

Installation Guide

for EMPRESS™ 2.4GHz Active RFID Reader

(Model: HKRAR-EMWF)

Revision: 1

Before use, please read these instructions completely

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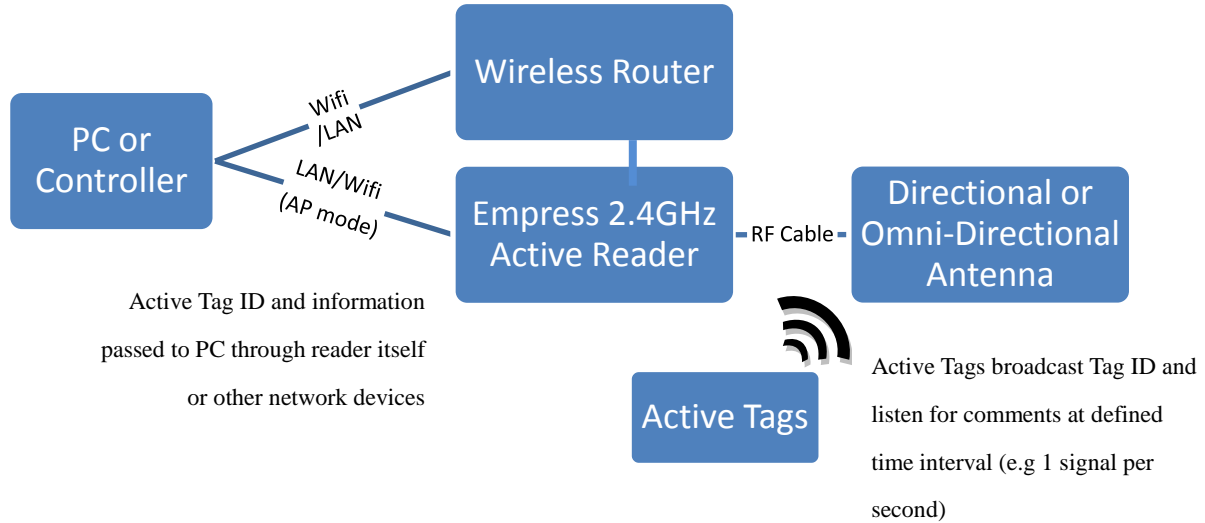
1.1 Introduction

Thank you for purchasing EMPRESS™ Reader, it is wireless and therefore is easy to install with low installation costs. It is a 2.4GHz Gain Adjustable Reader which uses the advanced 0.18um CMOS IC, and is well-fitted for being a Data Collector.

Through IEEE 802.11b/g (EMWF version), the reader gathers and transmits data to the wireless router or act as access point all by itself. Once powered, the HKRAR-EM series is instantly connected and become part of the network.

HKRAR-EMWF Active reader is user friendly with a web interface. You can get data and do analysis with a PC in an efficient way with its Wi-Fi feature. Its Omni-directional antenna can identify tags from all directions. Users can adjust the identification distance according to actual situations in order to make identification more accurate.

1.2 System Overview



1.2.1 Specification

Direction	Omni-directional, standard rubber antenna
Range	30-50m (depends on different Active RFID Tags),
Frequency	2.4GHz--2.5GHz ISM
RF Output Power	0dBm
Sensitivity	-85dBm
Power	500mA,5V
Modulation	GFSK
Software Interface	Xtractor™, .Net Platform
Data Rate	1Mbps
Operating Temperature	-40-60`C
Operating Humidity	95%(Non-condensing)
Anti-collision	200 tags simultaneously, shown within 5 sec.
Interface	WI-FI, IEEE 802.11b/g. can act as AP
Dimension	125mm * 108mm * 26mm

1.2.2 Components

One standard package of this product consists of following items;

- EMPRESS Reader x 1 piece
- 2.4GHz Antenna x 2 pieces
- DC Power Adaptor 5V 2.5A x 1 piece
- A Cross Cat-5 Cable (optional)

Other Essential Components

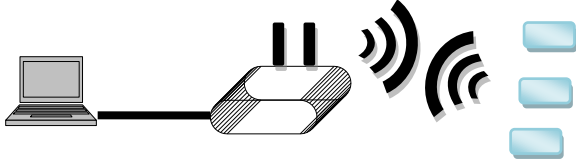
- Active Transponders from Hong Kong RFID
 - Personal Computer
- Minimum PC Requirements: **XXXXXX**

NOTE:

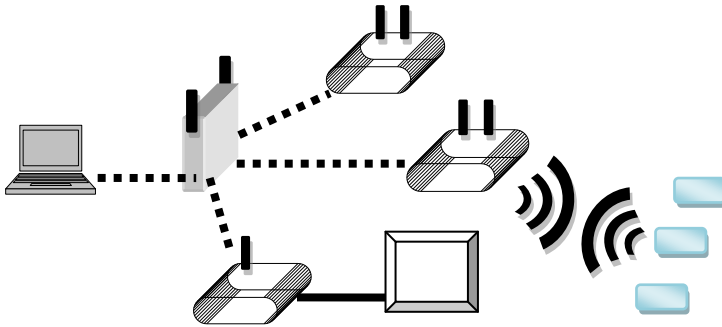
Active Transponders are essential to test the system and they are sold separately. Please contact your sales representative if you do not have any active transponders.

1.2.3 Network Setup

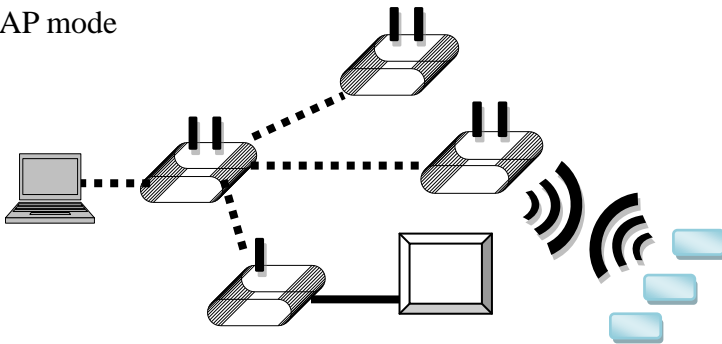
XXX mode



XXX mode (external antenna for illustration)



AP mode



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1.2.4 Application: Access Control System

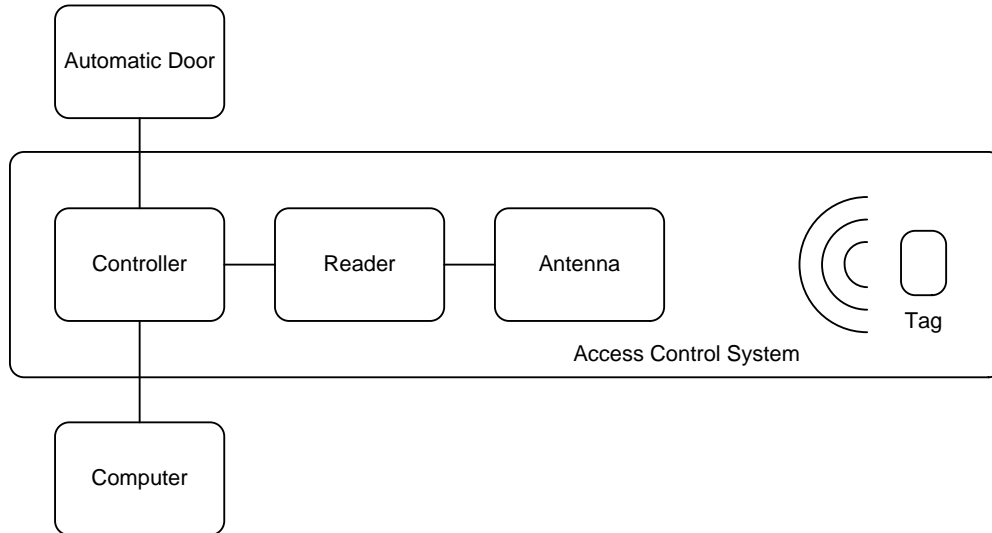


Fig.3 Overview of the access control system

The system can control an automatic door to achieve the purpose of access control. The results of the reader captured are recorded in the Controller.

