# User Manual

**WN-220ARM**
**Wireless 11N 150Mbps ADSL2+M Router**

## FCC Part 15.19

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

## FCC Part 15.21 information for user

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

## FCC Section 15.105 Information to the user.

NOTE:
This equipment has been tested and found to comply with the limits for a lass B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.

## RF exposure statements

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

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

**TABLE OF CONTENTS**

# CHAPTER 1. Introduction

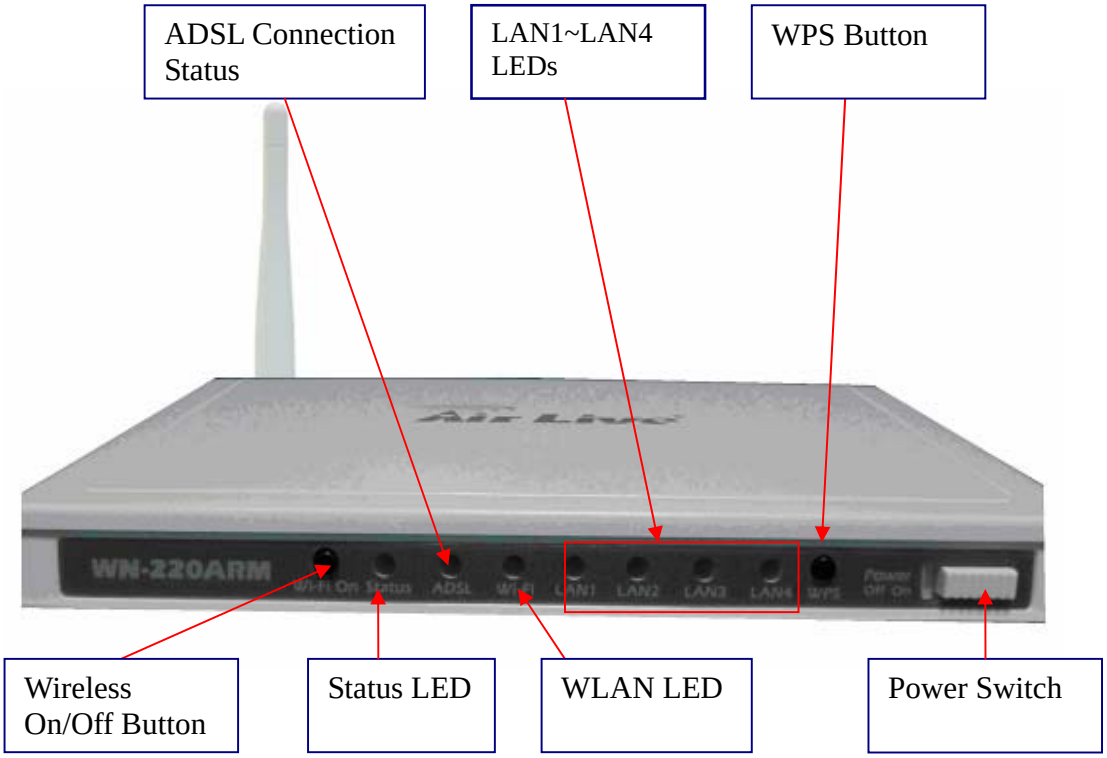
Congratulations on your purchase of this outstanding product: WN-220ARM Wireless 11N 150Mbps ADSL2+M Router. This product is specifically designed for home and small office needs. It provides a complete solution for Internet surfing. Instructions for installing and configuring this product can be found in this manual. Before you install and use this product, please read this manual carefully for fully exploiting the functions of this product.

## 1.1 Package List

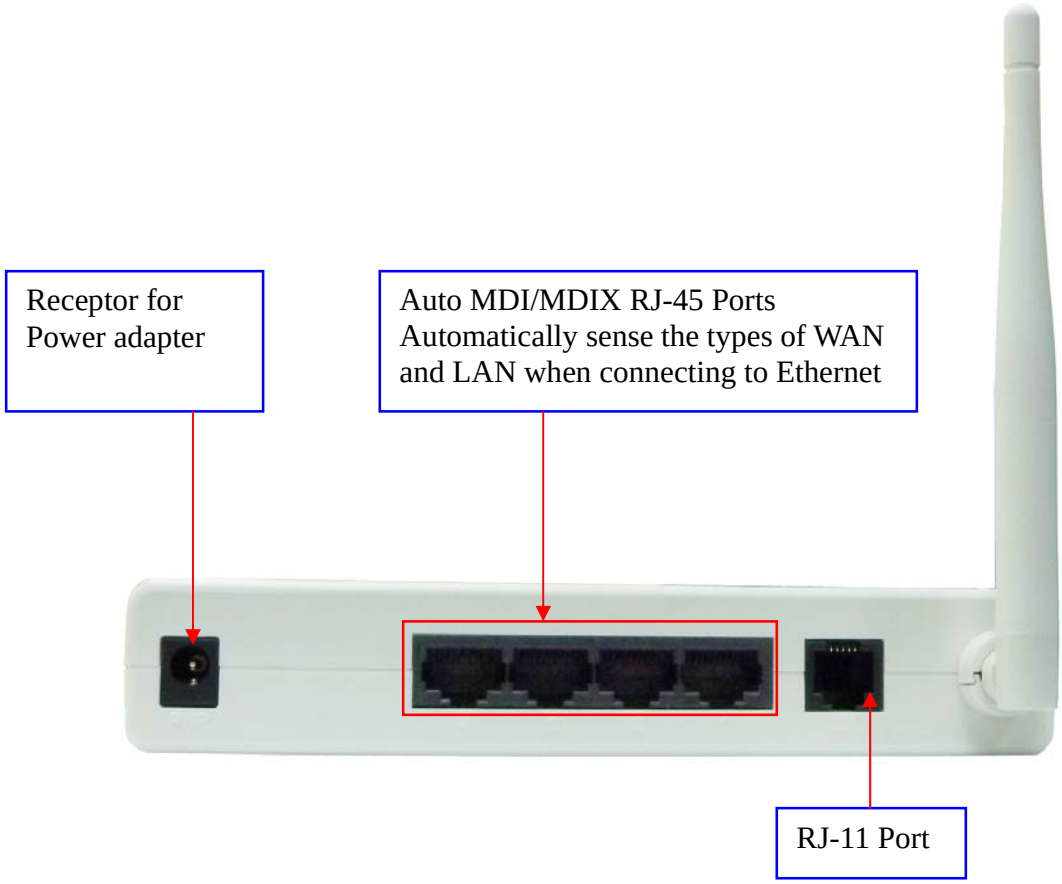
| Items | Description | Quantity |
|---|---|---|
| 1 | Wireless 11N 150Mbps ADSL2+M Router | 1 |
| 2 | Power adapter 12Vdc/ 0.6A | 1 |
| 3 | CD | 1 |

## 1.2 Hardware Installation

### 1.2.1 Hardware configuration




Reset: Press “Wireless on/off” and “WPS” button for 5 sec simultaneously.




## 1.2.2 LED indicators

| | LED color | Description |
|---|---|---|
| Status | Green in flash | power is on |
| | Green in fast flash | Reset mode |
| ADSL | Green in flash | xDSL connection is established |
| | Green in fast flash | Data packet transferred via DSL Line |
| WLAN | Green | WiFi is on. |
| | Green in flash | Data access |
| LAN | Green | RJ45 cable is plugged, and Ethernet connection is established. |
| | Green in flash | Data access |

## 1.2.3 Installation Steps

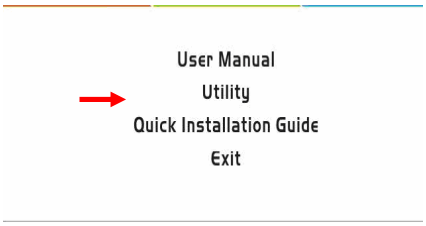
**Step 1. Connect with the Ethernet patch cable:**
Insert the Ethernet cable into RJ45 Ethernet Port on the back panel. And then plug the other end of RJ45 into the computer or Laptop computer. The LED of Internet connection will show green color if the Ethernet connection is normally connected.

**Step 2. Insert the RJ11 cable for ADSL**

**Step 3. Connect the power adapter:**
Plug the other end of the power adapter into a wall outlet.

**Step 4. power on**
Switch the power on in front of this WiFi ADSL Router

**Step 5. Start to configure the device:**
You can start to configure the device via the Easy Setup.
(see Easy Setup Utility)



# CHAPTER 2. Getting Started

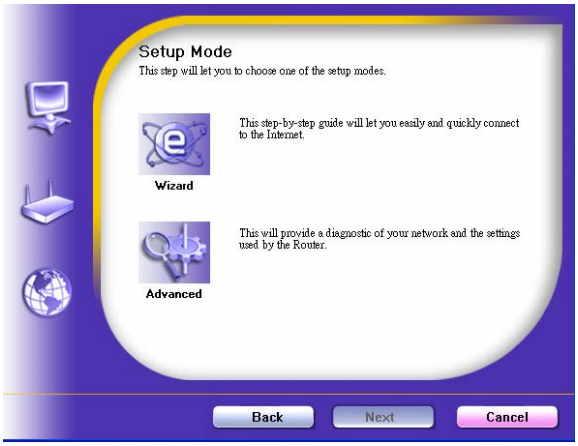
## 2.1 Easy Setup by Windows Utility

**Step 1:**
Install the Easy Setup Utility from CD then follow the steps to configure it.

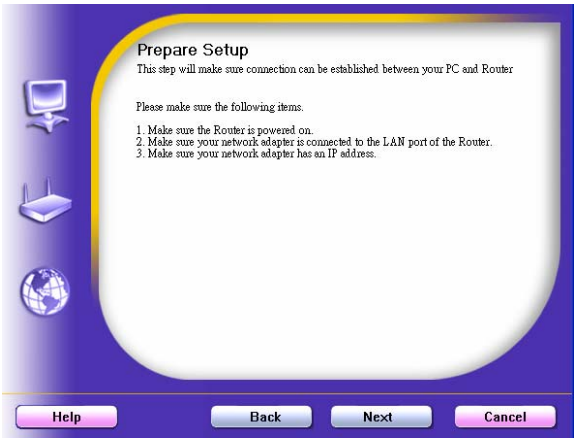
**Step 2:**
Select Language then click “Next” to continue.


**Step 3:**
Then click the “Wizard” to continue.

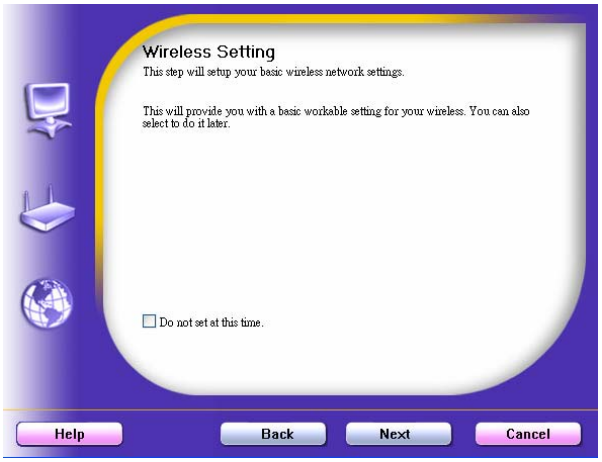
Or click “advanced” to run advanced mode for more detailed setting.
(See User Manual)



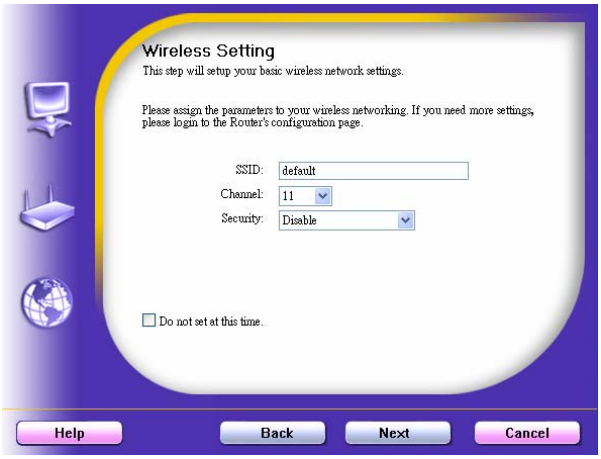

**Step 4:**
Click “Next” to continue.



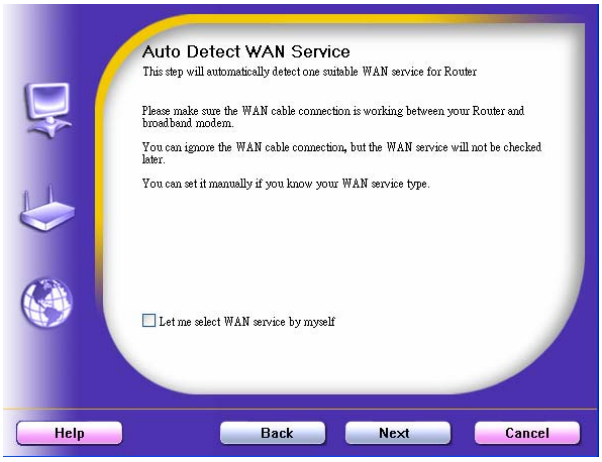
**Step 7:**
Configure your wireless interface.



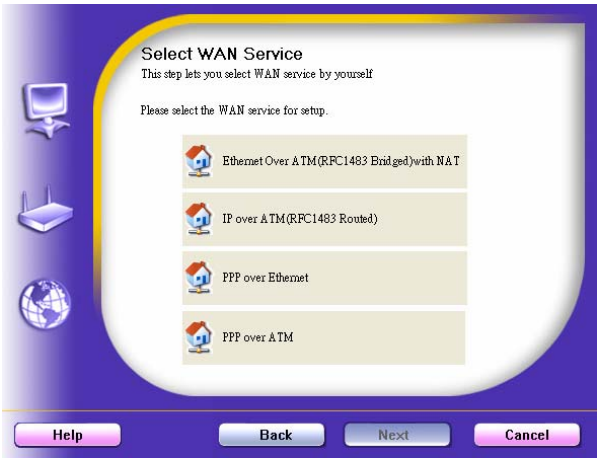

**Step 8:**
Insert SSID, Channel and Security options, and then click “Next” to continue.




**Step 9:**
Auto detect the WAN service, just click the [Next] button.
Or you could select the WAN type by yourself via select the check box [Let me select WAN service by myself] → jump to Step 10.

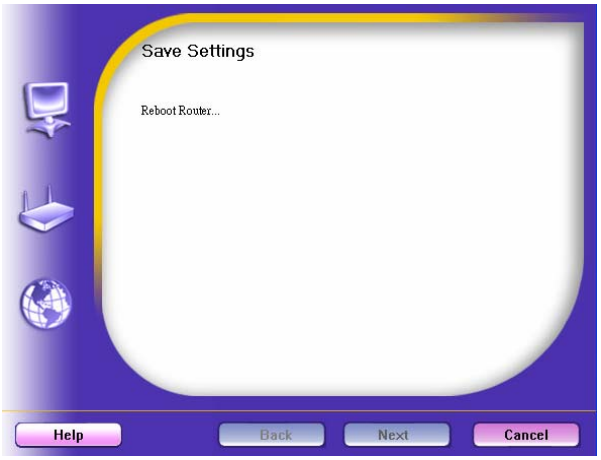


**Step 10:**
Select the WAN type by yourself. You can get this information by asking your ISP.

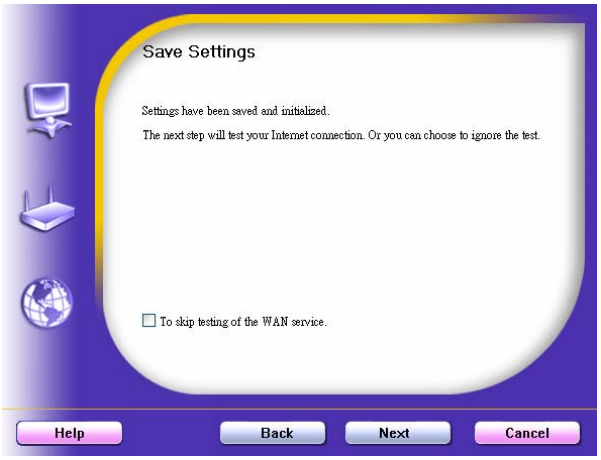



**Step 12：**
The WiFi ADSL Router is rebooted to make your entire configuration take effect.

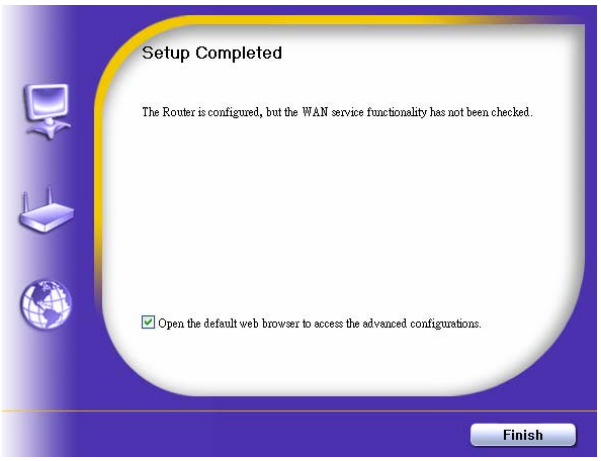

**Step 13：**
Click “Next” to test the Internet connection.



**Step 14：**
Click “Next” to test WAN Networking service or you can ignore test.




**Step 15：**
Congratulations!
Setup is completed.
Now you have already connected to Internet successfully.

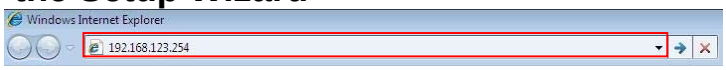


## 2.2 Easy Setup by Configuring Web Pages

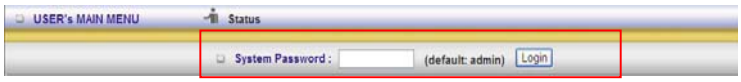
You can also browse UI of the web to configure the device.

### Browse to Activate the Setup Wizard

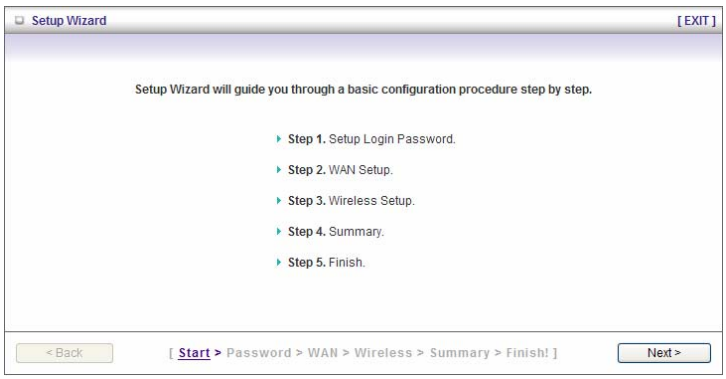
Type in the IP Address (http://192.168.123.254)




Type the default password ‘admin’ in the System Password and then click ‘login’ button.

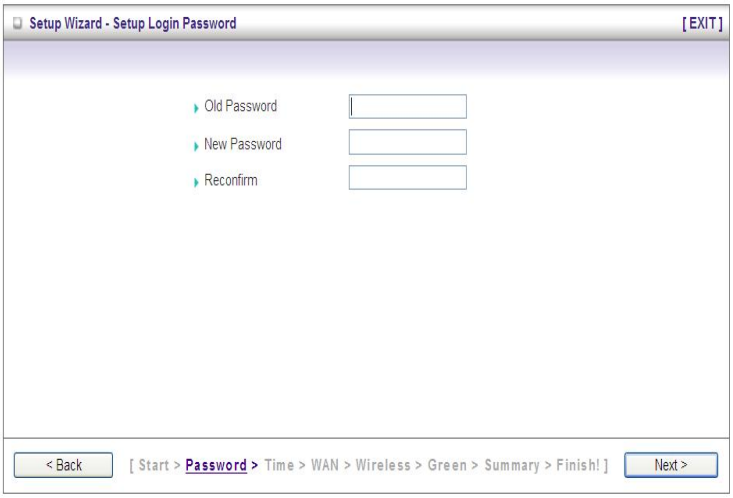



Select “Wizard” for basic settings in simple way. Press “Next” to start the Setup Wizard.

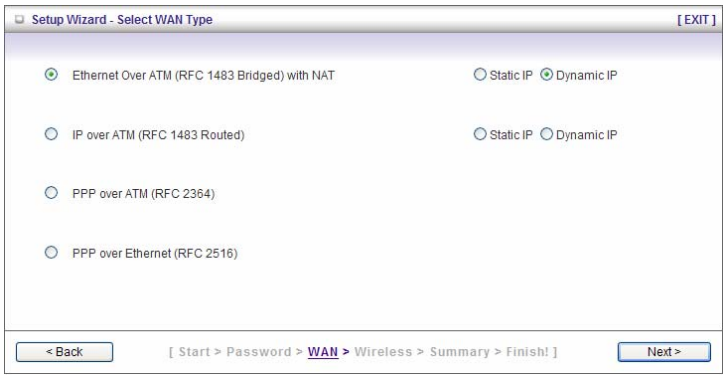



### Configure with the Setup Wizard

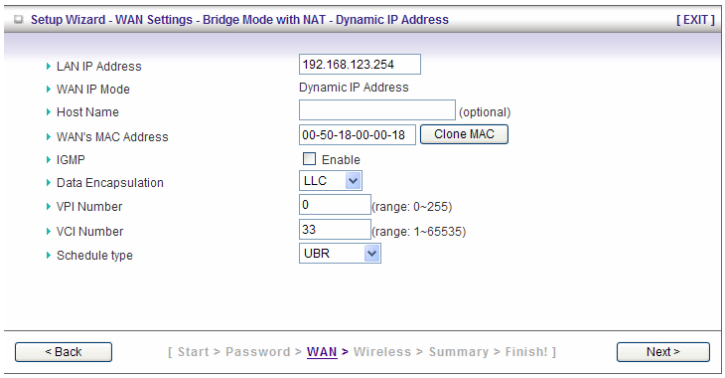
**Step 1:**
Setup login password. Enter your system password.



