Multi-Function 802.11b/g Wireless Router

802.11g/802.11b Wireless Access Point

Broadband Internet Access

4-Port Switching Hub

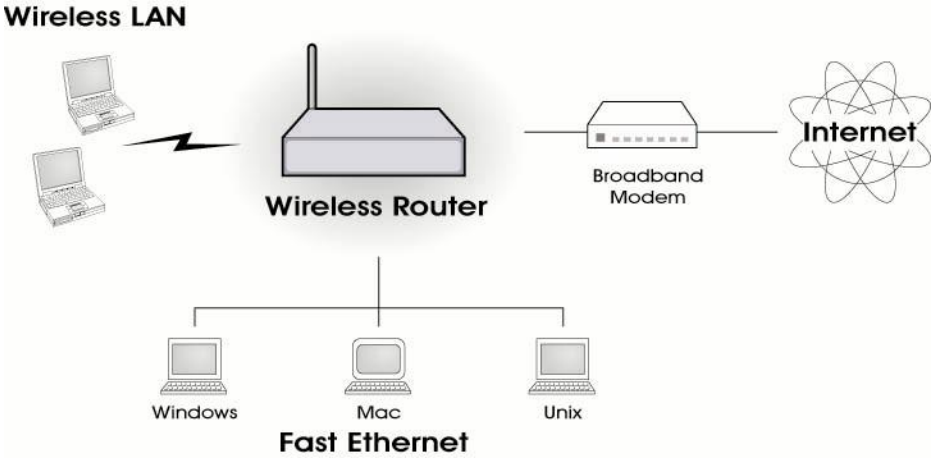
User’s Manual

Table of Contents

Chapter 1: Introduction

Congratulations on the purchase of your new Wireless Router. The Wireless Router is a multi-function device providing the following services:

- ***Shared Broadband Internet Access*** for all LAN users.
- ***4-Port Switching Hub*** for 10BaseT or 100BaseT connections.
- ***Wireless Access Point*** for 802.11b and 802.11g Wireless Stations.



Wireless Router Features

The Wireless Router incorporates many advanced features, carefully designed to provide sophisticated functions while being easy to use.

Internet Access Features

- ***Shared Internet Access.*** All users on the LAN or WLAN can access the Internet through the Wireless Router, using only a single external IP Address. The local (invalid) IP Addresses are hidden from external sources. This process is called NAT (Network Address Translation).
- ***DSL & Cable Modem Support.*** The Wireless Router has a 10/100BaseT Ethernet port for connecting a DSL or Cable Modem. All popular DSL and Cable Modems are supported. SingTel RAS and Big Pond (Australia) login support is also included.
- ***PPPoE,*** and ***PPTP.*** The Internet (WAN port) connection supports PPPoE (PPP over Ethernet), PPTP (Peer-to-Peer Tunneling Protocol), as well as "Direct Connection" type services. Unnumbered IP with PPPoE is also supported.
- ***Fixed or Dynamic IP Address.*** On the Internet (WAN port) connection, the Wireless Router supports both Dynamic IP Address (IP Address is allocated on connection) and Fixed IP Address.

Advanced Internet Functions

- ***Communication Applications.*** Support for Internet communication applications, such as interactive Games, Telephony, and Conferencing applications, which are often difficult to use when behind a Firewall, is included.
- ***Special Internet Applications.*** Applications which use non-standard connections or port numbers are normally blocked by the Firewall. The ability to define and allow such applications is provided, to enable such applications to be used normally.

- ***Virtual Servers.*** This feature allows Internet users to access Internet servers on your LAN. The required setup is quick and easy.
- ***DDNS Support.*** DDNS (Dynamic DNS) allows Internet users to connect to Virtual Servers on your LAN using a domain name, even if your IP address is not fixed.
- ***DMZ.*** For each WAN (Internet) IP address allocated to you, only one (1) PC on your local LAN can be configured to allow unrestricted 2-way communication with Servers or individual users on the Internet. This provides the ability to run programs which are incompatible with Firewalls.
- ***URL Filter.*** Use the URL Filter to block access to undesirable Web sites by LAN users.
- ***Internet Access Log.*** See which Internet connections have been made.
- ***Access Control.*** Using the Access Control feature, you can assign LAN users to different groups, and determine which Internet services are available to each group.
- ***VPN Pass through Support.*** PCs with VPN (Virtual Private Networking) software using PPTP, L2TP and IPSec are transparently supported - no configuration is required.

Wireless Features

- ***Standards Compliant.*** The Wireless Router complies with the IEEE802.11g (DSSS) specifications for Wireless LANs.
- ***Supports both 802.11b and 802.11g Wireless Stations.*** The 802.11g standard provides for backward compatibility with the 802.11b standard, so both 802.11b and 802.11g Wireless stations can be used simultaneously.
- ***Speeds to 54Mbps.*** All speeds up to the 802.11g maximum of 54Mbps are supported.
- ***WEP support.*** Support for WEP (Wired Equivalent Privacy) is included. Key sizes of 64 Bit and 128 Bit are supported.
- ***Wireless MAC Access Control.*** The Wireless Access Control feature can check the the MAC address (hardware address) of Wireless stations to ensure that only trusted Wireless Stations can access your LAN.
- ***Simple Configuration.*** If the default settings are unsuitable, they can be changed quickly and easily.

LAN Features

- ***4-Port Switching Hub.*** The Wireless Router incorporates a 4-port 10/100BaseT switching hub, making it easy to create or extend your LAN.
- ***DHCP Server Support.*** **D**ynamic **H**ost **C**onfiguration **P**rotocol provides a dynamic IP address to PCs and other devices upon request. The Wireless Router can act as a **DHCP Server** for devices on your local LAN and WLAN.
- .

Configuration & Management

- ***Easy Setup.*** Use your WEB browser from anywhere on the LAN or WLAN for configuration.
- ***Configuration File Upload/Download.*** Save (download) the configuration data from the Wireless Router to your PC, and restore (upload) a previously-saved configuration file to the Wireless Router.
- ***Remote Management.*** The Wireless Router can be managed from any PC on your LAN. And, if the Internet connection exists, it can also (optionally) be configured via the Internet.

- ***Network Diagnostics.*** You can use the Wireless Router to perform a *Ping* or *DNS lookup*.
- ***UPnP Support.*** UPnP (Universal Plug and Play) allows automatic discovery and configuration of the Wireless Router. UPnP is by supported by Windows ME, XP, or later.

Security Features

- ***Password - protected Configuration***. Optional password protection is provided to prevent unauthorized users from modifying the configuration data and settings.
- ***Wireless LAN Security***. WEP (Wired Equivalent Privacy) is supported, as well as Wireless access control to prevent unknown wireless stations from accessing your LAN.
- ***NAT Protection.*** An intrinsic side effect of NAT (Network Address Translation) technology is that by allowing all LAN users to share a single IP address, the location and even the existence of each PC is hidden. From the external viewpoint, there is no network, only a single device - the Wireless Router.
- ***Protection against DoS attacks.*** DoS (Denial of Service) attacks can flood your Internet connection with invalid packets and connection requests, using so much bandwidth and so many resources that Internet access becomes unavailable. The Wireless Router incorporates protection against DoS attacks.

Package Contents

The following items should be included:

- The Wireless Router Unit
- Power Adapter
- Quick Installation Guide
- CD-ROM containing the on-line manual.

If any of the above items are damaged or missing, please contact your dealer immediately.

Physical Details

Front-mounted LEDs

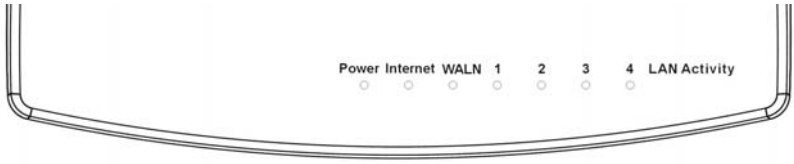


Figure 1: Front Panel

Power LED

On - Power on.

Off - No power.

Internet LED

On - Connection to the Broadband Modem attached to the WAN (Internet) port is established.

Off - No connection to the Broadband Modem.

Flashing - Data is being transmitted or received via the WAN port.

WLAN LED

On - Wireless connection available; Wireless Access Point is ready for use.

Off - No Wireless connection available.

Flashing - Data is being transmitted or received via the Wireless access point. Data includes "network traffic" as well as user data.

LAN LEDs

For each port, there are 2 LEDs

- **Link/Act**
  - **On** - Corresponding LAN (hub) port is active.
  - **Off** - No active connection on the corresponding LAN (hub) port.
  - **Flashing** - Data is being transmitted or received via the corresponding LAN (hub) port.
- **100**
  - **On** - Corresponding LAN (hub) port is using 100BaseT.
  - **Off** - Corresponding LAN (hub) port connection is using 10BaseT, or no active connection.

Rear Panel

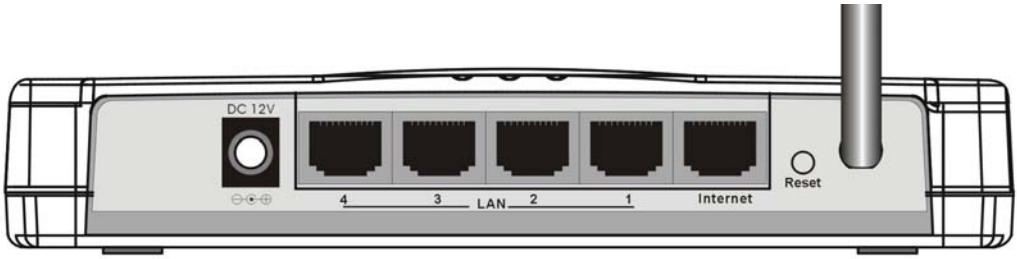


Figure 2: Rear Panel

Power port	Connect the supplied power adapter here.
10/100BaseT LAN port	Use standard LAN cables (RJ45 connectors) to connect your PCs to these ports. If required, any port can be connected to another hub. Any LAN port will automatically function as an "Uplink" port when necessary.
Internet port (10/100BaseT)	Connect the DSL or Cable Modem here. If your modem came with a cable, use the supplied cable. Otherwise, use a standard LAN cable.
Reset Button	This button has two (2) functions: • **Reboot**. When pressed within 3~5 seconds, the power LED lights amber then released, the Wireless Router will reboot (restart). • **Clear All Data**. This button can also be used to clear ALL data and restore ALL settings to the factory default values. To Clear All Data and restore the factory default values: 1. After Power On. 2. Hold the Reset Button down. 3. Keep holding the Reset Button more than 5 seconds, until the Amber LED has flashed. 4. Release the Reset Button. The Wireless Router is now using the factory default values.

About the Operation Mode

AP 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.

Bridge 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 …etc. 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.

Repeater

Refer to the illustration below. While acting as Bridges, AP1 (with Station 1 being associated to) and AP2 (with Station 2 being associated) can communicate with each other through wireless interface (with WDS). Thus Station 1 can communicate with Station 2 and both Station 1 and Station 2 are able to access the Internet if only AP1 or AP2 has the Internet connection.

