

Installation and Configuration Quick Guide

R2000

Industrial Dual SIM Cellular VPN Router
(2 Eth + 2 SIM)

Package Contents

Before installing your R2000 Router, please verify the kit contents as following.

- 1 x Robustel R2000 Industrial Dual SIM Cellular VPN Router
- 1 x 3-pin 3.5 mm male terminal block for power supply
- 1 x *Quick Start Guide* with download link of other documents or tools

Optional Accessories (sold separately)

- 3G/4G SMA cellular antenna (stubby/magnet optional)
- RP-SMA WiFi antenna (stubby/magnet optional)
- Wall mounting kit
- 35 mm DIN rail mounting kit
- Ethernet cable
- AC/DC power adapter (12V DC, 1.5 A; EU/US/UK/AU plug optional)

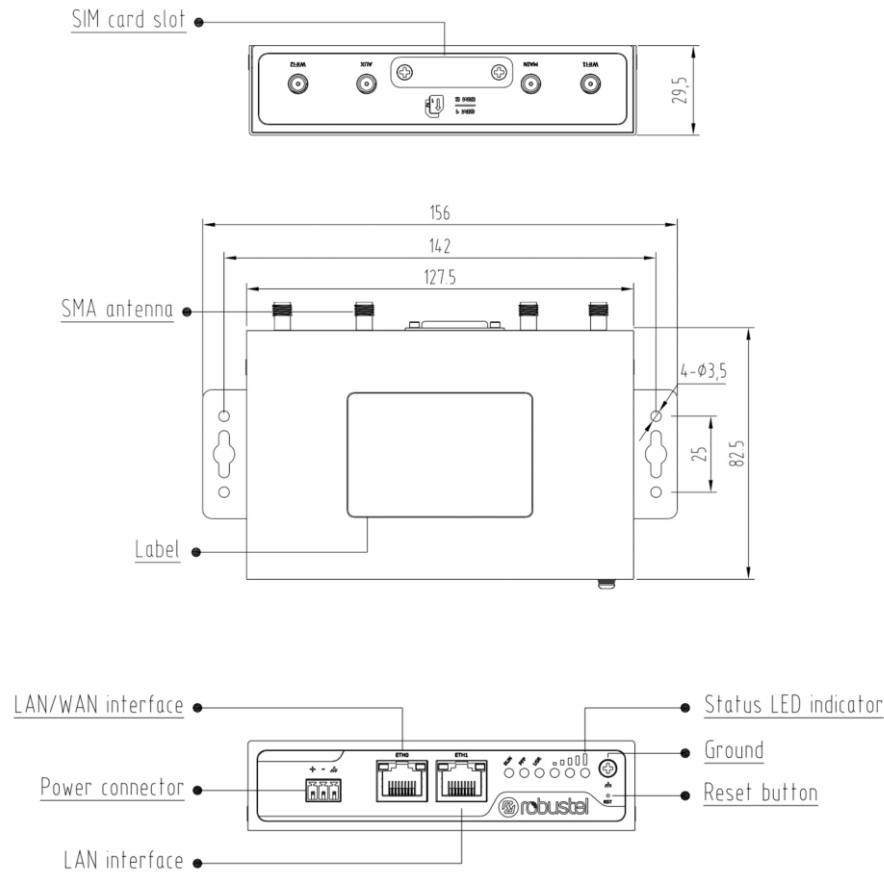
***If any of the above items is missing or damaged, please contact your Robustel sales representative.**

Environmental Requirements

- Input voltage: 9 to 26V DC (A014401/A014402/A014403/A014404/A014405/A014406/A014701/A014702/A014703/A014704/A014705/A014706)
or 9 to 36V DC
- Power consumption: 100 mA@12 V in idle state, 500 mA (peak) @12 V in communication state
- Operating temperature: -25 to +70 °C
- Relative humidity: 5 to 95% RH

