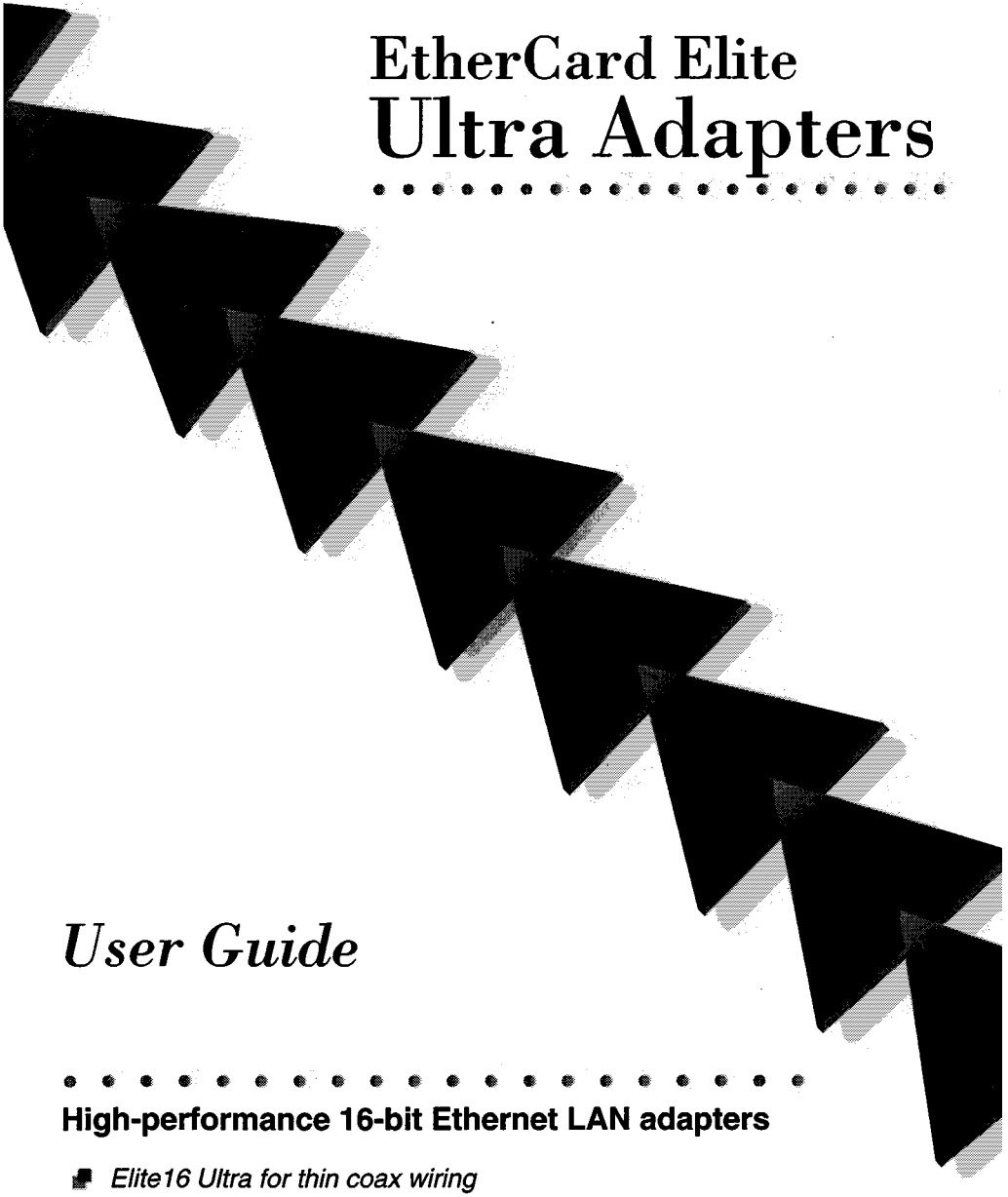
SMC®

EtherCard Elite Ultra Adapters



User Guide

High-performance 16-bit Ethernet LAN adapters

- *Elite16 Ultra for thin coax wiring*
- *Elite16T Ultra for unshielded twisted-pair wiring*
- *Elite16C Ultra for all coax and unshielded twisted-pair wiring*

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LIMITED WARRANTY

HARDWARE: SMC warrants its hardware products listed below to be free from defects in workmanship and materials, under normal use and service, for the following lengths of time from the date of purchase from SMC or its Authorized Reseller:

EtherCard Plus Elite Adapters	Five years
EtherCard Elite Ultra Adapters	Limited Lifetime (see below – EtherCard Elite Ultra Adapters)
EliteSeries Ethernet Concentrators	Three years
Spare parts and spare kits	90 days
Driver Software	90 days

If a product does not operate as warranted during the applicable warranty period, SMC shall, at its expense, correct any such defect by repairing the defective product or part or, at its option, by delivering to Customer an equivalent product or part to replace the defective item. All products that are replaced will become the property of SMC. Replacement products may be new or reconditioned. Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

SMC shall not be responsible for any software, firmware, information, or memory data of Customer contained in, stored on, or integrated with any products returned to SMC pursuant to any warranty.

ETHERCARD ELITE ULTRA ADAPTERS: EtherCard Elite Ultra Adapters have a standard three-year warranty. If you wish to extend your three-year warranty on these adapters to a lifetime warranty, please complete and return the enclosed product registration card within 90 days of purchase from SMC or its authorized reseller. Be sure to include the type and serial number of the computer in which the adapter was originally installed, and the serial number of the SMC Elite Ultra Adapter (located on the board). Failure to complete and return this card does not affect the standard, three-year warranty. After registration, any defective SMC adapter will be repaired or replaced, at SMC's option, for as long as the adapter continues to be used in its original ISA or EISA computer (all driver software is covered as indicated below).

SOFTWARE: SMC warrants that the software programs licensed from it will perform in substantial conformance to the applicable published program specifications for a period of ninety (90) days from the date of purchase from SMC or its Authorized Reseller. SMC warrants the magnetic media containing software against failure during the warranty period. No updates are provided. SMC's sole obligation hereunder shall be (at SMC's discretion) to refund the purchase price paid by Customer for any defective software products, or to replace any defective software products with products which substantially conform to SMC's applicable published specifications. Customer assumes responsibility for the selection of the appropriate applications program and associated reference materials. SMC makes no warranty that its software products will work in combination with any hardware or applications software products provided by third parties, that the operation of the software products will be uninterrupted or error free, or that all defects in the software products will be corrected. For any third party products listed in the SMC software product documenta-

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EtherCard Elite Ultra Adapters User Guide

- EtherCard Elite16 Ultra
  10BASE2 Adapter, (Board Type 8216)
- EtherCard Elite16T Ultra
  10BASE-T Adapter, (Board Type 8216T)
- EtherCard Elite16C Ultra
  Combo (10BASE-T, 10BASE2, AUI) Adapter
  (Board Type 8216C)

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FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Notes

INTRODUCTION 1

This user guide contains all the information you need to install, configure, and use the following SMC EtherCard Elite Ultra adapters:

- EtherCard Elite16 Ultra™, 10BASE2 Adapter (Board Type 8216). See Figure 1-1.
- EtherCard Elite16T Ultra™, 10BASE-T Adapter (Board Type 8216T). See Figure 1-2.
- EtherCard Elite16C Ultra™ Combo, 10BASE-T, 10BASE2, AUI Adapter (Board Type 8216C). See Figure 1-3.

All SMC EtherCard Elite Ultra adapters are IEEE 802.3-compatible Ethernet adapters that are ideal for use in network file servers, workstations (with or without local disks), bridges, and gateways.

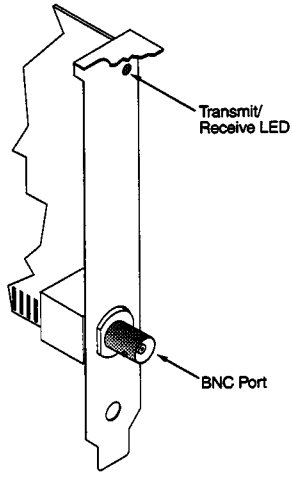


Figure 1-1. EtherCard Elite16 Ultra Adapter

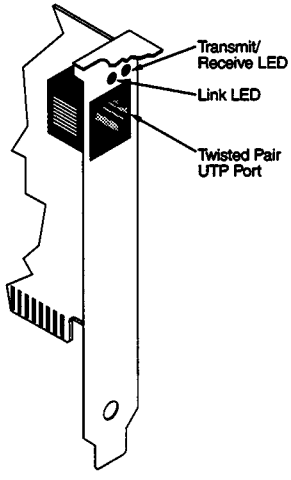


Figure 1-2. EtherCard Elite16T Ultra Adapter

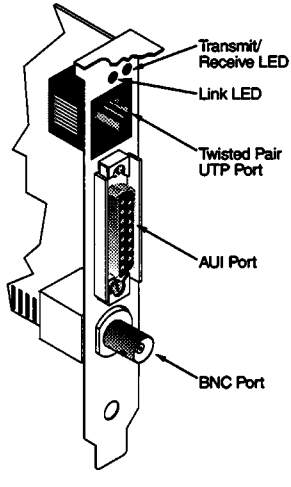


Figure 1-3. EtherCard Elite16C Ultra Adapter

Features

SMC's EtherCard Elite Ultra adapters are a new generation of high-performance Ethernet adapters. Their unique design and state-of-the-art technology combine easy installation and configuration with unparalleled high-speed performance.

The EtherCard Elite Ultra adapters are based on SMC's new SMC83C790 UltraChip™ Ethernet controller. The UltraChip Ethernet controller is based on unique SimulTasking™ technology that provides higher performance by increasing the data-transfer speed between the network and the host PC.

The following list describes your adapter's features.

- SimulTasking technology combines top performance with unsurpassed data-transfer speeds.
- UltraChip technology provides a single-chip Ethernet solution for unsurpassed reliability.
- Complies with FCC Class B standard.
- Advanced UMAC/LMAC™ driver architecture assures the widest driver support available in today's LAN marketplace.
- Driver assurance guarantees that a single driver handles every SMC and Western Digital 8- and 16-bit EtherCard adapter.
- Versatile design permits installation into any computer slot, including 8-bit slots.
- EZSelect configuration method lets you choose a preassigned adapter configuration, or have a conflict-free configuration assigned automatically.
- The EZStart™ utility program provides a Windows-like operation that makes adapter configuration/testing and driver installation fast and easy.
- The PC Agent/SNMP program lets you collect and monitor LAN driver and computer statistics from your PC, without any other software tools.
- Includes lifetime warranty with free technical support.

Package Contents

Your SMC package contains:

- One SMC EtherCard Elite Ultra adapter
- One SuperDisk™ diskette containing the EZStart program with compressed driver and ancillary files
- This user guide
- A Registration Card

When you open your package, make sure that you have received all of these items and that none of the items is damaged. If any item is missing or damaged, contact your place of purchase immediately.

What Else You Will Need

To use your SMC EtherCard Elite Ultra adapter, ensure that the following minimum hardware and software requirements are met:

- An available 8- or 16-bit slot in any IBM PC/XT /AT or compatible computer, a PS/2 computer with an ISA bus, or a PC with an EISA bus (a 16-bit slot is recommended).
- MS-DOS or PC-DOS operating system, version 3.11 or later, which is required to run the EZStart program.
- 16KB of contiguous available memory space (in the region C000 to EFFF, inclusive) for the adapter's RAM buffer.
- An additional 16KB of contiguous available memory space (in the region C000 to EFFF, inclusive) to install an optional Boot ROM.
- Approximately 22KB of additional RAM memory to use the optional PC Agent/SNMP. For your convenience, PC Agent/SNMP can be loaded into high or low memory.
- An agent-compatible network driver resident in memory if using the optional PC Agent/SNMP. SMC network drivers that are compatible with PC Agent/SNMP are:
  - NDIS DOS Ethernet driver – SMC8000.DOS (v2.00 or later)
  - ODI DOS Ethernet driver – SMC8000.COM (v3.03 or later)
  - IPX driver – IPX.COM (v 5.00 or later)

Conventions in This User Guide

The following conventions are used in this user guide.

Adapter Models

This user guide describes the three SMC EtherCard Elite Ultra adapter models. If information pertains to all three models, the term "adapters" will be used to refer to all three models collectively. However, if information applies to only certain models, those models will be clearly identified.

Notes

If information requires special attention, the symbol ☞ appears in front of it. For example:

☞ Use extreme care when handling the Boot ROM and your adapter. Both contain sensitive components that are prone to damage from electrostatic discharge.

Selecting Menu Items

Some EZStart procedures require that you "select" items with a mouse. The term "select" means to move the pointer to a particular item on the screen and then press the left mouse button.

Key Combinations

For users who do not have a mouse or prefer using a keyboard, EZStart procedures can be performed using two keys. For example:

If you do not have a mouse, press Alt+A to start the Automatic Setup and Test.

Alt+A means you hold down the Alt key and then press A.

Enter Key

In this user guide, the carriage return key is referred to as the Enter key. This key, which is also referred to as the Return key, often has the designation ↵.

User Entries

When you are required to make a keyboard entry, the information you are to enter appears in **bold** type. For example:

1. To run the EZStart program, type **EZSTART** and press the Enter key.

Variables

When you are required to type a variable, the variable appears in ***bold italics*** between brackets. For example:

1. If you unloaded PC Agent/SNMP and want to reload it during the current computer session without rebooting, type **PCAGENT [*filename.cfg*]** at the DOS command line and press the Enter key.

In this example, the variable **[*filename.cfg*]** means you should type the name of the configuration file, instead of the actual characters filename.cfg. When you type a variable, do not include the brackets; these are provided for reference purposes only.

EZStart Buttons

EZStart is a Windows-like program that lets you use buttons to perform various functions. For example, there is an **Automatic Setup and Test** button that lets you automatically configure and test your adapter. In this user guide, buttons that appear in EZStart screens are shown in **bold**. For example:

1. From the EZStart main screen, select **Automatic Setup and Test** to initiate EZStart's Automatic Setup and Test.

INSTALLING A BOOT ROM 2

This chapter describes how to install an optional Boot ROM on your adapter. A Boot ROM allows your PC to load its operating system over the network, instead of from the PC's local hard disk.

☞ If you do not intend to install a Boot ROM, you can skip this chapter.

Installation Instructions

Your adapter includes a socket that can accommodate a Boot ROM. If you want to install a Boot ROM but do not currently have one, contact the dealer where you purchased your adapter.

Once you obtain a Boot ROM, use the following procedure to install it on your adapter.

☞ Use extreme care when handling the Boot ROM and your adapter. In particular, follow electrostatic discharge (ESD) procedures before handling this equipment.

1. Discharge any static electricity from your body.
2. Find the Boot ROM socket on your adapter.
3. Orient the Boot ROM so that its notch is on the same side as the notch on the adapter socket. Make sure the Boot ROM is properly oriented. If you install the Boot ROM backwards, you will damage it.
4. Align the pins on the Boot ROM with the socket on your adapter (see Figure 2-1). Then carefully insert the Boot ROM straight down until it is firmly seated in the socket. Be careful not to bend any Boot ROM pins.

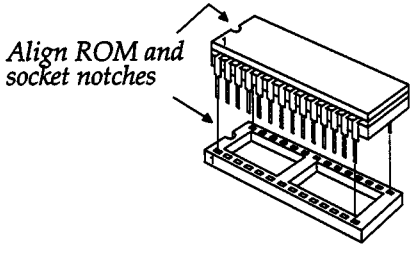


Figure 2-1. Installing a Boot ROM

5. Refer to the manual that came with your network operating system for any additional remote booting instructions.

After installing the Boot ROM, proceed to Chapter 3 to choose a Soft or preassigned EZSelect configuration method. If you choose the Soft method, you can use EZStart's Automatic Setup and Test feature to automatically configure the adapter, including the ROM size and ROM base address. Alternatively, you can use EZStart's Manual Setup feature (described in Appendix A) to custom-configure the adapter, including the ROM size and ROM base address, for a computer that requires particular attention.

If you choose the preassigned method, and you installed a Boot ROM, you can select configuration 4 or 5 to set the ROM size to 16KB and the ROM base address to D800. Note that preassigned configurations 2 and 3 will disable an installed Boot ROM.

CHOOSING AN EZSelect CONFIGURATION METHOD 3

The EZSelect configuration method lets you easily select the way you want your adapter to be configured. This chapter describes how to choose an EZSelect configuration method.

Overview

For ultimate flexibility, your adapter provides two EZSelect configuration methods, a "Soft" method and a preassigned method. Both methods let you use a selector on the adapter to choose how your adapter will be configured.

