802.11b/g/n
Wireless iNIC Module

User’s Guide

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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

IMPORTANT NOTE:
FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

IMPORTANT NOTE:
This module is intended for OEM integrator. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID:U4P-E45 ". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.

Table of Content

Chapter 1: Introduction

For easy configure and achieve stable wireless feature for household appliance and try to create a new application for Wi-Fi module. By MII interface, user could embed our module in projector, Set-Top BOX and Multimedia center etc.

Features

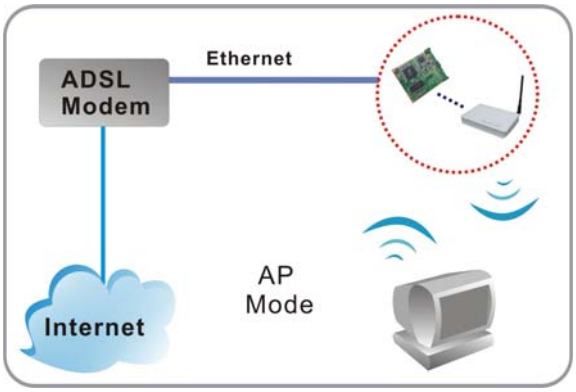
1. Support the IEEE 802.11b/g/n standard, high speed date rate up to 300Mbps.
2. High security with build-in Security: WEP 64/128 bits, WPA, WPA2, WPA Mixed, 802.1x Authenication.
3. Support AP, WDS and Client (Infrastructure) mode.
4. Advanced Quality of Service (QoS) - 802.11e, WMM.
5. Easy configuration for home user setup.
6. MAC filtering for wireless.

Chapter 2: About the Operation Modes

This device provides operational applications with **AP, WDS** and **Client** modes, which are mutually exclusive. If you want to change the settings in order to perform more advanced configuration or even change the mode of operation, you can use the web-based utility provided by the manufacturer as described in the following sections.

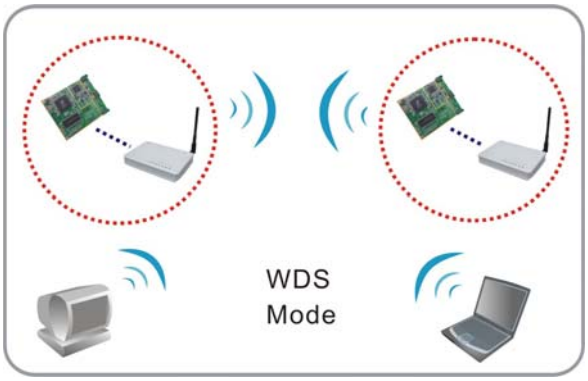
Access Point Mode

When acting as an access point, this device connects all the stations (PC/notebook with wireless network adapter) to a wired network. All stations can have the Internet access if only the Access Point has the Internet connection.



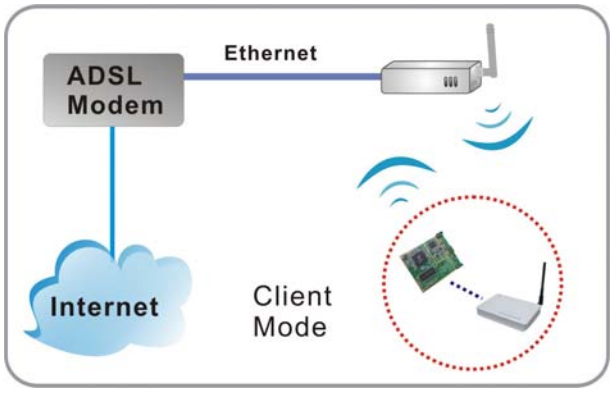
WDS Mode

The WDS (Wireless Distributed System) function lets this access point act as a wireless LAN access point and repeater at the same time. Users can use this feature to build up a large wireless network in a large space like airports, hotels and schools and so on. This feature is also useful when users want to bridge networks between buildings where it is impossible to deploy network cable connections between these buildings.



Client Mode

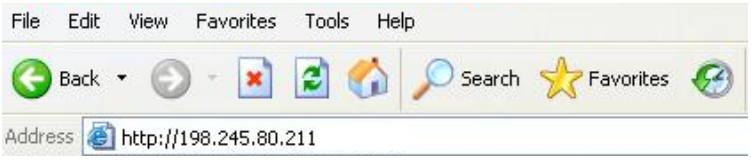
If set to Client (Infrastructure) mode, this device can work like a wireless station when it's connected to a computer so that the computer can send packets from wired end to wireless interface.



Chapter 3: Configuration

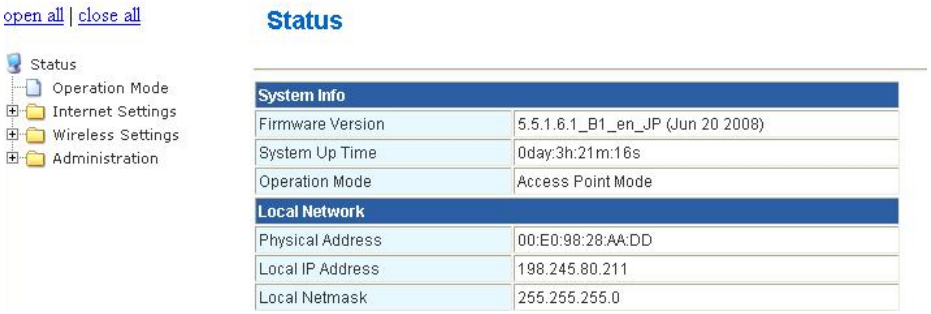
Login

1. Start your computer. Connect an Ethernet cable between your computer and the device.
2. Make sure your wired station is set to the same subnet as the device, i.e. 198.245.80.123
3. Start your WEB browser. In the *Address* box, enter the following: http:// 198.245.80.211



4. Please enter the username “admin” and password “admin” for login.

The configuration menu is divided into three folders: Internet Settings, Wireless Settings, and Administration. Click on the desired setup item to expand the folder in the main navigation page. The setup pages covered in this utility are described below.



Common Connection Types

Cable Modems

Type	Details	ISP Data required
Dynamic IP Address	Your IP Address is allocated automatically, when you connect to you ISP.	Usually, none. However, some ISP's may require you to use a particular Hostname, Domain name, or MAC (physical) address.
Static (Fixed) IP Address	Your ISP allocates a permanent IP Address to you.	IP Address allocated to you. Some ISP's may also require you to use a particular Hostname, Domain name, or MAC (physical) address.

DSL Modems

Type	Details	ISP Data required
Dynamic IP Address	Your IP Address is allocated automatically, when you connect to you ISP.	None.
Static (Fixed) IP Address	Your ISP allocates a permanent IP Address to you.	IP Address allocated to you.
PPPoE	You connect to the ISP only when required. The IP address is usually allocated automatically.	User name and password.
PPTP	Mainly used in Europe. You connect to the ISP only when required. The IP address is usually allocated automatically, but may be Static (Fixed).	• PPTP Server IP Address. • User name and password. • IP Address allocated to you, if Static (Fixed).

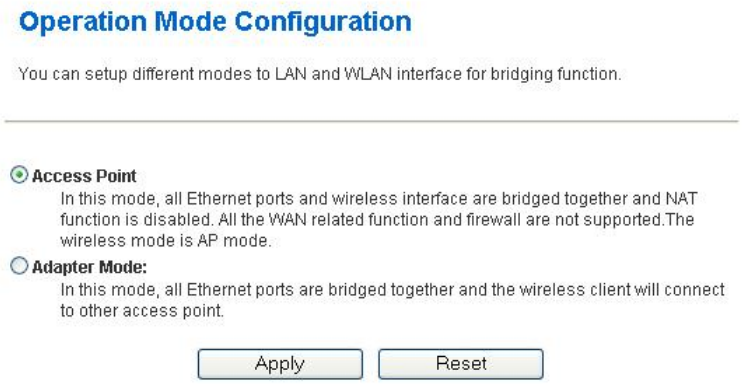
Other Modems (e.g. Broadband Wireless)

Type	Details	ISP Data required
Dynamic IP Address	Your IP Address is allocated automatically, when you connect to you ISP.	None.
Static (Fixed) IP Address	Your ISP allocates a permanent IP Address to you.	IP Address allocated to you.

