

# User Manual

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## **BEC MX-200** **Advanced Industrial** **4G/LTE Wireless Router**



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# CHAPTER 1: INTRODUCTION

## Introduction to your Router

The BEC MX-200 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 MX-200 provides a reliable and cost-effective alternative solution for business continuity. The platform can serve as the primary connection or backup connection when wired connections fail are unavailable or non-existent.

The MX-200 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 exclusively features dual WAN - load balance or auto-failover/failback to provide extraordinary, always-on internet connectivity.

### Ultra-Compact and Lightweight Design

Designed for continuous operation in harsh environments, the MX-200 supports an extended operating temperature range from -4 to 140° F (-20 to 60° C) and a flexible input voltage range of 8-56V 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 and can be easily mounted discretely anywhere.

### Secure VPN Connections

The MX-200 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 (3G Fallback optional)
- 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)
- 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



## Hardware Specifications

### Physical interface

- 3G/4G LTE: Two(2) detachable antennas
- WAN: 3G/4G LTE (and/or ETH WAN Optional)
- 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

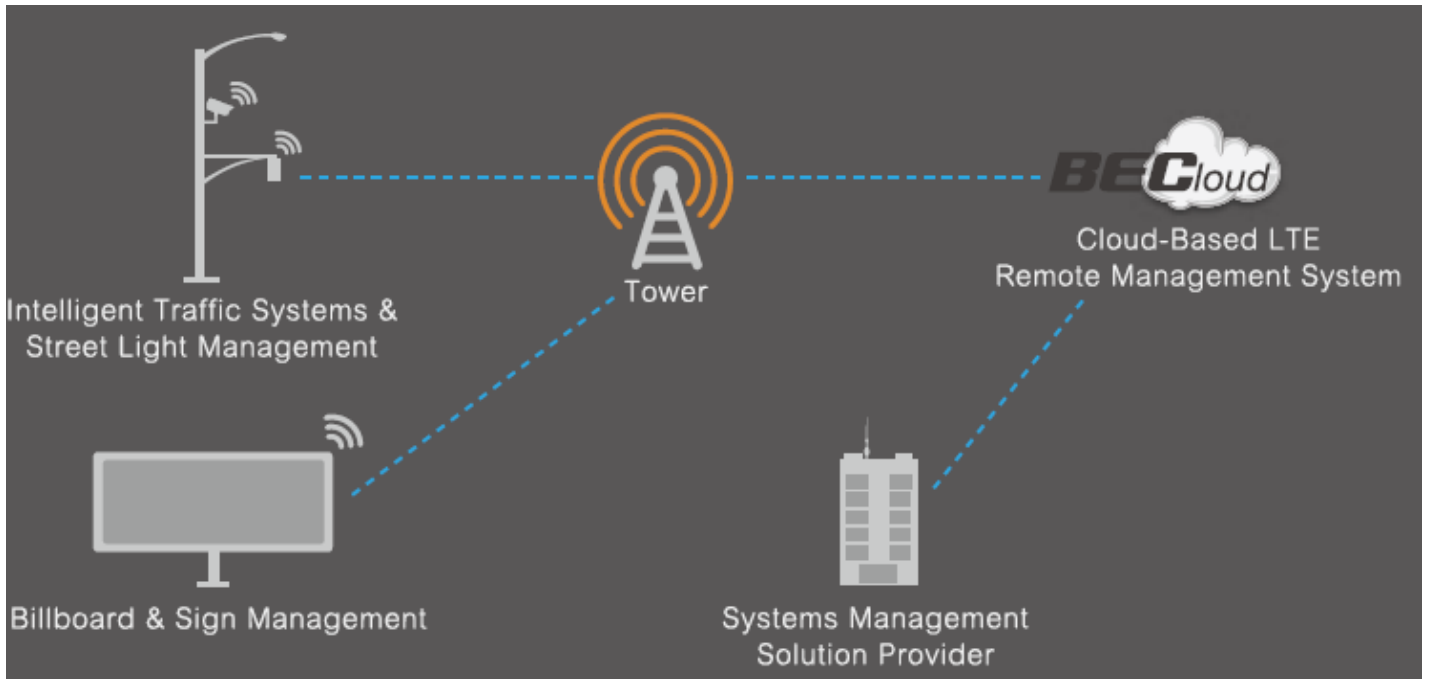
### Physical Specifications

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

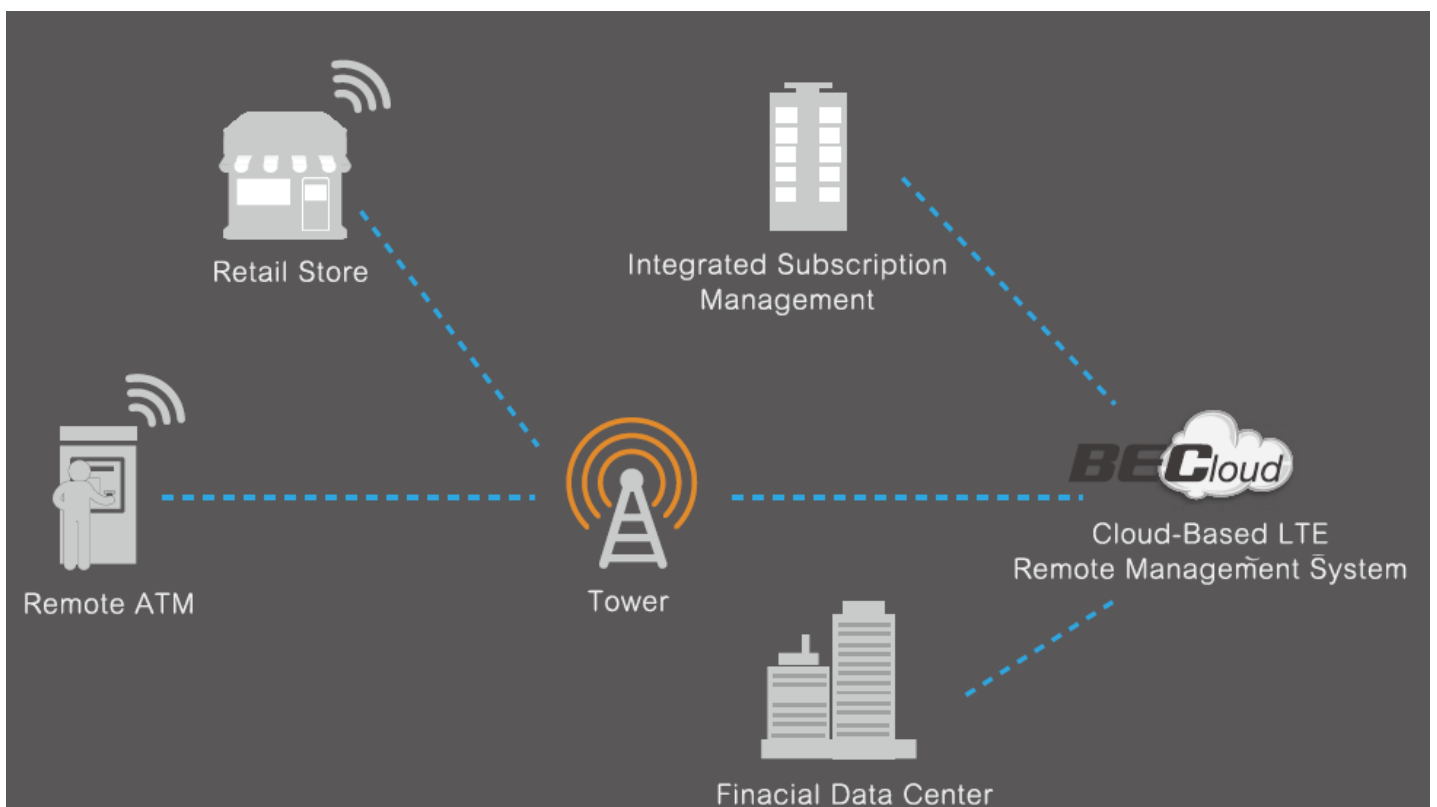
## Application Diagrams

The MX-200 Advanced Industrial 4G/LTE Wireless VPN Router is ideal the ideal solution for Digital signage, Remote surveillance, Vending Machines, Retail Point-of-Sales (PoS), Remote patient care/maintenance services, SCADA, Metering applications and much more.

### Industrial Industry:



### Power / Energy Industry:



# CHAPTER 2: PRODUCT OVERVIEW

## Important Note for Using This Router



### **Warning**

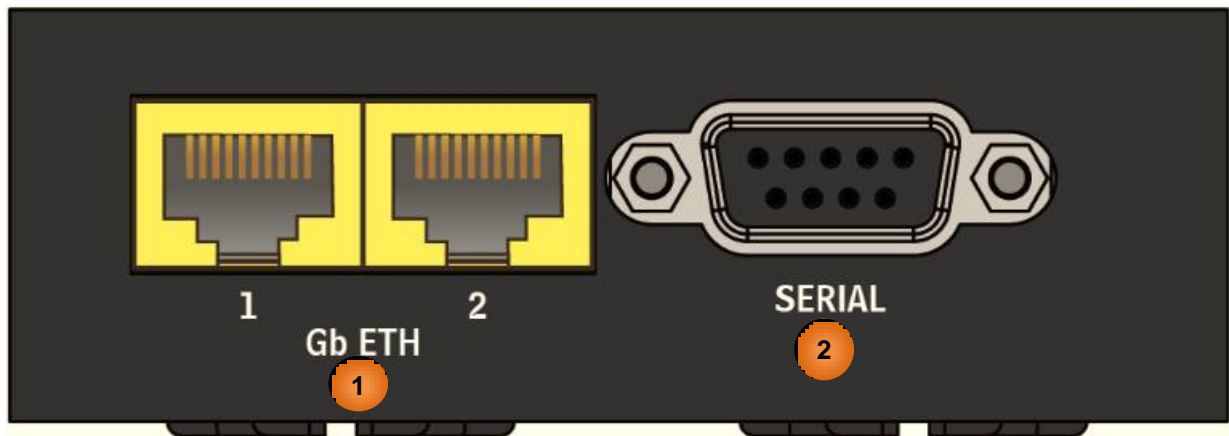
- ✓ Do not use the router in high humidity or high temperature.
- ✓ Do not use the same power source for the MX-200 on other equipment.
- ✓ Do not open or repair the case yourself. If the device becomes too hot, turn off the power immediately and have it repaired at a qualified service center.
- ✓ Avoid using this product and all accessories outdoors.



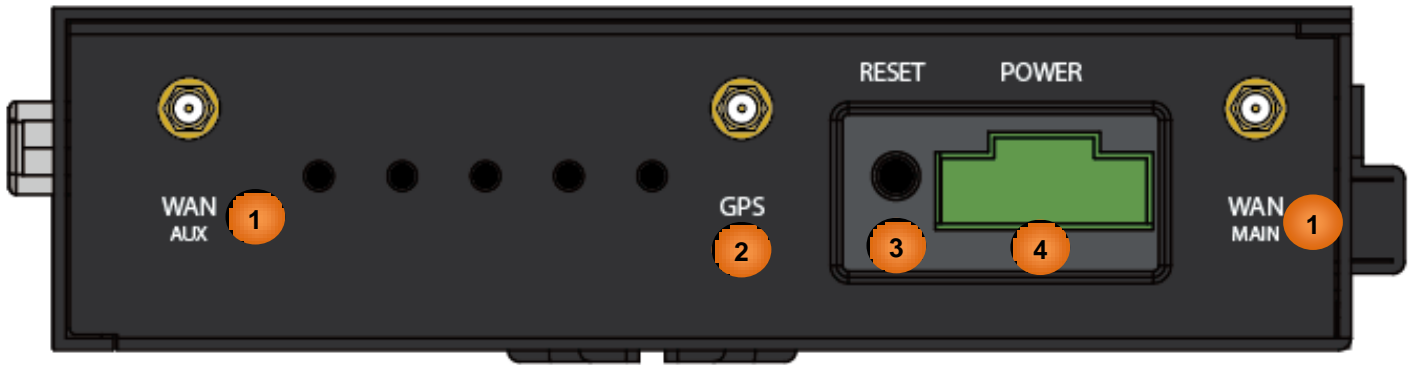
### **Attention**

- ✓ 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.

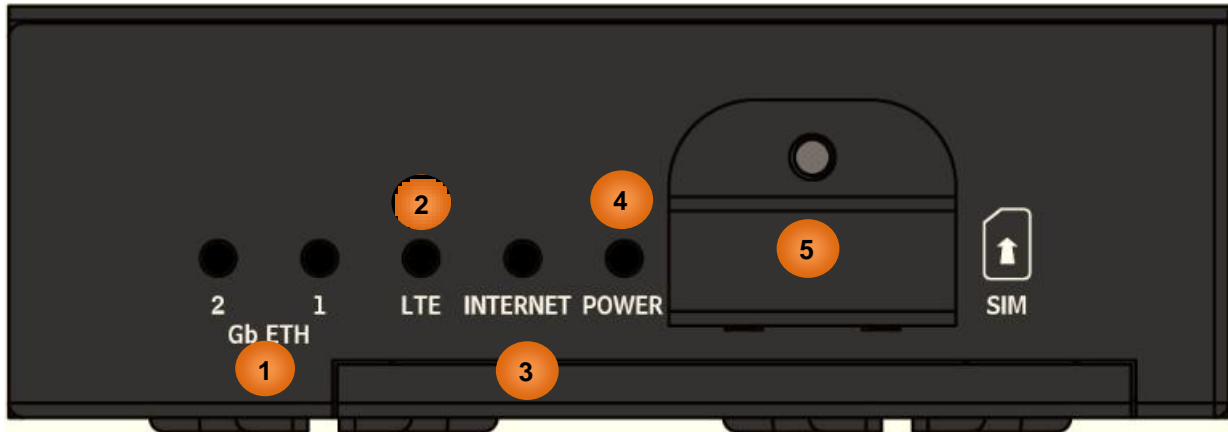
## Device Description




INTERFACE		MEANING
1	Gigabit Ethernet (LAN 1 ~ 2)	<p><b>ETH1 is a LAN / WAN configurable port for broadband connectivity</b></p> <p>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.</p>
2	SERIAL	<p>RS-232 serial port for machine connection and data collection</p> <p>Connect the male end of RS-232 serial data cable to the MX-200 and the other end to a machine or PC.</p>



INTERFACE		MEANING
1	WAN (MAIN/AUX) 4G/LTE Antenna Connectors	SMA female connectors. Manually screw the 3G/4G antennas tight to the female connectors for the Cellular Module
2	GPS Antenna Connector	SMA female connectors. Manually screw the GPS antenna tight to the connector
3	RESET	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	POWER	Connect the supplied screw terminal block, 2-pin 3.5mm, to this jack port



LEDS / INTERFACE		MEANING	
1	Gb ETH (1 & 2) (Gigabit Ethernet)	<b>ETH #1 Can be configured to be WAN port for broadband connectivity</b>	
		Green	<b>Ethernet LAN:</b> Connected to an Gigabit (1000Mbps) Ethernet device <b>Ethernet WAN (ETH1 Only):</b> Successfully connected with a broadband connection device
		Red	Transmission speed is at 10/100Mbps
		Blinking	Data being transmitted/received
		Off	No device is connected to the Ethernet port
2	LTE (Received Signal Strength Indicator)	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	Internet	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	Power	Green	System ready
		Red	Boot failure
5	SIM Card Slot	N/A 	Insert mini SIM card (2FF) with the gold contact facing down. Push mini SIM card (2FF) inwards to eject it <b>* Power off the MX-200 before inserting or removing the SIM card</b>

## System Recovery Procedures

The purpose is to allow users to restore the MX-200 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 Device

- 2.1 Power off your MX-200
- 2.2 Power on the MX-200 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 Device

With INTERNET light flashes green, MX-200 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 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.
- 3.4 INTERNET LED turns green after the Firmware upgrade completed
- 3.5 Power cycle on & off to regain access to the MX-200.

## 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 XP / 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. To configure other types of workstations, please consult the manufacturer's documentation.

