



## **TAP-620-M12**

**EN50155 IEEE 802.11 a/b/g/n Access Point**

## **User's Manual**

**Version 1.0**

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[www.oring-networking.com](http://www.oring-networking.com)

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# Getting to Know Your Access Point

## 1.1 About the ORing Access Point

TAP-620-M12 is reliable IEEE802.11a/b/g/n WLAN with 2 ports LAN Access Point. It can be configured to operate in AP/Client/Bridge mode. You can configure TAP-620-M12 by Window Utility or WEB interfaces via LAN port or WLAN interface. TAP-620-M12 provides dual Ethernet ports in switch mode, so you can use Daisy Chain to reduce the usage of Ethernet switch ports. Therefore, TAP-620-M12 is one of the best communication solutions for wireless application.



## 1.2 Software Features

- High Speed Air Connectivity: WLAN interface support up to 300Mbps link speed connection
- Highly Security Capability: WEP/WPA/WPA2/Radius/TKIP supported
- Support AP/Client/Bridge/AP-Client Mode
- Switch Mode Supported: Daisy Chain support to reduce usage of switch ports
- Secured Management by HTTPS
- Event Warning by Syslog, Email, SNMP Trap, Relay and Beeper

## 1.3 Hardware Features

- Redundant Power Inputs: Dual 12~48 VDC on M23 connector
- 10/100Base-T(X) Ethernet port
- Casing: IP-40
- Dimensions(W x D x H) : 125mm(W) x 65mm(D) x 196mm(H)
- Operating Temperature: -20 to 70°C
- Storage Temperature: -40 to 85°C
- Operating Humidity: 5% to 95%, non-condensing

# Hardware Installation

## 2.1 Wall Mounting Installation

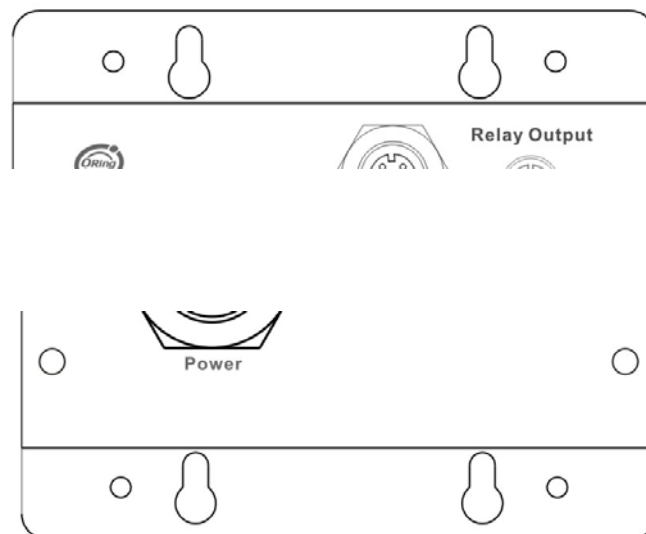
Each AP has another installation method to fix the AP. The following steps show how to mount the AP on the wall:

Step 1: Use screws that can be found in the package to combine the wall mount TAP-620-M12.

The screws specification shows in the following two pictures. In order to prevent the AP from any damage, the screws should not larger than the size that used in TAP-620-M12.



Step 2: Mount the combined AP on the wall.



# Hardware Overview

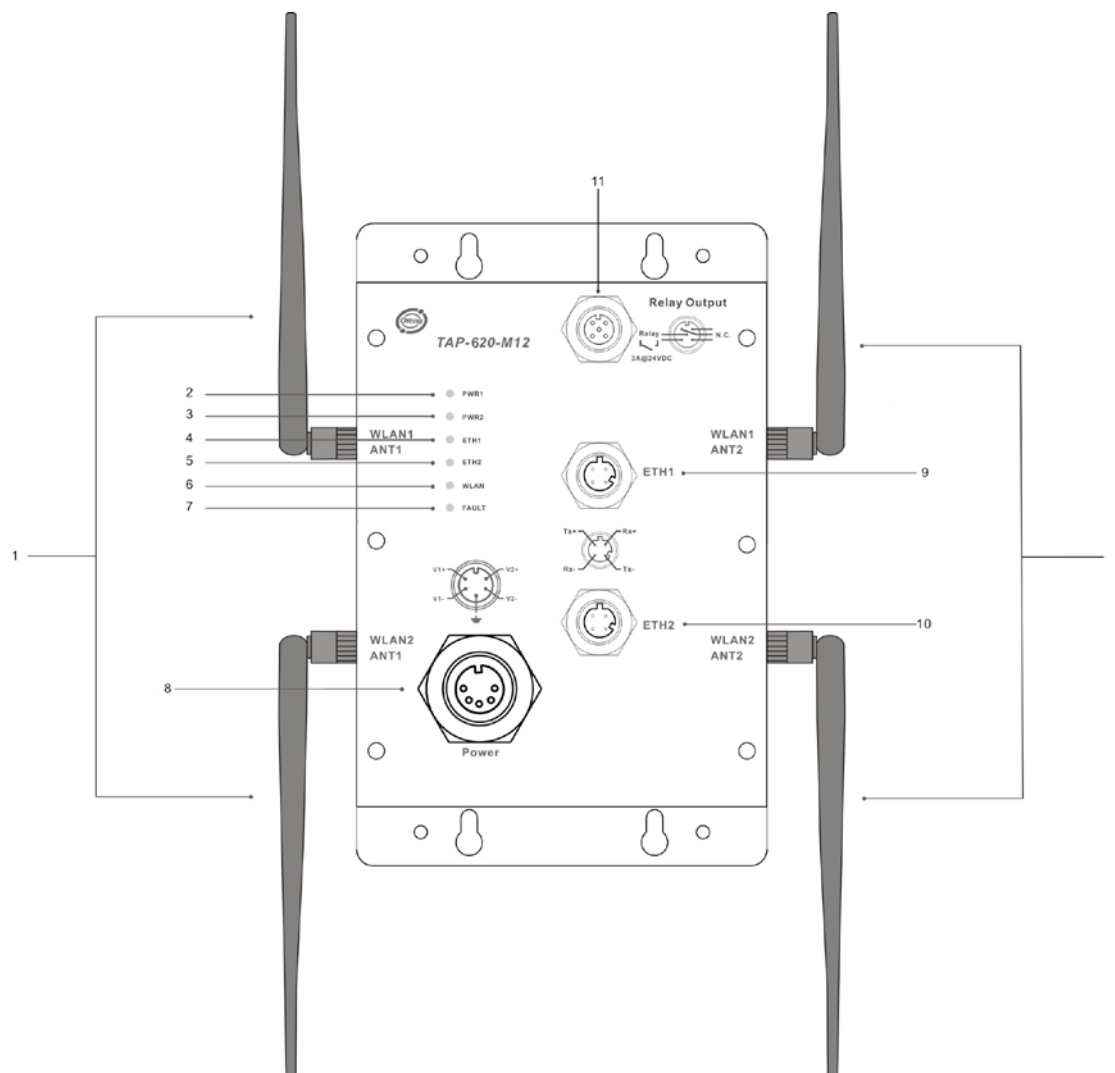
## 3.1 Front Panel

The following table describes the labels that stick on the TAP-620-M12.

Port	Description
<b>10/100 Base-T(X) fast Ethernet ports on M12 connector (D-coding)</b>	2 10/100Base-T(X) fast Ethernet ports support auto-negotiation. Default Setting : Speed: auto
<b>Relay Output on M12 (A-coding) connector</b>	Relay output to carry capacity of 3A at 24VDC
<b>Redundant power inputs on M23 connector</b>	Dual Power Inputs. 12~48 VDC on M23 connector



# TAP-620-M12



1. 2.4/5 GHz antenna with typical 3.0 dBi antenna for 5GHz and 2 dBi for 2.4GHz.
2. LED for PWR1 and system status. When the PWR1 links, the green LED will be light on.
3. LED for PWR2 and system status. When the PWR2 links, the green LED will be light on.
4. LED for Ethernet port1 status.
5. LED for Ethernet port2 status.
6. LED for WLAN link status.
7. LED for Fault Relay. When the fault occurs, the red LED will be light on.
8. Power Input port on M23 connector
9. Ethernet port1 on M12(D-coding) connector

10. Ethernet port2 on M12(D-coding) connector
11. Relay output on M12(A-coding) connector

### 3.2 Front Panel LEDs

LED	Color	Status	Description
<b>PWR1</b>	Green/Red	Green On	DC power 1 activated.
		Green blinking	Device been located
		Red blinking	Indicates an IP conflict, or DHCP or BOOTP server did not respond properly
<b>PWR2</b>	Green/Red	Green On	DC power 2 activated.
		Green blinking	Device been located
		Red blinking	Indicates an IP conflict, or DHCP or BOOTP server did not respond properly
<b>ETH1</b>	Amber	On	Port link up at 10Mbps.
		Blinking	Data transmitted.
	Green	On	Port link up at 100Mbps.
		Blinking	Data transmitted.
<b>ETH2</b>	Amber	On	Port link up at 10Mbps.
		Blinking	Data transmitted.
	Green	On	Port link up at 100Mbps.
		Blinking	Data transmitted.
<b>WLAN</b>	Green	On	WLAN1 activated.
		Blinking	WLAN1 Data transmitted.
	Red	On	WLAN2 activated.
		Blinking	WLAN2 Data transmitted.
<b>Fault</b>	Red	On	Fault relay. Power failure or Port down/fail.

