Outdoor
Wireless Router/Bridge

User's Manual

Before operating the unit, please read this manual thoroughly, and retain it for future reference.

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Chapter 1. Hardware Installation

This chapter describes the procedures for installing the Outdoor Router/Bridge.

Note: Before you mount the Router/Bridge to a mast or on the side of a building, be sure to configure and test the device first.

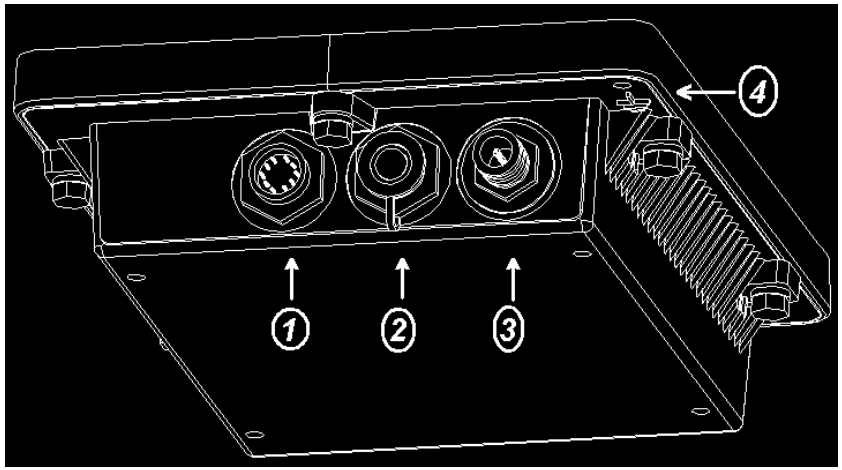
1.1 Before You Start

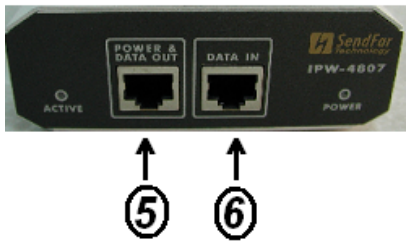
After unpacking the system, make sure the following items are present and in good condition.

1. Router/Bridge
2. Inline Power Injector
3. AC Power Cord
4. MIL-C-5015 style RS232 Console Port Cable
5. Grounding Wire
6. Cross over Ethernet Cable
7. Reverse Polarity-N Female RF Cable
8. 30M MIL-C-5015 style Ethernet Cable
9. Mast Mounting Kit
10. Wall Mounting Kit
11. User's Manual Disk
12. Simple Spanner

1.2 Locate the Router/Bridge and Inline Power Injector Ports

- Special Ethernet port 1 for connecting the MIL-C-5015 style Ethernet Cable
- Special serial port 2 for connecting the MIL-C-5015 style RS-232 console port cable
- Reverse Polarity-N Male connector 3 for connecting the antenna or RF cable.
- Grounding port 4.
- Power & Data output port 5 for connecting the other of the MIL-C-5015 style Ethernet Cable
- Data input port 6 for connecting the Ethernet Cable to a Hub Switch Router or a PC.



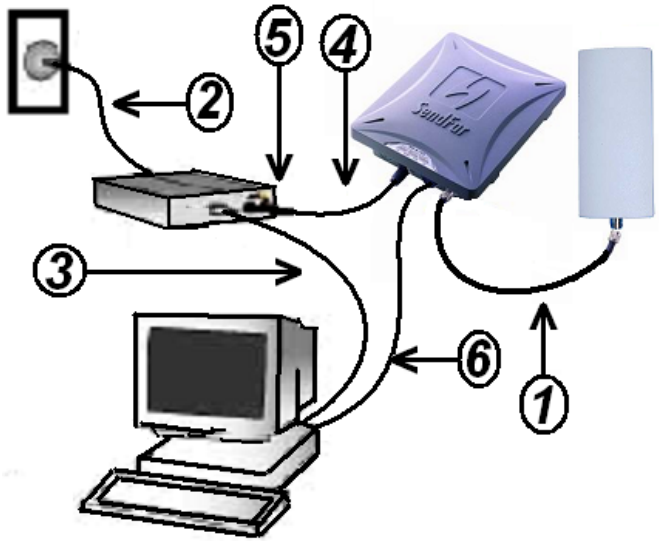


1.3 Preparing Installation

Before installing your Outdoor Wireless LAN system for your outdoor application in a hard-to-reach location, we recommend that you configure and test all the devices first.

For configuring the Outdoor Router/Bridge, you need follow the quick steps below to power up your Router/Bridge:

Step 1: With the unit powered off, attach one end of the RF cable to the antenna connector and then connect the antenna to the other end of the RF cable as shown in following:



Step 2 Plug the female end of the power cord into the Inline Power Injector, and then plug the male end of the power cord into a power outlet or power strip. The Power LED on the front of the Inline Power Injector will light up.

Step 3 Run the cross over Ethernet cable (included in your package) from Data Input Port (on the front of the Inline Power Injector) to the Ethernet Port on a PC.

NOTE: This connection is required for setting up initial configuration information. After configuration is completed, this cable will be removed,

and then you should run an Ethernet cable from Data Input Port (on the front of the Inline Power Injector) to the LAN connection (such as to a hub, bridge or directly into a patch panel).

Step 4 Plug the MIL-C-5015 style Ethernet connector into the Special Ethernet port on the back of the Router/Bridge.

Step 5 Plug the RJ-45 Ethernet connector (the other end of the Special Ethernet cable) into the Power & Data Output Port on the front of the Inline Power Injector.

Step 6 Attach the MIL-C-5015 style (RS-232) null modem cable to the Serial Port Adapter. Connect the other cable end (DB9 female) to a terminal or a PC running a terminal emulation program.

When the Router/Bridge receives power over the Ethernet cable, the Router/Bridge will start its boot sequence and the Active LED on the front of the Inline Power Injector will light up.

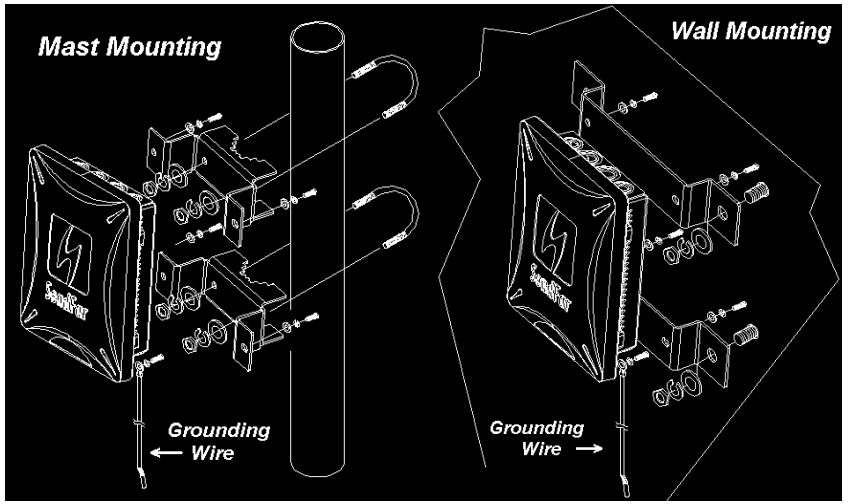
You can configure the Router/Bridge using the HTML browser, such as Internet Explorer or Netscape Navigator from a remote host or PC.

NOTE: The outdoor Router/Bridge antenna cabling systems be identified by Reverse Polarity-N connectors (pictured in following)

Please Note: The gender of the connectors is NOT determined by the connector's thread, but its center pin;
A solid center pin = Male, a hollow pin = Female.

1.4 Outdoor Installation

Outdoor Router/Bridge device can be mounted on the side of a building or mounted to an antenna mast as shown in following:



A wall (side) mount allows for mounting an antenna (mast) on the side of a building or on the side of an elevator penthouse. This will provide a convenient mounting location when the roof overhang is not excessive and/or the location is high enough to provide a clear line of sight.

In most situations mounting an antenna directly to the wall will not allow you to properly align the antenna with the corresponding antenna at the opposite end of your wireless link. As poor alignment will typically result in poor performance, we advise you to always mount the Outdoor Router/Bridge and antenna to a mast.

1.4.1 Antenna Mast Requirements

To accommodate the outdoor antennas, the antenna mast must satisfy the following requirements:

a. The construction of the mast must be of a sturdy, weatherproof and no corrosive material like for example galvanized or stainless steel construction pipe.

b. Typical diameter of the mast should be between 35 mm (1.4 in.) and 41 mm (1.625 in.). Subject to the type of antenna that you intend to install other diameters may be possible as well.

c. The height of the antenna mast must be sufficient to allow the antenna to be installed at least 1.5 m (5 ft.) above the peak of roof. If the roof is metal, then the height of the antenna should be a minimum of 3 m (10 ft) above the roof.

d. The mast or wall-bracket must be free from any substance that may prevent
a good electrical connection with the antenna; for example, paint.

1.4.2 Grounding

A safety grounding system is necessary to protect your outdoor installation from lightning strikes and the build-up of static electricity. So direct grounding of the antenna mast, Outdoor Router/Bridge and Surge Arrester is very important. The Outdoor Router/Bridge has built in Surge Arrester. So Mounting the Outdoor Router/Bridge on the antenna mast, you have to connect the Outdoor Router/Bridge to the same grounding system with the AC wall outlet.

The grounding system must comply with the National Electrical Code and safety standards that apply in your country. Always check with a qualified electrician if you are in doubt as to whether your outdoor installation is properly grounded.

1.4.3 Antenna Alignment

For optimal performance of your wireless link, make sure that the antennas are properly aligned (facing one another “eye-to-eye”). To align the antennas:

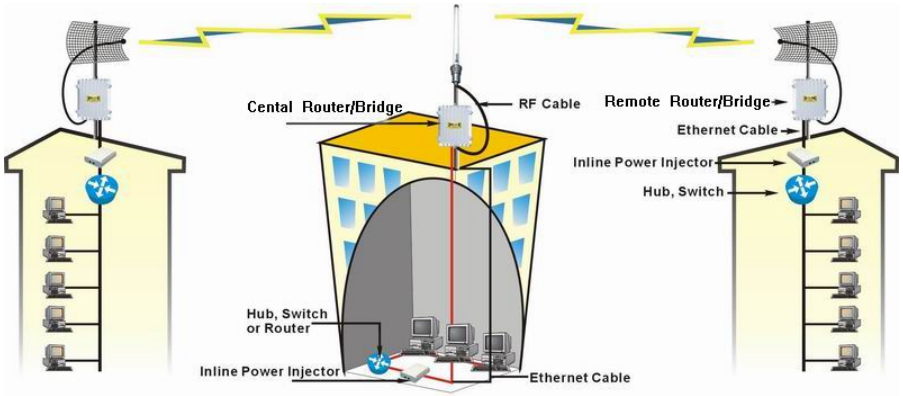
_ Use a pair of binoculars and/or a map of the area and compass to point the antennas to one another.

