

Billion M500

4G/LTE Industrial/In-Vehicle Multi-Carrier Router

User Manual

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Chapter 1: Introduction

Introduction to your Router

The Billion M500 4G/LTE Industrial/In-Vehicle Multi-Carrier Router is a high performance all-in-one fixed wireless communications platform with advanced software enabling high availability, reliable and secure wireless connectivity for mission critical applications. The compact rugged design integrates dual SIM dual-radio, 4-port Gigabit switch, WiFi access point, embedded GPS with concurrent-multi-GNSS engine for GPS or GLONASS and ignition power control for in-vehicle applications.

The Industrial LTE Router is specifically designed to support a wide range of applications and vertical machine-to-machine (M2M) market segments.

Flexible Deployment Options

The Industrial LTE Router provides users with flexible, scalable deployment options optimized to both reduce costs and provide the longest possible lifespan for the investment. The Industrial LTE Router integrates multi-WAN options, Dual SIM/Dual Radio, Gigabit E-WAN, and WirelessClient for network expandability and reliable connectivity

High Availability and Network Resilience (Always-on Connectivity)

The Industrial LTE Router is a feature-rich industrial class router combined with robust network processing and Multi-WAN connectivity, purposely built for network resilience and business continuity. The platform supports dual-SIM and dual-LTE radios for carrier redundancy or load balancing between carriers' networks.

In the event of a connectivity failure of the primary WAN interface, traffic is automatically redirected to the secondary WAN interface. The Industrial LTE Router will also fallback when the primary interface connection is restored. This functionality operates regardless of whether the primary connection is LTE or a wired connection such as fiber, cable or DSL.

Load balancing and traffic prioritization mechanisms can be enabled to enhance failover performance and maximize bandwidth utilization for critical applications delivery.

Carrier-grade Wireless LAN

The Industrial LTE Router integrates an 802.11n access point supporting data rates of up to 300Mbps. Security functionality includes: WEP 64/128 bit, WPA, WPA2 (PSK, TKIP and AES), 802.1X, SSID broadcast disable and wireless MAC address filtering and MSSID with Client Isolation to enhance the level of transmission security and access control over the Wireless LAN.

The router also supports the Wi-Fi Protected Setup (WPS) standard, allowing users to establish a secure wireless network by simply pushing a button. If your network requires wider coverage, the built-in Wireless Distribution System (WDS) repeater function allows you to expand your wireless network without the need for any external wires or cables.

Extraordinary Connectivity with Solid Data Protection

The Industrial LTE Router features a rugged, compact design with integrated dual 4G/LTE WAN ports,

4-port Gigabit Ethernet switch, 802.11n Wi-Fi access point with multiple SSID supports, and two multi-function USB 2.0 host interfaces for Storage/NAS. SPI firewall, and advanced VPN integration provide security needed to enhance the operations of Public Safety, Energy Wellhead and Gas Industry, Industrial M2M Segment, PoS/Kiosks/ATM, Fleet Management, and Smart Transportation/Bus.

Vehicle Tracking System

Industrial LTE Router is embedded with a GNSS receiver for GPS or GLONASS. To co-work with On-Board Diagnostics(OBD) system, it eases the central control of geographically-dispersed fleets by presenting individual vehicles' detailed information, including remaining fuel levels, rapid accelerations, and locations.

Robust Design to Withstand in the Harshest Environments

The industrial-grade enclosure is designed to resist heat, dust, moisture and provides long-term operation in the toughest of environments. The Industrial LTE Router supports an extended temperatures range from -40 to 140° F (-40 to 60° C) for extremely challenging conditions such as industrial automation, mining plants, wellhead & gas drilling, manufacturing factories, and virtually anywhere that requires a robust wireless connection.

Secure VPN Connections

The Industrial LTE Router supports comprehensive and robust IPsec/PPTP/L2TP/GRE VPN (Virtual Private Network) protocols for business users to establish private encrypted tunnels over the public Internet to secure data transmission between headquarters and branch offices. It also supports VPN dial in from smart phones for secure remote Internet connection via your home broadband. With a built-in DES/3DES VPN accelerator, the router enhances IPsec VPN performance significantly.

IPv6 Supported

Internet Protocol version 6 (IPv6) is a version of the Internet Protocol that is designed to succeed IPv4. IPv6 has a vastly larger address space than IPv4. The router is already supporting IPv6, you can use it in IPv6 environment no need to change device. The dual-stack protocol implementation in an operating system is a fundamental IPv4-to-IPv6 transition technology. It implements IPv4 and IPv6 protocol stacks either independently or in a hybrid form. The hybrid form is commonly implemented in modern operating systems supporting IPv6.

Quick Start Wizard

Support a WEB GUI page to install this device quickly. With this wizard, simple steps will get you connected to the Internet immediately.

Firmware Upgradeable

Device can be upgraded to the latest firmware through the WEB based GUI.

Features & Specifications

- Dual 4G/LTE broadband connectivity (3G Fallback optional)
- Multi-WAN interfaces (Dual SIM/Dual Radio, EWAN, and Wireless Client) for network expandability and reliable connectivity
- High performance antenna for increased coverage, signal reception and efficiency
- Embedded GPS option for real-time asset tracking and location data-based applications
- Enterprise level routing functionality
- Gigabit Ethernet WAN (GbE WAN) for Cable/Fiber/xDSL high WAN throughput
- Gigabit Ethernet LAN
- IPv6 ready (IPv4/IPv6 dual stack)
- Multiple wireless SSIDs with wireless guest access and client isolation
- IEEE 802.11 b/g/n compliant Wireless Access Point with Wi-Fi Protected Setup (WPS)
- Wi-Fi Protected Access (WPA-PSK/ WPA2-PSK) and Wired Equivalent Privacy (WEP)
- Secured IPSec VPN with powerful DES/ 3DES/ AES
- Secured PPTP VPN with Pap/ Chap/ MPPE authentication
- Secured L2TP VPN with Pap/Chap authentication
- Secured GRE VPN tunnel
- 64 secured VPN tunnels
- Firewall Security with DoS Preventing and Packet Filtering
- Quality of Service Control for traffic prioritization management
- Universal Plug and Play (UPnP) Compliance
- Ease of Use with Quick Installation Wizard
- USB port for NAS (FTP/ SAMBA server)
- Global Navigation Satellite System (GNSS)
- Small form factor with multiple mounting options, easily installed by a single person
- Power ignition control option when mounted within vehicles
- Hardened enclosure with Industrial-graded components
- Designed to withstand hypothermia, heat and protect from shock, vibration, etc.
- MIL-STD-810G Compliant
- Ideal Solution for Business Continuity, Logistics/Transportation and Fleet, Public Safety/FirstNet applications.

Availability and Resilience

- Dual-4G/LTE Interfaces (Dual LTE Modules) ^{*1}
- Auto fail-over and failback
- Load Balancing

Supported Frequency Bands

- Primary WAN LTE: FDD and TDD (Bands depend on module configuration) ^{*1}
- Secondary WAN LTE: Optional (Bands depend on module configuration) ^{*1}

High-speed Mobile Wireless Communication

- Embedded Dual 4G/LTE module
- High performance external antenna

Global Navigation Satellite System (GNSS)

- Embedded Dual 4G/LTE module
- High performance external antenna

Network Protocols and Features

- IPv4, IPv6 or IPv4/IPv6 Dual Stack ^{*2}
- NAT, Static Routing and RIP-1/2
- DHCPv4/v6
- Universal Plug and Play (UPnP) Compliant
- Dynamic Domain Name System (DDNS)
- Virtual Server and DMZ
- SNTP, DNS proxy
- IGMP snooping and IGMP proxy
- MLD snooping and MLD proxy

Firewall

- Built-in NAT Firewall
- Stateful Packet Inspection (SPI)
- DoS attack prevention including Land Attack, Ping of Death, etc
- Access control
- IP&MAC filter, URL Content Filter
- Password protection for system management
- VPN pass-through

Quality of Service Control

- Traffic prioritization management based-on Protocol, Port Number and IP Address (IPv4/IPv6)

IPTV Applications^{*3}

- IGMP proxy and IGMP snooping
- MLD proxy and MLD snooping
- Interface Grouping (VLAN)
- Quality of Service (QoS)

Wireless LAN

- Compliant with IEEE 802.11 b/g/n standards
- 2.4 GHz - 2.484GHz radio band for wireless
- Up to 300 Mbps wireless operation rate
- 64/128 bits WEP supported for encryption
- WPS (Wi-Fi Protected Setup) for easy setup
- Wireless Security with WPA-PSK, WPA2-PSK support
- WDS repeater function support
- Multiple SSIDs
- Wireless MAC Filtering
- Wireless client isolation

USB Application Server

- Storage/NAS: SAMBA Server, FTP Server

Virtual Private Network (VPN)

- IPSec VPN Tunnels
- PPTP VPN Tunnels
- L2TP VPN Tunnels
- GRE VPN Tunnels

Management

- Quick Installation wizard
- Web-based GUI for remote and local management
- Firmware upgrades and configuration data upload and download via web-based GUI
- Supports DHCP server / client / relay
- Supports SNMP v1, v2, v3, MIB-I and MIB-II
- TR-069^{*4} supports remote management

NOTE!



1. The 4G LTE is dependent on your local service provider
2. Future release and only upon request for Telco/ ISP tender projects.
3. IPTV application may require subscription to IPTV services from a Telco / ISP.
4. On request for Telco / ISP projects
5. Specifications on this datasheet are subject to change without prior notice.

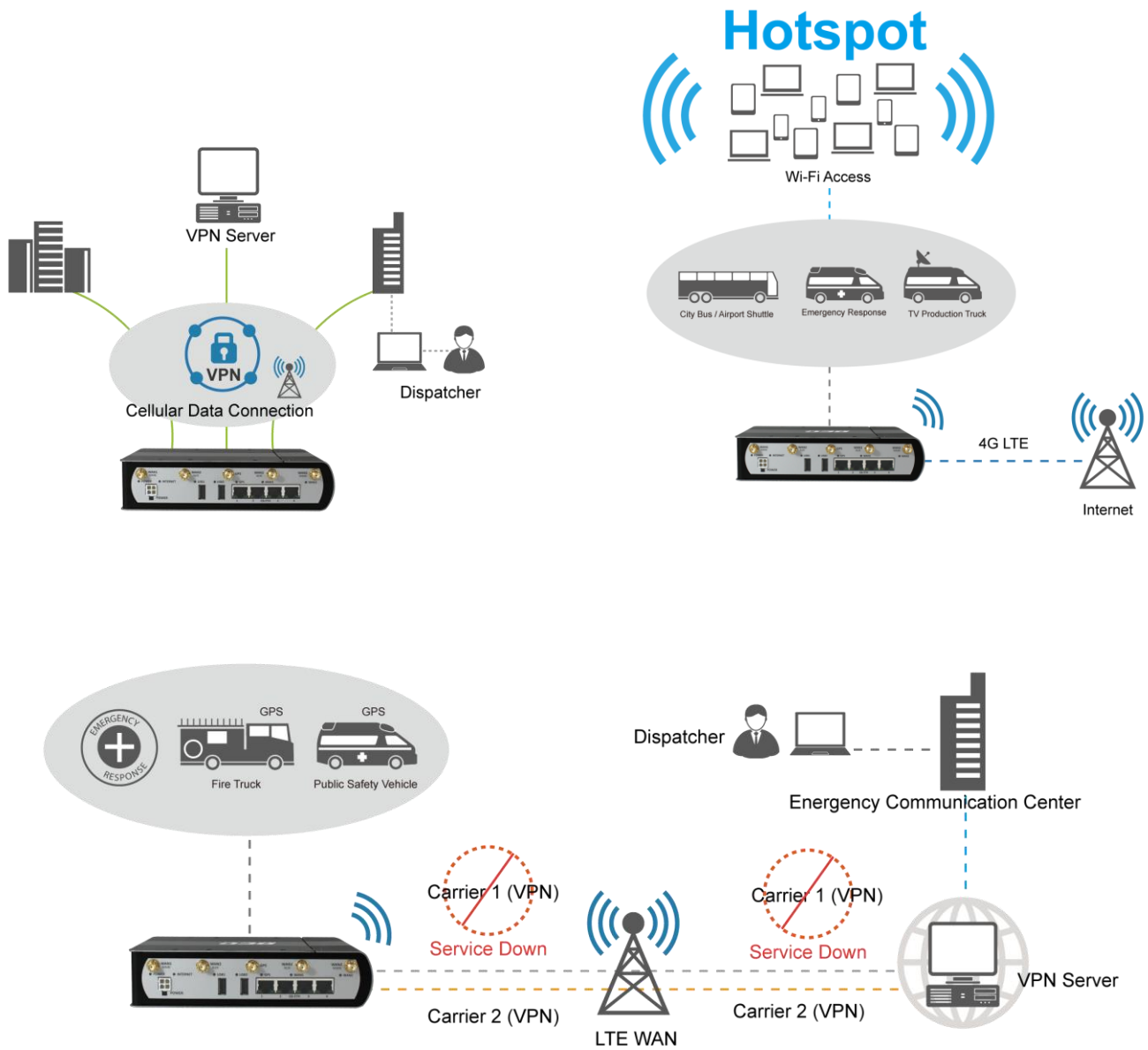
Hardware Specifications

Physical interface

- 4G/LTE module: 2 Embedded 4G/LTE modules
- Ethernet: 4-port 10 / 100 / 1000Mbps auto-crossover (MDI / MDI-X) Switch
- EWAN: Ethernet port #4 can be configured as an EWAN port for connecting to Cable/Fiber/xDSL modem for Broadband connectivity.
- GNSS: Embedded GNSS
- SIM card slot: 2 mini-SIM(2FF) card slots
- USB: 2 USB 2.0 Type A Host port for storage service
- Mini USB: 2 mini USB connectors for 4G/LTE module debug
- 4G/LTE antenna: 4 detachable antennas (2 antennas for each 4G/LTE module)
- GPS antenna: 1 active GPS antenna
- WiFi antenna: 2 detachable wireless antennas
- Factory default reset button
- Wireless on/off and WPS push button
- 4-pin power connector

Application Diagram

The Industrial LTE Router is specifically designed to provide outstanding network efficiency and internet security for a wide range of applications and vertical M2M market segments.



Chapter 2: Product Overview

Important Note for Using This Router



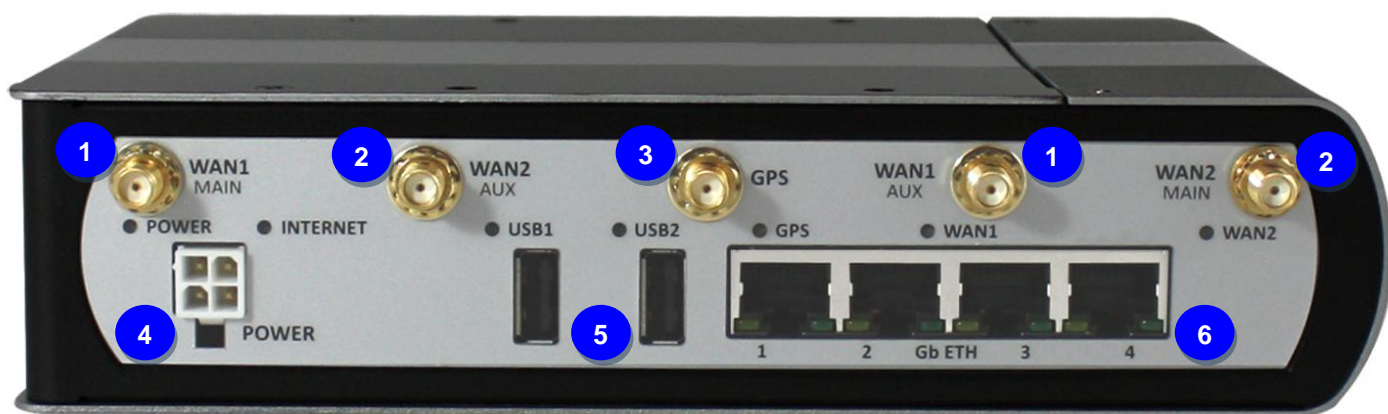
Warning

- ✓ Do not use the router in high humidity or high temperature.
- ✓ Do not open or repair the case yourself. If the device becomes too hot, turn off the power immediately and have it repaired at a qualified service center.
- ✓ Avoid using this product and all accessories outdoors.

Device Description



Index	Item	Description	
1	WiFi antenna	Screw the supplied WiFi antennas onto the antenna connectors	
2	WiFi/WPS LED	The single-colour LED behaves as follows:	
		Green	Wireless connection established
		Green blinking	Data being transmitted / received
3	WiFi On/Off & WPS button	By controlling the pressing time, users can achieve two different effects: (1) WiFi On/Off: Press & hold the button for more than 6 seconds to On/Off the wireless. (2) WPS: Press & hold the button for less than 6 seconds to trigger WPS function.	
4	Reset button	After the device is powered on, press it 6 seconds or above : to restore to factory default settings (this is used when you cannot login to the router, e.g. forgot your password)	
5	Mini USB port	Direct connect to embedded 4G/LTE module for debugging or module firmware upgrade.	
6	SIM card slot	Insert the mini SIM card(2FF) with the gold contact facing up. Push the mini SIM card(2FF) inwards to eject it Warning: Before inserting or removing the SIM card, you must disconnect the router from the power adapter.	



Index	Item	Description
1	4G/LTE 1 antenna	Screw the supplied 4G/LTE antennas onto the antenna connectors for 4G/LTE module 1.
2	4G/LTE 2 antenna	Screw the supplied 4G/LTE antennas onto the antenna connectors for 4G/LTE module 2.
3	GPS antenna	Screw the supplied GPS antenna onto the antenna connectors.
4	Power Jack	Connect the supplied Power cable to this jack
5	USB port	The USB can support setup for storage/file sharing. Connect an external USB dongle / hard drive for storage.
6	Gigabit Ethernet (LAN 1 ~ LAN 4)	Connect a UTP Ethernet cable (Cat-5 or Cat-5e) to one of the four LAN ports when connecting to a PC or an office/home network of 10Mbps/ 100Mbps/ 1000Mbps



Index	Item	Description	
1	Power LED	The Power dual-colour LED behaves as shown below.	
		Green	System is up and ready
		Red	Boot failure
2	Internet LED	The Internet dual-colour LED behaves as shown below.	
		Green	IP connected and traffic is passing through the device.
		Red	IP request failed.
3	USB LED	The single-colour LED behaves as shown below.	
		Green	Connecting to a USB dongle or a hard drive.
		Off	Not connected to any USB device.
4	GPS LED	The single-colour LED behaves as shown below.	
		Green	GPS active
5	WAN LED (Received Signal Strength Indicator)	The 4G/LTE received signal dual-colour LED behaves as shown below.	
		Green	RSSI greater than -69 dBm. Excellent signal condition.
		Green Flashing quickly	RSSI from -81 to -69 dBm. Good signal condition
		Red Flashing quickly	RSSI from -99 to -81 dBm. Fair signal condition.
		Red Flashing slowly	RSSI less than -99 dBm. Poor signal condition.
		Red	No signal and the 4G/LTE module is in service
Off	No LTE module or LTE module fails		
6	Ethernet LED	The dual-colour LED behaves as shown below.	
		Green	Transmission speed is at Gigabit speed (1000Mbps)
		Orange	Transmission speed is at 10/100Mbps
		Blinking	Data being transmitted/received

Connect to a power source

The power connector includes one input pin to meet “Ignition Sensing”. The pin is ESD protected to do “automatic ON and time-delay Off” if ACC input signal is connected to a vehicle’s ACC signal line.

Ignition Sensing: In this mode the router will turn off after the input has been held at low for the timeout period. The router will then reboot when the input is returned to high. If the input is held low for less than the timeout period before returning to high, no action is taken.

This diagram shows the connector pin definition.



Pin	Definition	Details	Wireless Color
1	Ground	-	Black
2	Ground	-	Black
3	ACC	Standard ignition-on signal. The voltage higher than 10.0V will be detected as ignition asserted.	White
4	VCC	10V ~ 56V DC	Red

The wire colors shown are for the power/GPIO cable that comes with the Industrial LTE Router. (optional)

The detail instruction in Rest button

Recovery procedures for non-working routers (e.g. after a failed firmware upgrade flash):

Power on the router, once the Power LED lit red, please press this reset button using the end of paper clip or other small pointed object immediately.

The router's emergency-reflash web interface will then be accessible via <http://192.168.1>, where you can upload a firmware image to restore the router to a functional state.

Please note that the router will only respond with its web interface at this address (**192.168.1.1**), and will not respond to ping request from your PC or other telnet operations.

Note:

Before starting recovery process, please configure the IP address of the PC as 192.168.1.100 and proceed with the following step-by-step guide.

1. Power the router off.
2. Press reset button and power on the router, once the Power lights Red, keeping press reset button over 6 seconds.
3. Internet led flashes Green, router entering recovery procedure and router's IP will reset to Emergency IP address (Say 192.168.1.1).
4. Open browser and access <http://192.168.1.1> to upload the firmware.
5. Internet led lit Red, and router starts to write firmware into flash. Please DO NOT power off the router at this step.
6. Internet led lit Green when successfully upgrade firmware.
7. Power the router off and then on again.

Cabling

One of the most common causes of problems is bad cabling. Make sure that all connected devices are turned on. On the front panel of the product is a bank of LEDs. Verify that the LAN Link and LEDs are lit. If they are not, verify that you are using the proper cables.

Chapter 3: Basic Installation

The router can be configured with your web browser. A web browser is included as a standard application in the following operating systems: Windows, Linux, Mac OS, etc. The product provides an easy and user-friendly interface for configuration.

PCs must have an Ethernet interface installed properly and be connected to the router either directly or through an external repeater hub, and have TCP/IP installed and configured to obtain an IP address through a DHCP server or a fixed IP address that must be in the same subnet as the router. The default IP address of the router is **192.168.1.254** and the subnet mask is **255.255.255.0** (i.e. any attached PC must be in the same subnet, and have an IP address in the range of 192.168.1.1 to 192.168.1.253). The best and easiest way is to configure the PC to get an IP address automatically from the router using DHCP. If you encounter any problems accessing the router's web interface it may also be advisable to **uninstall** any kind of software firewall on your PCs, as they can cause problems accessing the 192.168.1.254 IP address of the router. Users should make their own decisions on how to best protect their network.

Please follow the steps below for your PC's network environment installation. First of all, please check your PC's network components. The TCP/IP protocol stack and Ethernet network adapter must be installed. If not, please refer to your Windows-related or other operating system manuals.



Any TCP/IP capable workstation can be used to communicate with or through the **Industrial LTE Router**. To configure other types of workstations, please consult the manufacturer's documentation.

Default Settings

Before configuring the router, you need to know the following default settings.

Web Interface: (Username and Password)

- ✓ Username: admin
- ✓ Password: admin

The default username and password are “**admin**” and “**admin**” respectively.



If you ever forget the username/password to login to the router, you may press the RESET button up to 6 seconds then release it to restore the factory default settings.

Caution: After pressing the RESET button for more than 6 seconds then release it, to be sure you power cycle the device again.

Device LAN IP Settings

- ✓ IP Address: 192.168.1.254
- ✓ Subnet Mask: 255.255.255.0

DHCP Server:

- ✓ DHCP server is enabled.
- ✓ Start IP Address: 192.168.1.100
- ✓ IP pool counts: 20

Information from Your ISP

Before configuring this device, you have to check with your ISP (Internet Service Provider) what kind of service is provided such as **4G/LTE**, **EWAN** (Dynamic IP address, Static IP address, PPPoE, Bridge Mode) or **Wireless Client** (Dynamic IP address, Static IP address) .

Chapter 4: Device Configuration

Login to your Device

Open your web browser, enter the IP address of your router, which by default is **192.168.1.254**, and click **Go**, a user name and password window prompt appears.

The default username and password is **“admin”** and **“admin”** respectively for the **Administrator**.

Authentication Required

The server http://192.168.1.254:80 requires a username and password. The server says: M500.

User Name:

Password:

Congratulations!

You have successfully logged on to your Industrial LTE Router !

BILLION 4G LTE Router Powering communications with Security

► Status
► Quick Start
► Configuration

Status

▼ Device Information

Model Name	M500
Firmware Version	1.04.1.1
MAC Address	60:03:47:10:3e:d7
Date-Time	Thu Jan 1 00:01:39 UTC 1970
System Up Time	1 min

▼ Physical Port Status

4G/LTE -1	✗
4G/LTE -2	✗
EWAN	✗
Wireless Client	✗
Ethernet	✓
Wireless	✓

▼ WAN

Interface	Protocol	Connection	IP Address	Default Gateway
4G/LTE -1	Dynamic IP	Not Connected	/	

▼ LAN

IP Address	Subnet Mask/Prefix Length	DHCP Server
192.168.1.254	255.255.255.0	Enable / 192.168.1.100~192.168.1.119 Enable / Stateless

▼ Wireless

Mode	SSID	Channel	Security
802.11b+g+n	wlan-ap	6	OPEN

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Once you have logged on to your Industrial LTE Router via your web browser, you can begin to set it up according to your requirements. On the configuration homepage, the left navigation pane links you directly to the setup page, which includes:

- **Status**(Device Info, System Log, 4G/LTE Status, GPS Status, Hardware Monitor, Hotspot Status, Statistics, DHCP Table, IPSec Status, PPTP Status, L2TP Status, GRE Status, Disk Status, ARP Table)
- **Quick Start** (Wizard Setup)
- **Configuration** (Interface Setup, Dual WAN, Hotspot, Advanced Setup, VPN, Access Management, Maintenance)

Please see the relevant sections of this manual for detailed instructions on how to configure your gateway.

Status

In this section, you can check the router working status, including **Device Info**, **System Log**, **4G/LTE Status**, **GPS Status**, **Hardware Monitor**, **Hotspot Status**, **Statistics**, **DHCP Table**, **IPSec Status**, **PPTP Status**, **L2TP Status**, **GRE Status**, **Disk Status**, **ARP Table**.

4G LTE RouterPowering communications with Security

- Status
- Device Info
- System Log
- 4G/LTE Status
- GPS Status
- Hardware Monitor
- Hotspot Status
- Statistics
- DHCP Table
- IPSec Status
- PPTP Status
- L2TP Status
- GRE Status
- Disk Status
- ARP Table
- Quick Start
- Configuration

Status

Device Information

Model Name	M500
Firmware Version	1.04.1.1
MAC Address	60:03:47:10:3e:d7
Date-Time	Fri May 6 08:44:12 UTC 2016
System Up Time	2 mins

Physical Port Status

4G/LTE -1	✓
4G/LTE -2	✗
EWAN	✗
Wireless Client	✗
Ethernet	✓
Wireless	✓

WAN

Interface	Protocol	Connection	IP Address	Default Gateway
4G/LTE -1	Dynamic IP	0d: 0h: 0m:31s Connected	10.64.196.96/255.255.255.192	10.64.196.97

LAN

IP Address	Subnet Mask/Prefix Length	DHCP Server
192.168.1.254	255.255.255.0	Enable / 192.168.1.100~192.168.1.119 Enable / Stateless

Wireless


Mode	SSID	Channel	Security
802.11b+g+n	wlan-ap	6	OPEN

Restart Logout

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Device Info

It contains basic information of the device.

Status 

Device Information		Physical Port Status	
Model Name	M500	4G/LTE -1	✓
Firmware Version	1.04.1.1	4G/LTE -2	✗
MAC Address	60:03:47:10:3e:d7	EWAN	✗
Date-Time	Fri May 6 08:44:12 UTC 2016	Wireless Client	✗
System Up Time	2 mins	Ethernet	✓
		Wireless	✓

WAN				
Interface	Protocol	Connection	IP Address	Default Gateway
4G/LTE -1	Dynamic IP	0d: 0h: 0m:31s Connected	10.64.196.96/255.255.255.192	10.64.196.97

LAN		
IP Address	Subnet Mask/Prefix Length	DHCP Server
192.168.1.254	255.255.255.0	Enable / 192.168.1.100~192.168.1.119 Enable / Stateless

Wireless			
Mode	SSID	Channel	Security
802.11b+g+n	wlan-ap	6	OPEN

Device Information

Model Name: Show model name of the router

Firmware Version: This is the Firmware version

MAC Address: This is the MAC Address

Date Time: The current date and time.

System Up Time: The duration since system is up.

Physical Port Status

Here the page shows the status of physical port of 4G/LTE, EWAN, WirelessClient, Ethernet and Wireless.

WAN

Interface: The WAN interface, "4G/LTE-1", "4G/LTE-2", "EWAN (LAN4)" and "Wireless Client".

Protocol: The protocol in use.

Connection: The connection status of the link.

IP Address: The WAN interface IP address obtained.

Default Gateway: The default gateway address.

LAN

IP Address: LAN IP address.

Subnet Mask/Prefix Length: Subnet mask for IPv4 or Prefix length for IPv6 on LAN..

DHCP Server: LAN port DHCP information.

Wireless

Mode: The wireless mode in use.

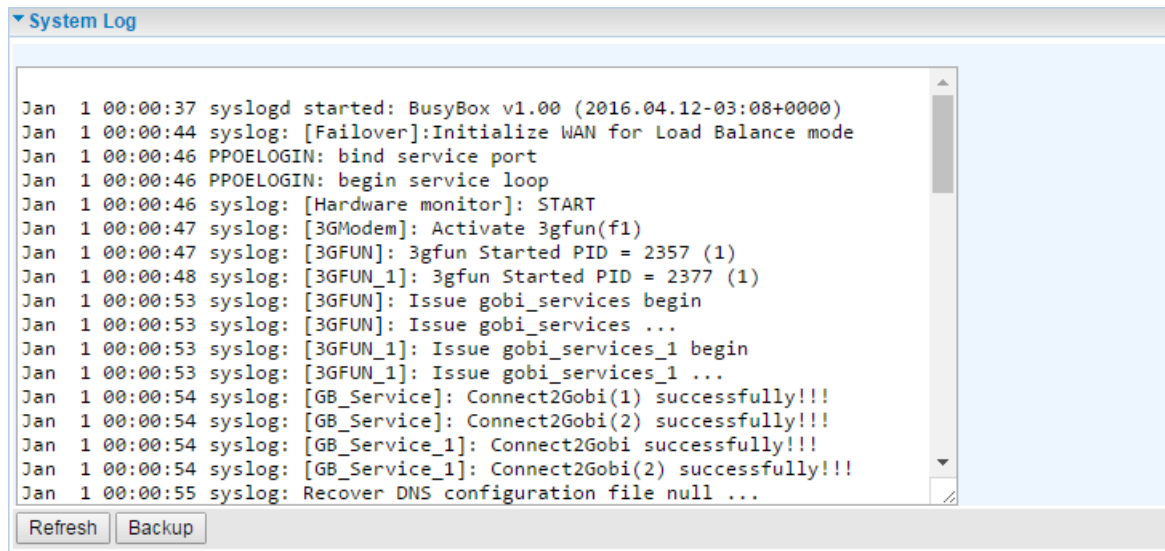
SSID: The SSID.