The Soft method is the default configuration method. With this method, you leave the selector in the **Soft** position on the adapter. You can then install the adapter in a computer and use EZStart's Automatic Setup and Test feature to automatically select a configuration that does not conflict with any other installed devices — including any other installed adapters. This configuration method is convenient for users who want to install multiple adapters in the same computer, because it guarantees that each adapter will have a unique, conflict-free configuration.

The preassigned method, on the other hand, is convenient for users who want to install a single adapter into many identically configured computers. For example, you can choose a preassigned configuration for one adapter, install it into a computer, and use the Automatic Setup and Test feature to see whether the configuration you chose conflicts with other installed devices. If no conflict is detected, you can configure the other adapters the same way and install them into their respective computers without having to run EZStart for each installation.

The following section describes the Soft configuration method. For information on using the preassigned configuration method, refer to page 3-3.

☞ For your convenience, you can use macros to automate the EZSelect configuration process. For more information, refer to Appendix B.

Using the Soft Configuration Method

The Soft configuration method ensures that when you run EZStart's Automatic Setup and Test feature, the adapter will be assigned a nonconflicting configuration automatically. If you installed a Boot ROM, the Automatic Setup and Test feature also configures the ROM size and ROM base address automatically.

To use the Soft configuration method:

1. Look at the adapter and make sure the selector is in the **Soft** position. **This is the factory default setting.**
2. Install the adapter in your computer (refer to Chapter 4).
3. Run EZStart's Automatic Setup and Test feature (refer to Chapter 5).
4. If you want to install additional adapters into the same computer, repeat steps 1 through 3. EZStart's Automatic Setup and Test feature ensures that each adapter will have its own unique, nonconflicting configuration.

☞ If you will be installing one or more adapters into a computer that requires particular attention (for example, a computer that has a number of installed devices), you may want to use EZStart's Manual Setup feature instead, to manually customize your adapter configuration. For more information, refer to Appendix A.

Using the Preassigned Configuration Method

The following procedure describes how to choose a preassigned configuration for your adapter.

1. Move the selector to the preassigned configuration you want to use. Figure 3-1 shows the preassigned configurations you can choose.

☞ If you installed a Boot ROM, select either configuration 4 or 5. These preassigned configurations set the ROM size to 16KB and the ROM base address to D800. Do not select configuration 2 or 3, because they disable an installed Boot ROM.

	I/O Base Address	IRQ Channel	RAM Base Address	ROM Base Address
1 (Factory default)	Soft Configuration			
2	280	3	D000	NONE
3	300	10	CC00	NONE
4	280	3	D000	D800
5	300	10	CC00	D800

Figure 3-1. Selecting a Preassigned Configuration

2. Install the adapter in your computer (refer to Chapter 4).
3. (Optional) Run EZStart's Automatic Setup and Test feature to make sure the preassigned configuration you chose does not conflict with other installed devices (refer to Chapter 5).
4. If you want to install additional adapters into the same computer, repeat steps 1 and 2 (and optionally 3). Make sure you choose a different preassigned configuration for each adapter you install.

INSTALLING AND CABLING YOUR ADAPTER 4

This chapter describes how to install your adapter in a computer and how to connect to your network.

Installing Your Adapter

You can install your adapter in any EISA bus slot or in either an 8-bit or 16-bit ISA bus expansion slot. For maximum performance, a 16-bit slot is recommended; a 16-bit slot also allows IRQ channels above 7 to be used with your adapter.

To install your adapter:

1. Turn off the computer's power.
2. Install the adapter according to the computer manufacturer's instructions. Always handle the adapter by its edges.

Connecting to the Network

After you install your adapter, you can use the procedures in this section to connect to your network. Topics in this section include:

- Connecting to a thin Ethernet cable — see page 4-2.
- Connecting to a thick Ethernet cable — see page 4-4.
- Connecting to a 10BASE-T concentrator — see page 4-5.

☞ For information on adapter connector pin assignments and cabling specifications, refer to Appendix C.

Connecting to a Thin Ethernet Cable

To connect your adapter to a thin Ethernet cable, you will need a BNC T-connector like the one shown in Figure 4-1. If you're installing a workstation at the end of the thin Ethernet cable, you will also need a terminator similar to the one shown in Figure 4-2.

1. Attach a BNC T-connector directly to the BNC port on the adapter's bracket by aligning the notches on the adapter's BNC connector with the notches on the BNC T-connector, and twisting clockwise about a quarter of a turn.
2. If the computer is not at the end of the cable segment, attach the BNC connector on the cable from each adjacent network station to the two open ends of the BNC T-connector.

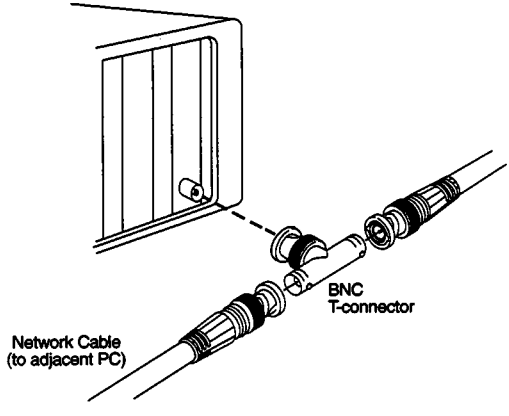


Figure 4-1. Attaching to a Thin Coax Cable Segment

3. If the computer is at either end of the cable segment, connect a 50-ohm terminator to the open end of the BNC T-connector (see Figure 4-2).

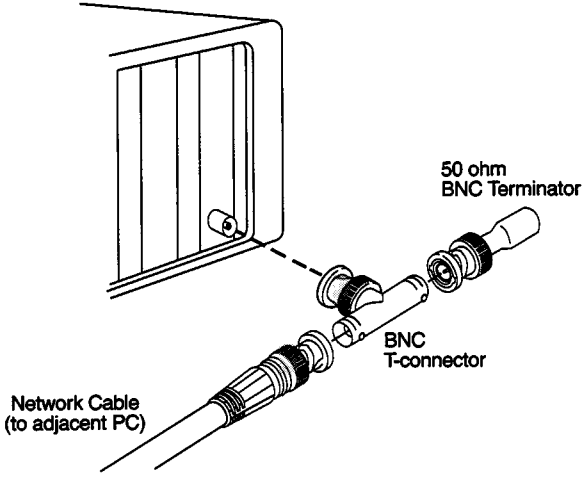


Figure 4-2. Terminating the Cable Segment

Connecting to a Thick Ethernet Cable

To connect your adapter to a thick Ethernet cable, you will need a transceiver drop cable like the one shown in Figure 4-3.

1. Follow the transceiver manufacturer instructions to install a transceiver at a marked location on the thick coax cable.
2. Attach the drop cable's DB-15 connector to the adapter's AUI port (see Figure 4-3). The AUI port has a sliding latch that locks the connector in place. The latch is snug and may require some effort to move it.
3. Attach the other end of the drop cable to the transceiver's AUI port.

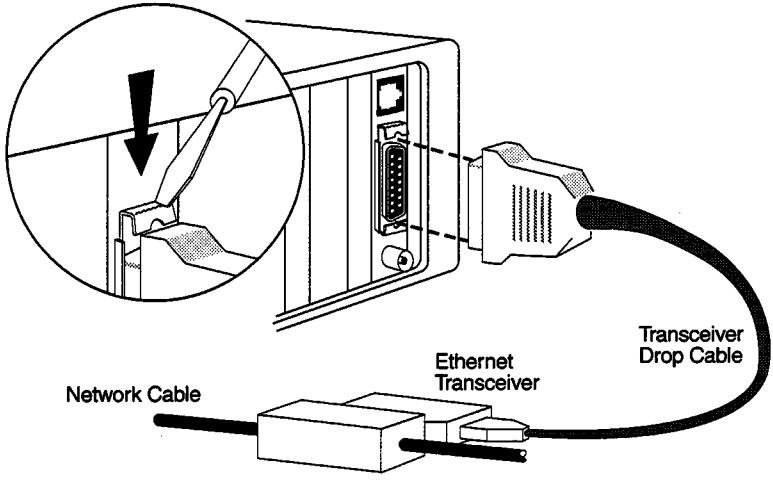


Figure 4-3. Attaching to Thick Ethernet Cable

Connecting to a 10BASE-T Concentrator

You can use unshielded twisted-pair (UTP) cable to connect your adapter to a 10BASE-T concentrator. This connection can be made directly, or indirectly via a wall outlet that has the proper wiring for an RJ-45 connector. Refer to the following instructions and Figure 4-4 to make these connections.

1. Attach the male RJ-45 connector on one end of an unshielded twisted-pair cable to the adapter's RJ-45 port.
2. Attach the male connector on the other end directly to an RJ-45 port on a 10BASE-T concentrator.

   OR

   Attach the male connector on the other end to a wall outlet with the proper wiring for an RJ-45 connector. Wiring from the wall outlet connection is usually routed to the concentrator through the telephone punch-down block located in a wiring closet.

☞ Regulations regarding the connection of equipment to telephone networks vary from country to country. Check with your local telephone company before using existing telephone wiring.

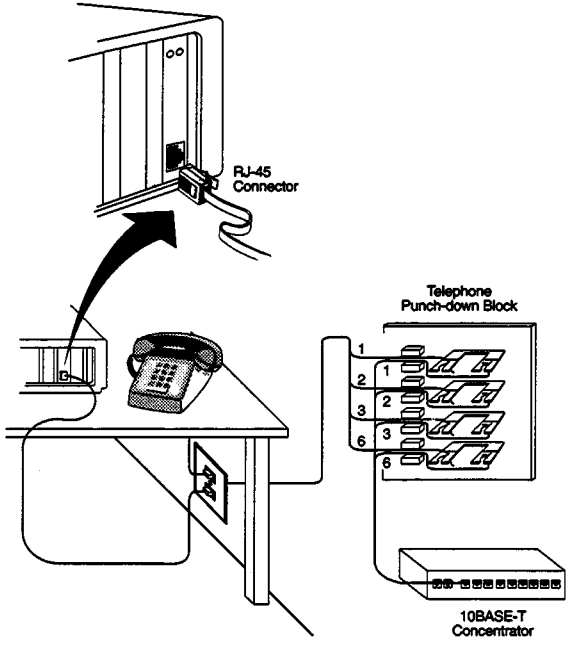


Figure 4-4. Connecting to a 10BASE-T Concentrator

USING EZStart TO SETUP AND TEST YOUR ADAPTER 5

The EZStart utility program provides an Automatic Setup and Test feature, which you can use to configure your adapter and test its basic functions. This chapter provides an overview of EZStart and describes how to use the Automatic Setup and Test feature.

EZStart Overview

EZStart provides a familiar Windows-like interface that can be accessed with a mouse. EZStart runs under MS-DOS or PC-DOS, version 3.11 or later, with or without Microsoft Windows. If your computer does not have a mouse, you can use the keys described in Table 5-1 to navigate through EZStart and select functions.

Each EZStart screen has a help line at the bottom that describes the purpose of the screen or selected function (the highlighted button).

Table 5-1. Keys for Navigating Through EZStart

To...	Use This Key...
Move to the next field or button	Tab
Move to the previous field or button	Shift+Tab
Select the highlighted function	Enter
Move to the next selection in a list box	Down arrow
Move to the previous selection in a list box	Up arrow
Obtain help	F1
Select a function that is not highlighted	Alt + underscored character For example, Alt + x to Exit
Close the current window (including Help windows)	F3 or Alt+F4

Loading EZStart

You can run EZStart from the SuperDisk floppy disk or, for improved performance, from your computer's hard disk. You can also run EZStart from Microsoft Windows.

Running EZStart from a Floppy Disk

To run EZStart from a floppy disk:

1. Insert the SuperDisk into your computer's floppy drive.
2. Change to the floppy drive where you inserted the SuperDisk. For example, if you inserted the SuperDisk in drive A, type **A:** and press the Enter key.
3. Type **EZStart** and press Enter. The EZStart main screen appears (see Figure 5-1).

☞ If your computer has more than one adapter, a screen shows each installed adapter and its configuration. Choose one by double-clicking on it, or by highlighting it and either choosing **Select** or pressing Enter. The EZStart main screen then appears.

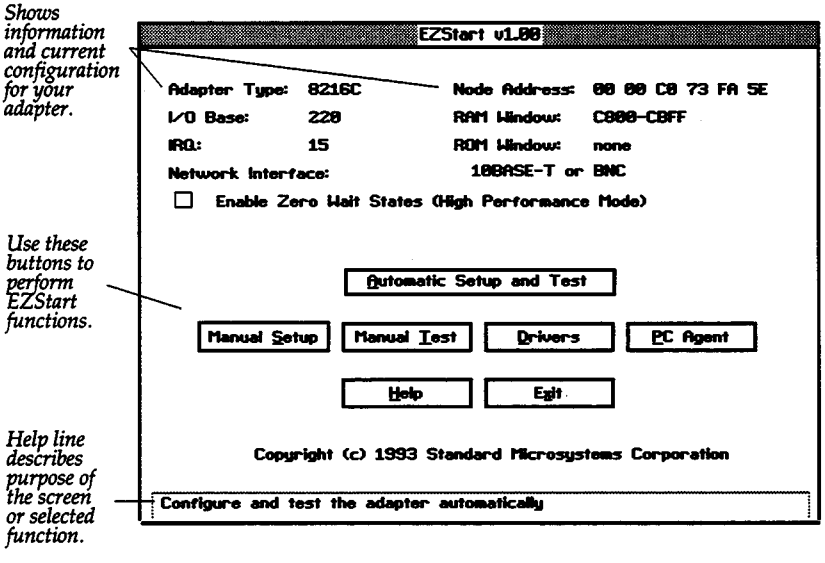


Figure 5-1. EZStart Main Screen

Running EZStart from a Hard Disk

To run EZStart from a hard disk, all of the EZStart files and the compressed driver file, SMCA*nn*.EXE, must reside in the same directory; otherwise, you will not be able to use EZStart to install drivers and PC Agent/SNMP.

1. Insert the SuperDisk into your computer's floppy drive.
2. Use the DOS COPY command to copy all the EZStart files from the SuperDisk to the directory that contains, or will contain, the compressed driver file, SMCA*nn*.EXE.
3. If you have not yet copied the compressed driver file, SMCA*nn*.EXE, to the same directory where you copied the EZStart files, do so now (refer to page 6-2).

☞ If you obtain an updated SMCA*nn*.EXE file and want to use it in place of the one on your computer's hard disk, copy the SMCA*nn*.EXE file you are currently using from your computer's hard disk to a floppy disk for safekeeping, then delete it from the hard disk. You can now copy the updated SMCA*nn*.EXE file to the same location where your EZStart files reside.

4. Change to the directory where you installed the EZStart files and SMCA*nn*.EXE, type **EZStart**, and press Enter. The EZStart main screen appears (see Figure 5-1).

☞ If your computer has more than one adapter, a screen shows each installed adapter and its configuration. Choose one by double-clicking on it, or by highlighting it and either choosing **Select** or pressing Enter. The EZStart main screen then appears.

Running EZStart from Microsoft Windows

The following instructions describe how to run EZStart from the Microsoft Windows desktop. This will allow you to double-click on the EZStart icon to access EZStart directly from Microsoft Windows.

1. Insert the SuperDisk into your computer's floppy drive.
2. Use the DOS COPY command to copy all the EZStart files from the SuperDisk to the directory that contains, or will contain, the compressed driver file, SMCA*nn*.EXE.

3. If you have not yet copied the compressed driver file, SMCA*nn*.EXE, to the same directory where you copied the EZStart files, do so now (refer to page 6-2).

☞ If you obtain an updated SMCA*nn*.EXE file and want to use it in place of the one on your computer's hard disk, copy the SMCA*nn*.EXE file you are currently using from your computer's hard disk to a floppy disk for safekeeping, then delete it from the hard disk. You can now copy the updated SMCA*nn*.EXE file to the same location where your EZStart files reside.

4. Start Microsoft Windows.

5. From the Microsoft Windows Program Manager, select **New** in the **File** menu.

6. Select **Program Item**.

7. Select the **OK** button.

8. For the **Command Line** entry, type the complete path where you copied the EZStart files and the SMCA*nn*.EXE file. For example: **C:\SMC\EZSTART.EXE**

☞ You can use the **Browse** button to search for the directory and filename where these files reside.

☞ If you prefer, you can use the EZSTART.ICO file instead of EZSTART.EXE for the **Command Line** entry and gain additional control over the environment in which EZStart loads. For more information on working with .PIF files, refer to the Microsoft Windows documentation.

