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802.11a/b/g MiniPCI Module

(AMBIT WLAN 802.11 a/b/g)

User's Manual

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Chapter 1 About the AMBIT WLAN 802.11a/b/g device

1-1 Introduction

The AMBIT WLAN 802.11a/b/g device allows you to access Wireless Local Area Networks (WLANs), share a local printer and files with others in your network, access the Internet, and roam about the office—wirelessly. This wireless Local Area Network solution is designed for both large and small businesses, and it is scalable so that you can add users and new network features as your networking needs grow.

The AMBIT WLAN 802.11a/b/g device is a dual band WLAN device that allows for access to both 2.4Ghz and 5Ghz WLAN technologies. The AMBIT WLAN 802.11a/b/g device will operate with at a maximum data rate of 11Mbps with 802.11b (2.4Ghz), 54Mbps with 802.11g (2.4Ghz) wireless networks and a maximum data rate of 54Mbps with 802.11a (5Ghz) wireless networks. The AMBIT WLAN 802.11a/b/g device will automatically detect and seamlessly roam between both 802.11b (2.4Ghz), 802.11g (2.4Ghz) and 802.11a (5Ghz) wireless networks

1-2 Using a Wireless Local Area Network

A wireless LAN provides the same functionality of a wired network, but it eliminates the need to install networking cables and other networking equipment. Not only is a wireless LAN easier to deploy, but it also allows for mobility through “roaming.” For example the AMBIT WLAN 802.11a/b/g device can roam from a conference room to an office without being disconnected from the network.

1-3 Features and Requirements

The AMBIT WLAN 802.11a/b/g device includes the following features:

Wireless Features

- Support for the IEEE 802.11a standard
- Support for the IEEE 802.11b standard
- Operates within the 2.4-GHz band
- Operates within the 5Ghz band
- Maximum data rate of up to 54 Mbps (802.11a/g)
- Maximum data rate of up to 11 Mbps (802.11b)

Interoperability

- WiFi certified at 5Ghz to ensure wireless interoperability with other WiFi (802.11a) certified devices.
- WiFi certified at 2.4Ghz to ensure wireless interoperability with other WiFi (802.11b) certified devices.

Security

- Cisco Client Extension compatibility (including LEAP)
- Wired Equivalent Privacy (WEP) encryption, operating with 64bit, 128bit or 152 bit encryption
- AES-CCM Encryption support
- Support for Windows 802.1X supplicants

Chapter 2 Network Configuring and Planning

A wireless LAN can be configured for two different modes of operation. While each method has its advantages, one may be better suited for your needs. Review the following configurations to determine which mode is best for you.

- Ad-Hoc Network
- Access Point (Infrastructure) Network

2-1 Ad-Hoc Network

An Ad-Hoc network is the simplest to deploy and is ideal for small offices. Ad-Hoc wireless networks can be comprised of two or more wireless client configured to communicate with one another. All Ad-hoc clients communicate directly with each other without using an access point (AP). As a user on this type of network, you are able to quickly build up a wireless network in order to share files with other employees, print to a shared office printer, and access the Internet through a single shared connection.

Ad-hoc networking is cost effective, because no other devices components are needed (access points, hubs or routers) in order to setup a network. However, with peer-to-peer Ad-Hoc networking, your computer is only able to communicate with other nearby wireless clients.

Characteristics

Networked computers send data directly to each other

Advantages

- Simple setup
- Cost efficiency

Disadvantages

Communication is limited to nearby wireless clients

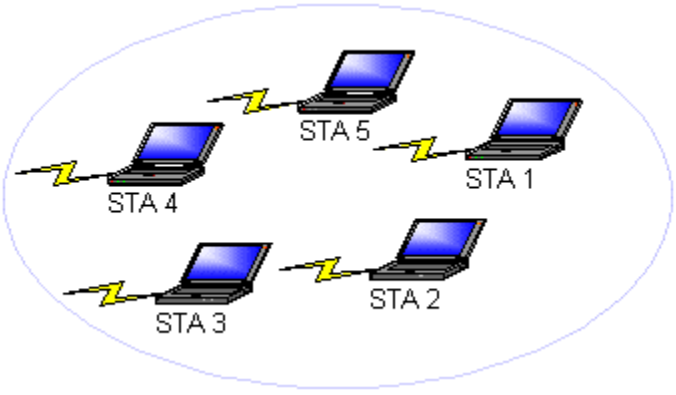


Figure 2-1

2-2 Access Point (Infrastructure) Network

An Access Point network is also referred to as an "Infrastructure" network. The key difference between a wireless access point network and an Ad-Hoc network is the addition of one extra element—the Access Point. The Access Point serves as the focal point for all data traffic on your wireless network, optimally managing all wireless data transactions.

Additionally, the wireless Infrastructure can provide access to an existing wired LAN. This link allows computers on the infrastructure wireless LAN to access the other wired LAN's resources and tools, including Internet access, email delivery, file transfer, and printer sharing.

Characteristics

Networked computers communicate with each other through a dedicated Access Point. All data transmitted between the computers on this wireless LAN passes through the access point.

Advantages

- Extended range: The access point extends the range of the wireless LAN. Each wireless client computer can communicate with other computers equipped with wireless devices that are within the range of the access point.
- Roaming: As you move throughout the building, the AMBIT WLAN 802.11a/b/g device will automatically search for an access point to use, ensuring continuous communication with the wireless network.
- Network connectivity: An access point can provide wireless LAN access to an existing *wired* network by bridging the two networks together. This gives users of the wireless LAN access to corporate email, Internet, shared printers and files.

Disadvantages

Because this network mode offers more features, it requires additional components and setup time to deploy.

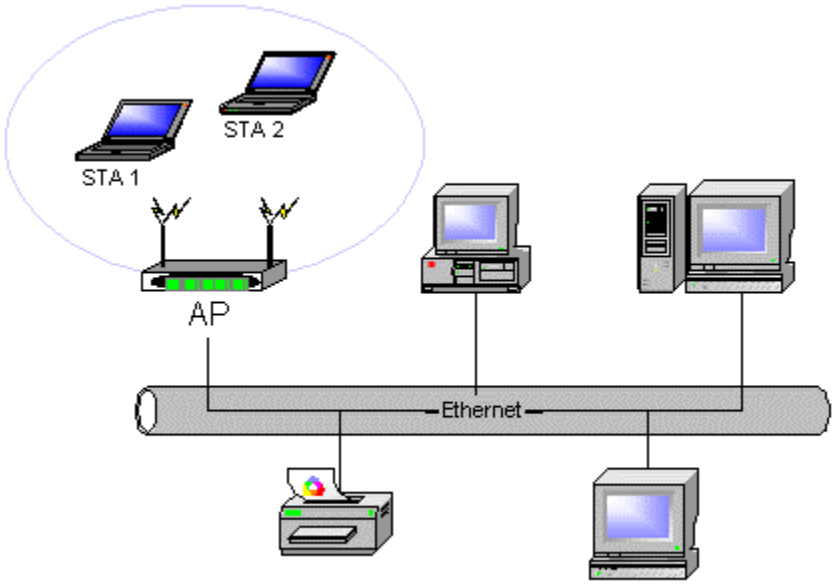


Figure 2-2

Chapter 3 Atheros Client Utility Installation

Note for Windows XP Users: The Windows XP operating system has a built-in feature known as "Wireless Zero Configuration" which has the capability to configure and control the AMBIT WLAN 802.11a/b/g device (See Chapter 5). Installing the Wireless LAN Client utility will disable this Windows XP feature. For most Windows XP users, it is recommended that they do not install the Atheros Client Utility. Installation of the Atheros Client utility is only needed if your wireless LAN network requires Cisco Client Extension or if you want to use Atheros Client Utility instead of Windows XP Wireless Zero configuration services.

