

802.11g Wireless MIMO CardBus Card

User's Guide

Version 1.0

Federal Communication Commission Interference Statement

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 generates, 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 of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This device complies with FCC RF Exposure limits set forth for an uncontrolled environment, under 47 CFR 2.1093 paragraph (d)(2).

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment has been tested for notebook lap-held configuration and complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. To maintain compliance with FCC RF exposure requirements, please do not use this device for other applications.

U-MEDIA declares that WCB-360A, (FCC ID: SI5WCB360A) is limited in CH1~CH11 for 2.4 GHz by specified firmware controlled in U.S.A.

The maximum average SAR (1g) is 0.375W/kg.

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Chapter 1 - Getting Started

This chapter introduces the Card and prepares you to use the Wireless Utility.

1.1 About Your 802.11g WLAN MIMO CardBus Card

The Card is an IEEE 802.11g compliant wireless LAN adapter. With the Card, you can enjoy wireless mobility within almost any wireless networking environment.

The following lists the main features of your Card.

- ✓ Your Card can communicate with other IEEE 802.11g compliant wireless devices.
- ✓ Automatic rate selection.
- ✓ Standard data transmission rates up to 54 Mbps.
- ✓ Proprietary Atheros transmission rates of 108 Mbps
- ✓ Offers 64-bit, 128-bit and 152-bit WEP (Wired Equivalent Privacy) data encryption for network security.
- ✓ Supports IEEE802.1x and WPA (Wi-Fi Protected Access).
- ✓ Low CPU utilization allowing more computer system resources for other programs.
- ✓ A built-in antenna.
- ✓ Driver support for Windows XP/2000/ME/98SE

1.2 Card Hardware and Utility Installation

Follow the instructions in the Quick Start Guide to install the Utility and make hardware connections.

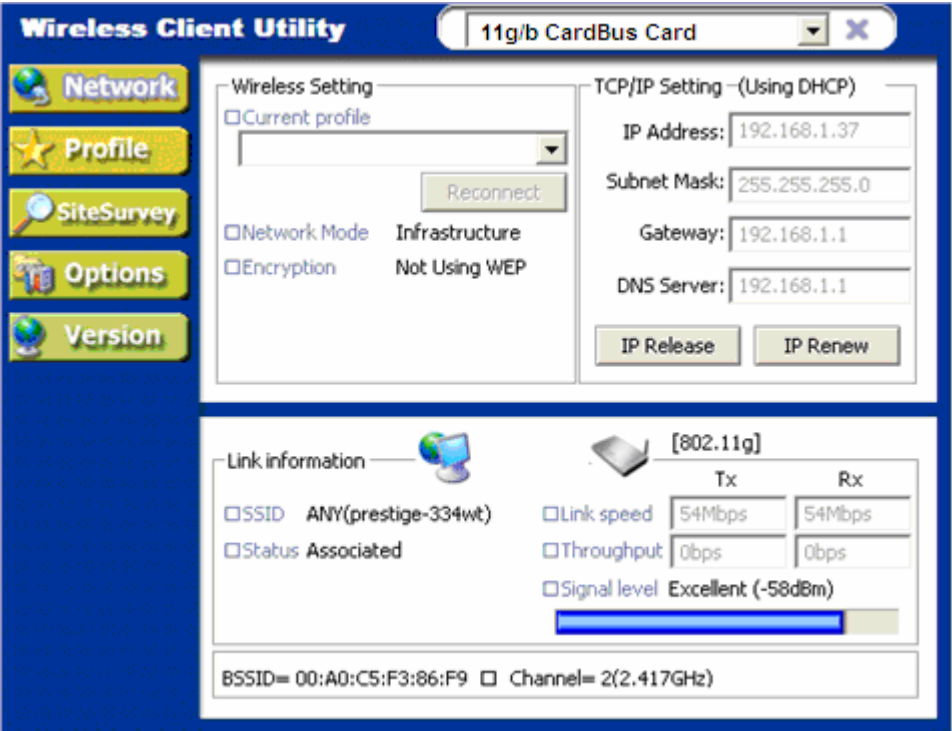
1.3 Using the Utility to Configure Your Network

The following are explanations on how to configure and use the Utility program. For initial setup, please see the included Quick Start Guide.

After completing the installation procedure, a new icon as shown below will automatically appear in the lower right tray bar.



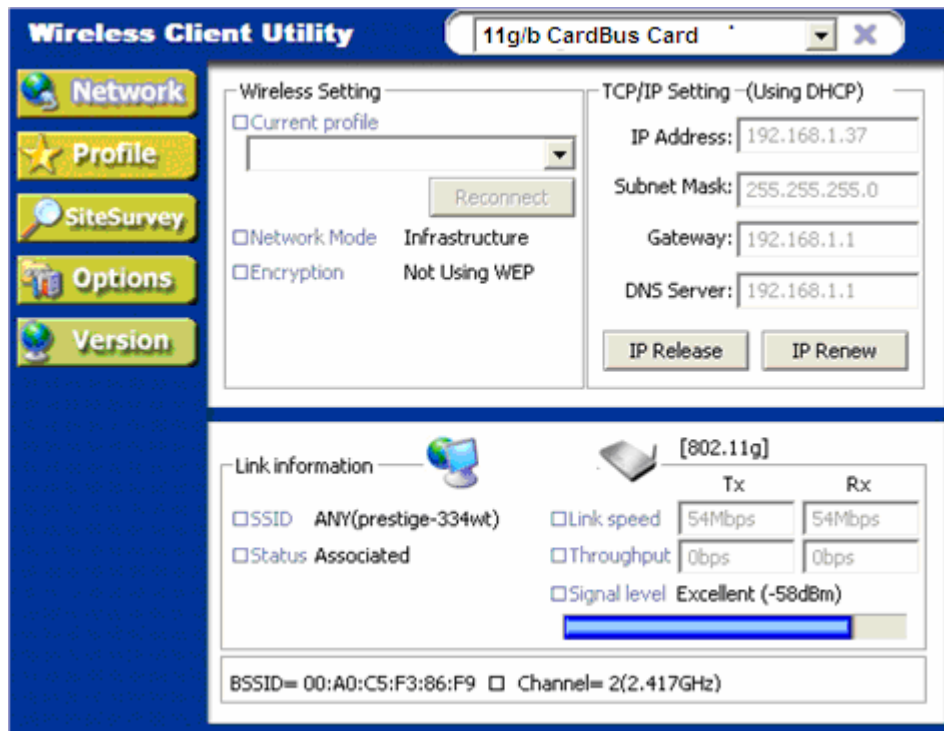
Double-clicking on the icon will display the following wireless utility window.



Each of the pages (Network, Profile, Site Survey, Options, Version) presented in the Wireless Utility are explained in the following sections.

1.3.1 Network

This page shows how the network is presently configured: network mode, information on the connected AP, TCP/IP, etc. This information cannot be modified in the Network screen.



The screenshot shows the 'Wireless Client Utility' window with the 'Network' tab selected. The window title bar indicates '11g/b CardBus Card'. The left sidebar contains buttons for 'Network', 'Profile', 'SiteSurvey', 'Options', and 'Version'. The main area is divided into two sections: 'Wireless Setting' and 'TCP/IP Setting - (Using DHCP)'. The 'Wireless Setting' section includes a 'Current profile' dropdown, a 'Reconnect' button, and checkboxes for 'Network Mode' (Infrastructure) and 'Encryption' (Not Using WEP). The 'TCP/IP Setting' section includes fields for 'IP Address' (192.168.1.37), 'Subnet Mask' (255.255.255.0), 'Gateway' (192.168.1.1), and 'DNS Server' (192.168.1.1), along with 'IP Release' and 'IP Renew' buttons. Below these is a 'Link information' section showing 'SSID: ANY(prestige-334wt)', 'Status: Associated', 'Link speed: 54Mbps', 'Throughput: 0bps', and 'Signal level: Excellent (-58dBm)' with a corresponding signal strength bar. At the bottom, it displays 'BSSID= 00:A0:C5:F3:86:F9' and 'Channel= 2(2.417GHz)'.

