MSI RG54G3
Wireless 802.11b/g Broadband Router

User Manual

Hiermit erklärt *Micro Star International CO., LTD* dass sich dieses Produkt in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet.
Die Konformitätserklärung kann auf folgender website eingesehen werden:
http://www.msi-technology.de/support/dl_man.php?Prod_Typ=9

Hereby, *Micro Star International CO., LTD* declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
The respective Declaration of conformity can be found online:
http://www.msi-technology.de/support/dl_man.php?Prod_Typ=9

IEEE 802.11b/g 2.4 GHz operation
Europe: Frequencies: 2.400 – 2.4835 GHz

France: Frequencies: 2.4465– 2.4835 GHz, channels 10, 11, 12, 13
BANDE DE FREQUENCES DES 2.4GHZ
La décision N° 02-1008 en date du 31 octobre 2002 autorise l'utilisation d'une partie de la bande de fréquences 2400-2483,5 MHz pour les réseaux locaux radioéléctriques (RLAN) comme suit :
L'utilisation de la bande 2400-2446,5 MHz est autorisée à l'intérieur des bâtiments avec une puissance isotrope rayonnée équivalente (PIRE) limitée à 10 mW et que l'utilisation de la bande 2446,5-2483,5 MHz est autorisée à l'intérieur des bâtiments avec une PIRE limitée à 100 mW. L'utilisation en extérieur est soumise à demande d'autorisation sur la bande de fréquences de 2446,5-2483,5 MHz avec une puissance limitée à 100mW.

Notified Countries:
Germany, UK, Netherlands, Belgium, Norway, Sweden, Denmark, Finland, France, Italy, Spain, Austria, Iceland, Ireland, Portugal, Greece, Luxemburg and Switzerland

Bestimmungsgemäße Verwendung:
Dieses Produkt integriert als Teil der Produktausstattung eine WLAN-Komponente.
Die WLAN-Komponente verbindet Computer über eine Funkverbindung . Es kann auch eine Funkverbindung zu anderen geeigneten WLAN-Geräten hergestellt werden.

Prescribed use:
This product integrates a WLAN-device.
The WLAN-device sets up a radio link between to computer. In addition it is possible to link the WLAN device to any other WLAN device which stick to the IEEE 802.11b/g requirements.

Hinweise zur Reichweite:
Der Abstand zwischen Sender und Empfänger (von einem WLAN-Gerät zu einem anderen WLAN-Gerät) hängt stark von der Einsatzumgebung ab. Wände, Betonboden (Eisen), beschichtete Fensterscheiben, Fahrzeug-Karosserie, etc..
Weitere Beeinflussungen:
- Hochfrequenzaussendungen jeder Art
- Gebäude, Bäume, etc.
- Heizkörper, Stahlbeton, etc.
- offen betriebene Computer, etc.
- Mikrowellenherde, etc,

Die Kommunikation zwischen unterschiedlichen WLAN-Geräten ist von der jeweiligen Software und dem entsprechenden Versionsstand abhängig

Operating range:
The transmission range between different WLAN devices varies depending the specific environment. Walls, concrete floor (iron), laminated windows, vehicle-body, etc..
More electromagnetic interferences:
- high frequency emission of any kind,
- Buildings, trees, etc.
- Heaters, ferroconcrete, etc.
- open computer systems, etc.
- Microwave oven, etc,

Communication (exchange data) is dependent on the software of the WLAN devices.

FCC Caution

1. The 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.
2. FCC RF Radiation Exposure Statement: The equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.
3. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
4. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

Copyright Notice

Trademarks

Revision History

Revision	**History**	**Date**
V 1.0	First Release	June 2005

Important Safety Precautions

Always read and follow these basic safety precautions carefully when handling any piece of electronic component.

1. Keep this User Manual for future reference.
2. Keep this equipment away from humidity.
3. Lay this equipment on a reliable flat surface before setting it up.
4. The openings on the enclosure are for air convection hence protects the equipment from overheating.
5. All cautions and warnings on the equipment should be noted.
6. Never pour any liquid into the opening that could damage or cause electrical shock.
7. If any of the following situations arises, get the equipment checked by a service personnel:
   - Liquid has penetrated into the equipment
   - The equipment has been exposed to moisture
   - The equipment has not work well or you can not get it work according to User Manual
   - The equipment has dropped and damaged
   - If the equipment has obvious sign of breakage
8. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT UNCONDITIONED, STORAGE TEMPERATURE ABOVE 60°C OR BELOW -20°C, IT MAY DAMAGE THE EQUIPMENT.

Contents

Chapter 1 Introduction

Congratulations on your purchase of this outstanding Wireless Broadband Router. This product is specifically designed for Small Office and Home Office needs. It provides a complete SOHO solution for Internet surfing, and is easy to configure and operate even for non-technical users. Instructions for installing and configuring this product can be found in this manual. Before you install and use this product, please read this manual carefully for fully exploiting the functions of this product.

Functions and Features

Router Basic functions

- **Auto-sensing Ethernet Switch**
  Equipped with a 4-port auto-sensing Ethernet switch.
- **WAN type supported**
  The router supports some WAN types, Static, Dynamic, PPPoE , PPTP ,L2TP, Dynamic IP with Road Runner.
- **Firewall**
  All unwanted packets from outside intruders are blocked to protect your Intranet.
- **DHCP server supported**
  All of the networked computers can retrieve TCP/IP settings automatically from this product.
- **Web-based configuring**
  Configurable through any networked computer's web browser using Netscape or Internet Explorer.
- **Virtual Server supported**
  Enable you to expose WWW, FTP and other services on your LAN to be accessible to Internet users.
- **User-Definable Application Sensing Tunnel**
  User can define the attributes to support the special applications requiring multiple connections, like Internet gaming, video conferencing, Internet telephony and so on, then this product can sense the application type and open multi-port tunnel for it.
- **DMZ Host supported**
  Lets a networked computer be fully exposed to the Internet; this function is used when special application sensing tunnel feature is insufficient to allow an application to function correctly.
- **Statistics of WAN Supported**
  Enables you to monitor inbound and outbound packets

Wireless functions

- **High speed for wireless LAN connection**

  Up to 54Mbps data rate by incorporating Orthogonal Frequency Division Multiplexing (OFDM).

- **Roaming**

  Provides seamless roaming within the IEEE 802.11b (11M) and IEEE 802.11g (54M) WLAN infrastructure.

- **IEEE 802.11b compatible (11M)**

  Allowing inter-operation among multiple vendors.

- **IEEE 802.11g compatible (54M)**

  Allowing inter-operation among multiple vendors.

- **Auto fallback**

  54M, 48M, 36M, 24M, 18M, 12M, 6M data rate with auto fallback in 802.11g mode.

  11M, 5.5M, 2M, 1M data rate with auto fallback in 802.11b mode.

Security functions

- **Packet filter supported**

  Packet Filter allows you to control access to a network by analyzing the incoming and outgoing packets and letting them pass or halting them based on the IP address of the source and destination.

- **Domain Filter Supported**

  Let you prevent users under this device from accessing specific URLs.

- **URL Blocking Supported**

  URL Blocking can block hundreds of websites connection by simply a **keyword**.

- **VPN Pass-through**

  The router also supports VPN pass-through.

- **802.1X supported**

  When the 802.1X function is enabled, the Wireless user must authenticate to this router first to use the Network service.

- **Support WPA-PSK and WPA**

  When the WPA function is enabled, the Wireless user must authenticate to this router first to use the Network service

- **SPI Mode Supported**

  When SPI Mode is enabled, the router will check every incoming packet to detect if this packet is valid.

- **DoS Attack Detection Supported**

  When this feature is enabled, the router will detect and log the DoS attack comes from the Internet.

Advanced functions

- **System time Supported**

  Allow you to synchronize system time with network time server.
- **E-mail Alert Supported**

  The router can send its info by mail.
- **Dynamic dns Supported**

  At present,the router has 3 ddns.dyndns,TZO.com and dhs.org.
- **SNMP Supported**

  The router supports basic SNMP function.
- **Routing Table Supported**

  Now, the router supports static routing.
- **Schedule Rule supported**

  Customers can control some functions, like virtual server and packet filters when to access or when to block.

Other functions

- **UPNP (Universal Plug and Play)Supported**

  The router also supports this function. The applications: X-box, Msn Messenger.

Packing List

- Wireless broadband router unit
- Installation CD-ROM
- Power adapter
- CAT-5 UTP Fast Ethernet cable

Chapter 2 Hardware Installation

2.1 Panel Layout

2.1.1. Front Panel

Figure 2-1 Front Panel

LED	Function	Color	Status	Description
POWER	Power indication	Green	On	Power is being applied to this product.
Status	System status	Green	Blinking	M1 is flashed once per second to indicate system is alive.
WAN	WAN port activity	Green	On	The WAN port is linked.
			Blinking	The WAN port is sending or receiving data.
WLAN	Wireless activity	Green	Blinking	Sending or receiving data via wireless
Link/Act. 1~4	Link status	Green	On	An active station is connected to the corresponding LAN port.
			Blinking	The corresponding LAN port is sending or receiving data.

2.1.2. Rear Panel

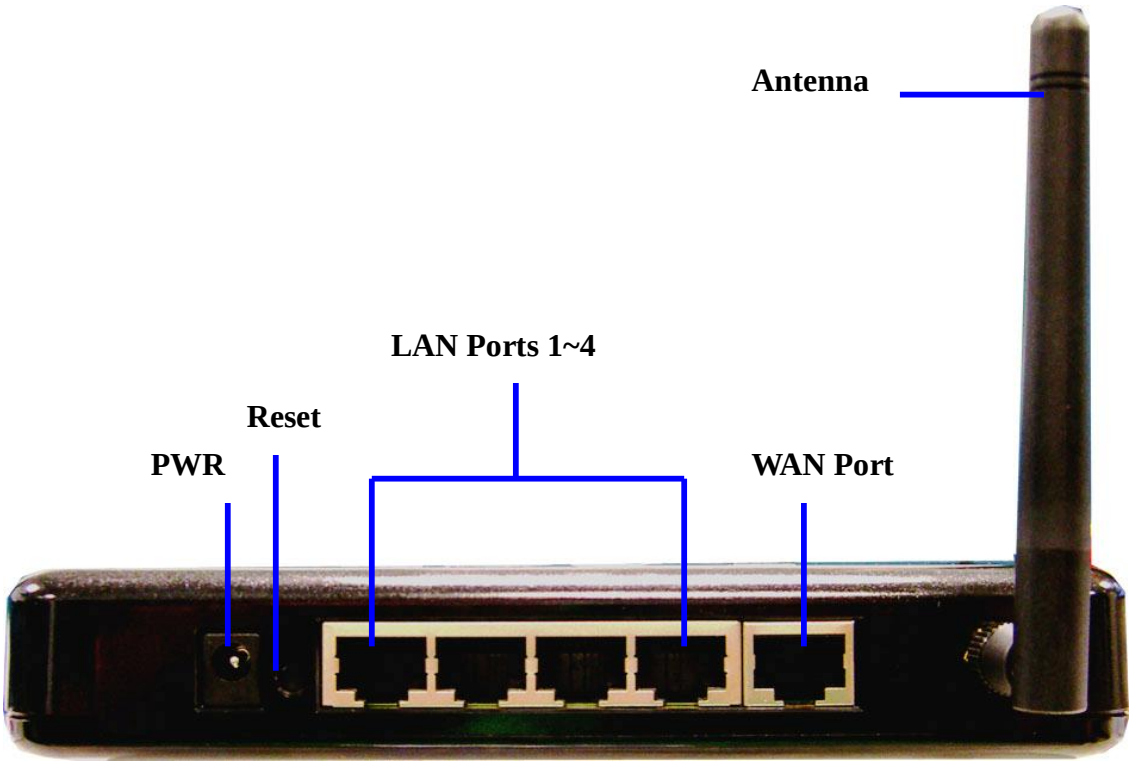


Figure 2-2 Rear Panel

Port	Description
PWR	Power inlet
WAN	the port where you will connect your cable (or DSL) modem or Ethernet router.
LAN Port 1-4	the ports where you will connect networked computers and other devices.
Reset	To reset system settings to factory defaults

2.2 Procedure for Hardware Installation

2. Decide where to place your Wireless Broadband Router

You can place your Wireless Broadband Router on a desk or other flat surface, or you can mount it on a wall. For optimal performance, place your Wireless Broadband Router in the center of your office (or your home) in a location that is away from any potential source of interference, such as a metal wall or microwave oven. This location must be close to power and network connection.

2. Setup LAN connection

a. Wired LAN connection: connects an Ethernet cable from your computer's Ethernet port to one of the LAN ports of this product.

b. Wireless LAN connection: locate this product at a proper position to gain the best transmit performance

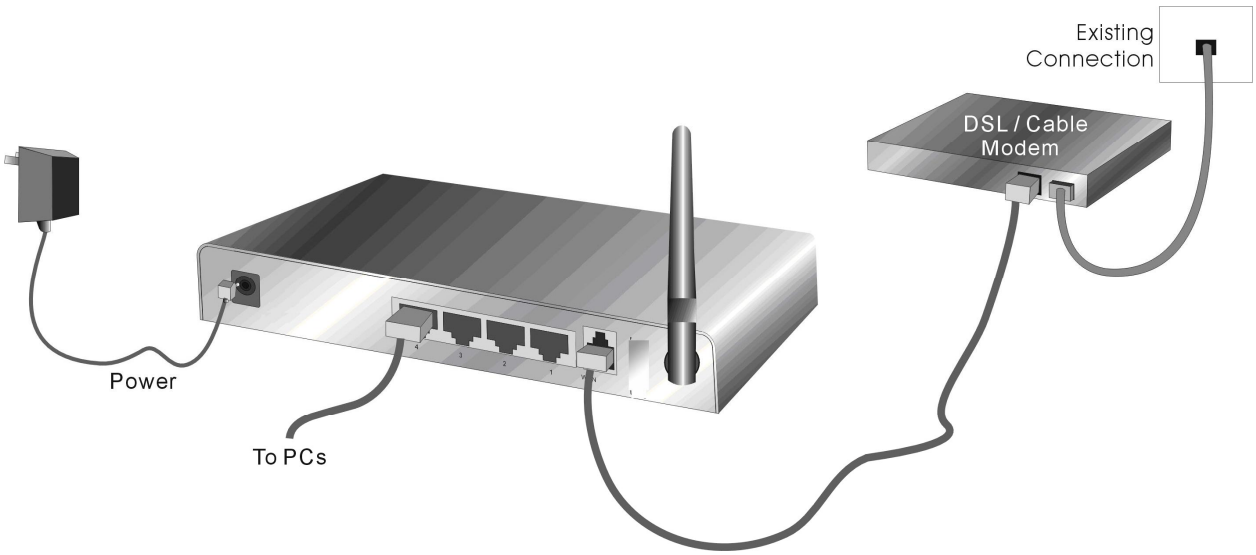


Figure 2-3 Setup of LAN and WAN connections for this product.

3. Setup WAN connection

Prepare an Ethernet cable for connecting this product to your cable/xDSL modem or Ethernet backbone. Figure 2-3 illustrates the WAN connection.

4. Power on

Connecting the power cord to power inlet and turning the power switch on, this product will automatically enter the self-test phase. When it is in the self-test phase, the indicators M1 will be lighted ON for about 10 seconds, and then M1 will be flashed 3 times to indicate that the self-test operation has finished. Finally, the M1 will be continuously flashed once per second to indicate that this product is in normal operation.

Chapter 3 Network Settings and Software Installation

To use this product correctly, you have to properly configure the network settings of your computers and install the attached setup program into your MS Windows platform (Windows 95/98/NT/2000).

3.1 Make Correct Network Settings of Your Computer

The default IP address of this product is 192.168.1.254, and the default subnet mask is 255.255.255.0. These addresses can be changed on your need, but the default values are used in this manual. If the TCP/IP environment of your computer has not yet been configured, you can refer to **Appendix A** to configure it. For example,

1. configure IP as 192.168.1.1, subnet mask as 255.255.255.0 and gateway as 192.168.1.254, or more easier,
2. configure your computers to load TCP/IP setting automatically, that is, via DHCP server of this product.

After installing the TCP/IP communication protocol, you can use the **ping** command to check if your computer has successfully connected to this product. The following example shows the ping procedure for Windows 95 platforms. First, execute the **ping** command

ping 192.168.1.254

If the following messages appear:

Pinging 192.168.1.254 with 32 bytes of data:

Reply from 192.168.1.254: bytes=32 time=2ms TTL=64

a communication link between your computer and this product has been successfully established. Otherwise, if you get the following messages,

Pinging 192.168.1.254 with 32 bytes of data:

Request timed out.

There must be something wrong in your installation procedure. You have to check the following items in sequence:

1. Is the Ethernet cable correctly connected between this product and your computer?

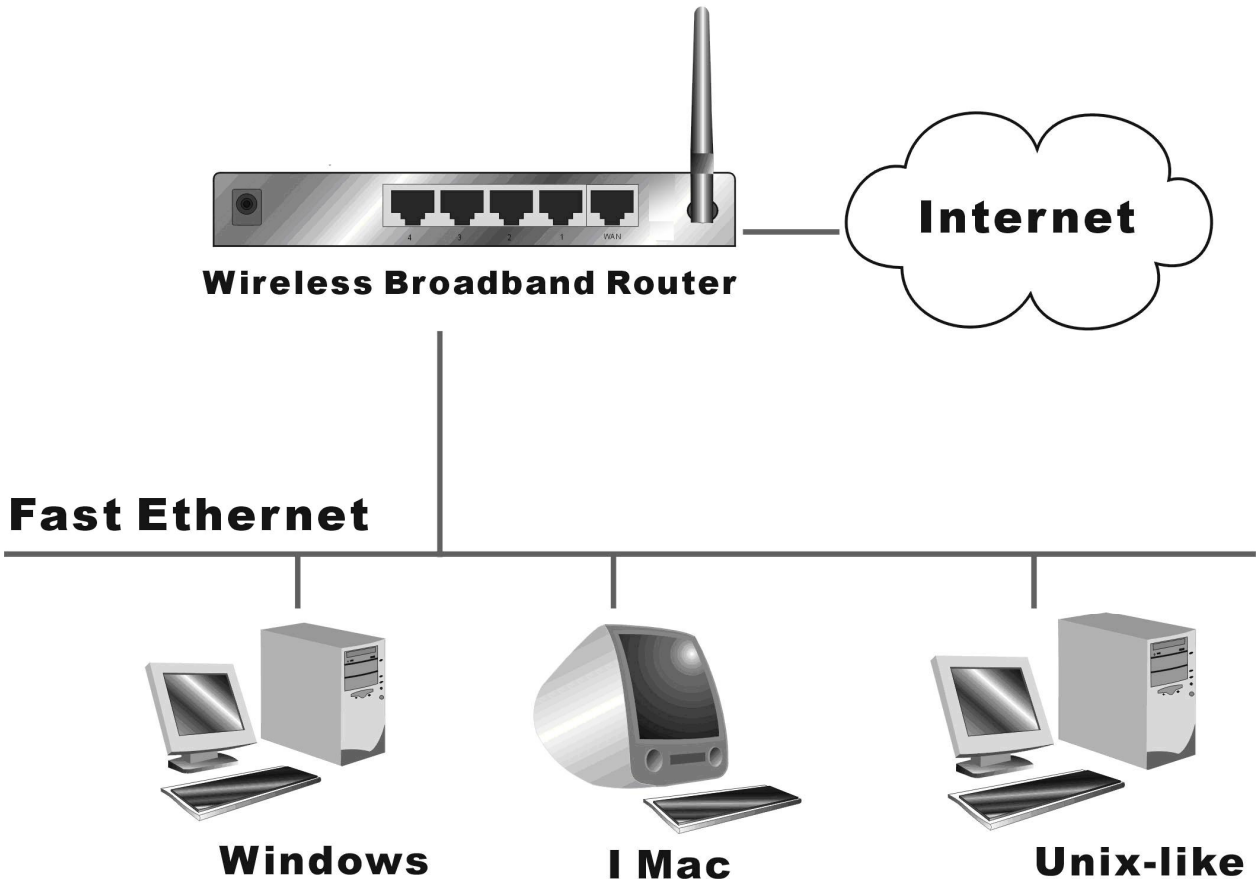
   Tip: The LAN LED of this product and the link LED of network card on your computer must be lighted.

2. Is the TCP/IP environment of your computers properly configured?

   Tip: If the IP address of this product is 192.168.1.254, the IP address of your computer must be 192.168.1.X and default gateway must be 192.168.1.254.

Chapter 4 Configuring Wireless Broadband Router

This product provides Web based configuration scheme, that is, configuring by your Web browser, such as Netscape Communicator or Internet Explorer. This approach can be adopted in any MS Windows, Macintosh or UNIX based platforms.



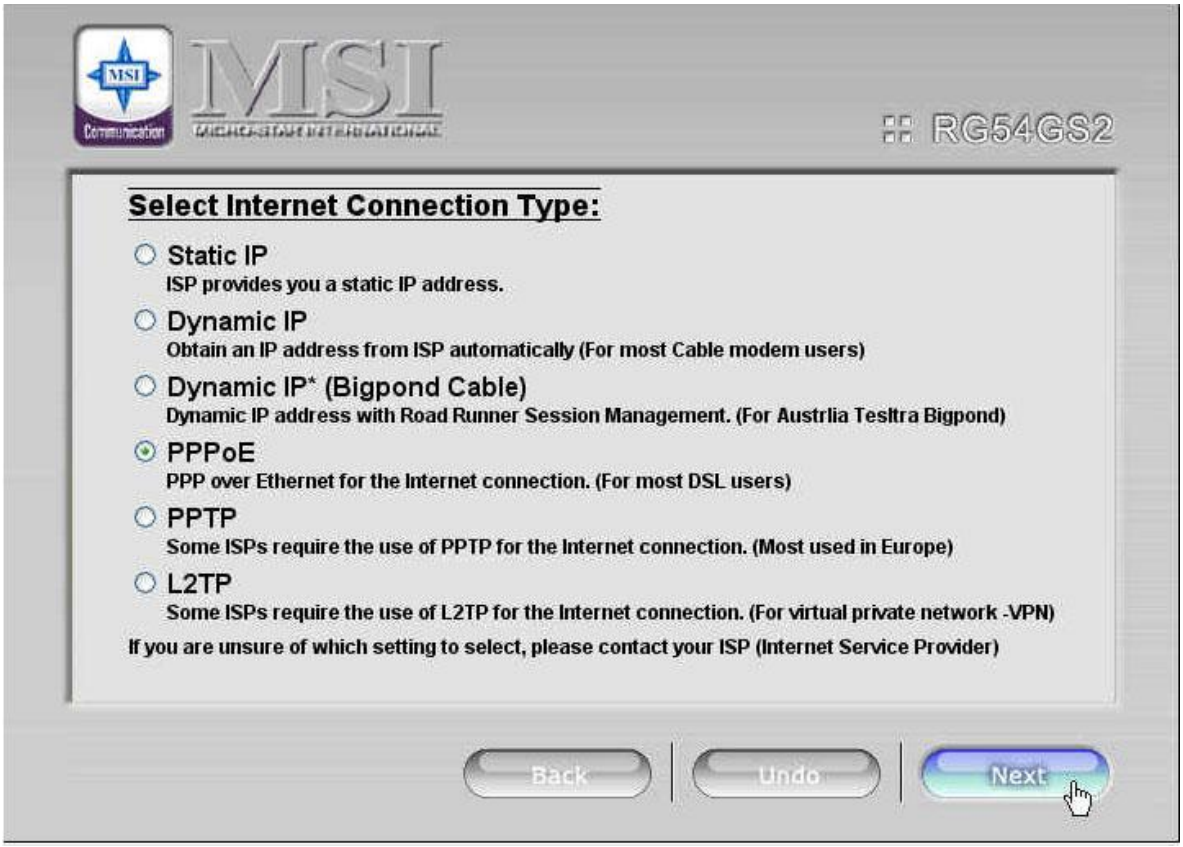
4.1 Start-up and Log in

Activate your browser, and **disable the proxy** or **add the IP address of this product into the exceptions**. Then, type this product's IP address in the Location (for Netscape) or Address (for IE) field and press ENTER. For example: **http://192.168.1.254**.

After the connection is established, you will see the web user interface of this product. To log in as an administrator, enter the system password (the factory setting is "**admin**") in the **Password** field and click on the **OK** button. If the password is correct, the web appearance will be changed into administrator configure mode. As listed in its main menu, there are several options for system administration.

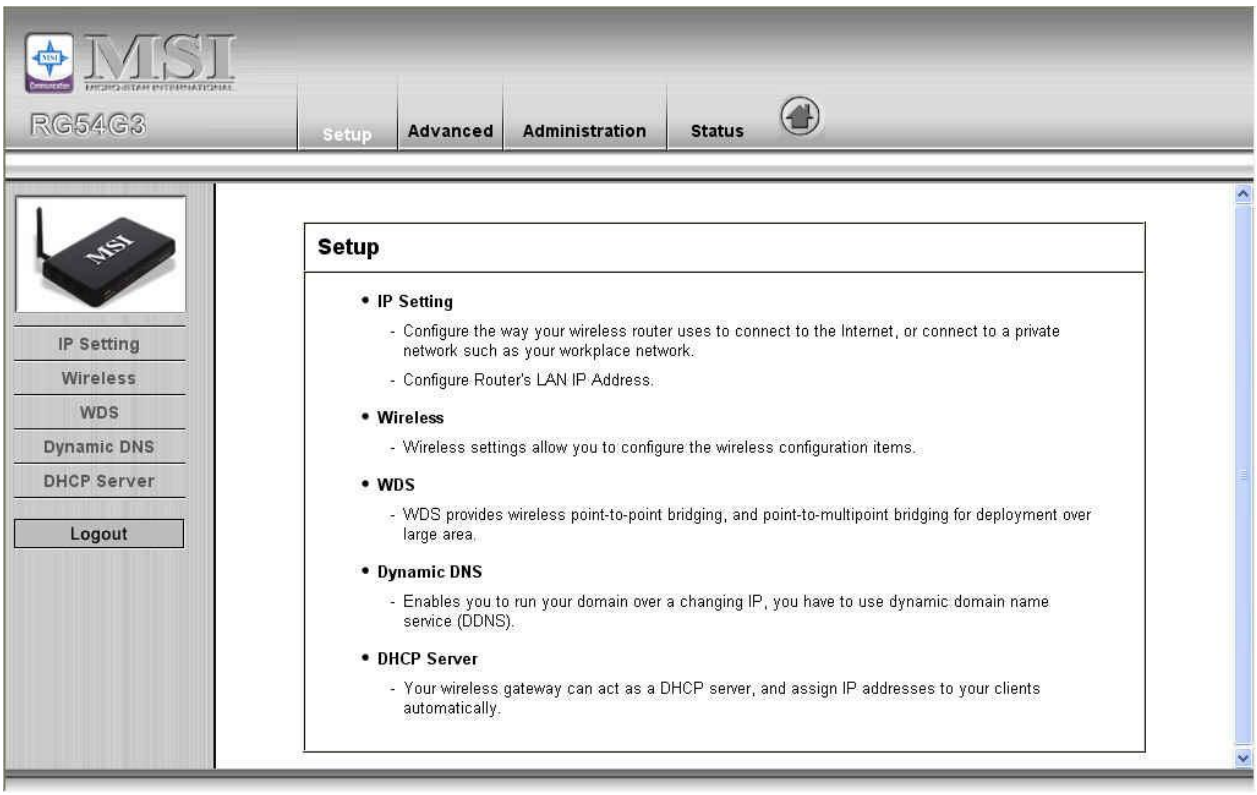
4.2 Wizard

Setup Wizard will guide you through a basic configuration procedure step by step.Press **"Next >"**

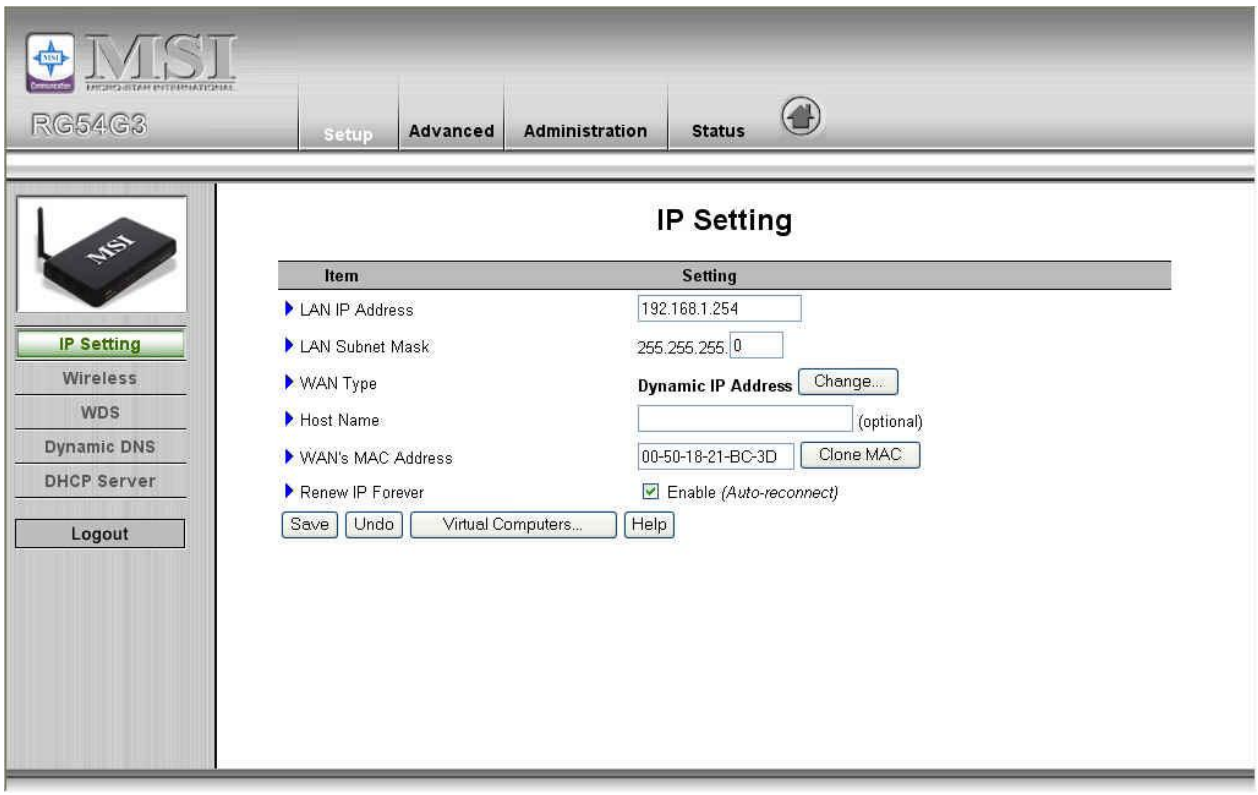


Setup Wizard - Select WAN Type: For detail settings, please refer to **4.3.1 IP Setting.**

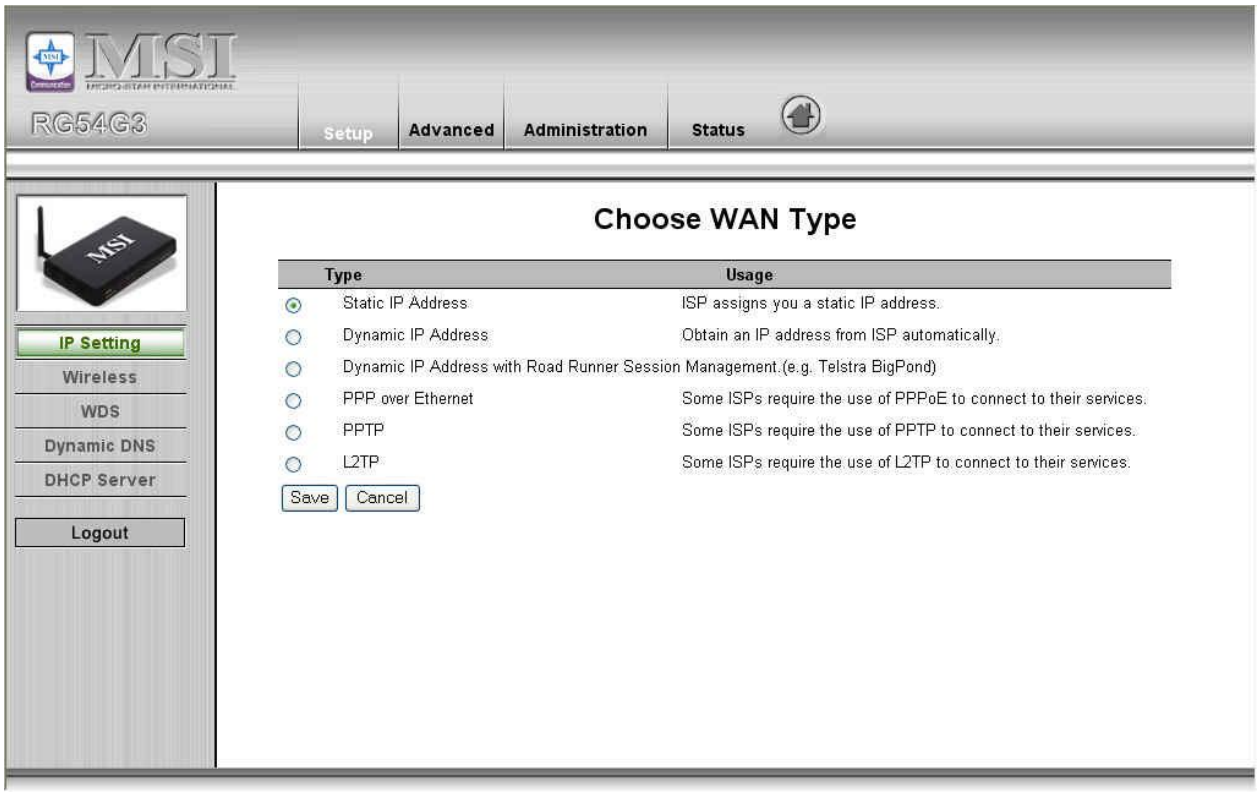
4.3 Setup



4.3.1 IP Setting – WAN Type, IP Mode



Press **"Change"**



This option is primary to enable this product to work properly. The setting items and the web appearance depend on the WAN type. Choose correct WAN type before you start.

