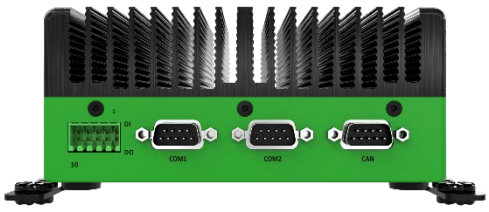
USER'S MANUAL

JCO-1000-ORN-A

NVIDIA Jetson Orin™ NX/Nano AI Computer



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Prefaces

Revision

Revision	Description	Date
1.3	Manual Released	2025/9/12

Disclaimer

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Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. Please recycle to minimize pollution and ensure environment protection.

Safety Precautions

Before installing and using the equipment, please read the following precautions:

- Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
- The power outlet shall be installed near the equipment and shall be easily accessible.
- Turn off the system power and disconnect the power cord from its source before making any installation. Be sure both the system and the external devices are turned OFF. Sudden surge
- of power could ruin sensitive components. Make sure the equipment is properly grounded.
- When the power is connected, never open the equipment. The equipment should be opened only by qualified service personnel.
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Disconnect this equipment from the power before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- Avoid the dusty, humidity and temperature extremes.
- Do not place heavy objects on the equipment.
- If the equipment is not used for long time, disconnect it from the power to avoid being damaged by transient over-voltage.
- The storage temperature shall be above -30°C and below 85°C.
- The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
- If one of the following situation arises, get the equipment checked be service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well or it cannot work according the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.

Technical Support and Assistance

1. Visit the Premio Inc website at www.premioinc.com where you can find the latest information about the product.
2. Contact your distributor, our technical support team or sales representative for technical support if you need additional assistance. Please have following information ready before you call:
   - Model name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Conventions Used in this Manual

WARNING This indication alerts operators to an operation that, if not strictly observed, may result in severe injury.

CAUTION This indication alerts operators to an operation that, if not strictly observed, may result in safety hazards to personnel or damage to equipment.

NOTE This indication provides additional information to complete a task easily.

Package Contents

Before installation, please ensure all the items listed in the following table are included in the package.

Item	Description	Q'ty
1	**JCO-1000-ORN-A** Lite-Range AI Computer	1
2	Wall Mount Kit	1
3	Accessory Kit	1

Ordering Information

Model No.	Product Description
JCO-1000-ORN-A-NX16	Basic Fanless Edge AI Embedded Computer with NVIDIA® Jetson Orin™ NX Super 16G, 1x HDMI, 1x LAN, 4x USB, 1x CAN
JCO-1000-ORN-A-NX8	Basic Fanless Edge AI Embedded Computer with NVIDIA® Jetson Orin™ NX Super 8G, 1x HDMI, 1x LAN, 4x USB, 1x CAN
JCO-1000-ORN-A-NN8	Basic Fanless Edge AI Embedded Computer with NVIDIA® Jetson Orin™ Nano Super 8G, 1x HDMI, 1x LAN, 4x USB, 1x CAN
JCO-1000-ORN-A-NN4	Basic Fanless Edge AI Embedded Computer with NVIDIA® Jetson Orin™ Nano Super 4G, 1x HDMI, 1x LAN, 4x USB, 1x CAN

Optional Accessories

Model No.	Product Description
1-E09A12002	Adapter AC/DC 24V 5A 120W with 3pin Terminal Block Plug 5.0mm Pitch
1-TPCD00005	Power Cord, 3-pin US Type, 180cm
1-TPCD00002	Power Cord, European Type, 180cm
1-TPCD00001	Power Cord, 3-pin UK Type, 180cm
1-TPCD00003	Power Cord, Japanese Type, 180cm

Chapter 1

Product Introductions

1.1 Overview

Featuring NVIDIA Jetson Orin NX (16GB/8GB) and Nano (8GB/4GB) Orin system-on-module (SOM), the JCO-1000 Series offers entry-level AI performance with up to 100 TOPS in the whole JCO series. With configurable power modes (7W to 25W), rugged design, NVMe data storage, and rich I/O, the JCO-1000-ORN is deployment-ready for the harshest conditions.

Model No.	Rear Panel	Front Panel
JCO-1000-ORN-A		

Key Features

- NVIDIA® Jetson Orin™ NX Super 8GB/16GB or Nano Super 8GB/4GB GPU with 32 Tensor Cores
- 1x HDMI 2.0, 3840 x 2160 @ 60Hz
- 1x GbE LAN
- 1x External Dual Nano SIM socket
- 1x M.2 (M Key, 2242/2280, PCIex 4, NVMe Storage) (128GB Default)
- 4x USB 3.2 Gen 2, 1x USB Type-C (For OS Flash)
- 4x DI + 4x DO with isolation
- 9 to 36VDC Wide Range Power Input Supporting AT/ATX Mode
- Wide Operating Temperature -20°C up to 55°C

1.2 Hardware Specification

System	
Processor **NVIDIA® Jetson Orin™ NX Super/Nano Super GPU with 32 Tensor Cores** • NX 16 GB: 1024-core NVIDIA Ampere architecture GPU (40W/157 TOPS) • NX 8 GB: 1024-core NVIDIA Ampere architecture GPU (40W/117 TOPS) • Nano 8 GB: 1024-core NVIDIA Ampere architecture GPU (25W/67 TOPS) • Nano 4 GB: 512-core NVIDIA Ampere architecture GPU (25W/34 TOPS)	
LAN Chipset	GbE1: RGMII
Watchdog	Software Programmable Supports 1~255 sec. System Reset
TPM	TPM 2.0

Display	
HDMI	1x HDMI 2.0, 3840 x 2160 @ 60Hz

Storage	
M.2	1x M.2 (M Key, 2242/2280, PCIe x4, NVMe) (Default 128GB)
SD	1x Micro 2.0 SD Slot
SIM Socket	1x External Dual Nano SIM socket (Attached to M.2 B Key)

Expansion	
M.2	• 1x M.2 (B Key, 2242/3042/3052, PCIe x1, USB 3.2 Gen1, Support 4G/5G Module) • 1x M.2 (E Key, 2230, PCIe x1, USB 2.0, Support Wi-Fi/Bluetooth)

I/O	
CAN	CAN 2.0 B
COM	2x RS-232/422/485
DIO	4 in / 4 out (Isolated)
LAN	1x GbE RJ45
OOB	1x RJ45 (Optional OOB Management Module, Occupied 1x COM & Micro USB Console Port)
USB	4x USB 3.2 Gen 2 (10 Gbps) 1x USB Type-C (For OS Flash) 1x Micro USB (Console)
LED	3x LED LED 1 : Programmable LED (Blue Color) LED 2 : Programmable LED (Blue Color) LED 3 : Programmable LED (Red Color)
Others	Service Panel: • 1x Micro USB (For Console) • 1x USB Type-C (For OS Flash) • 1x PC/CAR Mode SW • 1x AT/ATX SW • 1x Micro SD Slot • 1x Dual SIM Slot 5x WiFi Antenna Holes 1x Power Switch and 1x Reset Switch, 1x 2P Terminal Block for Remote SW 1x CMOS Battery Cable 1x 4-Pin FAN Connector 1x MIPI CSI-2 22-Pin Connector 1x MIPI CSI-2 15-Pin Connector Intregated RTC
Audio	1x Mic-in, 1x Line-out

Power	
Power Adapter	Optional AC/DC 24V/5A, 120W
Power Mode	AT, ATX
Power Ignition Sensing	Adjustable Power Ignition Management
Power Supply Voltage	DC IN 9~36V
Power Connector	3-pin Terminal Block
Power Protection	OVP (Over Voltage Protection) OCP (Over Current Protection) Reverse Protection

Operating System	
Linux	Linux Ubuntu 22.04 with JetPack 6.2

Environment	
Operating Temp.	-20°C to 55°C (15W, 25W) -20°C to 35°C (40W)
Storage Temp.	-30°C to 85°C
Relative Humidity	10% to 95% (non-condensing)
Certification	CE, FCC Class B, UL 62368-1, 3rd Ed., RoHS 3.0, REACH
Vibration	With SSD: 5 Grms (5 - 500 Hz, 0.5 hr/axis)
Shock	With SSD: 50G half-sin 11ms

Physical	
Dimensions	150 (W) x 105 (D) x 65 (H) mm
Weights	1.1kg
Construction	Extruded Aluminum with Heavy Duty Metal
Mounting Options	Wall Mounting

* All specifications and photos are subject to change without notice.

1.3 System I/O

JCO-1000-ORN-A

Front Panel

DC IN
Used to plug a DC power input with terminal block

USB 3.2 Gen 2 port (10 Gbps)
Used to connect USB 3.2 device

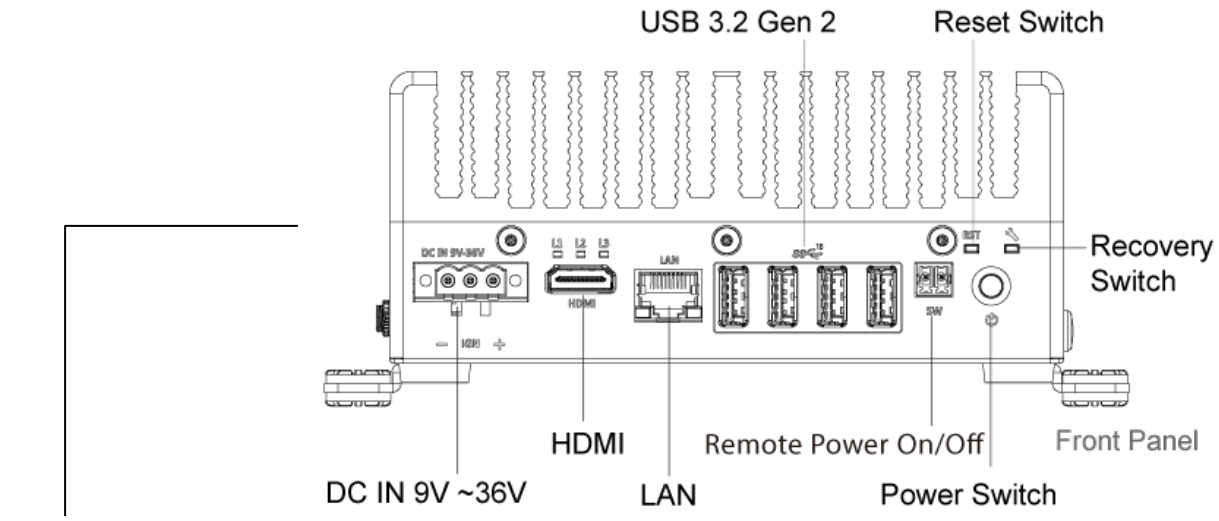
HDMI
Used to connect HDMI-compatible devices

LAN ports
Used to connect the system to a local area network

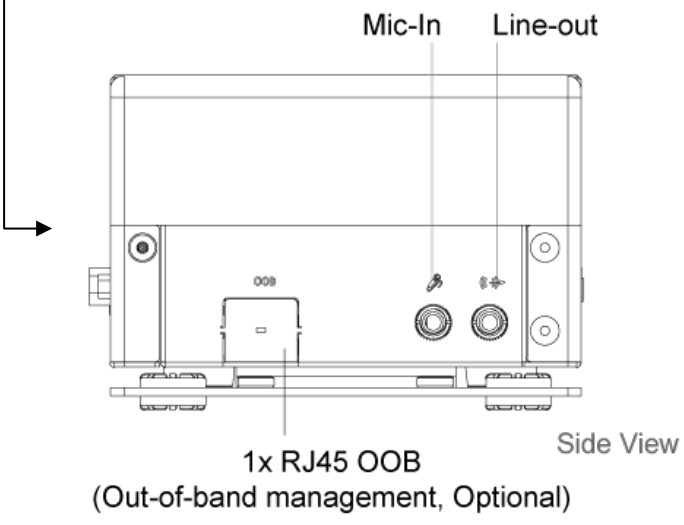
Remote Power on/off
Used to plug a remote power on/off terminal block

Reset Switch
Used to Power Reset

Power Switch
Used to Power start button



Side View



Mic-In
Used to connect a microphone

Line-out
Used to connect a speaker

OOB (Optional)
Remote Mangement And Wireless Connectivity

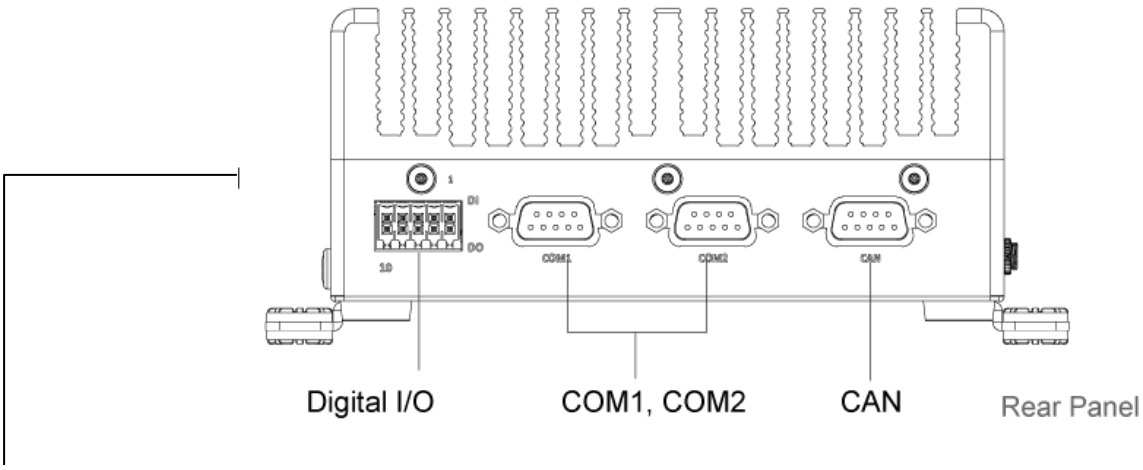
JCO-1000-ORN-A

Rear Panel

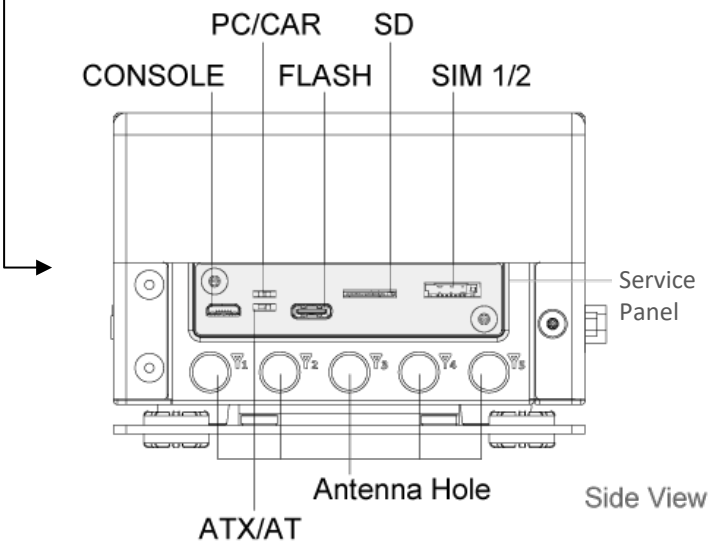
Digital I/O
The Digital I/O terminal block supports 4 digital input and 4 digital output

COM port
COM1 ~ COM2 support RS232/422/485 serial device

CAN
Used to connect an ECU (Electronic control unit) device with D-SUB 9 pin connector



Side View



SIM 1/2
The SIM card has 2 slots located on the Side View of the system, SIM 1 and SIM 2.