9. Select **Change Icon**.

10. Select **OK**.

11. Select **Browse** and select the directory where you installed EZStart.

12. Select the **EZSTART.ICO** file to install the icon on your Windows desktop.

13. Select **OK** with each window, until you return to your Windows desktop.
14. Double-click on the EZStart icon to start EZStart.

☞ If you use EZStart with Windows for Workgroups, do not run EZStart from the MS-DOS Prompt in the Main Group. Instead, double-click on the EZStart icon on the Windows Desktop, or exit Windows for Workgroups and run EZStart from the MS-DOS prompt.

Automatic Setup and Test

EZStart's Automatic Setup and Test feature is comprised of two parts. The first part configures your adapter according to the EZSelect configuration method you chose in Chapter 3.

- If you selected the Soft configuration method — EZStart automatically assigns a nonconflicting configuration to the adapter.
- If you selected a preassigned configuration — EZStart determines whether the configuration you chose conflicts with any other devices installed in the computer, and prompts you if a conflict is detected.

The second part runs the Basic Adapter Test once. This test evaluates your adapter's basic components functions, including I/O port accessibility, LAN address ROM, on-board RAM, network controller registers, Boot ROM (if installed), internal loopback, and interrupt generation.

Before proceeding, note the following information:

- Configuration settings — for a complete list of the configuration settings available for your adapter, including the adapter's default settings, refer to Table A-1 on page A-4.
- Testing individual adapter parameters — you can use EZStart's Manual Test feature to test individual adapter parameters. For more information, refer to Appendix D.
- Multiple adapters — if you work with multiple adapters, refer to page 5-8 for guidelines on how you can use Automatic

Setup and Test to configure multiple adapters quickly and easily.

To run EZStart's Automatic Setup and Test feature:

1. From the EZStart main screen, select **Automatic Setup and Test** (see Figure 5-2).

☞ If you do not have a mouse, press Alt+A, or press the Tab key to move to **Automatic Setup and Test** and press the Enter key.

Select **Automatic Setup and Test** *to begin the procedure.*

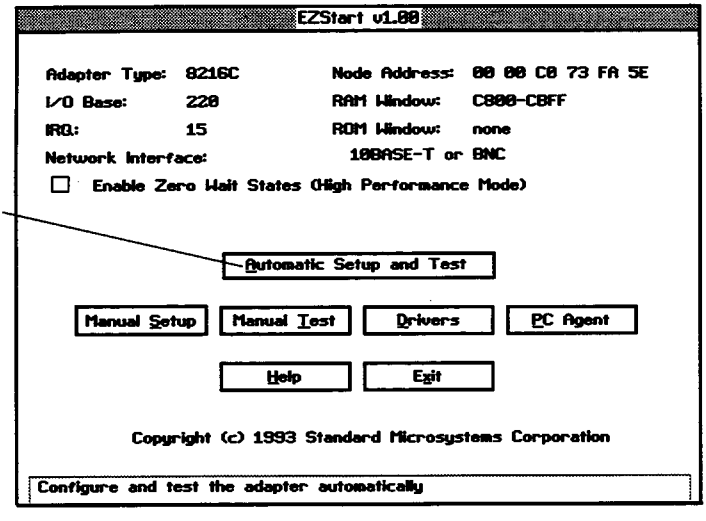


Figure 5-2. Running Automatic Setup and Test

EZStart searches for a nonconflicting configuration (if you selected the Soft configuration method), or verifies that the preassigned configuration does not conflict with any installed devices. Then EZStart tests the adapter's basic functions.

When the Automatic Setup and Test procedure is completed, a screen similar to the one in Figure 5-3 appears, displaying the adapter configuration and test result. If you chose a preassigned configuration that conflicts with another installed de-

vice, however, EZStart searches for a nonconflicting configuration and displays it in the screen shown in Figure 5-3.

☞ If EZStart is unable to find a nonconflicting configuration for your adapter, an appropriate message appears. For example, if an I/O Base Address setting cannot be found for your adapter, the following message appears: **Could not find any available IO space.** You can then use EZStart's Manual Setup feature (described in Appendix A) to manually select a nonconflicting configuration and the Manual Test feature (described in Appendix D) to test the configuration.

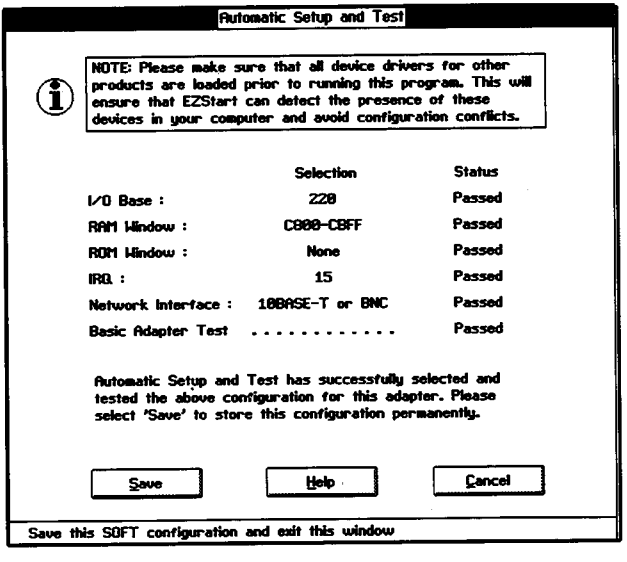


Figure 5-3. Sample Automatic Setup and Test Results

2. To save the displayed configuration, select **Save**. The screen shown in Figure 5-4 then asks whether you want to install a network driver.

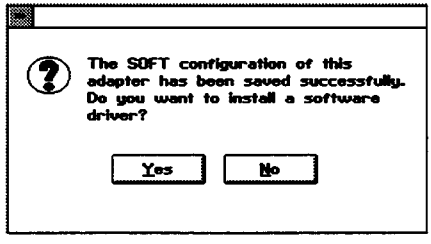


Figure 5-4. Saving a Configuration

☞ If EZStart finds a conflict with a preassigned configuration, a message prompts you to move the selector to the **Soft** position. If you receive this message, select **OK** to display the message in Figure 5-4 and install network drivers, if desired. However, the nonconflicting configuration will not take effect until you save and exit from EZStart, turn off your PC, move the selector to the **Soft** position on the adapter, and turn on your PC again.

3. To install a network driver, select **Yes** and proceed to Chapter 6.

   OR

   Select **No** to return to the EZStart main screen. You can then use the buttons at the lower half of the screen to perform other EZStart functions, or select **Exit** to quit EZStart.

Multiple Adapter Guidelines

EZStart's Automatic Setup and Test feature offers a significant advantage to users who work with multiple adapters — namely, a fast and easy way of ensuring that adapters do not conflict with other installed devices.

For example, assume you want to install multiple adapters in the same computer. You can choose the Soft configuration for each adapter, install the first adapter in the computer, and use Automatic Setup and Test to automatically assign a nonconflicting configuration to that adapter. You can then repeat this procedure for each additional adapter you want to install in the same computer. Each time you run Automatic Setup and Test, the most recently installed

adapter is configured with a unique address that will not conflict with any other installed device — including any adapter you previously installed.

EZStart's Automatic Setup and Test feature can also be helpful to users who want to install a single adapter in each one of a group of computers that have the same configuration. For the first adapter, choose a preassigned configuration that you believe will not conflict with other installed devices. Then install the adapter in the computer and use Automatic Setup and Test to verify that the preassigned configuration does not conflict with other installed devices. If it does not conflict, you can use the same preassigned configuration with the other adapters and install them in their respective computer without having to run Automatic Setup and Test after each installation — since you verified that the adapter configuration does not conflict with devices installed in computers that have the same configuration as the first.

If a conflict is detected, choose another preassigned configuration for the adapter and run Automatic Setup and Test again to verify that this configuration will not conflict with another installed device. When you find a nonconflicting configuration, use it for the other adapters you want to install into identically configured computers.

Notes

INSTALLING NETWORK DRIVERS 6

EZStart accesses network driver files using the compressed driver file, SMCA*nn*.EXE. The "A" in this filename denotes 8216 Elite Ultra and "*nn*" denotes the SuperDisk version. This chapter describes how to install network drivers from this compressed file on the SuperDisk.

Overview

SMC provides a broad range of network operating system drivers and interface software, including NetWare (IPX, DOS, and OS/2 ODI), Microsoft LAN Manager and Windows NT. For optimum performance, most drivers can be loaded into your computer's upper memory area.

All SMC network driver files reside in a compressed file called SMCA*nn*.EXE, located in the root directory of the SuperDisk. There are two ways to install drivers from this compressed file:

- Using EZStart to install selected network drivers to a Destination Directory
- Using a manual method to extract the entire SMCA*nn*.EXE file to a Destination Directory

The following sections describe these methods.

EZStart Method

Using EZStart, you can automatically copy the network drivers needed for your environment from the compressed file, SMCA*nn*.EXE, to a Destination Directory on your computer's hard disk; to a blank, formatted floppy disk; or to the SuperDisk. The installation instructions on the next page describe this procedure.

When you use EZStart to copy a network driver, you also copy supporting files for that driver, including configuration files, installation instructions, and release information. You can also view these supporting files on the computer screen and print them, if desired.

☞ If you execute EZStart from your computer's hard disk and obtain an updated SMCA*nn*.EXE file, you will want to use the updated file in place of the one on the hard disk. Therefore, copy the SMCA*nn*.EXE file you are currently using from your computer's hard disk to a floppy disk for safekeeping, then delete it from the hard disk. You can now copy the updated SMCA*nn*.EXE file to the same location where your EZStart files reside.

Manual Method

The manual method lets you extract all of the network drivers and supporting files from the SMCA*nn*.EXE file to a Destination Directory on your computer's hard disk. You can then decide which drivers and supporting files you need.

☞ The extracted drivers take up approximately 1.3MB of disk space. Make sure you have sufficient disk space available before extracting the compressed drivers.

1. Move to the floppy drive where the SuperDisk resides.
2. Type the following command line at the DOS prompt and press Enter:

   SMCA*nn* <*Destination Directory*>

In the command line above:

- *nn* is the SuperDisk version.
- *<Destination Directory>* is the complete path where you want the extracted SuperDisk contents to reside.

Installation Instructions

The following procedure describes how to use EZStart to install network drivers. You can install network drivers after running the EZStart Automatic Setup and Test, or at any time from the EZStart main screen.

After the driver is installed, you can use the instructions in this procedure to view and print its supporting files.

1. If you just completed the Automatic Setup and Test, proceed to step 2. Otherwise, load EZStart, as described on page 5-2, and select **Drivers** from the EZStart main screen.

   The Network Operating System Selection screen appears, with a list of network operating systems (see Figure 6-1).

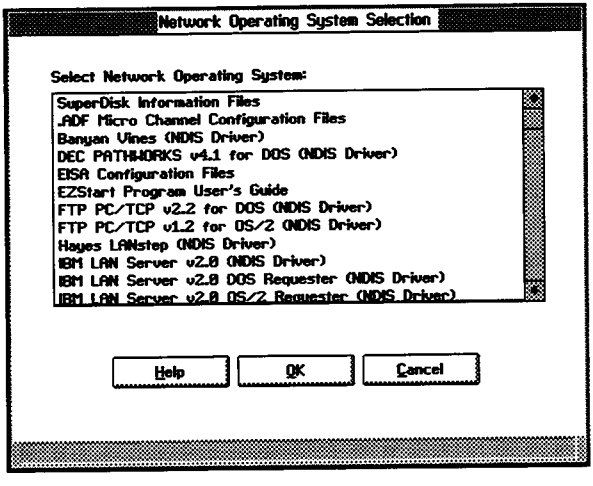


Figure 6-1. Selecting a Network Operating System

2. Select your network operating system from the list. If you do not see the desired network operating system in the list, use the scroll arrows on the right side of the list box to scroll through the list until you see your network operating system.

☞ If you prefer, use the Up and Down Arrow keys to scroll through the list line by line, or use the Page Up and Page Down keys to scroll a page at a time. When you find the desired network operating system, highlight it using the Up and Down Arrow keys and press Enter to select it.

3. Select **OK**. A Driver Installation screen for the selected driver appears. Figure 6-2 shows the Driver Installation screen for NetWare DOS ODI Shell.

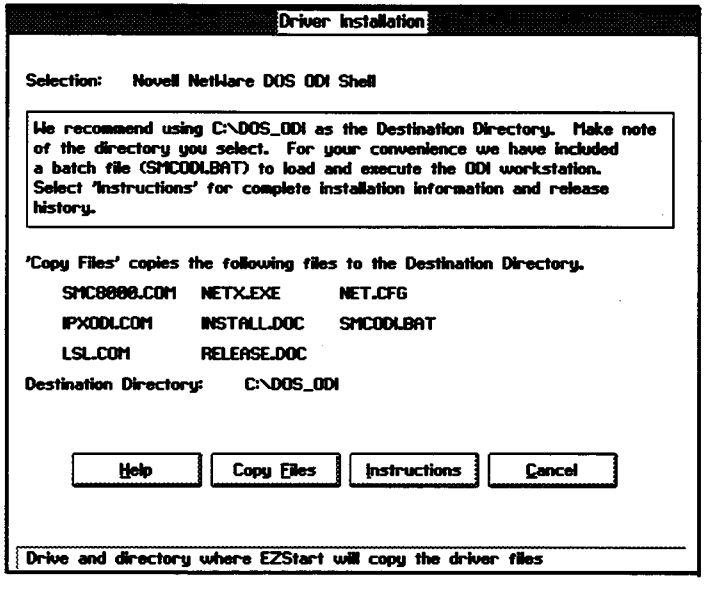


Figure 6-2. Sample Driver Installation Screen

EZStart suggests a Destination Directory consistent with the installation instructions for the network operating system, and lists the driver program, any supporting files, the installation file (named INSTALL.DOC for most drivers), and RELEASE.DOC file for that network operating system driver. The installation file contains complete instructions for installing the network driver. The RELEASE.DOC file contains release information about the current version of the network driver.

☞ Some network drivers can be installed simply by using EZStart to copy them from the SuperDisk to the appropriate destination on your computer's hard disk. Other network drivers require an installation disk, which you can create as follows:

- If your computer has two floppy drives — use EZStart to copy the network drivers from the SuperDisk to a blank, formatted floppy diskette in the second floppy drive.

  OR

- If your computer has one floppy drive — use EZStart to copy the network drivers to your computer's hard disk, then use the DOS COPY command to copy them to a blank, formatted floppy diskette. Alternatively, if you made a backup copy of the SuperDisk, you can leave the backup in the floppy drive and use EZStart to copy the network drivers onto it, if room permits (a message appears if there is not enough room).

After the network drivers are copied, you can use the instructions in that driver's installation file, along with the installation diskette you created, to install the driver on your computer.

4. If you want to view and/or print driver configuration files and documents such as INSTALL.DOC and RELEASE.DOC before copying the driver files, refer to "Viewing Driver Documents and Configuration Files" on page 6-6 and "Printing Driver Documents and Configuration Files" on page 6-7. Then continue with step 5 in this procedure to copy the driver files to your computer hard disk.
5. To copy the driver files to your computer's hard disk, accept the default destination or enter a Destination Directory (EZStart will automatically create the directory if it doesn't exist).
6. Select **Copy Files**. The selected driver and associated files are copied to the Destination Directory.
7. After the files are copied, the message **Copy Complete** appears. Select **OK** to remove the message.
8. If the driver you copied does not support PC Agent/SNMP, proceed to the next sections to view and/or print driver documents and configuration files.

   If the driver supports PC Agent/SNMP, the message shown in Figure 6-3 appears.

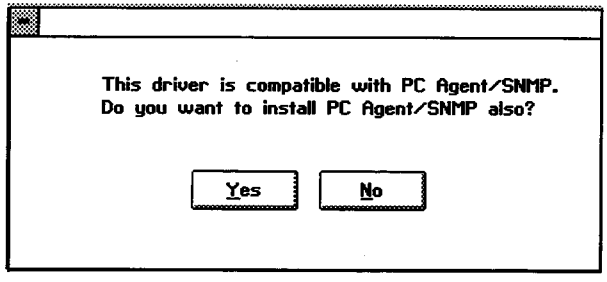


Figure 6-3. Prompt for Installing PC Agent/SNMP

9. To install PC Agent/SNMP, select **Yes** and proceed to Chapter 7. If you do not want to install it, select **No** to return to the Driver Installation screen.

Viewing Driver Documents and Configuration Files

The following procedure describes how to use EZStart to view driver configuration files and documents such as INSTALL.DOC (which contains the primary installation instructions for that driver) and RELEASE.DOC (which contains driver-release information). You can perform this procedure before or after copying driver files from the SuperDisk diskette to your computer's hard disk.