Channel: The current channel.

Security: The wireless security setting, authentication type.

System Log

In system log, you can check the operations status and any glitches to the router.




```
Jan 1 00:00:37 syslogd started: BusyBox v1.00 (2016.04.12-03:08+0000)
Jan 1 00:00:44 syslog: [Failover]:Initialize WAN for Load Balance mode
Jan 1 00:00:46 PPOELOGIN: bind service port
Jan 1 00:00:46 PPOELOGIN: begin service loop
Jan 1 00:00:46 syslog: [Hardware monitor]: START
Jan 1 00:00:47 syslog: [3GModem]: Activate 3gfun(f1)
Jan 1 00:00:47 syslog: [3GFUN]: 3gfun Started PID = 2357 (1)
Jan 1 00:00:48 syslog: [3GFUN_1]: 3gfun Started PID = 2377 (1)
Jan 1 00:00:53 syslog: [3GFUN]: Issue gobi_services begin
Jan 1 00:00:53 syslog: [3GFUN]: Issue gobi_services ...
Jan 1 00:00:53 syslog: [3GFUN_1]: Issue gobi_services_1 begin
Jan 1 00:00:53 syslog: [3GFUN_1]: Issue gobi_services_1 ...
Jan 1 00:00:54 syslog: [GB_Service]: Connect2Gobi(1) successfully!!!
Jan 1 00:00:54 syslog: [GB_Service]: Connect2Gobi(2) successfully!!!
Jan 1 00:00:54 syslog: [GB_Service_1]: Connect2Gobi successfully!!!
Jan 1 00:00:54 syslog: [GB_Service_1]: Connect2Gobi(2) successfully!!!
Jan 1 00:00:55 syslog: Recover DNS configuration file null ...
```

Refresh Backup

Refresh: Press this button to refresh the statistics.

4G/LTE Status

This page contains 4G/LTE connection information.

4G/LTE -1 Status	
WAN	4G/LTE -1 ▾
Status	Up
Signal Strength	 -62.00dbm
Signal Information	RSRP:-92.50 , RSRQ:-13.80 , SINR:11.90
Network Name	"Chunghwa Telecom"
Cell ID	81023501
Physical Cell ID	123
Card IMEI
Card IMSI
Network Mode	LTE
Network Band	B3
<input type="button" value="Refresh"/>	

Status: The current status of the 4G/LTE connection.

Signal Strength: The signal strength bar and dBm value indicates the current 4G/LTE signal strength. The front panel 4G/LTE Signal Strength LED indicates the signal strength as well.

Signal Information: Shows important LTE signal parameters such as RSRP (Reference Signal Receiving Power), RSRQ (Reference Signal Receiving Quality), SINR (Signal to Interference plus Noise Ratio).

- RSRP (Reference Signal Receiving Power): is the average power of all resource elements which carry cell-specified reference signals over the entire bandwidth.
- RSRQ (Reference Signal Receiving Quality): measures the signal strength and is calculated based on both RSRP and RSSI.
- RSSI (Received Signal Strength Indicator): parameter which provides information about total received wide-band power (measure in all symbols) including all interference and thermal noise.
- SINR (Signal to Interference plus Noise Ratio): is also a measure of signal quality as well. It is widely used by the operators as it provides a clear relationship between RF conditions and throughput. NOTE: Some LTE modules do not provide this information.

Network Name: The name of the LTE network the router is connecting to.

Cell ID: The ID of base station that the device is connected to.

Physical Cell ID: The physical ID of base station that the device is connected to.

Card IMEI: The unique identification number that is used to identify the 4G/LTE module.

Card IMSI: The international mobile subscriber identity used to uniquely identify the user of a cellular network – a number provisioned in the SIM card.

Network Mode: Show the using network mode.

Network Band: Show the using network band.

Refresh: Press this button to refresh the statistics.

GPS Status

In GPS status, you can check the UTC time, position of the router.

▼GPS Status

```
GPS 6 Satellites
UTC Time (hh:mm:ss): 03:31:22
Latitude: N2447.899658
Longitude: E12100.429688
Speed: 0 MPH, 0 km/h
```

Refresh

Hardware Monitor

In hardware monitor, you can check the voltage, current and temperature of system.



The screenshot shows a window titled "Hardware Monitor" with a dropdown arrow on the left. The main content area is light blue and contains a white box with the following text: "Voltage:15.00V Current:0.36A" and "Temperature:41.00C / 105.80F". Below this box is a grey bar containing a "Refresh" button.

Voltage:15.00V	Current:0.36A
Temperature:41.00C	105.80F

Refresh

Hotspot Status

The Hotspot status shows each hotspot client's connection status/information.

Hotspot Status							
MAC Address	IP Address	Authenticated	User Name	Duration Time	Idle Time	Upload	Download
0C:84:DC:91:7C:25	10.0.0.2	Authorized	hotspot-1	35/3600	0/180	0%/0	0%/0
<input type="button" value="Refresh"/>							

MAC Address: The MAC of the currently active client or the client attempting to connect in.

IP Address: The IP assigned to the client.

Authenticated: Show the client is authorized or not.

User Name: The username of the logged client; in agreement mode, no username showed.

Duration Time: The uptime of the client.

Upload: The upload traffic percentage of the used to the maximum allowed.

Download: The download traffic percentage of the used to the maximum allowed.

Statistics

❖ 4G/LTE

Statistics	
Traffic Statistics	
Interface	<input checked="" type="radio"/> 4G/LTE -1 <input type="radio"/> 4G/LTE -2 <input type="radio"/> EWAN(LAN4) <input type="radio"/> Ethernet <input type="radio"/> Wireless
Transmit Statistics	
Transmit Frames of Current Connection	333
Transmit Bytes of Current Connection	27693
Transmit Total Frames	290
Transmit Total Bytes	29997
Receive Statistics	
Receive Frames of Current Connection	329
Receive Bytes of Current Connection	27638
Receive Total Frames	333
Receive Total Bytes	28862
<input type="button" value="Refresh"/>	

Interface: List all available network interfaces in the router. You are currently checking on the physical status of **3G/4G-LTE** interface.

Transmit Frames of Current Connection: This field displays the total number of 4G/LTE frames transmitted until the latest second for the current connection.

Transmit Bytes of Current Connection: This field shows the total bytes transmitted till the latest second for the current connection for the current connection.

Transmit Total Frames: The field displays the total number of frames transmitted till the latest second since system is up.

Transmit Total Bytes: This field displays the total number of bytes transmitted until the latest second since system is up.

Receive Frames of Current Connection: This field displays the number of frames received until the latest second for the current connection.

Receive Bytes of Current Connection: This field shows the total bytes received till the latest second for the current connection.

Receive Total Frames: This field displays the total number of frames received until the latest second since system is up.

Receive Total Bytes: This field displays the total frames received till the latest second since system is up.

Statistics	
Traffic Statistics	
Interface	<input type="radio"/> 4G/LTE -1 <input type="radio"/> 4G/LTE -2 <input checked="" type="radio"/> EWAN(LAN4) <input type="radio"/> Ethernet <input type="radio"/> Wireless
Transmit Statistics	
Transmit Frames	0
Transmit Multicast Frames	0
Transmit Total Bytes	0
Transmit Collision	0
Transmit Error Frames	0
Receive Statistics	
Receive Frames	0
Receive Multicast Frame	0
Receive Total Bytes	0
Receive CRC Errors	0
Receive Under-size Frames	0
<input type="button" value="Refresh"/>	

Interface: List all available network interfaces in the router. You are currently checking on the physical status of the **EWAN** port.

Transmit Frames: This field displays the total number of frames transmitted until the latest second.

Transmit Multicast Frames: This field displays the total number of multicast frames transmitted till the latest second.

Transmit Total Bytes: This field displays the total number of bytes transmitted until the latest second.

Transmit Collision: This is the number of collisions on this port.

Transmit Error Frames: This field displays the number of error packets on this port.

Receive Frames: This field displays the number of frames received until the latest second.

Receive Multicast Frames: This field displays the number of multicast frames received until the latest second.

Receive Total Bytes: This field displays the number of bytes received until the latest second.

Receive CRC Errors: This field displays the number of error packets on this port.

Receive Under-size Frames: This field displays the number of under-size frames received until the latest second.

Refresh: Press this button to refresh the statistics.

❖ Ethernet

▼ Statistics	
Traffic Statistics	
Interface	<input type="radio"/> 4G/LTE -1 <input type="radio"/> 4G/LTE -2 <input type="radio"/> EWAN(LAN4) <input checked="" type="radio"/> Ethernet <input type="radio"/> Wireless
Transmit Statistics	
Transmit Frames	1771
Transmit Multicast Frames	1004
Transmit Total Bytes	710823
Transmit Collision	0
Transmit Error Frames	0
Receive Statistics	
Receive Frames	585
Receive Multicast Frame	10
Receive Total Bytes	129986
Receive CRC Errors	0
Receive Under-size Frames	0
<input type="button" value="Refresh"/>	

Interface: List all available network interfaces in the router. You are currently checking on the physical status of the **Ethernet** port.

Transmit Frames: This field displays the number of frames transmitted until the latest second.

Transmit Multicast Frames: This field displays the number of multicast frames transmitted until the latest second.

Transmit Total Bytes: This field displays the number of bytes transmitted until the latest second.

Transmit Collision: This is the number of collisions on this port.

Transmit Error Frames: This field displays the number of error packets on this port.

Receive Frames: This field displays the number of frames received until the latest second.

Receive Multicast Frames: This field displays the number of multicast frames received until the latest second.

Receive Total Bytes: This field displays the number of bytes received until the latest second.

Receive CRC Errors: This field displays the number of error packets on this port.

Receive Under-size Frames: This field displays the number of under-size frames received until the latest second.

Refresh: Press this button to refresh the statistics.

❖ Wireless

▼ Statistics	
Traffic Statistics	
Interface	<input type="radio"/> 4G/LTE -1 <input type="radio"/> 4G/LTE -2 <input type="radio"/> EWAN(LAN4) <input type="radio"/> Ethernet <input checked="" type="radio"/> Wireless
Transmit Statistics	
Transmit Frames	18679
Transmit Error Frames	294
Transmit Drop Frames	294
Receive Statistics	
Receive Frames	27946
Receive Error Frames	837
Receive Drop Frames	837
<input type="button" value="Refresh"/>	

Interface: List all available network interfaces in the router. You are currently checking on the physical status of the **Wireless**.

Transmit Frames: This field displays the number of frames transmitted until the latest second.

Transmit Error Frames: This field displays the number of error frames transmitted until the latest second.

Transmit Drop Frames: This field displays the number of drop frames transmitted until the latest second.

Receive Frames: This field displays the number of frames received until the latest second.

Receive Error Frames: This field displays the number of error frames received until the latest second.

Receive Drop Frames: This field displays the number of drop frames received until the latest second.

Refresh: Press this button to refresh the statistics.

DHCP Table

DHCP table displays the devices connected to the router with clear information.

DHCP Table				
#	Host Name	IP Address	MAC Address	Expire Time
1	Billion-HC-ee	192.168.1.101	00:C0:9F:D1:E1:CA	0days 23:36:1

Index: The index identifying the connected devices.

Host Name: Show the hostname of the PC.

IP Address: The IP allocated to the device.

MAC Address: The MAC of the connected device.

Expire Time: The total remaining interval since the IP assignment to the PC.

IPSec Status

Index	Action	Connection Name	Active	Connection State	Statistics	Remote Gateway	Remote Network	Local Network
0	<input type="button" value="Connect"/> <input type="button" value="Drop"/>	H-to-B	Yes	Phase1 Established Phase2 Established	191408/43308	69.121.1.30	192.168.0.0/24	192.168.1.0/24

Index: The IPSec tunnel index number.

Action: Connect or Drop the connection.

Connection Name: User-defined IPSes VPN connection name.

Active: Show if the tunnel is active for connection.

Connection State: Show the IPSec phase 1 and phase 2 connecting status.

Statistics: Display the upstream/downstream traffic per session in KB. The value clears when session disconnects.

Remote Gateway: The IP of the remote IPSec gateway.

Remote Network: The IP and netmask of remote access range.

Local Network: The IP and netmask of local access range.

PPTP Status

❖ PPTP Server

PPTP Status						
PPTP Server						
Index	Connection Name	Active	Connection State	Connection Type	Assigned IP Address	Remote Network
1	HS-LL	Yes	Yes	Lan to Lan	192.168.1.2	192.168.0.0 / 255.255.255.0

PPTP Client						
Index	Connection Name	Active	Connection State	Connection Type	Server IP Address	Remote Network

Index: The PPTP server tunnel index number.

Connection Name: Show user-defined PPTP VPN connection name.

Active: Show if the tunnel is active for connection.

Connection State: Show the connecting status.

Connection Type: Remote Access or LAN to LAN.

Assigned IP Address: Show the IP assigned to the client by PPTP Server.

Remote Network: Display the remote network and subnet mask in LAN to LAN PPTP connection.

Refresh: Click this button to refresh the connection status.

❖ PPTP Client

PPTP Status						
PPTP Server						
Index	Connection Name	Active	Connection State	Connection Type	Assigned IP Address	Remote Network
1	HS-LL	Yes	Yes	Lan to Lan	192.168.1.2	192.168.0.0 / 255.255.255.0

PPTP Client						
Index	Connection Name	Active	Connection State	Connection Type	Server IP Address	Remote Network

Index: The PPTP client tunnel index number.

Connection Name: Show user-defined PPTP VPN connection name.

Active: Show if the tunnel is active for connection.

Connection State: Show the connecting status.

Connection Type: Remote Access or LAN to LAN.

Server IP Address: Show the IP of remote PPTP Server.

Remote Network: Display the remote network and subnet mask in LAN to LAN PPTP connection.

Refresh: Click this button to refresh the connection status.

L2TP Status

▼ L2TP Status						
Index	Connection Name	Active	Connection State	Connection Mode	Connection Type	Tunnel Remote IP Address
1	HS-LL	Yes	Connected	Dial in	Lan to Lan	192.168.1.200
<input type="button" value="Refresh"/>						

Index: The L2TP tunnel index number.

Connection Name: Display the user-defined L2TP connection name.

Active: Show if the tunnel is active for connection.

Connection State: Show the connecting status.

Connection Mode: The L2TP mode is dialin or dialout.

Connection Type: Remote Access or LAN to LAN.

Tunnel Remote IP Address: Display the remote tunnel IP address.

Refresh: Click this button to refresh the connection status.

GRE Status

GRE Status				
Index	Connection Name	Active	Remote Gateway IP	Remote Network
1	GRE-0	Yes	69.121.1.30	192.168.0.0/255.255.255.0
<input type="button" value="Refresh"/>				

Index: The GRE tunnel index number.

Connection Name: Display the user-defined GRE connection name.

Active: Show if the tunnel is active for connection.

Connection State: Show the connecting status.

Remote Gateway IP: The IP of the remote GRE gateway.

Remote Network: Display the remote network.

Disk Status

▼ Disk Status		
Partition	Disk Space(KB)	Free Space(KB)
usb1_1	15718272	14033064
usb2_1	15734652	11170204

Partition: Display the USB storage partition.

Disk Space (KB): Display the total storage space of the NAS in Kbytes unit.

Free Space (KB): Display the available space in Kbytes unit.

ARP Table

This section displays the router's ARP (Address Resolution Protocol) Table, which shows the mapping of Internet (IP) addresses to Ethernet (MAC) addresses.

▼ ARP Table		
#	IP	MAC Address
1	10.113.76.168	02:50:f3:00:0b:00
2	192.168.1.234	00:16:d3:e7:09:a3

#: The Index of the ARP rule item.

IP Address: Shows the IP Address of the device that the MAC address maps to.

MAC Address: Shows the MAC address that is corresponded to the IP address of the device it is mapped to.

Quick Start

This is a useful and easy utility to help you to setup the router quickly and to connect to your ISP (Internet Service Provider) with only a few steps. It will guide you step by step to setup password, time zone, wireless and WAN settings of your device. The Quick Start Wizard is a helpful guide for the first-time users to the device.

Quick Start
The 'Quick Start' wizard will guide you to configure the device to connect to your ISP(Internet Service Provider). Please follow the 'Quick Start' wizard step by step to configure the device. It will allow you to have Internet access within minutes.
<input type="button" value="Run Wizard"/>

For detailed instructions on configuring WAN settings, see refer to the **Interface Setup** section.

Quick Start
The Wizard will guide you through these five quick steps. Begin by clicking on NEXT.
Step 1. Set your new password
Step 2. Choose your time zone
Step 3. Set your wireless connection
Step 4. Set your internet connection
Step 5. Confirm the configuration and save it
<input type="button" value="Next"/>

Click **Next** to move on to Step 1.

Step 1 – Password

Set new password of the “admin” account to access for router management. The default is “admin”. Once changed, please use this new password next time when accessing to the router. Click **Next** to continue.

Quick Start - Password
You may change the admin account password by entering in a new password. Click NEXT to continue.
New Password <input type="text"/>
Confirm Password <input type="text"/>
<input type="button" value="Back"/> <input type="button" value="Next"/>

Step 2 – Time Zone

Choose your time zone. Click Next to continue.

Quick Start - Time Zone
Select the appropriate time zone for your location and click NEXT to continue.
Time Zone <input type="text" value="(GMT) Greenwich Mean Time : Dublin, Edinburgh, Lisbon, London"/>
<input type="button" value="Back"/> <input type="button" value="Next"/>

Step 3 – Wireless

Set up your wireless connection if you want to connect to the Internet wirelessly on your PCs. Click **Next** to continue.

Quick Start - Wireless

Configure your wireless network, authentication type and click NEXT to continue.

Access Point	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
SSID	wlan-ap
Broadcast SSID	<input checked="" type="radio"/> Yes <input type="radio"/> No
Channel	UNITED STATES 06
Security Type	OPEN

Back Next

Step 4 – ISP Connection Type

Set up your Internet connection.

4.1 Select an appropriate WAN connection protocol then click **Next** to continue.

Quick Start - ISP Connection Type

Select the WAN Interface and Internet Connection Type to connect to your ISP. Click NEXT to continue.

WAN Interface	4G/LTE -1
---------------	-----------

Back Next

Input all relevant 3G/4G-LTE parameters from your ISP.

Quick Start - 4G/LTE -1

Enter the 3G information provided to you by your ISP. Click NEXT to continue.

TEL No.	*99***1#
APN	internet
Username	
Password	
PIN	

Back Next

4.2 If selected **EWAN**

Quick Start - ISP Connection Type

Select the WAN Interface and Internet Connection Type to connect to your ISP. Click NEXT to continue.

WAN Interface	EWAN(LAN4)
ISP	<input type="radio"/> Dynamic IP Address <input type="radio"/> Static IP Address (Choose this option to set static IP information provided to you by your ISP.) <input checked="" type="radio"/> PPPoE (Choose this option if your ISP uses PPPoE..)

Back Next

If selected **PPPoE**, please enter PPPoE account information provided by your ISP. Click **NEXT** to continue. Or, others protocol assigned by your ISP.

Quick Start - PPPoE

Provide the PPPoE information. Click NEXT to continue.

Username	
Password	

Back Next

4.3 If selected **Wireless Client**

▼ Quick Start - ISP Connection Type	
Select the WAN Interface and Internet Connection Type to connect to your ISP. Click NEXT to continue.	
WAN Interface	Wireless Client ▼
ISP	<input checked="" type="radio"/> Dynamic IP Address
	<input type="radio"/> Static IP Address (Choose this option to set static IP information provided to you by your ISP.)
	Back Next

If selected **Dynamic IP Address**, click **Next** to continue. Or, others protocol assigned by your ISP.

▼ Quick Start - Dynamic IP Address	
Your choice is Dynamic IP. Click NEXT to continue.	
Back	Next

Step 5 – Quick Start Completed

The Setup Wizard has completed. Click on BACK to modify changes or mistakes. Click **NEXT** to save the current settings.

▼ Quick Start - Quick Start Completed	
Quick Start Completed !!	
The Setup Wizard has completed. Click on BACK to modify changes or mistakes. Click NEXT to exit the Setup Wizard.	
Back	Next

Step 6 – Quick Start Completed

▼ Quick Start - Quick Start Completed !!	
Quick Start Completed !!	
Saved Changes.	

Configuration

Click to access and configure the available features in the following: **Interface Setup, Dual WAN, Hotspot, Advanced Setup, VPN, Access Management, and Maintenance.**

The screenshot displays the configuration interface for a BILLION 4G LTE Router. The page features a blue header with the BILLION logo and the slogan "Powering communications with Security". A navigation menu on the left lists various configuration options, with "Configuration" selected. The main content area is titled "Configuration" and shows the "Internet" settings. The settings include:


Setting	Value
WAN Interface	4G/LTE -1
Status	Activated
Usage Allowance	Enable
Network Mode	Automatic
TEL No.	*99***1#
Dual APN	Single APN
APN	Internet
Authentication Protocol	Disable
Username	
Password	
PIN	
Connection	Always On (Recommended)
Keep Alive	No
Keep Alive IP	
Default Route	Yes
NAT	Enable
MTU	0 (0 means use default:1500)

At the bottom of the configuration area is a "Save" button. In the bottom right corner of the page, there are "Restart" and "Logout" buttons. The footer contains the copyright notice: "Copyright @ Billion Electric Co., Ltd. All rights reserved."

These functions are described in the following sections.

Interface Setup

Here are the features under **Interface Setup: Internet, LAN, Wireless and Wireless MAC Filter.**



4G LTE RouterPowering communications
with Security

- Status
- Quick Start
- Configuration
 - ▾ Interface Setup
 - Internet
 - LAN
 - Wireless
 - Wireless MAC Filter
 - Dual WAN
 - Hotspot
 - Advanced Setup
 - VPN
 - Access Management
 - Maintenance

Configuration

▼ Internet

WAN Interface	4G/LTE -1 ▼
Status	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
Usage Allowance ▸	<input type="checkbox"/> Enable
Network Mode	Automatic ▼
TEL No.	*99***1#
Dual APN	Single APN ▼
APN	internet
Authentication Protocol	Disable ▼
Username	<input type="text"/>
Password	<input type="password"/>
PIN	<input type="text"/>
Connection	<input checked="" type="radio"/> Always On (Recommended)
Keep Alive	<input type="radio"/> Yes <input checked="" type="radio"/> No
Keep Alive IP	<input type="text"/>
Default Route	<input checked="" type="radio"/> Yes <input type="radio"/> No
NAT	Enable ▼
MTU	0 (0 means use default:1500)

 Restart  Logout

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Internet

❖ 4G/LTE

Internet	
WAN Interface	4G/LTE -1 ▾
Status	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
Usage Allowance ▶	<input type="checkbox"/> Enable
Network Mode	Automatic ▾
TEL No.	*99***1#
Dual APN	Single APN ▾
APN	internet
Authentication Protocol	Disable ▾
Username	
Password	
PIN	
Connection	<input checked="" type="radio"/> Always On (Recommended)
Keep Alive	<input type="radio"/> Yes <input checked="" type="radio"/> No
Keep Alive IP	
Default Route	<input checked="" type="radio"/> Yes <input type="radio"/> No
NAT	Enable ▾
MTU	0 (0 means use default:1500)
<input type="button" value="Save"/>	

Status: Choose Activated to enable the 3G/4G-LTE connection.

Usage Allowance: to control 4G/LTE flow, click it to further configure about 4G/LTE flow control, refer to the following [Usage Allowance](#) for more information.

Network Mode: There are some options of service standards: “Automatic”, “UMTS 3G only”, “GSM 2G Only”, “UMTS 3G Preferred”, “GSM 2G Preferred”, “GSM and UMTS Only”, “LTE Only”, “GSM, UMTS, LTE”. If you are not sure which mode to use, you may select **Automatic** to auto detect the best mode for you.

TEL No.: The dial string to make a GPRS / 3G/4G-LTE user internetworking call. It may provide by your mobile service provider.

Dual APN: Industrial LTE Router can support up to two APNs. Select Single or Dual.

APN: An APN is similar to a URL on the WWW, it is what the unit makes a GPRS / UMTS call. The service provider is able to attach anything to an APN to create a data connection, requirements for APNs varies between different service providers. Most service providers have an internet portal which they use to connect to a DHCP Server, thus giving you access to the internet i.e. some 3G operators use the APN ‘internet’ for their portal. The default value is “internet”.

Authentication Protocol: Check if the ISP wants authentication, select PAP or ChAP.

Username/Password: Enter the username and password provided by your service provider. The username and password are case sensitive.

PIN: PIN stands for Personal Identification Number. A PIN code is a numeric value used in certain systems as a password to gain access, and authenticate. In mobile phones a PIN code locks the SIM card until you enter the correct code. If you enter the PIN code incorrectly 3 times in a row, then the SIM card will be blocked and you will require a PUK code from your network/service provider.

Connection: Default set to Always on to keep an always-on 3G/4G-LTE connection.

Keep Alive: Select **Yes** to keep the 3G/4G-LTE connection always on.

Keep Alive IP: Enter the IP address which is used for “ping”, and router will ping the IP to find whether the connection is on or not, if not, router will recover the connection.

Default Route: Select **Yes** to use this interface as default route interface.

NAT: Select this option to Disabled/Enable the NAT (Network Address Translation) function. Enable NAT to grant multiples devices in LAN to access to the Internet through a single WAN IP.

MTU: Set the MTU(maximum transimission unit) value.

Usage Allowance

Usage Allowance	
Parameters	
Mode	<input type="radio"/> Volume-based Only Download <input type="text"/> MB data volume per month included
	<input checked="" type="radio"/> Time-based 720 <input type="text"/> hours per month included The billing period always begins on day 1 <input type="text"/> of a month.
Over usage allowance action	None <input type="text"/>
Save the statistics to ROM	Disable <input type="text"/>
<input type="button" value="Save"/> <input type="button" value="Back"/>	

Mode: include **Volume-based** and **Time-based** control.

Volume-based include “only Download”, “only Upload” and “Download and Upload” to limit the flow. Time-based control the flow by providing specific hours per month.

The billing period begins on: the beginning day of billing each month.

Over usage allowance action: what to do when the flow is over usage allowance, the available methods are “Disconnect”, “E-mail Alert”, “E-mail Alert and Disconnect”.

Save the statistics to ROM: to save the statistics to ROM system.

Internet	
WAN Interface	EWAN(LAN4) ▼
Status	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
IPv4/IPv6	
IP Version	<input type="radio"/> IPv4 <input checked="" type="radio"/> IPv4/IPv6 <input type="radio"/> IPv6
ISP Connection Type	
ISP	<input type="radio"/> Dynamic IP Address <input type="radio"/> Static IP Address <input checked="" type="radio"/> PPPoE
802.1q Options	
802.1q	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
VLAN ID	0 (range: 0~4095)
PPPoE	
Username	<input type="text"/>
Password	<input type="text"/>
Bridge Interface for PPPoE	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Connection Setting	
Connection	<input checked="" type="radio"/> Always On (Recommended) <input type="radio"/> Connect Manually
TCP MSS Option	TCP MSS <input type="text" value="0"/> bytes(0 means use default)
IP Options	
IP Common Options	
Default Route	<input checked="" type="radio"/> Yes <input type="radio"/> No
TCP MTU Option	TCP MTU <input type="text" value="0"/> bytes(0 means use default:1492)
IPv4 Options	
Get IP Address	<input type="radio"/> Static <input checked="" type="radio"/> Dynamic
Static IP Address	<input type="text" value="0.0.0.0"/>
IP Subnet Mask	<input type="text" value="0.0.0.0"/>
Gateway	<input type="text" value="0.0.0.0"/>
NAT	Enable ▼
Dynamic Route	RIP1 ▼ Direction None ▼
IGMP Proxy	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
IPv6 Options	
IPv6 Address	<input type="text"/> / <input type="text"/>
Obtain IPv6 DNS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Primary DNS	<input type="text"/>
Secondary DNS	<input type="text"/>
MLD Proxy	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
<input type="button" value="Save"/>	

Internet	
WAN Interface	EWAN(LAN4) ▾
Status	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
IPv4/IPv6	
IP Version	<input type="radio"/> IPv4 <input checked="" type="radio"/> IPv4/IPv6 <input type="radio"/> IPv6
ISP Connection Type	
ISP	<input type="radio"/> Dynamic IP Address <input type="radio"/> Static IP Address <input checked="" type="radio"/> PPPoE
802.1q Options	
802.1q	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
VLAN ID	0 (range: 0~4095)
PPPoE	
Username	<input type="text"/>
Password	<input type="text"/>
Bridge Interface for PPPoE	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Connection Setting	
Connection	<input checked="" type="radio"/> Always On (Recommended) <input type="radio"/> Connect Manually
TCP MSS Option	TCP MSS <input type="text" value="0"/> bytes(0 means use default)

Status: Select whether to enable the service.

IPv4/IPv6

IP Version: Choose **IPv4**, **IPv4/IPv6**, **IPv6** based on your environment. If you don't know which one to choose from, please choose IPv4/IPv6 instead.

ISP Connection Type:

ISP: Select the encapsulation type your ISP uses.

