

# Secure Ethernet Network Adapters

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AT-2712FX/SC  
AT-2912T

## Installation and User's Guide

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# Electrical Safety and Emissions Standards

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This product meets the following standards.

## U.S. Federal Communications Commission

### Declaration of Conformity

Manufacturer Name: Allied Telesis, Inc.

Declares that the product: **Secure Ethernet Adapter**

Model Numbers: **AT-2712FX/SC and AT-2912T**

This product complies with FCC Part 15B, Class B Limits:

This device complies 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 B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.


## European Union Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment

This Allied Telesis RoHS-compliant product conforms to the European Union Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment. Allied Telesis ensures RoHS conformance by requiring supplier Declarations of Conformity, monitoring incoming materials, and maintaining manufacturing process controls.

RFI Emissions	FCC Class B, EN55022 Class B, EN61000-3-2, EN61000-3-3, VCCI Class B, C-TICK, CE
Immunity	EN55024
Electrical Safety	EN60950 (TUV), UL 60950 (cUL <sub>US</sub> )
 Laser Safety	EN60825

## Translated Safety Statements

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**Important:** The  indicates that a translation of the safety statement is available in a PDF document titled "Translated Safety Statements" (613-000990) posted on the Allied Telesis website at [www.alliedtelesis.com](http://www.alliedtelesis.com) and on this product CD.

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# Preface

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This guide contains instructions on how to install the AT-2712FX/SC and AT-2912T adapters and configure the adapters using the driver software.

The Preface contains the following sections:



- “Safety Symbols Used in this Document” on page 12
- “Where to Find Web-based Guides” on page 13
- “Contacting Allied Telesis” on page 14
- “Management Software Updates” on page 14

## Safety Symbols Used in this Document

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This document uses the safety symbols defined in Table 1.

Table 1. Safety Symbols

Symbol	Meaning	Description
	Caution	Performing or omitting a specific action may result in equipment damage or loss of data.
	Warning	Performing or omitting a specific action may result in electrical shock.

## Where to Find Web-based Guides

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The installation and user guides for all Allied Telesis products are available in portable document format (PDF) on our web site at **[www.alliedtelesis.com](http://www.alliedtelesis.com)**. You can view the documents online or download them onto a local workstation or server.

## Contacting Allied Telesis

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

### Online Support

You can request technical support online by accessing the Allied Telesis Knowledge Base: [www.alliedtelesis.com/support/kb.aspx](http://www.alliedtelesis.com/support/kb.aspx). 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 section of the Allied Telesis web site: [www.alliedtelesis.com/support](http://www.alliedtelesis.com/support).

### Returning Products

Products for return or repair must first be assigned a return materials authorization (RMA) number. A product sent to Allied Telesis without an RMA number will be returned to the sender at the sender's expense. For instructions on how to obtain an RMA number, go to the Support section on our web site at [www.alliedtelesis.com/support/rma.aspx](http://www.alliedtelesis.com/support/rma.aspx).

### For Sales or Corporate Information

You can contact Allied Telesis for sales or corporate information through our web site at <http://www.alliedtelesis.com/purchase>.

### Warranty

Go to [www.alliedtelesis.com/warranty](http://www.alliedtelesis.com/warranty) for the specific terms and conditions of the warranty and for warranty registration for the AT-2712FX/SC and AT-2912T adapters.

### Management Software Updates

New releases of management software for our managed products are available from either of the following Internet sites:

- Allied Telesis web site: [www.alliedtelesis.com](http://www.alliedtelesis.com)
- Allied Telesis FTP server: <ftp://ftp.alliedtelesis.com>

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

## Chapter 1

# Introducing the AT-2712FX/SC and AT-2912T Adapters

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This chapter provides an introduction to the Allied Telesis AT-2712FX/SC and AT-2912T Secure Ethernet Network Adapters and contains the following sections:

- ❑ “Functional Descriptions” on page 16
- ❑ “Features” on page 18
- ❑ “Physical Descriptions” on page 19

## Functional Descriptions

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Both the AT-2712FX/SC and AT-2912T adapters feature in-built cryptographic processors that take over a number of data encryption and decryption functions within the hardware, releasing the host CPU to perform other tasks. This ensures the highest possible speeds when transmitting or receiving secure data, with no compromise on data security or host system performance.

As part of the company's green range, both products are engineered to reduce power consumption. They incorporate centralized power management features that automatically place idle circuitry into a lower power mode to save energy and battery life in a laptop.

This section provides functional descriptions of the AT-2712FX/SC and AT-2912T adapters.

### **AT-2712FX/SC Adapter**

The AT-2712FX/SC adapter connects a PCI-E compliant server or workstation to a Fast Ethernet network using fiber optic cabling and a connector that meets 62.5/125  $\mu\text{m}$  or 50/125  $\mu\text{m}$  multimode specifications. This adapter operates at speeds of 100 Mbps in both full-duplex and half-duplex modes.

The AT-2712FX/SC adapter has an SC connector, as show in Figure 1.

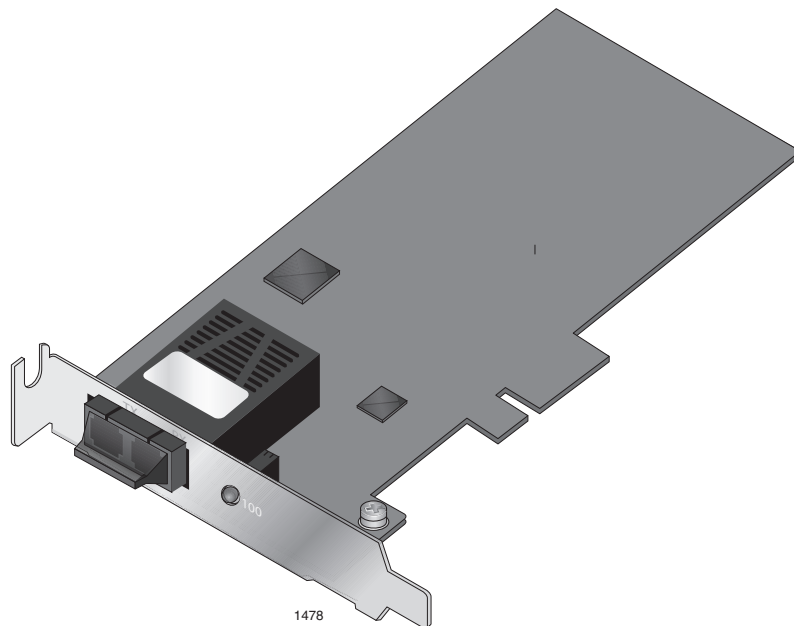


Figure 1. AT-2712FX/SC Adapter



## AT-2912T Adapter

The AT-2912T adapter is a Gigabit Ethernet secure PCIe NIC featuring on-board encryption. It is fully compatible with other secure IPsec as well as non-IPsec NICs. This adapter operates at speeds of 10/100/1000T Mbps in both full-duplex and half-duplex modes.

The AT-2912T adapter has one twisted-pair connector, as shown in Figure 2.

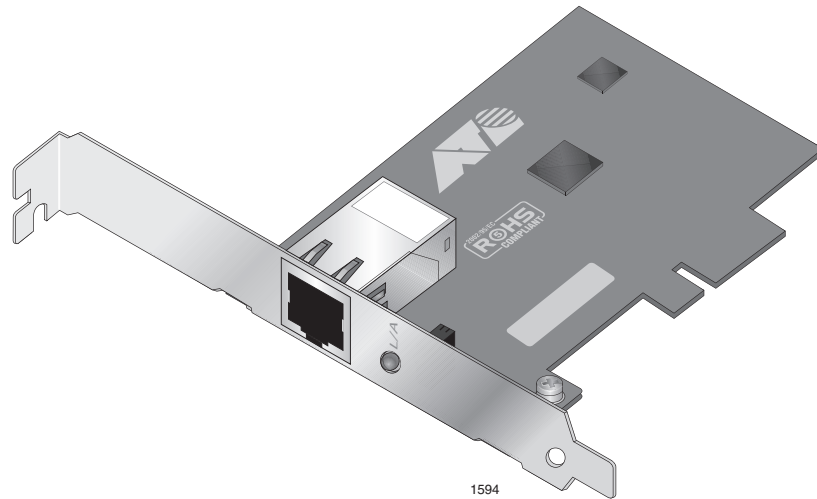


Figure 2. AT-2912T Adapter

## Contents of Your Shipment

The following items are included with your adapter:

- Antistatic bag (used for protecting the adapter when stored or shipped). Keep the adapter in its packaging until ready for installation.
- Low-profile bracket (attached to the AT-2712FX/SC adapter)
- Standard bracket (attached to the AT-2912T adapter)

Inform your network supplier of any missing or damaged items. If you need to return the adapter, you must pack it in the original (or equivalent) packing material or the warranty will be voided. See "Returning Products" on page 14.

The documentation for these adapters is available in portable document format (PDF) on our web site at [www.alliedtelesis.com](http://www.alliedtelesis.com). You can view the documents online or download them onto a local workstation or server.

## Features

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The following list of features for the AT-2712FX/SC and AT-2912T adapters applies to all of the supported operating systems:

- PCI-Express x1 interface
- Flow Control (IEEE 802.1x)
- Layer 2 Priority Encoding (802.1p)
- TCP checksum RX/TX support
- 72 KB packet buffer
- PXE remote root support
- Wake on LAN (WOL)
- IPSec

## Physical Descriptions

This section provides descriptions of the AT-2712FX/SC and AT-2912T faceplates and LEDs.

### AT-2712FX/SC Adapter Physical Description

The faceplate on the AT-2712FX/SC adapter provides two fiber optic connectors for attaching the adapter to a compatible link partner. See Figure 3 for an illustration of the adapter's faceplate.

The AT-2712FX/SC adapter has one fiber port and one LED, as shown in Figure 3 and described in Table 1.



Figure 3. AT-2712FX/SC Faceplate

Table 1. Fiber Optic Port 100 LED Status

State	Description
Green	The port is operating at 100 Mbps and has a valid link.
Flashing	The port is receiving or transmitting network packets at 100 Mbps.

### AT-2912T Adapter Physical Description

The faceplate on the AT-2912T adapter provides one twisted-pair connector for attaching the adapter to a compatible link partner. See Figure 4 for an illustration of the adapter's faceplate.

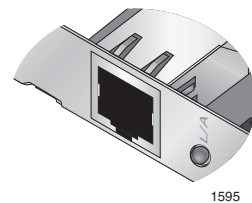


Figure 4. AT-2912T Faceplate

The AT-2912T adapter has one LED as described in Table 2.

Table 2. Twisted-Pair Port LED Status

<b>State</b>	<b>Description</b>
Green	The port is operating at 10/100/1000 Mbps and has a valid link.
Flashing	The port is receiving or transmitting network packets at 10/100/1000T Mbps

## Chapter 2

# Installing the Hardware

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This chapter contains the following sections:

- ❑ “Reviewing Safety Precautions” on page 22
- ❑ “Pre-Installation Checklist” on page 24
- ❑ “Installing a Network Adapter Card” on page 27
- ❑ “Connecting the Network Cables” on page 31


## Reviewing Safety Precautions

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Please review the following safety precautions before you begin to install a network adapter card.

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### Note

The  indicates that a translation of the safety statement is available in a PDF document titled “Translated Safety Statements” on the Allied Telesis website at [www.alliedtelesis.com](http://www.alliedtelesis.com).

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### Warning

This is a “Class 1 LED product”.  1

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### Warning


Do not stare into the laser beam.  2

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### Warning


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

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### Warning


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

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### Warning

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

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### Note

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

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### Warning

The adapter is being installed in a system that operates with voltages that can be lethal. Before you remove the cover of your system, you must observe the following precautions to protect yourself and to prevent damage to the system components.

- Remove any metallic objects or jewelry from your hands and wrists.

- Make sure to use only insulated or nonconducting tools.
  - Verify that the system is powered OFF and unplugged before accessing internal components.
  - Installation or removal of adapters must be performed in a static-free environment. The use of a properly grounded wrist strap or other personal antistatic devices and an antistatic mat is strongly recommended.
-

## Pre-Installation Checklist

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Before you install an adapter card, check the following list:

1. Verify that your system is using the latest BIOS.

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**Note**

If you acquired the adapter software from the Allied Telesis support website, enter the path to where the adapter driver files reside on your system.

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2. If your system is active, shut it down.
3. When the system shut down is complete, power OFF and unplug your system.
4. Holding the adapter card by the edges, remove it from its shipping package and place it on an antistatic surface.
5. Check the adapter for visible signs of damage, particularly on the card's edge connector.



**Caution**

Do not attempt to install a damaged adapter. If the adapter is damaged, report it to Allied Telesis. See "Contacting Allied Telesis" on page 14.

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## Replacing the Bracket

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The AT-2712FX/SC adapter is shipped with the low-profile bracket attached to the adapter. The AT-2912T adapter is shipped with the standard bracket attached to the adapter. Depending on your PC, you may need to replace the bracket attached to your adapter.

The following procedure describes how to remove the low-profile bracket from the adapter and replace it with the standard bracket. You can also use this procedure to remove the standard bracket and replace it with the low-profile bracket.

