

AT-2874SX

Gigabit Ethernet Fiber ExpressCard

□ AT-2874SX/SC



3113

Installation and User's Guide

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Electrical Safety and Emissions Standards

This product meets the following standards.

U.S. Federal Communications Commission	
Declaration of Conformity	
Manufacturer Name: Allied Telesis, Inc.	
Declares that the product: Gigabit Ethernet Fiber ExpressCard	
Model Number: AT-2874SX/SC	
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:	
<ul style="list-style-type: none">- 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 A, VCCI Class A, C-TICK, CE
Immunity	EN55024
Electrical Safety	EN60950-1 (TUV), UL 60950-1 (cUL _{US})



Laser Safety EN60825

Translated Safety Statements

Important: The  indicates that a translation of the safety statement is available in a PDF document titled “Translated Safety Statements” posted on the Allied Telesis website at: www.alliedtelesis.com/support/.

Contents

Preface	7
Safety Symbols Used in this Document	8
Contacting Allied Telesis	9
Chapter 1: Overview	11
Description	12
PCI ExpressCard	12
SC Fiber Optic Adapter	12
LED	13
Stabilizer	13
Supported Operating Systems	14
Driver for Linux Systems	14
Features	15
Contents of Your Shipment	16
Warranty Registration	17
Chapter 2: Installing the Hardware	19
Reviewing Safety Precautions	20
Pre-Installation Checklist	21
Installing the AT-2874SX ExpressCard	22
Connecting the Network Cable	26
Chapter 3: Installing the Driver Software	27
Overview	28
Guidelines	29
Accessing Device Manager	30
Accessing Device Manager on Windows 8	30
Accessing Device Manager on Windows Vista or Windows 7	32
Accessing Device Manager on Windows XP	33
Uninstalling Driver Software	36
Downloading the Setup File	38
Executing the Setup Program	39
Chapter 4: Modifying Advanced Properties	43
Overview	44
Guidelines	44
Supported Advanced Properties	45
Advanced Properties for Windows XP	45
Advanced Properties for Windows Vista and Windows 7	45
Advanced Properties for Windows 8	46
Accessing Advanced Properties	47
Flow Control	49
Interrupt Moderation	50
IPv4 Checksum Offload	52
Jumbo Packet	53
Large Send Offload (IPv4)	54
Large Send Offload v2 (IPv4)	56
Large Send Offload v2 (IPv6)	57
Log Status Messages	58
Max IRQ per Sec	59
Network Address	60

Receive Buffers	62
Receive Side Scaling	63
Speed & Duplex	64
TCP/UDP Checksum Offload (IPv4)	65
TCP Checksum Offload (IPv4)	66
TCP Checksum Offload (IPv6)	68
Transmit Buffers	70
UDP Checksum Offload (IPv4)	71
UDP Checksum Offload (IPv6)	73
Wake on Magic Packet	75
Wake on Pattern Match	76
Appendix A: Specifications	77
Physical Specification	77
Environmental Specifications	77
Power Specification	77
Appendix B: Cleaning Fiber Optic Connectors	79
Overview	80
Guidelines	80
Cleaning Using a Cartridge-Type Cleaner	81
Cleaning Using a Swab	83

Preface

This manual is the installation and user's guide for the AT-2874SX Gigabit Ethernet Fiber ExpressCard. The instructions in this guide explain how to install the ExpressCard on a laptop computer, install and uninstall the driver software, and configure the advanced properties. The AT-2874SX ExpressCard has one model available:

- AT-2874SX/SC

This preface contains the following sections:

- "Safety Symbols Used in this Document" on page 8
- "Contacting Allied Telesis" on page 9

Safety Symbols Used in this Document

This document 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.



Warning

Warnings inform you that an eye and skin hazard exists due to the presence of a Class 1 laser device.

Contacting Allied Telesis

If you need assistance with this product, you may contact Allied Telesis technical support by going to the Support & Services section of the Allied Telesis web site at **www.alliedtelesis.com/support**. You can find links for the following services on this page:

- ❑ 24/7 Online Support - Enter our interactive support center to search for answers to your questions in our knowledge database, check support tickets, learn about Return Merchandise Authorization (RMA), and contact Allied Telesis technical experts.
- ❑ USA and EMEA phone support - Select the phone number that best fits your location and customer type.
- ❑ Hardware warranty information - Learn about Allied Telesis warranties and register your product online.
- ❑ Replacement Services - Submit an RMA request via our interactive support center.
- ❑ Documentation - View the most recent installation guides, user guides, software release notes, white papers and data sheets for your product.
- ❑ Software Updates - Download the latest software releases for your product.

For sales or corporate contact information, go to **www.alliedtelesis.com/purchase** and select your region.

Chapter 1

Overview

This chapter provides an overview of the AT-2874SX Gigabit Ethernet Fiber ExpressCard.

It contains the following sections:

- “Description” on page 12
- “Supported Operating Systems” on page 14
- “Features” on page 15
- “Contents of Your Shipment” on page 16
- “Warranty Registration” on page 17

Description

The AT-2874SX ExpressCard is a Gigabit Fiber Ethernet PCI ExpressCard with an SC fiber optic adapter based on Marvell 88E8059 chipset.

The AT-2874SX ExpressCard connects a laptop computer to a Gigabit Ethernet network using fiber optic cabling and an SC adapter. The ExpressCard operates at a speed of 1000 Mbps in the full-duplex mode.

First, insert the AT-2874SX ExpressCard into the PCI ExpressCard slot of a laptop. After you inserted the ExpressCard into your laptop computer, install driver software. To insert the ExpressCard into your laptop, see Chapter 2, "Installing the Hardware" on page 19. To install driver software, see Chapter 3, "Installing the Driver Software" on page 27.

The AT-2874SX ExpressCard is shown in Figure 1.



Figure 1. AT-2874SX ExpressCard

PCI ExpressCard

The AT-2874SX ExpressCard has a 34mm-wide PCI ExpressCard interface. You can install the AT-2874SX ExpressCard in a 34mm or 54mm PCI ExpressCard slot on your laptop computer.

A PCI ExpressCard is a new notebook interface that replaces the PCMCIA Card Bus interface.

SC Fiber Optic Adapter

The AT-2874SX/SC model is equipped with a 1000BASE-SX port with the SC adapter for attaching the ExpressCard to a compatible link partner.

The SC adapter is shown in Figure 2.



Figure 2. SC Fiber Optic Adapter

LED The AT-2874SX ExpressCard has one LED as shown in Figure 3.



Figure 3. AT-2874SX LED

Table 1 describes the link states that the LED indicates.

Table 1. Fiber Optic Port LED Status

State	Description
Green	The port is operating at 1000 Mbps and has a valid link.
Flashing	The port is receiving or transmitting network packets at 1000 Mbps.

Stabilizer The stabilizer as shown in Figure 4 is a plastic bracket to help the ExpressCard fit into the 54mm PCI ExpressCard slot. Allied Telesis recommends utilizing the stabilizer when installing the ExpressCard in the 54mm interface slot.

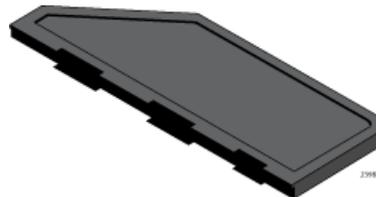


Figure 4. Stabilizer

Supported Operating Systems

The following operating systems are supported:

- Windows XP
- Windows Vista
- Windows 7
- Windows 8
- Linux

To install driver software for Windows Operating Systems, see Chapter 3, "Installing the Driver Software" on page 27 for detailed information.

Driver for Linux Systems

If your Linux system has an inbox driver for the AT-2874SX ExpressCard, you do not need to install a driver. If your Linux system does not have a driver for the AT-2874SX ExpressCard, you must install one.

To obtain driver software for AT-2874SX ExpressCard, go to the Marvell's driver download website:

<http://www.marvell.com/support/downloads/search.do>

The AT-2874SX ExpressCard is based on Marvel 88E8057 chipset so that you select "88E8057" from the **Part Number** drop-down list.

Features

The AT-2874SX ExpressCard supports the following features:

- One 1000BASE-SX port with an SC fiber optic adapter
- Link/Activity LED
- PCI ExpressCard Interface
- Jumbo frames
- Checksum offload
- Flow control (IEEE 802.3x)
- Traffic optimization (IEEE 802.1p)
- PXE remote boot
- RoHS Compliant
- CPU task offload
- TCP segmentation
- Microsoft-certified drivers
- Hot insertion and removal

Contents of Your Shipment

The following items are included with your AT-2874SX ExpressCard:

□ Antistatic bag

The ExpressCard is shipped in an antistatic bag. It protects the card when stored or shipped. Keep the card in its packaging until ready for installation.

□ Rubber plug

The rubber plug prevents the fiber optic adapters from being exposed to dust particles. Cover the connectors when the fiber optic adapters are not used.

□ Stabilizer

When installing the AT-2874SX ExpressCard into the 54mm PCI card slot of your laptop computer, attach the stabilizer to your AT-2874SX ExpressCard.

Note

The AT-2874SX ExpressCard is not shipped with a software driver CD. You must download the setup file from the Allied Telesis website. See Chapter 3, "Downloading the Setup File" on page 38.

Inform your network equipment supplier of any missing or damaged items. If you need to return the ExpressCard, you must pack it in the original (or equivalent) packing material or the warranty will be voided. See "Contacting Allied Telesis" on page 9.

The product documentation is available in Portable Document Format (PDF) on our web site at www.alliedtelesis.com/support/software/. You can view the documents online or download them onto a local workstation or server.

Warranty Registration

Allied Telesis hardware products are covered under limited warranties.

All Allied Telesis warranties are subject to and provided only on the terms and conditions set out in the Allied Telesis Limited Warranties listed on the Allied Telesis website at <http://alliedtelesis.com/support/warranty>.

Chapter 2

Installing the Hardware

This chapter contains the following sections:

- “Reviewing Safety Precautions” on page 20
- “Pre-Installation Checklist” on page 21
- “Installing the AT-2874SX ExpressCard” on page 22
- “Connecting the Network Cable” on page 26

Reviewing Safety Precautions

Review the following safety precautions before you begin to install the AT-2874SX ExpressCard.

Note

The  indicates that a translation of the safety statement is available for viewing in portable document format (PDF) titled **Translated Safety Statements** from our web site at www.alliedtelesis.com/support.



Warning

This is a "Class 1 LED product".  L1



Warning

Do not stare into the laser beam.  L2



Warning

Do not look directly at the fiber optic cable ends or inspect the cable ends with an optical lens.  E29



Warning

Do not work on this equipment or cables during periods of lightning activity.  E2



Warning

Operating Temperature: This product is designed for a maximum ambient temperature of 40 degrees C.  E7

Note

All Countries: Install this product in accordance with local and National Electric Codes.  E8

Pre-Installation Checklist

Before installing the AT-2874SX ExpressCard, check the following list:

1. Verify that your laptop is using the latest BIOS.
2. Check the ExpressCard for visible signs of damage, particularly on the edge connector.



Caution

Do not attempt to install a damaged product. If the product is damaged, report it to Allied Telesis. See “Contacting Allied Telesis” on page 9.

Installing the AT-2874SX ExpressCard

The following instructions describe how to install the AT-2874SX ExpressCard in a laptop computer equipped with a 34 mm or 54 mm PCI ExpressCard interface slot. The installation illustrations in this manual use the 54 mm interface.

For additional information about installing an PCI ExpressCard on your particular laptop, refer to the manual that was supplied with your laptop.

Note

To perform the following procedure, you need to supply a pen.

To install an AT-2874SX ExpressCard, do the following:

1. Review the “Pre-Installation Checklist” on page 21 and “Reviewing Safety Precautions” on page 20.
2. Select the 34 mm or 54 mm ExpressCard slot.

See Figure 5 for an example of the 54 mm ExpressCard slot.

Note

If you do not know how to identify a PCI ExpressCard slot, refer to your laptop documentation.

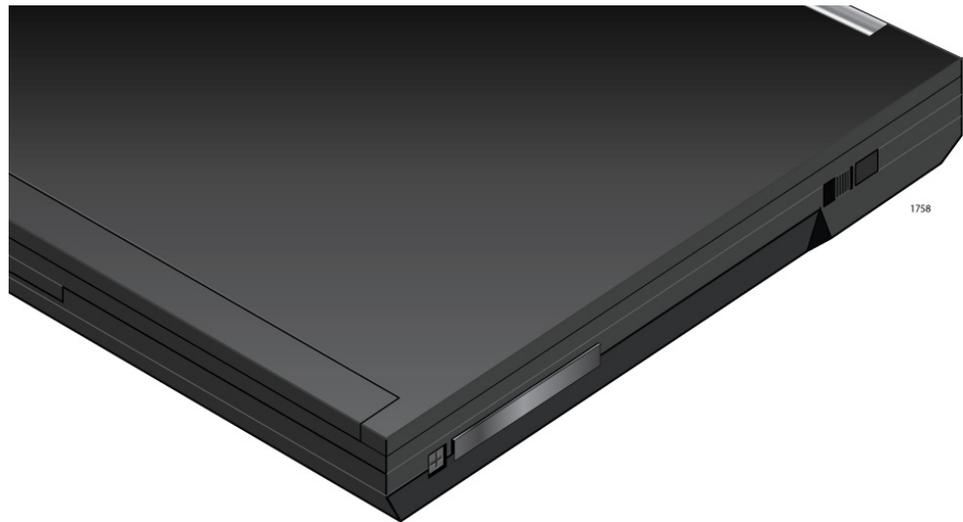


Figure 5. Selecting the PCI ExpressCard Slot

3. Use a pen and press the button toward the laptop and to the left. See Figure 6 on page 23.



Figure 6. Pressing the Button

The button pops out along with the plate. See Figure 7.