1. **LAN IP Address**: the local IP address of this device. The computers on your network must use the LAN IP address of your product as their Default Gateway. You can change it if necessary.
2. **WAN Type**: WAN connection type of your ISP. You can click **Change** button to choose a correct one from the following four options:
   A. Static IP Address: ISP assigns you a static IP address.
   B. Dynamic IP Address: Obtain an IP address from ISP automatically.
   C. Dynamic IP Address with Road Runner Session Management.(e.g. Telstra BigPond)
   D. PPP over Ethernet: Some ISPs require the use of PPPoE to connect to their services.
   E. PPTP: Some ISPs require the use of PPTP to connect to their services.
   F. L2TP: Some ISPs require the use of L2TP to connect to their services

4.3.1.1 Static IP Address

WAN IP Address, Subnet Mask, Gateway, Primary and Secondary DNS: enter the proper setting provided by your ISP.

4.3.1.2 Dynamic IP Address

1. Host Name: optional. Required by some ISPs, for example, @Home.
2. Renew IP Forever: this feature enables this product to renew your IP address automatically when the lease time is expiring-- even when the system is idle.

4.3.1.3 Dynamic IP Address with Road Runner Session Management.(e.g. Telstra BigPond)

1. LAN IP Address is the IP address of this product. It must be the default gateway of your computers.
2. WAN Type is Dynamic IP Address. If the WAN type is not correct, change it!
3. Host Name: optional. Required by some ISPs, e.g. @Home.
4. Renew IP Forever: this feature enable this product renew IP address automatically when the lease time is being expired even the system is in idle state.

4.3.1.4 PPP over Ethernet

1. PPPoE Account and Password: the account and password your ISP assigned to you. For security, this field appears blank. If you don't want to change the password, leave it empty.
2. PPPoE Service Name: optional. Input the service name if your ISP requires it. Otherwise, leave it blank.
3. Maximum Idle Time: the amount of time of inactivity before disconnecting your PPPoE session. Set it to zero or enable Auto-reconnect to disable this feature.

4. **Maximum Transmission Unit (MTU)**: Most ISP offers MTU value to users. The most common MTU value is 1492.
5. Connection Control:There are 3 modes to select:

   Connect-on-demand:The device will link up with ISP when the clients send outgoing packets.

   Auto-Reconnect(Always-on):The device will link upw with ISP until the connection is established.

   Manually:The device will not make the link until someone clicks the connect-button in the Staus-page.

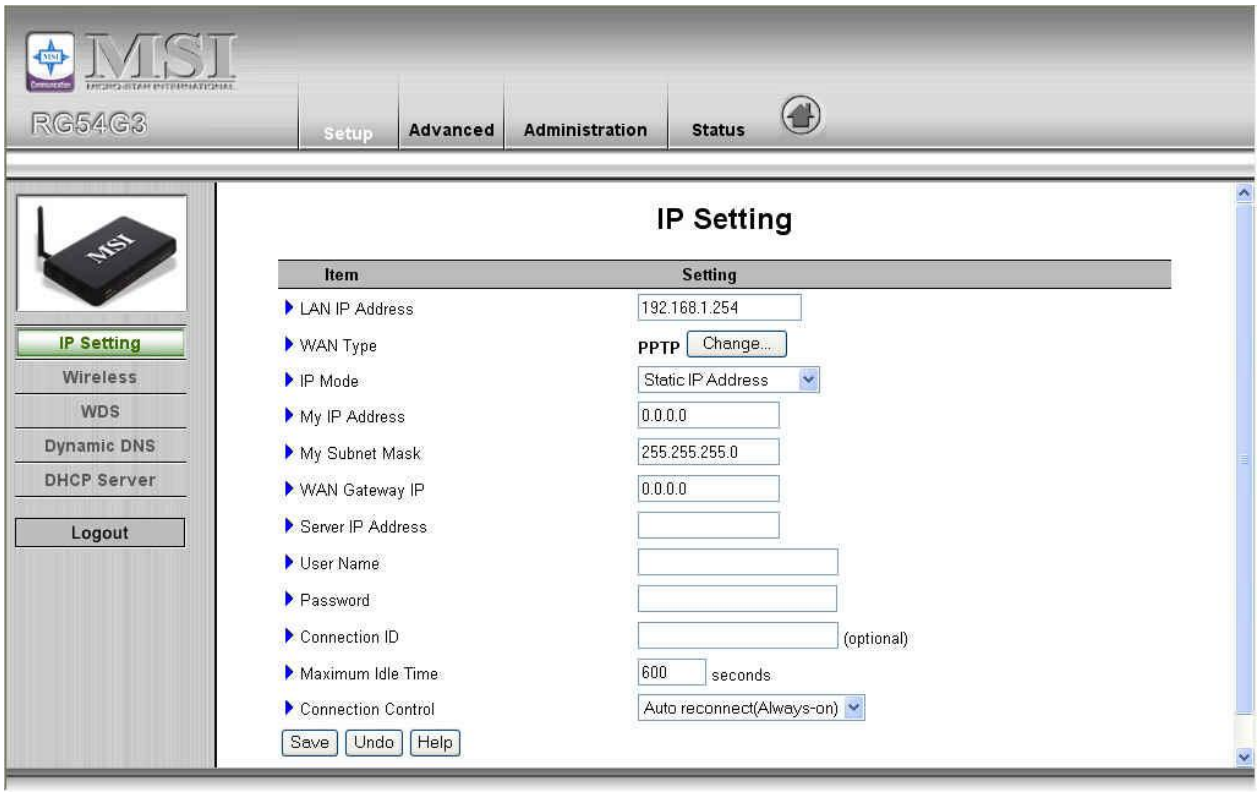
4.3.1.5 PPTP

1. My IP Address and My Subnet Mask: the private IP address and subnet mask your ISP assigned to you.
2. Server IP Address: the IP address of the PPTP server.
3. PPTP Account and Password: the account and password your ISP assigned to you. If you don't want to change the password, keep it empty.
3. Connection ID: optional. Input the connection ID if your ISP requires it.
4. Maximum Idle Time: the time of no activity to disconnect your PPTP session. Set it to zero or enable Auto-reconnect to disable this feature. If Auto-reconnect is enabled, this product will connect to ISP automatically, after system is restarted or connection is dropped.
5. Connection Control:There are 3 modes to select:

   Connect-on-demand:The device will link up with ISP when the clients send outgoing packets.

   Auto-Reconnect(Always-on):The device will link upw with ISP until the connection is established.

   Manually:The device will not make the link until someone clicks the connect-button in the Staus-page.



4.3.1.6 L2TP

First,Please check your ISP assigned and Select Static IP Address or Dynamic IP Address.

For example:Use Static

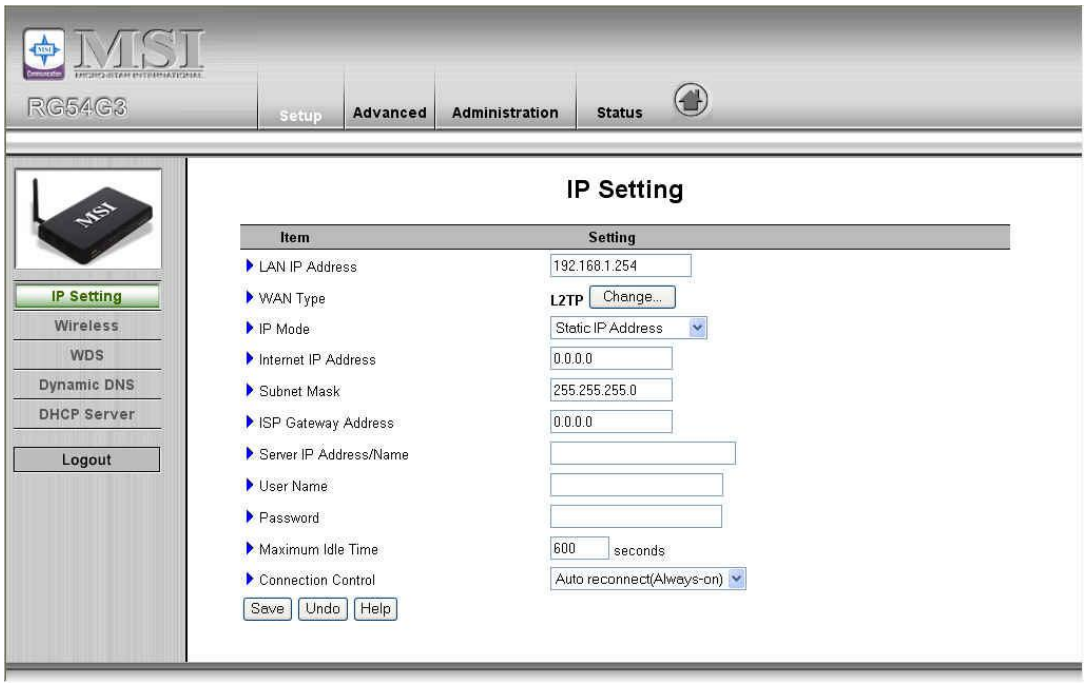
1. My IP Address and My Subnet Mask: the private IP address and subnet mask your ISP assigned to you.
2. Server IP Address: the IP address of the PPTP server.
3. PPTP Account and Password: the account and password your ISP assigned to you. If you don't want to change the password, keep it empty.
3. Connection ID: optional. Input the connection ID if your ISP requires it.
4. Maximum Idle Time: the time of no activity to disconnect your PPTP session. Set it to zero or enable Auto-reconnect to disable this feature. If Auto-reconnect is enabled, this product will connect to ISP automatically, after system is restarted or connection is dropped.

6. Connection Control:There are 3 modes to select:

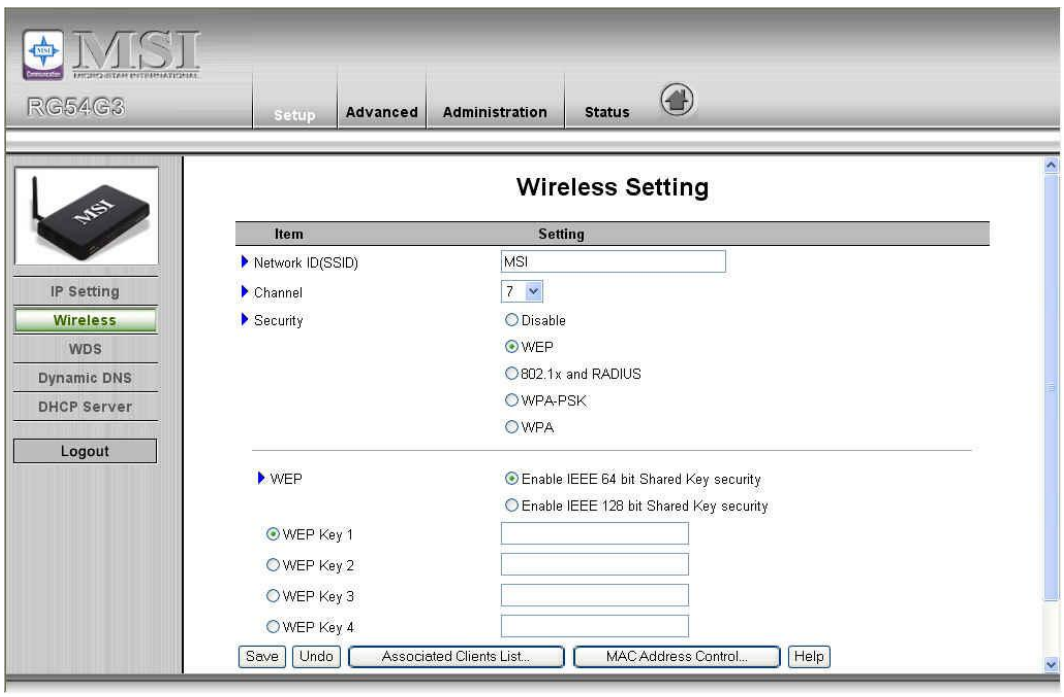
Connect-on-demand:The device will link up with ISP when the clients send outgoing packets.

Auto-Reconnect(Always-on):The device will link upw with ISP until the connection is established.

Manually:The device will not make the link until someone clicks the connect-button in the Staus-page.



4.3.2 Wireless Setting, and 802.1X setting



Wireless settings allow you to set the wireless configuration items.

1. **Network ID (SSID)**: Network ID is used for identifying the Wireless LAN (WLAN). Client stations can roam freely over this product and other Access Points that have the same Network ID. (The factory setting is "**default**")
2. **Channel**: The radio channel number. The permissible channels depend on the Regulatory Domain.
   The factory setting is as follow: **channel 6** for North America; **channel 7** for European (ETSI); **channel 7** for Japan.
3. **WEP Security**: Select the data privacy algorithm you want. Enabling the security can protect your data while it is transferred from one station to another. The standardized IEEE 802.11 WEP (128 or 64-bit) is used here.
4. **WEP Key 1, 2, 3 & 4**: When you enable the 128 or 64 bit WEP key security, please select one WEP key to be used and input 26 or 10 hexadecimal (0, 1, 2…8, 9, A, B…F) digits.
5. Pass-phrase Generator: Since hexadecimal characters are not easily remembered, this device offers a conversion utility to convert a simple word or phrase into hex.
6. **802.1X Setting**

802.1X

Check Box was used to switch the function of the 802.1X. When the 802.1X function is enabled, the Wireless user must **authenticate** to this router first to use the Network service.

RADIUS Server

IP address or the 802.1X server's domain-name.

RADIUS Shared Key

Key value shared by the RADIUS server and this router. This key value is consistent with the key value in the RADIUS server.

WPA-PSK

1. Select Preshare Key Mode

If you select HEX,you have to fill in 64 hexadecimal (0, 1, 2…8, 9, A, B…F) digits

If ASCII,the length of preshare key is from 8 to 63.

2. Fill in the key, Ex 145678

WPA

Check Box was used to switch the function of the WPA. When the WPA function is enabled, the Wireless user must **authenticate** to this router first to use the Network service. RADIUS Server

IP address or the 802.1X server's domain-name.

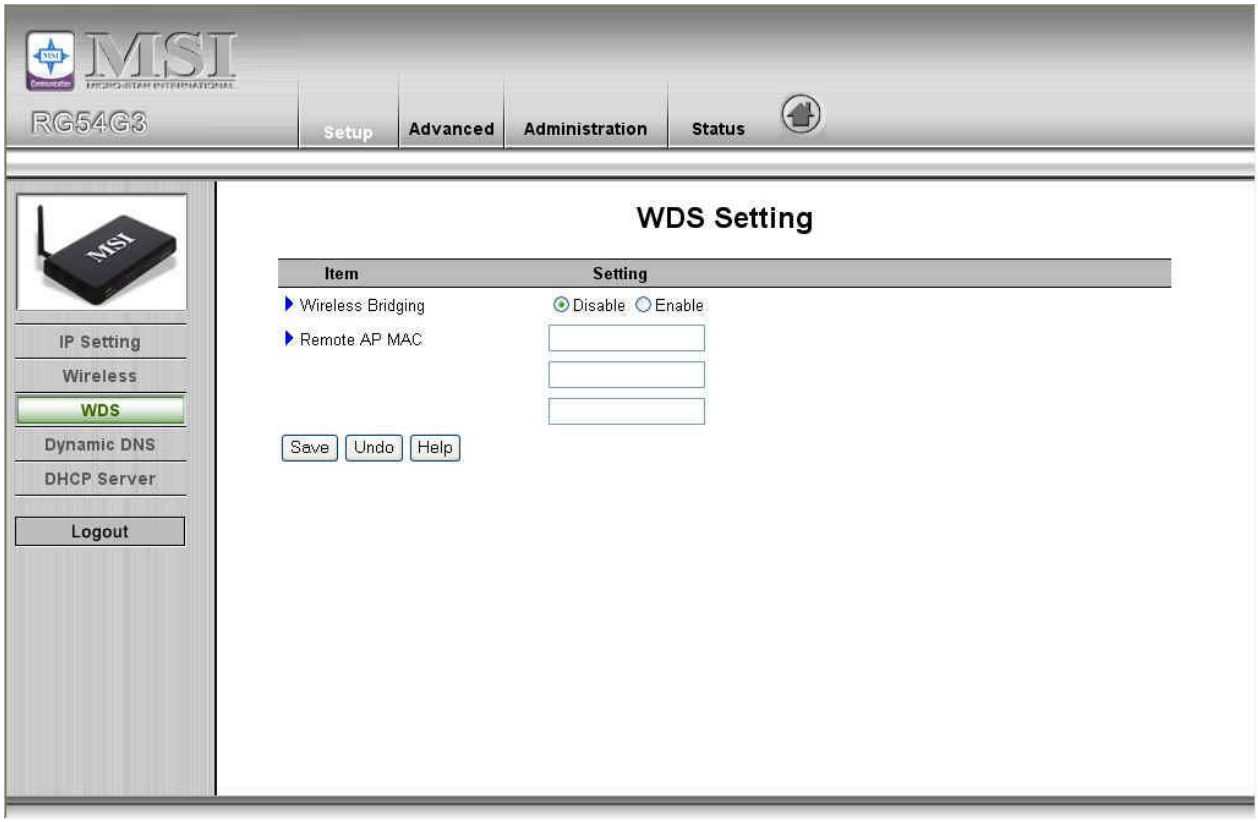
RADIUS Shared Key

Key value shared by the RADIUS server and this router. This key value is consistent with the key value in the RADIUS server.

4.3.3 WDS

The Wireless Distribution System (WDS) supports peer-to-peer AP communication. Select **Enable** to allow Bridge (WDS) mode between routers or **Disable** to block communication between routers.

To enable **WDS**, set the **Wireless Bridging (WDS)** function to **Enable**. Enter the Wireless MAC address of the router to communicate with in the form of two characters separated by a colon and click **Save**.



4.3.4 Dynamic DNS

To host your server on a changing IP address, you have to use dynamic domain name service (DDNS).

So that anyone wishing to reach your host only needs to know the name of it. Dynamic DNS will map the name of your host to your current IP address, which changes each time you connect your Internet service provider.

Before you enable **Dynamic DNS**, you need to register an account on one of these Dynamic DNS servers that we list in **provider** field.

To enable **Dynamic DNS** click the check box next to **Enable** in the **DDNS** field.

Next you can enter the appropriate information about your Dynamic DNS Server.

You have to define:

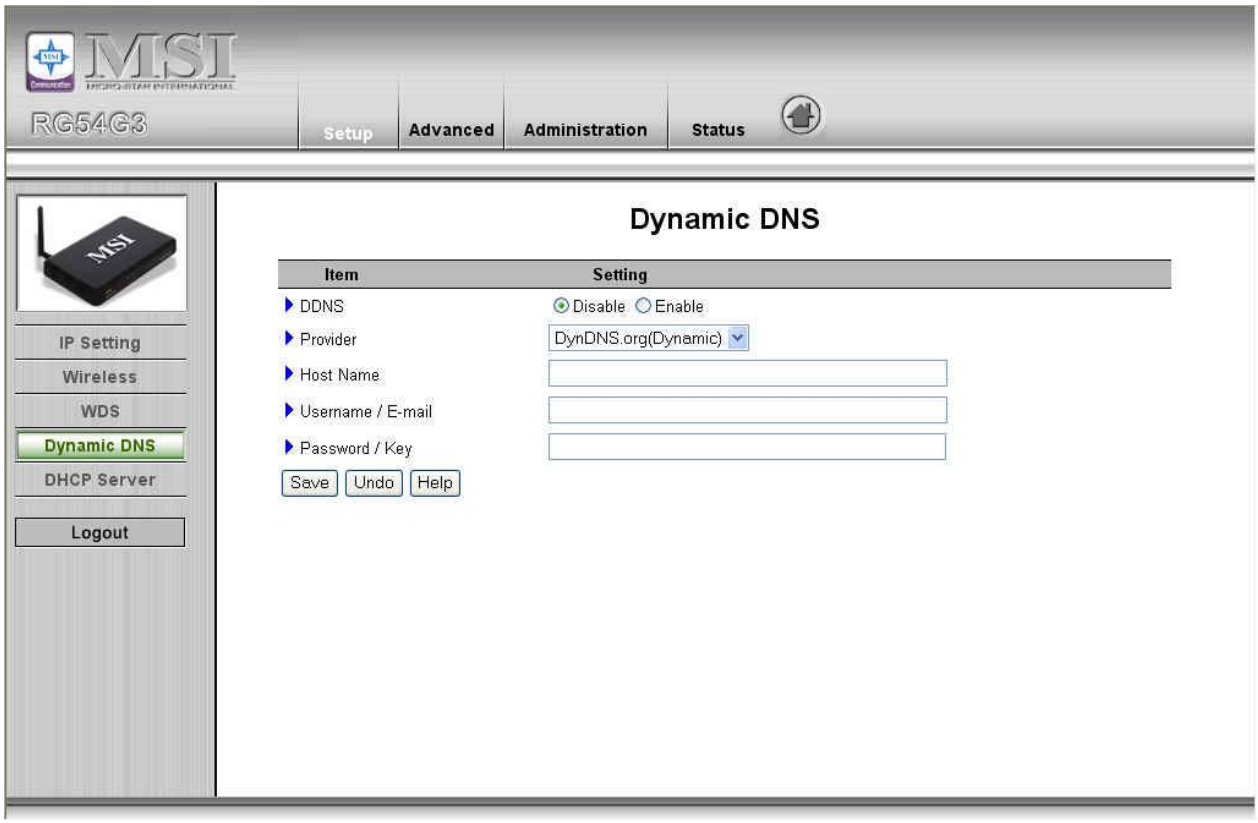
Provider

Host Name

Username/E-mail

Password/Key

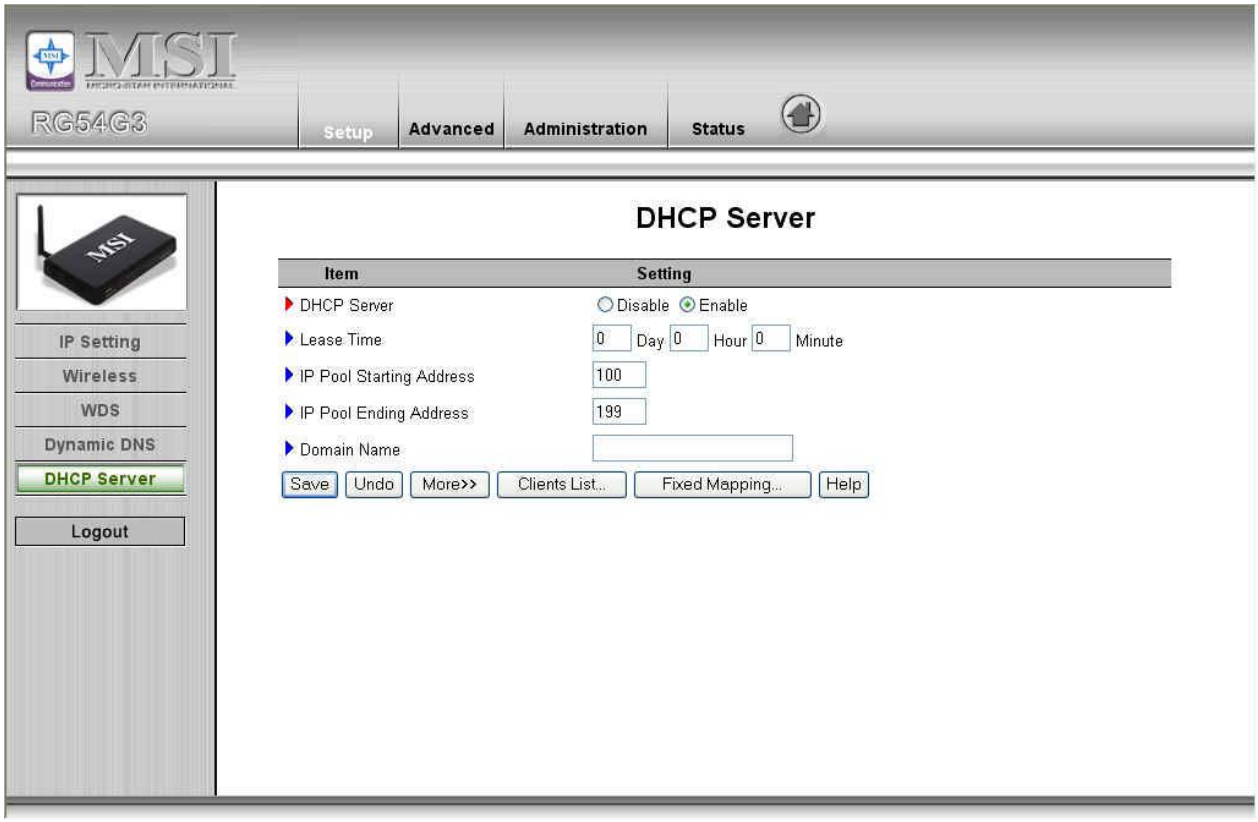
You will get this information when you register an account on a Dynamic DNS server.



4.3.5 DHCP Server

Press **"More>>"**

The settings of a TCP/IP environment include host IP, Subnet Mask, Gateway, and DNS configurations. It is not easy to manually configure all the computers and devices in your network. Fortunately, DHCP Server provides a rather simple approach to handle all these settings. This product supports the function of DHCP server. If you enable this product's DHCP server and configure your computers as "automatic IP allocation" mode, then when your computer is powered on, it will automatically load the proper TCP/IP settings from this product. The settings of DHCP server include the following items:



1. **DHCP Server**: Choose “Disable” or “Enable.”

2. **Lease Time:** Define the period of time for the IP address leased.

3. **IP pool starting Address/ IP pool starting Address**: Whenever there is a request, the DHCP server will automatically allocate an unused IP address from the IP address pool to the requesting computer. You must specify the starting and ending address of the IP address pool.

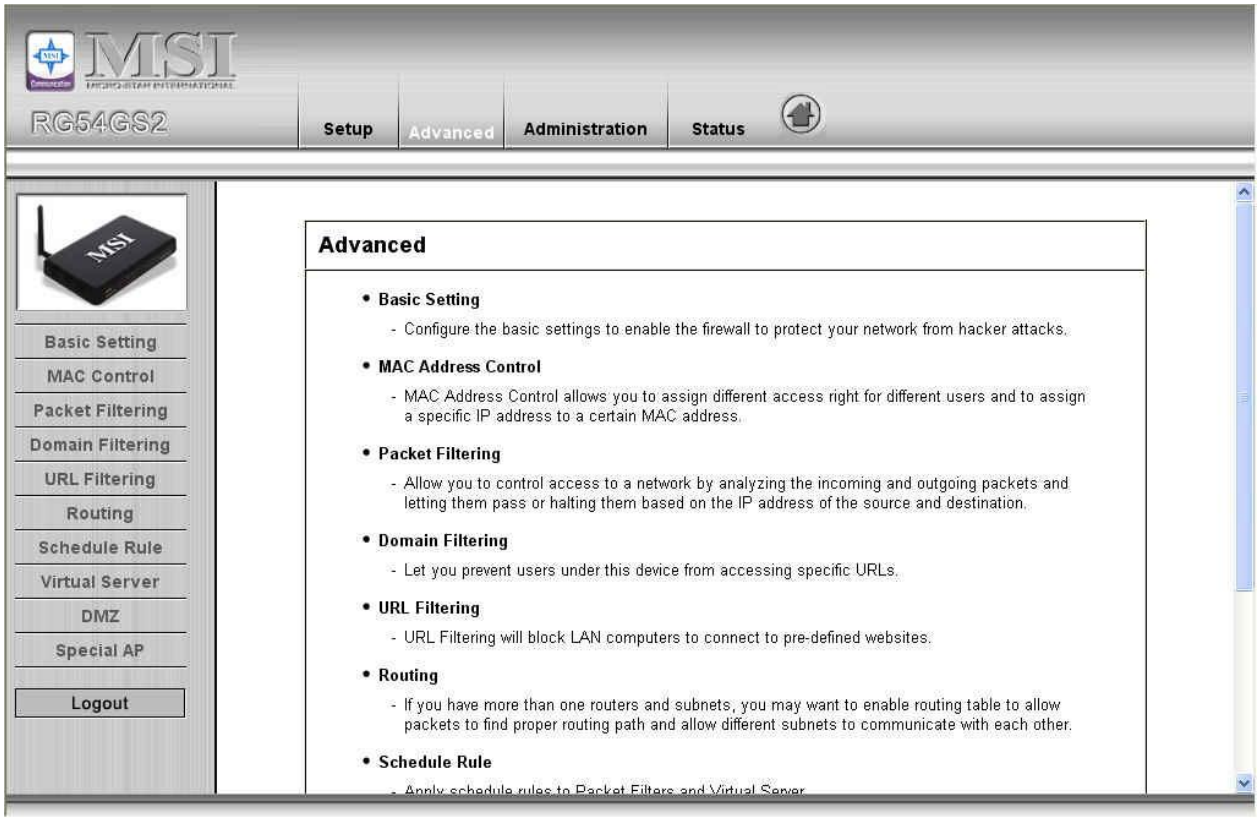
4. **Domain Name**: Optional, this information will be passed to the client.