1.2.5 Application: Location System

XXXXXX

1.3 Reader Indicators

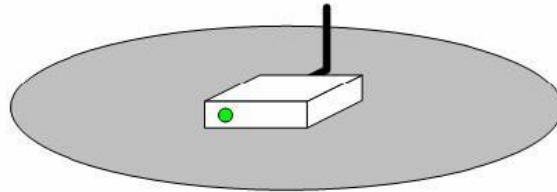
	Name	Function / Description
1	DC Power Jack	Supply power
2	Red LED	Power ON
3	Green LED	Data processing identity
4	NETWORK	Connect to PC to reader
5	RESET	Reboot button Please hold the button for 5sec
6	Wifi	For Wifi Antenna
7	ANT	For any 2.4GHz antenna, directional or omi-directional



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1.3.1 Omni-directional Antenna for Empress Active Reader

This antenna detects all tags in range from all angles.



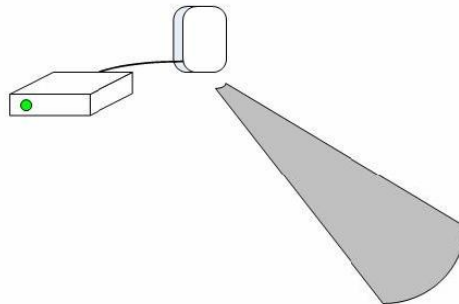
Technical Specification:

Frequency Range (MHz)	2400-2483
Bandwidth(MHz)	83
Gain (dBi)	8
VSWR	<=1.5
Impedance (ohm)	50
Max. Power (W)	50
Connector	N Female
Dimension (mm)	145 x 97 x 38
Weight (g)	210



1.3.2 Directional Antenna for Empress Active Reader (Optional)

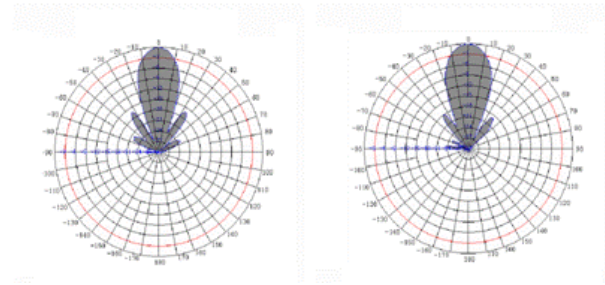
Directional antenna only detects tags in specific angle. Please note that the antenna has horizontal and vertical orientation.



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Long Range Directional 2.4GHz Antenna: HKRAA-2417

Electrical Specification	
Frequency Range	2400-2500MHz
VSWR	≤ 1.5
Input Impedance	50Ω
Gain	17dBi
Polarization Type	Vertical or Horizontal
Horizontal Plane Θ_{HP}	$20 \pm 2^\circ$
Vertical Plane Θ_{HP}	$20 \pm 2^\circ$
Front to Back Ratio	≥ 26dB
Maximum Input Power	6W
Connector Type	N -Female
Lightning Protection	DC ground
Mechanical Specifications	
Dimension	305mm × 305mm × 25mm
Weight	1.5Kg
Rated Wind Velocity	210km/h
Radome material	UV-Resistance ABS
Working Temperature	-40-60°C



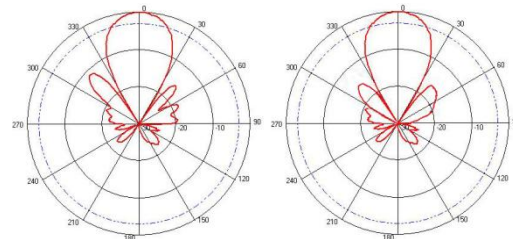
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Mid Range Directional 2.4GHz Antenna HKRAA-2414

Electrical Specification	
Frequency Range	2400-2500MHz
VSWR	≤ 1.5
Input Impedance	50 Ω
Gain	14dBi
Polarization Type	Vertical or Horizontal
Horizontal Plane θ_{HP}	$30 \pm 2^\circ$
Vertical Plane θ_{HP}	$30 \pm 2^\circ$
Beam Electrical Down tilt	0°
Front to Back Ratio	≥ 25 dB
Maximum Input Power	50W
Connector Type	N -Female
Lightning Protection	DC ground
Mechanical Specifications	
Dimension	190mm \times 190mm \times 30mm
Weight	0.5Kg
Rated Wind Velocity	210km/h
Radome material	UV-protected ABS
Diameter of Mounting pole	$\phi 30 - \phi 54$ mm
Working Temperature	-40~+60 $^\circ$ C



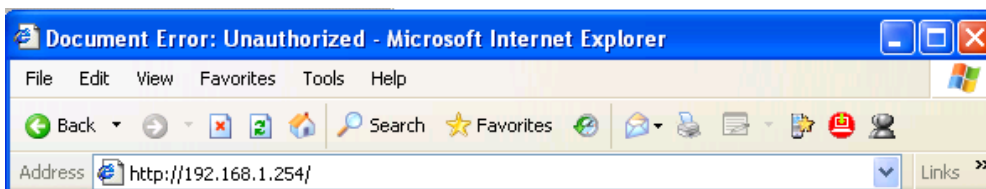
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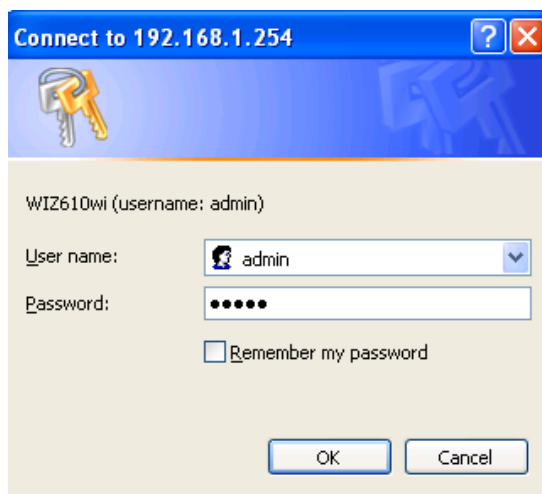
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1.4 First Time Installation:

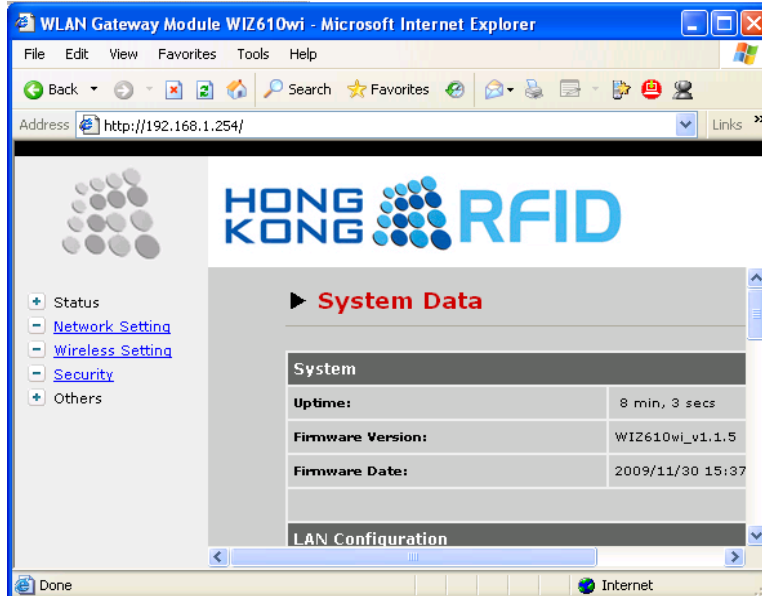
- 1) Take out the reader from the box and connect the all two antenna (ANT and WiFi) at the back of the reader
- 2) Plug the power adapter in the power jack. The red LED will turn on.
- 3) Connect the reader to a PC with Cross Cat 5 cable
- 4) Open your web browser and type **192.168.1.254** (if cannot open the setting page, try to turn off other connections, e.g. WIFI)