## Cables and Antenna

## 4.1 Ethernet Cables

The TAP-620-M12 WLAN AP has two 10/100Base-T(X) Ethernet ports. According to the link type, the AP use CAT 3, 4, 5,5e UTP cables to connect to any other network device (PCs, servers, switches, routers, or hubs). Please refer to the following table for cable specifications.

Cable Types and Specifications

Cable	Type	Max. Length	Connector
10Base-T	Cat. 3, 4, 5 100-ohm	UTP 100 m (328 ft)	M12(D-codng)
100Base-T(X)	Cat. 5 100-ohm UTP	UTP 100 m (328 ft)	M12(D-coding)

## 4.2 100Base-T(X)/10Base-T Pin Assignments

With 100Base-T(X)/10Base-T cable, pins 1 and 2 are used for transmitting data, and pins 3 and 6 are used for receiving data.

M12(4-pin, D-coding) Pin Assignments



Pin Number	Assignment
1	RD+
2	TD+
3	RD-
4	TD-

The TAP-620-M12 supports auto MDI/MDI-X operation. You can use a straight-through cable to connect PC and AP. The following table below shows the 10Base-T/100Base-T(X) MDI and MDI-X port pin outs.

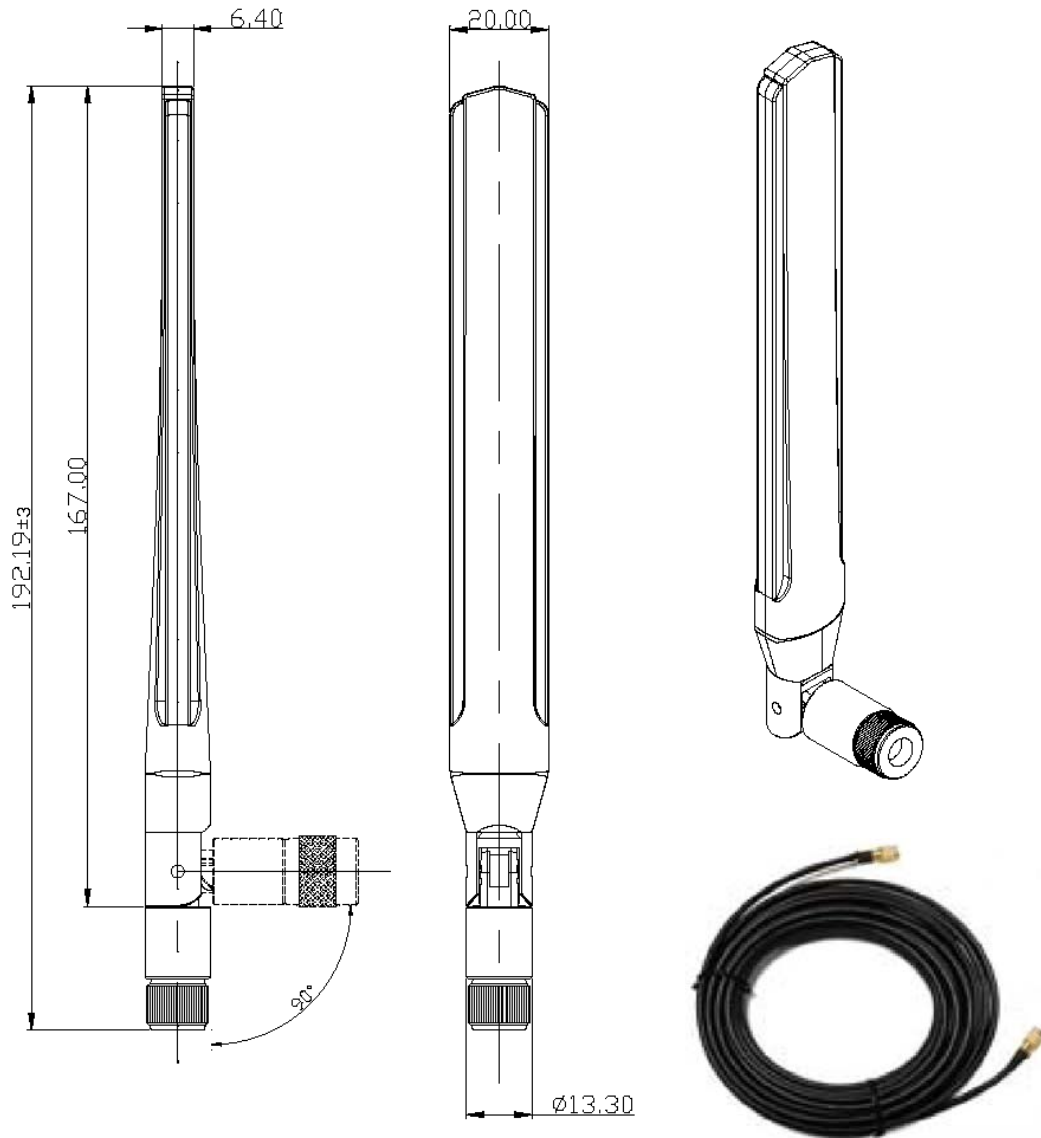
MDI/MDI-X pins assignment

Pin Number	MDI port	MDI-X port
1	RD+(receive)	TD+(transmit)
2	TD+(transmit)	RD+(receive)
3	RD-(receive)	TD-(transmit)
4	TD-(transmit)	RD-(receive)

**Note:** "+" and "-" signs represent the polarity of the wires that make up each wire pair.

### 4.3 Wireless Antenna

2.4GHz/5GHz antenna is used for TAP-620-M12 and connected with a reversed SMA connector. External RF cable and antenna also can be applied with this connector.



# Management Interface

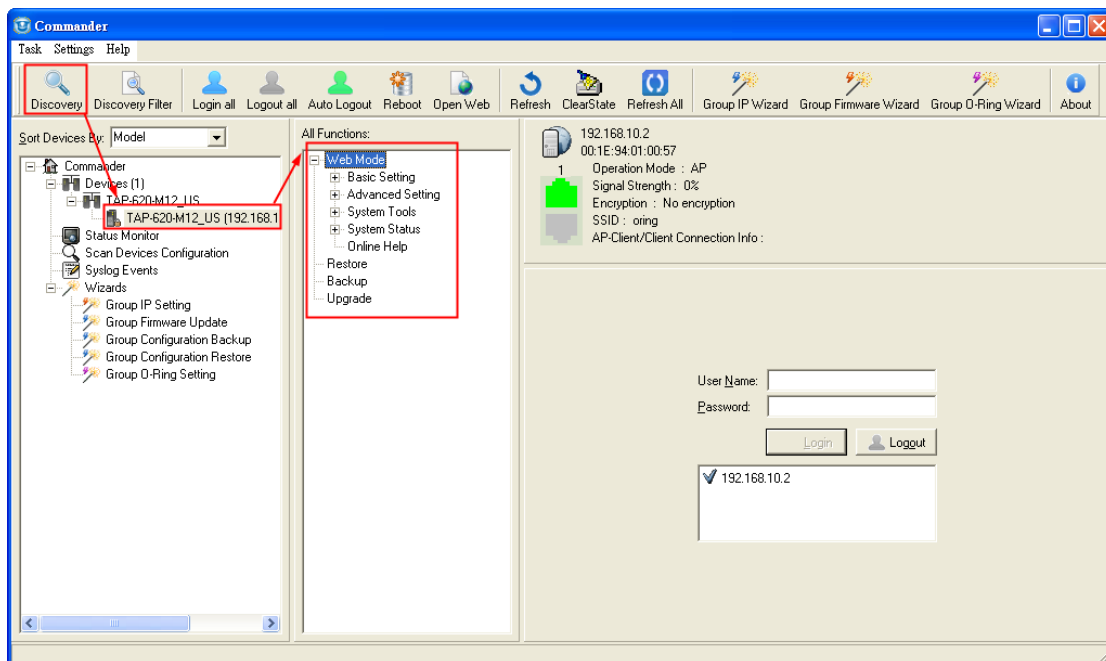
## 5.1 Explore TAP-620-M12

### 5.1.1 Open-Vision\_Commander

TAP-620-M12 can also be configure through Oring's window utility Open-Vision

Step 1: Open the commander and click "Discover", the AP devices will show on the list.