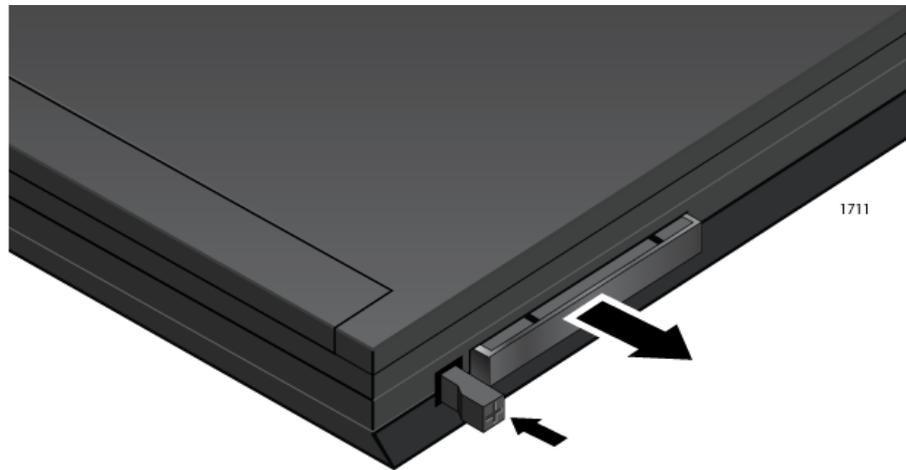


Figure 7. The Button and Plate after Pressing the Button

4. Remove the plate from the laptop. See Figure 8 on page 24.
Keep the plate in a safe place. You may need it for future use.

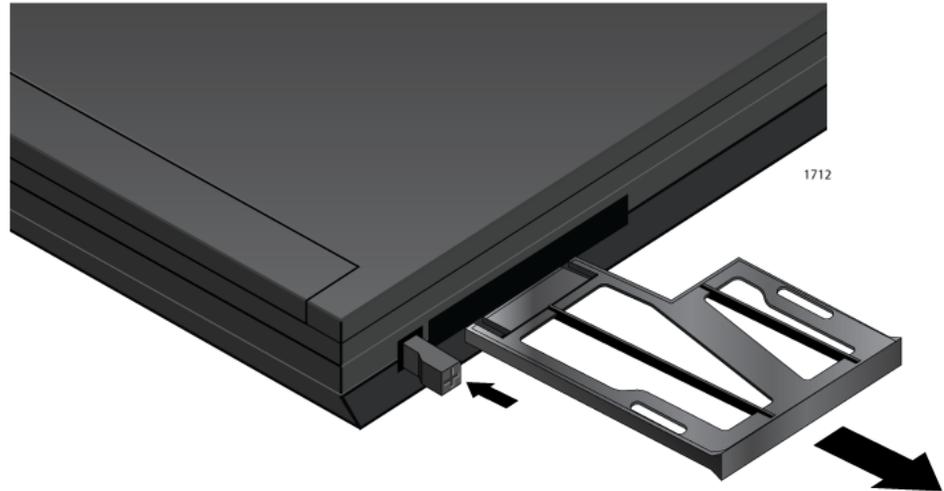


Figure 8. Removing the Plate

5. When installing the ExpressCard in the 54mm Express Card slot, attach the stabilizer to the card as shown in Figure 9.

Note

When installing the ExpressCard in the 34mm ExpressCard slot, skip this step.



Figure 9. Attaching the Stabilizer to the AT-2874SX ExpressCard

6. Applying even pressure at both corners of the ExpressCard, push the card until it is firmly seated in the PCI ExpressCard slot. Figure 10 on page 25 shows how to insert the card in the 54mm slot.

The ExpressCard fits snugly into the slot.

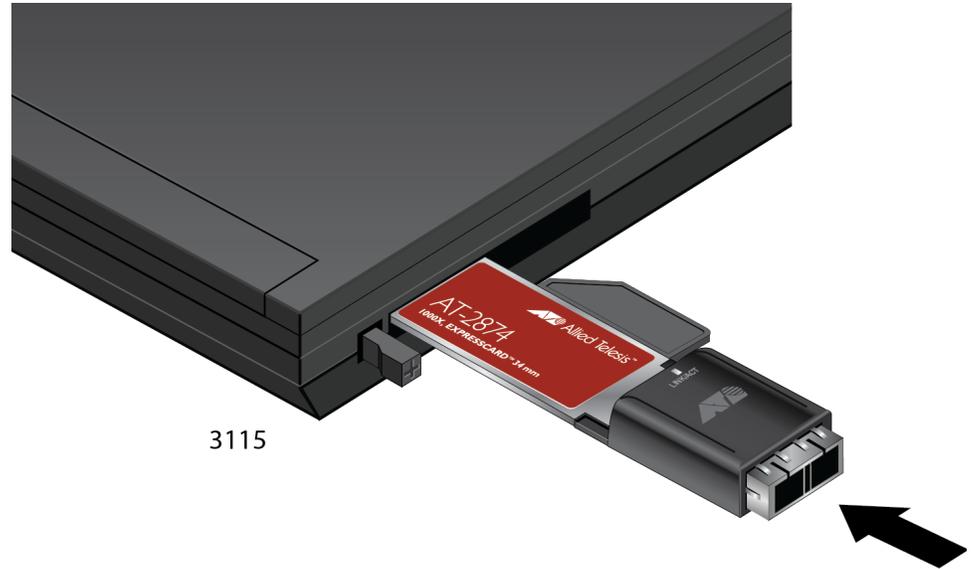


Figure 10. Inserting the Unit into the 54mm Slot



Caution

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

7. Make sure the ExpressCard is seated securely.

Connecting the Network Cable

The AT-2874SX ExpressCard has a fiber optic adapter for attaching the laptop to a compatible link partner, or an IEEE 802.3z compliant Gigabit Ethernet switch. To connect the ExpressCard to the network, you must have a fiber optic cable with an SC connector.

To connect a fiber optic cable to the ExpressCard, do the following:

1. Remove the rubber plug from the ExpressCard.

Keep the rubber plug in a safe place. You may need it for future use.



Warning

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

2. Connect one end of the fiber optic cable to the ExpressCard.
3. Connect the other end of the fiber optic cable to the appropriate Ethernet fiber optic port.
4. Observe the LED signal to check the link state.

After the cable is properly connected at both ends, the ExpressCard port LED is functional. See “LED” on page 13 for a description of the LED operation.

Note

Even minor smudges or dirt on the end face of the fiber can disrupt light transmission and lead to failure of the connection. For instructions that describe how to clean the fiber optic connector, see Appendix B “Cleaning Fiber Optic Connectors” on page 79

Chapter 3

Installing the Driver Software

This chapter describes how to install driver software for the AT-2874SX ExpressCard onto your Windows Operating system.

This chapter contains the following topics:

- “Overview” on page 28
- “Accessing Device Manager” on page 30
- “Uninstalling Driver Software” on page 36
- “Downloading the Setup File” on page 38
- “Executing the Setup Program” on page 39

Overview

When you physically install the AT-2874SX ExpressCard, the Windows operating system detects a new hardware and may install an inbox, Marvell, or Allied Telesis driver software for your ExpressCard. You must uninstall the driver that was automatically installed *before* installing the proper Allied Telesis driver software.

Note

If you install the proper Allied Telesis driver without uninstalling the existing driver, your system displays unsupported options of the Speed & Duplex, Wake on Magic Packet, and Wake on Pattern Match properties. See “Speed & Duplex” on page 64, “Wake on Magic Packet” on page 75, and “Wake on Pattern Match” on page 76 for more information.

If your system is Windows 8, you must uninstall the driver before installing the proper Allied Telesis driver software because Windows 8 automatically installs an inbox driver.

Windows XP, Windows Vista, and Windows 7 do not come with an inbox driver for the AT-2874SX ExpressCard; however, the system may install a driver automatically if the Windows operating system was updated or a Marvell or Allied Telesis driver already resides in the system. If Device Manager lists your ExpressCard as a Marvell or Allied Telesis device, you must uninstall the driver before installing the proper Allied Telesis driver.

To install driver software, do the following:

1. Access the Device Manager to check whether a driver is automatically installed. See “Accessing Device Manager” on page 30.

If your AT-2874SX ExpressCard is listed as an Ethernet Controller, skip step 2 and go to step 3. When no driver is installed, the Windows operating system lists an adapter as an Ethernet Controller.

2. Uninstall the driver software that was automatically installed. See “Uninstalling Driver Software” on page 36.
3. Download the setup file from the Allied Telesis website. See “Downloading the Setup File” on page 38.
4. Install driver software by executing the setup program. “Executing the Setup Program” on page 39.

Guidelines Here are the guidelines for installing the driver software on your operating system:

- To install the driver software, you must have administrative privileges.
- When you physically install the AT-2874SX ExpressCard, your Windows system detects a new adapter and may install a driver that exists in your system. You must uninstall the driver before executing the setup program.
- Device Manager lists an adapter as an Ethernet Controller when no driver is installed.
- Device Manager lists an adapter as a Marvell or Allied Telesis device when Marvell or Allied Telesis driver has been installed.

Accessing Device Manager

When you uninstall the driver software for AT-2874SX ExpressCard, you must first access Device Manager.

The procedures for accessing Device Manager are slightly different among Windows operating systems. To access Device Manager on your operating system, follow one of the procedures below:

- “Accessing Device Manager on Windows 8,” next
- “Accessing Device Manager on Windows Vista or Windows 7” on page 32
- “Accessing Device Manager on Windows XP” on page 33

Accessing Device Manager on Windows 8

To access Device Manager on Windows 8, do the following:

1. Move the cursor to the lower left corner of the desktop.

The Start tile appears as shown in Figure 11.

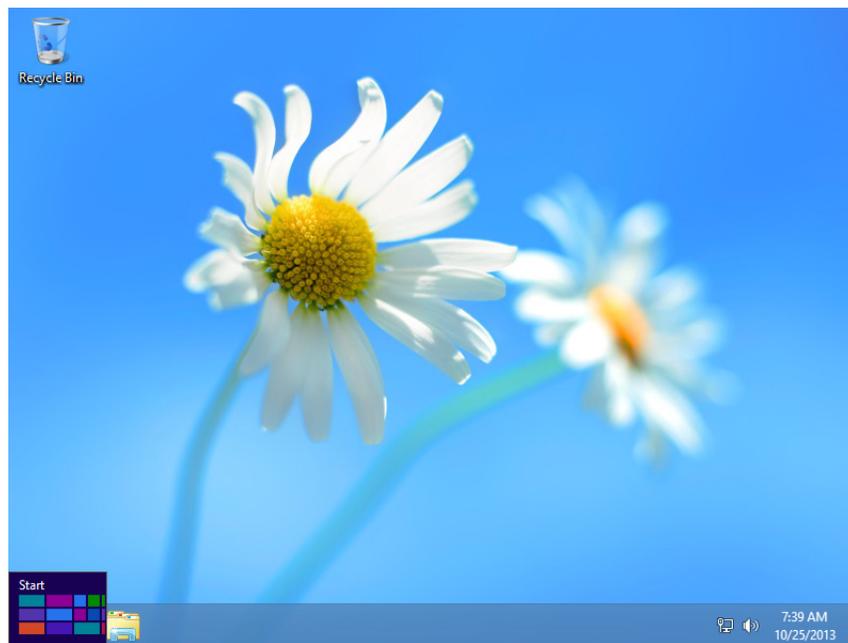


Figure 11. Start Tile on Windows 8

2. Right-click the **Start tile**.

The drop-up menu appears as shown in Figure 12 on page 31.

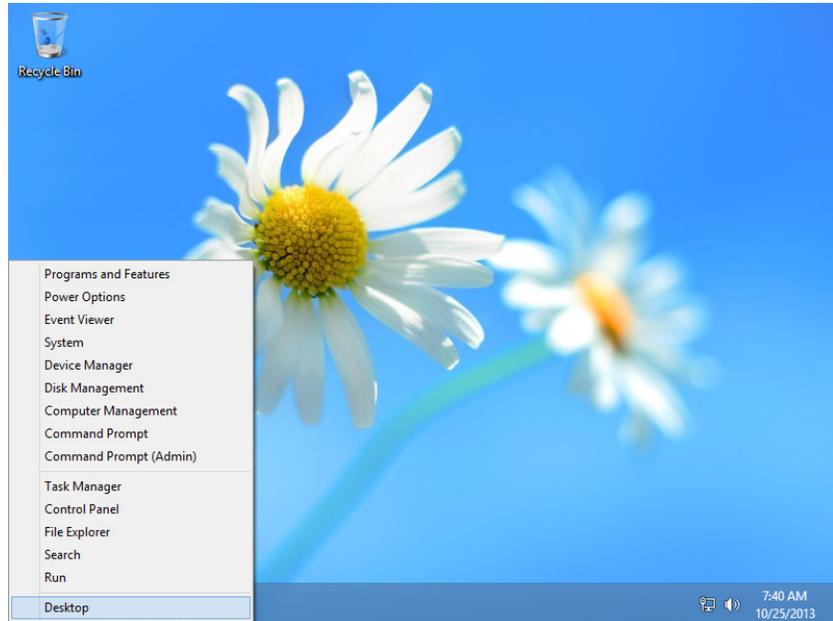


Figure 12. Drop-up Menu on Windows 8

3. Select **Device Manager** from the menu.

The Device Manager window opens as shown in Figure 13.

Note

The Windows system detects a new hardware and creates an entry as Ethernet Controller, Marvell device, or Allied Telesis device.