To replace the low-profile bracket with the standard bracket, perform the following procedure:

1. Remove the screws that attach the bracket to the adapter. See Figure 5.

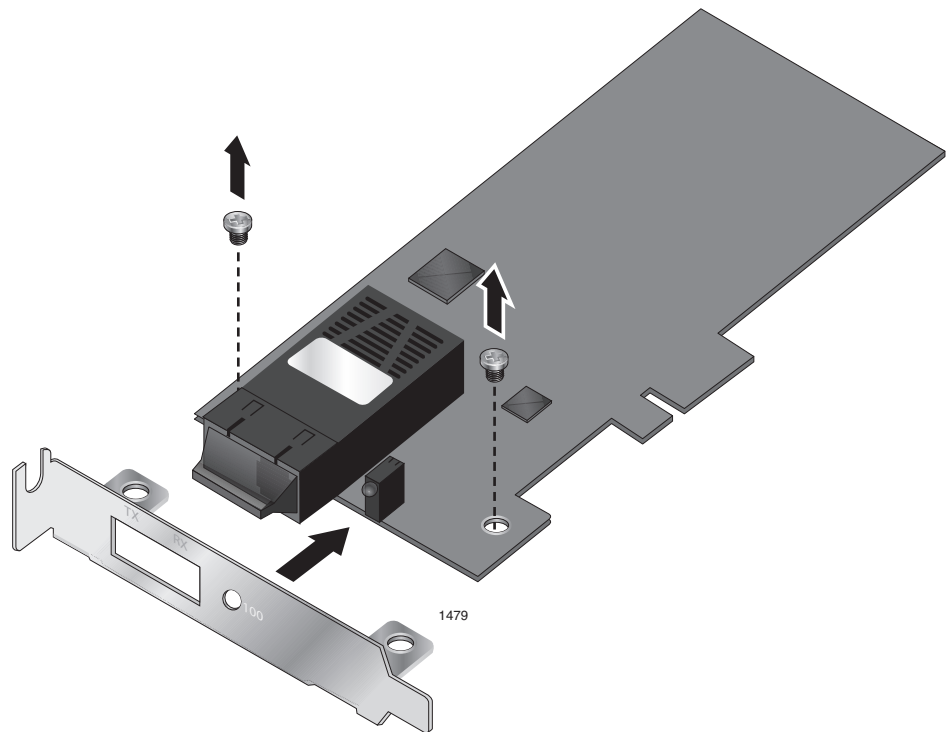


Figure 5. Removing the Low-Profile Bracket

2. Align the tabs of the standard bracket with the holes on the adapter and fasten the screws onto the adapter. See Figure 6.

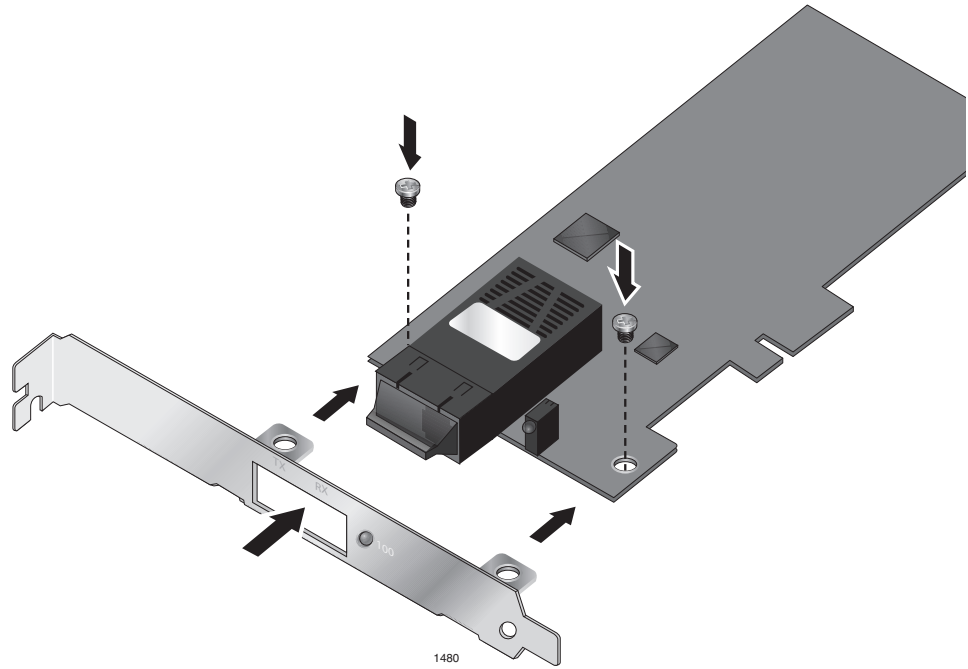


Figure 6. Fastening Screws onto Standard Bracket

## Installing a Network Adapter Card

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The following instructions apply to installing both the AT-2712FX/SC and AT-2912T adapters in most systems. For details about performing these tasks on your particular system, refer to the manuals that were supplied with your system.

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**Note**

To perform this procedure, you need to supply a Phillips-head screw.

---

To install an AT-2712FX/SC or AT-2912T adapter, perform the following procedure:

1. Review the “Pre-Installation Checklist” on page 24 and “Reviewing Safety Precautions” on page 22.

Before installing the adapter, ensure the system power is OFF and unplugged from the power outlet, and that proper electrical grounding procedures have been followed.

**Warning**

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

---

2. Remove the system cover and select any appropriate empty PCI slot. See Figure 7 on page 28.

If you do not know how to identify an appropriate PCI slot, refer to your system documentation.

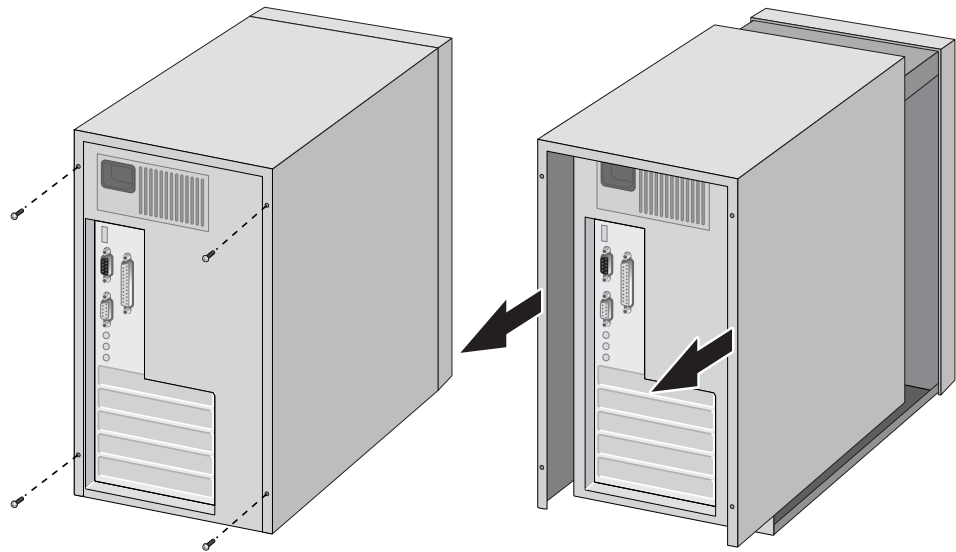


Figure 7. Removing the PC Cover

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 8.

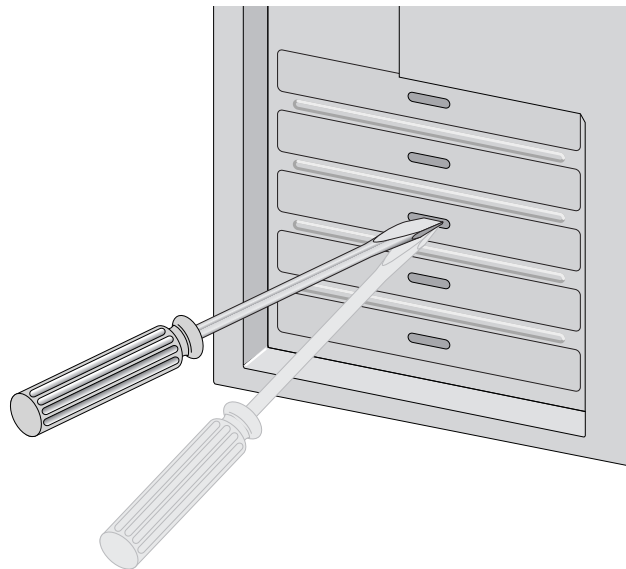


Figure 8. Removing the Faceplate From PCI Slot

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**Note**

If you cannot locate or do not know how to find an appropriate 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. Applying even pressure at both corners of the card, push the adapter card until it is firmly seated in the appropriate PCI slot.

Make sure the card is securely seated. To insert the network adapter card, see Figure 9.

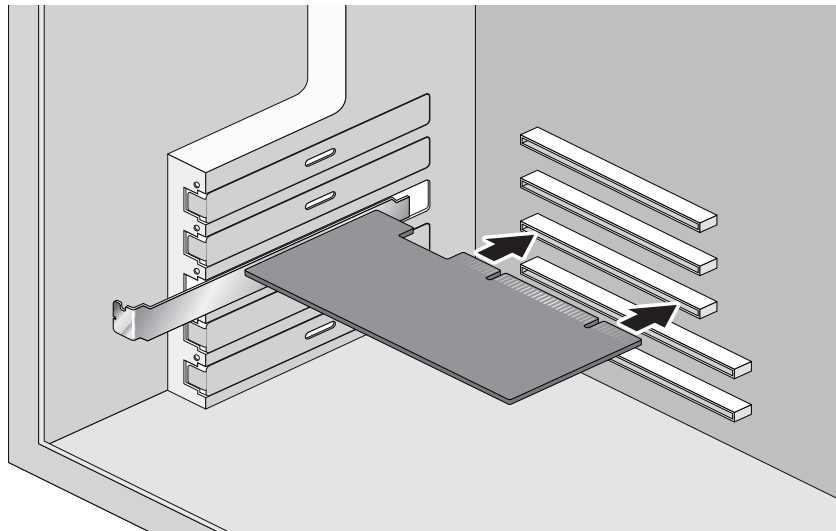


Figure 9. Inserting the Adapter with a High-profile Bracket



**Caution**

Do not use excessive force when seating the card, because this may damage the system or the adapter. If the card resists seating, remove it from the system, realign it, and try again.

---

6. Secure the network adapter card to the chassis with a Phillips-head screw (not provided). See Figure 10 on page 30.

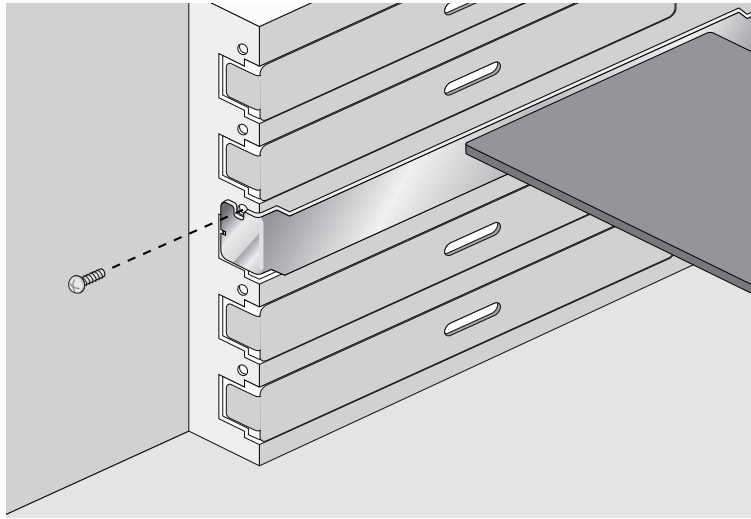


Figure 10. Securing the Adapter with a High-profile Bracket

7. Replace the system's cover and secure it with the screws removed in Step 2.
8. Disconnect any personal antistatic devices.
9. Power the system on.

Once the system returns to proper operation, the adapter hardware is fully installed. Next, connect the network cables. See "Connecting the Network Cables" on page 31.

## Connecting the Network Cables

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The AT-2712FX/SC adapter has two fiber optic connectors (transmit and receive) for attaching the system to a compatible link partner, or an IEEE 802.3z compliant Fast Ethernet switch. The AT-2912T adapter has one twisted-pair connector.

For the AT-2712FX/SC adapter you need a fiber optic cable. For specifications for this cable, see the AT-2712FX/SC adapter data sheet.

For the AT-2912T adapter, you need a twisted-pair cable. For pin signals and pinout information, see “10/100/1000Base-T Twisted-Pair Port Connectors” on page 90 and “Console Port Pinouts” on page 92.

To connect a network cable to the adapter, perform the following procedure:



### Warning

The fiber optic ports contain a Class 1 LED device. When the ports are disconnected, always cover them with the provided plug. Exposed ports may cause skin or eye damage.

---

1. Connect one end of the cable to the adapter.
2. For the AT-2712FX/SC adapter, connect the other end of the cable to the appropriate Ethernet fiber optic port. For the AT-2912T adapter, connect the other end of the cable to another twisted pair port.

---

### Note

After the cable is properly connected at both ends, the adapter port LEDs should be functional. See “Physical Descriptions” on page 19 for a description of LED operation for each adapter model. For driver installation and configuration instructions, refer to the software configuration for a specific driver.

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After you connect the system to the network and power is supplied, the AT-2712FX/SC adapter attempts to establish the connection at 100 Mbps full-duplex only.





## Chapter 3

# Enabling Vista IPSec

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This chapter describes how to enable the Vista IPSec Operating System on the AT-2712FX/SC and AT-2912T adapters. The installation procedure is identical for the both the Vista 32-bit and 64-bit operating systems.

This chapter contains the following sections:

- ❑ “Introduction” on page 34
- ❑ “Setting Vista’s Next Generation TCP/IP Stack” on page 35
- ❑ “Uninstalling the Driver Software” on page 44

## Introduction

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Traditionally, IPSec has been used for remote connections, but this feature has moved into the Local Area Network (LAN) to secure local network traffic against eavesdropping.

Vista's Next Generation TCP/IP stack provides APIs for accessing brackets to allow advanced granularity to filter both inbound and outbound traffic. This was not possible with Microsoft's XP Operating system. In addition, Vista's security management now closely ties the Firewall and IPSec features together by using a snap-in called Windows Firewall with Advanced Security. The onboard encryption engine on the AT-2712FX/SC and AT-2912T adapters allows off-loading of this task to the network controller instead of the host CPU, thereby freeing the host CPU for other important tasks. The off-loading feature is unique in the industry and enables you to set tight security efficiently within your network at a minimal cost.

Microsoft's Technet website, [www.technet.microsoft.com](http://www.technet.microsoft.com), offers several technical publications as well as online seminars that describe Vista's advanced IPSec and Firewall features and their implementation. These topics are beyond the scope of this chapter. Instead, Allied Telesis recommends that you consult Technet for additional information.

## Setting Vista's Next Generation TCP/IP Stack

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After you install an Allied Telesis AT-2712FX/SC or AT-2912T adapter in your PC, the system detects the new hardware automatically when the Windows Vista Operating system first boots up. You are prompted to install the driver software for that device shortly after you log in. To update the driver software, you must have administrative privileges.