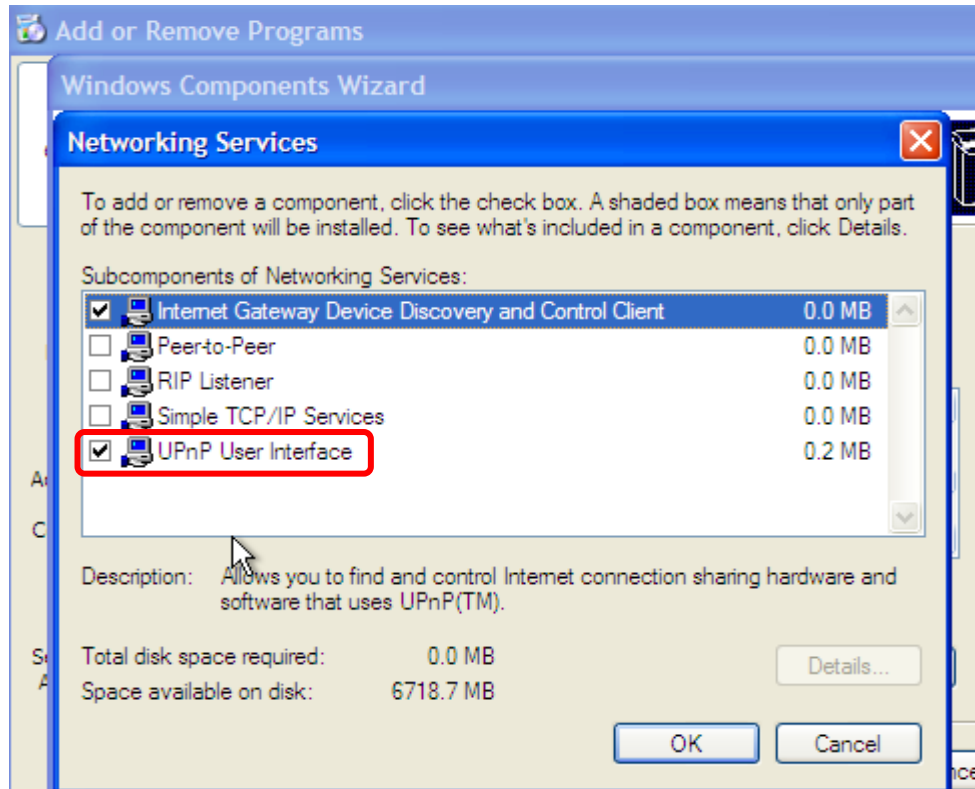
Step 2: Choose your access point, and it will show the AP function tree. Simultaneity, you can login and then set the AP.



User interface of commander

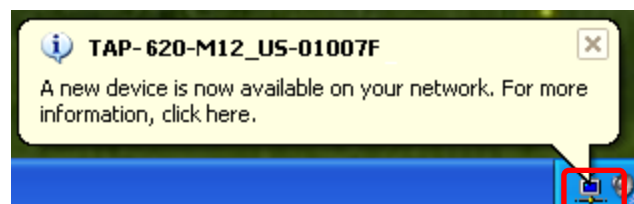
## 5.2 UPnP Equipment

Step 1: To check whether the UPnP UI of the computer is connected to the TAP-620-M12, go to **Control Panel > Add or Remove Programs > Windows Components Wizard > Networking Servers > UPnP User Interface** and pitch on the UPnP User Interface.

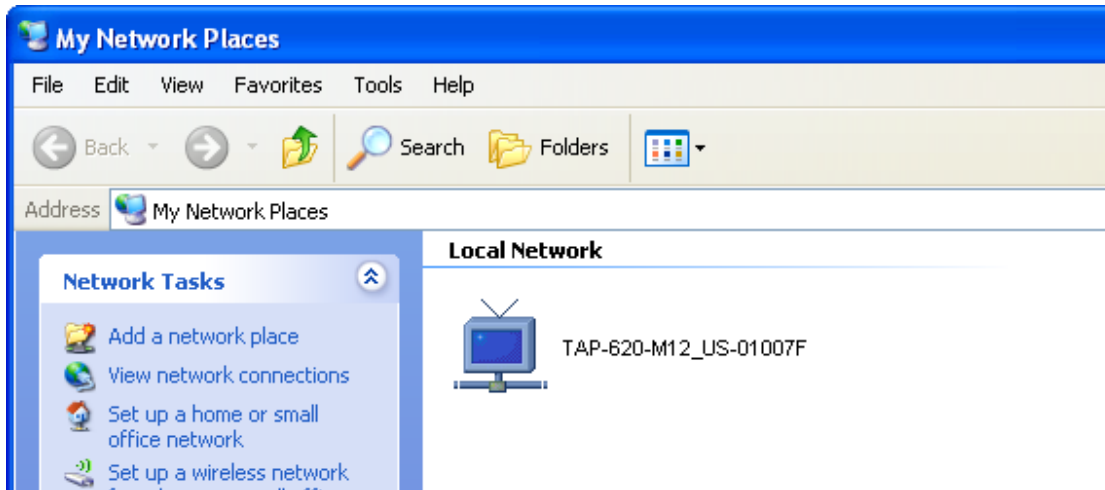


UPnP configuration page

Step 2: At the right-below corner of the computer, you will find a sign of the UPnP equipment.



Step 3: Click the sign of the UPnP equipment, then you will find the UPnP equipment in the network neighborhood.



Step 4: Right click the UPnP equipment to choose “Properties”, it will show as the following pictures:

Step 5: Right click the UPnP equipment or double click the UPnP equipment to transfer; it will go to the web page.

## 5.3 Configuration by Web Browser

This section introduces the configuration by Web browser.

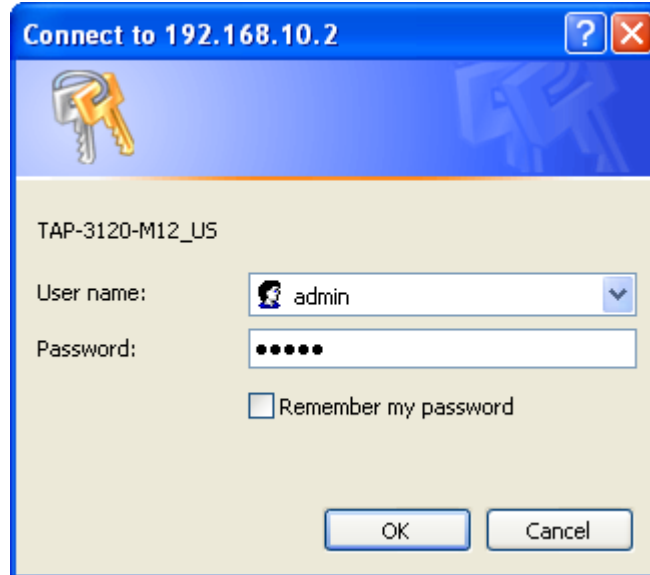
## 5.4 About Web-Based Management

An embedded HTML web site resides in flash memory in the system. It contains advanced management features and allows you to manage the AP from anywhere on the network through a standard web browser such as Microsoft Internet Explorer.

The Web-Based Management function supports Internet Explorer 5.0 or later. It is based on Java Applets with an aim to reduce network bandwidth consumption, enhance access speed and present an easy viewing screen.

**Note:** By default, IE5.0 or later version does not allow Java Applets to open sockets. You need to explicitly modify the browser setting in order to enable Java Applets to use network ports.

Through the front section's information, you will see as follows, enter your user name (**admin**) and your password (**admin**), and then click **OK** to continue.



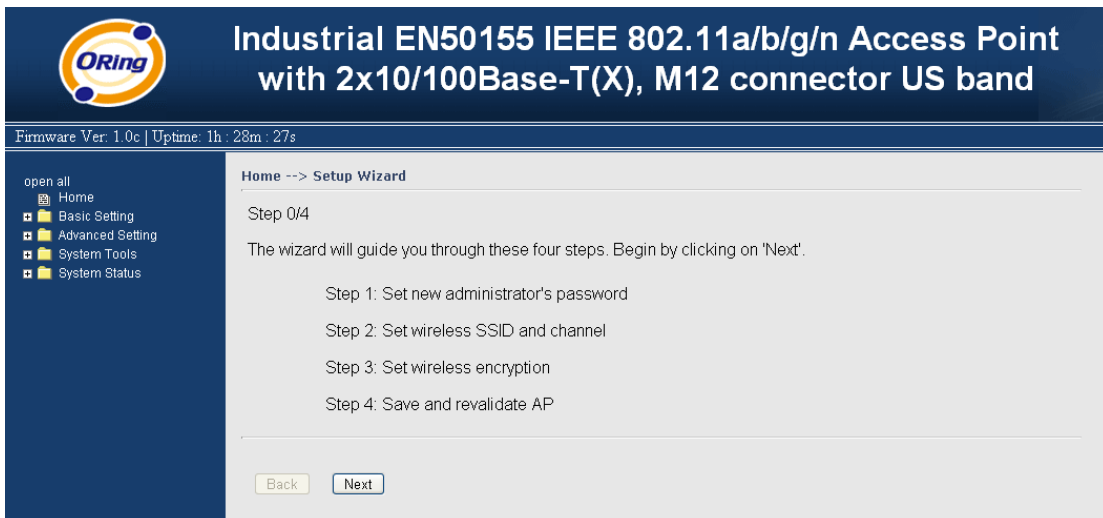
The image shows a Windows-style dialog box titled "Connect to 192.168.10.2". It features a key icon in the top left. The main content area is light beige and contains the following elements: the device ID "TAP-3120-M12\_US", a "User name:" label followed by a dropdown menu showing "admin", a "Password:" label followed by a masked password field (six dots), and a checkbox labeled "Remember my password". At the bottom right, there are two buttons: "OK" and "Cancel".

Login screen

For security reasons, we strongly suggest you change the password. Click on **System Tools > Administrator** and modify the password.

## 5.5 Main Interface

The **Home** screen will appear. Please click "Run Wizard" to go to the **Home > Setup Wizard** page to quick install the AP.



