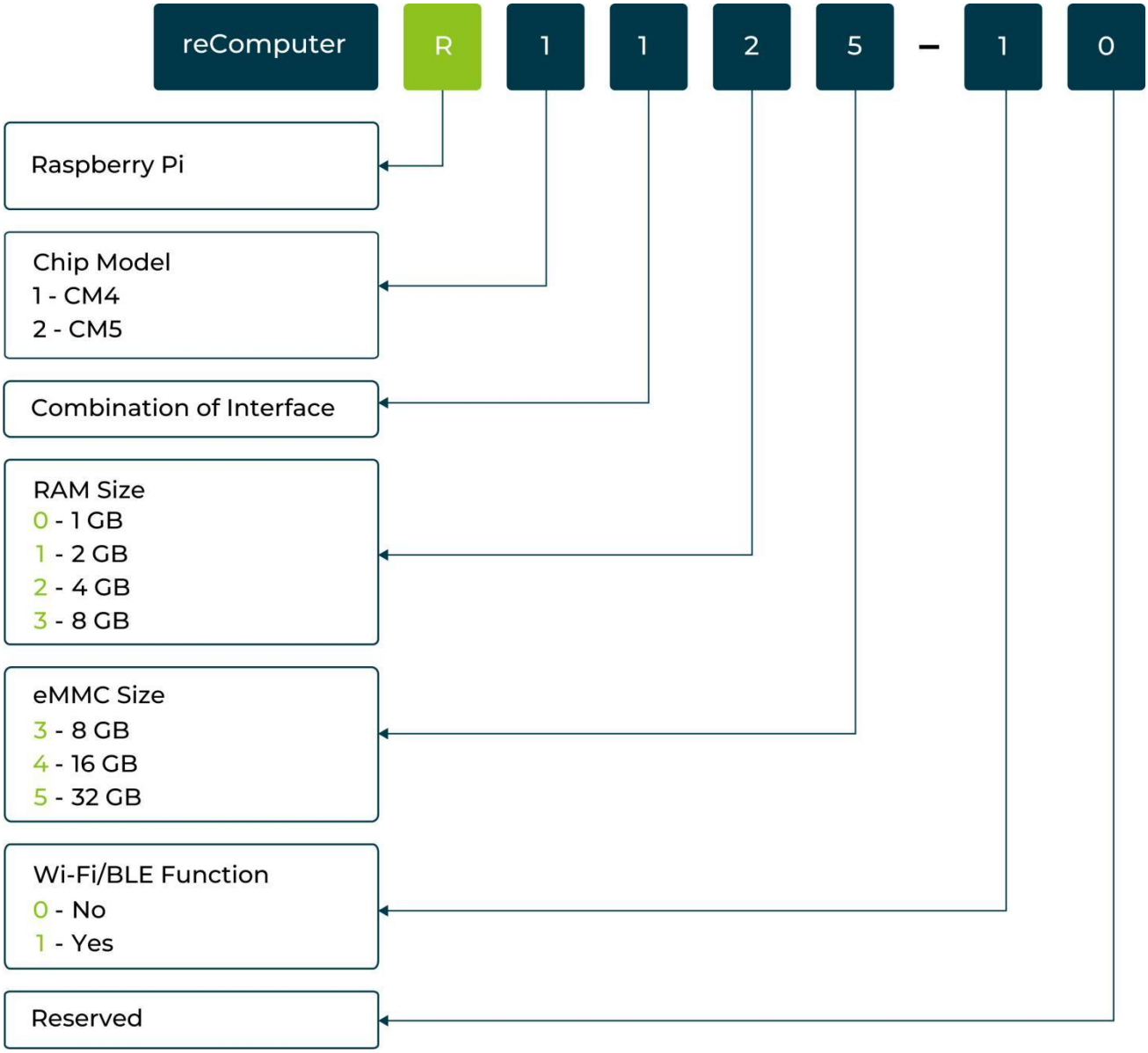
seeed studio

Powered by Raspberry Pi

reComputer R1100
User Manual
Edge IoT Controller

Naming Conventions



For example, the naming of 8GB RAM and 32GB eMMC CM4 module with Wi-Fi and BLE function tailored for edge IoT gateway is reComputer R1125-10.

Revision History

Version	Date	Description
1.0	2024-10-17	

Contents

C1. Introduction

1.1 Overview

The reComputer R1100, powered by Raspberry Pi CM4, is an adaptable edge IoT gateway with AI capabilities. It features comprehensive industrial interfaces (2x Ethernet, 2xUSB, 2xRS485, 2xRS232, 2xDI and 2xDO) and flexible wireless connectivity options (4G, LoRa®, Wi-Fi/BLE), making it ideal for diverse industrial applications.

Application

The reComputer R1100 series has extensive applications in the IoT field. It can be used in aspects such as data acquisition and process monitoring, automation and robot control, intelligent manufacturing, and industrial communication and networking. With its small size, flexibility, low cost, and programmability, it provides strong support for automation & IoT system and more.

1.2 Feature

Designed for Automation & IoT System

- Support BACnet, Modbus RTU, Modbus TCP/IP and KNX protocol
- Support Node-RED, CODESYS, balena and etc
- Clear dual-sided LED indicators help check operational status quickly
- High-quality metal case, compatible with DIN-rail and Wall installation
- Supports Yocto and Buildroot for customized OS

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, USB LoRa®, USB Zigbee
- Mini-PCIe2: SPI LoRa®, USB LoRa®, USB Zigbee

Rich Interfaces

- 2x RS485 (isolated), 2x RS232 (isolated), 2x isolated DI ports, 2x isolated DO ports
- 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 Micro SD card slot
- 1x Nano SIM card slot(Internal)

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: reComputer R1100 will remain in production until at least December 2030

1.3 Specification

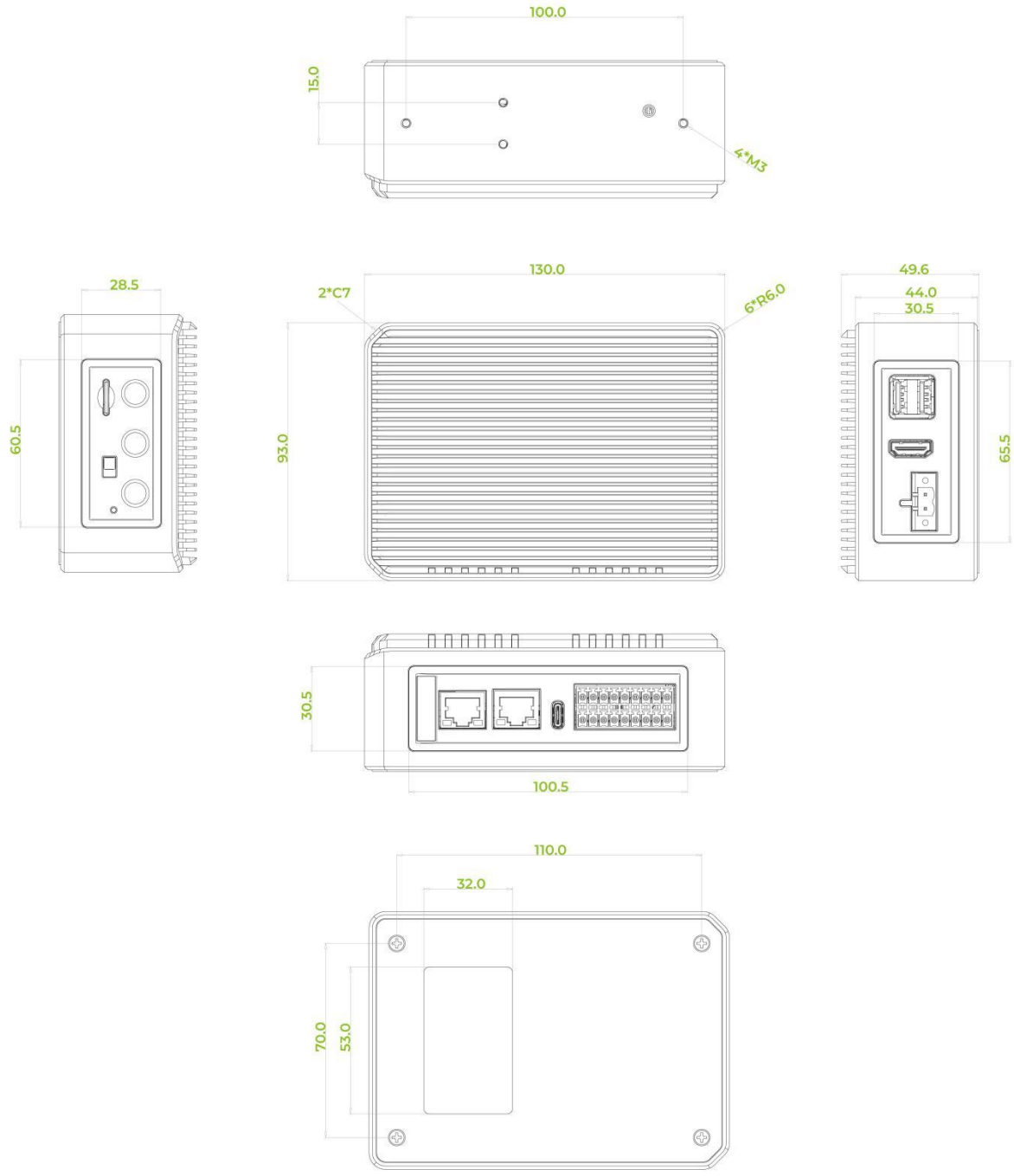
Parameter	Description	
Hardware Specification		
Product Series	R11xx-10	R11xx-00
CPU	Raspberry Pi CM4, Quad-core Cortex-A72@ 1.5GHz	
Operating System	Raspbian, Debian, Yocto, Buildroot	
RAM	1GB/2GB/4GB/8GB	
eMMC	8GB/16GB/32GB	
System Specification		
Power Input	DC 9V~36V, 2-pin Terminal Block	
PoE(as powered device)	IEEE 802.3af Standard 12.95W PoE*	
Overvoltage Protection	40V	
Power Consumption	Idle: 2.88W; Full Load: 5.52W	
Power Switch	No	
Reboot Switch	Yes	
Interface		
Ethernet	1 x 10/100/1000 Mbps(supports PoE*)	
	1 x 10/100 Mbps IEEE 802.3/802.3u	
USB	2 x USB-A 2.0 Host	
	1 x USB-C 2.0 (For flashing OS)	
RS485	2x RS485(Isolated)	
RS232	2x RS232(Isolated)	
DI	2 x Isolated DI Ports	
	Input Voltage: 5~24V DC	
DO	2 x Isolated DO Ports	
	Output Voltage: <60V DC	
SIM Card	1x Nano SIM Card Slot (Internal)	
SD Card	1x Micro SD Card Slot	
SSD Card	1x M.2 NVMe SSD Slot 2280-M Key	
LED	12 x LED indicators	
Buzzer	1	
Reset Button	1	
HDMI	1 x HDMI 2.0	
Wireless Communication		
Wi-Fi 2.4/5.0 GHz	On-chip Wi-Fi*	No

BLE 5.0	On-chip BLE*	No
LoRa®	USB LoRa®*/SPI LoRa®*	
4G Cellular	4G LTE*	
Zigbee	USB Zigbee*	
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	
Others		
Supercapacitor UPS	SuperCAP UPS LTC3350 Module*	
Hardware Watchdog	1~255s	
RTC	High Accuracy RTC	
Security	Encryption Chip TPM 2.0*	
	ATECC608A	
Heat Dissipation	Fanless	
Warranty	2 years	
Production Lifetime	Until December 2030	
Statement	Options marked with * require additional purchase according to the accessories list.	

Component and Interface Status Statement	
Reserved	Designated for future use or expansion.
Optional	Non-essential components, users can choose to include or exclude.
Occupied	Currently in use and integral to product functionality.
Included	Essential components provided with standard package.