Configuration via Web

Operation Mode

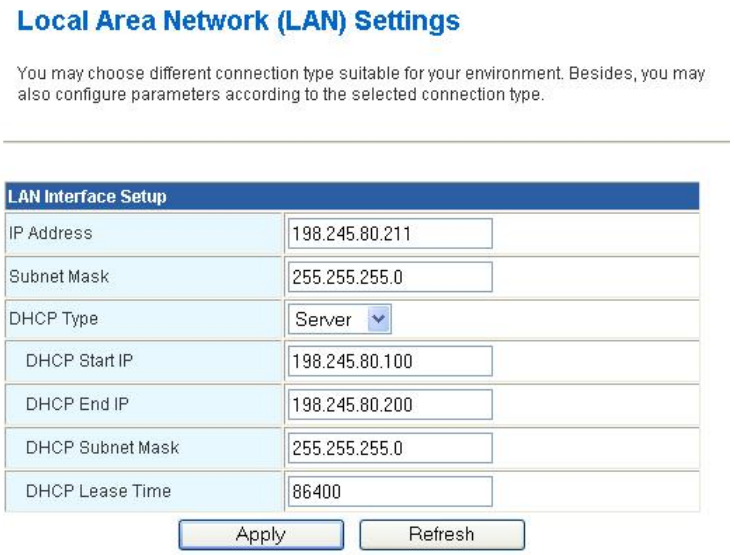
Select an operation mode then click **Apply** to enable the mode you preferred or click **Reset** button to discard current settings. Default operation mode is AP mode.



Operation Mode	
Access Point	When acting as an access point, this device connects all the stations (PC/notebook with wireless network adapter) to a wired network. All stations can have the Internet access if only the Access Point has the Internet connection.
Adapter Mode	If set to Client (Infrastructure) mode, this device can work like a wireless station when it's connected to a computer so that the computer can send packets from wired end to wireless interface.

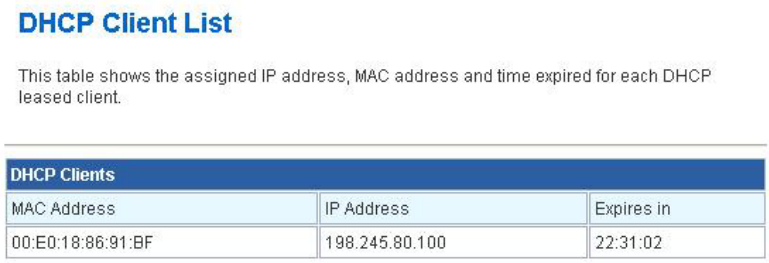
Internet Settings

LAN (Local Area Network) Settings



LAN Interface Setup	
IP Address	Shows the IP address of the device.
Subnet Mask	Shows the subnet mask of the device.
DHCP Type	**Disable**: Select to disable this device to distribute IP addresses. **Server**: Select to enable this device to distribute IP Addresses (DHCP Server). And the following field will be activated for you to enter the starting IP Address.
DHCP Start IP	The starting address of this local IP network address pool.
DHCP End IP	The ending address of this local IP network address pool.
DHCP Subnet Mask	Shows the DHCP subnet mask.
DHCP Lease Time	Default settings are 86400 seconds.
Apply	Click to save and apply the current settings.
Refresh	Click to get the latest information.

DHCP Clients



DHCP Client List

This table shows the assigned IP address, MAC address and time expired for each DHCP leased client.

DHCP Clients		
MAC Address	IP Address	Expires in
00:E0:18:86:91:BF	198.245.80.100	22:31:02

DHCP Clients	
MAC Address	Shows the client MAC address information.
IP Address	Shows the client IP address information.
Expires in	Shows the expired time of the client.

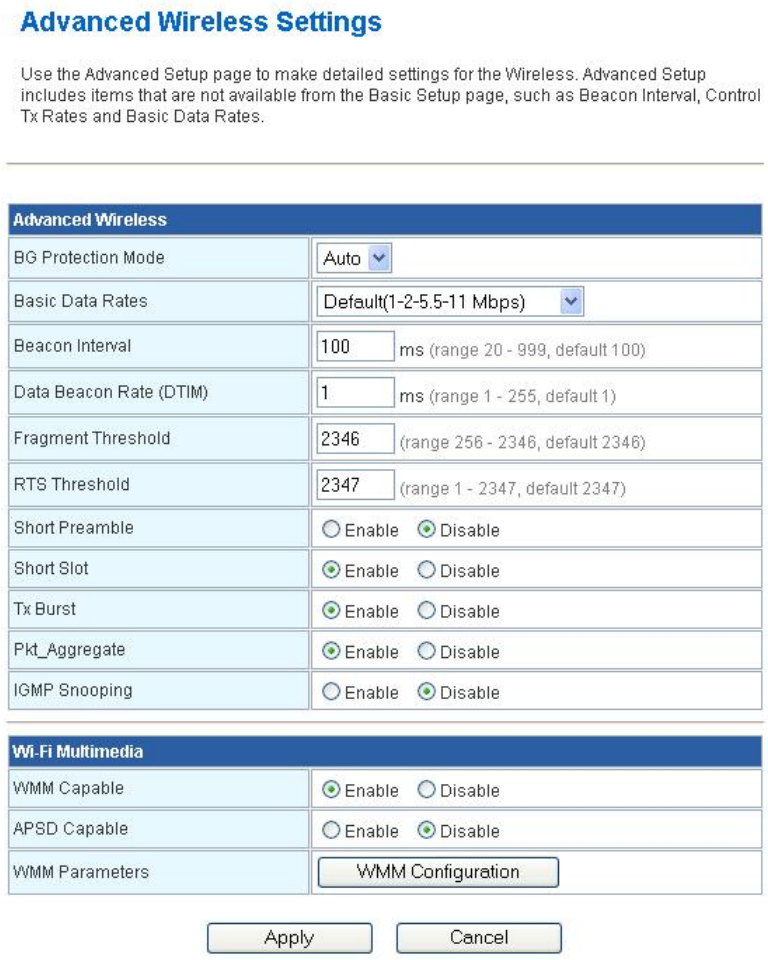
Wireless Settings

Basic

Wireless Network	
Radio On/Off	Click **Radio OFF** button to turn off the radio function.
Network Mode	Select **11 b/g mixed mode**, **11b only**, **11g only** or **11 b/g/n mixed mode** from the pull-down menu. Default setting is **11 b/g/n mixed mode**.

Network Name (SSID)	A SSID is referred to a network name because essentially it is a name that identifies a wireless network.
Multiple SSID 1~6	A multiple SSID is referred to a network name because essentially it is a name that identifies a wireless network.
Broadcast Network Name(SSID)	**Enable**: This wireless AP will broadcast its SSID to stations. **Disable**: This wireless AP will NOT broadcast its SSID to stations. If stations want to connect to this wireless AP, this AP's SSID should be known in advance to make a connection.
BSSID	Shows the MAC address of the device.
Frequency (Channel)	Select **Channel 1~13** or **Auto Select** from the pull-down menu.
Wireless Distribution System(WDS)	
WDS Mode	Select the mode from the pull-down menu, **Disable**, **Lazy Mode**, **Bridge Mode** or **Repeater Mode**.
HT Physical Mode	
Operating Mode	Select **Mixed Mode** or **Green Field**. Default setting is **Mixed Mode**.
Channel Band Width	Select **20** or **20/40**, default setting is **20/40**.
Guard Interval	Select **Long** or **Auto**, default setting is **Auto**.
MCS	Default setting is **Auto**. Or select form the pull-down menu **0~15, 32** or **Auto.**
Reverse Direction Grant(RDG)	Select **Disable** or **Enable** this function, default setting is **Enable**.
Extension Channel	Default setting is **2452MHz (Channel 9)**.
Aggregation MSDU (A-MSDU)	Select **Disable** or **Enable**, default setting is **Disable**.
Auto Block ACK	Select **Disable** or **Enable**, default setting is **Enable**.
Decline BA Request	Select **Disable** or **Enable**, default setting is **Disable**.
Other	
HT Tx Stream	Select 1 or 2 form the pull-down menu.
HT Rx Stream	Select 1 or 2 form the pull-down menu.
Apply	Click to save and apply the current settings.
Cancel	Click to discard the current settings.

