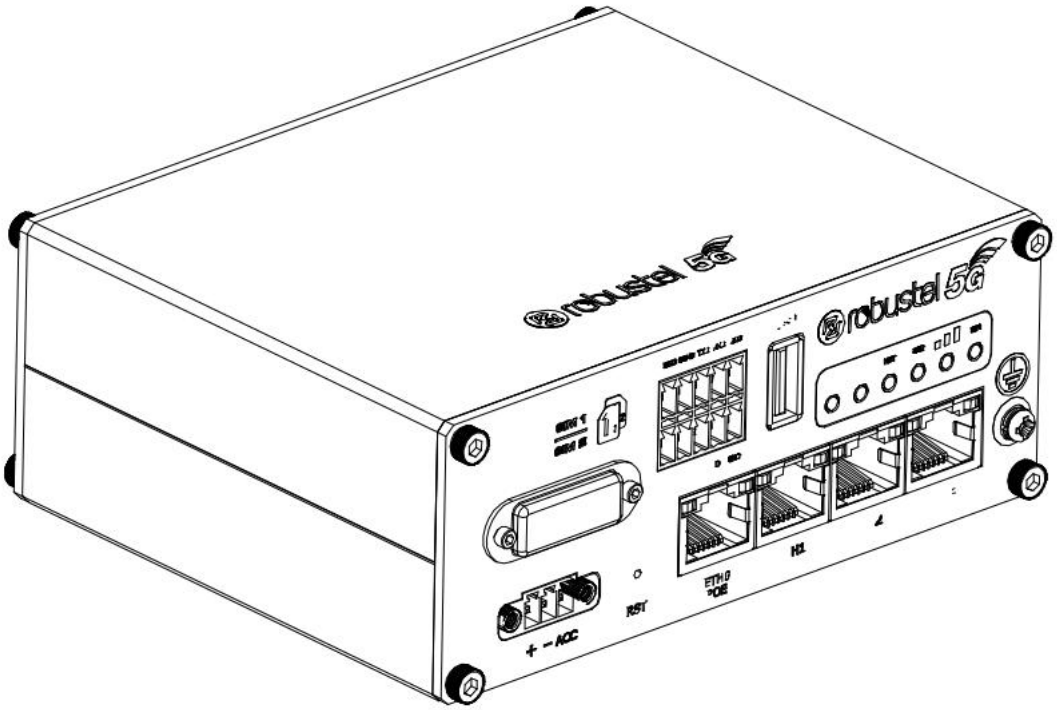
R5020

Hardware Manual



Version: 1.0.0

Date: July 6, 2022

Regulatory and Type Approval Information

Table 1: Toxic or Hazardous Substances or Elements with Defined Concentration Limits

Name of the Part	Hazardous Substances									
	(Pb)	(Hg)	(Cd)	(Cr(VI))	(PBB)	(PBDE)	(DEHP)	(BBP)	(DBP)	(DIBP)
Metal parts	o	o	o	o	-	-	-	-	-	-
Circuit modules	o	o	o	o	o	o	o	o	o	o
Cables and cable assemblies	o	o	o	o	o	o	o	o	o	o
Plastic and polymeric parts	o	o	o	o	o	o	o	o	o	o

o:
Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in RoHS2.0.
X:
Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials for this part *might exceed* the limit requirement in RoHS2.0.
-:
Indicates that it does not contain the toxic or hazardous substance.

Radio Specifications

RF technologies	3G, 4G, 5G, GNSS*, Wi-Fi
Cellular Frequency*	**3G:** WCDMA: B1/B2/B3/B4/B5/B6/B8/B19 **4G:** LTE FDD: B1/B2/B3/B4/B5/B7/B8/B12(B17)/B13/B14/ B18/B19/B20/B25/B26/B28/B29/B30/B32/B66/B71 LTE TDD: B34/B38/B39/B40/B41/B42/B43/B48 LAA: B46 **5G:** NSA/SA: n1/n2/n3/n5/n7/n8/n12/n20/n25/n28/n38/n40/ n41/n48*/n66/n71/n77/n78/n79
Wi-Fi Frequency	2.4 GHz: 2.412 - 2.472 GHz 5 GHz: 5.15 - 5.825 GHz
Max RF power	28 dBm@5G, 25 dBm@WCDMA, 28 dBm@LTE, 22.96dBm@Wi-Fi

* ***May vary on difference models.***

Simplified EU Declaration of Conformity

We, Guangzhou Robustel Co., Ltd. are located at 501, Building #2, 63 Yongan Road, Huangpu District, Guangzhou, China, declare that this radio equipment complies with all applicable EU directives. The full text of the EU DoC is available at the following internet address:
www.robustel.com/certifications/

FCC Declaration of Conformity

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.