1.4 Dimension

Mechanical	
Dimension(W x H x D)	130 mm x 93 mm x 49.6 mm
Enclosure	6061 Aluminum Alloy Casing with Transparent PC Side Panels
Mounting	DIN-rail/Wall
Weight(Net)	560g



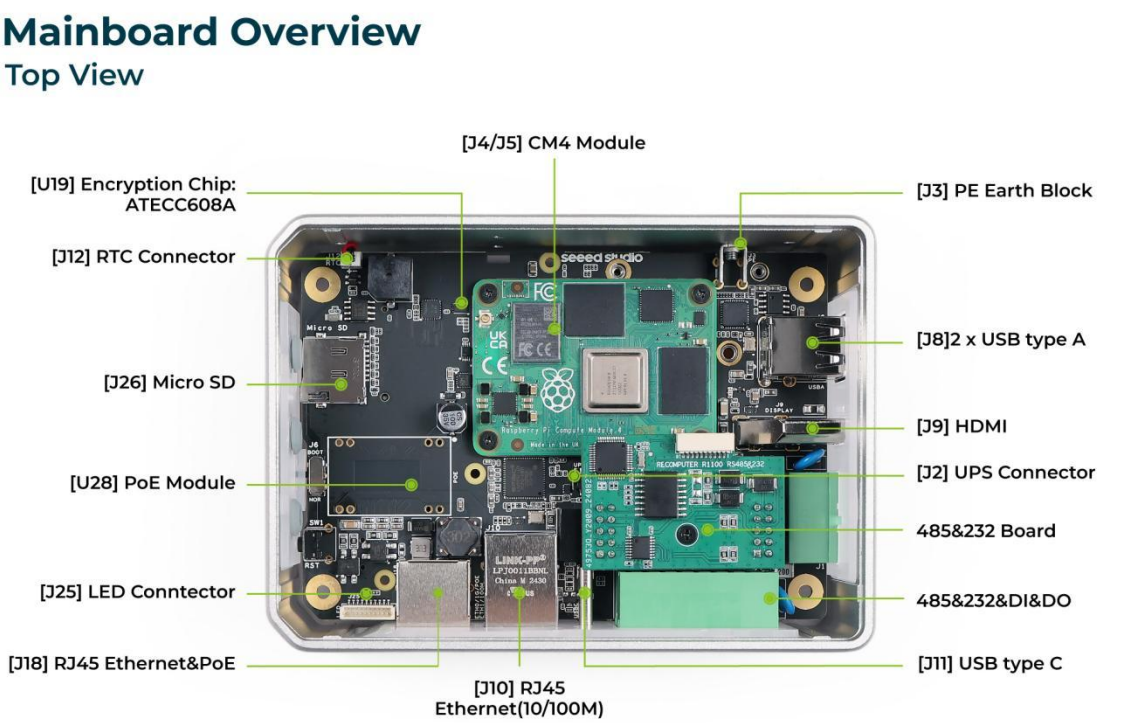
C2. Hardware Overview

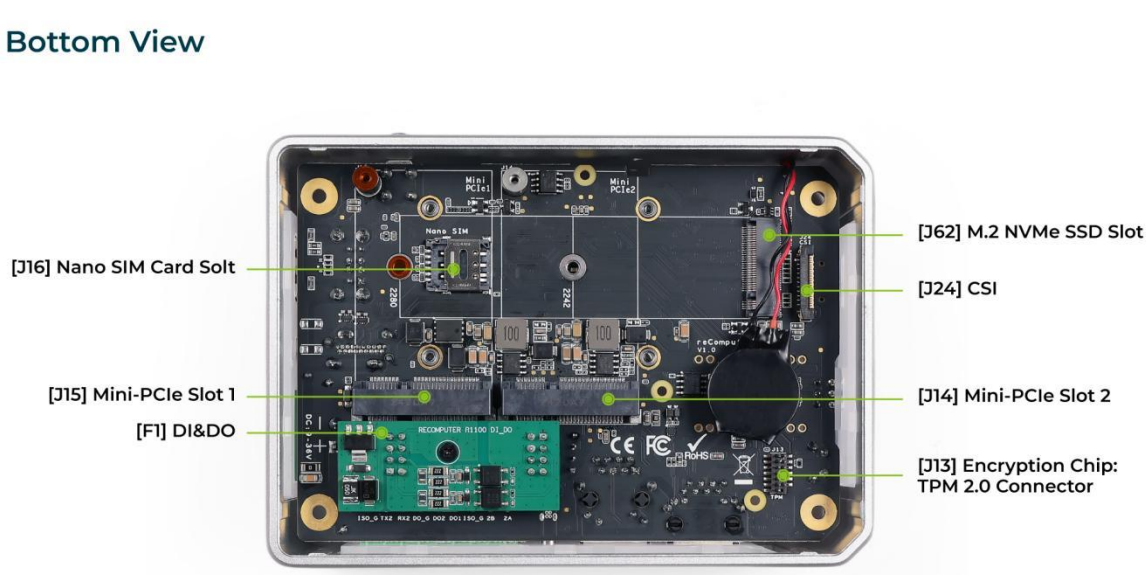
2.1 System Overview

2.1.1 Interface Overview

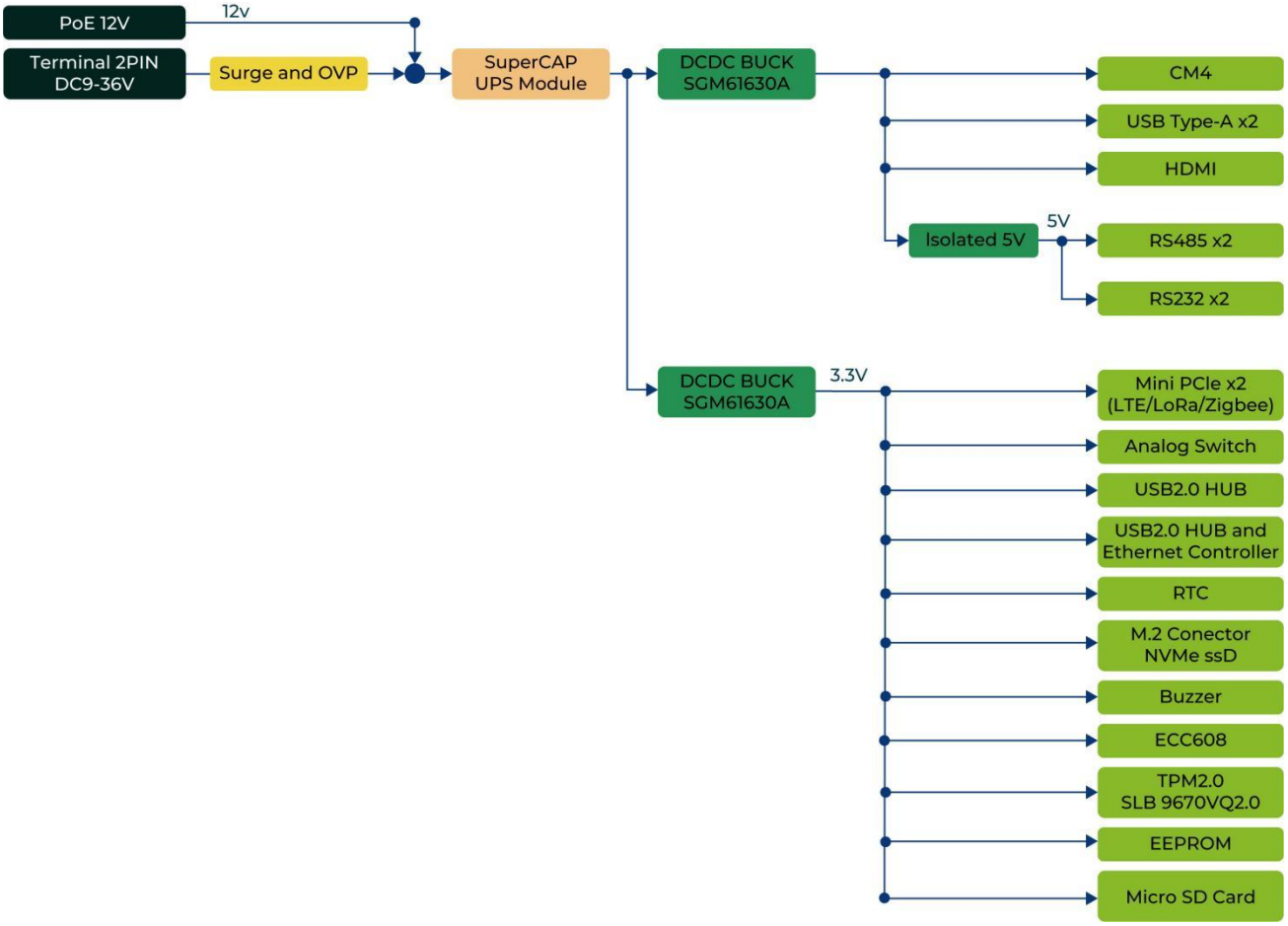
1. 1000M Ethernet
2. 100M Ethernet
3. Serial Console
4. 2x Isolated RS485, 2x Isolated RS232, 2x Isolated DI, 2x Isolated DO
5. LED
6. 3 x Reserved Antenna Ports for Wireless
7. Micro SD Card Slot
8. Boot Switch
9. Reset Hole
10. Power In
11. HDMI
12. USB Host

2.1.2 Mainboard Overview



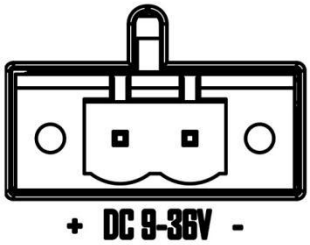


2.1.3 Power Diagram



The reComputer R1100 supports two power supply options: DC terminal and PoE port. By default, the reComputer R1100 is powered through the DC terminal (Official regional power adapter SKU:110061505/110061506), while the PoE power supply(PoE module, SKU:110991925) is optional. This provides flexibility in power supply selection and allows for easy integration with various power sources.

2-Pin Power Terminal



The reComputer R1100 is supplied with a terminal DC voltage of 9~36V. The power supply is connected via the 2-pin power terminal block connector. To ground the reComputer R1100, 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 reComputer R1100 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 reComputer R1100 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 DC terminal for power supply instead to ensure stable and reliable operation of the device.

Power Consumption

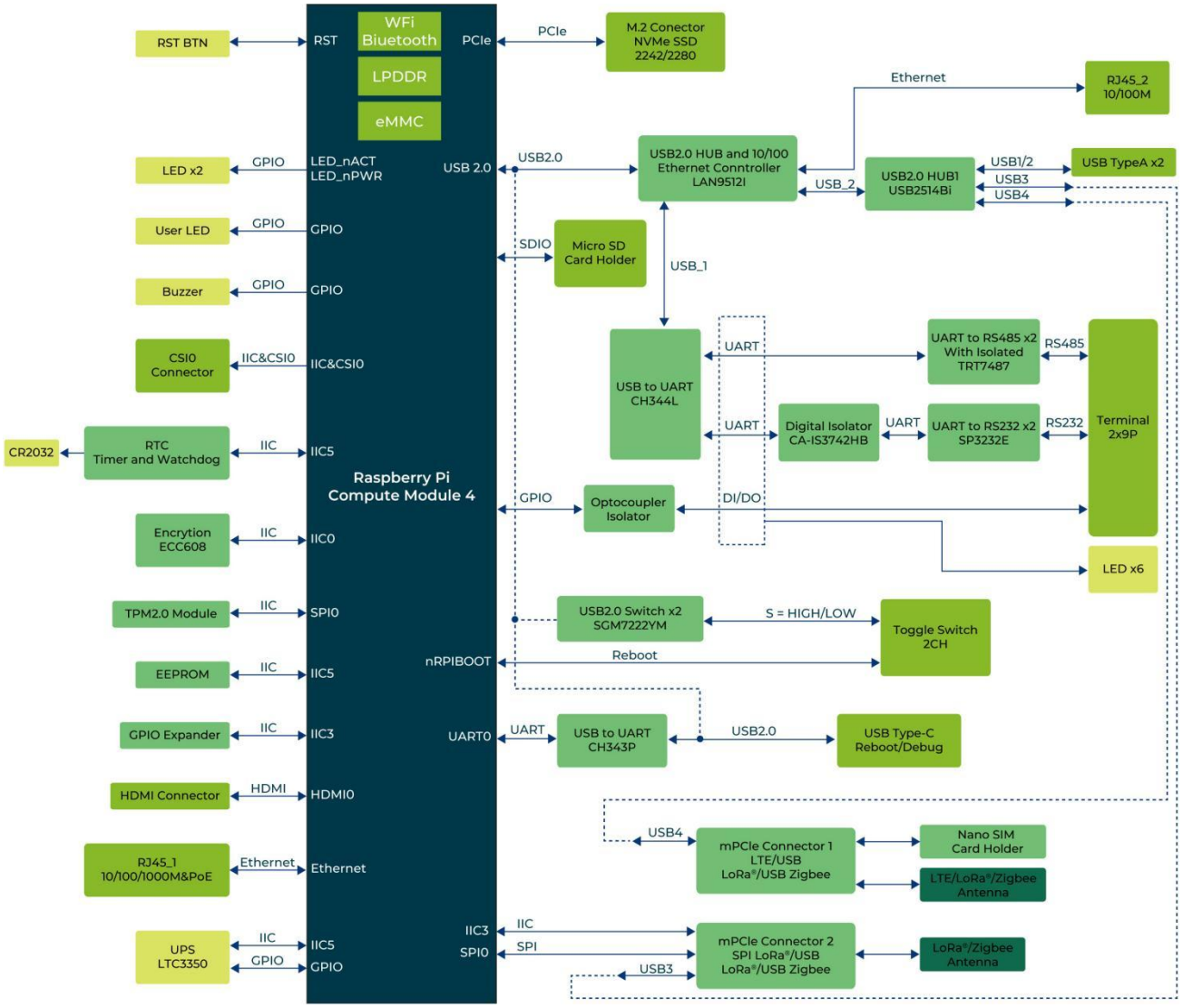
Please refer to the table below for the tested power consumption of reComputer R1100 in Seeed Studio's laboratory. Please note that this value is for reference only, as the test methods and environment can result in variations in the results.

