



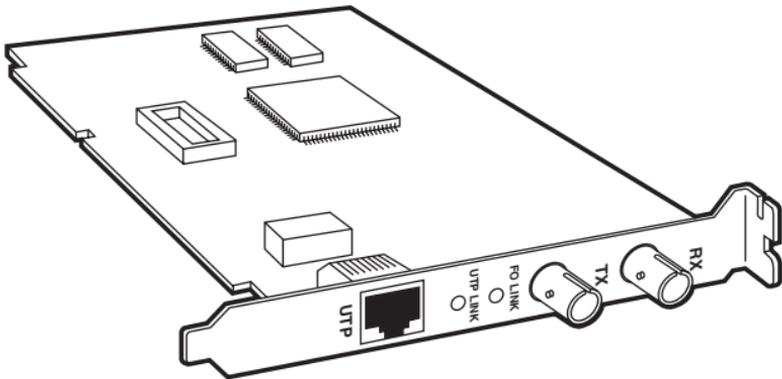
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1000 Park Drive • Lawrence, PA 15055-1018 • 724-746-5500 • Fax 724-746-0746



# ISA Fiber Adapter 10BASE-T/10BASE-FL with ST and RJ-45 Connectors



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## CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)

FREE technical support 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**

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**FEDERAL COMMUNICATIONS COMMISSION  
AND  
CANADIAN DEPARTMENT OF COMMUNICATIONS  
RADIO FREQUENCY INTERFERENCE STATEMENTS**

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

*This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.*

*Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.*



The equipment described in this document is CE certified.

# NORMAS OFICIALES MEXICANAS (NOM) ELECTRICAL SAFETY STATEMENT

## INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energia.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos liquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
  - A: El cable de poder o el contacto ha sido dañado; u
  - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
  - C: El aparato ha sido expuesto a la lluvia; o
  - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
  - E: El aparato ha sido tirado o su cubierta ha sido dañada.

### TRADEMARKS

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# 1. Specifications

**On-Board Memory**—16 KB of static RAM

**Network Controller**—National Semiconductor®  
AT/LANTIC

**Network Interface**—*FOIRL*: Cable type: Dual  
fiberoptic (62.5/125, 50/125, 82/125, 100/160);  
Cable length: 2 km maximum; Connectors: (2) ST;  
*IOBASE-T*: Cable type: 100-ohm unshielded twisted  
pair; Connector: (1) RJ-45; Cable length: 100 m  
maximum

**Bus Interface**—8-bit XT or 16-bit AT (software-  
selectable)

**Interrupt Channels**—Software-selectable: 3, 4, 5, 10,  
11, 12, 15, 2/9

**Temperature**—*Operating*: 32 to 158°F (0 to 70°C);  
*Storage*: -40 to +158°F (-40 to 70°C)

**Relative Humidity**—10 to 80% noncondensing

**Indicators**—Full Duplex, Copper and Fiber Link  
Status; For Each Link: Status and Activity

## ISA FIBER ADAPTER

**Power Consumption**—9 VDC @ 490 mA, 12 VDC @ 145 mA

**Size**—7.3"H x 4"W x 0.5"D (18.5 x 10.2 x 1.3 cm)

**Weight**—0.4 lb. (0.2 kg)

## 2. Introduction

### 2.1 Overview

The ISA Fiber Adapter offers high-performance, reliable, and cost-effective Ethernet connectivity for desktop personal computers. It's easy to install and maintain. The Adapter provides both 10BASE-FL and 10BASE-T connectivity. It's a complete 16-bit Ethernet solution in a half-size, jumperless, ISA adapter card which can be configured as either a shared memory or an I/O port.

### 2.2 Features

- Board options are configurable by software. (No jumpers.)
- Half-size AT adapter card.
- 2 Modes for ISA interface—Shared Memory or I/O Port. (NE2000plus compatible.)
- Fiberoptic or twisted-pair media supported on the card.

- Automatic twisted-pair-receive-polarity detection/correction.
- Boot PROM socket to allow diskless boot from NetWare, LAN Manager and other network operating systems.
- Eight user-selectable interrupts.
- Driver support for Novell, IBM, Microsoft, and other network operating systems.

### 2.3 The Network Connection

There are two ways to connect the ISA Fiber Adapter to an Ethernet network: 10BASE-FL using dual fiberoptic cable or 10BASE-T using unshielded twisted-pair copper cable.