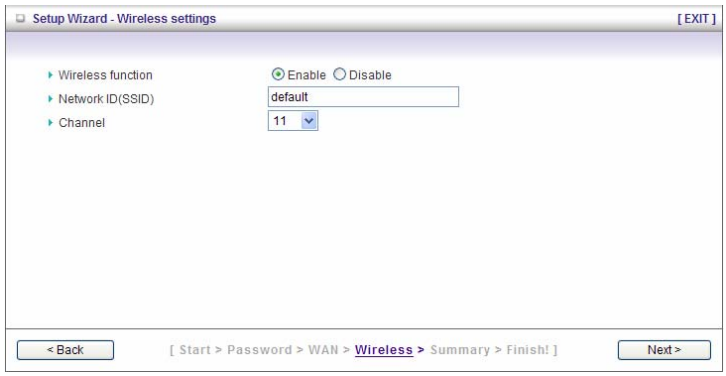
**Step 2:**
Setup Wan Type.



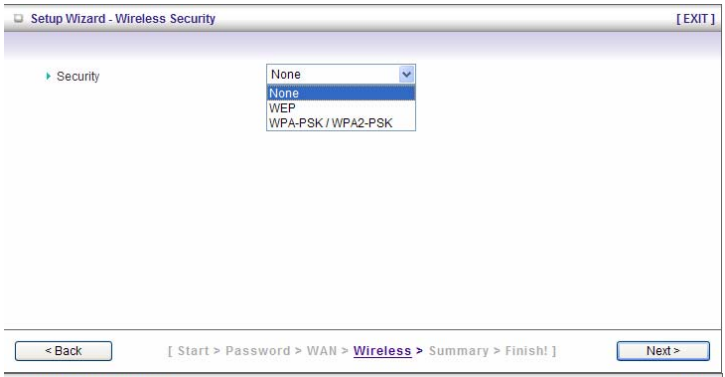

**Step 3:**
Type in WAN information and go 'next' step.



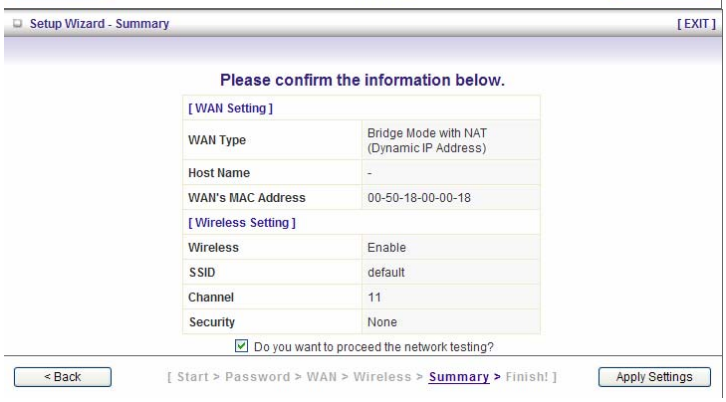

**Step 4:**
Wireless Set up.



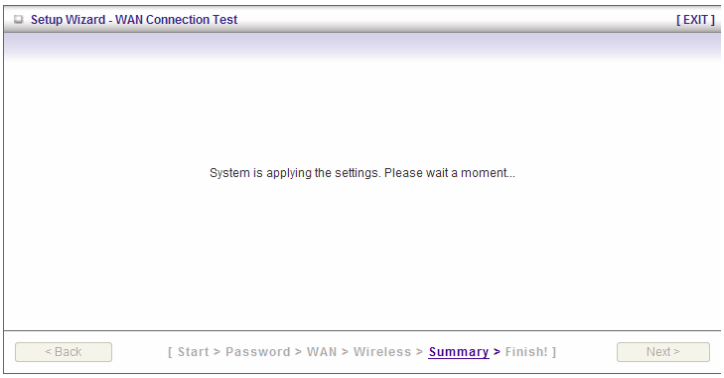
**Step 5:**
**Wireless security setup.**



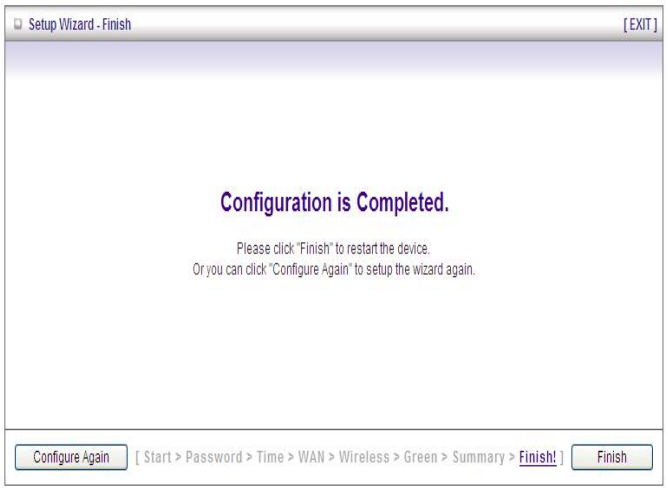

**Step 6:**
Confirm your information and apply the settings.




**Step 7:**
Setup completed.



**Step 8:**
Click Finish to complete it.



# CHAPTER 3. Making Configuration

## 3.1 Start to configure

Whenever you want to configure your network or this device, you can access the Configuration Menu by opening the web-browser and typing in the IP Address of the device. The default IP Address is: 192.168.123.254.


Enter the default password “admin” in the System Password and then click ‘login’ button.


Afterwards, select ‘Advanced’ indicated in the user interface for further configuring this device. In the “Advanced” page, it could be categorized four sections, respectively Basic Setting, Forwarding Rules, Security Setting, and Advanced Setting.

## 3.2 System Status

System Status [ HELP ]

| Item | WAN Status | Sidenote |
|---|---|---|
| Remaining Lease Time | 00:00:00 | Renew |
| IP Address | 0.0.0.0 | |
| Subnet Mask | 0.0.0.0 | |
| Gateway | 0.0.0.0 | |
| Domain Name Server | 0.0.0.0 | |
| MAC Address | 00-50-18-00-00-18 | |
| ADSL Connection (DownStream/UpStream) | Disconnected | Bridge Mode with NAT |

Wireless Status

| Item | WLAN Status | Sidenote |
|---|---|---|
| Wireless mode | Enable | |
| SSID | default | |
| Channel | 11 | |
| Security | None | |
| MAC Address | 00-50-18-00-00-19 | |

Statistics Information

| Statistics of WAN | Inbound | Outbound |
|---|---|---|
| Octets | 0 | 3817 |
| Unicast Packets | 0 | 108 |
| Non-unicast Packets | 0 | 1 |

ADSL Modem Status | View Log... | Clients List... | NAT Status... | Refresh

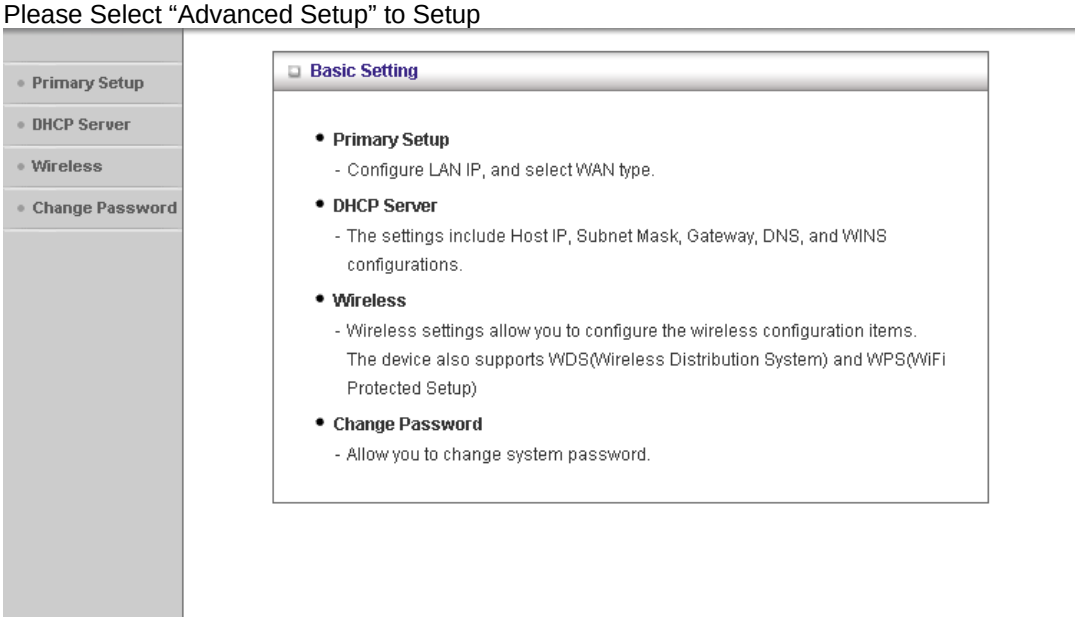
This option provides the function for observing this product's working status:
WAN Port Status.
If the WAN port is assigned a dynamic IP, there may appear a "**Renew**" or "**Release**" button on the Sidenote column. You can click this button to renew or release IP manually.

Statistics of WAN: enables you to monitor inbound and outbound packets

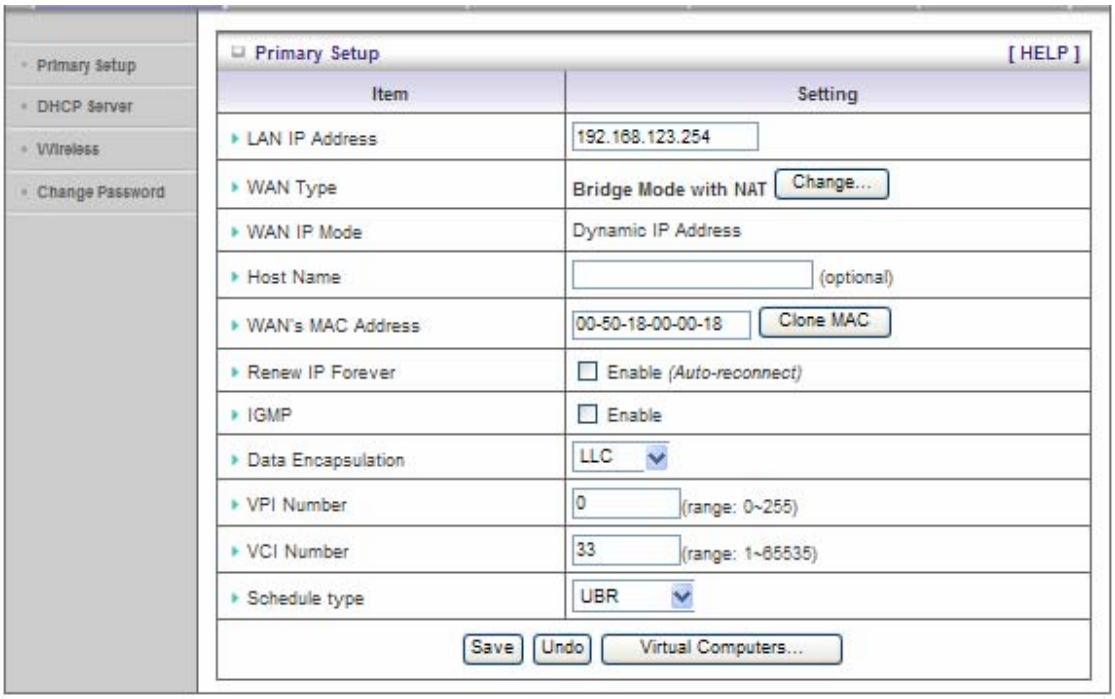
## 3.3 Advanced

### 3.3.1 Basic Setting

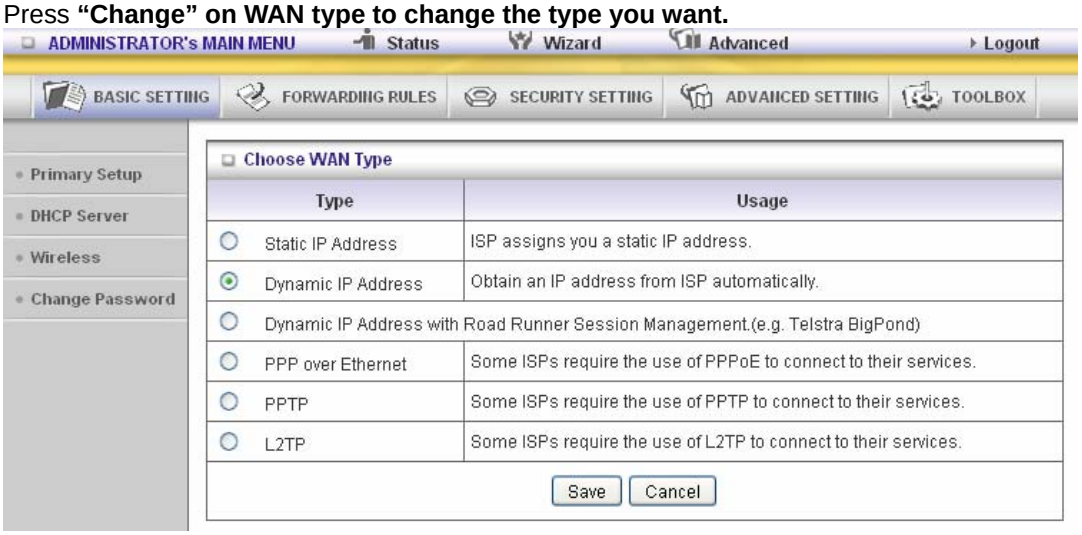
Please Select “Advanced Setup” to Setup




# 3.3.1.1 Primary Setup – WAN Type, Virtual Computers



Press **“Change” on WAN type to change the type you want.**



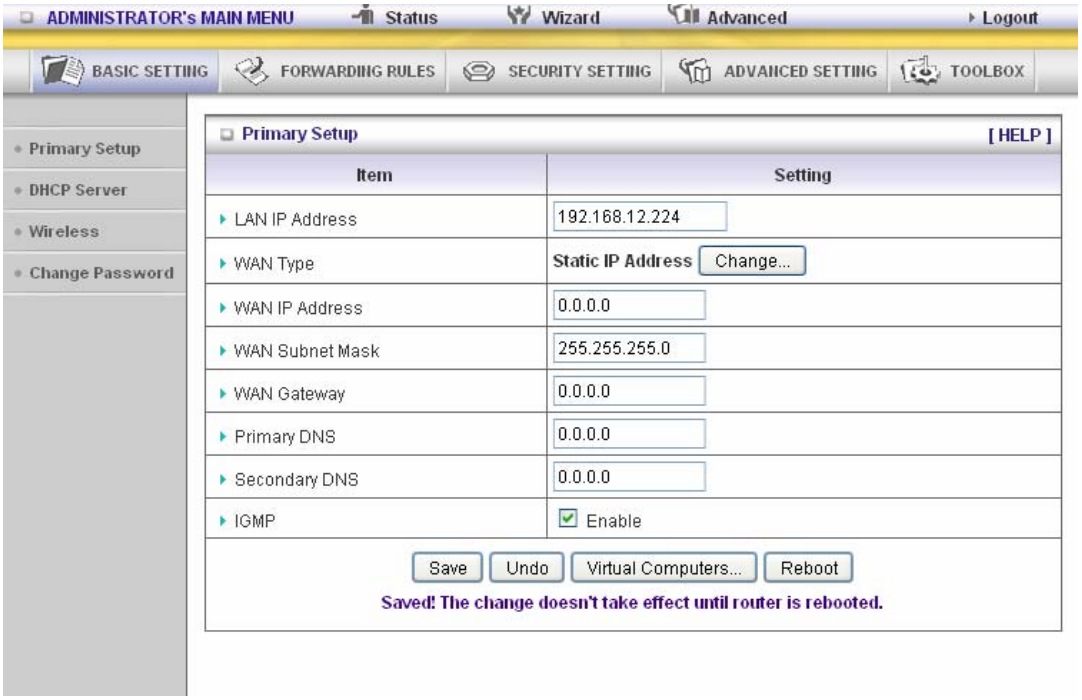

This option is primary to enable this product to work properly. The setting items and the web appearance depend on the WAN type. Choose correct WAN type before you start.

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.

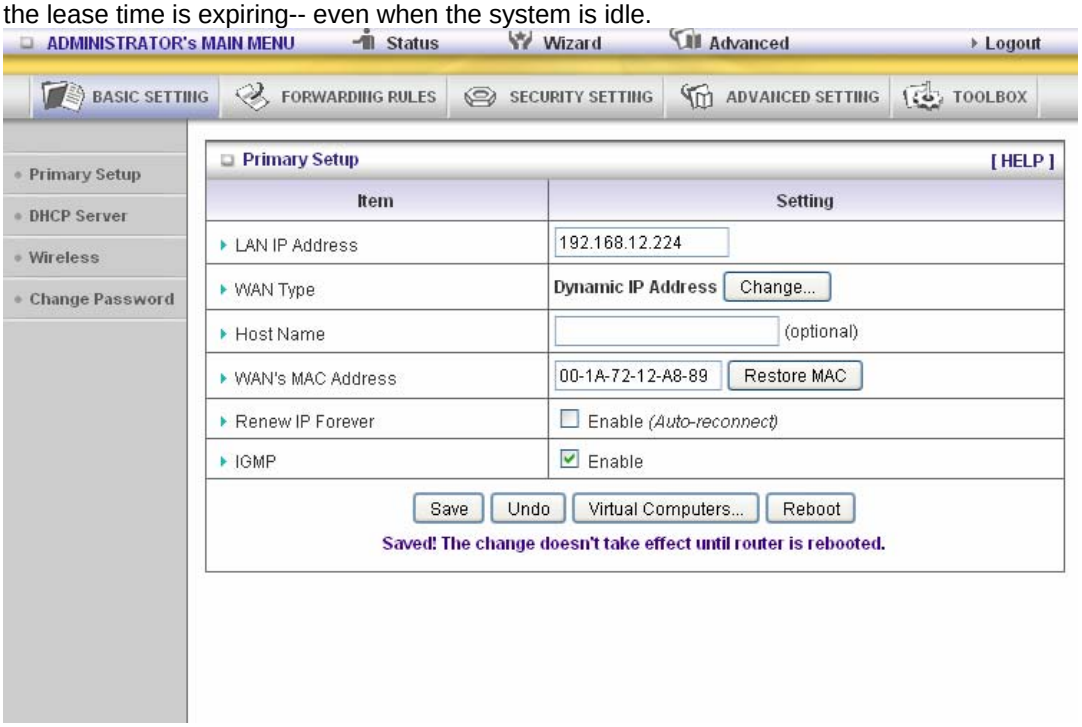

2. **WAN Type**: WAN connection type of your ISP. You can click **Change** button to choose a correct one from the following four options:
   A. Static IP Address: ISP assigns you a static IP address.
   B. Dynamic IP Address: Obtain an IP address from ISP automatically.
   C. PPP over Ethernet: Some ISPs require the use of PPPoE to connect to their services.
   D. 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

**Static IP Address: ISP assigns you a static IP address:**

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



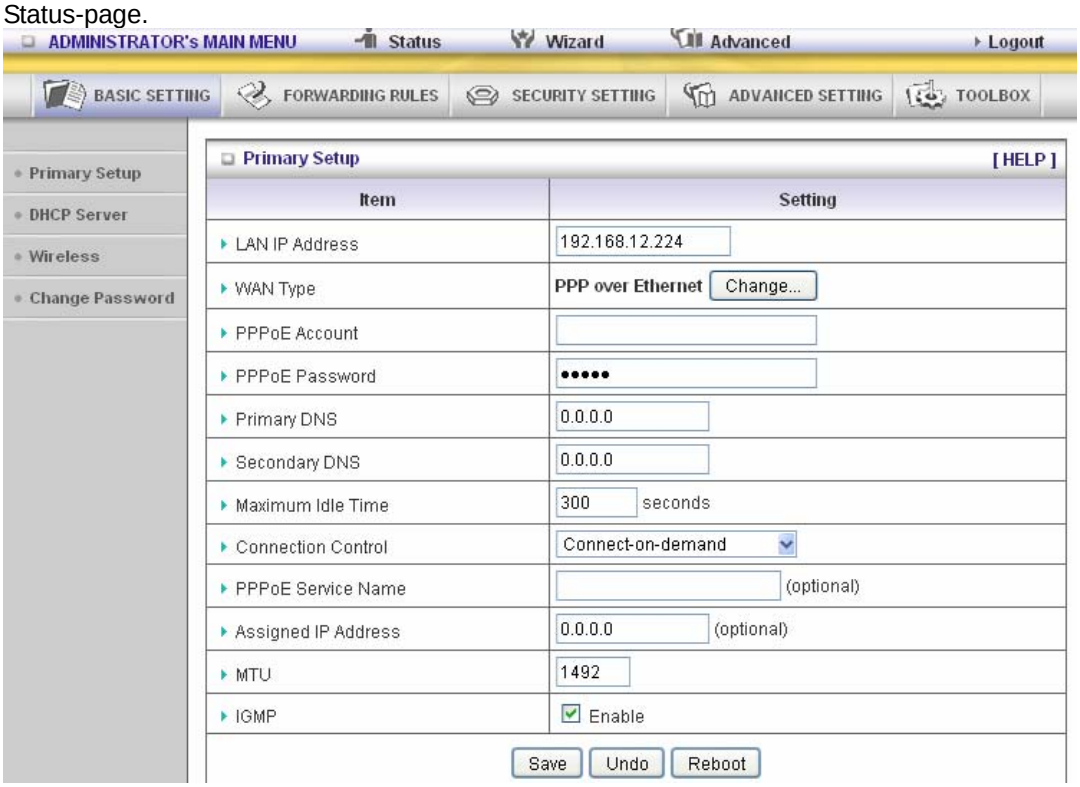

**Dynamic IP Address: Obtain an IP address from ISP automatically.**
Host Name: optional. Required by some ISPs, for example, @Home.
Renew IP Forever: this feature enables this product to renew your IP address automatically when the lease time is expiring-- even when the system is idle.