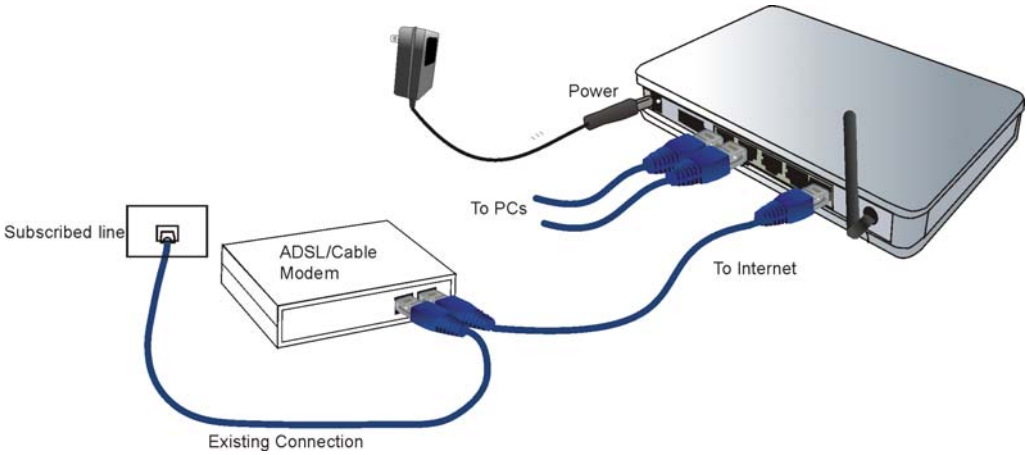
To set the operation mode to **Bridge**, please go to "**Wireless →Basic Settings"**, in the "**Mode**" field click the down arrow ▼ to select **AP** mode. And go to "**Wireless →WDS Settings"** to enable **WDS.**

Chapter 2: Installation

Requirements

- Network cables. Use standard 10/100BaseT network (UTP) cables with RJ45 connectors.
- TCP/IP protocol must be installed on all PCs.
- For Internet Access, an Internet Access account with an ISP, and either of a DSL or Cable modem (for WAN port usage)
- To use the Wireless Access Point, all Wireless devices must be compliant with the IEEE802.11b or IEEE802.11g specifications.

Procedure



1. Choose an Installation Site

Select a suitable place on the network to install the Wireless Router.
Ensure the Wireless Router and the DSL/Cable modem are powered OFF.

2. Connect LAN Cables

Use standard LAN cables to connect PCs to the Switching Hub ports on the Wireless Router. Both 10BaseT and 100BaseT connections can be used simultaneously.
If required, connect any port to a normal port on another Hub, using a standard LAN cable. Any LAN port on the Wireless Router will automatically function as an "Uplink" port when required.

3. Connect WAN Cable

Connect the DSL or Cable modem to the WAN port on the Wireless Router. Use the cable supplied with your DSL/Cable modem. If no cable was supplied, use a standard cable.

4. Power Up

- Power on the Cable or DSL modem.
- Connect the supplied power adapter to the Wireless Router and power up.
  Use only the power adapter provided. Using a different one may cause hardware damage

5. Check the LEDs

- The *Power* LED should be ON.
- The *Status* LED should flash, then turn Off. If it stays on, there is a hardware error.
- For each LAN (PC) connection, the LAN *Link/Act* LED should be ON (provided the PC is also ON.)
- The *WAN* LED should be ON.
- The *WLAN* LED should be ON

For more information, refer to *Front-mounted LEDs* in Chapter 1.

Chapter 3: Setup

Overview

This chapter describes the setup procedure for:

- Internet Access
- LAN configuration
- Wireless setup
- Assigning a Password to protect the configuration data.

PCs on your local LAN may also require configuration. For details, see *Chapter 4 - PC Configuration*.

Other configuration may also be required, depending on which features and functions of the Wireless Router you wish to use. Use the table below to locate detailed instructions for the required functions.

Configuration Program

The Wireless Router contains an HTTP server. This enables you to connect to it, and configure it, using your Web Browser. **Your Browser must support JavaScript**.

The configuration program has been tested on the following browsers:

- Netscape V4.08 or later
- Internet Explorer V4 or later

Preparation

Before attempting to configure the Wireless Router, please ensure that:

- Your PC can establish a physical connection to the Wireless Router. The PC and the Wireless Router must be directly connected (using the Hub ports on the Wireless Router) or on the same LAN segment.
- The Wireless Router must be installed and powered ON.
- If the Wireless Router's default IP Address (192.168.1.254) is already used by another device, the other device must be turned OFF until the Wireless Router is allocated a new IP Address during configuration.

Using UPnP

If your Windows system supports UPnP, an icon for the Wireless Router will appear in the system tray, notifying you that a new network device has been found, and offering to create a new desktop shortcut to the newly-discovered device.

- Unless you intend to change the IP Address of the Wireless Router, you can accept the desktop shortcut.
- Whether you accept the desktop shortcut or not, you can always find UPnP devices in *My Network Places* (previously called *Network Neighborhood*).
- Double - click the icon for the Wireless Router (either on the Desktop, or in *My Network Places*) to start the configuration. Refer to the following section *Setup Wizard* for details of the initial configuration process.

Using your Web Browser

To establish a connection from your PC to the Wireless Router:

1. After installing the Wireless Router in your LAN, start your PC. If your PC is already running, restart it.
2. Start your WEB browser.
3. In the *Address* box, enter "HTTP://" and the IP Address of the Wireless Router, as in this example, which uses the Wireless Router's default IP Address:

   ```
   HTTP://192.168.1.254
   ```

No username and password required for the first login (default setting). However, you can assign a set of username and password for future security. See the *Password Setup* section later in this chapter for details.

If you can't connect

If the Wireless Router does not respond, check the following:

- The Wireless Router is properly installed, LAN connection is OK, and it is powered ON. You can test the connection by using the "Ping" command:
  - Open the MS-DOS window or command prompt window.
  - Enter the command:

    ```
    ping 192.168.1.254
    ```

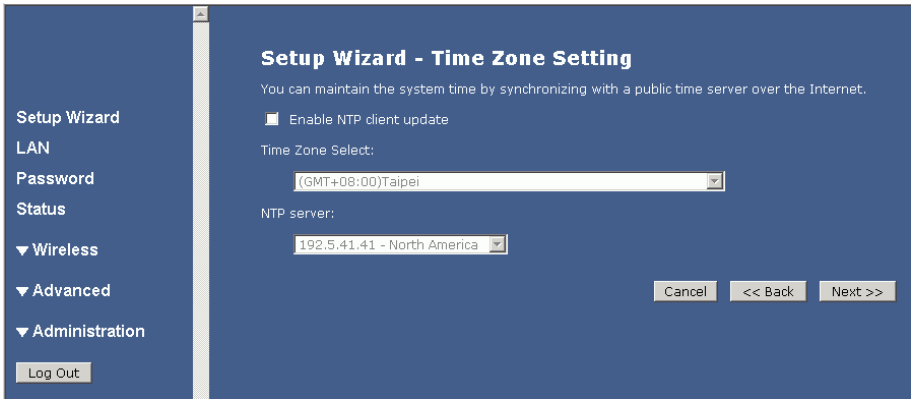
    If no response is received, either the connection is not working, or your PC's IP address is not compatible with the Wireless Router's IP Address. (See next item.)
- If your PC is using a fixed IP Address, its IP Address must be within the range 192.168.1.1 to 192.168.1.253 to be compatible with the Wireless Router's default IP Address of 192.168.1.254. Also, the *Network Mask* must be set to 255.255.255.0. See *Chapter 4 - PC Configuration* for details on checking your PC's TCP/IP settings.
- Ensure that your PC and the Wireless Router are on the same network segment. (If you don't have a router, this must be the case.)
- Ensure you are using the wired LAN interface. The Wireless interface can only be used if its configuration matches your PC's wireless settings.

Setup Wizard

The Setup Wizard provides brief and basic configuration of this device, you may enter each screen to change the default settings. For more detailed settings, you may refer to the "Configuration via Web" section.

1. View the listed configuration items and click **Next** to continue.

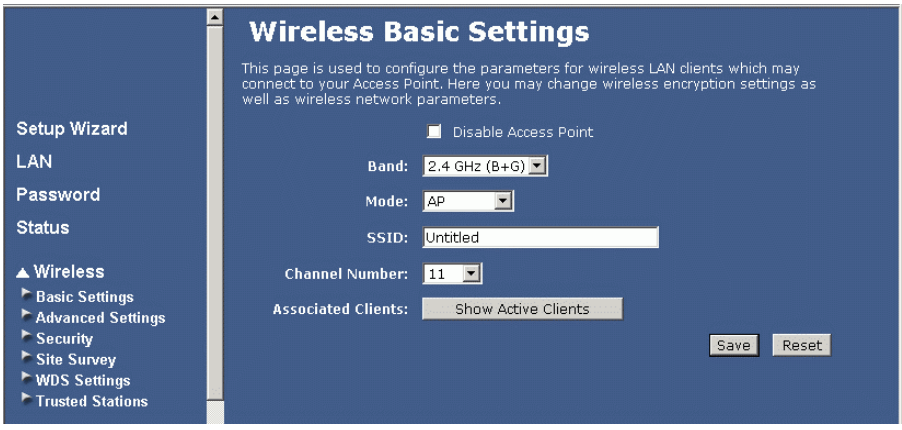
2. Configure Time Zone and NTP server by enabling NTP client update. Click **Next** to continue.



3. Configure the parameters for area network (If you want to change the default parameters) by entering New IP Address and Subnet Mask.

4. Change the access method (Static IP, DHCP, PPPoE or PPTP) by selecting for the pull-down menu. Click **Next** to continue.

5. Configure the parameters for wireless LAN clients. Check the Disable Access Point to disable the settings of this screen. Click **Next** to continue.



6. Manage your wireless network security by selecting the encryption type (None, WEP and WPA (TKIP)) from the pull-down menu. Click **Finish** to exit Set Wizard screen.

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

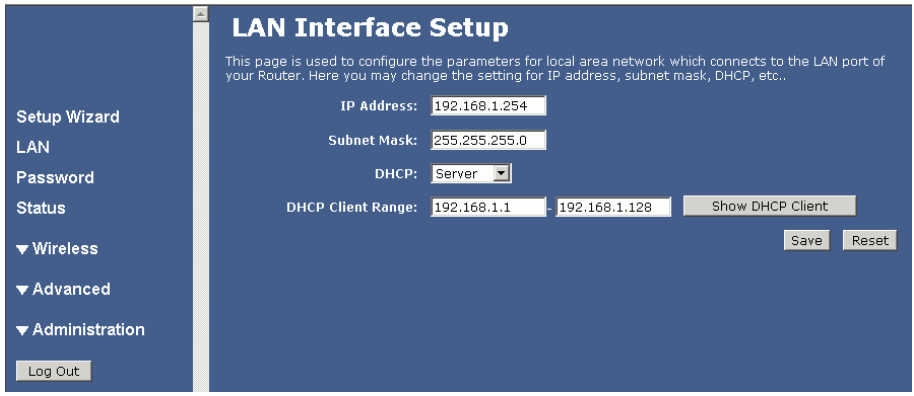
Type	Details	ISP Data required
Dynamic IP Address	Your IP Address is allocated automatically, when you connect to you ISP.	None.
Static (Fixed) IP Address	Your ISP allocates a permanent IP Address to you.	IP Address allocated to you.
PPPoE	You connect to the ISP only when required. The IP address is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

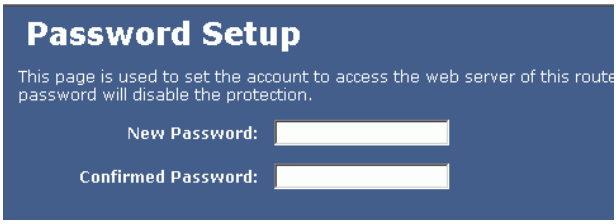
Configuration via Web

LAN Interface Setup



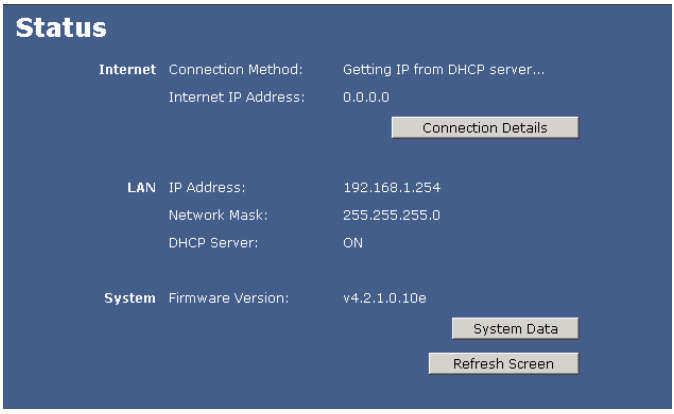
IP Address	Default: 192.168.1.254 (this is the local address of this Router)
Subnet Mask	Default: 255.255.255.0
DHCP	**Disable**: Select to disable this Router to distribute IP Addresses (Disabled) **Server**: Select to enable this Router to distribute IP Addresses (DHCP Server). And the following field will be activated for you to enter the starting IP Address
DHCP Client Range	**The starting address of this local IP network address pool. The pool is a piece of continuous IP address segment. Keep the default value 192.168.1.1 should work for most cases.** • Maximum: **253**. Default value 253 should work for most cases. *Note: If "Continuous IP address poll starts" is set at 192.168.1.1 and the "Number of IP address in pool" is 253, the device will distribute IP addresses from 192.168.1.1 to 192.168.1.253 to all the computers in the network that request IP addresses from DHCP server (Router)*
Show Client	Click to show Active DHCP Client table.
Save	After completing the settings on this page, click **Save** to save the settings.
Reset	Click **Reset** to restore to default values.

