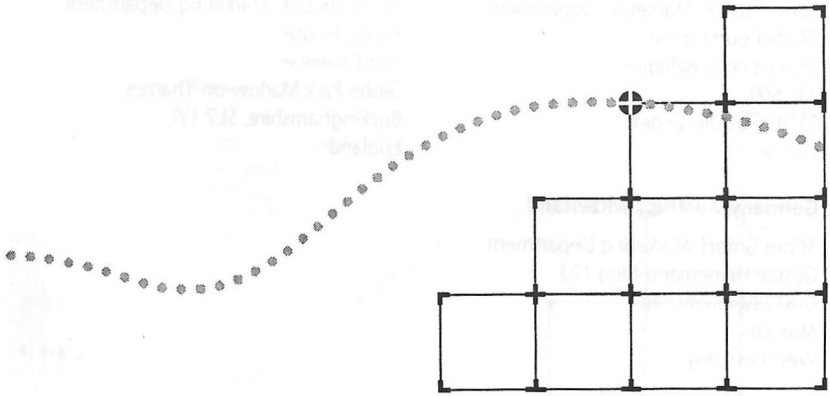
LIFETIME WARRANTY

3Com's EtherLink®, TokenLink® III 16/4, and FDDILink™ adapters have a Lifetime Warranty.

To ensure the very best 3Com service and support, take the time to complete the product registration card.

Any defective 3Com adapter will be repaired or replaced, at 3Com's option, for as long as the adapter resides in its original IBM® Personal Computer, Personal System/2®, or compatible computer (driver software is covered by the standard 90-day limited software warranty).



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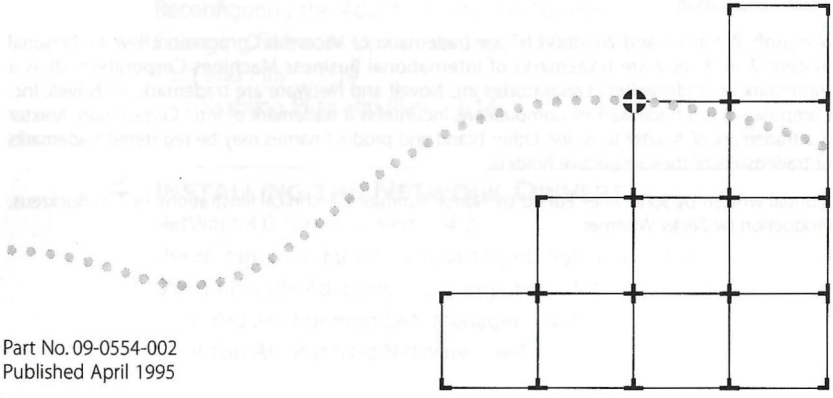
EtherLink® III Parallel Tasking® 16-Bit ISA Adapter User Guide

A member of the 3Com EtherLink III family of adapters



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1 PRODUCT OVERVIEW

The 3Com® EtherLink® III Parallel Tasking® adapters are a family of third-generation Ethernet adapters. This family includes 16-bit Industry Standard Architecture (ISA) and 32-bit Extended Industry Standard Architecture (EISA) adapters as well as Micro Channel® Architecture (MCA) and Personal Computer Memory Card International Association (PCMCIA) adapters. This guide contains installation, configuration, and diagnostic information about the 16-bit ISA adapters *only*.

Overview

This guide describes these 3Com EtherLink III ISA adapters:

- 3C509B-TPO (twisted-pair only)
- 3C509B-TP (twisted-pair)
- 3C509B (coax)
- 3C509B-COMBO (coax and twisted-pair)

These adapters are functionally identical; they differ only in the layout of the components and the type of media supported on the backplates, as shown in Figure 1-1. The name "EtherLink III adapter" is used in this guide to refer to all four adapters unless otherwise specified.

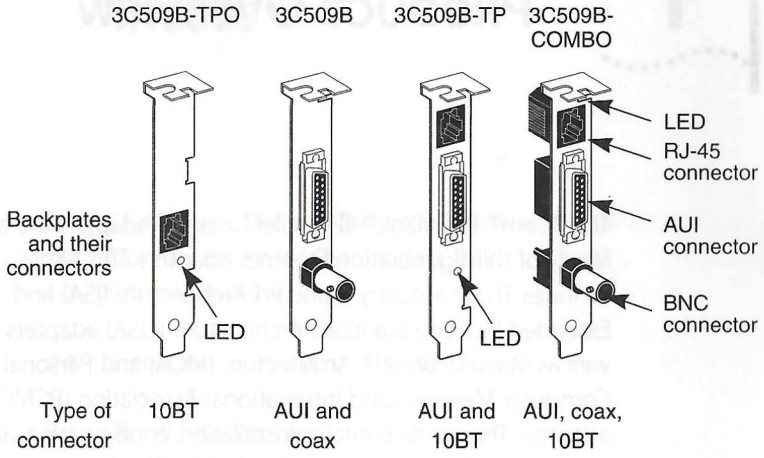

Figure 1-1 ISA Adapter Types

EtherLink III adapters connect your IBM® personal computer or compatible to an Ethernet network wired with IEEE 802 standard 10BASE2 or 10BASE5 coaxial cable, or 10BASE-T twisted-pair cable. The cable specifications and connector types for each adapter are shown in Table 1-1.

Table 1-1 ISA Adapter Cable and Connector Specifications

ISA Adapter Number	Cable Specifications	Connector Types
3C509B-TPO	10BASE-T	RJ-45
3C509B-TP	10BASE-T	RJ-45
	Thick coax*	AUI
3C509B coax	Thin coax	BNC
	Thick coax	AUI
3C509B-COMBO	10BASE-T	RJ-45
	Thin coax	BNC
	Thick coax	AUI

* If an external transceiver is used, the 3C509B-TP adapter can be connected to thin coax cabling as well.

The EtherLink III adapter can be installed in either ISA or EISA computers, including the following:

- IBM Personal Computer AT® (ISA only)
- IBM Personal System/2® computers containing ISA or EISA buses
- Any compatible UL®-listed personal AT-compatible computer that includes instructions for the installation of hardware and software options inside the main system unit

System Requirements

The host system in which the EtherLink III adapter is installed must meet these minimum requirements:

- 80286 CPU or above
- One 8- or 16-bit slot
- 16 bytes of I/O space, starting at any 16-byte boundary from 200h to 3F0h

Features

The EtherLink III adapter has the following features:

- Hardware Plug and Play support, which automatically configures ISA bus resources without user intervention
- AutoLink™ auto installation software, which installs all Novell® NetWare® DOS ODI client software into your operating system
- Auto Select Media Type capability, which enables certain drivers to automatically detect the type of media connector that connects the adapter to the network
- Backward compatibility with existing (3C509) EtherLink III ISA adapter drivers
- Network management support through Transcend® EtherLink SmartAgent™ software, which is auto-installed with the drivers

Roadmap to the User Guide

Table 1-2 shows where to find specific information in this guide.

Table 1-2 Topic Locator for the User Guide

If you are looking for:	Turn to:
An overview of EtherLink III ISA adapters	Chapter 1
Adapter installation instructions	Chapter 2
Instructions for connecting the adapter to the network	Chapter 2
Adapter configuration instructions	Chapter 3
Information about installing network drivers	Chapter 4
Details about troubleshooting and the diagnostic program	Chapter 5

Table 1-3 lists the icon conventions that are used throughout this guide.