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 reComputer R1100 device without running any test programs.
Full Load	24V	230mA	5.52W	Configure CPU to run at full load using the "stress -c 4" command. No external devices connected.

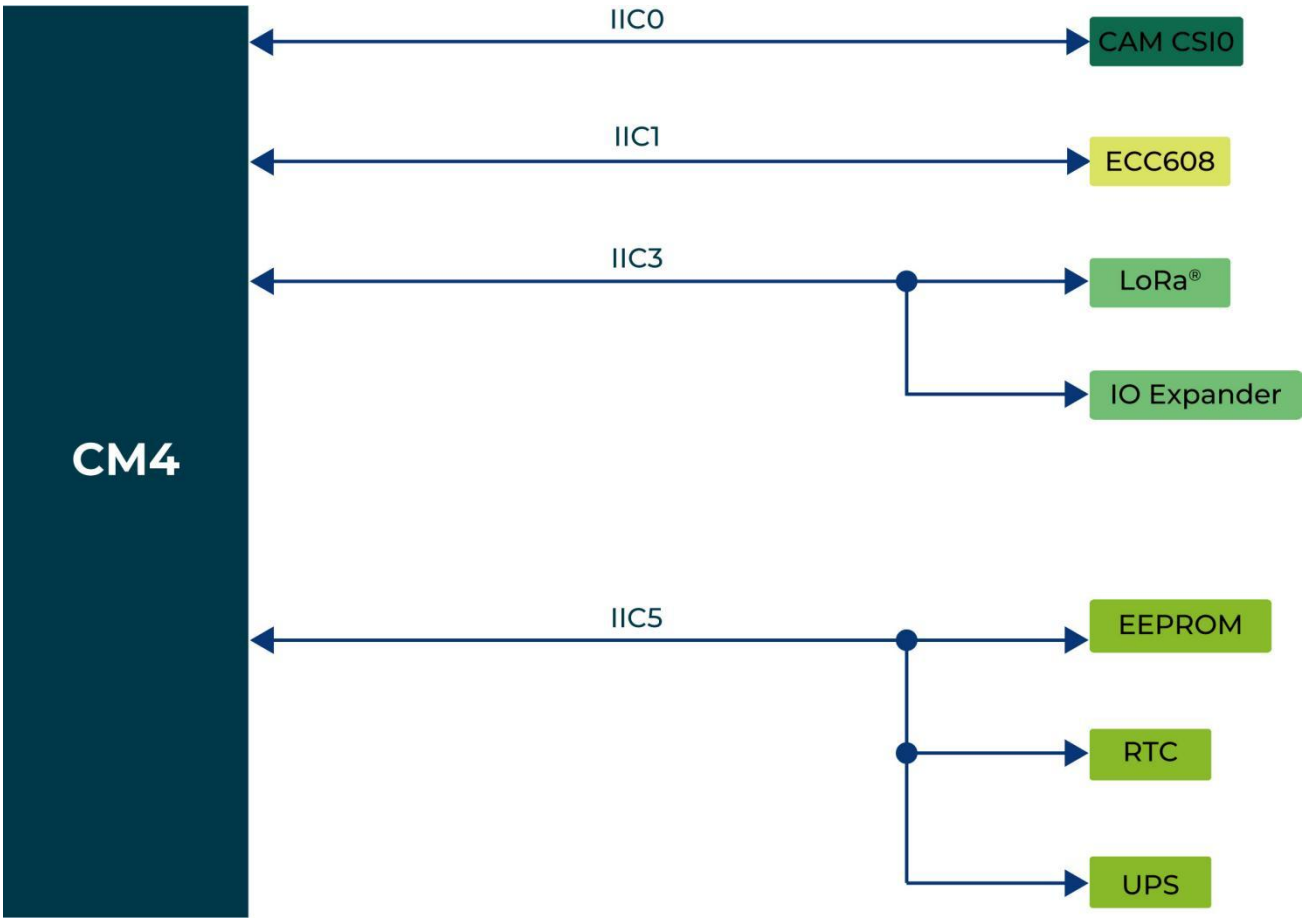
Power On and Power Off

The reComputer R1100 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.

2.1.4 Block Diagram



2.1.5 IIC Diagram



2.2 Interface Description

Interface	
Ethernet	1 x 10/100/1000 MbpS (supports POE*)
	1 x 10/100 Mbps IEEE802.3/802.3u
USB	2 x USB-A 2.0 Host
	1 x USB-C 2.0 (for flashing OS)
RS485	2x RS485(Isolated)
RS232	2x RS232(Isolated)
DI	2 x Isolated DI Ports
	Input Voltage: 5~24V DC
DO	2 x Isolated DO Ports
	Output Voltage: <60V DC
HDMI	1 x HDMI 2.0
SD Card Slot	supports Micro SD Card
SIM Card Slot	supports Nano SIM Card
M.2 Slot	supports M.2 NVMe SSD
LED	12 x LED indicators
Buzzer	1
Reset Button	1

2.2.1 LED Indicator Status

The reComputer R1100 features 12 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.
4G	Green	On	The dial-up is successful and the connection is normal.
		Off	4G signal is not connected or the device is not powered on.
DI1	Green	On/Blink	The input signal has been detected.
		Off	The device is not powered on or there is no data transmission.
DI2	Green	On/Blink	The input signal has been detected.
		Off	The device is not powered on or there is no data transmission.
DO1	Green	On/Blink	The output signal has been detected.
		Off	The device is not powered on or there is no data transmission.
DO2	Green	On/Blink	The output signal has been detected.
		Off	The device is not powered on or there is no data transmission.
COM1	Green	On/Blink	RS485 channel 1 is receiveing or sending data.
		Off	No data transfer on RS485 channel 1.
COM2	Green	On/Blink	RS485 channel 2 is receiveing or sending data.
		Off	No data transfer on RS485 channel 2.
COM3	Green	On/Blink	RS232 channel 1 is receiveing or sending data.
		Off	No data transfer on RS232 channel 1.
COM4	Green	On/Blink	RS232 channel 2 is receiveing or sending data.
		Off	No data transfer on RS232 channel 2.

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

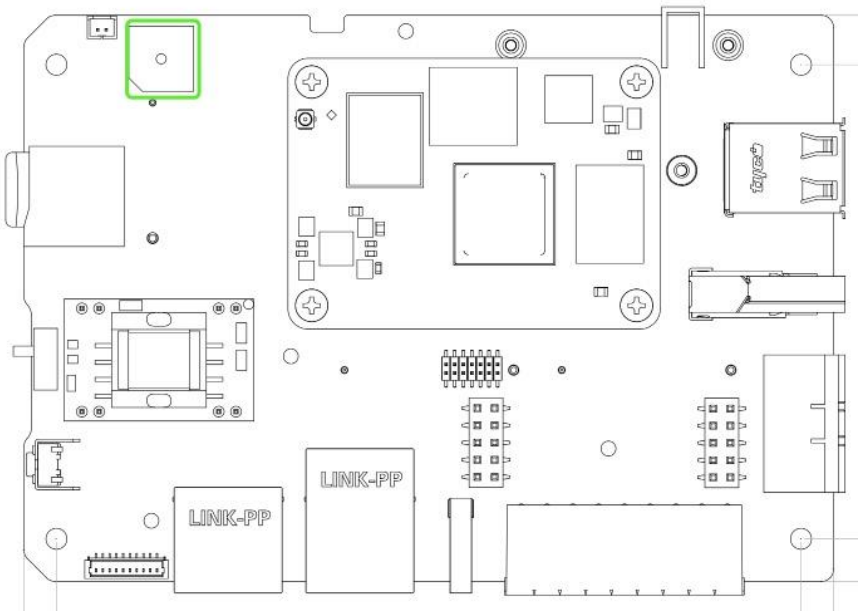
USER Indicator

The reComputer R1100 contains a USER indicator, and users can customize the status according to actual needs.

Note

For details of USER LED testing, please refer to section 3.3.

2.2.2 Buzzer



The reComputer R1100 contains an active buzzer, which can be used for various purposes such as alarm and event notifications. Enter in the terminal of reComputer R1100:

```
cat /sys/kernel/debug/gpio
```

This command will output the GPIO corresponding to the Buzzer_EN is gpio587.

> ***Note***
>
> *For details of buzzer testing, please refer to section 3.17.*

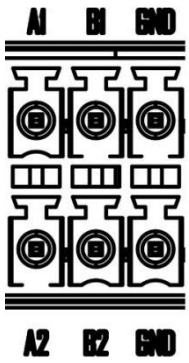
2.2.3 RS485

The reComputer R1100 series equipment includes 2x RS485 ports, 6-Pin 3.5mm spacing phoenix terminals.

The silkscreen of single RS485 is "A/B/GND".

Pin Definition

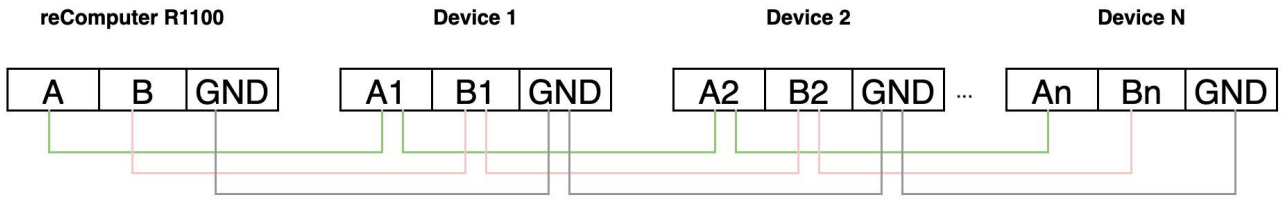
Terminal pins are defined as follows:



Pin ID	Pin Name
1	R485-1_A
2	R485-2_A
3	R485-1_B
4	R485-2_B
5	GND
6	GND

Connecting Cables

Schematic diagram of RS485 wires is as follws:



Note

The product packaging contains some 120 Ohm terminal resistors. You can use them as needed when communicating via RS485.

For details of RS485 testing, please refer to section 3.10.

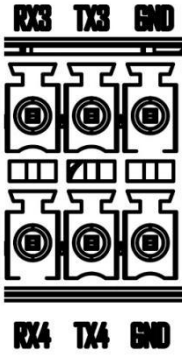
2.2.4 RS232

The reComputer R1100 series equipment includes 2x RS232 ports, 6-Pin 3.5mm spacing phoenix terminals.

The silkscreen of single RS232 is "TX/RX/GND".

Pin Definition

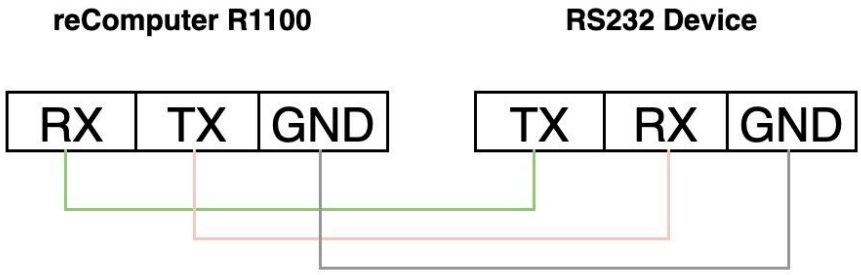
Terminal pins are defined as follows:



Pin ID	Pin Name
13	R232-3_RX
14	R232-4_RX
15	R232-3_TX
16	R232-4_TX
17	GND
18	GND

Connecting Cables

Schematic diagram of RS232 wires is as follws:



Note

For details of RS232 testing, please refer to section 3.11.