5. **Primary DNS/Secondary DNS**: This feature allows you to assign DNS Servers

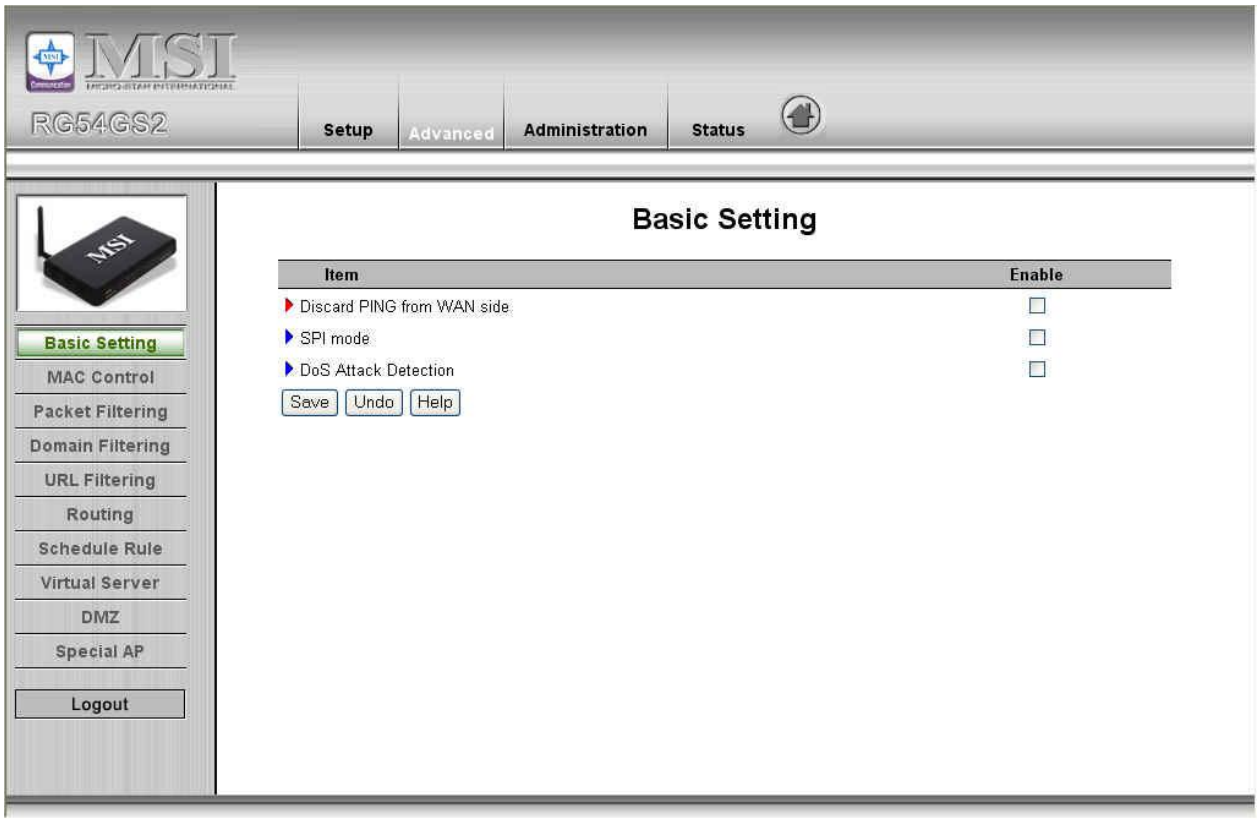
6. **Primary WINS/Secondary WINS**: This feature allows you to assign WINS Servers

7. **Gateway**: The Gateway Address would be the IP address of an alternate Gateway. This function enables you to assign another gateway to your PC, when DHCP server offers an IP to your PC.

4.4 Advanced



4.4.1 Basic Setting



Discard PING from WAN side

When this feature is enabled, any host on the WAN cannot ping this product.

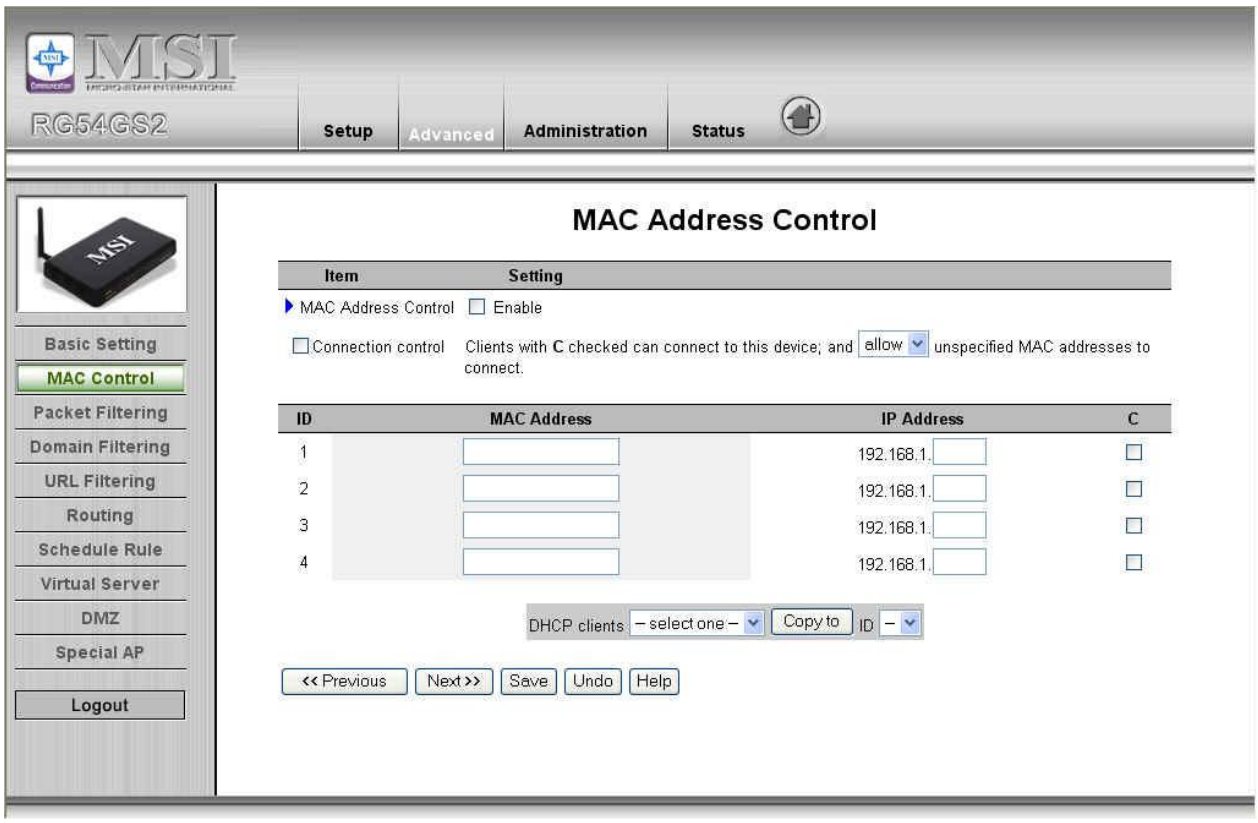
SPI Mode

When this feature is enabled, the router will record the packet information pass through the router like IP address, port address, ACK, SEQ number and so on. And the router will check every incoming packet to detect if this packet is valid.

DoS Attack Detection

When this feature is enabled, the router will detect and log the DoS attack comes from the Internet. Currently, the router can detect the following DoS attack: SYN Attack, WinNuke, Port Scan, Ping of Death, Land Attack etc.

4.4.2 MAC Address Control



MAC Address Control allows you to assign different access right for different users and to assign a specific IP address to a certain MAC address.

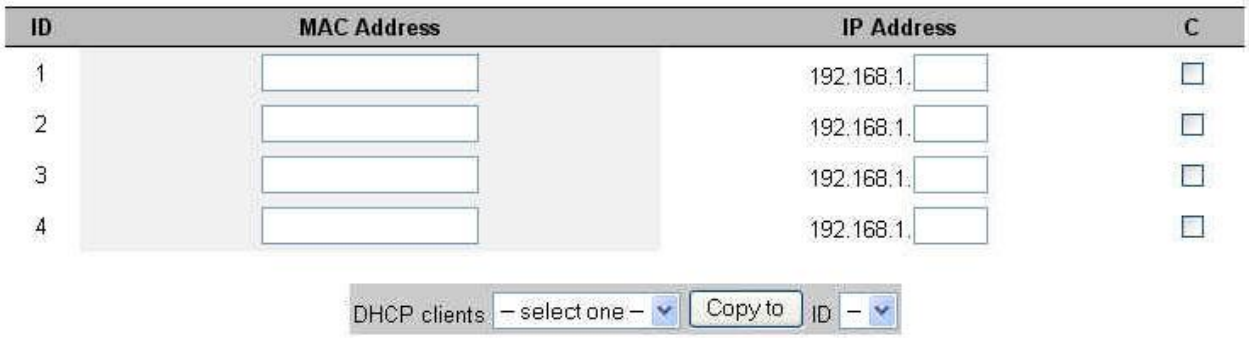
MAC Address Control Check “Enable” to enable the “MAC Address Control”. All of the settings in this page will take effect only when “Enable” is checked.

Connection control Check "Connection control" to enable the controlling of which wired and wireless clients can connect to this device. If a client is denied to connect to this device, it means the client can't access to the Internet either. Choose "allow" or "deny" to allow or deny the clients, whose MAC addresses are not in the "Control table" (please see below), to connect to this device.

Association control Check "Association control" to enable the

controlling of which wireless client can associate to the wireless LAN. If a client is denied to associate to the wireless LAN, it means the client can't send or receive any data via this device. Choose "allow" or "deny" to allow or deny the clients, whose MAC addresses are not in the "Control table", to associate to the wireless LAN.

Control table



"Control table" is the table at the bottom of the "MAC Address Control" page. Each row of this table indicates the MAC address and the expected IP address mapping of a client. There are four columns in this table:

MAC Address	MAC address indicates a specific client.
IP Address	Expected IP address of the corresponding client. Keep it empty if you don't care its IP address.
C	When "**Connection control**" is checked, check "**C**" will allow the corresponding client to connect to this device.
A	When "**Association control**" is checked, check "**A**" will allow the corresponding client to associate to the wireless LAN.

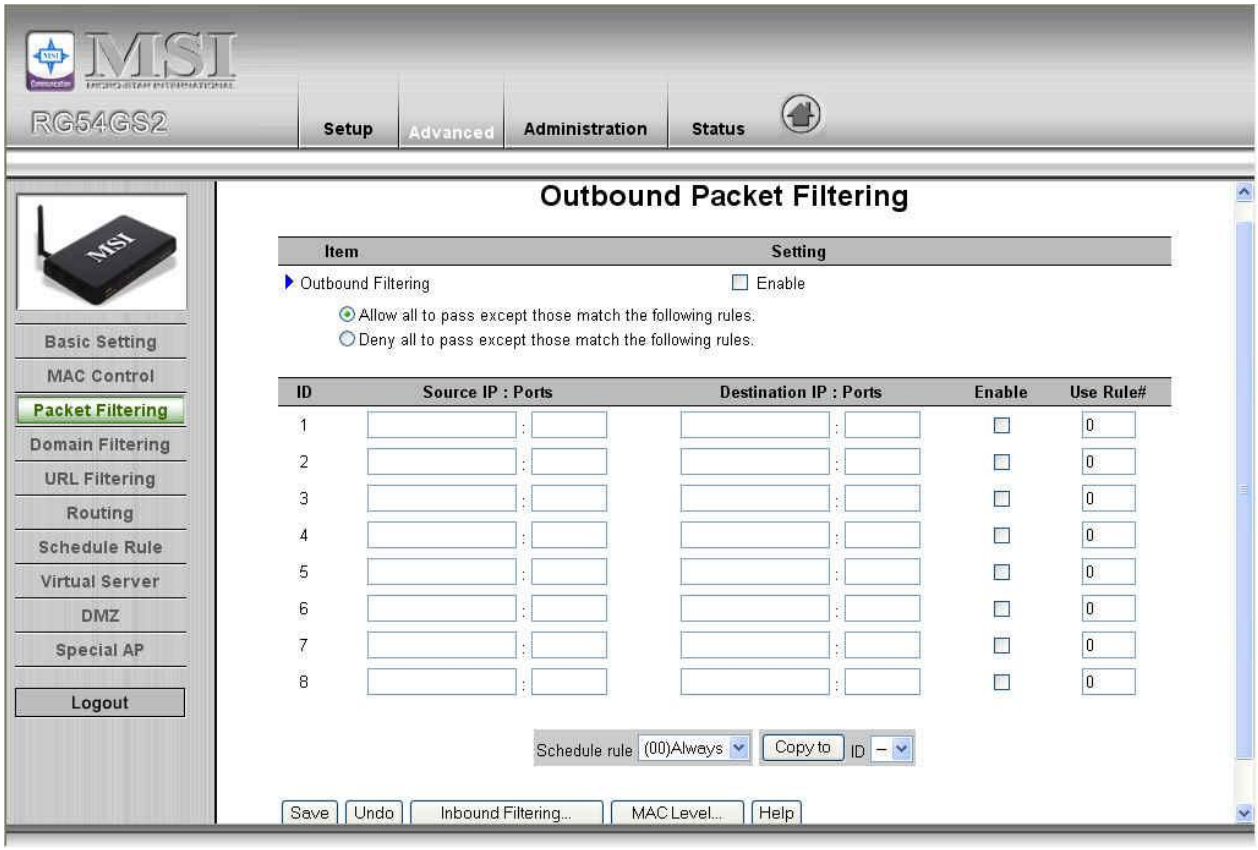
In this page, we provide the following Combobox and button to help you to input the MAC address.

You can select a specific client in the “DHCP clients” Combobox, and then click on the “Copy to” button to copy the

MAC address of the client you select to the ID selected in the “ID” Combobox.

Previous page and Next Page To make this setup page simple and clear, we have divided the “Control table” into several pages. You can use these buttons to navigate to different pages.

4.4.3 Packet Filtering



Packet Filter enables you to control what packets are allowed to pass the router. Outbound filter applies on all outbound packets. However, Inbound filter applies on packets that destined to Virtual Servers or DMZ host only. You can select one of the two filtering policies:

1. Allow all to pass except those match the specified rules
2. Deny all to pass except those match the specified rules

You can specify 8 rules for each direction: inbound or outbound. For each rule, you can define the following:

- Source IP address
- Source port address
- Destination IP address
- Destination port address
- Protocol: TCP or UDP or both.
- Use Rule#

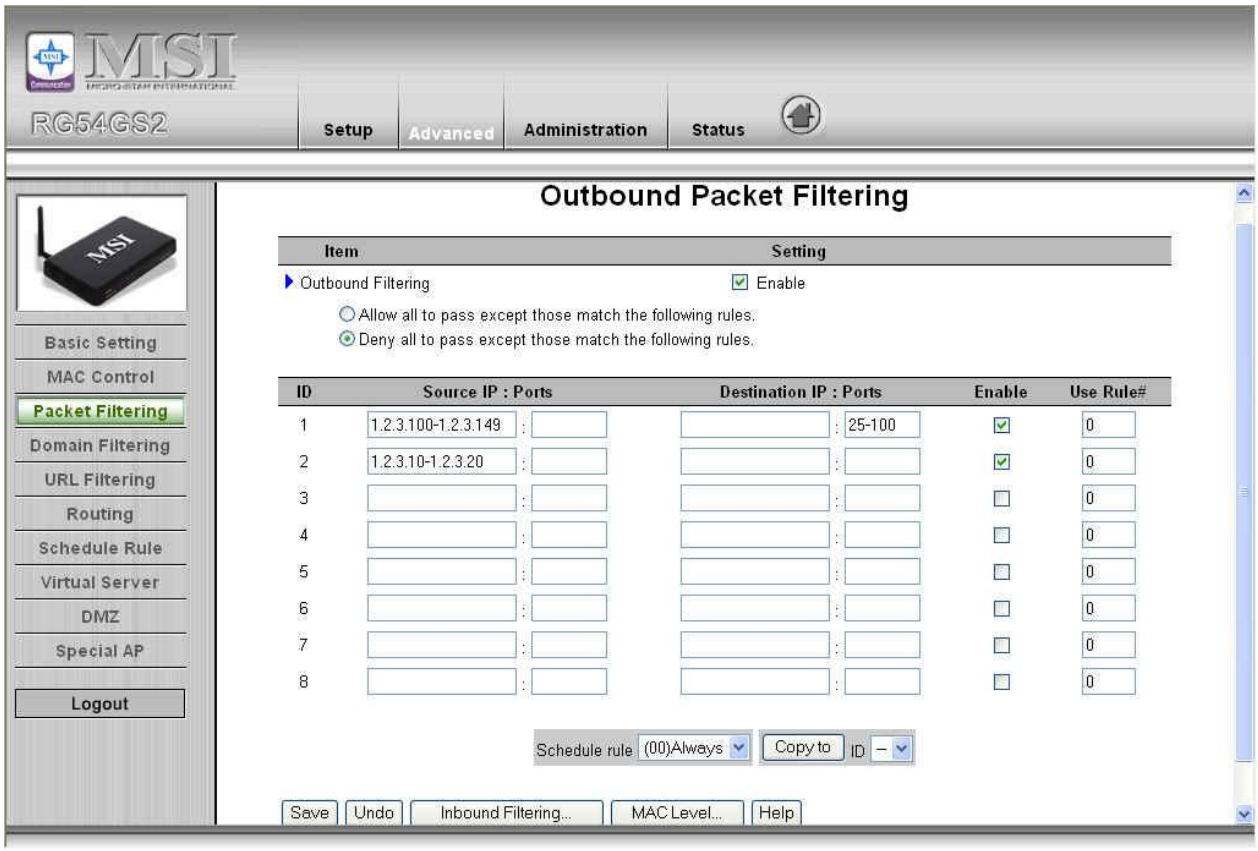
For source or destination IP address, you can define a single IP address (4.3.2.1) or a range of IP addresses (4.3.2.1-4.3.2.254). An empty implies all IP addresses.
For source or destination port, you can define a single port (80) or a range of ports (1000-1999). Add prefix "T" or "U" to specify TCP or UDP protocol. For example, T80, U53, U2000-2999. No prefix indicates both TCP and UDP are defined. An empty implies all port addresses. **Packet Filter** can work with **Scheduling Rules**, and give user more flexibility on Access control. For Detail, please refer to **Scheduling Rule**.

Each rule can be enabled or disabled individually.

Inbound Filter:

To enable **Inbound Packet Filter** click the check box next to **Enable** in the **Inbound Packet Filter** field.

Suppose you have SMTP Server (25), POP Server (110), Web Server (80), FTP Server (21), and News Server (119) defined in Virtual Server or DMZ Host.
Example 1:

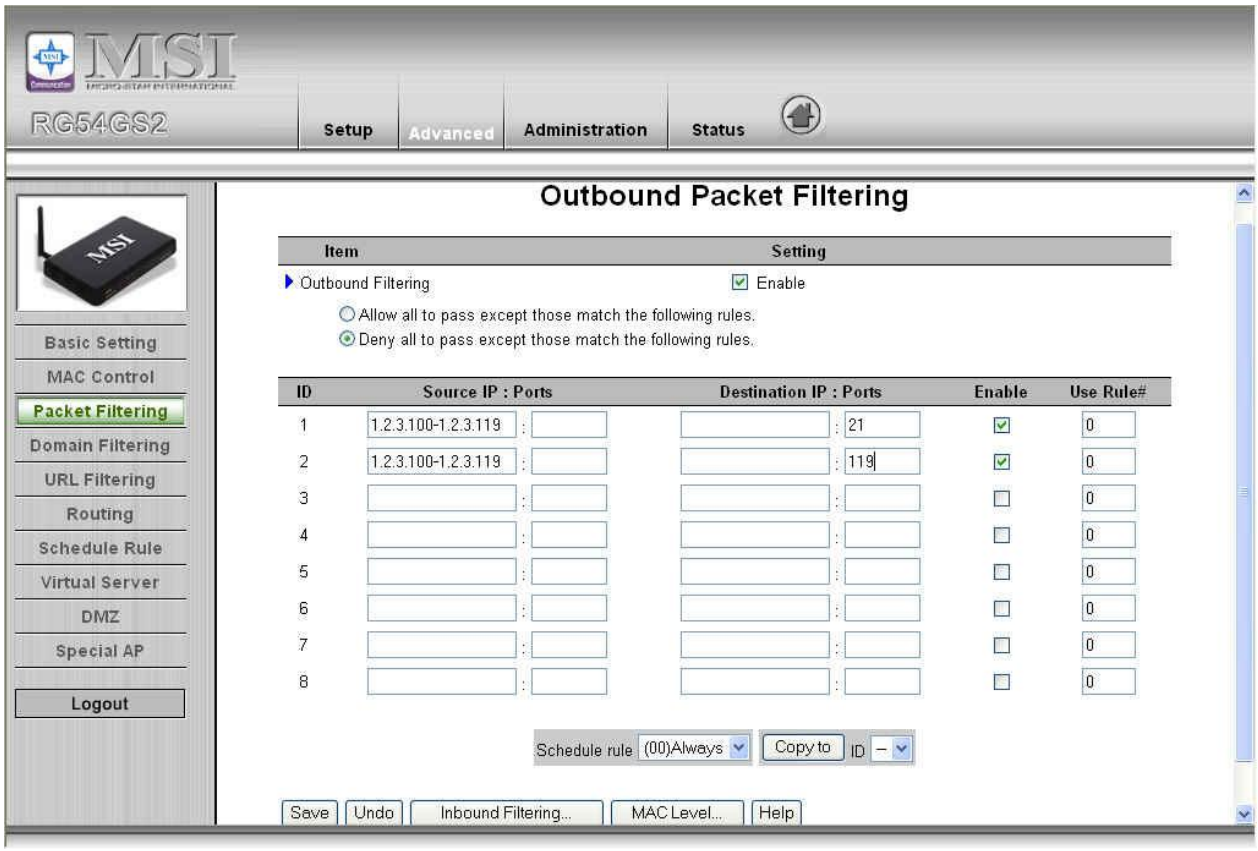


(1.2.3.100-1.2.3.149) They are allow to send mail (port 25), receive mail (port 110), and browse the Internet (port 80)

(1.2.3.10-1.2.3.20) They can do everything (block nothing)

Others are all blocked.

Example 2:



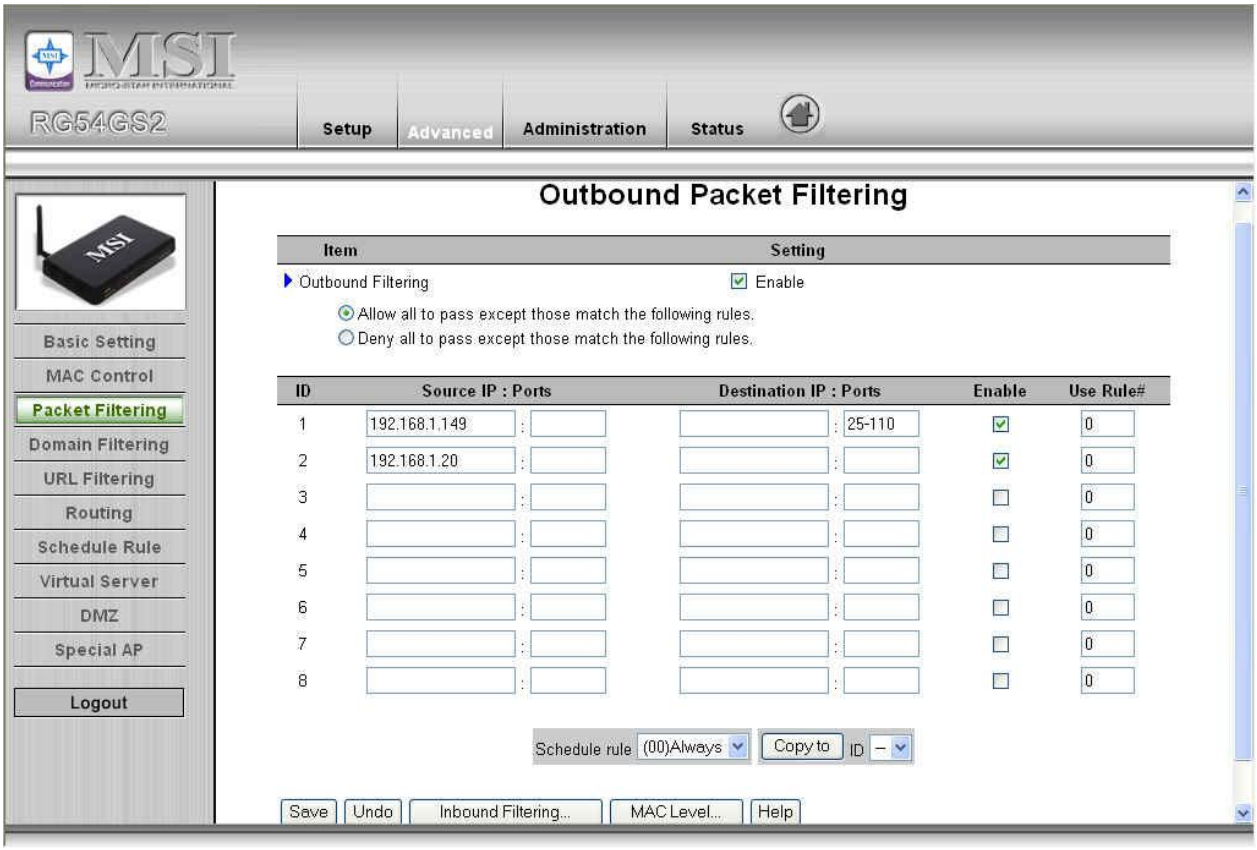
(1.2.3.100-1.2.3.119) They can do everything except read net news (port 119) and transfer files via FTP (port 21)
Others are all allowed.

After **Inbound Packet Filter** setting is configured, click the **save** button.

Outbound Filter:

To enable **Outbound Packet Filter** click the check box next to **Enable** in the **Outbound Packet Filter** field.

Example 1:

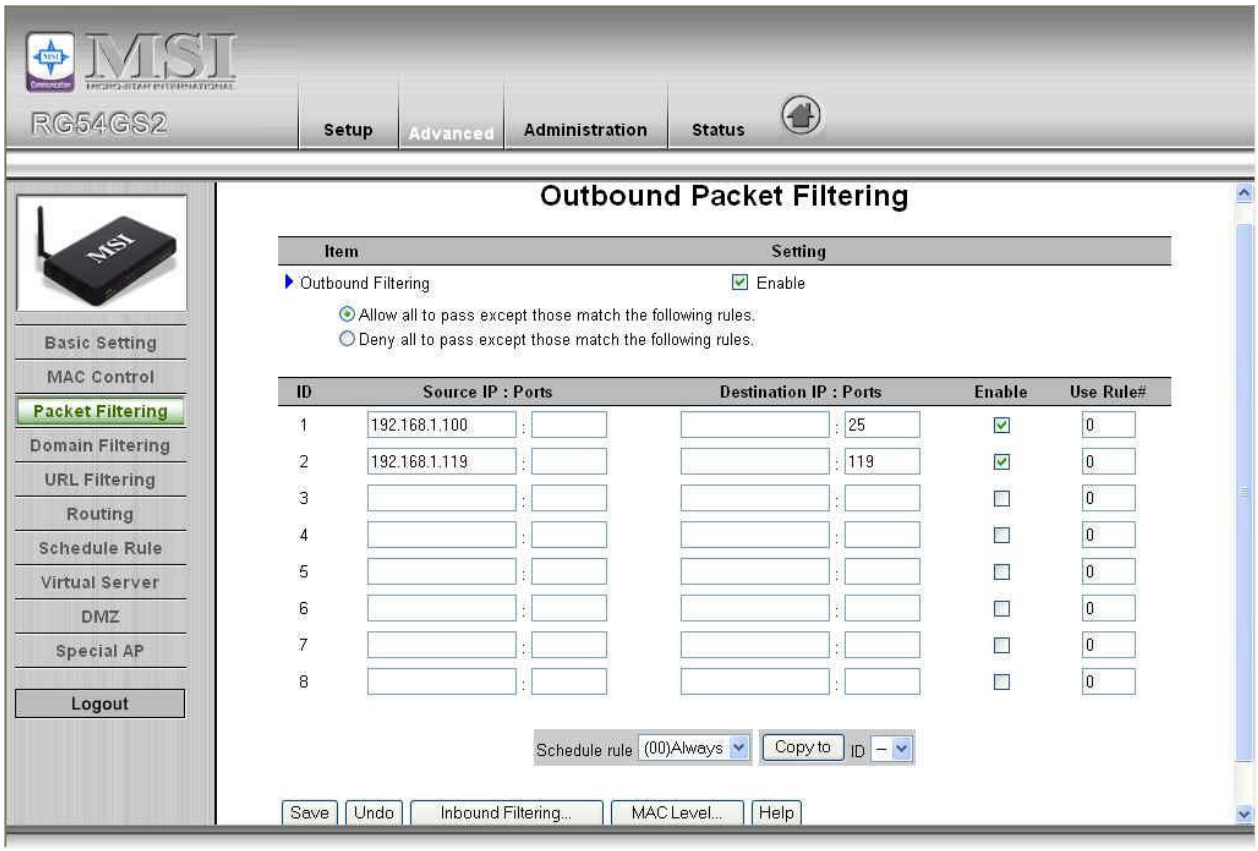


(192.168.1.100-192.168.1.149) They are allowed to send mail (port 25), receive mail (port 110), and browse Internet (port 80); port 53 (DNS) is necessary to resolve the domain name.

(192.168.1.10-192.168.1.20) They can do everything (block nothing)

Others are all blocked.

