User Manual

WISE-710-N600A

工業通訊網關

Industrial Protocol Gateway with Freescale i.MX 6 DualLite CPU, Dual GbE, 3 x COM, 4 x DI/O, 1 x Micro USB, and 1 x Micro SD Slot

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Acknowledgements

Support

For more information on this and other Advantech products, please visit our website at http://www.advantech.com

For technical support and customer service, please visit our support website at

http://support.advantech.com/

Part No. 2003E71000 Edition 1

Printed in China January 2019

Product Warranty (2 years)

Advantech warrants the original purchaser that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products that have been repaired or altered by persons other than repair personnel authorized by Advantech, or products that have been subject to misuse, abuse, accident, or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced free of charge during the warranty period. For out-of-warranty repairs, customers are billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

If you believe your product is defective, follow the steps outlined below.

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages displayed when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an return merchandize authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
5. Write the RMA number clearly on the outside of the package and ship the package prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This type of cable is available from Advantech. Please contact your local supplier for ordering information.

FCC Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference. In such cases, users are required to correct the interference at their own expense.

警告使用者

這是甲類測試產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Technical Support and Assistance

1. Visit the Advantech website at www.advantech.com/support to obtain the latest product information.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before calling:
   - Product 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

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power supply from the PC chassis before manual handling. Do not touch any components on the CPU card or other cards while the PC is powered on.
- Disconnect the power supply before making any configuration changes. The sudden rush of power when connecting a jumper or installing a card may damage sensitive electronic components.

Safety Instructions

1. Read these safety instructions carefully.
2. Retain this user manual for future reference.
3. Disconnect the equipment from all power outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or spray detergents.
4. For pluggable equipment, the power outlet socket must be located near the equipment and easily accessible.
5. Protect the equipment from humidity.
6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. Do not cover the openings.
8. Ensure that the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord away from high traffic areas. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following occurs, have the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated the equipment.
    - The equipment has been exposed to moisture.
    - The equipment is malfunctioning, or does not operate according to the user manual.
    - The equipment has been dropped and damaged.
    - The equipment shows obvious signs of breakage.
15. Do not leave the equipment in an environment with a storage temperature of below -30 °C (-22 °F) or above 75 °C (167 °F) as this may damage the equipment. The equipment should be kept in a controlled environment.
16. CAUTION: Batteries are at risk of exploding if incorrectly replaced. Replace only with the same or equivalent type as recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.
17. ATTENTION: Danger d'explosion si la batterie est mal remplace. Remplacer uniquement par le meme type ou equivalent lent recommandé par le fabricant. Jeter les piles usagées selon les instructions du fabricant.
18. In accordance with IEC 704-1:1982 specifications, the sound pressure level at the operator's position does not exceed 70 dB (A).

DISCLAIMER: These instructions are provided according to IEC 704-1 standards. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

安全指示

1. 請仔細閱讀此安全操作說明。
2. 請妥善保存此用戶手冊供日後參考。
3. 用濕抹布清洗設備前，請確認拔除電源線。請勿使用液體或去污噴霧劑清洗設備。
4. 對於使用電源線的設備，設備周圍必須有容易接觸到的電源插座。
5. 請勿在潮濕環境中試用設備。
6. 請在安裝前確保設備放置在可靠的平面上，意外摔落可能會導致設備損壞。
7. 設備機殼的開孔適用於空氣對，從而防止設備過熱。請勿覆蓋開孔。
8. 當您連接設備到電源插座前，請確認電源插座的電壓符合要求。
9. 請將電源線佈置在人們不易絆倒的位置，請勿在電源線上覆蓋任何雜物。
10. 請注意設備上所有的警告標示。
11. 如果長時間不使用設備，請拔除與電源插座的連結，避免設備被超標的電壓波動損壞。
12. 請勿讓任何液體流入通風口，以免引起火灾或短路。
13. 請勿自行打開設備。為了確保您的安全，請透過經認證的工程師來打開設備。
14. 如遇下列情況，請由專業人員維修：
    - 電源線或插頭損壞；
    - 設備內部有液體流入；
    - 設備曾暴露在過度潮濕環境中使用；
    - 設備無法正常工作，或您無法透過用戶手冊來正常工作；
    - 設備摔落或損壞；
    - 設備有明顯外觀損；
15. 請勿將設備放置在超出建議溫度範圍的環境，即不要低於 -30 °C (-22 °F) 或高於 75 °C (167 °F)，否則可能會造成設備損壞。
16. 注意：若電池更換不正確，將有爆炸危險。因此，只可以使用製造商推薦的同一種或者同等型號的電池進行替換。請按照製造商的指示處理舊電池。
17. 根據 IEC 704-1:1982 規定，操作員所在位置音量不可高於 70 分貝。
18. 限制區域：請勿將設備安裝於限制區域使用。
19. 免責聲明：請安全訓示符合 IEC 704-1 要求。研華公司對其內容之準確性不承擔任何法律責任。

Contents

Chapter 1

Overview

This chapter provides an overview of WISE-710-N600A.

- Introduction
- Specifications
- Safety Precautions
- Dimensions
- Packing List

1.1 Introduction

The WISE-710 series devices are durable industrial protocol gateways that support various mount options (DIN rail, wall, and pole) for diverse industrial automation applications.

The latest model, WISE-710-N600A, is equipped with a Freescale i.MX 6 DualLite processor, 1 GB of DDR3 RAM, dual GbE LAN, three COM, four DI/O, one Micro USB, and one Micro SD slot. WISE-710 gateways also feature eight AI, four DI, four RTD, four thermocouples, and wireless communication technology, providing great expandability for multiple applications.

Moreover, with the inclusion of Ubuntu and the EdgeLink edge solution-ready package (ESRP), WISE-710 series devices support plug-and-play functionality, thereby ensuring convenient installation and operation.

1.2 Specifications

1.2.1 General

- Certification: CE, FCC
- Mount Options: Wall, DIN rail, pole (optional)
- Power Consumption: 5W@24 V_{DC}
- Power Requirements: 24 V_{DC}

1.2.2 System

- CPU: Freescale i.MX 6 DL, 1 GHz
- Memory: 1 GB DDR3L
- LED Indicators: Power, Wireless, LAN, COM1 ~ 3
- Storage: 8 GB eMMC (up to 32 GB)
- SD: 1 x Micro SD slot
- USB: 1 x Micro USB slot
- Real-Time Clock: Yes

1.2.3 Communication

- Serial Port (COM1): RS-232/485
- Serial Port (COM2): RS-485/ CAN bus (switch)
- Serial Port (COM3): RS-485
- Serial Port Speed: RS-232/RS-485: 50 ~ 115.2 kbps
- Ethernet Port: 2 x 10/100/1000 BASE-T RJ-45 ports
- USB: 1 x Micro USB slot
- SD: 1 x Micro SD slot
- Optional Wireless Interface: 1 x Mini PCIe (full size)
- Type: Wi-Fi, 3G, 4G, NB-IoT

1.2.4 Software

- OS Support: Yocto 2.1 kernel 4.1.15, Ubuntu 16.04 kernel 4.1.15
- Programming: Linux C

1.2.5 Environment

- Humidity: 10 ~ 95% RH @ 40 °C, non-condensing
- Operating Temperature: -20 ~ 55 °C (-4 ~ 131 °F)
- Storage Temperature: -30 ~ 75 °C (-22 ~ 167 °F)

1.3 Safety Precautions

Please follow the safety precautions provided throughout this user manual to avoid damaging the device or incurring personal injury.

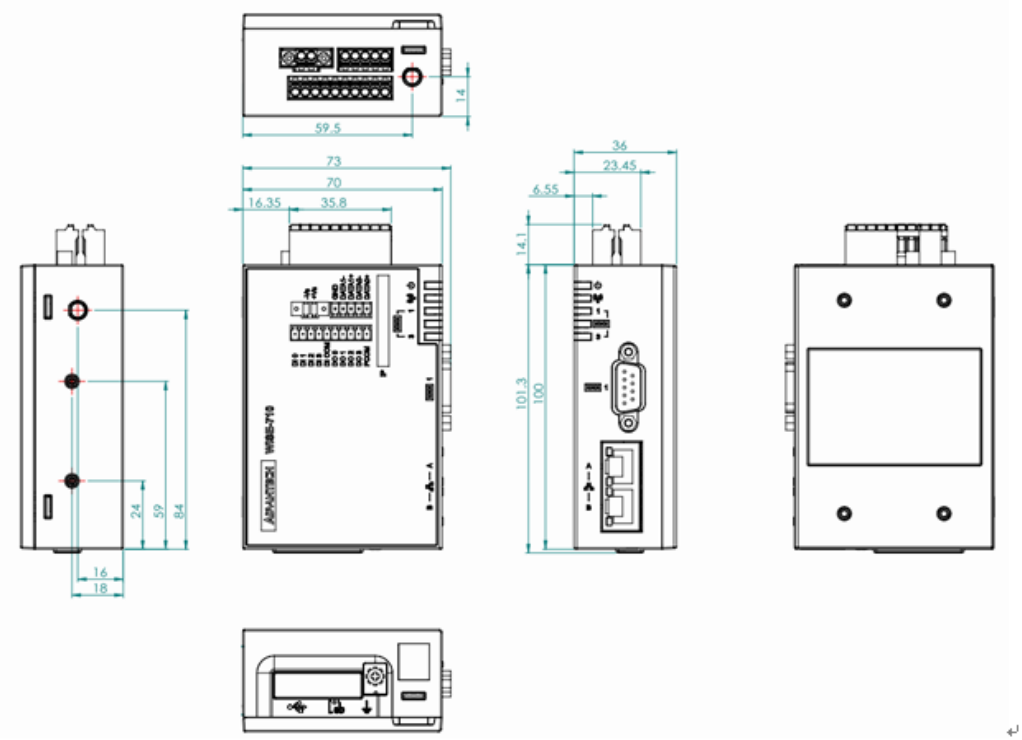
Warning! *Always disconnect the power cord from the chassis before manual handling. Do not touch any of the components when the device is powered on. A sudden rush of power can damage sensitive electronic components. Only experienced technical personnel should open the chassis.*

Warning! *Toujours débrancher le cordon d'alimentation de votre boîtier lorsque vous êtes travailler. Ne branchez pas lorsque l'appareil est allumé. Un afflux soudain de puissance peut endommager les composants électroniques sensibles. Seulement connu personnel de l'électronique devraient ouvrir le châssis.*

Caution! *Always ground yourself to remove any static electric charge before touching WISE-710-N600A. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag.*

Caution! *Toujours à la terre pour éliminer toute charge d'électricité statique avant toucher WISE-710-N600A. Appareils électroniques modernes sont très sensibles à charges d'électricité statique. Utilisez un bracelet antistatique à tout moment. Placez tous composants électroniques sur une surface antistatique ou dans un statique-sac blindé.*

1.4 Dimensions



1.5 Accessories

The following items should be included with the device:

- 1 x 5-pin connector
- 1 x 2-pin connector
- 1 x 10-pin connector
- 1 x WISE-710-N600A user manual
- 1 x RoHs declaration
- 1 x Warranty card
- 1 x GND cable
- 2 x Mounting kit holder
- 2 x Mounting kit latch
- 4 x Mounting kit screws

If any of the above items are missing or damaged, contact your distributor or sales representative immediately.