IC Declaration of Conformity

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada’s licence-exempt RSS(s). Operation is subject to the following two conditions:
(1)This device may not cause interference.
(2)This device must accept any interference, including interference that may cause undesired operation of the device.

L’émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d’Innovation, Sciences et Développement économique 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;
(2) L' appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d' en compromettre le fonctionnement.

Radio Frequency Exposure Statement for IC

This device complies with IC exposure limits set forth for an uncontrolled environment. This device shall be installed and operated with minimum distance 20cm between the radiator & body.

Cet équipement est conforme aux limites d'exposition IC définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et la carrosserie.

Related download link

Find more product documents or tools at:
www.robustel.com/en/documentations/

Technical Support

Tel: +86-20-82321505
Email: support@robustel.com
Web: www.robustel.com

Document History

Updates between document versions are cumulative. Therefore, the latest document version contains all updates made to previous versions.

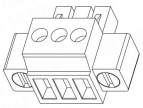
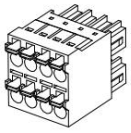
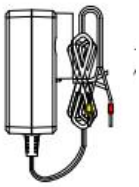
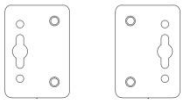
Date	Firmware Version	Document Version	Change Description
July 6, 2022	5.0.0	1.0.0	Initial release.

Overview

Robustel R5020 supports WCDMA 3G network, LTE 4G network, and 5G network to provide high-speed wireless network bandwidth for devices through wireless connection, and it has dual-SIM card backup to ensure stable wireless network connection.

Package Checklist

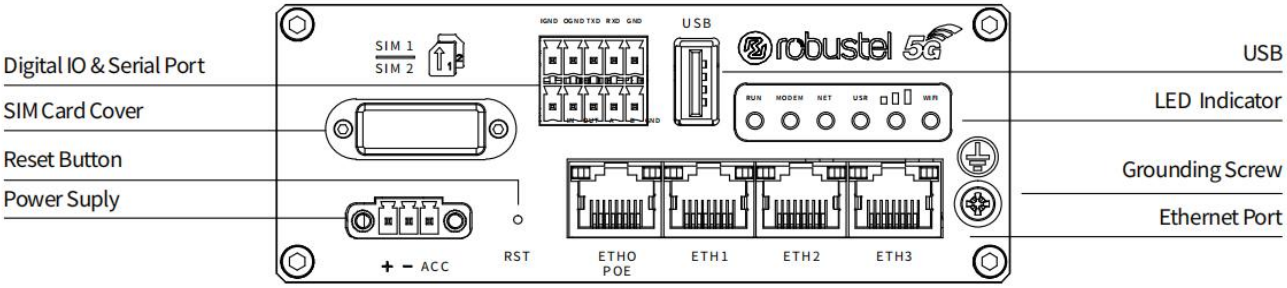
Before commencing installation ensure your package has the following components:

Device	3PIN Terminal Block	2x5PIN Terminal Block	Power Supply	Mounting Kit
				

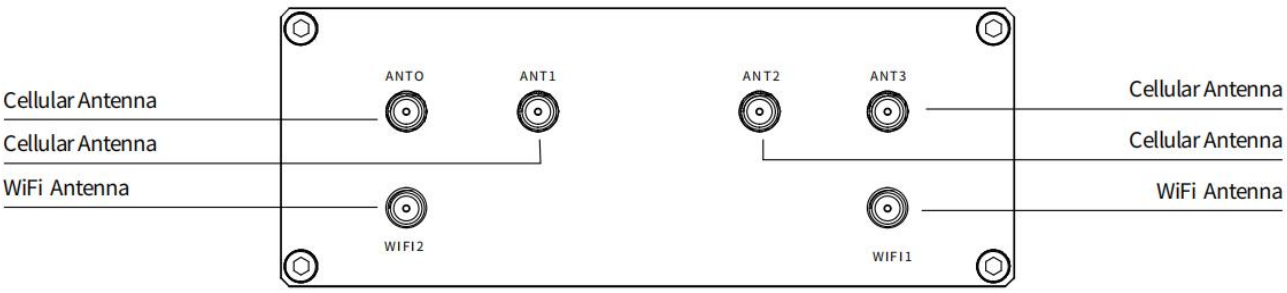
RCMS Card	Quick Start Guide Card	Cellular Antenna (Rubber)	Wi-Fi Antenna	
				

Note: The accessories could be different on specific order.