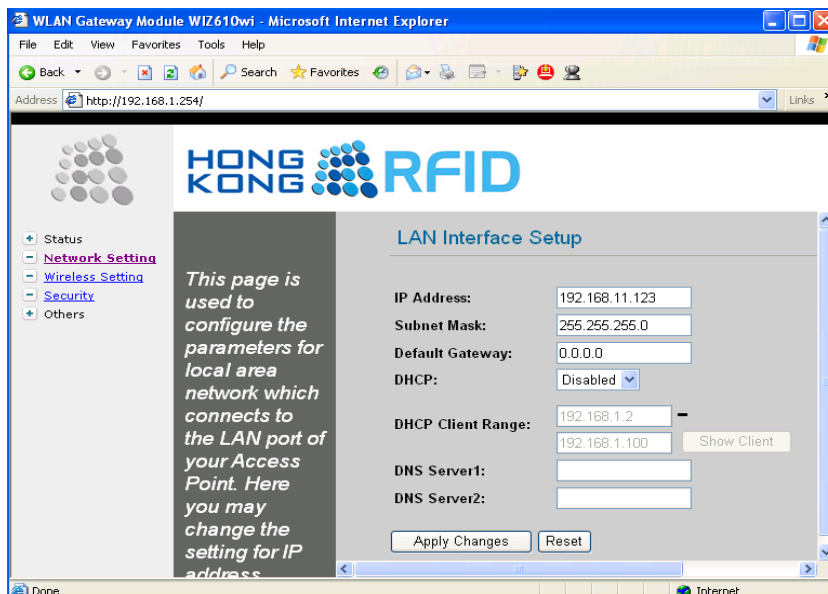
- 5) A dialog box will prompt you for the User name and Password. Enter the default values and click OK. Default login of setup page
user name: **admin**
password : **admin**



- 6) Continue the following setting step, the setup page will be display after log-in.



- 7) Select **Network Setting** on the left column. The LAN Interface Setup will display.
- 8) Select an idle IP address on your network and Enter in the **IP Address**. Enter the **Subnet Mask** and **Default Gateway** of your network. Disabled **DHCP**. Press **Apply Changes**.

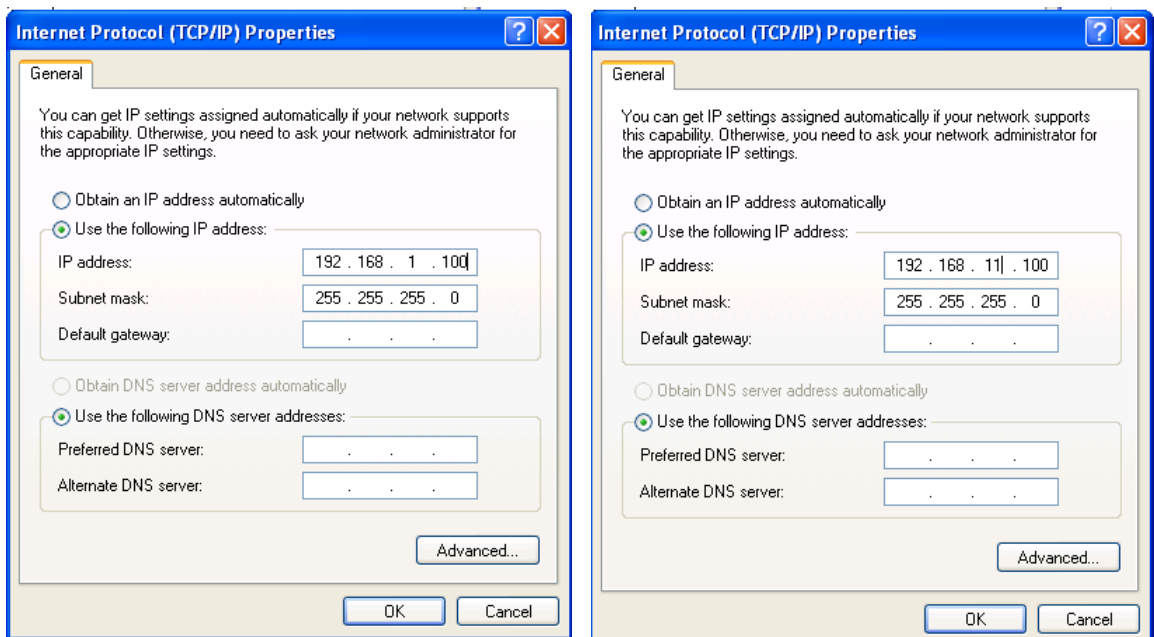


- 9) Successful message will show and click new IP Address to continuous setting.

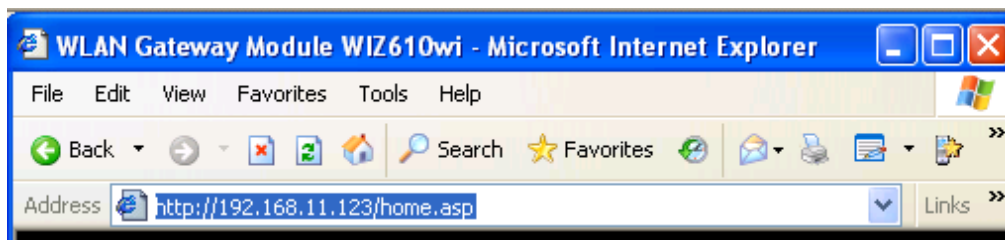
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NOTE:

- 1) skip from here on if new IP address is in same subnet of previous one
Go the **Start => settings => control panel => network connections.**
- 2) Selection connection which connect to the reader.
- 3) Press **properties**
- 4) Select **Internet Protocol(TCP/IP)** and press **properties**
- 5) change the IP address which in the same domain with reader.

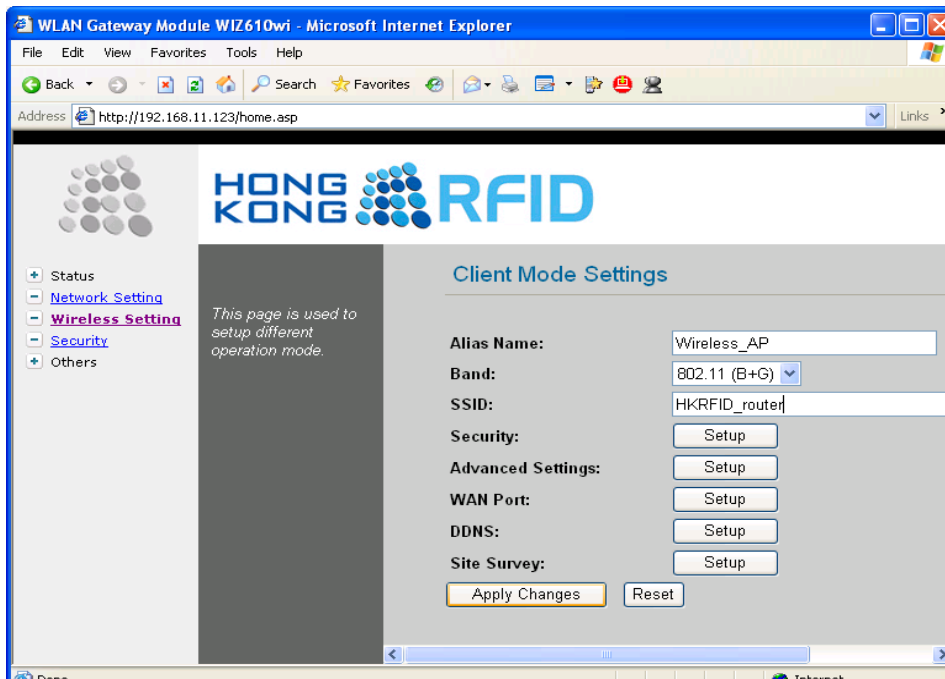


- 6) Press OK to close all the dialog.
- 7) Open Internet Explorer and type in the new IP address in the address field and press Enter