1.6 Applicable Product Models

This manual is applicable to the following product models:

WISE-710-N600A

WISE-710-N6MCA

WISE-710-N6STA

Chapter 2

Hardware Functionality

This chapter explains how to setup the WISE-710-N600A hardware functions, including connecting peripherals and setting switches and indicators.

- Introduction
- LED Status Indicators
- COM Port Interface
- LAN Connector
- Power Connector
- Digital Input and Output
- Micro USB Slot
- Micro SD Slot

2.1 Introduction

Figures 2.1 to 2.3 show the connector locations on the WISE-710-N600A gateway. Information about each connector and I/O slot is provided in the following sections.

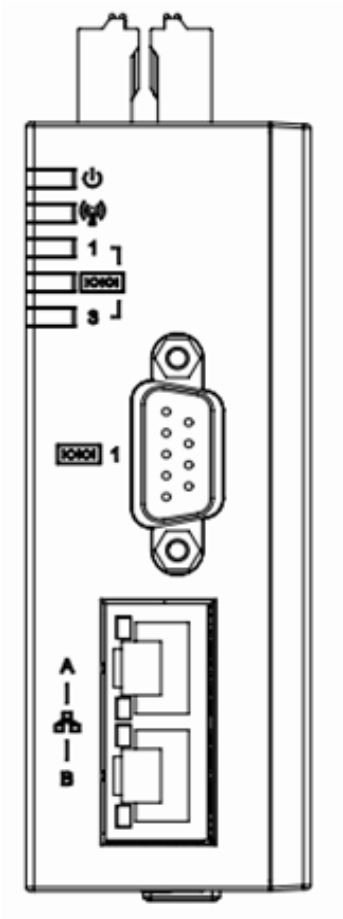


Figure 2.1 WISE-710-N600A Front Panel

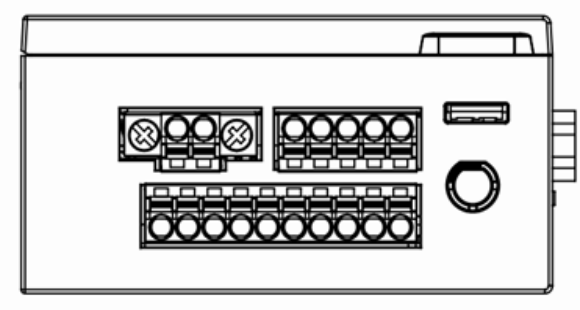


Figure 2.2 WISE-710-N600A Top View

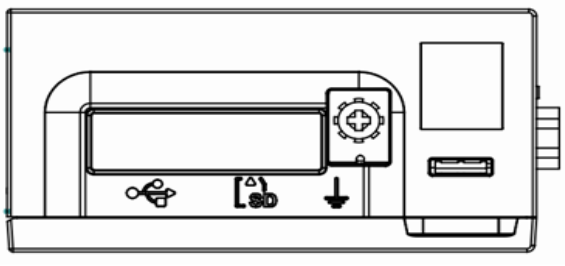


Figure 2.3 WISE-710-N600A Underside View

2.2 LED Status Indicators

LED	Status	Description
PWR	Green	Power is on
	Off	Power is off
WLAN	Green	Signals are being transmitted and received
COM1~3	Green	Standby
	Flashing Green	Signals are being transmitted and received

2.3 COM Port Interface (COM1, COM2, COM3)

WISE-710-N600A features one RS232/485 (DB9), one RS485/CAN bus (2-pin terminal), and one RS485 (3-pin terminal) port. The COM port settings can be adjusted using the on-board switches (Refer to Appendix A.3).

2.4 LAN Connector (LAN1 ~ LAN2)

WISE-710-N600A is equipped with a dual Gigabit LAN controller and Realtek RTL8364NBI Ethernet controller chip that is fully compliant with IEEE 802.3u 10/100/1000 BASE-T. The Ethernet port is a standard RJ-45 jack. LED indicators provided at the front show the device's Link (green/orange) and Active (green LED) status (Refer to Appendix A.2).

2.5 Power Connector

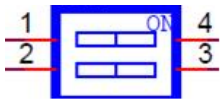
WISE-710-N600A comes with a connector that supports 24 V_{DC} power input and features reversed wiring protection. This means that reversed wiring of the ground and power lines will not cause system damage (Refer to Appendix A.1).

2.6 Digital Input and Output

WISE-710-N600A features four digital input and four digital output channels configured via GPIO pins for most On/Off, trigger, and status readings.

2.6.1 Digital Input (Default Setting: Dry Contact)

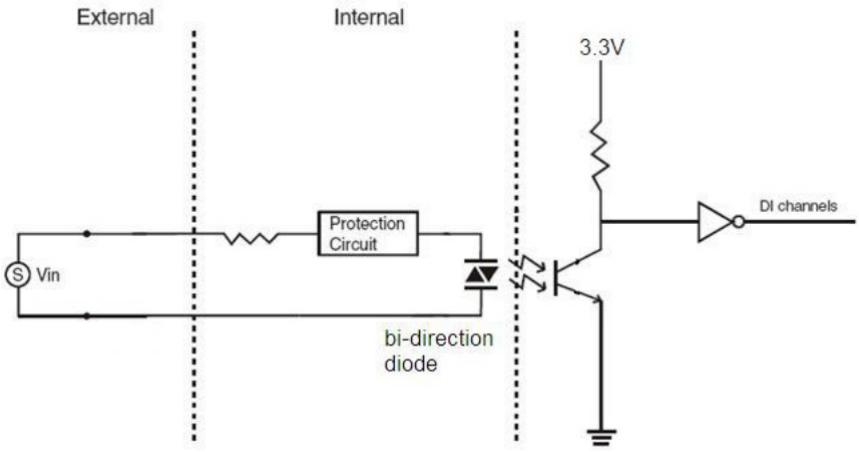
- Input Channels: 4
- Input Voltage (Wet Contact), Configure SW8 to 1, 3
  - Logic 0: 0 ~ 3 V_{DC}
  - Logic 1: 10 ~ 30 V_{DC}
- Input Voltage (Dry Contact), Configure SW8 to 2, 4
  - Logic 0: Open
  - Logic 1: Shorted to GND
- Input Current
  - 10 V_{DC} @ 2.67mA
  - 20 V_{DC} @ 5.64mA
  - 30 V_{DC} @ 8.91mA
- Isolation Protection: 2,500 V_{DC}
- Overvoltage Protection: 30 V_{DC}
- ESD Protection: 4KV (contact), 8KV (air)
- Opto-Isolator Response: 50 µs



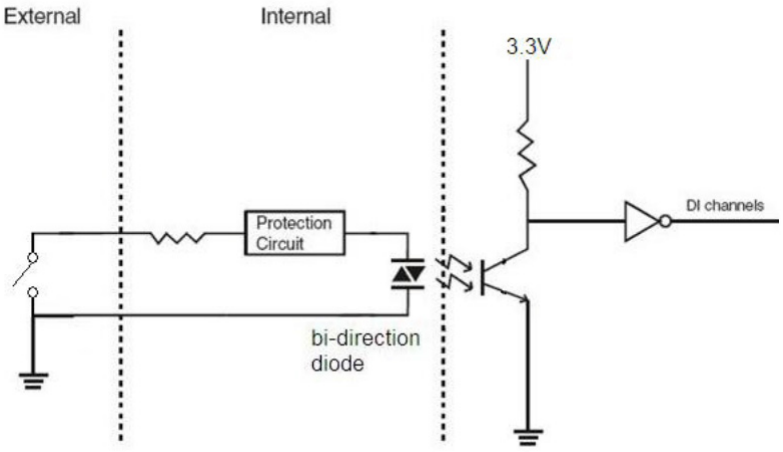
2.6.2 Digital Output

- Channels: 4
- Output Voltage: 5 ~ 30 V_{DC}
- Output Capability Sink: 24 mA max./channel
- Opto-Isolator Response: 50 µs

Wet Contact



Dry Contact



2.7 Micro USB Slot

WISE-710-N600A is equipped with one micro USB slot.

2.8 Micro SD Slot

WISE-710-N600A is equipped with one micro SD slot that supports SD/MMC cards in Class 2, 4, 6, 8, 10. The supported capacity is up to 32 GB (SDHC).

Chapter 3

Initial Setup

This chapter explains how to initialize WISE-710-N600A.