Wireless Setting		TCP/IP Setting - (Using DHCP)	
☐ Current profile		IP Address:	192.168.1.37
☐ Network Mode	Infrastructure	Subnet Mask:	255.255.255.0
☐ Encryption	Not Using WEP	Gateway:	192.168.1.1
		DNS Server:	192.168.1.1
		IP Release	IP Renew

Link information		[802.11g]	
		Tx	Rx
☐ SSID	ANY(prestige-334wt)	Link speed	54Mbps
☐ Status	Associated	Throughput	0bps
		Signal level	Excellent (-58dBm)

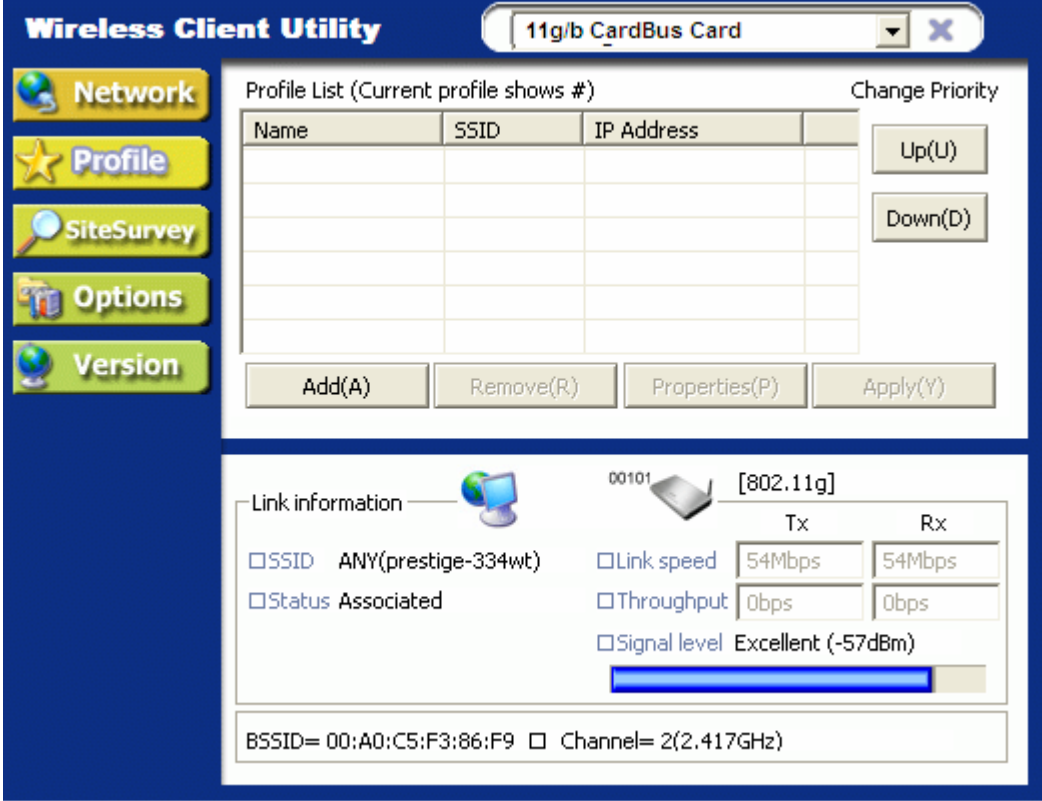
BSSID= 00:A0:C5:F3:86:F9 Channel= 2(2.417GHz)

The "Current Status" (lower) window shows the signal quality, signal strength, channel, etc. between the client and AP. It is always in view regardless of which page (Network, Profile, Search, Option, Version) is selected within the Wireless Utility.

1.3.2 Profile

This page is used to manage connections with Access Points. You can create different configuration profiles for connections with different APs and SSIDs.

The advantage of saving different profiles is the easiness of quickly changing connections without having to configure the PC with every single variable each time a connection change is made. Also, when configuring TCP/IP via the Wireless Utility you do not need to reboot the PC as when TCP/IP configuration is done via Windows' Control Panel.



The image shows the 'Wireless Client Utility' window with the 'Profile' tab selected. The window title bar includes a dropdown menu showing '11g/b CardBus Card' and a close button. On the left is a sidebar with buttons for 'Network', 'Profile' (highlighted), 'SiteSurvey', 'Options', and 'Version'. The main area is divided into two sections. The top section, 'Profile List (Current profile shows #)', contains a table with columns 'Name', 'SSID', and 'IP Address'. To the right of the table are 'Up(U)' and 'Down(D)' buttons. Below the table are 'Add(A)', 'Remove(R)', 'Properties(P)', and 'Apply(Y)' buttons. The bottom section, 'Link information', shows a computer icon and a wireless card icon labeled '00101' and '[802.11g]'. It includes checkboxes for 'SSID' (ANY(prestige-334wt)), 'Status' (Associated), 'Link speed' (54Mbps), 'Throughput' (0bps), and 'Signal level' (Excellent (-57dBm)). A signal strength bar is shown below the signal level. At the bottom, it displays 'BSSID= 00:A0:C5:F3:86:F9' and 'Channel= 2(2.417GHz)'.

Name	SSID	IP Address

Link information

☐ SSID ANY(prestige-334wt) ☐ Link speed 54Mbps ☐ Throughput 0bps ☐ Signal level Excellent (-57dBm)

☐ Status Associated

BSSID= 00:A0:C5:F3:86:F9 ☐ Channel= 2(2.417GHz)

Explanation of each button in this page is shown below.

Add

Clicking on this button enables you to create a new profile. The following steps show how this can be done.

1) Click on [Add] and the following screen will appear.

Profile Wizard

Wireless CardBus Card

Profile Name
Please enter a name for this profile.
Ex) Office, My Home

Network mode
Infrastructure

- Network using AP
Choose infrastructure mode if you are connecting to an access point or wireless router. Choose "Ad-Hoc" mode if you are going to connect directly to another computer.

SSID
ANY Browse

Enter SSID of network.
If you want to scan possible network, click 'Browse'.

Back Next Cancel

2) On this screen you will insert some basic settings for your wireless network.

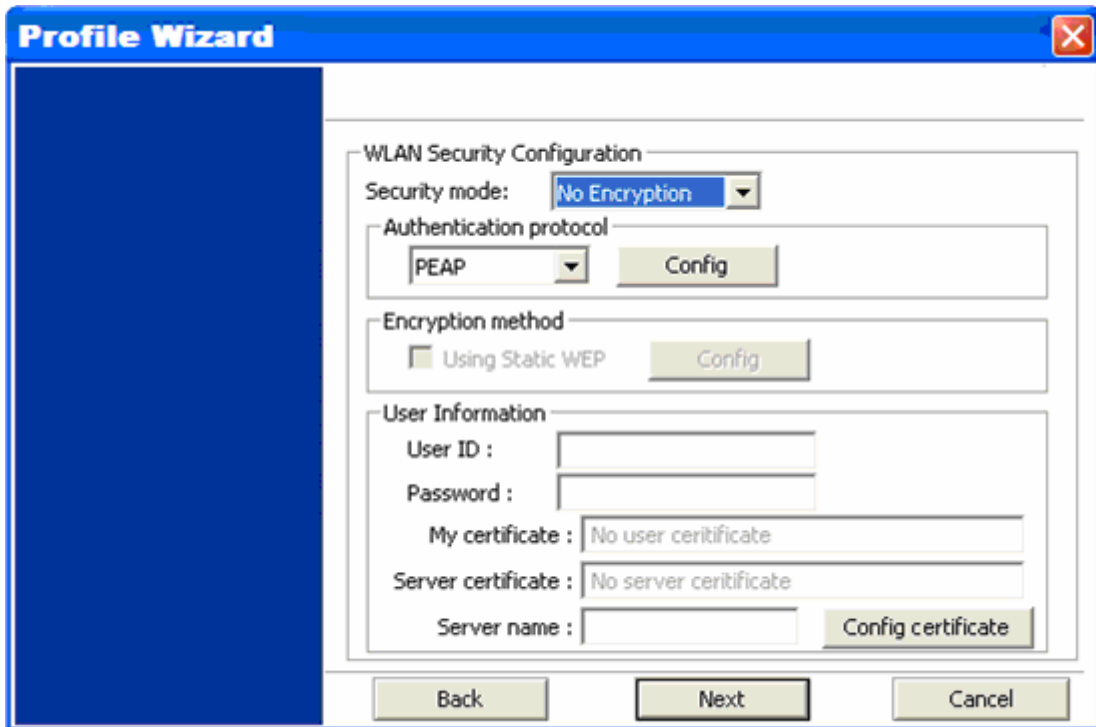
- a. [Profile Name] Enter in a descriptive name for this profile.
- b. [Network Mode] If connecting to an access point or wireless router, choose "Infrastructure"³. If you are going to network one computer directly to another computer without an access point, then choose "Ad-Hoc"⁴.
- c. [SSID] Select [Browse] The utility will perform a brief site survey and display the results to you. Click on the SSID5 of the access point you would like to connect to and

