Ethernet Network Adapters

**AT-2450FTX, AT-2451FTX,
AT-2700FX, AT-2701FX,
AT-2700FTX, AT-2701FTX,
AT-2745FX, AT-2746FX**

Installation Guide

Allied Telesyn

PN 613-50669-00 Rev A

Electrical Safety and Emissions Standards

This product meets the following standards.

U.S. Federal Communications Commission
Declaration of Conformity
Manufacturer Name: Allied Telesyn, Inc.
Declares that the product: Network Adapter Cards
Model Numbers: AT-2450FTX, AT-2451FTX, AT-2700FX, AT-2701FX, AT-2700FTX, AT-2701FTX, AT-2745FX, AT-2746FX
These products comply with FCC Part 15B, Class B Limits:
These devices comply with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device must not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Radiated Energy
Note: This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of 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 instructions, may 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 the 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.
Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission rules.

Industry Canada
This Class Bdigital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

RFI Emissions	EN55022 Class B, EN61000-3-2, EN61000-3-3
Immunity	EN55024
Electrical Safety	EN60950 (TUV), UL 60950 ($_{C}UL_{US}$)
Laser Safety	EN60825

Translated Safety Statements

Important: Appendix E contains translated safety statements for installing this equipment. When you see the ✍, go to Appendix E for the translated safety statement in your language.

Wichtig: Anhang E enthält übersetzte Sicherheitshinweise für die Installation dieses Geräts. Wenn Sie ✍ sehen, schlagen Sie in Anhang E den übersetzten Sicherheitshinweis in Ihrer Sprache nach.

Importante: El Apéndice E contiene mensajes de seguridad traducidos para la instalación de este equipo. Cuando vea el símbolo ✍, vaya al Apéndice E para ver el mensaje de seguridad traducido a su idioma.

Important : L'annexe E contient les instructions de sécurité relatives à l'installation de cet équipement. Lorsque vous voyez le symbole ✍, reportez-vous à l'annexe E pour consulter la traduction de ces instructions dans votre langue.

Importante: l'Appendice E contiene avvisi di sicurezza tradotti per l'installazione di questa apparecchiatura. Il simbolo ✍, indica di consultare l'Appendice E per l'avviso di sicurezza nella propria lingua.

Важно: Приложение E содержит переведенную инструкцию по безопасности при установке данного устройства. Если Вы встретите ✍, перейдите к Приложению E для получения переведенной инструкции по безопасности.

Contents

Preface

This guide contains installation instructions for the following Allied Telesyn network adapter card series:

- AT-2450FTX
- AT-2451FTX
- AT-2700FX
- AT-2701FX
- AT-2700FTX
- AT-2701FTX
- AT-2745FX
- AT-2746FX

Note
The AT-2450FTX, AT-2700FX, AT-2700FTX, and AT-2745FX Series are no longer available from Allied Telesyn and have been replaced by the AT-2451FTX, AT-2701FX, AT-2701FTX, and AT-2746FX Series, respectively. They are described in this guide for reference purposes for those networks where the cards are already installed.

Document Conventions

This guide uses the following conventions:

Note
Notes provide additional information.

Caution
Cautions inform you that performing or omitting a specific action may result in equipment damage or loss of data.

Warning
Warnings inform you that performing or omitting a specific action may result in bodily injury.

Where to Find Web-based Guides

The installation and user guides for all Allied Telesyn products are available in Portable Document Format (PDF) from our web site at **www.alliedtelesyn.com**. You can view the documents on-line or download them onto a local workstation or server.

Contacting Allied Telesyn

This section provides Allied Telesyn contact information for technical support as well as sales or corporate information.

Online Support

You can request technical support online by accessing the Allied Telesyn Knowledge Base from the following web site: **www.alliedtelesyn.com/kb**. You can use the Knowledge Base to submit questions to our technical support staff and review answers to previously asked questions.

Email and Telephone Support

For Technical Support via email or telephone, refer to the Support & Services section of the Allied Telesyn web site: **www.alliedtelesyn.com**.

Returning Products

Products for return or repair must first be assigned a Return Materials Authorization (RMA) number. A product sent to Allied Telesyn without a RMA number will be returned to the sender at the sender's expense.

To obtain a RMA number, contact Allied Telesyn's Technical Support at our web site: **www.alliedtelesyn.com**.

For Sales or Corporate Information

You can contact Allied Telesyn for sales or corporate information at our web site: **www.alliedtelesyn.com**. To find the contact information for your country, select Contact Us -> Worldwide Contacts.

Adapter Card Driver Updates

You can download new releases of network adapter card drivers from either of the following Internet sites:

- Allied Telesyn web site: **www.alliedtelesyn.com**
- Allied Telesyn FTP server: **ftp://ftp.alliedtelesyn.com**

To download new firmware from the Allied Telesyn FTP server using your workstation's command prompt, you will need FTP client software and you must log in to the server. Enter "anonymous" as the user name and your email address for the password.

Chapter 1

Network Adapter Card Overview

This chapter describes the features of the Allied Telesyn network adapter cards. Sections in the chapter include:

Overview

The Allied Telesyn Ethernet network adapter cards are designed to simplify the task of building a new 10 Mbps or 100 Mbps Ethernet network or expanding an existing one. Offered in a variety of port configurations, these adapters give you the power and flexibility to build an Ethernet network suited to the unique requirements of your business environment.

Table 1 lists the port configurations of the network adapter card series described in this guide.

Table 1. Port Configurations

Series	Twisted Pair Port	Fiber Optic Port	Second Fiber Optic Port
AT-2450FTX	10/100Base-TX	10Base-FL	-
AT-2451FTX	10/100Base-TX	10Base-FL	-
AT-2700FX	-	100Base-FX	-
AT-2701FX	-	100Base-FX	-
AT-2700FTX	10/100Base-TX	100Base-FX	-
AT-2701FTX	10/100Base-TX	100Base-FX	-
AT-2745FX	-	10Base-FL	100Base-FX
AT-2746FX	-	10Base-FL	100Base-FX

Note
The AT-2450FTX, AT-2700FX, AT-2700FTX, and AT-2745FX Series are no longer available from Allied Telesyn. They have been replaced by the AT-2451FTX, AT-2701FX, AT-2701FTX, and AT-2746FX Series, respectively. They are described in this guide for reference purposes for those networks where the cards are already installed.

As shown in Table 1, most of the network adapter cards discussed in this manual are dual port adapters. A dual port card has either a twisted pair port and a fiber optic port or two fiber optic ports.

Dual port adapters can simplify the installation and maintenance of your network because the same network adapter card can be used for either twisted pair cable or fiber optic cable. This eliminates the need of purchasing different cards for different cable media and so reduces the number of types of adapters needed to build your network.

Dual port adapters also simplify the task of relocating nodes in a network. When a node is moved to a new location that also involves a change to the media connection, such as from twisted pair cable to fiber optic cable, no change to the adapter is necessary since the adapter has ports for both types of medium.

Selecting which port to use on a dual port adapter is usually dictated by the distance of the node from the Ethernet switch of hub or the working environment. The maximum operating distance for the twisted pair port is 100 meters, typically making this port appropriate for nodes within that operating distance from the Ethernet switch or hub.

The fiber optic port is appropriate for nodes that are greater than 100 meters from the switch or hub or in working environments where electromagnetic emissions from manufacturing or other heavy equipment could affect network transmissions over twisted pair cabling.

All of the adapters described in this guide use the same network adapter card drivers. This further simplifies the task of network maintenance by reducing the number of drivers you need to maintain.

AT-2450FTX and AT-2451FTX Series

The adapters in the AT-2450FTX Series are:

- AT-2450FTX/SC
- AT-2450FTX/ST

The adapters in the AT-2451FTX Series are:

- AT-2451FTX/SC
- AT-2451FTX/ST

These are dual port adapters. They feature a twisted pair port and a fiber optic port. The twisted pair port has a standard RJ-45 connector and operates at either 10 or 100 Mbps (10Base-T/100Base-TX), half- or full-duplex mode. The adapter features Auto-Negotiation, which allows the network adapter port to automatically set its speed and duplex mode to match the settings of the port on the remote device, such as an Ethernet switch or hub.

The second port is a fiber optic port with either a duplex SC or duplex ST connector, depending on the model. This port has a fixed operating speed of 10 Mbps (10Base-FL), half- or full-duplex mode. The default setting is full-duplex. The duplex mode must be set manually.

Note
You can use only one port on this adapter at a time. Do not attach both ports to the network at the same time.

Differences between the two series are:

- The AT-2450FTX Series is PCI 2.1-compliant.
- The AT-2451FTX Series is PCI 2.2-compliant.
- The AT-2450FTX Series was offered in two versions — a standard version and a low profile version for systems that accept only low profile adapters.
- The AT-2451FTX Series can be installed in either a standard or low profile system. The adapter comes with two brackets, one for a standard system and another for a low profile system.
- The BootPROM and Managed Boot Agent (MBA) were optional with the AT-2450FTX Series.
- The BootPROM and MBA come standard with the AT-2451FTX Series.

- The AT-2450FTX Series supported the Wake on LAN feature only on the twisted pair port.
- The AT-2451FTX Series supports the Wake on LAN feature on both ports.

Specifications

Table 2 lists the adapter specifications.

Table 2. AT-2450FTX and AT-2451FTX Series Network Adapter Cards

Basic Features	
Supported Platforms	IBM PC or compatible
Supported Operating Systems	Microsoft Windows 2000 Microsoft Windows 2003 Microsoft Windows XP Microsoft Windows NT 4.0 Novell Netware 6.5 Linux 2.4 and 2.6 Solaris 9
Motherboard Connector	AT-2450FTX Series: PCI bus 2.1-compliant (32-bit bus width) AT-2451FTX Series: PCI bus 2.2-compliant (32-bit bus width)
Number of Ports	2
Twisted Pair Port	
Standards	10Base-T and 100Base-TX
Speed	10 Mbps or 100 Mbps (Default: Auto-Negotiation)
Duplex Mode	Half- or full-duplex (Default: Auto-Negotiation)
Type of Connector	RJ-45
Maximum Operating Distance	100 meters (328 feet)

Table 2. AT-2450FTX and AT-2451FTX Series Network Adapter Cards (Continued)

Type of Cabling	10Base-T operation: Category 3 or better 100 ohm shielded or unshielded twisted pair cable 100Base-TX operation: Category 5 or better 100 ohm shielded or unshielded twisted pair cable
Wiring Configuration	MDI
Fiber Optic Port	
Standard	10Base-FL
Speed	10 Mbps
Duplex Mode	Half- or full-duplex (Default: Full-duplex)
Type of Connector	AT-2450FTX/SC - duplex SC AT-2450FTX/ST - duplex ST AT-2451FTX/SC - duplex SC AT-2451FTX/ST - duplex ST
Maximum Operating Distance[1]	2 kilometers (1.2 miles)
Type of Cabling	50/125 or 62.5/125 micron (core/cladding) multimode fiber optic cable
Operating Specifications	Wavelength: 820 nm Output power - 50/125 micron cabling: Minimum: -18.8 dBm Maximum: -13.8 dBm Output power - 62.5/125 micron cabling: Minimum: -15.0 dBm Maximum: -10.0 dBm Input sensitivity: Typical: -4.4 dBm

Table 2. AT-2450FTX and AT-2451FTX Series Network Adapter Cards (Continued)

Wake on LAN Feature	
AT-2450FTX Series	Supported on twisted pair port only.
AT-2451FTX Series	Supported on both twisted pair port and fiber optic port.
Default Setting	Disabled
BootPROM Chip and MBA Feature	
AT-2450FTX Series	Optional
AT-2451FTX Series	Standard
Default Port	10/100Base-TX
Load Balancing and Fail-over Protection	
AT-2450FTX Series	Not supported
AT-2451FTX Series	Supported[2] Default setting: Disabled

1. Numerous factors, such as too many splices or poorly implemented splices, can significantly reduce the maximum distance of a fiber optic port. Fiber optic cable should only be installed by a qualified fiber optic cable contractor.
2. Microsoft Windows 2000, 2003, and XP.

LEDs

Table 3 describes the LEDs for the ports on the AT-2450FTX and AT-2451FTX Series. The twisted pair port uses the 10 or 100 LED, depending on its operating speed. The fiber optic port uses just the 10 LED.

Table 3. AT-2450FTX and AT-2451FTX Series LEDs

LED	Status	Description
10	Green	The twisted pair port or fiber optic port is operating at 10 Mbps, full-duplex mode.
	Amber	The twisted pair port or fiber optic port is operating at 10 Mbps, half-duplex mode.
	Flashing	The twisted pair port or fiber optic port is receiving or transmitting network packets at 10 Mbps.
100	Green	The twisted pair port is operating at 100 Mbps, full-duplex mode.
	Amber	The twisted pair port is operating at 100 Mbps, half-duplex mode.
	Flashing	The twisted pair port is receiving or transmitting network packets at 100 Mbps.

AT-2700FX and AT-2701FX Series

The adapters in the AT-2700FX Series are:

- AT-2700FX/SC
- AT-2700FX/ST
- AT-2700FX/MT
- AT-2700FX/VF

The adapters in the AT-2701FX Series are:

- AT-2701FX/SC
- AT-2701FX/ST
- AT-2701FX/MT
- AT-2701FX/VF

These adapters feature a single fiber optic port with a fixed operating speed of 100 Mbps with half- or full-duplex operation. The port has a maximum operating distance of 2 kilometers in full-duplex mode and uses 50/125 or 62.5/125 micron (core/cladding) multimode fiber optic cable. Maximum operating distance will be less for half-duplex mode.

These adapters are appropriate in network environments where the distance between an end node and an Ethernet hub or switch is more than 100 meters, the maximum allowed for twisted pair cable, or in manufacturing areas or other heavy equipment environments where electromagnetic emissions could interfere with nodes connected with twisted pair cable.

Differences between the two series are:

- The AT-2700FX Series is PCI 2.1-compliant.
- The AT-2701FX Series is PCI 2.2-compliant.
- The AT-2700FX Series was offered in two versions — a standard version and a low profile version for systems that accept only low profile adapters.
- The AT-2701FX Series can be installed in either a standard or low profile system. The adapter comes with two brackets, one for a standard system and another for a low profile system.
- The BootPROM chip and MBA were optional with the AT-2700FX Series.
- The BootPROM chip and MBA come standard with the AT-2701FX Series.

Specifications

Table 4 lists the adapter specifications.

Table 4. AT-2700FX and AT-2701FX Series Network Adapter Cards

Basic Features	
Supported Platforms	IBM PC or compatible
Supported Operating Systems	Microsoft Windows 2000 Microsoft Windows 2003 Microsoft Windows XP Microsoft Windows NT 4.0 Novell Netware 6.5 Linux 2.4 and 2.6 Solaris 9
Motherboard Connector	AT-2700FX Series: PCI bus 2.1-compliant (32-bit bus width) AT-2701FX Series: PCI bus 2.2-compliant (32-bit bus width)
Number of Ports	1
Fiber Optic Port	
Standard	100Base-FX
Speed	100 Mbps
Duplex Mode	Half- or full-duplex (Default: full-duplex)
Type of Connector	AT-2700FX Series: AT-2700FX/SC - duplex SC AT-2700FX/ST - duplex ST AT-2700FX/MT - MT-RJ AT-2700FX/VF - VF-45 AT-2701FX Series AT-2701FX/SC - duplex SC AT-2701FX/ST - duplex ST AT-2701FX/MT - MT-RJ AT-2701FX/VF - VF-45
Maximum Operating Distance[1]	2 kilometers (1.2 miles) in full-duplex mode 412 meters (1236 feet) in half-duplex mode

Table 4. AT-2700FX and AT-2701FX Series Network Adapter Cards (Continued)

Type of Cabling	50/125 or 62.5/125 micron (core/cladding) multimode fiber optic cable
Operating Specifications	Wavelength: 1310 nm Output power - 50/125 micron cabling: Minimum: -22.5 dBm Maximum: -14 dBm Output power - 62.5/125 micron cabling: Minimum: -19.0 dBm Maximum: -14 dBm Input sensitivity: Minimum: -31 dBm Maximum: -14 dBm
Wake on LAN Feature	
AT-2700FX Series	Supported
AT-2701FX Series	Supported
Default Setting	Disabled
BootPROM Chip and MBA Feature	
AT-2700FX Series	Optional
AT-2701FX Series	Standard
Load Balancing and Fail-over Protection	
AT-2700FX Series	Not supported
AT-2701FX Series	Supported[2] Default setting: Disabled

1. Numerous factors, such as too many splices or poorly implemented splices, can significantly reduce the maximum distance of a fiber optic port. Fiber optic cable should only be installed by a qualified fiber optic cable contractor.
2. Microsoft Windows 2000, 2003, and XP.

LED

The AT-2700FX and AT-2701FX Series have one LED, defined in Table 5.

Table 5. AT-2700FX and AT-2701FX Series LED

LED	Status	Description
100	Green	The port is operating in full-duplex mode.
	Amber	The port is operating in half-duplex mode.
	Blinking	The port is receiving or transmitting network traffic.

AT-2700FTX and AT-2701FTX Series

The adapters in the AT-2700FTX Series are:

- AT-2700FTX/SC
- AT-2700FTX/ST
- AT-2700FTX/MT
- AT-2700FTX/VF

The adapters in the AT-2701FTX Series are:

- AT-2701FTX/SC
- AT-2701FTX/ST
- AT-2701FTX/MT
- AT-2701FTX/VF

These dual-port adapters feature a 10/100Base-TX twisted pair port and a 100Base-FX fiber optic port. The twisted pair port features Auto-Negotiation and can operate at either 10 or 100 Mbps, half- or full-duplex mode. The fiber optic port has a fixed operating speed of 100 Mbps (100Base-FX), half- or full-duplex mode, and a maximum operating distance of 2 kilometers (1.28 miles) in full-duplex mode. Maximum distance for the fiber optic port is less for half-duplex mode.

Note
You can use only one port on this adapter at a time. Do not attach both ports to the network at the same time.

Differences between the two series are:

- The AT-2700FTX Series is PCI 2.1-compliant.
- The AT-2701FTX Series is PCI 2.2-compliant.
- The AT-2700FTX Series was offered in two versions — a standard version and a low profile version for systems that accept only low profile adapters.
- The AT-2701FTX Series can be installed in either a standard or low profile system. The adapter comes with two brackets, one for a standard system and another for a low profile system.
- The BootPROM chip and MBA were optional with the AT-2700FTX Series.
- The BootPROM chip and MBA come standard with the AT-2701FTX Series.

Specifications

Table 6 lists the specifications of the AT-2700FTX and AT-2701FTX Series adapter cards.

Table 6. AT-2700FTX and AT-2701FTX Series Network Adapter Cards

Basic Features	
Supported Platforms	IBM PC or compatible
Supported Operating Systems	Microsoft Windows 2000 Microsoft Windows 2003 Microsoft Windows XP Microsoft Windows NT 4.0 Novell Netware 6.5 Linux 2.4 and 2.6 Solaris 9
Type of Motherboard Connector	AT-2700FTX Series: PCI bus 2.1-compliant (32-bit bus width) AT-2701FTX Series: PCI bus 2.2-compliant (32-bit bus width)
Number of Ports	2
Twisted Pair Port	
Standards	10Base-T and 100Base-TX
Speed	10 Mbps or 100 Mbps (Default: Auto-Negotiation)
Duplex Mode	Half- or full-duplex (Default: Auto-Negotiation)
Type of Connector	RJ-45
Maximum Operating Distance	100 m (328 ft.)
Type of Cabling	10Base-T operation: 100 Ohm shielded or unshielded Category 3 or better 100Base-TX operation: 100 Ohm shielded or unshielded Category 5 or better
Fiber Optic Port	
Standard	100Base-FX
Speed	100 Mbps

Table 6. AT-2700FTX and AT-2701FTX Series Network Adapter Cards (Continued)

Duplex Mode	Half- or full-duplex (Default: full-duplex)
Type of Connector	AT-2700FTX Series: AT-2700FTX/SC - duplex SC AT-2700FTX/ST - duplex ST AT-2700FTX/MT - MT-RJ AT-2700FTX/VF - VF-45 AT-2701FTX Series: AT-2701FTX/SC - duplex SC AT-2701FTX/ST - duplex ST AT-2701FTX/MT - MT-RJ AT-2701FTX/VF - VF-45
Maximum Operating Distance[1]	2 km (1.24 miles) in full-duplex mode 412 m (1373 feet) in half-duplex mode
Type of Cabling	50/125 or 62.5/125 micron (core/cladding) multimode fiber optic cable
Operating Specifications	Wavelength: 1310 nm Output power - 50/125 micron cabling: Minimum: -22.5 dBm Maximum: -14 dBm Output power - 62.5/125 micron cabling: Minimum: -19.0 dBm Maximum: -14 dBm Input sensitivity: Minimum: -31 dBm Maximum: -14 dBm
Wake on LAN Feature	
AT-2700FTX Series	Supported on both ports.
AT-2701FTX Series	Supported on both ports.
Default Setting	Disabled

Table 6. AT-2700FTX and AT-2701FTX Series Network Adapter Cards (Continued)

BootPROM Chip and MBA Feature	
AT-2700FTX Series	Optional
AT-2701FTX Series	Standard
Default Port	100Base-FX
Load Balancing and Fail-over Protection	
AT-2700FTX Series	Not supported
AT-2701FTX Series	Supported[2] Default setting: Disabled

1. Numerous factors, such as too many splices or poorly implemented splices, can significantly reduce the maximum distance of a fiber optic port. Fiber optic cable should only be installed by a qualified fiber optic cable contractor.
2. Microsoft Windows 2000, 2003, and XP.

LEDs

Table 7 describes the LEDs on the AT-2700FTX and AT-2701FTX Series adapter cards. The twisted pair port uses either the 10 or 100 LED, depending on its operating speed. The fiber optic port uses just the 100 LED.

Table 7. AT-2700FTX and AT-2701FTX Series LEDs

LED	Status	Description
10	Green	The twisted pair port is operating at 10 Mbps, full-duplex mode.
	Amber	The twisted pair port is operating at 10 Mbps, half-duplex mode.
	Flashing	The twisted pair port is receiving or transmitting network packets at 10 Mbps.

Table 7. AT-2700FTX and AT-2701FTX Series LEDs (Continued)

LED	Status	Description
100	Green	The twisted pair port or fiber optic port is operating at 100 Mbps, full-duplex mode.
	Amber	The twisted pair port or fiber optic port is operating at 100 Mbps, half-duplex mode.
	Flashing	The twisted pair port or fiber optic port is receiving or transmitting network packets at 100 Mbps.

AT-2745FX and AT-2746FX Series

The adapters in the AT-2745FX Series are:

- AT-2745FX/SC
- AT-2745FX/ST
- AT-2745FX/STSC

The adapters in the AT-2746FX Series are:

- AT-2746FX/SC/SC
- AT-2746FX/ST/ST
- AT-2746FX/ST/SC

The AT-2745FX and AT-2746FX Series are dual port adapters. But unlike the other dual port adapters discussed in this guide, which feature a twisted pair port and a fiber optic port, these adapter cards have two fiber optic ports. One port is 10Base-FL and the other 100Base-FX. These adapters allow you to use the same network adapter card for either 10 Mbps or 100 Mbps over fiber optic cable. The cards are appropriate in network environments whether there is a mix of 10Base-FL and 100Base-FX Ethernet hubs and switches. They can also be useful in 10Base-FL environments where there are future plans to upgrade the switches and hubs to 100Base-FX.

Note
You can use only one port on this adapter at a time. Do not attach both ports to the network at the same time.

Differences between the two series are:

- The AT-2745FX Series is PCI 2.1-compliant.
- The AT-2746FX Series is PCI 2.2-compliant.
- The AT-2745FX Series was offered in two versions — a standard version and a low profile version for systems that accept only low profile adapters.
- The AT-2746FX Series can be installed in either a standard or low profile system. The adapter comes with two brackets, one for a standard system and another for a low profile system.
- The AT-2745FX Series supported the Wake on LAN feature only on the 100Base-FX port.
- The AT-2746FX Series supports the Wake on LAN feature on both ports.

- The BootPROM chip and MBA were optional with the AT-2745FX Series.
- The BootPROM chip and MBA come standard with the AT-2746FX Series.

Specifications

Table 8 lists the specifications of the AT-2745FX and AT-2746FX Series adapter cards.

Table 8. AT-2745FX and AT-2746FX Series Network Adapter Cards

Basic Features	
Supported Platforms	IBM PC or compatible
Supported Operating Systems	Microsoft Windows 2000 Microsoft Windows 2003 Microsoft Windows XP Microsoft Windows NT 4.0 Novell Netware 6.5 Linux 2.4 and 2.6 Solaris 9
Type of Motherboard Connector	AT-2745FX Series: PCI bus 2.1-compliant (32-bit bus width) AT-2746FX Series: PCI bus 2.2-compliant (32-bit bus width)
Number of Ports	2
10Base-FL Fiber Optic Port	
Standard	10Base-FL
Speed	10 Mbps
Duplex Mode	Half- or full-duplex (Default: full-duplex)
Type of Connector	AT-2745FX Series: AT-2745FX/SC: duplex SC AT-2745FX/ST: duplex ST AT-2745FX/STSC: duplex ST AT-2746FX Series: AT-2746FX/SC/SC: duplex SC AT-2746FX/ST/ST: duplex ST AT-2745FX/ST/SC: duplex ST
Maximum Operating Distance[1]	2 kilometers (1.2 miles)

Table 8. AT-2745FX and AT-2746FX Series Network Adapter Cards (Continued)

Type of Cabling	50/125 or 62.5/125 micron (core/cladding) multimode fiber optic cable
Operating Specifications	Wavelength: 820 nm Output power - 50/125 micron cabling: Minimum: -18.8 dBm Maximum: -13.8 dBm Output power - 62.5/125 micron cabling: Minimum: -15.0 dBm Maximum: -10.0 dBm Input sensitivity: Typical: -4.4 dBm
100Base-FX Fiber Optic Port	
Standard	100Base-FX
Speed	100 Mbps
Duplex Mode	Half- or full-duplex (Default: full-duplex)
Type of Connector	AT-2745FX Series: AT-2745FX/SC: duplex SC AT-2745FX/ST: duplex ST AT-2745FX/STSC: duplex SC AT-2746FX Series: AT-2746FX/SC/SC: duplex SC AT-2746FX/ST/ST: duplex ST AT-2745FX/ST/SC: duplex SC
Maximum Operating Distance[1]	2 kilometers (1.2 miles) in full-duplex mode 412 m (1373 feet) in half-duplex mode
Type of Cabling	50/125 or 62.5/125 micron (core/cladding) multimode fiber optic cable

Table 8. AT-2745FX and AT-2746FX Series Network Adapter Cards (Continued)

Operating Specifications	Wavelength: 1310 nm Output power - 50/125 micron cabling: Minimum: -22.5 dBm Maximum: -14 dBm Output power - 62.5/125 micron cabling: Minimum: -19.0 dBm Maximum: -14 dBm Input sensitivity: Minimum: -31 dBm Maximum: -14 dBm
Wake on LAN Feature	
AT-2745FX Series	Supported on 100Base-FX port only.
AT-2746FX Series	Supported on both ports.
Default Setting	Disabled
BootPROM Chip and MBA Feature	
AT-2745FX Series	Optional
AT-2746FX Series	Standard
Default Port	100Base-FX
Load Balancing and Fail-over Protection	
AT-2745FX Series	Not supported
AT-2746FX Series	Supported[2] Default setting: Disabled

1. Numerous factors, such as too many splices or poorly implemented splices, can significantly reduce the maximum distance of a fiber optic port. Fiber optic cable should only be installed by a qualified fiber optic cable contractor.
2. Microsoft Windows 2000, 2003, and XP.

LEDs

Table 9 describes the LEDs on the AT-2745FX and AT-2746FX Series adapter cards. The 10Base-FL port uses the 10 LED and the 100Base-FX port uses the 100 LED.

Table 9. AT-2745FX and AT-2746FX Series LEDs

LED	Status	Description
10	Green	The 10Base-FL port is operating at 10 Mbps, full-duplex mode.
	Amber	The 10Base-FL port is operating at 10 Mbps, half-duplex mode.
	Flashing	The 10Base-FL port is receiving or transmitting network packets at 10 Mbps.
100	Green	The 100Base-FX port is operating at 100 Mbps, full-duplex mode.
	Amber	The 100Base-FX port is operating at 100 Mbps, half-duplex mode.
	Flashing	The 100Base-FX port is receiving or transmitting network packets at 100 Mbps.

Additional Features

The following sections describe these network adapter card features:

Wake on LAN

This feature can help automate many of your network administrator functions, such as backing up workstation files and updating system files. It allows a network adapter card to power ON a system that has been powered OFF or is in a sleep mode.

The feature is activated whenever the network adapter card receives a special signal, called a Magic Packet, from a network management program. Once the card has received the Magic Packet and instructed the system to power ON, the network management program can run whatever network management function needs to be performed on the system, automatically. If your network management program permits, you can configure the program to run the tasks during non-business hours so as not interrupt the work of the network users. This helps simplify your network maintenance tasks and limits the impact the tasks have on your network users.

There are several steps you need to perform before you can use the Wake on LAN feature on the network adapter card. First, you need to determine whether the system where you will be installing the card supports Wake on LAN. Not all do. The best way to determine this is by referring to the system's documentation.

Next, you need to determine whether the system is PCI 2.1- or PCI 2.2-compliant. (PCI is an acronym for Peripheral Component Interconnect.) Again, the system's documentation should tell you this. Computers that are PCI 2.1-compliant and that support Wake on LAN control the feature through a special Wake on LAN connector on the system's motherboard. As part of the installation procedure you will need to connect the network adapter card to the special connector on the motherboard using the Wake on LAN cable included with the adapter card.

When you install a PCI 2.2-compatible adapter in a PCI 2.2-compliant computer, the Wake on LAN cable is unnecessary because the feature is controlled through the connector bus on the network adapter card and the system's motherboard.

Note
Wake on LAN is not supported when a PCI 2.1-compliant adapter, such as the AT-2450FTX Series, is installed in a PCI 2.2-compliant computer. Additionally, Wake on LAN is not supported on the 10Base-FL ports on the AT-2450FTX and AT-2745FX Series network adapter cards.

The following table can help sort things out. To determine whether you need to use the Wake on LAN cable, match the type of adapter you purchased with the type of system in which you are installing it.

Table 10. When to Use the Wake on LAN Cable

	PCI 2.1-Compatible System	**PCI 2-2 Compatible System**
PCI 2.1-compatible adapter	Install Wake on LAN cable	Wake on LAN not supported.
PCI 2.2 compatible adapter	Install Wake on LAN cable	Connector bus (Wake on LAN cable not used)

This feature also requires a network management program capable of sending out Magic Packets to the network adapter card. An example is HP OpenView Network Node Manager. Of course, whatever program you choose to use should also allow you to specify what network maintenance functions you want performed once a system has powered ON.

Driver Installation and the AT-Setup Utility

The quickest and easiest way to install the driver for the network adapter card on a Microsoft Windows 2000, 2003, or XP system is with the AT-Setup utility. This utility, included on the Allied Telesyn Installation CD, is also useful in updating an adapter driver already installed on a system or correcting a driver installation. For systems without a CD driver, the Installation CD comes with a utility program that creates a driver installation diskette that contains the AT-Setup utility and the driver, so you can run the program from a diskette drive rather than from a CD drive.

For instructions on how to use the AT-Setup utility, refer to Chapter 3, "Microsoft Windows 2000, 2003, and XP" on page 57.

Note
The Installation CD that comes with your network adapter card has two drivers for Microsoft Windows 2000, 2003, or XP system. There is a regular driver and an enhanced driver that supports load balancing and fail-over (LBFO) protection. The AT-Setup utility can be used to install the regular driver. To install the LBFO driver, you must install it manually. For further information, refer to "Load Balancing and Fail-over Protection" on page 39 and "Choosing a Network Adapter Card Driver" on page 58.

Virtual LANs and the AT-MUX Protocol

All of the adapters discussed in this guide are IEEE 802.1Q-compliant and are designed to support virtual LANs (VLANs) and tagged packets. A VLAN is an independent traffic domain where traffic generated by the nodes of a VLAN is restricted only to nodes that are members of the same VLAN. Traffic within a VLAN cannot cross over a VLAN boundary unless there is an interconnection device, such as a router or a Layer 3 switch, in the network.

VLANs are often used to group nodes with related functions into their own separate, logical LAN segments. These VLAN groupings can be based on similar data needs or security requirements. VLANs can increase network performance and security by restricting traffic to specific devices or areas of a network.

A tagged VLAN (IEEE 802.1Q) contains one or more network links that carry traffic from more than one VLAN. The VLAN traffic is identified by a *header tag*, or simply *tag*, that follows the source and destination addresses in a packet. The tag contains a VLAN identifier (VID) that uniquely identifies the VLAN to which a packet belongs.

The Allied Telesyn network adapter cards are capable of reading the header tag in tagged packets as they arrive on the port, as well as adding tags to packets when transmitting packets.

Before a network adapter card can handle tagged packets, you must configure it by specifying the appropriate VIDs of the VLANs whose tagged packets the adapter is to process.

There are two ways to add VIDs to a network adapter card in a Microsoft Windows 2000, 2003, or XP system. If the card will be handling tagged traffic from only one tagged VLAN, you can specify the VID using the Network Connections window in Microsoft Windows, as explained in "Configuring Additional Network Adapter Card Settings" on page 96.

If the network adapter card will be handling tagged traffic from more than one VLAN, you can use the AT-MUX protocol, which is included on the Installation CD shipped with the network adapter card. The protocol allows you to assign up to 16 VIDs to a single adapter, enabling a network

adapter card to process tagged traffic from up to 16 different VLANs. The protocol is described in Chapter 9, “AT-MUX Multiple VLAN Protocol” on page 157.

Note
The AT-MUX protocol is compatible with Microsoft Windows 2000, 2003, and XP operating systems. You cannot use this protocol with any other operating system.

The following briefly outlines the behavior of a network adapter card when handling tagged and untagged VLAN traffic:

- An adapter where no VIDs have been assigned accepts and transmits only untagged packets. (An untagged packet does not contain a header tag and, consequently, lacks VLAN identification.) The adapter discards any tagged packets that arrive on the port.
- An adapter where at least one VID has been assigned accepts only those tagged packets with header tags that match the assigned VIDs. The adapter discards all untagged packets as well as any tagged packets with VIDs that do not match the VIDs assigned to the card.

Operating Statistics and the AT-Stat Utility

The AT-Stat utility can used to configure a card’s operating specifications and display operating statistics. Functions include:

- Displaying performance statistics, such as the number of packets sent and received by a network adapter card.
- Displaying the number of packet errors, such as CRC errors and alignment errors.
- Configuring the IP address, subnet mask, and gateway address.
- Pinging another network device.
- Performing a throughput test.

For instructions, refer to Chapter 8, “AT-Stat Utility” on page 133.

Note
The AT-Stat utility is compatible with Microsoft Windows 2000, 2003, and XP operating systems. This utility cannot be used with any other operating system.

Diagnostics and the AT-Diag Utility

Included on the Allied Telesyn Installation CD is the AT-Diag utility. This program is useful in testing and configuring a network adapter card. Functions include:

- Testing a network adapter card.
- Performing a link test between an adapter port and a remote device, such as an Ethernet switch or hub.
- Setting the speed and duplex mode of an adapter port.
- Enabling or disabling the BootPROM chip and MBA.
- Specifying the default port for MBA.
- Viewing hardware information.

For instructions, refer to Chapter 10, “AT-Diag Utility” on page 175.

Load Balancing and Fail-over Protection

Allied Telesyn offers two drivers for an adapter card installed in a Microsoft Windows 2000, 2003, or XP system. There is a regular driver and an enhanced driver with load balancing and fail-over (LBFO) protection. These latter features are described in the following subsections.

Load Balancing

The load balancing feature of the LBFO driver is primarily intended for adapters in network servers. It enhances network performance by distributing the traffic over two adapters and also increases network resiliency by providing a redundant link from the server to the network should a link fail.

The LBFO driver allows you to increase the bandwidth from a network server by configuring two network adapters to function as one virtual adapter. The two adapters distribute traffic between themselves by taking turns transmitting packets in a round-robin fashion. One adapter transmits a packet, the next packet is transmitted by the other adapter, and so on.

Note the following before using the LBFO driver:

- This driver is supported only on Microsoft Windows 2000, 2003, and XP systems.
- The driver is supported on the AT-2451FTX, AT-2701FX, AT-2701FTX, and AT-2746FX Series cards. It is not supported on the older versions of these adapters (for example, AT-2450FTX, AT-2700FX, etc.).

Note
The LBFO driver has not been certified by Microsoft Corporation.

There are two versions of the load balancing feature: mode 1 and mode 2. The basic characteristics of mode 1 are:

- Both adapters use the same MAC address, but different IP addresses.
- The ports on the two adapter cards must be connected to the same remote device.

The basic characteristics of mode 2 are:

- Both adapters use different MAC addresses and IP addresses.
- The ports on the two adapter cards can be connected to the same remote device or to different remote devices.

While Mode 1 typically offers the best in terms of performance, you might not be able to use it in all situations. It all depends on the capability of the Ethernet switch to which the ports on the adapters are connected. If the switch cannot handle learning the same MAC address on more than one port, you will probably need to use Mode 2.

Here are the steps to implementing load balancing:

1. Install two adapter cards into the system. The two cards must be identical (for example, two AT-2701FX Series cards).
2. Manually load the LBFO driver onto the cards. Be sure to install the LBFO driver instead of the regular driver. You must install the driver twice, once for each card. For instructions, refer to “Manually Installing a Driver” on page 73.

   Note
   You cannot use the AT-Setup utility to load the LBFO driver.

3. Manually assign both cards an IP address or activate the DHCP client. The IP addresses must be different for the two cards, even if you are using mode 1. The addresses must belong to the same subnet. Consequently, the network portion of the addresses must be the same as well as the subnet masks. For instructions, refer to “Configuring the IP Address, Subnet Mask, and Gateway Address” on page 92. (In mode 1, both adapters use the same MAC address. The MAC address assignment is handled automatically by the driver.)
4. Assign both adapter cards to the same team. For instructions, refer to “Configuring Additional Network Adapter Card Settings” on page 96.

Fail-over Protection

Another feature of the LBFO driver is fail-over protection. This feature is useful in situations where a network device could benefit from link redundancy, but not necessarily load balancing. The fail-over feature protects against a loss of network connectivity should an adapter lose its link to a remote device or the remote device loses power or is taken out of service, such as for maintenance. When the link is lost on the primary adapter, the redundant adapter automatically takes over the task of sending and receiving network traffic.

There are two possible configurations for this feature. In the first configuration both the primary link and the redundant link are connected to the same remote node. This is illustrated in Figure 1 where the links from a server containing two network adapter cards both go to the same Ethernet switch. If the primary link should fail, the redundant link automatically takes over, preventing a loss of network connectivity to the server.

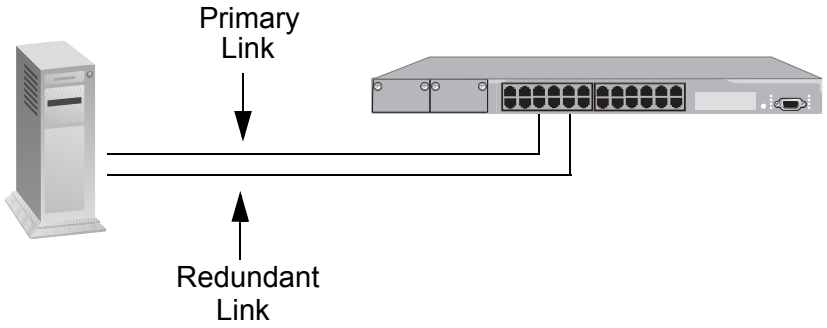


Figure 1. Fail-over Protection - Configuration #1

The drawback to this configuration is that it does not protect against a loss of network access to the server should the switch lose power or be removed from service. Fortunately, with fail-over protection the links can go to different remote nodes. An example is illustrated in Figure 2 where the primary and redundant links of the two adapters in the server go to different Ethernet switches. Now, if the switch where the primary link is connected loses power or is removed from service, network connectivity to the server continues uninterrupted through the other Ethernet switch.

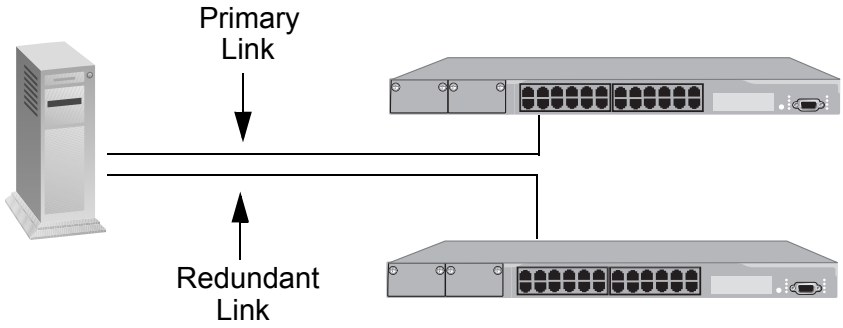


Figure 2. Fail-over Protection - Configuration #2

The selection of the active adapter is determined by the network driver and the computer's operating system. The active, primary adapter is determined by whichever adapter establishes a link with its remote device first. If the primary adapter loses its link with its remote device, the redundant adapter automatically changes to the primary function and remains as the primary adapter until such time as the status of its link changes.

When an adapter card driver notes that it has changed from the redundant to the active status, it sends out a Address Resolution Protocol (ARP) packet. The purpose of the packet is to notify the network nodes of the system's new MAC address and IP address.

To implement this feature, you need to install two identical adapters into the system and create a team of the cards. Both adapters must be members of the same team. One adapter will function as the active, primary adapter and the second adapter will function as the redundant adapter. There can be only one active and one redundant adapter per team. You must also assign each adapter a unique IP address.

Implementing port redundancy requires the following steps:

1. Install two identical adapters in the network device.
2. Manually load the LBFO driver onto the cards. Be sure to install the LBFO driver instead of the regular driver. You must install the driver twice, once for each card. For instructions, refer to "Manually Installing a Driver" on page 73.

   Note
   You cannot use the AT-Setup utility to load the LBFO driver.

3. Assign each adapter a unique IP address. The IP addresses must be in the same subnet. Consequently, the network portion of the addresses must be the same as well as the subnet masks. For instructions, refer to "Configuring the IP Address, Subnet Mask, and Gateway Address" on page 92.
4. Create a team consisting of the two adapter cards. For instructions, refer to "Configuring Additional Network Adapter Card Settings" on page 96.

Managed Boot Agent

The managed boot agent (MBA) and the BootPROM chip allow you to perform pre-boot procedures on a system, such as installing an operating system, running a virus checker, or downloading a predefined system configuration. You can couple this feature with the Wake on LAN feature to perform configuration and maintenance tasks during non-work hours so as not to interfere with the work of your network users.

Note
The MBA and BootPROM chip come standard with the AT-2451FTX, AT-2701FX, AT-2701FTX, and AT-2746FX Series cards. They are sold separately for the AT-2450FTX, AT-2700FX, AT-2700FTX, and AT-2745FX Series adapters.

In order to use MBA on a dual port card you must specify which port is connected to the network. This is made with the AT-Diag utility, described in Chapter 10 on page 175. The MBA can address only one port at a time and it cannot change ports automatically. The selected port is referred to as the default MBA port. The factory settings of the default MBA port on the dual port adapter cards are:

- AT-2450FTX and AT-2451FTX Series cards — 10/100Base-TX twisted pair port
- AT-2700FTX and AT-2701FTX Series cards — 100Base-FX fiber optic port
- AT-2745FX and AT-2746FX Series cards — 100Base-FX fiber optic port

For example, to use MBA on the 10Base-FL port on the AT-2746FX Series card, you would run the AT-Diag utility and specify that port as the default MBA port.

Chapter 2

Installing a Network Adapter Card

This chapter contains instructions for installing an Allied Telesyn network adapter card. Sections in the chapter include:

Verifying Package Contents

Make sure the following items are included in your package. If any item is missing or damaged, contact your Allied Telesyn sales representative for assistance.

- ❑ Allied Telesyn Network Adapter Card
- ❑ Allied Telesyn Installation CD
- ❑ Wake on LAN Cable
- ❑ Low Profile Bracket (AT-2451FTX, AT-2701FX, AT-2701FTX, and AT-2746FX Series)
- ❑ Warranty Card

Reviewing Safety Precautions

Please review the following safety precautions before you begin to install the network adapter card. Refer to Appendix E, “Translated Safety Statements” on page 209 for translated safety statements in your language.

Warning
This is a “Class 1 LED product”. 1

Warning
Do not stare into the laser beam. 2

Warning
Warning: Do not look directly at the fiber optic cable ends or inspect the cable ends with an optical lens. 31

Warning
Do not work on this equipment or cables during periods of lightning activity. 4

Warning
Operating Temperature: This product is designed for a maximum ambient temperature of 40 degrees C. 9

Note
All Countries: Install this product in accordance with local and National Electric Codes. 10

Installing the Low Profile Bracket

The AT-2451FTX, AT-2701FX, AT-2701FTX and AT-2746FX Series network adapter cards come with two brackets, a pre-installed standard bracket and a low profile bracket for systems that require low profile adapters. If you are installing the card in a low profile system, you must replace the standard bracket on the card with the low profile bracket.

Replacing the bracket must be performed with extreme care to avoid damaging the network adapter card.

Caution
Wear a grounding device and observe electrostatic discharge precautions when installing the bracket. Failure to observe this caution could result in damage to the network adapter card.

To install the low profile bracket, perform the following procedure:

1. Using a Phillips-head screwdriver, carefully remove the two screws that secure the standard bracket to the network adapter card and remove the bracket, as shown in Figure 3.

