LINOVISION

IOT-EC01

User Manual

Updated on July 1, 2025

IOT-EC01 User Manual

1. Introduction

1.1 Overview

The IOT-EC01 edge IoT controller is built on the high-performance Raspberry Pi CM4 platform, featuring a quadcore A72 processor with a maximum support of 8GB RAM and 32GB eMMC. Equipped with dual Ethernet interfaces that can be flexibly configured, it also includes 3 isolated RS485 channels supporting BACnet, Modbus RTU, Modbus TCP/IP ,and KNX protocols.

With robust IoT network communication capabilities, the IOT-EC01 supports multiple wireless communication options including 4G, LoRa®, Wi-Fi/BLE, allowing for flexible configurations to serve as corresponding wireless gateways. This controller is well-suited for remote device management, energy management, and various other scenarios in the field of smart buildings.

Application

This controller is designed for managing and controlling devices in subsystems such as HVAC, lighting, and power distribution of smart buildings, making it suitable for both new constructions and retrofitting applications.

1.2 Feature

Designed for Building Automation System

- Multiple isolated RS485 channels supports high and low speeds communication.
- Supports BACnet, Modbus RTU, Modbus TCP/IP and KNX protocol
- Up to 8GB RAM supports the processing of thousands of data points, ensuring efficient performance
- Clear dual-sided LED indicators help check operational status quickly
- High-quality metal case, compatible with DIN-rail and Wall installation

Powerful Performance

- Powered by Raspberry Pi CM4
- Broadcom BCM2711 quad-core Cortex-A72 (ARM v8) 64-bit SoC @1.5GHz
- Up to 8GB RAM and 32GB eMMC

Rich Wireless Capabilities

- On-chip Wi-Fi
- On-chip BLE
- Mini-PCIe1: LTE
- Mini-PCIe2: SPI LoRa®

Rich Interfaces

- 3x RS485 (isolated)
- 1x 10M/100M/1000M Ethernet (Support PoE*)
- 1x 10M/100M Ethernet
- 1x HDMI 2.0
- 2x Type-A USB2.0
- 1x Type-C USB2.0 (USB console for OS update)
- 1x SIM card slot

Safety and Reliability

- Hardware Watchdog
- UPS Supercapacitor(optional)
- Metal casing with PC side panels
- ESD: EN61000-4-2, level 3
- EFT: EN61000-4-4, level 2
- Surge: EN61000-4-5, level 2
- Production Lifetime: IOT-EC01 will remain in production until at least December 2030

1.3 Specification

Parameter	Description
Hardware Specification	
CPU	Raspberry Pi CM4, Quad-core Cortex-A72@ 1.5GHz
Operating System	Raspbian, Debian
RAM	8GB

Storage	32GB eMMC
Interface	
Ethernet Port	1 * 10/100/1000 Mbps (Supports PoE*)
	1 * 10/100 Mbps IEEE802.3/802.3u
USB	2 * USB-A 2.0 Host
	1 * USB-C 2.0 (for flashing OS)
Serial Port	3 * RS485(lsolated)
HDMI	1 * HDMI 2.0
SlM Card	1 * Standard SlM Card Slot
SSD Card	1 * M.2 NVMe SSD Slot 2280-M Key
LED	6 * LED indicators
Buzzer	1
Reset Button	1
Wireless Communication	
Wi-Fi	On-chip Wi-Fi 2.4/5.0 GHz
BLE	On-chip BLE 5.0
LoRa®	SPI LoRa®
4G Cellular	4G LTE
Standards	
EMC	ESD: EN61000-4-2, Level 3; EFT: EN61000-4-4, Level 2; Surge: EN61000-4-5, Level 2
Certification	CE, FCC, TELEC, ROHS, REACH
Ambient Conditions	
Ingress Protection	IP40
Operating Temperature	-30~70°C
Operating Humidity	10~95% RH
Storage Temperature	-40~80°C

System	
Power input	AC 12~24 V/DC 9~36 V, 2-pin Terminal Block
PoE(as powered device)	IEEE 802.3af Standard 12.95 W PoE
Power Consumption	Idle: 2.88 W; Full Load: 5.52 W
Power switch	No
Reboot Switch	Yes
Other	
Hardware Watch Dog	1~255s
RTC	High Accuracy RTC
Security	ATECC608A
Heat Dissipation	Fanless
Warranty	2 years
Production Lifetime	Until December 2030

1.4 Dimension

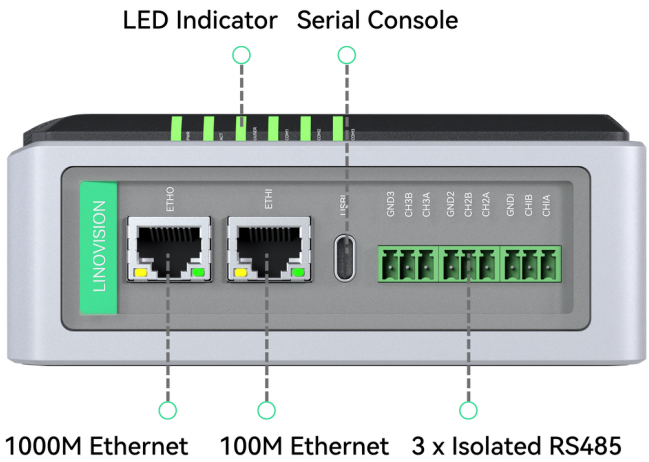
Mechanical	
Dimension(W x H x D)	130 mm x 93 mm x 49.5 mm
Enclosure	6061 Aluminum Alloy Casing with Transparent PC Side Panels
Mounting	DIN-rail/Wall
Weight(Net)	560g

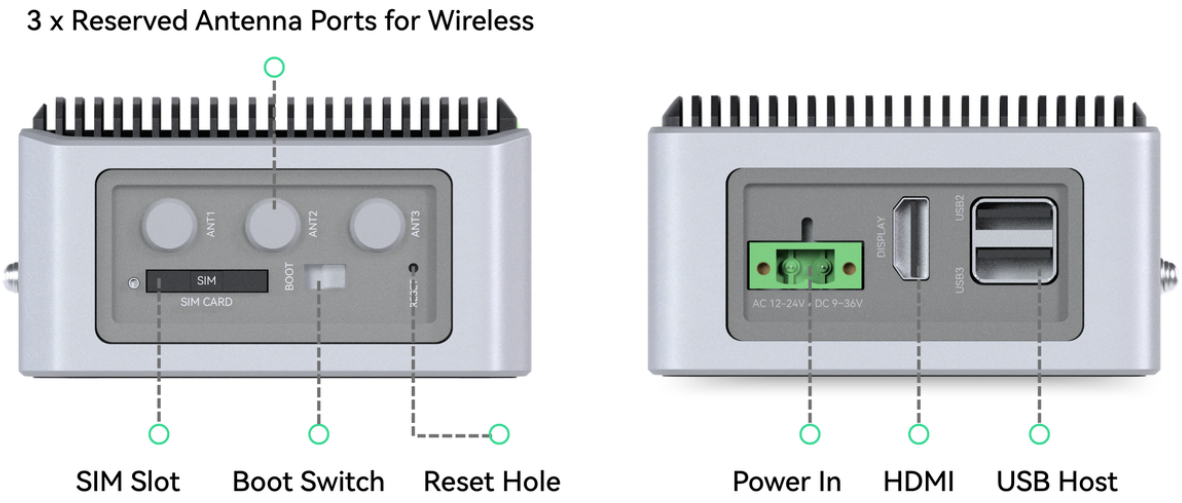
Weight:545g (1.20 lb)