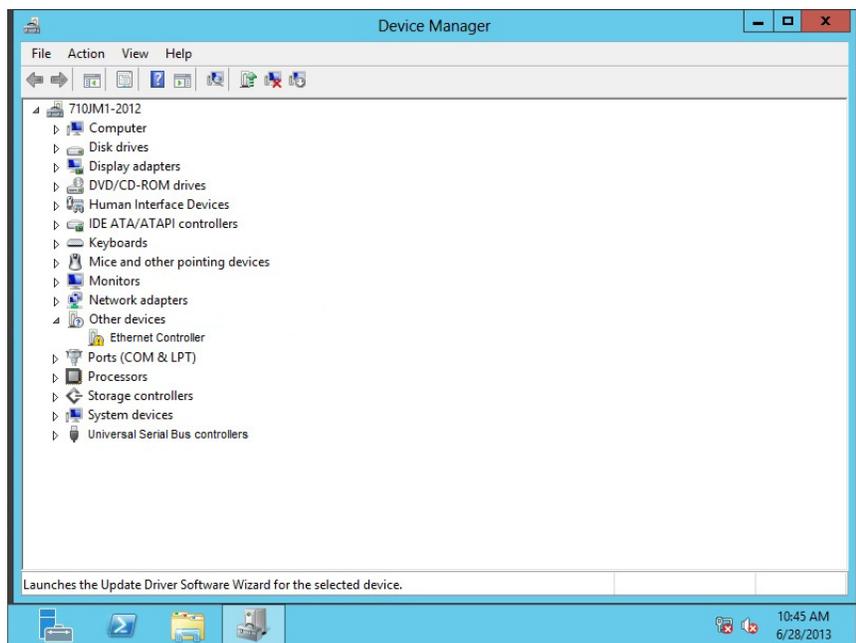


Figure 13. Device Manager on Windows 8

Accessing Device Manager on Windows Vista or Windows 7

To access Device Manager on Windows Vista or Windows 7, do the following:

1. Right-click the **Computer** icon on the desktop and select **Properties**.

The System window is opened as shown in Figure 14.

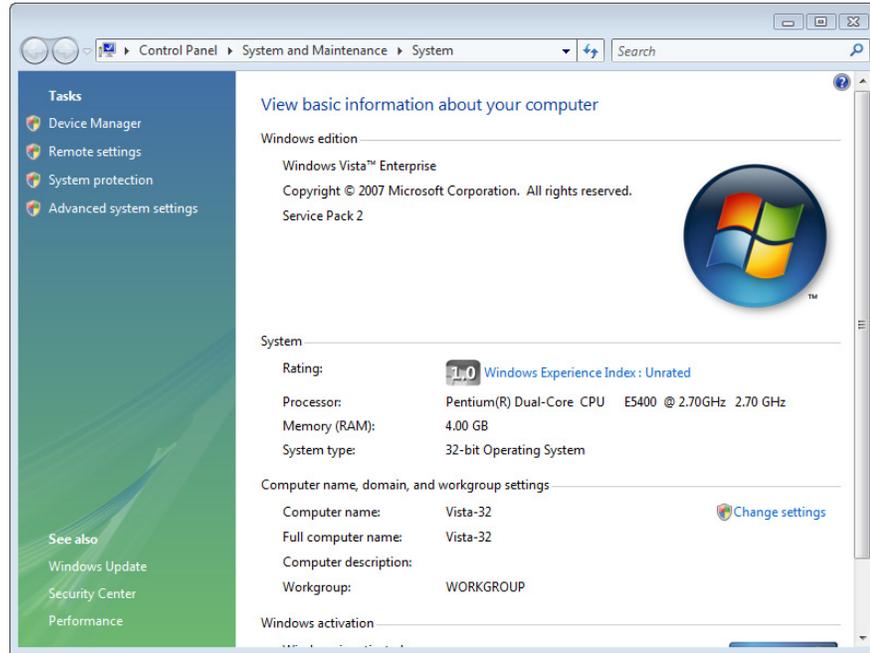


Figure 14. System Window on Windows Vista and Windows 7

2. Click **Device Manager** on the left side bar.

The Device Manager window opens as shown in Figure 13 on page 31.

Note

The Windows system detects a new hardware and creates an entry as Ethernet Controller, Marvell device, or Allied Telesis device.

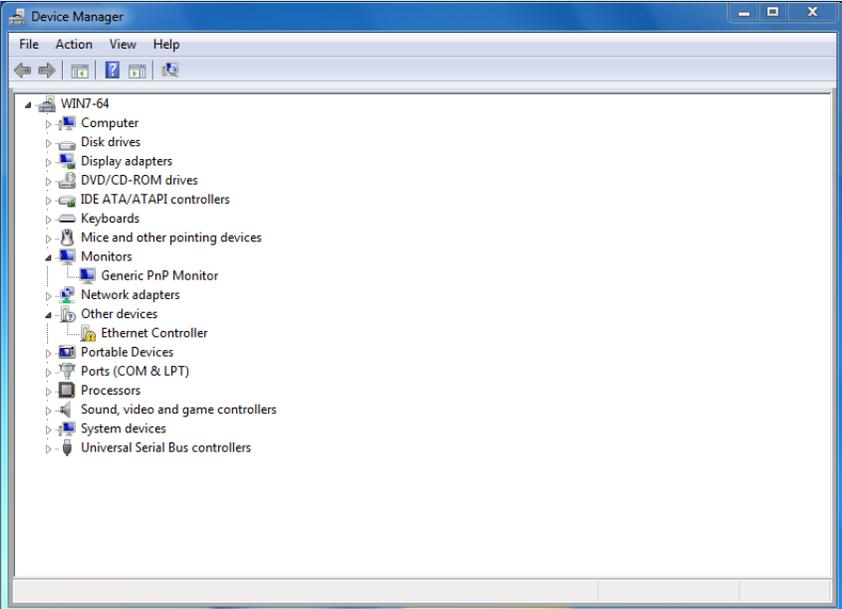


Figure 15. Device Manager Window Vista and Windows 7

**Accessing Device
Manager on
Windows XP**

To access Device Manager on Windows XP, do the following:

- 1. Right-click the **My Computer** icon on the desktop and select **Properties**.

The System Properties window is opened as shown in Figure 16.

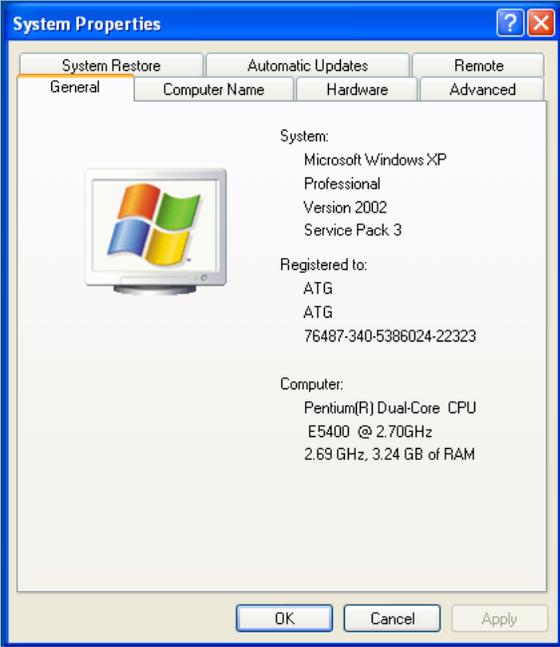


Figure 16. System Properties Window on Windows XP

2. Select the **Hardware** Tab.

The Hardware page is shown in Figure 17.

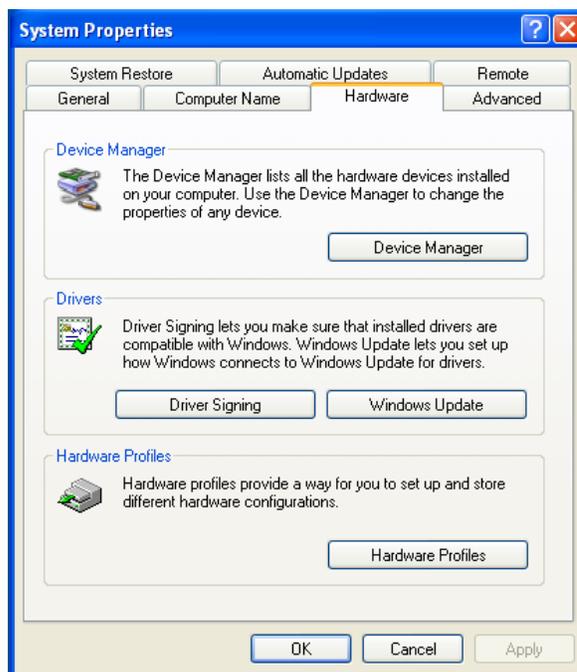


Figure 17. Hardware Page on Windows XP

3. Click **Device Manager**.

The Device Manager window opens as shown in Figure 13 on page 31.

Note

The Windows system detects a new hardware and creates an entry as Ethernet Controller, Marvell device, or Allied Telesis device.

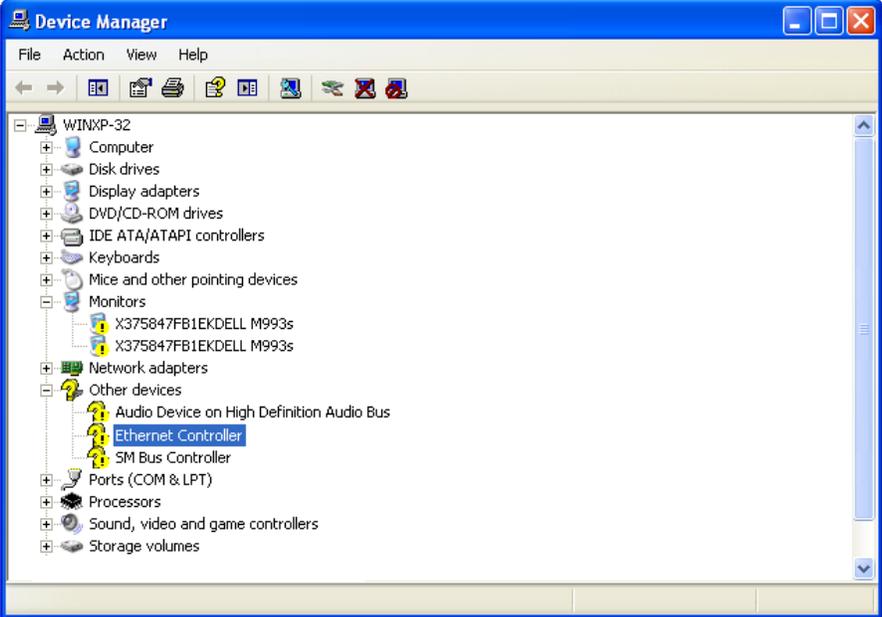


Figure 18. Device Manager Window on Windows XP

Uninstalling Driver Software

When you physically install the AT-2874SX ExpressCard, your Windows operating system detects a new hardware and may install an inbox, Marvell, or Allied Telesis driver. You must uninstall the driver that the operating system automatically installed.

1. Open Device Manager.

For instructions on how to open Device Manager, see “Accessing Device Manager” on page 30.

2. In the Device Manager window, expand the Network adapters on the list.
3. Right-click a Marvell device or Allied Telesis device entry.

Shortcut menu appears as shown in Figure 19.

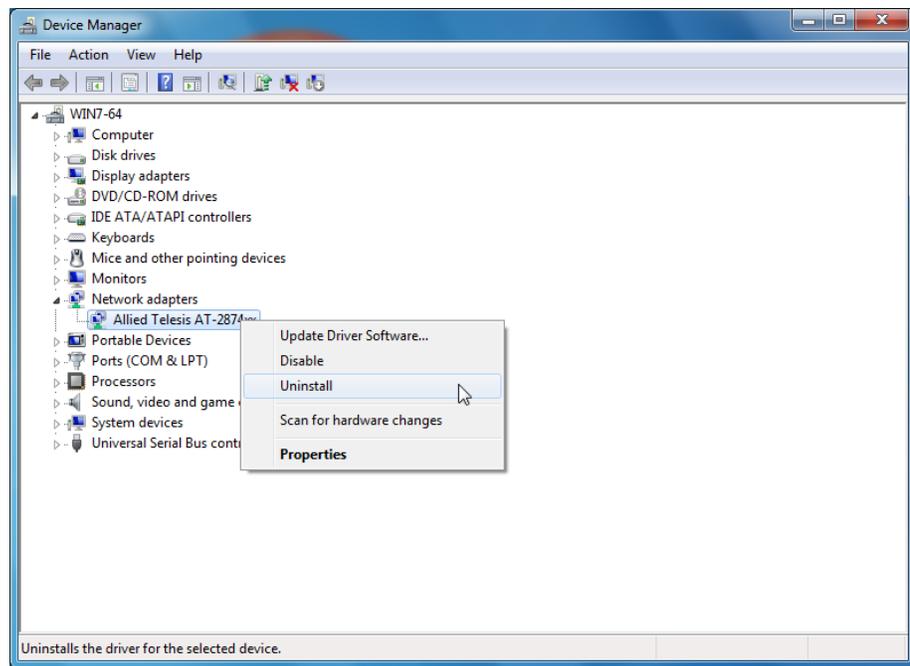


Figure 19. Device Manager Uninstall Window

4. Select **Uninstall**.

The Confirm Device Uninstall window pops up.

5. Check the checkbox if you want to delete the driver software.

Note

This option is not available for Windows XP.

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

Downloading the Setup File

The AT-2874SX ExpressCard is not shipped with a CD including the setup program to install driver software. You must download the setup file from the Allied Telesis website.

To download the setup file, do the following:

1. Open a web browser, such as Internet Explorer or FireFox, on your system and enter the following:

`http://www.alliedtelesis.com/support/software`

2. The Allied Telesis Software Download page is displayed.
3. Select "AT-2874SX" from the pulldown menu of Product.

A list is displayed as shown in Figure 20.

The screenshot shows the Allied Telesis website's 'Software Downloads' page. At the top, there is a navigation bar with 'Solutions | Services | Products | Support | About | Purchase' and a search box. Below this is a green 'Support' banner with the breadcrumb 'HOME » SUPPORT » SOFTWARE » SOFTWARE DOWNLOADS'. A left sidebar lists various support categories like 'Support Center', 'Software', 'Documentation', etc. The main content area is titled 'Software Downloads' and includes instructions to choose a product and log in for restricted software. Below these instructions is a search and filter section with a 'Search By Title' input, a 'Product' dropdown menu set to 'AT-2874SX', and columns for 'Size' and 'Date'. A table lists the available software download: 'AT-2814FX / AT-2874SX Drivers for Windows XP, Vista, 7, 8 (32 and 64 bit) v11.45.4.3' with a size of 1.84 MB and a date of 29 Jul 2013. The footer contains the Allied Telesis logo and the tagline 'the solution : the network'.