**PPP over Ethernet: Some ISPs require the use of PPPoE to connect to their services.**
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.
PPPoE Service Name: optional. Input the service name if your ISP requires it. Otherwise, leave it blank.

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.

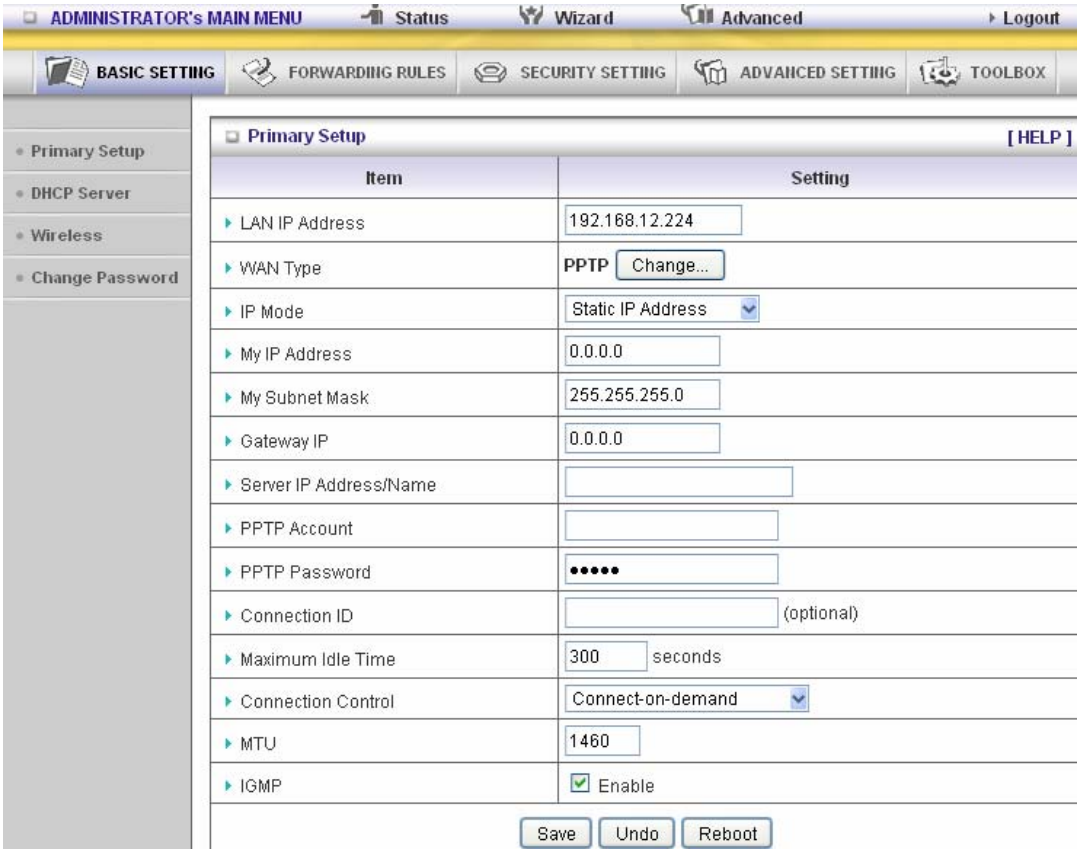
**Maximum Transmission Unit (MTU)**: Most ISP offers MTU value to users. The most common MTU value is 1492.
Connection Control: There are 3 modes to select:
Connect-on-demand: The device will link up with ISP when the clients send outgoing packets.
Auto-Reconnect (Always-on):The device will link with ISP until the connection is established.
Manually :The device will not make the link until someone clicks the connect-button in the Status-page.




**PPTP: Some ISPs require the use of PPTP to connect to their services**
First, please check your ISP assigned and Select Static IP Address or Dynamic IP Address.

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.
4. Connection ID: optional. Input the connection ID if your ISP requires it.
5. 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.

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 with ISP until the connection is established.
Manually: The device will not make the link until someone clicks the connect-button in the Status-page.




**L2TP: Some ISPs require the use of L2TP to connect to their services**
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.
4. Connection ID: optional. Input the connection ID if your ISP requires it.
5. 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.

Connection Control: There are 3 modes to select:
Connect-on-demand: The device will link up with ISP when the clients send outgoing packets.
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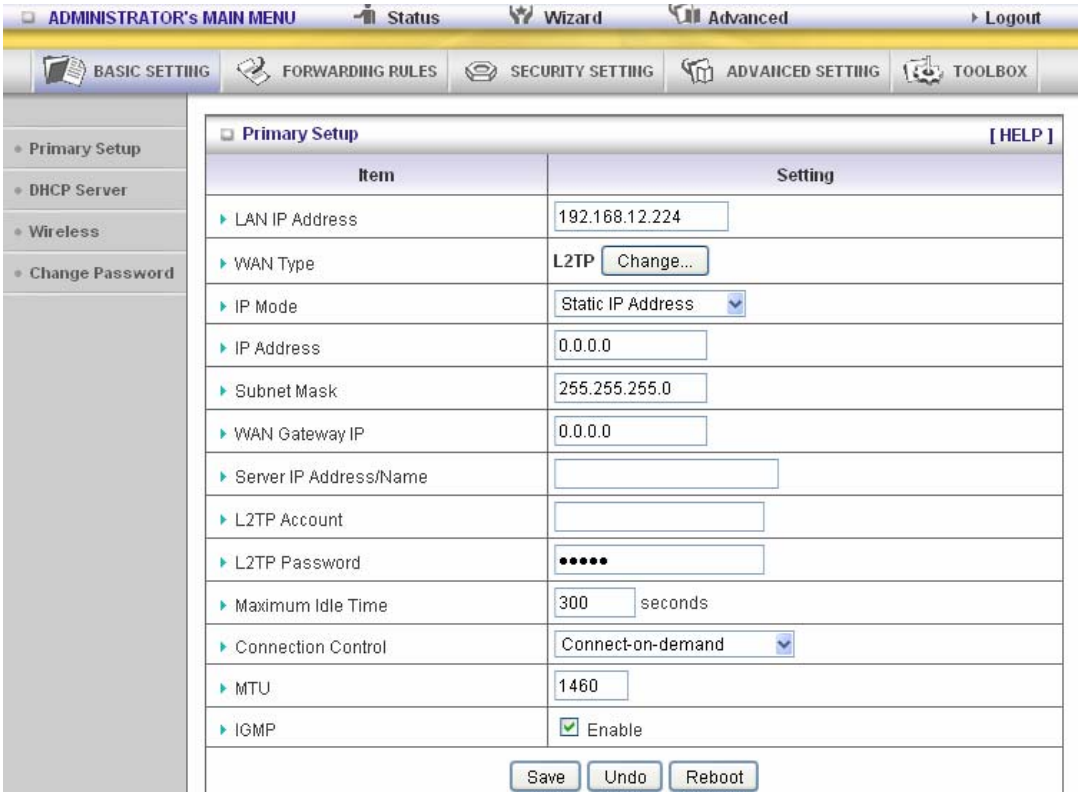
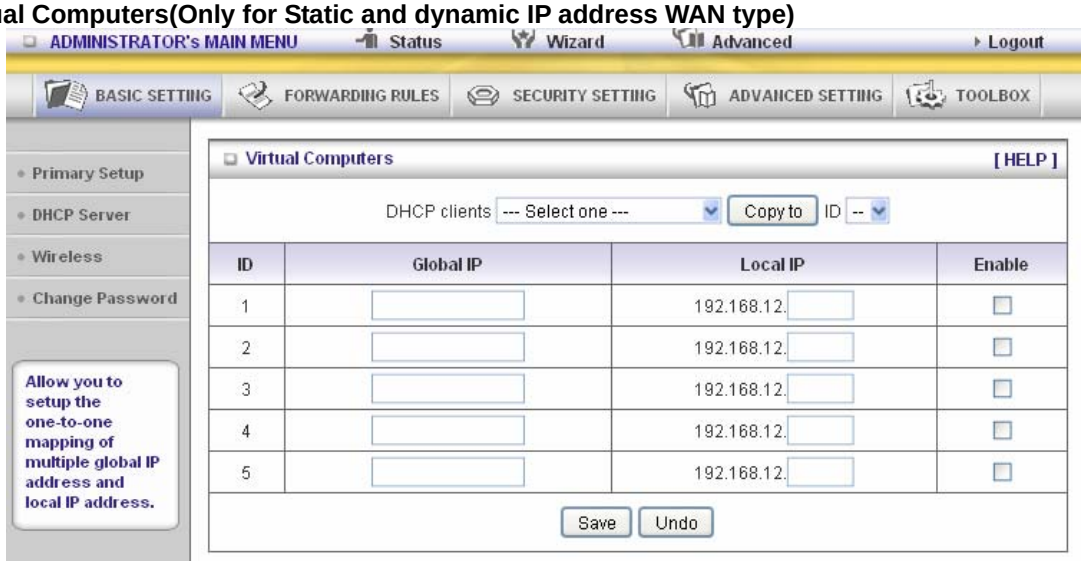
Manually :The device will not make the link until someone clicks the connect-button in the Status-page.


ADMINISTRATOR's MAIN MENU
Status
Wizard
Advanced
Logout
BASIC SETTING
FORWARDING RULES
SECURITY SETTING
ADVANCED SETTING
TOOLBOX
Primary Setup
DHCP Server
Wireless
Change Password
Primary Setup
[ HELP ]
Item
Setting
LAN IP Address
192.168.12.224
WAN Type
L2TP
Change...
IP Mode
Static IP Address
IP Address
0.0.0.0
Subnet Mask
255.255.255.0
WAN Gateway IP
0.0.0.0
Server IP Address/Name
L2TP Account
L2TP Password
Maximum Idle Time
300
seconds
Connection Control
Connect-on-demand
MTU
1460
IGMP
Enable
Save
Undo
Reboot

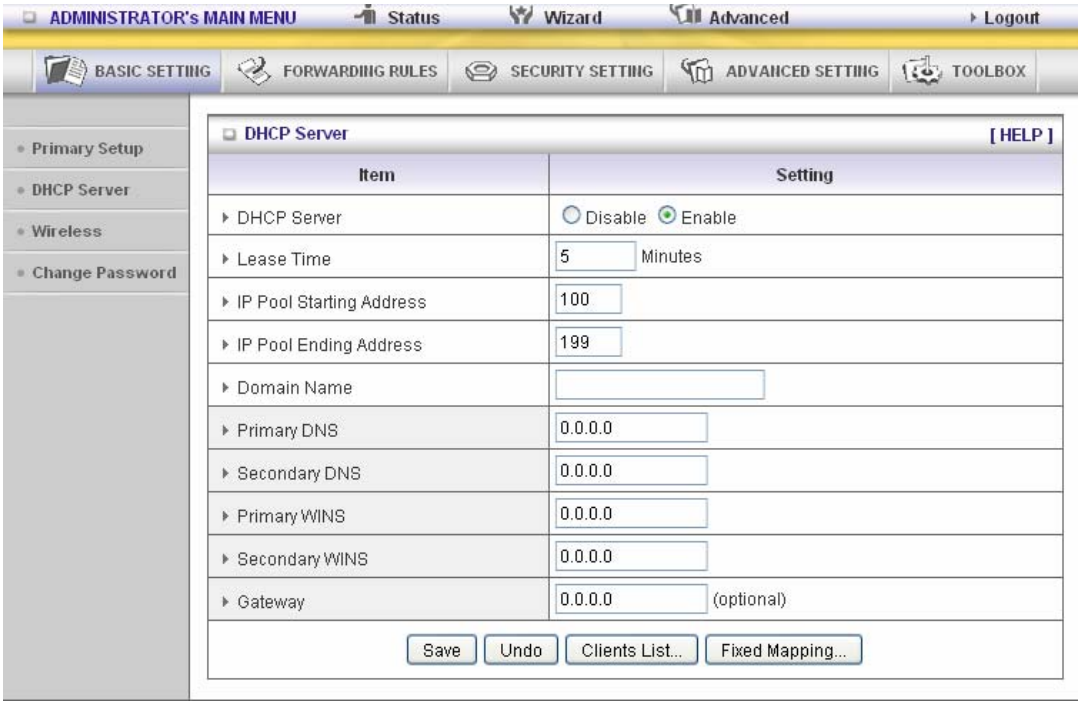
**Virtual Computers(Only for Static and dynamic IP address WAN type)**




Virtual Computer enables you to use the original NAT feature, and allows you to setup the one-to-one mapping of multiple global IP address and local IP address.

- Global IP: Enter the global IP address assigned by your ISP.
- Local IP: Enter the local IP address of your LAN PC corresponding to the global IP address.
- Enable: Check this item to enable the Virtual Computer feature.

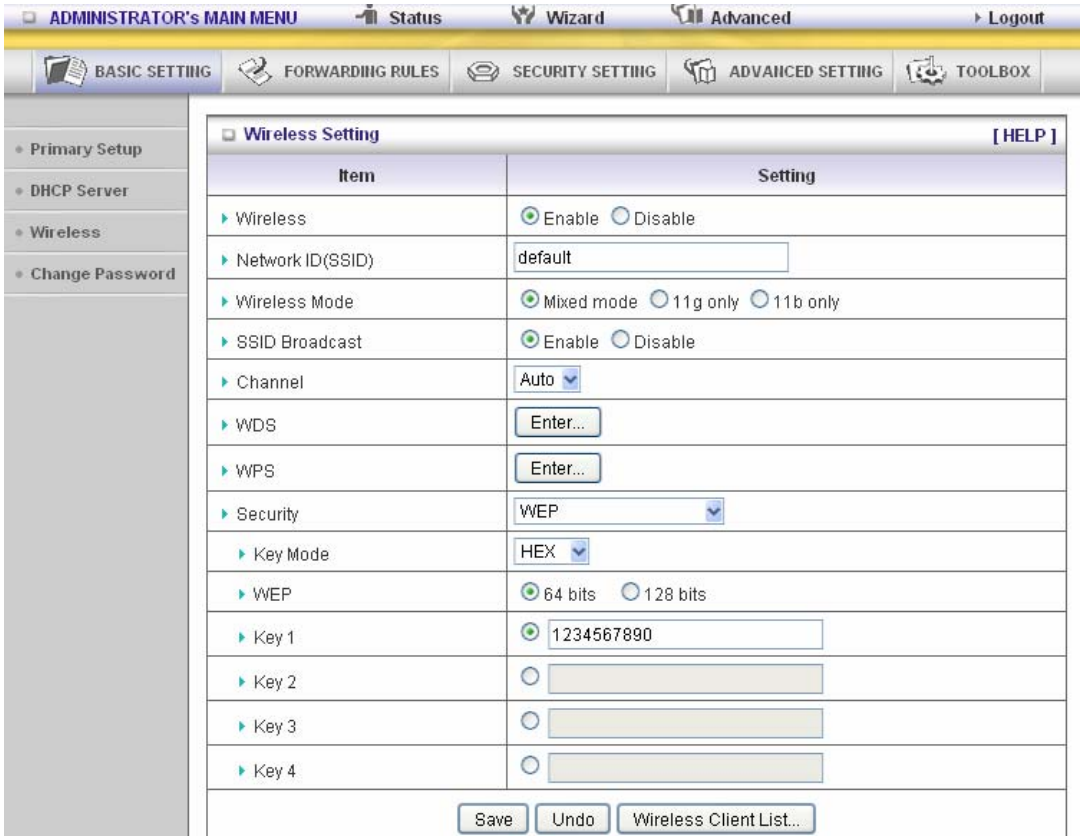
# 3.3.1.2 DHCP Server




Press **"More>>"**

1. **DHCP Server**: Choose "Disable" or "Enable."
2. **Lease time**: This is the length of time that the client may use the IP address it has been Assigned by DHCP server.
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.
8. **DHCP Client List**:

# 3.3.1.3 Wireless Setting



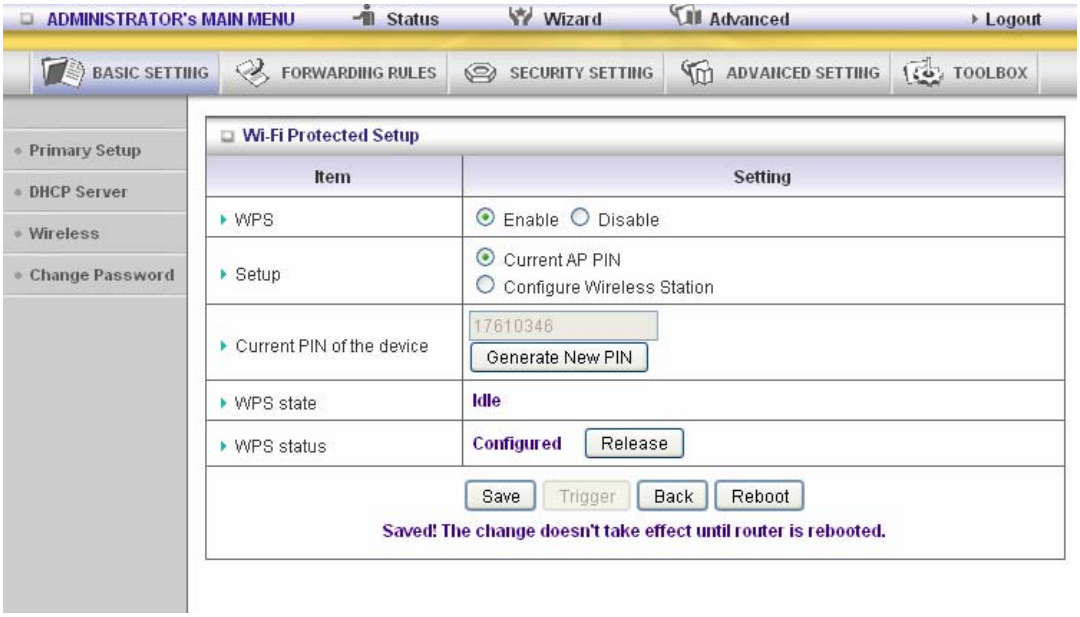

Wireless settings allow you to set the wireless configuration items.
**Wireless :** The user can enable or disable wireless function.

**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**")

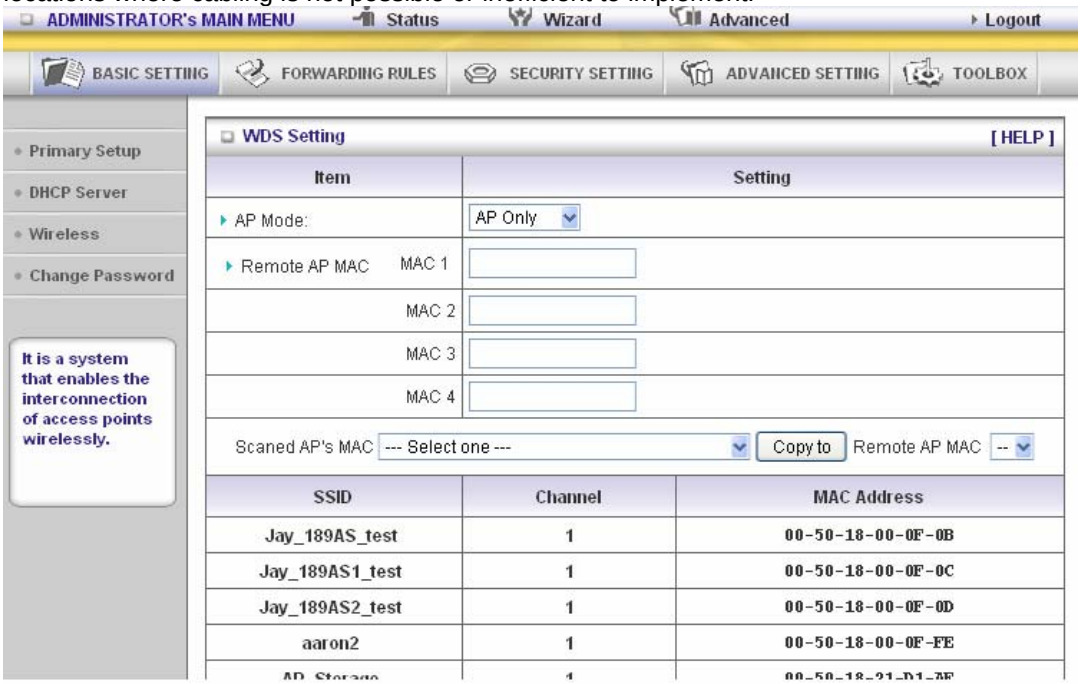
**SSID Broadcast**: The router will Broadcast beacons that have some information, including SSID so that the wireless clients can know how many ap devices by scanning function in the network. Therefore, this function is disabled, the wireless clients can not find the device from beacons.

**Channel:** The radio channel number. The permissible channels depend on the Regulatory Domain. The factory default setting is as the following: channel 11 for North America; channel 13 for European (ETSI).

**WPS (WiFi Protection Setup)**
WPS is WiFi Protection Setup which is similar to WCN-NET and offers safe and easy way in wireless Connection.


ADMINISTRATOR's MAIN MENU
Status
Wizard
Advanced
Logout
BASIC SETTING
FORWARDING RULES
SECURITY SETTING
ADVANCED SETTING
TOOLBOX
Primary Setup
DHCP Server
Wireless
Change Password
Wi-Fi Protected Setup
Item
Setting
WPS
Enable
Disable
Setup
Current AP PIN
Configure Wireless Station
Current PIN of the device
17610346
Generate New PIN
WPS state
Idle
WPS status
Configured
Release
Save
Trigger
Back
Reboot
Saved! The change doesn't take effect until router is rebooted.

**WDS(Wireless Distribution System)**
WDS operation as defined by the IEEE802.11 standard has been made available. Using WDS it is possible to wirelessly connect Access Points, and in doing so extend a wired infrastructure to locations where cabling is not possible or inefficient to implement.