_ Use the Utility- “Wireless Link Info” in the Web Configure as described in the "Utility " section to analyze the radio link quality.
The “Wireless Link Info” will enable you to display the levels of signal strength and link quality.
Looking at the Wireless Link Info screen, you can interactively optimize antenna alignment if required, by making small modifications in the antenna orientation.

_ Alternatively, consult a professional Antenna Installation Service to optimize the antenna alignment.
Omni-directional antennas are characterized by a wide radiation pattern. Therefore alignment of this type of antennas is less critical than for directional antennas.

Chapter 2. Network Topologies

This section describes several main types of installations commonly implemented using the Outdoor Wireless Router/Bridge System (RB). This is by no means intended to be an exhaustive list of all possible configurations, but rather shows examples of some of the more common implementations. The RB can be configured into two roles: Central Router/Bridge (CRB) and Remote Extension Router/Bridge (RRB) to accomplish the broadband wireless point-to-point, point-to-multipoint systems (as shown in following figuration).

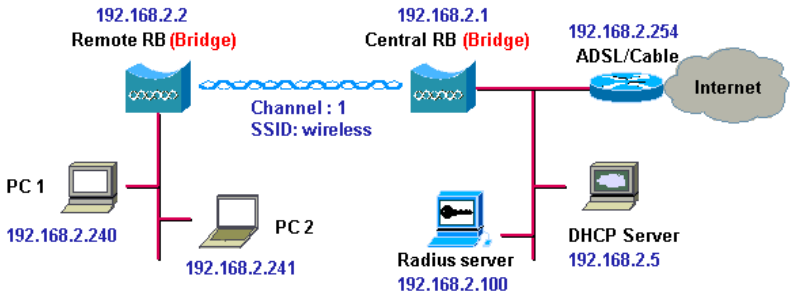


Both the Central RB and the Remote RB can performed in router or bridge modes. In a Point-to-Multipoint topology, all communication between network systems is done through a centralized agent. In the Outdoor Wireless Router/Bridge product, the centralized agent is Central Router or Central Bridge and the individual network notes may be Remote Router or Remote Bridge.

To show some possibilities of Point-to-Multipoint topologies, the following examples are provided:

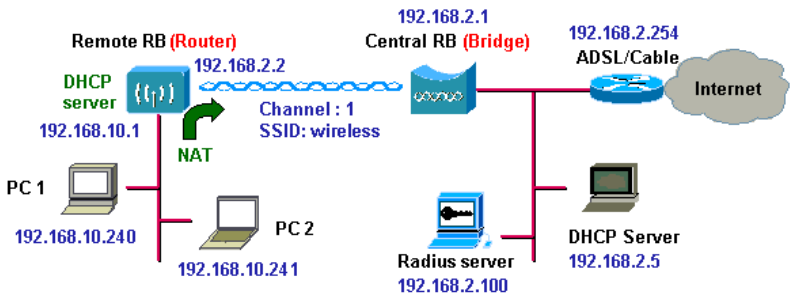
1. Remote Wireless Bridge-to-Central Wireless Bridge
2. Remote Wireless Router-to-Central Wireless Bridge
3. Remote Wireless Bridge-to-Central Wireless Router
4. Remote Wireless Router-to-Central Wireless Router

2.1 Remote Wireless Bridge-to-Central Wireless Bridge



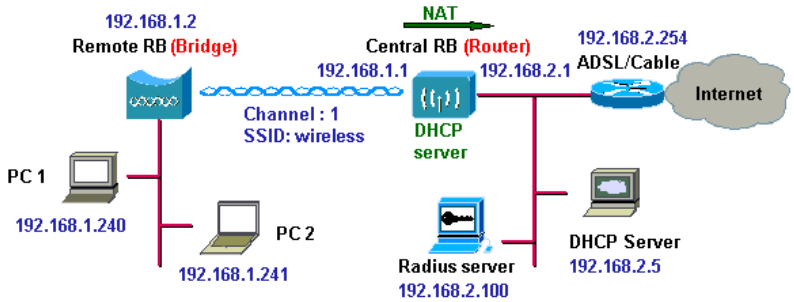
1. **Set the Central RB as a bridge (***bridge IP address is 192.168.2.1***).**
2. **Set Wireless parameters on Central RB: Channel (***1***) and SSID (***wireless***)**
3. **Set the Remote RB as a bridge (***bridge IP address is 192.168.2.2***).**
4. **Set Wireless parameters on Remote RB: Channel (***1***) and SSID (***wireless***), these parameters must same with Central RB.**
5. **Left side subnet is transparent to the right side.**
6. **DHCP server assign IP address to PC1 and PC2**

2.2 Remote Wireless Router-to-Central Wireless Bridge



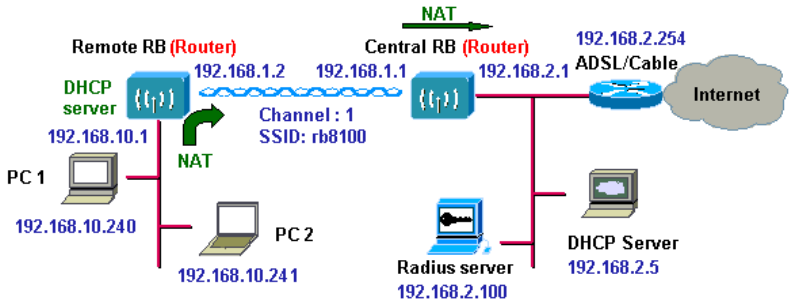
1. **Set the Central RB as a bridge (***bridge IP address is 192.168.2.1***).**
2. **Set Wireless parameters on Central RB: Channel (***1***) and SSID (***wireless***).**
3. **Set the Remote RB as a Router (***Wireless Interface IP is 192.168.2.2, Ethernet Interface IP is 192.168.10.1, must turn on NAT on Wireless Interface, default route is 192.168.2.254***).**
4. **Set Wireless parameters on Remote RB: Channel (***1***) and SSID (***wireless***), these parameters must same with Central RB.**
5. **Set the DHCP server service on the Remote RB and apply it on Ethernet Interface.**
6. **The Remote RB assign IP address to PC1 and PC2**

2.3 Remote Wireless Bridge-to-Central Wireless Router



1. **Set the Central RB run as a Wireless Router (***Wireless Interface IP is 192.168.1.1, Ethernet Interface IP is 192.168.2.1, must turn on NAT on Ethernet interface, default route is 192.168.2.254***).**
2. **Set Wireless parameters on Central RB: Channel (***1***) and SSID (***wireless***)**
3. **Set the DHCP server service on the Central RB and apply it on Wireless Interface.**
4. **Set the Remote RB as a Bridge (***Bridge Interface IP is 192.168.1.2***).**
5. **Set Wireless parameters on Remote RB: Channel (***1***) and SSID (***wireless***), these parameters must same with Central RB.**
6. **The Central RB assign IP address to PC1 and PC2**
7. **The operator can also turn off NAT behavior on Central RB and two subnets are transparent.**

2.4 Remote Wireless Router-to-Central Wireless Router



1. **Set the Central RB run as a Wireless Router (***Wireless Interface IP is 192.168.1.1, Ethernet Interface IP is 192.168.2.1, default route is 192.168.2.254***).**
2. **Set Wireless parameters on Central RB: Channel (***1***) and SSID (***wireless***).**
3. **Set the Remote RB as a Wireless Router (***Wireless Interface IP is 192.168.1.2, Ethernet Interface IP is 192.168.10.1, default route is 192.168.1.1***).**
4. **Set Wireless parameters on Remote RB: Channel (***1***) and SSID (***wireless***), these parameters must same with Central RB.**
5. **Set the DHCP server service on the Remote RB and apply it on Ethernet Interface.**
6. **The Remote RB assigns IP address to PC1 and PC2.**

The operator can also turn off NAT behavior on Central RB and turn on NAT behavior on Remote RB. In this case, any outgoing packets will transfer to 192.168.1.2

- **Remote RB: turn on NAT on Wireless Interface.**

The operator can also turn on NAT behavior on Central RB and turn on NAT behavior on Remote RB.

- **Central RB: turn on NAT on Ethernet interface.**
- **Remote RB: turn on NAT on Wireless Interface.**

Chapter 3. Web Access

Web Connection

The SendFar Outdoor Wireless Access Router/Bridge (RB) supports access to the configuration system through the use of an HTTP Interface (web browser). Before configuring the RB, you need to know the IP Address assigned to the unit.
When shipped from the factory, the IP Address (192.168.2.1) was assigned to the RB by default. **To start a web connection use:**

http://192.168.2.1/

Identify the IP Address assigned to the unit

However, the IP Address may be changed and you cannot connect the unit using the default IP Address. In this case, you must identify the RB IP Address before configuration. To identify the IP Address, you can use the Serial Port to gain access the current network status. To start a Serial Port connection:

1. *Attach a serial data (RS-232) cable to the Serial Port Adapter. Connect the other cable end to a terminal or a PC running a terminal emulation program. Use a 9-pin female to 9-pin female NULL Modem cable.*
2. *Set the terminal to **115200** Baud, **No**-Parity, **8** data bits, **1** Stop bit, and ANSI compatible.*

Note: Running a terminal emulation program on your PC, such as HyperTerminal, and then set the following connection properties:

- Click the **Start icon** > **Program** > **Accessories** > **Communication** > **Terminal**.
- Create a new connection file, and then select a Com Port <*COM1, COM2, etc., depending on your PC*> with ***115200*bps / 8-bits / 1-stop**.
- Click the properties icon in the **Tool Bar > setting > select Emulation terminal *VT100* > ok**.

3. *Reboot or turn on your RB*
4. *When the RB is powered up, the "Current Network Status" will be displayed.*

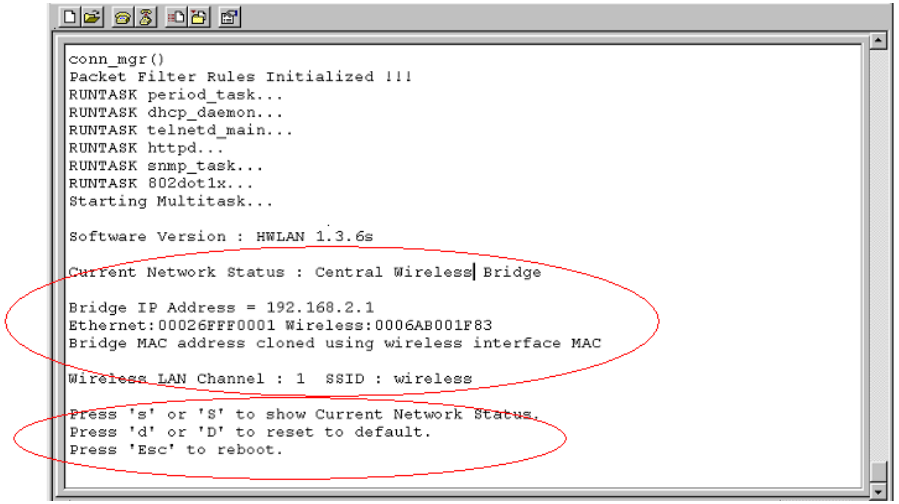


Figure 3-1 Current Network Status

Web Access Procedure

Once you identify the IP Address assigned to your OWRB, use your web browser to configure the OWRB through the HTTP Interface.