- ▶ **Dynamic IP:** Select this option if your ISP provides you an IP address automatically.
- ▶ **Static IP:** Select this option to set static IP information. You will need to enter in the Connection type, IP address, subnet mask, and gateway address, provided to you by your ISP. Each IP address entered in the fields must be in the appropriate IP form. IP address from by four IP octets separated by a dot (xx.xx.xx.xx). The Router will not accept the IP address if it is not in this format.
- ▶ **PPPoE:** Select this option if your ISP requires you to use a PPPoE connection.
- ▶ **Bridge:** Select this mode if you want to use this device as an OSI Layer 2 device like a switch.

802.1q Options

802.1q: When activated, please enter a VLAN ID.

VLAN ID: It is a parameter to specify the VLAN which the frame belongs. Enter the VLAN ID identification, tagged: 0-4095.

PPPoE (If selected PPPoE as WAN Connection Type; otherwise, skip this part)

Username: Enter the user name provided by your ISP.

Password: Enter the password provided by your ISP.

Bridge Interface for PPPoE: When "Activated", the device will gain WAN IP from your ISP with the PPPoE account. While if you dial up with the account within your PC, the device will then work as a bridge forwarding the PPPoE information to the PPPoE server and send the response to your PC, thus

your PC gets a public WAN IP working in the internet. But if your PC is connected to the router working as a DHCP client, in this mode, the device acts as a NAT router.

Connection Setting

Connection:

- ▶ **Always On:** Click on **Always On** to establish a PPPoE session during start up and to automatically re-establish the PPPoE session when disconnected by the ISP.
- ▶ **Connect Manually:** Select Connect Manually when you don't want the connection up all the time.

TCP MSS Option: Enter the maximum size of the data that TCP can send in a segment. Maximum Segment Size (MSS).

IP Options

IP Options	
IP Common Options	
Default Route	<input checked="" type="radio"/> Yes <input type="radio"/> No
TCP MTU Option	TCP MTU <input type="text" value="0"/> bytes(0 means use default:1492)
IPv4 Options	
Get IP Address	<input type="radio"/> Static <input checked="" type="radio"/> Dynamic
Static IP Address	<input type="text" value="0.0.0.0"/>
IP Subnet Mask	<input type="text" value="0.0.0.0"/>
Gateway	<input type="text" value="0.0.0.0"/>
NAT	<input type="text" value="Enable"/>
Dynamic Route	<input type="text" value="RIP1"/> Direction <input type="text" value="None"/>
IGMP Proxy	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
IPv6 Options	
IPv6 Address	<input type="text" value=""/> / <input type="text" value=""/>
Obtain IPv6 DNS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Primary DNS	<input type="text" value=""/>
Secondary DNS	<input type="text" value=""/>
MLD Proxy	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

Default Route: Select **Yes** to use this interface as default route interface.

TCP MTU Option: Enter the maximum packet that can be transmitted. Default MTU is set to 1492.

IPv4 Options

Get IP Address: Choose Static or Dynamic

Static IP Address: If Static is selected in the above field, please enter the specific IP address you get from ISP and the following IP subnet mask and gateway address.

IP Subnet Mask: The default is 0.0.0.0. User can change it to other such as 255.255.255.0. Type the subnet mask assigned to you by your ISP (if given).

Gateway: Enter the specific gateway IP address you get from ISP.

NAT: Select Enable if you use this router to hold a group of PCs to get access to the internet.

Dynamic Route:

- ▶ **RIP Version:** (Routing Information protocol) Select this option to specify the RIP version, including RIP-1, RIP-2.
- ▶ **RIP Direction:** Select this option to specify the RIP direction.
 - **None** is for disabling the RIP function.
 - **Both** means the router will periodically send routing information and accept routing information then incorporate into routing table.
 - **IN only** means the router will only accept but will not send RIP packet.
 - **OUT only** means the router will only send but will not accept RIP packet.

IGMP Proxy: IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a Multicast group. Choose whether enable IGMP proxy.

IPv6 Options(only when choose IPv4/IPv6 or just IPv6 in IP version field above)

IPv6 Address: Type the WAN IPv6 address from your ISP.

Obtain IPv6 DNS: Choose if you want to obtain DNS automatically.

Primary/Secondary DNS: if you choose Disable in the Obtain IPv6 DNS field, please type the exactly primary and secondary DNS.

MLD Proxy: MLD (Multicast Listener Discovery Protocol) is to IPv6 just as IGMP to IPv4. It is a Multicast Management protocol for IPv6 multicast packets.

When router's Internet configuration is finished successfully, you can go to status to get the connection information.

❖ Wireless Client

When Wireless Client is selected, the router will act as an ordinary wireless client to connect to an AP to connect to the Internet.

Internet				
WAN Interface	Wireless Client ▼			
Status	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated			
ISP Connection Type				
ISP	<input checked="" type="radio"/> Dynamic IP Address <input type="radio"/> Static IP Address			
Dynamic IP Address				
IP Common Options				
Default Route	<input checked="" type="radio"/> Yes <input type="radio"/> No			
IPv4 Options				
NAT	Enable ▼			
Wireless Options				
SSID	<input type="text"/>			
Channel	Auto ▼			
Security Type	OPEN ▼			
Save Scan				
Site Survey				
CH	SSID	BSSID	Security	Signal(%)

Status: Choose Activated to enable the Wireless Client connection.

ISP Connection Type:

ISP: Select the encapsulation type your ISP uses.

- ▶ **Dynamic IP:** Select this option if your ISP provides you an IP address automatically.
- ▶ **Static IP:** Select this option to set static IP information. You will need to enter in the Connection type, IP address, subnet mask, and gateway address, DNS, provided to you by your ISP. Each IP address entered in the fields must be in the appropriate IP form. IP address from by four IP octets separated by a dot (xx.xx.xx.xx). The Router will not accept the IP address if it is not in this format.

IP Common Options

Default Route: Select **Yes** to use this interface as default route interface.

IPv4 Options

NAT: Select Enable if you use this router to hold a group of PCs to get access to the internet.

Wireless Options

SSID: The target wireless AP. User can alliteratively input the SSID manually or also use the Scan button to scan and select.

Channel: Choose the wireless working channel

Security Type: Set the wireless security mode, namely, OPEN, WEP 64-bit, WEP 128-bit, WPA-PSk and WPA2-PSK.

Use "Scan" button to scan the available SSIDs in the air, find your desired on, type the encyption key.

Site Survey					
	CH	SSID	BSSID	Security	Signal(%)
<input type="radio"/>	1	wlan-ap-2.4g	00:04:ed:01:00:03	NONE	100
<input type="radio"/>	1	wlan-ap	00:04:ed:78:78:79	NONE	100
<input type="radio"/>	1	FET Wi-Fi Auto	00:24:6c:49:80:34	NONE	52
<input checked="" type="radio"/>	1	Billion-WiFi	00:04:ed:34:10:00	WPA1PSK/WPA2PSK	100
<input type="radio"/>	1	Xiaomi_123	8c:be:be:08:d8:4c	WPA2PSK	73
<input type="radio"/>	4	FON+WRT	00:18:84:a0:c6:19	WPA2PSK	52
<input type="radio"/>	5	OEM	08:cc:68:8a:b9:60	WPA2PSK	26
<input type="radio"/>	5	Xiaomi_5893	64:09:80:7e:58:94	WPA1PSK/WPA2PSK	37
<input type="radio"/>	6	Sam_24G_N	00:04:ed:45:00:02	WPA1PSK	83

LAN

A Local Area Network (LAN) is a shared communication system to which many computers are attached and is limited to the immediate area, usually the same building or floor of a building.

LAN	
IPv4 Parameters	
IP Address	<input type="text" value="192.168.1.254"/>
IP Subnet Mask	<input type="text" value="255.255.255.0"/>
Alias IP Address	<input type="text" value="0.0.0.0"/> (0.0.0.0 means to close the alias ip)
Alias IP Subnet Mask	<input type="text" value="0.0.0.0"/>
Snooping	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Dynamic Route	RIP1 ▾ Direction <input type="text" value="None"/> ▾
DHCPv4 Server	
DHCPv4 Server	<input type="radio"/> Disabled <input checked="" type="radio"/> Enabled <input type="radio"/> Relay
Start IP	<input type="text" value="192.168.1.100"/>
IP Pool Count	<input type="text" value="20"/>
Lease Time	<input type="text" value="86400"/> seconds (0 sets to default value of 259200)
Physical Ports	<input checked="" type="checkbox"/> LAN1 <input checked="" type="checkbox"/> LAN2 <input checked="" type="checkbox"/> LAN3 <input checked="" type="checkbox"/> LAN4 <input checked="" type="checkbox"/> WLAN1
DNS Relay	<input checked="" type="radio"/> Automatically <input type="radio"/> Manually
Primary DNS	<input type="text"/>
Secondary DNS	<input type="text"/>
Fixed Host	
IP Address	<input type="text"/>
MAC Address	<input type="text"/>
IPv6 Parameters	
Interface Address/Prefix Length	<input type="text"/> / <input type="text"/>
DHCPv6 Server	
DHCPv6 Server	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
DHCPv6 Server Type	<input checked="" type="radio"/> Stateless <input type="radio"/> Stateful
Start Interface ID	<input type="text"/>
End Interface ID	<input type="text"/>
Lease Time	<input type="text"/> seconds(0 sets to default value of 4800)
Router Advertisements	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
<input type="button" value="Save"/>	

LAN	
IPv4 Parameters	
IP Address	<input type="text" value="192.168.1.254"/>
IP Subnet Mask	<input type="text" value="255.255.255.0"/>
Alias IP Address	<input type="text" value="0.0.0.0"/> (0.0.0.0 means to close the alias ip)
Alias IP Subnet Mask	<input type="text" value="0.0.0.0"/>
Snooping	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Dynamic Route	RIP1 ▾ Direction None ▾
DHCPv4 Server	
DHCPv4 Server	<input type="radio"/> Disabled <input checked="" type="radio"/> Enabled <input type="radio"/> Relay
Start IP	<input type="text" value="192.168.1.100"/>
IP Pool Count	<input type="text" value="20"/>
Lease Time	<input type="text" value="86400"/> seconds (0 sets to default value of 259200)
Physical Ports	<input checked="" type="checkbox"/> LAN1 <input checked="" type="checkbox"/> LAN2 <input checked="" type="checkbox"/> LAN3 <input checked="" type="checkbox"/> LAN4 <input checked="" type="checkbox"/> WLAN1
DNS Relay	<input checked="" type="radio"/> Automatically <input type="radio"/> Manually
Primary DNS	<input type="text"/>
Secondary DNS	<input type="text"/>
Fixed Host	
IP Address	<input type="text"/>
MAC Address	<input type="text"/>

IPv4 Parameters

IP Address: Enter the IP address of Router in dotted decimal notation, for example, 192.168.1.254 (factory default).

IP Subnet Mask: The default is 255.255.255.0. User can change it to other such as 255.255.255.128.

Alias IP Address: This is for local networks virtual IP interface. Specify an IP address on this virtual interface.

Alias IP Subnet Mask: Specify a subnet mask on this virtual interface.

Snooping: Select **Activated** to enable IGMP/MLD Snooping function, Without IGMP/MLD snooping, multicast traffic is treated in the same manner as broadcast traffic - that is, it is forwarded to all ports. With IGMP/MLD snooping, multicast traffic of a group is only forwarded to ports that have members of that group.

Dynamic Route: Select the RIP version from RIP1 or RIP2.

DHCPv4 Server

DHCP (Dynamic Host Configuration Protocol) allows individual clients to obtain TCP/IP configuration at start-up from a server.

DHCPv4 Server: If set to **Enabled**, your Industrial LTE Router can assign IP addresses, default gateway and DNS servers to the DHCP client.

- ▶ If set to **Disabled**, the DHCP server will be disabled.
- ▶ If set to **Relay**, the Industrial LTE Router acts as a surrogate DHCP server and relays DHCP requests and responses between the remote server and the clients. Enter the IP address of the actual, remote DHCP server in the Remote DHCP Server field in this case.
- ▶ When DHCP is used, the following items need to be set.

Start IP: This field specifies the first of the contiguous addresses in the IP address pool.

IP Pool Count: This field specifies the count of the IP address pool.

Lease Time: The current lease time of client.

DNS Relay Select Automatically obtained or Manually set (if selected. Please set the exactly information).

Primary DNS Server: Enter the IP addresses of the DNS servers. The DNS servers are passed to the DHCP clients along with the IP address and the subnet mask.

Secondary DNS Server: Enter the IP addresses of the DNS servers. The DNS servers are passed to the DHCP clients along with the IP address and the subnet mask.


Fixed Host

In this field, users can map the specific IP (must in the DHCP IP pool) for some specific MAC, and this information can be listed in the following table.

IP Address: Enter the specific IP. For example: 192.168.1.110.

MAC Address: Enter the responding MAC. For example: 00:0A:F7:45:6D:ED

When added, you can see the ones listed as showed below:

Fixed Host Listing			
Index	IP Address	MAC Address	Delete
1	192.168.1.110	00:04:ED:01:01:10	

IPv6 parameters

IPv6 Parameters	
Interface Address/Prefix Length	<input type="text"/> / <input type="text"/>
DHCPv6 Server	
DHCPv6 Server	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
DHCPv6 Server Type	<input checked="" type="radio"/> Stateless <input type="radio"/> Stateful
Start Interface ID	<input type="text"/>
End Interface ID	<input type="text"/>
Lease Time	<input type="text"/> seconds(0 sets to default value of 4800)
Router Advertisements	<input type="radio"/> Disable <input checked="" type="radio"/> Enable

The IPv6 address composes of two parts, thus, the prefix and the interface ID.

Interface Address / Prefix Length: Enter a static LAN IPv6 address. If you are not sure what to do with this field, please leave it empty as if contains false information it could result in LAN devices not being able to access other IPv6 device. Router will take the same WAN's prefix to LAN side if the field is empty.

DHCPv6 Server

There are two methods to dynamically configure IPv6 address on hosts, **Stateless** and **Stateful**.

Stateless auto-configuration requires no manual configuration of hosts, minimal (if any) configuration of routers, and no additional servers. The stateless mechanism allows a host to generate its own addresses using a combination of locally available information (MAC address) and information (prefix) advertised by routers. Routers advertise prefixes that identify the subnet(s) associated with a link, while hosts generate an "interface identifier" that uniquely identifies an interface on a subnet. An address is formed by combining the two. When using stateless configuration, you needn't configure

anything on the client.

Stateful configuration, for example using DHCPv6 (which resembles its counterpart DHCP in IPv4.) In the stateful auto configuration model, hosts obtain interface addresses and/or configuration information and parameters from a DHCPv6 server. The Server maintains a database that keeps track of which addresses have been assigned to which hosts.

DHCPv6 Server: Check whether to enable DHCPv6 server.

DHCPv6 Server Type: Select Stateless or Stateful. When DHCPv6 is enabled, this parameter is available.

- ▶ **Stateless:** If selected, the PCs in LAN are configured through RA mode, thus, the PCs in LAN are configured through RA mode, to obtain the prefix message and generate an address using a combination of locally available information (MAC address) and information (prefix) advertised by routers, but they can obtain such information like DNS from DHCPv6 Server.
- ▶ **Stateful:** If selected, the PCs in LAN will be configured like in IPv4 mode, thus obtain addresses and DNS information from DHCPv6 server.

Start interface ID: enter the start interface ID. The IPv6 address composed of two parts, thus, the prefix and the interface ID. Interface is like the Host ID compared to IPv4.

End interface ID: enter the end interface ID.

Leased Time (hour): the leased time, similar to leased time in DHCPv4, is a time limit assigned to clients, when expires, the assigned ID will be recycled and reassigned.

Router Advertisement: Check to Enable or Disable the Issue Router Advertisement feature. This feature is to send Router Advertisement messages periodically which would multicast the IPv6 Prefix information (similar to v4 network number 192.168.1.0) to all LAN devices if the field is enabled. We suggest enabling this field.

Wireless

This section introduces the wireless LAN and some basic configurations. Wireless LANs can be as complex as a number of computers with wireless LAN cards communicating through access points which bridge network traffic to the wired LAN.

Wireless 2.4G	
Access Point Settings	
Access Point	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
AP MAC Address	60:03:47:10:3E:D7
Wireless Mode	802.11b+g+n ▼
Channel	UNITED STATES ▼ 06 ▼ Current Channel : 6
Beacon Interval	100 (range: 20~1000)
RTS/CTS Threshold	2347 (range: 1500~2347)
Fragmentation Threshold	2346 (range: 256~2346, even numbers only)
DTIM Interval	1 (range: 1~255)
TX Power	100 (range:1~100)
IGMP Snooping	<input checked="" type="radio"/> Yes <input type="radio"/> No
11n Settings	
Channel Bandwidth	40 MHz ▼
Guard Interval	Auto ▼
MCS	Auto ▼
SSID Settings	
Available SSID	1 ▼
SSID Index	<input checked="" type="radio"/> SSID1
SSID	wlan-ap
Broadcast SSID	<input checked="" type="radio"/> Yes <input type="radio"/> No
SSID Activated	Always ▼
WPS Settings	
Use WPS	<input checked="" type="radio"/> Yes <input type="radio"/> No
WPS State	Configured
WPS Mode	<input type="radio"/> PIN code <input checked="" type="radio"/> PBC
Security Settings	
Security Type	OPEN ▼
WDS Settings	
AP MAC Address	60:03:47:10:3E:D7
WDS Mode	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
WDS Peer MAC #1	00:00:00:00:00:00
WDS Peer MAC #2	00:00:00:00:00:00
WDS Peer MAC #3	00:00:00:00:00:00
WDS Peer MAC #4	00:00:00:00:00:00
<input type="button" value="Save"/>	

Access Point Settings

Wireless 2.4G	
Access Point Settings	
Access Point	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
AP MAC Address	60:03:47:10:3E:D7
Wireless Mode	802.11b+g+n ▼
Channel	UNITED STATES ▼ 06 ▼ Current Channel : 6
Beacon Interval	100 (range: 20~1000)
RTS/CTS Threshold	2347 (range: 1500~2347)
Fragmentation Threshold	2346 (range: 256~2346, even numbers only)
DTIM Interval	1 (range: 1~255)
TX Power	100 (range:1~100)
IGMP Snooping	<input checked="" type="radio"/> Yes <input type="radio"/> No

Access Point: Default setting is set to **Activated**. If you want to close the wireless interface, select **Deactivated**.

AP MAC Address: The MAC address of wireless AP.

Wireless Mode: The default setting is **802.11b+g+n** (Mixed mode). If you do not know or have both 11g and 11b devices in your network, then keep the default in **mixed mode**. From the drop-down manual, you can select **802.11g** if you have only 11g card. If you have only 11b card, then select **802.11b** and if you only have 802.11n then select **802.11n**.

Channel: The range of radio frequencies used by IEEE 802.11b/g/n wireless devices is called a channel. There are Regulation Domains and Channel ID in this field. The Channel ID will be different based on Regulation Domains. Select a channel from the drop-down list box.

Beacon interval: The Beacon Interval value indicates the frequency interval of the beacon. Enter a value between 20 and 1000. A beacon is a packet broadcast by the Router to synchronize the wireless network.

RTS/CTS Threshold: The RTS (Request To Send) threshold (number of bytes) for enabling RTS/CTS handshake. Data with its frame size larger than this value will perform the RTS/CTS handshake. Enter a value between 1500 and 2347.

Fragmentation Threshold: The threshold (number of bytes) for the fragmentation boundary for directed messages. It is the maximum data fragment size that can be sent. Enter a value between 256 and 2346, even number only.

DTIM Interval: This value, between 1 and 255, indicates the interval of the Delivery Traffic Indication Message (DTIM).

TX Power: The transmission power of the antennas, ranging from 1-100, the higher the more powerful of the transmission performance.

IGMP Snooping: Enable or disable the IGMP Snooping function for wireless. Without IGMP snooping, multicast traffic is treated in the same manner as broadcast traffic - that is, it is forwarded to all ports. With IGMP snooping, multicast traffic of a group is only forwarded to ports that have members of that group.”

11n Settings

11n Settings	
Channel Bandwidth	40 MHz ▼
Guard Interval	Auto ▼
MCS	Auto ▼
SSID Settings	
Available SSID	1 ▼
SSID Index	<input checked="" type="radio"/> SSID1
SSID	wlan-ap
Broadcast SSID	<input checked="" type="radio"/> Yes <input type="radio"/> No
SSID Activated	Always ▼

Channel Bandwidth: Select either **20 MHz** or **20/40 MHz** for the channel bandwidth. The wider the Channel bandwidth the better the performance will be.

Guard Interval: Select either **400nsec** or **800nsec** for the guard interval. The guard interval is here to ensure that data transmission do not interfere with each other. It also prevents propagation delays, echoing and reflections. The shorter the Guard Interval, the better the performance will be. We recommend users to select Auto.

MCS: There are options **0~15** and **AUTO** to select for the **Modulation and Coding Scheme**. We recommend users selecting **AUTO**.

SSID Settings

Available SSID: User can determine how many virtual SSIDs to be used. Default is 1, maximum is 4.

SSID Index: Select the number of SSIDs you want to config; up to 4 SSIDs are available in the list.

SSID: The SSID is the unique name of a wireless access point (AP) to be distinguished from another. For security propose, change the default **wlan-ap** to a unique ID name to the AP which is already built-in to the router's wireless interface. Make sure your wireless clients have exactly the SSID as the device, in order to get connected to your network.

Broadcast SSID: Select **Yes** to make the SSID visible so a station can obtain the SSID through passive scanning. Select **No** to hide the SSID in so a station cannot obtain the SSID through passive scanning.

Clients Isolation: This parameter is to control access between two wireless clients. If users enable this function, then each of the wireless clients will not be able to communicate with the other.

SSID Activated: Select the time period during which the SSID is active. Default is always which means the SSID will be active all the time without time control. See [Time Schedule](#) to set the timeslot to flexibly control when the SSID functions.

WPS Settings

WPS Settings	
Use WPS	<input checked="" type="radio"/> Yes <input type="radio"/> No
WPS State	Configured
WPS Mode	<input type="radio"/> PIN code <input checked="" type="radio"/> PBC

WPS (Wi-Fi Protected Setup) feature is a standard protocol created by Wi-Fi Alliance. This feature greatly simplifies the steps needed to create a Wi-Fi network for a residential or an office setting. WPS supports 2 types of configuration methods which are commonly known among consumers: [PIN](#)

[Method](#) & [PBC Method](#).

Use WPS: Enable this feature by choosing the "YES" radiobutton.

WPS State: Display whether the WPS is **configured** or **unconfigured**.

WPS Mode: Select the mode which to start WPS, choose between **PIN Code** and **PBC** (Push Button). Selecting **Pin Code** mode will require you to know the enrollee PIN code.

To future understand the two modes of configuration; please refer to the example of the **Wi-Fi Protected Setup**.

Security Settings

Security Settings	
Security Type	OPEN

Security Type: You can disable or enable wireless security for protecting wireless network. The default type of wireless security is OPEN and to allow all wireless stations to communicate with the access points without any data encryption.

To prevent unauthorized wireless stations from accessing data transmitted over the network, the router offers secure data encryption, known as WEP and WPA.

There are five alternatives to select from: WEP 64-bit, WEP 128-bit, WPA-PSK, WPA2-PSK, and Mixed WPA/WPA2-PSK. If you require high security for transmissions, please select WPA-PSK, WPA2-PSK or WPA/WPA2-PSK.

Security Settings	
Security Type	WEP 128-bit
WEP Authentication Method	Both
WEP 128-bit	For each key, please enter either (1) 13 characters, or (2) 26 characters ranging from 0~9, a, b, c, d, e, f.
<input checked="" type="radio"/> Key #1	<input type="text"/>
<input type="radio"/> Key #2	<input type="text"/>
<input type="radio"/> Key #3	<input type="text"/>
<input type="radio"/> Key #4	<input type="text"/>

▶ [WEP 64-bit, WEP 128-bit](#)

WEP Authentication Method: WEP authentication method, there are two methods of authentication used, Open System authentication (OPENWEB) and Share Key authentication (SHAREDWEB). We suggest you select OPENWEB.

Key 1 to Key 4: Enter the key to encrypt wireless data. To allow encrypted data transmission, the WEP Encryption Key values on all wireless stations must be the same as the router. There are four keys for your selection. The input format is in HEX style, 5 and 13 HEX codes are required for 64-bitWEP and 128-bitWEP respectively.

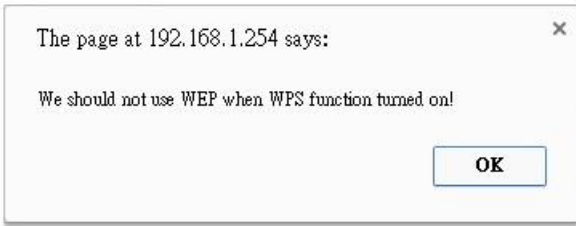
If you chose **WEP 64-bit**, then enter any 5 ASCII characters or 10 hexadecimal characters ("0-9", "A-F").

If you chose **WEP 128-bit**, then enter 13 ASCII characters or 26 hexadecimal characters ("0-9", "A-F").

You must configure all four keys, but only one key can be activated at any one time. The default key is key 1.

Note: When you enable **WPS** function, this **WEP** function will be invalid. And if you select one of

WEP-64Bits/ WEP-128Bits, the following prompt box will appear to notice you.



Security Settings	
Security Type	Mixed WPA2/WPA-PSK ▼
WPA Algorithms	TKIP+AES ▼
Pre-Shared Key	<input type="text"/> (8~63 characters or 64 Hex string)
Key Renewal Interval	600 seconds (10 ~ 4194303)

▶ **WPA-PSK, WPA2-PSK, Mixed WPA2/WPA-PSK**

WPA Algorithms: TKIP (Temporal Key Integrity Protocol) or AES (Advanced Encryption System) utilizes a stronger encryption method and incorporates Message Integrity Code (MIC) to provide protection against hackers.

Pre-Shared key: The key for network authentication. The input format should be 8-63 ASCII characters or 64 hexadecimal characters

Key Renewal Interval: The time interval for changing the security key automatically between wireless client and AP.

WDS Settings

WDS Settings	
AP MAC Address	60:03:47:10:3E:D7
WDS Mode	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
WDS Peer MAC #1	<input type="text"/> 00:00:00:00:00:00
WDS Peer MAC #2	<input type="text"/> 00:00:00:00:00:00
WDS Peer MAC #3	<input type="text"/> 00:00:00:00:00:00
WDS Peer MAC #4	<input type="text"/> 00:00:00:00:00:00

WDS (Wireless distributed system) is a wireless access point mode that enables wireless link and communication with other access point. It is easy to be installed, just define the peer's MAC of the connected AP.

WDS Mode: select Activated to enable WDS feature and Deactivated to disable this feature.

MAC Address: Enter the AP MAC addresses (in XX:XX:XX:XX:XX:XX format) of the peer connected AP.

Example: Wi-Fi Protected Setup (WPS) I:

PIN Method: Configure AP as Registrar

1. Jot down the client's Pin (e.g. 04640776).
2. Enter the Enrollee (Client) PIN code and then press Start WPS.

SSID Settings	
Available SSID	1 ▾
SSID Index	<input checked="" type="radio"/> SSID1
SSID	Billion_AP
Broadcast SSID	<input checked="" type="radio"/> Yes <input type="radio"/> No
SSID Activated	Always ▾
WPS Settings	
Use WPS	<input checked="" type="radio"/> Yes <input type="radio"/> No
WPS State	Unconfigured
WPS Mode	<input checked="" type="radio"/> PIN code <input type="radio"/> PBC
AP PIN Code	10646632 <input type="button" value="Generate"/>
Enrollee PIN Code	04640776
WPS Progress	Idle <input type="button" value="Start WPS"/>
Security Settings	
Security Type	WPA2-PSK ▾
WPA Algorithms	AES ▾
Pre-Shared Key	wireless1031d7 (8~63 characters or 64 Hex string)
Key Renewal Interval	600 seconds (10 ~ 4194303)

3. Launch the wireless client's WPS utility (e.g. Ralink Utility). Set the Config Mode as Enrollee, press the WPS button on the top bar, select the AP (e.g. Billion_AP) from the WPS AP List column. Then press the PIN button located on the middle left of the page to run the scan.

ID	BSSID	SSID
Billion_AP	00-04-ED-85-46-92	1
wlan-ap	00-21-85-BE-3B-2B	1
Welcome to RFINICS	00-21-27-6A-2B-7E	8
Mai-Lang	00-21-91-EE-2A-68	9

4. The client's SSID and security setting will now be configured to match the SSID and security setting of the registrar (router).

[Network](#)
[Advanced](#)
[Statistics](#)
[WMM](#)
[WPS](#)
[Radio On/Off](#)
[About](#)
[Help](#)

WPS AP List

ID :	Billion_AP	00-04-ED-85-46-92	1	
ID :	wlan-ap	00-21-85-8E-3B-2B	1	
ID :	Welcome to RFINICS	00-21-27-6A-2B-7E	8	🔑

WPSProfile List

▶ Billion_AP

WPS Associate IE

WPS Probe IE

Status >> Billion_AP <-> 00-04-ED-85-46-92
 Extra Info >> Link is Up [TxPower:100%]
 Channel >> 1 <-> 2412 MHz; central channel : 6
 Authentication >> WPA2-PSK
 Encryption >> AES
 Network Type >> Infrastructure
 IP Address >> 192.168.1.101
 Sub Mask >> 255.255.255.0
 Default Gateway >> 192.168.1.254
 HT

BW >> 40 SNR0 >> 30
 GI >> long MCS >> 5 SNR1 >> 20102206

Link Quality >> 100%
Signal Strength 1 >> 41%
Signal Strength 2 >> 44%
Noise Strength >> 26%

Transmit
 Link Speed >> 108.0 Mbps
 Throughput >> 0.000 Kbps

Receive
 Link Speed >> 1.0 Mbps
 Throughput >> 109.204 Kbps

Example: Wi-Fi Protected Setup (WPS) II:

PIN Method: Configure AP as Enrollee

1. Jot down the WPS PIN (e.g. 07966170). Press Start WPS.

SSID Settings	
Available SSID	1 ▾
SSID Index	<input checked="" type="radio"/> SSID1
SSID	Billion_AP
Broadcast SSID	<input checked="" type="radio"/> Yes <input type="radio"/> No
SSID Activated	Always ▾
WPS Settings	
Use WPS	<input checked="" type="radio"/> Yes <input type="radio"/> No
WPS State	Unconfigured
WPS Mode	<input checked="" type="radio"/> PIN code <input type="radio"/> PBC
AP PIN Code	07966170 <input type="button" value="Generate"/>
Enrollee PIN Code	<input type="text"/>
WPS Progress	Idle <input type="button" value="Start WPS"/>
Security Settings	
Security Type	WPA2-PSK ▾
WPA Algorithms	AES ▾
Pre-Shared Key	wireless1031d7 (8~63 characters or 64 Hex string)
Key Renewal Interval	600 seconds (10 ~ 4194303)

2. Launch the wireless client's WPS utility (e.g. Ralink Utility). Set the Config Mode as Registrar. Enter the PIN number in the PIN Code column then choose the correct AP (e.g. Billion_AP) from the WPS AP List before pressing the PIN button to run the scan.