Hardware Introduction

1. Overview




2. PIN Assignment

| ETH | |
|-----|----------|
| PIN | Function |
| 1 | TX+ |
| 2 | TX- |
| 3 | RX+ |
| 6 | RX- |

| PIN | Polarity |
|-----|----------|
| 10 | Positive |
| 11 | Negative |
| 12 | GND |

3. LED Indicators

| Name | Color | Status | Description |
|---------|-------|--|--|
| RUN | Green | On, fast blinking (250 mSec blink time) | Router is powered on (System is initializing) |
| | | On, blinking (500 mSec blink time) | Router starts operating |
| | | Off | Router is powered off |
| PPP | Green | On, solid | Link connection is working |
| | | Off | Link connection is not working |
| USR-SIM | Green | On, blinking | Backup card is being used |
| | | Off | Main card is being used |

| Name | Color | Status | Description |
|---|-------|--------------|---|
| USR-NET | Green | On, solid | Network is joined successfully and worked in an optimum one |
| | | On, blinking | Network is joined successfully but worked in a lower-level than standard |
| | | Off | Network is not joined or joining |
| USR-OpenVPN | Green | On, solid | OpenVPN connection is established |
| | | Off | OpenVPN connection is not established |
| USR-IPsec | Green | On, solid | IPsec connection is established |
| | | Off | IPsec connection is not established |
| USR-WiFi | Green | On, solid | WiFi is enabled and working properly |
| | | Off | WiFi is disabled or not working properly |
|  | Green | On, solid | High Signal strength (21-31) is available |
| | | On, solid | Medium Signal strength (11-20) is available |
| | | On, solid | Low Signal strength (1-10) is available |
| | | Off | No signal |
| | | On, blinking | When the network is disconnected, those three signal LEDs are designed as a binary combination code to indicate a series of error report. Blinking: 1 Off: 0 001 AT command failed 010 no SIM card detected 011 need to enter the PIN code 100 need to enter the PUK code 101 registration failed 110 module error 111 not support the module |

4. Reset Button

| Function | Operation |
|-------------------------------------|---|
| Reboot | Press and hold the RST button for 2 to 7 seconds under the operating status. |
| Restore to factory default settings | Wait for 5 seconds after powering up the router, press and hold the RST button until all six LEDs start blinking one by one, and release the button to return the router to factory defaults. |

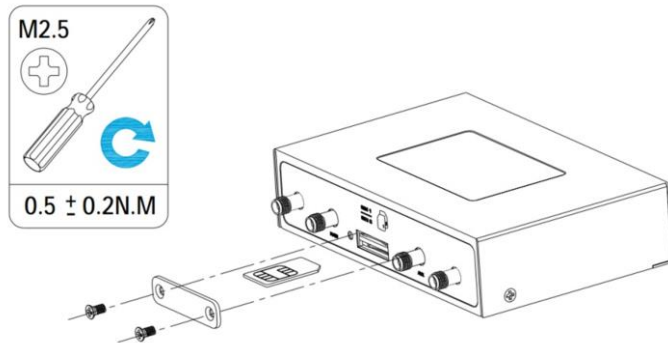
5. Ethernet Port

There are two Ethernet ports on R2000 Router, including ETH0 and ETH1. The ETH0 on the router can be configured as either a WAN port or LAN port, also can be assigned as a PoE port, while ETH1 can only be configured as a LAN port. Each has two LED indicators. The yellow one is a link indicator but the green one doesn't mean anything. For details about status, see the table below.

| Indicator | State | Description |
|----------------|--------------|-------------------------------|
| Link indicator | On, solid | Connection is established |
| | On, blinking | Data is being transferred |
| | Off | Connection is not established |

Hardware Installation

1. Insert or Remove SIM Card



Insert or remove the SIM card as shown in the following steps.

- **Insert SIM card**

1. Make sure router is powered off.
2. To remove cover, loosen the screws associated with the cover by using a screwdriver and then find the SIM card slot.
3. To insert SIM card, press the card with finger until you hear a click and then tighten the screws associated with the cover by using a screwdriver.
4. To put back the cover and tighten the screws associated with the cover by using a screwdriver.

