NEXCOM

NEXCOM International Co., Ltd.

Mobile Computing Solutions
Fanless Railway Computer
nROK 5X00 Series
User Manual

www.nexcom.com

Contents

Chapter 3: System Setup

Preface

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Acknowledgements

nROK 5X00 series is a trademark of NEXCOM International Co., Ltd. All other product names mentioned herein are registered trademarks of their respective owners.

Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

Declaration of Conformity

FCC

This equipment has been tested and verified to comply with the limits for a Class A digital device, pursuant to Part 15 of 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 instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

RoHS Compliance

NEXCOM RoHS Environmental Policy and Status Update

NEXCOM is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2011/65/EU, to be your trusted green partner and to protect our environment.

RoHS restricts the use of Lead (Pb) < 0.1% or 1,000ppm, Mercury (Hg) < 0.1% or 1,000ppm, Cadmium (Cd) < 0.01% or 100ppm, Hexavalent Chromium (Cr6+) < 0.1% or 1,000ppm, Polybrominated biphenyls (PBB) < 0.1% or 1,000ppm, and Polybrominated diphenyl Ethers (PBDE) < 0.1% or 1,000ppm.

In order to meet the RoHS compliant directives, NEXCOM has established an engineering and manufacturing task force in to implement the introduction of green products. The task force will ensure that we follow the standard NEXCOM development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which NEXCOM are renowned.

The model selection criteria will be based on market demand. Vendors and suppliers will ensure that all designed components will be RoHS compliant.

How to recognize NEXCOM RoHS Products?

For existing products where there are non-RoHS and RoHS versions, the suffix "(LF)" will be added to the compliant product name.

All new product models launched after January 2013 will be RoHS compliant. They will use the usual NEXCOM naming convention.

Warranty and RMA

NEXCOM Warranty Period

NEXCOM manufactures products that are new or equivalent to new in accordance with industry standard. NEXCOM warrants that products will be free from defect in material and workmanship for 2 years, beginning on the date of invoice by NEXCOM. HCP series products (Blade Server) which are manufactured by NEXCOM are covered by a three year warranty period.

NEXCOM Return Merchandise Authorization (RMA)

✠ Customers shall enclose the "NEXCOM RMA Service Form" with the returned packages.

✠ Customers must collect all the information about the problems encountered and note anything abnormal or, print out any on-screen messages, and describe the problems on the "NEXCOM RMA Service Form" for the RMA number apply process.

✠ Customers can send back the faulty products with or without accessories (manuals, cable, etc.) and any components from the card, such as CPU and RAM. If the components were suspected as part of the problems, please note clearly which components are included. Otherwise, NEXCOM is not responsible for the devices/parts.

✠ Customers are responsible for the safe packaging of defective products, making sure it is durable enough to be resistant against further damage and deterioration during transportation. In case of damages occurred during transportation, the repair is treated as "Out of Warranty."

✠ Any products returned by NEXCOM to other locations besides the customers' site will bear an extra charge and will be billed to the customer.

Repair Service Charges for Out-of-Warranty Products

NEXCOM will charge for out-of-warranty products in two categories, one is basic diagnostic fee and another is component (product) fee.

System Level

✠ Component fee: NEXCOM will only charge for main components such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistor, capacitor.

✠ Items will be replaced with NEXCOM products if the original one cannot be repaired. Ex: motherboard, power supply, etc.

✠ Replace with 3rd party products if needed.

✠ If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

Board Level

✠ Component fee: NEXCOM will only charge for main components, such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistors, capacitors.

If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

Warnings

Read and adhere to all warnings, cautions, and notices in this guide and the documentation supplied with the chassis, power supply, and accessory modules. If the instructions for the chassis and power supply are inconsistent with these instructions or the instructions for accessory modules, contact the supplier to find out how you can ensure that your computer meets safety and regulatory requirements.

Cautions

Electrostatic discharge (ESD) can damage system components. Do the described procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

Safety Information

Before installing and using the device, note the following precautions:

✠ Read all instructions carefully.
✠ Do not place the unit on an unstable surface, cart, or stand.
✠ Follow all warnings and cautions in this manual.

▪ When replacing parts, ensure that your service technician uses parts specified by the manufacturer.

▪ Avoid using the system near water, in direct sunlight, or near a heating device.

▪ The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.

The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Installation Recommendations

Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

• A Philips screwdriver
• A flat-tipped screwdriver
• A grounding strap
• An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needlenose pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

Safety Precautions

1. Read these safety instructions carefully.

2. Keep this User Manual for later reference.

3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.