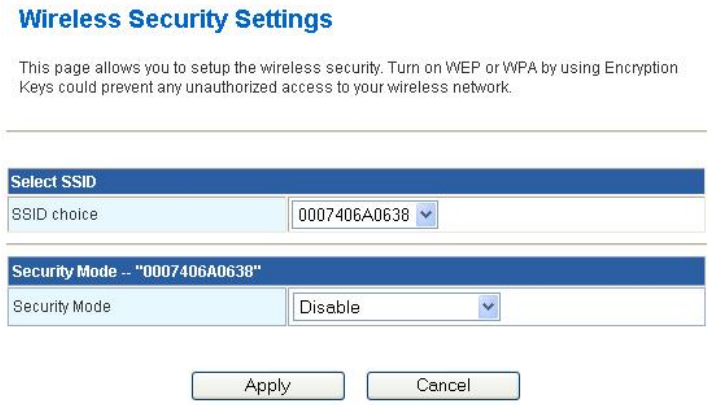
Advanced



Advanced Wireless	
BG Protection Mode	Select **Auto**, **On** or **Off** from the pull-down menu.
Basic Data Rates	By default, the unit adaptively selects the highest possible rate for transmission. Select the basic rates to be used among the following options: **1-2Mbps**, **Default (1-2-5.5-11Mbps)**, or **All(1-2-5,5-6-11-12-24Mbps.)**
Beacon Interval	Beacon Interval is the amount of time between beacon transmissions. Before a station enters power save mode, the station needs the beacon interval to know when to wake up to receive the beacon. Range 20-999, default is **100**.
Data Beacon Rate (DTIM)	Range from 1 to 255, default setting is 1.
Fragment Threshold	Fragmentation mechanism is used for improving the efficiency when high traffic flows along in the wireless network. If the 802.11g MIMO Wireless Device often transmit large files in wireless network, you can enter new Fragment Threshold value to split the packet. The value can be set from 256 to 2346. The default value is **2346**.

RTS Threshold	RTS Threshold is a mechanism implemented to prevent the "**Hidden Node**" problem. If the "Hidden Node" problem is an issue, please specify the packet size. *The RTS mechanism will be activated if the data size exceeds the value you set.*. The default value is **2347**. **Warning:** Enabling RTS Threshold will cause redundant network overhead that could negatively affect the throughput performance instead of providing a remedy. This value should remain at its default setting of **2347**. Should you encounter inconsistent data flow, only minor modifications of this value are recommended.
Short Preamble	Select **Disable** or **Enable** this function, default setting is **Disable**. A preamble is a signal used in wireless environment to synchronize the transmitting timing including Synchronization and Start frame delimiter.
Short Slot	Select **Disable** or **Enable** this function, default setting is **Enable**.
Tx Burst	Select **Disable** or **Enable** this function, default setting is **Enable**.
Pkt_Aggregate	Select **Disable** or **Enable** this function, default setting is **Enable**.
IGMP Snooping	Select **Disable** or **Enable** this function, default setting is **Disable**.
Wi-Fi Multimedia	
WMM Capable	Select **Disable** or **Enable** this function, default setting is **Enable**.
APSD Capable	Select **Disable** or **Enable** this function, default setting is **Disable**.
WMM Parameters	Click the **WMM Configuration** button to go further settings.
Apply	Click to save and apply the current settings.
Cancel	Click to discard the current settings.

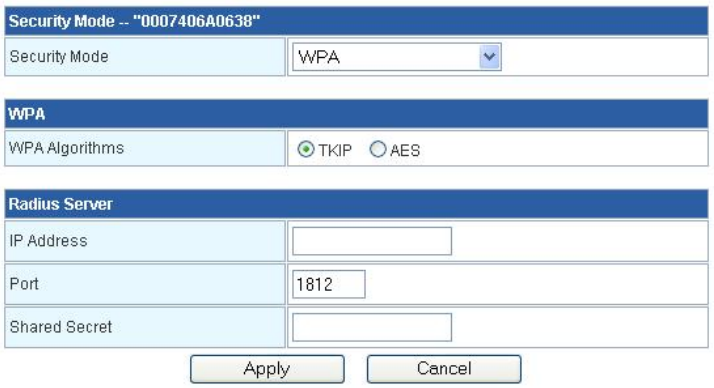
Security

Select SSID	
SSID choice	Select the SSID form the pull-down menu for security settings.
Security Mode	There are several types of authentication modes including **Disable**, **Open, Shared, WEP Auto, WPA, WPA-PSK, WPA2, WPA2-PSK**, **WPA-PSK/WPA2-PSK, WPA/WPA2** and **802.1X.** **Disable**  **Disable:** Encryption is set to **Disable** by default**.** There is no security be set when Disable be selected. **OPEN, SHARED, WEP AUTO**  **Open**: If your wireless device is using "**Open"** authentication, then the wireless adapter will need to be set to the same authentication type. **Shared**: Shared key is when both the sender and the recipient share a secret key. **WEP Auto:** If **WEP** encryption is selected, users will have to **Set WEP keys** either manually or select to **Use 802.1x Authentication** to make the RADIUS server to issue the WEP key dynamically. **Default Key**: There are four keys 1~4 that you can select at will. All computers, access points, and wireless adapters must use the same key when making a connection.

WEP Key 1~4: Enter the password in the encryption key field that the encryption key number must match the selected key.

- Hexadecimal (128bits): 26 Hex characters (0~9, a~f).
- ASCII (128bits): 13 ASCII characters.

WPA



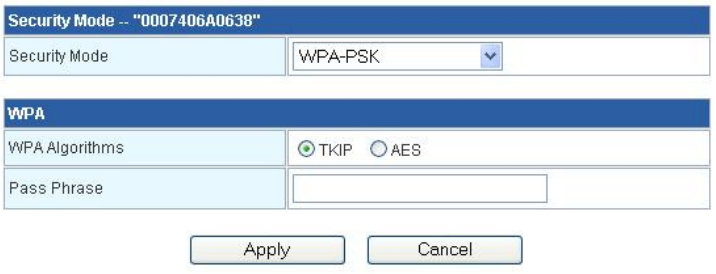
WPA (Wi-Fi Protected Access): It is designed to improve WEP security and provides stronger data protection and network access control than WEP. Most wireless networks should use either WEP or WPA security. If **WPA** is selected, please select **WPA Algorithms** for **TKIP** or **AES.** Then enter **Port, IP address** and **Shared Secret** for **Enterprise (RADIUS Server)** authentication mode. RADIUS is an authentication, authorization and accounting client-server protocol. The client is a Network Access Server that desires to authenticate its links. The server is a server that has access to a user database with authentication information.

IP Address: Enter the RADIUS Server's IP Address provided by your ISP.

Port: Enter the RADIUS Server's port number provided by your ISP. The default is **1812**.

Shared Secret: Enter the password that the device shares with the RADIUS Server.

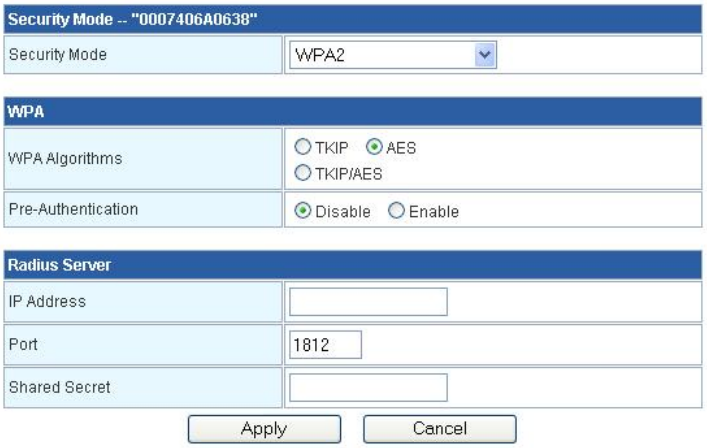
WPA-PSK



WPA Algorithms: Select **TKIP** or **AES** for the WPA Algorithms.

