

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**

Copyright

The documentation and the software included with this product are copyrighted 2020 by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements to the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated, or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. The information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of the rights of third parties that may result from its use.

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/>

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 a return merchandise 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.

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 -40 °C (-40 °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 remplacée. Remplacer uniquement par le même type ou équivalent 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，以免引起火災或短路。
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 -40°C (-40°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	1
1.1	Introduction	2
1.2	Specifications	2
1.2.1	General	2
1.2.2	System	2
1.2.3	Communication	2
1.2.4	Software	2
1.2.5	Environment	3
1.3	Safety Precautions	3
1.4	Dimensions	4
1.5	Accessories	4
1.6	Applicable Product Models	5
Chapter 2	Hardware Functionality	7
2.1	Introduction	8
	Figure 2.1 WISE-710-N600A Front Panel	8
	Figure 2.2 WISE-710-N600A Top View	8
	Figure 2.3 WISE-710-N600A Underside View	9
2.2	LED Status Indicators	9
2.3	COM Port Interface (COM1, COM2, COM3)	9
2.4	LAN Connector (LAN1 ~ LAN2)	9
2.5	Power Connector	9
2.6	Digital Input and Output	10
	2.6.1 Digital Input (Default Setting: Dry Contact)	10
	2.6.2 Digital Output	10
2.7	Micro USB Slot	11
2.8	Micro SD Slot	11
Chapter 3	Initial Setup	13
3.1	Power Supply	14
3.2	DIN-Rail Installation	14
3.3	Wall Mount Installation	16
3.4	Wi-Fi Module and Antenna Installation	17
3.5	Expansion Module Installation	24
3.6	Software Installation	26
	3.6.1 How to Use the Debugging Port	26
	3.6.2 System Recovery SOP	28
	3.6.3 Node-RED Installation	29
Appendix A	System Settings/Pin Assignments ..	31
A.1	Power Connector	32
A.2	LAN RJ45 Connector	32
A.3	COM Ports	33
	A.3.1 COM1	33
	A.3.2 COM2 and COM3	34
A.4	Micro USB Connector	34
A.5	Micro SD Connector	35
A.6	Board Connectors and Switches	35
	Figure A.1 Connector and Switch Locations on the Main Board	

	(Top/Rear)	35
Figure A.2	Connector and Switch Locations on the Main Board (Top/Front)	36
Figure A.3	Connector and Switch Locations on the Daughter Board (Top/Front).....	36
A.7	Mini PCIE Slot (MINIPCI-E)	37
A.8	COM1 RS232/485/Console Mode Setting (SW9)	39
A.9	COM2 RS485/CAN Mode Setting (SW11).....	39
A.10	Termination Resistor Selection (SW12).....	40
A.11	DI Wet/Dry Contact Selection (SW8)	40
A.12	Boot Mode Selection (SW2).....	41

Appendix B **WISE-710 I/O Module Manual 43**

B.1	Introduction	44
B.2	Install /Update I/O Module Application	44
B.3	Test the Module	44
B.4	Example Code	47
B.5	libIOModule Support List.....	47
B.6	AI Range Code	47

Chapter 1

Overview

This chapter provides an overview of WISE-710-N600A

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

1.1 Introduction

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 NXP i.MX 6 1GHz Dual-core processor, 1 GB DDR3 RAM, dual GbE LAN, three serial ports, four digital input, four digital output, one Micro USB, and one Micro SD slot.

The WISE-710 series of devices support plug-and-play functionality and allow the user to remotely monitor data from the edge devices to cloud.

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: NXP® ARM® Cortex™-A9 i.MX6 dual-core 1.0 GHz processor
- Memory: 1 GB DDR3L
- LED Indicators: Power, Wireless, LAN, COM1 ~ 3
- Storage: 8 GB eMMC
- 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 Host (Support flash storage)
- Isolated DI/DO: 4-ch digital input, 4-ch digital output, isolation protection voltage 2000 VDC
- SD: 1 x Micro SD slot
- mPCIe: 1 x Full size mPCIe with USB signal

1.2.4 Software

- OS Support
 - ESRP-PCS-WISE710: Yocto 2.1 kernel 4.1.15
 - WISE-710-N600A: 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: -40 ~ 40 °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.*



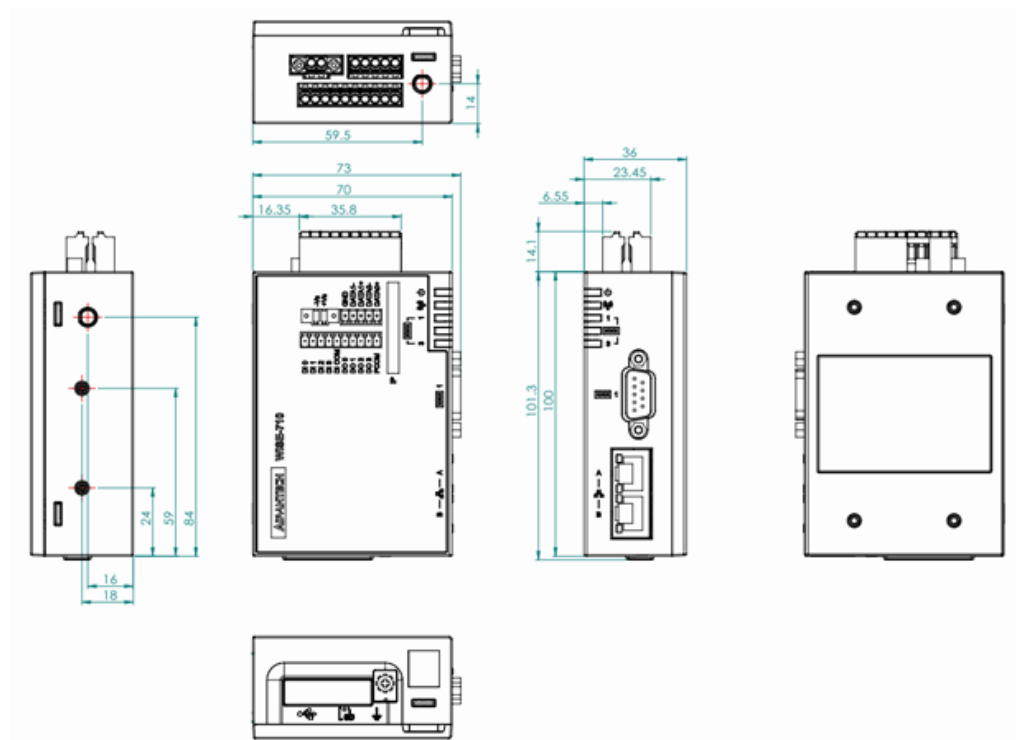
Caution! *Always ground yourself to remove any static electric charge before touching WISE-710-N600A. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded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

- Basic unit:
 - WISE-710-N600A: Ubuntu 16.04 Open Platform
 - ESRP-PCS-WISE710: Yocto 2.1 WISE-PaaS/EdgeLink Edge Ready Solution Package
- Expansion kit:
 - WISE-710-0010A: WISE-710 Series 4AI/4DI Expansion Kit
 - WISE-710-0020A: WISE-710 6DI/2DO/RS485(Modbus RTU) expansion Kit

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.