4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.

5. Keep this equipment away from humidity.

6. Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.

7. Do not leave this equipment in either an unconditioned environment or in a above 40°C storage temperature as this may damage the equipment.

8. The openings on the enclosure are for air convection to protect the equipment from overheating. DO NOT COVER THE OPENINGS.

9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.

10. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.

11. All cautions and warnings on the equipment should be noted.

12. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.

13. Never pour any liquid into an opening. This may cause fire or electrical shock.

14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.

15. If one of the following situations arises, get the equipment checked by service personnel:

    a. The power cord or plug is damaged.

    b. Liquid has penetrated into the equipment.

    c. The equipment has been exposed to moisture.

    d. The equipment does not work well, or you cannot get it to work according to the user's manual.

    e. The equipment has been dropped and damaged.

    f. The equipment has obvious signs of breakage.

16. Do not place heavy objects on the equipment.

17. The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.

18. **CAUTION**: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

19. The computer is provided with CD drives that comply with the appropriate safety standards including IEC 60825.

Technical Support and Assistance

1. For the most updated information of NEXCOM products, visit NEXCOM's website at www.nexcom.com.

2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:

   – Product name and serial number
   – Detailed information of the peripheral devices
   – Detailed information of the installed software (operating system, version, application software, etc.)
   – A complete description of the problem
   – The exact wordings of the error messages

Warning!
1. Handling the unit: carry the unit with both hands and handle it with care.
2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.
3. CompactFlash: Turn off the unit's power before inserting or removing a CompactFlash storage card.

Conventions Used in this Manual

Warning: Information about certain situations, which if not observed, can cause personal injury. This will prevent injury to yourself when performing a task.

Caution: Information to avoid damaging components or losing data.

Note: Provides additional information to complete a task easily.

Battery - Safety Measures

Caution

- Risk of explosion if battery is replaced by an incorrect type.
- Dispose of used batteries according to the instructions.

Safety Warning

This equipment is intended for installation in a Restricted Access Location only.

Resetting the Date and Time

Note: Remember to reset the date and time upon receiving the product. You can set them in the AMI BIOS. Refer to chapter 4 for more information.

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Package Contents

Before continuing, verify that the package that you received is complete. Your package should have all the items listed in the following table.

Item	P/N	Name	Specification	Qty
1	50311F0110X00	Flathead Screw Long	F3x5 NI NYLOK	16
2	602DCD0733X00	nROK 5500/5300 Series DVD Driver VER:1.0	JCL	1

Ordering Information

The following provides ordering information.

- nROK 5500-FC8 (P/N:10A00550000X0)
  - Intel® Core™ i7 3517UE fanless rackmount railway computer with 8-channel PoE and 110VDC isolation power input
- nROK 5300-AC8 (P/N:10A00530000X0)
  - Intel® Core™ i5 3610ME fanless rackmount railway computer with 8-channel PoE and 24VDC isolation power input

The following combinations are also available, please contact NEXCOM Global Service for further information

- nROK 5500-AC8 (P/N:TBD)
  - Intel® Core™ i7 3517UE fanless rackmount railway computer with 8-channel PoE and 24VDC isolation power input
- nROK 5500-AC (P/N:TBD)
  - Intel® Core™ i7 3517UE fanless rackmount railway computer and 24VDC isolation power input
- nROK 5500-FC (P/N:TBD)
  - Intel® Core™ i7 3517UE fanless rackmount railway computer and 110VDC isolation power input
- nROK 5300-FC8 (P/N:TBD)
  - Intel® Core™ i5 3610ME fanless rackmount railway computer with 8-channel PoE and 110VDC isolation power input
- nROK 5300-FC (P/N:TBD)
  - Intel® Core™ i5 3610ME fanless rackmount railway computer and 110VDC isolation power input
- nROK 5300-AC (P/N:TBD)
  - Intel® Core™ i5 3610ME fanless rackmount railway computer and 24VDC isolation power input