Table 1-3 Notice Icons

Icon	Type	Description
	Information Note	Information notes call attention to important features or instructions.
	Caution	Cautions contain directions that you must follow to avoid immediate system damage or loss of data.
	Warning	Warnings contain directions that you must follow for your personal safety. Follow all instructions carefully.

2 INSTALLING THE ADAPTER

This chapter describes how to install the EtherLink III adapter in your computer. It includes instructions for inserting the adapter into the computer and connecting the adapter to the network using the on-board transceiver or an external transceiver.

Getting Started

Open the shipping container and verify that you have received all items on the packing list. Inspect each item for damage.

CAUTION: *Each adapter is packed in antistatic material to protect it during shipment. To avoid damaging any static-sensitive components after removal from the bag, be sure to reduce any static electricity on your person. One way to do this is to touch the metal chassis of your computer. You can maintain grounding by wearing a wrist strap attached to the chassis.*

You can install the EtherLink III adapter in either one of the following environments:

- An ISA adapter in an ISA computer
- An ISA adapter in an EISA computer

If you are unsure of the type of media connector that your adapter has, refer to Figure 1-1.

Inserting the Adapter

To insert the adapter into the computer, follow these steps:

1 **Unplug the computer and disconnect all cables that are connected to the main system unit.**

2 **Remove all jewelry from your hands and wrists. Use only insulated or nonconductive tools.**

3 **Remove the computer's cover and select any of the available expansion slots.**

4 **Insert the adapter in the slot and secure the screw.**

If you are installing an ISA adapter in an EISA slot, be aware that the EISA-bus edge connector is deeper than the ISA edge connector.

The adapter's backplate should be flush with the computer's backplane. Be sure that the adapter's connector fingers are completely seated in the slot.

5 **Replace the computer's cover and reconnect all cables, including the network cable.**

You must connect the adapter to the network before configuring the adapter and loading the drivers.

Connecting to the Network

This section describes how to connect different types of network cables to the EtherLink III adapters. Table 2-1 lists the types of network cable connectors that are found on the EtherLink III ISA adapters.

Table 2-1 Connectors for EtherLink III ISA Adapters

Cable Type	Connector	Transceiver Type
Thin coaxial	BNC	On-board coax
Twisted-pair	RJ-45	On-board TP
Thick coaxial	AUI (15-pin)	External

Connecting to the On-board Transceiver

Each EtherLink III adapter is equipped with an on-board transceiver to allow easy connection to the network.

Connecting to Thin Ethernet Cable

The EtherLink III coax adapter (3C509B) and the 3C509B-COMBO adapter are factory-set to use the on-board transceiver with thin Ethernet cable. Follow these steps:

1 **Connect the T connector on the thin Ethernet cable to the adapter's BNC connector (see Figure 2-1).**

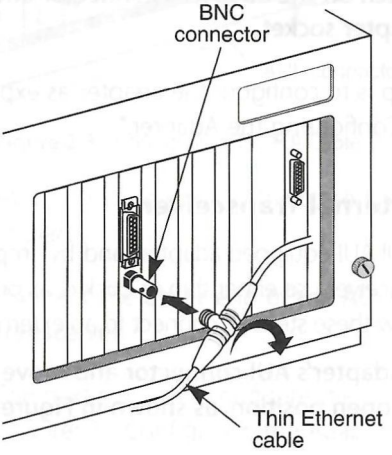

Figure 2-1 Connecting Thin Ethernet Cable

2 **Align the T connector's slots with the pegs on the BNC connector.**

3 **Push the T connector in and twist it clockwise until it stops.**

The next step is to configure the adapter, as explained in Chapter 3, "Configuring the Adapter."

Connecting to Twisted-pair Cable

The EtherLink III 10BASE-T adapters (3C509B-TP and 3C509B-TPO) are factory-set to use the on-board transceiver with twisted-pair cable.

1 **Make sure that the connector on your cable is wired appropriately for standard 10BASE-T adapter cards.**

Refer to Appendix A, "Specifications," for RJ-45 connector pin assignments.

2 **Align the RJ-45 plug on the end of the twisted-pair cable with the notch on the adapter's connector and insert it into the adapter socket.**

The next step is to configure the adapter, as explained in Chapter 3, "Configuring the Adapter."

Connecting to an External Transceiver

You can install AUI-equipped adapters and, by employing an external transceiver, use either thin or thick coax or twisted-pair cabling. Follow these steps to connect to an external transceiver:

1 **Locate the adapter's AUI connector and move the slide latch to the open position, as shown in Figure 2-2.**

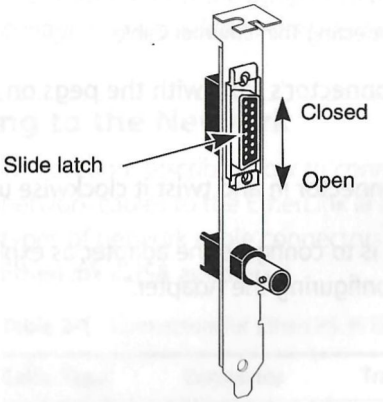

Figure 2-2 Slide Latch

2 Connect the AUI cable or transceiver to the AUI connector on the adapter, as shown in Figure 2-3.

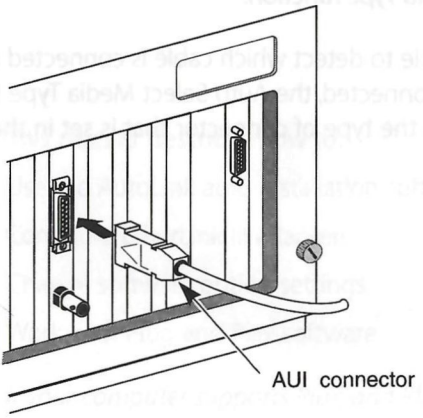

Figure 2-3 Connecting the AUI Cable

Move the slide latch to the closed position to lock the cable in place.

3 Connect the other end of the AUI cable to the external transceiver.

The next step is to configure the adapter, as explained in Chapter 3, "Configuring the Adapter."

Auto Select Media Type

The Auto Select Media Type function is only implemented by the drivers contained on the *EtherDisk®* diskette supplied with the EtherLink III adapter. This includes NetWare ODI drivers, NDIS 2.01 drivers, Windows for Workgroups drivers, and Windows NT™ drivers for Intel® architecture. If you have one of these drivers installed, as soon as you connect a network cable to the system, the Auto Select Media Type function will detect the type of cable making the connection and automatically select that connection.

Drivers from the previous generation of EtherLink III adapters (that is, adapters without a "B" suffix) do not support the Auto Select Media Type function.

If it is unable to detect which cable is connected or if there is no cable connected, the Auto Select Media Type function defaults to the type of connector that is set in the EEPROM.

3 CONFIGURING THE ADAPTER

This chapter describes how to:

- Use the AutoLink auto installation software
- Configure EtherLink III adapters
- Change software option settings
- Work with Plug and Play software

If your computer supports Plug and Play, some resources will be allocated automatically. For details, refer to the description of the Plug and Play function at the end of this chapter.

AutoLink Software for NetWare Environments

3Com's AutoLink auto installation software is designed to automatically configure a single EtherLink III adapter in an ISA computer running NetWare. The AutoLink program automatically configures the adapter and installs all necessary NetWare DOS ODI client software. It also modifies the CONFIG.SYS and AUTOEXEC.BAT files. It automatically logs on to the server and updates the client software if your system administrator has already configured a 3Install account on your server.