2. Hardware Overview

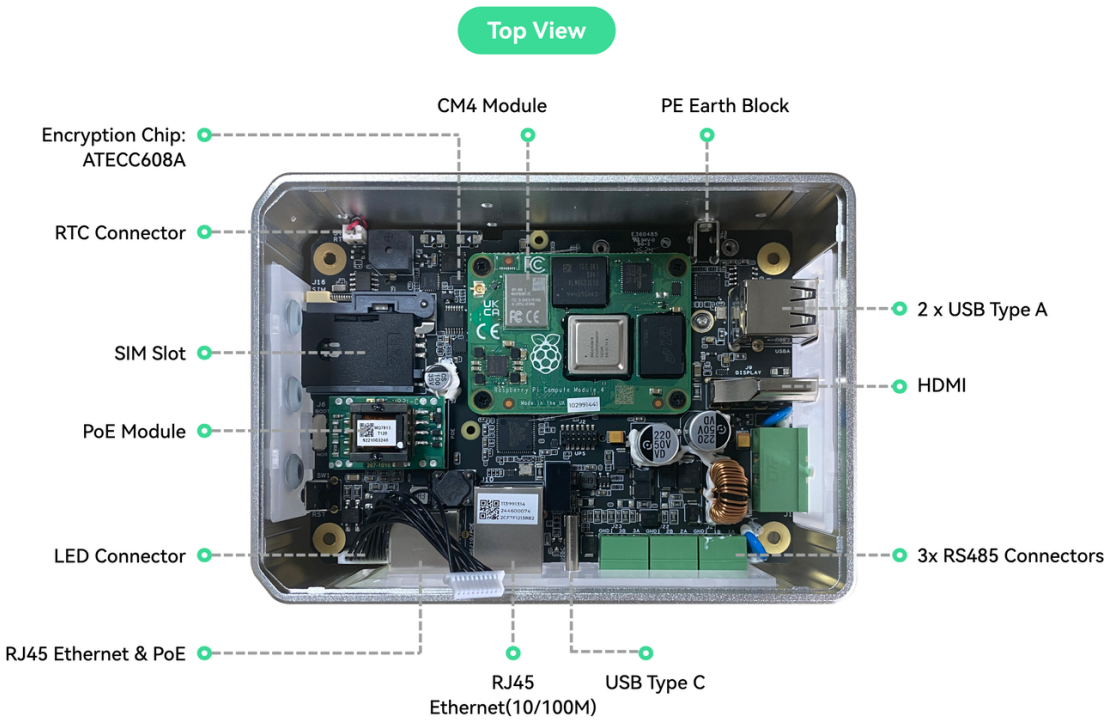
2.1 System Overview

2.1.1 Interface Overview

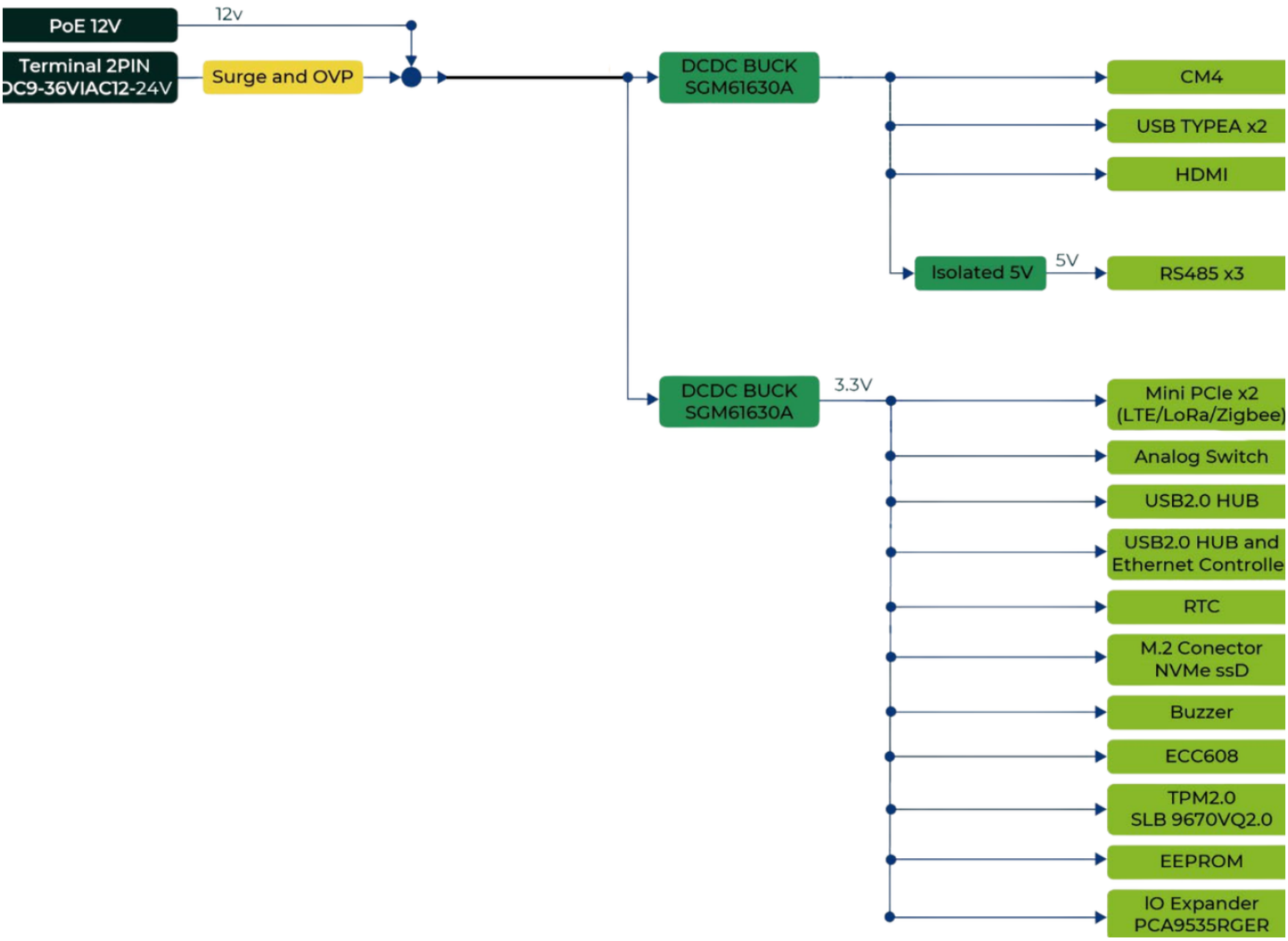




2.1.2 Mainboard Overview



2.1.3 Power Diagram



The IOT-EC01 supports three power supply options: AC, DC terminal and PoE port. This provides flexibility in power supply selection and allows for easy integration with various power sources.

2-Pin Power Terminal

The IOT-EC01 is supplied with a nominal AC voltage of 12~24 V or DC voltage of 9~36V. The power supply is connected via the 2-pin power terminal block connector **(regardless of positive and negative).** To ground the IOT-EC01, the ground wire can be secured to the screw located at the top left corner of the power terminal.

PoE

With the PoE module installed, the ETH0 port of IOT-EC01 can support PoE power supply, providing a convenient and efficient way to power the device over Ethernet. This option simplifies the installation process and reduces the amount of cabling required, making it an ideal solution for applications with limited power sources or where power outlets are not readily available.

- PoE input: Range 44~57V; Typical 48V
- PoE output: 12V, 1.1A Max.

Note

It's worth noting that the PoE module provided with the IOT-EC01 is compliant with the IEEE 802.3af standard and can provide a maximum power supply of 12.95W. Therefore, if there is a need to connect high-power peripherals such as SSD or 4G modules, the PoE power supply may not be sufficient. In this case, it's recommended to use the AC/DC terminal for power supply instead to ensure stable and reliable operation of the device.

Power Consumption

Please refer to the table below for the tested power consumption of IOT-EC01. Please note that this value is for reference only, as the test methods and environment can result in variations in the results.