- Optional Accessories

Part Number	Description
10VK0WLAN02X0	WLAN Kit QCOM ZQ802XRACB, w/ BT Combo, w/ Antenna & RF Cable
10VK0WLAN05X0	WLAN Kit BOINTEC: DPE909AA, w/BT Combo, w/ Antenna & RF Cable
10VK0WLAN06X0	WLAN Kit BOINTEC: CPE902A Industrial Grade, w/ Antenna & RF Cable
10VK0WWAN01X0	WWAN Kit CINTERION: CM8000 (PHS8-P), w/ Antenna & RF Cable
10VK0WWAN11X0	WWAN Kit HUAWEI MU709, w/ Antenna & RF Cable
10VK0WWAN09X0	WWAN Kit uBlox LISA-U200, w/ Antenna & RF Cable
10VK00LTE02X0	WWAN Kit Sierra MC7304 LTE, w/ Antenna & RF Cable
10VK00GPS01X0	GPS Kit uBlox-M8N solution, w/ Bracket, w/ Antenna & RF Cable
10VK00GPS03X0	GPS Kit uBlox-M8L solution, supports DR, 5V Antenna, w/ Coin Battery, w/ Bracket, w/ Antenna
10A005X0003X0	PCIe Expansion Kit One PCI x 8 expansion
10A005X0004X0	Cable Kit 1x M12 to LAN(4P) cable, 1x M12 to LAN(8P) cable, 1x M12 to USB cable, 1x Power cable

Chapter 1: Product Introduction

Overview

Key Features

- High performance processor with Intel® Core™ i7 3517UE/ i5 3610ME
- Fanless and rugged design
- Support ignition signal for delay-time control
- Support software base RAID 0/ 1/ 5/ 10
- Isolation RS-232 / 422/ 485 / GPIO

- Four Removable 2.5" SSD tray
- DC power input with isolated protection
- Support 8 channels POE with IEEE802.3af for optional
- Support one PCI express by 8 expansion slot for optional
- Certified by EN50155 with TX grade temperature standard (SSD only)

nROK 5X00 series is targeted for the rolling stock market with special design scheme to meet the criteria of installation in the vehicle on the rolling stock.

They pass numerous environmental tests and are compliant EN50155 standard. Rapid transit system, metropolitan rail, commuter rail, high speed rail, tram, and train will make the best use of nROK.

nROK 5X00 series also offer the powerful computing platform with rack mount form factor to install in the cabinet. It is packed with the eight PoE LAN ports and multiple storage bays with SATA interface and RAID capability for large media program. I/O connections are securely fixed with locks, averting system breakdown caused by loose ends. Wireless communication design is reserved to supports GPS function and WiFi and WWAN connection.

Hardware Specifications

CPU

- Intel® Core™ i7 3517UE 1.7GHz
- Intel® Core™ i5 3610ME 2.7GHz

Main Chipset

- Intel® QM77 chipsets

Memory

- 2GB DDR3 1333MHz SODIMM with ECC (up to 16GB)

Expansion

- 2x Mini-PCIe socket (PCIe + USB) for WLAN option
- 1x Mini-PCIe socket (USB) for 3.5G module option
- 1x GPS or GPS with dead reckoning option

I/O Interfaces - Front

- 7x LED for power, storage, WWAN, WLAN, GPS, LAN1 and LAN2
- Power on/ off switch
- 2x 10/ 100/ 1000 Ethernet with M12 connector and support iAMT8.0
- 8x 10/100/1000 PoE LAN (PoE optional) with M12 connector and support IEEE802.3af
- 2x USB 3.0 type A connector
- 1x USB 2.0 with M12 connector
- 1x DB15 VGA connector
- 2x HDMI connector
- 2x DB9 RS-232 connector
- 1x DB9 RS-422/ 485 connector

- 1x DB9 female connector for GPI / GPO connector
  Digital Input (source type: 0~30V)
  Digital Output (sink type: 20mA max)
- 1x Line-in, 1x Line-out, 1x Mic-in

I/O Interfaces - Rear

- Power DC input
- 5x Antenna holes for WWAN/ WLAN/ GPS/ BT

Expandable Storage

- 4x 2.5" SATA SSD removable tray

Power Management

- Selectable boot-up & shut-down voltage for low power protection by software
- Configurable, 8-level on/off delay time by software
- Status of ignition and low voltage status can be detected by software

System Management

- Watchdog timeout can be programmable by Software from 1 second to 255 seconds
- Tolerance 15% under room temperature 25°C

Operating System

- Windows 7 professional for embedded, Windows XP professional for embedded
- WES 7P, WES 2009, Linux (kernel 2.6.X) whether it support RAID function

System Dimensions

• 482.6mm (W) x 400mm (D) x 88mm (H) (19" x 15.75" x 3.46")