---

**Note**

The adapter must be physically installed in your system before you install the driver software. See Chapter 2, "Installing the Hardware" on page 21 for instructions.

---

To set the Next Generation TCP/IP Stack of the Vista Operating System, do the following:

1. Start a Windows Vista Operating system and log in.

You must have Administrator privileges to update the driver software.

2. The **Found New Hardware** page is displayed on your personal computer.

The Found New Hardware page is shown in Figure 11.



Figure 11. Found New Hardware Page

3. From the Found New Hardware page, select **Locate and install driver software (recommended)**.

The Found New Hardware - Ethernet Controller page is displayed. See Figure 12.

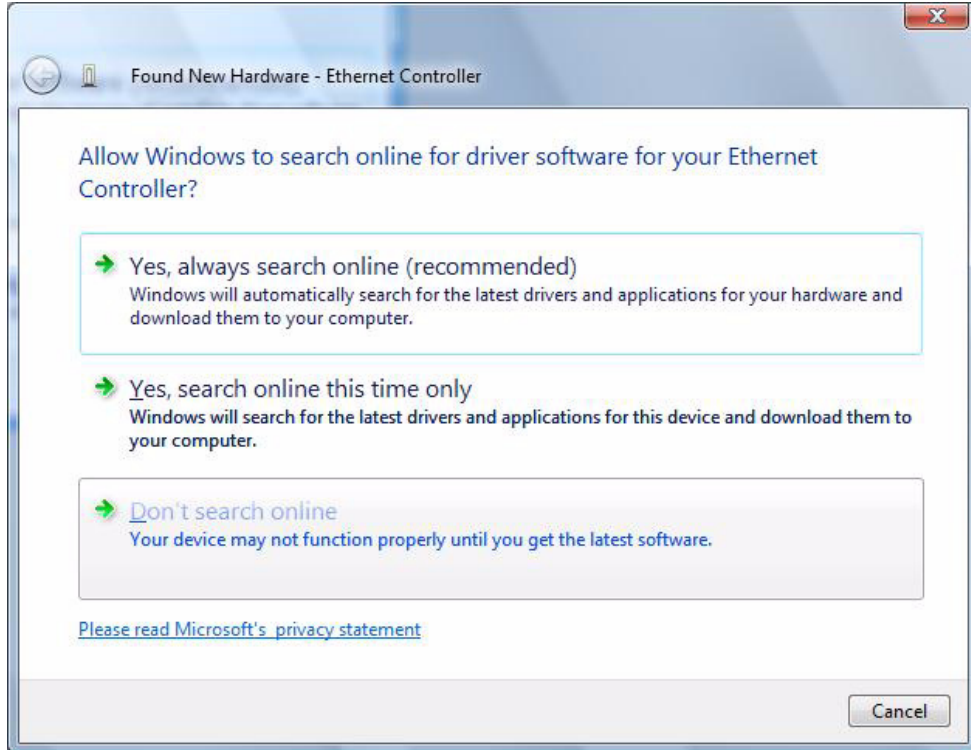


Figure 12. Found New Hardware - Ethernet Controller Page

4. From the Found New Hardware - Ethernet Controller page, select **Yes, always search online (recommended)**.

The Found New Hardware - Ethernet Controller Insert the Disc page is displayed. See Figure 13 on page 37.

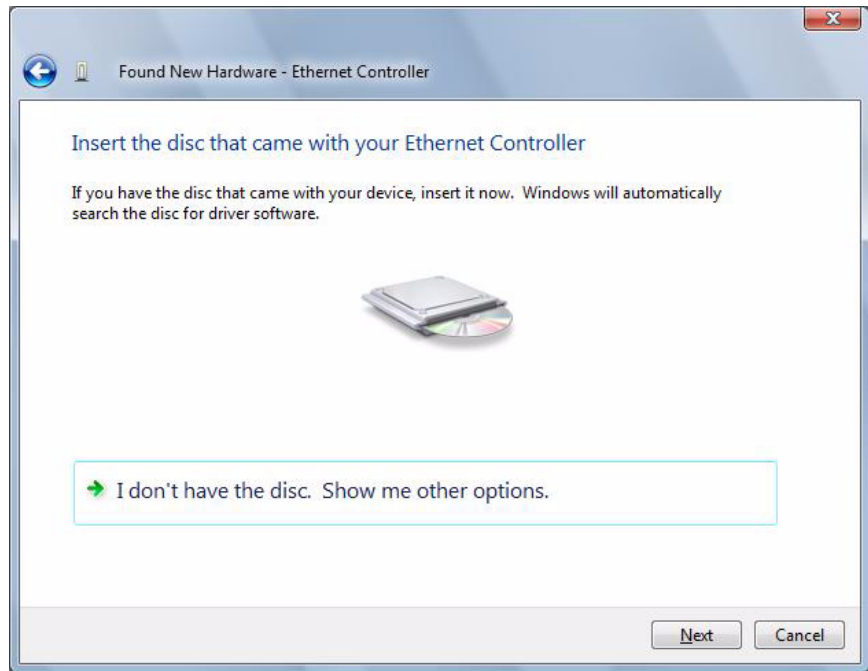


Figure 13. Found New Hardware - Ethernet Controller Insert the Disc Page

5. Click **I don't have the disc. Show me other options.**

---

**Note**

The AT-2712FX/SC and AT-2912T adapters are not shipped with a CD.

---

The Found New Hardware - Ethernet Controller Windows Couldn't Find Driver page is displayed. See Figure 14 on page 38.

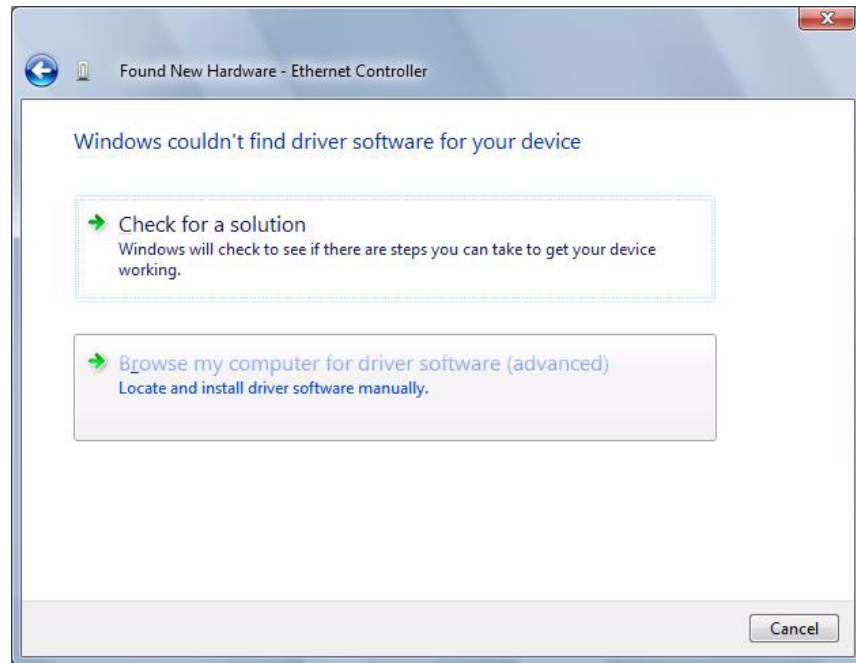


Figure 14. Found New Hardware - Ethernet Controller Windows Couldn't Find Driver Page

6. Select **Browse my computer for drive software (advanced)**.

The following page is displayed:

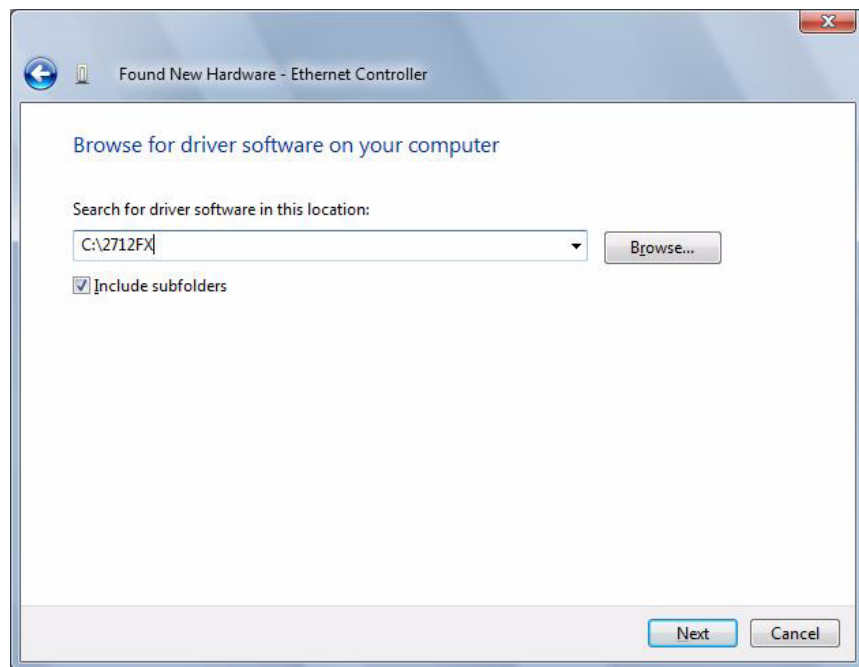


Figure 15. Found New Hardware - Ethernet Controller Browse for Driver Software Page

7. Click the **Browse** button.

Figure 16 is displayed.

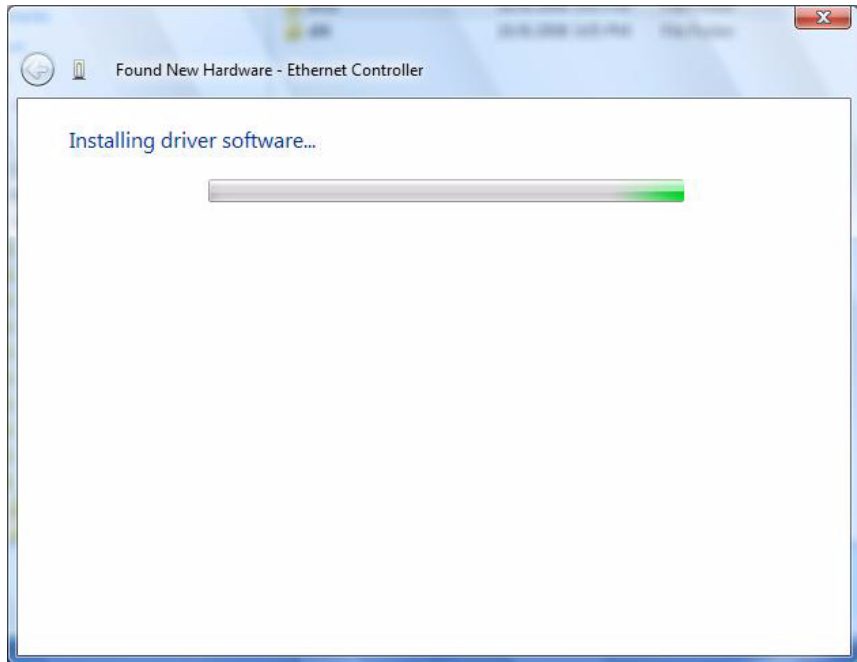


Figure 16. Found New Hardware - Ethernet Controller Installing Driver Page

Then a confirmation page is displayed. Figure 17 shows the confirmation page for an AT-2712FX/SC adapter. The confirmation page for the AT-2912 adapter is similar to this page.

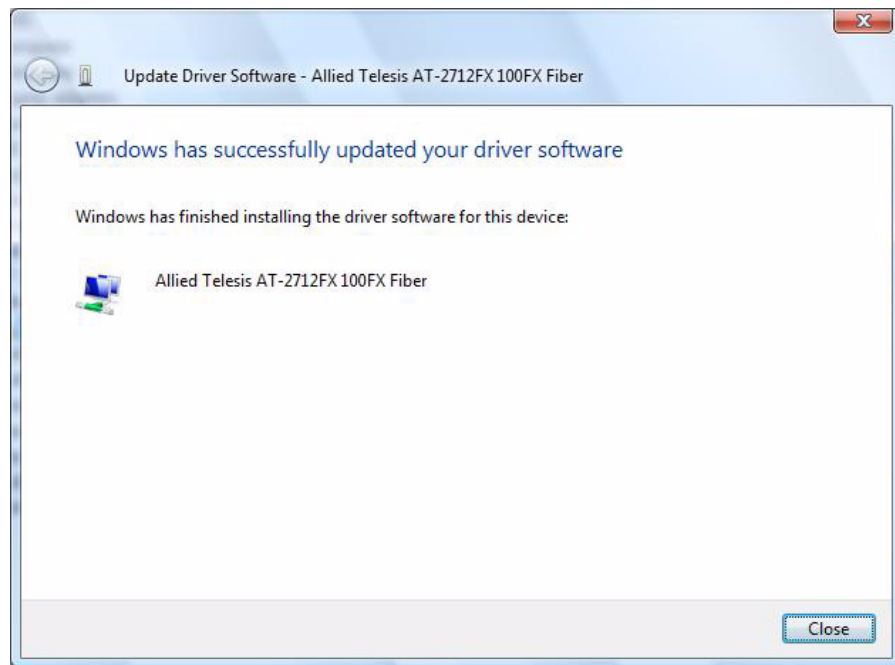


Figure 17. Update Driver Software - Allied Telesis AT-2712FX 100FX Fiber Page

8. Confirm that the AT-2712FX/SC or AT-2912T adapter has been installed successfully by clicking on the Device Manager. Steps 8 through 10 instruct you how to access the Device Manager. If you know how to access the Device Manager, skip to step 11.



From the Start menu, select Settings and then the Control Panel. See Figure 18.