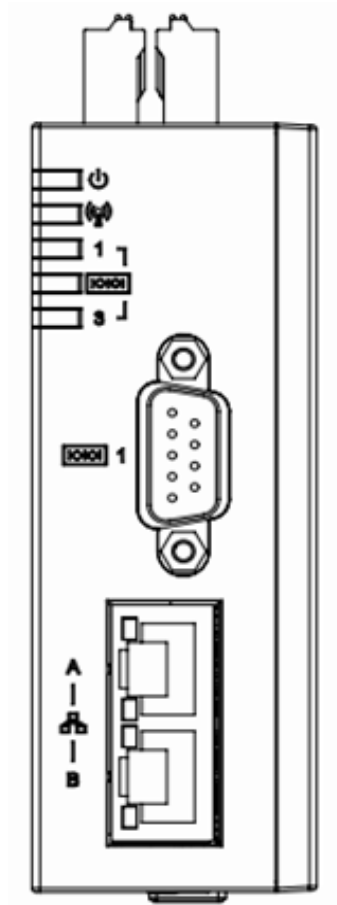


Figure 2.1 WISE-710-N600A Front Panel

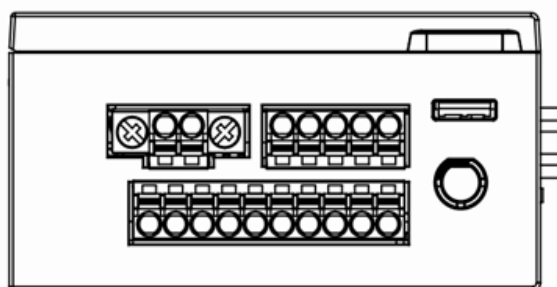


Figure 2.2 WISE-710-N600A Top View

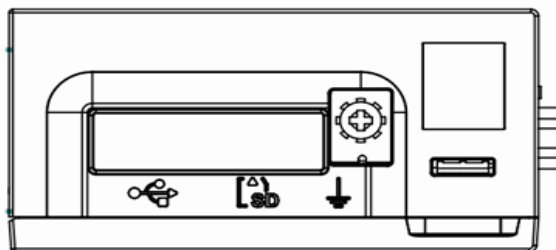


Figure 2.3 WISE-710-N600A Underside View

2.2 LED Status Indicators

LED	Status	Description
PWR	Green	Power is on regardless of whether the device is turned on or off
	Off	Power is off
WLAN	Green	LTE Signals are being transmitted and received (LED blinking behavior depends on wireless module)
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).

Note!  LAN 1 (ETH0) and LAN 2 (ETH1) defined in the operating system refer to LAN B and LAN A connectors on the device, respectively. MAC address can be found with S/N on the back of mother board under the upper plastic cover.

2.5 Power Connector

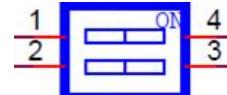
WISE-710-N600A comes with a connector that supports 24 V_{DC} power input and features reversed wiring protection. This means that reversed wiring of the ground and power lines will not cause system damage (Refer to Appendix A.1).

2.6 Digital Input and Output

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

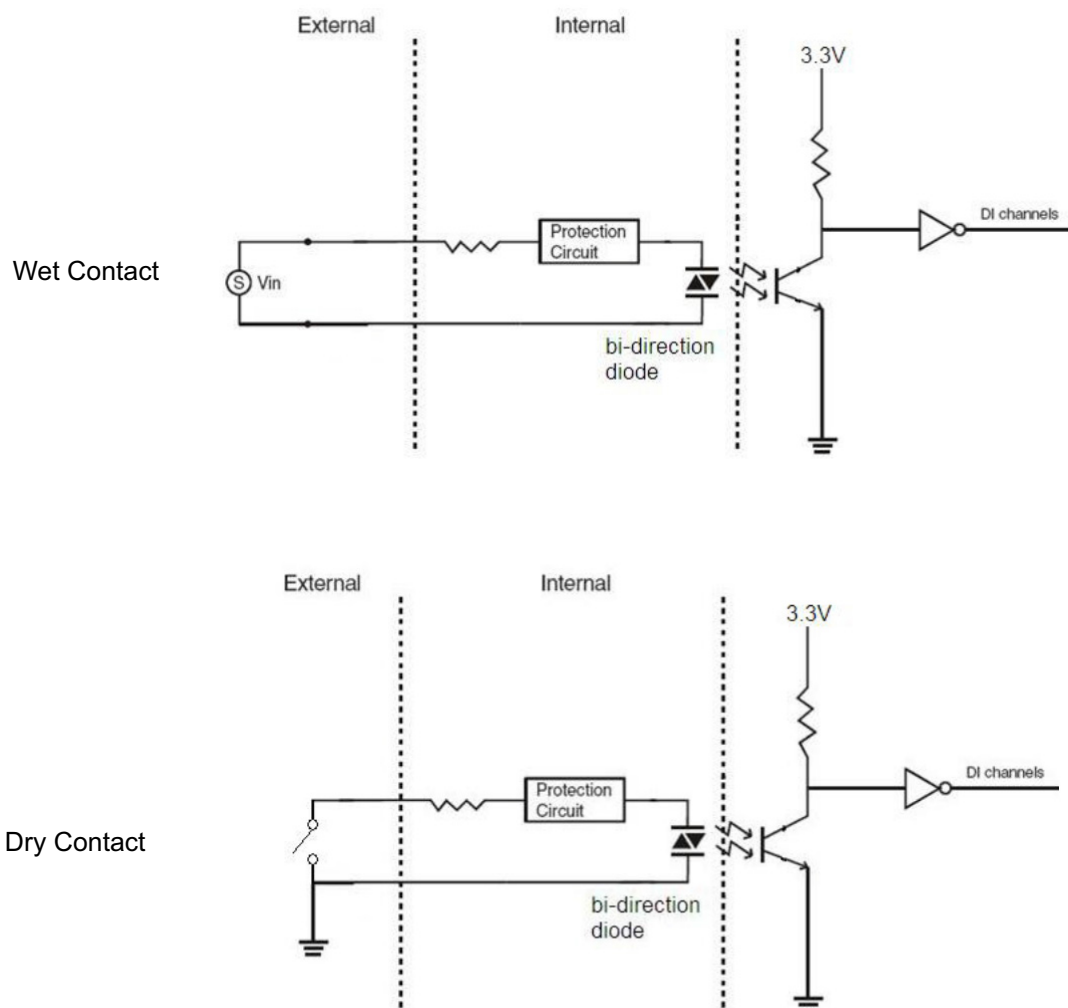
2.6.1 Digital Input (Default Setting: Dry Contact)

- 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: 2,000 V_{DC}
- Overvoltage Protection: 40 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



2.7 Micro USB Slot

WISE-710-N600A is equipped with one micro USB Host slot which supports storage flash

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

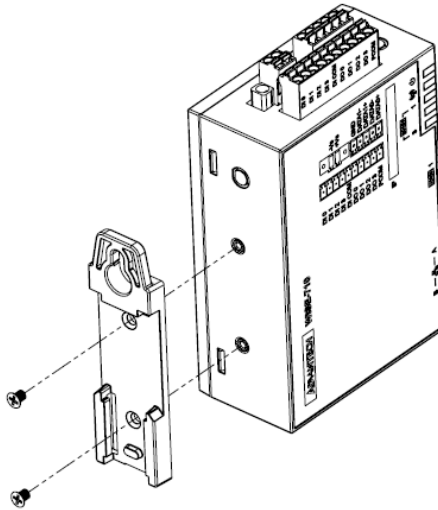
- Power Supply
- Din-Rail Installation
- Wall Mount Installation
- Wi-Fi Module and Antenna Installation
- Expansion Module Installation
- Software Installation

3.1 Power Supply

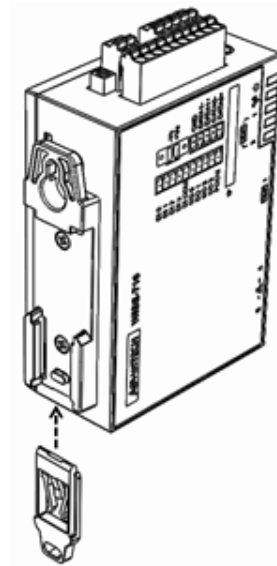
WISE-710-N600A is intended to be supplied by an approved power adapter or DC power source rated $24V_{DC}$, $\pm 20\%$, 0.5A, and TMA 55 °C. If you require more information, please contact Advantech.