**Attention**



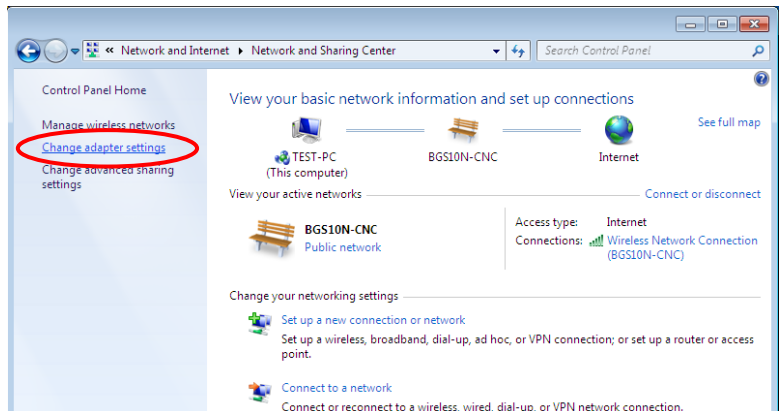
## Network Configuration – IPv4

### Configuring PC in Windows 10 (IPv4)

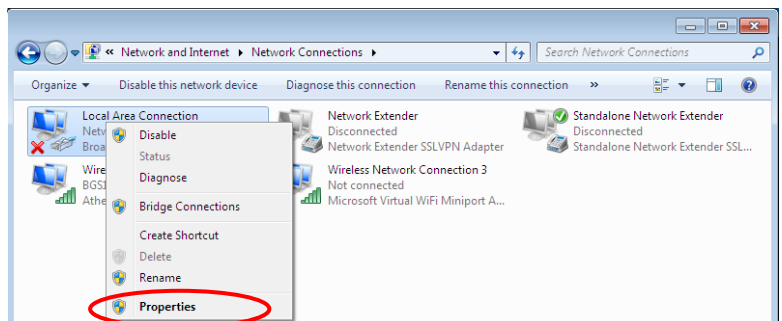
1. Click .
2. Click  Settings
3. Then click on **Network and Internet**. 
4. Under **Related settings**, select **Network and Sharing Center**

- Related settings
- Change adapter options
- Change advanced sharing options
- Network and Sharing Center**
- HomeGroup
- Internet options
- Windows Firewall

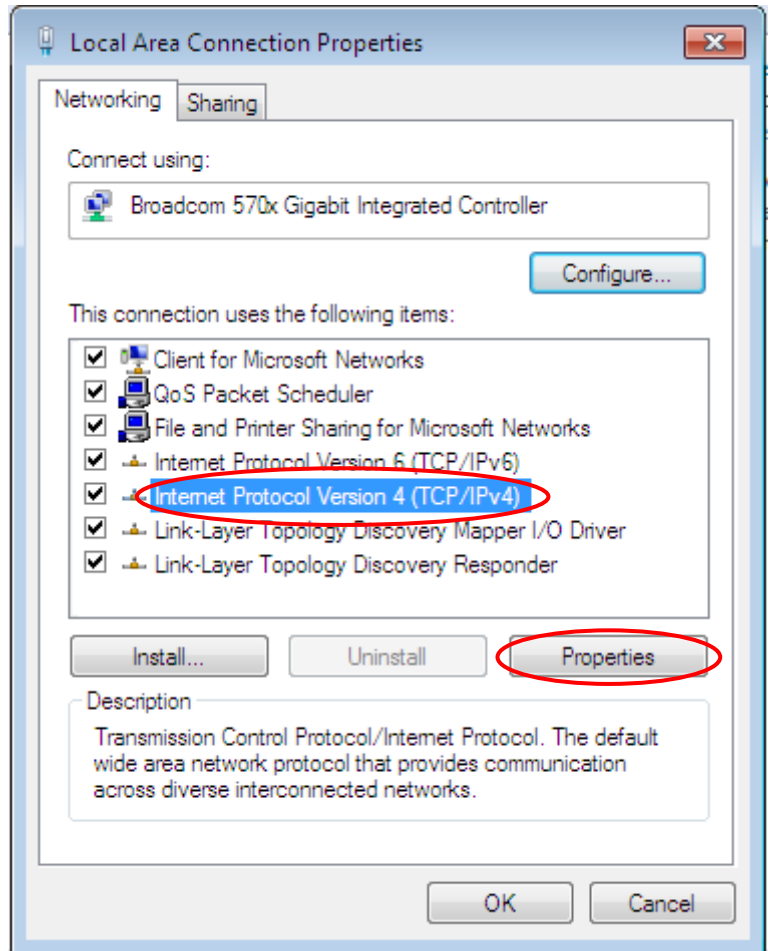
5. When the **Network and Sharing Center** window pops up, select and click on **Change adapter settings** on the left window panel.



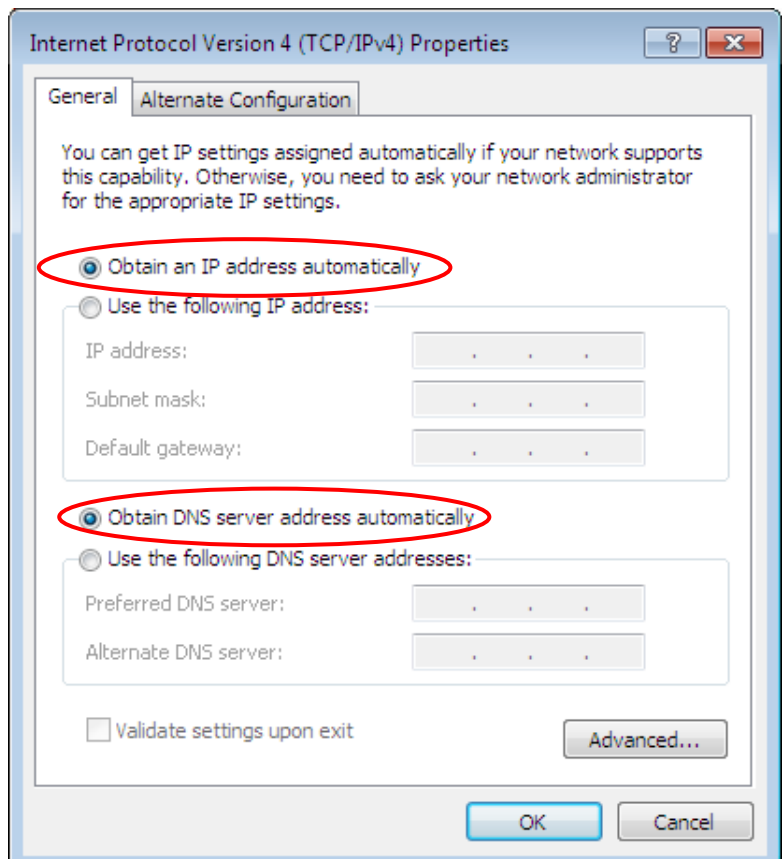
6. Select the **Local Area Connection**, and right click the icon to select **Properties**.



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



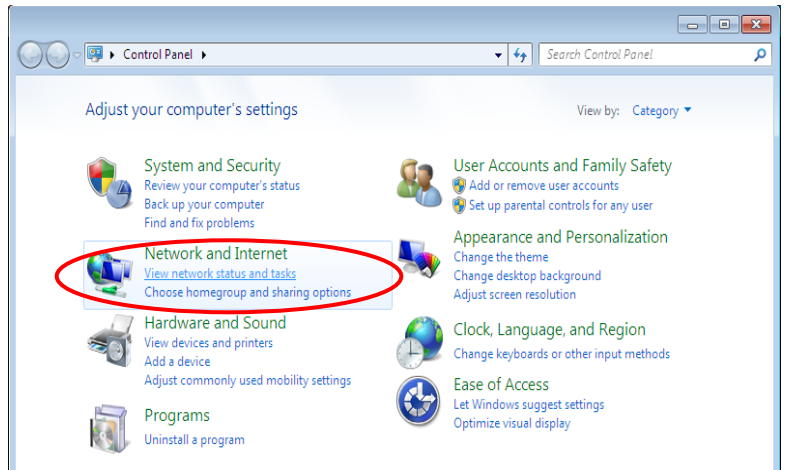
8. In the **TCP/IPv4 properties** window, select the **Obtain an IP address automatically** and **Obtain DNS Server address automatically** radio buttons. Then click **OK** to exit the setting.
9. Click **OK** again in the **Local Area Connection Properties** window to apply the new configuration.



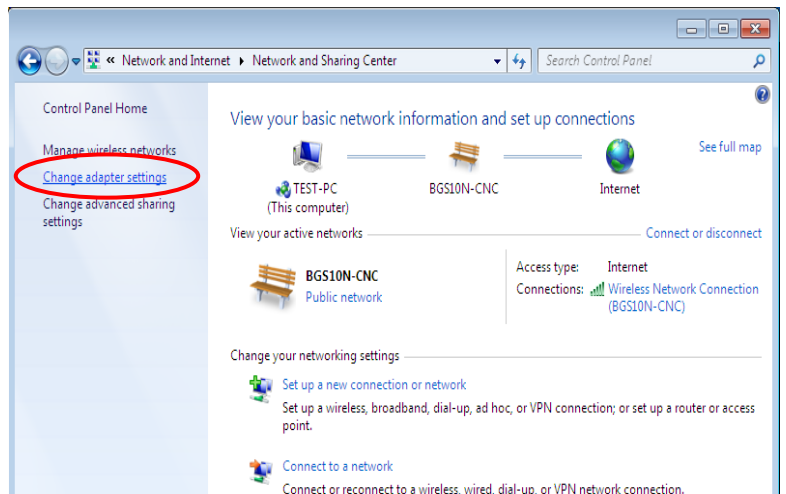
## Configuring PC in Windows 7/8 (IPv4)

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

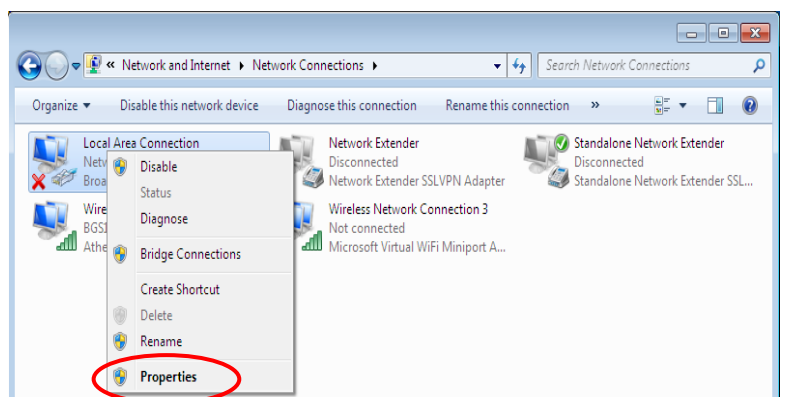
11. Then click on **Network and Internet**.



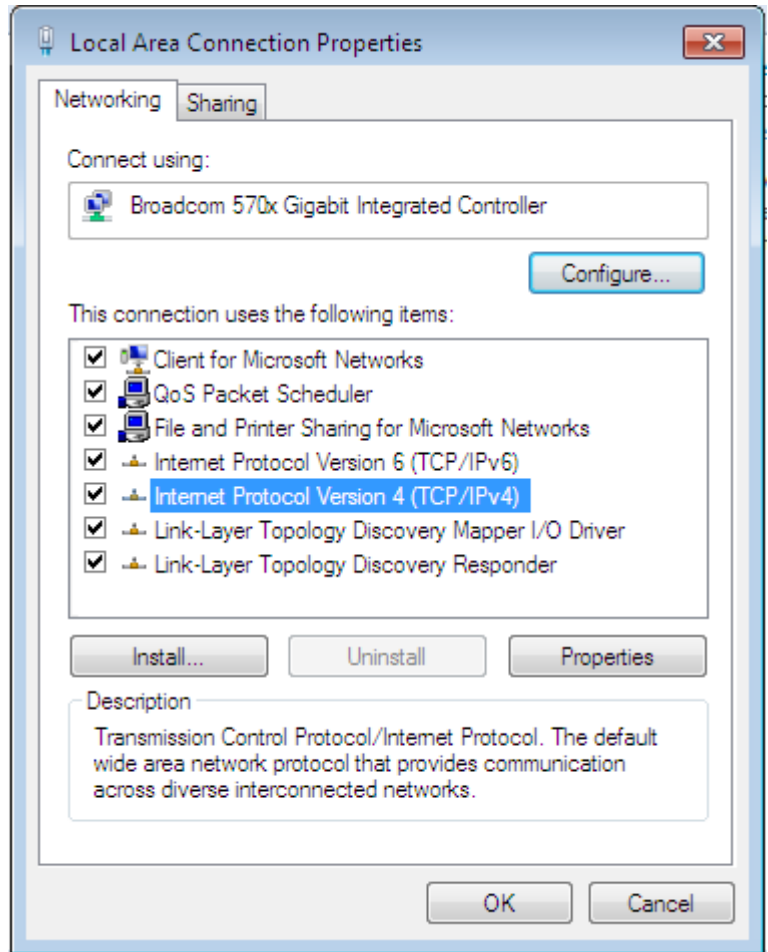
12. When the **Network and Sharing Center** window pops up, select and click on **Change adapter settings** on the left window panel.



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

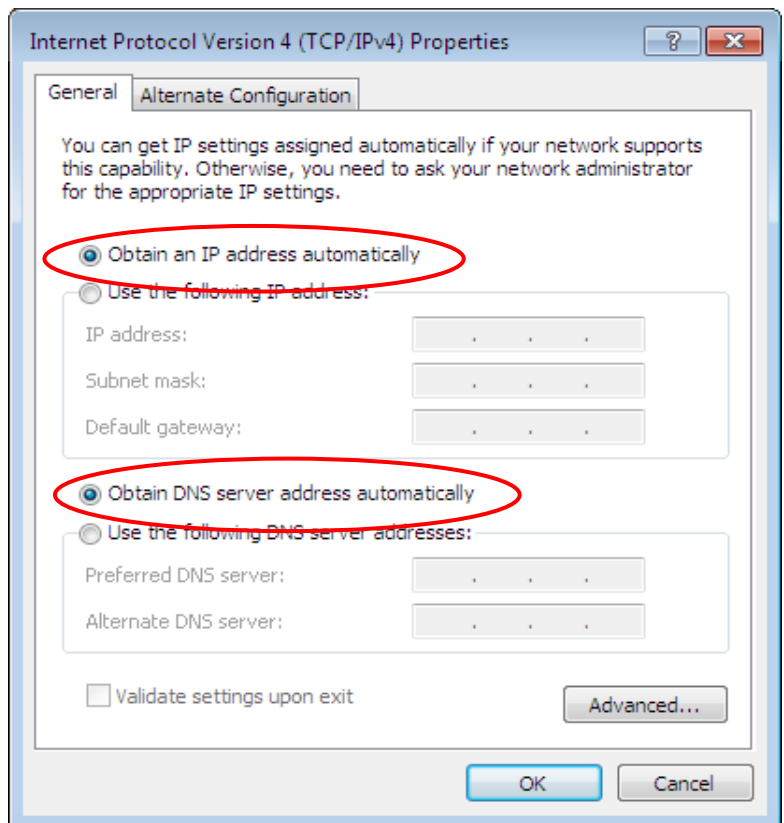


14. Select **Internet Protocol Version 4 (TCP/IPv4)** then click **Properties**.



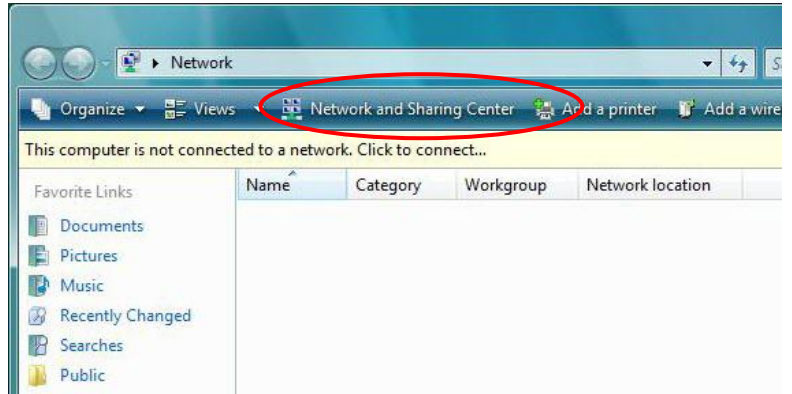
15. In the **TCP/IPv4 properties** window, select the **Obtain an IP address automatically** and **Obtain DNS Server address automatically** radio buttons. Then click **OK** to exit the setting.