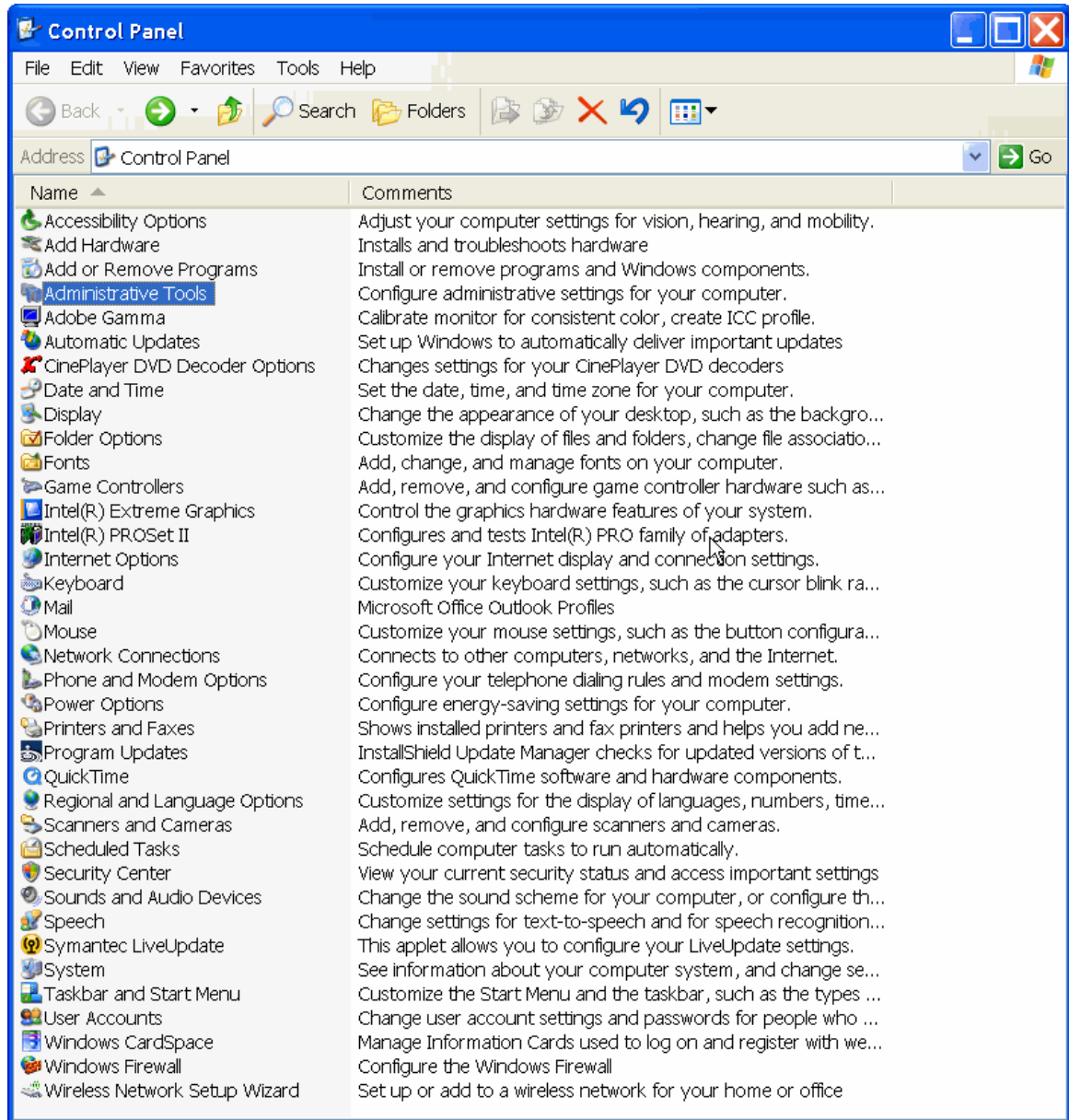


Figure 18. Control Panel Window

- From the Control Panel, select Administrative Tools.

The Administrative Tools window is displayed. See Figure 19 on page 42.

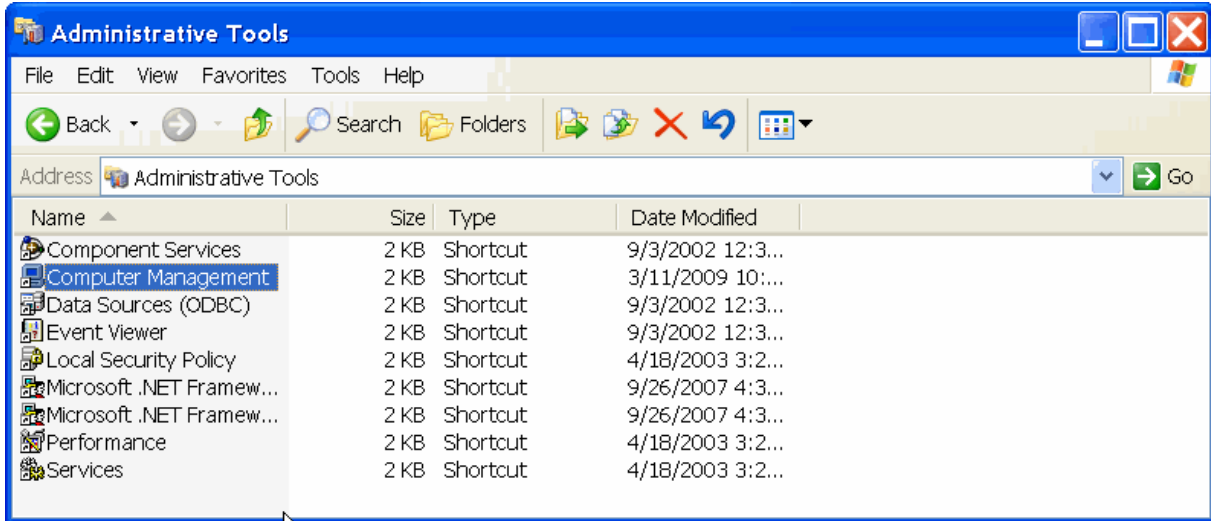


Figure 19. Administrative Tools Window

10. From the Administrative Tools window, select Computer Management. See the Computer Management window in Figure 20.

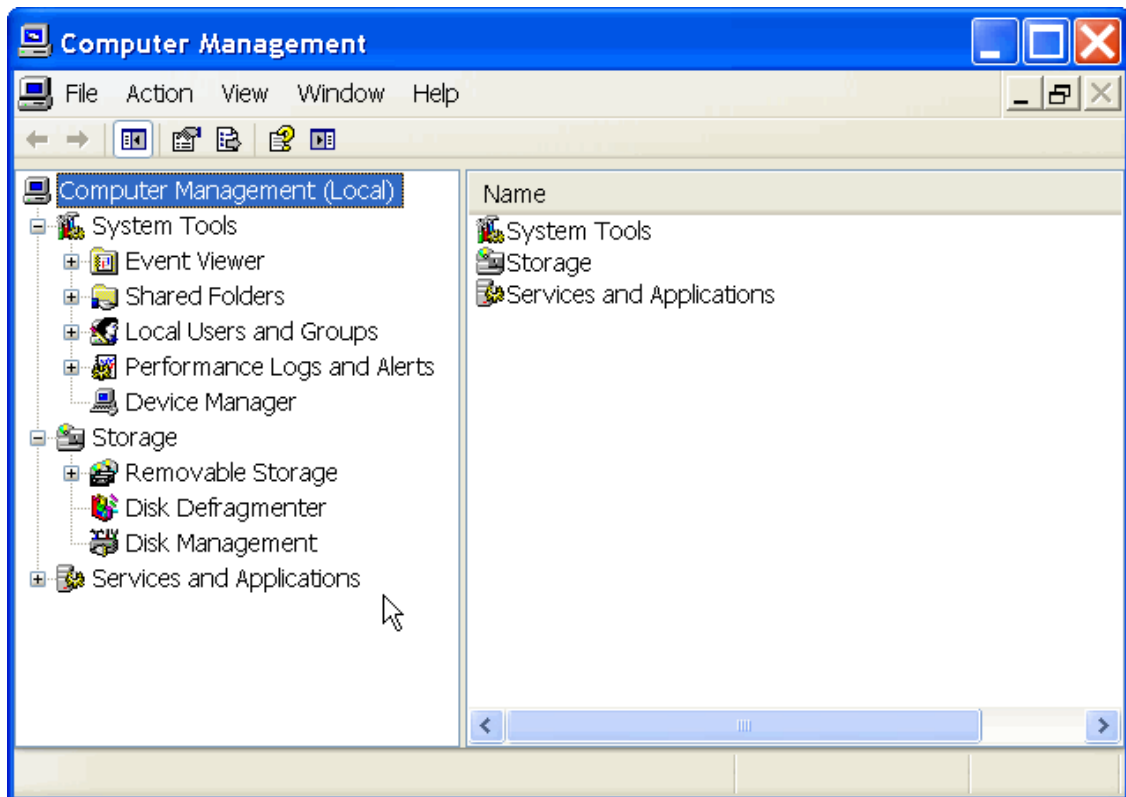


Figure 20. Computer Management Window

11. From the Computer Management, select Device Manager in the left panel. The Device Manager window is displayed. See Figure 21.

On the Device Manager page, either “Allied Telesis AT-2712FX Fiber” or “Allied Telesis AT-2912T” is listed under “Network adapters.”

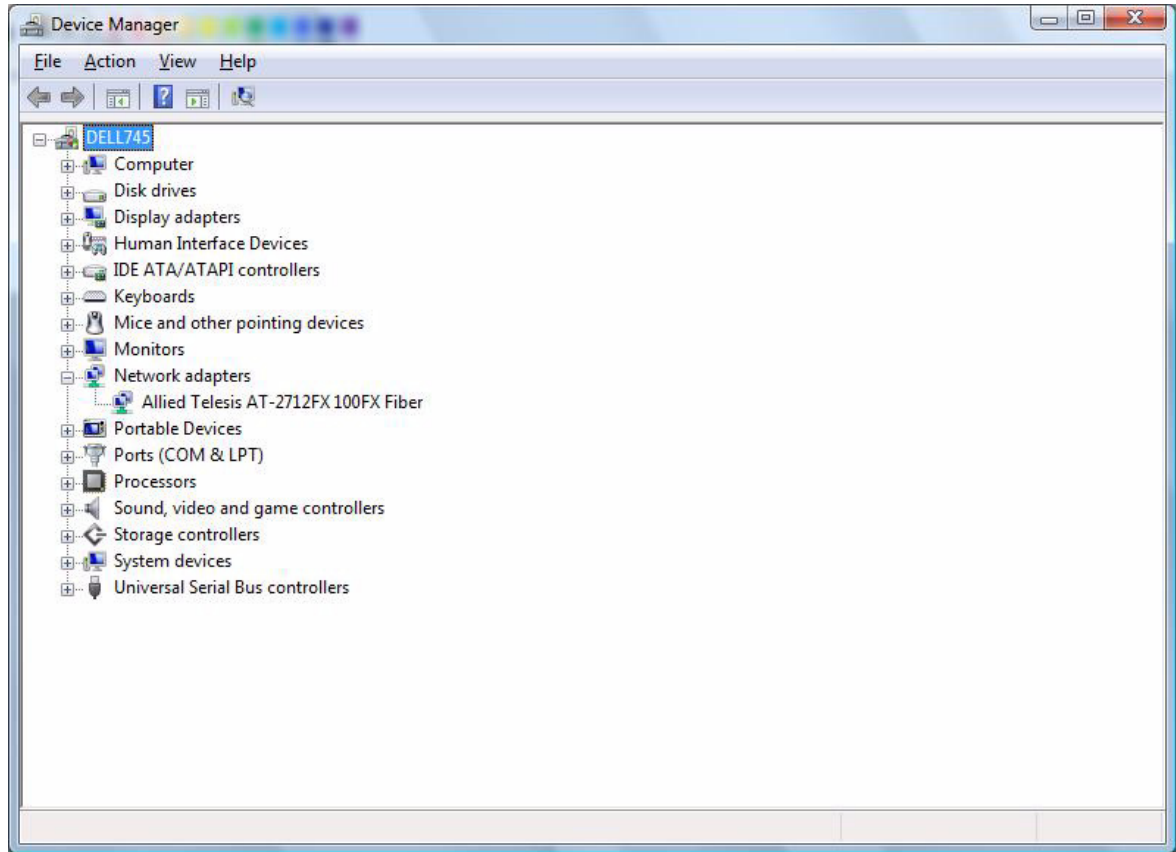


Figure 21. Device Manager Window

12. Click the **Close** button.

You have completed the installation process for the AT-2712FX/SC or AT-2912T driver.

## Uninstalling the Driver Software

---

Before physically removing an adapter from your system, you need to uninstall the adapter driver software first. The procedure in this section describes how to uninstall the driver software.



### Caution

Before uninstalling the Allied Telesis device, be sure to capture all of the Advanced Property settings because the properties are lost during the uninstall process.

---

To uninstall the adapter software from your system, perform the following procedure:

1. Start Windows Vista and log in.

---

### Note

You must have Administrator privileges to remove the driver software.

---

2. Open the **Device Manager**.

For instructions on how to open the Device Manager, see steps 8 through 11 in “Setting Vista’s Next Generation TCP/IP Stack” on page 35.

The Device Manager Window is shown in Figure 21 on page 43.

3. In the Device Manager window, click the **+** next to the Network Adapters folder.

The selection expands to show the list of installed network adapter cards.

4. Right-click on the adapter you want to remove and select **Uninstall**.

A Confirm Device Removal window opens.

5. Click **OK** to complete the uninstall.

---

### Note

Not all of the driver files are removed as a result of this procedure. You can remove additional drivers and installation files by selecting the checkbox to remove these files.

---

## Chapter 4

# Installing Windows Server 2003 and Windows XP Driver Software

---

This chapter describes how to install the Windows 2003 and Windows XP driver software in the AT-2712FX/SC and AT-2912T adapters. It contains the following sections:

- ❑ “Installing the Driver Software” on page 46
- ❑ “Modifying Configuration Properties” on page 53
- ❑ “Uninstalling the Driver Software” on page 63

## Installing the Driver Software

---

When a Windows Server 2003 or Windows XP system first boots up after you install a new Allied Telesis AT-2712FX/SC or AT-2912T adapter, the system automatically detects the new hardware and prompts you to install the driver software for that device.

---

**Note**

The adapter must be physically installed in your system before installing the driver software. See Chapter 2, “Installing the Hardware” on page 21 for details.

---

---

**Note**

If the Windows Server 2003 or Windows XP system detects an adapter and installs a default driver, update the driver as described in “Updating the Adapter Software” on page 47.