The following procedure explains how to configure each item.

1. Open your browser and enter the IP Address
2. Press **ENTER** and the RB ***Login*** screen appear.

Figure 3-2 Login Screen

3. Enter **root** in the **User Name** and the **Password** fields. And then the web configuration user interface screen appears.

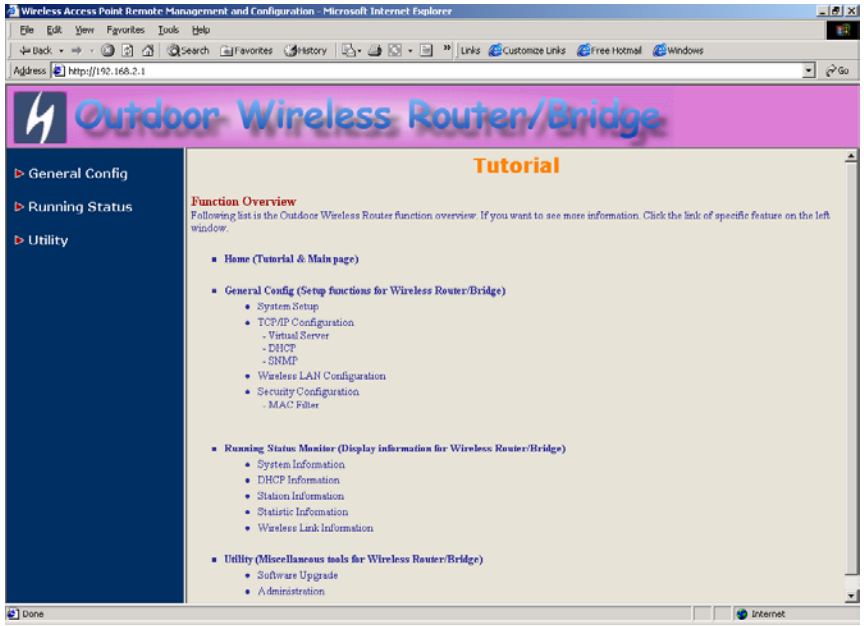


Figure 3-3 Web User Interface

Web Configuration Structure

The web configuration user interface be grouped in a tree structure, and contains the following settings or information:

- ▽ General Configuration
  - System
  - TCP/IP
    - Virtual Server
    - DHCP
    - SNMP
  - Wireless
  - Security
    - MAC Filter

▽ Running Status
- System Info
- DHCP Info
- Station Info (Central RB only)
- Statistic Info
- Wireless Link Info (Remote Extension RB only)

▽ Utility
- Software Upgrade
- Administration

Move through the tree by clicking on an icon to expand or collapse the tree. The nodes on the tree represent web pages that allow you to view and modify the parameters.

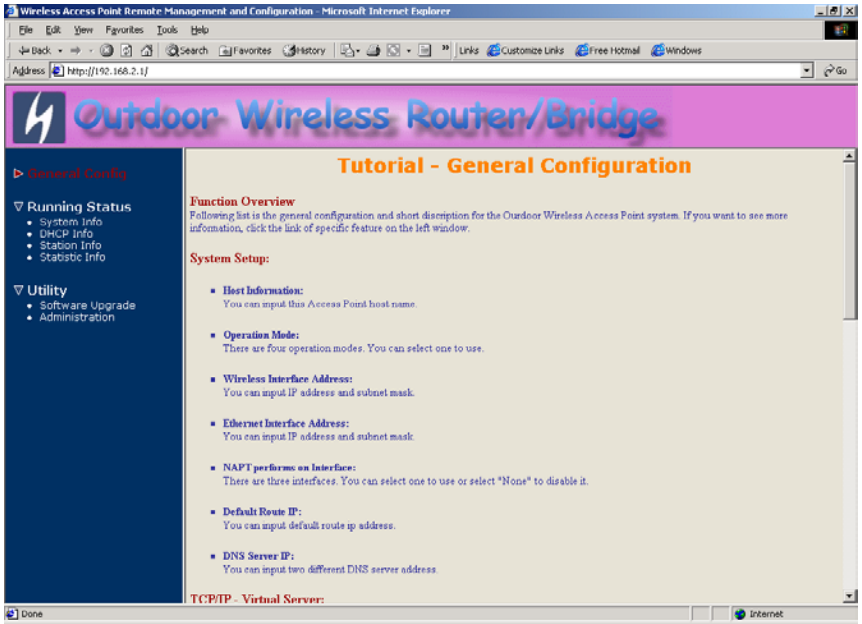


Figure 3-4 Web Configuration Structure

Chapter 4. Configuration

4.1 Introduction

What you Need to Know

The RB can be configured into two operation roles:

Central Wireless Router/Bridge (Central RB) and Remote Wireless Router/Bridge (Remote RB).

Central RB can performed in four operation modes*:*

- Central Wireless Bridge
- Central Wireless Router with PPPoE Ethernet connection
- Central Wireless Router with dynamic IP address Ethernet
- Central Wireless Router with static IP address Ethernet

Remote RB can performed in two operation modes*:*

- Remote Wireless Bridge
- Remote Wireless Router

The RB is shipped with default configuration is as a bridge between an Ethernet and wireless network. Users simply need to attach the RB to your wired LAN. If users would like to configure the RB, please refer to the following procedures.

4.1.1 Basic Configuration Steps

Modify the Default Settings and Apply the New

This section will describe a 5-step configuration to setup your Outdoor Wireless Router/Bridge (RB) workable.

1. Select an operation mode for your RB on the web page "/**General Config/System/**", and click **FINISH** to refresh this page.

2. Modify the factory-set default parameters on the web page "/**General Config/System/**"page, and click **FINISH** to save your changes.
3. Modify the factory-set default parameters on the web page "/**General Config/Wireless/**"page, and click **FINISH** to save your changes.
4. (Optional) Modify others parameters on the web page "/**General Config/**"page, and click **FINISH** to save your changes.
5. Move on page "/***Utility/Administration/"***, select the ***Save then Restart*** and then click **FINISH** to take effect the previous configuration changes.

4.2 System Setup

When setting up a SendFar Wireless Router/Bridge (RB), you must decide which operation mode that your RB works. This feature is available in the "/**General Config/System/**" page.
Figure 4-1 & 4-2 show the "**General Configuration – System Setup"** page.

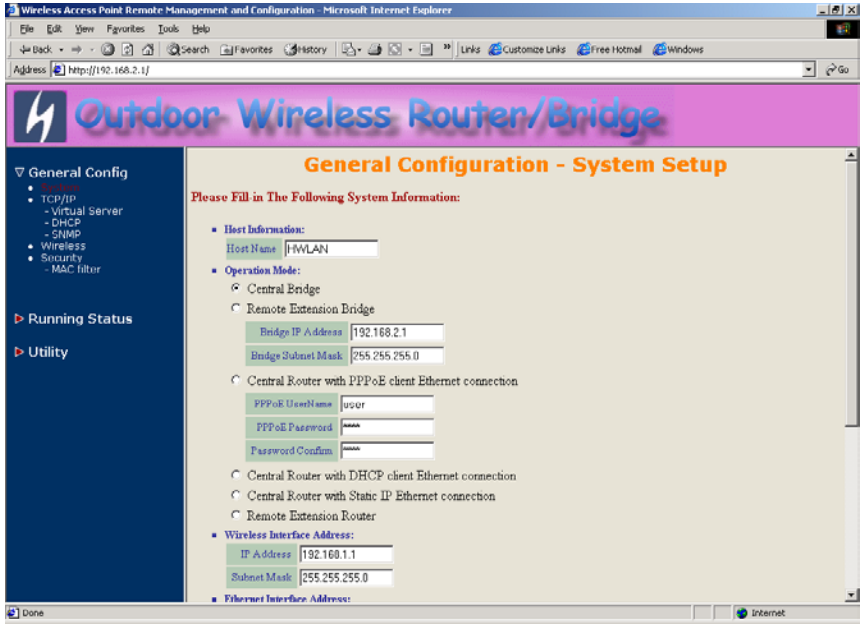


Figure 4-1 General Configuration – System Setup-1

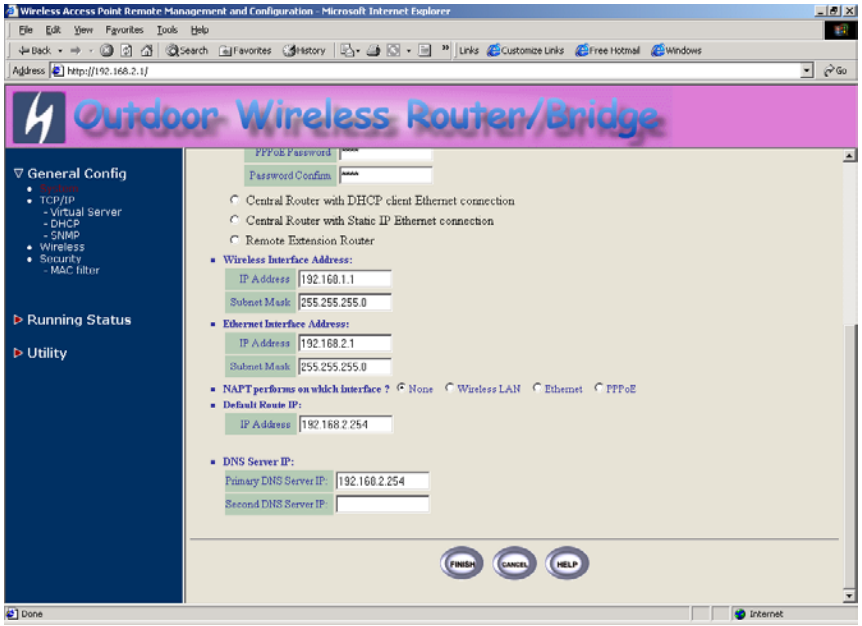


Figure 4-2 General Configuration – System Setup-2

Host Information

- Host Name. The Host Name is not an essential setting, but it helps identify the device in network. Use this setting to assign a name to the device.

Operation Mode

The First Thing You Have To Do

Select an operation mode, and click **FINISH** to refresh this page.

Central Bridge

Select the Central Wireless Bridge mode. And then set the corresponding parameters.

- Bridge IP Address. Use this setting to assign or change the bridge's IP address.

- Bridge Subnet Mask. Enter an IP subnet mask to identify the sub network so the IP address can be recognized on the LAN.

Default Route IP

- IP Address. Enter the default Gateway IP Address.

After that, click ***FINISH*** at the bottom of this page to complete the modification of this page.