Figure 20. Software Downloads List

4. Click "AT-2874SX Drivers for Windows."
5. Save the AT-2874SX-drivers-setup zip folder onto your system and record the location of the folder.

Executing the Setup Program

To install the driver software for the AT-2874SX ExpressCard, do the following:

1. Locate the AT-2874SX setup zip folder that you downloaded from the Allied Telesis website onto your system.

See “Downloading the Setup File” on page 38.

2. Extract files from the zip folder.
3. Open the folder including uncompressed files. Figure 21 shows an example.

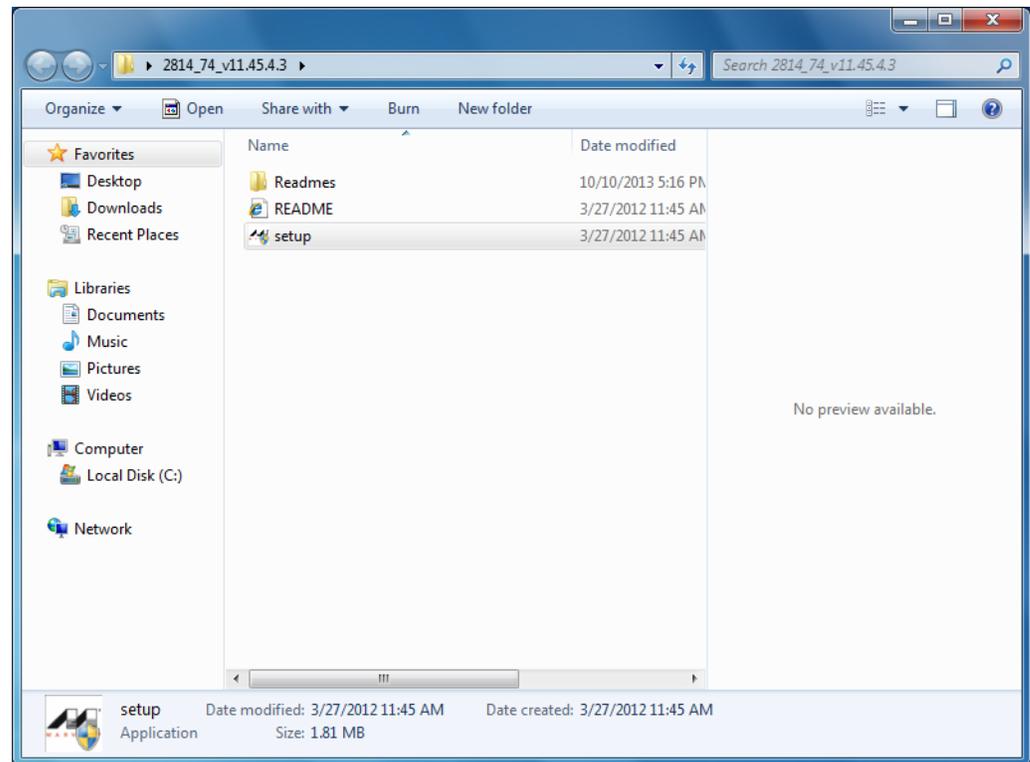


Figure 21. Setup File

4. Double-click the setup.exe file.

The User Account Control window appears, prompting you to allow the Marvell Miniport Driver program to make a change on your system.

Note

If you are using Windows XP operating system, the User Account Control window does not come up. Go to step 5.

5. Click **Yes** to allow Marvell Miniport Driver to be installed.

The Marvell Miniport Driver Setup Wizard window comes up. See Figure 22.

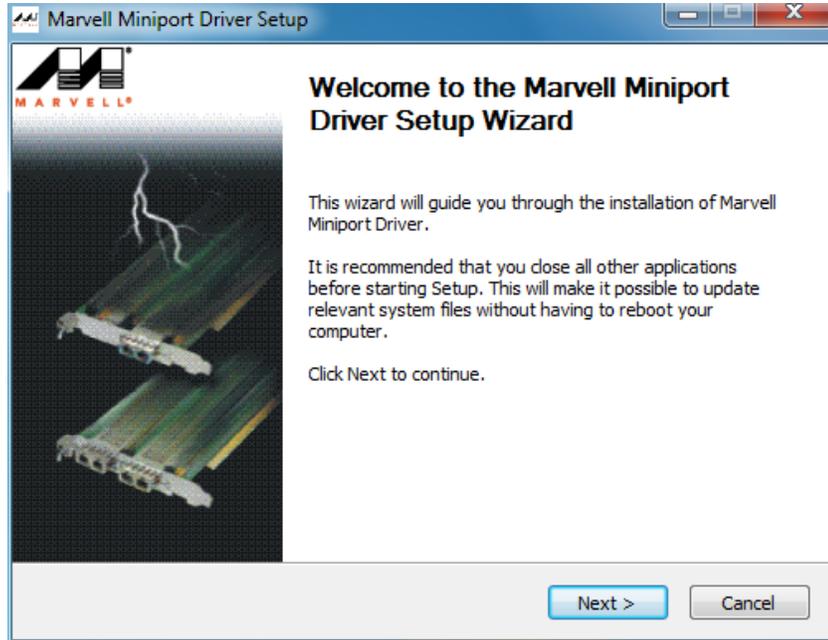


Figure 22. Marvell Miniport Driver Setup Wizard

6. Click **Next**.

The Licence Agreement window comes up as shown in Figure 23.

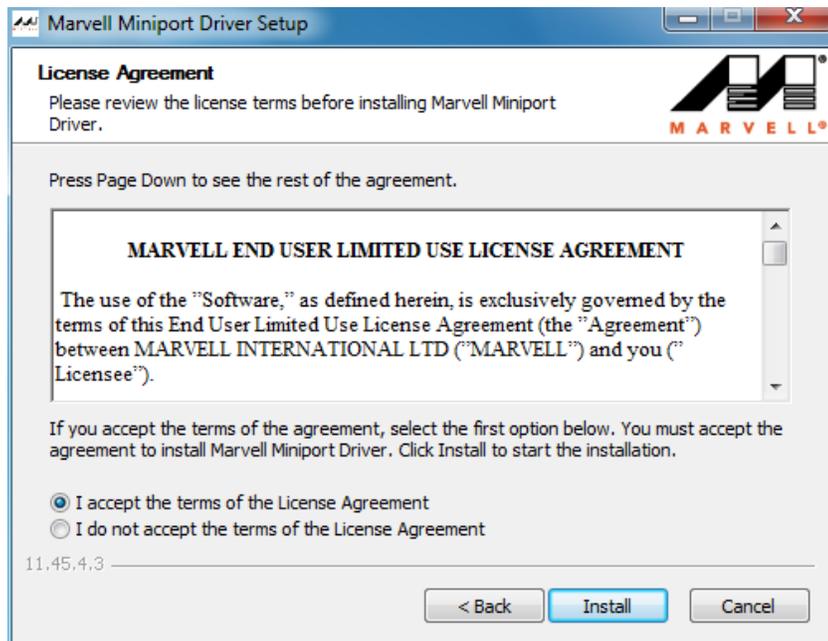


Figure 23. Setup Wizard License Agreement

7. Read the License Agreement.
8. If you accept the terms of the agreement, select the first option and click **Install**.

When the installation is completed, the Installation Complete window is displayed. See Figure 24.

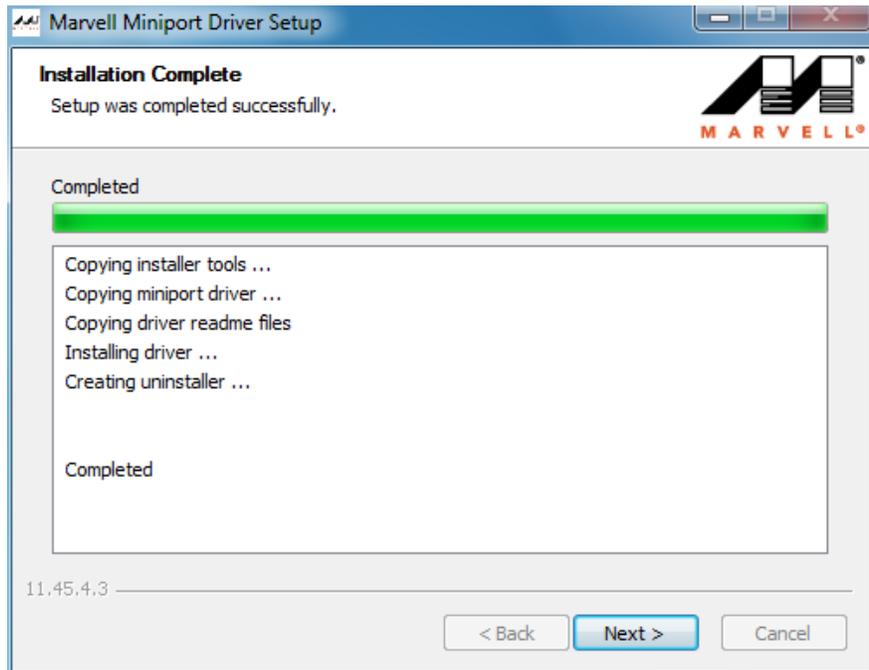


Figure 24. Installation Complete

9. Click **Next**.

The final Wizard window comes up as shown in Figure 25 on page 42.

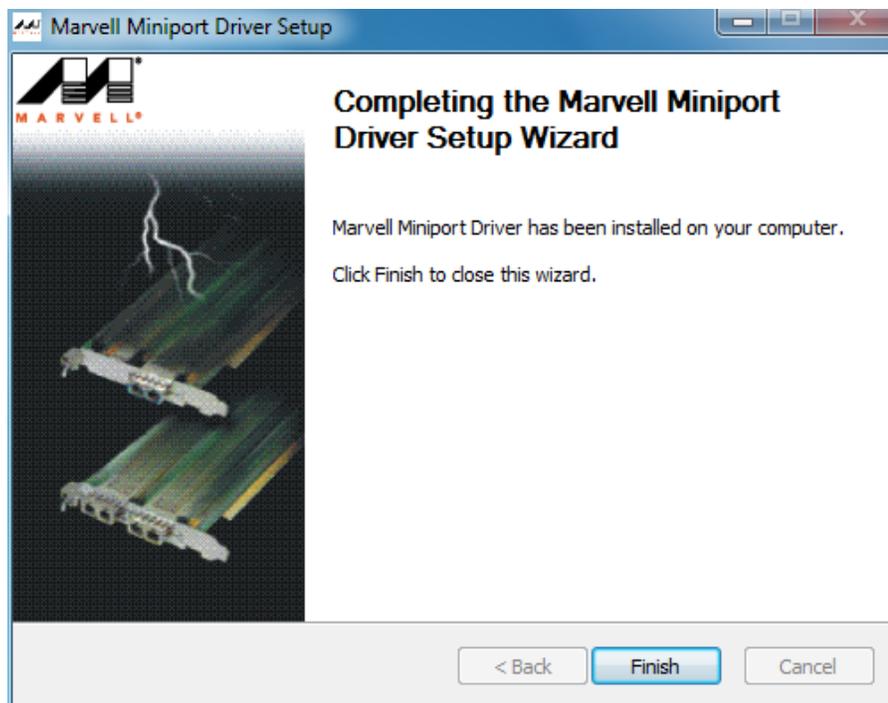


Figure 25. Finishing Setup Wizard

10. Click **Finish**.

Chapter 4

Modifying Advanced Properties

This chapter includes the following topics:

- ❑ “Overview” on page 44
- ❑ “Supported Advanced Properties” on page 45
- ❑ “Accessing Advanced Properties” on page 47
- ❑ “Flow Control” on page 49
- ❑ “Interrupt Moderation” on page 50
- ❑ “IPv4 Checksum Offload” on page 52
- ❑ “Jumbo Packet” on page 53
- ❑ “Large Send Offload (IPv4)” on page 54
- ❑ “Large Send Offload v2 (IPv4)” on page 56
- ❑ “Large Send Offload v2 (IPv6)” on page 57
- ❑ “Log Status Messages” on page 58
- ❑ “Max IRQ per Sec” on page 59
- ❑ “Network Address” on page 60
- ❑ “Receive Buffers” on page 62
- ❑ “Receive Side Scaling” on page 63
- ❑ “Speed & Duplex” on page 64
- ❑ “TCP/UDP Checksum Offload (IPv4)” on page 65
- ❑ “TCP Checksum Offload (IPv4)” on page 66
- ❑ “TCP Checksum Offload (IPv6)” on page 68
- ❑ “Transmit Buffers” on page 70
- ❑ “UDP Checksum Offload (IPv4)” on page 71
- ❑ “UDP Checksum Offload (IPv6)” on page 73
- ❑ “Wake on Magic Packet” on page 75
- ❑ “Wake on Pattern Match” on page 76

Overview

The AT-2874SX ExpressCard allows you to modify advanced properties to meet your requirements. To access the advanced properties, access Device Manager, then go to each advanced property page.

Guidelines

Here are the guidelines to modifying the advanced properties:

- ❑ To change the advanced property settings, you must have Administrator privileges.
- ❑ When you upgrade the driver software, the settings of the advanced properties may change. Verify the settings after upgrading the driver software.
- ❑ If the Speed & Duplex, Wake on Magic Packet, or Wake on Pattern Match property shows options, the proper Allied Telesis driver is not installed. Uninstall the driver from Device Manager, download the setup file from Allied Telesis website, and execute the setup program. For more information, see Chapter 3, "Installing the Driver Software" on page 27.

Supported Advanced Properties

The supported advanced properties depend upon Windows operating systems.