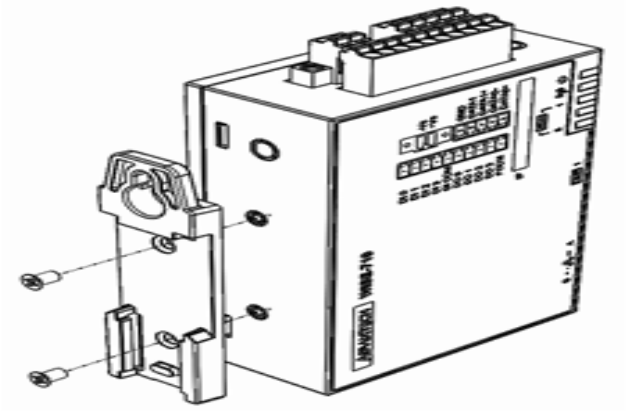
- Power Supply
- Din Rail Installation
- Wall Mount Installation
- Wi-Fi Module and Antenna Installation
- Expansion Module Installation
- Software Installation

3.1 Power Supply

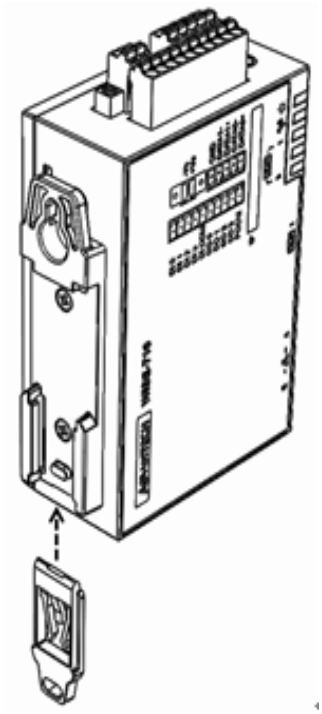
WISE-710-N600A is intended to be supplied by an approved power adapter or DC power source rated 24V_{DC}, +-20%,0.5A, and TMA 55 °C. If you require more information, please contact Advantech.

3.2 DIN Rail Installation

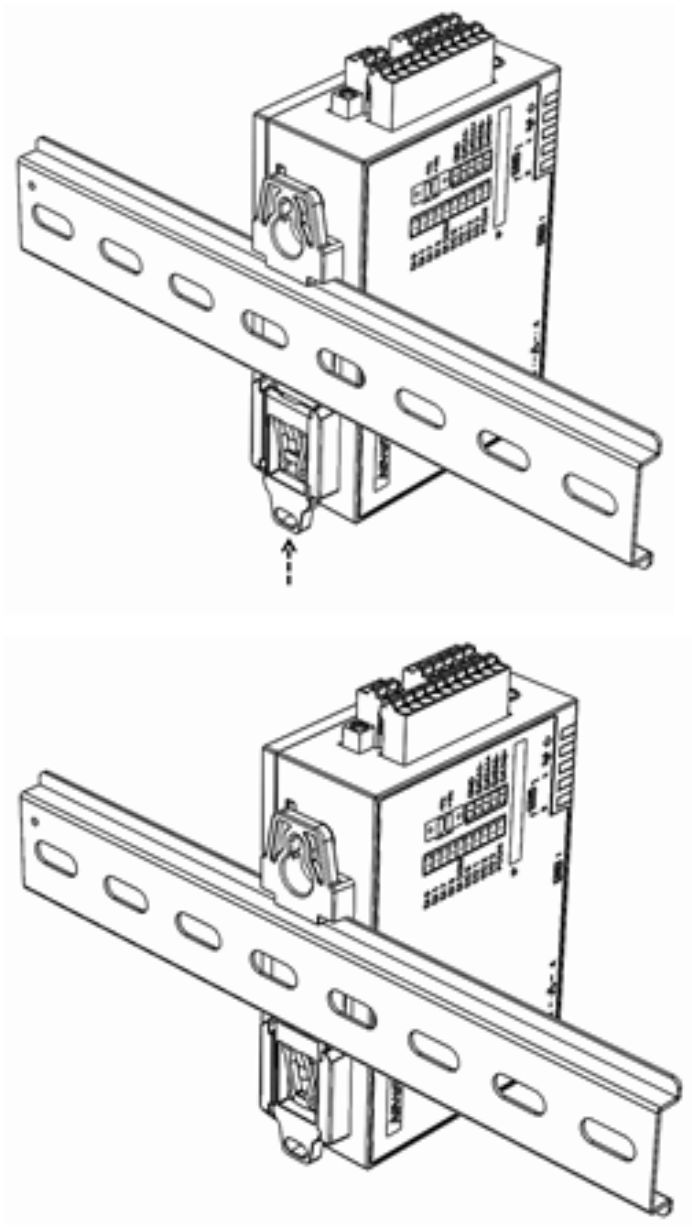
1. Fasten the DIN rail bracket to the device using two screws



2. Install the mount latch

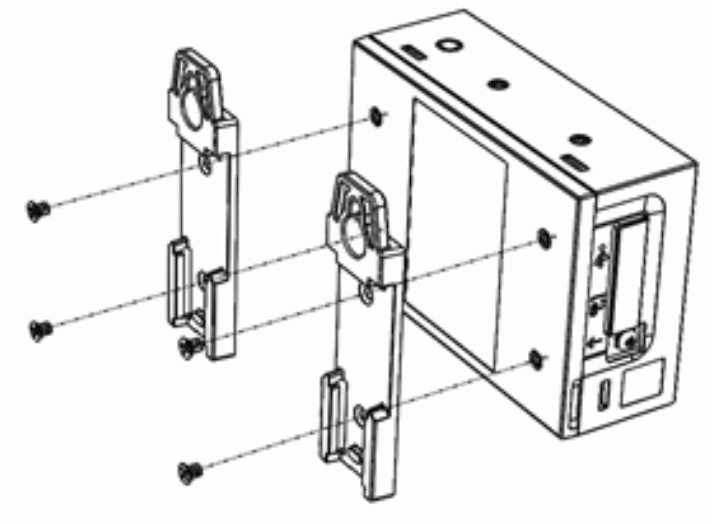


3. Install the DIN rail onto the DIN-rail bracket

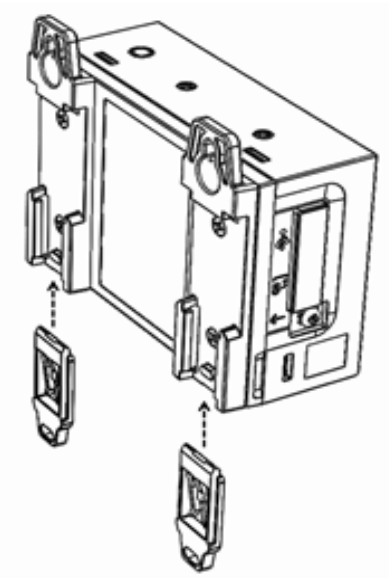


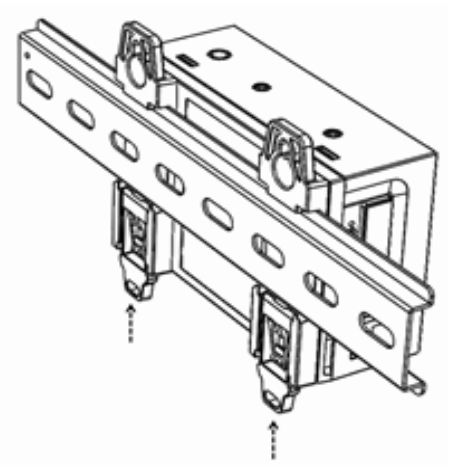
3.3 Wall Mount Installation

1. Fasten the wall mount bracket to the device using four screws.



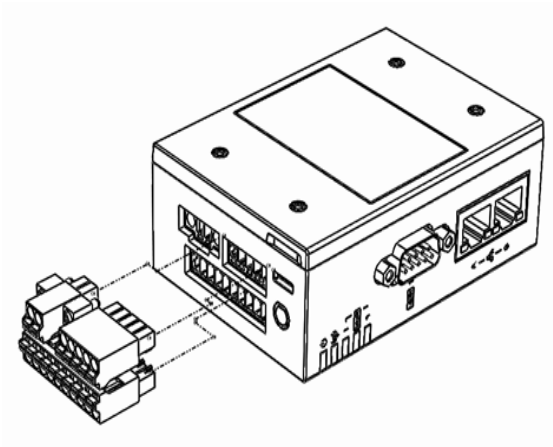
2. Install the two mount latches.



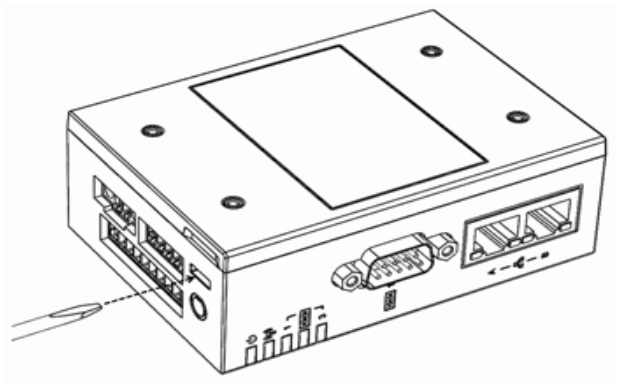


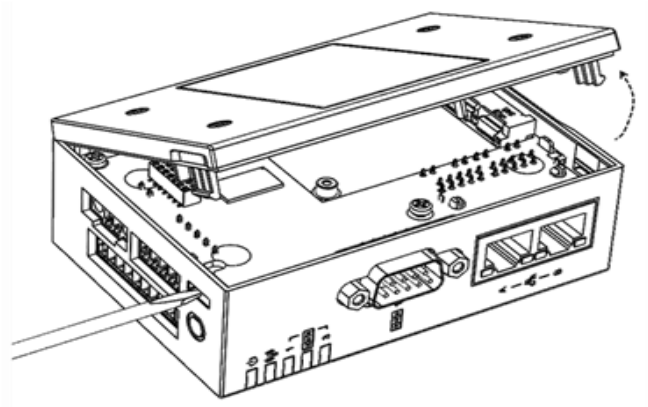
3.4 Wi-Fi Module and Antenna Installation

