

# User Manual

## BEC MX-200 PL9 Advanced Industrial 4G LTE Router



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# CHAPTER 1: INTRODUCTION

## Introduction to your Router

The BEC MX-200 PL9 Advanced Industrial 4G/LTE Router is a high performance fixed wireless platform enabling real-time 4G Cellular data connectivity for your existing serial devices and Ethernet network. The ultra-compact industrial-grade router, designed to deliver reliable and secure connectivity between devices across a broad range of M2M/IoT and industrial communication applications.

The MX-200 PL9 features two Gigabit Ethernet interfaces and a RS-232 Serial interface enabling wireless data connectivity for a broad range of applications and vertical machine-to-machine (M2M) market segments. Intelligent software supports configurable LAN/WAN options, embedded LTE module and enterprise level functionality such as: advanced security mechanisms, Quality of Service (QoS), SPI firewall, integrated VPN, auto failover for unparalleled uptime and network redundancy, and cloud-based management to extend visibility and control of devices remotely.

### 4G/LTE Mobility

To offer an advanced network solution that meets the growing demands of M2M services, MX-200 PL9 exclusively features dual WAN - load balance or auto-failover/fallback to provide extraordinary, always-on internet connectivity.

### Ultra-Compact and Lightweight Design

Designed for continuous operation in harsh environments, the MX-200 PL9 supports an extended operating temperature range from -40 to 158° F (-40 to 70° C) and a flexible input voltage range of 9-56V DC making it suitable for diverse environments and applications. To enable simple, reliable and efficient integration the ultra-compact, lightweight and low profile design incorporates highly flexible mounting options to ensure that the device can be easily mounted discretely anywhere.

### Secure VPN Connections

The MX-200 PL9 supports comprehensive and robust IPSec 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

- 4G LTE and/or Ethernet IP broadband connectivity
- High performance SX antenna for increased coverage, signal reception and efficiency
- Gigabit Ethernet WAN (GbE WAN) for Cable/Fiber/xDSL high WAN throughput
- Gigabit Ethernet LAN
- IPv6 ready (IPv4/IPv6 dual stack)
- 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
- 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
- Small form factor with multiple mounting options, easily installed by a single person
- Hardened enclosure with Industrial-graded components
- Designed to withstand hypothermia, heat and protect from shock, vibration, etc.

### Availability and Resilience

- Dual-WAN Interfaces
- Auto fail-over and failback
- High performance external antennas

### Network Protocols and Features

- IPv4, IPv6, IPv4 / IPv6 dual stack
- IP Tunnel IPv6 in IPv4 (6RD)
- IP Tunnel IPv4 in IPv6 (DS-Lite)
- NAT, static routing and RIP-1/2
- Universal Plug and Play (UPnP) compliant
- Dynamic Domain Name System (DDNS)
- Virtual server and DMZ
- SNTP, DNS relay
- IGMP proxy and IGMP snooping

- MLD proxy and MLD snooping
- Supports port-based Virtual LAN (VLAN)

## 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)

## Virtual Private Network (VPN) (Optional)

- 8 IPSec VPN Tunnels
- 8 PPTP VPN Tunnels (Dial-in:4, Dial-out:4)
- 8 L2TP VPN Tunnels (Dial-in:4, Dial-out:4)
- GRE (up to 8 tunnels)
- OpenVPN (Server: 1 rule, Clients: 4)
- Embedded PPTP / L2TP / IPSec Client and Server
- IKE Key Management
- MPPE Encryption for PPTP
- IPSec DES, 3DES and AES encryption

## Management

- Quick Installation wizard
- Web-based GUI for remote and local management (IPv4/IPv6)
- Firmware upgrades and configuration data upload and download via web-based GUI
- Supports DHCP server / client / relay
- Supports SNMP
- TR-069 supports remote management
- BECentral Cloud Management

## Hardware Specifications

### Physical interface

- 4G/LTE: Two (2) SMA Female Connectors
- GPS: (1) SMA female Connector
- WAN: Cellular 4G/LTE (and/or Ethernet WAN (Configurable)
- RS-232 (DCE, DB-9): one (1) port
- Ethernet LAN: 2-port 10/100/1000Mbps, auto-crossover (MDI/ MDI-X) switch
- SIM Card: One (1) slot
- Reset Button
- Power Connector: 4-pin connectors
- LED Indicators: Power / Internet / LTE / Ethernet

### Physical Specifications

- Dimensions (W\*H\*D): 4.29" x 1.17" x 3.43" (109mm x 29.7mm x 87mm)

## Approvals (MX-200 PL9)

### PTCRB, FCC

### UL Safety

- Class I Division 2 (C1D2) Groups ABCD T4
- Power Rating: 9-56V DC, 1.34-0.22A
- Operating Temperature Range: -40° to +70° C (-40° to +158° F)



**Attention**

- ✓ BEC MX-200 PL9, THE EQUIPMENT, IS AN OPEN-TYPE DEVICE AND IS MEANT TO BE INSTALLED IN AN ENCLOSURE SUITABLE FOR THE ENVIRONMENT SUCH THAT THE EQUIPMENT IS ONLY ACCESSIBLE WITH THE USE OF A TOOL.
- ✓ BEC MX-200 PL9 IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D HAZARDOUS LOCATIONS, OR NONHAZARDOUS LOCATIONS ONLY.



**Warning**

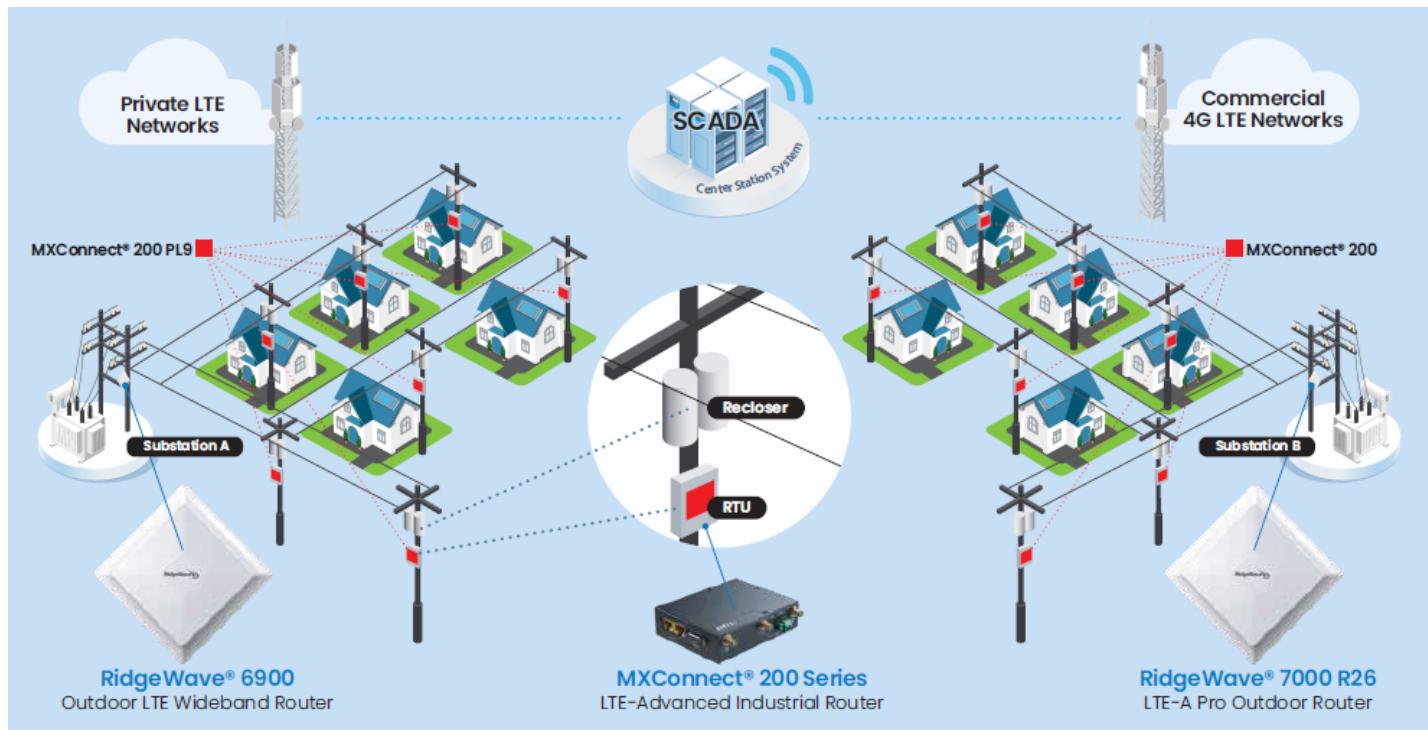
**EXPLOSION HAZARD – DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED.**

**AVERTISSEMENT – RISQUE D'EXPLOSION. NE PAS BRANCHER NI DÉBRANCHER SOUS TENSION.**

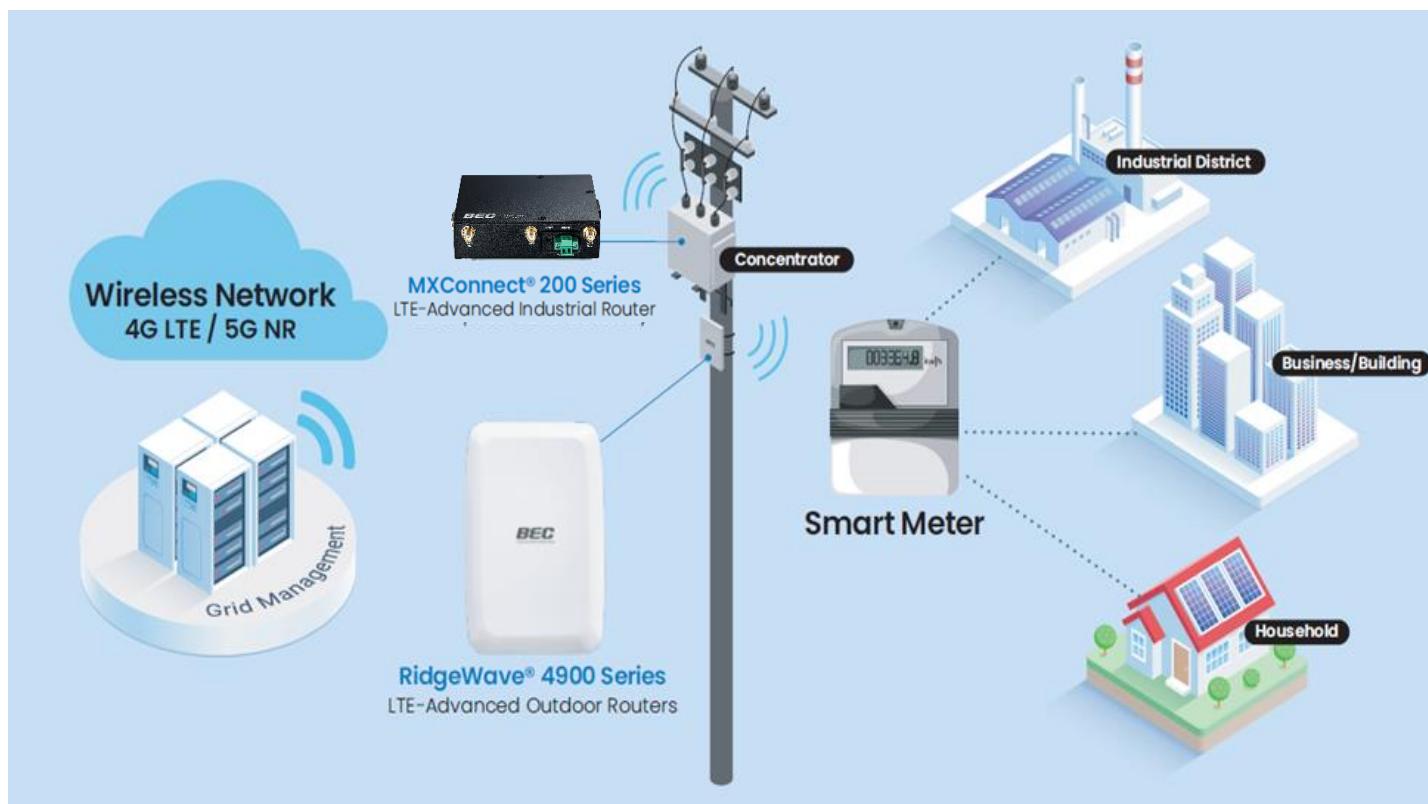
## Application Diagrams

The MX-200 PL9 Advanced Industrial 4G/LTE VPN Router is the ideal solution for mission critical applications such as: Private LTE, Primary Connectivity, Industrial Communications, M2M/IoT SCADA, Remote Monitoring/Control, Field Area Networks (FAN) deployments and much more.

### FLISR Solution:



### AMI Backhaul:



# CHAPTER 2: PRODUCT OVERVIEW

## Important Note for Using This Router



**Warning**

- ✓ Do not use the router in high humidity or high temperature.
- ✓ Do not use the same power source for the MX-200 PL9 on other equipment.
- ✓ 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.



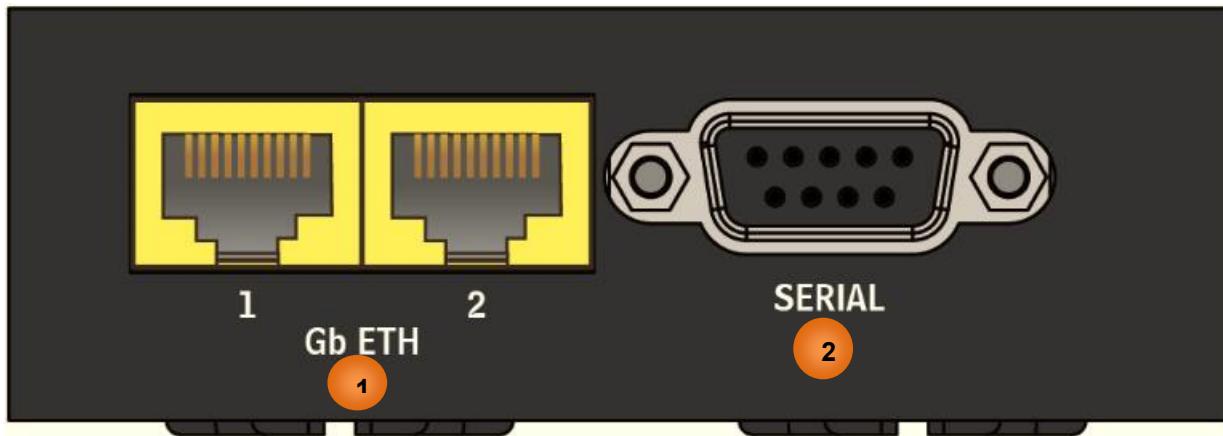
**Attention**

- ✓ Place the router on a stable surface.
- ✓ Only use the power adapter that comes with the package. Using a different voltage rating power adaptor may damage the router.

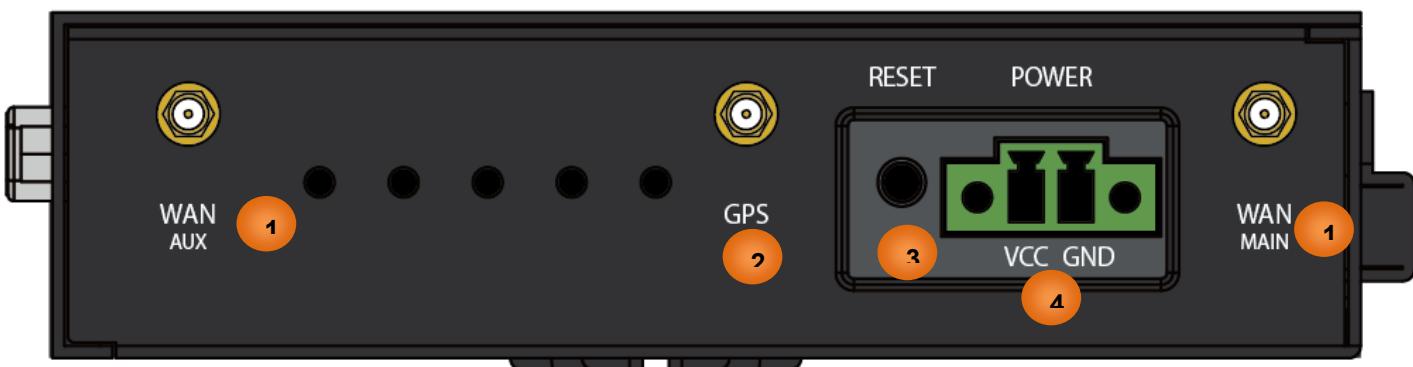
## Package Contents

✓ BEC MX-200 PL9 M2M Router * 1	(Optional Accessories)
✓ Quick Installation Guide * 1	✓ 4G Antennas
✓ DIN Rail Mounting Kit * 1	✓ Active GPS Antenna
✓ Power Terminal Block 2-pin 3.5mm * 1	
✓ Power Converter with 2-pin Terminal Block * 1	
✓ DC Power Adapter, 12V 1.2A* 1	
✓ Ethernet (RJ-45) Cable * 1	

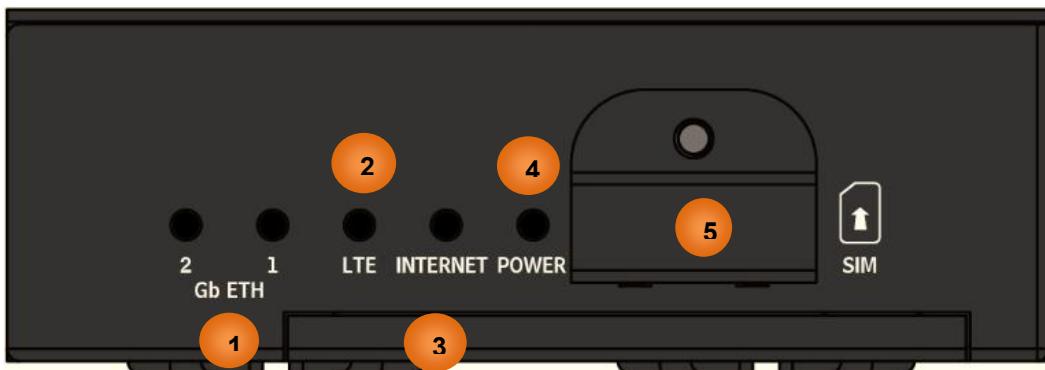
## Device Description



INTERFACE		MEANING
1	<b>Gigabit Ethernet (LAN 1 ~ 2)</b>	<b>ETH1 is a LAN / WAN configurable port for broadband connectivity</b> Connect PCs, Laptops or any other office/home LAN devices with the supplied RJ-45 Ethernet cable (Cat-5 or Cat-5e) to any of those two LAN ports.
2	<b>SERIAL</b>	RS-232 serial port for machine connection and data collection Connect the male end of RS-232 serial data cable to the MX-200 PL9 and the other end to a machine or PC.



INTERFACE		MEANING
1	<b>WAN (MAIN/AUX)</b> <b>4G LTE Antenna Connectors</b>	<p>SMA female connectors.</p> <p>Manually screw the 4G LTE antennas tight to the female connectors</p> <p>* 3G/4G-LTE antenna(s) sold separately</p>
2	<b>GPS Antenna Connector</b>	<p>SMA female connectors.</p> <p>Manually screw the GPS antenna tight to the connector</p> <p>* GPS antenna sold separately</p>
3	<b>RESET</b>	After the device is powered on, press it <b>6 seconds or above</b> : to restore to factory default settings (this is used when you cannot login to the router, e.g. forgot your password)
4	<b>POWER</b>	<p>Attach the power terminal block, 2-pin 3.5mm, or the power converter with 2-pin terminal block here.</p> <p><b>VCC</b> (Left Connector): Power - Red Wire to connect to the Positive (+) terminal of the power supply.</p> <p><b>GND</b> (Right Connector): Ground – Black Wire to connect to the ground of the power supply</p>



LEDS / INTERFACE		MEANING	
<b>ETH #1 Can be configured to be WAN port for broadband connectivity</b>			
1	<b>Gb ETH (1 &amp; 2) (Gigabit Ethernet)</b>	Green	<b>Ethernet LAN:</b> Connected to an Gigabit (1000Mbps) Ethernet device
		Red	<b>Ethernet WAN (ETH1 Only):</b> Successfully connected with a broadband connection device
		Blinking	Transmission speed is at 10/100Mbps
		Off	Data being transmitted/received
2	<b>LTE (Received Signal Strength Indicator)</b>	Green	RSSI greater than -69 dBm. Excellent signal condition
		Green / Fast Flashing	RSSI from -81 to -69 dBm. Good signal condition
		Red / Fast Flashing	RSSI from -99 to -81 dBm. Fair signal condition
		Red / Slow Flashing	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
3	<b>Internet</b>	Green	IP connected and traffic is passing through the device
		Red	IP request failed
		Off	Either in bridged mode or WAN connection is not present
4	<b>Power</b>	Green	System ready
		Red	Boot failure
5	<b>SIM Card Slot</b>	 N/A	Insert mini SIM card (2FF) with the gold contact facing down. Push mini-SIM card (2FF) inwards to eject it  <small>* Power off the MX-200 PL9 before inserting or removing the SIM card</small>

## System Recovery Procedures

The purpose is to allow users to restore the MX-200 PL9 to its initial stage when the device is outage, upgraded to a wrong / broken firmware, cannot access to the GUI with wrong username and/or password, etc.

### Step 1 – Configure your PC Network IP Address

Before performing the system recovery, assign this IP address and Netmask to your PC, **192.168.1.100** and **255.255.255.0** respectively.

### Step 2 – Reset your MX-200 PL9 Device

- 2.1 Power off your MX-200 PL9
- 2.2 Power on the MX-200 PL9 while pushing the RESET button with a small pointed object (such as paper clip, needle, toothpick, and etc.).
- 2.3 When the POWER LED turns RED, keep holding and pushing the RESET button until the INTERNET LED flashes in GREEN

### Step 3 – Restore your MX-200 PL9 Device

With INTERNET light flashes green, MX-200 PL9 is in recovery mode and ready for a new Firmware.

- 3.1 Open a web browser and type the IP address, **192.168.1.1**, to access to the recovery page.  
**NOTE:** In the recovery mode, MX-200 PL9 will not respond to any PING or other requests.
- 3.2 Browse to the new Firmware image file then click Upload to start the upgrade process.
- 3.3 INTERNET LED turns red means the Firmware upgrade is in process.  
DO NOT power off or reboot the device, it would permanently damage your MX-200 PL9.
- 3.4 INTERNET LED turns green after the Firmware upgrade completed
- 3.5 Power cycle on & off to regain access to the MX-200 PL9.

## 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 Vista / 7 / 8, 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 or 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 MX-200 PL9. To configure other types of workstations, please consult the manufacturer's documentation.

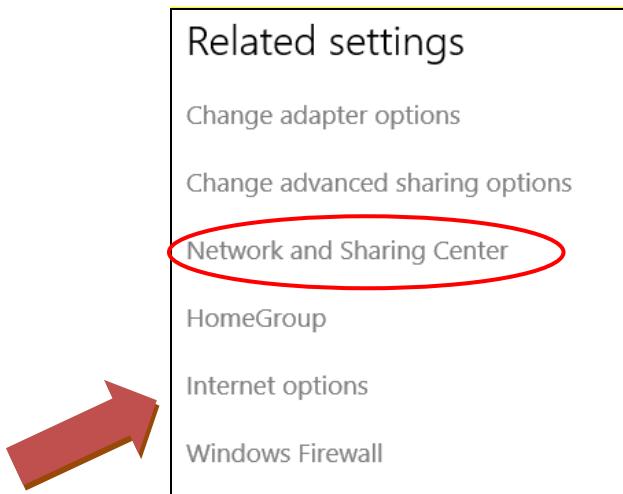
**Attention**

# Network Configuration – IPv4

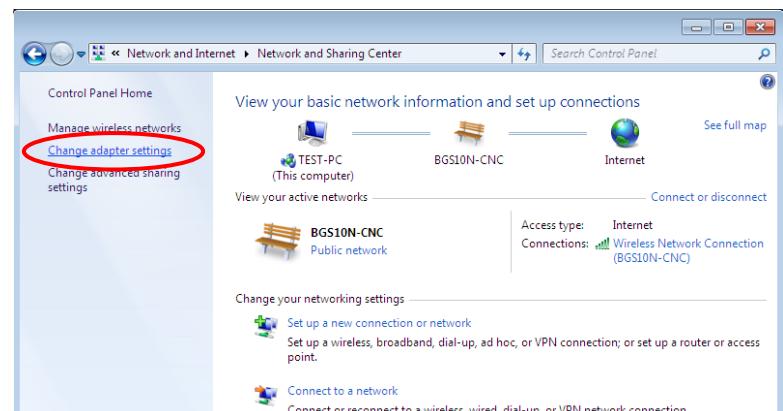
## Configuring PC in Windows 10 (IPv4)

1. Click .
2. Click  Settings
3. Then click on **Network and Internet**.  

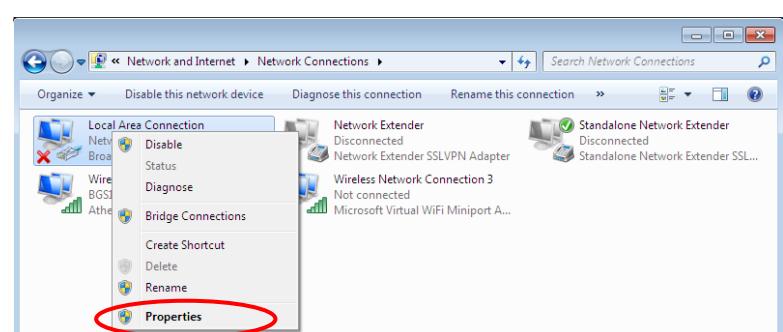
4. Under **Related settings**, select **Network and Sharing Center**



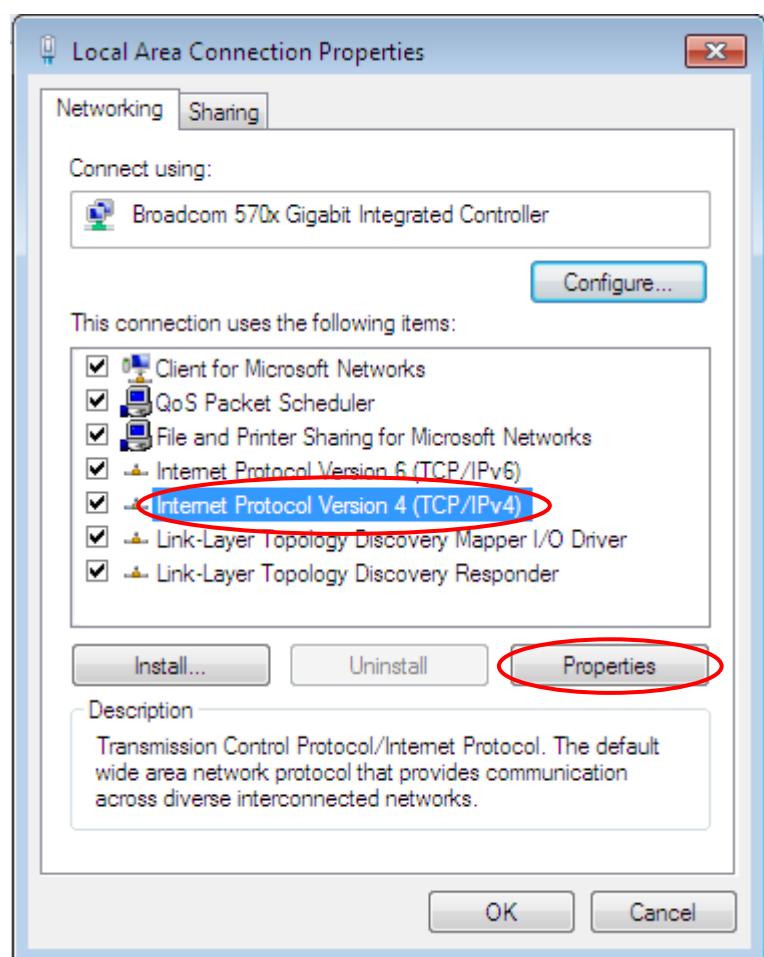
5. When the **Network and Sharing Center** window pops up, select and click on **Change adapter settings** on the left window panel.