- **Remove SIM card**

1. Make sure router is powered off.
2. To remove slot cover, loosen the screws associated with the cover by using a screwdriver and then find the SIM card slot.
3. To remove SIM card, press the card with finger until it pops out and then take out the card.
4. To put back the cover and tighten the screws associated with the cover by using a screwdriver.

Note:

1. Recommended torque for inserting is 0.5 N.m, and the maximum allowed is 0.7 N.m.
2. Use the specific card when the device is working in extreme temperature (temperature exceeding 40 °C), because the regular card for long-time working in harsh environment will be disconnected frequently.
3. Do not forget to twist the cover tightly to avoid being stolen.
4. Do not touch the metal of the card surface in case information in the card will lose or be destroyed.
5. Do not bend or scratch the card.
6. Keep the card away from electricity and magnetism.
7. Make sure router is powered off before inserting or removing the card.

2. Attach External Antenna (SMA Type)

Attach an external SMA antenna to the router's antenna connector and twist tightly. Make sure the antenna is within the correct frequency range provided by the ISP and with 50 Ohm impedance.

Note: Recommended torque for mounting is 0.35 N.m.

3. Ground the Router

Router grounding helps prevent the noise effect due to electromagnetic interference (EMI). Connect the router to the site ground wire by the ground screw before powering on.

Note: This product is appropriate to be mounted on a sound grounded device surface, such as a metal panel.

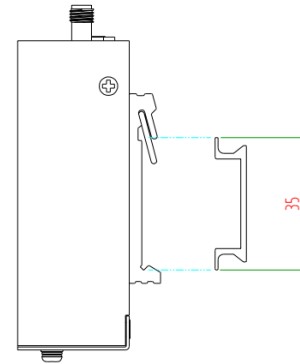
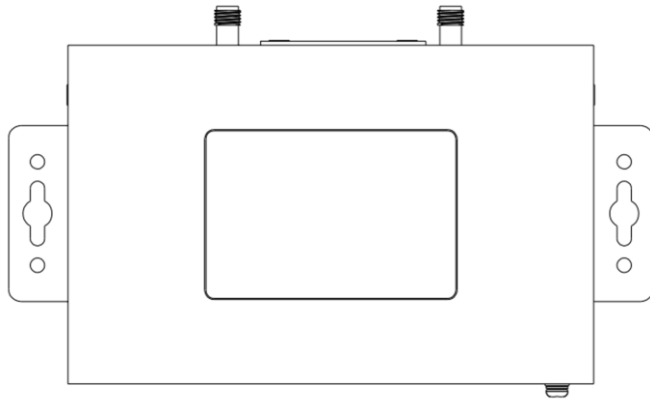
4. Mount the Router

The router can be placed on a desktop or mounted to a wall or a 35 mm DIN rail.

Two methods for mounting the router

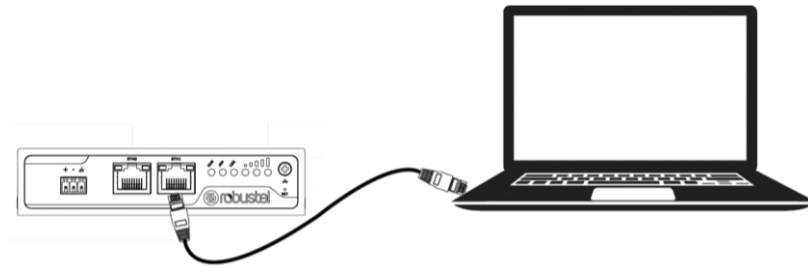
- **Wall mounting** (measured in mm)
Use 4 pcs of M2.5*4 flat head Phillips screws to fix the wall mounting kit to the router, and then use 2 pcs of M3 drywall screws to mount the router associated with the wall mounting kit on the wall.

Note: Recommended torque for mounting is 0.5 N.m, and the maximum allowed is 0.7 N.m.



5. Connect the Router to a Computer

Connect an Ethernet cable to the port marked ETH0 or ETH1 at the bottom of the router, and connect the other end of the cable to your computer.