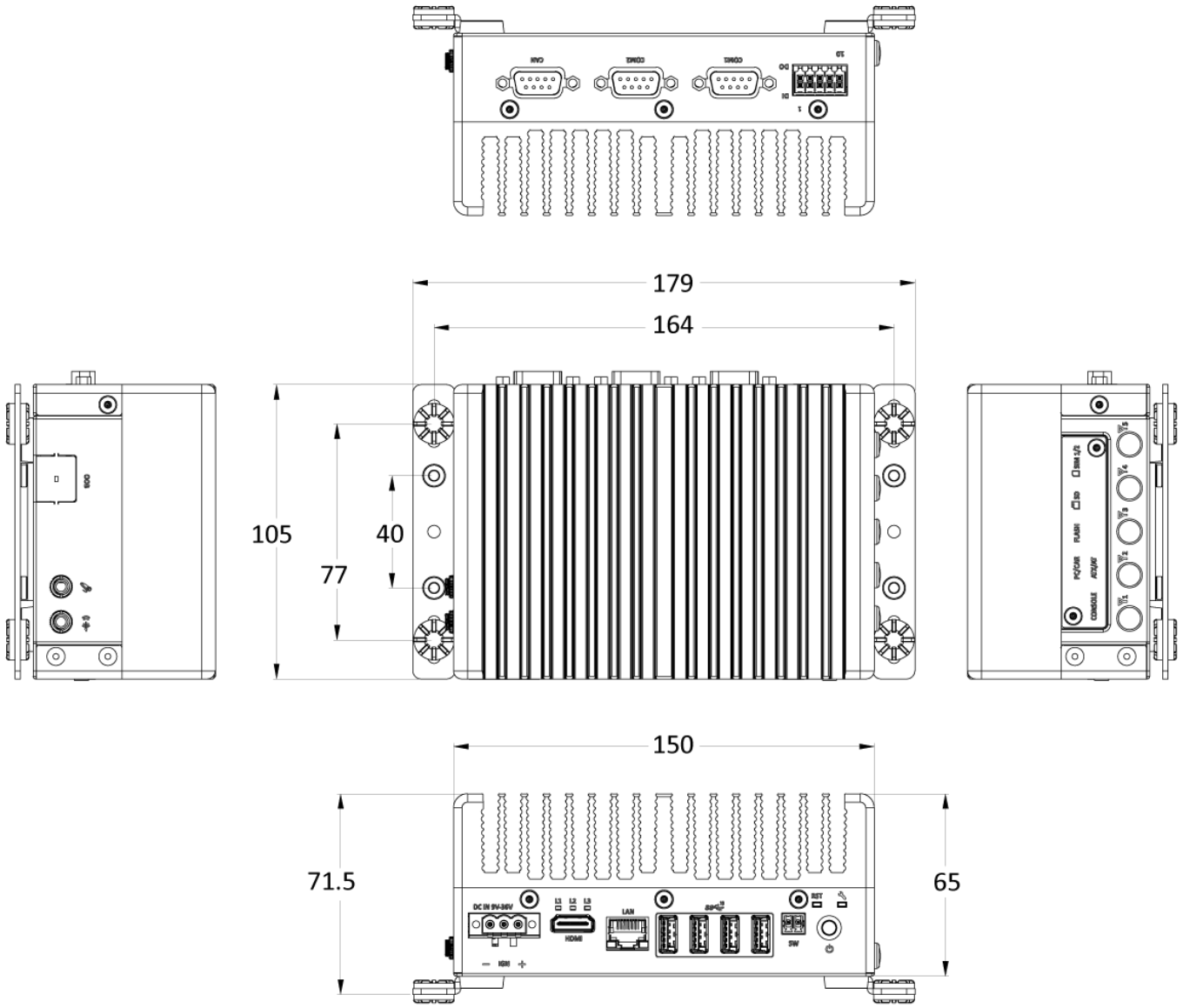
SD
Used to insert SD card

PC/Car mode select switch
Used to select PC or Car mode

1.4 Mechanical Dimensions

JCO-1000-ORN-A

Unit: mm

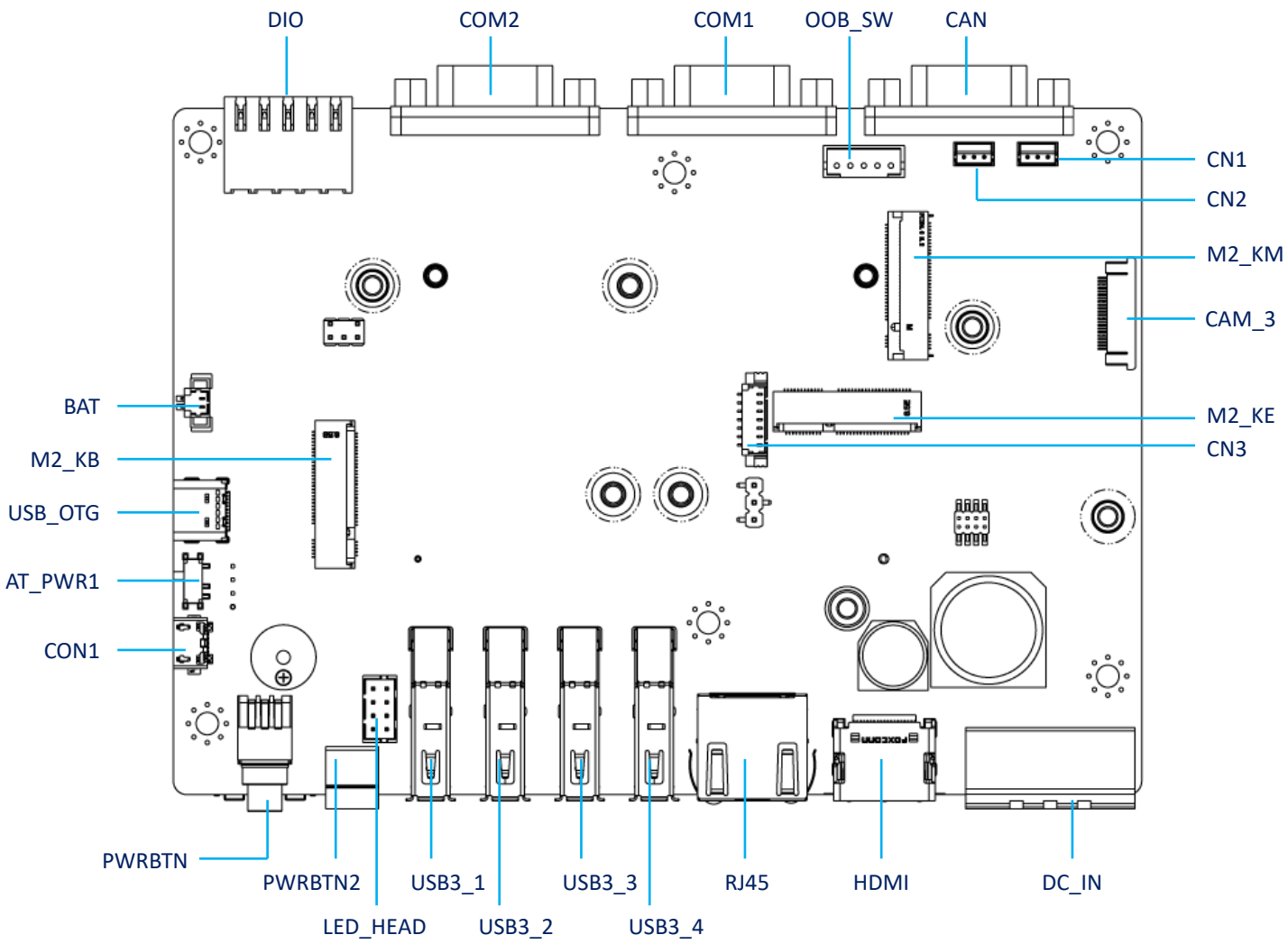


Chapter 2

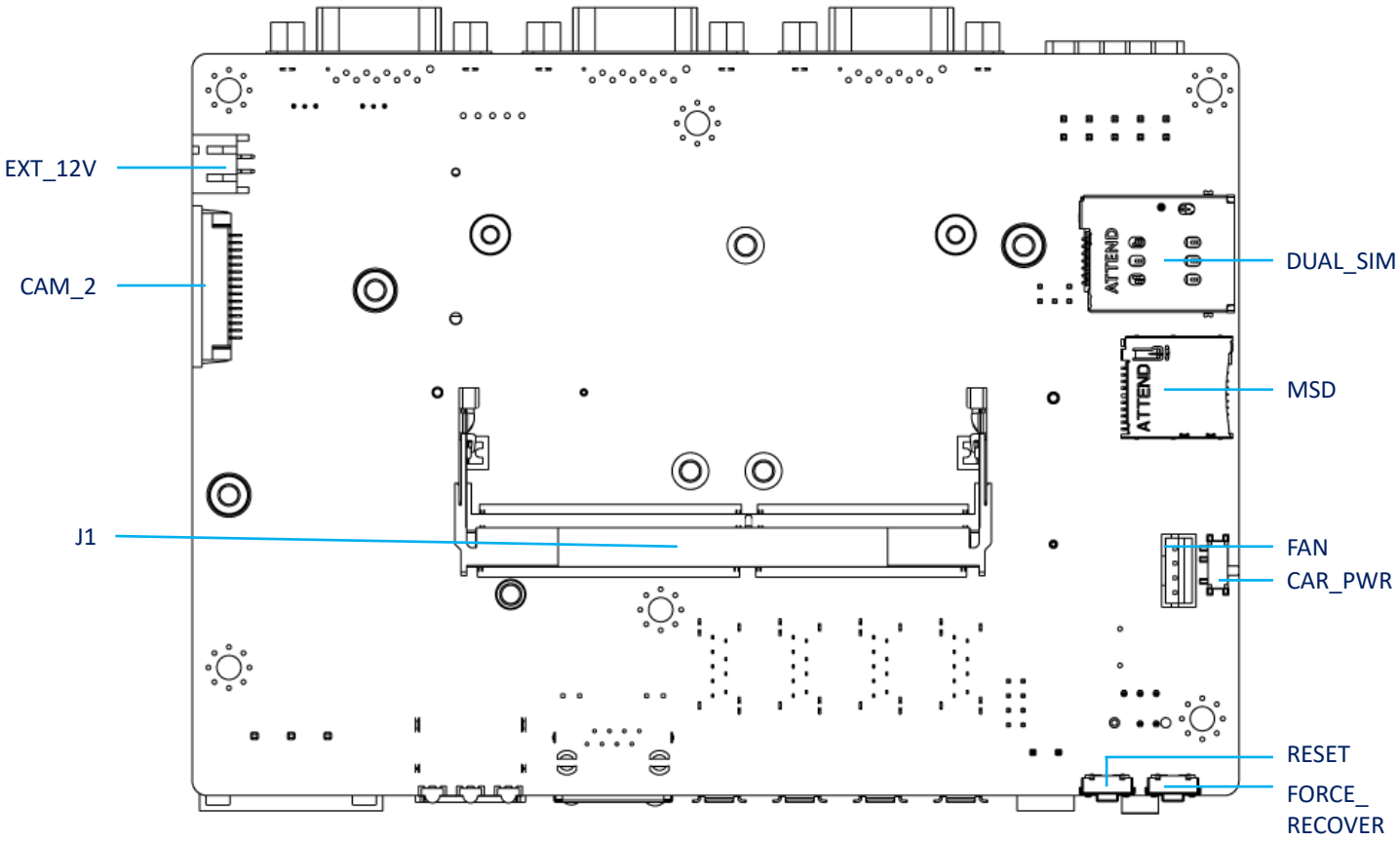
Mechanical Specifications

2.1 Switch and Connector Locations

2.1.1 Top View



2.1.2 Bottom View

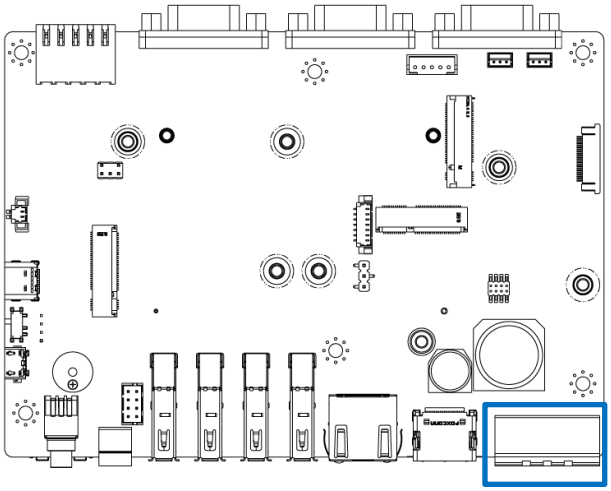


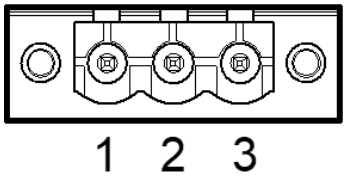
2.2 Connector / Switch Definition

Connector Location	Definition
DC_IN	3-pin DC +9~36V Power Input Connector
PWRBTN	Power Switch
PWRBTN2	Remote Power Switch
RESET	RESET Button
FORCE_RECOVERY	Force Recovery Button
HDMI	Display Port
COM1/2	RS232 / RS422 / RS485 Connector (Half Duplex)
CON1	Micro USB (Console Port)
USB3_1/2/3/4	USB 3.2 Gen 2 Port (10 Gbps, Shared with USB 3 Hub)
USB_OTG	Power LED Status
RJ45	1G bit/s LAN Port
RJ45_1(option)	Wafer 2x4P for 1G LAN port
LED_HEAD	PC mode / CAR mode select
LED2 ~ LED4	By User LED Status
AT_PWR1	AT / ATX Power Mode Switch
CAR_PWR	PC / CAR side Mode Switch
OOB_SW	OOB Connector
FAN	CPU FAN Connector
CAN	CAN Bus Connector
M.2_KB	M.2 B-Key Socket
M.2_KE	M.2 E-Key Socket
M.2_KM	M.2 M-Key Socket
DUAL_SIM	SIM Card Dual Socket
DIO	4DI/DO Connector
CN1	Auto Link for OOB
CN2	ByPass UART for OOB
EXT_12V	External Power
MSD	Micro SD Socket
CAM_2	15P FPC Camera Connector
CAM_3	22P FPC Camera Connector
CN3(option)	Audio Output Connector

2.3 I/O Interface Descriptions

DC Power Input Connector (+9~36V)

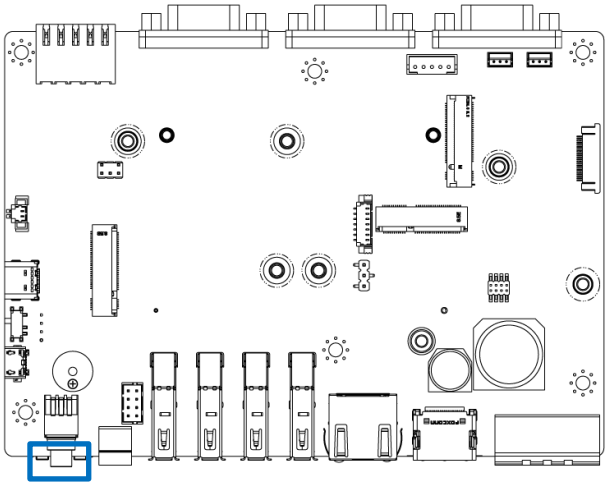




DC_IN

Pin	Definition
1	+9 ~ 36Vin
2	IGN
3	GND

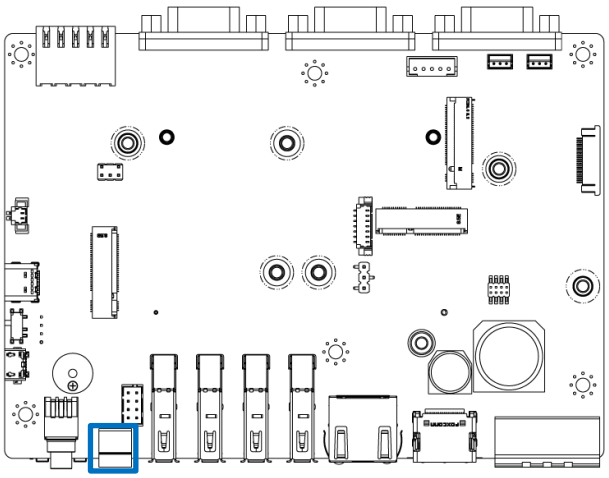
Power Button of ATX model

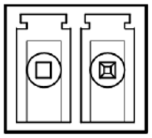


PWRBTN

Pin	Definition	Pin	Definition
1	NC	4	GND
2	Power Button	5	LED Power
3	NC	6	GND

Remove Power Button of ATX model





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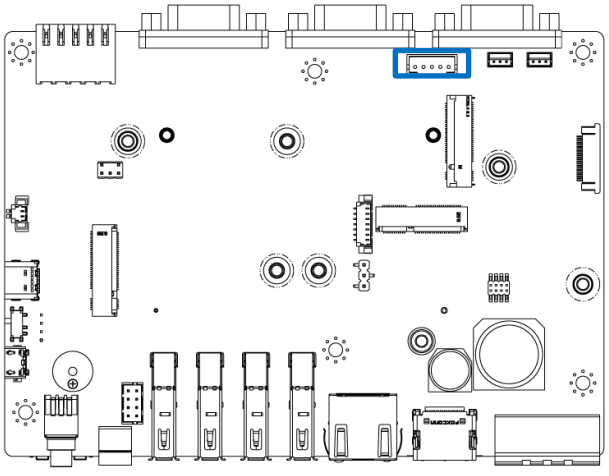
PWRBTN2

Pin	Definition
1	Power Button
2	GND

OOB Function



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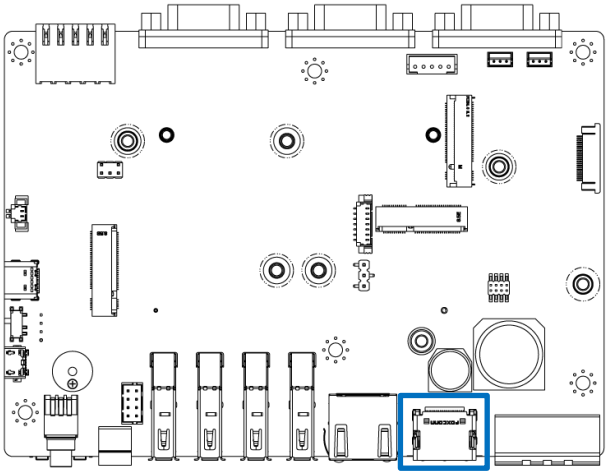
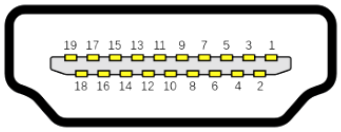
OOB_SW

Pin	Definition
1	5V
2	GND
3	PWRBTN#
4	SYS_RST_IN_N
5	Power_On_Off

HDMI Display Connector



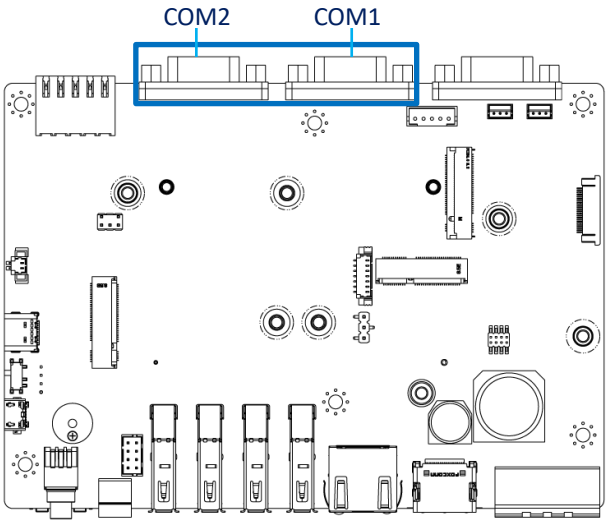


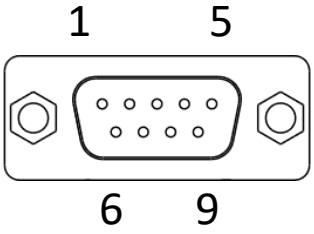
Type A (Receptacle) HDMI

HDMI

Pin	Definition	Pin	Definition
1	D2+	2	D2 Shield
3	D2-	4	D1+
5	D1_Shield	6	D1-
7	D0+	8	D0 Shield
9	D0-	10	CK+
11	CK Shield	12	CK-
13	CE Remote	14	NC
15	DDC CLK	16	DDC DAT
17	GND	18	5V
19	HDMI_HPD	20	

RS232 / RS422 / RS485 switch Connector

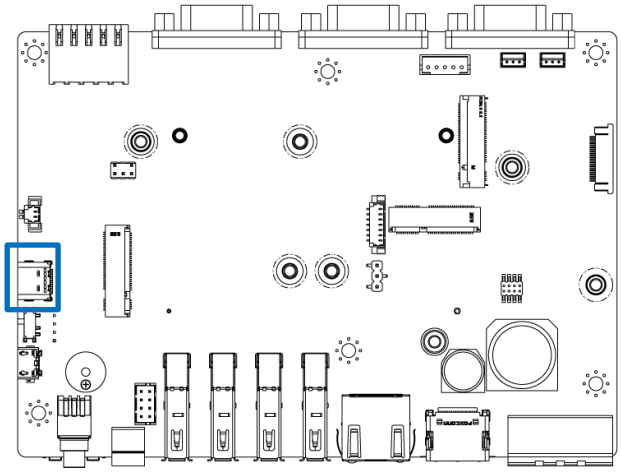


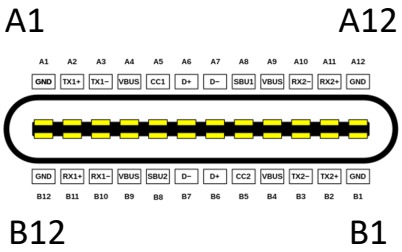


COM1 / 2

DB9 Pin	RS232	RS485/RS422 Full Duplex	RS485 Half Duplex
1		TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	
4		RX-	
5	GND		
6			
7	RTS		
8	CTS		
9			

Console Connector

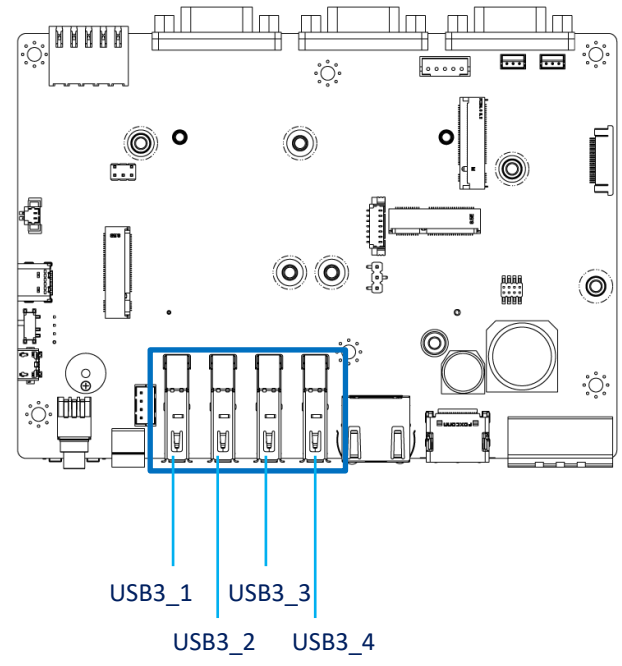


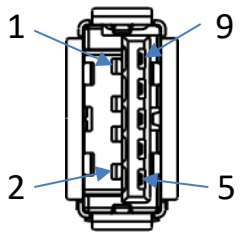


USB_OTG

Pin	Definition
A4,A9 & B4,B9	VBUS +5V
A6 & B6	DP
A7 & B6	DM
A1,A12, & B1,B12	GND
A1,A3,A5,A8,A10,A11	NC
B2,B3,B5,B8,B10,B11	NC