To use the AutoLink feature to install and configure the EtherLink III adapter, your computer must meet the following requirements:

- Use the Novell NetWare 2.x, 3.1x, or 4.x network operating system (NOS)
- Have only one EtherLink III adapter installed
- Be intended for use as a NetWare DOS ODI client

If you have a non-NetWare network environment, see the section "Non-NetWare Environments" later in this chapter. For other adapter configuration situations, see one of the following sections:

- Configuring Multiple Adapters
- Configuring the Adapter for an EISA Computer
- Reconfiguring the Adapter for an ISA Computer

For information on using command line commands to configure the adapter, press [F1] to access the Help screen.

Using the AutoLink Program

To use the AutoLink program to configure a single EtherLink III adapter, follow the steps below. If you have more than one EtherLink III adapter in your computer, see the section "Configuring Multiple Adapters" later in this chapter.

1 **Make sure that you have booted the computer under DOS, version 3.1 or later, and that your computer is connected to the network, as detailed in Chapter 2, "Installing the Adapter."**

2 **Insert the *EtherDisk* diskette in a floppy drive on your computer and make that drive the current drive.**

For example, if the diskette drive is A, type the following command:

```
A: [Enter]
```

3 **Type at the prompt:**

```
AUTOLINK [Enter]
```

For configurations other than a single EtherLink III adapter in a DOS ODI client environment, type:

```
INSTALL [Enter]
```

4 **The first time you use the diskette to install an adapter, a license screen appears. To accept the terms and conditions of the 3Com end-user software license agreement, type the following:**

```
Y
```

To view the full text of the license agreement, press [F1].

The AutoLink information screen appears, as shown in Figure 3-1.

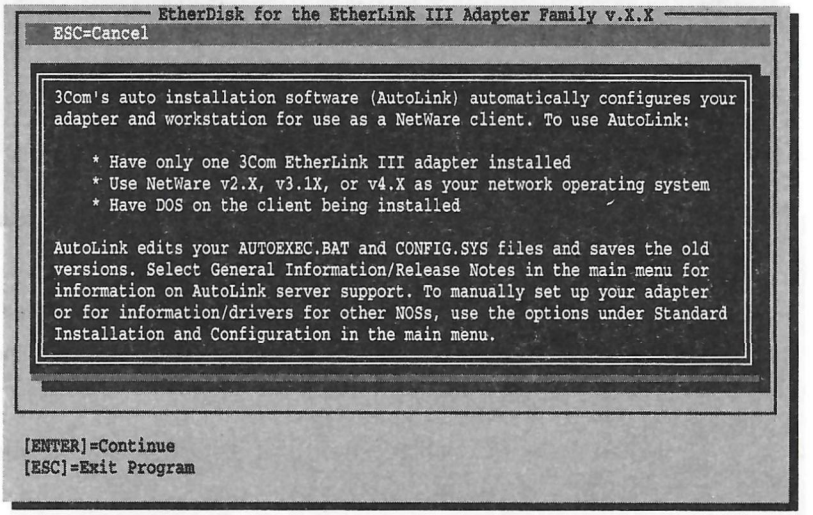

Figure 3-1 AutoLink Information Screen

5 **Read the screen and press [Enter].**

6 When the main menu screen shown in Figure 3-2 appears, select NetWare DOS ODI Client, and press [Enter].

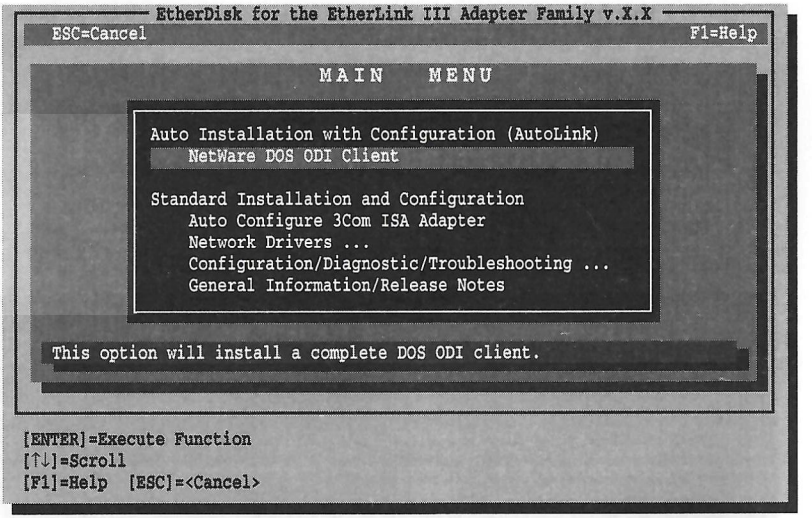

Figure 3-2 Main Menu

Auto installation with configuration will take a few minutes. Several messages appear while the AutoLink program is running. A final message indicating successful configuration appears.

7 When the auto installation process is finished, remove the diskette and reboot the computer.

When you do this, a DOS ODI client starts.

To ensure that your computer is configured with the latest client software, ask your system administrator to configure a 3Install account on the server. Instructions for configuring a 3Install account are contained in the README.TXT file located in the \QINSTALL\SERVER directory on the EtherDisk *diskette.*

You can use the AUTOLINK.CFG file to control the AutoLink process. The AUTOLINK.CFG file in the root directory contains default settings and descriptions of other control parameters.

This concludes the installation and configuration of a single adapter using the AutoLink feature. For driver installation instructions, refer to Chapter 4, "Installing the Network Drivers."

Configuring Multiple Adapters

If you have installed more than one adapter in an ISA computer, follow the steps below to configure the adapters.

Configuring the First Adapter

After you have started the *EtherDisk* diskette program, as explained in steps 1 through 5 in the previous section, "Using the AutoLink Program," follow the steps below:

1 **When the main menu appears, select Configuration/Diagnostic/Troubleshooting.**

2 **Select Configuration and Diagnostic Program from the next screen.**

A screen appears that is similar to the one shown in Figure 3-3.

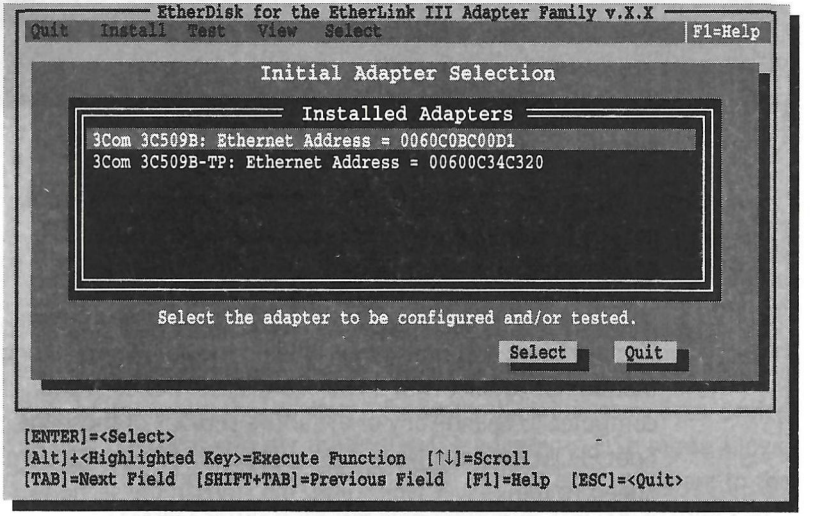

Figure 3-3 Main Window with Multiple Adapters

3 **Highlight the adapter you want to configure by using the arrow keys. Then press [Enter], or tab to the <Select> command button and press [Enter].**

A screen appears, showing your selection.

4 The menu selection Configure Adapter appears already highlighted. Press [Enter].

A configuration screen similar to that shown in Figure 3-4 appears.