3-1 Atheros Client Utility Installation

1. Begin installation by starting the software setup program according to the step described below…
   - Windows 2000 – Double click the desktop icon labeled "Software Setup".
   - Windows XP - Choose Start\Programs\Software Setup

2. Click Next on the Software Setup "Welcome" dialog box.

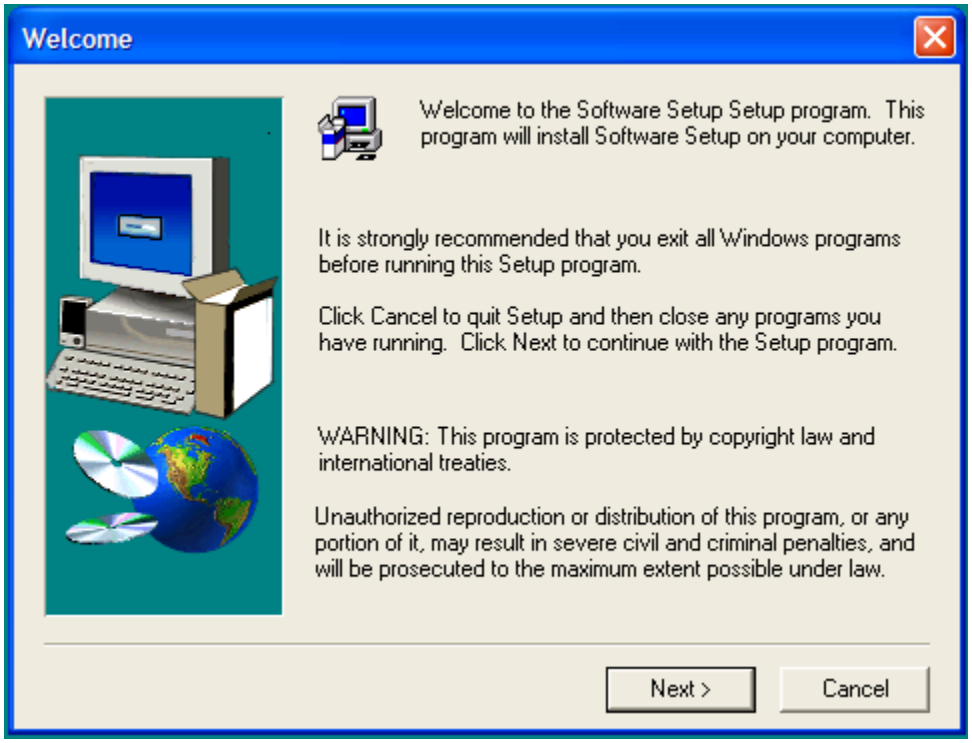


Figure 3-1

3. Scroll down and check the Box labeled, “Atheros Client Utility”.

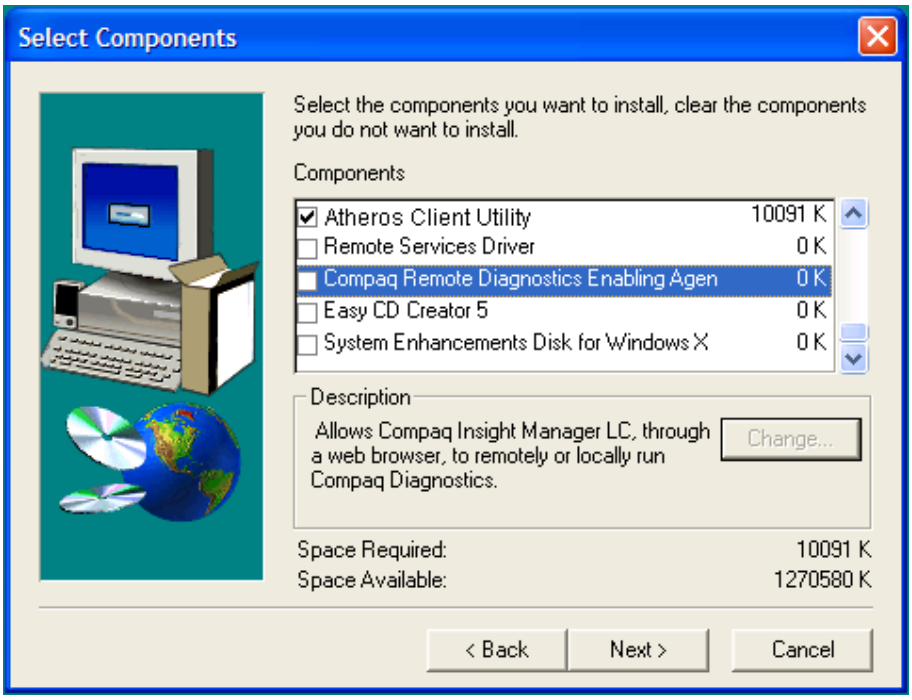


Figure 3-2

4. Click on the Next button.

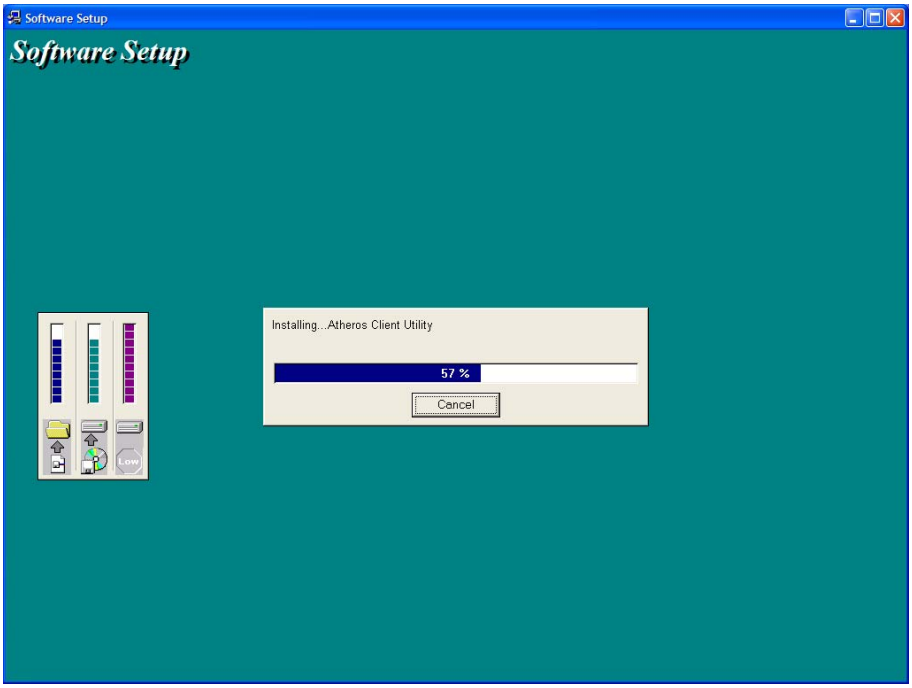


Figure 3-3

5. Congratulations! Atheros Client Utility has been installed successfully. Please click '**Finish**' to go to the next step.

Figure 3-4

6. The Atheros Client Utility will automatically be loaded each time your computer started. To access the utility click on Atheros Client Utility icon in the system tray (Uninstall information can be found in Appendix A)

Chapter 4 Atheros Client Utility (ACU) Configuration

The following sections describe the Atheros Client Utility (ACU). The ACU provides quick access and friendly interface to configure the Wireless LAN settings. If you are using Windows XP and have not installed the Atheros Client Utility, information on configuring your AMBIT WLAN 802.11a/b/g device using Windows XP Zero Configuration feature can be found in Chapter 5.

4-1 Atheros Client Utility icon

The Atheros Client Utility icon will appear in the system tray each time your computer is restarted. To utilize the utility, double click on the ACU icon.

Figure 4-1

The Atheros Client Utility icon will display the current status of the wireless connection. . The number that appears in the upper left portion of the icon indicates the current frequency (2.4 Ghz or 5 Ghz) that the radio is operating in, when the radio is in a no link state the frequency band will toggle between 2.4 and 5 while it is scanning through those frequencies. The following are the various states that can be displayed by the icon…

- Radio Disabled is indicates that the AMBIT WLAN 802.11 a/b/g device has been disabled through either Hardware or Software
- Yellow bars, then the signal strength is very small and the wireless connection is at its limit of range
- Green bars indicate good or excellent signal strength is being received.

See Figure 4-1 for the various states of the Atheros Client Utility icon.

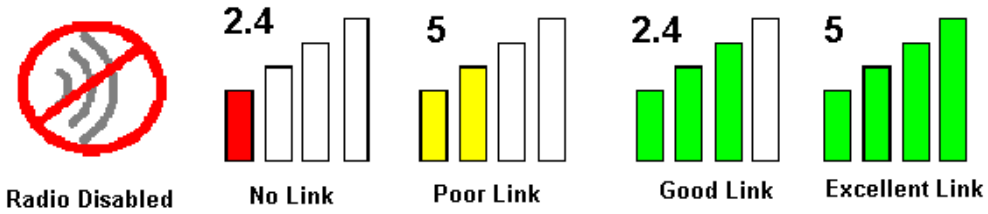


Figure 4-2

4-2 Current Status Tab

The current status tab displays the following information about your wireless connection.