1. Remove the terminal plug.

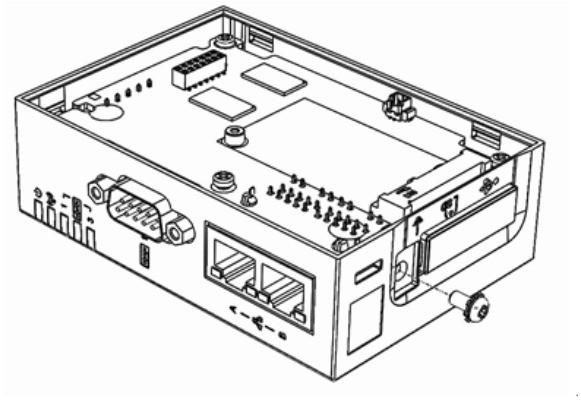


2. Open the rear cover of the device by pushing the clips on both sides using a flat-head screwdriver.

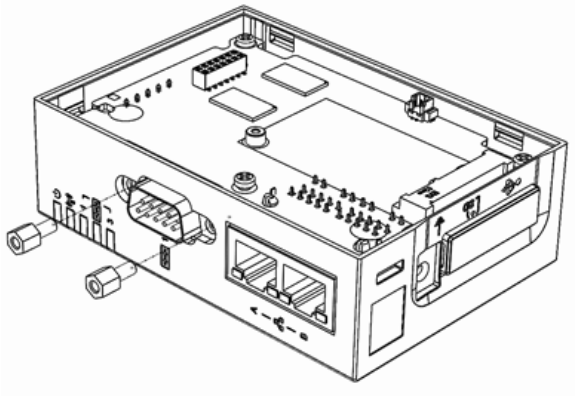




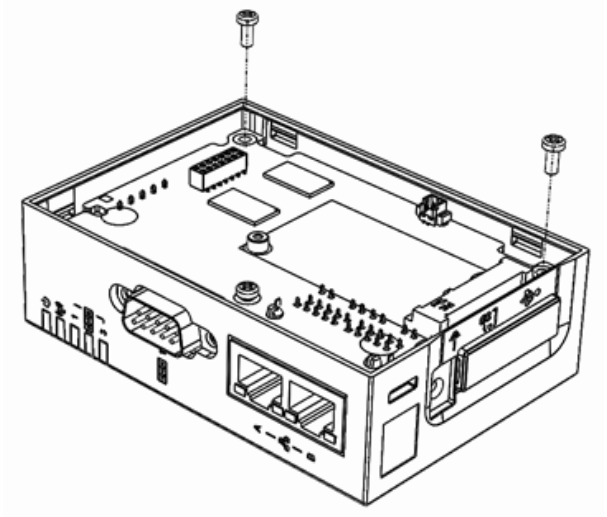
3. Loosen and remove the grounding screw.



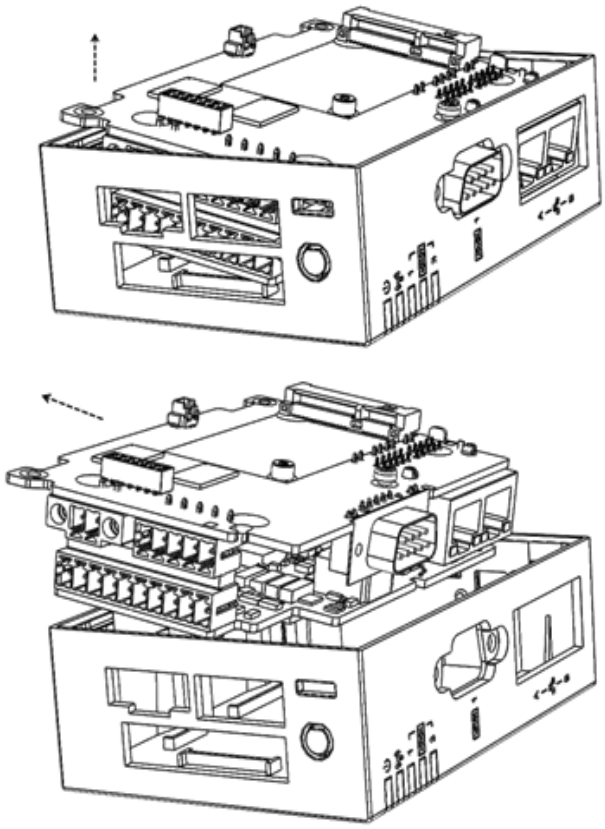
4. Loosen and remove the two COM port nuts.



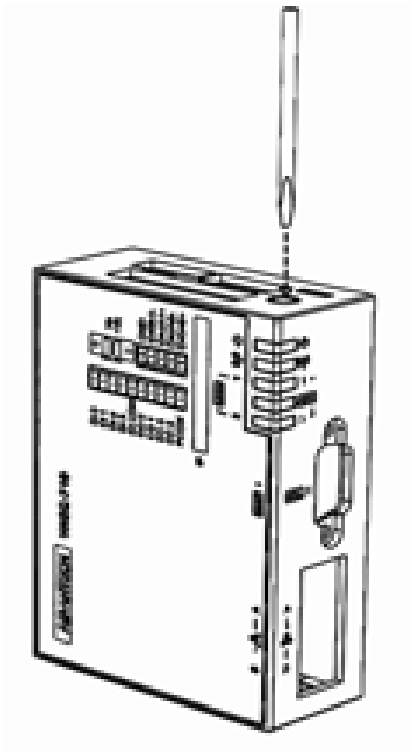
5. Loosen and remove the two screws on the main board.



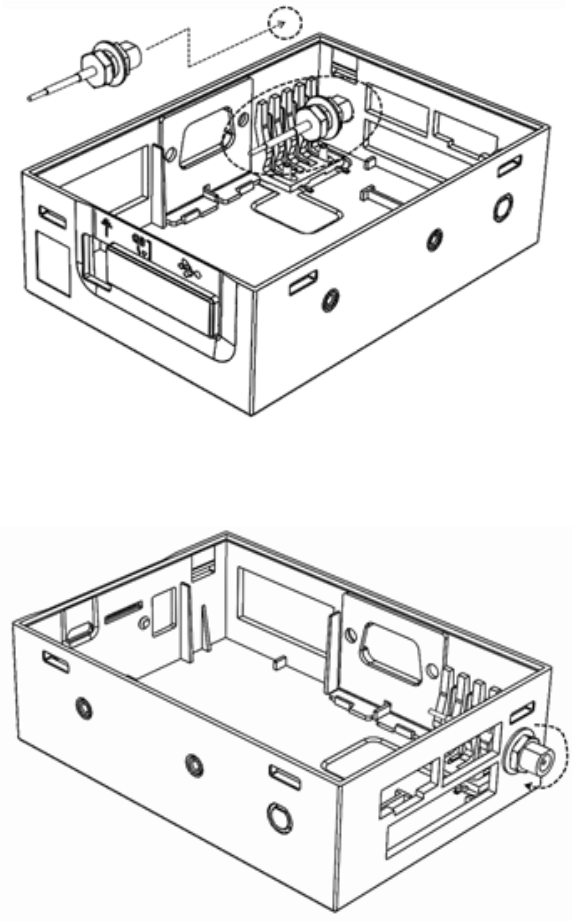
6. To remove the printed circuit board, first lift the board slightly. Then with the board tilted at a slight angle, carefully remove it from the device.



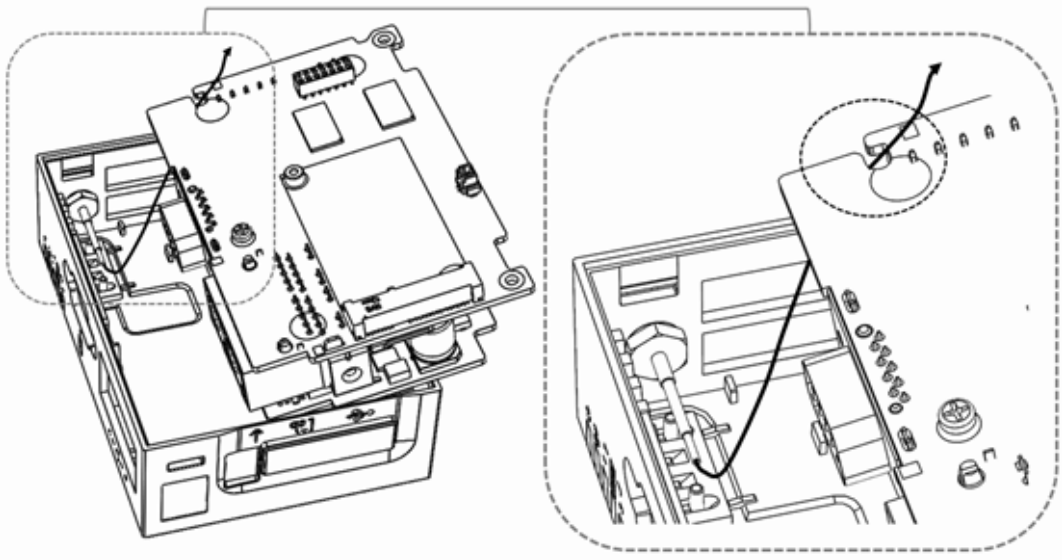
7. Remove the side cover SMA dummy door.



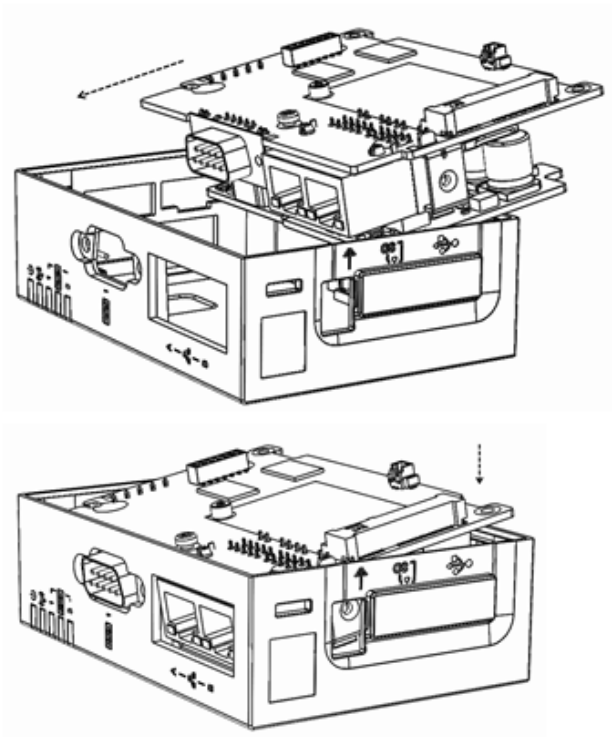
8. Fasten the SMA cable in place using a socket wrench.