Remote Extension Bridge

Select the Remote Wireless Bridge mode. And then set the corresponding parameters.

- Bridge IP Address. Use this setting to assign or change the bridge's IP address.

- Bridge Subnet Mask. Enter an IP subnet mask to identify the sub network so the IP address can be recognized on the LAN.

Default Route IP

- IP Address. Enter the default Gateway IP Address.

After that, click ***FINISH*** at the bottom of this page to complete the modification of this page.

Central Router with PPPoE Client Ethernet connection

If you are an ADSL subscriber, you need to specify that you personal ISP ***PPPoE Username and Password*** to enable ADSL broadband access.

- PPPoE User Name. This setting allows you to enter the user name that your ISP assigns to your account.

- PPPoE Password. Enter the password that your ISP assigns to your account.

- Password Confirm. Enter the PPPoE Password once more again.

Wireless Interface Address

- IP Address. Use this setting to assign or change the wireless interface's IP address.

- Subnet Mask. Enter an IP subnet mask to identify the sub network so the IP address can be recognized on the WLAN.

Ethernet Interface Address

- IP Address. Use this setting to assign or change the Ethernet interface's IP address

- Subnet Mask. Enter an IP subnet mask to identify the sub network so the IP address can be recognized on the WAN.

NAPT performs on which interface?

There are three interfaces. You can select one to use or select "None" to disable it.

Default Route IP

- IP Address. Enter the default Gateway IP Address.

DNS Server IP

- Primary DNS Server IP. Enter the Primary Domain Name Server IP Address.

- Secondary DNS Server IP. Enter the Secondary Domain Name Server IP Address.

After that, click ***FINISH*** at the bottom of this page to complete the modification of this page.

Central Router with DHCP Client Ethernet connection

Wireless Interface Address

- IP Address. Use this setting to assign or change the wireless interface's IP address.

- Subnet Mask. Enter an IP subnet mask to identify the sub network so the IP address can be recognized on the WLAN.

NAPT performs on which interface?

There are three interfaces. You can select one to use or select "None" to disable it.

Default Route IP

- IP Address. Enter the default Gateway IP Address.

DNS Server IP

- Primary DNS Server IP. Enter the Primary Domain Name Server IP Address.

- Secondary DNS Server IP. Enter the Secondary Domain Name Server IP Address.

After that, click ***FINISH*** at the bottom of this page to complete the modification of this page.

Wireless Router with static IP Ethernet connection

Wireless Interface Address

- IP Address. Use this setting to assign or change the wireless interface's IP address.

- Subnet Mask. Enter an IP subnet mask to identify the sub network so the IP address can be recognized on the WLAN.

Ethernet Interface Address

- IP Address. Use this setting to assign or change the Ethernet interface's IP address

- Subnet Mask. Enter an IP subnet mask to identify the sub network so the IP address can be recognized on the WAN.

NAPT performs on which interface?

There are three interfaces. You can select one to use or select "None"

to disable it.

Default Route IP

- IP Address. Enter the default Gateway IP Address.

DNS Server IP

- Primary DNS Server IP. Enter the Primary Domain Name Server IP Address.

- Secondary DNS Server IP. Enter the Secondary Domain Name Server IP Address.

After that, click ***FINISH*** at the bottom of this page to complete the modification of this page.

Remote Extension Router

Wireless Interface Address

- IP Address. Use this setting to assign or change the wireless interface's IP address.

- Subnet Mask. Enter an IP subnet mask to identify the sub network so the IP address can be recognized on the WLAN.

Ethernet Interface Address

- IP Address. Use this setting to assign or change the Ethernet interface's IP address

- Subnet Mask. Enter an IP subnet mask to identify the sub network so the IP address can be recognized on the WAN.

NAPT performs on which interface?

There are three interfaces. You can select one to use or select "None" to disable it.

Default Route IP

- IP Address. Enter the default Gateway IP Address.

DNS Server IP

- Primary DNS Server IP. Enter the Primary Domain Name Server IP Address.

- Secondary DNS Server IP. Enter the Secondary Domain Name Server IP Address.

After that, click ***FINISH*** at the bottom of this page to complete the modification of this page.

4.3 TCP/IP Protocol Configure

4.3.1 Virtual Server Mapping

Sometimes, the operator can expose the internal servers on the local intranet to the public Internet. For this, you must create the Virtual Server Mapping for these invisible internal servers.

Select the ***"/General Config/ Virtual Server/"***, and then the ***General Configuration - Virtual Server*** screen appears. Figure 4-3 show the current virtual server entry table. (***Default Virtual Server Mapping pool is empty***)

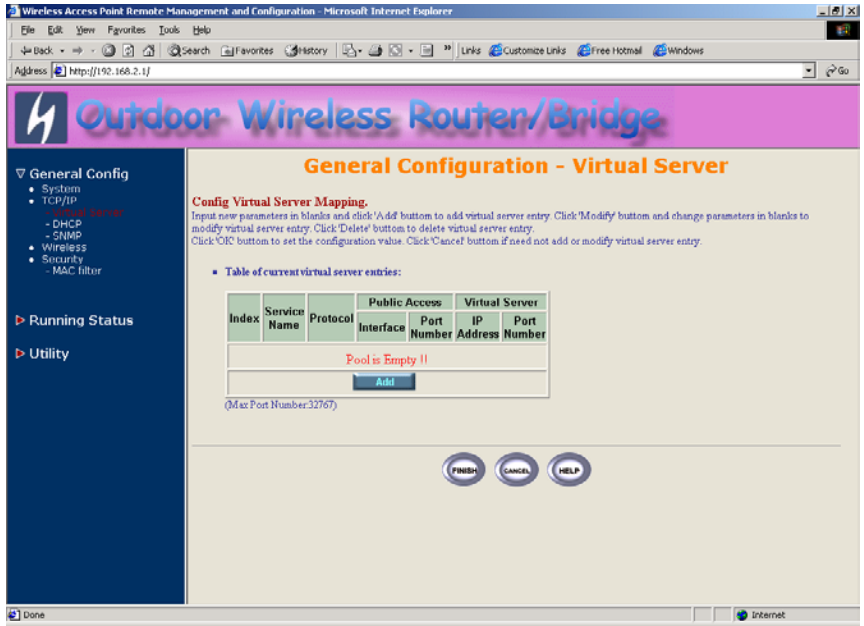


Figure 4-3 ***General Configuration - Virtual Server***

1. Click **Add**. The Virtual Server Entry Edit page **Figure 4-4** appears.
2. To edit the Virtual Server Entry, specify all the entry fields to allow Internet user to access the Internal servers.

   Service Name: Alias name of this internal server, such as FTP.

   Access Interface: Indicate the translation occurs on which interface (Wireless interface / Ethernet interface), such as Ethernet.

   Protocol: Indicate which protocol (TCP/UDP) you want to translate from outside to internal server, such as TCP.

   Public Access Port number: Indicate which socket port (1 ~ 65535) you want to translate from outside to internal server, such as 21.

   Virtual Server IP address: Specify the private IP address of the internal server, such as 192.168.1.100.

   Virtual Server Port number: Specify the socket port (1 ~ 65535) of the internal server, such as 21.

3. Click **OK**. The Virtual Server Entry Table appears with the entries list.
4. To modify or delete a virtual server entry, click the select button beside the entry index number and click **Modify** or **Delete**.
5. To add another entry to the Virtual Server Mapping Pool, repeat step 1 through step 3.
6. When you have included all the entries you need, click **FINISH**.

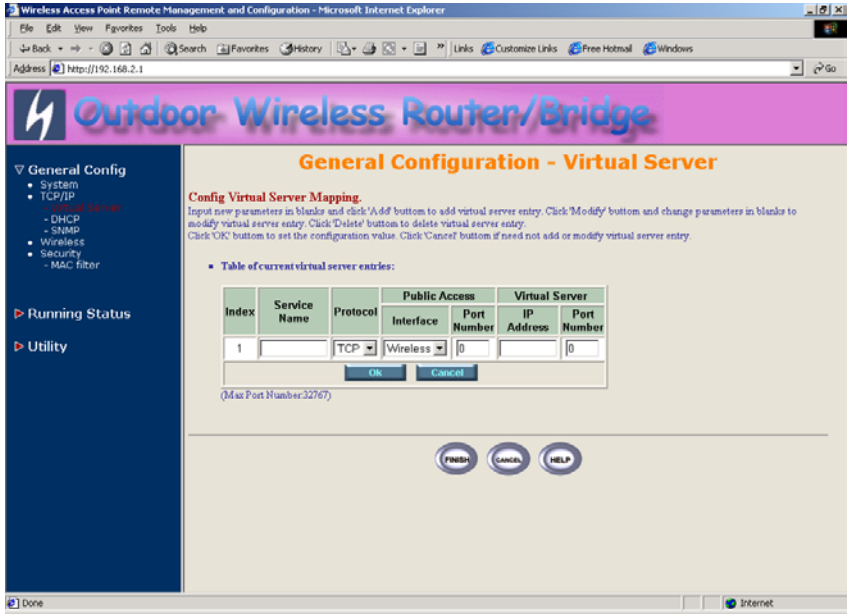


Figure 4-4 Add ***Virtual Server Entry***

4.4 Configure DHCP server

Sometimes, the operator want to managing a large TCP/IP network requires maintaining accurate and up-to-date IP address and domain name information. In this situation, it needs manually configure and enable the DHCP server service. ***Select the "/General Config/ DHCP/"***, and then the General Configuration – DHCP Parameter screen appears. Figure 4-5 shows the general DHCP parameters and the fixed host entry table. (Default fixed host entry pool is empty).

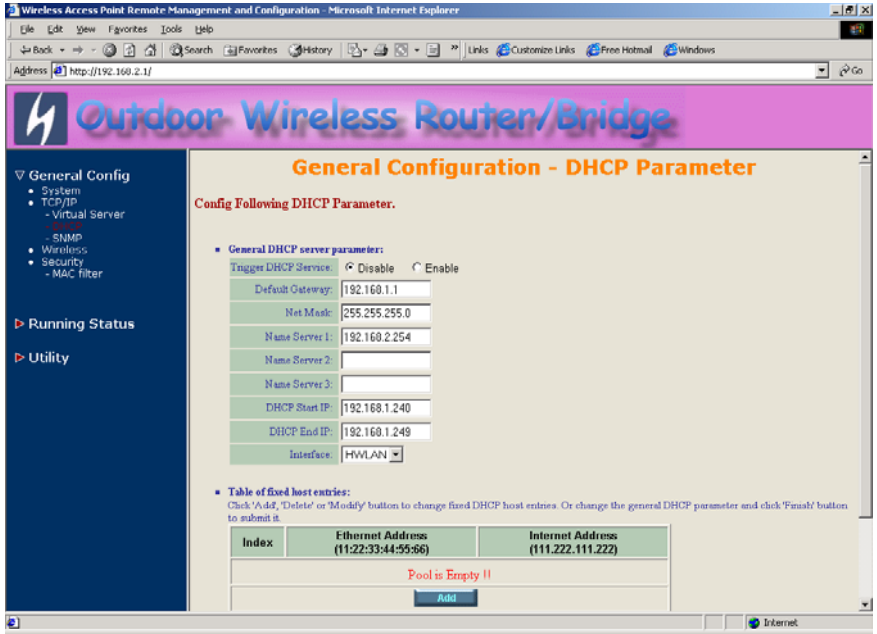


Figure 4-5 DHCP Parameter

4.4.1 General DHCP Server Parameter

- Trigger DHCP Service. Select **Enable** to allow the RB to assign IP Addresses from IP Pool Table. Select **Disable** to prevent IP Address assignment from the RB

- Default Gateway. Enter the default Gateway IP Address.