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



## Configuring PC in Windows Vista (IPv4)

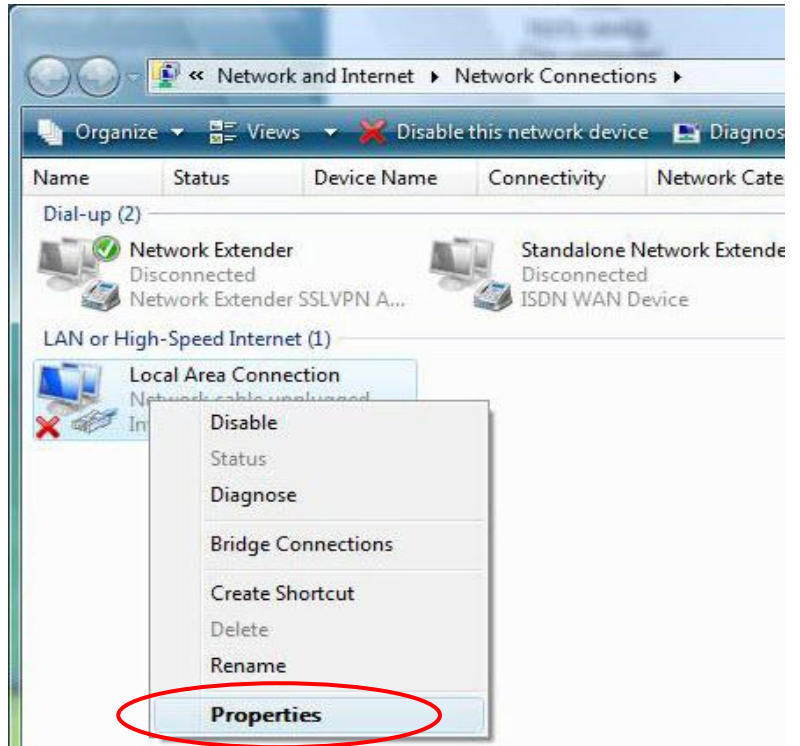
1. Go to **Start**. Click on **Network**.
2. Then click on **Network and Sharing Center** at the top bar.



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

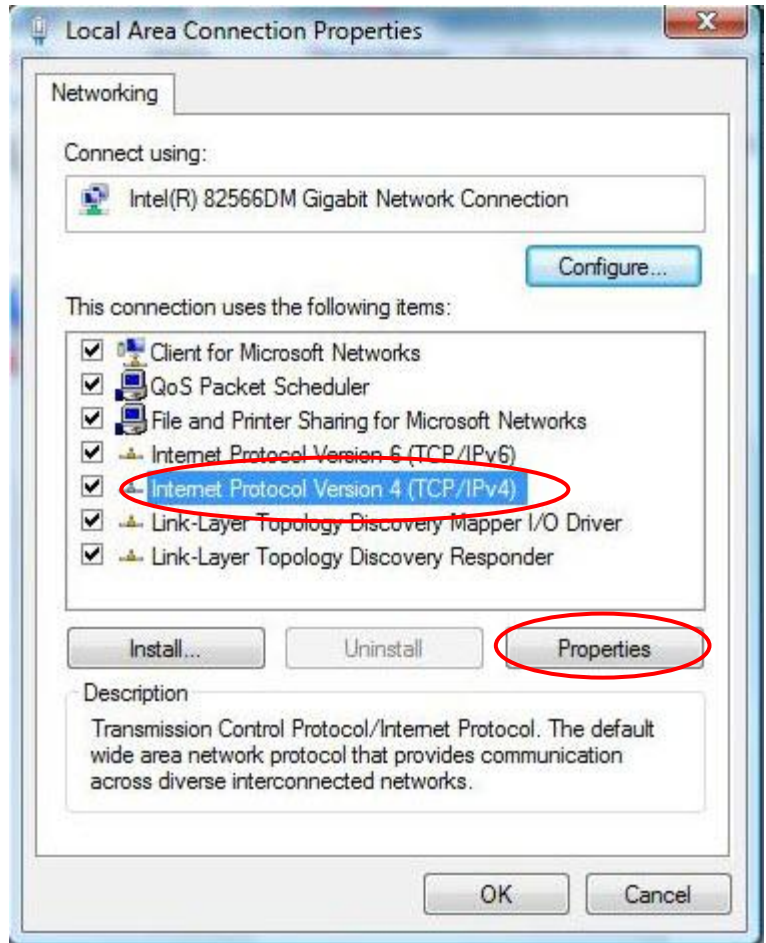


4. Select the **Local Area Connection**, and right click the icon to select **Properties**.



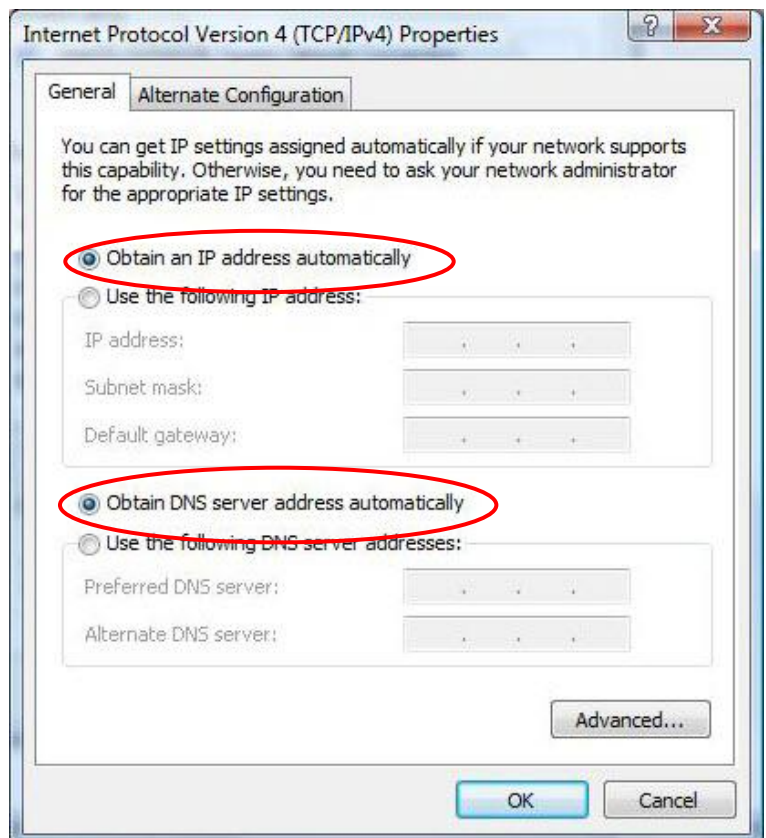


5. Select **Internet Protocol Version 4 (TCP/IPv4)** then click **Properties**.



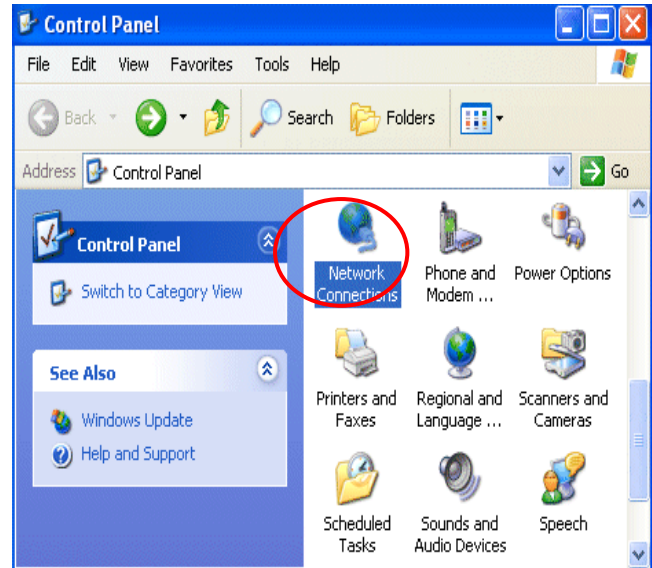
6. In the **TCP/IPv4 properties** window, select the **Obtain an IP address automatically** and **Obtain DNS Server address automatically** radio buttons. Then click **OK** to exit the setting.

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

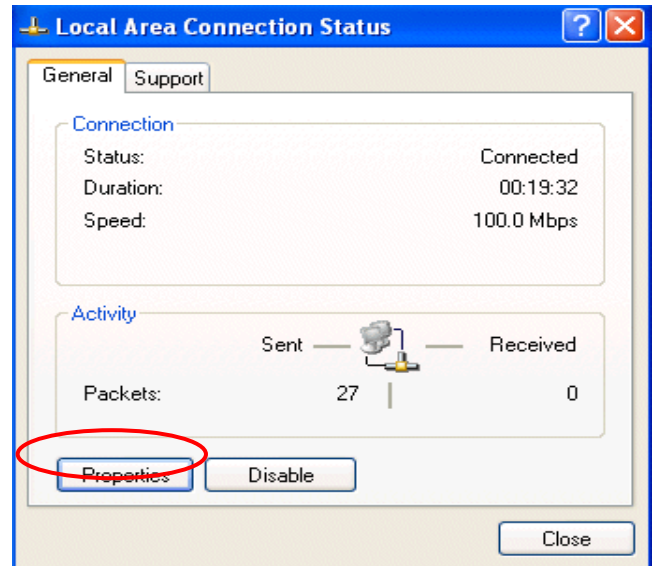


## Configuring PC in Windows XP (IPv4)

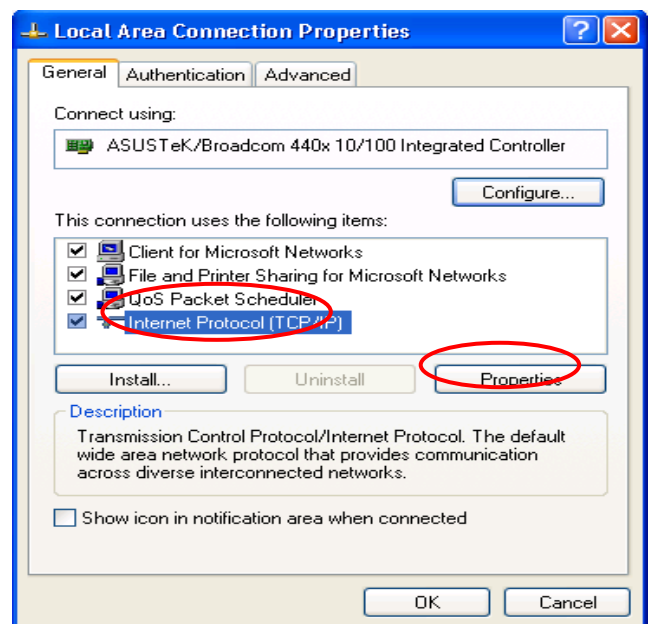
1. Go to **Start**. Click on **Control Panel**.
2. Then click on **Network and Internet**.



3. In the **Local Area Connection Status** window, click **Properties**.

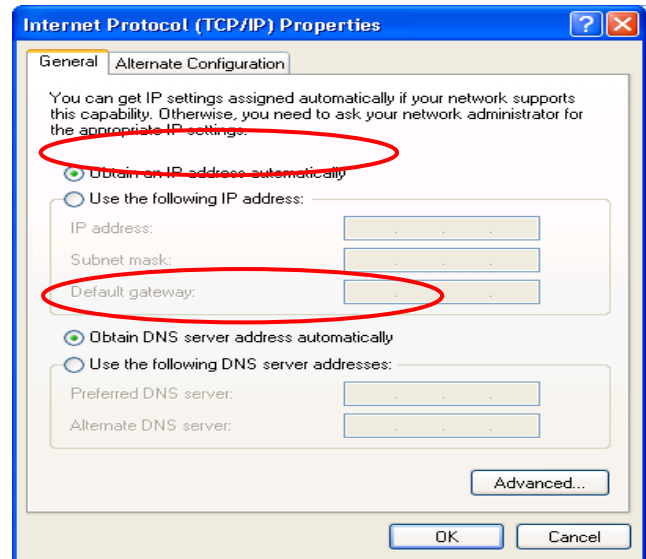


4. Select **Internet Protocol (TCP/IP)** and click **Properties**.



5. Select the **Obtain an IP address automatically** and the **Obtain DNS server address automatically** radio buttons.




6. Click **OK** to finish the 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**

Related settings

Change adapter options

Change advanced sharing options

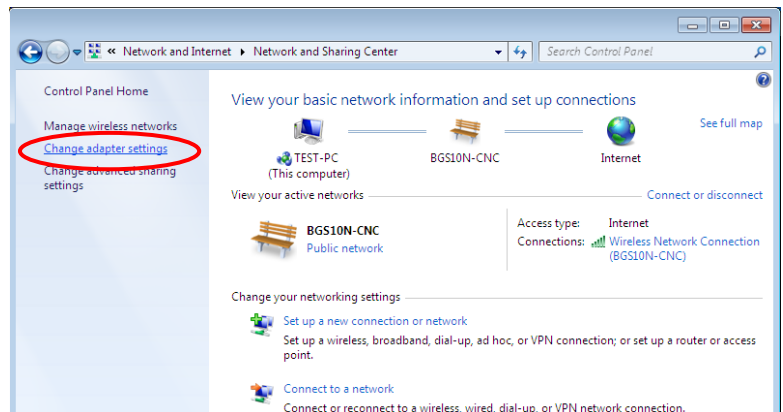
**Network and Sharing Center**

HomeGroup

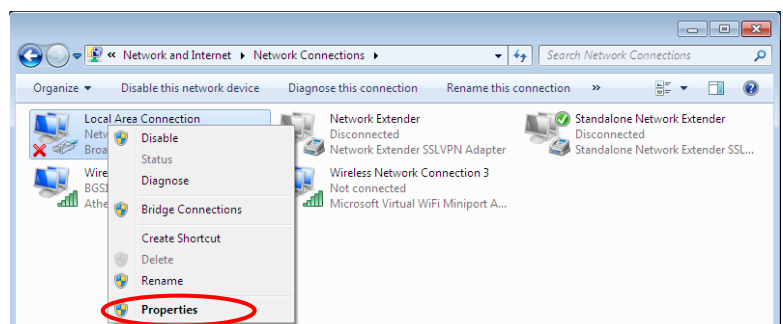
Internet options

Windows Firewall

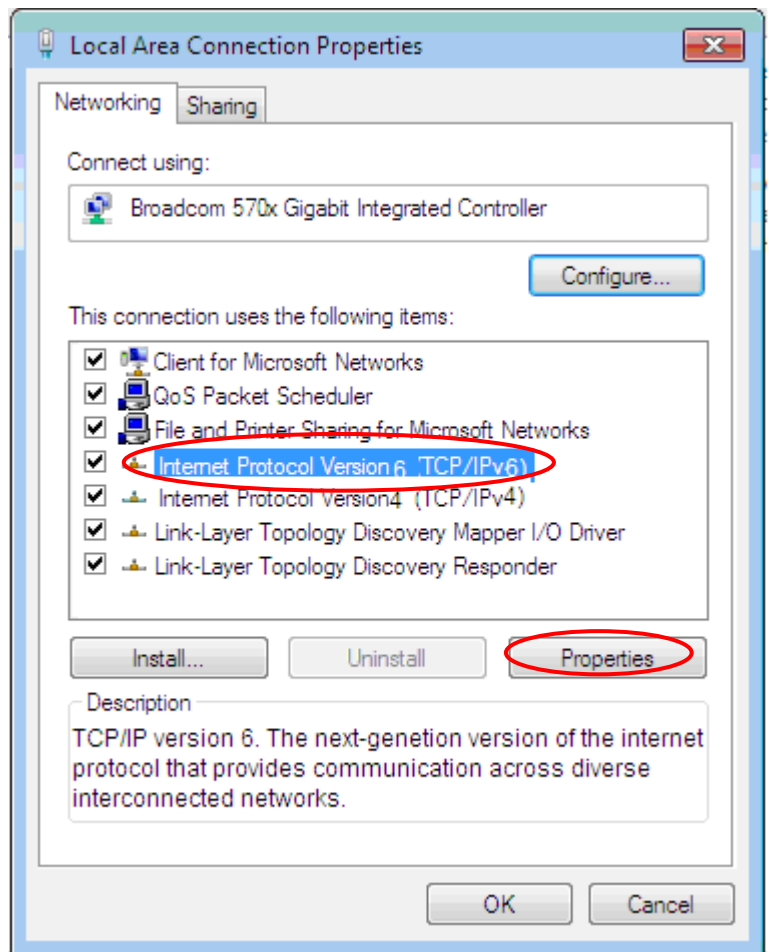
5. When the **Network and Sharing Center** window pops up, select and click on **Change adapter settings** on the left window panel.