**Security**: Select the data privacy algorithm you want. Enabling the security can protect your data while it is transferred from one station to another.

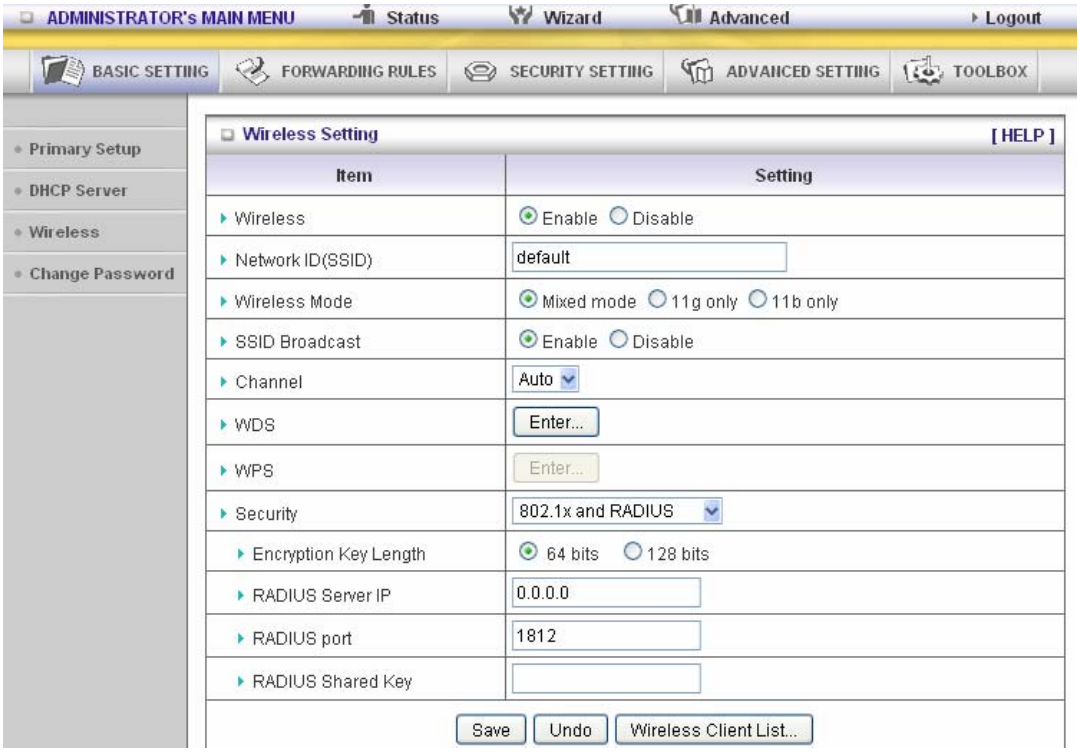
**There are several security types to use:**

**WEP** :
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.

**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

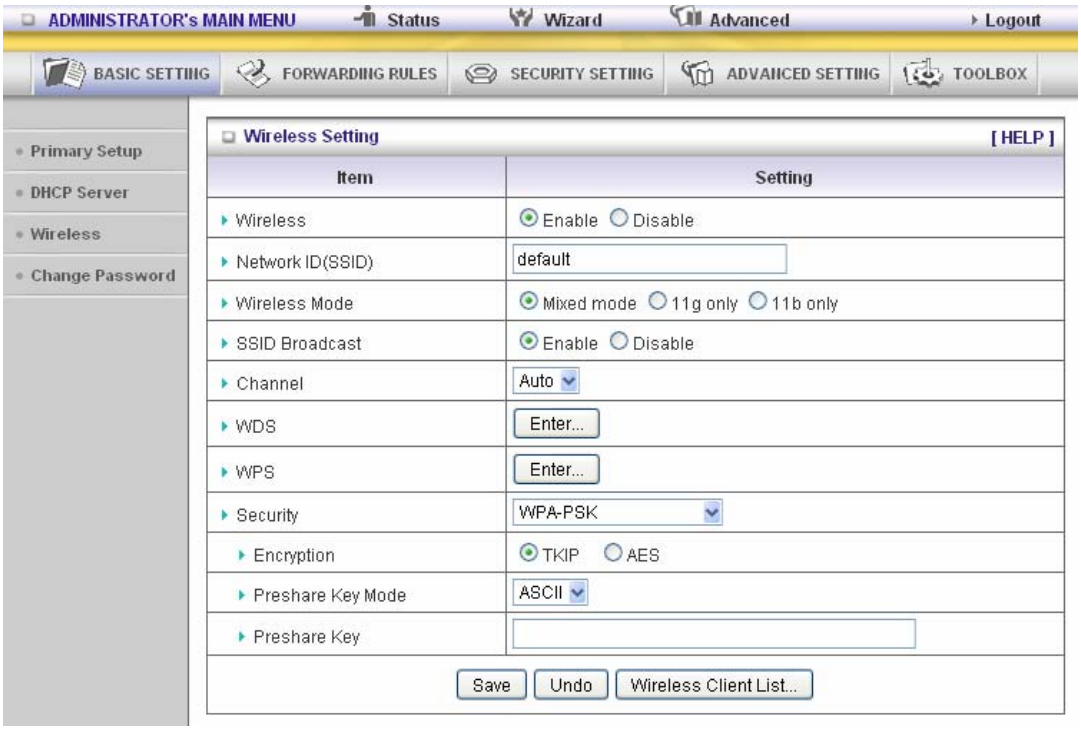
IP address or the 802.1X server's domain-name.
RADIUS Shared Key

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 Encryption and Pre-share 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 pre-share key is from 8 to 63.
2. Fill in the key, Ex 12345678



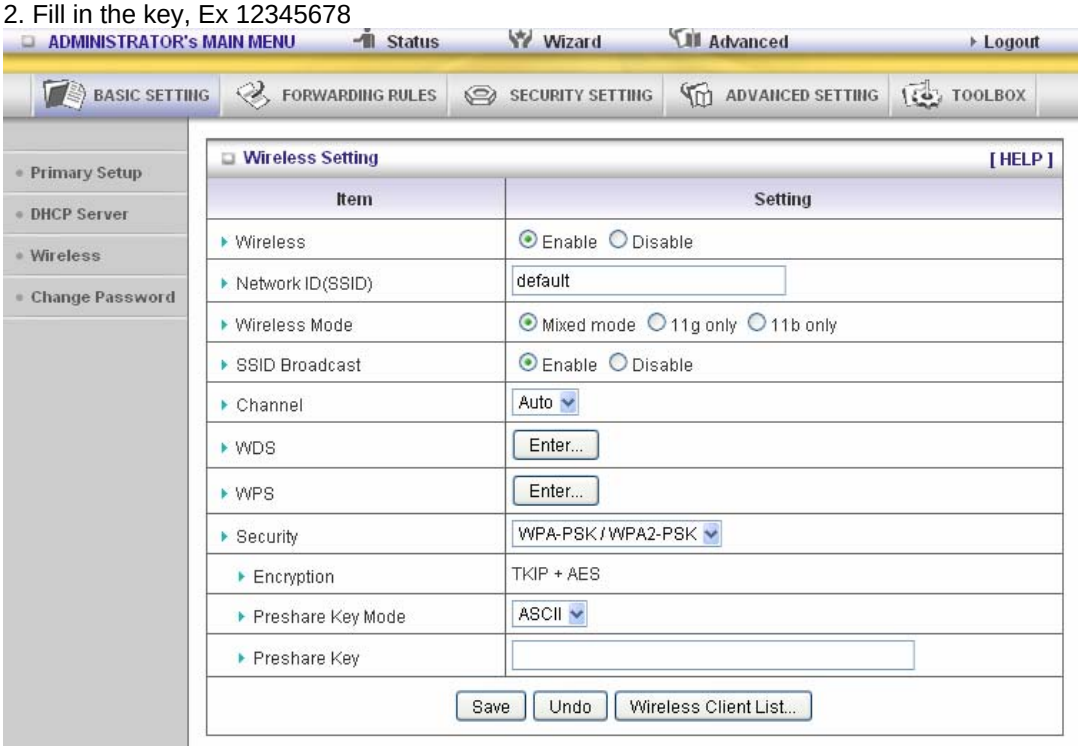

**WPA**

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.
Select Encryption and RADIUS Shared Key
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 pre-share key is from 8 to 63.
Key value shared by the RADIUS server and this router. This key value is consistent with the key value in the RADIUS server.

**WPA2-PSK(AES)**
1. Select Pre-share 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 Pre-share key is from 8 to 63.
2. Fill in the key, Ex 12345678

**WPA2(AES)**
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.
Select RADIUS Shared Key
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 Pre-share key is from 8 to 63.
Key value shared by the RADIUS server and this router. This key value is consistent with the key value in the RADIUS server.

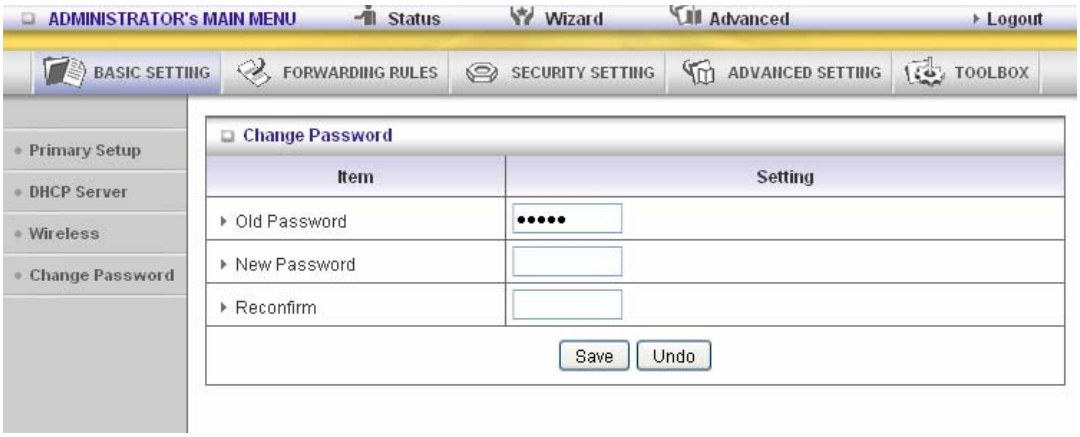
**WPA-PSK /WPA2-PSK**
The router will detect automatically which Security type the client
uses to encrypt.
1. Select Pre-share Key Mode
If you select HEX, you have to fill in 64 hexadecimal (0, 1, 2…8, 9, A, B…F) digits.
If ASCII, the length of Pre-share key is from 8 to 63.
2. Fill in the key, Ex 12345678



**WPA/WPA2**
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
The router will detect automatically which Security type (Wpa-psk version 1 or 2) the client uses to encrypt.
IP address or the 802.1X server's domain-name.
Select RADIUS Shared Key
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 Pre-share key is from 8 to 63.
Key value shared by the RADIUS server and this router. This key value is consistent with the key value in the RADIUS server.

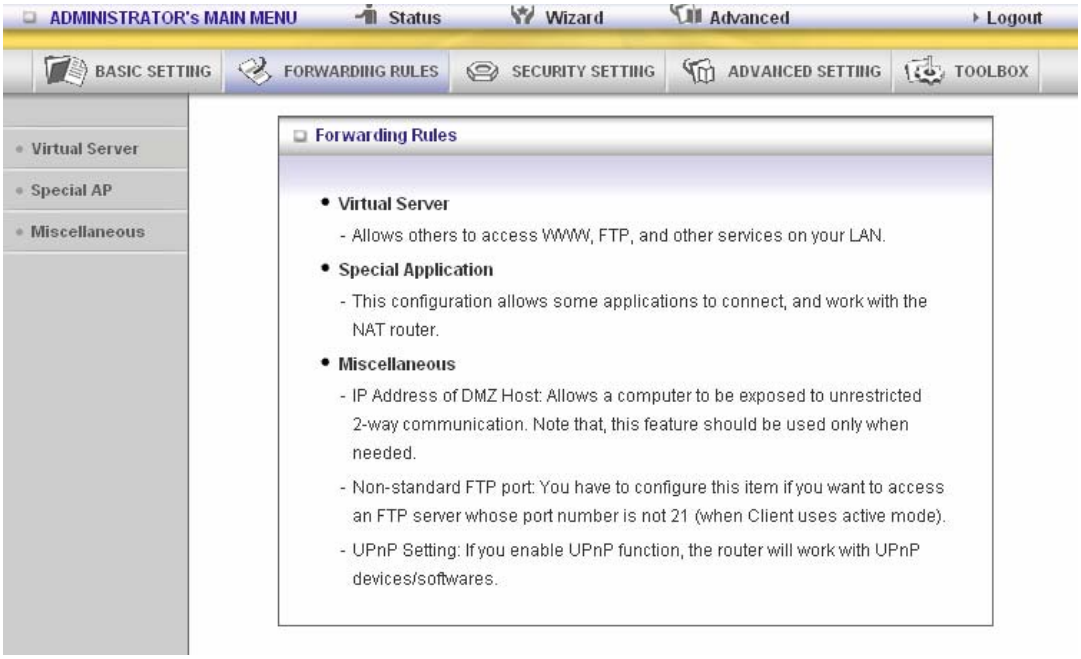
**Wireless Client List**


# 3.3.1.4 Change Password

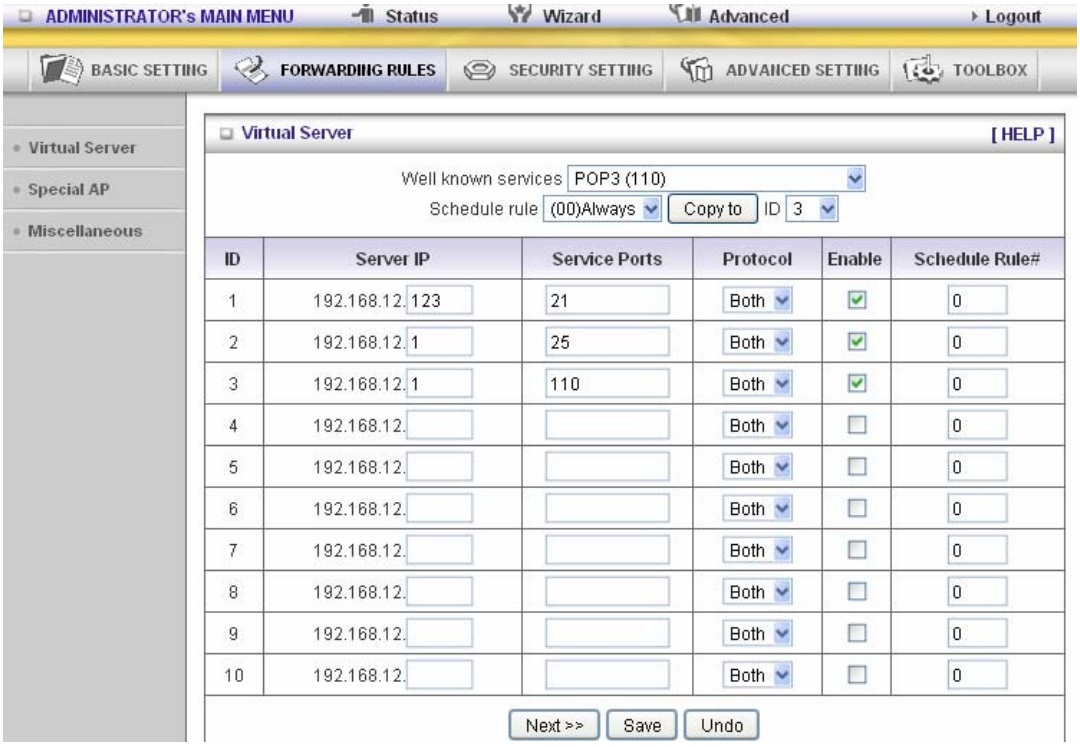



You can change Password here. We **strongly** recommend you to change the system password for security reason.

# 3.3.2 Forwarding Rules



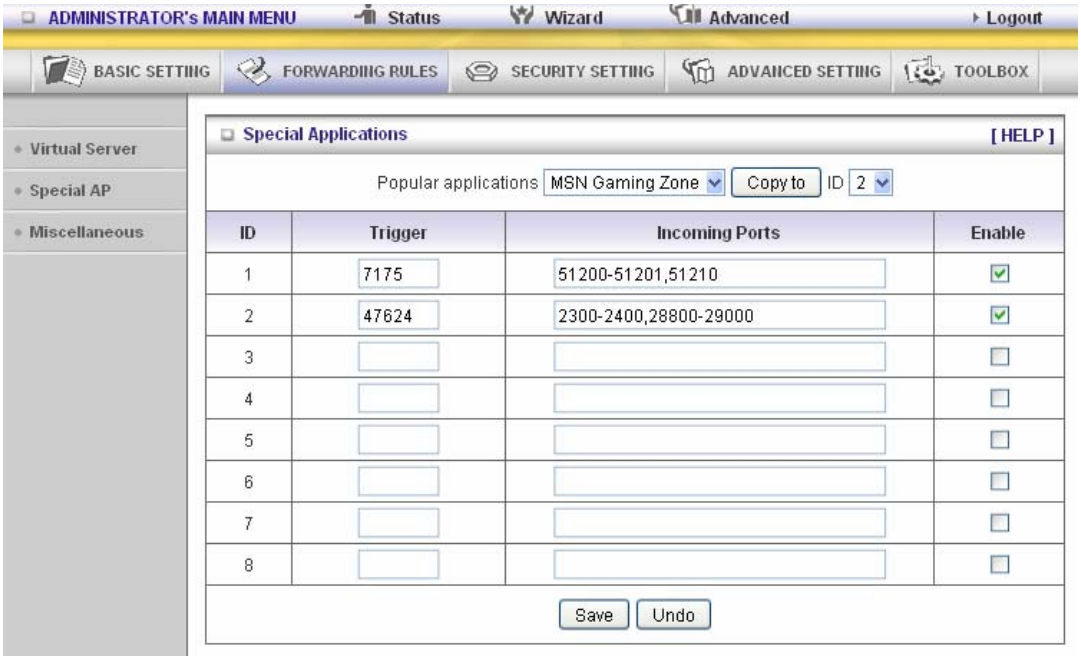
# 3.3.2.1 Virtual Server




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**.

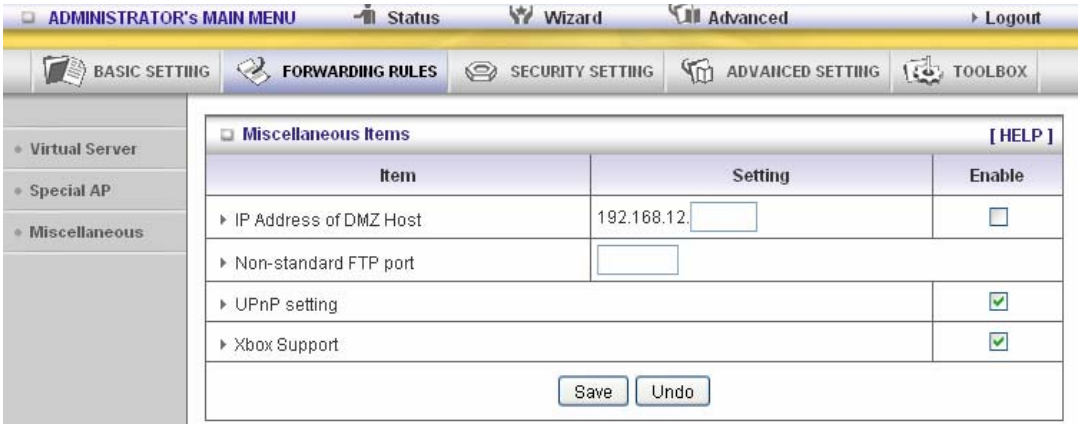
# 3.3.2.2 Special AP




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.

# 3.3.2.3 Miscellaneous Items



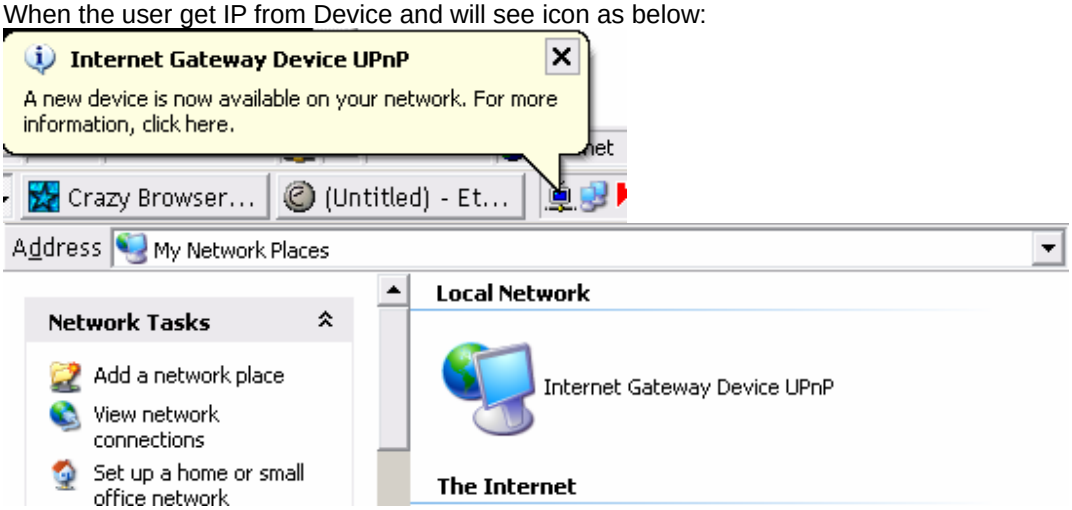

**IP Address of DMZ Host**
DMZ ( Demilitarized Zone) Host is a host without the protection of firewall. It allows a computer to be exposed to unrestricted 2-way communication for Internet games, Video conferencing, Internet telephony and other special applications.

NOTE: This feature should be used only when needed.