Advanced Properties for Windows XP

Table 2 lists supported advanced properties for Windows XP. Driver software version 11.45.3.3 is available for Windows XP.

Table 2. Advanced Properties for Windows XP

Driver Version	Advanced Property
11.45.3.3	<input type="checkbox"/> “Flow Control” on page 49 <input type="checkbox"/> “Interrupt Moderation” on page 50 <input type="checkbox"/> “Jumbo Packet” on page 53 <input type="checkbox"/> “Large Send Offload (IPv4)” on page 54 <input type="checkbox"/> “Log Status Messages” on page 58 <input type="checkbox"/> “Max IRQ per Sec” on page 59 <input type="checkbox"/> “Network Address” on page 60 <input type="checkbox"/> “Receive Buffers” on page 62 <input type="checkbox"/> “TCP/UDP Checksum Offload (IPv4)” on page 65 <input type="checkbox"/> “Transmit Buffers” on page 70

Advanced Properties for Windows Vista and Windows 7

Table 3 lists supported advanced properties for Windows Vista and Windows 7. Driver software version 11.45.3.3 is available for Windows Vista and Windows 7.

Table 3. Advanced Properties for Windows Vista and 7

Driver Version	Advanced Property
11.45.3.3	<input type="checkbox"/> “Flow Control” on page 49 <input type="checkbox"/> “Interrupt Moderation” on page 50 <input type="checkbox"/> “IPv4 Checksum Offload” on page 52 <input type="checkbox"/> “Jumbo Packet” on page 53 <input type="checkbox"/> “Large Send Offload (IPv4)” on page 54 <input type="checkbox"/> “Large Send Offload v2 (IPv4)” on page 56

Table 3. Advanced Properties for Windows Vista and 7 (Continued)

Driver Version	Advanced Property
	<ul style="list-style-type: none"> <input type="checkbox"/> "Large Send Offload v2 (IPv6)" on page 57 <input type="checkbox"/> "Log Status Messages" on page 58 <input type="checkbox"/> "Max IRQ per Sec" on page 59 <input type="checkbox"/> "Network Address" on page 60 <input type="checkbox"/> "Receive Buffers" on page 62 <input type="checkbox"/> "Receive Side Scaling" on page 63 <input type="checkbox"/> "TCP Checksum Offload (IPv4)" on page 66 <input type="checkbox"/> "TCP Checksum Offload (IPv6)" on page 68 <input type="checkbox"/> "Transmit Buffers" on page 70 <input type="checkbox"/> "UDP Checksum Offload (IPv4)" on page 71 <input type="checkbox"/> "UDP Checksum Offload (IPv6)" on page 73

Advanced Properties for Windows 8

Table 4 lists supported advanced properties for Windows 8. Driver software version 12.10.10.3 is available for Windows 8.

Table 4. Advanced Properties for Windows 8

Driver Version	Advanced Property
12.10.10.3	<ul style="list-style-type: none"> <input type="checkbox"/> "Flow Control" on page 49 <input type="checkbox"/> "Interrupt Moderation" on page 50 <input type="checkbox"/> "IPv4 Checksum Offload" on page 52 <input type="checkbox"/> "Jumbo Packet" on page 53 <input type="checkbox"/> "Large Send Offload (IPv4)" on page 54 <input type="checkbox"/> "Large Send Offload v2 (IPv4)" on page 56 <input type="checkbox"/> "Large Send Offload v2 (IPv6)" on page 57 <input type="checkbox"/> "Network Address" on page 60 <input type="checkbox"/> "TCP Checksum Offload (IPv4)" on page 66 <input type="checkbox"/> "TCP Checksum Offload (IPv6)" on page 68 <input type="checkbox"/> "UDP Checksum Offload (IPv4)" on page 71 <input type="checkbox"/> "UDP Checksum Offload (IPv6)" on page 73

Accessing Advanced Properties

To modify advanced properties, first access Device Manager, open the properties of your ExpressCard interface, and select a feature you want to change its setting.

1. To access the Device Manager, follow one of these procedures:
 - “Accessing Device Manager on Windows XP” on page 33
 - “Accessing Device Manager on Windows Vista or Windows 7” on page 32
 - “Accessing Device Manager on Windows 8” on page 30
2. In the Device Manager window, double-click **Allied Telesis AT-2874xx**.

The properties window pops up as shown in Figure 26.

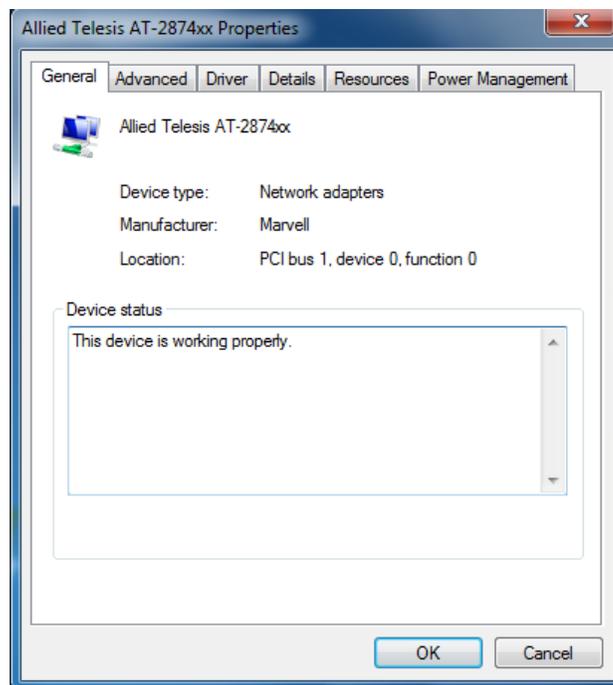


Figure 26. Properties Window

3. Click the **Advanced** tab.

The Advanced Properties window opens as shown in Figure 27.

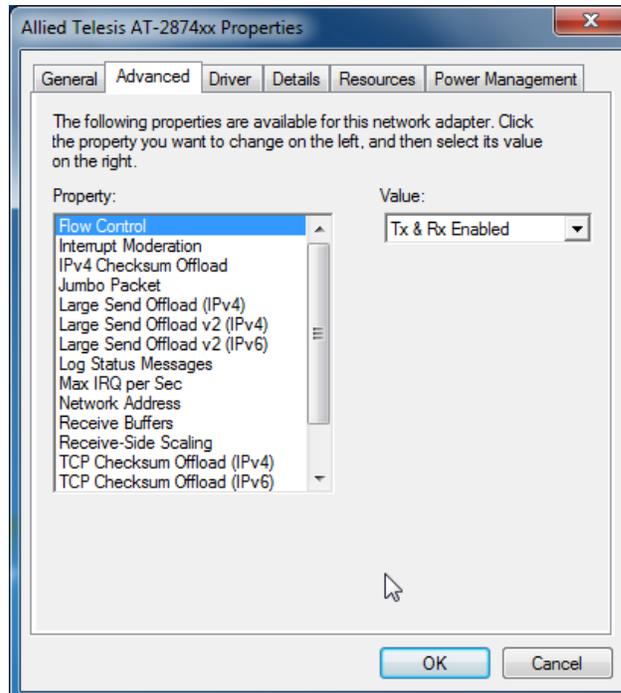


Figure 27. Advanced Properties Window

Flow Control

The Flow Control feature allows you to control the flow between the adapter and its link partner. You can enable or disable the adapter to process received PAUSE frames and transmit PAUSE frames.

To enable or disable the Flow Control feature, do the following:

1. Access the Advanced Properties.

See “Accessing Advanced Properties” on page 47.

2. Select **Flow Control** in the Property box.

The Flow Control page is displayed as shown in Figure 28.

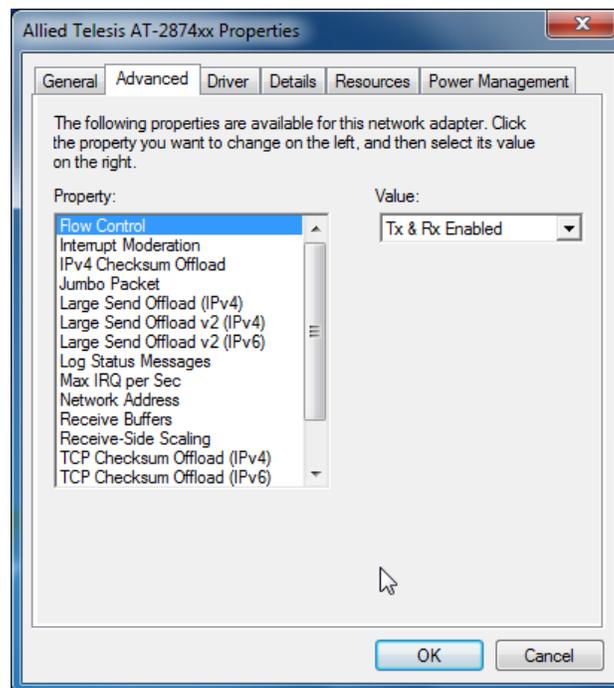


Figure 28. Flow Control Page

3. Select one of the following options:

- Disabled** — The adapter ignores PAUSE frames.
- Tx & Rx Enabled** — The adapter processes PAUSE frames when receiving and transmits PAUSE frames. This is the default setting.

4. Click **OK**.

Interrupt Moderation

The Interrupt Moderation feature allows you to control the rate of interrupts to the CPU during packet transmission and reception. When this feature is enabled, interrupts are handled as a group so that the CPU utilization decreases; however, the latency may increase. To specify the interrupt rate, see “Max IRQ per Sec” on page 59.

Note

Windows 8 does not support the Max IRQ per Sec property. See “Advanced Properties for Windows 8” on page 46.

To enable or disable the Interrupt Moderation feature, do the following:

1. Access the Advanced Properties.

See “Accessing Advanced Properties” on page 47.

2. Select **Interrupt Moderation** in the Property box.

The Interrupt Moderation page is displayed as shown in Figure 29.

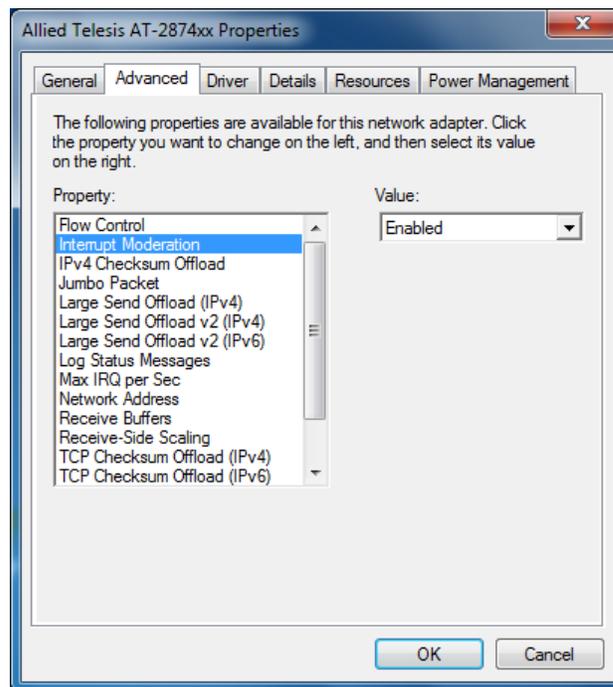


Figure 29. Interrupt Moderation Page

3. Select one of the following options:
 - Disabled** — The Interrupt Moderation feature is disabled
 - Enabled** — The Interrupt Moderation feature is enabled. This is the default setting.
4. Click **OK**.

IPv4 Checksum Offload

The IPv4 Checksum Offload feature allows the ExpressCard to verify the IPv4 checksum to enhance IPv4 receive and transmit performance and reduce CPU utilization.

To enable or disable the IPv4 Checksum Offload feature, do the following:

1. Access the Advanced Properties.

See “Accessing Advanced Properties” on page 47.

2. Select **IPv4 Checksum Offload** in the Property box.

The IPv4 Checksum Offload page is displayed as shown in Figure 30.

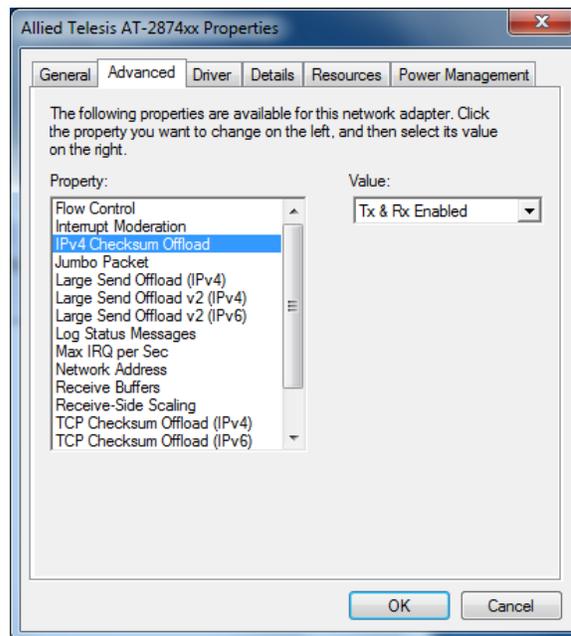


Figure 30. IPv4 Checksum Offload Page

3. Select one of the following options:

- Disabled** — The CPU verifies IPv4 checksum.
- Rx & Tx Enabled** — The ExpressCard verifies IPv4 Checksum for both receiving and transmitting packets. This is the default setting.
- Rx Enabled** — The ExpressCard verifies IPv4 Checksum only for receiving packets.
- Tx Enabled** — The ExpressCard verifies IPv4 Checksum only for transmitting packets.

4. Click **OK**.

Jumbo Packet

The Jumbo Packet feature allows you to specify the size of the Ethernet frame that the adapter supports. The network performance usually improves when the larger frame size is specified; however, the network must be capable of supporting the oversized Ethernet frames.

To change the Jumbo Packet setting, do the following:

1. Access the Advanced Properties.
See “Accessing Advanced Properties” on page 47.
2. Select **Jumbo Packet** in the Property box.