Status	Voltage	Current	Power Consumption	Description
Shutdown	24V	51mA	1.224W	Static power consumption test in shutdown and power-off state.
Idle	24V	120mA	2.88W	To test the input current when supplying 24V power to the IOT-EC01 device without running any test programs.
Full Load	24V	230mA	5.52W	Configure CPU to run at full load using the "stress -c4" command. No external devices

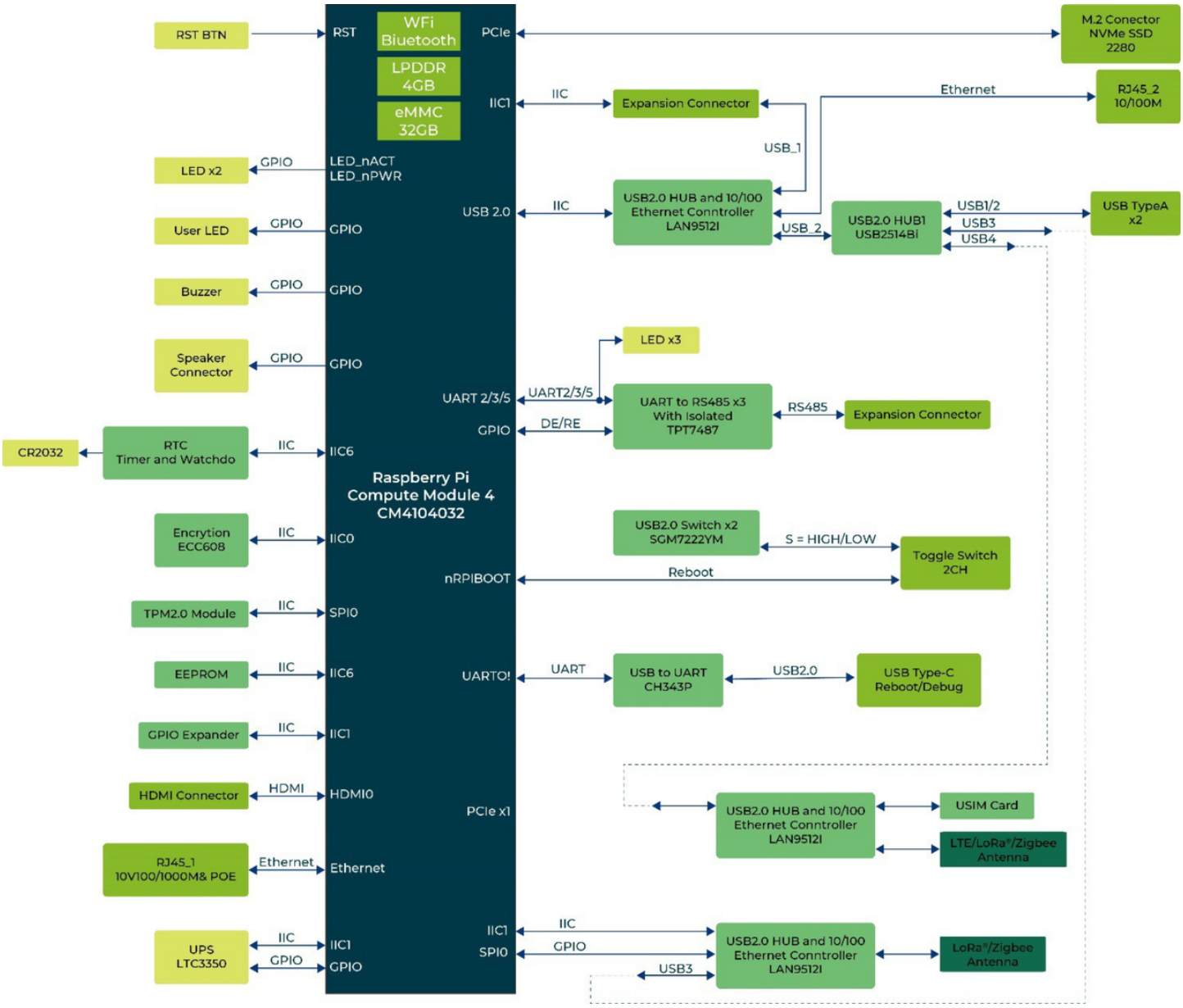
				connected.

Power On and Power Off

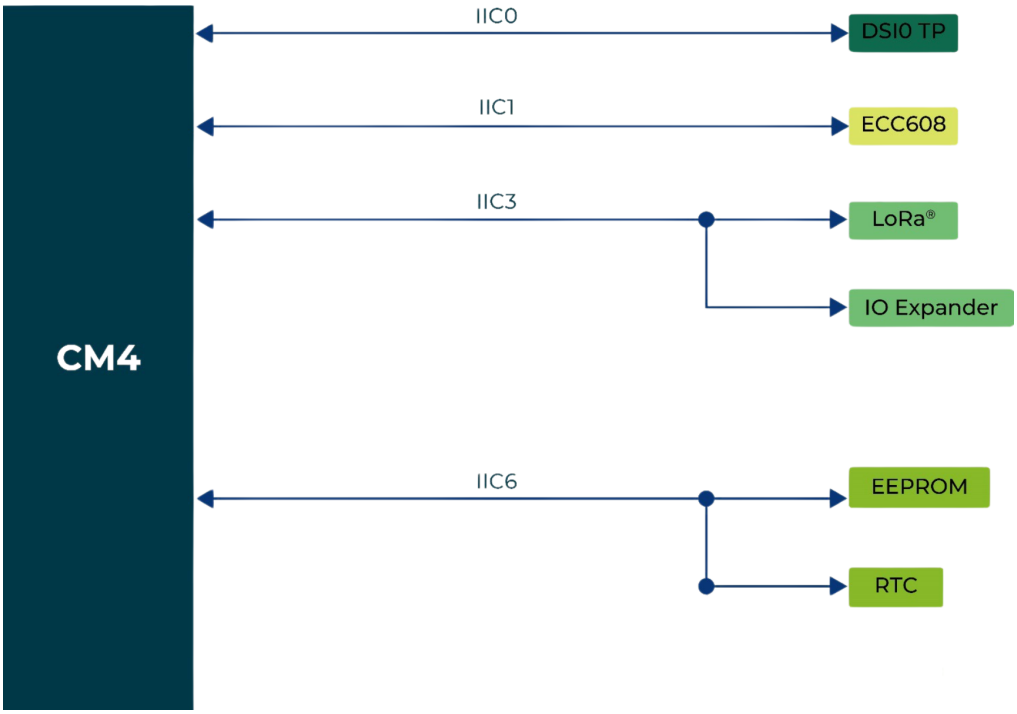
The IOT-EC01 does not come with a power button by default, and the system will automatically start up once power is connected. When shutting down, please select the shutdown option in the operating system and wait for the system to fully shut down before cutting off power. To restart the system, simply reconnect to the power.

The power solution utilizes a bridge rectifier diode for reverse polarity protection and is compatible with both AC and DC inputs. This ensures that **regardless of how the power supply's positive and negative terminals** are connected, the circuit will not be damaged. By using a bridge rectifier, the output voltage polarity remains fixed irrespective of the input DC polarity, providing effective reverse polarity protection.

2.1.4 Block Diagram



2.1.5 IIC Diagram



2.2 Interface Description

Interface	
Ethernet Port	1 * 10/100/1000 Mbps (Supports PoE)
	1 * 10/100 Mbps IEEE802.3/802.3u
USB	2 * USB-A 2.0 Host
	1 * USB-C 2.0 (for flashing OS)
Serial Port	3 * RS485(Isolated)
HDMI	1 * HDMI 2.0
SIM Card	1 * Standard SIM Card Slot
SSD Card	1 * M.2 NVMe SSD Slot 2280-M Key
LED	6 * LED indicators
Buzzer	1
Reset Button	1

2.2.1 LED Indicator Status

The IOT-EC01 features 6 LED indicators that serve to signal the machine's operational status. Please refer to the table below for the specific functions and status of each LED:

LED Indicator	Color	Status	Description
PWR	Green	On	The device has been connected to power.
		Off	The device is not connnected to power.
ACT	Green		Under Linux this pin will flash to signify eMMC access. If any error occurs during booting, then this LED will flash an error pattern which can be decoded using the look up table(Raspberry Pi Documentation - Configuration) on the Raspberry Pi website.
USER	Green/Red/Blue		Need to be defined by user.
RS485-1	Green	Off	No data transfer on RS485 channel 1.
		Blink	RS485 channel 1 is receiveing or sending data.
RS485-2	Green	Off	No data transfer on RS485 channel 2.
		Blink	RS485 channel 2 is receiveing or sending data.
RS485-3	Green	Off	No data transfer on RS485 channel 3.
		Blink	RS485 channel 3 is receiveing or sending data.