Pass Phrase: Pass Phrase serves as a password. Users may key in 8 to 63 characters string if you select Passphrase to set the passwords or leave it blank, in which the 802.1x Authentication will be activated. Make sure the same password is used on client's end.

WPA2



WPA Algorithms: Select **TKIP, AES** or **TKIP/AES** for the WPA Algorithms.

Pre-Authentication: Select Enable or Disable to execute this function .This function only valid under WAP2-RADIUS authentication. The two most important features beyond WPA to become standardized through 802.11i/ WPA2 are: pre-authentication, which enables secure fast roaming without noticeable signal latency. Pre-authentication provides a way to establish a PMK security association before a client associates. The advantage is that the client reduces the time that it's disconnected to the network.

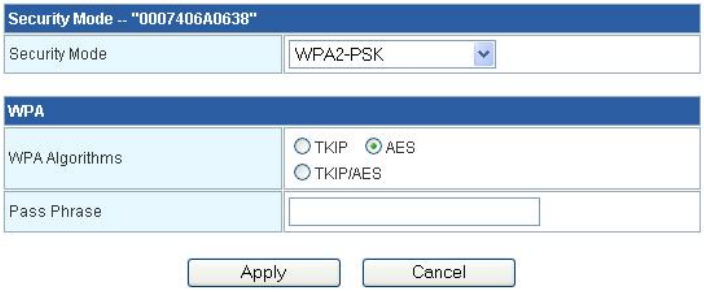
Radius Server: RADIUS is an authentication, authorization and accounting client-server protocol. The client is a Network Access Server that desires to authenticate its links. The server is a server that has access to a user database with authentication information.

IP Address: Enter the RADIUS Server's IP Address provided by your ISP.

Port: Enter the RADIUS Server's port number provided by your ISP. The default is **1812**.

Shared Secret: Enter the password that the device shares with the RADIUS Server.

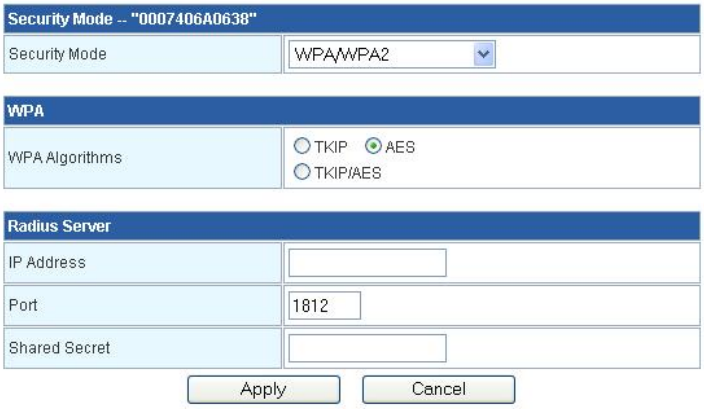
WPA2-PSK, WPA-PSK/WPA2-PSK



WPA Algorithms: Select **TKIP, AES** or **TKIP/AES** for the WPA Algorithms.

Pass Phrase: Pass Phrase serves as a password. Users may key in 8 to 63 characters string if you select Passphrase to set the passwords or leave it blank, in which the 802.1x Authentication will be activated. Make sure the same password is used on client's end.

WPA/WPA2



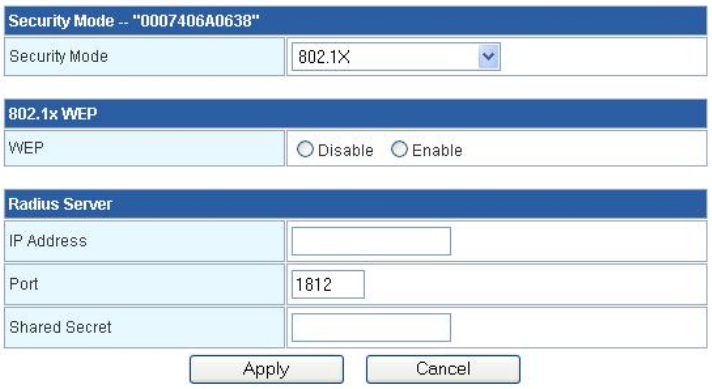
WPA Algorithms: Select **TKIP, AES** or **TKIP/AES** for the WPA Algorithms.

Radius Server: RADIUS is an authentication, authorization and accounting client-server protocol. The client is a Network Access Server that desires to authenticate its links. The server is a server that has access to a user database with authentication information.

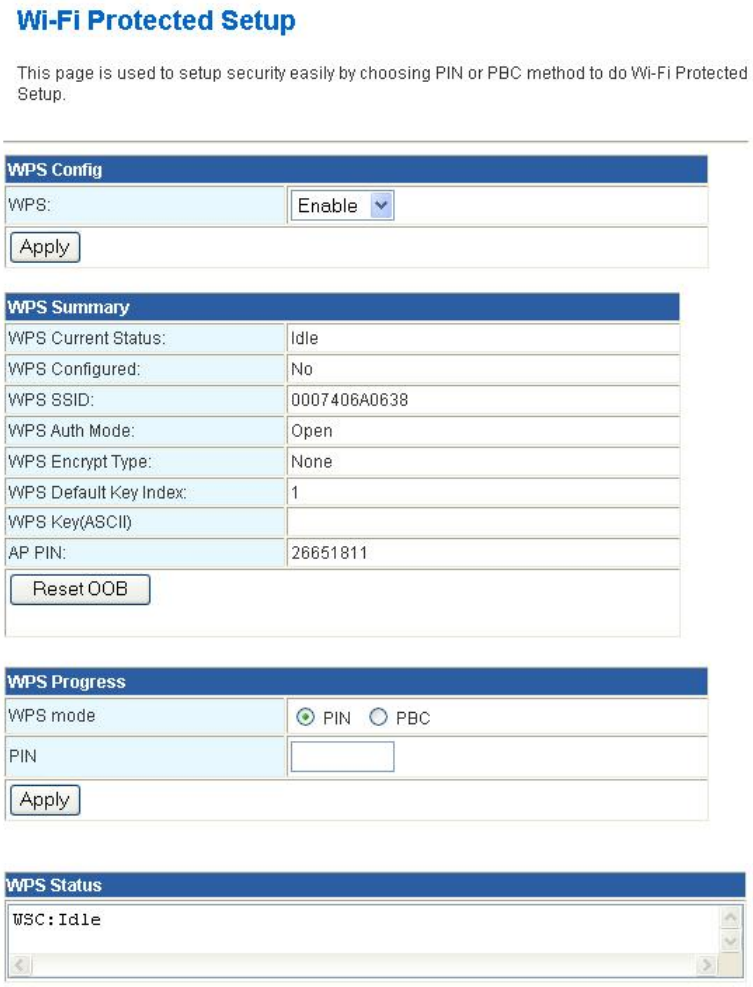
IP Address: Enter the RADIUS Server's IP Address provided by your ISP.

Port: Enter the RADIUS Server's port number provided by your ISP. The default is **1812**.

Shared Secret: Enter the password that the device shares with the RADIUS Server.