6. Select the **Local Area Connection**, and right click the icon to select **Properties**.

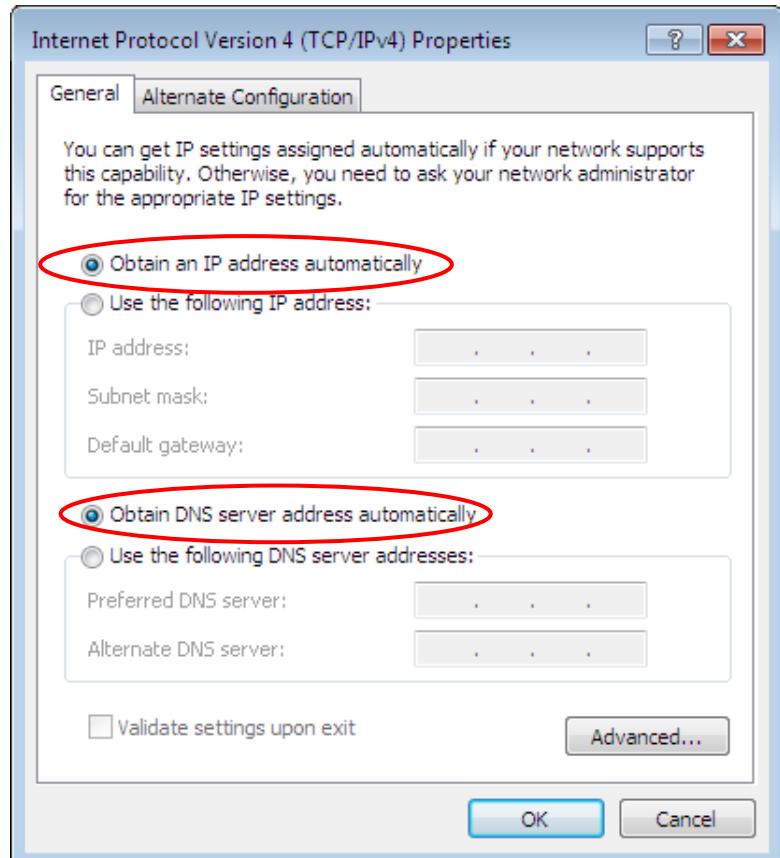


7. Select **Internet Protocol Version 4 (TCP/IPv4)** then click **Properties**.



8. In the **TCP/IPv4 properties** window, select the **Obtain an IP address automatically** and **Obtain DNS Server address automatically** radio buttons. Then click **OK** to exit the setting.

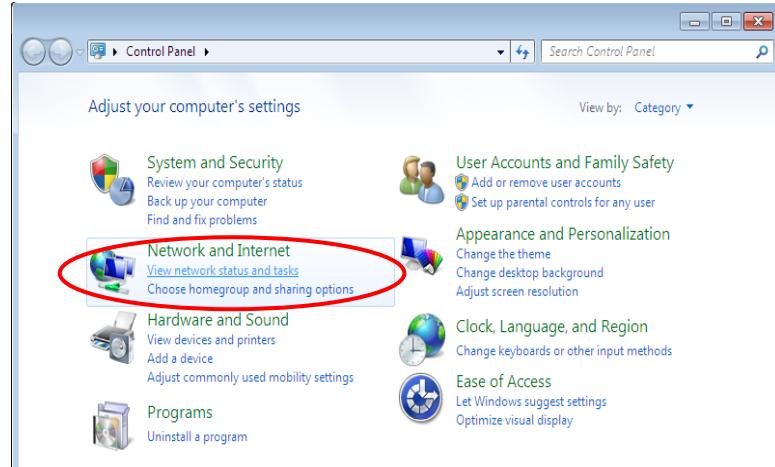
9. Click **OK** again in the **Local Area Connection Properties** window to apply the new configuration.



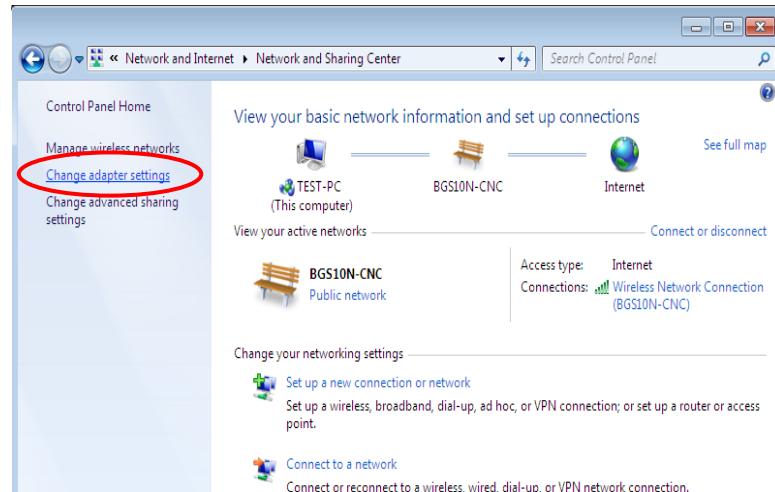
## Configuring PC in Windows 7/8 (IPv4)

1. Go to **Start**. Click on **Control Panel**.

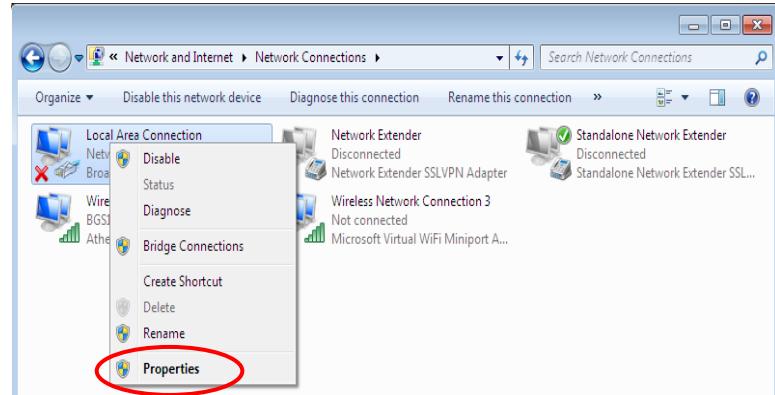
2. Then click on **Network and Internet**.



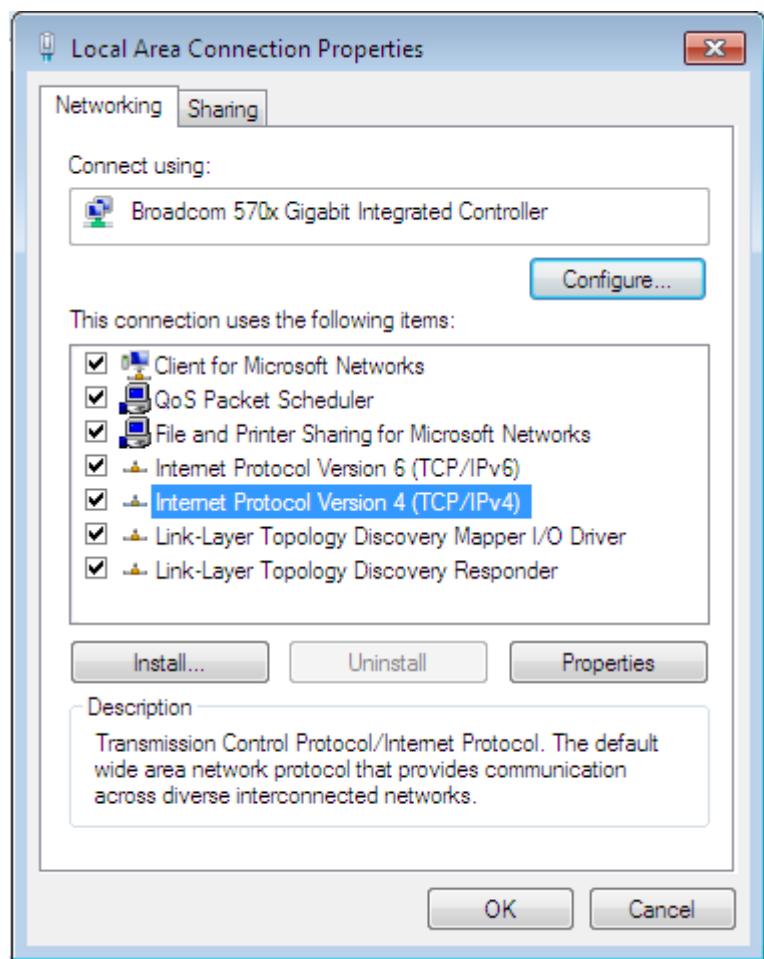
3. When the **Network and Sharing Center** window pops up, select and click on **Change adapter settings** on the left window panel.



4. Select the **Local Area Connection**, and right click the icon to select **Properties**.

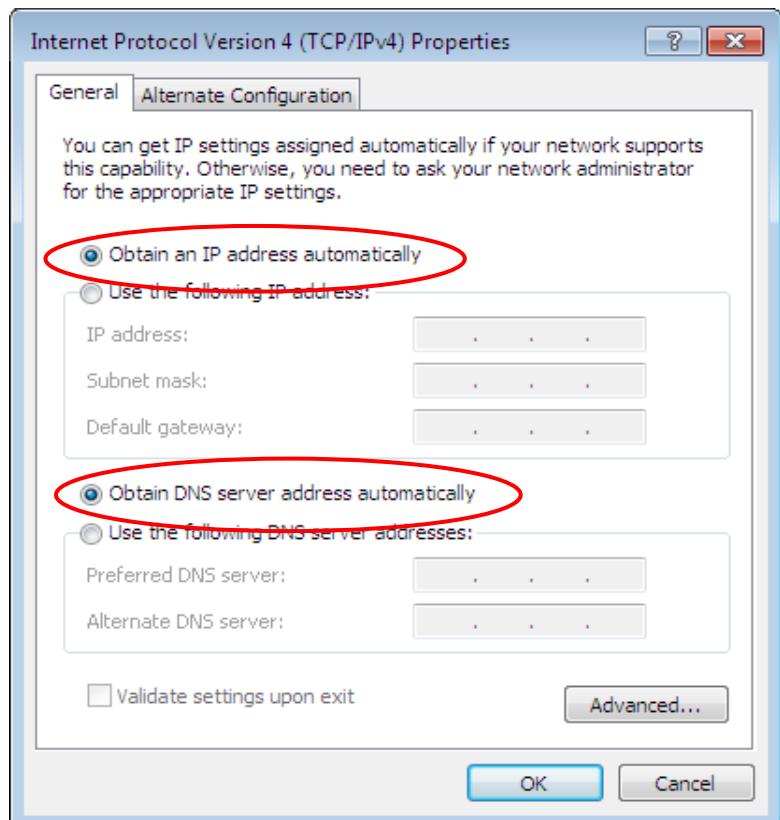


5. Select **Internet Protocol Version 4 (TCP/IPv4)** then click **Properties**.



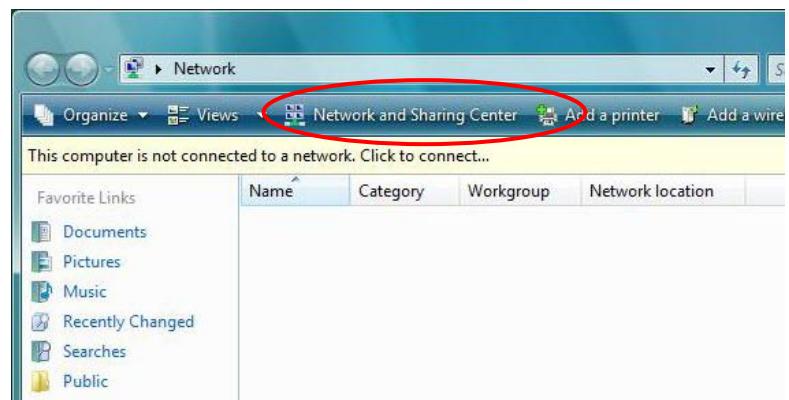
6. In the **TCP/IPv4 properties** window, select the **Obtain an IP address automatically** and **Obtain DNS Server address automatically** radio buttons. Then click **OK** to exit the setting.

7. Click **OK** again in the **Local Area Connection Properties** window to apply the new configuration.



## Configuring PC in Windows Vista (IPv4)

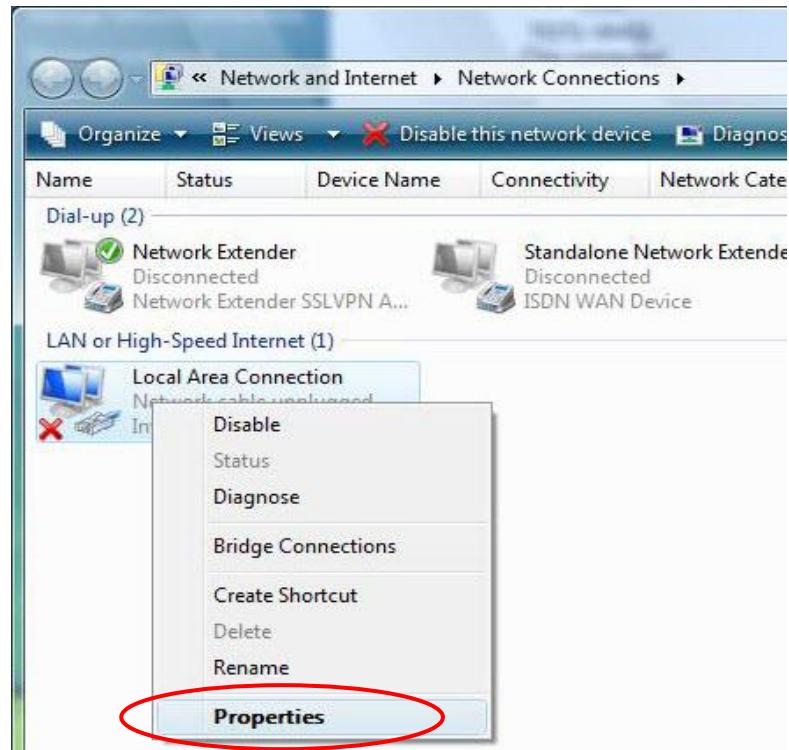
1. Go to **Start**. Click on **Network**.
2. Then click on **Network and Sharing Center** at the top bar.



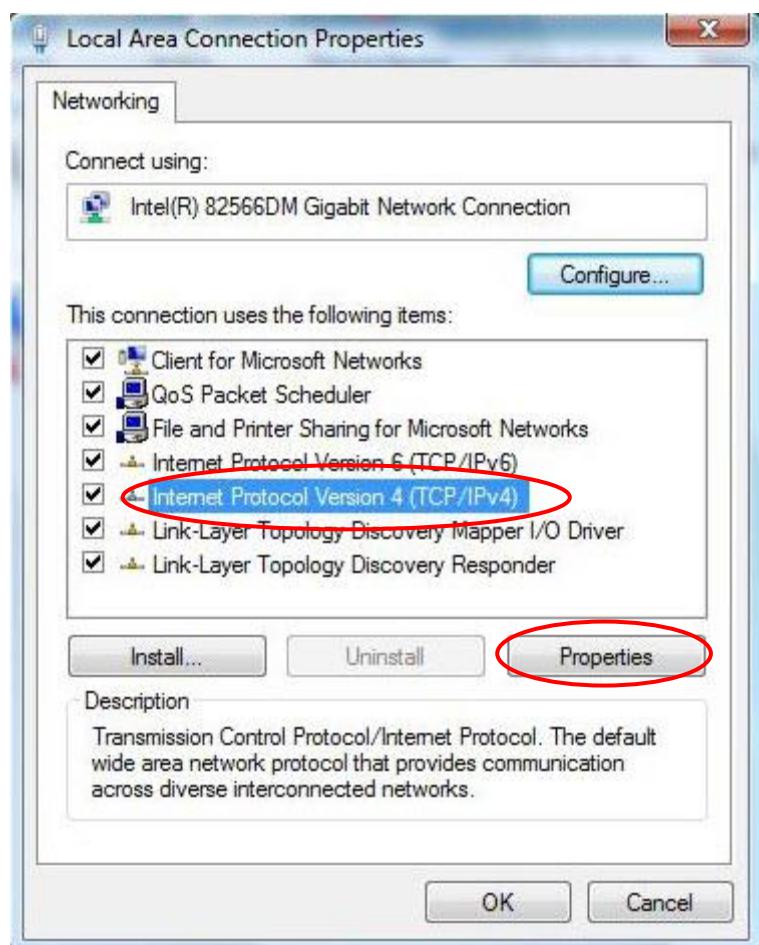
3. When the **Network and Sharing Center** window pops up, select and click on **Manage network connections** on the left window pane.



4. Select the **Local Area Connection**, and right click the icon to select **Properties**.

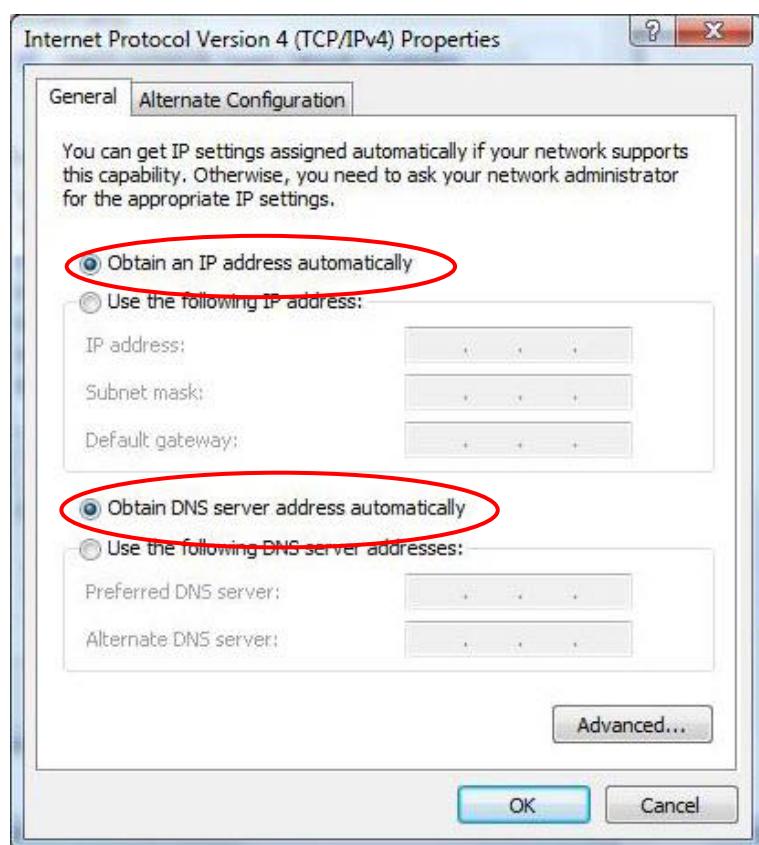


5. Select **Internet Protocol Version 4 (TCP/IPv4)** then click **Properties**.



6. In the **TCP/IPv4 properties** window, select the **Obtain an IP address automatically** and **Obtain DNS Server address automatically** radio buttons. Then click **OK** to exit the setting.

7. Click **OK** again in the **Local Area Connection Properties** window to apply the new configuration.

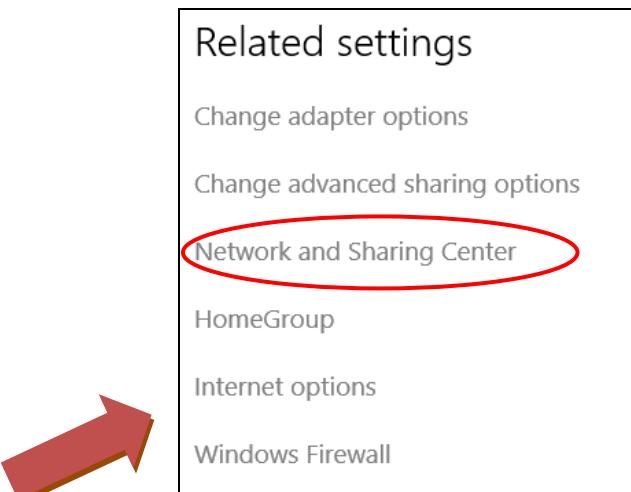


## Network Configuration – IPv6

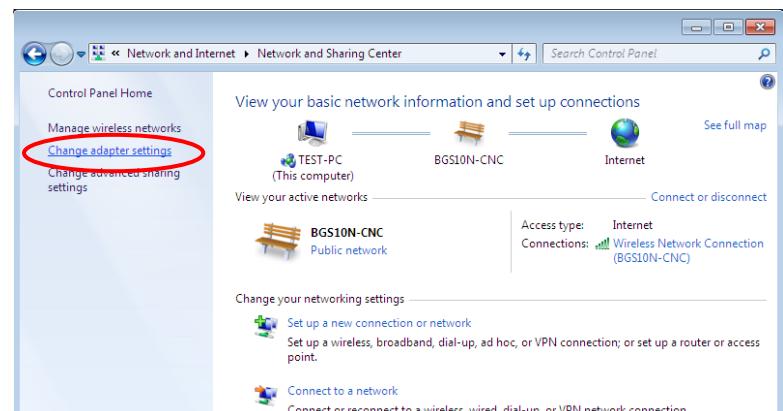
### Configuring PC in Windows 10 (IPv6)

1. Click .
2. Click  Settings
3. Then click on **Network and Internet**.  

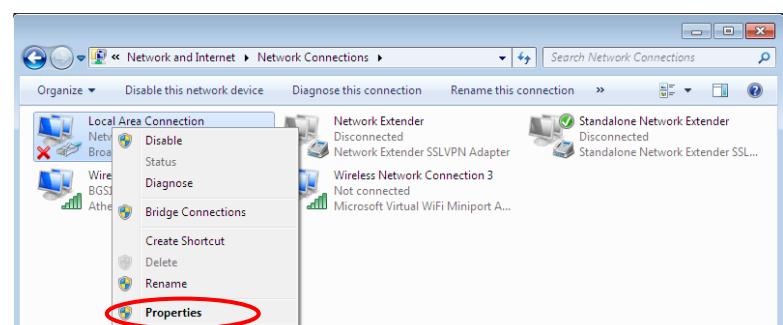
4. Under **Related settings**, select **Network and Sharing Center**



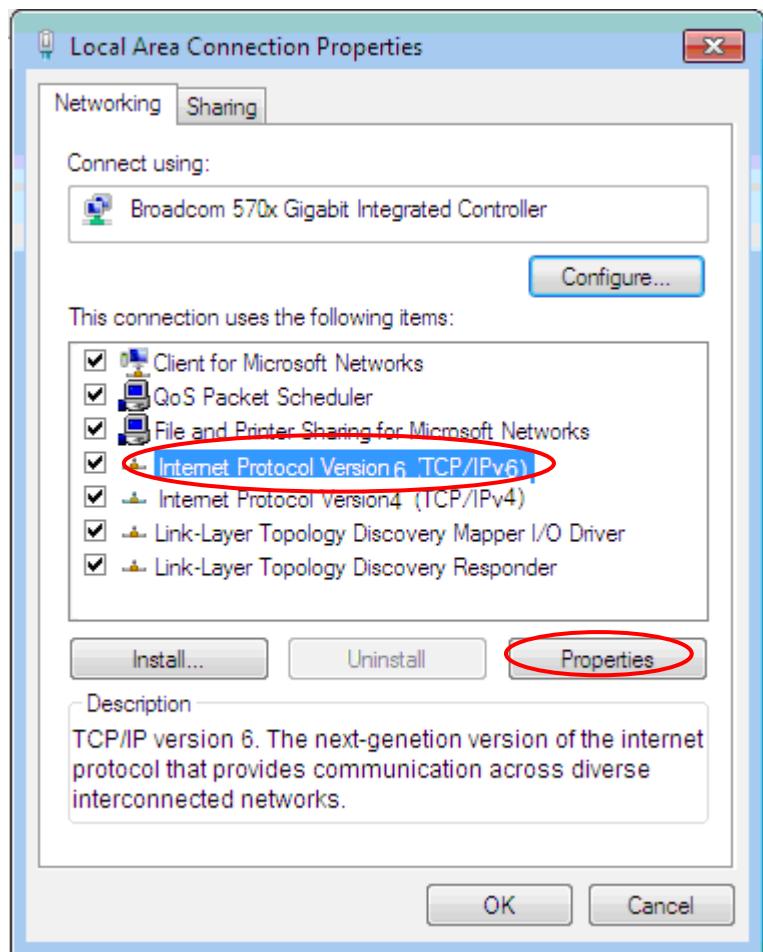
5. When the **Network and Sharing Center** window pops up, select and click on **Change adapter settings** on the left window panel.