USB 3.2 Gen2

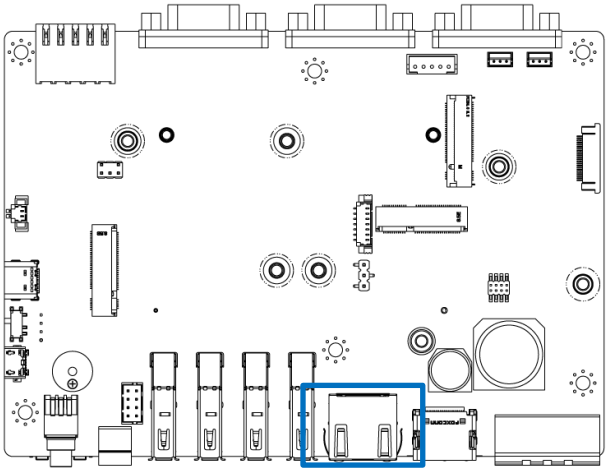


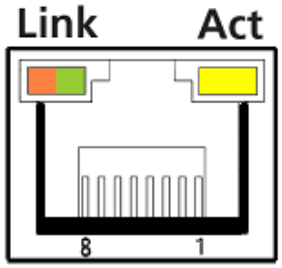


USB3_1 / 2 / 3 / 4

Pin	Definition	Pin	Definition
1	5V	6	USB3_RX+
2	USB2_D-	7	GND
3	USB2_D+	8	USB3_TX-
4	GND	9	USB3_TX+
5	USB3_RX-		

GIGA LAN with LEDs Port



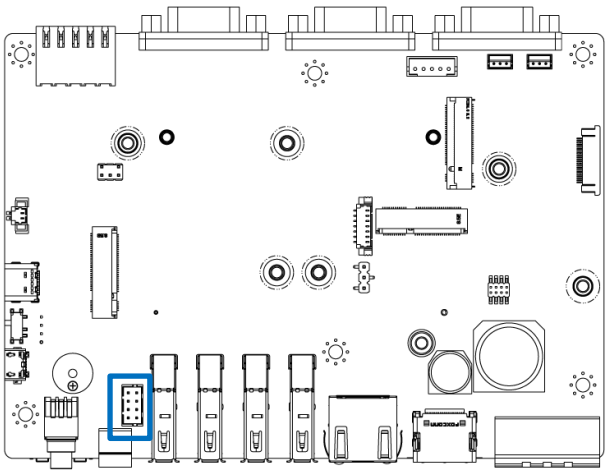


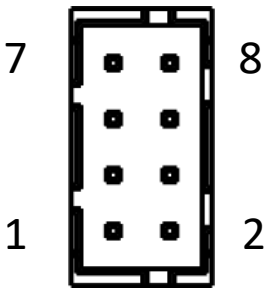
RJ45

Pin	Definition	Pin	Definition
1	MIDI0_P	4	MIDI2_P
2	MIDI0_N	5	MIDI2_N
3	MIDI1_P	7	MIDI3_P
6	MIDI1_N	8	MIDI3_N

Link LED Status	Definition	Act LED Status	Definition
Steady Orange	Network Link	Blinking Yellow	Data Activity
Steady Green	Network Link	Off	No Activity
Off	10Mbps Network Link		

External LED Header

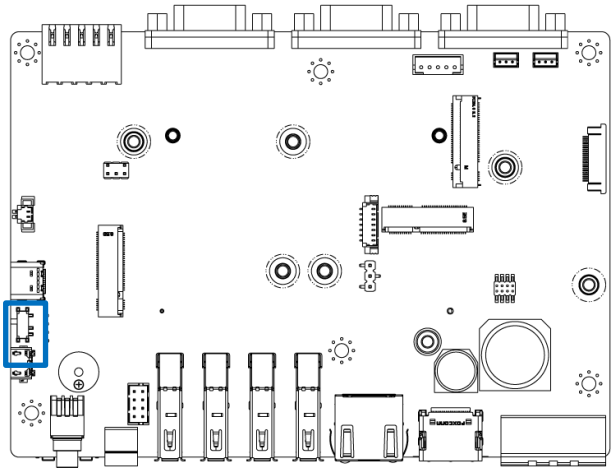


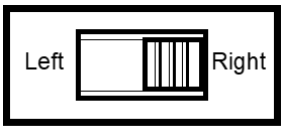


LED_HEAD

Pin	Definition	Pin	Definition
1	Backup button	2	PWR_LED#
3	GND	4	L1_LED#
5	3.3V	6	L2_LED#
7	3.3V	8	L3_LED#

AT / ATX Power Mode Switch

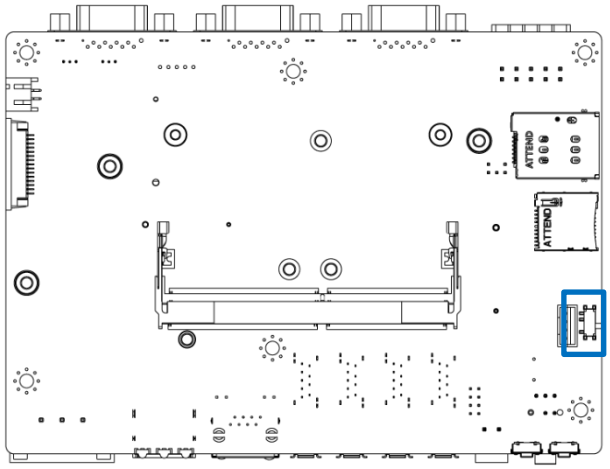


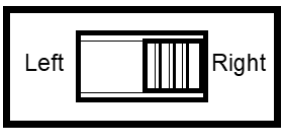


AT_PWR1

Pin	Definition
1-2(left)	AT mode
2-3(right)	ATX mode

PC / Car side Mode Switch

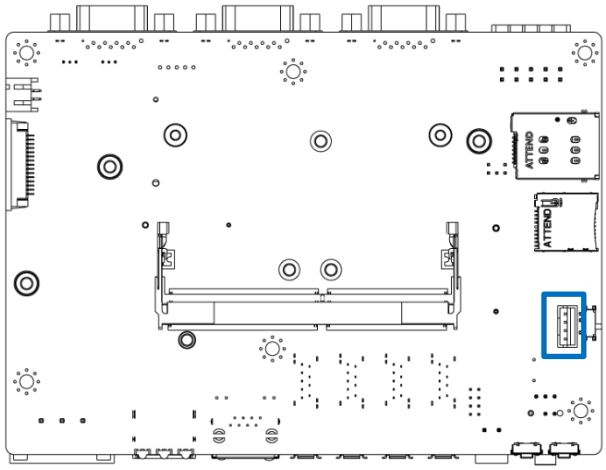




CAR_PWR

Pin	Definition
1-2(left)	PC mode
2-3(right)	Car mode

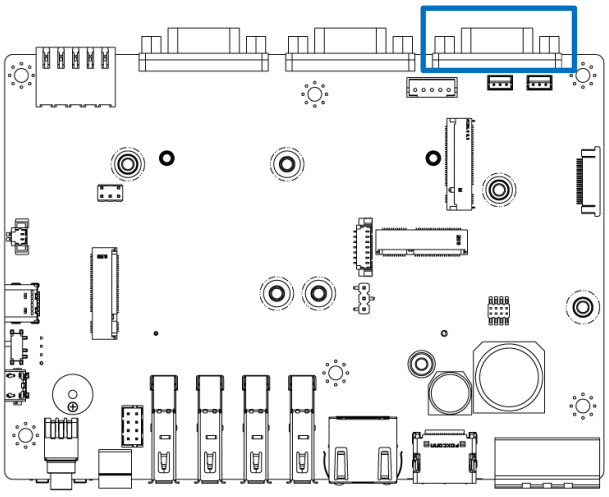
CPU Fan

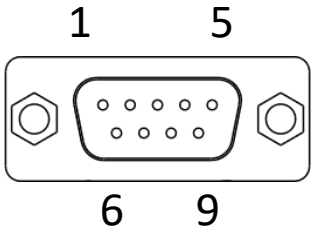


FAN

Pin	Definition
1	GND
2	12V/5V
3	FAN_TACH
4	FAN_PWM

CAN BUS Connector

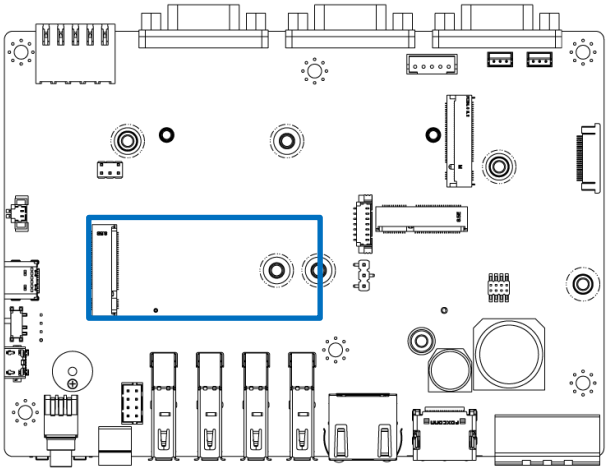


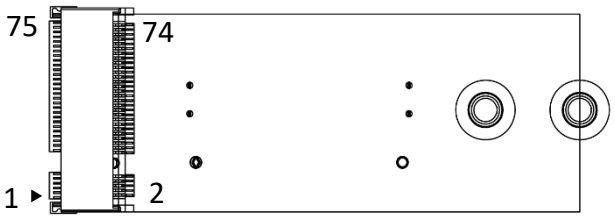


CAN

DB9 Pin	CAN BUS
1	
2	CAN_L
3	
4	
5	GND
6	
7	CAN_H
8	
9	

M.2 Key B Socket



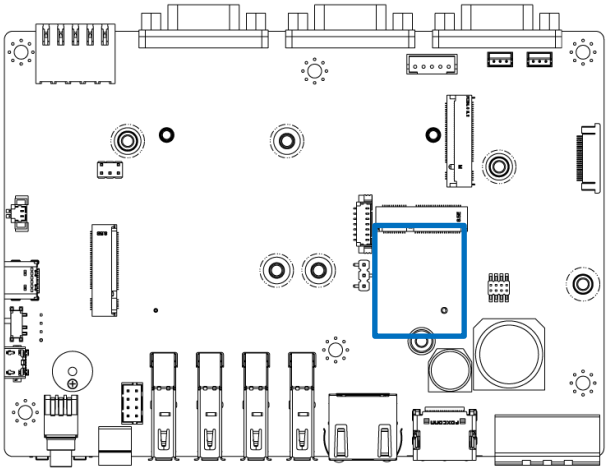


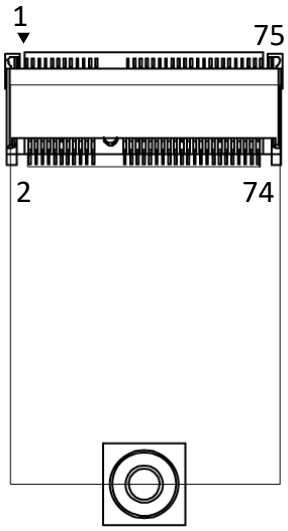
M2 KB

Pin	Definition	Pin	Definition
1	3.3V		
3	GND	2	3.3V
5	GND	4	3.3V
7	USB2_D+	6	Full_card_PWR_OFF#
9	USB2_D-	8	W_Disable1#
11	GND	10	WWAN_LED#
21	NC	20	NC
23	NC	22	NC
25	NC	24	NC
27	GND	26	NC
29	USB3_RX-	28	NC
31	USB3_RX+	30	SIM1_RST
33	GND	32	SIM1_CLK
35	USB3_TX-	34	SIM1_DAT
37	USB3_TX+	36	SIM1_PWR
39	GND	38	NC
41	PCIe_RX-	40	SIM2_DET
43	PCIe_RX+	42	SIM2_DAT

45	GND	44	SIM2_CLK
47	PCIe_TX-	46	SIM2_RST
49	PCI_TX+	48	SIM2_PWR
51	GND	50	PCIe_RST
53	PCIe_CLK-	52	PCIe_CLKREQ
55	PCIe_CLK+	54	PCIe_WAKE
57	GND	56	NC
59	NC	58	NC
61	NC	60	NC
63	NC	62	NC
65	NC	64	NC
67	5G_RST	66	SIM1_DET
69	NC	68	32KHz
71	GND	70	3.3V
73	GND	72	3.3V
75	NC	74	3.3V

M.2 Key E Socket



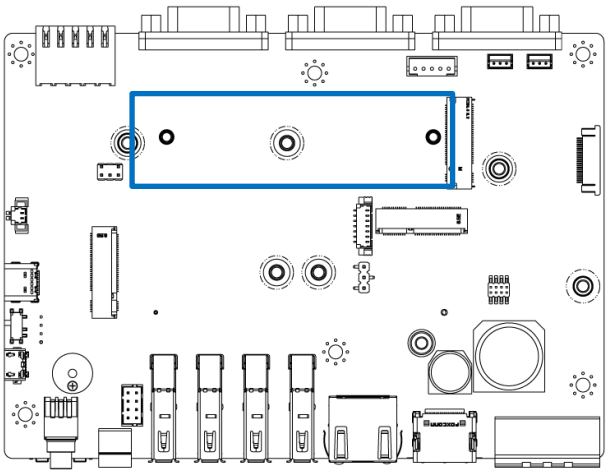


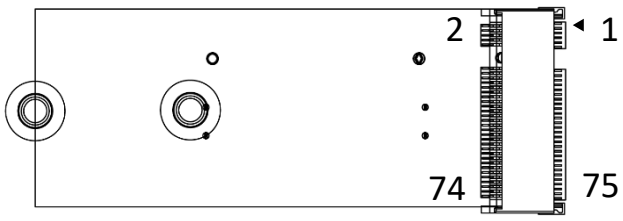
M2 KE

Pin	Definition	Pin	Definition
1	GND		
3	USB2_D+	2	3.3V
5	USB2_D-	4	3.3V
7	GND	6	NC
9	NC	8	I2S_SCLK
11	NC	10	I2S_LRCK
13	NC	12	I2S_SDIN
15	NC	14	I2S_SDOUT
17	NC	16	NC
19	NC	18	GND
21	NC	20	BT_WAKE
23	NC	22	NC
33	GND	32	NC
35	PCIe_TX+	34	NC
37	PCIe_TX-	36	NC
39	GND	38	NC
41	PCIe_RX+	40	NC
43	PCIe_RX-	42	NC

45	GND	44	NC
47	PCIe_CLK+	46	NC
49	PCIe_CLK-	48	NC
51	GND	50	32 KHz
53	PCIe_CLKREQ	52	PCIe_RST
55	PCIe_WAKE	54	W_Disable2
57	GND	56	W_Disable1
59	NC	58	I2C_SDA
61	NC	60	I2C_SCL
63	GND	62	M2E_Alert
65	NC	64	NC
67	NC	66	NC
69	GND	68	NC
71	NC	70	NC
73	NC	72	3.3V
75	GND	74	3.3V

M.2 Key M Socket



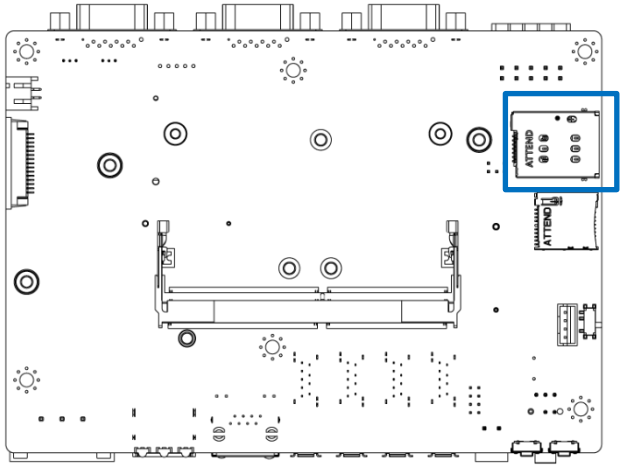


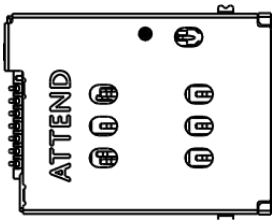
M2 KM

Pin	Definition	Pin	Definition
1	GND	2	3.3V
3	GND	4	3.3V
5	PCIe_RX3-	6	NC
7	PCIe_RX3+	8	NC
9	GND	10	NC
11	PCIe_TX3-	12	3.3V
13	PCIe_TX3+	14	3.3V
15	GND	16	3.3V
17	PCIe_RX2-	18	3.3V
19	PCIe_RX2+	20	NC
21	GND	22	NC
23	PCIe_TX2-	24	NC
25	PCIe_TX2+	26	NC
27	GND	28	NC
29	PCIe_RX1-	30	NC
31	PCIe_RX1+	32	NC
33	GND	34	NC
35	PCIe_TX1-	36	NC
37	PCIe_TX1+	38	NC

39	GND	40	I2C_SCL
41	PCIe_RX0-	42	I2C_SDA
43	PCIe_RX0+	44	M2 ALERT
45	GND	46	NC
47	PCIe_TX0-	48	NC
49	PCIe_TX0+	50	PCI_RST
51	GND	52	PCIe_CLKREQ
53	PCIe_CLK-	54	PCIe_WAKE
55	PCIe_CLK+	56	NC
57	GND	58	NC
67	NC	68	3.3V
69	NC	70	3.3V
71	GND	72	3.3V
73	GND	74	3.3V
75	GND		

SIM Card Socket

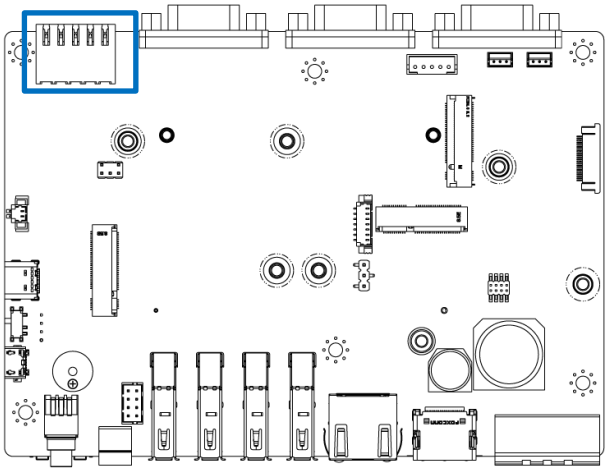




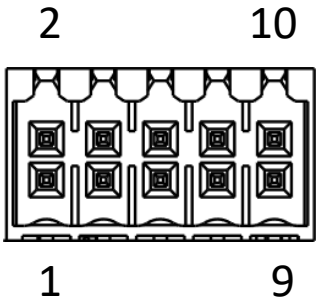
DUAL_SIM

Pin (SIM1/2)	Definition
C1/C8	PWR
C2/C9	RST
C3/C10	CLK
C5/C12	GND
C6/C13	VPP
C7/C14	I/O
CD1/CD2	Card Detect Switch

Digital input / Output Connector

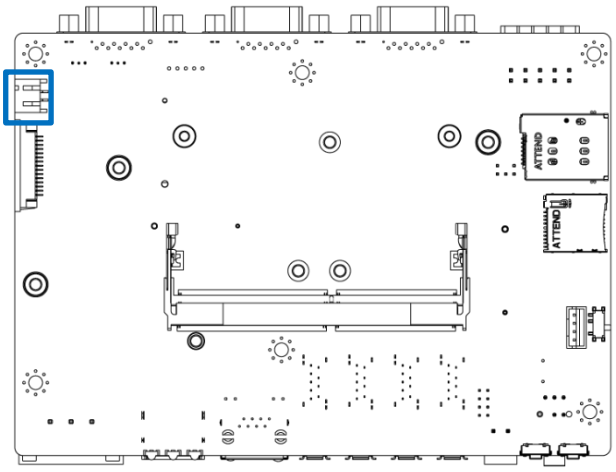


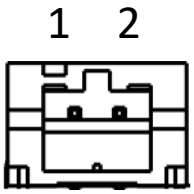
DIO



Pin	Definition	Pin	Definition
1	IN1	2	OUT1
3	IN2	4	OUT2
5	IN3	6	OUT3
7	IN4	8	OUT4
9	XCOM+	10	XCOM-

