IMG-311DL-4GS

Industrial 4G LTE Cellular Router

User Manual

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CONTACT INFORMATION

ORing Industrial Networking Corp.
3F 542-2 Zhongzheng Road, Xindian District, New Taipei City, 231 Taiwan, R.O.C.
Tel: + 886 2 2218 1066 // Fax: + 886 2 2218 1014
Website: www.ORingnet.com

Technical Support
E-mail: support@oringnet.com

Sales Contact
E-mail: sales@oringnet.com (Headquarters)
sales@oring-china.com (China)

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Getting Started

1.1 About the IMG-311DL-4GS

The IMG-311DL-4GS is a reliable Industrial 4G LTE router with a 10/100Base-T(X) ports . It supports MAC filters for security control and can be support GPRS/3G/3.5G/LTE modem via the internal 4G module. You can set up a WLAN environment that fulfills demands of various applications by dialing up cellular modems.

1.2 Software Features

- Compact size industrial M2M gateway for remote access, data collection and end-devices control applications suitable for multiple IoT Cloud Platform interfaces
- Support MQTT/LWM2M* IoT protocol
- Support Modbus TCP/RTU industrial protocol
- Support GPS
- Support Open VPN, PPTP VPN, IPSec.
- Support DHCP forwarding through PPTP function
- Redundant multiple host devices:
  5 host devices:Virtual COM, TCP Server, TCP Client mode,
  UDP mode(4 IP Ranges)
- Secure management by HTTPS
- IP table to prevent access from unauthorized IP address
- Supports NAT setting (virtual server, port trigger, DMZ, and UPnP)
- Versatile modes & event alarm by e-mail
- Event warning by Syslog, e-mail, SNMP trap,
- Support ORing Open Gateway (protocol converter) software feature for user-friendly IIoT deployment

1.3 Hardware Features

- High speed air connectivity: WLAN interface supports up to 150Mbps link speed.
- 1 x 10/100Base-T(X) Ethernet ports for WAN / LAN connection individually.
- 4G LTE dial-up modem included
- 1 x RS-232/422/485 serial ports
- 1x DI and 1x DO
- 12~48VDC power input on terminal block

- Operating temperature: -10 to 60°C
- Storage temperature: -40 to 85°C
- Operating humidity: 5% to 95%, non-condensing
- DIN-Rail and panel mounting enabled
- Rigid IP-30 housing design
- Dimensions: 26.1(W)x94.9(D)x144.3(H) mm

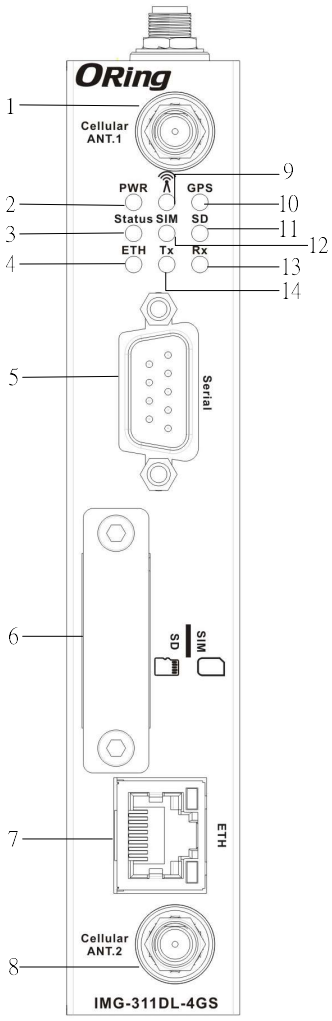
1.4 Conditions of Safe use

Special Conditions of Use

- The equipment shall be installed in an enclosure that provides a degree of protection not less than IP 54 in accordance with EN 60079-15 and accessible only by the use of a tool
- Subject devices are for use in an area of not more than pollution degree 2 in accordance with EN 60664-1
- Transient protection shall be provided that is set at a level not exceeding 140 % of the peak rated voltage value at the supply terminals to the equipment
- This equipment is open-type device that is to be installed in an enclosure only accessible with the use of a tool, suitable for the environment
- This equipment is suitable for use in Class I, Division 2, Groups A, B, C, and D or non-hazardous locations only
- WARNING - EXPLOSION HAZARD – Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous

Hardware Overview

2.1 Front Panel



1. Cellular 1 antenna connector
2. LED for Power
3. LED for System status
4. LED for ETH port
5. Serial port (RS232/422/485)
6. SIM card slot
7. Ethernet port
8. Cellular 1 antenna connector
9. LED for cellular status
10. LED for GPS status
11. LED for SD card status
12. LED for SIM card status
13. RX Status of serial port
14. TX Status of serial port

2.1.1 Ports and Connectors

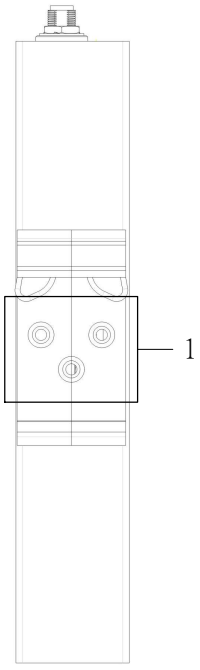
The router is equipped with the following ports and features on the front panel.

Port	Description
10/100Base-T(X) Fast Ethernet Ports	10/100Base-T(X) RJ-45 fast Ethernet ports supporting auto-negotiation. Default setting including Speed: auto Duplex: auto
ANT.	2 x SMA female connector for cellular antenna.
Serial port	1x RS-232/422/485 Serial port in DB9 connector

2.1.2 LEDs

LED	Color	Status	Description
PWR	Green	On	DC power activated
Status	Green	On	System function normal
ETH	Green	On	Port is linked and running at 100Mbps
		Blinking	Data being transmitted
		Blinking	Data being transmitted
Cellular	Green	On	Link
SIM	Green	On	SIM card is ready
GPS	Green	On	Satellites ≥ 4
		Blinking	Satellites < 4
SD	Green	On	SD card is ready
TX / RX	Red	On	Serial port receiving data
	Green	On	Serial port transmitting data

2.2 Rear Panel



1. Din-rail screw holes

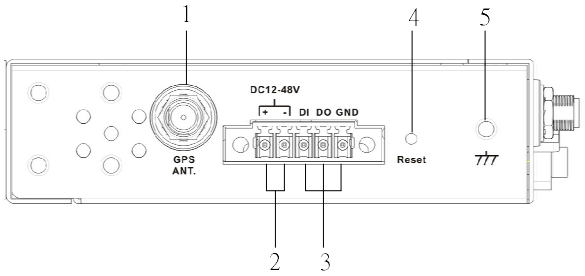
On the rear panel of the router sit three sets of screw holes. The two sets placed in triangular patterns on both ends of the rear panel are used for wall-mounting (red boxes in the figure below) and the set of four holes in the middle are used for Din-rail installation (blue box in the

figure below). For more information on installation, please refer to 3.1 Din-rail Installation.

2.3 Top Panel

The router is equipped with the following ports and features on the top panel.

Port	Description
GPS ANT.	1 x External reverse SMA antenna connector for GPS
5 pin Terminal block	5 pin Terminal block with V+, V-, DI, DO and GND



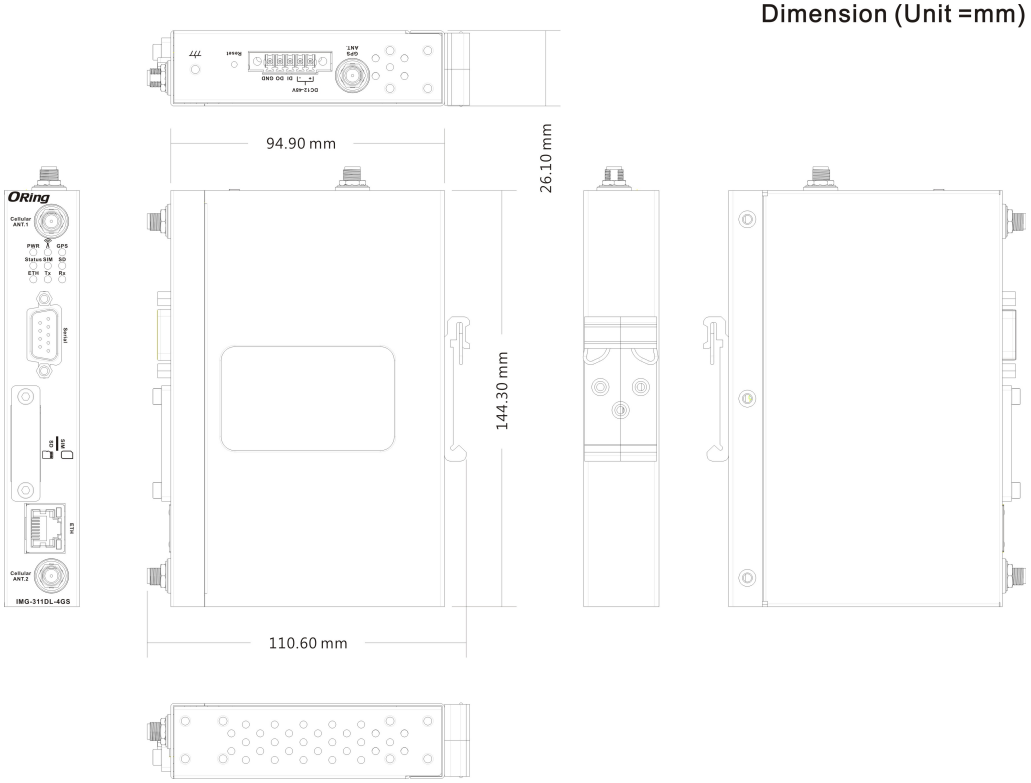
1. GPS Antenna
2. Power Input DC 12~ 48.
3. Digital Input / Output and GND
4. Factory reset button
5. Frame GND.

Hardware Installation

3.1 DIN-rail Installation

The router comes with a DIN-rail kit to allow you to fasten the router to a DIN-rail in any environments.

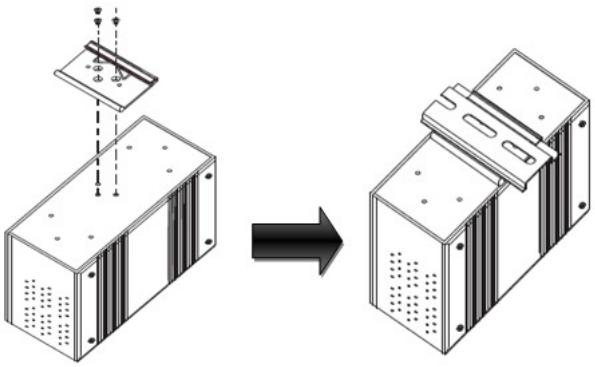
Dimension (Unit =mm)



DIN-rail Kit Measurement (Unit = mm)

Step 1: Slant the router and screw the Din-rail kit onto the back of the router, right in the middle of the back panel.

Step 2: Slide the router onto a DIN-rail from the Din-rail kit and make sure the router clicks into the rail firmly.



3.2 Wall Mounting

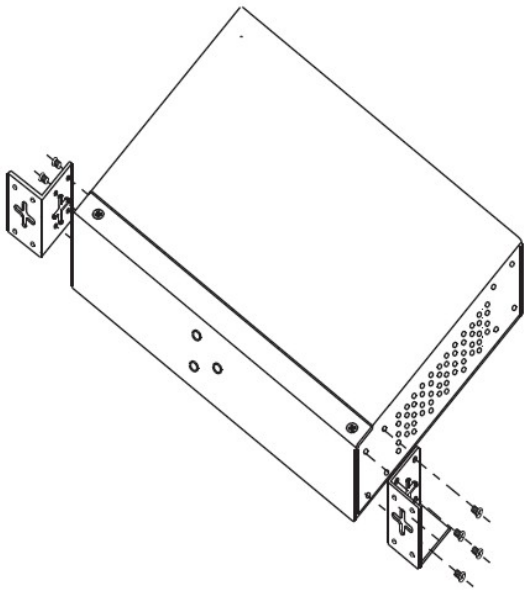
Besides Din-rail, the router can be fixed to the wall via a wall mount panel, which can be found in the package.

To mount the router onto the wall, follow the steps:

Step 1: Screw the two pieces of wall-mount kits onto both ends of the rear panel of the router. A total of six screws are required, as shown below.

Step 2: Use the router, with wall mount plates attached, as a guide to mark the correct locations of the four screws.

Step 3: Insert a screw head through the large part of the keyhole-shaped aperture on the plate, and then slide the router downwards. Tighten the four screw for added stability.



The screws should be 6mm diameter head x 3mm diameter thread, as shown below. Note that the screws should not be larger than the size used in the series to prevent damaging the router.

3.3 Wiring

WARNING

Be sure to switch off the power and make sure the area is not hazardous before disconnecting modules or wires. The devices may only be connected to the supply voltage shown on the type plate.

3.3.1 Grounding

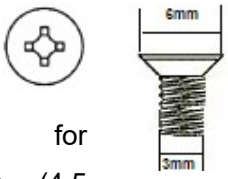
Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting devices.

The minimum cross-sectional area of Earthling conductor shall equal to input wiring cable.

3.3.2 Field Wire information

Terminal Block Header: Cat. No. 2EHDRC-04P, manufactured by Dinkle Enterprise Co., Ltd. Rated 300 V, 15 A, 105°C.

Terminal Block Plug: Cat. No. 2ESDV-04P, manufactured by Dinkle Enterprise Co., Ltd. Rated 300 V, 15 A, 105°C, suitable for 3.3-0.08 mm² (12-28 AWG) wire size, torque value 0.51 N-m (4.5 lb-in)



ATTENTION

1. Be sure to disconnect the power cord before installing and/or wiring your routers.
2. Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.
3. If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.
4. Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.
5. Do not run signal or communications wiring and power wiring through the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.
6. You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring sharing similar electrical characteristics can be bundled together
7. You should separate input wiring from output wiring
8. It is advised to label the wiring to all devices in the system

Cables and Antenna

4.1 Ethernet Cables

The device a 10/100Base-T(X) Ethernet ports. According to the link type, the AP uses CAT 3, 4, 5, 5e, 6 UTP cables to connect to any other network device (PCs, servers, switches, routers, or hubs). Please refer to the following table for cable specifications.

Cable Types and Specifications

Cable	Type	Max. Length	Connector
10BASE-T	Cat. 3, 4, 5 100-ohm	UTP 100 m (328 ft)	RJ-45
100BASE-T(X)	Cat. 5 100-ohm UTP	UTP 100 m (328 ft)	RJ-45

4.2 RJ-45 Pin Assignment

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

10/100 Base-T(X) RJ-45 Pin Assignments :

Pin Number	Assignment
1	TD+
2	TD-
3	RD+
4	n/c
5	n/c
6	RD-
7	n/c
8	n/c

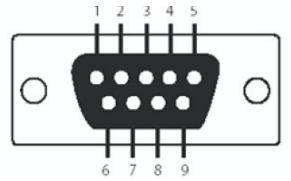
The router also supports auto MDI/MDI-X operation. You can use a straight-through cable to connect PC and router. The following table below shows the 10/100BASE-T(X) MDI and MDI-X port pin outs.