- Profile Name – The current name of the selected configuration profile.
- Network Type – The current type of wireless network that is either Access Point or Ad-hoc.
- Wireless Mode – The current wireless mode is the frequency and data rate that has been selected.
- Current Channel – Specifies the current channel that the AMBIT WLAN 802.11 a/b/g is connected to or scanning on.
- Link Status – The link can be either connected or disconnected to an Access point or other wireless client.
- Encryption Type – Describes whether or not the wireless traffic is encrypting.
- IP Address –The current IP address of the AMBIT WLAN 802.11 a/b/g device.

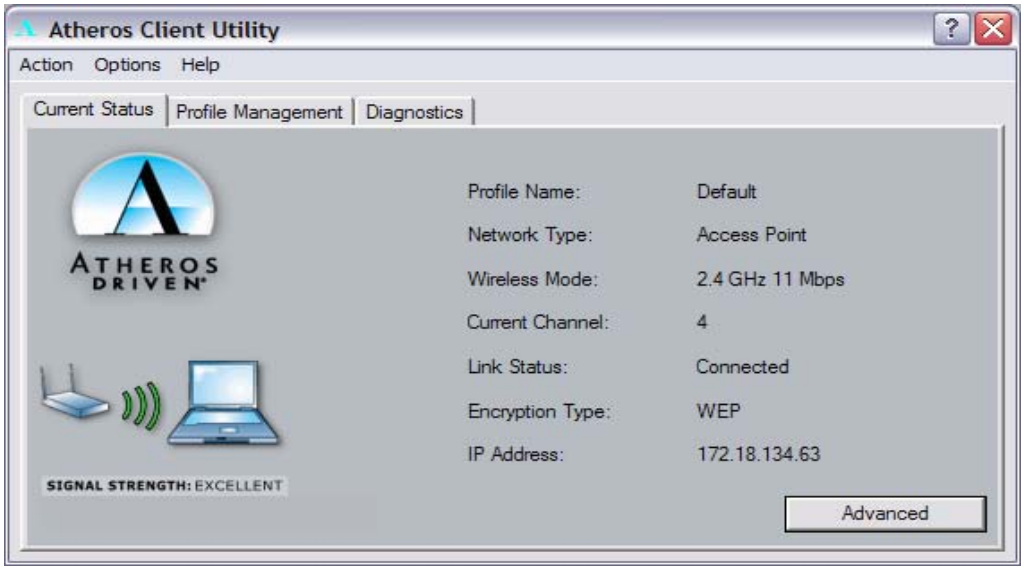

Atheros Client Utility
Action Options Help
Current Status
Profile Management
Diagnostics
ATHEROS DRIVEN
SIGNAL STRENGTH: EXCELLENT
Profile Name: Default
Network Type: Access Point
Wireless Mode: 2.4 GHz 11 Mbps
Current Channel: 4
Link Status: Connected
Encryption Type: WEP
IP Address: 172.18.134.63
Advanced

Figure 4-3

The Advanced button provides more detailed information regarding your wireless connection.

- Transmit Power Level – Provides current setting of Radio output power
- Network Name (SSID) – The wireless network name (SSID) that the device is currently connected with
- Power Save Mode – The type of Power Savings that is configured on the device
- Frequency – The current frequency that the Wireless device is connected or scanning on.
- Transmit Rate – The transmit rate (Mbps) for the current connection for the wireless driver.
- Receive Rate –The receive rate (Mbps) for the current connection for the driver.

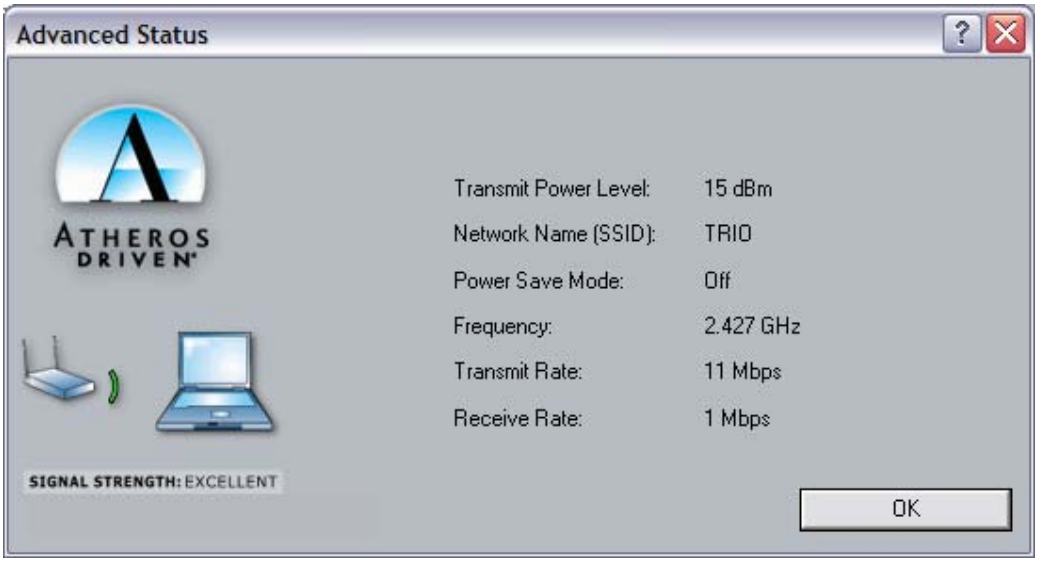


Figure 4-4

4-3 Profile Management

The Profile Management tab allows the user to configure several different user defined profiles. Each profile can be configured to match the appropriate settings of a unique wireless network.

The Profile box lists all the configured profiles. The Details dialog describes the basic settings (SSID, Network Type, Security Mode) of the highlighted profile. The active profile will be displayed with the wireless icon next to it. To make a profile active, highlight the profile and click on the Activate button. By setting a Profile active, you configure the wireless device to search for wireless networks that match up to those specific profile wireless settings.

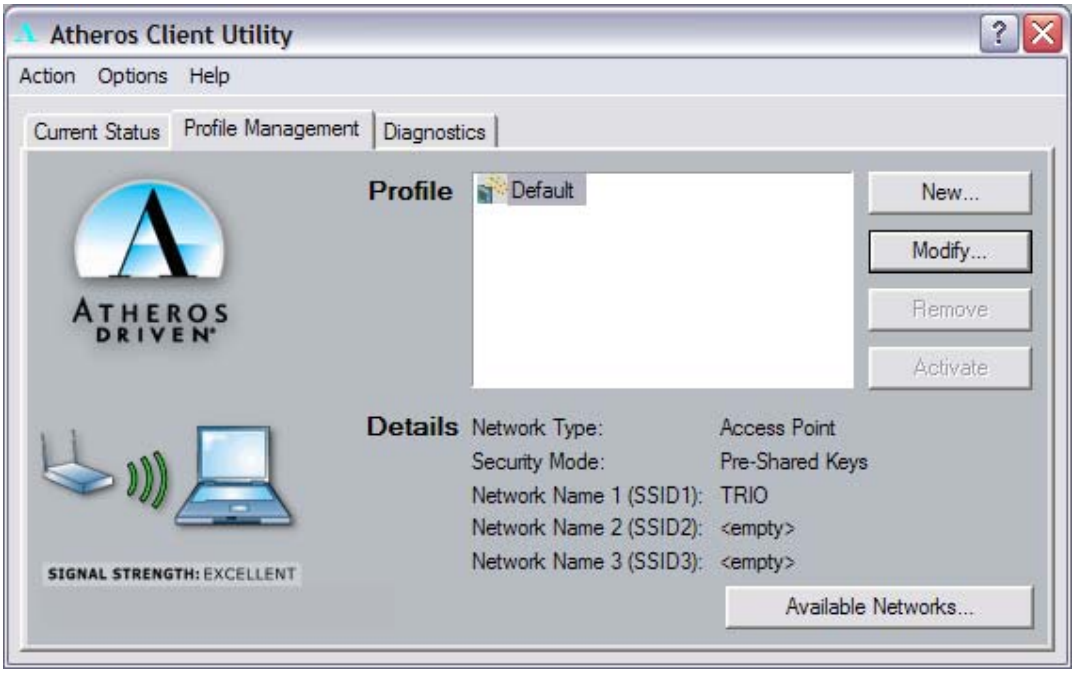


Figure 4-5

The Available networks button allows the user to view a list of all available wireless network that are within range of the AMBIT WLAN 802.11 a/b/g . Each wireless network entry displays the SSID, encryption settings, signal strength level, channel and wireless mode information. You can create a new profile utilizing Available networks button by highlighting the wireless network you want to create a profile for and clicking on the Activate button.