ACT Status table

Long flashes	Short flashes	Status
0	3	Generic failure to boot
0	4	start*.elf not found
0	7	Kernel image not found
0	8	SDRAM failure

0	9	Insufficient SDRAM
0	10	In HALT state
2	1	Partition not FAT
2	2	Failed to read from partition
2	3	Extended partition not FAT
2	4	File signature/hash mismatch - Pi 4
4	4	Unsupported board type
4	5	Fatal firmware error
4	6	Power failure type A
4	7	Power failure type B

If the ACT LED blinks in a regular four blink pattern, it cannot find bootcode(start.elf).

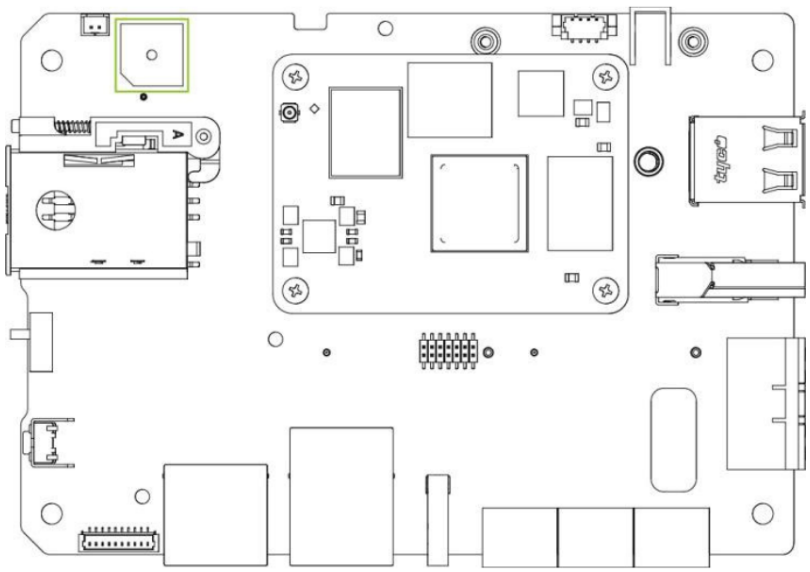
If the ACT LED blinks in an irregular pattern then booting has started.

If the ACT LED doesn't blink, then the EEPROM code might be corrupted, try again without anything connected to make sure. For more detail please check the Raspberry Pi forum:

STICKY: Is your Pi not booting? (The Boot Problems Sticky) - Raspberry Pi Forums.

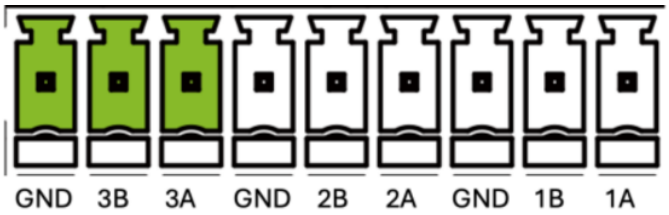
For more detail please check the Raspberry Pi forum:
https://forums.raspberrypi.com//viewtopic.php?f=28&t=58151

2.2.2 Buzzer



The IOT-EC01 features an active buzzer, which can be used for various purposes such as alarm and event notifications.

2.2.3 RS485



The IOT-EC01 is equipped with 3 sets of RS485 interface using 3-pin connector, which is isolated for both signal and power to ensure safe and reliable operation in industrial and automation applications. The RS485A and RS485B signals are isolated using capacitive isolation, which provides excellent EMI immunity and meets the high-speed communication requirements of the RS485 interface.

Note

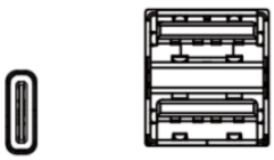
The RS485 interface uses an isolated power supply, which means that the ground signal for external devices connected to the RS485 interface should be connected to the GND_ISO pin.

2.2.4 Boot Switch

The Boot Switch of the IOT-EC01 is connected to the nRPI_BOOT pin of CM4. This switch provides users with the option to select the boot source between eMMC and USB. In normal mode, the switch should be set away from the side with the "BOOT" label, enabling the system to boot from eMMC. Conversely, when users need to flash the system image, they should set the switch towards the "BOOT" label, allowing the system to boot from the Type-C USB interface.

Switch Position	Mode	Description	nRPI-BOOT
	Normal mode	Boot from eMMC	Low
	Flash mode	Boot from USB	High

2.2.5 USB



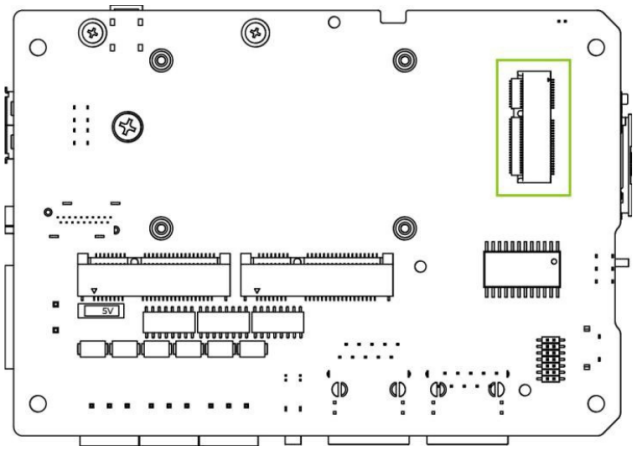
The IOT-EC01 is equipped with one USB Type-C port and two USB Type-A ports. Please refer to the table below for their functions and descriptions.

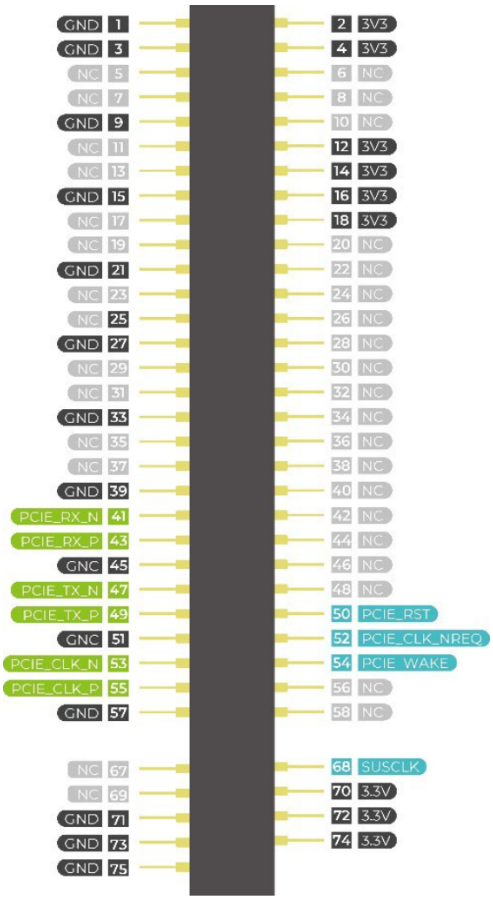
Type	Quantity	Protocol	Function	Description
Type-C	*1	USB2.0	USB-Device	Used for serial port debugging, burning image, etc.
Type-A	*2	USB2.0	USB-Host	Connect different USB devices such as flash drives, USB keyboards or mouses.

2.2.6 SIM Slot

The IOT-EC01 uses a standard-size SIM card slot commonly found in industrial applications, which requires a standard SIM card with dimensions of 25mm x 15mm.