☞ The file containing the primary installation instructions is not always named INSTALL.DOC. For example, the installation file for the DEC Pathworks selection is named DEC41DOS.DOC. By default, the primary installation file is always displayed first in the list of document and configuration files.

1. Select **Instructions** in the Driver Installation screen. A Document screen appears.
2. Select the Document drop-down box at the top-left corner of the Document screen. A list of the documents and configuration files associated with the driver appears. By default, the primary installation file for the driver is the first file in the list.
3. Select the document or file you want to view. If the document or file exceeds what can be shown on your screen, use the scroll

arrow or scroll bar to the right of the screen, or the Page Down or down arrow key, to scroll down.

☞ For your convenience, you can use your text editor or word processor to view and print driver configuration files and documents after you copy the driver files to your computer's hard disk.

Printing Driver Documents and Configuration Files

If you want to obtain a hard copy version of a driver configuration file or document displayed on your computer screen:

1. Prepare your printer.
2. Select **Print** in the Document screen. The displayed file or document is printed.
3. If you have not yet copied the driver onto your computer's hard disk, proceed to step 5 under "Installation Instructions" on page 6-5. Otherwise, proceed to "Completing the Driver Installation," next.

Completing the Driver Installation

When you finish with the installation:

1. Select **Cancel** in the Driver Installation screen. You return to the EZStart main screen.
2. Follow the installation instructions in the .DOC file(s) for the driver that you installed.

Notes

INSTALLING AND USING PC AGENT/SNMP 7

This chapter describes how to install and use PC Agent/SNMP. PC Agent/SNMP is a Simple Network Management Protocol (SNMP) agent that collects valuable statistical and configuration information about your computer, adapter, and network. By analyzing this information, network administrators can keep their networks operating at peak efficiency.

Overview

PC Agent maintains a database of computer and adapter statistical and configuration information in your computer's RAM. Most of this information— such as memory usage, disk capacity, and disk usage — is obtained directly from the computer and adapter during network operation; additional information — such as the name of the person using the computer and the computer's location, make, and model — is obtained from a user-defined configuration file.

PC Agent/SNMP is a true SNMP agent, allowing your computer and adapter to be directly monitored by any SNMP Manager, such as Hewlett Packard's OpenView, Sun SunNet Manager, and SMC's own EliteView. You can also use the **PC Agent** button on the EZStart main screen to view information collected by PC Agent/SNMP.

In addition, PC Agent/SNMP is network operating system-independent, offering end-to-end management of your entire star or bus network — even if the server is inoperable.

PC Agent Requirements

PC Agent/SNMP is a DOS terminate-and-stay-resident (TSR) program that occupies approximately 22KB of memory. For convenience, PC Agent/SNMP can be loaded into either high or low memory.

PC Agent/SNMP also requires an agent-compatible network driver to be resident in your computer's memory. The SMC network drivers compatible with PC Agent/SNMP are:

- NDIS DOS Ethernet driver – SMC8000.DOS (version 2.00 or later)
- ODI DOS Ethernet driver – SMC8000.COM (version 3.03 or later)
- IPX driver – IPX.COM (version 5.00 or later)

☞ PC Agent/SNMP can be used with IPX and TCP/IP networks. Although PC Agent/SNMP does not require the loading of a network operating system or protocol stack, an IP address must be available if it is to communicate with SNMP Network Management Stations using TCP/IP protocol.

Installation Instructions

The following procedure describes how to install PC Agent/SNMP. You can install PC Agent/SNMP after installing an agent-compatible driver, or at any time from the EZStart main screen.

After the driver is installed, you can use the instructions in this procedure to view the statistical and configuration information gathered by PC Agent/SNMP.

1. If you just installed an agent-compatible driver, proceed to step 3. Otherwise, load EZStart, as described on page 5-2, and select **PC Agent** from the EZStart main screen. The PC Agent/SNMP screen appears (see Figure 7-1).

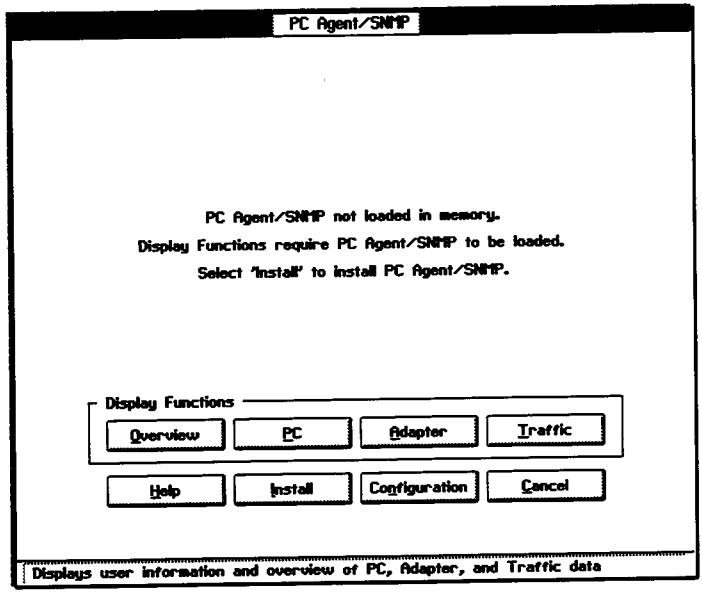


Figure 7-1. PC Agent/SNMP Screen

2. Select **Install**. The PC Agent/SNMP Information and Installation screen appears (see Figure 7-2).

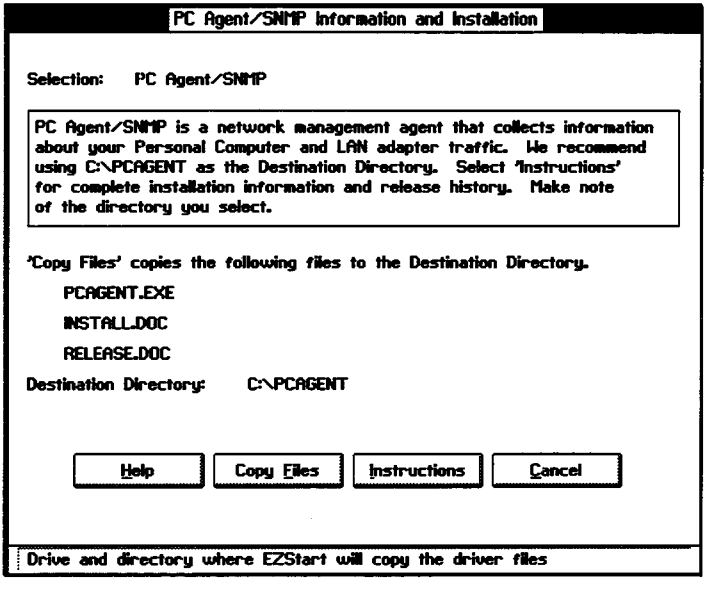


Figure 7-2. PC Agent/SNMP Information and Installation Screen

3. Either accept the default destination or enter a Destination Directory (EZStart will automatically create the directory if it doesn't exist).
4. Select **Copy Files** to copy the PC Agent/SNMP files to the specified directory.
5. After the files are copied, the message **Copy Complete** appears. Select **OK** to remove the message.
6. Another message appears, asking whether you want to create a PC Agent/SNMP configuration file. Select **Yes** if you want to create a configuration file or **No** to not create one.

☞ The PC Agent/SNMP configuration file passes user-defined information to PC Agent/SNMP, such as the name of the

person using the computer and the computer's location, make, and model.

7. If you select **Yes**, a message tells you that the configuration file does not exist. Select **Yes** to create the file or **No** to not create it.
8. Either accept the default filename (pcagent.cfg), or enter a unique name (including the full path) for the configuration file. Note that the PC Agent/SNMP files and the configuration file must reside in the same directory.

☞ If you installed PC Agent/SNMP for an adapter previously installed in the same computer, assign a different filename to this configuration file. If you desire, you can change the filename later when you save the file (refer to page 7-9).

9. Select **OK**. A screen similar to the one in Figure 7-3 appears.
10. Complete the fields in the screen shown in Figure 7-3. Refer to Table 7-1 for information on completing these fields.

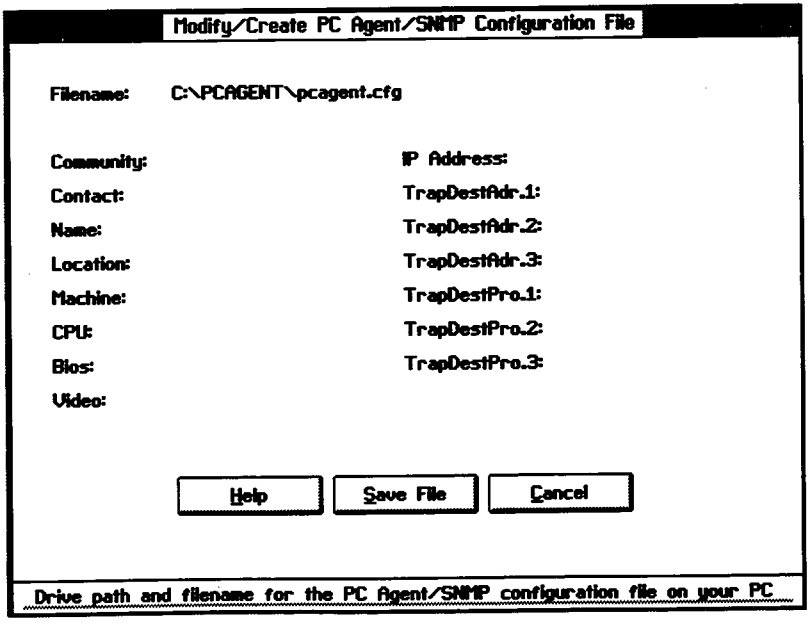


Figure 7-3. Creating a Configuration File

Table 7-1. Creating a Configuration File

In This Field...	Enter This Information...
Community	Password (up to 12 characters) that the SNMP Manager uses for read/write operations. If no password is defined, the default password "public" is used.
Contact	Name of person to call for help (up to 45 characters). This field is initialized by the agent with SMC's technical support telephone number in the USA. *Example:* 1-800-123-2345
Name	Computer user's name (up to 45 characters). *Example:* Harlan Marks
Location	Computer's physical location (up to 45 characters). *Example:* Downtown Library
Machine	Computer make and model (up to 45 characters). *Example:* IBM AT
CPU	Type of microprocessor installed in the computer, and presence of an installed coprocessor. The agent ascertains this data from the computer, or you can enter this information (up to 30 characters). *Example:* Processor 80386
Bios	Computer BIOS manufacturer and version number. The computer provides this data by scanning for copyright notices in the BIOS area, or you can enter this information (up to 50 characters). *Example:* ABC BIOS V1.10
Video	Type of video adapter used by your computer (up to 25 characters). *Example:* Super VGA

In This Field...	Enter This Information...
IP Address	IP address for PC Agent/SNMP. IP address is required if PC Agent/SNMP communicates with SNMP management stations using the TCP/IP protocol. Otherwise, it is optional. If the computer also has a TCP/IP stack, the agent address may be identical to the one assigned to the TCP/IP stack. However, you may want to assign a different IP address to the agent to avoid confusion. The IP address string in the configuration file is smcDosWsIpAdr and is assigned a value in the form X.X.X.X, where each "X" is a value from 0 to 255. The object name is case-sensitive. *Example:* 129.254.2.3

In This Field...	Enter This Information...
TrapDestAdr.1 **TrapDestAdr.2** **TrapDestAdr.3**	In a TCP/IP network, these are IP addresses of network management stations where traps (alerts) are to be sent if an alarm occurs. In an IPX network, these are IPX network addresses of the network management stations where traps should be sent. Traps can be sent to up to 3 management stations (Adr.1, Adr.2, and Adr.3). In an IPX network, if the network management station is on another network, the protocol specified here should be acceptable to the router on the local network. 1 = Not used 2 = TCP/IP (Ethernet and Token-Ring) 3 = IPX with Ethernet II frame type (Ethernet only) 4 = IPX with 802.2 (LLC) frame type (Ethernet and Token-Ring) 5 = IPX with SNAP frame type (Ethernet and Token-Ring) 6 = IPX with 802.3 frame type (Ethernet only) *Example:* 1=2
ipDfGwy	Default gateway for the IP network, used when traps are configured for IP addresses on another subnet. This information is assigned a value in the form X.X.X.X, where each "X" is a value from 0 to 255. The object name is case-sensitive. (See the Note on the next page.)

In This Field...	Enter This Information...
ipSubNetMask	IP subnet mask, indicating which bits in IP address field refer to the network address. This information is assigned a value in the form X.X.X.X, where each "X" is a value from 0 to 255. The object name is case-sensitive. (See the Note, below.) *Example:* 255.255.0.0

Note: The **ipDfGwy** and **ipSubNetMask fields** can be accessed directly in the PC Agent/SNMP configuration file; they cannot be accessed via EZStart.

11. To save the configuration file under a different name, enter this information next to **Filename**. Note that the configuration file must remain in the same directory as PC Agent/SNMP.
12. Select **Save File**. You return to the PC Agent/SNMP Information and Installation screen.
13. To view or print the PCAGENT.DOC file, which explains how to load PC Agent/SNMP with your network operating system and driver, select **Instructions**.
14. Your installation is now complete. To return to the EZStart main screen, select **Cancel** in each screen that appears until you see the EZStart main screen.
15. To perform other EZStart functions, select the appropriate button. To exit EZStart, select **Exit**.

Loading and Unloading PC Agent/SNMP

The following sections describe how to load and unload PC Agent/SNMP.

Loading PC Agent/SNMP

PC Agent/SNMP is a TSR program and consists of a single executable file: PCAGENT.EXE. After you install PC Agent/SNMP, you can have it automatically load each time your computer boots by adding the appropriate statements to your computer's AUTOEXEC.BAT file and rebooting your computer.

PC Agent/SNMP can load only after the appropriate driver (IPX, ODI, or NDIS) loads into memory. For example, adding the following lines to the AUTOEXEC.BAT file loads the Novell Link Support Layer (LSL) and the SMC Ethernet ODI Driver (SMC8000.COM), followed by PC Agent/SNMP, with PCAGENT.CFG used as the configuration file:

```
LSL
SMC8000
PCAGENT PCAGENT.CFG
```

Since PC Agent/SNMP can be loaded only after the appropriate driver loads into memory, PC Agent/SNMP should execute immediately after the driver loads, as in the example above. This ensures that load-time requirements are met.

It may be more convenient, however, to place configuration files for the various computers on a server, where they can be controlled by a network administrator. In this case, the Login sequence precedes the loading of PC Agent. For example, if the network administrator allocates a user area on network drive F for the various users' configuration files, the following lines in user Kathy's AUTOEXEC.BAT file loads PC Agent in a NetWare environment:

```
LSL
SMC8000
IPXODI
NETX
LOGIN
PCAGENT F:\USERS\AGTSTUFF\KATHY.CFG
```

☞ Because PC Agent/SNMP is a TSR, it cannot be loaded after Microsoft Windows is running.

When PC Agent/SNMP loads, it first examines the computer and adapter and initializes its database accordingly. Then, if a configuration file has been specified, PC Agent/SNMP uses the file to initialize, and in some cases overwrite, the information in its database. If a configuration file has not been specified, PC Agent/SNMP uses PCAGENT.CFG as the default configuration file and assumes that the file resides in the same directory as PC Agent/SNMP.

For example, the agent may initialize the display type value in its database to "EGA/VGA" (a generic description). However, if the display type is also present in the configuration file, its value replaces the information obtained by PC Agent/SNMP. Often the description entered into the configuration file is more specific than that which can be obtained by PC Agent/SNMP (for example, "ATI VGA Wonder w/512KB").

☞ If you installed more than one adapter and/or driver in the same computer, PC Agent/SNMP looks for the driver loaded at the lowest memory address, and monitors and collects configuration information for that driver only. You can use the MEM/P command, available with DOS versions 5.0 and later, to see which driver resides at the lowest memory address.

Unloading PC Agent/SNMP

To unload PC Agent/SNMP:

1. Type **PCAGENT /U** at the DOS command line.
2. Press the Enter key.

If you want to reload PC Agent/SNMP during the current computer session without having to reboot:

1. Type **PCAGENT [*filename.cfg*]** at the DOS command line, where **[*filename.cfg*]** is the name of the configuration file.
2. Press Enter.

Viewing PC Agent/SNMP Data

EZStart provides the following ways to view data that PC Agent/SNMP collects:

- Configuration overview — provides an overview of the network station configuration. Refer to the next section.
- PC information — refer to page 7-14.
- Adapter information — refer to page 7-15.
- Traffic information — refer to page 7-16.