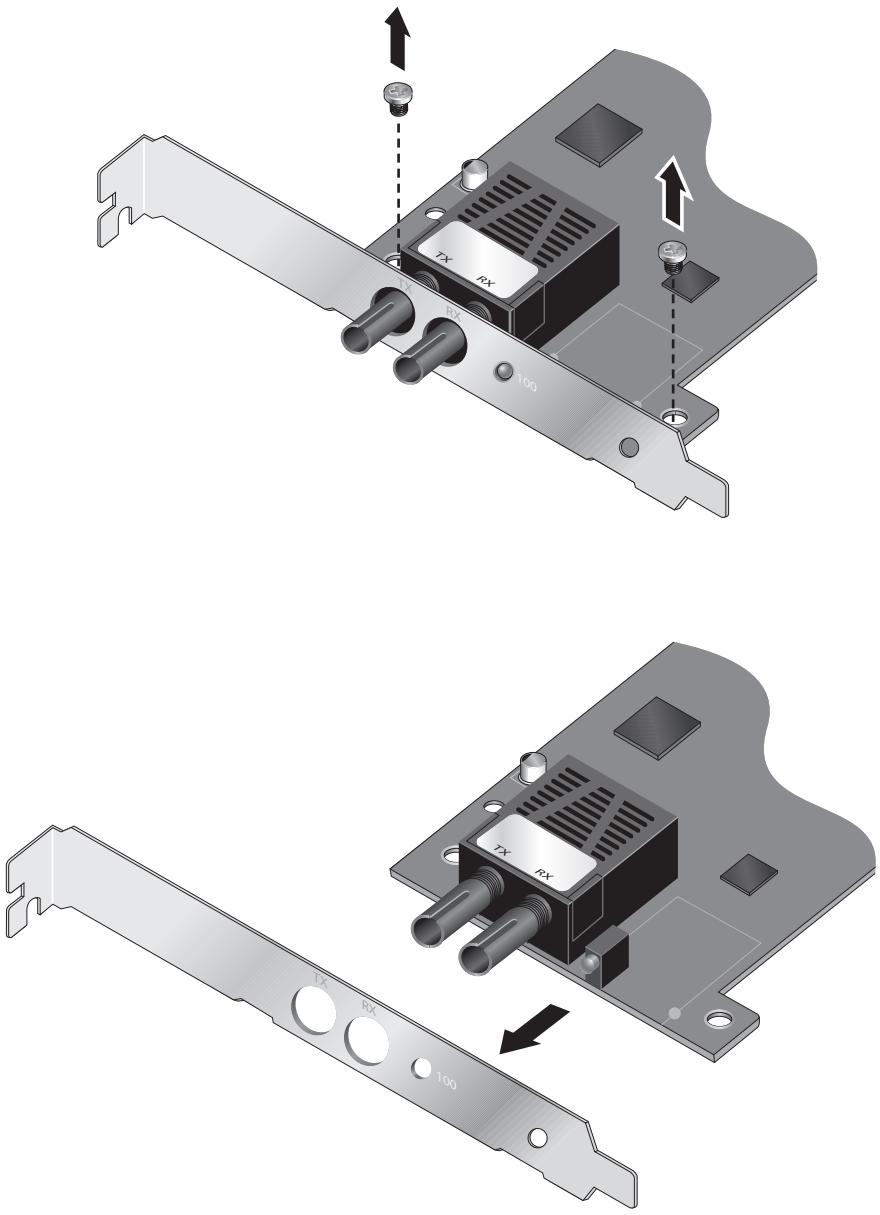


Figure 3. Removing the Standard Bracket

2. Position the low profile bracket on the adapter card and secure with the two screws, as shown in Figure 4.

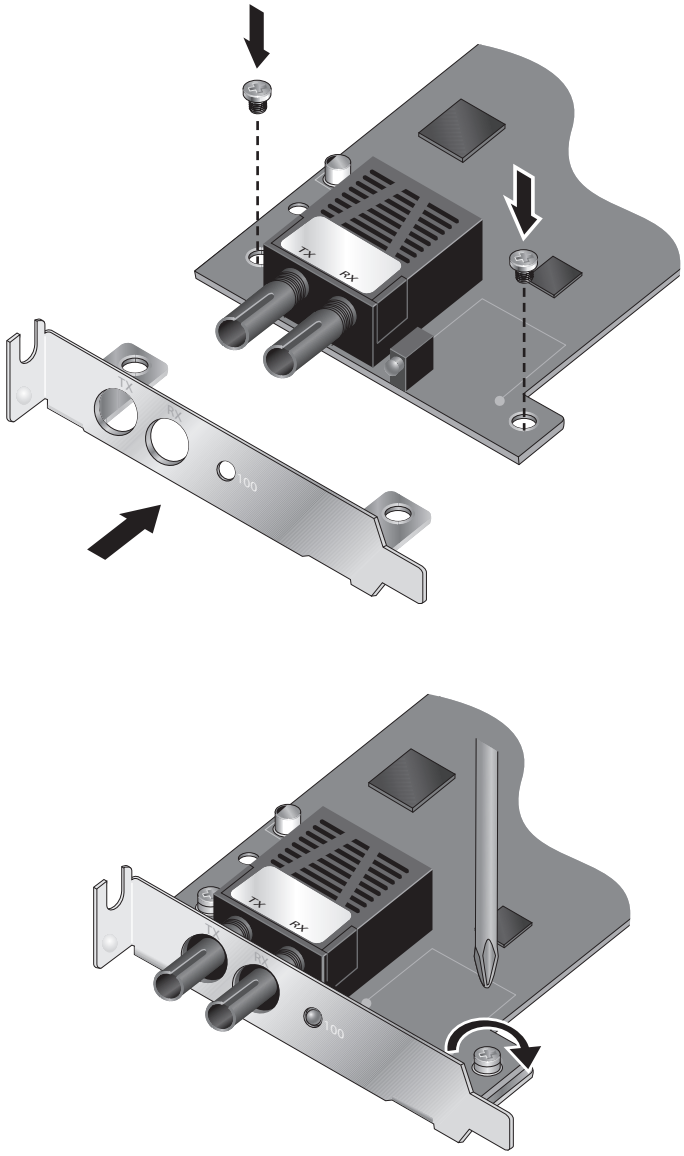


Figure 4. Installing the Low Profile Bracket

Installing a Network Adapter Card

This section explains how to install a network adapter card in most PC-compatible systems. Refer to system's instruction manual for specific information on installing peripheral devices.

Note
The optional BootPROM chip for an AT-2450FTX, AT-2700FX, AT-2700FTX, or AT-2745FX Series card should be installed before the card is installed in the system. For instructions, go to "Installing a BootPROM Chip" on page 200.

To install the network adapter card, perform the following procedure:

1. Shutdown your system and disconnect the power cord from the outlet.

Warning
High voltage inside the system presents a safety hazard. Make sure the power is off before removing the cover.

2. Remove the system's cover by removing the screws from the chassis and gently sliding off the cover. See Figure 5.

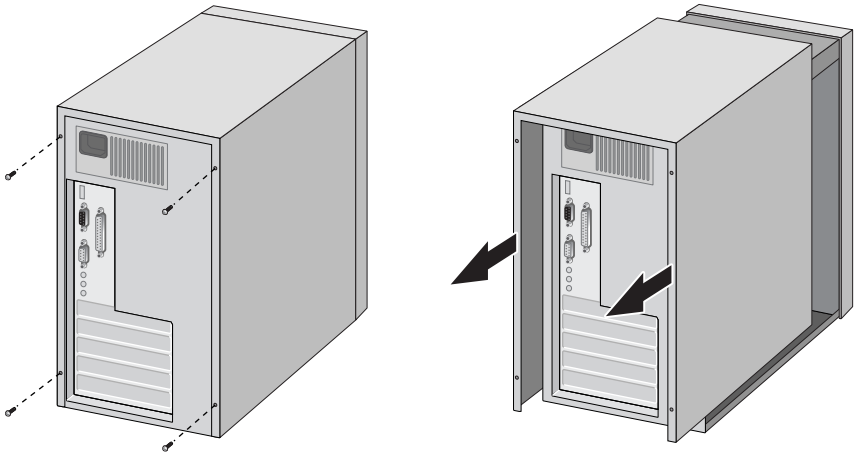


Figure 5. Removing the PC Cover

3. Select an empty, non-shared PCI slot and remove the faceplate. Keep the faceplate in a safe place. You may need it for future use. See Figure 6.

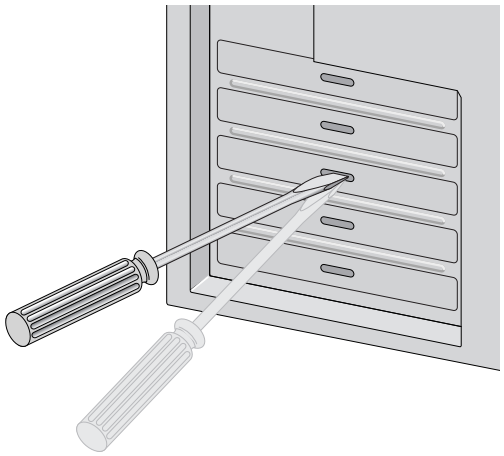


Figure 6. Removing the Faceplate From PCI Slot

If you are installing the network adapter card in a PCI 2.1-compliant system and want to use the Wake on LAN feature, choose a slot that is near the Wake on LAN connector on the system's motherboard. This will make installing the Wake on LAN cable easier.

Note
If you cannot locate or know how to find an PCI slot, refer to the documentation that came with your system.

4. Remove the network adapter card from the shipping package and store the packaging material in a safe location.

Caution
Wear a grounding device and observe electrostatic discharge precautions when installing the network adapter card in a system. Failure to observe this caution could result in damage to the card.

5. To use the Wake on LAN feature in a PCI 2.1-compatible system, connect one end of the Wake on LAN cable included with the network adapter card to the Wake on LAN connector on the card, as shown in Figure 7. If you are installing the card in a PCI 2.2-compliant system or do not intend to use this feature, skip this step. For background information on this feature, refer to “Wake on LAN” on page 35.

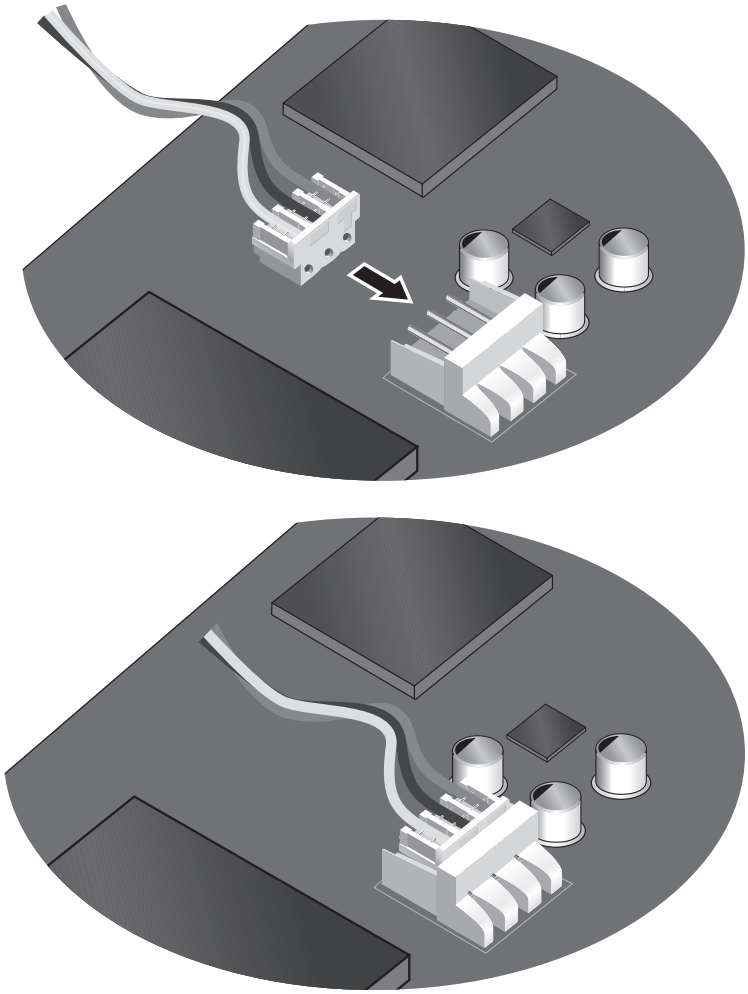


Figure 7. Connecting the Wake on LAN Cable to the Adapter Card

6. Gently insert the network adapter card into the PCI slot. Make sure the card is securely seated.

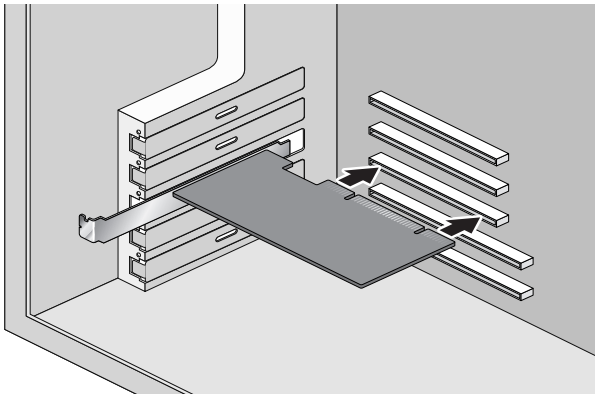


Figure 8. Inserting the Network Adapter Card

7. Secure the network adapter card to the chassis with a Phillips-head screw, not provided.

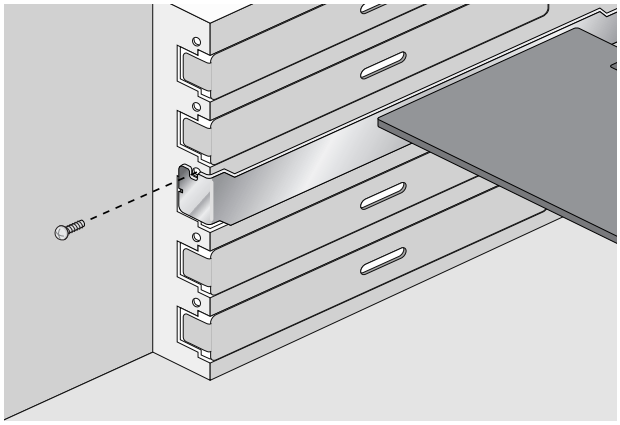


Figure 9. Securing the Adapter Card

8. To use the Wake on LAN feature in a PCI 2.1-compatible system, connect the other end of the Wake on LAN cable to the Wake on LAN connector on the system's motherboard. Refer to the system's documentation for the location of the connector. If you are installing the card in a PCI 2.2-compliant system or do not want to use the Wake on LAN feature, skip this step.

9. Replace the system's cover and secure it with the screws removed in Step 2.

10. Connect the network adapter card to the network by connecting the appropriate network cable.

Note
If you installed a dual port network adapter card, connect only one port to the network.

11. Power ON the system.

    If you installed the adapter card in a Microsoft Windows 2000, 2003, or XP system and did not pre-install the driver, the Found New Hardware Wizard launches automatically once the system detects the new card. Figure 10 illustrates the first window of the wizard.

Figure 10. Found New Hardware Wizard Window

12. At this point, you have a choice on how to install the adapter card's driver. If you prefer to use the AT-Setup utility, click **Cancel** in the wizard and perform the procedure "Installing or Updating a Driver Using the AT-Setup Utility" on page 59. Alternatively, you can use the wizard to manually install the driver by performing the procedure "Manually Installing a Driver" on page 73.

    This completes the installation of the network adapter card. Go to the appropriate chapter in this guide for installation instructions for the adapter card's driver.

Chapter 3

Microsoft Windows 2000, 2003, and XP

This chapter contains instructions on how to install, update, and remove the network adapter driver on a Microsoft Windows 2000, 2003, or XP system. This chapter also contains the procedure for adjusting a network adapter card's parameters, such as assigning an IP address and changing port speed and duplex mode. Procedures in the chapter include:

Choosing a Network Adapter Card Driver

The first step to installing the driver for your new network adapter card is to select a driver. Allied Telesyn offers two drivers for Microsoft Windows 2000, 2003, and XP systems. There is a regular driver and an enhanced driver that features load balancing and fail-over (LBFO) protection. The LBFO driver is primarily intended for adapters in network servers. It enhances network performance by distributing the traffic from the server over two adapters. It also increases the resiliency of your network by providing a redundant link from the server to the network. For background information on the LBFO driver, refer to “Load Balancing and Fail-over Protection” on page 39.

You can install the regular driver using the AT-Setup utility, as explained in “Installing or Updating a Driver Using the AT-Setup Utility” on page 59 or manually with the procedure “Manually Installing a Driver” on page 73.

To install the LBFO driver, you must use the procedure “Manually Installing a Driver” on page 73. The LBFO driver cannot be installed using the AT-Setup utility.

Note
The LBFO driver has not been certified by Microsoft Corporation.

Installing or Updating a Driver Using the AT-Setup Utility

Included on the Allied Telesyn Installation CD is the AT-Setup utility. This utility is a quick and easy way to install the regular adapter driver on a Microsoft Windows 2000, 2003, or XP system.

> **Note**
> Do not perform this procedure to install the LBFO driver. Instead, go to “Manually Installing a Driver” on page 73.

You can run the AT-Setup utility either before or after you install the network adapter card. Running the AT-Setup utility before installing the card pre-loads the driver.

If you install an adapter card in your system before running the AT-Setup utility, your operating system will attempt to install an adapter driver automatically. Microsoft’s New Hardware Installation Wizard will prompt you for the location of the appropriate driver for the adapter card. You can either instruct the installation wizard to the proper location on the Allied Telesyn Installation CD, given in Step 11 in the procedure “Manually Installing a Driver” on page 73, or cancel the hardware wizard and perform the AT-Setup utility.

You can also use the AT-Setup utility to update the regular driver or to correct problems during installation. If an error message occurs, simply run AT-Setup again. The utility will scan your operating system and fix any known issues.

AT-Setup Guidelines

Before running the AT-Setup utility, please review the following guidelines:

- The AT-Setup utility is designed for Microsoft Windows 2000, 2003, and XP operating systems. Do not use this program with any other operating system.
- If the system contains more than one adapter card, you must install the adapter driver on each card. You can either run the AT-Setup utility, which automatically installs the driver on all of the adapter cards that it detects in the system, or you can install the driver manually for each card.
- If the system where you installed the adapter card does not have a CD drive, you can create a driver installation diskette and run the AT-Setup utility from the diskette. Refer to “Creating a Driver Installation Disk” on page 68 for instructions.
- Allied Telesyn network adapter cards are PCI-compliant. The adapter card’s operating parameters, such as interrupt level and memory range, are set automatically by the computer to avoid conflict with other devices in your system. Do not change any of the operating

parameters of an adapter card without a full understanding of the parameters' functions.

Running AT-Setup from the Installation CD

To install or update the regular adapter card driver using the AT-Setup utility from the Installation CD, perform the following procedure:

1. Insert the Allied Telesyn Installation CD into the CD drive.

   Your system should automatically launch the CD and display the main window, shown in Figure 11. If this window does not appear, double-click on the My Computer icon, then double-click on the Allied Telesyn Installation CD icon.

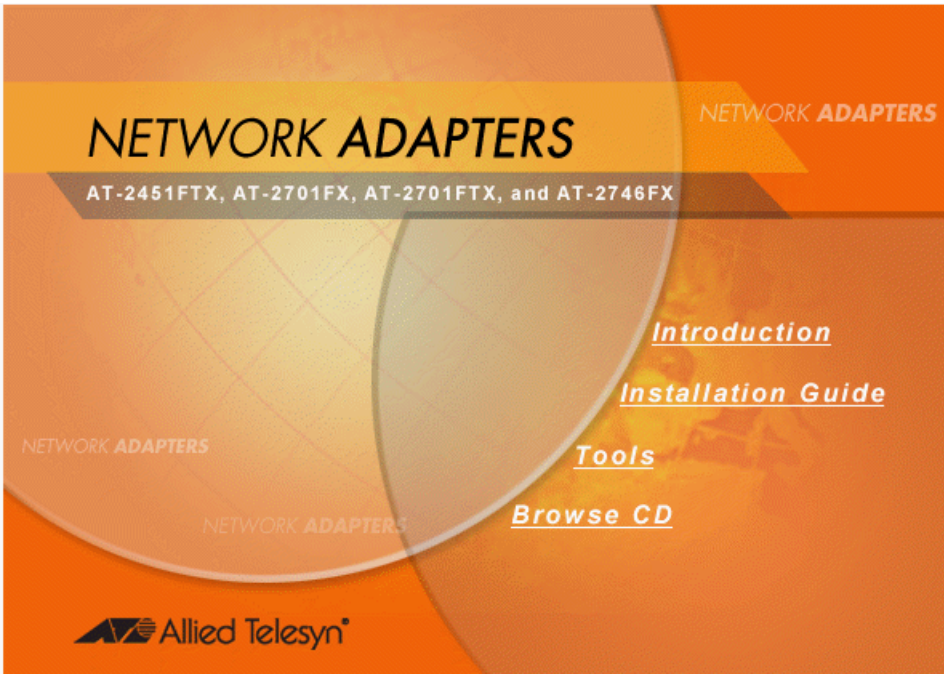


Figure 11. Installation CD Main Window

2. Select **Tools**.

   The Tools window is shown in Figure 12.

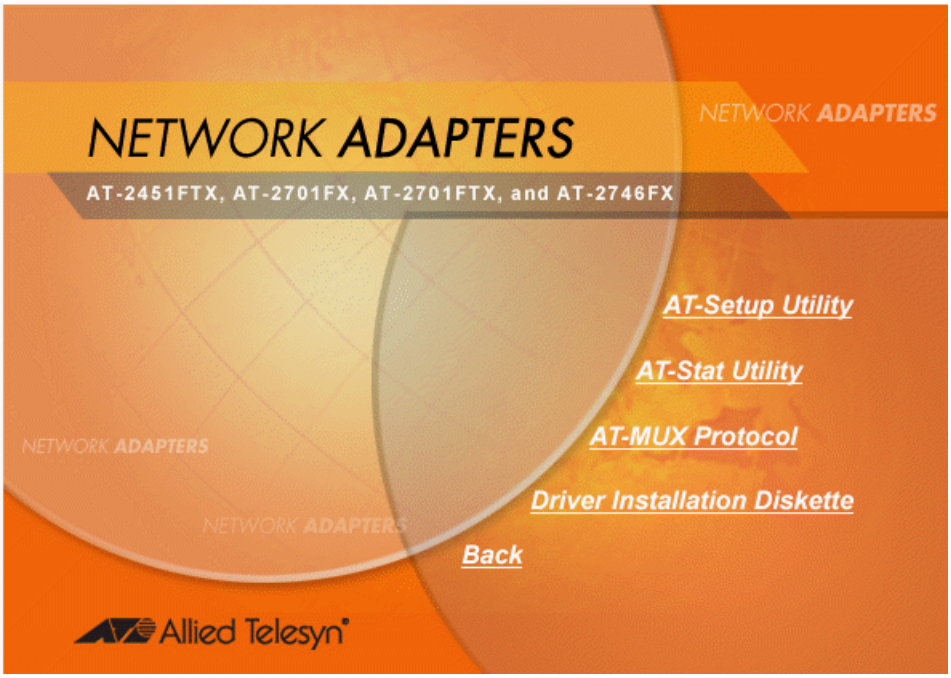


Figure 12. Tools Window

3. Select **AT-Setup Utility**.

   The AT-Setup Utility window is shown in Figure 13.

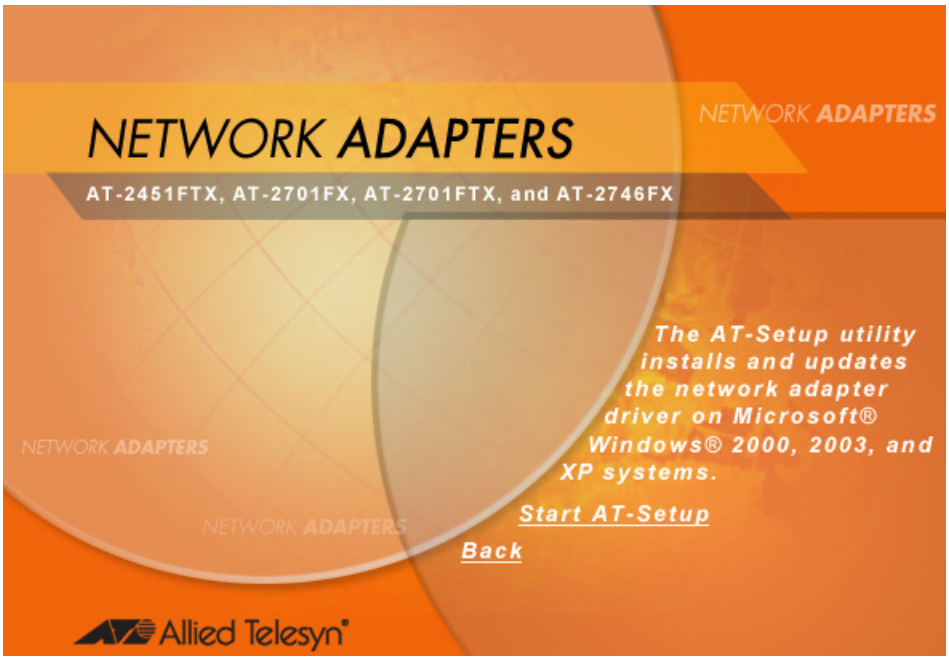


Figure 13. AT-Setup Utility Window

4. Select **Start AT-Setup**.

Note
The security prompts in Steps 4, 5, and 6 are from Microsoft Internet Explorer version 6.0. These security prompts may not appear or you may see different prompts if you are using a different version of Microsoft Internet Explorer or a different web browser.

The following prompt is displayed.

Figure 14. Active Content Warning Prompt

5. Select **Yes**.

The following prompt is displayed:

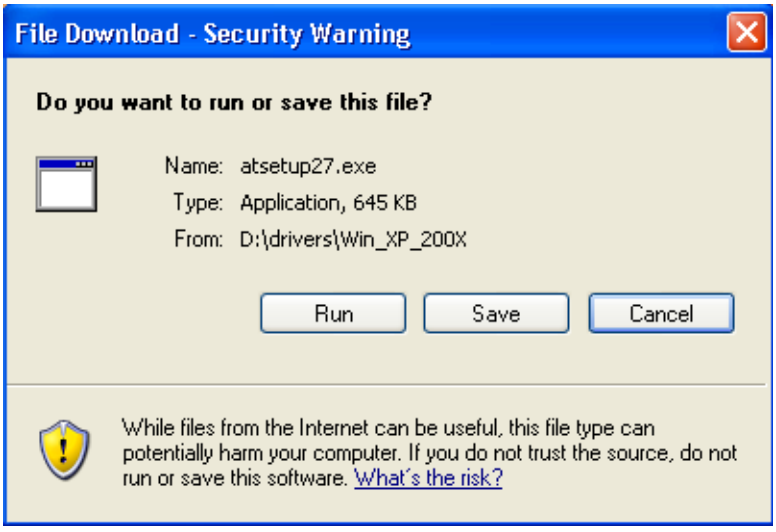


Figure 15. File Download - Security Warning Prompt

6. Select **Run** to run the AT-Setup utility from the Installation CD.

   The following security warning prompt is displayed.

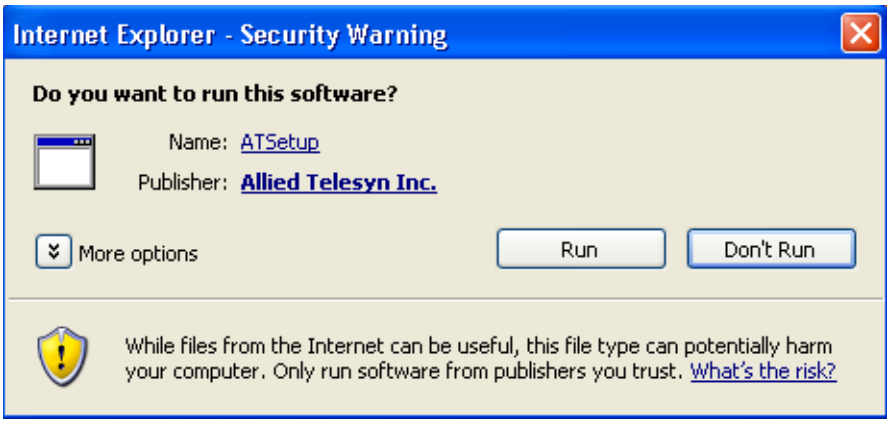


Figure 16. Internet Explorer - Security Warning Prompt

7. Select **Run** to launch the AT-Setup utility.

   If you are updating a driver, the program displays the Overwrite Protection window, shown in Figure 17.

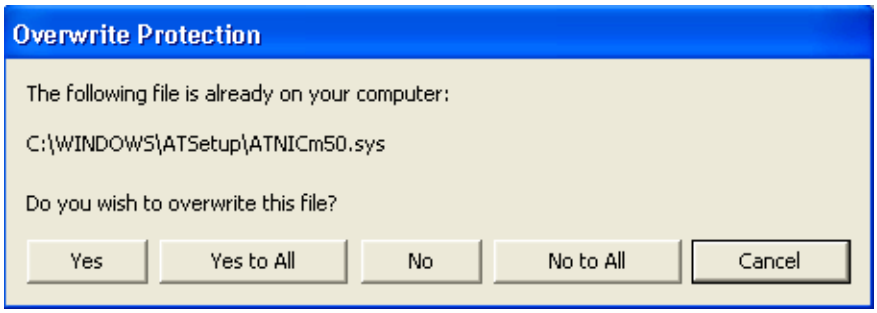


Figure 17. Overwrite Protection Window

8. If the Overwrite Protection window appears, select **Yes to All**. The utility searches the system for any network adapter cards. If it detects a card(s), the utility displays the card model name(s) in the ATSetup window. (In some cases, the utility might omit the model name and display just the words “Ethernet Controller.”) An example of the window is shown in Figure 18.

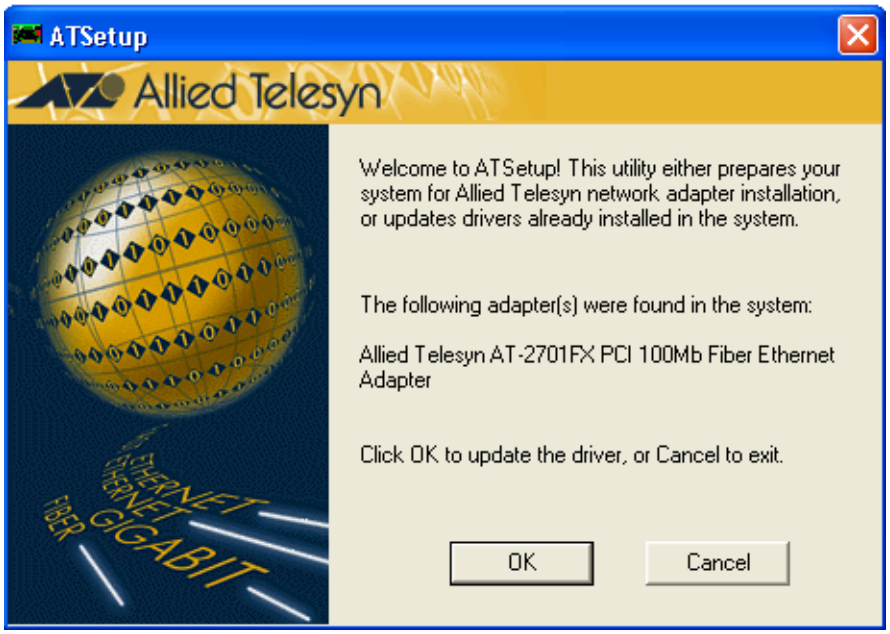


Figure 18. AT-Setup Window (Card Installed)

If the adapter card has not been installed, the window in Figure 19 is displayed:

Figure 19. AT-Setup Window (No Card Installed)

9. Select **OK**.

   The AT-Setup utility copies the adapter driver from the Installation CD to the system's hard disk and integrates it with the system's operating system. The entire process can take up to 30 seconds to complete.

   Note
   If you see the error message "Failed to remove network adapter for update. The data is invalid.", click **OK**. The message can be ignored.

10. If the card is already installed in the system, the AT-Setup utility displays the message in Figure 20 once the driver is installed. Click **OK**. To complete the installation, connect the twisted pair cable or the fiber optic cable to the port on the adapter.

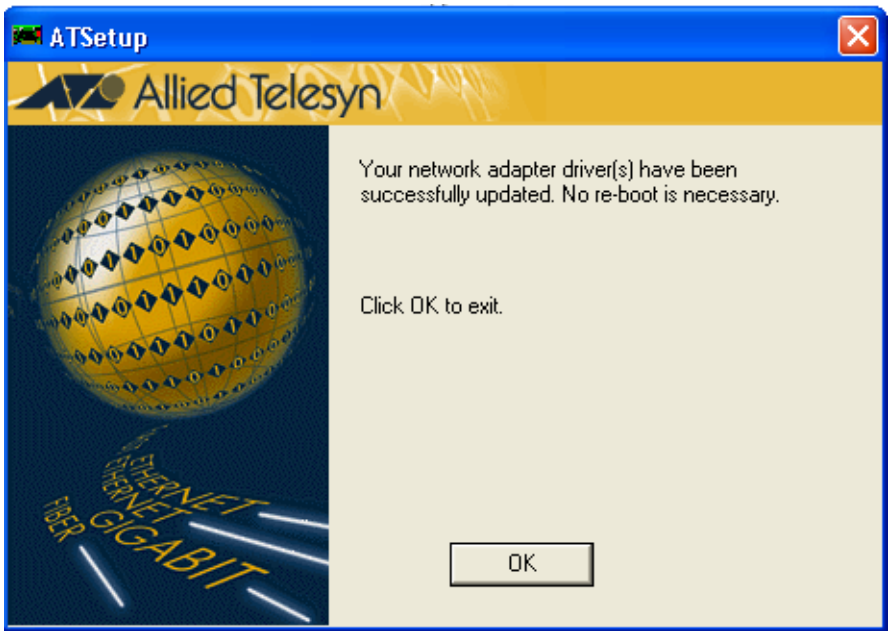


Figure 20. AT-Setup Window - Completion

Note
To configure the adapter's settings, refer to "Configuring the Network Adapter Card Settings" on page 91.

11. If the card has not been installed, the prompt in Figure 21 is displayed. Remove the CD from the CD driver and click **Yes**. The Windows operating system and the system are automatically shut down. You can now install the adapter card. For instructions, refer to Chapter 2, “Installing a Network Adapter Card” on page 45.

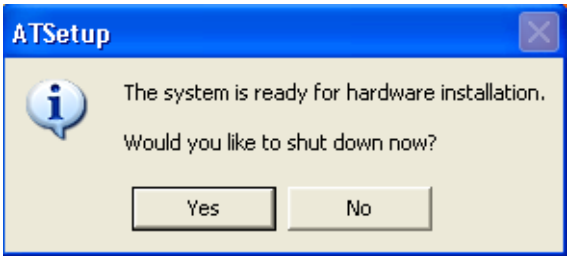


Figure 21. Shut Down Prompt

Running AT-Setup from a Driver Installation Diskette

To install the network adapter driver using the AT-Setup utility from a driver installation diskette, perform the following procedure:

1. Insert the driver installation disk into the floppy drive.

> **Note**
> For instructions on how to create a driver installation disk, refer to “Creating a Driver Installation Disk” on page 68.

2. From the Start menu on the Window’s toolbar, select **Run**, as shown in Figure 22.

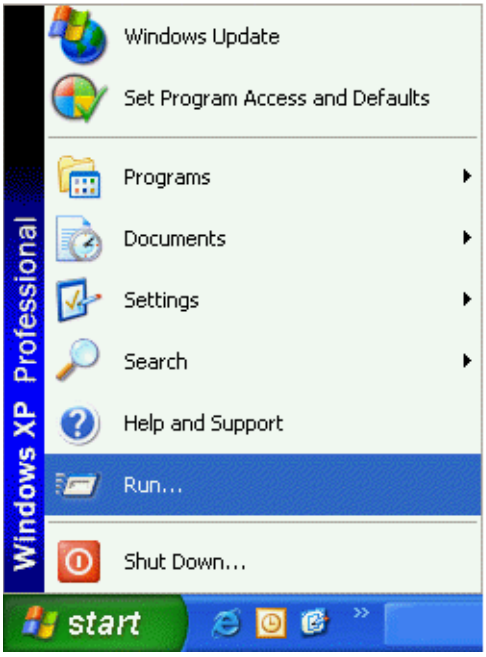


Figure 22. Run Selection in the Start Menu

The Run window is shown in Figure 23.

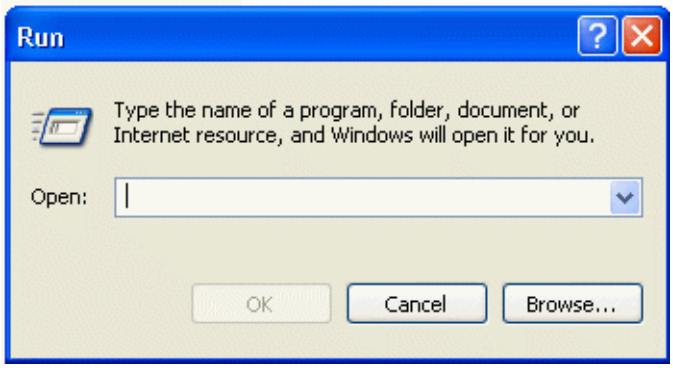


Figure 23. Run Window

3. In the Open field, type: ***x*:\Win_XP_200X\atsetup** where '*x*' is the drive letter of the floppy drive.

4. Select **OK**.

5. To complete the installation of the adapter card driver, perform Steps 8 to 11 in the procedure "Running AT-Setup from the Installation CD" on page 60.

Creating a Driver Installation Disk

This procedure creates a driver installation diskette. You can use the diskette to run the AT-Setup utility on those systems that do not have a CD drive.

To create a driver installation disk, perform the following procedure on a system that has both a CD drive and floppy drive:

1. Make sure your system is turned ON and the Windows operating system is running.

2. Insert the Allied Telesyn Installation CD into the CD drive.

   The Installation CD main window is shown in Figure 24. If this window does not appear, double-click on the My Computer icon, then double-click on the Allied Telesyn Installation CD icon.

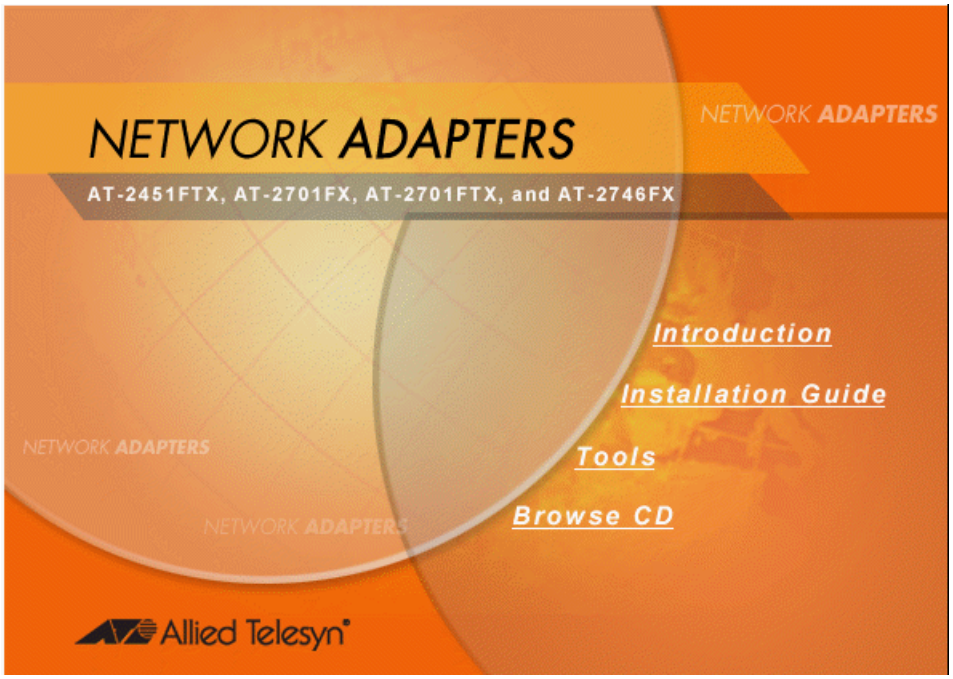


Figure 24. Allied Telesyn Installation CD Main Window

3. Select **Tools**.

   The Tools window is shown in Figure 25.

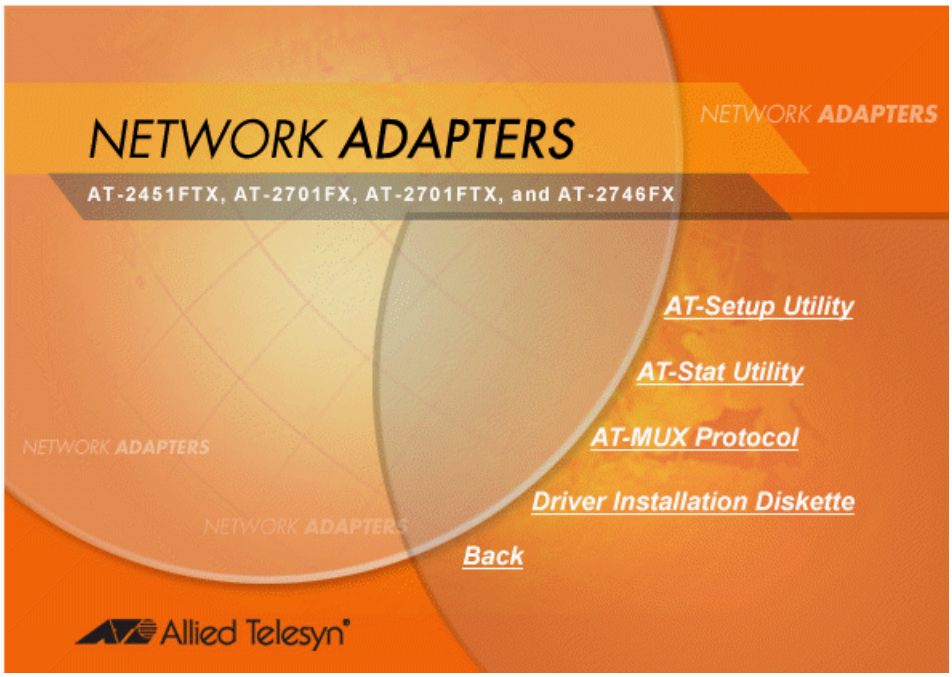


Figure 25. Installation CD Tools Window

4. Select **Driver Installation Diskette**.

   The Driver Installation Diskette window is shown in Figure 26.

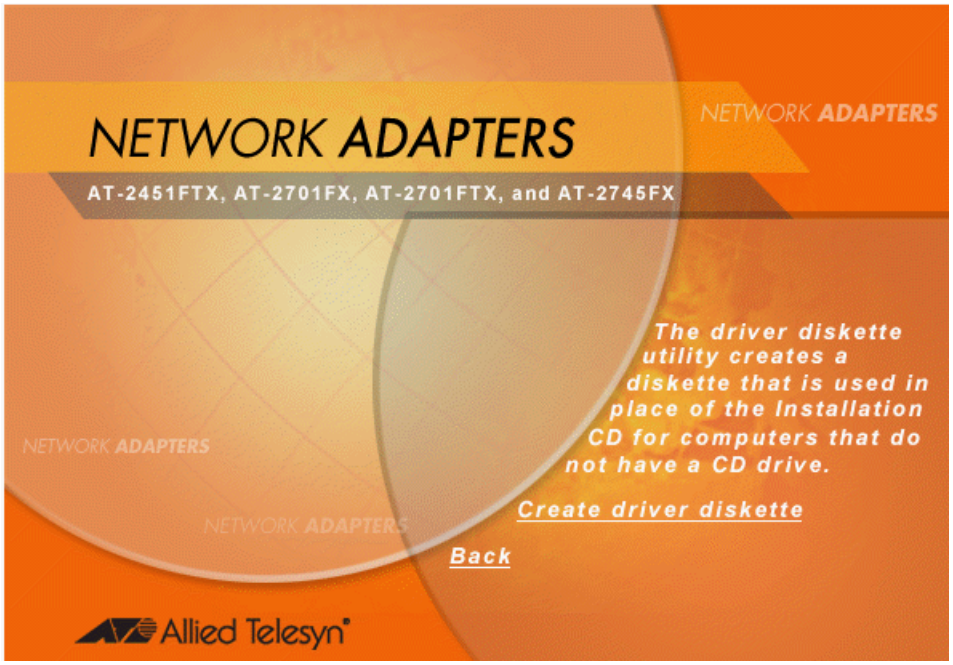


Figure 26. Driver Diskette Utility Window

5. Insert a blank, formatted floppy disk into the floppy drive.
6. Select **Create driver diskette**.

Note
The security prompts in Steps 4, 5, and 6 are from Microsoft Internet Explorer version 6.0. These security prompts may not appear or you may see different prompts if you are using a different version of Microsoft Internet Explorer or a different web browser.

The prompt in Figure 27 is displayed.

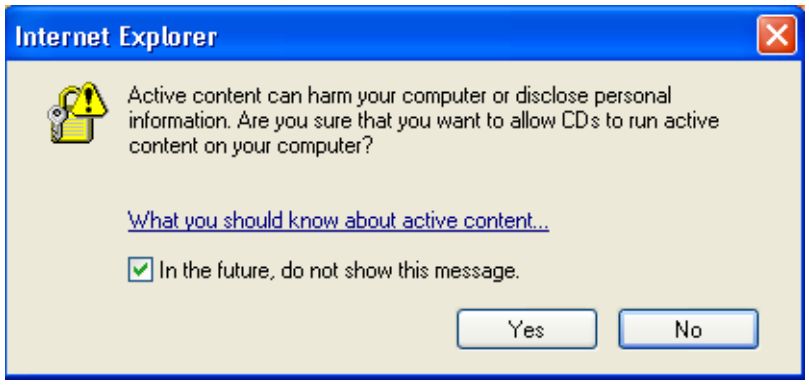


Figure 27. Active Content Warning Prompt

7. Select **Yes**.

The prompt in Figure 28 is displayed.

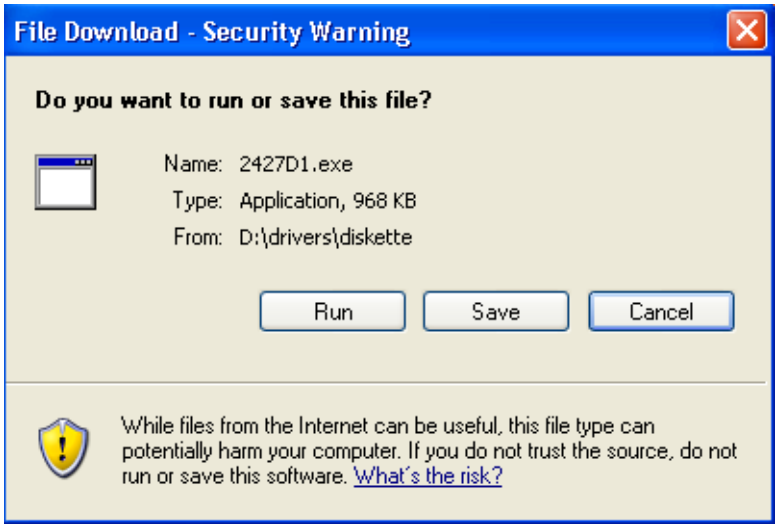


Figure 28. File Download - Security Warning Prompt

8. Select **Run** to run the utility from the Installation CD.

   The following security warning prompt is displayed.

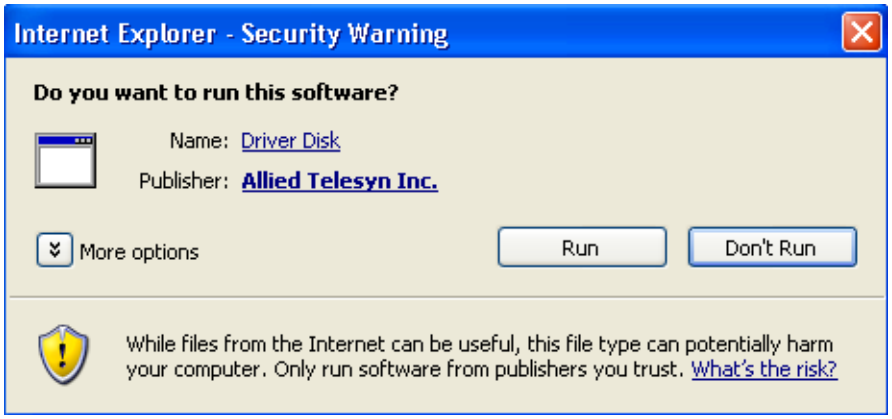


Figure 29. Internet Explorer - Security Warning Prompt

9. Select **Run**.

   The prompt in Figure 30 is displayed.