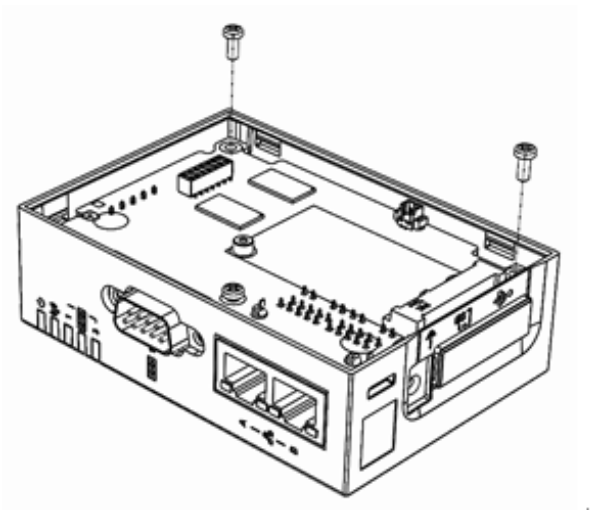
9. The SMA cable should be routed as shown below.



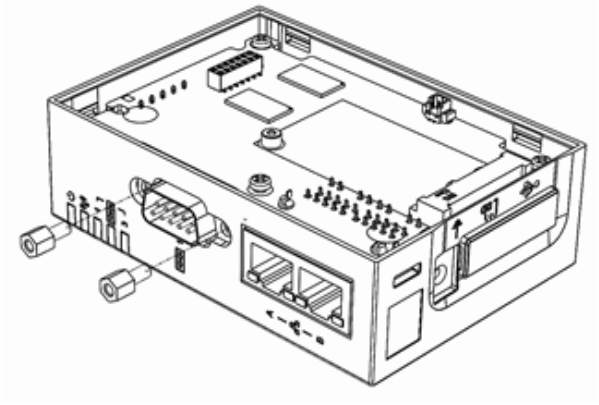
10. Install the printed circuit board.



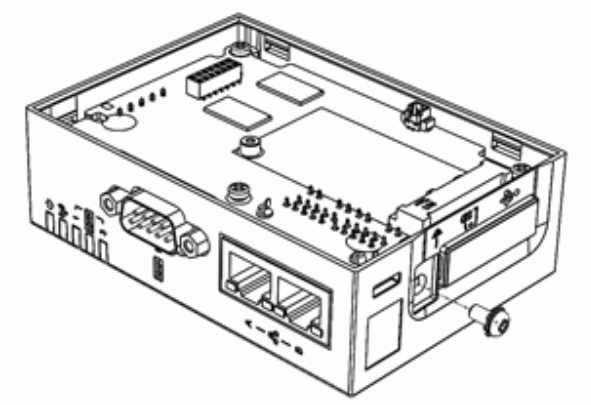
11. Fasten the PCBA in place using two screws.



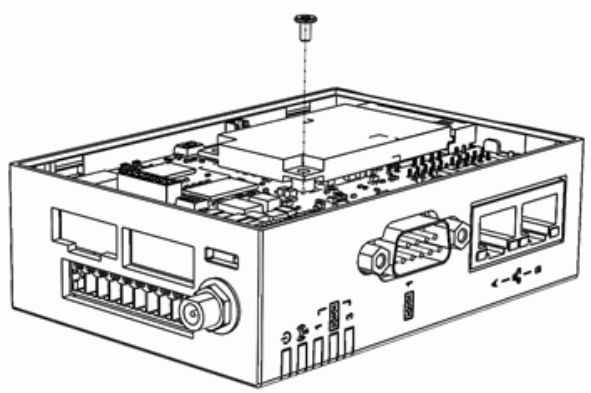
12. Replace and tighten the two COM port nuts.



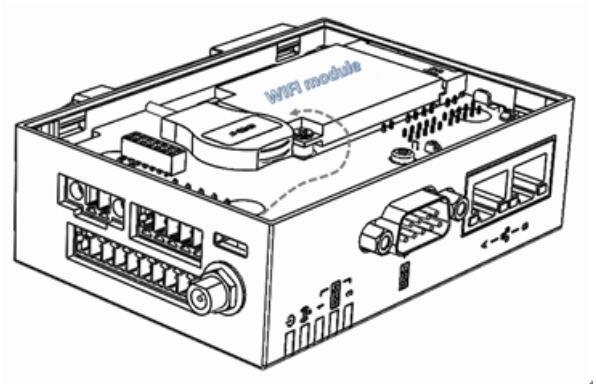
13. Replace and tighten the grounding screw.



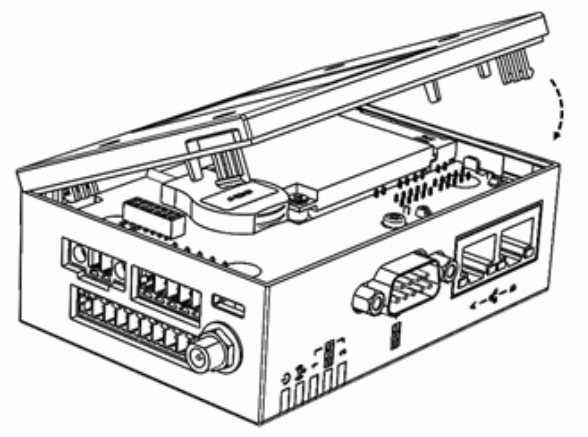
14. Insert the Wi-Fi module and fasten in place using one screw.



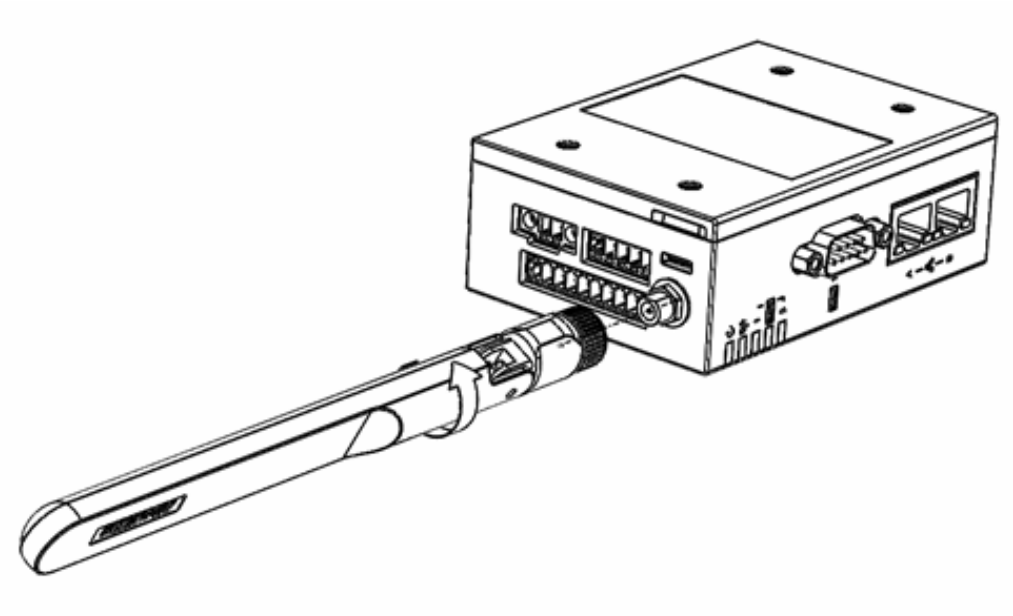
15. Plug the SMA cable into the wireless module.



16. Replace the rear cover of the device.

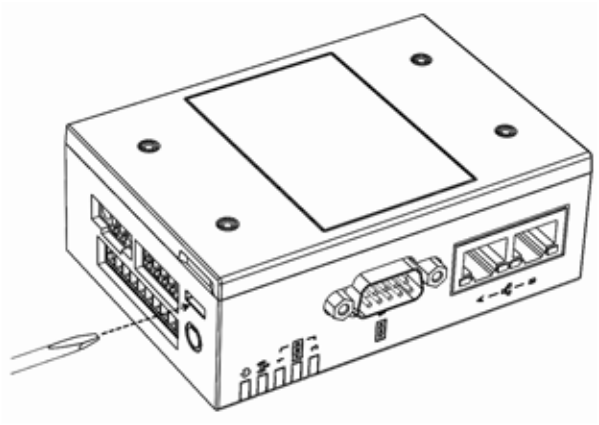


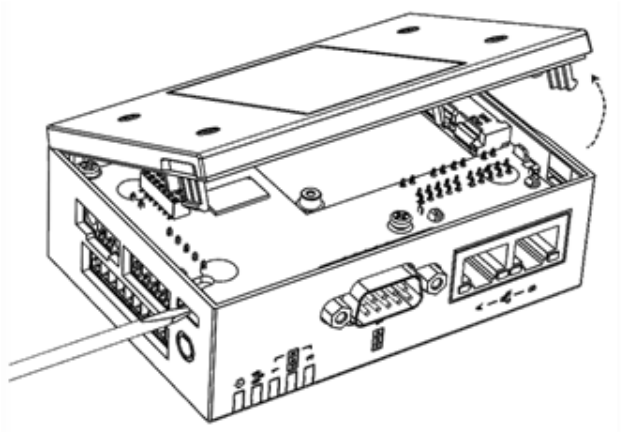
17. Install the antenna.