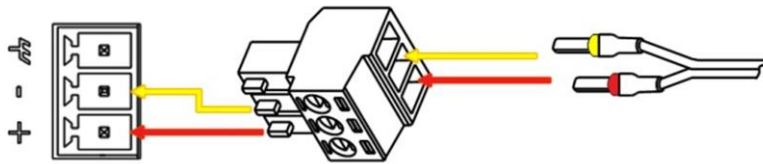
- **DIN rail mounting** (measured in mm)
Use 3 pcs of M3*6 flat head Phillips screws to fix the DIN rail to the router, and then hang the DIN rail on the mounting bracket. It is necessary to choose a standard bracket.

Note: Recommended torque for mounting is 1.0 N.m, and the maximum allowed is 1.2 N.m.

6. Power Supply

CONNECTING THE POWER CABLE

| COLOR | POLARITY |
|--------|----------|
| RED | + |
| YELLOW | - |



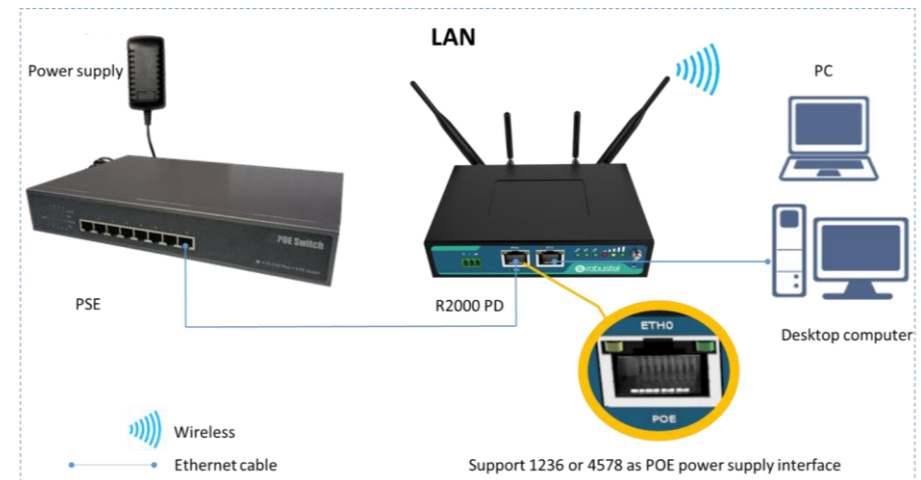
R2000 router supports reverse polarity protection, but always refers to the figure above to connect the power adapter correctly. There are two cables associated with the power adapter. Following to the color of the head, connect the cable marked red to the positive pole through a terminal block, and connect the yellow one to the negative in the same way.

Note: The range of power voltage is 9 to 26V DC (A014401, A014402, A014403, A014404, A014405, A014406, A014701, A014702, A014703, A014704, A014705, A014706) or 9 to 36V DC.

7. PD Connection (Optional)

If you would like to power the R2000 Router through the Ethernet port, please refer to the following topology to connect the R2000 to a PSE (Power Sourcing Equipment). The range of PoE power voltage is 48~57V DC.

Note: It is not recommended to use DC power supply and PD power supply simultaneously.