6. Select the **Local Area Connection**, and right click the icon to select **Properties**.

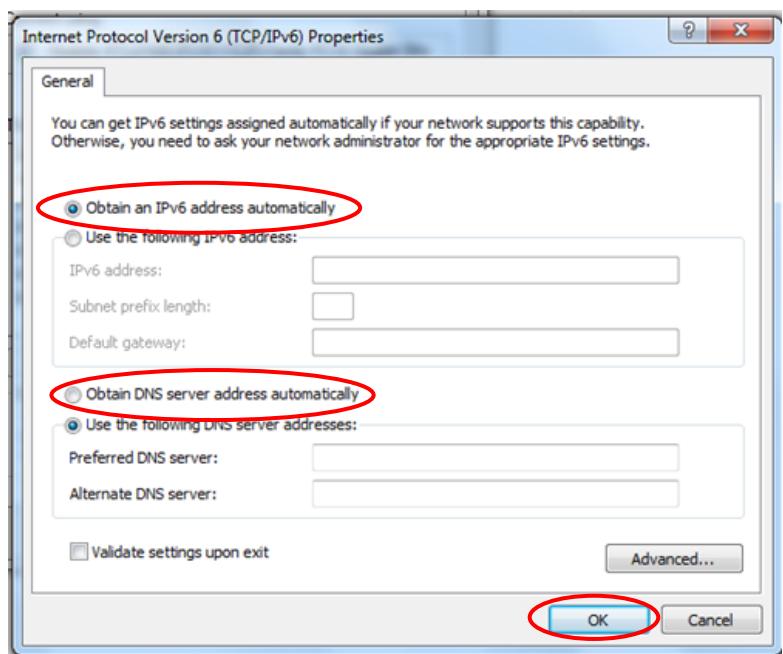


7. Select **Internet Protocol Version 6 (TCP/IPv6)** then click **Properties**.



8. In the **TCP/IPv6 properties** window, select the **Obtain an IPv6 address automatically** and **Obtain DNS Server address automatically** radio buttons. Then click **OK** to exit the setting.

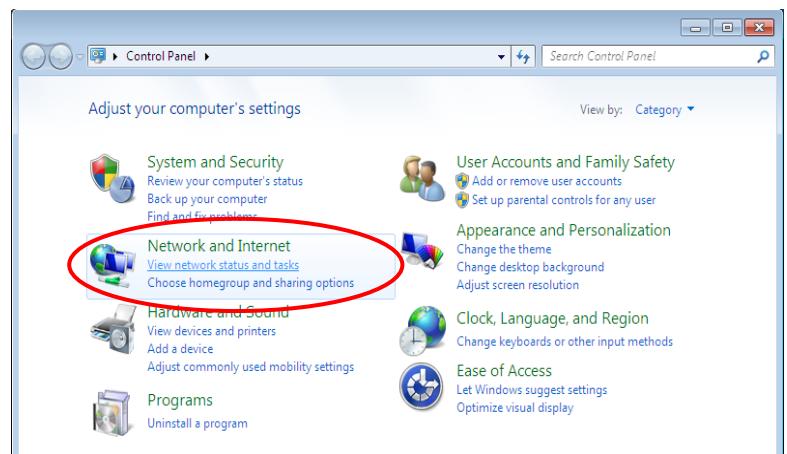
9. Click **OK** again in the **Local Area Connection Properties** window to apply the new configuration.



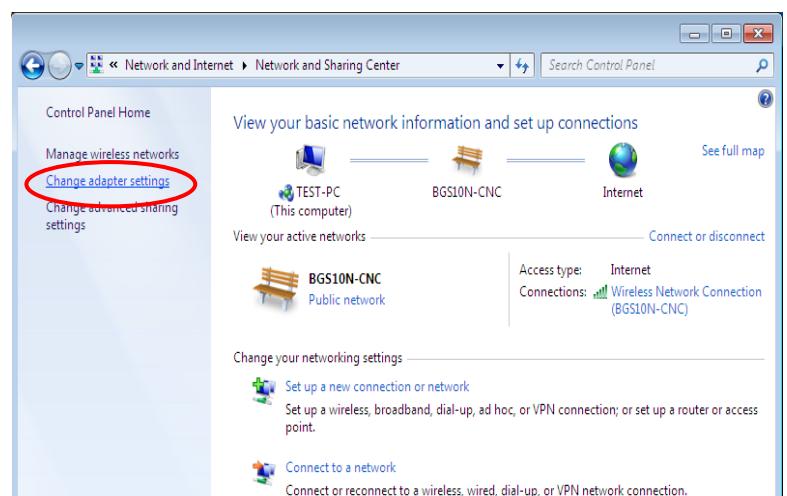
## Configuring PC in Windows 7/8 (IPv6)

1. Go to **Start**. Click on **Control Panel**.

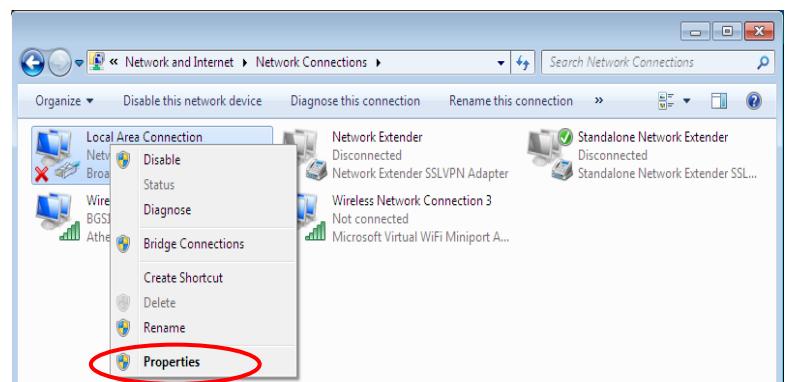
2. Then click on **Network and Internet**.



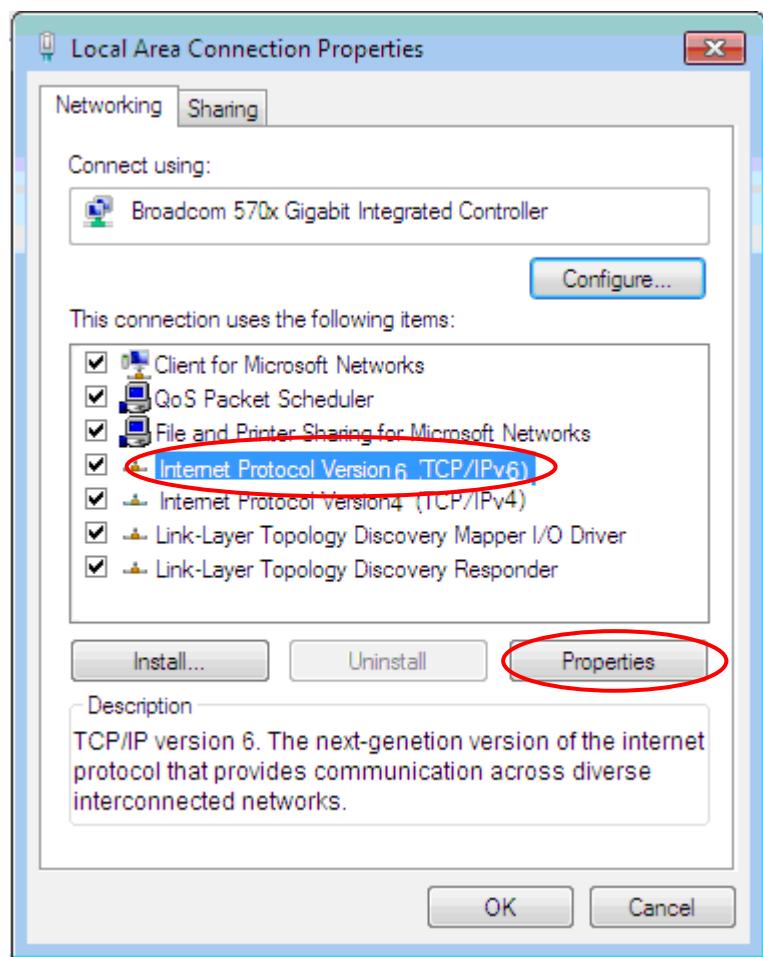
3. When the **Network and Sharing Center** window pops up, select and click on **Change adapter settings** on the left window panel.



4. Select the **Local Area Connection**, and right click the icon to select **Properties**.

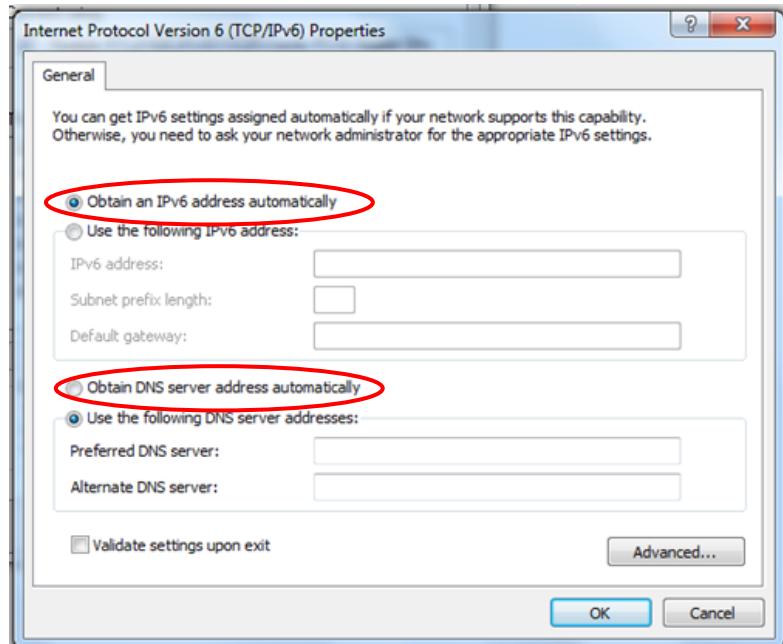


5. Select **Internet Protocol Version 6 (TCP/IPv6)** then click **Properties**.



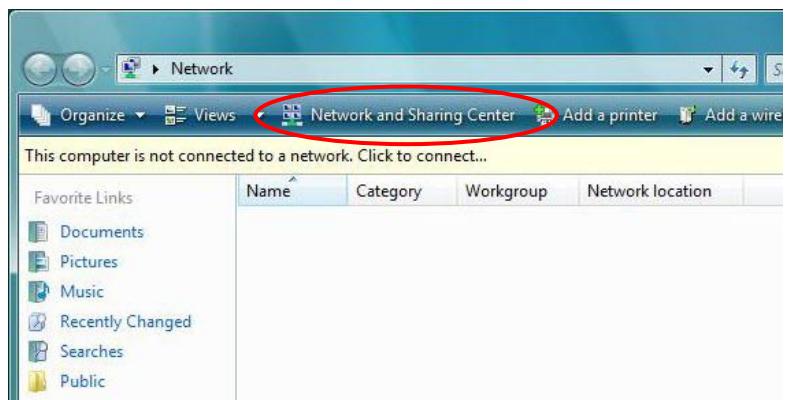
6. In the **TCP/IPv6 properties** window, select the **Obtain an IPv6 address automatically** and **Obtain DNS Server address automatically** radio buttons. Then click **OK** to exit the setting.

7. Click **OK** again in the **Local Area Connection Properties** window to apply the new configuration.



## Configuring PC in Windows Vista (IPv6)

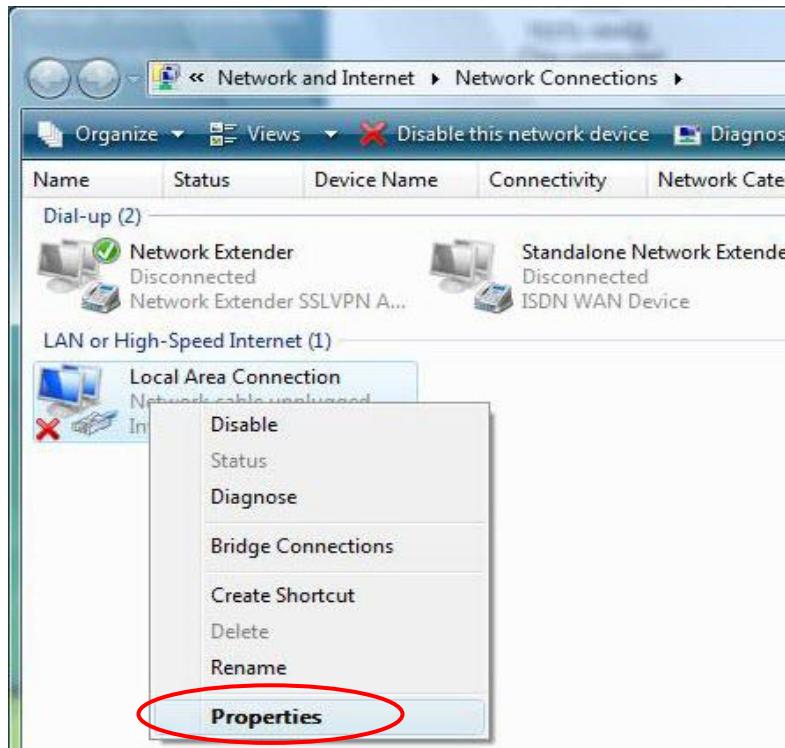
1. Go to **Start**. Click on **Network**.



2. Then click on **Network and Sharing Center** at the top bar.

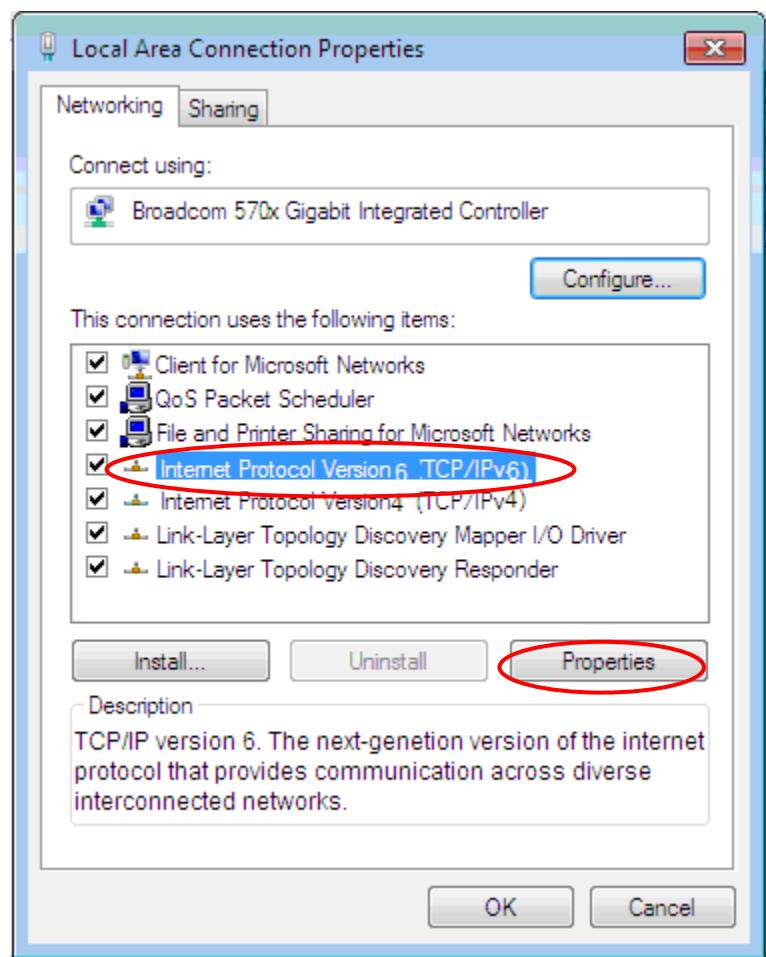


3. When the **Network and Sharing Center** window pops up, select and click on **Manage network connections** on the left window pane.



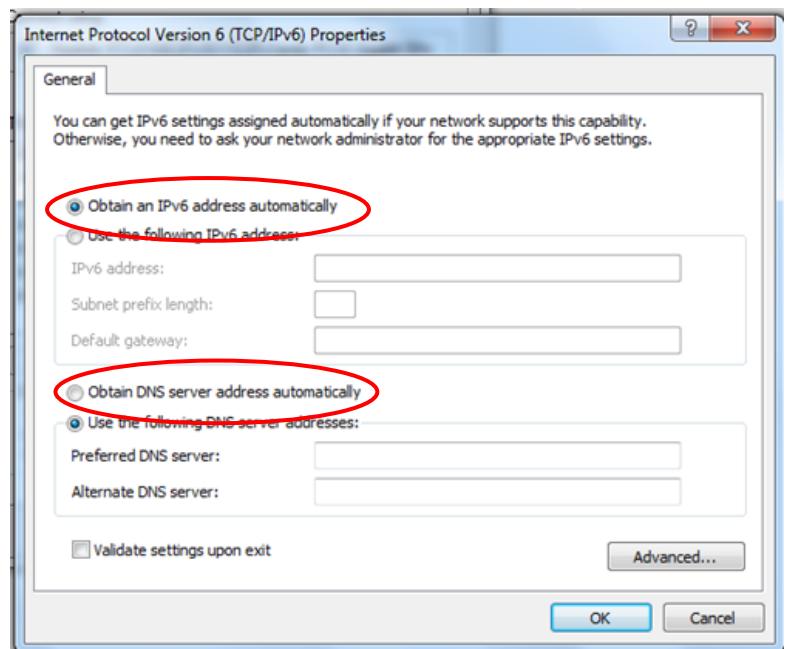
4. Select the **Local Area Connection**, and right click the icon to select **Properties**.

5. Select **Internet Protocol Version 6 (TCP/IPv6)** then click **Properties**.



6. In the **TCP/IPv6 properties** window, select the **Obtain an IP address automatically** and **Obtain DNS Server address automatically** radio buttons. Then click **OK** to exit the setting.

7. Click **OK** again in the **Local Area Connection Properties** window to apply the new configuration.



# Default Settings

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

## Web Interface: (Username and Password)

### Administrator

- ✓ Username: admin
- ✓ Password: A unique12-digit password can be found on the device label.

### User

- ✓ Username: user
- ✓ Password: user



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: 100

# 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**.

For the **User** account, default username and password is “**user**” and “**user**”.

**NOTE: This username / password may vary by different Internet Service Providers.**



**Congratulations! You have successfully logged on to your MX-200 PL9**

Once you have logged on to your MX-200 PL9 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 pages, which includes:

Section	Status	Quick Start (Wizard Setup)	Configuration
Sub- Items	Device Info		<b>Interface Setup</b> <ul style="list-style-type: none"> <li>- Internet</li> <li>- LAN</li> <li>- Loopback</li> </ul> <b>Dual WAN</b> <ul style="list-style-type: none"> <li>- General Setting</li> <li>- Outbound Load Balance</li> <li>- Protocol Binding</li> </ul> <b>Advanced Setup</b> <ul style="list-style-type: none"> <li>- Firewall</li> <li>- Routing</li> <li>- Dynamic Routing</li> <li>- NAT</li> <li>- VRRP</li> <li>- Static DNS</li> <li>- QoS</li> <li>- Time Schedule</li> <li>- Mail Alert</li> <li>- Serial</li> </ul>
	System Status		
	System Log		
	3G/4G-LTE Status		
	Statistics		
	DHCP Table		
	IPSEC Status		<b>VPN</b> <ul style="list-style-type: none"> <li>- IPSec</li> <li>- PPTP Server</li> <li>- PPTP Client</li> <li>- L2TP</li> <li>- GRE</li> <li>- OpenVPN Server</li> <li>- OpenVPN Client</li> </ul>
	PPTP Status		
	L2TP Status		
	GRE Status		<b>Access Management</b> <ul style="list-style-type: none"> <li>- Device Management</li> <li>- SNMP</li> <li>- Syslog</li> <li>- Universal Plug &amp; Play</li> <li>- Dynamic DNS</li> <li>- Access Control</li> <li>- Packet Filter</li> <li>- CWMP (TR-069)</li> <li>- Parental Control</li> <li>- BECentral Management</li> </ul>
	OpenVPN Status		
	ARP Table		<b>Maintenance</b> <ul style="list-style-type: none"> <li>- User Management</li> <li>- Certificate Management</li> <li>- Time Zone</li> <li>- Firmware &amp; Configuration</li> <li>- System Restart</li> <li>- Auto Reboot</li> <li>- Diagnostic Tool</li> </ul>
	VRRP Status		

Please see the relevant sections of this manual for detailed instructions on how to configure your **MX-200 PL9** device.

# Status

## Device Info

It provides brief status summary of the device.

Device Information		Physical Port Status	
Model Name	MX-200	4G LTE -1	✗
Firmware Version	1.02.1.10	EWAN	✗
MAC Address	00:04:ed:98:76:54	Ethernet	✓
Date-Time	Fri Jan 2 01:59:11 UTC 1970		
System Up Time	1 day 1 hour 59 mins		
WAN		LAN	
Interface	Protocol	Connection	IP Address
4G LTE -1	Dynamic IP	Not Connected	/
IP Address	Subnet Mask/Prefix Length	DHCP Server	
192.168.1.254	255.255.255.0	Enable / 192.168.1.100~192.168.1.199	Enable / Stateless

### Device Information

**Model Name:** Name of the router for identification purpose.

**Firmware Version:** Software version currently loaded in the router

**MAC Address:** A unique number that identifies the router

**Data Time:** Setup correct time on the **MX-200 PL9** with your PC. Check on [Time Zone](#) section for more configuration information.

**System Uptime:** Display how long the **MX-200 PL9** has been powered on.

### Physical Port Status

**Physical Port Status :** Display available connection interfaces, WAN (3G/4G-LTE, EWAN) and LAN (Ethernet) are supported in the MX-200 PL9.

#### WAN

**Interface:** List current available WAN connections.

**Protocol:** Display selected WAN connection protocol

**Connection:** The current connection status.

**IP Address:** WAN port IP address.

**Default Gateway:** The IP address of the default gateway.

#### LAN

**IP Address:** LAN port IPv4 address.

**Subnet Mask/Prefix Length:** Display LAN port IP subnet mask of IPv4 and/or Prefix length of IPv6.

**DHCP Server:** Display LAN DHCP status of IPv4 and IPv6.

- ▶ **Enable / 192.168.1.100~199:** DHCPv4 server status on or off / DHCP IP range
- ▶ **Enable / Stateless:** DHCPv6 server status on or off / DHCPv6 server Type

## System Status

Display device CPU and memory usage information

System Status	
CPU	
Usage	1%
Memory	
Total	60520 kB
Free	32196 kB
Cached	9948 kB
<input type="button" value="Refresh"/>	

### CPU

**Usage:** Display the amount of CPU's processing capacity is being used in percentage (%). Higher the % rate may result in slow Internet loading, experiencing video lags, etc. To reduce high CPU consumption by resetting the device, power off and on, an easiest way to regain the service.

### Memory

**Total / Free / Cached (in Kbyte):** Display the memory consumptions in kilobytes (kB).

## System Log

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

System Log	
Jan 1 00:00:31	syslogd started: BusyBox v1.00 (2015.12.28-02:11+0000)
Jan 1 00:00:33	pptpd[1492]: MGR: Manager process started
Jan 1 00:00:33	pptpd[1492]: MGR: Maximum of 100 connections available
Jan 1 00:00:39	PPOELOGIN: bind service port
Jan 1 00:00:39	PPOELOGIN: begin service loop
Jan 1 00:00:39	syslog: [Hardware monitor]: START
Jan 1 00:03:54	WEB: WEB user <admin> login

**Refresh:** Press this button to refresh the statistics.

**Backup:** Press to save the System log, log.cfg, to your computer / notebook.

## 3G/4G-LTE Status

It contains 3G/4G-LTE connection information.

4G/LTE Status	
Status	Up
Signal Strength	 -62.00dbm
Signal Information	RSRP:-92.50 , RSRQ:-13.80 , SINR:11.90
Network Name	"Chunghwa Telecom"
Cell ID	81023501
Card IMEI	
Card IMSI	
Network Mode	LTE
Network Band	B3
Usage Allowance	
Amount used	0 Hours of 720 Hours
Billing period	 Day:6
<input type="button" value="Clean"/>	<input type="button" value="Save"/>
<input type="button" value="Refresh"/>	

**Status:** The current status of the 3G/4G-LTE connection.

**Signal Strength:** The signal strength bar and dBm value indicates the current 3G/4G-LTE signal strength. The front panel 3G/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. Please refer to the [Device Description](#) for details.
- ▶ 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:** Display the actual PCI (Physical Cell ID) that device is attached and to transfer the data.

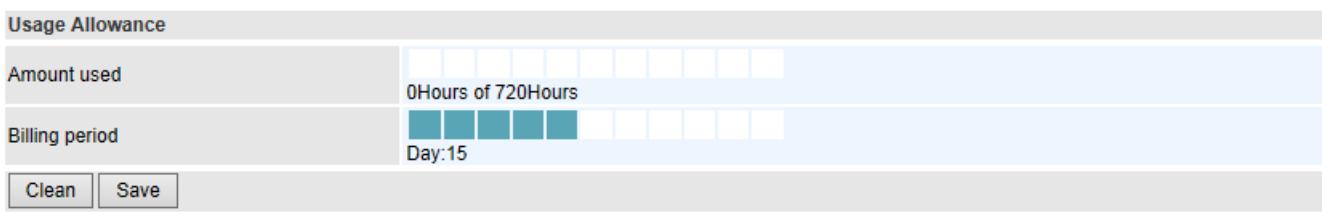
**Card IMEI:** The unique identification number that is used to identify the 3G/4G-LTE module.

**Card IMSI:** The international mobile subscriber identity used to uniquely identify the 3G/4G-LTE

module.