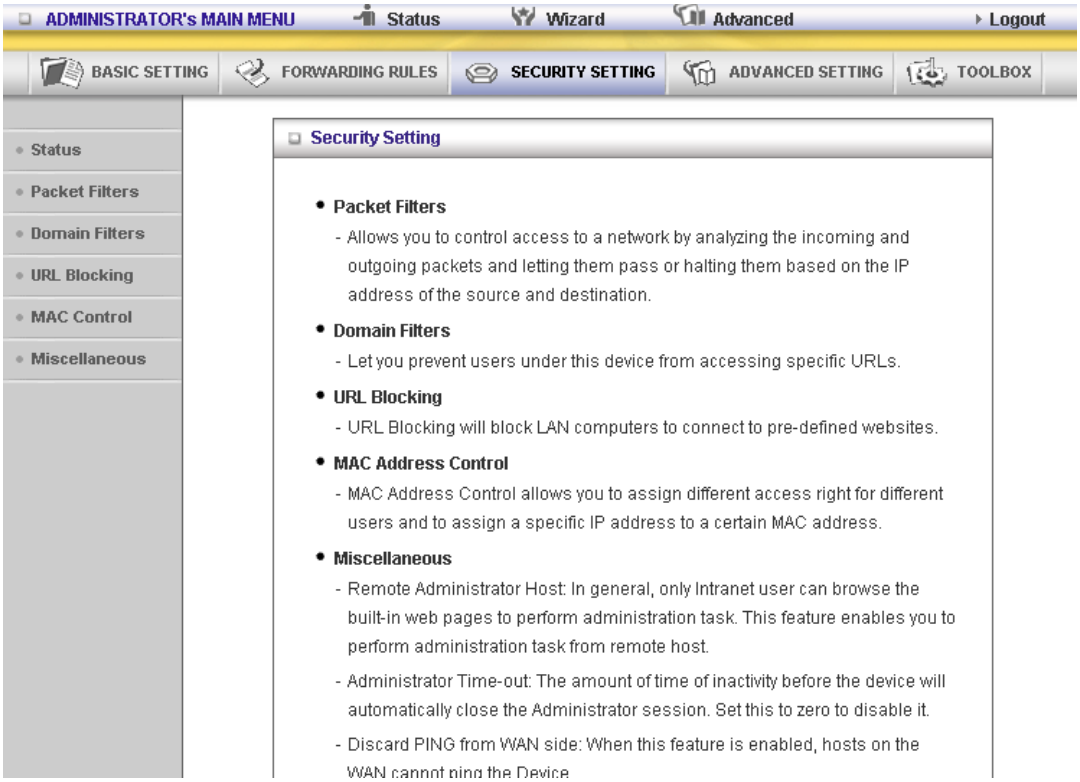
**Non-standard FTP port**
You have to configure this item if you want to access an FTP server whose port number is not 21. This setting will be lost after rebooting.

**Xbox Support**
The Xbox is a video game console produced by Microsoft Corporation. Please enable this function when you play games.

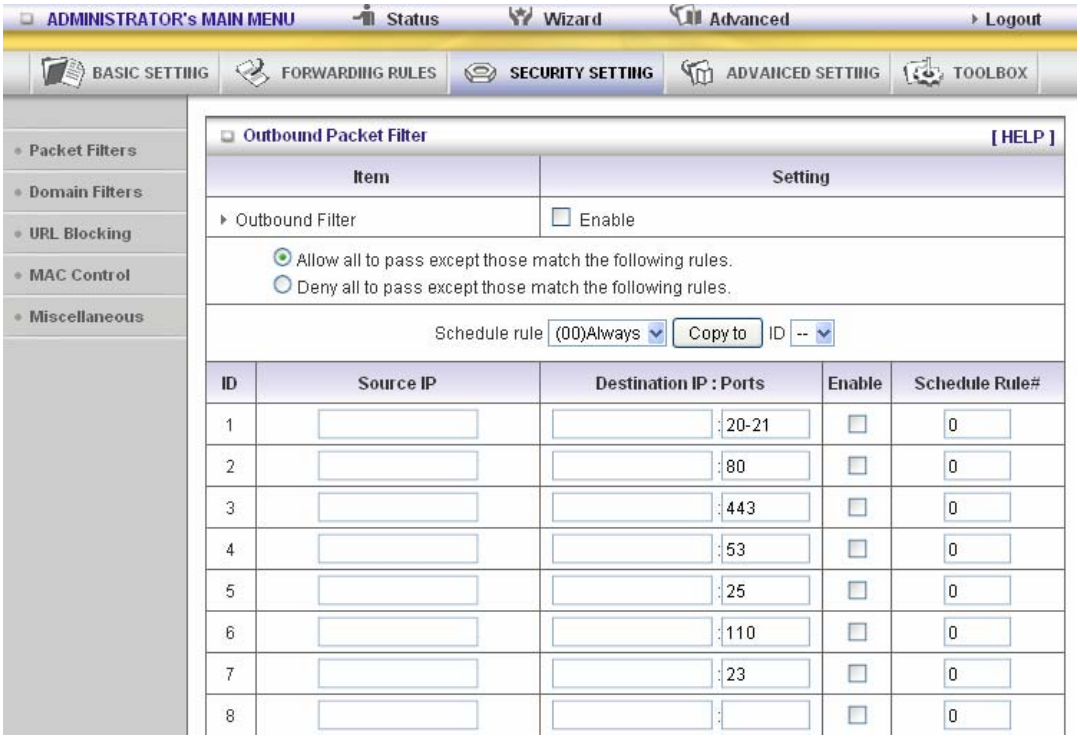
**UpnP Setting**
The device also supports this function. If the OS supports this function enable it, like Windows XP. When the user get IP from Device and will see icon as below:



# 3.3.3 Security Settings



# 3.3.3.1 Packet Filters




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**.

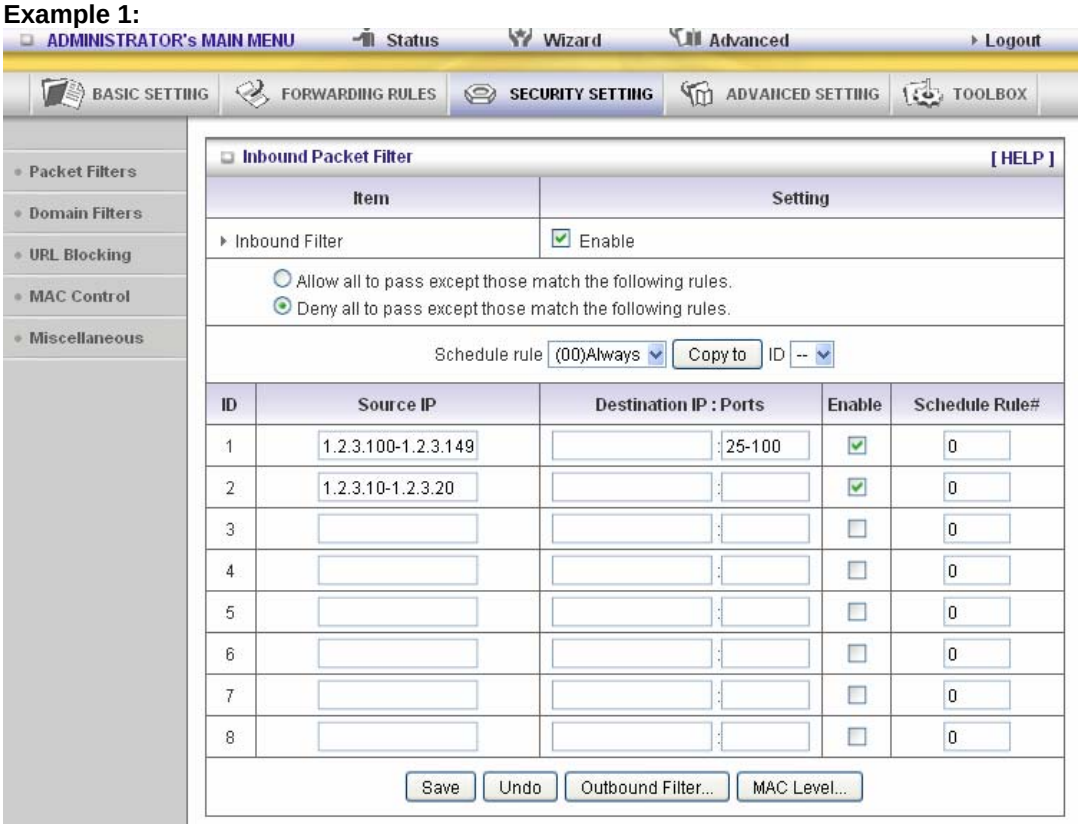
Each rule can be enabled or disabled individually.

Inbound Filter:

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

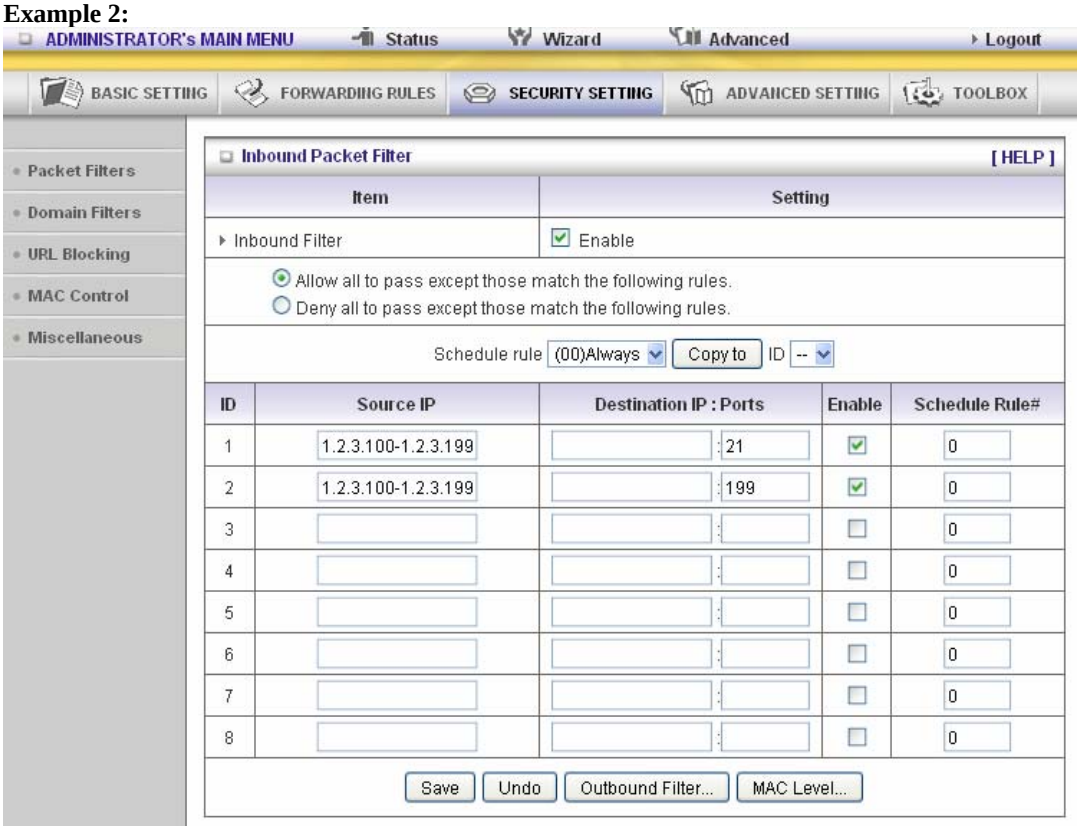
Suppose you have SMTP Server (25), POP Server (110), Web Server (80), FTP Server (21), and News Server (119) defined in Virtual Server or DMZ Host.

**Example 1:**




(1.2.3.100-1.2.3.149) Remote hosts are allow to send mail (port 25), and browse the Internet (port 80)
(1.2.3.10-1.2.3.20) Remote hosts can do everything (block nothing)
Others are all blocked.

**Example 2:**



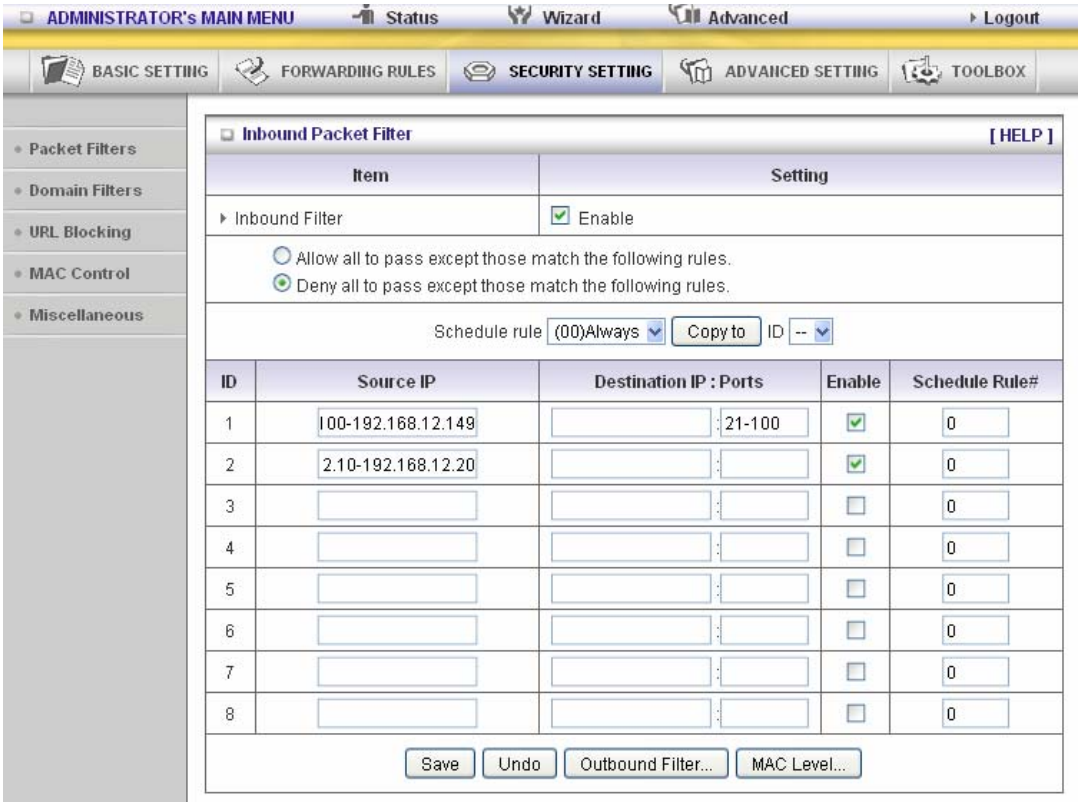

(1.2.3.100-1.2.3.119) Remote hosts can do everything except read net news (port 119) and transfer files via FTP (port 21) behind Router Server.
Others are all allowed.

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.

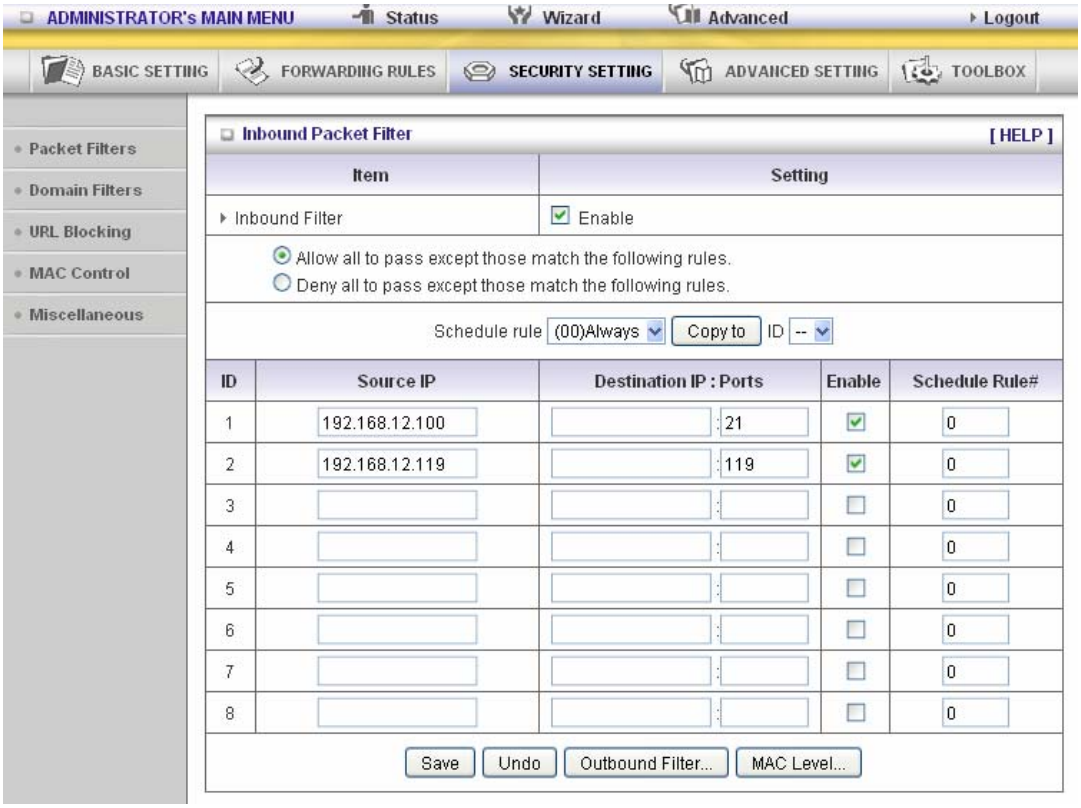
**Example 1:**
**Router LAN IP is 192.168.12.254**




(192.168.12.100-192.168.12.149) Located hosts are only 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.

(192.168.12.10-192.168.12.20) Located hosts can do everything (block nothing)
Others are all blocked.

**Example 2:**
**Router LAN IP is 192.168.12.254**

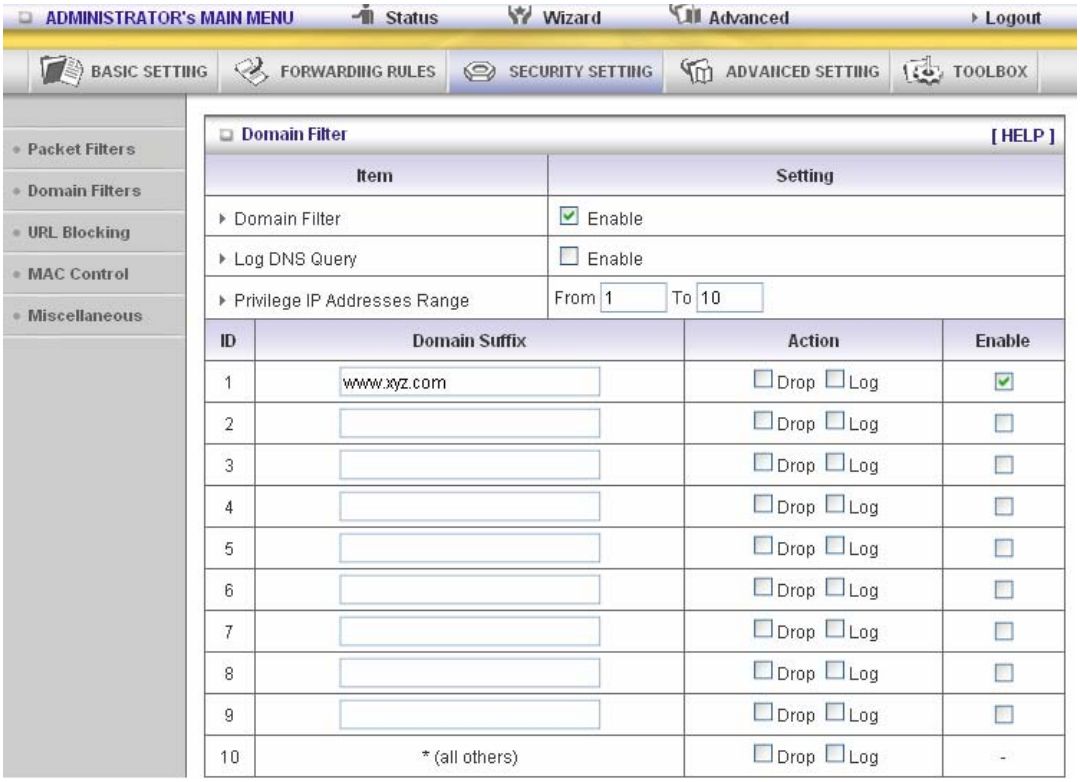



(192.168.12.100 and 192.168.12.119) Located Hosts can do everything except read net news (port 119) and transfer files via FTP (port 21)

Others are allowed

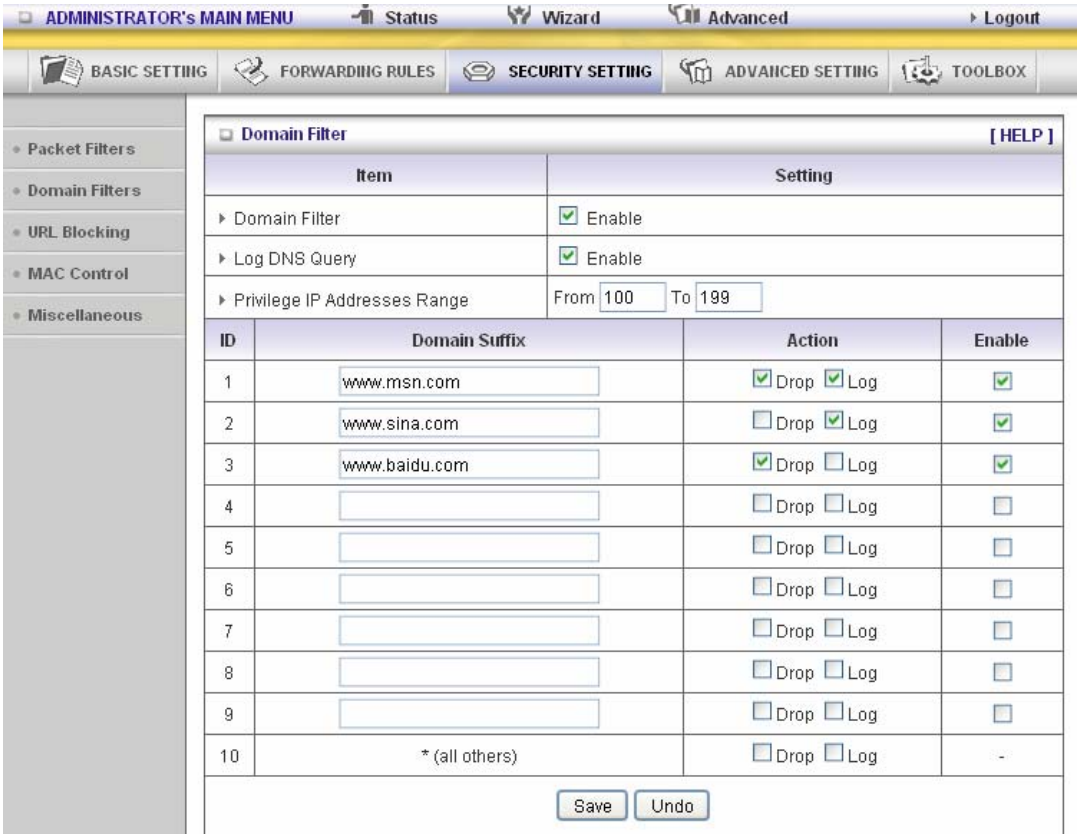
After **Outbound Packet Filter** setting is configured, click the **save** button.

