## IEEE 802.11b Outdoor Wireless Client Bridge

## **User Manual**

## November 03, 2004 Version 1.00



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

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## **Chapter 1. Introduction**

## 1.1 Introducing the Wireless client bridge

The Wireless client bridge is a fully interoperable with IEEE 802.11b compliant Outdoor Wireless Last-mile product. The Wireless client bridge operates in remote bridge mode, and connects Outdoor Wireless Router Bridge to construct point-to-point as well as point-to-multipoint topologies, for maximum flexibility in configuring building-to-building networks to WISP.

#### **1.2 Product Features**

- ✓ Outdoor enclosure in compliance with IP67
- ✓ RF transmit power 100mW (20dBm) with -85dBm Rx sensitivity
   @ 11Mbps data rate
- ✓ Embedded 9dBi patch directional antenna
- ✓ Support 24VDC 0.8A Power-over-Ethernet
- ✓ NAT/NAPT and Virtual Server Mapping support
- ✓ MIB-II and Private MIB support
- MAC address based access control

### **1.3 Package Contents**

The product package contains the following items.

- 1. One (1) Wireless client bridge Outdoor Wireless Client Bridge unit
- 2. One (1) 100~240VAC, 50~60Hz AC/DC adapter with wallmount plug and DC plug power cord
- 3. One (1) 24VDC, 830mA Inline Power Injector (PoE)
- 4. Three (3) water protect kit consists of 3 of components
- 5. One (1) 1.8m grounding wire
- 6. One (1) User manual CD-disc
- 7. One (1) wall/mast mounting kit, including one (1) band clamp

## **1.4 System Requirements**

Installation of the Outdoor Wireless Client Bridge requires the following:

- 1. A Windows-based PC/AT compatible computer or Ethernet data device with an available RJ-45 Ethernet port to run the configuration program or with TCP/IP connection to the Ethernet network.
- 2. A 10/100Base-T Ethernet RJ-45 Ethernet cable is connected to Ethernet network.
- **3.** A RS-232 consol port cable is connected to PC/AT compatible computer.
- 4. An AC power outlet (100~240V, 50~60Hz) supplies the power.

## 1.5 Inline Power Injector (PoE)

The Wireless client bridge is equipped with an Inline Power Injector module. The Inline Power Injector (PoE) delivers both data and power to Wireless client bridge unit via a signal Ethernet cable, and gives the following benefits to improve the performance vs. installation cost ratio.

- 1. This works great in areas where you may not have power and/or Ethernet easily accessible, like house roof.
- 2. This also allows you to place the Wireless client bridge unit closer to the antenna, more easily thus reducing signal loss over antenna cabling.
- **3.** Ethernet signal travels well over CAT 5 cable but 2.4GHz signal doesn't do as well over antenna cabling.
- 4. Ethernet cabling is much cheaper than Antenna cabling.

## **Chapter 2. Installation and Basic Configuration**

This chapter describes the procedures of installing the Wireless client bridge.

## 2.1 Before You Start

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

- 1. Wireless client bridge Outdoor Wireless Client Bridge unit
- 2. AC/DC adapter 100~240VAC, 50~60Hz with wall-mount plug and DC plug power cord
- 3. Inline Power Injector (PoE) 24VDC, 830mA
- 4. Water protect kit consists of three of components
- 5. Grounding wire 1.8m
- 6. User manual CD-disc
- 7. Wall/mast mounting kit, including one (1) band clamp



# 2.2 Locate the Wireless client bridge and Inline Power Injector Ports

- Interface on the Wireless client bridge Unit
  - Ethernet Port 1 for connecting the RJ-45 CAT-5 Ethernet cable.
  - ✓ RS-232 Console Port 2 for connecting the 1.8m RS-232 null modem console cable.
- **NOTE:** The RJ-45 Ethernet cable is not provided in Wireless client bridge shipping package as an accessory. User can find one from computer store in accordance with the length required for outdoor deployment.
- NOTE: How to make up Water protect kit



PS: 1. Red line is RJ-45 cable 2.Use dryer blew Ardent shrink casing pipe





Interface on the Inline Power Injector

- ✓ **Data Input Port 3** for connecting cross-over Ethernet Cable to PC or straight Ethernet cable to Hub Switch Router.
- ✓ 110~240VÅC, 50~60Hz AC/DC power adapter DC Input Port
   ▲
- ✓ Power & Data Output Port 5 for connecting the 30m RJ-45 CAT-5 Ethernet Cable.
- ✓ Grounding Port 6.
- **NOTE:** The cross-over or straight type Ethernet cable is not provided in Wireless client bridge shipping package as an accessory. User can find one from computer store in accordance with the length required for indoor deployment.



The Wireless client bridge can be mounted on the wall, you can use the Wall Mount kit to mount the Wireless client bridge as shown in **Figure 2.2.1**.





You can also mount the Wireless client bridge to the mast as shown in **Figure 2.2.2**.



Figure 2.2.2

## 2.3 Preparing Installation

Before installing Wireless client bridge for the outdoor application in a hardto-reach location, we recommend to configure and test all the devices first.

For configuring the Wireless client bridge, please follow the quick steps below to power up the Wireless client bridge.