Expansion Power : 12V Power Output Connector

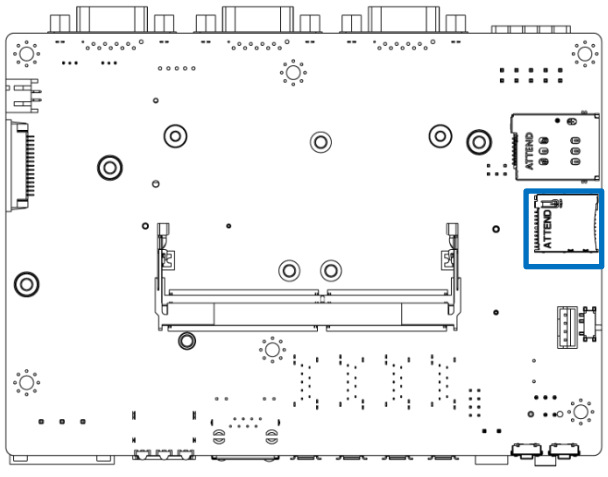


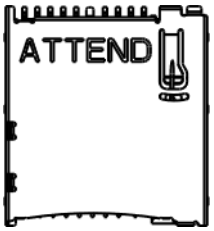


EXT_12V

Pin	Definition
1	12V
2	GND

Micro SD socket

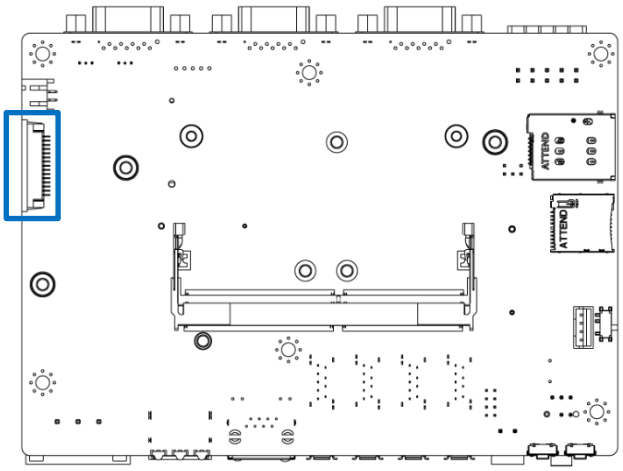


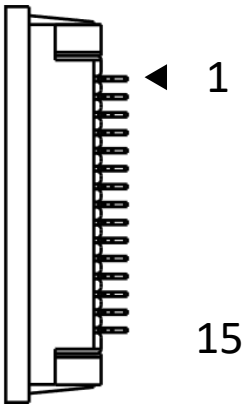


MSD

Pin	Definition	Pin	Definition
1	SDMMC_D2	10	GND
2	SDMMC_D3	11	NC
3	SDMMC_CMD	12	NC
4	3.3V	13	GND
5	SDMMC_CLK	14	NC
CD	SDMMC_DET	15	NC
6	GND	16	GND
7	SDMMC_D0	17	NC
8	SDMMC_D1		
9	NC		

Camera FPC Connector

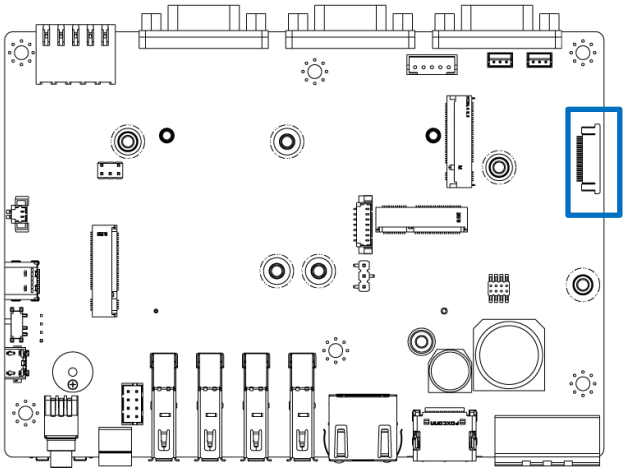


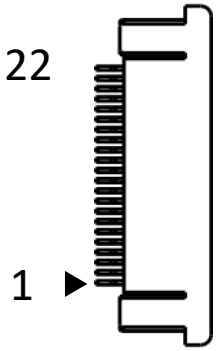


CAM_2

DB9 Pin	Definition
1	GND
2	CSI1_D0_N
3	CSI1_D0_P
4	GND
5	CSI1_D1_N
6	CSI1_D1_P
7	GND
8	CSI1_CLK_N
9	CSI1_CLK_P
10	GND
11	CAM0_PWRDN
12	CAM0_MCLK
13	SCL
14	SDA
15	3.3V

Camera FPC Connector

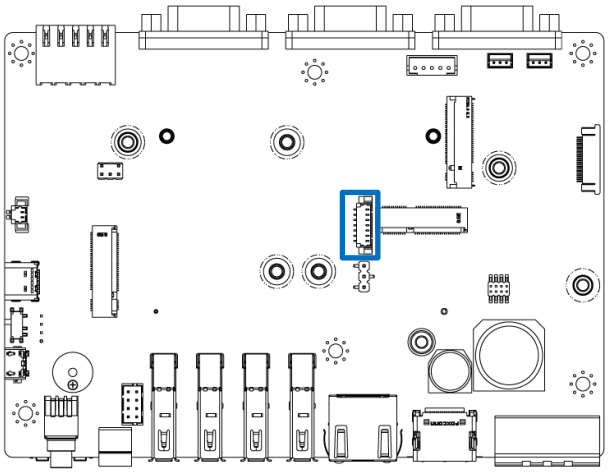


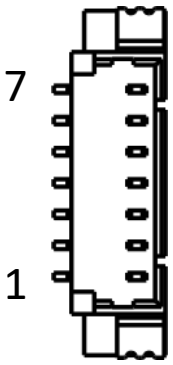


CAM_3

DB9 Pin	Definition
1	3.3V
2	SDA
3	SCL
4	GND
5	CAM1_MCLK
6	CAM1_PWRDN
7	GND
8	CSI3_D1_P
9	CSI3_D1_N
10	GND
11	CSI3_D0_P
12	CSI3_D0_N
13	GND
14	CSI2_CLK_P
15	CSI2_CLK_N
16	GND
17	CSI2_D1_P
18	CSI2_D1_N
19	GND
20	CSI2_D0_P
21	CSI2_D0_N
22	GND

Audio Output Connector(option)

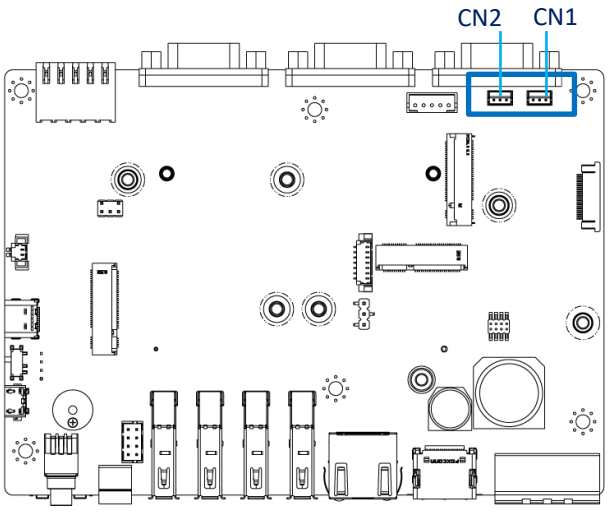


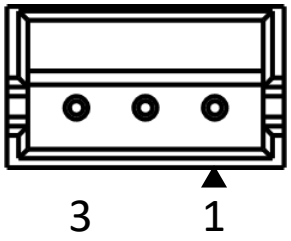


CN3

DB9 Pin	CAN BUS
1	LINE_OUT_L/Head Ouput_L
2	LINE_OUT_R/Head Ouput_R
3	Audio GND
4	Audio GND
5	Audio GND
6	LINE_IN_L/MIC_IN
7	LINE_IN_R

CN1: AutoLink of OOB Connector
CN2: Bypass UART of OOB Connector





CN1 / 2

Pin	Signal
1	RX
2	TX
3	GND

Chapter 3

System Setup

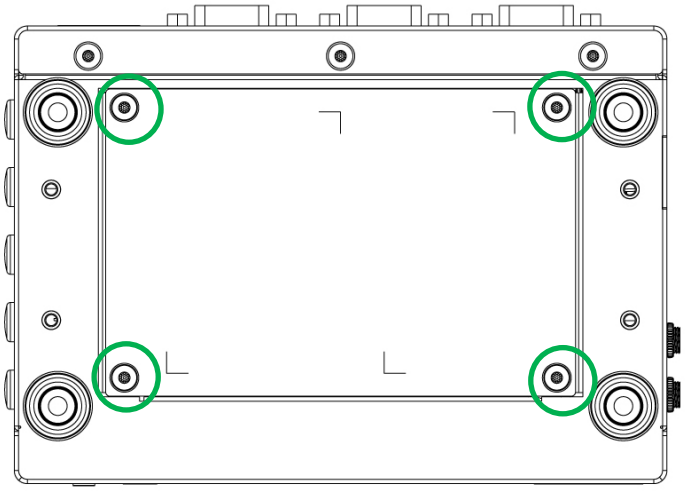
3.1 Set torque force to 3.5 kgf-cm to screw or unscrew system parts.

WARNING

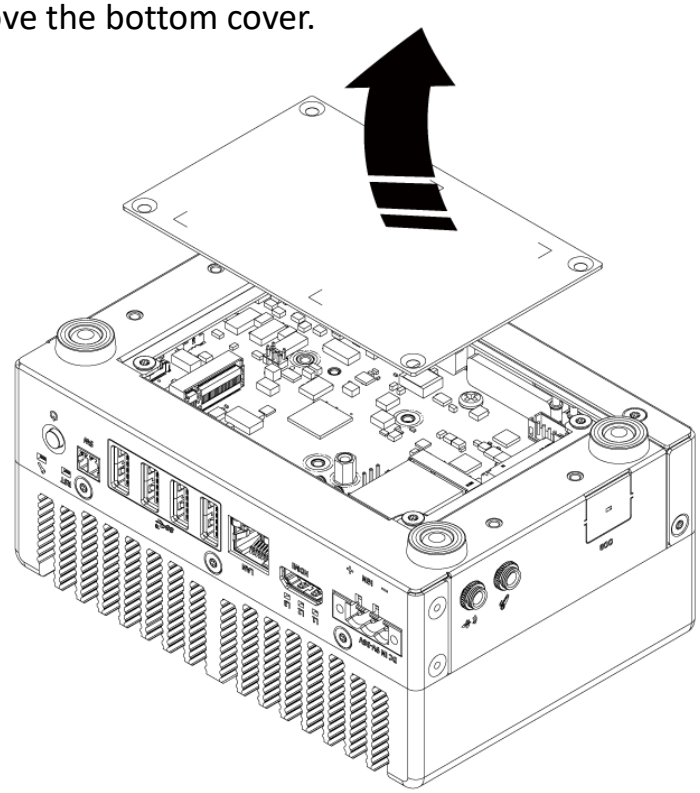
To ensure safety and prevent system damage, please switch off the system and disconnect it from its power source before disassembly.

3.2 Removing the upper cover

1. Turn the computer upside down. Remove the four screws on the bottom cover, as highlighted in the picture below.

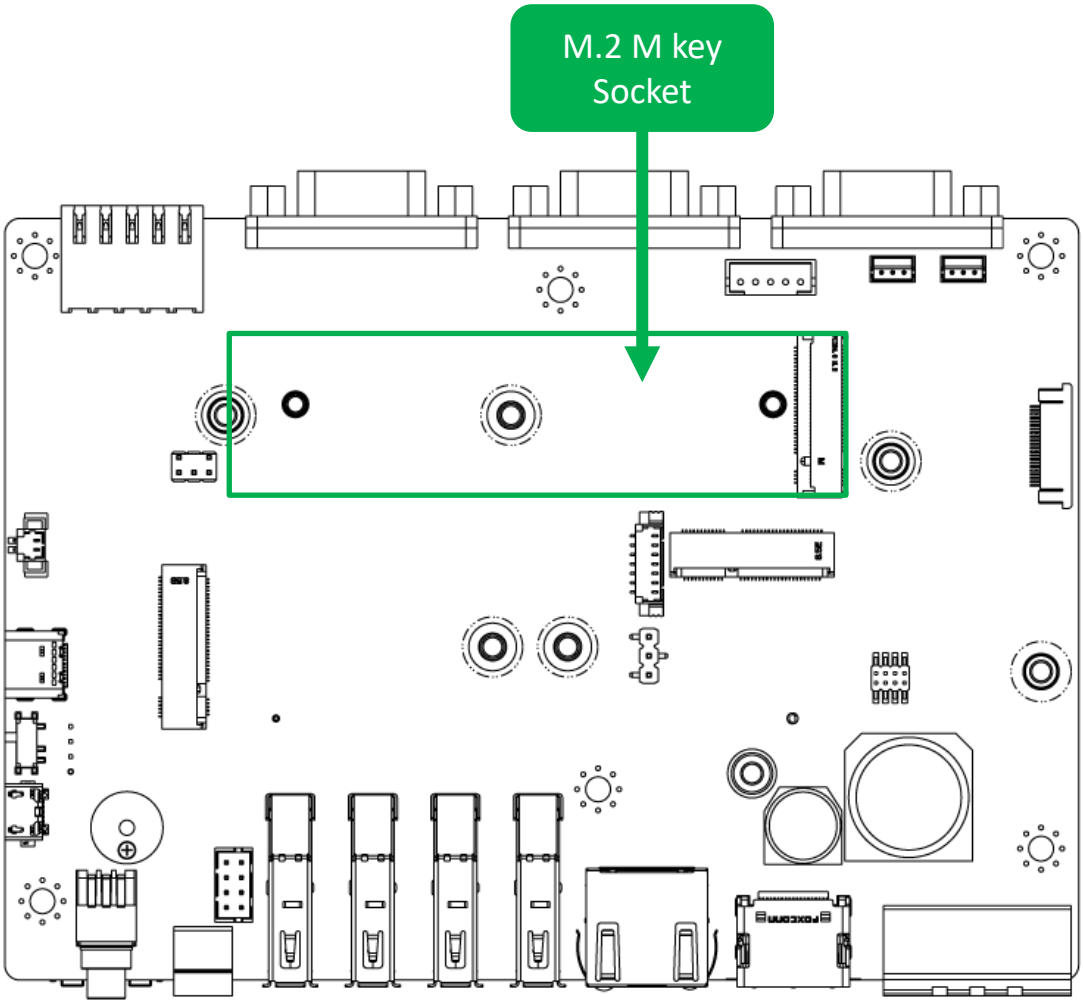


2. Now you can remove the bottom cover.



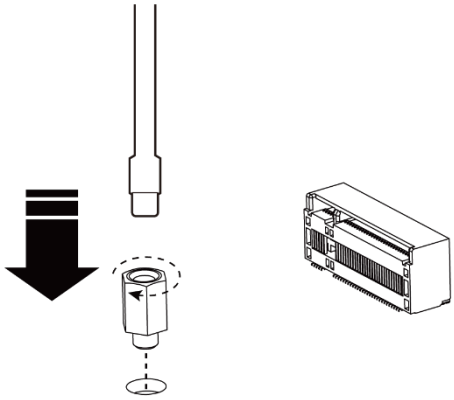
3.3 Install M.2 M Key Socket

The M.2 M Key slot supports NVMe SSD, as highlighted in the picture below.

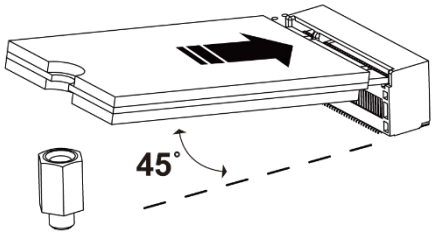


Install M.2 M Key NVMe SSD Step by Step

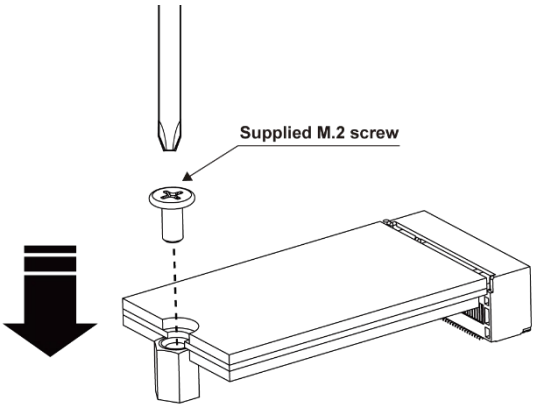
1. Assemble the copper stud



2. Insert the NVMe SSD at a 45-degree angle into the M.2 B-Key slot.

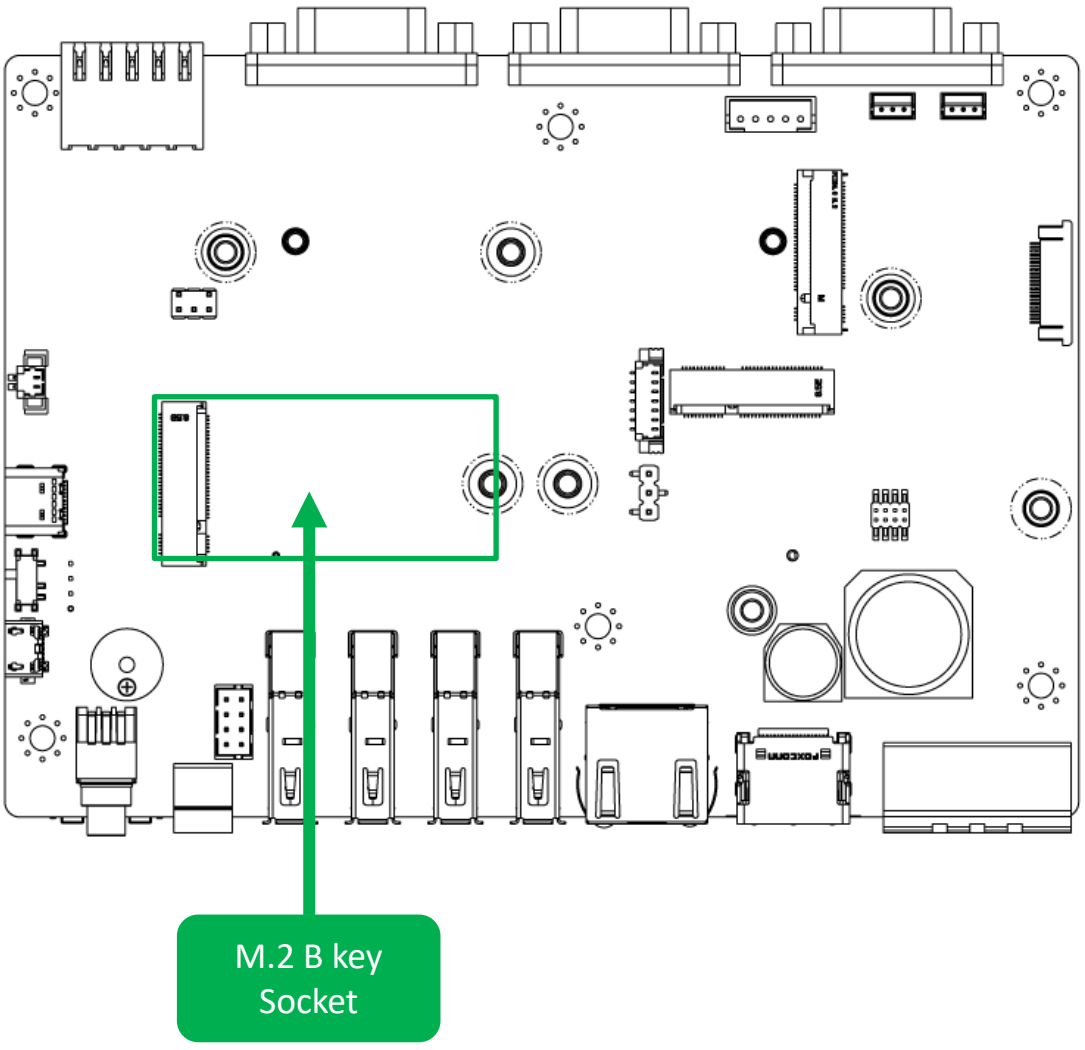


3. Press the NVMe SSD down and secure it with one screw.



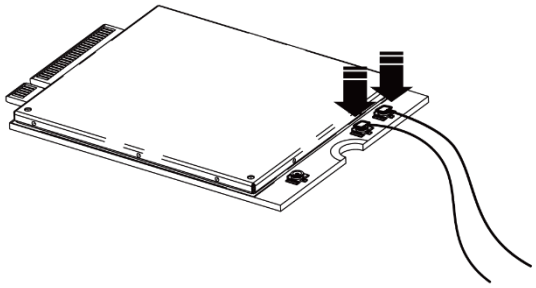
3.4 Install M.2 B Key Communication Module and Antenna

The M.2 B-Key supports communication (4G/5G) module, as highlighted in the picture below.