The screenshot shows the Ralink Utility WPS configuration interface. The top menu includes Network, Advanced, Statistics, WMM, WPS, Radio On/Off, About, and Help. The main area is divided into several sections:

- WPS AP List:** A table listing available APs with columns for ID, Name, MAC Address, and PIN Code. The entries are:

ID	Name	MAC Address	PIN Code
0x0000	Billion_AP	00-04-ED-85-46-92	1
	Welcome to RFINICS	00-21-27-6A-2B-7E	8
	Mal-Lang	00-21-91-EE-2A-68	9
- WPS Profile List:** Shows the selected profile, Billion_AP.
- Configuration:** Includes buttons for PIN, PBC, WPS Associate IE, and WPS Probe IE. The Config Mode is set to Registrar.
- Status:** Shows the connection progress (100%) and a message: "WPS status is connected successfully".
- Link Quality:** A bar chart showing Link Quality at 100%, Signal Strength 1 at 24%, Signal Strength 2 at 65%, and Noise Strength at 26%.
- Transmit/Receive:** Shows Link Speed and Throughput for both directions.

3. The router's (AP's) SSID and security setting will now be configured to match the SSID and security setting of the registrar (client).

The screenshot displays a wireless network configuration interface. At the top, there are navigation tabs: Network, Advanced, Statistics, WMM, WPS, Radio On/Off, About, and Help. The main content area is divided into several sections:

- WPS AP List:** A table listing available WPS APs.

ID	SSID	BSSID	Priority	Icon
0x0000	Billion_AP	00-04-ED-85-46-92	1	
	Welcome to RFINICS	00-21-27-6A-2B-7E	8	
	Mai-Lang	00-21-91-EE-2A-68	9	
- WPS Profile List:** Shows the selected profile: Billion_AP.
- Configuration and Action Buttons:** Includes buttons for Rescan, Information, Pin Code (03454435), Config Mode, Registrar, Detail, Connect, Rotate, Disconnect, and Export Profile.
- WPS Status:** Shows WPS Associate IE and WPS Probe IE are checked. A progress bar indicates "Progress >> 100%" and a message states "WPS status is connected successfully".
- Status and Performance Metrics:**
 - Status: Billion_AP <-> 00-04-ED-85-46-92
 - Link Quality: 100%
 - Signal Strength 1: 24%
 - Signal Strength 2: 65%
 - Noise Strength: 26%
 - Transmit: Link Speed 150.0 Mbps, Throughput 0.000 Kbps
 - Receive: Link Speed 1.0 Mbps, Throughput 118.144 Kbps
- Network Information:**
 - Authentication: WPA2-PSK
 - Encryption: AES
 - Network Type: Infrastructure
 - IP Address: 192.168.1.101
 - Sub Mask: 255.255.255.0
 - Default Gateway: 192.168.1.254
 - HT: BW 40, MCS 7, SNR0 30, SNR1 20102206

4. Now to make sure that the setup is correctly done, cross check to see if the SSID and the security setting of the registrar setting match with the parameters found on both Wireless Configuration and Wireless Security Configuration page.

Example: Wi-Fi Protected Setup (WPS) III:

PBC Method:

1. Press the PBC radio button, Then Start WPS.

SSID Settings	
Available SSID	1 ▾
SSID Index	<input checked="" type="radio"/> SSID1
SSID	Billion_AP
Broadcast SSID	<input checked="" type="radio"/> Yes <input type="radio"/> No
SSID Activated	Always ▾
WPS Settings	
Use WPS	<input checked="" type="radio"/> Yes <input type="radio"/> No
WPS State	Unconfigured
WPS Mode	<input type="radio"/> PIN code <input checked="" type="radio"/> PBC
Security Settings	
Security Type	WPA2-PSK ▾
WPA Algorithms	AES ▾
Pre-Shared Key	wireless1031d7 (8-63 characters or 64 Hex string)
Key Renewal Interval	600 seconds (10 ~ 4194303)

2. Launch the wireless client's WPS Utility (e.g. Ralink Utility). Set the Config Mode as Enrollee. Then press the WPS button and choose the correct AP (e.g. Billion_AP) from the WPS AP List section before pressing the PBC button to run the scan.

3. When the PBC button is pushed, a wireless communication will be established between your router and the PC. The client's SSID and security setting will now be configured to match the SSID and security setting of the router.

The screenshot displays the Ralink WPS Utility interface. At the top, there are navigation tabs: Profile, Network, Advanced, Statistics, WMM, WPS, SSD, and Radio On/Off. The main area is divided into several sections:

- WPS AP List:** A table listing available APs with columns for ID, Name, MAC Address, and Index. The entries are: wlan-ap (00-04-ED-33-EF-D1, 1), Billion_AP (00:04:ED:85:46:92, 1), 111111 (00-0C-43-30-52-50, 7), and Welcome to RFINICS (00-21-27-6A-2B-7E, 8).
- WPS Profile List:** A section showing the selected profile, "Billion_AP".
- Buttons:** Includes "Rescan", "Information", "Pin Code" (00745659), "Renew", "Config Mode", "Registrar" (dropdown), "Detail", "Connect", "Rotate", "Disconnect", and "Export Profile".
- WPS Mode Selection:** "PIN" and "PBC" buttons. "WPS Associate IE" and "WPS Probe IE" checkboxes are checked.
- Progress Bar:** Shows "Progress >> 100%".
- Status Message:** "WPS status is connected successfully - 5200NRC".
- Status & Link Quality:** Shows "Status >> Billion_AP <-> 00-04-ED-85-46-92". Link quality metrics include: Link Quality >> 100%, Signal Strength 1 >> 62%, Signal Strength 2 >> 86%, and Noise Strength >> 26%.
- Network Information:** Authentication >> WPA2-PSK, Encryption >> AES, Network Type >> Infrastructure, IP Address >> 192.168.1.101, Sub Mask >> 255.255.255.0, Default Gateway >> 192.168.1.254.
- Transmit/Receive Performance:** Transmit: Link Speed >> 72.2 Mbps, Throughput >> 1.008 Kbps. Receive: Link Speed >> 1.0 Mbps, Throughput >> 48.172 Kbps.

Wireless MAC Filter

The MAC filter screen allows you to configure the router to give exclusive access to up to 8 devices (Allow Association) or exclude up to 8 devices from accessing the router (Deny Association). Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:AA:BB:00:00:02.

You need to know the MAC address of the devices you wish to filter.

Wireless MAC Address Filter 2.4G

SSID Index: SSID1

Active: Activated Deactivated

Action: the follow Wireless LAN station(s) association.

MAC Address:

Wireless MAC Address Filter Listing

Index	MAC Address	Edit	Delete
-------	-------------	------	--------

SSID Index: Select the targeted SSID you want the MAC filter rules to apply to.

Active: Select **Activated** to enable MAC address filtering.

Action: Define the filter action for the list of MAC addresses in the MAC address filter table.

Select **Deny** to block access to the AP, MAC addresses not listed will be allowed to access the router. Select **Allow** to permit access to the router, MAC addresses not listed will be denied access to the router.

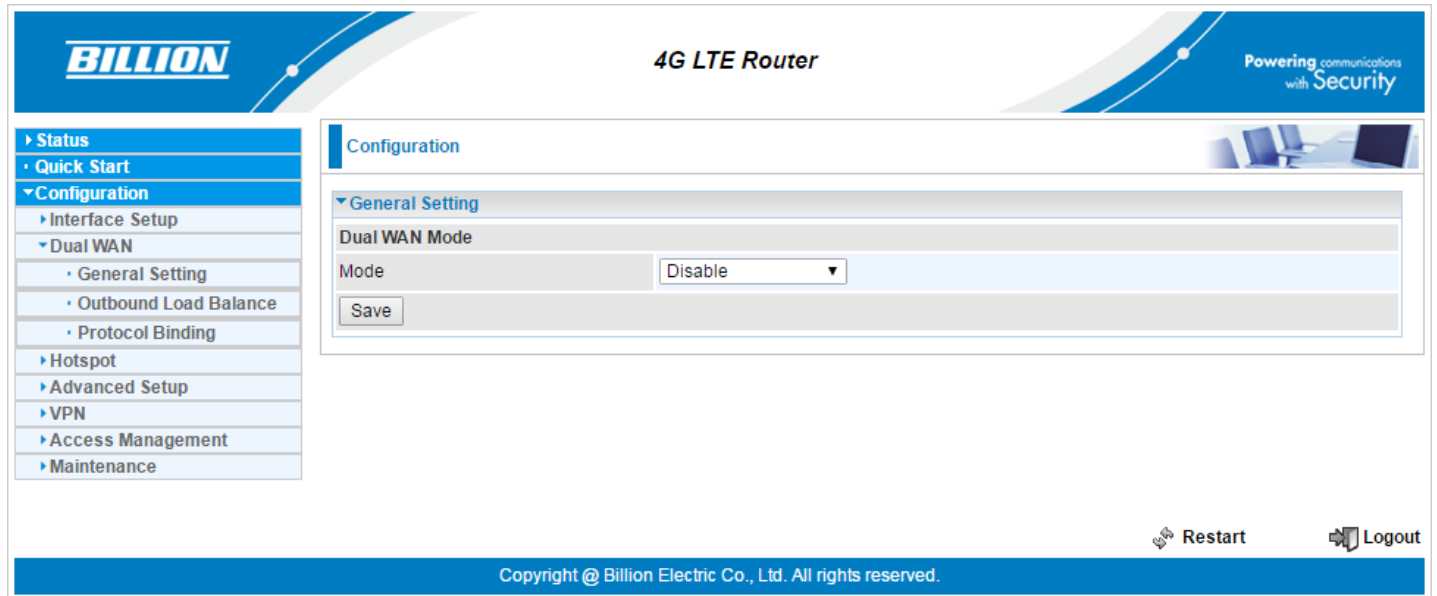
MAC Address: Enter the MAC addresses (in XX:XX:XX:XX:XX:XX format) of the wireless station that are allowed or denied access to the specified in these address fields.

Dual WAN

Dual WAN is specially designed to offer users failover/fallback.

Auto failover/fallback is to ensure an always-on internet connection. Users can set a WAN1 (main WAN) and WAN 2 (backup WAN), and when WAN1 fails, it will switch to WAN2, and when WAN1 restores, it will switch to WAN1 again.

General Setting



The screenshot displays the web interface of a Billion 4G LTE Router. The top header includes the 'BILLION' logo, the text '4G LTE Router', and the slogan 'Powering communications with Security'. On the left, a navigation menu lists various settings: Status, Quick Start, Configuration (expanded), Interface Setup, Dual WAN (expanded), Hotspot, Advanced Setup, VPN, Access Management, and Maintenance. Under the 'Dual WAN' section, 'General Setting' is selected. The main content area shows the 'Dual WAN Mode' configuration. The 'Mode' dropdown menu is currently set to 'Disable'. A 'Save' button is located below the dropdown. At the bottom right of the configuration area, there are 'Restart' and 'Logout' buttons. The footer contains the copyright notice: 'Copyright @ Billion Electric Co., Ltd. All rights reserved.'

Select "Failover & Failback" or "Failover & Priority" to enable the failover/failback feature to keep WAN always on or "Load Balance" to maximize WAN band width.

❖ Failover & Failback

General Setting	
Dual WAN Mode	
Mode	Failover & Failback ▼
WAN Port Service Detection Policy	
WAN1	4G/LTE -1 ▼
WAN2	4G/LTE -2 ▼
Keep Backup Interface Connected	Disable ▼
Minimum RSRP/RSSI	-105 / -90 dbm(-111~ -5, 0:disable)
Connectivity Decision	Auto failover takes place after straight 3 consecutive failure in every 30 seconds.
Probe By Ping	<input checked="" type="checkbox"/> Enable
Ping Setting	<input type="radio"/> Gateway
	<input checked="" type="radio"/> Host 8.8.8.8
	Timeout 3 seconds
Probe By Signal Strength	<input checked="" type="checkbox"/> Enable
Minimum RSRP/RSSI	-105 / -90 dbm(-111~ -5, 0:disable)
<input type="button" value="Save"/>	

WAN Port Service Detection Policy

WAN1: Select "4G/LTE-1", "4G/LTE 2", "EWAN" or "Wireless Client" for WAN1 (The main WAN).

WAN2: Select the "4G/LTE-2", "EWAN" or "Wireless Client" for WAN2 as backup port if you select "4G/LTE-1" as WAN1.

Keep Backup Interface Connected: Select "Disable" if don't keep backup WAN interface connected. Select "Always" if to keep backup WAN interface connected. Select "By Signal Strength", start up backup WAN connection to stand-by when main WAN signal strength less than "Minimum RSRP/RSSI" setting value.

Minimum RSRP/RSSI: If main connection signal less than this value, system will start up backup WAN to stand-by.

Connectivity Decision: Set how many times of probing failure to switch to backup port.

Probe By Ping: Check connection status by Ping.

Probe Cycle: Set the time duration for the **Probe Cycle** to determine when the router will switch to the backup connection (backup port) once the main connection (main port) fails. For example, when set to 30 seconds, the probe will be conducted every 30 seconds.

Note:

1) The time set is for each probe cycle, but the decision to change to the backup port is determined by **Probe Cycle** multiplied by **connection Decision amount** (e.g. From the image above it will be 30 seconds multiplied by 3 consecutive fails, the router will determine failover to WAN2 (backup port)).

2).The failback setting follow the same decision policy as the failover. For example, according to settings above in the screenshot, the connection probe will be carried out every 30 seconds, and 3 consecutive times of probe success is found, the router will determine failback to WAN1 (main WAN).

Ping Settings: Choose to probe gateway or host

- ▶ **Gateway:** It will send ping packets to gateway of main Wan interface and wait for response from it in every "Probe Cycle" to check the connectivity of the gateway of main WAN.
- ▶ **Host:** It will send ping packets to specific host and wait for response in every "Probe Cycle". The host must be an IP address.

Probe By Signal Strength: Check main WAN connection status by signal strength.

Minimum RSRP/RSSI: If the signal strength of main WAN is less than this value, system switch connecting to backup WAN.

❖ Failover & Priority

General Setting	
Dual WAN Mode	
Mode	Failover & Priority ▼
WAN Port Service Detection Policy	
WAN1	4G/LTE -1 ▼
WAN2	4G/LTE -2 ▼
Connectivity Decision	Auto failover takes place after straight <input type="text" value="3"/> consecutive failure in every <input type="text" value="30"/> seconds.
Priority By	Signal Strength ▼
<input type="button" value="Save"/>	

WAN Port Service Detection Policy

WAN1: Select “4G/LTE-1”, “4G/LTE 2”, “EWAN” or “Wireless Client” for WAN1 (The main WAN).

WAN2: Select the “4G/LTE-2”, “EWAN” or “Wireless Client” for WAN2 as backup port if you select “4G/LTE-1” as WAN1.

Connectivity Decision: Set how many times of probing failure to switch to backup port.

Priority by: The condition is signal strength. Switch to the WAN port which has good signal strength.

❖ Load Balance

General Setting	
Dual WAN Mode	
Mode	Load Balance ▼
WAN Port Service Detection Policy	
WAN1	4G/LTE -1 ▼
WAN2	4G/LTE -2 ▼
Service Detection	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Connectivity Decision	Auto failover takes place after straight <input type="text" value="3"/> consecutive failure in every <input type="text" value="30"/> seconds.
Probe WAN1	<input type="radio"/> Gateway <input checked="" type="radio"/> Host <input type="text" value="8.8.8.8"/> Timeout <input type="text" value="3"/> seconds
Probe WAN2	<input type="radio"/> Gateway <input checked="" type="radio"/> Host <input type="text" value="8.8.4.4"/>
<input type="button" value="Save"/>	

WAN Port Service Detection Policy

WAN1: Select “4G/LTE-1”, “4G/LTE-2”, “EWAN” or “Wireless Client” for WAN1.

WAN2: Select the “4G/LTE-2”, “EWAN” or “Wireless Client” if you select “4G/LTE-1” as WAN1.

Service Detection: Select if to keep detecte WAN interface connected.

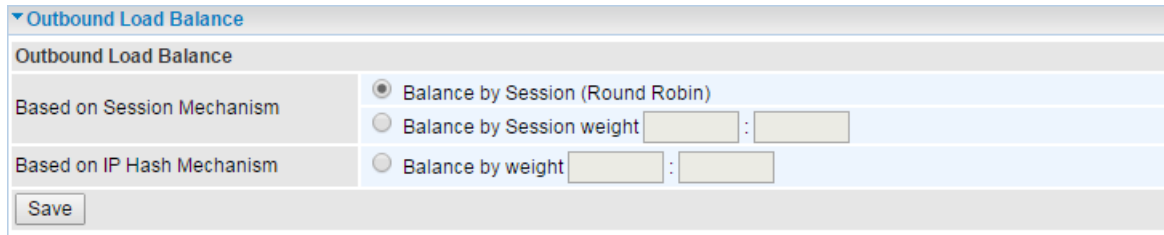
Connectivity Decision: Set how many times of probing failure to disable load balance.

Probe WAN 1/2: Choose the probe policy, to probe gateway or host (users decide themselves)

- ▶ **Gateway:** It will send ping packets to gateway of Wan1 interface and wait for response from it in every “Probe Cycle” to check the connectivity of the gateway of WAN1 interface.
- ▶ **Host:** It will send ping packets to specific host and wait for response in every “Probe Cycle”. The host must be an IP address.

Outbound Load Balance

The connections are distributed over WAN1 and WAN2 so that it can utilize bandwidth of both WAN ports. With Outbound load balance, traffic may be routed to a faster link when one of the WAN is slower or congested so that user gains better throughput and less delay.



The screenshot shows a configuration window titled "Outbound Load Balance". It has a sub-header "Outbound Load Balance". Below this, there are two main sections: "Based on Session Mechanism" and "Based on IP Hash Mechanism". Under "Based on Session Mechanism", there are three radio button options: "Balance by Session (Round Robin)" (which is selected), "Balance by Session weight" (with two empty input fields separated by a colon), and "Balance by weight" (with two empty input fields separated by a colon). Under "Based on IP Hash Mechanism", there is one radio button option: "Balance by weight" (with two empty input fields separated by a colon). At the bottom left of the window is a "Save" button.

User can distribute outbound traffic based on **Session Mechanism** or **IP Hash Mechanism**.

Base on Session Mechanism:

Balance by Session (Round Robin): Balance session traffic based on a round robin method.

Balance by Session weight: Balance session traffic based on a weight ratio. Enter the desired ratio in the fields provided.

Base on IP Hash Mechanism:

Balance by weight: Use an IP hash to balance traffic based on a ratio. Enter the desired ratio into the fields provided.

Protocol Binding

Protocol Binding lets you direct specific traffic to go out from a specific WAN port. Policies determine how specific types of internet traffic are routed, for example, traffic from a particular IP(es) granted access to only one WAN port rather than using both of the WAN ports as with load balancing.

Protocol Binding								
Rule Index	1 ▼							
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No							
Bind Interface	WAN1 ▼ (Current WAN1 Mode: 4G/LTE -1 , Current WAN2 Mode: 4G/LTE -2)							
Source IP Address	0.0.0.0 (0.0.0.0 means Don't care)							
Subnet Mask	0.0.0.0							
Port Number	0 (0 means Don't care)							
Destination IP Address	0.0.0.0 (0.0.0.0 means Don't care)							
Subnet Mask	0.0.0.0							
Port Number	0 (0 means Don't care)							
DSCP	0 (Value Range:0~64, 64 means Don't care)							
Protocol	TCP ▼							
Save Delete								
Protocol Binding List								
#	Active	Interface	Source IP Address/Mask	Destination IP Address/Mask	Source Port	Destination Port	DSCP	Protocol

Rule Index: The index marking the rule. Maximum entries can be 16.

Active: Select whether to enable the rule.

Bind Interface: To determine the WAN interface the to-be-set rule will apply to and what type of traffic is to be bound to forward to the which WAN interface.

Source IP Address: Enter the source IP address featuring the traffic origin.

Subnet Mask: Enter the subnet of the designation network.

Port Number: Enter the port number which defines the application.

Destination IP Address: Enter the destination IP address featuring the traffic destination.

Subnet Mask: Enter the subnet of the designation network.

Port Number: Enter the port number which defines the application.

DSCP: The DSCP value. Value Range:0~64, 64 means Don't care

Protocol: Select the protocol traffic is using (TCP, UDP, ICMP).

Hotspot

A hotspot is usually a public location (coffee shops, airports, etc) where people obtain internet access typically using WiFi technology.

The Billion Industrial LTE Router HotSpot Gateway provides authentication for clients before access to public networks. It also allows users to access some web pages without authentication using Walled Garden feature. Rich features are explained in these sections: **General Setting, Built-In User Account, Walled Garden, Advertisement, Session Log** and **Customization**.

The screenshot shows the configuration interface for a Billion 4G LTE Router. The page is titled "4G LTE Router" and features the Billion logo and the slogan "Powering communications with Security". A navigation menu on the left includes sections for Status, Quick Start, Configuration, Advanced Setup, VPN, Access Management, and Maintenance. The Configuration section is expanded to show Hotspot settings.

Configuration

- General Setting
 - Hotspot: Activated Deactivated
 - Interface: WLAN1
 - IP Address: 10.0.0.1
 - IP Subnet Mask: 255.255.255.0
 - Login Mode: Authentication
 - Redirection On Successful Authentication To: (empty string: user intended to vi)
 - Authentication
 - Authentication Method: RADIUS Built-in User Account
 - Primary RADIUS Server:
 - Secondary RADIUS Server:
 - Shared Secret Key:
 - Session Settings
 - Session Timeout: 3600 seconds (0~86400,0:disable)
 - Idle Timeout: 180 seconds (0~3600,0:disable)
 - Upload Bandwidth: 0 Kbps (0~5120,0:not limited)
 - Download Bandwidth: 0 Kbps (0~5120,0:not limited)

Buttons: Save, Restart, Logout

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General Setting

This section is to setup HotSpot server on a router and authentication methods, session settings.

General Setting	
Hotspot	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
Interface	<input checked="" type="checkbox"/> WLAN1
IP Address	<input type="text" value="10.0.0.1"/>
IP Subnet Mask	<input type="text" value="255.255.255.0"/>
Login Mode	Authentication
Redirection On Successful Authentication To	<input type="text"/> (empty string: user intended to vi
Authentication	
Authentication Method	<input checked="" type="radio"/> RADIUS <input type="radio"/> Built-in User Account
Primary RADIUS Server	<input type="text"/>
Secondary RADIUS Server	<input type="text"/>
Shared Secret Key	<input type="text"/>
Session Settings	
Session Timeout	<input type="text" value="3600"/> seconds (0~86400,0:disable)
Idle Timeout	<input type="text" value="180"/> seconds (0~3600,0:disable)
Upload Bandwidth	<input type="text" value="0"/> Kbps (0~5120,0:not limited)
Download Bandwidth	<input type="text" value="0"/> Kbps (0~5120,0:not limited)
<input type="button" value="Save"/>	

General Setting:

Hotspot: Activate or Deactivate Hotspot feature.

Interface: Determine which SSID is configured as a Hotspot. Industrial LTE Router has 4 virtual SSIDs. Now it is fixed on SSID1 (WLAN1), it can be select in the future.

IP Address/IP Subnet Mask: The IP Subnet assigned to this Hotspot network. The IP can be changed according to different user's need.

Login Mode: Authentication or Agreement.

- ▶ **Authentication:** when authentication is selected, client needs to provide authenticated account, either via external RADIUS server or built-in user account database, to login to access internet.
- ▶ **Agreement:** when ageeemnt is selected, client doesn't need an account to access internet. Open your brower, the hotspot guide page directly appears.

Redirection on successful authentication to: Set the URL to be redirected to.

Authentication:

Authentication Method: Client login authentication methods via external RADIUS server or Industrial LTE Router built-in user account database.

Primary/Secondary RADIUS Server: Specify the primary and secondayr RADIUS server address.

Shared Secret Key: The password for RADIUS server.

Session Settings:

Session Timeout: period of time after which if client hasn't been authorized itself with hotspot system, the client login attempt proves failed, another try needed.

Idle Timeout: period of inactivity for each client. When there is no traffic from this client (literally client computer should be switched off), once the timeout is reached, the link disconnect automatically.

Upload/Download Bandwidth: The maximum usage bandwidth to each client.

Built-in User Account

This part is to configure the local valid user account database. Up to 16 accounts can be created.

Built-in User Account		
Rule Index	0 ▾	
Active	<input type="radio"/> Yes <input checked="" type="radio"/> No	
User Name	<input type="text"/>	
Password	<input type="text"/>	
<input type="button" value="Save"/> <input type="button" value="Delete"/>		
Built-in User Account List		
Index	Active	Username

Rule Index: 0-15, the valid user identifier index.

User Name/Password: Enter the username /password for each valid user.

Authorized of Client

It is for priority(trusted) client for whom authentication is not needed to internet access. Also they can enjoy unlimited Upload/Download Bandwidth. These privileged clients can be added by MACs.

Authorized of Client		
Authorized of Client	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated	
Rule Index	0 ▾	
Active	<input type="radio"/> Yes <input checked="" type="radio"/> No	
MAC Address	<input type="text"/>	
<input type="button" value="Save"/> <input type="button" value="Delete"/>		
Authorized of Client List		
Index	Active	MAC Address

Authorized of Client: Activate or Deactivate the feature.

Rule Index: 0-15 trusted users can be added, each identified by a rule index.

Active: Activate the rule or not. If activated, the client is a trusted client.

MAC Address: Enter the authorized client MAC.

Walled Garden

It allows users to access some web pages (listed in the Walled Garden List) without authentication.

Walled Garden		
Rule Index	0 ▾	
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Domain name or IP Address	<input type="text" value="www.billion.com"/>	
<input type="button" value="Save"/> <input type="button" value="Delete"/>		
Walled Garden List		
Index	Active	Domain name or IP Address
0	Yes	www.billion.com

Rule Index: 0-15 different domain names or IP addresses can be added.

Active: Select Yes to activate the rule. If activated, the domain name or IP will be open without authentication to access.

Domain name or IP Address: Enter the domain name or IP address open to access for unauthorized clients.

Advertisement

This part is for propaganda purpose for some website after successfully logged in.

Advertisement		
Advertisement	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated	
Mode	Frame ▾	
Rule Index	0 ▾	
Active	<input type="radio"/> Yes <input checked="" type="radio"/> No	
URL	<input type="text"/>	
<input type="button" value="Save"/> <input type="button" value="Delete"/>		
Advertisement List		
Index	Active	URL

Advertisement: Activate or deactivate the Advertisement feature.

Mode: The mode the propaganda advertisement is shown in.

Rule Index: The rule index identifying the URL, 0-15 URLs can be created.

URL: The propaganda web URL.

Session Log

Session Log periodically records session information and mails it to hotspot manager helped by [Mail Alert](#). How often to record the session log and to mail can be set here.

Session Log	
Session Log	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Log Session data every	<input type="text" value="1"/> minutes (1~60)
Mail Session Log file every	<input type="text" value="5"/> minutes (5~1440)
<input type="button" value="Save"/>	

Session Log: Activate session log or not.

Log Session data every: Set how often to record the session log. By default, session log records every 1 minutes.

Mail Session Log File every: Set how often to send the session log file.

Customization

Customization allows users to customize their desired authenticate page strings, if not, default settings are showed on the authentication page. Places where strings are to be shown are listed in the following screenshots in red rectangle, please check where to change.

Customization	
Customization	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Title	<input type="text" value="HotSpot"/>
Login Subtitle	<input type="text" value="Welcome to my HotSpot!"/>
Login Successfully Message	<input type="text" value="Success"/>
Footnote	<input type="text" value="This service is provided for free and used at your own risk."/>
Show Logo	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Terms and Conditions	
Terms Part1	<input type="text" value="Terms Part1"/>
Terms Part2	<input type="text" value="Terms Part2"/>
Terms Part3	<input type="text" value="Terms Part3"/>
<small>Terms and Conditions TextBox can not accept newline.</small>	
<input type="button" value="Save"/>	

Example: How to use Hotspot

Use a laptop, smartphont or PDA with wireless to use hotspot to access internet.

Hotspot server configuration on the router:

1. Login to the Industrial LTE Router and move to Configuration > Interface Setup > Wirelss to set the WLAN1(hotspot is running on WLAN1). Change SSID to "M500-Hotspot" for test.

Note: Before using hotspot, please connect to the SSID running hotspot first.

SSID Settings	
Available SSID	1 ▾
SSID Index	<input checked="" type="radio"/> SSID1
SSID	M500-Hotspot
Broadcast SSID	<input checked="" type="radio"/> Yes <input type="radio"/> No
SSID Activated	Always ▾
WPS Settings	
Use WPS	<input checked="" type="radio"/> Yes <input type="radio"/> No
WPS State	Configured
WPS Mode	<input type="radio"/> PIN code <input checked="" type="radio"/> PBC
Security Settings	
Security Type	OPEN ▾

2. Hotspot interface, login setting and the session control setting.

Here the login mode is "Authentication", and Authentication Method is "RADIUS" for auththication.

