AR5BCB-00043 Cardbus Card User's Guide

Revision September 2003

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Document Number: 984-00016-005

Document Conventions

Text Conventions

bold	Bold type within paragraph text indicates commands, file names, directory names, paths, output, or returned values. Example: The DK_Client package will not function, except when the **wdreg_install** batchfile is used.
italic	Within commands, italics indicate a variable that the user must specify. Example: **mem_alloc** *size_in_bytes* Titles of manuals or other published documents are also set in italics.
`Courier`	The Courier font indicates output or display. Example: `Error:Unable to allocate memory for transfer!`
[ ]	Within commands, items enclosed in square brackets are optional parameters or values that the user can choose to specify or omit.
{ }	Within commands, items enclosed in braces are options from which the user must choose.
|	Within commands, the vertical bar separates options.
…	An ellipsis indicates a repetition of the preceding parameter.
>	The right angle bracket separates successive menu selections. Example: Start > Programs > DK > wdreg_install**.**

Notices

NOTE: This message denotes neutral or positive information that calls out important points to the text. A note provides information that may apply only in special cases.

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Preface

This user's guide provides the necessary information for first-time users to successfully install the Atheros Network Driver Interface Specification (NDIS) driver, for the purpose of operating the Atheros Network Adapter in a Microsoft Windows environment. This guide also provides information for users who wish to upgrade the Atheros NDIS driver from previous releases.

This guide describes the steps required to install NDIS drivers for the Atheros Network Adapter in Windows 2000, Windows Millennium Edition, Windows 98 Second Edition, Windows XP, and Windows NT 4.0. This guide also includes detailed instructions for configuring the Adapter to interact with an access point (AP) in infrastructure mode, or with other Wireless Stations (STAs) in ad hoc mode.

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About this Document

The document consists of the following chapters and appendix:

Chapter 1	**Introduction**—Hardware, Software, and System Requirements needed to setup Atheros Wireless Adapter.
Chapter 2	**Windows 2000**—Installation/Uninstallation Procedures and Device/Network Configurations for Windows 2000.
Chapter 3	**Windows 98 Second Edition**—Installation/Uninstallation Procedures and Device/Network Configurations for Windows 98 Second Edition.
Chapter 4	**Windows Millennium Edition**—Installation/Uninstallation Procedures and Device/Network Configurations for Windows Millennium Edition.
Chapter 5	**Windows XP**—Installation/Uninstallation Procedures and Device/Network Configurations for Windows XP.
Chapter 6	**Windows NT 4.0**—Installation/Uninstallation Procedures and Device/Network Configurations for Windows NT 4.0.

Chapter 7 **Troubleshooting**—Hints on fixing common Installation/ Uninstallation and Device/Network Configurations issues.

Appendix A **Supported Channels and Data Rates**—Describes available Data Rates and Channel Frequencies for operation

Appendix B **Regulatory Compliance Information**—Important user information and instructions concerning operating this device in accordance with National spectrum usage laws for radio devices.

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Introduction

The Atheros Wireless Network Adapters implement a half-duplex, Orthogonal Frequency Division Multiplexing (OFDM) baseband processor supporting all IEEE 802.11g data rates (6 to 54 Mbps) and 802.11b data rates (1 to 11 Mbps). In the Atheros Turbo Mode™, the adapters support data rates up to 108 Mbps. The host interface is compatible with the PC Card 7.1 and PCI 2.2 standards.

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Package Contents

Make sure the following materials are available before beginning:

- Atheros Software Release CD, or electronic equivalent
- Atheros Wireless Network Adapter

System Requirements

- Laptop PC containing:
  - 32-bit CardBus slot (or Desktop PC with PC Card-PCI adapter)
  - 32 MB memory or greater
  - 300 MHz processor or higher
- Microsoft Windows 2000/Windows Millennium Edition/Windows 98 Second Edition/Windows XP/Windows NT 4.0 (with Service Pack 6)

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Windows 2000

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This chapter describes the Windows 2000 driver installation.

Driver Installation (First-Time Installation)

This section describes the first-time installation for the driver for Windows 2000. For a previously installed driver, Atheros provides the InstallShield Wizard, which includes an application for upgrading the present driver and the Atheros Client Utility.

To install the NDIS Driver (first-time installation):

Insert the Atheros Wireless Network Adapter into a 32-bit CardBus slot and follow these steps to install the NDIS driver:

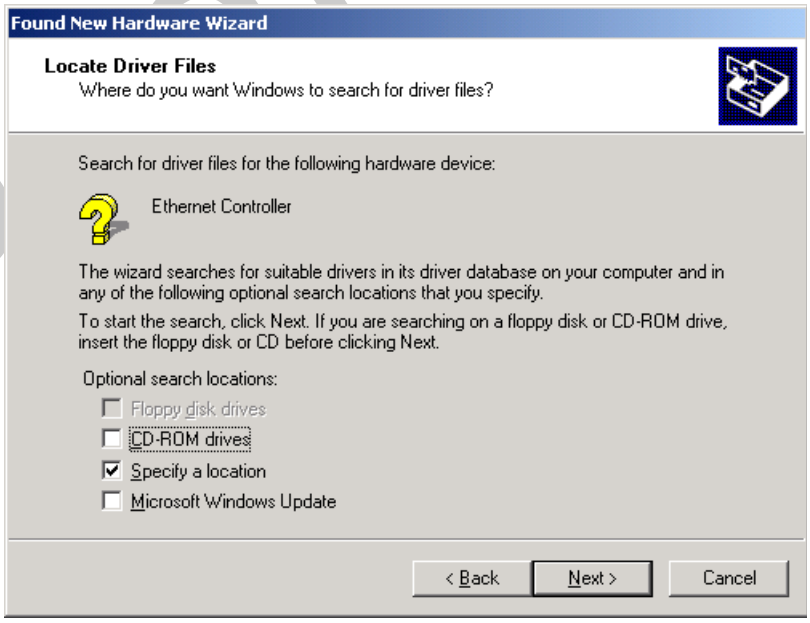
1. Wait for the Found New Hardware Wizard dialog box to display.

2. Click Next to continue.

3. Choose "Search for a suitable driver for my device (recommended)."

4. Click Next.

5. Insert the Release CD into the CD-ROM drive.



6. Choose Specify a location under "Optional search locations."

7. Click Next to continue.

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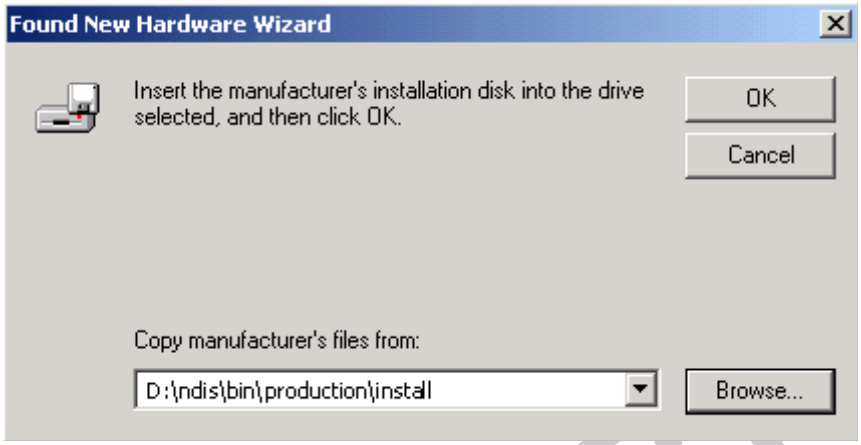
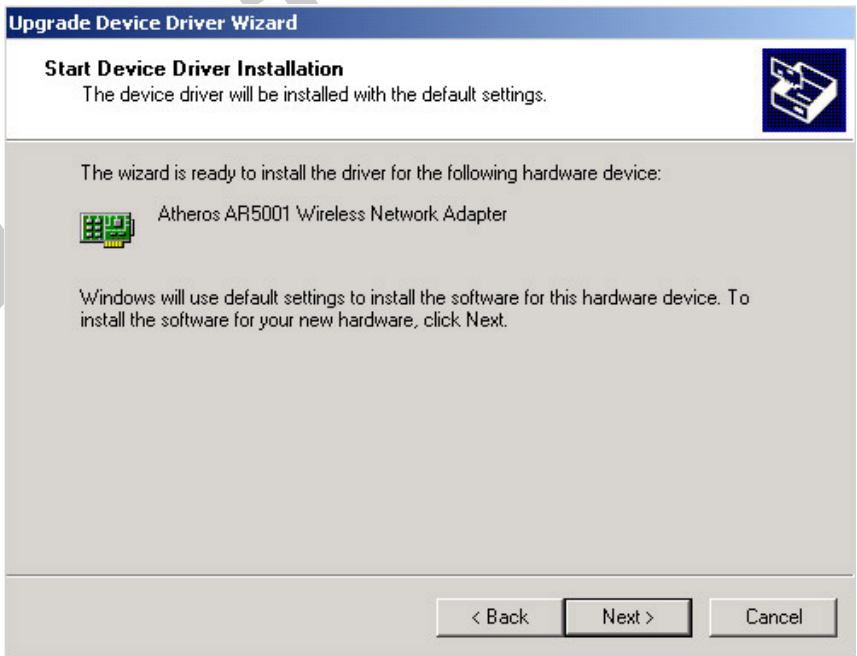
8. Browse to the NDIS driver directory. The default folder is **D:\ndis\bin\production\install** (assuming D: is the CD-ROM drive).



9. Click OK to continue.

10. After finding the Atheros driver installation file **net5211.inf**, click Next to continue.



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11. The Atheros NDIS evaluation driver currently does not have a digital signature from Microsoft. Therefore, Windows 2000 shows a warning message. Click Yes to proceed with driver installation.

12. Click Finish to complete the driver installation. See "Device Configuration" on page 2-7 for the device configuration information.