# 3.3.3.2 Domain filters




**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 this access.
**Enable**
Check to enable each rule.

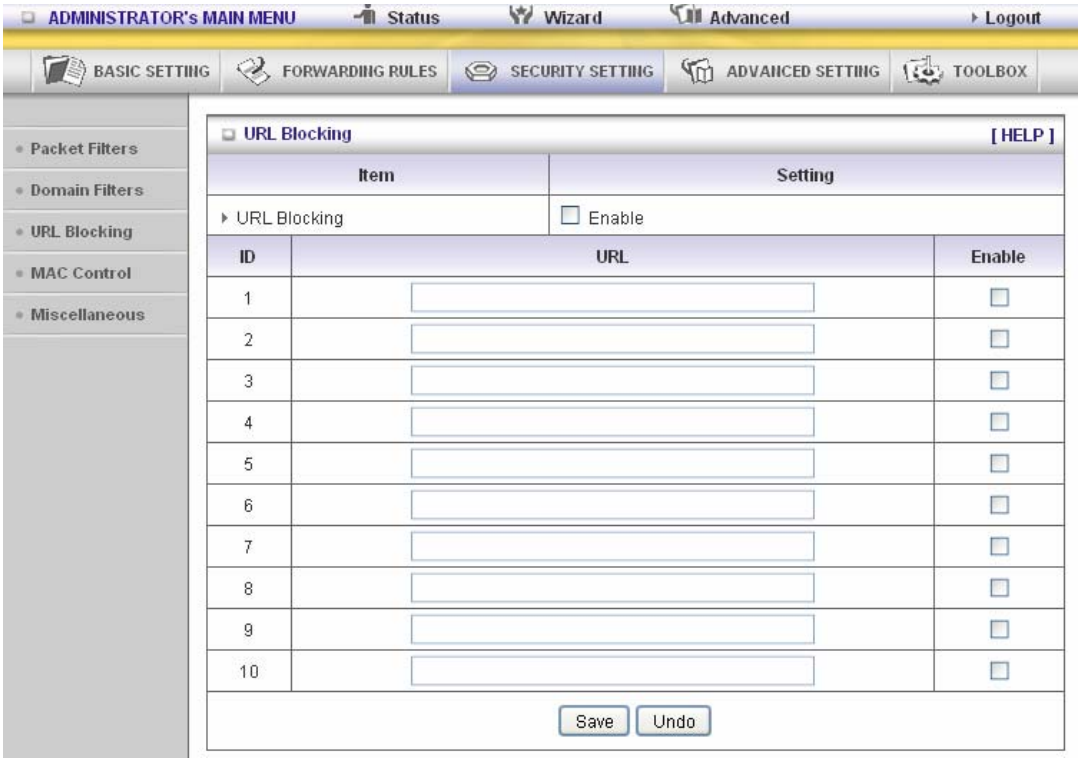
**Example:**




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.baidu.com” will be blocked, but the action will not be record in log-file.
4. IP address x.x.x.1~x.x.x.99 can access Internet without restriction.

# 3.3.3.3 URL Blocking



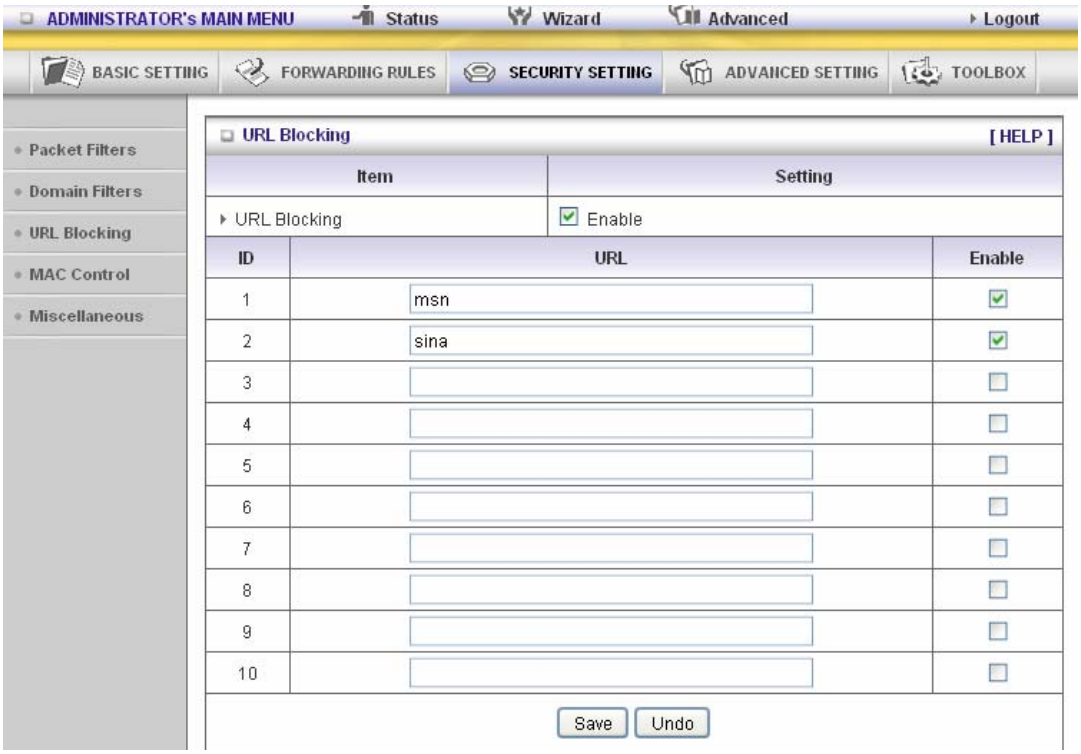

**URL Blocking** will block LAN computers to connect to pre-defined Websites.
The major difference between “Domain filter” and “URL Blocking” is Domain filter require user to input suffix (like .com or .org, etc), while URL Blocking require user to input a keyword only. In other words, Domain filter 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.

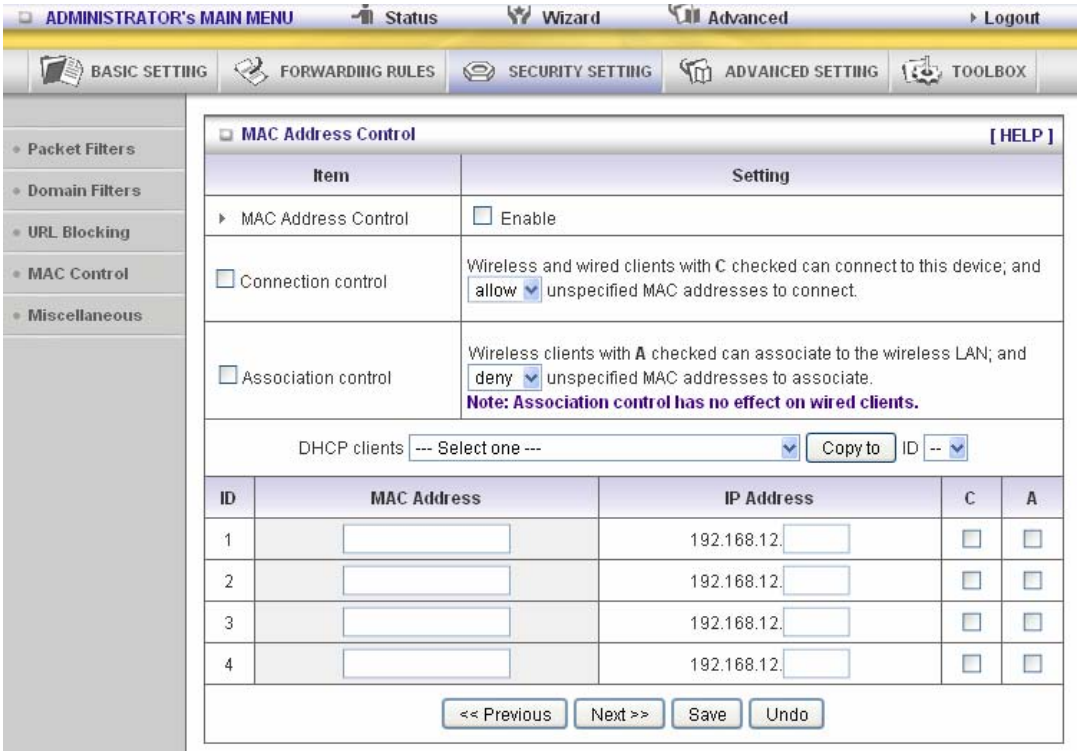



In this example:

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

# 3.3.3.4 MAC 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**

| ID | MAC Address | IP Address | C | A |
|---|---|---|---|---|
| 1 | | 192.168.12. | ☐ | ☐ |
| 2 | | 192.168.12. | ☐ | ☐ |
| 3 | | 192.168.12. | ☐ | ☐ |
| 4 | | 192.168.12. | ☐ | ☐ |

"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:

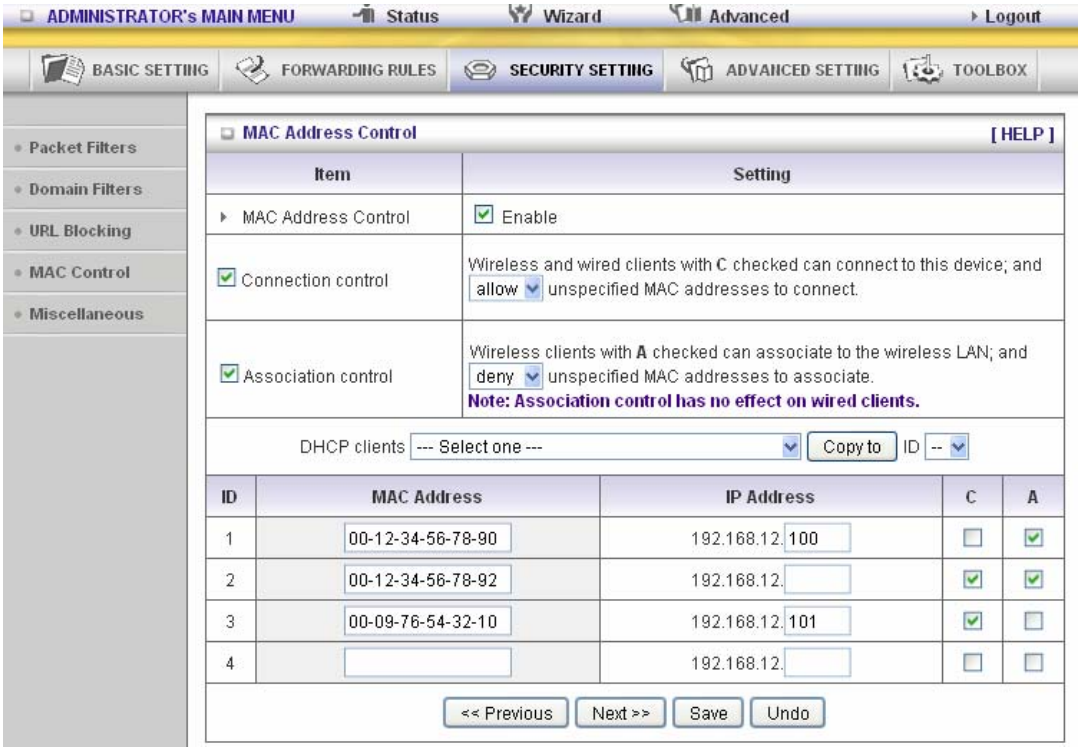
| | |
|---|---|
| **MAC Address** | MAC address indicates a specific client. |
| **IP Address** | Expected IP address of the corresponding client. Keep it empty if you don't care its IP address. |
| **C** | When "**Connection control**" is checked, check "**C**" will allow the corresponding client to 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.

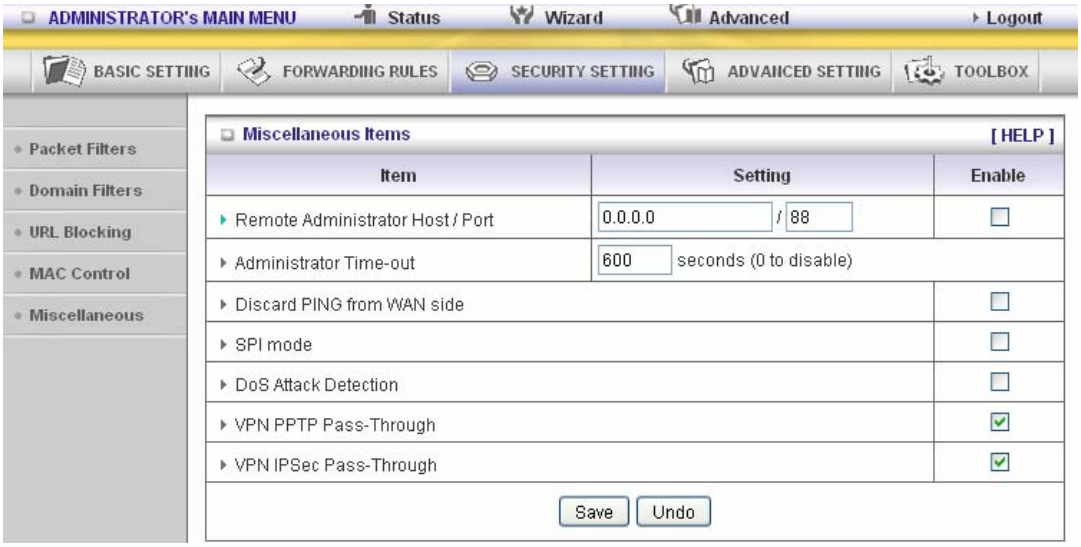
**Example:**




In this scenario, there are three clients listed in the Control Table. Clients 1 and 2 are wireless, and client 3 is wired.

1. The "MAC Address Control" function is enabled.
2. "Connection control" is enabled, and all of the wired and wireless clients not listed in the "Control table" are "allowed" to connect to this device.
3. "Association control" is enabled, and all of the wireless clients not listed in the "Control table" are "denied" to associate to the wireless LAN.
4. Clients 1 and 3 have fixed IP addresses either from the DHCP server of this device or manually assigned:
   ID 1 - "00-12-34-56-78-90" --> 192.168.12.100
   ID 3 - "00-98-76-54-32-10" --> 192.168.12.101
   Client 2 will obtain its IP address from the IP Address pool specified in the "DHCP Server" page or can use a manually assigned static IP address.
   If, for example, client 3 tries to use an IP address different from the address listed in the Control table (192.168.12.101), it will be denied to connect to this device.
5. Clients 2 and 3 and other wired clients with a MAC address unspecified in the Control table are all allowed to connect to this device. But client 1 is denied to connect to this device.
6. Clients 1 and 2 are allowed to associate to the wireless LAN, but a wireless client with a MAC address not specified in the Control table is denied to associate to the wireless LAN. Client 3 is a wired client and so is not affected by Association control.

# 3.3.3.5 MiscelLANeous Items




**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.

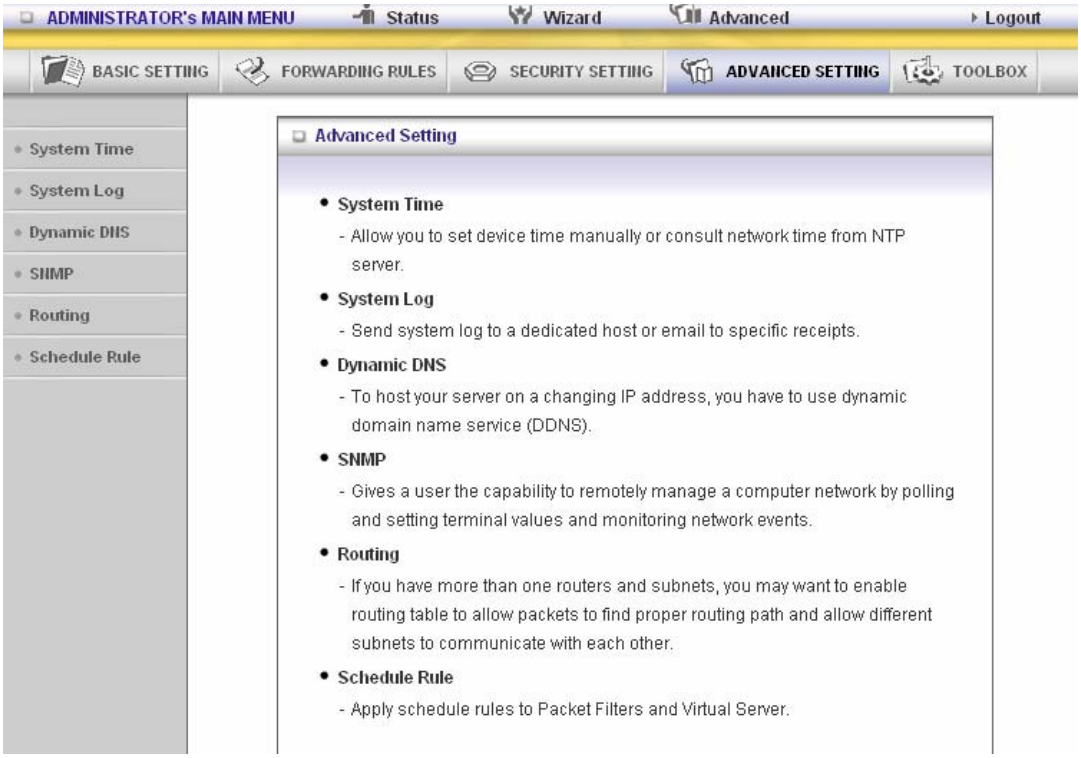
**Discard PING from WAN side**
When this feature is enabled, any host on the WAN cannot ping this product.

**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.

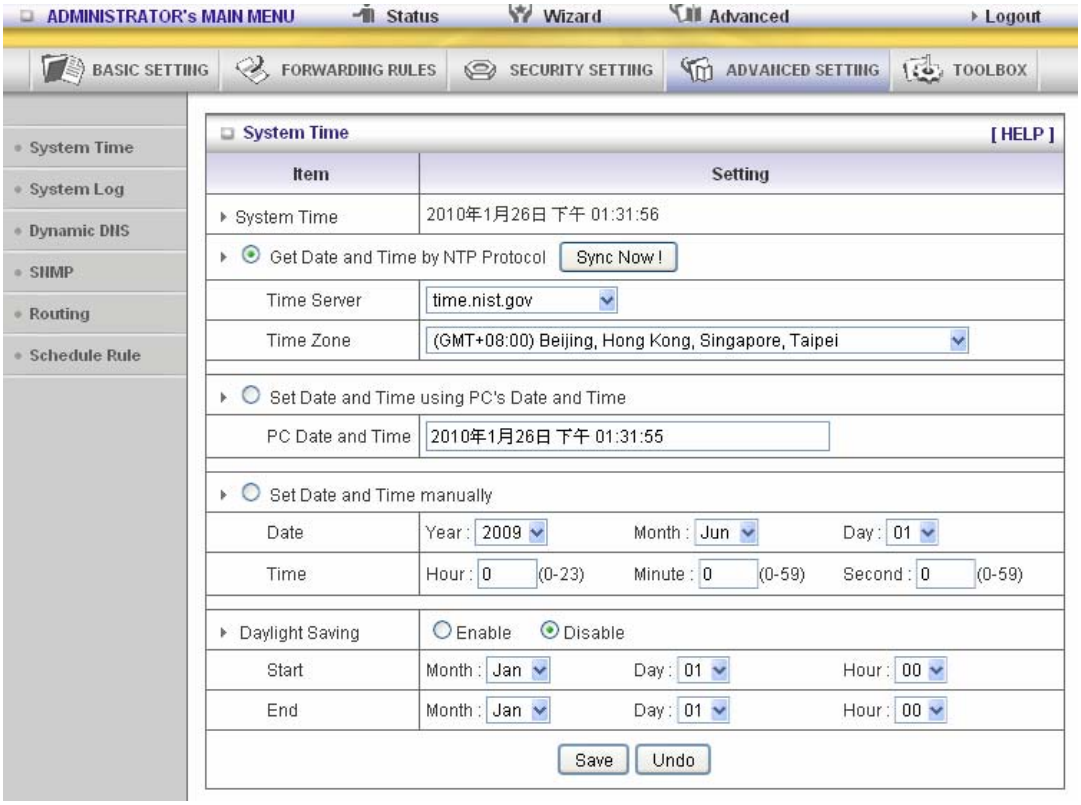
**DoS Attack Detection**
When this feature is enabled, the router will detect and log the DoS attack comes from the Internet. Currently, the router can detect the following DoS attack: SYN Attack, WinNuke, Port Scan, Ping of Death, LANd Attack etc.