Panel Layout (May Vary on Different Models)



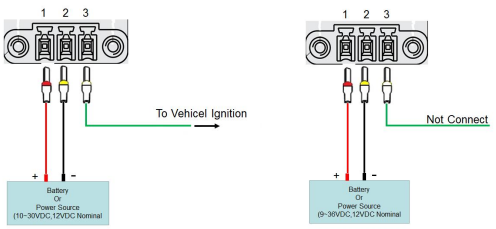
Front-View



Back-View

Interface Descriptions

1. Power Supply. 3PIN 3.5mm pitch terminal block.

PIN	Description	Note	
1	V+	Connect adapter or battery positive (red line)	
2	V-	Connect adapter or battery negative (yellow line)	
3	ACC (Optional)	Car ignition and flameout detection (green line) Note: when the car ignition and flameout detection function is not used, the ACC pin need to be connected to the V+ and cannot be left floating.	**With ACC Function** **With POE Function** Note: 1) ACC and POE function can only be selected one 2) The input voltage is 10 to 30V DC(With ignition sensing) or 9 to 36V DC(Without ignition sensing)

2. LED Indicator.

Name	Color	Status	Description
RUN	Green	On, solid	Router is powered on
		On, blinking	Router starts operating
		Off	Router is powered off
MODEM	Green	On, solid	Link connection is working
		On, blinking	Data is sent and received
		Off	Link connection is not working
NET	Green	On, solid	Connection to 5G network is established(5g signal is the best)
		On, blinking	Connection to Legacy network (4G or 3G) is established(3G signal difference / 4G signal medium)
		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-SIM	Green	On, solid	Main SIM card is being used
		On, blinking	Backup SIM card is being used
		Off	No SIM card is being used
	Green	On, solid	5G network: Reference Signal Received Power greater than -86 dBm (Strong signal) Non-5G network: Received Signal Strength Indication greater than -73 dBm (Strong signal)
	Yellow	On, solid	5G network: Reference Signal Received Power -105 to -86 dBm (Moderate signal) Non-5G network: Received Signal Strength Indication -91 to -73 dBm (Moderate signal)
	Red	On, solid	5G network: Reference Signal Received Power -140 to -106 dBm (Weak signal) Non-5G network: Received Signal Strength Indication -111 to -93dBm (Weak signal)
	--	Off	No signal
WiFi	Green	On, solid	Wi-Fi is enabled and working properly
		Off	Wi-Fi is disabled or not working properly

Note: You can choose the display type of USR LED. For more details, please refer to ***RT123_SM_RobustOS Software Manual,*** **Services > Advanced > System >System Settings > User LED Type.**

3. Reset Button.

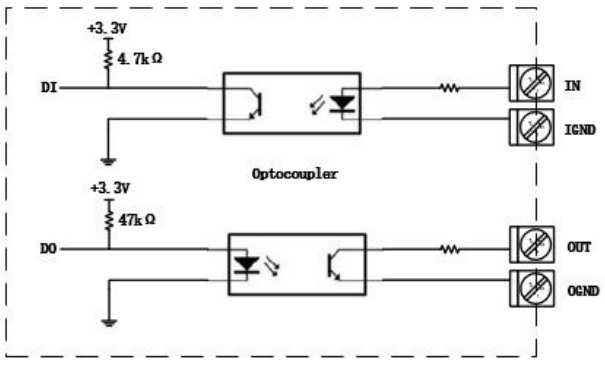
Function	Operation
Reboot	Press and hold the RST button for 2~ 5 seconds under the operating status.
Restore to default configuration	Press and hold the RST button for 5~10 seconds, the RUN LED starts blinking quickly, the router will restore to default configuration.
Restore to factory default settings	Once the operation of restoring default configuration is performed twice within one minute, the router will restore to factory default settings.
Note: The more details please refer to ***RT123_SM_RobustOS Software Manual, 2.3 Factory Reset.***	

4. Ethernet Ports. There are four Ethernet ports on R5020, including ETH0 (Optional POE supported), ETH1, ETH2, ETH3. The ETH0 on the router can be configured as a WAN port, while ETH1, ETH2 and ETH3 can only be configured as a LAN port. By default, ETH1, ETH2 and ETH3 are lan0, and their IP are 192.168.0.1/255.255.255.0.