---

---

**Note**

If there is an onboard Broadcom network interface, the native Broadcom driver may load. Update the drive as described in “Updating the Windows 2003 Server or Windows XP Driver Software” on page 47.

---

## Updating the Adapter Software

This section provides a procedure for updating the adapter software for the Windows Server 2003 or Windows XP systems.

---

### Note

You must have Administrator privileges to update the driver software.

---

When you update the adapter software on existing devices, the Advanced Property settings may not be updated unless you remove the existing device by following the instructions in “Uninstalling the Driver Software” on page 63. Then you must perform a scan for hardware changes in the device manager, followed by reinstalling the device with the current adapter software as described in “Installing the Driver Software” on page 46.



---

### Caution

Before uninstalling a device, capture all of the Advanced Property settings because the properties will be lost.

---

## Updating the Windows 2003 Server or Windows XP Driver Software

To update the adapter software on a Windows Server 2003 or a Windows XP system, perform the following procedure.

---

### Note

Update all adapters by repeating the following steps on each device.

---

1. Start either a Windows Server 2003 system or a Windows XP system and log in.

You must have Administrator privileges to update the driver software.

2. On the desktop, right click **My Computer**.

The My Computer window opens.

3. Select **Properties** from the menu.

The System Properties dialog box opens, as shown in Figure 22.

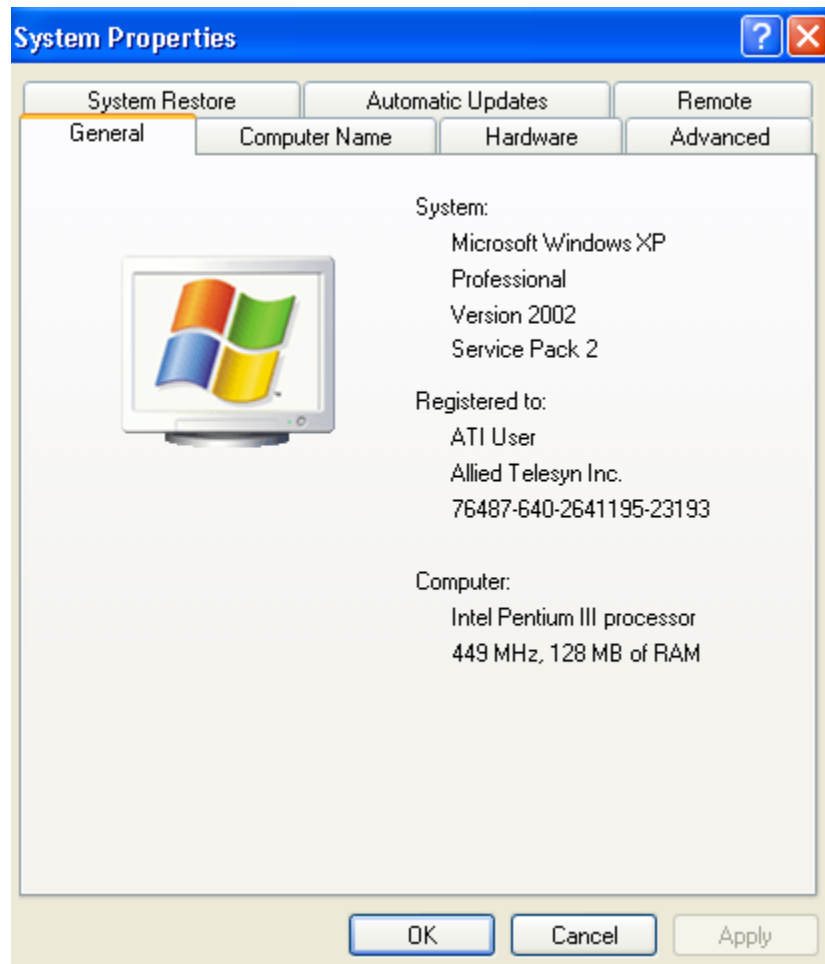


Figure 22. System Properties Dialog Box

4. Select the **Hardware** Tab.

The Hardware Tab is shown in Figure 23 on page 49.



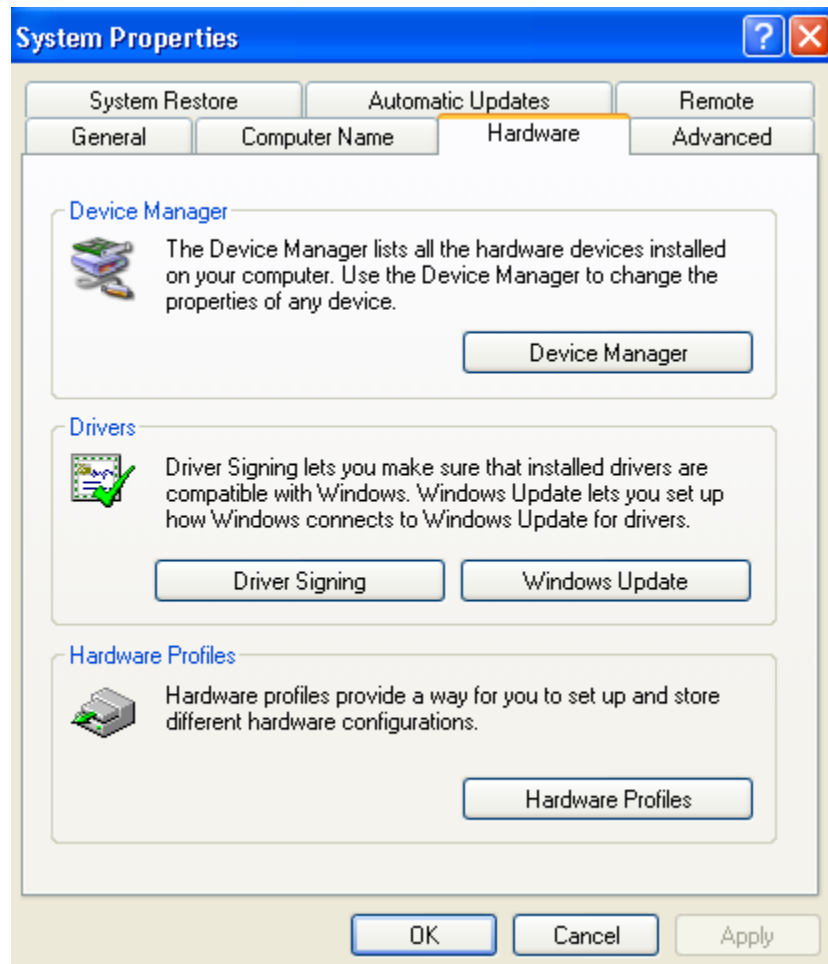


Figure 23. Hardware Tab

5. Click **Device Manager**.

The Device Manager Window is shown in Figure 24.

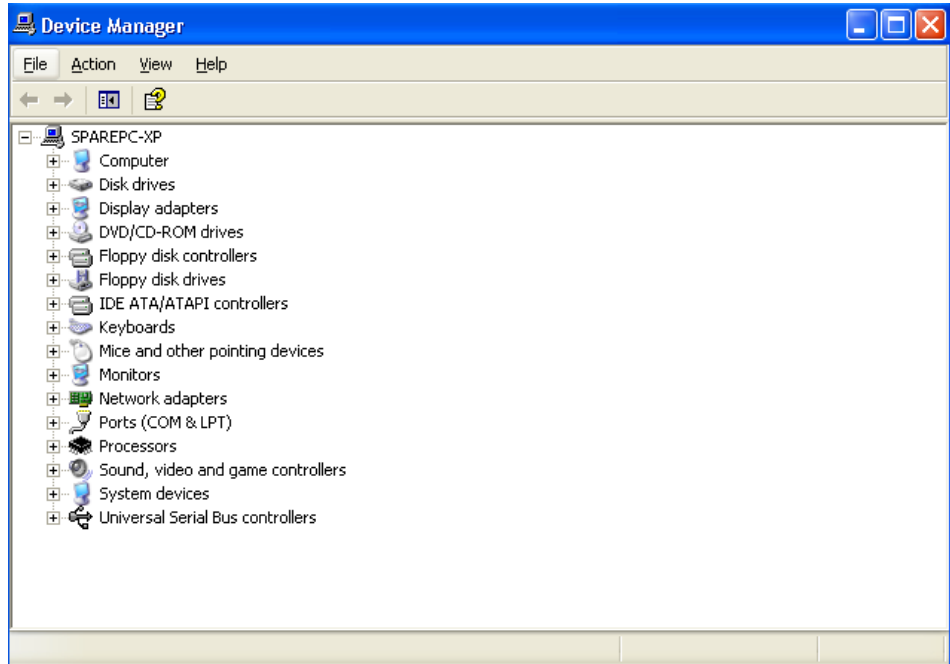


Figure 24. Device Manager Window

6. In the Device Manager window, click the + next to the Network Adapters folder.

The selection expands to show the list of installed network adapter cards.

- Right click on the adapter whose driver you want to update and select **Update Driver**.

The Hardware Update Wizard Window opens, as shown in Figure 25.



Figure 25. Welcome to Hardware Update Wizard Window

- For a Windows 2003 system, skip to step 10. For a Windows XP system, click **No, not this time** to copy the driver software from the proper media.
- Click **Next**.

The Second New Found Hardware Wizard Window opens, as shown in Figure 26.

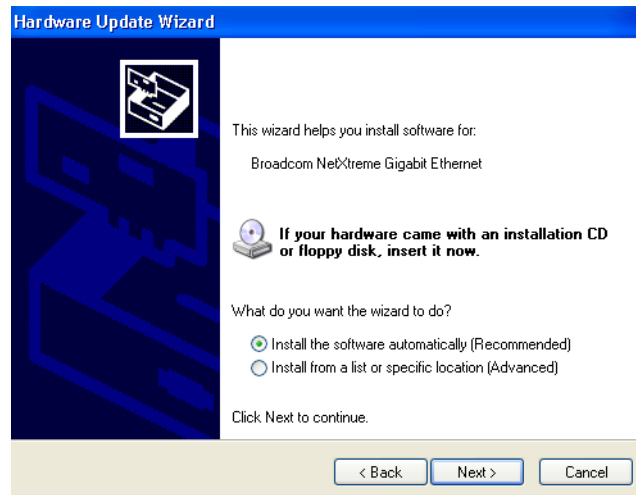


Figure 26. Hardware Update Wizard Window

- Click **Install from a list or specific location (Advanced)**.

11. Click **Next**.

12. If you are prompted to specify the location of the drive, click **Browse** and locate the path of the drivers.

---

**Note**

Do not use the text field to locate the path of the drivers.

---

After driver software installation is complete, you are ready to modify the configuration properties. See “Modifying Configuration Properties” on page 53.

## Modifying Configuration Properties

---

Although the default values are appropriate in most cases, you can change any of the available options to meet the requirements of your system. After the adapter driver software has been installed, you can use this procedure to verify or change the following adapter properties:

- "802.1p QOS" on page 53
- "Checksum Offload" on page 55
- "Flow Control" on page 56
- "Large Send Offload" on page 57
- "Locally Administered Address" on page 58
- "Speed and Duplex Mode" on page 59
- "Wake Up Capabilities" on page 61
- "WOL Speed" on page 62

---

**Note**

The procedures in the following sections may differ slightly if the "Classic Start Menu" is set on your computer.

---

### 802.1p QOS

The 802.1p QOS property is a standard that enables the Quality of Service (QOS) feature. It is responsible for the QOS provisions on the local segment, and the avoidance of the "all packets are treated equally" issue, which falls onto the hub or switch servicing segment. 802.1p QOS provides prioritization of packets traversing a subnet. Thus, when the local segment becomes congested and the hub or switch workload results in the delaying or dropping packets, those packets with flags that correspond to higher priorities receive preferential treatment and are serviced before packets with lower priorities.

---

**Note**

You must have Administrator privileges to update the driver software.

---

To enable or disable the 802.1p QOS property, perform the following procedure:

1. Start either a Windows Server 2003 system or a Windows XP system and log in.
2. On the desktop, right click **My Computer** and select "**Properties.**"

The System Properties dialog box opens, as shown in Figure 22 on page 48.

3. In the “Hardware tab” on the System Properties dialog box, select “**Device Manager.**”

The Device Manager window is shown in Figure 24 on page 50.

4. Click the “+” next to the Network Adapters folder. Then double click on the desired Allied Telesis network adapter.

For the AT-2712FX/SC adapter, the Allied Telesis AT-2712FX 100 Mb Fiber Ethernet Properties window is displayed. See Figure 27.

5. Click the **Advanced** tab.

The Advanced tab for the AT-2712FX/SC adapter is shown in Figure 27.

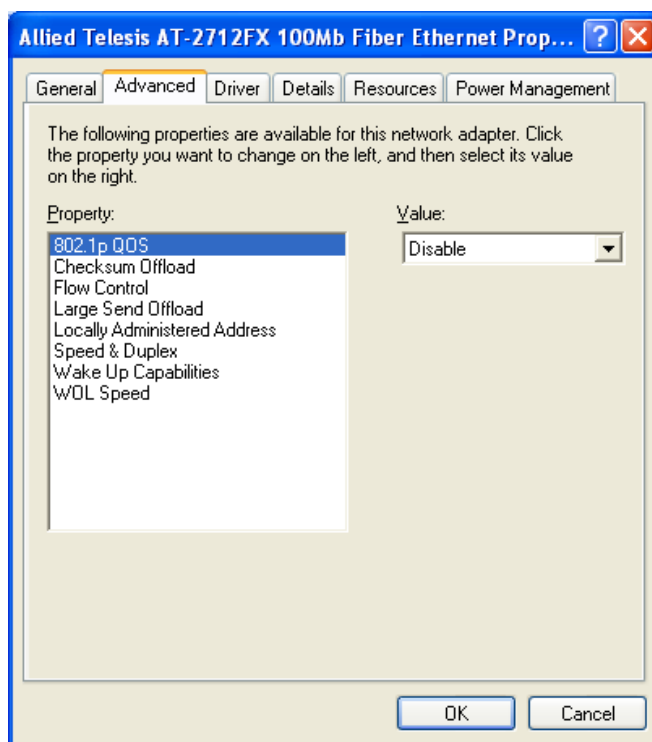


Figure 27. Allied Telesis AT-2712FX 100 Mb Fiber Ethernet Properties Window

6. From the Property list on the Advanced tab, select **802.1p QOS.**
7. From the Value list on the Advanced tab, select one of the following:
  - Enable** - Enables the 802.1p QOS property.
  - Disable** - Disables the 802.1p QOS property. This is the default.