MDI/MDI-X pins assignment

Pin Number	MDI port	MDI-X port
1	TD+(transmit)	RD+(receive)
2	TD-(transmit)	RD-(receive)
3	RD+(receive)	TD+(transmit)
4	n/c	n/c
5	n/c	n/c
6	RD-(receive)	TD-(transmit)
7	n/c	n/c
8	n/c	n/c

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

4.3 Serial Port Pin definition



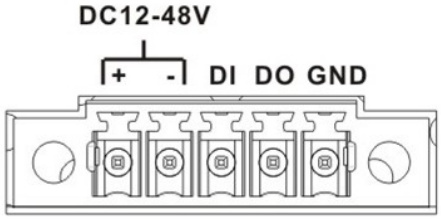
DB9 connector

Pin #	RS-232	RS-422	RS-485 (4 wire)	RS-485 (2 wire)
1	DCD	TX-	TX-	DATA -
2	RXD	TX+	TX+	DATA +
3	TXD	RX+	RX+	
4	DTR	RX-	RX-	
5	GND	GND	GND	
6	DSR			
7	RTS			
8	CTS			
9	RI			

4.4 Digital Input & Digital Output

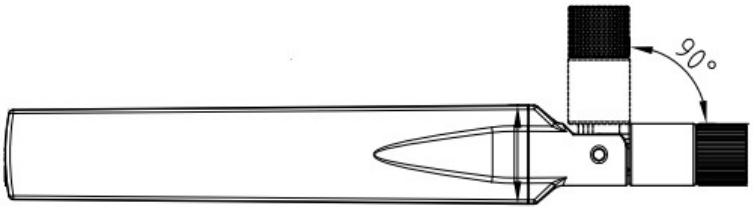
The IMG-311DL-4GS provide a Digital Input and Digital Output (dry contact).

The DI:Logic level 1: 5V~30V, Logic level 0: 0V~2V and DO:Maximum Voltage is 30V, Maximum Current is 20mA



4.5 Cellular Antenna

The router provides two SMA connector for cellular antennas. External RF cables and antennas can also be used with the connector.



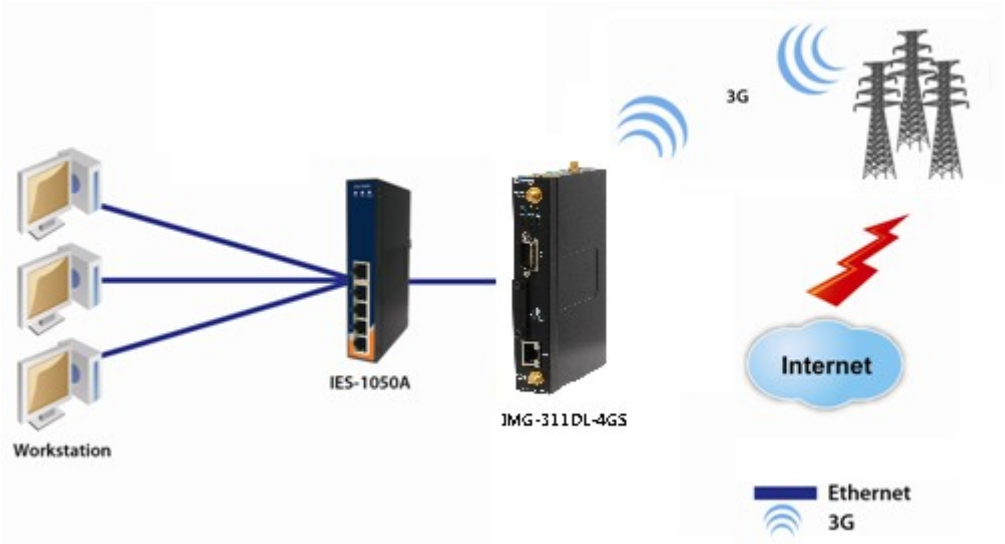
4.6 GPS Antenna

The router provides a reversed SMA connector for GPS antennas. You can also use external RF cables and antennas with the connectors.

Management Interface

5.1 Installation

Before installing the router, you need to be able to access the router via a computer equipped with an Ethernet card interface. To simplify the connection, it is recommended to use an Ethernet card to connect to a LAN.



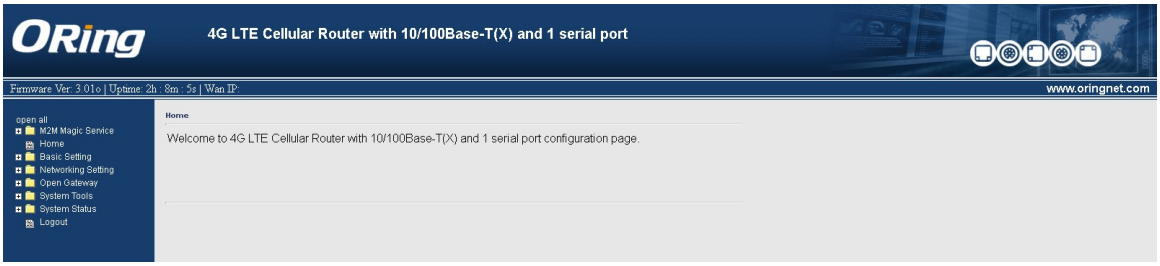
Follow the steps below to install and connect the router to PCs:

Step 1: Select power source. The router can be powered by +12~48V DC power input.

Step 2: Connect a computer to the router. Use either a straight-through Ethernet cable or cross-over cable to connect the ETH port of the router to a computer. Once the LED of the LAN port lights up, which indicates the connection is established, the computer will initiate a DHCP request to retrieve an IP address from the AP router.

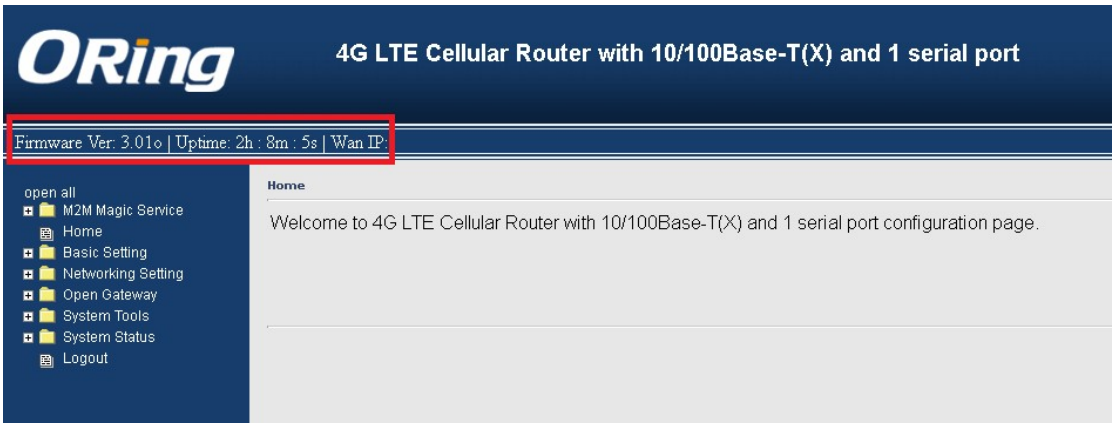
Step 3: Configure the router on a web-based management utility. Open a web browser on your computer and type http://192.168.10.1 (default gateway IP of the router) in the address box to access the webpage. A login window will pop up where you can enter the default login name admin and password admin. For security reasons, we strongly recommend you to change the password. Click on **System Tools** > **Login Setting** after logging in to change the password.

After you log in successfully, a Web interface will appear, as shown below. On the left hand side of the interface is a list of functions where you can configure the settings. The details of the configurations will be shown on the right screen.



5.2 Configuration

On top of the Home screen shows information about the firmware version, uptime, and WAN IP address.



Label	Description
Firmware	Shows the current firmware version
Uptime	Shows the elapsed time since the AP router is started
Wan IP	Shows WAN IP address

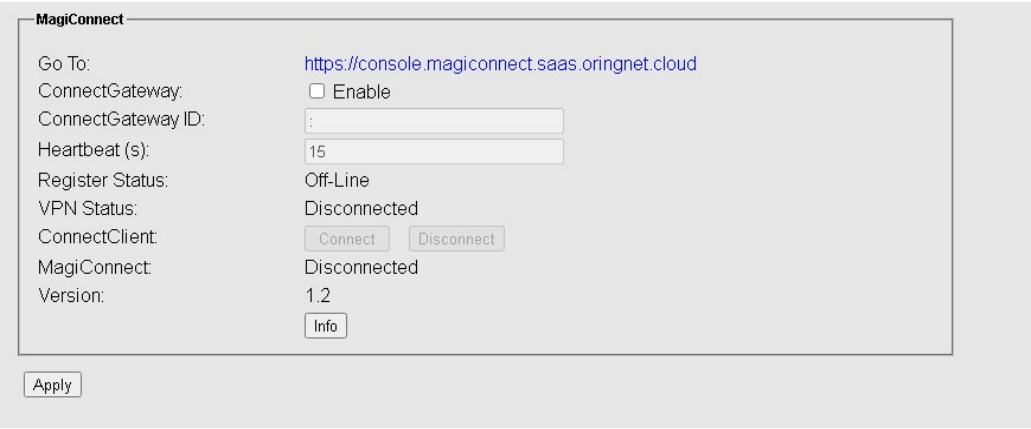
5.2.1 M2M Magic service

Ready for use out of the box, ConnectGateway allows connections to remote devices such as PLC and HMI devices via the intranet and 3G/4G networks.

MagiConnect

Label	Description
ConnectGateway	Check the box to enable ConnectGateway
ConnectGateway ID	Fill in the ConnectGateway ID which can be found in Magiconnect Portal.
Heartbeat	Heartbeat to monitor device connections (default 15 second)
Register Status	Status to register with MagiConnect Portal (On-line /Off-line)
VPN Status	VPN connectivity with MagiConnect Portal
MagiConnect	MagiConnect Tunnel connection status.
Version	MagiConnect Version

MagiCollect

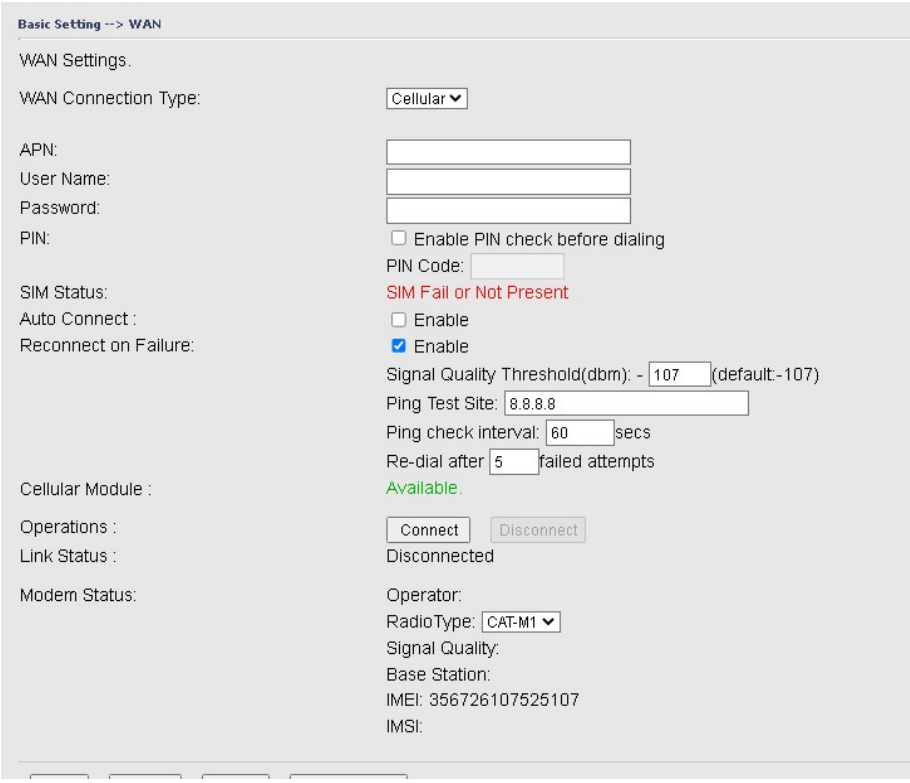


Label	Description
ConnectGateway	Check the box to enable ConnectGateway
ConnectGateway ID	Fill in the ConnectGateway ID which can be found in Magiconnect Portal.
Heartbeat	Heartbeat to monitor device connections (default 15 second)
Register Status	Status to register with MagiConnect Portal (On-line /Off-line)
VPN Status	VPN connectivity with MagiConnect Portal
MagiConnect	MagiConnect Tunnel connection status.
Version	MagiConnect Version

5.2.2 Basic Setting

This section will guide you through the general settings for the router.

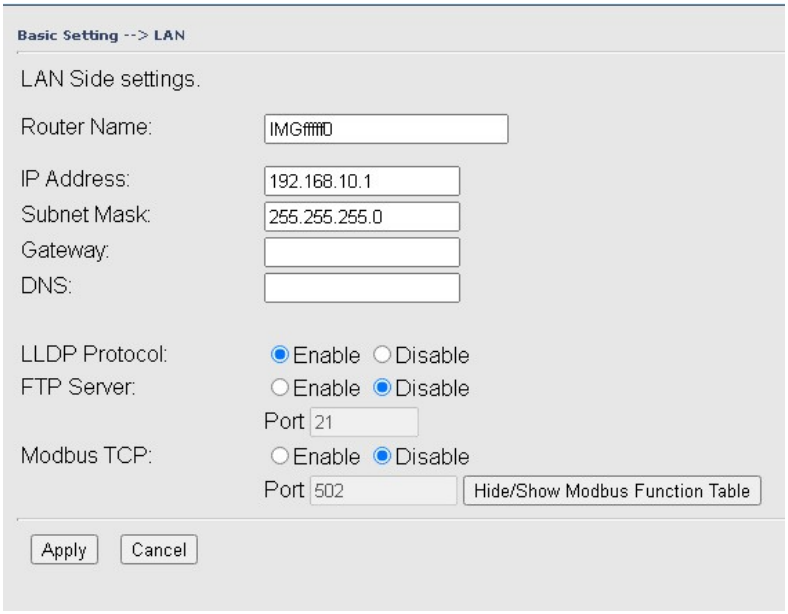
WAN Connection Type as Cellular



Label	Description
APN	Enter the APN value (optional)
User Name	Enter the user name provided by your ISP
Password	Enter the password provided by your ISP
Baud Rate	Select a Baud Rate from the drop-down list
Ping Test Site	Type a website address the field to use it to check if the connection is alive or lost.
Ping check interval	Interval time to ping test site
Re-dial	Re-dial after 5 pings failure.
PIN	Enter a PIN code if you want to perform PIN check
Auto Connect	Check to start connections when the router boots up
Dual SIM	Enable dual SIM mode.
Reconnect on Failure	Check to allow for reconnection when links fail
Cellular Module	Shows the status of the device
Operations	Click **Connect** to start modem/3G connections or **Disconnect** to shut down connections
Link Status	Shows the status of connections
Modem Status	Shows information about the modem

LAN

This page allows you to configure the IP settings of the LAN for the router. The LAN IP address is private to your internal network and is not visible to Internet.