2.2.7 SSD Slot





The SSD slot on the IOT-EC01 is designed to accommodate NVMe M.2 2280 SSDs for 128GB, 256GB, 512GB and 1TB in capacity. This slot allows for high-speed storage expansion, enabling users to enhance the performance and capacity of their system.

Note

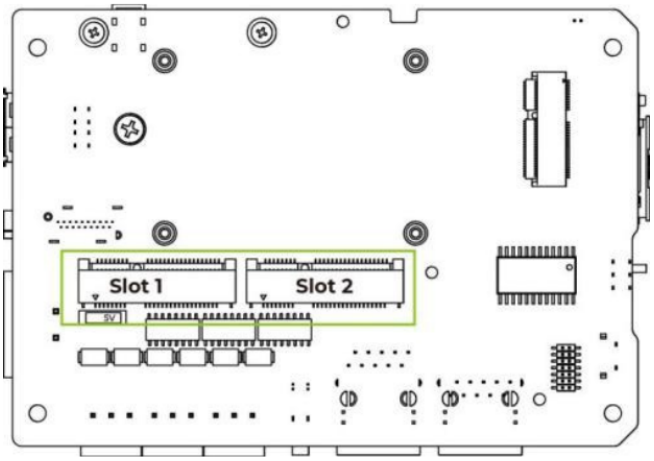
There are two main uses for SSD cards:

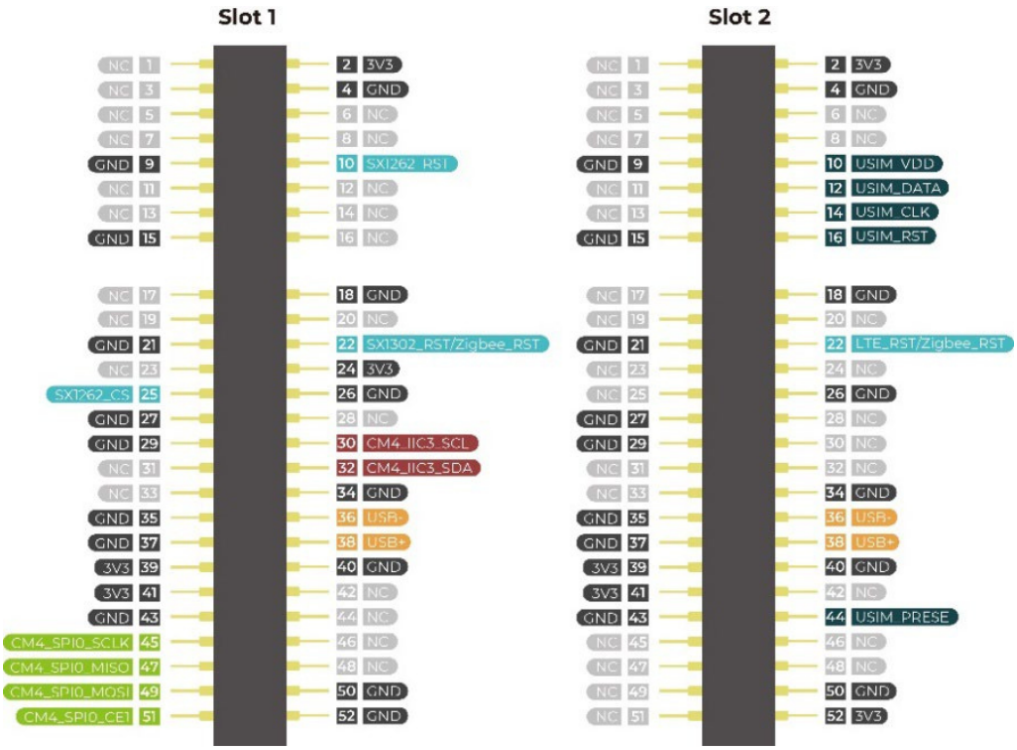
*1. **High Capacity Storage:** SSD cards can be utilized for high-capacity storage needs.*

*2.**Boot Drive with Image:** Another usage involves using the SSD both as a high capacity storage and for storing system images, allowing booting directly from the SSD card.*

It's important to note that not all SSD cards available in the market support the second usage. This model has been tested and verified for boot functionality, reducing the risk of compatibility issues and minimizing trial and error costs.

2.2.8 Mini-PCIe Slot





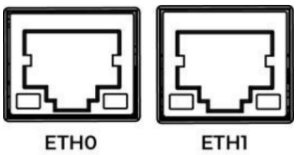
Slot	Supported Protocol
Mini-PCIe 1	4G LTE
Mini-PCIe 2	SPI LoRa®

This device features two Mini-PCIe interfaces, namely Mini-PCIe Slot 1 and Mini-PCIe Slot 2. Slot 1 connects to SIM card slot, while Slot 2 supports SPI protocols but doesn't connect to SIM card slot. Therefore, 4G LTE device can be connected through Slot 1, while SPI LoRa® device can be connected through Slot 2.

2.2.9 Reset Hole

There is a Mini Push Button Switch located in the reset hole of IOT-EC01. By pressing this button with a thin object, the CM4 can be reset. This pin when high signals that the CM4 has started. Driving this pin low resets the module.

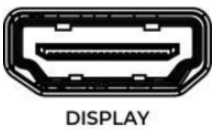
2.2.10 Ethernet RJ45



Name	Type	Speeds	PoE
ETH0	CM4 native Gigabit Ethernet	10/100/1000 Mbit/s	Supported (with additional module)
ETH1	Converted from USB	10/100 Mbit/s	Not Supported

The IOT-EC01 comes with two Ethernet RJ45 ports. ETH0 is a CM4 native Gigabit Ethernet interface that supports three different speeds: 10/100/1000 Mbit/s. An additional PoE module can be purchased to enable power-over-Ethernet (PoE) delivery through this interface, providing power to the IOT-EC01. Another one ETH1 supports 10/100 Mbit/s which is converted from USB.

2.2.11 HDMI



The IOT-EC01 features a native HDMI interface from CM4, supporting up to 4K @ 60 fps video output. It is ideal for applications that require multiple displays, allowing users to output their content to external large screens.

2.2.12 RTC

The IOT-EC01 features an RTC circuit that comes pre-installed with a CR2032 battery, enabling it to maintain timekeeping functionality even in the event of power loss.

2.2.13 Watchdog

The IOT-EC01 comes equipped with an independent hardware watchdog circuit that ensures automatic system reboot in case of abnormal system crashes. The watchdog circuit is implemented through RTC and allows for flexible feeding times from 1 to 255 seconds.

2.2.14 PoE

The IOT-EC01 can support the IEEE 802.3af PD (Powered Devices) standard by adding a PoE power supply module. Users need to disassemble the device to install the PoE module for Ethernet PoE function. For guidance on disassembly, please refer to section "4.1 Disassembly Guide."

2.3.15 SSD

The IOT-EC01 supports 2280 NVMe SSD through the use of a PCIe slot(J62) below two Mini-PCIe slots on board. It is important to note that the CM4's PCIe is Gen2.0 with a maximum theoretical speed of 5Gbps. If you are using a Gen3.0 or higher SSD, it may not be able to achieve the SSD's maximum speed. After testing, the IOT-EC01 with installed SSD can achieve a maximum write speed of 230 MB/s and a maximum read speed of 370 MB/s.

3. Configuring System

3.1 Wi-Fi Scanning

To scan for Wi-Fi networks:

```
代码块
1   sudo iwlist wlan0 scan
```

This command will list available Wi-Fi networks along with their details.

3.2 Bluetooth Scanning

To scan for Bluetooth devices:

```
代码块
1   sudo bluetoothctl
```

This command will open the Bluetooth control interface. From there, you can run additional commands to scan for nearby Bluetooth devices:

```
代码块
1   scan on
```

This command will start scanning for nearby Bluetooth devices. You can then use other commands within the ***bluetoothctl*** interface to interact with Bluetooth devices, such as pairing

or connecting to them.