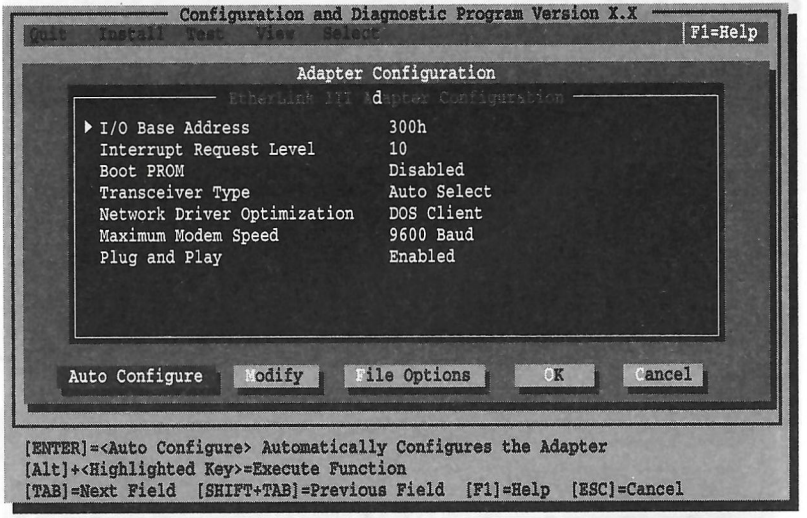

Figure 3-4 Configuration Dialog Box

5 From the screen similar to the one shown in Figure 3-4, make sure the <Auto Configure> command button is highlighted and press [Enter].

This automatically configures the I/O Base Address, Interrupt Request Level, and Transceiver Type on the adapter to settings that do not conflict with those of any other device in your computer. To change any of the above settings or those for Boot PROM, Network Driver Optimization, Maximum Modem Speed, or Transceiver Type, follow the steps in the section "Changing Software Option Settings" later in this chapter.

If you encounter a problem with the Auto Configure option, access the Help screens by pressing [F1].

6 The <OK> command button becomes highlighted after configuration is complete. Press [Enter] to accept the configuration parameters.

Configuring the Remaining Adapter(s)

To configure the rest of the adapters, return to the Configuration and Diagnostic screen (by pressing the [Esc] key) and repeat steps 3 through 6 in the previous section. Select each adapter that needs to be configured.

When all adapters have been configured, a message indicating successful configuration appears. Configuration is now complete. For driver installation instructions, proceed to Chapter 4, "Installing the Network Drivers."

Non-NetWare Environments

To configure a single EtherLink III adapter for a non-NetWare NOS, proceed as follows:

1 **Follow steps 1 through 5 in the section "Using the AutoLink Program" earlier in this chapter.**

2 **When the main menu screen shown in Figure 3-2 appears, select Auto Configure 3Com ISA Adapter and press [Enter].**

When the message indicating successful configuration appears, proceed to Chapter 4, "Installing the Network Drivers," for instructions for installing the driver.

Configuring the Adapter for an EISA Computer

EISA computers come with an automatic configuration program that allocates the system's resources to each device in the computer. Putting an ISA adapter in EISA mode allows it to be configured by the EISA configuration program to the correct settings for the EISA computer. The ISA adapter can also be reconfigured to work in an ISA computer.

You can configure an ISA adapter for EISA mode only if it is in an EISA slot.

CAUTION: *An ISA adapter configured for an EISA computer will not work in an ISA computer without being reconfigured. Refer to the section "Reconfiguring the Adapter for an ISA Computer" later in this chapter for instructions.*

To configure the adapter to work in an EISA computer, follow steps 1 through 5 in the section "Using the AutoLink Program" earlier in this chapter. Then follow these steps:

1 **When the main menu screen shown in Figure 3-2 appears, select Configuration/Diagnostic/Troubleshooting and press [Enter].**

2 **When the Configuration and Diagnostic screen appears, select Configuration and Diagnostic Program.**

3 **Do one of the following:**

- If you have a single adapter installed, the menu selection Configure Adapter appears already highlighted. Press [Enter].
- If you have multiple adapters installed, use the arrow keys to select an adapter and press [Enter].

  A screen identifying the adapter then appears with the Test menu bar item highlighted.

  a Use the left arrow key to select the Install menu bar item. The Configure Adapter option will be highlighted.

  b Press [Enter].

4 **When the Adapter Configuration dialog box appears, select the <Modify> button. Press [Enter].**

The I/O Base Address field is selected, followed by the I/O Base Address dialog box.

5 **Use the arrow key to select EISA. Press [Enter].**

This changes the I/O base address setting.

6 **Save the new configuration setting to the adapter by selecting the <OK> button. Press [Enter].**

7 Exit the program and remove the *EtherDisk* diskette.

8 Insert the EISA configuration diskette provided with your computer.

9 Turn off the computer. Wait 10 seconds and then turn it on again.

10 Follow the instructions that accompanied your EISA computer to run the EISA configuration program.

When the program asks for .CFG files to copy, insert the *EtherDisk* diskette, press [Enter], and use the appropriate file:

- !TCM5094.CFG for the 3C509B-COMBO adapter
- !TCM5091.CFG for the 3C509B coax adapter
- !TCM5090.CFG for the 3C509B-TP adapter
- !TCM5095.CFG for the 3C509B-TPO adapter

The sequence of configuration steps required for some EISA computers may vary from the steps above. Consult the configuration program manual provided by the manufacturer of your computer for more details.

Reconfiguring the Adapter for an ISA Computer

Use this procedure only for reconfiguring an ISA adapter that has been previously configured to function in an EISA computer.

To reconfigure the adapter, install the adapter in either an ISA or an EISA computer and follow steps 1 through 5 in the section "Using the AutoLink Program" earlier in this chapter. Then follow these steps:

1 When the main menu screen shown in Figure 3-2 appears, select Configuration/Diagnostic/Troubleshooting and press [Enter].

2 When the Configuration and Diagnostic screen appears, select Configuration and Diagnostic Program.

3 Do one of the following:

- If you have a single adapter installed, the menu selection Configure Adapter appears already highlighted. Press [Enter].
- If you have multiple adapters installed, use the arrow keys to select an adapter and press [Enter].

  A screen identifying the adapter then appears with the Test menu bar item highlighted.

a Use the left arrow key to select the Install menu bar item. The Configure Adapter option will be highlighted.

b Press [Enter].

4 When the Adapter Configuration dialog box appears, select the <Modify> button. Press [Enter].

The I/O Base Address field is selected. An I/O Base Address dialog box appears.

5 Use the arrow key to select ISA. Press [Enter].

This changes the I/O Base Address setting, and it appears changed on a screen similar to the one shown in Figure 3-4.

If your system supports Plug and Play, the I/O Base Address, Interrupt Request Level, and Boot PROM parameters will be automatically set.

6 Select the option setting in the Adapter Configuration dialog box for any of the other parameters you want to change, or accept the defaults.

For more information about each of the settings, refer to the on-line help (using [F1] when the option is highlighted).

7 Save the new configuration setting to the adapter by clicking the <OK> button and pressing [Enter].

8 Remove the *EtherDisk* diskette.

9 If you are working in an EISA computer, insert the computer's configuration utility diskette and reboot the computer.

10 If you are working in an EISA computer, remove the adapter from the computer and install it in the ISA computer. Follow the instructions given in Chapter 2, "Installing the Adapter."

Changing Software Option Settings

You should change the default settings of an EtherLink III adapter only if a conflict with another device or card exists. For information on settings of other standard devices, select the Configuration/Diagnostic/Troubleshooting option on the *EtherDisk* diskette main menu.