Example 2:

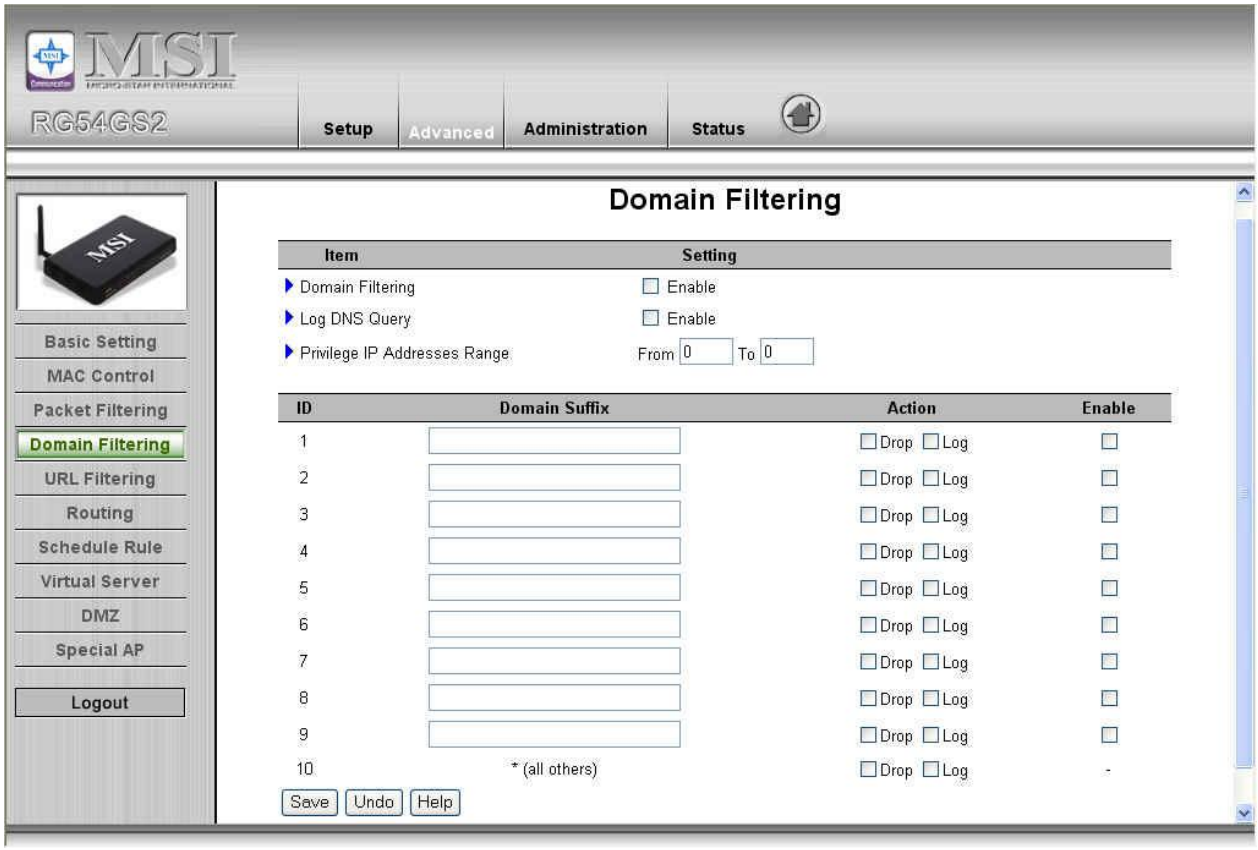


(192.168.1.100-192.168.1.119) They can do everything except read net news (port 119) and transfer files via FTP (port 21)

Others are allowed

After **Outbound Packet Filter** setting is configured, click the **save** button.

4.4.4 Domain Filtering



Domain Filter

Let you prevent users under this device from accessing specific URLs.

Domain Filter Enable

Check if you want to enable Domain Filter.

Log DNS Query

Check if you want to log the action when someone accesses the specific URLs.

Privilege IP Addresses Range

Setting a group of hosts and privilege these hosts to access network without restriction.

Domain Suffix

A suffix of URL to be restricted. For example, ".com", "xxx.com".

Action

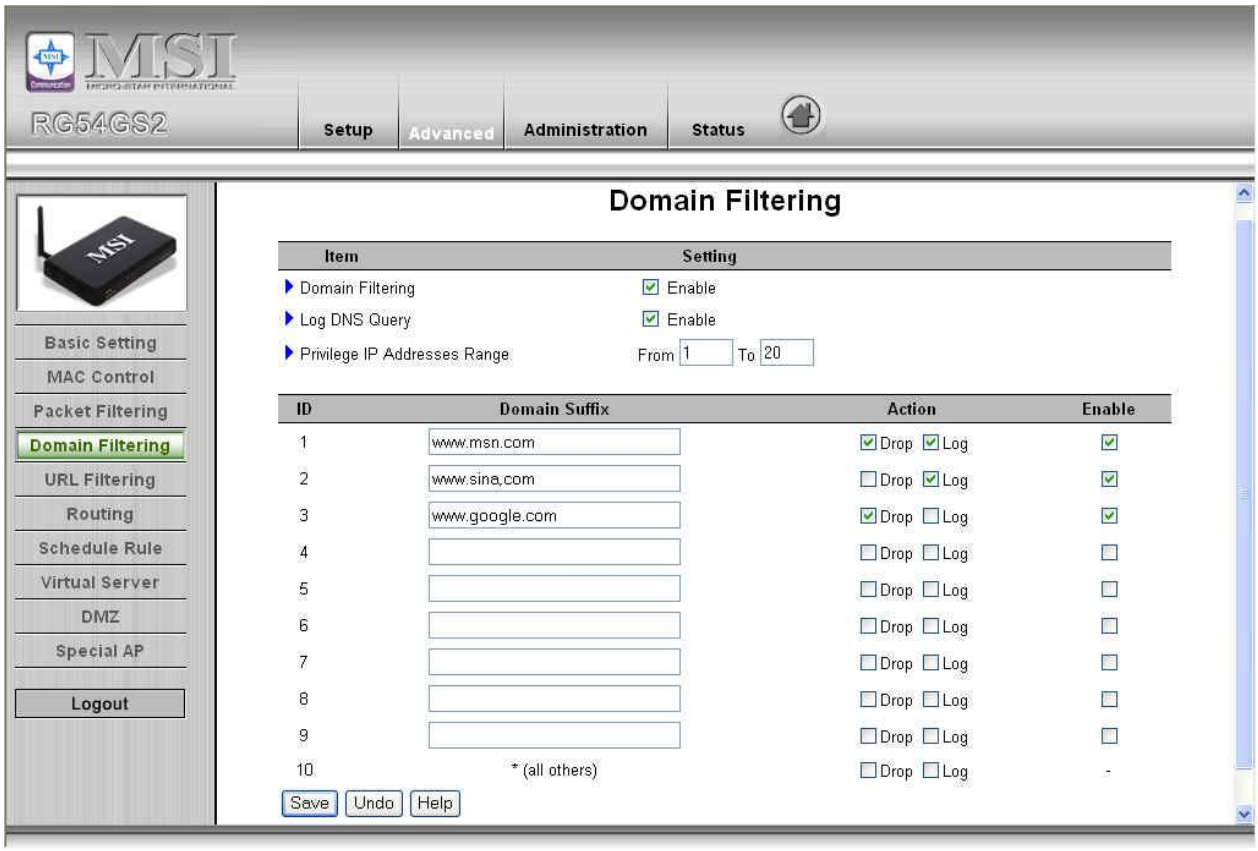
When someone is accessing the URL met the domain-suffix, what kind of action you want.

Check drop to block the access. Check log to log these access.

Enable

Check to enable each rule.

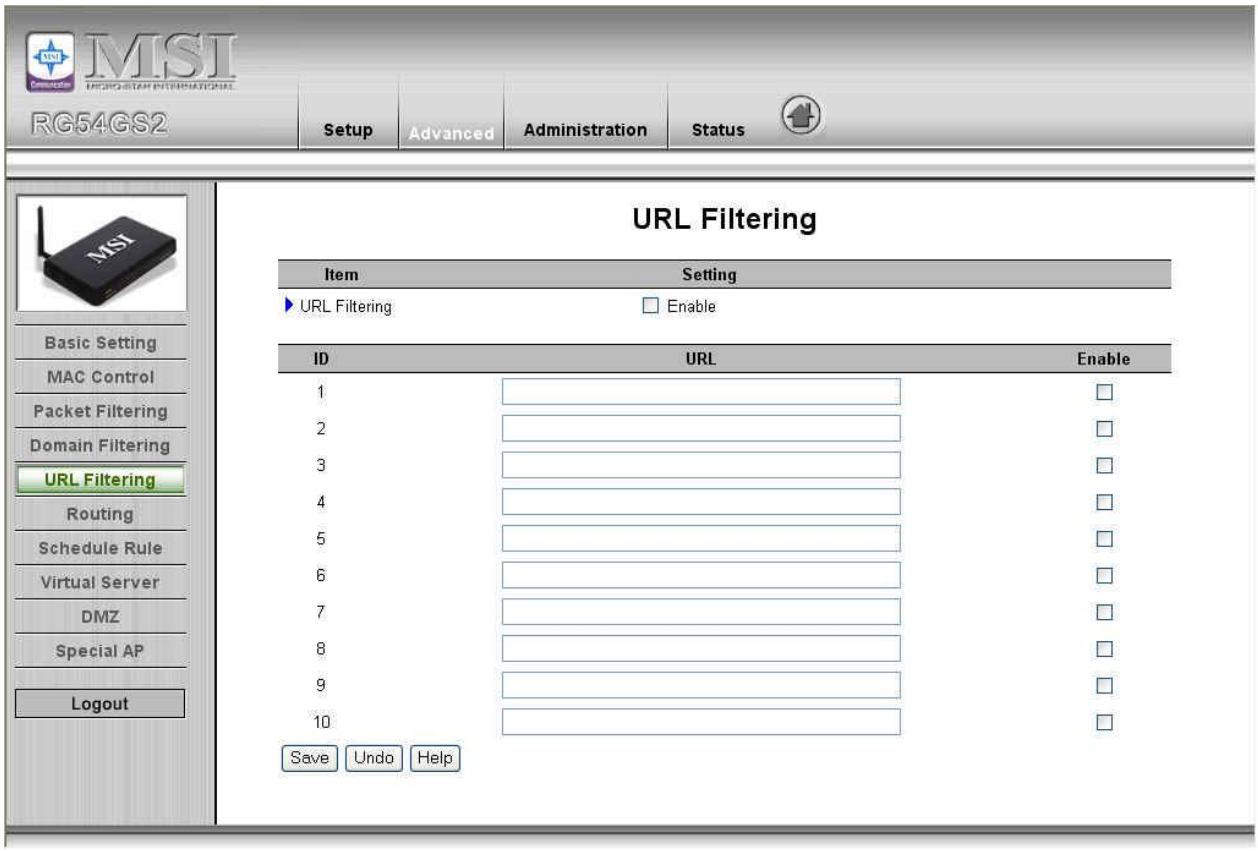
Example:



In this example:

1. URL include “www.msn.com” will be blocked, and the action will be record in log-file.
2. URL include “www.sina.com” will not be blocked, but the action will be record in log-file.
3. URL include “www.google.com” will be blocked, but the action will not be record in log-file.
4. IP address X.X.X.1~ X.X.X.20 can access network without restriction.

4.4.5 URL Filtering



URL Blocking will block LAN computers to connect to pre-defined Websites.

The major difference between "Domain filter" and "URL Blocking" is Domain filter require user to input suffix (like .com or .org, etc), while URL Blocking require user to input a keyword only. In other words, Domain filter can block specific website, while URL Blocking can block hundreds of websites by simply a **keyword**.

URL Blocking Enable

Checked if you want to enable URL Blocking.

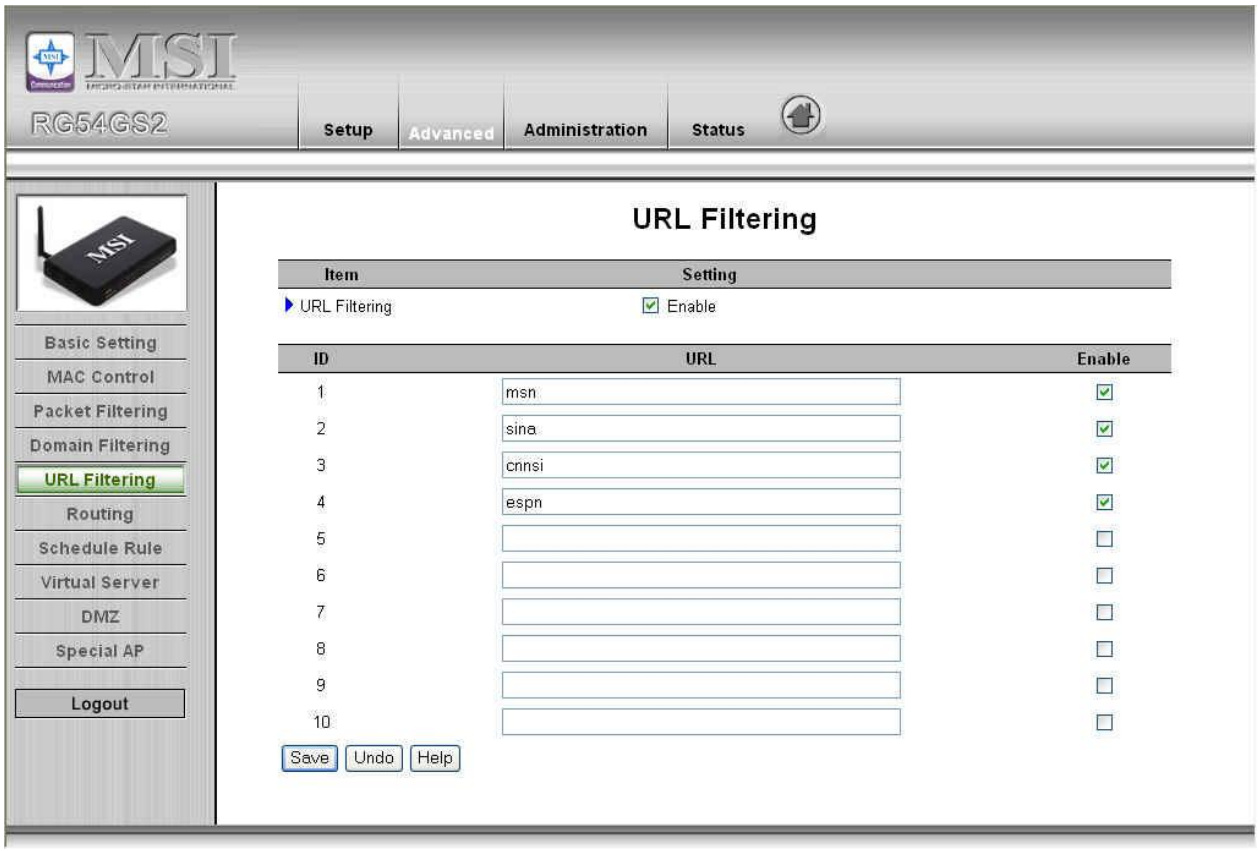
URL

If any part of the Website's URL matches the pre-defined word, the connection will be blocked.

For example, you can use pre-defined word "sex" to block all websites if their URLs contain pre-defined word "sex".

Enable

Checked to enable each rule.



In this example:

1. URL include “msn” will be blocked, and the action will be record in log-file.

2. URL include “sina” will be blocked, but the action will be record in log-file

3. URL include “cnnsi” will not be blocked, but the action will be record in log-file.

4. URL include “espn” will be blocked, but the action will be record in log-file

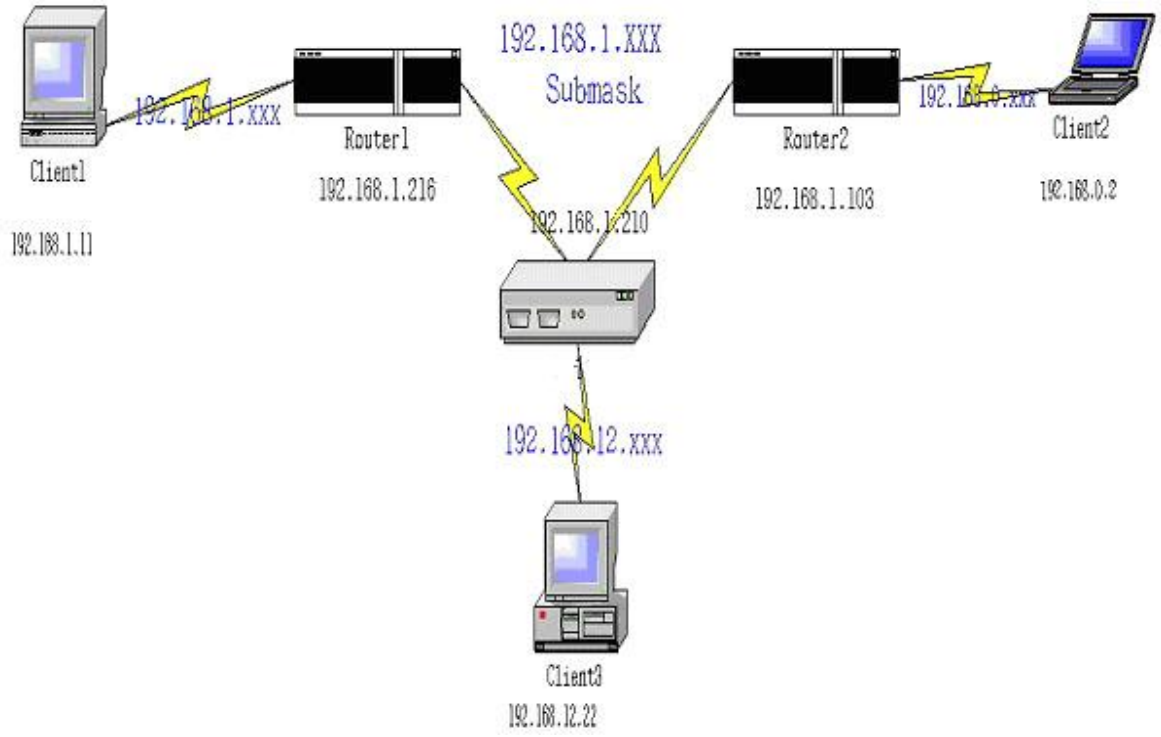
4.4.6 Routing Table

Routing Tables allow you to determine which physical interface address to use for outgoing IP data grams. If you have more than one routers and subnets, you will need to enable routing table to allow packets to find proper routing path and allow different subnets to communicate with each other.

Routing Table settings are settings used to setup the functions of static.

Static Routing: For static routing, you can specify up to 8 routing rules. You can enter the destination IP address, subnet mask, gateway, hop for each routing rule, and then enable or disable the rule by checking or unchecking the Enable checkbox.

Example:



Configuration on NAT Router

Destination	SubnetMask	Gateway	Hop	Enabled
192.168.1.0	255.255.255.0	192.168.1.216	1	V
192.168.0.0	255.255.255.0	192.168.1.103	1	V

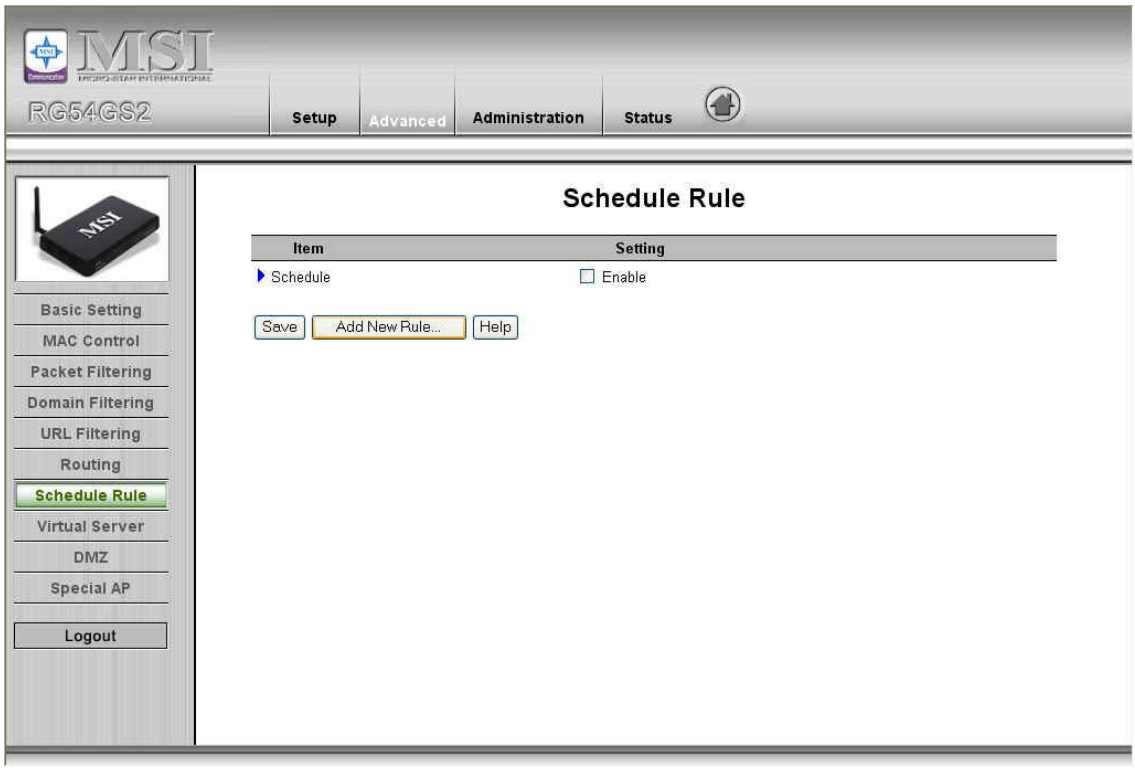
So if, for example, the client3 wanted to send an IP data gram to 192.168.0.2, it would use the above table to determine that it had to go via 192.168.1.103 (a gateway),

And if it sends Packets to 192.168.1.11 will go via 192.168.1.216

Each rule can be enabled or disabled individually.

After **routing table** setting is configured, click the **save** button.

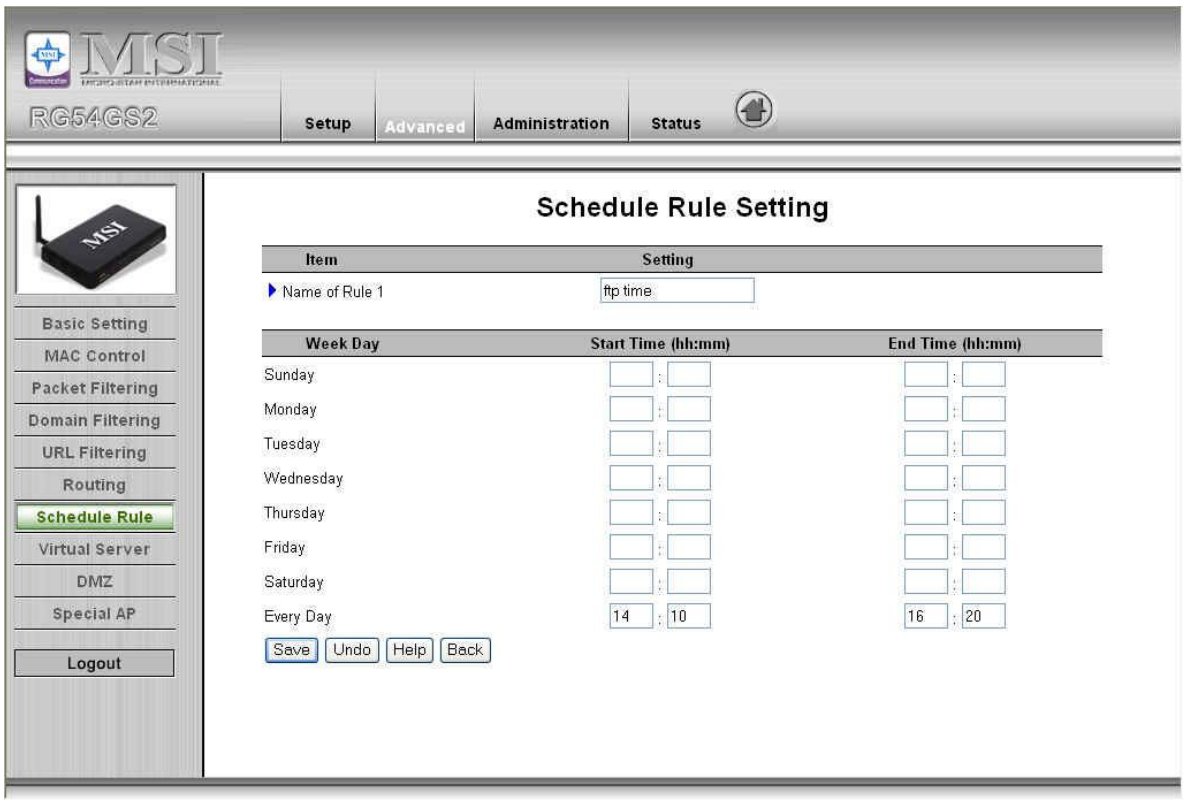
4.4.7 Schedule Rule



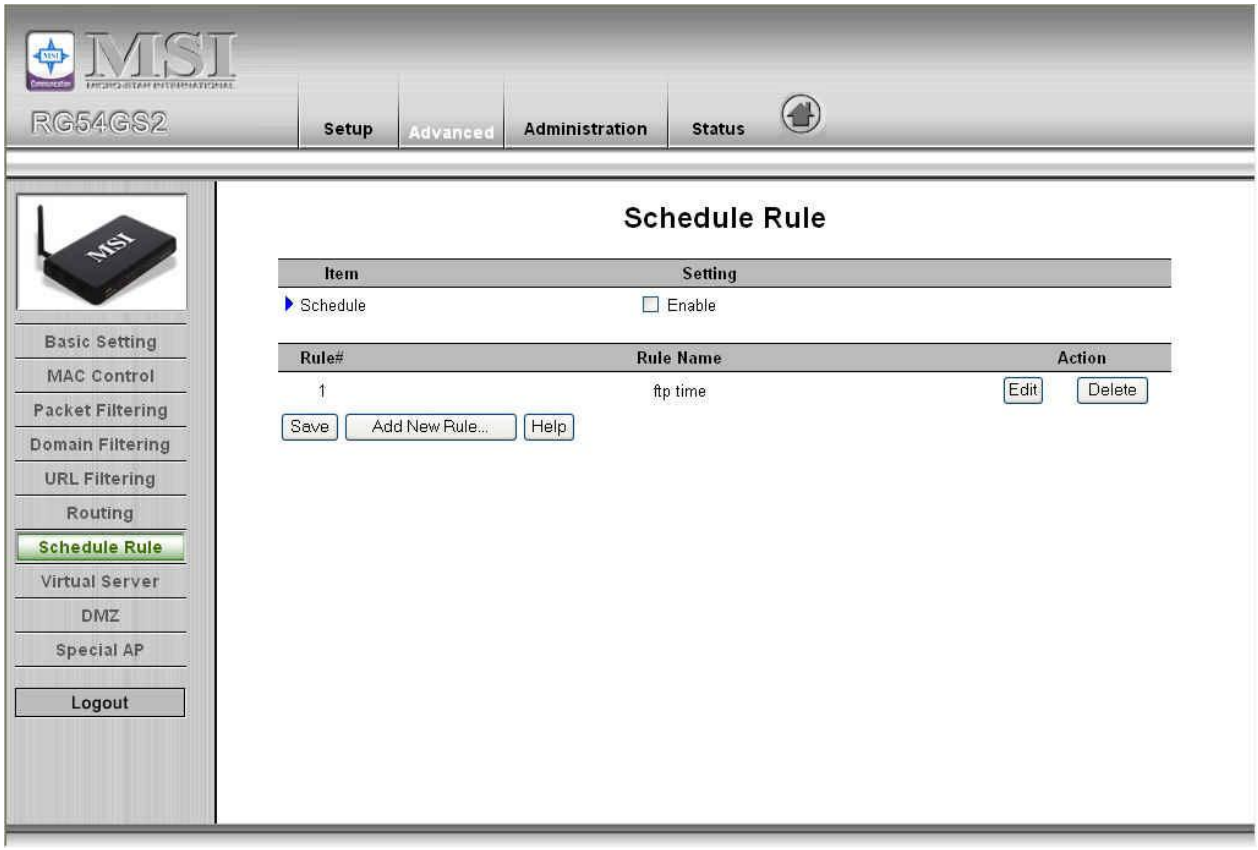
You can set the schedule time to decide which service will be turned on or off. Select the "enable" item.

Press **"Add New Rule"**

You can write a rule name and set which day and what time to schedule from "Start Time" to "End Time". The following example configure "ftp time" as everyday 14:10 to 16:20



After configure Rule 1 à



Schedule Enable

Selected if you want to Enable the Scheduler.

Edit

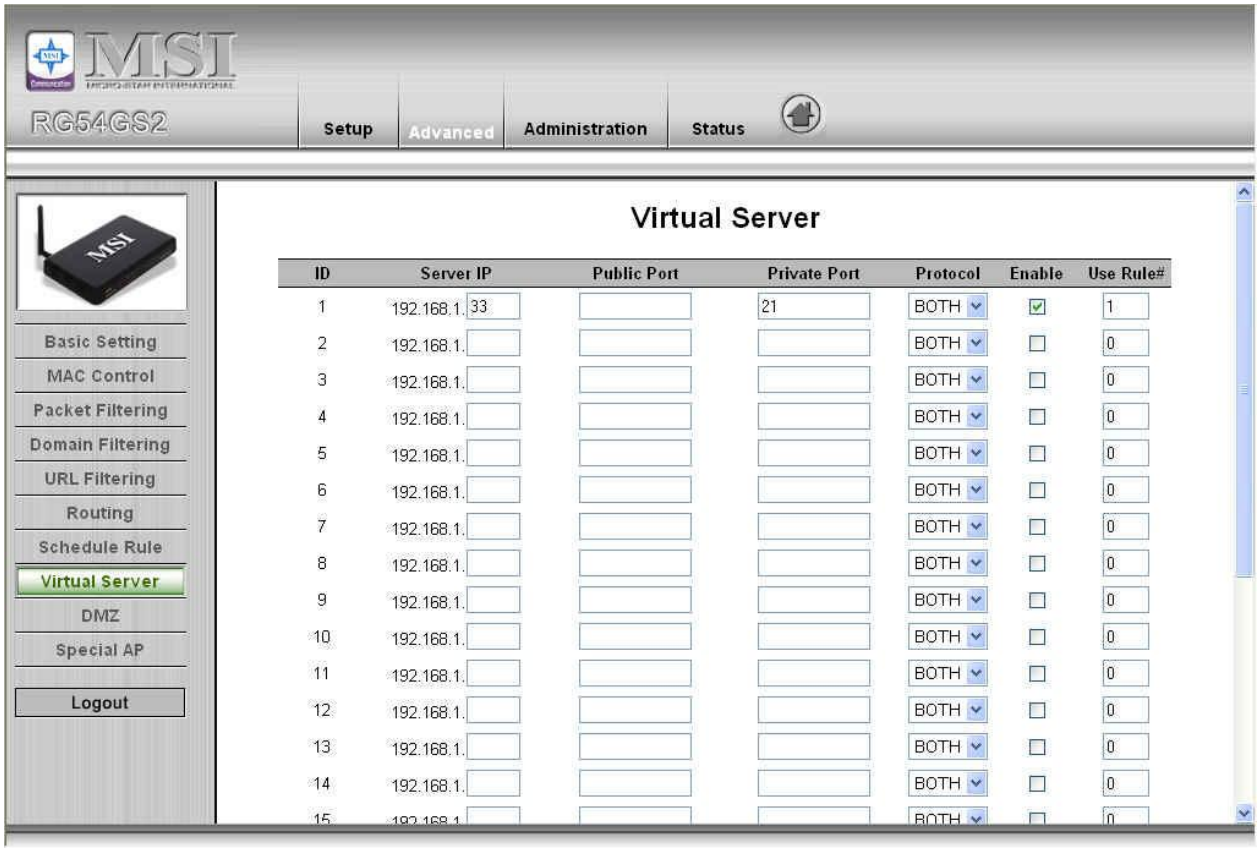
To edit the schedule rule.