- Subnet Mask. Configure the subnet for the client.

- Name Server 1, 2, 3. Configure the DNS servers IP for the client.

- DHCP Start IP address. Enter the starting IP Address for this IP Pool Table.

- DHCP End IP address. Enter the ending IP Address for this IP Pool Table.

- Apply Interface. Enable DHCP server service on Wireless or Ethernet interface.

4.4.2 Fixed Host Entries

Figure 4-5 shows the general DHCP parameters and the fixed host entry table. (Default fixed host entry pool is empty).

1. Click **Add**. The Fixed Host Entry Edit page **Figure 4-6** appears.
2. To edit the Fixed Host Entry, specify the Ethernet and Internet Address fields.

- Ethernet Address. Enter the MAC address for a fixed IP user.

- Internet Address. Assign a fixed IP Address to this special user.

3. Click **OK**. The Fixed Host Entry Table appears with the entries list.
4. To modify or delete a fixed host entry, click the select button beside the entry index number and click **Modify** or **Delete**.

5. To add another entry to the Fixed Host Mapping Pool, repeat step 1 through step 3.

6. When you have included all the entries you need, click **FINISH**.

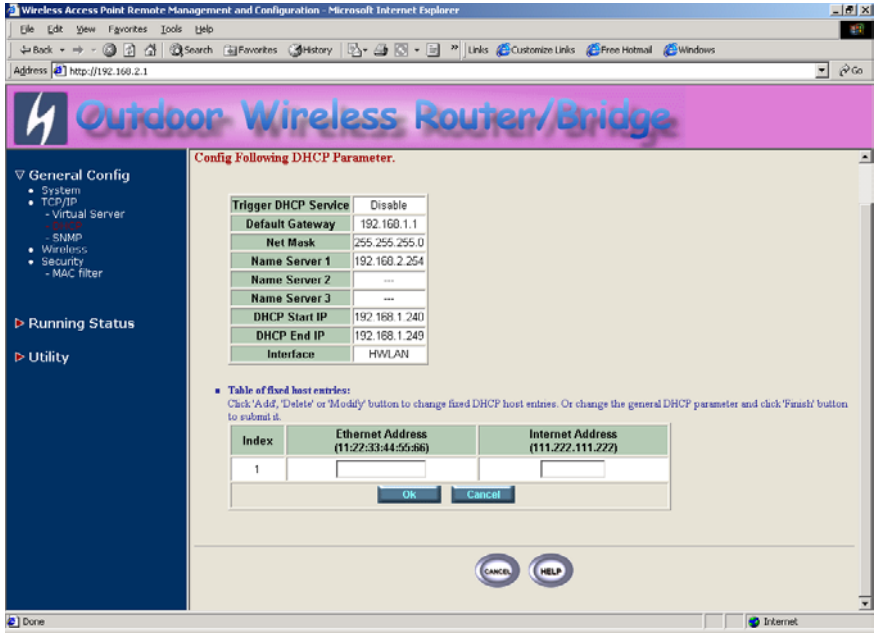


Figure 4-6 Add Fixed Host Entry

4.5 Configure SNMP

Click General Config, SNMP, and then the General Configuration – SNMP Community Parameter screen appears. Figure 4-7 shows the current SNMP community pool and trap host pool.

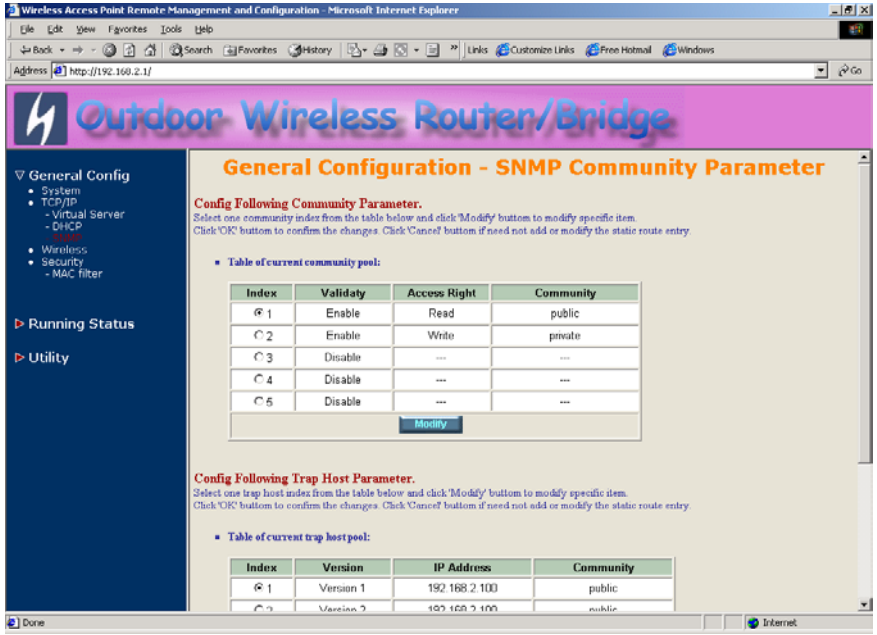


Figure 4-7 General Configuration – SNMP Community Parameter

4.5.1 Configure Community Pool

The SNMP Community Pool has five entries.

1. To modify a entry, click the select button beside the entry index number and then click **Modify**, the configuration page **Figure 4-8** appears.

2. Specify the Validity, Access Right and Community field.

- Validity. Select **Enable** or **Disable** to control this community.

- Access Right. Select a command from the pull down menu for this field.

- Community. Enter the password related the Access Right in this field.

3. Click **OK**. To refresh the current community pool.
4. To modify another community entry to the current community pool, repeat step 1 through step 3.
5. When you have modified all the entries you need, click **FINISH**.

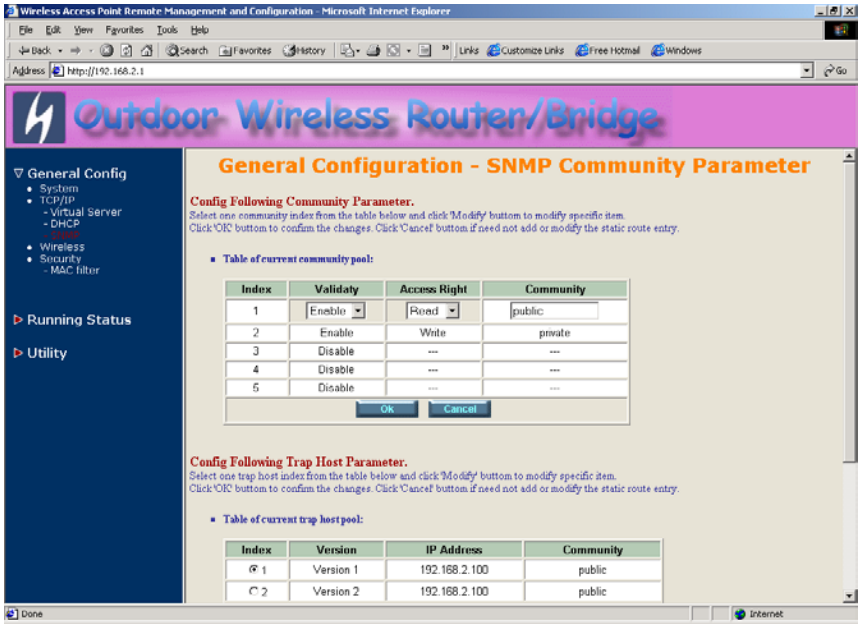


Figure 4-8 Modify SNMP Community Parameter

4.5.2 Configure Trap Host Pool

The Trap Host Pool has five entries.

1. To modify a entry, click the select button beside the entry index number and click **Modify** . The configuration page **Figure 4-9** appears.
2. Specify the Version, IP Address and Community field.

- Version. Select **Disable, Version 1** or **Version 2** to control this trap host.

- IP Address. Enter the Trap Host IP Address.

- Community. Enter the password in this field.

3. Click **OK**. To refresh the current trap host pool.
4. To modify another trap host entry to the current trap host pool, repeat step 1 through step 3.
5. When you have modified all the entries you need, click **FINISH**.

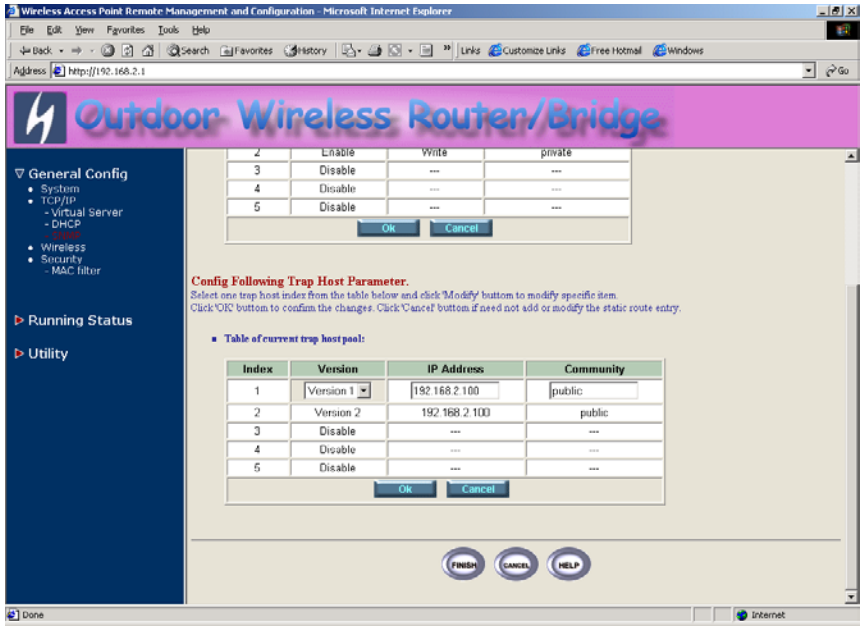


Figure 4-9 Modify SNMP Trap Host Parameter

4.6 Configure Wireless related parameters

Click **General Cofig, Wireless.** The Wireless LAN information page **Figure 4-10** appears. In here, enter the ***Channel*** (default is ***1***), ***rts Threshold*** (default is ***1600***), ***frag Threshold*** (default is ***1600***), ***SSID*** (default is ***wireless***) and ***Station Name*** (default is ***ap***) that are suitable for your radio network and then you can clicked radio button to disable WEP or enable 64/128 bit ***WEP services*** (default is ***disable***), if WEP is enabled, you must input corresponded ***Default Key index*** and ***WEP Key*** and then click **KeyGen** to generate the WEP64 & WEP128 key patterns. After that, click ***FINISH*** at the bottom of this page to complete the modification.