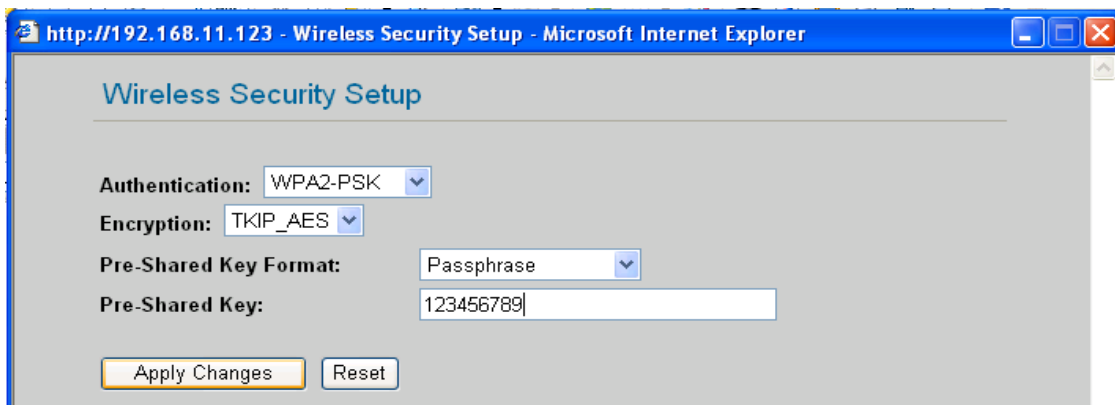


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- 8) Select **Wireless Setting** on the left column. Operation Mode will show
- 9) Select **Client** and press Setup. It takes a moment applying the setting and Client Mode Setting will show.
- 10) Enter the SSID name in of your wireless network and press Apply Changes.

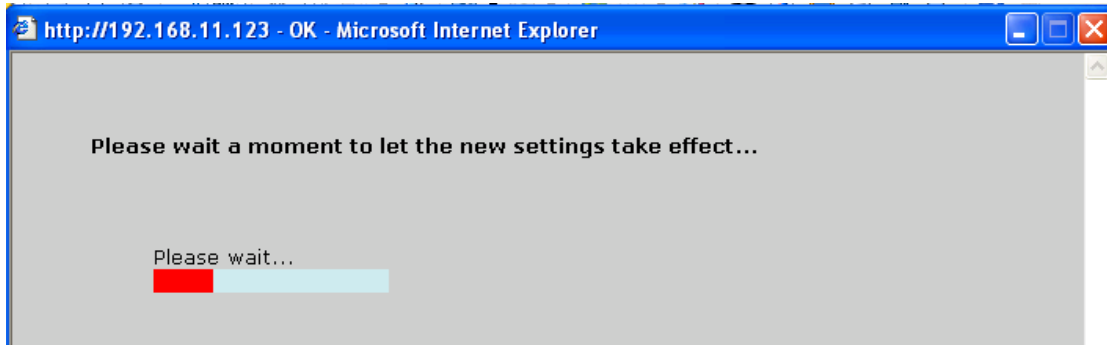


- 11) Press Security **Setup**. A **Wireless Security Setup dialog** will show.
- 12) Select your network authentication and Select/Enter according information.
Press Apply Change.



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13) It takes a moment applying setting.




14) After loading the setting. Close the entire dialog.

15) All setting complete.

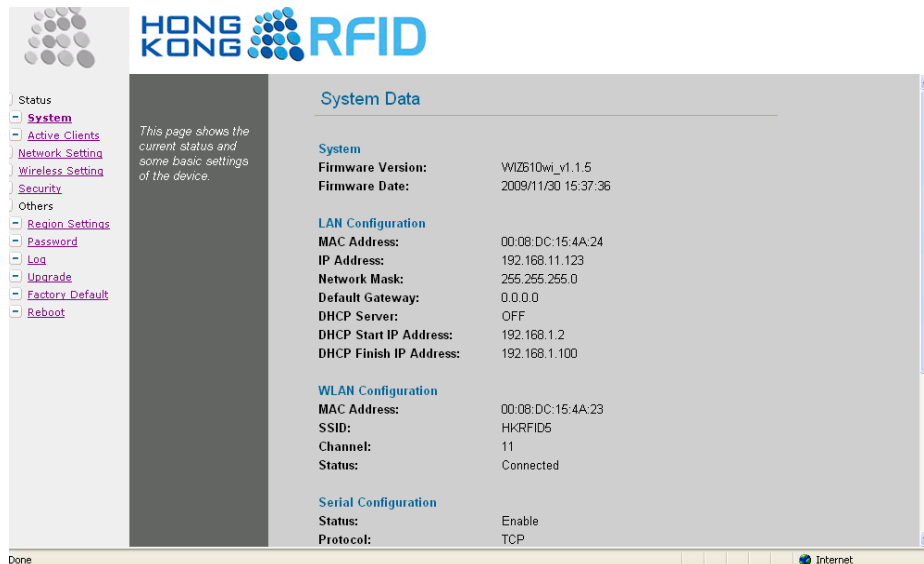
1.5 Wireless Connection Configuration Guide

1.5.1 Briefly description

 <ul style="list-style-type: none"> <input type="checkbox"/> Status <input type="checkbox"/> System <input type="checkbox"/> Active Clients <input type="checkbox"/> Network Setting <input type="checkbox"/> Wireless Setting <input type="checkbox"/> Security <input type="checkbox"/> Others <ul style="list-style-type: none"> <input type="checkbox"/> Region Settings <input type="checkbox"/> Password <input type="checkbox"/> Log <input type="checkbox"/> Upgrade <input type="checkbox"/> Factory Default <input type="checkbox"/> Reboot 	<ul style="list-style-type: none"> < check the system status and reader configuration <check the all active client status < setting network config. e.g. IP address, subnet Mask, etc. < setting the operation mode and the wireless connection < setting the wireless connection security < select the country code < charge password < for user setup/check the log file of the reader < upgrade the firmware < to reset all setting to factory default setting < reboot the reader
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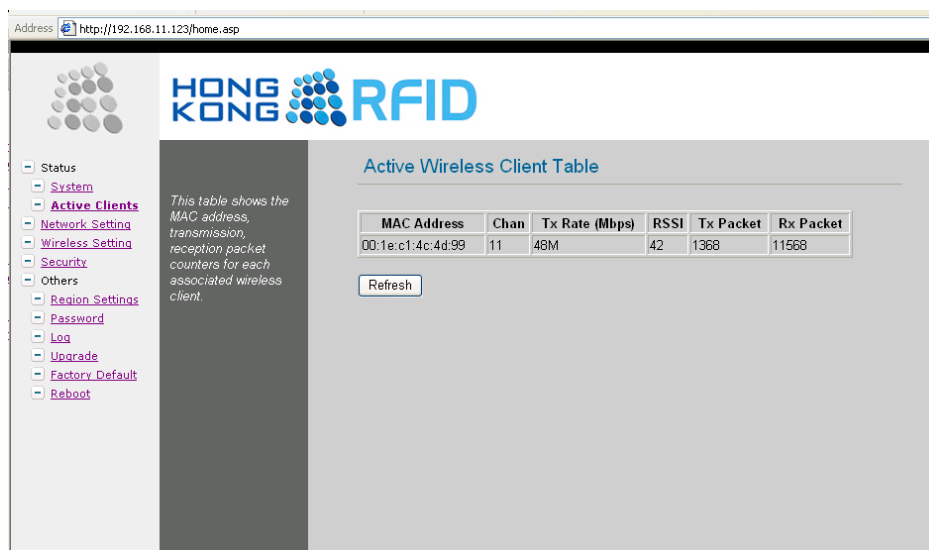
1.5.2 Status-system

It shows all the system information: firmware version, LAN configuration, WLAN configuration, Serial configuration.