---

**Note**

Enabling 802.1p QOS also requires an 802.1p aware switch.

---

8. Click **OK**.
9. If prompted to restart your computer, click **Yes**.

Although it is not necessary to reboot the system for new adapter properties to take effect, rebooting is recommended to reinitialize all registers.

10. Verify that the adapter port LEDs operate as described in "Physical Descriptions" on page 19.

**Checksum Offload**

Usually, the Checksum Offload function is computed by the protocol stack. By selecting one of the Checksum Offload properties, the adapter can compute the checksum.

---

**Note**

You must have Administrator privileges to update the driver software.

---

To change the Checksum Offload setting, perform the following procedure:

1. Start either a Windows Server 2003 system or a Windows XP system and log in.
2. On the desktop, right click **My Computer** and select "**Properties**."

The System Properties dialog box opens, as shown in Figure 22 on page 48.

3. In the "Hardware tab" on the System Properties dialog box, select "**Device Manager**."

The Device Manager window is shown in Figure 24 on page 50.

4. Click the "+" next to the Network Adapters folder. Then double click on the desired Allied Telesis network adapter.

For the AT-2712FX/SC adapter, the Allied Telesis AT-2712FX 100 Mb Fiber Ethernet Properties window is displayed. See Figure 27 on page 54.

5. From the Advanced tab, select **Checksum Offload**.
6. From the Value list on the Advanced tab, select one of the following:
  - None** - Disables checksum offloading.

- Rx TCP/IP Checksum** - Enables receive TCP, IP, and UDP checksum offloading.
- Tx TCP/IP Checksum** - Enables transmit TCP, IP, and UDP checksum offloading.
- Tx/Rx TCP/IP Checksum (default)** - Enables transmit and receive TCP, IP, and UDP checksum offloading.

7. Click **OK**.
8. If prompted to restart your computer, click **Yes**.

Although it is not necessary to reboot the system for new adapter properties to take effect, rebooting is recommended to reinitialize all registers.

9. Verify that the adapter port LEDs operate as described in “Physical Descriptions” on page 19.

## Flow Control

The Flow Control property allows you to enable or disable the receipt or transmission of PAUSE frames which enable the adapter and the switch to control the transmit rate. The port side that is receiving the PAUSE frame momentarily stops transmitting. The recommended selection is Disable, which configures the adapter to ignore PAUSE frames.

By default, the Flow Control property is set to disabled.

---

### Note

You must have Administrator privileges to update the driver software.

---

To change the Flow Control property, perform the following procedure:

1. Start either a Windows Server 2003 system or a Windows XP system and log in.
2. On the desktop, right click **My Computer** and select “**Properties**.”

The System Properties dialog box opens, as shown in Figure 22 on page 48.

3. In the “Hardware tab” on the System Properties dialog box, select “**Device Manager**.”

The Device Manager window is shown in Figure 24 on page 50.

4. Click the “+” next to the Network Adapters folder. Then double click on the desired Allied Telesis network adapter.



For the AT-2712FX/SC adapter, the Allied Telesis AT-2712FX 100 Mb Fiber Ethernet Properties window is displayed. See Figure 27 on page 54.

5. From the Property list on the Advanced tab, select **Flow Control**.
6. From the Value list on the Advanced tab, select one of the following:
  - Auto** - (default) PAUSE frame receipt and transmission is optimized.
  - Disable** - PAUSE frame receipt and transmission is disabled (recommended).
  - Rx PAUSE** - PAUSE frame receipt is enabled.
  - Rx/Tx PAUSE** - PAUSE frame receipt and transmission is enabled.
  - Tx PAUSE** - PAUSE frame transmission is enabled.
7. Click **OK**.
8. If prompted to restart your computer, click **Yes**.

Although it is not necessary to reboot the system for new adapter properties to take effect, rebooting is recommended to reinitialize all registers.

9. Verify that the adapter port LEDs operate as described in "Physical Descriptions" on page 19.

## Large Send Offload

Normally, the protocol stack performs TCP segmentation. When you enable the Large Send Offload property, the network adapter can do the TCP segmentation.

---

### Note

You must have Administrator privileges to update the driver software.

---

To change the Large Send Offload property, perform the following procedure:

1. Start either a Windows Server 2003 system or a Windows XP system and log in.
2. On the desktop, right click **My Computer** and select "**Properties**."

The System Properties dialog box opens, as shown in Figure 22 on page 48.

3. In the "Hardware tab" on the System Properties dialog box, select "**Device Manager**."

The Device Manager window is shown in Figure 24 on page 50.

4. Click the “+” next to the Network Adapters folder. Then double click on the desired Allied Telesis network adapter.

For the AT-2712FX/SC adapter, the Allied Telesis AT-2712FX 100 Mb Fiber Ethernet Properties window is displayed. See Figure 27 on page 54.

5. Click the **Advanced** tab.

The Advanced tab is shown in Figure 27 on page 54.

6. From the Property list on the Advanced tab, select **Large Send Offload**.
7. From the Value list on the Advanced tab, select one of the following:
  - Enable** - Enables the Large Send Offload property.
  - Disable** - Disables the Large Send Offload property. This is the default.
8. Click **OK**.
9. If prompted to restart your computer, click **Yes**.

Although it is not necessary to reboot the system for new adapter properties to take effect, rebooting is recommended to reinitialize all registers.

10. Verify that the adapter port LEDs operate as described in “Physical Descriptions” on page 19.

### **Locally Administered Address**

The Locally Administered Address is a user-defined address that is used in place of the MAC address originally assigned to the adapter. Every adapter in the network must have its own unique MAC address. This locally administered address consists of a 12-digit hexadecimal number.

---

#### **Note**

You must have Administrator privileges to update the driver software.

---

To change the Locally Administered Address property, perform the following procedure:

1. Start either a Windows Server 2003 system or a Windows XP system and log in.
2. On the desktop, right click **My Computer** and select “**Properties**.”

The System Properties dialog box opens, as shown in Figure 22 on page 48.

3. In the “Hardware tab” on the System Properties dialog box, select **“Device Manager.”**

The Device Manager window is shown in Figure 24 on page 50.

4. Click the “+” next to the Network Adapters folder. Then double click on the desired Allied Telesis network adapter.

For the AT-2712FX/SC adapter, the Allied Telesis AT-2712FX 100 Mb Fiber Ethernet Properties window is displayed. See Figure 27 on page 54.

5. Click the **Advanced** tab.

The Advanced tab is shown in Figure 27 on page 54.

6. From the Property list on the Advanced tab, select **Locally Administered Address.**

7. In the Value list on the Advanced tab, enter the Locally Administered Address.

- The range is 0000 0000 0001 to FFFF FFFF FFFD.
- Do not use a multicast address (least significant bit of the high byte = 1).
- Do not use all 0's or all F's.

8. Click **OK.**

9. If prompted to restart your computer, click **Yes.**

Although it is not necessary to reboot the system for new adapter properties to take effect, rebooting is recommended to reinitialize all registers.

10. Verify that the adapter port LEDs operate as described in “Physical Descriptions” on page 19.

## **Speed and Duplex Mode**

The speed and duplex mode feature allow you to set the speed of the adapter as well as the change the duplex mode from full to half.

---

**Note**

You must have Administrator privileges to update the driver software.

---

To change the speed and duplex mode of an adapter, perform the following procedure:

1. Start either a Windows Server 2003 system or a Windows XP system and log in.

2. On the desktop, right click **My Computer** and select "**Properties.**"

The System Properties dialog box opens, as shown in Figure 22 on page 48.

3. In the "Hardware tab" on the System Properties dialog box, select "**Device Manager.**"

The Device Manager window is shown in Figure 24 on page 50.

4. Click the "+" next to the Network Adapters folder. Then double click on the desired Allied Telesis network adapter.

For the AT-2712FX/SC adapter, the Allied Telesis AT-2712FX 100 Mb Fiber Ethernet Properties window is displayed. See Figure 27 on page 54.

5. Click the **Advanced** tab.

The Advanced tab is shown in Figure 27 on page 54.

6. From the Property list on the Advanced tab, select "**Speed & Duplex.**"

7. In the Value list on the Advanced tab, select one of the following:

- 10 Mb Full
- 10 Mb Half
- 100 Mb Full
- 100 Mb Half
- Auto

For the AT-2712FX/SC adapter, you can only select either the 100 Mb Full or the 100 MB Half speeds and duplex modes.

For the AT-2912T adapter, you can select from all 5 options.

8. Click **OK.**

## Wake Up Capabilities

The Wake Up Capabilities property enables the network adapter to wake up from a low-power mode when it receives a network wake-up frame. There are two types of wake-up frames: Magic Packet and Wake Up Frame.

---

### Note

You must have Administrator privileges to update the driver software.

---

To change the Wake Up Capabilities property, perform the following procedure:

1. Start either a Windows Server 2003 system or a Windows XP system and log in.

2. On the desktop, right click **My Computer** and select "**Properties.**"

The System Properties dialog box opens, as shown in Figure 22 on page 48.

3. In the "Hardware tab" on the System Properties dialog box, select "**Device Manager.**"

The Device Manager window is shown in Figure 24 on page 50.

4. Click the "+" next to the Network Adapters folder. Then double click on the desired Allied Telesis network adapter.

For the AT-2712FX/SC adapter, the Allied Telesis AT-2712FX 100 Mb Fiber Ethernet Properties window is displayed. See Figure 27 on page 54.

5. Click the **Advanced** tab.

The Advanced tab is shown in Figure 27 on page 54.

6. From the Property list on the Advanced tab, select **Wake Up Capabilities.**

7. From the Value list on the Advanced tab, select one of the following:

- Both - Implements Magic Packet and Wake Up Frame.
- Magic Packet - Selects Magic Packet as the Wake Up frame.
- None - Selects no wake-up frame.
- Wake Up Frame - Selects Wake Up Frame as the wake-up frame and allows the network adapter to wake up the system when an event, such as a ping or an ARP request, is received.

8. Click **OK.**

## WOL Speed

The WOL Speed property sets the speed at which the network adapter connects to the network while the network adapter is in Wake on LAN (WOL) mode. By default, the WOL Speed property is set to Auto.

---

### Note

You must have Administrator privileges to update the driver software.

---

To change the WOL Speed property, perform the following procedure:

1. Start either a Windows Server 2003 system or a Windows XP system and log in.

2. On the desktop, right click **My Computer** and select "**Properties.**"

The System Properties dialog box opens, as shown in Figure 22 on page 48.

3. In the "Hardware tab" on the System Properties dialog box, select "**Device Manager.**"

The Device Manager window is shown in Figure 24 on page 50.

4. Click the "+" next to the Network Adapters folder. Then double click on the desired Allied Telesis network adapter.

For the AT-2712FX/SC adapter, the Allied Telesis AT-2712FX 100 Mb Fiber Ethernet Properties window is displayed. See Figure 27 on page 54.

5. Click the **Advanced** tab.

The Advanced tab is shown in Figure 27 on page 54.

6. From the Property list on the Advanced tab, select **Wake Up Capabilities.**

7. From the Value list on the Advanced tab, select:

100Mb - Sets the speed to 100 Mb. This is the default.

8. Click **OK.**

## Uninstalling the Driver Software

---

Before physically removing an adapter from your system, first uninstall the adapter driver software. For instructions on how to uninstall the driver software, refer to the chapter in this manual that pertains to your platform.

---

### Note

You must have Administrator privileges to remove the driver software.

---



---

### Caution

Before uninstalling the Allied Telesis device, be sure to capture all Advanced Property settings because the properties are lost during the uninstall process.

---

To uninstall the adapter software from your system, perform the following procedure:

1. Start Windows Server 2003 or Windows XP and log in.
2. Choose from the following:
  - If you have a Windows 2003 Server system, click **Start**. Then select the **Control Panel** from the menu. Double-click the **System** icon.
  - If you have a Windows XP system, right click on **My Computer**. Then select **Properties** from the menu.

The System Properties dialog box opens, as shown in Figure 22 on page 48.

3. Click the **Hardware** tab.

The Hardware tab is shown in Figure 23 on page 49.

4. Click **Device Manager**.

The Device Manager Window is shown in Figure 24 on page 50.

5. In the Device Manager window, click the **+** next to the Network Adapters folder.

The folder expands to show the list of installed network adapter cards.

6. Right-click on the adapter you want to remove and select **Uninstall**.

A Confirm Device Removal window opens.

7. Click **OK** to complete the uninstall.

---

**Note**

Not all driver files are removed as part of this procedure. Note that drivers and adapters can be removed via the Hot Plug application, if it is supported.

---



## Chapter 5

# Enabling LINUX

---

This chapter describes how to enable the LINUX System on the AT-2712FX/SC and AT-2912T adapters. This chapter contains the following sections:

- ❑ “Introduction” on page 66
- ❑ “Installing LINUX TG3 File” on page 67
- ❑ “Unloading and Removing the Driver” on page 72
- ❑ “Driver Messages” on page 73

## Introduction

---

This chapter describes the tg3 Linux driver for the Broadcom NetXtreme PCI/PCI-X/PCI Express Ethernet Network Controllers.

The most recent driver is in the latest 2.6 Linux kernel. You can download the driver from [www.broadcom.com](http://www.broadcom.com) as a source package. However, it is generally not necessary to do so if you are using the latest 2.6 upstream kernel from [www.kernel.org](http://www.kernel.org) or one of the latest vendor kernels from Red Hat, SuSE, or others.

The tg3 driver from the Broadcom package is almost identical to the tg3 driver in the latest 2.6 upstream Linux kernel. It includes some additional kernel-compatible code to allow it to compile on older 2.6 and some 2.4 kernels. The version number is similar but generally has a one-letter suffix, for example 3.55b, to distinguish it from the in-kernel tg3 driver.

### Limitations

The current version of the driver has been tested on the 2.4x kernels starting from 2.4.24 and all 2.6.x kernels.



#### Caution

The driver may not compile on kernels older than version 2.4.24.

---

Testing is concentrated on i386 and x86\_64 CPU architectures. Only limited testing has been done on some other architectures such as PowerPC and SPARC64.