3.2 DIN-Rail Installation

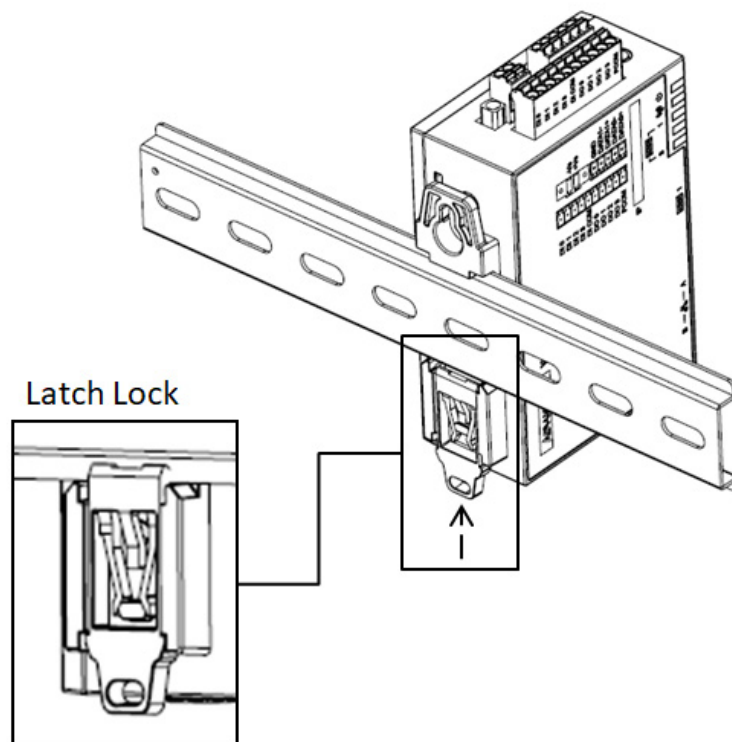
1. Fasten the DIN rail bracket to the device using two screws



2. Install the mount latch

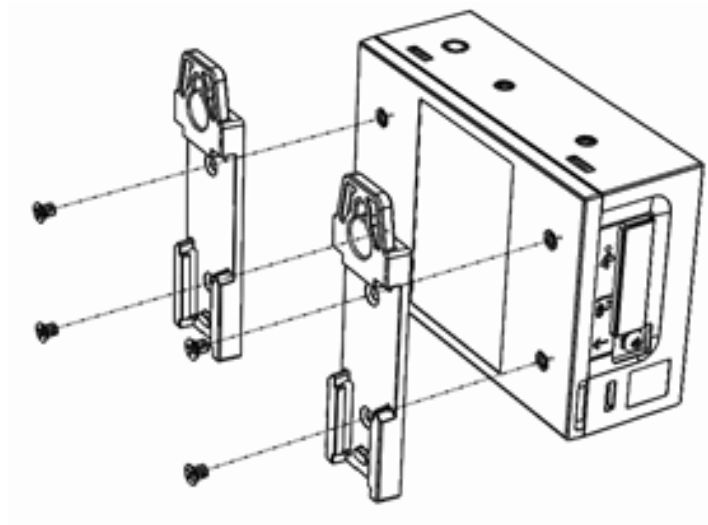


3. Install the DIN rail onto the DIN-rail bracket

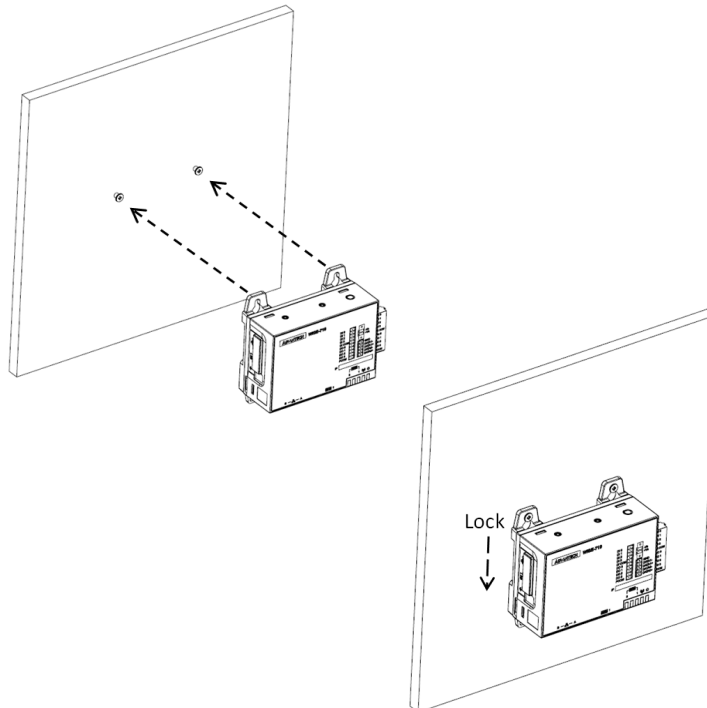


3.3 Wall Mount Installation

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

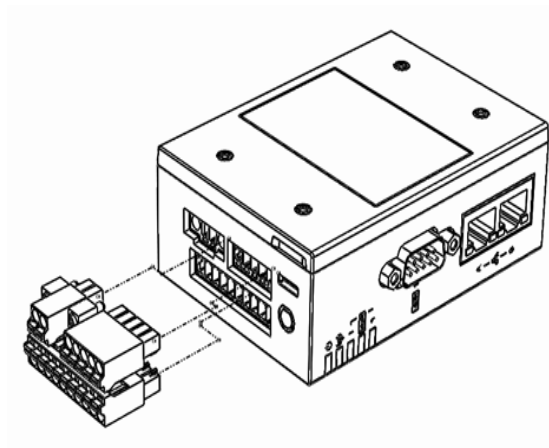


2. Install the wall mount bracket onto the wall

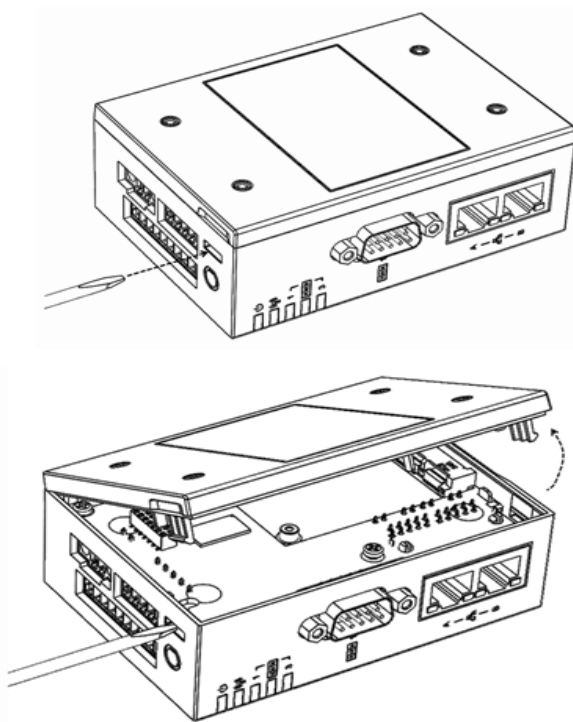


3.4 Wi-Fi Module and Antenna Installation

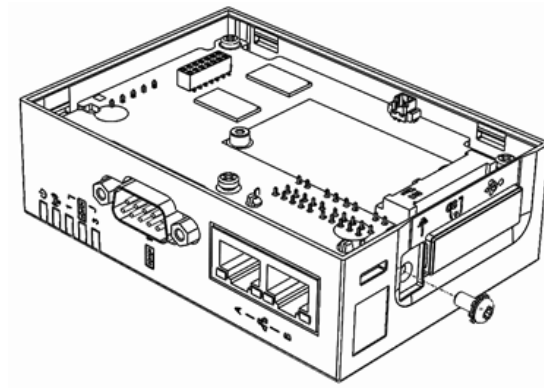
1. Remove the terminal plug



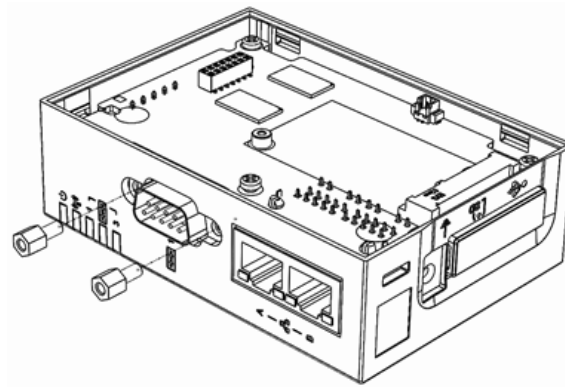
2. Open the rear cover of the device by pushing the clips on both sides using a flat-head screwdriver