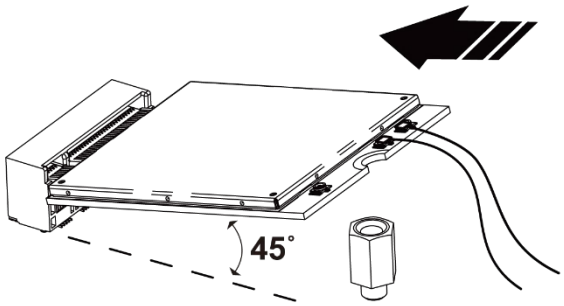


Install M.2 B Key (4G/5G) module Step by Step

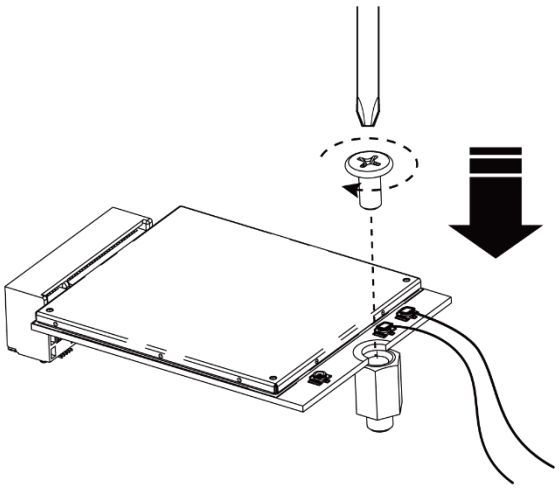
1. Connect the SMA cables to the communication (4G/5G) module.

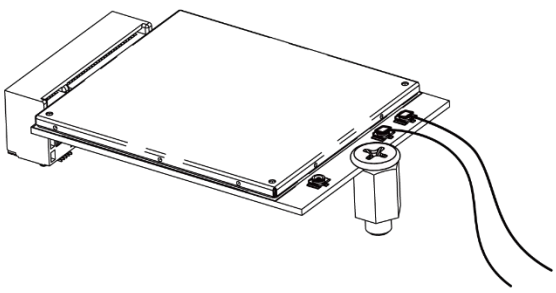


2. Insert the communication (4G/5G) module at a 45-degree angle.

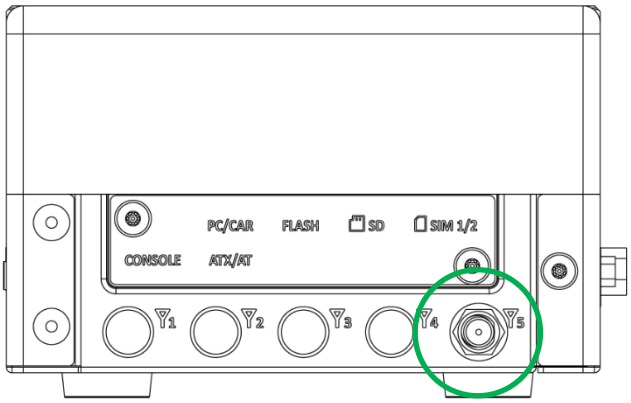


3. Press the communication module down and secure it with one screw.



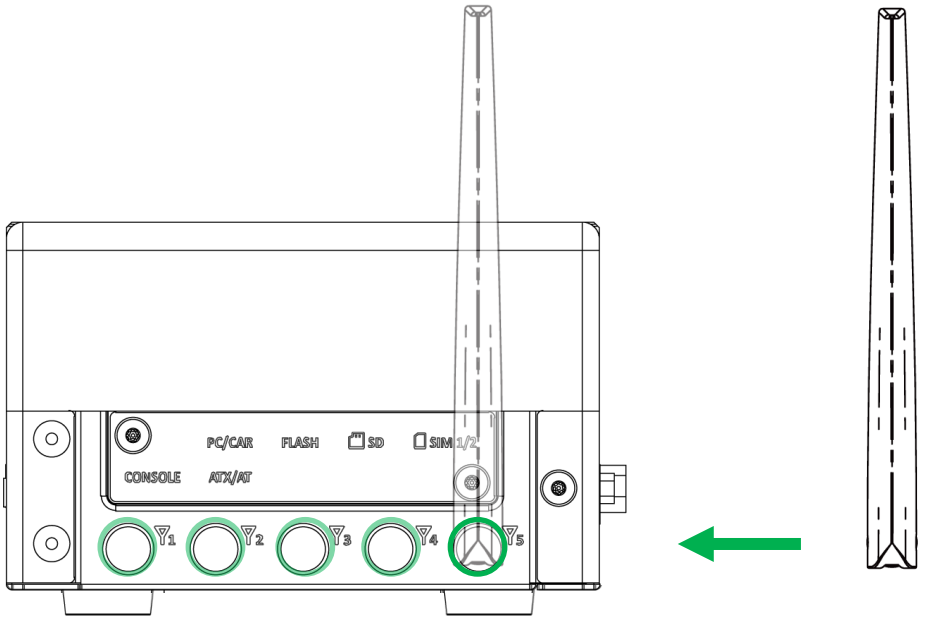


4. Assemble the antenna and SMA jack together; the outcome should resemble the picture below.



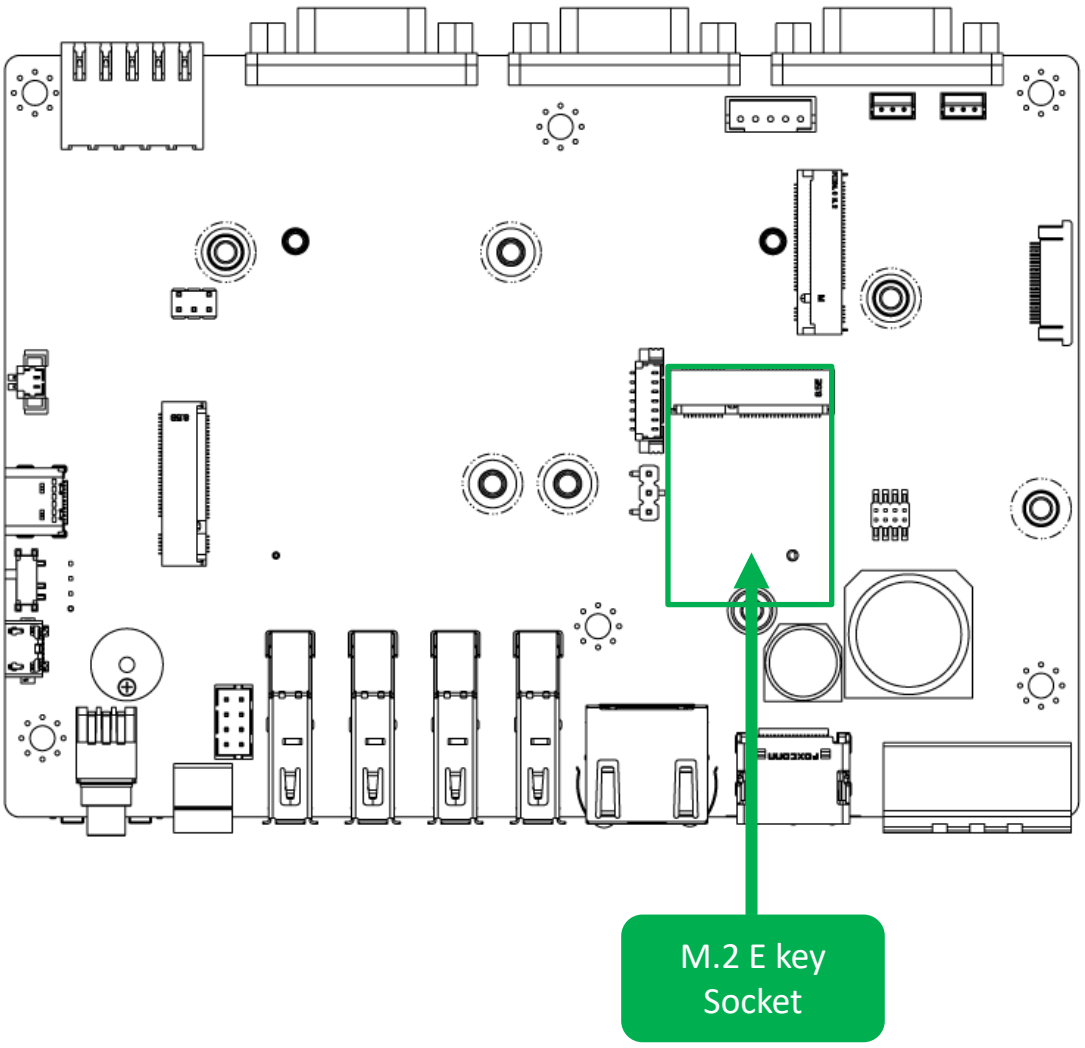
Attach the cable end of the wireless RF connector to the communication module.

Assemble the antenna and SMA jack together



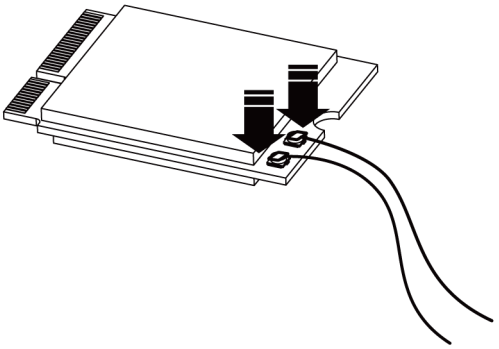
3.5 Install M.2 E Key Wifi and Antenna

The M.2 E-Key supports Wi-Fi module, , as highlighted in the picture below.

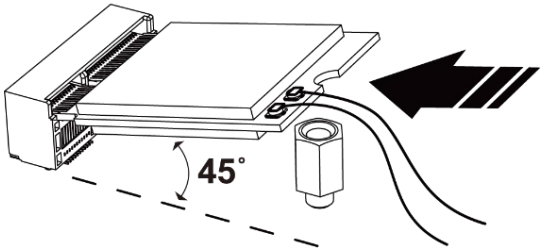


Install M.2 E Key Wifi module Step by Step

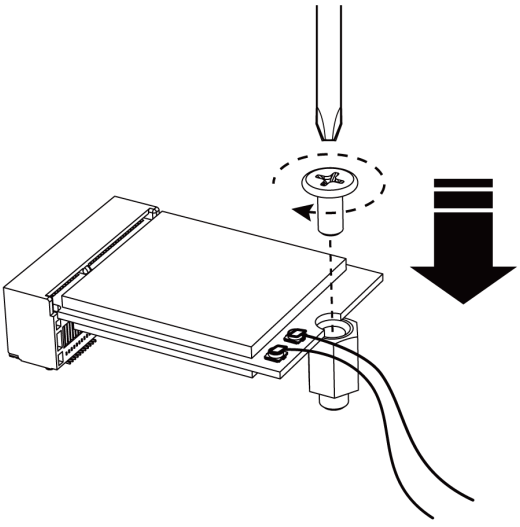
1. Connect the SMA cables to the Wi-Fi module.

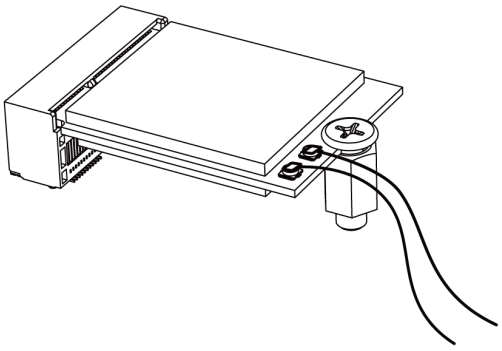


2. Insert the Wi-Fi module at a 45-degree angle.



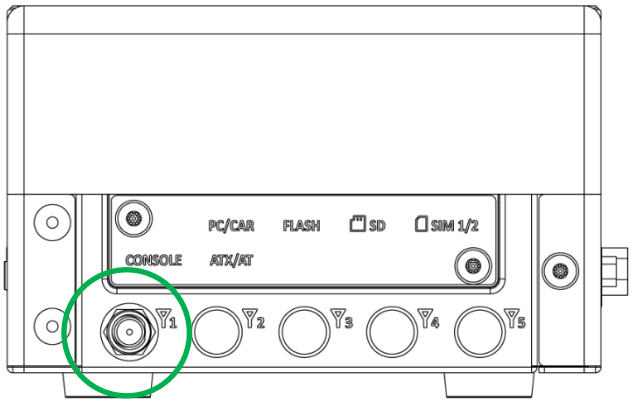
3. Press the Wi-Fi module down and secure it with one screw.



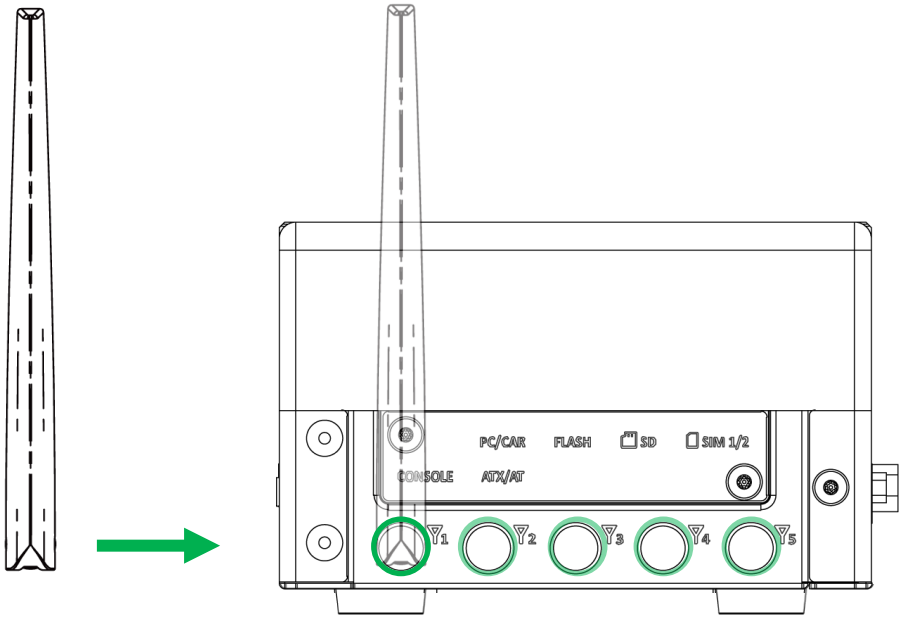


4. Assemble the antenna and SMA jack together; the outcome should resemble the picture below.

Attach the cable end of the wireless RF connector to the communication module.