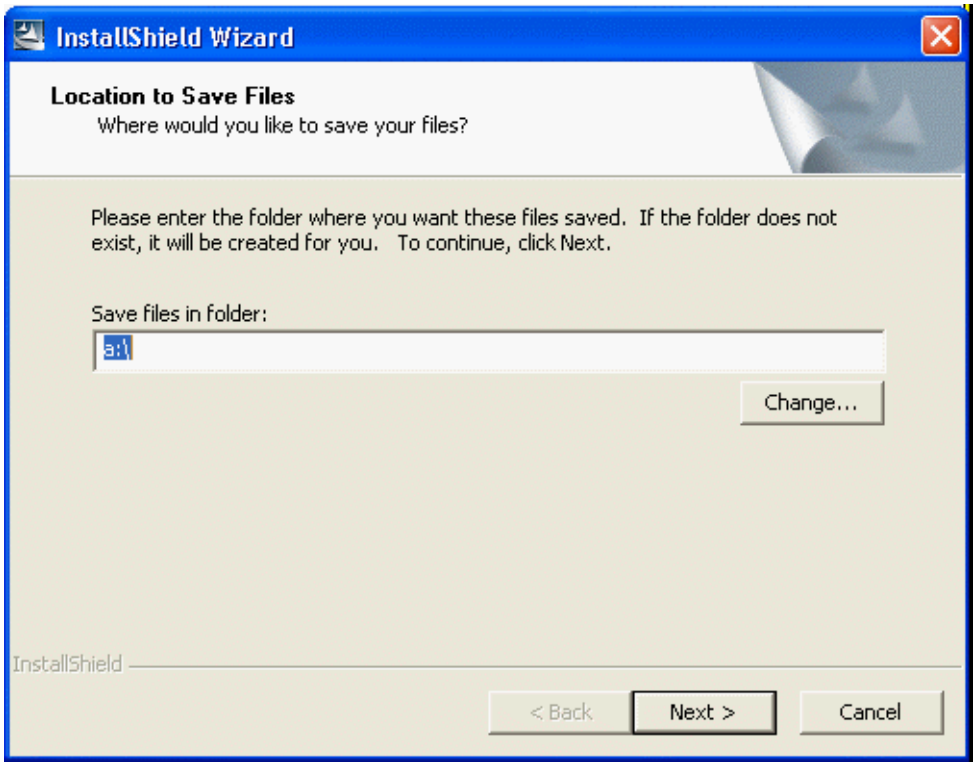


Figure 30. InstallShield Wizard

10. Specify the floppy drive containing the blank disk.
11. Select **Next**. The adapter drivers and the AT-Setup utility are saved to the floppy disk. The program displays the message in Figure 31when the process is complete.

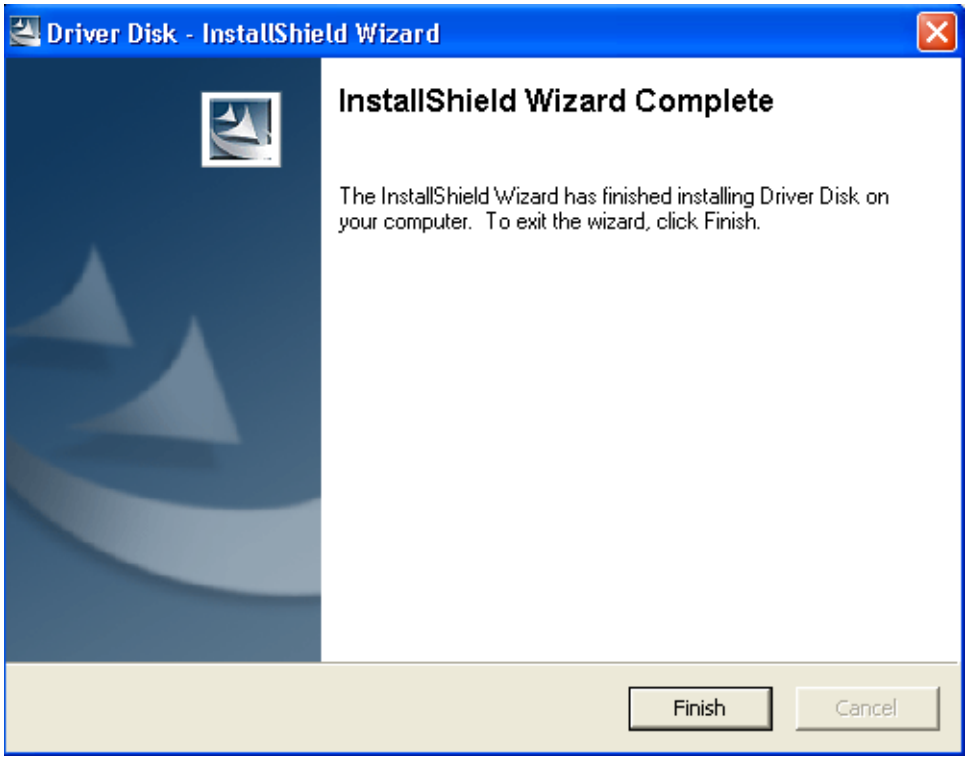


Figure 31. Driver Installation Diskette Completion Message

This completes the procedure for creating a driver installation disk. To use the diskette to install the driver on a Microsoft Windows 2000, 2003, or XP system, refer to “Running AT-Setup from a Driver Installation Diskette” on page 66 or “Manually Installing a Driver” on page 73.

Manually Installing a Driver

This section contains the procedure for manually installing the regular or LBFO network adapter driver on a Microsoft Windows 2000, 2003, or XP operating system. You can perform the procedure using the Allied Telesyn Installation CD or, for those systems without a CD drive, a driver installation diskette. For instructions on how to create a driver installation diskette, refer to “Creating a Driver Installation Disk” on page 68.

1. Shutdown the Microsoft Windows 2000, 2003, or XP operating system and power OFF your computer.

2. Install the network adapter card. Refer to Chapter 2, “Installing a Network Adapter Card” on page 45 and the documentation that came with your computer for instructions.

3. Power ON the computer.

   After detecting the new adapter card, the system launches the Found New Hardware Wizard, which displays the window shown in Figure 32.

Figure 32. Found New Hardware Wizard Window (1 of 4)

4. Insert the Installation CD or the driver installation diskette into the appropriate drive on the system.

   Note
   If you system launches the web browser when you insert the Installation CD, minimize or close the web browser window.

5. In the Found New Hardware Wizard window, select **No, not this time**.
6. Select **Next**.

   The window shown in Figure 33 is displayed.

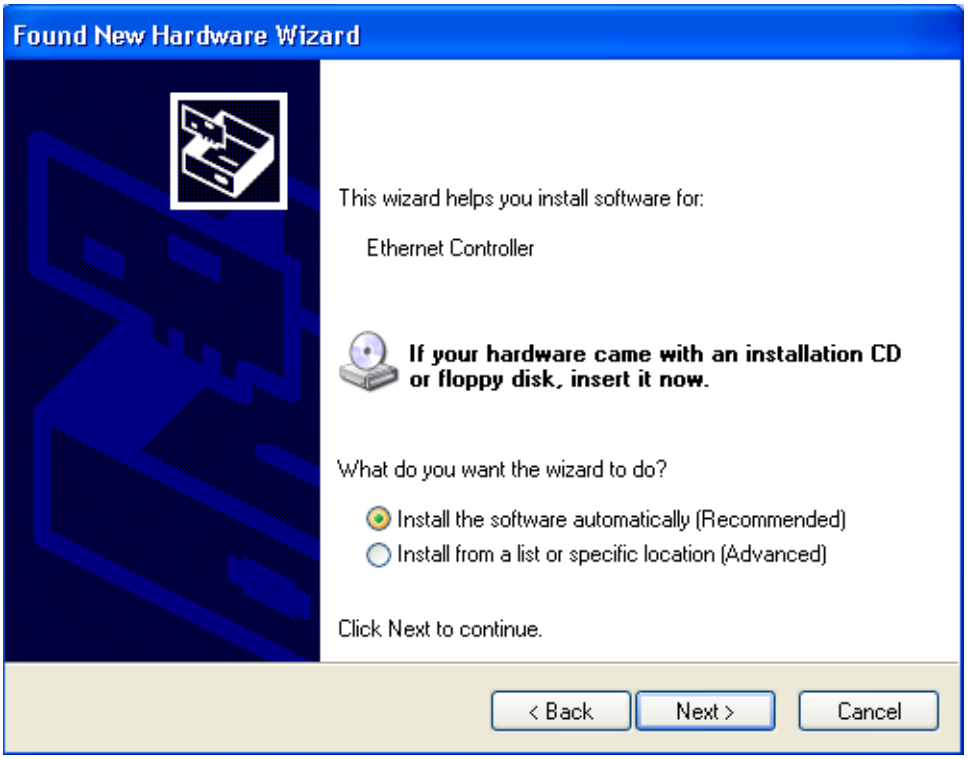


Figure 33. Found New Hardware Wizard Window (2 of 4)

7. Select **Install from a list or specific location (Advanced)**.

8. Select **Next**.

   The window shown in Figure 34 is displayed.

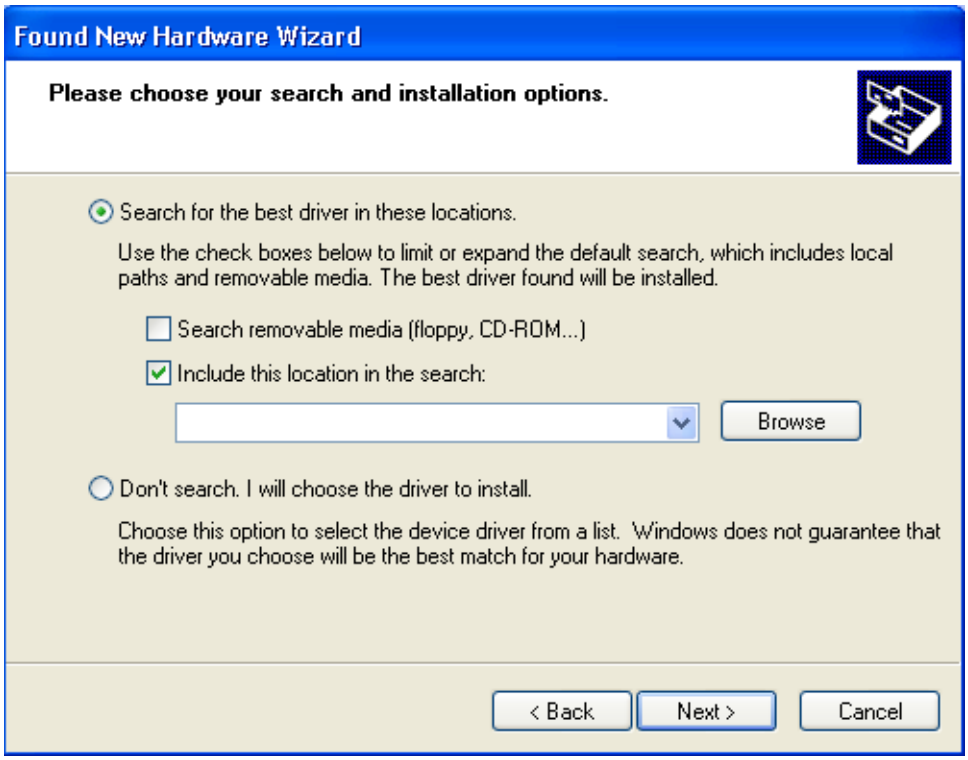


Figure 34. Found New Hardware Wizard Window (3 of 4)

9. If selected, deselect **Search removable media (floppy, CD-ROM...)**.

10. Select **Include this location in the search**.

11. Specify the location of the driver file using the Browse button or by entering the drive letter and path in the field.

    - If you are installing the regular driver, the driver files are stored in this subdirectory on the Installation CD and the driver installation diskette:

      `x:\drivers\Win_XP_200x`

    - If you are installing the LBFO adapter driver, the files are stored in this subdirectory on the Installation CD and the driver installation diskette:

      `x:\drivers\Win_XP_200X_lbfo`

    Where *X:* is the driver letter of the CD drive or the diskette drive.

12. After you have specified the location, select **Next**.

13. If you are installing the LBFO driver, a message is displayed stating that the driver has not been certified by Microsoft. If you see the message, click **Continue Anyway**.

    The wizard installs the adapter driver. The installation process can take up to 30 seconds to complete.

    Once installed, the window in Figure 35 is displayed.

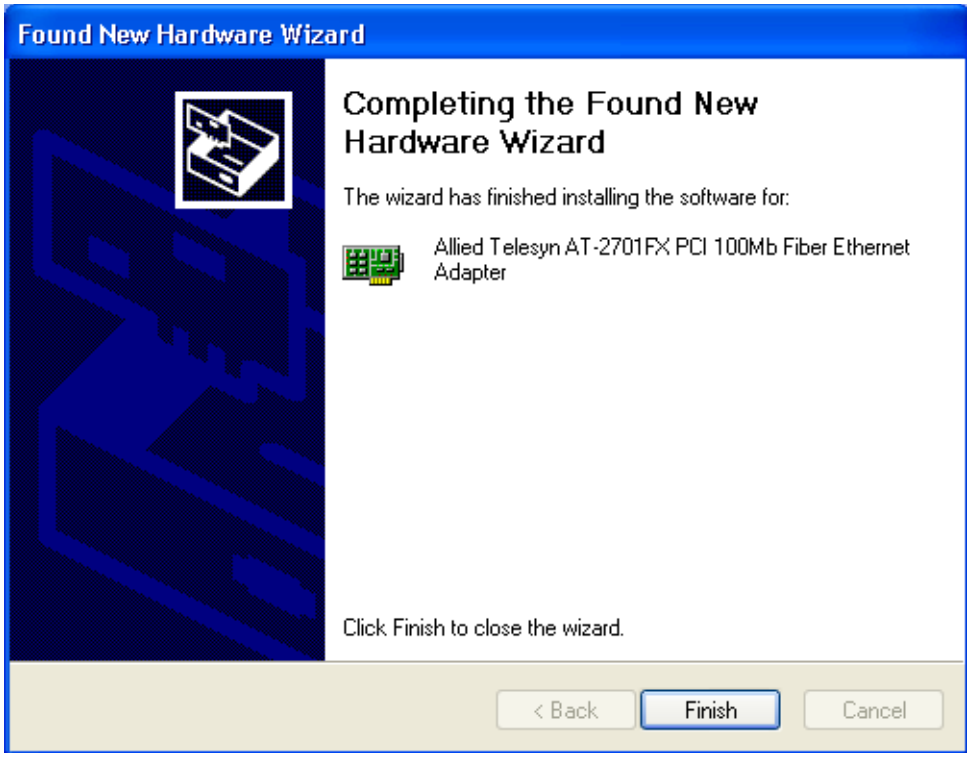


Figure 35. Found New Hardware Wizard Window (4 of 4)

14. Select **Finish**.

15. Reboot your system.

    This completes the procedure for manually installing the driver on a Microsoft Windows 2000, 2003, or XP system. To adjust the adapter's parameters, refer to "Configuring the Network Adapter Card Settings" on page 91.

Manually Updating a Driver

This section contains the procedure for updating a regular or LBFO network adapter driver on a Microsoft Windows 2000, 2003, or XP system. You can perform the procedure using the Allied Telesyn Installation CD or, if the system does not have a CD driver, a driver installation disk. For instructions on how to create a driver installation disk, refer to “Creating a Driver Installation Disk” on page 68.

Note
Since the regular adapter driver and LBFO driver are considered different drivers, you cannot use this procedure to convert a regular driver already installed on a system into an LBFO driver, or vice versa. If one of the adapter drivers is already installed, you must uninstall it prior to installing the other driver. For background information on the two drivers, refer to “Load Balancing and Fail-over Protection” on page 39 and “Choosing a Network Adapter Card Driver” on page 58.

Note
You should have the Windows Installation CD or floppy disk(s) available. You may be prompted to copy support files for networking.

To update a driver, perform the following procedure:

1. From the desktop, right-click the **My Computer** icon and select **Properties** from the menu, as shown in Figure 36.

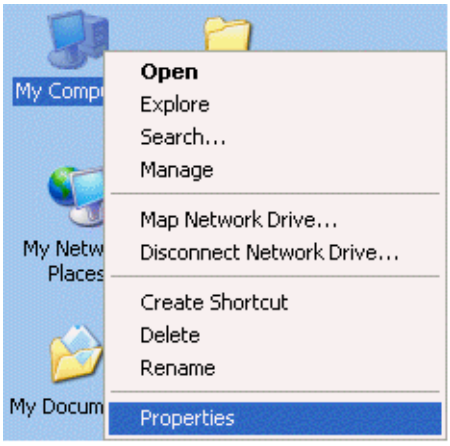


Figure 36. My Computer Icon and Menu

The System Properties window is shown in Figure 37.

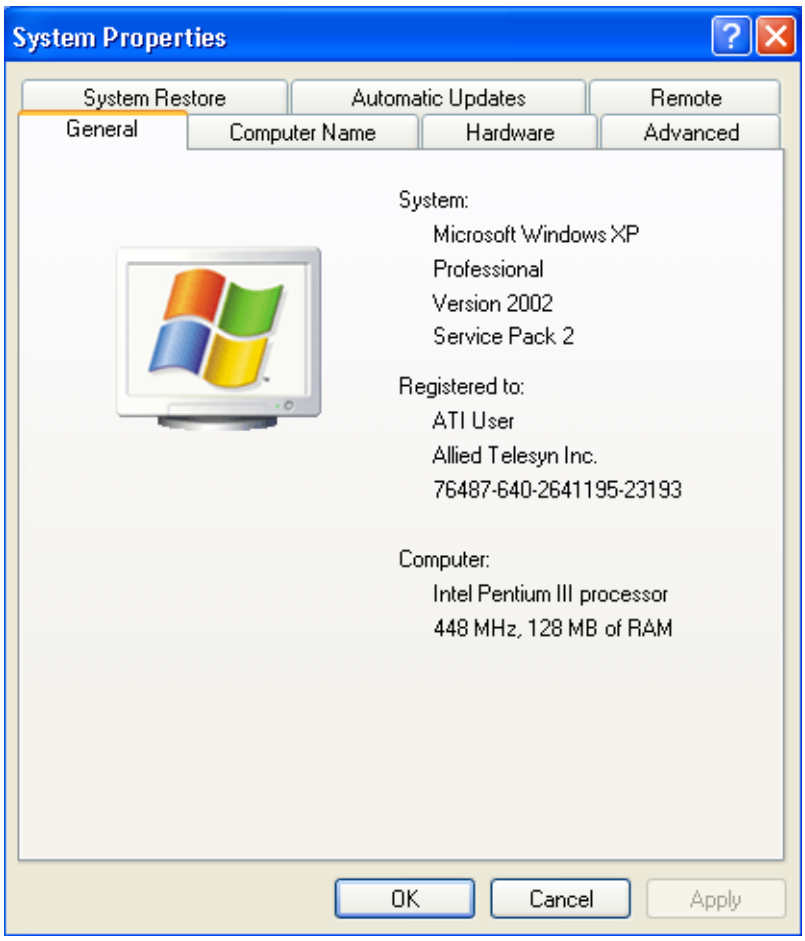


Figure 37. System Properties Window

2. Select the **Hardware** tab.

   The Hardware tab is shown in Figure 38.

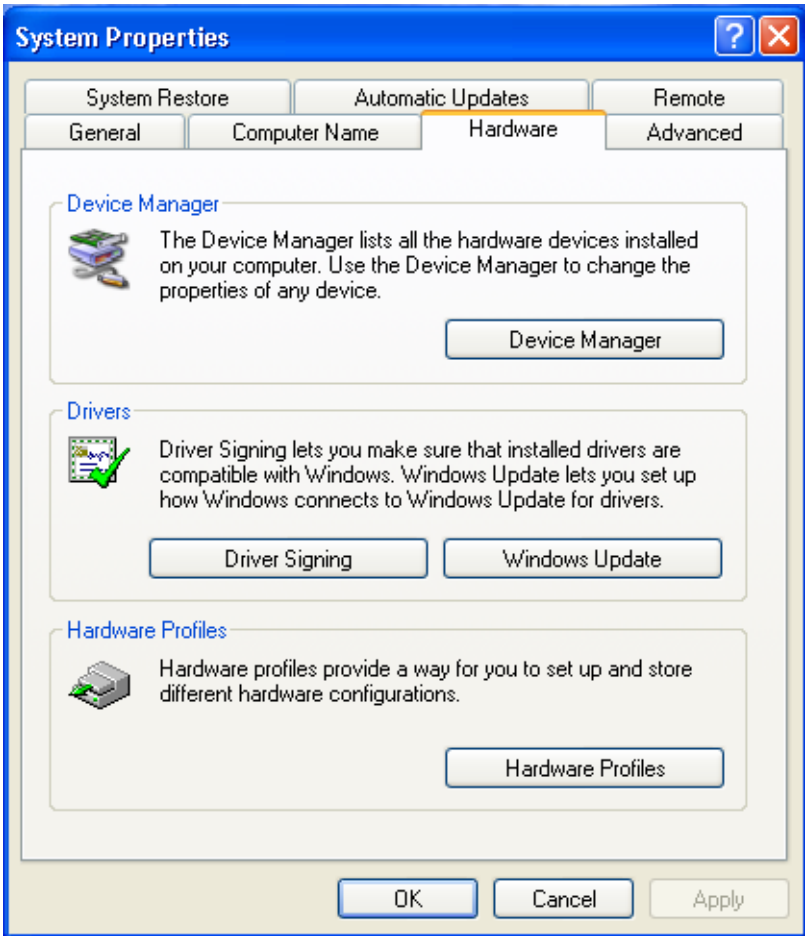


Figure 38. Device Manager Tab Window

3. Click the **Device Manager** button.

   The Device Manager window is shown in Figure 39.

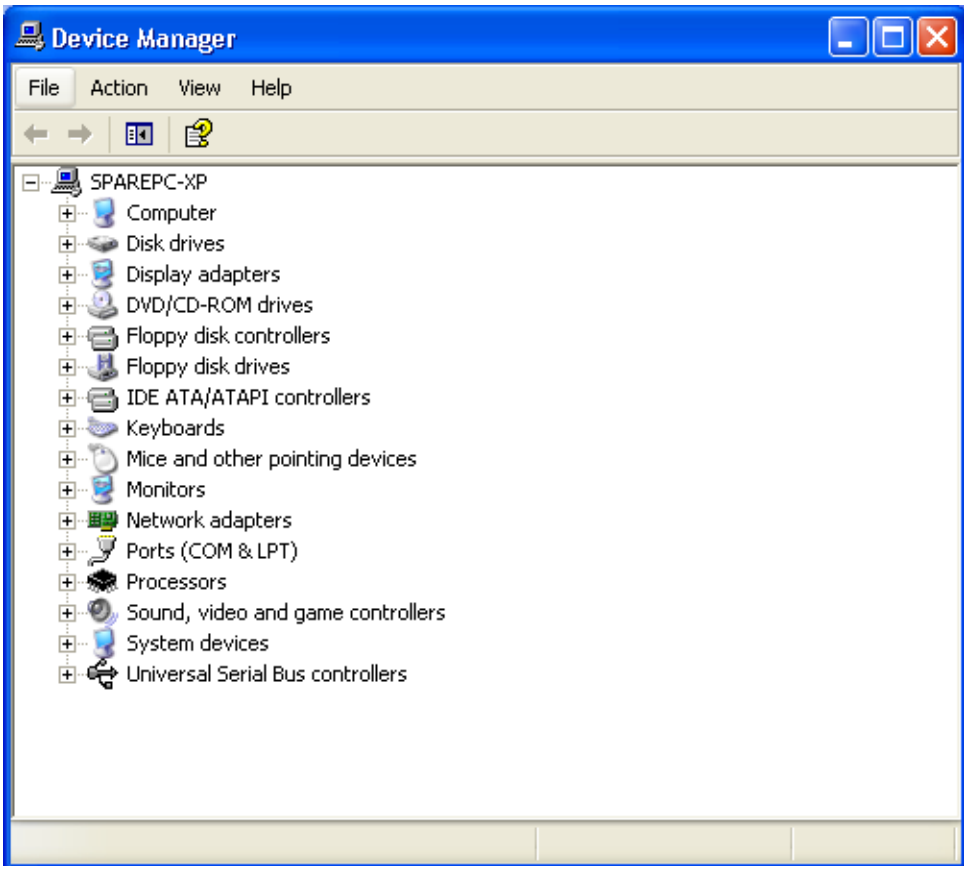
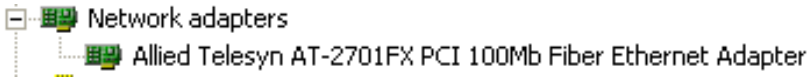


Figure 39. Device Manager Window

4. Expand **Network adapters** by either double-clicking on it or by clicking once on the expansion box next to it.

   The network adapter cards installed on the system are listed under Network adapters. An example is shown here.



Note
The branch under Network Adapters will include VLANs if VIDs were added to the adapter with the AT-MUX protocol. The VLANs are labelled as “Allied Telesyn VLAN-Tagging miniport Driver.” In the next step you must choose the selection for the network adapter card and not a VLAN. The adapter card selection has the adapter’s model number in the label.

5. Right-click on the network adapter card whose driver you want to update and select **Update Driver** from the pop-up menu, as shown in.Figure 40.

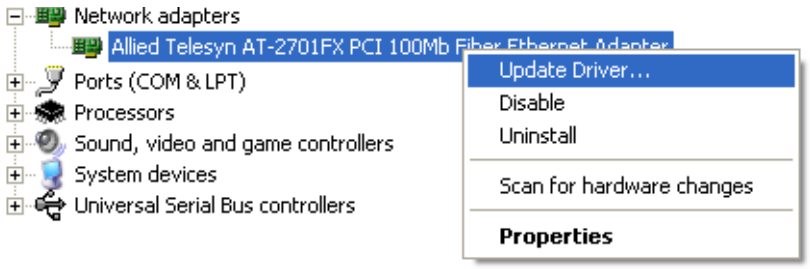


Figure 40. Update Driver Menu Selection

The first of the Hardware Update Wizard windows is shown in Figure 41.

Figure 41. Welcome to the Hardware Update Wizard Window (1 of 4)

6. Select **No, not this time**.

7. Click **Next**.

   The window shown in Figure 42 is displayed.

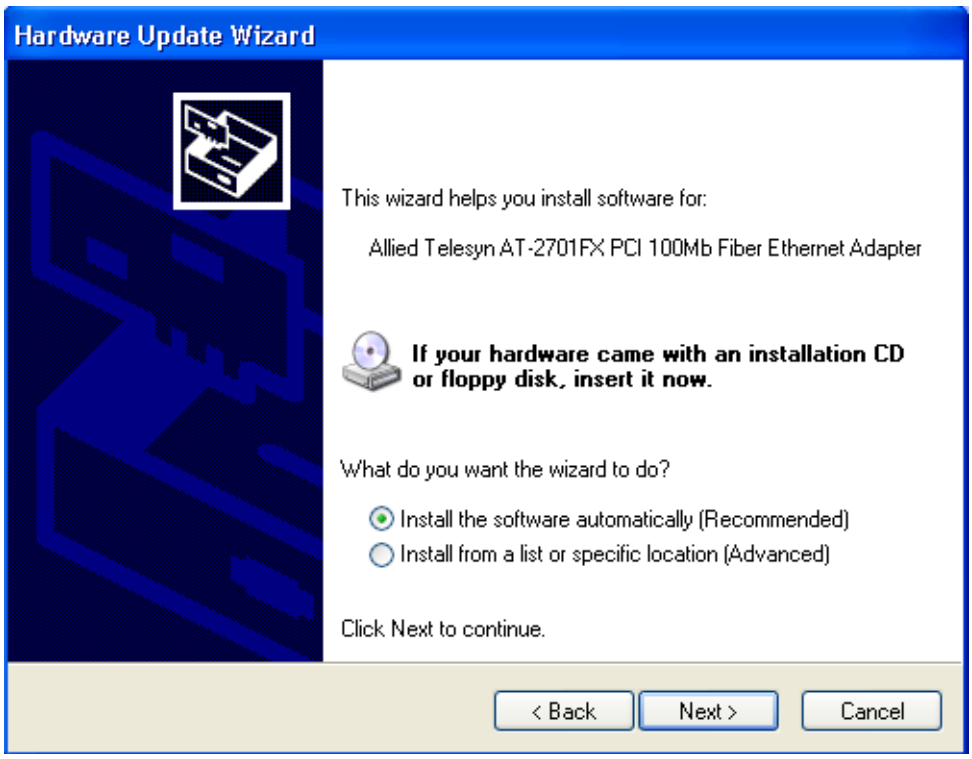


Figure 42. Hardware Update Wizard Window (2 of 4)

8. Insert the Installation CD or the driver installation diskette into the appropriate drive on the system.

   Note
   If, when you insert the CD, the system launches the web browser, minimize or close the web browser window.

9. Select **Install from a list of specific location (Advanced)**.

10. Click **Next**.

The Hardware Update Wizard window shown in Figure 43 is displayed.

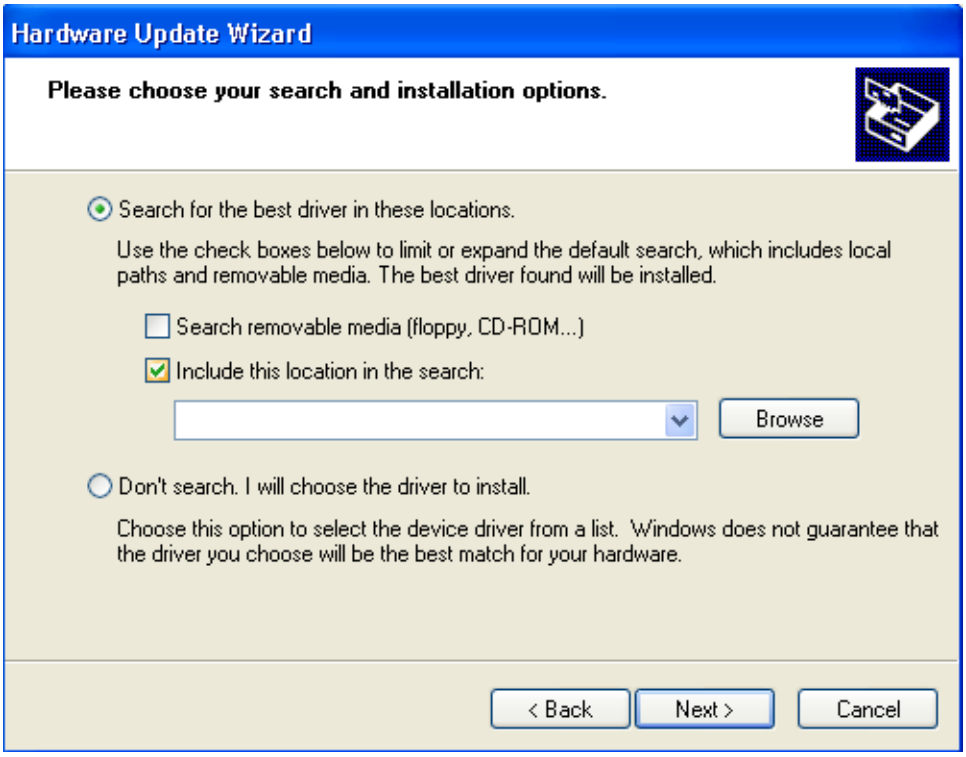


Figure 43. Hardware Update Wizard Window (3 of 4)

11. If selected, deselect **Search removable media (floppy, CD-ROM...)**.
12. Select **Include this location in the search**.
    - ❒ If you are updating the regular driver, the driver files are stored in this subdirectory on the Installation CD and the driver installation diskette:

      `x:\drivers\Win_XP_200x`
    - ❒ If you are updating the LBFO adapter driver, the files are stored in this subdirectory on the Installation CD and the driver installation diskette:

      `x:\drivers\Win_XP_200X_lbfo`

    Where *X*: is the driver letter of the CD drive or diskette drive.
13. Click **Next**.

Microsoft Windows updates the driver and displays the window in Figure 44

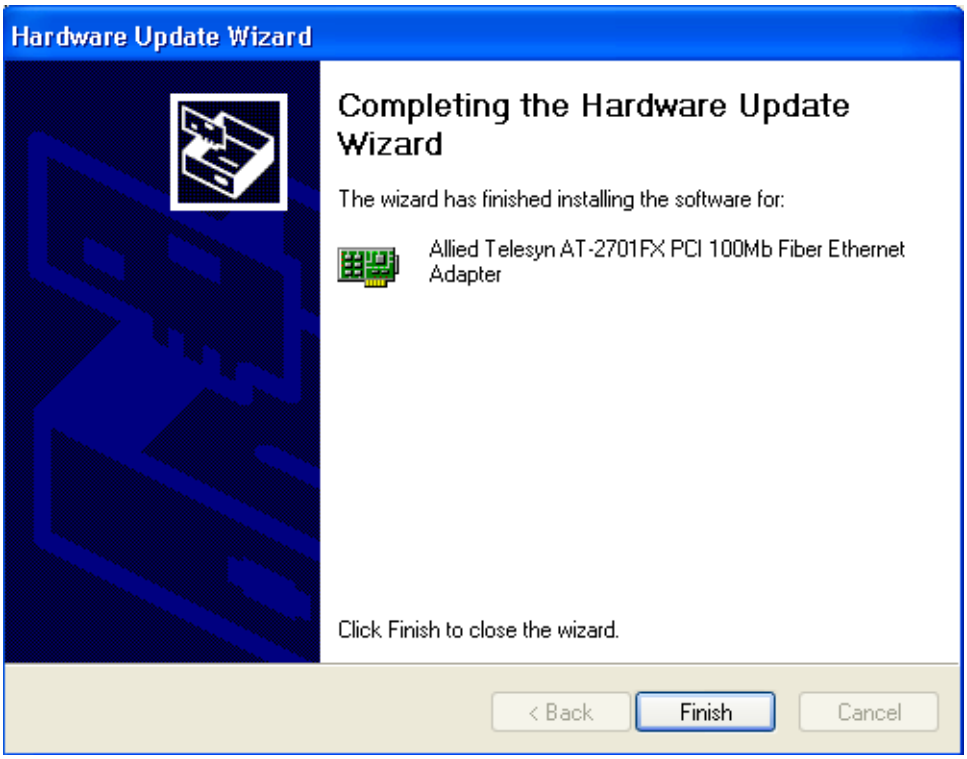


Figure 44. Hardware Update Wizard Window (4 of 4)

If the new driver is the same or older than the driver that is already installed, the system cancels the update and displays a window stating that it could not find a better match.

14. Click **Finish**.

    This completes the procedure for updating an adapter card driver on a Microsoft Windows 2000, 2003, or XP system.

Removing a Driver

To remove a network adapter driver from a Windows 2000, 2003 or XP operating system, perform the following procedure.

1. From the desktop, right-click **My Computer**, then select **Properties** from the pop-up menu.

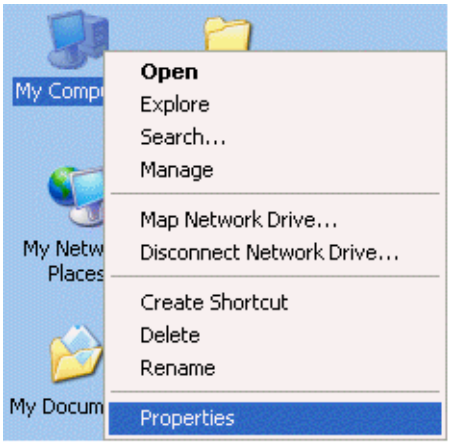


Figure 45. My Computer Icon and Menu

The System Properties window is shown in Figure 46.

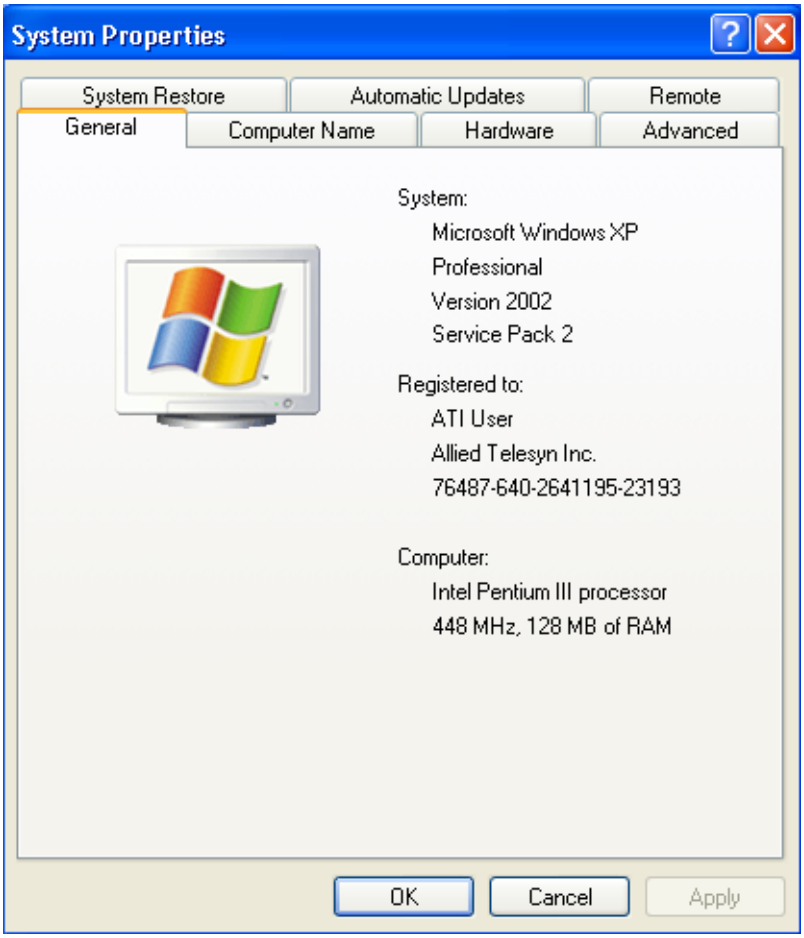


Figure 46. Properties Window

2. Select the **Hardware** tab.

   The Hardware tab is shown in Figure 47.

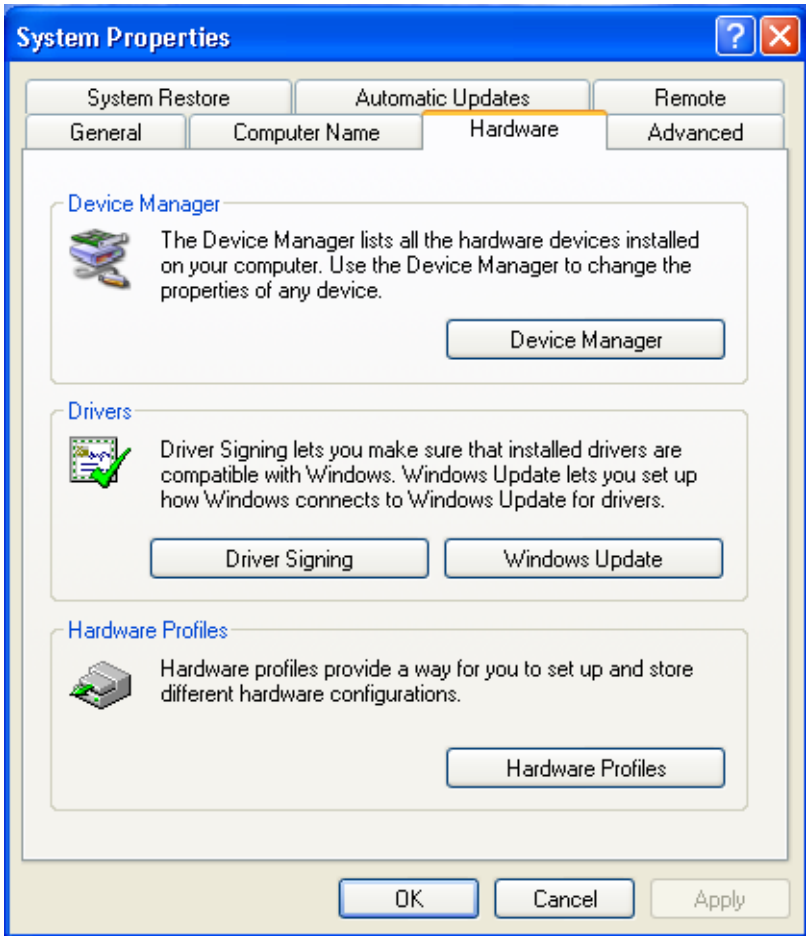


Figure 47. Hardware Tab

3. Select **Device Manager**.

   The Device Manager window is shown in Figure 48.

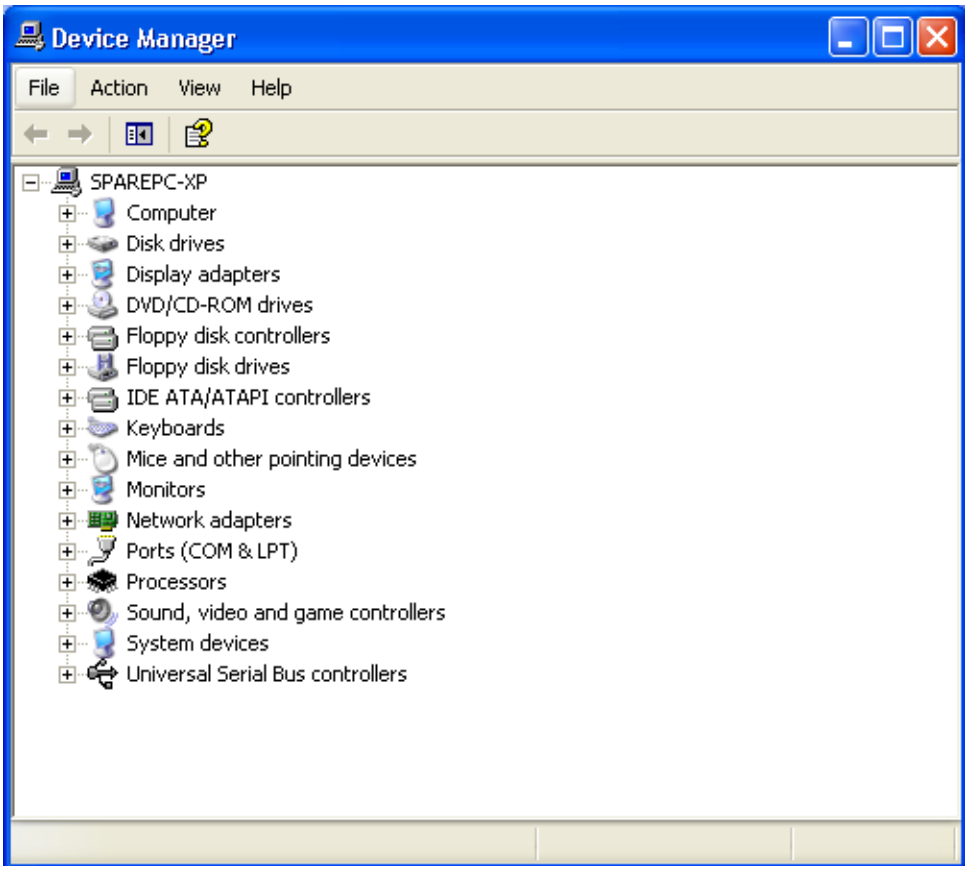
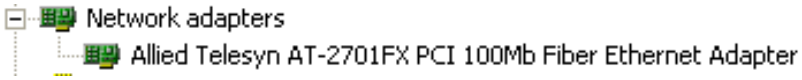


Figure 48. Device Manager Window

4. Expand **Network adapters** by either double-clicking on it or by clicking once on the expansion box next to it. The adapter drivers installed on the switch are listed under Network adapters. An example is shown here.



Note
The branch under Network Adapters will include VLANs if VIDs were added to the adapter with the AT-MUX protocol. The VLANs are labelled “Allied Telesyn VLAN-Tagging miniport Driver.” In the next step you must choose the selection for the network adapter card and not one of the VLANs. The adapter card selection has the adapter’s model number in the label. For instructions on how to remove a VID from the card, refer to “Adding, Changing, or Deleting VIDs” on page 168.

5. Right-click on the adapter driver you want to remove and select either **Remove** or **Uninstall** from the pop-up menu, as shown in Figure 49.

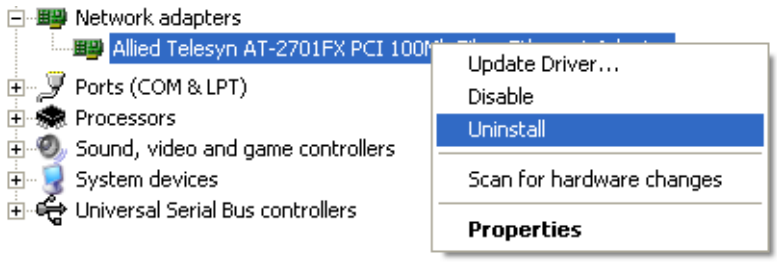


Figure 49. Uninstall Menu Selection

A confirmation window is displayed.

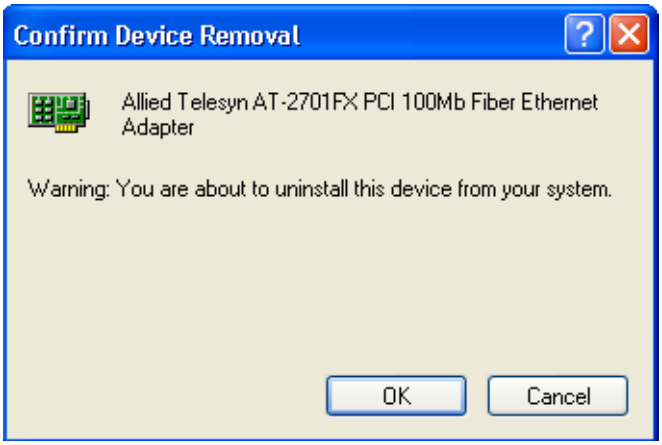


Figure 50. Confirm Device Removal Window

6. Select **OK**.

   If you intend to remove the adapter card from the system, go to the next step. If you removed the adapter driver with the intent of replacing it with another driver (for example, if you are replacing the regular adapter driver with the LBFO driver), some additional steps might be required, depending on the operating system. For instance, on a Microsoft Windows XP system you might need to delete OEM.INF and OEM.PNF files from the \WINDOWS\INF system folder before you can load the new driver. For further information, refer to the documentation included with the system.

7. Shutdown the Microsoft Windows operating system and power OFF the system.

8. Remove the network adapter card from the system. For instructions, refer to the documentation that came with your computer.