Password Setup



New Password	Maximum input is 36 alphanumeric characters (case sensitive)
Confirmed Password	Key in the password again to confirm.
Save	After completing the settings on this page, click **Save** to save the settings.
Reset	Click **Reset** to clear settings.

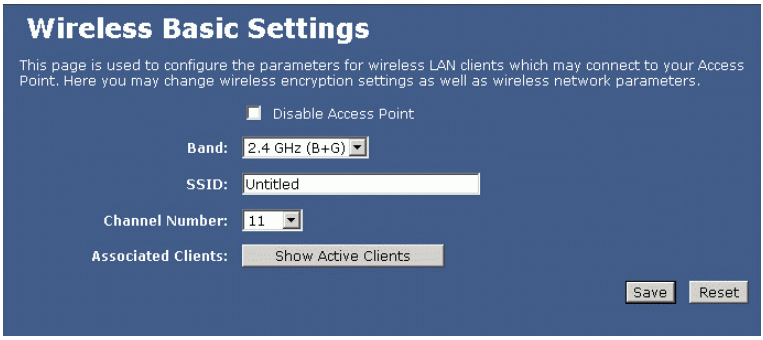
Status



Internet	Shows the internet connection status
LAN	Shows the Local area network information
System	Briefly shows the device name and firmware information
Connection Details	Click to show more details of the internet connection
System Data	Click to show the detailed information of the system
Refresh Screen	Click to refresh all the data

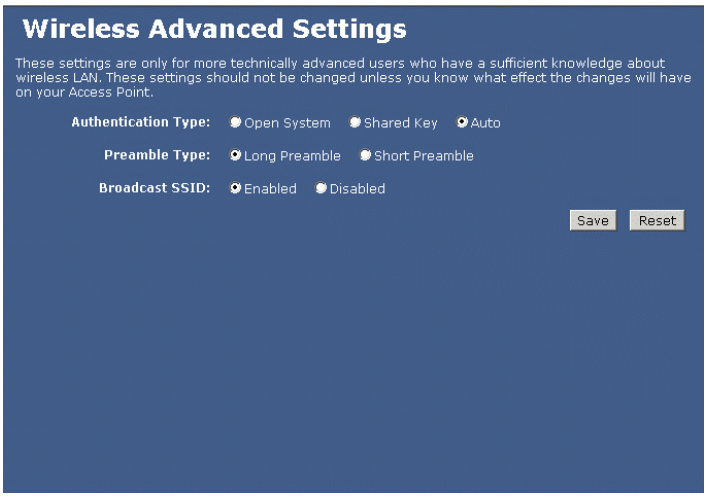
Wireless

Wireless basic Settings



Disable Access Point	Check to disable the AP function. The wireless (WLAN) LED on front panel will remain OFF if the Wireless interface is disabled.
Band	You can choose one mode of the following you need. ⊙ 2.4GHz **(B):** 802.11b supported rate only. ⊙ 2.4GHz **(G):** 802.11g supported rate only. ⊙ 2.4GHz **(B+G):** 802.11b supported rate and 802.11g supported rate. The default is 2.4GHz **(B+G)** mode.
SSID	Shows the SSID name.
Channel Number	Select which channel to be located (from 1 to 11).
Associated Clients	Click to show all the listed active clients.
Save	After completing the settings on this page, click **Save** to save the settings.
Reset	Click **Reset** to restore to default values.

Wireless Advanced Settings



Authentication Type	**Open System**： If your access point/wireless router is using "**Open** " authentication, then the wireless adapter will need to be set to the same authentication type. **Shared Key**: **Shared Key** is when both the sender and the recipient share a secret key. **Auto:** Select **Auto Switch** for the adapter to automatically select the appropriate
Preamble Type	A preamble is a signal used in wireless environment to synchronize the transmitting timing including Synchronization and Start frame delimiter. (**Note**: If you want to change the Preamble type into **Long** or **Short**, please check the setting of AP.)
Broadcast 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.
Save	After completing the settings on this page, click **Save** to save the settings.
Reset	Click **Reset** to restore to default values.

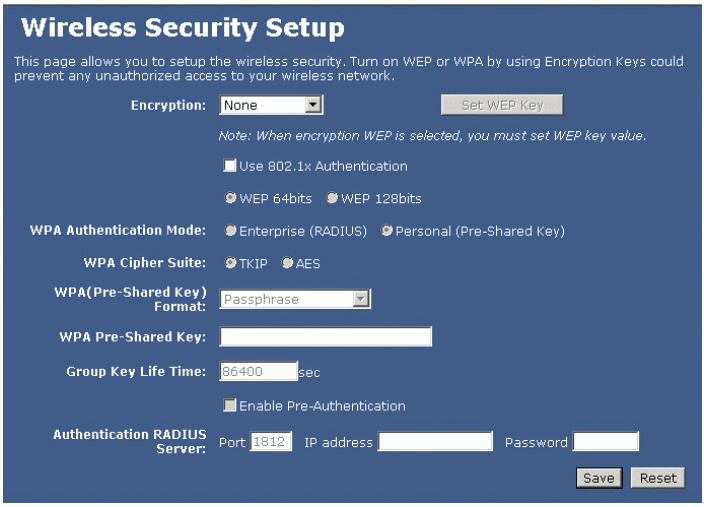
Security

Here you can configure the security of your wireless network. Selecting different method will enable you to have different level of security. Please note that by using any encryption, by which data packet is encrypted before transmission to prevent data packets from being eavesdropped by unrelated people, there may be a significant degradation of the data throughput on the wireless link.

Note: This security function only enabled under **AP mode** and **Repeater mode**.

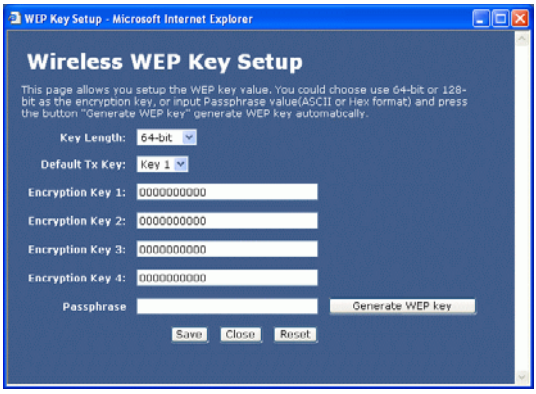
Encryption**: None** (Encryption is set to **None** by default**)**

If **Use 802.1x Authentication** is selected, the RADIUS Server will proceed to check the 802.1x Authentication.



Encryption: WEP

If **WEP** 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.



SET WEP KEY	▪ Click the **Set WEP Keys** will prompt you a window to set **64bit** or **128bit** Encryption. ▪ Select **HEX** if you are using hexadecimal numbers (**0-9, or A-F**). Select **ASCII** if you are using ASCII characters (**case-sensitive**). ▪ **Ten hexadecimal digits** or **five ASCII characters** are needed if **64-bit WEP** is used; **26 hexadecimal digits** or **13 ASCII characters** are needed if **128-bit WEP** is used.

Encryption: WPA (TKIP)

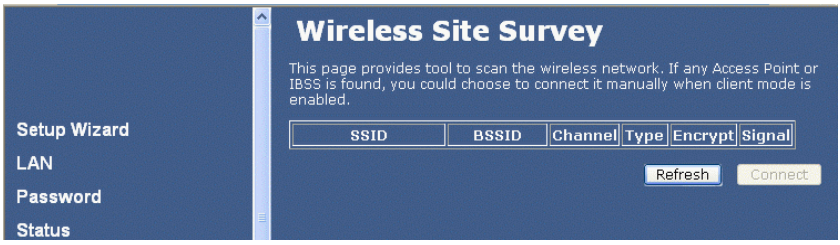
WPA (TKIP): If **WPA** is selected, users will have to select the Authentication modes between **Enterprise (RADIUS)** and **Personal** (**Pre-shared Key)**.

Pre-shared Key	Pre-Shared-Key serves as a password. Users may key in a 1 to 63 characters string to set the password or leave it blank, in which the 802.1x Authentication will be activated. Make sure the same password is used on client's end. There are two formats for choice to set the Pre-shared key, i.e. **Passphrase** and **Hex**. If **Hex** is selected, users will have

	to enter a 64 characters string. For easier configuration, the **Passphrase** (at least 8 characters) format is recommended.
Group Key Life Time	Enter the number of seconds that will elapse before the group key change automatically. The default is 86400 seconds.
Enable Pre-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. Preauthentication 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.
Authentication RADIUS Server	**Port**: Enter the RADIUS Server's port number provided by your ISP. The default is **1812**. **IP Address:** Enter the RADIUS Server's IP Address provided by your ISP. **Password:** Enter the password that the AP shares with the RADIUS Server.
Save	Press to save the new settings on the screen.
Reset	Press to discard the current settings.

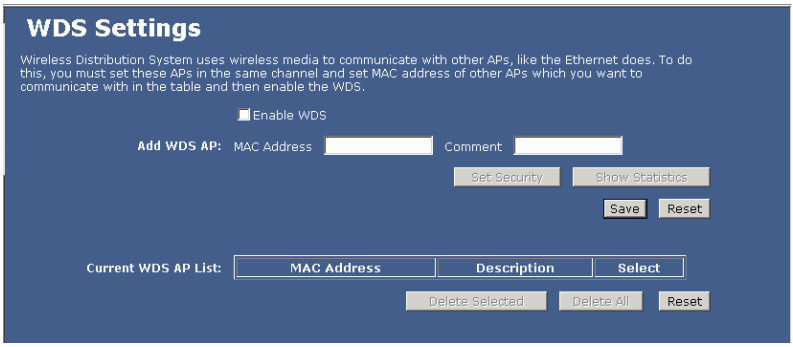
Site Survey

Site survey displays all the active Access Points and IBSS in the neighborhood.



Refresh	Click **Refresh** to get the latest information.
Connect	Click **Connect** to make a wireless connection.

WDS Settings



Enable WDS	Check **Enable WDS** to enable the WDS function.
Add WDS AP	**MAC Address**: Enter the Wireless BSSID of the wireless AP that you want to connect with. To check your wireless router's MAC address, please go to **Status** and then click the **System Data** button to find your MAC address. **Comme**nt: Enter a description for the device.
Set Security	Enable the WDS function and then click to set the WDS security, for detailed security setup, please refer the Wireless Security mentioned previously. 
Show Statistics	Click to show the current WDS AP table.
Save	Click **Save** to save the current settings.
Reset	Click **Reset** to clear and reset.
Current WDS AP List	Click **Current WDS AP List** to show the current WDS AP information.
Delete Selected	Click **Delete Selected** to delete the selected items.
Delete All	Click **Delete All** to delete all the items.
Reset	Click **Reset** to reset.

