ZDC Dual-RF Outdoor Wireless Access

ZA-5000-D

User's Manual

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FCC Information

This equipment has been tested and found to comply with the limits for Class digital devices pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

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 radio communication.

Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at this own expense.

The user should not modify or change this equipment without written approval from company name. Modification could void authority to use this equipment.

For the safety reason, people should not work in a situation which RF Exposure limits be exceeded. To prevent the situation happening, people who work with the antenna should be aware of the following rules:
Install the antenna in a location where a distance of 20cm from the antenna may be maintained.
While installing the antenna in the location, please do not turn on the power of wireless card.
While the device is working, please do not contact the antenna.

About the manual

The purpose to use this manual is for install the Wireless Outdoor Bridge. This manual is including disposing course and method and helping the customer to solve the unpredictable problem.

ZDC ZA-5000-D
User's Manual
2005.4

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1. ZA-5000-D Introduction

- ➢ **Appearance of Product**
- ➢ **Features and Benefits**
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The next-generation Broadband Wireless Access device － ZA-5000-D Dual-RF Outdoor Wireless Access Point, Simultaneously works as 5GHz Bridge and 2.4GHz Access Point. The new features and benefits are: support POE (power over Ethernet); support testlink, use this utility, you can place the antenna in the best place. Surface packing is full block out and with waterproof function. The Access Point provides powerful features.

Appearance of Product

Features and Benefits

The Access Point's Wireless 1 works as 5GHz Bridge.
The Access Point's Wireless 2 works as 2.4GHz AP.
The Access Point has a build-in 23dBi 5GHz antenna and an N type connector.
MAC address control
Easy to install and friendly to user, just plug and play
Provides Web-based configuration utility
Tight design with lightweight, compact size, and low power consumption
Support power over Ethernet
Waterproof and can place into outdoor directly
Test-link utility, help you place your antenna at the best place

Representative Application

The Access Point offer a fast, reliable, cost-effective solution for wireless client access to the network in applications like these:

◆Remote Access to Corporate Network Information
E-mail, file transfer and terminal emulation.

◆Difficult-to-Wire Environments

Historical or old buildings, asbestos installations, and open area where wiring is difficult to deploy.

◆Frequently Changing Environments

Retailers, Manufacturers and those who frequently rearrange the workplace and change location.

◆Temporary LANs for Special Projects or Peak Time

Trade shows, exhibitions and construction sites where a temporary network will be practical; Retailers, airline and shipping companies need additional workstations during peak period; Auditors requiring workgroups at customer sites.

◆Access to Database for Mobile Workers

Doctors, nurses, retailers, accessing their database while being mobile in the hospital, retail store or office campus.

◆SOHO (Small Office and Home Office) Users

SOHO users need easy and quick installation of a small computer network.

◆High Security Connection

The secure wireless network can be installed quickly and provide flexibility.

System Requirement

Installation of the Access Point requires:

◆ A RJ-45 connector, supports the transfer rate of 10/100bps data.

◆ A PC of install the following WEB browsers, Microsoft Internet Explorer 6 and fix Service Pack 1 or the newer patch and wrapped up Q323308.

⚠	Notice: Please use more than Microsoft IE 6. 0!

◆ One 48V, 1A power module, in order to power supply of the Access Point.

2. Hardware Installation

- ➢ **Product Kit**
- ➢ **Hardware Installation**

Product Kit

Before installation, make sure that you the following items:
ZA-5000-D*1
DC Injector*1
Product CD*1
Power Adapter*1
Fixed settings*1

If any of the above items are not included or damaged, please contact your local dealer for support.
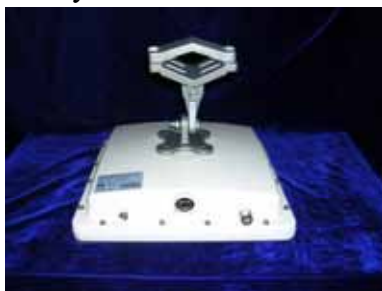
Hardware Installation

Take the following steps to install the Access Point.

◆Hardware equipment

◆Fixation
First you should fix the Access Point, the following figure show it:

◆Connect the Ethernet Cable
The Access Point supports 10/100M Ethernet connection. Attach UTP Ethernet cable to the RJ-45 connector on the Access Point. Then connect the other end of the RJ-45 cable to a hub or a

station.

Put UTP cable through the water-joint

Make the RJ-45 connector:
white orange｜orange   white green｜blue   white blue｜green   white brown｜brown

Plug water-joint into the Access point, and close the water-joint.

⚠	Notice: For protected integrated 23dBi gain antenna of wireless1, Surface of device was placed plastic protective pellicle, when you use device, please rip away.

⚠	Notice: Wireless2 of device need additional high gain antenna, you may select appropriate antenna by real situation, and suggest that there has long distance between antenna of wireless1 and antenna of wireless2 for preventing interference.

⛔	Warning: Please confirm ground connection of the Access Point.

3. Configuring ZA-5000-D

Using the Web Management
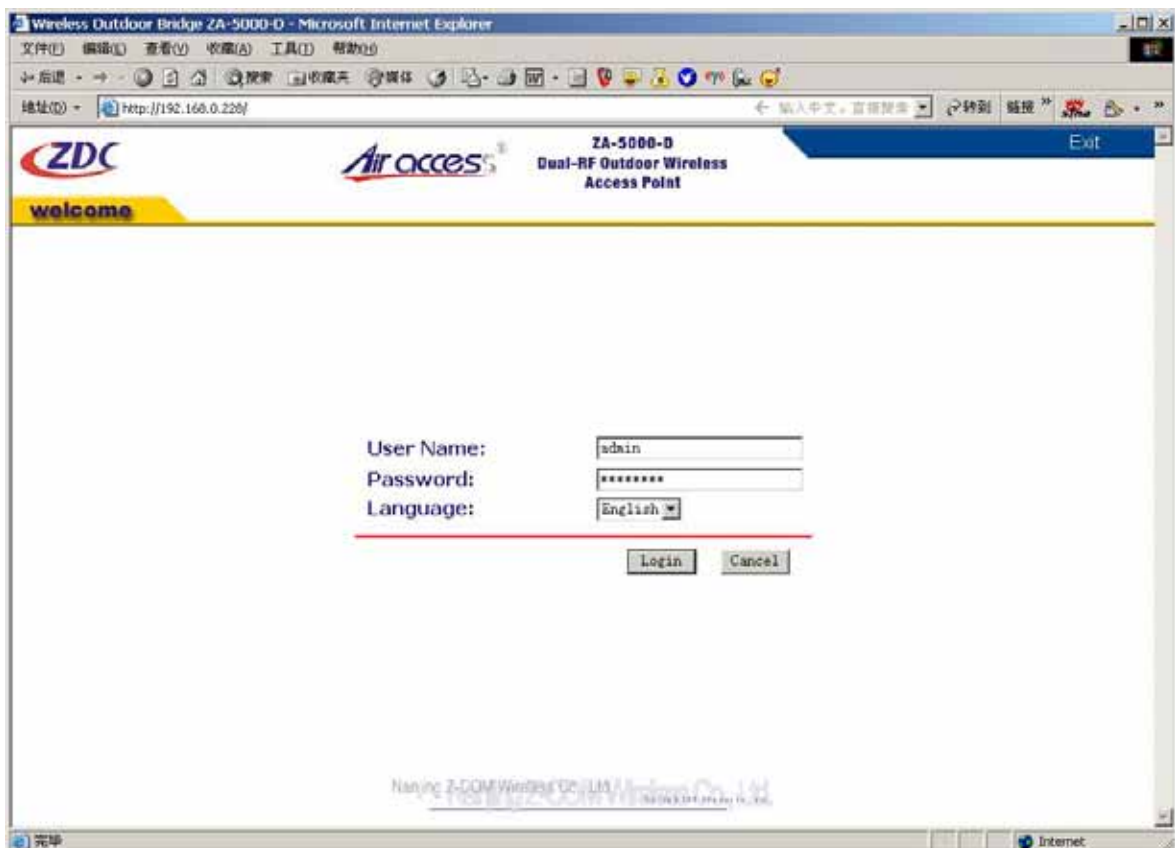
Picture1   Enter

The built-in Web Management provides you a user-friendly graphical user interface. The Access Point allows you via web browser (MS Inter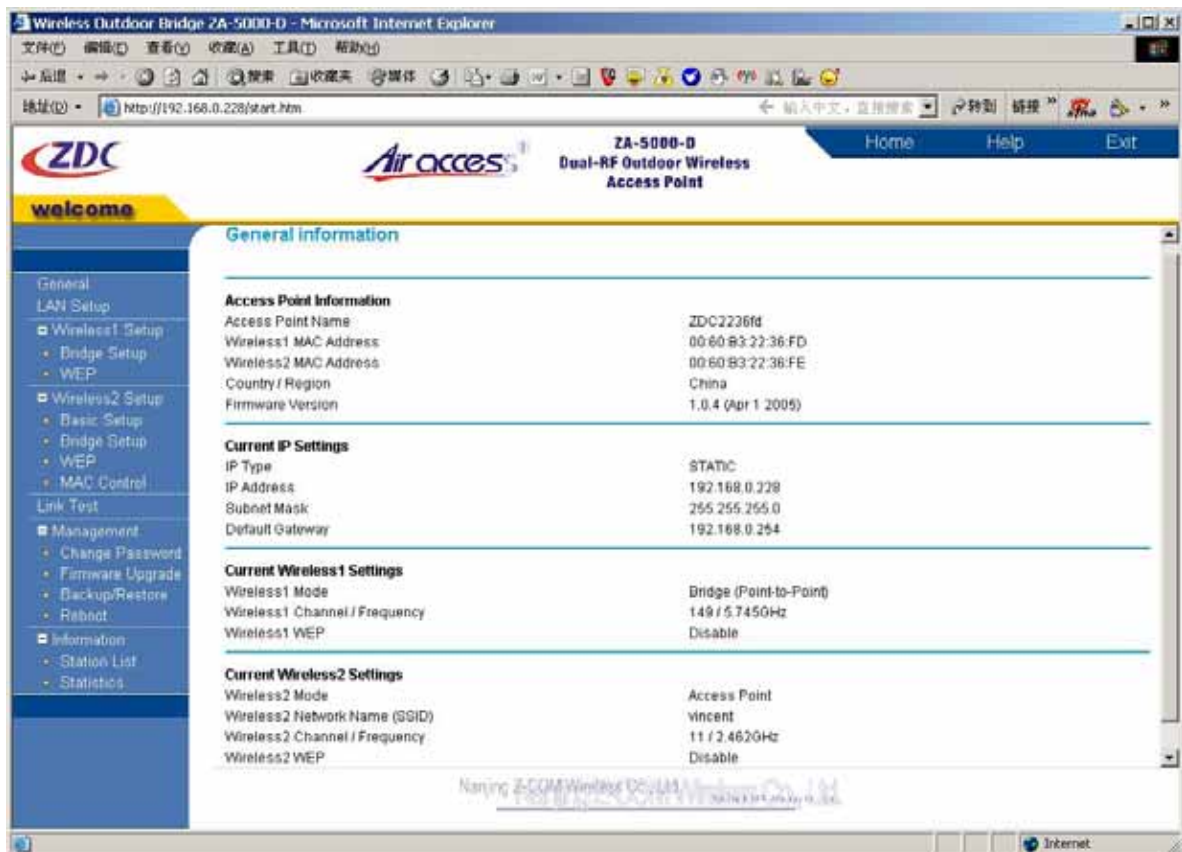net Explorer 6.0) to monitor and configuration. Run Web Explorer, Enter default IP Address (**192.168.0.228**) of the Access Point in the Address field. Enter default User Name (**admin**) and default Password (**password**), Click Login button. The

main page will show up.

The Access Point allows configuration only via Web.

General

Picture2   General

The Access Point General Information page displays current settings and statistics for your Access Point. As this information is read-only, any changes must be made on other pages.

Access Point Information: General information.

Current IP Settings:
These are the current settings for IP address, Subnet Mask, Default Gateway and DHCP settings.

Current Wireless1 Settings:
These are the current settings for the Access Point's Wireless1.

Current Wireless2 Settings:
These are the current settings for the Access Point's Wireless2.

LAN Setup
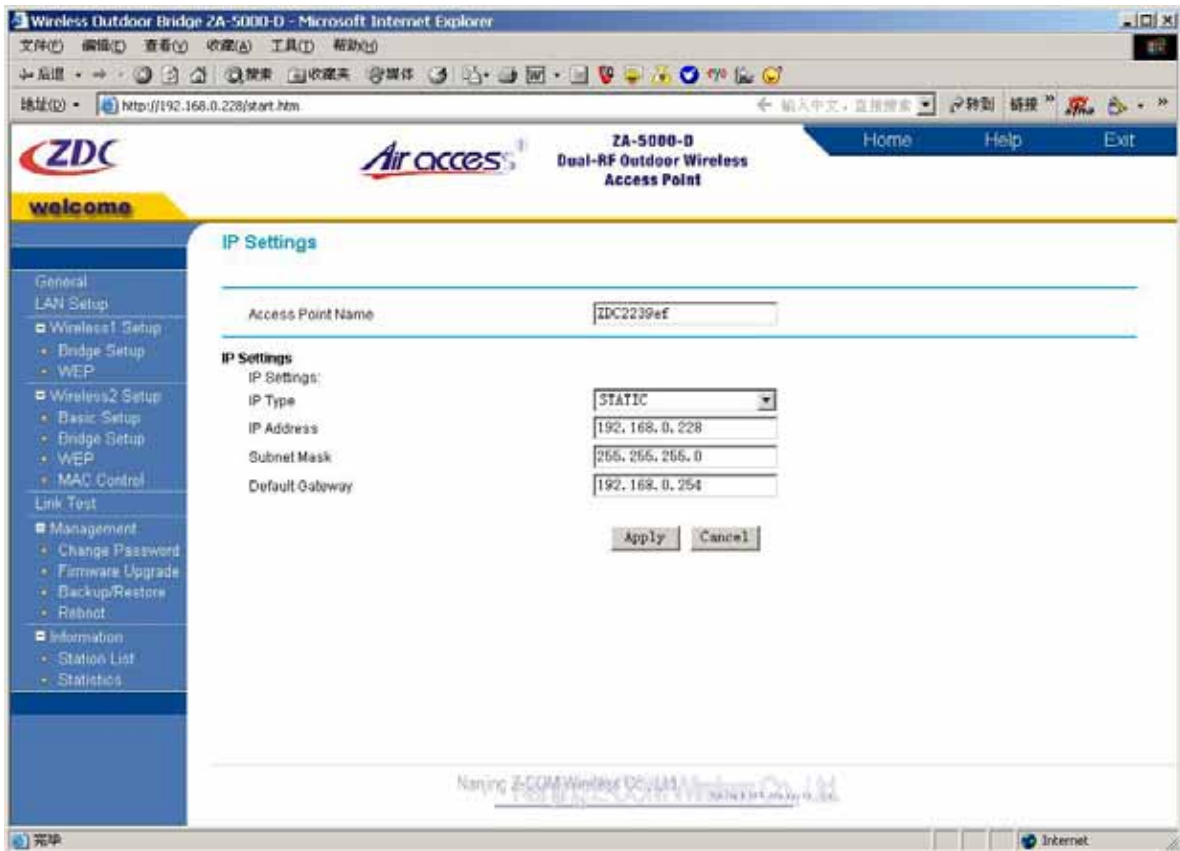
Picture3   IP Settings

The default values are suitable for most users and situations.

Access Point Name:
This unique name is the access point NetBIOS name. You may modify the default name with a unique name up to 15 characters long.
Default: ZDCxxxxxx, where xxxxxx represents the last 6 digits of the Access Point card1's MAC address.

IP Type:
By default, The Access Point is set IP Type to STATIC. The access point will get the IP address, subnet mask and the default gateway settings automatically from the DHCP server if DHCP is enabled.

IP Address:
Type the IP address of the Access Point (**Default: 192.168.0.228**).

IP Subnet Mask:
The Access Point will automatically calculate the subnet mask based on the IP address that you assign. Otherwise, you can use 255.255.255.0 as the subnet mask.

Default Gateway Address:

The Access Point use this IP address as default router gateway for any traffic beyond the local network.

Wireless1 Setup
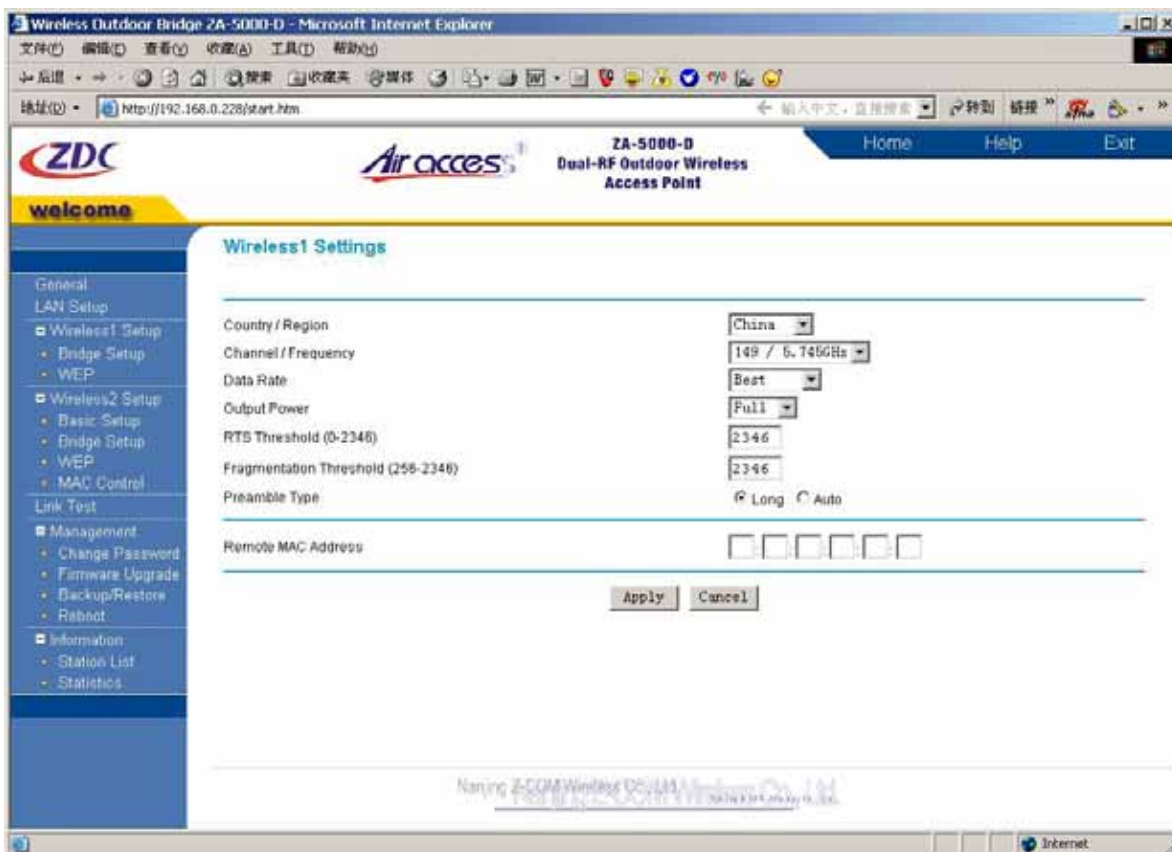
Picture 4   Wireless1 Settings

Country/Region:

Select your country or region from the drop-down list. This field displays the region of operation for which the wireless interface is intended. It may not be legal to operate the Access Point in a country/region other than the country/region shown here. If your country or region is not listed, please check with your local government agency or check our website for more information on which channels to use.

Default: China

Channel/Frequency:

Select the channel you wish to use on your wireless LAN.

Default: 149

⚠	Note: If you experience interference (shown by lost connections and/or slow data transfers) you may need to experiment with different channels to see which is the best.

Data Rate:

Shows the available transmit data rate of the wireless network. The possible data rates supported are: 6 Mbps,9 Mbps, 12 Mbps, 18 Mbps,24 Mbps, 36 Mbps, 48 Mbps and 54 Mbps.
Default: Best.

Output power:

Shows the available transmit power of the access point. The possible Tx power options are: Full, 50%, 25%, 12.5%, minimum. The transmit power may varies depends on the local regulatory regulations.
Default: Full.

RTS Threshold:

Request to Send Threshold. The packet size that is used to determine if it should use the CSMA/CD (Carrier Sense Multiple Access with Collision Detection) mechanism or the CSMA/CA mechanism for packet transmission. With the CSMA/CD transmission mechanism, the transmitting station sends out the actual packet as soon as it has waited for the silence period. With the CSMA/CA transmission mechanism, the transmitting station sends out an RTS packet to the receiving station, and waits for the receiving station to send back a CTS (Clear to Send) packet before sending the actual packet data.
Default: 2346

Fragmentation Threshold:

This is the maximum packet size used for fragmentation. Packets larger than the size programmed in this field will be fragmented. The Fragment Threshold value must be larger than the RTS Threshold value.
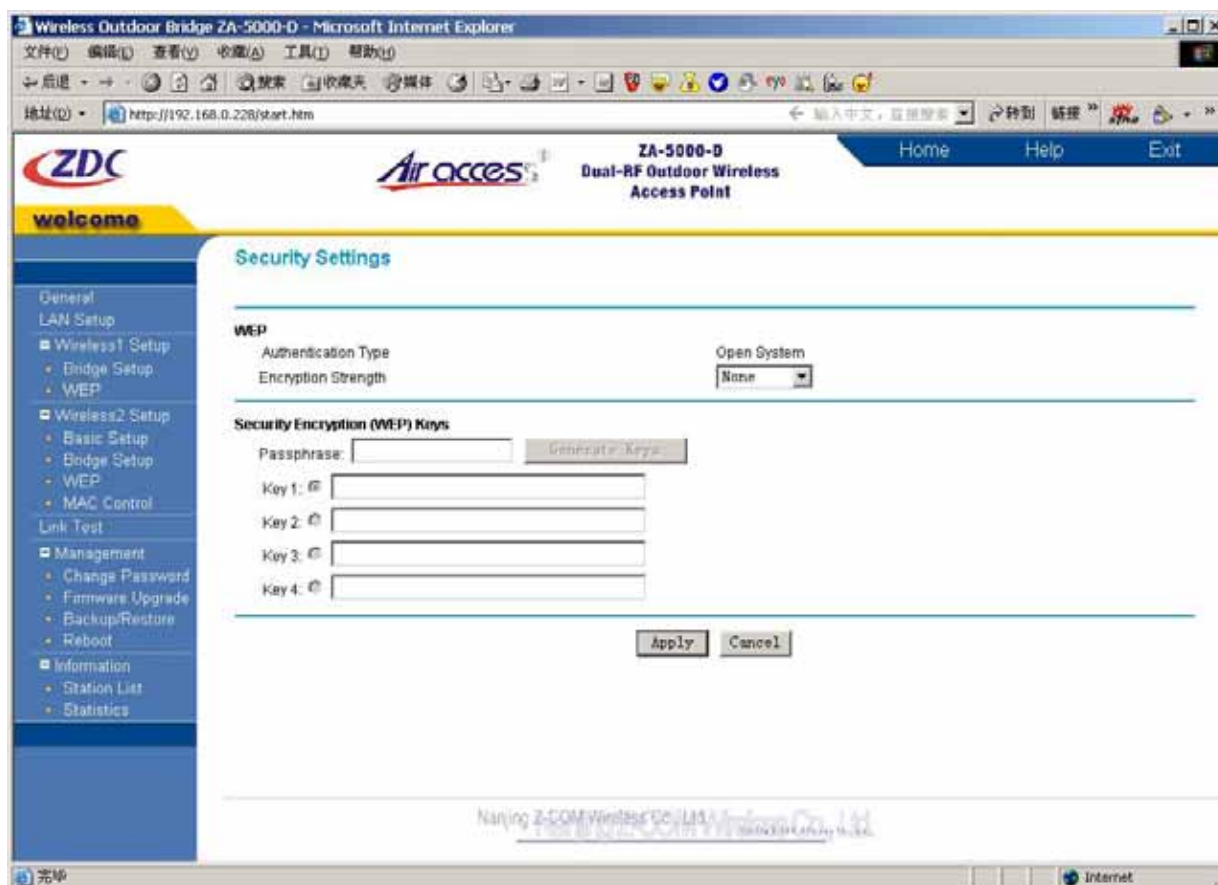Default: 2346

Preamble Type:

A long preamble may provide a more reliable connection or slightly longer range. An auto preamble gives better performance.
Default: Long

Remote MAC Address:

You must enter the MAC address of the other Bridge-mode Wireless Station in the field provided.

Wireless1 Security

Picture5 Wireless1 WEP

WEP:
Enable or Disable the Wired Equivalent Privacy for data encryption.

Encryption Strength:
Select the desired option. If enabled (64 bit, 128 bit or 152 bits) the keys must be entered, and other wireless stations must use the same keys. Note that 64-bit and 128-bit are the standard encryption strength options. 152-bit key length is a proper mode that will only work with other wireless devices that support this mode.
Default: None

Security Encryption(WEP) Keys:
To use the "passphrase" to generate the keys, enter a character and click the "Generate Keys" button. You can also enter the keys directly. These keys must match the other wireless stations.
Key 1 Key 2 Key 3 Key 4
Select the key to be used as the default key. Data transmissions are always encrypted using the default key. The other keys can only be used to decrypt received data.

Wireless2 Setup
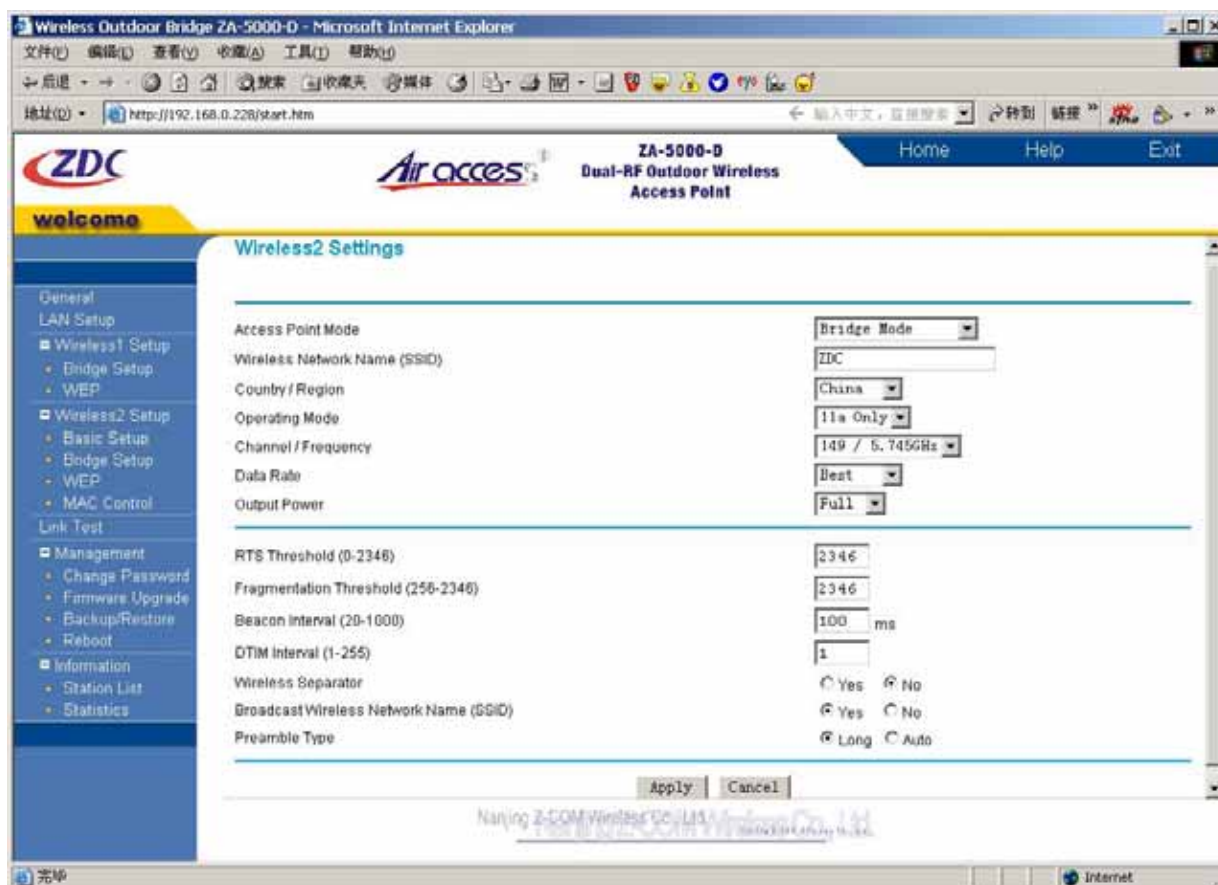
Picture6 Wireless1 Settings

Access Point Mode:
You may select Access Point Mode of wireless2 in drop list. The device support AP Mode, Bridge Mode, AP + Bridge Mode.
Default: Bridge Mode.

Wireless Network Name (SSID):
Enter a 32-character (maximum) service set ID in this field; the characters are case sensitive. When in infrastructure mode, this field defines the service set ID (SSID). The SSID assigned to the wireless node is required to match the SSID in order for the wireless node to communicate with the Access Point.
Default: ZDC

Country/Region:
Select your country or region from the drop-down list. This field displays the region of operation for which the wireless interface is intended. It may not be legal to operate the Access Point in a country/region other than the country/region shown here. If your country or region is not listed, please check with your local government agency or check our website for more information on which channels to use.

Default: China

Operating Mode:
You may select Operating Mode of wireless2 in drop list. The device support 802.11a, 802.11g, 802.11b.
Default: 802.11a.

Channel/Frequency:
Select the channel you wish to use on your wireless LAN.
Default: 149

⚠	Note: If you experience interference (shown by lost connections and/or slow data transfers) you may need to experiment with different channels to see which is the best.

Data Rate:
Shows the available transmit data rate of the wireless network. The possible data rates supported are: 1 Mbps, 2 Mbps, 5.5 Mbps, 11 Mbps, 6 Mbps,9 Mbps, 12 Mbps, 18 Mbps,24 Mbps, 36 Mbps, 48 Mbps and 54 Mbps.
Default: Best.

Output power:
Shows the available transmit power of the access point. The possible Tx power options are: Full, 50%, 25%, 12.5%, minimum. The transmit power may varies depends on the local regulatory regulations.
Default: Full.

RTS Threshold:
Request to Send Threshold. The packet size that is used to determine if it should use the CSMA/CD(Carrier Sense Multiple Access with Collision Detection)mechanism or the CSMA/CA mechanism for packet transmission. With the CSMA/CD transmission mechanism, the transmitting station sends out the actual packet as soon as it has waited for the silence period. With the CSMA/CA transmission mechanism, the transmitting station sends out an RTS packet to the receiving station, and waits for the receiving station to send back a CTS (Clear to Send) packet before sending the actual packet data.
Default: 2346

Fragmentation Threshold:
This is the maximum packet size used for fragmentation. Packets larger than the size programmed in this field will be fragmented. The Fragment Threshold value must be larger than the RTS Threshold value.
Default: 2346

Beacon Interval:

The Beacon Interval, Specifies the interval time between 20ms and 1000ms for each beacon transmission.

Default: 100

DTIM:
The Delivery Traffic Indication Message, Specifies the data beacon rate between 1 and 255.
Default: 1

Wireless Separator:
The remote aps will not be able to communicate with each other if this feature is enabled.
Default: No

Broadcast Wireless Network Name (SSID):
If set to Yes, The Access Point will broadcast its SSID, allowing wireless stations which have a "null" (blank) SSID to adopt the correct SSID. If set to No, the SSID is not broadcast.
Default: Yes

Preamble Type:
A long preamble may provide a more reliable connection or slightly longer range. An auto preamble gives better performance.
Default: Long

Wireless2 Bridge Setup
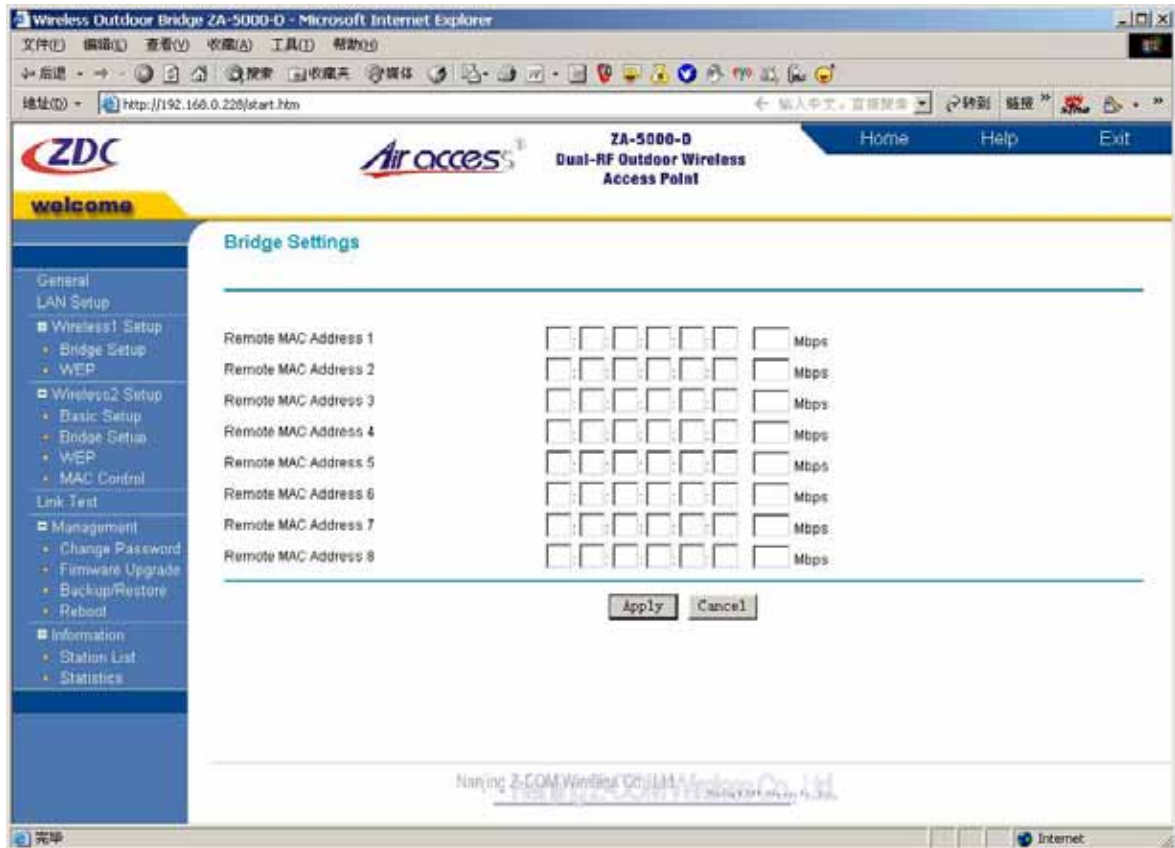
Picture7 Wireless1 Bridge Settings

You must enter the MAC address of the other Bridge-mode Wireless Station in the field provided. The remote Bridge must be set to Point-to-Point Bridge mode, using this central Bridge MAC address. They then send all traffic to this Master, rather than communicate directly with each other

Wireless2 Security

WEP Setup

Picture8 Wireless2 WEP

WEP:
Enable or Disable the Wired Equivalent Privacy for data encryption.

Authentication Type:
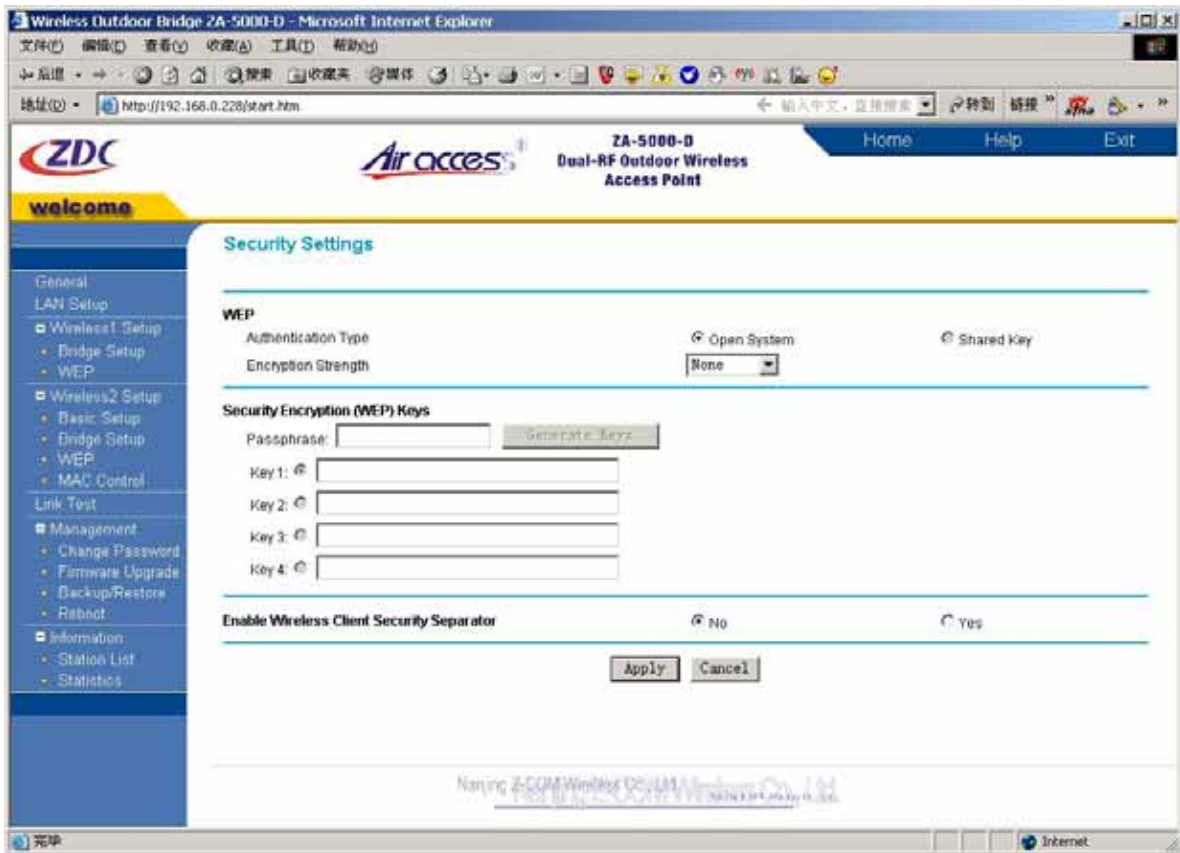Specifies the Authentication type used: Open System or Shared Key. If "Shared Key" is selected, you need to enable WEP and enter at least one shared key.
Default: Open System

Encryption Strength:
Select the desired option. If enabled (64 bit, 128 bit or 152 bits) the keys must be entered, and other wireless stations must use the same keys. Note that 64-bit and 128-bit are the standard encryption strength options. 152-bit key length is a proper mode that will only work with other wireless devices that support this mode.
Default: None

Security Encryption(WEP) Keys:
To use the "passphrase" to generate the keys, enter a character and click the "Generate Keys" button. You can also enter the keys directly. These keys must match the other wireless stations.
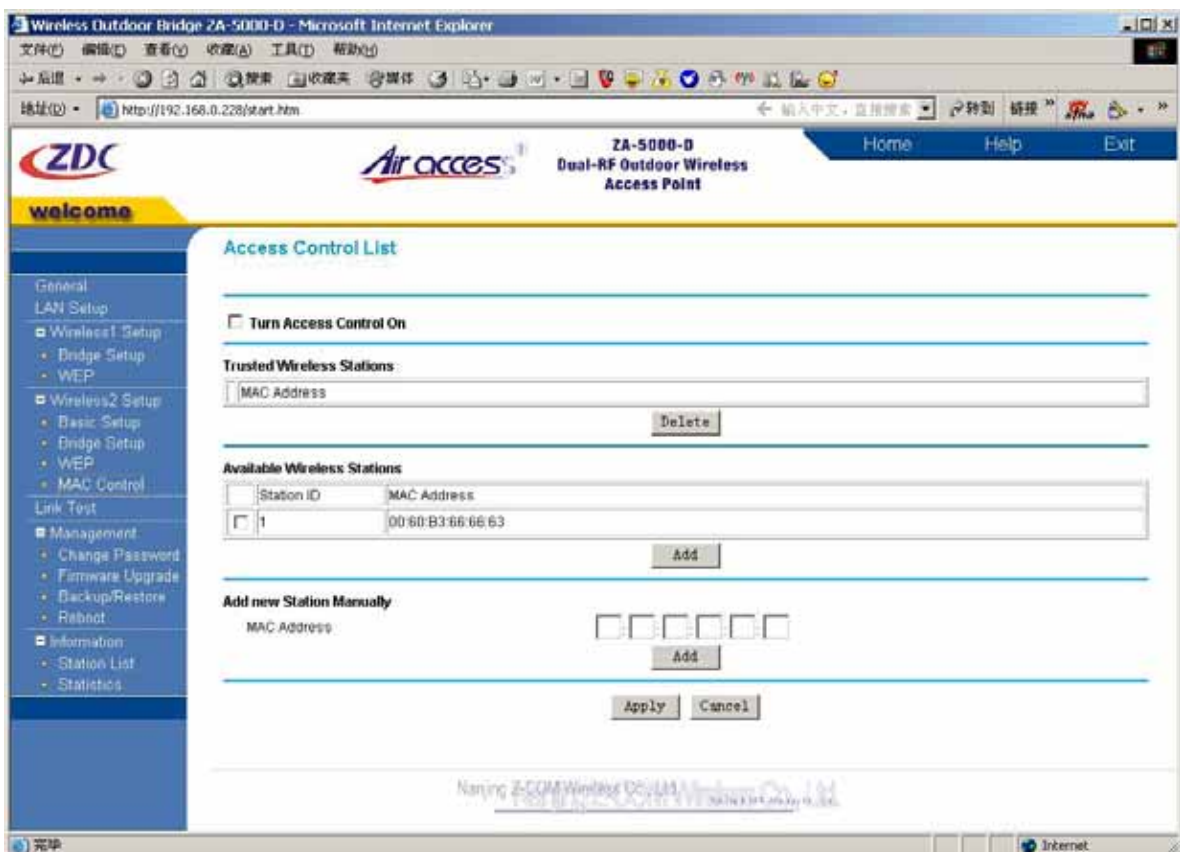
Key 1   Key 2   Key 3   Key 4

Select the key to be used as the default key. Data transmissions are always encrypted using the default key. The other keys can only be used to decrypt received data.

Wireless Client Security Separator:
The associated wireless station will not be able to communicate with each other if this feature is enabled.
Default: Disable.

MAC Control Setup

<div align="center">

Picture9 Wireless2 MAC Control

</div>

The optional Access Control window lets you block the network access privilege of the specified stations through the Access Point. This provides an additional layer of security.

Choose the Turn Access Control On to enable Access Control feature.

Trusted Wireless Stations:
This lists any wireless stations you have entered. If you have not entered any wireless stations this list will be empty.
To delete an existing entry, select it and then click the "Delete" button.
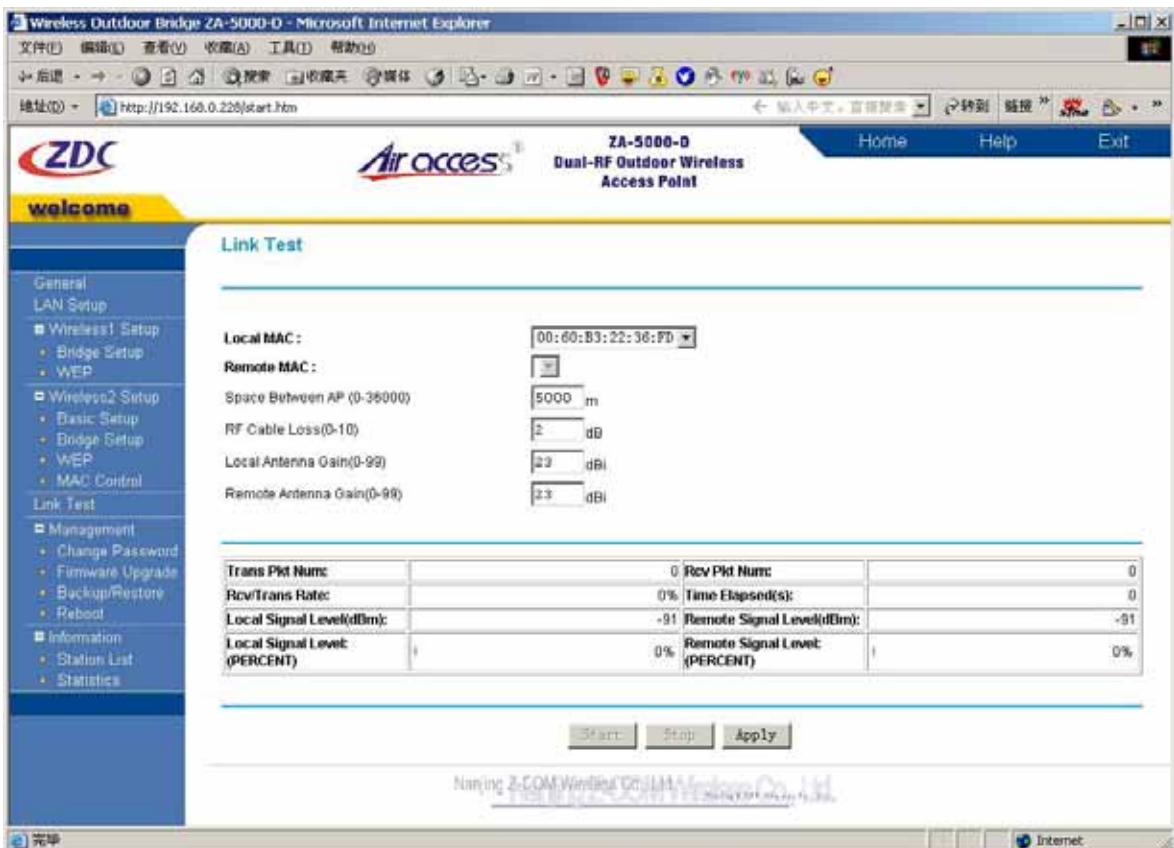
Available Wireless Stations:

Select the stations from the wireless station list and click Add button to add to the Trusted Wireless Stations list.

Add new Station Manually:
Use this to add the MAC address of the wireless stations to the Trusted Wireless Stations list.

Link Test

Picture10 Link Test

Select MAC Address of wireless1 in Local MAC list, then input the parameters of Space Between AP, RF Cable Loss, Local Antenna Gain and Remote Antenna Gain, click "Apply" button, then click "Start" button, test wireless1 chain.

Select MAC Address of wireless2 in Local MAC list, then select Remote MAC Address in Remote MAC list, input the parameters of Space Between AP, RF Cable Loss, Local Antenna Gain and Remote Antenna Gain, click "Apply" button, then click "Start" button, test wireless2 chain.

⚠	Notice: In Bridge Mode, the value of Space Between AP should close to the real distance.

⛔	Warning: The value of Space Between AP must be input.

View the intensity of signal, and adjust the positions and angles of the antenna according to the intensity of signal. Adjust the antenna from side to side from head to foot, observe the number value of dBm at the same time, when the number value of dBm is the greatest, the antenna is in the best positions and angles promptly.

⚠	Notice: Two kinds of expression methods that equipment has offered the intensity of signal to compare with intensity of signal, the intensity of signal than only generally consults the meaning, is subject to number value of the intensity of signal (dBm) while adjusting the antenna!

If wireless2 work In Point-to-Multipoint mode, then must test every chain.

⚠	Notice: In the Point-to-Multipoint mode, central point input the distance from the central point to the farthest remote point, Each remote point input the real distance from the each remote point to the central point.

Management

Change Password
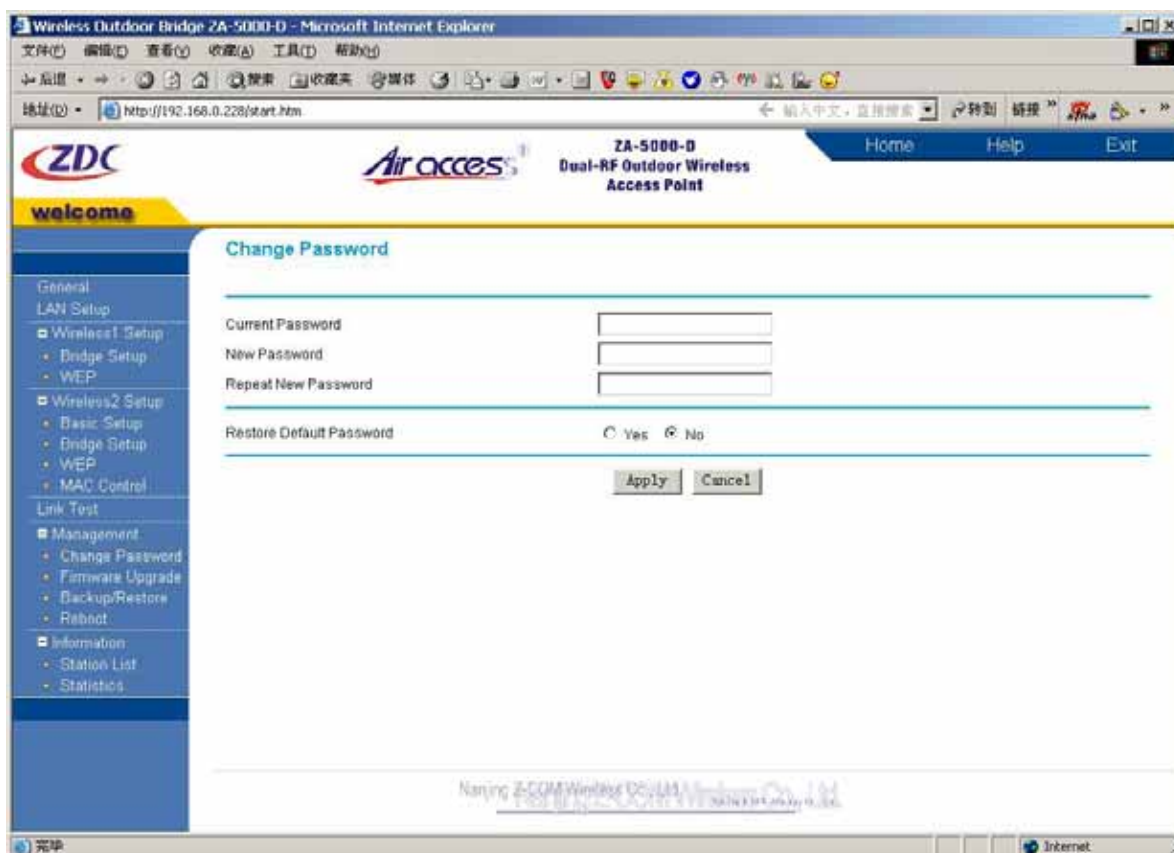
Picture11 Change password

You can use the Change Password page to change the Access Point administrator's password for

accessing the Settings pages.

To change the password:
1．Type the old password. The default password for the Access Point is: password.
2．Type a new password and type it again in the Repeat new password box to confirm it.

⚠	Notice: Be sure to write it down in a secure location and the maximal length of the password is 19 characters.

3．Click Apply to have the password changed or click Cancel to keep the current password.

Firmware Upgrade
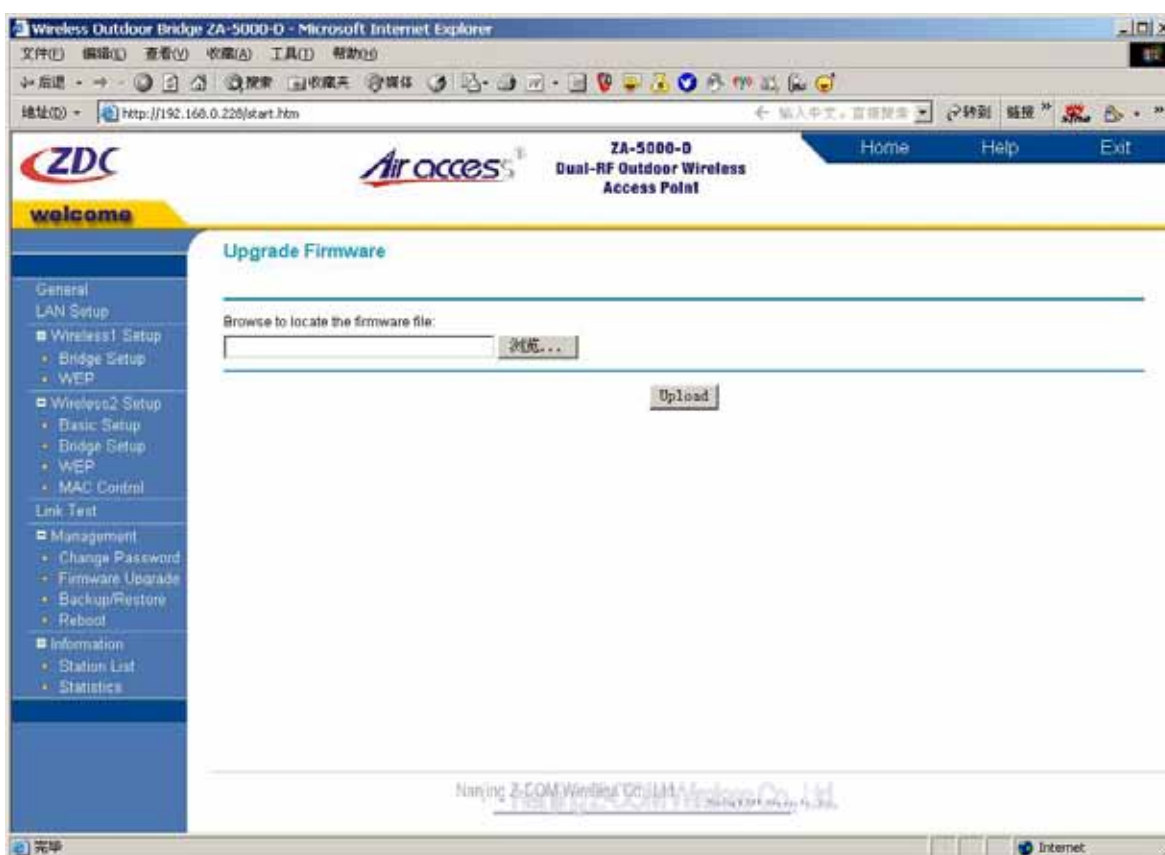
Picture12 Upgrade Firmware

You can install a new version of the Access Point's software using the Firmware Upgrade page.

⛔	Warning: Once you click **Upload** do NOT interrupt the process of sending the software to the Access Point and restarting the Access Point.

To upgrade the Access Point software:
1．Download the new software.
2．If not done automatically, uncompress the downloaded file. If included, read the Release Notes before continuing.

3．Click Browse.
4．Locate and select the file you just downloaded and uncompressed from your local hard disk.
5．Click Upload to send the software to the Access Point. This loads the new software into the Access Point and causes the Access Point to restart.

	Notice: Do not try to go online, turn off the Access Point, shutdown the computer or do anything else to the Access Point until the Access Point finishes restarting! When the Test light turns off, wait a few more seconds before doing anything.

6．Click General and check the Firmware Version to verify that the Access Point now has the new software installed.

	Warning: In some cases, such as a major upgrade, you may need to erase the configuration and manually reconfigure your Access Point after upgrading it. Refer to the Release Notes included with the software to find out if you need to reconfigure the Access Point.

Backup/Restore
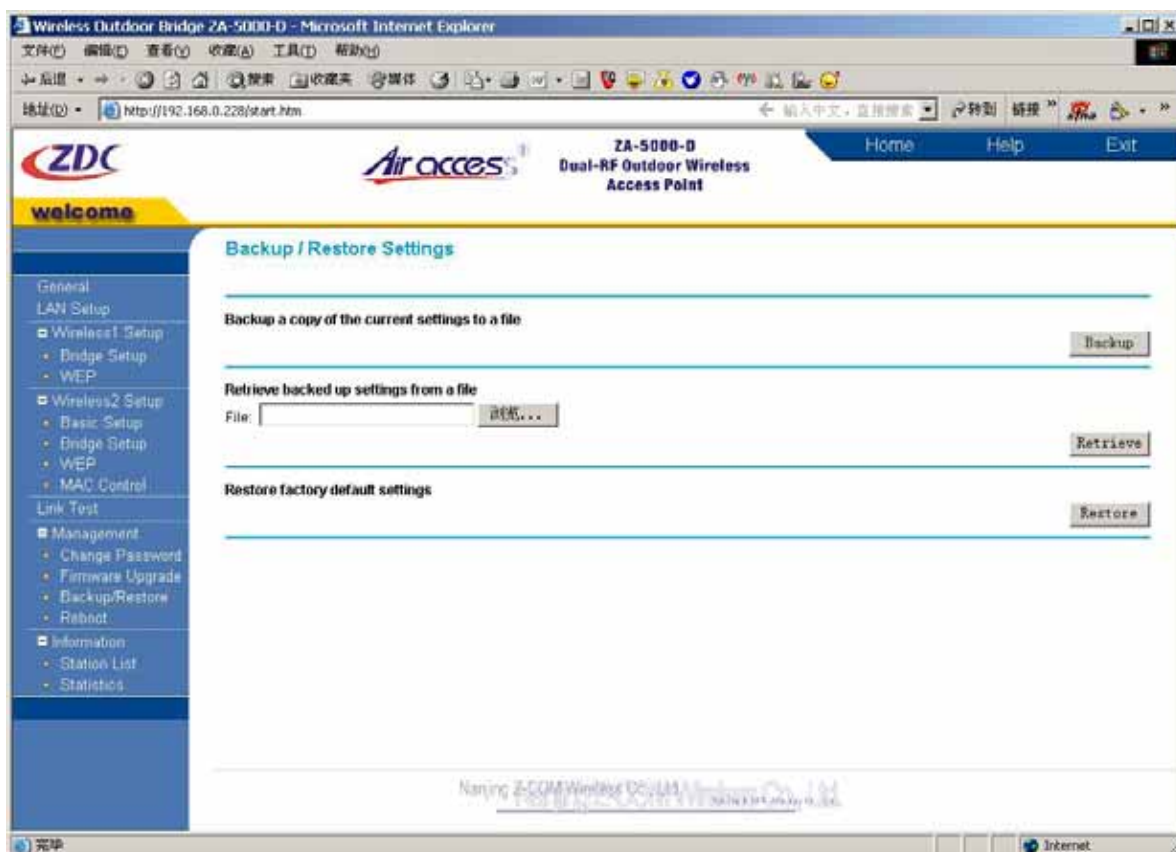
Picture13 Backup/Restore Settings

This page allows you to back up the Access Point's current settings and restore the factory default settings.

Once you have the Access Point working properly, you should back up the information to have it available if something goes wrong. When you backup the settings, they are saved as a file on your computer. You can restore the Access Point 's settings from this file.

Backup a copy of the current settings to a file
To create a backup file of the current settings:
1. Click Backup.
2. If you don't have your browser set up to save downloaded files automatically, locate where you want to save the file, rename it if you like, and click Backup.
3. If you have your browser set up to save downloaded files automatically, the file is saved to the your browser's download location on the hard disk.

Retrieve backed up settings from a file
To restore settings from a backup file:
1. Click Browse.
2. Locate and select the previously saved backup file (by default, ZA5000D.cfg).
3. Click Retrieve. A window appears letting you know that the Access Point has been successfully restored to previous settings. The Access Point will restart. This will take about one minute.
4. Close the message window.

Restore factory default settings
To erase the current settings and reset the Access Point to the original factory default settings: Click Restore.

	Notice: Do not try to go online, turn off the Access Point, shutdown the computer or do anything else to the Access Point until it finishes restarting! When the Test light turns off, wait a few more seconds before doing anything with the Access Point.

Reboot

You may select Yes on Reboot page the Access Point and then click on Apply button to reboot the Access Point.
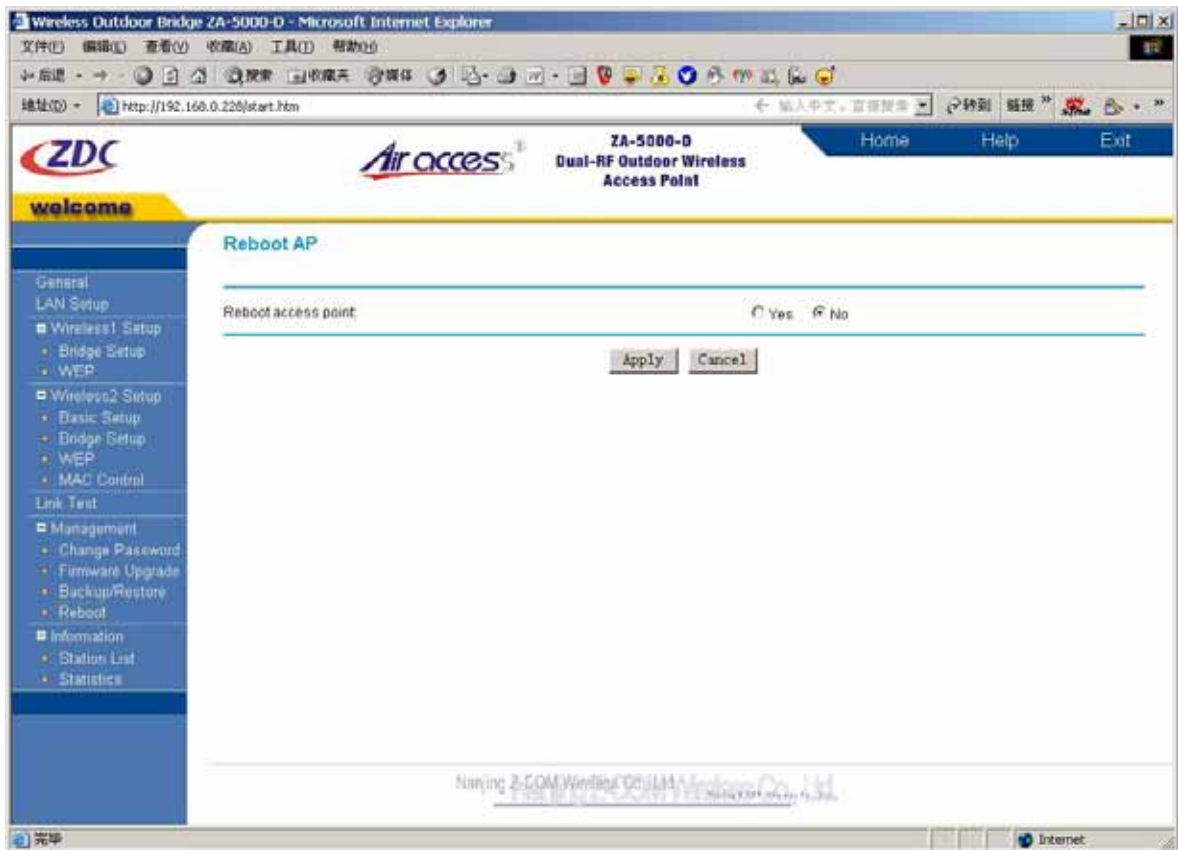
Picture14 Reboot AP

Information

Station List
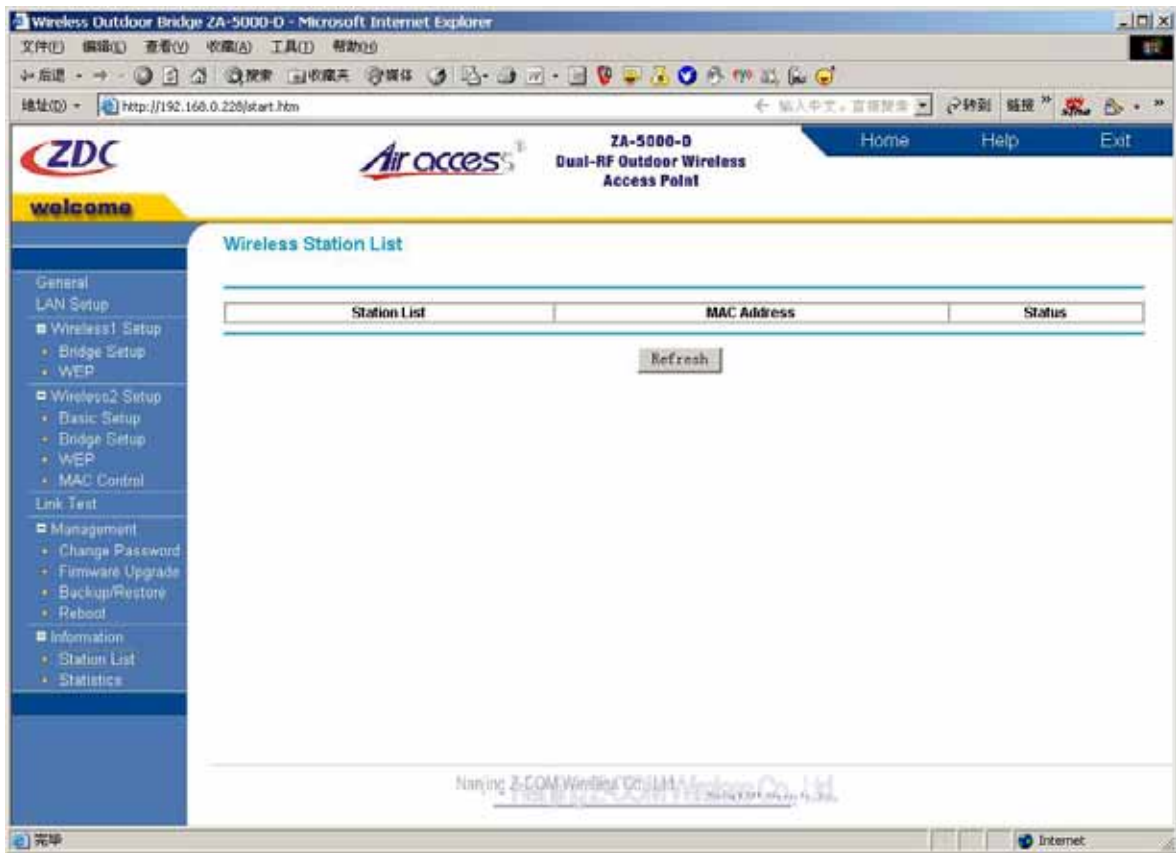
Picture15 Wireless Station List

This page shows the Station ID, and MAC (Media Access Control) address for each Access Point or client node associated with the Access Point.

Statistics
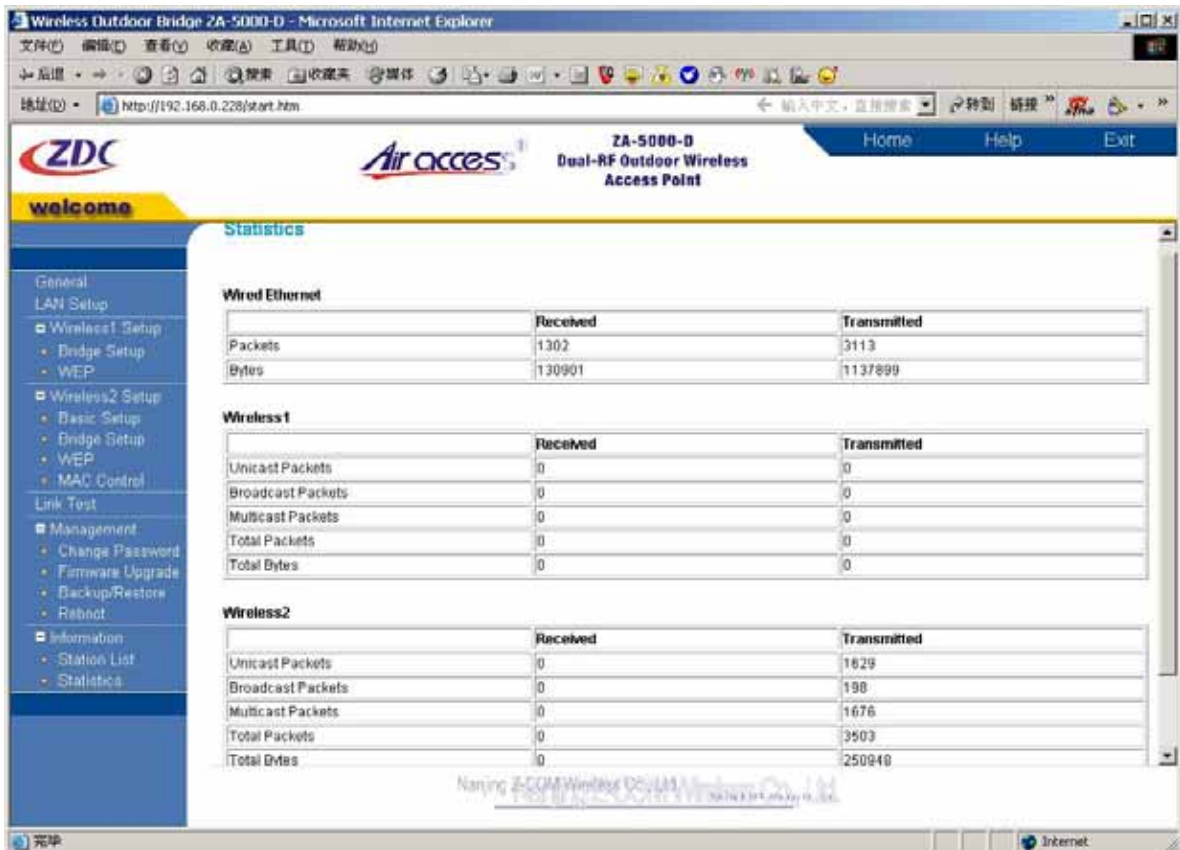
Picture16 Statistics

This page displays both wired and wireless interface network traffic. Click Refresh to update the current statistics.

Wired Ethernet:
This section displays traffic statistics for the wired Ethernet interface.

Wireless1:
This section displays traffic statistics for the Wireless1 interface.

Wireless2:
This section displays traffic statistics for the Wireless2 interface.

4. Troubleshooting

- **FAQ**
- **Technical support**

FAQ

Technical support

You can access the web page: http://www.zcom.com.cn/chinese/download.asp?styleid=1. Upgrade latest version software to download, if meet difficulty and please contact our supplier in the course of installing and using the Access Point.

Appendix

- **Technical Specifications**
- **Glossary**
- **ASCII**

Technical Specifications

ZA-5000-D Product Specifications		
Description	The next-generation Wireless LAN device－ZA-5000-D 802.11a/b/g Wireless Outdoor Bridge, Unique double RF design can work in 2.4GHz and 5.8GHz at the same time, and concert some operation mode (Bridge Repeater mode、Bridge + AP mode), then agilely settings and performance was be smart improve.	
	Wireless1	Wireless2
Feature		
Standards	IEEE 802.11a	IEEE 802.11a/b/g
Data Rate Selection	Best、54、48、36、24、18、12、9、6Mbps	Best、54、48、36、24、18、12、9、6Mbps 11、5.5、2、1Mps
AP Mode	Yes	Yes
Bridge Mode	PTP	PTMP、Repeater
DHCP Client	Yes	
Spanning Tree	Yes	
Link Test	Yes	
Security		
WEP	Yes	Yes
MAC Control	Yes	Yes
SSID Broadcast	No	Yes
STA Separator	No	Yes
WDS Separator	No	Yes
Management		
Web	Yes	
F/W Upgrade	Yes (Web/TFTP)	
Backup/Retrieve	Yes	
Physical		
Antenna	Integrated 23dBi flab antenna	N type interface
LAN	1个 10/100-BaseTX RJ-45 Ethernet Interface	
Default Button	Yes	
Power	100-240V AC, 50/60Hz～48V DC/1A	
Channel	**5GHz：**	**5GHz：**

	America： 5.15GHz～5.25GHz； 5.25GHz～5.35GHz； 5.725GHz～5.825GHz Europe： 5.47GHz～5.725GHz China： 5.725GHz～5.850GHz	America： 5.15GHz～5.25GHz； 5.25GHz～5.35GHz 5.725GHz～5.825GHz Europe： 5.47GHz～5.725GHz China： 5.725GHz～5.850GHz **2.4GHz：** America: 2.412GHz~2.462GHz Japan： 2.412GHz~2.484GHz Europe： 2.412GHz~2.472GHz China： 2.412GHz~2.472GHz
RF Max Output Power	18dBm(±2dBm)＋23dBi	18dBm±2dBm（802.11a/g） 21dBm±2dBm（802.11b）
Sensitivity	－65dBm@54Mbps； －66dBm@48Mbps； －70dBm@36Mbps； －74dBm@24Mbps； －77dBm@18Mbps； －79dBm@12Mps； －81dBm@9Mps； －82dBm@6Mbps	－65dBm@54Mbps； －66dBm@48Mbps； －70dBm@36Mbps； －74dBm@24Mbps； －77dBm@18Mbps； －79dBm@12Mps； －81dBm@9Mps； －82dBm@6Mbps； －80dBm@11Mbps －83dBm@5.5Mbps； －84dBm@2Mbps； －87dBm@1Mbps
Power Consumption	TBD	
Environment		
Operating temperature	-15～60℃ -5～60℃	
Storage temperature	-20～80℃	
Humidity	5～95％	

Glossary

AP	The abbreviation of Access Point, refer in particular to the wireless access point.
BWA	The abbreviation of Broadband Wireless Access, does not have the network bridge to refer in particular to broadband.
IEEE 802.11	Include IEEE 802.11a/b/g。
⚠Notice	Show that there is important information that reminds you with better using the equipment.
⛔warning	It have potential dangerous operation will do harm to hardware of the equipment or make data not to lose or make equipment not to can be used normally all to show.
SSID	It distributes to may make wireless users can connect to the network name of AP to use for. It is different from the access point name of AP, it was used for distinguishing AP that that is only available for AP.
AP IP address	If has not used DHCP server in the network, has needed to assign a legal IP address for AP , used to land to AP through HTTP. IP address of acquiescence is http://192. 168. 0. 228.
HTTP User's name/password	Used for landing admin password or password of user name of acquiescence to AP from WEB page.
Encrypt setting	Which kind of encryption ways are not needed to decide to set up for AP with you according to the environment.
Link test	When AP is chosen as mode of bridge graft, this function can be used for determining the connection state with a purpose MAC address.
MAC control	This function is only valid under AP mode, invalid under the mode of bridge graft. Used in MAC address to filter.
Trusted STA	Wireless STA when should only tabulate when MAC controls the function to open could be connected to AP.
Available STA	MAC address connected to STA of AP all show in should be tabulatedding, when can add to and can believe wireless STA is tabulated according to the need .

ASCII

You can dispose sexadecimal number system counting or ACSII one yard of keys encrypted as WEP.Sexadecimal number system is made up by 0-9 and A-F (letter does not distinguish capital and small letter); ACSII yard is by 0-9 figures , A-F , a-f (letter distinguishes capital and small letter), and the punctuation mark makes up . Each ACSII yard can is it says to count by one sexadecimal number system of two. One-one ASCII yard of all and sexadecimal number system are counted to make forms and list all.

ASCII Character	Hex Equivalent	ASCII Character	Hex Equivalent	ASCII Character	Hex Equivalent	ASCII Character	Hex Equivalent
!	21	9	39	Q	51	i	69
"	22	:	3A	R	52	j	6A
#	23	;	3B	S	53	k	6B
$	24	<	3C	T	54	l	6C
%	25	=	3D	U	55	m	6D
&	26	>	3E	V	56	n	6E
'	27	?	3F	W	57	o	6F
(	28	@	40	X	58	p	70
)	29	A	41	Y	59	q	71
*	2A	B	42	Z	5A	r	72
+	2B	C	43	[	5B	s	73
,	2C	D	44	\	5C	t	74
-	2D	E	45	]	5D	u	75
.	2E	F	46	^	5E	v	76
/	2F	G	47	_	5F	w	77
0	30	H	48	`	60	x	78
1	31	I	49	a	61	y	79
2	32	J	4A	b	62	z	7A
3	33	K	4B	c	63	{	7B
4	34	L	4C	d	64			7C
5	35	M	4D	e	65	}	7D
6	36	N	4E	f	66	~	7E
7	37	O	4F	g	67		
8	38	P	50	h	68		