Ethernet LED Indicator	Status	Description
Link indicator (Yellow)	On, solid	Connection is established
	On, blinking	Data is being transferred
	Off	Connection is not established

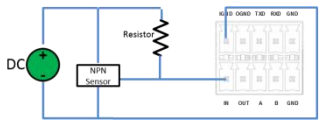
5. Digital IO & Serial Port. 2x5PIN 3.5mm pitch terminal block, 1 set of DO, 1 set of DI, 1 x RS232 and 1 x RS485. DI signal access, can be used for NPN/PNP type sensor signal or switch signal acquisition. DO signal output, can be used for NPN/PNP sensor control, please connect signals by referring to typical applications .

PIN	DI/DO	RS232	RS485	Direction
1	IGND	--	--	--
2	OGND	--	--	--
3	--	TXD	--	Router → Device
4	--	RXD	--	Router ← Device
5	--	GND	--	--
6	IN	--	--	--
7	OUT	--	--	--
8	--	--	A	--
9	--	--	B	--
10	--	--	GND	--

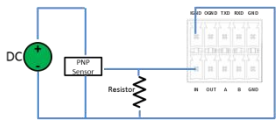


Internal diagram of DI&DO

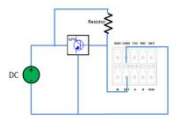
Typical Application:



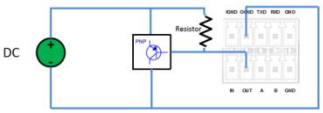
DI connected with NPN sensor



DI connected with PNP sensor



DO Driven NPN Triode



DO Driven PNP Triode

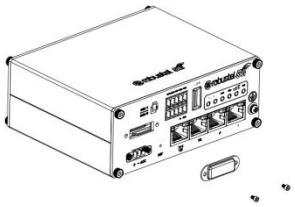
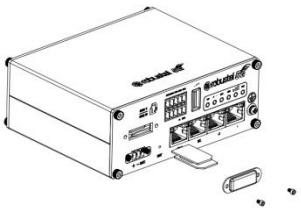
Note: The external power supply DC voltage range is 3V~30V.

6. USB Interface.

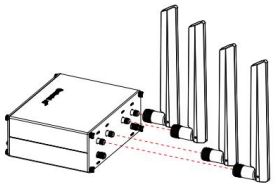
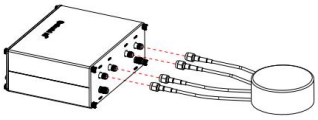
Function	Operation
Firmware upgrade	USB interface is used for batch firmware upgrading, but cannot be used for sending or receiving data from slave devices which connected to it. You can insert a USB storage device into the router's USB interface, such as a U disk or a hard disk. If there have a supported configuration file or a router firmware in this USB storage device, the router will automatically update the configuration file or the firmware. For more details, please refer to ***RT123_SM_RobustOS Software Manual***.

Hardware Installation

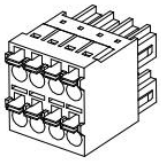
1. **SIM Card Installation**. Remove the SIM card cover to insert the SIM cards into the device, then screw up the cover.

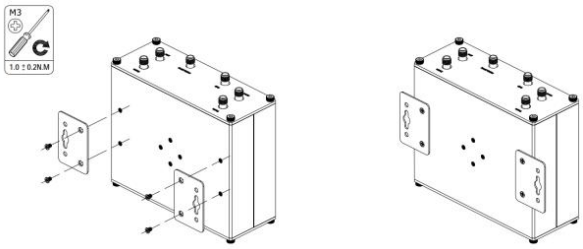
2. **Antenna Installation.** Rotate the antenna into the antenna connector accordingly. Here take the cellular antenna as example. For 5G 4-IN-1 combo antenna, LHM# cable need to be connected to ANT1 and ANT2 while the MH# cable need to be connected to ANT0 and ANT3. GPS function is available when using the 4 in 1 combo antenna.