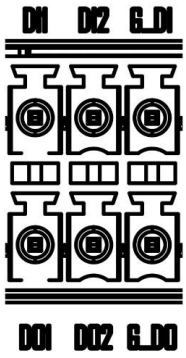
2.2.5 DI

The reComputer R1100 series equipment includes 2x DI ports, 3-Pin 3.5mm spacing phoenix terminals.

The silkscreen of single DI is "DI/G_DI".

Pin Definition

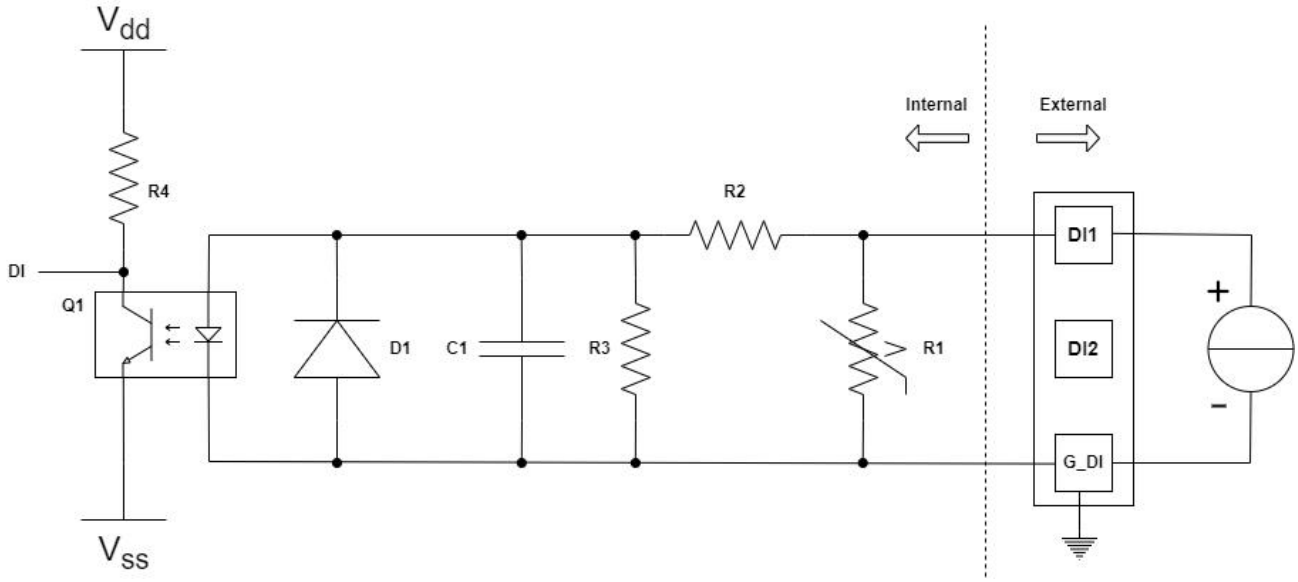
Terminal pins are defined as follows:



Pin ID	Pin Name
7	DI1
9	DI2
11	G_DI

Connecting Cables

Schematic diagram of a single DI wires is as follws:



Parameter	Description
Input Type	PNP
Isolation Protection	5 kV
DI to G_DI	ON state: 5~30 VDC

Note

For details of DI testing, please refer to section 3.12.

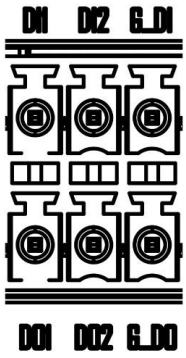
2.2.6 DO

The reComputer R1100 series equipment includes 2x DO ports, 3-Pin 3.5mm spacing phoenix terminals.

The silkscreen of single DO is "DO/G_DO".

Pin Definition

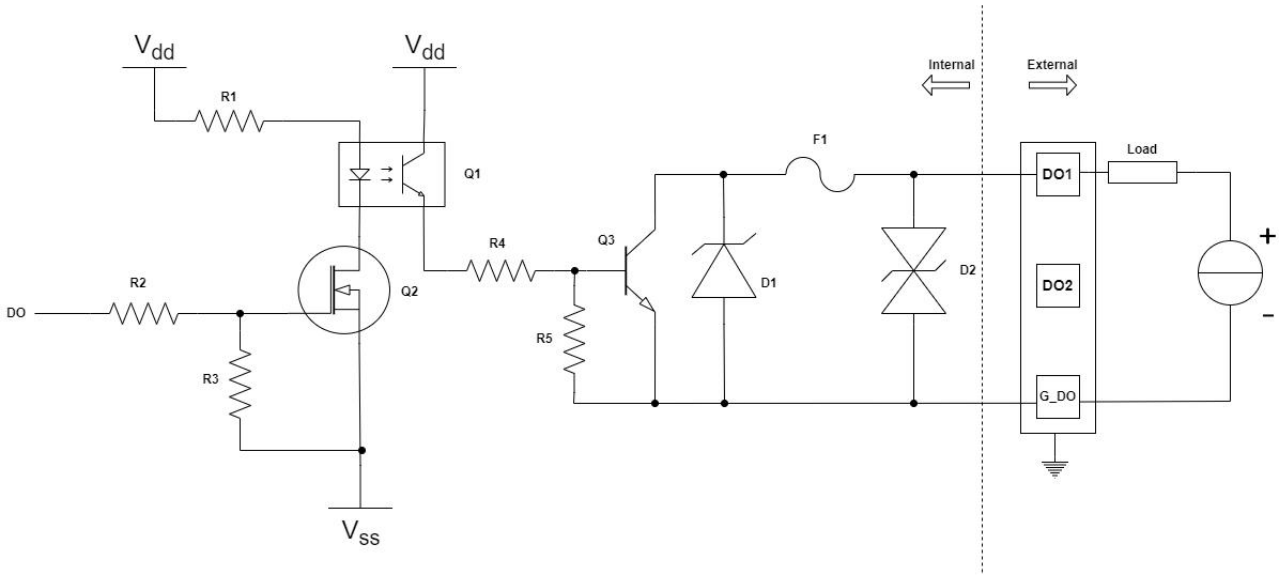
Terminal pins are defined as follows:



Pin ID	Pin Name
8	DO1
10	DO2
12	G_DO

Connecting Cables

Schematic diagram of a single DO wires is as follws:



Parameter	Description
Output Type	Transistor
Isolation Protection	5 kV
Output	< 60V DC

Note

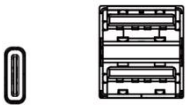
For details of DO testing, please refer to section 3.13.

2.2.7 Boot Switch

The Boot Switch of the reComputer R1100 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

2.2.8 USB



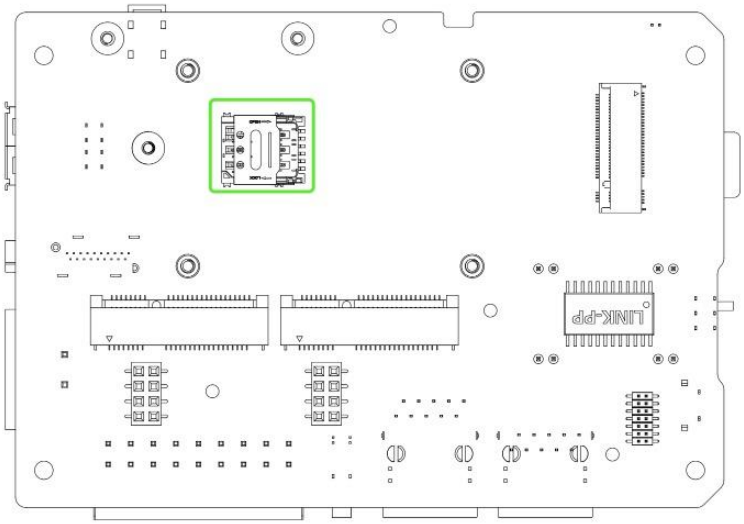
The reComputer R1100 is equipped with one USB Type-C port and two USB Type-A ports. Please refer to the table below for their functions and descriptions.

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.

2.2.9 SD Card Slot

The reComputer R1100 series equipment includes an micro SD card slot, which is used to install micro SD card for shoring user data.

2.2.10 SIM Slot(Internal)



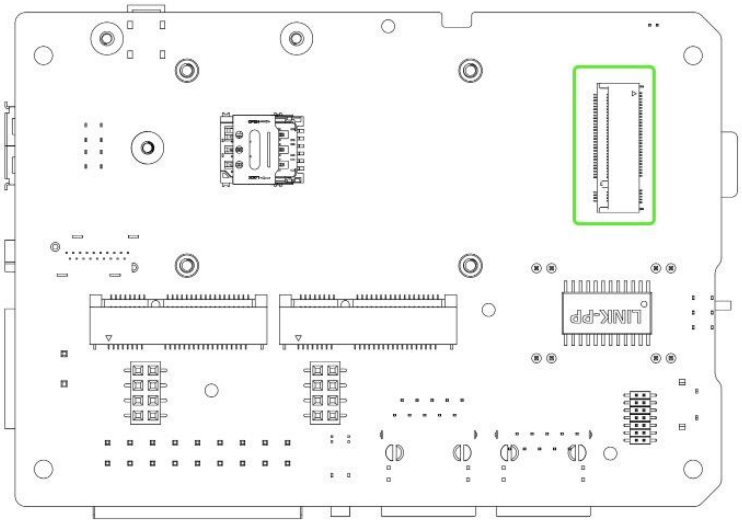
The reComputer R1100 series equipment includes an internal Nano SIM card slot, which is used to install Nano SIM card for obtaining 4G signals.

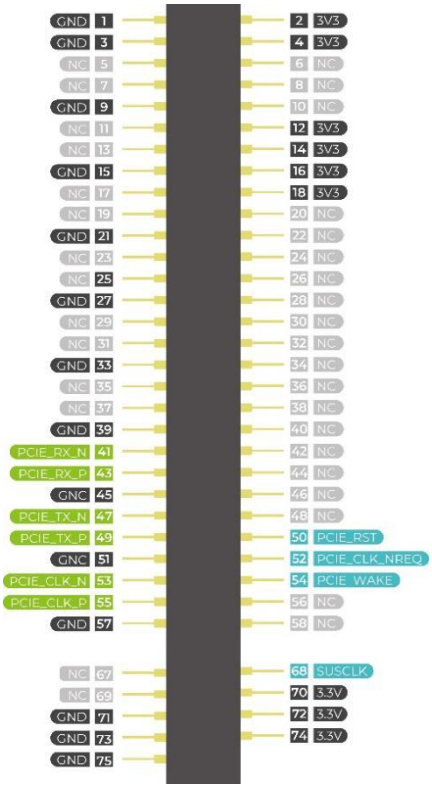
The size differences between standard SIM, Micro SIM and Nano SIM cards are as follows:

Note

Please note that the standard version of reComputer R1100 does not come with a 4G module. If you require 4G functionality, an additional 4G module must be purchased separately. For more information, please refer to section "2.3.2 4G Module".