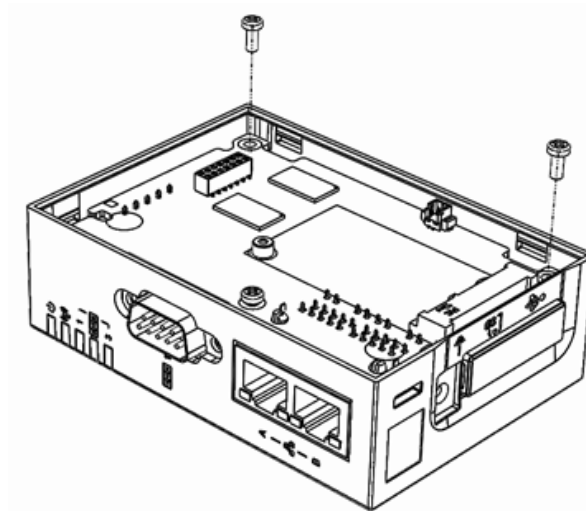
3. Loosen and remove the grounding screw



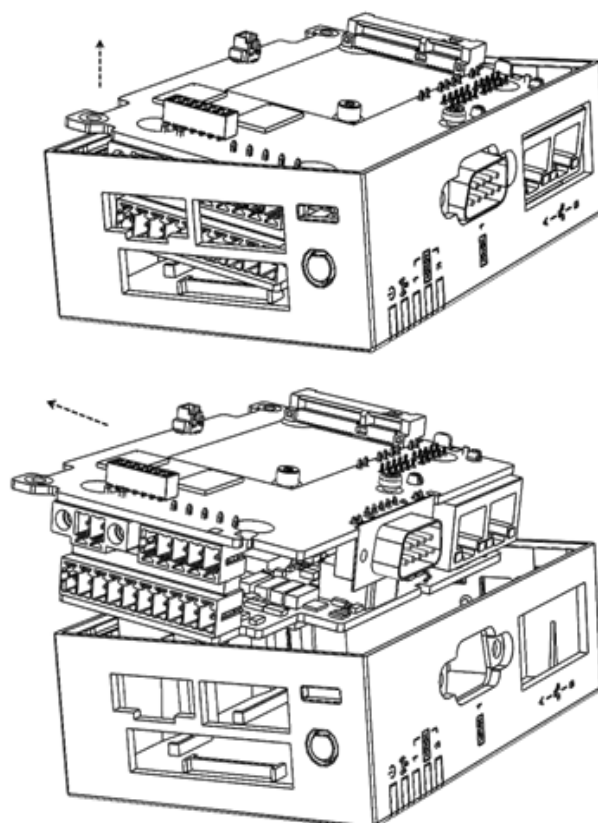
4. Loosen and remove the two COM port nuts



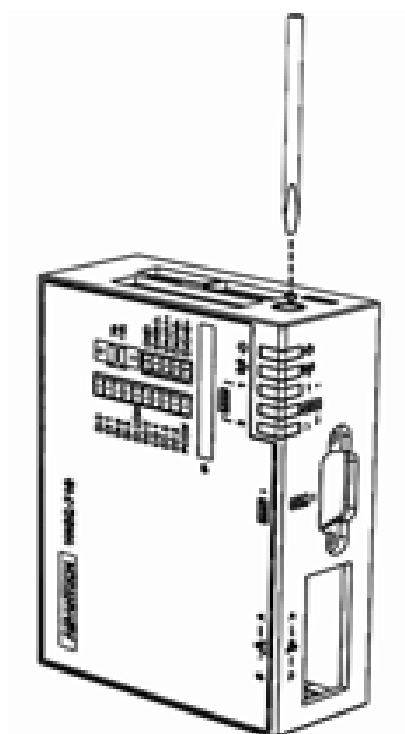
5. Loosen and remove the two screws on the main board



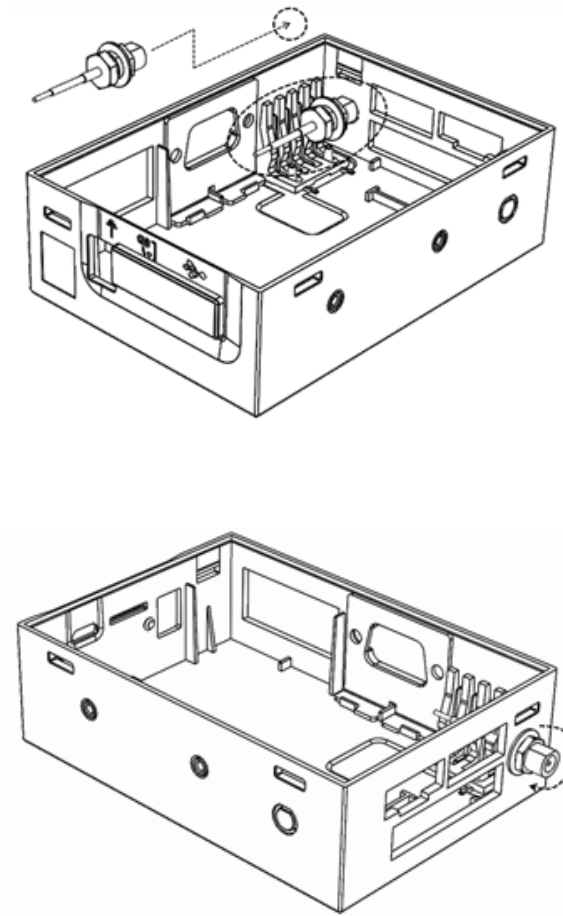
6. To remove the printed circuit board, first lift the board slightly. Then with the board tilted at a slight angle, carefully remove it from the device.