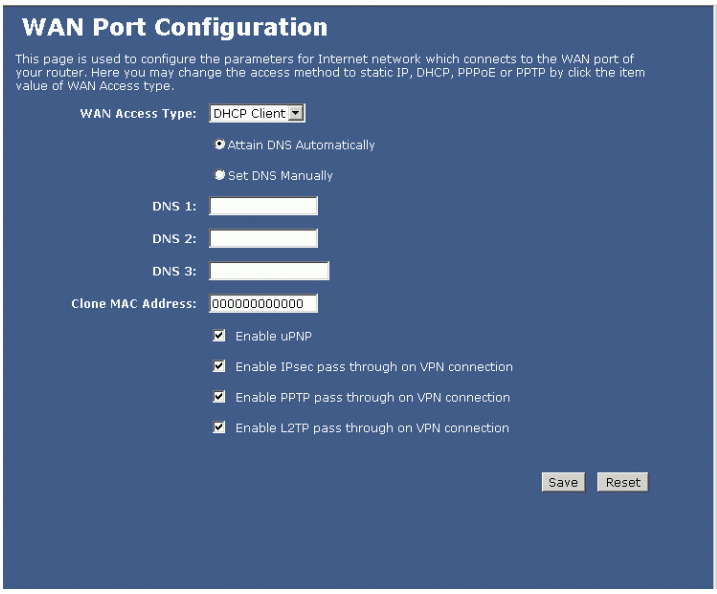
Trusted Stations

The Trusted Stations screen allows you to configure this device to give exclusive access to up to 20 devices. Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02. You need to know the MAC address of the devices to configure this screen.

Wireless Access Control Mode	Select the Access Control Mode from the pull-down menu. **Disable**: Select to disable Wireless Access Control Mode. **Allow Listed**: Only the stations shown in the table can associate with the AP.
MAC Address	Enter the MAC addresses of the wireless station that are allowed or denied access to this wireless router in these address fields. Enter the MAC addresses in a valid MAC address format, that is, six hexadecimal character pairs, for example, 12:34:56:78:9a:bc.
Description	Enter in a descriptive name so you know which device the MAC address is associated with.
Current Access Control List	Shows the current access control list.
Delete Selected	Select the MAC Address (es) you want to delete and then click the **Delete Selected** button to delete the selected items.
Delete All	Click to delete all the MAC Address (es) listed.
Save	After completing the settings on this page, click **Save** to save the settings.
Reset	Click **Reset** to restore to default values.
Current Access Control List	Shows the current access control information.
Delete Selected	Click **Delete Selected** to delete items which are slected.
Delete All	Click **Delete All** to delete all the items.
Reset	Click **Reset** to rest.

Advanced

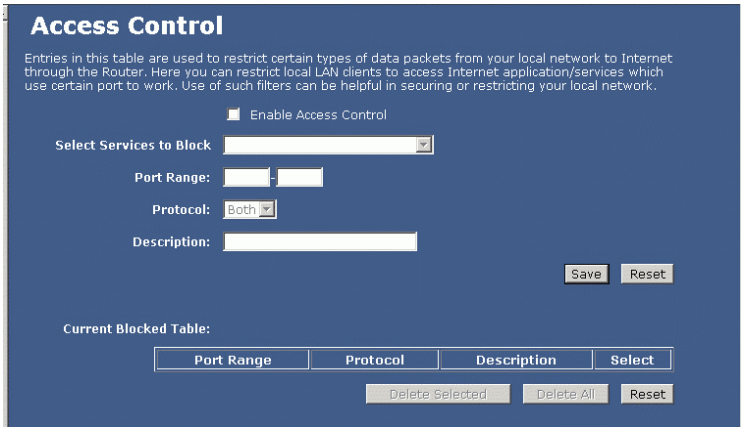
WAN Port



WAN Access Type	Select the WAN access type (Static IP, DHCP, PPPoE and PPTP) from the pull-down menu.
DNS 1-3	Enter the DNS server IP address(es) provided by your ISP, or you can specify your own preferred DNS server IP address(es). DNS 1 and DNS 2 servers are optional. You can enter another DNS server's IP address as a backup. DNS 1 and DNS 2 servers will be used when the DNS 1 server fails.
Clone MAC Address	Your ISP may require a particular MAC address in order for you to connect to the Internet. This MAC address is the PC's MAC address that your ISP had originally connected your Internet connection to. Type in this Clone MAC address in this section to replace the WAN MAC address with the MAC address of that PC.
Enable uPNP **Enable Ipsec pass through on VPN connection** **Enable L2TP pass through on VPN conenction**	Check to enable the listed functions.
Save	After completing the settings on this page, click **Save** to save the settings.
Reset	Click **Reset** to restore to default values.

Access Control

This screen allows you to block access to specified Internet services based on port number used. This can be used restrict Internet access to only certain applications or to block applications you feel may be harmful.

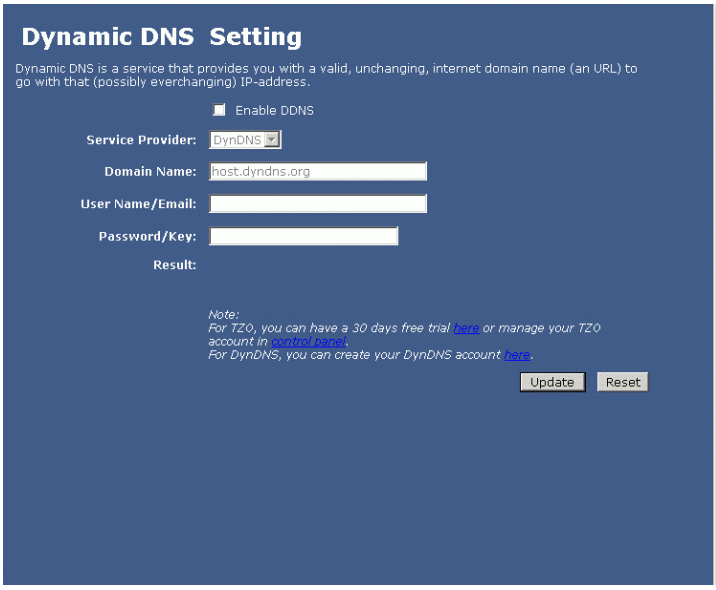


Enable Access Control	Select to enable Access Control function.
Select Services to Block	This lists all defined Services. Select the Services you wish to block.
Port Range	For TCP and UDP Services, enter the beginning of the range of port numbers used by the service. If the service uses a single port number, enter it in both the start and finish fields.
Protocol	Select the protocol (TCP, UDP or Both) used to the remote system or service.
Description	You may key in a description for port range.
Save	After completing the settings on this page, click **Save** to save the settings.
Reset	Click **Reset** to restore to default values.
Current Blocked Table	Shows the current blocked information.
Delete Selected	Click **Delete Selected** to delete items which are slected.
Delete All	Click **Delete All** to delete all the items.
Reset	Click **Reset** to rest

Dynamic DNS

Dynamic DNS allows you to update your current dynamic IP address with one or many dynamic DNS services so that anyone can contact you (in NetMeeting, CU-SeeMe, etc.). You can also access your FTP server or Web site on your own computer using a domain name (for instance myhost.dhs.org, where myhost is a name of your choice) that will never change instead of using an IP address that changes each time you reconnect. Your friends or relatives will always be able to call you even if they don't know your IP address.

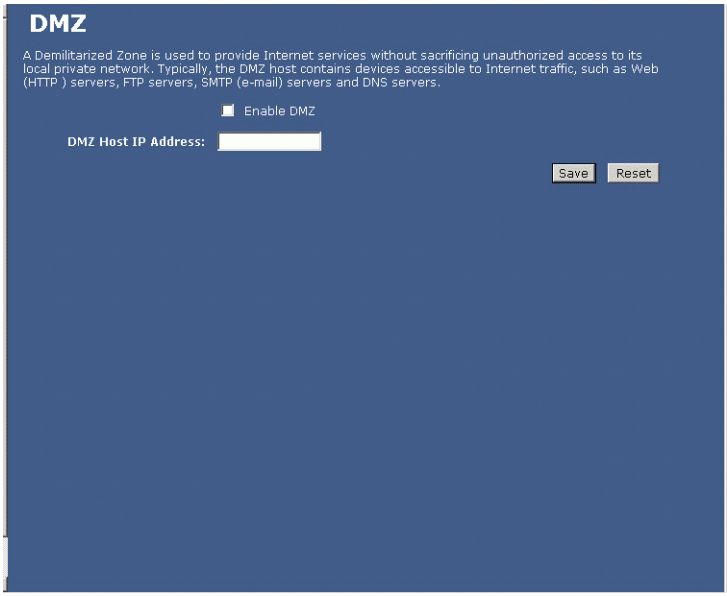
First of all, you need to have registered a dynamic DNS account with either www.dyndns.org or www.tzo.com. This is for people with a dynamic IP from their ISP or DHCP server that would still like to have a domain name. The Dynamic DNS service provider will give you a password or key.



Enable DDNS	Check to enable DDNS function. This free service is very useful when combined with the Virtual Server feature. It allows Internet users to connect to your Virtual Servers using a URL, rather than an IP Address. This also solves the problem of having a dynamic IP address. With a dynamic IP address, your IP address may change whenever you connect, which makes it difficult to connect to you.
Service Provider	• Select the desired DDNS Service Provider from the list. • Details of your DDNS account (Name, password, Domain name) must then be entered and saved on this screen. • This device will then automatically ensure that your current IP Address is recorded by the DDNS Service Provider. • From the Internet, users will now be able to connect to your Virtual Servers (or DMZ PC) using your Domain name.
Domain Name	Apply for a Domain Name, and ensure it is allocated to you.
User Name/Email	Enter your Username for the DDNS Service.
Password/key	Enter your current password for the DDNS Service.
Result	Tells you the current result from trying to register your IP address with the DDNS provider.
Update	Click **Update** to update the screen information.
Reset	Click **Reset** to restore to default values.

DMZ

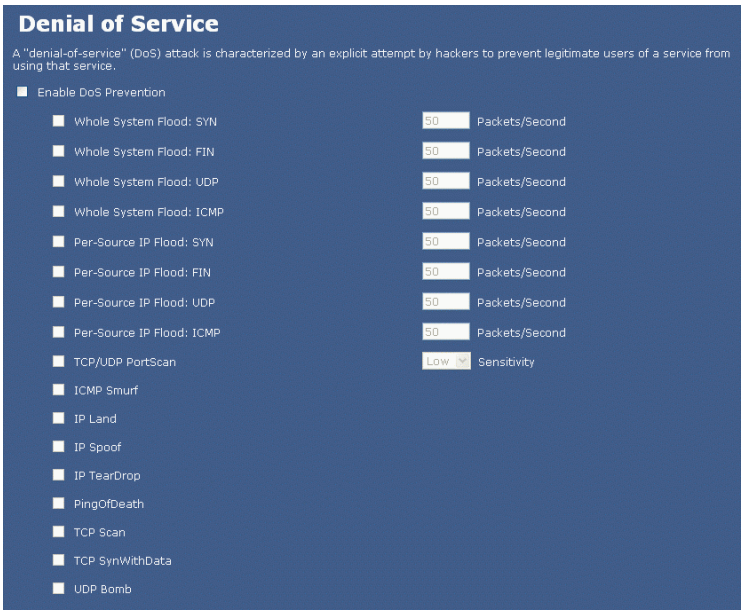
If the DMZ Host Function is enabled, it means that you set up DMZ host at a particular computer to be exposed to the Internet so that some applications/software, especially Internet / online game can have two-way connections. A device acting as DMZ is not protected by this device's firewall.



