

IOT Gateway User Guide

Revision History

Version	Date	Change Description	Author
V1.0	2020/12/1	Initial Release	S. Turner
V1.2	2020/2/1	Addition of Minusforty Label	S.Turner

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1. Purpose

This document describes the basic functions and physical interfaces of the IOTGateway and is intended to guide users through the installation and configuration process. .

2. Introduction

The IOTGateway is designed to connect a variety of commercial devices such as refrigerators and freezers to the Internet. The IOT Gateway supports connection to the cloud via Ethernet, Wi-Fi or LTE interfaces and can connect to a suitable industrial device via a TTL Modbus interface.

After correctly configuring, the IOTGateway will periodically connect to the industrial device, monitor operational parameters (via the TTL Modbus interface) and upload data to the cloud monitoring platform.

3. IOTGateway External Images



**Front
Label Option1**



**Front
Label Option 2**



Rear



Side



Bottom

4. Electrical Specifications

External DC Power	+6V to +18V DC
USB Power	+5V (USB)
LTE Modem	LTE B2/B4/B5
Wi-Fi Connection	802.11n 2.4GHz
Max Power Consumption	5W
Size	173*90*40mm
Material	ABS

5. External interface

5.1 Network interface

The IOTGateway supports following ways to connect to the internet:

1. Wi-Fi
2. Ethernet cable
3. LTE Cellular network (optional, only available when the LTE modem and adapter board is correctly inserted);
4. The IOTGateway supports Wi-Fi Mesh Networking, which means one IOTGateway can connect to the internet via another IOTGateway. In this mode the master IOTGateway can share its LTE connection to a number of other IOTGateways connected over Wi-Fi

5.2 Power supply interface

There are two interfaces for power supply: macro USB interface and external +12VDC Supply

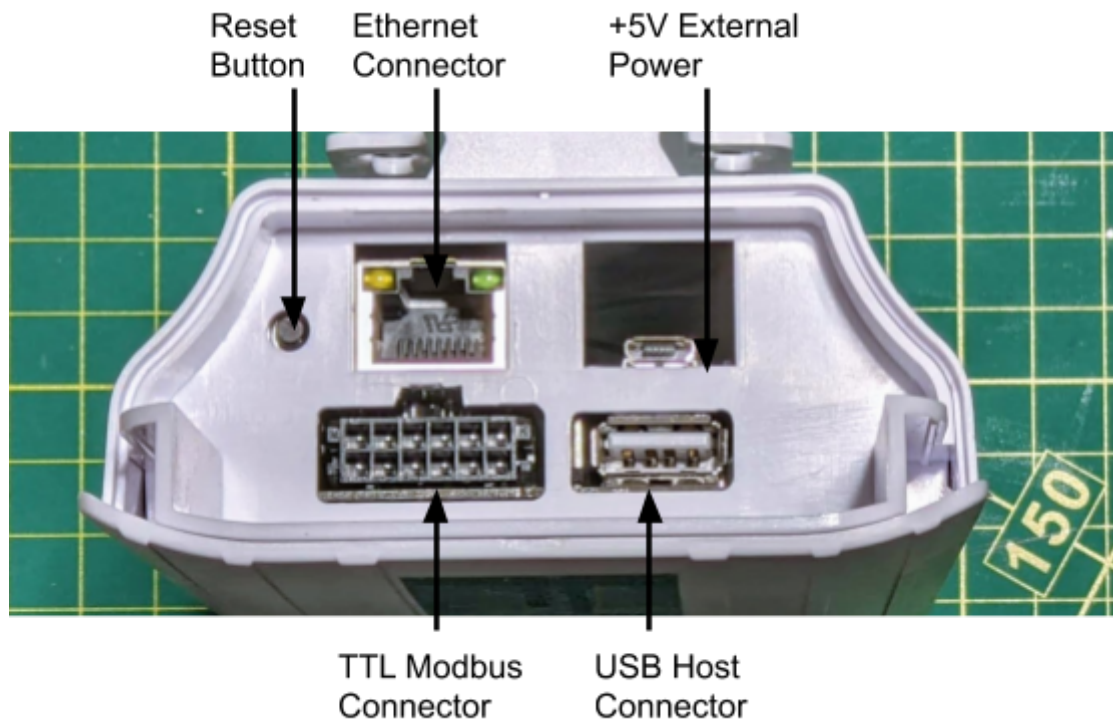
- The IOTGateway can be powered directly through the TTL Modbus connector. The external supply range is from +6VDC to +18VDC (details of the connector pinout can be found in section 7)
 - The TTL Modbus connector also provides an isolated power fail detection circuit to provide an alert when the main power fails and the IOTGateway is powered from the external battery backup supply.
- Macro USB power supply, powered by the 5V/1A DC.