ACU Installation and Driver Update

Atheros provides an InstallShield utility to upgrade the NDIS driver, if a previous release is installed, and to install the Atheros Client Utility (ACU).

To install the ACU and upgrade the NDIS driver:

When an Atheros NDIS driver has been previously installed, insert the Atheros Wireless Network Adapter into a 32-bit CardBus slot. Follow these steps to update the NDIS driver:

1. Open the InstallShield Wizard (**setup.exe**).

2. Click Next to continue.

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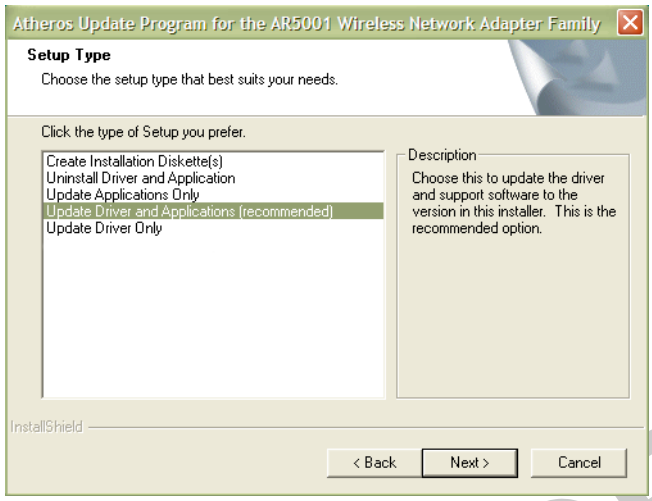
3. Click Yes to accept the License Agreement.

   The Update Program Setup Type dialog will display.



4. The Setup Type page provides selections as summarized in Table 2-1. Choose the selection appropriate for your network.

Table 2-1. **Setup Type Page Selections**

Selection	Description
Install Driver and Atheros Client Utility	Recommended. Updates drivers and installs the ACU.
Install Driver Only	Installs NDIS driver only.
Install Atheros Client Utility Only	Installs ACU only.
Make Driver Installation Diskettes	Creates ACU installation diskettes.

5. Click Next to continue.

6. Choose the destination location. Click Next to continue.

7. Specify the program folder to store start icons.

8. Use the checkbox to enable the ACU tray icon and start the ACU when restarting the system. The tray icon will appear in the Windows System Tray.

9. If a previous release of the ACU is installed, make sure it is not currently running. Click Next to continue.

   If you are running a previous version of the ACU, a dialog box will appear requesting an exit from the program. Click OK and continue.

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10. The Atheros NDIS evaluation driver currently does not have a digital signature from Microsoft, so Windows 2000 may show a warning message. Click Yes to proceed with driver installation.

11. Click Finish when the InstallShield Wizard is complete.

Driver and ACU Uninstallation

This section provides information about uninstallation procedures for Atheros software releases.

To uninstall the ACU and the NDIS driver:

Use the InstallShield Updater to uninstall the NDIS driver and ACU application and remove them from the Device Manager.

1. Open the InstallShield Wizard (**setup.exe**).

2. Click Next to continue.

3. Click Yes to accept the License Agreement.

4. On the Setup Type page, choose Uninstall Driver and Applications to uninstall drivers and Atheros Client Utility.

   Click Next to continue.

5. Click Finish when the InstallShield Wizard is complete.

Some files are left on the system to ease reinstallation. Use the following instructions to completely remove these files.

1. Go to the Start menu and choose Search For Files or Folders...

2. Enter **oem*.inf** in the "Search for files or folders named "field", and enter **Atheros** in the "Containing text:" field.

3. Click Search Now.

   A few files matching these criteria are possible, if previous drivers have not been removed properly.

4. Choose the files that have been found and delete them from the system.

5. To complete the uninstallation, remove the file **ar5211.sys** from the **\WINNT\system32\drivers** folder.

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Device Configuration

Use the Atheros Client Utility to configure the device driver.

Access the Atheros Client Utility by clicking the Start button and choosing Programs > Atheros > Atheros Client Utility. The ACU tray icon is displayed in the right side of the Toolbar. Launch the ACU by double-clicking the tray icon, or by right-clicking the tray icon and selecting Launch Station Utility.

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Windows 98 Second Edition

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This chapter describes the Windows 98 Second Edition driver installation.

Driver Installation (First Time Installation)

This section describes the first-time installation for the driver for Windows 98 Second Edition.

To install the NDIS Driver (first-time installation):

Insert the Atheros Wireless Network Adapter into a 32-bit CardBus slot and follow these steps to install the NDIS driver.

1. Wait for the following dialog box to appear, and click Next to continue.

2. Choose “Search for the best driver for your device (Recommended),” and click Next.

3. Insert the Atheros Software Release CD in the CD-ROM drive. Choose “Specify a location” and browse to the location where the NDIS driver is located. The default folder is **D:\ndis\bin\production\install** (assuming D: is the CD-ROM drive).