³ Infrastructure: You will need an access point to use the Wireless CardBus Card in Infrastructure mode. Because all communication will be done via the Access Point, the Access Point's SSID must be used.

⁴ Ad-Hoc: In Ad-Hoc mode communication is made peer-to-peer between the client PCs and without the use of an Access Point. All PCs communicating in an Ad-Hoc should use the same SSID (whatever your choice is).

then click on [Add to Profile]. If the access point you choose has encryption enabled, a window will pop up reminding you to enter the encryption information on the next page. If your access point is not listed, close the [Site Survey] window, and type the name of the SSID into the [SSID] field.

d. Click [Next]. The following screen will appear.

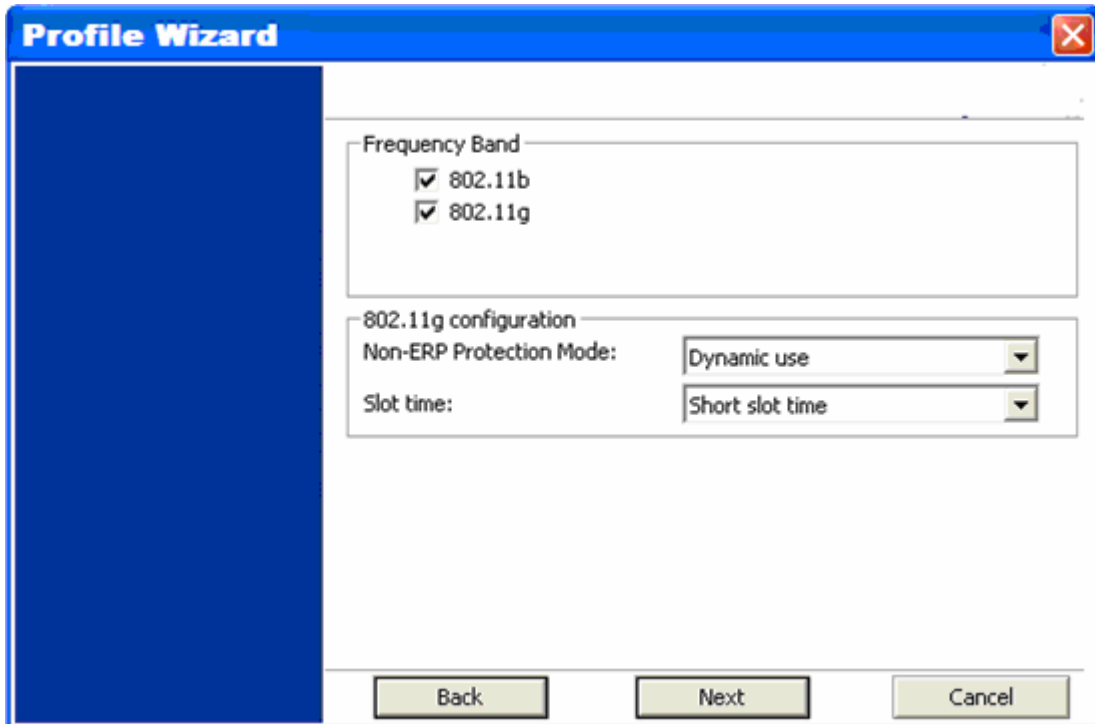
The screenshot shows a window titled "Profile Wizard" with a blue header bar. On the left is a large blue vertical rectangle. The main area is titled "WLAN Security Configuration". It contains several sections: "Security mode:" with a dropdown menu set to "No Encryption"; "Authentication protocol" with a dropdown set to "PEAP" and a "Config" button; "Encryption method" with a checkbox for "Using Static WEP" and a "Config" button; and "User Information" which includes fields for "User ID", "Password", "My certificate" (set to "No user certificate"), "Server certificate" (set to "No server certificate"), and "Server name" with a "Config certificate" button. At the bottom are "Back", "Next", and "Cancel" buttons.

This screen will vary in appearance depending on whether any encryption was detected with your access point.

3) Enter in the appropriate security information.

⁵SSID: The SSID is a group name used by users of a common wireless network. Only those devices using the same SSID are able to access each other. Also, you must use the same SSID as the Access Point you want to connect with. SSIDs are case sensitive so take care to make sure your capitalization matches.

a. Click [Next]. The following screen will appear.



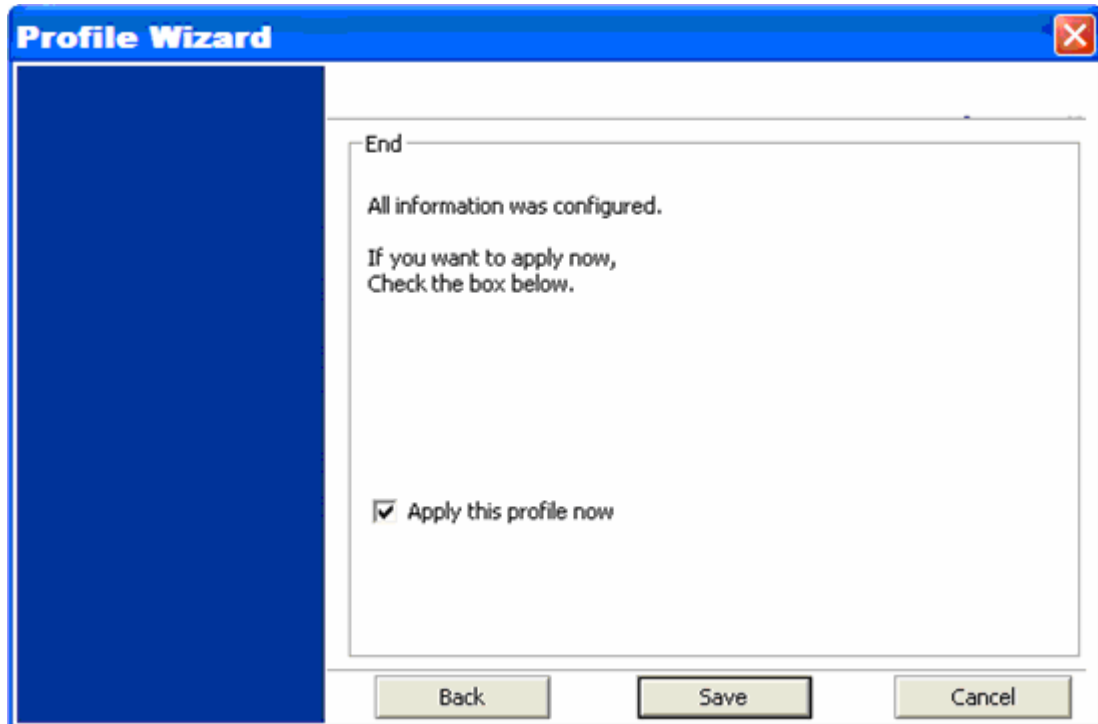
The screenshot shows a window titled "Profile Wizard" with a blue title bar and a red close button. The window is divided into two main sections. The left section is a solid blue vertical bar. The right section contains configuration options. Under the heading "Frequency Band", there are two checked checkboxes: "802.11b" and "802.11g". Below this, under the heading "802.11g configuration", there are two dropdown menus. The first is labeled "Non-ERP Protection Mode:" and is set to "Dynamic use". The second is labeled "Slot time:" and is set to "Short slot time". At the bottom of the window, there are three buttons: "Back", "Next", and "Cancel".