1.5.3 Status-Active Client

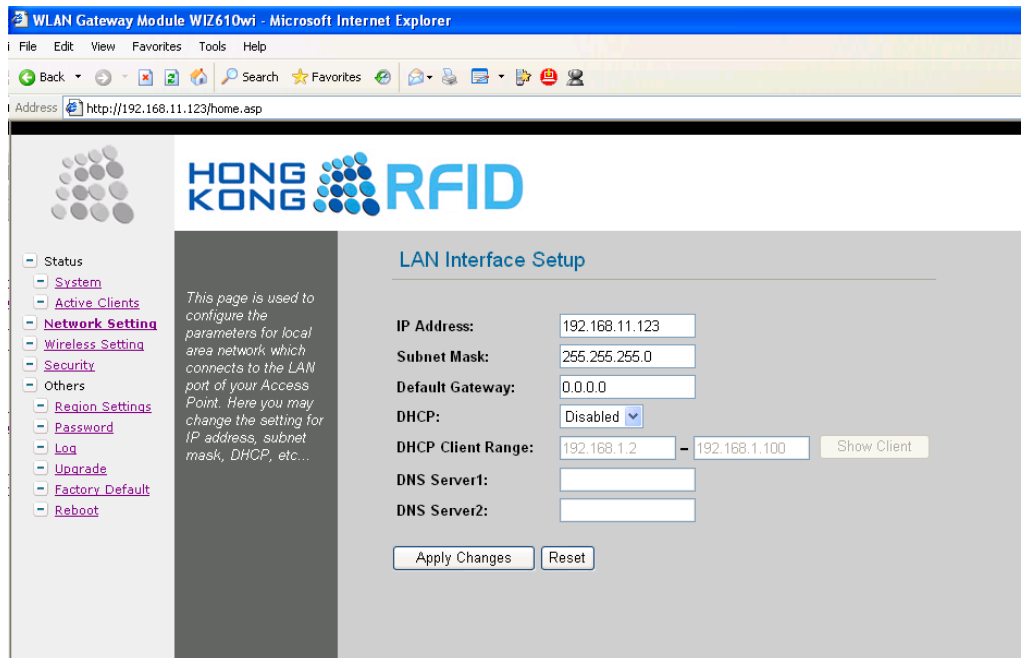
In this page, the information of clients connecting to WIZ610wi is displayed. If you click “Refresh” button, the client list and information are updated.



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1.5.4 Network Setting

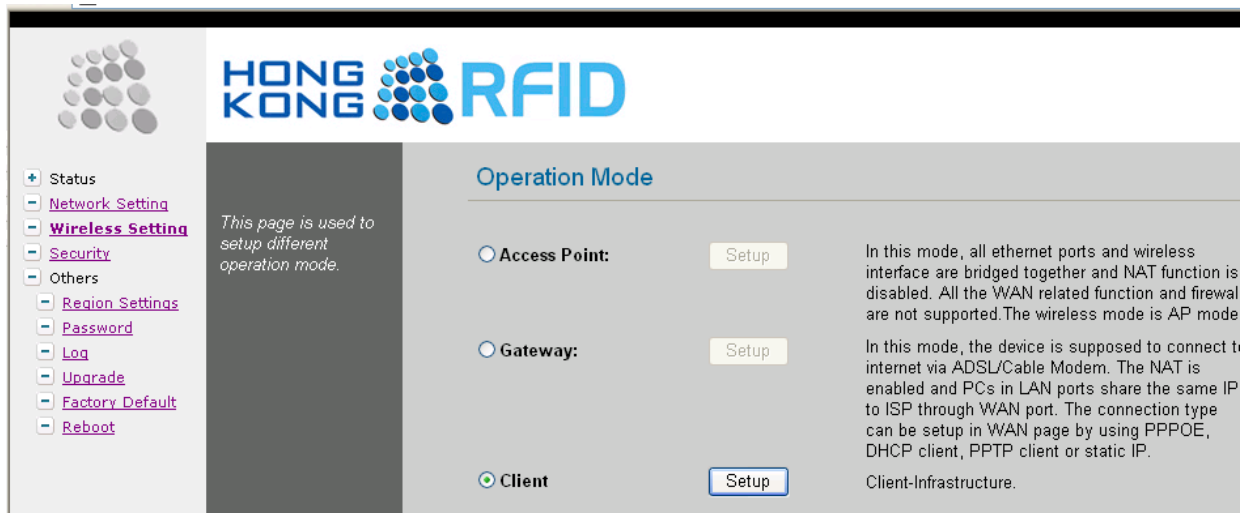
For user change the network setting of the reader.



Name	function
IP Address	Set the IP address to the reader
Subnet Mask	Set your network subnet mask to the reader
Default Gateway	Set the your network gateway to the reader
DHCP:	When the reader set as a server, you can set the reader activate the DHCP function.
DHCP Client Range	When the reader set as a server and DHCP function is on, user should set a range of IP address to the client for connection.
Show Client	To show the list of connected Clients

1.5.5 Wireless Setting

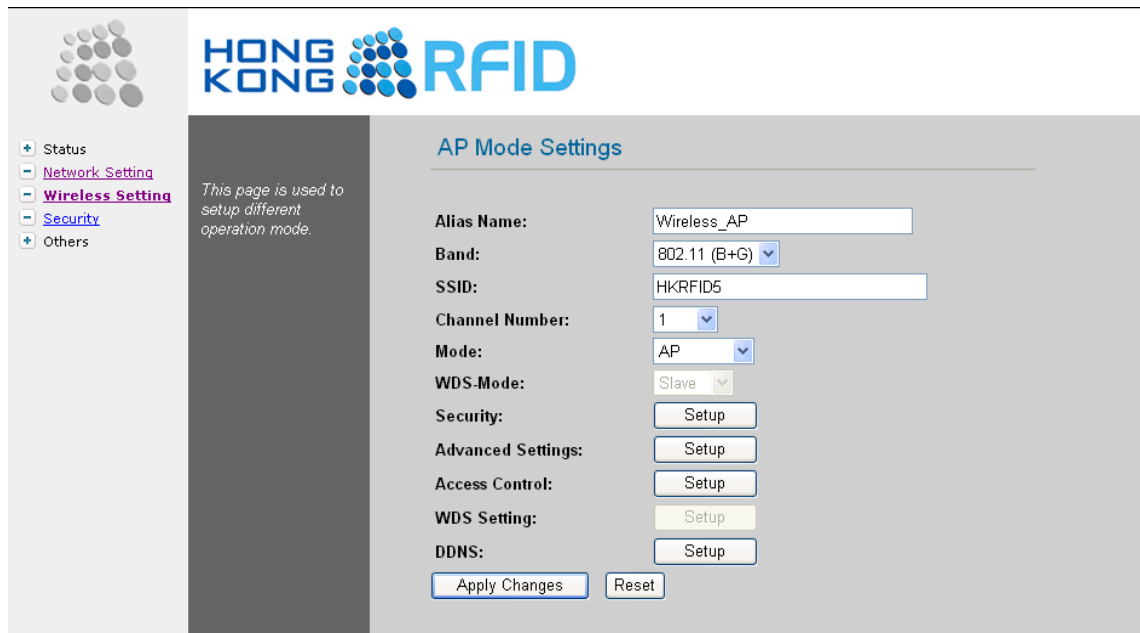
It selects the operation mode of the reader and the setup the selected mode



Mode	Function
Access Point	In this mode, all ethernet ports and wireless interface are bridged together and NAT function is disabled. All the WAN related function and firewall are not supported. The wireless mode is AP mode.
Gateway	In this mode, the device is supposed to connect to internet via ADSL/Cable Modem. The NAT is enabled and PCs in LAN ports share the same IP to ISP through WAN port. The connection type can be setup in WAN page by using PPPOE, DHCP client, PPTP client or static IP.
Client	Client-Infrastructure.