On some kernels, you may need to make minor changes to some source files and the Makefile.

### Packaging

To replace an older previously installed or in-kernel tg3 driver, follow the instructions in “Installing LINUX TG3 File” on page 67.

The driver package from [www.broadcom.com](http://www.broadcom.com) is released in two packaging formats: source RPM and compressed tar formats. The file names for the two packages are tg3<version>.src.rpm and tgs<version>.tar.gz respectively. Identical source files to build the driver are included in both packages.

## Installing LINUX TG3 File

---

There are two procedures to install the Linux TG3 file:

- “Installing the Source RPM Package” on page 67
- “Building the Driver from the Source TAR File” on page 68

### Installing the Source RPM Package

Here are general guidelines for installing the driver:

1. Install the source RPM package by enter the following command:

```
rpm -ivh tg3<version>.src.rpm
```

2. Change directory to the RPM path and build the binary driver for your kernel. Enter one of the following commands:

```
cd /usr/src/{redhat, openLinux, turbo, packages, rpm..}
```

or

```
rpmbuild -bb SPECS/tg3.spec (for RPM version 4.x.x)
```

---

#### Note

The RPM path is different for specific Linux distributions.

---

3. By default, the driver is compiled for the running kernel. To build the driver for a kernel different from the running kernel, specify the kernel by defining it in KVER. If this is not necessary, skip to step 4. Enter the following command:

```
rpmbuild -bb SPECS/tg3.spec --define "KVER <kernel_<br>version>
```

where <kernel\_version> in the form of 2.x.y-z is the version number of another kernel that is installed on the system.

4. To install the newly-built package (driver and man page), enter the following command:

```
rpm -ivh RPMS/<arch>/tg3-<version>.<arch>.rpm
```

where <arch> is the architecture of the machine such as i386. For example:

```
rpm -ivh RPMS/i386/tg3-<version>.i386.rpm
```

---

**Note**

The force option may be needed on some Linux distributions if conflicts are reported.

---

Depending on the kernel, the driver is installed in one of the following directories:

2.4.x kernels:

```
/lib/modules/<kernel_version>/kernel/drivers/net/  
tg3.o
```

2.6.x kernels:

```
/lib/modules/<kernel_version>/kernel/drivers/net/  
tg3.ko
```

5. To load the driver, enter one of the following commands:

```
insmod tg3.o
```

or

```
insmod tg3.ko (on 2.6 kernels)
```

or

```
modprobe tg3
```

To configure the network protocol and address, refer to the Linux version-specific documentation.

## **Building the Driver from the Source TAR File**

To build the LINUX driver from the source TAR file, use the following procedure:

1. Create a directory, called tg3 - version, and extract the TAR files to the directory. Enter the following command:

```
tar xvzf tg3-version.tar.gz
```

2. Build the driver tg3.o or tg3.ko as a loadable module for the running kernel. Enter the following commands:

```
cd src  
make
```

3. The driver is compiled for the running kernel by default. To build the driver for a kernel different from the one running, specify the kernel by defining it in KVER. If this is not necessary, skip to step 4.

Enter the following command:

```
make KVER=<kernel_version>
```

where <kernel\_version> in the form of 2.x.y-z is the version of another kernel that is installed on the system.

4. Test the driver by loading it. Enter the following commands:

```
insmod tg3.o
```

or

```
insmod tg3.ko (on 2.6 kernels)
```

or

```
modprobe tg3
```

5. Install the driver by entering the following command:

```
make install
```

See “Installing the Source RPM Package” on page 67 for the location of the installed driver.

To configure the network protocol and address, refer to the Linux version-specific documentation.

## Driver Settings

It is important to configure the AT-2712FX/SC speed and duplex settings. By default the Linux driver is configured for autonegotiation which is not supported with an 100 FX operation. Driver settings can be queried and changed using the ethtool utility. Download the latest ethtool from the following web site:

<http://sourceforge.net/projects/gkernel>

See Table 3 on page 70 for examples that describe how to use the ethtool utility. In addition, see the ethtool man page for more information about this utility.

The ethtool settings do not persist across reboot or module reload. However, you can place the ethtool commands in a startup script such as /etc/rc.local to preserve the settings across a reboot.

On Red Hat distributions, you can specify “ethtool -s” parameters in the ifcfg-ethx scripts using the ETHTOOL\_OPTS keyword. The specified ethtool parameters are set up during ifup. For example, go to the following directory:

```
/etc/sysconfig/network-scripts/ifcfg-eth0
```

Add the following line to the script:

```
ETHTOOL_OPTS="wol g speed 100 duplex half autoneg off"
```

Table 3. Ethtool Utility Examples

Action	Commands
Display current speed, duplex, and link status	ethtool eth0
Change speed, duplex mode, and autonegotiation status to 100Mbps half duplex, and no autonegotiation	ethtool -s eth0 speed 100 duplex half autoneg off
Change speed, duplex mode, and autonegotiation status to 100Mbps full duplex mode, and no autonegotiation	ethtool -s eth0 speed 100 duplex full autoneg off
Display flow control settings	ethtool -a eth0
Turn off flow control	ethtool -A eth0 autoneg off rx off tx off
Display offload settings	ethtool -k eth0
Turn off TCP Segmentation Offload (TSO)	ethtool -K eth0 tso off
Display statistics	ethtool -S eth0
Perform a self-test on an interface that is up and running	ethtool -t eth0

## Driver Default Settings

See Table 4 for the default settings of the Linux driver.

Table 4. Linux Driver Settings

Feature	Default Setting
Speed	Autonegotiation with all speeds advertised
Flow control	Autonegotiation with Rx and Tx advertised
MTU	1500 (range 46 - 9000)
Rx Ring Size	200 (range 0 - 511)
Rx Jumbo Ring Size	100 (range 0 - 255)
Tx Ring Size	511 (range (MAX_SKB_FRAGS+1) - 511)

Table 4. Linux Driver Settings (Continued)

<b>Feature</b>	<b>Default Setting</b>
Coalesce Rx usecs	20 (range 0 - 1023)
Coalesce Rx usecs irq	20 (range 0 - 255)
Coalesce Rx frames	5 (range 0 1023)
Coalesce Rx frames irq	5 (range 0 - 255)
Coalesce Tx usecs	72 (range 0 - 1023)
Coalesce Tx usecs irq	20 (range 0 - 255)
Coalesce Tx frames	53 (range 0 - 1023)
Coalesce Tx frames irq	5 (range 0 - 255)
Coalesce stats usecs	1000000 (approximately 1 second) Some coalescing parameters are not used or have different defaults on some chips
MSI	Enabled if supported by the chip and passes the interrupt test
TSO	Enabled on newer chips that support TCP segmentation offload in hardware
WoL (Wake on LAN)	Disabled

## Unloading and Removing the Driver

---

To unload the driver, use the `ifconfig` command to bring down all `eth#` interfaces opened by the driver. Then enter the following command:

```
rmmod tg3
```

---

**Note**

On all 2.6 kernels, you do not need to bring down the `eth#` interfaces before unloading the driver module.

---

If the driver was installed using `rpm`, enter the following command to remove it:

```
rpm -e tg3
```

If the driver was installed using the `make install` command from the tar file, you need to manually delete the driver `tg3.o` (or `tg3.ko`) from the system. Refer to “Installing the Source RPM Package” on page 67 for the location of the installed driver.



## Driver Messages

---

The following messages are the most common sample messages that are logged in the `/var/log/messages` file. Use the `dmesg -n<level>` command to control the level at which messages appear on the console. Most systems are set to level 6 by default. To see all messages, set the level higher than 6.

### Driver Signon

```
tg3.c:v3.92n (September 29, 2008)
```

### NIC Detected

```
eth0: Tigon3 [partno(BCM95704A6) rev 2003 PHY(5704)
(PCIX:100MHz:64-bit)
10/100/1000BaseT Ethernet 00:10:18:04:3f:36
eth0: RXcsums[1] LinkChgREG[0] MIirq[0] ASF[0]
wirespeed[1] TSOcap[1]
eth0: dma_rwctrl[769f4000] dma_mask[64-bit]
```

### Link Up and Speed Indication

```
tg3: eth0: Link is up at 1000 Mbps, full duplex.
tg3: eth0: Flow control is on for TX and on for RX.
```

### Link Down Indication

```
tg3: eth#: Link is down.
```



## Chapter 6

# MS-DOS Diagnostics

---

This chapter describes the MS-DOS diagnostics and contains the following sections:

- ❑ “Introduction” on page 76
- ❑ “DOS Prompt Commands” on page 77
- ❑ “Diagnostic Tests” on page 78
- ❑ “Error Messages” on page 85

## Introduction

---

This section provides the information on how to use the DOS diagnostic utilities program on an Allied Telesis Fast Ethernet adapter.

For detailed information about the DOS diagnostic utilities program, see the *Broadcom B57UDIAG Diagnostics Users Guide*. You can download this document from the Allied Telesis website: [www.alliedtelesis.com](http://www.alliedtelesis.com).

**Prerequisites** The DOS diagnostics require the following prerequisites. See Table 5. The commands in this table can be entered from the DOS prompt.

Table 5. DOS Diagnostics Prerequisites

OS	DOS 6.22
Software	b57udiag.exe cpu.bin flshdiag.bin cpu05.bin flshdg5x.bin

## DOS Prompt Commands

---

Table 6 lists the DOS prompt commands.

Table 6. DOS Prompt Commands

Command	Description
-c <num>	Specify adapter to be tested and/or modified
-cmd	Enter command mode
-w <value>	Enable/Disable (value = 1/0) WOL in manufacture mode
-mba <value>	Option to select MBA protocol 0 = Disable 1 = Enable
-mbap <value>	Option to select MBA protocol 0 = PXE 1 = RPL 2 = BOOTP
-mbas <value>	Option to select MBA speed 0 = auto 1 = 10HD 2 = 10FD 3 = 100HD 4 = 100FD 6 = 1000FD (fiber)
-firm <file name>	Update devices eeprom based on <file name> image match to HW
-ver	Version of the current software/ eeprom.bin
-pxe <file name>	Programming PXE firmware from file
-elog <file name>	Output error to log file

## Diagnostic Tests

---

The tests are divided into four groups: Register Tests, Memory Tests, Miscellaneous Tests, and Data Tests. They numbered as group 'A', 'B', 'C', and 'D'.

**Test Names** This section lists the names of the diagnostics tests.

### Group A.

- A1. Indirect Register Test
- A2. Control Register Test
- A3. Interrupt Test
- A4. BIST
- A5. PCI Cfg Register Test

### Group B.

- B1. Scratch Pad Test
- B2. BD SRAM Test
- B3. DMA SRAM Test
- B4. MBUF SRAM Test
- B5. MBUF SRAM via DMA Test
- B6. External SRAM Test

### Group C.

- C1. EEPROM Test
- C2. CPU Test
- C3. DMA Test
- C4. MII Test
- C5. VPD Test
- C6. ASF Test
- C7. ROM Expansion Test

### Group D.

- D1. Mac Loopback Test
- D2. Phy Loopback Test
- D3. RJ45 Loopback Test
- D4. MII Miscellaneous Test
- D5. MSI Test

**Test Descriptions** This section provides descriptions of the diagnostic tests.

### **A1. Indirect Register Test**

**Function:** Using an indirect addressing method, writing increment data into MAC hash Register table and reading it back for verification. The memory read/write is done 100 times while increment test data.

**Default:** Test Enabled

### **A2. Control Register Test**

**Function:** Each Register specified in the configuration contents read only bit and read/write bit defines. The test writing zero and one into the test bits to insure the read only bits are not changed, and read/write bits are changed accordingly.

**Default:** Test Enabled.

### **A3. Interrupt Test**

**Function:** This test verifies the interrupt functionality. It enables interrupt and waits for interrupt to occur. It waits for 500ms and reports error if could not generate interrupts.

**Default:** Enabled

### **A4. BIST**

**Function:** Hardware Built-In-Self-Test (BIST). This test initiates BIST and waits for the test result returned by hardware.

**Default:** Due to the intermittent failure, this test is currently disabled by default.

### **A5. PCI Cfg Register Test**

**Function:** This test verifies the access integrity of the PCI config registers.

### **B1. Scratch Pad Test**

**Function:** This test tests the scratch pad SRAM on board. The following tests are performed:

**Data Pattern Test:** Writes test data into the SRAM and reads it back to ensure data is correct. The test data used is 0x00000000, 0xFFFFFFFF, 0xAA55AA55, and 0x55AA55AA.

**Alternate Data Pattern Test:** Writes test data into the SRAM. Writes complement test data into the next address. Reads back both to insure the

data is correct. After the test, the program reads back data one more time to insure the data stays correct. The test data used is 0x00000000, 0xFFFFFFFF, 0xAA55AA55, and 0x55AA55AA.

**Address Test:** Writes each address with unique increment data. Read back data to insure data is correct. After fill the entire data with the unique data, the program reads back data again to insure data stays the same.

**WalkingOne bit Test:** For each address, data one is written and read back for testing. Then shift the data left one bit, so the data becomes two and perform the same test again. It repeats for 32 times until the test bit is shifted out of test data. The same is test is repeated for entire test range.

**Pseudo Random Data Test:** A pre-calculated pseudo random data is used to write a unique data into each test RAM. After the first pass the test, the program reads back one more time to insure data stays correct.

**Default:** Enabled

## **B2. BD SRAM Test**

**Function:** This test tests the BD SRAM. This performs exact the same way of testing as described in B1. Scratch Pad Test.

**Default:** Enabled

## **B3. DMA SRAM Test**

**Function:** It tests DMA SRAM by performing the tests described in test B1. The Scratch Pad Test.

**Default:** Enabled

## **B4. MBUF SRAM Test**

**Function:** It tests DMA SRAM by performing the tests described in test B1. The Scratch Pad Test.

**Default:** Enabled

## **B5. MBUF SRAM via DMA Test**

**Function:** Eight test pattern data are used in the test. They are described below. A 0x1000 sized data buffer is used for this test. Before each pattern test, the buffer is initialized and filled with the test pattern. It then performs size 0x1000 transmit DMA from host buffer to NIC MBUF memory. Verify the data integrity in MBUF against host memory and repeat the DMA for the entire MBUF buffer. Then it performs receive DMA from NIC to host. The 0x1000-byte test buffer is cleared to zero before each receive-DMA. Verify the data integrity and test is repeated for the entire MBUF SRAM range. See Table 7 on page 81.