4) On this screen you will configure the wireless modes supported by this profile.

a. Under [Frequency Band], put a check mark next to each wireless protocol you want this profile to support. If you are unsure of which protocol to choose, leave all checked.

b. For [802.11g Configuration] leave all settings at default unless instructed by your network administrator to change them.

c. Click [Next]. The following screen will appear.



5) Final Step

- a. Uncheck the box [Apply this profile now] if you do not want to activate this profile at this time.
- b. Click [Save] to complete the wizard and save the profile you have just created.

Remove

To remove a profile from the "Profile List" select it and then click on [Remove].

Apply

If you want to change the current profile with another profile from the "Profile List", select the desired profile and click on [Apply]. The new profile will immediately become the current profile and you will be connected with its SSID.

Properties

Selecting a profile from the "Profile List" and clicking on [Properties] will allow you to check and/or modify the properties of the selected profile. Clicking on [Properties] will take you to the following screen.

The screenshot shows a Windows-style dialog box titled "Example's property" with a standard close button (X) in the top right corner. On the left side, there is a vertical list of settings categories: "Basic Setting", "Advanced Settings", "WLAN Security", "Frequency Band", "Chipset Features", and "TCP/IP". The "Basic Setting" category is currently selected. The main area of the dialog is divided into three sections. The first section, "Profile Name", contains the text "Please enter a name for this profile. Ex) Office, My Home" and a text input field with the value "Example". The second section, "Network mode", features a dropdown menu set to "Infrastructure". Below this, there is a sub-header "- Network using AP" followed by explanatory text: "Choose infrastructure mode if you are connecting to an access point or wireless router. Choose 'Ad-Hoc' mode if you are going to connect directly to another computer." The third section, "SSID", includes a text input field with "ExampleAP" and a "Browse" button to its right. Below the input field, it says "Enter SSID of network. If you want to scan possible nework, click 'Browse'". At the bottom of the dialog, there are three buttons: "Apply Now", "Save", and "Cancel".

Example's property

- Basic Setting
- Advanced Settings
- WLAN Security
- Frequency Band
- Chipset Features
- TCP/IP

Profile Name
Please enter a name for this profile.
Ex) Office, My Home
Example

Network mode
Infrastructure

- Network using AP
Choose infrastructure mode if you are connecting to an access point or wireless router. Choose "Ad-Hoc" mode if you are going to connect directly to another computer.

SSID
ExampleAP Browse
Enter SSID of network.
If you want to scan possible nework, click 'Browse'.

Apply Now Save Cancel

Each page in [Properties] is explained below.

Basic Settings: In this page, you can verify the name of the current profile.

The screenshot shows a window titled "Example's property" with a standard Windows-style title bar (blue with a close button). On the left is a vertical tabbed menu with the following items: "Basic Setting" (selected), "Advanced Settings", "WLAN Security", "Frequency Band", "Chipset Features", and "TCP/IP". The main content area is divided into three sections:

- Profile Name:** A text box containing "Example". Above it is the label "Profile Name" and a prompt: "Please enter a name for this profile. Ex) Office, My Home".
- Network mode:** A dropdown menu currently showing "Infrastructure". Below it is a section titled "- Network using AP" with explanatory text: "Choose infrastructure mode if you are connecting to an access point or wireless router. Choose 'Ad-Hoc' mode if you are going to connect directly to another computer."
- SSID:** A text box containing "ExampleAP" and a "Browse" button to its right. Below the text box is the prompt: "Enter SSID of network. If you want to scan possible network, click 'Browse'."

At the bottom of the dialog are three buttons: "Apply Now", "Save", and "Cancel".

[Profile Name] Allows you to change the name of the current profile.

[Network Mode] Allows you to change between Infrastructure and Ad-Hoc networking modes.

[SSID] Allows you to change the SSID that this profile will associate with. Use the [Browse] button to perform a site survey and select the SSID from a list of available SSIDs. Keep in mind when manually entering an SSID that SSIDs are case sensitive.

Advanced Settings: This screen allows you to make changes to the default ways the card operates including advanced 802.11 settings. Unless you are an advanced user and have deep knowledge about each property on this page, it is recommended that you leave them at the default settings.

Example's property

Basic Setting

Advanced Settings

WLAN Security

Frequency Band

Chipset Features

TCP/IP

☒ Auto power saving mode

PowerSaving: Fast Power Saving

802.11b Preamble: Long Preamble

RTS Threshold: 2432

FRAG Threshold: 2432

Roaming optimization: Default roaming mode

Data Tx Rate

☒ Use Auto-Fallback

802.11b Tx Rates: 11Mbps

802.11g Tx Rates: 54Mbps

Apply Now

Save

Cancel

WLAN Security: This screen allows you to configure the security settings of your wireless LAN.

The screenshot shows a window titled "Example's property" with a blue header bar. On the left is a sidebar with a tree view containing the following items: "Basic Setting", "Advanced Settings", "WLAN Security" (which is highlighted with a blue background), "Frequency Band", "Chipset Features", and "TCP/IP". The main area of the window is titled "WLAN Security Configuration". It contains three main sections: "Security mode:" with a dropdown menu currently set to "No Encryption"; "Authentication protocol" with a dropdown menu set to "None" and a "Config" button to its right; and "Encryption method" with a checkbox labeled "Using Static WEP" and a "Config" button to its right. At the bottom of the window are three buttons: "Apply Now", "Save", and "Cancel".

Security Mode

1) No Encryption

All data sent between the AP and the client is left unencrypted and may be viewed by other wireless devices.

2) WEP

Wired Equivalent Privacy – Encrypts all traffic sent between the AP and the client using a shared key. When using WEP encryption (available in 64, 128, or 152-bit), only those APs and PCs using the same WEP Key are allowed to communicate with each other.

3) WPA

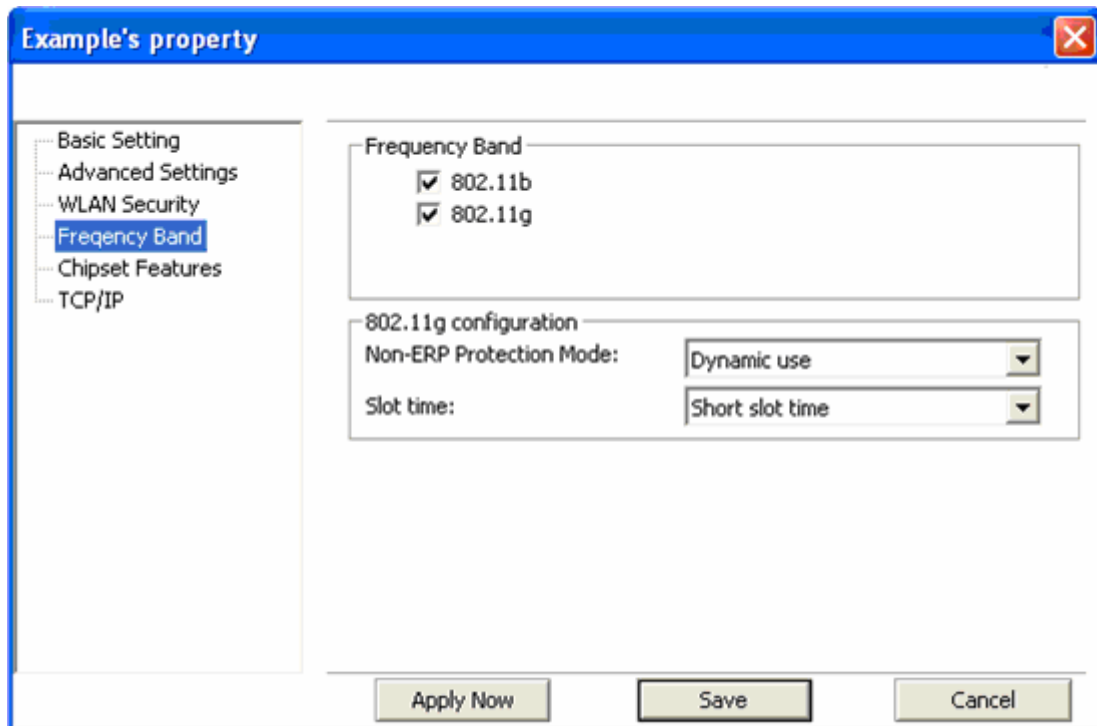
Wi-Fi Protected Access – Encrypts all traffic between the access point and the client using either TKIP or AES encryption. Depending on the authentication protocol selected, each client must authenticate using their own unique username, password, and security certificate.