The image displays the main interface of the ORing Industrial EN50155 IEEE 802.11a/b/g/n Access Point. The top header is dark blue with the ORing logo on the left and the product name "Industrial EN50155 IEEE 802.11a/b/g/n Access Point with 2x10/100Base-T(X), M12 connector US band" in white text. Below the header, a status bar shows "Firmware Ver: 1.0c | Uptime: 1h : 23m : 27s". The main content area is divided into a left sidebar and a right main panel. The sidebar is dark blue and contains a tree view with "open all" and folders for "Home", "Basic Setting", "Advanced Setting", "System Tools", and "System Status". The main panel is light gray and displays the "Home --> Setup Wizard" page. It shows "Step 0/4" and a message: "The wizard will guide you through these four steps. Begin by clicking on 'Next'." Below this, four steps are listed: "Step 1: Set new administrator's password", "Step 2: Set wireless SSID and channel", "Step 3: Set wireless encryption", and "Step 4: Save and revalidate AP". At the bottom of the main panel, there are "Back" and "Next" buttons.

Main interface



## 5.5.1 Basic Setting

### Setting Operation Mode

Basic Setting --> Operation Mode

- AP  
This mode provides Access Point services for other wireless clients.
- AP-Client  
This mode provides a 1-to-N MAC address mapping mechanism such that multiple stations behind the AP can transparently connect to the other AP even they didn't support WDS.
- Client  
In this mode the AP functions as a wireless client to connect to other AP, thus provides transparent connection between ethernet & wireless port. This mode provides no Access Point services but with 802.1X supported.
- Bridge  
This mode provides Static LAN-to-LAN Bridging functionality. The static LAN-to-LAN bridging function is supported through Wireless Distribution System(WDS).

#### Operation mode interface

The following table describes the labels in this screen.

Label	Description
<b>AP</b>	This mode provides Access Point services for other wireless clients.
<b>AP-Client</b>	The AP-Client function provides a 1-to-N MAC address mapping mechanism such that multiple stations behind the AP can transparently connect to the other AP even they didn't support WDS.
<b>Client</b>	In this mode the AP functions as a wireless client to connect to other AP, thus provides transparent connection between Ethernet & wireless port. This mode provides no Access Point services but with 802.1X supported.
<b>Bridge</b>	This mode provides Static LAN-to-LAN Bridging functionality. The static LAN-to-LAN bridging function is supported through Wireless Distribution System (WDS).

In each mode, the TAP-620-M12 forwards packet between its Ethernet interface and wireless interface for wired hosts on the Ethernet side, and wireless hosts on the wireless side.

## Setting WDS (Bridge Mode)

Basic Setting --> WDS

Operation mode of the AP should be set to "Bridge" mode before these settings changed.

WDS Mode:

Peer Mac Address 1:   Enabled

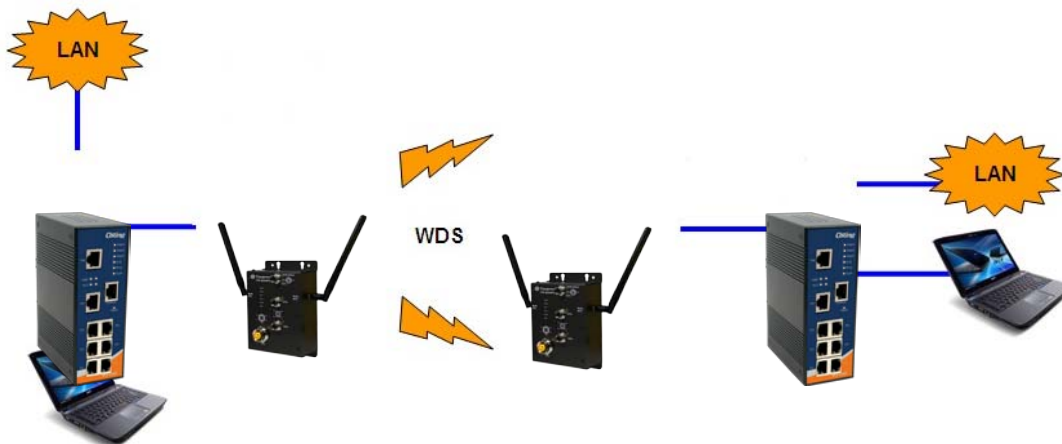
Peer Mac Address 2:   Enabled

Peer Mac Address 3:   Enabled

Peer Mac Address 4:   Enabled

WDS setting interface

This type of wireless link is established between two IEEE 802.11 access points. Wireless packets transmitted along the WDS link comply with the IEEE 802.11 WDS (Wireless Distribution System) format at the link layer.



Point-to-Point WDS Link

The following table describes the labels in this screen.

Label	Description
<b>WDS Mode</b>	This mode provides Static LAN-to-LAN Bridging functionality. The static LAN-to-LAN bridging function is supported through Wireless Distribution System (WDS).
<b>Peer MAC Address</b>	Set the Mac address of other access point(s). Simultaneity, choose on "Enable".

First of all, if APs link with WDS mode, it should obey the following rules:

1. LAN IP Address should set different IP in the same network.

2. All AP's DHCP Server should set shutdown.
3. WDS should set Enable.
4. Each AP should have the same setting except 'Peer Mac Address' set to the other's Mac address
5. At wireless web setting Security and Channel should be the same,
6. AP's distance should be limited within a certainty area.

**WDS –Bridge Mode**

Basic Setting --> WDS

Operation mode of the AP should be set to "Bridge" mode before these settings changed.

WDS Mode: Bridge Mode

Peer Mac Address 1:   Enabled

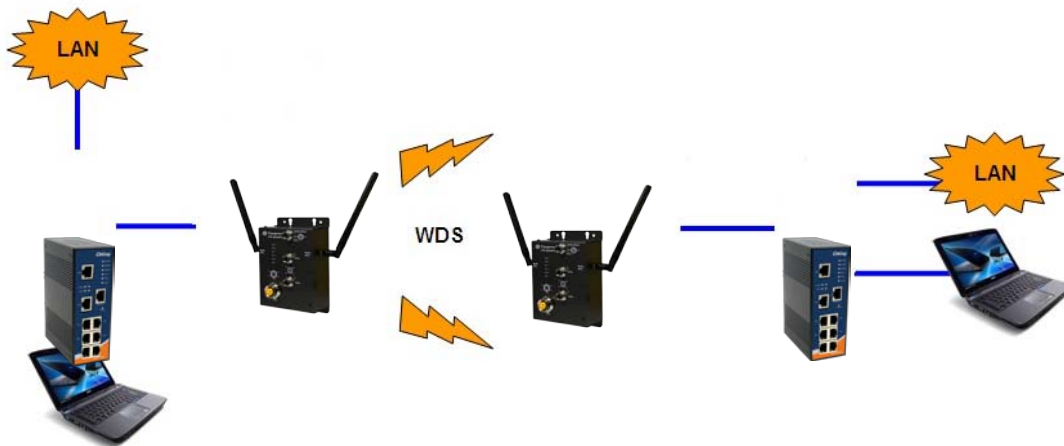
Peer Mac Address 2:   Enabled

Peer Mac Address 3:   Enabled

Peer Mac Address 4:   Enabled

The peer WDS APs are according to the MAC address listed in "Peer Mac Address" fields.

The working principle of **Bridge Mode** as follows:



In the figure, the AP behaves as a standard bridge that forwards traffic between WDS links (links that connect to other AP/wireless bridges) and an Ethernet port. As a standard bridge, the AP learns MAC addresses of up to 64 wireless or 128 total wired and wireless network devices, which are connected to their respective Ethernet ports to limit the amount of data to be forwarded. Only data destined for stations which are known to reside on the peer Ethernet link, multicast data or data with unknown destinations need to be forwarded to the peer AP via the WDS link.

## WDS –Repeater Mode

Basic Setting --> WDS

Operation mode of the AP should be set to "Bridge" mode before these settings changed.

WDS Mode: Repeater Mode ▾

Peer Mac Address 1:   Enabled

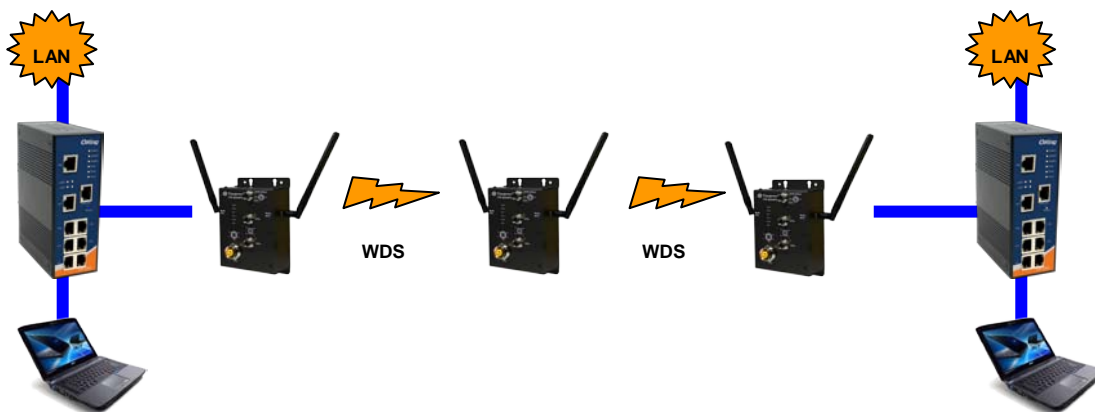
Peer Mac Address 2:   Enabled

Peer Mac Address 3:   Enabled

Peer Mac Address 4:   Enabled

The peer WDS APs are according to the MAC address listed in "Peer Mac Address" fields.