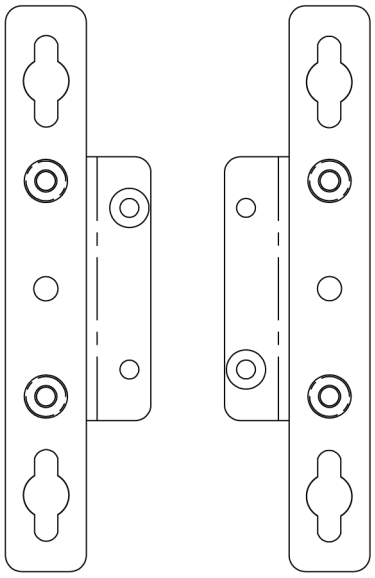


Assemble the antenna and SMA jack together

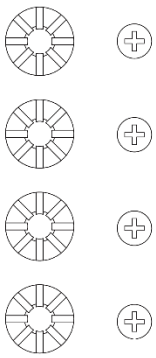


3.6 Wall Mount and Foot Pads

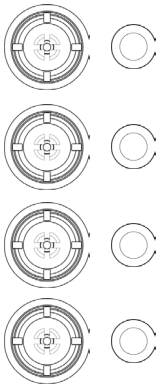
Wall Mount



Wall Mount Pads

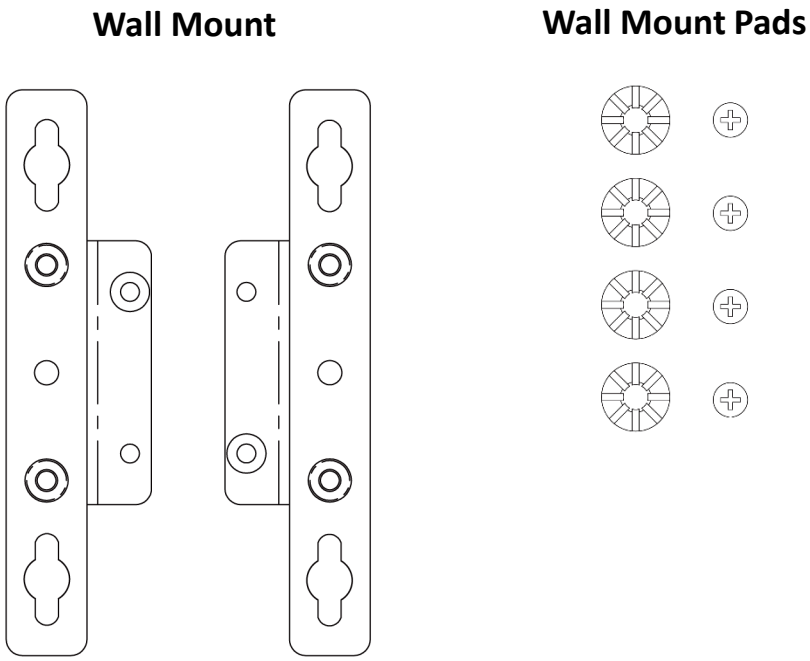


Foot Pads

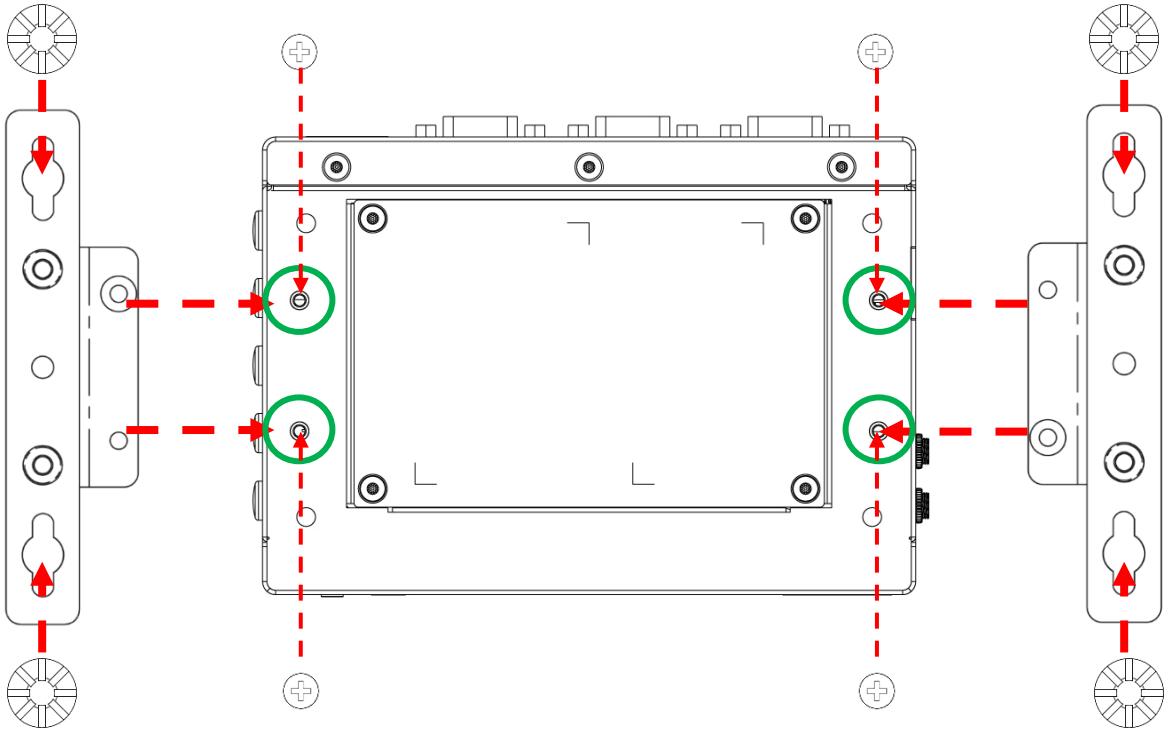


3.6.1 Installing Wall Mount

1. Wall Mount holder is available for JCO-1000-ORN series.

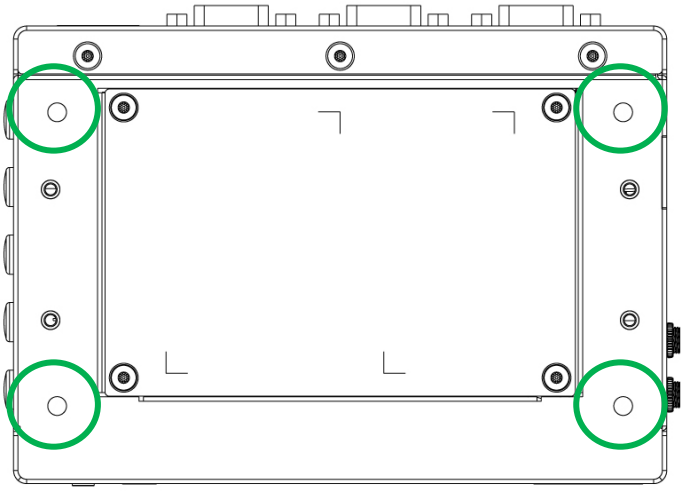


2. Assemble the anti-vibration grommets and screws together.

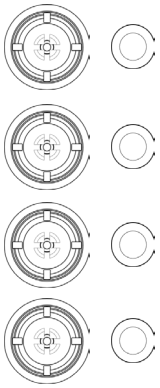


3.6.2 Installing Foot Pads

Below is the rubber foot accessory.

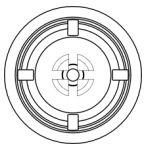


Rubber Foot



- **Step 1:** Install the Rubber Foot onto the bottom panel.
- **Step 2:** Insert the push pin through the foot pad.

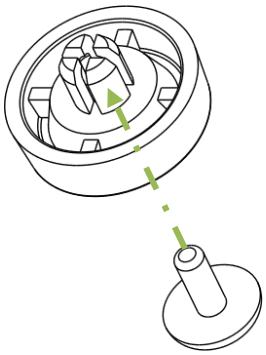
Rubber Foot



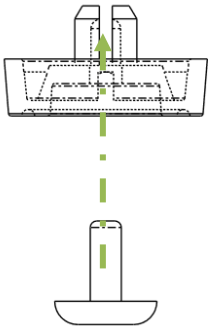
push pin

Install the Rubber Foot first and then the push pin

Side view



Front view



Chapter 4

Software Setup Guide

4.1 OS Flash Image Guide

4.1.1 Preparation

Host PC:
You need a host PC running Ubuntu Desktop 20.04. And need install below package:

sudo apt-get install qemu-user-static
sudo apt-get install sshpass
sudo apt-get install abootimg
sudo apt install nfs-kernel-server
sudo apt-get install libxml2-utils
sudo apt-get install zstd
sudo apt-get install binutils

- BSP Image:
  For BSP image download, please contact your distributor, our technical support team, or sales representative. The file name will follow the format of :

  {Model}_{JetPack_Ver}_{BSP_Ver}.tar.gz

  For Example:

  JCO-1000-ORN-A_JP62_V1.3.1.tar.gz

- BSP Image file MD5 checksum verification:
  For BSP image download, please contact your distributor, our technical support team, or sales representative. The file name will follow the format of :

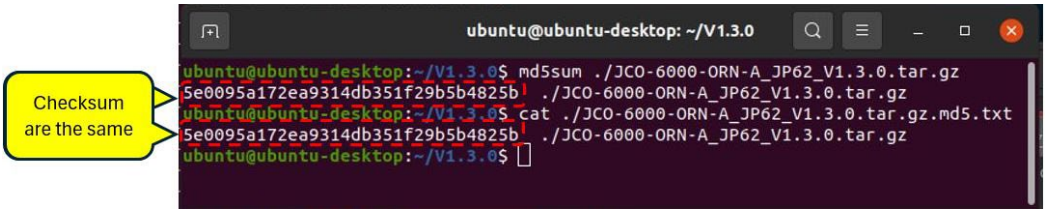
  {Model}_{JetPack_Ver}_{BSP_Ver}.tar.gz.md5.txt

  For Example:

  JCO-1000-ORN-A_JP62_V1.3.1.tar.gz.md5.txt

  On Host Computer, open Linux terminal and enter the following command to check the BSP image file checksum is correct:

```
$ md5sum ./JCO-1000-ORN-A_JP62_V1.3.1.tar.gz
$ cat ./JCO-1000-ORN-A_JP62_V1.3.1.tar.gz.md5.txt
```



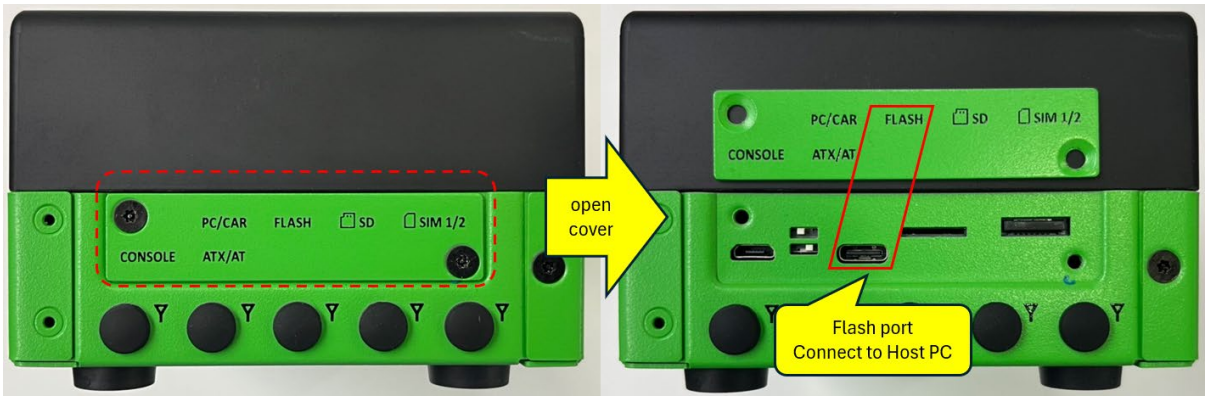
4.1.2 Flash BSP Image

On Host Computer, open Linux terminal and enter the following command to extract compressed OS image files (file name may vary):

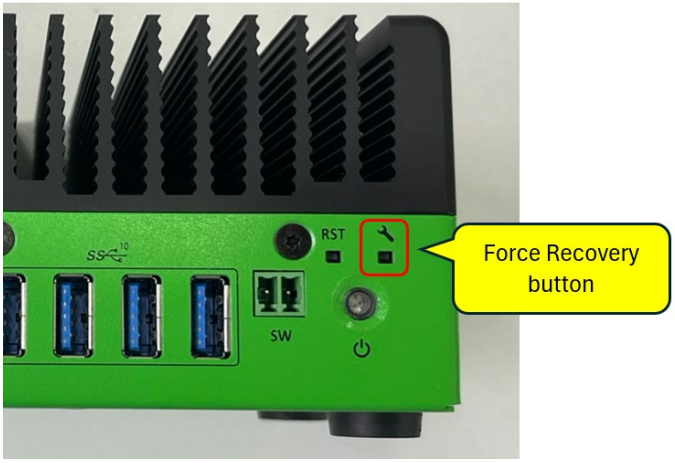
```
$ sudo tar zxvf JCO-1000-ORN-A_JP62_V1.3.1.tar.gz
```

Next, following steps to setup the system to start in USB Recovery Mode:

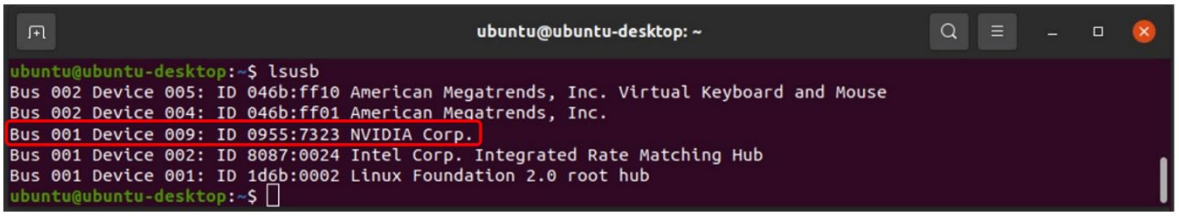
1. Connect the USB type-C cable to the "Flash" port on the JCO-1000-ORN-A and the USB port on the host PC.



2. Press and hold force recovery button, then press power button on the system. Wait for two seconds then release the buttons.



3. When device is in recovery mode, lsusb command on host PC will list a line of "0955:7323 Nvidia Corp"

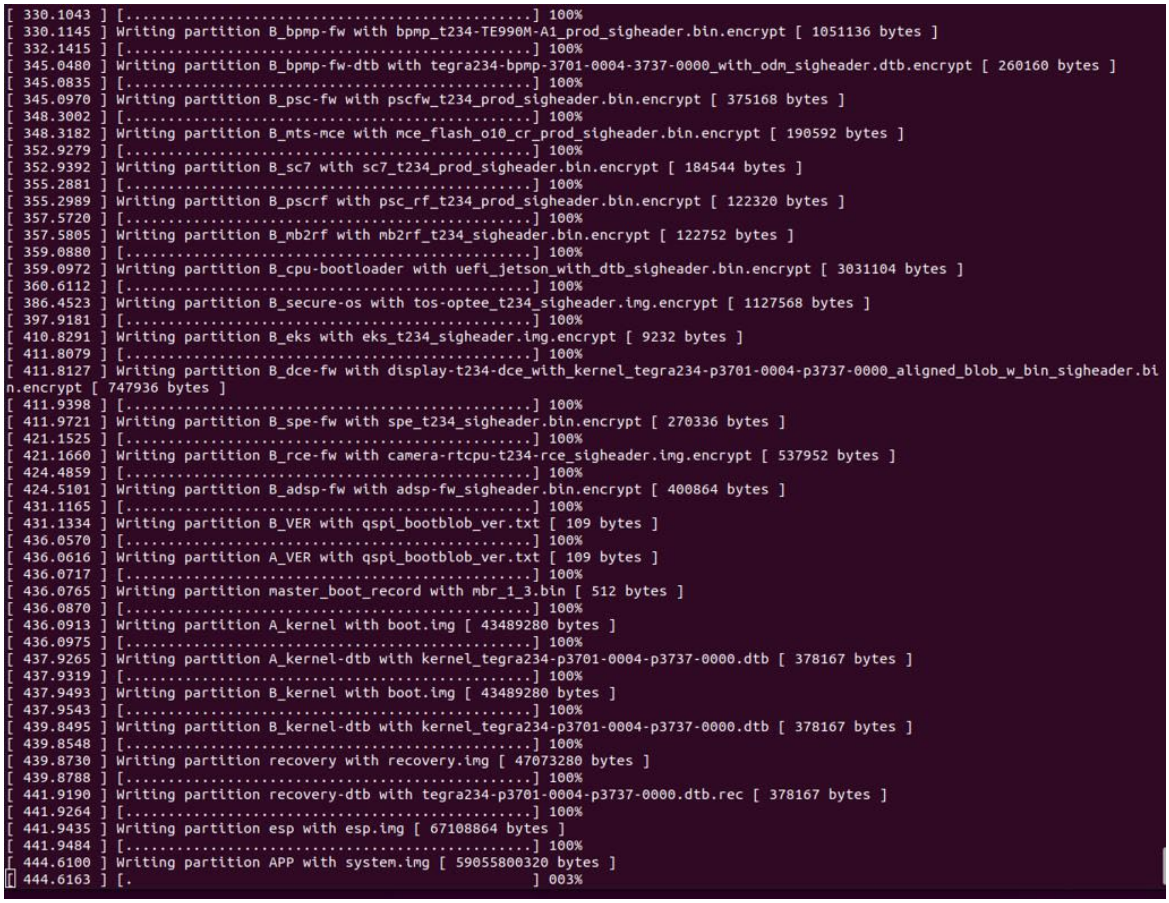


Next, following steps to flash BSP image in JCO-1000 :

1. Open terminal on Ubuntu host PC, then access the bootloader folder you extracted in the previous section.
2. Enter the following command in terminal to flash the image:

```
$ sudo ./flash-jco-1000.sh
```

3. Wait as the image is installed. Once finished you should see the following:



```
tar: Read checkpoint 460000
tar: Read checkpoint 470000
tar: Read checkpoint 480000
tar: Read checkpoint 490000
tar: Read checkpoint 500000
tar: Read checkpoint 510000
tar: Read checkpoint 520000
tar: Read checkpoint 530000
tar: Read checkpoint 540000
tar: Read checkpoint 550000
tar: Read checkpoint 560000
tar: Read checkpoint 570000
tar: Read checkpoint 580000
writing item=16, 9:0:secondary_gpt, 61203267072, 16896, gpt_secondary_9_0.bin, 16896, fixed-<reserved>-0, 8b
2a095a2f0562b9f5d2d878102e074cc7086de7
[ 305]: l4t_flash_from_kernel: Successfully flash the external device
[ 305]: l4t_flash_from_kernel: Flashing success
[ 305]: l4t_flash_from_kernel: The device size indicated in the partition layout xml is smaller than the act
ual size. This utility will try to fix the GPT.
Flash is successful
Reboot device
Cleaning up...
Log is saved to Linux_for_Tegra/initrdlog/flash_1-1_0_20240506-150619.log
ubuntu@ubuntu-DWL01:~/JCO-3000-ORN-A_JP512_V0.0.1$
```

4. The system will reboot after flashing all images.

4.2 MCU Control Functions

4.2.1 Control Functions

MCU driver can control or get status of the below functions.

- LED Control
- GPIO Control
- Device Mode Status
- Buzzer Control
- Com Port Control
- IGN Power On/Off Delay Time Control
- Setting Save Control
- GPIO Configuration Control

4.2.2 LED Control

Control L1 ~ L3 leds's behavior.

- The sysfs path : /sys/bus/i2c/devices/7-0040/
- Sysfs files : led_1 ~ led_3 (Read/Write)
- Control method :

```
$ echo value > /sys/bus/i2c/devices/7-0040/led_2
```

- Value format :

BIT number	Function	Default value
2 ~ 0	<Hz> 0: OFF, 7: ON, 1 ~6: Hz	0
5 ~ 3	<Light Count> 0: continuous, 1~ 7: count	0
6 ~ 7	<Gap Time> 0:continuous, 1 ~3 : 0.5~ 1.5S gap	0

4.2.3 GPIO Control

Read or setup GPIO status

- The sysfs path : /sys/bus/i2c/devices/7-0040/
- Sysfs files :
  - gpio_in (Read-only) : default value 0
  - gpio_out (Read/Write) : default value 0
- Control method :

```
$ cat /sys/bus/i2c/devices/7-0040/gpio_in
$ echo value > /sys/bus/i2c/devices/7-0040/gpio_out
```

- GPIO bit mapping :
  - GPIO Input

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
'1'	'1'	'1'	'1'	IN4	IN3	IN2	IN1

gpio_in value calculation example:

$(249)_{10} = (1111\ 1001)_2$

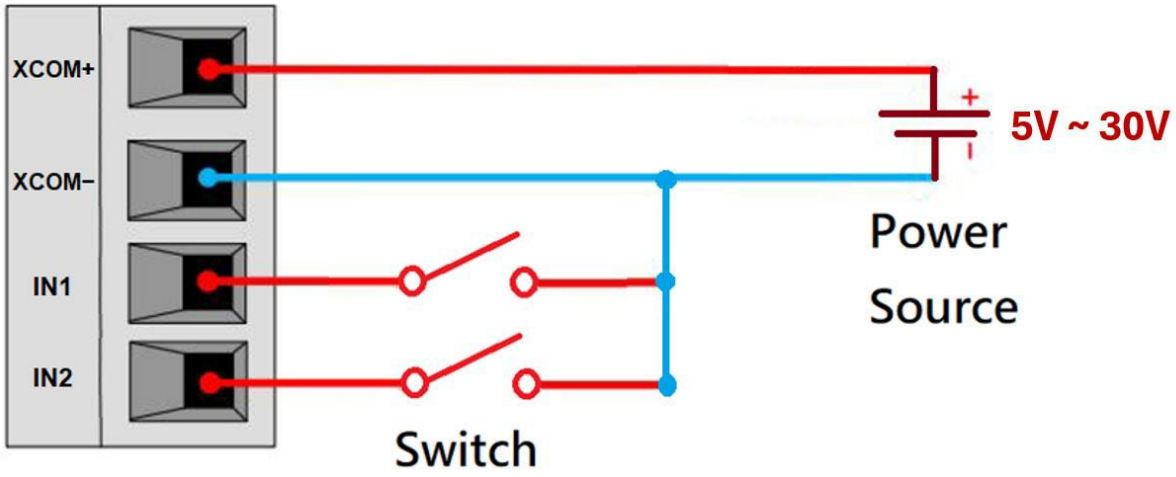
  - GPIO Onput

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
'0'	'0'	'0'	'0'	OUT4	OUT3	OUT2	OUT1