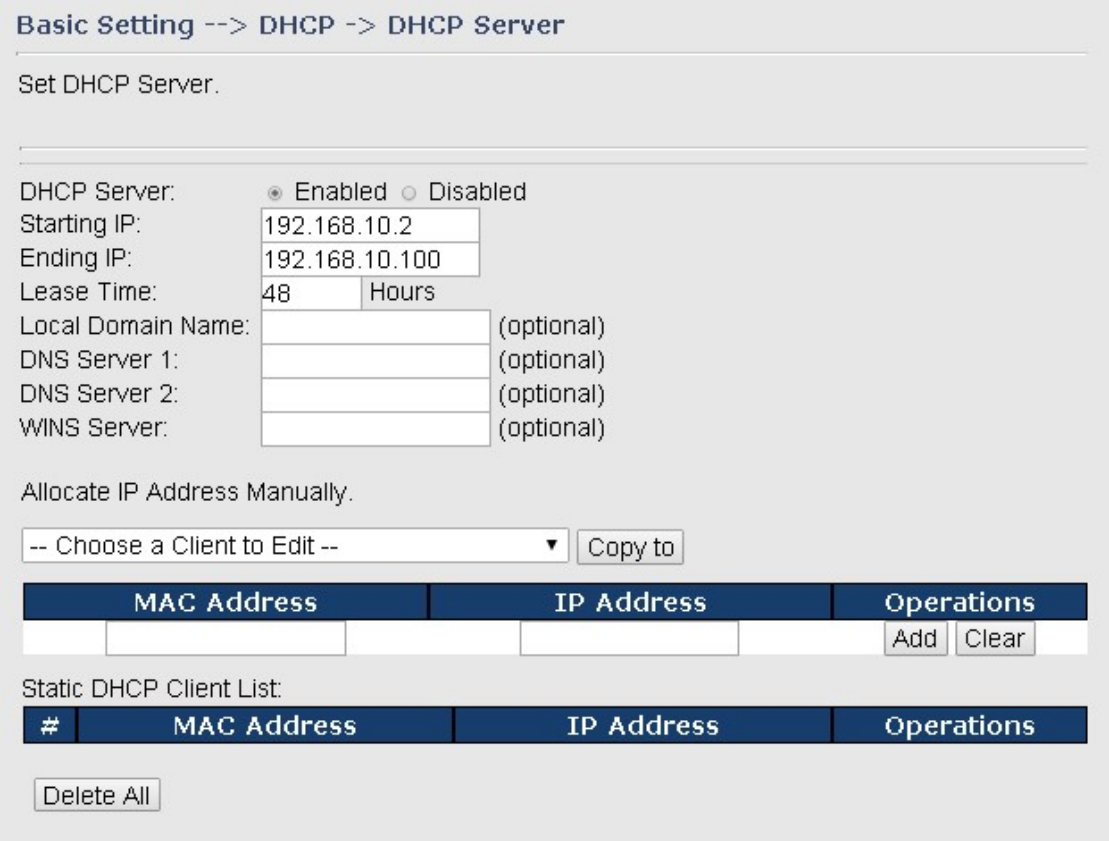
Label	Description
Router Name	Enter the name of your router
IP Address	The IP address of the LAN. The default value is **192.168.10.1**
Subnet Mask	The subnet mask of the LAN. The default value is **255.255.255.0**
LLDP Protocol	LLDP is a vendor-neutral protocol used by network devices for advertising their identity, capabilities, and neighbors on a LAN. You can enable or disable LLDP protocol.
Modbus TCP	Enabl/Disable Modbus TCP

DHCP

DHCP is a network protocol designed to allow devices connected to a network to communicate with each other using an IP address. The connection works in a client-server model, in which DHCP clients request an IP address from a DHCP server. The router comes with a built-in DHCP (Dynamic Host Control Protocol) server which assigns an IP address to a computer (DHCP client) on the LAN automatically. The router can also serve as a relay agent which will forward DHCP requests from DHCP clients to a DHCP server on the Internet.

The IP allocation provides one-to-one mapping of MAC address to IP address. When a computer with a MAC address requesting an IP address from the router, it will be assigned with the IP address according to the mapping. You can choose one from the client list and add it to the mapping list.

DHCP Server

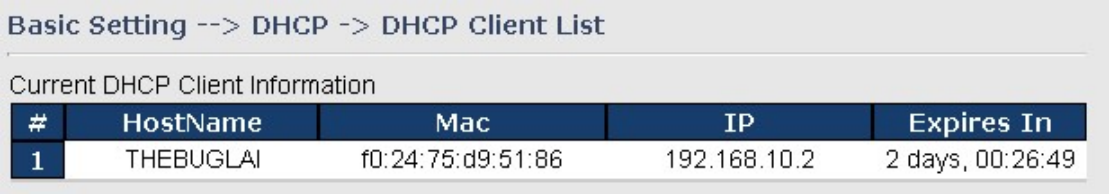


Label	Description
DHCP Server	Enables or disables the DHCP server function. The default setting is **Enabled**.
Starting IP	The starting IP address of the IP range assigned by the DHCP server
Ending IP	The ending IP address of the IP range assigned by the DHCP server
Lease Time	The period of time for the IP address to be leased. During the lease time, the DHCP server cannot assign that IP address to any other clients. Enter a number in the field. The default setting is 48 hours.
Local Domain Name	Enter the local domain name of a private network (optional)

DNS Server 1&2	Enter the IP address for the DNS server (optional)
WINS Server	Enter the WINS server (optional)
Allocate IP Address Manually	The IP Allocation section provides one-to-one mapping of MAC address to IP address. When a computer with the MAC address requests an IP from the router, it will be assigned with the IP address according to the mapping. You can choose one from the client list and add it to the mapping relationship.
Static DHCP Client List	The list shows the one-to-one relationship of the MAC address and IP address.

DHCP Client List

This page will show the DHCP client information including the host name, MAC address, IP address, and the expiration date of the address.

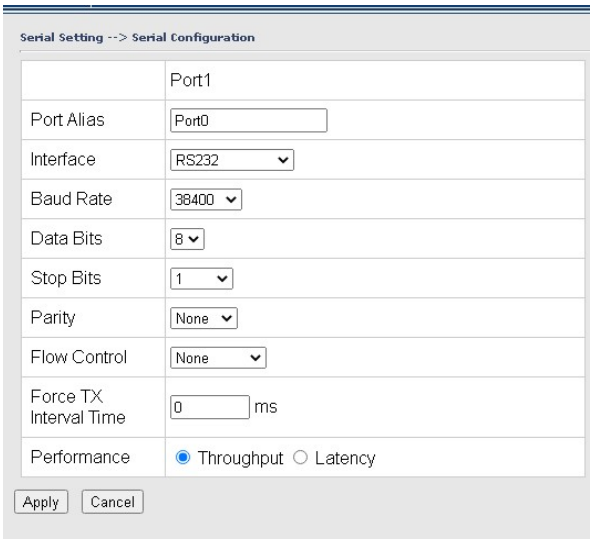


Serial setting.

1. Remote Management

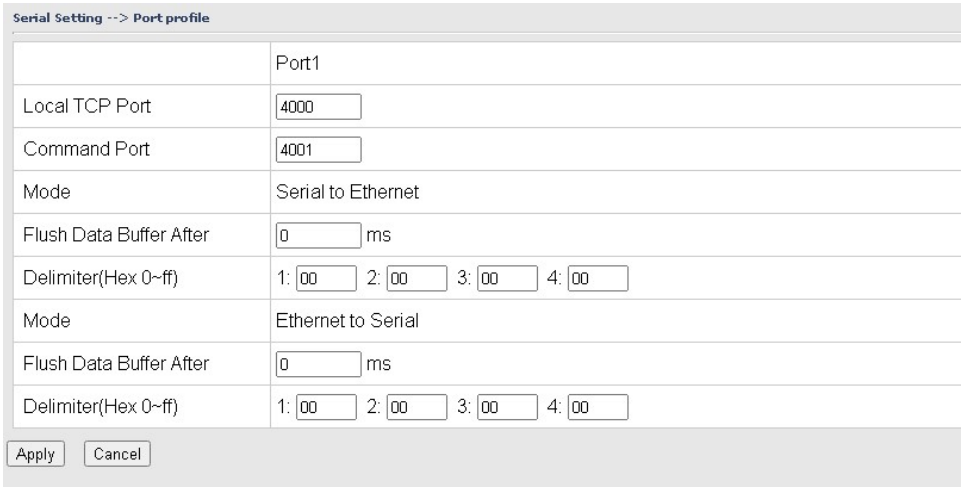
Label	Description
Remote Management	Enable to allow DS-tool to access M2M through WAN
Port External Access	Enable to allow the serial port to be access through WAN

2. Serial Configuration



Label	Description
Port Alias	Remark the port to hint the connected device.
Interface	RS232 / RS422 / RS485(2-wires) / RS485(4-wires)
Baud rate	110bps/300bps/1200bps/2400bps/4800bps/9600bps/19200bps/ 38400bps/57600bps/115200bps/230400bps
Data Bits	7, 8
Stop Bits	1, 2 (1.5)
Parity	No, Even, Odd, Mark, Space
Flow Control	No, XON/XOFF, RTS/CTS, DTR/DSR
Force TX Interval Time	Force TX interval time is to specify the timeout when no data has been transmitted. When the timeout is reached or TX buffer is full (4K Bytes), the queued data will be sent. 0 means disable. Factory default value is 0.
Performance	Throughput: This mode optimized for highest transmission speed. Latency: This mode optimized for shortest response time.
Apply	Activate settings on this page.

2. Port Profile

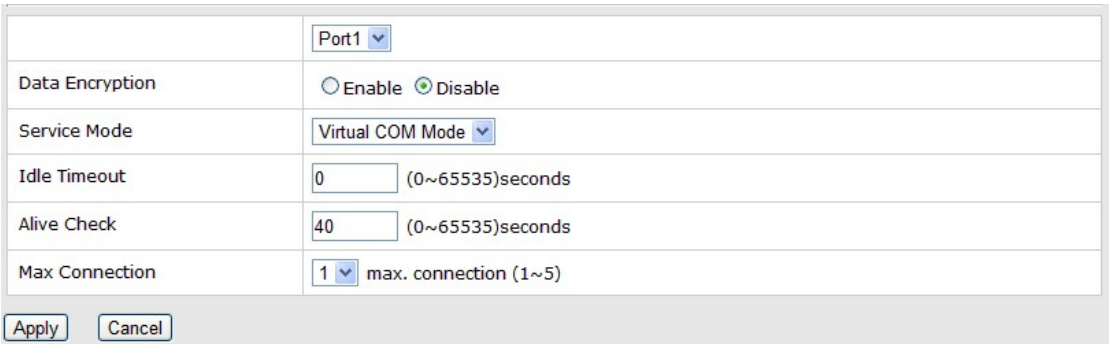


Label	Description
Serial to Ethernet	**Flush Data Buffer After:** The received data will be queued in the buffer until all the delimiters are matched. When the buffer is full (4K Bytes) or after "**flush S2E data buffer**" timeout, the data will also be sent. You can set the time from 0 to 65535 seconds. **Delimiter:** You can define max. 4 delimiters (00~FF, Hex) for each way. The data will be hold until the delimiters are received or the option "**Flush Serial to Ethernet data buffer**" times out. 0 means disable. Factory default is 0
Ethernet to serial	**Flush Data Buffer After:** The received data will be queued in the buffer until all the delimiters are matched. When the buffer is full (4K Bytes) or after "**flush E2S data buffer**" timeout, the data will also be sent. You can set the time from 0 to 65535 seconds. **Delimiter:** You can define max. 4 delimiters (00~FF, Hex) for each way. The data will be hold until the delimiters are received or the option "**Flush Ethernet to Serial data buffer**" times out. 0 means disable. Factory default is 0

3. Service Mode –– Virtual COM Mode

In Virtual COM Mode, the driver establishes a transparent connection

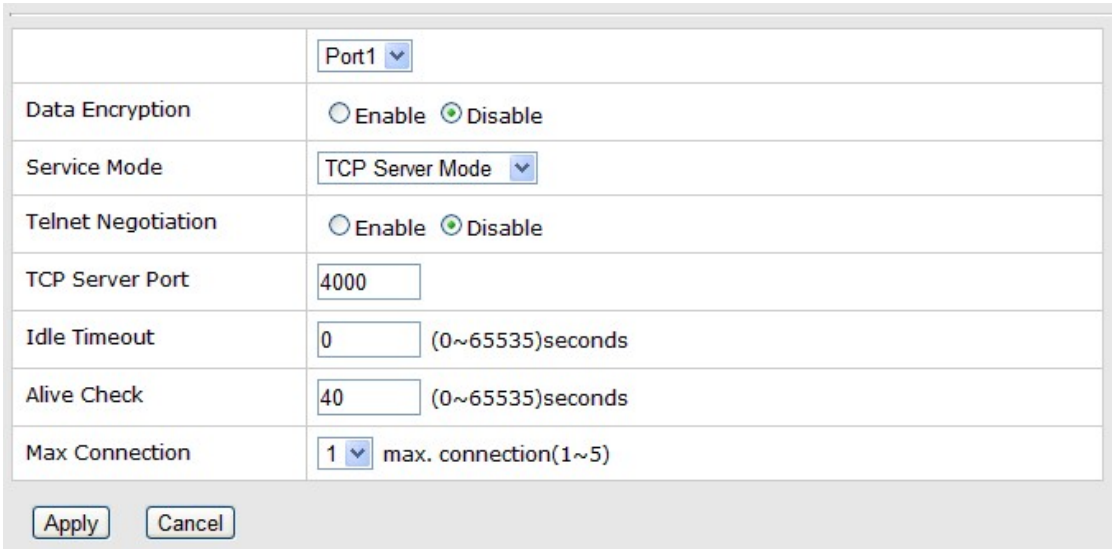
between host and serial device by mapping the Port of the serial server serial port to local COM port on the host computer. Virtual COM Mode also supports up to 5 simultaneous connections, so that multiple hosts can send or receive data by the same serial device at the same time.



Label	Description
Data Encryption	Use SSL to encrypt data.
Idle Timeout	When serial port stops data transmission for a defined period of time (Idle Timeout), the connection will be closed and the port will be freed and try to connect with other hosts. 0 indicate disable this function. Factory default value is 0. If Multilink is configured, only the first host connection is effective for this setting.
Alive Check	The serial device will send TCP alive-check package in each defined time interval (Alive Check) to remote host to check the TCP connection. If the TCP connection is not alive, the connection will be closed and the port will be freed. 0 indicate disable this function. Factory default is 0.
Max Connection	The number of Max connection can support simultaneous connections are 5, default values is 1.