3.3 LoRa® over Mini-PCIe

After install the LoRa® SPI to Mini-PCIe slot 2, can configure LoRa® SPI, follow these steps:

1. Clone the ***SX1302_HAL*** repository:

```
代码块
1   cd ~/
2   git clone https://github.com/Lora-net/sx1302_hal
```

2. Navigate into the cloned directory:

```
代码块
1   cd sx1302_hal
```

3. Modify the configuration file:

```
代码块
1   sudo vim ./libLoRagw/inc/LoRagw_i2c.h
```

Change ***#define I2C_DEVICE "/dev/i2c-1"*** to ***#define I2C_DEVICE "/dev/i2c-3".***

4. Compile the code:

```
代码块
1   sudo make
```

5. Modify the configuration code:

```
代码块
1   sudo vim ./tools/reset_lgw.sh
```

Update the pin configurations:

```
代码块
```

```
SX1302_RESET_PIN=580 # SX1302 reset
SX1302_POWER_EN_PIN=578 # SX1302 power enable
SX1261_RESET_PIN=579 # SX1261 reset (LBT / Spectral Scan)
```

6. Copy the reset_lgw.sh script

```
代码块
cp ~/sx1302_hal/tools/reset_lgw.sh ~/sx1302_hal/packet_forwarder/
```

7. replace the default ***SPI*** port of the LoraWAN® Module in the ***global_conf.json.sx1250.US915*** config file:

```
代码块
sed -i 's/spidev0.0/spidev0.1/g' global_conf.json.sx1250.US915
```

8. Start LoraWAN® Module

```
代码块
cd ~/sx1302_hal/packet_forwarder
sudo ./lora_pkt_fwd -c global_conf.json.sx1250.US915
```

These steps will configure LoRa® SPI and run the packet forwarder with the specified configuration file.

3.4 4G Cellular over Mini-PCIe

To interact with a 4G module using AT commands via minicom, follow these steps:

1. Open minicom with the appropriate serial port and baud rate:

```
代码块
sudo minicom -D /dev/ttyUSB2 -b 115200
```

This command opens minicom with the specified serial port (/dev/ttyUSB2) at a baud rate of 115200.

2. Once minicom is open, you can start sending AT commands to the 4G module. For example:

```
AT
```

This command checks if the module is responsive. You should receive an "***OK***" response if the module is working properly.

3. To dial a phone number using the 4G module, you can use the ATD command followed by the phone number:

```
代码块
ATD<phone_number>;
```

Replace <***phone_number***> with the desired phone number you want to dial.

Make sure to include a semicolon ; at the end of the command to indicate the end of the phone number.

3.5 RS485 Drivers

To drive RS485 individually, follow these steps for export and control. By default, the power enable port of the RS485 port is high. And each RS485 interface is in the accepting state. You can do a simple experiment.

The 485 port that connects the pc to the IOT-EC01.

Enter in the terminal of IOT-EC01:

```
代码块
cat /dev/ttyAMA2
```

Then send some data in the serial debugging tool of your computer, you can observe the data in the terminal window of IOT-EC01.

3.6 USB Hub Testing

To test the USB hub, you can use the following steps:

1. Check if the USB hub is detected by running the ***lsusb*** command. This command lists all connected USB devices, including hubs.

```
代码块
lsusb
```

Running this command should display information about the USB devices connected to your system, including any USB hubs that are present.

If the USB hub is functioning properly, you should see its details listed in the output of the ***lsusb*** command. If it's not listed, there may be an issue with the hub or its connection to the system. In such cases, you may need to troubleshoot the USB hub or its connections.

3.7 MAC Address of Ethernet

Use the following command to read the EEPROM of the Ethernet port (replace eth1 with the appropriate interface name):

```
代码块
1   sudo ethtool -e eth1 offset 0 length 512
```

This command will display the contents of the EEPROM, including the MAC address.

3.8 SSD

To list the disks, including the SSD, you can use the fdisk -l command. Here's how:

```
代码块
1   sudo fdisk -l
```

This command will display a list of all disks connected to your system, including the SSD if it's properly detected. Look for entries that represent your SSD. They typically start with ***/dev/sd*** followed by a letter (e.g., ***/dev/sda, /dev/sdb***, etc.).

Once you identify the entry corresponding to your SSD, you can proceed with partitioning or formatting it as needed.

3.9 Query GPIO Mappings

To query GPIO mappings and offsets, follow these steps:

1. Copy and paste the following command to query GPIO mappings:

```
代码块
1   cat /sys/kernel/debug/gpio
```

This command will provide you with the necessary information regarding GPIO mappings and offsets whenever needed throughout the process.

4. Assembly Guide

4.1 Disassembly Guide

Following these steps should help you disassemble the device without any issues.

Step 1: Remove the Four Screws at the Bottom:

- Locate and unscrew the four screws located at the bottom of the device using an appropriate screwdriver.

Step 2: Take Off the Floor Panel:

- Once the screws are removed, carefully lift off the floor panel from the device.

Step 3: Remove the Plastic Side Panels:

- Identify the plastic side panels on three sides of the device.
- Gently pry or unsnap each side panel from the device. If they are tight, you may need to use tools, but be careful not to damage the panels.

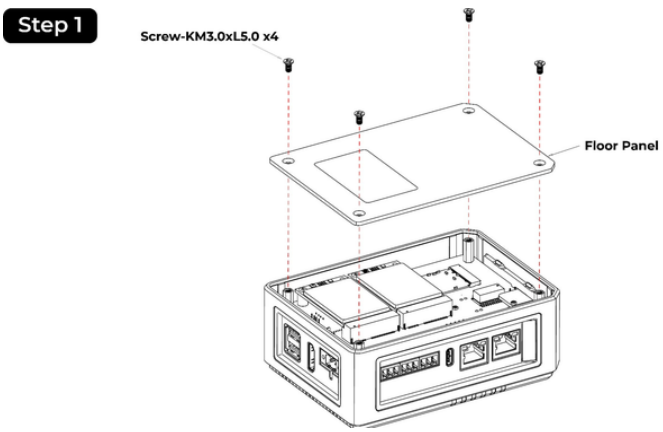
Step 4: Be Mindful of the Boot Switch Plastic Plate:

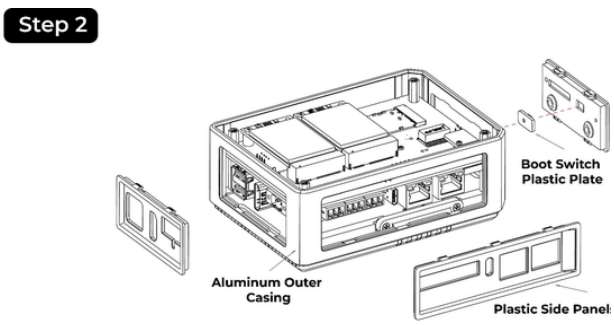
- Note the boot switch on one of the panels; it may have a small plastic plate attached.
- Ensure this plate doesn't fall off or get lost during the disassembly process.

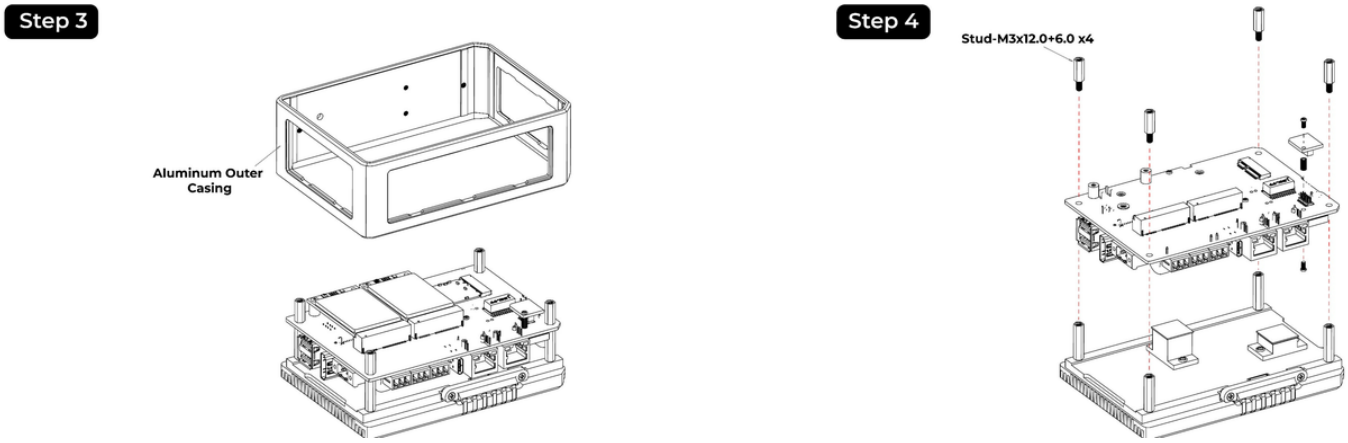
Step 5: Take Down the Aluminum Outer Casing:

- Once the side panels are removed, you can access the aluminum outer casing.
- Carefully lift and remove the aluminum casing from the device.