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

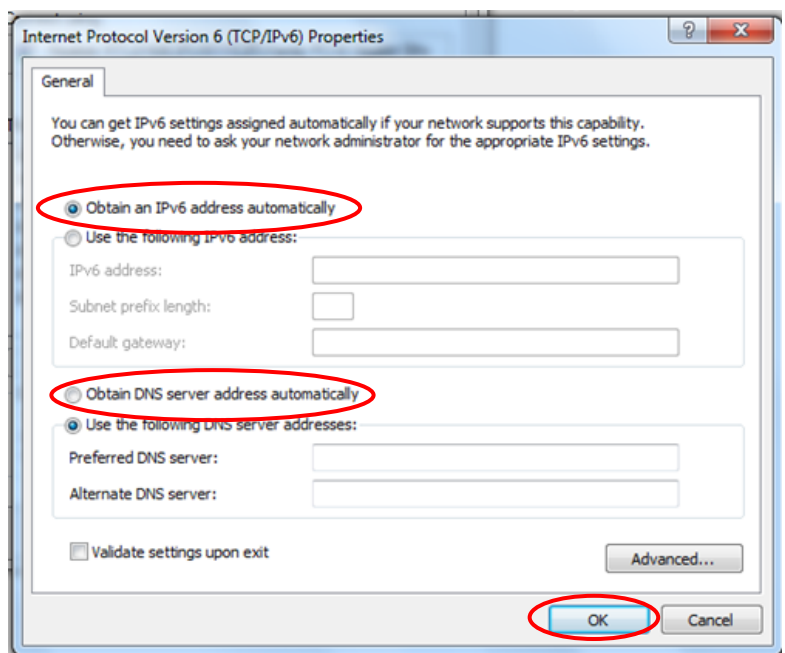


7. Select **Internet Protocol Version 6 (TCP/IPv6)** then click **Properties**.



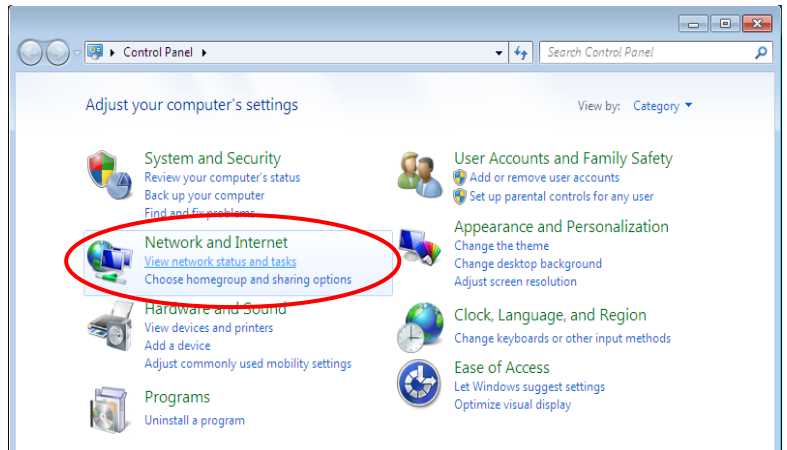
8. In the **TCP/IPv6 properties** window, select the **Obtain an IPv6 address automatically** and **Obtain DNS Server address automatically** radio buttons. Then click **OK** to exit the setting.

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



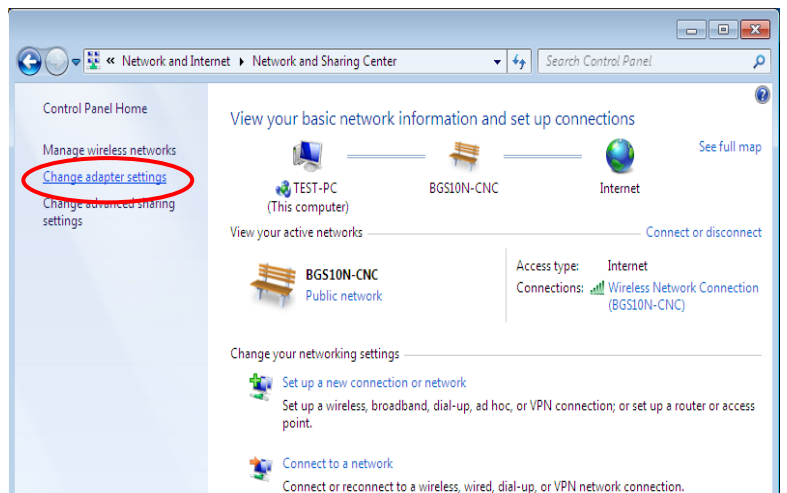
## Configuring PC in Windows 7/8 (IPv6)

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

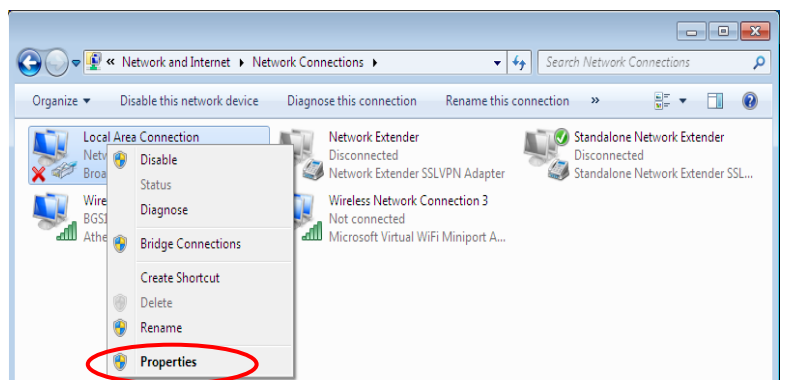


2. Then click on **Network and Internet**.

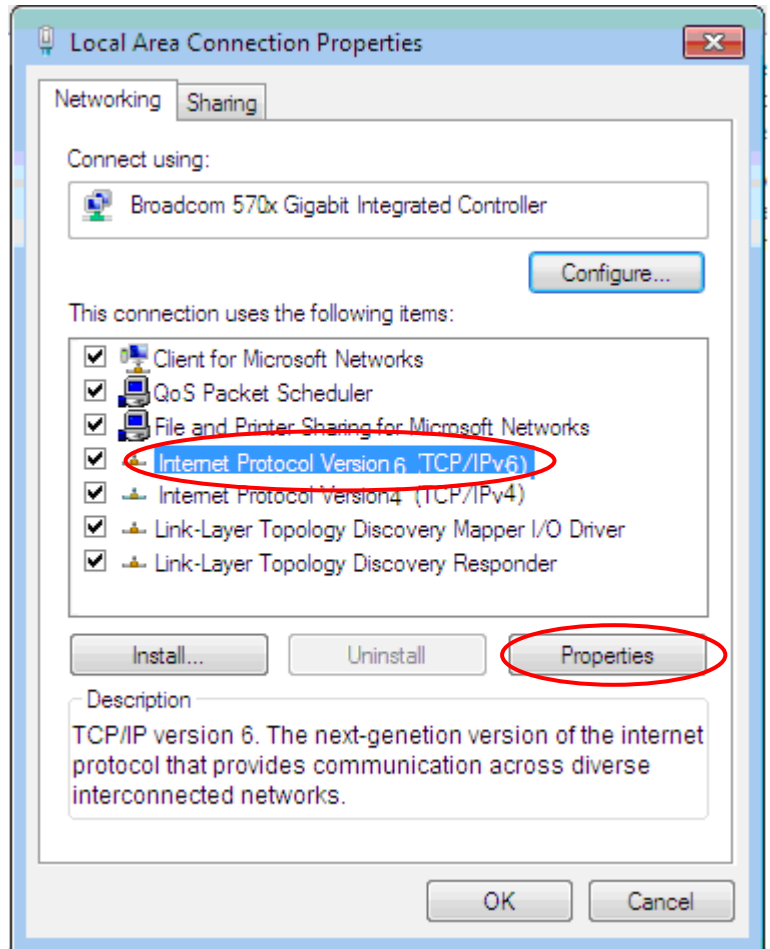
3. When the **Network and Sharing Center** window pops up, select and click on **Change adapter settings** on the left window panel.



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

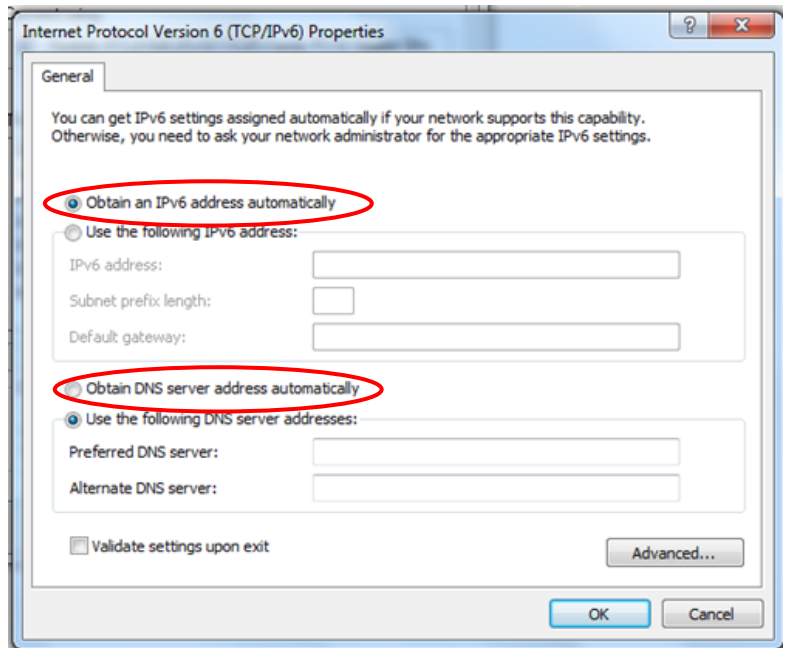


5. Select **Internet Protocol Version 6 (TCP/IPv6)** then click **Properties**.



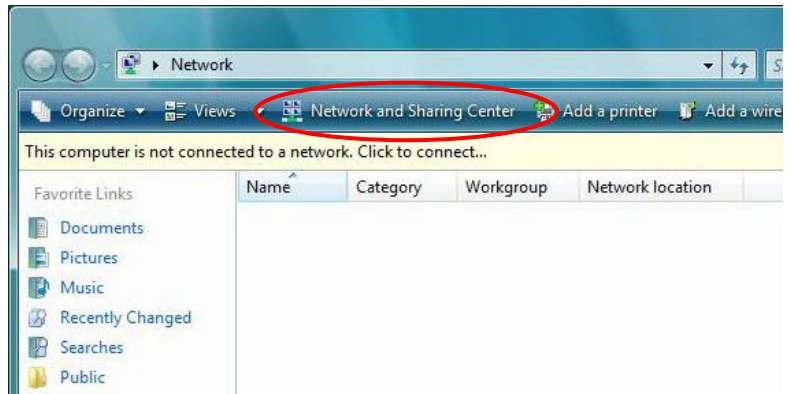
6. In the **TCP/IPv6 properties** window, select the **Obtain an IPv6 address automatically** and **Obtain DNS Server address automatically** radio buttons. Then click **OK** to exit the setting.

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



## Configuring PC in Windows Vista (IPv6)

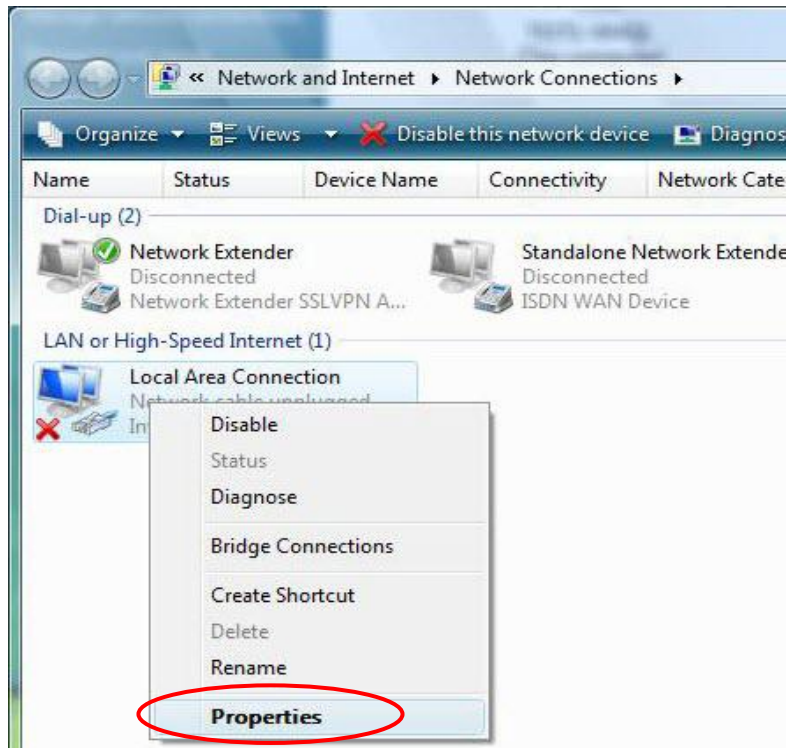
1. Go to **Start**. Click on **Network**.
2. Then click on **Network and Sharing Center** at the top bar.



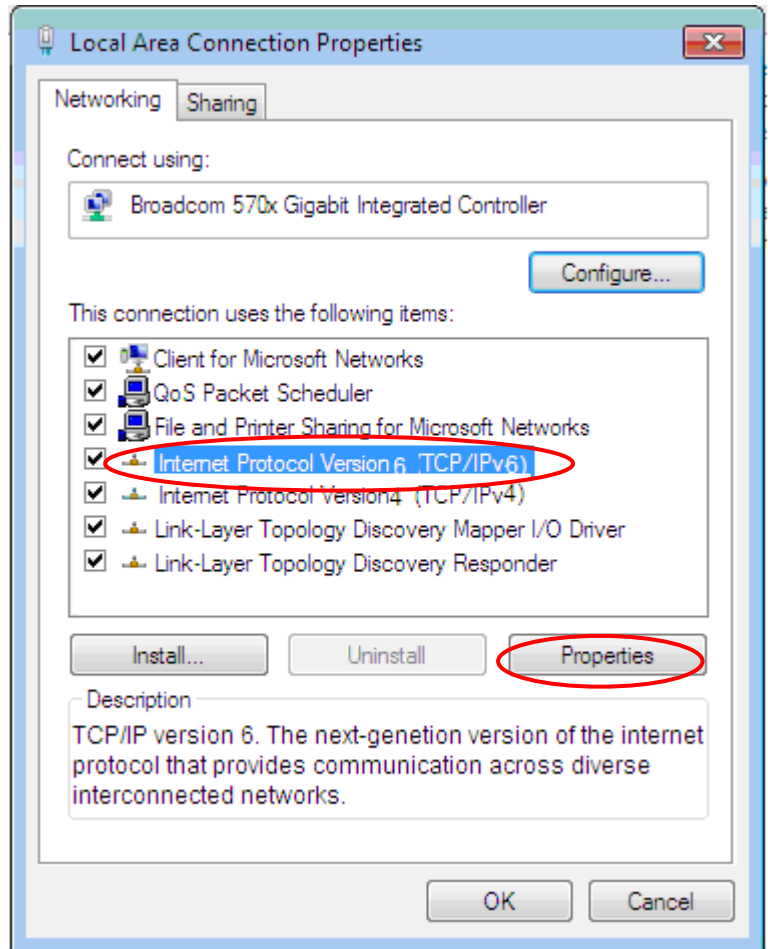
3. When the **Network and Sharing Center** window pops up, select and click on **Manage network connections** on the left window pane.