General Setting	
Hotspot	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
Interface	<input checked="" type="checkbox"/> WLAN1 ▾
IP Address	10.0.0.1
IP Subnet Mask	255.255.255.0
Login Mode	Authentication ▾
Redirection On Successful Authentication To	<input type="text"/> (empty string: user intended to vi
Authentication	
Authentication Method	<input checked="" type="radio"/> RADIUS <input type="radio"/> Built-in User Account
Primary RADIUS Server	192.168.1.200
Secondary RADIUS Server	<input type="text"/>
Shared Secret Key	12345678
Session Settings	
Session Timeout	3600 seconds (0~86400,0:disable)
Idle Timeout	180 seconds (0~3600,0:disable)
Upload Bandwidth	0 Kbps (0~5120,0:not limited)
Download Bandwidth	0 Kbps (0~5120,0:not limited)
<input type="button" value="Save"/>	

If the Authentication Method is "Built-in User Account" for auththication, create a valid client account.

AuthenticationAuthentication Method RADIUS Built-in User AccountPrimary RADIUS Server Secondary RADIUS Server Shared Secret Key **▼ Built-in User Account**Rule Index ▼Active Yes NoUser Name Password **Built-in User Account List**

Index	Active	Username
0	Yes	user1

Wireless Client Connection:

1. Connect to the SSID(M500-Hotspot) on the laptop.
2. Launch the web browser, the hotspot welcome and authentication page pops up.

HotSpot

Welcome to my HotSpot!

You can use the Internet, but have to login first.
You must also agree to these [terms and conditions](#).

Username

Password

This service is provided for free and used at your own risk.



3. Input correct Username and Password then logging successful.

HotSpot

Success!

You are about to be redirected to:

<http://www.msftncsi.com/redirect>


To log out, type "logout" (or "http://logout/") in your browser. **enjoy!**

This service is provided for free and used at your own risk.



Advanced Setup

Advanced Step provides advanced features including **Firewall**, **Routing**, **NAT**, **Dynamic Routing**, **Static DNS**, **Time Schedule**, **Mail Alert** and **Remote System Log** for advanced users.

4G LTE RouterPowering communications with Security

- ▶ Status
- Quick Start
- ▼ Configuration
 - ▶ Interface Setup
 - ▶ Dual WAN
 - ▶ Hotspot
 - ▼ Advanced Setup
 - Firewall
 - Routing
 - ▶ Dynamic Routing
 - NAT
 - Static DNS
 - Time Schedule
 - Mail Alert
 - Remote System Log
 - ▶ VPN
 - ▶ Access Management
 - ▶ Maintenance



Configuration

▼ Firewall

Firewall	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
SPI	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled

(WARNING: If You enabled SPI, all traffics initiated from WAN would be blocked, including DMZ, Virtual Server, and ACL WAN side.)

Save

 Restart  Logout

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Firewall

Your router includes a firewall for helping to prevent attacks from hackers. In addition to this, when using NAT (Network Address Translation) the router acts as a “natural” Internet firewall, since all PCs on your LAN use private IP addresses that cannot be directly accessed from the Internet.

Firewall	
Firewall	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
SPI	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
(WARNING: If You enabled SPI, all traffics initiated from WAN would be blocked, including DMZ, Virtual Server, and ACL WAN side.)	
<input type="button" value="Save"/>	

Firewall: To automatically detect and block Denial of Service (DoS) attacks, such as Ping of Death, SYN Flood, Port Scan and Land Attack.

- ▶ **Enabled:** It activates your firewall function.
- ▶ **Disabled:** It disables the firewall function.

SPI: If you enabled SPI, all traffics initiated from WAN would be blocked, including DMZ, Virtual Server, and ACL WAN side.

- ▶ **Enabled:** It activates your SPI function.
- ▶ **Disabled:** It disables the SPI function.

Routing

This is static route feature. You are equipped with the capability to control the routing of all the traffic across your network. With each routing rule created, user can specifically assign the destination where the traffic will be routed to.

▼ Routing Table							
#	Destination IP Address	Subnet Mask	Gateway IP Address	Metric	Interface	Edit	Drop
0	10.117.138.176	255.255.255.252	0.0.0.0	0	4G LTE -1		
1	10.0.0.0	255.255.255.0	0.0.0.0	0	tun0		
2	192.168.1.0	255.255.255.0	0.0.0.0	0	br0		
3	127.0.0.0	255.255.0.0	0.0.0.0	0	loopback		
4	239.0.0.0	255.0.0.0	0.0.0.0	0	br0		
5	0.0.0.0	0.0.0.0	10.117.138.178	0	4G LTE -1		

Index: Item number

Destination IP Address: IP address of the destination network

Subnet Mask: The subnet mask of destination network.

Gateway IP Address: IP address of the gateway or existing interface that this route uses.

Metric: It represents the cost of transmission for routing purposes. The number need not be precise, but it must be between 1 and 15.

Interface: Media/channel selected to append the route.

Edit: Edit the route; this icon is not shown for system default route.

Drop: Drop the route; this icon is not shown for system default route.

Add Route

▼ Static Route	
Destination IP Address	<input type="text" value="0.0.0.0"/>
Destination Subnet Mask	<input type="text" value="0.0.0.0"/>
Gateway IP Address / Interface	<input type="radio"/> <input type="text" value="0.0.0.0"/> <input checked="" type="radio"/> <input type="text" value="4G/LTE -1"/>
Metric	<input type="text" value="1"/>

Destination IP Address: This is the destination subnet IP address.

Destination Subnet Mask: The subnet mask of destination network.

Gateway IP Address/Interface: This is the gateway IP address or existing interface to which packets are to be forwarded.

Metric: It represents the cost of transmission for routing purposes. The number need not be precise, but it must be between 1 and 15.

Dynamic Routing

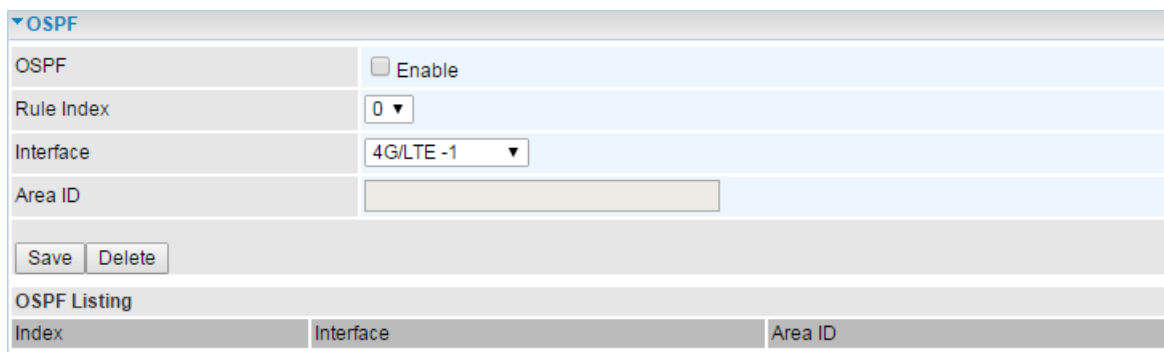
OSPF

Open Shortest Path First (OSPF) is a most widely used interior gateway protocol (IGP) for Internet Protocol (IP) networks. It uses a link state routing algorithm and falls into the group of interior routing protocols, operating within a single autonomous system (AS).

OSPF allows collections of routers to be grouped together. Such a group is called an area (AS). Each area runs a separate copy of the basic link-state routing algorithm. This means that each area has its own link-state database and corresponding shortest path tree.

The structure of an area is invisible from other areas. This isolation of knowledge makes the protocol more scalable if multiple areas are used.

The most widely used exterior gateway protocol is the Border Gateway Protocol (BGP), which will be our next topic, the principal routing protocol between autonomous systems on the internet.



OSPF		
OSPF	<input type="checkbox"/> Enable	
Rule Index	0	
Interface	4G/LTE -1	
Area ID		
<input type="button" value="Save"/> <input type="button" value="Delete"/>		
OSPF Listing		
Index	Interface	Area ID

OSPF: Enable to activate OSPF routing.

Rule Index: A total 10 OSPF rules are allowed, ranging from 0 to 9.

Interface: Set the interface which runs the OSPF process (involved in OSPF routing). It can be WAN interfaces or established GRE tunnels.

Area ID: The OSPF area identifier. It is a decimal number in the range of 0-4294967295. Here to set the area ID which the interface belongs to. The area with area-id="0" is the backbone area.

If the router has networks in more than one area, then an area with area-id="0" (the backbone) must always be present. All other areas are connected to it. The backbone is responsible for distributing routing information between non-backbone areas. The backbone must be contiguous, i.e. there must be no disconnected segments. However, area border routers do not need to be physically connected to the backbone - connection to it may be simulated using a virtual link.

BGP

Border Gateway Protocol (BGP) is a standardized exterior gateway protocol (an uniquely TCP based inter-Autonomous System routing protocol) designed to allow setting up an inter-domain dynamic routing system that automatically updates routing tables of devices running BGP in case of network topology changes.

BGP			
BGP	<input type="checkbox"/> Enable		
As Number	<input type="text"/>		
Rule Index	0 ▾		
Neighbor IP	<input type="text"/>		
Neighbor As Number	<input type="text"/>		
Allowas-in	<input type="checkbox"/> Enable		
<input type="button" value="Save"/> <input type="button" value="Delete"/>			
BGP Listing			
Index	Neighbor IP	Neighbor As Number	Allowas-in

BGP: Enable to activate BGP routing.

AS Number: Designate the AS number of local router. The AS number is used to identify the IBGP or EBGP your neighbor is running. The same AS number means the IBGP, and the different means EBGP.

Rule Index: A total 10 BGP rules are allowed, ranging from 0 to 9.

Neighbor IP: Set your neighbor IP.

Neighbor AS Number: Set your neighbor AS number.

Allowas-in: Enable to allow inter-communication between devices in the same AS. If the local and neighbor AS number are the same, thus, a inter-AS communication, please enable the allowas-in. Otherwise, the router only support EBGP routing between different domains.

NAT

The NAT (Network Address Translation) feature transforms a private IP into a public IP, allowing multiple users to access the internet through a single IP account, sharing the single IP address. NAT break the originally envisioned model of IP end-to-end connectivity across the internet so NAT can cause problems where IPSec/ PPTP encryption is applied or some application layer protocols such as SIP phones are located behind a NAT. And NAT makes it difficult for systems behind a NAT to accept incoming communications.

In this session, there are “VPN Passthrough”, “SIP ALG”, “DMZ” and “Virtual Server” provided to solve these nasty problems.

NAT	
NAT Status	Enable
ALG	
VPN Passthrough	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled
SIP ALG	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled
DMZ / Virtual Server	
Interface	4G/LTE -1
DMZ	▶ Edit
Virtual Server	▶ Edit

NAT Status: Enabled. It depends on ISP Connection Type in Internet settings.

VPN Passthrough: VPN pass-through is a feature of routers which allows VPN client on a private network to establish outbound VPNs unhindered.

SIP ALG: Enable the SIP ALG when SIP phone needs ALG to pass through the NAT. Disable the SIP ALG when SIP phone includes NAT-Traversal algorithm.

Interface: Select to set DMZ/Virtual Server for “3G/4G-LTE” or “EWAN”.

Click **DMZ** [▶ Edit](#) or **Virtual Server** [▶ Edit](#) to move on to set the DMZ or Virtual Server parameters, which are represented in the following scenario.

DMZ

NOTE: This feature disables automatically if WAN connection is in BRIDGE mode.

The DMZ Host is a local computer exposed to the Internet. When setting a particular internal IP address as the DMZ Host, all incoming packets will be checked by the Firewall and NAT algorithms then passed to the DMZ host, when a packet received does not use a port number used by any other Virtual Server entries.

DMZ	
DMZ for	4G/LTE -1
DMZ	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
DMZ Host IP Address	<input type="text" value="0.0.0.0"/>
<input type="button" value="Save"/> <input type="button" value="Back"/>	

DMZ for: Indicate the related WAN interface which allows outside network to connect in and communicate.

DMZ:

- ▶ **Enabled:** It activates your DMZ function.
- ▶ **Disabled:** It disables the DMZ function.

DMZ Host IP Address: Give a static IP address to the DMZ Host when **Enabled** radio button is checked. Be aware that this IP will be exposed to the WAN/Internet.

Select the **Save** button to apply your changes.

Virtual Server

NOTE: This feature disables automatically if WAN connection is in BRIDGE mode.

The device can be configured as a virtual server so that remote users accessing services such as Web or FTP services via the public (WAN) IP address can be automatically redirected to local servers in the LAN network. Depending on the requested service (TCP/UDP port number), the device redirects the external service request to the appropriate server within the LAN network.

Virtual Server for: 4G/LTE -1

Protocol: TCP

Start Port Number:

End Port Number:

Local IP Address:

Start Port Number (Local):

End Port Number(Local):

Virtual Server Listing

Rule	Protocol	Start Port	End port	Local IP Address	Start Port Local	End Port Local	Edit	Drop
0	N/A	N/A	N/A	N/A	N/A	N/A		
1	N/A	N/A	N/A	N/A	N/A	N/A		
2	N/A	N/A	N/A	N/A	N/A	N/A		
3	N/A	N/A	N/A	N/A	N/A	N/A		
4	N/A	N/A	N/A	N/A	N/A	N/A		
5	N/A	N/A	N/A	N/A	N/A	N/A		
6	N/A	N/A	N/A	N/A	N/A	N/A		
7	N/A	N/A	N/A	N/A	N/A	N/A		
8	N/A	N/A	N/A	N/A	N/A	N/A		
9	N/A	N/A	N/A	N/A	N/A	N/A		

Virtual Server for: Indicate the related WAN interface which allows outside network to connect in and communicate.

Protocol: Choose the application protocol.

Start / End Port Number: Enter a port or port range you want to forward.

(Example: Start / End: 21 or Start: 1000, End: 2000).

The starting greater than zero (0) and the ending port must be the same or larger than the starting port.

Local IP Address: Enter your local server IP address in this field.

Start / End Port Number (Local): Enter the start / end port number of the local application (service).

Examples of well-known and registered port numbers are shown below. For further information, please see IANA's website at <http://www.iana.org/assignments/port-numbers>

Well-known and Registered Ports

Port Number	Protocol	Description
21	TCP	FTP Control
22	TCP & UDP	SSH Remote Login Protocol
23	TCP	Telnet
25	TCP	SMTP (Simple Mail Transfer Protocol)
53	TCP & UDP	DNS (Domain Name Server)
69	UDP	TFTP (Trivial File Transfer Protocol)
80	TCP	World Wide Web HTTP
110	TCP	POP3 (Post Office Protocol Version 3)
443	TCP & UDP	HTTPS
1503	TCP	T.120
1720	TCP	H.323
7070	UDP	RealAudio



Using port forwarding does have security implications, as outside users will be able to connect to PCs on your network. For this reason you are advised to use specific Virtual Server entries just for the ports your application requires, instead of using DMZ. As doing so will result in all connections from the WAN attempt to access to your public IP of the DMZ PC specified.



Attention

If you have disabled the NAT option in the WAN-ISP section, the Virtual Server function will hence be invalid.

If the DHCP server option is enabled, you have to be very careful in assigning the IP addresses of the virtual servers in order to avoid conflicts. The easiest way of configuring Virtual Servers is to manually assign static IP address to each virtual server PC, with an address that does not fall into the range of IP addresses that are to be issued by the DHCP server. You can configure the virtual server IP address manually, but it must still be in the same subnet as the router.

Example: How to setup Port Forwarding for port 21 (FTP server)

If you have a FTP server in your LAN network and want others to access it through WAN.

Step 1: Assign a static IP to your local computer that is hosting the FTP server.

Step 2: Login to the Gateway and go to **Configuration / Advanced Setup / NAT / Virtual Server.**

FTP server uses TCP protocol with port 21.

Enter "21" to Start and End Port Number. Industrial LTE Router will accept port 21 requests from WAN side.

Enter the static IP assigned to the local PC that is hosting the FTP server. Ex: 192.168.1.110

Enter "21" to Local Start and End Port number. Industrial LTE Router will forward port 21 request from WAN to the specific LAN PC (ex:192.168.1.110) in the network.

Step 3: Click **Save** to save settings.

Virtual Server

Virtual Server for	4G/LTE -1
Protocol	TCP
Start Port Number	21
End Port Number	21
Local IP Address	192.168.1.110
Start Port Number (Local)	21
End Port Number(Local)	21

Save Back

Virtual Server Listing

Rule	Protocol	Start Port	End port	Local IP Address	Start Port Local	End Port Local	Edit	Drop
0	TCP	21	21	192.168.1.110	21	21		
1	N/A	N/A	N/A	N/A	N/A	N/A		
2	N/A	N/A	N/A	N/A	N/A	N/A		
3	N/A	N/A	N/A	N/A	N/A	N/A		
4	N/A	N/A	N/A	N/A	N/A	N/A		
5	N/A	N/A	N/A	N/A	N/A	N/A		
6	N/A	N/A	N/A	N/A	N/A	N/A		
7	N/A	N/A	N/A	N/A	N/A	N/A		
8	N/A	N/A	N/A	N/A	N/A	N/A		
9	N/A	N/A	N/A	N/A	N/A	N/A		

Static DNS

The Domain Name System (DNS) is a hierarchical naming system built on a distributed database for computers, services, or any resource connected to the Internet or a private network associates various information with domain names assigned to each of the participating entities. Most importantly, it translates domain names meaningful to humans into the numerical identifiers associated with networking equipment for the purpose of locating and addressing these devices worldwide.

An often-used analogy to explain the Domain Name System is that it serves as the phone book for the Internet by translating human-friendly computer hostnames into IP addresses. For example, the domain name `www.example.com` can be translated into the addresses `192.0.32.10` (IPv4).

▼ Static DNS

IP Address	<input type="text"/>
Domain Name	<input type="text"/>

Static DNS Listing

Index	IP Address	Domain Name	Edit	Delete
-------	------------	-------------	------	--------

IP Address: The IP address you are going to give a specific domain name.

Domain Name: The friendly domain name for the IP address.

Press **Save** button to apply your settings.

Time Schedule

The Time Schedule supports up to **16** timeslots which helps you to manage your Internet connection. In each time profile, you may schedule specific day(s) i.e. Monday through Sunday to restrict or allowing the usage of the Internet by users or applications.

This Time Schedule correlates closely with router's time, since router does not have a real time clock on board; it uses the Simple Network Time Protocol (SNTP) to get the current time from an SNTP server from the Internet.

Time Schedule							
Rule Index	0 ▼						
Rule Name	TimeSlot1						
	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.
Day of Week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Start Time	00:00	00:00	00:00	00:00	00:00	00:00	00:00
End Time	00:00	00:00	00:00	00:00	00:00	00:00	00:00
<input type="button" value="Save"/>							

Rule Index: The rule index (0-15) for identifying each timeslot.

Rule Name: User-defined identification for each time period.

Day of Week: Mon. to Sun. Specify the time interval for each timeslot from "Day of Week".

Start Time: The starting point of the interval for the timeslot, anytime in 00:00 – 24:00.

End Time: The ending point of the interval for the timeslot, anytime in 00:00 – 24:00.

For example, user can add a timeslot named "TimeSlot1" which features a period from 9:00 of Saturday to 18:00 of Sunday.

Time Schedule							
Rule Index	0 ▼						
Rule Name	TimeSlot1						
	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.
Day of Week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Start Time	00:00	00:00	00:00	00:00	00:00	09:00	00:00
End Time	00:00	00:00	00:00	00:00	00:00	24:00	18:00
<input type="button" value="Save"/>							

Another TimeSlot2 spanning from 09:00 to 18:00 of Wednesday

Time Schedule							
Rule Index	1 ▼						
Rule Name	TimeSlot2						
	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.
Day of Week	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Start Time	00:00	00:00	09:00	00:00	00:00	00:00	00:00
End Time	00:00	00:00	18:00	00:00	00:00	00:00	00:00
<input type="button" value="Save"/>							

Mail Alert

Mail alert is designed to keep system administrator or other relevant personnel alerted of any unexpected events that might have occurred to the network computers or server for monitoring efficiency. With this alert system, appropriate solutions may be tackled to fix problems that may have arisen so that the server can be properly maintained.

Mail Alert	
Server Information	
SMTP Server	<input type="text"/>
Username	<input type="text"/>
Password	<input type="text"/>
Sender's E-mail	<input type="text"/> (Must be XXX@yyy.zzz)
SSL/TLS	<input type="checkbox"/> Enable
Port	<input type="text" value="25"/> (1~65535)
<input type="button" value="Account Test"/>	
WAN IP Change Alert	
Recipient's E-mail	<input type="text"/> (Must be XXX@yyy.zzz)
3G/4G LTE Usage Allowance	
Recipient's E-mail	<input type="text"/> (Must be XXX@yyy.zzz)
Hotspot Session Log	
Recipient's E-mail	<input type="text"/> (Must be XXX@yyy.zzz)
<input type="button" value="Apply"/>	

SMTP Server: Enter the SMTP server that you would like to use for sending emails.

Username: Enter the username of your email account to be used by the SMTP server.

Password: Enter the password of your email account.

Sender's Email: Enter your email address.

SSL/TLS: Check to whether to enable SSL encryption feature.

Port: the port, default is 25.

Account Test: Press this button to test the connectivity and feasibility to your sender's e-mail.

WAN IP Change Alert: Enter the email address that will receive the alert message once a WAN IP change has been detected.

3G/LTE Usage Allowance: Enter the email address that will receive the alert message once the 3G over Usage Allowance occurs.

Hotspot Session Log: Enter the email address that will receive the periodic mail of the session log information to track the hotspot session information.

Remote System Log

Remote System Log is designed to keep remote administrators informed of the system-operating information. Administrator can set up a remote system log server for receiving and monitoring the system information by enabling remote system log feature on the router.

Remote System Log	
Remote System Log	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Server IP Address	<input type="text" value="0.0.0.0"/>
Server UDP Port	<input type="text" value="514"/>
<input type="button" value="Save"/>	

Remote System Log: Select whether to activate “Remote System Log”.

Server IP Address: Enter the remote syslog server IP address.

Server UDP Port: Enter the UDP port of the remote syslog server.

VPN

A **Virtual Private Network (VPN)** is a private network that interconnects remote (and often geographically separate) networks through primarily public communication infrastructures such as the Internet. VPNs provide security through tunneling protocols and security procedures such as encryption. For example, a VPN could be used to securely connect the branch offices of an organization to a head office network through the public Internet.

Industrial LTE Router supports **IPSec**, **PPTP**, **L2TP**, **GRE** for enterprise users.

The screenshot displays the web management interface for a Billion 4G LTE Router. The header includes the Billion logo, the product name "4G LTE Router", and the slogan "Powering communications with Security". A left-hand navigation menu lists various system functions, with "VPN" expanded to show sub-options: IPsec, PPTP Server, PPTP Client, L2TP, GRE, Access Management, and Maintenance. The main content area is titled "Configuration" and shows the "IPSec" section. It features a table for "IPSec Listing" with columns for Index, Connection Name, Active, Interface, Remote Gateway IP, Remote Network, Edit, and Delete. Below the table is an "Add New Connection" button. At the bottom right of the interface, there are "Restart" and "Logout" buttons. The footer contains the copyright notice: "Copyright @ Billion Electric Co., Ltd. All rights reserved."

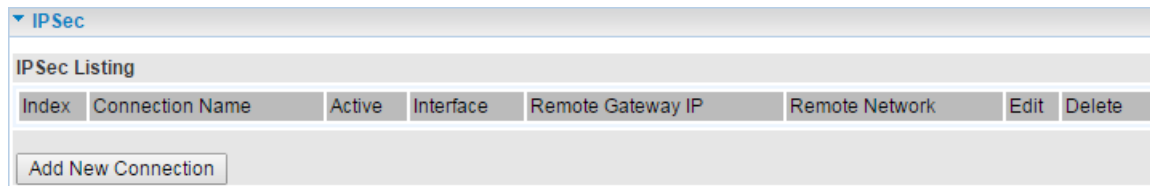
Index	Connection Name	Active	Interface	Remote Gateway IP	Remote Network	Edit	Delete
<input type="button" value="Add New Connection"/>							

IPSec

Internet Protocol Security (IPSec) is a protocol suite for securing Internet Protocol (IP) communications by authenticating and encrypting each IP packet of a communication session. IPsec also includes protocols for establishing mutual authentication between agents at the beginning of the session and negotiation of cryptographic keys to be used during the session.

IPSec is an end-to-end security scheme operating in the Internet Layer of the Internet Protocol Suite. It can be used in protecting data flows between a pair of security gateways (*network-to-network*), or between a security gateway and a host (*network-to-host*).

A total of 8 IPSec tunnels can be added.



Click **Add New Connection** to create IPSec connections.

IPSec Connection Setting

IPSec					
Connection Name	<input type="text"/>				
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No				
Interface	Auto <input type="button" value="v"/>				
Remote Gateway IP	<input type="text"/> (0.0.0.0 means any)				
Local Access Range	Subnet <input type="button" value="v"/>	Local IP Address	<input type="text"/> 0.0.0.0	IP Subnetmask	<input type="text"/> 0.0.0.0
Remote Access Range	Subnet <input type="button" value="v"/>	Remote IP Address	<input type="text"/> 0.0.0.0	IP Subnetmask	<input type="text"/> 0.0.0.0
IKE Mode	Main <input type="button" value="v"/>	Pre-Shared Key	<input type="text"/>		
Local ID Type	Default Wan IP <input type="button" value="v"/>	IDContent	<input type="text"/> *		
Remote ID Type	Default Wan IP <input type="button" value="v"/>	IDContent	<input type="text"/> *		
Encryption Algorithm	DES <input type="button" value="v"/>	Authentication Algorithm	MD5 <input type="button" value="v"/>	Diffie-Hellman Group	MODP1024(DH2) <input type="button" value="v"/>
IPSec Proposal	<input checked="" type="radio"/> ESP <input type="radio"/> AH				
	Authentication Algorithm	MD5 <input type="button" value="v"/>	Encryption Algorithm	DES <input type="button" value="v"/>	
Perfect Forward Secrecy	None <input type="button" value="v"/>				
Phase 1 (IKE)SA Lifetime	<input type="text"/> 480	min(s)	Phase 2 (IPSec)	<input type="text"/> 60	min(s)
Keepalive	None <input type="button" value="v"/>	PING to the IP(0.0.0.0:NEVER)	<input type="text"/> 0.0.0.0	Interval	<input type="text"/> 10 seconds **
Disconnection Time after No Traffic	<input type="text"/> 180 seconds (180 at least)				
Reconnection Time	<input type="text"/> 3 min(s) (3 at least)				
Note *: FQDN with @ as first character means don't resolve domain name.					
Note **: (0-3600, 0 means NEVER)					
<input type="button" value="Save"/> <input type="button" value="Back"/>					

Connection Name	<input type="text"/>				
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No				
Interface	Auto <input type="button" value="v"/>				
Remote Gateway IP	<input type="text"/> (0.0.0.0 means any)				
Local Access Range	Subnet <input type="button" value="v"/>	Local IP Address	<input type="text"/> 0.0.0.0	IP Subnetmask	<input type="text"/> 0.0.0.0
Remote Access Range	Subnet <input type="button" value="v"/>	Remote IP Address	<input type="text"/> 0.0.0.0	IP Subnetmask	<input type="text"/> 0.0.0.0

Connection Name: A given name for the connection (e.g. “connection to office”).

Active: Select **Yes** to activate the tunnel.

Interface: Select the set used interface for the IPSec connection, when you select 3G/4G-LTE interface, the IPSec tunnel would via this interface to connect to the remote peer.

Remote Gateway IP: The WAN IP address of the remote VPN gateway that is to be connected, establishing a VPN tunnel.

Local Access Range: Set the IP address or subnet of the local network.

- ▶ **Single IP:** The IP address of the local host, for establishing an IPSec connection between a security gateway and a host (*network-to-host*).
- ▶ **Subnet:** The subnet of the local network, for establishing an IPSec tunnel between a pair of security gateways (*network-to-network*)

Remote Access Range: Set the IP address or subnet of the remote network.

- ▶ **Single IP:** The IP address of the local host, for establishing an IPSec connection between a security gateway and a host (network-to-host). If the remote peer is a host, select Single Address.

- ▶ **Subnet:** The subnet of the local network, for establishing an IPSec tunnel between a pair of security gateways (network-to-network), If the remote peer is a network, select Subnet.

IPSec Phase 1(IKE)

IKE Mode	Main ▼	Pre-Shared Key	<input type="text"/>
Local ID Type	Default Wan IP ▼	IDContent	<input type="text"/> *
Remote ID Type	Default Wan IP ▼	IDContent	<input type="text"/> *
Encryption Algorithm	DES ▼	Authentication Algorithm	MD5 ▼
		Diffie-Hellman Group	MODP1024(DH2) ▼

IKE Mode: IKE, Internet Key Exchange, is the mechanism to negotiate and exchange parameters and keys between IPSec peers to establish security associations(SA). Select Main or Aggressive mode.

Pre-Shared Key: This is for the Internet Key Exchange (IKE) protocol, a string from 4 to 128 characters. Both sides should use the same key. IKE is used to establish a shared security policy and authenticated keys for services (such as IPSec) that require a key. Before any IPSec traffic can be passed, each router must be able to verify the identity of its peer. This can be done by manually entering the pre-shared key into both sides (router or hosts).

Local ID Type and Remote ID Type: When the mode of IKE is aggressive, Local and Remote peers can be identified by other IDs.

IDContent: Enter IDContent the name you want to identify when the Local and Remote Type are Domain Name; Enter IDContent IP address you want to identify when the Local and Remote Type are IP addresses (IPv4 and IPv6 supported).

Encryption Algorithm: Select the encryption algorithm from the drop-down menu. There are several options: DES and AES (128, 192 and 256). 3DES and AES are more powerful but increase latency.

- ▶ **DES:** Stands for Data Encryption Standard, it uses 56 bits as an encryption method.
- ▶ **3DES:** Stands for Triple Data Encryption Standard, it uses 168 (56*3) bits as an encryption method.
- ▶ **AES:** Stands for Advanced Encryption Standards, you can use 128, 192 or 256 bits as encryption method.