Enable DMZ	If the DMZ Host Function is enabled, it means that you set up DMZ host at a particular computer to be exposed to the Internet so that some applications/software, especially Internet / online game can have two-way connections.
DMZ Host IP Address	Enter the IP address of a particular host in your LAN which will receive all the packets originally going to the WAN port/Public IP address above. **Note:** You need to give your LAN PC clients a fixed/static IP address for DMZ to work properly.
Save	After completing the settings on this page, click **Save** to save the settings.
Reset	Click **Reset** to restore to default values.

DoS Setting

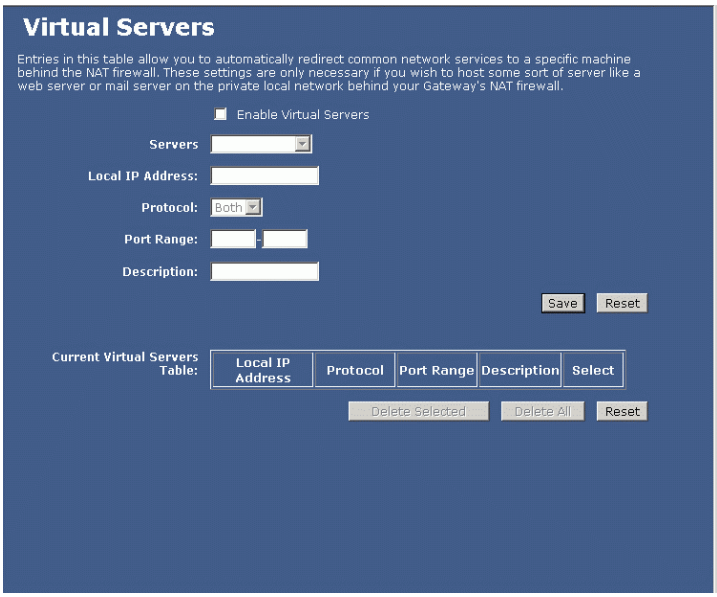
DoS (Denial of Service) attacks can flood your Internet connection with invalid packets and connection requests, using so much bandwidth and so many resources that Internet access becomes unavailable. The Wireless Router incorporates protection against DoS attacks. This screen allows you to configure DoS protection.



□ Enable DoS Prevention	Check to enable the DoS prevention function. Select the item listed to enable.
Enable Source IP Blocking □ Block time (sec)	Set the threshold for the frequency of packets that are allowed to pass through. The default value is 50 packets per seconds. You can adjust the value according to your need. It is recommended that you set a practical number so that your network performance won't be hampered.
Select All	Click to select all listed items.
Clear All	Click to clear all listed items.
Apply Changes	Click to save the current settings.

Virtual Server

The Virtual Server function is a list of inside (behind NAT on the LAN) servers, for example, web or FTP, that you can make visible to the outside world even though NAT makes your whole inside network appear as a single computer to the outside world. You may enter a single port number or a range of port numbers to be forwarded, and the local IP address of the desired server. The port number identifies a service; for example, web service is on port 80 and FTP on port 21. In some cases, such as for unknown services or where one server can support more than one service (for example both FTP and web service), it might be better to specify a range of port numbers. You can allocate a server IP address that corresponds to a port or a range of ports. Many residential broadband ISP accounts do not allow you to run any server processes (such as a Web or FTP server) from your location. Your ISP may periodically check for servers and may suspend your account if it discovers any active services at your location. If you are unsure, refer to your ISP.



Enable Virtual Servers	Check to enable virtual server function.
Servers	You can set up a local server with specific port number that stands for the service (e.g. web (80), FTP (21), Telnet (23)). When this device receives an incoming access request for this specific port, it will be forwarded to the corresponding internal server. You can add virtual servers by either port numbers or by names. Maximum 24 Server entries are allowed and each port number can only be assigned to one IP address.
Local IP Address	Enter the Local Server's IP address.
Protocol	Select the protocol (TCP, UDP or Both) used to the remote system or service.
Port Range	For TCP and UDP Services, enter the beginning of the range of port numbers used by the service. If the service uses a single port number, enter it in both the start and finish fields.
Description	You may key in a description for the local IP address.
Save	After completing the settings on this page, click **Save** to save the settings.
Reset	Click **Reset** to restore to default values.
Current Virtual Servers Table	Shows the current virtual servers information.
Delete Selected	Click **Delete Selected** to delete items which are slected.
Delete All	Click **Delete All** to delete all the items.
Reset	Click **Reset** to rest

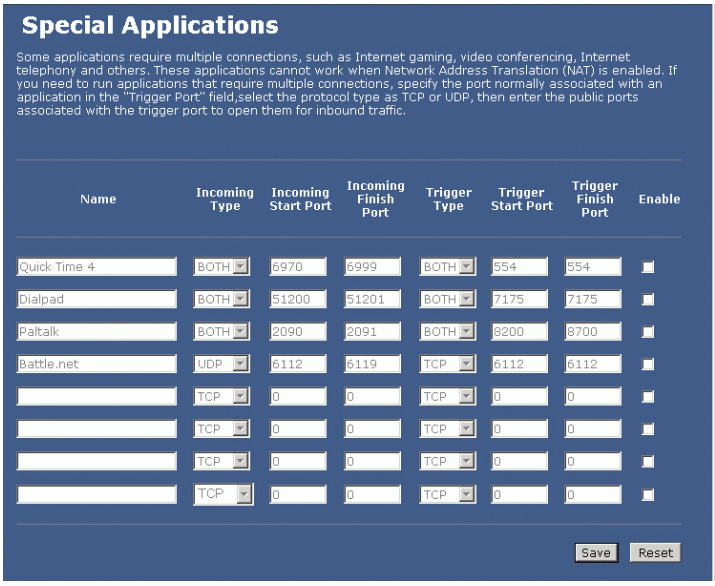
Special Application

If you use Internet applications that use non-standard connections or port numbers, you may find that they do not function correctly because they are blocked by the Wireless Router's firewall. In this case, you can define those applications as "**Special Application**" so that they can function properly.

You can define your Special Applications. You will need detailed information about the application such as number of port required; this is normally available from the supplier of the application.

Also, note that "**Incoming**" on this screen refer to traffic from the client (PC) viewpoint.

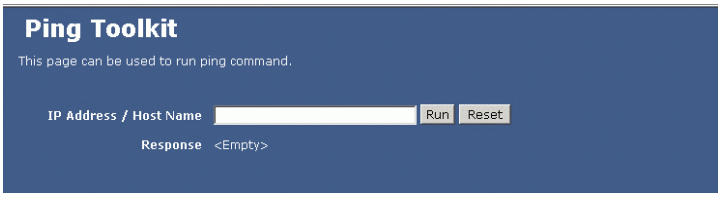
You have to firstly check **Enable** before you can add/edit an application.



Name	Enter the application name.
Incoming Type	Click the down arrow ▼ to select the incoming application type (TCP or UDP)
Incoming Start Port	Type a port number or the starting port number in a range of port numbers. .
Incoming Finish Port	Type a port number or the ending port number in a range of port numbers.
Trigger Type	Click the down arrow ▼ to select the trigger type (TCP or UDP)
Trigger Start Port	Enter a port number as the starting outbound port for the special application defined in the preceding field.
Trigger Finish Port	Enter a port number as the ending outbound port for the special application defined in the preceding field.
Save	Press to save the new settings on the screen.
Undo	Press to discard the data you have entered since last time you press **Save**.

Ping

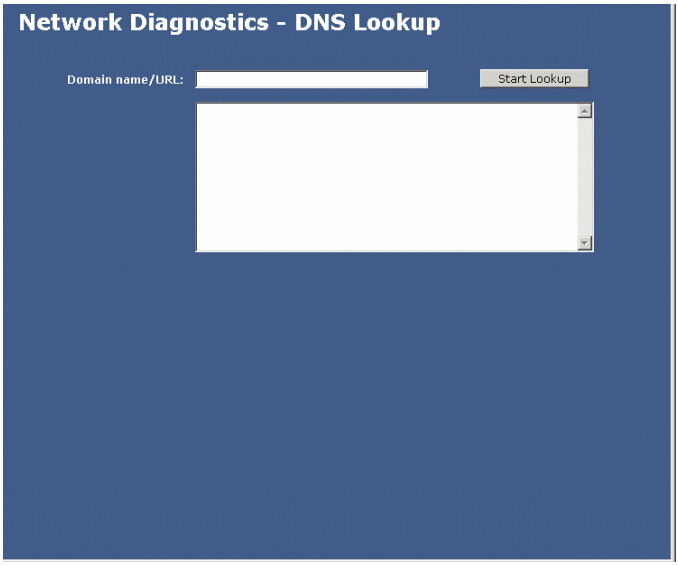
This screen allows you to perform a "**Ping**". The **response** messages that will appear below can be useful in diagnosing network problems.



IP Address/ Host name	Enter the IP address or domain name that you want to ping.
Run	Click to start pinging.
Reset	Click to clear the current IP address /Host name.

Diagnostics

This screen allows you to perform a DNS lookup on any host name you enter. This can be used to help diagnose network problems.



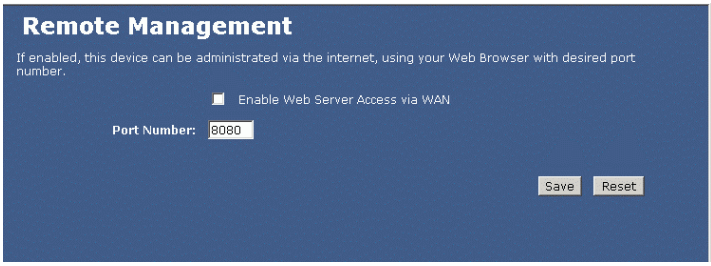
Domain Name/URL	Enter the domain name you want to lookup.
Start Lookup	Click this button to activate the DNS lookup.

Administration

Remote management

Remote management allows you to remotely configure your P-330W over your Internet connection. Since this is a potential security risk, this feature is turned off by default.

The Wireless Router can be managed from any PC on your LAN. And, if the Internet connection exists, it can also (optionally) be configured via the Internet.



□ Enable web Server Access via WAN	Check to enable the function.
Port number	Enter the port number.
Save	Click to save the current settings.
Reset	Click to clear the current settings.

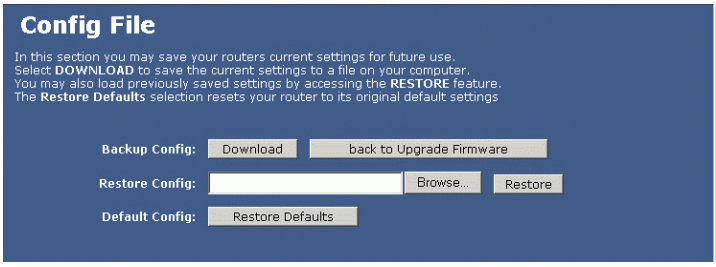
Config File

This feature allows you to download the current settings from the Wireless Router, and save them to a file on your PC.

You can restore a previously downloaded configuration file to the Wireless Router, by uploading it to the Wireless Router.

This screen also allows you to set the Wireless Router back to its factory default configuration. Any existing settings will be deleted.

An example ***Config File*** screen is shown below.