4. Click Next to continue.

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5. When the Atheros driver installation file **net5211.inf** has been found, click Next to continue.

6. Click Finish to continue.

7. Click Yes to restart the system and complete driver installation. Refer to "Device Configuration" on page 2-7 for information on device configuration.

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ACU Installation and Driver Update

Atheros provides an InstallShield utility to upgrade the NDIS driver, if a previous release is installed, and to install the Atheros Client Utility (ACU). For complete information on upgrading your NDIS driver, refer to "ACU Installation and Driver Update" on page 2-4.

Use the Atheros Client Utility to configure the device driver. For complete information on configuring the device driver, refer to "Device Configuration" on page 2-7.

You can also use the InstallShield Updater to uninstall the NDIS driver and ACU application and remove them from the Device Manager. For complete information on uninstalling the NDIS driver and ACU application, refer to "Driver and ACU Uninstallation" on page 2-6.

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Windows Millennium Edition

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This chapter describes the Windows Millennium Edition installation.

Driver Installation (First Time Installation)

This section describes the first-time installation for the driver for Windows Millennium Edition. For a previously installed driver, Atheros provides the InstallShield Wizard, which includes an application for upgrading the present driver and the Atheros Client Utility.

To install the NDIS Driver (first-time installation):

Insert the Atheros Wireless Network Adapter into a 32-bit CardBus slot and follow these steps to install the NDIS driver:

1. Wait for the Add New Hardware Wizard dialog box to appear. Choose "Specify the location of the driver (Advanced)," and click Next to continue.

2. Choose "Search for the best driver for your device. (Recommended)."

    a. Select "Specify a location."

    b. Click Browse to locate the NDIS driver. The default folder is **E:\ndis\bin\production\install** (assuming E: is the CD-ROM drive).

c. Click Next to continue.

d. When the Atheros driver installation file **net5211.inf** has been found, click Next to continue.

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3. Click Finish to continue, and restart the system to complete driver installation. Refer to "Device Configuration" on page 2-7 for device configuration.

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ACU Installation and Driver Update

Atheros provides an InstallShield utility to upgrade the NDIS driver, if a previous release is installed, and to install the Atheros Client Utility (ACU). For complete information on upgrading your NDIS driver, refer to "ACU Installation and Driver Update" on page 2-4.

Use the Atheros Client Utility to configure the device driver. For complete information on configuring the device driver, refer to "Device Configuration" on page 2-7.

You can also use the InstallShield Updater to uninstall the NDIS driver and ACU application and remove them from the Device Manager. For complete information on uninstalling the NDIS driver and ACU application, refer to "Driver and ACU Uninstallation" on page 2-6.

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Windows XP

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This chapter describes the Windows XP driver installation.

Driver Installation (First Time Install)

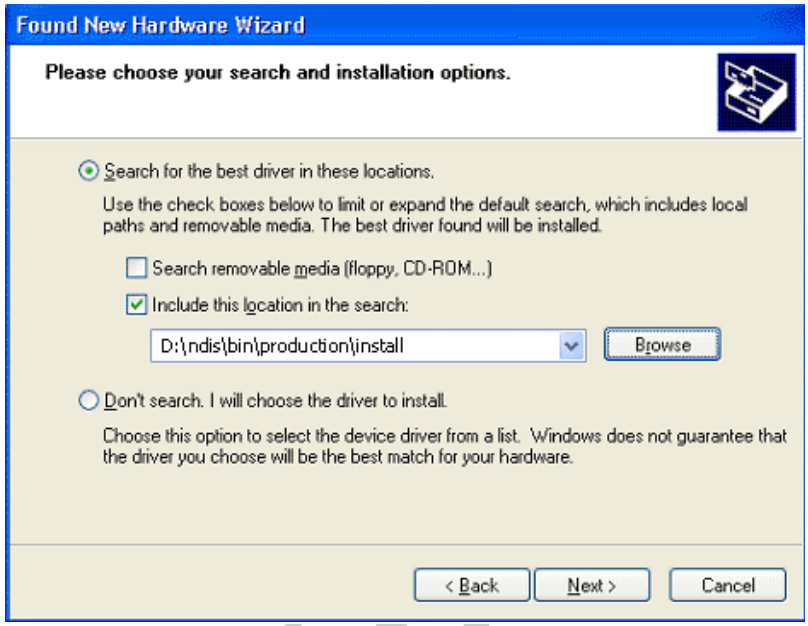
This section describes the first-time installation for the driver for Windows XP. For a previously installed driver, Atheros provides the InstallShield Wizard, which includes an application for upgrading the present driver and the Atheros Client Utility.