Authentication Algorithm: Authentication establishes the integrity of the datagram and ensures it is not tampered with in transmission. There are 3 options: Message Digest 5 (MD5) and Secure Hash Algorithm (SHA1, SHA256). SHA1 is more resistant to brute-force attacks than MD5. However, it is slower.

- ▶ **MD5:** A one-way hashing algorithm that produces a 128-bit hash.
- ▶ **SHA1:** A one-way hashing algorithm that produces a 160-bit hash.

Diffie-Hellman Group: It is a public-key cryptography protocol that allows two parties to establish a shared secret over an unsecured communication channel (i.e. over the Internet). MODP stands for Modular Exponentiation Groups.

IPSec Phase 2(IPSec)

IPSec Proposal	<input checked="" type="radio"/> ESP	<input type="radio"/> AH
	Authentication Algorithm	MD5 ▼
	Encryption Algorithm	DES ▼
Perfect Forward Secrecy	None ▼	

IPSec Proposal: Select the IPSec security method. There are two methods of verifying the authentication information, AH(Authentication Header) and ESP(Encapsulating Security Payload).

Use ESP for greater security so that data will be encrypted and the data origin be authenticated but using AH data origin will only be authenticated but not encrypted.

Authentication Algorithm: Authentication establishes the integrity of the datagram and ensures it is not tampered with in transmission. There are 3 options: Message Digest 5 (MD5) and Secure Hash Algorithm (SHA1, SHA256). SHA1 is more resistant to brute-force attacks than MD5. However, it is slower.

- ▶ **MD5:** A one-way hashing algorithm that produces a 128-bit hash.
- ▶ **SHA1:** A one-way hashing algorithm that produces a 160-bit hash.

Encryption Algorithm: Select the encryption algorithm from the drop-down menu. There are several options: DES and AES (128, 192 and 256). 3DES and AES are more powerful but increase latency.

- ▶ **DES:** Stands for Data Encryption Standard, it uses 56 bits as an encryption method.
- ▶ **3DES:** Stands for Triple Data Encryption Standard, it uses 168 (56*3) bits as an encryption method.
- ▶ **AES:** Stands for Advanced Encryption Standards, you can use 128, 192 or 256 bits as encryption method.

Perfect Forward Secrecy: It is a public-key cryptography protocol that allows two parties to establish a shared secret over an unsecured communication channel (i.e. over the Internet). MODP stands for Modular Exponentiation Groups.

IPSec SA Lifetime

Phase 1 (IKE)SA Lifetime	480	min(s)	Phase 2 (IPSec)	60	min(s)
--------------------------	-----	--------	-----------------	----	--------

SA Lifetime: Specify the number of minutes that a Security Association (SA) will stay active before new encryption and authentication key will be exchanged. There are two kinds of SAs, IKE and IPSec. IKE negotiates and establishes SA on behalf of IPSec, an IKE SA is used by IKE.

- ▶ **Phase 1 (IKE):** To issue an initial connection request for a new VPN tunnel. The range can be from 5 to 15,000 minutes, and the default is 480 minutes.
- ▶ **Phase 2 (IPSec):** To negotiate and establish secure authentication. The range can be from 5 to 15,000 minutes, and the default is 60 minutes. A short SA time increases security by forcing the two parties to update the keys. However, every time the VPN tunnel re-negotiates, access through the tunnel will be temporarily disconnected.

IPSec Conneciton Keep Alvie

Keepalive	None ▼	PING to the IP(0.0.0.0:NEVER)	0.0.0.0	Interval	10	seconds **
Disconnection Time after No Traffic	180	seconds (180 at least)				
Reconnection Time	3	min(s) (3 at least)				

Keep Alive:

- ▶ **None:** The default setting is None. To this mode, it will not detect the remote IPSec peer has been lost or not. It only follows the policy of Disconnection time after no traffic, which the remote IPSec will be disconnected after the time you set in this function.
- ▶ **PING:** This mode will detect the remote IPSec peer has lost or not by pinging specify IP address.
- ▶ **DPD:** Dead peer detection (DPD) is a keeping alive mechanism that enables the router to be detected lively when the connection between the router and a remote IPSec peer has lost.

Please be noted, it must be enabled on the both sites.

PING to the IP: It is able to IP Ping the remote PC with the specified IP address and alert when the connection fails. Once alter message is received, Router will drop this tunnel connection. Reestablish of this connection is required. Default setting is 0.0.0.0 which disables the function

Interval: This sets the time interval between Pings to the IP function to monitor the connection status. Default interval setting is 10 seconds. Time interval can be set from 0 to 3600 second, 0 second disables the function.

Ping to the IP	Interval (sec)	Ping to the IP Action
0.0.0.0	0	No
0.0.0.0	2000	No
xxx.xxx.xxx.xxx (A valid IP Address)	0	No
xxx.xxx.xxx.xxx(A valid IP Address)	2000	Yes, activate it in every 2000 second.

Disconnection Time after No Traffic: It is the NO Response time clock. When no traffic stage time is beyond the Disconnection time set, Router will automatically halt the tunnel connection and re-establish it base on the Reconnection Time set. 180 seconds is minimum time interval for this function.

Reconnection Time: It is the reconnecting time interval after NO TRAFFIC is initiated. 3 minutes is minimum time interval for this function.

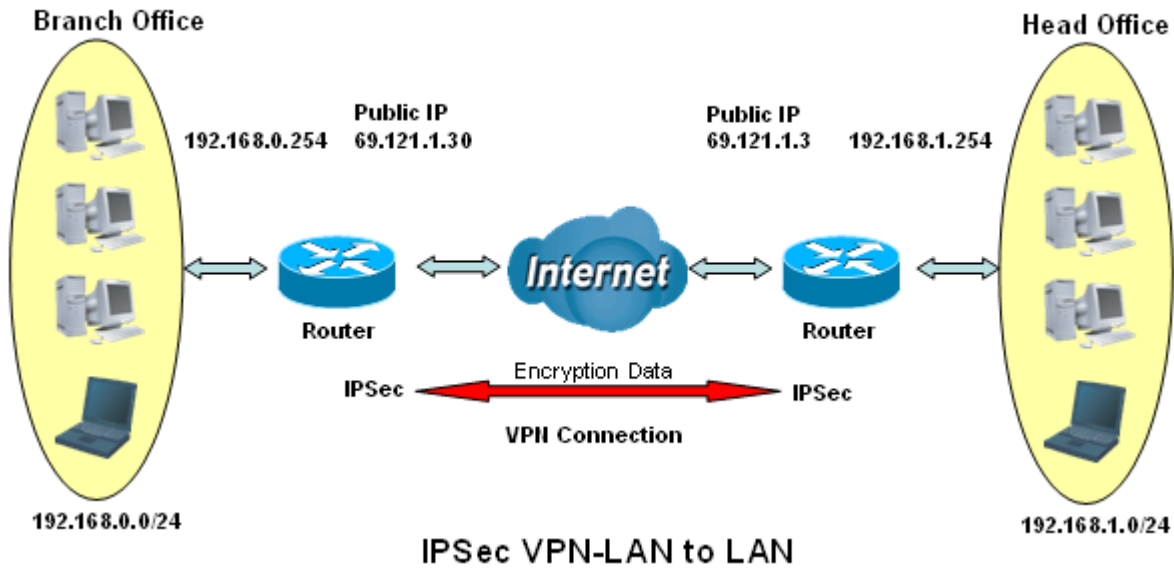
Click **SAVE** to submit the settings.

Example: How to establish an IPSec Tunnel

1. LAN to LAN connection

Two Industrial LTE Router want to setup a secure IPSec VPN tunnel

Note: The IPSec Settings shall be consistent between the two routers.



Head Office Side:

Item		Description
Connection Name	H-to-B	Name for IPSec tunnel
Remote Secure Gateway	69.121.1.30	IP address of the Branch office gateway
Access Netork		
Local Access Range	Subnet	Head Office network
Local Netwrok IP Address	192.168.1.0	
Local Netwrok Netmask	255.255.255.0	
Remote Access Range	Subnet	Branch office network
Remote Netwrok IP Address	192.168.0.0	
Remote Netwrok Netmask	255.255.255.0	
IPSec Proposal		
IKE Mode	Main	Security Plan
Pre-Shared Key	1234567890	
Phase 1 Encryption	AES-128	
Phase 1 Authentication	SHA1	
Phase 1 Diffie-Hellman Group	MODP 1024(group2)	
Phase 2 Proposal	ESP	
Phase 2 Authentication	SHA1	
Phase 2 Encryption	3DES	
Prefer Forward Security	MODP 1024(group2)	

IPSec

Connection Name	H-to-B				
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No				
Interface	Auto				
Remote Gateway IP	69.121.1.30 (0.0.0.0 means any)				
Local Access Range	Subnet	Local IP Address	192.168.1.0	IP Subnetmask	255.255.255.0
Remote Access Range	Subnet	Remote IP Address	192.168.0.0	IP Subnetmask	255.255.255.0
IKE Mode	Main	Pre-Shared Key	1234567890		
Local ID Type	Default Wan IP	IDContent			
Remote ID Type	Default Wan IP	IDContent			
Encryption Algorithm	AES-128	Authentication Algorithm	SHA1	Diffie-Hellman Group	MODP1024(DH2)
IPSec Proposal	<input checked="" type="radio"/> ESP <input type="radio"/> AH				
	Authentication Algorithm	SHA1	Encryption Algorithm	3DES	
Perfect Forward Secrecy	MODP1024(DH2)				
Phase 1 (IKE)SA Lifetime	480 min(s)	Phase 2 (IPSec)	60 min(s)		
Keepalive	None	PING to the IP(0.0.0.0:NEVER)	0.0.0.0	Interval	10 seconds **
Disconnection Time after No Traffic	180 seconds (180 at least)				
Reconnection Time	3 min(s) (3 at least)				

Note *: FQDN with @ as first character means don't resolve domain name.

Note **: (0-3600, 0 means NEVER)

Save Back

Branch Office Side:

Item		Description
Connection Name	B-to-H	Name for IPSec tunnel
Remote Secure Gateway	69.121.1.3	IP address of the Branch office gateway
Access Netork		
Local Access Range	Subnet	Head Office network
Local Netwrok IP Address	192.168.0.0	
Local Netwrok Netmask	255.255.255.0	
Remote Access Range	Subnet	Branch office network
Remote Netwrok IP Address	192.168.1.0	
Remote Netwrok Netmask	255.255.255.0	
IPSec Proposal		
IKE Mode	Main	Security Plan
Pre-Shared Key	1234567890	
Phase 1 Encryption	AES-128	
Phase 1 Authentication	SHA1	
Phase 1 Diffie-Hellman Group	MODP 1024(group2)	
Phase 2 Proposal	ESP	
Phase 2 Authentication	SHA1	
Phase 2 Encryption	3DES	
Prefer Forward Security	MODP 1024(group2)	

IPSec

Connection Name	B-to-H				
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No				
Interface	Auto				
Remote Gateway IP	69.121.1.3 (0.0.0.0 means any)				
Local Access Range	Subnet	Local IP Address	192.168.0.0	IP Subnetmask	255.255.255.0
Remote Access Range	Subnet	Remote IP Address	192.168.1.0	IP Subnetmask	255.255.255.0
IKE Mode	Main	Pre-Shared Key	1234567890		
Local ID Type	Default Wan IP	IDContent			
Remote ID Type	Default Wan IP	IDContent			
Encryption Algorithm	AES-128	Authentication Algorithm	SHA1	Diffie-Hellman Group	MODP1024(DH2)
IPSec Proposal	<input checked="" type="radio"/> ESP <input type="radio"/> AH				
	Authentication Algorithm	SHA1	Encryption Algorithm	3DES	
Perfect Forward Secrecy	MODP1024(DH2)				
Phase 1 (IKE)SA Lifetime	480 min(s)	Phase 2 (IPSec)	60 min(s)		
Keepalive	None	PING to the IP(0.0.0.0:NEVER)	0.0.0.0	Interval	10 seconds **
Disconnection Time after No Traffic	180 seconds (180 at least)				
Reconnection Time	3 min(s) (3 at least)				

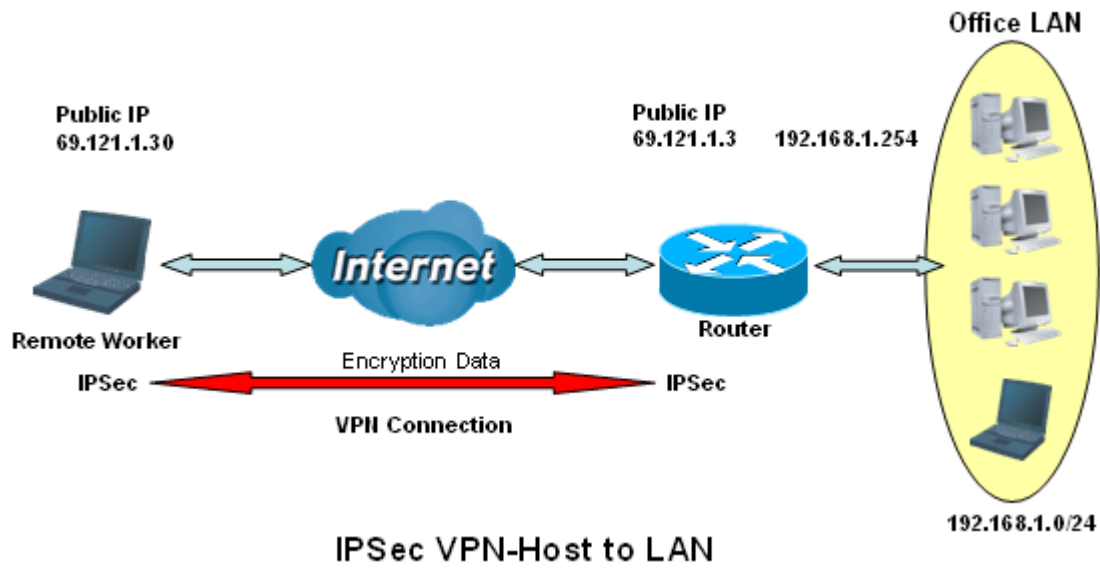
Note *: FQDN with @ as first character means don't resolve domain name.

Note **: (0-3600, 0 means NEVER)

Save Back

2. Host to LAN

Router servers as VPN server, and host should install the IPSec client to connect to head office through IPSec VPN.



Head Office Side:

Item		Description
Connection Name	H-to-H	Name for IPSec tunnel
Remote Secure Gateway	69.121.1.30	IP address of the Branch office gateway
Access Netork		
Local Access Range	Subnet	Head Office network
Local Netwrok IP Address	192.168.1.0	
Local Netwrok Netmask	255.255.255.0	
Remote Access Range	Signal IP	Host
Remote Netwrok IP Address	69.121.1.30	
Remote Netwrok Netmask	255.255.255.255	
IPSec Proposal		
IKE Mode	Main	Security Plan
Pre-Shared Key	1234567890	
Phase 1 Encryption	AES-128	
Phase 1 Authentication	SHA1	
Phase 1 Diffie-Hellman Group	MODP 1024(group2)	
Phase 2 Proposal	ESP	
Phase 2 Authentication	SHA1	
Phase 2 Encryption	3DES	
Prefer Forward Security	MODP 1024(group2)	

IPSec

Connection Name	H-to-H				
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No				
Interface	Auto				
Remote Gateway IP	69.121.1.30 (0.0.0.0 means any)				
Local Access Range	Subnet	Local IP Address	192.168.1.0	IP Subnetmask	255.255.255.0
Remote Access Range	Single IP	Remote IP Address	69.121.1.30	IP Subnetmask	255.255.255.255
IKE Mode	Main	Pre-Shared Key	1234567890		
Local ID Type	Default Wan IP	IDContent			
Remote ID Type	Default Wan IP	IDContent			
Encryption Algorithm	AES-128	Authentication Algorithm	SHA1	Diffie-Hellman Group	MODP1024(DH2)
IPSec Proposal	<input checked="" type="radio"/> ESP <input type="radio"/> AH				
	Authentication Algorithm	SHA1	Encryption Algorithm	3DES	
Perfect Forward Secrecy	MODP1024(DH2)				
Phase 1 (IKE)SA Lifetime	480 min(s)	Phase 2 (IPSec)	60 min(s)		
Keepalive	None	PING to the IP(0.0.0.0:NEVER)	0.0.0.0	Interval	10 seconds **
Disconnection Time after No Traffic	180 seconds (180 at least)				
Reconnection Time	3 min(s) (3 at least)				

Note *: FQDN with @ as first character means don't resolve domain name.

Note **: (0-3600, 0 means NEVER)

Save Back

PPTP Server

The **Point-to-Point Tunneling Protocol** (PPTP) is a Layer2 tunneling protocol for implementing virtual private networks through IP network.

In the Microsoft implementation, the tunneled PPP traffic can be authenticated with PAP, CHAP, and Microsoft CHAP V1/V2 . The PPP payload is encrypted using Microsoft Point-to-Point Encryption (MPPE) when using MSCHAPv1/v2.

Note: 4 sessions for Client and 4 sessions for Server respectively.

PPTP Server	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Authentication Type	Chap/Pap
MS-DNS	192.168.1.254
Rule Index	1
Connection Name	
Active	<input type="radio"/> Yes <input checked="" type="radio"/> No
Username	
Password	
Connection Type	Remote Access
Private IP Address assigned to Dial-in User	
Remote Network IP Address	
Remote Network Netmask	

Save Delete

Index	Connection Name	Active	Username	Connection Type	Assigned IP Address
-------	-----------------	--------	----------	-----------------	---------------------

PPTP Server: Select **Activated** to activate PPTP Server. **Deactivated** to deactivate PPTP Server.

Authentication Type: The authentication type, Pap or Chap, and MPPE 128bit Encryption. When using PAP, the password is sent unencrypted, whilst CHAP encrypts the password before sending, and also allows for challenges at different periods to ensure that an intruder has not replaced the client. When passed the authentication with MS-CHAPv2, the MPPE encryption is supported.

MS-DNS: Directly set the IP of DNS server or let the 192.168.1.254(the router by default) be the MS-DNS server.

Rule Index: 4 rules can be added, 1-4 digit to mark each rule.

Connection Name: User-defined name for the PPTP connection.

Active: Select **Yes** to activate the account. PPTP server is waiting for the client to connect to this account.

Username: Please input the username for this account.

Password: Please input the password for this account.

Connection Type: Select Remote Access for single user, Select LAN to LAN for remote gateway.

Private IP Address Assigned to Dial-in User: Specify the private IP address to be assigned to dialin clients, and the IP should be in the same subnet as local LAN, but not occupied.

Remote Network IP Address: Please input the subnet IP for remote network.

Remote Network Netmask: Please input the Netmask for remote network.

Click **Save** button to save your changes.

PPTP Client

PPTP client can help you dial the PPTP server to establish PPTP tunnel over Internet. A total of 4 sessions can be created for PPTP client.

PPTP Client					
Rule Index	1 ▾				
Connection Name	<input type="text"/>				
Active	<input type="radio"/> Yes <input checked="" type="radio"/> No				
Authentication Type	Chap/Pap ▾				
Username	<input type="text"/>				
Password	<input type="text"/>				
Connection Type	Remote Access ▾				
Server IP Address	<input type="text"/>				
Remote Network IP Address	<input type="text"/>				
Remote Network Netmask	<input type="text"/>				
<input type="button" value="Save"/> <input type="button" value="Delete"/>					
PPTP Client Listing					
Index	Connection Name	Active	Username	Connection Type	Server IP Address

Rule Index: 4 rules can be added, 1-4 digit to mark each rule.

Connection Name: User-defined name for the PPTP connection.

Active: Select **Yes** to activate the account. PPTP server is waiting for the client to connect to this account.

Authentication Type: The authentication type, Pap or Chap, and MPPE 128bit Encryption. When using PAP, the password is sent unencrypted, whilst CHAP encrypts the password before sending, and also allows for challenges at different periods to ensure that an intruder has not replaced the client. When passed the authentication with MS-CHAPv2, the MPPE encryption is supported.

Username: Please input the username for this account.

Password: Please input the password for this account.

Connection Type: Select Remote Access for single user, Select LAN to LAN for remote gateway.

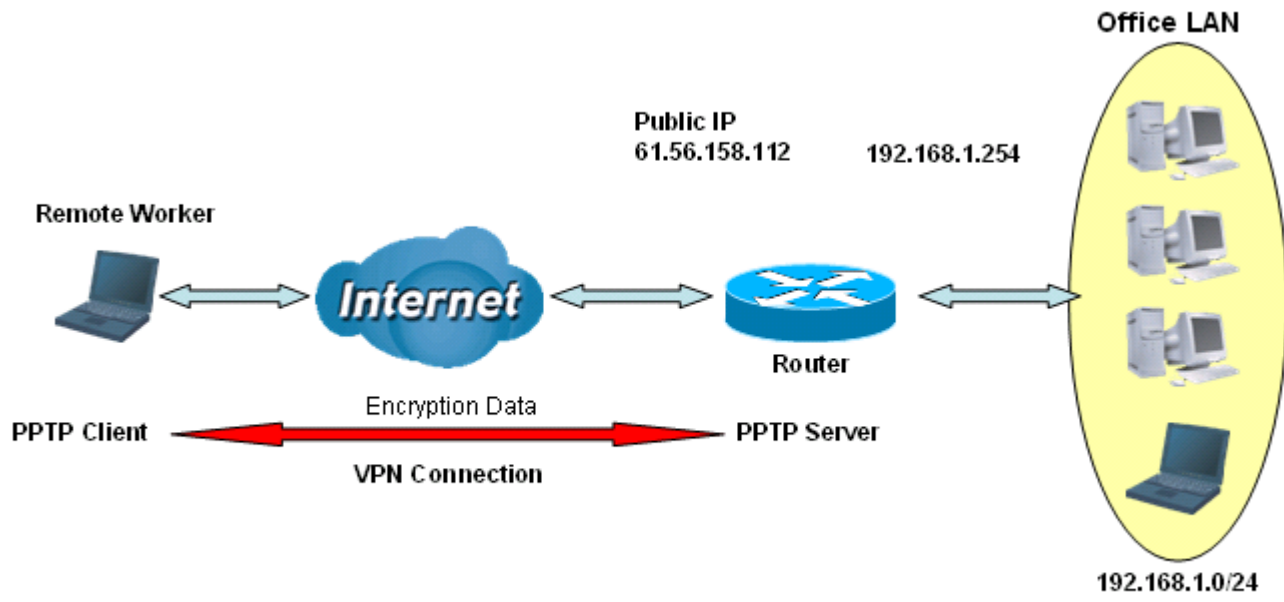
Server Address: Enter the WAN IP address of the PPTP server.

Remote Network IP Address: Please input the subnet IP for remote network.

Remote Network Netmask: Please input the Netmask for remote network.

Click **Save** button to save your changes.

Example: PPTP Dial-in Remote Access connection



PPTP VPN-Remote Access (Dial-in)

Configuring PPTP Server in the Office

The input IP address 192.168.1.2 will be assigned to the remote worker. Please make sure this IP is not used in the Office LAN.

Item		Description
Connection Name	HS-RA	Give a name of L2TP connecton
Authentication Type	MPPE 128bit	Authentication type
Username	test	Dial in authenticate user name
Passwrod	test	Dial in authenticate user password
Conneciton Type	Remote Access	Remote access for dial in
Assigned IP	192.168.1.2	An IP assigned to the dial in client

▼ PPTP Server

PPTP Server Activated Deactivated

Authentication Type

MS-DNS

Rule Index

Connection Name

Active Yes No

Username

Password

Connection Type

Private IP Address assigned to Dial-in User

Remote Network IP Address

Remote Network Netmask

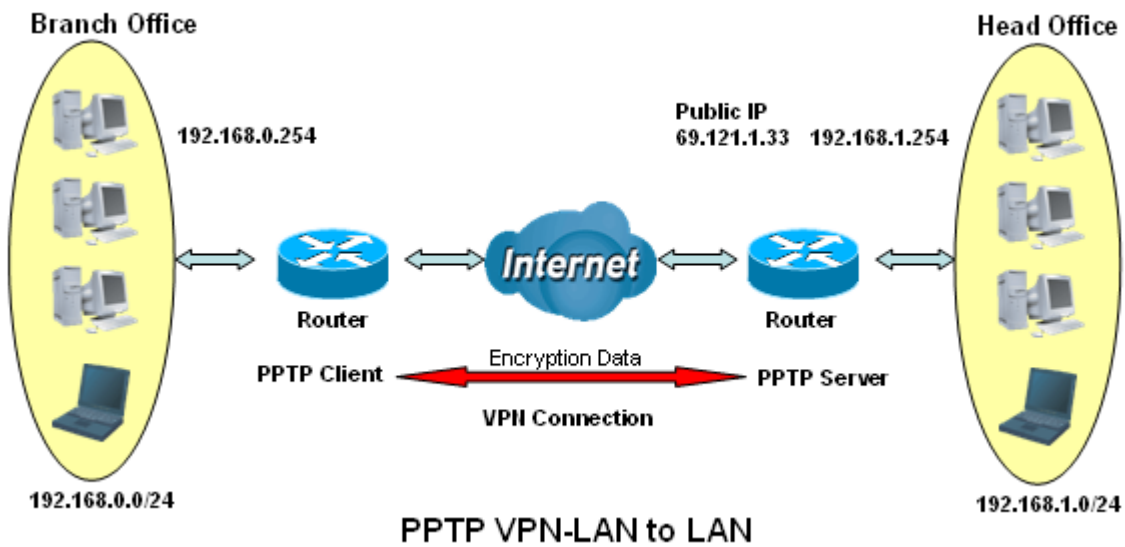
PPTP Server Listing

Index	Connection Name	Active	Username	Connection Type	Assigned IP Address
1	HS-RA	Yes	test	Remote Access	192.168.1.2

Example: PPTP LAN to LAN connection

The branch office establishes a PPTP VPN tunnel with head office to connect two private networks over the Internet. The routers are installed in the head office and branch offices accordingly.

Note: Both office LAN networks must be in different subnets with the LAN-LAN application.



Configuring PPTP Server in the Head office

The IP address 192.168.1.2 will be assigned to the router located in the branch office. Please make sure this IP is not used in the head office LAN.

Item		Description
Connection Name	HS-LL	Give a name of PPTP conneciton
Authentication Type	MPPE 128bit	Authentication type
Username	test	Dial in authenticate user name
Passwrod	test	Dial in authenticate user password
Conneciton Type	LAN to LAN	LAN to LAN for dial in
Assigned IP	192.168.1.2	An IP assigned to the dial in client
Remote Network IP	129.168.0.0	Remote access network
Remote Network Netmask	255.255.255.0	

▼ PPTP Server

PPTP Server Activated Deactivated

Authentication Type: MPPE 128bit Encryption ▼

MS-DNS: 192.168.1.254

Rule Index: 1 ▼

Connection Name: HS-LL

Active: Yes No

Username: test

Password: ****

Connection Type: LAN to LAN ▼

Private IP Address assigned to Dial-in User: 192.168.1.2

Remote Network IP Address: 192.168.0.0

Remote Network Netmask: 255.255.255.0

Save Delete

PPTP Server Listing

Index	Connection Name	Active	Username	Connection Type	Assigned IP Address
1	HS-LL	Yes	test	Lan to Lan	192.168.1.2

Configuring PPTP Client in the Branch office

The IP address 69.1.121.33 is the Public IP address of the router located in head office.

Item		Description
Connection Name	BC-LL	Give a name of PPTP conneciton
Authentication Type	MPPE 128bit	Authentication type
Username	test	Dial in authenticate user name
Passwrod	test	Dial in authenticate user password
Conneciton Type	LAN to LAN	LAN to LAN for dial in
Server IP	69.121.1.33	Dialed server IP
Remote Network IP	129.168.1.0	Remote access network
Remote Network Netmask	255.255.255.0	

▼ PPTP Client

Rule Index	1 ▼
Connection Name	BC-LL
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No
Authentication Type	MPPE 128bit Encryption ▼
Username	test
Password
Connection Type	LAN to LAN ▼
Server IP Address	69.121.1.33
Remote Network IP Address	192.168.1.0
Remote Network Netmask	255.255.255.0

PPTP Client Listing

Index	Connection Name	Active	Username	Connection Type	Server IP Address
1	BC-LL	Yes	test	Lan to Lan	69.121.1.33

L2TP

L2TP, Layer 2 Tunneling Protocol is a tunneling protocol used to support virtual private networks (VPNs). It does not provide any encryption or confidentiality by itself; it relies on an encryption protocol that it passes within the tunnel to provide.

Note: 4 sessions for dial-in connections and 4 sessions for dial-out connections

L2TP				
Rule Index	1 ▾			
Connection Name	<input type="text"/>			
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No			
Connection Mode	Dial in ▾			
Authentication Type	Chap/Pap ▾			
Username	<input type="text"/>			
Password	<input type="text"/>			
Private IP Address assigned to Dial-in User	<input type="text"/>			
Connection Type	Remote Access ▾			
Tunnel Authentication	<input type="checkbox"/> Enable			
Secret Password	<input type="text"/>			
Local Host Name	<input type="text"/>			
Remote Host Name	<input type="text"/>			
Active as Default Route	<input type="checkbox"/> Enable			
IPSec	<input type="checkbox"/> Enable			
<input type="button" value="Save"/> <input type="button" value="Delete"/>				
L2TP Listing				
Index	Connection Name	Active	Connection Mode	Connection Type

Rule Index: The Index to mark the session.

Connection Name: User-defined name for the connection.

Active: To enable or disable the tunnel.

Conneciton Mode:

Connection Mode	Dial in ▾
Authentication Type	Chap/Pap ▾
Username	<input type="text"/>
Password	<input type="text"/>
Private IP Address assigned to Dial-in User	<input type="text"/>

Connection Mode: Select Dial In to operate as a L2TP server.