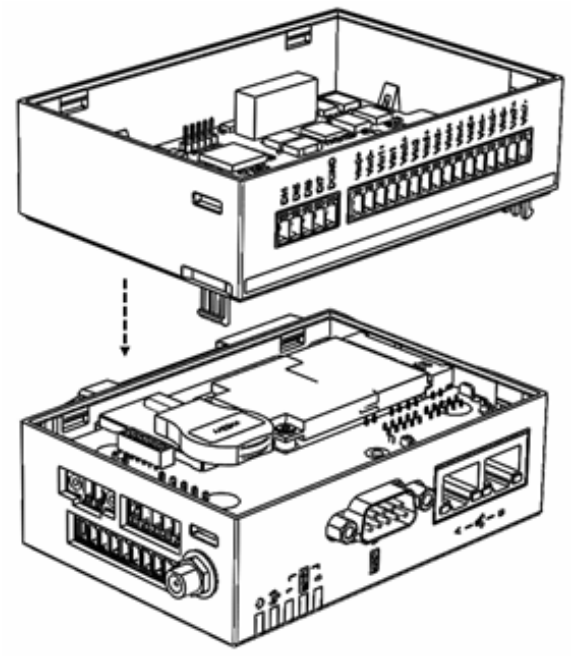
3.5 Expansion Module Installation

1. Open the rear cover of the device by pushing the clips on both side using a flat-head screwdriver.

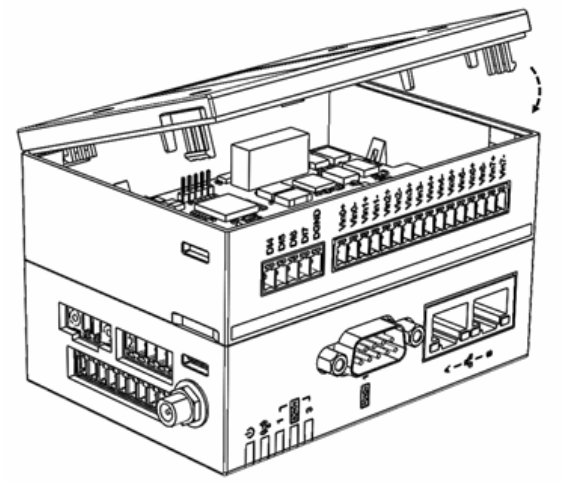




2. Attach the expansion module to the main terminal.



3. Replace the rear cover.

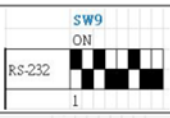
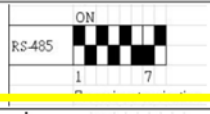
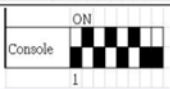


3.6 Software Installation

3.6.1 How to Use the Debugging Port

Before testing WISE-710, install the putty tool (https://www.putty.org/) on the host PC, connect the PC to WISE-710 (using RS232), and set COM1 (hardware SW9) to console mode.

2.1 COM1 RS232/485/Console mode setting (SW9)

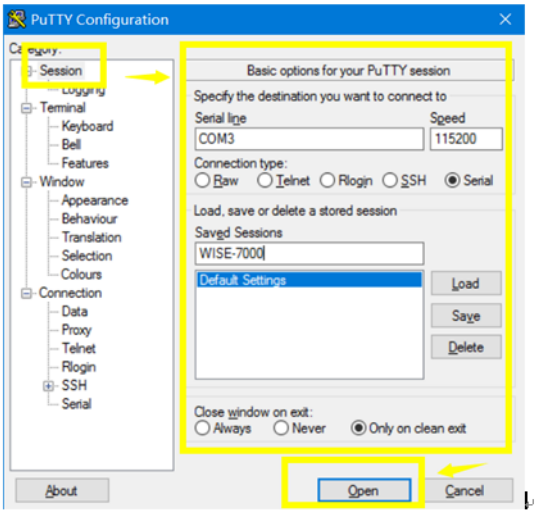
	COM1 RS232/485/Console mode setting	
Description	This switch is used to select COM1 RS232/485/Console mode setting	
Default	RS232 mode	
RS232 Mode	Bit 1,3,6 ON Bit 2,4,5,7,8 OFF	
RS485 Mode	Bit 1,3,5,8 ON Bit 2,4,6,7 OFF Bit 7 receiver termination	
Console Mode	Bit 2,4,6 ON Bit 1,3,5,7,8 OFF	

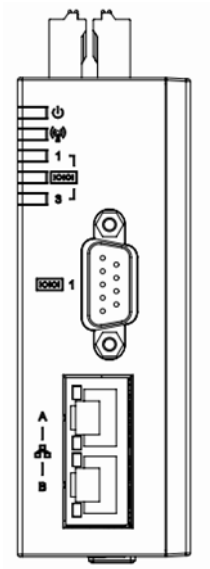
The putty tool can be used to connect to the WISE-710 gateway by following the steps outlined below.

Step 1: Check the debug COM port connected

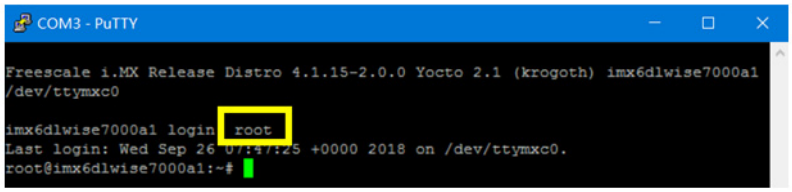
Desktop->my computer->property->HYPERLINK "D:/[Tools]YouDaoDict/Dict/8.3.1.0/resultui/html/index.html" \l "/javascript:;" device?HYPERLINK "D:/[Tools]YouDaoDict/Dict/8.3.1.0/resultui/html/index.html" \l "/javascript:;" manager->COM&LPT

Step 2: Configure the putty tool

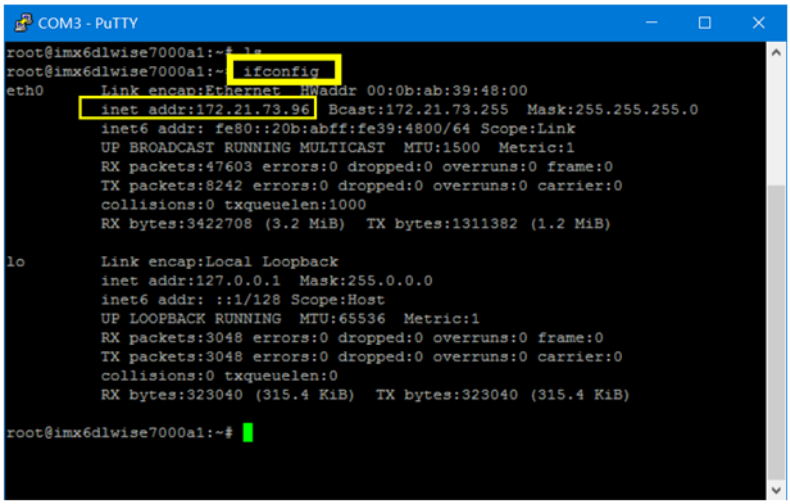




Step 3: Power on the WISE-710 device and log in (use root login)



Step 4: Use the "ifconfig" command to check the IP address



3.6.2 How to Use a LAN Port

Version

Uboot: uboot-2016.03

Kernel: kernel-4.1.15

File System: yocto-2.1

Hardware configuration

MiniPCIe: EWM-C117FL06E 4G module + Hinet SIM card

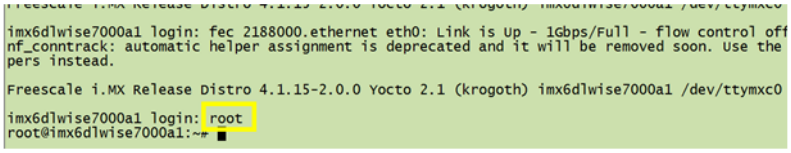
SW2: 1ON 2OFF (boot from emmc)

SW9: 2OFF 2ON 3OFF 4ON 5OFF 6ON 7OFF 8OFF (use debug console)

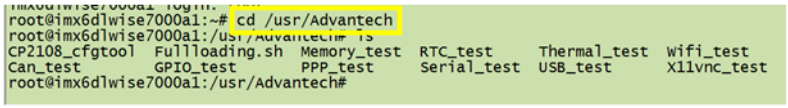
LAN: CAT5.e + 100M/1000M external network

Test flow

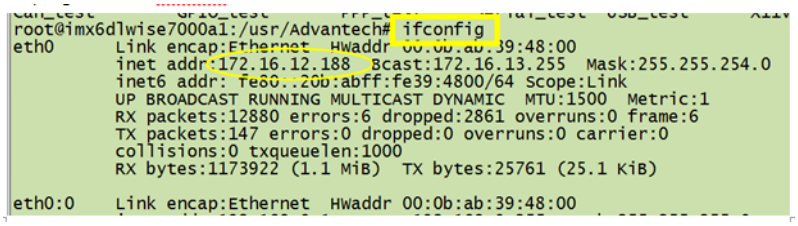
Step 1: Login with the debug console



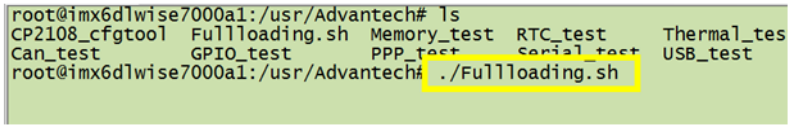
Step 2: Enter test directory



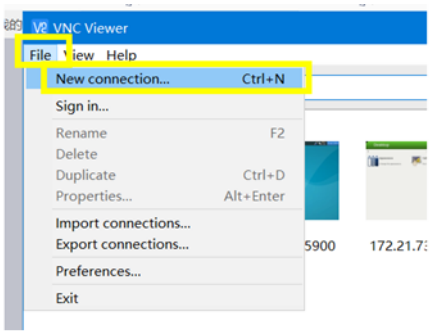
Step 3: Obtain the current ethernet IP

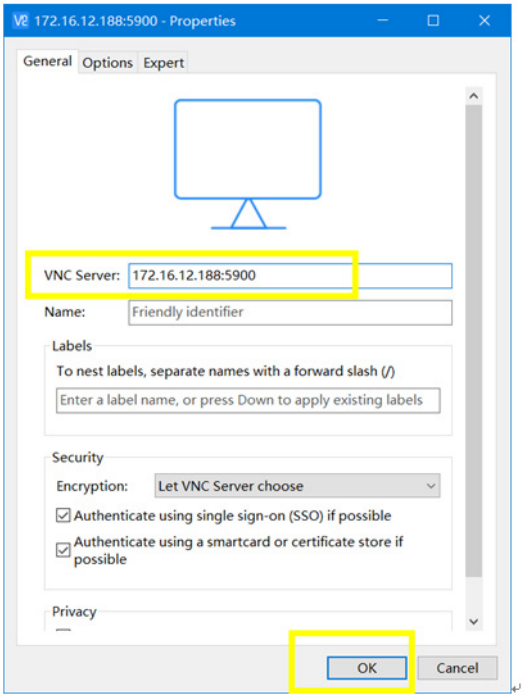


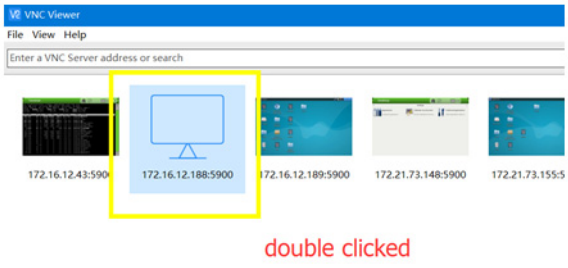
Step 4: Run a full-load test script, wait 2 min (initializing 4G and other devices)