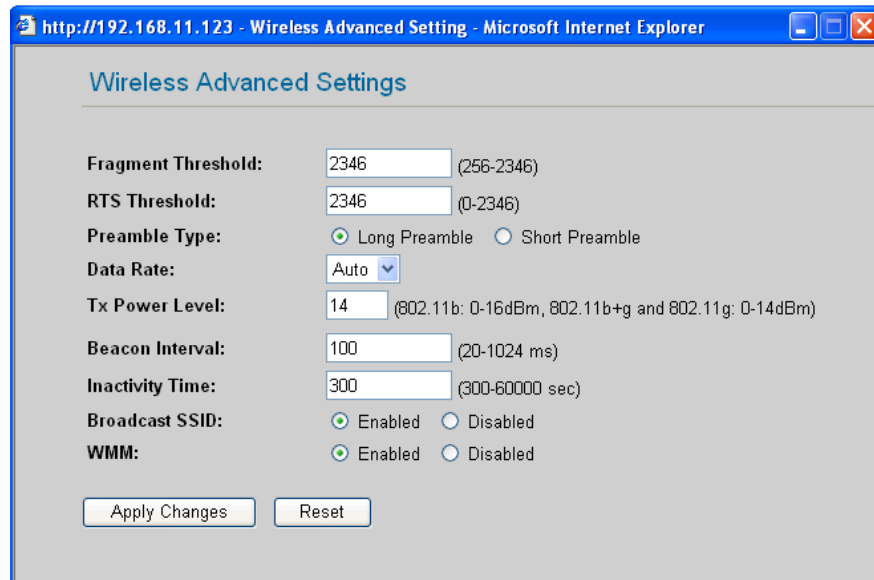
1.5.6 Access Point Setup

After selecting the AP mode and please click “Setup” button,



Name	Function
Alias Name:	Type in the reader name
Band	Select communication protocol
SSID	Input SSID for wireless communication.
Channel Number:	Select the channel frequency which you will use for wireless communication.
Mode:	Select the mode of the AP : set reader operates as Access Point. AP+WDS : WDS(Wireless Distribution System) repeater, this mode can let the reader communication each other. In this mode, the reader will also operate with AP mode in the same time.
WDS-Mode:	Select the master/ salve when WDS is set
Security:	Setting the wireless connection security
Advanced Settings:	Have a more advanced setting : Fragment Threshold, RTS Threshold,Preamble Type, Beacon Interval

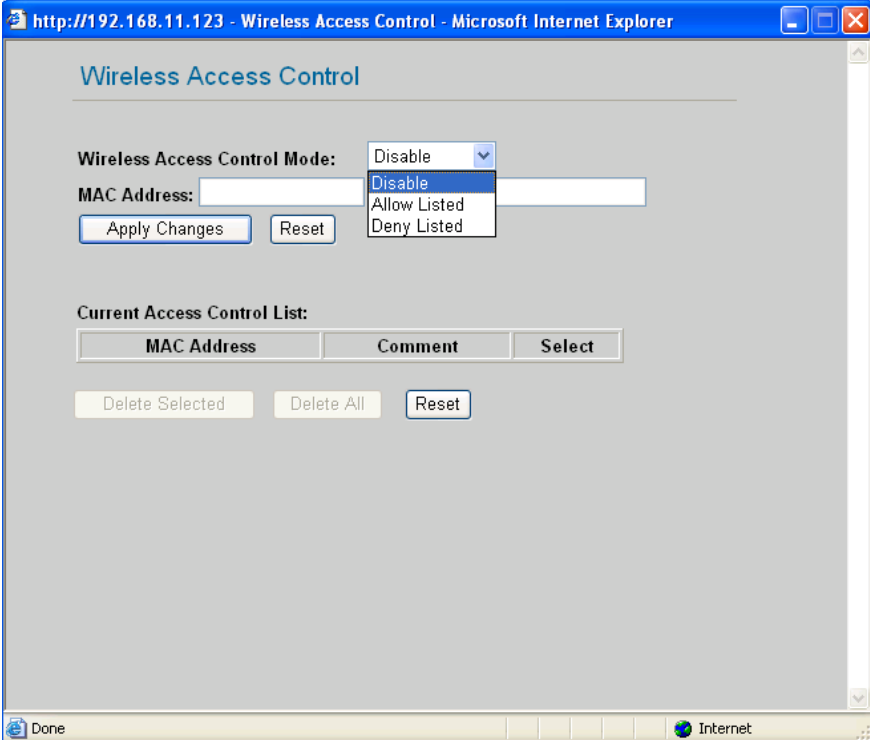
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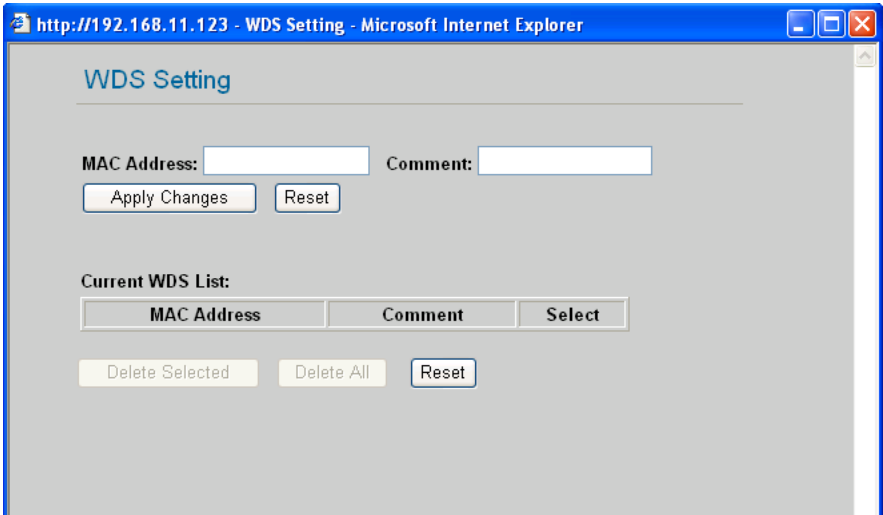


-Fragment Threshold: This value specifies the maximum size for a packet before data is fragmented into multiple packets. If you experience a high packet error rate, you may slightly increase the Fragmentation Threshold. Setting the Fragmentation Threshold too low may result in poor network performance. Only minor reduction of the default value is recommended. In most cases, it should remain as its default value of 2346.

-RTS Threshold: When you encounter inconsistent data flow, only minor reduction of the default value, 2347, is recommended. If a network packet is smaller than the preset RTS threshold size, the RTS/CTS mechanism will not be enabled. The Router frames to a particular receiving of a data frame. After receiving responds with a Clear to Send right to begin transmission. The as its default value of 2347.