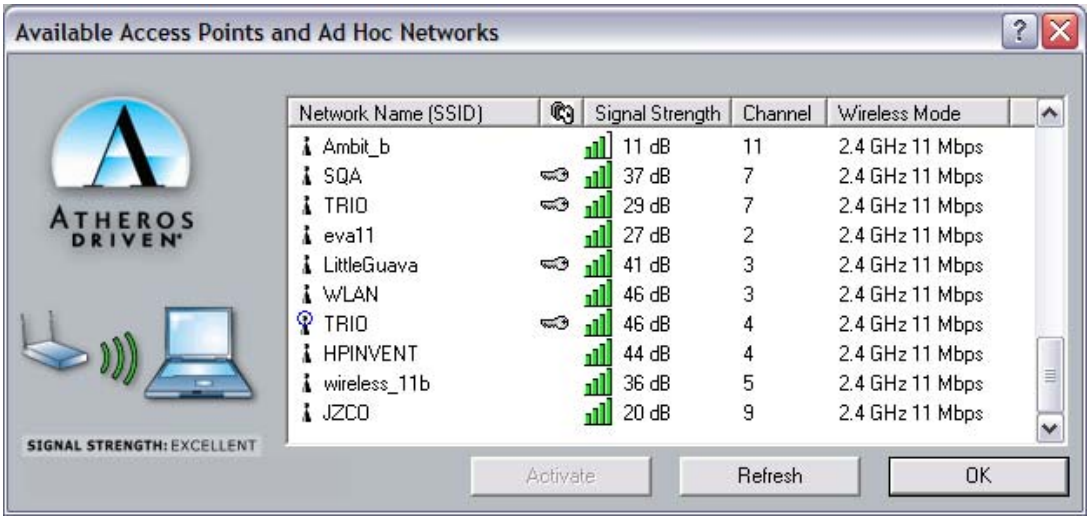


Figure 4-6

4-3-1 Create or Modify a Profile

1. From the Profile Management tab Click on the New or Modify button
2. The Network Configuration Settings dialog box will appear
3. In the Profile Name box, type in a unique name that describes the wireless network you are configuring the settings to connect to.
4. In the SSID boxes type in the SSID that matches up with the wireless network you are trying to configure the profile to connect with. There are three SSID selections (SSID1, SSID2, SSID3) available; this feature allows you to configure a single profile to match up to 3 different SSID's.

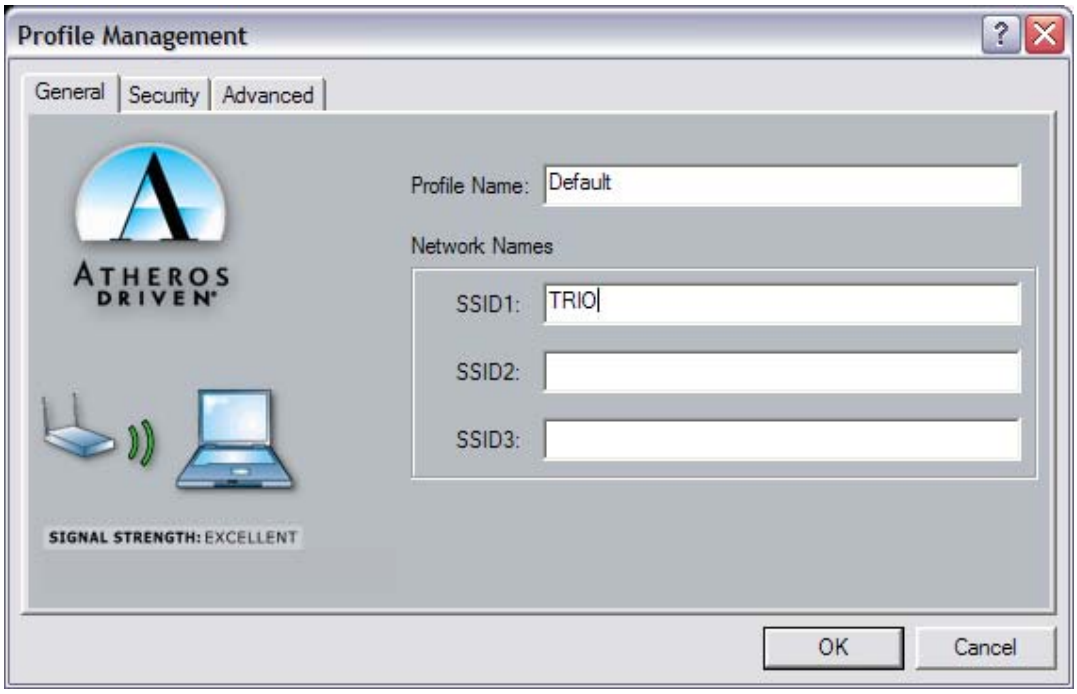


Figure 4-7

5. Select the Security Tab to manage the security settings associated with this profile

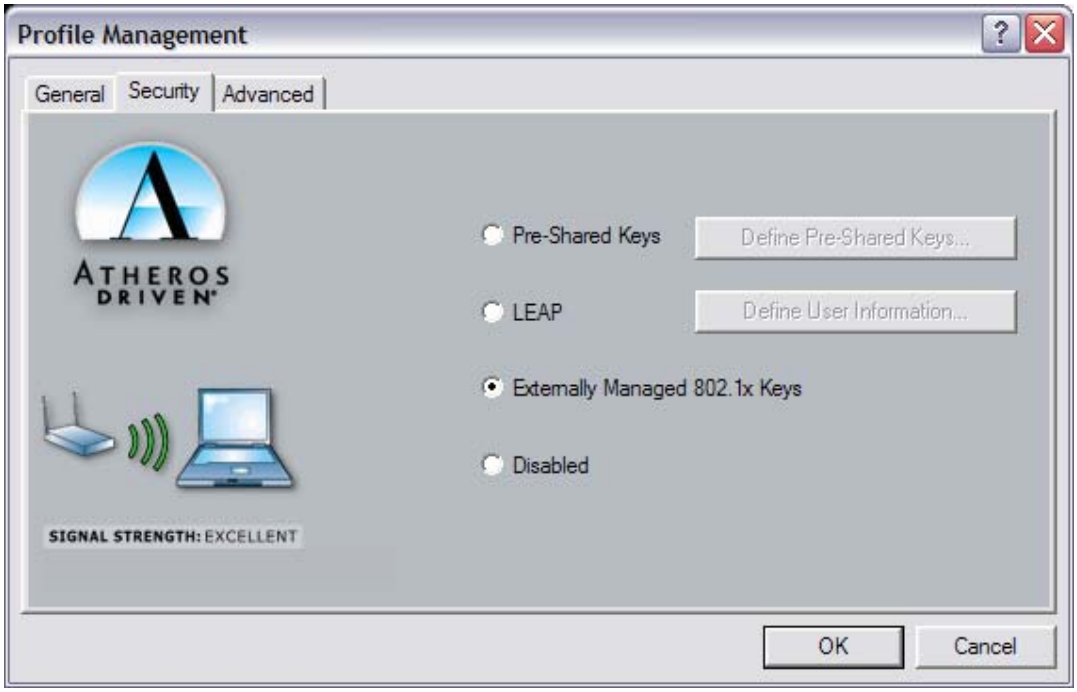


Figure 4-8

6. Choose the security setting that is required on the wireless network. Once the appropriate security mode is chosen the button next to the selection will enable you to include any additional information required by that security mode.

4-3-2 Security Settings in Profile Management

The Security Tab allows you to configure the AMBIT WLAN 802.11a/b/g device to match the security settings of the Wireless LAN network.

Select the appropriate security mode…

- **Pre-Shared Keys** – This mode is commonly referred to as WEP encryption, and allows for setting of all four WEP keys. The pre-shared key selection also allows for setting of a unique key, which is used with higher forms of encryption such as AES.
- **LEAP** – This is CCX compliant feature that allows for authentication with Cisco access points. This mode should only be used if your Wireless LAN requires LEAP authentication
- **Externally Managed 802.1X Keys** – This security mode allows for dynamic switching of encryption keys using 802.1X authentication. This mode should only be used if your Wireless LAN requires 802.1X authentication.
- **Disabled** – Use this mode when there is no security authentication or encryption is currently enabled on your Wireless LAN network.