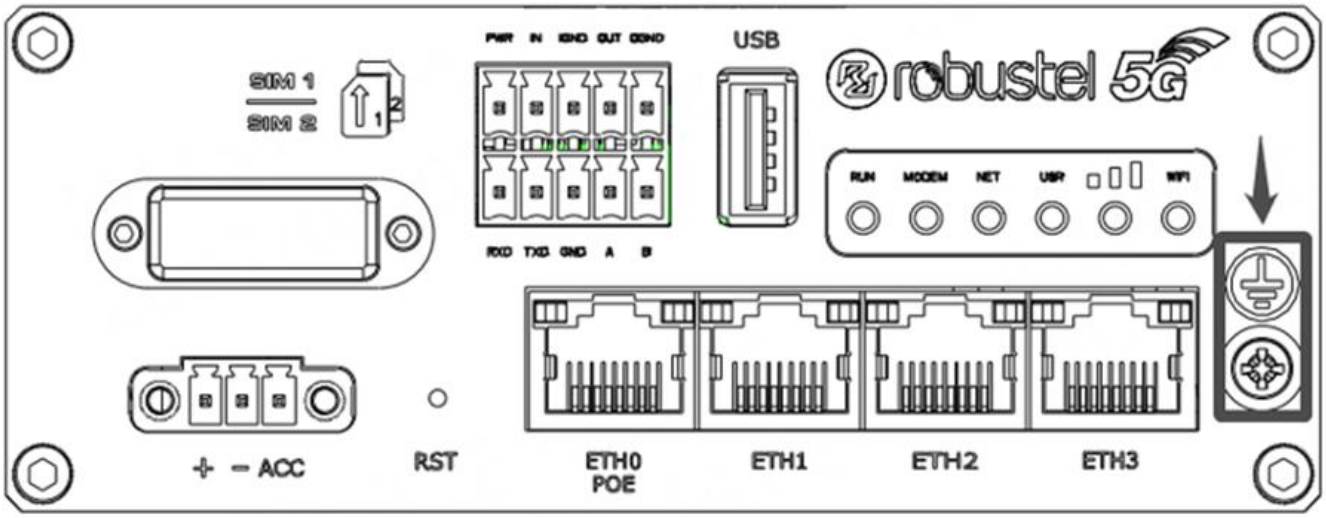
3. **Terminal Block Installation.** Insert the 2x5PIN terminal blocks into the interfaces connector, then can connect the devices or sensors to the gateway via corresponding interfaces e.g. RS232/RS485, DIDO...



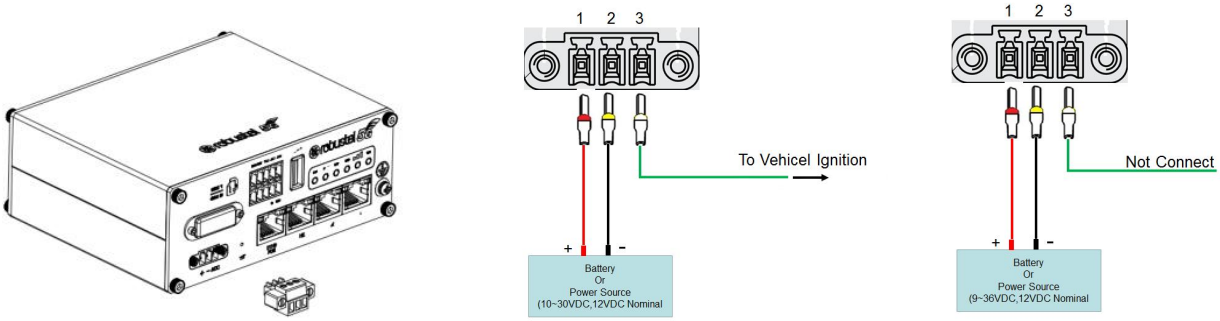
4. **Mounting Kit installation.**



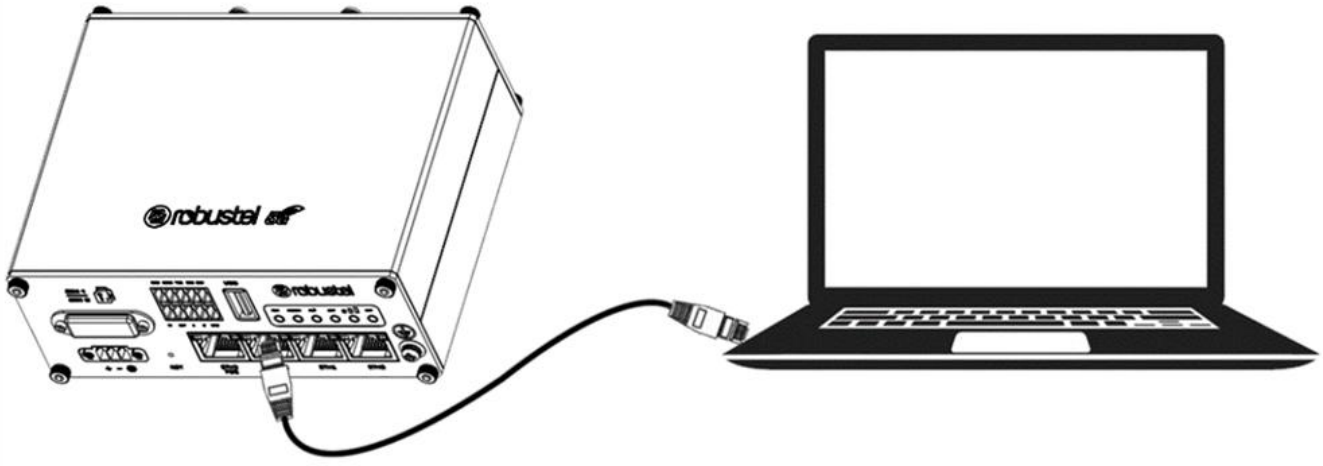
5. Grounding the Device. Grounding will help to prevent the noise effect due to electromagnetic interference (EMI). Connect the device to the site ground wire by the grounding screw before powering on.