Authentication Type: Default is Chap/Pap(CHAP, Challenge Handshake Authentication Protocol. PAP, Password Authentication Protocol.) if you want the router to determine the authentication type to use, or else manually specify PAP if you know which type the server is using (when acting as a client), or else the authentication type you want clients connecting to you to use (when acting as a server).

Username: Please input the username for this account.

Password: Please input the password for this account.

Private IP Address Assigned to Dial-in User: The private IP to be assigned to dialin user by L2TP

server. The IP should be in the same subnet as local LAN, and should not be occupied.

Connection Mode	Dial out ▼
Server IP Address	<input type="text"/>
Authentication Type	Chap/Pap ▼
Username	<input type="text"/>
Password	<input type="text"/>

Connection Mode: Choose Dial Out if you want your router to operate as a client (connecting to a remote L2TP Server, e.g, your office server).

Server IP Address: Enter the IP address of your VPN Server.

Authentication Type: Default is Chap/Pap(CHAP, Challenge Handshake Authentication Protocol. PAP, Password Authentication Protocol.) if you want the router to determine the authentication type to use, or else manually specify PAP if you know which type the server is using (when acting as a client), or else the authentication type you want clients connecting to you to use (when acting as a server).

Username: Please input the username for this account.

Password: Please input the password for this account.

Conneciton Type:

Connection Type	Remote Access ▼
-----------------	-----------------

Connection Type: Remote Access for single user.

Connection Type	Lan to Lan ▼
Remote Network IP Address	<input type="text"/>
Remote Network Netmask	<input type="text"/>

Connection Type: If “LAN to LAN” is selected, enter the peer network information, such as network address and netmask.

Tunnel Authentication and Active as Default Router:

Tunnel Authentication	<input type="checkbox"/> Enable
Secret Password	<input type="text"/>
Local Host Name	<input type="text"/>
Remote Host Name	<input type="text"/>
Active as Default Route	<input type="checkbox"/> Enable

Tunnel Authentication: This enables router to authenticate both the L2TP remote and L2TP host. This is only valid when L2TP remote supports this feature.

Secret Password: The secure password length should be 16 characters which may include numbers and characters.

Local Host Name: Enter hostname of Local VPN device that is connected / establishes a VPN tunnel.

Remote Host Name: Enter hostname of remote VPN device. It is a tunnel identifier from the Remote VPN device matches with the Remote hostname provided. If remote hostname matches, tunnel will be connected; otherwise, it will be dropped.

Active as Default Route: Enabled to let the tunnel to be the default route for traffic, under this circumstance, all packets will be forwarded to this tunnel and routed to the next hop.

L2TP over IPSec

IPSec	<input checked="" type="checkbox"/> Enable
IKE Mode	Main ▼
IKE(IPSec) Local ID	Default (Local Wan IP) ▼ <input type="text"/>
IKE(IPSec) Remote ID	Default (Remote IP) ▼ <input type="text"/>
IKE(IPSec) Pre-Shared Key	<input type="text"/>

IPSec: This enables L2TP tunnel over IPSec

IKE Mode: IKE, Internet Key Exchange, is the mechanism to negotiate and exchange parameters and keys between IPSec peers to establish security associations(SA). Select Main or Aggressive mode.

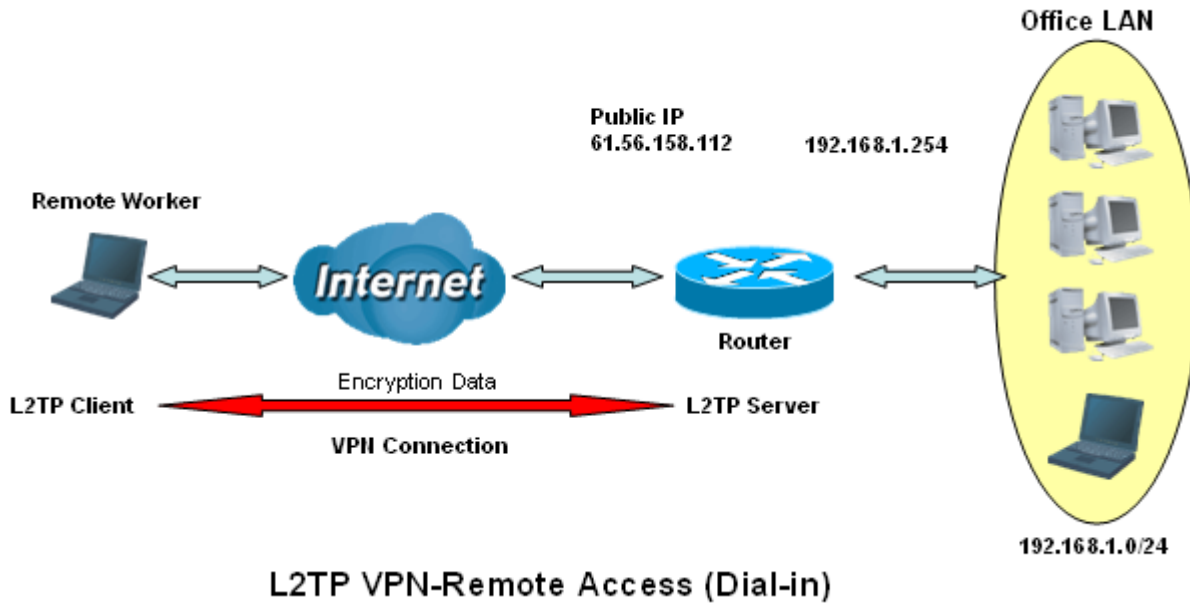
Local ID Type and Remote ID Type: When the mode of IKE is aggressive, Local and Remote peers can be identified by other IDs.

Pre-Shared Key: This is for the Internet Key Exchange (IKE) protocol, a string from 4 to 128 characters. Both sides should use the same key. IKE is used to establish a shared security policy and authenticated keys for services (such as IPSec) that require a key. Before any IPSec traffic can be passed, each router must be able to verify the identity of its peer. This can be done by manually entering the pre-shared key into both sides (router or hosts).

Example: How to establish an L2TP Tunnel

1. Configuring a L2TP VPN - Remote Access Dial-in Connection

A remote worker establishes a L2TP VPN connection with the head office using Microsoft's VPN Adapter (included with Windows XP/2000/ME, etc.). The router is installed in the head office, connected to a couple of PCs and Servers.



Configuring L2TP VPN Dial-in in the Office

The input IP address 192.168.1.200 will be assigned to the remote worker. Please make sure this IP is not used in the Office LAN.

Item		Description
Connection Name	HS-RA	Give a name of L2TP connecton
Connection Mode	Dial in	Operate as L2TP server
Authentication Type	Chap/Pap	Authentication type
Username	test	Dial in authenticate user name
Passwrod	test	Dial in authenticate user password
Assigned IP	192.168.1.200	An IP assigned to the dial in client
Conneciton Type	Remote Access	Remote access for dial in

▼ L2TP

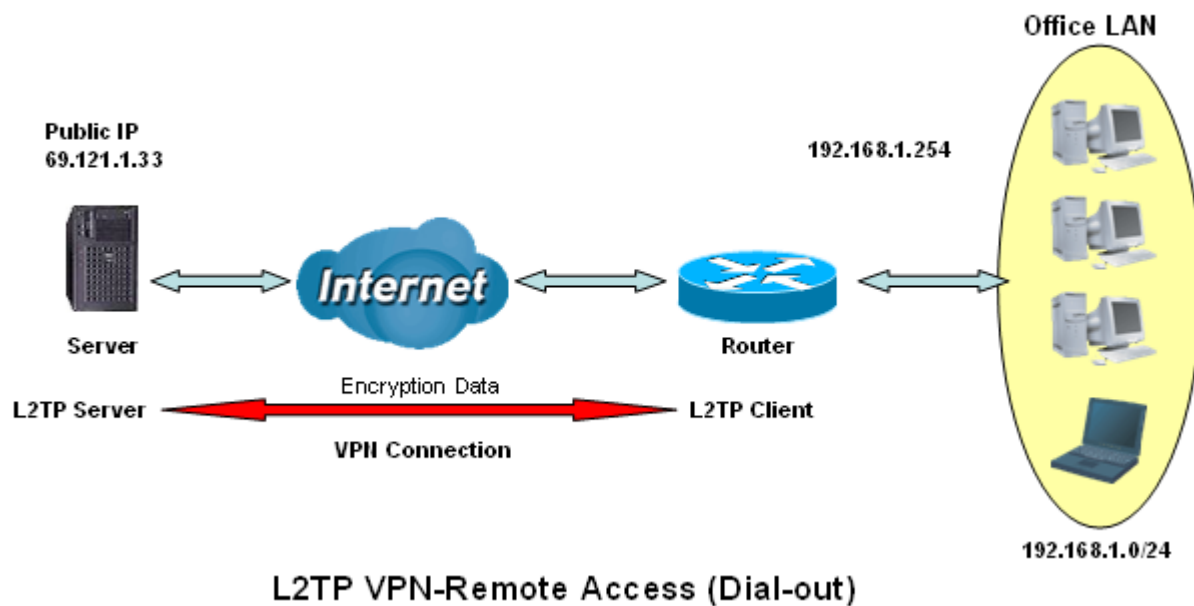
Rule Index	1 ▼
Connection Name	HS-RA
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No
Connection Mode	Dial in ▼
Authentication Type	Chap/Pap ▼
Username	test
Password
Private IP Address assigned to Dial-in User	192.168.1.200
Connection Type	Remote Access ▼
Tunnel Authentication	<input type="checkbox"/> Enable
Secret Password	
Local Host Name	
Remote Host Name	
Active as Default Route	<input type="checkbox"/> Enable
IPSec	<input type="checkbox"/> Enable

L2TP Listing

Index	Connection Name	Active	Connection Mode	Connection Type
1	HS-RA	Yes	Dial in	Remote Access

2. Configuring a Remote Access L2TP VPN Dial-out Connection

A company's office establishes a L2TP VPN connection with a file server located at a separate location. The router is installed in the office, connected to a couple of PCs and Servers.



Configuring L2TP VPN Dial-out in the Office

Item		Description
Connection Name	HC-RA	Give a name of L2TP connection
Connection Mode	Dial out	Operate as L2TP client
Server IP	69.121.1.33	Dialed server IP
Authentication Type	Chap/Pap	Authentication type
Username	test	Dial out authenticate user name
Password	test	Dial out authenticate user password
Connection Type	Remote Access	Remote access for dial out

▼ L2TP

Rule Index	1 ▼
Connection Name	HC-RA
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No
Connection Mode	Dial out ▼
Server IP Address	69.121.1.33
Authentication Type	Chap/Pap ▼
Username	test
Password
Connection Type	Remote Access ▼
Tunnel Authentication	<input type="checkbox"/> Enable
Secret Password	
Local Host Name	
Remote Host Name	
Active as Default Route	<input type="checkbox"/> Enable
IPSec	<input type="checkbox"/> Enable

Save Delete

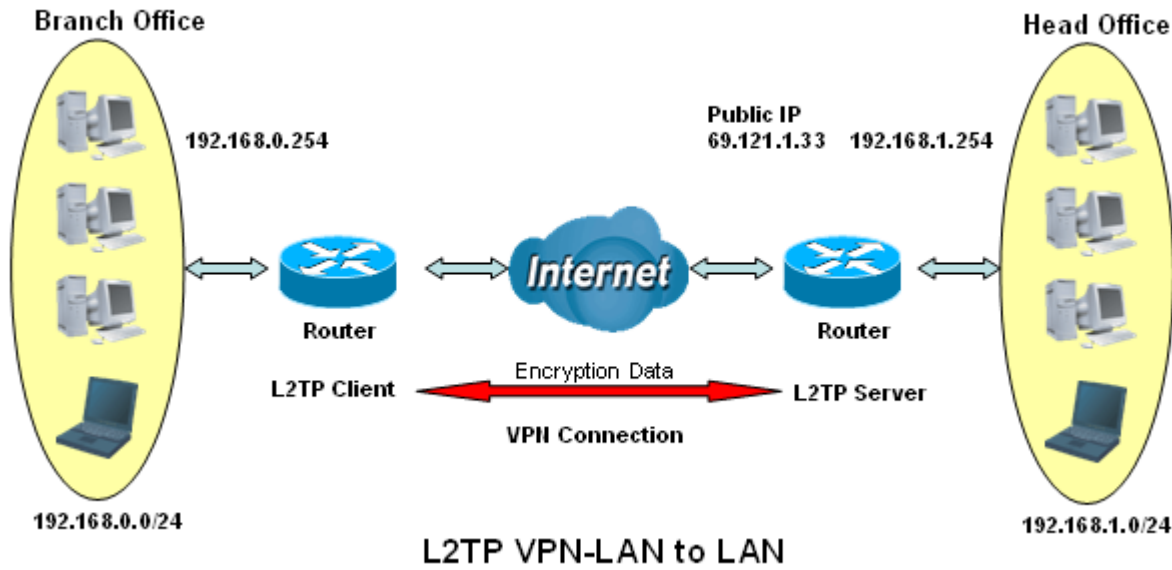
L2TP Listing

Index	Connection Name	Active	Connection Mode	Connection Type
1	HC-RA	Yes	Dial out	Remote Access

3. Configuring L2TP LAN to LAN VPN Connection

The branch office establishes a L2TP VPN tunnel with head office to connect two private networks over the Internet. The routers are installed in the head office and branch office accordingly.

Note: Both office LAN networks must be in different subnets with the LAN-LAN application.



Configuring L2TP VPN Dial-in in the Head office

The IP address 192.168.1.200 will be assigned to the router located in the branch office. Please make sure this IP is not used in the head office LAN.

Item		Description
Connection Name	HS-LL	Give a name of L2TP conneciton
Connection Mode	Dial in	Operate as L2TP server
Authentication Type	Chap/Pap	Authentication type
Username	Test	Dial in authenticate user name
Passwrod	Test	Dial in authenticate user password
Assigned IP	192.168.1.200	An IP assigned to the dial in client
Conneciton Type	LAN to LAN	LAN to LAN for dial in
Remote Network IP	129.168.0.0	Remote access network
Remote Network Netmask	255.255.255.0	

▼ L2TP

Rule Index	1 ▼
Connection Name	HS-LL
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No
Connection Mode	Dial in ▼
Authentication Type	Chap/Pap ▼
Username	test
Password	****
Private IP Address assigned to Dial-in User	192.168.1.200
Connection Type	Lan to Lan ▼
Remote Network IP Address	192.168.0.0
Remote Network Netmask	255.255.255.0
Tunnel Authentication	<input type="checkbox"/> Enable
Secret Password	
Local Host Name	
Remote Host Name	
Active as Default Route	<input type="checkbox"/> Enable
IPSec	<input type="checkbox"/> Enable

L2TP Listing

Index	Connection Name	Active	Connection Mode	Connection Type
1	HS-LL	Yes	Dial in	Lan to Lan

Configuring L2TP VPN Dial-out in the Branch office

The IP address 69.1.121.33 is the Public IP address of the router located in head office.

Item		Description
Connection Name	BC-LL	Give a name of L2TP conneciton
Connection Mode	Dial out	Operate as L2TP client
Server IP	69.121.1.33	Dialed server IP
Authentication Type	Chap/Pap	Authentication type
Username	test	Dial in authenticate user name
Passwrod	test	Dial in authenticate user password
Conneciton Type	LAN to LAN	LAN to LAN for dial out
Remote Network IP	129.168.1.0	Remote access network
Remote Network Netmask	255.255.255.0	

▼ L2TP

Rule Index	1 ▼
Connection Name	BC-LL
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No
Connection Mode	Dial out ▼
Server IP Address	69.121.1.33
Authentication Type	Chap/Pap ▼
Username	test
Password
Connection Type	Lan to Lan ▼
Remote Network IP Address	192.168.1.0
Remote Network Netmask	255.255.255.0
Tunnel Authentication	<input type="checkbox"/> Enable
Secret Password	
Local Host Name	
Remote Host Name	
Active as Default Route	<input type="checkbox"/> Enable
IPSec	<input type="checkbox"/> Enable

L2TP Listing

Index	Connection Name	Active	Connection Mode	Connection Type
1	BC-LL	Yes	Dial out	Lan to Lan

GRE

Generic Routing Encapsulation (GRE) is a tunneling protocol that can encapsulate a wide variety of network layer protocol packets inside virtual point-to-point links over an IP network.

Note: up to 8 tunnels can be added.

GRE							
Rule Index	1 ▼						
Connection Name	<input type="text"/>						
Active	<input type="radio"/> Yes <input checked="" type="radio"/> No						
Interface	4G/LTE -1 ▼						
Remote Gateway IP	<input type="text" value="0.0.0.0"/>						
Tunnel Local IP Address (Virtual Interface)	<input type="text" value="0.0.0.0"/>						
Local Network Netmask	<input type="text" value="0.0.0.0"/>						
Tunnel Remote IP Address (Virtual Interface)	<input type="text" value="0.0.0.0"/>						
Remote Network IP Address	<input type="text" value="0.0.0.0"/>						
Remote Network Netmask	<input type="text" value="0.0.0.0"/>						
Enable Keepalive	<input type="checkbox"/>						
Keepalive Retry Times	<input type="text" value="3"/>						
Keepalive Interval	<input type="text" value="5"/> Second(s)						
MTU	<input type="text" value="1460"/>						
Active as Default Route	<input type="radio"/> Yes <input checked="" type="radio"/> No						
IPSec	<input type="checkbox"/> Enable						
<input type="button" value="Save"/> <input type="button" value="Delete"/>							
GRE Listing							
<table border="1"><thead><tr><th>Index</th><th>Connection Name</th><th>Active</th><th>Interface</th><th>Remote Gateway IP</th><th>Remote Network</th></tr></thead></table>	Index	Connection Name	Active	Interface	Remote Gateway IP	Remote Network	
Index	Connection Name	Active	Interface	Remote Gateway IP	Remote Network		

Rule Index: 8 GRE rules can be added, 1-8 digit to mark each rule.

Connection Name: User-defined name for the connection.

Active: Select Yes to activate the GRE tunnel.

Interface: Select the exact WAN interface configured for the tunnel as the local IP.

Remote Gateway: The remote GRE gateway IP.

Tunnel Local IP: Please set the source IP for the local tunnel.

Tunnel Local Netmask: Please set the netmask for the local tunnel.

Tunnel Remote IP Address: Set the peer IP address of the tunnel.

Remote Network IP Address: Please set the subnet IP for remote network.

Remote Network Netmask: Please set the Netmask for remote network.

Enable Keepalive: Normally, the tunnel interface is always up. Enable keepalive to determine when the tunnel interface is to be closed. The local router sends keepalive packets to the peer router, if keepalive response is not received from peer router within the allowed time ('retry time' multiply 'interval', based on default settings, the time interval can be 30 seconds), the local router will shut up its tunnel interface.

Keepalive Retry Times: Set the keepalive retry times, default is 3.

Keepalive Interval: Set the keepalive Interval, unit in seconds. Default is 5 seconds.

MTU: Maximum Transmission Unit.

Active as Default Route: Select if to set the GRE tunnel as the default route.

GRE over IPsec

IPsec	<input checked="" type="checkbox"/> Enable
IKE Mode	Main ▼
IKE(IPsec) Local ID	Default (Local Wan IP) ▼ <input type="text"/>
IKE(IPsec) Remote ID	Default (Remote IP) ▼ <input type="text"/>
IKE(IPsec) Pre-Shared Key	<input type="text"/>

IPsec: This enables GRE tunnel over IPsec


IKE Mode: IKE, Internet Key Exchange, is the mechanism to negotiate and exchange parameters and keys between IPsec peers to establish security associations(SA). Select Main or Aggressive mode.

Local ID Type and **Remote ID Type:** When the mode of IKE is aggressive, Local and Remote peers can be identified by other IDs.

Pre-Shared Key: This is for the Internet Key Exchange (IKE) protocol, a string from 4 to 128 characters. Both sides should use the same key. IKE is used to establish a shared security policy and authenticated keys for services (such as IPsec) that require a key. Before any IPsec traffic can be passed, each router must be able to verify the identity of its peer. This can be done by manually entering the pre-shared key into both sides (router or hosts).

Access Management

Access Management equipments the users with the ability of maintaining the access management, including **Device Management**, **SNMP**, **Universal Plug & Play**, **Dynamic DNS**, **Access Control**, **Packet Filter**, **CWMP(TR-069)**, **Parental Control**, and **SAMBA & FTP Server**.

4G LTE RouterPowering communications with Security

- ▶ Status
- ▶ Quick Start
- ▼ Configuration
 - ▶ Interface Setup
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 - ▼ Access Management
 - Device Management
 - SNMP
 - Universal Plug & Play
 - Dynamic DNS
 - Access Control
 - Packet Filter
 - CWMP (TR-069)
 - Parental Control
 - SAMBA & FTP Server
 - ▶ Maintenance

Configuration



▼ Device Management

Device Host Name

Host Name

Embedded Web Server

HTTP Port (The default HTTP port number is 80.)

 Restart  Logout

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Device Management

Device management offers users a way to change the embedded web server accessing port, default 80. User can change the http port to 8080 or something else here.

Device Management	
Device Host Name	
Host Name	<input type="text" value="home.gateway"/>
<input type="button" value="Save"/>	
Embedded Web Server	
HTTP Port	<input type="text" value="80"/> (The default HTTP port number is 80.)
<input type="button" value="Save"/>	

SNMP

Simple Network Management Protocol (SNMP) is a protocol used for exchanging management information between network devices. SNMP is a member of the TCP/IP protocol suite. Industrial LTE Router serves as a SNMP agent which allows a manager station to manage and monitor the router through the network.

SNMP	
SNMP	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Get Community	<input type="text"/>
Set Community	<input type="text"/>
Trap Manager IP	<input type="text" value="0.0.0.0"/>
SNMPv3	
SNMPv3	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Username	<input type="text"/>
Access Permissions	<input type="text" value="Read Only"/>
Authentication Protocol	<input type="text" value="MD5"/>
Authentication Key	<input type="text"/> (8~31 characters)
Privacy Protocol	<input type="text" value="DES"/>
Privacy Key	<input type="text"/> (8~31 characters)
<input type="button" value="Save"/>	

SNMP: Select to enable SNMP feature.

Get Community: Type the Get Community, which is the password for the incoming Get-and-GetNext requests from the management station.

Set Community: Type the Set Community, which is the password for incoming Set requests from the management station.

Trap Manager IP: Enter the IP of the server receiving the trap message (when some exception occurs) sent by this SNMP agent.

SNMPv3: Enable to activate the SNMPv3.

Username: Enter the name allowed to access the SNMP agent.

Access Permissions: Set the access permissions for the user; RO--read only and RW--read and writer.

Authentication Protocol: Select the authentication protocol, MD5 and SHA. SNMP agent can communicate with the manager station through authentication and encryption to secure the message exchange. Set the authentication and encryption information here and below.

Authentication Key: Set the authentication key, 8-31 characters.

Privacy Protocol: Select the privacy mode, DES and AES.

Privacy Key: Set the privacy key, 8-31 characters.

Universal Plug & Play

UPnP offers peer-to-peer network connectivity for PCs and other network devices, along with control and data transfer between devices. UPnP offers many advantages for users running NAT routers through UPnP NAT Traversal, and on supported systems makes tasks such as port forwarding much easier by letting the application control the required settings, removing the need for the user to control advanced configuration of their device.

Both the user's Operating System and the relevant application must support UPnP in addition to the router. Windows XP and Windows ME natively support UPnP (when the component is installed), and Windows 98 users may install the Internet Connection Sharing client from Windows XP in order to support UPnP. Windows 2000 does not support UPnP.

Universal Plug & Play	
UPnP	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
Auto-configured	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated (by UPnP-enabled Application)
<input type="button" value="Save"/>	

UPnP: Select this checkbox to activate UPnP. Be aware that anyone could use a UPnP application to open the web configuration's login screen without entering the Industrial LTE Router IP address.

Auto-configured: Select this check box to allow UPnP-enabled applications to automatically configure the Industrial LTE Router so that they can communicate through the gateway, for example by using NAT traversal, UPnP applications automatically reserve a NAT forwarding port in order to communicate with another UPnP enabled device; this eliminates the need to manually configure port forwarding for the UPnP enabled application.

Dynamic DNS

The Dynamic DNS function allows you to alias a dynamic IP address to a static hostname, allowing users whose ISP does not assign them a static IP address to use a domain name. This is especially useful for hosting servers via your internet connection, so that anyone wishing to connect to you may use your domain name, rather than having to use your dynamic IP address, which changes from time to time. This dynamic IP address is the WAN IP address of the router, which is assigned to you by your ISP.

Here users can register different WAN interfaces with different DNS(es). But note that first users have to go to the Dynamic DNS registration service provider to register an account.

Dynamic DNS	
Dynamic DNS	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Service Provider	www.dyndns.org (custom) ▼
My Host Name	<input type="text"/>
Username	<input type="text"/>
Password	<input type="text"/>
Wildcard support	<input type="radio"/> Yes <input checked="" type="radio"/> No
Period	25 Day(s) ▼
<input type="button" value="Save"/>	

Dynamic DNS: Select this check box to activate Dynamic DNS.

Service Provider: Select from drop-down menu for the appropriate service provider, for example: www.dyndns.org.

My Host Name: Type the domain name assigned to your router by your Dynamic DNS provider.

Username: Type your user name.

Password: Type the password.

Wildcard support: Select this check box to enable DYNDNS Wildcard.

Period: Set the time period between updates, for the Router to exchange information with the DDNS server. In addition to updating periodically as per your settings, the router will perform an update when your dynamic IP address changes.

Example: How to register a DDNS account

Note first users have to go to the Dynamic DNS registration service provider to register an account.

User **test1** register a Dynamic Domain Names in DDNS provider <http://www.dyndns.org/> .

DDNS: www.hometest.com using username/password test/test

Dynamic DNS	
Dynamic DNS	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
Service Provider	www.dyndns.org (custom) ▼
My Host Name	myhome.dyndns.org
Username	myhome-123
Password	*****
Wildcard support	<input type="radio"/> Yes <input checked="" type="radio"/> No
Period	25 Day(s) ▼
<input type="button" value="Save"/>	

Access Control

Access Control Listing allows you to determine which services/protocols can access Industrial LTE Router interface from which computers. It is a management tool aimed to allow IPs (set in secure IP address) to access specified embedded applications (Web, etc, user can set) through some specified interface (LAN, WAN or both). User can have an elaborate understanding in the examples below.

The maximum number of entries is **16**.

▼ Access Control

Access Control Activated Deactivated

Access Control Editing

Rule Index

Active Yes No

Secure IP Address ~ (0.0.0.0 ~ 0.0.0.0 means all IPs)

Application

Interface

Access Control Listing

Index	Active	Secure IP Address	Application	Interface
0	Yes	0.0.0.0-0.0.0.0	ALL	LAN
1	Yes	0.0.0.0-0.0.0.0	Ping	WAN

Access Control: Select whether to make Access Control function available.

Rule Index: This is item number

Active: Select to activate the rule.

Secure IP Address: The default 0.0.0.0 allows any client to use this service to manage the gateway. Type an IP address range to restrict access to the client(s) without a matching IP address.

Application: Choose a service that you want to all access to all the secure IP clients. The drop-down menu lists all the common used applications.

Interface: Select the access interface. Choices are **LAN**, **WAN** and **Both**.

By default, the “Access Control” has **two default rules**.

Default Rule 1: (Index 0), a rule to allow only clients from LAN to have access to all embedded applications (Web, FTP, etc). Under this situation, clients from WAN cannot access the router even from Ping.

▼ Access Control

Access Control Activated Deactivated

Access Control Editing

Rule Index

Active Yes No

Secure IP Address ~ (0.0.0.0 ~ 0.0.0.0 means all IPs)

Application

Interface

Access Control Listing

Index	Active	Secure IP Address	Application	Interface
0	Yes	0.0.0.0-0.0.0.0	ALL	LAN
1	Yes	0.0.0.0-0.0.0.0	Ping	WAN

Default Rule 2: (Index 1), an ACL rule to open Ping to WAN side.

▼ Access Control

Access Control Activated Deactivated

Access Control Editing

Rule Index

Active Yes No

Secure IP Address ~ (0.0.0.0 ~ 0.0.0.0 means all IPs)

Application

Interface

Access Control Listing

Index	Active	Secure IP Address	Application	Interface
0	Yes	0.0.0.0-0.0.0.0	ALL	LAN
1	Yes	0.0.0.0-0.0.0.0	Ping	WAN

Packet Filter

You can filter the packages by MAC address, IP address, Protocol, Port number and Application or URL.

❖ Packet Filter - IP & MAC Filter

Packet Filter

Filter Type: IP & MAC Filter

IP & MAC Filter Editing

Rule Index: 0

Individual Active: Yes No

Action: Black List

Interface: 4G/LTE -1

Direction: Both

Type: IPv4

Source IP Address: 0.0.0.0 (0.0.0.0 means Don't care)

Source Subnet Mask: 0.0.0.0

Source Port Number: 0 (0 means Don't care)

Destination IP Address: 0.0.0.0 (0.0.0.0 means Don't care)

Destination Subnet Mask: 0.0.0.0

Destination Port Number: 0 (0 means Don't care)

DSCP: 0 (Value Range:0~64, 64 means Don't care)

Protocol: TCP

Save Delete

IP & MAC Filter List

#	Active	Interface	Direction	Source IP(IPv6) Address/Mask(Prefix)	Destination IP(IPv6) Address/Mask(Prefix)	Source MAC Address	Source Port	Destination Port	DSCP	Protocol
---	--------	-----------	-----------	--------------------------------------	---	--------------------	-------------	------------------	------	----------

Packet Filter

Filter Type: There are three types “IP & MAC Filter”, “Application Filter”, and “URL Filter” that user can select for this filter rule. Here we set **IP & MAC Filter**.

IP & MAC Filter Editing

Rule Index: This is item number

Individual Active: Select **Yes** to activate the rule.

Action: This is how to deal with the packets matching the rule. Allow please select White List or block selecting Black List.

Interface: Select to determine which interface the rule will be applied to.

Direction: Select to determine whether the rule applies to outgoing packets, incoming packets or packets of both directions.