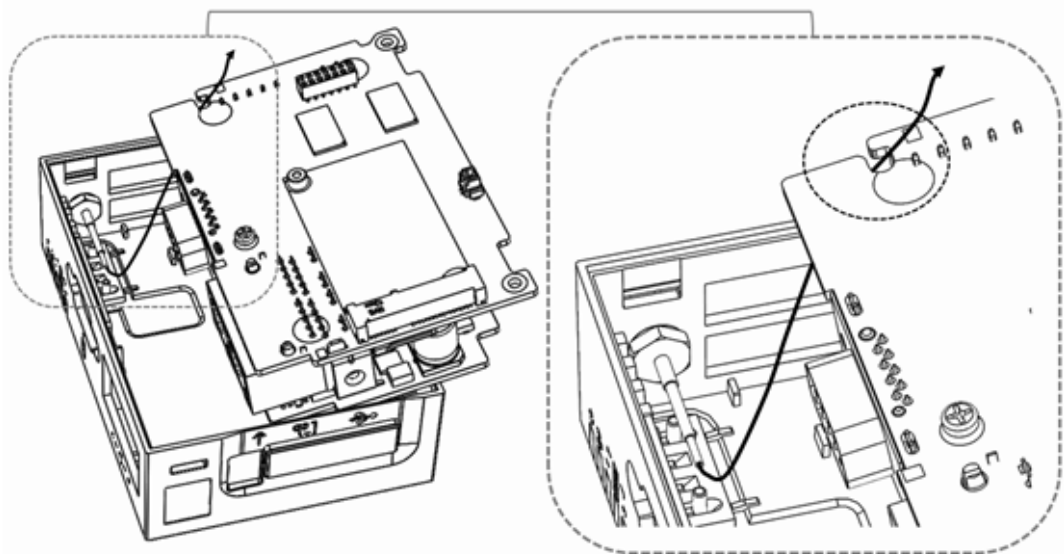
7. Remove the side cover SMA dummy door



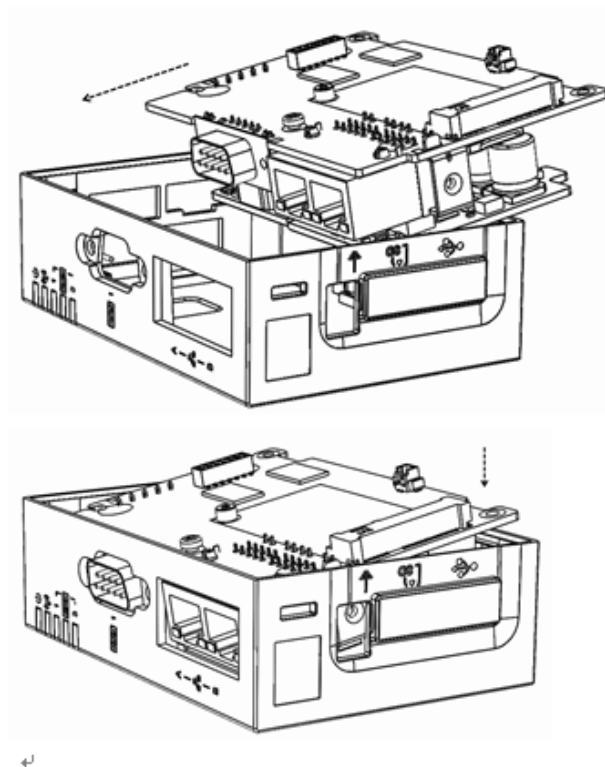
8. Fasten the SMA cable in place using a socket wrench



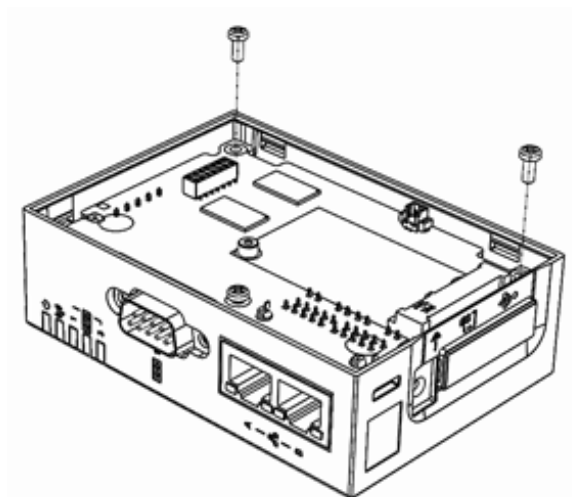
9. The SMA cable should be routed as shown below



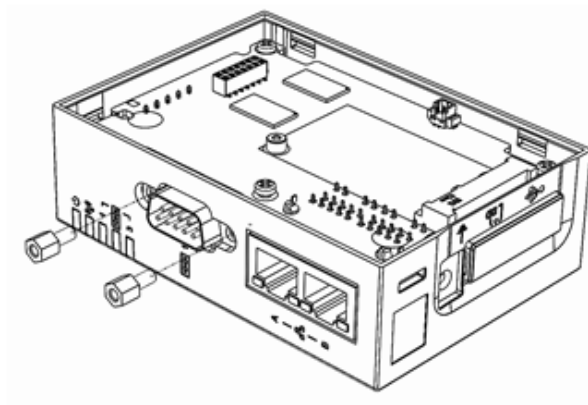
10. Install the printed circuit board



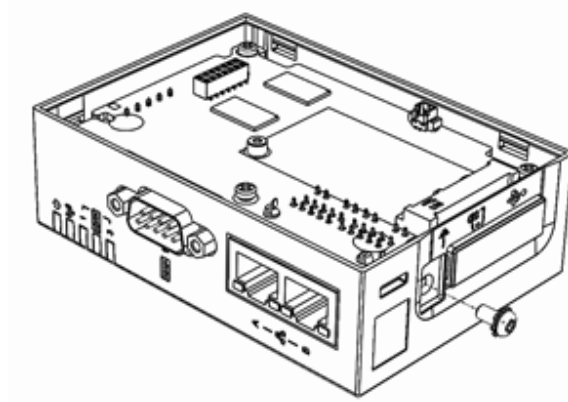
11. Fasten the PCBA in place using two screws



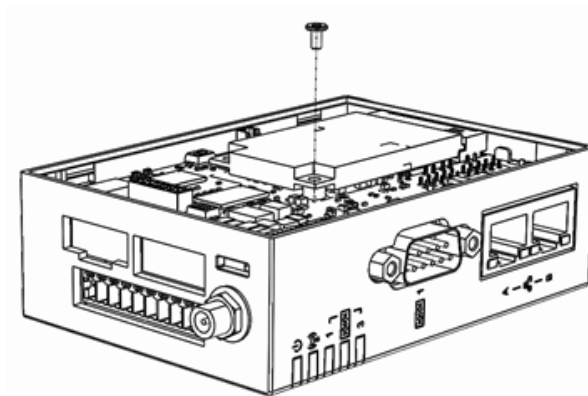
12. Replace and tighten the two COM port nuts



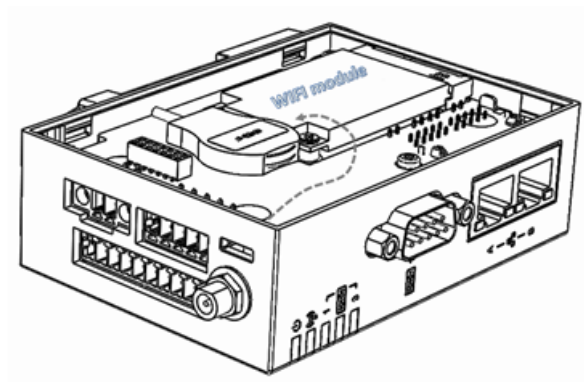
13. Replace and tighten the grounding screw



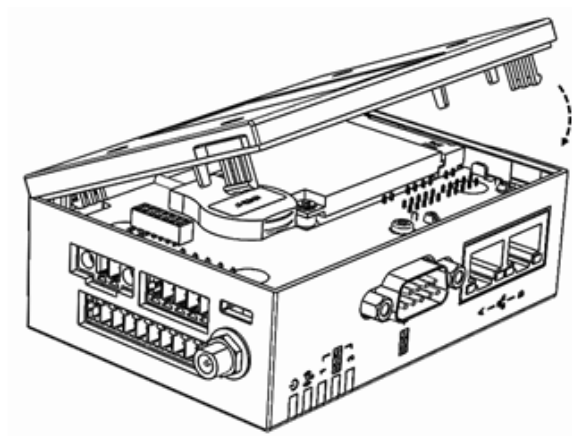
14. Insert the Wi-Fi module and fasten in place using one screw



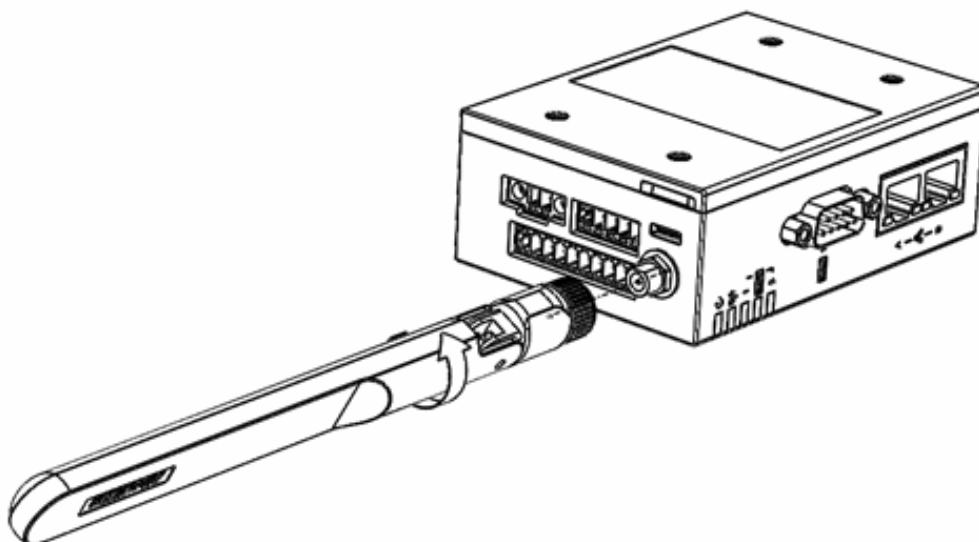
15. Plug the SMA cable into the wireless module