**Network Mode / Band:** Show the using network mode and LTE band.

### Usage Allowance



**Amount Used:** Display the amount of mobile data used and remaining in current billing cycle.

**Billing Cycle:** Display the start date and number of days remaining in current billing cycle

**Clean:** Reset current saved mobile usage

**Save:** Click to save current mobile status to ROM

**Refresh:** Click to refresh the page.

## Statistics

### ❖ 4G/LTE

Take 4G/LTE as an example to describe the following connection transmission information.

▼ Statistics		
Traffic Statistics		
Interface	<input checked="" type="radio"/> 3G/4G-LTE Status	<input type="radio"/> EWAN(LAN1)
Transmit Statistics		
Transmit Frames of Current Connection	0	
Transmit Bytes of Current Connection	0	
Transmit Total Frames	0	
Transmit Total Bytes	0	
Receive Statistics		
Receive Frames of Current Connection	0	
Receive Bytes of Current Connection	0	
Receive Total Frames	0	
Receive Total Bytes	0	
<input type="button" value="Refresh"/>		

### Traffic Statistics

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

### Transmit Statistics

**Transmit Frames of Current Connection:** Display the total number of 3G/4G/LTE frames transmitted until the latest second for the current connection.

**Transmit Bytes of Current Connection:** Display the total bytes transmitted till the latest second for the current connection for the current connection.

**Transmit Total Frames:** Display the total number of frames transmitted till the latest second since system is up.

**Transmit Total Bytes:** Display the total number of bytes transmitted until the latest second since system is up.

### Receive Statistics

**Receive Frames of Current Connection:** Display the number of frames received until the latest second for the current connection.

**Receive Bytes of Current Connection:** Display the total bytes received till the latest second for the current connection.

**Receive Total Frames:** Display the total number of frames received until the latest second since system is up.

**Receive Total Bytes:** Display the total frames received till the latest second since system is up.

**Refresh:** Click to refresh the page.

❖ **EWAN (LAN1)**

Statistics			
Traffic Statistics			
Interface	<input type="radio"/> 3G/4G-LTE Status	<input checked="" type="radio"/> EWAN(LAN1)	<input type="radio"/> Ethernet
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"/>			

**Traffic Statistics**

**Interface:** List all available network interfaces in the router. You are currently checking on the physical status of the **EWAN (Ethernet #1)** port.

**Transmit Statistics**

**Transmit Frames:** Display the number of frames transmitted until the latest second.

**Transmit Multicast Frames:** Display the number of multicast frames transmitted until the latest second.

**Transmit Total Bytes:** Display the number of bytes transmitted until the latest second.

**Transmit Collision:** Numbers of collisions have occurred on this port.

**Transmit Error Frames:** Display the number of error packets on this port.

**Receive Statistics**

**Receive Frames:** Display the number of frames received until the latest second.

**Receive Multicast Frames:** Display the number of multicast frames received until the latest second.

**Receive Total Bytes:** Display the number of bytes received until the latest second.

**Receive CRC Errors:** Display the number of error packets on this port.

**Receive Under-size Frames:** Display the number of under-size frames received until the latest second.

**Refresh:** Click to refresh the page.

## ❖ Ethernet

Statistics			
Traffic Statistics			
Interface	<input type="radio"/> 3G/4G-LTE Status	<input checked="" type="radio"/> EWAN(LAN1)	<input type="radio"/> Ethernet
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"/>			

### Traffic Statistics

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

### Transmit Statistics

**Transmit Frames:** Display the number of frames transmitted until the latest second.

**Transmit Multicast Frames:** Display the number of multicast frames transmitted until the latest second.

**Transmit Total Bytes:** Display the number of bytes transmitted until the latest second.

**Transmit Collision:** Numbers of collisions have occurred on this port.

**Transmit Error Frames:** Display the number of error packets on this port.

### Receive Statistics

**Receive Frames:** Display the number of frames received until the latest second.

**Receive Multicast Frames:** Display the number of multicast frames received until the latest second.

**Receive Total Bytes:** Display the number of bytes received until the latest second.

**Receive CRC Errors:** Display the number of error packets on this port.

**Receive Under-size Frames:** Display the number of under-size frames received until the latest second.

**Refresh:** Click to refresh the page.

## DHCP Table

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

▼DHCP Table				
Index	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 numeric indicator for devices using dynamic IP addresses.

**Host Name:** Display 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

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

**Index #:** The numeric IPSec VPN tunnel/ rule.

**Action:** Display Connect or Drop the connection.

**Connection Name:** The profile name of the VPN connection/tunnel.

**Active:** Display Yes or No to indicate the profile is enabled or disabled.

**Connection State:** Display statuses of IPSec phase 1 and phase 2 connections.

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

**Remote Gateway:** Display remote gateway IP address.

**Remote Network:** Display remote local IP address and Netmask.

**Local Network:** Display local IP address and Netmask.

**Refresh:** Click to refresh the page.

## 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
<input type="button" value="Refresh"/>						

**Index #:** The numeric PPTP VPN tunnel/ rule.

**Connection Name:** The profile name of the VPN connection/tunnel.

**Active:** Display Yes or No to indicate the profile is enabled or disabled.

**Connection State:** Display the VPN connection status.

**Connection Type:** Display if VPN connection is for single PC use (Remote Access) or multi-user use (LAN to LAN).

**Assigned IP Address:** Display the IP address assigned to the client by the PPTP Server.

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

**Refresh:** Click to refresh the page.

### ❖ PPTP Client

PPTP Status						
PPTP Server						
Index	Connection Name	Active	Connection State	Connection Type	Assigned IP Address	Remote Network
PPTP Client						
Index	Connection Name	Active	Connection State	Connection Type	Server IP Address	Remote Network
1	BC-LL	Yes	Yes	Lan to Lan	69.121.1.33	192.168.1.0 / 255.255.255.0
<input type="button" value="Refresh"/>						

**Index #:** The numeric PPTP VPN tunnel/ rule.

**Connection Name:** The profile name of the VPN connection/tunnel.

**Active:** Display Yes or No to indicate the profile is enabled or disabled.

**Connection State:** Display Yes/No to indicate the VPN connection status.

**Connection Type:** Display if VPN connection is for single PC use (Remote Access) or multi-user use (LAN to LAN).

**Server IP Address:** Display the WAN IP address of remote PPTP Server.

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

**Refresh:** Click to refresh the page.

## 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
Refresh						

**Index #:** The numeric L2TP VPN tunnel/rule indicator.

**Connection Name:** The profile name of the VPN connection/tunnel.

**Active:** Display Yes or No to indicate the profile is enabled or disabled.

**Connection State:** Display Yes/No to indicate the VPN connection status.

**Connection Mode:** Display if L2TP mode is a dial-in or dial-out.

**Connection Type:** Display if VPN connection is for single PC use (Remote Access) or multi-user use (LAN to LAN).

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

**Refresh:** Click to refresh the page.

## GRE Status

GRE Status					
Index	Connection Name	Active	Connection State	Remote Gateway IP	Remote Network
1	GRE-0	Yes	Connected	69.121.1.30	192.168.0.0/255.255.255.0

**Index #:** The numerical GRE tunnel/rule indication.

**Connection Name:** The profile name of the VPN connection/tunnel.

**Active:** Display Yes or No to indicate the profile is enabled or disabled.

**Connection State:** Display Yes/No to indicate the VPN connection status.

**Remote Gateway IP:** Display the remote gateway IP address.

**Remote Network:** Display the remote local network IP address / Netmask.

## OpenVPN Status

### ❖ OpenVPN Server

OpenVPN Status					
OpenVPN Server					
Index	Connection Name	Active	Service Port	Tunnel Network	Status
1	OpenVPN1	Yes	1194 /udp	192.168.100.0 /255.255.255.0	Ready
OpenVPN Client					
Index	Connection Name	Active	Remote Server	Status	Detail Info

Refresh

**Index #:** The numeric OpenVPN tunnel/ rule.

**Connection Name:** The profile name of the VPN connection/tunnel.

**Active:** Display Yes or No to indicate the profile is enabled or disabled.

**Service Port:** Display the port/protocol (1194/udp) used for OpenVPN connection.

**Tunnel Network:** Display the virtual tunnel IP address and Netmask of the OpenVPN server.

**Status:** Display the status of the profile/rule

**Refresh:** Click to refresh the page.

### ❖ OpenVPN Client

OpenVPN Status					
OpenVPN Server					
Index	Connection Name	Active	Service Port	Tunnel Network	Status
OpenVPN Client					
Index	Connection Name	Active	Remote Server	Status	Detail Info
1	OpenVPN1	Yes	69.121.10.5:1194 /udp	Connected	Assigned IP: 192.168.100.2 Route: 192.168.100.0/255.255.255.0 192.168.5.0/255.255.255.0

Refresh

**Index #:** The numeric OpenVPN tunnel/ rule.

**Connection Name:** The profile name of the VPN connection/tunnel.

**Active:** Display Yes or No to indicate the profile is enabled or disabled.

**Remote Server:** Display the remote server public IP address and used port/protocol for this connection.

**Status:** Display the status of the profile/rule

**Detailed Info:** Display detailed IP assignment and routing information of this VPN connection.

**Refresh:** Click to refresh the page.

## ARP Table

ARP (Address Resolution Protocol) table displays a mapping IP address with a PC's MAC address.

ARP Table		
#	IP	MAC Address
1	192.168.1.11	f0:de:f1:31:68:77

**#**: The numeric table list indicator.

**IP Address**: It is the internal/local IP address to access to the network.

**MAC Address**: The MAC address of a device, e.g. PC, notebook, printer, etc., that is corresponded with the IP address.

## VRRP Status

VRRP Status	
Current Status	N/A
Current Master	N/A

**Current Status**: Display current VRRP status, Master or Backup.

**Current Master**: Display the IP address of the Master

## 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, 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.

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 internet connection  
Step 4. Confirm the configuration and save it

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"/>

### 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-06:00 Central Time (US &amp; Canada), Mexico City, Saskatchewan"/>
-----------	--

### Step 3 – ISP Connection Type

Set up your Internet connection.

3.1 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
<a href="#">Back</a>	<a href="#">Next</a>

3.2(1) If selected **4G/LTE**

Input all relevant 3G/4G/LTE parameters from your cellular provider.

Click **Next** to continue.

▼ Quick Start - 4G/LTE

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

TEL No.	*99***1#
APN	internet
PDN Type	<input checked="" type="radio"/> IPv4 <input type="radio"/> IPv4/IPv6 <input type="radio"/> IPv6
Authentication Protocol	Disable
Username	
Password	
PIN	.....
Keep Alive	<input type="radio"/> Yes <input checked="" type="radio"/> No
MTU	1428 (0 means use default:1500)
<a href="#">Back</a>	<a href="#">Next</a>

3.2(2) If selected **EWAN (LAN1) / Static IP or PPPoE**, enter the static IP address or PPPoE account information provided by your ISP.

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	EWAN(LAN1)
ISP	<input type="radio"/> Dynamic IP Address ( Select the WAN Interface and Internet Connection Type to connect to your ISP. Click <b>NEXT</b> to continue. ) <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..)
<a href="#">Back</a>	<a href="#">Next</a>

#### Step 4 – Quick Start Completed

The Setup Wizard has completed. Click on **BACK** to make changes or correct mistakes. Click **NEXT** to save the current settings and complete the Quick Start setups.

▼ 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.

<a href="#">Back</a>	<a href="#">Next</a>
----------------------	----------------------

▼ Quick Start - Quick Start Completed !!

Quick Start Completed !!

Saved Changes.

Go back to the **Status > Device Info** to view the status.

# Device Configuration

## Interface Setup

Here are the features under **Interface Setup: Internet, LAN and Loopback**

### Internet

#### ❖ 4G/LTE

Internet	
WAN Interface	4G/LTE
Status	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
Usage Allowance	<input type="checkbox"/> Enable
IP Pass-Through Mode	<input type="checkbox"/> Enable
LTE Antenna Diversity	Enabled
Network Mode	Automatic
PLMN Selection	Operator Numeric <input type="text"/> RAT <input type="text"/> <input type="button" value="Scan"/>
TEL No.	*99***1#
Dual APN	Single APN
APN	internet
PDN Type	<input checked="" type="radio"/> IPv4 <input type="radio"/> IPv4/IPv6 <input type="radio"/> IPv6
Authentication Protocol	Disable
Username	<input type="text"/>
Password	<input type="text"/>
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	1428 (0 means use default:1500)
<input type="button" value="Save"/>	

**WAN Interface:** List all available WAN interfaces. (In this section, you have selected to use 4G/LTE)

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

**Usage Allowance:** Enable and click “**Usage Allowance**” for further setting configuration of your 4G/LTE data usage.

### Usage Allowance

**Usage Allowance (Cont.)**

Usage Allowance

Parameters

Mode: Time-based (selected)

Over usage allowance action: None

Save the statistics to ROM: Disable

Buttons: Save, 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.

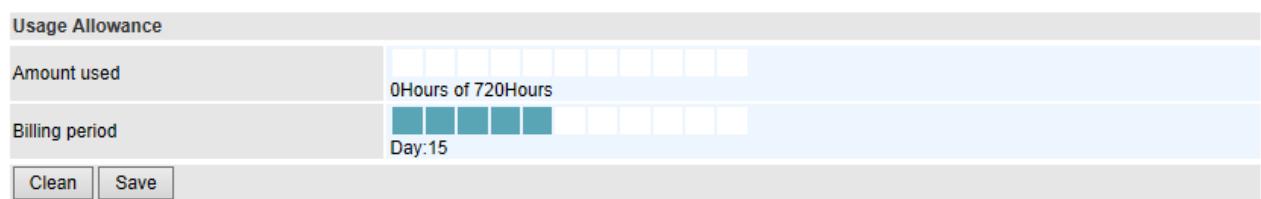
**Over usage allowance action:** Here are actions to perform when mobile data usage, defined in **Mode**, reached to its maximum.

- ▶ **None:** No action taken
- ▶ **Disconnect:** Disconnect mobile connection
- ▶ **Email Alert:** Send an e-mail alert and keep the mobile connection alive.
- ▶ **Email Alert and Disconnect:** Disconnect mobile connection after an alert e-mail is being sent.

**Save the statistics to ROM:**

- ▶ **Every one hour:** Activate the 3G/4G-LTE statistics on data usage and this info will get updated and saved to the internal memory (ROM) in every hour.

Once the feature is turned on, you can see the amount of data used and how many days left before next billing cycle starts. Go to **Status >> 3G/4G-LTE Status** page for details.



**NOTE:** This statistic information will get deleted after a factory reset.

- ▶ **Disable:** No action taken

**LTE Mode\***: Display current selected LTE frequency band. To change the band, please click “**LTE Mode**” link to access to the band selection page.

**LTE Band**

**LTE Band:** A list of available LTE bands to choose from.

LTE Mode

Parameters

LTE Band: B12

\*\*\*Please save config and restart to activate the setting. Please make sure device had get WAN IP, then config this feature.

Apply Save Config & Restart

**LTE Antenna Diversity \***: When **enabled**, the auxiliary antenna will be activated. With **disabled**, only the primary antenna is receiving and transmitting data. To change it, please click “**LTE Antenna Diversity**” link to access to the selection page.

### LTE Antenna Diversity

To enable or disable the LTE antenna diversity feature.

LTE Mode

Parameters

LTE Antenna Diversity: [Blank]

\*\*\*Please save config and restart to activate the setting. Please make sure device had get WAN IP, then config this feature.

Apply Save Config & Restart

\* Feature is available with specific cellular module

**IP Pass-through Mode**: When **enabled**, MX-200 PL9 is in bridge mode that it does not obtain a WAN IP address; features such as routing capabilities, NAT, firewall, etc., are being disabled. The client router that is behind the MX-200 PL9 now obtains a WAN IP address. When **disabled**, MX-200 PL9 is in router mode that it handles a WAN IP address and all features become available.

**Network Mode**: There are 8 options of service standards: “Automatic”, “UMTS 3G only”, “GSM 2G Only”, “UMTS 3G Preferred”, “GSM 2G Preferred”, “GSM and UMTS Only”, “LTE Only”, and “GSM, UMTS, LTE”. If you are not sure which mode to use, you may select **Automatic** to auto detect the best mode for you.

**PLMN (Public Land Mobile Network) Selection**: Either manually enter the information or click **Scan** button to scanning all closest base stations in the area. **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 \***: Unit can support up to two (2) APNs. Select **Single / Dual** or a **different LTE/3G APN**.

► **APN (3G)**: If select **LTE/3G with different APN**, enter the APN here.

\* Feature is available with specific cellular module

**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”.

**PDN Type**: The IP type for PDN connections. Available types are **IPv4**, **IPv6**, and **IPv4v6**.

**Authentication Protocol**: Manually specify CHAP (Challenge Handshake Authentication Protocol) or PAP (Password Authentication Protocol). When using PAP, the password is sent unencrypted, while CHAP encrypts the password before sending, and also allows for challenges at different periods to ensure that an intruder has not replaced the client.

**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 into the phone 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 / IP:** Select **Yes** to keep the 3G/4G-LTE connection always on. Manually enter the Keep Alive IP Address to be used for ping operation to check if the connection is still on.

**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.

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

**MTU:** Maximum Transmission Unit. The size of the largest datagram (excluding media-specific headers) an IP attempts to send through the interface. **0** means to use default MTU size, 1500byte.

Click **Save** to apply settings.

## ❖ EWAN (LAN 1)

Internet	
WAN Interface	EWAN(LAN1) <input type="button" value="▼"/>
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 <small>(range: 0~4095)</small>
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 <input type="button" value="▼"/>
Dynamic Route	RIP1 <input type="button" value="▼"/> Direction <input style="background-color: #f0f0f0; border: 1px solid #ccc; padding: 2px 5px;" type="button" value="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"/>	

**Status:** Select to enable/activate or disable/deactivated 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. But if your PC is connected to the router working as a DHCP client, in this mode, the device acts as a NAT router; 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 WAN IP working in the internet.

### 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

<b>IP Options</b>	
<b>IP Common Options</b>	
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)
<b>IPv4 Options</b>	
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
<b>IPv6 Options</b>	
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

## IP Common Options

**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 **0** means it is set to 1492 bytes.

## 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:** Enable to allow MX-200 PL9 to assign private network IPs to all devices in the network for get Internet access.

### **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:** 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.

Click **Save** to apply settings.

## 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			
<b>IPv4 Parameters</b>			
IP Address	192.168.1.254		
IP Subnet Mask	255.255.255.0		
Alias IP Address	0.0.0.0 (0.0.0.0 means to close the alias ip)		
Alias IP Subnet Mask	0.0.0.0		
Snooping	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated		
Dynamic Route	RIP1 <input type="button" value="▼"/> Direction <input style="width: 50px; height: 20px; border: none; border-bottom: 1px solid black;" type="button" value="None"/> <input style="width: 20px; height: 20px; border: none; border-left: 1px solid black;" type="button" value="▼"/>		
<b>DHCPv4 Server</b>			
DHCPv4 Server	<input type="radio"/> Disabled <input checked="" type="radio"/> Enabled <input type="radio"/> Relay		
Start IP	192.168.1.100		
IP Pool Count	100		
Lease Time	86400 seconds (0 sets to default value of 259200)		
Physical Ports	<input checked="" type="checkbox"/> LAN1 <input checked="" type="checkbox"/> LAN2		
DNS Relay	<input checked="" type="radio"/> Automatically <input type="radio"/> Manually		
Primary DNS	<input type="text"/>		
Secondary DNS	<input type="text"/>		
Option 66	<input type="text"/>		
Option 160	<input type="text"/>		
<b>Fixed Host</b>			
IP Address	<input type="text"/>		
MAC Address	<input type="text"/>		
<b>IPv6 Parameters</b>			
Interface Address/Prefix Length	<input type="text"/> / <input type="text"/>		
<b>DHCPv6 Server</b>			
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"/>			
<b>Fixed Host List</b>			
Index	IP	MAC	Drop

### 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.

**IGMP Snooping:** Select **Activated** to enable IGMP Snooping function. Without the IGMP snooping, multicast traffic is treated in the same manner as broadcast traffic to be forwarded to all ports. With

IGMP 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	<input type="radio"/> Disabled <input checked="" type="radio"/> Enabled <input type="radio"/> Relay
Start IP	192.168.1.100
IP Pool Count	100
Lease Time	86400 seconds (0 sets to default value of 259200)
Physical Ports	<input checked="" type="checkbox"/> LAN1 <input checked="" type="checkbox"/> LAN2
DNS Relay	<input checked="" type="radio"/> Automatically <input type="radio"/> Manually
Primary DNS	
Secondary DNS	
Option 66	
Option 160	

**DHCPv4 Server:** If set to **Enabled**, your MX-200 PL9 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 MX-200 PL9 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.

**Physical Ports:** Select to determine if the DHCPv4 server is applicable to the specific port or ports. By default, all ports can obtain local IP from the DHCPv4 server.

### DNS Relay:

- ▶ Select **Automatic** detection or
- ▶ **Manually** specific Primary and Secondary DNS IP addresses

**Primary / 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.

**Option 66:** Set the IP or hostname of the TFTP server for devices, like IPTV Set Box, to get configuration settings from the TFTP server.

**Option 160:** Set the IP or hostname of the TFTP server for devices, like IPTV Set Box, to get configuration settings from the TFTP server. (The option 160 is an extended feature in DHCP option, similar to option 66, but using http or https protocols.)

## 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.

Fixed Host		
IP Address	<input type="text"/>	
MAC Address	<input type="text"/>	

**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

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

Interface Address/Prefix Length	<input type="text"/>	/	<input type="text"/>
---------------------------------	----------------------	---	----------------------

**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

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

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 (seconds):** 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.

Click **Save** to apply settings.

## Loopback

Loopback interface is a widely known virtual interface, not the physical interface, on router and is highly robust and always up. The loopback interface has its own IP and subnet mask, often used for router management as Telnet management IP and involved in BGP as BGP Update-Source and OSPF as Router ID.

▼ Loopback

Loopback interface	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
IP Address	127.0.0.1
IP Subnet Mask	255.0.0.0
<b>Save</b>	

**IP Address:** Enter a dedicated IP address for the loopback interface.

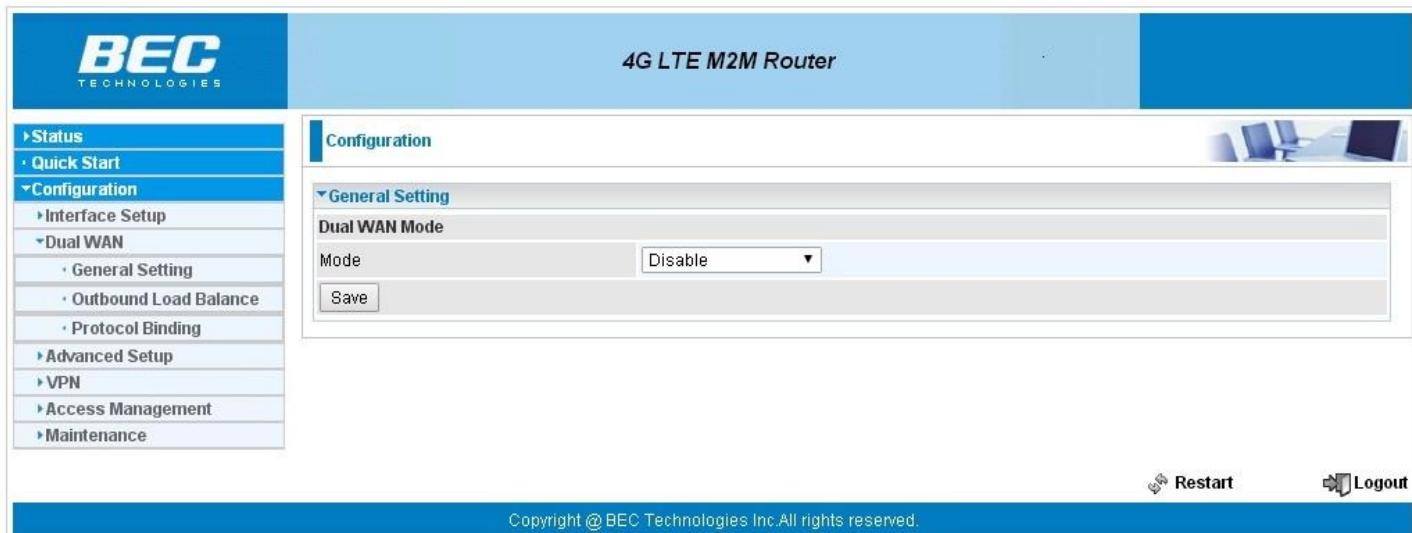
**IP Subnet Mask:** Enter the subnet mask for the loopback interface.

Click **Save** to apply settings.

## Dual WAN

Dual WAN, is a feature to have two independent Internet connection connected concurrently, offers a reliable Internet connectivity and maximize bandwidth utilization for critical applications delivery.

### General Setting



The screenshot shows the BEC 4G LTE M2M Router configuration interface. The left sidebar menu includes: Status, Quick Start, Configuration (selected), Interface Setup, Dual WAN (selected), General Setting, Outbound Load Balance, Protocol Binding, Advanced Setup, VPN, Access Management, and Maintenance. The main content area is titled 'Configuration' and 'General Setting'. It shows 'Dual WAN Mode' with a dropdown menu set to 'Disable' and a 'Save' button. The bottom right of the interface has 'Restart' and 'Logout' buttons, and a copyright notice: 'Copyright @ BEC Technologies Inc All rights reserved.'

**Mode:** Select a mode then click **Save** to proceed.

### ❖ Failover & Failback

Auto failover/failback ensures always-online network connectivity. When primary WAN link (WAN1) fails, all traffic will switch over to the backup WAN (WAN2) seamlessly.

Again, when the primary link is restored, traffic will be handled over from WAN2 to WAN1.