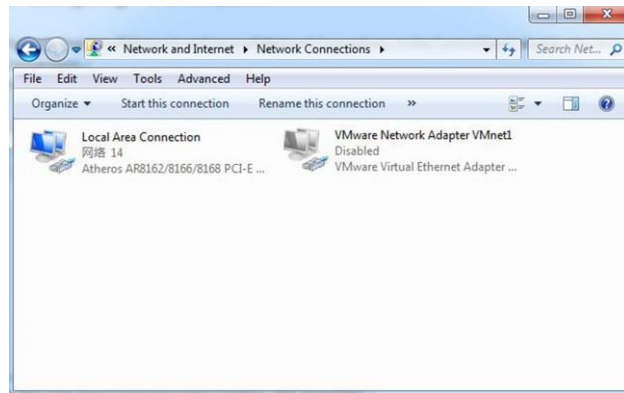


PC Configuration

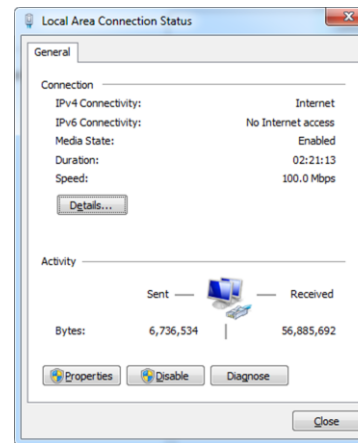
There are two methods to get IP address for the PC. One is to obtain an IP address automatically from “Local Area Connection”, and another is to configure a static IP address manually within the same subnet of the router. Please refer to the steps below.

Here take **Windows 7** as example, and the configuration for windows system is similar.

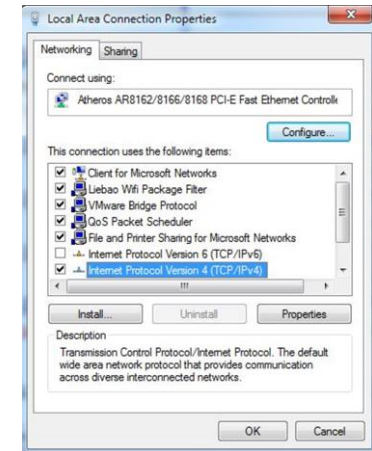
1. Click **Start > Control panel**, double-click **Network and Sharing Center**, and then double-click **Local Area Connection**.



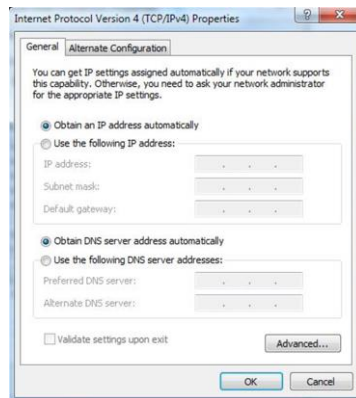
2. Click **Properties** in the window of **Local Area Connection Status**.



3. Choose **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.

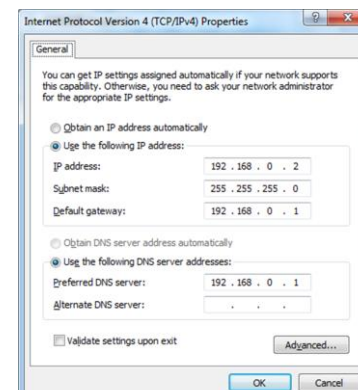


4. Two ways for configuring the IP address of PC.
Obtain an IP address automatically:



Use the following IP address

(Configured a static IP address manually within the same subnet of the router)



5. Click **OK** to finish the configuration.

Router Configuration

1. Log in the Router

To log in to the management page and view the configuration status of your router, please follow the steps below.

1. On your PC, open a web browser such as Internet Explorer, Google or Firefox etc.
2. From your web browser, type the IP address of the router into the address bar and press enter. The default IP address of the router is 192.168.0.1, though the actual address may vary.



3. In the login page, enter the username and password, choose language and then click **LOGIN**. The default username and password are “admin”.



Note: If enter the wrong username or password over six times, the login web will be locked for 5 minutes.

4. After logging in, the home page of the R2000 Router’s web interface is displayed, for example.

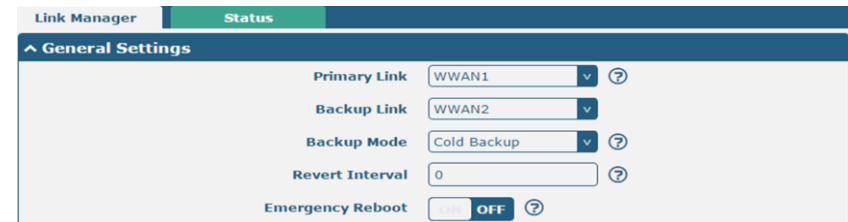


Note: To configure parameters should follow this order “modify parameter 1 > Submit > modify parameter 2 > Submit > Save & Apply”.