16. Replace the rear cover of the device

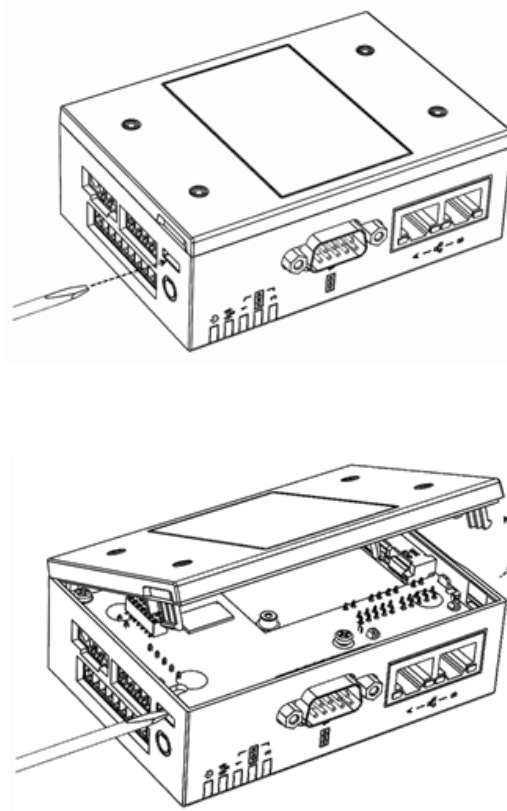


17. Install the antenna

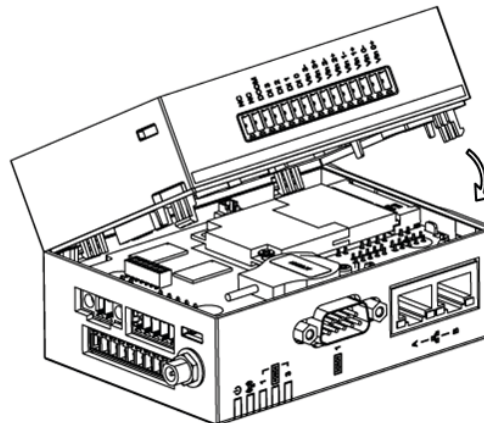


3.5 Expansion Module Installation

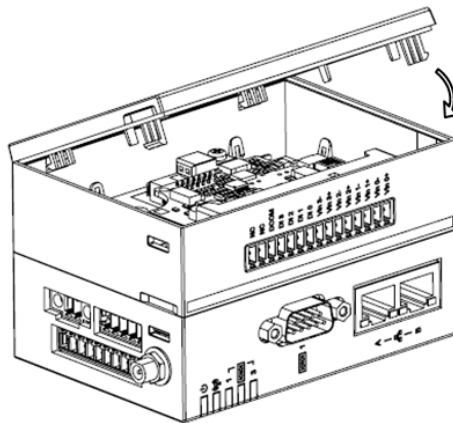
1. Open the rear cover of the device by pushing the clips on both sides using a flat-head screwdriver



2. Attach the expansion module to the main terminal



3. Replace the rear cover

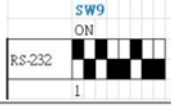
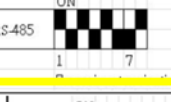
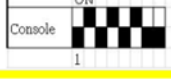


3.6 Software Installation

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	
		1
RS485 Mode	Bit 1,3,5,8 ON Bit 2,4,6,7 OFF Bit 7 receiver termination	
		1 7
Console Mode	Bit 2,4,6 ON Bit 1,3,5,7,8 OFF	
		1

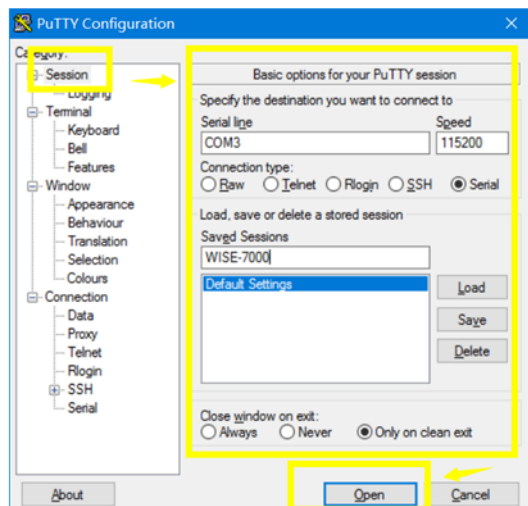
The putty tool can be used to connect to the WISE-710 gateway by following the steps outlined below

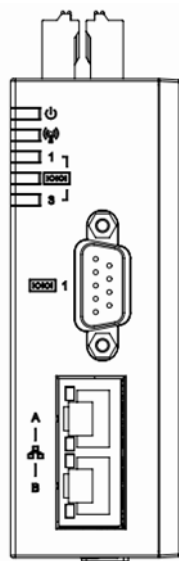
Step 1: Check if the debug COM port is connected

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



Step 2: Configure the putty tool





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

```
COM3 - PuTTY
Freescale i.MX Release Distro 4.1.15-2.0.0 Yocto 2.1 (krogoth) imx6dlwise7000a1
/dev/ttyMXC0

imx6dlwise7000a1 login root
Last login: Wed Sep 26 07:14:25 +0000 2018 on /dev/ttyMXC0.
root@imx6dlwise7000a1:~#
```

Step 4: Use the “ifconfig” command to check the IP address

```
COM3 - PuTTY
root@imx6dlwise7000a1:~# ifconfig
root@imx6dlwise7000a1:~# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0b:ab:39:48:00
          inet addr:172.21.73.96  Bcast:172.21.73.255  Mask:255.255.255.0
          inet6 addr: fe80::20b:abff:fe39:4800/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:47603 errors:0 dropped:0 overruns:0 frame:0
          TX packets:8242 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:3422708 (3.2 MiB)  TX bytes:1311382 (1.2 MiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:3048 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3048 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:323040 (315.4 KiB)  TX bytes:323040 (315.4 KiB)

root@imx6dlwise7000a1:~#
```

3.6.2 System Recovery SOP

The instruction 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. Kindly note that the image Yocto 2.1 emdedded in ESRP-PCS-WISE710 includes Advantech WISE-PaaS/EdgeLink which is not applicable to this instruction due to Advantech license policy.