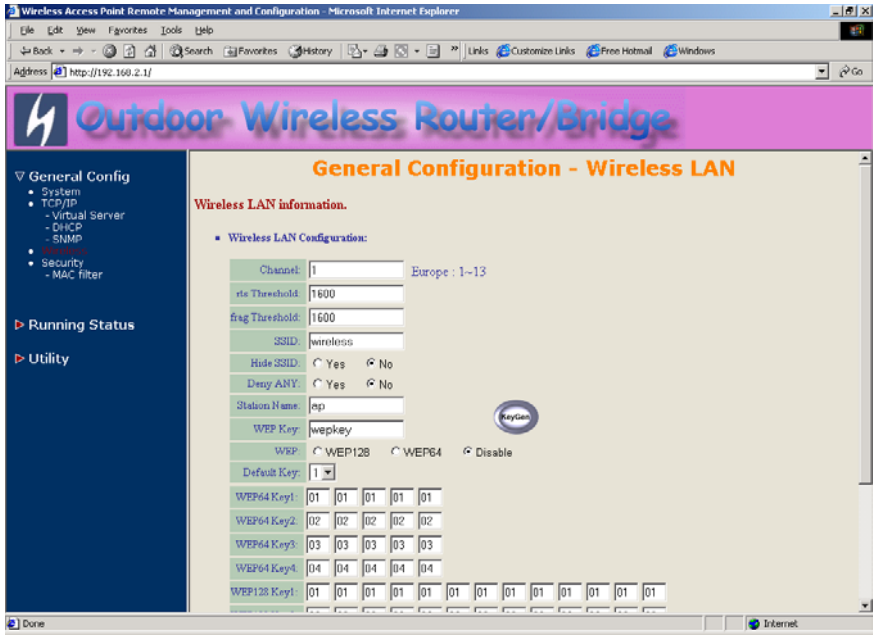


Figure 4-10

- Channel. The factory setting is Radio Channel 1 transmitting at 2412 MHz. The channel set appears on the screen installed on your access. Each channel covers 22 MHz. The bandwidth for channels 1, 6, and 11 does not overlap, so you can set up multiple access point in the same vicinity without causing interference.

- RTS Threshold. This setting determines the packet size at which the bridge issues a request to send (RTS) before sending the packet. A low RTS Threshold setting can be useful in areas where many client devices are associating with the access point, or in areas where the clients are far apart and can detect only the bridge and not each other. Enter a setting ranging from 0 to 2339 bytes.

- Frag Threshold. This setting determines the size at which packets are fragmented (sent as several pieces instead of as one block). Enter a setting ranging from 256 to 2338 bytes. Use a low setting in areas where communication is poor or where there is a great deal of radio interference.

- SSID. The **Service Set ID (SSID)** can be any alphanumeric, case-sensitive entry from two to 32 characters long. This string functions as a password to joint the radio network.

- Hide SSID. You use this setting to choose whether devices that do not specify an SSID are allowed to associate with the access point. With Yes selected, the SSID used by other devices must match exactly the AP's SSID.

- Deny Any. You use this setting to choose whether devices that specify **the well define SSID keyword 'ANY' or 'any'** are allowed to associate with the access point. With **Yes** selected, the SSID **'ANY' or 'any'** used by other devices are not allowed to associate with the access point

- Station Name. Enter any alphanumeric, case-sensitive entry.

- WEP Key. Enter 1~15 characters for 64 and 128 bits WEP KEY encryption, and then click **KeyGen** to generate the WEP64 & WEP128 key patterns.

- WEP. Disable or **enable** 64/128 bit WEP services.

- Default Key. Select an encryption key from the pull down menu.

- WEP64 Key1~4 & WEP128 Key1~4. The keys in these fields can be generated automatically by **KeyGen** function. For 40-bit encryption, enter 10 hexadecimal digits; for 128-bit encryption, enter 26 hexadecimal digits. Hexadecimal digits include the numbers 0 through 9 and the letters A through F. Your 40-bit WEP keys can contain any combination of 10 of these characters; your 128-bit WEP keys can contain any combination of 26 of these characters. The letters are not case-sensitive.

4.7 Security

4.7.1 MAC based Access Control

1. Click ***Basic Config***, select ***MAC Filter*** page, and choice the MAC Filter services is ***Enable*** or ***Disable*** (as shown in **Figure 4-11**).

2. You can specify the MAC address of a wireless client station. All MAC entries in the MAC address table are permitted to connect into the RB. You can also click ***ADD***, ***DELETE***, ***MODIFY*** button to maintain this MAC address table. After that, click ***FINISH*** at the bottom of this page to complete the modification of this page.

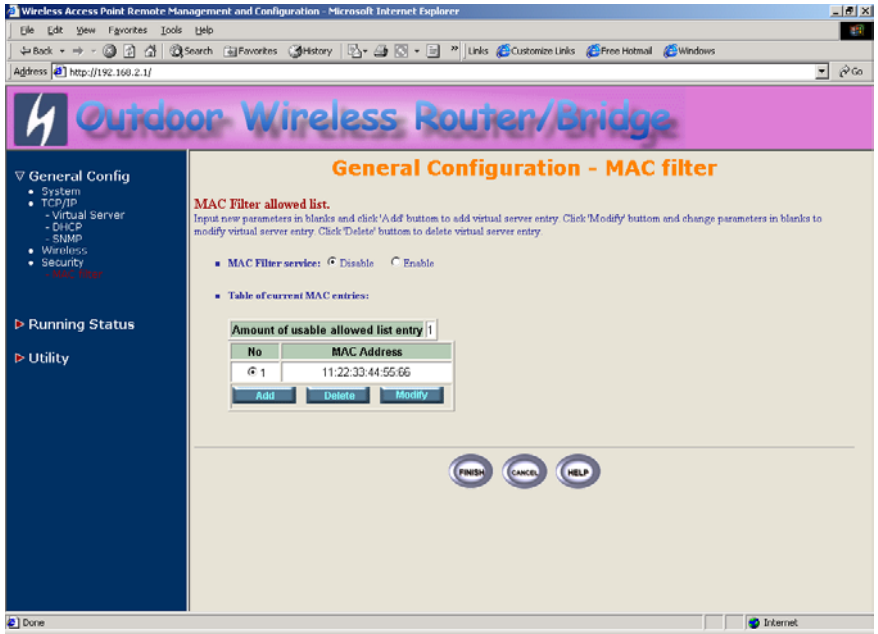


Figure 4-11

4.8 Utility

4.8.1 Software Upgrade

1. Click ***Utility***, select ***Software Upgrade*** page (as shown in **Figure 4-12**), and then you can use TFTP to upgrade your AP. In here, you must specify the ***TFTP server IP*** and select which file you want to upgrade it (***Program image, Web image***), then click ***OK*** button to start the TFTP upgrade process.

2. If the upgrade process is success, the AP will apply the new settings and start rebooting right away.

Hint: You must set up a TFTP server and this server must contain one latest new image.

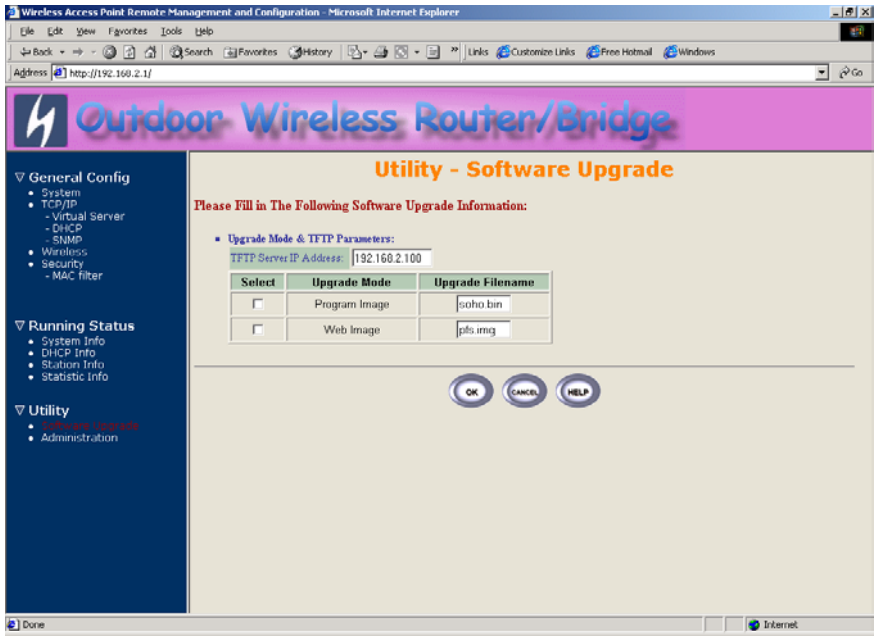


Figure 4-12

4.8.2 Administration

Click ***Utility***, ***Administration.*** Figure 4-13 shows the Utility – Administration page.

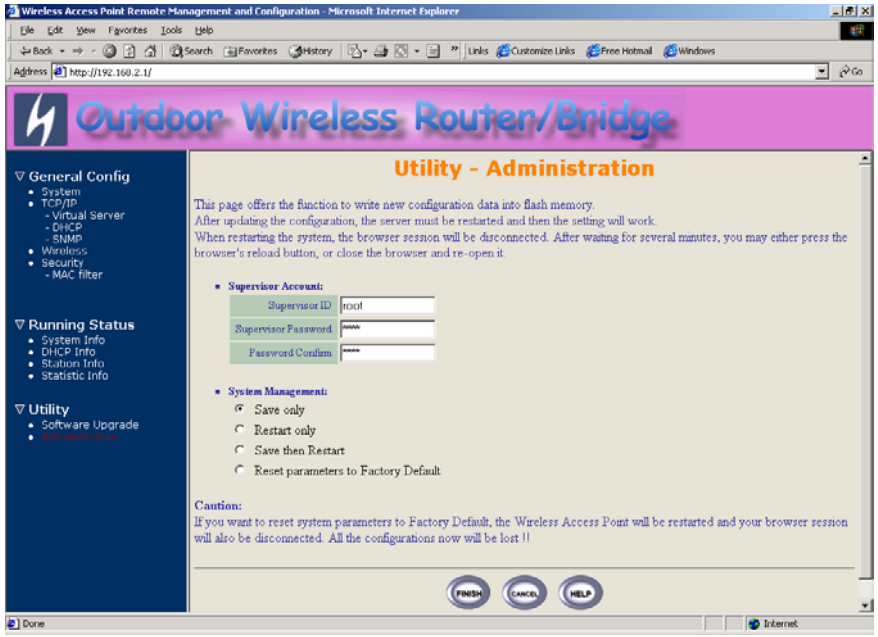


Figure 4-13 Utility – Administration

Supervisor Account

Change the supervisor's user name & password in the Supervisor Account field, and Click ***FINISH***. To take effect the previous configuration changes.