Delete

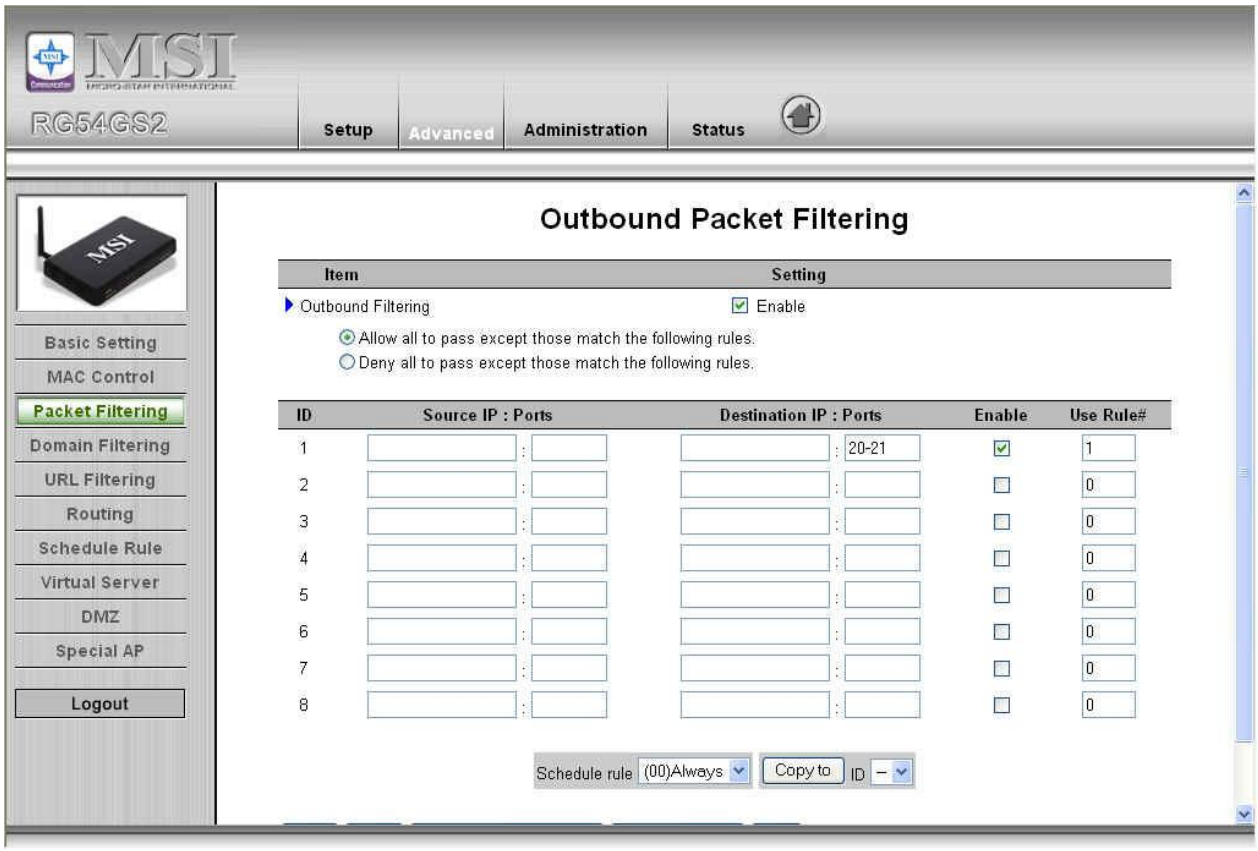
To delete the schedule rule, and the rule# of the rules behind the deleted one will decrease one automatically.

Schedule Rule can be apply to Virtual server and Packet Filter, for example:

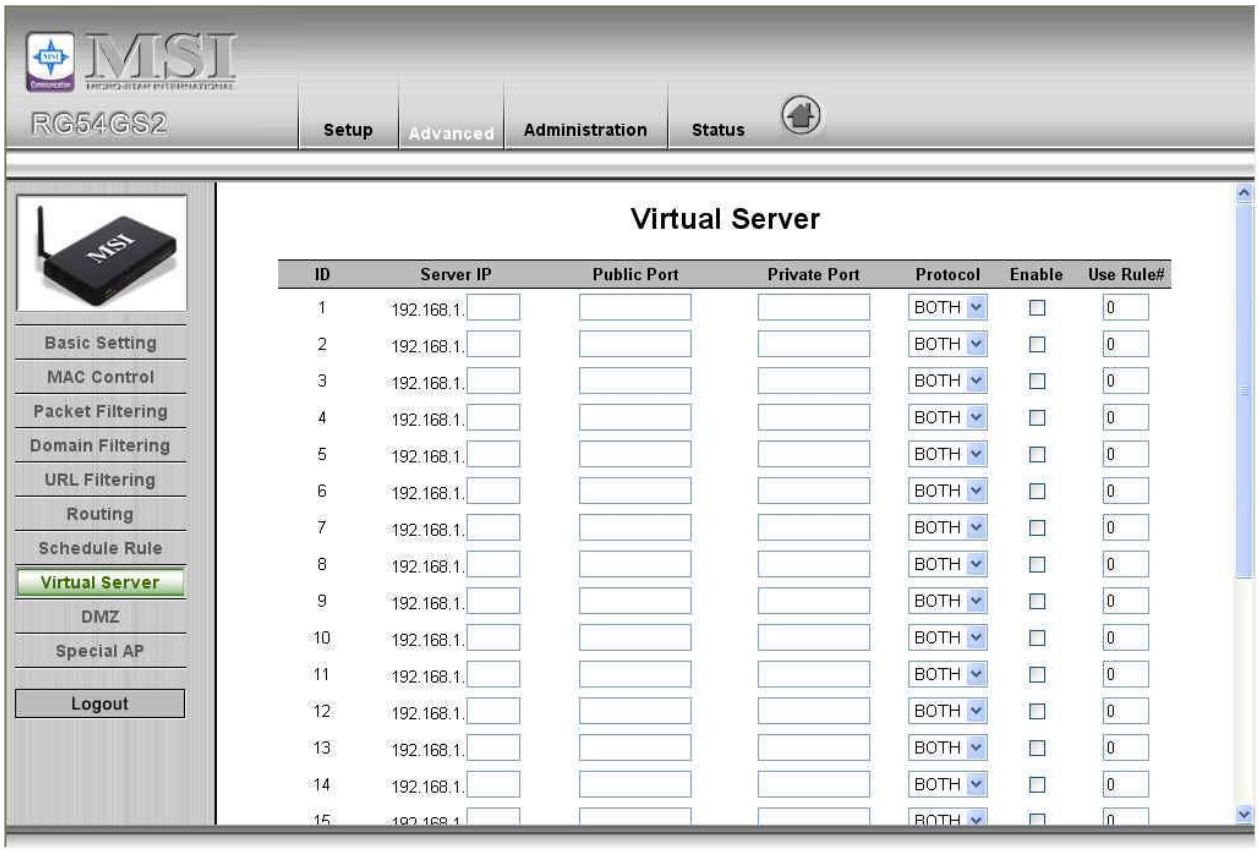
Exanple1: **Virtual Server** – Apply Rule#1 (ftp time: everyday 14:10 to 16:20)



Exanple2: **Packet Filter** – Apply Rule#1 (ftp time: everyday 14:10 to 16:20).



4.4.8 Virtual Server



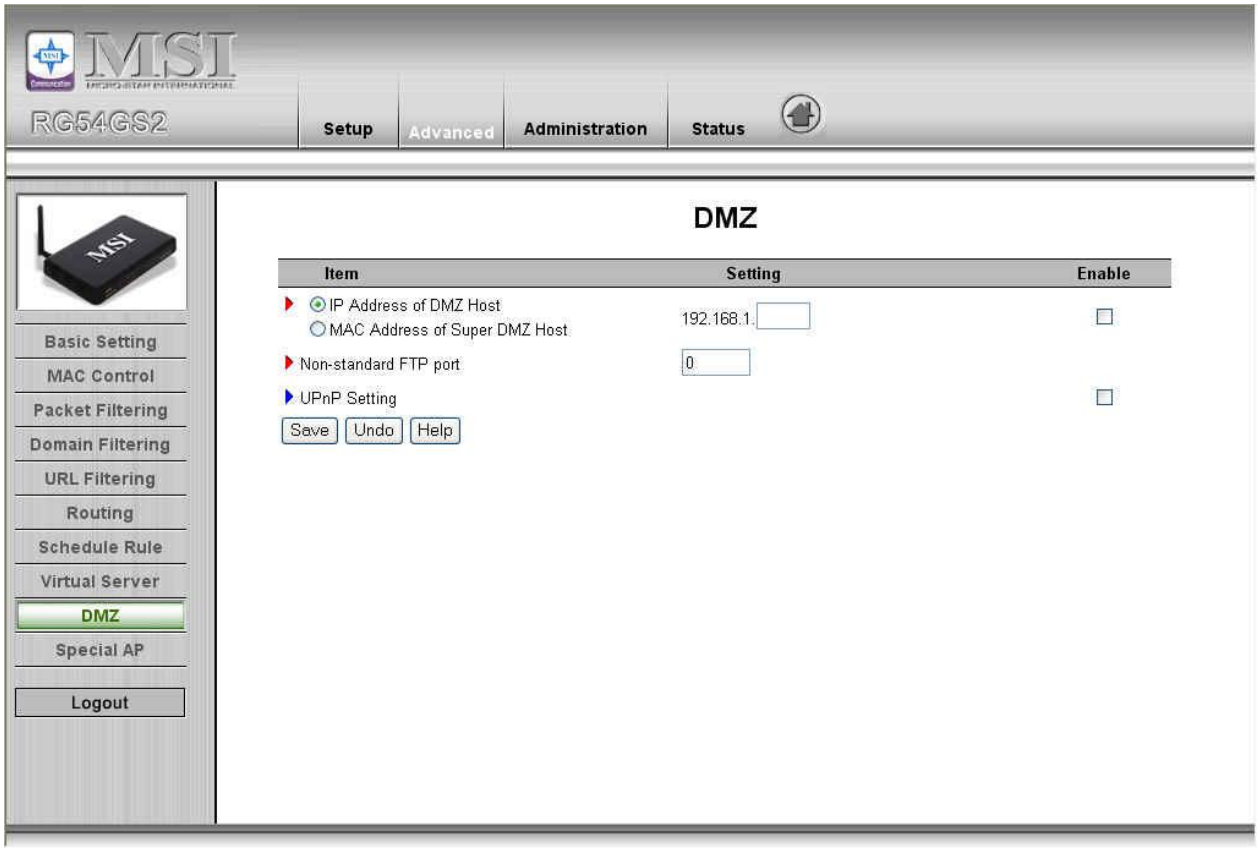
This product's NAT firewall filters out unrecognized packets to protect your Intranet, so all hosts behind this product are invisible to the outside world. If you wish, you can make some of them accessible by enabling the Virtual Server Mapping.

A virtual server is defined as a **Service Port**, and all requests to this port will be redirected to the computer specified by the **Server IP**. **Virtual Server** can work with **Scheduling Rules**, and give user more flexibility on Access control. For Detail, please refer to **Scheduling Rule**.

For example, if you have an FTP server (port 21) at 192.168.1.1, a Web server (port 80) at 192.168.1.2, and a VPN server at 192.168.1.6, then you need to specify the following virtual server mapping table:

Service Port	Server IP	Enable
21	192.168.1.1	V
80	192.168.1.2	V
1723	192.168.1.6	V

4.4.9 DMZ



IP Address of DMZ Host

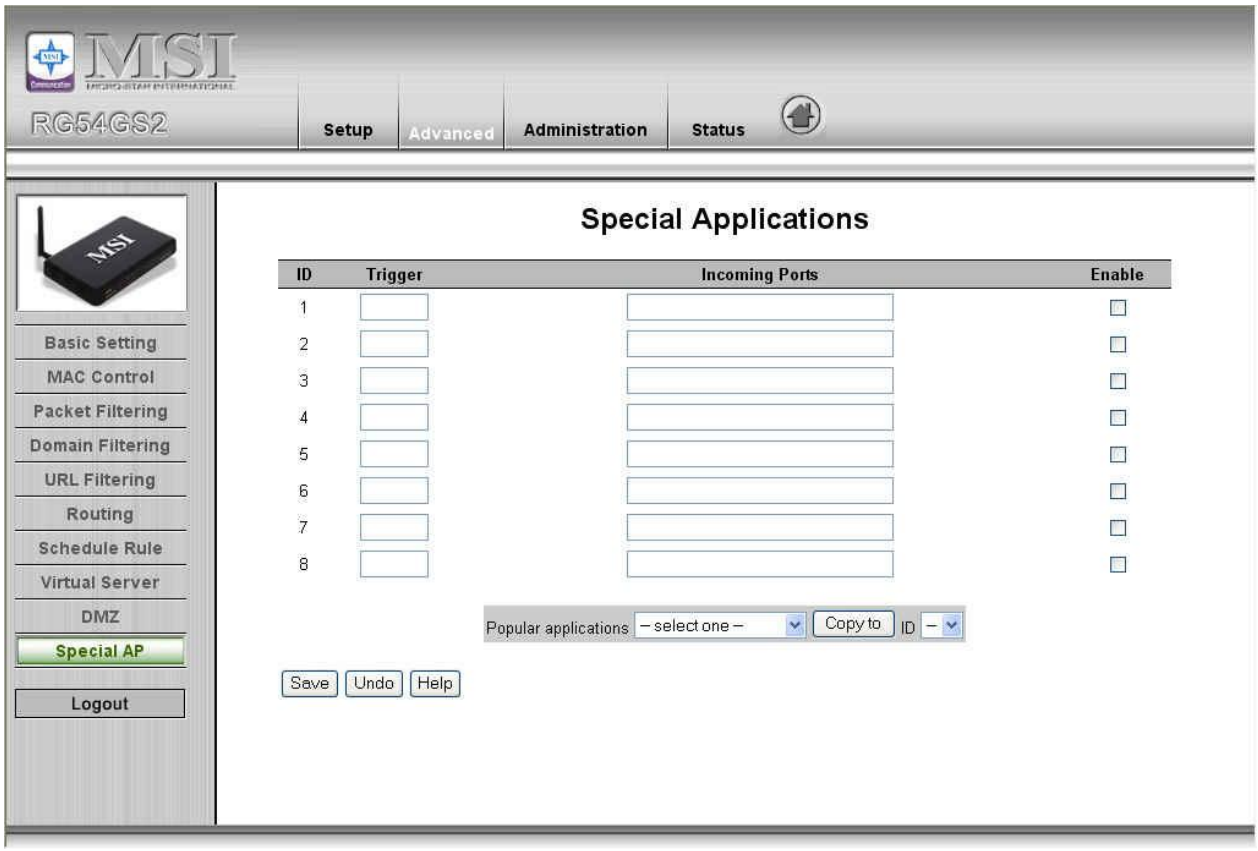
DMZ (DeMilitarized Zone) Host is a host without the protection of firewall. It allows a computer to be exposed to unrestricted 2-way communication for Internet games, Video conferencing, Internet telephony and other special applications.

NOTE: This feature should be used only when needed.

Non-standard FTP port

You have to configure this item if you want to access an FTP server whose port number is not 21. This setting will be lost after rebooting.

4.4.10 Special AP



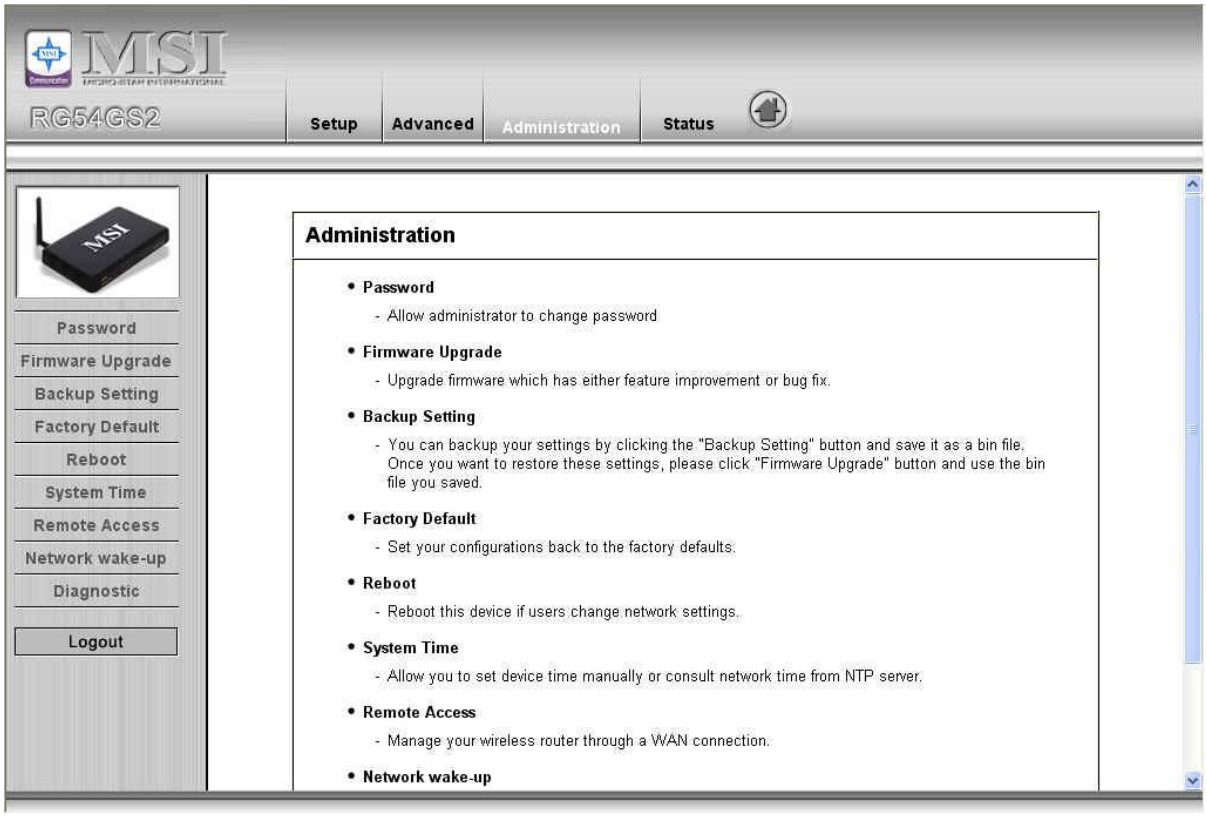
Some applications require multiple connections, like Internet games, Video conferencing, Internet telephony, etc. Because of the firewall function, these applications cannot work with a pure NAT router. The **Special Applications** feature allows some of these applications to work with this product. If the mechanism of Special Applications fails to make an application work, try setting your computer as the **DMZ** host instead.

1. **Trigger**: the outbound port number issued by the application..
2. **Incoming Ports**: when the trigger packet is detected, the inbound packets sent to the specified port numbers are allowed to pass through the firewall.

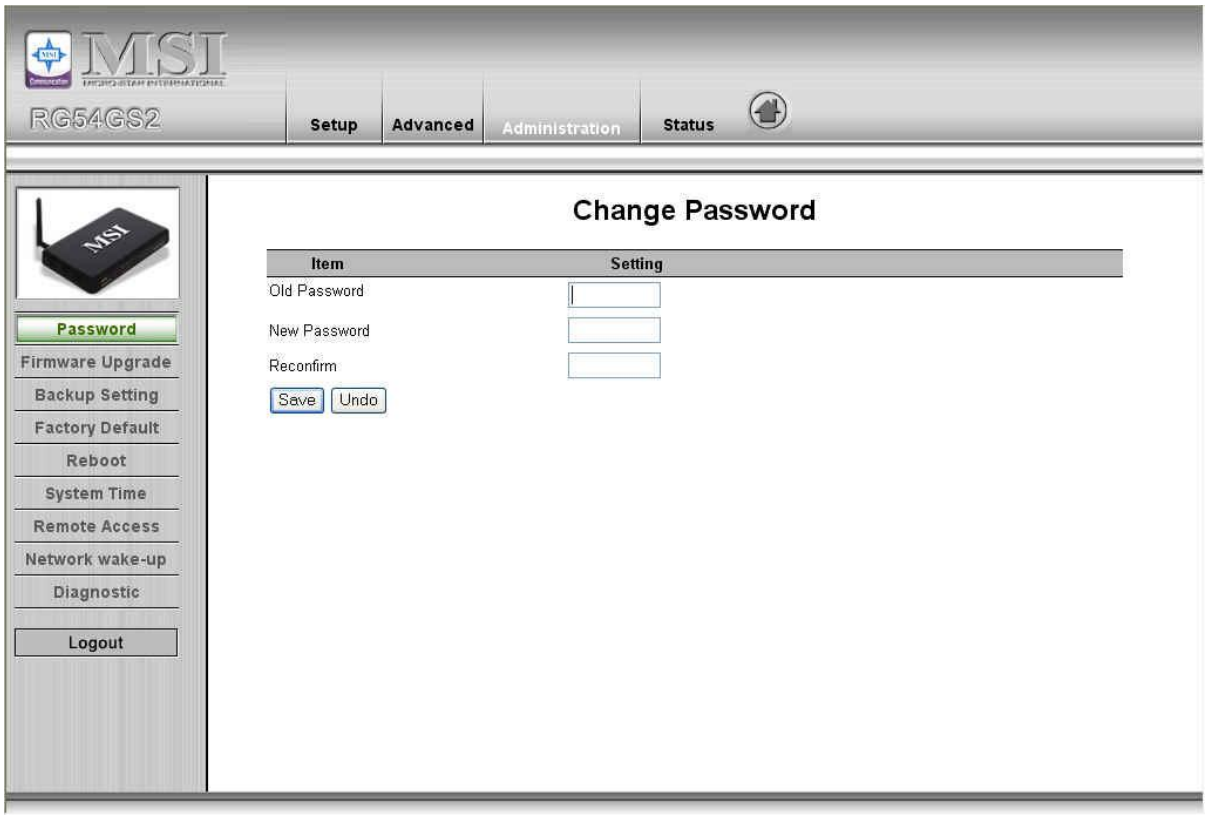
This product provides some predefined settings Select your application and click **Copy to** to add the predefined setting to your list.

Note! At any given time, only one PC can use each Special Application tunnel.

4.5 Administration

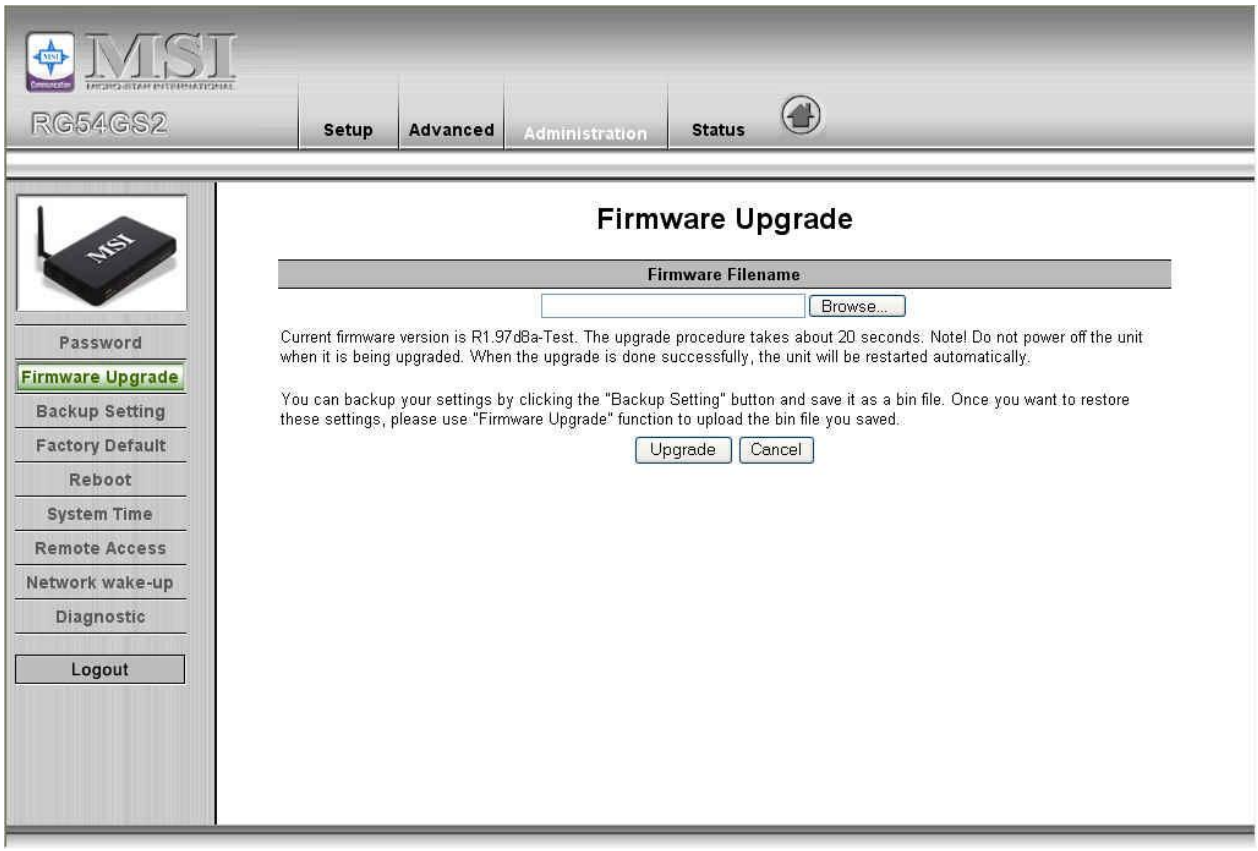


4.5.1 Change Password



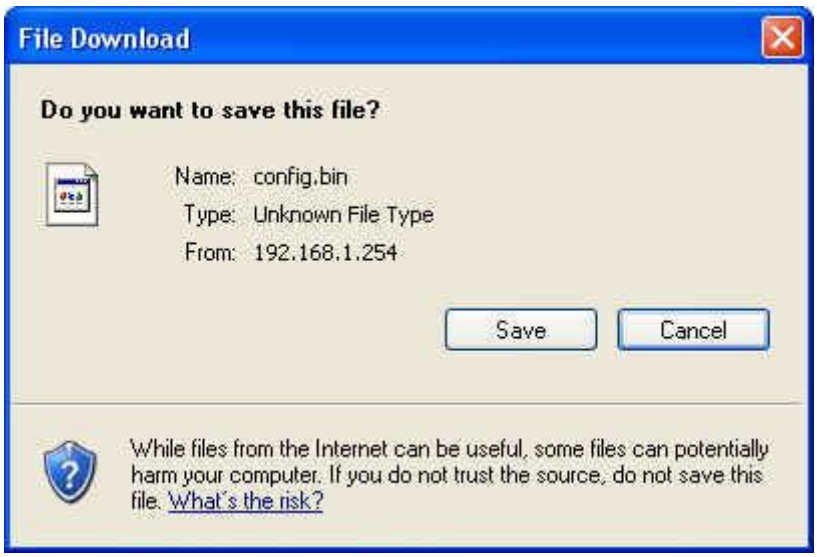
You can change Password here. We **strongly** recommend you to change the system password for security reason.

4.5.2 Firmware Upgrade



You can upgrade firmware by clicking **Firmware Upgrade** button.

4.5.3 Backup Setting



You can backup your settings by clicking the **Backup Setting** button and save it as a bin file. Once you want to restore these settings, please click **Firmware Upgrade** button and use the bin file you saved.

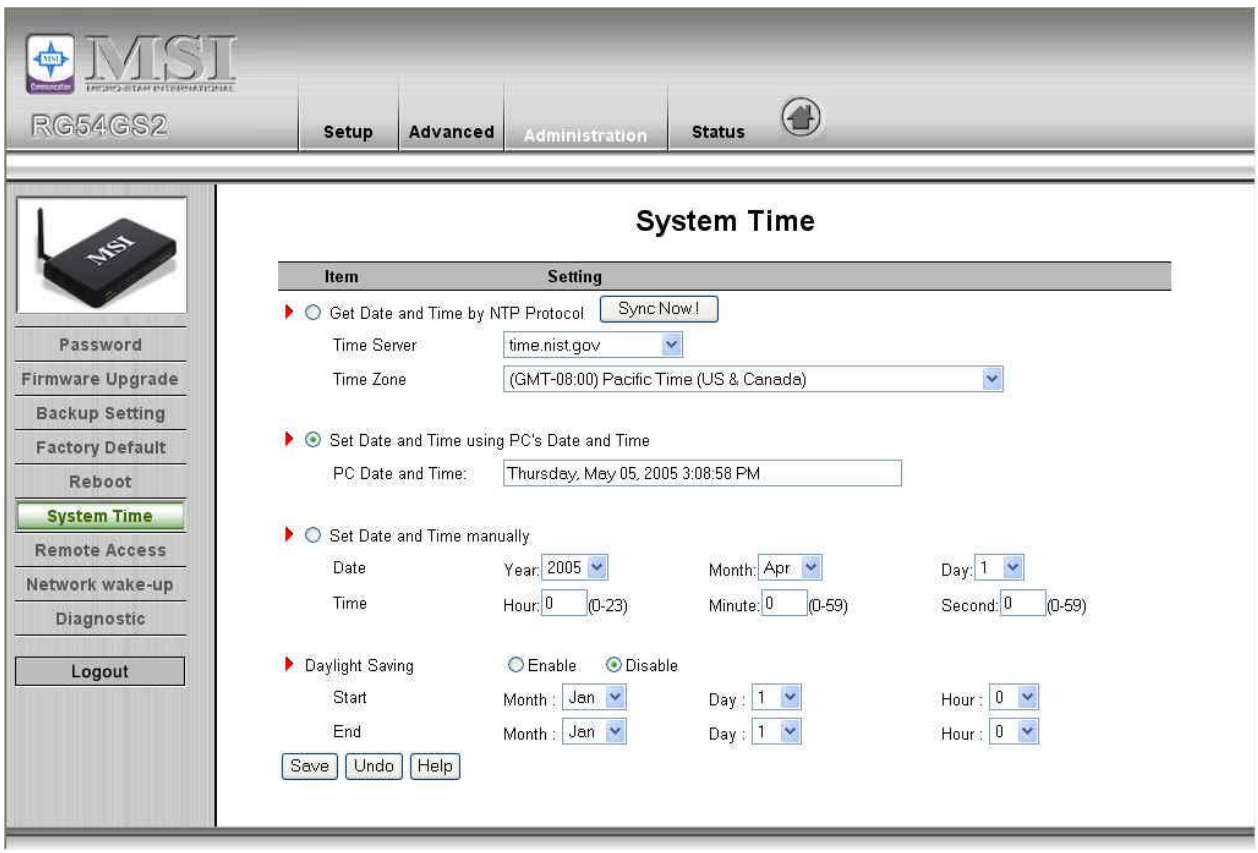
4.5.4 Reset to factory default

You can also reset this product to factory default by clicking the **Reset to default** button.