The default settings can also be changed in the following situations:

- You have a boot PROM.
- You are using a modem faster than 9600 baud.
- You want to optimize driver performance for OS/2® or Windows or for operation on a server.
- You want to deactivate the Auto Select Media Type option. (Select this option if you are unsure of the media connection to your adapter.)
- You want to change the type of network connector.
- You want to disable Plug and Play.

Table 3-1 lists each software option, the default setting, and the available settings. Refer to the on-line help (using [F1] when the option is highlighted) for more information about each setting.

Table 3-1 Option Settings

Option	Default Setting	Available Settings
I/O Base Address	300h	200h, 210h, 220h, 230h, 240h, 250h, 260h, 270h, 280h, 290h, 2A0h, 2B0h, 2C0h, 2D0h, 2E0h, 2F0h, 300h, 310h, 320h, 330h, 340h, 350h, 360h, 370h, 380h, 390h, 3A0h, 3B0h, 3C0h, 3D0h, 3E0h, EISA
Interrupt Request Level	10	3, 5, 7, 9, 10, 11, 12, 15
Boot PROM*	Disabled	Disabled, 8 K, 16 K, 32 K
Transceiver Type	Auto Select for all except 3C509B-TPO, which is On-board TP	On-board Coax (BNC), On-board TP (RJ-45), External (AUI/DIX), or Auto Select
Network Driver	Windows	DOS Client, Windows or OS/2 Client, Server
Maximum Modem Speed (fastest modem installed)	9600 Baud	No Modem, 1200, 2400, 9600, 19200, or 38400 Baud
Plug and Play	Enabled	Enabled, Disabled

* Refer to the section "ROM Size and Base Register" in the *EtherLink III Parallel Tasking ISA, EISA, Micro Channel, and PCMCIA Adapter Driver Technical Reference* for the size and base address table that gives the boot PROM's location in memory.

To change the software option settings, follow steps 1 through 5 in the section "Using the AutoLink Program" earlier in this chapter. Then follow these steps:

1 **When the main menu screen shown in Figure 3-2 appears, select Configuration/Diagnostic/Troubleshooting.**

2 **When the Configuration and Diagnostic screen appears, select Configuration and Diagnostic Program.**

3 **Do one of the following:**

- If you have a single adapter installed, the menu selection Configure Adapter appears already highlighted. Press [Enter].
- If you have multiple adapters installed, use the arrow keys to select an adapter and press [Enter].

A screen identifying the adapter then appears with the Test menu bar item highlighted.

a Use the left arrow key to select the Install menu bar item. The Configure Adapter option will be highlighted.

b Press [Enter].

4 Press [Tab] several times to highlight the first option in the main dialog box, and use the arrow keys to highlight the parameter option you want to change. Press [Enter].

A second dialog box appears.

5 Use the arrow keys to scroll through the list of settings for that option. Select a setting and press [Enter].

6 Continue this procedure for any of the other parameter options.

Refer to the on-line help (using [F1] when the option is highlighted) for more information about each of the settings.

7 Press [Tab] to highlight <OK>. Press [Enter].

You must highlight <OK> and press [Enter] to save the new settings to the adapter.

If you want to use the same settings on other adapters, you can save the configuration settings to a file. Select <Save> under <File Options> in the Adapter Configuration dialog box. For example, type:

```
D:\CONFIG\3C5xx.SET
```

where xx *represents the last two digits of the adapter number. This saves the settings to the default file 3C5XX.SET in the CONFIG directory in drive D. Refer to the on-line help (using [F1]) for more information.*

Plug and Play

Plug and Play functions only in computers running specific Plug and Play software. If you are using a system that supports Plug and Play, three parameters (IRQ, I/O Base, and ROM Base) will be set by the Plug and Play software. If you set any of these resources yourself, Plug and Play will ignore these settings and will override them. (You will still set ROM size to indicate the presence of a network boot ROM and its size.)

If you are running Plug and Play software, you may still have to load the adapter drivers located on the *EtherDisk* diskette. If you are on a NetWare server, run the AutoLink auto installation software. To load the NDIS driver, refer to Chapter 4, "Installing the Network Drivers."

Disabling Plug and Play

You can disable the Plug and Play feature by changing the Plug and Play software option setting, as shown in Table 3-1. You *must* disable Plug and Play support if any one of the following conditions exists:

- The computer you are using supports the Plug and Play BIOS and you are *not* using Plug and Play software.
- The adapter driver does not support Plug and Play. The only drivers that support Plug and Play are DOS ODI and DOS NDIS 2.01 drivers.
- You want to configure the EtherLink III adapter manually.

4 Installing the Network Drivers

This chapter describes how to install the network drivers required to let the EtherLink III adapter operate with your network operating system (NOS). If you are running NetWare 2.x, 3.1x, or 4.x, you can use 3Com's AutoLink auto installation feature, which automatically installs all the NetWare DOS ODI client software (including drivers). Refer to Chapter 3 for installation instructions. If you are running any other network operating system, follow the driver installation instructions in this chapter. For additional information, press [F1] to access Help.

The *EtherDisk* diskette contains the latest versions of the network drivers available when 3Com shipped the adapter. It also contains other important information concerning EtherLink III adapters and their configuration.

To obtain network operating system drivers not included on the EtherDisk *diskette, contact the manufacturer of that network operating system or application. To obtain a list of supported drivers along with software driver updates and patches for the drivers on the* EtherDisk *diskette, use one of the bulletin board services listed in Appendix B, "Technical Support." For example, Document 9071 in 3Com's CardFacts® fax service contains a list of all available drivers.*

To install the network drivers:

1 **Select Network Drivers in the main menu.**

For instructions for accessing the main menu, refer to Chapter 3, "Configuring the Adapter."

2 **Select the appropriate driver for your network operating system from the menu choices.**

The menu program copies the selected driver to a specified disk drive.

3 **Refer to your network operating system manuals for instructions for using the driver with your network operating system.**

All network adapters in the EtherLink III Parallel Tasking adapter family (except for the EtherLink III PCMCIA adapters) use the same drivers. These drivers are backward-compatible with the previous generation of EtherLink III adapters.

NetWare 4.0 Server Drivers

The *EtherDisk* diskette contains a NetWare 4.0 server driver and five NetWare Loadable Modules (NLMs) that enable the NetWare 4.0 driver to be used with NetWare 3.11 software.

To load the 4.0 server driver while running NetWare 3.11, copy all files from the \NETWARE\311SRV subdirectory on the *EtherDisk* diskette to the server hard disk. To start the server driver, enter the following commands:

```
load C:LSLENH.NLM [Enter]
load C:3C5X9.LAN [Enter]
```

If this order is not followed, the system will not operate correctly. When this has been done, bind the protocol to the driver as usual.

When running the 3C5X9.LAN driver with NetWare 3.11, you must update the MONITOR.NLM file that accompanied NetWare 3.11 with the MONITOR.NLM file on the EtherDisk *diskette in the directory \NETWARE\311SRV.*

If you are running NetWare 3.12 or 4.x, use only the 3C5X9.LAN driver from the *EtherDisk* diskette. Use the appropriate NLM files from the Novell server installation.

Using Transcend EtherLink SmartAgent Software

3Com's EtherLink SmartAgent driver agents, which provide network management capabilities for adapters and PCs, are included on the *EtherDisk* diskette. NetWare DOS ODI client drivers already have embedded agents. NDIS DOS and OS/2 driver agents can be installed after NDIS drivers are loaded. NetWare 3.x servers require a NetWare Loadable Module (NLM) driver agent, which is available only from the 3Com Transcend EtherLink SmartAgent product.