2. Configure the Cellular Connection

Click **Interface > Link Manager > Link Manager > General Settings**, choose “WWAN1” as the primary link and “WWAN2” as the backup link, and set “Cold Backup” as the backup mode, then click “Submit”.

Note: Link Settings allows you to configure the parameters of link connection, including WWAN1/WWAN2, WAN and WLAN. It is recommended to enable Ping detection to keep the router always online. The Ping detection increases the reliability and also costs the data traffic.



| Link Settings | | | |
|---------------|-------|-------------|-----------------|
| Index | Type | Description | Connection Type |
| 1 | WWAN1 | | DHCP |
| 2 | WWAN2 | | DHCP |
| 3 | WAN | | DHCP |
| 4 | WLAN | | DHCP |

Click  on the right-most of WWAN1 to enter the configuration window.

Link Manager

General Settings

Index

1

Type

WWAN1

Description

The window is displayed as below when enabling the “Automatic APN Selection” option.

WWAN Settings

Automatic APN Selection

ON

Dialup Number

*99***1#

Authentication Type

Auto

Switch SIM By Data Allowance

OFF

Data Allowance

0

Billing Day

1

The window is displayed as below when enabling the “Ping Detection” option.

Ping Detection Settings

Enable

ON

Primary Server

8.8.8.8

Secondary Server

114.114.114.114

Interval

300

Retry Interval

5

Timeout

3

Max Ping Tries

3

Advanced Settings

NAT Enable

ON

Upload Bandwidth

10000

Download Bandwidth

10000

Overridden Primary DNS

Overridden Secondary DNS

Debug Enable

ON

Verbose Debug Enable

OFF

When finished, click **Submit** > **Save & Apply** for the configuration to take effect.

3. Check the Cellular Connection Status

Click **Interface** > **Cellular** > **Status** to view the status of the cellular connection, and click the row of status, the details status information will be displayed under the row.

| Cellular | | | |
|----------------------------|--------------|-------------|-----------------|
| Status | | | |
| AT Debug | | | |
| Status | | | |
| Index | Modem Status | Modem Model | IMSI |
| 1 | Ready | MC7430 | 460012148626831 |
| Registration | | | |
| Registered to home network | | | |

| Status | | | |
|---|--------------|-------------|-----------------|
| Index | Modem Status | Modem Model | IMSI |
| 1 | Ready | MC7430 | 460012148626831 |
| Registration | | | |
| Registered to home network | | | |
| Index 1 | | | |
| Modem Status Ready | | | |
| Modem Model MC7430 | | | |
| Current SIM SIM1 | | | |
| Phone Number | | | |
| IMSI 460012148626831 | | | |
| ICCID NOT | | | |
| Registration Registered to home network | | | |
| Network Provider CHN-UNICOM | | | |
| Network Type LTE | | | |
| Signal Strength 18 (-77dBm) | | | |
| Bit Error Rate 99 | | | |
| PLMN ID 46001 | | | |
| Local Area Code FFE | | | |
| Cell ID 6074702 | | | |
| IMEI 359074060118488 | | | |
| Firmware Version SW19X30C_02.14.03.00 r6134 CARMD-EV-FRMWR2 2016/0... | | | |

4. Configure the IP of the Router

There are two Ethernet ports on R2000 Router, including ETH0 and ETH1. The ETH0 on the router can be configured as either a WAN port or LAN port, while ETH1 can only be configured as a LAN port. The ETH0 and ETH1 can freely choose from lan0 and lan1, but at least one LAN port must be assigned as lan0. The default settings of ETH0 and ETH1 are lan0 and their default IP are 192.168.0.1/255.255.255.0.