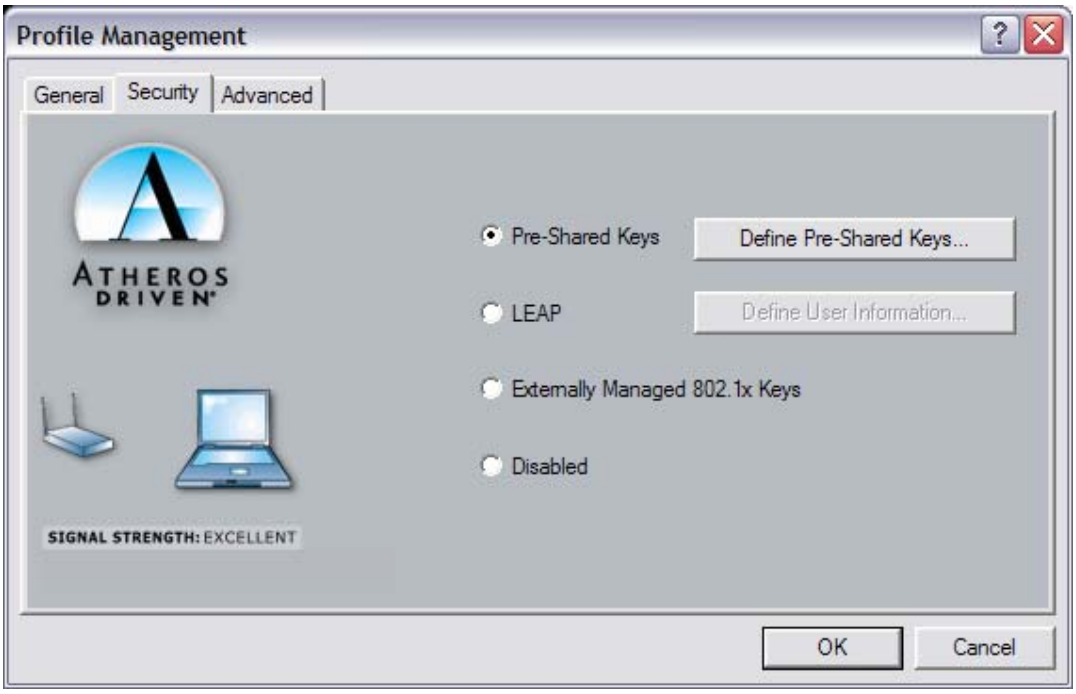


Figure 4-9

Setting Pre-Shared Keys

Pre-Shared keys can be defined using the “Define Pre-Shared Keys” box

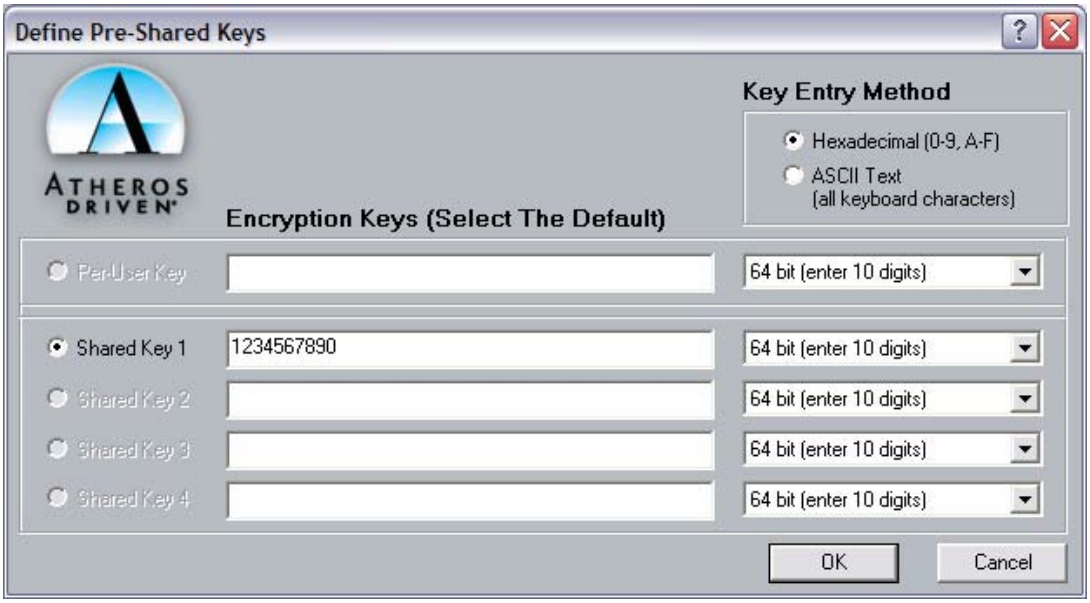


Figure 4-10

Key Entry Method – Determines the entry method for an encryption key:

- Hexadecimal (0-9, A-F)
- ASCII text (any keyboard characters, A-Z, 0-9).

PreUser Key – Defines the unique encryption key for network configuration security. The Pre User key is used with many authentication mechanism and encryption

Shared Keys – Determines a set of shared encryption keys (First, Second, Third, Fourth) used for wireless encryption and security. At least one Shared Key field must be populated to enable security using a shared key. If more then one key is defined then Click on the radio button to select a key as the default encryption key.

Key Length – The options for Key Length are

- 64 bit encryption (10 digits)
- 128 bit encryption (26 digits)
- 152 bit encryption (32 digits)

The number of available characters allowed to be entered in the encryption key field will automatically be determined by the Key length setting.

Setting LEAP authentication

LEAP authentication is a part of CCX compatibility and allows you to configure the AMBIT WLAN 802.11 a/b/g device to match the work with a Wireless LAN that incorporates LEAP authentication. This mode should only be used if your Wireless LAN requires LEAP authentication.

To configure the LEAP settings for a particular profile select LEAP in the security mode and click on the Define LEAP settings button to configure the settings described below.

- Username – The username that is used to log in to the LEAP network
- Password – The password used to log in to the LEAP network. This password is encrypted using the same encryption as the encryption keys.

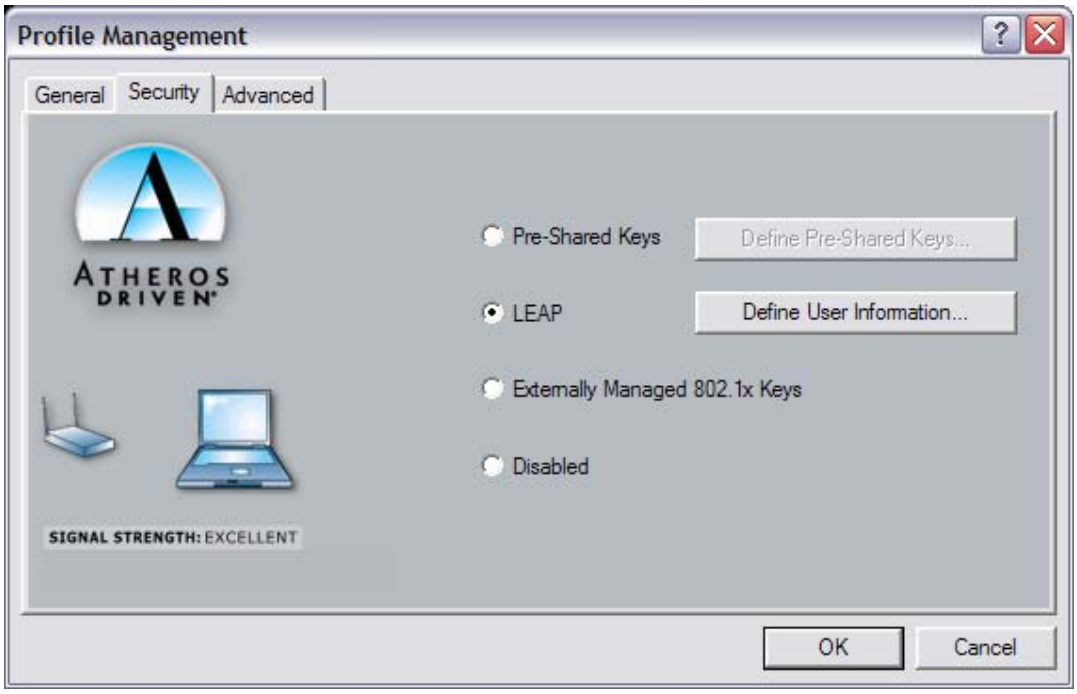


Figure 4-11

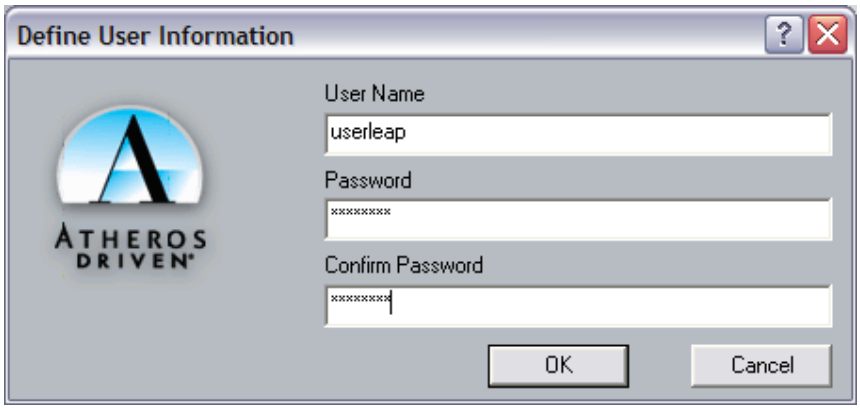


Figure 4-12

4-3-3 Advanced settings in Profile Management

The advanced tab provide more complex wireless settings and these settings should only be modified if there is a specific requirement on your wireless network.

a. **Power Save Mode** - allows the user to minimize power utilized by the AMBIT WLAN 802.11 a/b/g device. Note: Setting Power Save Mode to enabled (Normal or Maximum) may cause the user to experience an extended connection delay of up to one minute.

b. **Network Type** - allows the user to configure the AMBIT WLAN 802.11 a/b/g device as either an Ad-hoc or Access Point type network

c. **802.11b Preamble** - allows setting the preamble support to match up with the specified wireless network.

d. **Transmit Power Level** - allows the user to modify the power output of the radio. Setting. Note: Setting this to any other value except 100% will decrease range of your AMBIT WLAN 802.11a/b/g device.