Step 6: Remove the four screws that secure the PCB in place



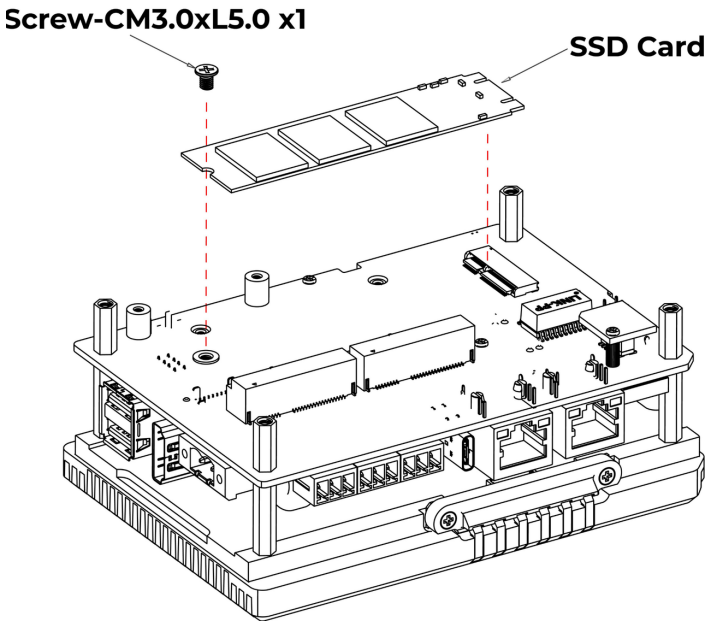




4.2 Assemble SSD

Step 1: Remove the back cover following the disassembly guide.

Step 2: Load the SSD into the M.2 socket and lock the screws.



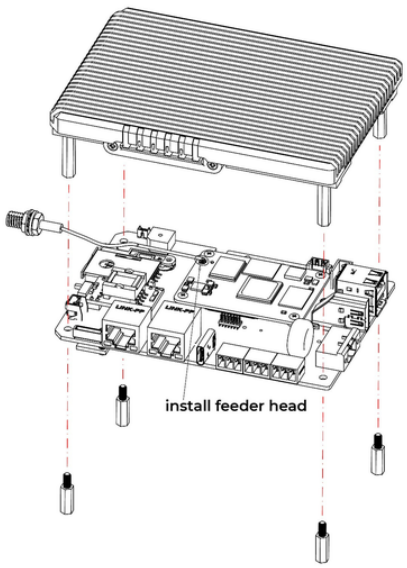
4.3 Assemble Wi-Fi/BLE Antenna

Step 1: Disassemble the entire device following section 4.1 "Disassembly Guide".

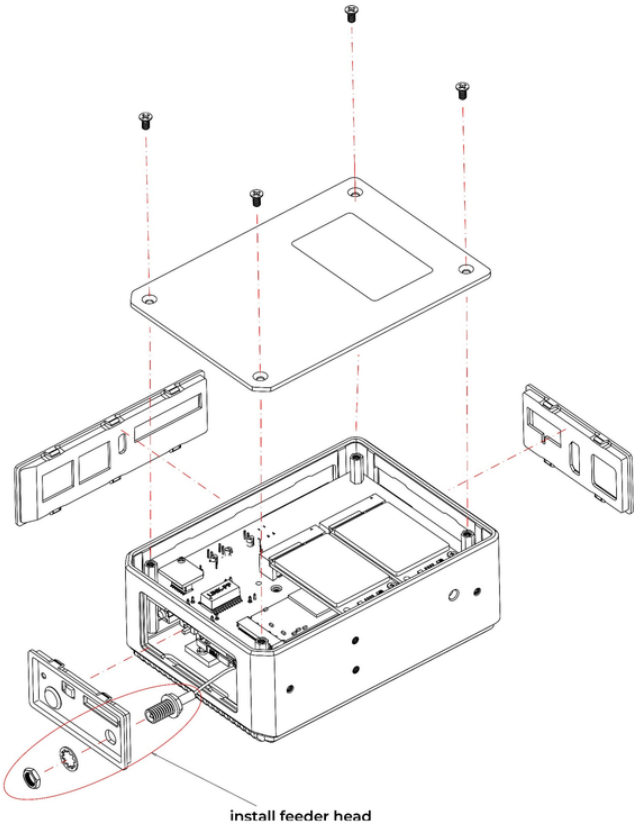
Step 2: Connect the feeder line from the CM4 module to antenna hole following the illustrastions below.

Step 3: Assemble the device for usage.

Step 1



Step 2



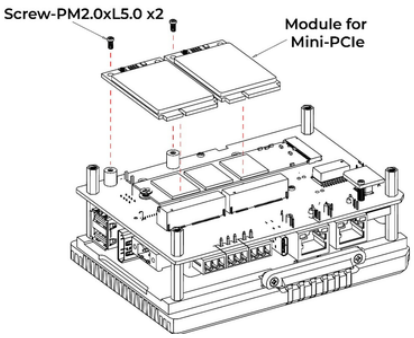
4.4 Assemble 4G/LoRa® Module and Antenna

Step 1: Make sure the module for Mini-PCIe slots is loaded above the SSD card.

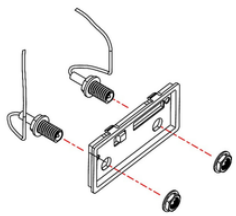
Step 2: Load the 4G module/LoRa® Module(following the matching relationship of each slot according to section"2.2.8") into the Mini-PCIe slot and lock the screws.