To install the NDIS Driver (first-time installation):

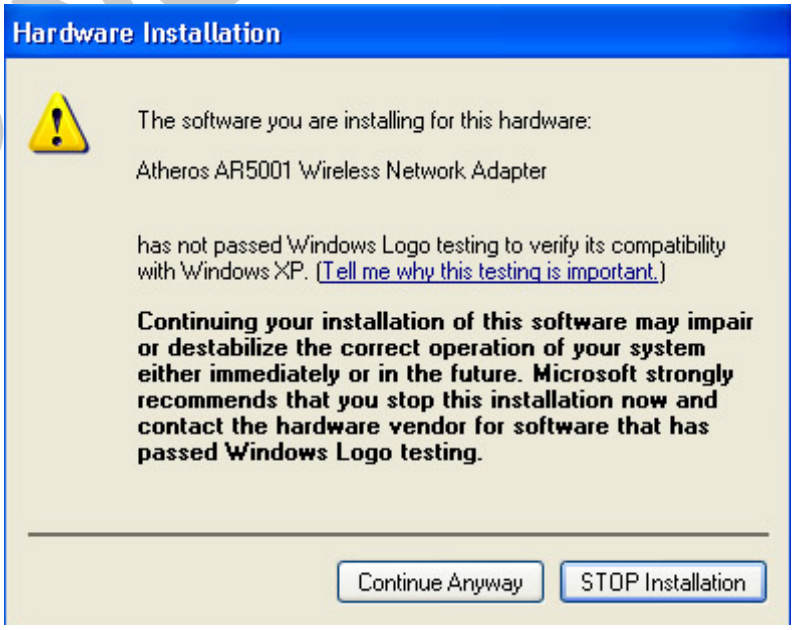
Insert the Atheros Wireless Network Adapter into a 32-bit CardBus slot and follow these steps to install the NDIS driver:

1. Wait for the Found New Hardware Wizard dialog box to appear. Choose "Install from a list or specific location (Advanced)," and click Next to continue.

2. Under "Search for the best driver in these locations," choose "Include this location in the search" and click Browse to find the location of the NDIS driver. When the location has been identified, click Next to continue.



3. The Atheros NDIS evaluation driver currently does not have a digital signature from Microsoft. Therefore, Windows XP shows a warning message. Click Continue Anyway to proceed with driver installation.



4. Click Finish to complete driver installation, and refer to "Device Configuration" on page 2-7 for device configuration.

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ACU Installation and Driver Update

Atheros provides an InstallShield utility to upgrade the NDIS driver, if a previous release is installed, and to install the Atheros Client Utility (ACU). For complete information on upgrading your NDIS driver, refer to "ACU Installation and Driver Update" on page 2-4.

Use the Atheros Client Utility to configure the device driver. For complete information on configuring the device driver, refer to "Device Configuration" on page 2-7.

You can also use the InstallShield Updater to uninstall the NDIS driver and ACU application and remove them from the Device Manager. For complete information on uninstalling the NDIS driver and ACU application, refer to "Driver and ACU Uninstallation" on page 2-6.

Windows XP Wireless Network Configuration

Windows XP provides Zero Configuration functionality that automatically tries to connect the Wireless Adapter to available wireless networks. This section explains how to set up and manage security configurations using both the Atheros Client Utility (ACU) and Windows XP Zero Configuration.

For complete information on Zero Configuration, visit the following Microsoft web site:

http://www.microsoft.com/technet/prodtechnol/winxppro/reskit/prdc_mcc_kqmu.asp

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ACU Security

The ACU allows connection profiles of:

- No security

  Link encryption/decryption is disabled, no keys are installed.

- Static key security

  Keys are installed at driver initialization and profile change events. All Atheros-supported encryption protocols are supported and the chosen keys can be 40-, 104-, or 128-bits.

- Dynamic key security

  Pre-configured keys will be installed, but the expectation is that protocols running outside the context of the ACU will be providing link security.

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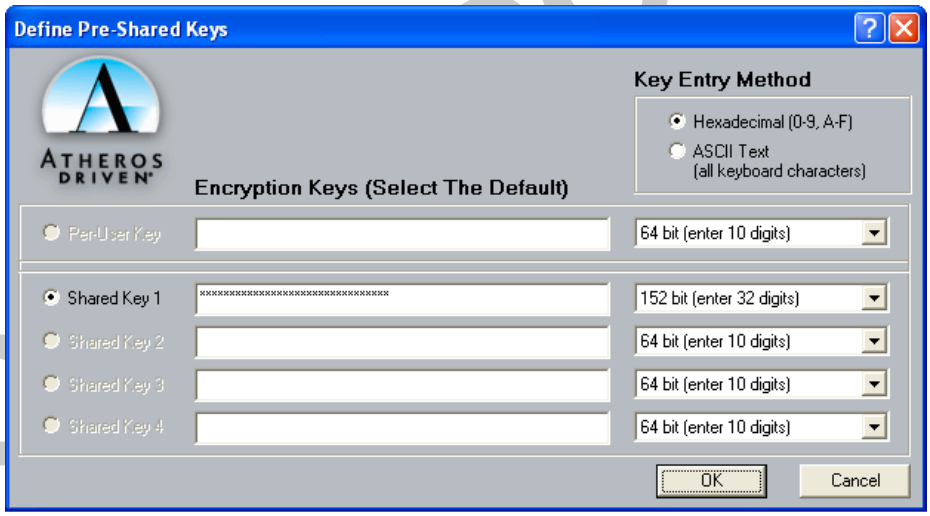

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Windows NT 4.0

This chapter describes the Windows NT 4.0 driver installation.