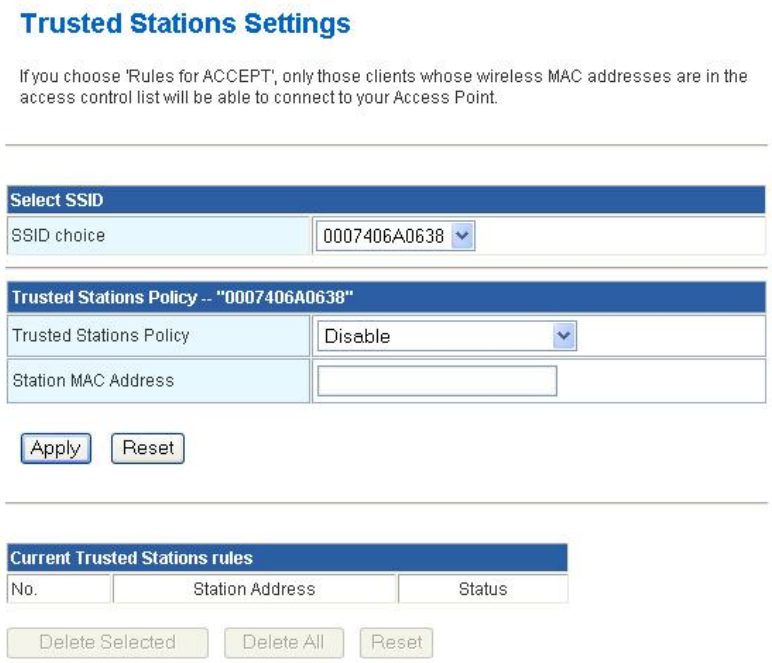
	802.1X  **802.1x WEP**: Select **Disable** or **Enable** to use 802.1x authentication to make the RADIUS server to issue the WEP key dynamically. **Radius Server:** RADIUS is an authentication, authorization and accounting client-server protocol. The client is a Network Access Server that desires to authenticate its links. The server is a server that has access to a user database with authentication information. **IP Address:** Enter the RADIUS Server's IP Address provided by your ISP. **Port:** Enter the RADIUS Server's port number provided by your ISP. The default is **1812**. **Shared Secret:** Enter the password that the device shares with the RADIUS Server.
Apply	Click to save and apply the current settings.
Cancel	Click to discard the current settings.

WPS



WPS Configuration	
WPS	Select **Enable** or **Disable** from the pull-down menu.
Apply	Click to save and apply the current settings.
WPS Summary	Here shows the WPS function status.
Reset OOB	Click the button to reset the settings.
WPS Process	
WPS mode	Select **PCB** or **PIN** WPS mode.
PIN	Enter the **PIN** code form the registrar or enrollee to make a WPS connection with client.
PBC	Select **PBC** then click **Apply** to make a WPS connection with client.
Apply	Click to save and apply the current settings.
WPS Status	Here shows the current status of the WPS function.

Trusted Stations



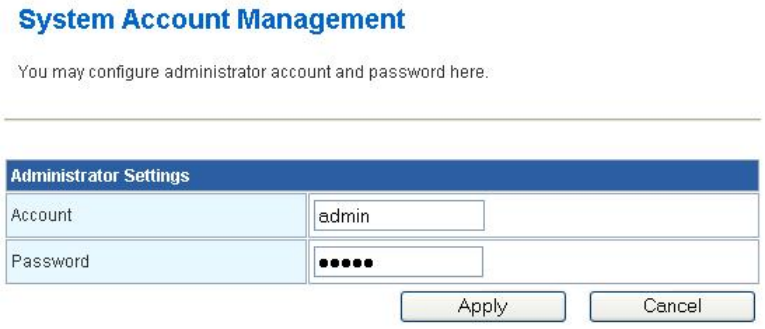
Select SSID	
SSID choice	Select the SSID from the pull-down menu.
Trusted Stations Policy	
Trusted Stations Policy	Select **Disable**, **Enable –Rules for DROP**, or **Enable –Rules for ACCEPT** form the pull-down menu.
Station MAC Address	Enter the MAC address of the station.
Apply	Click to save and apply the current settings.
Reset	Press to discard the current settings.
Current Trusted Stations rules	Here shows the information of the trusted stations clients.
Delete Selected	Select the unwanted trusted station MAC addresses and then click the Delete Selected button to eliminate them.
Delete All	Click to delete all the trusted station MAC addresses in the table.
Reset	Click to clear the current settings.

Station List

Here shows the information of stations that connected with the AP.

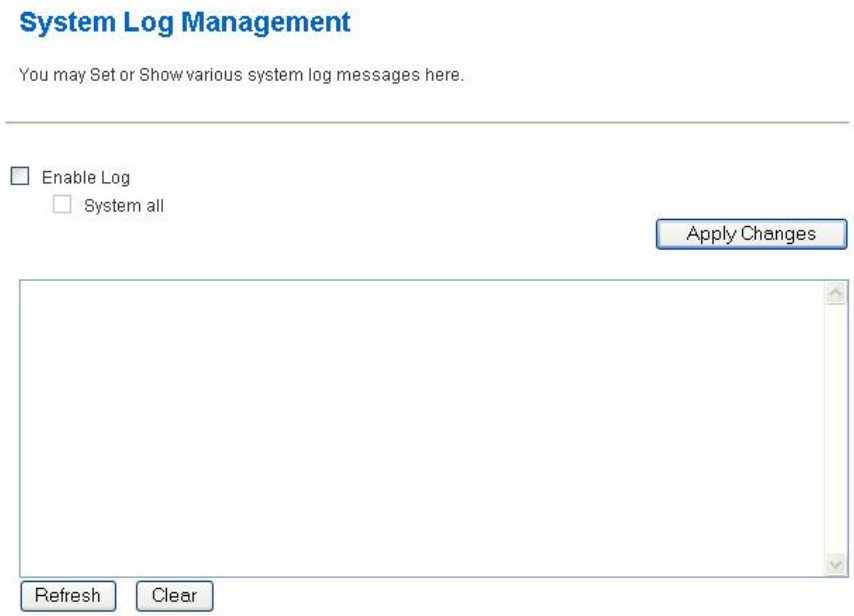
Administration

User/ Password



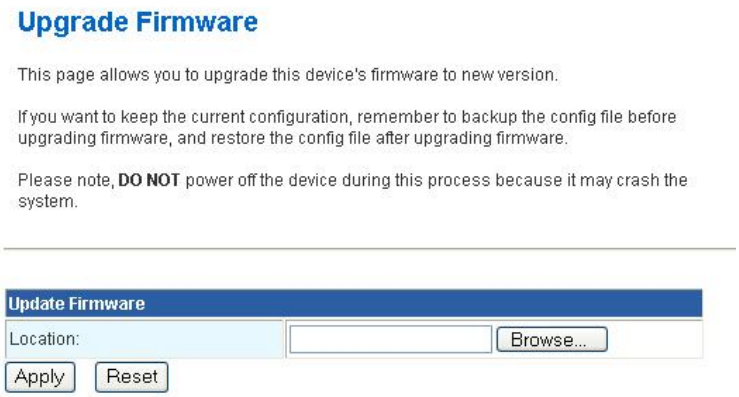
Administrator Settings	
Account	Enter the user name for managing this device. Maximum Input is 16 alphanumeric characters.
Password	Enter the passwords for managing this device.
Apply	Click to save and apply the current settings.
Cancel	Click to discard the current settings.

System Log



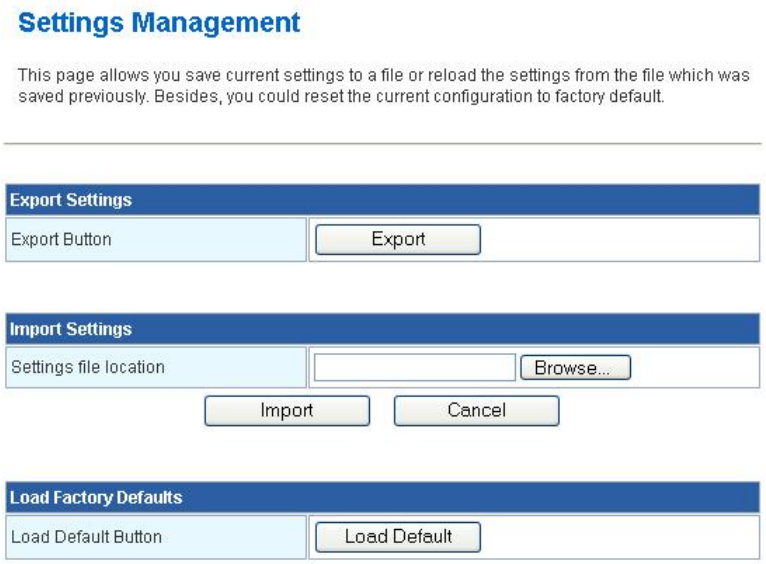
System Log Management	
Enable Log	Check the box to enable this function.
System all	Check to show all system related log files.
Apply Changes	Click this button to save the settings.
Refresh	Click to renew the current log message.
Clear	Click to remove current log message.