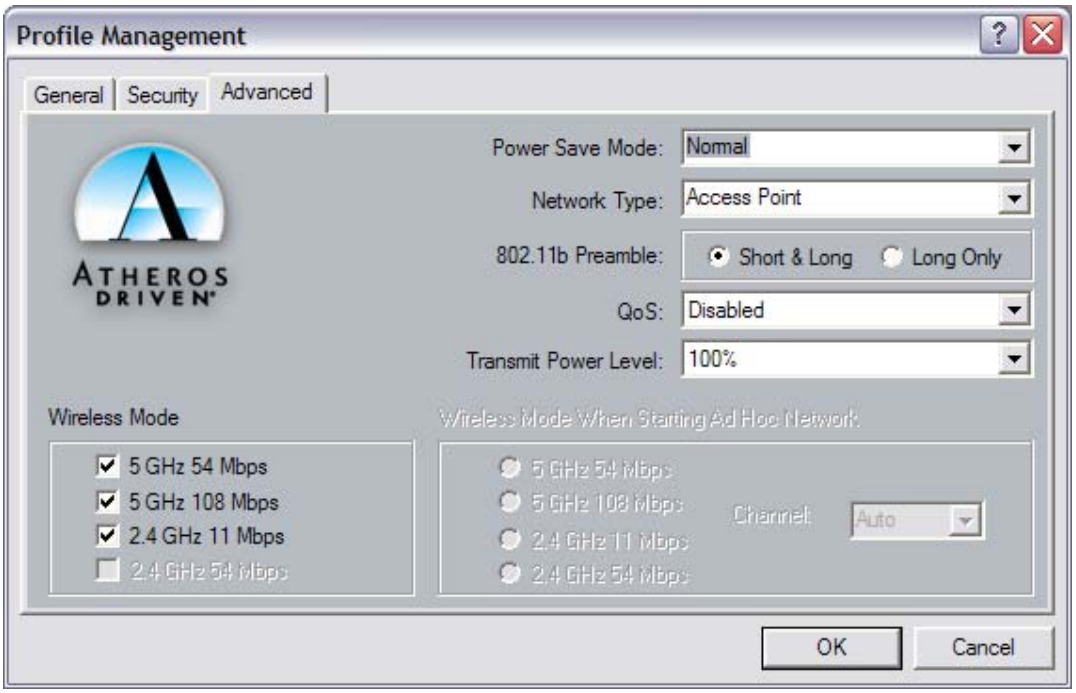


Figure 4-13

Wireless Mode Setting

The wireless Mode settings allow the user to specify which wireless frequency and data rate the wireless network is operating at. If all selections are chosen, the AMBIT WLAN 802.11 a/b/g device will automatically search all frequencies and data rates for wireless networks that match up to the profile settings.

Wireless Mode when starting Ad-Hoc setting

The "Wireless Mode when starting ad-hoc setting" allows the user to determine the type of ad-hoc network to be started. Note: This setting will only take effect if there are no other ad-hoc networks with the same SSID currently operating within range. If existing ad-hoc networks with the same SSID are currently operating, then the AMBIT WLAN 802.11 a/b/g device will connect using the frequency and data rate provided by the exiting ad-hoc network.

4-4 Diagnostic Tab

The diagnostic TAB displays the current data statistics for both receive and transmit. Additional statistics and driver information can be displayed using the appropriate labeled buttons.

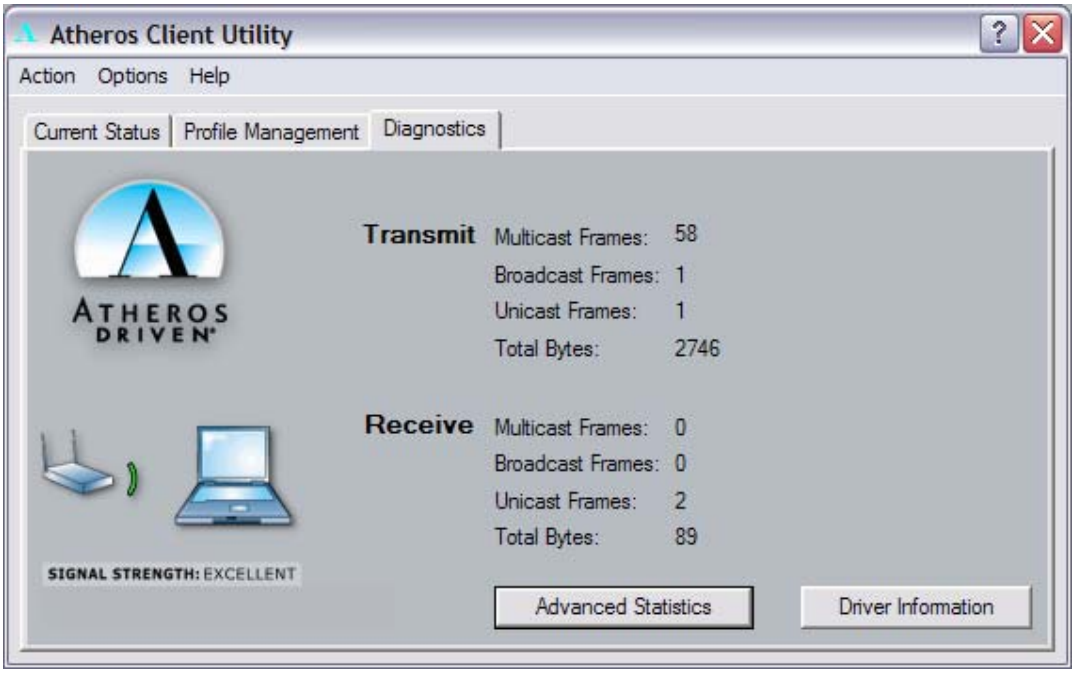


Figure 4-14

4-5 Action Menu

The Action menu allows for enabling and disabling both the wireless radio and/or system tray icon.

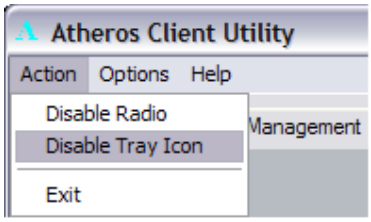


Figure 4-15

4-5-1 Enable/Disable Radio

There may be situations when the user wants to disable the AMBIT WLAN 802.11 a/b/g device's radio, so that the wireless device cannot send or receive any wireless traffic. If a user is in an environment where there are no wireless networks, the user may turn off the radio in order to minimize power consumption of the AMBIT WLAN 802.11 a/b/g device.

In the ACTION menu of the ACU there is an Enable Radio/Disable Radio selection. The choice provided in the menu will toggle the current state of the radio.

- **Enable Radio:** The Radio is currently OFF (Disabled), and the "Enable Radio" selection will turn ON the Radio of the wireless device.
- **Disable Radio:** The Radio is currently ON (Enabled), and the "Disable Radio" selection will turn OFF the Radio of the wireless device

The AMBIT WLAN 802.11 a/b/g device radio also may be disabled through an external button located on your platform, please review your platform user's guide for additional information about the wireless enable/disable button

4-5-2 Enable/Disable Tray Icon

In the ACTION menu of the ACU there is an Enable Tray Icon/Disable tray Icon selection. The choice provided in the menu will toggle the current state of the System tray Icon.

- **Disable Tray Icon:** This will remove the tray icon from you system tray. The system tray icon appears in the system tray again after system is restarted or if the Atheros Client utility is opened again through Start\Programs\Atheros\ACU.