Driver Installation and TCP/IP Setup

Windows NT 4.0 does not support “plug-and-play.” Therefore, the Atheros NDIS driver installation uses an approach that is different from the installation used in other Operating Systems. To install the Atheros Wireless Network Adapter in Windows NT 4.0 with Service Pack 6, a PC Card utility called CardWizard is used. If the computer system does not have the CardWizard utility pre-loaded, purchase it from SystemSoft Corporation (www.systemsoft.com) or download a 14-day evaluation copy at ftp://www.systemsoft.com/pub/Wn51tren.exe. Note that CardWizard requires Windows NT 4.0 Build 1381 (Service Pack 6) installed to function correctly.

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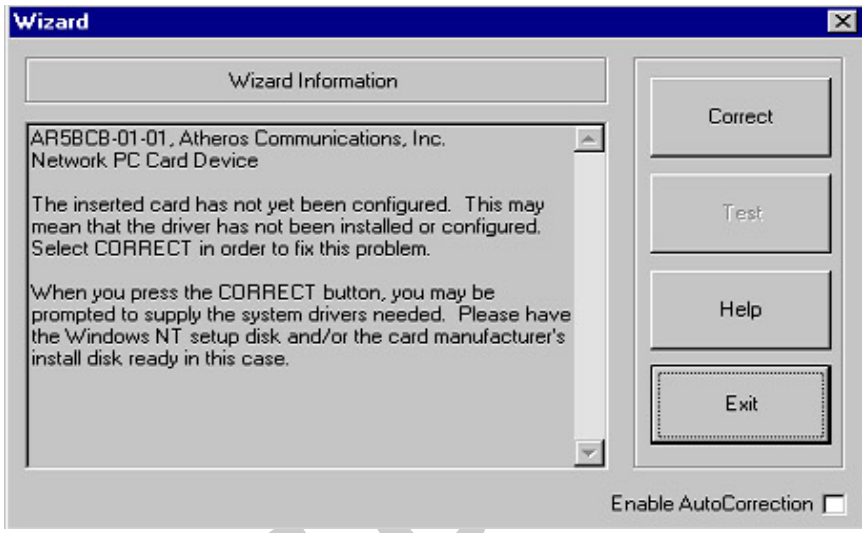
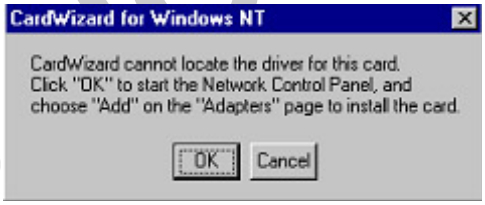
After the CardWizard utility is loaded, insert the Atheros Wireless Network Adapter into a 32-bit CardBus slot, and follow these steps to install the NDIS driver:

1. CardWizard will detect the insertion of the Atheros CardBus card and show the following screen. Click Correct to continue.



2. Click OK to continue.



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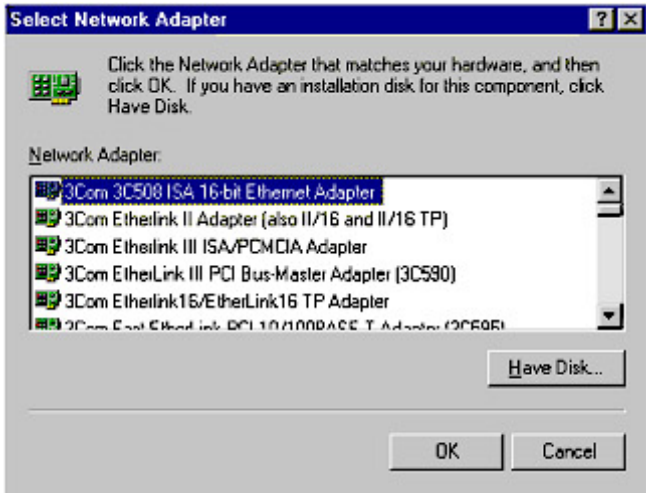
3. Windows NT 4.0 Network Properties windows displays. Click Add to continue.