To learn more about WPA please see Chapter 2.

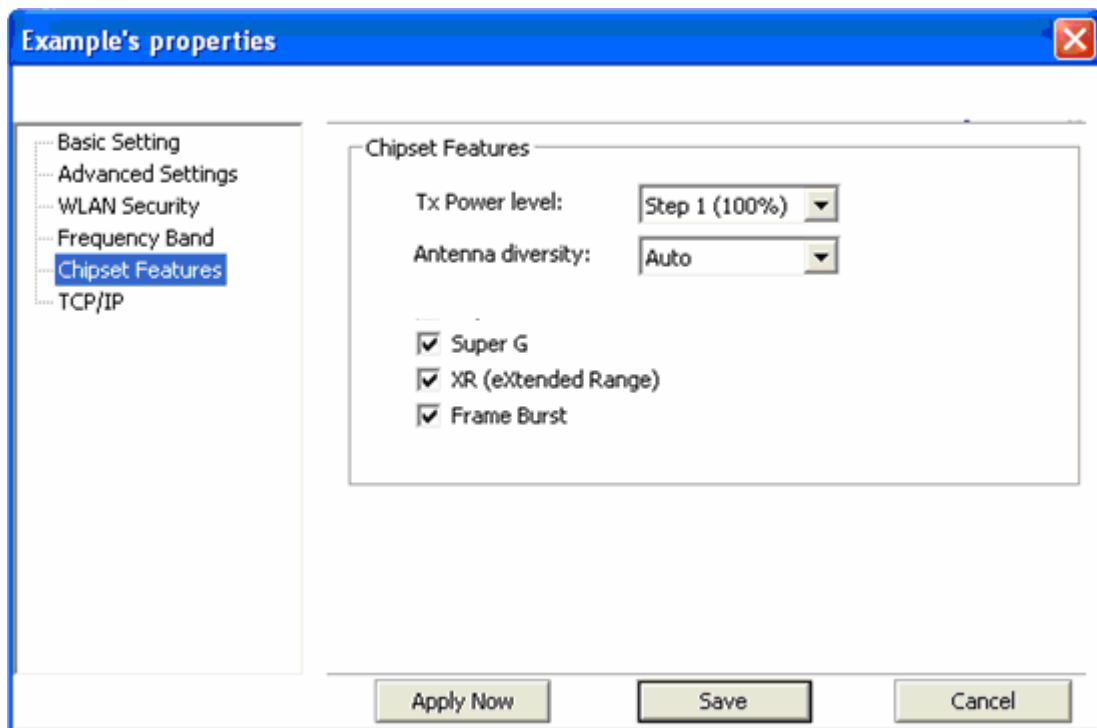
4) WPA-PSK

WPA-PSK is a compromise between WPA and WEP. Like WEP, it uses a pre-shared key that every user of the network must have in order to be able to send and receive data. Like WPA, it uses either TKIP or AES, which improve greatly over the encryption found in WEP. We recommend you use WPA or WPA-PSK whenever possible.

Frequency Band: This screen lets you define which 802.11 wireless standards to try to connect to. It also lets you change some 802.11g behaviors.



Chipset Features: This screen allows you to configure advanced features built into the wireless chipset.



[Tx Power Level] Allows you to adjust the output power of your radio. Reducing output power can reduce power usage of your laptop and will limit the distance that your wireless signal will reach.

[Antenna Diversity] Defines whether to use both internal antennas. Antenna Diversity usually provides a higher quality connection.

[Super G] Support for Atheros 108Mbps Super G mode.

[XR] Support for Atheros Extended Range technology.

[Frame Burst] Allows for faster speeds while maintaining compatibility with other 802.11 devices which may be on your network.

TCP/IP: This allows you to change your TCP/IP settings.

The screenshot shows a window titled "Example's property" with a close button in the top right corner. On the left is a sidebar with a tree view containing the following items: "Basic Setting", "Advanced Settings", "WLAN Security", "Frequency Band", "Chipset Features", and "TCP/IP". The "TCP/IP" item is selected. The main area of the window is titled "TCP/IP Config" and contains three radio buttons: "Use IP Changer" (unchecked), "Use DHCP" (checked), and "Use Static IP below" (unchecked). Below the "Use Static IP below" radio button is a group box containing five text input fields, each with a label and a small icon to its right: "IP Address:", "Subnet Mask:", "Gateway:", "Pri DNS Server:", and "Sec DNS Server:". At the bottom of the window are three buttons: "Apply Now", "Save", and "Cancel".

[Use IP Changer] By putting a checkmark in the box, you will overwrite your existing WLAN TCP/IP configuration and use the IP Changer software built-into the Wirelss Utility. This allows you to configure TCP/IP settings for each profile.

1.3.3 Site Survey

This page shows a list of SSIDs in your vicinity. Information regarding each SSID is also shown: SSID, mode, signal strength, channel, BSSID (MAC address), data rate, and WEP/WPA status.

The screenshot displays the 'Wireless Client Utility' window. On the left is a sidebar with buttons for 'Network', 'Profile', 'SiteSurvey', 'Options', and 'Version'. The main area is titled 'Available networks (5 found)' and contains a table with the following data:

SSID	Mode	Strength	Ch	WEP	BSSID
ZyXELUSA	802.11b	-51 dBm	1	O	00:AC
Guests	802.11b	-91 dBm	11	O	00:AC
prestige-334wt	802.11g	-49 dBm	2	X	00:AC
Wireless	802.11g	-65 dBm	6	X	00:AC
Wireless	802.11g	-59 dBm	6	X	00:AC

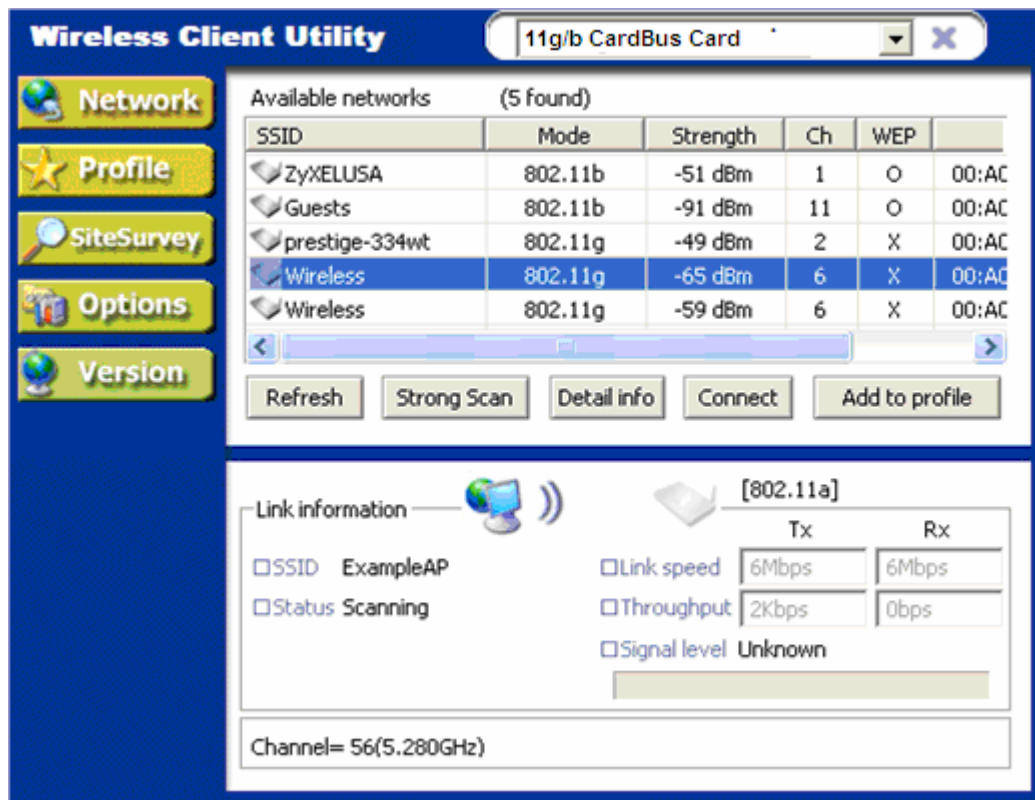
Below the table are buttons for 'Refresh', 'Strong Scan', 'Detail info', 'Connect', and 'Add to profile'. At the bottom, the 'Link information' section shows 'Link speed' as 6Mbps, 'Throughput' as 0bps, and 'Signal level' as Unknown. The channel is listed as 'Channel= 52(5.260GHz)'.