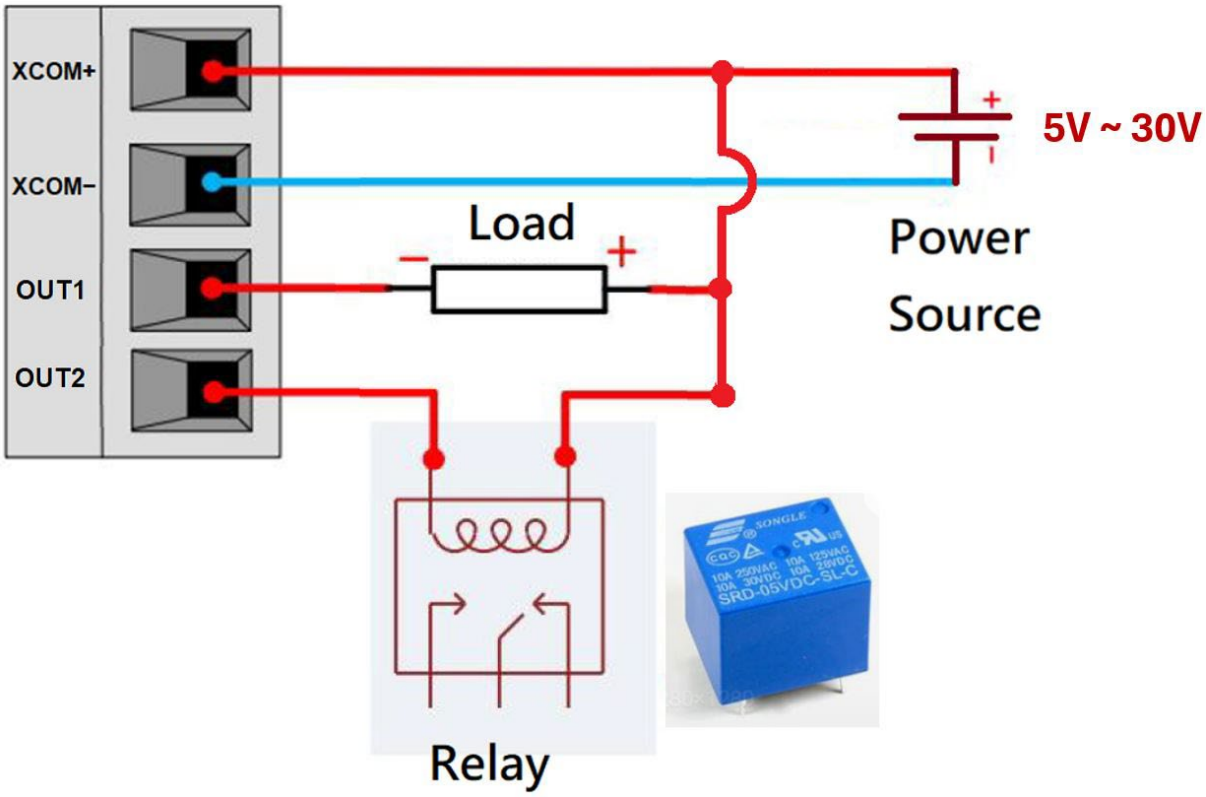
gpio_out value calculation example:

$(1100)_2 = (12)_{10}$

- Application circuit example:
  - DI application circuit:



  - DO application circuit



Note:

- OUTx set value 0 to turn on the Relay or Load
- OUTx set value 1 to turn off the Relay or Load
- Control logic can be changed , refer to 4.2.10

4.2.4 Device Mode Status

Read device mode as PC MODE or IGN MODE

- The sysfs path : /sys/bus/i2c/devices/7-0040/
- Sysfs files : device_mode (Read-only)
- Control method :

```
$ cat /sys/bus/i2c/devices/7-0040/device_mode
```

- Value format :
  - PC MODE : PC mode
  - IGN MODE : Ignition Mode

4.2.5 Buzzer Control

Control buzzer fucntion

- The sysfs path : /sys/bus/i2c/devices/7-0040/
- Sysfs files : buzzer_time (Read/Write) : default value 0
- Control method :

```
$ echo value > /sys/bus/i2c/devices/7-0040/buzzer_time
```

- Value format :

  Buzzer turn on time : value * 0.1 seconds , then Buzzer turn off.

  The value will auto clear to 0

4.2.6 Power on Buzzer Control

Enable or disable the buzzer when power on

- The sysfs path : /sys/bus/i2c/devices/7-0040/
- Sysfs files : power_on_buzzer (Read/Write) : default value 1 (EEPROM Save)
- Control method :

```
$ echo value > /sys/bus/i2c/devices/7-0040/power_on_buzzer
```

- Value format :

  1 : Enable the Buzzer when power on.

  0 : Disable the Buzzer when power on.

4.2.7 Com Port and OOB Connection Control

Set the COM port mode as RS-232, RS-485 or RS-422 and set OOB connection status

- The sysfs path : /sys/bus/i2c/devices/7-0040/
- Sysfs files : mgpio_out (Read/Write) : default value 5
  (RS-232, OOB connection disable, EEPROM Save)
- Control method :

```
$ echo mode > /sys/bus/i2c/devices/7-0040/mgpio_out
$ cat /sys/bus/i2c/devices/7-0040/mgpio_out
```

- Bit Control Map:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
OOB	'0'	'0'	'0'	COM2	COM2	COM1	COM1

- Value format :
  - COM port mode settings (2 bits) :
    - RS-232 MODE : $(01)_2$
    - RS-485 MODE : $(10)_2$
    - RS-422 MODE : $(11)_2$
  - OOB setting (1 bit):
    - OOB connection enable : Bit 7 → 1
    - OOB connection disable : Bit 7 → 0
  - Example:
    - OOB Connection Disable , COM2 (RS-232), COM1 (RS-232) : (0 000 01 01)2 = (5)10
    - OOB Connection Disable , COM2 (RS-485), COM1 (RS-422) : (0 000 10 11)2 = (11)10
    - OOB Connection Enable , COM1 (RS-232) : (1 000 00 01)2 = (129)10

Note:

1. When OOB connection enabled, COM2 will be disabled.
2. If want to keep the setting after power off, need to do "Setting Save Control".

4.2.8 IGN Power On/Off Delay Time Control

Set IGN ON/OFF to SYS-PW ON/OFF delay time at ignition mode

- The sysfs path : /sys/bus/i2c/devices/7-0040/
- Sysfs files :
  - ign_on_dly_s (Read/Write) : default value 8 (EEPROM Save)
    - IGN ON to SYS-PW ON delay second
  - sw_on_dly_s (Read/Write) : default value 2 (EEPROM Save)
    - SYS-PW ON to BUTTON PUSH delay second
  - sw_off_dly_s (Read/Write) : default value 3 (EEPROM Save)
    - IGN OFF to BUTTON PUSH OFF MB delay second
  - pw_off_dly_s (Read/Write) : default value 60 (EEPROM Save)
    - BUTTON PUSH to SYS-PW OFF delay second
- Control method examples:

```
$ echo value > /sys/bus/i2c/devices/7-0040/ign_on_dly_s
$ cat /sys/bus/i2c/devices/7-0040/ign_on_dly_s
```

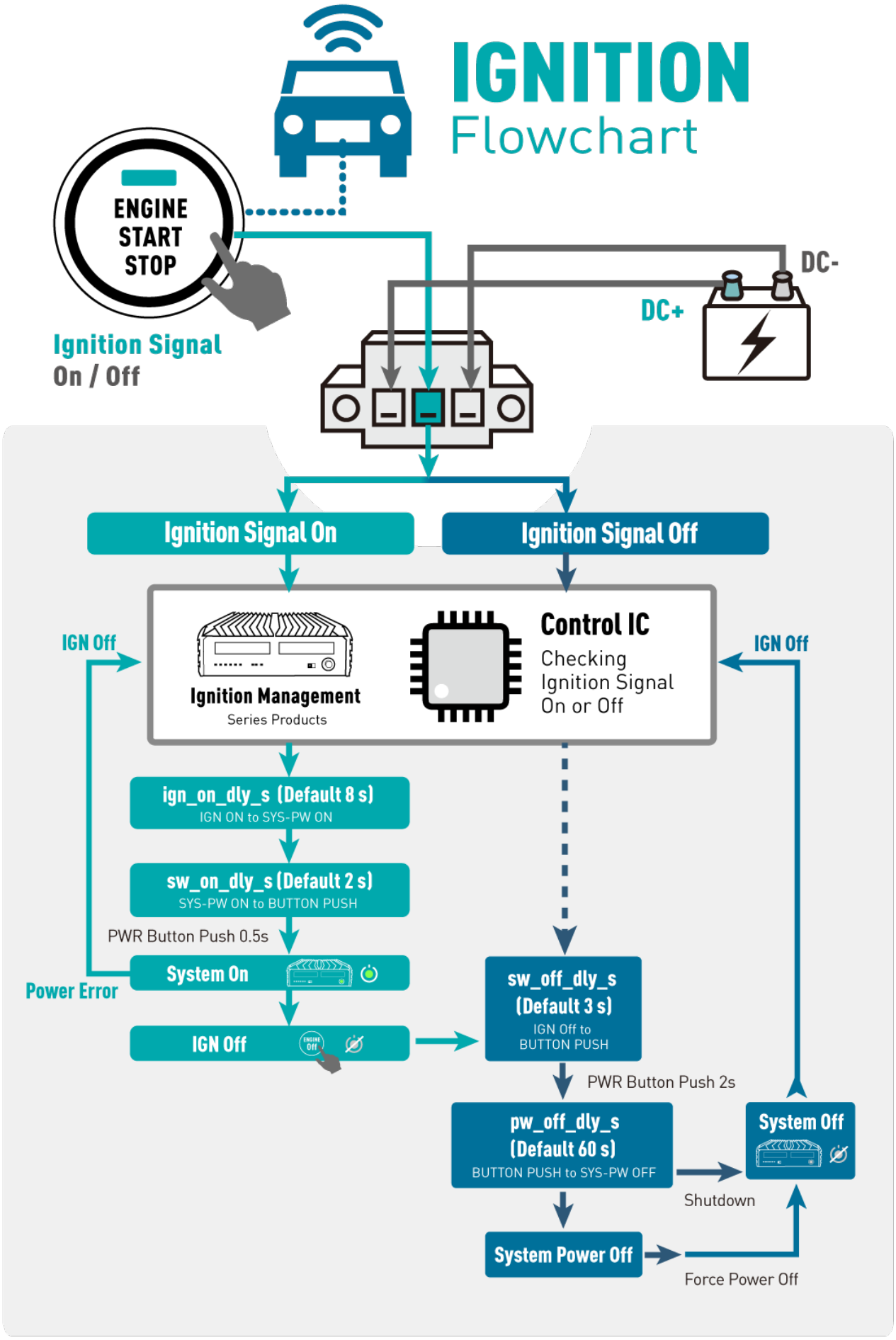
- Value format :

  Value * 1 seconds

  Range: 0 ~ 65535 seconds

- Set power button to trigger system shutdown immediately

```
$ gsettings set org.gnome.SessionManager logout-prompt false
```


IGNITION
Flowchart
ENGINE
START
STOP
Ignition Signal
On / Off
DC-
DC+
Ignition Signal On
Ignition Signal Off
IGN Off
Ignition Management
Series Products
Control IC
Checking
Ignition Signal
On or Off
IGN Off
ign_on_dly_s (Default 8 s)
IGN ON to SYS-PW ON
sw_on_dly_s (Default 2 s)
SYS-PW ON to BUTTON PUSH
PWR Button Push 0.5s
System On
Power Error
IGN Off
sw_off_dly_s
(Default 3 s)
IGN Off to
BUTTON PUSH
PWR Button Push 2s
pw_off_dly_s
(Default 60 s)
BUTTON PUSH to SYS-PW OFF
System Off
Shutdown
System Power Off
Force Power Off

	Item	Default (X)	Behavior	Purpose
ign_on_dly	IGN ON To SYS-PWR ON	8S	The MCU turns on the system power approximately (X) seconds after the engine starts.	Prevents system instability due to vehicle power supply inrush current.
sw_on_dly	SYS-PW to BUTTON PUSH	2S	The MCU triggers the power-on signal approximately (X) seconds after the system power is turned on.	Wait until the system power supply is stable before proceeding
sw_Off_dly	IGN OFF TO BUTTON PUSH	3S	The MCU sends the power-off signal to the system approximately (X) seconds after receiving the IGN Off signal.	To perform a proper shutdown procedure
pw_off_dly	BUTTON PUSH to SYS-PW OFF	60S	A forced power cut-off shutdown is performed approximately (X) seconds later.	Prevent continuous battery consumption when the system does not shut down properly

4.2.9 Setting Save Control

Save the settings into the EEPROM

- The sysfs path : /sys/bus/i2c/devices/7-0040/
- Sysfs files : rom_update (Read/Write) : default value 0
- Control method :

```
$ echo 1 > /sys/bus/i2c/devices/7-0040/rom_update
```

- Value format :

  Value > 0 , update (EEPROM SAVE) REG to EEPROM , update ok MCU auto clear to 0

4.2.10 GPIO Configuration Control

Set GPIO value reverse for every pin and default value of GPIO output pins when power on.

GPIO default setting :

- Input bit logic : following voltage level
  - Voltage Hi Level : '1'
  - Voltage Low Level : '0'
- Output bit logic :
  - Turn on device : '0'
  - Turn off device : '1'

When the GPIO reverse bit is set '1' , the GPIO logic shows as below:

- Input bit logic :
  - Voltage Hi Level : '0'
  - Voltage Low Level : '1'
- Output bit logic :
  - Turn on device : '1'
  - Turn off device : '0'
- The sysfs path : /sys/bus/i2c/devices/7-0040/
- Sysfs files :
  - gpio_in_reverse (Read/Write) : default value 0 (EEPROM Save)
  - gpio_out_reverse (Read/Write) : default value 0 (EEPROM Save)
  - gpio_out_power_on (Read/Write) : default value 0 (EEPROM Save)
- Control method :

```
$ cat /sys/bus/i2c/devices/7-0040/gpio_in_reverse

$ echo value > /sys/bus/i2c/devices/7-0040/ gpio_out_power_on
```

- GPIO bit mapping :
  - GPIO Input Inverse Bit

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
'0'	'0'	'0'	'0'	IN4	IN3	IN2	IN1

gpio_in_reverse value calculation example:

$(9)_{10} = (0000\ 1001)_2$

- GPIO output Inverse Bit

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
'0'	'0'	'0'	'0'	OUT4	OUT3	OUT2	OUT1

gpio_out_reverse value calculation example:

$(0000\ 1100)_2 = (12)_{10}$

- GPIO output Bit when power on

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
'0'	'0'	'0'	'0'	OUT4	OUT3	OUT2	OUT1

gpio_out_power_on value calculation example:

$(0000\ 1100)_2 = (12)_{10}$

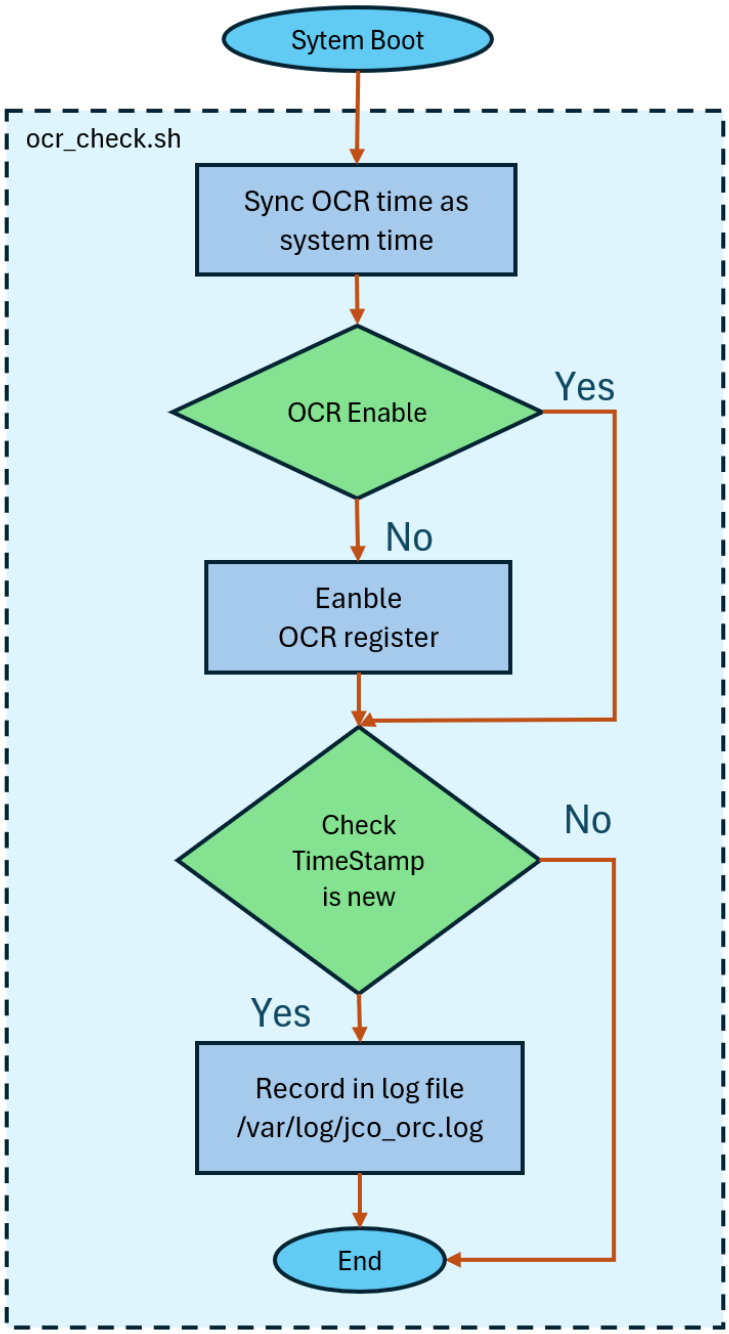
Note: The value will be applied to "gpio_out" when power on

4.3 Case Open Detection (Option)

4.3.1 Driver Function

OCR (Open Case Recorder) driver can record case open time in log when system boot. However, can also check the case status by OCR function control at a specific time.

4.3.2 OCR function flow chart



4.3.3 OCR function control

OCR (Open Case Recorder) driver can record case open time in log when system boot. However, can also check the case status by OCR function control at a specific time.

- Get or Set the OCR time
  - The sysfs path : /sys/bus/i2c/devices/7-0051/
  - Sysfs files : time_now (Read/Write)
  - Control method :

    Get OCR time

    ```
    $ cat /sys/bus/i2c/devices/7-0051/time_now
    ```

    Set OCR time

    ```
    $ echo Value > /sys/bus/i2c/devices/7-0051/time_now
    ```

  - Value format :
    - YYYY/MM/DD_HH:MM:SS

      Ex: 2024/10/18_15:02:06

- Get the timestamp of the latest open case time
  - The sysfs path : /sys/bus/i2c/devices/7-0051/
  - Sysfs files : timestamp1 (Read)
  - Control method :

    ```
    $ cat /sys/bus/i2c/devices/7-0051/timestamp1
    ```

  - Value format :
    - ◆ Empty : No data
    - ◆ YYYY/MM/DD_HH:MM:SS

      Ex: 2024/10/18_15:02:06

- Clear the timestamp of the latest open case time
  - The sysfs path : /sys/bus/i2c/devices/7-0051/
  - Sysfs files : clear_timestamp (Write)
  - Control method :

```
$ echo 1 > /sys/bus/i2c/devices/7-0051/clear_timestamp
```

- Enable open case recorder function
  - The sysfs path : /sys/bus/i2c/devices/7-0051/
  - Sysfs files : enable_tsr (Read/Write)
  - Control method :

Enable function:

```
$ echo 1 > /sys/bus/i2c/devices/7-0051/enable_tsr
```

Disable function:

```
$ echo 0 > /sys/bus/i2c/devices/7-0051/enable_tsr
```

Check open case function status:

```
$ cat /sys/bus/i2c/devices/7-0051/enable_tsr
```

Value format :

1 : Function enable

0: Function disable

- Read open case recorder log
  - The log file path : /var/log/jco_ocr.log
  - Control method :

```
$ cat /var/log/jco_ocr.log
```

Value format example:

Case Open Time [2024/10/18_13:12:11]

4.4 Create USERNAME and PASSWORD

Create username and password

User can create username and password of Ubuntu OS by command before flashing BSP image.