**Not allowed to mapping Virtual COM from web*

4. Service Mode – TCP Server mode



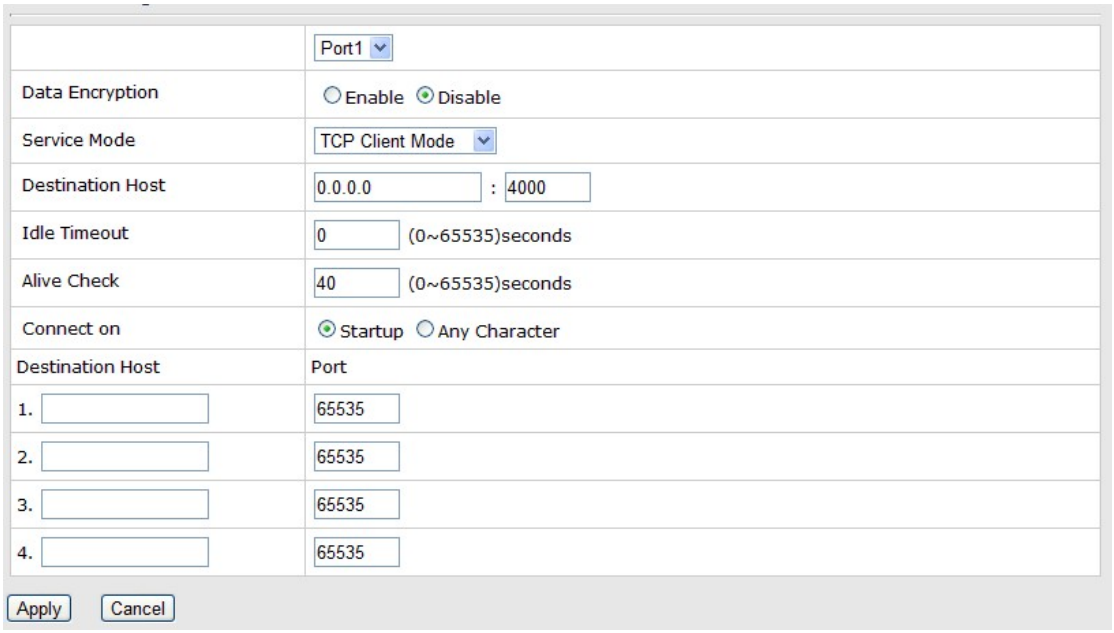
In TCP Server Mode, DS is configured with a unique Port combination on a TCP/IP network. In this case, DS waits passively to be contacted by the device. After the device establishes a connection with the serial device, it can then proceed with data transmission. TCP Server mode also supports up to 5 simultaneous connections, so that multiple device can receive data from the same serial device at the same time.

Label	Description
Data Encryption	Use SSL to encrypt data.
Telnet Negotiation	Full Telnet command / symbol compatible
TCP Server Port	Set the port number for data transmission.
Idle Timeout	When serial port stops data transmission for a defined period of time (Idle Timeout), the connection will be closed and the port will be freed and try to connect with other hosts. 0 indicate disable this function. Factory default value is 0. If Multilink is configured, only the first host connection is effective for this setting.
Alive Check	The serial device will send TCP alive-check package in each defined time interval (Alive Check) to remote host to check the TCP connection. If the TCP connection is not alive, the connection will be closed and the port will be freed. 0 indicate disable this function. Factory default is 0.
Max Connection	The number of Max connection can support simultaneous connections are 5, default values is 1.

5. Service Mode – TCP Client Mode

In TCP Client Mode, device can establish a TCP connection with

server by the method you set (Startup or any character). After the data has been transferred, device can disconnect automatically from the server by using the TCP alive check time or Idle timeout settings.

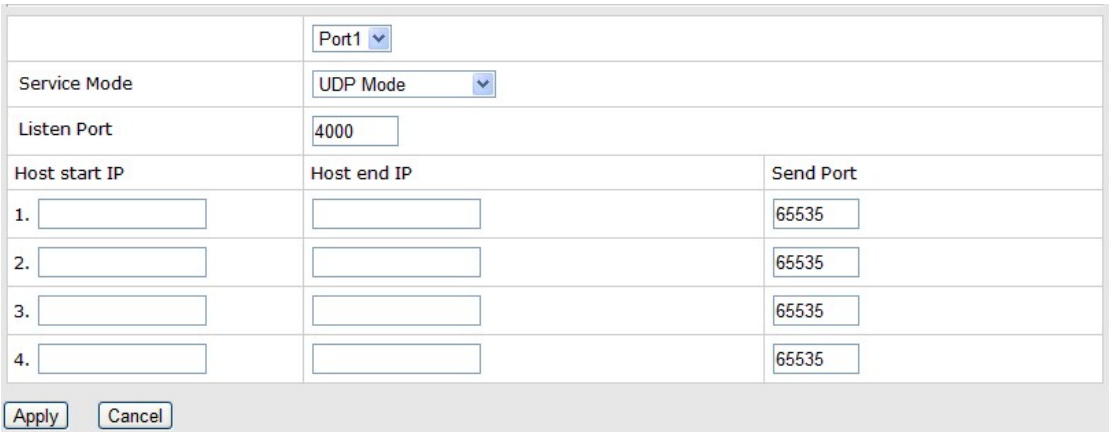


Label	Description
Data Encryption	Use SSL to encrypt data.
Destination Host	Set the IP address of host and the port number of data port. .
Idle Timeout	When serial port stops data transmission for a defined period of time (Idle Timeout), the connection will be closed and the port will be freed and try to connect with other hosts. 0 indicate disable this function. Factory default value is 0. If Multilink is configured, only the first host connection is effective for this setting.
Alive Check	The serial device will send TCP alive-check package in each defined time interval (Alive Check) to remote host to check the TCP connection. If the TCP connection is not alive, the connection will be closed and the port will be freed. 0 indicate disable this function. Factory default is 0.
Connect on Startup	The TCP Client will build TCP connection once the connected serial device is started.
Connect on Any Character	The TCP Client will build TCP connection once the connected serial device starts to send data.

6. Service Mode – UDP Mode

Compared to TCP communication, UDP is faster and more efficient.

In UDP mode, you can Uni-cast or Multi-cast data from the serial device server to host computers, and the serial device can also receive data from one or multiple host



DDNS

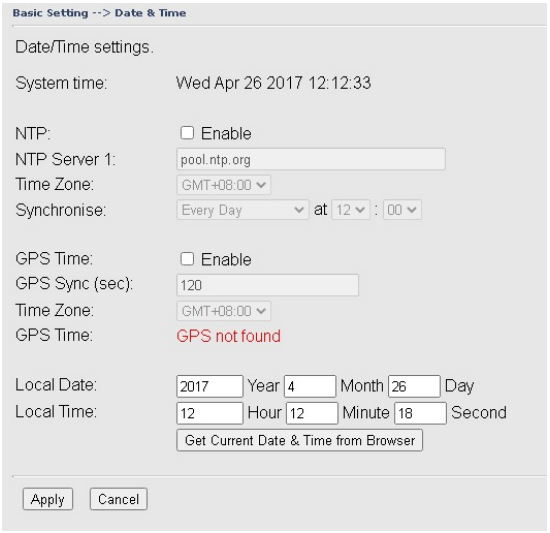
DDNS (Dynamic Domain Name System) allows you to configure a domain name for your IP address which is dynamically assigned by your ISP. Therefore, you can use a static domain name that always points to the current dynamic IP address.

Label	Description
DDNS Service	Choose a DDNS service provider from the list
User Name	Enter the user name of your DDNS account
Password	Enter the password of your DDNS account
Domain	Enter the domain name provided by your dynamic DNS service provider

Date & Time

In this page, you can set the date & time of the device. A correct date and time will help the system log events. You can set up a NTP (Network Time Protocol) client to synchronize date

& time with a NTP server on the Internet.



Label	Description
NTP	Enables or disables NTP function
NTP Server 1	The primary NTP server
Time Zone	Select the time zone you are located in
Synchronize	Specify the scheduled time for synchronization
GPS Time	Enable /Disable GPS Time sync
GPS Sync (sec)	GPS sync timer
GPS Time zone	Select the time zone you are located in
Local Date	Set a local date manually
Local Time	Set a local time manually

5.2.3 Open Gateway-Inside

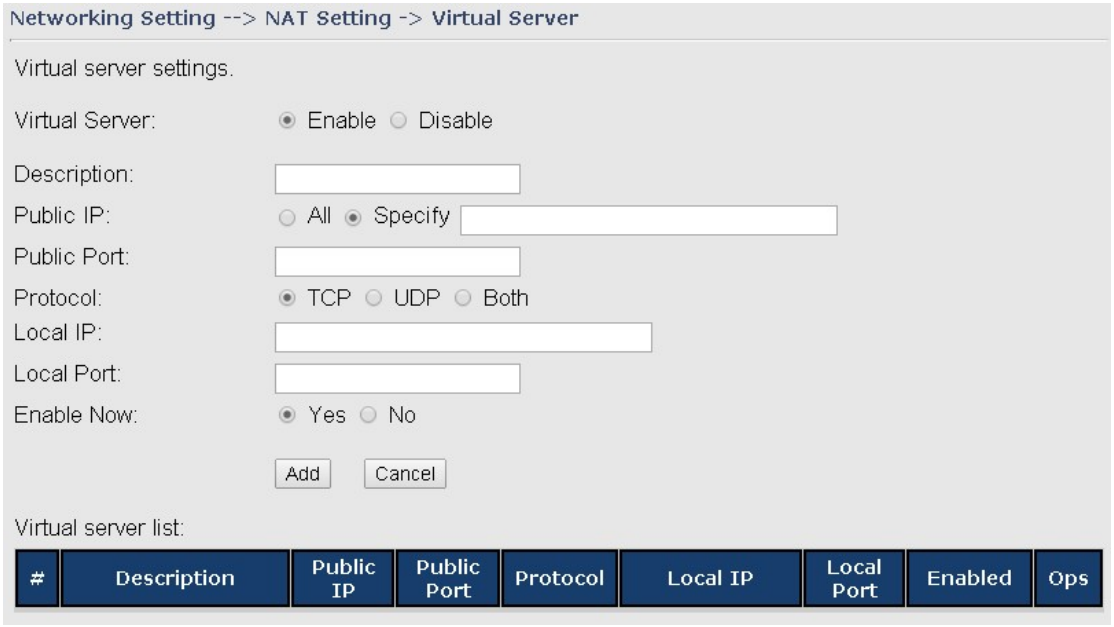
Please refer to Open Gateway User Manual for this feature.

5.2.4 Networking Setting

NAT Setting

Virtual Server

This page allows you to set up virtual server setting. A virtual server allows Internet users to access services on your LAN. This is a useful function if you host services online such as FTP, Web or game servers. A public port must be defined for the virtual server on your router in order to redirect traffic to an internal LAN IP address and LAN port. Any PC used as a virtual server must have a static or reserved IP address.



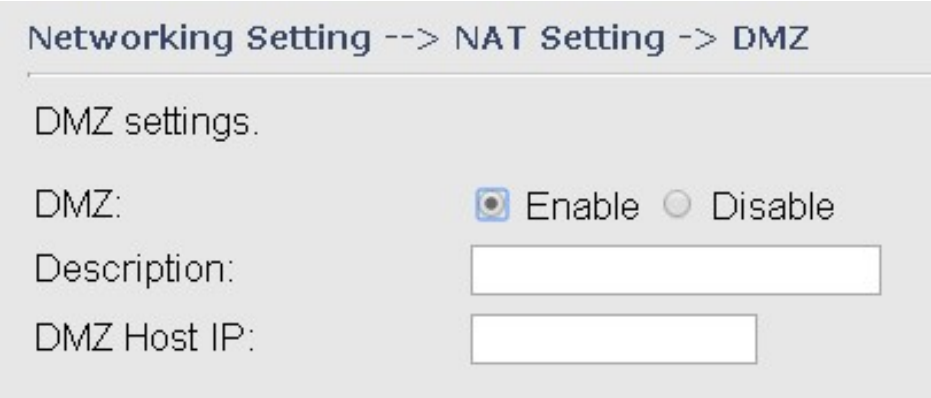
Label	Description
Virtual Server	Select **Enabled** or **Disabled** to activate or deactivate virtual server
Description	Enter the description of the entry. Acceptable characters are 0-9, a-z, and A-Z. A null value is allowed.
Public IP	Enter a public IP allowed to access the virtual service. If not specified, choose **All**.
Public Port	The port number to be used to access the virtual service on the WAN (Wide Area Network)
Protocol	The protocol used for the virtual service
Local IP	The IP address of the computer that will provide virtual service
Local Port	The port number of the service used by the private IP computer
Enable Now	Enables the virtual server entry after adding it
Virtual server list	Click **Edit** to edit the virtual service entry and **Del** to delete the entry.

DMZ

DMZ (Demilitarized Zone) allows a computer to be exposed to the Internet without passing through the security settings and therefore is unsecured. This feature is useful for special purposes such as gaming.

To use this function, you need to set an internal computer as the DMZ host by entering its IP address. Adding a client to the DMZ may expose your local network to a variety of security

risks, so use this function carefully.



Label	Description
DMZ	Enables or disables DMZ
Description	Enter a description for the DMZ host entry
DMZ Host IP	Enter the IP address of the computer to act as the DMZ host

UPnP

The UPnP (Universal Plug and Play) feature allows Internet devices to access local host resources or devices as needed. UPnP-enabled devices can be automatically discovered by the UPnP service application on the LAN.