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

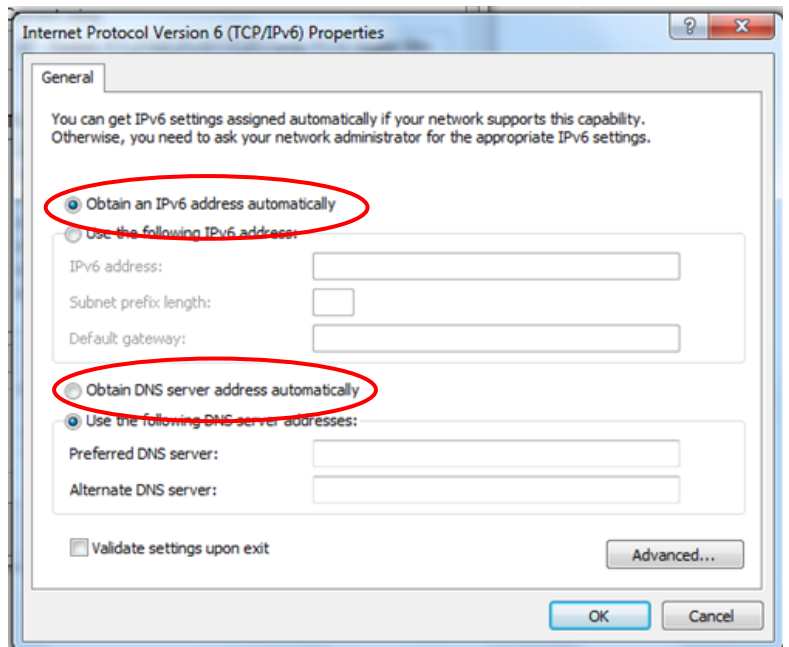


5. Select **Internet Protocol Version 6 (TCP/IPv6)** then click **Properties**.



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.

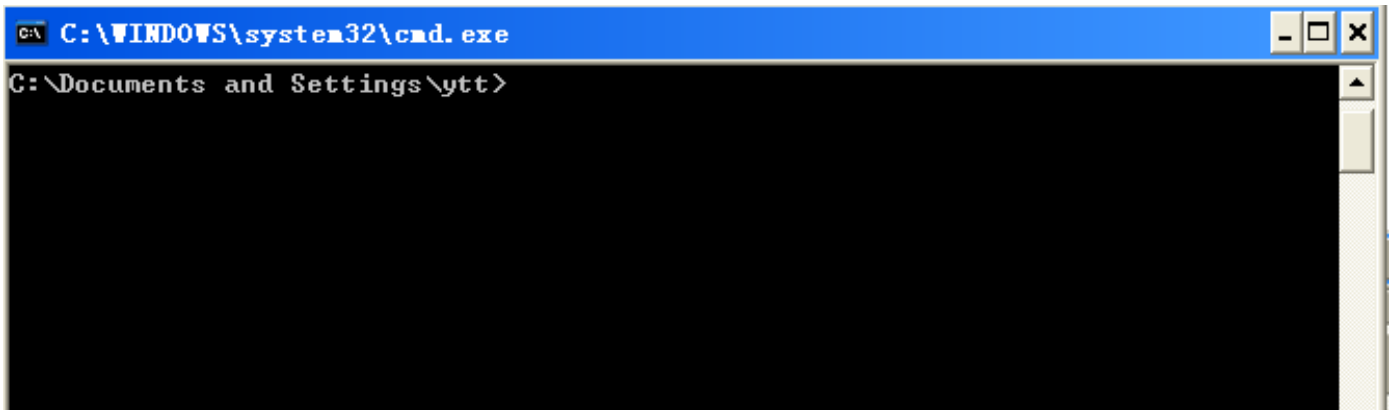


## Configuring PC in Windows XP (IPv6)

IPv6 is supported by Windows XP, but you need to install it first.

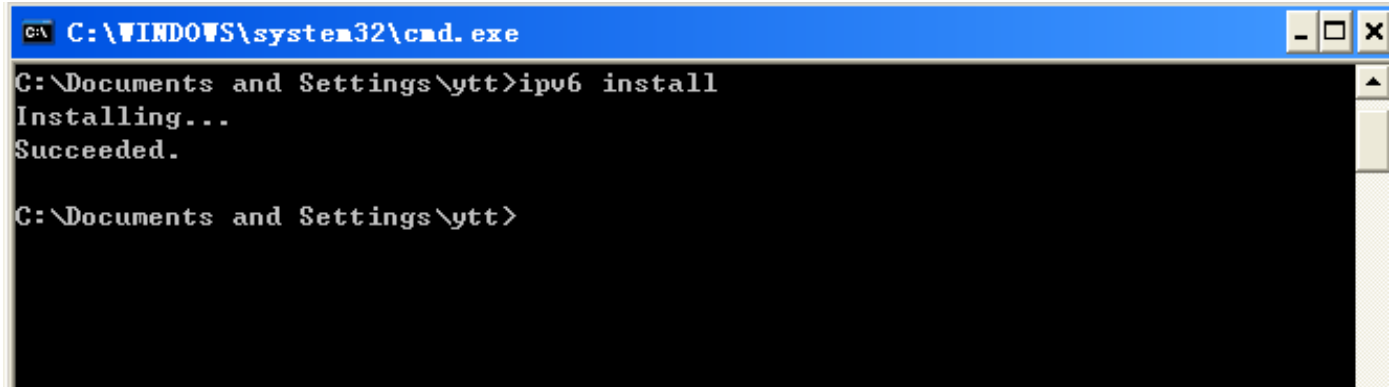
Please follow the steps to install IPv6:

1. On the Desktop, Click **Start > Run**, type **cmd**, then press **Enter** key in the keyboard, the following screen appears.



```
C:\WINDOWS\system32\cmd.exe
C:\Documents and Settings\ytt>
```

2. Key in command **ipv6 install**



```
C:\WINDOWS\system32\cmd.exe
C:\Documents and Settings\ytt>ipv6 install
Installing...
Succeeded.
C:\Documents and Settings\ytt>
```

Installation of IPv6 is now completed. Please test it to see if it works or not. .



## Default Settings

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

### Web Interface: (Username and Password)

#### Administrator

- ✓ Username: admin
- ✓ Password: admin

#### 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

### 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



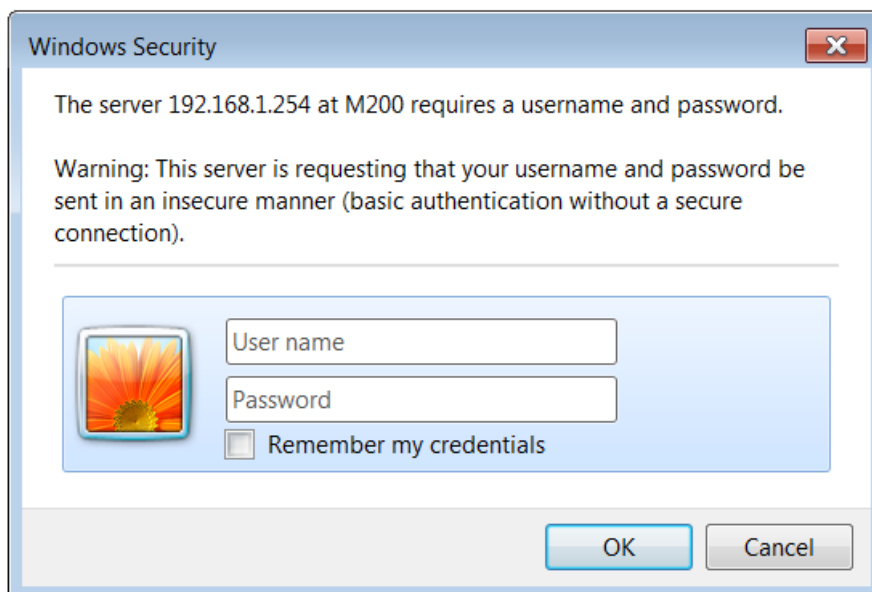
# CHAPTER 4: DEVICE CONFIGURATION

## 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**

Once you have logged on to your MX-200 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> </ul>
	System Log		<b>Dual WAN</b> <ul style="list-style-type: none"> <li>- General Setting</li> <li>- Outbound Load Balance</li> <li>- Protocol Binding</li> </ul>
	3G/4G-LTE Status		<b>Advanced Setup</b> <ul style="list-style-type: none"> <li>- Firewall</li> <li>- Routing</li> <li>- Dynamic Routing</li> <li>- NAT</li> <li>- Static DNS</li> <li>- Time Schedule</li> <li>- Mail Alert</li> <li>- Remote System Log</li> <li>- Serial</li> </ul>
	Statistics		<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> </ul>
	DHCP Table		<b>Access Management</b> <ul style="list-style-type: none"> <li>- Device Management</li> <li>- SNMP</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> </ul>
	IPSec Status		<b>Maintenance</b> <ul style="list-style-type: none"> <li>- User Management</li> <li>- Time Zone</li> <li>- License</li> <li>- Firmware &amp; Configuration</li> <li>- System Restart</li> <li>- Auto Reboot</li> <li>- Diagnostic Tool</li> </ul>
	PPTP Status		
	L2TP Status		
	GRE Status		
	ARP Table		

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

# Status

In this section, you can check the router working status, including **Device Info**, **System Log**, **3G/4G-LTE Status**, **Statistics**, **DHCP Table**, **IPSec Status**, **PPTP Satus**, **L2TP Status**, **GRE Status**, and **ARP Table**.

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

LAN		
IP Address	Subnet Mask/Prefix Length	DHCP Server
192.168.1.254	255.255.255.0	Enable / 192.168.1.100~192.168.1.199 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** with your PC. Check on [Time Zone](#) section for more configuration information.

**System Uptime:** Display how long the **MX-200** 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.

### 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.

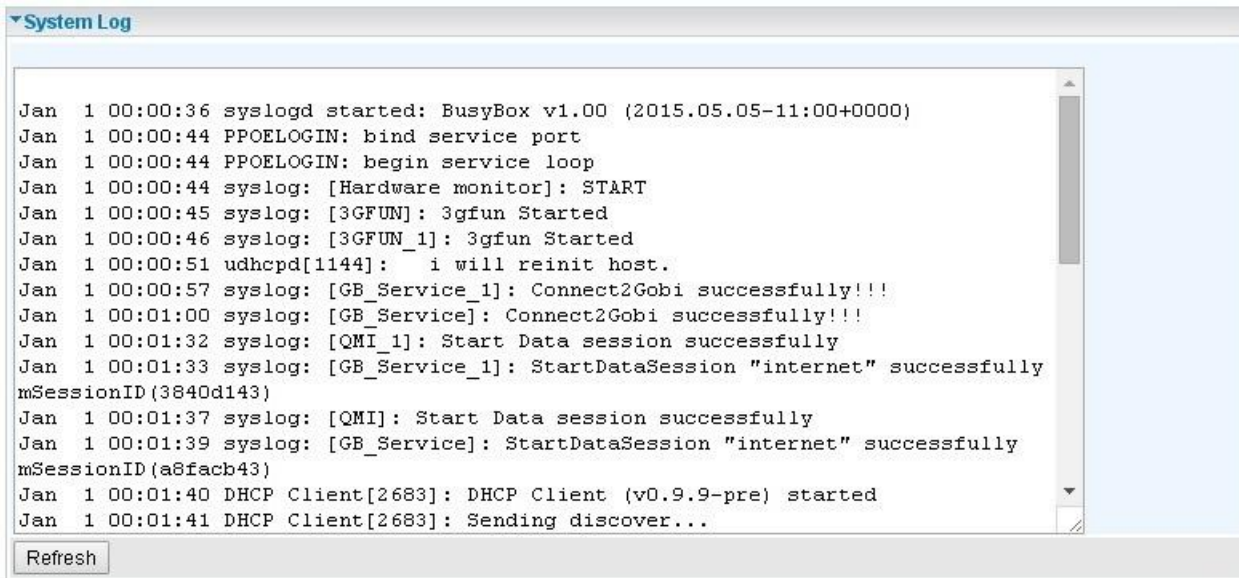
**Subnet Mask/Prefix Length:** Display LAN port IP subnet mask of IPv4 and/or Prefix length of IPv6.

**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 Log

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



```
System Log

Jan 1 00:00:36 syslogd started: BusyBox v1.00 (2015.05.05-11:00+0000)
Jan 1 00:00:44 PPOELOGIN: bind service port
Jan 1 00:00:44 PPOELOGIN: begin service loop
Jan 1 00:00:44 syslog: [Hardware monitor]: START
Jan 1 00:00:45 syslog: [3GFUN]: 3gfun Started
Jan 1 00:00:46 syslog: [3GFUN_1]: 3gfun Started
Jan 1 00:00:51 udhcpd[1144]: i will reinit host.
Jan 1 00:00:57 syslog: [GB_Service_1]: Connect2Gobi successfully!!!
Jan 1 00:01:00 syslog: [GB_Service]: Connect2Gobi successfully!!!
Jan 1 00:01:32 syslog: [QMI_1]: Start Data session successfully
Jan 1 00:01:33 syslog: [GB_Service_1]: StartDataSession "internet" successfully
mSessionID(3840d143)
Jan 1 00:01:37 syslog: [QMI]: Start Data session successfully
Jan 1 00:01:39 syslog: [GB_Service]: StartDataSession "internet" successfully
mSessionID(a8facb43)
Jan 1 00:01:40 DHCP Client[2683]: DHCP Client (v0.9.9-pre) started
Jan 1 00:01:41 DHCP Client[2683]: Sending discover...

Refresh
```

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

## 3G/4G-LTE Status

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

4G LTE Status	
WAN	4G LTE -1
Status	Up
Signal Strength	 -64.00dbm
Signal Information	RSRP:-90 , RSRQ:-13 , SINR:3.6
Network Name	"Chunghwa Telecom"
Cell ID	04D4520D(81023501)
Card IMEI	.....
Card IMSI	.....
Network Mode	LTE
Network Band	B3
<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.

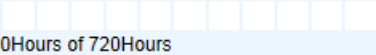
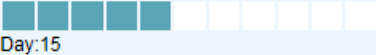
**Card IMEI:** The unique identification number that is used to identify the 3G/4G-LTE module.

**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

To enable this feature, please go to **Configuration >> Interface Setup >> Internet >> click "Usage Allowance" >> enable "Save the statistics to ROM"**

Usage Allowance	
Amount used	 0Hours of 720Hours
Billing period	 Day:15
<input type="button" value="Clean"/> <input type="button" value="Save"/>	

**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 this page.

## Statistics

### ❖ 3G/4G-LTE

Take 3G/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) <input type="radio"/> Ethernet
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
Refresh	

#### Traffic Statistics

**Interface:** List all available network interfaces in the router. You are currently checking on the physical status of **3G/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 this 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 this 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
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 this page.

## DHCP Table

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

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:** Show the hostname of the PC.

**IP Address:** The IP allocated to the device.

**MAC Address:** The MAC of the connected device.

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

## IPsec Status

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

**Index #:** The numeric IPsec tunnel indicator.

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

**Connection Name:** User-defined IPsec VPN connection name.

**Active:** Show if the tunnel is active for connection.

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

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

**Remote Gateway:** The IP of the remote IPsec gateway.

**Remote Network:** The IP and Netmask of remote access range.

**Local Network:** The IP and Netmask of local access range.

## PPTP Status

### ❖ PPTP Server

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

**Index #:** The numeric PPTP connection indicator.

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

**Active:** Show if the tunnel is active for connection.

**Connection State:** Show the connecting status.

**Connection Type:** Remote Access or LAN to LAN.

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

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

**Refresh:** Click this button to refresh the connection status.

### ❖ PPTP Client

▼ PPTP Status						
PPTP Server						
Index	Connection Name	Active	Connection State	Connection Type	Assigned IP Address	Remote Network
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
Refresh						

**Index #:** The numeric PPTP connection indicator.

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

**Active:** Show if the tunnel is active for connection.

**Connection State:** Show the connecting status.

**Connection Type:** Remote Access or LAN to LAN.

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

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

**Refresh:** Click this button to refresh the connection status.

## L2TP Status

L2TP Status						
Index	Connection Name	Active	Connection State	Connection Mode	Connection Type	Tunnel Remote IP Address
1	HS-LL	Yes	Connected	Dial in	Lan to Lan	192.168.1.200

Refresh

**Index #:** The numeric L2TP tunnel indicator.

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

**Active:** Show if the tunnel is active for connection.

**Connection State:** Show the connecting status.

**Connection Mode:** The L2TP mode is dial-in or dial-out.

**Connection Type:** Remote Access or LAN to LAN.

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

**Refresh:** Click this button to refresh the connection status.

## GRE Status

GRE Status					
Index	Connection Name	Active	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 indication.

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

**Active:** Show if the tunnel is active for connection.

**Connection State:** Show the connecting status.

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

**Remote Network:** Display the remote network.

## ARP Table

This section displays the router's ARP (Address Resolution Protocol) Table, which shows the mapping of Internet (IP) addresses to Ethernet (MAC) addresses. This is useful as a quick way of determining the MAC address of the network interface of your PCs to use with the router's **Firewall / MAC Address Filter** function. See the Firewall section of this manual for more information on this feature.