Warning: The IOT can only use one of the two power supplies at the same time. Please don't insert two power supplies at the same time, otherwise the IOTGateway may be damaged.

6. External connectors

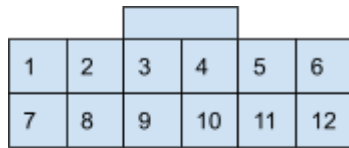
The following connectors are located in the covered section at the base of the IOTGateway



7. TTL Modbus Connector Pinout

The IOTGateway includes a TTL Modbus connector as shown below to allow the Gateway to communicate with an external industrial device such as a refrigerator or freezer.

The following image shows the connector pinout.



1	2	3	4	5	6
7	8	9	10	11	12

Pinout shown looking into the front of the connector

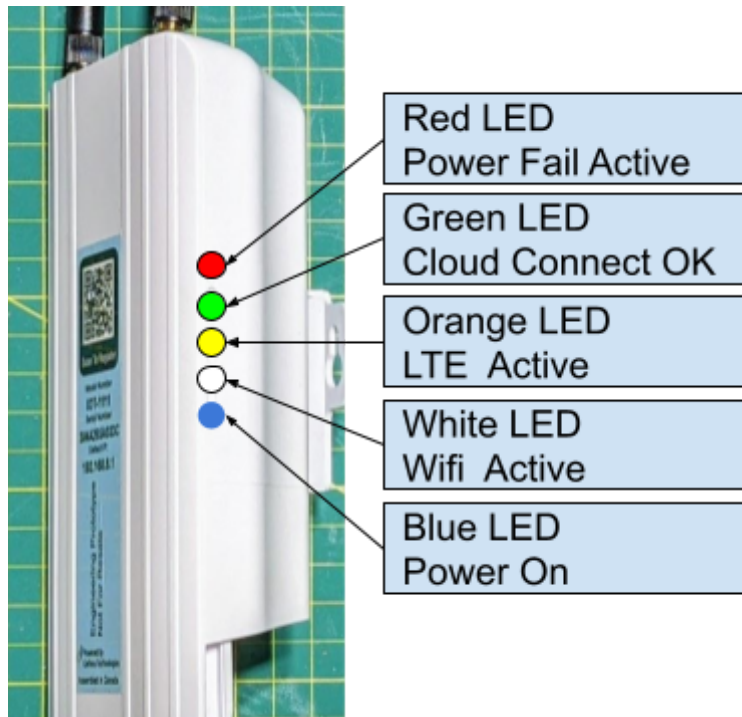
Connector Part Number - Molex 0430451200

Mating Connector Part Number - Molex 430251200

Pin Number	Name	Name
1	UART 1 TX	UART 1 TTL Transmit Signal 5V Max
2	UART 1 RX	UART 1 TTL Receive Signal 5V Max
3	UART 1 TX	UART 2 TTL Transmit Signal 5V Max
4	UART 1 RX	UART 2 TTL Receive Signal 5V Max
5	GPIO1	Optically isolated general purpose input 12V Max
6	+VIN	+6V to +18V External Power Input
7	UART1 GND	UART 1 Ground Connection
8	UART1 VCC	UART1 Voltage Output +5V +/- 5%
9	UART2 GND	UART 2 Ground Connection
10	UART2 VCC	UART2 Voltage Output +5V +/- 5%
11	GPIO2	+6V to +18V External Power Input
12	GND	External Supply Ground

8. LED indicators

The gateway has 5 LED indicators. The LEDs are located to the right side of the case as shown below. The LEDs are located inside the plastic case to protect the water resistance of the case and can not be seen from the exterior of the case.



- Blue Indicator Light
 - Indicates that the IOTGateway is successfully powered.
- White Indicator Light
 - Indicates that the IOTGateway Wi-Fi interface is active
- Yellow Indicator Light
 - Indicates that the IOTGateway LTE interface is active
- Green Indicator Light
 - Indicates that IOTGateway is successfully connected to the Cloud Application
- Red Indicator Light
 - Indicates that a power fail has occurred and the unit is powered from the backup

9. Reset and Factory Reset

The RESET button is situated next to the ethernet slot on the gateway as shown below. The reset button can be pressed using a suitable tool such as paperclip.