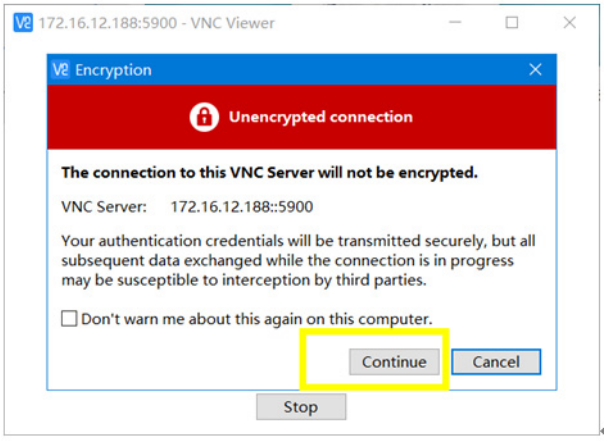
Step 5: Open the remote desktop (use VNC Viewer 6.18.625)

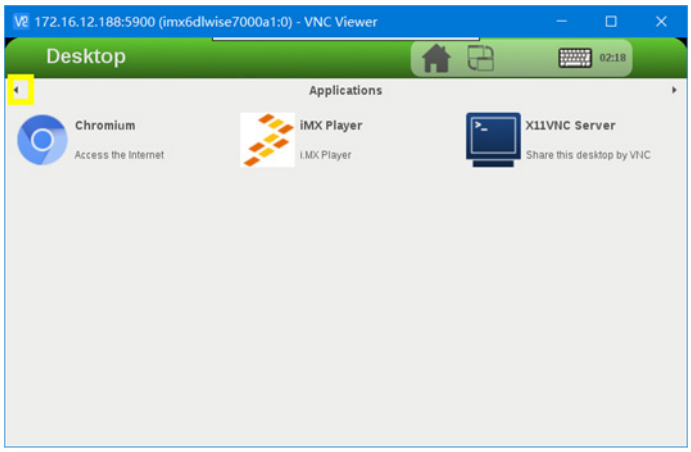






double clicked





3.6.3 System Recovery SOP

This SOP provides detailed procedures for restoring the eMMC image. If the onboard flash image is accidentally destroyed, the system can be recovered by following the steps outlined below.

For Yocto2.1 IMG

1. Make boot SD on Linux

Copy the “WISE-710-rx.yyyymmdd.tar.gz” package to your Linux desktop.

Open “Terminal” on Ubuntu 16.04 LTS.

```
user@ubuntu:/home/user# sudo su (Change to "root" authority)
```

Input your password.

```
root@ubuntu:/home/user# cd Desktop/
root@ubuntu:/home/user# tar zxvf WISE-710-rx.yyyymmdd.tar.gz
```

Insert one SD card to the computer

Check the SD card location (/dev/sdx)

```
root@ubuntu:/home/user# cd ./WISE-710-rx.yyyymmdd/scripts
root@ubuntu:/home/user# ./mksd_recovery-linux.sh /dev/sdx
```

Please wait until dump disk is completed.

2. Restoring eMMC from boot SD

Boot the WISE-710 device from the SD card (SW2 1OFF 2ON).

```
Freescale i.MX Release Distro 4.1.15-2.0.0 imx6dlwise710a1 /
dev/ttymxc0 imx6dlwise710a1 login: root
root@imx6dlwise710a1:~# cd /mk_inand/scripts
root@imx6qitb200a1:~# ./Factory.sh [MAC_ADDR]
```

For example

```
root@imx6dlwise710a1:~# ./Factory.sh aa:bb:cc:dd:ee:ff
```

Or use the current mac address

```
root@imx6dlwise710a1:~# ./Factory.sh AUTOMAC
```

Power off the device and remove the SD card

```
root@imx6dlwise710a1:~# sync
root@imx6dlwise710a1:~# poweroff
```

3. Boot from eMMC

Boot the WISE-710 device from eMMC (SW2 1ON 2OFF).

Click any key in boot delay, then recover all boot env values.

```
Boot> env default -a
Boot> saveenv
```

Then disconnect and reconnect the power supply.

For Ubuntu IMG

1. Make boot SD on Linux

Copy the “WISE-710-rx-ubuntu.yyyymmdd.tar.gz” package to your Linux desktop.
Open “Terminal” on Ubuntu 16.04 LTS.

```
user@ubuntu:/home/user# sudo su (Change to "root" authority)
```

Input your password

```
root@ubuntu:/home/user# cd Desktop/
root@ubuntu:/home/user#  tar  zxvf  WISE-710-rx-ubuntu.yyyym-
mdd.tar.gz
```

Insert one SD card into the computer
Check the SD card location (/dev/sdx)

```
root@ubuntu:/home/user#    cd    ./WISE-710-rx-ubuntu.yyyymmdd/
scripts
root@ubuntu:/home/user#    ./mksd_recovery-linux.sh    /dev/sdx
ubuntu16044
```

Please wait until dump disk is completed.

2. Restoring eMMC from Boot SD

Boot the WISE-710 device from the SD card (SW2 1OFF 2ON).

```
Freescale i.MX Release Distro 4.1.15-2.0.0 imx6dlwise710a1 /
dev/ttymxc0
imx6dlwise710a1 login: root
root@imx6dlwise710a1:~# cd /mk_inand/scripts
root@imx6qitb200a1:~# ./Factory.sh [MAC_ADDR] ubuntu16044
```

For example (write mac address as aa:bb:cc:dd:ee:ff)

```
root@imx6dlwise710a1:~#    ./Factory.sh    "aa:bb:cc:dd:ee:ff"
ubuntu16044
```

Or use the current mac address

```
root@imx6dlwise710a1:~# ./Factory.sh AUTOMAC ubuntu16044
```

Power off the device and remove the SD card

```
root@imx6dlwise710a1:~# sync
root@imx6dlwise710a1:~# poweroff
```

3. Boot from eMMC

Boot the WISE-710 device from eMMC (SW2 1ON 2OFF).

Click any key in boot delay, then recover all boot env values.

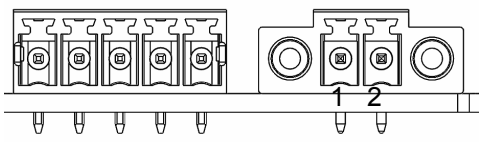
```
Boot> env default -a
Boot> saveenv
```

Then disconnect and reconnect the power supply.

Appendix A

System Settings/Pin Assignments

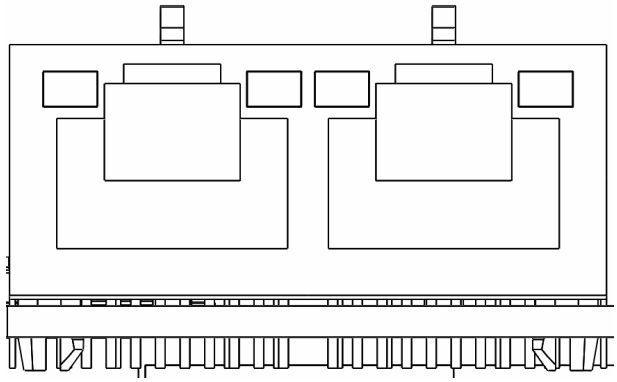
A.1 Power Connector



1652007987-01 terminal block 2P/3.5/(M)/PA66/RA/Sn/D/GR/L3.4

Pin	Signal	Description
1	Power IN V+	24V_{DC} +-20% power in
2	Power IN V- (GND)	

A.2 LAN RJ45 Connector



1652006625-01 phone jack RJ45 28P 2.54 mm DIP RTB-19GB9J4A

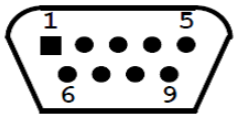
RJ45 Pin	Signal	Description
1	MDI0+	In BASE-T: Media-dependent interface [0] 1000BASE-T: In MDI configuration, MDI[0]+/- corresponds to BI_DA+/- and in MDI-X configuration, MDI[0]+/- corresponds to BI_DB+/-. 10BASE-T and 100BASE-TX: In MDI configuration, MDI[0]+/- is used for the transmit pair and in MDIX configuration, MDI[0]+/- is used for the receive pair.
2	MDI0-	

3	MDI1+	In BASE-T: Media-dependent interface [1]: 1000BASE-T: In MDI configuration, MDI[1]+/- corresponds to BI_DB+ and in MDI-X configuration, MDI[1]+/- corresponds to BI_DA+/-. 10BASE-T and 100BASE-TX: In MDI configuration, MDI[1]+/- is used for the receive pair and in MDI-X configuration, MDI[1]+/- is used for the transmit pair.
6	MDI1-	
4	MDI2+	In BASE-T: Media-dependent interface [3:2]: 1000BASE-T: In MDI and in MDI-X configuration, MDI[2]+/- corresponds to BI_DC+/- and MDI[3]+/- corresponds to BI_DD+/-. 100BASE-TX: Unused 10BASE-T: Unused
5	MDI2-	
7	MDI3+	
8	MDI3-	

1G	Left LED	Right LED		
	10Link	100Link	1000Link	Active
	Off	Orange	Green	Green

A.3 COM Ports

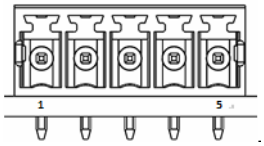
A.3.1 COM1



1654000056 D-SUB connector 9P 90D(M) DIP 070241MR009S200ZU

Pin	RS232	RS485	Console
1	DCD	D-	
2	RX	D+	RX
3	TX		TX
4	DTR		
5	GND	GND	GND
6	DSR		
7	RTS		
8	CTS		
9	RI		

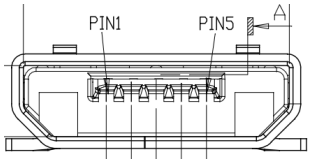
A.3.2 COM2 and COM3



1652007988-01 terminal block 5P/3.5/(M)/PA66/RA/Sn/D/GR/L3.4

Pin	RS485	CAN
1	COM2 D+	CAN D+
2	COM2 D-	CAN D-
3	COM3 D+	
4	COM3 D-	
5	GND	

A.4 Micro USB Connector



1654011848-02 micro USB 5P/0.65 mm/(F)/PA6T/RA/GFL/S/BK/B type

Pin	Signal	Description
1	USB VBUS	USB power output, USB 2.0 5 V/0.5A
2	USB_P-	USB 2.0 data -
3	USB_P+	USB 2.0 data +
4	ID	Host: connected to the signal ground Device: not connected
5	GND	Ground for power return