Construction

• Sheet metal with heat sink

Environment

• Operating temperatures
  Ambient with air: -40°C to 70°C (EN50155 Class TX)
• Storage temperatures: -40°C to 80°C
• Damp heat test: 55°C, 95% RH (non-operating, EN 50155)
• Relative humidity: 0% to 90% (non-condensing)
• Vibration (random):
  Compliance with EN61373 Category 1 Class B
• Shock:
  Compliance with EN61373 Category 1 Class B

Standards/ Certifications

• CE
• FCC Class A
• Compliance with EN50155

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Getting to Know nROK 5X00

Front Panel
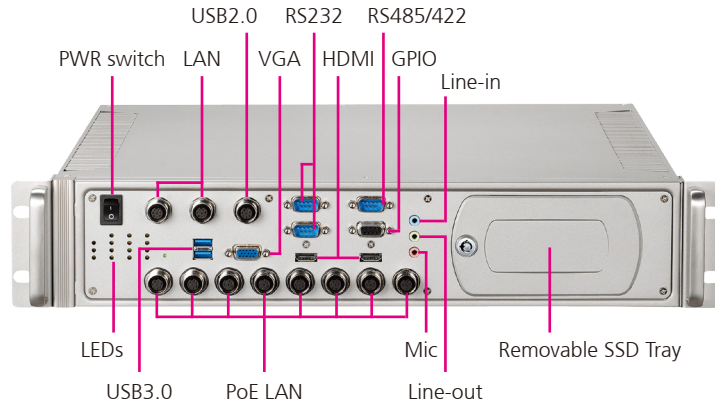
LAN 1-2 / PoE LAN 1-8 Connectors
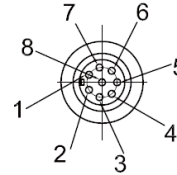
Connector pin definition

Pin	Definition	Pin	Definition
1	LAN1_MDI_1N	2	LAN1_MDI_1P
3	LAN1_MDI_2N	4	LAN1_MDI_3P
5	LAN1_MDI_3N	6	LAN1_MDI_2P
7	LAN1_MDI_4N	8	LAN1_MDI_4P

USB 2.0 Connector
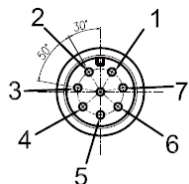
Connector pin definition

Pin	Definition	Pin	Definition
1	USB_D-	2	USB_D+
3	USB_VCC	4	USB_GND
5	USB_D-	6	USB_D+
7	USB_VCC	8	USB_GND

RS232 and RS485/422 Connectors
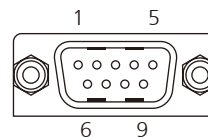
Connector pin definition

RS232

Pin	Definition	Pin	Definition
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	RI1	10	NC

RS485

Pin	Definition	Pin	Definition
1	RS422_RX+ / RS485_+	2	RS422_RX- / RS485_-
3	RS422_TX+	4	RS422_TX-
5	GND	6	NC
7	NC	8	NC
9	NC	10	NC

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GPIO Connector

```
  1      5
  6      9
```

Connector pin definition

Pin	Definition	Pin	Definition
1	INPUT_1 PORT	2	INPUT_2 PORT
3	INPUT_3 PORT	4	INPUT_4 PORT
5	GND	6	OUTPUT_1 PORT
7	OUTPUT_2 PORT /	8	OUTPUT_3 PORT
9	OUTPUT_4 PORT	10	NC

VGA

```
  5      1
 15     11
```

Connector pin definition

Pin	Definition	Pin	Definition
1	RED	2	GREEN
3	BLUE	4	Gnd
5	Gnd	6	Gnd
7	Gnd	8	Gnd
9	VCC	10	Gnd
11	Gnd	12	DDCDAT
13	Hsync	14	Vsync
15	DDCCLK	16	OPEN

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HDMI

Connector pin definition

Pin	Definition	Pin	Definition
1	HDMI1_DATA2-P	2	GND
3	HDMI1_DATA2-N	4	HDMI1_DATA1-P
5	GND	6	HDMI1_DATA1-N
7	HDMI1_DATA0-P	8	GND
9	HDMI1_DATA0-N	10	HDMI1_CLK-P
11	GND	12	HDMI1_CLK-N
13	NC	14	NC
15	HDMI1_DDC_SCL	16	HDMI1_DDC_SDA
17	GND	18	VCC5
19	HDMI1_HPD_R		

USB 3.0

Connector pin definition

Pin	Definition	Pin	Definition
1	VCC	2	USB0-
3	USB0+	4	GND
5	USB3_RX0-	6	USB3_RX0+
7	GND	8	USB3_TX0-
9	USB3_TX0+	10	VCC
11	USB1-	12	USB1+
13	GND	14	USB3_RX1-
15	USB3_RX1+	16	GND
17	USB3_TX1-	18	USB3_TX1+

Getting to Know nROK 5X00

Rear Panel

DC Input
24V/110V

GPS   WLAN   WWAN/   WWAN   BT
WLAN

GPS/WWAN/WLAN/BT Module Antenna Mounting Hole

The antenna mounting holes are used to mount and connect antennas to the GPS/WWAN/WLAN/BT module.