Refresh

[Refresh] will scan the vicinity for a certain amount of time and display the scan results.

Strong Scan

[Strong Scan] will continuously scan the vicinity every 2.5 seconds until you click on [Stop], which appears in place of [Strong Scan] when scanning.



Selecting a network from the [Available Networks] list will enable the [Detail Info], [Connect] and [Add to profile] buttons.

Detail Info

[Detail info] will display the following screen showing the selected device's configuration information. An alternative to clicking on [Detail info] is double-clicking on the SSID of choice.

Detail Information

SSID:

Wireless

BSSID:

00:A0:C5:5A:6C:74

Channel:

1

Network Mode

Infrastructure Mode

WEP:

Using WEP

Supported Rate(Mb/sec):

1 ,2 ,5 ,11

Physical layer Type:

802.11b

Beacon Period(msec):

100

Close

Connect

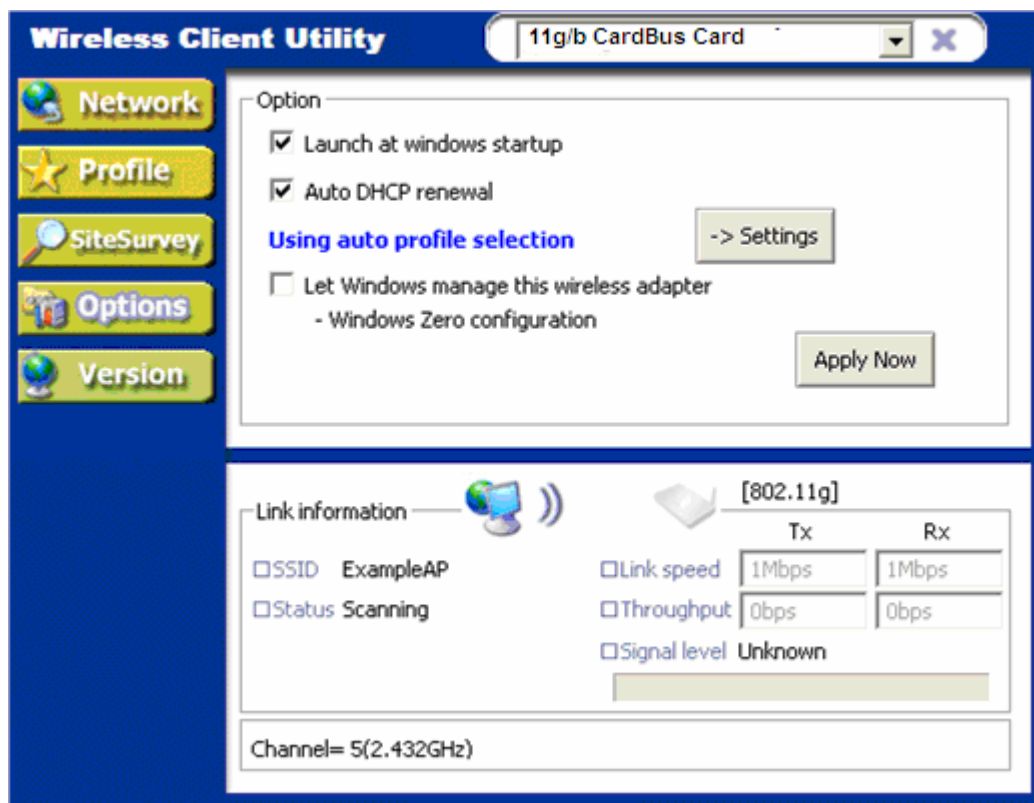
[Connect] will immediately connect you with the selected network.

Add to profile

[Add to profile] will have the same effect as clicking on [Add] in the [Profile] page

1.3.4 Options

In this page you can configure the behavior of the Wireless utility.



Launch at windows startup

Selecting this option will automatically start the Wireless Utility program whenever you start Windows.

Auto DH CP renewal

Automatically renews the DHCP information after changing profiles.

Auto-Pro file Selection

Allows you to define the behavior of the auto-profile selection algorithm. Click [Settings] to configure.

See following screen shot for options.

Auto profile selection setting

☐ Not use this feature

☒ Use this feature

Auto selection method

☒ according to priority

☐ according to signal strength

Connection time out (seconds)

10

☒ Show message when applying auto selected profile

OK

1.3.5 Version

Software and Hardware information of the current client device.

Network

Profile

SiteSurvey

Options

Version

11g/b CardBus Card

S/W Information

Package Version : Ver 1.0.0 [2004-10-19]

Driver Version : 3.3.0.162

Utility Version : 3.1.6.013

H/W Information

Supported mode : 802.11g / 802.11b

MAC Address : 00:03:7F:BE:F0:E6

Supported Ch : Ch 1~Ch 11,

Link information

SSID ZyXELUSA

Status Associated

Link speed 5.5Mbps

Throughput 0bps

Signal level Excellent (-56dBm)

Tx 11Mbps

Rx 960bps

BSSID= 00:A0:C5:62:CF:E6

Channel= 1(2.412GHz)

24

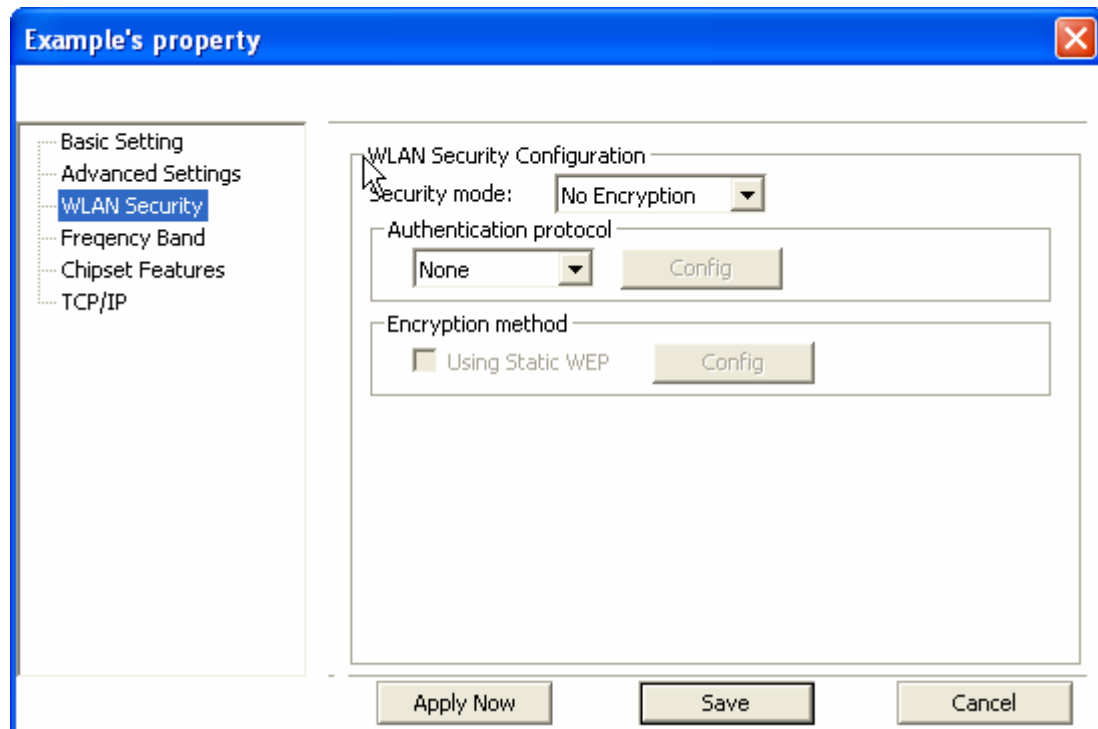
Chapter 2 - Configuring Wireless Security

This chapter covers the configuration of security options in the Wireless Utility.