9. Power ON your computer.

   This completes the procedure for removing a driver and network adapter card from a system.

Running AT-Setup to Complete Driver Installation

If you were unable to complete the installation of the regular adapter card driver or if an error occurred during the installation, run AT-Setup again. AT-Setup will scan your operating system and correct any known problems. Refer to “Installing or Updating a Driver Using the AT-Setup Utility” on page 59 for instructions.

Configuring the Network Adapter Card Settings

A network adapter card has a number of parameters that you can adjust. In some cases, the default configuration of the network adapter card will be sufficient for it to operate without any adjustments. In other cases, you might need to adjust one or more parameters.

Here are three of the parameters that you can set on an adapter.

- IP address - Specifies a unique Internet Protocol address for the adapter.
- Subnet mask - Delineates the network portion of the IP address from the node portion.
- Gateway address - Specifies the IP address of a router or Layer 3 switch to be used by the node for traffic destined outside its virtual LAN or network.

You can set these parameters manually or you can activate the DHCP client software on the network adapter card and have the card retrieve this information automatically from a DHCP or BOOTP server on your network whenever the system is reset or power cycled. (Of course, the latter does require that there be a DHCP or BOOTP server somewhere on your network.) For instructions on how to set these parameters, refer to “Configuring the IP Address, Subnet Mask, and Gateway Address” on page 92.

Listed here are additional adapter card parameters you might need to adjust, depending on the operating characteristics of the device to which the port on the network adapter card is connected and the network environment:

- Port speed and duplex mode - The default speed and duplex mode setting for a twisted pair port on an Allied Telesyn adapter card is Auto-Negotiation. The default duplex mode setting for a fiber optic port is full-duplex.
- Magic packet - Enables and disables the Wake on LAN feature on the adapter card. The default setting for this feature is disabled.
- QoS tagging - Enables and disables the card’s ability to pass a Class of Service level to packets. The default setting for this feature is disabled.
- VLAN ID - Specifies a VLAN identifier if the adapter card is to handle tagged packets.
- Network Address (LAA) - Specifies an alternate MAC address for the adapter card.
- Load balancing and fail over teams - Selects a load balancing mode and assigns the adapter card to a team. These parameters are

available only with the LBFO adapter driver. For background information, refer to “Load Balancing and Fail-over Protection” on page 39.

For instructions on how to set these parameters, refer to “Configuring Additional Network Adapter Card Settings” on page 96.

Configuring the IP Address, Subnet Mask, and Gateway Address

To configure the IP address, subnet mask, and gateway address or to activate the DHCP client software, perform the following procedure:

1. From the desktop, right-click the **My Network Places** icon and select **Properties** from the menu, as shown in Figure 51.

Figure 51. My Network Places Icon Menu

An example of the Network Connections window is shown in Figure 52.

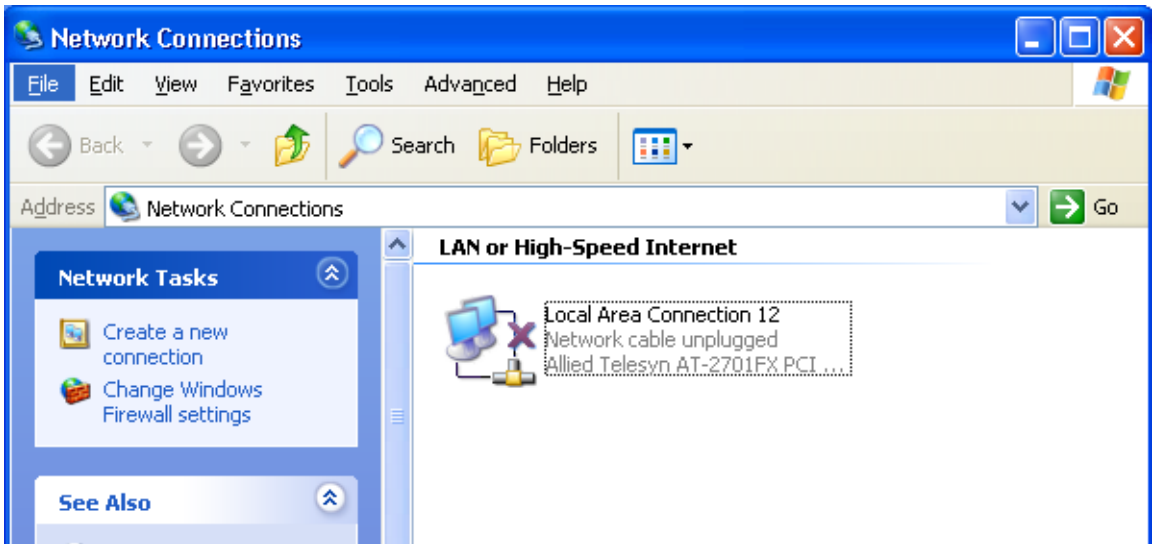


Figure 52. Network Connections Window

Note
The Network Connections window will contain more than one LAN connection if the system contains more than one adapter or if VIDs were added to an adapter using the AT-MUX protocol.

2. Do one of the following:

   - If you are *not* using the AT-MUX protocol, right-click the **Local Area Connections** of the LAN connection icon for the network adapter card and then select **Properties**, as shown in Figure 53. The LAN connection icon for the network adapter card has the adapter card model number in the icon's label. (To view an icon's label, select the Tile menu selection under the View menu in the Network Connections window. Alternately, you can open the Properties window of a LAN connection.)

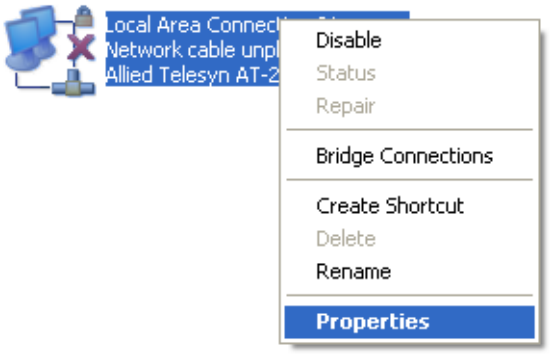


Figure 53. Local Area Connections Pop-up Menu

   - If you are using the AT-MUX protocol, right-click the **Local Area Connections** of the LAN connection icon for the VLAN you want to configure and then select **Properties**. The IP information on a system using the AT-MUX protocol must be set on each VLAN individually, and not on the adapter. For further information on the protocol, refer to Chapter 9, "AT-MUX Multiple VLAN Protocol" on page 157.

An example of the Local Area Connection Properties window is shown in Figure 54.

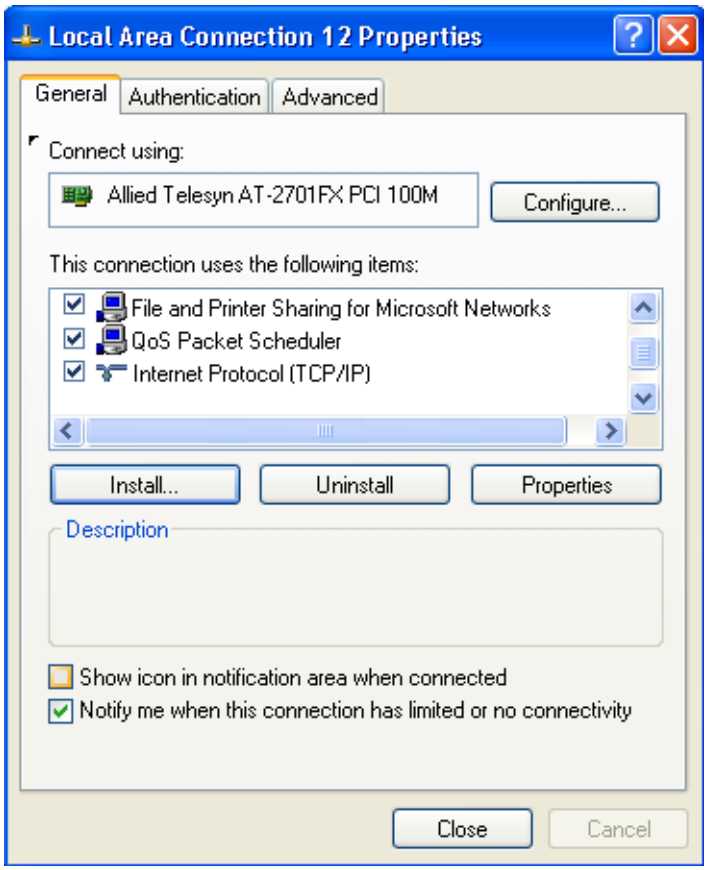


Figure 54. Local Area Connection Properties Window

3. Select **Internet Protocol (TCP/IP)**, then click **Properties**.

Note
If the Properties button is greyed out and cannot be selected, it probably means the system has the AT-MUX protocol and in Step 2 above you selected the icon for the adapter card instead of for a VLAN. It is important to remember when setting the IP address, subnet mask, and default gateway address on a system that has the protocol that you must set this information on the individual VLANs and not on the adapter card. To recover, simply close the Properties window and repeat Step 2, this time selecting a VLAN icon.

The Internet Protocol (TCP/IP) Properties window is shown in Figure 55.

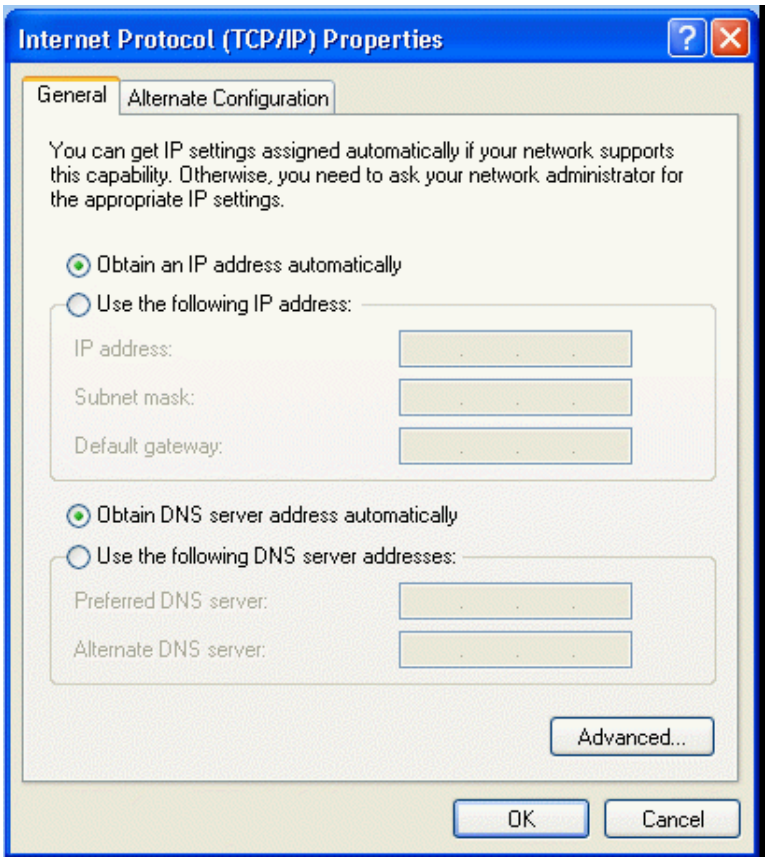


Figure 55. Internet Protocol (TCP/IP) Properties Window

4. If you want the adapter to obtain its IP address, subnet mask, and default gateway from a DHCP or BOOTP server, select **Obtain an IP address automatically**. If you want to set these parameters manually, select **Use the following IP address** and enter the information into the fields.

5. If your network has a domain name service, which converts domain names into IP addresses, and you want the computer to obtain the IP address of the domain name server from a DHCP or BOOTP server, select **Obtain DNS server address automatically**. To enter the IP address of a domain name server manually, select **Use the following DNS server addresses** and enter the IP address in the field. You can enter up to two IP addresses of domain name servers. The alternate DNS server address is used only if the server specified as the preferred DNS server does not respond.

Note
The Internet Protocol (TCP/IP) Properties window has other parameters that you can set. Do not set any other parameters unless you have an complete understanding of their function.

6. Click **OK** to close the Internet Protocol (TCP/IP) Properties window.
7. Click **OK** to close the Local Area Connection Properties window.

   This completes the procedure for configuring the IP address and subnet mask of a network adapter card.

Configuring Additional Network Adapter Card Settings

This procedure explains how to change these parameters on a network adapter card:

- Port speed and duplex mode
- Magic packet
- QoS tagging
- VLAN ID
- Locally administered MAC address
- Load balancing mode and fail-over protection

Note
For a dual port adapter Allied Telesyn recommends connecting the appropriate port on the adapter to the network before performing this procedure. Additionally, check to be sure that the remote device to which the port on the adapter is connected is powered ON.

Caution
If you are planning to use the load balancing or fail-over protection feature of the LBFO driver, do not connect both adapters to the network at the same time until *after* you have configured the feature.

To configure these parameters, perform the following procedure:

1. From the desktop, right-click **My Computer**, then select **Properties**.

The System Properties window is shown in Figure 56.

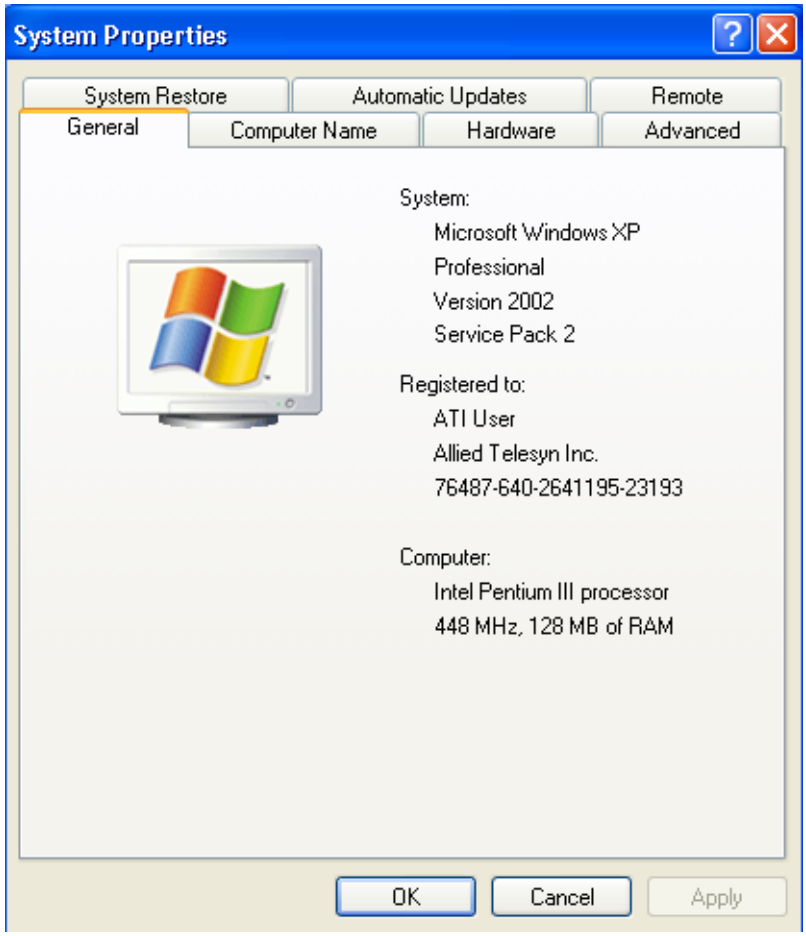


Figure 56. Properties Window

2. Select the **Hardware** tab.

   The Hardware tab is shown in Figure 57.

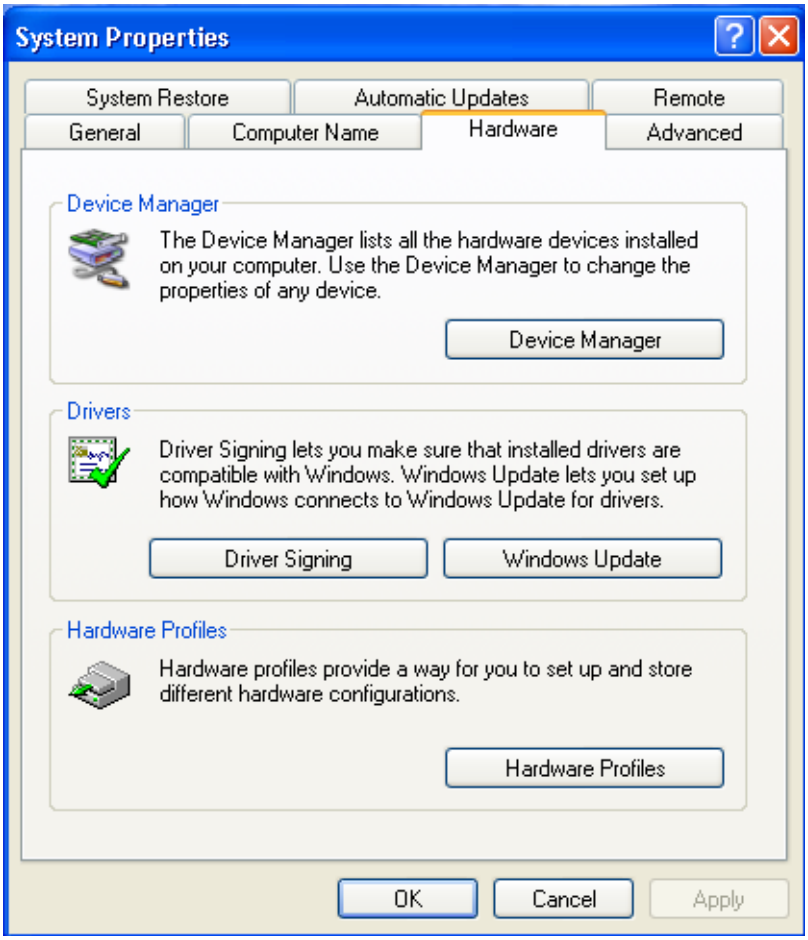


Figure 57. Hardware Tab Window

3. Select **Device Manager**.

   The Device Manager window is shown in Figure 58.

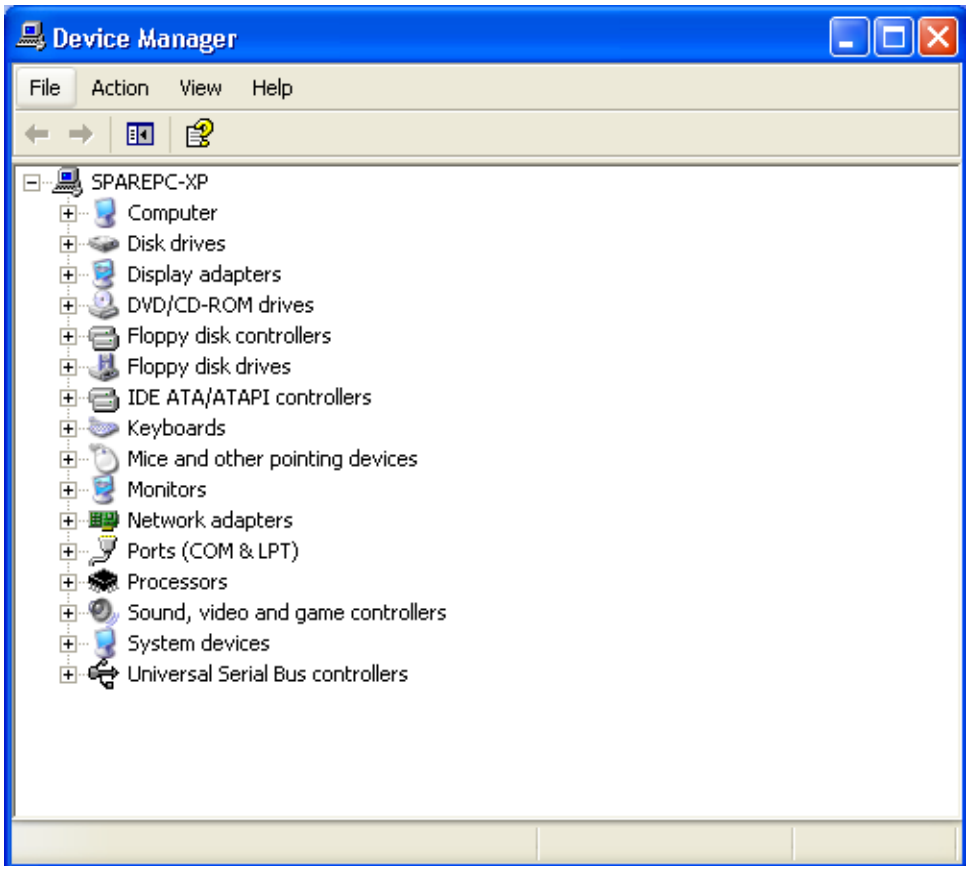
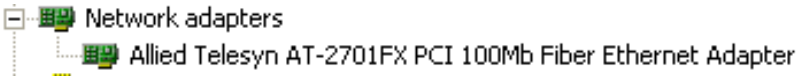


Figure 58. Device Manager Window

4. Expand **Network adapters** by either double-clicking on it or by clicking once on the expansion box next to it.

   The selection expands to display the network adapter cards installed in the system. An example is shown here.



Note
The branch under Network Adapters will include VLANs if VIDs were added to the adapter with the AT-MUX protocol. The VLANs are labelled “Allied Telesyn VLAN-Tagging miniport Driver.” In the next step you must select the network adapter card and not a VLAN. The adapter card selection has the adapter’s model number in the label.

5. Right-click on the adapter driver you want to configure and select **Properties** from the pop-up menu, as shown in Figure 59.

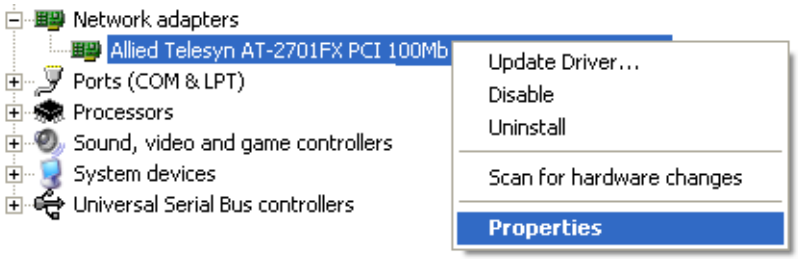


Figure 59. Properties Menu Selection

The Properties window is shown in Figure 60.

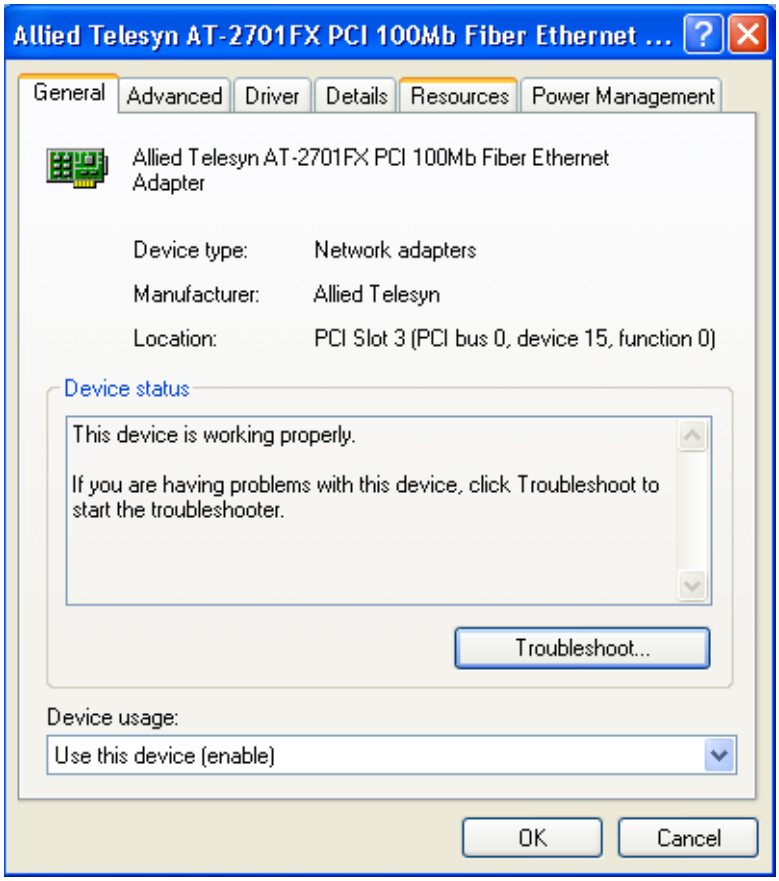


Figure 60. General Tab of the Network Adapter Card Properties Window

6. From the Properties window, select the **Advanced** tab.

   Figure 61 illustrates the Advanced tab.

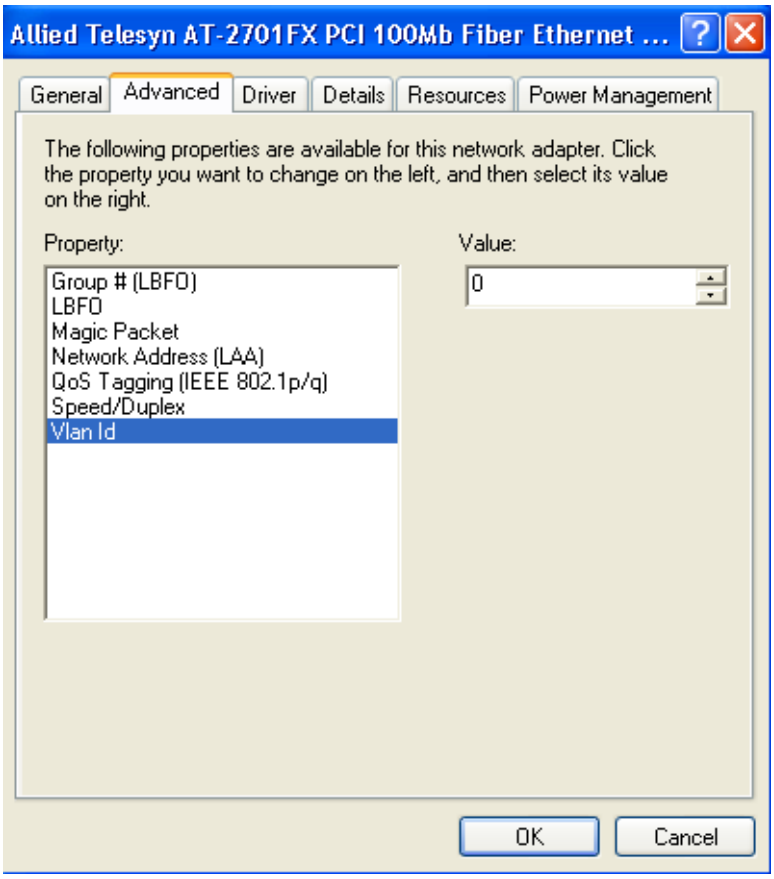


Figure 61. Advanced Tab of the Network Adapter Card Properties Window

7. Adjust the parameters as needed. The parameters are defined in Table 11.

Table 11. Advanced Tab Parameters in the Network Adapter Card Properties Window

Property	**Definition**
Group #	Assigns the adapter to a group (also referred to as a team) for load balancing or fail-over (LBFO) protection. A group can have up to two adapters. This selection appears in the window only with the LBFO adapter card driver. For background information, refer to “Load Balancing and Fail-over Protection” on page 39 and “Choosing a Network Adapter Card Driver” on page 58.

Table 11. Advanced Tab Parameters in the Network Adapter Card Properties Window (Continued)

Property	Definition
LBFO	Enables or disables load balancing or fail-over protection. This selection appears only with the LBFO adapter card driver. Available settings are: Disabled - Disables load balancing and fail-over protection on the adapter. This is the default setting. Enabled - Mode 1 - Activates the mode 1 load balancing feature, where both adapters in the team share the same MAC address. Enabled - Mode 2 - Activates the mode 2 load balancing feature, where both adapters in the team use different MAC addresses. Failover Only - Activates fail-over protection, where one adapter in the team functions as the primary adapter and the other acts as a redundant link should the primary link fail. You can select only one setting. For background information on these features, refer to “Load Balancing and Fail-over Protection” on page 39 and “Choosing a Network Adapter Card Driver” on page 58.

Table 11. Advanced Tab Parameters in the Network Adapter Card Properties Window (Continued)

Property	Definition
Magic Packet	Enables and disables the Wake on LAN feature on the adapter. This feature powers ON a system that has been powered OFF or is in a sleep mode, whenever the network adapter card receives a magic packet from a management application program. Possible settings are: On: Enables the feature. Off: Disables the feature. This is the default setting. For background information, refer to “Wake on LAN” on page 35
Network Address (LAA)	Specifies a locally administered address (LAA) for the network adapter card. You can use this parameter to assign the card a new MAC address that overrides the address assigned to it by Allied Telesyn. This parameter is seldom used and should be used with caution.

Table 11. Advanced Tab Parameters in the Network Adapter Card Properties Window (Continued)

Property	Definition
QoS Tagging (IEEE 802.1p/q)	Activates or deactivates Class of Service (CoS) on the adapter. CoS, as defined in the IEEE 802.1p standard, has eight levels of priority. The priorities are 0 to 7, with 0 the lowest priority and 7 the highest. Activating this feature allows the adapter to pass a CoS level to the packets as they are transmitted. (This feature has no affect on received traffic.) The CoS level inserted into transmitted packets is controlled by the application program running on the system. Possible settings are: On - Activates CoS on the adapter. Off - Disables the feature. This is the default setting. **Note** Allied Telesyn is not aware of any applications developed for the Microsoft Windows operating system that use CoS. Consequently, it is unlikely you would ever need to activate this feature.

Table 11. Advanced Tab Parameters in the Network Adapter Card Properties Window (Continued)

Property	Definition
Speed/Duplex	Sets the speed and duplex mode of the port on the adapter. The selections you see here will vary depending on the port type. **Note** If you are configuring a dual port adapter, Allied Telesyn recommends connecting the appropriate port on the adapter to the network before setting this parameter. You should also check to be sure that the remote device (e.g., Ethernet switch or hub) is powered ON.
VLAN ID	Specifies a VLAN identifier (VID). You can use this parameter to specify a single VID if you want the adapter to handle tagged packets. By specifying a VID, you are instructing the adapter to accept and process only tagged packets from the VLAN whose VID matches the number you enter here. For example, if you were to set this parameter to 22, the adapter would only accept tagged packets with that VID in the header tag. All untagged packets and other tagged packets containing a different VID would be discarded. The range is 0 to 4095. This parameter should be set to the default value of 0, which disables the feature, if the adapter will not be handling tagged packets or if you intend to use the AT-MUX protocol to add more than one VID. For further information, refer to “Virtual LANs and the AT-MUX Protocol” on page 37.

8. After configuring the settings, click **OK** to close the Properties window.

   This completes the procedure for configuring the parameter settings on a network adapter card.

Chapter 4

Microsoft Windows NT 4.0

This chapter contains the procedure for installing a network adapter driver on a Microsoft Windows NT 4.0 system. Procedures in the chapter include:

Note
You cannot use the AT-Setup program to install the driver on a Microsoft Windows NT 4.0 system.

Installing the Driver on a Microsoft Windows NT 4.0 System

The following procedure installs the network adapter driver on a Microsoft Windows NT 4.0 operating system. You can perform the procedure using the Allied Telesyn Installation CD or, for those systems without a CD drive, a driver installation diskette. For instructions on how to create a driver installation diskette, refer to “Creating a Driver Installation Disk” on page 68.

Note
Allied Telesyn recommends installing Service Pack 6a (SP6a) on a Windows NT 4.0 system before installing the network adapter driver.

To install the network adapter driver, perform the following procedure:

1. Shutdown Windows NT and power OFF the system.
2. Install the network adapter card. Refer to Chapter 2, “Installing a Network Adapter Card” on page 45 and the documentation that came with your system for instructions.
3. Power ON the system.
4. From the desktop, click **Start**.
5. Select **Settings,** then select **Control Panel**, as shown in Figure 62.

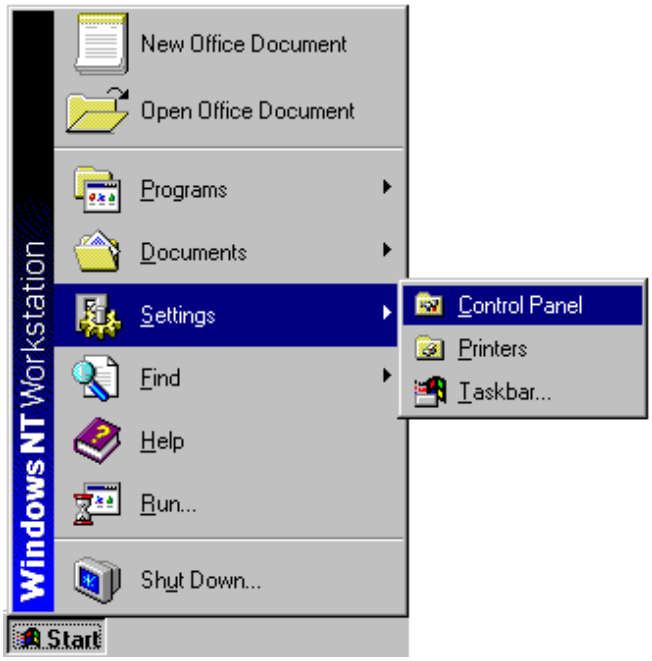


Figure 62. Start Menu

The Control Panel is shown in Figure 63.

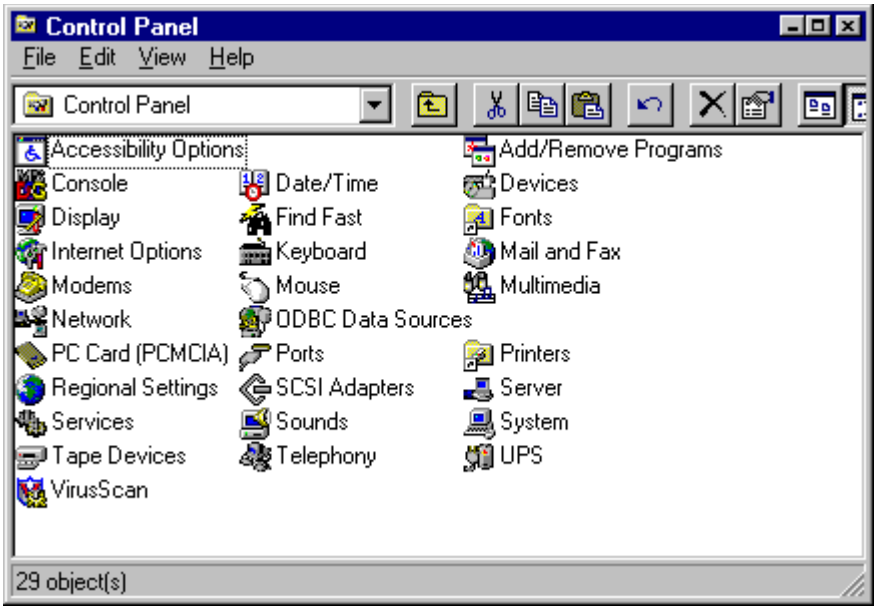


Figure 63. Control Panel Window

6. Double-click on the **Network** icon.

   The Network window is shown in Figure 64.

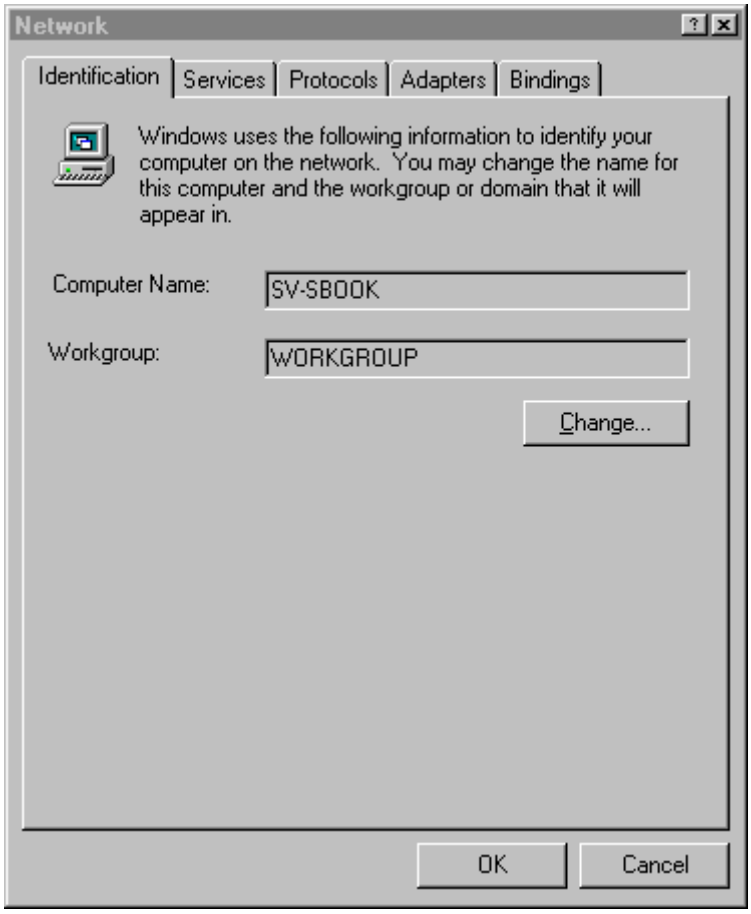


Figure 64. Network Window

7. Select the **Adapters** tab.

   The Adapters tab of the Network window is shown in Figure 65.

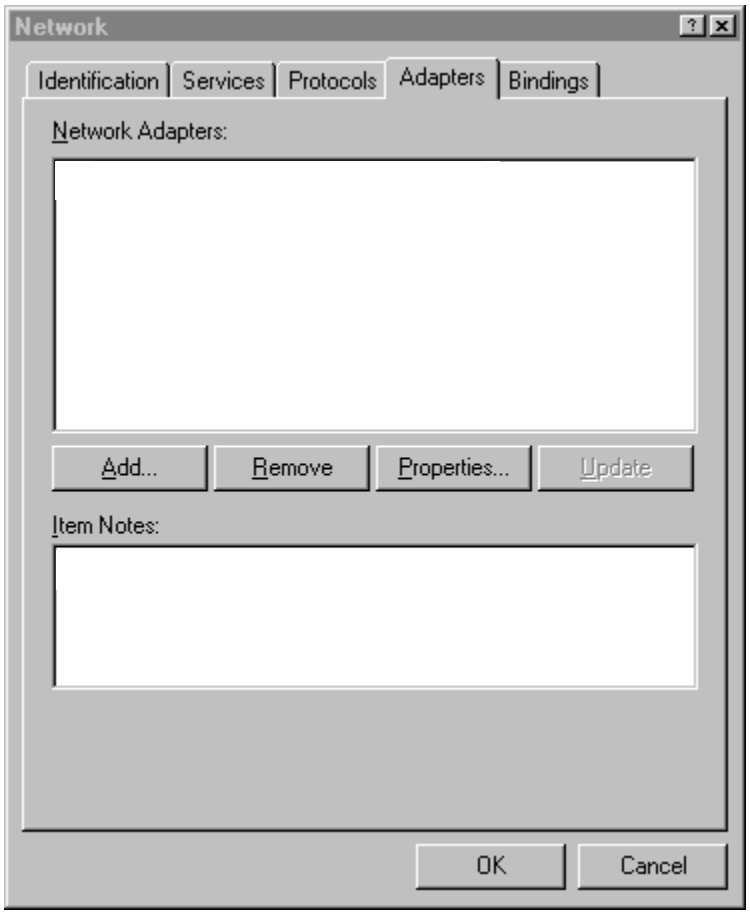


Figure 65. Adapters Tab

8. Select **Add**.

   The Select Network Adapter window is shown in Figure 66.

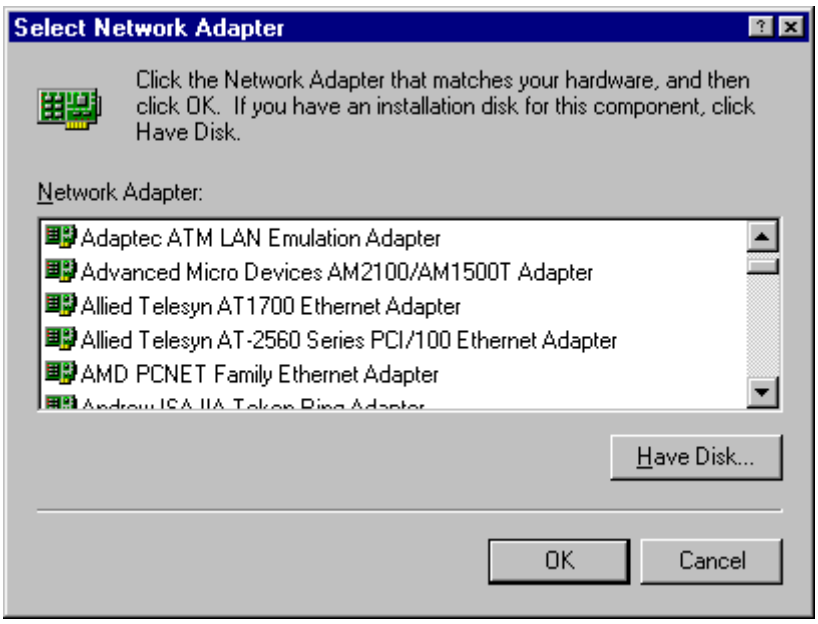


Figure 66. Select Network Adapter Window

9. Select **Have Disk**.

   The Insert Disk window is shown in Figure 67.

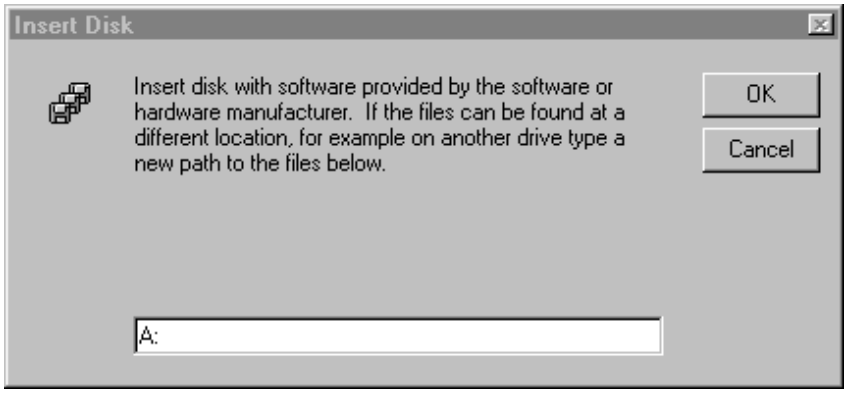


Figure 67. Insert Disk Window

10. Insert the Allied Telesyn Installation CD or the driver installation diskette into the appropriate drive.

Note
If you are using the Allied Telesyn Installation CD and your system launches the web browser, close or minimize the web browser window.

11. In the Insert Disk window, specify the drive and path to the driver.

    If you are using the Installation CD, enter.

    x:\drivers\winnt4

    Where "*x*" is the drive letter of the CD drive.

    if you are using a driver installation diskette, enter:

    x:\winnt4

    Where "*x*" is the drive letter of the diskette drive.

    The Select OEM Option window is shown in Figure 68.

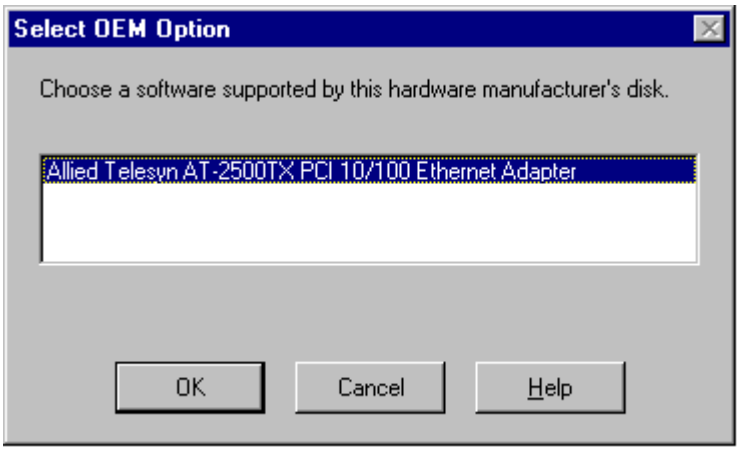


Figure 68. Select OEM Option Window

12. Select the appropriate Allied Telesyn network adapter card.

13. Select **OK**.

    The Adapters tab in the Network window is shown in Figure 69.

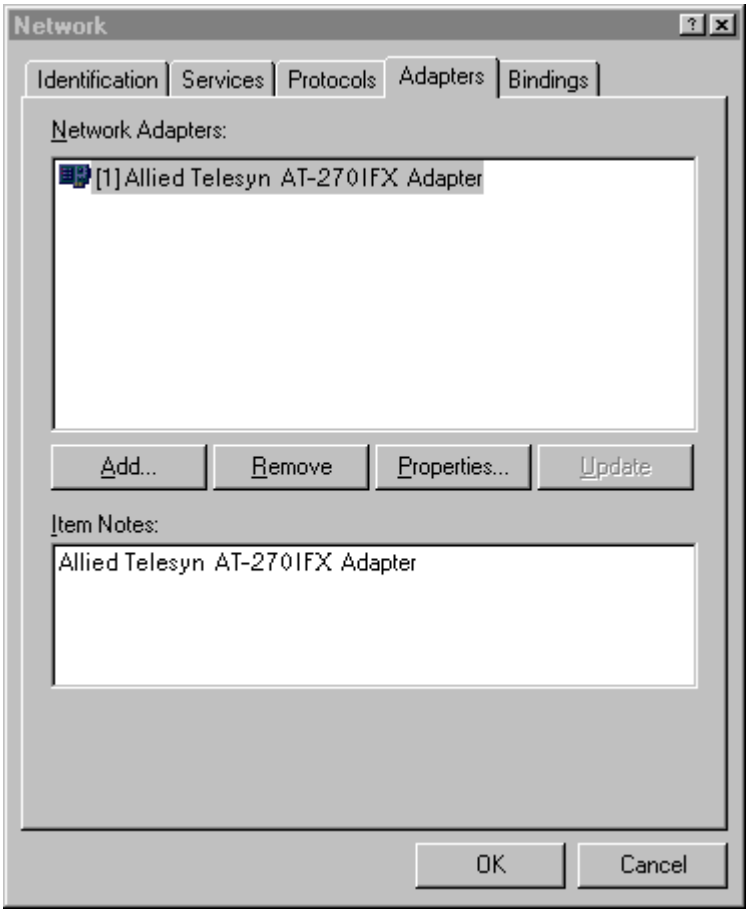


Figure 69. Adapters Tab

14. Verify that your new Allied Telesyn network adapter card appears in the list, then select **OK**.

> **Note**
> Windows NT 4.0 prompts you to configure the protocols that you will be using for network communications.

15. Restart your computer when prompted.

This completes the procedure for installing the adapter driver on a Microsoft Windows NT system.

Removing the Driver from a Windows NT 4.0 System

This section contains the procedure for removing the network adapter driver from the Windows NT 4.0 operating system.

1. From the desktop, right-click the **Network Neighborhood** icon, then select **Properties** from the pop-up menu, as shown in Figure 70.