4.5.5 Reboot

You can also reboot this product by clicking the **Reboot** button.

4.5.6 System Time



Get Date and Time by NTP Protocol

Selected if you want to Get Date and Time by NTP Protocol.

Time Server

Select a NTP time server to consult UTC time

Time Zone

Select a time zone where this device locates.

Set Date and Time manually

Selected if you want to Set Date and Time manually.

Set Date and Time manually

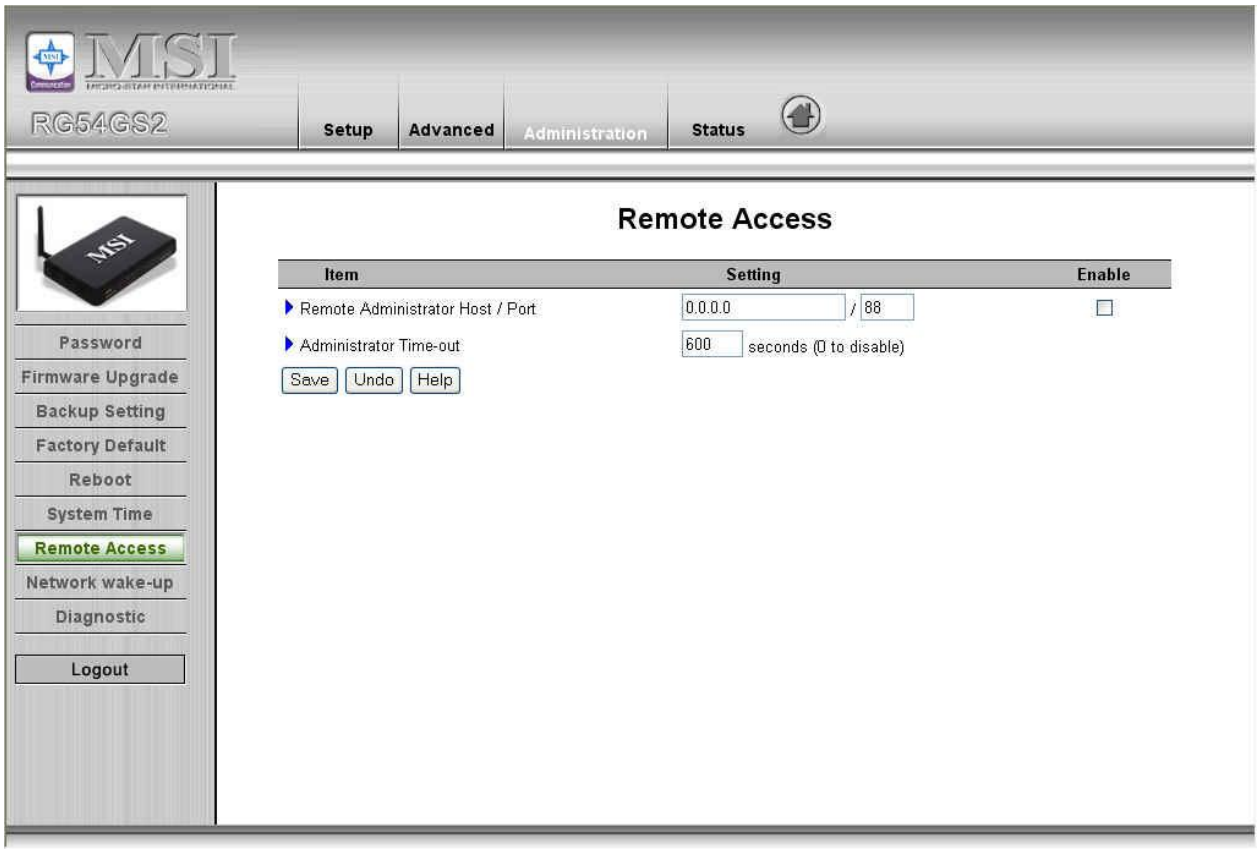
Selected if you want to Set Date and Time manually.

Function of Buttons

Sync Now: Synchronize system time with network time server

Daylight Saving: Set up where the location is.

4.5.7 Remote Access



Remote Administrator Host/Port

In general, only Intranet user can browse the built-in web pages to perform administration task. This feature enables you to perform administration task from remote host. If this feature is enabled, only the specified IP address can

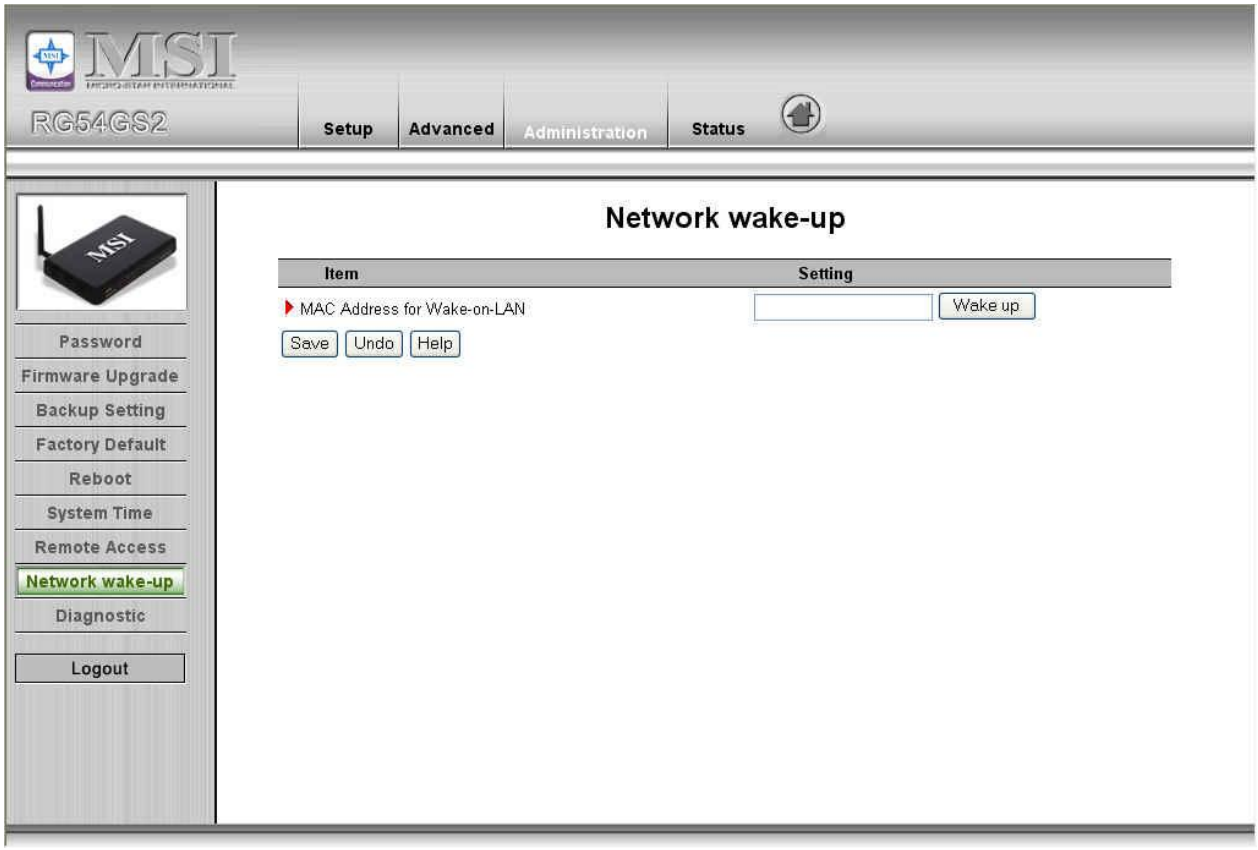
perform remote administration. If the specified IP address is 0.0.0.0, any host can connect to this product to perform administration task. You can use subnet mask bits "/nn" notation to specified a group of trusted IP addresses. For example, "10.1.2.0/24".

NOTE: When Remote Administration is enabled, the web server port will be shifted to 88. You can change web server port to other port, too.

Administrator Time-out

The time of no activity to logout automatically. Set it to zero to disable this feature.

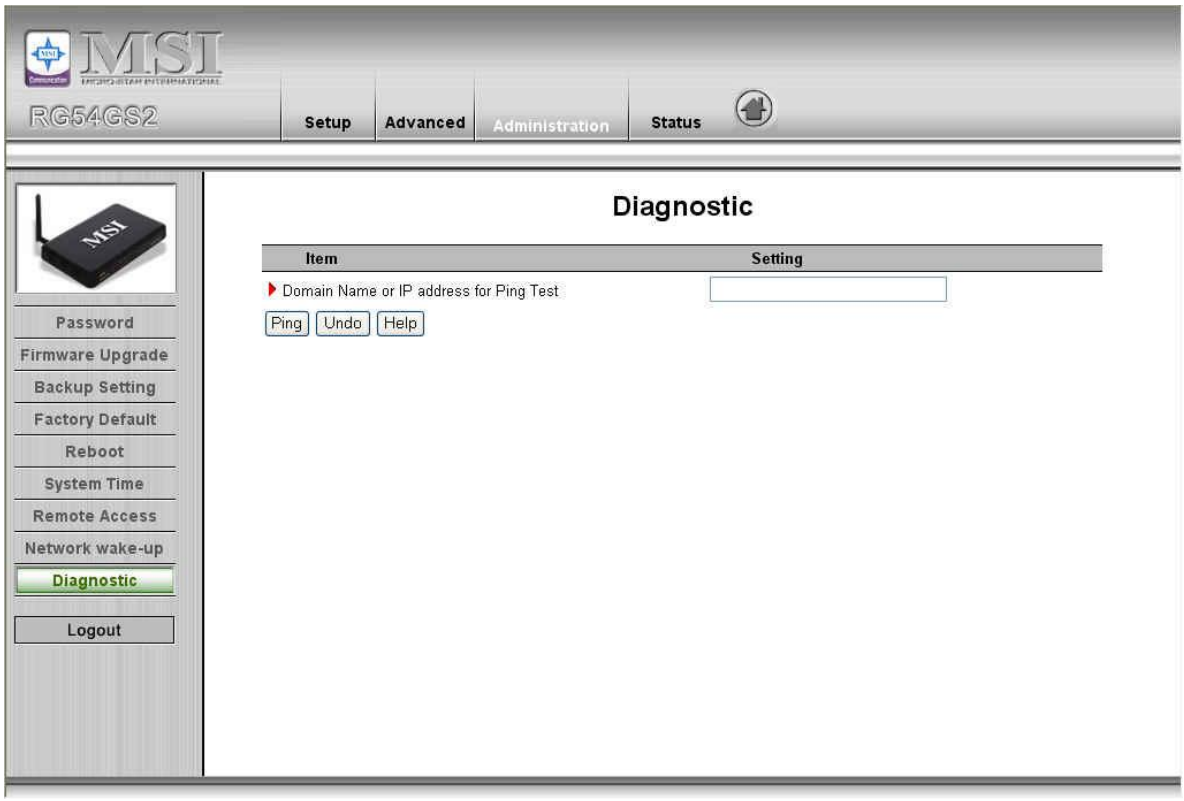
4.5.8 Network wake-up



MAC Address for Wake-on-LAN

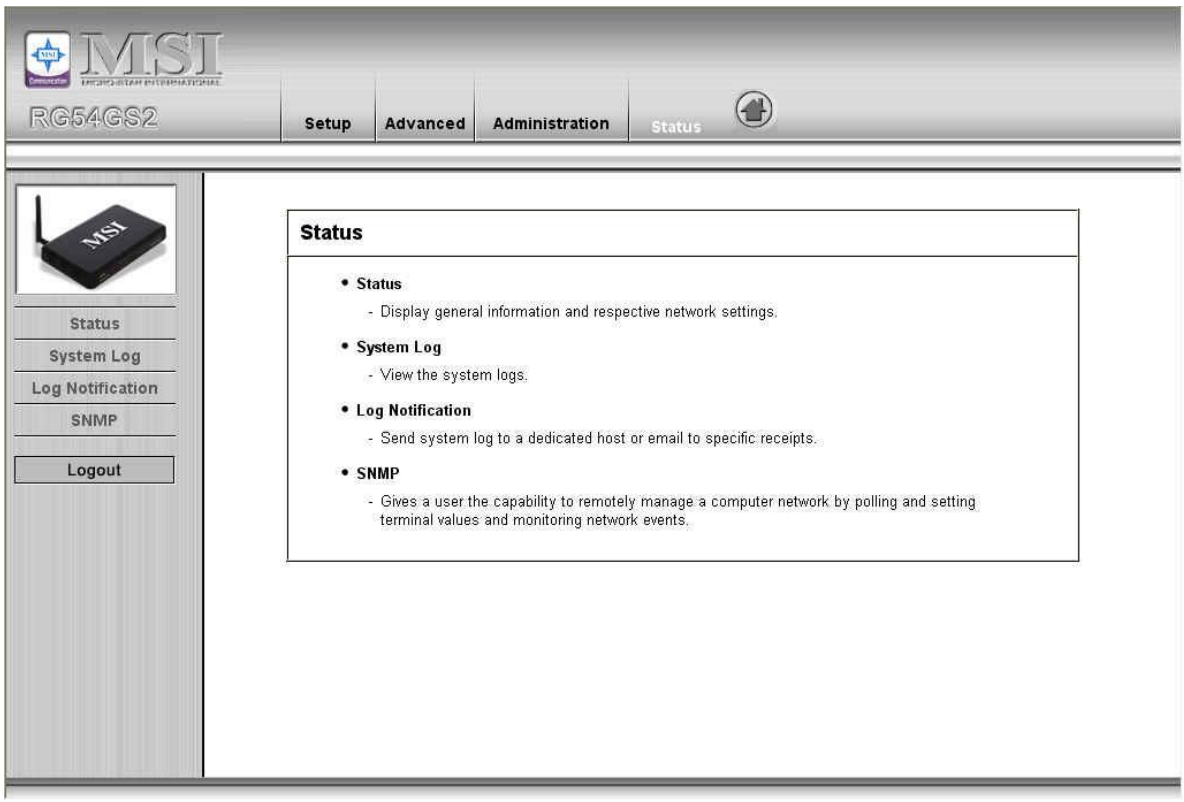
Wake-on-LAN is a technology that enables you to power up a networked device remotely. In order to enjoy this feature, the target device must be Wake-on-LAN enabled and you have to know the MAC address of this device, say 00-11-22-33-44-55. Clicking "Wake up" button will make the router to send the wake-up frame to the target device immediately.

4.5.9 Diagnostic

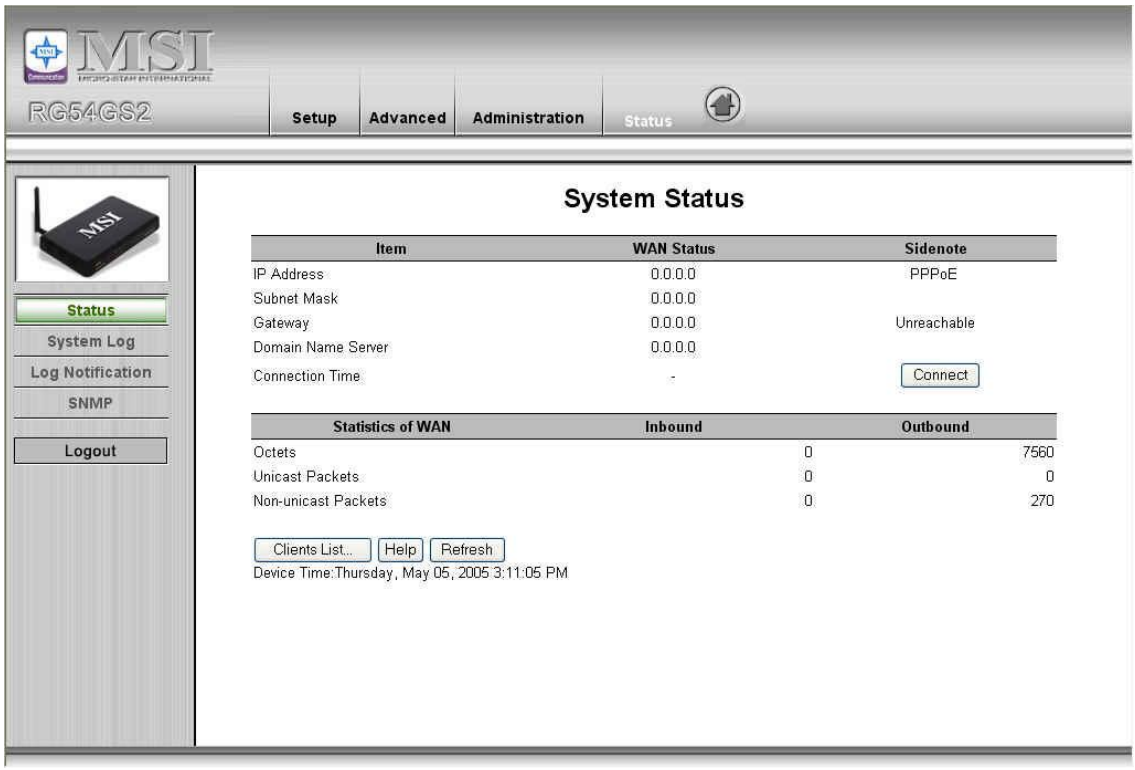


This is the graphic interface of "**Ping**" command, you can enter the Domain Name or IP address to ping if it is working.

4.6 Status

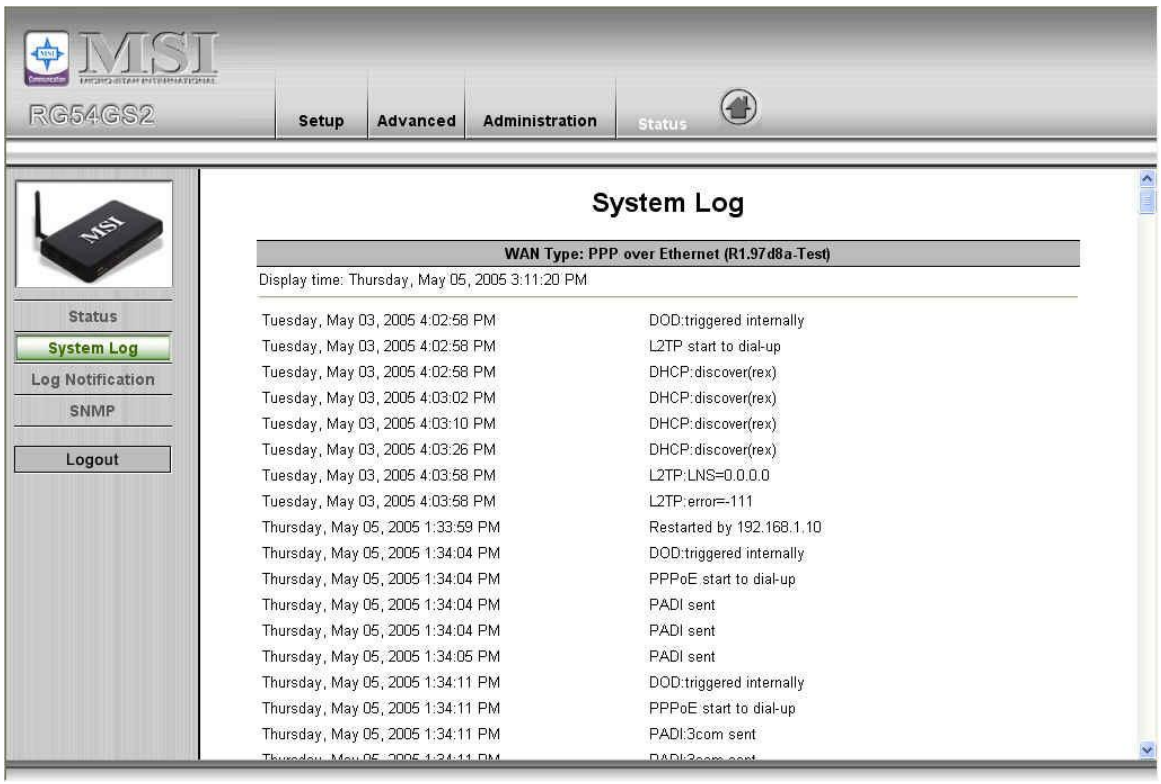


4.6.1 System Status



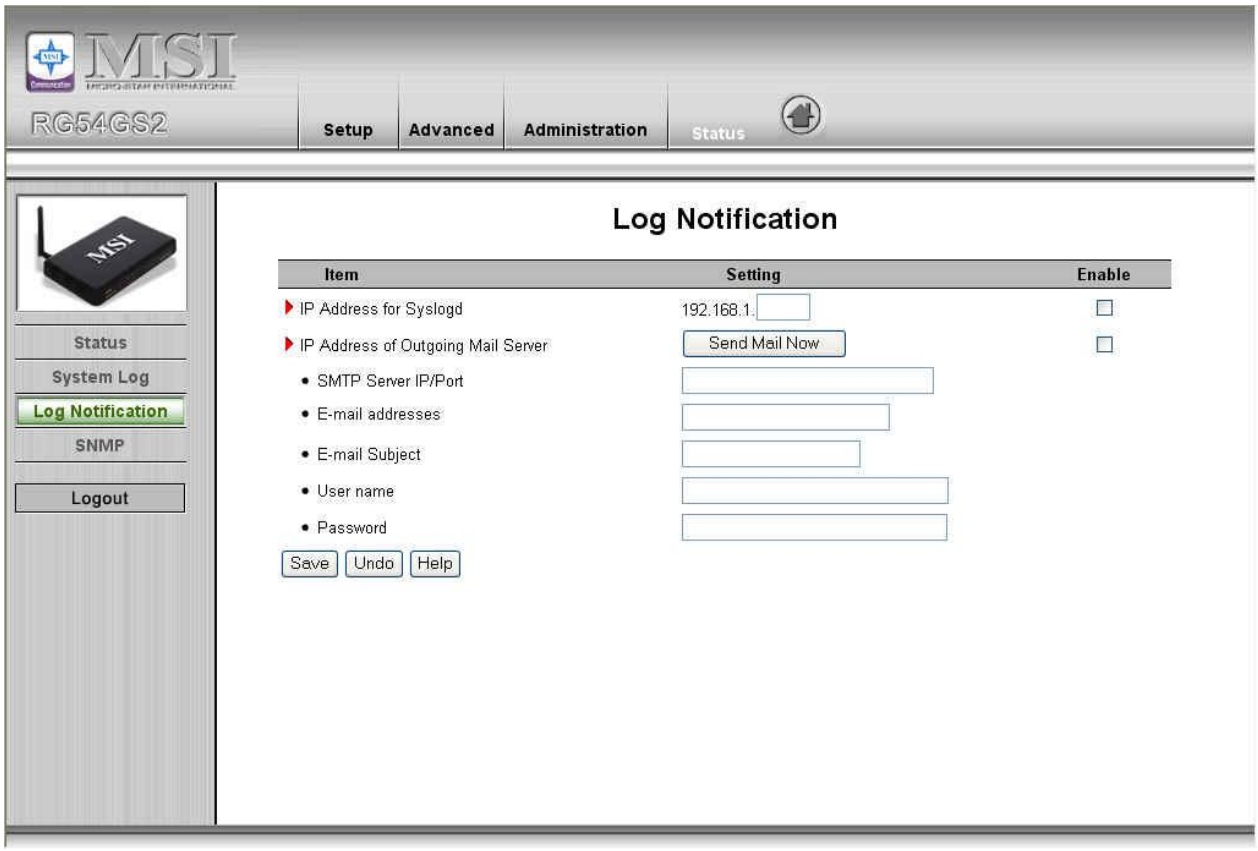
This item shows the static data of the router,

4.6.2 System Log



You can View system log by clicking the View Log **button**

4.6.3 Log Notification



This page support two methods to export system logs to specific destination by means of syslog(UDP) and SMTP(TCP). The items you have to setup including:

IP Address for Syslog

Host IP of destination where syslogs will be sent to.

Check **Enable** to enable this function.

E-mail Alert Enable

Check if you want to enable Email alert (send syslog via email).

SMTP Server IP and Port

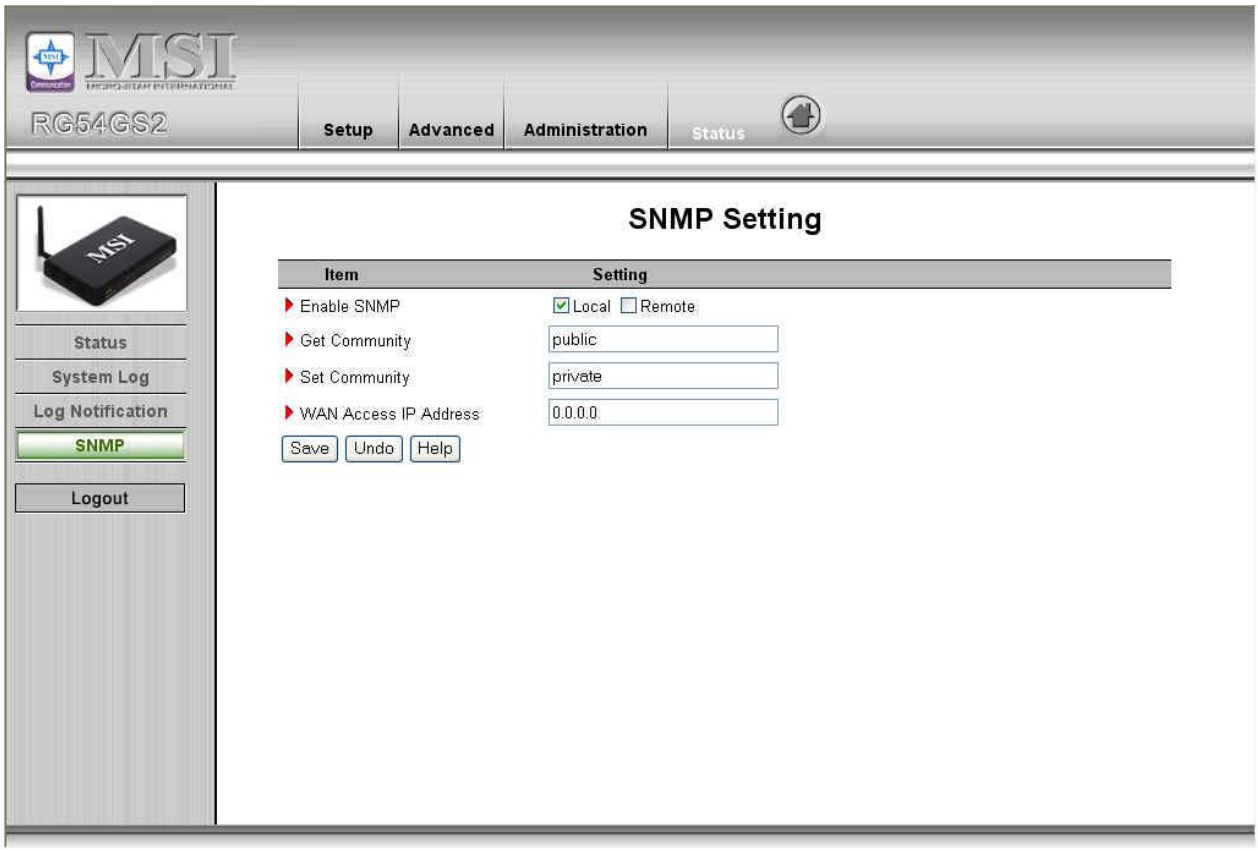
Input the SMTP server IP and port, which are concated with ':'. If you do not specify port number, the default value is 25.

For example, "mail.your_url.com" or "192.168.1.100:26".

Send E-mail alert to

The recipients who will receive these logs. You can assign more than 1 recipient, using ';' or ',' to separate these email addresses.

4.6.4 SNMP Setting



In brief, SNMP, the Simple Network Management Protocol, is a protocol designed to give a user the capability to remotely manage a computer network by polling and setting terminal values and monitoring network events.

Enable SNMP

You must check either Local or Remote or both to enable SNMP function. If Local is checked, this device will response request from LAN. If Remote is checked, this device will response request from WAN.

Get Community

Setting the community of GetRequest your device will response.

Set Community

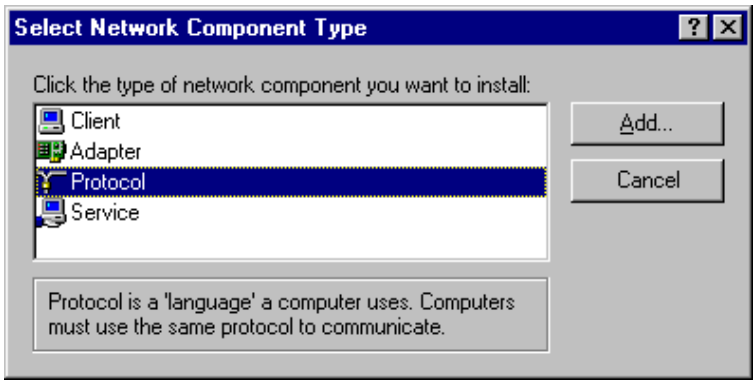
Setting the community of SetRequest your device will accept.

Appendix A TCP/IP Configuration for Windows 95/98

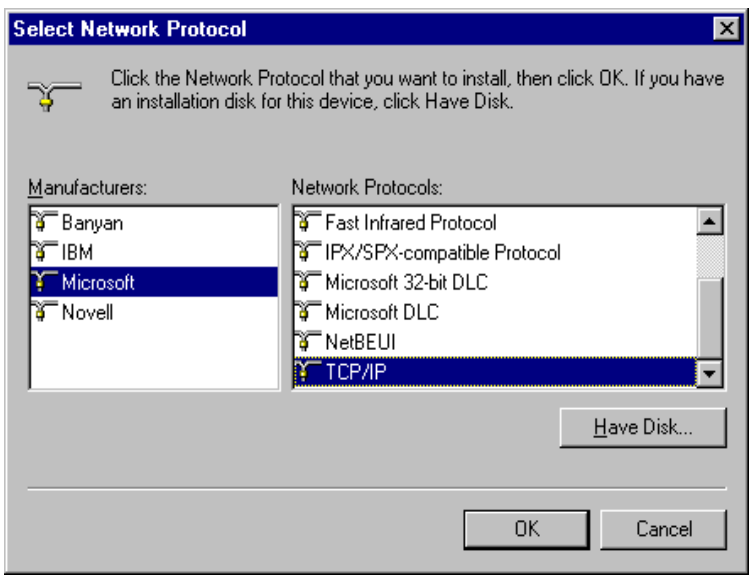
This section introduces you how to install TCP/IP protocol into your personal computer. And suppose you have been successfully installed one network card on your personal computer. If not, please refer to your network card manual. Moreover, the Section B.2 tells you how to set TCP/IP values for working with this NAT Router correctly.