Configuration Overview

After PC Agent/SNMP is installed and loaded, you can obtain an overview of the network station configuration, including information about the PC, the adapter, and the network traffic, by selecting **PC Agent** on the EZStart main screen. A screen similar to the one in Figure 7-4 appears.

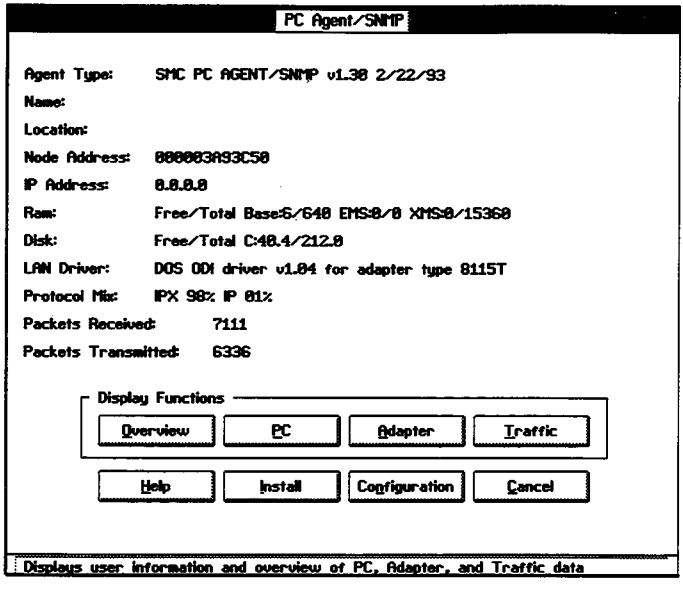


Figure 7-4. Network Station Configuration Overview

The **Display Functions** area at the bottom of the screen provides buttons that let you navigate through other PC Agent/SNMP screens and perform the functions shown in Figure 7-5.

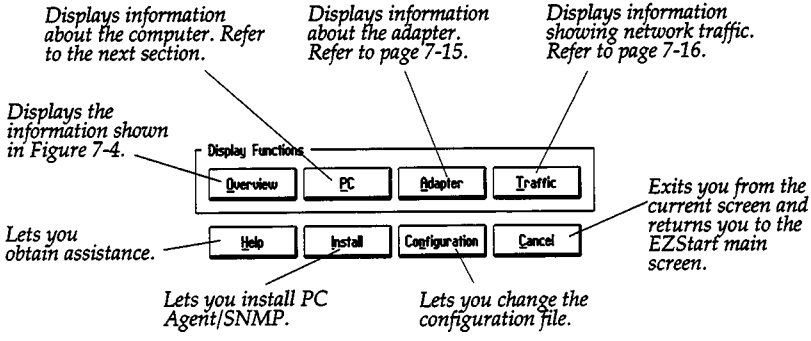


Figure 7-5. Display Functions

PC Information

If you select **PC** in the **Display Functions** area, a screen similar to the one in Figure 7-6 appears. This screen displays information about the computer. Except for **Machine, Video,** and **Comments,** all the information shown in this screen is obtained from PC Agent/SNMP. **Machine** and **Video** information is obtained from the configuration file. Comments are notes that you entered for your own personal reference in the PC Agent/SNMP configuration file.

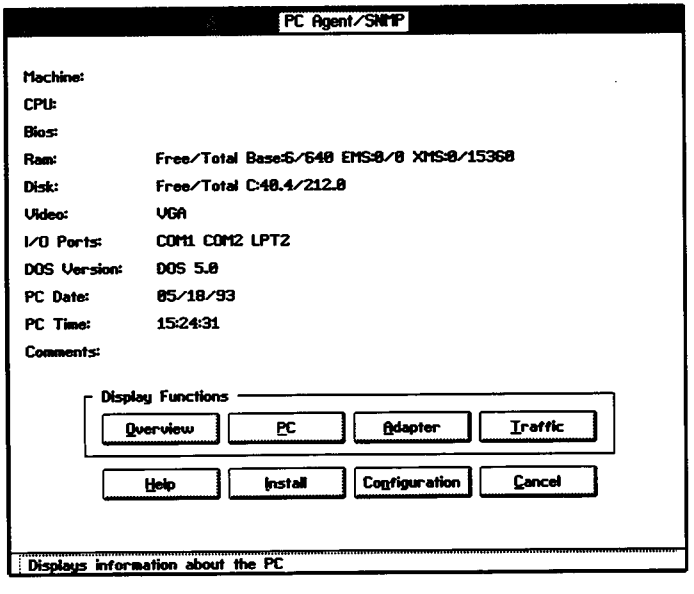


Figure 7-6. PC Information

Adapter Information

If you select **Adapter** in the **Display Functions** area, a screen similar to the one in Figure 7-7 appears. This screen displays information about the adapter, including the network driver and the adapter configuration.

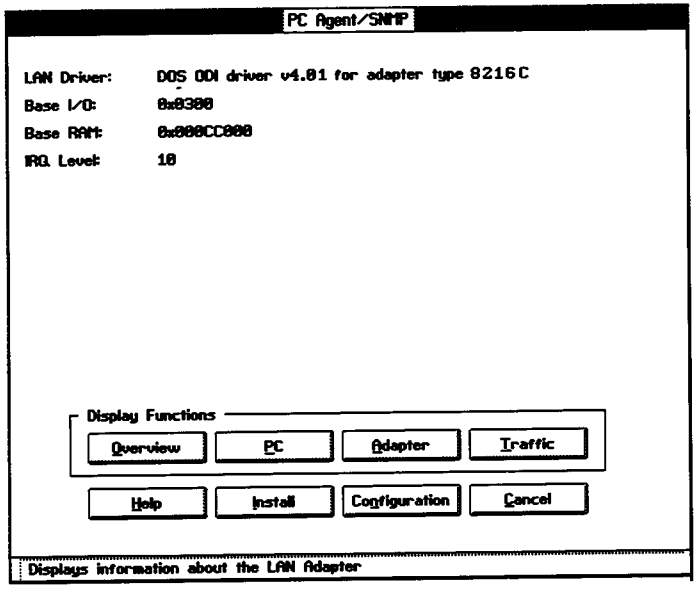


Figure 7-7. Adapter Information

Traffic Information

If you select **Traffic** in the **Display Functions** area, a screen similar to the one in Figure 7-8 appears. This screen displays network traffic information.

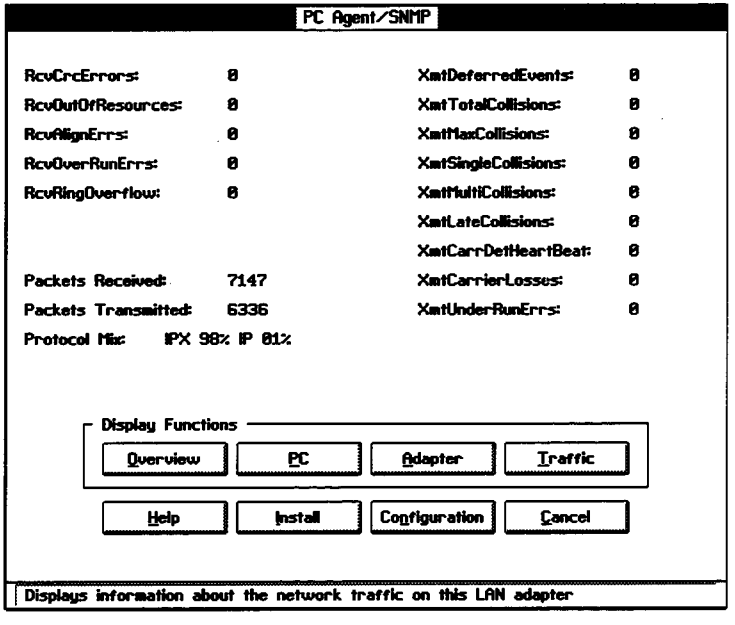


Figure 7-8. Network Traffic Information

Returning to the EZStart Main Screen

When you finish viewing PC Agent/SNMP data, select **Cancel** until the EZStart main screen reappears. You can then perform other EZStart functions by selecting the appropriate button, or exit EZStart by selecting **Exit**.

USING EZStart FOR MANUAL SETUP A

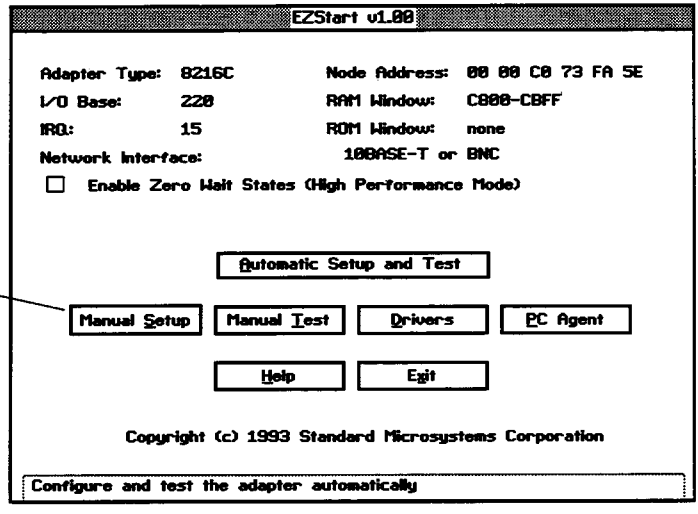
All devices installed in a computer (such as video adapters and disk controllers) or connected to computers (such as printers and modems) use the computer's resources. Configuration options such as IRQ channel, I/O base address, and memory base address determine how a computer's resources are apportioned to each device. If a computer has a number of installed and add-on devices, the devices may be vying for more resources than the computer can provide. As a result, you may encounter a conflict with the devices installed in your computer.

Using EZStart's Manual Setup feature, you can custom-configure your adapter to avoid conflicts with other installed and add-on devices. This appendix describes how to use EZStart's Manual Setup feature to configure your adapter.

Using the Manual Setup Feature

To use the Manual Setup feature:

1. Make sure the adapter selector is in the default **Soft** position (refer to page 3-2).
2. Install the adapter in your computer (refer to Chapter 4).
3. Load EZStart (refer to page 5-2).
4. From the EZStart main screen, select **Manual Setup** (see Figure A-1). The Manual Setup screen in Figure A-2 appears.



Select **Manual Setup** *to custom-configure your adapter.*

Figure A-1. EZStart Main Screen

5. Under **SOFT Setup**, you can:
   - Select the adapter's I/O base address — refer to page A-4.
   - Select the adapter's IRQ level — refer to page A-6.
   - Select the adapter's RAM base address — refer to page A-6.
   - Enable or disable the adapter's Boot ROM — if you installed a Boot ROM on your adapter and want to enable it, click on **Enable ROM** so an **X** appears next to it. Then set the ROM base address and ROM size settings for the Boot ROM. Refer to page A-8.

☞ If you installed a Boot ROM and ran the Automatic Setup and Test feature prior to running Manual Setup, **Enable ROM** will be enabled on the Manual Setup screen.

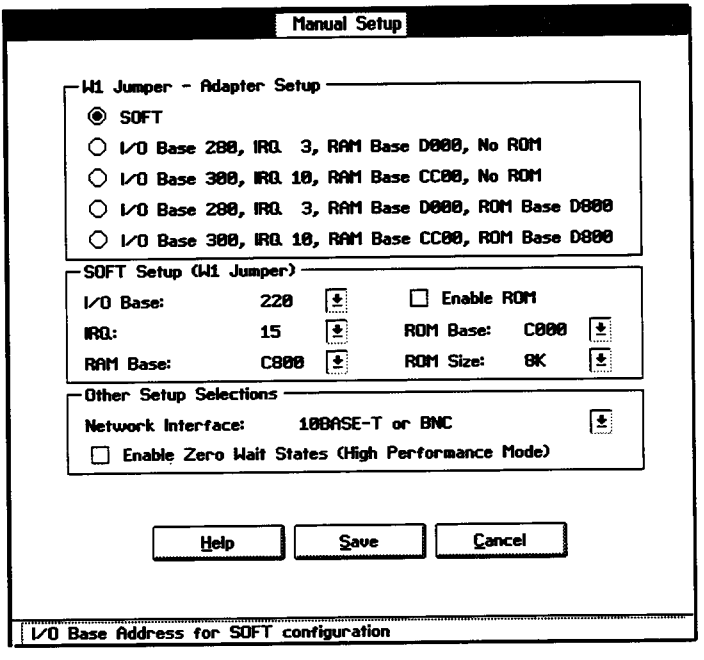


Figure A-2. Manual Setup Screen

6. Under **Other Setup Selections**, you can:
   - Select the network interface.
   - Enable zero wait states — enable this option only with certain LAN servers that experience a heavy processing load, where the reduction of CPU utilization will be significant. Zero wait state capability is not supported by all computers. If you enable this option, use EZStart's Manual Test feature to run the Basic Adapter Test with the Repeat feature and verify that your adapter is working properly with this setting (refer to Appendix D).
7. Select **Save**. You return to the EZStart main screen.

8. *Optional.* Select **Manual Test** and run the Basic Adapter Test to make sure your adapter's basic functions are working properly (refer to Appendix D).
9. *Optional.* Select **Drivers** to install the network driver (refer to Chapter 6).
10. *Optional.* If you want to use PC Agent/SNMP, refer to Chapter 7.
11. Select **Exit** from the EZStart main screen to exit EZStart. Then proceed with any additional network operating system software installation or configuration.

Selecting Configuration Options

The following sections provide helpful information for determining which I/O base address, IRQ level, RAM base address settings you should select for your adapter. Table A-1 shows the configuration options available for your adapter.

Table A-1. Adapter Configuration Options

Option	Values	Default
I/O Base Address	200, 220, 240, 260, 280, 2A0, 2C0, 2E0, 300, 320, 340, 360, 380	340
IRQ	2/9, 3, 5, 7, 10, 11, 15	15
RAM Base Address	C000, C200, C400, C600, C800, CA00, CC00, CE00, D000, D200, D400, D600, D800, DA00, DC00, DE00, E000, E200, E400, E600, E800, EA00, EC00	C800
ROM Base Address	C000, C200, C400, C600, C800, CA00, CC00, CE00, D000, D200, D400, D600, D800, DA00, DC00, DE00, E000, E200, E400, E600, E800, EA00, EC00, EE00	Disabled

Selecting an I/O Base Address

The I/O base address designates the beginning of address space available for communication between the computer and its in-

stalled devices. Each installed device must have a unique address range.

An ISA or EISA computer uses I/O base address ranges that start at 200, 220, 240, 260, 280, 2A0, 2C0, 2E0, 300, 320, 340, 360, and 380. Your adapter requires 32 (20 hex) contiguous I/O addresses. For example, an I/O base address of 280 uses addresses 280 through 29F.

Table A-2 lists I/O base addresses and the devices that commonly use those addresses.

Table A-2. I/O Base Addresses Used by Various Devices

Address	Typical Device Using That Address
000 – 01F	DMA Controller #1
020 – 03F	Interrupt Controller #1
040 – 05F	Timer
060 – 06F	Keyboard
070 – 07F	Real-time Clock, NMI
080 – 09F	DMA Page Register
0A0 – 0BF	Interrupt Controller #2
0C0 – 0DF	DMA Controller #2
0F0	Clear Math Coprocessor Busy
0F1	Reserved
0F8 – 1F8	Math Coprocessor
107	Reserved for RAM/ROM swap feature
1F0 – 1F8	Fixed Disk
200 – 207	Game I/O
278 – 27F	Parallel Printer Port #2
2F8 – 2FF	Serial Port #2
300 – 31F	Prototype Card
360 – 36F	Reserved
378 – 37F	Parallel Printer Port #1
380 – 38F	SDLC, bisynchronous #2
3A0 – 3AF	Bisynchronous #1
3B0 – 3BF	Monochrome Display and Printer Adapter
3C0 – 3CF	Reserved
3D0 – 3DF	Color/Graphics Monitor Adapter (EGA/VGA)
3F0 – 3F7	Floppy Disk Controller
3F8 – 3FF	Serial Port #1

IRQ Channel

An interrupt request (IRQ) signals the computer when a device needs attention. Each adapter must have an IRQ assigned that is distinct from that assigned to any other add-on device or other SMC adapter installed in the computer.

Your adapter supports IRQ channels 2/9, 3, 5, 7, 10, 11, and 15 for computers with an AT or EISA bus, and IRQ channels 2, 3, 5, and 7 for computers with an 8-bit (XT) bus. Some devices commonly installed in computers have standard IRQ channels already assigned to them. Table A-3 lists the IRQ channels supported by your adapter and the devices that commonly use those IRQ channels.