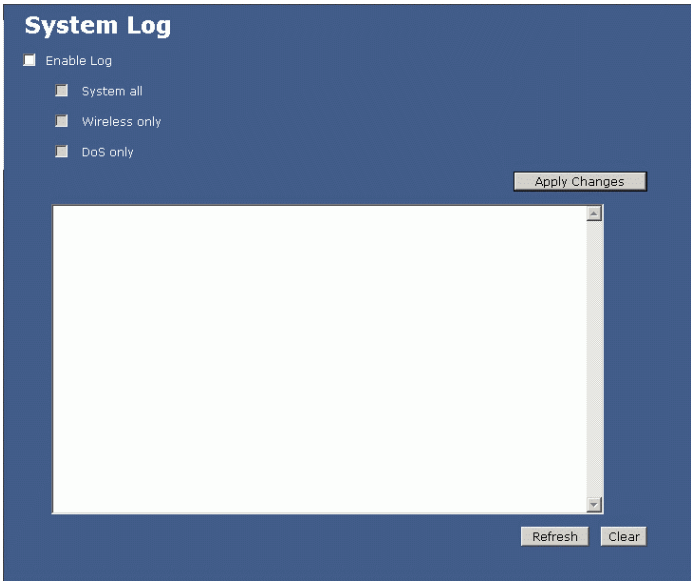


Backup Config	Use this to download a copy of the current configuration, and store the file on your PC. Click **Download** to start the download.
Restore Config	This allows you to restore a previously saved configuration file back to the Wireless Router. Click **Browse** to select the configuration file, then click **Restore** to upload the configuration file. **WARNING !** Uploading a configuration file will destroy (overwrite) ALL of the existing settings.
Default Config	Clicking the **Restore Defaults** button will reset the Wireless Router to its factory default settings. **WARNING !**

	This will delete ALL of the existing settings.

Log

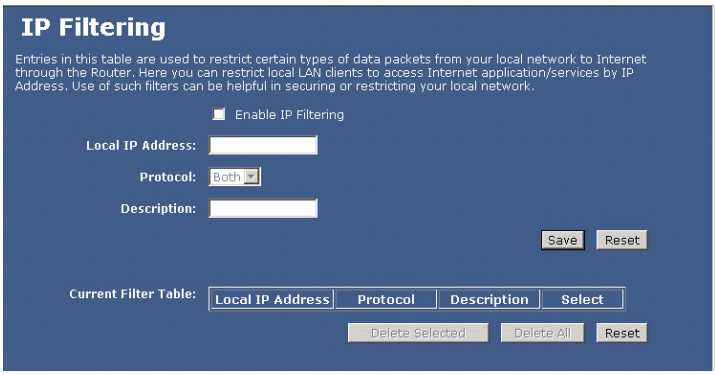
The Logs record various types of activity on the Wireless Router. This data is useful for troubleshooting, but enabling all logs will generate a large amount of data and adversely affect performance.



Enable Log	Check to enable logging function.
System All	Activates all logging functions.
Wireless Only	Only logs related to the wireless LAN will be recorded.
DoS Only	Only logs related to the DoS protection will be recorded.
Save	After completing the settings on this page, click **Save** to save the settings.
Refresh	Click to refresh the logs.
Clear	Click to delete the logs.

IP Filtering

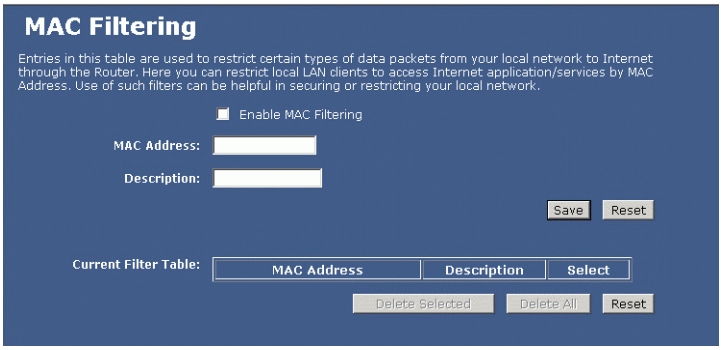
Entries in this table are used to restrict certain types of data packets from your local network to Internet through the Router. Here you can restrict local LAN clients to access Internet application/services by IP Address. Use of such filters can be helpful in securing or restricting your local network.



Enable IP Filtering	Check to enable the IP filtering function.
Local IP Address	Enter the client IP address.
Protocol	Select the protocol (TCP, UDP or Both) used to the remote system or service.
Description	You may key in a description for the local IP address
Current Filter Table	Shows the current filter information.
Delete Selected	Click **Delete Selected** to delete items which are slected.
Delete All	Click **Delete All** to delete all the items.
Reset	Click **Reset** to rest
Save	After completing the settings on this page, click **Save** to save the settings.
Reset	Click **Reset** to restore to default values.

MAC Filtering

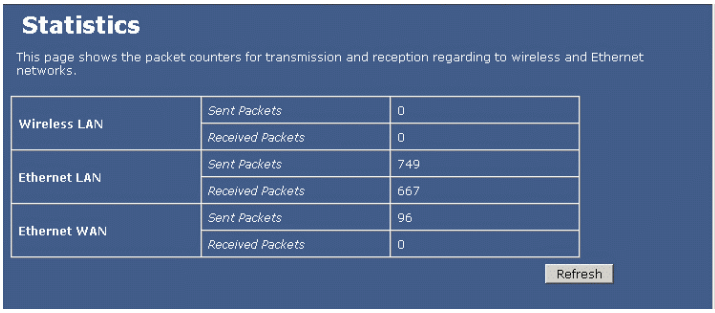
This screen is used to restrict devices on your local network from being able to access the Internet. You do this by entering the MAC address of any device you want to restrict.



Enable MAC Filtering	Check to enable MAC filtering function.
MAC Address	Enter the client MAC address.

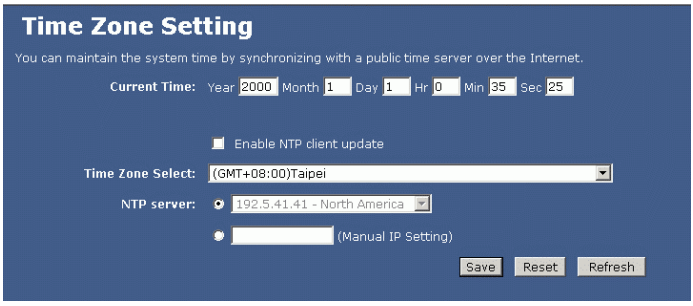
Description	You may key in a description for the MAC address.
Current Filter Table	Shows the current filter information.
Delete Selected	Click **Delete Selected** to delete items which are slected.
Delete All	Click **Delete All** to delete all the items.
Reset	Click **Reset** to rest
Save	After completing the settings on this page, click **Save** to save the settings.
Reset	Click **Reset** to restore to default values.

Statistics



Refresh	Click to refresh the statistics table.

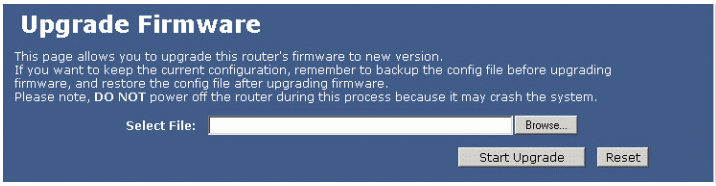
Time Zone Setting



Current Time	Enter the current time of this wireless router.
Enable NTP client update	Check to enable **NTP (**Network Time Protocol Server) **client update** function.
Time Zone Select	Select the time zone from the pull-down menu.
NTP server	You may choose to select NTP server from the pull-down menu or enter an IP address of a specific server.
Save	After completing the settings on this page, click **Save** to save the settings.

Reset	Click **Reset** to restore to default values.
Refresh	Click to refresh the current time.

Upgrade Firmware



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

Navigation & Data Input

- Use the menu bar on the left of the screen, and the "Back" button on your Browser, for navigation.
- Changing to another screen without clicking "Save" does NOT save any changes you may have made. You must "Save" before changing screens or your data will be ignored.

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 Router.

The first step is to check the PC's TCP/IP settings.

The Wireless Router 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 the default Wireless Router settings, and the default Windows TCP/IP settings, no changes need to be made.

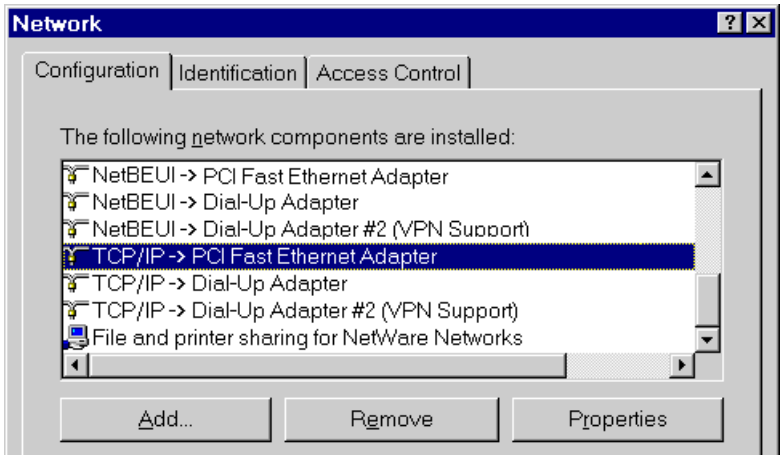
- By default, the Wireless Router will act as a DHCP Server, automatically providing a suitable IP Address (and related information) to each PC when the PC boots.
- For all non-Server versions of Windows, the default TCP/IP setting is to act as a DHCP client.

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

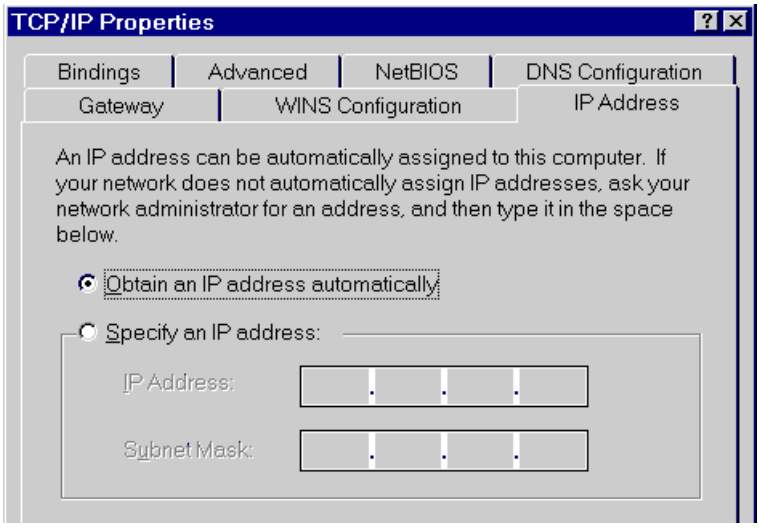
- The *Gateway* must be set to the IP address of the Wireless Router
- The *DNS* should be set to the address provided by your ISP.

Checking TCP/IP Settings - Windows 98/ME:

1. Select *Control Panel - Network*. You should see a screen like the following:



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



Ensure your TCP/IP settings are correct, as follows:

Using DHCP

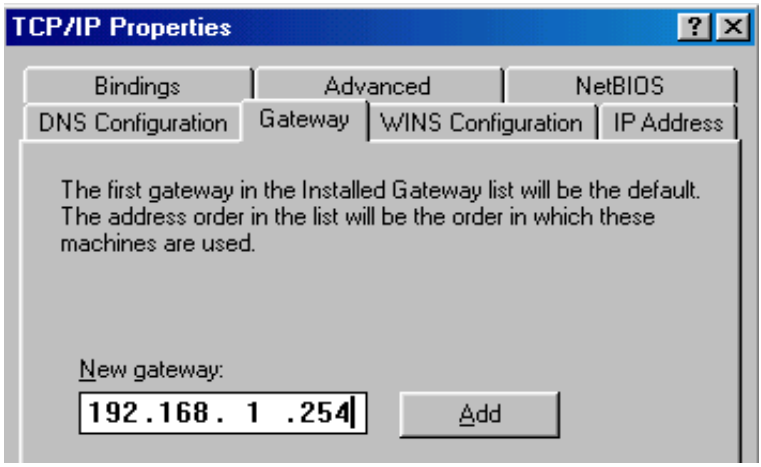
To use DHCP, select the radio button *Obtain an IP Address automatically*. This is the default Windows setting. **Using this is recommended**. By default, the Wireless Router will act as a DHCP Server.

Restart your PC to ensure it obtains an IP Address from the Wireless Router.