Step 3: Install the feeder line following the pictures below

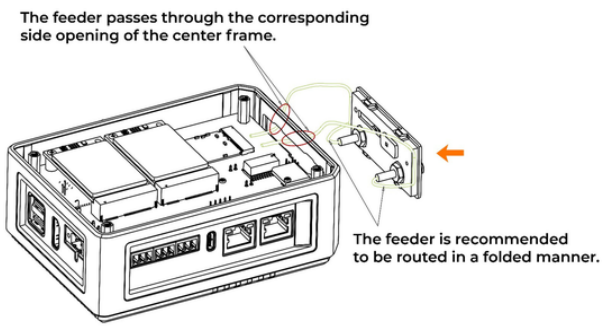
Step 1



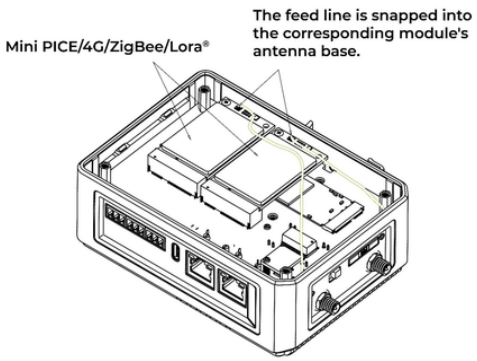
Step 2



Step 3



Step 4

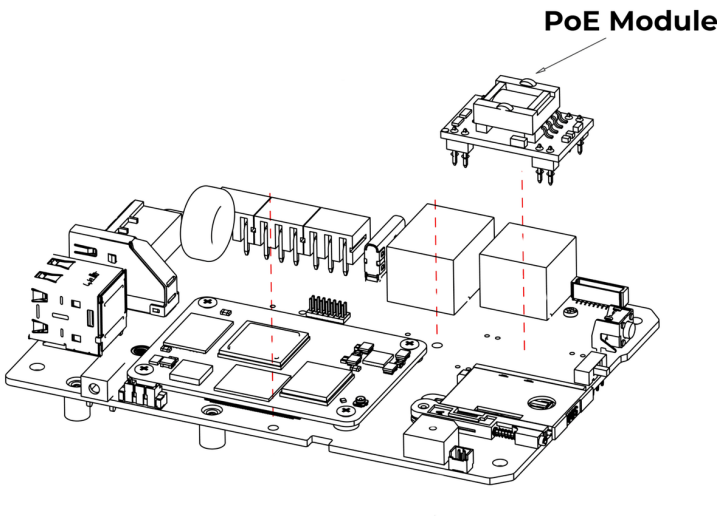


4.6 Assemble PoE module

Step 1: Before installing the PoE module on the CM4 module side of board, disassemble the entire device following the disassembly guide provided.

Step 2: Install the PoE Module

- Align the PoE module with the designated aperture on the board.
- Carefully solder the PoE module onto the board. Due to the compact nature of the board, exercise caution while soldering to avoid damaging nearby components.



4.5 Mounting Guide

4.5.1 DIN-rail Mounting Guide

IOT-EC01 offers various installation methods. The DIN-rail clip and installation screws are included in the

packaging. Follow the diagram to correctly attach the DIN-rail clip to the mounting holes on the side of the device. Once the screws are securely fastened, you can then install the device onto the mounting rail.

Step 1: Place the device and rail clip on the upper edge of the standard profile rail at the position shown and push the device down.

Step 2: Swing the rail clip of the device from below through the standard profile rail.

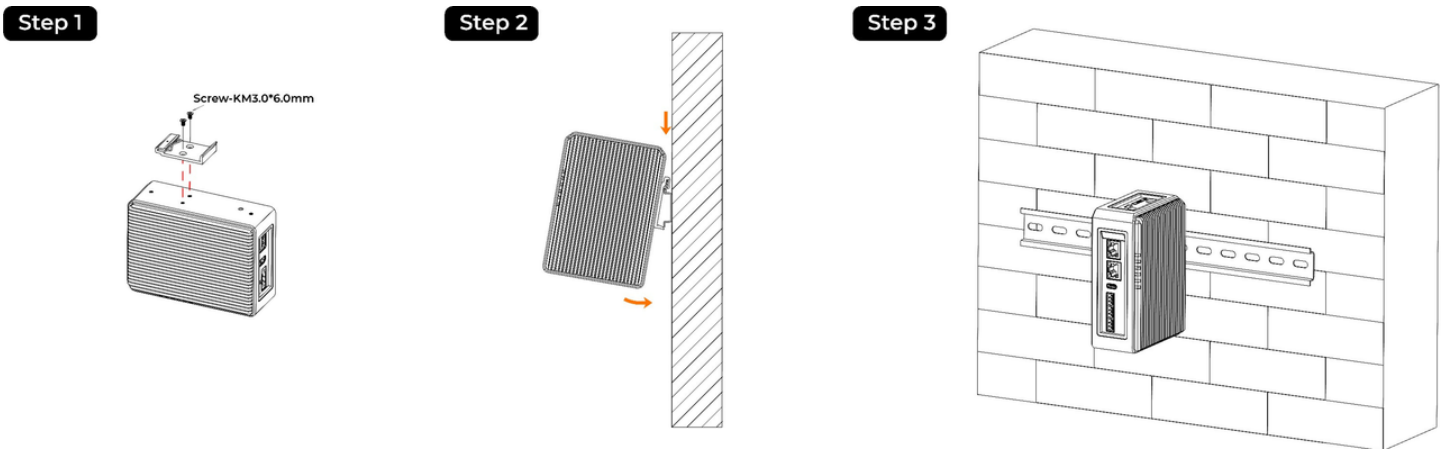
Step 3: Push the device in the direction of the standard profile rail. You will hear the device click into place.

Removing

Step 1: Push down the device until it is released by the rail clip.

Step 2: Swing the device out of the standard profile rail.

Step 3: Lift the device up and of



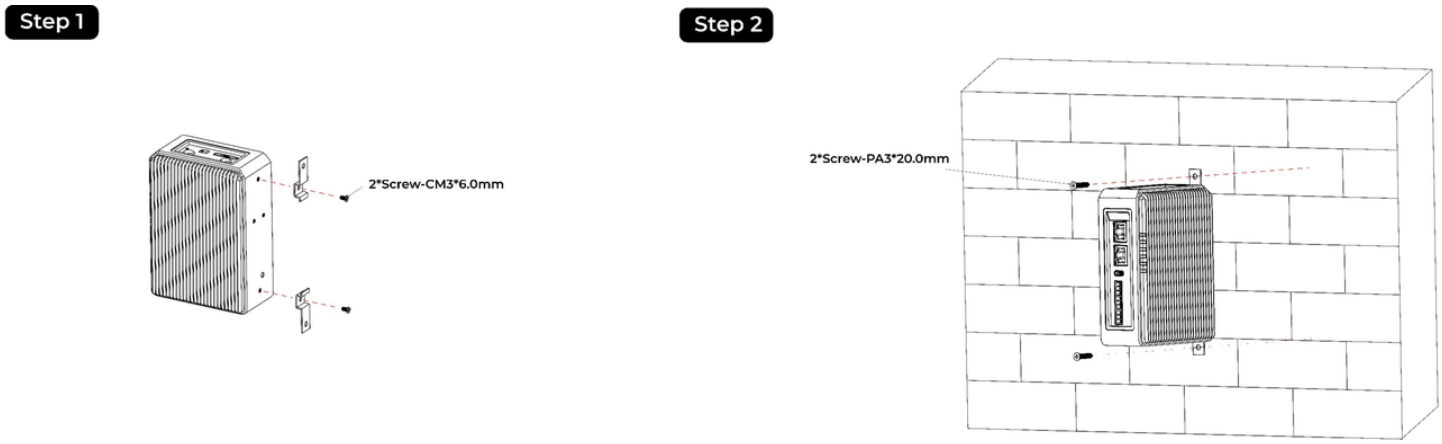
4.5.2 Wall Mounting Guide

Vertical mounting method is also suitable for IOT-EC01, however the mounting brackets are not included in box, that need additional purchase.

Step 1: Lay the mounting brackets on the rear of the device.

Step 2: Fasten the brackets with supplied screws.

Step 3: Mark the bore holes, drill the required holes in the wall and fasten the device to the wall using two screws.



5. Warranty

5.1 Warranty

1. From the date of sale, the company provides 24 months free warranty for the products.
2. Warranty coverage is limited to products purchased from the official Linovision website. Customers need to keep receipts and purchase vouchers.
3. The products to be repaired shall be properly packaged and transported, and the customer shall be responsible for any loss or damage during transportation.

4. During the warranty period, the freight and maintenance costs arising from product quality failures shall be borne by Linovision. If the warranty period exceeds 24 months, Linovision will charge the fee for replacing parts according to the product failure, and the freight is borne by the user.
5. During the free warranty period, in case of any of the following events, Linovision has the right to refuse service or charge materials and service fees at its discretion.

   Product failure or damage caused by improper use by users.

   The product label is damaged and the product information cannot be identified.

Even within the warranty period, if the product has functional issues or is difficult to repair due to improper customer use, unaut- horized disassembly or modification, poor operating environment, improper maintenance, accidents, or other reasons. Linovision reserves the right to make judgments on the above situations and collect maintenance fees.

Other unavoidable external factors cause product failure and damage.

The above warranty regulations are only applicable to the above Linovision IOT-EC01, other products are not applicable!