Enable Tray Icon: This will allow for the system tray icon to once again be placed in the system tray.

Chapter 5 Wireless Configuration using Windows XP

5-1 Configuring Your Wireless Networking Settings

The Windows XP operating system has a built-in feature known as "Wireless Zero Configuration" which has the capability to configure and control this Wireless LAN device. To configure your device with this feature follow the steps below…

1. From the Start menu, select **Control Panel.**
2. Click **Network and Internet Connections.**
3. Click **Network Connections.**
4. Right-click the network connection associated with your AMBIT WLAN 802.11 a/b/g device, and select **Properties.**
5. Click on the **Wireless Networks** tab.
6. Click on the link Setting Up Wireless Network Configuration.

When the Help and Support Center window appears, you can access information regarding wireless
Network configuration. To access configuration information of your adapter, follow the on-screen
instructions.

5-2 Advanced Wireless Settings

The AMBIT WLAN 802.11 a/b/g device has several advanced settings which may need to be configured depending on your wireless network. It is recommended that these settings remain unchanged unless there is a specific need that requires modifying these settings.

1. From the Start menu, select **Control Panel.**
2. Click **Network and Internet Connections.**
3. Click **Network Connections.**
4. Right-click the connection for your AMBIT WLAN 802.11a/b/g device, and select **Properties**.
5. From the General tab, click the **Configure** button.

6. Click on the **Advanced** TAB
7. Modify the wireless settings as required

5-3 Disabling the Radio

There may be situations when the user wants to disable the AMBIT WLAN 802.11 a/b/g device radio, so that the wireless device cannot send or receive any wireless traffic. If a user is in an environment where there are no wireless networks, the user may turn off the radio in order to minimize power consumption of the AMBIT WLAN 802.11 a/b/g device. Follow the steps outlined in the Section 5-2 above labeled "Advanced Wireless settings" and choose the Radio ON/OFF selection.

- Select OFF – To turn OFF radio of the AMBIT WLAN 802.11 a/b/g device
- Select ON – To turn ON the radio of the AMBIT WLAN 802.11 a/b/g device
-

The AMBIT WLAN 802.11 a/b/g device radio may also be disabled through an external button located on your platform, please review your platform users guide for additional information about the wireless enable/disable button

5-4 Help and Support Information

Configuration information and troubleshooting in Windows XP is available in Microsoft's Help and Support Center on Windows XP systems. Links to the appropriate Microsoft
Web sites are also available here.
To access this information:
1. From the Start menu, select **Control Panel.**
2. Click **Network and Internet Connections.**
3. Click **Network Connections.**
4. Right-click the connection for your AMBIT WLAN 802.11 a/b/g device, and select **Properties**.
5. From the General tab, click the **Configure** button.
6. From the General tab, click the **Troubleshoot** button.

When the Help and Support Center window appears, you can access information regarding the
Network adapter. To access configuration information of your adapter, follow the on-screen Instructions. For the network adapter to function in a wireless LAN, you must change the settings at

Least once.

Appendix A – Atheros Client Utility Uninstall Process

Follow the steps below to remove the Atheros Client Utility:

1. Access the Control Panel from the Start menu
2. Click on the 'Add/Remove Programs' in the 'Control Panel'.
3. Select 'Atheros Client Utility' and click 'Change/Remove' button, the dialog as below displays.

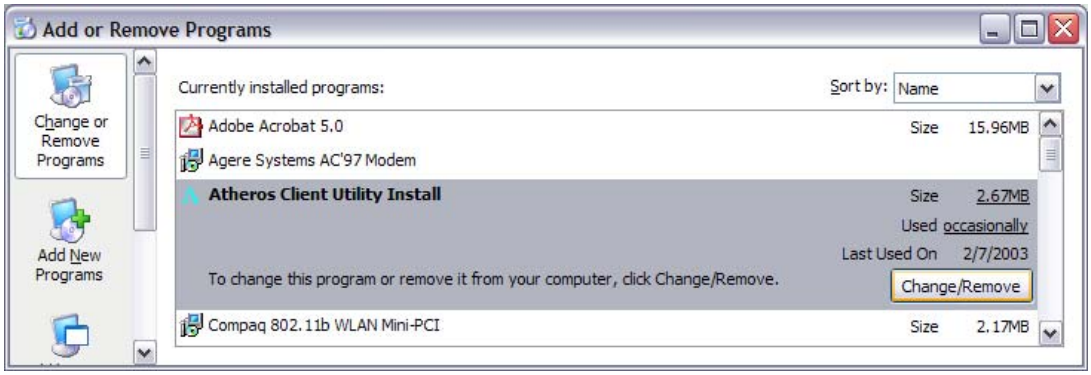


Figure A-1

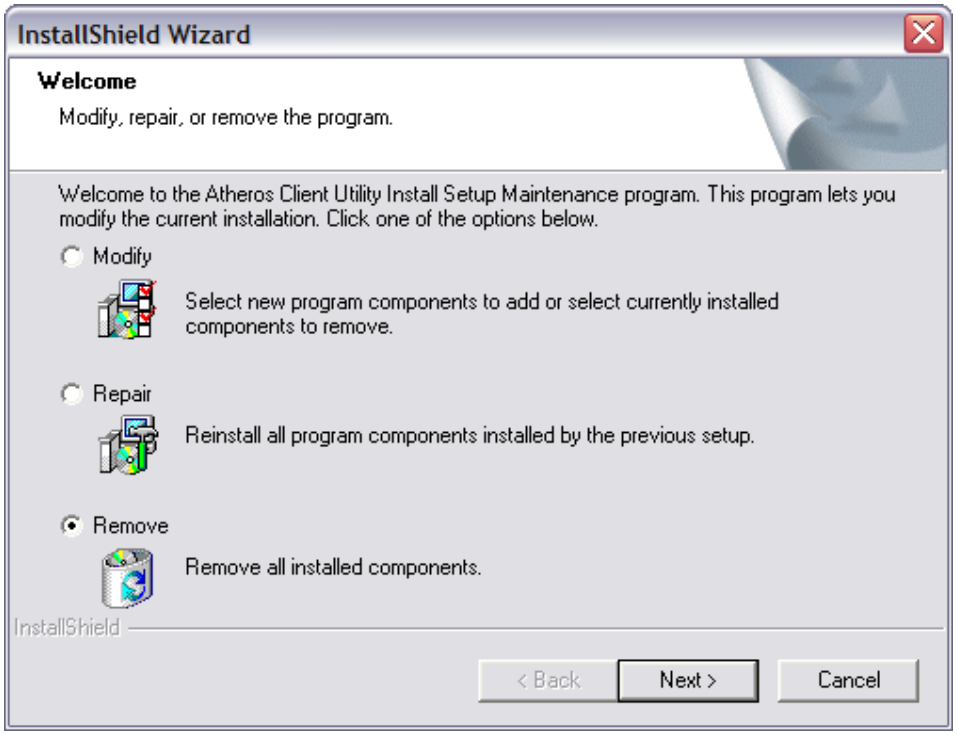


Figure A-2

2. Select ‘Remove’ and then click the ‘Next’ button to perform the un-installation. Click ‘OK’ button if you really want to remove the Atheros Client Utility.