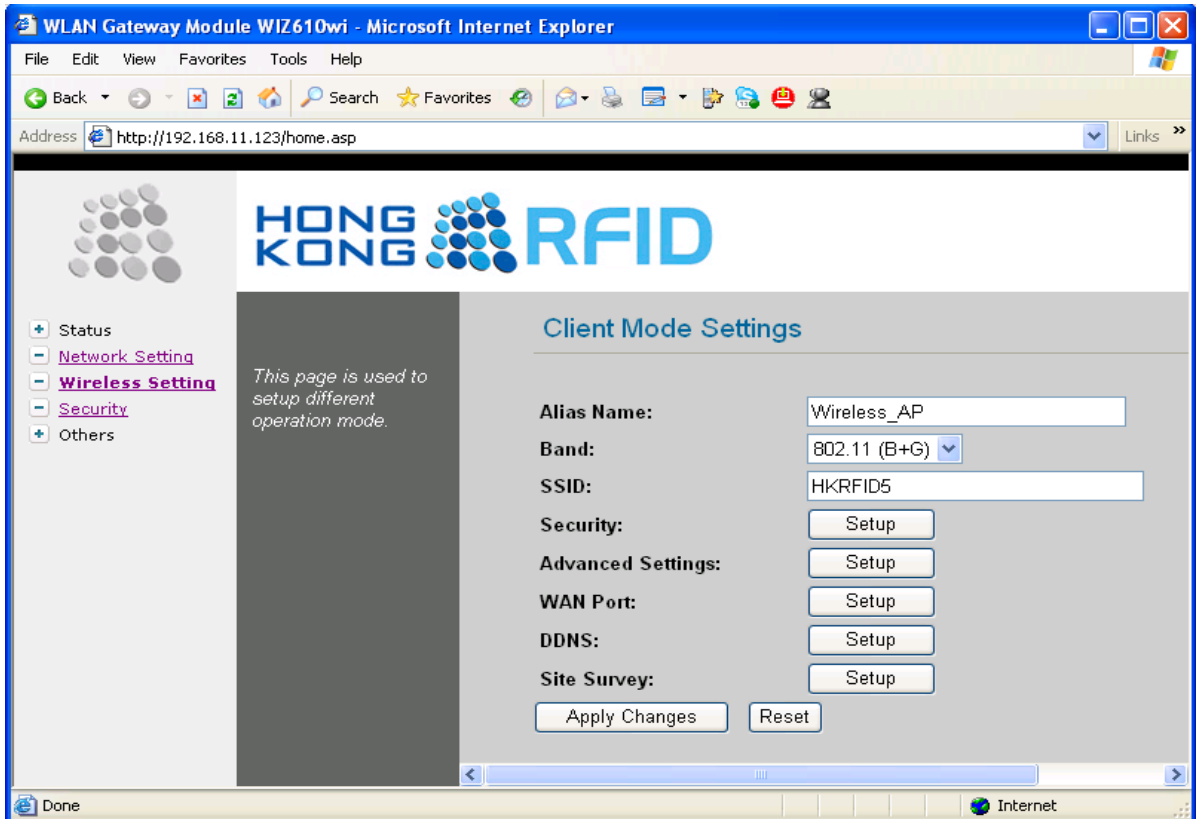
-Beacon Interval: The default value is 100. Enter a value between 1 and 65,535 milliseconds. The Beacon Interval value indicates the frequency interval of the beacon. A beacon is a packet broadcast by the Router to synchronize the wireless network.

<p>Access Control:</p>	<p>Setting the MAC address to allows or blocks clients access</p>  <p>Disable: the wire access control mode Allow Listed: add the MAC address user in to allow mode Deny Listed: add the MAC address client into deny mode</p>
<p>WDS Setting:</p>	<p>If AP mode is set as WDS Repeater, WDS Setting button is activated. WDS is Wireless Distribution System that is working as a wireless bridge between AP and AP.</p>

	
DDNS:	DDNS: Dynamic DNS is a service that provides you with a valid, unchanging, internet domain name (an URL) to go with that IP-address. You can apply one at www.no-ip.com .

1.5.7 Client Mode Setup

After selecting the Client mode and please click “Setup” button



Name	function
Alias Name	Type in the reader name
Band	Select communication protocol
SSID	Input SSID for wireless communication.
Security	Setting the wireless connection security
Advanced Settings	Have a more advanced setting : Fragment Threshold, RTS Threshold,Preamble Type, Beacon Interval
WAN Port	Setup the WAN Port
DDNS	DDNS: Dynamic DNS is a service that provides you with a valid, unchanging, internet domain name (an URL) to go with that IP-address. You can apply one at www.no-ip.com .
Site Survey	Look for the available wireless network

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1.5.8 Security

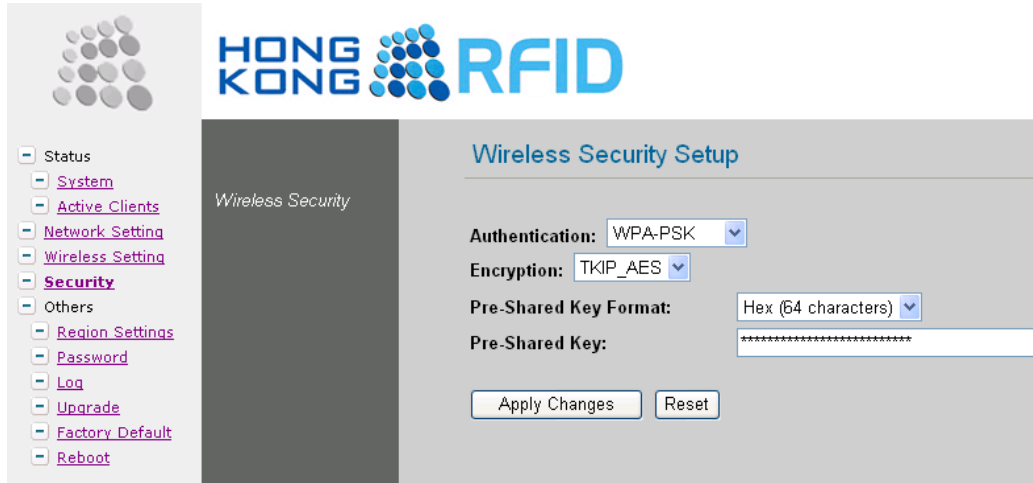
Setting the wireless connection security.



Authentication	Select the authentication of the network to connect the four selection: -Open system -Shared key -WPA-PSK -WPA2-PSK
Encryption:	Select the encryption of the network to connect the two selection: -TKIP_AES -WEP

The encryption is TKIP_AES

Encryption: TKIP AES
Pre-Shared Key Format: Select the key format
Pre-Shared Key: Enter the Key



The encryption is WEP

- Encryption: WEP
- Key Length: Select the key length :
64-bit or 128-bit
- Key Format: Select the key format:
ASCII (5 characters) or Hex (10 characters)
- Default Tx Key: Selection the Default Key
- Encryption Key 1: Enter the key
- Encryption Key 2: Enter the key (if any)
- Encryption Key 3: Enter the key (if any)
- Encryption Key 4: Enter the key (if any)