4. On the Select Network Adapter dialog box, click Have Disk.



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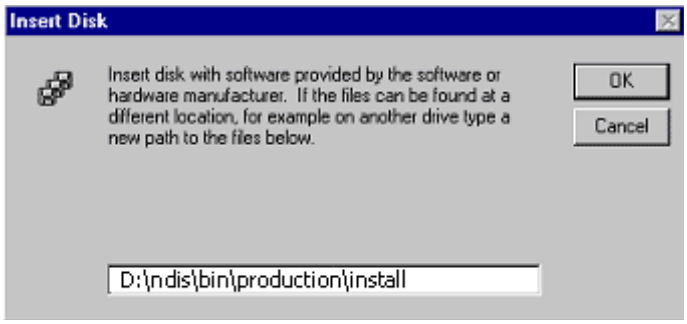
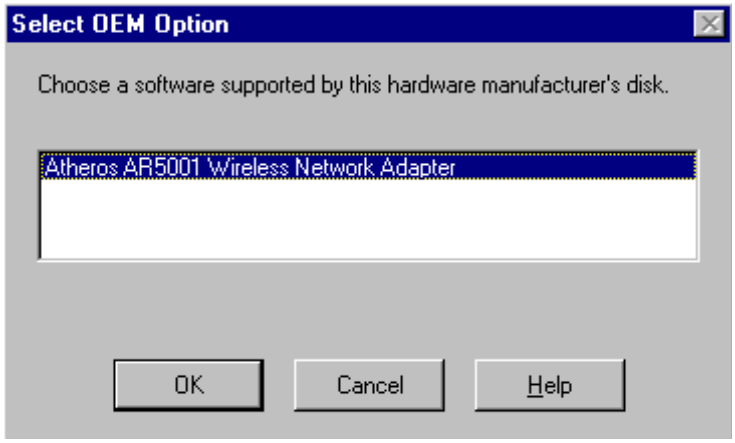
5. Manually enter the location of where the Atheros NDIS 4.0 driver is located. For example, **D:\ndis\bin\production\install**.



6. Click OK to continue.

7. Make sure Atheros Wireless Network Adapter is selected.



8. Click OK to continue.

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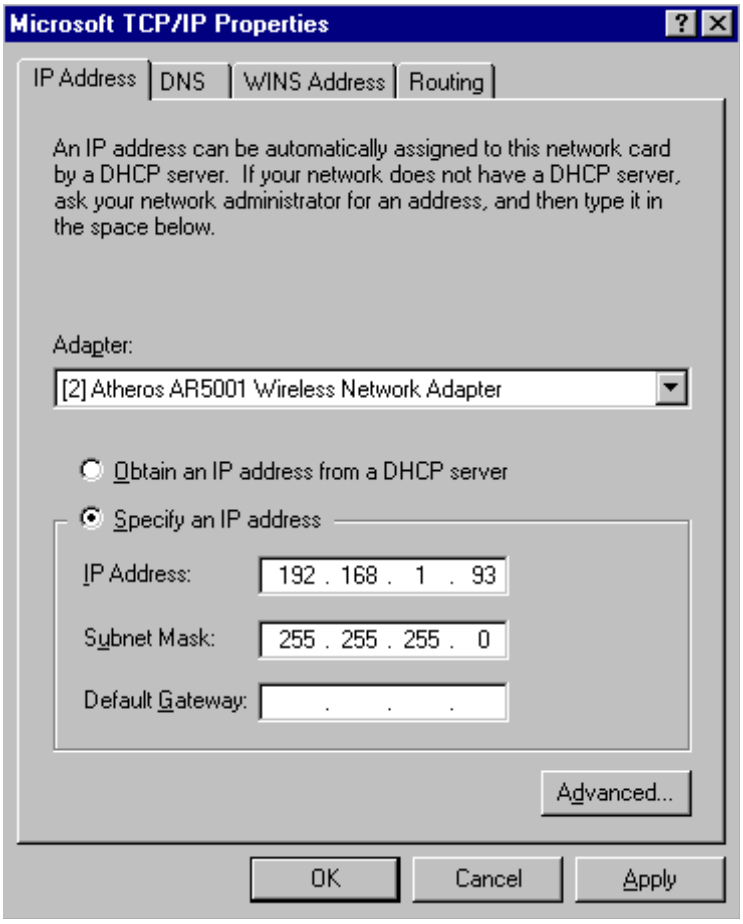
Windows NT 4.0 binds the TCP/IP protocol to the Atheros Wireless Network Adapters, so TCP/IP properties have to be entered. Depending on the type of network the station connects to, Gateway and DNS Configuration information may also be required. IP configuration information (DHCP or assigned IP address, Gateway and DNS server IP addresses) is usually obtained from the corporate IT staff. For a simple demonstration, the station is assigned a static IP address.

9. Choose "Specify an IP address" and enter an IP address and subnet mask. Assigning an IP address and subnet mask allows the station to interact with the AP or other stations in the same IP subnet.



10. Click OK to complete the TCP/IP configuration.

11. Restart the system for the changes to take effect.

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ACU Installation and Driver Update

Atheros provides an InstallShield utility to upgrade the NDIS driver, if a previous release is installed, and to install the Atheros Client Utility (ACU). For complete information on upgrading your NDIS driver, refer to "ACU Installation and Driver Update" on page 2-4.

Use the Atheros Client Utility to configure the device driver. For complete information on configuring the device driver, refer to "Device Configuration" on page 2-7.

You can also use the InstallShield Updater to uninstall the NDIS driver and ACU application and remove them from the Device Manager. For complete information on uninstalling the NDIS driver and ACU application, refer to "Driver and ACU Uninstallation" on page 2-6.