The working principle of **Repeater Mode** as follows:



In the figure, Repeater is used to extend the range of the wireless infrastructure by forwarding traffic between associated wireless stations and another repeater or AP connected to the wired LAN.

## Setting Wireless

Basic Setting --> Wireless

These are the basic wireless settings for the AP.

SSID:

Channel:

**Security Options**

Security Type:

- None
- WEP
- WPA-PSK/WPA2-PSK
- WPA/WPA2
- 802.1X

The following table describes the labels in this screen.

Label	Description
<b>SSID</b>	Service Set Identifier Default is the default setting. The SSID is a unique name that identifies a network. All devices on the network must share the same SSID name in order to communicate on the network. If you change the SSID from the default setting, input your new SSID name in this field.
<b>Channel</b>	Channel 6 is the default channel, input a new number if you want to change the default setting. All devices on the network must be set to the same channel to communicate on the network.
<b>Security options</b>	<p>Select the type of security for your wireless network at <b>Security Type:</b></p> <p><b>None:</b> Select for no security.</p> <p><b>WEP:</b> Select for security WEP.</p> <p><b>WPA-PSK/WPA2-PSK:</b> Select for security WPA-PSK or WPA2-PSK without a RADIUS server.</p> <p><b>WPA/WPA2:</b> Select for WPA or WPA2 (Wi-Fi Protected Access) authentication in conjunction with a RADIUS server.</p> <p><b>802.1x:</b> Authentication through RADIUS server</p>

### Security Type – None

No security protection on your wireless LAN access.

### Security Type – WEP

**Basic Setting --> Wireless**

These are the basic wireless settings for the AP.

SSID:

Channel:

**Security Options**

Security Type:

Auth Mode:  Open  Shared  WEPAUTO

WEP Encryption:

Key Type:

Default Key Index:

KEY1:

KEY2:

KEY3:

KEY4:

1. Security Type: Select **WEP**
2. WEP Encryption: Select 64 Bit or 128 Bit WEP encryption.
3. Key Type: Select ASCII or Hex key type.
4. Default Key Index: Select one of the keys to be the active key.
5. Key 1-4: Input up to four encryption keys.

**ASCII** (American Standard Code for Information Interchange) is a code for representing English letters as numbers from 0-127. **Hex** digits consist of the numbers 0-9 and the letters A-F.

## Security Type – WPA-PSK/WPA2-PSK

**Basic Setting --> Wireless**

These are the basic wireless settings for the AP.

SSID:

Channel:

**Security Options**

Security Type:

Auth Mode:  WPAPSK  WPA2PSK  WPAPSK/WPA2PSK mix

Encryption Type:  TKIP  AES  TKIP/AES mix

Shared Key:  (8~64 characters)

1. Security Type: Select **WPA-PSK/WPA2-PSK**.
2. Encryption Type: Select **TKIP** or **AES** encryption.
3. Share Key: Enter your password. The password can be between 8 and 64 characters.

## Security Type – WPA /WPA2

**Basic Setting --> Wireless**

These are the basic wireless settings for the AP.

SSID:

Channel:

**Security Options**

Security Type:

Auth Mode:  WPA  WPA2  WPA/WPA2 mix

Encryption Type:  TKIP  AES  TKIP/AES mix

Radius Server IP:  .  .  .

Radius Port:

Shared Secret:

1. Security Type: Select **WPA/WPA2**
2. Radius Server IP: Enter the IP address of the RADIUS Server.
3. Port: Enter the RADIUS port (1812 is default).
4. Shared Secret: Enter the RADIUS password or key.

### Security Type – 802.1x

Basic Setting --> Wireless

These are the basic wireless settings for the AP.

SSID:

Channel:

**Security Options**

Security Type:

WEP Encryption:

Key Type:

Default Key Index:

KEY1:

KEY2:

KEY3:

KEY4:

Radius Server IP:  .  .  .

Radius Port:

Shared Secret:

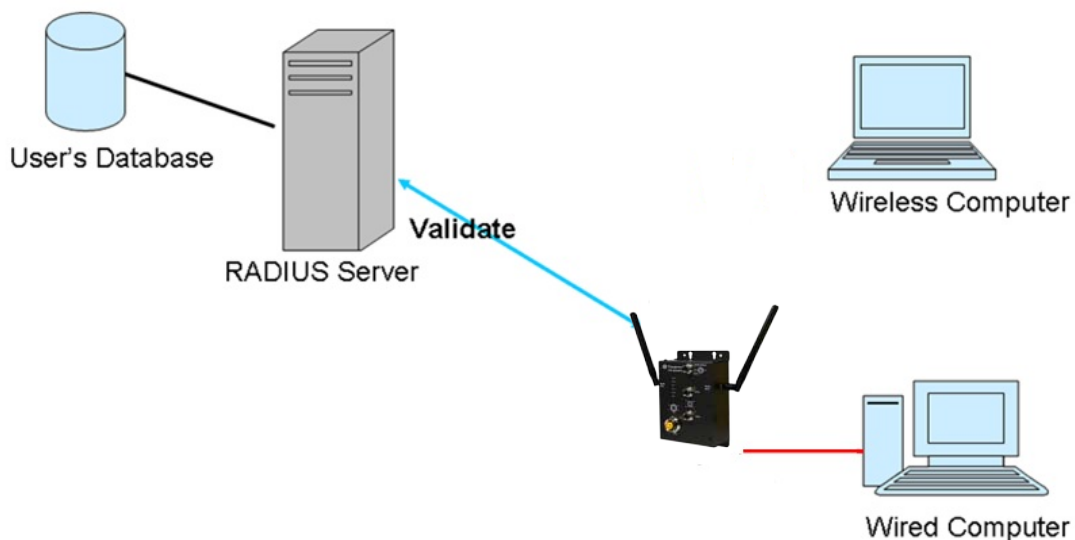
1. Security Type: Select **802.1x**
2. WEP Encryption: Select 64 Bit or 128 Bit WEP encryption.
3. Key Type: Select ASCII or Hex key type.
4. Default Key Index: Select one of the keys to be the active key.
5. Key 1-4: Input up to four encryption keys.
6. Radius Server IP: Enter the IP address of the RADIUS Server.
7. Port: Enter the RADIUS port (1812 is default).
8. Shared Secret: Enter the RADIUS password or key.



**RADIUS** (Remote Authentication Dial-in User Service) is the industrial standard agreement, and it is used to provide an identify verification. The Radius customer (is usually a dial-in server, VPN server or wireless point) send your proof and the conjunction parameter to the Radius server by Radius news. The Radius server validates the request of the Radius customer, and return Radius news to back.

Radius server validates your proof, also carry on the authorization. So the Radius server received by ISA server responded (point out the customer carries proof to be not granted) and it means that the Radius server did not authorize you to carry. Even if the proof has already passed an identify verification, the ISA server may also refuse you to carry a claim according to the authorization strategy of the Radius server.

The principle of the Radius server shows in the following pictures:



## Client

The **Basic setting**—> **Client** page is mainly set the client which through the SSID and Security to connect to other AP. In this mode, the Security Type should be the same with the AP Server.

**Basic Setting --> Client**

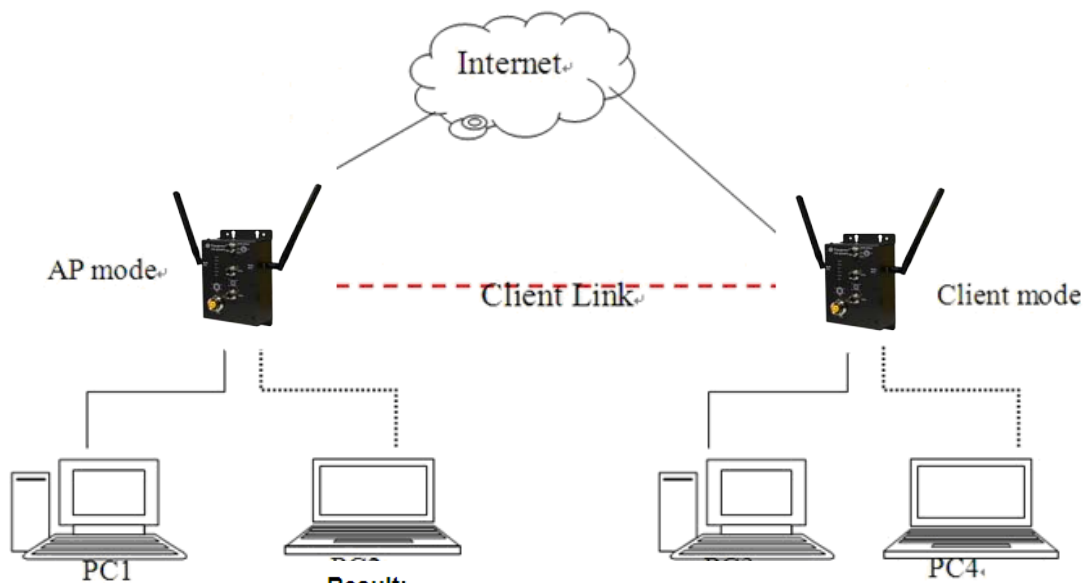
Client related settings.