- a) If the RESET button is pressed for less than 30 seconds a gateway REBOOT is initiated. The IOTGateway takes approximately -1 minute to reestablish a network connection and come back online after a reset.
- b) If the RESET button is pressed for more than 30 seconds a factory RESET is initiated. The factory reset erases all network credentials in addition to cleaning up local files and logs on the device. .

11. Procedure to Insert LTE SIM card

Please note: This procedure is only for IOTGateway with USB adapter and LTE module installed. The SIM card installation procedure is outlined below.

1. Start with the IOTGateway closed and face down.



2. Slowly slide the electronics assembly from the case being careful to prevent antenna cables being entangled. The SIM card connector is positioned to the underside of the LTE adapter board. Situate the SIM card as shown.



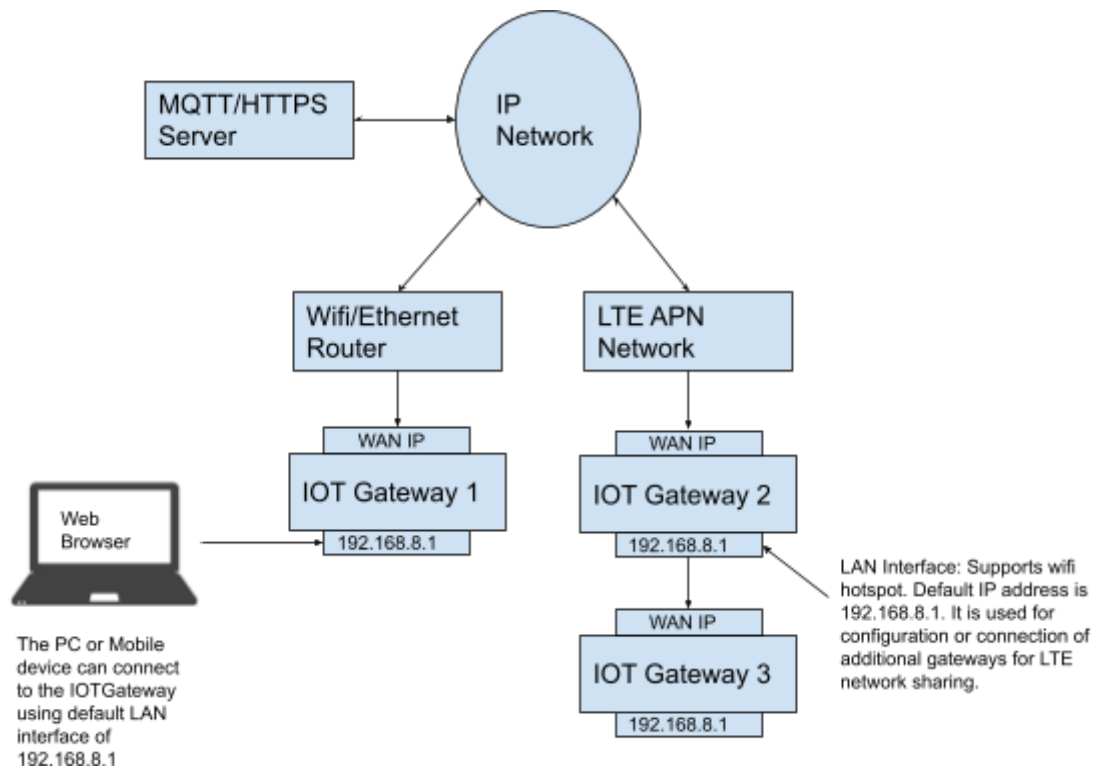
3. Push the SIM card into the connector using a suitable plastic tool.



4. Slide the electronics assembly back into the case being careful to prevent damage to internal components or antenna cables.
5. The SIM Card assembly process is now complete.

12. Network Architecture

The IOTGateway can be configured via a web application running on the device. A Chrome browser is recommended to use for the configuration either from a computer or mobile device. The web configuration tool running on the IOTGateway provides a variety of configuration settings such as Wi-Fi SSID and Password, LTE APN and Network connection (Wi-Fi, Ethernet, LTE)



As shown above, each base station has two interfaces with different IP addresses. One of these IP addresses (referred to as the WAN port) is used to connect to the internet network (MQTT server), which has a series of firewall rule protection. The other IP address (referred to as LAN port, also known as the intranet interface) is used for Wi-Fi hotspot broadcasting.