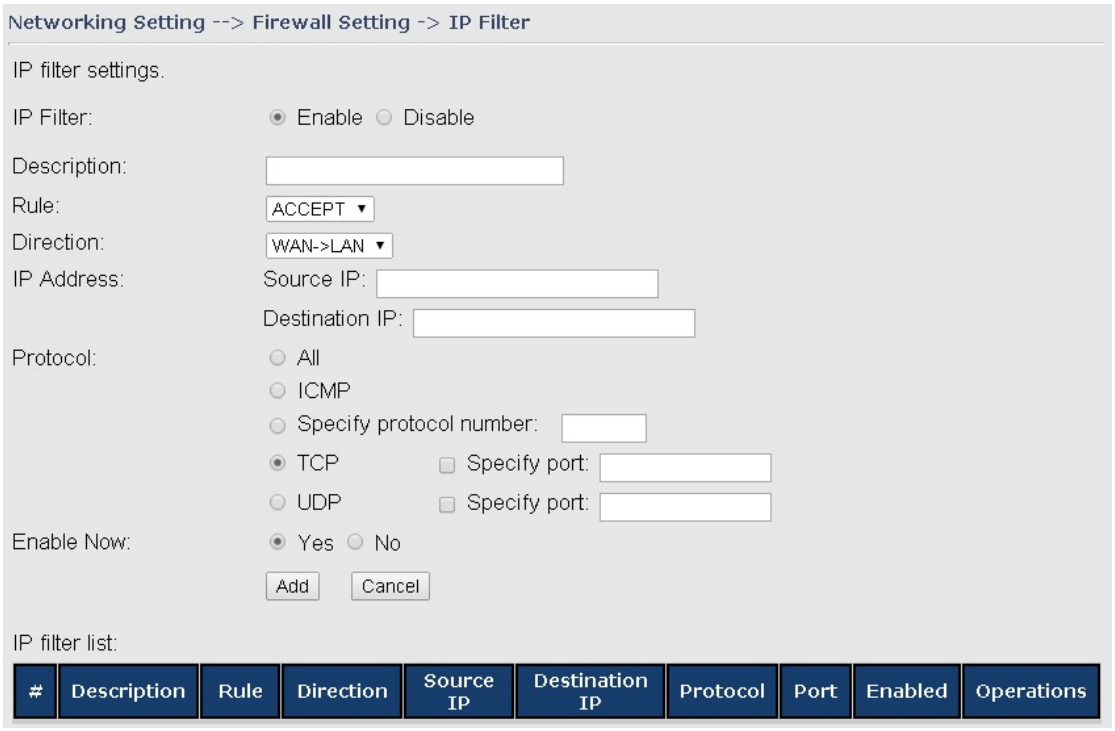
Label	Description
UPnP	Enable or disable UPnP.
Enable NAT-PMP	NAT-PMP allows a computer in a private network (behind a NAT router) to automatically configure the router to allow parties outside the private network to contact with each other. NAT-PMP operates with UDP. It essentially automates the process of port forwarding. Check the box to enable NAT-PMP.
UPnP List	This table lists the current auto port forwarding information. **Application**: The application that generates this port

	forwarding. **Ext Port**: The port opened on WAN **Protocol**: The protocol type **Int Port**: The port redirected to the local computer **IP Address**: The IP address of local computer to be redirected to

Firewall Setting

IP Filter

IP filters enable you to control the forwarding of incoming and outgoing data between your LAN and the Internet and within your LAN. This control is implemented via IP filter rules which are defined to block attempts by certain computers on your LAN to access certain types of data or Internet locations. You can also block incoming access to computers on your LAN.

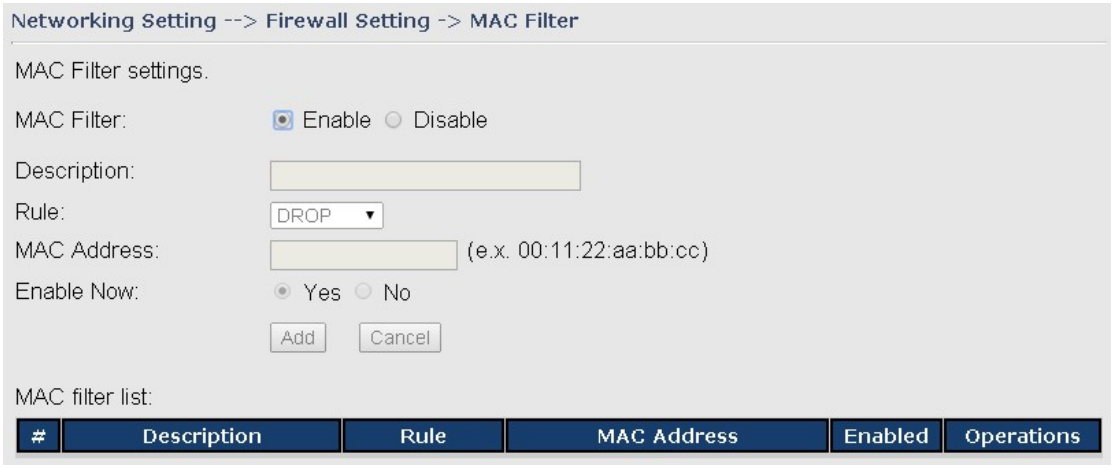


Label	Description
IP Filter	Enables or disables the IP Filter
Description	Enter description for the entry.
Rule	Configures the rules to be applied to the IP filter. Available options include **DROP**, **ACCEPT**, and **REJECT.**
Direction	Specifies the direction of data flow to be filtered
IP Address	Enter the IP address of the source and destination computer

Protocol	Configures the protocol to be filtered
Enable Now	Click **Yes** to enable the entry after adding it
IP filter list	Shows the information of all IP filters. Click **Edit** to edit the entry or **Del** to delete the entry.

MAC Filter

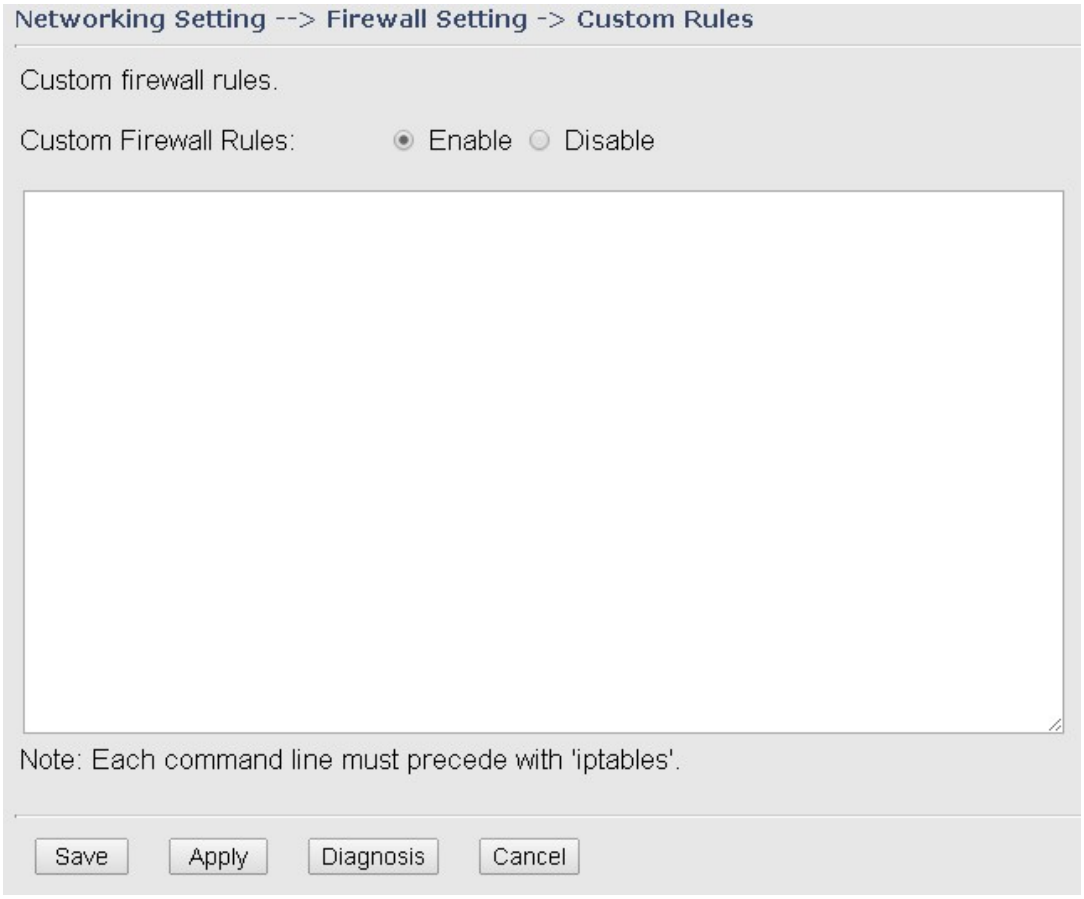
This page enables you to deny or allow LAN computers to access the Internet based on their MAC addresses.



Label	Description
MAC Filter	Enables or disables the MAC Filter
Description	Enter description for the entry
Rule	Configures the rules to be applied to the MAC filter. Available options include **DROP**, **ACCEPT**, and **REJECT.**
MAC Address	Enter the MAC address to be filtered
Enable Now	Click **Yes** to enable the entry after adding it
MAC filter list	Shows the information of all MAC filters. Click **Edit** to edit the entry or **Del** to delete the entry.

Custom Rules

Custom firewall rules provide more granular access control beyond LAN isolation. Firewall rules are evaluated from top to bottom. The first rule that matches is applied, and subsequent rules are not evaluated. If no rules match, the default rule (allow all traffic) is applied.



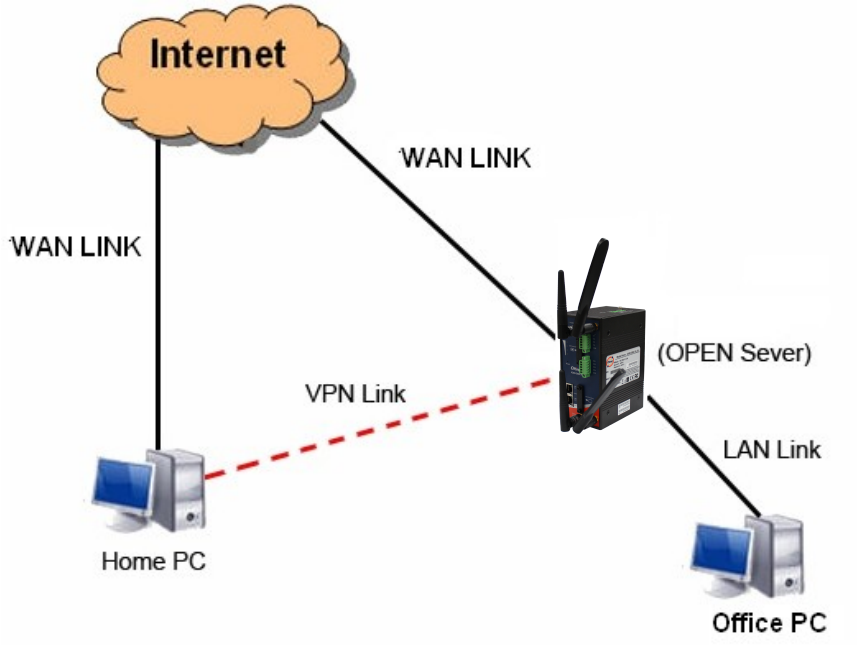
VPN Setting

OpenVPN

A VPN is a method of linking two locations as if they are on a local private network to facilitate data transmission and ensure data security. The links between the locations are known as tunnels. VPN can achieve confidentiality, authentication, and integrity of data by utilizing encapsulation protocols, encryption algorithms, and hashing algorithms.

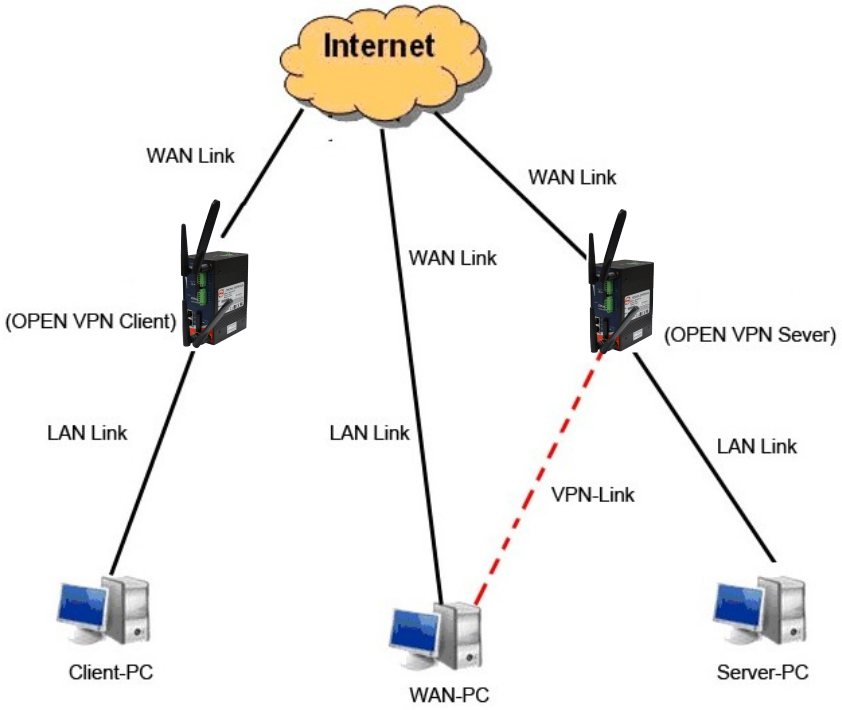
Open VPN enables you to easily set up a virtual private network over an encrypted connection. It is a full-function SSL VPN solution which accommodates a wide range of configurations including remote access, site-to-site VPNs, WiFi security, and enterprise-level remote access with load balancing, failover, and fine-grained access control features.

To set up your router as an Open VPN server, you need to install openvpn client software for your Windows-based PC. You can download it from http://openvpn.net/download.html#stablel. The software version must match the current version of Openvpn used by the router which is version 2.0.9.

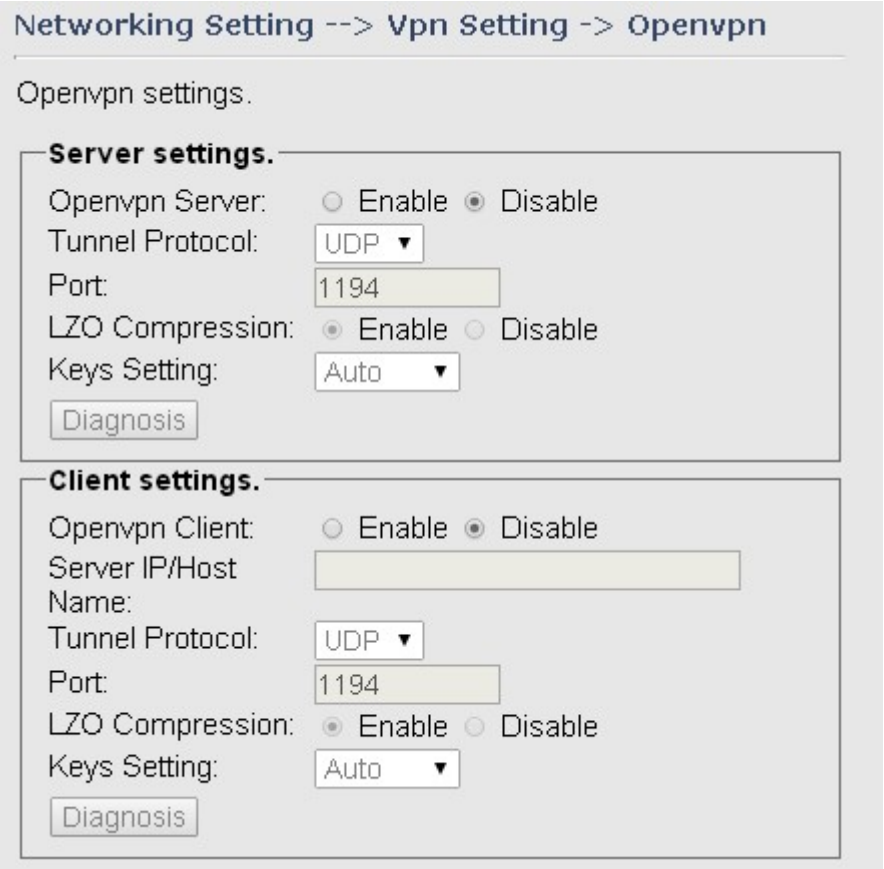


Connection to Open VPN Server

When you enable Open VPN Client, you need two routers to create site-to-site VPN connections. The server IP and client IP address should be within the same network domain.