DC Input 24V/110V (Circle Type Connector)
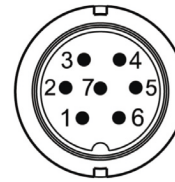
Pin	Definition	Pin	Definition
1	VCC	2	VCC
3	V-	4	V-
5	Ignition V-	6	Ground
7	Ignition	8	

Mechanical Dimensions

482.60

88.00

400.00
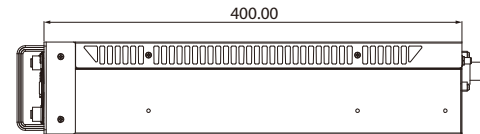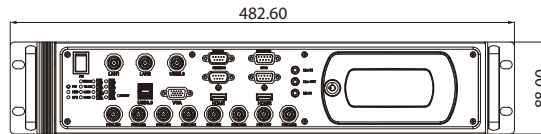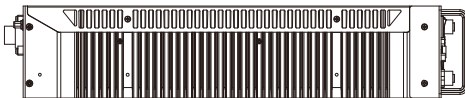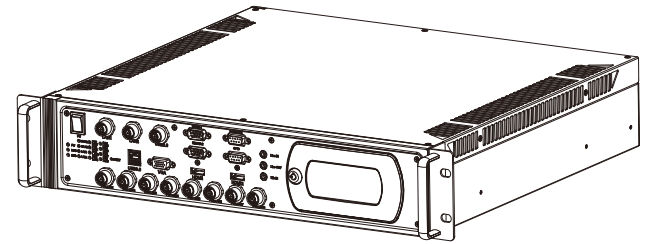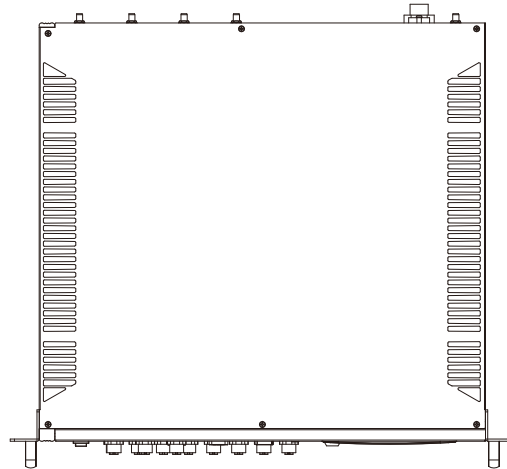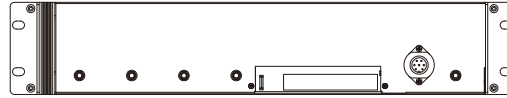
Chapter 2: Jumpers and Connectors

This chapter describes how to set the jumpers on the motherboard. Note that the following procedures are generic for all nROK 5X00 series.

Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

  - A Philips screwdriver
  - A flat-tipped screwdriver
  - A set of jewelers Screwdrivers
  - A grounding strap
  - An anti-static pad

- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environment tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on the computers that are still connected to a power supply can be extremely dangerous.

Follow the guidelines below to avoid damage to your computer or yourself:

- Always disconnect the unit from the power outlet whenever you are working inside the case.

- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.

- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.

- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.

- Use correct screws and do not over tighten screws.

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Jumper

A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is **short**. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is **open**.

Refer to the illustrations below for examples of what the 2-pin and 3-pin jumpers look like when they are short (on) and open (off).