2.2.11 SSD Slot



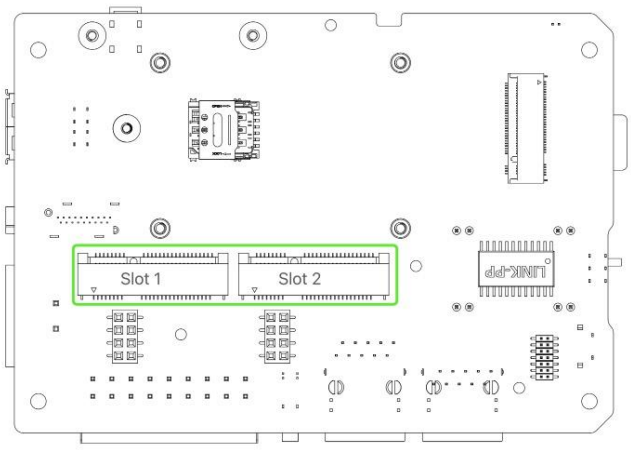


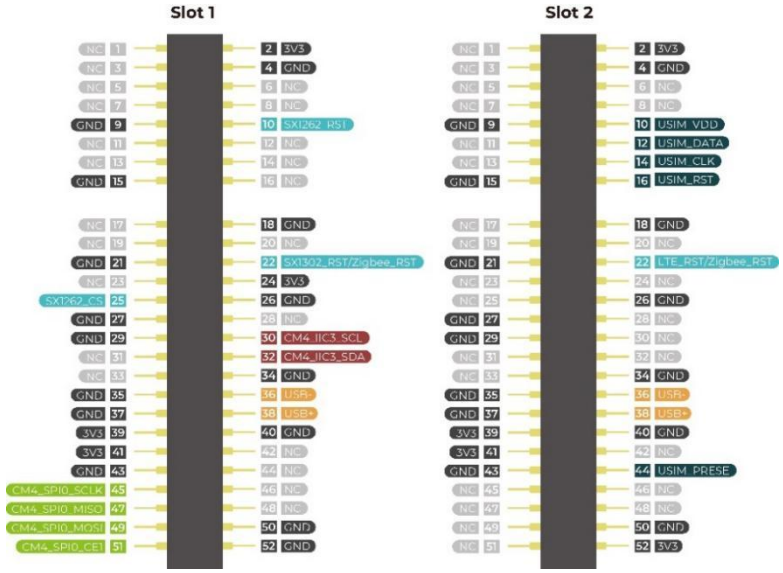
The SSD slot on the reComputer R1100 is designed to accommodate NVMe M.2 2280 SSDs for 128GB, 256GB, 512GB and 1TB in capacity. This slot allows for high-speed storage expansion, enabling users to enhance the performance and capacity of their system.

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. Therefore, if you inten d to use it as a boot drive and are unsure about which model to purchase, we recommend opting for our recommend ed 1TB SSD(SKU 112990267). This model has been tested and verified for boot functionality, reducing the risk of compat ibility issues and minimizing trial and error costs.

2.2.12 Mini-PCIe Slot





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

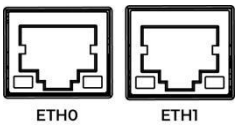
This device features two Mini-PCIe interfaces, namely Mini-PCIe Slot 1 and Mini-PCIe Slot 2. Slot 1 connects to SIM card slot and supports USB protocols, while Slot 2 supports both USB and SPI protocols but doesn't connect to SIM card slot. Therefore, devices such as 4G LTE, USB LoRa®, and USB Zigbee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

2.2.13 Reset Hole

RESET

There is a Mini Push Button Switch located in the reset hole of reComputer R1100. 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.

2.2.14 Ethernet RJ45



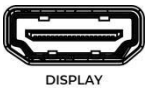
Name	Type	Speeds	PoE
ETH0	CM4 native Gigabit Ethernet	10/100/1000 Mbit/s	Supported (with additional module)
ETH1	Converted from USB	10/100 Mbit/s	Not Supported

The reComputer R1100 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 reComputer R1100. Another one ETH1 supports 10/100 Mbit/s which is converted from USB.

Note

For more detail about PoE, please check section "2.3.5 PoE".

2.2.15 HDMI



The reComputer R1100 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.

2.2.16 RTC

The reComputer R1100 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.

Note

For details of RTC testing, please refer to section 3.15.

2.2.17 Watchdog

The reComputer R1100 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.

Note

For details of watchdog testing, please refer to section 3.16.

2.3 Optional Interfaces and Module

The reComputer R1100 supports a rich selection of expansion modules and accessories, making it suitable for a wide range of scenarios and requirements. If you are interested in customizing the reComputer R1100, please contactodm@seeed.cc for more information.

Here is the accessories and optional modules list:

Remark	Item	Product Name	SKU
Must be used together for LoRa®WAN Function	LoRa® Module	Region optional LoRaWAN Gateway Module(SPI)-US915	114992969
		Region optional LoRaWAN Gateway Module(SPI)-EU868	114993268
		Region optional LoRaWAN Gateway Module(USB)-US915	114992991
		Region optional LoRaWAN Gateway Module(USB)-EU868	114992628
	LoRa® Antenna	LoRa Antenna Kit - 868-915 MHz	110061501
	Zigbee Module	Mini-PCIe USB Zigbee Module	110992005
	Zigbee Antenna	Zigbee Antenna Kit for reComputer R	110061641
This accessory is required for Wi-Fi function	Wi-Fi/BLE Antenna	Raspberry Pi Compute Module 4 Antenna Kit	114992364

4G antenna with 4G module for 4G function, GPS antenna with 4G module for GPS function	4G module	LTE Cat 4 EC25-AFXGA-Mini-PCIe Module - for North American	113991134
		LTE Cat 4 EC25-EUXGR-Mini-PCIe Module - for EMEA and Thai	113991135
		LTE Cat 4 EC25-AUXGR-Mini-PCIe Module - for Australia	113991174
		LTE Cat 4 EC25-EFA-Mini-PCIe Module - for Thai	113991214
		LTE Cat 4 EC25-EMGA-Mini-PCIe Module - for Malaysia	113991234
		LTE Cat 4 EC25-JFA-mini-PCIe	113991296
	4G Antenna	4G Antenna Kit for 4G module	110061502
	GPS Antenna	GPS Antenna Kit for EC25 4G Module	110061521
	Encryption Chip TPM 2.0	TPM 2.0 Module with infineon SLB9670	114993114
	SSD card	NVMe M.2 2280 SSD 1TB	112990267
		512GB NVMe M.2 PCIe Gen3x4 2280 Internal SSD	112990247
		256GB NVMe M.2 PCIe Gen3x4 2280 Internal SSD	112990246
		128GB NVMe M.2 PCIe Gen3x4 2280 Internal SSD	112990226
This module needs to be soldered onto the carrier board of the reComputer R1100	PoE	MQ7813T120 PoE Module Kit for reTerminal DM	110991925
	UPS	SuperCAP UPS LTC3350 Module	110992004

The reComputer R1100 mainboard features two Mini-PCIe slots. Mini-PCIe slot 1 supports 4G module, LoRa® module using the USB protocol and Zigbee module using USB protocol; while Mini-PCIe slot 2 supports LoRa® module using the USB and SPI protocol and Zigbee module using USB protocol. Additionally, 4G module and LoRa® module shouldn't be used at the same time, can not plug in two LoRa® modules on board.

Note

Can not plug in 2 LoRa® modules on board.

2.3.1 Wi-Fi/BLE

The reComputer R1100-10 is powered by the CM4 with an onboard Wi-Fi/BLE version, providing the same Wi-Fi/BLE parameters as the CM4. For detailed parameter information, please refer to the Raspberry Pi official website.

2.3.2 4G Module

The reComputer R1100 mainboard features two Mini-PCIe slots, with Mini-PCIe slot 1 supporting a 4G module using the USB protocol. The EC25 4G module from Quectel has been fully tested to be compatible with the reComputer R1100.

Note

Please note that if you require 4G functionality, it is necessary to purchase the corresponding 4G module and external antenna, and follow the instructions in section 4.5 "Assemble 4G/LoRa®/Zigbee Module and Antenna".

2.3.3 LoRa® Module

Both two Mini-PCIe slots supports LoRa® module using the USB protocol. Meanwhile, Mini-PCIe slot2 supports a LoRa® module using the SPI protocol. The WM1302 module from Seeed Studio has been fully tested to be compatible with the reComputer R1100.

Note

Please note that if you require LoRa® functionality, it is necessary to purchase the corresponding LoRa® module and external antenna, and follow the instructions in section 4.5 "Assemble 4G/LoRa®/Zigbee Module and Antenna".

2.3.4 Zigbee Module

The Mini-PCIe slots offer support for Zigbee modules utilizing the USB protocol, allowing for seamless integration of Zigbee functionality into compatible devices. This feature enables efficient communication and control within Zigbee networks, enhancing the versatility and connectivity of the system. With two Mini-PCIe slots available for Zigbee modules, users have the flexibility to implement diverse applications for enhanced reliability.

Note

Please note that if you require Zigbee functionality, it is necessary to purchase the corresponding Zigbee module and external antenna, and follow the instructions in section 4.5 "Assemble 4G/LoRa®/Zigbee Module and Antenna".

2.3.5 PoE

The reComputer R1100 can support the IEEE 802.3af PD (Powered Devices) standard by adding a PoE power supply module. The seat for PoE is pre-soldered on board; however, 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."

Note

The reComputer R1100 supports PoE power supply, but the standard product does not include a PoE module by default. Seeed can provide PoE soldering and assembly services for batch customization orders. However, if a customer is testing a sample, they will need to solder and assemble the PoE module themselves. Instructions on how to do so, please refer to section 4.7 "Assemble PoE Module" for detailed.

2.3.6 SSD

The reComputer R1100 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 reTerminal DM with installed SSD can achieve a maximum write speed of 230MB/s and a maximum read speed of 370MB/s. If you are unsure which SSDs are compatible, you can purchase following the accessories list below.

Note

Please note that:

1- The speed test results may vary depending on the SSD model, testing method, and testing environment. The values provided here are for reference purposes only and were obtained in Seeed's laboratory.

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 highcapacity 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. Therefore, if you intend to use it as a boot drive and are unsure about which model to purchase, we recommend opting for our recommended 1TB SSD(SKU 112990267). This model has been tested and verified for boot functionality, reducing the risk of compatibility issues and minimizing trial and error costs.

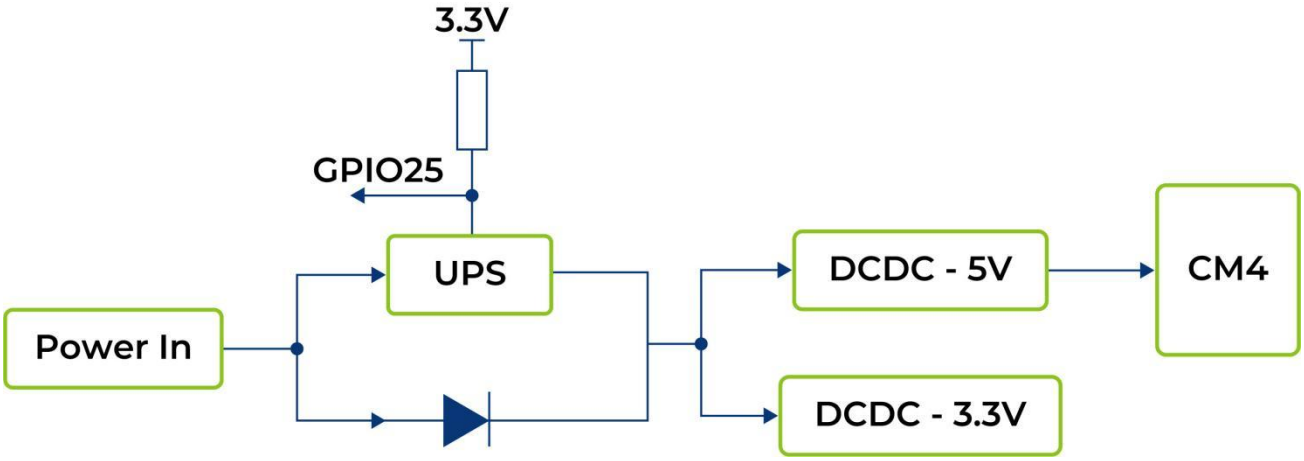
2.3.7 Encryption Chip TPM 2.0

The TPM features Infineon's OPTIGA™ TPM SLB9670 which is compliant to the Trusted Computing Group (TCG) TPM 2.0 specification is recommended as encryption chip to the reComputer R1100. The chip features an SPI interface applied for port J13 on board, to enable a root of trust for platform integrity, remote attestation, and cryptographic services.

Note

Please refer to section 4.6 "Assemble TPM 2.0 Module" for instruction.

2.3.8 UPS



The UPS is 7F, which operates in series. The UPS module is positioned between the DC5V and CM4 components, with a G PIO signal utilized to alert the CPU in the event of a power loss from the 5V supply. Upon receiving this signal, the CPU ex ecutes an urgent script before the super capacitor's energy is depleted, initiating a "$ shutdown" command.
The backup duration provided by the UPS heavily relies on the system load. Below are some typical scenarios tested with a CM4 module featuring 4GB RAM, 32GB eMMC storage, and a Wi-Fi module.