Open VPN Server and Client Connection



Label	Description
Openvpn Server	Enables or disables the function of Open VPN server
Tunnel Protocol	Select **UDP** or **TCP** protocol depending on your needs. TCP is more reliable than UDP, but UDP performs better than TCP. It is recommended to use UDP if the distance between VPN server and client is short; otherwise, use TCP.
Port	The number of the port (default is **1194**).
LZO Compression	Enables or disables the function of LZO Compression
Keys Setting	Select **Auto** to use preset certificates or **Manual** to use your certificates. Please install openvpn client software to generate your certificates and paste them here. For more information, please visit openvpn website.
Openvpn Client	Enables or disables the function of Open VPN client.
Server IP/Host Name	Enter the Open VPN server IP address
Tunnel Protocol	Select **UDP** or **TCP** protocol depending on your needs. TCP is more reliable than UDP, but UDP performs better than TCP. It is recommended to use UDP if the distance between

	VPN server and client is short; otherwise, use TCP.
Port	The number of the port (default is **1194**).
LZO Compression	Enables or disables the LZO Compression
Keys Setting	Select **Auto** to use preset certificates or **Manual** to use your certificates. Please install openvpn client software to generate your certificates and paste them here. For more information, please visit openvpn website.

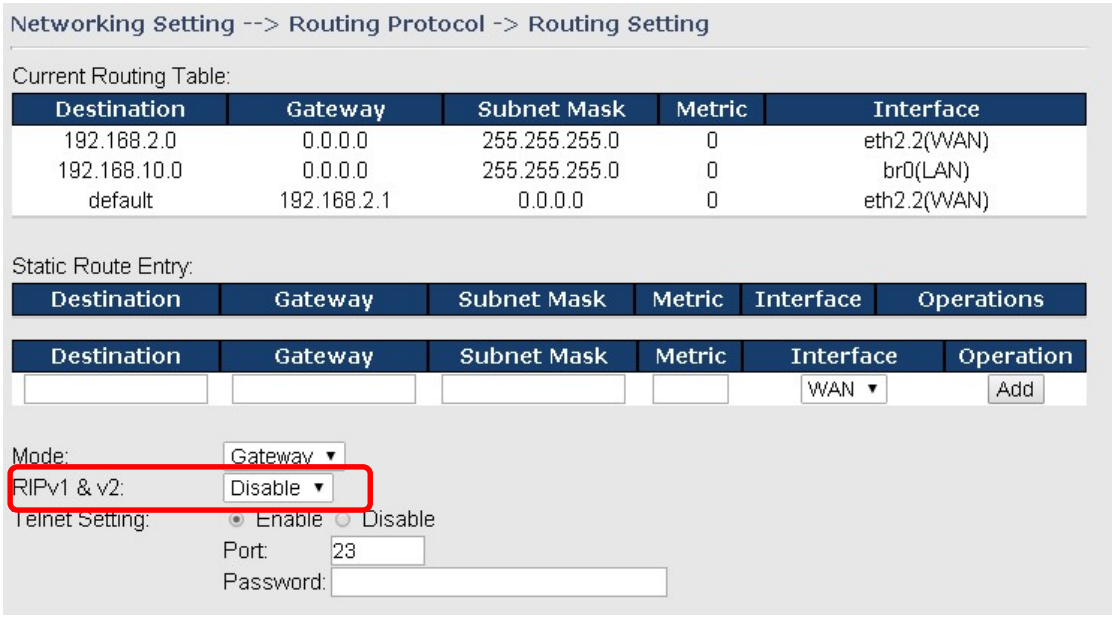
Routing Protocol

Routing Setting

This page shows the information of the routing table. You can configure static and dynamic routing settings in this page.

Static Routing

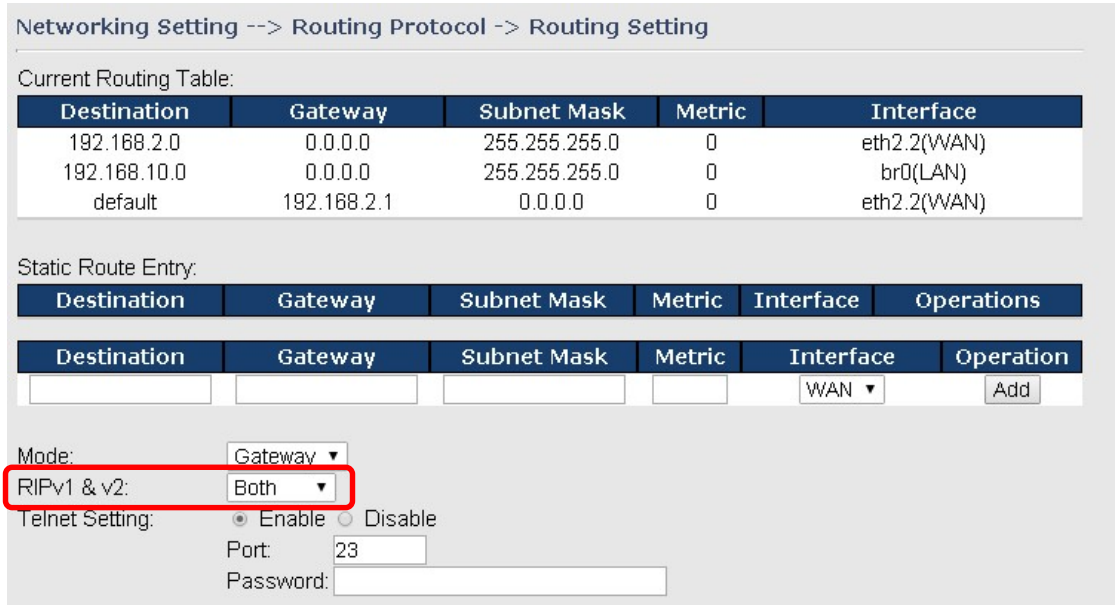
When RIPv1 & v2 is **Disabled**, the router will operate in static routing mode, which means routers forward packets using either route information from route table entries that you manually configure or the route information that is calculated using dynamic routing algorithms.



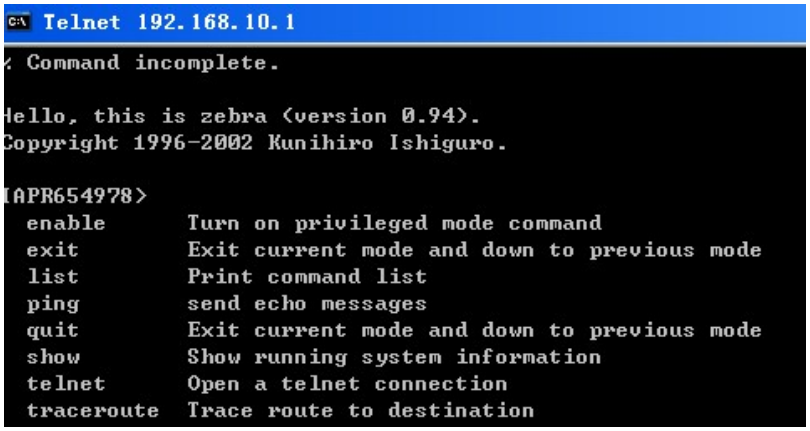
Dynamic Routing

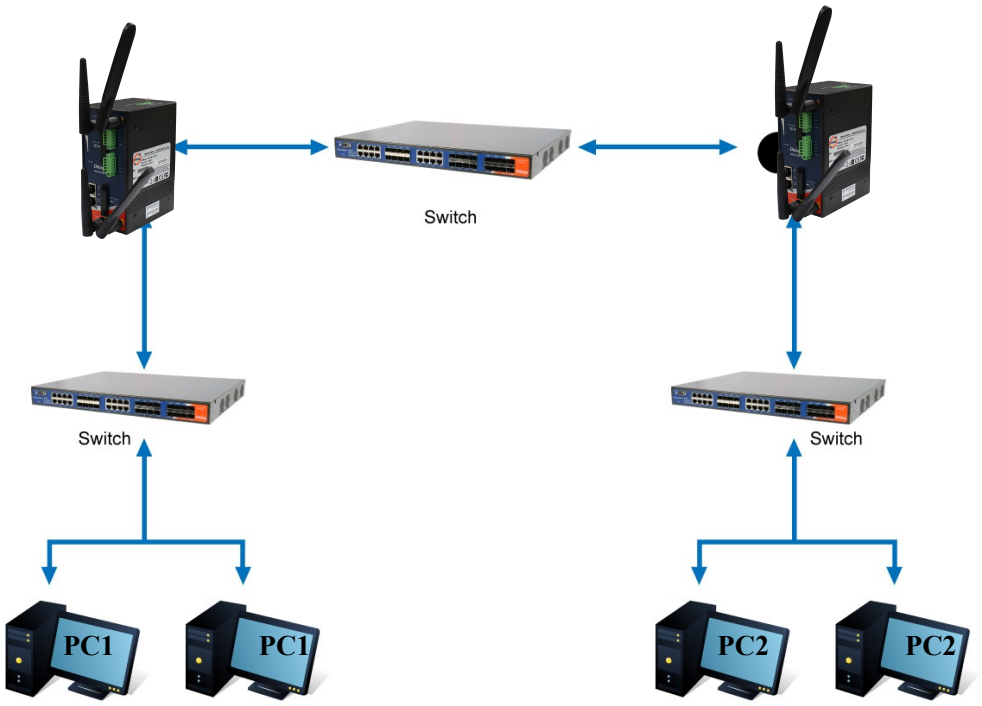
Dynamic routing lets routing tables in routers change as the routes change. If the best path to a destination cannot be used, dynamic routing protocols change routing tables when necessary to keep your network traffic moving. Dynamic routing protocols include RIP, OSPF, and BGP; however, the device only supports RIP (Routing Information Protocol).

Do not choose **Disable** in the RIPv1 & v2 list if you want to enable Dynamic Routing. After clicking **Apply**, more information will be displayed in Current Routing Table.



Label	Description
Current Routing Table	Shows all routing information, including static and dynamic routing (if enabled)
Static Route Entry	Fills in corresponding information to add new entries to the static routing tablet
Mode	Choose **Gateway Mode** if you want PCs in the LAN to visit external network, otherwise choose **Router Mode**
RIPv1 &v2	Choose **Disable** to disable dynamic routing or other options to configure the interfaces for dynamic routing
Telnet Setting	This option is only available when dynamic routing is enabled. It allows you to make detailed configurations via simple comments.





Routing Topography

5.2.5 System Tools

Login Setting

You can change login name and password in page. The default login name and password are both **admin**.

Label	Description
Old Name	Type in current login name
Old Password	Type in current password
New Name	Enter a new login name. Acceptable characters contain '0-9', 'a-z', 'A-Z' and the length must be 1 to 15 characters. An empty name is not acceptable.
New Password	Enter a new login password. Length must be 0 to 22 characters.
Confirm New Password	Retype the new password to confirm it.
Web Protocol	Choose a web management page protocol from **HTTP** and **HTTPS**. HTTPS (HTTP over SSL) encrypts data sent and received over the Web. Choose HTTPS if you want a secure connection.
Port	Choose a web management page port number. For HTTP, default port is 80. For HTTPS, default port is 443.

Router Restart

This page allows you to configure restart settings for the router.

Label	Description
Restart Now	Click to restart the router via warm reset
Scheduling	**Enable**: check to activate the setting Restart at: specify the time for resetting the router. You can configure the action to be performed periodically.

Firmware Upgrade

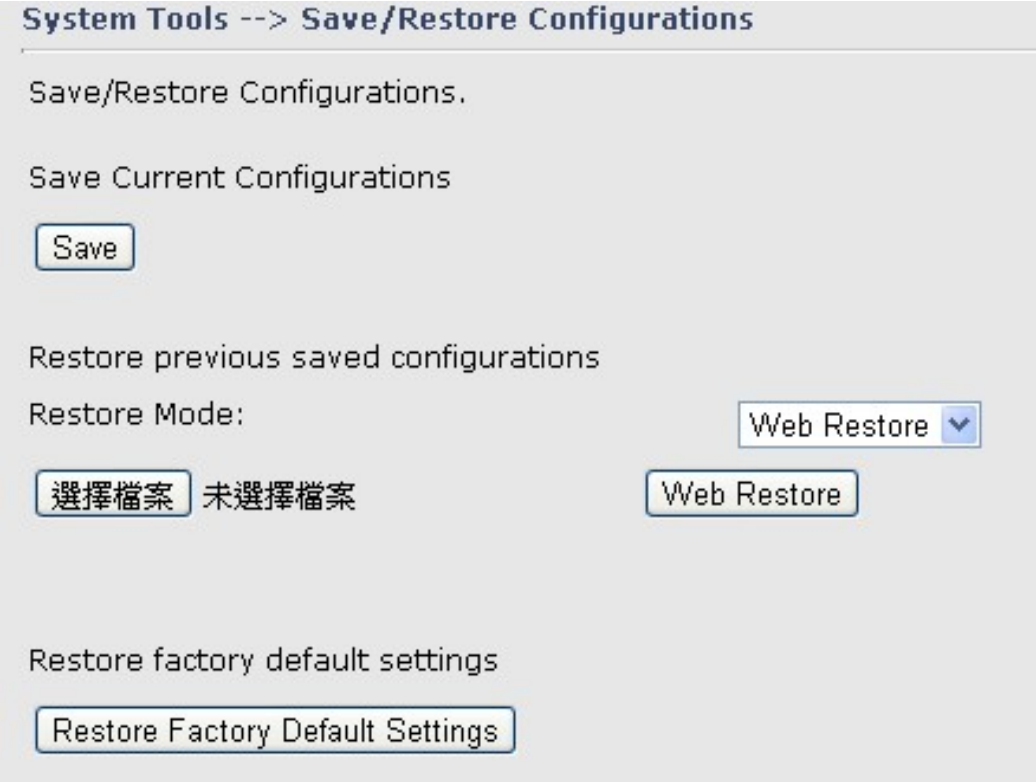
ORing launches new firmware constantly to enhance router performance and functions. To upgrade firmware, download new firmware from ORing's website to your PC and install it via Web upgrade. Make sure the firmware file matches the model of your router. It will take

several minutes to upload and update the firmware. After upgrade completes successfully, reboot the router.

During firmware upgrading, do not turn off the power of the router or press the reset button.

Save/Restore Configurations

This page allows you to save configurations or return settings to previous status. You can download the configuration file from the Web. Note: users using old versions of Internet Explorer may have to click on the warning on top of the browser and choose Download File.