▼ 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 IP Address of internal host that join this network.

**MAC Address:** The MAC address of internal host.

## Quick Start

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

**Quick Start**

The 'Quick Start' wizard will guide you to configure the device to connect to your ISP(Internet Service Provider).  
Please follow the 'Quick Start' wizard step by step to configure the device. It will allow you to have Internet access within minutes.

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 4. Set your internet connection

Step 5. 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

Confirm Password

### 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

### Step 3 – ISP Connection Type

Set up your 3G/4G-LTE Internet connection.



3.1 Select an appropriate WAN connection protocol then click **NEXT** to continue.

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

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

Click **Next** to continue.

3.2(2) If selected **EWAN(LAN1) / PPPoE**, please enter PPPoE account information provided by your ISP.

Click **NEXT** to continue.

### 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.

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

## Configuration

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

These functions are described in the following sections.

### Interface Setup

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

#### Internet

##### ❖ 3G/4G-LTE

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

**WAN Interface:** List all available WAN interfaces. (In this section, you have selected to use 3G/4G-LTE)

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

**Usage Allowance:** Enable and click “Usage Allowance” for further setting configuration of your 3G/4G-LTE data usage.

## Usage Allowance

**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 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.

\* **Feature is available with specific cellular module**

**IP Pass-through Mode:** When **enabled**, MX-200 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 now obtains a WAN IP address. When **disabled**, MX-200 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”, “GSM, UMTS, LTE”. If you are not sure which mode to use, you may select **Automatic** to auto detect the best mode for you.

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

**Dual APN:** Default is with Single APN. To support Dual/multiple APNs, a license key is required. Please consult with Billion/BEC for more information.

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

**Authentication Protocol:** Manually specify CHAP (Challenge Handshake Authentication Protocol) or PAP (Password Authentication Protocol) if you know which authentication type the server is using (when acting as a client), or the authentication type you want the clients to use when they are connecting to you (when acting as a server). 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 the settings.

## ❖ EWAN (LAN 1)

▼ Internet	
WAN Interface	EWAN(LAN1) ▼
Status	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
IPv4/IPv6	
IP Version	<input type="radio"/> IPv4 <input checked="" type="radio"/> IPv4/IPv6 <input type="radio"/> IPv6
ISP Connection Type	
ISP	<input type="radio"/> Dynamic IP Address <input type="radio"/> Static IP Address <input checked="" type="radio"/> PPPoE
802.1q Options	
802.1q	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
VLAN ID	0 (range: 0~4095)
PPPoE	
Username	<input type="text"/>
Password	<input type="text"/>
Bridge Interface for PPPoE	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Connection Setting	
Connection	<input checked="" type="radio"/> Always On (Recommended) <input type="radio"/> Connect Manually
TCP MSS Option	TCP MSS <input type="text" value="0"/> bytes(0 means use default)
IP Options	
IP Common Options	
Default Route	<input checked="" type="radio"/> Yes <input type="radio"/> No
TCP MTU Option	TCP MTU <input type="text" value="0"/> bytes(0 means use default:1492)
IPv4 Options	
Get IP Address	<input type="radio"/> Static <input checked="" type="radio"/> Dynamic
Static IP Address	<input type="text" value="0.0.0.0"/>
IP Subnet Mask	<input type="text" value="0.0.0.0"/>
Gateway	<input type="text" value="0.0.0.0"/>
NAT	Enable ▼
Dynamic Route	RIP1 ▼ Direction None ▼
IGMP Proxy	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
IPv6 Options	
IPv6 Address	<input type="text"/> / <input type="text"/>
Obtain IPv6 DNS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Primary DNS	<input type="text"/>
Secondary DNS	<input type="text"/>
MLD Proxy	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
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

IP Options	
<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-1000 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 the 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**

**IPv4 Parameters**

IP Address	<input type="text" value="192.168.1.254"/>
IP Subnet Mask	<input type="text" value="255.255.255.0"/>
Alias IP Address	<input type="text" value="0.0.0.0"/> (0.0.0.0 means to close the alias ip)
Alias IP Subnet Mask	<input type="text" value="0.0.0.0"/>
Snooping	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
Dynamic Route	RIP1 Direction: None

**DHCPv4 Server**

DHCPv4 Server	<input type="radio"/> Disabled <input checked="" type="radio"/> Enabled <input type="radio"/> Relay
Start IP	<input type="text" value="192.168.1.100"/>
IP Pool Count	<input type="text" value="100"/>
Lease Time	<input type="text" value="86400"/> seconds (0 sets to default value of 259200)
Physical Ports	<input checked="" type="checkbox"/> LAN1 <input checked="" type="checkbox"/> LAN2 <input checked="" type="checkbox"/> LAN3 <input checked="" type="checkbox"/> LAN4 <input checked="" type="checkbox"/> WLAN1
DNS Relay	<input checked="" type="radio"/> Automatically <input type="radio"/> Manually
Primary DNS	<input type="text"/>
Secondary DNS	<input type="text"/>

**Fixed Host**

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

**IPv6 Parameters**

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

**DHCPv6 Server**

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

**Fixed Host List**

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 IGMP snooping,

multicast traffic is treated in the same manner as broadcast traffic - that is, it is forwarded to all ports. With IGMP snooping, multicast traffic of a group is only forwarded to ports that have members of that group.

**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	
DHCPv4 Server	<input type="radio"/> Disabled <input checked="" type="radio"/> Enabled <input type="radio"/> Relay
Start IP	<input type="text" value="192.168.1.100"/>
IP Pool Count	<input type="text" value="100"/>
Lease Time	<input type="text" value="86400"/> seconds (0 sets to default value of 259200)
Physical Ports	<input checked="" type="checkbox"/> LAN1 <input checked="" type="checkbox"/> LAN2
DNS Relay	<input checked="" type="radio"/> Automatically <input type="radio"/> Manually
Primary DNS	<input type="text"/>
Secondary DNS	<input type="text"/>

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

**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.

### 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.

IPv6 Parameters	
Interface Address/Prefix Length	<input type="text"/> / <input type="text"/>
MLD Snooping	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
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

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

### DHCPv6 Server

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

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

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

**DHCPv6 Server:** Check whether to enable DHCPv6 server.

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

available.

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

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

**End interface ID:** enter the end interface ID.

**Leased Time (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 the 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 web interface of a BEC 4G LTE M2M Router. The top header includes the BEC Technologies logo and the device name. A left sidebar contains a navigation menu with options like Status, Quick Start, Configuration, Interface Setup, Dual WAN, Outbound Load Balance, Protocol Binding, Advanced Setup, VPN, Access Management, and Maintenance. The main content area is titled 'Configuration' and shows the 'General Setting' section. Under 'Dual WAN Mode', the 'Mode' is set to 'Disable' in a dropdown menu, and a 'Save' button is visible. At the bottom right, there are 'Restart' and 'Logout' buttons. A footer contains the copyright notice: 'Copyright © BEC Technologies Inc. All rights reserved.'

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

## Dual WAN – General Setting (Failover &amp; Failback)

## ❖ Failover &amp; 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	
Dual WAN Mode	
Mode	Failover & Failback ▼
WAN Port Service Detection Policy	
WAN1	4G LTE -1 ▼
WAN2	EWAN(LAN1) ▼
Keep Backup Interface Connected	<input type="checkbox"/> Enabled
Connectivity Decision	Auto failover takes place after straight <input type="text" value="3"/> consecutive failure in every <input type="text" value="30"/> seconds.
Probe By Ping	<input checked="" type="checkbox"/> Enable
Ping Setting	<input type="radio"/> Gateway <input checked="" type="radio"/> Host <input type="text" value="8.8.8.8"/>
Probe By Signal Strength	<input checked="" type="checkbox"/> Enable
Minimum RSRP/RSSI	<input type="text" value="-105"/> / <input type="text" value="-90"/> dbm(-111~ -5 , 0:disable)
<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:** Enable if want to keep the backup WAN (WAN2) interface always connected to the Internet.

**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:**

- 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.
- 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 fallback or failover procedures.

Click **Save** to apply the settings.

❖ **Load Balance**

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

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

General Setting	
Dual WAN Mode	
Mode	Load Balance
WAN Port Service Detection Policy	
WAN1	4G LTE -1
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"/>
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 the 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 the 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 particular IP address(es) granted access to only one WAN port rather than using both of the WAN ports as with load balancing.

▼ Protocol Binding

Rule Index	1 ▼
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No
Bind Interface	WAN1 ▼ (Current WAN1 Mode: 4G LTE -1 , Current WAN2 Mode: 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 ▼

Save 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 source IP address featuring the traffic origin.

**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 IP address featuring the traffic destination.

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

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

**DSCP:** The DSCP value. Value Range from 0~64; 64 means Don't care

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

Click **Save** to apply the 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 Setup provides advanced features including **Firewall**, **Routing**, **Dynamic Routing**, **NAT**, **Static DNS**, **Time Schedule**, **Mail Alert**, **Remote System Log**, 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.)	
<input type="button" value="Save"/>	

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

- ▶ **Enabled:** 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 the 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	<input type="text" value="0.0.0.0"/>
Destination Subnet Mask	<input type="text" value="0.0.0.0"/>
Gateway IP Address / Interface	<input type="radio"/> <input type="text" value="0.0.0.0"/> <input checked="" type="radio"/> <input type="text" value="4G LTE -1"/>
Metric	<input type="text" value="1"/>
<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 break the originally envisioned model of IP end-to-end connectivity across the internet so NAT can cause problems where IPSec/ PPTP encryption is applied or some application layer protocols such as SIP phones are located behind a NAT. And NAT makes it difficult for systems behind a NAT to accept incoming communications.

### ❖ OSPF

▼ OSPF

OSPF	<input type="checkbox"/> Enable
Rule Index	0 ▼
Interface	EWAN(LAN1) ▼
Area ID	<input style="width: 100%;" type="text"/>

OSPF Listing

Index	Interface	Area ID

❖ BGP

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

## NAT

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

Configuration	
NAT	
NAT Status	Enable
ALG	
VPN Passthrough	<input checked="" type="radio"/> Enabled <input type="radio"/> Disabled
SIP ALG	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
DMZ / Virtual Server	
Interface	3G/4G-LTE ▼
DMZ	<a href="#">Edit</a>
Virtual Server	<a href="#">Edit</a>

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

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

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

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

## DMZ

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

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

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

**DMZ for (via a WAN Interface):** Allows outside network to connect in and communicate with internal LAN devices via this 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 the settings



**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 to direct all incoming traffic to the servers on the LAN.

Configure a virtual rule in MX-200 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 -1
Protocol	TCP
Start Port Number	<input type="text"/>
End Port Number	<input type="text"/>
Local IP Address	<input type="text"/>
Start Port Number (Local)	<input type="text"/>
End Port Number (Local)	<input type="text"/>

Save Back

Virtual Server Listing								
Index	Protocol	Start Port	End port	Local IP Address	Start Port Local	End Port Local	Edit	Delete
0	N/A	N/A	N/A	N/A	N/A	N/A		
1	N/A	N/A	N/A	N/A	N/A	N/A		
2	N/A	N/A	N/A	N/A	N/A	N/A		
3	N/A	N/A	N/A	N/A	N/A	N/A		
4	N/A	N/A	N/A	N/A	N/A	N/A		
5	N/A	N/A	N/A	N/A	N/A	N/A		
6	N/A	N/A	N/A	N/A	N/A	N/A		
7	N/A	N/A	N/A	N/A	N/A	N/A		
8	N/A	N/A	N/A	N/A	N/A	N/A		
9	N/A	N/A	N/A	N/A	N/A	N/A		

**Virtual Server for:** Indicate the related WAN interface to allow outside network to connect in and communicate with internal LAN devices.

**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 your server IP address in this field.

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

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

**Well-known and Registered Ports**

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



**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 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 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 -1
Protocol	TCP
Start Port Number	21
End Port Number	21
Local IP Address	192.168.1.110
Start Port Number (Local)	21
End Port Number(Local)	21

Save Back

**Virtual Server Listing**

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

## Static DNS

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

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

**Static DNS**

IP Address

Domain Name

**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 your settings.

## Time Schedule

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

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

Time Schedule							
Rule Index	0 ▼						
Rule Name	TimeSlot1						
	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.
Day of Week	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Start Time	00:00	00:00	00:00	00:00	00:00	00:00	00:00
End Time	00:00	00:00	00:00	00:00	00:00	00:00	00:00
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
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
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	
<b>Server Information</b>	
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	<input type="text" value="25"/> (1~65535)
<input type="button" value="Account Test"/>	
<b>WAN IP Change Alert</b>	
Recipient's E-mail	<input type="text"/> (Must be XXX@yyy.zzz)
<b>3G/LTE Usage Allowance</b>	
Recipient's E-mail	<input type="text"/> (Must be XXX@yyy.zzz)
<input type="button" value="Apply"/>	

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

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

**Password:** Enter the password of your email account.

**Sender's Email:** Enter your email address.

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

**Port:** the port, default is 25.

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

**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):** E Enter a valid e-mail address to receive an alert message when the 3G over Usage Allowance occurs.

Click **Apply** button to save your settings

## Remote System Log

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

**Remote System Log:** Select **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 the settings

## Serial (RS-232 Port)

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

Serial	
General Settings	
Baud Rate	115200 ▼
Data Bits	8 bits ▼
Parity	None ▼
Stop Bits	1 bit ▼

### General Settings

**Baud Rate:** Specify the desired 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 a mode among Disable, Modbus/TCP, and Serial TCP

- ▶ **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 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:

Mode	TCP
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 <input type="text" value="1000"/> msec(1~30000)
	<input checked="" type="radio"/> Characters <input type="text" value="0x0d0a"/> ("0x"+Hex Code,e.g. "0x0d" or "0x0d0a")
TCP Idle Timeout	<input type="text" value="60"/> seconds (10~180)

- **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 Delimitier:** A way to keep packets in tract.
  - **Time Delimitier:** Default time is in 1000ms. After time has reached, serial data will be transmitted. Time range from 1 – 30000ms.
  - **Character Delimitier:** 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 definded time, serial connection will get aborted.

## VPN

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

MX-200 supports **IPSec**, **PPTP**, **L2TP**, and **GRE** for enterprise users.

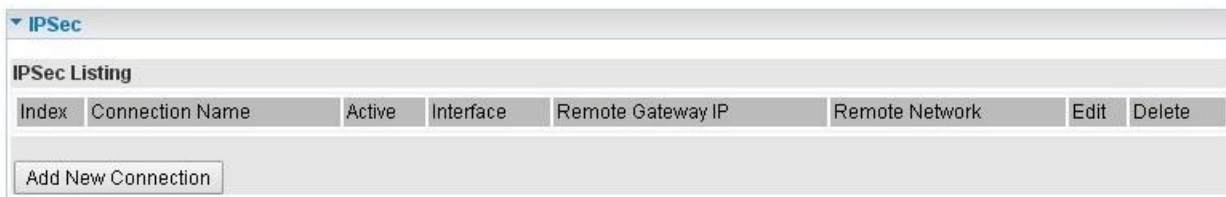
The screenshot displays the configuration interface for a BEC 4G LTE M2M Router. The top header includes the BEC Technologies logo and the device model name. A left-hand navigation menu lists various configuration options, with 'VPN' expanded to show sub-options like IPSec, PPTP Server, PPTP Client, L2TP, and GRE. The main content area is titled 'Configuration' and features a sub-section for 'IPSec'. Below this, there is an 'IPSec Listing' table with columns for Index, Connection Name, Active, Interface, Remote Gateway IP, Remote Network, Edit, and Delete. An 'Add New Connection' button is located below the table. At the bottom right of the interface, there are 'Restart' and 'Logout' buttons. The footer contains the copyright notice: 'Copyright © BEC Technologies Inc. All rights reserved.'

## IPSec

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

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

A total of 8 IPSec tunnels can be added.



Click **Add New Connection** to create an IPSec connection .