**VPN PPTP and IPSec Pass-Through**
Virtual Private Networking (VPN) is typically used for work-related networking. For VPN tunnels, the router supports IPSec Passthrough and PPTP Passthrough.

# 3.3.4 Advanced Settings



# 3.3.4.1 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**

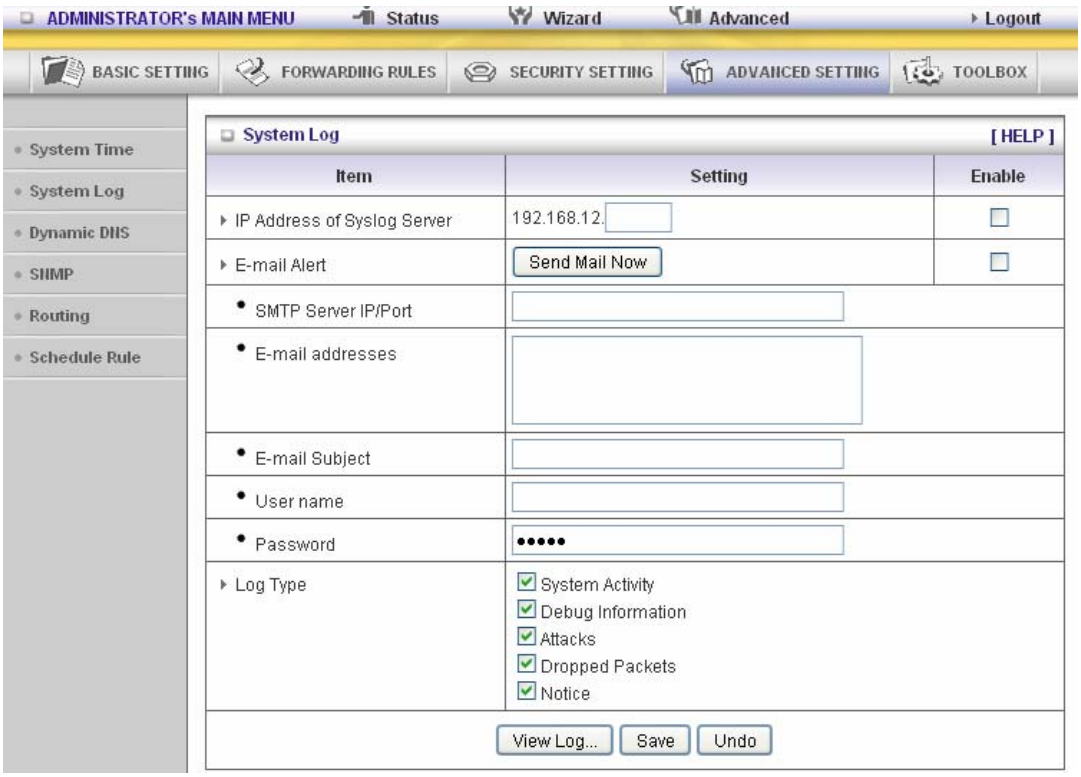
Selected if you want to Set Date and Time manually.
**Set Date and Time manually**

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.

# 3.3.4.2 System Log




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.

# 3.3.4.3 System Log


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

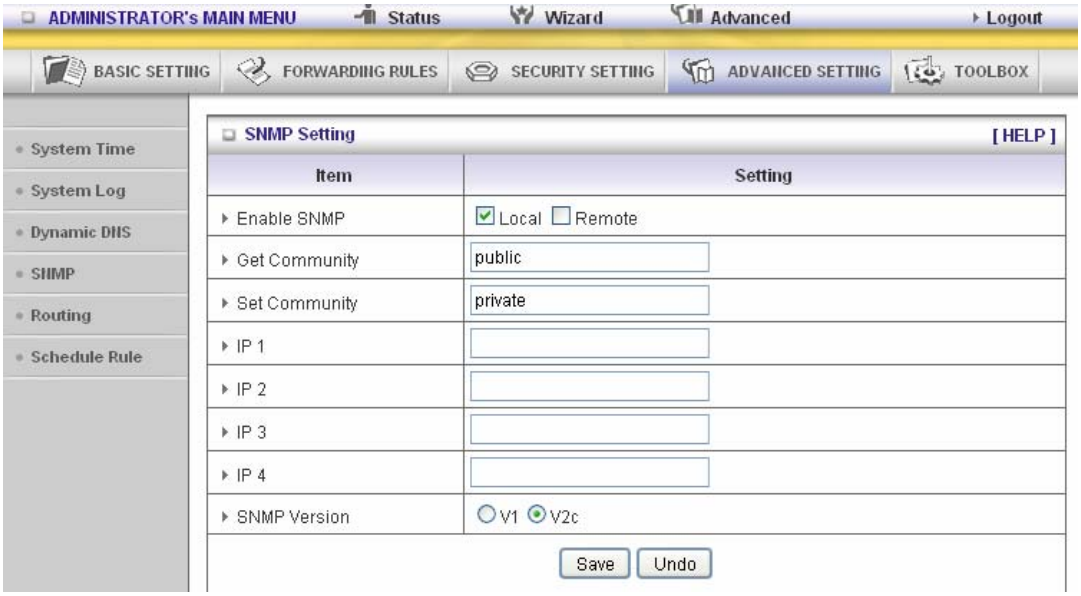
Host Name

Username/E-mail

Password/Key

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

# 3.3.4.4 SNMP




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 Local, 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.

IP 1, IP 2, IP 3, IP 4

Input your SNMP Management PC's IP here. User has to configure to where this device should send SNMP Trap message.

**SNMP Version**

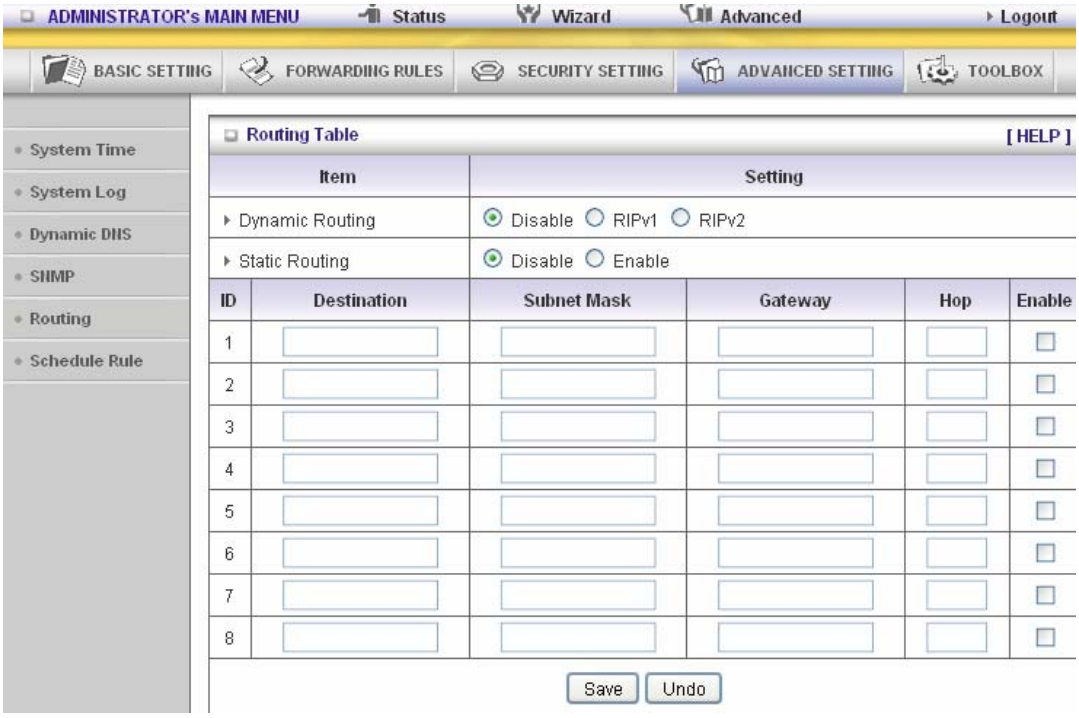
Please select proper SNMP Version that your SNMP Management software supports.

**WAN Access IP Address**

If the user wants to limit to specific the IP address to access, please input in the item. The default 0.0.0.0 and means every IP of Internet can get some information of device with SNMP protocol.

**Click on "Save" to store your setting or "Undo" to give up.**

# 3.3.4.5 Routing



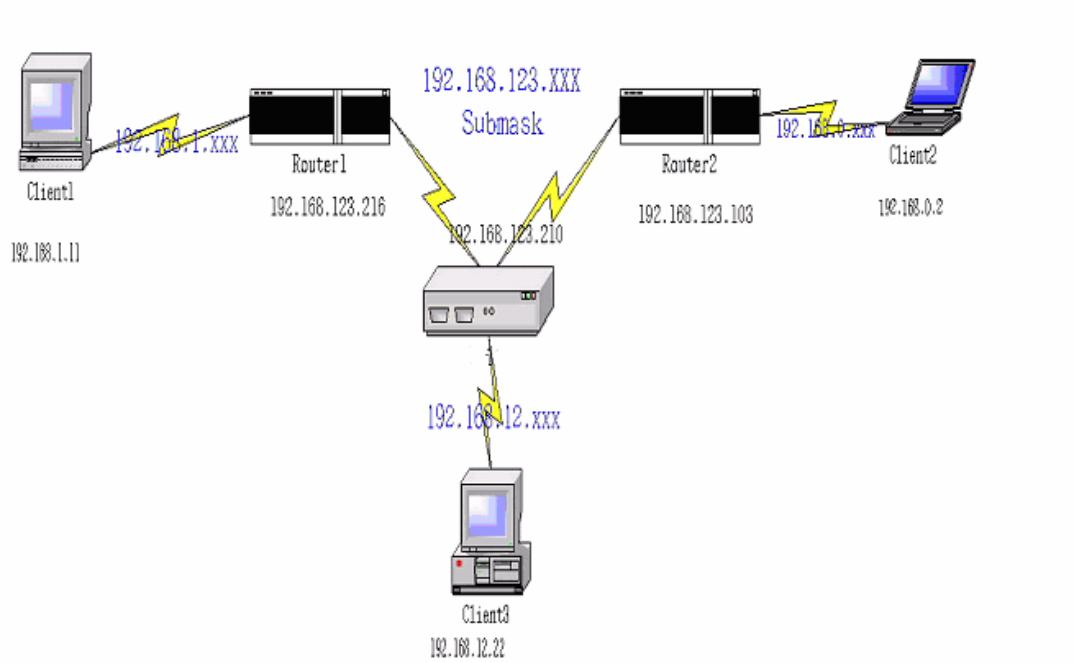

**Routing Tables** allow you to determine which physical interface address to use for outgoing IP data grams. If you have more than one routers and subnets, you will need to enable routing table to allow packets to find proper routing path and allow different subnets to communicate with each other.

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

**Dynamic Routing**
Routing Information Protocol (RIP) will exchange information about destinations for computing routes throughout the network. Please select RIPv2 only if you have different subnet in your network.
Otherwise, please select RIPv1 if you need this protocol.

**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:**

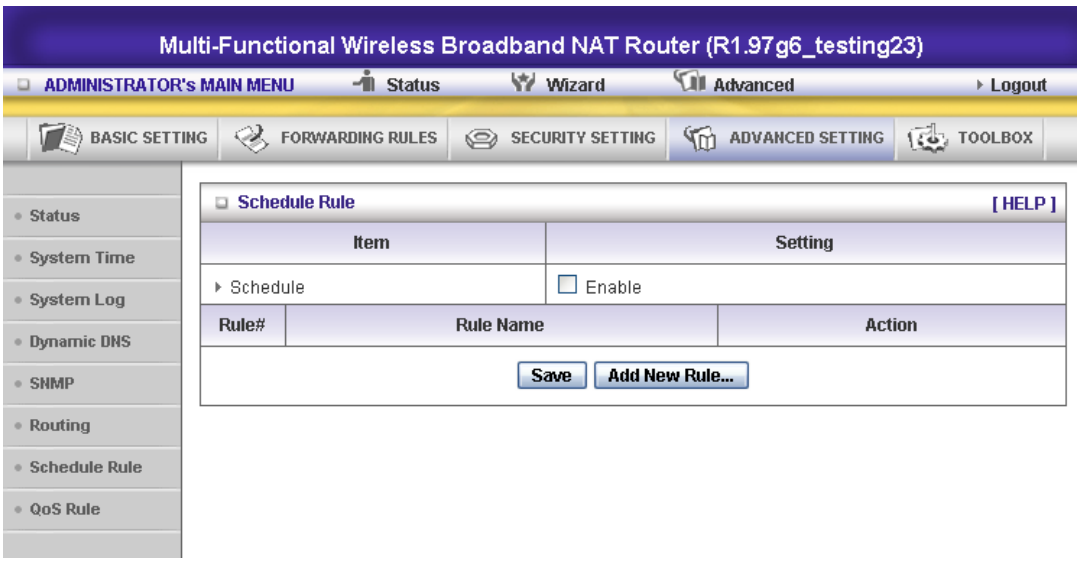



Configuration on NAT Router

| Destination | SubnetMask | Gateway | Hop | Enabled |
|---|---|---|---|---|
| 192.168.1.0 | 255.255.255.0 | 192.168.123.216 | 1 | ˇ |
| 192.168.0.0 | 255.255.255.0 | 192.168.123.103 | 1 | ˇ |

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 192.168.123.103 (a gateway),
And if it sends Packets to 192.168.1.11 will go via 192.168.123.216
Each rule can be enabled or disabled individually.
After **routing table** setting is configured, click the **save** button.

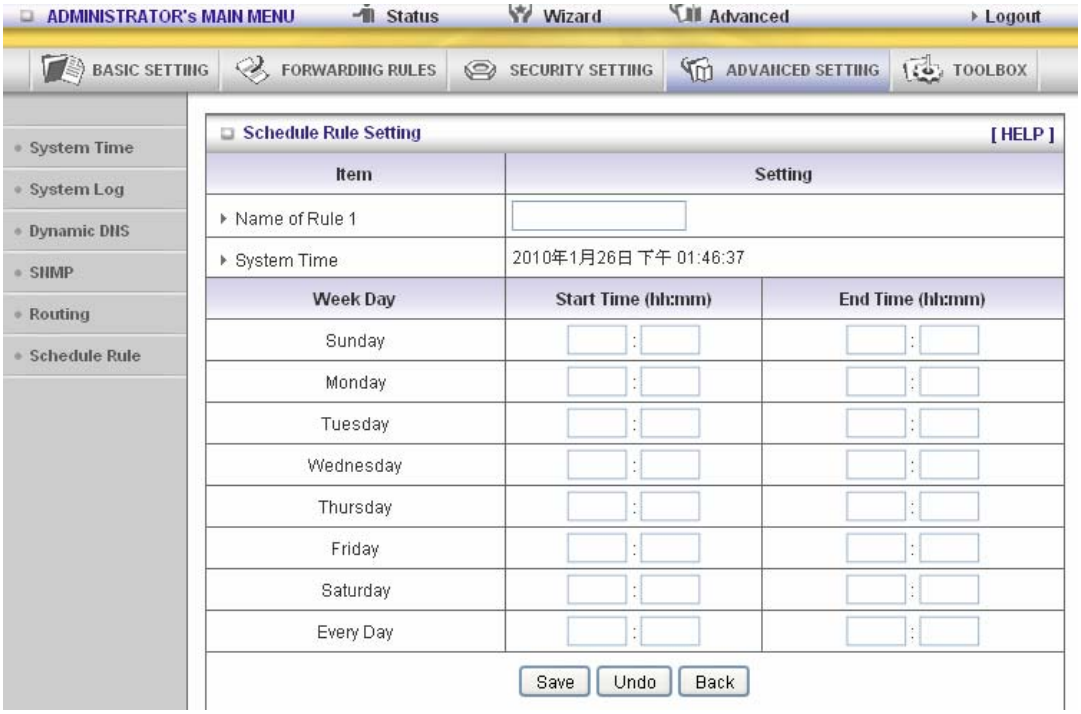
# 3.3.4.6 Schedule Rule




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

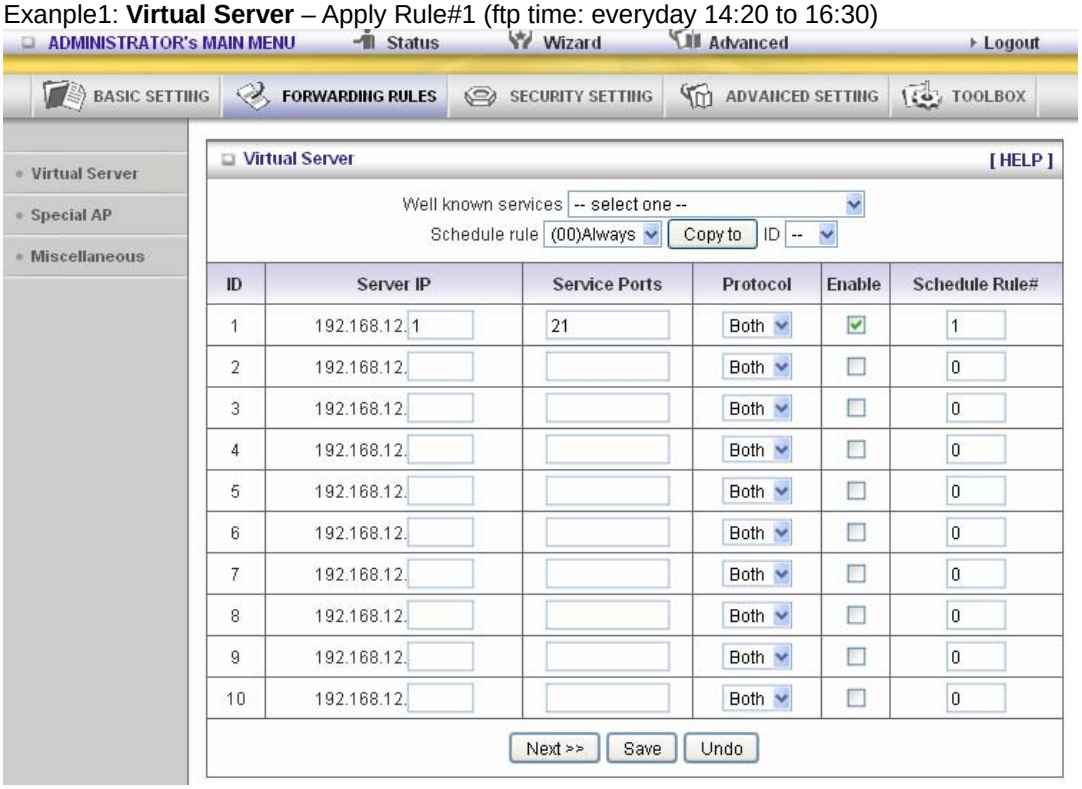
Press “Add New Rule”

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

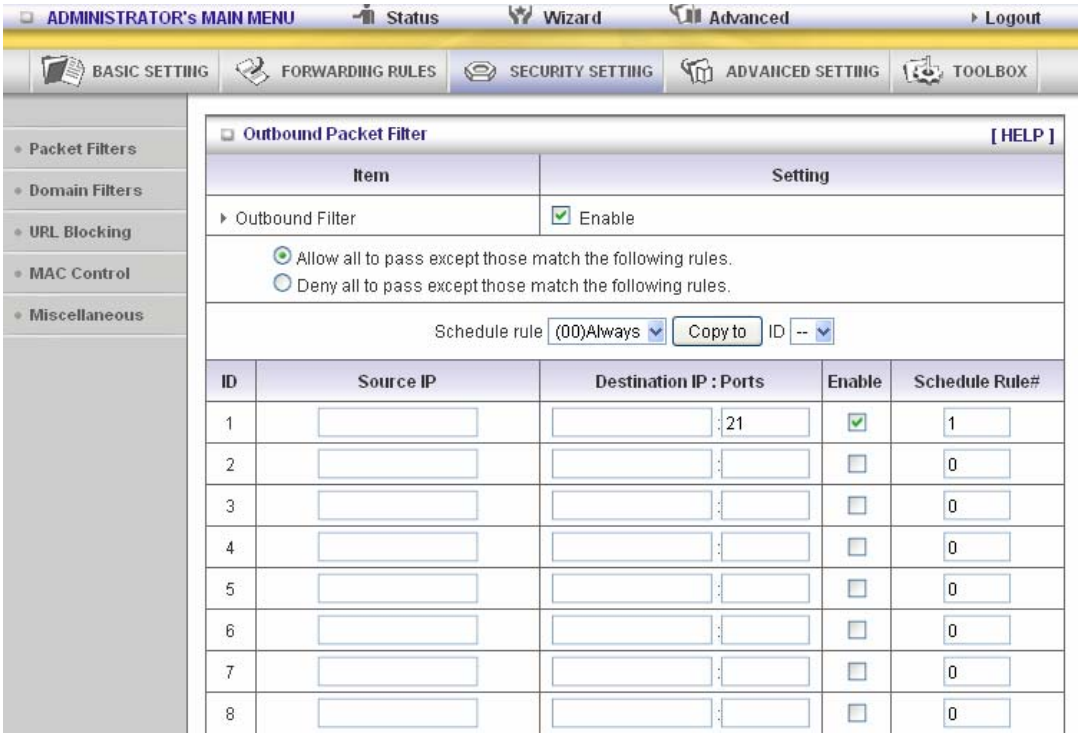


**Schedule Enable**
Selected if you want to Enable the Scheduler.
**Edit**
To edit the schedule rule.
**Delete**
To delete the schedule rule, and the rule# of the rules behind the deleted one will decrease one automatically.
Schedule Rule can be apply to Virtual server and Packet Filter, for example:

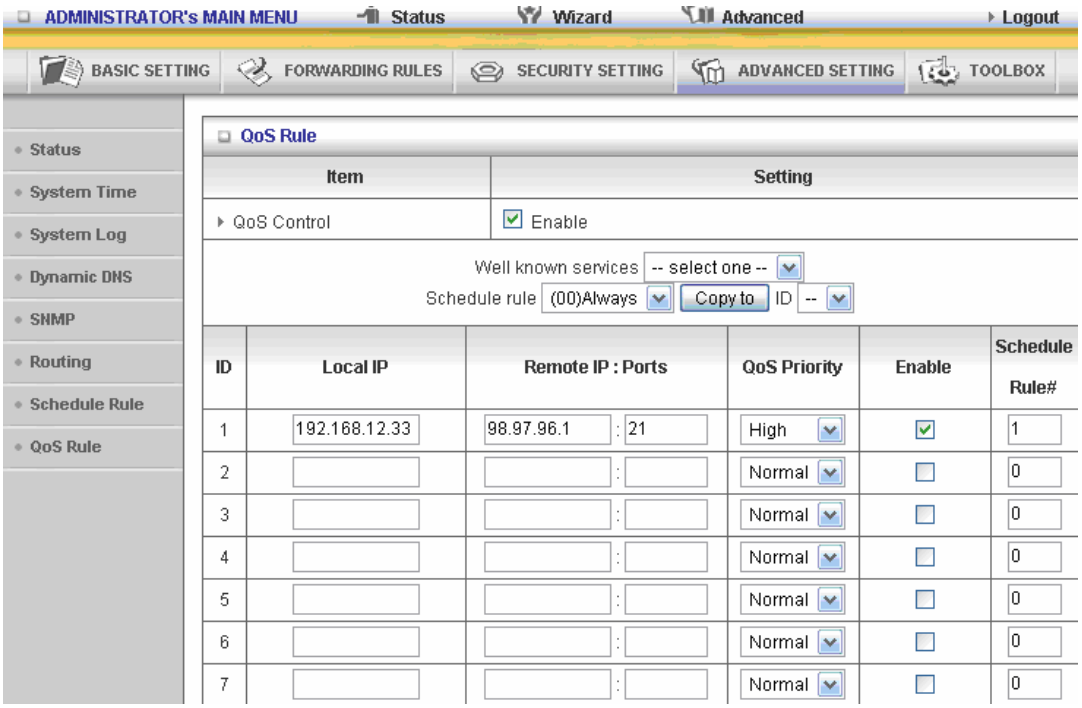
Exanple1: **Virtual Server** – Apply Rule#1 (ftp time: everyday 14:20 to 16:30)




Exanple2: **Packet Filter** – Apply Rule#1 (ftp time: everyday 14:20 to 16:30).