Table 7. DMA Test Patterns

Test Pattern	Description
"16 00's 16 FF's"	Full the entire host DMA buffer with 16 bytes of 00's and then 16 bytes of FF's.
"16 FF's 16 0's"	Full the entire host DMA buffer with 16 bytes of FF's and then 16 bytes of 00's.
"32 00's 32 FF's"	Full the entire host DMA buffer with 32 bytes of 00's and then 32 bytes of FF's.
"32 FF's 32 00's"	Full the entire host DMA buffer with 32 bytes of FF's and then 32 bytes of 00's.
"00000000's"	Full the entire host DMA buffer with all zeros.
"FFFFFFFF's"	Full the entire host DMA buffer with all FF's.
"AA55AA55's"	Full the entire host DMA buffer with data 0xAA55AA55.
"55AA55AA's"	Full the entire host DMA buffer with data 0xAA55AA55.

**Default:** Enabled

## B6. External SRAM Test

**Function:** It tests DMA SRAM by performing the tests described in test B1. The Scratch Pad Test.

**Default:** Disabled

## C1. EEPROM Test

**Function:** An increment test data is used in EEPROM test. It fills the test data into the test range and read back to verify the content. After the test, it fills data with zero to clear the memory.

**Default:** Enabled

## C2. CPU Test

**Function:** This test opens the file cpu.bin. If file exists and content is good, it loads code to rx and tx CPU and verifies CPU execution.

**Default:** Enabled

### C3. DMA Test

**Function:** Both high and low priorities DMA are tested. It moves data from the host memory to NIC SRAM, verifies data, and then moves data back to the host memory again to verify data.

**Default:** Enabled

### C4. MII Test

**Function:** The function is identical to A2. Control Register Test. The test writing zero and one into the test bits to insure the read only bits value are not changed, and read/write bits are changed accordingly.

**Default:** Test Enabled.

The test attempts to read the register configuration file 'miireg.txt' for the register defines. If the file does not exist, the following table is used. See Table 8.

Table 8. Default Register

Offset	R/O Mask	R/W Mask
0x00	0x0000	0x7180
0x02	0xffff	0x0000
0x03	0xffff	0x0000
0x04	0x0000	0xffff
0x05	0xefff	0x0000
0x06	0x0001	0x0000
0x07	0x0800	0xb7ff
0x08	0xffff	0x0000
0x09	0x0000	0xff00
0x0a	0x7c00	0x0000
0x10	0x0000	0xffbf
0x11	0x3300	0x0000
0x19	0x001f	0x0000
0x1e	0x0000	0xffff
0x1f	0x0000	0xffff

## C5. VPD Test

**Function:** It saves the content of VPD before it performs the test. Once the test is done, this function writes one of the following five pattern test data into VPD memory:

- 0xFF
- 0xAA
- 0x55
- increment data
- decrement data

By default, increment data pattern is used. It writes and reads back the data for the entire test range, and then restores the original content.

**Default:** Disabled

## C6. ASF Test

Function: m

### 1. Reset test.

Setting reset bit, poll for self-clearing. Verify reset value of registers.

### 2. Event Mapping Test

Setting SMB\_ATTN bit. By changing ASF\_ATTN LOC bits, verify the mapping bits in TX\_CPU or RX\_CPU event bits.

### 3. Counter Test

Clear WG\_TO, HB\_TO, PA\_TO, PL\_TO, RT\_TO bits by setting those bits. Make sure the bits clear.

Clear Timestamp Counter. Writing a value 1 into each PL, PA, HB, WG, RT counters. Set TSC\_EN bit.

Poll each PA\_TO bit and count up to 50 times. Check if PL\_TO gets set at the end of 50 times. Continue to count up to 200 times. Check if all other TO bits are set and verify Timestamp Counter is incremented.

## C7. ROM Expansion Test

**Function:** This function tests the ability to enable/disable/access the expansion ROM on the device.

### **D1. Mac Loopback Test**

**Function:** This is internal loopback data transmit/receive test. It initializes the MAC into internal loopback mode and transmits 100 packets. The data should be routed back to the receive channel and received by the receive routine which verifies the integrity of data. One Fast rate is used for this test.

**Default:** Enabled

### **D2. Phy Loopback Test**

**Function:** This test is same as D1. Mac Loopback Test except, the data is routed back via physical layer device. One Giga bit rate is used for this test.

**Default:** Enabled

### **D3. RJ45 Loopback Test**

**Function:** This is external loopback test. From the UUT point of view, no loopback mode is configured. The data expected to be routed back by RJ45 loopback connector. 100M/s and 1000M/s are used for this test.

**Default:** Disabled

### **D4. MII Miscellaneous Test**

**Function:** This function tests the auto-polling and phy-interrupt capabilities. These are the functionalities of the phy.

**Default:** Enabled

### **D5. MSI Test**

**Function:**

**Default:** Disabled

## Error Messages

---

```
/* 0 */ "PASS",
/* 1 */ "Got 0x%08X @ 0x%08X. Expected 0x%08X",
/* 2 */ "Cannot perform task while chip is running",
/* 3 */ "Invalid NIC device",
/* 4 */ "Read only bit %s got changed after writing zero at
        offset 0x%X",
/* 5 */ "Read only bit %s got changed after writing one at
        offset 0x%X",
/* 6 */ "Read/write bit %s did not get cleared after writing
        zero at offset 0x%X",
/* 7 */ "Read/write bit %s did not get set after writing one
        at offset 0x%X",
/* 8 */ "BIST failed",
/* 9 */ "Could not generate interrupt",
/* 10 */ "Aborted by user",
/* 11 */ "Tx DMA:Got 0x%08X @ 0x%08X. Expected 0x%08X",
/* 12 */ "Rx DMA:Got 0x%08X @ 0x%08X. Expected 0x%08X",
/* 13 */ "Tx DMA failed",
/* 14 */ "Rx DMA failed",
/* 15 */ "Data error, got 0x%08X at 0x%08X, expected
        0x%08X",
/* 16 */ "Second read error, got 0x%08X at 0x%08X, expected
        0x%08X",
/* 17 */ "Failed writing EEPROM at 0x%04X",
/* 18 */ "Failed reading EEPROM at 0x%04X",
/* 19 */ "EEPROM data error, got 0x08X at 0x04X, expected
        0x%08X",
/* 20 */ "Cannot open file %s",
/* 21 */ "Invalid CPU image file %s",
/* 22 */ "Invalid CPU image size %d",
/* 23 */ "Cannot allocate memory",
```

```
/* 24 */ "Cannot reset CPU",
/* 25 */ "Cannot release CPU",
/* 26 */ "CPU test failed",
/* 27 */ "Invalid Test Address Range\nInvalid NIC address is
        0x%08X-0x%08X and exclude 0x%08X-0x%08X",
/* 28 */      "DMA:Got 0x%08X @ 0x%08X. Expected 0x%08X",
/* 29 */ "Unsupported PhyId %04X:%04X",
/* 30 */ "Too many registers specified in the file, max is
        %d",
/* 31 */ "Cannot write to VPD memory",
/* 32 */ "VPD data error, got %08X @ 0x04X, expected %08X",
/* 33 */ "No good link! Check Loopback plug",
/* 34 */ "Cannot TX Packet!",
/* 35 */ "Requested to Tx %d. Only %d is transmitted",
/* 36 */ "Expected %d packets. Only %d good packet(s) have
        been received\n%d unknown packets have been
        received.\n%d bad packets have
        beenreceived.",
/* 37 */ "%c%d is an invalid Test",
/* 38 */ "EEPROM checksum error",
/* 39 */ "Error in reading WOL/PXE",
/* 40 */ "Error in writing WOL/PXE",
/* 41 */ "No external memory detected",
/* 42 */ "DMA buffer %04X is large, size must be less than
        %04X",
/* 43 */ "File size %d is too big, max is %d",
/* 44 */ "Invalid %s",
/* 45 */ "Failed writing 0x%x to 0x%x",
/* 46 */ "",
/* 47 */ "Ambiguous command",
/* 48 */ "Unknown command",
/* 49 */ "Invalid option",
```

```
/* 50 */ "Cannot perform task while chip is not running.  
        (need driver)",  
/* 51 */ "Cannot open register define file or content is  
        bad",  
/* 52 */ "ASF Reset bit did not self-cleared",  
/* 53 */ "ATTN_LOC %d cannot be mapped to %cX CPU event bit  
        %d",  
/* 54 */ "%s Register is not cleared to zero after reset",  
/* 55 */ "Cannot start poll_ASF Timer",  
/* 56 */ "poll_ASF bit did not get reset after  
        acknowledged",  
/* 57 */ "Timestamp Counter is not counting",  
/* 58 */ "%s Timer is not working",  
/* 59 */ "Cannot clear bit %s in %cX CPU event register",  
/* 60 */ "Invalid "EEPROM_FILENAME" file size, expected %d  
        but only can read %d bytes",  
/* 61 */ "Invalid magic value in %s, expected %08x but found  
        %08x",  
/* 62 */ "Invalid manufacture revision, expected %c but  
        found %c",  
/* 63 */ "Invalid Boot Code revision, expected %d.%d but  
        found %d.%d",  
/* 64 */ "Cannot write to EEPROM",  
/* 65 */ "Cannot read from EEPROM",  
/* 66 */ "Invalid Checksum",  
/* 67 */ "Invalid Magic value",  
/* 68 */ "Invalid MAC address, expected %02X-%02X-%02X-%02X-  
        %02X-%02X",  
/* 69 */ "Slot error, expected an UUT to be found at  
        location %02X:%02X:00",  
/* 70 */ "Adjacent memory has been corrupted while testing  
        block 0x%08x-0x%08x\nGot 0x%08x @ address  
        0x%08x. Expected 0x%08x",  
/* 71 */ "The function is not Supported in this chip",  
/* 72 */ "Packets received with CRC error",
```

```
/* 73 */ "MII error bits set: %04x",  
/* 74 */ "CPU does not initialize MAC address register  
        correctly",  
/* 75 */ "Invalid firmware file format",  
/* 76 */ "Resetting TX CPU Failed",  
/* 77 */ "Resetting RX CPU Failed",  
/* 78 */ "Invalid MAC address",  
/* 79 */ "Mac address registers are not initialized  
        correctly",  
/* 80 */ "EEPROM Bootstrap checksum error",
```



# Appendix A

# Specifications

---

## Physical Specifications

---

This section provides the dimensions and weight of the adapters.

Dimensions:     AT-2712FX/SC: 11.59 cm x 6.89 cm (4.56 in. x 2.71 in.)  
                   AT-2912T: 8.18 cm x 6.89 cm (3.22 in. x 2.71 in.)

Weight:           AT-2712FX/SC: 45.36 g (.10 lbs.)  
                   AT-2912T: 45.36 g (.10 lbs.)

## Environmental Specifications

---

The following environmental specifications apply to both the AT-2712FX/SC and AT-2912T adapters:

Operating Temperature:     0°C to 50°C (+32°F to +122°F)  
Storage Temperature:       -20°C to +70°C (-4°F to +158°F)  
Operating Humidity:         30% to 80% (noncondensing)  
Storage Humidity:           10% to 95% (noncondensing)  
Maximum Operating Altitude: 10,000  
Maximum Storage Altitude   35,000 ft.

## Power Specifications

---

The following power specifications apply to both the AT-2712FX/SC and AT-2912T adapters:

Operating Voltage:     3.3V

Power Consumption: AT-2712FX/SC: 3.22 Watts, @ +3.3V

## Performance Specifications

---

The following performance specifications apply to both the AT-2712FX/SC and AT-2912T adapters:

PCI clock:	33/66 MHz max
PCI-X clock:	66 to 133 MHz
PCI or PCI-X Data/Address:	AT-2712FX/SC 32-bit

## Operating Specifications

---

The following operating specifications apply to the AT-2712FX/SC adapter:

Output Optical Power:	-9.5 dBm minimum to -4 dBm maximum
Input Optical Power:	-18 dBm to 0 dBm maximum
Receive Sensitivity:	-12.5 dBm with 62.5 um fiber or -13.5 dBm with 50 um fiber

## 10/100/1000Base-T Twisted-Pair Port Connectors

---

This section lists the pin signals for the 10/100/1000Base-T twisted-pair ports for the AT-2912T adapter. Figure 28 illustrates the pin layout to an RJ-45 connector and port.

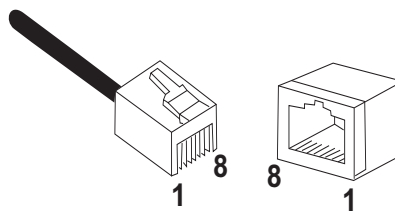


Figure 28. RJ-45 Connector and Port Pin Layout

Table 9 lists the RJ-45 pin signals when a twisted-pair port is operating in the MDI configuration.

Table 9. MDI Pin Signals (10Base-T or 100Base-TX)

Pin	Signal
1	TX+
2	TX-
3	RX+
6	RX-

Table 10 lists the RJ-45 port pin signals when a twisted-pair port is operating in the MDI-X configuration.

Table 10. MDI-X Pin Signals (10Base-T or 100Base-TX)

Pin	Signal
1	RX+
2	RX-
3	TX+
6	TX-

Table 11 lists the RJ-45 connector pins and their signals when a 1000Base-T port is operating at 1000 Mbps.

Table 11. RJ-45 1000Base-T Connector Pinouts<sup>a</sup>

Pin	Pair	Signal
1	1	TX and RX+
2	1	TX and RX-
3	2	TX and RX+
4	3	TX and RX+
5	3	TX and RX-
6	2	TX and RX-
7	4	TX and RX+
8	4	TX and RX-

a. Bi-directional data on each pair.

## Console Port Pinouts

---

Table 12 lists the pin signals on the RJ-45 style serial terminal port for the AT-2912T adapter.

Table 12. Console Port Pinouts

<b>Pin</b>	<b>Signal</b>
4	Ground
3	Transmit Data
6	Receive Data
7	No Connection
5	Ground
2	No Connection
8	No Connection
1	No Connection