Mode of Operation	Time(s)	Remark
Idle	37	Testing under idle conditions with official driver program loaded
Full load of CPU	18	stress -c 4 -t 10m -v &

Note

For UPS function please contact us for more information, and the alarm signal is active LOW.

C3. Configuring System

3.1 Flashing Image

To update the firmware, first ensure that you update the drivers. Here are the steps to install and update the drivers:

1. Clone the repository with the following command:

```
git clone --depth 1 https://github.com/Seeed-Studio/seeed-linux-dtoverlays.git
```

2. Navigate into the cloned directory:

```
cd seeed-linux-dtoverlays
```

3. Run the script to install the drivers:

```
sudo ./scripts/reTerminal.sh --device reComputer-R110x
```

4. After the installation is complete, reboot your device:

```
sudo reboot
```

This process will ensure that your drivers are up to date before updating the firmware.

3.2 Query GPIO Mappings

To query GPIO mappings and offsets, follow these steps:

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

```
cat /sys/kernel/debug/gpio
```

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

3.3 USER LED Testing

We provide LEDs in three colors of red, blue and green for users to use. You can enter the /sys/class/leds/ directory to view：

```
cd /sys/class/leds/
ls
```

Use the following command to light up the LED of the corresponding color.

```
sudo su
echo 1 > /sys/class/leds/led-red//brightness
echo 1 > /sys/class/leds/led-blue/brightness
echo 1 > /sys/class/leds/led-green/brightness
```

The third led-user LED will light up.

3.4 SPI Communication Testing

To test SPI communication by shorting the TPM module's MISO and MOSI pins, follow these steps:

1. Clone the spidev-test repository:

```
# Don't forget to connect to network before running command
git clone https://github.com/rm-hull/spidev-test.git
```

2. Navigate into the spidev-test directory:

```
cd spidev-test
```

3. Compile the spidev_test.c file:

```
gcc spidev_test.c -o spidev_test
```

4. Run the spidev_test program with the following command:

```
./spidev_test -D /dev/spidev0.1 -v -p hello
```

This command tests SPI communication on the specified SPI device (***/dev/spidev0.1***) with verbose output (***-v***) and sends the message "hello" (***-p hello***).

By shorting the TPM module's MISO and MOSI pins, you're effectively creating a loopback scenario, where data sent on MOSI is received on MISO. This setup allows you to test SPI communication without an actual device connected.

3.5 Wi-Fi Scanning

To scan for Wi-Fi networks:

```
sudo iwlist wlan0 scan
```

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

3.6 Bluetooth Scanning

To scan for Bluetooth devices:

```
sudo bluetoothctl
```

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

```
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.

3.7 LoRa® over Mini-PCIe

3.7.1 LoRa® SPI

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

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

```
cd ~/
git clone https://github.com/Lora-net/sx1302_hal
```

2. Navigate into the cloned directory:

```
cd sx1302_hal
```

3. Modify the configuration file:

```
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:

```
sudo make
```

5. Modify the configuration code:

```
sudo vim ./tools/reset_lgw.sh
```

Update the pin configurations:

```
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

```
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(Configuration files are selected based on the module you are using):

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

8. Start LoraWAN® Module

```
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.

3.7.2 LoRa® USB

For LoRa® USB, the previous commands remain the same as for LoRa® SPI. However, the final command needs to be changed to:

```
#pull up the SX1302_RST pin first

echo 1 > /sys/class/gpio/gpio580/value

./LoRa_pkt_fwd -c global_conf.json.sx1250.EU868.USB
```

This command specifies the configuration file to be used for LoRa® USB.

3.8 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:

```
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:

```
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.

3.9 Zigbee over Mini-PCIe

To test Zigbee communication with two Zigbee modules, follow these steps:

1. Check Serial Ports:

Use the following command to check available serial ports:

```
cat /dev/ttyUSB*
```

2. Install Serial Communication Tool:

```
sudo apt-get install cutecom
```

3. Open Serial Port for Coordinator (First Zigbee Module):

Open the ***cutecom*** tool and configure it for the first serial port:

Baud rate: ***115200***
Check the "***Hex output***" option at the bottom of the interface.
Follow these steps to configure the first Zigbee module:
Set as coordinator: Send command '***55 04 00 05 00 05'***, expect response '***55 04 00 05 00 05'***.
Reset device: Press reset button or send command '***55 07 00 04 00 FF FF 00 04'.***
Network formation: Send command ***'55 03 00 02 02'.***

4. Open Serial Port for Router (Second Zigbee Module):

Open another instance of ***cutecom*** and configure it for the second serial port with the same settings as before.

Follow these steps to configure the second Zigbee module:

Set as router: Send command '***55 04 00 05 01 04'***, expect response '***55 04 00 05 00 05'.***
Reset device: Press reset button or send command '***55 07 00 04 00 FF FF 00 04'.***
Network formation: Send command '***55 03 00 02 02'***.

5. Check Device Status:

Send command '***55 03 00 00 00'*** to check the device status. Expect a response similar to '***55 2a 00 00 00 01 XX XX XX XX'***, where 'XX' represents device information.

6. Enter Transparent Mode:

If network formation is successful, enter transparent mode by sending command ***55 07 00 11 00 03 00 01 13.*** Both modules should be in transparent mode for direct communication. To exit transparent mode, send ***"+++".***

7. Additional Notes:

- If router configuration fails, the device may already be a coordinator. Leave the network using command '***55 07 00 04 02 xx xx xx'.***
- Test transmission power using commands '55 04 0D 00 00 0D' (query) and '55 04 0D 01 XX XX' (set).

Ensure you replace ***/dev/ttyUSB**** with the correct serial port for each Zigbee module. Follow these steps carefully to test Zigbee communication between the two modules successfully.

3.10 RS485 Testing

reComputer R1100 includes 2x RS485 ports, and the corresponding COM ports and device files are as follows:

Number of RS485 Ports	Corresponding COM Port	Corresponding Silk Screen	Corresponding Device File
RS485_1	COM1	A1/B1/GND	/dev/ttyACM0
RS485_2	COM2	A2/B2/GND	/dev/ttyACM1

To test the functionality of RS485, you can follow these steps to test it:

1、 Please connect RS485_1 and RS485_2's A and B.

2、 We provide a program to test the sending and receiving functions and speed between serial ports. Please test it through the following commands:

```
git clone https://github.com/ackPeng/R1100_TEST.git

cd R1100_TEST

gcc -o serial_test serial_test.c

./serial_test /dev/ttyACM0 /dev/ttyACM1 115200
```

This program will send 1M data from RS485_1 to RS485_2, and record the completion time and baud rate. (the actual baud rate will be a little lower than the theoretical baud rate, which is normal)

3.11 RS232 Testing

reComputer R1100 includes 2x RS232 ports, and the corresponding COM ports and device files are as follows:

Number of RS485 Ports	Corresponding COM Port	Corresponding Silk Screen	Corresponding Device File
RS232_1	COM3	RX3/TX3/GND	/dev/ttyACM2
RS232_2	COM4	RX4/TX4/GND	/dev/ttyACM3

To test the functionality of RS232, you can follow these steps to test it:

1、 Please connect the TX of RS232_1 to the RX of RS232_2, and the RX of RS232_1 to the TX of RS232_2.

2、 We provide a program to test the sending and receiving functions and speed between serial ports. Please test it through the following commands:

```
git clone https://github.com/ackPeng/R1100_TEST.git

cd R1100_TEST

gcc -o serial_test serial_test.c

./serial_test /dev/ttyACM2 /dev/ttyACM3 115200
```

This program will send 1M data from RS232_1 to RS232_2, and record the completion time and baud rate. (the actual baud rate will be a little lower than the theoretical baud rate, which is normal).

3.12 DI Testing

reComputer R1100 contains 2x DI ports, user can configure these ports according to actual needs.

Number of ports	DI ports	Corresponding extended GPIO
2	DI1	GPIO 530
	DI2	GPIO 531

The input type of the DI ports is PNP. It supports input voltage is 5VDC~24VDC,current - 1000mA.

To test the functionality of DI, you can follow these steps to test it:

1、 The connection between the DI port of reComputer R1100 and the external load has been completed.

2、 Enter the following command to get the status of GPIO：

```
echo 530 > /sys/class/gpio/export
echo in > /sys/class/gpio/gpio530/direction
cat /sys/class/gpio/gpio530/value
```

3、 When the external level is high, the value of /sys/class/gpio/gpio530/value is 0; when the external level is low, /sys/class/gpio/gpio530/value is 1.

3.13 DO Testing

reComputer R1100 contains 2x DO ports, user can configure these ports according to actual needs.

Number of ports	DI ports	Corresponding extended GPIO
2	DO1	GPIO 532
	DO2	GPIO 533

The output type of the DO ports is transistor. It supports output voltage - under 60 VDC, current capacity - 500 mA.

To test the functionality of DO, you can follow these steps to test it:

1、 The connection between the DO port of reComputer R1100 and the external load has been completed.

2、 Enter the following command to set the output to high level or low level：

```
echo 532 > /sys/class/gpio/export
echo out > /sys/class/gpio/gpio532/direction
echo 1 > /sys/class/gpio/gpio532/value
echo 0 > /sys/class/gpio/gpio532/value
```

3.14 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.

```
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 liste d, there may be an issue with the hub or its connection to the system. In such cases, you may need to troubleshoot the U SB hub or its connections.

3.15 RTC

To test the Real-Time Clock (RTC) functionality, follow these steps:

1. Disable automatic time synchronization:

```
sudo systemctl stop systemd-timesyncd
sudo systemctl disable systemd-timesyncd
```

2. Set the time :

```
sudo hwclock --set --date "2024-11-12 12:00:00"
```

3. Synchronize the RTC time to the system:

```
sudo hwclock --hctosys
```

4. Check the RTC time:

```
sudo hwclock -r
```

This command will read and display the time stored in the RTC.

5. Disconnect the power source from the RTC, wait a few minutes, then reconnect it and check the RTC time again to see if it retained the correct time.

3.16 Watchdog

To perform a watchdog test, follow these steps:

1. Install the watchdog software:

```
sudo apt install watchdog
```

2. Edit the watchdog configuration file:

```
# make sure you install vim already, if haven't, can install by the command below
sudo apt-get install vim
sudo vim /etc/watchdog.conf
```

Modify the configuration as follows:

```
watchdog-device= /dev/watchdog

# Uncomment and edit this line for hardware timeout values that differ

# from the default of one minute.

watchdog-timeout  = 120

# If your watchdog trips by itself when the first timeout interval

# elapses then try uncommenting the line below and changing the

# value to 'yes'.

#watchdog-refresh-use-settimeout    = auto

# If you have a buggy watchdog device (e.g. some IPMI implementations)

# try uncommenting this line and setting it to 'yes'.
```

```
#watchdog-refresh-ignore-errors       = no
# ====================== Other system settings =======================
#
# Interval between tests. Should be a couple of seconds shorter than
# the hardware time-out value.
interval= 15
max-load-1              = 24
#max-load-5= 18
#max-load-15= 12
realtime= yes
priority= 1
```

You can adjust other settings as needed.

3. Ensure the watchdog service is running:

```
sudo systemctl start watchdog
```

4. To test the watchdog functionality, execute the following command to simulate a system hang:

```
sudo su
echo 1 > /proc/sys/kernel/sysrq
echo "c" > /proc/sysrq-trigger
```

This command triggers a kernel crash and should cause the watchdog to reboot the system.

5. Monitor the system to confirm that it reboots after the specified timeout period.

These steps will help you test and ensure the functionality of the watchdog timer on your system.

3.17 Buzzer

The GPIO corresponding to the buzzer is gpio587. Enter the following script to turn the buzzer on/off :

1. Turn on the buzzer :

```
echo 587 > /sys/class/gpio/export
echo out > /sys/class/gpio/gpio587/direction
echo 1 > /sys/class/gpio/gpio587/value
```

2. Turn off the buzzer :

```
echo 587 > /sys/class/gpio/export
 echo out > /sys/class/gpio/gpio587/direction
 echo 0 > /sys/class/gpio/gpio587/value
```

3.18 CSI Camera

Execute the following command to process the CSI camera test：

1. Modify /boot/firware/config.txt file,Add the following content at the end of the file:

```
sudo nano /boot/firware/config.txt
```

2. Add the following content at the end of the file:

```
dtoverlay=imx219,cam0
```

3. After restarting, check if there is a camera:

```
libcamera-jpeg --list-camera
```

Then turn on the camera:

```
rpicam-hello --timeout 0
```

3.19 TPM 2.0

If you connect TPM 2.0 module to device, the following code can help check TPM connection.

```
ls /dev | grep tpm
```

If you see ***tpm0*** and ***tpmrm0*** in the output, it means that TPM (Trusted Platform Module) devices are detected and available on your system. This indicates that the TPM hardware is recognized and accessible, which is a good sign. You can proceed with using TPM-related functionalities or applications knowing that the devices are present and accessible.