These driver agents permit remote management of PCs and EtherLink III adapters through use of 3Com's Transcend WorkGroup Manager for Windows application software, which is available separately. The driver agents occupy less than 6 KB on client PCs. They are fully SNMP compliant when used with EtherLink SmartAgent SoftHub™/DOS software, one copy of which is included with each copy of Transcend WorkGroup Manager.

WorkGroup Manager software integrates hub and adapter management, using a graphical interface to let you automatically monitor traffic and error levels and control network access. WorkGroup Manager features virtual grouping of PCs for more efficient management and includes enhanced features for 3Com LinkBuilder® hubs. It will also let you discover and track PC and adapter hardware, software, configurations, and users.

When you install the EtherLink III adapter and drivers, make sure the Transcend EtherLink SmartAgent driver agents are fully installed and configured. This includes entry of user-definable information in NET.CFG files for NetWare PCs and PROTOCOL.INI files for NDIS-based PCs.

For more information on WorkGroup Manager software, contact your authorized 3Com representative.

Using Multiple Adapters in a Computer

The following information is helpful if you have more than one EtherLink III adapter per computer. Refer to the documentation accompanying your operating system for complete details.

If You Are Running LAN Manager

If you are running Microsoft® LAN Manager and you change the I/O base address setting, you must also change the IOADDRESS line in the PROTOCOL.INI file to use the new setting. The file is located on the startup diskette or the hard drive.

If you have configured an ISA adapter for an EISA computer, the PROTOCOL.INI file looks for the parameter SLOT=*number* rather than the I/O base address.

If You Are Running NetWare

If you are running NetWare and you have installed multiple adapters in an ISA computer, you will see the following message when you try to load the DOS ODI drivers:

```
Multiple EtherLink III Adapters found.
Use NET.CFG to specify I/O Port.
```

Specify which adapter you want the driver to recognize by adding the I/O base address to the NET.CFG file using the PORT statement.

If the adapter is configured for EISA operation, use the SLOT parameter to select the adapter.

5 Performing Troubleshooting and Diagnostic Tests

This chapter explains how to isolate and solve EtherLink III adapter problems.

Make sure that the adapter is correctly installed and configured in an Industry Standard Architecture (ISA) or Extended Industry Standard Architecture (EISA) bus. (See Chapter 2 for installation instructions and Chapter 3 for configuration instructions.)

Troubleshooting with the Diagnostic Tests

The three diagnostic tests on the *EtherDisk* diskette check the adapter's overall operation and permit the isolation of faults. You can run the diagnostic tests after installing one or more EtherLink III adapters, or you can run them when a fault is suspected. If the tests in their default configuration do not isolate the problem, you can change the test parameters to meet specific situations.

Always run diagnostic tests with no device drivers or memory managers installed. Whenever you plan to run the diagnostic tests, you must first boot your system from a DOS diskette containing no device drivers.

If you are using DOS 6.x in a plain DOS environment, you can bypass the CONFIG.SYS and AUTOEXEC.BAT files by holding down the right shift key while booting the system. If you are running under DOS 6.2, pressing [F5] while booting the system will also bypass the same two files.

The diagnostic tests are divided into three groups, designated Group 1, Group 2, and Group 3.

Group 1 tests check the physical components, connectors, and circuitry on the adapter.

The Group 2 test (for the 3C509B coax and 3C509B-COMBO adapters only, *not* twisted-pair adapters) checks the adapter's ability to transmit and receive data via the internal transceiver.

The Group 3 test (the Echo Exchange Test) tests the adapter's ability to transmit and receive data while on the network.

If the adapter passes all three tests successfully, hardware failure is ruled out. If a problem still remains, look at cabling, software, and other issues that affect functionality on the network.

Starting the Diagnostic Program

To use the *EtherDisk* diskette Configuration and Diagnostic Program, follow these steps:

1 **In the main menu, select Configuration/Diagnostic/ Troubleshooting and press [Enter].**

Refer to Chapter 3 for instructions for accessing the main menu.

2 **When the Configuration and Diagnostic screen appears, select Configuration and Diagnostic Program, and press [Enter].**

If you are testing multiple adapters, a screen displaying descriptions of each installed adapter appears. Highlight the adapter you want to test and press [Enter]. A screen appears, showing the selected adapter.

3 **Continue with the instructions given in the next section, "Running the Group 1 Tests."**

You can also run the tests from the command line. At the system prompt, type:

```
3C5X9CFG RUN
```

Running the Group 1 Tests

The Group 1 tests include:

- Register Access Test
- EEPROM Vital Data Test
- EEPROM Configurable Data Test
- FIFO Loopback Test
- Interrupt Test
- Ethernet Core Loopback Test
- Encoder/Decoder Loopback Test

For a description of each Group 1 test, access Help by pressing [F1]. When the Help screen appears, tab to the <Index> command button and press [Enter]. Use the arrow keys to move through the Index listings. Select Test Definitions and press [Enter].

To run the Group 1 tests, follow these steps:

1 **Under the Test pull-down menu, select Run Tests. Press [Enter].**

The Run Tests dialog box appears, with the <Start> command button highlighted.

2 **Press [Enter] to start the tests.**

Group 1 tests run ten times (default setting) unless you specify otherwise. The test results are displayed on the screen in the Results column.

To run the tests continuously, go to the Repetitions box on the Test Setup screen and select Continuous (and deselect Halt on Error in the Errors box). To access the Test Setup screen, select Test in the menu bar and then select Test Setup in the drop-down menu. Press [Enter].

Running the Group 2 Test

The Group 2 test is called the Network Loopback Test. It tests the 3C509B and 3C509B-COMBO adapters' ability to transmit and receive data over the network. This test requires installation of a loopback plug at the adapter's transceiver connection. Or, you can run the test on a nonproduction network on which only the computer being tested is operating.

CAUTION: *Running the Group 2 test while connected to an active network can cause intermittent failures.*

Assembling a Loopback Plug

If you do not have a loopback plug, you can order one from your authorized network supplier (3Com part number 3C537) or you can make your own. To assemble the loopback plug, connect two 50-ohm network cable terminators to a T connector, as shown in Figure 5-1. You can purchase the terminators from your network supplier (3Com part number 3C535).

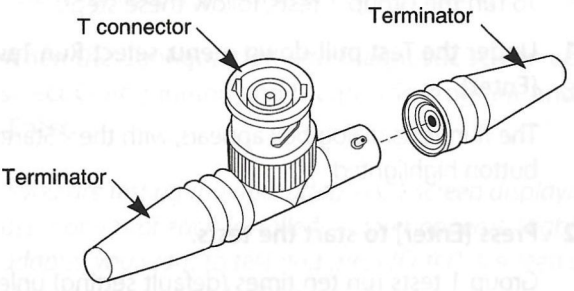

Figure 5-1 Assembling a Loopback Plug

Starting the Group 2 Test

To run the Group 2 Test on an EtherLink III adapter, follow these steps:

1 **Connect the loopback plug to the round BNC connector on the back of the adapter.**

2 **Start the Configuration and Diagnostic Program, as described earlier in this chapter.**

3 **Select Test Setup from the Test menu.**

4 **Enable the Group 2 test. Highlight <OK> and press [Enter].**

5 **Go to the Run Tests dialog box to start the tests.**

6 **After the test is completed:**

a Exit the Configuration and Diagnostic Program.

b Remove the loopback plug.