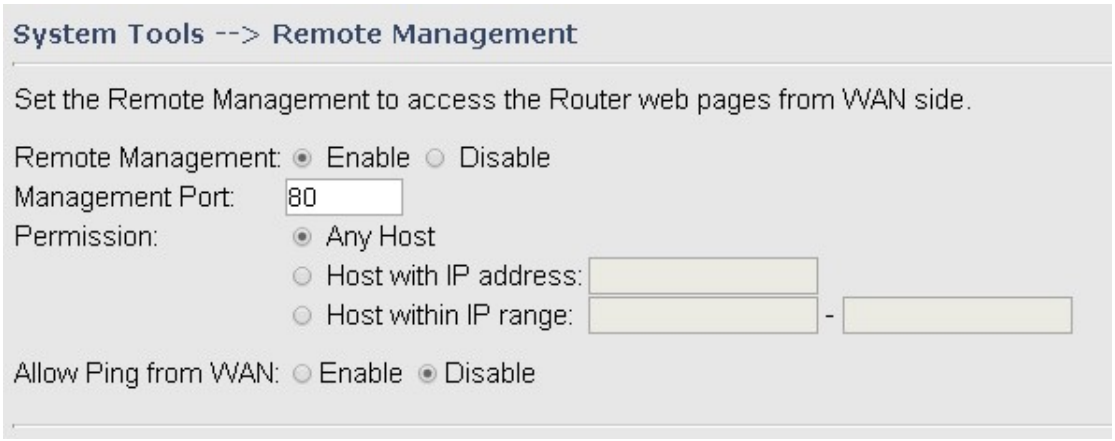


Label	Description

Save	Click to save existing configurations as a file for future usage.
Select File	You can restore configurations to previous status by installing a previous configuration file. To do this, choose **Web Restore** or **Tftp Restore**. If you choose **Web Restore**, you need to choose a file and click **Web Restore**. If you selet **Tftp Restore**, fill in a Tftp server IP address and the file name before clicking **Tftp Restore**.
Restore Factory Default Setting	Click to reset the router to the factory settings. The router will reboot to validate the default settings.

Remote Management

The page allows you to configure remote management settings.

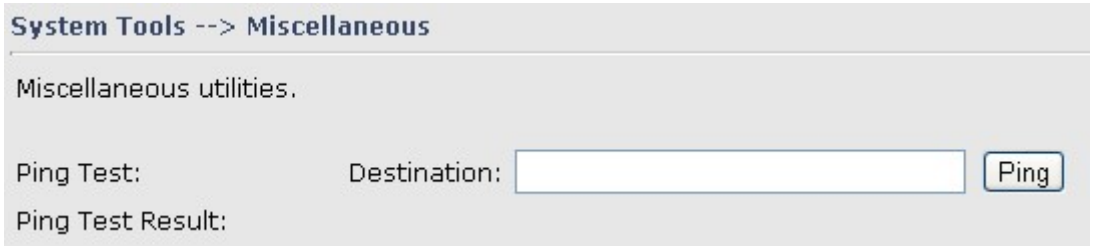


Label	Description
Remote Management	Enables or disables remote management function
Management Port	Enter the port number that will be open to outside access. This port must be used when you establish a remote connection.
Permission	You can grant remote access to specific users. Tick **Any Host** or enter a hostname or IP address if you only want a specific computer or device to be able to access the device.
Allow Ping from WAN	Click Enable to allow system administrator to ping the router from WAN interface

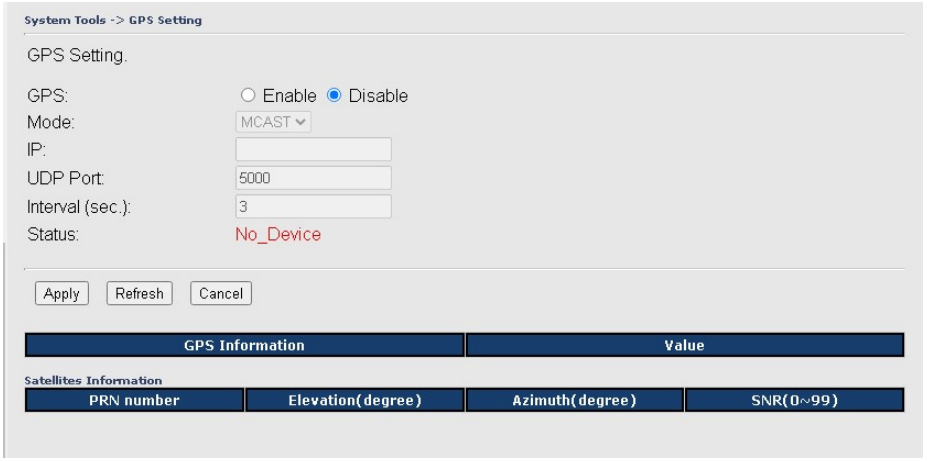
Miscellaneous

This page enables you to run ping test which will send out ping packets to test if a computer

is on the Internet or if the WAN connection is OK. Enter a domain name or IP address in the destination box and click **Ping** to test.



GPS Setting

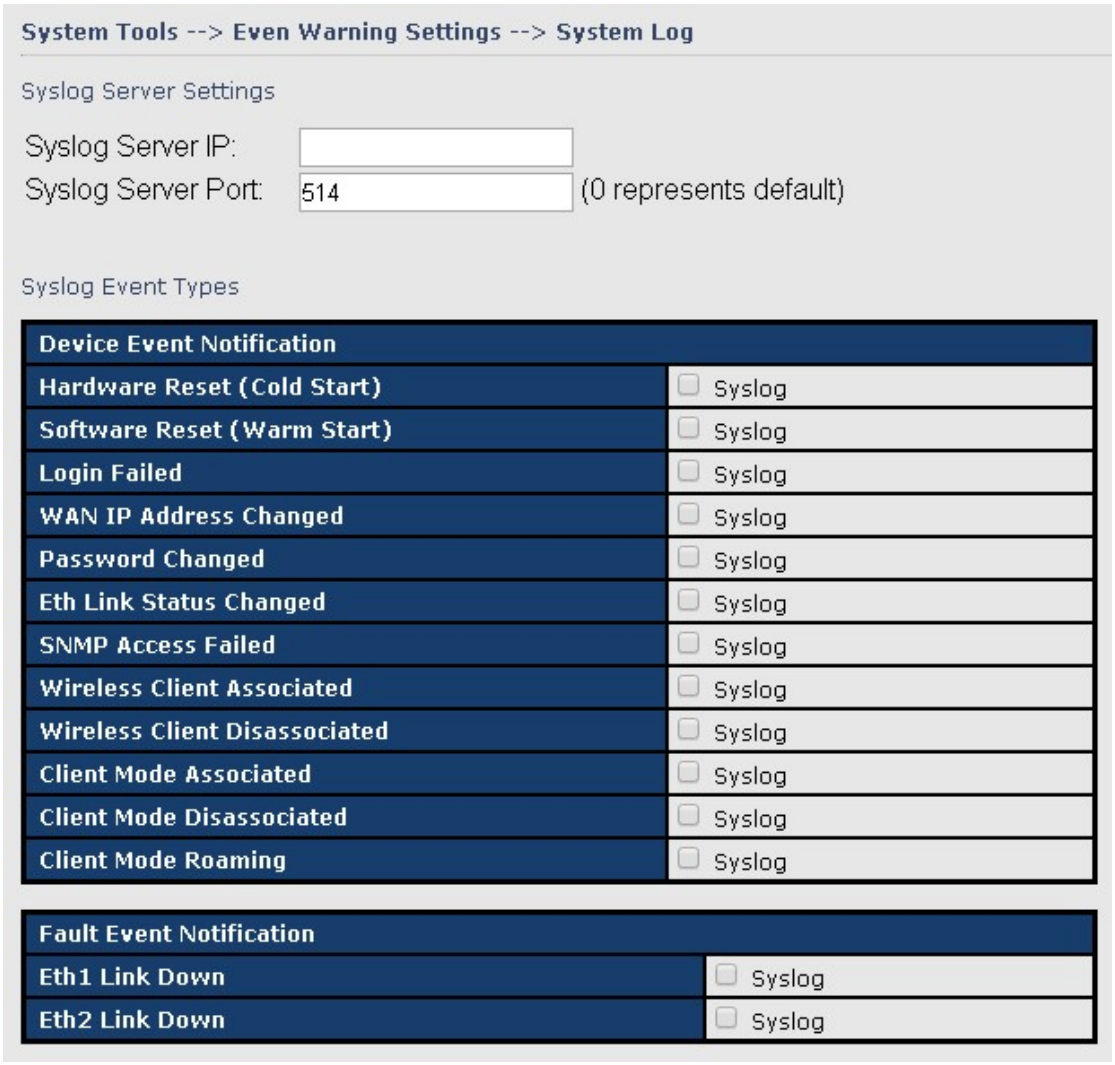


Label	Description
GPS	Enable/Disable GPS
Mode	Select the GPS sync mode MCAST or UCAST
IP	Setup the IP Address
UDP Port	Setup the UDP port to use
Interval (sec)	Setup the interval (sec) timer.

Event Warning Setting

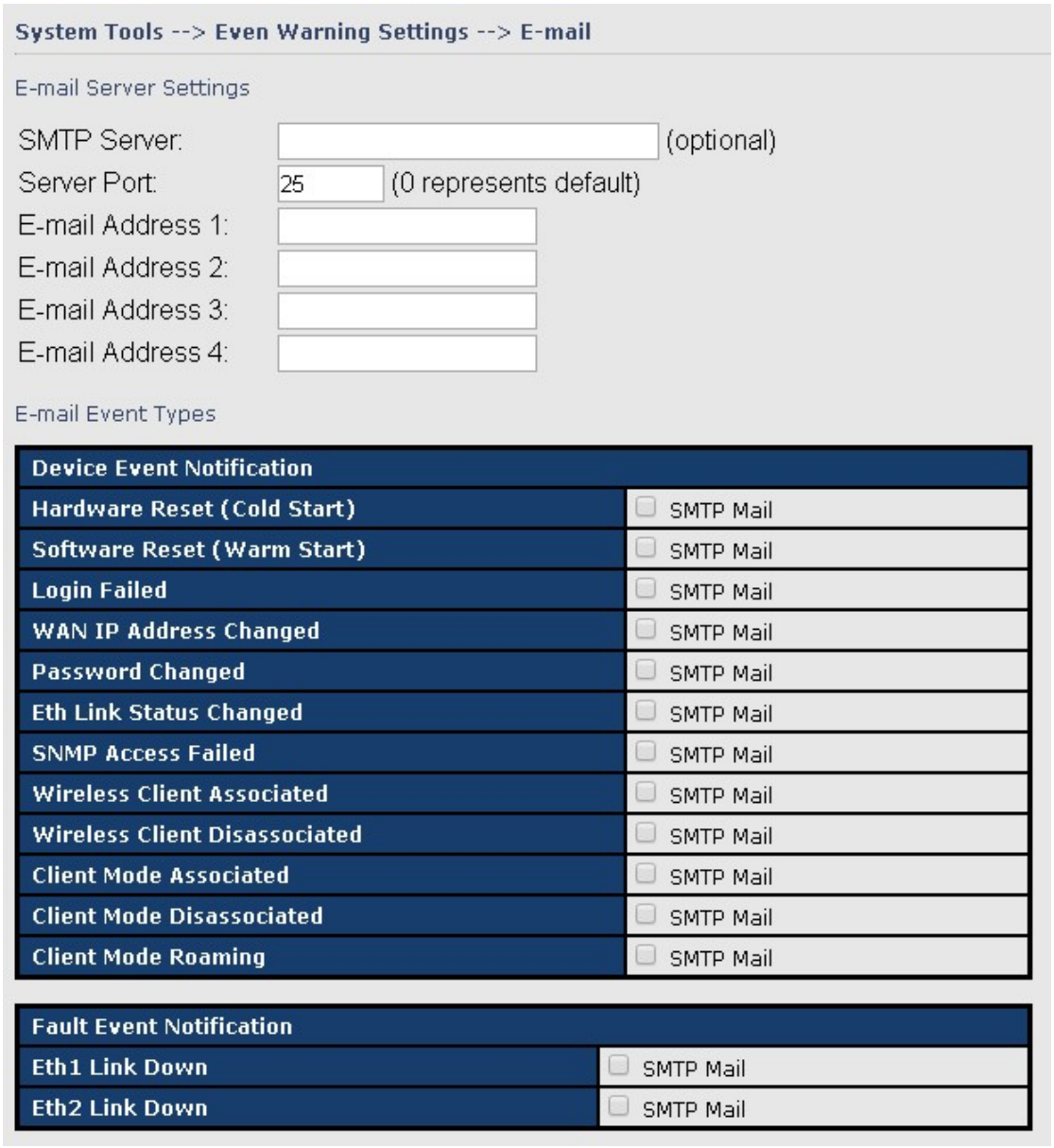
When an error occurs, the device will notify you through system log, and SNMP messages. You can configure the system to issue a notification when specific events occur by checking the box next to the event.

Syslog Server Settings



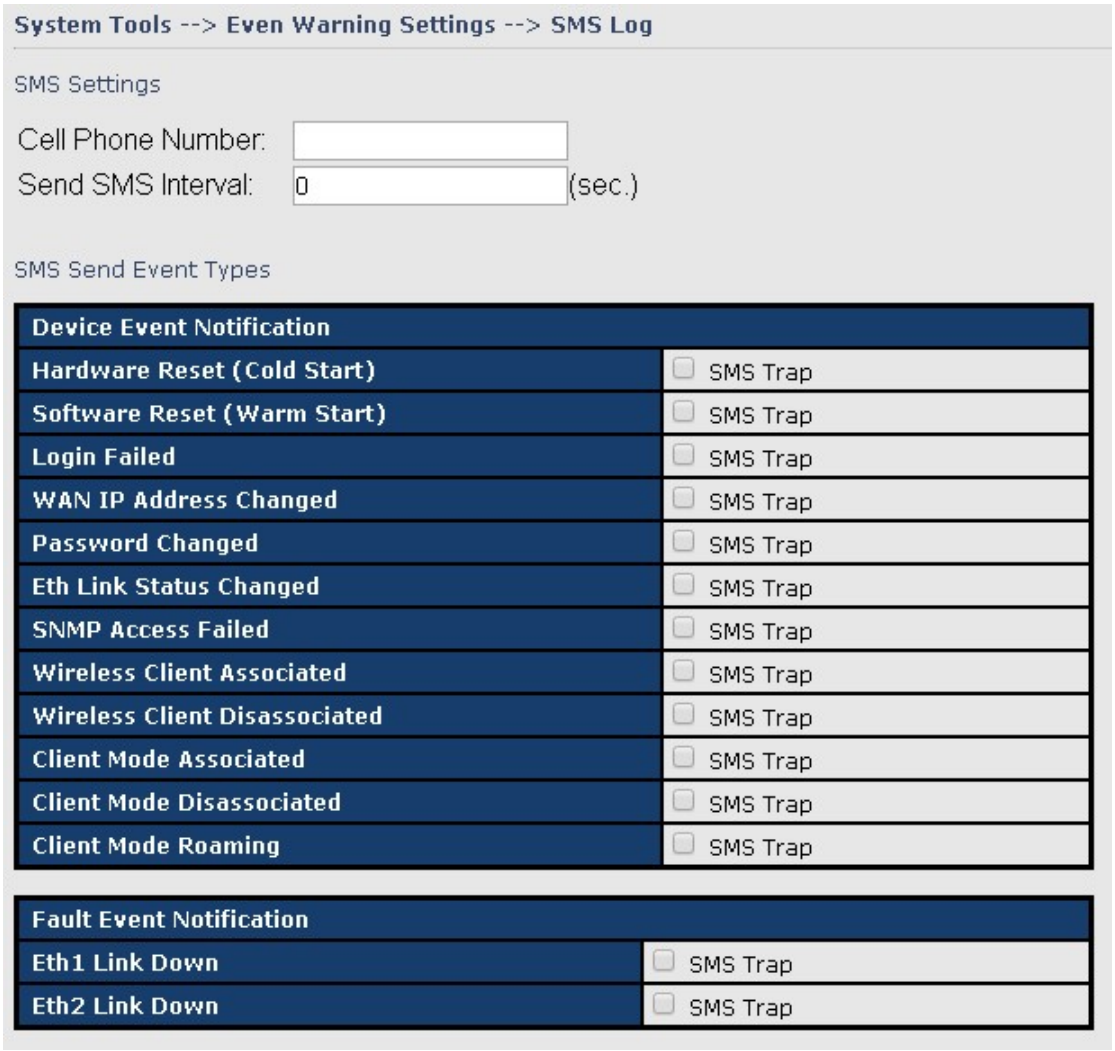
Label	Description
Syslog Server IP	Enter the IP address of a remote server if you want the logs to be stored remotely. Leave it blank will disable remote syslog.
Syslog Server Port	Specifies the port to be logged remotely. Default port is 514.