A.1 Install TCP/IP Protocol into Your PC

1. Click **Start** button and choose **Settings**, then click **Control Panel**.
2. Double click **Network** icon and select **Configuration** tab in the Network window.
3. Click **Add** button to add network component into your PC.
4. Double click **Protocol** to add TCP/IP protocol.



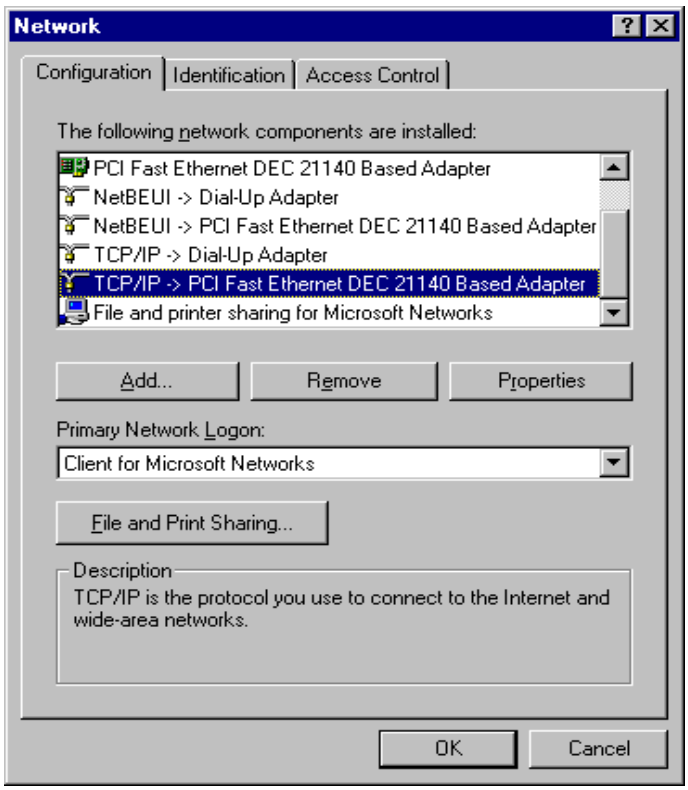
5. Select **Microsoft** item in the manufactures list. And choose **TCP/IP** in the Network Protocols. Click **OK** button to return to Network window.



6. The TCP/IP protocol shall be listed in the Network window. Click **OK** to complete the install procedure and restart your PC to enable the TCP/IP protocol.

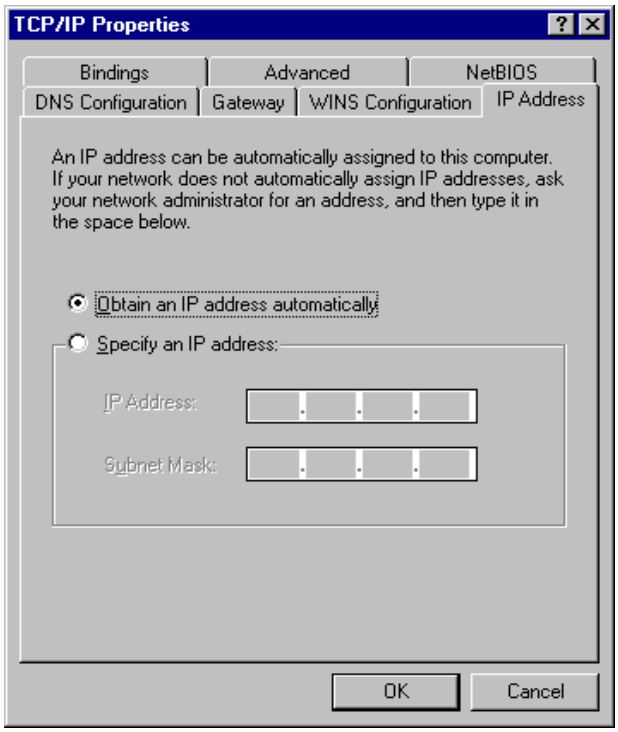
A.2 Set TCP/IP Protocol for Working with NAT Router

1. Click **Start** button and choose **Settings**, then click **Control Panel**.
2. Double click **Network** icon. Select the TCP/IP line that has been associated to your network card in the **Configuration** tab of the Network window.

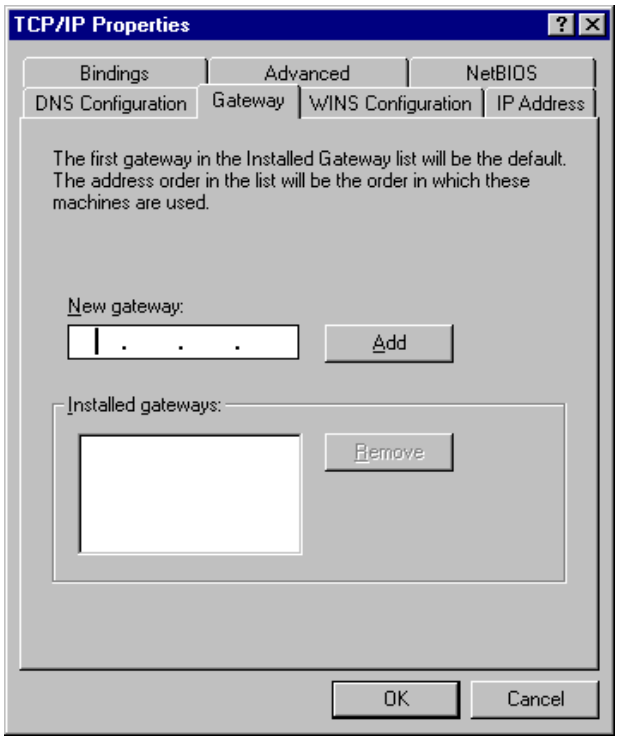


3. Click **Properties** button to set the TCP/IP protocol for this NAT Router.
4. Now, you have two setting methods:

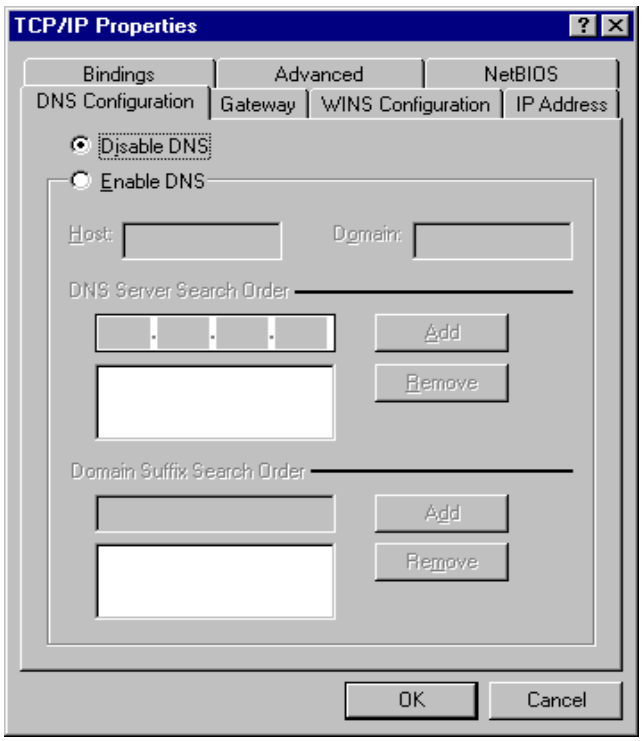
a. Select **Obtain an IP address automatically** in the IP Address tab.



b. Don't input any value in the Gateway tab.

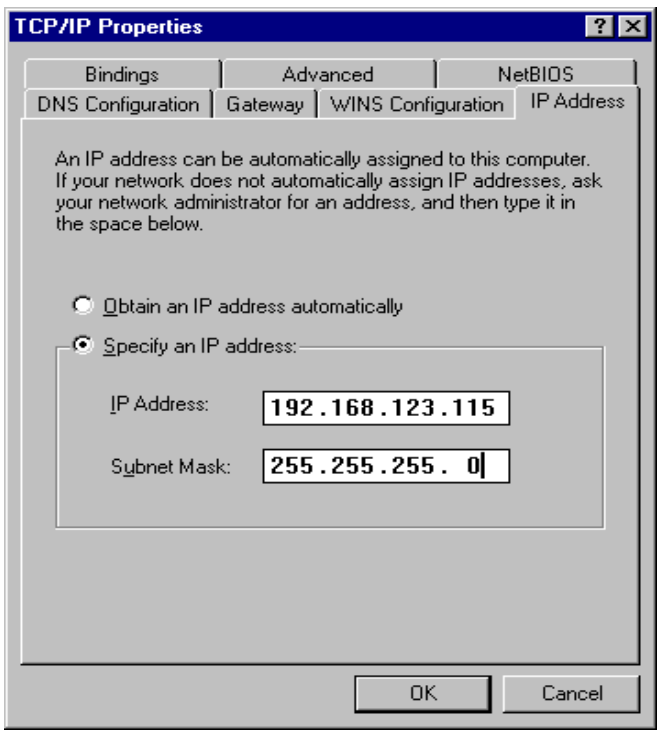


c. Choose **Disable DNS** in the DNS Configuration tab.

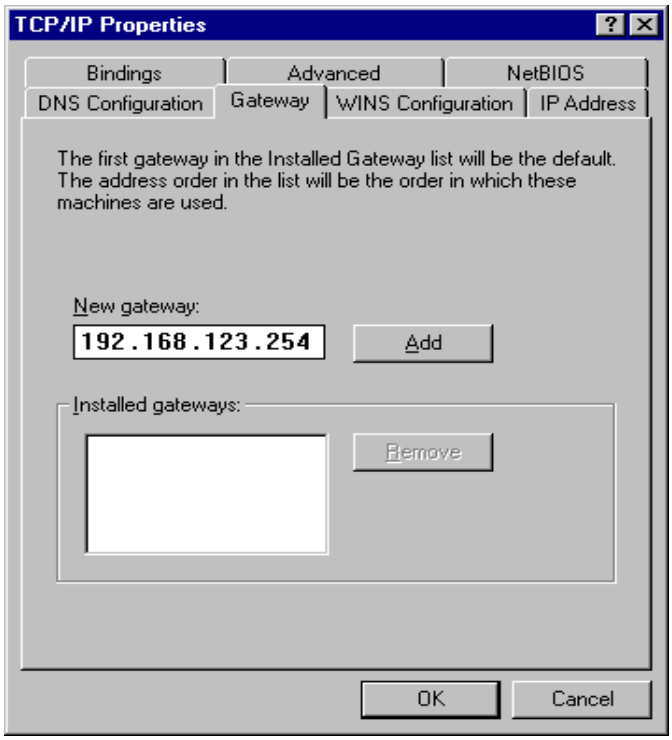


B. Configure IP manually

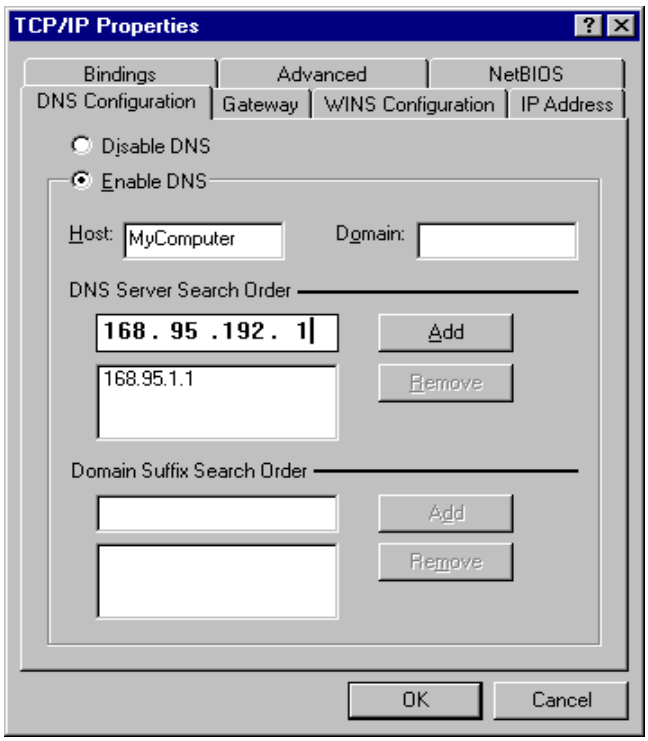
a. Select **Specify an IP address** in the IP Address tab. The default IP address of this product is 192.168.1.254. So please use 192.168.1.xxx (xxx is between 1 and 253) for IP Address field and 255.255.255.0 for Subnet Mask field.



b. In the Gateway tab, add the IP address of this product (default IP is 192.168.1.254) in the New gateway field and click **Add** button.



c. In the DNS Configuration tab, add the DNS values which are provided by the ISP into DNS Server Search Order field and click **Add** button.



Appendix B 802.1x Setting

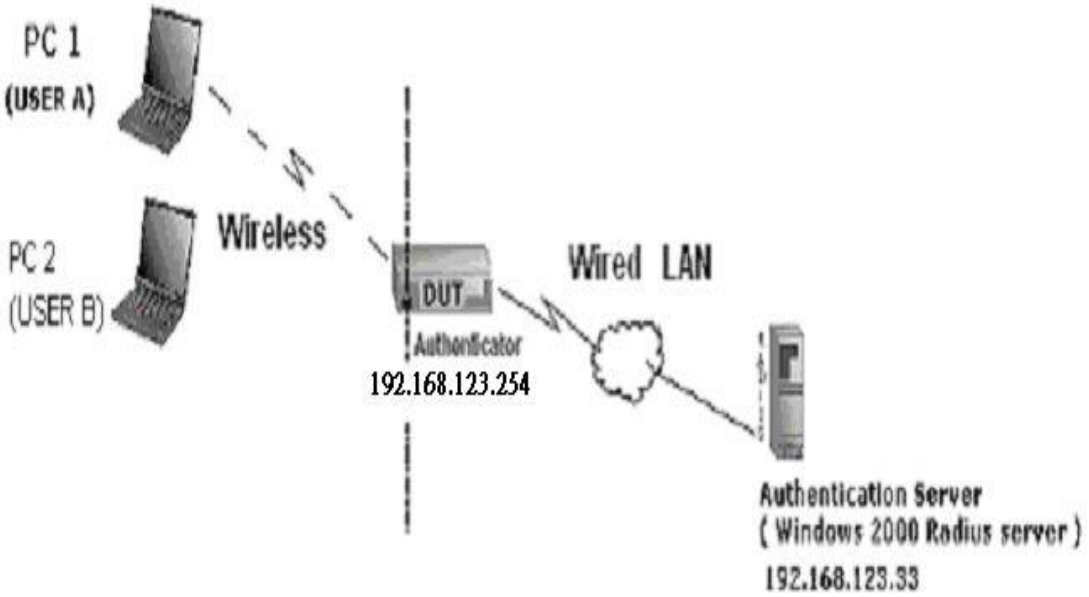


Figure 1: Testing Environment (Use Windows 2000 Radius Server)

1 Equipment Details

PC1:

Microsoft Windows XP Professional without Service Pack 1.

D-Link DWL-650+ wireless LAN adapter

Driver version: 3.0.5.0 (Driver date: 03.05.2003)

PC2:

Microsoft Windows XP Professional with Service Pack 1a.

Z-Com XI-725 wireless LAN USB adapter

Driver version: 1.7.29.0 (Driver date: 10.20.2001)

Authentication Server: Windows 2000 RADIUS server with Service Pack 3 and HotFix Q313664.

Note. Windows 2000 RADIUS server only supports PEAP after upgrade to service pack 3 and HotFix Q313664 *(You can get more information from http://support.microsoft.com/default.aspx?scid=kb;en-us;313664)*

2 DUT

Configuration:

1.Enable DHCP server.

2.WAN setting: static IP address.

3.LAN IP address: 192.168.1.254/24.

4.Set RADIUS server IP.

5.Set RADIUS server shared key.

6.Configure WEP key and 802.1X setting.

The following test will use the inbuilt 802.1X authentication method such as ,EAP_TLS, PEAP_CHAPv2(Windows XP with SP1 only), and PEAP_TLS(Windows XP with SP1 only) using the Smart Card or other Certificate of the Windows XP Professional.

3. DUT and Windows 2000 Radius Server Setup

3-1-1. Setup Windows 2000 RADIUS Server

We have to change authentication method to MD5_Challenge or using smart card or other certificate on RADIUS server according to the test condition.

3-1-2. Setup DUT

1.Enable the 802.1X (check the “Enable checkbox“).

2.Enter the RADIUS server IP.

3.Enter the shared key. (The key shared by the RADIUS server and DUT).

4.We will change 802.1X encryption key length to fit the variable test condition.

3-1-3. Setup Network adapter on PC

1.Choose the IEEE802.1X as the authentication method. (Fig 2)

Note.

Figure 2 is a setting picture of Windows XP without service pack 1. If users upgrade to service pack 1, then they can’t see MD5-Challenge from EAP type list any more, but they will get a new Protected EAP (PEAP) option.

2.Choose MD5-Challenge or Smart Card or other Certificate as the EAP type.

3.If choosing use smart card or the certificate as the EAP type, we select to use a certificate on this computer. (Fig 3)

4. We will change EAP type to fit the variable test condition.

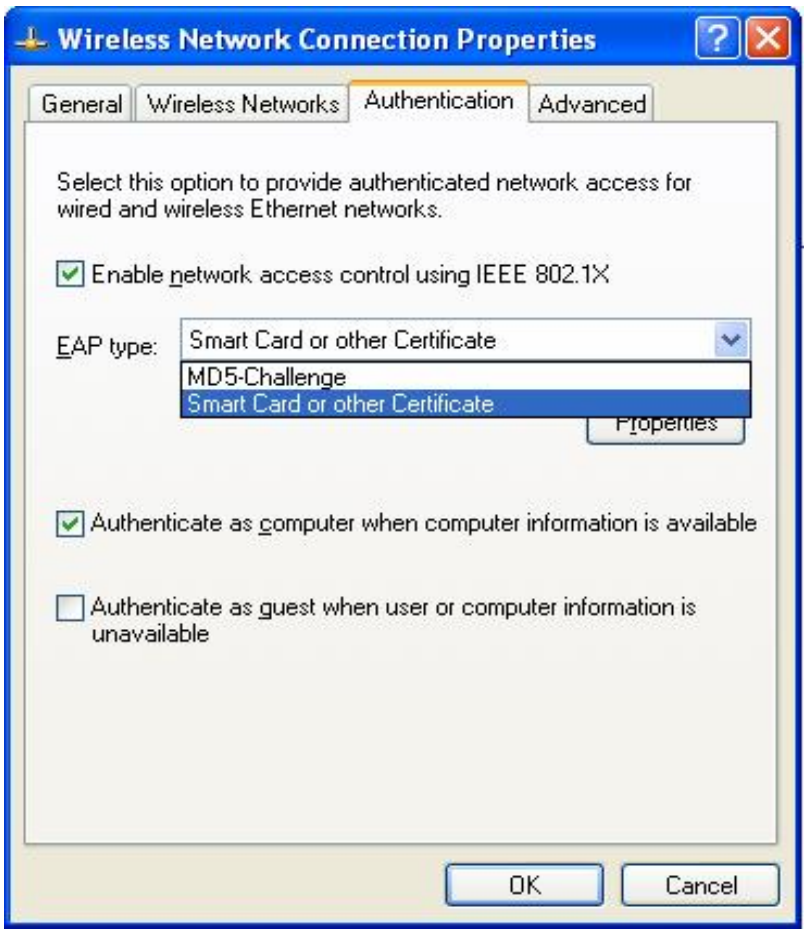


Figure 2: Enable IEEE 802.1X access control

Figure 3: Smart card or certificate properties

4. Windows 2000 RADIUS server Authentication testing:

4.1DUT authenticate PC1 using certificate. (PC2 follows the same test procedures.)

1. Download and install the certificate on PC1. (Fig 4)
2. PC1 choose the SSID of DUT as the Access Point.
3. Set authentication type of wireless client and RADIUS server both to EAP_TLS.
4. Disable the wireless connection and enable again.
5. The DUT will send the user's certificate to the RADIUS server, and then send the message of authentication result to PC1. (Fig 5)
6. Windows XP will prompt that the authentication process is success or fail and end the authentication procedure. (Fig 6)
7. Terminate the test steps when PC1 get dynamic IP and PING remote host successfully.

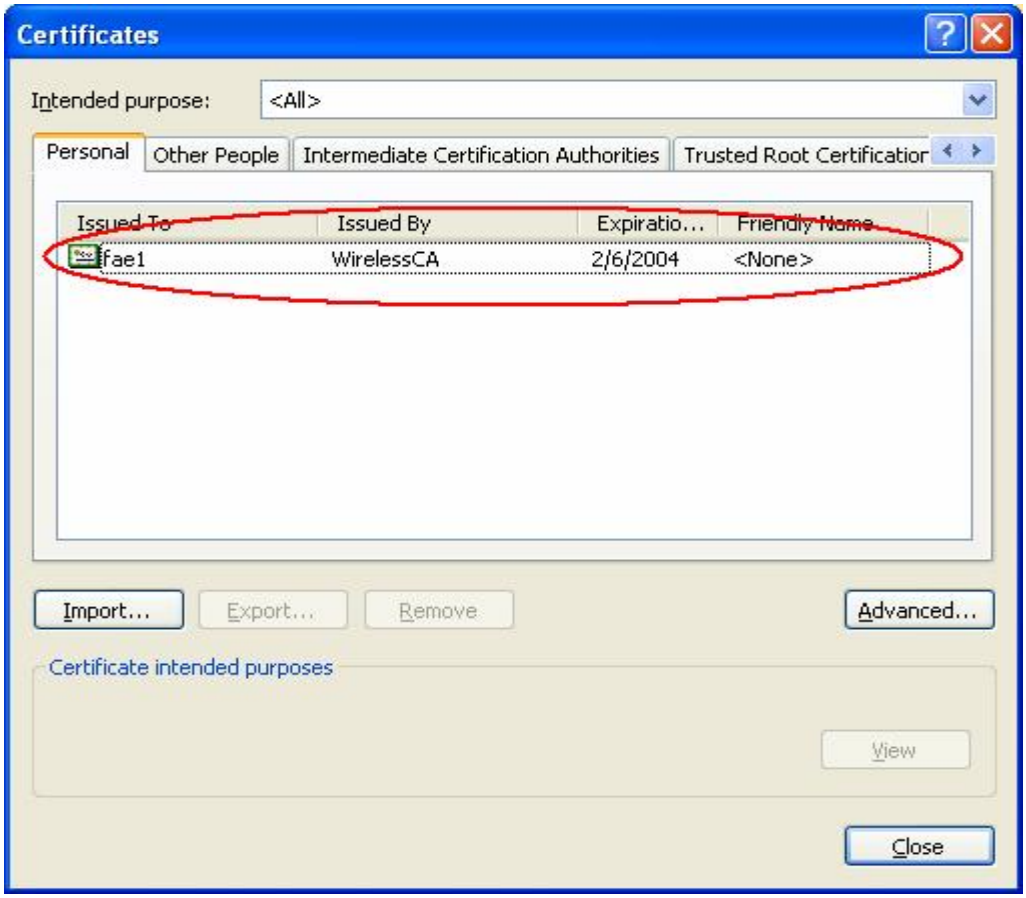


Figure 4: Certificate information on PC1

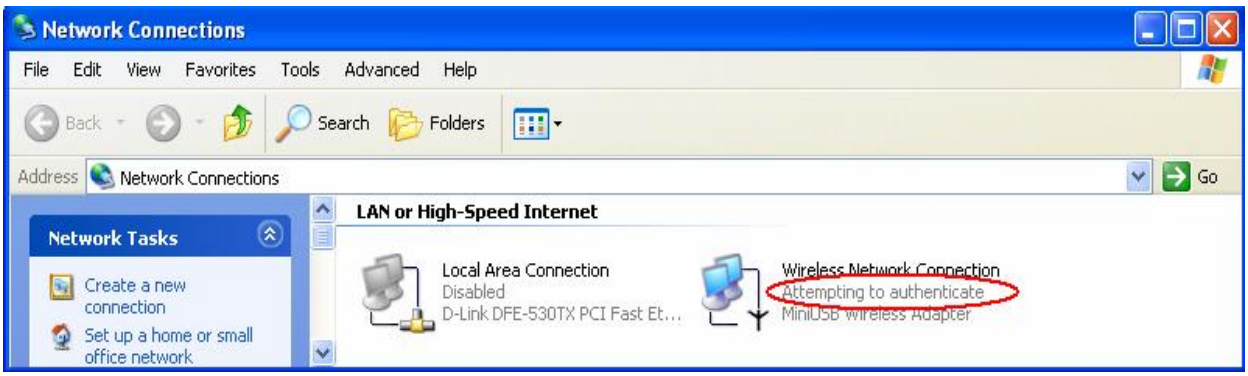


Figure 5: Authenticating

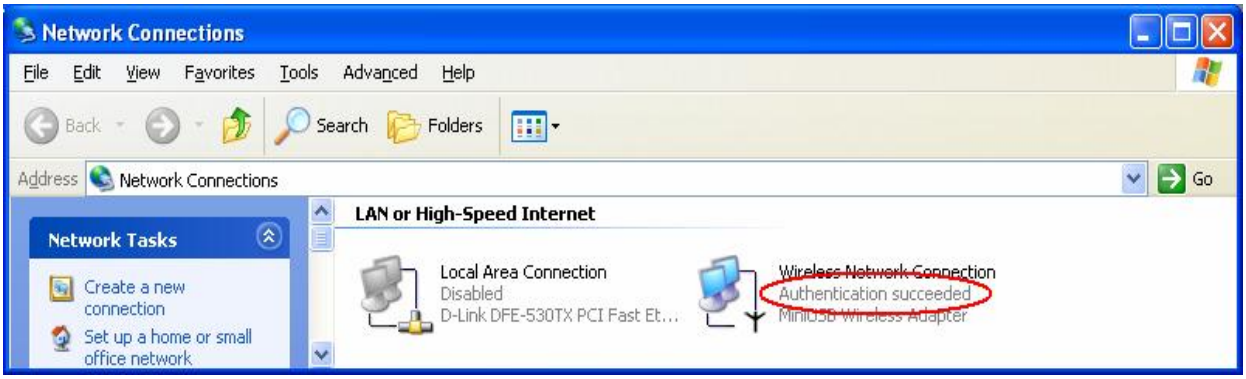


Figure 6: Authentication success

4.2DUT authenticate PC2 using PEAP-TLS.

1. PC2 choose the SSID of DUT as the Access Point.
2. Set authentication type of wireless client and RADIUS server both to PEAP_TLS.
3. Disable the wireless connection and enable again.
4. The DUT will send the user's certificate to the RADIUS server, and then send the message of authentication result to PC2.
5. Windows XP will prompt that the authentication process is success or fail and end the authentication procedure.
6. Terminate the test steps when PC2 get dynamic IP and PING remote host successfully.

Support Type: The router supports the types of 802.1x Authentication: PEAP-CHAPv2 and PEAP-TLS.

Note.

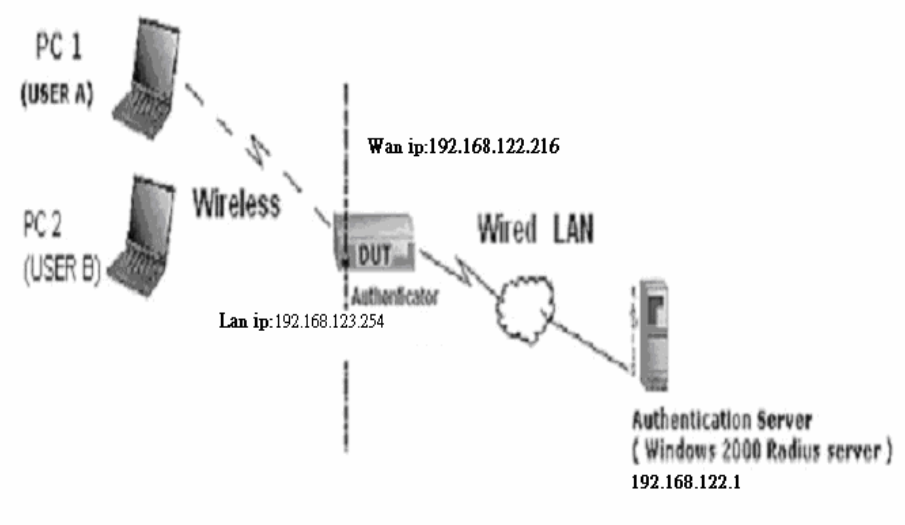
1.PC1 is on Windows XP platform without Service Pack 1.

2.PC2 is on Windows XP platform with Service Pack 1a.

3.PEAP is supported on Windows XP with Service Pack 1 only.

4.Windows XP with Service Pack 1 allows 802.1x authentication only when data encryption function is enable.

Appendix C WPA-PSK and WPA



Wireless Router: LAN IP: 192.168.123.254

WAN IP: 192.168.122.216

Radius Server: 192.168.122.1

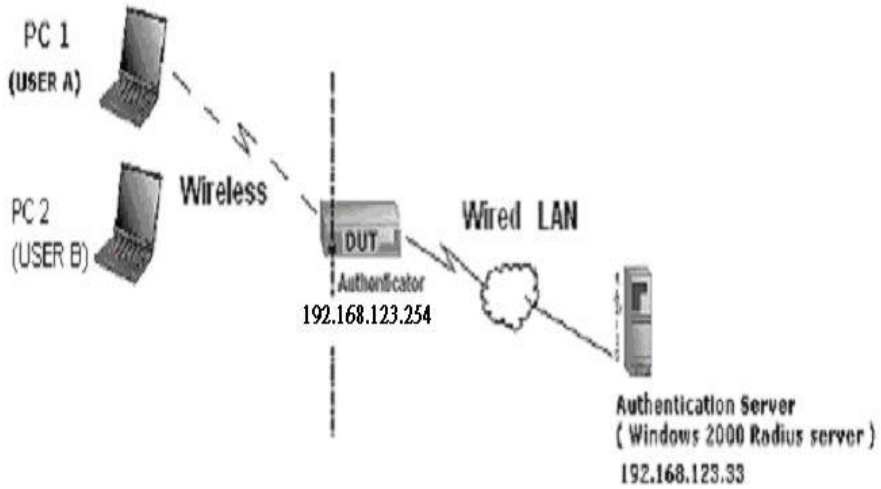
UserA : XP Wireless Card:Ti-11g

Tool: Odyssey Client Manager

Refer to: www.funk.com

Download: http://www.funk.com/News&Events/ody_c_wpa_preview_pn.asp

Or Another Configuration:

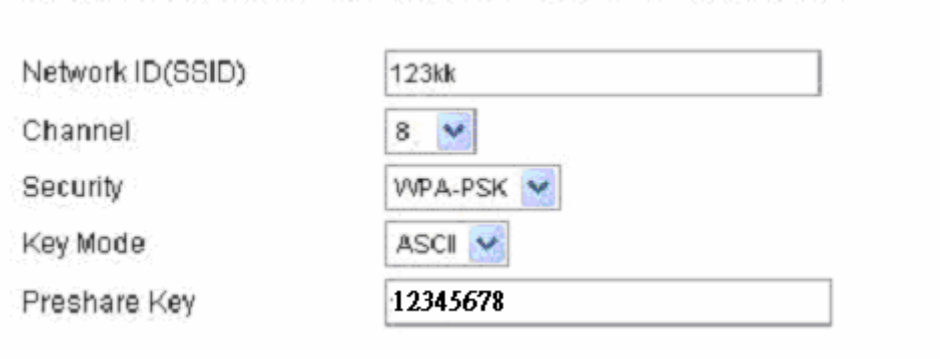


WPA-PSK

In fact, it is not necessary for this function to authenticate by Radius Server, the client and wireless Router authenticate by themselves.