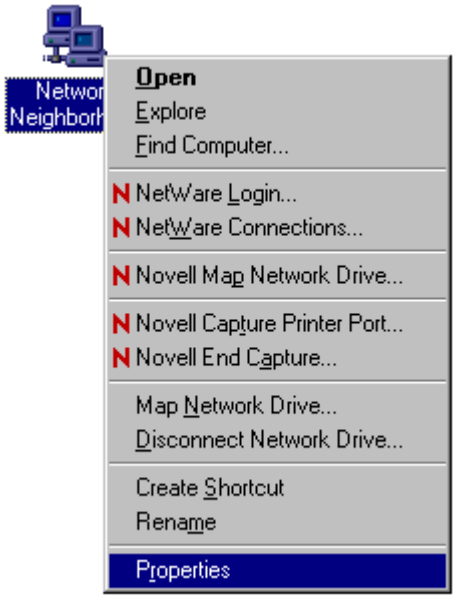


Figure 70. Network Neighborhood Icon and Menu

The Network window is shown in Figure 71.

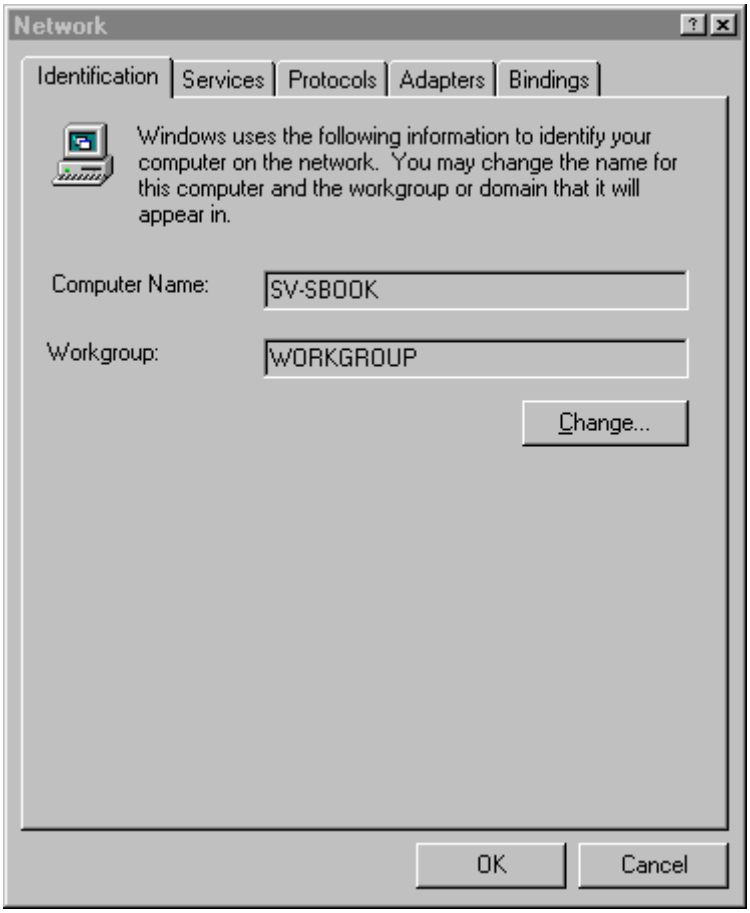


Figure 71. Network Window

2. Select the **Adapters** tab.

   The Adapters tab of the Network window is shown in Figure 72.

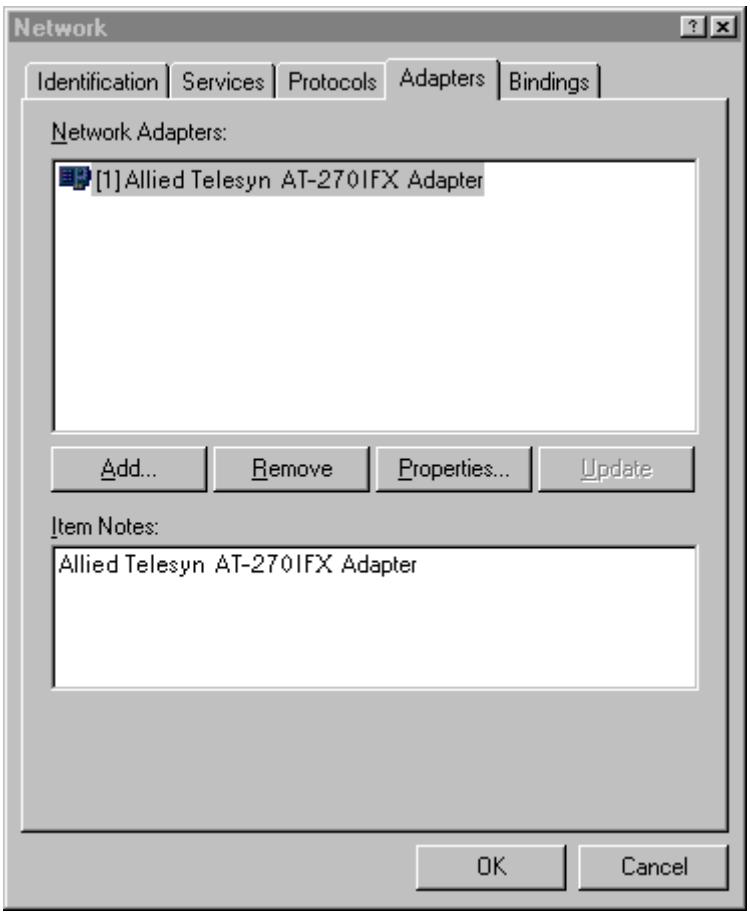


Figure 72. Adapters Tab Window

3. Select the Allied Telesyn network adapter card whose driver you want to remove.

4. Select **Remove**.

5. If prompted, select **Yes** to confirm that you want to remove the adapter driver. The Adapters tab is displayed again, without the icon for the network adapter card.

6. Select **OK**.

7. If prompted to restart the system, select **No**.

Note
If you select **Yes**, Windows NT 4.0 will attempt to reload the adapter driver.

8. Shutdown Windows NT 4.0 and power OFF your computer.
9. Remove the network adapter card from your computer. For instructions, refer to the documentation that came with your system.
10. Power ON your system.

    This completes the procedure for removing the network adapter card and driver from your computer.

Chapter 5

Novell Netware 6.5

This chapter contains the following procedure:

Installing the Network Adapter Driver on a Novell NetWare 6.5 System

This section contains the procedure for installing a network adapter driver on a system running Novell NetWare 6.5.

Files Needed for Installation

The .LDI file and the .LAN file for your adapter must be present to successfully complete installation.

You can perform the procedure using the Allied Telesyn Installation CD or, for those systems without a CD drive, a driver installation diskette. For instructions on how to create a driver installation diskette, refer to “Creating a Driver Installation Disk” on page 68. The network adapter driver is stored in the `\drivers\netware` subdirectory on the Allied Telesyn Installation CD and in the `\netware` subdirectory on a driver installation diskette.

New Server Installation

The NetWare utility NWCONFIG provides the user with the ability to add additional network adapter cards. At the system console, type `NWCONFIG`.

1. Select **Driver Options** and then **Configure Network Driver**.
2. Select **Additional Driver**.

   The NWCONFIG displays a list of the available drivers.
3. Press <**Insert**> to specify a driver not listed.
4. Insert the Allied Telesyn Installation CD or the driver installation disk into the appropriate drive.
5. Press <**F3**> to change the default path and specify the drive and path to the driver. The driver is stored in the `\drivers\netware` subdirectory on the Allied Telesyn Installation CD and in the `\netware` subdirectory on a driver installation diskette.
6. Press **Return**.

   The adapter driver and other required files are copied to the SYS: volume.
7. On the next menu, Protocols and Parameters, specify any necessary parameters. A slot value is required when loading the adapter driver. If the slot is unknown, the driver will correctly detect the slot value when loading.
8. Select **Save parameters and load driver**.
9. Proceed with the installation as outlined in the Novell documentation.

Manual Installation

1. At the file server console prompt, issue these load statements in the order given here:

```
LOAD <DRIVE>:<PATH>\NBI
LOAD <DRIVE>:<PATH>\MSM
LOAD <DRIVE>:<PATH>\ETHERTSM
LOAD <DRIVE>:<PATH>\<DRIVER>
```

Where <DRIVE> and <PATH> are the drive and directory where you copied the NLMs and the adapter driver file. <DRIVER> is the filename of the driver.

Note
If MSM and ETHERTSM NLMs are not loaded, they are automatically loaded before the driver. You will be prompted if you do not specify a SLOT number.

Type the following command to bind the LAN driver to IPX in order to attach it to the server.

```
BIND IPX TO <DRIVER> NET=n
```

Where <DRIVER> is the filename of the driver and *n* is the node address Novell uses for routing IPX packets. This number is arbitrary if there is only one server on the network. If there are multiple servers on the same network, this value must match the other servers' external network number.

Note
The default frame type for Novell file servers is now Ethernet_802.2. If you require Ethernet_802.3, specify `FRAME=ETHERNET_802.3` on the command line when loading the driver.

To load multiple frame types for a single card, enter a LOAD and BIND statement for each frame type. You need to supply a name on each load line in order to avoid being prompted for which board to bind to an IPX. If you do not have the name option in the AUTOEXEC.NCF file, it will not execute completely without user intervention.

Example:

```
LOAD <DRIVER> FRAME=ETHERNET_802.3 NAME=IEE8023
BIND IPX TO IEE8023 NET=11111
LOAD <DRIVER> FRAME=ETHERNET_802.2 NAME=IEE8022
BIND IPX TO LAN8022 NET=22222
```

<DRIVER> is the filename of the adapter driver.

If you have a PCI-1 bus in your system, add `BUSTYPE=PCI1` to the command line (for example, `LOAD C:\SERVER\CATNIC BUSTYPE=PCI1`). Otherwise the driver may not find the card. If you do not know which bus you have, try loading without the driver without the option. If it loads, you can omit the option.

Add the necessary load and bind statements to the server's AUTOEXEC.NCF file so that the LAN driver loads automatically each time the server starts up. Here is an example of how the commands would look in your AUTOEXEC.NCF file.

```
("NCF Files Options - Create / Edit Server Startup
Files")
LOAD CATNIC FRAME=Ethernet_802.3 (overrides default
frame type)
BIND IPX to CATNIC net=1 (all servers on the LAN
segment need the same #)
```

2. Proceed with the installation as outlined in the Novell Netware documentation.

Multiple Adapters

If you have multiple Allied Telesyn adapters installed in the system, use the keyword SLOT to identify a card to a driver. If you have multiple adapters in a single server, each adapter must have a different network number and SLOT number. Also, you might want to name each adapter. To distinguish particular cards, add the options in LOAD commands. For example:

```
LOAD CATNIC FRAME=Ethernet_802.2 NAME=LAN_A SLOT=1
BIND IPX TO LAN_A NET=11
LOAD CATNIC FRAME=Ethernet_802.2 NAME=LAN_B SLOT=2
BIND IPX TO LAN_B NET=22
```

Add the load and bind statements you need to the server's AUTOEXEC.NCF file so that the adapter drivers load automatically each time the server starts.

In an IPX internal router configuration (a server with two adapters, each connected to a different network), the data transfer rate across the router can be low. This happens if client workstations have CPU speeds equal to or higher than the server. You might be able to increase the data transfer rate by adding the following line to STARTUP.NCF:

```
SET MAXIMUM INTERRUPT EVENTS = 100000
```

The default setting is 10.

If you have problems loading the driver on multiple adapters and the initialization fails due to "Insufficient RCBs," increase the number of buffers allocated to the server by adding the following lines to the STARTUP.NCF file:

```
SET MINIMUM PACKET RECEIVE BUFFERS = 100 (or larger)
SET MAXIMUM PACKET RECEIVE BUFFERS = 500 (or larger)
```

The minimum value must be at least 30 times the number of PCI adapters in the computer. Recommended settings are:

1-3 adapters: 100

4 adapters: 150

The maximum permitted value depends on the amount of memory in the server. It must be greater than the minimum value.

Removing an Adapter Driver from Novell Netware 6.5 Server

This section contains the procedure for removing a network adapter driver from a system running Novell Netware 6.5 Server.

To remove a driver, you can either use the NWCONFIG program supplied with NetWare or edit the AUTOEXEC.NCF file in the SYS:SYSTEM directory with a text editor. The procedure below explains how to remove a driver using the NWCONFIG program.

1. Type **NWCONFIG** at the server console to bring up the installation module.
2. Select **Driver Options** and press Return.
3. Select **Deselect a selected driver** from the next menu and press Return. This moves the highlight to the installed adapter(s).
4. Select the adapter you want to remove.
5. Press Return again to remove the selected driver.

Chapter 6

Linux 2.4 and 2.6

This chapter contains the following procedure:

Installing the ATNIC Driver on Linux 2.4

This driver supports dynamic loading and unloading via the KLM support provided by Linux. As a result, you must custom build the driver for the particular version of the kernel installed. The driver is located on the Allied Telesyn Installation CD in the `\drivers\linux` subdirectory and in the `\linux` subdirectory of a driver installation diskette.

Limitations

The current version of the driver has been tested as a loadable module on Red Hat 7.0, 7.1, and 7.2 Linux distributions for i386 and ia64. Testing has also been done on other similar Linux distributions using the 2.4.x kernels.

Building the Driver

Note
You must have the kernel source code and the full GCC library installed in order to build and load the driver. For RedHat, the kernel source is located on the installation CDs (Disk2), not the source CDs. Look for a file with the name KERNEL-SOURCE-X.X.XX-i386.RPM, where x stands for build number.

To insure that the kernel source code is installed, change to the USR/SRC directory and verify that the Linux source tree is present. Look for linux-x.x.x-x, where x stands for the current build numbers. If you only see a linux directory, chances you installed the wrong source files.

1. Copy the Allied Telesyn driver source TAR file to a temporary directory, and type **tar -xvf *filename*** to extract the files.
2. Edit **Makefile** using VI or your favorite text editor, and change the LINUX path variable to the directory name where the kernel source files are installed.
3. Type **make** to compile the driver source code. If successful, you should see the file atnic32.o.
4. Continue with the driver installation.

Installing the Driver

Run **make install** to install the driver.

The atnic32.o file will be copied to the `lib/modules/<build#>/kernel/drivers/net` directory and depmod - a will be run to update dependencies.

Dynamic Loading

Type **insmod atnic32.o** to dynamically load the driver without installing it into the operating system.

To configure network protocol and address, refer to Linux documentations.

Changing Configuration Settings

To enable Auto-Negotiation, edit the /etc/conf.modules file to add the line `options atnic options=0` below the `alias eth0 atnic` line. The following lines indicate the various options for enabling the various interfaces. Only ONE of the following lines should be added. Only one interface is activated based on the keyword it represents. If neither option is selected the driver/device defaults to Auto-Negotiation. Each option is selected by the number it represents.

> **Note**
> Full duplex operation on the Am79C970 chipset-based cards is only supported on the 10Base-T interface.

```
options atnic options=0 #(MII, Autonegotiation)

options atnic options=1 #(MII, 100Mbps, Half duplex)

options atnic options=2 #(MII, 100Mbps, Full duplex)

options atnic options=3 #(MII, 10Mbps, Half duplex)

options atnic options=4 #(MII, 10Mbps, Full duplex)
```

Setting the Adapter's Speed and Duplex Mode on Linux 2.6

Linux 2.6 comes with the adapter driver. Driver installation is not required.

This section contains the procedure for setting the adapter's speed and duplex mode in a Linux 2.6 system. The procedure is divided into two phases.

Phase 1 Run the AT-Diag utility and set the adapter's speed and duplex mode. For instructions, refer to Chapter 10, "AT-Diag Utility" on page 175. Alternatively, you can use the BootPROM chip and MBA to configure the adapter.

Phase 2 Edit the `/etc/modprobe.conf` file and add the line "`options pcnet32 options=` below the line `alias eth0 pcnet32`. Below are the various options for setting the speed and duplex mode:

- AT-2701FX and AT-2701FTX 100Mbps Fiber Optic Port

  ```
  options pcnet32 options=13 #100Mb Half Duplex
  options pcnet32 options=14 #100Mbps Full Duplex
  ```

- AT-2451FTX 10Mbps Fiber Optic Port

  ```
  options pcnet32 options=9 #10Mb Half Duplex
  options pcnet32 options=10 #10Mb Full Duplex
  ```

You can omit the line `options pcnet32 options=` when setting the twisted pair port to 'Auto' for Auto-Negotiation.

The following example configures an AT-2701FX or AT-2701FTX adapter card to 100 Mbps, half-duplex.

```
alias eth0 pcnet32
options pcnet32 options=13
```

Chapter 7
Solaris 9

This chapter contains the following sections:

Note
Solaris 9 is supported on the AT-2451FTX, AT-2701FX, AT-2701FTX, and AT-2746FX Series cards.

Supported Operating System

The adapter drivers have been tested on Solaris 9 with Sparc platforms in both 32 and 64 bit environments. While the drivers should work on Solaris 8 and Solaris 10 platforms, they have not been tested on those operating systems; consequently, those platforms are not supported at this time.

Installing the Driver

To install the driver, perform the following procedure:

1. Install the appropriate package for either Solaris 32 or 64 bit version of the OS.

   The 32 bit version of the adapter driver is stored in the following subdirectories on the Installation CD and a driver installation diskette:

   - Installation CD: `\drivers\Solaris\32bit`
   - Driver installation diskette: `\Solaris\32bit`

   The 64 bit version of the adapter driver is stored in the following subdirectories on the Installation CD and a driver installation diskette:

   - Installation CD: `\drivers\Solaris\64bit`
   - Driver installation diskette: `\Solaris\64bit`

   For instructions on how to create a driver installation diskette, refer to “Creating a Driver Installation Disk” on page 68.

2. Uncompress the package with the following command:

   ```
   uncompress atnic_sparcxx_133.tar.Z
   ```

3. Extract the files with this command:

   ```
   tar -xvf atnic_sparcxx_133.tar
   ```

4. Install the package from the directory that contains the extracted files with this command:

   ```
   pkgadd -d atnic
   ```

Configuring the Network Adapter Card

To configure the speed and duplex of the adapter, go to the following file and configure the speed_duplex parameter to the desired value:

```
/kernel/drv/ae.conf
```

Possible values for the speed_duplex parameter are:

0 - Auto Negotiation

1 - 100Mb/half duplex

2 - 100Mb/full duplex

3 - 10Mb/half duplex

4 - 10Mb/full duplex

5 - Hardware

Note
Since a fiber optic port does not support Auto-Negotiation, the setting “0” is inappropriate when configuring that type of port. To configure a fiber optic port, select the appropriate speed and duplex mode setting (1 to 4).

Removing the Driver

To remove the driver from the system, enter the following command:

```
pkgrm atnic
```

Chapter 8

AT-Stat Utility

The AT-Stat utility displays operating information and statistics on Allied Telesyn network adapter cards in Microsoft Windows 2000, 2003, and XP systems. The sections in this chapter include:

Installing the AT-Stat Utility

To use the AT-Stat utility, you must install it on the system. You cannot run the utility from the Allied Telesyn Installation CD. If the system has a CD drive, perform the steps in the next procedure to install the utility. If the system does not have a CD drive, go to “Installing without a CD Drive” on page 140.

Note
The AT-Stat utility is supported on the Microsoft Windows 2000, 2003, and XP operating systems. This utility is not supported on any other operating system.

Note
The adapter driver for AT-2450FTX, AT-2700FX, AT-2700FTX, and AT-2745FX Series network adapter cards must be updated to obtain custom statistics. Otherwise, only generic statistics are available. To update an adapter driver, refer to “Installing or Updating a Driver Using the AT-Setup Utility” on page 59 or “Manually Updating a Driver” on page 77.

Installing with a CD Drive

To install the AT-Stat utility on a system that has a CD drive, perform the following procedure:

1. Insert the Allied Telesyn Installation CD into the CD drive.

   The Installation CD main window is shown in Figure 73. If this menu is not displayed, double-click on the My Computer icon, then double-click on the Allied Telesyn Installation CD icon.

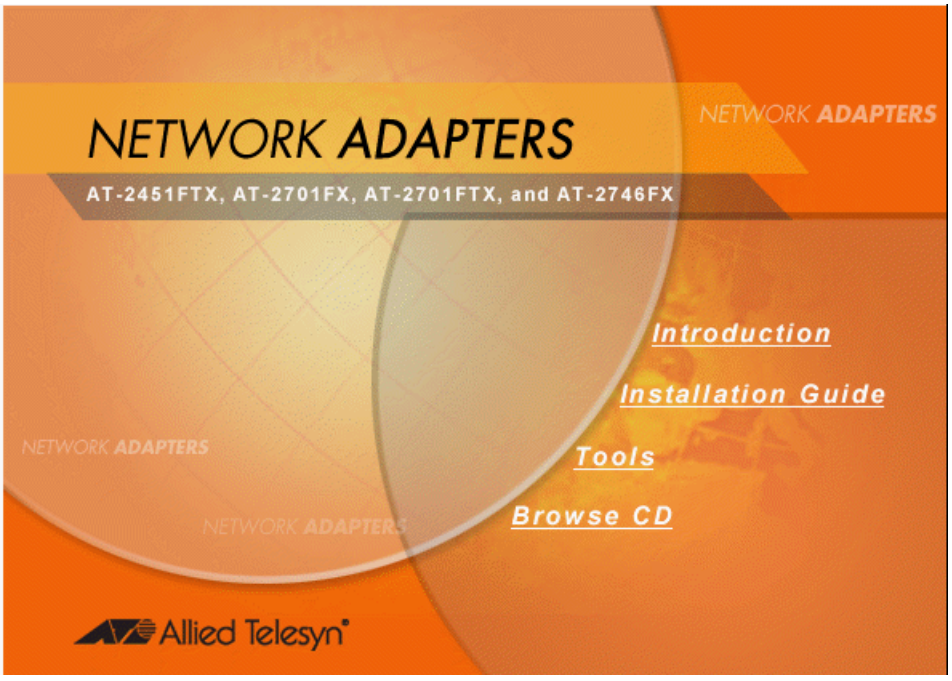


Figure 73. Installation CD Main Window

2. Select **Tools**.

   The Tools window is shown in Figure 74.

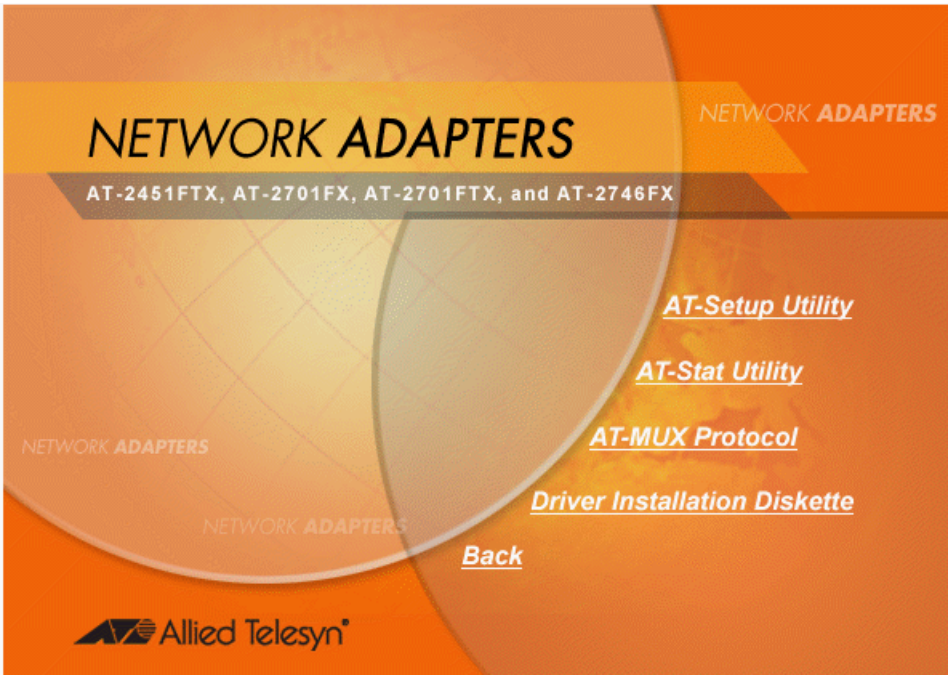


Figure 74. Tools Window

3. Select **AT-Stat Utility**.

   The AT-Stat utility window is shown in Figure 75.

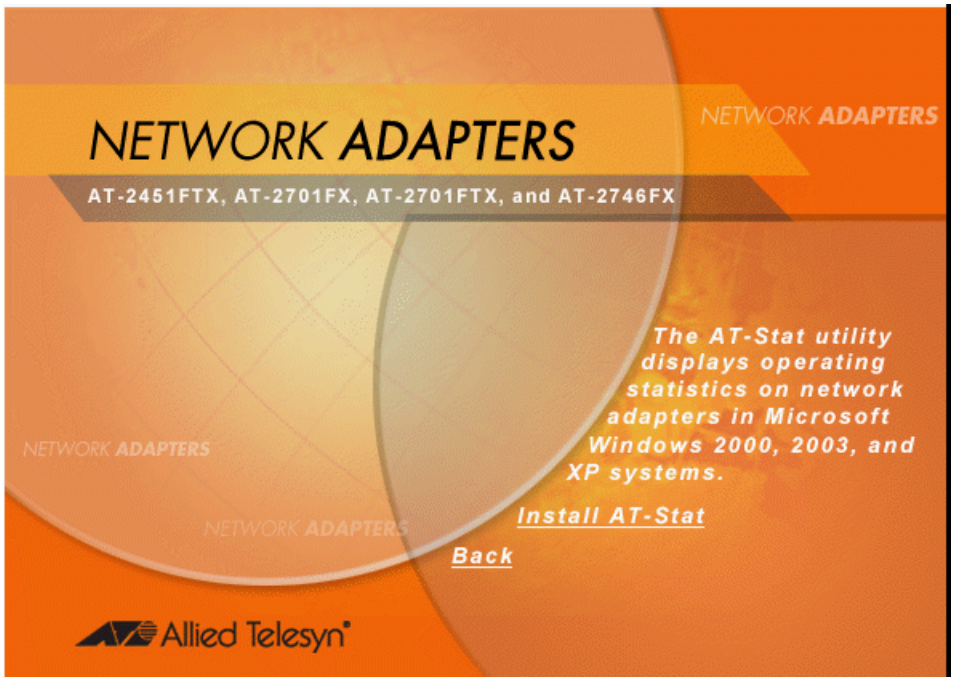


Figure 75. AT-Stat Utility Window

4. Select **Install AT-Stat**.

Note
The security prompts shown in Steps 4, 5, and 6 are from Microsoft Internet Explorer version 6.0. You may not see these security prompts or you may see different prompts if you are using a different version of Microsoft Internet Explorer or a different web browser.

The prompt in Figure 76 is displayed.

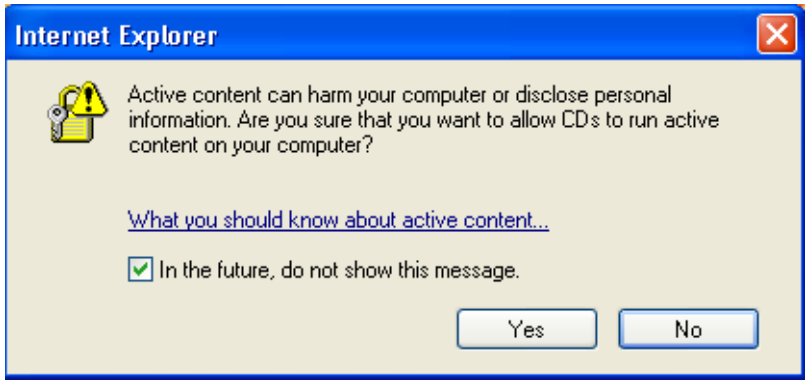


Figure 76. Active Content Warning Prompt

5. Select **Yes**.

   The prompt in Figure 77 is displayed.

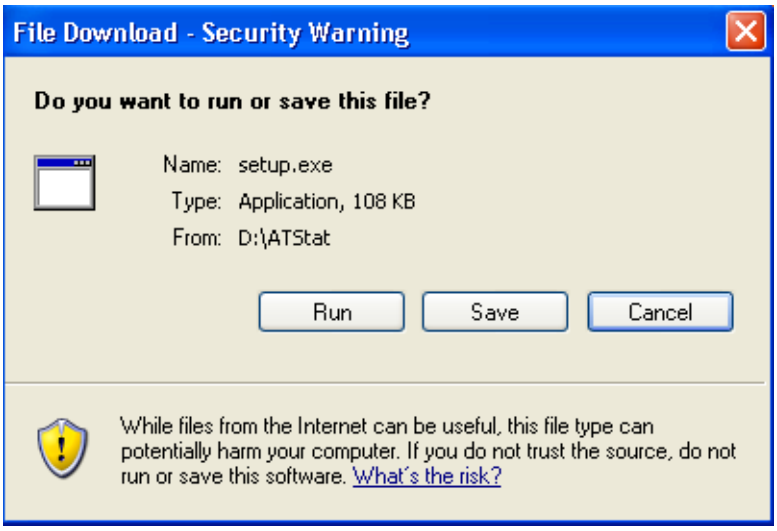


Figure 77. File Download - Security Warning Prompt

6. Select **Run** to run the installation program from the CD.

   The security warning prompt in Figure 78 is displayed.

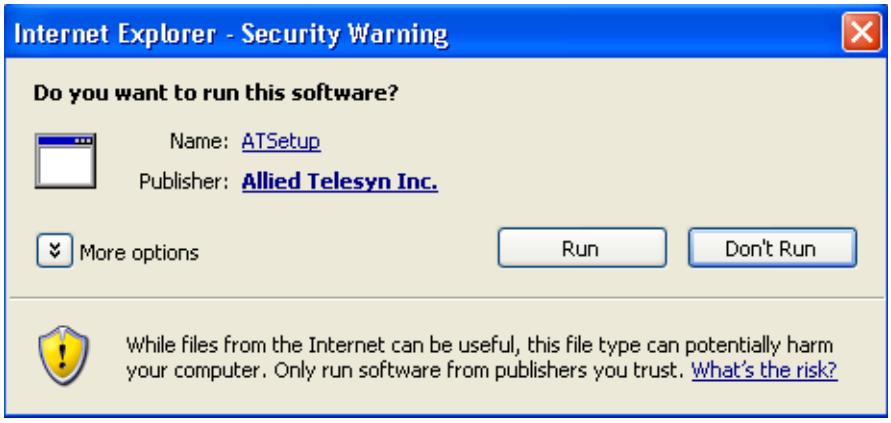


Figure 78. Internet Explorer - Security Warning Prompt

7. Select **Run**.

   The first of the AT-Stat utility installation windows is shown in Figure 79.

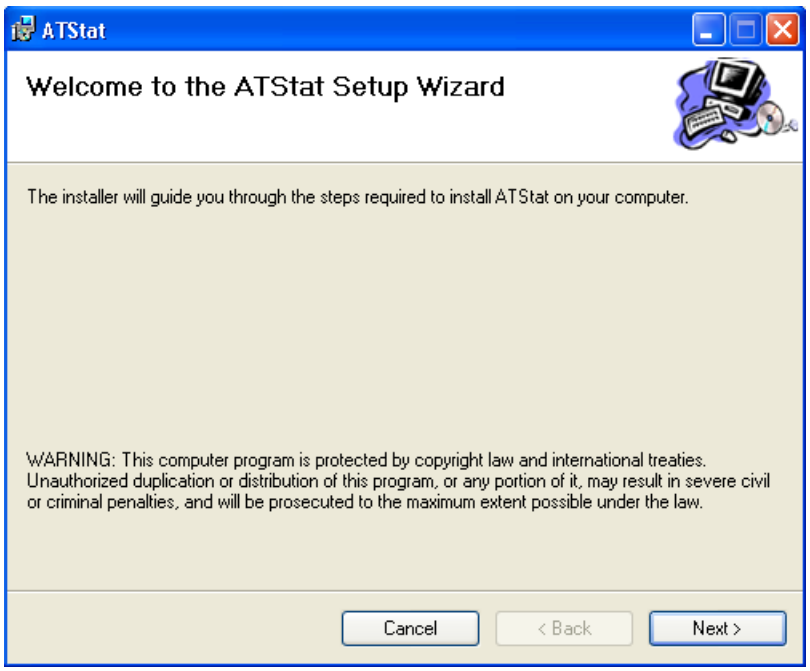


Figure 79. AT-Stat Installation Window (1 of 4)

8. Click **Next**. The second installation window is shown in Figure 80.

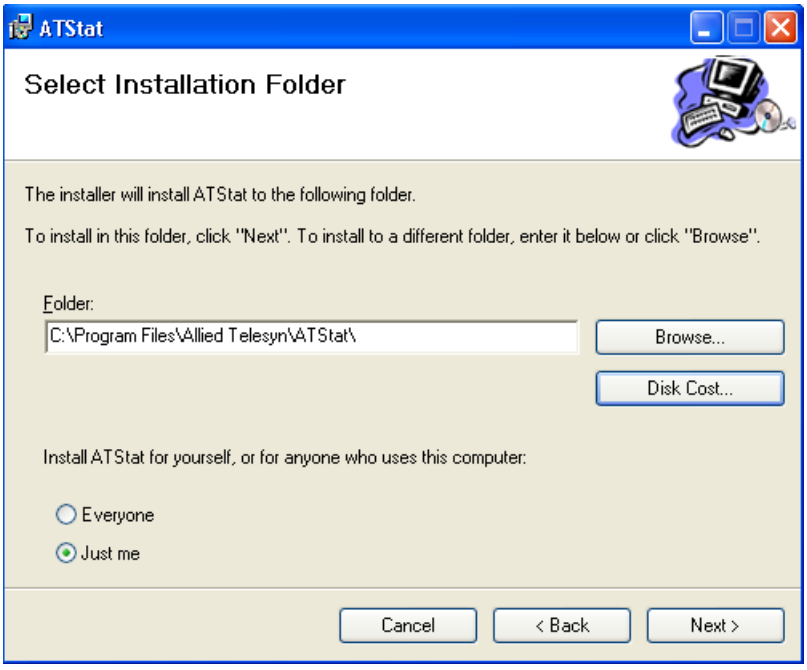


Figure 80. AT-Stat Installation Window (2 of 4)

9. Configure the window as follows:

   - ❒ To change the location where the utility will be stored on the system, enter the driver and path in the Folder field, or use the Browse button to specify a location. The default folder is Program Files\Allied Telesyn\ATStat. To view the disk drives on the system and the available storage space, use the Disk Cost button.
   - ❒ If the system has multiple user accounts and you want to limit use of the utility to just the current account, click **Just Me**. If you want all of the system's user accounts to have access to the program, click **Everyone**.

10. Click **Next**.

    The installation program displays the confirmation window shown in Figure 81.

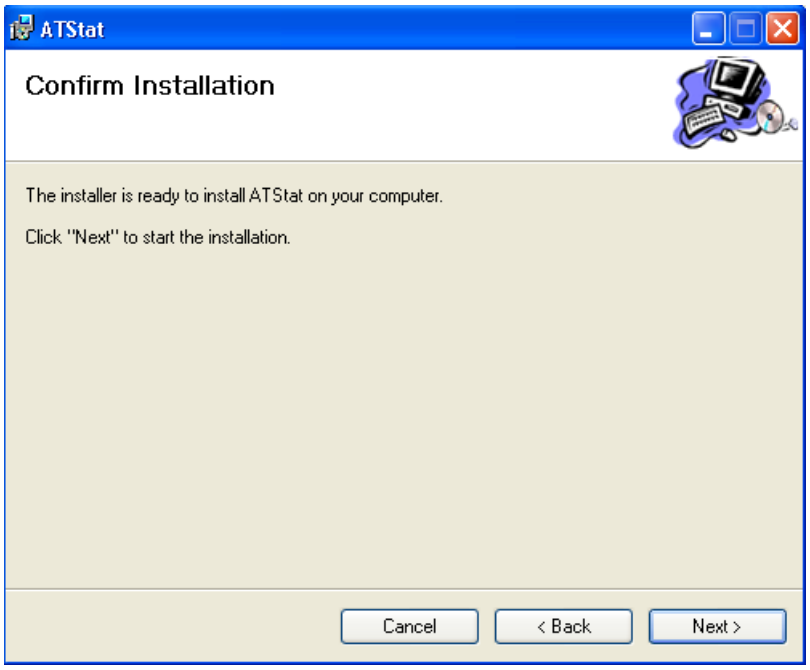


Figure 81. AT-Stat Installation Window (3 of 4)

11. Click **Next**.

The installation program installs the utility, a process that takes only a few seconds. Once the utility is installed, the window in Figure 82 is displayed.

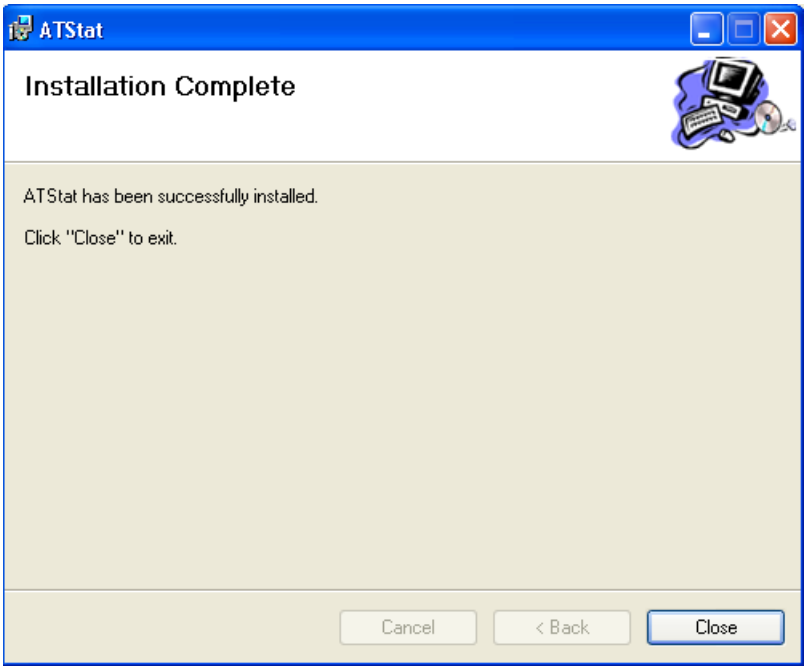


Figure 82. AT-Stat Installation Window (4 of 4)

12. Click **Close**.

13. Shut down the Microsoft Windows operating system and either reset or power cycle your system.

Note
A system reset is required after installing the AT-Stat utility.

This completes the installation procedure for the AT-Stat utility. For further instructions, refer to “Using the AT-Stat Utility” on page 142.

Installing without a CD Drive

The following procedure explains how to install the AT-Stat utility on a system that does not have a CD drive. This procedure assumes that the system has access to the Internet.

To install the utility on a system that does not have a CD drive, perform the following procedure:

1. At the system where you want to install the utility, create an empty folder to store the program files.

2. Connect to the Product Support web page on the Allied Telesyn web site at **www.alliedtelesyn.com**.

3. Download the zip file containing the adapter drivers for your adapter card from the Product Support web page to the empty directory created in Step 1.

4. Unzip the file.

5. Change to the ATStat subdirectory.

6. Launch the “setup.exe” file stored in the ATStat subdirectory.

7. To complete the installation, perform the procedure “Installing with a CD Drive” on page 134 starting with Step 8.

Using the AT-Stat Utility

The AT-Stat utility displays basic information and operating statistics on Allied Telesyn network adapter cards installed in Windows 2000, 2003, and XP systems.

In order to use the AT-Stat utility, you must install it on your system. You cannot run the utility from the Installation CD. For installation instructions, refer to “Installing the AT-Stat Utility” on page 134.

Starting the AT-Stat Utility

To start the utility, select **Allied Telesyn ATStat** from the Programs menu of the Start menu, as shown in Figure 83.

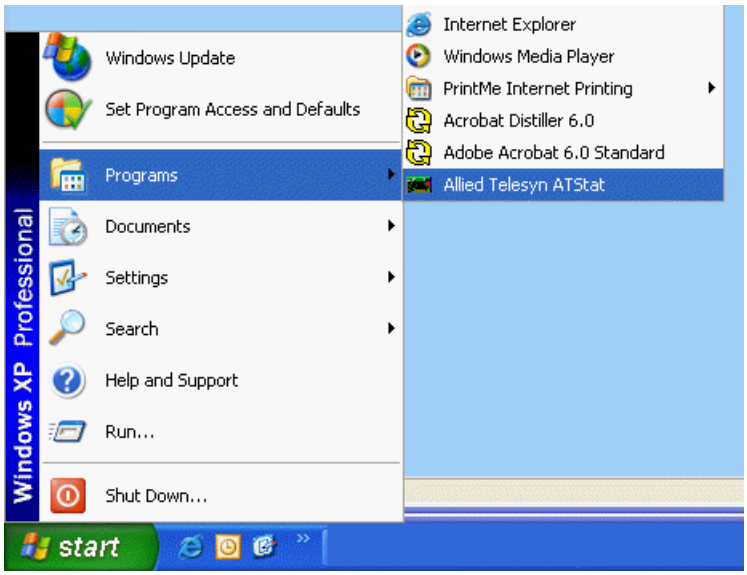


Figure 83. Starting the AT-Stat Utility

The utility’s interface consists of five tabs: General, Statistics, Ping, NetCheck, and Support. The tabs are described in the following sections:

- “General Tab” on page 143
- “Statistics Tab” on page 147
- “Ping Tab” on page 150
- “NetCheck Tab” on page 151
- “Support Tab” on page 152

General Tab

Figure 84 shows the General tab.

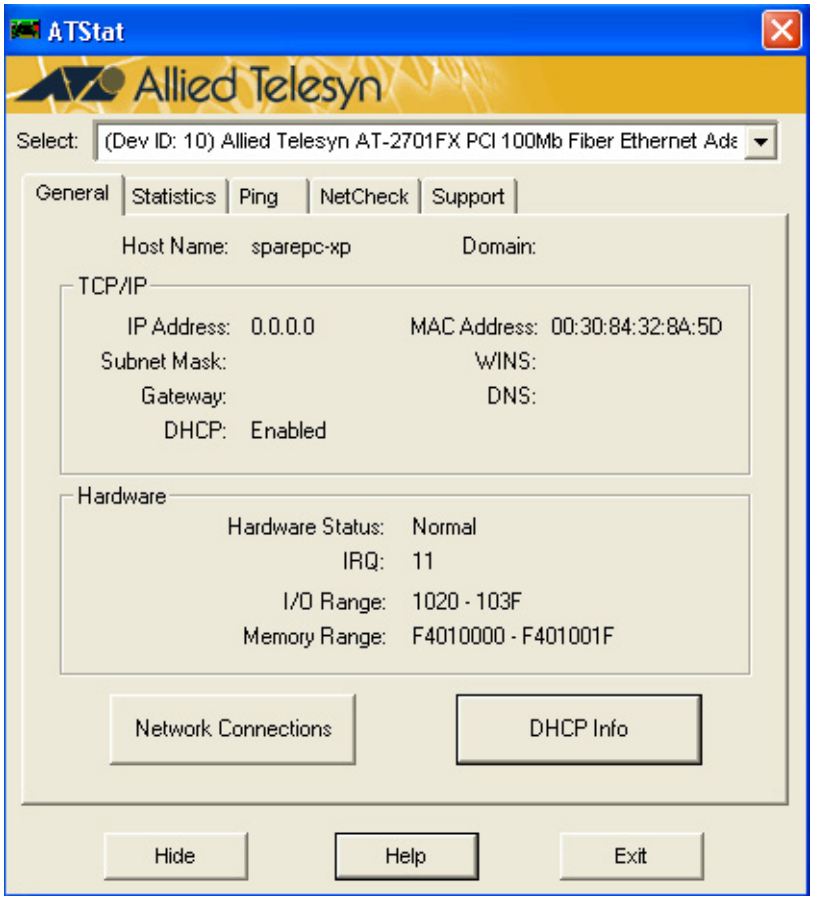


Figure 84. General Tab

Note
If the system contains more than one network adapter card, use the Select pull-down menu at the top of the window to choose an adapter.

Table 12 defines the information in the General tab

Table 12. General Tab

Field	Description
TCP/IP	
IP Address	Displays the IP address assigned to the adapter. For instructions on how to manually assign an IP address or activate the DHCP client software, refer to “Configuring the IP Address, Subnet Mask, and Gateway Address” on page 92. **Note** The AT-Stat utility might not display an IP address and subnet mask if the port on the adapter has not established an active link with the remote device.
Subnet Mask	Displays the subnet mask assigned to the adapter.
Gateway	Specifies the IP address of a default gateway router.
DHCP	Displays whether the DHCP client has been activated on the network adapter card. Possible values are: Enabled - The DHCP client software is active and the adapter is getting its IP configuration from a DHCP or BOOTP server. Disabled - The DHCP client software is inactive. The IP configuration must be set manually. For information on how to activate the DHCP client software, refer to “Configuring the IP Address, Subnet Mask, and Gateway Address” on page 92.
MAC Address	Displays the adapter’s MAC address.

Table 12. General Tab (Continued)

Field	Description
WINS	Displays the IP address of the Windows Internet Name Service, used in name resolution by converting NetBIOS names into IP addresses.
DNS	Displays the IP address of the domain name server.
Hardware	
Hardware Status	Displays a text readable form of the user code returned by the Microsoft Windows operating system.
IRQ	Displays the interrupt level assigned to the network adapter card.
I/O Range	Specifies the input/output address range used by the system to access the registers on the network adapter card.
Memory Range	Specifies the range of shared memory allocated for use by the network adapter card.
Network Connections button	Launches the Network Connections window. This window is used to set the IP address, subnet mask and default gateway of the network adapter card. For further information, refer to “Configuring the IP Address, Subnet Mask, and Gateway Address” on page 92. The Network Connections window is also used together with the AT-MUX protocol to add and delete VIDs for adapters that handle tagged traffic from multiple VLANs. For information, refer to Chapter 9, “AT-MUX Multiple VLAN Protocol” on page 157.

Table 12. General Tab (Continued)

Field	Description
DHCP Info Button	Displays the following DHCP or BOOTP information: DHCP Server - The IP address of the DHCP or BOOTP server that issued the adapter's IP configuration. Lease Obtained - The date and time when the DHCP or BOOTP server issued the IP configuration. Lease Expires - The expiration date and time for the IP configuration.

Note
The IP address, subnet mask, and gateway fields display the values assigned to the network adapter card itself. If you used the AT-MUX protocol to add VLAN identifiers, these fields will in all likelihood be empty since the IP configurations must be assigned to the individual VLAN connections. For further information, refer to Chapter 9, "AT-MUX Multiple VLAN Protocol" on page 157.

Statistics Tab

Figure 85 shows the Statistics tab. This tab displays status information and operating statistics of a network adapter card.