Peer AP SSID:

**Security Options**

Security Type: None  
None  
WEP  
WPA-PSK/WPA2-PSK

The principle of the AP-Client/Client mode shows in the following pictures:



**Result:**

1. PC1, PC2 can visit PC3, PC4 and AP Client
2. PC3, PC4 can visit PC1, PC2 and AP
3. AP Client can visit AP

The following table describes the labels in this screen.

Label	Description
<b>Peer AP SSID</b>	Enter the other AP which used for AP mode.
<b>Site Scan</b>	You can scan the APs which used for AP mode in the certainty area
<b>Security Type</b>	Set the same security with the AP which you want to connect.

## LAN Setting

The **Basic Setting > LAN Setting** page is mainly set IP address for LAN interface. To access the AP normally, a valid IP address of your LAN should be specified to the LAN interface. The default IP setting is DHCP server (Obtain an IP address automatically).

Basic Setting --> LAN Setting

LAN settings of AP.

Obtain an IP address automatically  
 Use the following IP address

IP Address:  .  .  .   
 Subnet Mask:  .  .  .   
 Default Gateway:  .  .  .

Obtain DNS server address automatically  
 Use the following DNS server addresses

Preferred DNS:  .  .  .   
 Alternate DNS:  .  .  .

Device Name:

Ethernet Mode:  Redundant  Switch

Spanning Tree Protocol:  Enable  Disable

LLDP Protocol:  Enable  Disable

The following table describes the labels in this screen.

Label	Description
<b>Obtain an IP address automatically</b>	Select this option if you would like to obtain an IP address automatically assigned by DHCP server in your network
<b>Use the following IP address</b>	<p>Select this option if you are manually assigning an IP address.</p> <p><b>IP Address:</b> There is a default IP address in the AP, and you can input a new IP address.</p> <p><b>Subnet Mask:</b> 255.255.255.0 is the default Subnet Mask. All devices on the network must have the same subnet mask to communicate on the network.</p> <p><b>Default Gateway:</b> Enter the IP address of the router in your network.</p>
<b>Obtain DNS server address automatically</b>	This option is selected by DHCP server.

<p><b>Use the following DNS server addresses</b></p>	<p>This option is selected by manually set</p> <p><b>Preferred DNS:</b> There is a default DNS server, and you can input another new DNS server.</p> <p><b>Alternate DNS:</b> There is a default DNS server, and you can input another new DNS server.</p>
--	--

### Setting DHCP Server

**Basic Setting --> DHCP Server**

The AP can be setup as a DHCP server to distribute IP addresses to the WLAN network.

DHCP Server       Enabled    Disabled

**Options**

Starting IP address:     .  .  .

Maximum Number of IPs:

Lease Time:             hours

DHCP Clients List

Hostname	Mac Address	IP Address	Expires In
----------	-------------	------------	------------

The following table describes the labels in this screen.

Label	Description
<b>DHCP Server</b>	Enable or Disable the DHCP Server function. Enable – the AP will be the DHCP server on your local network
<b>Start IP Address</b>	The dynamic IP assign range. Low IP address is the beginning of the dynamic IP assigns range. For example: dynamic IP assign range is from 192.168.1.100 to 192.168.1.200. 192.168.1.100 will be the Start IP address.
<b>Maximum Number of IPs</b>	The dynamic IP assign range. High IP address is the end of the dynamic IP assigns range. For example: dynamic IP assign range is from 192.168.1.100 to 192.168.1.200. <b>100</b> will be entering into textbox.
<b>Lease Time (Hour)</b>	It is the time period that system will reset the dynamic IP assignment to ensure the dynamic IP will not been occupied for a long time or the server doesn't know that the dynamic IP is idle.
<b>DHCP Clients List</b>	List the devices on your network that are receiving dynamic IP addresses from the TAP-620-M12.

## 5.5.2 Advanced Setting Wireless

**Advanced Setting --> Wireless**

Wireless performance tuning.

Beacon Interval:  (msec, range:20~999, default:100)

DTIM Interval:  (range: 1~255, default:1)

Fragmentation Threshold:  (range: 256~2346, default:2346)

RTS Threshold:  (range: 1~2347, default:2347)

Xmit Power:  % (range: 1~100, default:100)

Max Client Threshold  (range: 1~32, default 10)

Wireless Mode:  BG Mixed Mode  B Mode  A Mode  G Mode  
 2G N Mode  GN mixed Mode  AN mixed Mode  
 BGN mixed Mode  AGN mixed Mode  5G N Mode

Preamble:  Long  Short

SSID Broadcast:  Enabled  Disabled

HT Operating Mode:  Mixed Mode  Green Field

HT Band Width:  20 MHz  20/40 MHz

HT Guard Interval:  long  short

HT MCS:

HT RDG:  Disable  Enable

HT Extension Channel:

HT Aggregation MSDU:  Disable  Enable

HT Auto BlockACK:  Disable  Enable

HT Decline BA Request:  Disable  Enable

HT TxStream:

HT RxStream:

The following table describes the labels in this screen.

Label	Description
<b>Beacon Interval</b>	The default value is 100. The Beacon Interval value indicates the frequency interval of the beacon. A beacon is a packet broadcast by the AP to synchronize the wireless network. 50 is recommended in poor reception.
<b>DTIM Interval</b>	The default value is 1. This value, between 1 and 255 milliseconds, indicates the interval of the Delivery Traffic Indication Message (DTIM). A DTIM field is a countdown field informing clients of the next window for listening to broadcast and multicast messages. When the AP has buffered broadcast or multicast messages for associated clients, it sends the next DTIM



	with a DTIM Interval value. Its clients hear the beacons and awaken to receive the broadcast and multicast messages.
<b>Fragmentation Threshold</b>	This value should remain at its default setting of 2346. The range is 256-2346 bytes. It 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 modifications of this value are recommended.
<b>RTS Threshold</b>	This value should remain at its default setting of 2347. The range is 0-2347 bytes. Should you encounter inconsistent data flow, only minor modifications are recommended. If a network packet is smaller than the preset RTS threshold size, the RTS/CTS mechanism will not be enabled. The AP sends Request to Send (RTS) frames to a particular receiving station and negotiates the sending of a data frame. After receiving an RTS, the wireless station responds with a Clear to Send (CTS) frame to acknowledge the right to begin transmission.
<b>Xmit Power</b>	This value ranges from 1 - 100 percent, default value is 100 percent. A safe increase of up to 60 percent would be suitable for most users. Higher power settings are not recommended for users due to excess heat generated by the radio chipset, which can affect the life of the AP.
<b>Wireless Network Mode</b>	You can select 802.11 a/b/g/n wireless mode mix or single
<b>Transmission Rate</b>	The default setting is <b>Auto</b> . The range is from 1 to 300Mbps. The rate of data transmission should be set depending on the speed of your wireless network. You can select from a range of transmission speeds, or keep the default setting, Auto, to have the AP automatically use the fastest possible data rate and enable the Auto-Fallback feature. Auto-Fallback will negotiate the best possible connection speed between the AP and a wireless client.
<b>Preamble</b>	Values are Long and Short, default value is Long. If your wireless device supports the short preamble and you are having trouble getting it to communicate with other 802.11b devices, make sure that it is set to use the long preamble
<b>SSID Broadcast</b>	When wireless clients survey the local area for wireless networks

	to associate with, they will detect the SSID broadcast by the AP. To broadcast the AP SSID, keep the default setting, Enable. If you do not want to broadcast the AP SSID, then select Disable.
<b>Signal Threshold for Roaming</b>	Roaming signal threshold setting. When signal below this value AP will roaming to another client target which the same SSID, security option and signal strongest within the environment.(This value just effect on client-mode equipment)
<b>Max Client Threshold</b>	Max number of client equipment setting. When client number over this value AP will reject roaming equipment connection.(This value just effect on AP-mode equipment)

## X-Roaming

Extra parameters for Client Mode:

X-Roaming:  Disabled  Standard  
Signal Threshold for Roaming  dbm(range: 10~90, default 75)

<b>X-Roaming</b>	<p><b>Disable:</b> Disable X-Roaming protocol.</p> <p><b>Standard:</b> Roaming group does not require the same wireless channel, but slower to switch than the “fixed channel” mode</p> <p><b>Fixed channel:</b> Roaming group must be required the same wireless channel, but faster to switch than the “Standard” mode</p>
<b>Roaming Signal Threshold</b>	Roaming signal threshold setting. When signal below this value AP will roaming to another client target which the same SSID, security option and signal strongest within the environment.(This value just effect on client-mode equipment)

## MAC Filter

Use **Advanced Setting > MAC Filters** to allow or deny wireless clients, by their MAC addresses, from accessing the TAP-620-M12. You can manually add a MAC address or select the MAC address from **Connected Clients** that are currently connected to the AP.

**Advanced Setting --> MAC Filters**

Filters are used to allow or deny Wireless Clients from accessing the AP.