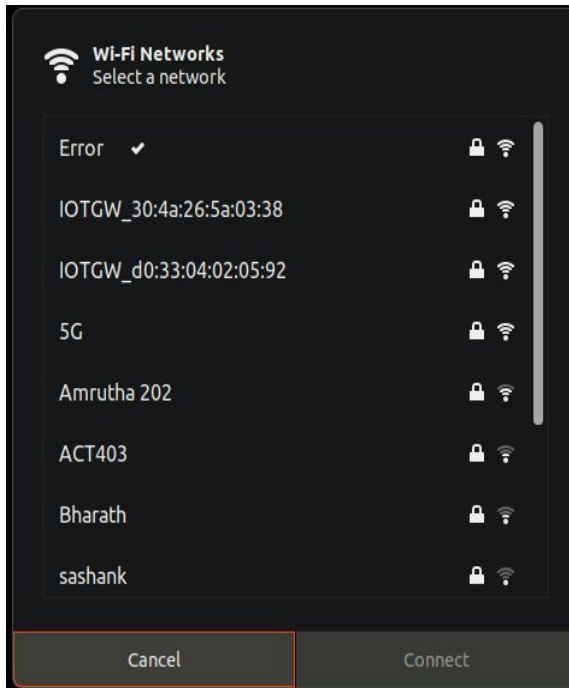
WAN Port: This interface supports Wi-Fi, ETH (network wire) or LTE Network. The IOTGateway can connect to a router via Wi-Fi or LAN network cable. Alternatively, if equipped with an LTE modem, the IOT Gateway can connect to the network via the LTE modem. In all cases the IP addresses are assigned by routers/Cellular Network. The base station is connected to the MQTT/HTTPs server through this interface. For WAN address IP address configuration see "12.2.1 configuring WAN port network connection".

LAN port: This interface only supports Wi-Fi. The default IP address of this interface is 192.168.8.1, a PC or mobile device can connect to this interface through Wi-Fi, or the next IOTGateway can connect to the internet via the upper layer IOTGateway.

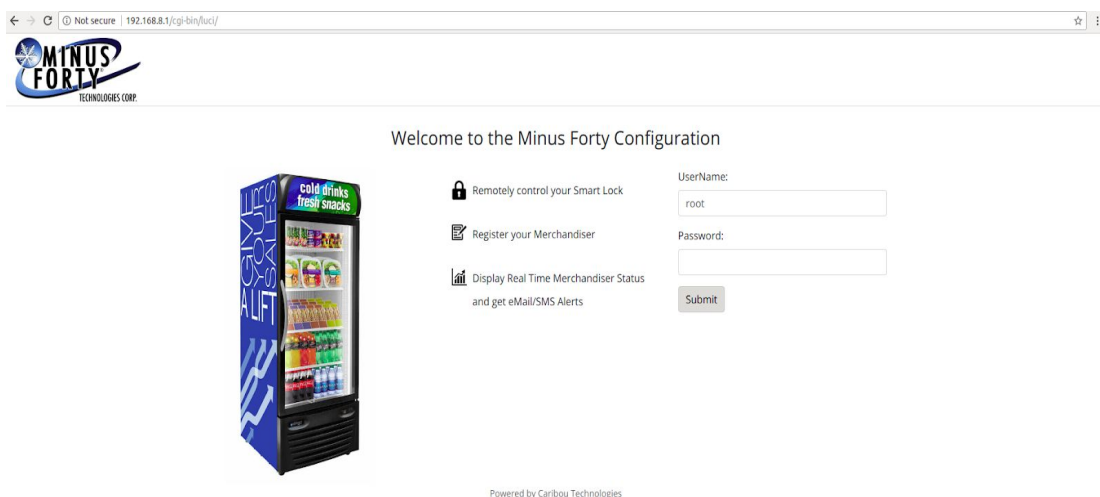
The gateway can only be configured through the Wi-Fi interface. Configuration via the ethernet port is not possible.

12.1 Connect to IOTGateway

After power on, the IOTGateway will automatically broadcast the Wi-Fi SSID using the default Wi-Fi name “IOTGW_?????????” where ?????????? is the serial number for the IOTGateway.