General Setting	
<b>Dual WAN Mode</b>	
Mode	<b>Failover &amp; Failback</b>
<b>WAN Port Service Detection Policy</b>	
WAN1	4G/LTE
WAN2	EWAN(LAN1)
Keep Backup Interface Connected	Disable
Minimun RSRP/RSSI	-105 / -90 dbm(-111~ -5 , 0:disable)
Connectivity Decision	Auto failover takes place after straight <b>3</b> consecutive failure in every <b>30</b> seconds.
Probe By Ping	<input checked="" type="checkbox"/> Enable <input type="radio"/> Gateway <input checked="" type="radio"/> Host <b>8.8.8.8</b> Timeout <b>3</b> seconds
Probe By Signal Strength	<input checked="" type="checkbox"/> Enable Minimum RSRP/RSSI <b>-105 / -90 dbm(-111~ -5 , 0:disable)</b>
<input type="button" value="Save"/>	

### **WAN Port Service Detection Policy**

**WAN1 (Primary):** Choose a desired WAN as the primary WAN Link from the list.

**WAN2 (Backup):** Choose a desired WAN as the backup WAN Link from the list.

**Keep Backup Interface Connected:** Select the following option whether to keep the backup WAN (WAN2) interface connected to the Internet.

- ▶ **Disable:** Inactivate this feature.
- ▶ **Always:** Keep the backup WAN (WAN2) interface always connected to the Internet
- ▶ **By Signal Strength:** Enable and initiate automatic backup WAN to connect to the Internet at all time until the RSRP / RSSI of primary WAN is greater than the Minimum RSRP / RSSI.
  - **Minimum RSRP / RSSI:** Set a minimum requirement for RSRP and RSSI for the primary WAN. Value range from -111 ~ -5. 0 means don't care/no need to check this value.

**NOTE:** Both the RSRP and RSSI cannot be 0 at the same time.

**Connectivity Decision & Probe Cycle:** Set a number of times and time in seconds to determine when to switch to the backup link (WAN2) when primary link (WAN1) fails and vice versa.

Example, *Auto failover takes place after straight **3** consecutive failures in every **30** seconds* meaning all traffic will hand over to backup link (WAN2) after primary link fails to response in total of 90 seconds, 30 seconds for 3 consecutive failures.

**Note:** Failover and Failback follow the same **Connectivity Decision & Probe Cycle** rule to failover from WAN1 to WAN2 or fallback from WAN2 to WAN1.

#### Failover/Fallback Rule Decisions:

1. **Probe by Ping:** Enable Ping to the gateway or an IP address
  - ▶ **Gateway:** Internal system will wait for responses to the pings from the gateway of the WAN.
  - ▶ **Host:** Internal system will wait for responses to the pings from a fixed IP address.
2. **Probe by Signal Strength:** Enable to measure the LTE signal strength
  - ▶ **Minimum RSRP / RSSI:** Set a minimum requirement for RSRP and RSSI for initiating automatic WAN failback or failover procedures.  
The valid range is from -111 ~ -5. 0 means don't care/no need to check this value.  
**NOTE:** Both the RSRP and RSSI cannot be 0 at the same time.

Click **Save** to apply settings.

## ❖ Load Balance

Load balance aggregates the bandwidth of the two WAN links to optimize traffic distribution.

When primary link, WAN1, goes down, all traffic will be redirected to the backup, WAN2, to ensure service continuity.

**General Setting**

<b>Dual WAN Mode</b>	
Mode	Load Balance
<b>WAN Port Service Detection Policy</b>	
WAN1	4G/LTE
WAN2	EWAN(LAN1)
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 (Primary):** Choose a desired WAN as the primary WAN Link from the list.

**WAN2 (Backup):** Choose a desired WAN as the backup WAN Link from the list.

**Service Detection:** Enable to detect WAN connectivity automatically.

**Connectivity Decision & Probe Cycle:** Set a number of times and time in seconds to determine when to turn-off the Load Balancing service.

Example, *Disable Load Balance after straight 3 consecutive failures in every 30 seconds* meaning all traffic will hand over to backup link (WAN2) after primary link fails to response in total of 90 seconds, 30 seconds for 3 consecutive failures.

### Deactivate Load Balance Decision:

**Probe Ping on WAN 1 / WAN2:** Enable Ping to the gateway or an IP address

- ▶ **Gateway:** Internal system will wait for responses to the pings from the gateway of the WAN.
- ▶ **Host:** Internal system will wait for responses to the pings from a fixed IP address.

Click **Save** to apply settings

## 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 links is slower or congested so that user gains better throughput and less delay.



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

### Base on Session Mechanism:

**Balance by Session (Round Robin):** Automatically assign requests/traffics to each WAN interface based on real-time WAN traffic-handling capacity.

OR

**Balance by Session weight:** Manually Balance session traffic based on a weight ratio.

Example: Session weight by 3:1 meaning forward 3 requests to WAN1 and 1 request to WAN2.

### Base on IP Hash Mechanism:

**Balance by weight:** Use an IP hash to balance traffic based on a ratio. It is to guarantee requests from the same IP address get forward to the same WAN interface.

Click **Save** to apply settings

## 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 specific IP address is 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 , Current WAN2 Mode: EWAN )
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
<input type="button" value="Save"/> <input type="button" value="Delete"/>	

**Protocol Binding List**

#	Active	Interface	Source IP Address/Mask	Destination IP Address/Mask	Source Port	Destination Port	DSCP	Protocol
---	--------	-----------	------------------------	-----------------------------	-------------	------------------	------	----------

**Rule Index:** The numeric rule indicator. The maximum entry is up to 16.

**Active:** Click YES to activate the rule

**Bind Interface:** The dedicated WAN interface that guarantees to handle this traffic request.

**Source IP Address:** Enter the local network, known as source, IP address of the origin of a traffic/packet. 0.0.0.0 means any IP address in the network.

**Subnet Mask:** Enter the subnet of the source network.

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

**Destination IP Address:** Enter the destination / remote WAN IP address where the traffic/packet is going to. Enter 0.0.0.0 if no need to route to a specific IP address

**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 from 0~64; 64 means any value/unspecified

**Protocol:** Select a protocol, TCP, UDP, ICMP, to use for this traffic.

Click **Save** to apply settings

**Example:**

All traffics from IP 192.168.1.100/255.255.255.0 with port 8080 will go through WAN1 interface.

The only time it would go through WAN2 interface is when WAN1 has no Internet connection.

Protocol Binding List								
#	Active	Interface	Source IP Address/Mask	Destination IP Address/Mask	Source Port	Destination Port	DSCP	Protocol
1	Yes	WAN1	192.168.1.100/ 255.255.255.0	0.0.0.0/ 0.0.0.0	8080	0	0	TCP

## Advanced Setup

Advanced configuration features provides advanced features, including **Firewall**, **Routing**, **Dynamic Routing**, **NAT**, **VRP**, **Static DNS**, **Time Schedule**, **Mail Alert**, and **Serial**, for advanced users.

### 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.)

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:** Activate your firewall function.
- ▶ **Disabled:** Deactivate 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:** Activate your SPI function.
- ▶ **Disabled:** Deactivate the SPI function.

Click **Save** to apply settings

## 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							
Index	Destination IP Address	Subnet Mask	Gateway IP Address	Metric	Interface	Edit	Drop
0	100.87.150.196	255.255.255.252	0.0.0.0	0	ppp12		
1	100.72.1.208	255.255.255.248	0.0.0.0	0	ppp11		
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	lo		
4	239.0.0.0	255.0.0.0	0.0.0.0	0	br0		
5	0.0.0.0	0.0.0.0	100.72.1.209	0	ppp11		

Add Route

**Index #:** The numeric route indicator.

**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	0.0.0.0
Destination Subnet Mask	0.0.0.0
Gateway IP Address / Interface	<input type="radio"/> 0.0.0.0 <input checked="" type="radio"/> 4G/LTE <input type="button" value="▼"/>
Metric	1
<input type="button" value="Save"/> <input type="button" value="Back"/>	

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

**Destination Subnet Mask:** The subnet mask of destination network.

**Gateway IP Address or 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.

Click **Save** to add this route

## Dynamic Routing

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 breaks 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.

## Open Shortest Path First (OSPF)

Index	Interface	Area ID

**OSPF:** Enable to activate OSPF routing.

**Rule Index:** The numeric route indicator. The maximum entry is up to 10, 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. Enter the area ID in 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.

## Border Gateway Protocol (BGP)

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	1 ▾
Neighbor IP	<input type="text"/>
Neighbor As Number	<input type="text"/>
Allowas-in	<input type="checkbox"/> Enable
Next-Hop-Self	<input type="checkbox"/> Enable

**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:** The numeric route indicator. The maximum entry is up to 10, ranging from 0 to 9.

**Neighbor IP:** Enter the neighbor IP address.

**Neighbor AS Number:** Enter the 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, an inter-AS communication, please enable the allowas-in. Otherwise, the router only support EBGP routing between different domains.

**Next-Hop-Self:** Enable to use the router's own loopback address as the next-hop address.

## 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 breaks 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.

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

**NAT Status:** Enabled. (Disabled if WAN connection is in **BRIDGE** mode)

### ALG

**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.

### DMZ / Virtual Server

**Interface:** Select a WAN interface connection to allow external access to your internal network.

**Service Index:** Associated to EWAN interface marking each EWAN service (0-7), to select which EWAN service the DMZ and Virtual server are applied to.

Click **DMZ**  or **Virtual Server**  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 or NAT is being turned OFF.**

The DMZ Host is a local computer which has all UDP and TCP ports exposed to the Internet. When setting an internal IP address as the DMZ Host, all incoming packets will be forwarded to this local host device. Packet filter or virtual server entries will take priority over forwarding internet packets to the DMZ host.

**▼ DMZ**

DMZ for	Single IPs Account/ EWAN(LAN1)
DMZ	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
DMZ Host IP Address	0.0.0.0

**Save** **Back**

**Except Ports**

Port	<input type="text"/>
Protocol	TCP
Description	<input type="text"/> <b>Add</b>

**DMZ Export Ports Listing**

Index	Description	Protocol	Port	Edit	Delete
1	N/A	N/A	N/A		
2	N/A	N/A	N/A		
3	N/A	N/A	N/A		
4	N/A	N/A	N/A		
5	N/A	N/A	N/A		
6	N/A	N/A	N/A		

**DMZ for (via a WAN Interface):** Allows outside network to connect in and communicate with internal LAN devices via a specific WAN interface.

**DMZ:**

- ▶ **Enabled:** Activate the DMZ function.
- ▶ **Disabled:** Deactivate 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.

Click **Save** to apply settings

**Except Ports**

**Except Ports:** Bypass UDP or/and TCP ports, in the list, being forwarded to the DMZ host.

**Port:** Enter port to be monitored.

**Protocol:** Enter the protocol to be monitored.

**Description:** Enter a description to this rule.

**Example:** Skip port 80 (UDP/TCP) in the list. All Incoming request to access to port 80 (Web GUI) will be forwarded to the embedded HTTP server of MX-200 PL9 instead of the DMZ host.

Click **Add** to add an entry to the Except Listing.

## Virtual Server

**NOTE: This feature disables automatically if WAN connection is in BRIDGE mode or NAT is being turned OFF.**

Virtual Server is also known as Port Forwarding that allows MX-200 PL9 to direct incoming traffic to a specific device in the network.

Configure a virtual rule in MX-200 PL9 for remote users accessing services such as Web or FTP services via the public (WAN) IP address that 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

Virtual Server for	4G/LTE
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

**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		
10	N/A	N/A	N/A	N/A	N/A	N/A		

**Virtual Server for:** Indicate the related WAN interface to allow outside network to communicate with the internal LAN device.

**Protocol:** Choose the application protocol.

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

(Example: Start / End: 1000 or Start: 1000 & End: 2000).

The starting port must be greater than zero (0). The end port must be greater than or equal to the start port.

**Local IP Address:** Enter the server IP address in the network to receive the traffic/packets.

**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



#### Attention

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.

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. The MX-200 PL9 will accept port 21 requests from WAN side.

Enter the static IP assigned to the local PC that is hosting the FTP server. Ex: 192.168.1.102

Enter "21" to Local Start and End Port number. The MX-200 PL9 will forward port 21 request from WAN to the specific LAN PC (Example: 192.168.1.102) in the network.

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

Virtual Server									
Virtual Server for	4G/LTE								
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								
<input type="button" value="Save"/> <input type="button" value="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			
10	N/A	N/A	N/A	N/A	N/A	N/A			

## VRRP

VRRP is designed to eliminate the single point of failure inherent in the static default routed environment. VRRP specifies an election protocol that dynamically assigns responsibility for a virtual router to one of the VRRP routers in a LAN. The VRRP router controlling the IP address associated with a virtual router is called the Master, and forwards packets sent to these IP addresses. The election process provides dynamic fail-over in the forwarding responsibility should the Master become unavailable. Any of the virtual router's IP addresses in a LAN can then be used as the default first hop router by end-hosts. The advantage gained from using VRRP is a higher availability default path without requiring configuration of dynamic routing or router discovery protocols on every end-host.

VRRP	
VRRP	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
VRID	1 (1~255)
Priority	100 (1~254)
Preempt Mode	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
VRIP	192.168.1.253
Advertisement Period	1 (1~2147483647)

**Save**

**VRRP:** Click to activate the feature.

**VRID:** Virtual Router Identifier, range from 1-255 (decimal). A master or backup router running the VRRP protocol may participate in one VRID instance.

**Priority:** Specifies the sending VRRP router's priority for the virtual router. Higher values equal higher priority. The priority value for the VRRP router that owns the IP address associated with the virtual router MUST be 255. VRRP routers backing up a virtual router MUST use priority values between 1 and 254. The default priority value for VRRP routers backing up a virtual router is 100. The priority value zero (0) has special meaning indicating that the current Master has stopped participating in VRRP. This is used to trigger Backup routers to quickly transition to Master without having to wait for the current Master to timeout.

**Preempt Mode:** When preempt mode is activated, a backup router always takes over the responsibility of the master router. When deactivated, the lower priority backup is left in the master state.

**VRIP:** An IP address which is associated with the virtual router.

**Advertisement period:** Indicates the time interval in seconds between advertisements. Default in 1 second.

Click **Save** to apply settings.

## 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 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.

Click **Save** to apply settings.

## QoS

QoS helps you control the upload traffic of each application from LAN (Ethernet and/or Wireless) to WAN (Internet).

It facilitates you the features to control the quality of throughput for each application. This is useful when there on certain types of data you want give higher priority to, such as voice data packets given higher priority than web data packets.

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**Quality of Service**

SW QoS	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated				
<b>Bandwidth</b>					
LAN to WAN	Bandwidth <input type="text" value="100000"/> Kbps				
WAN to LAN	EWAN(LAN2)	Bandwidth <input type="text" value="100000"/> Kbps			
	4G/LTE	Bandwidth <input type="text" value="100000"/> Kbps			
<b>Bandwidth Save</b>					
Rule Index	1 ▾	Wan Interfae	EWAN(LAN2) ▾	Application	
Direction	LAN to WAN ▾	Protocol	Any ▾	DSCP Marking	Disable ▾
Rate Type	Limited(Maximum) ▾	Rate	Kbps	Priority	High ▾
Internal IP Address	0.0.0.0 0.0.0.0	~	Internal Port	0 ~ 0	**
External IP Address	0.0.0.0 0.0.0.0	~	External Port	0 ~ 0	**
Note * : 0.0.0.0 ~ 0.0.0.0 means all IPs					
Note * : 0 ~ 0 means all Ports					
<b>QoS Control Listing</b>					
Index	Application	Direction	Rate Type	Rate	Wan Interface

**SW QoS:** Select **Activate** to enable the QoS

**LAN to WAN (Bandwidth):** You want to control the traffic from local network to the outside (Upstream). You can assign the priority for the application or you can limit the rate of the application.

*E.g.:* you have an FTP server inside the local network, and you want to have a limited control by the QoS policy and so you need to add a policy with LAN to WAN direction setting.

**WAN to LAN (Bandwidth):** Control traffic from WAN to LAN (Downstream).

Click **Bandwidth Save** to save settings.

**Rule Index:** Index marking for each rule up to maximum of 16.

- **WAN Interface:** Select a WAN interface connection to allow external access to your internal

network.

- ▶ **Application:** Assign a name that identifies the new QoS application rule. Select from the list box for quick setup.

**Direction:** Shows the direction mode of the QoS application

- ▶ **Protocol:** Select a protocol from the drop-down list
- ▶ **DSCP Marking:** Differentiated Services Code Point (DSCP), it is the first 6 bits in the ToS byte. DSCP Marking allows users to classify the traffic of the application to be executed according to the DSCP value.

**Rate Type:** Choose **Limited** (Maximum) or **Guaranteed** (Minimum) to specify the date rate is allowed for this policy.

- ▶ **Rate:** Specify the date rate in Kbps.
- ▶ **Priority:** Set the priority given to each policy/application. Specify the priority for the use of bandwidth. You can specify which application can have higher priority to acquire the bandwidth. Its default setting is set to High. You may adjust this setting to fit your policy / application.

**Internal IP Address:** The IP address values for Local LAN devices you want to give control.

- ▶ **Internal Port:** The Port number on the LAN side, it is used to identify an application.

**External IP Address:** The IP address on remote / WAN side.

- ▶ **External Port:** The Port number on the remote / WAN side.

Click **Save** to apply settings.

**To Remove a Policy:** Simply select the Index then hit the **Delete** button to remove from the list.

## 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"/>
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"/>	

**Time Index:** The rule indicator (0-15) for identifying each timeslot.

**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.

Click **Save** to apply your settings.

Example, you can add a timeslot named “TimeSlot1” which features a period from 9:00 of Monday to 18:00 of Tuesday.

**Time Schedule**

Rule Index	0
Rule Name	TimeSlot1
	Mon. Tues. Wed. Thur. Fri. Sat. Sun.
Day of Week	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Start Time	09:00 00:00 00:00 00:00 00:00 00:00 00:00
End Time	24:00 18:00 00:00 00:00 00:00 00:00 00:00
<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="password"/> .....
Sender's E-mail	<input type="text"/> (Must be XXX@yyy.zzz)
SSL/TLS	<input type="checkbox"/> Enable
Port	25 <small>(1~65535)</small>
<b>Account Test</b>	
<b>WAN IP Change Alert</b>	
Recipient's E-mail	<input type="text"/> (Must be XXX@yyy.zzz)
<b>4G/LTE Usage Allowance</b>	
Recipient's E-mail	<input type="text"/> (Must be XXX@yyy.zzz)
<b>Apply</b>	

### Server Information

**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:** Click the button to test the connectivity and feasibility to your sender's e-mail.

### WAN IP Change Alert

**Recipient's Email (WAN IP Change Alert):** Enter a valid e-mail address to receive an alert message when WAN IP change has been detected.

**Recipient's Email (3G/4G-LTE Usage Allowance):** Enter a valid e-mail address to receive an alert message when the 3G or 4G/LTE over Usage Allowance occurs.

Click **Apply** button to save settings

## Serial (RS-232 Console Port)

Here is the Serial RS-232 console configuration to connect with any existing industrial machine.

Serial	
General Settings	
Baud Rate	115200
Data Bits	8 bits
Parity	None
Stop Bits	1 bit
Application	
Mode	Disabled
<input type="button" value="Save"/>	

### General Settings

**Baud Rate:** Specify the desire baud rate (speed) run on this serial port

**Data Bits:** Specify the number of data bits contained in a frame

**Parity:** A simple form of error detection in a frame

**Stop Bits:** Specify the stop bits of a frame

### Application

**Mode:** Select one of the mode from the list, **Disable / Modbus/TCP / TCP Server / TCP Client / Telnet Server / SSH Server.**

- ▶ **Disable:** Disable the serial port, RS-232.
- ▶ **Modbus/TCP:** Modbus is a master/slave communication uses IP over Ethernet to carry data between devices/machines

Mode	Modbus/TCP
Port	502
Response Timeout	3000 ms

- **Port:** Generally uses port 502, master and slave must use the same port. Specify port other than port 502.
- **Response Timeout (ms):** Specify a response time-out in milliseconds. After the response timeout expires, default is in 3000ms (3 seconds), data transactions will get aborted.

Here are the possible causes for a timeout to occur:

- Serial connection errors between the MX-200 PL9 and the serial device
- Hardware issue with the Serial device
- Serial device response time is longer than the specified Response Timeout value. Increase the time-out value to see if it helps

► **TCP Server:**

Mode	TCP Server
Port	782
Empty Serial Buffer When TCP Connection is Established	<input checked="" type="radio"/> Yes <input type="radio"/> No
Data Packet Delimitier	<input type="radio"/> Inter-character Time Gap 1000 msec(1~30000) <input checked="" type="radio"/> Characters 0x0d0a ("0x"+Hex Code,e.g. "0x0d" or "0x0d0a")
TCP Idle Timeout	60 seconds (10~180)
<input type="button" value="Save"/>	

- **Port:** Use 782(tcp/udp), an unassigned port, for the TCP Server. Specify a tcp/udp port other than port 782.
- **Empty Serial Buffer When TCP Connection is Established:** When TCP link connection is established, serial buffer will get deleted. Enable to empty the buffer after TCP connection is up.
- **Data packet Delimiter:** A way to keep packets in tract.
  - **Inter-character Time Gap:** Default time is in 1000ms. After time has reached, serial data will be transmitted. Time range from 1 – 30000ms.
  - **Character Delimiter:** Default characters are 0x0d0a. Serial data will get transmitted when seeing the specified character(s), in this case, 0x0d0a. Valid characters “0x” + Hex code
- **TCP Idle Timeout (Seconds):** Default time is in 60 seconds. Specify an idle time-out in seconds. After the timeout expires, meaning no data transmission within the defined time, serial connection will get aborted. Time range from 10 – 180 seconds

► **TCP Client:**

Mode	TCP Client
Remote Host Name / IP	
Port	782
Empty Serial Buffer When TCP Connection is Established	<input checked="" type="radio"/> Yes <input type="radio"/> No
Data Packet Delimitier	<input type="radio"/> Inter-character Time Gap 1000 msec(1~30000) <input checked="" type="radio"/> Characters 0x0d0a ("0x"+Hex Code,e.g. "0x0d" or "0x0d0a")
TCP Idle Timeout	60 seconds (10~180)
<input type="button" value="Save"/>	

- **Remote Host Name / IP:** Enter either TCP server's name or IP address.
- **Port:** Generally uses port 782(tcp/udp). Specify tcp/udp port other than port 782.
- **Empty Serial Buffer When TCP Connection is Established:** When TCP link connection is established, serial buffer will get deleted. Enable to empty the buffer after TCP connection is up.
- **Data packet Delimiter:** A way to keep packets in tract.
  - **Inter-character Time Gap:** Default time is in 1000ms. After time has reached, serial

data will be transmitted. Time range from 1 – 30000ms.

- **Character Delimiter:** Default characters are 0x0d0a. Serial data will get transmitted when seeing the specified character(s), in this case, 0x0d0a. Valid characters “0x” + Hex code.
- **TCP Idle Timeout (Seconds):** Default time is in 60 seconds. Specify an idle time-out in seconds. After the timeout expires, meaning no data transmission within the defined time, serial connection will get aborted. Time range from 10 – 180 seconds.

▶ **Telnet Server:**

Mode	Telnet Server
Port	782
<input type="button" value="Save"/>	

- **Port:** Use 782(tcp/udp), an unassigned port. Specify a tcp/udp port other than port 782 for the Telnet server. Port 23 is being reserved, don't use this port.

**Note: MX-200 PL9 uses port 23 as default port the embedded Telnet server.**

▶ **SSH Server:**

Mode	SSH Server
Port	782
<input type="button" value="Save"/>	

- **Port:** Use 782(tcp/udp), an unassigned port. Specify a tcp/udp port other than port 782 for the SSH server. Port 22 is being reserved, don't use this port.

**Note: MX-200 PL9 uses port 22 as default port the embedded SSH server.**

Click **Save** to apply settings

## 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 Headquarter office network through the public Internet.

MX-200 PL9 supports **IPSec, PPTP, L2TP, GRE**, and **OpenVPN**.

## 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.

IPSec						
IPSec Listing						
Index	Connection Name	Active	Interface	Remote Gateway IP	Remote Network	Edit
Add New Connection						

Click **Add New Connection** to create a new IPSec profile.

## IPSec Connection Setting

IPSec			
Connection Name			
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No		
Interface	Auto		
Remote Gateway IP	(0.0.0.0 means any)		
Local Access Range	Subnet	Local IP Address	0.0.0.0
Remote Access Range	Subnet	Remote IP Address	0.0.0.0
IKE Mode	Main	Pre-Shared Key	
Local ID Type	Default (Local WAN IP)	IDContent	*
Remote ID Type	Default (Remote Gateway IP)	IDContent	*
IKE Proposal	Encryption Algorithm	DES	Authentication Algorithm MD5
	Diffie-Hellman Group	MODP1024(DH2)	
IPSec Proposal	<input checked="" type="radio"/> ESP <input type="radio"/> AH		
	Encryption Algorithm	DES	Authentication Algorithm MD5
	Perfect Forward Secrecy	None	
SA Lifetime	Phase 1 (IKE)	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)			
<input type="button" value="Save"/> <input type="button" value="Back"/>			

**Connection Name:** Enter a description for this connection/profile.

**Active: Yes** to activate the connection.

**Interface:** Select a WAN interface to establish a tunnel with the remote VPN device. **Auto** allows system to automatically initiate a connection via current connected WAN interface.

**Remote Gateway IP:** The WAN IP address of the remote VPN device. Enter **0.0.0.0** for unknown remote WAN IP address – only the peer can initiate the tunnel connection.

**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	
Local ID Type	Default (Local WAN IP)	IDContent	*
Remote ID Type	Default (Remote Gateway IP)	IDContent	*
IKE Proposal	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 / 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).

**IKE Proposal & 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	
	Encryption Algorithm	DES	Authentication Algorithm MD5
	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.

**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.

**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)
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**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, and 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 Connection Keep Alive

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:** Disable. The system will not detect remote IPSec peer is still alive or lost. The remote peer will get disconnected after the interval, in seconds, is up.
- ▶ **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.