Upload Firmware



Update Firmware	
Location	Click the **Browse** button, find and open the firmware file (the browser will display to correct file path).
Apply	Click the Apply button to perform.
Reset	Click Reset to restore to default values.

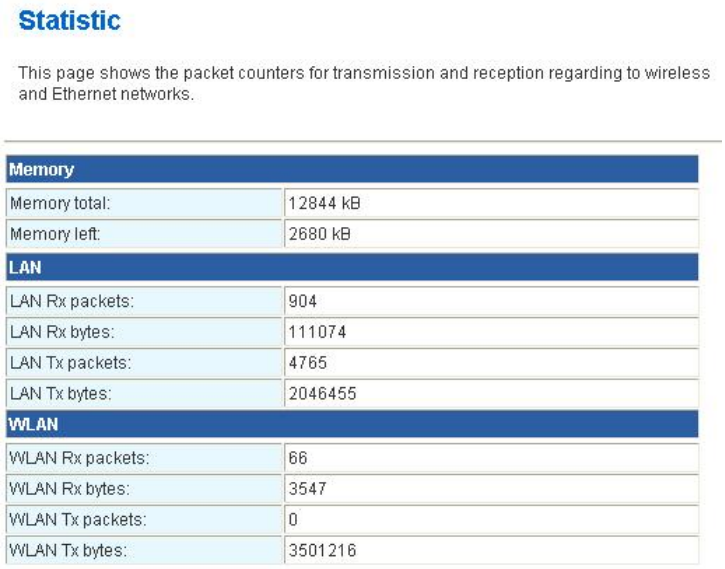
Settings Management



Export Settings	
Export Button	Click the **Export** button to export the current device settings.
Import Settings	
Settings file location	Click the **Browse** button, find and open the file that has been saved before. (The browser will display to correct file path).
Import	Click the **Import** button to import the device settings.
Cancel	Click to discard the current settings.
Load Factory Defaults	
Load Default Button	Click to **Load Default** button to set the device back to factory default settings.

Statistics

This screen displays the transmission and reception statistics on your current networks.



Statistic

This page shows the packet counters for transmission and reception regarding to wireless and Ethernet networks.

Memory	
Memory total:	12844 kB
Memory left:	2680 kB
LAN	
LAN Rx packets:	904
LAN Rx bytes:	111074
LAN Tx packets:	4765
LAN Tx bytes:	2046455
WLAN	
WLAN Rx packets:	66
WLAN Rx bytes:	3547
WLAN Tx packets:	0
WLAN Tx bytes:	3501216

Chapter 4: PC Configuration

Overview

For each PC, the following may need to be configured:

- TCP/IP network settings
- Internet Access configuration
- Wireless configuration

Windows Clients

- This section describes how to configure Windows clients for Internet access via the Wireless Device.
- The first step is to check the PC's TCP/IP settings.
- The Wireless Device uses the TCP/IP network protocol for all functions, so it is essential that the TCP/IP protocol be installed and configured on each PC.

TCP/IP Settings - Overview

If using default Wireless Device settings, and default Windows TCP/IP settings, no changes need to be made.

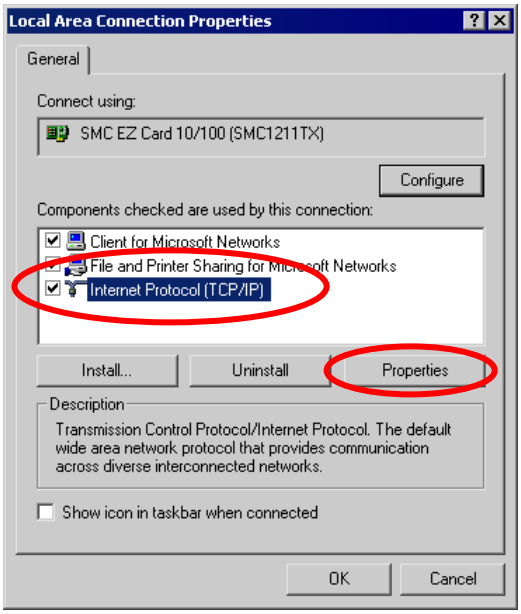
- By default, the Wireless Device will act as a DHCP Server, automatically providing a suitable IP Address (and related information) to each PC when the PC boots.
- For all non-Server versions of Windows, the default TCP/IP setting is to act as a DHCP client.

If using a Fixed (specified) IP address, the following changes are required:

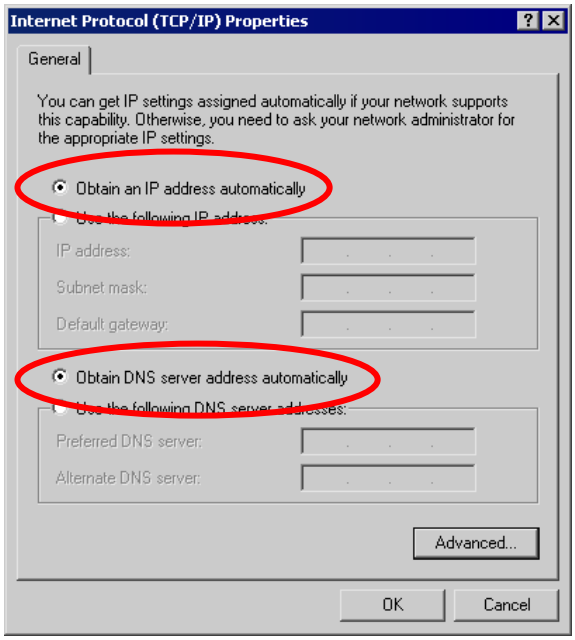
- The *Gateway* must be set to the IP address of the Wireless Device.
- The *DNS* should be set to the address provided by your ISP.

Checking TCP/IP Settings - Windows 2000

1. Select Control Panel - Network and Dial-up Connection.
2. Right - click the *Local Area Connection* icon and select *Properties*. You should see a screen like the following:



3. Select the *TCP/IP* protocol for your network card.
4. Click on the *Properties* button. You should then see a screen like the following.



5. Ensure your TCP/IP settings are correct, as described below.

Using DHCP

- To use DHCP, select the radio button *Obtain an IP Address automatically*. This is the default Windows setting. **Using this is recommended**. By default, the Wireless Device will act as a DHCP Server.
- Restart your PC to ensure it obtains an IP Address from the Wireless Device.

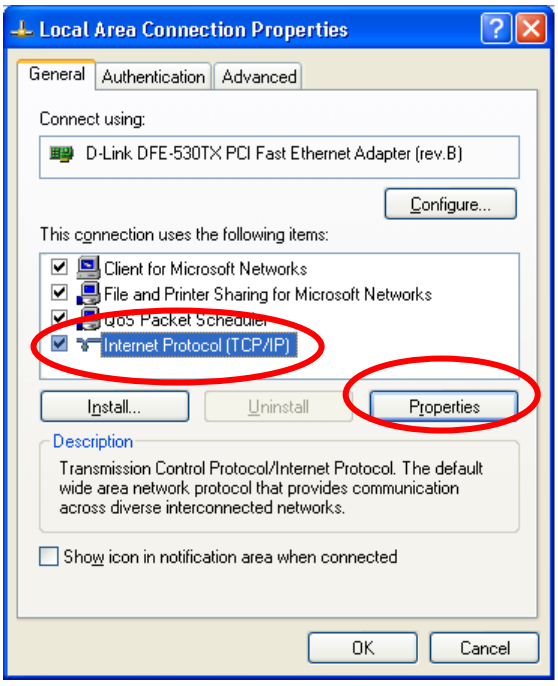
Using a fixed IP Address ("Use the following IP Address")

If your PC is already configured, check with your network administrator before making the following changes.