Table A-3. IRQ Channels Used by Various Devices

IRQ	XT	AT
2/9*	EGA/VGA	EGA/VGA
3	COM2	COM2
5	Hard Disk	LPT2
7	LPT1	LPT1
10	N/A	Unused
11	N/A	Unused
15	N/A	Unused

* IRQ 2 for 8-bit buses, and IRQ 9 for 16-bit buses.

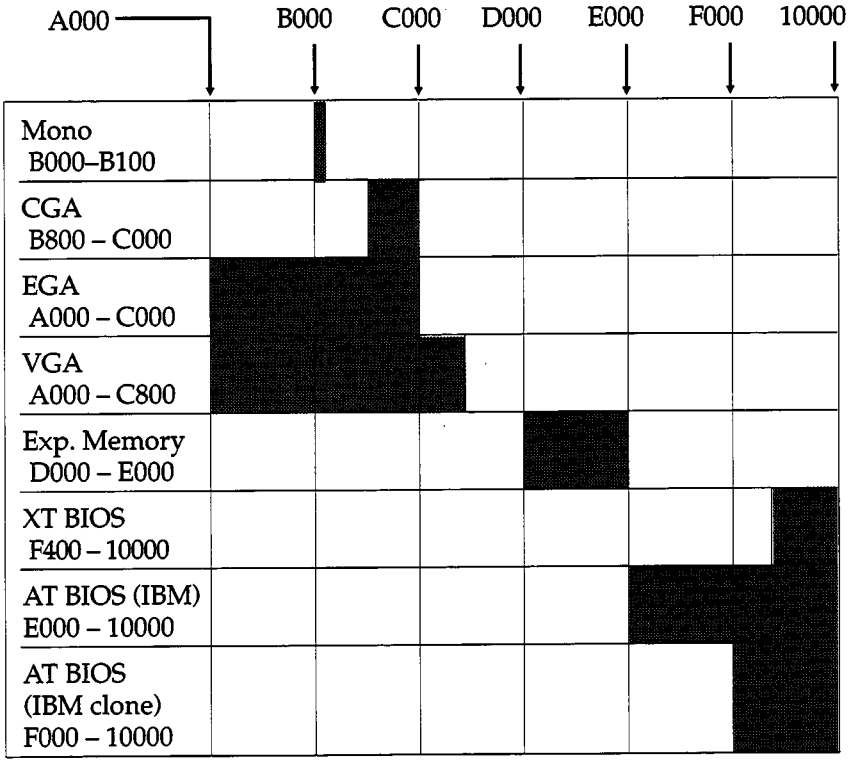
RAM Base Address

The RAM base address defines the beginning of a 16KB address space shared by the adapter and the computer. For example, if the RAM base address is D000 (hex), the address space allotted is D000 through D3FF, which is 16KB. Your adapter's RAM base address can be designated at every 8KB boundary, beginning with C000.

Available selections are C000, C200, C400, C600, C800, CA00, CC00, CE00, D000, D200, D400, D600, D800, DA00, DC00, DE00, E000, E200, E400, E600, E800, EA00, and EC00. Table A-4 shows memory

address space used for common devices. The shaded areas represent the range being used.

Table A-4. Memory Space Used by Various Devices



☞ If the RAM window overlaps the DFFF - E000 boundary, performance will decrease.

Boot ROM Base Address and Window Size

If you installed a Boot ROM on your adapter, and your adapter is using the Soft configuration method, you can use EZStart's Manual Setup feature to enable or disable the Boot ROM. If you enable the Boot ROM, you can also use Manual Setup to select the ROM base address and ROM size.

Supported ROM base addresses include C000, C200, C400, C600, C800, CA00, CC00, CE00, D000, D200, D400, D600, D800, DA00, DC00, DE00, E000, E200, E400, E600, E800, EA00, EC00, and EE00. To help you determine the appropriate ROM base address for your adapter, and avoid I/O conflicts, refer to Table A-4 on page A-7.

ROM size refers to the amount of computer address space occupied by the Boot ROM. SMC's ROMs require 16KB of address space; other manufacturer's ROMs can be configured to use 8, 16, or 32KB of address space.

Using Memory-Management Utilities

If your computer uses a memory-management utility such as EMM386, QEMM, or 386MAX, refer to page D-13 in Appendix D for information on configuring your adapter so it does not conflict with the memory-management utility. You should also refer to this page in Appendix D if your computer uses programs such as Windows, which map memory between 640 KB and 1 MB.

USING MACROS B

This appendix describes EZStart's macro feature, which provides fast relief from repetitive operations. If you perform the same EZStart tasks over and over many times, you can use macros to make a "recording" of the procedure, then "play it back" when needed. Whether it's a simple job like viewing PC Agent/SNMP statistics, or a complex job like configuring and testing multiple adapters, it can probably be done better and faster by a macro.

Overview

Think of a macro as your personal assistant. For example, you can create a macro to set up and test multiple adapters, run diagnostic tests, view PC Agent/SNMP statistics, or perform any other EZStart function. Once a macro learns the routine, just give the appropriate command and relax while the macro does the work.

The following list summarizes the reasons you should use macros:

- Macros don't make mistakes — once you record a macro, there's no need to worry about inaccuracy. The macro will repeat each time it is activated.
- Macros never forget — it's easier to keep track of a macro than a complicated list of keystrokes. With a macro, you only have to perform the keystrokes once. From then on, the macro will remember them for you.
- Macros don't get bored — if you find yourself performing the same monotonous task frequently, let a macro do it instead. Macros might not make your tasks more exciting, but they'll speed things up so you'll get your work done faster.
- Macros maintain continuity — if you use the same configuration or testing procedure with multiple adapters, you want things done the same way every time. Define your procedures with a macro and they will be performed *exactly* the same way every time.
- Macros are time savers — you can start a macro that will automatically perform the recorded task while you perform other work.

Recording a Macro

The following procedure describes how to record a macro. You can record a macro that has the default name EZSTART.MAC or another name you specify. Before proceeding, you may want to refer to page B-4 for examples of recording macros.

1. To record a macro called EZSTART.MAC, load EZStart (refer to page 5-2).

   OR

   To assign a different name to the macro, type the following on the DOS command line and press Enter:

   EZSTART [*macro name*]

   In the example above, **[*macro name*]** is a unique macro name. For example, you can type **EZSTART TEST.MAC** to create a macro named TEST.MAC that will test adapters.

   Observe the following guidelines when typing a macro name:

   - Include the .MAC extension at the end of the macro name. Otherwise, an error message appears and EZStart will not load.
   - If you use a name that is already assigned to a macro, you will play back that macro instead of recording a new one.
   - If you want to use a name that is already assigned to a macro, use the DOS RENAME command to rename the existing macro before recording the new one. Alternatively, you can type **/D** after the macro name (for example, **EZSTART TEST /D**) to record a new macro using an existing macro name; note, however, that the new macro you record will overwrite the existing macro that has the same name.

2. To start macro recording, press Ctrl+F1. The message **RECORDING** appears in every screen to show you are recording a macro.
3. Perform the keystrokes you want recorded as part of the macro.
4. To insert a pause when the macro is played back, press Ctrl+F3. Pauses are useful when manual intervention is required during

playback. For example, if you create a macro to configure your adapter and install a driver, you can insert a pause where you want the Destination Directory specified. Press Ctrl+F3 at the point where you want macro playback to continue.

5. When you finish recording the macro, press Ctrl+F1.

Playing Back a Macro

The following sections describe how to play back a macro.

Playing Back the Default Macro

To play back the default macro, EZSTART.MAC:

1. Load EZStart (refer to page 5-2).
2. Press Ctrl+F2. The message **PLAYING** appears on each screen as EZSTART.MAC is played back.

☞ If you want to stop playback, press Ctrl+F2 again.

Immediate Macro Playback

To play back a macro immediately:

1. From the DOS command line, type **EZSTART [*macro name*]**, where **[*macro name*]** is the name of the macro you want to play back. For example, to play back a macro named TEST.MAC, type **EZSTART TEST**.
2. Press the Enter key. The macro is played back and the message **PLAYING** appears on each screen.

Delayed Macro Playback

To delay macro playback until EZStart is loaded:

1. From the DOS command line, type **EZSTART [*macro name*] /D**, where **[*macro name*]** is the name of the macro you want to play back.
2. Press the Enter key.

The macro will not play back until you load EZStart and press Ctrl+F2. (However, if you press Ctrl+F1 instead of Ctrl+F2, any further keystrokes that you make will overwrite the existing macro of the same name, as described on the previous page.) When the

macro is played back, the message **PLAYING** appears on each screen. If you want to stop playback, press Ctrl+F2 again.

Examples of Recording a Macro

This section provides two examples of how macros can automate the configuration and testing of an adapter. Before you create your own macros, it is a good idea to outline the procedure you intend to perform before you start recording the macro. In some ways, recording a macro is similar to directing a movie. Experienced directors don't shoot a scene without planning every detail — and you should do the same before recording your macro.

It is recommended, therefore, that you have a script prior to recording your macro. Write down all the steps you want to record. You may even want to stage a "dress rehearsal" before you start recording. This will allow you to perform each step and check to make sure there are no unwanted surprises. Remember that when you start macro recording, you are "on camera," and every step you make is recorded exactly as you performed it, and in precisely the exact time frame it took to execute the original action.

Example 1

Assume you want to install multiple adapters in the same computer. You can configure each adapter for the Soft configuration method and install it in the computer. You can then create the following macro to record EZStart's Automatic Setup and Test feature, which automatically assigns a nonconflicting configuration to the adapter.

1. Load EZStart.
2. Press Ctrl+F1 to start recording the macro.
3. From the EZStart main screen, select **Automatic Setup and Test**. EZStart automatically assigns a nonconflicting configuration to the adapter.
4. Select **Save** to save the configuration.
5. Press Ctrl+F1 again to stop recording the macro.

After this macro is recorded, it can be played back each time you want to use the Automatic Setup and Test feature with other adapt-

ers that are installed in the same computer. EZStart's Automatic Setup and Test feature ensures that each adapter will be assigned a nonconflicting configuration.

Example 2

The following example involves a more sophisticated macro. This example involves a user who frequently installs single adapters, equipped with a Boot ROM, into identically configured computers. Each adapter uses the Soft configuration method because it needs to be custom-configured using EZStart's Manual Setup feature. Each adapter also requires a PC Agent/SNMP-compatible Ethernet driver to be copied from the SuperDisk diskette to the computer's hard drive, and also requires PC Agent/SNMP to be installed.

1. Load EZStart
2. Press Ctrl+F1 to start macro recording.
3. Select **Manual Setup** from the EZStart main screen.
4. When the Manual Setup screen appears, select the appropriate I/O base address, IRQ channel, and RAM base address values.
5. Since this macro is for adapters equipped with a Boot ROM, select the ROM base address and ROM size for the Boot ROM.
6. For **Network Interface**, select **10BASE-T or BNC.**
7. Each computer can take advantage of the adapter's high-performance zero wait state feature, so select **Enable Zero Wait States.**
8. Select **Save** to save the configuration and exit the Manual Setup screen.
9. Select **Drivers** from the EZStart main screen.
10. Press Ctrl+F3 to insert a pause at this location in the macro. This is where the user playing back the macro selects the network operating system to be copied to the computer's hard disk.
11. Because a PC Agent/SNMP-compatible driver is required in this example, the user can select the NDIS DOS Ethernet driver, ODI DOS Ethernet driver, or IPX driver. Since you are creating

this macro, select one of these drivers. When the macro is played back, however, any driver can be selected during the pause. However, the macro will only allow the PC Agent/SNMP information to be accessed if one of the compatible drivers is selected during the pause.

12. Press Ctrl+F3 to resume macro recording.
13. Select **OK**. A Driver Installation screen for the selected driver appears.
14. Select **Copy Files**. The selected driver and associated files are copied to the Destination Directory.
15. When the **Copy Complete** message appears, select **OK** to remove the message. A message tells you that the installed driver is compatible with PC Agent/SNMP and asks whether you want to install PC Agent/SNMP.
16. Select **Yes** to install PC Agent/SNMP and display the PC Agent/SNMP screen.
17. Press Ctrl+F3 to insert a pause at this location in the macro. This is where the user playing back the macro can optionally specify a different Destination Directory. This is also where the user selects **Copy Files** to copy PC Agent/SNMP to the Destination Directory.
18. Select **Copy Files** to copy PC Agent/SNMP to the Destination Directory. The **Copy Complete** message appears.
19. Press Ctrl+F3 to resume macro recording.
20. Select **OK** to remove the **Copy Complete** message.
21. When the message asks whether you want to create a PC Agent/SNMP configuration file, select **Yes**.
22. Select **OK** to accept the default configuration filename.
23. When a message informs you that the configuration file does not exist, select **Yes** to create the file.
24. Complete the fields in the Modify/Create PC Agent/SNMP Configuration File screen.
25. Select **Save File**.

26. Select **OK** to verify the path and filename.
27. When the "Save Completed" message appears, select **OK**.
28. Select **Cancel** until you return to the EZStart main screen.
29. Press Ctrl+F1 to stop recording the macro.
30. Select **Exit** to exit the EZStart main screen.

This concludes the macro recording procedure. You can now use the procedure on page B-3 to play back this macro each time you want to use the same scenario with other adapters.

Notes

CABLING C

Your adapter can connect to the Ethernet network using a variety of cabling methods. This appendix describes cabling information for your adapter, starting with an overview of Ethernet topologies and cabling methods.

Overview

Traditionally, the Ethernet cabling system, or topology, conforms to a linear bus consisting of a thick or thin coax cable segment with a terminating resistor at each end and a ground at one end. The linear bus is limited in distance and in the number of devices that can be attached to it. As a result, the linear bus is best suited for small, closely situated networks.

A less expensive alternative to thick and thin Ethernet cabling is twisted pair wiring. Twisted pair networks are configured in a star topology, rather than the linear bus used for Ethernet coax networks, and have a concentrator or multi-port repeater as the central component.

The following sections provide more information on these Ethernet cable types and topologies:

- For thick coax cabling — refer to page C-2.
- For thin coax cabling — refer to page C-4 .
- For twisted pair cabling — refer to page C-6.

Thick Coax Cabling

Thick coax cable is the original media for Ethernet networks. It is primarily used for connecting workstations to mainframes and minicomputers. Each workstation attaches to the thick coax cable through the AUI connector on your adapter, an Attachment Unit Interface (AUI) drop cable, and a transceiver (see Figure C-1). In addition to providing a way for the workstation to attach to the network, the transceiver also monitors the cable to detect collisions.

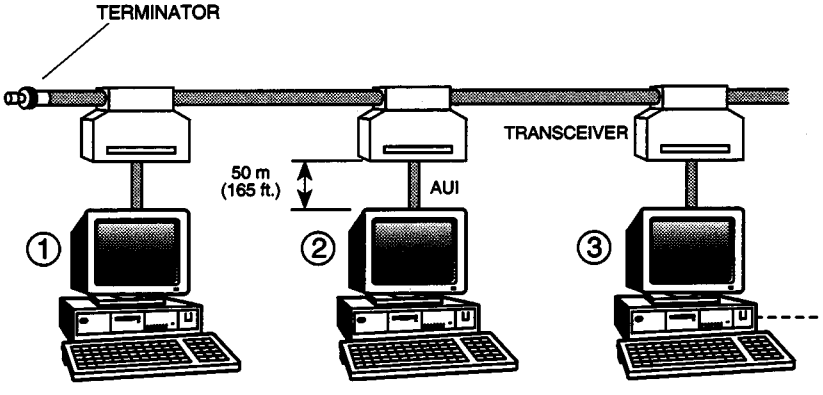


Figure C-1. Thick Coax Cable Segment

Thick Coax Cabling Requirements

Thick coax cabling is limited to 1,640 feet (500 meters) and can have up to 100 transceivers attached to it. The AUI cable can be up to 165 feet (50 meters) long.

Thick coax cabling must be terminated at each end using 50 ohm terminators, and one end must be earth grounded.

Thick Coax Cabling Lengths

Table C-1 lists the cable lengths for thick coax cabling.

Table C-1. Thick Coax Cable Lengths

Description	Specification
Maximum trunk length	1,640 feet (500 meters)
Maximum number of nodes per trunk	100
Maximum number of trunks	5 (only 3 can have workstations attached)
Maximum length of entire network (all trunks added together)	8,200 feet 2,500 meters
Minimum cable length between taps	8 feet (2.5 meters)
Maximum length of drop cable	165 feet (50 meters)

Thick coax networks can be expanded by joining pairs of segments with repeaters. Repeaters amplify and regenerate the network signal. Up to five trunk segments can be connected using repeaters; however, only three of these segments can have workstations attached.