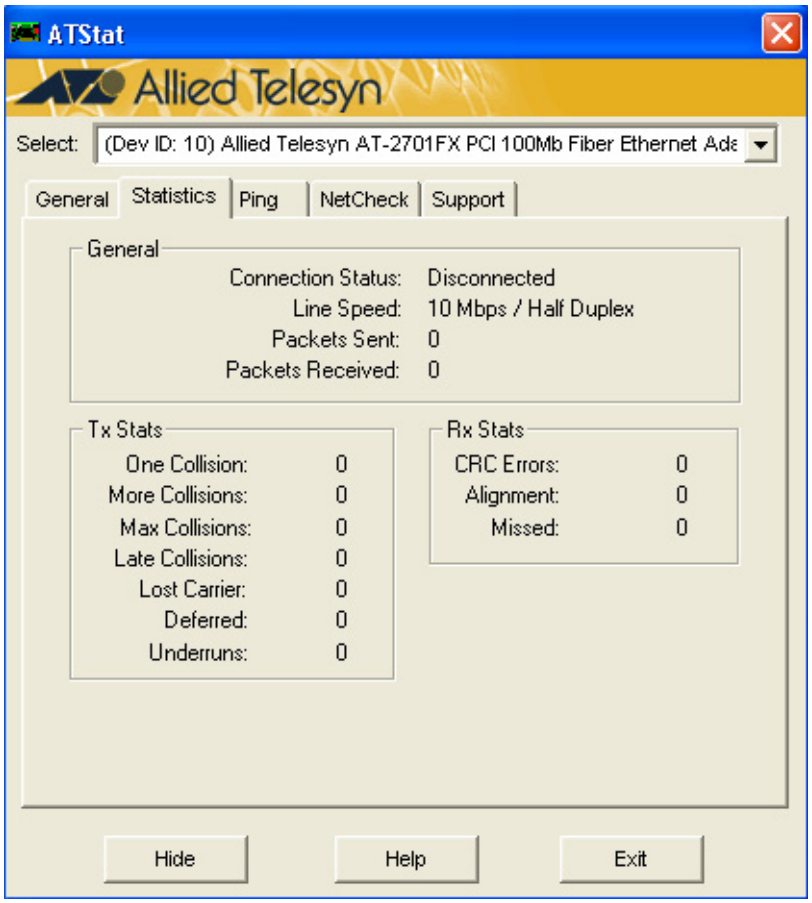


Figure 85. Statistics Tab

Table 13 defines the statistics.

Table 13. Statistics Tab

Statistic	Description
General	
Connection Status	Indicates whether the port has established a valid link to the Ethernet switch or hub.
Line Speed	Indicates the current operating speed and duplex mode of the port. For instructions on how to configure a port, refer to “Configuring Additional Network Adapter Card Settings” on page 96. Alternatively, you can use the AT-Diag utility, described in Chapter 10 on page 175.

Table 13. Statistics Tab (Continued)

Statistic	Description
Packets Sent	Indicates the total number of packets sent by the adapter.
Packets Received	Indicates the total number of packets received by the adapter.
Tx (Transmit) Stats	
One Collision	Displays the total number of times the network adapter card experienced at least one collision while transmitting a packet.
More Collisions	Displays the total number of times the network adapter card experienced more than one collision while sending a packet.
Max Collisions	Displays the total number of times the network adapter card experienced the maximum number of 16 collisions while attempting to transmit a packet, causing the adapter to discard the packet.
Late Collisions	Specifies the total number of late collisions experienced by the network adapter card. A late collision occurs when the adapter detects a collision after sending the 512th bit of a packet.
Lost Carrier	Specifies the total number of times the adapter lost the carrier sense condition while transmitting a packet.
Deferred	Specifies the total number of deferred transmissions experienced by the adapter. A deferred transmission occurs when the adapter delays the transmission of a packet because the network medium is already busy.
Underruns	Specifies the total number of underrun errors experienced by the network adapter card. An underrun error occurs when the adapter sends an incomplete frame because the system did not transfer the frame fast enough to the adapter or because the adapter was unable to gain control of the system’s bus.

Table 13. Statistics Tab (Continued)

Statistic	Description
Rx (Receive) Stats	
CRC Errors	Displays the number of frames with a cyclic redundancy check (CRC) error but with the proper length (64-1518 bytes) received on the port.
Alignment	Specifies the total number of alignment errors encountered by the adapter. An alignment error occurs when a received packet contains a frame check sequence error as well as a bit count that is not an integral multiple of 8.
Missed	Displays the number of frames successfully received by the port but discarded by the network adapter card due to a lack of buffer space.

Note
All counters return to zero when the system is reset or power cycled.

Ping Tab

Figure 86 shows the Ping tab.

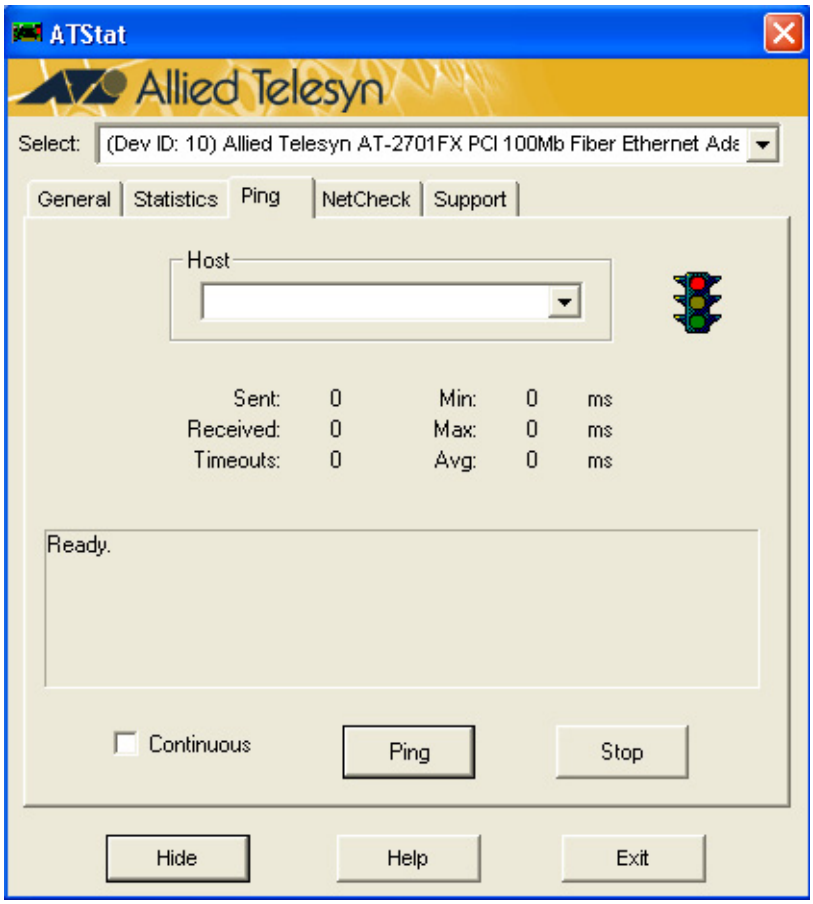


Figure 86. Ping Tab

You can use this tab to instruct the adapter to ping another node on the network This feature is helpful in determining whether an operational path exists between the adapter and another network node.

To instruct the adapter to ping another network device, do the following procedure:

1. In the Host field, enter the IP address of the end node you want the adapter to ping. If your network has a domain name server, you can enter the node's domain name in place of the IP address.

2. If you want the utility to make continuous ping requests, click **Continuous**. If you leave this blank, the utility issues four pings.

3. Click **Ping**.

4. If you selected the Continuous option, you must click **Stop** to stop the pings. If you did not select the option, the test automatically stops after four pings.

The results of the ping are displayed in the tab. The Min., Max., and Avg., values are the minimum, maximum, and average response times in milliseconds by the end node to the pings. The traffic light also indicates the results of the ping. Green means it was successful, yellow that it timed out, and red that the system could not launch the ping program.

NetCheck Tab

Figure 87 shows the NetCheck tab.

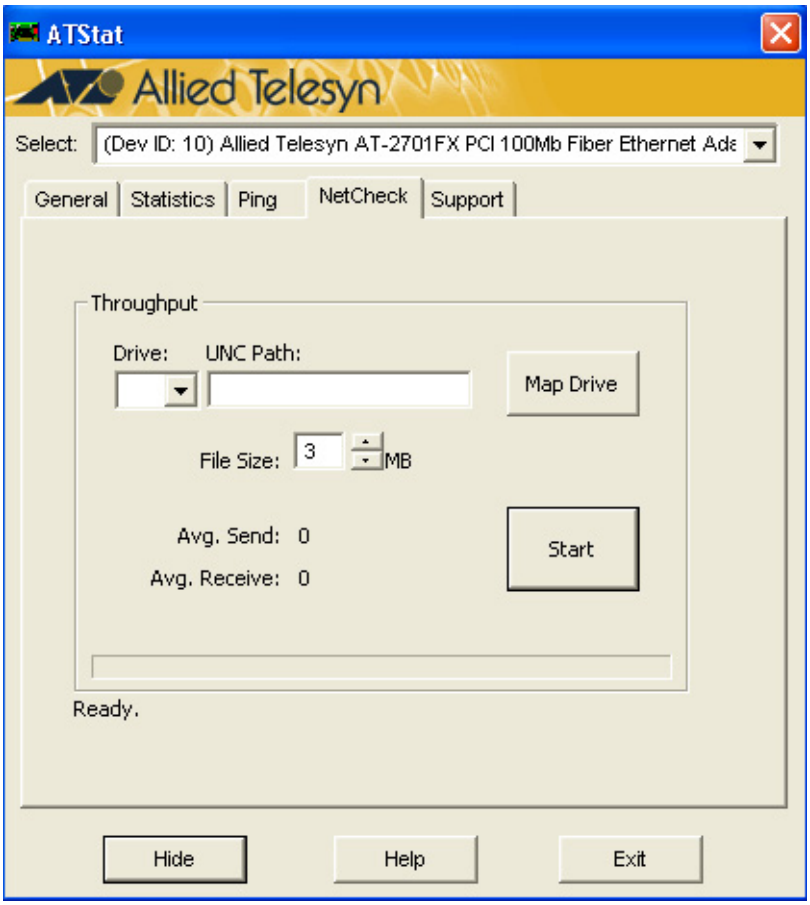


Figure 87. NetCheck Tab

You can use this tab to run a throughput test.

The ping test, explained in the previous subsection, allows you to determine whether an operational network path exists between a network adapter and another node on the network. A throughput test allows you to go a step further by measuring the speed at which traffic can be passed over the path and so gauge the available bandwidth.

The utility performs the test by creating a file of 1 to 11 megabytes on the local hard disk, sending it to a specified network drive, and then copying it back again to the local hard disk. The file is transferred a total of three times for each test. The speed at which the file is both sent and received

by the adapter is reported in megabits per second in the Avg. Send and Avg. Receive fields of the window.

In a properly configured network, the average send and receive values should be roughly the same. However, widely divergent values, such as the average received being only half the average sent, could indicate a network configuration problem, such as a duplex mode mismatch.

To perform a throughput test, do the following:

1. Specify a network driver where the test file will be copied to and retrieved from. There are two ways you can specify the network driver:
   - ❒ Use the Drive pull-down menu to select a network drive, or
   - ❒ Specify the network drive by entering in the UNC Path field its Universal Naming Convention (UNC) (for example, “\\<systemname>\drive”).
2. Using the File Size parameter, select the size of the test file. The range is 1 to 11 megabytes. The default is 3 megabytes.
3. Click **Start**.

   The utility creates the test file on the local hard disk and sends it to the remote network node. Once the file has been stored on the remote device, the test copies it back again onto the local hard disk. The file is transferred a total of three times. During the test, the Avg. Send and Avg. Receive statistics are updated to reflect the speed in megabits per second at which the file is sent and received by the network adapter card.

   Once the test is complete, the file is deleted from the local hard disk and the remote network drive.

Support Tab

The Support tab contains URL links to the Allied Telesyn home page, as well as to our technical support and networking products page.

Removing the AT-Stat Utility

This section contains the procedure for removing the AT-Stat utility from a Microsoft Windows 2000, 2003, or XP system.

1. From the desktop, select **Start**.
2. Select **Settings**, then **Control Panel**, as shown in Figure 88.

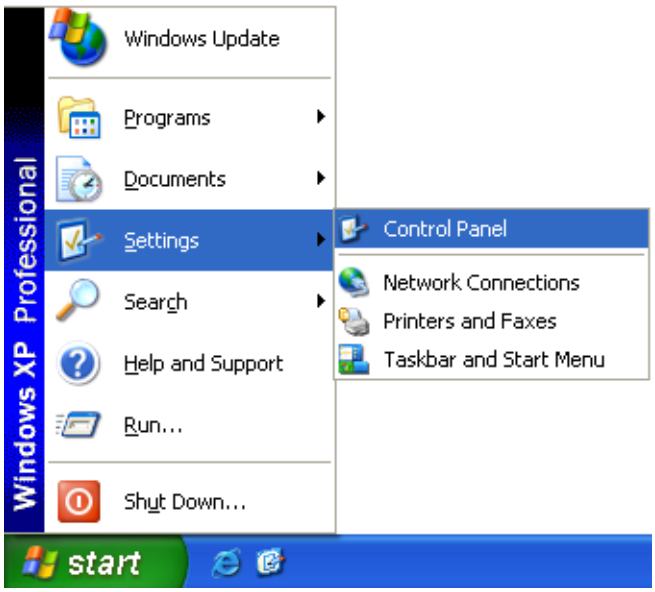


Figure 88. Control Panel Selection

The Control Panel window is shown in Figure 89.

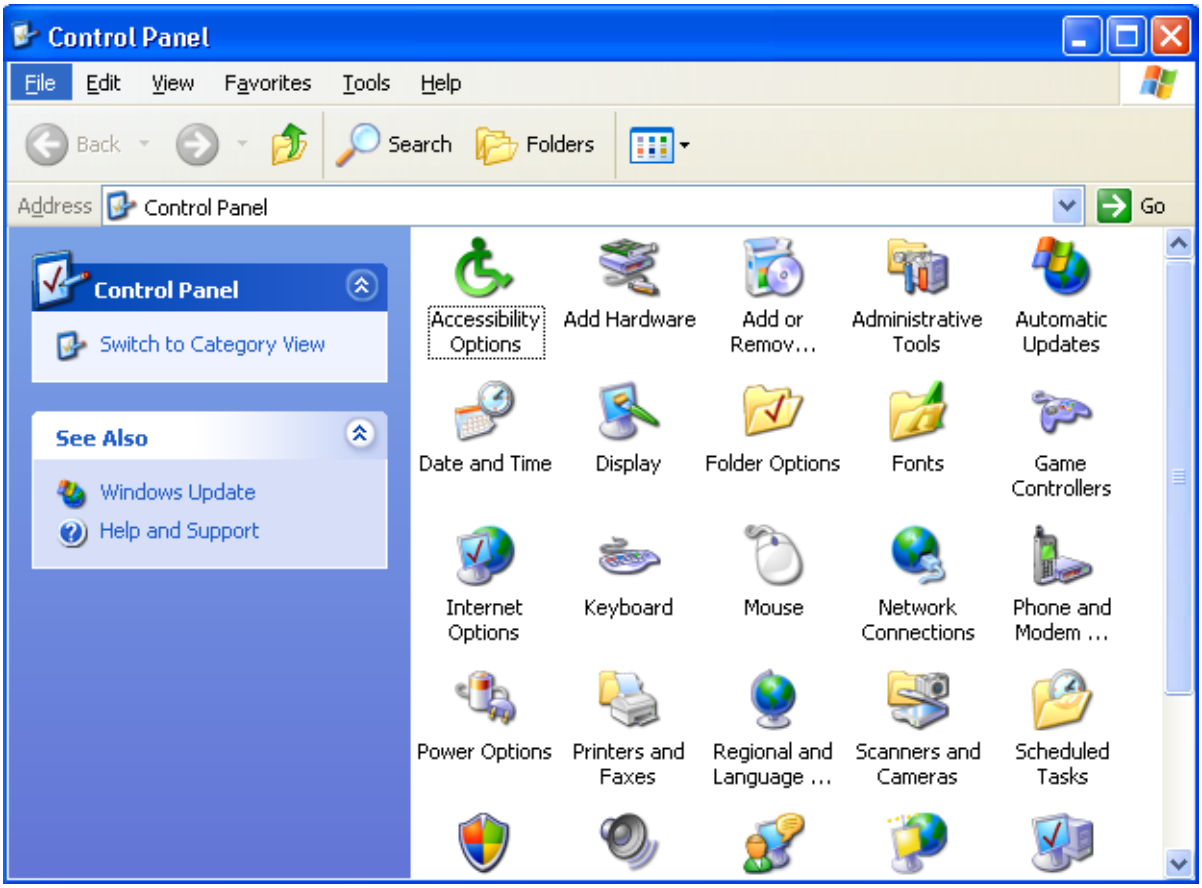


Figure 89. Control Panel Window

3. Double-click on **Add or Remove Programs**. The Add or Remove Programs window is shown in Figure 90.

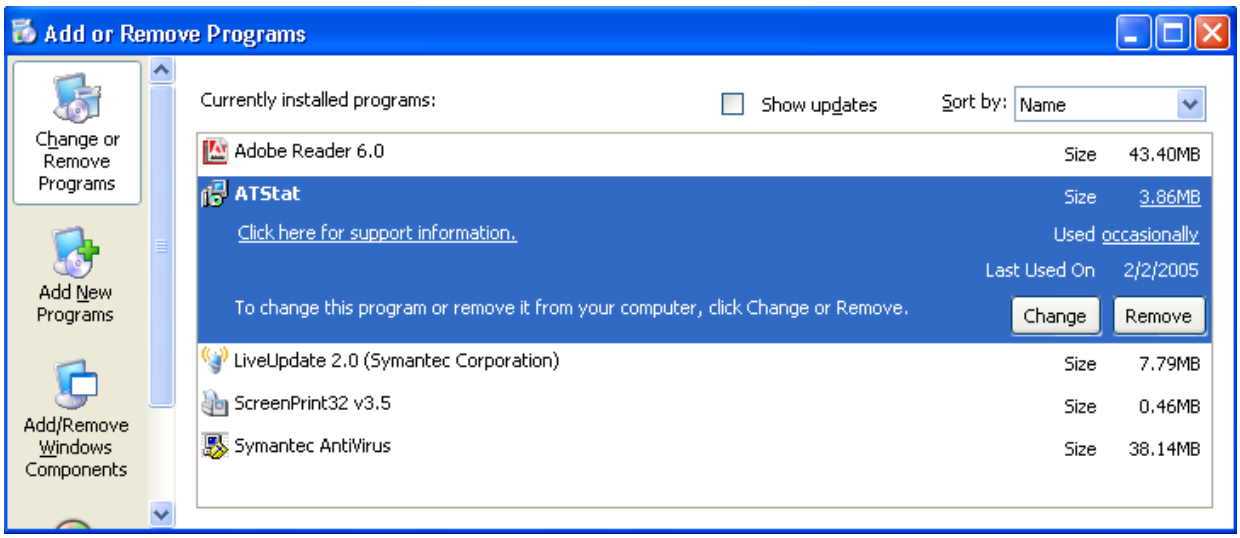


Figure 90. Add or Remove Programs Window

4. Select **ATStat** from the list.
5. Select **Remove**.

   A confirmation prompt is displayed.

6. Select **Yes** to remove the utility or **No** to cancel the procedure.

   If you selected Yes, the utility is removed from the system. This completes the procedure for removing the AT-Stat utility from a system.

Chapter 9

AT-MUX Multiple VLAN Protocol

This chapter describes the AT-MUX protocol. Sections in the chapter include:

AT-MUX Protocol Overview

The AT-MUX protocol is useful in Ethernet networks where there are tagged virtual LANs (VLAN). You can use the protocol to assign up to 16 VLAN identifiers (VID) to an adapter so that it can process and transmit tagged traffic from multiple tagged VLANs.

Note
The AT-MUX protocol is supported on Microsoft Windows 2000, 2003, and XP systems only. The system must have the latest Microsoft Windows 2000, 2003, or XP Ndis 5 driver (version 4.1.10).

As explained in “Virtual LANs and the AT-MUX Protocol” on page 37, a VLAN is an independent traffic domain where traffic generated by the nodes of a VLAN is restricted only to other nodes of the same VLAN. Tagged traffic within a VLAN is identified by a header tag that follows the source and destination addresses in a frame. The tag contains the VID that identifies the VLAN to which the packet belongs.

With the AT-MUX protocol you can assign multiple VIDs to an adapter so that the adapter can read the tag in tagged traffic that it receives as well as add tags to traffic that it transmits. To configure the AT-MUX protocol, you specify the VIDs of the VLANs whose traffic you want the adapter to handle. For instance, assume that you had installed the adapter in a server that will handle traffic from the following three VLANs:

- Sales - VID 12
- Sales Support - VID 14
- Marketing - VID 25

In this example, you would use the AT-MUX protocol to add these three VIDs to the adapter. Untagged packets and tagged Ethernet traffic from VLANs other than these three would be discarded by the adapter.

For systems with multiple adapter cards, you must install the AT-MUX protocol on each adapter that you want to support multiple VLANs. For instance, if a system contained two adapters and you wanted both adapters to handle tagged packets, you would install the utility on both adapters.

Each VID and, consequently, each VLAN is considered a separate LAN connection by the network adapter card. This is reflected in the Network Connections window of the Microsoft Windows operating system. A new LAN connection is added to the window for each new VLAN. The icon for a VLAN connection is easily identified by the label “Allied Telesyn VLAN-Tagging miniport Driver.” (The easiest way to view this is by selecting the Tile menu selection under the View menu in the Network Connections

window. An alternative is to open the Properties window of a LAN connection.)

The original LAN connection for the adapter remains in the Network Connections window and is identified by the card's model number in the icon's label and in the card's Properties window.

This is illustrated in Figure 91 where two VLANs have been added to a system.

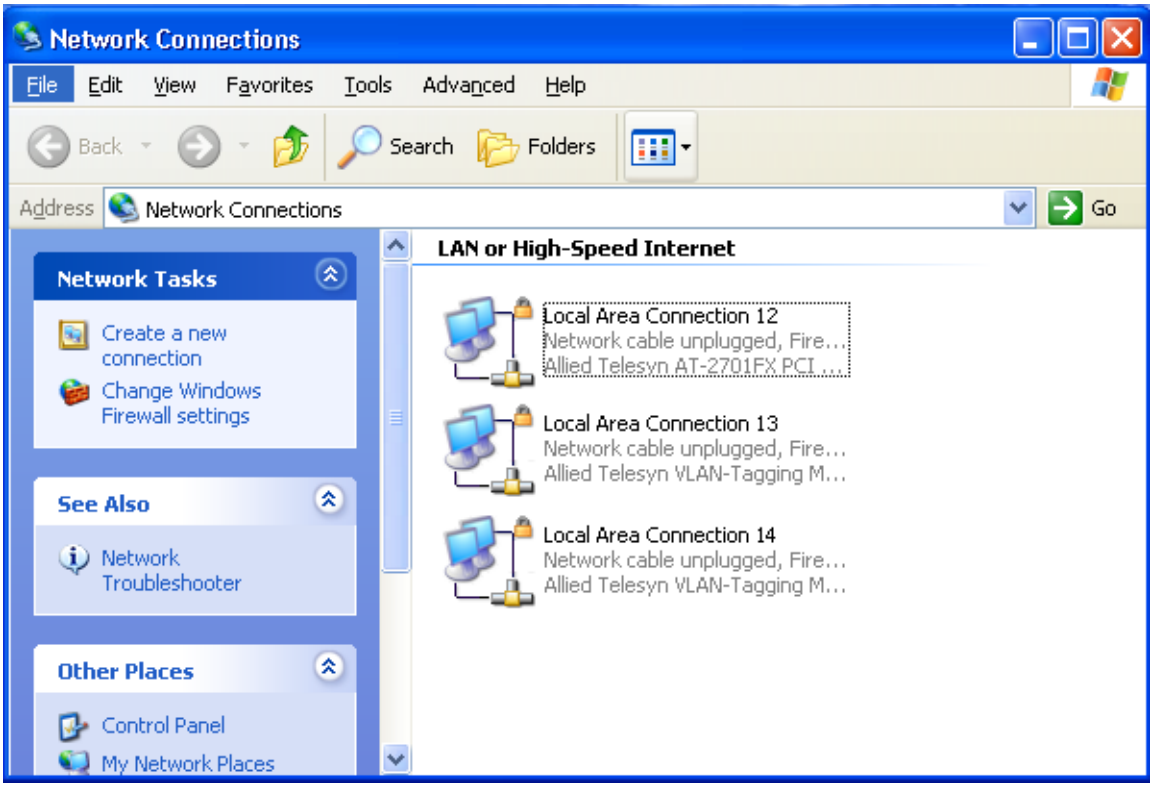


Figure 91. Network Connections Window with Tagged VLANs

In the example, the network adapter card is represented by LAN Area Connection 12. This is indicated by the card's model number in the icon's label. LAN Area Connections 13 and 14 represent the two VLANs.

There is no relationship between the LAN connection numbers displayed in the Network Connections window and the VIDs of the VLANS. The LAN connection numbers are assigned by the Microsoft Windows operating system based on a number of factors, such as how many network connections there are and how many adapters have previously been installed in the system.

The AT-MUX protocol is only active in the network adapter card's LAN connection. Consequently, you must use that LAN connection icon to create, delete, or modify VIDs. All other properties of this connection, such as file and print sharing, are deselected and inactive.

To adjust the properties of a VLAN connection, you must use the corresponding tagged VLAN connection icon. Since each VLAN is considered a separate connection, you can adjust the properties individually.

This is illustrated in Figure 92 on page 161. The figure shows the Network Connections window with three LAN connections, one for the adapter and two others for tagged VLANs. The figure shows the properties windows for the network adapter card and the first VLAN connection. Note that the Properties window for the card's connection has only the AT-MUX protocol selected and all others deselected, while the reverse is true for the Properties window of the tagged VLAN connection.

Each VLAN must be assigned a unique IP address. All of the addresses of the VLANs of a network adapter card must belong to the same subnet. Consequently, the network portion of the IP addresses must be the same for all the addresses and they must all share the same subnet mask. For instructions on how to set the IP configuration, refer to "Configuring the IP Address, Subnet Mask, and Gateway Address" on page 92.

Planning is essential to using the AT-MUX protocol. This should include determining the VIDs of the VLANs you want to add to the card. You should also select IP addresses and a subnet mask. Of course, you can activate DHCP client on the VLAN connections and have a BOOTP or DHCP server assign the IP addresses and subnet mask automatically. Creating a table similar to the following can help in implementing the feature.

Table 14. AT-MUX Protocol Planning

VID	IP Address	Subnet Mask	LAN Connection Number[1]
5	169.14.14.24	255.255.255.0	3
16	169.14.14.17	255.255.255.0	4
22	169.14.14.32	255.255.255.0	5

1. Assigned automatically by Microsoft Windows.

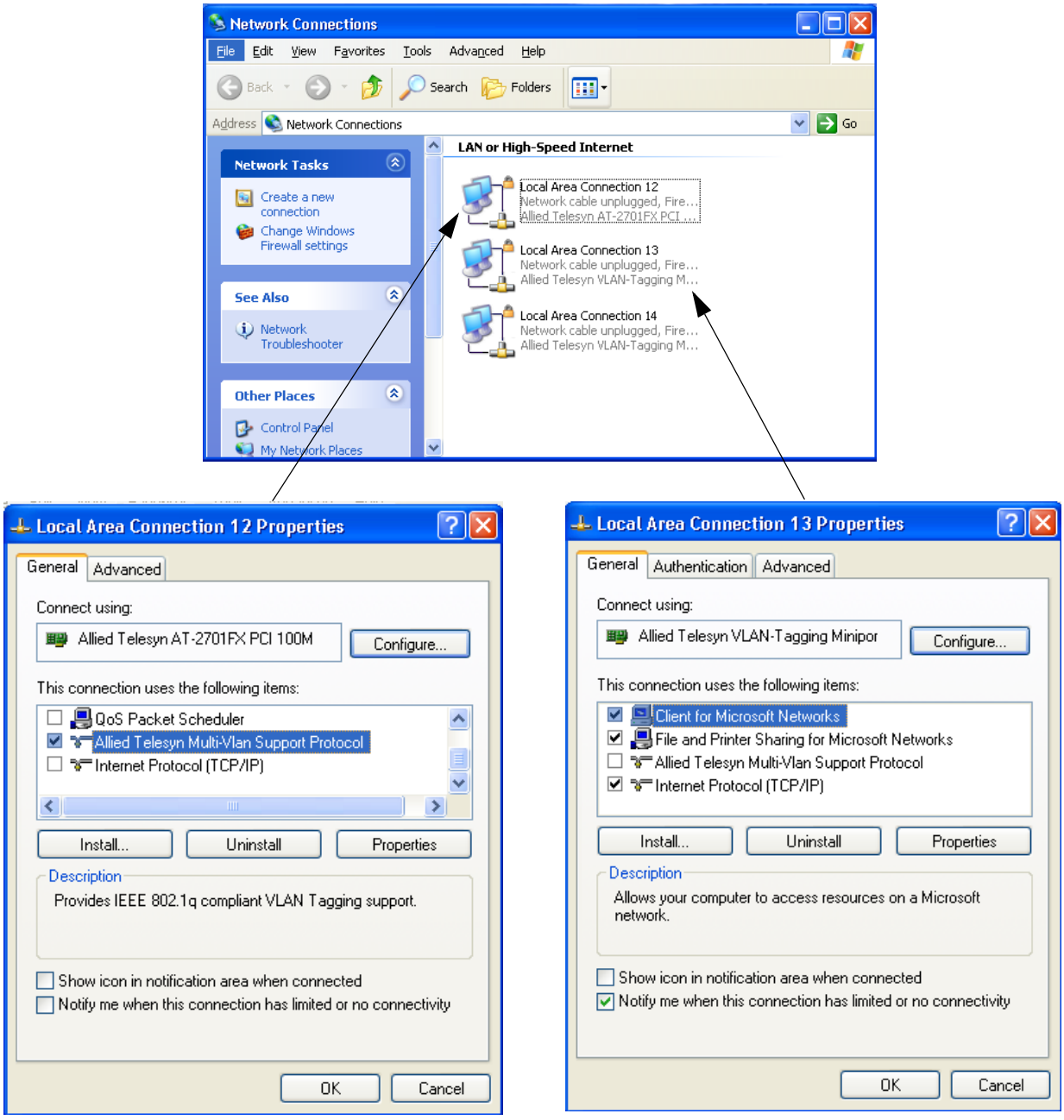


Figure 92. Relationship Between the LAN Connections and the Properties Windows

To summarize, you must use the network adapter card's LAN connection to add, modify, or delete VIDs. To adjust the protocol settings for a VLAN connection, such as print or file sharing, or to set the IP configuration, use the VLAN's corresponding LAN connection.

Installing the AT-MUX Protocol

This procedure explains how to install the AT-MUX protocol on a Microsoft Window 2000, 2003, or XP system.

If the system does not have a CD drive, you can copy the files in the `\drivers\AT-Mux` directory on the Installation CD into the root directory of a blank, formatted diskette, and use the diskette in place of the Installation CD during this procedure.

Note
For systems with more than one Allied Telesyn network adapter card, you must install the AT-MUX protocol on each card where multiple VLAN support is desired.

To install the AT-MUX protocol, perform the following procedure:

1. From the desktop, right-click the **My Network Places** icon and select **Properties** from the menu, as shown in Figure 93.

Figure 93. My Network Places Icon Menu

The Network Connections window is shown in Figure 94.

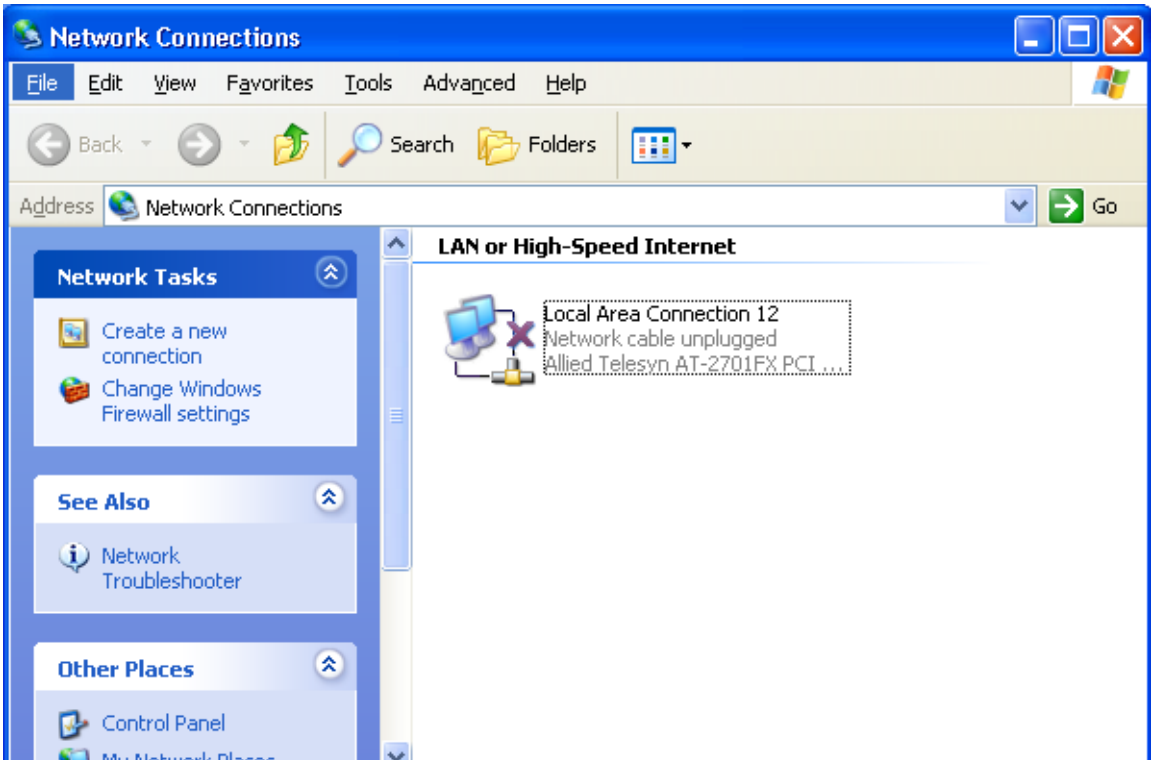


Figure 94. Network Connections Window

2. Right-click on the local area connection representing the Allied Telesyn adapter card where you want to add the protocol and select **Properties** from the pop-up menu, as shown in Figure 95.

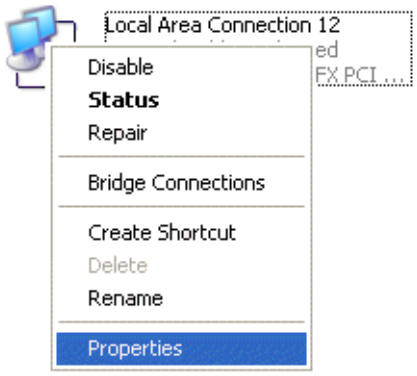


Figure 95. Local Area Connection Icon Pop-up Menu

The Local Area Connection Properties window is shown in Figure 96.

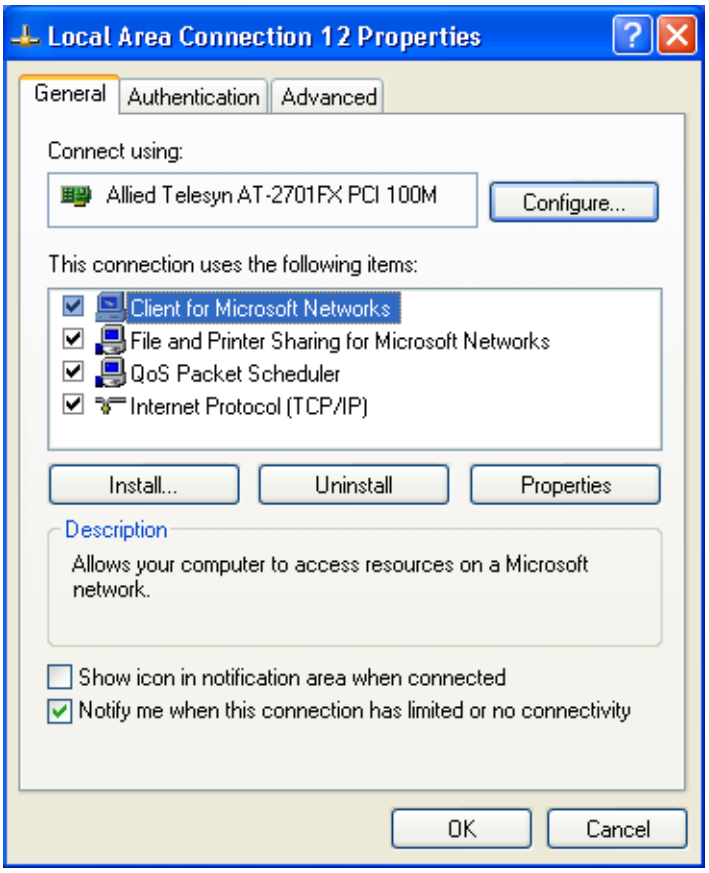


Figure 96. Local Area Connection Properties Window

3. Select **Install**.

   The Select Network Component Type window is shown in Figure 97.

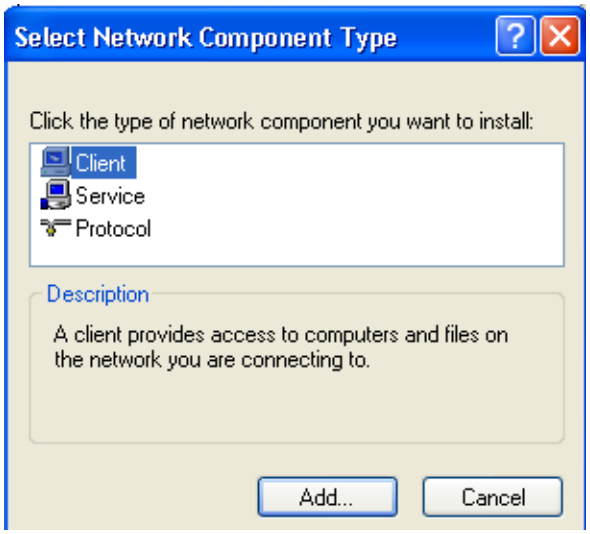


Figure 97. Select Network Component Type Window

4. Select **Protocol,** then select **Add**.

   The Select Network Protocol window is shown in Figure 98.

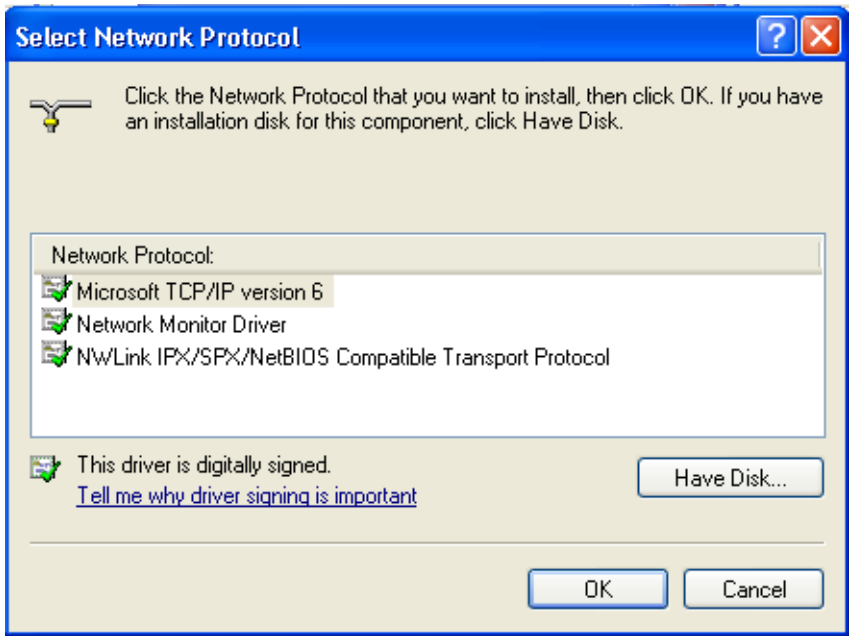


Figure 98. Select Network Protocol Window

5. Select **Have Disk**.

   The Install From Disk window is shown in Figure 99.

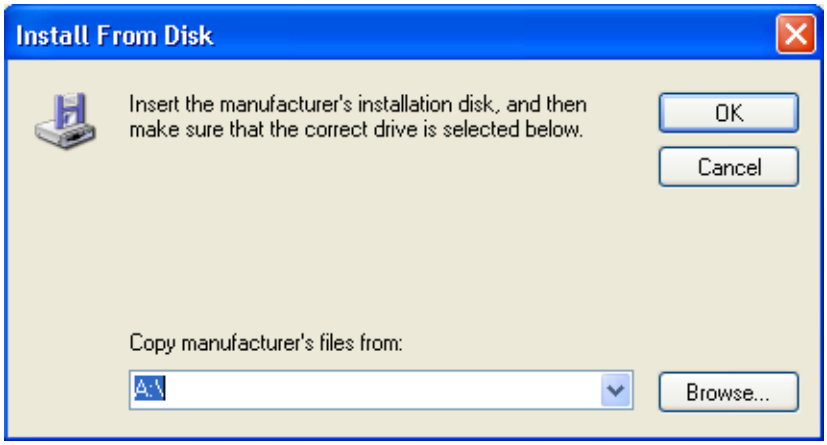


Figure 99. Install From Disk Window

6. Insert the Allied Telesyn Installation CD into the CD drive. If you copied the AT-MUX files from the CD to a diskette, insert the disk into the diskette drive.

Note
If you are using the Allied Telesyn Installation CD and the CD interface window opens, close or minimize the window.

7. Use the **Browse** button or manually enter the drive letter and location of the AT-MUX protocol files. If you are using the Installation CD, the files are stored in the `\drivers\AT-Mux` subdirectory.

8. Select **OK**.

   The Select Network Protocol window is displayed again, this time with the AT-MUX protocol, as shown in Figure 100.

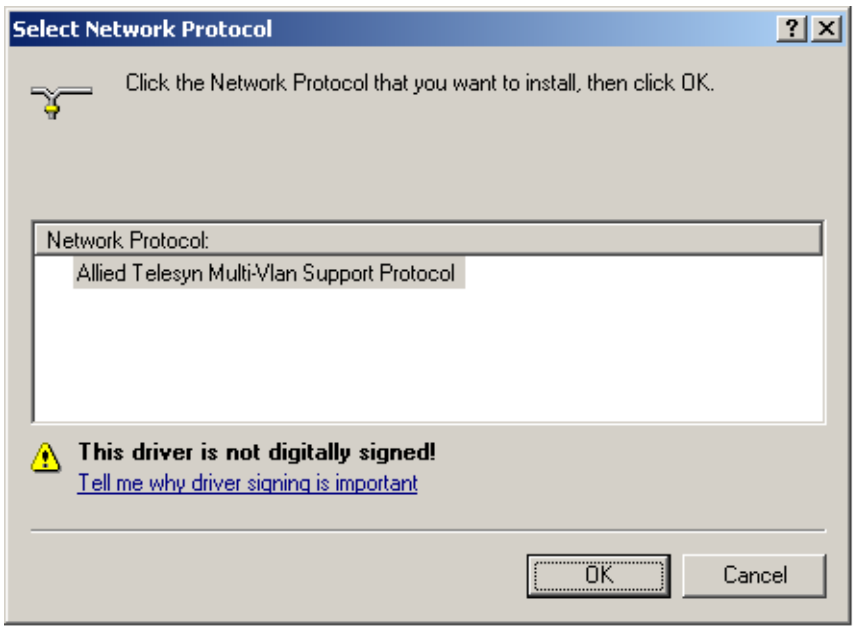


Figure 100. Select Network Protocol Window

Note
You may see the statement “This Driver Not Digitally Signed” and error messages concerning the Windows logo. You can ignore these messages. Allied Telesyn is in the process of digitally signing the AT-MUX protocol but was unable to complete the process before release of this installation guide.

9. If it is not already chosen, select **Allied Telesyn Multi-VLAN Support Protocol** and select **OK**.

   The AT-MUX protocol (labeled as Allied Telesyn Multi-VLAN Support Protocol) is added to the Local Area Connection Properties window, as shown in Figure 101.

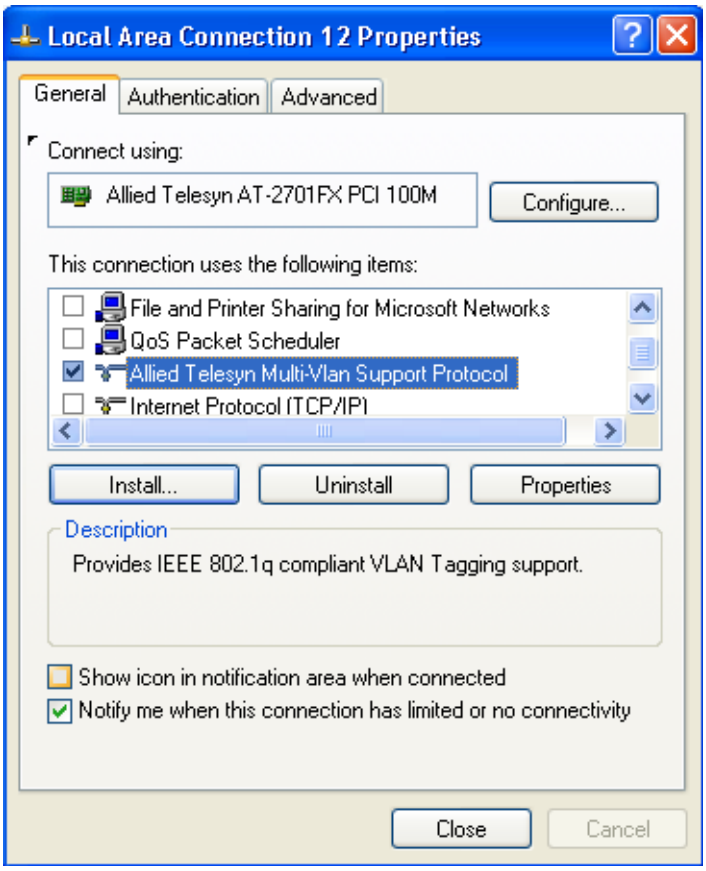


Figure 101. Local Area Connection Properties Window with the AT-MUX Protocol

10. Select **Close**.

    This completes the procedure for installing the AT-MUX protocol on the system. If the system contains more than one adapter, repeat this procedure to install the protocol on each adapter that will handle tagged packets.

Adding, Changing, or Deleting VIDs

To add, change, or delete a VID from a network adapter card, perform the following procedure:

1. From the desktop, right-click the **My Network Places** icon and select **Properties** from the menu, as shown in Figure 102.

Figure 102. My Network Places Icon Menu

An example of the Network Connections window is shown in Figure 103.