- Step 1 Attach the 1.8m RS-232 null modem console cable to the Console Port on the Wireless client bridge unit (refer to <u>page 4</u>), and the other end (DB9 female type) to a terminal or a PC running a terminal emulation program.
- Step 2 Plug the DC plug of the AC/DC power adapter into the DC Input Port of Inline Power Injector and the wall-mount plug into a power outlet or power strip (refer to page 4). The Power LED on the Inline Power Injector will light up.
- Step 3 Run the cross-over type uplink Ethernet cable from Data Input Port (refer topage 4) to the Ethernet port on a PC

**NOTE:** This connection is required for setting up initial configuration information. After configuration is completed, the RS-232 null modem console cable shall be removed, and run a cross-over Ethernet cable from **Data Input Port** to PC, or a straight Ethernet cable to LAN connection, e.g. Hub.

Step 5 Attach one straight Ethernet cable to the **Power & Data Output Port** on the Inline Power Injector(refer to <u>page 5</u>).

Step 6 Plug the other end of the straight Ethernet cable to the Ethernet Port (refer to page 5) on the Wireless client bridge.

When the Wireless client bridge receives power over the Ethernet cable, the Wireless client bridge will start its boot sequence and the **Active** LED on the Inline Power Injector will light up.

You can configure the Wireless client bridge via HTML browser, such as Microsoft Internet Explorer or Netscape Navigator from a remote host or PC.

## 2.4 Basic Configuration

#### 2.4.1 What you need to know

The Wireless client bridge can be configured into two operation roles, including **Wireless Client Bridge** and **Wireless Client Router**.

The Wireless client bridge is shipped with default configuration to function as a client bridge between an Ethernet and Wireless network by attaching Wireless client bridge to the wired LAN simply. If user would configure Wireless client bridge, please refer to the following procedures.

#### 2.4.2 Basic Configuration Steps

This section describes a five-step configuration procedure to setup Wireless client bridge workable upon your topology requirement.

- Step 1 Select an operation mode for Wireless client bridge on the web page "/General Config/System/", and click FINISH to refresh this page.
- Step 2 Modify the factory-default parameters on the web page "/General Config/System/", and click FINISH to save the changes.
- Step 3 Modify the factory-default parameters on the web page "/General Config/Wireless/", and click **FINISH** to save the changes.
- Step 4 (Optional) Modify other parameters on the web page "/General Config/", and click **FINISH** to save the changes.
- Step 5Move to page "/Utility/Administration/", select theSavethen Restartand then click FINISHto take effect on the previous<br/>configuration changes.

#### 2.4.3 Login into the Web Interface

The Wireless client bridge supports access to the configuration system through the use of an HTTP Interface.

#### Web Configuration

Before configuring Wireless client bridge, user needs to know the IP Address assigned to the unit. When shipped from the factory, the IP Address **192.168.5.99** was assigned to the Wireless client bridge by default. **To start a web connection, use http://192.168.2.1** 

#### Identify the IP Address assigned to the unit

However, user may change the IP Address later and cannot connect the unit by using the default IP Address. In this case, it is a must to identify the Wireless client bridge current IP Address before configuring. To identify the IP Address, user can use the serial port (refer to <u>page 4</u>) to gain access of the current network status.

To start a Serial Port connection by following the steps below.

- Step 1 Attach the RS-232 null modem console cable (refer to page 4 and page 6) to the RS-232 Console Port on Wireless client bridge. Connect the other end to a terminal or a PC running a terminal emulation program.
- Step 2 Set the terminal to 115200 baud rate, None Parity, 8 data bits, 1 Stop bit, and ANSI compatible.
- **Step 3** Run a terminal emulation program on PC, such as **Hyper Terminal**, and set the following connection properties.
  - Step 3.1 Click the Start icon > Program > Accessories > Communication > Terminal.
  - Step 3.2 Create a new connection file, and select a Com Port <COM1, COM2, etc., depending on PC> with 115200bps / 8-bits / 1-stop.
  - Step 3.3 Click the properties icon in the Tool Bar > setting > select Emulation terminal VT100 > ok.

- Step 4 Reboot Wireless client bridge.
- Step 5 When the Wireless client bridge is powered up, the "Current Network Status" will be displayed as shown below.



#### Web Access Procedures

Once you identify the IP Address assigned to Wireless client bridge, use web browser to configure Wireless client bridge through the HTTP Interface. The following procedure explains how to configure each item.

Step 1 Open your browser and enter the IP Address

Step 2 Press <ENTER> key and the Wireless client bridge Login screen appears as shown below.

Enter Nets	work Passwoi	ď	<u>?</u> ×
<b>?</b> >	Please type yo	our user name and password.	
(J	Site:	192.168.2.1	
	Realm	System Setup	
	<u>U</u> ser Name	root	
	<u>P</u> assword	****	
	Save this	password in your password list	
		OK Car	icel

Step 3 Enter "root" in the User Name and the Password fields, and clickOK to enter the web configuration user interface screen as shown below.



#### Web Configuration Structure

The web configuration user interface is grouped into a tree structure, and contains the following settings or information.

∇ General Configuration

- System
- TCP/IP
  - SNMP
- Wireless
- - System Info
  - Statistic Info

- Site Survey
- Wireless Link Info

- 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 viewing and modifying the parameters.

## 2.4.4 Set IP Address, Subnet Mask, Default Route IP



#### Host Information

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

#### IP Use MAC Addr.

You can choice Enable or Disable. If you choice Enable , it will set IP = 10.X.X.X that used to last 3 MAC Address ID.

For example :

MAC Addr = 00:47:55:43:43:49 => IP = 10.67.67.73(43hex=67decimal) If you choice Disable you need setting **Bridge IP Address Information**.

#### Bridge IP Address

Use this setting to assign or change the Wireless client bridge 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 Gateway IP Address

Enter the default Gateway IP Address, and click **FINISH** at the bottom of this page to complete the modification of this page.

#### 2.4.5 Set Wireless Encryption for Wireless Interface

The Wireless client bridge supports 64-bit and 128-bit WEP encryption.

For **64-bit** WEP encryption, an encryption key is 10 hexadecimal characters (0-9 and A-F) or 5 ASCII characters.

For **128-bit** WEP encryption, an encryption key is 26 hexadecimal characters or 13 ASCII characters.

Modify the WEP encryption parameters on the web page "/General Config/Woreless/". Enter 1~15 characters into the WEP Key field, and click KeyGen to generate the WEP64 or WEP128 key patterns.

#### 2.4.6 Change Supervisor Account & Password

Enter the **Utility > Administration** page. The figure below shows the **Utility/ Administration** page.



#### Supervisor Account

Change the supervisor's user name and password in the **Supervisor Account** field, and click **FINISH** to take effect on the previous configuration changes.

#### Apply the New Settings

Step 1 Enter the Utility > Administration page, select the Save then Restart to apply the new configuration settings.

Step 2 Click **FINISH** to take effect on the previous configuration changes.

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

#### 2.4.7 Upgrade the Firmware

#### Setup your TFTP Server

The Trivial File Transfer Protocol (TFTP) Server allows you to transfer files across a network. You can download the firmware files for Wireless client bridge upgrades.

After the TFTP Server is installed, make sure you have the proper TFTP Server IP address, the proper Wireless client bridge firmware files, and the TFTP Server is operational.

#### Update the Firmware using the TFTP method

- Step 1 Enter the Utility > Software Upgrade page as shown in the figure below, and can use TFTP to upgrade Wireless client bridge. Here, user 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.
- **Step 2** If the upgrade process is success, the Wireless client bridge will apply the new settings and start rebooting right away.

**Hint:** You must set up a TFTP Server and this server must contain the latest new image files.

🗿 Wireless Client Bridge Remote M	lanagemer	nt and Config	guration - Microsoft I	nternet Explorer			
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Wireless							
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			U	tility - Softwa	are Upgr	ade	
System     TCP/IP	Please	e Fill in Th	e Following Softwa	re Upgrade Information:			
- SNMP • Wireless							
<ul> <li>Security         <ul> <li>MAC filter</li> <li>MAC filter</li> </ul> </li> </ul>		and the second s	IP Address: 192.166				
Firewall		Select	Upgrade Mode				
			Program Image				
<ul> <li>System Info</li> <li>Statistic Info</li> </ul>			Web Image	SUFS.Img			
<ul> <li>Site Survey</li> <li>Wireless Link Info</li> </ul>			, ,				
⊽ Utility							
<ul> <li>Software Upgrade</li> <li>Administration</li> </ul>							
http://192.168.2.1/util/swup.sht						1 1	創業

#### Upgrade the Firmware using RS-232 console

Please refer to <u>Provision 2.4.3</u> that introduces how to use RS-232 console port.

- Identify the IP Address assigned to the unit.
- Step 1 If the connection is normal, when the Wireless client bridge is powered up, the "Current Network Status" will be displayed as



shown below.

Step 2 Press <Esc> keystroke to reboot the Wireless client bridge. Press <x> key during the boot process, and it will display prompt character NetARM> as the figure shown in the next page.

11	Packet Filter Rules Initialized !!!
ш	RUNTASK id=11 httpd timer task
ш	RUNTASK id=12 hting Multitask
ш	
U	Software Version : HWLAN 1.31.201RC2
Ш	Current Network Stat= 192.168.2.1
Ш	
ш	Bridge MAC Address = [00-02-6F-01-76-C2]
ш	Wireless LAN Chterface IP = 192.168.10.1
ш	Press 's' or 'S' to show Current Network Status.
ш	Press 'Esc' to reboot.
ш	hwlan shut
ш	hwlan shut
ш	LOOPBACK device O SHUTDOWN!
ш	now rebooting ng System Check.
ш	now reducting ng system check.
ш	
Ш	
Ш	
ш	4510B BIOS Version 1.01B 2002/08/05
ш	Little Endian/10.32192M
ш	Toshiba TCx
ш	Now, switch to [Xmodem] protocol!!
Ш	
Ш	NetARM>
U	Here we believe and the second s

Step 3 Press "h" keystroke, it will display related commands as the figure shown below.



**Step 4** Select "**F** -- **upgrade Flash memory**" and it will display upgrade items for selection as the figure shown below.

		1B 2002/08/09 k	5			1
Little End Toshiba TC NetARM> h D memor E Erase G Go, s S Save H Help M Dump W Write X Switc	ian/10.32192 SBFUT160A fo y Dump flash memor de Flash mem cart rom ima inage to fil messages flac address Mac address h download/u Program to	und. y section ory ge e	01			
NetARM> f 1:BOOT 3:S select are		G, 5:APFW, 6	CONFIG, 7	:SSMAC, de	fault:SOHO	

- Step 5 Select "3: SOHO" and select "4: WEBIMG" to update the firmware files one by one.
- Step 6 While the window starts to display "C" character continuously, click Transfer and select the new firmware files <soho.bin> file, press "OK" to start to transfer file to Wireless client bridge.
- Step 7 Select "4" to upgrade WEBIMG file. The procedures are the same with upgrading SOHO file (go back to step 5), but should select <pfs.img> file correctly for WEBIMG file upgrade.
- **Step 8** After the upgrade completes, remember to press "**R**" keystroke to reboot the system.

**Note:** The default transfer protocol is using "Xmodem", so please make sure you select correct protocol to download/upload files when you try to upgrade the Wireless client bridge's firmware files.

## 2.4.8 Back-up the Wireless client bridge's Configuration Files

After configuring Wireless client bridge, user can back-up the configuration files. User can upload the latest back-up files and recover the Wireless client bridge configuration to the settings specified in the back-up files.

#### Downloading Configuration Files

Just being the same with firmware upgrade procedures. After the prompt character **NetARM>** is displayed, select "**S** – **Save image to file**", and then select "**6: CONFIG**" to back-up the Wireless client bridge configuration as the figure shown below. The back-up file will be saved as <CONFIG.IMG> file.

Eile Edit View Call		2						
Now, switch to		] protocol!!						
NetARM> f 1:BOOT 3:SOHO, select area: start your xmo							OHO	
NetARM> h D memory Du E Erase fla F upgrade F G Go, start S Save imag H Help mess M Dump Mac W Write Mac X Switch do P upload Pr R Reboot	ish memory lash memo rom imag to file ages address address wnload/uy	pry ge pload protoco						
NetARM> s 1:BOOT 3:SOHO, select area:		3, 5:APFW, 6:	CONFIG,	7:SSMA	C, dei	fault:S	оно	
Connected 0:12:47	ANSIW	115200 8-N-1	SCROLL	CAPS	NUM	Capture	Print echo	

#### Uploading Configuration Files

To upload an configuration file to Wireless client bridge, user should select "F -- upgrade Flash memory" and then select "6: CONFIG". While the window starts to display "C" character continuously, click Transfer and select the preferred <CONFIG.IMG>, then press OK to start transferring file to Wireless client bridge.



**Note:** Remember to press "R" to reboot the system after you upload the configuration file to the Wireless client bridge

## **Chapter 3. Network Topologies**

This chapter describes several main types of installations implemented by using the Outdoor Wireless System commonly. 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 Wireless client bridge can only be configured into Wireless Client Router/Bridge to accomplish the broadband wireless point-to-point, pointto-multipoint systems with Central Bridge as the figure shown below.



The Wireless client bridge performs in either router or bridge mode. In a Point-to-Multipoint topology, all communication between network systems is done through a centralized agent. Among the Outdoor Wireless Router/Bridge products, the centralized agent is Central Router or Central Bridge and the individual network notes may be Wireless Client Router or Bridge.

To show the available Point-to-Multipoint topologies, the following examples are provided.

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

# 3.1 Wireless Client Bridge-to-Central Wireless Bridge



- Step 1 Set the Central Outdoor Unit <sup>\*1</sup> (hereinafter, "COU") to perform a bridge (bridge IP address: 192.168.2.1).
- Step 2 Set Wireless parameters on COU: Channel (1) and SSID (wireless)
- Step 3 Set the Remote Outdoor Unit <sup>\*2</sup> (hereinafter, "ROU") to perform a bridge (bridge IP address: 192.168.2.2).
- Step 4 Set Wireless parameters on ROU: Channel (1) and SSID (wireless), and these parameters must be the same with COU.
- **Step 5** Left side subnet is transparent to the right side.
- Step 6 DHCP server assign IP address to PC1 and PC2

#### Remarks:

- \*1 COU refers to Outdoor Wireless Router Bridge
- \*2 Both and Wireless client bridge could function the role of ROU

# 3.2 Wireless Client Router-to-Central Wireless Bridge



- Step 1 Set the COU to perform a bridge (bridge IP address: 192.168.2.1).
- Step 2 Set Wireless parameters on COU: Channel (1) and SSID (wireless).
- Step 3 Set the ROU to perform a Router (Wireless Interface IP: 192.168.2.2, Ethernet Interface IP: 192.168.10.1). It is a must to enable NAT on Wireless Interface (default route is 192.168.2.254).
- Step 4 Set Wireless parameters on ROU: Channel (1) and SSID (wireless), these parameters must same with COU.
- **Step 5** Set the DHCP server service on the ROU and apply it on Ethernet Interface.
- Step 6 The ROU assigns IP addresses to PC1 and PC2

# 3.3 Wireless Client Bridge-to-Central Wireless Router



- Step 1 Set the COU to perform a Wireless Router (Wireless Interface IP: 192.168.1.1, Ethernet Interface IP: 192.168.2.1). It is a must to enable NAT on Ethernet interface (default route: 192.168.2.254).
- Step 2 Set Wireless parameters on COU: Channel (1) and SSID (wireless)
- **Step 3** Set the DHCP server service on the COU and apply it on Wireless Interface.
- Step 4 Set the ROU to perform a Bridge (Bridge Interface IP: 192.168.1.2).
- Step 5 Set Wireless parameters on ROU: Channel (1) and SSID (wireless), and these parameters must be the same with the COU.
- Step 6 The COU assigns IP addresses to PC1 and PC2.
- **Step 7** The operator can also disable NAT behavior on COU to make the two subnets transparent.

# 3.4 Wireless Client Router-to-Central Wireless Router



- Step 1 Set the COU to perform a Wireless Router (Wireless Interface IP: 192.168.1.1, Ethernet Interface IP: 192.168.2.1, default route: 192.168.2.254).
- Step 2 Set Wireless parameters on COU: Channel (1) and SSID (wireless).
- Step 3 Set the ROU to perform a Wireless Router (Wireless Interface IP: 192.168.1.2, Ethernet Interface IP: 192.168.10.1, default route: 192.168.1.1).
- Step 4 Set Wireless parameters on ROU: Channel (1) and SSID (wireless), and these parameters must be the same with COU.
- **Step 5** Set the DHCP server service on the ROU and apply it on Ethernet Interface.
- Step 6 The ROU assigns IP addresses to PC1 and PC2.

The operator can also disable NAT behavior on COU and enable NAT behavior on ROU (**enable NAT on Wireless Interface**). In this case, any outgoing packets will transfer to **192.168.1.2**.

The operator can also enable NAT behavior on COU (enable NAT on Ethernet interface) and enable NAT behavior on ROU (enable NAT on Wireless Interface).

## **Chapter 4. Network Parameters**

## 4.1 IP Configuration

- Wireless Client Bridge
- Step 1 Enter the IP Address manually into the Bridge IP Address field.
- Step 2 Use Bridge IP Address setting to assign or change the bridge's IP address.
- Step 3 Click **FINISH** at the bottom of this page to complete the modification of IP address.

## 4.2 Configure SNMP

Select the "/General Config/ TCP/IP/SNMP", and the SNMP screen appears. The figure below shows the current SNMP community pool and trap host pool.

#### 4.2.1 Configure Community Pool

The SNMP Community Pool has five entries.

 To modify the entry, click the select button beside the entry index number and click <u>Modify</u>. The configuration page appears as the figure shown below.

			ration - Microsoft In	nternet Explorer			
檔案 (E) 編輯 (E) 檢親 (Y) 我	助最愛(A) 工	.具① 說明Œ	)				
🔇 l – A 🔹 🚫 – 💌	2 🏠 🔎	🕽 搜尋 ☆ 剝	助最爱 🜏 媒體	🚱 🎯 🍓 🖪	i • 🔜 🛍 🦓		
周址① 🍯 http://192.168.2.1/						💌 🔁 移至	連結
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Wireless							
Cliant Bridge							
Cucin Dridge							
General Config		Senera	I Config	uration - S	NMP Community Pa	rameter	
System							
TCP/IP     SNMP			ommunity Paran		attom to modify specific item.		
<ul> <li>Wireless</li> </ul>	Select o	ne community i	ndex from the table b	elow and click Woddy by	attom to modery specific item.		
<ul> <li>Security         <ul> <li>MAC filter</li> </ul> </li> </ul>		Table of gummy	t community pool:				
Firewall		1 able of curren	r community poor:				
		Index	Validaty	Access Right	Community		
Running Status     system Info		<b>⊙</b> 1	Enable	Read	public		
		02	Enable	Write	private		
<ul> <li>Statistic Info</li> </ul>		()3	Disable				
				1.1.1			
<ul> <li>Statistic Info</li> <li>Site Survey</li> <li>Wireless Link Info</li> </ul>		04	Disable				
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Statistic Info     Site Survey     Wireless Link Info      Utility     Software Upgrade	Select o	5 <b>g Following T</b> me trap host ind <b>Table of curren</b>	Disable Trap Host Parameters from the table bel	 Modify eter. low and click 'Mo dify' but	om to modify specific item.		

- 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 preferred, click FINISH.

#### 4.2.2 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 appears as following figure.

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Contraction	00	Disable				<u>^</u>
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<ul> <li>Security         <ul> <li>MAC filter</li> <li>Firewall</li> </ul> </li> <li>Running Status</li> </ul>	Config Following Select one trap host in		e <b>ter.</b> ow and click 'Modify' buttom to	) modify specific item.		
- MAC filter • Firewall Running Status • System Info • Statistic Info • Site Survey		dex from the table bel		o modify specific item. Community		
- MAC filter • Firewall Running Status • System Info • Statistic Info	Select one trap host in Table of curre	dex from the table bel nt trap host pool:	ow and click 'Modify' buttom to	÷.*.	•	
- MAC filter Firewall Running Status System Info Statistic Info Site Survey Wireless Link Info Utility	Select one trap host in  Table of curre Index	dex from the table bel nt trap host pool: Version	ow and click Modify buttom to IP Address	Community		
- MAC filter • Firewall Running Status • System Info • Statistic Info • Statistic Info • Site Survey • Wireless Link Info	Select one trap host in  Table of curre  Index  1	dex from the table bel nt trap host pool: Version Version 1	ow and click 'Modify' buttom to IP Address 192.168.2.168	Community	-	
- MAC filter Firewall System Info Status: Info Status: Info Site Survey Wireless Link Info Utility Software Upgrade	Select one trap host in Table of curre Index 0 1 2 2	dex from the table bel nt trap hest pool: Version 1 Version 2	ow and click 'Modify' buttom to IP Address 192.168.2.168 192.168.2.80	Community public public	I 	
- MAC filter Firewall System Info Status: Info Status: Info Site Survey Wireless Link Info Utility Software Upgrade	Table of curre     Table of curre     O	dex from the table bel nt trap lost pool: Version Version 1 Version 2 Disable	IP Address 192.168.2.168 192.168.2.80 	Community public public		
- MAC filter Firewall System Info Status: Info Status: Info Site Survey Wireless Link Info Utility Software Upgrade	Select one trap host in Table of curre Index 01 02 03 04	dex from the table bel nt trap lost pool: Version 1 Version 2 Disable Disable	IP Address 192.168.2.168 192.168.2.80  	Community public public		
- MAC filter Firewall Running Status System Info Statistic Info Statistic Info Vireless Link Info Utility Software Upgrade	Select one trap host in Table of curre Index 01 02 03 04	dex from the table bel nt trap lost pool: Version 1 Version 2 Disable Disable	IP Address 192.168.2.168 192.168.2.80  	Community public public		

- 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 preferred, click **FINISH**.

## 4.3 Configure Wireless related parameters

**Step 1** Select "/General Config/Wireless" and the Wireless LAN information page appears as the figure shown below.

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<ul> <li>System</li> <li>TCP/IP</li> </ul>	Wireless LAN info	rmatio	n.												
- SNMP • Wireless	Wireless LAN														
Security     MAC filter	<ul> <li>Wireless LAIV</li> </ul>	Conngu	ration:												
• Firewall	rts Threshold:	60													
	frag Threshold:	2346													
<ul> <li>System Info</li> <li>Statistic Info</li> </ul>	SSID:	wirele	ess												
<ul> <li>Site Survey</li> <li>Wireless Link Info</li> </ul>	Station Name:	ap				KeyGen									
	WEP Key:	-		100		-									
<ul> <li>Utility</li> <li>Software Upgrade</li> </ul>	WEP: Default Key:	_	(EP128	0W	/EP64	O Distant	sable								
Administration	WEP64 Key1:		01	01	01	01	-								
	WEP64 Key2:		02	02	02	01	-								
	WEP64 Key2: WEP64 Key3:		02	02	02	02	-								
	WEP64 Key4:		03	03	03	04	4								
	WEP128 Key1:		01	04	04	04	01	01	01	01	01	01	01	01	
	WEP128 Key2:		02	02	02	02	02	02	02	02	02	02	02	02	
	WEP128 Key3:		02	02	02	02	02	02	02	02	02	02	02	02	
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http://192.168.2.1/bconfig/hwlan.sht			_	_		_		_	_	_		the star		🧿 網際網路	

**Step 2** In the Wireless LAN information page, set the following parameters suitable for your radio network.

- ✓ rts Threshold (default parameter: 60)
- ✓ frag Threshold (default parameter: 2346)
- ✓ **SSID** (default parameter: **wireless**)
- ✓ Station Name (default parameter: ap)
- Step 3 Click radio button to disable WEP or enable 64/128 bit WEP services (default parameter: disable). If WEP is enabled, input corresponded Default Key index and WEP Key and then click KeyGen to generate the WEP64 & WEP128 key patterns.

**Step 4** Click **FINISH** at the bottom of this page to complete the modification.

The following gives more info about the parameters set in the Wireless LAN information page to users.

#### rts Threshold

The setting determines the packet size, ranging from **0 to 2339** bytes, 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.

#### frag Threshold

The setting determines the size, ranging from **256 to 2338** bytes, at which packets are fragmented (sent as several pieces instead of as one block). 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 **2 to 32** characters long. This string functions as a password to join the radio network.

#### 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 automatically.

#### WEP

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User can **Disable** or **enable** 64/128 bit WEP services here.

#### 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. The 40-bit WEP keys can contain any combination of 10 of these characters; the 128-bit WEP keys can contain any combination of 26 of these characters. The letters are not case-sensitive.

## 4.4 Utility

#### 4.4.1 Software Upgrade

- Step 1 Click Utility, select Software Upgrade page as the figure shown below, and then use TFTP to upgrade AP. In the Utility – Software Upgrade page, user must specify the TFTP server IP and select by which file to upgrade (Program image, Web image), then click OK button to start the TFTP upgrade process.
- **Step 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.

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		Util	ity - Software	Upgrad	e		
System     TCP/IP	Please Fill in The	Following Software U	Ingrada Information:				
- SNMP • Wireless	Tiease rm m The	Following Soltware C	pgrade information.				
Security     MAC filter		& TFTP Parameters:					
Firewall	TFTP Server	IP Address: 192.168.2.1	68				
	Select	Upgrade Mode	Upgrade Filename				
<ul> <li>Running Status</li> <li>System Info</li> </ul>		Program Image	SUSW.Bin				
<ul> <li>Statistic Info</li> <li>Site Survey</li> </ul>		Web Image	SUFS.Img				
<ul> <li>Wireless Link Info</li> </ul>							
<b>▽</b> Utility							
<ul> <li>Software Upgrade</li> <li>Administration</li> </ul>				Hell -			
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#### 4.4.2 Administration

Step 1 Click Utility, Administration. The following figure shows the Utility – Administration page.



- Supervisor Account. Change the supervisor's user name & password in the Supervisor Account field, and Click
   FINISH to take effect on the previous configuration changes.
- ✓ Apply the New Settings. Click Utility, Administration, select the Save then Restart to apply the new configuration settings.

Step 2 Click FINISH to take effect on the previous configuration changes.

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

## **Chapter 5. Monitor Information**

User can find the system running status and other information on this window. Click the **Running Status** link on the left window, use can choose which function that he wants to monitor.

#### General System Information

The following information can be found in this block.

- ✓ Product Model
- ✓ Host Name
- ✓ Software Version
- ✓ Build (Built by)
- ✓ Boot Code Version
- ✓ Web Version
- ✓ System Uptime

#### General System Status

The following information can be found in this block.

- ✓ Operation Mode
- ✓ Bridge IP Address
- ✓ Bridge Subnet
- ✓ Wireless SSID

#### Services Information

This block shows whether the following services are enabled or disabled.

- ✓ NAPT
- ✓ SNMP
- ✓ MAC Filter
- ✓ WEP encryption.

## 5.1 System Information

By selecting "Running Status/System Info", enter the System Information page as the figure shown below.

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		General Syster	Tuformation	
General Config		General Syster	II IIIIII IIIdtioli	
<ul> <li>System</li> <li>TCP/IP</li> </ul>	General System Informa	ion.		
<ul> <li>SNMP</li> <li>Wireless</li> </ul>				
<ul> <li>Security</li> </ul>	General System Inform	ation :		
<ul> <li>MAC filter</li> <li>Firewall</li> </ul>	Product Model	CB9		
	Host Name	SendFarSU		
Running Status		SendFar SU ver 1.39.003 - 2004/10/22		
<ul> <li>System Info</li> <li>Statistic Info</li> </ul>	Build	SOLUTIONS S.V.LX		
<ul> <li>Site Survey</li> </ul>	Boot Code Version	1.01BX		
<ul> <li>Wireless Link Info</li> </ul>	Web Version	1.37X 32 min 29 sec		
Utility	System Uptime	32 min 29 sec		
<ul> <li>Software Upgrade</li> </ul>	General System Status	:)		
Administration	Operation Mode	Wireless Client Bridge		
	Bridge IP Address	192.168.2.1		
	Bridge Subnet Mas	\$ 255.255.255.0		
	Wireless SSID	wireless		
		wireless		
	Service Information :			
		able		
		sable		
	WEP Encryption Di	sable		

In this page, user can find the system information and most of the running parameters.

## 5.2 Statistic Information

By selecting "Running Status/Statistic Info", the figure below shows the Statistic of Interface page.



In this page, user can find the packet statistic of each interface, Wireless and Ethernet. This statistic table includes the following information.

- ✓ In Packets
- ✓ Out Packets
- ✓ In Bytes
- ✓ Out Bytes.

## 5.3 Site Survey

By selecting "Running Status/Site Survey", enter the Site Survey page as the figure shown below

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System     TCP/IP	Site Surve	Pogo							
<ul> <li>SNMP</li> <li>Wireless</li> </ul>	Site Surve	ey Lage.							
<ul> <li>Security</li> </ul>		Survey Information :							
- MAC filter • Firewall	. She	Survey Information : SSID	BSSID	Channel	Туре	Encrypt	Signal	Select	
		3com	00:0D:54:9F:D2:0C	5	AP	no	22	0	
<ul> <li>Running Status</li> <li>System Info</li> </ul>		Sendfar_11g	00:0E:6A:D6:B1:9A	7	AP	yes	14	0	
<ul> <li>Statistic Info</li> <li>Site Survey</li> </ul>		sendfar	00:02:6F:03:0F:B0	11	AP	yes	41	0	
<ul> <li>Wireless Link Info</li> </ul>									
⊽ Utility									
<ul> <li>Software Upgrade</li> <li>Administration</li> </ul>			COK (	REFRESH (					
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In this page, user can click **REFRESH** find the AP near Wireless client bridge. This statistic table includes the following information.

- ✓ SSID
- ✓ BSSID
- ✓ Channel
- ✓ Type
- ✓ Encrypt
- ✓ Signal

## 5.4 Wireless Link Information

This item only displayed on ROU mode.

By selecting "Running Status/Wireless Link Info", the figure below shows the Radio Link Information page.



In this page, user can find the following information about the radio link.

- ✓ Link Status
- ✓ Current SSID
- ✓ SNR(C/I)
- ✓ RSL
- ✓ Noise Level
- ✓ Current Channel
- ✓ Current Tx Rate

## Chapter 6. Specifications

## 6.1 Hardware Specifications

#### General

Radio Data Rate	11, 5.5, 2 and 1 Mbps, Auto Fall-Back		
Client Interface	10/100Base-T Ethernet		
Range	300m @ 11 Mbps		
(Open environment)	400m @ 5.5Mbps		
	500m @ 2 Mbps		
	800m @ 1 Mbps		
Regulatory & Safety	FCC Part 15		
Certifications	EN 300 328-1		
	EN 300 328-2		
	EN 301 489-1		
	EN 301 489-17		
	EN 60950		
	IP67		
	DGT		
Compatibility	Fully interoperable with IEEE802.11b		
	compliant products		
Power Supply	Input: 100~240V, 50~60Hz		
(AC/DC Power Adaptor)	Output: 24V, 830mA		

#### Network Information

Network Architecture	Infrastructure (with Wireless client bridge)
Access Protocol	CSMA/CA
Roaming	IEEE802.11b compliant
Security	64-/128-bit data encryption

#### Radio Specifications

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	North America: 11
	Japan:14
	Europe: 13
	Spain:2
	France: 4
Transmit Power	10dBm (ETSI)
	19dBm (FCC)
Antenna	External 5dBi dipole antenna, or
	Embedded 9dBi patch antenna
Sensitivity @ FER=0.08	11 Mbps < -85dBm
-	5.5 Mbps < -88dBm
	2 Mbps < -91dBm
	1 Mbps < -93dBm

#### Environmental

Temperature Range	Operating: 0 to 55°C
	Storage: -20 to 75°C
Humidity (non-condensing)	5% to 95% typical

#### Physical Specifications

Dimensions	138.7mm x 104.0mm x 38.0mm
Weight	500g

## 6.2 Software Specifications

Protocol	TCP/IP
	DHCP Client
	802.1d Transparent Bridging
Security	64-/128-bit WEP encryption
-	MAC address based access control
Management	Web-based Manager
	Console (RS-232) configuration
	SNMP v1
	SNMP MIB-II
	Private MIB
Firmware upgrade	TFTP (Trivial FTP)
	Xmodem, 1K Xmodem
	Zmodem

## Chapter 7. Default Settings

## 7.1 General Configuration

### 7.1.1 System

Parameter	Description	Default Value
Host Name	Host name for the RB	ISP
IP Use MAC Addr.	You can choice IP produced method .	Disable
Bridge IP Address	For Wireless Client Bridge with	192.168.2.1
Bridge Subnet Mask	Operation Mode	255.255.255.0
Default Gateway IP Address	IP address of the gateway for default route when TCP/IP filtering	192.168.2.254

### 7.1.2 SNMP

#### 7.1.2.1 Table of SNMP Community Pool

Para	meter	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	Read
Index 2			Write
Index 3			
Index 4			
Index 5			
Index 1		Specify the type of community	public
Index 2	Community	(public or private) for SNMP	private
Index 3		Manager	
Index 4			
Index 5			

## 7.1.2.2Table of SNMP Trap Community Host Pool

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

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. <i>Note: each key must consist</i> 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.	
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### 7.1.3 Wireless LAN

Parameter	Description	Default Value
RTS Threshold	Set RTS (Request To Send) threshold value	60
Fragmentation Threshold	Set fragmentation threshold value	2346
SSID	Wireless LAN service area identifier of the RB (case sensitive)	wireless
Station Name	Show the name of the AP	ар
WEP Key	Push the "KeyGen" button to generate the WEP key patterns automatically	wepkey
WEP	<ol> <li>WEP128</li> <li>WEP64</li> <li>Disable</li> </ol>	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

## 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
Ungrada Filanama	Program Image	SUSW.Bin
Upgrade Filename	Web Image	SUFS.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 C 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.

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#### 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 or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### Declaration of Conformity

Declares that the product:

Date : November 18, 2003 Model Number : Wireless client bridge Equipment Type : Wireless Access Bridge Made in Taiwan

Complies with Part 15 Class C 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.

European Community – CE Notice Marking by the symbol :

# CE

Indicates compliance with the essential requirements of **Directive 1999/5/EC**. Such marking is indicative that this equipment meets or exceeds the following technical standards:

- ✓ EN 300 328-2
- ✓ EN 301 489-1
- ✓ EN 301 489-17
- ✓ EN 60950

Marking by the symbol :

## €0560

Indicates compliance with the essential requirements of **R&TTE Directive 99/5/EC**, and the product is permitted to be used in the following EC countries, including **Germany**, **UK**, **The Netherlands**, **Belgium**, **Norway**, **Sweden**, **Denmark**, **Finland**, **France**, **Italy**, **Spain**, **Austria**, **Iceland**, **Ireland**, **Portugal**, **Switzerland**, **Greece and Luxembourg**.

#### ■ 中華民國交通部電信總局低功率射頻電機型式認證 型式認證標籤式樣:

## **副電波93LP0030**

依據交通部電信總局『低功率輻射性電機管理辦法』第十四條規定,經型式 認證合格之低功率射頻電機,非經許可,公司、商號或使用者均不得擅自變 更頻率、加大功率或變更原設計之特性及功能。

依據交通部電信總局『低功率輻射性電機管理辦法』第十七條規定,低功率 射頻電機之使用不得影響飛航安全及干擾合法通信;經發現有干擾現象時, 應立即停用,並改善至無干擾時方得繼續使用。前項合法通信,指依電信法 規定作業之無線電信。低功率射頻電機須忍受合法通信或工業、科學及醫療 用電波輻射性電機設備之干擾。