MAC Filters:     Enabled    Disabled

**Options**

Only allow MAC address(es) listed below to connect to AP

Only deny MAC address(es) listed below to connect to AP

Associated Clients:  Copy To

MAC Filter Table:

1.	<input type="text"/>	11.	<input type="text"/>	21.	<input type="text"/>
2.	<input type="text"/>	12.	<input type="text"/>	22.	<input type="text"/>
3.	<input type="text"/>	13.	<input type="text"/>	23.	<input type="text"/>
4.	<input type="text"/>	14.	<input type="text"/>	24.	<input type="text"/>
5.	<input type="text"/>	15.	<input type="text"/>	25.	<input type="text"/>
6.	<input type="text"/>	16.	<input type="text"/>	26.	<input type="text"/>
7.	<input type="text"/>	17.	<input type="text"/>	27.	<input type="text"/>
8.	<input type="text"/>	18.	<input type="text"/>	28.	<input type="text"/>
9.	<input type="text"/>	19.	<input type="text"/>	29.	<input type="text"/>
10.	<input type="text"/>	20.	<input type="text"/>	30.	<input type="text"/>

The following table describes the labels in this screen.

Label	Description
<b>MAC Filter</b>	Enable or disable the function of MAC filter. MAC address allowed or denied option is selected by you.
<b>MAC Filter List</b>	This list will display the MAC addresses that are in the selected filter.
<b>Connected Clients</b>	This list will display the wireless MAC addresses that linked with AP.
<b>MAC Address</b>	MAC addresses need to be added to or clear from MAC filter list.
<b>Apply</b>	Click Apply to set the configurations.

## System Event

When the AP event triggered, the notification procedure will be performed according to the type of the event. Which notification would be performed depends on the selection of corresponding option in the **Advanced Setting > System Event** page.



**Advanced Setting --> System Event**

System Event Configuration.

Device Event Notification			
Hardware Reset (Cold Start)	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog
Software Reset (Warm Start)	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog
Login Failed	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog
IP Address Changed	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog
Password Changed	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog
Redundant Power Changed	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog
Eth Link Status Changed	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog
SNMP Access Failed	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog
Wireless Client Associated	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog
Wireless Client Disassociated	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog
Client Mode Associated	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog
Client Mode Disassociated	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog

Fault Event Notification and Fault LED/Relay				
Power 1 Fault	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog	<input type="checkbox"/> Fault LED/Relay
Power 2 Fault	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog	<input type="checkbox"/> Fault LED/Relay
Eth1 Link Down	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog	<input type="checkbox"/> Fault LED/Relay
Eth2 Link Down	<input type="checkbox"/> SMTP Mail	<input type="checkbox"/> SNMP Trap	<input type="checkbox"/> Syslog	<input type="checkbox"/> Fault LED/Relay

System events record the activities of the AP system. When the setting changes or action performs, the event will be sent to administrator by email. A trap will also be sent to SNMP server. The Syslog will record the event locally and may send the log remotely to a Syslog server. If serious event occurred, such as the power failure or link down, the fault LED will be switched on as warning.

## Email Settings

Email/SNMP/Syslog settings.

E-mail settings

SMTP Server:  (optional)

Server Port:  (0 represents default)

E-mail Address 1:

E-mail Address 2:

E-mail Address 3:

E-mail Address 4:

The following table describes the labels in this screen.

Label	Description
<b>SMTP Server</b>	Simple Message Transfer Protocol, enter the backup host to use if primary host is unavailable while sending mail by SMTP server.
<b>Server Port</b>	Specify the port where MTA can be contacted via SMTP server.
<b>E-mail Address 1-4</b>	Inputs specify the destination mail address.

## SNMP Settings

SNMP settings

SNMP Agent:  Enable  Disable

SNMP Trap Server 1:

SNMP Trap Server 2:

SNMP Trap Server 3:

SNMP Trap Server 4:

Community:

SysLocation:

SysContact:

The following table describes the labels in this screen.

Label	Description
<b>SNMP Agent</b>	SNMP (Simple Network Management Protocol) Agent is a service program that runs on the access point. The agent provides management information to the NMS by keeping track of various operational aspects of the AP system. Turn on to open this service and off to shutdown it.
<b>SNMP Trap Server 1-4</b>	Specify the IP of trap server, which is the address to which it will send traps AP generates.
<b>Community</b>	Community is essentially password to establish trust between managers and agents. Normally "public" is used for read-write community.
<b>SysLocation</b>	Specify sysLocation string.
<b>SysContact</b>	Specify sysContact string.

## Syslog Server Settings

Syslog Server settings

Syslog Server IP:

Syslog Server Port:  (0 represents default)

The following table describes the labels in this screen.

Label	Description
<b>Syslog Server IP</b>	Not only the syslog keeps the logs locally, it can also log to remote server. Specify the IP of remote server. Leave it blank to disable logging remotely.
<b>Syslog Server Port</b>	Specify the port of remote logging. Default port is 514.

## 5.5.3 System Tools

### Administrator

In this page, you can change the username and password. The new password must be typed twice to confirm (the default Name and Password is “admin” and “”).

System Tools --> Administrator

Modify web administrator's name and password.

Old Name:

Old Password:

New Name:

New Password:

Confirm New Password:

Web Protocol:  HTTP  HTTPS

Port:

Web Access Control:  Wired  Wireless

UPnP:  Enable  Disable

The following table describes the labels in this screen.

Label	Description
<b>Old Name</b>	This field displays the old login name. It's read only. The default value of login name is "admin".
<b>Old Password</b>	Before making a new setting, you should provide the old password for a verify check. Acceptable inputs of this field

	contains '0-9', 'a-z', 'A-Z' and must be between 0 to 15 characters in length. The factory default value of login password is null.
<b>New Name</b>	Enter a new login name. Acceptable inputs of this field contains '0-9', 'a-z', 'A-Z' and must be between 1 to 15 characters in length. This field can not accept null input.
<b>New Password</b>	Enter a new login password. Acceptable inputs of this field contains '0-9', 'a-z', 'A-Z' and must be between 0 to 15 characters in length.
<b>Confirm New Password</b>	Retype the password to confirm it. Acceptable inputs of this field contains '0-9', 'a-z', 'A-Z' and must be between 0 to 15 characters in length.
<b>Web Protocol</b>	Choose on the protocol for web. The default value is <b>HTTP</b> , if you want the web pages' security is better, choose the <b>HTTPS</b> protocol.
<b>Port</b>	Corresponding to the Web protocol, there is a default port (HTTP: 80, HTTPS: 443). And you can enter another number which should be in range of 1-65535.
<b>Web Access Control</b>	Choose the checkbox of the Wired and Wireless; you can visit the web page through the mode you choose.
<b>UPnP</b>	Pitch on "Enable", and the UPnP will display in the right-behind corner.

**HTTPS** (HTTP over SSL) is a Web protocol developed by Netscape and built into its browser that encrypts and decrypts user page requests as well as the pages that are returned by the Web server.

## Date & Time

In this page, set the date & time of the device. The correct date & time will be helpful for logging of system events. A NTP (Network Time Protocol) client can be used to synchronize date & time with NTP server.

**System Tools --> Date/Time**

---

Date/Time settings.

Local Date:  Year  Month  Day

Local Time:  Hour  Minute  Second

Time Zone:

NTP:  Enable

NTP Server 1:

NTP Server 2:  (optional)

Synchronise:  at  :

The following table describes the labels in this screen.

Label	Description
<b>Local Date</b>	Set local date manually.
<b>Local Time</b>	Set local time manually.
<b>Time Zone</b>	Select the time zone manually
<b>Get Current Date &amp; Time from Browser</b>	Click this button, you can set the time from browser.
<b>NTP</b>	Enable or disable NTP function to get the time from the NTP server.
<b>NTP Server 1</b>	The initial choice about NTP Server.
<b>NTP Server 2</b>	The second choice about NTP Server.
<b>Synchronize</b>	Set the time, and the AP's time synchronize with the NTP Server at the time

## Configuration

**System Tools --> Configuration**

You can backup the configuration file to your computer, and restore a previously saved configuration.

Save configuration to local

Restore a previously saved configuration

Use the button below to restore the default settings

The following table describes the labels in this screen.

Label	Description
<b>Download configuration</b>	The current system settings can be saved as a file onto the local hard drive.
<b>Upload configuration</b>	The saved file or any other saved setting file can be uploaded back on the AP. To reload a system settings file, click on <b>Browse</b> to browse the local hard drive and locate the system file to be used. Click <b>Upload</b> when you have selected the file to be loaded back onto the AP.
<b>Restore Default Settings</b>	You may also reset the IAP-120 / 120+ back to factory settings by clicking on <b>Restore Default Settings</b> . Make sure to save the unit's settings before clicking on this button. You will lose your current settings when you click this button.

## Firmware Upgrade

**System Tools --> Firmware Upgrade**

**Do NOT power off the AP while upgrading!**

Current Firmware Version: 1.0c

New firmware may provide better performance, bug fixes or more functions. To upgrade, you need a firmware file correspond to this AP model. It will take several minutes to upload and upgrade the firmware. After the upgrade is done successfully,

the access point will reboot and get revalidated.

---

**Notice: DO NOT POWER OFF THE AP OR PRESS THE RESET BUTTON WHILE THE FIRMWARE IS BEING UPGRADED.**

## Miscellaneous

If you want restart the access point through the **Warm Reset**, click **Restart Now** to restart the AP.