2.1 Configuring Security

You can configure your security settings at any time. Simply select the profile you wish to edit under the [Profile] tab, select [Properties] and then choose [WLAN Security]. You are also presented with the option to configure security during the profile creation process. Whether changing the security settings of an existing profile or creating a new profile, the steps to configure your security settings remain the same.

2.2 Configuring WEP



1. Select [WEP] under [Security Mode]
2. Put a check mark next to [Using Static WEP]
3. Click [Config]. You will then see the screen below.

4. [WEP Method] Select the correct encryption level to match your access point. Either 64, 128, or 152-bit. The encryption level set here must match the encryption level used by your access point.

- a. [Authentication] You can choose between Auto, Open System, and Shared. Please see section 2.5 for more information on the different types of authentication. For most installations choosing "Auto" is the best choice.
- b. Enter the WEP key exactly as you did in your access point.

There are three ways of generating a WEP Key:

Make key using PassPhrase: a WEP Key is automatically generated as you type in any PassPhrase of your choice. Use this feature when you have used a PassPhrase to generate your WEP key on your access point.

Manual Input (ASCII): You generate your own WEP Key using ASCII characters (5 characters for 64-bit, 13 characters for 128-bit, 16 characters for 152-bit)

Manual Input (Hexadecimal): You generate your own WEP Key using hexadecimal characters (10 characters for 64-bit, 26 characters for 128-bit, 32 characters for 152-bit).

5. Click [OK] to save your settings and return to the previous screen.
6. If you want to use 802.1x authentication with WEP, you will need to configure your 802.1x settings. Please see section 4.5 for details on configuring 802.1x.

2.3 Configuring WPA-PSK

The screenshot shows a window titled "Example's properties" with a blue header bar and a red close button. On the left is a tree view with the following items: Basic Setting, Advanced Settings, WLAN Security, Frequency Band, Chipset Features, and TCP/IP. The "WLAN Security" item is selected. The main area displays the "WLAN Security Configuration" section. It contains three sub-sections: "Security mode:" with a dropdown menu set to "WPA-PSK"; "Authentication protocol" with a dropdown menu set to "None" and a "Config" button; and "Encryption method" with a dropdown menu set to "TKIP" and a "Config" button. Below these is the "PSK Pass Phrase" section, which indicates "8-63 characters" and has an empty text input field. At the bottom of the window are three buttons: "Apply Now", "Save", and "Cancel".

1. Select [WPA-PSK] under [Security Mode].
2. Select [Encryption method]. You can choose between TKIP or AES. Most access points use TKIP for WPA-PSK.
3. Under [PSK Pass Phrase] enter the same pass phrase used to configure WPA-PSK on your access point.

2.4 Configuring WPA

The screenshot shows a window titled "Example's properties" with a close button in the top right corner. On the left is a sidebar with a tree view containing: Basic Setting, Advanced Settings, WLAN Security, Frequency Band, Chipset Features, and TCP/IP. The main area is titled "WLAN Security Configuration" and contains several sections:

- Security mode:** A dropdown menu with "WPA" selected.
- Authentication protocol:** A dropdown menu with "TLS" selected, followed by a "Config" button.
- Encryption method:** A dropdown menu with "TKIP" selected, followed by a "Config" button.
- User Information:** A section with the following fields:
 - User ID :** An empty text box.
 - Password :** An empty text box.
 - My certificate :** An empty text box.
 - Server certificate :** A dropdown menu with "No server certificate" selected.
 - Server name :** An empty text box.

At the bottom of the dialog are three buttons: "Apply Now", "Save", and "Cancel".

1. Select [WPA-PSK] under [Security Mode].
2. Select [Encryption method]. You can choose between TKIP or AES. Most access points use TKIP for WPA.
3. See section 4.5 for configuring 802.1x for WPA.

2.5 Configuring 802.1x

1. Choose the EAP method under [Authentication protocol].
2. Depending on the EAP method chosen the options under [User Information] will change.

2.5.1 Configuring 802.1x – EAP-MD5

1. EAP-MD5 is only a choice when use WEP. MD5 is not allowed for WPA.
2. Enter in unique User ID and Password under [User Information]

2.5.2 Configuring 802.1x – EAP-LEAP

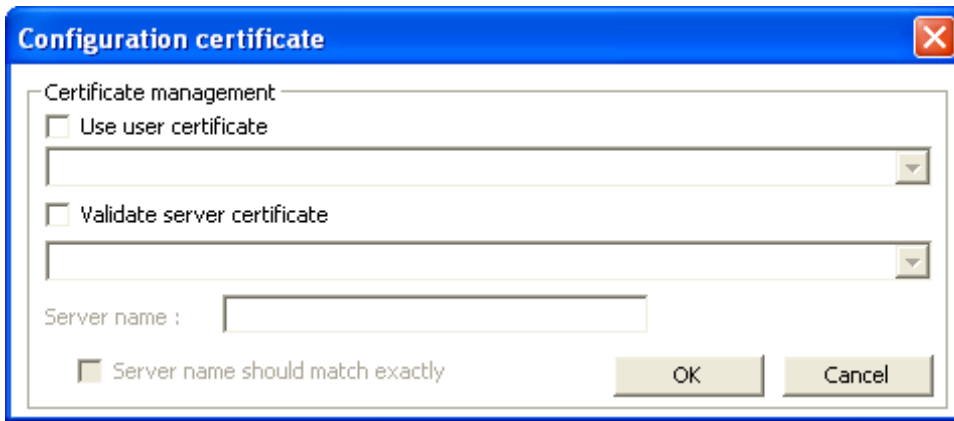
The screenshot shows a window titled "Example's properties" with a sidebar on the left containing a tree view with the following items: Basic Setting, Advanced Settings, WLAN Security (highlighted), Frequency Band, Chipset Features, and TCP/IP. The main area is titled "WLAN Security Configuration" and contains three sections: "Security mode:" with a dropdown menu set to "WPA"; "Authentication protocol" with a dropdown menu set to "LEAP" and a "Config" button; and "Encryption method" with a dropdown menu set to "TKIP" and a "Config" button. Below these is a "User Information" section with two text input fields labeled "User ID :" and "Password :". At the bottom of the window are three buttons: "Apply Now", "Save", and "Cancel".

1. Enter in unique User ID and Password under [User Information]

2.5.3 Configuring 802.1x – EAP-PEAP

1. Click [Config] under [Authentication protocol]
2. Select inner PEAP protocol. Your choices are [MS-CHAP v2] or [TLS].
3. Click [OK] to finish and return to the previous screen.
4. Enter in unique User ID and Password under [User Information].
5. If using a user6 or server certificate click [Config certificate]. The following window appears:

⁶ You must first have a wired connection to a network and obtain the certificate(s) from a certificate authority (CA). Consult your network administrator for more information.