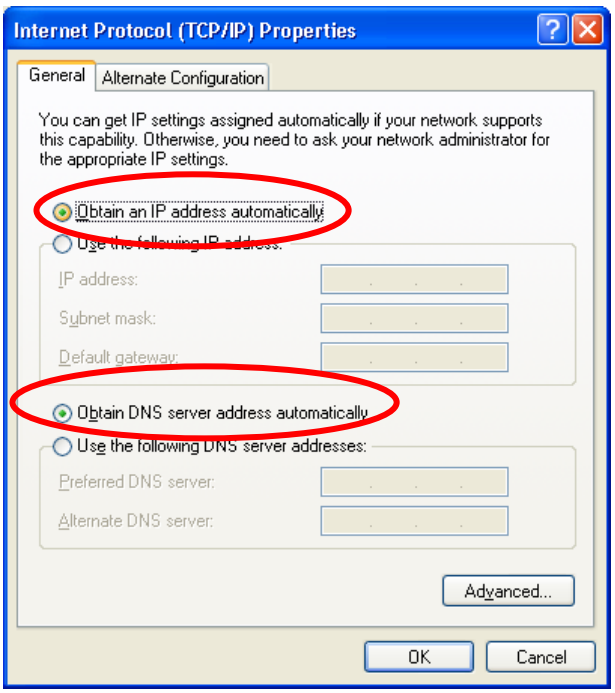
- Enter the Wireless Device's IP address in the *Default gateway* field and click *OK*. (Your LAN administrator can advise you of the IP Address they assigned to the Wireless Device.)
- If the *DNS Server* fields are empty, select *Use the following DNS server addresses*, and enters the DNS address or addresses provided by your ISP, then click *OK*.

Checking TCP/IP Settings - Windows XP

1. Select Control Panel - Network Connection.
2. Right click the *Local Area Connection* and choose *Properties*. You should see a screen like the following:



3. Select the *TCP/IP* protocol for your network card.
4. Click on the *Properties* button. You should then see a screen like the following.



5. Ensure your TCP/IP settings are correct.

Using DHCP

- To use DHCP, select *Obtain an IP Address automatically*. This is the default Windows setting. **Using this is recommended**. By default, the Wireless Device will act as a DHCP Server.
- Restart your PC to ensure it obtains an IP Address from the Wireless Device.

Using a fixed IP Address ("Use the following IP Address")

If your PC is already configured, check with your network administrator before making the following changes.

- In the *Default gateway* field, enter the Wireless Device's IP address and click *OK*. Your LAN administrator can advise you of the IP Address they assigned to the Wireless Device.
- If the *DNS Server* fields are empty, select *Use the following DNS server addresses*, and enters the DNS address or addresses provided by your ISP, then click *OK*.

Internet Access

To configure your PCs to use the Wireless Device for Internet access:

- Ensure that the DSL modem, Cable modem, or other permanent connection is functional.
- Use the following procedure to configure your Browser to access the Internet via the LAN, rather than by a Dial-up connection.

For Windows 2000

1. Select Start Menu - Settings - Control Panel - Internet Options.
2. Select the Connection tab, and click the *Setup* button.
3. Select "I want to set up my Internet connection manually, or I want to connect through a local area network (LAN)" and click *Next*.
4. Select "I connect through a local area network (LAN)" and click *Next*.
5. Ensure all of the boxes on the following Local area network Internet Configuration screen are **unchecked**.
6. Check the "No" option when prompted "Do you want to set up an Internet mail account now?"
7. Click *Finish* to close the Internet Connection Wizard. Setup is now completed.

For Windows XP

1. Select Start Menu - Control Panel - Network and Internet Connections.
2. Select *Set up or change your Internet Connection*.
3. Select the *Connection* tab, and click the *Setup* button.
4. Cancel the pop-up "Location Information" screen.
5. Click *Next* on the "New Connection Wizard" screen.
6. Select "Connect to the Internet" and click *Next*.
7. Select "Set up my connection manually" and click *Next*.
8. Check "Connect using a broadband connection that is always on" and click *Next*.
9. Click *Finish* to close the New Connection Wizard. Setup is now completed.

Accessing AOL

To access AOL (America On Line) through the Wireless Device, the *AOL for Windows* software must be configured to use TCP/IP network access, rather than a dial-up connection. The configuration process is as follows:

1. Start the *AOL for Windows* communication software. Ensure that it is Version 2.5, 3.0 or later. This procedure will not work with earlier versions.
2. Click the *Setup* button.
3. Select *Create Location*, and change the location name from "New Locality" to "Wireless Device."
4. Click *Edit Location*. Select *TCP/IP* for the *Network* field. (Leave the *Phone Number* blank.)
5. Click *Save*, then *OK*. Configuration is now complete.
6. Before clicking "Sign On", always ensure that you are using the "Wireless Device" location.

Macintosh Clients

From your Macintosh, you can access the Internet via the Wireless Device. The procedure is as follows.

1. Open the TCP/IP Control Panel.
2. Select *Ethernet* from the *Connect via* pop-up menu.
3. Select *Using DHCP Server* from the *Configure* pop-up menu. The DHCP Client ID field can be left blank.
4. Close the TCP/IP panel, saving your settings.

Note:

If using manually assigned IP addresses instead of DHCP, the required changes are:

- Set the *Device Address* field to the Wireless Device's IP Address.
- Ensure your DNS settings are correct.

Linux Clients

To access the Internet via the Wireless Device, it is only necessary to set the Wireless Device as the "Gateway".
Ensure you are logged in as "root" before attempting any changes.

Fixed IP Address

By default, most Unix installations use a fixed IP Address. If you wish to continue using a fixed IP Address, make the following changes to your configuration.

- Set your "Default Gateway" to the IP Address of the Wireless Device.
- Ensure your DNS (Name server) settings are correct.

To act as a DHCP Client (Recommended)

The procedure below may vary according to your version of Linux and X -windows shell.

1. Start your X Windows client.
2. Select *Control Panel - Network*
3. Select the "Interface" entry for your Network card. Normally, this will be called "eth0".
4. Click the *Edit* button, set the "protocol" to "DHCP", and save this data.
5. To apply your changes:
   - Use the "Deactivate" and "Activate" buttons, if available.
   - OR, restart your system.

Other Unix Systems

To access the Internet via the Wireless Device:

- Ensure the "Gateway" field for your network card is set to the IP Address of the Wireless Device.
- Ensure your DNS (Name Server) settings are correct.

Wireless Station Configuration

- This section applies to all Wireless stations wishing to use the Wireless Device's Access Point, regardless of the operating system that is used on the client.
- To use the Wireless Station with Wireless Device, each Wireless Station must have compatible settings, as follows:

Mode	The mode must be set to ***Infrastructure***.
SSID (ESSID)	This must match the value used on the Wireless Device. The default value is **Untitled**. **Note! *The SSID is case sensitive.***
WEP	By default, the security setting on the Wireless Device is **Disabled**. • If security setting remains disabled on the Wireless Device, all stations must have it disabled. • If security setting is enabled on the Wireless Device, each station must use the same settings as the Wireless Device.
WPA **WPA2 (AES)** **WPA2 Mixed**	WPA (TKIP/AES)/ WPA2 (AES)/ WPA2 Mixed: If one of these securities is enabled on the Wireless Device, each station must use the same settings as the Wireless Device. If there is no security is enabled on the Wireless Device, the security of each station should be disabled as well.

Note: By default, the Wireless Device will allow both 802.11b and 802.11g connections.

Appendix A:

Troubleshooting

Overview

This chapter covers some common problems that may be encountered while using the Wireless Device and some possible solutions to them. If you follow the suggested steps and the Wireless Device still does not function properly, contact your dealer for further advice.