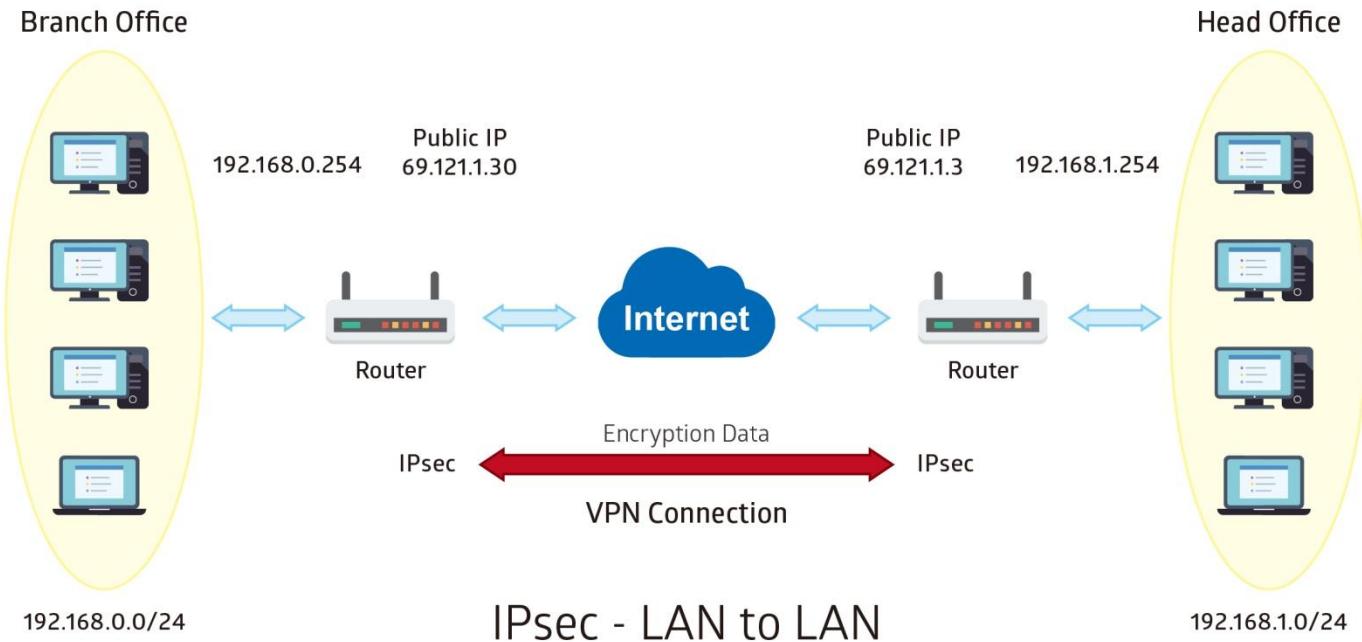
**Reconnection Time:** It is the reconnecting time interval after NO TRAFFIC is initiated. 3 minutes is minimum time interval for this function.

Click **Save** to apply settings.

## Examples: IPSec – Network (LAN) to Network (LAN)

Two of the MX-200 PL9 devices want to setup a secure IPSec VPN tunnel

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



**Headquarter office Side:**

<b>Configuration Settings</b>		<b>Description</b>
Connection Name	H-to-B	Assigned name to this tunnel/profile
Remote Secure Gateway	69.121.1.30	IP address of the Branch office gateway
<b>Access Network</b>		
Local Access Range	Subnet	Headquarter office network
Local Network IP Address	192.168.1.0	
Local Network Netmask	255.255.255.0	
Remote Access Range	Subnet	Branch office network
Remote Network IP Address	192.168.0.0	
Remote Network Netmask	255.255.255.0	
<b>IPSec Proposal</b>		
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 <input style="width: 20px; height: 15px;" type="button" value="..."/>					
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		
Remote Access Range	Subnet	Remote IP Address	192.168.0.0	IP Subnetmask		
IKE Mode	Main	Pre-Shared Key	1234567890			
Local ID Type	Default Wan IP	IDContent	<input type="text"/> *			
Remote ID Type	Default Wan IP	IDContent	<input type="text"/> *			
Encryption Algorithm	AES-128	Authentication Algorithm	SHA1	Diffie-Hellman Group		
IPSec Proposal	<input checked="" type="radio"/> ESP <input type="radio"/> AH	Authentication Algorithm	SHA1	Encryption Algorithm		
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	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)						
<input type="button" value="Save"/> <input type="button" value="Back"/>						

Branch Office Side:

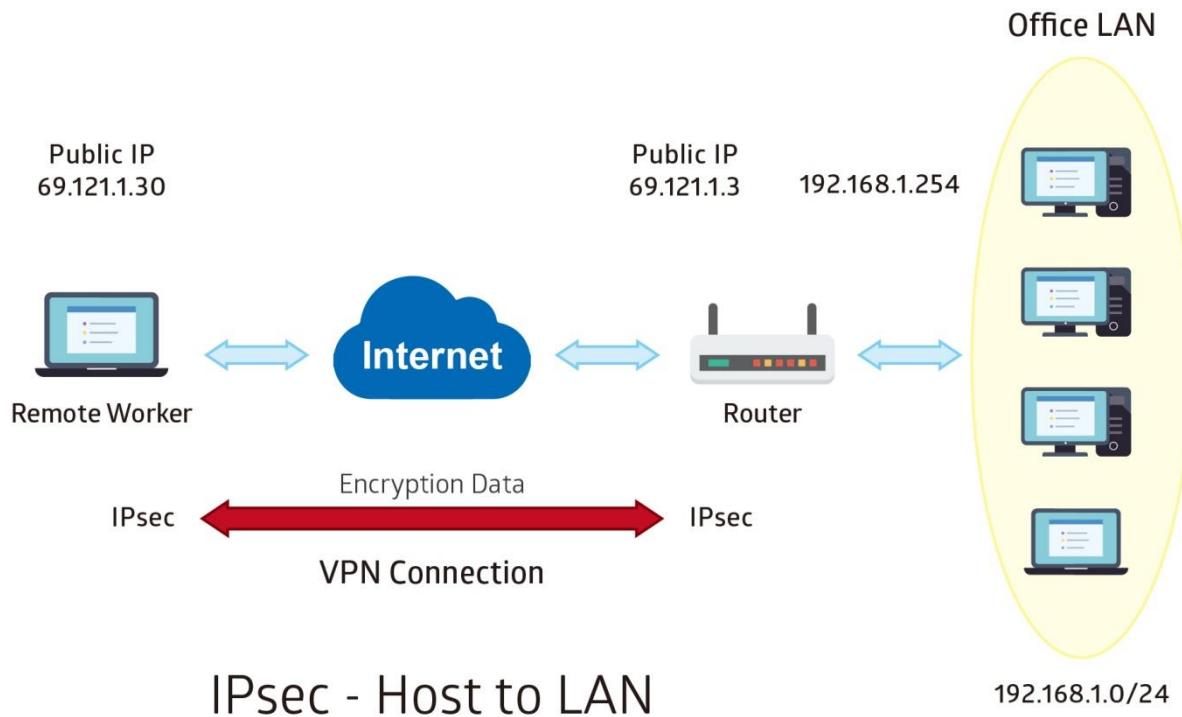
Configuration Settings		Description
Connection Name	B-to-H	Assigned name to this tunnel/profile
Remote Secure Gateway	69.121.1.3	IP address of the Branch office gateway
Access Network		
Local Access Range	Subnet	Headquarter office network
Local Network IP Address	192.168.0.0	
Local Network Netmask	255.255.255.0	
Remote Access Range	Subnet	Branch office network
Remote Network IP Address	192.168.1.0	
Remote Network 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 <input style="width: 20px; height: 15px;" type="button" value="..."/>					
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		
Remote Access Range	Subnet	Remote IP Address	192.168.1.0	IP Subnetmask		
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		
IPSec Proposal	<input checked="" type="radio"/> ESP <input type="radio"/> AH	Authentication Algorithm	SHA1	Encryption Algorithm		
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	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)						
<input type="button" value="Save"/> <input type="button" value="Back"/>						

## Examples: IPSec – Remote Employee to MX-200 PL9 Connection

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



**Headquarter office Side:**

<b>Configuration Settings</b>		<b>Description</b>
Connection Name	H-to-H	Assigned name to this tunnel/profile
Remote Secure Gateway	69.121.1.30	IP address of the Branch office gateway
<b>Access Network</b>		
Local Access Range	Subnet	Headquarter office LAN network information
Local Network IP Address	192.168.1.0	
Local Network Netmask	255.255.255.0	
Remote Access Range	Signal IP	Remote worker IP address
Remote Network IP Address	69.121.1.30	
Remote Network Netmask	255.255.255.255	
<b>IPSec Proposal</b>		
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)					
<input type="button" value="Save"/>	<input type="button" value="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	
PPTP Server	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Authentication Type	Chap/Pap
Encryption Key Length	Auto
Encryption Mode	Allow Stateless and Statefull
CCP	<input checked="" type="radio"/> Yes <input type="radio"/> No
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	
<input type="button" value="Save"/> <input type="button" value="Delete"/>	
<b>PPTP Server Listing</b>	
<input type="button" value="Index"/> <input type="button" value="Connection Name"/> <input type="button" value="Active"/> <input type="button" value="Username"/> <input type="button" value="Connection Type"/> <input type="button" value="Assigned IP Address"/>	

**PPTP Server:** Select **Activate / Deactivate** to enable or disable the PPTP Server.

**Authentication Type:** Pick an authentication type from the drop-down list. 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.

**Encryption Key Length:** **Auto**, data encryption and key length, with 40-bit or 128-bit, is automatically negotiated when establish a connection. 128-bit keys provide strong stronger encryption than 40-bit keys.

**Encryption Mode:** The encryption key will be changed every 256 packets with Stateful mode. With Stateless mode, the key will be changed in each packet.

**CCP (Compression Control Protocol):** Enable to compress data to save bandwidth and increase data transfer speed.

**MS-DNS:** Assign a DNS server or use router default IP address to be the MS-DNS server IP address.

**Rule Index:** The numeric rule indicator for PPTP server. The maximum entry is up to 4.

**Connection Name:** Enter a description for this connection/profile.

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

**Username / Password:** Enter the username / password for this profile.

**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 dial-in clients, and the IP should be in the same subnet as local LAN, but not occupied.

**Remote Network IP Address:** Enter the subnet IP of the remote LAN network.

**Remote Network Netmask:** Enter the Netmask of the remote LAN network.

Click **Save** to apply settings.

## PPTP Client

Establish a PPTP tunnel over Internet to connect with a PPTP server.

A total of 4 PPTP Client sessions can be created.

PPTP Client					
Rule Index	1				
Connection Name					
Active	<input type="radio"/> Yes <input checked="" type="radio"/> No				
Authentication Type	Chap/Pap				
Encryption Key Length	Auto				
Encryption Mode	Allow Stateless or Statefull				
CCP	<input checked="" type="radio"/> Yes <input type="radio"/> No				
Username					
Password	*****				
Connection Type	Remote Access				
Server IP Address					
Remote Network IP Address					
Remote Network Netmask					
Active as Default Route	<input type="checkbox"/> Enable				
<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:** The numeric rule indicator for PPTP client. The maximum entry is up to 4.

**Connection Name:** Enter a description for this connection/profile.

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

**Authentication Type:** Pick an authentication type from the drop-down list. 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.

**Encryption Key Length:** Auto, data encryption and key length, with 40-bit or 128-bit, is automatically negotiated when establish a connection. 128-bit keys provide strong stronger encryption than 40-bit keys.

**Encryption Mode:** The encryption key will be changed every 256 packets with Stateful mode. With Stateless mode, the key will be changed in each packet.

**CCP (Compression Control Protocol):** Enable to compress data to save bandwidth and increase data transfer speed.

**Username / Password:** Enter the username / password provided by the PPTP server/host.

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

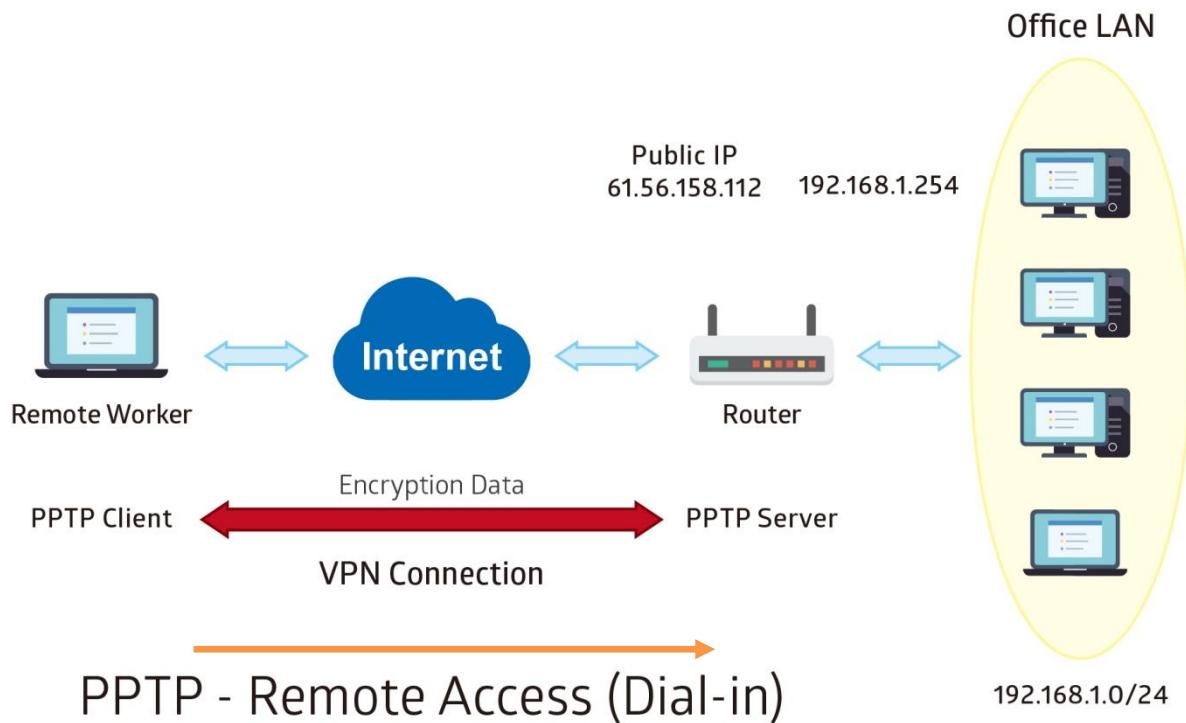
**Server Address:** Enter the WAN IP address of the PPTP server.

**Remote Network IP Address:** Enter the subnet IP of the server/host LAN network.

**Remote Network Netmask:** Enter the Netmask of the server/host LAN network.

Click **Save** to apply settings.

Example: PPTP – Remote Employee Dial-in to MX-200 PL9



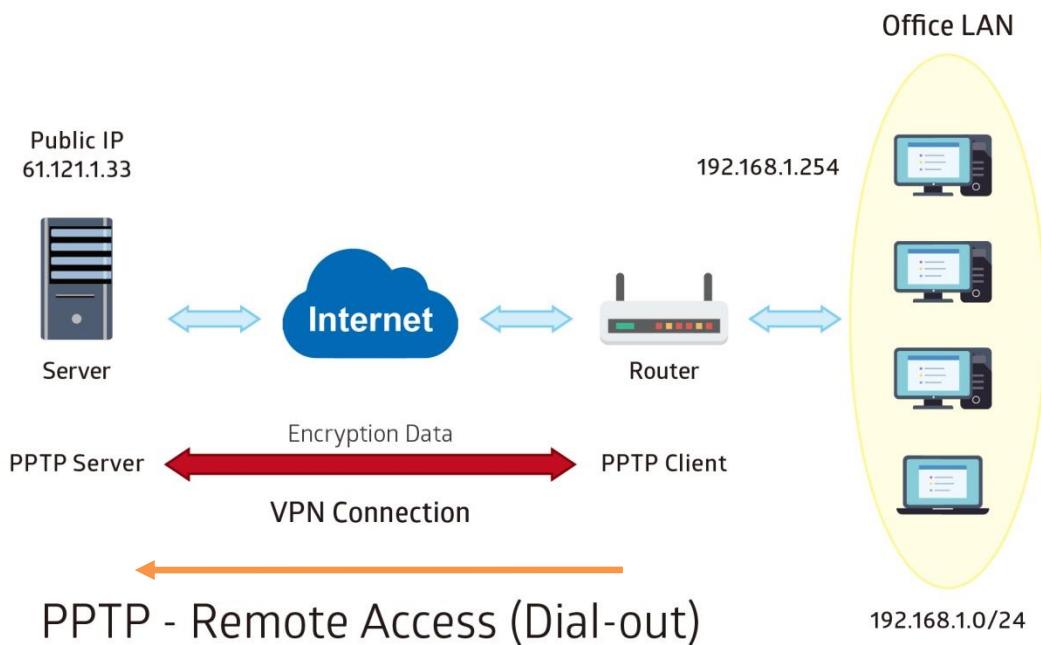
The input IP address 192.168.1.2 will be assigned to the remote worker. Please make sure this IP is not used in the Office LAN.

Configuration Settings		Description
Connection Name	HS-RA	Assigned name to this tunnel/profile
Authentication Type	MS-CHAPv2	Authentication type
Username	test	Credential created from the device to a PPTP client to dial-in to the network.
Password	test	
Connection Type	Remote Access	Remote access for a dial-in
Assigned IP	192.168.1.2	Local IP assigned to the dial-in client

PPTP Server					
PPTP Server	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated				
Authentication Type	MS-CHAPv2				
Encryption Key Length	Auto				
Encryption Mode	Allow Stateless and Statefull				
CCP	<input checked="" type="radio"/> Yes <input type="radio"/> No				
MS-DNS	192.168.1.254				
Rule Index	1				
Connection Name	HS-RA				
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No				
Username	test				
Password	*****				
Connection Type	Remote Access				
Private IP Address assigned to Dial-in User	192.168.1.2				
Remote Network IP Address					
Remote Network Netmask					
<input type="button" value="Save"/> <input type="button" value="Delete"/>					
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 – Remote Employee Dial-out to MX-200 PL9

A company's office establishes a PPTP 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.



PPTP Server WAN IP address is 61.121.1.33 of the Headquarter office.

Configuration Settings		Description
Connection Name	HS-RA	Assigned name to this tunnel/profile
Authentication Type	MS-CHAPv2	Authentication type
Username	test	Credential assigned from the PPTP server for PPP client to dial-in to its network.
Password	test	
Connection Type	Remote Access	Remote access for a dial-in
Server IP	61.121.1.33	VPN server WAN IP address

**PPTP Client**

Rule Index	1
Connection Name	HS-RA
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No
Authentication Type	MS-CHAPv2
Encryption Key Length	Auto
Encryption Mode	Allow Stateless or Statefull
CCP	<input checked="" type="radio"/> Yes <input type="radio"/> No
Username	test
Password	*****
Connection Type	Remote Access
Server IP Address	69.121.1.33
Remote Network IP Address	192.168.1.0
Remote Network Netmask	255.255.255.0
Active as Default Route	<input type="checkbox"/> Enable
<input type="button" value="Save"/> <input type="button" value="Delete"/>	

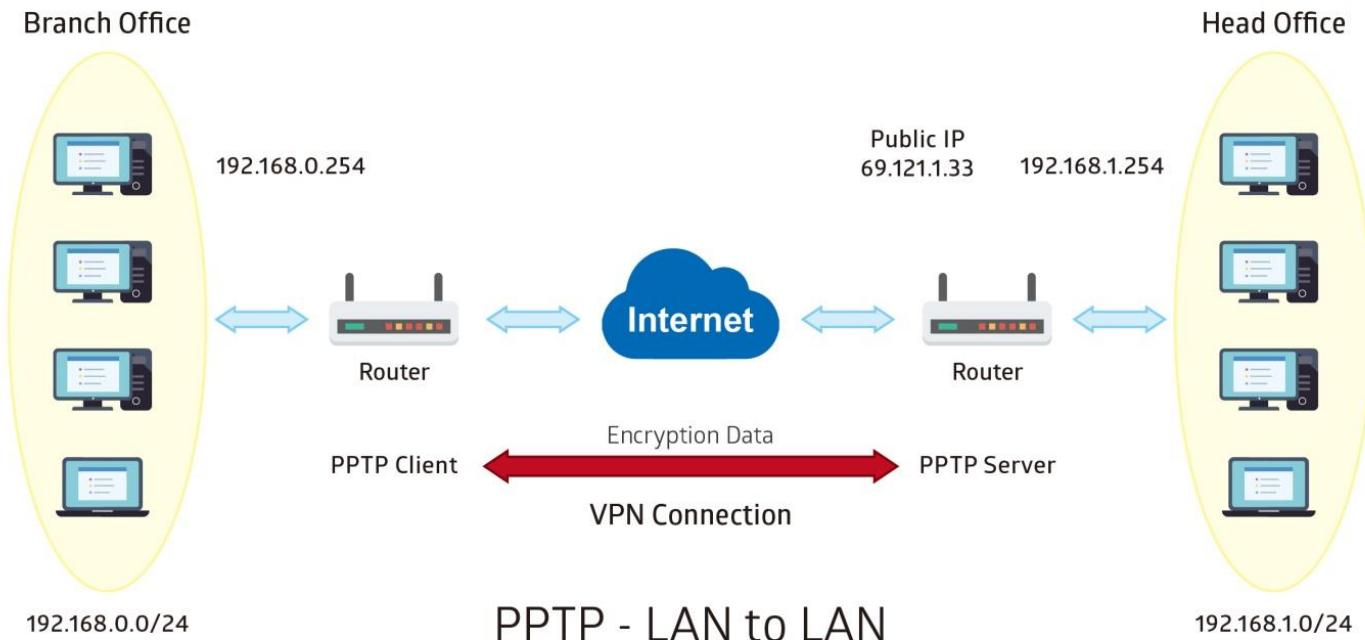
**PPTP Client Listing**

Index	Connection Name	Active	Username	Connection Type	Server IP Address
1	HS-RA	Yes	test	Remote Access	69.121.1.33

## Example: PPTP – Network (LAN) to Network (LAN) Connection

The branch office establishes a PPTP VPN tunnel with Headquarter office to connect two private networks over the Internet. The routers are installed in the Headquarter 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 Headquarter 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 Headquarter office LAN.

Configuration Settings		Description
Connection Name	HS-LL	Assigned name to this tunnel/profile
Authentication Type	MS-CHAPv2	Authentication type
Username	test	Credential created for a PPTP client to dial-in to its local network.
Password	test	
Connection Type	LAN to LAN	LAN to LAN connection
Assigned IP	192.168.1.2	Local IP assigned to the dial-in client
Remote Network IP	129.168.0.0	Remote, Branch office, LAN network IP
Remote Network Netmask	255.255.255.0	address and Netmask

**PPTP Server**

PPTP Server	<input checked="" type="radio"/> Active <input type="radio"/> Deactivated
Authentication Type	MS-CHAPv2
Encryption Key Length	Auto
Encryption Mode	Allow Stateless and Statefull
CCP	<input checked="" type="radio"/> Yes <input type="radio"/> No
MS-DNS	192.168.1.254
Rule Index	1
Connection Name	HS-LL
Active	<input checked="" type="radio"/> Yes <input type="radio"/> 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
<b>Save</b>	<b>Delete</b>

**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 Headquarter office.

Configuration Settings		Description
Connection Name	BC-LL	Assigned name to this tunnel/profile
Authentication Type	MS-CHAPv2	Authentication type
Username	test	Credential assigned from the Headquarter Server to dial-in.
Password	test	
Connection Type	LAN to LAN	LAN to LAN connection
Server IP	69.121.1.33	Headquarter Serve WAN IP address
Remote Network IP	129.168.1.0	Remote, Headquarter office, LAN network
Remote Network Netmask	255.255.255.0	IP address and Netmask

**PPTP Client**

Rule Index	1				
Connection Name	BC-LL				
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No				
Authentication Type	MS-CHAPv2				
Encryption Key Length	Auto				
Encryption Mode	Allow Stateless or Statefull				
CCP	<input checked="" type="radio"/> Yes <input type="radio"/> No				
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				
Active as Default Route	<input type="checkbox"/> Enable				
<b>Save</b>	<b>Delete</b>				
<b>PPTP Client Listing</b>					
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				
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No			
Connection Mode	Dial in			
Authentication Type	Chap/Pap			
Username				
Password				
Private IP Address assigned to Dial-in User				
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			
<input type="button" value="Save"/> <input type="button" value="Delete"/>				
L2TP Listing				
Index	Connection Name	Active	Connection Mode	Connection Type

**Rule Index:** The numeric rule indicator for L2TP. The maximum entry is up to 8 (4 dial-in and 4 dial-out profiles).

**Connection Name:** Enter a description for this connection/profile.

**Active:** To enable or disable this profile.

### Connection Mode (Dial in)

Connection Mode	Dial in
Authentication Type	Chap/Pap
Username	
Password	
Private IP Address assigned to Dial-in User	

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

**Authentication Type:** Default in 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 / Password (Server/Host):** Enter the username / password for this profile.

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

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

### Connection Mode (Dial out)

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 / Password (Client):** Enter the username / password provided by the Server/Host.

### Connection Type

- ▶ **Remote Access:** From a single user.
- ▶ **LAN to LAN:** Enter the peer network information, such as network address and Netmask.

### Tunnel Authentication and Active

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 / established a VPN tunnel.

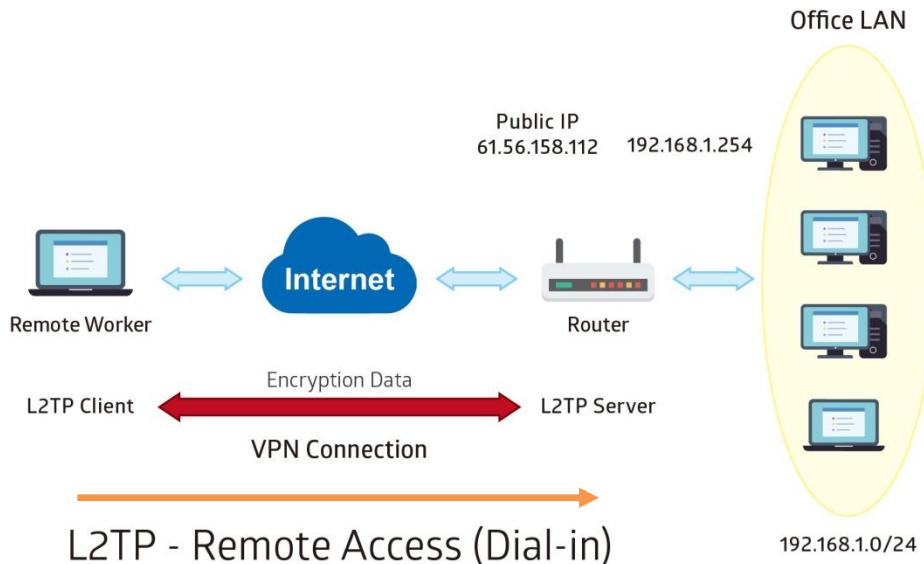
**Remote Host Name:** Enter hostname of remote VPN device. It is a tunnel identifier from the Remote VPN device matches with the Remote hostname provided. If remote hostname matches, tunnel will be connected; otherwise, it will be dropped.