System Tools --> Miscellaneous

Miscellaneous settings.

Click the button below to restart the AP.

## 5.5.4 System Status

### System Info

System Status --> System Info

System information details.

**Model**

Model Name:	TAP-620-M12_US
Model Description:	Industrial EN50155 IEEE 802.11a/b/g/n Access Point with 2x10/100Base-T(X), M12 connector US band

**Firmware**

Version:	1.0c
----------	------

**Ethernet**

MAC Address:	00:1E:94:01:00:57
IP Address:	192.168.10.2
Subnet Mask:	255.255.0.0
Default Gateway:	0.0.0.0
DHCP Server:	Disabled

**Operation Mode**

Operation Mode:	AP
-----------------	----

**Wireless**

MAC Address:	00:0E:8E:28:7C:74
SSID:	oring
Encryption:	No encryption
Signal Strength:	----
Channel:	6
WDS MAC Address:	
Peer AP SSID:	
Client MAC Address:	
Client Encryption:	No encryption
Client Connection Info:	

**Device Time**

Current Time:	Thu, 01 Jan 2009 02:02:14 +0800
---------------	---------------------------------

This page displays the current information for the TAP-620-M12. It will display model name, as well as firmware version, Ethernet, Wireless info and device time.



## System Log

System Status --> System Log

System log details.

#	Date Time	Content

The system log tracks the important events and setting changes of the AP. If the AP is rebooted, the logs are automatically cleared.

Click the button '**Refresh**' to refresh the page; Click the button '**Clear**' to clear log entries.

## Traffic Statistics

System Status --> Traffic/Port Status

Traffic status displays received and transmitted packets passing through the AP.

Interface	Send	Receive
Ethernet	1590396 Bytes (3276 Packages)	344007 Bytes (2610 Packages)
Wireless	79194 Bytes (242 Packages)	0 Bytes (0 Packages)

Port status displays the state of all ports in AP.

Port	State
Ethernet Port1	Link up, forwarding
Ethernet Port2	Link down, forwarding
Wireless Port	forwarding
WDS Virtual Port1	Not Set
WDS Virtual Port2	Not Set
WDS Virtual Port3	Not Set
WDS Virtual Port4	Not Set

This page displays the network traffic statistics for both received and transmitted packets through the Ethernet port and wireless connections associated with the AP. Simultaneity, the traffic counter will reset by the device rebooting.



### 5.5.5 Online Help

Click on any item in the **Online Help** screen for more information.

<b>Index</b>	<b>Home -&gt; Setup Wizard</b>
<b>Home</b> <ul style="list-style-type: none"><li>■ Setup Wizard</li></ul>	<b>Setup Wizard</b>
<b>Basic Setting</b> <ul style="list-style-type: none"><li>■ Operation Mode</li><li>■ WDS</li><li>■ Wireless</li><li>■ LAN Setting</li><li>■ DHCP Server</li></ul>	<p>The Setup Wizard is a useful and easy utility to help setup the AP to quickly adapt it to your existing network with only a few steps required. It will guide you step by step to configure the settings of the AP. The Setup Wizard is a helpful guide for first time users to the AP.</p> <p>For step 1, you can set a new login password if required, the default login name is 'admin', and default login password is null.</p> <p>For step 2, you can set the wireless SSID name and channel, a default SSID has been provided for you. By default the channel is set to 6.</p> <p>For step 3, set the wireless encryption to WEP will strengthen the security of the wireless network, or just leave encryption disabled and anyone can connect to the AP.</p> <p>For step 4, save the previous settings and revalidate the AP.</p>
<b>Advanced Setting</b> <ul style="list-style-type: none"><li>■ Wireless</li><li>■ MAC Filter</li><li>■ Email/SNMP/Syslog</li><li>■ System Event</li></ul>	
<b>System Tools</b> <ul style="list-style-type: none"><li>■ Administrator</li><li>■ Date &amp; Time</li><li>■ Configuration</li><li>■ Firmware Upgrade</li><li>■ Miscellaneous</li></ul>	
<b>System Status</b> <ul style="list-style-type: none"><li>■ System Info</li><li>■ System Log</li><li>■ Traffic Stats</li><li>■ Wireless Clients</li></ul>	

# Technical Specifications

<b>LAN Interface</b>	
Ethernet Ports in M12 connector (4-pin, D-coding)	2 x 10/100Base-T(X), Auto MDI/MDI-X
Protocols	IP, TCP, UDP, DHCP, BOOTP, ARP/RARP, DNS, SNMP MIB II, HTTPS, SNMPV1/V2, Trap, Private MIB
<b>WLAN Interface</b>	
Operating Mode	AP/ Client /Bridge/ AP-Client
Antenna and Connector	2 antennas with 3dBi for 5GHz and 2dBi for 2.4GHz in reverse SMA connector
Radio Frequency Type	DSSS, OFDM, Greenfield
Modulation	IEEE802.11a/n: OFDM with BPSK, QPSK, 16QAM, 64QAM IEEE802.11b: CCK, DQPSK, DBPSK IEEE802.11g/n: OFDM with BPSK, QPSK, 16QAM, 64QAM
Frequency Band	America / FCC: 2.412~2.462 GHz (11 channels) 5.180~5.240 GHz & 5.745~5.825 GHz ( 9 channels ) Europe CE / ETSI: 2.412~2.472 GHz ( 13 channels ) 5.180~5.240 GHz ( 4 channels ) Japan(JP): 2.412~2.484 GHz ( 13 channels ) 5.180~5.240 GHz ( 4 channels )
Transmission Rate	802.11b: 1/2/5.5/11 Mbps 802.11a/g: 6/9/12/18/24/36/48/54 Mbps 802.11n(40MHz): UP to 300 Mbps
Transmit Power	802.11a:13dBm ±1.5dBm@54Mbps 802.11b:16dBm ±1.5dBm@11Mbps 802.11g:14dBm ±1.5dBm@54Mbps 802.11n(2.4G@20MHz):13dBm ±1.5dBm 802.11n(2.4G@40MHz):12dBm ±1.5dBm 802.11n(5G@20MHz):12dBm ±1.5dBm



	802.11n(5G @40MHz):12dBm ±1.5dBm
Receiver Sensitivity	802.11a: -68dBm ±2dBm@54Mbps 802.11b: -82dBm ±2dBm@11Mbps 802.11g: -68dBm ±2dBm@54Mbps 802.11n(2.4G@20MHz, MCS15): -64dBm ±2dBm 802.11n(2.4G@40MHz, MCS15): -60dBm ±2dBm 802.11n(5G@20MHz, MCS15): -64dBm ±2dBm 802.11n(5G@40MHz, MCS15): -60dBm ±2dBm
Encryption Security	WEP: (64-bit, 128-bit key supported) WPA/WPA2:802.11i (WEP and AES encryption) WPA-PSK (256-bit key pre-shared key supported) TKIP encryption
Wireless Security	SSID broadcast disable
LED Indicators	PWR 1(2) / Ready: 1) Red On: Power is on and booting up. 2) Green On: Power is on and functioning normally. ETH1(2) Link / ACT: Orange ON/Blinking: 10 Mbps Ethernet Green ON/Blinking: 100 Mbps Ethernet WLAN Link/ACT: Green for WLAN 1 and Red for WLAN 2 Fault indicator: Red On: Ethernet link down or power down
<b>Power Requirements</b>	
Power Input Voltage	Dual power inputs PWR1/2: 12 ~ 48VDC in M23 connector
Reverse Polarity Protection	Present
Power Consumption	8.3 Watts
<b>Environmental</b>	
Operating Temperature	-10 to 60°C
Storage Temperature	-40 to 85°C
Operating Humidity	5% to 95%, non-condensing
<b>Mechanical</b>	
Dimensions(W x D x H)	125mm(W) x 65mm(D) x 196mm(H)
Casing	IP-40 protection
<b>Regulatory Approvals</b>	

EMI	FCC Part 15, CISPR (EN55022) class A, EN50155 (EN50121-3-2)
EMS	EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS), EN61000-4-8, EN61000-4-11
Shock	IEC60068-2-27, EN61373
Free Fall	IEC60068-2-32
Vibration	IEC60068-2-6, EN61373
Rail Traffic	EN50155
Cooling	EN60068-2-1
Dry Heat	EN60068-2-2
Safety	EN60950-1

## Compliance

### FCC

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

### Industry Canada Statement

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Industry Canada - Class B This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of Industry Canada.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par l'Industrie.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

L'opération est soumise aux deux conditions suivantes: (1) cet appareil ne peut causer d'interférences, et (2) cet appareil doit accepter toute interférence, y compris celles susceptibles de provoquer fonctionnement du dispositif.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

Afin de réduire les interférences radio potentielles pour les autres utilisateurs, le type d'antenne et son gain doivent être choisis que la puissance isotrope rayonnée équivalente (PIRE) est pas plus que celle permise pour une communication réussie

RF exposure warning: The equipment complies with RF exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Avertissement d'exposition RF: L'équipement est conforme aux limites d'exposition aux RF établies pour un incontrôlé environnement. L'antenne (s) utilisée pour ce transmetteur ne doit pas être co-localisés ou fonctionner en conjonction avec toute autre antenne ou transmetteur.