- Open terminal on Ubuntu host PC, then access the BSP image unzipped folder
- Enter the following command in terminal to change username and password in the image:

```
$ sudo
Linux_for_Tegra/tools/l4t_create_default_user.sh -u
username -p password -a -n pc_name –accept-license
```

Type what you want to replace the parameters:

- username
- Password
- pc_name

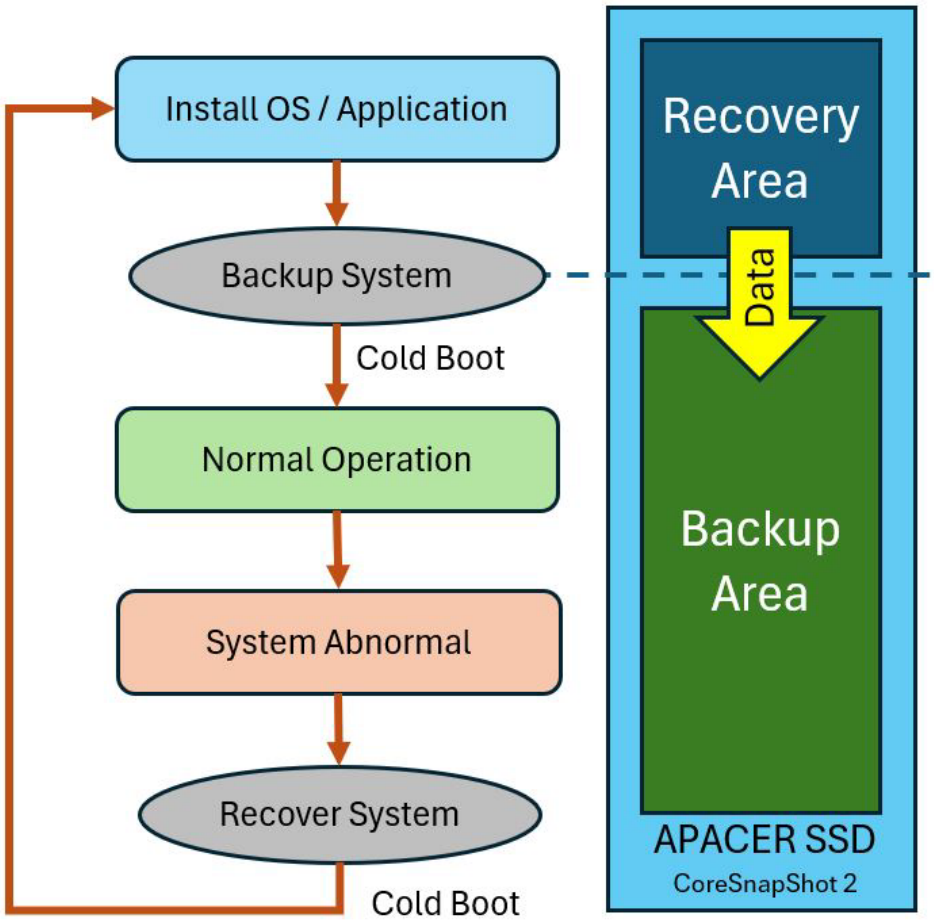
- Follow section 4.1.2 to flash BSP image to system

4.5 SSD Recovery OS (Option)

Using Apacer SSD can support recovery OS feature

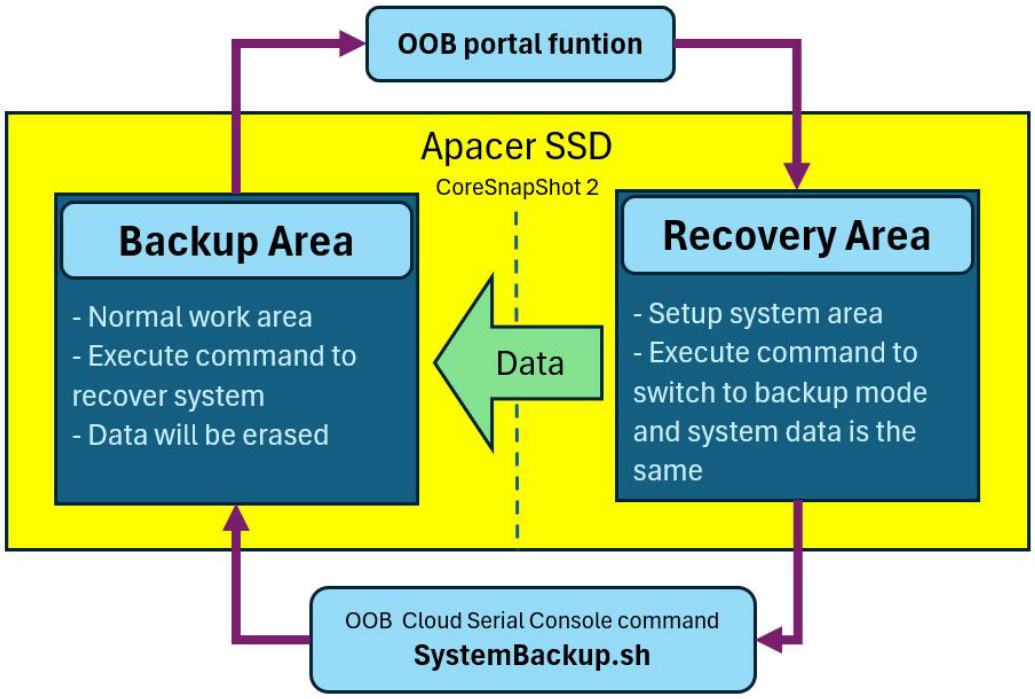
System and data can backup after system setup finished. Once the system encountered problems such as data corruption or failure to work, a simple quickly recovery operation can be performed via remote control or locally. Backup and recovery times are unlimited.

- Recovery OS Diagram



- Recovery OS with OOB

  Trigger system backup or recovery by OOB.



- Trigger methods:

  ▼ Backup System:

  Open cloud serial console window and execute the command

  $ sudo SystemBack.sh

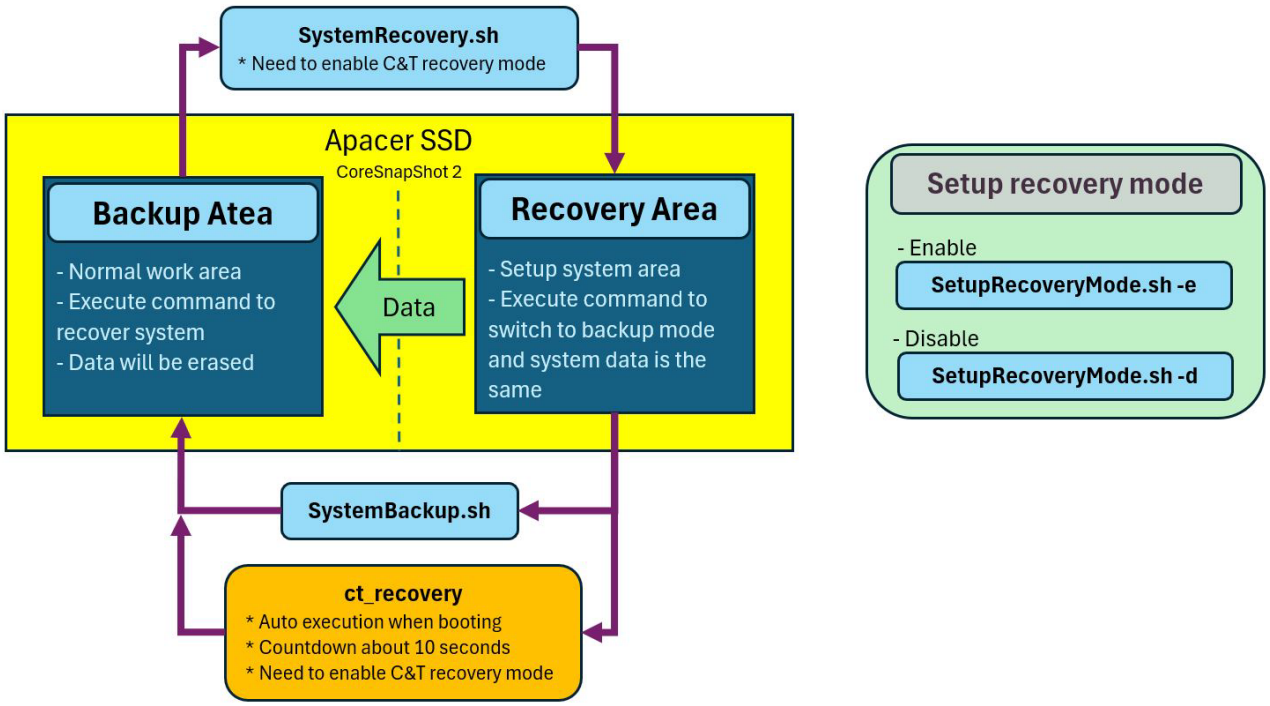
  ▼ Recovery System :

  Click OOB portal function. System will be switch to recovery area.

  If want to switch to backup area, need to execute backup command.

- Recovery OS with commands

  Trigger system backup or recovery by script. The scripts can be executed by local terminal or remote SSH.



  - Trigger methods:

    ▼ Backup System:

    Enable recovery mode then execute backup command

    $ sudo SetupRecoveryMode.sh –e

    $ sudo SystemBackup.sh

    ▼ Recovery System :

    Trigger by recovery command. The system will reboot into the recovery area and the countdown app will automatically run. The system will reboot into backup area after countdown to 0 second.

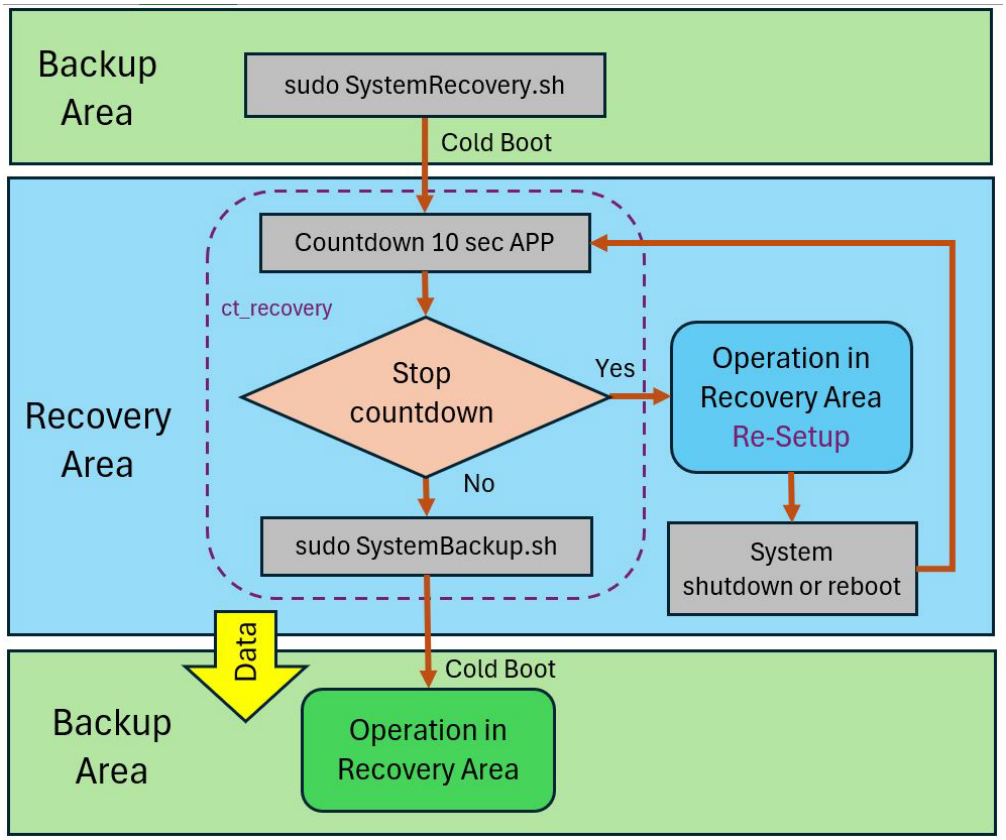
    $ sudo SystemRecovery.sh

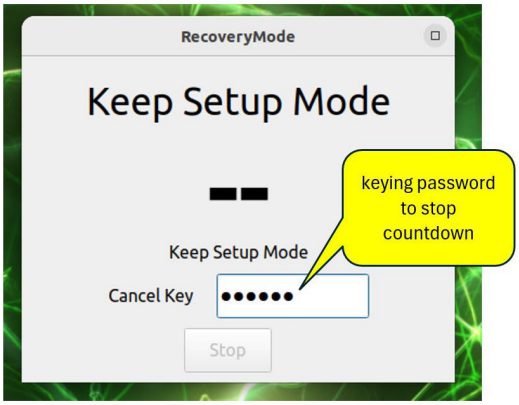
▼ Re-Setup System:

Execute system recovery command and keying password to stop countdown APP. System will keep to stay in recovery area then can do re-setup system. After reboot or shutdown system, the system boot will run countdown 10 sec APP again.

$ sudo SystemRecovery.sh

- Recovery / Re-Setup System Flow





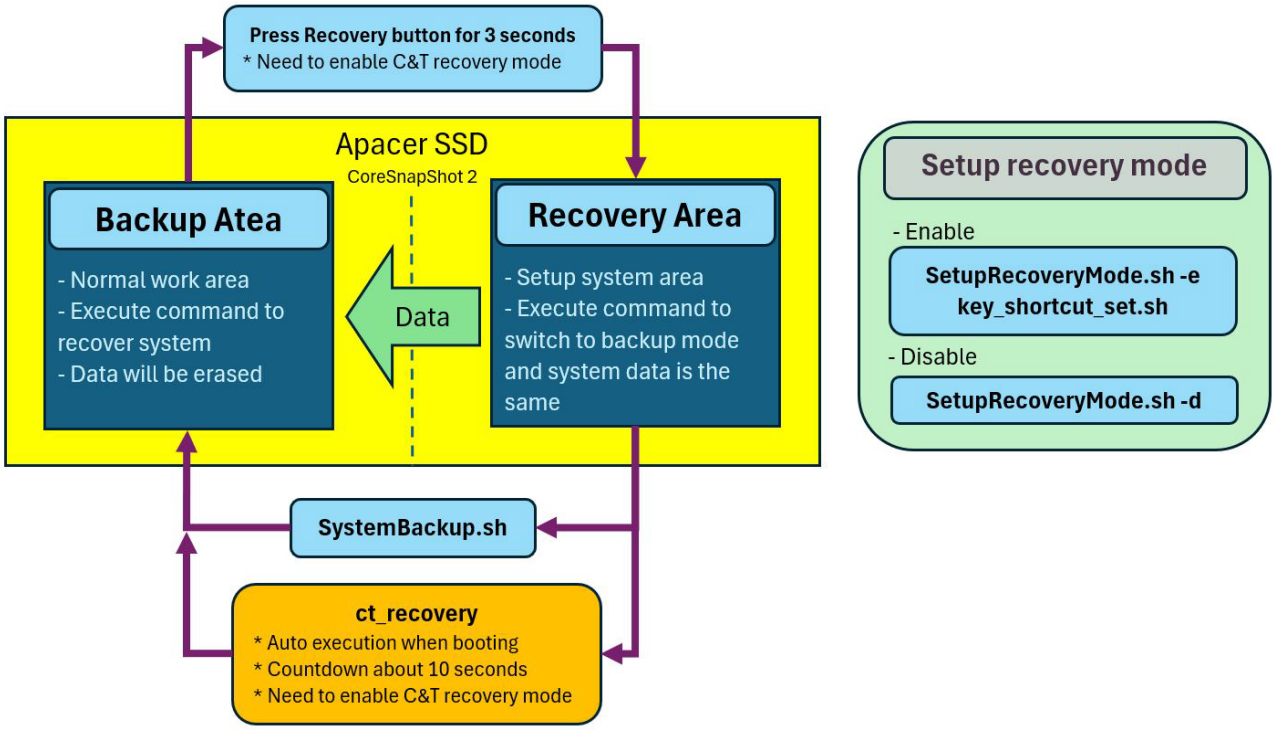
▼ Stop Recovery OS Feature:

Disable recovery mode by script

$ sudo SetupRecoveryMode.sh -d

- Recovery OS with button

  Trigger system recovery by recovery button.



  - Trigger methods:

    ▼ Backup System:

    Enable recovery mode then execute backup command

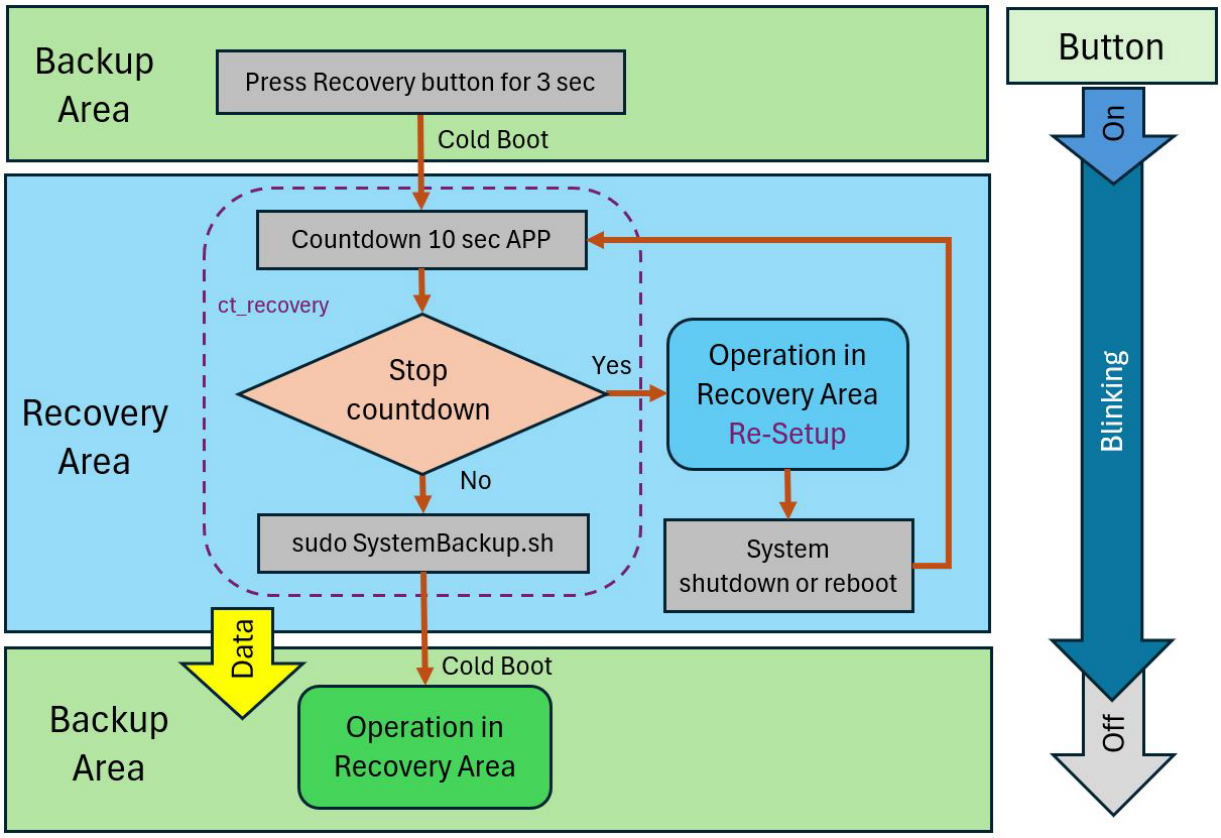
    $ sudo SetupRecoveryMode.sh -e

    $ key_shortcut_set.sh

    $ sudo SystemBackup.sh

    ▼ Recovery System :

    Press recovery button for 3 seconds. When press button, LED will be turn on. Pressing time over 3 seconds , system will trigger recovery command and reboot twice time. LED will be blinking when recovery process and turn off after system recovery.


Backup Area
Press Recovery button for 3 sec
Cold Boot
Recovery Area
Countdown 10 sec APP
ct_recovery
Stop countdown
Yes
No
Operation in Recovery Area Re-Setup
System shutdown or reboot
sudo SystemBackup.sh
Data
Cold Boot
Backup Area
Operation in Recovery Area
Button
On
Blinking
Off