ADMINISTRATOR's MAIN MENU
Status
Wizard
Advanced
Logout
BASIC SETTING
FORWARDING RULES
SECURITY SETTING
ADVANCED SETTING
TOOLBOX
Packet Filters
Domain Filters
URL Blocking
MAC Control
Miscellaneous
Outbound Packet Filter
[ HELP ]
Item
Setting
Outbound Filter
Enable
Allow all to pass except those match the following rules.
Deny all to pass except those match the following rules.
Schedule rule (00)Always
Copy to
ID --
ID
Source IP
Destination IP : Ports
Enable
Schedule Rule#
1 21 1
2 0
3 0
4 0
5 0
6 0
7 0
8 0

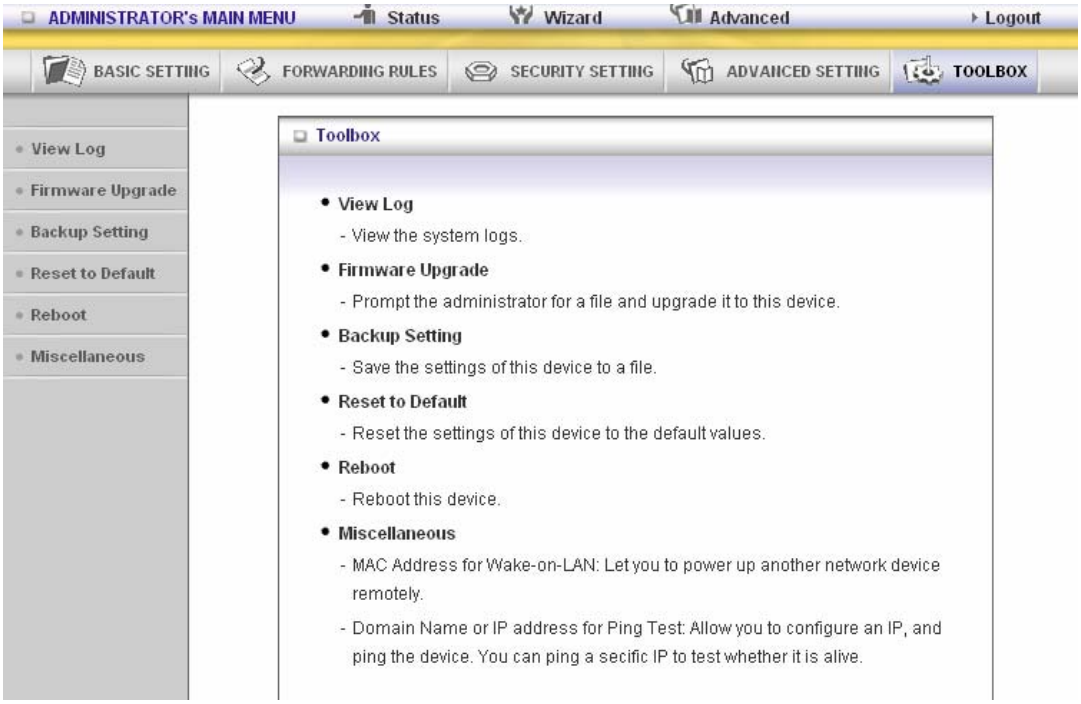
# 3.3.4.7 QoS Rule



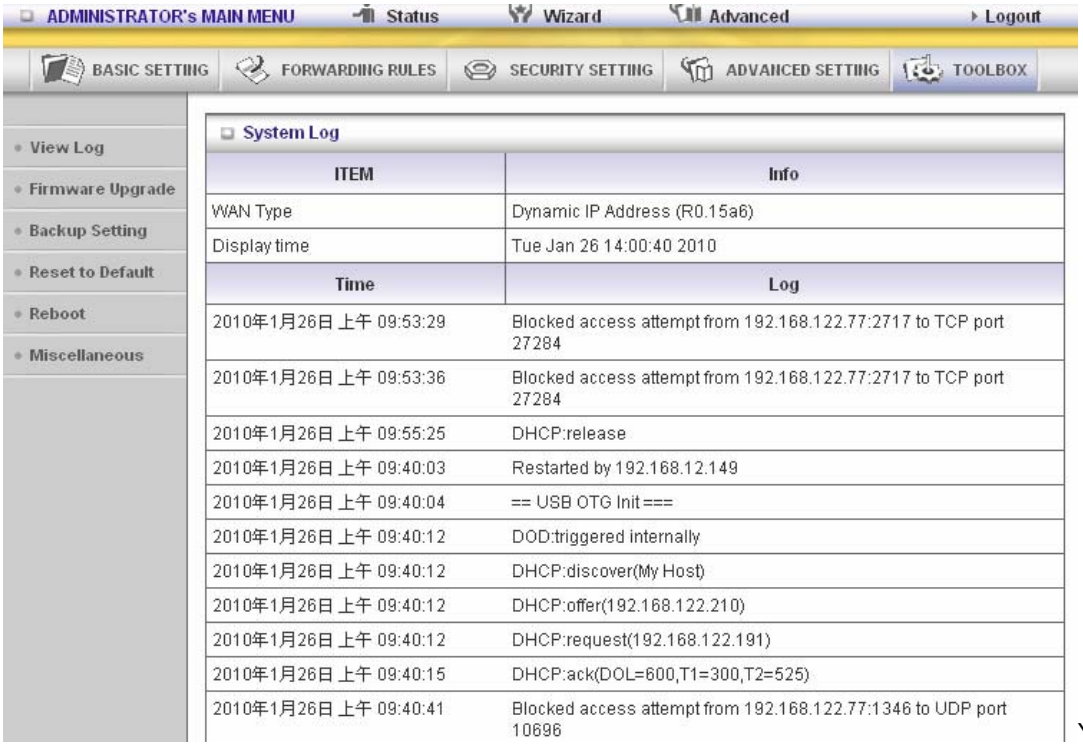

**Local IP:**
Please input Client IP,ex192.168.12.33.

**Remote Priority:**
Please input Global IP and port,ex:168.96.2.3 and port 21

# 3.3.5 Toolbox

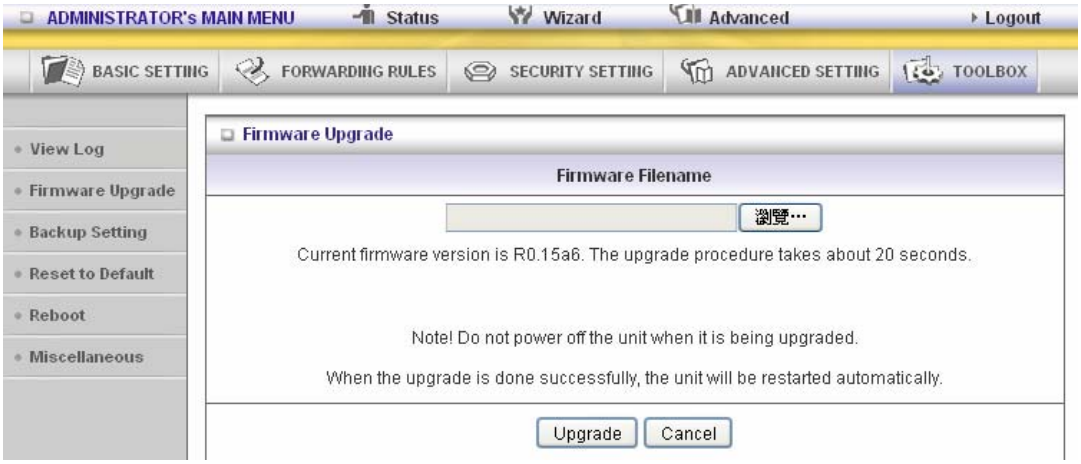

ADMINISTRATOR's MAIN MENU
Status
Wizard
Advanced
Logout
BASIC SETTING
FORWARDING RULES
SECURITY SETTING
ADVANCED SETTING
TOOLBOX
View Log
Firmware Upgrade
Backup Setting
Reset to Default
Reboot
Miscellaneous
Toolbox
View Log
- View the system logs.
Firmware Upgrade
- Prompt the administrator for a file and upgrade it to this device.
Backup Setting
- Save the settings of this device to a file.
Reset to Default
- Reset the settings of this device to the default values.
Reboot
- Reboot this device.
Miscellaneous
- MAC Address for Wake-on-LAN: Let you to power up another network device remotely.
- Domain Name or IP address for Ping Test: Allow you to configure an IP, and ping the device. You can ping a secific IP to test whether it is alive.

# 3.3.5.1 View Log



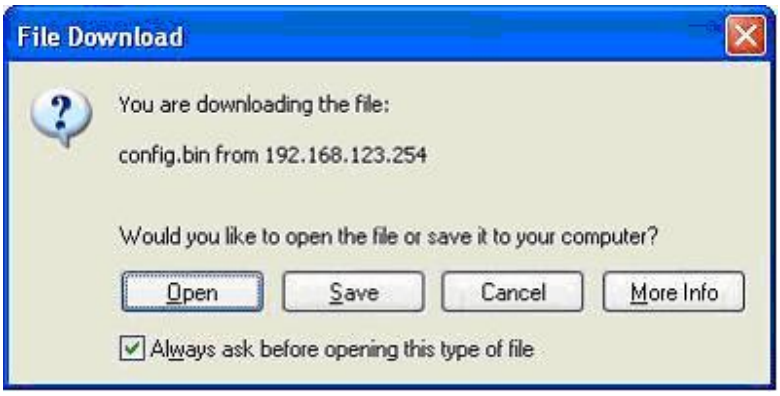

You can View system log by clicking the **View Log** button

## 3.3.5.2 Firmware Upgrade




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

## 3.3.5.3 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.

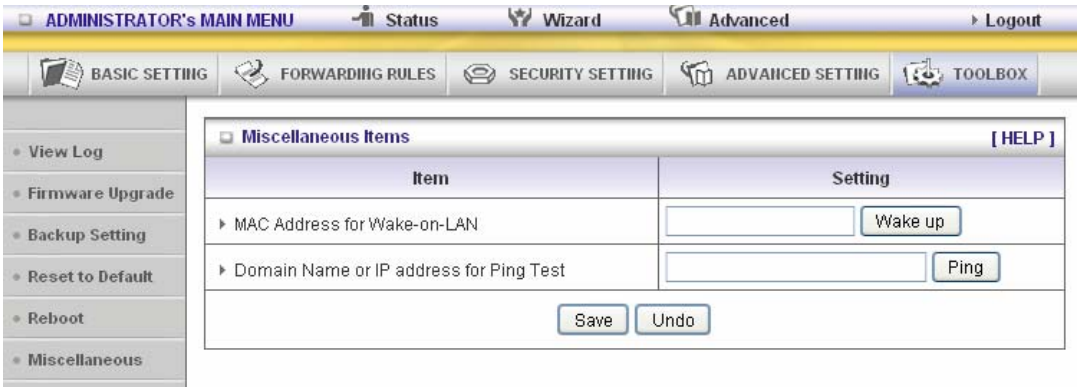
## 3.3.5.4 Reset to default


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

## 3.3.5.5 Reboot


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

## 3.3.5.6 MiscelLANeous Items




**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.

**Domain Name or IP Address for Test**

Allow you to configure an IP, and ping the device. You can ping a secific IP to test whether it is alive.

# CHAPTER 4. Troubleshooting

This Chapter provides solutions to problems for the installation and operation of the WiFi ADSL Router. You can refer to the following if you are having problems.

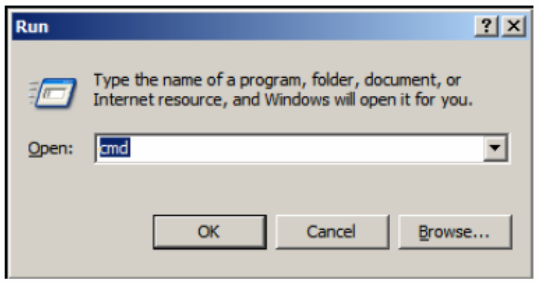
## 1 Why can't I configure the router even the cable is plugged and the LED is lit?

Do a **Ping test** to make sure that the WiFi Combo VPN Router is responding.

**Note:** It is recommended that you use an Ethernet connection to configure it.

Go to **Start > Run**.

1. Type **cmd**.




2. Press **OK.**
3. Type **ipconfig** to get the IP of default gateway.
4. Type "**ping 192.168.123.254".** Assure that you ping the correct IP Address assigned to the WiFi ADSL Router. It will show four replies if you ping correctly.

```
Pinging 192.168.123.254 with 32 bytes of data:

Reply from 192.168.123.254: bytes=32 time<1ms TTL=64
Reply from 192.168.123.254: bytes=32 time<1ms TTL=64
Reply from 192.168.123.254: bytes=32 time<1ms TTL=64
Reply from 192.168.123.254: bytes=32 time<1ms TTL=64
```

Ensure that your Ethernet Adapter is working, and that all network drivers are installed properly. Network adapter names will vary depending on your specific adapter. The installation steps listed below are applicable for all network adapters.

1. Go to **Start > Right click on "My Computer" > Properties**.
2. **Select** the **Hardware Tab**.
3. Click **Device Manager**.
4. Double-click on "**Network Adapters"**.
5. Right-click on **Wireless Card bus Adapter** or **your specific network adapter**.

6. Select **Properties** to ensure that all drivers are installed properly.
7. Look under **Device Status** to see if the device is working properly.
8. Click "**OK"**.

# 2 What can I do if my Ethernet connection does not work properly?

A. Make sure the RJ45 cable connects with the router.

B. Ensure that the setting on your Network Interface Card adapter is "Enabled".

C. If settings are correct, ensure that you are not using a crossover Ethernet cable, not all Network Interface Cards are MDI/MDIX compatible, and use a patch cable is recommended.

D. If the connection still doesn't work properly, then you can reset it to default.

# 3 **Problems with 3G connection?** ( only for the model with 3G support function)

**A. What can I do if the 3G connection is failed by Auto detection?**

Maybe the device can't recognize your ISP automatically. Please select "Manual" mode, and filling in dial-up settings manually.

**B. What can I do if my country and ISP are not in the list?**

Please choose "Others" item from the list, and filling in dial-up settings manually.

**C. What can I do if my 3G connection is failed even the dongle is plugged?**

Please check the following items:

I. Make sure you have inserted a validated SIM card in the 3G data card, and the subscription from ISP is still available

II. If you activate PIN code check feature in SIM card, making sure the PIN code you fill in dial-up page is correct

III. Checking with your ISP to see all dial-up settings are correct

IV. Make sure 3G signal from your ISP is available in your environment

**D. What can I do if my router can't recognize my 3G data card even it is plugged?**

There might be compatibility issue with some certain 3G cards. Please check the latest compatibility list to see if your 3G card is already supported.

**E. What should I insert in APN, PIN Code, Account, Password, Primary DNS, and Secondary DNS?**

The device will show this information after you choose country and Telcom. You can also check these values with your ISP.

**F. Which 3G network should I select?**

It depends on what service your ISP provider. Please check your ISP to know this

information.

### G. Why does my 3G connection keep dropping?

Please check 3G signal strength from your ISP in your environment is above middle level.

# 4 Something wrong with the wireless connection?

### A. Can't setup a wireless connection?

I. Ensure that the SSID and the encryption settings are exactly the same to the Clients.

II. Move the WiFi ADSL Router and the wireless client into the same room, and then test the wireless connection.

III. Disable all security settings such as **WEP**, and **MAC Address Control**.

IV. Turn off the WiFi ADSL Router and the client, then restart it and then turn on the client again.

V. Ensure that the LEDs are indicating normally. If not, make sure that the power and Ethernet cables are firmly connected.

VI. Ensure that the IP Address, subnet mask, gateway and DNS settings are correctly entered for the network.

VII. If you are using other wireless device, home security systems or ceiling fans, lights in your home, your wireless connection may degrade dramatically. Keep your product away from electrical devices that generate RF noise such as microwaves, monitors, electric motors…

### B. What can I do if my wireless client can not access the Internet?

I. Out of range: Put the router closer to your client.

II. Wrong SSID or Encryption Key: Check the SSID or Encryption setting.

III. Connect with wrong AP: Ensure that the client is connected with the correct Access Point.

i. **Right-click** on the **Local Area Connection icon** in the taskbar.

ii. Select **View Available Wireless Networks in Wireless Configure**. Ensure you have selected the correct available network.

iii. Reset the WiFi ADSL Router to default setting

### C. Why does my wireless connection keep dropping?

I. Antenna Orientation.

i. Try different antenna orientations for the WiFi ADSL Router.

ii. Try to keep the antenna at least 6 inches away from the wall or other objects.

II. Try changing the channel on the WiFi ADSL Router, and your Access Point and Wireless adapter to a different channel to avoid interference.

III. Keep your product away from electrical devices that generate RF noise, like microwaves, monitors, electric motors, etc.

# 5 What to do if I forgot my encryption key?

1. Go back to advanced setting to set up your Encryption key again.
2. Reset the WiFi ADSL Router to default setting

# Appendix A. Spec Summary Table

| Device Interface | | WN-220ARM |
|---|---|---|
| ADSL Line | xDSL port (Annex A) | 1 |
| Ethernet LAN | RJ-45 port, 10/100Mbps, auto-MDI/MDIX | 4 |
| ADSL2 /2+ Standard Module | 1-port ADSL2+ connector<br>ITU 992.1 (G.dmt) Annex A, ITU 992.2 (G.lite), ITU 992.3 ADSL2 (G.dmt.bis), ITU 992.5 ADSL2+ | ● |
| Antenna | For 1.8 dBm detachable antenna | 1 |
| WPS Button | WPS Button | 1 |
| Wireless On/Off Button | Enable /Disable Wireless On/Off | 1 |
| LED Indication | ADSL/Status / LAN1 ~ LAN4/ WiFi | ● |
| Power Jack | DC Power Jack, powered via external DC 9V/1A switching power adapter | 1 |
| Wireless LAN (WiFi) | | |
| Standard | IEEE 802.11b/g/n-lite(1T1R) compliance | ● |
| SSID | SSID broadcast or in stealth mode | ● |
| Channel | Auto-selection, manually | ● |
| Security | WEP, WPA, WPA-PSK, WPA2, WPA2-PSK | ● |
| WPS | WPS (Wi-Fi Protected Setup) | ● |
| WMM | WMM (Wi-Fi Multimedia) | ● |
| Functionality | | |
| DSL WAN | PPPoE / PPPoA / IPoA / Static IP / Dynamic IP | ● |
| WAN Connection | Auto-reconnect, dial-on-demand, manually | ● |
| One-to-Many NAT | Virtual server, special application, DMZ, Super DMZ (IP pass through) And IPTV IGMP V1 V2 Pass through | ● |
| NAT Session | Support NAT session | 8000 |
| SPI Firewall | IP/Service filter, URL blocking, MAC control | ● |
| DoS Protection | DoS (Deny of Service) detection and protection | ● |
| Routing Protocol | Static route, dynamic route (RIP v1/v2) | ● |
| Management | SNMP, UPnP IGD, syslog | ● |
| Administration | Web-based UI, remote login, backup/restore setting | ● |
| Environment & Certification | | |
| Package Information | Package dimension (mm) | |
| | Package weight (g) | |
| Operation Temp. | Temp.: 0~40oC, Humidity 10%~90% non-condensing | ● |

| | | |
|---|---|---|
| Storage Temp. | Temp.: -10~70oC, Humidity: 0~95% non-condensing | ● |
| EMI Certification | CE/FCC compliance | ● |
| RoHS | RoHS compliance | ● |

*Specifications are subject to change without notic