The Jumbo Packet page is displayed as shown in Figure 31.

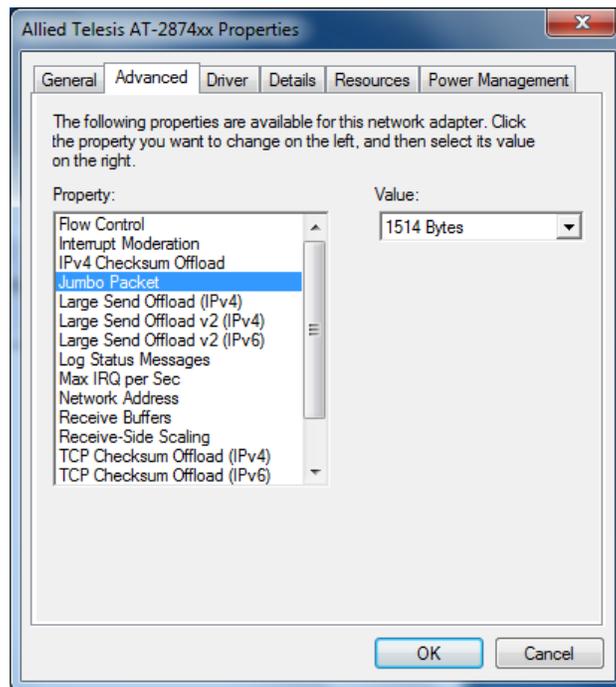


Figure 31. Jumbo Packet Page

3. Select one of the following options:
 - 1514 Bytes** — This is the default setting.
 - 4088 Bytes**
 - 9014 Bytes**
4. Click **OK**.

Large Send Offload (IPv4)

The Large Send Offload (IPv4) feature allows you to control the load of sending out large packets. When this feature is enabled, the adapter segments large packets and reduces the CPU load.

The Large Send Offload (IPv4) feature supports packets up to 64kb. The Large Send Offload v2 (IPv4), which supports packets up to 256kb, overrides the Large Send Offload (IPv4) feature if both features are enabled. For more information, see “Large Send Offload v2 (IPv4)” on page 56.

Note

Windows XP does not support the Large Send Offload v2 (IPv4). See “Advanced Properties for Windows XP” on page 45.

To enable or disable the Large Send Offload (IPv4) feature, do the following:

1. Access the Advanced Properties.

See “Accessing Advanced Properties” on page 47.

2. Select **Large Send Offload (IPv4)** in the Property box.

The Large Send Offload (IPv4) page is displayed as shown in Figure 32.

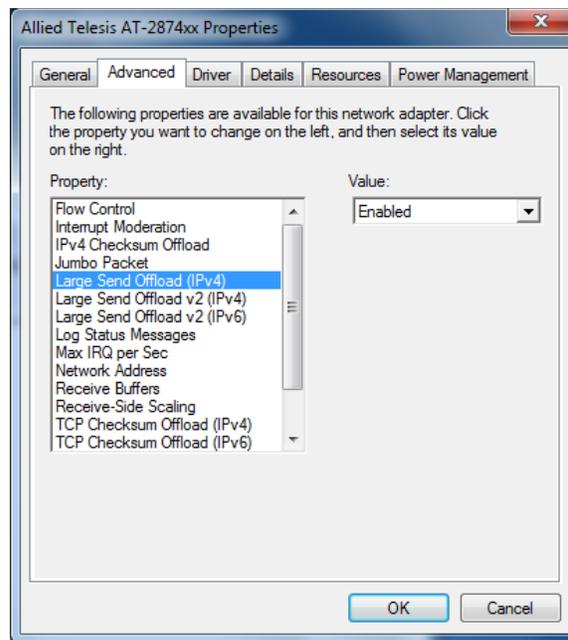


Figure 32. Large Send Offload (IPv4) Page

3. Select one of the following options:
 - Disabled**— This feature is disabled.
 - Enabled** — The adapter segments large packets up to 64kb for IPv4 traffic before sending them out. This is the default setting.
4. Click **OK**.

Large Send Offload v2 (IPv4)

The Large Send Offload v2 (IPv4) feature allows you to control the load of sending out large packets. When this feature is enabled, the adapter segments large packets for IPv4 traffic and reduces the CPU load.

This feature, which supports large packets up to 256kb, overrides the Large Send Offload (IPv4) feature if both features are enabled.

To enable or disable the Large Send Offload v2 (IPv4) feature, do the following:

1. Access the Advanced Properties.

See “Accessing Advanced Properties” on page 47.

2. Select **Large Send Offload v2 (IPv4)** in the Property box.

The Large Send Offload v2 (IPv4) page is displayed as shown in Figure 33.

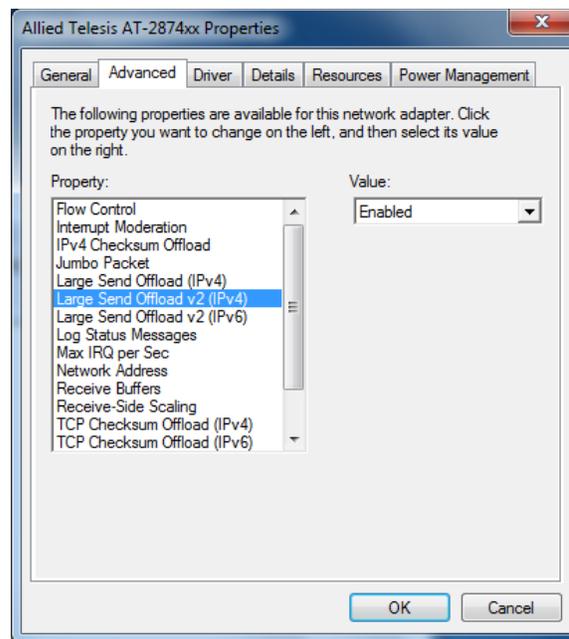


Figure 33. Large Send Offload v2 (IPv4) Page

3. Select one of the following options:

- Disabled** — The feature is disabled.
- Enabled** — The adapter segments large packets up to 256kb for IPv4 traffic before sending them out. This is the default setting.

4. Click **OK**.

Large Send Offload v2 (IPv6)

The Large Send Offload v2 (IPv6) feature allows you to control the load of sending out large packets. When this feature is enabled, the adapter segments large packets for IPv6 traffic and reduces the CPU load.

To enable or disable the Large Send Offload v2 (IPv6) feature, do the following:

1. Access the Advanced Properties.
See “Accessing Advanced Properties” on page 47.
2. Select **Large Send Offload v2 (IPv6)** in the Property box.

The Large Send Offload v2 (IPv6) page is displayed as shown in Figure 34.

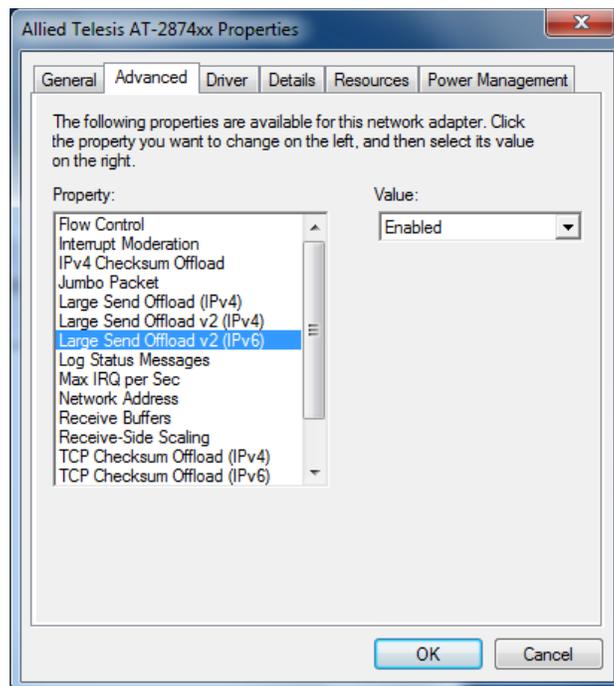


Figure 34. Large Send Offload (IPv6) Page

3. Select one of the following options:
 - Disabled** — The adapter does not segment packets for IPv6 traffic.
 - Enabled** — The adapter segments large packets up to 256kb for IPv6 traffic before sending them out. This is the default setting.
4. Click **OK**.

Log Status Messages

The Log Status Messages property allows you to select messages that the driver generates.

To change the Log Status Messages, do the following:

1. Access the Advanced Properties.

See “Accessing Advanced Properties” on page 47.

2. Select **Log Status Messages** in the Property box.

The Log Status Messages page is displayed as shown in Figure 35.

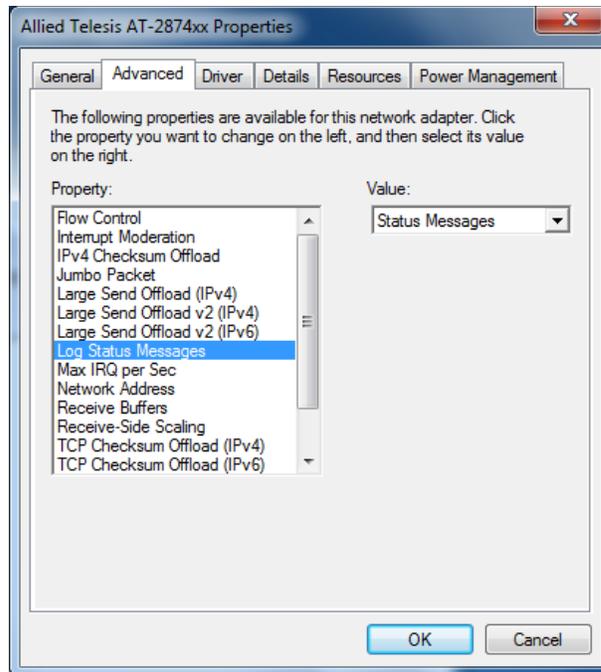


Figure 35. Log Status Message Page

3. Select one of the following options:

- None** — The adapter does not generate any messages.
- Errors** — The adapter generates only error messages.
- Warnings** — The adapter generates only warning messages.
- Status Messages**— The adapter generates an event log entry every time the link status changes. This is the default setting.
- All Messages** — The adapter generates all messages. This option is for test purposes only.

4. Click **OK**.

Max IRQ per Sec

The Max IRQ per Sec property specifies the interrupt rate for Interrupt Moderation. See “Interrupt Moderation” on page 50.

To change the Max IRQ per Sec value, do the following:

1. Access the Advanced Properties.

See “Accessing Advanced Properties” on page 47.

2. Select **Max IRQ per Sec** in the Property box.

The Max IRQ per Sec page is displayed as shown in Figure 36.

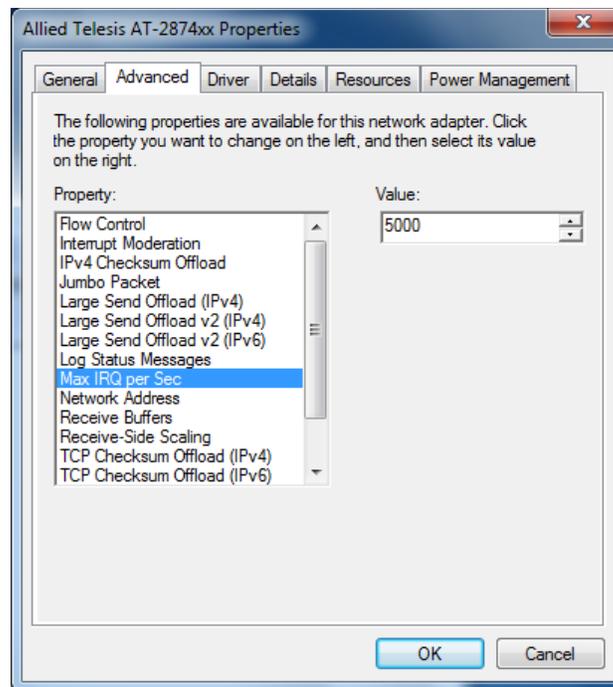


Figure 36. Max IRQ per Sec Page

3. Specify the Max IRQ per Sec value.

The range of the value is from 1000 to 30000. The default value is 5000.

4. Click **OK**.

Network Address

The Network Address property allows you to replace the MAC address originally assigned to the adapter with a user-defined address.



Caution

The network address overrides the original MAC address stored in the AT-2874SX ExpressCard. When you change the MAC address, ensure that a unique MAC address is assigned.

To assign or change the Network Address, do the following:

1. Access the Advanced Properties.

See “Accessing Advanced Properties” on page 47.

2. Select **Network Address** in the Property box.

The Network Address page is displayed as shown in Figure 37.

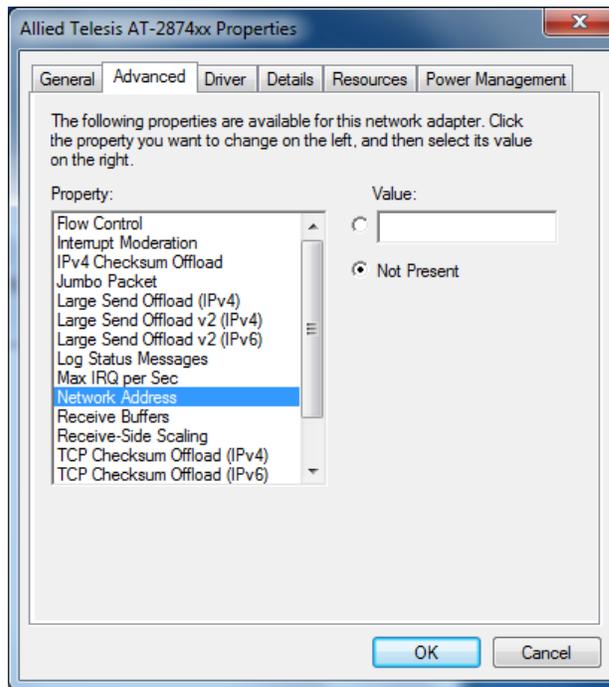


Figure 37. Network Address Page

3. In the **Value** text box, enter a user-defined address for the AT-2874SX ExpressCard.

By default, no user-defined address is assigned.