Apply the New Settings

1. Click ***Utility***, ***Administration,*** select the ***Save then Restart*** to apply the new configuration settings.

2. Click ***FINISH***. To take effect the previous configuration changes.

Hint: It takes about 10 seconds, to complete the restart process.

Chapter 5. Status Monitor

You can see the system running status and the some information on this windows. Click the **Running Status** link on the left window (as shown in **Figure 5-1**), you can choose which function that you want to monitor.

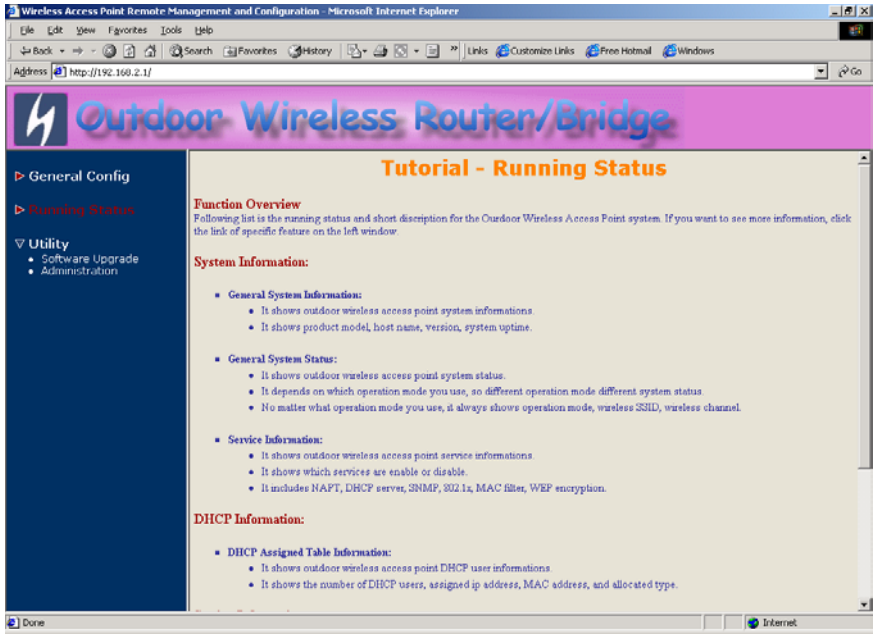


Figure 5-1 Running Status

5.1 System Information

Click **Running Status**, **System Info**. Figure 5-2 shows the System Information page.

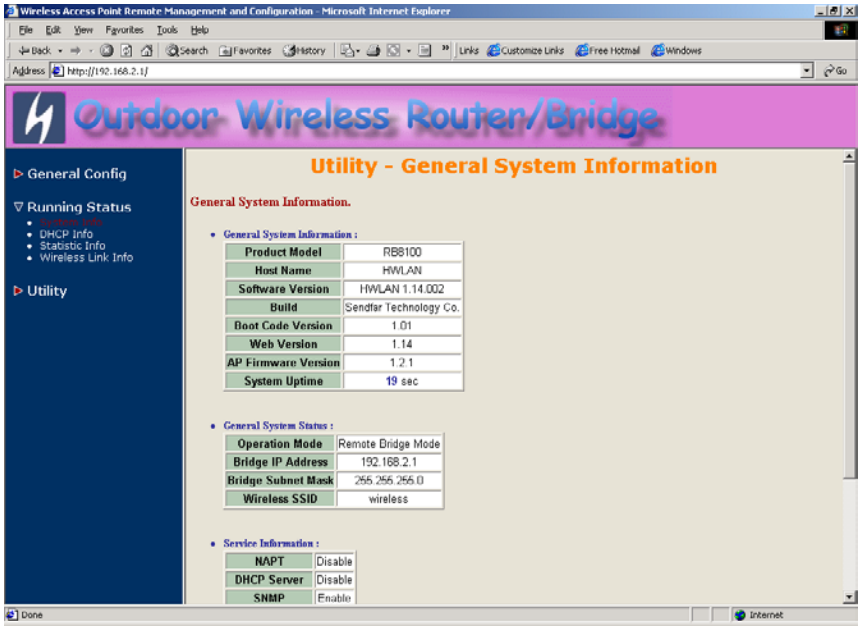


Figure 5-2 Running Status – System Info

In this page, you can see the system information and most running parameters.

General System Information This block displayed the Product Model, Host Name, Software Version, Build, Boot Code Version, Web Version, AP Firmware version and System Uptime.

General System Status This block displayed the Operation Mode, Interface IP/Net mask and brief wireless parameters, if the operator turn on the DHCP or PPPoE services, you can also see the related information on here.

Services Information This block displayed which service is turn on or not. It is includes the NAPT, DHCP server, SNMP, 802.1x access control, MAC Filter and WEP encryption.

5.2 DHCP Information

Click **Running Status**, **DHCP Info**. Figure 5-3 shows the DHCP assigned IP Information page.

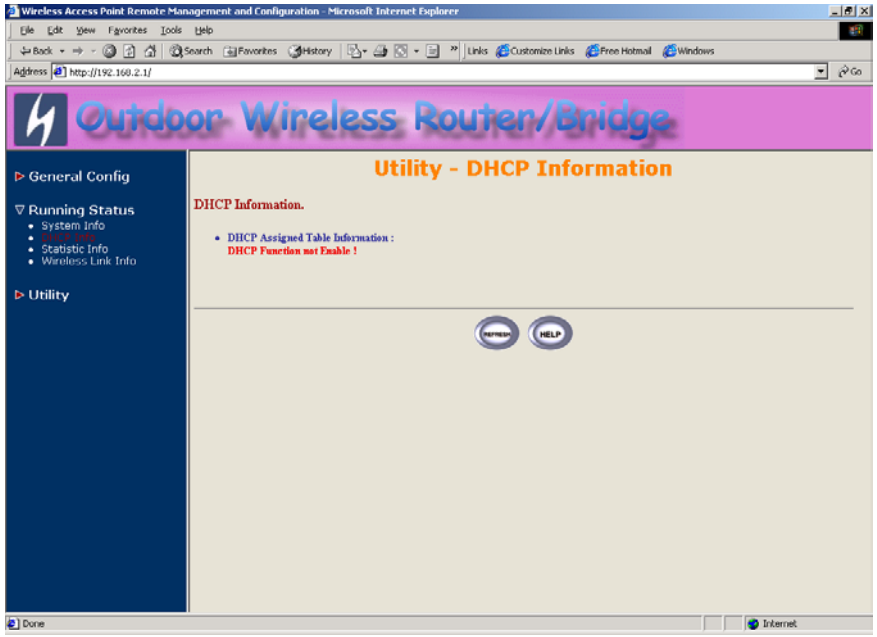


Figure 5-2 Running Status – DHCP Info

In this page, you can see the DHCP server assigned table, includes MAC address, corresponded IP address and IP assigning type (Dynamic or Fix).

5.3 Station Information

This item only displayed on Central RB mode.
Click **Running Status**, **Station Info**. Figure 5-3 shows the associated stations information page.

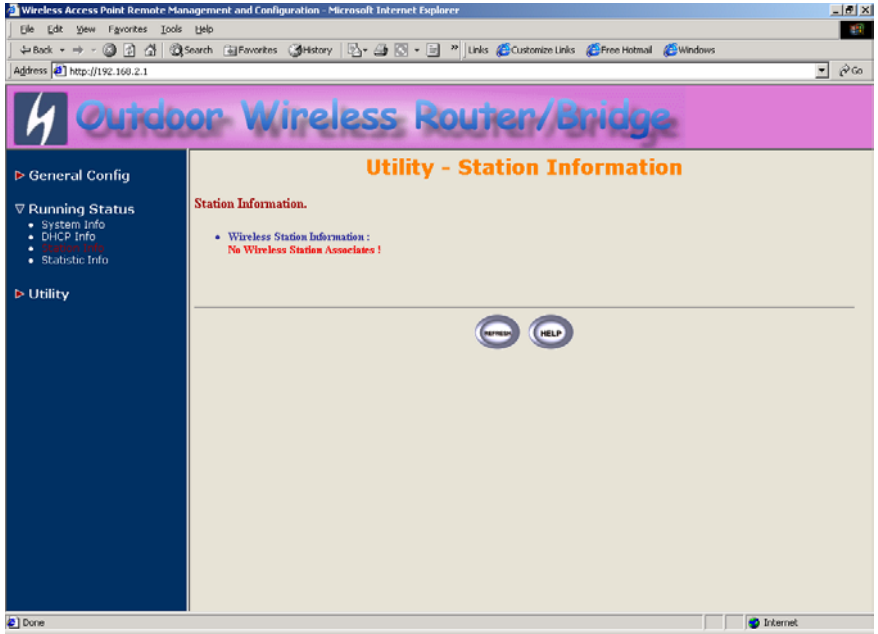


Figure 5-3 Running Status – Station Info

In this page, you can see how many wireless stations associated to this AP, this association table includes the associated station MAC address and the corresponded connection time.

5.4 Statistic Information

Click **Running Status**, **Statistic Info**. Figure 5-3 shows the statistic of interface page.

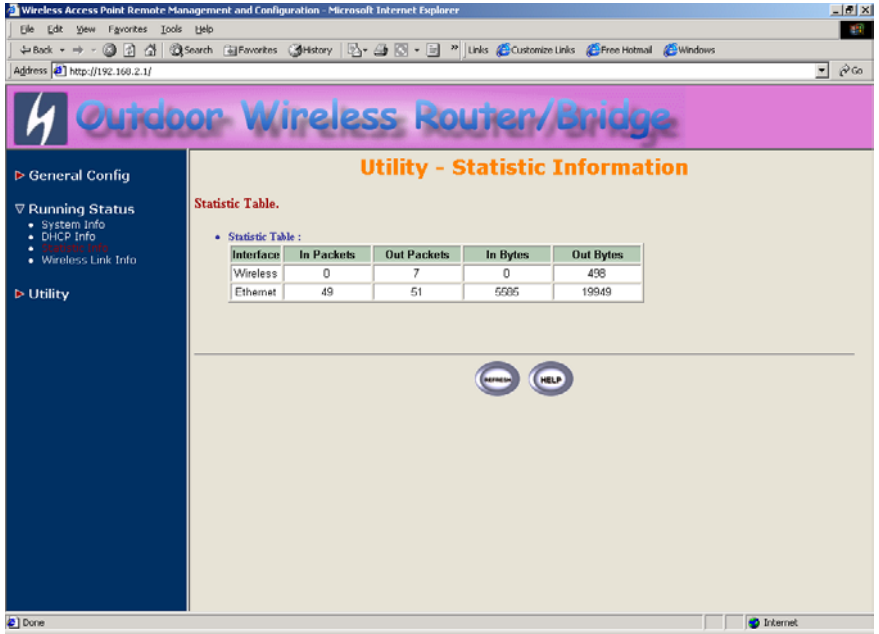


Figure 5-4 Running Status – Statistic Info

In this page, you can see the packet statistic of each interface, Wireless and Ethernet. This statistic table includes the In Packets, Out Packets, In Bytes and Out Bytes.