Running the Group 3 Test

The Group 3 test is called the Echo Exchange Test. It tests the adapter's ability to transmit and receive data while on the network.

To run the Group 3 test on the network, you need a second computer set up as an echo server. The echo server receives packets from the adapter being tested and echoes them back to the adapter.

The second computer must be equipped with a 3Com adapter. The diagnostic program that comes with the adapter supports the EtherLink III echo server diagnostic program.

Setting Up an Echo Server

If your echo server contains an EtherLink III adapter, select the Echo Server menu item under the Test menu, and click the <Start> command button to make the computer an echo server.

If you are setting up an echo server using a 3Com adapter other than an EtherLink III adapter, follow these steps:

1 **Select a computer to use as an echo server.**

2 **Insert the *EtherDisk* diskette in a floppy drive.**

The diagnostic program comes on the *EtherDisk* diskette that accompanied the adapter.

3 Start the diagnostic program on the echo server.

The diagnostic program that you use depends on the adapter that is installed in the echo server. After the system prompt, of the drive containing the Configuration and Diagnostic Program, enter the name of the appropriate program (for example, 3C523) from Table 5-1.

Table 5-1 Diagnostic Programs

Diagnostic Program Name	Adapter in the Echo Server
3C503	EtherLink II® or II TP, EtherLink II/16 or II/16 TP
3C505	EtherLink Plus®
3C507	EtherLink 16 or EtherLink 16 TP
3C5X9CFG	EtherLink III family
3C523	EtherLink/MC
3C523TP	EtherLink/MC TP
3C527	EtherLink/MC 32

4 In the Diagnostic and Configuration Program main window, select Echo Server from the Test menu on the menu bar.

The program notifies you that your computer is now set up as an echo server.

Starting the Group 3 Test

To run the Group 3 test on an EtherLink III adapter, follow these steps:

1 Start the Configuration and Diagnostic Program.

This program must be on the computer containing the adapter you want to test.

2 Select Test Setup from the Test menu.

3 Enable the Group 3 test. Highlight <OK> and press [Enter].

4 Go to the Run Tests dialog box to start the tests.

5 **After the test is completed:**

a Exit the program on the echo server.

b Exit the Configuration and Diagnostic Program.

Getting Help If a Test Fails

If any test fails, you can get additional information as follows:

- Highlight the test that failed in the Run Tests dialog box and press [Enter].
- Highlight the <Zoom> command button and press [Enter].

If the diagnostic tests fail, the adapter may not be defective. The problem may be incorrect option settings, option settings that conflict with the settings of other adapters, or improper installation. Follow the steps below to test the adapter further.

CAUTION: *Make sure to turn the power off before inserting or removing the adapter from the computer.*

1 **Make sure the board is seated correctly in the slot.**

Check the adapter installation by reviewing the installation instructions in Chapter 2.

The maximum bus speed supported by the EtherLink III adapters is 10 MHz.

2 **Inspect all cables and connections.**

If you are using thin Ethernet cable, make sure that you have a T connector attached to the adapter and all other adapters on the network. Make sure that the thin Ethernet segment is terminated at both ends with a 50-ohm terminator.

3 **Make sure that you booted your computer under DOS version 3.1 or later, and that no device drivers or memory managers are loaded.**

4 **If you are running the Group 2 test (only on the 3C509B coax or 3C509B-COMBO adapter), make sure that the loopback plug is securely attached to the adapter's BNC connector and that the adapter is attached to a properly cabled nonproduction network.**

If this test fails, try another loopback plug.

5 **If you are running the Group 3 test, make sure that the adapter is connected to a properly cabled and inactive network and that an echo server is set up on the network.**

6 **Make sure that the settings for the adapter's options are not the same settings used in the system or on any other adapter boards installed in the computer.**

If you need help, select Configuration/Diagnstics/Troubleshooting on the *EtherDisk* diskette main menu.

7 **Install the adapter in another slot and run the diagnostic tests again.**

The original slot may be defective.

8 **Replace the failed adapter with a working adapter and run the diagnostic tests again.**

Use the same option settings as those used on the failed adapter.

If the working adapter passes all tests, the original adapter is probably defective. Refer to Appendix B, "Technical Support."

9 **Make sure that if you have an ISA computer, the ISA adapter has been configured to work in an ISA computer.**

Refer to the section "Reconfiguring the Adapter for an ISA Computer" in Chapter 3.

10 **Install the adapter in another functioning computer and run the tests again.**

Your computer may be defective. If the adapter passes the tests in the second computer, contact the reseller or manufacturer of the original computer.

11 If you experience problems that occur only when using the AutoLink program, display or print the AUTOLINK.LOG file. The AUTOLINK.LOG file contains a log of all the events that occurred during the AutoLink installation and configuration process.

a To display the file, type:

```
type autolink.log | more
```

b To print the file, type:

```
print autolink.log
```

Changing the Test Setup

To change the test parameters, follow these steps:

1 Choose Test Setup from the Test menu in the main window of the Configuration and Diagnostic Program or use the <Test Setup> command button in the Run Tests dialog box.

2 Press [Tab] to highlight any of the fields within the Test Setup dialog box.

3 To change a setting in any field, follow these steps:

a In the Group Select box, use the arrow keys to select a test group.

For more information on Group 2 or Group 3 tests, refer to the appropriate sections earlier in this chapter.

b In the Group *X* Tests box, use the arrow keys to highlight a test. Press the [Space Bar] to enable or disable an individual test.

c In the Repetitions box, specify the number of times you want to run the tests, or use the arrow keys to select the Continuous option.

d In the Errors box, press the [Space Bar] to select or deselect the Halt on Error parameter.

4 **When you are satisfied with the new test setup, highlight the <OK> command button and press [Enter].**

5 **To run the tests, choose Run Tests from the Test menu and select the <Start> command button.**

CAUTION: *Do not use an active network to run the Group 2 or Group 3 tests.*

Miscellaneous Checks

Check for specific hardware problems, such as broken traces or loose/broken solder connections.

If you have installed the adapter correctly and you still experience problems, check the software.

Make sure that you have installed the correct drivers for the network operating system you are running (refer to Chapter 4, "Installing the Network Drivers").

If any problem persists, refer to Appendix B, "Technical Support."

Link Beat LED

The EtherLink III twisted-pair and COMBO adapters have an LED for the link beat (see Figure 1-1). The link beat LED confirms that there is an active connection between the adapter and the hub.

When you first install the adapter and power up the computer, the LED lights, but the link beat is inactive. For the link beat to be active (enabled), you need to have run the Group 3 test or have loaded the network drivers.

If you are experiencing any problems, first make sure that your hub complies with the 10BASE-T specifications and then check the LED. The meaning of LED activity is given below:

- If the LED is on, the link beat is working.
- If the LED is off, the link beat has not been established or there is a problem with the connection between the adapter and the hub.
- If the LED is blinking, the cable polarity is reversed.

A SPECIFICATIONS

This appendix lists the specifications, connector pin assignments, and cable requirements for the EtherLink III adapter.

Adapter Specifications

Network Interface

3C509B	Ethernet IEEE 802.3 industry standard for a 10 Mbps baseband CSMA/CD local area network
3C509B-TPO 3C509B-TP	Ethernet IEEE 802.3i 10BASE-T industry standard for a 10 Mbps baseband CSMA/CD local area network
3C509B-COMBO	IEEE 802.3i 10BASE-T and Ethernet IEEE 802.3 industry standard for a 10 Mbps CSMA/CD local area network

Physical Dimensions

Length:	155.956 mm (6.14 inches)
TPO height:	63.5 mm (2.5 inches)
Height (all others):	100.33 mm (3.95 inches)

Environmental Operating Range

Operating temperature:	0° to 70° C (32° to 158° F)
Humidity:	10 to 90% noncondensing

Power Requirements

Operating voltage:	+5 V ± 5% @ 200 mA max +12 V ± 5% @ 0.5 A max

RJ-45 Connector Pin Assignments

Figure A-1 shows the RJ-45 connector pin assignments.