1. Make boot SD on Linux

Step 1: Copy the "WISE-710-rx-ubuntu.yyyymmdd.tar.gz" package to your Linux desktop and Open "Terminal" on Ubuntu 16.04 LTS.

```
user@ubuntu:/home/user# sudo su
```

Step 2: Input your password

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

Step 3: Insert one SD card into the computer and 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
```

Step 4: Wait until dump disk is completed

2. Restoring eMMC from Boot SD

After the WISE-710 is powered on, presence of an SD card will automatically be detected. If there is an SD card, it will be preferred to boot from the SD card, otherwise it will boot from eMMC. Insert SD card to start WISE-710 and enter the system.

Step 1: Login in by super user and boot the WISE-710 device from the SD card.

User name: root

Password: 123456

```
Freescale i.MX Release Distro 4.1.15-2.0.0 imx6dlwise710a1 /dev/ttyxc0  
imx6dlwise710a1 login: root  
root@imx6dlwise710a1:~# cd /mk_inand/scripts  
root@imx6qitb200a1:~# ./mkinand-linux.sh /dev/mmcb1k0 ubuntu16044
```

Note! Note: By default, eMMC is under /dev/mmcb1k0 and SD card is under /dev/mmcb1k1.



Step 2: Power off the device, remove the SD card, and reboot WISE-710

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

After power is off, remove the SD card and reconnect the power supply. WISE-710 will boot by eMMC.

3.6.3 Node-RED Installation

Node-RED is programming tool which provides a browser-based editor that makes the user easy to create hardware, APIs and online services co-work applications.

Step 1: Untar "node-v12.13.0-linux-armv7l.tar.xz"

```
#tar Jxvf node-v12.13.0-linux-armv7l.tar.xz
```

Step 2: Copy "node-v12.13.0-linux-armv7l" folder into target device's rootfs

Step 3: Run on target device - Copy "node-v12.13.0-linux-armv7l/bin/node" into "/" bin/"

```
/# cp /node-v12.13.0-linux-armv7l/bin/node /bin/
```

Step 4: Connect to Internet to download and install Node-RED by npm

```
/# cd /node-v12.13.0-linux-armv7l/bin/
/node-v12.13.0-linux-armv7l/bin# sudo ./npm install -g node-red
```

Step 5: Launch node-red

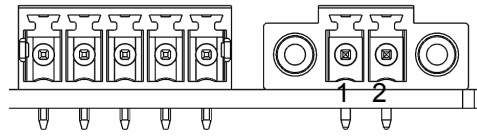
```
/# node-red
```

Step 6: Launch browser and use <http://127.0.0.1:1880> for node-red service

Appendix **A**

System Settings/Pin Assignments

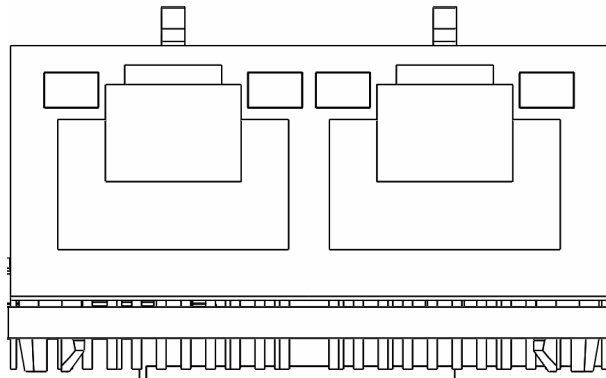
A.1 Power Connector



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

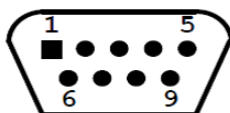
RJ45 Pin	Signal	Description
1	MDI0+	In BASE-T: Media-dependent interface [0] 1000BASE-T: In MDI configuration, MDI[0]+/- corresponds to BI_DA+/- and in MDI-X configuration, MDI[0]+/- corresponds to BI_DB+/-.
2	MDI0-	10BASE-T and 100BASE-TX: In MDI configuration, MDI[0]+/- is used for the transmit pair and in MDIX configuration, MDI[0]+/- is used for the receive pair.
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+/-.
6	MDI1-	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.

4	MDI2+	In BASE-T:
5	MDI2-	Media-dependent interface [3:2]:
7	MDI3+	1000BASE-T:
8	MDI3-	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

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

A.3 COM Ports

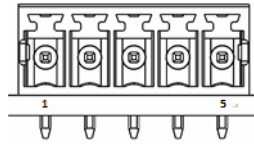
A.3.1 COM1



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		

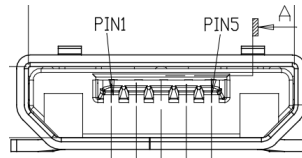
A.3.2 COM2 and COM3



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

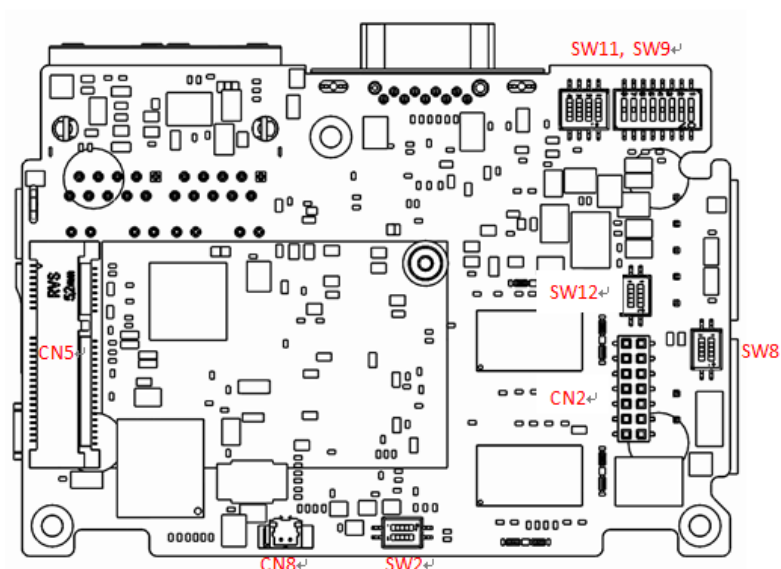


Figure A.1 Connector and Switch Locations on the Main Board (Top/Rear)

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

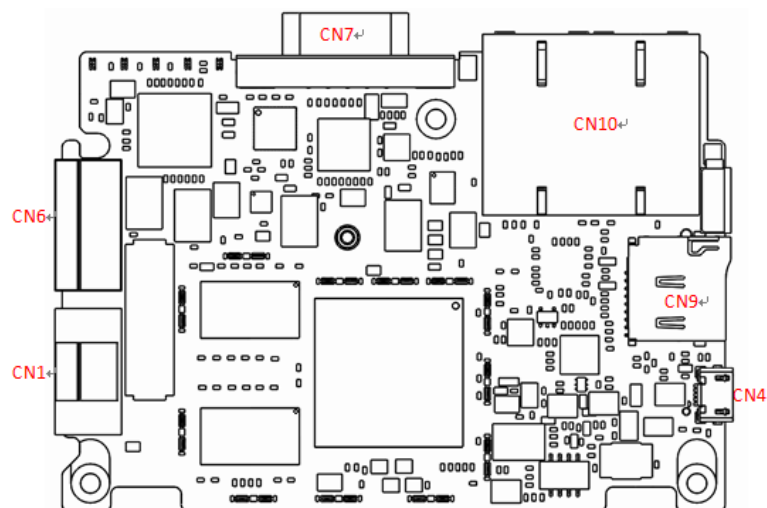


Figure A.2 Connector and Switch Locations on the Main Board (Top/Front)

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

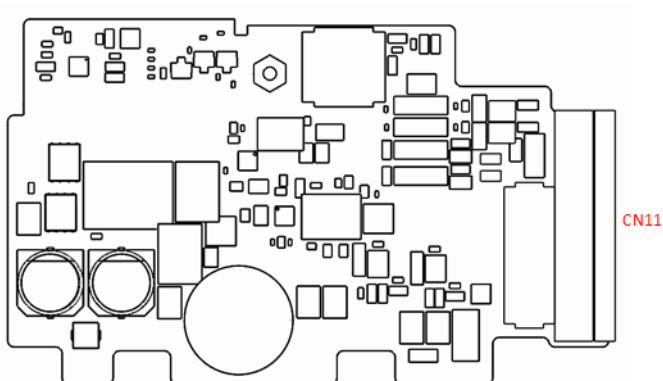
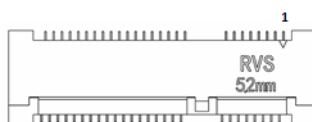


Figure A.3 Connector and Switch Locations on the Daughter Board (Top/Front)

Label	Function
CN11	Digital input/output connector

A.7 Mini PCIE Slot (MINIPCI-E)



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	

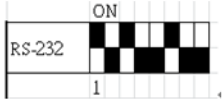
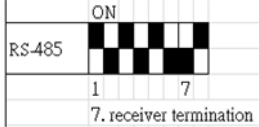
20	W_DISABLE#	Active low signal. This signal is used by the system to disable radio operation on add-in cards that implement radio frequency applications. When implemented, this signal requires a pull-up resistor on the card.	19	Reserved	NC
18	GND		17	Reserved	NC
	Key	Key		Key	Key
16	NC	NC	15	GND	
14	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

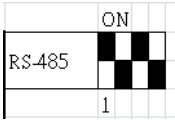
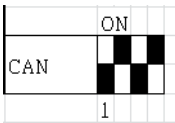
* +3.3 V is core power

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

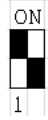
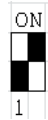
A.8 COM1 RS232/485/Console Mode Setting (SW9)

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	

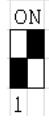
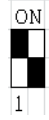
A.9 COM2 RS485/CAN Mode Setting (SW11)

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 in the earlier version of WISE-710. Now it is used by only the developer for product development. The latest version of WISE-710 will automatically switch boot mode if there is SD card in WISE-710. Please do not change the switch to avoid the possible failure.
Default	eMMC boot
Boot from SD	Bit 2 ON Bit 1 OFF 
Boot from eMMC	Bit 1 ON Bit 2 OFF 

Appendix **B**

WISE-710 I/O Module Manual

B.1 Introduction

WISE-710-N600A supports several I/O modules. The document presents an overview to demonstrate how to use I/O module WISE-710-0010A and WISE-710-0020A.

- WISE-710-0010A: WISE-710 4AI/4DI Expansion kit
- WISE-710-0020A: WISE-710 6DI/2DO/RS485(Modbus RTU) Expansion kit

B.2 Install /Update I/O Module Application

The utility **testdl_iomodule** provide the capability of WISE-710-0010A and WISE-710-0020A setup and testing.

Firstly, check if the files and directories below exist:

```
$ /usr/Advantech/AIExpansion_test/daemon/AdvAiDiExpd  
$ /usr/Advantech/AIExpansion_test/testdl_iomodule  
$ /usr/Advantech/AIExpansion_test/README  
$ /usr/Advantech/AIExpansion_test/src  
$ /usr/lib/libIOModule.so.x.x.x
```

If the files and directories do not exist, please visit WISE-710 Advantech product page to download the latest update. Copy and extract the package to WISE-710, then install by below command.

```
$ cd [IOModule_package_name]  
$ ./install.sh
```

B.3 Test the Module

1. Run the daemon program to connect the I/O module

```
$ /usr/Advantech/AIExpansion_test/daemon/AdvAiDiExpd &
```

2. Run the test utility

```
$ /usr/Advantech/AIExpansion_test/testdl_iomodule [Option] [Parameter1]...
```

[Example] Show help message

```

$ /usr/Advantech/AIExpansion_test/testdl_iomodule
Usage: /usr/Advantech/AIExpansion_test/testdl_iomodule [Choose] [Other arg...]
- ExtDIGetLevel: /usr/Advantech/AIExpansion_test/testdl_iomodule [Choose](1) [Id]
- ExtDOSetLevel: /usr/Advantech/AIExpansion_test/testdl_iomodule [Choose](2) [Id]
[Direction](0:input, 1:output)
- ExtDOGetLevel: /usr/Advantech/AIExpansion_test/testdl_iomodule [Choose](3)
[Id]
- ExtAISetValRange: /usr/Advantech/AIExpansion_test/testdl_iomodule [Choose](4)
[Id]
[Range code]
- ExtAIGetValRange: /usr/Advantech/AIExpansion_test/testdl_iomodule [Choose](5)
[Id]
- ExtAIGetValue: /usr/Advantech/AIExpansion_test/testdl_iomodule [Choose](6) [Id]
- ExtRSSSetAndWrite: /usr/Advantech/AIExpansion_test/testdl_iomodule [Choose](7)
[Id] [baud] [parity] [data_bit] [stop_bit] [timeout_s] [timeout_us] [delay] [star_ch]
[end_ch]

```

[Example] Set DO 0 to level 1

```

$ /usr/Advantech/AIExpansion_test/testdl_iomodule 4 0 1
ExtAISetValRange Id: 0
Range: 1

```

[Example] Get DO 0 level

```

$ /usr/Advantech/AIExpansion_test/testdl_iomodule 5 0
ExtAIGetValRange Id: 0
Range: 1

```

Note! The I/O node in the utility from 0 to 7 are mapping to physical I/O node 1 to 8 on WISE-710



[Example] Set Modbus connection and read register

```
$ /usr/Advantech/AIExpansion_test/testdl_iomodule 7 0 9600 0 8 1 0 100 10 0 29
com_index: 0
baud: 9600
parity: 0
data_bit: 8
stop_bit: 1
to_sec: 0
to_usec: 100
us: 10
Press any key to read register, press r to keep readingcom_index: 0
Read_number: 0, Reg_Val:0
Read_number: 1, Reg_Val:0
Read_number: 2, Reg_Val:0
Read_number: 3, Reg_Val:0
Read_number: 4, Reg_Val:0
Read_number: 5, Reg_Val:0
Read_number: 6, Reg_Val:0
Read_number: 7, Reg_Val:0
Read_number: 8, Reg_Val:0
Read_number: 9, Reg_Val:0
Read_number: 10, Reg_Val:0
Read_number: 11, Reg_Val:0
Read_number: 12, Reg_Val:0
Read_number: 13, Reg_Val:0
Read_number: 14, Reg_Val:0
Read_number: 15, Reg_Val:0
Read_number: 16, Reg_Val:0
Read_number: 17, Reg_Val:0
Read_number: 18, Reg_Val:0
Read_number: 19, Reg_Val:0
Read_number: 20, Reg_Val:0
Read_number: 21, Reg_Val:0
Read_number: 22, Reg_Val:0
Read_number: 23, Reg_Val:0
Read_number: 24, Reg_Val:0
Read_number: 25, Reg_Val:0
Read_number: 26, Reg_Val:0
Read_number: 27, Reg_Val:0
Read_number: 28, Reg_Val:0
Read_number: 29, Reg_Val:0
```

B.4 Example Code

For more specific application, refer to the API library, `libIOModule.so.x.x.x`, to create your own application. The source code and related header file of `testdl_iomodule` is located on `/usr/Advantech/AIExpansion_test/src` directory for reference.

B.5 libIOModule Support List

Function	Option	Support Module
ExtGetModuleName	1	WISE-710-0010A, WISE-710-0020A
ExtGetFWVersion	2	WISE-710-0010A, WISE-710-0020A
ExtDIGetLevel	3	WISE-710-0010A, WISE-710-0020A
ExtDOSetLevel	4	WISE-710-0020A
ExtDOGetLevel	5	WISE-710-0020A
ExtAISetValRange	6	WISE-710-0010A
ExtAIGetValRange	7	WISE-710-0010A
ExtAIGetValue	8	WISE-710-0010A
ExtRSSetAndWrite	9	WISE-710-0020A

B.6 AI Range Code

Range code	Range
328	0~10V
327	0 ~ 5 V
325	0 ~ 1 V
262	0 ~ 500 mV
261	0 ~ 150 mV
323	+/- 10 V
322	+/- 5 V
320	+/- 1 V
259	+/- 150 mV
260	+/- 500 mV
384	4 ~ 20 mA
385	+/- 20 mA
386	0 ~ 20 mA

www.advantech.com

Please verify specifications before quoting. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.

No part of this publication may be reproduced in any form or by any means, such as electronically, by photocopying, recording, or otherwise, without prior written permission from the publisher.

All brand and product names are trademarks or registered trademarks of their respective companies.

© Advantech Co., Ltd. 2020