**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.

Click **Save** to apply settings.

## Example: L2TP VPN – Remote Employee Dial-in to MX-200 PL9

A remote worker establishes a L2TP VPN connection with the Headquarter office using Microsoft's VPN Adapter. The router is installed in the Headquarter office, connected to a couple of PCs and Servers.



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.

Configuration Settings		Description
Connection Name	HS-RA	Assigned name to this tunnel/profile
Connection Mode	Dial in	Operate as L2TP server
Authentication Type	Chap/Pap	Authentication type
Username	test	Credential from the device for remote client to dial-in to the network.
Password	test	
Assigned IP	192.168.1.200	An IP assigned to the dial in client
Connection Type	Remote Access	Remote access for dial in

**L2TP**

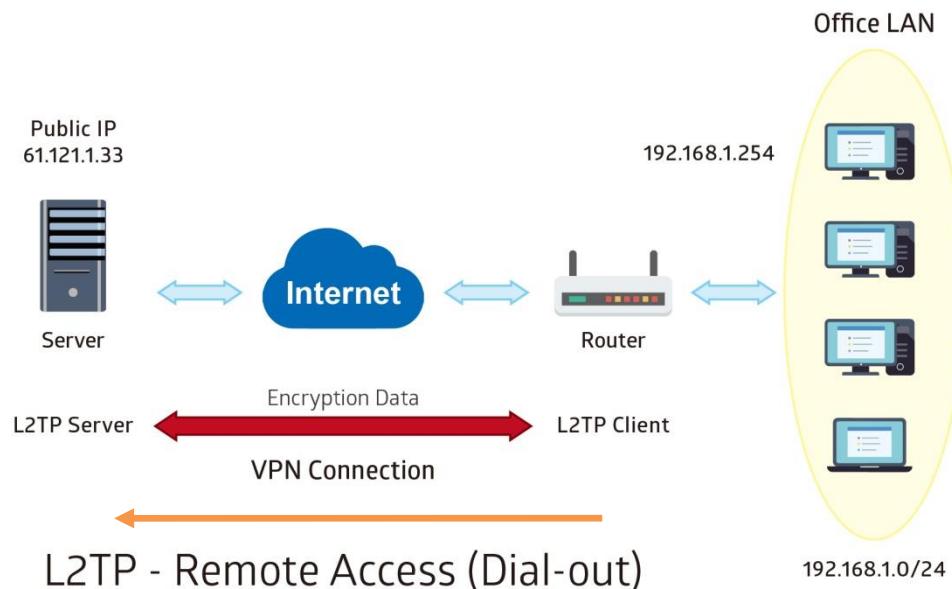
Rule Index	1
Connection Name	HS-RA
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No
Connection Mode	Dial in
Authentication Type	Chap/Pap
Username	test
Password	****
Private IP Address assigned to Dial-in User	192.168.1.200
Connection Type	Remote Access
Tunnel Authentication	<input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

**L2TP Listing**

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

## Example: L2TP VPN – MX-200 PL9 Dial-out to a Server

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.



Item	Description	
Connection Name	HC-RA	Assigned name to this tunnel/profile
Connection Mode	Dial out	Operate as L2TP client
Server IP	69.121.1.33	VPN server WAN IP address
Authentication Type	Chap/Pap	Authentication type
Username	test	Credential from the VPN Server for remote clients to dial-in to the network.
Password	test	
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
<b>Save</b>	<b>Delete</b>

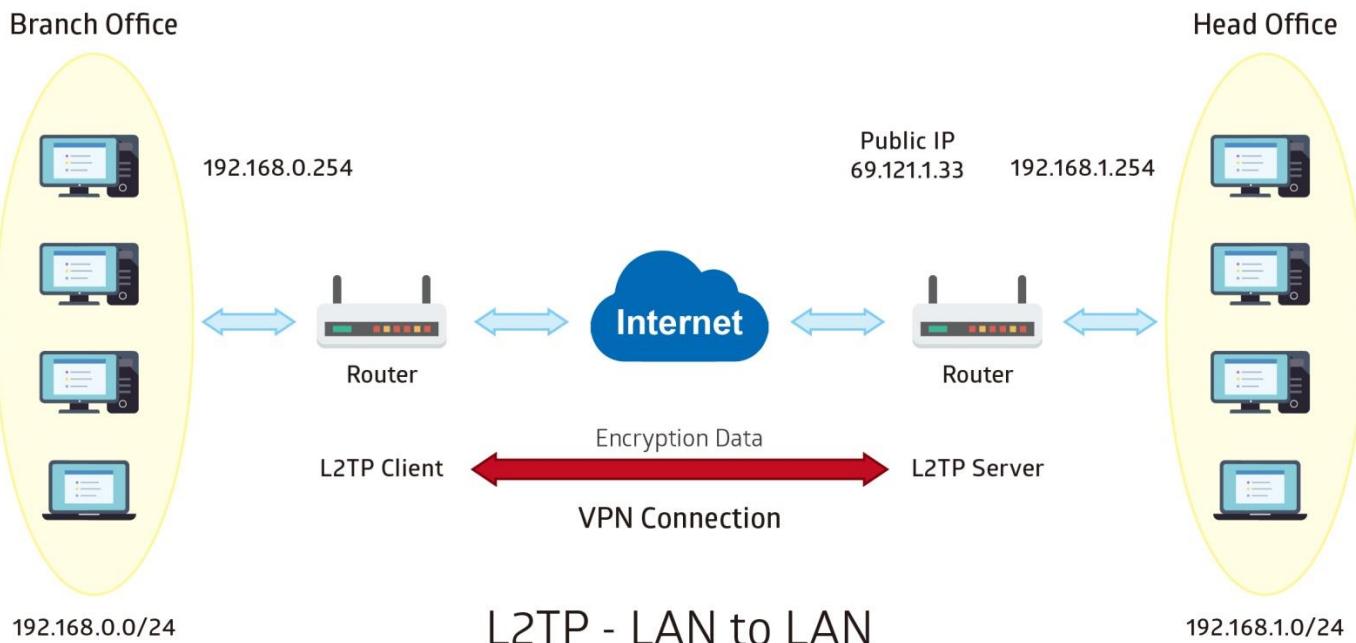
**L2TP Listing**

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

## Example: L2TP VPN – Network (LAN) to Network (LAN) Connection

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

The IP address 192.168.1.200 will be assigned to the router located in the branch office.

Item	Description	
Connection Name	HS-LL	Assigned name to this tunnel/profile
Connection Mode	Dial in	Operate as L2TP server
Authentication Type	Chap/Pap	Authentication type
Username	Test	Credential for a PPTP client to dial-in to the network.
Password	Test	
Assigned IP	192.168.1.200	An IP assigned to the dial in client
Connection Type	LAN to LAN	LAN to LAN for dial in
Remote Network IP	129.168.0.0	Remote, Branch office, LAN network IP
Remote Network Netmask	255.255.255.0	address and Netmask

**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			
<input type="button" value="Save"/> <input type="button" value="Delete"/>				
<b>L2TP Listing</b>				
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 Headquarter office.

Item	Description	
Connection Name	BC-LL	Assigned name to this tunnel/profile
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	Credential from the PPTP server to dial-in to the network
Password	test	
Connection Type	LAN to LAN	LAN to LAN for dial out
Remote Network IP	129.168.1.0	Remote, Headquarter office, LAN network IP address and Netmask
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			
<input type="button" value="Save"/> <input type="button" value="Delete"/>				
<b>L2TP Listing</b>				
Index	Connection Name	Active	Connection Mode	Connection Type
1	BC-LL	Yes	Dial out	Lan to Lan

## GRE Tunnel

**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 GRE tunnels supported.

GRE	
Rule Index	1 <input type="button" value="▼"/>
Connection Name	<input type="text"/>
Active	<input type="radio"/> Yes <input checked="" type="radio"/> No
Interface	<input type="button" value="EWAN(LAN1) ▼"/>
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"/>
Tunnel Network Netmask (Virtual Interface)	<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	
Index	Connection Name
Active	Interface
Remote Gateway IP	Remote Network

**Rule Index:** The numeric rule indicator for GRE. The maximum entry is up to 8.

**Connection Name:** Enter a description for this connection/profile.

**Active:** Yes to activate this GRE profile.

**Interface:** Select a WAN interface to establish a tunnel with the remote VPN device.

**Remote Gateway:** Enter the remote GRE WAN IP address.

**Tunnel Local IP Address & Remote IP address (Virtual Interface):** Enter a virtual IP address for the local and peer network.

**Tunnel Network Netmask (Virtual Interface):** Enter the Netmask for this virtual interface.

**NOTE:** The virtual Local and Remote IP addresses must in **same subnet** and **cannot be existed or used** in both networks.

**Remote Network IP Address Netmask:** Enter remote LAN network IP address.

**Remote Network Netmask:** Enter remote LAN network Netmask.

**Enable Keep-alive:** Check the box to enable the keep-alive. The system will detect remote peer is still alive or lost. If no responses from the remote peer after certain times, **#-of-retry-time x interval**, the connection will get dropped.

**Keep-alive Retry Times:** Set the keep-alive retry times, default is 3.

**Keep-alive Interval:** Set the keep-alive Interval, unit in seconds. Default is 5 seconds.

Example: Keepalive retry time (3) x keepalive interval (5) = 15 seconds. If no responses for 15 seconds, GRE connection will get aborted.

**MTU:** Maximum Transmission Unit in byte. The size of the largest datagram (excluding media-specific headers) an IP attempts to send through the interface.

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

**IPSec:** Click the checkbox to enable GRE tunnel over IPSec.

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

**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.

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

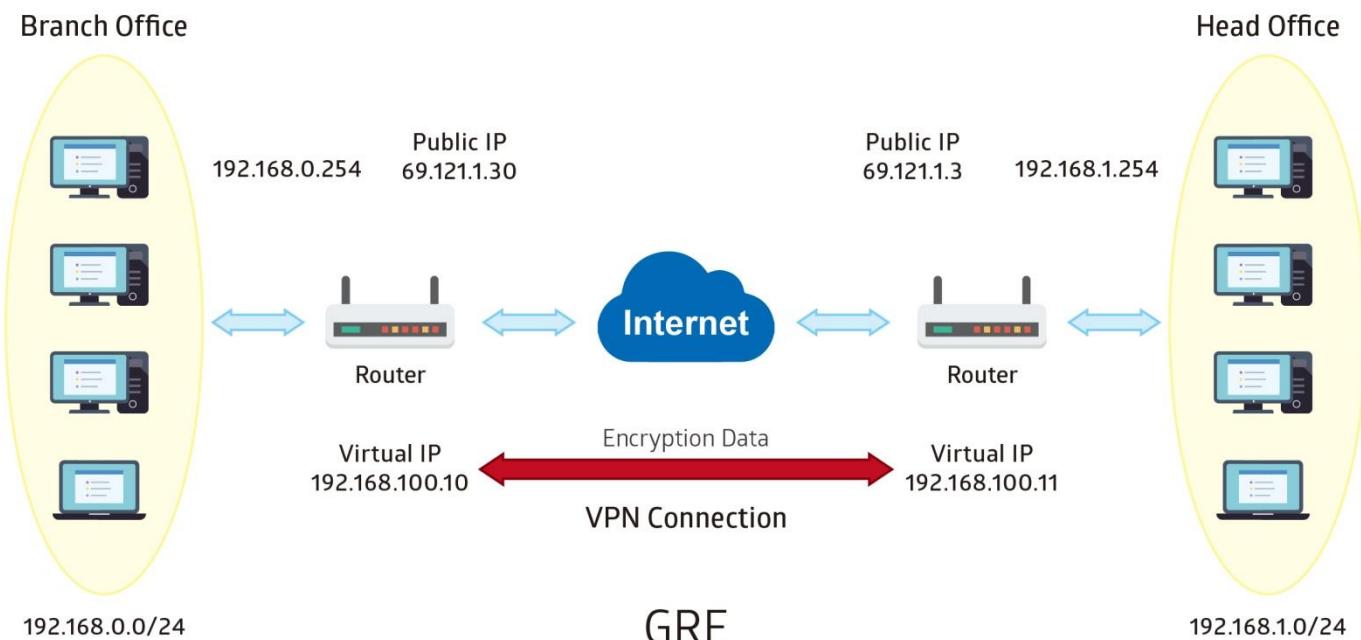
**IKE (IPSec) Pre-Shared Key:** This is for the Internet Key Exchange (IKE) protocol, a string from 4 to 128 characters. Both sides should use the same key. IKE is used to establish a shared security policy and authenticated keys for services (such as IPSec) that require a key. Before any IPSec traffic 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).

Click **Save** to apply settings.

## Example: GRE VPN – Network (LAN) to Network (LAN) Connection

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

**NOTE:** Both office LAN networks must be in different subnets with the GRE VPN connection.



## Configuring GRE connection in the Headquarter office

The IP address 69.1.121.30 is the Public IP address of the router located in branch office.

Item	Description	
Connection Name	HS-LL	Assigned name to this tunnel/profile
Remote Gateway IP	69.121.1.30	WAN IP address of Branch office
Tunnel Local IP Address (Virtual Interface)	192.168.100.11	Local and remote virtual interface IP address must be in same Netmask.
Tunnel Remote IP Address (Virtual Interface)	192.168.100.10	
Tunnel Network Netmask (Virtual Interface)	255.255.255.0	Network Netmask of this virtual interface.
Remote Network IP/ Netmask	192.168.0.0/255.255.255.0	The remote, branch office, LAN network IP and Netmask.

▼GRE

Rule Index	1				
Connection Name	HS-LL				
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No				
Interface	4G/LTE				
Remote Gateway IP	69.121.1.30				
Tunnel Local IP Address (Virtual Interface)	192.168.100.11				
Tunnel Network Netmask (Virtual Interface)	255.255.255.0				
Tunnel Remote IP Address (Virtual Interface)	192.168.100.10				
Remote Network IP Address	192.168.0.0				
Remote Network Netmask	255.255.255.0				
Enable Keepalive	<input type="checkbox"/>				
Keepalive Retry Times	3				
Keepalive Interval	5 Second(s)				
MTU	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					
Index	Connection Name	Active	Interface	Remote Gateway IP	Remote Network
1	HS-LL	Yes	4G LTE	69.121.1.30	192.168.0.0/255.255.255.0

## Configuring GRE connection in the Branch office

The IP address 69.1.121.3 is the Public IP address of the router located in Headquarter office.

Item	Description	
Connection Name	BC-LL	Assigned name to this tunnel/profile
Remote Gateway IP	69.121.1.3	WAN IP address of Headquarter office
Tunnel Local IP Address (Virtual Interface)	192.168.100.10	Local and remote virtual interface IP address must be in same Netmask.
Tunnel Remote IP Address (Virtual Interface)	192.168.100.11	
Tunnel Network Netmask (Virtual Interface)	255.255.255.0	Network Netmask of this virtual interface.
Remote Network IP/ Netmask	192.168.1.0/ 255.255.255.0	The remote, Headquarter office, LAN network IP and Netmask.

**GRE**

Rule Index	1				
Connection Name	BC-LL				
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No				
Interface	4G/LTE				
Remote Gateway IP	69.121.1.3				
Tunnel Local IP Address (Virtual Interface)	192.168.100.10				
Tunnel Network Netmask (Virtual Interface)	255.255.255.0				
Tunnel Remote IP Address (Virtual Interface)	192.168.100.11				
Remote Network IP Address	192.168.1.0				
Remote Network Netmask	255.255.255.0				
Enable Keepalive	<input type="checkbox"/>				
Keepalive Retry Times	3				
Keepalive Interval	5 Second(s)				
MTU	1460				
Active as Default Route	<input type="radio"/> Yes <input checked="" type="radio"/> No				
IPSec	<input type="checkbox"/> Enable				
<b>Save</b>	<b>Delete</b>				
<b>GRE Listing</b>					
Index	Connection Name	Active	Interface	Remote Gateway IP	Remote Network
1	BC-LL	Yes	4G LTE	69.121.1.3	192.168.1.0/255.255.255.0

## OpenVPN

OpenVPN is an open source software application that implements virtual private network (VPN) techniques for creating secure point-to-point or site-to-site connections in routed or bridged configurations and remote access facilities. It uses a custom security protocol that utilizes SSL/TLS for key exchange. OpenVPN can run over User Datagram Protocol (UDP) or Transmission Control Protocol (TCP) transports, multiplexing created SSL tunnels on a single TCP/UDP port. It is capable of traversing network address translation (NAT) and firewalls.

OpenVPN allows peers to authenticate each other using a pre-shared secret key, certificates, or username/password. Preshared secret key is the easiest, with certificate based being the most robust and feature-rich. It uses the OpenSSL encryption library extensively, allowing OpenVPN to use all the ciphers available in the OpenSSL package, as well as the SSLv3/TLSv1 protocol, and contains many security and control features.

It has integrated with OpenVPN package, allowing users to run OpenVPN in server or client mode from their network routers.

## OpenVPN Server

**NOTE:** Up to 1 profile.

OpenVPN Server			
Rule Index	1		
Connection Name			
Active	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Local Service Port	1194		
Tunnel Network (Virtual interface)			
IP Address		Netmask	255.255.255.0
Local Access Range			
IP Address		Netmask	255.255.255.0
Protocol	UDP		
Local Certificate Index	Default		
Trusted CA Index	Default		
Cryptographic Suite			
Cipher	Default	Hash	Default
Compression	Adaptive		
Keepalive	<input checked="" type="checkbox"/> Enable	Interval	10 second(s)
Timeout	120 second(s)		
<input type="button" value="Save"/> <input type="button" value="Delete"/>			

**Rule Index:** The numeric rule indicator for OpenVPN.

**Connection Name:** Enter a description for this connection/profile.

**Active:** Yes to activate this profile.

**Local Service Port:** Port 1194 is the default assigned port for OpenVPN

### Tunnel Network (virtual Interface)

**IP Address / Netmask:** Enter a virtual IP address and Netmask for this tunnel.

**NOTE:** The virtual IP addresses **cannot be existed or used** in both networks.

## Local Access Range

**IP Address / Netmask:** Enter local LAN network IP address and Netmask.

**Protocol:** OpenVPN can run over either UDP or TCP transports. Select the protocol.

**Local Certificate / Trusted CA Index:** OpenVPN mutually authenticate the server and client based on certificates and CA. Select a certificate and CA.

To import certificates and CAs, go to **Maintenance >> Certificate Management** to upload files. Otherwise, select **Default** certificate and CA.

## Cryptographic Suite

**Cipher:** OpenVPN uses all the ciphers available in the OpenSSL package to encrypt both the data and channels. Select an encryption method.

**Hash:** To establish the integrity of the datagram and ensures it is not tampered with in transmission. There are 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.

**Compression:** Choose **adaptive** to use the LZO compression library to compress the data stream.

**Keepalive:** Check the box to enable the keep-alive. The system will automatic send ping packet to remote peer to keep the tunnel active.

**Interval:** Set the keep-alive Interval, unit in seconds. Default is **10** seconds. Valid interval range is from **0 to 3600** seconds.

**Timeout:** Re-establish tunnel if no responses from peer network after timeout period expires. Default is 120 seconds.

Click **Save** to apply settings.

## OpenVPN Client

OpenVPN client must match the VPN information / settings with the OpenVPN Server.

**NOTE:** Up to 4 tunnels supported.

OpenVPN Client			
Rule Index	1		
Connection Name			
Active	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Server IP Address or Domain Name		Port Number	1194
Active as Default Route	<input type="radio"/> Yes	<input checked="" type="radio"/> No	
Remote Subnet			
IP Address		Netmask	255.255.255.0
Protocol	UDP		
Local Certificate Index	Default		
Trusted CA Index	Default		
Cryptographic Suite			
Cipher	Default	Hash	Default
Compression	Adaptive		
Keepalive	<input checked="" type="checkbox"/> Enable	Interval	10 second(s)
		Timeout	120 second(s)
<b>Save</b> <b>Delete</b>			

**Rule Index:** The numeric rule indicator for OpenVPN. Maximum up to 4 profile/tunnels

**Connection Name:** Enter a description for this connection/profile.

**Active:** Yes to activate this profile.

**Server IP Address or Domain Name:** Enter OpenVPN Server's WAN IP address or Domain name.

**Service Port:** Port 1194 is the official assigned port number for OpenVPN

**Active as Default Route:** Choose Yes to let the OpenVPN tunnel/connection be the default route for traffic, under this circumstance, all outgoing packets will be forwarded to this tunnel and routed to the next hop.

### Remote Subnet

**IP Address / Netmask:** Enter the LAN network IP address and Netmask of the OpenVPN Server.

**Protocol:** OpenVPN can run over either UDP or TCP transports. Select the protocol.

**Local Certificate / Trusted CA Index:** OpenVPN mutually authenticate the server and client based on certificates and CA. Select a certificate and CA.

To import certificates and CAs, go to **Maintenance >> Certificate Management** to upload files. Otherwise, select Default certificate and CA.

### Cryptographic Suite

**Cipher:** OpenVPN uses all the ciphers available in the OpenSSL package to encrypt both the data and channels. Select an encryption method.

**Hash:** To establish the integrity of the datagram and ensures it is not tampered with in transmission. There are 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.

**Compression:** Choose **adaptive** to use the LZO compression library to compress the data stream.

**Keepalive:** Check the box to enable the keep-alive. The system will automatic send ping packet to remote peer to keep the tunnel active.

**Interval:** Set the keep-alive Interval, unit in seconds. Default is **10** seconds. Valid interval range is from **0 to 3600** seconds.

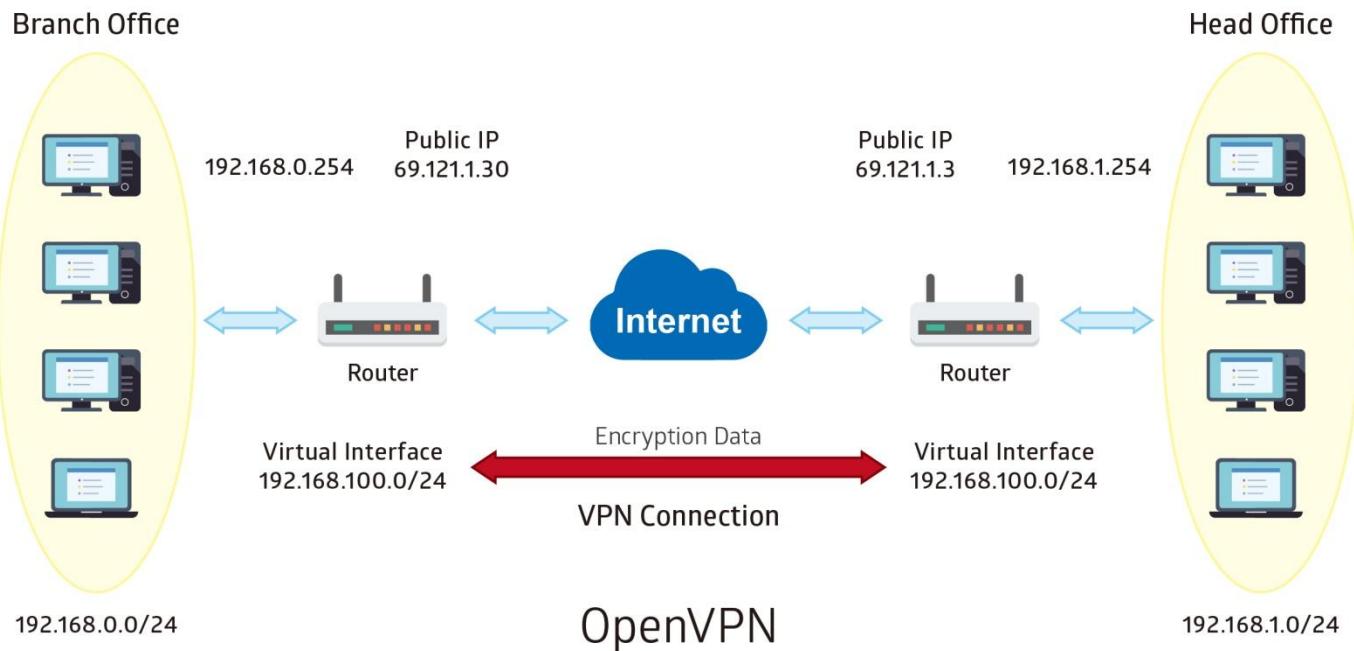
**Timeout:** Re-establish tunnel if no responses from peer network after timeout period expires. Default is 120 seconds.

Click **Save** to apply settings.

## Example: OpenVPN – Network (LAN) to Network (LAN) Connection

The Branch office establishes a tunnel with Headquarter office to connect two private networks over the OpenVPN.

**NOTE:** Both office LAN networks must be in different subnets with the GRE VPN connection.



## Configuring OpenVPN server in Headquarter office

The IP address 69.1.121.30 is the WAN IP address of the router located in the Branch office.

The OpenVPN tunnel network virtual interface is set to 192.168.100.0/24.

Item	Description	
Connection Name	HS-LL	Assigned name to this tunnel/profile
Tunnel Network (Virtual Interface)	192.168.100.0/ 255.255.255.0	IP address & Netmask of the virtual tunnel.
Local Access Range	192.168.0.0/ 255.255.255.0	OpenVPN Server's local LAN network.