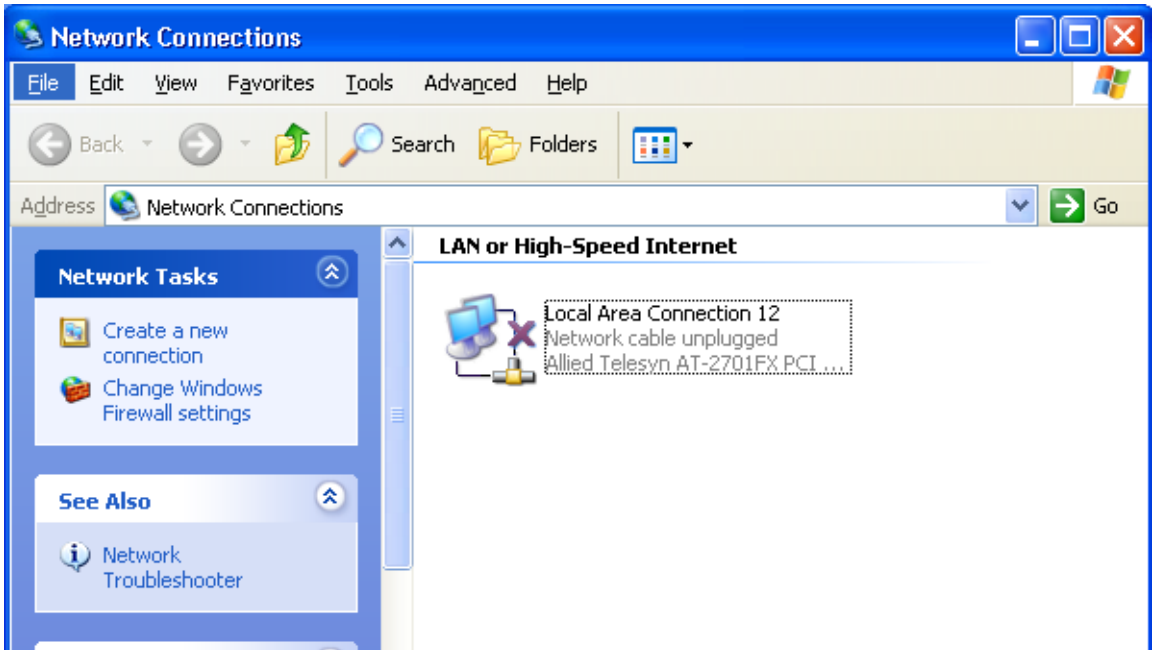


Figure 103. Network Connections Window

2. Right-click the **Local Area Connections** for the adapter card, identified by the adapter card model number in the icon's label, then select **Properties**, as shown in Figure 104.

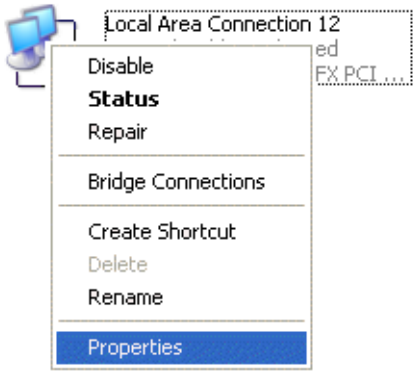


Figure 104. Local Area Connection Icon Pop-up Menu

Note
The Network Connections window will contain multiple LAN connections if VIDs have already been added to a network adapter card. It is important when adding, changing, or deleting VIDs that you select the card's LAN connection, identified by the model number in the icon's label, and not a LAN connection for a tagged VLAN. VIDs can be added, changed, and deleted only through the LAN connection of the network adapter card.

An example of the Local Area Connection Properties window for the adapter card is shown in Figure 105.

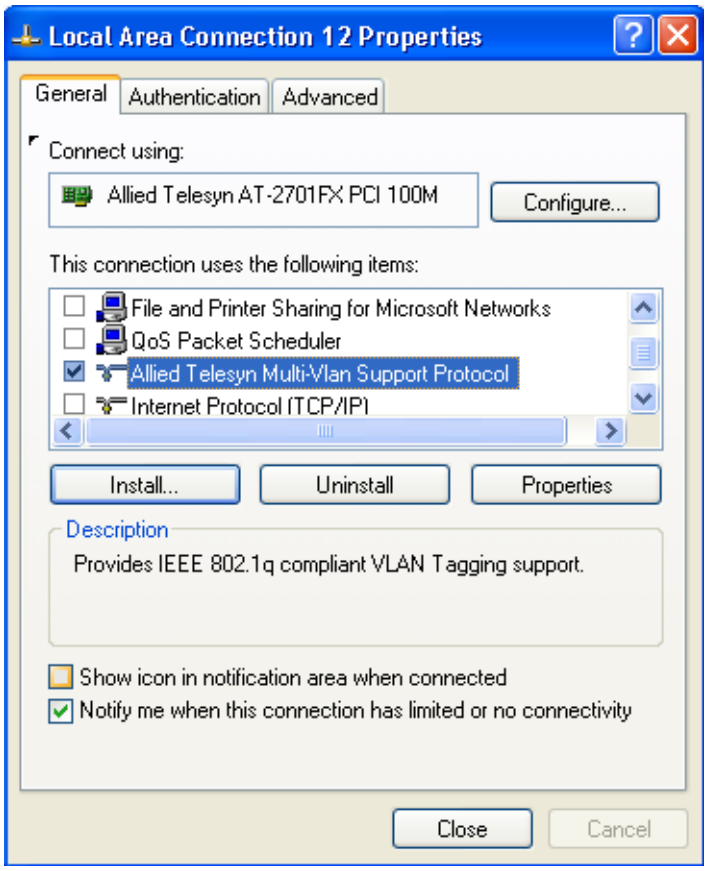


Figure 105. Local Area Connection Properties Window

3. Select **Allied Telesyn Multi-Vlan Support Protocol**, then select **Properties**.

Note
If the Properties button is greyed out and cannot be selected, it probably means in Step 2 you selected a LAN connection icon for a VLAN instead of for the adapter. It is important when adding, changing, or deleting VIDs that you select the network adapter card's LAN connection icon, identified by the model number in the icon's label, and not a LAN connection for a tagged VLAN. To recover, simply close the Properties window and repeat Step 2, this time selecting the card's icon.

The Allied Telesyn Multi-VLAN Support Protocol Properties window is shown in Figure 106.

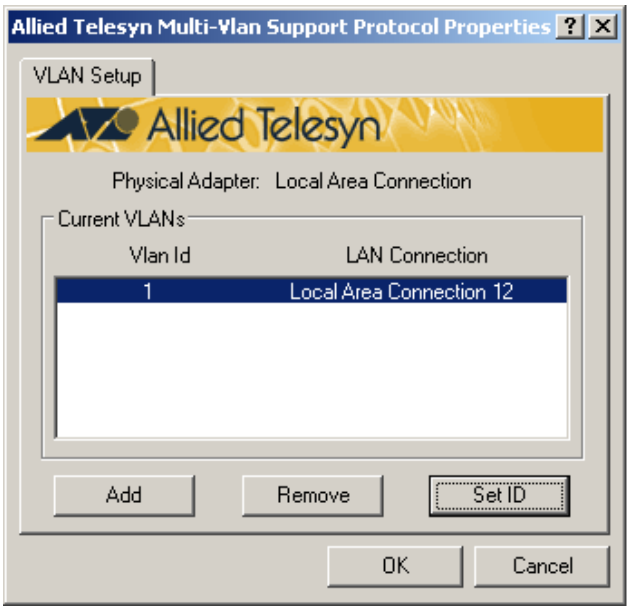


Figure 106. Allied Telesyn Multi-VLAN Support Protocol Properties Window

Note
To add a new VLAN connection, go to Step 4. To change a VID of an existing VLAN connection, go to Step 5. To delete a VLAN connection, go to Step 6.

4. To add a new VID, do the following:

   a. In the Allied Telesyn Multi-VLAN Support Protocol Properties window, select **Add**.

Note
You can ignore the “Not pass Windows Logo testing...” messages.

The Set VLAN ID window is shown in Figure 107.

Figure 107. Set VLAN ID Window

b. Select or enter the new VLAN ID, then select **OK**. The range is 0 to 4094.

   A new local area connection for the VLAN is added to Current VLANs in the Allied Telesyn Multi-VLAN Support Protocol Properties window, shown in Figure 106 on page 171.

c. Repeat Steps a. and b. to add more VIDs, if needed.

d. Once you have finished adding VIDs, select **OK** to return to the Network Connections window, shown in Figure 103 on page 168. The window will now include new LAN connections for the new VIDs.

5. To change the VID of an existing LAN connection, do the following:

   a. From the Allied Telesyn Multi-VLAN Support Protocol Properties window, click the LAN connection whose VID you want to change and click **Set ID**.

      The Set VLAN ID window, shown in Figure 107 on page 171, is displayed.

   b. Select or enter the new VID for the LAN connection and click **OK**.

      The VID of the LAN connection is modified.

   c. Repeat Steps a. and b. to change the VIDs of other LAN connections, if needed.

   d. Once you have finished modifying the VIDs, select **OK** to return to the Network Connections window.

6. To delete a VID, do the following:

   a. From the Allied Telesyn Multi-VLAN Support Protocol Properties window, select the LAN connection of the VLAN you want to delete and select **Remove**.

      A confirmation prompt is displayed.

   b. Select **OK**.

      The selected VLAN connection is deleted.

   c. Repeat Steps a. and b. to delete additional VLAN connections, if needed.

   d. Once you have finished deleting the LAN connections, select **OK** to return to the Network Connections window. The LAN connections of the deleted VIDs are removed from the window.

Removing the AT-MUX Protocol

This procedure removes the AT-MUX protocol from a system. You do not need to delete any existing VLAN connections prior to removing the protocol. The connections are automatically deleted when the protocol is removed.

To remove the AT-MUX protocol, perform the following procedure:

1. From the desktop, right-click the **My Network Places** icon and select **Properties** from the menu.

   The Network Connections window is shown in Figure 103 on page 168.

2. Right-click on the adapter's local area connection and select **Properties** from the pop-up menu.

   Note
   You must select the network adapter card's LAN connection icon. You cannot remove the protocol using the LAN connection of a VLAN.

   The Local Area Connection Properties window is shown in Figure 101 on page 167.

3. Select **Allied Telesyn Multi-Vlan Support Protocol**.

4. Select **Uninstall**.

   The AT-MUX protocol is removed from the system. This completes the procedure for removing the AT-MUX protocol.

Chapter 10

AT-Diag Utility

The AT-Diag utility is used to configure the speed and duplex mode of an adapter port, enable and disable the BootPROM chip and Managed Boot Agent, and test the adapter. Sections in this chapter include:

Starting the AT-Diag Utility

The AT-Diag utility is a quick and easy way for you to test the components on the adapter, configure the speed and duplex mode of the port, and enable or disable the BootPROM chip and MBA. But before you can use the utility, there are a couple things you need to do.

The utility only works under MS-DOS. The system cannot be running Microsoft Windows, Linux, or any other operating system. So the first thing you need to do is determine whether the system where you want to run the program has a DOS mode, in which it runs only MS-DOS. Refer to the system's documentation to determine whether this is possible and how to access the mode.

If the system does not have a DOS mode, you can create a MS-DOS boot diskette. There are web sites on the Internet with programs you can use to create the disk. Simply follow their instructions. A boot diskette for MS-DOS 6.22 will probably work for most systems.

If you are going to be using a boot diskette, you might need to change the BIOS on your system so that it boots from the diskette drive instead of from the hard disk. Refer to your system's documentation for instructions on how to access the BIOS. What you need to do is adjust the sequence of hardware devices the system looks to for its operating system whenever the unit is reset or power cycled. The diskette drive should come before the hard disk drive.

The final step is to copy the diagnostic program files from the Installation CD to a diskette or to create a driver installation diskette. When a system is booted in DOS, the CD drive might not be accessible, making it impossible for you to run the program from the Installation CD. The program files are located in the `\drivers\diagnos` folder on the Installation CD. There are three files. Be sure to copy all three files onto diskette. You can store them in the root directory of the diskette. If you prefer to use a driver installation diskette, refer to "Creating a Driver Installation Disk" on page 68.

Once you have determined how to boot the system into DOS or, alternatively, created a boot diskette, you are ready to run the diagnostics program. To start the program, perform the following procedure:

1. Boot the system in DOS. If you are using a MS-DOS boot diskette, insert the boot diskette into the diskette drive and reset the system.

   Wait for the DOS prompt (A:) to appear.

2. If you copied the AT-Diag program files onto a diskette, remove the boot diskette from the drive and insert the program diskette. Otherwise, insert the Installation CD into the CD drive.

3. At the DOS prompt, do one of the following:

   If you copied the program files onto diskette, type:

   ```
   a:\diag
   ```

   If you are using a driver installation diskette, type:

   ```
   a:\diag\diag
   ```

   If you are using the Installation CD, type:

   ```
   x:\drivers\diag\diag
   ```

   where *x*: is the drive letter for the CD drive.

   If the system contains just one Allied Telesyn adapter card, the AT-Diag main menu is displayed, as shown in Figure 108.

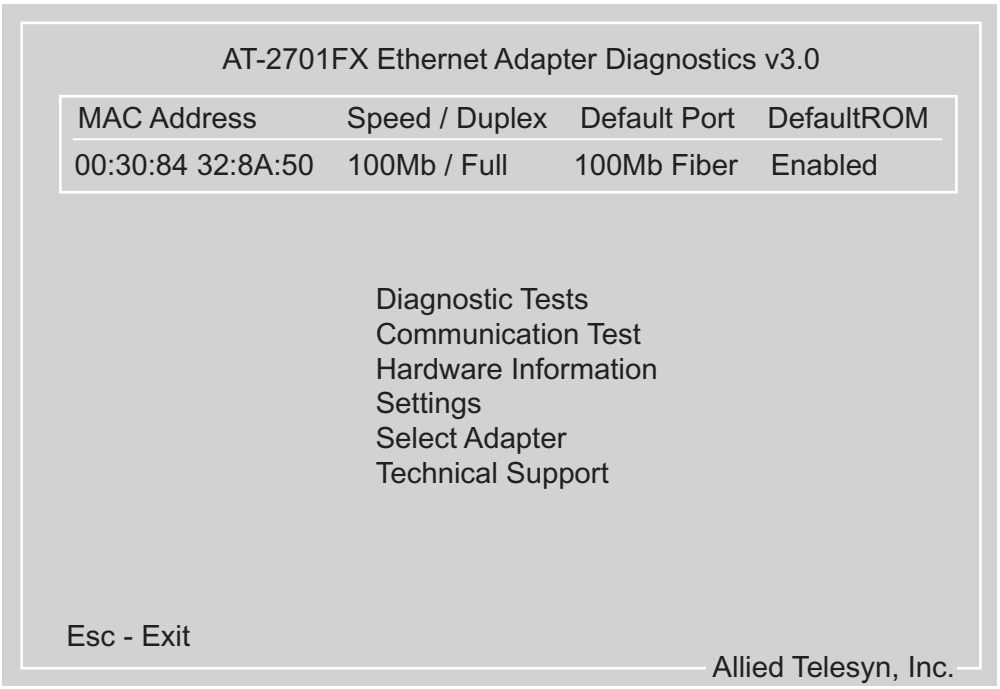


Figure 108. AT-Diag Main Menu

The card's model number, MAC address, and speed and duplex mode are displayed at the top of the window. Also included is the default port, which applies only to dual port adapters and specifies the port where the Managed Boot Agent (MBA) is active, and the status of the BootPROM chip.

Systems containing more than one Allied Telesyn adapter card display a prompt similar to the following prior to displaying the main menu. You can use this prompt to select the adapter card to test or configure. You can configure only one card at a time.

Figure 109. Select NIC Menu

4. To select a menu option, type the highlighted letter or use the up and down arrow keys to highlight the desired option and press Return.

   Note
   The selections in the main menu are described in the following sections.

5. If the system contains more that one network adapter card, use the Select Adapter selection to change adapters to test or configure.

6. When you are finished running diagnostics, press **Esc**. The command prompt is displayed again.

7. Remove the program diskette from the disk drive and reset the computer to restart the system's operating system.

Diagnostics Tests Option

This selection runs a series of tests on the components of the network adapter card. The tests start automatically as soon as you select Diagnostic Tests from the main menu. The Diagnostics window is shown in Figure 110.

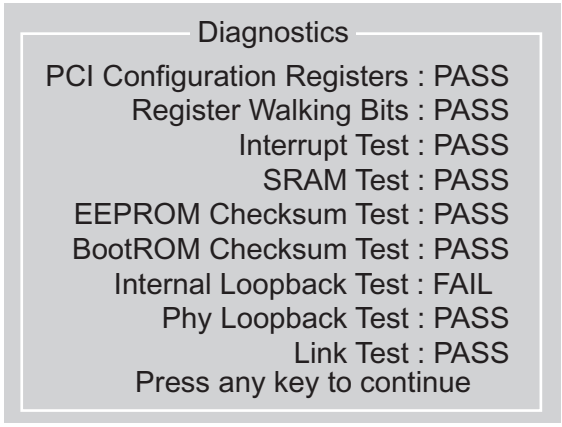


Figure 110. Diagnostics Window

A successful test is indicated with PASS and an unsuccessful test with FAIL. In a properly functioning card, all tests will report PASS, with the following possible exceptions:

- The BootROM Checksum Test reports “N/A” for an AT-2450FTX, AT-2700FX, AT-2700FTX, or AT-2745FX Series card if the optional BootPROM chip is not installed.
- The Link Test, which checks to see if a valid connection exists between the adapter port and the remote device (for example, an Ethernet switch) will fail if the port on the adapter is not connected to a remote device or if the remote device is not powered on.
- The Internal Loopback Test for an adapter with a fiber optic port requires a loopback connector, shown in Figure 111. The connector is used to test the adapter’s ability to transmit and receive traffic. This connector is not available from Allied Telesyn. The test reports “FAIL” if a loopback connector is not present.

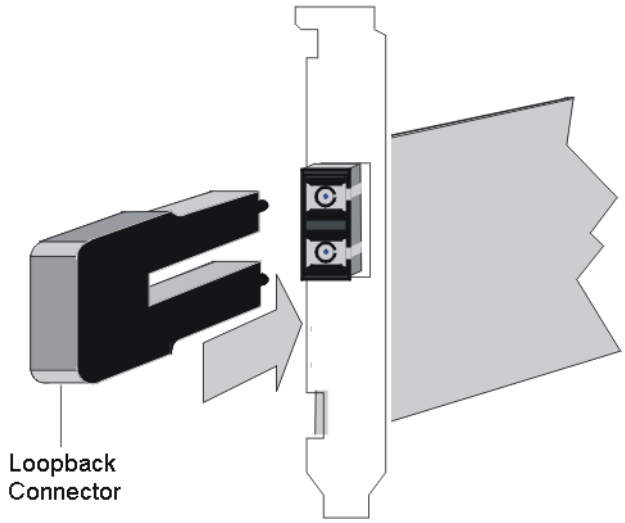


Figure 111. Loopback Connector

Communications Test Option

This test sends raw packets between two Allied Telesyn network adapter cards over the network to check the ability of the network adapter cards to communicate effectively with each other.

Please note the following before you run this test:

- This test requires that you run AT-Diag utility on two systems. One system will be sending the packets and the other will be receiving.
- This test is appropriate for both twisted pair and fiber optic ports.
- The port can be running in either full or half duplex mode.
- When testing a dual port adapter, connect only one port to the network. The utility runs the test on whichever port is connected to the network.

To run the test, perform the following procedure:

1. Start the AT-Diag utility on two network systems.
2. At each system, select Communications Test from the AT-Diag main menu.

   The Communications Test window is shown in Figure 112.

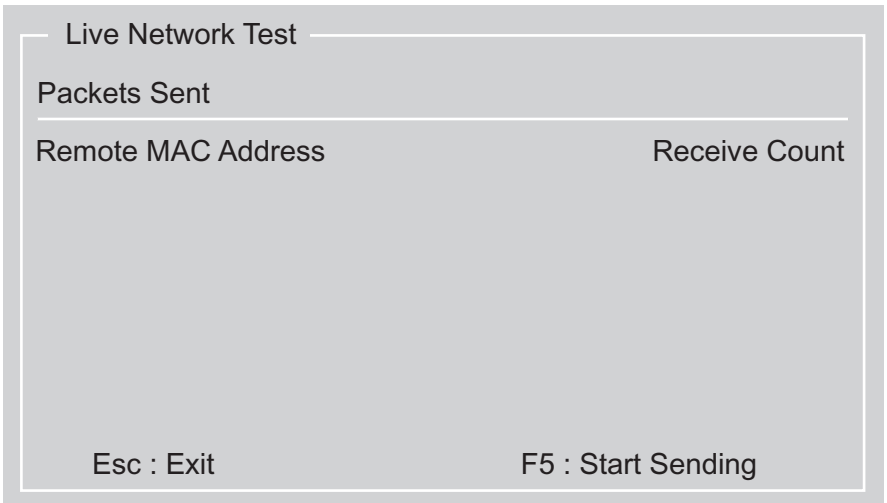


Figure 112. Communications Test Window

3. On the system that you want to send packets, press the F5 key to start the test.

   The Packets Sent field on the system sending the packets will increment as the adapter sends the raw packets. The Receive Count field on the other system running the AT-Diag utility should increment as it receives the packets.

4. To pause the test, press any key on the keyboard. To end the test and return to the AT-Diag main menu, press Esc.

   If the two systems and the network path between them are functioning properly, the Packets Sent statistic on the system sending the packets and the Packets Received statistic on the system receiving the packets should be identical or nearly so. A difference of more than 1% could indicate a network problem. For assistance, refer to Chapter 11, “Troubleshooting” on page 189.

Hardware Information Option

This menu option displays vendor and device information about the network adapter card. You cannot change any of the values in the Hardware Information window.

Settings Option

The Settings menu option is used to do the following:

- Set the speed and duplex mode of an adapter port
- Specify the default port for the MBA on a dual port adapter
- Enable or disable the BootPROM chip and the MBA

Selecting this menu item displays the EEPROM Settings menu, shown in Figure 113.

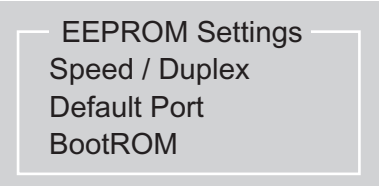


Figure 113. EEPROM Settings Menu

The menu selections are described in the following sections.

Speed/Duplex Selection

This selection sets the speed and duplex mode of a port. The selections vary depending on the port type. For example, a fiber optic port has settings only for duplex mode since a fiber optic port has a fixed operating speed.

Selecting the menu item displays a list of possible speed and duplex mode settings. To select a setting, type the corresponding number from the menu or use the up and down arrow keys to highlight the selection and press Return.

If you are configuring a dual port adapter, Allied Telesyn recommends connecting the appropriate port to the network before setting this parameter. The remote device, such as an Ethernet hub or switch, to which the port on the adapter is connected should be active and functioning properly.

Default Port

This selection applies only to dual port adapters and is used to designate the port where MBA is to be active. MBA can be active on only one port at a time and it cannot change ports automatically. You must designate the port on dual port adapters manually using this menu selection. If you intend to use MBA, the default port must be the port connected to the network.

Selecting the menu item displays a list of the adapter's two ports. Select a port by typing the corresponding number from the menu or using the up and down arrow keys to highlight the selection and pressing Return.

BootROM This selection enables and disables the BootPROM chip and the Managed Boot Agent on the network adapter card. The default setting for the BootPROM chip is enabled.

Selecting this menu item displays the two options Enable and Disable. To select a setting, type the corresponding number from the menu or use the up and down arrow keys to highlight the selection and then press Return.

> **Note**
> This menu item is not available for an AT-2450FTX, AT-2700FX, AT-2700FTX, or AT-2745FX Series card if the optional BootPROM chip is not installed.

Select Adapter Option

You can use this menu option to select the adapter to test or configure in systems that contain more than one network adapter card. When you select the option, the utility displays a window listing the adapters in the system. To selection an adapter, type its number from the list or select it with the up or down arrow keys and press Return.

Technical Support Option

This menu selection displays a window with the web addresses and telephone numbers for Allied Telesyn, Incorporated.

Chapter 11
Troubleshooting

This chapter contains suggestions on what to do if you encounter a problem using your new network adapter card.

> **Note**
> In the following discussions the term “remote device” refers to the device to which the port on the network adapter card is connected. Examples include Ethernet switches and hubs.

The LINK LED is off:

- ❒ Verify that the system in which the adapter card is installed is powered on and is operating correctly.
- ❒ Verify that the remote device is powered on and is operating correctly.
- ❒ Check to be sure that the twisted pair cable or fiber optic cable is securely connected to the port on the network adapter card and to the port on the remote device.
- ❒ Check that you are using the appropriate type of cable and that the cable length does not exceed the permitted maximum length. For cable types and lengths, refer to the appropriate table in Chapter 1, “Network Adapter Card Overview” on page 13.
- ❒ If the remote device has management firmware, verify that the port on the device has not been disabled. If it has been disabled, use the device’s management firmware to enable it.
- ❒ For a twisted pair port, check the wiring configuration of the port on the remote device. If it is configured as MDIX, check to be sure that you are using a straight-through twisted pair cable. If the port on the remote device is configured as MDI, verify that you are using a cross-over twisted pair cable. (If the port on the remote device features auto-MDI/MDIX, you can use either a straight-through or cross-over cable.) Refer to the documentation that came with the device to determine the wiring configuration of its twisted pair ports.

- For a fiber optic port, verify that the operating specifications (for instance, wavelength and maximum operating distance) of the fiber optic port on the remote device are compatible with the fiber optic port on the network adapter card. For example, a fiber optic port with an operating wavelength of 1310 nm will not function if connected to a remote fiber optic port with an operating wavelength of 820 nm. Refer to Chapter 1, “Network Adapter Card Overview” on page 13 for operating specifications of the fiber optic ports.
- For a fiber optic port, use a fiber optic tester to test signal attenuation on the cable. If signal strength is too low, you have either exceeded the permitted maximum length of the fiber optic port or the fiber optic cable has a problem, such as too many splices. Refer to Chapter 1, “Network Adapter Card Overview” on page 13 for operating specifications of the fiber optic ports.
- For a fiber optic port, check to be sure that the two strands of the fiber optic cable are connected correctly on both the network adapter card and the remote device. Duplex SC and ST ports consist of two separate connectors, as shown in Figure 114. Each connects to a different fiber strand. One is for receiving data and the other is for transmitting data. When connecting a fiber optic cable to a duplex ST or SC port, the strands have to cross. That is, the strand connected to the transmitter connector on the port on the network adapter card must connect to the receiver port on the remote device, while the strand connected to the receiver connector on the port on the network adapter card must connect to the transmitter port on the remote device.

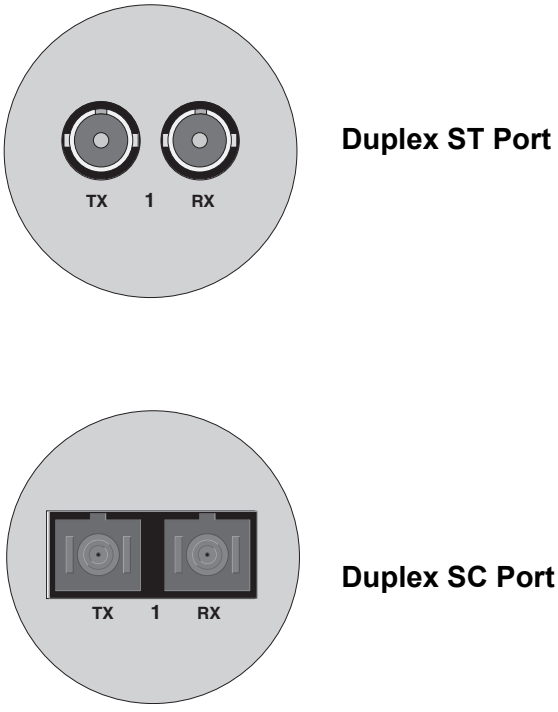


Figure 114. Duplex ST and SC Ports

- If possible, use another twisted pair or fiber optic cable to connect the network adapter card to the remote device. If this resolves the problem, replace the failed cable.
- For a dual port card, verify that only one port is connected to the network.
- Run the AT-Diag utility and perform the Diagnostics Test to test the network adapter card's components. For instructions, refer to Chapter 10, "AT-Diag Utility" on page 175.
- Power off the system and check to be sure that the network adapter card is securely installed in the PCI bus. You might try installing the network adapter card in a different PCI bus in the system to eliminate the possibility of a problem with the PCI connector on the system's motherboard.

The LEDs indicate the presence of a link between the port on the network adapter card and the remote device, but the network adapter card is not receiving or forwarding network traffic or performance is slow or intermittent:

- For a dual port network adapter card, check to be sure that only one port is connected to the network.
- For a twisted pair port operating at 100 Mbps, check to be sure you are using Category 5 or higher twisted pair cable. Category 3 cabling is sufficient for 10 Mbps operation, but can cause problems at 100 Mbps.
- For a fiber optic port, use a fiber optic tester to measure signal attenuation. If signal strength is too low, you have either exceeded the permitted maximum length of the fiber optic port or the fiber optic cable has a problem, such as too many splices. Refer to Chapter 1, "Network Adapter Card Overview" on page 13 for operating specifications of the fiber optic ports.
- For a twisted pair port, check the operating speed and duplex mode of the port on the remote device by referring to the device's documentation. If the device has management firmware, use the firmware to examine the port's operating settings. All of the adapters discussed in this guide have a default setting of Auto-Negotiation for the twisted pair port. If the port on the remote device does not feature Auto-Negotiation and has a fixed duplex mode of full-duplex, you must manually configure the speed and duplex mode of the adapter's port to avoid a duplex mode mismatch, which can impact performance. A twisted pair port operating in Auto-Negotiation will default to the half-duplex mode when connected to a device that is not using Auto-Negotiation. This results in a duplex mode mismatch if the second device is operating at full-duplex. To configure the port, you can use the AT-Diag utility, explained in Chapter 10 on page 175 or, if the system is running Microsoft Windows 2000, 2003, or XP, you can perform the procedure "Configuring the Network Adapter Card Settings" on page 91.

- For a fiber optic port, verify that the port on the network adapter card and the port on the remote device are operating with the same duplex mode. All of the adapters described in this guide have a default setting of full-duplex for the fiber optic port. To configure the duplex mode of a fiber optic port, you can use the AT-Diag utility, explained in Chapter 10 on page 175 or, if the system is running Microsoft Windows 2000, 2003, or XP, you can perform the procedure “Configuring the Network Adapter Card Settings” on page 91.
- Run the AT-Diag utility and perform the Diagnostics Test to test the network adapter card’s components.
- Run the AT-Diag utility and perform the Communications Test to test the quality of the communications path between the card and the remote device.
- If system is running Microsoft Windows 2000, 2003, or XP, perform the procedure “Configuring Additional Network Adapter Card Settings” on page 96. Check the VLAN ID value. If the network adapter card is handling only untagged packets or if you installed the AT-MUX utility, the VLAN ID value should be 0 (zero). If the adapter will be handling tagged packets from just one VLAN, this parameter should be set to the corresponding VID value. For further information, refer to “Virtual LANs and the AT-MUX Protocol” on page 37.
- Power off the system and try installing the network adapter card in a different PCI slot in the system.

The BootPROM chip and MBA are not functioning:

- For a dual port network adapter card, check to be sure that only one port is connected to the network.
- Perform the Diagnostics Test selection in the AT-Diag utility. If the BootROM Checksum Test fails, the network adapter card has a problem. Replace the card.
- Use the AT-Diag utility to verify that the BootPROM chip and MBA are activated on the card. The BootPROM chip is controlled with the Settings option in the main menu of the utility.
- For a dual port network adapter card, use the AT-Diag utility to verify that the port connected to the network has been designated as the default port for MBA. The default port is controlled through the Settings option in the main menu of the AT-Diag utility.

The link light is on but no cable is connected to the network adapter card:

- This could indicate a failure of the network adapter card. Perform the Diagnostics Test selection in the AT-Diag utility to test the card’s components.

Appendix A

Technical Specifications

Physical Specifications

AT-2451FTX Series	Height: 6.5 cm (2.5 in.) Length: 18 cm (7.25 in.)
AT-2701FX Series	Height: 6.5 cm (2.5 in.) Length: 17.5 cm (7 in.)
AT-2701FTX Series	Height: 6.5 cm (2.5 in.) Length: 17.5 cm (7 in.)
AT-2746FX Series	Height: 8.3 cm (3.25 in.) Length: 17.7 cm (7 in.)

Operating Voltage

AT-2451FTX, AT-2701FX, AT-2701FTX, and AT-2746FX Series	5 VDC, 1A maximum

Environmental Specifications

Operating Temperature	0° C to 40° C (32° F to 104° F)
Storage Temperature	-25° C to 70° C (-13° F to 158° F)
Operating Humidity	5% to 90% non-condensing
Storage Humidity	5% to 95% non-condensing
Maximum Operating Altitude	4,000 m (13,000 ft)
Maximum Non-operating Altitude	4,000 m (13,000 ft)

Electrical Safety and Emissions Standards

RFI Emissions	EN55022 Class B, EN61000-3-2, EN61000-3-3
Immunity	EN55024
Electrical Safety	EN60950 (TUV), UL 60950 ($_{C}UL_{US}$)
Laser Safety	EN60825

Twisted Pair Port Pin-outs

Figure 115 illustrates the pin layout of the RJ-45 port for those cards described in this guide that feature a twisted pair port.

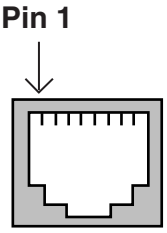


Figure 115 RJ-45 Port Pin Layout

Table 15 lists the RJ-45 pin signals for the 10/100Base-TX port.

Table 15. 10/100Base-TX Port MDI Pin Signals

Pin	MDI Signal
1	TX+
2	TX-
3	RX+
4	Unused
5	Unused
6	RX-
7	Unused
8	Unused

Appendix B

Unattended Microsoft Windows Installations

This chapter contains the following sections:

Unattended Microsoft Windows XP Installation

This section describes the steps required to add Allied Telesyn supplied OEM drivers to Microsoft Windows XP installations. This document includes only those drivers that are typically installed during graphical user interface (GUI)-mode Setup or post-Setup by standard Plug and Play enumeration. This will permit you to pre-load ATI Plug and Play drivers that you can use later, when the associated hardware is introduced in the system.

This section describes how to add OEM Plug and Play drivers to be used during an “unattended installation” of Windows XP. This document does not cover instructions for configuring “Sysprep Setup”, RIS installations, “Riprep” or upgrading a current windows installation.

What the Steps Do

Drivers that are installed during the "Installing Devices" portion of the GUI-mode Setup have to be found in certain predefined locations. At this point of the installation, Setup installs the devices (by using Plug and Play IDs) that have been discovered by Windows Plug and Play. Setup searches a predefined path on the drive, looking in .inf files to find the best match for the Plug and Play ID of the device.

This path is defined in the following registry location and is set to %SystemRoot%\Inf by default:

```
HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\Curren
tVersion\DevicePath: REG_EXPAND_SZ:%SystemRoot%\Inf
```

Setup uses this path to locate .inf files for device installation. After Setup, this path is also used for any new hardware found and installed. If you modify this key during Setup by using the Sysprep.inf or Unattended answer file, the value is saved and is also used after Setup.

The following sections of this document explain how to add ATI-supplied drivers to unattended installations of Windows.

Unattended Setup

To add OEM drivers to an unattended Setup, follow these steps.

Note
If the OEM-supplied drivers are not digitally signed, you will receive a warning message about this during Setup. To have the system ignore this message, add the following entry to the [Unattended] section of the Setup answer file (Unattend.txt):

```
DriverSigningPolicy = Ignore
```

For additional information about this setting, view article 236029 in the Microsoft Knowledge Base: How to Set the Driver Signing Policy for Windows Unattended Setup.

Note
View article 308662 in the Microsoft Knowledge Base for in-depth information on how to use Setup Manager to create the required Answer File in Windows (Unattend.txt). This document is not designed to provide that in-depth information.

The steps required:

1. Create a distribution point on a network server by copying the I386 folder from the Microsoft Windows CD-ROM to a location on the distribution server. Use the Setup Manager utility (Setupmgr.exe) to create a Unattended.txt file. You can find Setupmgr.exe on the Windows CD-ROM in the Support\Tools folder in the Deploy.cab file, along with the Setupmgr.chm file that contains information about Windows unattended Setup.

2. Create a oem\$1\Drivers\NIC folder in the I386 folder that you copied to the distribution server. The $1 folder resolves to %SystemDrive%. During text-mode setup, these folders and files are copied to the %SystemDrive%\Drivers folders. For example:

```
\i386
-\$oem$
- - \$1
- - - \Drivers
- - - - - \NIC
```

3. Copy the ATI-supplied driver files for the device to the folder created in the preceding step.

4. Add the OemPnPDriversPath = Driver_Paths entry in the [Unattended] section of the Setup answer file.

```
[Unattended]
OemPnPDriversPath = Drivers\NIC
```

Note
The %SystemDrive% environment variable string is automatically inserted before the listed search path so it is unnecessary to list the entire path.

5. Delete the file “netamd2.in_ from the \I386 directory that was previously copied to the distribution server.

6. Step 6. Replace the deleted file “netamd2.in_” from the previous step with the ATI “netamd2.inf” file that is provided with this document.

7. Save any changes you may have made to the unattend.txt file.

If you need to change the default adapter speed and duplex parameters, further changes will be needed to be made to the “unattend.txt” file. These changes are detailed here.

To change default AT-245x/270x Series adapter parameters during unattended setup

1. You will need to edit the “unattend.txt” file. Add the following entries:

```
[NetAdapters]
|Adapter01=params.Adapter01


[params.Adapter01]
   InfID="pci\ven_1022&dev_2000"
   AdditionalParams=params.Adapter01.additional


[params.Adapter01.additional]
; ‘EXTPHY’ is for the AT-245x/270x Series adapters.
Changes the default
; ‘Speed/Duplex’ Setting.
EXTPHY=”1”
```

2. Edit the EXTPHY= entry to contain the desired speed/duplex value.

   See chart below for the possible values.

   Table 16. EXTPHY Parameter Values

Value	Definition
1	100Mbps/Half Duplex
2	100Mbps/Full Duplex
3	10Mbps/Half Duplex
4	10Mbps/Full Duplex

3. Save your modified “unattend.txt” file.

Appendix C

Optional BootPROM Chip and DIP Switch Settings

This appendix explains how to install the optional BootPROM chip and set the DIP switch on the AT-2450FTX, AT-2700FX, AT-2700FTX, and AT-2745FX Series network adapter cards. Sections in the appendix include:

Note
This appendix does not apply to the AT-2451FTX, AT-2701FX, AT-2701FTX, and AT-2746FX Series cards. These cards do not have a DIP switch and come with the BootPROM chip as standard.

Installing a BootPROM Chip

Installing the BootPROM chip is a straightforward task, but you must take care to ensure that components are not damaged. Be sure you understand the following instructions before installing the chip.

Caution
Risk of equipment damage:
Before removing an adapter card, attach an earth ground to the PC chassis. If an earth ground is unavailable, ensure that the power is switched off and plug in the PC's grounded AC power cord.

Caution
Wear an anti-static wrist strap when handling ROMs. As an additional measure, do not touch the ROM's connectors. Leave the ROM in its anti-static packaging when not in use.

Caution
If the network adapter card is installed in the system, remove it before installing the chip. Refer to your system’s hardware documentation for instructions on how to remove adapter cards.

The BootPROM chip will be either square or rectangular. The square chip has an angled corner that must be oriented to match the angled corner of the socket, as shown in Figure 116. The rectangular chip has a notch in one end that must be aligned with the notch on the socket, as shown in Figure 117.

To install the chip, do the following:

1. If the network adapter card is already installed in the system, power off the computer and remove the adapter. Do not attempt to install the chip with the network adapter card in the system.
2. Remove the BootPROM chip from its anti-static packaging.
3. Position the chip on the empty socket on the network adapter card.

The AT-BP2700 and AT-BP2501 BootPROM chips are square. They have an angled corner that should be positioned on the angled corner of the ROM socket on the adapter card, as shown in Figure 116.

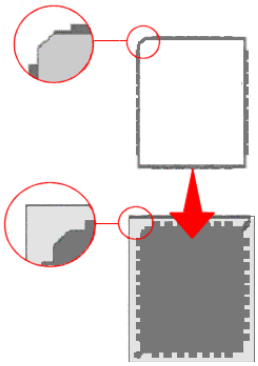


Figure 116. MBA ROM Installation

The AT-BD2700 and AT-BD2500 BootPROM chips have a notch in one end that must be positioned over the notch on the socket, as shown in Figure 117.

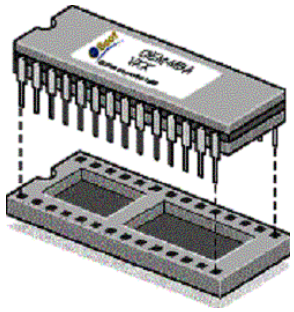


Figure 117. MBA ROM Installed on a AT-BD2700/AT-BD2500

4. Press down gently and evenly on the BootPROM chip until it is completely seated in the socket.

5. Examine the adapter for a DIP switch. Some of the older versions of the AT-2450FTX, AT-2700FTX, and AT-2745FX Series cards have a DIP switch you have to set if you install the optional BootPROM chip. If your network adapter card has a DIP switch, refer to “DIP Switch Settings” on page 202, for the appropriate setting.

6. Install the network adapter card in the system. For instructions, refer to Chapter 2, “Installing a Network Adapter Card” on page 45 and the documentation included with the system.

DIP Switch Settings

Some older models of the AT-2450FTX, AT-2700FTX, and AT-2745FX Series cards have a DIP switch you need to set if you install the optional BootPROM chip. If your network adapter card has the switch, you must set it to reflect the active port or speed of the adapter. The possible settings are given in the following tables.

Table 17. AT-2450FTX and AT-2700FTX Series

Active Port	Switch Position
Twisted Pair	Up[a]
Fiber	Down

a. Factory default.

Table 18. AT-2745FX Series

Active Port	Switch Position
100Base-FX Fiber	Up[a]
10Base-FL Fiber	Down

a. Factory default.

Note
If the optional BootPROM chip is **NOT** installed, the DIP switch should be set to the factory default setting.

Appendix D

Cleaning Fiber Optic Connectors

The fiber optic connector consists of a fiber optic plug and its adapter. The end of the fiber optic cable is held in the core of the ferrule in the plug. Light signals are transmitted through the core of the fiber. Even minor smudges or dirt on the end face of the fiber, completely invisible to the naked eye, can disrupt light transmission and lead to failure of the component or of the entire system. Therefore, it is of utmost importance to clean all fiber optic connectors before use.

Figure 118 shows the ferrule in an SC connector.

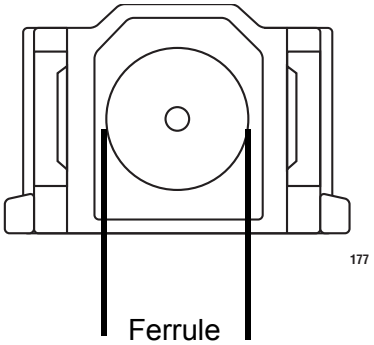


Figure 118. Ferrule in an SC Connector Plug

Figure 119 shows part of the end face of an unclean and clean ferrule.

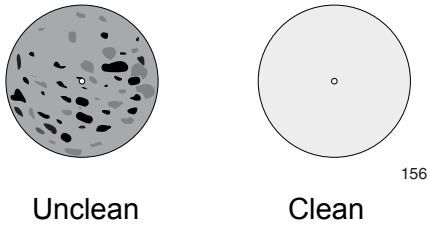


Figure 119. Unclean and Clean Ferrule

This appendix provides the following procedures

- “Using a Cartridge-Type Cleaner” on page 204
- “Using a Swab” on page 206

Using a Cartridge-Type Cleaner

Fiber optic cartridge cleaners are available from many vendors and are typically called “cartridge cleaners,” as shown in Figure 120.

Figure 120. Cartridge Cleaner

Note
Do not use compressed air or aerosol air to clean a fiber optic connector.

To clean a fiber optic connector using a cartridge cleaner, perform the following procedure.

1. With one hand, hold the cartridge cleaner and push the lever on the cleaning cartridge in the direction of the arrow to expose the cleaning surface, as shown in Figure 121.

2. Place the ferrule tip on the exposed cleaning surface and rub the ferrule in a downward direction, as shown in Figure 121.

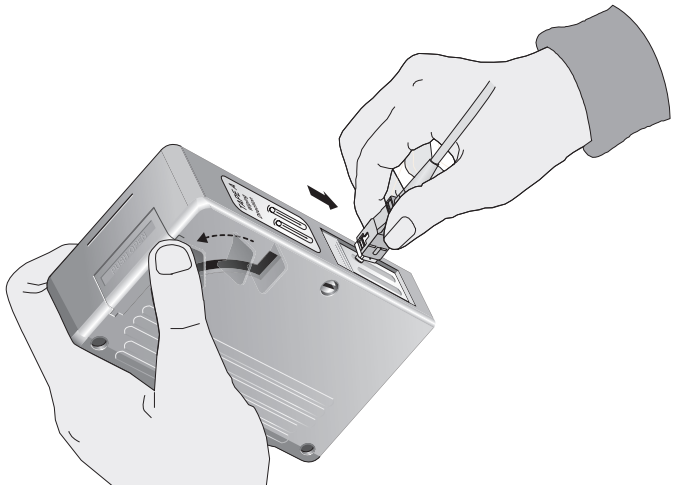


Figure 121. Rubbing the Ferrule Tip on the Cleaning Surface

Note
Rub the ferrule tip on the cleaning surface in one direction only.

3. When you reach the end of the cleaning surface, pick up the ferrule tip, rotate and place it at the top and rub downwards at least 2 times.

Caution
Failing to pick up the ferrule tip when you reach the bottom of the cleaning surface can result in static electricity that can damage the fiber optic cable.

4. If desired, repeat steps 3 and 4.
5. If a fiber inspection scope is available, use the scope to inspect the ferrule end face to make sure that it is clean.
6. Reconnect the cable to the port or protect the ferrule tip with a dust cap.

Note
Always keep a dust cap on a fiber optic cable when it is not in use.

Note
Do not touch the end face of the ferrule in the connector.

Warning
Do not look directly at the fiber optic cable ends or inspect the cable ends with an optical lens. 31

Using a Swab

Specially treated swabs (stick cleaners) are available for cleaning inside connector adapters or hard-to-reach ferrule tips. Shown in Figure 122, these swabs, often referred to as “lint free” or “alcohol free” swabs, are available from many vendors. Stick cleaners are available in both 2.5 mm and 1.25 mm sizes for use on SC and MU connectors respectively.

Note
NEVER use a household cotton swab and/or alcohol to clean a fiber optic connector. This may leave a residue on the ferrule tip.

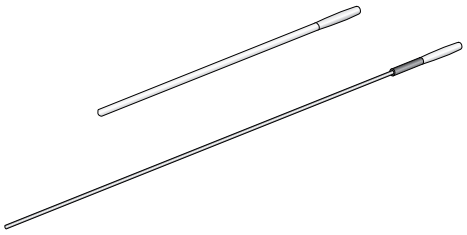


Figure 122. Lint-Free and Alcohol-Free Swabs

Note
Do not use compressed air or aerosol air to clean a fiber optic connector.

To clean a recessed ferrule using a swab, perform the following procedure.