A.5 Micro SD Connector

1654013298-01 micro SD card 8P/1.1 mm/(F)/LCP/RA/GFL/S/BK/H1.85

Pin	Signal	Description
1	DAT2	Data bit 2
2	DAT3	Data bit 3
3	CMD	Command line
4	VDD	Power supply 2,7-3,6 V
5	CLK	Clock input
6	VSS	Signal ground
7	DAT0	Data bit 0
8	DAT1	Data bit 1
SW1	SWITCH	Card detection

A.6 Board Connectors and Switches

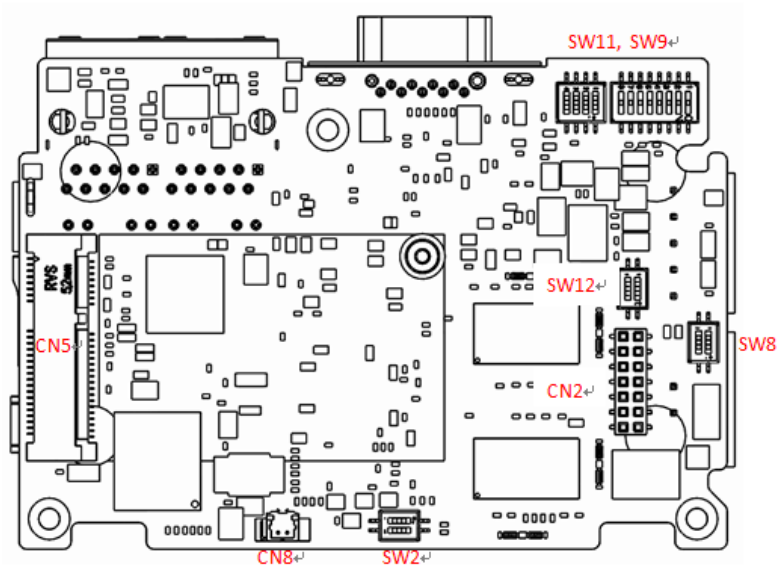


Figure A.1 Connector and Switch Locations on the Main Board (Top/Rear)

Label	Function
CN5	PCI Express mini card socket
SW11	COM2 mode setting
SW9	COM1 mode setting
SW12	Termination resistor select
SW8	Wet/Dry contact select
CN2	Expansion connector
CN8	RTC battery connector
SW2	Boot mode select

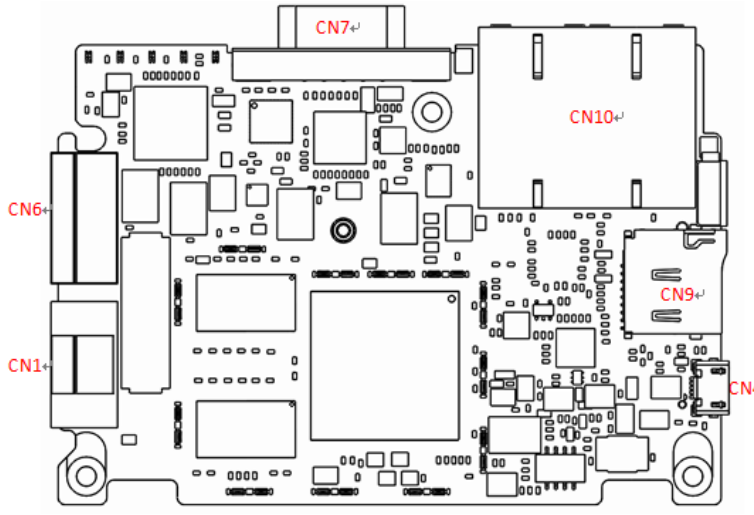


Figure A.2 Connector and Switch Locations on the Main Board (Top/Front)

Label	Function
CN1	Power in connector
CN6	COM2, COM3 connector
CN7	COM1 connector
CN10	RJ45 connector
CN9	Micro SD connector
CN4	Micro USB connector

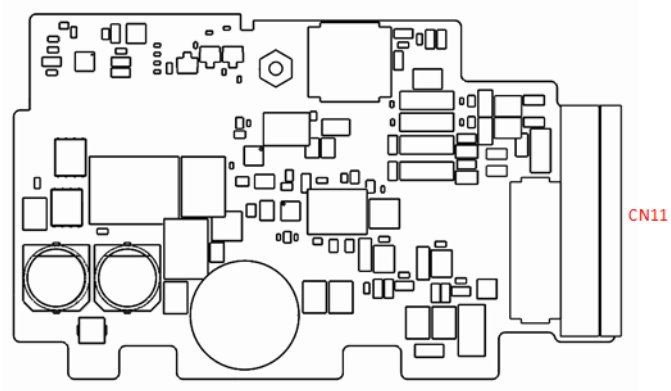
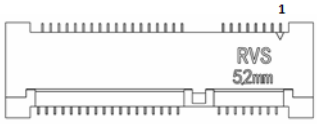


Figure A.3 Connector and Switch Locations on the Daughter Board (Top/Front)

Label	Function
CN11	Digital input/output connector

A.7 Mini PCIE Slot (MINIPCIE)



1654011229-01 mini PCIe 52P 0.8 mm RVS H = 5.2 mm 90D(F) SMD 88915
Supports PCI 1.1 and PCI 1.2 power definition

Pin	Signal	Description	Pin	Signal	Description
52	+3.3 V aux / +3.3 V	PCI 1.1 was +3.3 V, PCI 1.2 was +3.3 V aux	51	Reserved	NC
50	GND		49	Reserved	NC
48	+1.5 V		47	Reserved	NC
46	NC	NC	45	Reserved	NC
44	NC	NC	43	PIN43_MPCIE_ PWRSEL	The pin to select the Pin 2, 52 power output for +3.3 V aux or +3.3 V (PCI 1.1 is reserved and PCI 1.2 is GND)
42	NC	NC	41	+3.3 V aux	
40	GND		39	+3.3 V aux	
38	USB_D+	USB serial data interface compliant with USB 2.0 specifications	37	GND	
36	USB_D-		35	GND	
34	GND		33	PETp0	PCI Express differential transmit pair
32	SMB_DATA	SMBus data signal compliant with SMBus 2.0 specifications	31	PETn0	
30	SMB_CLK		29	GND	
28	+1.5V		27	GND	
26	GND		25	PERp0	PCI Express differential receive pair
24	+3.3Vaux		23	PERn0	
22	PERST#	Functional reset to the card	21	GND	

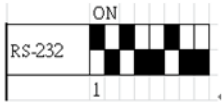
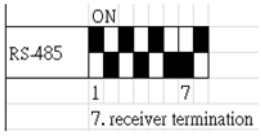
20	W_DISABLE#	Active low signal. This signal is used by the system to disable radio operation on add-in cards that implement radio frequency applications. When implemented, this signal requires a pull-up resistor on the card.	19	Reserved	NC
18	GND		17	Reserved	NC
	Key	Key		Key	Key
16	NC	NC	15	GND	
14	NC	NC	13	REFCLK+	
12	NC	NC	11	REFCLK-	
10	NC	NC	9	GND	
8	NC	NC	7	CLKREQ#	Reference clock request signal
6	1.5 V		5	NC	NC
4	GND		3	NC	NC
2	+3.3 V aux / +3.3 V	PCI 1.1 is +3.3 V and PCI 1.2 is +3.3 V aux	1	WAKE#	Open drain active low signal. This signal is used to request that the system return from a sleep/ suspended state to service a function-initiated wake event.

* +3.3 V aux is suspend power, power out to device = +3.3 V/1.1A

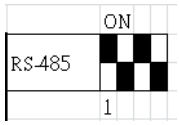
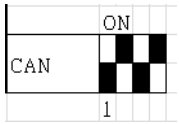
* +3.3 V is core power

* +1.5 V is core power, power out to device = +1.5 V/0.5A

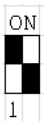
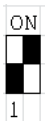
A.8 COM1 RS232/485/Console Mode Setting (SW9)

	COM1 RS232/485/Console Mode Setting	
Description	This switch is used to select COM1 RS232/485/Console mode settings	
Default	RS232 mode	
RS232 Mode	Bit 1,3,6 ON Bit 2,4,5,7,8 OFF	
RS485 Mode	Bit 1,3,5,8 ON Bit 2,4,6,7 OFF Bit 7 receiver termination	
Console Mode	Bit 2,4,6 ON Bit 1,3,5,7,8 OFF	

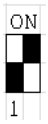
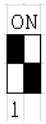
A.9 COM2 RS485/CAN Mode Setting (SW11)

	COM1 RS485/485/CAN Mode Setting	
Description	This switch is used to select COM2 RS485/CAN mode settings	
Default	RS485 mode	
RS485 Mode	Bit 1, 3 ON Bit 2, 4 OFF	
CAN Mode	Bit 2, 4 ON Bit 1, 3 OFF	

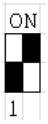
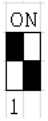
A.10 Termination Resistor Selection (SW12)

	Termination Resistor Selection	
Description	This switch is used to select the termination resistor (120 ohm) for long-distance transmission or device matching	
Default	Bit 1 OFF, Bit 2 OFF	
COM2_DATA0+	Bit 1 ON Bit 2 OFF	
COM3_DATA1+	Bit 2 ON Bit 1 OFF	

A.11 DI Wet/Dry Contact Selection (SW8)

	DI Wet/Dry Contact Selection	
Description	This switch is used to select between wet or dry contact	
Default	Dry contact	
Wet Contact	Bit 2 ON Bit 1 OFF	
Dry Contact	Bit 1 ON Bit 2 OFF	

A.12 Boot Mode Selection (SW2)

	Boot Mode Selection	
Description	This switch is used to select boot mode setting	
Default	eMMC boot	
Boot from SD	Bit 2 ON Bit 1 OFF	
Boot from eMMC	Bit 1 ON Bit 2 OFF	

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