5.5 Wireless Link Information

This item only displayed on Remote RB mode.
Click **Running Status**, **Wireless Link Info.** Figure 5-3 shows the Radio Link information page.

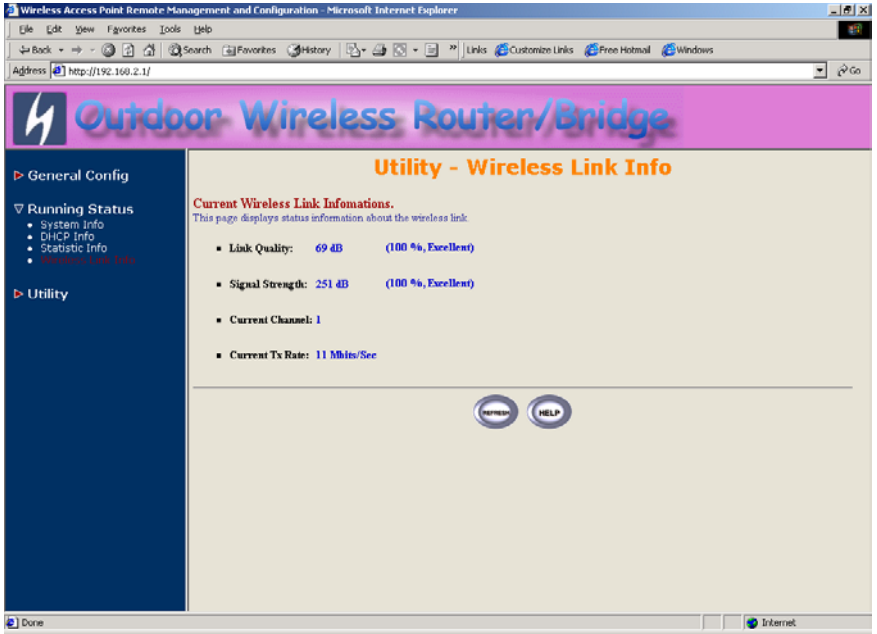


Figure 5-5 Running Status – Wireless Link Info

In this page, you can see four information about this radio link: Link Quality, Signal Strength, Current used channel and Current Tx Rate.

Chapter 6. Specifications

General

Compatibility	Fully interoperable with IEEE802.11b compliant products
Regulation Certifications	FCC Part 15, ETSI 300/328
Power Supply	Output: DC 5V/3A Input: 100/240 VAC; 50/60 Hz
Temperature Range	0 to 55 ℃ (operating) -20 to 75 ℃ (storage)
Humidity (non-condensing)	10% ~ 90%
Interface	LAN ports: 3 Switching (10Base-T/100Base-TX) WAN port: 1 (10Base-T/100Base-TX) Console port: RS-232 x 1

Radio

Frequency Band	2.4 – 2.484 GHz
Radio Type	Direct Sequence Spread Spectrum (DSSS)
Modulation	CCK (11, 5.5Mbps) DQPSK (2Mbps) DBPSK (1Mbps)
Operation Channels	11 for North America, 14 for Japan, 13 for Europe
Receiver Sensitivity	-84dBm for 11Mbps @ 8% PER (Packet Error Rate) -90dBm for 2Mbps @ 8% PER (Packet Error Rate)
RF Output Power	19dBm typically (including antenna gain), ETSI 18.6dBm typically (including antenna gain), FCC
RF Connector	Reversed N Type

Network Information

Protocol Supported	TCP/IP NAT/NAPT Virtual Server DHCP client DHCP server PPPoE Bridge
Security	PPP PAP/CHAP/MS-CHAP Authentication in Web-Based manager IEEE 802.1x Port-Based network access control Radius client (Authentication & Accounting) MAC address based access control 64-bit, 128-bit WEP encryption 802.11 SSID hidden Denial 802.11 “Any” station

Management

Local Configuration	RS-232 serial port
Remote Configuration	HTTP, SNMP
Firmware Upgrade	Upgrade via Serial Interface or TFTP

Physical Specifications

Dimensions	211(L) mm x 151(W) mm x 40(H) mm
Weight	1000 g

Chapter 7. Default Settings

7.1 General Configuration

7.1.1 System

Parameter	Description	Default Value
Host Name	Host name for the RB	HWLAN
Operation Mode	1. Central Bridge 2. Remote Extension Bridge 3. Central Router with PPPoE client Ethernet connection 4. Central Router with DHCP client Ethernet connection 5. Central Router with Static IP Ethernet connection 6. Remote Extension Router	Central Bridge
Bridge IP Address	For CRB /RRB with Bridge Operation Mode	192.168.2.1
Bridge Subnet Mask		255.255.255.0
PPPoE User Name	For Central Router with PPPoE client Ethernet connection only	user
PPPoE Password		pass
Password Confirm		pass
Wireless Interface Address	IP Address	192.168.1.1
	Subnet Mask	255.255.255.0
Ethernet-WAN Interface Address	IP Address	192.168.2.1
	Subnet Mask	255.255.255.0
Ethernet-LAN Interface Address	IP Address	192.168.2.1
	Subnet Mask	255.255.255.0
NAPT Interface	1. None 2. Wireless LAN	None

	3. Ethernet 4. PPPoE	
Default Route IP	IP address of the gateway for default route when TCP/IP filtering	192.168.2.254
Primary DNS Server IP	IP addresses of the DNS Servers of your Local ISP	192.168.2.254
Second DNS Server IP		

7.1.2 Virtual Server Mapping

Parameter	Description	Default Value
Service Name	Specify the service for public access	NULL
Protocol	Select a protocol for public access	NULL
Public Access	Interface	NULL
	Port Number	NULL
Virtual Server	IP address	NULL
	Port Number	NULL

Note: (Maximum Entry: 10, Maximum Port Number: 32767)

7.1.3 DHCP

Parameter	Description	Default Value
Trigger DHCP Service	Disable or Enable automatic IP address assignment to wireless stations	Disable
Default Gateway	IP address of the gateway for default route when TCP/IP filtering	192.168.1.1
Net Mask	Consists of four sets of digits that help divide a network into sub-networks and simplify routing and data transmission	255.255.255.0
Name Server 1:	IP address of the DNS host	192.168.2.254
Name Server 2:		Null
Name Server 3:		Null
DHCP Start IP	IP starting address	192.168.1.240
DHCP End IP	IP ending address	192.168.1.249
Interface	1. Wireless 2. Ethernet	Wireless
Fixed Host Entries (Max 10)	Ethernet Address	Empty
	IP Address	

7.1.4 SNMP

7.1.4.1 Table of SNMP Community Pool:

Parameter		Description	Default Value
Index 1	Validity	Enable or disable the function of the corresponding community index	Enable
Index 2			Enable
Index 3			Disable
Index 4			Disable
Index 5			Disable
Index 1	Access Right	Select the access right (Deny/Read/Write/Create) for SNMP Manager	Read
Index 2			Write
Index 3			---
Index 4			---
Index 5			---
Index 1	Community	Specify the type of community (public or private) for SNMP Manager	public
Index 2			private
Index 3			---
Index 4			---
Index 5			---

7.1.4.2 Table of SNMP Trap Community Host Pool:

Parameter		Description	Default Value
Index 1	Version	Select or disable the SNMP Version Version 1: MIB1 Version 2: MIB2	Version1
Index 2			Version2
Index 3			---
Index 4			---
Index 5			---
Index 1	IP Address	Specify the IP address of the SNMP Manager for SNMP Trap Report	192.168.2.100
Index 2			192.168.2.100
Index 3			---
Index 4			---
Index 5			---
Index 1	Community	Specify the type of community (public or private) for SNMP Manager	public
Index 2			public
Index 3			---
Index 4			---
Index 5			---

7.1.5 Wireless LAN

Parameter	Description	Default Value
Regulatory Domain	Define the regulatory domain to Which this NIC may be deployed	1
Channel	USA: 1~11, Europe: 1~13	1
RTS Threshold	Set RTS (Request To Send) threshold value	1600
Fragmentation Threshold	Set fragmentation threshold value	1600
SSID	Wireless LAN service area identifier of the RB (case sensitive)	wireless
Hide SSID	Yes or No	No
Deny ANY	Yes or No	No
Station Name	Show the name of the AP	ap
WEP Key	Push the "KeyGen" button to generate the WEP key patterns automatically	wepkey
WEP	1. WEP128 2. WEP64 3. Disable	Disable
Default Key	Select a WEP key to encrypt each frame transmitted from the radio using one the of the 4 Keys from the Key Panel	1
Key Panel	When you use WEP to communicate with the other wireless clients, all the wireless devices in this network must have the same encryption key or pass phrase. ***Note: each key must consist of hex digits, it means that only digit 0 -9 and letters A-F are valid entries. If entered incorrectly, program will not write keys to a driver.***	

7.2 Utility

7.2.1 Software Upgrade

Parameter	Description	Default Value
TFTP Server IP Address	Specify the IP address of the TFTP server to upgrade the firmware of the RB	192.168.2.100
Upgrade Filename	Program Image	soho.bin
	Web Image	pfs.img

7.2.2 Administration

Parameter	Description	Default Value
Supervisor ID	Supervisor's identity code	root
Supervisor Password	Supervisor's password	root
Password Confirm	Confirm the password again	root

Chapter 8. Regulatory Compliance Information

Radio Frequency Interference Requirements
This device complies with Part 15 of FCC Rules and Canada RSS-210.
Operation is subject to the following conditions:
This device may not cause harmful interference.
This device must accept any interference received, including interference that may cause undesired operation.

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 20 cm between the radiator & your body.

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

Interference Statement
This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules and Regulation. 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 instruction manual, may cause harmful interference to nearby TV's, VCR's, radio, computers, or other electronic devices. To minimize or prevent such interference, this equipment should not be placed or operated near these devices. If interference is experienced, moving the equipment away from them will often reduce or eliminate the interference.

However, there is no guarantee that interference will not occur in a particular installation. If the 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:
Re-orient 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 which the receiver is connected.
Consult the dealer or an experienced radio/TV technician for help.

Professional Installation
Per the recommendation of the FCC, the installation of high gain directional antenna to the system, which are intended to operated solely as a point-to-point system and whose total power exceeds +30dBm EIRP, require professional installation. It is the responsibility of the installer and the end user that the high power systems are operated strictly as a point-to-point system.
Systems operating as a point-to-multipoint system or use non directional antennas cannot exceed +30dBm EIRP power requirement under any circumstances and do not require professional installation.

Information to user
The user manual or instruction manual for an intentional orunintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authurity to operate the equipment.