Method1:

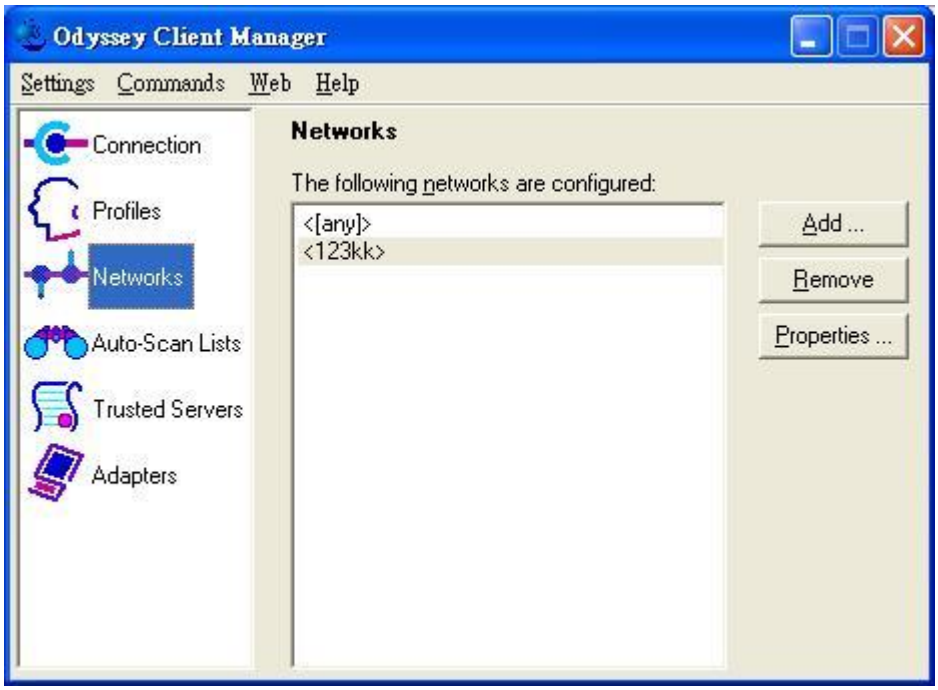
1. Go to the Web manager of Wireless Router to configure, like below:



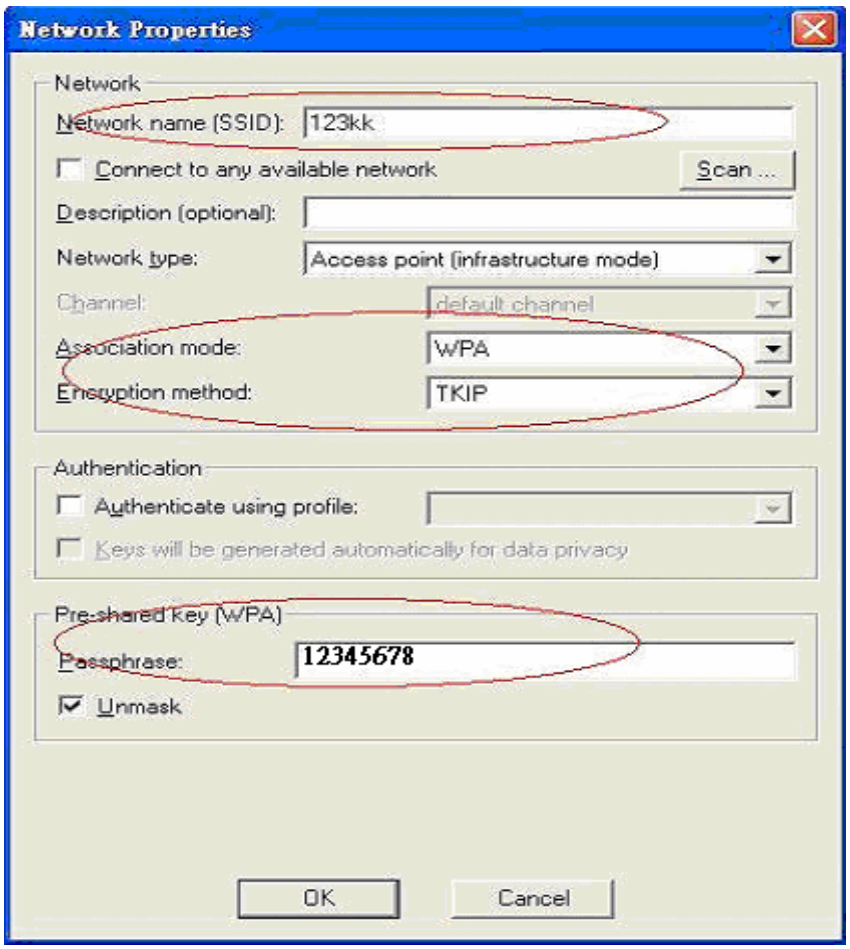
2. Go to Odyssey Client Manager, first choose “Network”

Before doing that, you should verify if the software can show the wireless card.

Open “Adapters”

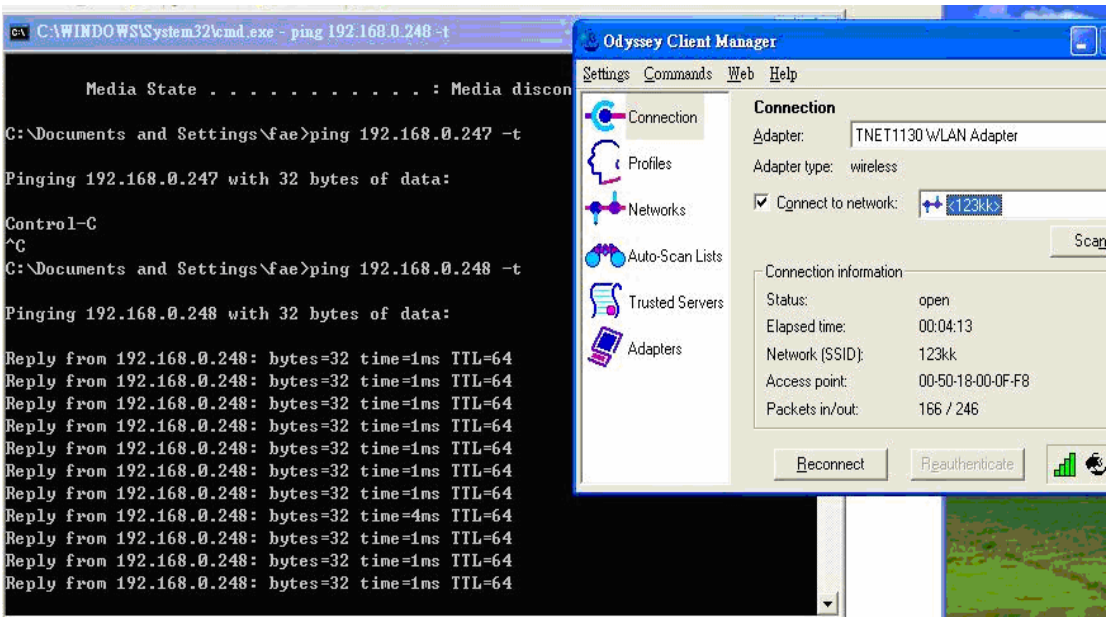


3. Add and edit some settings:



4. Back to Connection:

Then Select “Connect to network” You will see:



Method2:

1. First, patch windows XP and have to install “Service package 1”

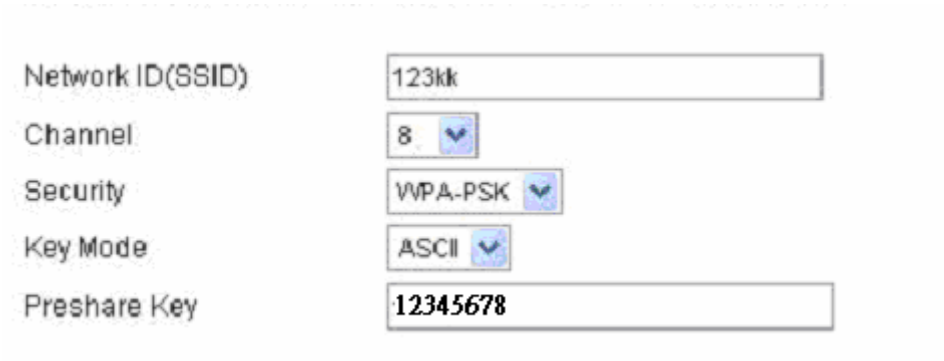
   Patch:

   http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=5039ef4a-61e0-4c44-94f0-c25c9de0ace9

2. Then reboot.

3. Setting on the router and client:

Router:

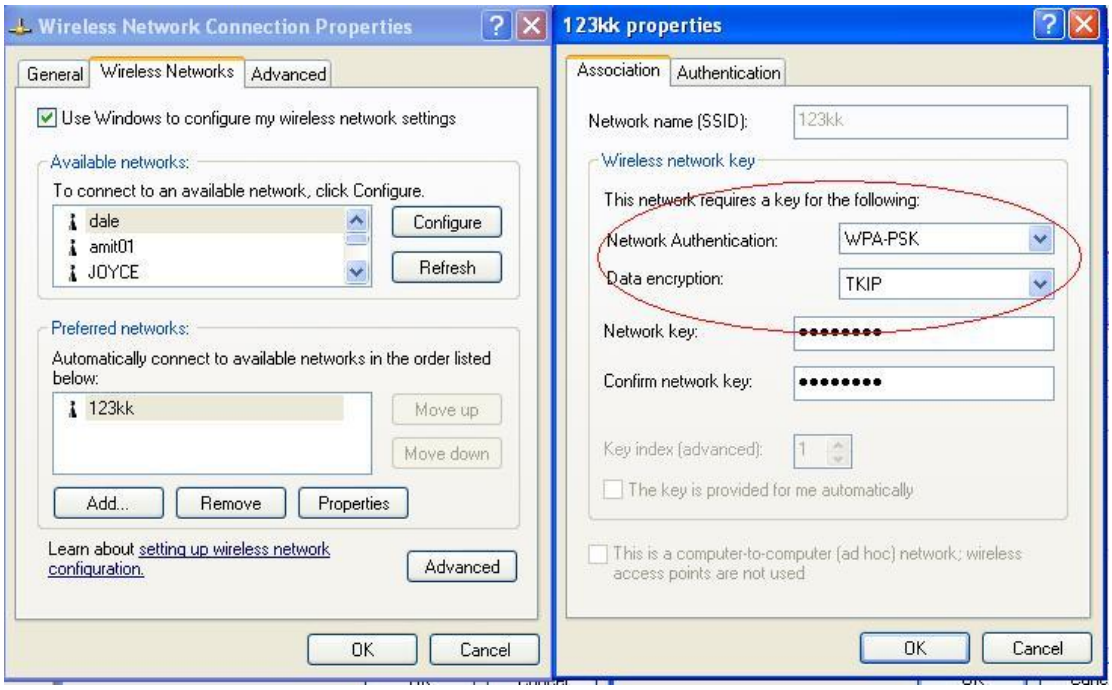


Client:

Go to “Network Connection” and select wireless adapter.

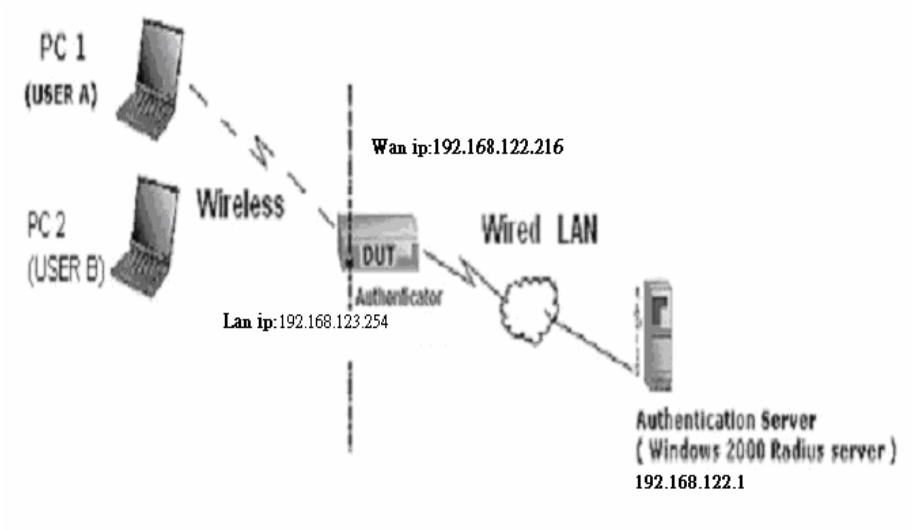
Choose “View available Wireless Networks” like below:

Advanced **à** choose “1kk”



WPA:

For this function, we need the server to authenticate. This function is like 802.1x.



The above is our environment:

Method 1:

1. The UserA or UserB have to get certificate from Radius, first.

http://192.168.122.1/certsrv

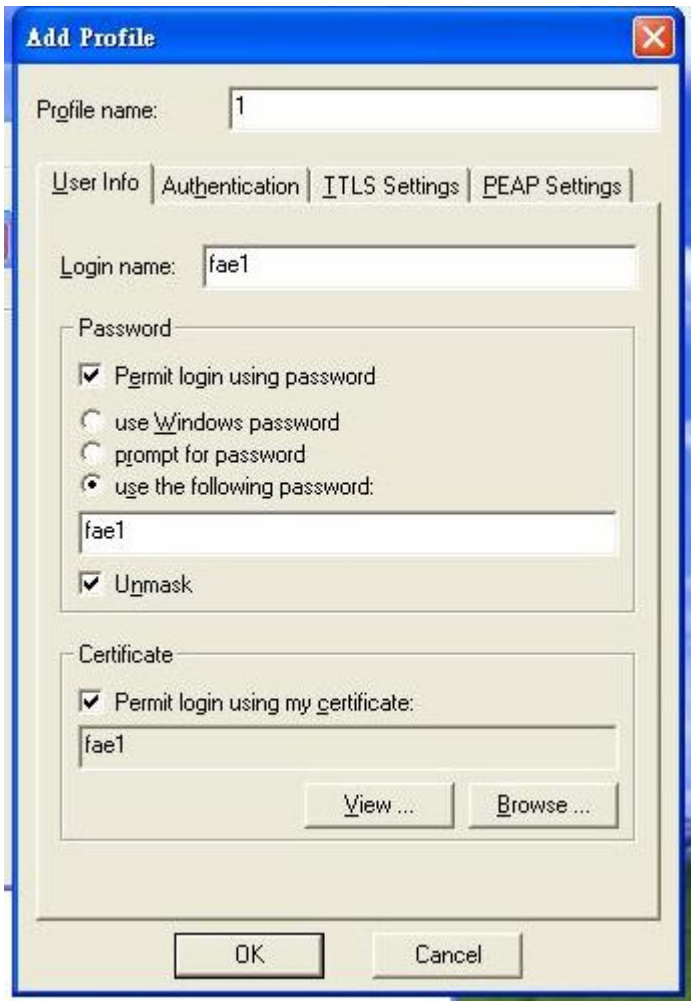
account : fae1

passwd : fae1

2. Then, Install this certificate and finish.

3. Go to the Web manager of Wireless Router to configure, like below:

4. Go to Odyssey Client Manager, choose “Profiles” and Setup Profile name as “1”

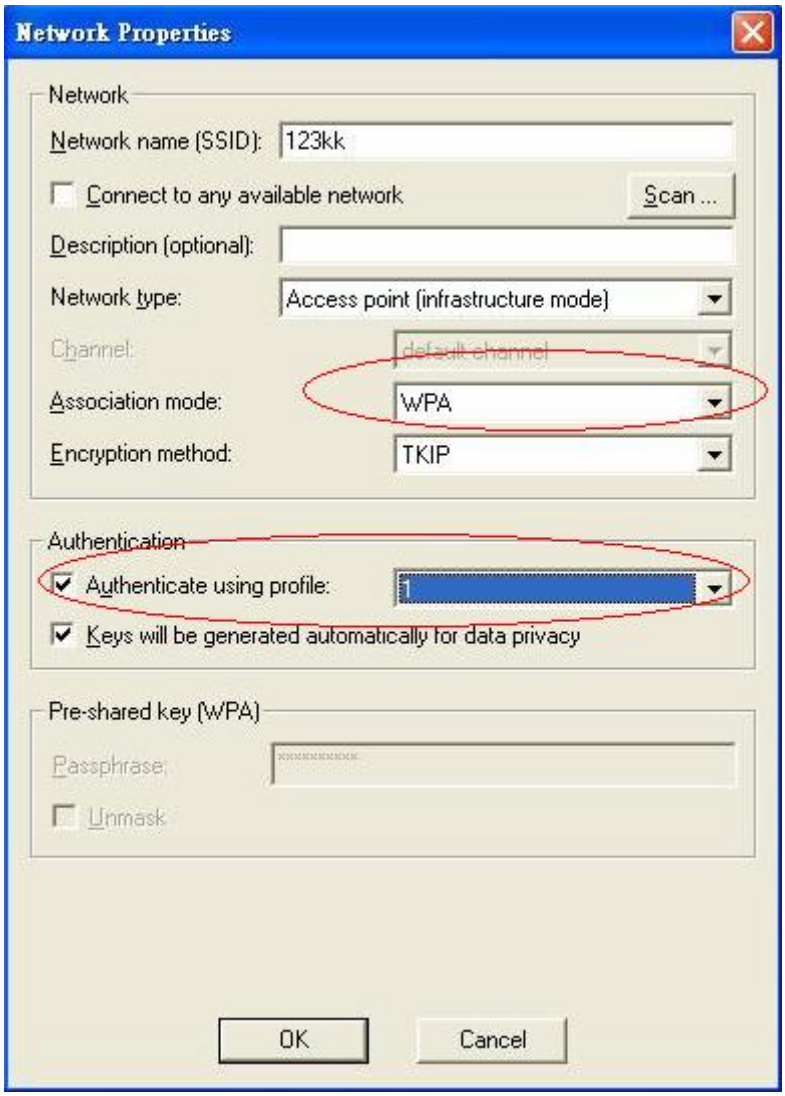


Login name and passwd are fae1 and fae1.
Remember that you get certificate from Radius in Step1.

5. Then Choose “certificate” like above.

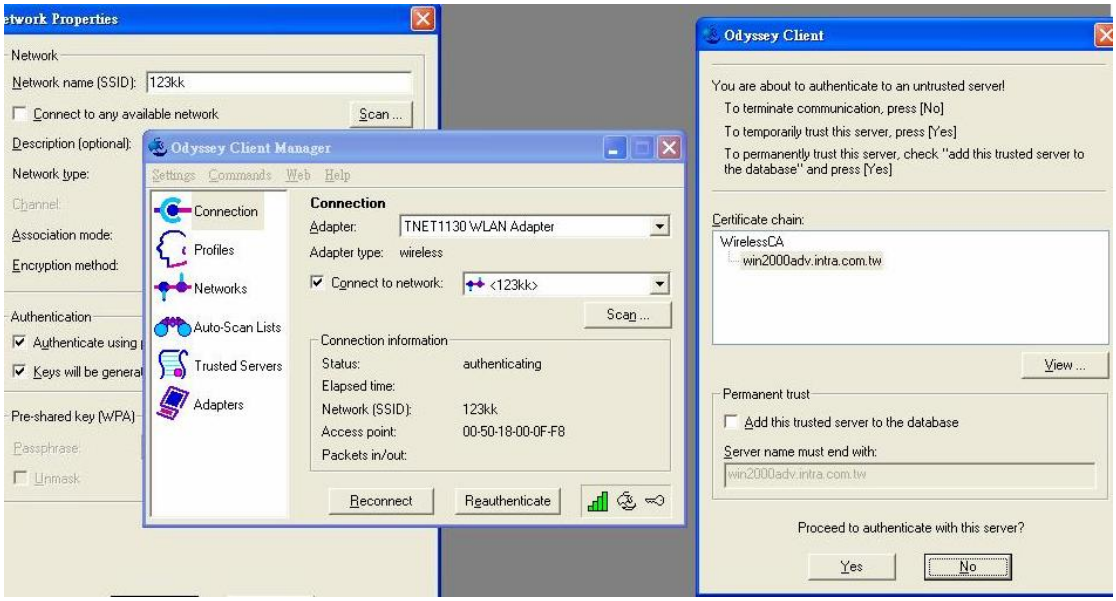
6. Then go to Authentication and first Remove EAP/ TLS and Add EAP/TLS again.

7. Go “Network” and Select “1” and ok

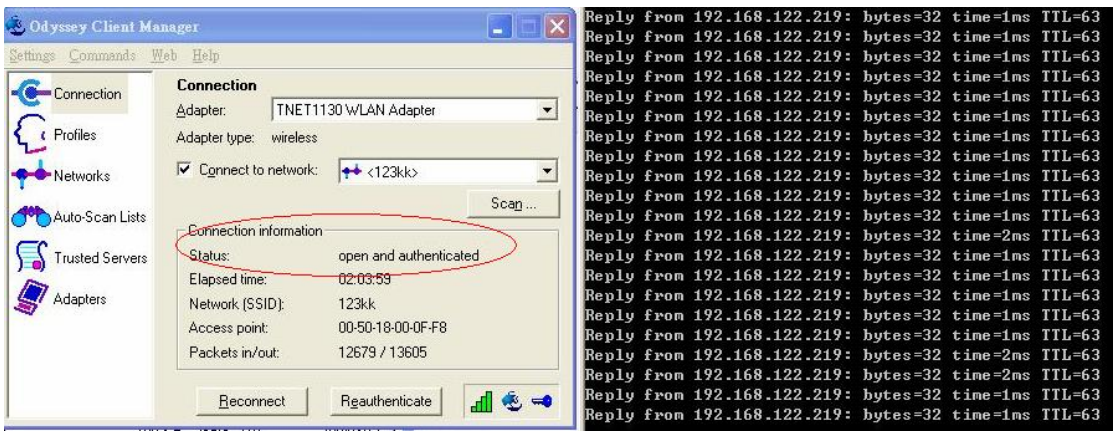


8. Back to Connection and Select “1kk.

If **successfully**, the wireless client has to authenticate with Radius Server, like below:



9.Result:



Method 2:

1. The UserA or UserB have to get certificate from Radius,first.

http://192.168.122.1/certsrv

account:fae1

passwd:fae1

2. Then Install this certificate and finish.

3. Setting on the router and client:

Router:

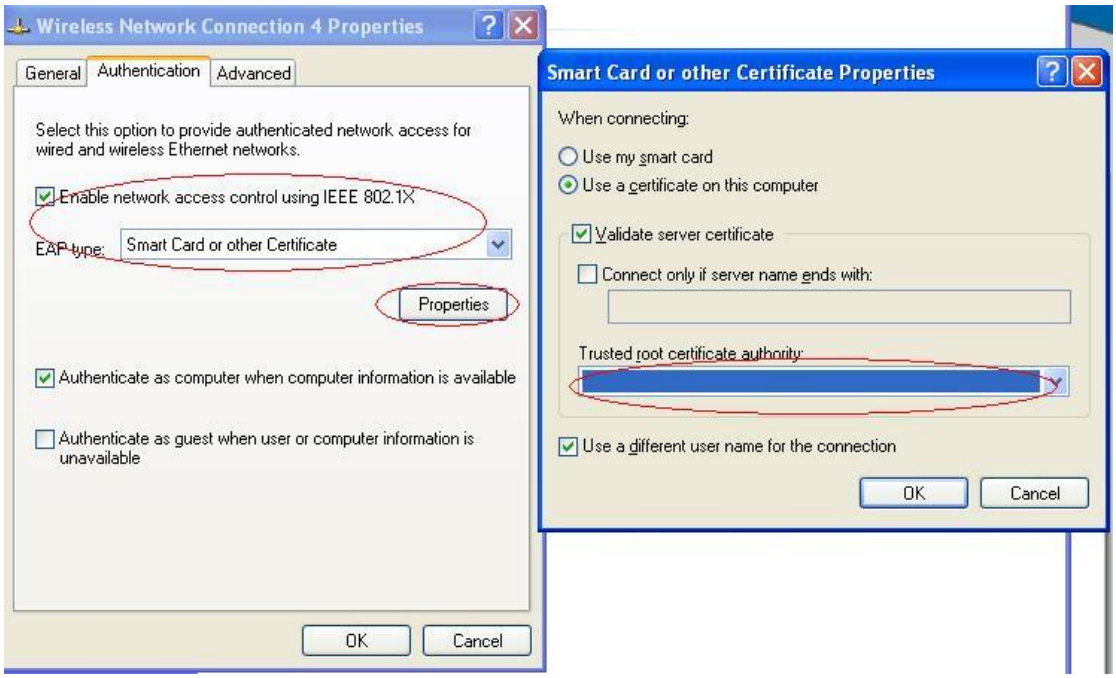
Client:

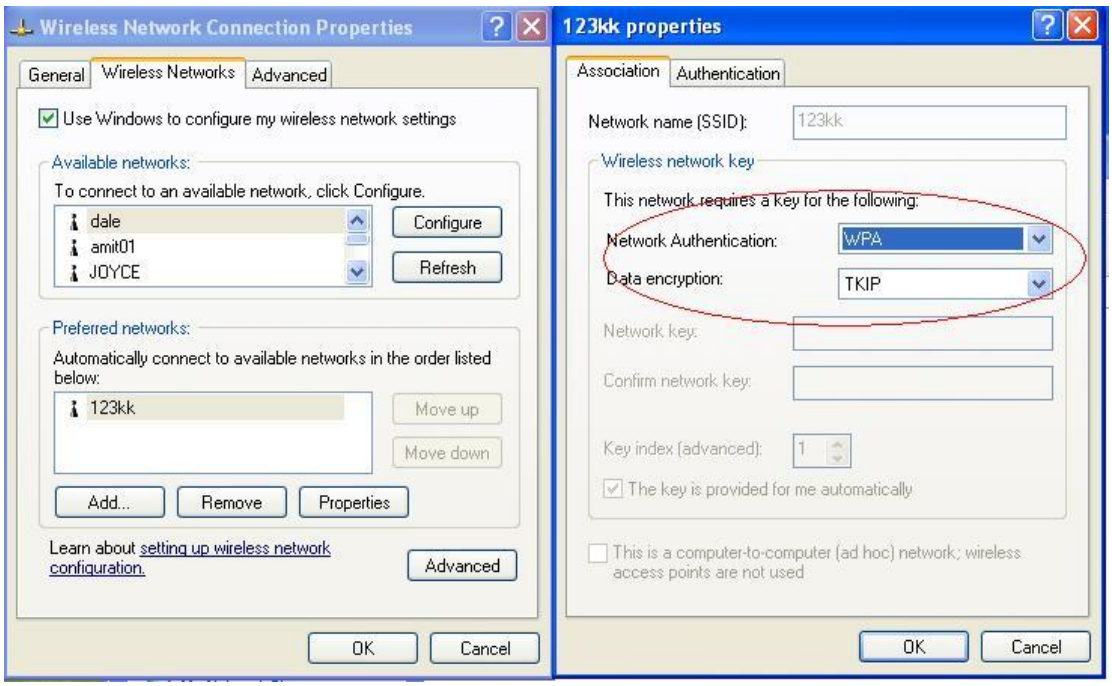
Go to “Network Connection” and select wireless adapter.

Choose “View available Wireless Networks” like below:

Advanced **à** choose “1kk”

Select “WirelessCA and Enable” in Trusted root certificate authority:





Then, if the wireless client wants to associate, it has to request to authenticate.

Appendix D FAQ and Troubleshooting

Reset to factory Default

There are 2 methods to reset to default.

1. **Restore with RESET button**

First, turn off the router and press the RESET button in. And then, power on the router and push the RESET button down until the M1 and or M2 LED (or Status LED) start flashing, then remove the finger. If LED flashes about 8 times, the RESTORE process is completed. However, if LED flashes 2 times, repeat.

2. **Restore directly when the router power on**

First, push the RESET button about 5 seconds (M1 will start flashing about 5 times), remove the finger

. The RESTORE process is completed.

Appendix E Product Specification

Hardware and Port Characteristic	
CPU	AMRISC 10100
Memory	Flash 1MB, DRAM 2MB
LAN Port	4 x RJ45, 10/100 Mbps with Auto-MDI/MDIX
WAN Port	1 x RJ45, 10/100 Mbps with Auto-MDI/MDIX
Input Power	AC 12V1A
Operational & Functional Characteristic	
Firmware Platform	MSI Proprietary Kernel
Management Method	Web-based
Supported WAN Type	Static IP Address
	Dynamic IP Address (DHCP Client)
	PPP over Ethernet
	Multi-session PPP over Ethernet (For Japan only)
	PPTP
	L2TP
Connection Scheme	Connect on Demand / Auto-Disconnect
	Manually Connect/Disconnect
	Auto Reconnect
NAT Functionality	One-to-Many NAT
	One-to-One NAT
	Virtual Server
	Special Application
	DMZ Host
Access Control	MAC-level Access Control
	Inbound/Outbound IP Filter
	Domain Access Control
Firewall	NAT Firewall with SPI mode
	DoS Detection
Event Logging	On-web logging
	Syslog supported

	Email Alert
VPN Supporting	IPSec, PPTP, LT2P Pass-Through
Routing	Static Route
Upgrade Method	Web-based
	Windows Application
Other Features	DDNS Supported
	UPnP Supported
	SNMP Supported
Wireless Support	
Standard	IEEE 802.11b / 802.11g
Data Rate*	6/12/18/24/36/48/54Mbps in 802.11g mode 1/2/5.5/11Mbps in 802.11b mode
Operating Frequency	2.4GHz
Range Coverage	Per cell indoors approx. 35-100 meters Per cell outdoors up to 100-300 meters
Antenna	2 dBi dipole antenna x 1
Number of Channels	America/ FCC: 2.412~2.462GHz (11 Channels) Japan/ TELEC: 2.412~2.484GHz (14 Channels) Europe/ ETSI: 2.412~2.472GHz (13 Channels)
Security	WEP encryption and WPA supported
Environment, Certification and Reliability	
Operating Temperature	Temperature: 0~40^{o}C, Humidity 10%~90% non-condensing
Storage Temperature	Temperature: -20~70^{o}C, Humidity: 0~95% non-condensing
EMC/Safety	FCC, CE, DGT