Repeaters count as workstations, so if you have two repeaters on a segment, a maximum of 98 additional workstations can be connected to the segment.

Thick coax networks can be expanded far beyond these limits by using bridges and routers, such as the SMC ES/1.

Thin Coax Cabling

Today, thin coax is the preferred cabling alternative over thick coax for local area networks (LANs) because it is less expensive and easier to install. However, distance and attachment restrictions are more stringent for thin coax cable than for thick coax cable.

According to IEEE 802.3 rules, a thin coax segment must support 30 attachments over a distance of 607 feet (185 meters). SMC offers extended-distance thin coax products — which support segments up to 1,000 feet (305 meters) — with cable meeting certain specifications.

Because most devices (including SMC Ethernet adapters) contain a built-in transceiver, an external transceiver is not required. Devices typically connect directly to the cable segment with BNC T-Connectors. However, an external transceiver is sometimes used because of the flexibility afforded by the AUI drop cable.

Thin coax cabling must be terminated at each end using 50 ohm terminators, with one end earth grounded, and conform to the specifications shown in Table C-3 (refer to page C-5). You will also need a terminator if you're installing a workstation at the end of the thin Ethernet cable.

Figure C-2 shows a typical network that uses thin coax cabling.

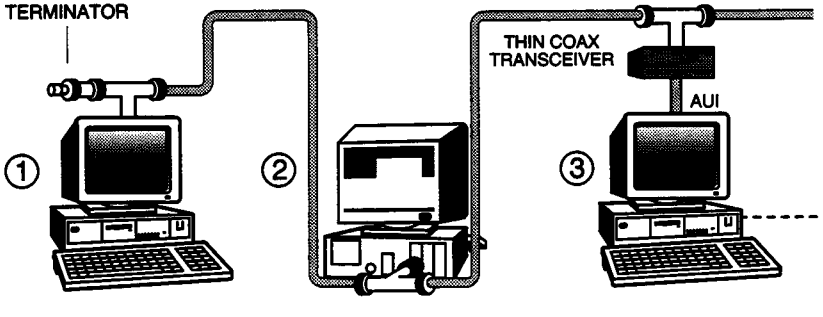


Figure C-2. Thin Coax Cable Segment

IEEE-Approved and Nonapproved Cables

Table C-2 lists cables that are approved and not approved by IEEE.

Table C-2. Approved and Nonapproved Cables

Cable	Description
Approved Cable Types	
802.3 10Base2	50 ohms, stranded tinned core
RG-58 a/u	50 ohms, stranded tinned core
RG-58 c/u	50 ohms, stranded tinned core
Nonapproved Cable Types	
RG-58	50 ohms, solid center core
RG-58 u	50 ohms, solid center core

Thin Coax Cabling Lengths

Table C-3 lists the cable lengths for thin coax cabling.

Table C-3. Thin Coax Cable Lengths

Description	Specification
Maximum trunk length	607 feet (185 meters)
Maximum number of nodes per trunk	30
Maximum number of trunks	5 (only 3 can have workstations attacked)
Maximum length of entire network (all trunks added together)	3,035 feet 925 meters
Minimum cable length between nodes	1.5 feet (0.5 meters)

Thin coax networks can be expanded by joining pairs of segments with repeaters. Repeaters amplify and regenerate the network signal. Up to five trunk segments can be connected using repeaters; however, only three of these segments can have workstations attached.

Repeaters count as workstations, so if you have two repeaters on a segment, a maximum of 28 additional workstations can be connected to the segment.

Thin coax networks can be expanded far beyond these limits by using bridges and routers, such as the SMC ES/1.

Twisted Pair Cabling

Twisted pair, telephone-type wiring, the type used for 10BASE-T networks, is low-cost, readily available, lightweight, and easy to install. Moreover, significant cost savings can be obtained by using existing installed wiring. However, distance is limited to 330 feet (100 meters).

Twisted pair networks are configured in a star topology rather than the linear bus used for Ethernet coax networks. The central component of this star is a concentrator or multi-port repeater, as shown in Figure C-3.

Twisted pair concentrators can be used as standalone units that allow multiple workstations to attach to the network. Each workstation connects to its own individual port on the concentrator. The 9-port concentrator in Figure C-3, for example, provides a network connection for up to nine workstations. If a device is not compatible, it can connect to the link segment using an appropriate transceiver.

Star topologies are easier to troubleshoot than linear bus topologies because each segment links exactly two devices — either two concentrators, or one concentrator and one station (such as a server or a workstation).

Twisted pair networks can be expanded by joining these concentrators into a two-level cascade, forming clusters of stars.

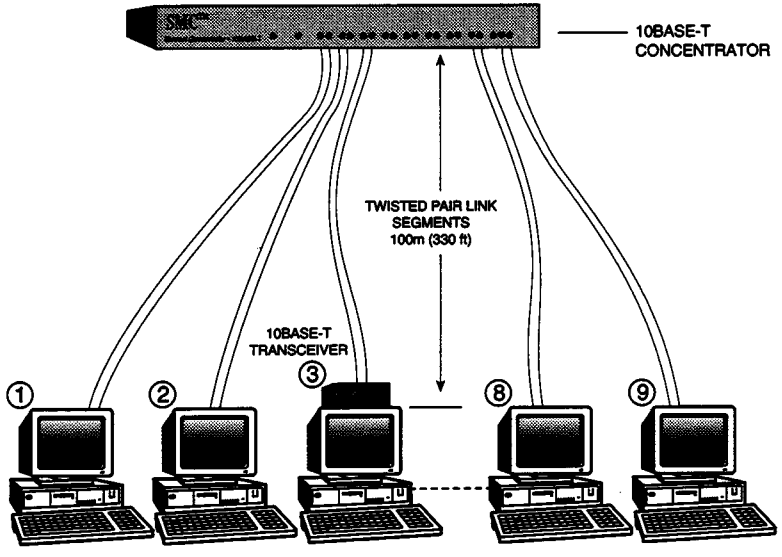


Figure C-3. Twisted Pair Cabling

Adapter Connectors

Your adapter may have one or more of the following connectors, depending on the model:

- AUI connector — a 15-pin, D-shaped connector for AUI interfaces to external transceivers. Refer to the next section.
- BNC connector — a cylindrical, bayonet-type connector for interfacing to thin Ethernet cables. Refer to page C-11.
- Twisted pair (UTP) connector — a small rectangular, snap-in, connector for interfacing to 10BASE-T cables. Refer to page C-11.

AUI Connector

Your adapter may be equipped with an AUI connector like the one shown in Figure C-4. To connect to a thick Ethernet installation, connect your adapter's AUI connector to a standard transceiver or AUI cable that conforms to the 10BASE5 specification. An example of a

suitable cable is Belden 9898. Figure C-5 shows the pin arrangements in an AUI cable connector.

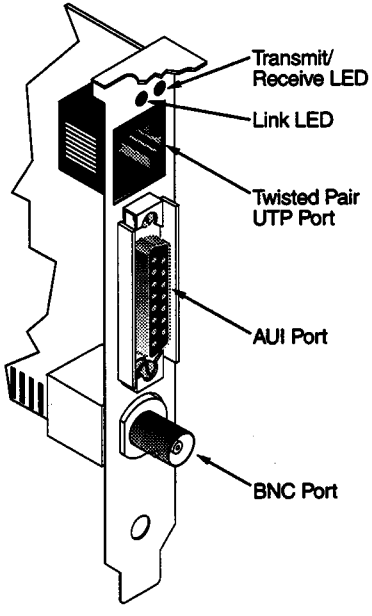


Figure C-4. Typical AUI, BNC, and UTP Connectors

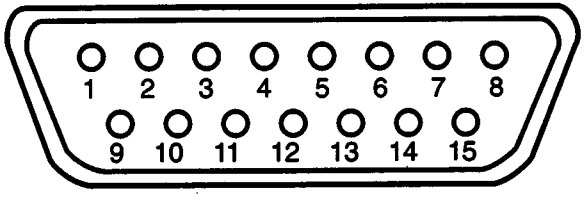


Figure C-5. Pin Arrangements in AUI Cable Connector

Table C-4 lists the pin assignments for the adapter's AUI port.

Table C-4. AUI Port Pin Assignments (15-pin D-type)

Pin	Signal Name	Signal Function
1	Control-in Shield	The shield for the CI twisted pair on the AUI cable.
2	Control-in Circuit A	The positive signal for the CI circuit. This circuit is used to send the mau_available and signal_quality_error messages to the equipment.
3	Data-out Circuit A	The positive signal for the DO circuit.
4	Data-in Shield	The shield for the DI circuit.
5	Data-in Circuit A	The positive signal for the DI circuit.
6	Voltage Common	The ground return for the VP circuit.
7	Not connected	
8	Not connected	
9	Control-in Circuit B	The negative signal for the CI circuit. This circuit sends the same signals listed for pin 2.
10	Data-out Circuit B	The negative signal for the DO circuit.
11	Data-out Shield	The shield for the DO twisted pair in the AUI cable.
12	Data-in Circuit B	The negative signal for the DI circuit.
13	Voltage Plus	The power supply to the transceiver. The supply must remain in the range 12V – 6% to 15V +5%.
14	Voltage Shield	The shield for the VC and VP (pins 6 and 13) twisted pair.
15	Not connected	

When attaching the cable to your adapter:

- Make sure the maximum cable length between the workstation and the transceiver on the thick Ethernet cable does not exceed 164 feet (50 meters).
- Make sure you engage the sliding latch on the adapter's AUI connector. Otherwise, the cable could fall off, disrupting communication between the workstation and the network.
- Make sure the network layout conforms to the specifications shown in Table C-1 (refer to page C-3).

The AUI connector does not consume power. It simply passes +12V power to an external transceiver attached to the AUI cable. To give you an idea of the amount of power likely to be consumed by typical transceivers, Table C-5 shows the power consumption for external transceivers made by three manufacturers.

Table C-5. Power Consumption for Three External Transceivers

Model	Manufacturer	Power Consumed
Model 28641A	HP	270 mA
External transceiver	Intel	150 mA
508 10BASE-T transceiver	Synoptics	420 mA

BNC Connector

Your adapter may be equipped with a BNC connector, like the one shown in Figure C-4. To connect to a thin Ethernet cable (which is sometimes referred to as Cheapernet cable), use a BNC T-connector; do not connect the end of the cable directly to your adapter's BNC connector.

Twisted Pair (UTP) Connector

Your adapter may be equipped with a twisted pair (UTP) connector, like the one shown in Figure C-4. This connector is a telephone-type (RJ-45) connector, and resembles a modular telephone jack.

The twisted pair connector can accommodate unshielded twisted pair (UTP) cable of 22, 24, or 26 gauge. The cable must be wired straight through, as shown in Figure C-6, and must comply with the IEEE 802.3 10BASE-T standards. The maximum distance between the workstation and hub is 330 feet (100 meters).

☞ Nontwisted pair cable (also referred to as silver satin) is not within the 10BASE-T specification and cannot be used. If it is used, your connection may not work at all, or you may encounter intermittent problems.

Table C-6 shows the pin assignments for the twisted pair connector. Note that although there are eight pins on this connector, only four are used (pins 1 and 2 must be a pair, and pins 3 and 6 must be a pair). If your workstations encounter problems connecting to the network, or if a hub is not able to "see" a workstation, the cable may be at fault. Verify that cable wiring adheres to the pin assignments in Table C-6.

Table C-6. Twisted Pair Port Pin Assignments

Pin	Level 3	Level 5	Function
1	White/ Orange	White	Transmit Data Plus. The positive signal for the TD differential pair. This signal contains the serial output data stream transmitted onto the network.
2	Orange/ White	Orange	Transmit Data Minus. The negative signal for the TD differential pair (pins 1 and 2).
3	White/ Green	White	Receive Data Plus. The positive signal for the RD differential pair. This signal contains the serial input data stream received from the network.
4	Blue/ White	Blue	Not used by 10BASE-T.
5	White/ Blue	White	Not used by 10BASE-T.
6	Green/ White	Green	Receive Data Minus. The negative signal for the RD differential pair (pins 3 and 6).
7	White/ Brown	White	Not used by 10BASE-T.
8	Brown/ White	Brown	Not used by 10BASE-T.

Pins 1 and 2 must be paired.

Pins 3 and 6 must be paired.

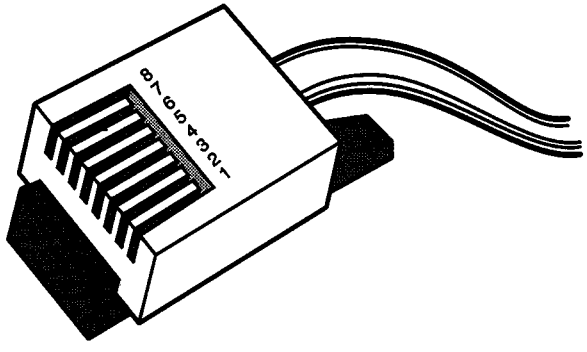


Figure C-6. 8-Pin RJ-45 Connector Pins

Notes

MANUAL TEST AND TROUBLESHOOTING D

This appendix describes the EZStart Manual Tests you can perform in the unlikely event you encounter problems with your adapter. It also describes troubleshooting techniques you can use to resolve common network problems.

EZStart Manual Tests

EZStart provides a Manual Test feature that comprises the following two tests:

- Basic Adapter Test — which verifies the operation of the adapter's basic functions.
- Two Node Test — which verifies the adapter's ability to communicate over the network with another adapter. The Two Node Test requires that an adapter identical to yours be installed in the network.

Running the Basic Adapter Test

The Basic Adapter Test exercises the following adapter components and functions to verify that they are working properly:

- I/O Port Accessibility
- LAN Address ROM
- Link Integrity (for 10BASE-T connections only)
- On-board RAM
- Network Controller Registers
- On-board ROM (if a boot ROM is installed)
- Internal Loopback
- Interrupt Generation

To run the Basic Adapter Test:

1. Load EZStart (refer to page 5-2).
2. Select **Manual Test** from the EZStart main screen. The Manual Test screen appears (see Figure D-1).

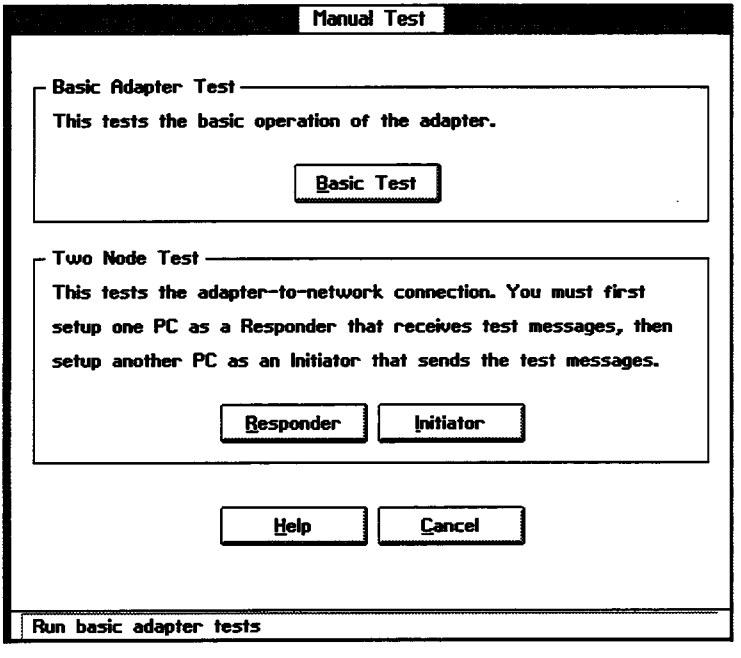


Figure D-1. Manual Test Screen

3. Select **Basic Test** from the **Basic Adapter Test** area to start the test. When the test finishes, the screen shows a list of tests that were performed, with a status of either **Passed** or **Failed**.
4. After running the Basic Adapter Test once, you can select **Repeat** to let the test run continuously (such as overnight) for special testing circumstances.

☞ To stop the Basic Test when it is running continuously, press Alt+C or Tab until the **Cancel** button is highlighted, then press the Enter key.

Running the Two Node Test

The following procedure describes how to run the Two Node Test. Before running the Two Node Test, run the Basic Adapter Test to ensure that the adapter's basic functions are working properly.

The Two Node Test verifies that the network cable is connected correctly so that the adapter can transmit and receive data. This loopback test requires at least two computers, with at least two SMC Elite, Ultra, or Plus series adapters.

☞ EZStart will work with the DIAGNOSE program available with older SMC adapters.

One computer will be configured as the Initiator, who generates and sends test messages; the other computer will be configured as the Responder, who receives and retransmits messages back to the Initiator. You can view the results of the test on both the initiating and the responding computer.