## IPsec Connection Setting

IPsec						
Connection Name	<input type="text"/>					
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No					
Interface	Auto <input type="button" value="v"/>					
Remote Gateway IP	<input type="text"/> (0.0.0.0 means any)					
Local Access Range	Subnet <input type="button" value="v"/>	Local IP Address	<input type="text"/> 0.0.0.0	IP Subnetmask	<input type="text"/> 0.0.0.0	
Remote Access Range	Subnet <input type="button" value="v"/>	Remote IP Address	<input type="text"/> 0.0.0.0	IP Subnetmask	<input type="text"/> 0.0.0.0	
IKE Mode	Main <input type="button" value="v"/>	Pre-Shared Key	<input type="text"/>			
Local ID Type	Default Wan IP <input type="button" value="v"/>	IDContent	<input type="text"/> *			
Remote ID Type	Default Wan IP <input type="button" value="v"/>	IDContent	<input type="text"/> *			
Encryption Algorithm	DES <input type="button" value="v"/>	Authentication Algorithm	MD5 <input type="button" value="v"/>	Diffie-Hellman Group	MODP1024(DH2) <input type="button" value="v"/>	
IPsec Proposal	<input checked="" type="radio"/> ESP <input type="radio"/> AH		Authentication Algorithm	MD5 <input type="button" value="v"/>	Encryption Algorithm	DES <input type="button" value="v"/>
Perfect Forward Secrecy	None <input type="button" value="v"/>					
Phase 1 (IKE)SA Lifetime	480 <input type="text"/>	min(s)	Phase 2 (IPsec)	60 <input type="text"/>	min(s)	
Keepalive	None <input type="button" value="v"/>	PING to the IP(0.0.0.0:NEVER)	<input type="text"/> 0.0.0.0	Interval	10 <input type="text"/> seconds **	
Disconnection Time after No Traffic	180 <input type="text"/>	seconds (180 at least)				
Reconnection Time	3 <input type="text"/>	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:** Assign a name for this connection. Example: connection to office.

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

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

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

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

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

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

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

### IPsec Phase 1(IKE)

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

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

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

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

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

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

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

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

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

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

### IPsec Phase 2(IPsec)

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

**IPsec Proposal:** Select the IPsec security method. There are two methods of verifying the authentication information, AH(Authentication Header) and ESP(Encapsulating Security Payload). Use ESP for greater security so that data will be encrypted and the data origin be authenticated but using AH data origin will only be authenticated but not encrypted.

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

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

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

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

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

### IPsec SA Lifetime

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

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

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

### IPsec 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.

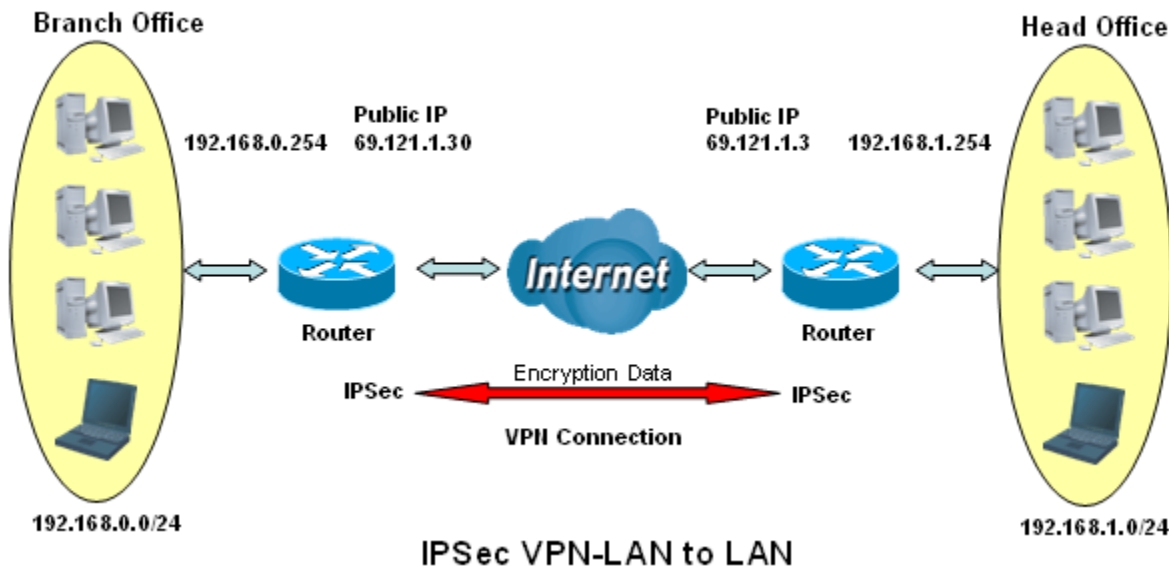
**Reconnection Time:** It is the reconnecting time interval after NO TRAFFIC is initiated. 3 minutes is minimum time interval for this function.

Click **Save** to apply the settings.

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

Two of the MX-1000 devices want to setup a secure IPsec VPN tunnel

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





**Head Office Side:**

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

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

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

**Branch Office Side:**

Configuration Settings		Description
Connection Name	B-to-H	Name for IPSec tunnel
Remote Secure Gateway	69.121.1.3	IP address of the Branch office gateway
Access Network		
Local Access Range	Subnet	Head 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**

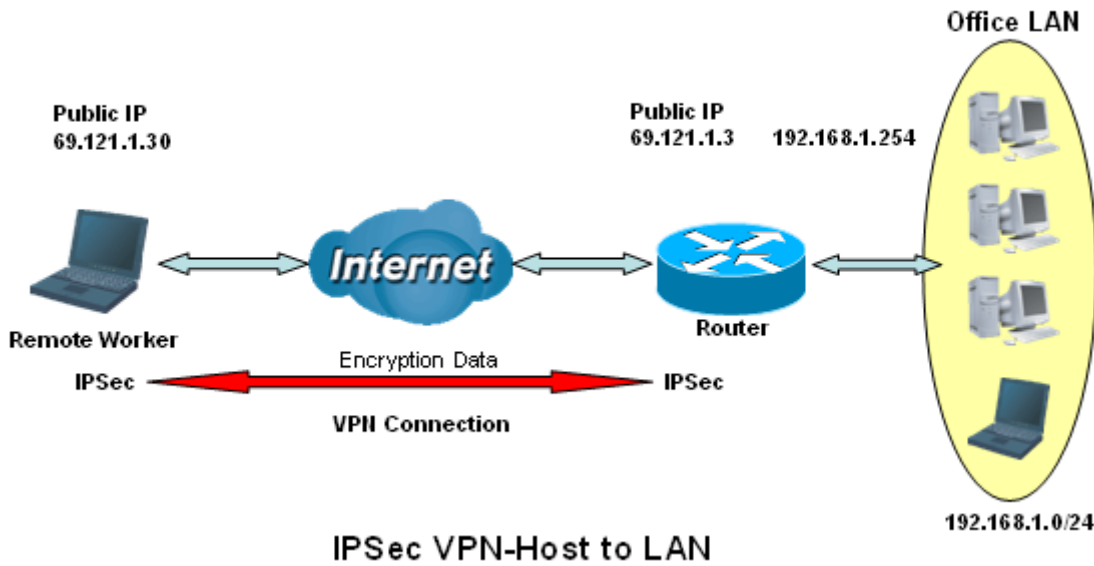
Connection Name	<input type="text" value="B-to-H"/>		
Active	<input checked="" type="radio"/> Yes <input type="radio"/> No		
Interface	<input type="text" value="Auto"/>		
Remote Gateway IP	<input type="text" value="69.121.1.3"/> (0.0.0.0 means any)		
Local Access Range	<input type="text" value="Subnet"/>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

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

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

### Examples: IPsec – Remote Employee to MX-200 Connection

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



**Head Office Side:**

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

**IPSec**

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

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

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

Save Back

## PPTP Server

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

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

**NOTE:** 4 sessions for Client and 4 sessions for Server respectively.

**PPTP Server**

PPTP Server  Activated  Deactivated

Authentication Type: Chap/Pap

MS-DNS: 192.168.1.254

Rule Index: 1

Connection Name:

Active:  Yes  No

Username:

Password:

Connection Type: Remote Access

Private IP Address assigned to Dial-in User:

Remote Network IP Address:

Remote Network Netmask:

Save Delete

**PPTP Server Listing**

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

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

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

**MS-DNS:** 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:** User-defined name for the PPTP connection.

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

**Username:** Please input the username for this account.

**Password:** Please input the password for this account.

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

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

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

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

Click **Save** to apply your settings.

## PPTP Client

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

**▼ PPTP Client**

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

**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:** User-defined name for the PPTP connection.

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

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

**Username:** Please input the username for this account.

**Password:** Please input the password for this account.

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

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

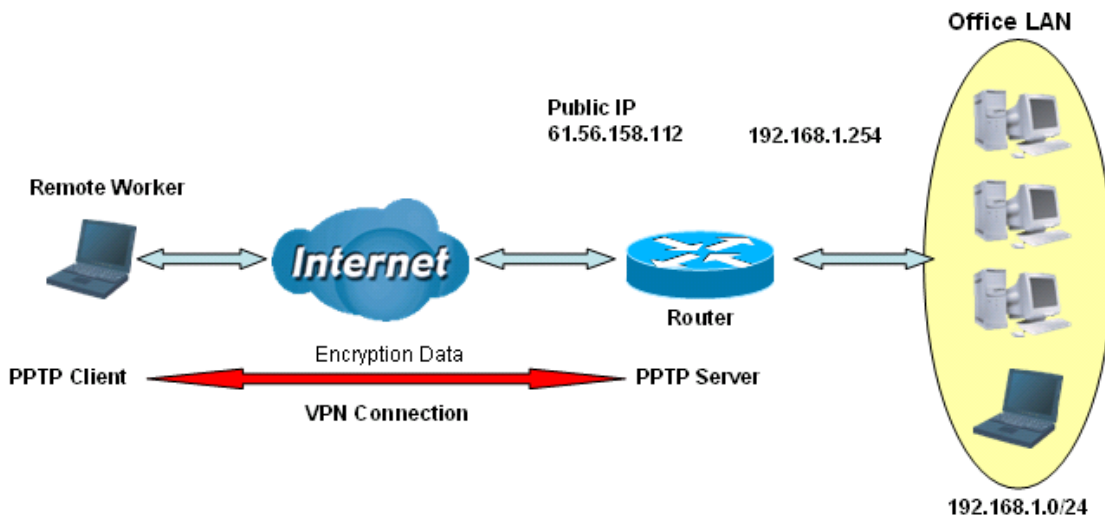
**Remote Network IP Address:** Please input the subnet IP for remote network.

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

Click **Save** to apply the settings.



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



**PPTP VPN-Remote Access (Dial-in)**

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	Give a name of L2TP connection
Authentication Type	MPPE 128bit	Authentication type
Username	test	Dial in authenticate user name
Password	test	Dial in authenticate user password
Connection Type	Remote Access	Remote access for dial in
Assigned IP	192.168.1.2	An IP assigned to the dial in client

**PPTP Server**

PPTP Server  Activated  Deactivated

Authentication Type: MPPE 128bit Encryption

MS-DNS: 192.168.1.254

Rule Index: 1

Connection Name: HS-RA

Active:  Yes  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:

Save Delete

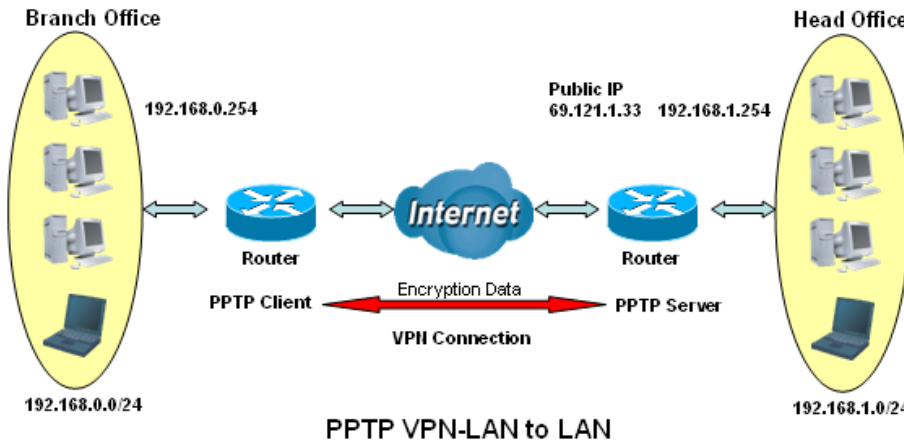
**PPTP Server Listing**

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

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

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

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



### Configuring PPTP Server in the Head office

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

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

**PPTP Server**

PPTP Server  Activated  Deactivated

Authentication Type: MPPE 128bit Encryption

MS-DNS: 192.168.1.254

Rule Index: 1

Connection Name: HS-LL

Active:  Yes  No

Username: test

Password: \*\*\*\*

Connection Type: LAN to LAN

Private IP Address assigned to Dial-in User: 192.168.1.2

Remote Network IP Address: 192.168.0.0

Remote Network Netmask: 255.255.255.0

Save Delete

**PPTP Server Listing**

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



### Configuring PPTP Client in the Branch office

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

Configuration Settings	Description
Connection Name	BC-LL
Authentication Type	MPPE 128bit
Username	test
Password	test
Connection Type	LAN to LAN
Server IP	69.121.1.33
Remote Network IP	129.168.1.0
Remote Network Netmask	255.255.255.0

**▼ PPTP Client**

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

**PPTP Client Listing**

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

## L2TP

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

**NOTE:** 4 sessions for dial-in connections and 4 sessions for dial-out connections

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

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

**Active:** To enable or disable the tunnel.

### Connection Mode (Dial in)

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

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

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

**Username:** Please input the username for this account.

**Password:** Please input the password for this account.

**Private IP Address Assigned to Dial-in User:** The private IP to be assigned to 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:** Please input the username for this account.

**Password:** Please input the password for this account.

### 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 / establishes a VPN tunnel.

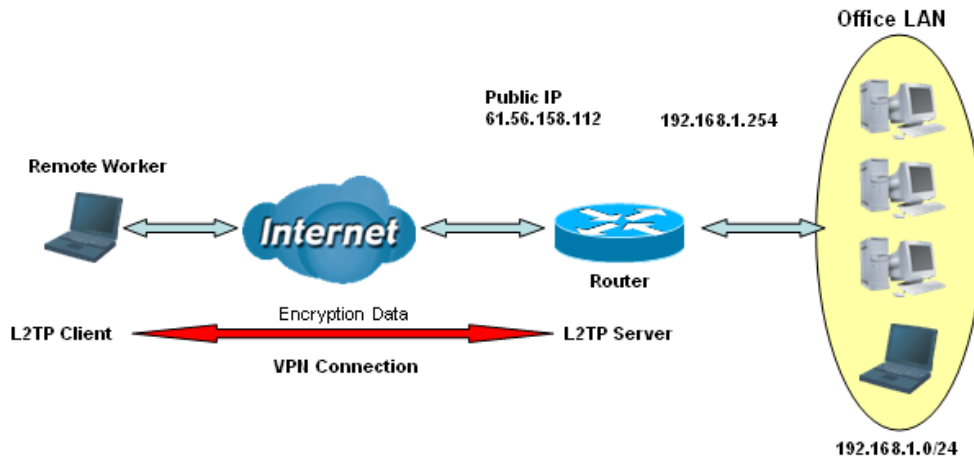
**Remote Host Name:** Enter hostname of remote VPN device. It is a tunnel identifier from the Remote VPN device matches with the Remote hostname provided. If remote hostname matches, tunnel will be connected; otherwise, it will be dropped.

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

Click **Save** to apply the settings.