3.20 ATECC608A

To interact with the ATECC608A device and generate a random serial number, follow these steps:

1. Clone the atecc-util repository:

```
git clone https://github.com/wirenboard/atecc-util.git
```

2. Navigate into the atecc-util directory:

```
cd atecc-util
```

3. Clone the cryptoauthlib repository:

```
git clone https://github.com/wirenboard/cryptoauthlib.git
```

4. Compile the ATECC utility:

```
make
```

5. Generate a random serial number:

```
./atecc -b 1 -s 192 -c 'serial'
```

This command instructs the ATECC utility to use slot 1 (-b 1), set the serial number size to 192 bits ***(-s 192),*** and generate a random serial number (***c 'serial').*** The output will be the generated serial number, such as ***"01235595d3d621f0ee".***

This process allows you to interact with the ATECC608A device and perform various operations, such as generating random serial numbers.

3.21 EEPROM

Here are the commands to interact with an EEPROM (Electrically Erasable Programmable Read-Only Memory):

1. Grant full permissions (read, write, and execute) to the EEPROM device file:

```
sudo chmod 777 /sys/bus/i2c/devices/6-0050/eeprom
```

2. Write the string "This is a test string" to the EEPROM device:

```
echo "This is a test string" > /sys/bus/i2c/devices/6-0050/eeprom
```

3. Read the contents of the EEPROM device and displays it in hexadecimal format using the ***hexdump*** utility:

```
cat /sys/bus/i2c/devices/6-0050/eeprom | hexdump -C
```

3.22 SSD

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

```
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.

3.23 UPS for Safe Shut Down

A GPIO6 between CPU and DC power in is used to alarm CPU when the power supply is down. Then the CPU should do s omething urgent in a script before energy exhaustion of super capacitor and run a "$ shutdown".

Another way to use this function is Initiate a shutdown when GPIO pin changes. The given GPIO pin is configured as an in put key that generates KEY_POWER events. This event is handled by systemd-logind by initiating a shutdown.

Use /boot/overlays/README as reference, then modify /boot/firmware/config.txt.

```
dtoverlay=gpio-shutdown, gpio_pin=GPIO6,active_low=1
```

Note

1. For UPS function please contact us for more information.

2. The alarm signal is active LOW.

The python code below is a demo for detecting the working mode of supercapacitor UPS through GPIO6, and automatic ally saving data and shut down when the system is powered off.

```
import RPi.GPIO as GPIO
import time,os
num = 0
GPIO.setmode(GPIO,BCM)
#set GPIO6 as input mode
#add 500ms jitter time for software stabilization
GPIO.setup(6,GPIO.IN,pull_up_down = GPIO.PUD_UP)
GPIO.add_event_detect(6,GPIO.FALLING, bouncetime = 500)
while True:
  if GPIO.event_detected(6):
```

```
        print('...External power off...')
        print('')
        os.system('sync')
        print('...Data saving...')
        print('')
        time.sleep(3)
        os.system('sync')
    #saving two times
        while num<5:
          print('----------')
          s = 5-num
          print('---' + str(s) + '---')
          num = num + 1
          time.sleep(1)
        print('---------')
        os.system('sudo shutdown -h now')
```

3.24 Installing Ubuntu on reComputer R1100

1. Burn Image

- Follow the instructions provided on the https://ubuntu.com/download/raspberry-pi to burn the downloaded image.

2. Initial Setup:

- Connect a monitor to your Raspberry Pi.
- Power on the Raspberry Pi.

3. Initial Configuration:

- Follow the onscreen instructions for the initial setup. This may include setting up the user account, language, and other preferences.

4. Install Seeed provided firmware:

- Once logged into the system, open a terminal window.
- Clone the Seeed-Studio GitHub repository by running the following command:

```
git clone --depth 1 https://github.com/Seeed-Studio/seeed-linux-dtoverlays.git
```

Navigate to the cloned repository directory:

```
cd seeed-linux-dtoverlays
```

Run the provided script to configure the display device. For example, to configure for reComputer-R110x, run:

```
sudo ./scripts/reTerminal.sh --device reComputer-R110x
```

5. Reboot:

After running the script, reboot your reComputer R1100 by running:

```
sudo reboot
```

3.25 Customized Linux: Yocto and Mender

The reComputer R1100 is an edge IoT controller device that utilizes the Raspberry Pi CM4 as its processor. When you require a customized Linux distribution to run on your device, as well as a convenient solution for managing software updates, Yocto Project and Mender come into play.

Yocto Project is a powerful tool tailored for creating custom Linux distributions specifically designed for embedded devices, ensuring that your device's requirements are met. On the other hand, Mender serves as an open-source over-the-air (OTA) software update manager for embedded Linux devices, simplifying the process of managing software updates. It enables remote management of software updates via the internet, eliminating the need for physical access to the device and ensuring its security and stability.

Therefore, we provide the official reComputer R110X script along with Yocto Project-generated images, as well as scripts for Mender updates, for your reference and convenience.

Note

More details and tutorial please refer to https://wiki.seeedstudio.com/recomputer_R1100_yocto_mender/

3.26 Costomized Linux: Buildroot

Buildroot is a powerful tool for developers who want to create a customized and lightweight Linux environment tailored to their embedded device's hardware and software requirements.Buildroot is another tool similar to Yocto Project that can be used to create custom Linux distributions for reComputer R1100. It is less resource-intensive than Yocto Project, making it a suitable choice for devices with limited processing power or memory. It is recommended to consult the Buildroot documentation and community resources to determine its compatibility with the device.

Note

More details and tutorial please refer to https://wiki.seeedstudio.com/recomputer_R1100_buildroot/

- To download and compile the Seeed Studio Linux Buildroot code, you may need to install the following libraries if they are not already installed:

```
sudo -E apt-get install sed make binutils build-essential gcc g++ bash patch gzip bzip2 perl tar cpio unzip rsync file bc wget python cvs git

mercurial subversion
```

- clone the code from github

```
git clone --depth 1 https://github.com/Seeed-Studio/seeed-linux-buildroot.git
```

- For 32-bit or 64-bit systems, configure and compile using predefined configuration files:

```
cd seeed-linux-buildroot

# For 64-bit:

make reComputer_R110x_64_defconfig

# For 32-bit:

make reComputer_R110x_32_defconfig

make
```

The final firmware files will be located in the following path: ***seeed-linux-buildroot/output/images/***.

C4. 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:

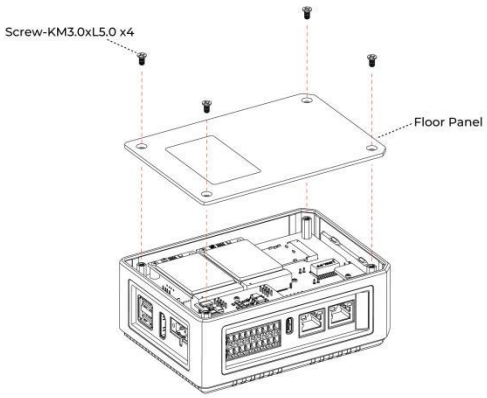
- Note the boot switch on one of the panels; it may have a small plastic plate attached.
- Ensure this plate doesn't fall off or get lost during the disassembly process.

Step 5: Take Down the Aluminum Outer Casing:

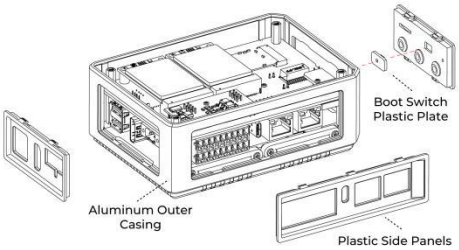
- Once the side panels are removed, you can access the aluminum outer casing.
- Carefully lift and remove the aluminum casing from the device.

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

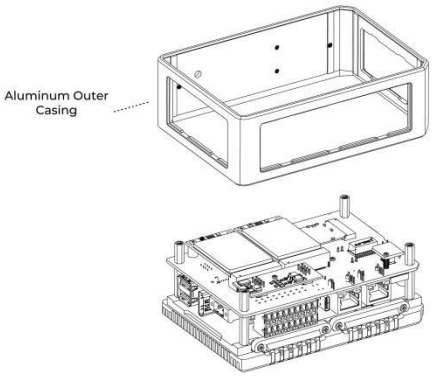
Step 1



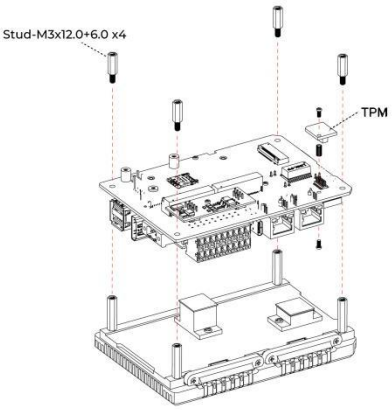
Step 2



Step 3



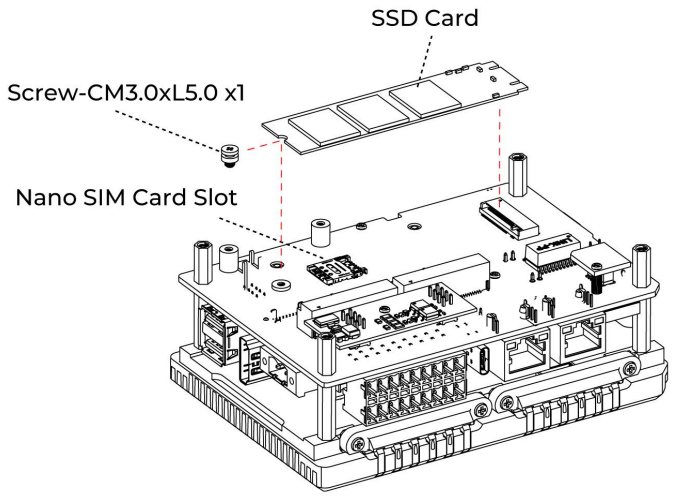
Step 4



4.2 Assemble Nano SIM Card

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

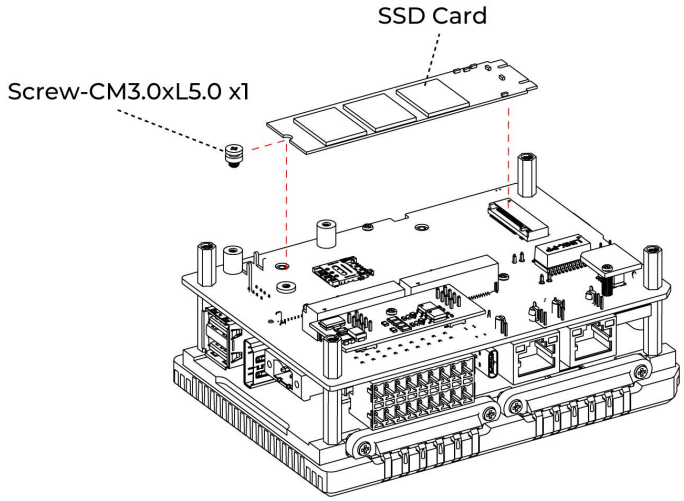
Step 2: Load the Nano SIM Card into the SIM slot.



4.3 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.



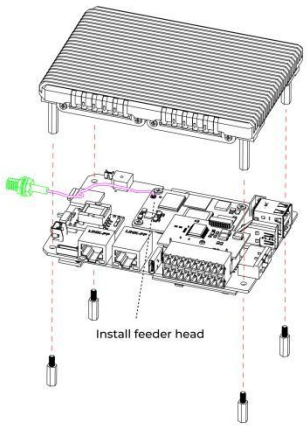
4.4 Assemble Wi-Fi/BLE Antenna

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

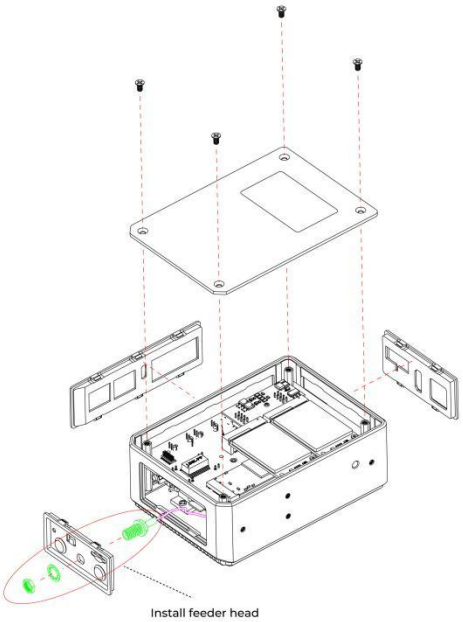
Step 2: Connect the feeder line from the CM4 module to antenna hole following the illustrastions below.

Step 3: Assemble the device for usage.

Step 1



Step 2



4.5 Assemble 4G/LoRa®/Zigbee Module and Antenna

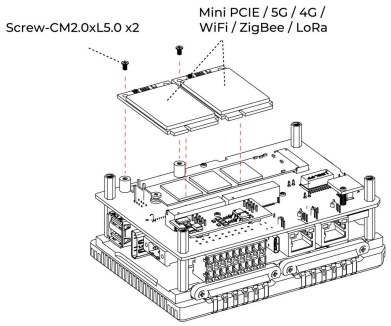
Step 1: Make sure the module for Mini-PCIe slots is loaded above the SSD card.

Step 2: Make sure the module for Mini-PCIe slots is loaded above the SSD card.

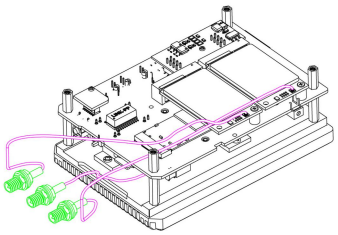
Step 3: Load the 4G module/LoRa® Module/Zigbee Module(following the matching relationship of each slot according to section"2.2.8") into the Mini-PCIe slot and lock the screws.

Step 4: Install the feeder line following the pictures below.

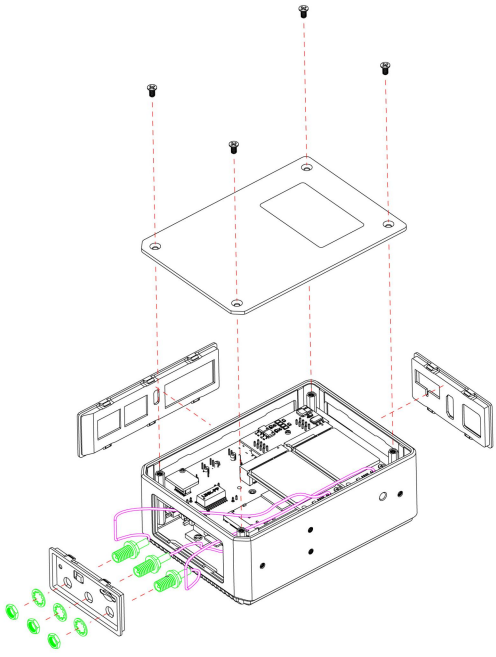
Step 1



Step 2



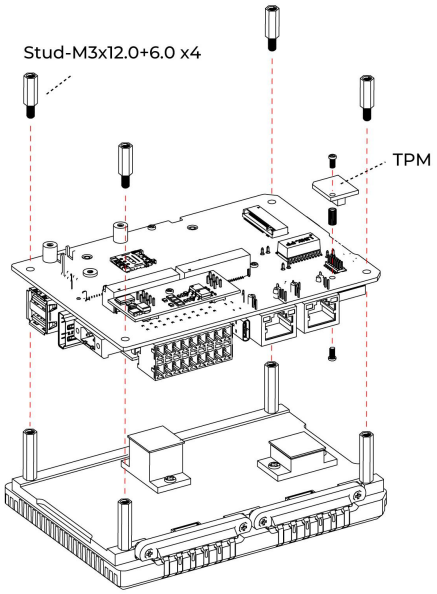
Step 3



4.6 Assemble TPM 2.0 Module

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

Step 2: Load the TPM 2.0 module into the J13 socket.



4.7 Assemble UPS and PoE module

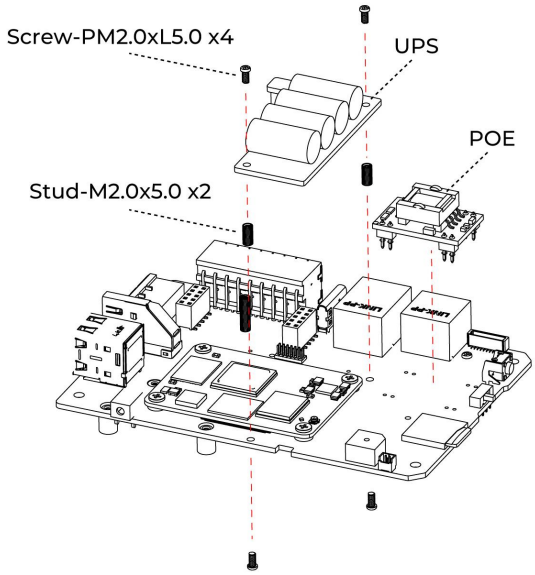
Step 1: Before installing the UPS and PoE module on the CM4 module side of board, disassemble the entire device following the disassembly guide provided.

Step 2:

- Using two PM2.0xL5.0 screws and M2.0x5.0 standoffs, secure the UPS module onto two holes without metal contact pads.
- Make sure the UPS module is aligned properly and firmly attached using the provided screws and standoffs.

Step 3: 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.



4.8 Mounting Guide

4.8.1 DIN-rail Mounting Guide

reComputer R1100 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.

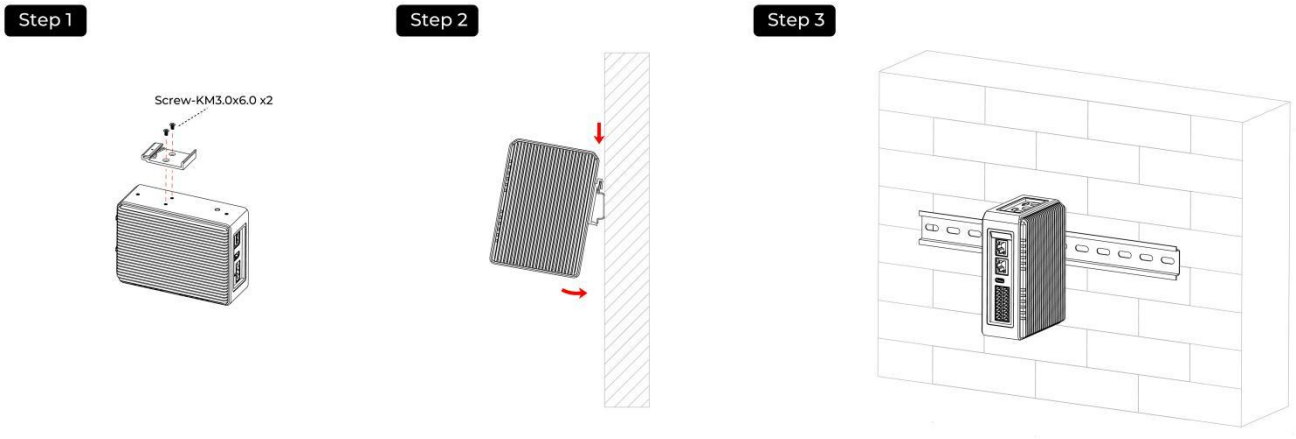
Step 3: Push the device in the direction of the standard profile rail. You will hear the device click into place.

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



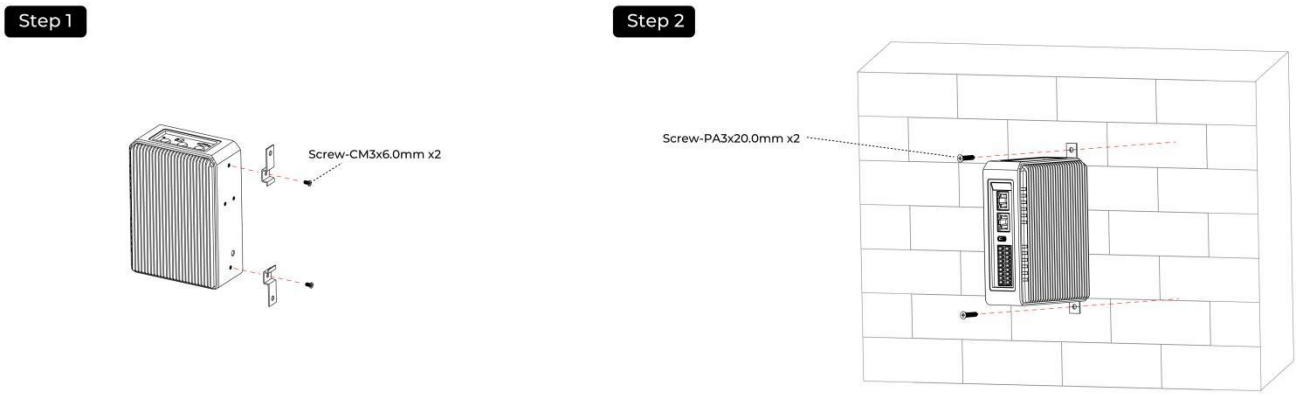
4.8.2 Wall Mounting Guide

Vertical mounting method is also suitable for reComputer R1100, 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.



C5. Accessories List

Item	Product	Product Name	SKU
LoRa® module		Region optional LoRaWAN Gateway Module(SPI)-US915	114992969
		Region optional LoRaWAN Gateway Module(SPI)-EU868	114993268
		Region optional LoRaWAN Gateway Module(USB)-US915	114992991
		Region optional LoRaWAN Gateway Module(USB)-EU868	114992628
LoRa® Antenna		LoRa Antenna Kit - 868-915 MHz	110061501
Wi-Fi/BLE Antenna		Raspberry Pi Compute Module 4 Antenna Kit	114992364
Zigbee Module		Mini-PCIe USB Zigbee Module	110992005
Zigbee Antenna		Zigbee Antenna Kit for reComputer R	110061641
4G Module		LTE Cat 4 EC25-AFXGA-Mini-PCIe Module - for North American	113991134
		LTE Cat 4 EC25-EUXGR-Mini-PCIe Module - for EMEA and Thai	113991135
		LTE Cat 4 EC25-AUXGR-Mini-PCIe Module - for Australia	113991174
		LTE Cat 4 EC25-EFA-Mini-PCIe Module - for Thai	113991214
		LTE Cat 4 EC25-EMGA-Mini-PCIe Module - for Malaysia	113991234
		LTE Cat 4 EC25-JFA-mini-PCIe	113991296
4G Antenna		4G Antenna Kit for 4G module	110061502
GPS Antenna		GPS Antenna Kit for EC25 4G Module	110061521
UPS Supercapacitor		SuperCAP UPS LTC3350 Module	110992004
Encryption chip TPM 2.0		TPM 2.0 Module with infineon SLB9670	114993114
SSD Card		NVMe M.2 2280 SSD 1TB	112990267
		512GB NVMe M.2 PCIe Gen3x4 2280 Internal SSD	112990247
		256GB NVMe M.2 PCIe Gen3x4 2280 Internal SSD	112990246

		128GB NVMe M.2 PCIe Gen3x4 2280 Internal SSD	112990226
PoE		MQ7813T120 PoE Module Kit for reTerminal DM	110991925
Power Adapter		Power Adapter-American	110061505
		Power Adapter-European	110061506

C6. Warranty & Support

6.1 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 Seeed Studio website or authorized distributors. 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 Seeed Studio. If the warranty period exceeds 24 months, Seeed Studio 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, Seeed Studio 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. Seeed Studio 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 Seeed Studio reComputer R1100 series, other products are not applicable!

6.2 Support

Quick start guide:

https://wiki.seeedstudio.com/recomputer_r/

Tech support email:

If you encounter any issues while deploying or testing, please don't hesitate to contact our technical support team at techsupport@seeed.io, or refer to our online knowledge base, https://wiki.seeedstudio.com.

Customized service email:

For further information about customizations, welcome you to directly reach out at edge@seeed.cc, we will provide prompt reply.

Discord:

Discord community:

Welcome to join our official community, where you can exchange product-related questions and get relevant support.

https://discord.seeed.cc