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Troubleshooting

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This chapter provides solutions to common problems that usually occur during the installation and operation of the Atheros Wireless Network Adapter. Read the following descriptions for solutions to common problems. If you cannot find an answer here, please contact an Atheros field application engineer for assistance.

1. **My computer does not recognize the Atheros CardBus card.**

   Make sure the CardBus card is properly inserted into a 32-bit CardBus slot. If Windows does not detect the hardware upon insertion of the card, the system could have a previous Atheros NDIS driver installed. Remove the old driver and try again.

2. **The Atheros Wireless Network Adapter does not work properly after the driver is installed.**

   Re-insert the CardBus card into the slot. A beep should be heard if the adapter is properly inserted. Go to Device Manager and make sure the Atheros Wireless Network Adapter exists under the network adapters device node. If you see the yellow exclamation mark then there are conflicting resources. In this case, make sure the computer system has a free IRQ and make sure you have installed the proper driver. Uninstall the driver, restart the system, and repeat the driver installation steps if necessary.

3. **Stations cannot associate in ad hoc mode.**

   Make sure the same service set identifier (SSID) is specified for all stations that need to join the same ad hoc network. Set up one station to establish a BSS and wait briefly before setting up other stations. This prevents several stations from trying to establish a BSS at the same time, which can result in multiple singular BSSs being established, rather than a single BSS with multiple stations associated to it.

4. **The station cannot access the Internet in the infrastructure configuration.**

   Make sure the station is associated and joined with the AP. If Wired Equivalent Privacy (WEP) security is enabled on the AP, the station must have the proper WEP keys specified. Also make sure TCP/IP properties are correctly configured.

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A

Supported Channels and Data Rates

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This section provides basic information for available data rates and channel frequencies in the NDIS driver.

NOTE: The Atheros Wireless Adapter's firmware limits operation to only the channels allowed in a particular Region or Country (i.e. Regulatory Domain). Therefore, all options listed below may not be available in your version of the Atheros Wireless Adapter.

CAUTION: Please refer to the "Regulatory Compliance" section of this guide for specific user requirements for operating this product in accordance with National laws for usage of the radio spectrum and operation of radio devices.

See Table A-1 for 802.11b/802.11g channel numbers and frequencies for the FCC regulatory domain.

See Table A-2 and Table A-3 for available data rates.

Table A-1. **IEEE Channel Numbers for 802.11b/802.11g**

Channel Number	Channel Frequency (MHz)	Regulatory Domain
1	2412	FCC
2	2417	FCC
3	2422	FCC
4	2427	FCC
5	2432	FCC
6	2437	FCC
7	2442	FCC
8	2447	FCC
9	2452	FCC
10	2457	FCC
11	2462	FCC
12	2467	FCC
13	2472	FCC

Table A-2. **Data Rates for 802.11b**

Rate Number	Data Rate
0	1 Mbps
1	2 Mbps
2	5.5 Mbps
3	11 Mbps

Table A-3. **Data Rates for 802.11g**

Rate Number	Data Rate
0	1 Mbps
1	2 Mbps
2	5.5 Mbps
3	11 Mbps
4	6 Mbps
5	9 Mbps
6	12 Mbps
7	18 Mbps
8	24 Mbps
9	36 Mbps

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Table A-3. **Data Rates for 802.11g**

Rate Number	Data Rate
10	48 Mbps
11	54 Mbps

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B

Regulatory Compliance Information

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This section includes user requirements for operating this product in accordance with National laws for usage of radio spectrum and operation of radio devices. Failure of the end-user to comply with the applicable requirements may result in unlawful operation and adverse action against the end-user by the applicable National regulatory authority.

NOTE: The Atheros Wireless Adapter's firmware limits operation to only the channels allowed in a particular Region or Country (i.e. Regulatory Domain). Therefore, all options described in this user's guide may not be available in your version of the Atheros Wireless Adapter.

FCC Requirements for Operation in the Unites States

Radio Frequency Interference Warnings & Instructions

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does 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 methods:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment into an electrical outlet on a circuit different from that which the radio receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

Modifications made to the product, unless expressly approved by Atheros Communication, could void the user's right to operate the equipment.

RF Exposure

This device has been tested for compliance with FCC RF Exposure (SAR) limits in typical laptop computer configurations and this device can be used in desktop or laptop computers with side mounted PCMCIA slots which can provide 1 cm separation distance from the antenna to the body of the user or a nearby person. Thin laptop computers may need special attention to maintain antenna spacing while operating.©
This device *cannot* be used with handheld PDAs (personal digital assistants).
This device and its antenna *must not* be co-located or operated in conjunction with any other antenna or transmitter.

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Declaration Of Conformity

We Atheros Communications, Inc.,

529 Almanor Ave.,Sunnyvale,CA 94085

declare under our sole responsibility that the model AR5BCB-00043 Cardbus Card Wireless Adapter complies with Part 15 of FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

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