1. Insert the swab into the adapter as shown in Figure 121 and rub the ferrule tip with the swab.

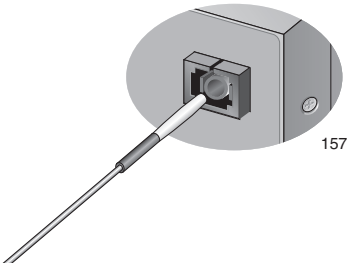


Figure 123. Cleaning a Recessed Ferrule

2. If desired, repeat step 1.

3. If a fiber inspection scope is available, use the scope to inspect the connector to make sure that it is clean and to check for scratches, pits, or other problems that may affect performance.

Note
Always keep a dust cap on a fiber optic cable when it is not in use.

Warning
Do not look directly at the fiber optic cable ends or inspect the cable ends with an optical lens. 31

Appendix E

Translated Safety Statements

Important: This appendix contains multiple-language translations for the safety statements in this guide.

Wichtig: Dieser Anhang enthält Übersetzungen der in diesem Handbuch enthaltenen Sicherheitshinweise in mehreren Sprachen.

Importante: Este apéndice contiene traducciones en múltiples idiomas de los mensajes de seguridad incluidos en esta guía.

Important: Cette annexe contient la traduction en plusieurs langues des instructions de sécurité figurant dans ce guide.

Importante: Questa appendice contiene traduzioni in più lingue degli avvisi di sicurezza di questa guida.

Важно: Данное приложение содержит переводы с разных языков по безопасности, приведенное в данном руководстве.

Laser Safety Notices

1  **Warning:** Class 1 Laser product.

2  **Warning:** Do not stare into the laser beam.

Electrical Safety Notices

3  **Warning:** To prevent electric shock, do not remove the cover. No user-serviceable parts inside. This unit contains hazardous voltages and should only be opened by a trained and qualified technician. To avoid the possibility of electric shock, disconnect electric power to the product before connecting or disconnecting the LAN cables.

4  **Warning:** Do not work on equipment or cables during periods of lightning activity.

5  **Warning:** Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord.

6  **Warning:** Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts.

7 Pluggable Equipment. The socket outlet shall be installed near the equipment and shall be easily accessible.

8  **Caution:** Air vents must not be blocked and must have free access to the room ambient air for cooling.

9 **Warning:** Operating Temperature. This product is designed for a maximum ambient temperature of 40° degrees C.

10 All Countries: Install product in accordance with local and National Electrical Codes.

11  **Warning:** As a safety precaution, install a circuit breaker with a minimum value of 15 Amps between the equipment and the DC power source.

Always connect the wires to the LAN equipment first before you connect the wires to the circuit breaker. Do not work with HOT feeds to avoid the danger of physical injury from electrical shock. Always be sure that the circuit breaker is in the OFF position before connecting the wires to the breaker.

12  **Warning**: Do not strip more than the recommended amount of wire. Stripping more than the recommended amount can create a safety hazard by leaving exposed wire on the terminal block after installation.

13  **Warning:** When installing this equipment, always ensure that the frame ground connection is installed first and disconnected last.

14 **Warning:** Check to see if there are any exposed copper strands coming from the installed wire. When this installation is done correctly there should be no exposed copper wire strands extending from the terminal block. Any exposed wiring can conduct harmful levels of electricity to persons touching the wires.

15 This system works with positive grounded or negative grounded DC systems.

16 **Warning:** Only trained and qualified personnel are allowed to install or to replace this equipment.

17 **Caution:** The attached mounting brackets must be used to securely mount the device on the wall.

18 **Caution:** Do not install in direct sunlight, or a damp or dusty place.

19 **Caution:** Do not expose the gateway device to moisture or water.

20 **Caution:** If the gateway device is installed indoors, make sure that the site is a dust-free environment. The site should provide for easy access to the ports of the gateway device.This will make it easy for you to connect and disconnect cables, as well as view the LEDs.

21 **Warning:** The power source for the gateway unit should be located near the unit and should be easily accessible.

22 **Caution:** To allow proper cooling of the gateway device, make sure that the air flow around the unit and through its heatsink cooling fins on the rear is not restricted.

23 Circuit Overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

24 **Caution:** Risk of explosion if battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer’s instructions.

Attention: Le remplacement de la batterie par une batterie de type incorrect peut provoquer un danger d’explosion. La remplacer uniquement par une batterie du même type ou de type équivalent recommandée par le constructeur. Les batteries doivent être éliminées conformément aux instructions du constructeur.

25 **Warning:** For centralized DC power connection, install only in a restricted access area.

26 A tray cable is required to connect the power source if the unit is powered by centralized DC power. The tray cable must be a UL listed Type TC tray cable and rated at 600 V and 90 degrees C, with three conductors, minimum 14 AWG.

27 **Warning:** Mounting of the equipment in the rack should be such that a hazardous condition is not created due to uneven mechanical loading.

28  **Warning:** Remove all metal jewelry, such as rings and watches, before installing or removing a line card from a powered-on chassis.

29 Use dedicated power circuits or power conditioners to supply reliable electrical power to the device.

30 **Warning:** The chassis may be heavy and awkward to lift. Allied Telesyn recommends that you get assistance when mounting the chassis in an equipment rack.

31  **Warning:** Do not look directly at the fiber optic cable ends or inspect the cable ends with an optical lens.

32  **Warning:** This unit might have more than one power cord. To reduce the risk of electric shock, disconnect all power cords before servicing the unit.

33 **Warning:** Only trained and qualified personnel are allowed to install or to replace this equipment.

34 **Warning:** The power input must be provided from SELV source only, per IEC 60950. Do not connect to a centralized DC battery bank.

35 UL recognized wires of 18 AWG minimum should be provided by the installer.

36 UL recognized wires of 22 AWG minimum should be provided by the installer.

37 **Caution:** Power to the hub must be sourced only from the adapter.

38 If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer’s maximum rated ambient temperature (Tmra).

39 **Caution:** Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

40  **Warning:** Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuits (e.g., use of power strips).

Telecommunications Compliance Notices

41  **Warning:** When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electronic shock, and injury to persons, including the following:

Do not use this product near water, for example, near a bathtub, washbowl, kitchen sink, or laundry tub in a wet basement or near a swimming pool.

Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.

Do not use the telephone to report a gas leak in the vicinity of the leak.

42  **Warning:** Before connecting to the telephony (TEL) ports on the gateway device, make sure to disconnect the Public Switch Telephone Network (PSTN) feed to the premises.

43 **Warning:** To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.

Lasersicherheitshinweise

1  **Achtung:** Laserprodukt der Klasse 1.

2  **Achtung:** Blicken Sie nicht in den Laserstrahl.

Elektrische Sicherheitshinweise

3  **Achtung:** Um Stromschläge zu vermeiden, darf die Abdeckung nicht entfernt werden. Die Ausrüstung enthält keine benutzerwartbaren Teile. Diese Einheit führt gefährliche Spannungen und sollte nur durch einen ausgebildeten und qualifizierten Techniker geöffnet werden. Zur Vermeidung der Möglichkeit von Stromschlägen ist die Stromversorgung des Produkts vor dem Anschließen oder Abtrennen von LAN-Kabeln zu unterbrechen.

4  **Achtung:** Bei Gewittern und Blitzaktivität dürfen keine Arbeiten an der Ausrüstung oder an Kabeln erfolgen.

5  **Achtung:** Das Stromkabel dient als Abtrennungselement. Zum Abschalten der Ausrüstung Stromkabel abziehen.

6  **Achtung:** Ausrüstung der Klasse I. Diese Ausrüstung muss geerdet werden. Der Stromstecker muss an eine vorschriftsmäßig geerdete Steckdose angeschlossen werden. Eine inkorrekt verdrahtete Steckdose kann gefährliche Spannungen auf zugängliche Metallteile aufbringen.

7 Steckbare Ausrüstung. Die Steckdose sollte in der Nähe der Ausrüstung installiert und leicht zugänglich sein.

8  **Vorsicht:** Belüftungsöffnungen dürfen nicht blockiert werden und müssen zur Kühlung durch die Umluft frei zugänglich sein.

9 **Achtung:** Betriebstemperatur. Dieses Produkt ist für eine maximale Umgebungstemperatur von 40° C konzipiert.

10 Alle Länder: Dieses Produkt muss entsprechend den örtlichen und nationalen Elektrizitätsvorschriften installiert werden.

11  **Achtung:** Als Sicherheitsvorkehrung sollte ein Überlastschalter mit einem minimalen Nennwert von 15 Ampere zwischen der Ausrüstung und der Gleichstromversorgung installiert werden.

Vor dem Anschluss der Kabel am Überlastschalter sollten stets zuerst die Kabel an die LAN-Ausrüstung angeschlossen werden. Zur Vermeidung von Verletzungen in Folge von Stromschlag sollte nicht mit SPANNUNGSFÜHRENDEN Versorgungen gearbeitet werden. Vor dem Anschluss der Kabel an den Überlastschalter ist stets Sorge zu tragen, dass der Überlastschalter AUSGESCHALTET ist.

12 **Achtung:** Nicht mehr als die empfohlene Kabellänge abisolieren. Durch das Abisolieren von mehr als der empfohlenen Länge können gefährliche blanke Drähte aus dem Anschlussblock hervorragen.

13 **Achtung:** Beim Installieren dieser Ausrüstung ist stets darauf zu achten, dass die Rahmenerdung zuerst angeschlossen und zuletzt abgetrennt wird.

14 **Achtung:** Das installierte Kabel muss auf etwaige freiliegende Kupferlitzen überprüft werden. Bei der korrekten Installation sollten keine freiliegenden Kupferdrahtlitzen aus dem Anschlussblock herausragen. Jegliche freiliegende Drähte können für Personen, die sie berühren, gefährlichen Strom führen.

15 Dieses System kann in Verbindung mit positiv geerdeten oder negativ geerdeten Gleichstromsystemen verwendet werden.

16 **Achtung:** Das Installieren und der Austausch dieser Ausrüstung ist nur ausgebildetem und qualifiziertem Personal gestattet.

17 **Vorsicht:** Mechanische Montage. Zur sicheren Wandmontage des Geräts sind die beiliegenden Montageklammern zu verwenden.

18 **Vorsicht:** Das Gerät darf nicht an feuchten, staubigen oder direktem Sonnenlicht ausgesetzten Orten installiert werden.

19 **Vorsicht:** Das Gateway-Gerät darf keiner Feuchtigkeit oder Wasser ausgesetzt werden.

20 **Vorsicht:** Bei der Innenraummontage des Gateway-Geräts ist darauf zu achten, dass es in einer staubfreien Umgebung installiert wird. Es sollte ein Installationsort gewählt werden, an dem die Ports am Gateway-Gerät gut zugänglich sind, um das Anschließen und Abtrennen von Kabeln zu erleichtern und den freien Blick auf die LEDs zu ermöglichen.

21 **Achtung:** Die Stromquelle für die Gateway-Einheit sollte sich in ihrer Nähe befinden und leicht zugänglich sein.

22 **Vorsicht:** Zur Gewährleistung der erforderlichen Kühlung des Gateway-Geräts ist darauf zu achten, dass der Luftfluss um die Einheit und über seine an der Rückseite befindlichen Kühlrippen nicht behindert wird.

23 Stromkreisüberlastung: Der Anschluss der Ausrüstung an den Versorgungsstromkreis und die möglichen Auswirkungen der Überlastung von Schaltkreisen auf den Überstromschutz und die Versorgungskabel sollten erwogen werden. In diesem Zusammenhang sollten auch die auf dem Typenschild der Ausrüstung angegebenen Nennwerte entsprechend berücksichtigt werden.

24 **Vorsicht:** Beim Ersetzen der Batterie durch einen inkorrekten Typ besteht Explosionsgefahr. Die Batterie sollte nur durch denselben oder einen gleichwertigen, vom Hersteller empfohlenen Typ ersetzt werden. Die Batterien sind gemäß der Anleitungen des Herstellers zu entsorgen.

25 **Achtung:** Bei einem zentralisierten Gleichstromanschluss darf die Installation nur in einem Bereich mit gesichertem Zugang erfolgen.

26 Bei der Versorgung der Einheit durch zentralisierten Gleichstrom ist ein Tray-Kabel zum Anschluss der Stromquelle erforderlich. Das Tray-Kabel muss ein UL-gelistetes Typ-TC-Tray-Kabel mit einer Nennspannung von 600 V und einer Nenntemperatur von 90 Grad Celsius, mit drei Leitern und mindestens 14 AWG sein.

27 **Achtung:** Bei der Rackmontage der Ausrüstung ist darauf zu achten, dass keine Gefahrenbedingung durch ungleichmäßige mechanische Belastung geschaffen wird.

28  **Achtung:** Vor dem Installieren oder Ausbauen einer Leitungskarte in das bzw. aus dem Chassis einer eingeschalteten Einheit ist aller metallischer Schmuck wie zum Beispiel Ringe oder Uhren zu entfernen.

29 Zur zuverlässigen Stromversorgung des Geräts sollte ein dedizierter Stromkreis oder Netzfilter und Stabilisator (Power Conditioner) verwendet werden.

30 **Achtung:** Das Chassis kann schwer und schwierig zu heben sein. Allied Telesyn empfiehlt, bei der Rackmontage des Chassis Hilfspersonal heranzuziehen.

31  **Achtung:** Sehen Sie nicht direkt auf die Enden der Faseroptikkabel und inspizieren Sie die Kabelenden nicht mit einer optischen Linse.

32  **Achtung:** An dieser Einheit kann mehr als ein Stromkabel vorhanden sein. Vor Wartungsarbeiten sollten zur Reduzierung des Stromschlagrisikos alle Stromkabel abgetrennt werden.

33 **Achtung:** Das Installieren und der Austausch dieser Ausrüstung ist nur ausgebildetem und qualifiziertem Personal gestattet.

34 **Achtung:** Der Stromeingang darf nur über eine SELV-Quelle gemäß IEC 60950 erfolgen. Eine zentralisierte Gleichstrom-Batteriebank darf nicht angeschlossen werden.

35 UL-anerkannte Kabel mit mindestens 18 AWG sollten vom Installateur bereitgestellt werden.

36 UL-anerkannte Kabel mit mindestens 22 AWG sollten vom Installateur bereitgestellt werden.

37 **Vorsicht:** Die Stromversorgung des Hub darf nur über den Adapter erfolgen.

38 Bei der Installation in einer geschlossenen oder einer mehrere Einheiten umfassenden Anordnung kann die Temperatur der Betriebsumgebung die Raumtemperatur übersteigen. Es sollte deshalb darauf geachtet werden, das die Ausrüstung in einer Umgebung installiert wird, die der maximalen Nennumgebungstemperatur (Tmra) des Herstellers entspricht.

39 **Vorsicht:** Beim Installieren der Ausrüstung in einem Rack ist darauf zu achten, dass der für den sicheren Betrieb der Ausrüstung erforderliche Luftfluss nicht beeinträchtigt wird.

40  **Achtung:** Es sollte eine zuverlässige Erdung der rackmontierten Ausrüstung aufrechterhalten werden. Andere Versorgungsleitungen als direkte Verbindungen zu den Zweigschaltungen (z. B. Verwendung von Verlängerungskabeln) sollten besonders sorgfältig erwogen werden.

Telekommunikationskonformitätshinweise

41 ⚠ **Achtung:** Bei der Verwendung Ihrer Telefonausrüstung sollten zur Reduzierung der Brand-, Stromschlag und Verletzungsgefahr stets grundsätzliche Sicherheitsrichtlinien, einschließlich der folgenden, befolgt werden:

Verwenden Sie dieses Produkt nicht in der Nähe von Wasser, zum Beispiel in der Nähe einer Badewanne, einer Waschschüssel, eines Spülbeckens, eines Waschbottichs, in einem nassen Kellerraum oder in der Nähe eines Schwimmbads.

Vermeiden Sie die Verwendung eines Telefons (mit Ausnahme eines schnurlosen Typs) während eines Gewitters. Es könnte eine geringfügige Blitzschlaggefahr bestehen.

Verwenden Sie das Telefon nicht, um das Austreten von Gas zu melden, wenn es sich in der Nähe dieser Gefahrenquelle befindet.

42 ⚠ **Achtung:** Vergewissern Sie sich vor dem Anschluss der Telefonports (TEL) am Gateway-Gerät, dass die Verbindung des Gebäudes zum öffentlichen Telefonnetz (PTSN) unterbrochen ist.

43 **Achtung:** Verwenden Sie zur Reduzierung der Brandgefahr nur Telekommunikationsleitungskabel Nr. 26 AWG oder stärkeres Kabel.

Avisos de seguridad láser

1  **Atención:** Producto láser de clase 1.

2  **Atención:** No mire el rayo láser.

Avisos de seguridad eléctricas

3  **Atención:** Para evitar la electrocución, no quite la tapa. La unidad no contiene piezas que pueda reparar el usuario. Esta unidad contiene tensiones peligrosas y sólo la debe abrir un técnico convenientemente formado y cualificado. Para evitar todo riesgo de electrocución, desconecte la alimentación eléctrica del producto antes de conectar o desconectar los cables de la LAN.

4  **Atención:** No manipule el equipo ni los cables mientras haya rayos en la atmósfera.

5  **Atención:** El cable de alimentación se utiliza como dispositivo de desconexión. Para desactivar el equipo, desconecte el cable de alimentación.

6  **Atención:** Equipo de Clase I. Este equipo debe conectarse a tierra. La clavija de alimentación se debe enchufar a una toma eléctrica convenientemente conectada a tierra. El uso de una toma mal conectada podría provocar tensiones peligrosas en las piezas metálicas accesibles para el usuario.

7 El equipo requiere conexión. La toma eléctrica debe estar situada cerca del equipo y ser de fácil acceso.

8  **Precaución:** Las rejillas de ventilación no deben estar obstruidas y deben tener libre acceso al aire de la sala para facilitar la refrigeración.

9 **Atención:** Temperatura de funcionamiento. Este producto está diseñado para funcionar con una temperatura ambiente máxima de 40 ºC.

10 Todos los países: Instale el producto de acuerdo con las recomendaciones de la normativa sobre instalaciones eléctricas de su país.

11  **Atención:** Como medida de seguridad, instale un disyuntor con un valor mínimo de 15 A entre el equipo y la toma de alimentación CC.

Conecte siempre los cables a los equipos de la LAN antes de conectarlos al disyuntor. No trabaje con cables activos para evitar el riesgo de lesiones físicas derivadas de una descarga eléctrica. Asegúrese siempre de que el disyuntor está en la posición desconectada antes de conectar los cables.

12  **Atención:** No pele más que la longitud recomendable de cable. Si se supera dicha longitud, puede producirse un riesgo al quedar cable al descubierto en el bloque de terminales después de la instalación.

13 **Atención:** Cuando instale el equipo, asegúrese de instalar primero la conexión a tierra del bastidor y de desconectarla en último lugar.

14 **Atención:** Compruebe si hay algún hilo de cobre al descubierto que proceda del cable instalado. Cuando la instalación se realiza correctamente, no debe quedar ningún hilo de cobre al descubierto fuera del bloque de terminales. Todo cable descubierto puede conducir un nivel peligroso de electricidad a las personas que lo toquen.

15 Este sistema funciona con sistemas CC con conexión a tierra positiva y negativa.

16 **Atención:** Este equipo sólo debe ser instalado y manipulado por personal convenientemente formado y cualificado.

17 **Precaución:** Utilice los soportes de montaje que acompañan al dispositivo para montarlo en un muro.

18 **Precaución:** No instale el dispositivo expuesto a la luz solar directa ni en un lugar húmedo o con polvo.

19 **Precaución:** No exponga el dispositivo de puerta de enlace a la humedad o el agua.

20 **Precaución:** Si el dispositivo de puerta de enlace se instala en el exterior, asegúrese de que el entorno esté libre de polvo. El emplazamiento debe permitir un acceso fácil a los puertos del dispositivo de puerta de enlace. De esta forma, resultará fácil conectar y desconectar los cables y ver los indicadores LED.

21 **Atención:** La toma eléctrica de la unidad de puerta de enlace debe estar situada cerca de la unidad y ser de fácil acceso.

22 **Precaución:** Para permitir la refrigeración adecuada del dispositivo de puerta de enlace, asegúrese de no limitar la circulación de aire alrededor de la unidad ni a través de las aletas de refrigeración del radiador de la parte trasera.

23 Sobrecarga de circuitos: Tenga en cuenta la conexión del equipo al circuito de alimentación y el posible efecto de la sobrecarga de los circuitos en la protección contra excesos de corriente y en los cables de alimentación. Para ello, consulte los valores que se indican en la placa de características del equipo.

24 **Precaución:** Si la batería se sustituye por otra de tipo incorrecto, existe un peligro de explosión. Sustitúyala únicamente por otra batería del mismo tipo, o equivalente, recomendada por el fabricante. Deseche la batería de acuerdo con las instrucciones del fabricante.

25 **Atención:** En el caso de una conexión CC centralizada, instale la unidad en una zona de acceso restringido.

26 Utilice un cable de control para la conexión a la toma eléctrica si la unidad utiliza alimentación CC centralizada. El cable de control debe ser de tipo TC, figurar en la lista UL y tener una capacidad nominal de 600 V y 90 ºC, con tres conductores y de un mínimo de14 AWG.

27 **Atención:** Si el equipo se monta en un rack, se deberá evitar todo peligro de irregularidad en la carga mecánica.

28  **Atención:** Quítese todas las joyas metálicas, como anillos y relojes, antes de instalar o quitar una tarjeta de red de un chasis con alimentación eléctrica.

29 Utilice circuitos de alimentación dedicados o acondicionadores de alimentación para suministrar energía eléctrica fiable al dispositivo.

30 **Atención:** El chasis puede ser pesado y difícil de levantar. Allied Telesyn recomienda buscar ayuda para montar el chasis en un rack.

31  **Atención:** No mire directamente los extremos del cable de fibra óptica ni los inspeccione con una lente óptica.

32  **Atención:** Esta unidad puede tener más de un cable de alimentación. Para reducir el peligro de electrocución, desconecte todos los cables de alimentación antes de manipular la unidad.

33 **Atención:** Este equipo sólo debe ser instalado y manipulado por personal convenientemente formado y cualificado.

34 **Atención:** La alimentación sólo debe proceder de una toma SELV, conforme a la norma UEC 60950. No conecte la unidad a un banco centralizado de baterías CC.

35 El instalador debe suministrar cables que figuren en la lista UL de un mínimo de 18 AWG.

36 El instalador debe suministrar cables que figuren en la lista UL de un mínimo de 22 AWG.

37 **Precaución:** La alimentación del concentrador sólo debe proceder del adaptador.

38 Si la unidad se instala en un conjunto de rack cerrado o con varias unidades, la temperatura ambiente de funcionamiento del entorno del rack puede ser superior a la de la sala. El equipo se debe instalar en un entorno que no supere la temperatura ambiente nominal máxima (Tmra) indicada por el fabricante.

39 **Precaución:** La instalación en un rack debe realizarse de forma que se garantice el caudal de aire necesario para el buen funcionamiento del equipo.

40  **Atención:** Se debe mantener en todo momento la fiabilidad de la conexión a tierra de los equipos montados en rack. Preste especial atención a las conexiones que no procedan directamente de los circuitos de bifurcación (por ej., regletas de conexión).

Avisos de conformidad de telecomunicaciones

41  **Atención:** Cuando utilice su equipo telefónico, deberá adoptar las siguientes precauciones de seguridad básicas para reducir el riesgo de incendio, descarga electrónica y lesiones:

No utilice este producto en zonas húmedas; por ejemplo, cerca de una bañera, un lavabo o un fregadero, en un sótano húmedo o cerca de una piscina.

Evite el uso de teléfonos no inalámbricos durante una tormenta eléctrica. a fin de evitar el riesgo de electrocución como consecuencia de un rayo.

No utilice el teléfono para notificar una fuga de gas en las inmediaciones de la misma.

42  **Atención:** Antes de realizar la conexión a los puertos de telefonía (TEL) del dispositivo de puerta de enlace, asegúrese de desconectar la alimentación de la red telefónica conmutada pública (PSTN/RTC) de las instalaciones.

43 **Atención:** Utilice sólo cable de telecomunicación 26 AWG o superior para reducir el riesgo de incendio.

Avis de sécurité laser

1  **Avertissement:** Produit laser de classe 1.

2  **Avertissement:** Ne pas observer directement le rayon laser.

Avis de sécurité électrique

3  **Avertissement:** Pour éviter tout risque d'électrocution, ne pas déposer le capot. L'appareil ne contient aucun composant réparable par l'utilisateur. Il est exposé à des tensions dangereuses et ne doit être ouvert que par un technicien compétent et qualifié. Pour éviter tout risque d'électrocution, débrancher l'alimentation électrique du produit avant de connecter ou de déconnecter les câbles de réseau local.

4  **Avertissement:** Ne pas travailler sur cet équipement ni sur ses câbles en présence de foudre.

5  **Avertissement:** Le cordon d'alimentation est utilisé en tant que mécanisme de déconnexion. Pour mettre l'équipement hors tension, débrancher le cordon d'alimentation.

6  **Avertissement:** Équipement de classe I. Cet équipement doit être mis à la terre. La prise d'alimentation doit être branchée sur une sortie d'alimentation correctement mise à la terre. Dans le cas contraire, les pièces métalliques accessibles risquent d'être soumises à des tensions dangereuses.

7 Équipement à connecter. La prise d'alimentation doit se situer à proximité de l'équipement et être facilement accessible.

8  **Attention:** Les orifices de ventilation doivent rester libres de toute obstruction pour pouvoir assurer le refroidissement par l'air de la pièce.

9 **Avertissement:** Température de fonctionnement. Ce produit a été conçu pour fonctionner à une température ambiante maximum de 40° C.

10 Dans tous les pays: installer le produit conformément aux réglementations électriques nationales et locales.

11  **Avertissement:** Par mesure de sécurité, installer un coupe-circuit d'une intensité minimum de 15 ampère entre l'équipement et la source d'alimentation en courant continu.

Toujours connecter les fils à l'équipement de réseau local avant de les raccorder au coupe-circuit. Ne pas travailler sur des composants d'alimentation CHAUDS pour éviter tout risque d'accident corporel par électrocution. Toujours s'assurer que le coupe-circuit est DÉSACTIVÉ avant de connecter les fils au coupe-circuit.

12 **Avertissement**: Respecter les recommandations pour dénuder les fils. Un dénudage excessif risque de présenter des risques pour la sécurité en laissant le fil exposé sur le bornier après l'installation.

13 **Avertissement:** Lors de l'installation de cet équipement, toujours s'assurer que la connexion de terre de la structure est installée en premier et déconnectée en dernier.

14 **Avertissement:** Vérifier la présence de fils de cuivre exposés sur le câble d'installation. Si l'installation a été correctement réalisée, aucun fil de cuivre sortant du bornier ne doit être exposé. Tout fil exposé peut exposer les personnes qui y touchent à une tension dangereuse.

15 Ce système fonctionne avec les mécanismes c.c. de mise à la terre négative ou positive.

16 **Avertissement:** Seul le personnel qualifié et compétent est autorisé à installer ou à remplacer cet équipement.

17 **Attention:** Les supports de montage fournis doivent être utilisés pour fixer l'équipement au mur.

18 **Attention:** Ne pas installer l'équipement au soleil, ni dans un endroit humide ou poussiéreux.

19 **Attention:** Ne pas exposer le périphérique servant de passerelle à l'eau ou l'humidité.

20 **Attention:** Si le périphérique servant de passerelle est installé à l'intérieur, s'assurer qu'il se trouve dans en endroit non poussiéreux. Le site doit offrir un accès aisé au port du périphérique servant de passerelle afin de faciliter la connexion et la déconnexion des câbles, tout en permettant d'observer aisément les voyants.

21 **Avertissement:** La source d'alimentation d'une unité servant de passerelle doit se situer à proximité de l'unité et rester facilement accessible.

22 **Attention:** Pour permettre le refroidissement correct de l'unité servant de passerelle, s'assurer que l'air circule librement autour de l'unité et à travers les ailettes du dissipateur thermique à l'arrière.

23 Surcharge du circuit: En connectant l'équipement au circuit d'alimentation, tenir compte des répercussions éventuelles d'une surcharge du circuit sur la protection contre les surcharges et le câblage d'alimentation. Tenir compte des valeurs nominales indiquées sur la plaque signalétique de l'équipement.

24 **Attention:** Le remplacement de la batterie par une batterie de type incorrect peut provoquer un danger d'explosion. La remplacer uniquement par une batterie du même type ou de type équivalent recommandée par le constructeur. Les batteries doivent être éliminées conformément aux instructions du constructeur.

25 **Avertissement:** Pour une connexion d'alimentation c.c. centralisée, installer uniquement dans un emplacement d'accès limité.

26 Un chemin de câble doit être utilisé pour la connexion à la source d'alimentation si l'unité est alimentée par alimentation c.c. centralisée. Le chemin de câble doit être de type TC agréé UL, intensité nominale de 600 V, 90 °C, trois conducteurs, 14 AWG minimum.

27 **Avertissement:** L'installation de l'équipement sur un rack doit se faire sans provoquer de danger par un chargement mécanique déséquilibré.

28  **Avertissement:** Retirer les bijoux en métal, tels que les bagues et les montres, avant d'installer ou de retirer une carte d'un châssis sous tension.

29 Utiliser des circuits d'alimentation ou des unités de conditionnement dédiés pour fournir une alimentation électrique fiable à l'équipement.

30 **Avertissement:** Le châssis peut être lourd et difficile à soulever. Allied Telesyn recommande de demander de l'aide pour installer le châssis dans un rack.

31  **Avertissement:** Ne pas observer directement l'extrémité des câbles en fibres optiques ou les inspecter à l'aide d'un objectif optique.

32  **Avertissement:** Cette unité peut être équipée de plusieurs cordons d'alimentation. Pour réduire les risques d'électrocution, débrancher tous les cordons d'alimentation avant de procéder à la maintenance de l'unité.

33 **Avertissement:** Seul le personnel qualifié et compétent est autorisé à installer ou à remplacer cet équipement.

34 **Avertissement:** L'alimentation doit être fournie par une source SELV uniquement, conformément à la norme IEC 60950. Ne pas connecter à une rangée de batteries c.c. centralisée.

35 L'installateur doit fournir des fils de 18 AWG agréés UL.

36 L'installateur doit fournir des fils de 22 AWG agréés UL.

37 **Attention:** Le concentrateur doit uniquement être alimenté par l'adaptateur.

38 Si l'équipement est installé dans un rack fermé ou à plusieurs unités, la température ambiante de fonctionnement du rack risque d'être supérieure à la température ambiante de la pièce. Il convient d'en tenir compte avant d'installer l'équipement dans un environnement conforme à la température ambiante maximum du constructeur.

39 **Attention:** Réduction de la circulation d'air: l'installation de l'équipement dans un rack ne doit pas compromettre la circulation d'air requise pour son fonctionnement sécurisé.

40  **Avertissement:** Une terre fiable doit être maintenue sur l'équipement en rack. Faire plus particulièrement attention aux connexions d'alimentation autres que les connexions directes sur les circuits de dérivation (par ex. utilisation de barrettes d'alimentation).

Télécommunications – Avis de conformité

41 **Avertissement:** Les précautions élémentaires de sécurité doivent être systématiquement respectées en utilisant l'équipement téléphonique pour réduire les risques d'incendie, d'électrocution et d'accident corporel, notamment:

Ne pas utiliser ce produit près d'une source d'eau, telle qu'une baignoire, un lavabo, un évier ou un baquet dans un sous-sol humide ou près d'une piscine.

Éviter d'utiliser le téléphone (autre que sans fil) en présence de foudre pendant un orage. La foudre peut entraîner un léger risque d'électrocution.

Ne pas utiliser le téléphone pour signaler une fuite de gaz à proximité de la fuite.

42 **Avertissement:** Avant de connecter les ports téléphoniques (TEL) sur le périphérique servant de passerelle, veiller à déconnecter les alimentations RTPC (réseau téléphonique public commuté) du local.

43 **Avertissement:** Pour réduire les risques d'incendie, utiliser uniquement un cordon de télécommunication n° 26 AWG ou supérieur.

Indicazioni sulla sicurezza laser

1  **Avvertenza:** Prodotto laser Classe 1.

2  **Avvertenza:** Non fissare il raggio laser.

Indicazioni sulla sicurezza elettrica

3  **Avvertenza:** Per evitare scosse elettriche, non rimuovere la copertura. All'interno non sono presenti componenti utilizzabili dall'utente. Questa unità presenta voltaggi rischiosi e deve essere aperta solo da un tecnico qualificato ed esperto. Per eliminare il rischio di scosse elettriche, scollegare il cavo di alimentazione del prodotto prima di collegare o scollegare i cavi della rete locale LAN.

4  **Pericolo:** Non utilizzare l'apparecchiatura o maneggiare i cavi in caso di lampi.

5  **Attenzione:** Il cavo di alimentazione viene utilizzato come dispositivo di scollegamento. Per togliere la corrente all'apparecchiatura, scollegare il cavo di alimentazione.

6  **Attenzione:** Apparecchiatura Classe I. Questa apparecchiatura deve essere messa a terra. Il cavo di alimentazione deve essere collegato a un socket correttamente cablato e messo a terra. Un socket non correttamente cablato potrebbe trasferire voltaggi pericolosi su componenti di metallo accessibili.

7 Apparecchiatura cablata. Il socket deve essere installato accanto all'apparecchiatura e deve essere facilmente accessibile.

8  **Attenzione:** Le prese d'aria non devono essere ostruite e devono avere libero accesso all'aria dell'ambiente per raffreddare l'apparecchiatura.

9 Temperatura di esercizio. Questo prodotto è progettato per una temperatura ambiente massima di 40°C.

10 Per tutti i paesi: Installare il prodotto in conformità con le normative sull'elettricità locali e nazionali.

11  **Avvertenza:** Per precauzione, installare un salvavita con un valore minimo di 15 ampere tra l'apparecchiatura e la fonte di alimentazione CC.

Collegare i cavi all'apparecchiatura LAN prima di collegarli al salvavita. Per evitare il rischio di danni fisici causati da scosse elettriche, non utilizzare l'apparecchiatura ad alte temperature. Verificare che il salvavita sia in posizione OFF prima di collegare i cavi.

12  **Avvertenza:** Non scollegare più cavi di quelli raccomandati: può essere pericoloso lasciare dei cavi esposti sul blocco terminale dopo l'installazione.

13 **Avvertenza:** Quando si installa l'apparecchiatura, verificare che il collegamento di messa a terra FG (frame ground) sia installato per primo e disinstallato per ultimo.

14 **Avvertenza:** Verificare che non sporgano fili di rame dai cavi installati. Se l'installazione viene effettuata correttamente, non vi sono fili di rame scoperti, sporgenti dal blocco terminale. Gli eventuali fili scoperti possono condurre livelli di elettricità dannosi sulle persone che li toccano.

15 Questa apparecchiatura funziona con sistemi CC con messa a terra a polarità positiva o negativa.

16 **Avvertenza:** Solo personale esperto e qualificato può installare o sostituire l'apparecchiatura.

17 **Attenzione:** Per un montaggio a muro sicuro del dispositivo, è necessario utilizzare i supporti di montaggio forniti in dotazione.

18 **Attenzione:** Non installare il dispositivo in un luogo esposto alla luce solare, umido o polveroso.

19 **Attenzione:** Non esporre il dispositivo gateway all'umidità o all'acqua.

20 **Attenzione:** Se il gateway è installato in un ambiente chiuso, verificare che l'ambiente sia privo di polvere. Il sito di installazione dovrebbe disporre di un facile accesso alle porte del gateway. Questo vi consentirà di collegare e scollegare i cavi e visualizzare i LED in modo semplice.

21 **Avvertenza:** La fonte di alimentazione dell'unità gateway deve essere posizionata vicino all'unità, in un luogo facilmente accessibile.

22 **Attenzione:** Per consentire il raffreddamento appropriato del dispositivo gateway, verificare che il flusso d'aria attorno all'unità e attraverso le ventole di raffreddamento per la dispersione del calore poste sul retro non sia ostruito.

23 Sovraccarico del circuito: Prestare attenzione al collegamento dell'apparecchiatura al circuito di alimentazione e all'effetto che il sovraccarico dei circuiti potrebbe avere sulla protezione contro i sovraccarichi di corrente e sui cavi di alimentazione. In tal senso, tenere presente i valori riportati sull'etichetta dell'apparecchiatura.

24 **Attenzione:** Se si sostituisce la batteria con un tipo di batteria non corretto, si rischia di provocare un'esplosione. Sostituire la batteria solo con una dello stesso tipo o di un tipo equivalente raccomandato dal produttore. Eliminare le batterie usate secondo le istruzioni del produttore.

25 **Avvertenza:** In caso di alimentazione CC centralizzata, installare l'apparecchiatura solo in aree ad accesso limitato.

26 Se l'unità ha un'alimentazione CC centralizzata, è necessario un cavo di tipo TC approvato UL, valutato a 600 V e 90°C, con tre conduttori, di minimo 14 AWG.

27 **Avvertenza:** Il montaggio dell'apparecchiatura in rack deve essere effettuato in modo da evitare di provocare rischi dovuti a un carico meccanico irregolare.

28  **Avvertenza:** Rimuovere tutti gli oggetti di metallo, ad esempio anelli e orologi, prima di installare o estrarre una scheda di linea da un chassis acceso.

29 Utilizzare circuiti di alimentazione o alimentatori dedicati per fornire energia elettrica al dispositivo in modo affidabile.

30 **Avvertenza:** Il chassis potrebbe risultare pesante e scomodo da sollevare. Allied Telesyn consiglia di richiedere assistenza per il montaggio del chassis in rack.

31  **Avvertenza:** Non osservare le estremità dei cavi a fibre ottiche direttamente oppure attraverso una lente ottica.

32  **Avvertenza:** Questa unità potrebbe disporre di più cavi di alimentazione. Per ridurre il rischio di scosse elettriche, scollegare tutti i cavi di alimentazione prima di iniziare la manutenzione dell'unità.

33 **Avvertenza:** Solo personale esperto e qualificato può installare o sostituire l'apparecchiatura.

34 **Avvertenza:** L'alimentazione deve essere fornita da una fonte SELV, come specificato nello standard IEC 60950. Non collegare il dispositivo a una batteria CC centralizzata.

35 I cavi riconosciuti UL di minimo 18 AWG non sono forniti in dotazione.

36 I cavi riconosciuti UL di minimo 22 AWG non sono forniti in dotazione.

37 **Attenzione:** L'hub deve essere alimentato solo mediante l'adattatore.

38 Se l'installazione è posizionata in un ambiente chiuso o in rack multi-unità, la temperatura operativa del rack potrebbe essere maggiore della temperatura ambiente. Per questo motivo, installare l'apparecchiatura in un ambiente compatibile con la temperatura ambiente massima stimata dal produttore (Tmra).

39 **Attenzione:** L'installazione dell'apparecchiatura in rack dovrebbe essere effettuata in modo che il flusso d'aria richiesto per un funzionamento sicuro non venga compromesso.

40  **Attenzione:** È necessario mantenere la messa a terra dell'apparecchiatura montata in rack. Prestare particolare attenzione ai collegamenti di alimentazione non CC ai circuiti periferici (ad esempio all'uso dei cavi di alimentazione).

Indicazioni per la conformità con le norme sulle telecomunicazioni

41  **Avvertenza:** Quando si utilizza l'apparecchiatura telefonica, per ridurre il rischio di incendio, scosse elettriche e danni alle persone, è necessario seguire alcune precauzioni di base per la sicurezza, ad esempio:

Non utilizzare il prodotto in prossimità di acqua, ad esempio, vicino a vasche da bagno, lavabi, lavandini, piscine oppure in ambienti umidi.

Non utilizzare un telefono (di tipo non cordless) durante un temporale: esiste il rischio remoto che i lampi provochino scosse elettriche.

Per segnalare una perdita di gas, non utilizzare il telefono in prossimità della perdita.

42  **Avvertenza:** Prima di utilizzare le porte per il collegamento telefonico (TEL) del dispositivo gateway, verificare che la rete telefonica pubblica (PSTN) sia disconnessa.

43 Per ridurre il rischio di incendi, utilizzare solo un cavo di linea telefonica di 26 AWG o superiore.

Лазерная безопасность

1  **Внимание:** лазерный продукт, класс 1.

2  **Внимание:** Не смотрите прямо в лазерный луч.

Электрическая безопасность

3  **Внимание:** Для предотвращения электрического шока, не снимайте кожух. Внутри нет частей, подлежащих обслуживанию пользователем. Этот устройство – под опасным напряжением и должно открываться только обученным и квалифицированным инженером. Для избежания возможности поражения электрическим током, отсоедините питание перед соединением или отсоединением сетевых кабелей LAN.

4  **Внимание:** Не работайте с оборудованием во время грозы.

5  **Внимание:** Кабель питания используется для отсоединения. Для отсоединения оборудования, отсоедините кабель питания.

6  **Внимание:** Оборудование Класса I. Это оборудование должно быть заземлено. Вилка питания должны быть присоединена к соответствующим образом подключенному заземлению. Неправильное соединение может подвергнуть доступные металлические части действию опасного напряжения.

7 Розетки. Розетка должна быть установлена невдалеке от оборудования и должна быть легко доступной.

8  **Предостережение:** Вентиляционные отверстия не должны быть заблокированы и должен быть свободный доступ к воздуху в комнате для охлаждения.

9 **Внимание:** Рабочая температура. Этот продукт предусмотрен для температуры окружающего воздуха не выше + 40° C.

10 Во всех странах: Инсталлируйте продукт в соответствии с национальными нормами электротехники.

11  **Внимание:** Для безопасности установите прерыватель для максимальной силы тока 15 ампер между оборудованием и источником постоянного тока.

Всегда подсоединяйте провода к сетевому оборудованию (LAN) перед тем, как присоединять кабели к прерывателю. Не работайте с кабелями под напряжением, чтобы избежать поражения электротоком. Перед присоединением проводов к прерывателю, убедитесь, что прерыватель находится в положении ВЫКЛ (OFF).

12  **Внимание:** Не очищайте от изоляции провод больше, чем рекомендовано. Чрезмерное очищение кабеля может составлять опасность после инсталляции.

13  **Внимание:** При инсталляции оборудования, убедитесь, что заземление подключается в первую, а отключается в последнюю очередь.

14  **Внимание:** Проверьте, нет ли на инсталлированных проводков на кабеле. При правильной инсталляции на терминале свободных проводков быть не должно. Открытые провода могут представлять опасность электрического поражения тем лицам, которые прикасаются к проводам.

15 Эта система действует как с плюсовым, так и минусовым заземлением постоянного тока.

16 **Внимание:** Это оборудование должно быть инсталлировано только обученными и квалифицированным работниками.

17  **Предостережение:** Оборудование должно быть надежно прикреплено к стене с помощью скоб.

18  **Предостережение:** Не инсталлируйте на солнцепеке, во влажном или пыльном месте.

19  **Предостережение:** Не подвергайте шлюзовую установку действию влажности или воды.

20  **Предостережение:** Если шлюзовая установка инсталлируется в помещении, позаботьтесь, чтобы в помещении не было пыли. Должен быть обеспечен легкий доступ к портам оборудования, чтобы Вам было легко соединять и отсоединять кабели и видеть светодиоды.

21 **Внимание:** Источник питания должен быть невдалеке от установки, и к нему должен быть удобный доступ.

22  **Предостережение:** Для хорошей вентиляции шлюзовой установки, позаботьтесь, чтобы вокруг установки и через вентиляционные решетки мог свободно циркулировать воздух.

23 Перегрузка контура: Следует подумать о том, какое количество оборудования присоединяется к контуру питания и на возможный эффект перегрузки контуров на защиту перегрузки и провода питания. Следует обращать внимание на указанные предельные показатели на фабричных табличках.

24 **Литиевая батарея:** Должна заменяться только обученным и квалифицированным инженером.

Предостережение: Возможен взрыв при замене неправильным типом батареи. Заменяйте только тем же или эквивалентным типом, рекомендованным производителем. Утилизируйте использованные батареи только в соответствии с указаниями производителя.

25 **Внимание:** Для централизованного подсоединения постоянного тока, устанавливайте только в помещении, доступ к которому ограничен.

26 Для подсоединения источника питания, если установка питается централизованным постоянным током, требуется желобной кабель. Кабель должен быть признанным UL типа и предназначен для 600 В и + 90°C, с тремя кондукторами, минимум 14 AWG (американский калибр).

27 **Внимание:** Установка оборудования на раме должна быть такой, чтобы не создавалось опасности от неровной механической нагрузки.

28  **Внимание:** Снимите все механические украшения, кольца и часы, перед инсталляцией и удалением линейной карты с корпуса под напряжением.

29 Для надежного питания используйте отдельные контуры питания и выравниватели энергии.

30 **Внимание:** Корпус может быть тяжелым и поднять его может быть сложно. Allied Telesyn рекомендует, что при установке корпуса на раме Вам необходимо обеспечить соответствующую помощь.

31  **Внимание:** Не смотрите прямо на торцы волоконно-оптического кабеля и не инспектируйте торцы кабеля с помощью оптической линзы.

32  **Внимание:** Установка может быть оборудована несколькими проводами питания. Перед техническим обслуживанием установки, отсоедините все провода питания.

33 **Внимание:** Оборудование должно обслуживаться и заменяться только обученными и квалифицированными работниками.

34 **Внимание:** Питание должно подаваться только от источника SELV, в соответствии с IEC 60950. Не подключайте к централизованному блоку аккумуляторов постоянного тока.

35 Инсталлятор должен обеспечивать провода, признанные UL, минимум 18 AWG.

36 Инсталлятор должен обеспечивать провода, признанные UL минимум 22 AWG.

37 **Предостережение:** Питание на узел должно подаваться только с адаптера.

38 При монтировке на раме с несколькими установками или в закрытом контуре, рабочая температура оборудования на раме может быть выше, чем температура окружающей среды. Поэтому следует позаботиться о том, чтобы температура не превышала максимальной температуры окружающей среды, указанной производителем (Tmra).

39 **Предостережение:** Уменьшенный воздушный поток: инсталляция оборудования на раме должна быть такой, чтобы не ограничивать циркуляцию воздуха, необходимую для безопасной работы оборудования.

40  **Внимание:** Оборудование на раме необходимо надежно заземлять. Особое внимание следует обращать на соединения питания, помимо прямых соединений к веткам контура (например, на розеточные блоки).

Телекоммуникационное соответствие

41 **Внимание:** При использовании телефонного оборудования, всегда следует обращать внимания на требования безопасности для снижения риска пожара, поражения током и ранения, в том числе:

Не используйте оборудование рядом с водой – например ванной, раковиной или стиральным резервуаров или в мокром подвале рядом с бассейном.

Во время электрической бури не используйте телефон (кроме беспроводного). Есть некоторый риск поражения от молнии.

Не используйте телефон для сообщения об утечке газа вблизи от утечки.

42 **Внимание:** Перед соединения к телефонным портам (TEL) на шлюзовой установке, отсоедините городской телефон (PSTN) от помещения.

43 **Внимание:** Для снижения риска пожара, используйте коммуникационный кабель не меньше 26 AWG.

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