6. Power Supply installation. Insert the power supply cord into the corresponding terminal block if needed, then insert the terminal block into the power connector.



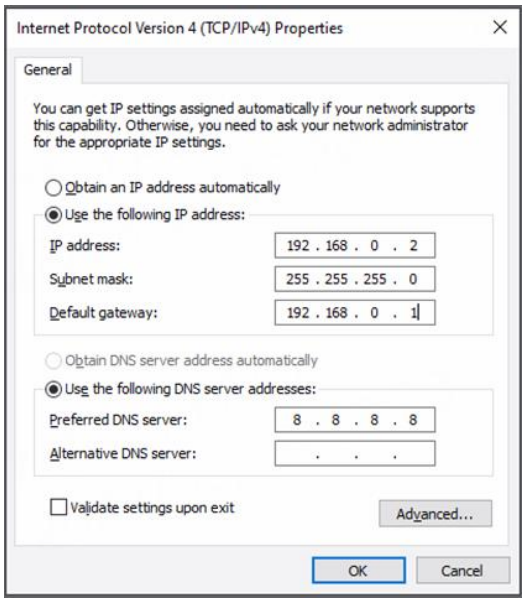
7. Connect the router to the computer. Connect the Ethernet cable to any port labeled ETH0 to ETH3 on the bottom of the router, and connect the other end of the cable to your computer.



Login to the Device

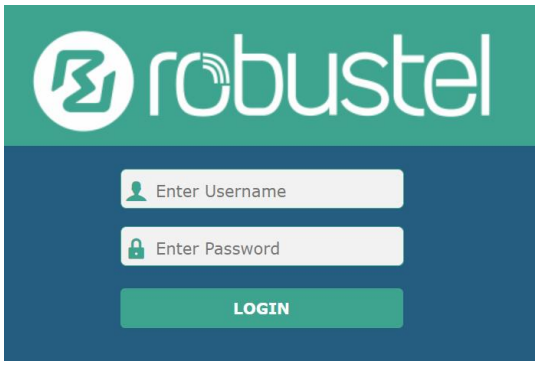
1. Connect the router's Ethernet port to a PC with a standard Ethernet cable.

2. Before logging in, manually configure the PC with a static IP address on the same subnet as the gateway address, click and configure "Use the following IP address".



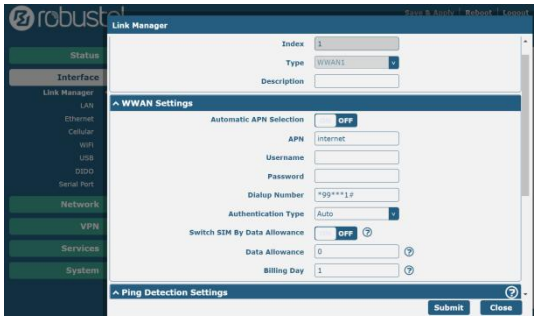
3. To enter the gateway's web interface, type http://192.168.0.1 into the URL field of your Internet browser.

4. Use login information shown in the product label when prompted for authentication.



5. After logging in, the home page of the web interface is displayed, then you can view system information and perform configuration on the device.

6. The automatic APN selection is ON by default, if need to specify your own APN, please go to the menu **Interface->Link Manager->Link Setting->WWAN Settings** to finish the specific setting.



7. The more configuration details please refer to ***RT123_SM_RobustOS Software Manual***. (END)