#### 2.3.1 FIBEROPTIC INTERFACE

The ISA Fiber Adapter's fiberoptic interface implements the Medium Attachment Unit functions for Fiber Optic medium (FOMAU), as specified by the IEEE 802.3 standard for FOIRL. The fiberoptic transmitter uses an

850-nanometer standard laser diode, ensuring long transmit distances.

A pair of fiberoptic ST connectors are provided for fiber attachment. After the card is installed in the PC, the top ST connector is attached to the RX (receive) fiber and the lower ST connector is attached to the TX (transmit) fiber.

### **2.3.2 TWISTED PAIR COPPER (UTP)**

The UTP port implements the Medium Attachment Unit functions for the Twisted Pair medium, as specified by the supplement to IEEE 802.3 standard (Type 10BASE-T). This UTP interface provides automatic twisted-pair receive-polarity detection and correction. The automatic polarity detection feature may be disabled through software to allow the NIC to operate with older UTP hardware that does not follow the 10BASE-T standard.

An RJ-45 connector with standard pinouts is provided for attachment to the UTP cable.

### 2.3.3 LINK STATUS LEDs

The ISA Fiber Adapter has two Link Status LED indicators. A green LED indicates a good link; an amber LED indicates an incomplete link. The LED indicator adjacent to the ST connectors is the fiber-link status indicator, and the LED indicator adjacent to the RJ-45 connector is the UTP-link status indicator.

- **Fiber Link Status**—Indicates that “Receive Carrier” has been detected. This LED will be green when there is a good connection via fiber to another device.
- **UTP Link Status**—Indicates that “Test Pulse” has been detected. This LED will be green when there is a good connection via UTP to another device.

## 3. Installation

### 3.1 Installing the Software Drivers

The following drivers are supported by the ISA Fiber Adapter:

#### *Novell Drivers*

- DOS ODI Client
- OS/2 ODI Client
- ODI Server
- Remote Boot ROM

#### *NDIS 2.01 Driver*

- LAN Manager from Microsoft

#### 3.1.1 WINDOWS 95

1. Go to **START**, **Settings**, and click **Control Panel**.
2. In **Control Panel**, click **System**.

3. In **System**, click on **Device Manager**.
4. Click on **Properties** and find an IRQ that is not being used. Then click **I/O** for an available address.

### 3.1.2 WINDOWS NT

1. Go to **START, Programs, Administrative Tools** and click on **Windows NT Diagnostics**.
2. Click on **Resources** and find an IRQ that is not being used. Then click **I/O** for an available I/O address.

### 3.1.3 USING THE AUTOSET8.EXE TO MAKE THE CARD SETTINGS

1. Copy the following file: config.txt  
AUTOSET8.EXE program from the diskette that came with the unit, to a DOS bootable diskette.
2. Boot the computer with the bootable diskette.
3. At the prompt, type `autoset8.exe`.
4. Autoset searches for any adapters already installed

and then displays a list of the boards detected on the right hand portion of the display.

5. Select **Change/Display Adapter Configuration** if the address in the display is not the setting you have selected. Press **Enter** to see parameters.
6. Use the down arrow to move to the field that you wish to change.
  - **I/O Base Address:** Press the enter key until you have the address you want.
  - **Interrupt assignment:** Press the enter key until you have the **IRQ** you want.
  - **Physical Media:** Press the enter key until you have the media you want to use.

#### **NOTE**

If you decide to change media after installation, you will have to use the bootable DOS diskette to make any changes.

7. Use the down arrow to move to **SAVE CONFIGURATION**.
8. Use the down arrow to **Quit**, then press **X** to exit.

9. Remove the bootable DOS diskette and restart the computer.

### 3.1.4 COMPLETING THE INSTALLATION USING WINDOWS 95

10. Go to **START, Settings**, and click **Control Panel**.
11. In **Control Panel**, select **New Hardware**. Then click **Next**, and click **NO**, then **Next**.
12. From the list, select **Network Adapter**. Within the Network Adapter list, choose **Novell/Anthem**. Click **NE2000 Compatible**, then click **Next**. Restart the computer as you are prompted.

### 3.1.5 COMPLETING THE INSTALLATION USING WINDOWS NT

10. Go to **START, Settings**, and click **Control Panel**.
11. In **Control Panel**, select **Network**. Then select the **Adapter** tab and click **ADD**.
12. From the list, select **Network Adapter**. Within the Network Adapter list, choose **Novell/Anthem**. Click **NE2000 Compatible**, then click **OK**. Click **OK** again. Restart the computer as you are prompted.

## 3.2 Installing the Hardware

Follow these steps to install the ISA Fiber Adapter:

1. Turn off power to the computer and unplug the power cord.
2. Remove the cover from the computer according to the instructions in the computer owner's manual.
3. Insert the ISA Fiber Adapter into any available 8/16 expansion slot. Make sure the adapter is firmly seated in the expansion connector.
4. Using a screw, attach the adapter mounting bracket firmly to the computer chassis.
5. Attach the interface cable to the appropriate connector.
  - For fiberoptic cable, attach the ST plugs to the appropriate ST receptacles. Make sure that the TX and RX connectors are connected to the RX and TX connectors respectively on the device at the other end of the cable.

## ISA FIBER ADAPTER

- For 10BASE-T, insert the RJ-45 plug into the RJ-45 receptacle, making sure that the locking device is secure.
6. Replace and secure the computer cover, plug in the power cord, and apply power to the computer. The hardware installation is complete.

## 4. Configuration Software

The following describes the general operation and features of the configuration software developed for use with the ISA Fiber Adapter cards.

### 4.1 Initializing the Software

Copy AUTOSET8.EXE from the Installation Diskette to a DOS boot diskette.

Insert the diskette into the computer in which the ISA Fiber Adapter has been installed, run the Autoset configuration program (AUTOSET8.EXE).

When first initiated, Autoset searches for any adapters already installed and then displays a list of the boards detected on the right-hand portion of the display. The program also detects which interrupts are already allocated by the system and which are free to be used with an adapter card. Following this, a search is carried out to detect any remote boot PROMs that are installed. Warning messages are displayed if either

- an interrupt is allocated to more than one of the boards detected;

- an interrupt is allocated to a board or is taken by the system; or
- a high interrupt is required by a board and that board is in an eight-bit slot.

The following options are now available:

### **“Configure New Adapter Automatically.”**

This option detects a free address and interrupt. If no adapter is detected, an error message is displayed and the menu is exited. If a board is enabled correctly, you are prompted to enter the architecture mode required. I/O Port mode is the default. A menu prompting you to enter the cable type required is displayed. Finally a menu displaying the options selected is displayed. When you exit this menu, the list of detected boards will be updated.

### **“Configure New Adapter Manually.”**

This option allows you to define the configuration you require. The items that appear in this menu are discussed in the section “Configurable Parameters.” When this menu is selected, the auto-selected

parameters for I/O Port address and interrupt are provided as initial selections.

An error will be displayed if a board fails to be enabled correctly. If the board enables correctly, the list of detected boards is updated after this menu is exited.

### **“Change/Display Adapter Configuration.”**

This option allows you to change the configuration of a board that is already installed. You are first prompted to enter the base address of the board to be altered. A check is then carried out to see if there is a board at this address; if not, an error message is displayed and the option exited. If the board detected is non-configurable, an error message is displayed and the option exited. The present configuration of the board is displayed on the left with an arrow pointing to the new user-selected configuration. The items that can be selected in this menu are discussed in the following section. If the user alters a board's configuration, the list of boards detected is updated.

## 4.2 Configurable Parameters

In general, these options are selected by highlighting the item required using the arrow keys and by scrolling through that item's available options using the <TAB> key.

- a. Base Address—Only addresses that are free are allowed to be selected—that is, addresses not used by any of the boards detected and are not used by the system or any other peripheral.
- b. Interrupt—Only interrupts not used by any of the detected boards or by the system are allowed to be selected. Also, if the board in question is in an eight-bit slot, then only interrupts 2, 3, 4, and 5 are selectable.

Interrupt 2/9 is the only interrupt that the software cannot identify as taken or not. Thus this interrupt is always made available and it is left to the user's discretion as to whether this interrupt is already in use by the system.

- c. Novell Configuration Option—This is only applicable in I/O port mode and allows the standard selection of options available for a Novell

NE2000 board. Any of the options that include an invalid I/O port address or interrupt are not selectable.

- d. Boot Prom—The NSC option must be selected.
- e. Advanced Configuration—This option should only be selected by an experienced user of the ISA Fiber Adapter.
- f. Save Configuration—this option sets the new configuration on the board and saves it. The next time the board is powered up, it will be configured using the saved information. Details of the configuration saved are held in the file “config.txt” in the current directory.
- g. Temporarily Change Configuration—This option loads the new configuration into the board; however, the next time the board is powered up, the old configuration will be reinstated.

## **5. Initializing the Adapter and Diagnostics**

### **5.1 Initializing the Adapter**

When initiated, this option checks to see if a configurable board is present and the configuration parameters are read from it. If a non-configurable board is present, a warning message is displayed and the previously selected configuration parameters are used. If no board is present, an error message is displayed and the routine is exited.

#### **NOTE**

If the card configuration is changed at any time, you must run the initialize and diagnostic function before leaving the AUTOSET8 program.

If the board is set in shared memory mode, you are prompted to select a buffer RAM address from a list of addresses known to be free for use. The option then initializes the board for correct operation. The buffer memory is written to and read from with data comparison carried out to check the operation. The selected cable type is checked to see whether the link is up and the interrupt is checked to be operational. If a boot PROM is detected, a check is carried out to make

sure it is valid. If these tests are completed successfully, the following network tests can be carried out; otherwise, they are not accessible.

## 5.2 Advanced Network Diagnostics

This option allows you to perform further diagnostic checks on the functionality of the adapter. The following options become available when you select this item.

### **“Set Up As A Master Station.”**

This option requires the use of two stations, one called a slave and one a master. A packet is “bounced” between the two stations. If any corruption occurs or a packet is “lost,” an error message is displayed.

The user is first prompted to enter the length of the test. This number relates to how many times a packet should be bounced between the two stations. The default is 400 hex. If 0 is entered, then the test proceeds indefinitely. The test should complete with the “Network Test Passed” message.

### **“Set Up As A Slave Station.”**

This option should be run on a board already known to be fully operational. The slave station should always enter the test before the master station.

### **“Show packets on the network.”**

This option will display any packet that is on the network.

## 6. Software Error/Warning Messages

This section deals with error/warning messages that may be displayed during the operation of the software. Where possible, resolving actions have also been described.

### *General Messages*

#### **“Out of Memory Error.”**

This message should never be displayed under normal circumstances. If this message ever appears, the only resolving action is to change the NIC card.

#### **“NON CONFIGURABLE.”**

This message may appear in the “Installed Adapters” menu.

An ISA Fiber Adapter with its access to configuration registers disabled.

**“No adapter at this address.”**

The user has selected an address to perform some operation on an adapter and no adapter of any kind was detected at that address.

**“ERROR—multiple boot ROM’s detected.  
This error has been automatically corrected.  
Please re-power the PC to enable the corrections.”**

More than one installed adapter has enabled a boot PROM. Only one boot PROM should ever be installed in a PC. To correct this, enable the adapter that has a boot PROM at the lowest address and set all other adapters to have no boot ROM enabled. These changes are saved to the adapters, but they are not truly active until the PC is repowered.

## 7. Hardware Configuration Messages

### 7.1 General Messages

**“This address contains a non-configurable NIC or other hardware. If this address contains a non-configurable NIC, select the correct configuration of the adapter using the Configure New Adapter Manually menu, ignore the I/O port address as it will be selected later. Once these are correct, exit the menu, no temporary or save of the configuration is required in that menu.”**

This deals with the situation in which you have selected an address at which hardware has been detected but is found not to be a configurable ISA Fiber Adapter. The software allows the use of original NE2000 or WD8013 adapters as well as ISA Fiber Adapters that have had their access to configuration registers disabled. To use these adapters, you must set the configuration used in the “Configure New Adapter Manually” menu. Following this, you should be able to correctly initialize the adapter.

*The following four warning messages may appear at the bottom of the “Installed Adapters” menu.*

**“IRQ X is installed twice.”**

Two detected adapter cards have selected the same interrupt. The user must change one of the adapter card interrupt settings.

**“IRQ X assigned in system.”**

This warning is provided although there is a valid situation where this can happen. An adapter card is configured with an interrupt that is also in use by the PC. This is valid in the case where an adapters driver software has already been installed and has taken the system interrupt in question.

**“IRQ X at I/O address 0xXXX and the adapter is in an 8 bit slot.”**

The adapter is configured to use an upper interrupt (greater than 7), but this interrupt is not available because the adapter is in an 8 bit slot. Select an interrupt in the lower range.

**“Boot PROM changes occur only after cold boot of PC.”**

This message appears after a change to the boot ROM configuration is saved. It highlights the fact that boot ROM changes are not immediate and need a “cold boot” (hard reset or switch off/on PC ) before the changes become active.

## **7.2 Error Messages**

### **“Error—No New Adapter.”**

You have attempted to enable a “new” (disabled) adapter card, but no card has been enabled. Either there was no adapter in the disabled state or that adapter is faulty.

### **“Error—An adapter has already been enabled.”**

This error appears if you try to enable multiple new (disabled) adapters during the same execution of the code. An adapter can only be enabled once and should not be placed in and out of the “disabled” state multiple times.