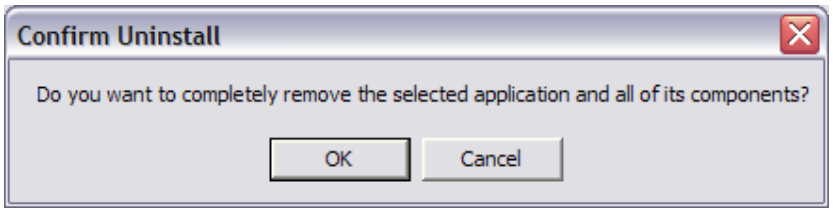


Figure A-3

3. Wait for the un-installation to do its work. Click ‘Finish’ to complete the un-Installation.

Figure A-4

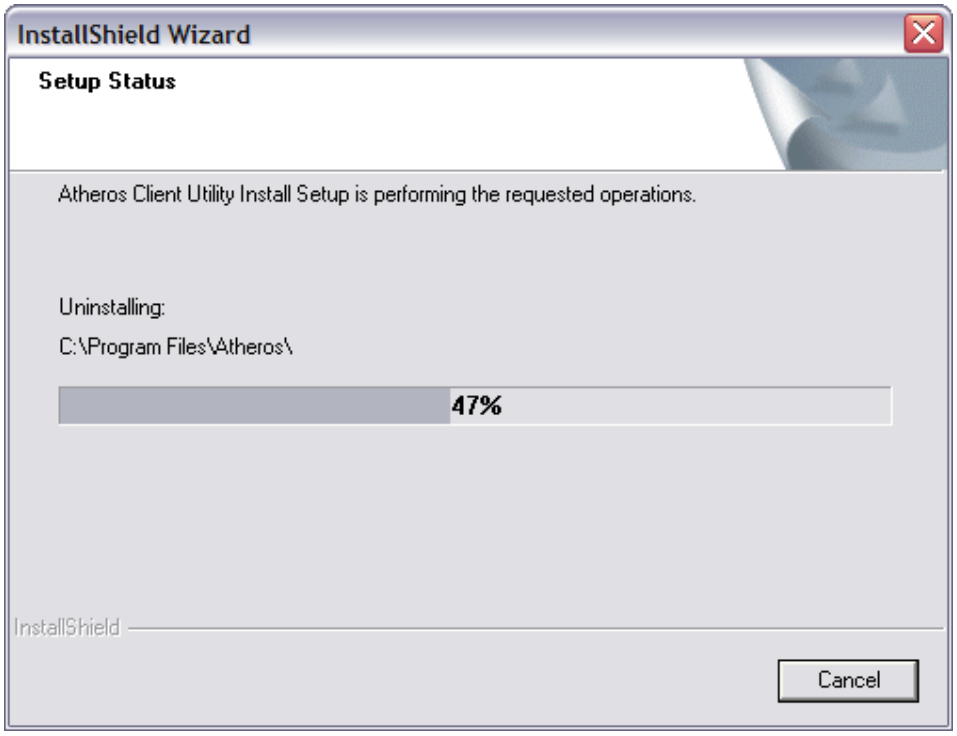

InstallShield Wizard
Setup Status
Atheros Client Utility Install Setup is performing the requested operations.
Uninstalling:
C:\Program Files\Atheros\
47%
InstallShield
Cancel

Figure A-5

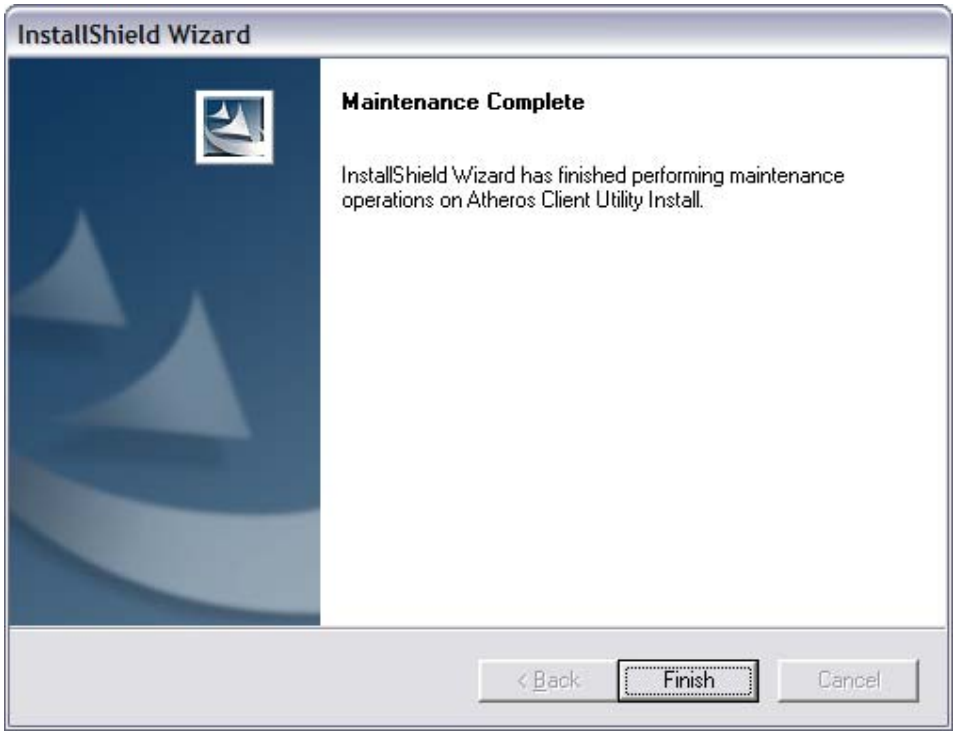

InstallShield Wizard
Maintenance Complete
InstallShield Wizard has finished performing maintenance operations on Atheros Client Utility Install.
< Back
Finish
Cancel

Figure A-6

Appendix B - Glossary

ACU - Atheros Client Utility (ACU) is the utility that allows for configuration of the AMBIT WLAN 802.11 a/b/g device

Access Point - An internetworking device that seamlessly connects wired and wireless networks together.

Ad Hoc - A peer- to-peer wireless network without Access Point. A group of wireless clients consistent an independent wireless LAN.

Backbone - The core infrastructure of a network, the portion of the network that transports information from one central location to another central location. The information is then off-loaded onto a local system.

BSS - Basic Service Set. An Access Point associated with several wireless stations.

ESS - Extended Service Set. More than one BSS can be configured as an Extended Service Set. An ESS is basically a roaming domain.

ESSID –Extended Service Set Identifier. The length of the ESSID information is between 0 and 32 octets. A 0 length identifier indicates the broadcast SSID.

Ethernet - A popular local area data communications network, originally developed by Xerox Corp., which accepts transmission from computers and terminals. Ethernet operates on 10/100 Mbps transmission rate over shielded coaxial cable or over shielded twisted pair telephone wire.

Infrastructure - An integrated wireless and wired LAN is called an infrastructure configuration.

Roaming - A function that allows one to travel with a mobile end system (wireless LAN mobile station, for example) through the territory of a domain (an ESS, for example) while continuously connecting to the infrastructure.

SSID – Service Set Identifier (SSID) is the network name used by the Wireless LAN . The length of the SSID information is between 0 and 32 octets.

WEP –Wired Equivalent Privacy. The optional cryptographic confidentiality algorithm specified by IEEE 802.11 used to provide data confidentiality that is subjectively equivalent to the confidentiality of a wired local area network (LAN) medium that does not employ cryptographic techniques to enhance privacy.

Appendix C –Wireless Notices

U.S. Regulatory Wireless Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The FCC requires the user to be notified that any changes or modifications made to device that are not expressly approved by the Hewlett-Packard Company may void the user's authority to operate the equipment.

This product emits radio frequency energy, but the radiated output power of this device is far below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact with the antenna during normal operation is minimized.

⚠	**Warning: Exposure to Radio Frequency Radiation** The radiated output power of this device is far below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact during normal operation is minimized. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna should not be less than 1.5cm (0.6 inches) during normal operation.

Canadian Regulatory Wireless Notice

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

European Union Notice

CE XXXX!

Products bearing the CE marking comply with the R&TTE Directive (1999/5/EC), EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN 55022 (CISPR 22) – Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11) – Electromagnetic Immunity

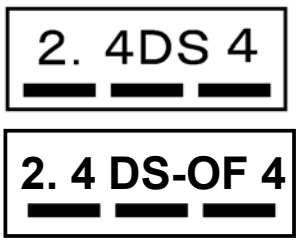
- EN61000-3-2 (IEC61000-3-2) – Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3) – Power Line Flicker
- EN 60950 (IEC 60950) – Product Safety
- EN 300 328-2 – Technical requirements for radio equipment
- EN 301 489-1, -17 – General EMC requirements for radio equipment

This product may be used in the following EU and EFTA countries: Austria, Belgium, Denmark, Finland, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and United Kingdom. Products not marked with "Not for use in France" may be used in France.

Japanese Regulatory Wireless Notice

この機器の使用周波数帯では、電子レンジ等の産業・科学・医療用機器のほか工場の製造ライン等で使用されている移動体識別用の構内無線局（免許を要する無線局）及び特定小電力無線局（免許を要しない無線局）が運用されています。
1　この機器を使用する前に、近くで移動体識別用の構内無線局及び特定小電力無線局が運用されていないことを確認して下さい。
2　万一、この機器から移動体識別用の構内無線局に対して電波干渉の事例が発生した場合には、速やかに使用周波数を変更するか又は電波の発射を停止した上、下記連絡先にご連絡頂き、混信回避のための処置等（例えば、パーティションの設置など）についてご相談して下さい。
3　その他、この機器から移動体識別用の特定小電力無線局に対して電波干渉の事例が発生した場合など何かお困りのことが起きたときは、次の連絡先へお問い合わせ下さい。

連絡先：コンパックコンピュータ株式会社　ＴＥＬ：０１２０－１０１５８９



Note: In Japan 5GHz is for indoor use only

Brazilian Regulatory Wireless Notice

Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário.