

Wireless LAN Device Series

WLAN Outdoor Bridge

ZW-2000-IA User Manual

Version.

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Preface

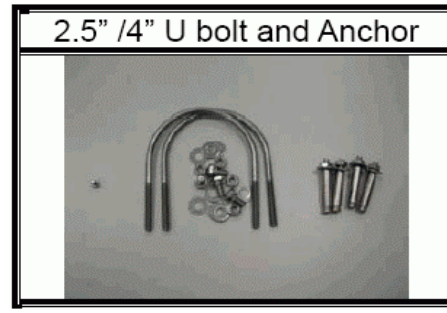
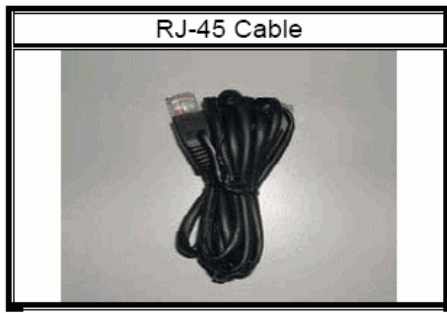
This guide is for the networking professional who installs and manages the Zinwell ZW-2000 outdoor product hereafter referred to as the “device”. To use this guide, you should have experience working with the TCP/IP configuration and be familiar with the concepts and terminology of wireless local area networks.

Ch 1. ZW-2000 Installation

Packing List

Before you start to install the ODU, make sure the package contains the following items :

- Wireless Outdoor Bridge unit * 1
- Mounting Kit * 1
- Waterproof (IP67) RJ-45 Cable (30M) * 1
- Waterproof (IP66) RF Cable (1M) * 1
- Power Over Ethernet Kit * 1
- Ground Wire * 1
- 2.5" /4" U bolts * 2 and Anchor * 4
- RJ-45 Cable (1.5M) * 1



Hardware Installation

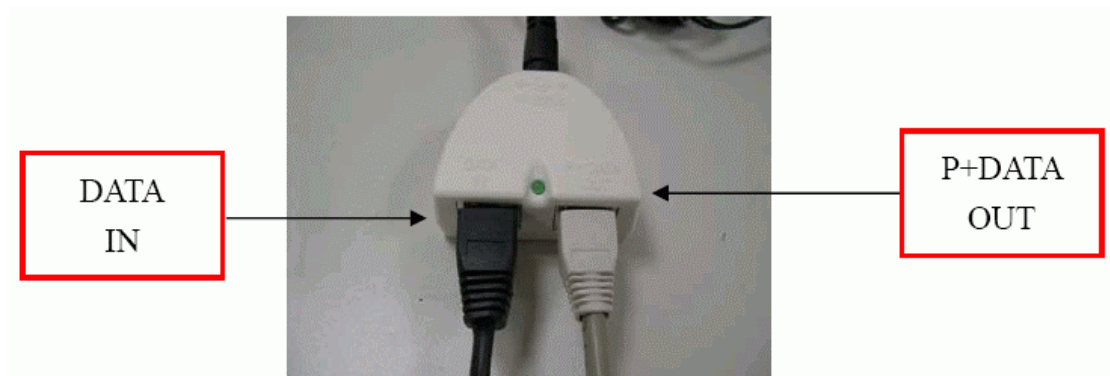
Once you check off everything from the package, you can start to install the ODU. You can mount to a pipe, a pole or to the side of a building. The steps are showed in the following :

1. You must mount the ODU into the bracket first.

Note: ALL the 4 screws had been tightened onto the ODU and Bracket

2. You can use the 2 or 4 inches U bolt to mount on the pipe, depending on the radius of the pipe. (Wall mounting is referred to Wall Mounting Figure) The two U bolts must be mounted tightly. Be aware of not over-tighten the U bolt.

3. After checking the ODU is mounted well, you can connect the following two cables: the Waterproof RJ-45 network cable to “P+ DATA OUT” port of ODU and the RF cable to antenna port. Additional waterproof tool, such as waterproof tape, is recommended to use to enhance the waterproof function. It is suggested to have a lightening protector between antenna and antenna port. Connect the ground wire as the figure of “ODU ground wire connection.”
4. Plug the other end of the waterproof RJ-45 cable to the PoE device. The PoE device is guaranteed only in indoor environment.



Caution: DON'T plug the power cord into PoE device before you finish install the antenna and Ground wire to ensure the safety.

If the RJ-45 cable's length is not long enough to connect to your network device for indoor parts installation, you can extend the cable length.

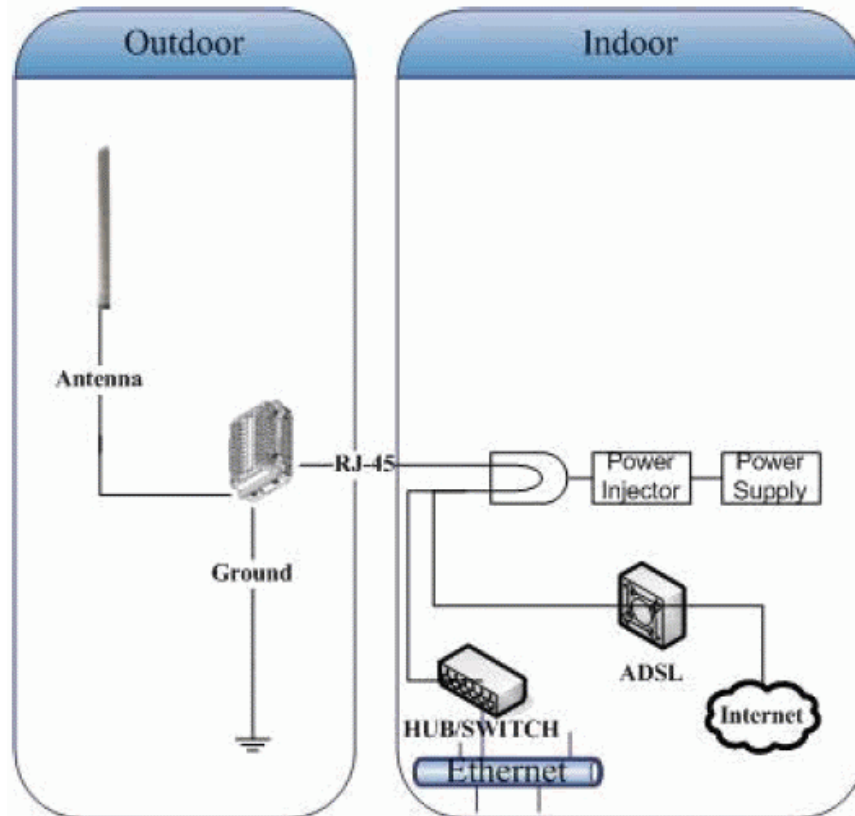
However, make sure the maximum length of the RJ-45 cable is shorter than 100M (about 109 yards) for normal operation under IEEE 802.3 standards.

When you plug the regular RJ-45 cable into the PoE device, you should use the regular RJ-45 cable to plug into the "DATA IN" of "Power Over Ethernet Kit" to connect to hub/switch or use the crosslink RJ-45 cable (Not included in the Packing List) to connect with user's PC.

The waterproof RJ-45 cable must be connected to the "P+DATA OUT" port.

Caution: Be careful! Don't plug the two cables inversely. It will damage the devices!

We recommend you refer to the following illustration as a guideline for hardware installation.



Ch 2. First Time Configuration

Before Start to Configure

There are two ways to configure the device, one is through web-browser, and the other is through Secure Shell CLI interface. To access the configuration interfaces, make sure you are using a computer connected to the same network as the device. The default IP address of the device is 192.168.2.254, and the subnet-mask is 255.255.255.0.

The device has three operation modes (Router/Bridge/WISP). In bridge mode, also known as AP Client, you can access the device by both WLAN (Wireless Local Area Network) and wired LAN. And in router/WISP modes, the device can be accessed by both WLAN and WAN. The default IP addresses for the device are 192.168.2.254(for LAN), 172.1.1.1(for WAN), so you need to make sure the IP address of your PC is in the same subnet as the device, such as 192.168.2.X (for LAN), 172.1.1.X (for WAN).

Please note that the DHCP server inside the device is default to up and running. Do not have multiple DHCP servers in your network environment, otherwise it will cause abnormal situation.

We also provide an auto-discovery tool which is for finding out the IP of the device. In case, you've forgot the IP of the device or the IP of the device has been changed, you can use the tool to find out the IP of the device even your PC is not in the same subnet as the device is.

Knowing the Network Application

ZW-2000 can act as the following roles, and it supports WDS (Wireless Distribution System) function.

- Access Point
- WDS (Wireless Repeater)
- Bridge/Router
- WISP
- AP Client

The device provides 3 different operation modes and the wireless radio of device can act as AP/Client/WDS. The operation mode is about the communication mechanism between the wired Ethernet NIC and wireless NIC, the following is the

types of operation mode.

Router

The wired Ethernet (WAN) port is used to connect with ADSL/Cable modem and the wireless NIC is used for your private WLAN. The NAT is existed between the 2 NIC and all the wireless clients share the same public IP address through the WAN port to ISP. The default IP configuration for WAN port is static IP. You can access the web server of device through the default WAN IP address 172.1.1.1 and modify the setting base on your ISP requirement.

Bridge

The wired Ethernet and wireless NIC are bridged together. Once the mode is selected, all the WAN related functions will be disabled.

WISP (Wireless ISP)

This mode can let you access the AP of your wireless ISP and share the same public IP address form your ISP to the PCs connecting with the wired Ethernet port of the device. To use this mode, first you must set the wireless radio to be client mode and connect to the AP of your ISP then you can configure the WAN IP configuration to meet your ISP requirement.

The wireless radio of the device acts as the following roles.

AP (Access Point)

The wireless radio of device serves as communications “hub” for wireless clients and provides a connection to a wired LAN.

AP Client

This mode provides the capability to connect with the other AP using infrastructure/Ad-hoc networking types. With bridge operation mode, you can directly connect the wired Ethernet port to your PC and the device becomes a wireless adapter. And with WISP operation mode, you can connect the wired Ethernet port to a hub/switch and all the PCs connecting with hub/switch can share the same public IP address from your ISP.

WDS (Wireless Distribution System)

This mode serves as a wireless repeater; the device forwards the packets to another AP with WDS function. When this mode is selected, all the wireless clients can't survey and connect to the device. The device only allows the WDS connection.

WDS+AP

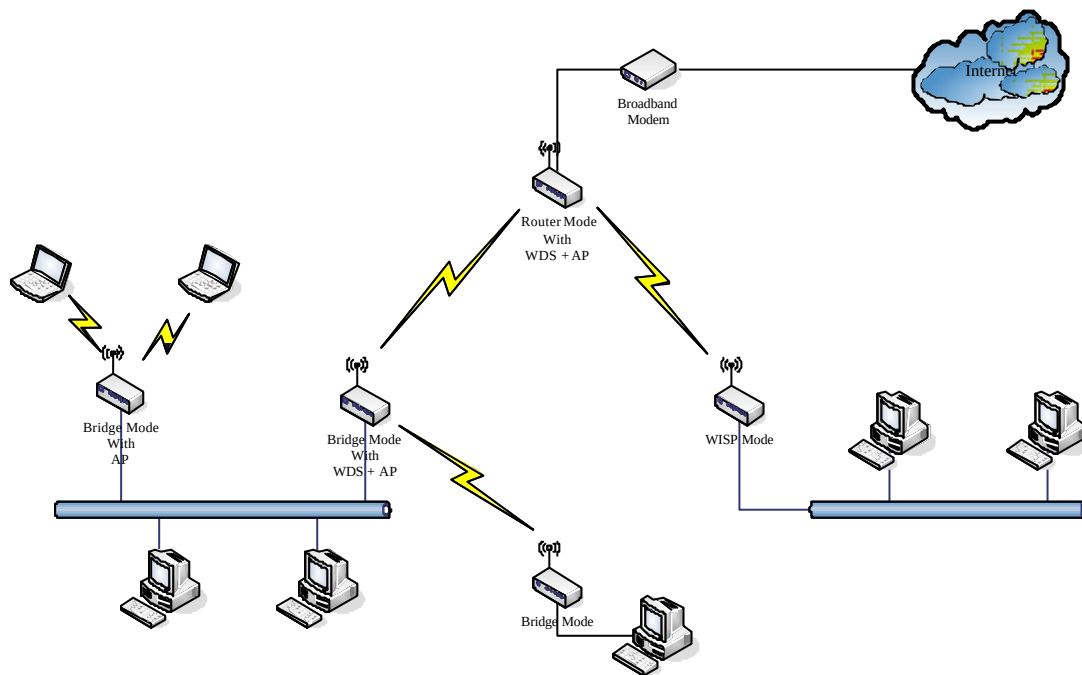
This mode combines WDS plus AP modes, it not only allows WDS connections but

also the wireless clients can survey and connect to the device.

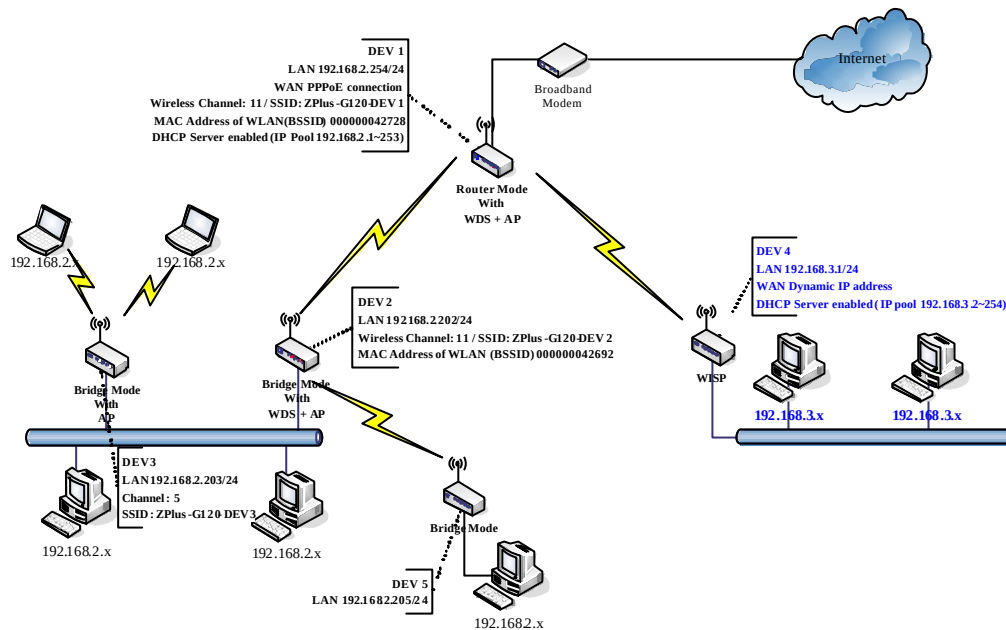
The following table shows the supporting combination of operation and wireless radio modes.

	<i>Bridge</i>	<i>Router</i>	<i>WISP</i>
<i>AP</i>	V	V	X
<i>WDS</i>	V	V	X
<i>Client</i>	V	X	V
<i>AP+WDS</i>	V	V	X

Hereafter are some topologies of network application for your reference.



Examples of Configuration



This example demonstrates how to set up a network with different device configurations. There are 2 DHCP servers (DEV1/DEV4) in the network to control the IP configuration of 2 domains (192.168.2.x/192.168.3.x). Once the setting is done, all the PCs can visit Internet through DEV1.

We assume all the devices keep the factory default setting. To make sure that user can continuing press the reset button for more than 5 seconds to restore the factory default setting.

The following descriptions show the steps to configure DEV1 to DEV5.

Configure DEV1:

1. Connect the ADSL modem to Ethernet port of device using Ethernet cable.
2. Access the web server (<http://192.168.2.254>) of device from the wireless station.
3. Use Wizard page to setup device.



4. Press “Next>>” button then set the “Operation Mode” to “Router” mode.

The screenshot shows the '1. Operation Mode' page of the 'Wireless LAN Series' setup wizard. On the left is a 'Site contents' sidebar with icons for Wizard, Operation Mode, Wireless, TCP/IP, Firewall, Management, and Reboot. The main area has the title '1. Operation Mode' and a description: 'You can setup different modes to LAN and WLAN interface for NAT and bridging function.' There are three radio button options: 'Router:' (selected), 'Bridge:', and 'Wireless ISP:'. Each option has a detailed description of its functionality. At the bottom right are three buttons: 'Cancel', '<<Back', and 'Next>>'.

5. Press “Next>>” button then disable “Time Zone” function.

The screenshot shows the '2. Time Zone Setting' page of the 'Wireless LAN Series' setup wizard. The sidebar is the same as the previous page. The main area has the title '2. Time Zone Setting' and a description: 'You can maintain the system time by synchronizing with a public time server over the Internet.' There is a checkbox labeled 'Enable NTP client update' which is currently unchecked. Below it are two dropdown menus: 'Time Zone Select:' with the value '(GMT-08:00)Pacific Time (US & Canada): Tijuana' and 'NTP server:' with the value '192.5.41.41 - North America'. At the bottom right are three buttons: 'Cancel', '<<Back', and 'Next>>'.

6. Press “Next>>” button then set the IP address of LAN interface.

The screenshot shows the '3. LAN Interface Setup' page of the 'Wireless LAN Series' setup wizard. The sidebar is the same. The main area has the title '3. LAN Interface Setup' and a description: 'This page is used to configure the parameters for local area network which connects to the device. Here you may change the setting for IP address, subnet mask. The DHCP Server will be up and running, please make sure there is no another DHCP Server in your network when the device is in Bridge/Client Modes.' There are two text input fields: 'IP Address:' with the value '192.168.2.254' and 'Subnet Mask:' with the value '255.255.255.0'. At the bottom right are three buttons: 'Cancel', '<<Back', and 'Next>>'.

7. Press “Next>>” button then select the “PPPoE” for “WAN Access Type” and fill in the “User Name” and “Password” fields.

The screenshot shows the '4. WAN Interface Setup' page of the 'Wireless LAN Series' setup wizard. The sidebar is the same. The main area has the title '4. WAN Interface Setup' and a description: 'This page is used to configure the parameters for Internet network which connects to the WAN port of your Access Point. Here you may change the access method to static IP, DHCP, PPPoE or PPTP by click the item value of WAN Access type.' There are three fields: 'WAN Access Type:' with a dropdown menu set to 'PPPoE', 'User Name:' with the text '87043609@hinet.net', and 'Password:' with a masked input field showing eight dots. At the bottom right are three buttons: 'Cancel', '<<Back', and 'Next>>'.

8. Press “Next>>” button then select the “AP+WDS” for “mode” and change the SSID to “DEV1”.

The screenshot shows the '5. Wireless Basic Settings' page. On the left is a 'Site contents' sidebar with a tree view containing: Wizard, Operation Mode, Wireless (selected), TCP/IP, Firewall, Management, and Reboot. The main content area has a title '5. Wireless Basic Settings' and a description: 'This page is used to configure the parameters for wireless LAN clients which may connect to your Access Point. If you want to use Wireless ISP mode, please choose the Client Mode.' Below this are several configuration fields: 'Band' set to '2.4 GHz (B+G)', 'Mode' set to 'AP+WDS', 'Network Type' set to 'Infrastructure', 'SSID' set to 'DEV1', and 'Channel Number' set to '11'. There is an unchecked checkbox for 'Enable Mac Clone (Single Ethernet Client)'. At the bottom right are three buttons: 'Cancel', '<<Back', and 'Next>>'.

9. Press “Next>>” button then select “None” for “Encryption” then press “Finished” button.

The screenshot shows the '6. Wireless Security Setup' page. The 'Site contents' sidebar is the same as in the previous screenshot, with 'Wireless' selected. The main content area has a title '6. Wireless Security Setup' and a description: 'This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.' There is an 'Encryption' dropdown menu currently set to 'None'. At the bottom right are three buttons: 'Cancel', '<<Back', and 'Finished'.

10. Wait for refreshing web page.

The screenshot shows a confirmation message page. The 'Site contents' sidebar is the same. The main content area has a title 'Wireless LAN Series' and a message: 'Change setting successfully! Please wait a while for refreshing webpage. If IP address was modified, you have to re-connect the WebServer with the new address.'

11. Use “WDS Settings” page to configure WDS.

The screenshot shows the 'WDS Settings' page. The 'Site contents' sidebar is updated with additional items: Basic Settings, Advanced Settings, Security, Access Control, WDS settings (selected), Site Survey, TCP/IP, Firewall, Management, and Reboot. The main content area has a title 'WDS Settings' and a description: 'Wireless Distribution System uses wireless media to communicate with other APs, like the Ethernet does. To do this, you must set these APs in the same channel and set MAC address of other APs which you want to communicate with in the table and then enable the WDS.' There is an unchecked checkbox for 'Enable WDS'. Below it is a table to 'Add WDS AP' with columns for 'MAC Address' and 'Comment'. There are buttons for 'Apply Changes', 'Reset', 'Set Security', and 'Show Statistics'. At the bottom, there is a section 'Current WDS AP List' with a table that has columns for 'MAC Address', 'Comment', and 'Select'. Below this table are buttons for 'Delete Selected', 'Delete All', and 'Reset'.

12. Enable WDS function and add the BSSID of DEV2 to "Current WDS AP List".

Wireless LAN Series

WDS Settings

Wireless Distribution System uses wireless media to communicate with other APs, like the Ethernet does. To do this, you must set these APs in the same channel and set MAC address of other APs which you want to communicate with in the table and then enable the WDS.

☒ Enable WDS

Add WDS APs:

MAC Address	Comment

Buttons:

Buttons:

Current WDS AP List:

MAC Address	Comment	Select
00:00:00:04:20:92	BSSID of DEV2	☐

Buttons:

13. Since we access the device by wireless connection, it may temporarily disconnect when applying the WDS setting. After re-connecting to the device, use the "Status" page to check the settings.

Wireless Configuration

Mode	AP+WDS - Router
Band	2.4 GHz (B+G)
SSID	DEV1
Channel Number	11
Encryption	Disabled(AP), Disabled(WDS)
BSSID	00:05:9e:80:19:bb
Associated Clients	1
Power(OFDM/G)	22 dbm
Power(CCK/B)	22 dbm

TCP/IP Configuration

Attain IP Protocol	Fixed IP
IP Address	192.168.2.254
Subnet Mask	255.255.255.0
Default Gateway	192.168.2.254
DHCP Server	Enabled
MAC Address	00:05:9e:80:19:bb

WAN Configuration

Attain IP Protocol	Fixed IP
IP Address	218.168.146.93
Subnet Mask	255.255.255.0
Default Gateway	218.168.146.254
MAC Address	00:05:9e:80:19:bc

Configure DEV2:

1. Access the web server (http://192.168.2.254) of device from the Ethernet port.

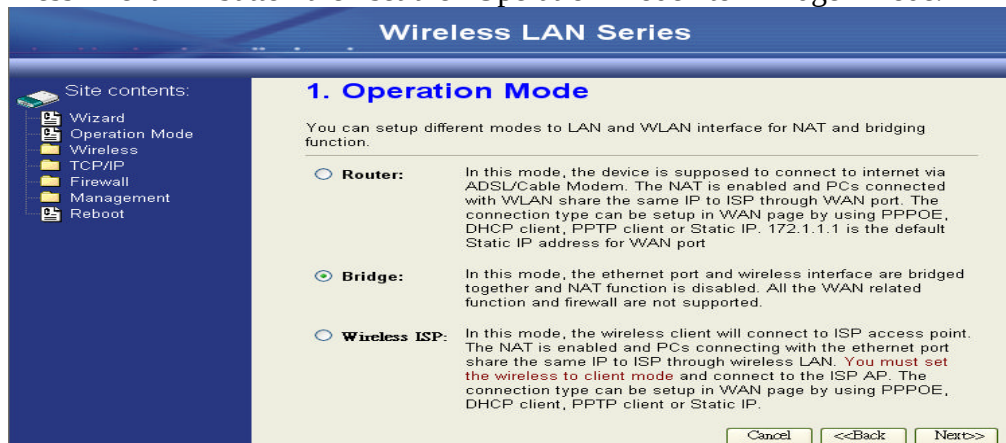
Caution

If you configure multiple devices in the same PC, since the devices have the same default IP address but different MAC addresses, it may cause you not able to access the web server of device. If the situation happens, please try to clean the ARP table of your PC by DOS command “arp -d” then you can access the web server of device using the default IP address.

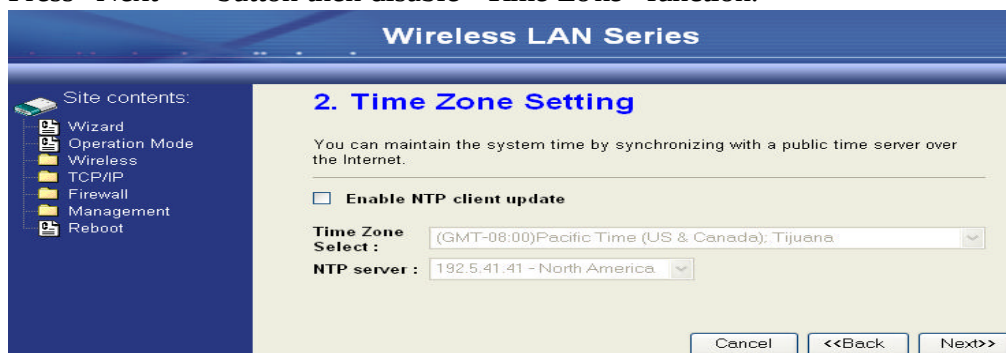
2. Use Wizard page to setup device.



3. Press “Next>>” button then set the “Operation Mode” to “Bridge” mode.



4. Press “Next>>” button then disable “Time Zone” function.



5. Press “Next>>” button then set the IP address of LAN interface.

Wireless LAN Series

Site contents:

- Wizard
- Operation Mode
- Wireless
- TCP/IP
- Firewall
- Management
- Reboot

3. LAN Interface Setup

This page is used to configure the parameters for local area network which connects to the device. Here you may change the setting for IP address, subnet mask. The DHCP Server will be up and running, please make sure there is no another DHCP Server in your network when the device is in Bridge/Client Modes.

IP Address: 192.168.2.202

Subnet Mask: 255.255.255.0

Cancel <<Back Next>>

6. Press “Next>>” button then select the “AP+WDS” for “mode” and change the SSID to “DEV2”.

Wireless LAN Series

Site contents:

- Wizard
- Operation Mode
- Wireless
- TCP/IP
- Firewall
- Management
- Reboot

5. Wireless Basic Settings

This page is used to configure the parameters for wireless LAN clients which may connect to your Access Point. If you want to use Wireless ISP mode, please choose the Client Mode.

Band: 2.4 GHz (B+G)

Mode: AP+WDS

Network Type: Infrastructure

SSID: DEV2

Channel Number: 11

☐ Enable Mac Clone (Single Ethernet Client)

Cancel <<Back Next>>

7. Press “Next>>” button then select “None” for “Encryption” then press “Finished” button.

Wireless LAN Series

Site contents:

- Wizard
- Operation Mode
- Wireless
- TCP/IP
- Firewall
- Management
- Reboot

6. Wireless Security Setup

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.

Encryption: None

Cancel <<Back Finished

8. Wait for refreshing web page.

Wireless LAN Series

Site contents:

- Wizard
- Operation Mode
- Wireless
- TCP/IP
- Firewall
- Management
- Reboot

Change setting successfully!

Please wait a while for refreshing webpage.

If IP address was modified, you have to re-connect the WebServer with the new address.

9. Access the web server by new IP address “192.168.2.202” then use “LAN Interface” page to disable DHCP Server.

Wireless LAN Series

Site contents:

- Wizard
- Operation Mode
- Wireless
- TCP/IP
- LAN Interface
- WAN Interface
- Route
- Firewall
- Management
- Reboot

LAN Interface Setup

This page is used to configure the parameters for local area network which connects to the device. Here you may change the setting for IP Address, Subnet Mask, DHCP, etc..

IP Address: 192.168.2.202

Subnet Mask: 255.255.255.0

Default Gateway: 0.0.0.0

DHCP: Disabled

DHCP Client Range: 192.168.2.1 - 192.168.2.201 [Show Client](#)

802.1d Spanning Tree: Disabled

Clone MAC Address: 000000000000

MTU Size: 1500

[Apply Changes](#) [Reset](#)

10. Wait for refreshing web page.

Wireless LAN Series

Site contents:

- Wizard
- Operation Mode
- Wireless
- TCP/IP
- LAN Interface
- WAN Interface
- Route
- Firewall
- Management
- Reboot

Change setting successfully!

Please wait a while for refreshing webpage.

If IP address was modified, you have to re-connect the WebServer with the new address.

11. Use “WDS Settings” page to configure WDS.

Wireless LAN Series

Site contents:

- Wizard
- Operation Mode
- Wireless
- Basic Settings
- Advanced Settings
- Security
- Access Control
- WDS settings
- Site Survey
- TCP/IP
- Firewall
- Management
- Reboot

WDS Settings

Wireless Distribution System uses wireless media to communicate with other APs, like the Ethernet does. To do this, you must set these APs in the same channel and set MAC address of other APs which you want to communicate with in the table and then enable the WDS.

☐ Enable WDS

Add WDS AP:

MAC Address	Comment

[Apply Changes](#) [Reset](#) [Set Security](#) [Show Statistics](#)

Current WDS AP List:

MAC Address	Comment	Select

[Delete Selected](#) [Delete All](#) [Reset](#)

12. Enable WDS function and add the BSSID of DEV1 to "Current WDS AP List".

Wireless LAN Series

WDS Settings

Wireless Distribution System uses wireless media to communicate with other APs, like the Ethernet does. To do this, you must set these APs in the same channel and set MAC address of other APs which you want to communicate with in the table and then enable the WDS.

☒ **Enable WDS**

Add WDS AP: **MAC Address** **Comment**

Current WDS AP List:

MAC Address	Comment	Select
00:00:00:04:27:28	BSSID of DEV1	☐

13. Use the "Status" page to check the settings.

Wireless Configuration

Mode AP+WDS - Router

Band 2.4 GHz (B+G)

SSID DEV2

Channel Number 11

Encryption Disabled(AP), Disabled(WDS)

BSSID 00:05:9e:80:f9:bb

Associated Clients 1

Power(OFDM/G) 22 dbm

Power(CCK/B) 22 dbm

TCP/IP Configuration

Attain IP Protocol Fixed IP

IP Address 192.168.2.254

Subnet Mask 255.255.255.0

Default Gateway 192.168.2.254

DHCP Server Enabled

MAC Address 00:05:9e:80:f9:bb

WAN Configuration

Attain IP Protocol Fixed IP

IP Address 218.168.146.93

Subnet Mask 255.255.255.0

Default Gateway 218.168.146.254

MAC Address 00:05:9e:80:f9:bc

Configure DEV3:

1. Access the web server (<http://192.168.2.254>) of device from the Ethernet port.

Caution

If you configure multiple devices in the same PC, since the devices have the same default IP address but different MAC addresses, it may cause you not able to access the web server of device. If the situation happens, please try to clean the ARP table of your PC by DOS command “arp -d” then you can access the web server of device using the default IP address.

2. Use “LAN Interface” page to set the IP address of LAN interface and disable DHCP server.

Wireless LAN Series

Site contents:

- Wizard
- Operation Mode
- Wireless
- TCP/IP
- LAN Interface
- WAN Interface
- Route
- Firewall
- Management
- Reboot

LAN Interface Setup

This page is used to configure the parameters for local area network which connects to the device. Here you may change the setting for IP Address, Subnet Mask, DHCP, etc..

IP Address:

Subnet Mask:

Default Gateway:

DHCP:

DHCP Client Range: -

802.1d Spanning Tree:

Clone MAC Address:

MTU Size:

3. Wait for refreshing web page.

Wireless LAN Series

Site contents:

- Wizard
- Operation Mode
- Wireless
- TCP/IP
- LAN Interface
- WAN Interface
- Route
- Firewall
- Management
- Reboot

Change setting successfully!

Please wait a while for refreshing webpage.

If IP address was modified, you have to re-connect the WebServer with the new address.