Here are guidelines for assigning a user-defined address:

- ❑ The address must be unique.
- ❑ The address consists of a 12-digit hexadecimal number, for example, "020C46005501."
- ❑ The address must start with "02" in the most significant byte, for example, "020304050607."
- ❑ Do not assign "0000 0000 0000" or "FFFF FFFF FFFF."
- ❑ The range is from 0200 0000 0000 to 02FF FFFF FFFF.

4. Click **OK**.

Receive Buffers

The Receive Buffers property specifies the number of packet receive buffers allocated for the adapter. Increasing this value may enhance performance in receiving traffic, but consumes more system memory.

To change the Receive Buffers value, do the following:

1. Access the Advanced Properties.

See “Accessing Advanced Properties” on page 47.

2. Select **Receive Buffers** in the Property box.

The Receive Buffers page is displayed as shown in Figure 38.

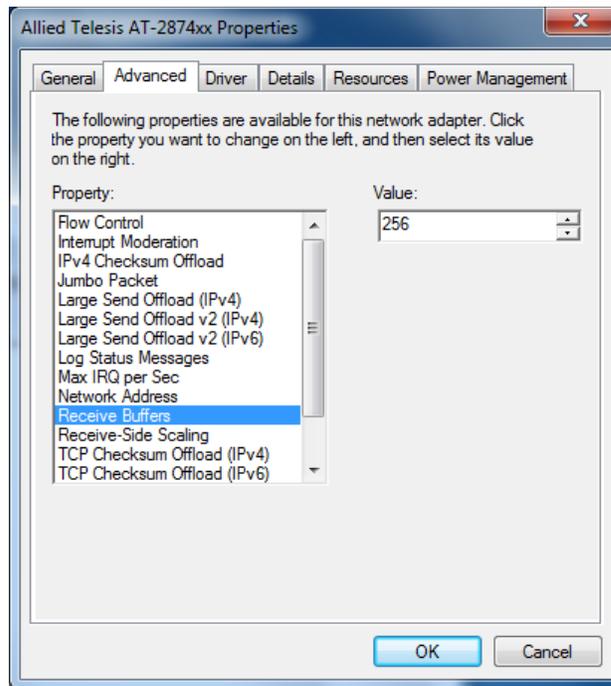


Figure 38. Receive Buffers Page

3. Specify 256 or 512.

The value is an increment of 256 and the range is from 256 to 512. The default value is 256.

4. Click **OK**.

Receive Side Scaling

The Receive Side Scaling (RSS) feature allows the adapter to efficiently distribute receive processing across multiple CPU's and to prevent from overloading a single CPU. To make this feature effective, the computer must have multiple CPU's in a multiprocessor system.

To enable or disable the Receive Side Scaling feature, do the following:

1. Access the Advanced Properties.
See "Accessing Advanced Properties" on page 47.
2. Select **Receive Side Scaling** in the Property box.

The Receive Side Scaling page is displayed as shown in Figure 39.

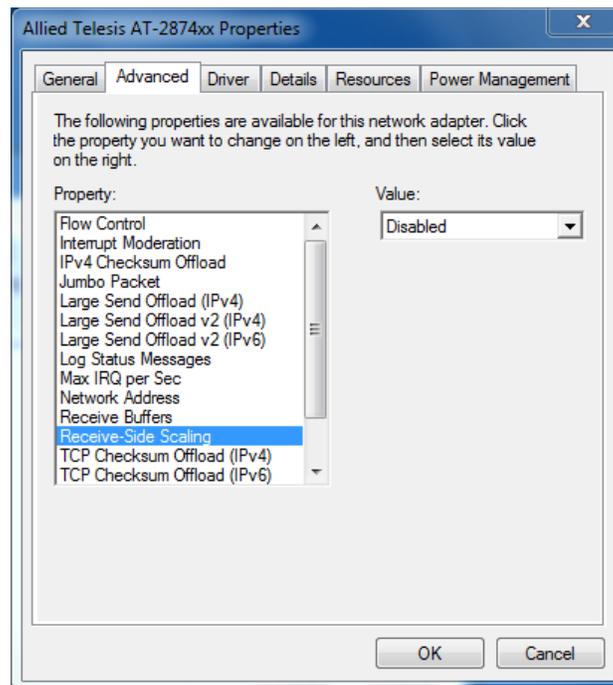


Figure 39. Receive Side Scaling Page

3. Select one of the following options:
 - Enabled** — Receiving data is processed by multiple CPU's.
 - Disabled** — Receiving data is processed by a single CPU. This is the default setting.
4. Click **OK**.

Speed & Duplex

The Speed & Duplex property is *not* supported for the AT-2874SX ExpressCard.

Note

You see the Speed & Duplex property as shown in Figure 40 when the proper Allied Telesis driver is *not* installed. To install driver software properly, see Chapter 3, “Installing the Driver Software” on page 27.

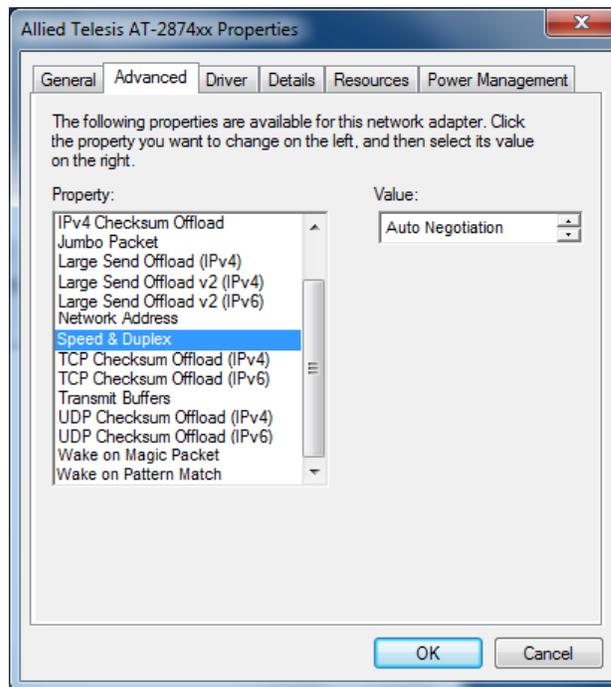


Figure 40. Speed & Duplex Page

If you want to use the currently installed driver, the property must be set to Auto Negotiation.

TCP/UDP Checksum Offload (IPv4)

The TCP/UDP Checksum Offload (IPv4) function enables the adapter to compute the TCP and UDP checksums of transmitting packets and verify the TCP and UDP checksums of receiving packets in order to take load off from the CPU.

To modify the TCP/UDP Checksum Offload (IPv4) setting, do the following:

1. Access the Device Manager on your operating system.
See “Accessing Advanced Properties” on page 47.
2. Select **TCP/UDP Checksum Offload (IPv4)** in the Property box.

The TCP/UDP Checksum Offload (IPv4) page is displayed as shown in Figure 41.

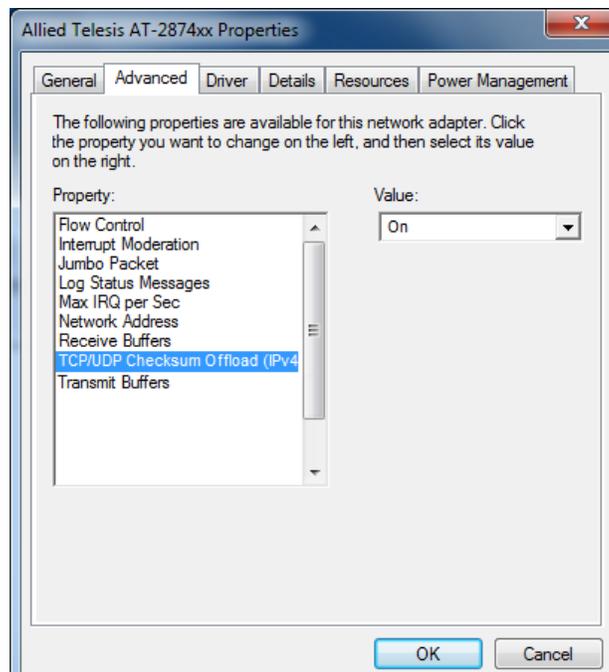


Figure 41. TCP/UDP Checksum Offload (IPv4) Page

3. Select one of the following options:
 - On** — The feature is enabled. This is the default setting.
 - Off** — The feature is disabled.
4. Click **OK**.

TCP Checksum Offload (IPv4)

The TCP Checksum Offload (IPv4) function enables the adapter to compute the TCP checksum of transmitting IPv4 packets and verify the TCP checksum of receiving IPv4 packets in order to take load off from the CPU.

To modify the TCP Checksum Offload (IPv4) setting, do the following:

1. Access the Device Manager on your operating system.

See “Accessing Advanced Properties” on page 47.

2. Select **TCP Checksum Offload (IPv4)** in the Property box.

The TCP Checksum Offload (IPv4) page is displayed as shown in Figure 42.

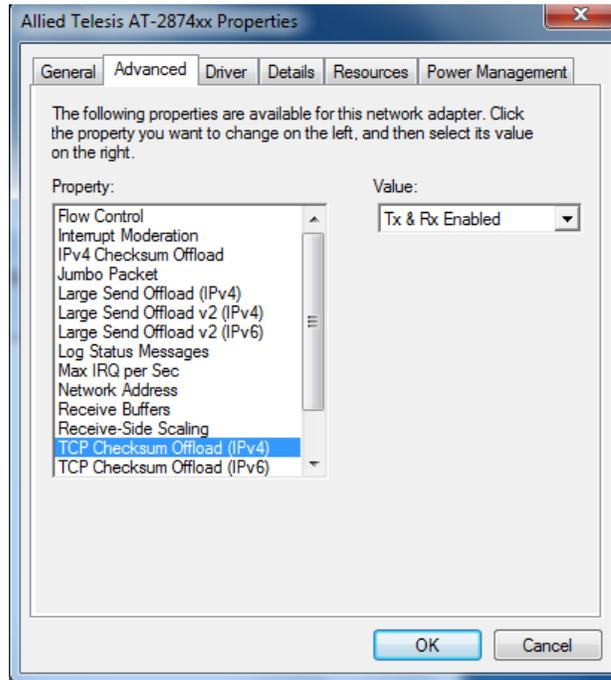


Figure 42. TCP Checksum Offload (IPv4) Page

3. Select one of the following options:
 - Rx & Tx Enabled** — Enables the feature for both receiving and transmitting IPv4 packets. This is the default setting.
 - Disabled** — Disables the feature for both receiving and transmitting.
 - Rx Enabled** — Enables the feature only for receiving IPv4 packets.
 - Tx Enabled** — Enables the feature only for transmitting IPv4 packets.
4. Click **OK**.

TCP Checksum Offload (IPv6)

The TCP Checksum Offload (IPv6) function enables the adapter to compute the TCP checksum of transmitting IPv6 packets and verify the TCP checksum of receiving IPv6 packets in order to load off from the CPU.

To enable or disable the TCP Checksum Offload (IPv6) feature, do the following:

1. Access the Device Manager on your operating system.

See “Accessing Advanced Properties” on page 47.

2. Select **TCP Checksum Offload (IPv6)** in the Property box.

The TCP Checksum Offload (IPv6) page is displayed as shown in Figure 43.

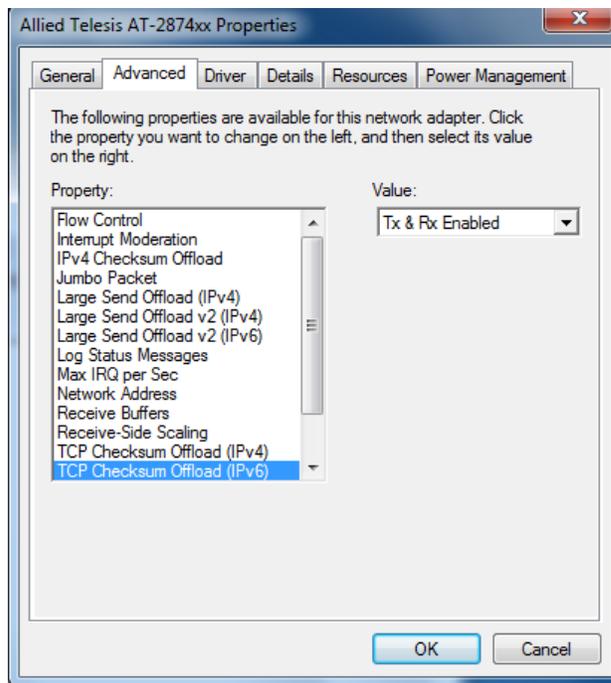


Figure 43. TCP Checksum Offload (IPv6) Page

3. Select one of the following options:
 - Rx & Tx Enabled** — Enables the feature for both receiving and transmitting IPv6 packets. This is the default setting.
 - Disabled** — Disables the feature for both receiving and transmitting.
 - Rx Enabled** — Enables the feature only for receiving IPv6 packets.
 - Tx Enabled** — Enables the feature only for transmitting IPv6 packets.
4. Click **OK**.

Transmit Buffers

The Transmit Buffers property specifies the number of packet transmit buffers allocated for the adapter.

To change the Transmit Buffers value, do the following:

1. Access the Device Manager on your operating system.

See “Accessing Advanced Properties” on page 47.

2. Select **Transmit Buffers** in the Property box.

The Transmit Buffers page is displayed as shown in Figure 44.