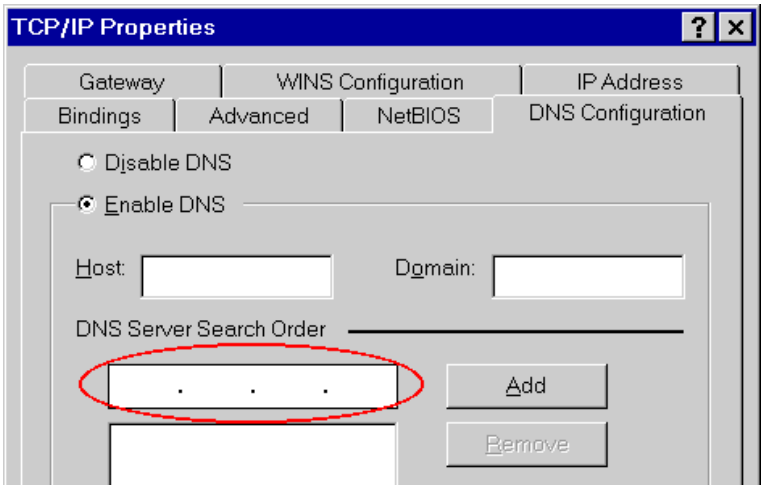
Using "Specify an IP Address"

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

- On the *Gateway* tab, enter the Wireless Router's IP address in the *New Gateway* field and click *Add*, as shown below. Your LAN administrator can advise you of the IP Address they assigned to the Wireless Router.

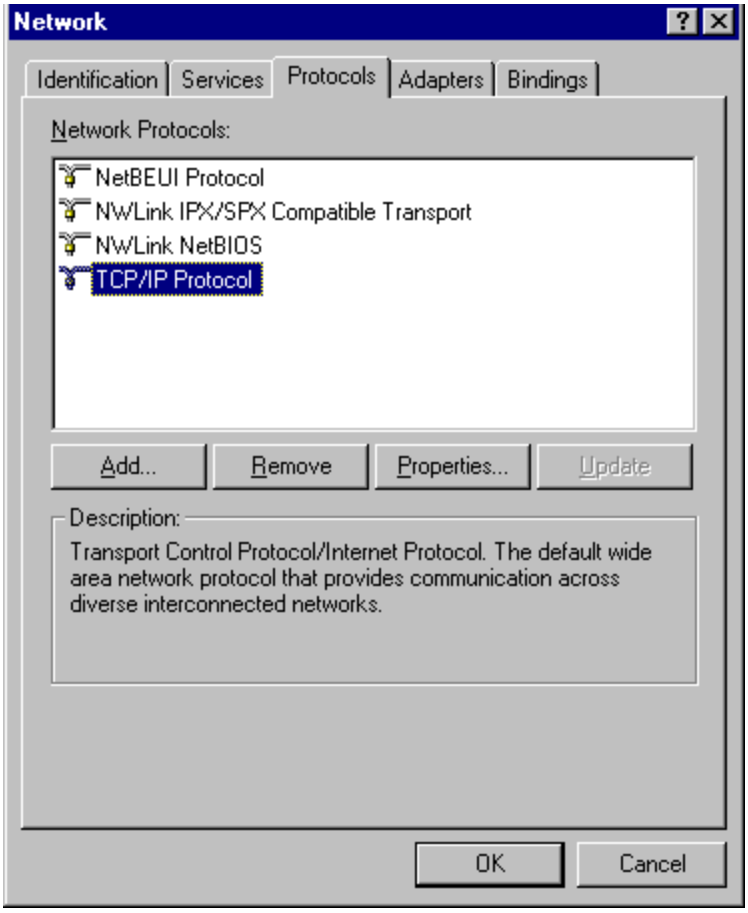


- On the *DNS Configuration* tab, ensure *Enable DNS* is selected. If the *DNS Server Search Order* list is empty, enter the DNS address provided by your ISP in the fields beside the *Add* button, then click *Add*.

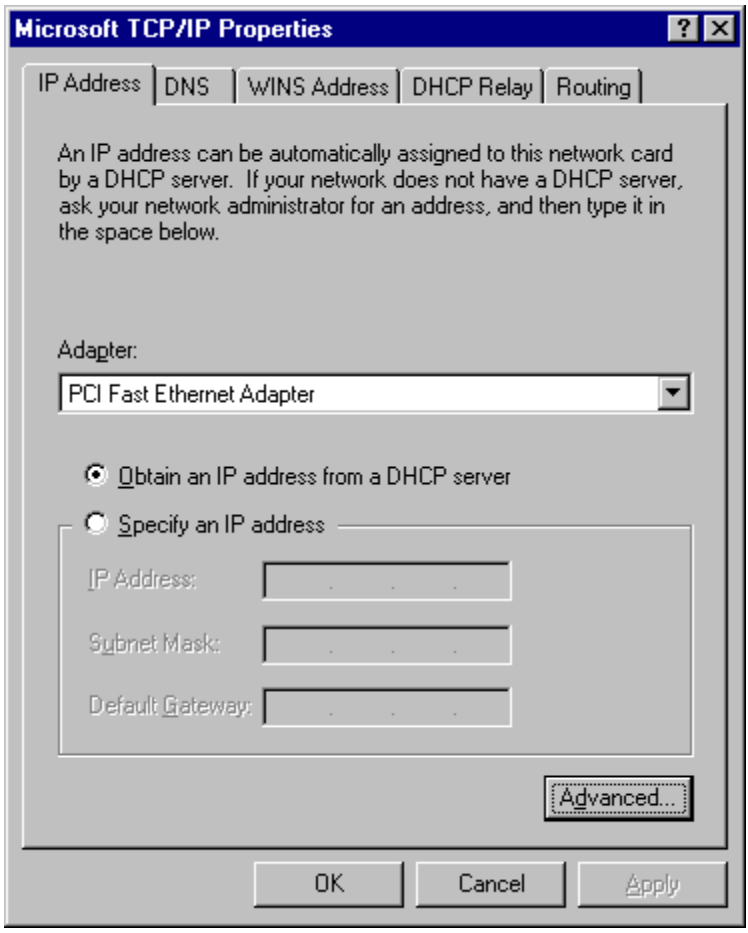


Checking TCP/IP Settings - Windows NT4.0

1. Select *Control Panel - Network*, and, on the *Protocols* tab, select the TCP/IP protocol, as shown below.



2. Click the *Properties* button to see a screen like the one below.



3. Select the network card for your LAN.
4. Select the appropriate radio button - *Obtain an IP address from a DHCP Server* or *Specify an IP Address*, as explained below.

Obtain an IP address from a DHCP Server

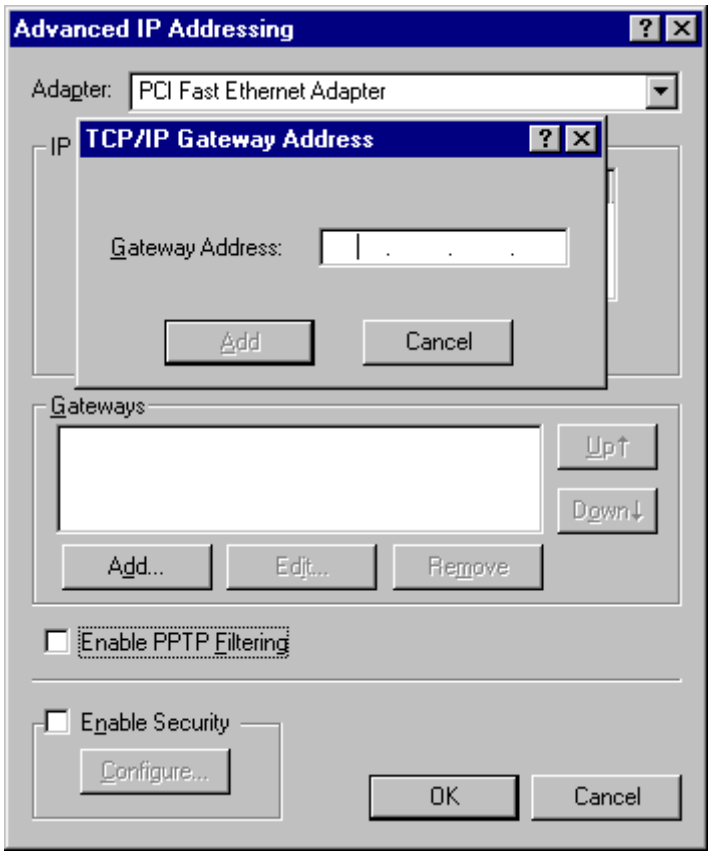
This is the default Windows setting. **Using this is recommended**. By default, the Wireless Router will act as a DHCP Server.

Restart your PC to ensure it obtains an IP Address from the Wireless Router.

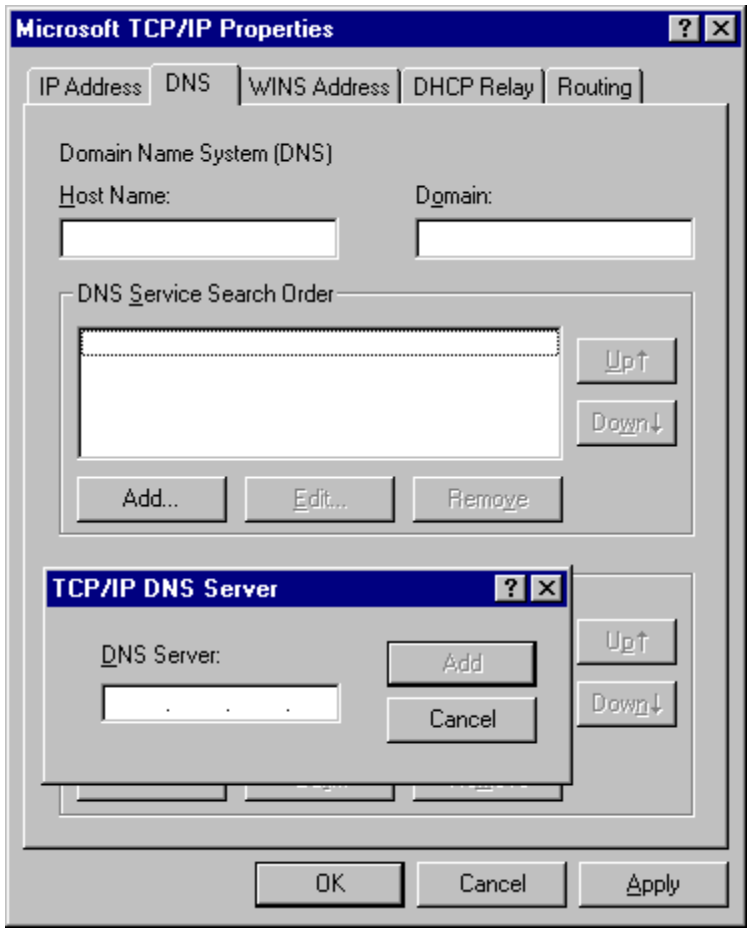
Specify an IP Address

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

1. The *Default Gateway* must be set to the IP address of the Wireless Router. To set this:
   - Click the *Advanced* button on the screen above.
   - On the following screen, click the *Add* button in the *Gateways* panel, and enter the Wireless Router's IP address.
   - If necessary, use the *Up* button to make the Wireless Router the first entry in the *Gateways* list.