General Problems

Problem 1:	**Can't connect to the Wireless Device to configure it.**
Solution 1:	Check the following: • The Wireless Device is properly installed, LAN connections are OK, and it is powered ON. • Ensure that your PC and the Wireless Device are on the same network segment. (If you don't have a device, this must be the case.) • If your PC is set to "Obtain an IP Address automatically" (DHCP client), restart it. • If your PC uses a Fixed (Static) IP address, ensure that it is using an IP Address within the range 10.10.10.1 to 10.10.10.253 and thus compatible with the Wireless Device's default IP Address of 10.10.10.254. Also, the Network Mask should be set to 255.255.255.0 to match the Wireless Device. In Windows, you can check these settings by using *Control Panel-Network* to check the *Properties* for the TCP/IP protocol.

Internet Access

Problem 1:	**When I enter a URL or IP address I get a time out error.**
Solution 1:	A number of things could be causing this. Try the following troubleshooting steps. • Check if other PCs work. If they do, ensure that your PCs IP settings are correct. If using a Fixed (Static) IP Address, check the Network Mask, Default gateway and DNS as well as the IP Address. • If the PCs are configured correctly, but still not working, check the Wireless Device. Ensure that it is connected and ON. Connect to it and check its settings. (If you can't connect to it, check the LAN and power connections.) • If the Wireless Device is configured correctly, check your Internet connection (DSL/Cable modem etc) to see that it is working correctly.
Problem 2:	**Some applications do not run properly when using the Wireless Device.**
Solution 2:	The Wireless Device processes the data passing through it, so it is not transparent. Use the *Special Applications* feature to allow the use of Internet applications, which do not function correctly. If this does solve the problem you can use the *DMZ* function. This should work with almost every application, but: • It is a security risk, since the firewall is disabled.

	• Only one (1) PC can use this feature.

Wireless Access

Problem 1:	**My PC can't locate the Wireless Device.**
Solution 1:	Check the following: • Your PC is set to *Infrastructure Mode*. (Access Points are always in *Infrastructure Mode*.) • The SSID on your PC and the Wireless Device are the same. Remember that the SSID is case-sensitive. So, for example "Workgroup" does NOT match "workgroup". • Both your PC and the Wireless Device must have the same setting for security. The default setting for the Wireless Device is disabled, so your wireless station should also have security setting disabled. • If security setting is enabled on the Wireless Device, your PC must have it enabled, and the password or key must match. • If the Wireless Device's *Wireless* screen is set to *Allow LAN access to selected Wireless Stations only*, then each of your Wireless stations must have been selected, or access will be blocked. • To see if radio interference is causing a problem, see if connection is possible when close to the Wireless Device. Remember that the connection range can be as little as 100 feet in poor environments.
Problem 2:	**Wireless connection speed is very slow.**
Solution 2:	The wireless system will connect at the highest possible speed, depending on the distance and the environment. To obtain the highest possible connection speed, you can experiment with the following: • **Wireless Device location.** Try adjusting the location and orientation of the Wireless Device. • **Wireless Channel.** If interference is the problem, changing to another channel may show a marked improvement. • **Radio Interference.** Other devices may be causing interference. You can experiment by switching other devices Off, and see if this helps. Any "noisy" devices should be shielded or relocated. • **RF Shielding**. Your environment may tend to block transmission between the wireless stations. This will mean high access speed is only possible when close to the Wireless Device.

Appendix B:

About Wireless LANs

BSS

BSS

A group of Wireless Stations and a single Access Point, all using the same ID (SSID), form a Basic Service Set (BSS).
Using the same SSID is essential. Devices with different SSIDs are unable to communicate with each other.

Channels

The Wireless Channel sets the radio frequency used for communication.

- Access Points use a fixed Channel. You can select the Channel used. This allows you to choose a Channel which provides the least interference and best performance. In the USA and Canada, 11 channel are available. If using multiple Access Points, it is better if adjacent Access Points use different Channels to reduce interference.
- In "Infrastructure" mode, Wireless Stations normally scan all Channels, looking for an Access Point. If more than one Access Point can be used, the one with the strongest signal is used. (This can only happen within an ESS.)

Note to US model owner: To comply with US FCC regulation, the country selection function has been completely removed from all US models. The above function is for non-US models only.

Security

Authentication methods include **Disable**, **Open, Shared, WEP Auto, WPA, WPA-PSK, WPA2, WPA2-PSK**, **WPA-PSK/WPA2-PSK, WPA1/WPA2 and 802.1X.** Once you choose your authentication, you then need to select the **Data Encryption** methods which may includes **WEP** Key, **Pass Phrase** and **Radius** Server settings.

Encryption

Enabling **WEP** can protect your data from eavesdroppers. There are two levels of WEP Encryption: 64 bits and 128 bits. 64 bits WEP encryption requires enter 10 Hex characters as a "secret key", whereas 128 bits WEP requires users to enter 26 Hex characters as "secret key".
PASS PHRASE is applicable only when you select to use WPA-PSK authentication. You will need to enter an 8~63 characters password to kick off the encryption process, which will generate four WEP keys automatically.
RADIUS setup is used to set up additional parameters for authorizing wireless clients through RADIUS server. The **RADIUS** setup is required when you select to use **Open System with 802.1x** or **WPA/WPA2** authentication.

Open, Shared, WEP auto

With **Shared Key or Open System,** the Wireless Device can automatically change its authentication method to **Shared Key** or **Open System** depending on its client's setting.
WEP (Wired Equivalent Privacy) is a standard for encrypting data before it is transmitted.

This is desirable because it is impossible to prevent snoopers from receiving any data that is transmitted by your Wireless Stations. But if the data is encrypted, then it is meaningless unless the receiver can decrypt it.
If WEP is used, the Wireless Stations and the Access Point must have the same settings for each of the following:

WEP	Off, 64 Bit, 128 Bit.
Key	For 64 Bit encryption, the Key value must match. For 128 Bit encryption, the Key value must match.
WEP Authentication	Open System or Shared Key.

WPA/WPA2

WPA/WPA2 (Wi-Fi Protected Access) is more secure than WEP. It uses a "Shared Key" which allows the encryption keys to be regenerated at a specified interval. There are four encryption options: **TKIP, AES, TKIP-AES** and additional setup for **RADIUS** is required in this method.

WPA-PSK/WPA2-PSK

WPA/WPA2 (Wi-Fi Protected Access using Pre-Shared Key) is recommended for users who are not using a RADIUS server in a home environment and all their clients support WPA/WPA2. This method provides a better security.

Encryption	WEP Key 1~4	Passphrase
TKIP	NOT REQUIRED	8-63 characters
AES		

802.1x

With **802.1x** authentication, a wireless PC can join any network and receive any messages that are not encrypted, however, additional setup for **RADIUS** to issue the WEP key dynamically will be required.

Wireless LAN Configuration

To allow Wireless Stations to use the Access Point, the Wireless Stations and the Access Point must use the same settings, as follows:

Mode	On client Wireless Stations, the mode must be set to "Infrastructure." (The Access Point is always in "Infrastructure" mode.)
SSID (ESSID)	Wireless Stations should use the same SSID (ESSID) as the Access Point they wish to connect to, but the SSID can not set to be null (blank).
WEP	The Wireless Stations and the Access Point must use the same settings for WEP (Off, 64 Bit, 128 Bit). **WEP Key:** If WEP is enabled, the Key must be the same on the Wireless Stations and the Access Point. **WEP Authentication:** If WEP is enabled, all Wireless Stations must use the same setting as the Access Point (either "Open System" or "Shared Key").

WPA **WPA2 (AES)** **WPA2 Mixed**	WPA (TKIP/AES)/ WPA2 (AES)/ WPA2 Mixed: If one of these securities is enabled on the Wireless Device, each station must use the same settings as the Wireless Device. If there is no security is enabled on the Wireless Device, the security of each station should be disabled as well.

Regulatory Approvals

CE Standards

This product complies with the 99/5/EEC directives, including the following safety and EMC standards:

- EN300328-2
- EN301489-1/-17
- EN60950

CE Marking Warning

This is a Class B product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.