- **Configure Lan0**

Click **Interface > LAN > LAN**, click lan0's edit button to configure its configuration, and modify its IPv4 address and Netmask.

| LAN | | | | |
|--------------------|-----------|-------------|---------------|---|
| Multiple IP | | | | |
| VLAN Trunk | | | | |
| Status | | | | |
| ^ Network Settings | | | | |
| Index | Interface | IP Address | Netmask | |
| 1 | lan0 | 192.168.0.1 | 255.255.255.0 |   |

Click lan0's edit button and configure its parameters in the pop up window.

LAN

^ General Settings

Index

1

Interface

lan0

IP Address

192.168.0.1

Netmask

255.255.255.0

MTU

1500

When finished, click **Submit > Save & Apply** for the configuration to take effect.



- **Configure Lan1**

Click **Interface > Ethernet > Ports**, click eth0's edit button, choose "lan1" as the assigned port, and click "Submit".

Note: By default, there is a LAN port (lan0) in the list. To begin adding a new LAN port (lan1), please configure one of eth0 or eth1 as lan1 first in **Ethernet > Ports > Port Settings**. Otherwise, the operation will be prompted as "List is full".

Ports **Status**

^ Port Settings

| Index | Port | Port Assignment | |
|-------|------|-----------------|---|
| 1 | eth0 | lan0 |  |
| 2 | eth1 | lan0 |  |

Index

1

Port

eth0

Port Assignment

lan0

lan1

wan

Submit

Close

Click **Interface > LAN** in the homepage, and click the add button. Choose lan1 as the interface, and configure its IPv4 address and Netmask.

LAN

^ General Settings

Index

2

Interface

lan1

IP Address

192.168.0.1

Netmask

255.255.255.0

MTU

1500

When finished, click **Submit > Save & Apply** for the configuration to take effect.

- **Configure Multiple IP**

Click **Interface > LAN > Multiple IP**, and click the edit button of lan0.

| Index | Interface | IP Address | Netmask |
|-------|-----------|------------|---------|
| + | | | |

Note: You may click to edit the multiple IP of the LAN port, or click to delete the multiple IP of the LAN port. Now, click to add a multiple IP to the LAN port.

Multiple IP

IP Settings

Index: 1

Interface: lan0

IP Address: 172.16.10.67

Netmask: 255.255.0.0

When finished, click **Submit > Save & Apply** for the configuration to take effect.

- **Configure WAN**

Click **Interface > Ethernet > Ports**, click the edit button of eth0, choose “wan” as the port assignment, and click “Submit”;

Port Settings

Index: 1

Port: eth0

Port Assignment: lan1, lan0, lan1, **wan**

Submit Close

Click **Interface > Link Manager > General Settings**, choose “WAN” as the primary link, and choose “None” as the backup link.

Link Manager

General Settings

Primary Link: WAN

Backup Link: None

Emergency Reboot: OFF

Click the edit button of WAN to enter its configuration window.

| Index | Type | Description | Connection Type |
|-------|-------|-------------|-----------------|
| 1 | WWAN1 | | DHCP |
| 2 | WWAN2 | | DHCP |
| 3 | WAN | | DHCP |
| 4 | WLAN | | DHCP |

Configure WAN’s related parameters as below.

Link Manager

General Settings

Index: 3

Type: WAN

Description:

Connection Type: DHCP

The window is displayed as below when enabling the “Ping Detection” option.

Ping Detection Settings

Enable: ON

Primary Server: 8.8.8.8

Secondary Server: 114.114.114.114

Interval: 300

Retry Interval: 5

Timeout: 3

Max Ping Tries: 3

^ Advanced Settings

| | |
|--------------------------|---|
| NAT Enable | <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF |
| MTU | <input type="text" value="1500"/> |
| Upload Bandwidth | <input type="text" value="10000"/> ? |
| Download Bandwidth | <input type="text" value="10000"/> |
| Overridden Primary DNS | <input type="text"/> |
| Overridden Secondary DNS | <input type="text"/> |
| Debug Enable | <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF |
| Verbose Debug Enable | <input type="checkbox"/> ON <input checked="" type="checkbox"/> OFF |

When finished, click **Submit > Save & Apply** for the configuration to take effect.



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