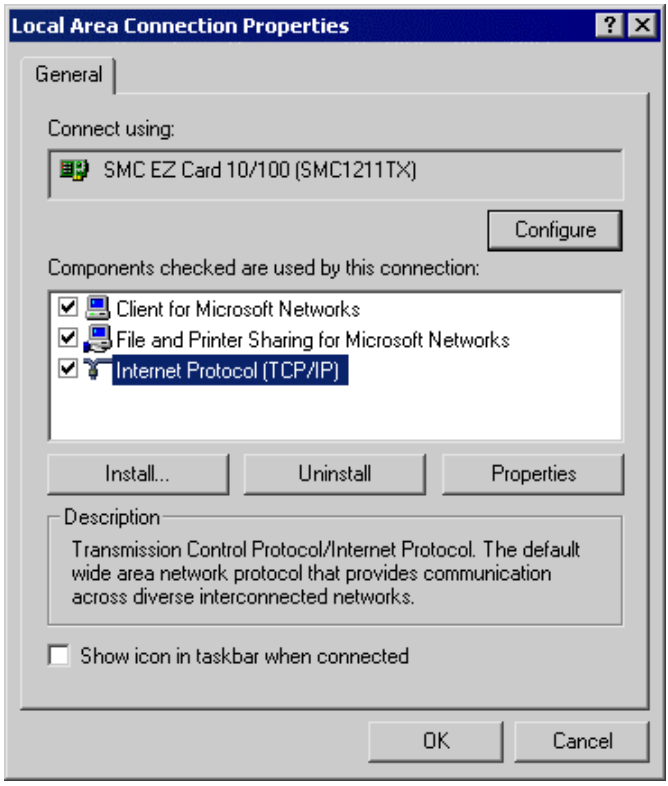


2. The DNS should be set to the address provided by your ISP, as follows:
   - Click the DNS tab.
   - On the DNS screen, shown below, click the *Add* button (under *DNS Service Search Order*), and enter the DNS provided by your ISP.

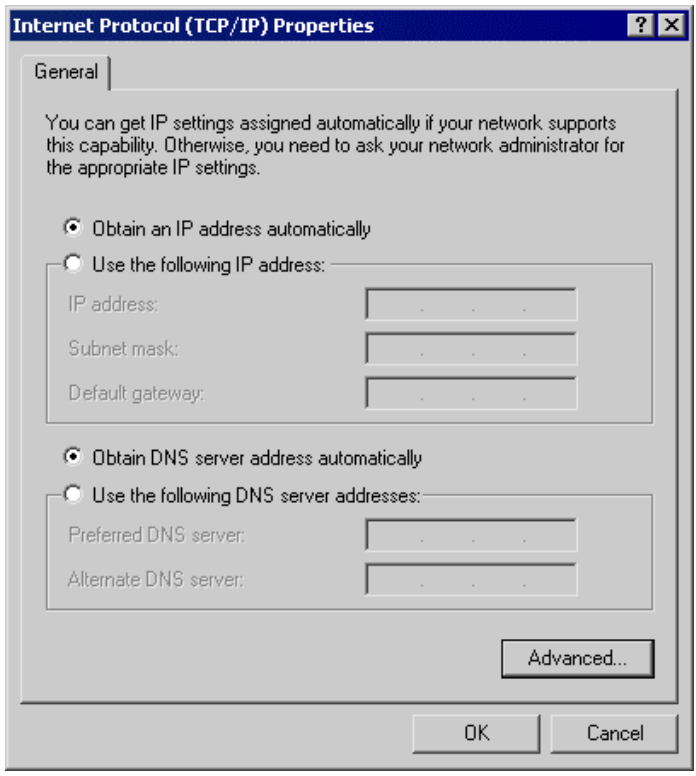

Microsoft TCP/IP Properties
IP Address
DNS
WINS Address
DHCP Relay
Routing
Domain Name System (DNS)
Host Name:
Domain:
DNS Service Search Order
Up↑
Down↓
Add...
Edit...
Remove
TCP/IP DNS Server
DNS Server:
Add
Cancel
Up↑
Down↓
OK
Cancel
Apply

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 Router will act as a DHCP Server.

Restart your PC to ensure it obtains an IP Address from the Wireless Router.

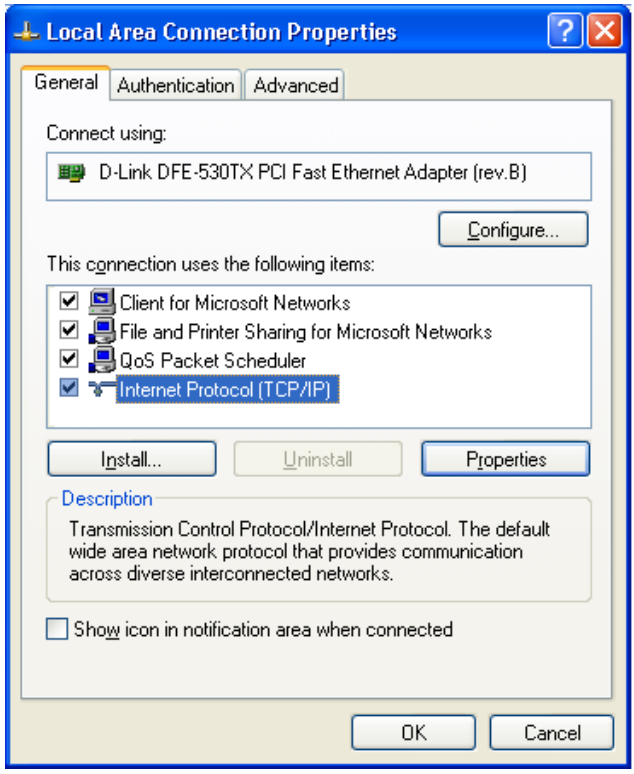
Using a fixed IP Address ("Use the following IP Address")

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

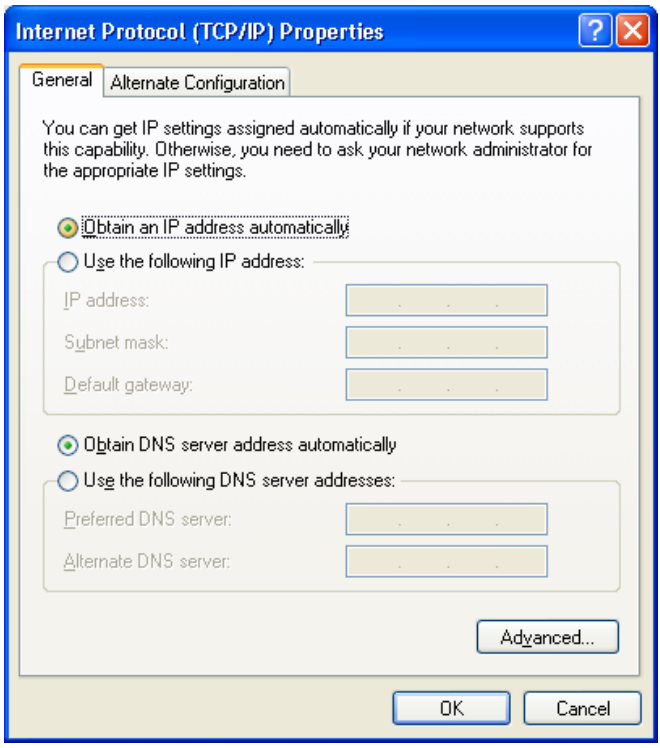
- Enter the Wireless Router's IP address in the *Default gateway* field and click *OK*. (Your LAN administrator can advise you of the IP Address they assigned to the Wireless Router.)
- If the *DNS Server* fields are empty, select *Use the following DNS server addresses*, and enter the DNS address or 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 the radio button *Obtain an IP Address automatically*. This is the default Windows setting. **Using this is recommended**. By default, the Wireless Router will act as a DHCP Server.

Restart your PC to ensure it obtains an IP Address from the Wireless Router.

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

Internet Access

To configure your PCs to use the Wireless Router 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 9x/ME/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 Router, 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:

- 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.
- Click the *Setup* button.
- Select *Create Location*, and change the location name from "New Locality" to "Wireless Router".
- Click *Edit Location*. Select *TCP/IP* for the *Network* field. (Leave the *Phone Number* blank.)
- Click *Save*, then *OK*.
  Configuration is now complete.
- Before clicking "Sign On", always ensure that you are using the "Wireless Router" location.

Macintosh Clients

From your Macintosh, you can access the Internet via the Wireless Router. 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 *Router Address* field to the Wireless Router's IP Address.
- Ensure your DNS settings are correct.

Linux Clients

To access the Internet via the Wireless Router, it is only necessary to set the Wireless Router 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 Router.
- 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 Router:

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

Wireless Station Configuration

This section applies to all Wireless stations wishing to use the Wireless Router's Access Point, regardless of the operating system which is used on the client.

To use the Wireless Access Point in the Wireless Router, 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 Router. The default value is **`Untitled`** **Note! The SSID is case sensitive.**
WEP	By default, WEP on the Wireless Router is **disabled**. • If WEP remains disabled on the Wireless Router, all stations must have WEP disabled. • If WEP is enabled on the Wireless Router, each station must use the same settings as the Wireless Router.

Note:

By default, the Wireless Router 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 Router and some possible solutions to them. If you follow the suggested steps and the Wireless Router still does not function properly, contact your dealer for further advice.

General Problems

Problem 1: **Can't connect to the Wireless Router to configure it.**

Solution 1: Check the following:

- The Wireless Router is properly installed, LAN connections are OK, and it is powered ON.
- Ensure that your PC and the Wireless Router are on the same network segment. (If you don't have a router, 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 192.168.1.1 to 192.168.1.253 and thus compatible with the Wireless Router's default IP Address of 192.168.1.254.
  Also, the Network Mask should be set to 255.255.255.0 to match the Wireless Router.
  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 Router. 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 Router 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 Router.**

Solution 2: The Wireless Router 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 Access Point.**

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 Access Point are the same. Remember that the SSID is case-sensitive. So, for example "Workgroup" does NOT match "workgroup".
- Both your PC and the Wireless Router must have the same setting for WEP. The default setting for the Wireless Router is disabled, so your wireless station should also have WEP disabled.
- If WEP is enabled on the Wireless Router, your PC must have WEP enabled, and the key must match.
- If the Wireless Router'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 Router. 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 Router location.
  Try adjusting the location and orientation of the Wireless Router.
- 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 Router.

Appendix B
About Wireless LANs

Modes

Wireless LANs can work in either of two (2) modes:

- Ad-hoc
- Infrastructure

Ad-hoc Mode

Ad-hoc mode does not require an Access Point or a wired (Ethernet) LAN. Wireless Stations (e.g. notebook PCs with wireless cards) communicate directly with each other.

Infrastructure Mode

In Infrastructure Mode, one or more Access Points are used to connect Wireless Stations (e.g. Notebook PCs with wireless cards) to a wired (Ethernet) LAN. The Wireless Stations can then access all LAN resources.

Access Points can only function in "Infrastructure" mode, and can communicate only with Wireless Stations which are set to "Infrastructure" mode.

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.)

WEP

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 which 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.

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. Alternatively, the SSID can be set to "any" or null (blank) to allow connection to any Access Point.

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").

Appendix C
Specifications

Multi-Function Wireless Router

Model	Wireless Router
Dimensions	141mm(W) * 100mm(D) * 27mm(H)
Operating Temperature	0° C to 40° C
Storage Temperature	-10° C to 70° C
Network Protocol:	TCP/IP
Network Interface:	5 Ethernet: 4 * 10/100BaseT (RJ45) LAN connection 1 * 10/100BaseT (RJ45) for WAN
LEDs	12
Power Adapter	12 V DC External

Wireless Interface

Standards	IEEE802.11g WLAN, JEIDA 4.2, roaming support
Frequency	2.4 to 2.4835GHz (Industrial Scientific Medical Band)
Channels	Maximum 14 Channels, depending on regulatory authorities
Modulation	DSSS BPSK/QPSK/CCK, OFDM/CCK
Data Rate	Up to 54 Mbps
Coverage Area	Indoors : 15m @54Mbps, 120m @6Mbps or lower Outdoors : 40m @54Mbps, 300m @6Mbps or lower
WEP	64Bit, 128Bit
Output Power	13dBm (typical)
Receiver Sensitivity	-80dBm Min.

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.