- Select the required IOTGateway. The Wi-Fi interface is secured using WPA encryption. The default password is set to “IOTGateway”. The default password can be modified in the configuration utility.
- The default IOTGateway configuration IP address is 192.168.8.1
- Login in to the IOTGateway configuration utility by typing <http://192.168.8.1> in the browser. The following logon screen will be displayed.
- Contact technical support for default Username and Password to log into the configuration utility



12.2 Network interface Configuration

12.2.1 Configure WAN interface

Tap on **Network** to go to the network configuration page. You can choose to connect to the internet network using Wi-Fi /Ethernet/LTE connection.

12.2.1.1 Connect to internet by Ethernet

The screenshot shows the 'Network' configuration page with the 'Network' tab selected. The 'Wan Mode' is set to 'Ethernet'. The 'Select Mode' is set to 'dhcp'. There is an 'Apply' button below the 'Select Mode' dropdown. The 'Broadcast SSID' checkbox is checked, and there is another 'Apply' button below it.

Wan Mode	Ethernet
Select Mode	dhcp
Apply	
Broadcast SSID	☒
Apply	

The IP address can be assigned as DHCP or static configuration.

12.2.1.2 Connect to internet by Wi-Fi

The screenshot shows the 'Network' configuration page with the 'Network' tab selected. The 'Wan Mode' is set to 'Wi-Fi'. The 'Nearby Wi-Fi' dropdown menu is open, showing a list of available Wi-Fi networks. The 'Password' field is empty. The 'Select Mode' dropdown menu is also open, showing a list of available modes. The 'Broadcast SSID' checkbox is checked, and there is an 'Apply' button below it.

Wan Mode	Wi-Fi
Nearby Wi-Fi	Tech_D0015645
Password	
Select Mode	ACT101478970183
Broadcast SSID	☒
Apply	

Admin Status Network Others Logout	
Wan Mode	Wi-Fi ▼
Nearby Wi-Fi	▼ 
Password	
Select Mode	dhcp ▼
Connect	
Broadcast SSID	☐
Apply	

Note: The device cannot connect to an WPA2-PSK (AES) encrypted network.

Connect to a hidden Wi-Fi AP:

You may see some Wi-Fi names like mac addresses; it means that Wi-Fi has been hidden. You should input the Wi-Fi name and password if you want to connect to it.

Wan Mode	Wlan ▼
Nearby WLAN	1e:bc:5a:8f:d3:c0 100 ▼ 
Name	
Password	
Mode	dhcp ▼
Apply	



If your Wi-Fi AP name does not appear in the nearby WLAN list, please try to reboot the IOTGateway. (you can reboot the device from the “Others” tab)

12.2.1.3 Connect to internet by LTE

Admin	Status	Network	Others	Logout
-------	--------	---------	--------	--------

Wan Mode	LTE
APN name	*****
Username (optional)	
Password (optional)	
Authentication (optional)	1(PAP)
Save	
ConnectLTE	
Broadcast SSID	☒
Apply	
Hotspot	Enable ☐ Disable ☒
Apply	



Please make sure your SIM card is inserted into the IOTGateway.

12.2.1.4 Setting Up a Hotspot to share and LTE Network Connection

The Hotspot box must be enabled in the Network tab to allow for LTE network sharing. If hotspot sharing has been selected, additional IOTGateways can connect to the LTE IOTGateway over Wi-Fi and access the internet via the shared LTE connection.

12.3 Configure IOTGateway Wi-Fi AP

The AP LAN IP address can be changed from the following screen.

Admin	Status	Network	Others	Logout
-------	--------	---------	--------	--------

MAC	D0:33:04:02:05:94
NetWorkMode	repeater
Eth WAN IP	N/A
WLAN WAN IP	192.168.0.1

AP CONFIGURATION

AP SSID	IOTGW_d0:33:04:02:05:92
AP LAN IP	192.168.8.1
AP Password	***** 

12.4 Modifying the Web Portal Login Password

The following page can be used to configure a new user password

Admin	Status	Network	Others	Logout
-------	--------	---------	--------	--------

Password Change

Password	
Confirm	

Reboot

Reboot	Reboot
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FCC Warning

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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ☒ Reorient or relocate the receiving antenna.
- ☒ Increase the separation between the equipment and receiver.
- ☒ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ☒ Consult the dealer or an experienced radio/TV technician for help.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.