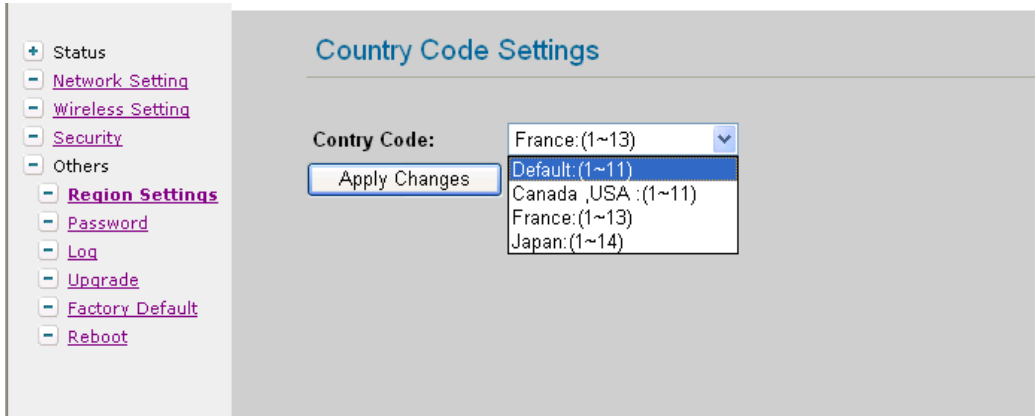


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1.5.9 Others

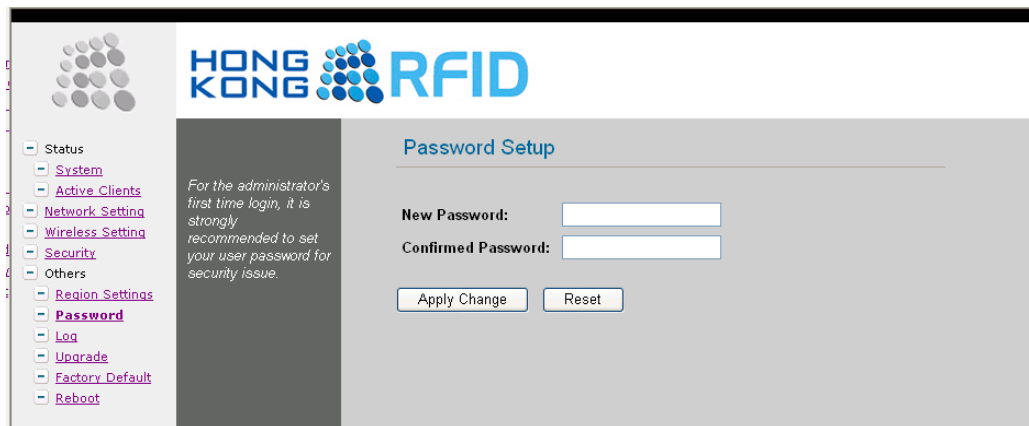
Region Settings:

- select the country code



Password

- for user to change the password(strongly recommended to set your user password for security issue.)



Log

- For the administrator's to setup the log function and check system log file.

Upgrade

- for user to upgrade the firmware of the reader.

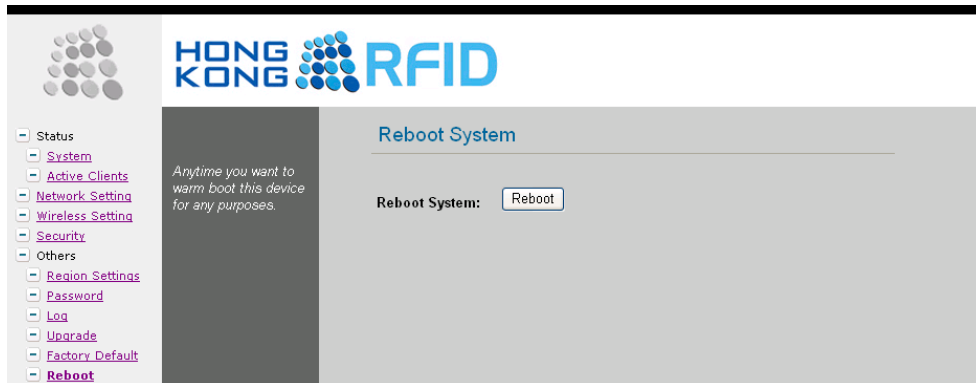
Factory Default

- to reset all setting to factory default setting



Reboot

- to reboot the reader



1.6 Computer Software Installation

INSTALLATION STEPS

- 1) install the window .net framework 3.5
- 2) install the Xtractor Package
- 3) start the software

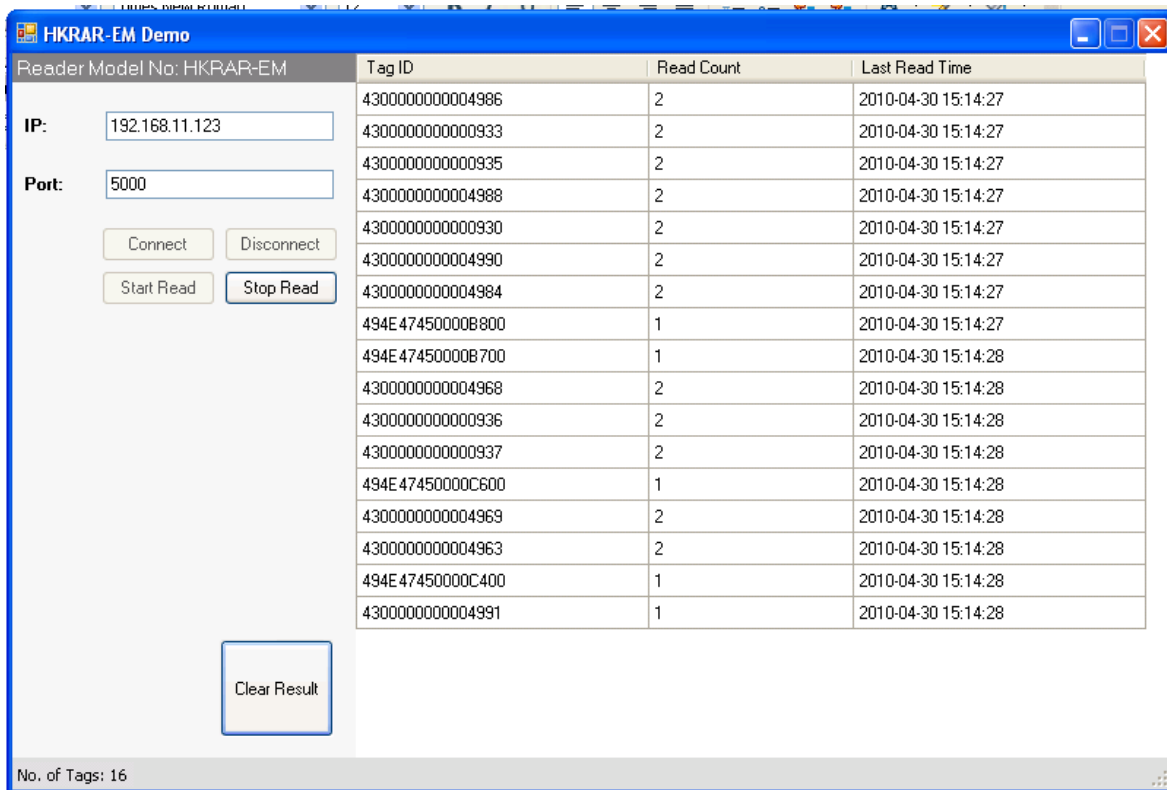
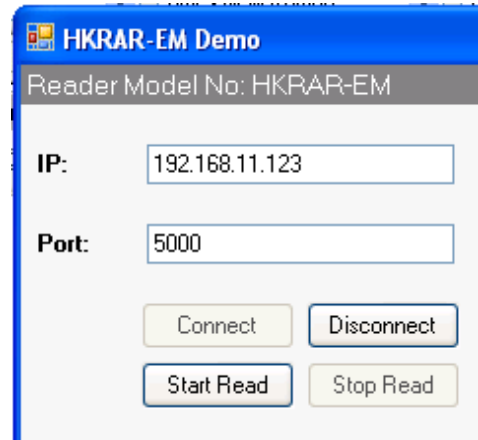
PROCEDURE

- 1) Install the window .net framework 3.5(if you already install before, ignore this part).
 - i. Double click the “WindowsInstaller-KB893803-v2-x86.exe” on the CD to process the installation
- 2) Install the Xtractor Package
 - i. extract the file “Xtractor Package.zip” on the CD(you need a unzip software)
 - ii. double click the “Installer.msi”to instal the Xtractor Package.
- 3) Start up the software
 - i)double click “Demo_HKRRAR-EM.exe” to start the software.

1.7 Demo Software User Guide

INSTALLATION STEPS

- 1) input the IP address of the reader in the IP field
- 2) input the port number of the reader(default is 5000)
- 3) press connect until the state bar show connected
- 4) press start read to receive tag information. And the state bar show the no. of tag received.
- 5) Press stop when you finish read the tag
- 6) you may clear the result window by clicking Clear Result and re-read the tag information
- 7) press disconnect to disconnect the reader



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FCC WARNING

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

This device must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

NOTE 1: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE 2: Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

NOTE 3: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.