kV CD, 8 kV AD
prEN 55024-3 (1991) / IEC 801-3 (1984), 3 V/m
prEN 55024-4 (1992) / IEC 801-4 (1988): 1 kV-(power line)
0.5 kV-(signal line)

Supplementary Information:

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC and carries the CE marking accordingly.

Tested with Hewlett-Packard Co. products only.

Roseville, November 29, 1994

Sandra L. Sheehan
Sandra L. Sheehan, Quality Manager

European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department ZQ/Standards Europe, Herrenberger Strasse 130, D-71034 Boblingen (FAX:+49-7031-14-3143)



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