E-Mail



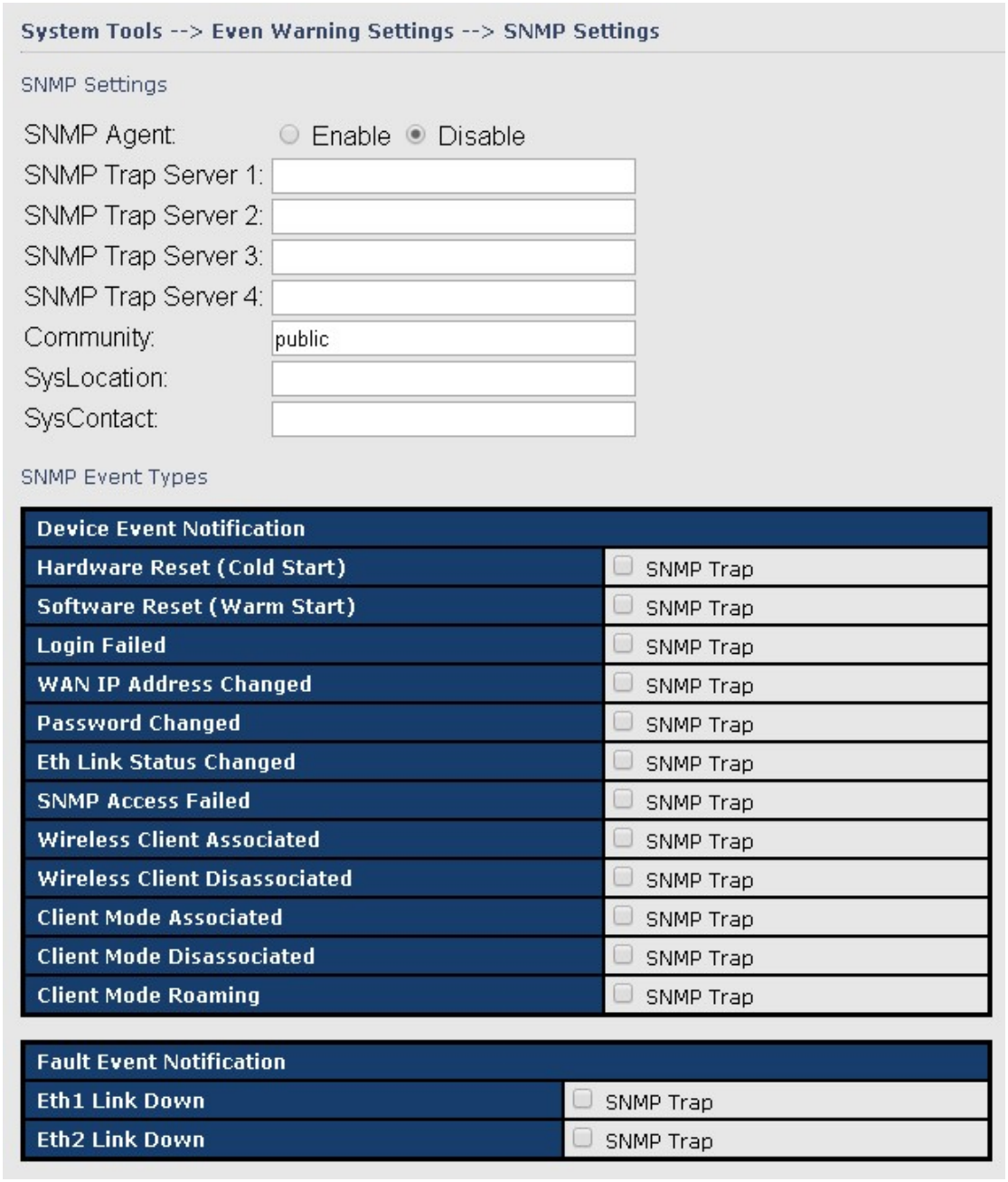
Label	Description
SMTP Server	Enter a backup host to be used when the primary host is unavailable.
Server Port	Specifies the port where MTA can be contacted via SMTP server
E-mail Address 1-4	Enter the mail address that will receive notifications

SMS



Label	Description
Cell Phone Number	Set Cell Phone Number.
Send SMS Interval	Set send interval

SNMP Settings



Label	Description
SNMP Agent	SNMP (Simple Network Management Protocol) Agent is a service program that runs on the access point. The agent provides management information to the NMS by keeping track of various operational aspects of the AP system. You can enable or disable the function.
SNMP Trap Server 1-4	Enter the IP address of the SNMP server which will send out traps generated by the AP.

Community	Community is a password to establish trust between managers and agents. Normally, **public** is used for read-write community.
SysLocation	Specifies sysLocation string
SysContact	Specifies sysContact string

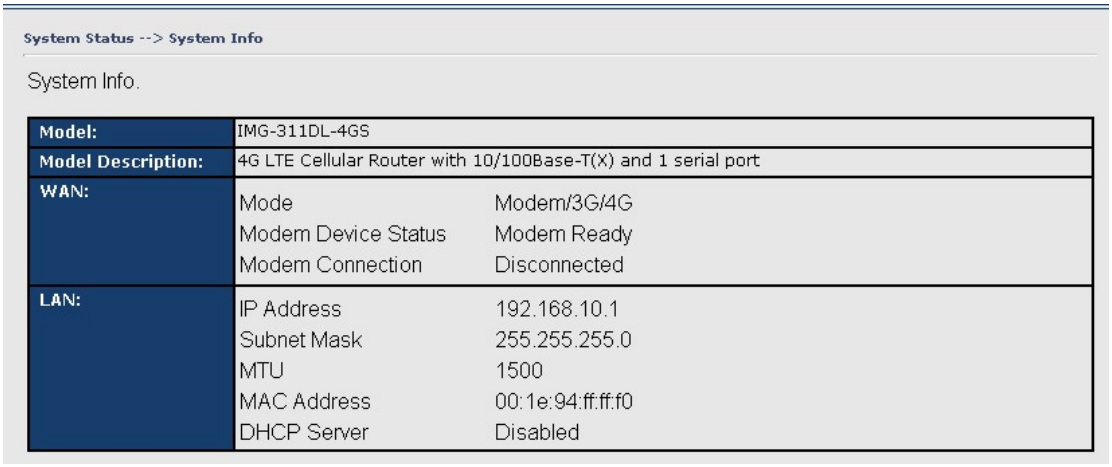
DIDO

Label	Description
Create DIDO Event	To add an event in order to trigger the DO action (On / Off) or MagiConnect action (connect / disconnect)
Polling Timer	Interval time to polling the events in list
Current DIDO Status	Current DI and Do Status
Setting DO	To set the DO to ON(Low) or OFF (High)

5.2.6 System Status

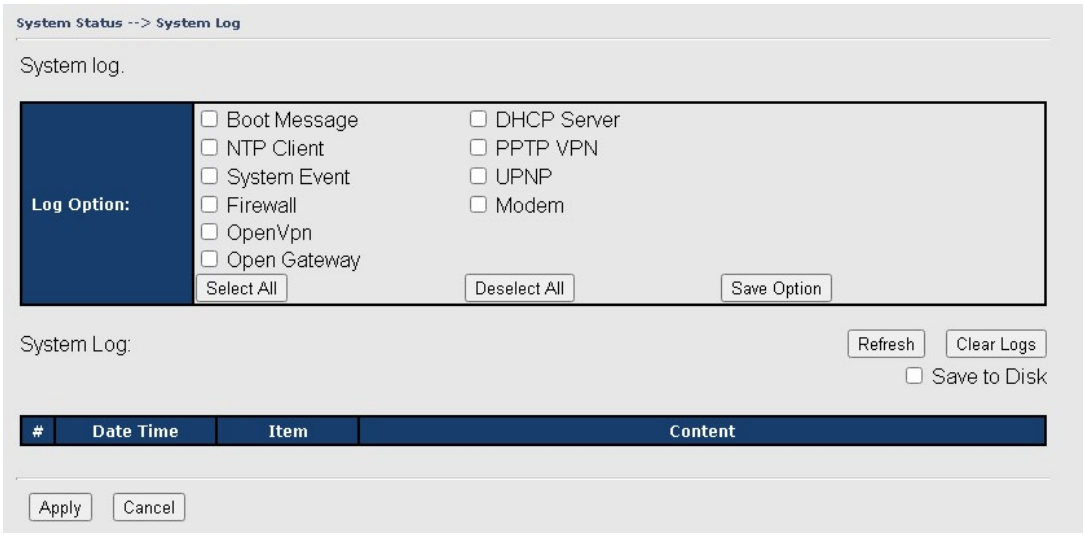
System Info

This page displays the detailed information of the router including model name, description, firmware version, WAN, and LAN settings.



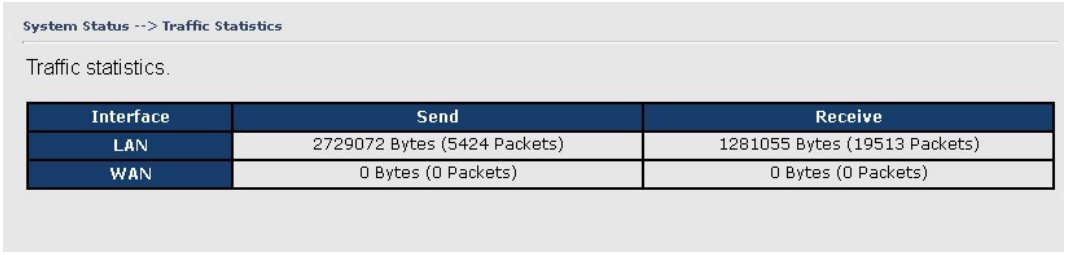
System Log

By checking in a specific box, the router will constantly log the events and provide the files for you to review. You can click **Refresh** to renew the page or **Clear Logs** to clear all or certain log entries.



Traffic Statistics

This page displays network traffic statistics for packets both received and transmitted through Ethernet ports connections.



Technical Specifications

ORing M2M Gateway Model	IMG-311DL-4GS
Physical Ports	
10/100 Base-T(X) Ports in RJ45 Auto MDI/MDIX	**1**
Sim card slot	**1**
SD card slot	**1**
GNSS support	
Antenna Connector	**1 x External reverse SMA antenna connector**
Frequency	**GPS** 1575.42±1.023 MHz
Cellular Interface	
LTE Connector	2 x SMA Female
Cellular Standard	GSM / GPRS/ EGPRS/ EDGE / WCDMA / HSDPA / HSUPA /LTE
Band Option	**EU grade** LTE: FDD:B1/B3/B7/B8/B20/B28 UMTS/HSDPA/HSUPA: B1/B8 GSM/GPRS/EDGE: 900/1800 MHz **US grade** LTE: FDD:B2/B4/B5/B12/B13 UMTS/HSDPA/HSUPA: B2/B4/B5
Serial Ports	
Connector	DB9 x 1
Operation Mode	RS-232/422/485
Serial Baud Rate	110 bps to 115.2 Kbps
Data Bits	7, 8
Parity	odd, even, none, mark, space
Stop Bits	1, 1.5, 2
RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, RI, GND
Flow Control	XON/XOFF, RTS/CTS, DTR/DSR
Digital Ports	
Digital I/O	3.5mm Digital input x 1 and output x 1 (DI :Logic level 1: 5V~30V, Logic level 0: 0V~2V DO:Maximum Voltage is 30V, Maximum Current is 20mA)
Network Protocol	
Protocol	ICMP, IP, TCP, UDP, DHCP, BOOTP, SSH, DNS, SNMP V1/V2c, HTTPS, SMTP, DDNS,
LED indicators	
Power indicator	1 x LED, PWR 1/ Ready: Green On: Power is on
Cellular	1 x LED, Green for Link.
SD	1 x LED, Green for SD Ready
SIM	1 x LED, Green for SIM Ready
Serial TX / RX LEDs:	Red: Serial port is receiving data Green: Serial port is transmitting data

SYS LED	1 x LED, Green On : System function normal
GPS	1 x LED, Solid for satellites ≧ 4 Blink for satellites < 4
Power	
Input power	DC inputs. 12-48VDC on 3.5mm terminal block
Power consumption (Typ.)	3W
Overload current protection	Present
Reverse polarity protection	Present on terminal block
Physical Characteristic	
Enclosure	IP-30
Dimension (W x D x H)	26.1(W) x 94.9(D) x 144.3(H) mm
Weight (g)	370g
Environmental	
Storage Temperature	-40 to 85°C (-40 to 185°F)
Operating Temperature	-10 to 60°C (14 to 140°F)
Operating Humidity	5% to 95% Non-condensing
Regulatory approvals	
EMI	FCC Part 15, CISPR (EN55022) class A
EMS	EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS), EN61000-4-8, EN61000-4-11
Shock	IEC60068-2-27
Free Fall	IEC60068-2-31
Vibration	IEC60068-2-6
Safety	EN60950-1
Warranty	5 years

Compliance

FCC Statement

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

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

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

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment. This device should be operated with minimum distance 20cm between the device and all persons. Operations in the 5.15-5.25GHz band are restricted to indoor usage only.

Industry Canada Statement

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

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

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

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

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

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

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

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

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

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

ATEX information

ATEX License Number DEMKO 16 ATEX 1701X

CE Ex II 3 G Ex nA IIC T4 Gc