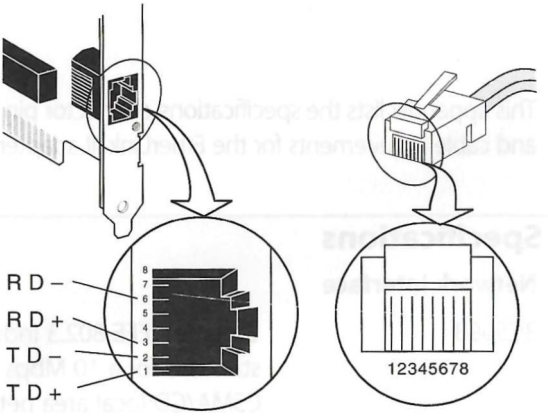

Figure A-1 RJ-45 Connector Pin Assignments

AUI Connector Pin Assignments

Table A-1 lists the pin assignments for the AUI (attachment unit interface) connector.

Table A-1 AUI Connector Pin Assignments

Pin	Function	Pin	Function
1	Collision shield	9	Collision –
2	Collision +	10	Transmit –
3	Transmit +	11	Transmit shield
4	Receive shield	12	Receive –
5	Receive +	13	+12 volts
6	Power return	14	Voltage shield
7	Not used	15	Not used
8	Not used		

Cable Specifications

In order to maintain compliance with the limits of a Class B digital device, 3Com requires that you use quality interface cables when connecting to this device. Changes or modifications not expressly approved by 3Com could void the user's authority to operate this equipment. Examples of supported cable types are shown below:

- For unshielded twisted-pair (UTP) connections:

  Unshielded twisted-pair (100 ohm):

  - Level 3 LAN and high-speed data cable, for example, Anixter® CM-00424BAG-3 or equivalent
  - Level 4 extended distance LAN cable, for example, Anixter CM-00424BAG-4 or equivalent

- For thin coax conections:

  RG58 A/U or C/U (50 ohm ± 4)

- For thick coax connections:

  RG9 (50 ohm ± 2)

For complete cabling details, refer to the IEEE 802.3 specification, section 8.4, "Coaxial Cables and Electrical Parameters."

B TECHNICAL SUPPORT

3Com provides easy access to technical support information through the variety of services described in this appendix.

On-line Technical Services

3Com offers worldwide product support seven days a week, 24 hours a day, through the following on-line systems:

- 3Com Bulletin Board Service (3ComBBS)
- World Wide Web Site
- Ask3Com℠ on CompuServe®
- 3ComFacts℠ Automated Fax Service

3Com Bulletin Board Service

3ComBBS contains patches, software, and drivers for all 3Com products, as well as technical articles. This service is available via modem seven days a week, 24 hours a day. To reach the service, set your modem to 8 data bits, no parity, and 1 stop bit. Call the telephone number nearest you:

Country	Baud Rate	Telephone Number
Australia	up to 14400 baud	(61) (2) 955 2073
France	up to 14400 baud	(33) (1) 69 86 69 54
Germany	up to 9600 baud up to 9600 baud	(49) (89) 627 32 188 (49) (89) 627 32 189
Hong Kong	up to 14400 baud	(852) 537 5601
Italy (fee required)	up to 9600 baud	(39) (2) 273 00680
Japan	up to 14400 baud	(81) (3) 3345 7266
Singapore	up to 14400 baud	(65) 534 5693
Taiwan	up to 14400 baud	(886) (2) 377 5838 (886) (2) 377 5840
U.K.	up to 14400 baud	(44) (144) 227 8278
U.S.	up to 14400 baud	(1) (408) 980 8204

World Wide Web Site

Access the latest networking information on 3Com's World Wide Web site by entering our URL into your Internet browser:

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http://www.3Com.com/
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This service features news and information about 3Com products, customer service and support, 3Com's latest news releases, selected articles from 3TECH™, 3Com's award-winning technical journal, and more.

Ask3Com on CompuServe

Ask3Com is a CompuServe-based service containing patches, software, drivers, and technical articles about all 3Com products, as well as an interactive forum for technical questions. To use Ask3Com, you need a CompuServe account.

To use Ask3Com:

1. **Log on to CompuServe.**
2. **Enter `go threecom`**
3. **Press [Return] to see the Ask3Com main menu.**

3ComFacts Automated Fax Service

3Com Corporation's interactive fax service, 3ComFacts, provides data sheets, technical articles, diagrams, and troubleshooting instructions on 3Com products 24 hours a day, seven days a week. Within this service, you may choose to access CardFacts® for adapter information, or NetFacts® for network system product information.

- **CardFacts** provides adapter installation diagrams, configuration drawings, troubleshooting instruction, and technical articles.

Document 9999 provides you with an index of adapter documents.

- **NetFacts** provides data sheets and technical articles on 3Com Corporation's hub, bridge, router, terminal server, and software products.

  Document 8888 provides you with an index of system product documents.

  Call 3ComFacts using your touch-tone telephone. International access numbers are:

Country	Fax Number
Hong Kong	(852) 537 5610
U.K.	(44) (144) 227 8279
U.S.	(1) (408) 727 7021

  Local access numbers are available within the following countries:

Country	Fax Number
Australia	800 123853
Denmark	800 17319
Finland	98 001 4444
France	05 90 81 58
Germany	0130 8180 63

Country	Fax Number
Italy	1678 99085
Netherlands	06 0228049
Norway	800 11062
Sweden	020 792954
U.K.	0800 626403

Support from Your Network Supplier

If additional assistance is required, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- Diagnostic error messages
- A list of system hardware and software, including revision levels
- Details about recent configuration changes, if applicable

If you are outside the U.S. and Canada, contact your local 3Com sales office to find your authorized service provider:

Country	Telephone Number
Australia (Sydney)	(61) (2) 959 3020
(Melbourne)	(61) (3) 653 9515
Belgium	(32) (2) 7164880
Brazil	(55) (11) 241 1571
Canada	(905) 882 9964
France	(33) (1) 69 86 68 00
Germany	(49) (89) 6 27 32 0
Hong Kong	(852) 868 9111
Italy	(39) (2) 273 02041
Japan	(81) (3) 33457251

Country	Telephone Number
Mexico	(525) 531 0591
Netherlands	(31) (3) 402 55033
Singapore	(65) 538 9368
South Africa	(27) (11) 803 7404
Spain	(34) (1) 3831700
Sweden	(46) (8) 632 91 00
Taiwan	(886) (2) 577 4352
United Arab Emirates	(971) (4) 349049
U.K.	(44) (1628) 897000

Returning Products for Repair

A product sent directly to 3Com for repair must first be assigned a Return Materials Authorization (RMA) number. A product sent to 3Com without an RMA number will be returned to the sender unopened, at the sender's expense.

To obtain an RMA number, call or fax:

Country	Telephone Number	Fax Number
U.S and Canada	(800) 876 3266, option 2	(408) 764 7120
Europe	(44) (1442) 278000	(44) (1442) 236824
Outside Europe, U.S. and Canada	(1) (408) 492 1790	(1) (408) 764 7290