To perform this test, set up the Responder first, then set up the Initiator.

Setting Up the Responder

1. Load EZStart (refer to page 5-2).
2. Select **Manual Test** from the EZStart main screen. The Main Test screen appears (see Figure D-1).
3. Select **Responder** from the **Two Node Test** area. The Respond To Test Messages screen appears (see Figure D-2).

   The computer is ready to receive and retransmit test messages. The numbers in the Frames Received and Frames Transmitted boxes will be updated dynamically once the Initiator begins the test. The only active button on the screen is **Stop**.
4. If you desire, you can set up additional computers as a Responder by repeating this procedure on those computers.

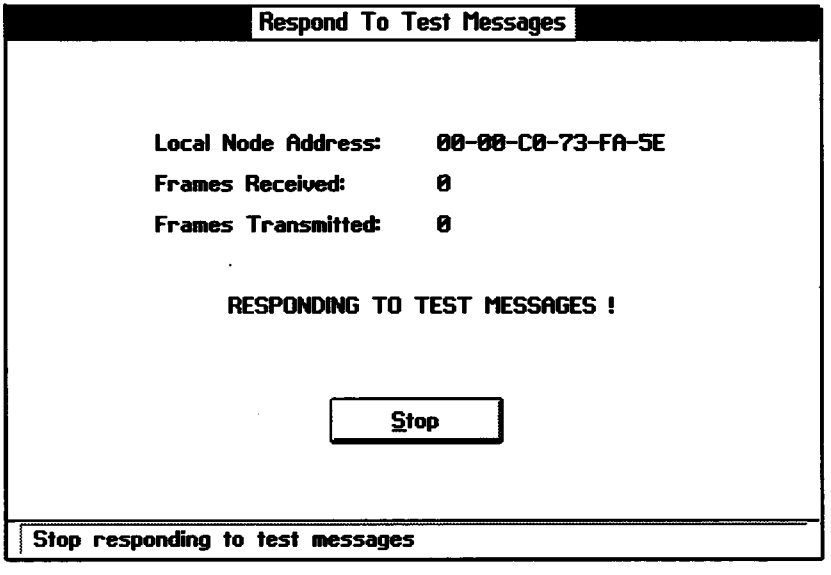


Figure D-2. Respond To Test Messages Screen

Setting Up the Initiator

1. On the computer whose adapter you are testing, load EZStart and select **Manual Test** from the EZStart main screen.

2. Select **Initiator** from the **Two Node Test** box. An Initiate Test Messages screen similar to the one in Figure D-3 appears.

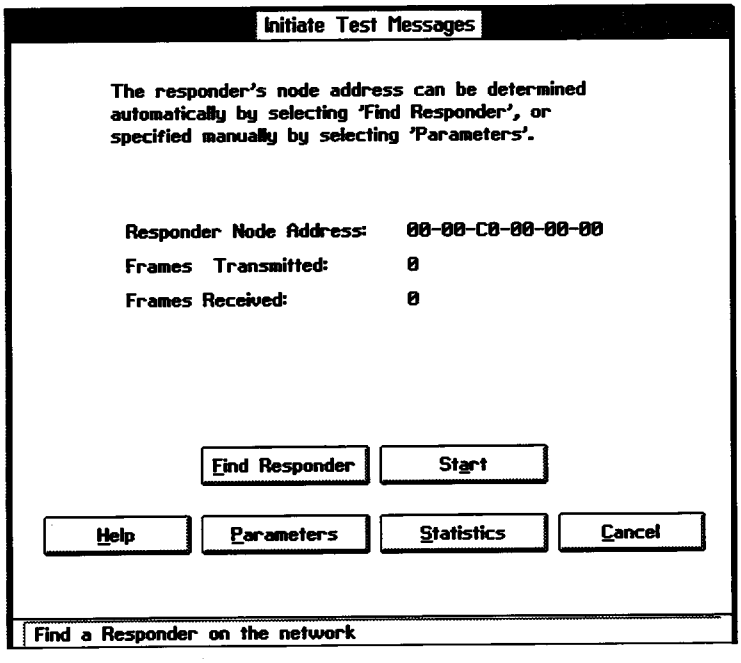


Figure D-3. Initiate Test Messages Screen

3. Use either of the following methods to select a Responder:

   - If a Responder is set up and waiting to respond to test messages, select **Find Responder** on the Initiate Test Messages screen. EZStart automatically finds the computer set up as a Responder. If several computers are set up as Responders, EZStart selects the first one it finds, which eliminates the need to obtain the Responder's node address.

     OR

   - If a computer is not configured as the Responder, or if you set up several Responders and want to specify a particular one, select **Parameters** in the Initiate Test Messages screen and enter that computer's node destination address (for

more information on parameters, refer to "Message Initiation Parameters," on page D-6).

4. Start the test by selecting **Start**. When the test starts, the message **INITIATING TEST MESSAGES!** appears on the screen, along with a **Stop** button. The number of frames transmitted and received will be dynamically updated as messages are sent and received.

   To stop the test, select **Stop**.

5. To view the statistics, select **Statistics** button (for more information, refer to page D-8).

6. If you desire, you can set up more than one computer as an Initiator, each addressing the same Responder or a different Responder.

Message Initiation Parameters

In most cases, you can use the following default message initiation parameters. If you want to change them, however, select **Parameters** to display the Set Parameters screen (see Figure D-4), change the desired parameters, and select **OK** to return to the Initiate Test Messages screen.

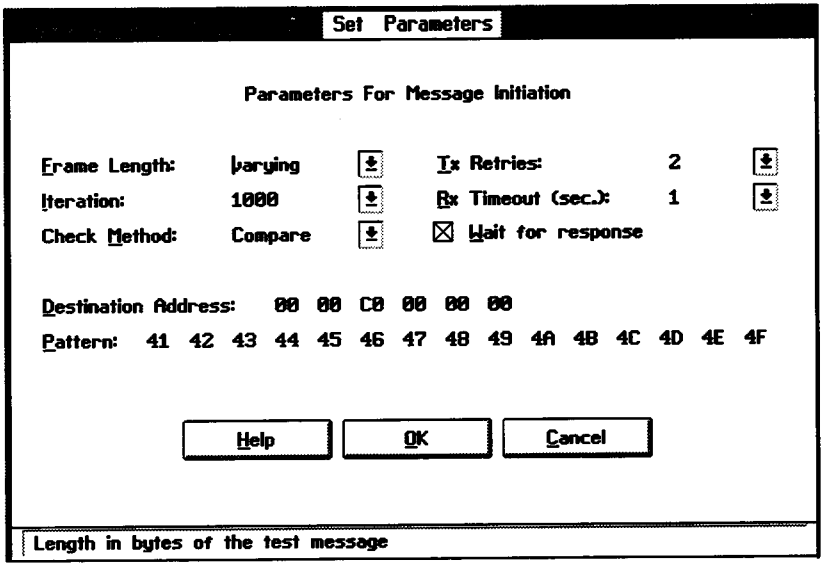


Figure D-4. Set Parameters Screen

Frame Length: The size of the packet to be sent and received. Some adapters may have problems with packets of specific lengths, or when the length changes. You can test packet sizes of 64 through 1,518 bytes, or varying, which automatically tests all lengths. The default is varying.

Iterations: The number of times to run this test, from 1 to infinity (continuous). The default is 1000.

Check Method: The method used to check that the data received from the Responder was exactly what had been transmitted. Choices are:

- *Compare* (the default) — compares the contents of each message packet byte-by-byte. This is the slowest but the most accurate of the check methods.
- *Checksum* — adds up the contents of each packet and compares the results. This method is faster than comparing.

- *None* — performs no checking of the data sent and received. This is the fastest method.

Tx (transmit) Retries: The number of times, from 0 to 10, that the Initiator tries to retransmit if no response is received. The default is 2.

Rx (receive) Timeout: The time, in seconds, that the Initiator waits for a response before its next retransmission.

Wait for response: By selecting this box (an "X" appears when selected), the Initiator will wait to receive a response before sending the next data packet. Waiting for a response will slow the test, but if a packet becomes corrupted, you will be able to see which packet was corrupted. *This function must be enabled to send frames of varying lengths.*

Destination Address: The node address of the Responder. If a Responder is already set up and waiting, and you used the Find Responder function, the node address of the responding computer appears. If not, you must enter the node address of the responding computer here.

Pattern: The repeated data (in hexadecimal) that the Initiator will send to the Responder. You can use the default or enter your own.

Viewing Test Results

The Two Node Test compiles a set of Transmit and Receive statistics that you can view by selecting **Statistics** in either the Initiate Test Messages or the Respond To Test Messages screen.

Figure D-5 shows the Statistics screen. The left side of the screen lists the transmit statistics, and the right side lists the receive statistics.

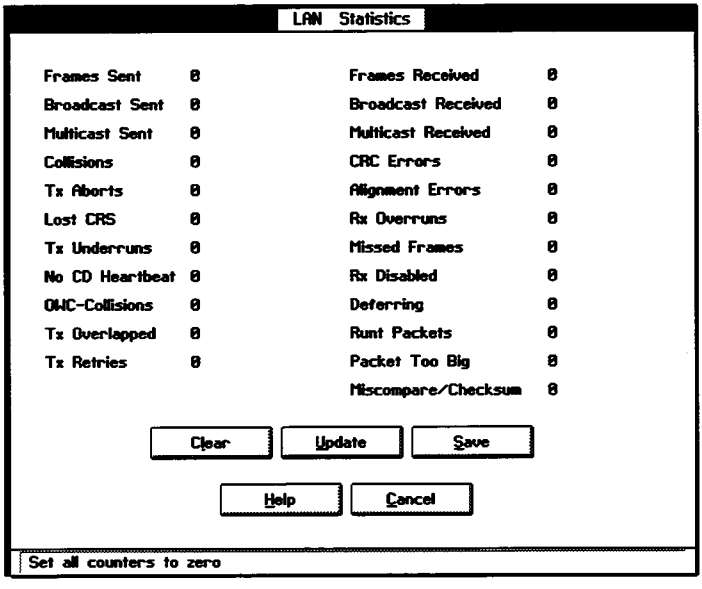


Figure D-5. Sample Statistics Screen

Troubleshooting

Most network problems are not due to adapter failures. They are typically caused by cabling errors, configuration conflicts with other installed adapters, or an incorrect software configuration. This section provides some check lists and procedures that will let you pinpoint the source of the problem, and also determine if an adapter is faulty.

Basics

1. Make sure that your cable and connectors are within the limits of the IEEE standard for the type of network that you are using. Refer to Appendix C for complete information.
2. Make sure the adapter is securely seated in the computer's expansion slot.
3. Verify that the network cable is securely attached.
4. Make sure that the correct software driver is installed.
5. Make sure the selector is set properly (refer to Chapter 3).
6. Make sure the computer is receiving power. Check that the power cord is firmly connected at the wall outlet and the computer. If you suspect the power outlet to be faulty, plug another electronic device, such as a lamp, into the outlet to verify that the outlet is working. If the outlet is controlled by a wall switch, make sure the switch has not removed power from the outlet. If possible connect your computer to an outlet not controlled by a wall switch.

Monitoring the LEDs

Each adapter includes one or two LEDs (depending on the board type). Figures 1-1 through 1-3 in the Introduction illustrate the LEDs on each adapter.

- **Transmit/Receive LED—** the yellow Transmit/Receive LED goes ON when the adapter is transmitting data to the network or receiving data from the network.
- **Link Integrity LED** — the green Link Integrity LED goes ON when there is a valid connection to a 10BASE-T concentrator.

Detecting and Resolving I/O Conflicts

An I/O conflict occurs when two or more adapters use the same I/O address. You can detect a conflict in one of two ways:

1. If you cannot connect to the network (or the network driver will not load). This will occur when you have installed the adapter without running EZStart to test the configuration.

   To resolve this type of conflict, run EZStart's Automatic Setup and Test function to let the program select a nonconflicting configuration.

2. If either of the following messages appears when you run EZStart:

> **I/O conflict detected on an SMC 8216 series Ethernet adapter at I/O base address *xxx*. Please move W1 selector on this adapter to another location, reset the computer, and run EZStart again.**

OR

> **Adapter Not Found**

   Resolve this type of conflict by moving the selector to another location, resetting the computer, and running EZStart's Automatic Setup and Test to check for further conflicts.

   If no message appears and the adapter passes the test, the conflict is resolved.

If one of the messages reappears, move the selector again, reset the computer, and rerun EZStart's Automatic Setup and Test.

If you tried the Soft configuration method and all of the settings in the preassigned configuration method, and still have an I/O conflict, try one of the following two methods.

Method 1:

This procedure requires that you know or find out the I/O addresses of other adapters installed in your computer.

1. Determine what I/O addresses are being used by other installed adapters. You can find this information in the user manual for each adapter.
2. Turn off the computer's power. Then remove the adapter that is conflicting with your adapter.
3. Run EZStart and select **Manual Setup**. Select an unused I/O base address. (EZStart may tell you to move the selector to **Soft**.) Exit EZStart.
4. Reinstall the adapter that you removed in Step 2.
5. Run EZStart and select **Automatic Setup and Test** to test the configuration. This should resolve the I/O conflict.

Method 2:

This procedure does not require you to know the I/O base addresses of other installed adapters.

1. Turn off the computer's power. Then remove all adapters except the video adapter, disk controller, and your adapter.
2. Run EZStart's Automatic Setup and Test to confirm that there are no I/O conflicts. If there are still I/O conflicts, contact Technical Support at the telephone numbers shown on the back cover of this *User Guide*.
3. Install one of the adapters that you removed, and run EZStart's Automatic Setup and Test.

   Repeat this step, one adapter at a time, until one of the messages described on the previous page appears.

4. Remove the last adapter that you installed.
5. Run EZStart and select **Manual Setup**. Select a different I/O base address (refer to page A-4).

   If EZStart directs you to move the selector to the **Soft** position, do so.
6. Reinstall the last adapter that you removed.
7. Run EZStart again, and select **Automatic Setup and Test**. If there is still an I/O conflict, repeat this procedure. Keep a list of the I/O base addresses that you have tried so you don't use them again.

Using Memory-Management Utilities

If your computer uses a memory-management utility such as EMM386, QEMM, or 386MAX, the utility uses part of the memory space normally allocated to your adapter. To exclude your adapter's 16 KB RAM address space from the memory-management driver, you generally must insert a command line into the CONFIG.SYS file. For example:

```
device=emm386 x=D0000-D3FFF
```

This command line should be placed at the beginning of the CONFIG.SYS file.

A similar situation exists with programs, such as Microsoft Windows, which map memory between 640 KB and 1 MB. Again, the best solution is to exclude your adapter's RAM address space from the memory-management driver.

For details on using a memory-management utility, refer to your utility's documentation.

Notes

SPECIFICATIONS E

General

Hardware compatibility	IBM-compatible computer with ISA or EISA bus
Standard supported	IEEE 802.3
I/O base address	200, 220, 240, 260, 280, 2A0, 2C0, 2E0, 300, 320, 340, 360, 380
Interrupt request channel	2/9, 3, 5, 7, 10, 11, 15
RAM buffer size	16KB
RAM base address	C000, C200, C400, C600, C800, CA00, CC00, CE00, D000, D200, D400, D600, D800, DA00, DC00, DE00, E000, E200, E400, E600, E800, EA00, EC00
RAM speed	35ns, 0 wait states enabled or
ROM size	disabled
RAM speed	64KB
ROM window size	16KB (SMC Boot ROMs)
ROM base address	C000, C200, C400, C600, C800, CA00, CC00, CE00, D000, D200, D400, D600, D800, DA00, DC00, DE00, E000, E200, E400, E600, E800, EA00, EC00, EE00

Electrical

Power (adapter only)	+5 VDC, 1.1 Amps, maximum
Power (external transceiver)	+12 VDC, 0.5 Amps, maximum

Environmental

Operating temperature (ambient)..... 32°F to 131°F (0°C to 55°C)
Operating humidity..... 10% to 90% (non-condensing)
Storage temperature..... -4°F to 158°F (-20°C to 70°C)
Storage humidity ..... 5% to 95% (non-condensing)

Physical

EtherCard Elite 16 Ultra:
- Size..... 3.695 inches by 6.245 inches, or 3.08 inches by 6.245 inches
- Weight ..... 3.5 ounces

EtherCard Elite 16T Ultra:
- Size..... 3.695 inches by 6.245 inches, or 3.08 inches by 6.245 inches
- Weight ..... 3.0 ounces

EtherCard Elite16C Ultra:
- Size..... 3.695 inches by 6.245 inches
- Weight ..... 3.6 ounces

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