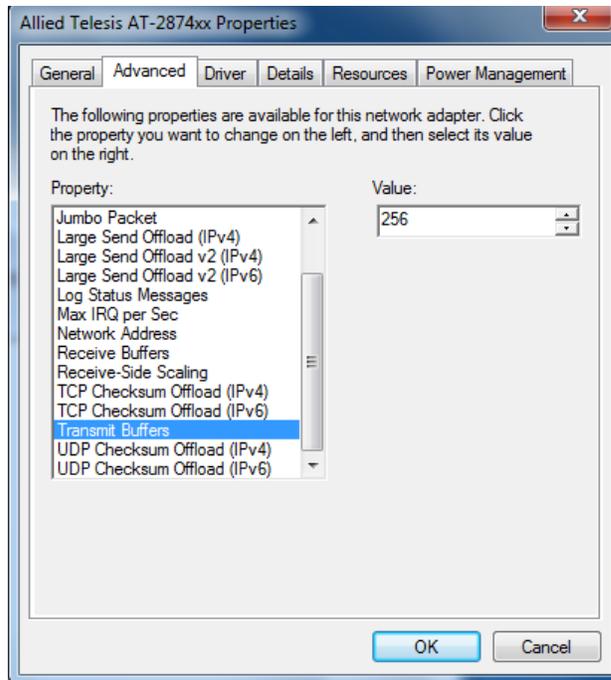


Figure 44. Transmit Buffers Page

3. Specify the number of transmit buffers that you want the system allocates.

The range of the value is from 100 to 600. The default value is 500.

4. Click **OK**.

UDP Checksum Offload (IPv4)

The UDP Checksum Offload (IPv4) function enables the adapter to compute the UDP checksum of transmitting IPv4 packets and verify the UDP checksum of receiving IPv4 packets in order to take load off from the CPU.

To modify the UDP Checksum Offload (IPv4) setting, do the following:

1. Access the Device Manager on your operating system.
See “Accessing Advanced Properties” on page 47.
2. Select **UDP Checksum Offload (IPv4)** in the Property box.

The UDP Checksum Offload (IPv4) page is displayed as shown in Figure 45.

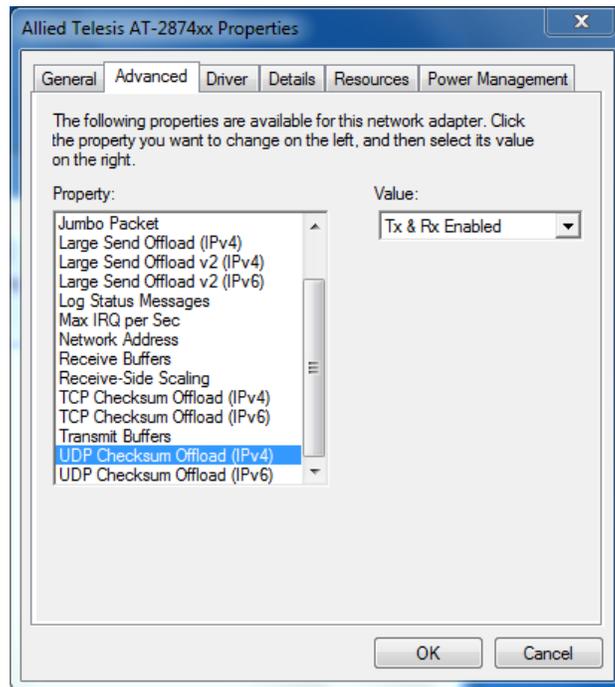


Figure 45. UDP Checksum Offload (IPv4) Page

3. Select one of the following options:
 - Rx & Tx Enabled** — Enables the feature for both receiving and transmitting IPv4 packets. This is the default setting.
 - Disabled** — Disables the feature for both receiving and transmitting.
 - Rx Enabled** — Enables the feature only for receiving IPv4 packets.
 - Tx Enabled** — Enables the feature only for transmitting IPv4 packets.
4. Click **OK**.

UDP Checksum Offload (IPv6)

The UDP Checksum Offload (IPv6) function enables the adapter to compute the UDP checksum of transmitting IPv6 packets and verify the UDP checksum of receiving IPv6 packets in order to take load off from the CPU.

To modify the UDP Checksum Offload (IPv6) setting, do the following:

1. Access the Device Manager on your operating system.
See “Accessing Advanced Properties” on page 47.
2. Select **UDP Checksum Offload (IPv6)** in the Property box.

The UDP Checksum Offload (IPv6) page is displayed as shown in Figure 46.

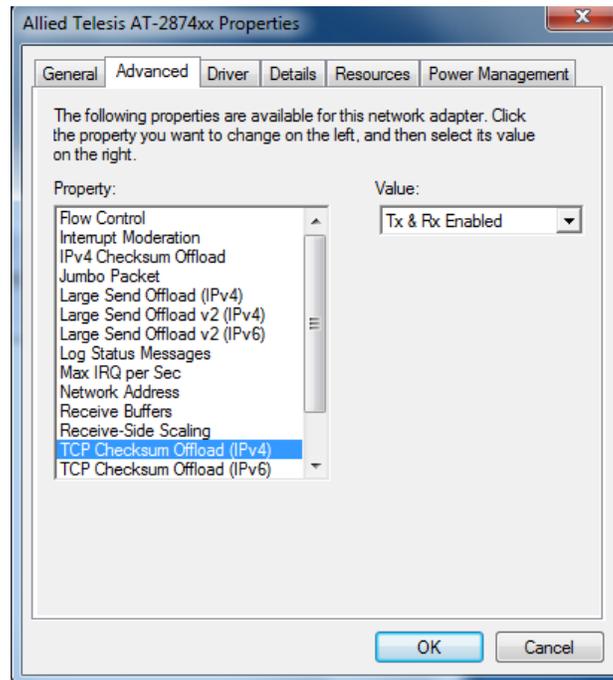


Figure 46. UDP Checksum Offload (IPv6) Page

3. Select one of the following options:
 - Rx & Tx Enabled** — Enables the feature for both receiving and transmitting IPv6 packets. This is the default setting.
 - Disabled** — Disables the feature for both receiving and transmitting.
 - Rx Enabled** — Enables the feature only for receiving IPv6 packets.
 - Tx Enabled** — Enables the feature only for transmitting IPv6 packets.
4. Click **OK**.

Wake on Magic Packet

The Wake on Magic Packet property is *not* supported for the AT-2874SX ExpressCard.

Note

You see the Wake on Magic Packet property as shown in Figure 47 when the proper Allied Telesis driver is *not* installed. To install driver software properly, see Chapter 3, “Installing the Driver Software” on page 27.

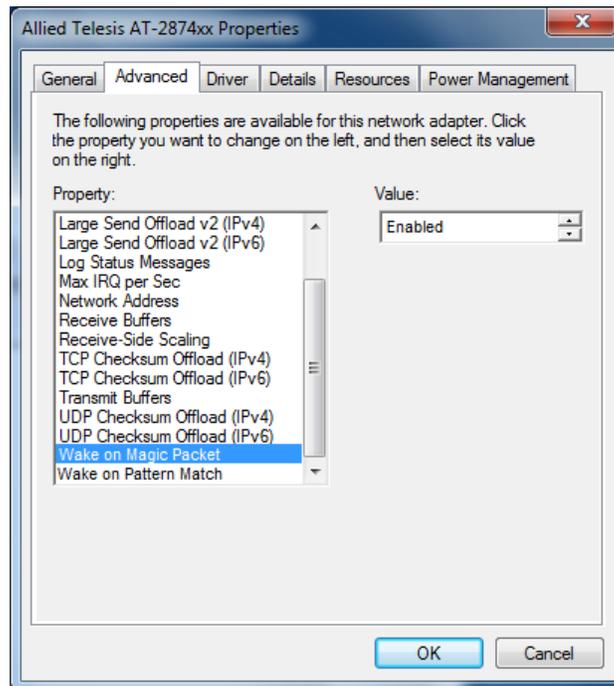


Figure 47. Wake on Magic Packet Page

If you want to use the currently installed driver, the property must be set to Disabled.

Wake on Pattern Match

The Wake on Pattern Match property is *not* supported for the AT-2874SX ExpressCard.

Note

You see the Wake on Pattern Match property as shown in Figure 48 when the proper Allied Telesis driver is *not* installed. To install driver software properly, see Chapter 3, “Installing the Driver Software” on page 27.

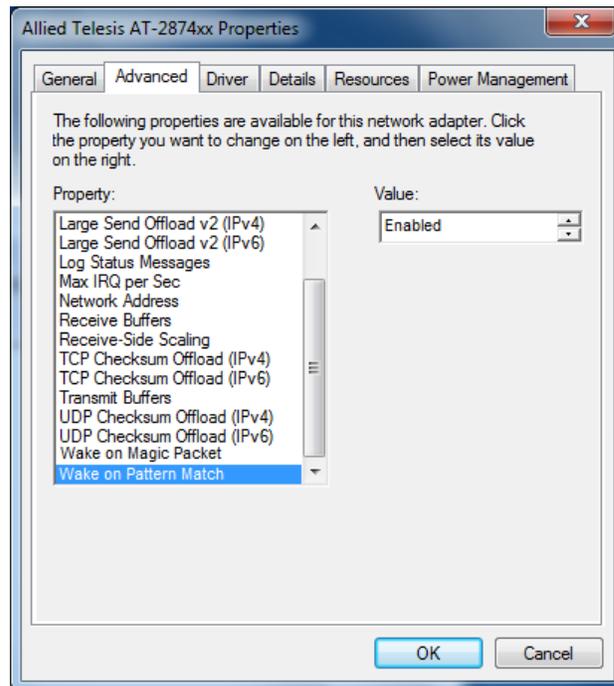


Figure 48. Wake on Pattern Match Page

If you want to use the currently installed driver, the property must be set to Disabled.

Appendix A

Specifications

Physical Specification

Dimensions: 13.7 cm x 3.4 cm (5.4 in. x 1.3 in.)

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)
Relative Humidity: 5% to 90% (non-condensing)
Altitude: Up to 3,048 m (10,000 ft.)

Power Specification

Power Consumption: 3.3W

Appendix B

Cleaning Fiber Optic Connectors

This appendix provides how to clean fiber optic connectors and consists of the following sections:

- “Overview” on page 80
- “Cleaning Using a Cartridge-Type Cleaner” on page 81
- “Cleaning Using a Swab” on page 83

Overview

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 as shown in Figure 49. Light signals are transmitted through the core of the fiber.

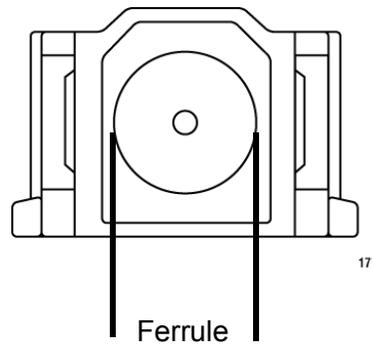


Figure 49. Ferrule in an SC Connector Plug

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. Figure 50 shows part of the end face of an unclean and clean ferrule.

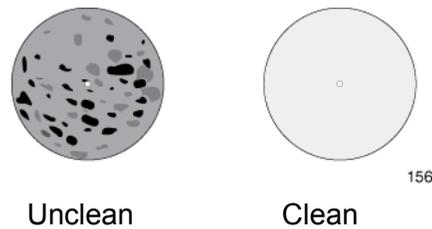


Figure 50. Unclean and Clean Ferrule

Guidelines

Here are general guidelines and warnings for fiber optic connectors:

- Always keep a dust cap on a fiber optic cable when it is not in use.
- Do not touch the end face of the ferrule in the connector.



Warning

Do not stare into the laser beam.  2



Warning

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

Cleaning Using a Cartridge-Type Cleaner

Fiber optic cartridge cleaners are available from many vendors and are typically called “cartridge cleaners,” as shown in Figure 51.



Figure 51. 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 52.

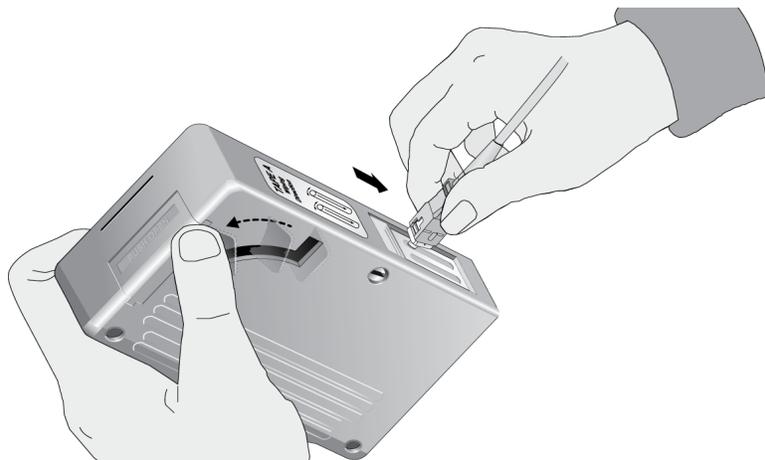


Figure 52. Rubbing the Ferrule Tip on the Cleaning Surface

2. Place the ferrule tip on the exposed cleaning surface and rub the ferrule in a downward direction, as shown in Figure 52.

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 2 and 3.
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.

Cleaning Using a Swab

Specially treated swabs (stick cleaners) are available for cleaning inside connector adapters or hard-to-reach ferrule tips. These swabs, often referred to as “lint free” or “alcohol free” swabs, are available from many vendors. See Figure 53. 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. A cotton swab or alcohol may leave a residue on the ferrule tip.

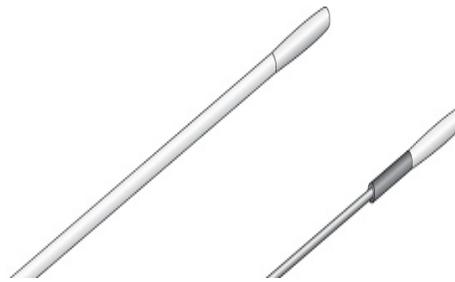


Figure 53. Lint-Free and Alcohol-Free Swabs

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 54 and rub the ferrule tip with the swab.



Figure 54. 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.
4. Reconnect the cable to the port or protect the ferrule tip with a dust cap.