▼ OpenVPN Server

Rule Index	1				
Connection Name	HS-LL				
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No				
Local Service Port	1194				
Tunnel Network (Virtual interface)					
IP Address	192.168.100.0	Netmask	255.255.255.0		
Local Access Range					
IP Address	192.168.0.0	Netmask	255.255.255.0		
Protocol	UDP				
Local Certificate Index	ServerLCA1				
Trusted CA Index	ServerTCA1				
Cryptographic Suite					
Cipher	Default	Hash	Default		
Compression	Adaptive				
Keepalive	<input checked="" type="checkbox"/> Enable	Interval	10 second(s)	Timeout	120 second(s)
<input type="button" value="Save"/>	<input type="button" value="Delete"/>				

## Configuring OpenVPN client in Branch office

The IP address 69.1.121.3 is the WAN IP address of the router located in Headquarter office.

Item	Description	
Connection Name	BC-LL	Assigned name to this tunnel/profile
Server IP Address	69.121.1.3	The WAN IP address of OpenVPN server.
Remote Subnet	192.168.0.0/ 255.255.255.0	Local LAN IP & Netmask of the Branch office

▼ OpenVPN Client

Rule Index	1				
Connection Name	BC-LL				
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No				
Server IP Address or Domain Name	69.121.1.3	Port Number	1194		
Active as Default Route	<input type="radio"/> Yes <input checked="" type="radio"/> No				
Remote Subnet					
IP Address	192.168.0.0	Netmask	255.255.255.0		
Protocol	UDP				
Local Certificate Index	ClientLCA1				
Trusted CA Index	ClientTCA1				
Cryptographic Suite					
Cipher	Default	Hash	Default		
Compression	Adaptive				
Keepalive	<input checked="" type="checkbox"/> Enable	Interval	10 second(s)	Timeout	120 second(s)
<input type="button" value="Save"/> <input type="button" value="Delete"/>					

## Access Management

### Device Management

▼ Device Management

<b>Device Host Name</b>	
Host Name	<input type="text" value="home.gateway"/>
<input type="button" value="Save"/>	
<b>Embedded Web Server</b>	
HTTP Port	<input type="text" value="80"/> (The default HTTP port number is 80.)
HTTPS Port	<input type="text" value="443"/> (The default HTTPS port number is 443.)
HTTPS Server Certificate Index	<input type="button" value="Default ▾"/>
<input type="button" value="Save"/>	

#### Device Host Name

**Host Name:** Enter the host name of the router. Default is **home.gateway**

#### Embedded Web Server

**HTTP Port:** It is the embedded web server (Web GUI) accessing port, default is **80**. It can be changed other port other than port 80, e.g. port [8080](#).

**HTTPS Port:** Similar to HTTP which is an unencrypted communication using port 80. HTTPS is encrypted by SSL using port 443 instead.

**HTTPS Server Certificate Index:** *HTTPS* known as HTTP-over-SSL tunnel protocol. Select a certificate to identify the system web server. When accessing to the web server (Web GUI), the browser will issue a warning page.

To import certificates, go to **Maintenance >> Certificate Management** to upload files. Otherwise, select **Default** certificate and CA.

Click **Save** to apply settings.

## SNMP

Simple Network Management Protocol (SNMP) is a protocol used for exchanging management information between network devices. The MX-200 PL9 serves as a SNMP agent that 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	
Set Community	
Trap Manager IP	0.0.0.0
System Name	
System Location	
System Contact	
SNMPv3	
SNMPv3	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Username	
Access Permissions	Read Only ▾
Authentication Protocol	MD5 ▾
Authentication Key	(8-31 characters)
Privacy Protocol	DES ▾
Privacy Key	(8-31 characters)
<input type="button" value="Save"/>	

**SNMP:** Activate to enable SNMP.

**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.

**System Name / Location / Contact:** String descriptions of the SNMP agent.

### SNMPv3

**SNMPv3:** Enable to activate the SNMPv3.

**User Name:** 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.

Click **Save** to apply settings.

## Syslog

Use the Syslog to collect system event information to a remote log server.

▼ Syslog

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

**Remote System Log:** Select **Activated** to enable this feature

**Server IP Address:** Assign the remote log server IP address.

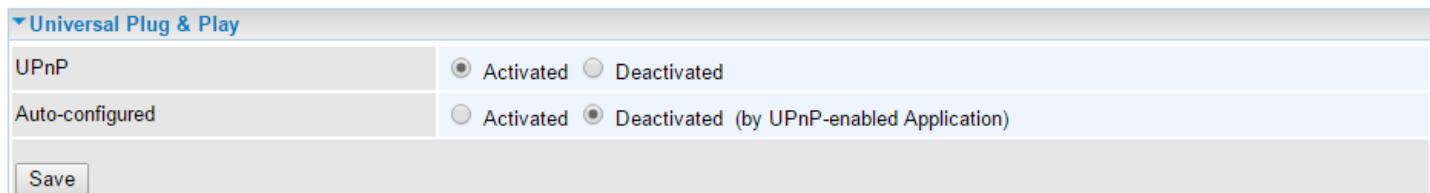
**Server UDP Port:** Assign the remote log server port, 514 is commonly used.

Click **Save** to apply settings.

## 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.



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

**UPnP:** Select this checkbox to activate UPnP. Be aware that anyone could use an UPnP application to open the web configuration's login screen without entering the MX-200 PL9's IP address

**Auto-configured:** Select this check box to allow UPnP-enabled applications to automatically configure the MX-200 PL9 so that they can communicate through the MX-200 PL9, 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.

Click **Save** to apply settings.

## Dynamic DNS (DDNS)

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 Providers.

If you do not have a DDNS account, please choose a DDNS Service Provider from the list then go to their website to create an account first.

Dynamic DNS	
Dynamic DNS	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Service Provider	<a href="http://www.dyndns.org/dynamic">www.dyndns.org (dynamic)</a> ▾
My Host Name	
Username	
Password	
Wildcard support	<input type="radio"/> Yes <input checked="" type="radio"/> No
Period	25 <a href="#">Day(s)</a> ▾
<a href="#">Save</a>	

**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](http://www.dyndns.org).

**My Host Name:** Type the domain name assigned to your MX-200 PL9 by your Dynamic DNS provider.

**Username / Password:** Enter the user name and password of the account you created with this service provider.

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

**Period:** Set the time period on how often the MX-200 PL9 will update the DDNS server with your current external IP address.

Click **Save** to apply settings.

## Example: How to register a DDNS account

If you do not have an account with Dynamic DNS, please go to [www.dyndns.org](http://www.dyndns.org) to register an account first.

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

DDNS: [www.hometest.com](http://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 (dynamic) ▾
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 the MX-200 PL9 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 entry is **16**.

The screenshot shows the 'Access Control' configuration page. At the top, there is a radio button for 'Activated' (selected) and 'Deactivated'. Below this is the 'Access Control Editing' section with fields for 'Rule Index' (0), 'Active' (Yes selected), 'Secure IP Address' (0.0.0.0), 'Application' (ALL), and 'Interface' (LAN). At the bottom of this section are 'Save' and 'Delete' buttons. The 'Access Control Listing' section shows a table with two rows:

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:** The numeric rule indicator.

**Active:** Yes to activate the rule.

**Secure IP Address:** The default 0.0.0.0 allows any client to use this service to manage the MX-200 PL9. 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 allow 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**.

Click **Save** to apply settings.

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

**Default Rule 1:** (Index 1), 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	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated			
<b>Access Control Editing</b>				
Rule Index	1 ▼			
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No			
Secure IP Address	0.0.0.0 ~ 0.0.0.0 (0.0.0.0 ~ 0.0.0.0 means all IPs)			
Application	ALL ▼			
Interface	LAN ▼			
<input type="button" value="Save"/> <input type="button" value="Delete"/>				
<b>Access Control Listing</b>				
Index	Active	Secure IP Address	Application	Interface
1	Yes	0.0.0.0-0.0.0.0	ALL	LAN
2	Yes	0.0.0.0-0.0.0.0	Ping	WAN

**Default Rule 2:** (Index 2), an ACL rule to open Ping to WAN side.

**Access Control**

Access Control	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated			
<b>Access Control Editing</b>				
Rule Index	2 ▼			
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No			
Secure IP Address	0.0.0.0 ~ 0.0.0.0 (0.0.0.0 ~ 0.0.0.0 means all IPs)			
Application	Ping ▼			
Interface	WAN ▼			
<input type="button" value="Save"/> <input type="button" value="Delete"/>				
<b>Access Control Listing</b>				
Index	Active	Secure IP Address	Application	Interface
1	Yes	0.0.0.0-0.0.0.0	ALL	LAN
2	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.

### ❖ Filter Type - IP & MAC Filter

Packet Filter

Packet Filter										
Filter Type	IP & MAC Filter ▼									
IP & MAC Filter Editing										
Action	Black List ▼									
Rule Index	1 ▼									
Individual Active	<input type="radio"/> Yes <input checked="" type="radio"/> No									
Interface	4G/LTE ▼									
Direction	Both ▼									
Type	IPv4 ▼									
Source IP Address	0.0.0.0 <small>(0.0.0.0 means Don't care)</small>									
Source Subnet Mask	0.0.0.0									
Source Port Number	0 <small>(0 means Don't care)</small>									
Destination IP Address	0.0.0.0 <small>(0.0.0.0 means Don't care)</small>									
Destination Subnet Mask	0.0.0.0									
Destination Port Number	0 <small>(0 means Don't care)</small>									
DSCH	64 <small>(Value Range: 0~64, 64 means Don't care)</small>									
Protocol	Any ▼									
Time Schedule	Always ▼									
<input type="button" value="Save"/> <input type="button" value="Delete"/>										
IP & MAC Filter List										
Index	Active	Interface	Direction	Source IP(IPv6) Address/Mask(Prefix)	Destination IP(IPv6) Address/Mask(Prefix)	Source MAC Address	Source Port	Destination Port	DSCH	Protocol

### IP & MAC Filter Editing

**Rule Index:** The numeric rule indicator.

**Individual Active:** Yes to enable the rule.

**Action:** This is how to deal with the packets matching the rule. Allow please select White List or Black 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.

► **IPv4**

Source IP Address	<input type="text" value="0.0.0.0"/>	(0.0.0.0 means Don't care)
Source Subnet Mask	<input type="text" value="0.0.0.0"/>	
Source Port Number	<input type="text" value="0"/>	(0 means Don't care)
Destination IP Address	<input type="text" value="0.0.0.0"/>	(0.0.0.0 means Don't care)
Destination Subnet Mask	<input type="text" value="0.0.0.0"/>	
Destination Port Number	<input type="text" value="0"/>	(0 means Don't care)
DSCP	<input type="text" value="0"/>	(Value Range:0~64, 64 means Don't care)
Protocol	<input style="width: 50px; height: 20px;" type="button" value="TCP"/>	

**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.

► **IPv6**

Source IPv6 Address	<input type="text" value="0:0:0:0:0:0:0:0"/>	(0:0:0:0:0:0:0:0 means Don't care)
Source IPv6 Prefix	<input type="text" value="32"/>	
Source Port Number	<input type="text" value="0"/>	(0 means Don't care)
Destination IPv6 Address	<input type="text" value="0:0:0:0:0:0:0:0"/>	(0:0:0:0:0:0:0:0 means Don't care)
Destination IPv6 Prefix	<input type="text" value="32"/>	
Destination Port Number	<input type="text" value="0"/>	(0 means Don't care)
DSCP	<input type="text" value="0"/>	(Value Range:0~64, 64 means Don't care)
Protocol	<input style="width: 50px; height: 20px;" type="button" value="TCP"/>	

**Source IP (IPv6) Address/ Prefix:** The source IP address or range of packets to be monitored.

**Source Port Number:** The source port number of packets to be monitored.

**Destination IP (IPv6) Address/ Prefix:** The destination subnet IP address.

**Destination Port Number:** 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

### ► MAC

Type	MAC <input type="button" value="▼"/>
Source MAC Address	<input type="text"/>

**Source MAC Address:** show the MAC address of the rule applied.

Click **Save** to apply settings.

❖ Filter Type- URL 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:** The numeric rule indicator.

**Individual Active:** To give control to the specific URL access individually, for example, you want to prohibit access to [www.yahoo.com](http://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.

Click **Save** to apply settings.

## 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	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
<b>ACS Login Information</b>	
URL	http://cpe.bectechnologies.com/comserver/node1/tr069
Username	testcpe
Password	ac5entry
<b>Connection Request Information</b>	
Path	
Username	conexant
Password	welcome
<b>Periodic Inform Config</b>	
Periodic Inform	<input checked="" type="radio"/> Activated <input type="radio"/> Deactivated
Interval	870
<b>Bind Wan Interface</b>	
Interface	Auto
<b>NATT Config</b>	
NATT Server	
NATT Period	
<b>Save</b>	

**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.

### Bind WAN Interface

**Interface:** Specify any available or a single WAN interface to handle TR-069 requests.

**NATT Config** - This is a proprietary feature provided by BEC. May leave them in blank, no configuration is required.

**NATT Server:** By BEC administrator only.

**NATT Period:** By BEC administrator only.

Click **Save** to apply settings.

## Parental Control

This feature provides Web content filtering offering safer and more reliable web surfing for users especially for parents to protect network security and control the contents for children at home.

▼ 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"/>

\*\*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.

To activate this feature, please log on to [www.opendns.com](http://www.opendns.com) to get an OpenDNS account first.

**Parent Control Provider:** Hosted by www.opendns.com

**Parent Control:** Enable the feature by clicking the **Activated**

**Host Name:** It is the domain name of your OpenDNS. If you don't have one, please leave it blank.

**Username / Password:** Put down your OpenDNS account username and password

Click **Save** to apply settings.

## BECentral Management

BECentral is a cloud based device management platform that provides operators with a comprehensive suite of services to manage devices in real-time.

▼ BECentral Management	
BECentral Management	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
BECentral Management URL	becentral.becloud.io
BECentral Management Port	48883
Organization ID	DEFAULT
Device Report Interval	480
Interface	ALL ▾
<input type="button" value="Save"/>	

**BECentral Management:** Activate to enable the feature.

**BECentral Management URL:** Access path to the BECentral.

**BECentral Management Port:** Port listened by the BECentral.

**Organization ID:** Customer ID

**Device Report Interval:** Enter the interval time in seconds to send inform message periodically to the BECentral.

**Interface:** Specify any available or a single WAN interface to handle BECentral requests.

## Maintenance

### User Management

User Management provides the Administrator with the ability to grant access control and manage GUI login credentials for each user.

There are two access management levels, Administrator and User.

The default root account, Administrator (admin), has full access to all the features listed and ability to create other accounts with features to allow other users to access to. The User account is with limited access (specified by advanced users with admin account) to the GUI.

Total of **8** accounts can be created to grant access to manage the MX-200 PL9 via the web page.

#### ❖ Administrator Account

**admin/admin** is the root/default account username and password.

**NOTE: This username / password may vary by different Internet Service Providers.**

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.

User Management	
<b>User Account</b>	
Index	<input type="text" value="1"/>
Username	<input type="text" value="admin"/>
New Password	<input type="text" value="....."/>
Confirm Password	<input type="text" value="....."/>
<input type="button" value="Save"/> <input type="button" value="Delete"/>	
<b>User Account Listing</b>	
Index	User Name
1	admin
2	user

### User Setup

**Index:** The numeric account indicator. The maximum entry is up to 8 accounts.

**User Name:** Create account(s) user name for GUI management.

**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

## ❖ User Account

**user/user** is the default user account username and password

**NOTE: This username / password may vary by different Internet Service Providers.**

<b>User Management</b>	
<b>User Account</b>	
Index	<input type="text" value="2"/>
Username	<input type="text" value="user"/>
New Password	<input type="text" value="****"/>
Confirm Password	<input type="text" value="****"/>
<b>Web GUI Permission</b>	
Guest Account	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Interface Setup	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Advanced Setup	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
VPN Setup	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Access Management	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Maintenance	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
<b>Save</b> <b>Delete</b>	

## User Account Setup

**Index #:** The numeric account indicator. The maximum entry is up to 8.

**Username:** Create account(s) user name for GUI management.

**New Password:** Password for the user account.

**Confirm Password:** Re-enter the password.

## Web GUI Permission

**Guest Account:** Enable to create this new guest account.

**Interface Setup / Advanced Setup / VPN Setup / Access Management / Maintenance:** Enable to grant this user access to these features.

When someone accesses to the MX-200 PL9 using this “user” account, he/she can only manage and configure the features that is pre-selected in **Web GUI Permission** for this account.

Click **Save** to apply settings.

## Certificate Management

This feature is used for OpenVPN and HTTPS Server authentication of the device using certificate. If the imported certificate doesn't match the authorized certificate with the Server then no access is allowed.

Local Certificate Listing			
Index	Certificate Name	Edit	Delete
1			
2			
Trusted CA Listing			
Index	Certificate Name	Edit	Delete
1			
2			

**Edit:** Click  (Edit) to import a certificate.

**Delete:** Click  (Delete) to remove the certificate from the list.

### Local Certificate Listing

▼ Local Certificate

Index	1 ▾
Certificate Name	<input type="text"/>
	<input type="checkbox"/> PKCS12
Certificate File	<input type="button" value="Choose File"/> No file chosen <input type="button" value="Upload"/> (Please upload Certificate File. )
Private Key File	<input type="button" value="Choose File"/> No file chosen <input type="button" value="Upload"/> (Please upload Private Key File. )
Password	.....
After clicked "Upload", please wait for 5 seconds and then click "Apply".	
<input type="button" value="Save"/> <input type="button" value="Back"/>	

**Index #:** The numeric account indicator. The maximum entry is up to 2.

**Certificate Name:** Description of the certificate.

**PKCS12:** Every certificate is accompanied by a private key. Upload both files if PKCS is disabled. Enable PKCS12 to put Certificate & Private Key in the same file, like \*.p12, \*.pfx.

**Certificate File:** Browse to locate the target certificate file on PC before uploading it.

**Private Key File:** Browse to locate the target file on PC before uploading it. If PKCS enabled, please ignore this setting.

**Password:** Enter the password if any, which is used to protect the private key. Otherwise, leave it empty.

Click **Apply** to save settings.

### Trusted CA Listing

▼ Trusted CA

Index	<input type="text" value="1"/>
CA Name	<input type="text"/>
CA Certificate File	<input type="button" value="Choose File"/> No file chosen <input type="button" value="Upload"/> (Please upload CA Certificate File. )
After clicked "Upload", please wait for 5 seconds and then click "Apply".	
<input type="button" value="Apply"/> <input type="button" value="Back"/>	

**Index #:** The numeric account indicator. The maximum entry is up to 2.

**CA Name:** Description of the CA.

**CA Certificate File:** Browse to locate the target certificate file on PC before uploading it.

Click **Apply** to save settings.

## Time Zone

With default, MX-200 PL9 does not contain the correct local time and date.

There are several options to setup, maintain, and configure current local time/date on the MX-200 PL9. If you plan to use **Time Schedule** feature, it is extremely important you set up the Time Zone correctly.

Time Zone	
Current Date/Time	N/A (Can't find NTP server)
Time Synchronization	
Synchronize time with	<input checked="" type="radio"/> NTP Server <input type="radio"/> PC's Clock <input type="radio"/> Manually
Time Zone	(GMT-06:00) Central Time (US & Canada), Maxico City, Saskatchewan
Daylight Saving	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
NTP Server Address	0.0.0.0 (0.0.0.0: Default Value)
<input type="button" value="Save"/>	

**Synchronize time with:** Select the methods to synchronize the time.

- ▶ **NTP Server automatically:** To synchronize time with the SNTP servers to get the current time from an SNTP server outside your network then choose your local time zone. After a successful connection to the Internet, MX-200 PL9 will retrieve the correct local time from the SNTP server this is specified.
- ▶ **PC's Clock:** To synchronize time with the PC's clock.
- ▶ **Manually:** Select this to enter the SNTP server IP address manually.
  - ◆ **Date:** Month / Date / Year. Month – 1 ~ 12 (January ~ December).
  - ◆ **Time:** Hour: Minute: Second

**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.

Click **Save** to apply settings.

## 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 MX-200 PL9 provides an easy way to update the code to take advantage of the changes.

To upgrade the firmware of the MX-200 PL9, you should download or copy the firmware to your local environment first. Click “**Choose File**” to specify the path of the firmware file. Then, click “**Upgrade**” to start upgrading process. After completing the firmware upgrade, the MX-200 PL9 will automatically restart and run the new firmware.

▼ Firmware & Configuration

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 **Browse** 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 MX-200 PL9 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: 100px; height: 10px; background-color: #3399FF; border: 1px solid #3399FF;"></div>
Percent	15 %



DO NOT turn off or power cycle the device while firmware upgrading is still in process.

Improper operation could damage your MX-200 PL9.

## System Restart

Click **System Restart** with option **Current Settings** to reboot your router.



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

Schedule an automatic reboot for your MX-200 PL9 to ensure proper operation and best performance. This reboot will only reboot with current configuration settings and not overwrite any existing 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 <input type="text" value="00"/> : <input type="text" value="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 <input type="text" value="00"/> : <input type="text" value="00"/>

Click **Save** to apply settings

**Example:** Schedule MX-200 PL9 to reboot at 10:00pm (22:00) every weekday (Monday thru Friday) and reboot at 9:00am on Saturday and Sunday.

▼ 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 <input type="text" value="22"/> : <input type="text" value="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 type="checkbox"/> Sat.	<input type="checkbox"/> Sun.	Time <input type="text" value="09"/> : <input type="text" value="00"/>

## 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 / EWAN (LAN1)

▼ Diagnostic Tool

WAN Interface	EWAN(LAN1) ▾
Testing Ethernet LAN Connection	N/A
Ping Primary DNS ( N/A )	N/A
Ping www.google.com	N/A
Ping other IP Address or Domain	<input type="radio"/> Yes <input checked="" type="radio"/> No N/A
<b>Start</b>	
Trace Route	<input type="radio"/> Yes <input checked="" type="radio"/> No
<b>Start Trace Route</b>	

**Ping other IP Address:** Click **Yes** if you wish to ping other IP address rather than google.com

Click **START** to begin to diagnose the connection.

▼ Diagnostic Tool

WAN Interface	4G/LTE ▾
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
<b>Start</b>	

**Trace Route** is to display how many hops (also view the exact hops) the packet of data has to take to get to the destination.

Click **Yes**, enter the IP address or domain then **Start Trace Route**.

Trace Route	<input checked="" type="radio"/> Yes <input type="radio"/> No
IP Address or Domain	<input type="text"/>
Max TTL Value	16 [2-30]
<b>Start Trace Route</b>	

**IP Address or Domain:** Set the destination host (IP, domain name) to be traced.

**Max TTL value:** Set the max Time to live (TTL) value.

Shown as we “trace” [www.billion.com](http://www.billion.com) below.

```
▼ Trace www.billion.com

traceroute to www.billion.com (125.227.205.188), 16 hops max, 60 byte packets
 1  172.16.1.254 (172.16.1.254)  0.472 ms  0.488 ms  0.643 ms
 2  122.96.153.233 (122.96.153.233)  7.354 ms  7.517 ms  7.704 ms
 3  221.6.12.69 (221.6.12.69)  7.921 ms  8.108 ms  8.256 ms
 4  221.6.1.253 (221.6.1.253)  8.392 ms  8.544 ms *
 5  219.158.99.245 (219.158.99.245)  36.110 ms  36.839 ms  37.001 ms
 6  * * *
 7  * * 219.158.103.26 (219.158.103.26)  40.731 ms
 8  211.72.233.194 (211.72.233.194)  65.969 ms  66.040 ms  66.019 ms
 9  220.128.6.126 (220.128.6.126)  61.726 ms  61.831 ms  61.960 ms
10  220.128.11.170 (220.128.11.170)  61.543 ms  61.583 ms  65.127 ms
11  220.128.17.85 (220.128.17.85)  63.436 ms  62.133 ms  65.862 ms
12  220.128.17.229 (220.128.17.229)  64.695 ms  64.849 ms  65.063 ms
13  168.95.229.145 (168.95.229.145)  61.915 ms  60.715 ms  60.825 ms
14  * * *
15  * * *
16  * * *
```

## LAN

▼ Diagnostic Tool

WAN Interface	LAN
Testing Ethernet LAN Connection	PASS
Ping other IP Address or Domain <input checked="" type="radio"/> Yes <input type="radio"/> No	Skipped
IP Address or Domain	N/A
<b>Start</b>	

**Ping other IP Address:** Click **Yes** to ping any desired IP address or a domain.

Click **START** to begin to diagnose the connection.

# Chapter 5: Troubleshooting

If your MX-200 PL9 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
<b>None of the LEDs is on when you turn on the router</b>	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 or BEC for technical support.
<b>You have forgotten your login username or password</b>	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
<b>Cannot PING any PC on LAN</b>	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 light, 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
<p><b>1. The front LEDs display incorrectly upgrade</b></p> <p><b>2. Still cannot access to the router management interface after pressing the RESET button.</b></p> <p><b>3. Software / Firmware upgrade failure</b></p>	<p>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.</p> <ol style="list-style-type: none"><li>1. Power the router off.</li><li>2. Press reset button and power on the router, once the Power lights Red, keeping press reset button over 6 seconds.</li><li>3. Internet LED flashes Green, router entering recovery procedure and router's IP will reset to Emergency IP address (Say 192.168.1.1).</li><li>4. Open browser and access <a href="http://192.168.1.1">http://192.168.1.1</a> to upload the firmware.</li><li>5. Internet LED lit Red, and router starts to write firmware into flash. Please DO NOT power off the router at this step.</li><li>6. Internet LED lit Green when successfully upgrade firmware.</li><li>7. Power cycle off/on the MX-200 PL9</li></ol>

# APPENDIX: PRODUCT SUPPORT & CONTACT

If you come across any problems please contact the dealer from where you have purchased the product.

Contact Support: <http://bectechnologies.net/support/>.

		
Submit A Ticket	Send An Email	Contact By Phone
<p><a href="https://helpdesk.becentral.io/">https://helpdesk.becentral.io/</a></p> <p>Create an account and submit support requests in our Help Desk Portal. We will respond to your ticket during our normal working hours.</p>	<p><a href="mailto:teamsupport@bectechnologies.net">teamsupport@bectechnologies.net</a></p> <p>Please include a description of the issue, product model, firmware version, application involved, and any relevant error messages.</p>	<p><a href="tel:+19724220877">+1-972-422-0877</a> Option 2</p> <p>Our Support Team is available by phone Monday through Friday 9am to 5pm CST</p>

MAC OS is a registered Trademark of Apple Computer, Inc.

Windows 10/8/7, 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.