Type: Choose type of field you want to specify to monitor. Select “IPv4” for IPv4 address, port number and protocol. Select “IPv6” for IPv6 address, port number and protocol. Select “MAC” for MAC address.

Source IP Address: The source IP address of packets to be monitored. 0.0.0.0 means “Don't care”.

Source Subnet Mask: Enter the subnet mask of the source network.

Source Port Number: The source port number of packets to be monitored. 0 means "Don't care".

Destination IP Address: The destination IP address of packets to be monitored. 0.0.0.0 means "Don't care".

Destination Subnet Mask: Enter the subnet mask of the destination network.

Destination Port Number: This is the Port that defines the application. (e.g. HTTP is port 80.)

DSCP: DSCP: Differentiated Services Code Point, it is recommended that this option be configured by an advanced user or keep 0. (0 means Don't care.)

Protocol: Specify the packet type (TCP, UDP, ICMP, and ICMPv6) that the rule applies to.

IP/MAC Filter List

Index: Item number.

Active: Whether the connection is currently active.

Interface: show the interface the rule applied to.

Direction: show the direction the rule applied to.

Source IP (IPv6) Address/Mask (Prefix): The source IP address or range of packets to be monitored.

Destination IP (IPv6) Address/Mask (Prefix): This is the destination subnet IP address.

Source MAC Address: show the MAC address of the rule applied.

Source Port: The source port number of packets to be monitored.

Destination Port: This is the Port or Port Ranges that defines the application.

DSCP: show the set DSCP.

Protocol: It is the packet protocol type used by the application. Select either **TCP** or **UDP** or **ICMP** or **ICMPv6**

❖ Packet Filter - URL Filter

Packet Filter		
Packet Filter		
Filter Type	URL Filter ▼	
URL Filter Editing		
URL Filter	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated	
URL Filter Rule Index	1 ▼	
Individual Active	<input type="radio"/> Yes <input checked="" type="radio"/> No	
URL (Host)	<input type="text"/>	
<input type="button" value="Save"/> <input type="button" value="Delete"/>		
URL Filter Listing		
Index	Active	URL

URL Filter: Select **Activated** to enable URL Filter.

URL Filter Rule Index: This is item number.

Individual Active: To give control to the specific URL access individually, for example, you want to prohibit access to www.yahoo.com, please first press Activated in “URL Filter” field, and also Yes in “Individual Active” field; if some time you want to allow access to this URL, you simply select No in individual active field. In a word, the command serves as a switch to the access of some specific URL with the filter on.

URL (Host): Specified URL which is prohibited from accessing.

CWMP (TR-069)

CWMP, short for CPE WAN Management Protocol, also called TR069 is a Broadband Forum technical specification entitled CPE WAN Management Protocol (CWMP). It defines an application layer protocol for remote management of end-user devices. It defines an application layer protocol for remote management of end-user devices.

As a bidirectional SOAP/HTTP based protocol it can provides the communication between customer premises equipment (CPE) and Auto Configuration Server (ACS). It includes both a safe configuration and the control of other CPE management functions within an integrated framework. In the course of the booming broadband market, the number of different internet access possibilities grew as well (e.g. modems, routers, gateways, set-top box, VoIP-phones).At the same time the configuration of this equipment became more complicated –too complicated for end-users. For this reason, TR-069 was developed. It provides the possibility of auto configuration of the access types. Using TR-069 the terminals can get in contact with the Auto Configuration Servers (ACS) and establish the configuration automatically and let ACS configure CPE automatically.

▼ CWMP (TR-069)

CWMP Activated Deactivated

ACS Login Information

URL

Username

Password

Connection Request Information

Path

Username

Password

Periodic Inform Config

Periodic Inform Activated Deactivated

Interval

Save

CWMP: Select activated to enable CWMP.

ACS Login Information

URL: Enter the ACS server login URL.

User Name: Specify the ACS User Name for ACS authentication to the connection from CPE.

Password: Enter the ACS server login password.

Connection Request Information

Path: Local path in HTTP URL for an ACS to make a Connection Request notification to the CPE.

Username: Username used to authenticate an ACS making a Connection Request to the CPE.

Password: Password used to authenticate an ACS making a Connection Request to the CPE.

Periodic Inform Config

Periodic Inform: Select Activated to authorize the router to send an Inform message to the ACS automatically.

Interval(s): Specify the inform interval time (sec) which CPE used to periodically send inform message to automatically connect to ACS. When the inform interval time arrives, the CPE will send inform message to automatically connect to ACS.

Parental Control

Parental Control provides Web content filtering offering safer and more reliable web surfing for users. Please get an account and configure at the selected Provider “www.opendns.com” in advance. If activated, the Parental Control has the top priority as DNS when accessing internet.

Parental Control	
Provider	www.opendns.com
Parental Control	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Host Name	<input type="text"/>
Username	<input type="text"/>
Password	<input type="text"/>
<small>**Parental Control provides Web content filtering while surfing the web safer and more reliable. Please get an account and configure at the selected Provider in advance.</small>	
<input type="button" value="Save"/>	

Host Name, Username and Password: Enter your registered domain name and your username and password at the provider website www.opendns.com.

SAMBA & FTP Server

Samba and FTP are served as network sharing.

SAMBA & FTP Server	
SAMBA	
SAMBA Server	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
Work Group	<input type="text" value="MyGroup"/>
Net BIOS Name	<input type="text" value="SambaSvr"/>
FTP	
FTP Server	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
FTP Server Port	<input type="text" value="21"/>
<input type="button" value="Save"/>	

SAMBA Server: Activated to enable SAMBA sharing.

Work Group: The same mechanism like in Microsoft work group, please set the Work Group name.

NetBIOS Name: The sharing NetBIOS name.

FTP Server: Activated to enable FTP sharing.

FTP Server Port: Set the working port. Well-known one is 21. User can change it.

SAMBA/FTP login account:

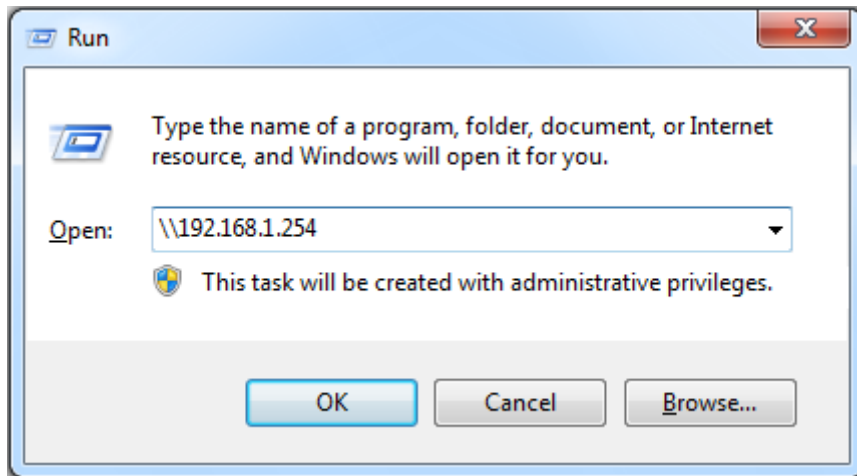
- ▶ **Default user:** admin/admin, it is the administrative user and a super user, it has the full authority of SAMBA /FTP access and operation permission of objects in SAMBA and FTP server.
- ▶ **New user:** users can create new user(s) to grant it (them) access and permission to the SAMBA & FTP server.

Please see [User Management](#).

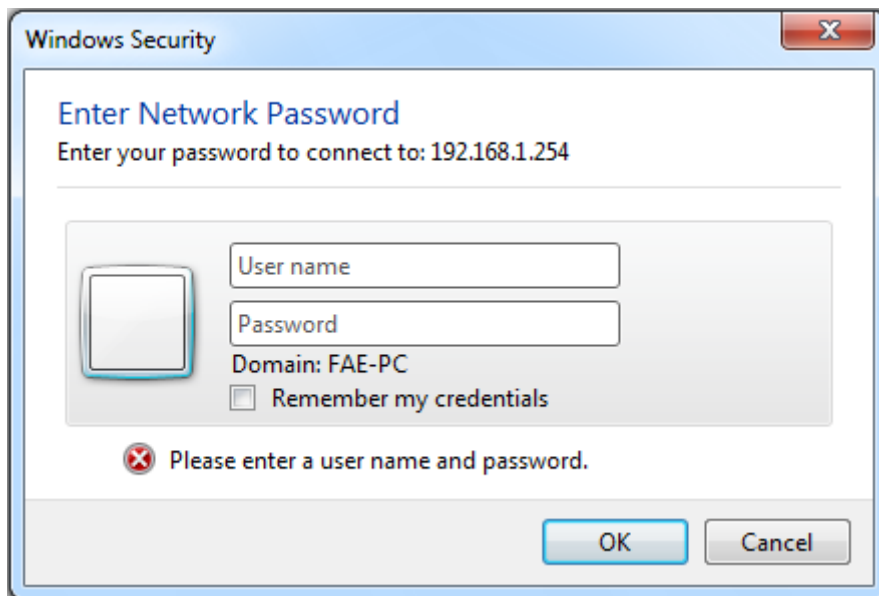
Example: How to setup Samba

1. Go directly to Start >> Run.

Enter [\\192.168.1.254](#) or [\\SambaSvr](#) , but if you enter [\\SambaSvr](#), please be sure your working PC is in the same workgroup as set in the samba server set above.)



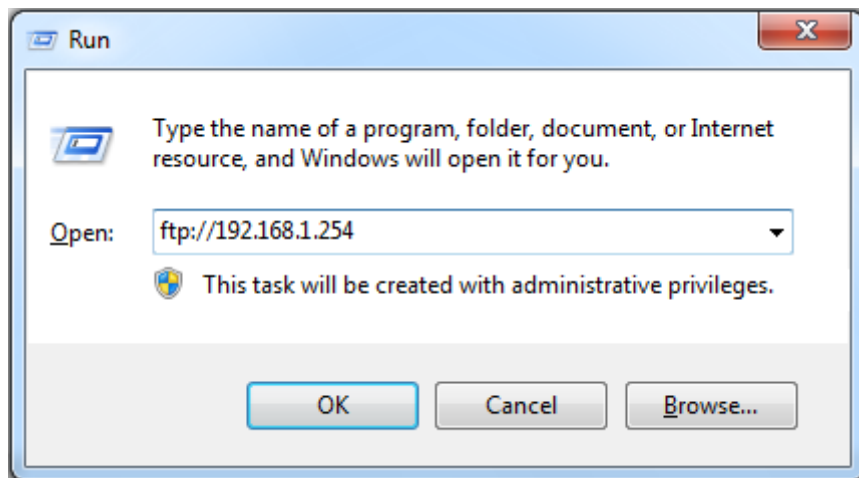
2. Enter the Username and Password.



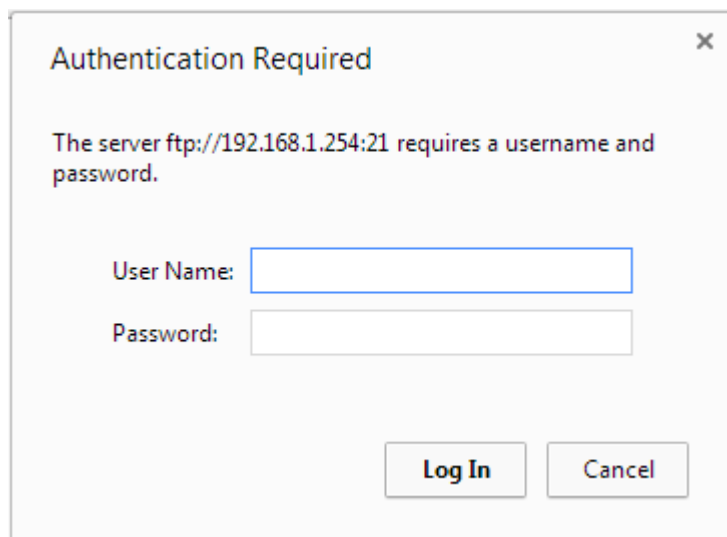
Example: How to setup FTP :

1. Go directly to Start >> Run.

Enter <ftp://192.168.1.254>




2. Enter the Username and Password.



Maintenance

Maintenance equipments the users with the ability of maintaining the device as well as examining the connectivity of the WAN connections, including **User Management, Time Zone, Firmware & Configuration, Auto Reboot, System Restart, Diagnostic Tool** and **Ignition Sensing**.

4G LTE RouterPowering communications with Security

- ▶ Status
- ▶ Quick Start
- ▶ Configuration
 - ▶ Interface Setup
 - ▶ Dual WAN
 - ▶ Hotspot
 - ▶ Advanced Setup
 - ▶ VPN
 - ▶ Access Management
 - ▶ Maintenance
 - User Management
 - Time Zone
 - Firmware & Configuration
 - System Restart
 - Auto Reboot
 - Diagnostic Tool
 - Ignition Sensing

Configuration

▼ User Management

User Account

Index: 1 ▼

Username: admin

New Password: *****

Confirm Password: *****

FTP Authority Setup

FTP Access: Enable Disable

Permission: Read/Write Read

SAMBA Authority Setup

SAMBA Access: Enable Disable

Permission: Read/Write Read

User Account List

#	User Name	FTP Access	FTP Permission	SAMBA Access	SAMBA Permission
1	admin	Enable	Read/Write	Enable	Read/Write
2	user	Disable	Read	Disable	Read

Restart Logout

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User Management

User Management controls the Router Web GUI permission, FTP/SAMBA access to the specific account.

In factory setting, the default accounts are **admin/admin** and **user/user**. The default root account admin has been authorized to web access of router, Samba access, and FTP access. **user/user** is equipment with limited access (specified by advanced users with admin account) to router web, and FTP/SAMBA . A total of **6** other accounts can be created to grant access to the access of Samba and FTP and web page (need to be specified).

Note: Please go to [SAMBA & FTP Server](#) to re-activate FTP and SAMBA server to enable the changes to the FTP and SAMBA account set here.

▼ User Management

User Account

Index: 1 ▼

Username: admin

New Password: *****

Confirm Password: *****

FTP Authority Setup

FTP Access: Enable Disable

Permission: Read/Write Read

SAMBA Authority Setup

SAMBA Access: Enable Disable

Permission: Read/Write Read

Save Delete

User Account List

#	User Name	FTP Access	FTP Permission	SAMBA Access	SAMBA Permission
1	admin	Enable	Read/Write	Enable	Read/Write
2	user	Disable	Read	Disable	Read

❖ Admin / Admin

admin/admin is the root account provided by our router.

▼ User Management

User Account

Index: 1 ▼

Username: admin

New Password:

Confirm Password:

FTP Authority Setup

FTP Access: Enable Disable

Permission: Read/Write Read

SAMBA Authority Setup

SAMBA Access: Enable Disable

Permission: Read/Write Read

Save Delete

User Account List

#	User Name	FTP Access	FTP Permission	SAMBA Access	SAMBA Permission
1	admin	Enable	Read/Write	Enable	Read/Write
2	user	Disable	Read	Disable	Read

User Setup

Index: User account index, total is 8.

User Name: Users can create account(s) to give it (them) access to SAMBA and FTP.

New Password: Enter a new password for this user account.

Confirmed Password: Re-enter the new password again; you must enter the password exactly the same as in the previous field

FTP Authority Setup

FTP Access: Enable to grant the user access to the FTP server.

Permission: Set the operation permission for the user, Read/Write or Read.

SAMBA Authority

SAMBA Access: Enable to grant the user access to the SAMBA server.

Permission: Set the operation permission for the user, Read/Write or Read.

❖ User / User and/or Adding additional user accounts

▼ User Management

User Account

Index: 2 ▼

Username: user

New Password: ****

Confirm Password: ****

FTP Authority Setup

FTP Access: Enable Disable

Permission: Read/Write Read

SAMBA Authority Setup

SAMBA Access: Enable Disable

Permission: Read/Write Read

Web GUI Permission

Guest Account: Enable Disable

Interface Setup: Enable Disable

Advanced Setup: Enable Disable

Access Management: Enable Disable

Maintenance: Enable Disable

Save Delete

User Account List

#	User Name	FTP Access	FTP Permission	SAMBA Access	SAMBA Permission
1	admin	Enable	Read/Write	Enable	Read/Write
2	user	Disable	Read	Disable	Read

User Setup

Index: User account index, total is 8.

User Name: Users can create account(s) to give it (them) access to SAMBA and FTP.

New Password: Type the password for the user account.

Confirmed Password: Type password again for confirmation.

FTP Authority Setup

FTP Access: Enable to grant the user access to the FTP server.

Permission: Set the operation permission for the user, Read/Write or Read.

SAMBA Authority

SAMBA Access: Enable to grant the user access to the SAMBA server.

Permission: Set the operation permission for the user, Read/Write or Read.

Web GUI Permission

Guest Account: A pre-set guest account setting granted with **Interface Setup**, **Advanced Setup**, **Access Management** and **Maintenance** access. Enable to have access to Interface Setup, Advanced Setup and Access Management or disable to set the specifics yourself.

Interface Setup: Enable to allowing access to Interface Setup with this account.

Advanced Setup: Enable to allowing access to Advanced Setup with this account.

Access Management: Enable to allowing access to Access Management with this account.

Maintenance: Enable to allowing access to Maintenance with this account.

Login using the Administrator account, you will have the full accessibility to manage & control your gateway device and can also create user accounts for others to control some of the open configuration settings.

▶ Status
• Quick Start
▶ Configuration
▶ Interface Setup
▶ Dual WAN
▶ Hotspot
▶ Advanced Setup
▶ VPN
▶ Access Management
▼ Maintenance
• User Management
• Time Zone
• Firmware & Configuration
• System Restart
• Auto Reboot
• Diagnostic Tool
• Ignition Sensing

When customers use the “user” account to login to the router, they are offered with only configuration items set in **Web GUI Permission**.

▶ Status
• Quick Start
▶ Configuration
▶ Interface Setup
▶ Dual WAN
▶ Hotspot
▶ Advanced Setup
▶ VPN
▶ Access Management
▼ Maintenance
• Time Zone
• Firmware & Configuration
• System Restart
• Auto Reboot
• Diagnostic Tool
• Ignition Sensing

Web GUI shown when “user” account uses Guest account on Web GUI Permission

▼ User Management

User Account

Index	3 ▼
Username	guest
New Password	••••
Confirm Password	••••

FTP Authority Setup

FTP Access	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Permission	<input type="radio"/> Read/Write <input checked="" type="radio"/> Read

SAMBA Authority Setup

SAMBA Access	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Permission	<input type="radio"/> Read/Write <input checked="" type="radio"/> Read

Web GUI Permission

Guest Account	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
---------------	---

User Account List

#	User Name	FTP Access	FTP Permission	SAMBA Access	SAMBA Permission
1	admin	Enable	Read/Write	Enable	Read/Write
2	user	Disable	Read	Disable	Read
3	guest	Disable	Read	Disable	Read

▼ Status

• Device Info
• System Log
• 4G/LTE Status
• GPS Status
• Hardware Monitor
• Hotspot Status
• Statistics
• DHCP Table
• IPSEC Status
• PPTP Status
• L2TP Status
• GRE Status
• Disk Status
• ARP Table

Time Zone

The router does not have a real time clock on board; instead, it uses the Simple Network Time Protocol (SNTP) to get the current time from an SNTP server outside your network. Choose your local time zone. After a successful connection to the Internet, the router will retrieve the correct local time from the SNTP server you have specified. If you prefer to specify an SNTP server other than the default, simply enter its IP address as shown above. Your ISP may provide an SNTP server for you to use.

Time Zone	
Current Date/Time	Tue May 10 10:07:10 2016
Time Synchronization	
Synchronize time with	<input checked="" type="radio"/> NTP Server <input type="radio"/> PC's Clock <input type="radio"/> Manually
Time Zone	(GMT) Greenwich Mean Time : Dublin, Edinburgh, Lisbon, London ▼
Daylight Saving	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
NTP Server Address	<input type="text" value="0.0.0.0"/> (0.0.0.0: Default Value)
<input type="button" value="Save"/>	

Current Date/Time: To show the current time based on the time synchronization mechanism users choose below.

Synchronize time with: Select the methods to synchronize the time.

- ▶ **NTP Server automatically:** To synchronize time with the NTP server.
- ▶ **PC's Clock:** To synchronize time with the PC's clock.
- ▶ **Manually:** Select this, user need to set the time yourself manually.

Time Zone: Choose the time zone of your location. This will set the time difference between your time zone and Greenwich Mean Time (GMT).

Daylight Saving: Select this option if you use daylight savings time.

NTP Server Address: Enter the IP address of your time server. Check with your ISP/network administrator if you are unsure of this information.

Firmware & Configuration

Firmware is the software that controls the hardware and provides all functionalities which are available in the GUI. This software may be improved and/or modified; your Industrial LTE Router provides an easy way to update the code to take advantage of the changes. .

To upgrade the firmware of Industrial LTE Router, you should download or copy the firmware to your local environment first. Press the “**Choose File**” button to specify the path of the firmware file. Then, click “**Upgrade**” to start upgrading. When the procedure is completed, Industrial LTE Router will reset automatically to make the new firmware work.

Firmware & Configuraiton	
Upgrade	<input checked="" type="radio"/> Firmware <input type="radio"/> Configuration
System Restart with	<input checked="" type="radio"/> Current Settings <input type="radio"/> Factory Default Settings
File	<input type="button" value="Choose File"/> No file chosen
Backup Configuration	<input type="button" value="Backup"/>
Status	
It might take several minutes, don't power off it during upgrading. Device will restart after the upgrade.	
<input type="button" value="Upgrade"/>	

Upgrade: Choose Firmware or Configuration you want to update.

System Restart with:

- ▶ **Current Settings:** Restart the device with the current settings automatically when finishing upgrading.
- ▶ **Factory Default Settings:** Restart the device with factory default settings automatically when finishing upgrading.

File: Type in the location of the file you want to upload in this field or click “**Choose File**” to find it.

Choose File: Click “**Choose File**” to find the configuration file or firmware file you want to upload. Remember that you must extract / decompress / unzip the .zip files before you can upload them.

Backup Configuration: Click “**Backup**” button to back up the current running configuration file and save it to your computer in the event that you need this configuration file to be restored back to your device when making false configurations and want to restore to the original settings.

Upgrade: Click “**Upgrade**” to begin the upload process. This process may take up to two minutes.

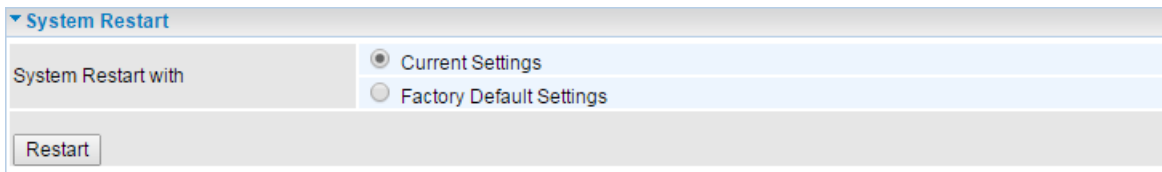
Firmware Upgrade	
File upload succeeded, starting flash erasing and programming!!	
Progress	<div style="width: 88%;"><div style="width: 88%;"></div></div>
Percent	88 %



DO NOT turn off / power off the device or interrupt the firmware upgrading while it is still in process. Improper operation could damage your Router.

System Restart

Click **System Restart** with option **Current Settings** to reboot your router.



The screenshot shows a web interface for system restart. At the top, there is a tab labeled "System Restart". Below the tab, there is a section titled "System Restart with" containing two radio button options: "Current Settings" (which is selected) and "Factory Default Settings". At the bottom of this section, there is a "Restart" button.

If you wish to restart the router using the factory default settings (for example, after a firmware upgrade or if you have saved an incorrect configuration), select **Factory Default Settings** to restore to factory default settings.

You may also restore your router to factory settings by holding the small Reset pinhole button on the back of your router in about more than 6s seconds whilst the router is turned on.

Auto Reboot

Auto reboot offers flexible rebooting service (reboot with the current configuration) of router for users in line with scheduled timetable settings

Auto Reboot											
Schedule	1.	<input type="checkbox"/> Enable	<input type="checkbox"/> Mon.	<input type="checkbox"/> Tues.	<input type="checkbox"/> Wed.	<input type="checkbox"/> Thur.	<input type="checkbox"/> Fri.	<input type="checkbox"/> Sat.	<input type="checkbox"/> Sun.	Time	00 : 00
	2.	<input type="checkbox"/> Enable	<input type="checkbox"/> Mon.	<input type="checkbox"/> Tues.	<input type="checkbox"/> Wed.	<input type="checkbox"/> Thur.	<input type="checkbox"/> Fri.	<input type="checkbox"/> Sat.	<input type="checkbox"/> Sun.	Time	00 : 00
<input type="button" value="Save"/>											

Enable to set the time schedule for rebooting.

For example, the router is scheduled to reboot at 22:00 every single weekday, and to reboot at 9:00 on Saturday and Sunday. You can set as follows:

Auto Reboot											
Schedule	1.	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Mon.	<input checked="" type="checkbox"/> Tues.	<input checked="" type="checkbox"/> Wed.	<input checked="" type="checkbox"/> Thur.	<input checked="" type="checkbox"/> Fri.	<input type="checkbox"/> Sat.	<input type="checkbox"/> Sun.	Time	22 : 00
	2.	<input checked="" type="checkbox"/> Enable	<input type="checkbox"/> Mon.	<input type="checkbox"/> Tues.	<input type="checkbox"/> Wed.	<input type="checkbox"/> Thur.	<input type="checkbox"/> Fri.	<input checked="" type="checkbox"/> Sat.	<input checked="" type="checkbox"/> Sun.	Time	09 : 00
<input type="button" value="Save"/>											

Diagnostics Tool

The Diagnostic Test page shows the test results for the connectivity of the physical layer and protocol layer for both LAN and WAN sides.

3G/4G-LTE:

▼ Diagnostic Tool	
WAN Interface	4G/LTE -1 ▼
Testing Ethernet LAN Connection	N/A
Ping Primary DNS (168.95.1.1)	N/A
Ping www.google.com	N/A
Ping other IP Address <input type="radio"/> Yes <input checked="" type="radio"/> No	N/A
<input type="button" value="Start"/>	

Click START to begin to diagnose the connection.

▼ Diagnostic Tool	
WAN Interface	4G/LTE -1 ▼
Testing Ethernet LAN Connection	PASS
Ping Primary DNS (168.95.1.1)	PASS
Ping www.google.com	PASS
Ping other IP Address <input checked="" type="radio"/> Yes <input type="radio"/> No	PASS
IP Address	8.8.8.8
<input type="button" value="Start"/>	

EWAN:

▼ Diagnostic Tool	
WAN Interface	EWAN(LAN4) ▼
Testing Ethernet LAN Connection	N/A
Ping Primary DNS (N/A)	N/A
Ping www.google.com	N/A
Ping other IP Address <input type="radio"/> Yes <input checked="" type="radio"/> No	N/A
<input type="button" value="Start"/>	

WirelessClient:

▼ Diagnostic Tool	
WAN Interface	Wireless Client ▼
Testing Ethernet LAN Connection	N/A
Ping Primary DNS (N/A)	N/A
Ping www.google.com	N/A
Ping other IP Address <input type="radio"/> Yes <input checked="" type="radio"/> No	N/A
<input type="button" value="Start"/>	

Ignition Sensing

Ignition sensing allows you to set the router to power on when the ignition key is turned to ACC/ON, and then power off after the ignition key is turned off with a designated time delay. For example, set your router to remain on for an hour after the vehicle is turned off and then shut off. When the vehicle is turned on again, the router will also turn back on.

▼ Ignition Sensing

Ignition Sensing Interval Time

****Click Apply then Restart buttons to apply your new settings****

Ignition Sensing Interval Time: Set the timeout period of the desired number of seconds, this is how long the router will remain on after the vehicle is turned off. (If the vehicle is turned back on before the timeout is reached, no action is taken.)

Chapter 5: Troubleshooting

If your Industrial LTE Router is not functioning properly, you can refer to this chapter for simple troubleshooting before contacting your service provider support. This can save you time and effort but if symptoms persist, consult your service provider.

Problems with the Router

Problem	Suggested Action
None of the LEDs is on when you turn on the router	Check the connection between the router and the adapter. If the problem persists, most likely it is due to the malfunction of your hardware. Please contact your service provider for technical support.
You have forgotten your login username or password	Try the default username "admin" and password "admin". If this fails, you can restore your router to its factory settings by pressing the reset button on the device rear side.

Problem with LAN Interface

Problem	Suggested Action
Cannot PING any PC on LAN	Check the Ethernet LEDs on the front panel. The LED should be on for the port that has a PC connected. If it does not lit, check to see if the cable between your router and the PC is properly connected. Make sure you have first uninstalled your firewall program before troubleshooting.
	Verify that the IP address and the subnet mask are consistent for both the router and the workstations.

Recovery Procedures

Problem	Suggested Action
---------	------------------

- **The front LEDs display incorrectly**
- **Still cannot access to the router management interface after pressing the RESET button.**
- **Software / Firmware upgrade failure**

Before starting recovery process, please configure the IP address of the PC as 192.168.1.100 and proceed with the following step-by-step guide.

1. Power the router off.
2. Press reset button and power on the router, once the Power lights Red, keeping press reset button over 6 seconds.
3. Internet LED flashes Green, router entering recovery procedure and router's IP will reset to Emergency IP address (Say 192.168.1.1).
4. Open browser and access <http://192.168.1.1> to upload the firmware.
5. Internet LED lit Red, and router starts to write firmware into flash. Please DO NOT power off the router at this step.
6. Internet LED lit Green when successfully upgrade firmware.
7. Power the router off and then on.

Appendix: Product Support & Contact

If you come across any problems please contact the dealer from where you have purchased the product.

Contact Billion

WORLDWIDE

<http://www.billion.com/>

MAC OS is a registered Trademark of Apple Computer, Inc.

Windows 7/98, Windows XP, and Windows Vista are registered Trademarks of Microsoft Corporation.

Federal Communication Commission Interference Statement

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.

FCC Caution:

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
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. . This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

Co-location statement

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.