A screenshot of a Windows-style dialog box titled "Configuration certificate" with a blue header bar and a red close button in the top right corner. The dialog contains a "Certificate management" section with two checkboxes: "Use user certificate" and "Validate server certificate". Each checkbox is followed by a pull-down menu. Below these is a "Server name" label followed by a text input field. At the bottom left is a checkbox labeled "Server name should match exactly". At the bottom right are "OK" and "Cancel" buttons.

Configuration certificate

Certificate management

☐ Use user certificate

☐ Validate server certificate

Server name :

☐ Server name should match exactly

OK Cancel

[Use user certificate]: Put a check in the box to activate user certificate. Then select certificate from the pull down menu.

[Validate server certificate]: Put a check in the box to activate server certificate. Then select the certificate authority from the pull down menu.

[Server name]: Name of server used for 802.1x authentication.

[Server name should match exactly]: Check this box to force server name to match exactly the same in the certificate.

6. Click [OK] to finish and return to the previous screen.

2.5.4 Configuring 802.1x – EAP-TLS

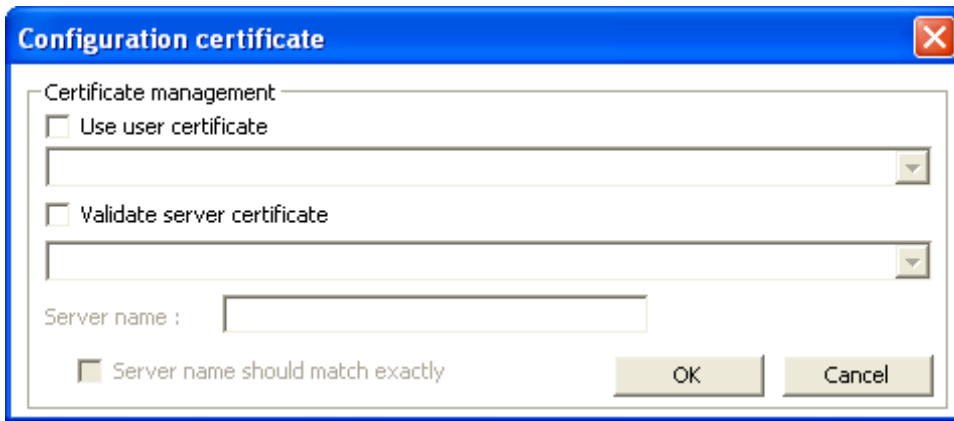
The screenshot shows a window titled "Example's properties" with a sidebar on the left containing a tree view with the following items: Basic Setting, Advanced Settings, WLAN Security (selected), Frequency Band, Chipset Features, and TCP/IP. The main content area is titled "WLAN Security Configuration" and contains the following fields and buttons:

- Security mode:** A dropdown menu set to "WPA".
- Authentication protocol:** A dropdown menu set to "TLS" with a "Config" button to its right.
- Encryption method:** A dropdown menu set to "TKIP" with a "Config" button to its right.
- User Information:** A section containing:
 - User ID :** A text input field.
 - Password :** A text input field.
 - My certificate :** A text input field.
 - Server certificate :** A dropdown menu set to "No server certificate".
 - Server name :** A text input field.
 - Config certificate:** A button located to the right of the "Server name" field.

At the bottom of the window are three buttons: "Apply Now", "Save", and "Cancel".

1. Enter in unique User ID and Password under [User Information].
2. TLS requires you to configure both a server and user⁷ certificate.
3. Click [Config certificate]. The following window appears:

⁷ You must first have a wired connection to a network and obtain the certificate(s) from a certificate authority (CA). Consult your network administrator for more information.

A Windows-style dialog box titled "Configuration certificate" with a blue header bar and a red close button in the top right corner. The dialog contains a "Certificate management" section with two checkboxes: "Use user certificate" and "Validate server certificate". Each checkbox is followed by a pull-down menu. Below these is a "Server name" label followed by a text input field. At the bottom left is a checkbox labeled "Server name should match exactly". At the bottom right are "OK" and "Cancel" buttons.

Configuration certificate

Certificate management

☐ Use user certificate

☐ Validate server certificate

Server name :

☐ Server name should match exactly

OK Cancel

[Use user certificate]: Put a check in the box to activate user certificate. Then select certificate from the pull down menu.

[Validate server certificate]: Put a check in the box to activate server certificate. Then select the certificate authority from the pull down menu.

[Server name]: Name of server used for 802.1x authentication.

[Server name should match exactly]: Check this box to force server name to match exactly the name in the certificate.

4. Make selections and then click [OK] to finish and return to the previous screen.

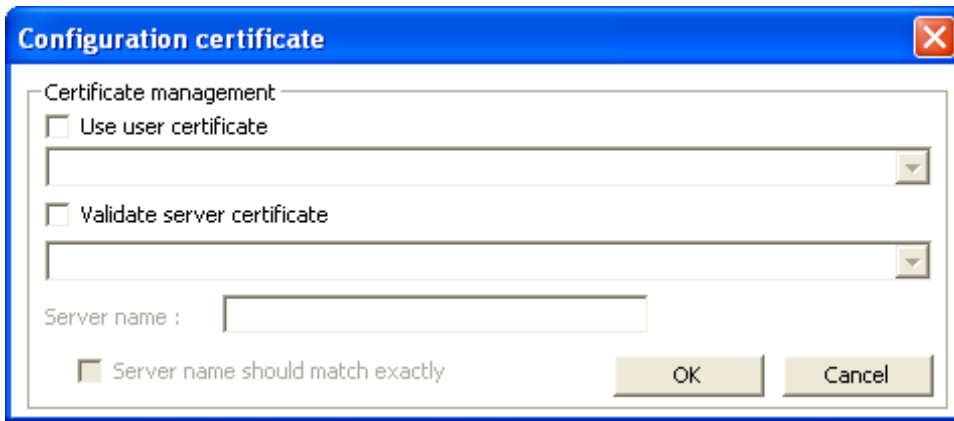
2.5.5 Configuring 802.1x – EAP-TTLS

The screenshot shows a window titled "Example's properties" with a blue header bar. On the left is a sidebar with a tree view containing: "Basic Setting", "Advanced Settings", "WLAN Security" (highlighted in blue), "Frequency Band", "Chipset Features", and "TCP/IP". The main area is titled "WLAN Security Configuration" and contains several sections:

- Security mode:** A dropdown menu set to "WPA".
- Authentication protocol:** A dropdown menu set to "TTLS" with a "Config" button to its right.
- Encryption method:** A dropdown menu set to "TKIP" with a "Config" button to its right.
- User Information:** A section with the following fields:
 - User ID :** An empty text input field.
 - Password :** An empty text input field.
 - My certificate :** An empty text input field.
 - Server certificate :** A dropdown menu set to "No server certificate".
 - Server name :** An empty text input field.

At the bottom of the window are three buttons: "Apply Now", "Save", and "Cancel".

1. Enter in unique User ID and Password under [User Information].
2. Select inner TTLS protocol. You can choose between [PAP], [CHAP], [MS-CHAP], [MS-CHAPv2], or [MD5-Challenge].
3. Click [OK] to finish and return to the previous screen.
4. Click [Config certificate]. The following window appears:

A Windows-style dialog box titled "Configuration certificate" with a blue header bar and a red close button in the top right corner. The dialog contains a "Certificate management" section with two checkboxes: "Use user certificate" and "Validate server certificate". Each checkbox is followed by a pull-down menu. Below these is a "Server name" label followed by a text input field. At the bottom left is a checkbox labeled "Server name should match exactly". At the bottom right are "OK" and "Cancel" buttons.

Configuration certificate

Certificate management

☐ Use user certificate

☐ Validate server certificate

Server name :

☐ Server name should match exactly

OK Cancel

[Use user certificate]: Put a check in the box to activate user certificate. Then select certificate from the pull down menu.

[Validate server certificate]: Put a check in the box to activate server certificate. Then select the certificate authority from the pull down menu.

[Server name]: Name of server used for 802.1x authentication.

[Server name should match exactly]: Check this box to force server name to match exactly the name in the certificate.

5. Make selections and then click [OK] to finish and return to the previous screen. Server certificate must be configured for TTLS to work.