### **“No I/O port available for configuration.”**

This error appears if all ISA Fiber Adapter I/O port addresses appear to be taken. It is unlikely that all the ports would be taken, but it is possible on some PCs that the search method used by the software is invalid. In this case, exit the code and re-execute it with the command “`autoset no_search.`” If you’re using this method, refer to **Section 7.4**.

### **“No memory address available.”**

The software was not able to identify any 16K area of system RAM (between 0xC000 and 0xE000) that is free. It is unlikely that all the system RAM is being used, but if a memory manager is installed on the PC this may be the case. If a memory manager is installed, then refer to its documentation on how to free an area of RAM for peripherals such as this adapter card. If there is no memory-manager program, then it is possible that the search method used is invalid on the PC in question. In this case, refer to **Section 7.4**.

**“No Interrupt available for configuration.”**

There is no free interrupt that can be assigned to a new adapter. The only solution to this is to free an interrupt used for another possibly redundant purpose.

**“No interrupt is available for an 8 bit slot.”**

You have enabled a “new” adapter in an 8-bit slot. However none of the lower interrupts are available for configuration. Either re-install the adapter in a 16-bit slot, or free one of the lower interrupts.

**“All IRQs have been assigned, exit and remove a card.”**

The software has detected two adapters using the same interrupt and can find no available interrupt to resolve the situation. Remove one of the cards to free an interrupt or resolve the interrupt conflict. You must free an interrupt before trying to install another adapter.

**“Error saving configuration.”**

The adapter has failed to complete the save to EEPROM sequence correctly. This may not be fatal, but it is a serious hardware error.

**“Configuration text file not saved, Disk drive not ready.”**

The code has attempted to write the config.txt file to a diskette, but the drive contains no diskette.

**“Configuration text file not saved, Disk is write protected.”**

The code has attempted to write the config.txt file to a protected diskette. Backup the Autoset program to a nonprotected diskette and execute the code from there.

### **7.3 Diagnostic Messages**

**“The hardware has not been initialized yet. You need to execute the initialization first.”**

This message can appear in the “Advanced Network Diagnostics” section. You have either failed to select the “Board Initialization and Diagnostics” option or this option has failed one of its tests. If the later is the case, refer to the error message displayed next to the failing test.

**“Cannot initialize an adapter with a disabled Interrupt.”**

You should select a valid interrupt for this adapter.

**“No NIC. DMA Failure.”**

These messages may be returned by the Network Interface Controller test in the Board Initialization and Diagnostics section. Both messages highlight a fault in the NIC core of the ISA Fiber Adapter, a fatal hardware error.

**“Incorrect PROM ID byte.”**

Another message that can be returned by the same test. There is a flaw in the EEPROM. This message only occurs in I/O Mode. This is fatal if you wish to select I/O mode.

**“(xfer to memory)  
(xfer from memory)  
Failed after X bytes with X.”**

These messages may be returned by the Buffer Memory test. The first two messages highlight errors in the transfer of data, the third in the data transferred. This is a fatal adapter error.

### **“Cable Disconnected. Cable Unterminated.”**

Both errors highlight possibly faulty cabling if they are not simply disconnected or unterminated. These error messages may be returned by the Cable Connection test.

### **“No Interrupt.”**

This message may be returned by the Interrupt Assignment test. The interrupt is not active. You should select an alternative interrupt and retry the test. However, this is a hardware error that should not occur under normal circumstances.

### **“Boot ROM Failed.”**

This message may be returned by the Boot ROM Check. A boot ROM has been detected but has failed to pass the checksum test. This may not be a fatal error, but you will have to replace the ROM on the adapter card.

*The following errors may appear during the advanced diagnostics test.*

**“ No Slave Response.  
No Master Response.”**

This indicates that one station has failed to receive a packet from its opposing station. There are two causes for this: Either the cabling system is faulty or the adapter of the station in question is faulty.

**“Reception Failed.”**

Indicates some kind of corruption of the packet received.

**“Transmission Failed.”**

Indicates some kind of corruption of the transmission sequence.

**“Packet Mismatch Error.”**

The data in the packet received is incorrect. A fatal hardware error.

**“Test Aborted.”**

The user has exited the test (by pressing a key).

### 7.4 No Search

The search method used to detect free I/O port addresses or free system RAM may be invalid on some PCs. You can disable these searches by typing the command “no\_search” following the code’s executable name. If you select this method, you must decide which addresses are free and which are not. The “Configure New Adapter Automatically” option is no longer made available if you use the “no\_search” option.