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

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



L2TP VPN-Remote Access (Dial-in)

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	Give a name of L2TP connection
Connection Mode	Dial in	Operate as L2TP server
Authentication Type	Chap/Pap	Authentication type
Username	test	Dial in authenticate user name
Password	test	Dial in authenticate user password
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:  Yes  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:  Enable

Secret Password:

Local Host Name:

Remote Host Name:

Active as Default Route:  Enable

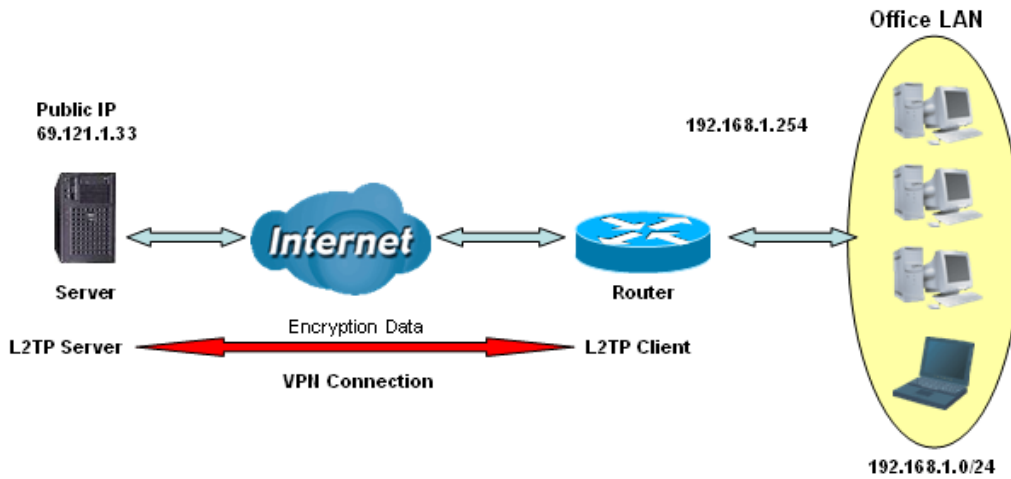
Save Delete

**L2TP Listing**

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

### Example: L2TP VPN – MX-200 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.



L2TP VPN-Remote Access (Dial-out)

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

**L2TP**

Rule Index: 1

Connection Name: HC-RA

Active:  Yes  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:  Enable

Secret Password:

Local Host Name:

Remote Host Name:

Active as Default Route:  Enable

Save Delete

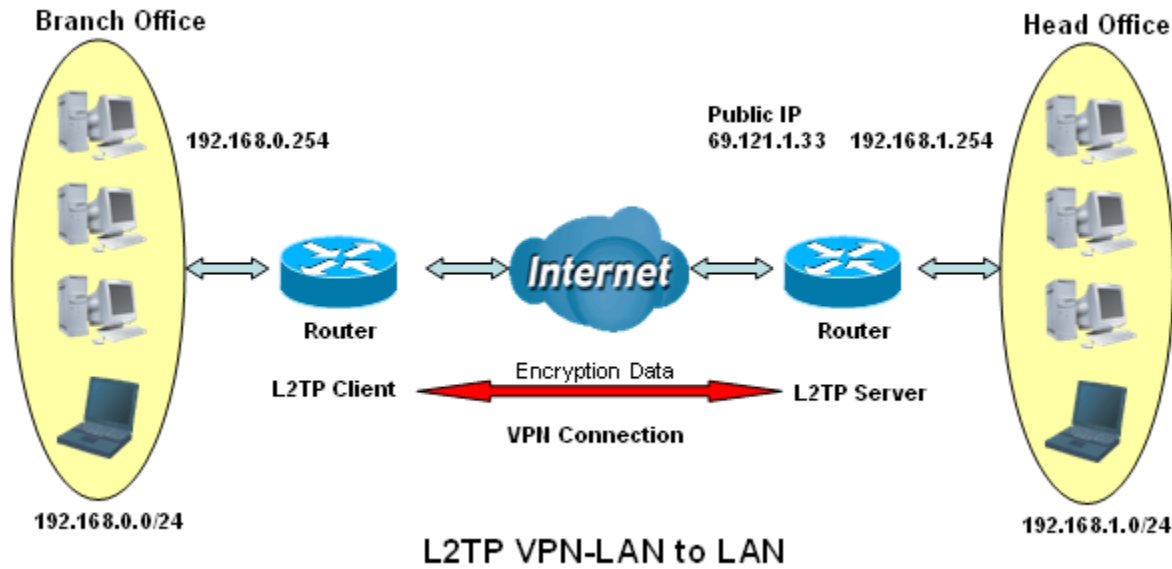
**L2TP Listing**

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 head office to connect two private networks over the Internet. The routers are installed in the head office and branch office accordingly.

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



**Configuring L2TP VPN Dial-in in the Head office**

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

Item		Description
Connection Name	HS-LL	Give a name of L2TP connection
Connection Mode	Dial in	Operate as L2TP server
Authentication Type	Chap/Pap	Authentication type
Username	Test	Dial in authenticate user name
Password	Test	Dial in authenticate user password
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 access network
Remote Network Netmask	255.255.255.0	

**L2TP**

Rule Index: 1

Connection Name: HS-LL

Active:  Yes  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:  Enable

Secret Password:

Local Host Name:

Remote Host Name:

Active as Default Route:  Enable

Save Delete

**L2TP Listing**

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



## Configuring L2TP VPN Dial-out in the Branch office

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

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

**▼L2TP**

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

**L2TP Listing**

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 tunnels can be added.

GRE					
Rule Index	1 ▼				
Connection Name	<input type="text"/>				
Active	<input type="radio"/> Yes <input checked="" type="radio"/> No				
Interface	4G LTE -1 ▼				
Remote Gateway IP	<input type="text" value="0.0.0.0"/>				
Tunnel Local IP Address	<input type="text" value="0.0.0.0"/>				
Tunnel Local Netmask	<input type="text" value="0.0.0.0"/>				
Tunnel Remote IP Address	<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				
<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:** User-defined name for the connection.

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

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

**Remote Gateway:** The remote GRE gateway IP.

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

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

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

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

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

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

**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.

**MTU:** Maximum Transmission Unit.

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

Click **Save** to apply the settings

## Access Management

Features including **Device Management**, **SNMP**, **Universal Plug & Play**, **Dynamic DNS**, **Access Control**, **Packet Filter**, **CWMP (TR-069)**, and **Parental Control**.

### Device Management

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

The screenshot shows a web interface for Device Management. It is divided into two sections. The first section, titled "Device Host Name", contains a "Host Name" field with the value "home.gateway" and a "Save" button below it. The second section, titled "Embedded Web Server", contains an "HTTP Port" field with the value "80" and a note "(The default HTTP port number is 80.)" to its right, with a "Save" button below it.

Click **Save** to apply the settings.

## SNMP

Simple Network Management Protocol (SNMP) is a protocol used for exchanging management information between network devices. SNMP is a member of the TCP/IP protocol suite. The MX-200 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	<input type="text"/>
Set Community	<input type="text"/>
Trap Manager IP	0.0.0.0
SNMPv3	
SNMPv3	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Username	<input type="text"/>
Access Permissions	Read Only ▼
Authentication Protocol	MD5 ▼
Authentication Key	<input type="text"/> (8~31 characters)
Privacy Protocol	DES ▼
Privacy Key	<input type="text"/> (8~31 characters)
Save	

**SNMP:** Select to enable SNMP feature.

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

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

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

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

**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 the 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 type="radio"/> Activated <input checked="" type="radio"/> Deactivated (by UPnP-enabled Application)
<input type="button" value="Save"/>	

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

**Auto-configured:** Select this check box to allow UPnP-enabled applications to automatically configure the MX-200 so that they can communicate through the MX-200, 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 the 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	www.dyndns.org (dynamic) ▼
My Host Name	<input type="text"/>
Username	<input type="text"/>
Password	<input type="text"/>
Wildcard support	<input type="radio"/> Yes <input checked="" type="radio"/> No
Period	25 Day(s) ▼
Save	

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

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

**My Host Name:** Type the domain name assigned to your MX-200 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 will update the DDNS server with your current external IP address.

Click **Save** to apply the 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 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**.

**Access Control**

Access Control  Activated  Deactivated

---

**Access Control Editing**

Rule Index:

Active:  Yes  No

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

Application:

Interface:

---

**Access Control Listing**

Index	Active	Secure IP Address	Application	Interface
1	Yes	0.0.0.0-0.0.0.0	ALL	LAN
2	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. Type an IP address range to restrict access to the client(s) without a matching IP address.

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

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

Click **Save** to apply the 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  Activated  Deactivated

---

**Access Control Editing**

Rule Index: 1

Active:  Yes  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

---

**Access Control Listing**

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  Activated  Deactivated

---

**Access Control Editing**

Rule Index: 2

Active:  Yes  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

---

**Access Control Listing**

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**

Rule Index 1 ▾

Individual Active  Yes  No

Action Black List ▾

Interface 4G LTE -1 ▾

Direction Both ▾

Type IPv4 ▾

Source IP Address 0.0.0.0 (0.0.0.0 means Don't care)

Source Subnet Mask 0.0.0.0

Source Port Number 0 (0 means Don't care)

Destination IP Address 0.0.0.0 (0.0.0.0 means Don't care)

Destination Subnet Mask 0.0.0.0

Destination Port Number 0 (0 means Don't care)

DSCP 0 (Value Range:0~64, 64 means Don't care)

Protocol TCP ▾

**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	DSCP	Protocol

### IP & MAC Filter Editing

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

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

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

**Interface:** Select to determine which interface the rule will be applied to.

**Direction:** Select to determine whether the rule applies to outgoing packets, incoming packets or packets of both directions.

**Type:** Choose type of field you want to specify to monitor. Select “IPv4” for IPv4 address, port number and protocol. Select “IPv6” for IPv6 address, port number and protocol. Select “MAC” for MAC address.

**Source IP Address:** The source IP address of packets to be monitored. 0.0.0.0 means “Don’t care”.

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

**Source Port Number:** The source port number of packets to be monitored. 0 means “Don’t care”.

**Destination IP Address:** The destination IP address of packets to be monitored. 0.0.0.0 means “Don’t care”.

**Destination Subnet Mask:** Enter the subnet mask of the destination network.

**Destination Port Number:** This is the Port that defines the application. (E.g. HTTP is port 80.)

**DSCP:** DSCP: Differentiated Services Code Point, it is recommended that this option be configured by an advanced user or keep 0. (0 means Don’t care.)

**Protocol:** Specify the packet type (TCP, UDP, ICMP, and ICMPv6) that the rule applies to.

### **IP/MAC Filter Listing**

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

**Active:** Whether the connection is currently active.

**Interface:** show the interface the rule applied to.

**Direction:** show the direction the rule applied to.

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

**Destination IP (IPv6) Address/Mask (Prefix):** This is the destination subnet IP address.

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

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

**Destination Port:** This is the Port or Port Ranges that defines the application.

**DSCP:** show the set DSCP.

**Protocol:** It is the packet protocol type used by the application. Select either **TCP** or **UDP** or **ICMP** or **ICMPv6**

Click **Save** to apply the settings.

❖ Filter Type - Application Filter

▼ Packet Filter	
Packet Filter	
Filter Type	Application Filter ▼
Application Filter Editing	
Application Filter	<input type="radio"/> Activated <input checked="" type="radio"/> Deactivated
ICQ	<input checked="" type="radio"/> Allow <input type="radio"/> Deny
MSN	<input checked="" type="radio"/> Allow <input type="radio"/> Deny
YMSG	<input checked="" type="radio"/> Allow <input type="radio"/> Deny
Real Audio/Video(RTSP)	<input checked="" type="radio"/> Allow <input type="radio"/> Deny
Save	

**Application Filter:** Select this option to Activated/Deactivated the Application filter.

**ICQ:** Select this option to Allow/Deny ICQ.

**MSN:** Select this option to Allow/Deny MSN.

**YMSG:** Select this option to Allow/Deny Yahoo messenger.

**Real Audio/Video (RTSP):** Select this option to Allow/Deny Real Audio/Video (RTSP).

Click **Save** to apply the 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 the 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.

The screenshot shows a web-based configuration page for CWMP (TR-069). At the top, there is a dropdown menu labeled 'CWMP (TR-069)'. Below it, the 'CWMP' status is set to 'Deactivated' with radio buttons for 'Activated' and 'Deactivated'. The 'ACS Login Information' section includes fields for 'URL', 'Username', and 'Password'. The 'Connection Request Information' section includes fields for 'Path', 'Username', and 'Password'. The 'Periodic Inform Config' section has 'Periodic Inform' set to 'Activated' and an 'Interval' of '5000'. The 'NATT Config' section includes fields for 'NATT Server' and 'NATT Period'. A 'Save' button is located at the bottom left of the form.

**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.

**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 the 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"/>
<p>**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.</p>	
<input type="button" value="Save"/>	

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](http://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 the settings.



## Maintenance

Maintenance equipments the users with the ability of maintaining the device as well as examining the connectivity of the WAN connections, including **User Management, Time Zone, License, Firmware & Configuration, System Restart, Auto Reboot,** and **Diagnostic Tool.**

### 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 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	
User Account	
Index	1 ▼
Username	admin
New Password	.....
Confirm Password	.....
<input type="button" value="Save"/> <input type="button" value="Delete"/>	
User Account List	
#	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.**

▼ **User Management**

**User Account**

Index: 2 ▼

Username: user

New Password: \*\*\*\*

Confirm Password: \*\*\*\*

**Web GUI Permission**

Guest Account:  Enable  Disable

Interface Setup:  Enable  Disable

Advanced Setup:  Enable  Disable

Access Management:  Enable  Disable

Maintenance:  Enable  Disable

Save Delete

**User Account List**

#	User Name
1	admin

**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 / Access Management Setup / Maintenances:** Enable to grant this user access to these features.

When someone accesses to the MX-200 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 the settings.

## Time Zone

With default, MX-200 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. 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 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 SNMP server IP address manually.

**Time Zone:** Choose the time zone of your location. This will set the time difference between your time zone and Greenwich Mean Time (GMT).

**Daylight Saving:** Select this option if you use daylight savings time.

**NTP Server Address:** Enter the IP address of your time server. Check with your ISP/network administrator if you are unsure of this information.

## License

Some of the advanced features are required for a license. For more information, please contact with Billion/BEC for more information.

Input your license key here and click “Upgrade” to enable the features.

**NOTE:** Device will reboot after the upgrade.

▼ License	
License	<input type="text"/>
Status	
It might take several minutes, don't power off it during upgrading. Device will restart after the upgrade	
<input type="button" value="Upgrade"/>	

## 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 provides an easy way to update the code to take advantage of the changes. .

To upgrade the firmware of the MX-200, 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 will automatically restart and run the new firmware.

**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 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.



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

Improper operation could damage your MX-200.

## System Restart

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



The screenshot shows a web interface for the 'System Restart' section. At the top, there is a tab labeled 'System Restart'. Below this, there is a form with a label 'System Restart with' on the left. To the right of this label are two radio button options: 'Current Settings' (which is selected) and 'Factory Default Settings'. At the bottom of the form is a 'Restart' button.

If you wish to restart the router using the factory default settings (for example, after a firmware upgrade or if you have saved an incorrect configuration), select **Factory Default Settings** to restore to factory default settings.

You may also restore your router to factory settings by holding the small Reset pinhole button on the back of your router in about more than 6s seconds whilst the router is turned on.

## Auto Reboot

Schedule an automatic reboot for your MX-200 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 00 : 00
	2.	<input type="checkbox"/> Enable	<input type="checkbox"/> Mon.	<input type="checkbox"/> Tues.	<input type="checkbox"/> Wed.	<input type="checkbox"/> Thur.	<input type="checkbox"/> Fri.	<input type="checkbox"/> Sat.	<input type="checkbox"/> Sun.	Time 00 : 00
Save										

Click **Save** to apply the settings

**Example:** Schedule MX-200 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 22 : 00
	2.	<input checked="" type="checkbox"/> Enable	<input type="checkbox"/> Mon.	<input type="checkbox"/> Tues.	<input type="checkbox"/> Wed.	<input type="checkbox"/> Thur.	<input type="checkbox"/> Fri.	<input checked="" type="checkbox"/> Sat.	<input checked="" type="checkbox"/> Sun.	Time 09 : 00
Save										

## Diagnostics Tool

The Diagnostic Test page shows the test results for the connectivity of the physical layer and protocol layer for both LAN and WAN sides.

### 3G/4G-LTE / EWAN (LAN1)

Diagnostic Tool	
WAN Interface	4G LTE -1 ▾
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
Start	

**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 -1 ▾
Testing Ethernet LAN Connection	PASS
Ping Primary DNS ( 168.95.1.1 )	PASS
Ping www.google.com	PASS
Ping other IP Address <input checked="" type="radio"/> Yes <input type="radio"/> No	PASS
IP Address	8.8.8.8
Start	



# Chapter 5: Troubleshooting

If your MX-200 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 lit, check to see if the cable between your router and the PC is properly connected. Make sure you have first uninstalled your firewall program before troubleshooting.
	Verify that the IP address and the subnet mask are consistent for both the router and the workstations.

## Recovery Procedures

Problem	Suggested Action
<ul style="list-style-type: none"> <li>- The front LEDs display incorrectly</li> <li>- Still cannot access to the router management interface after pressing the RESET button.</li> <li>- Software / Firmware upgrade failure</li> </ul>	<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</li> </ol>

# APPENDIX: PRODUCT SUPPORT & CONTACT

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

Contact BEC @ <http://www.bectechnologies.net>

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### **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.