Two-Pin Jumpers: Open (Left) and Short (Right)
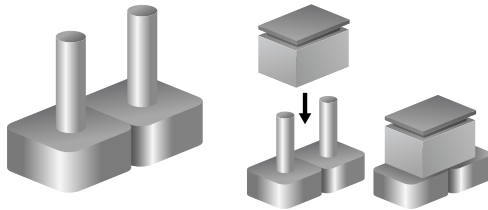
Three-Pin Jumpers: Pins 1 and 2 Are Short
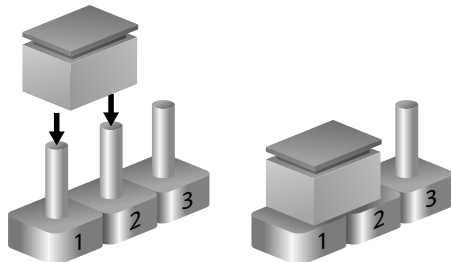
Locations of the Jumpers and Connectors

The figure below is the mainboard which is the board used in the nROK 5X00 system. It shows the locations of the jumpers and connectors.

Top View
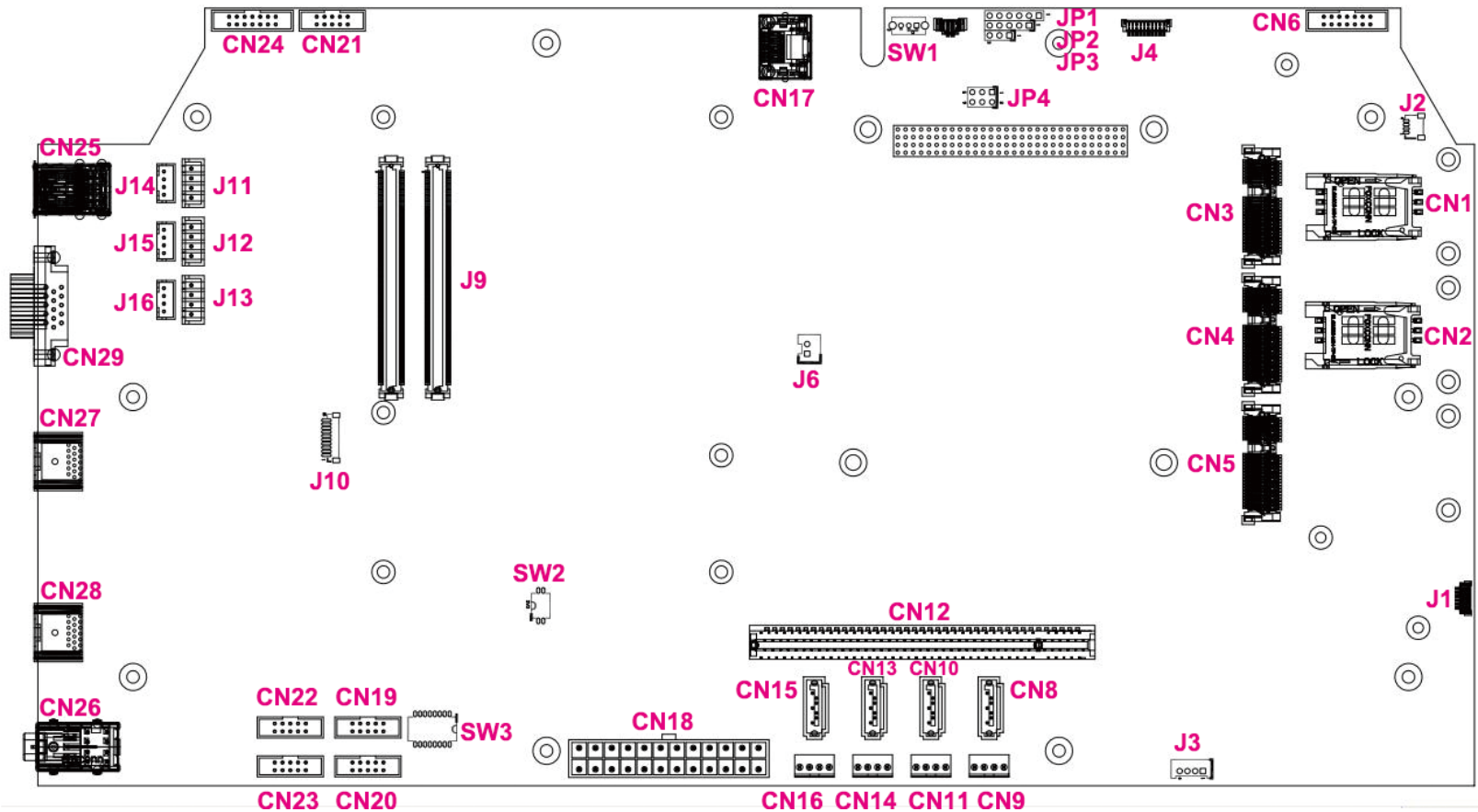
Bottom View
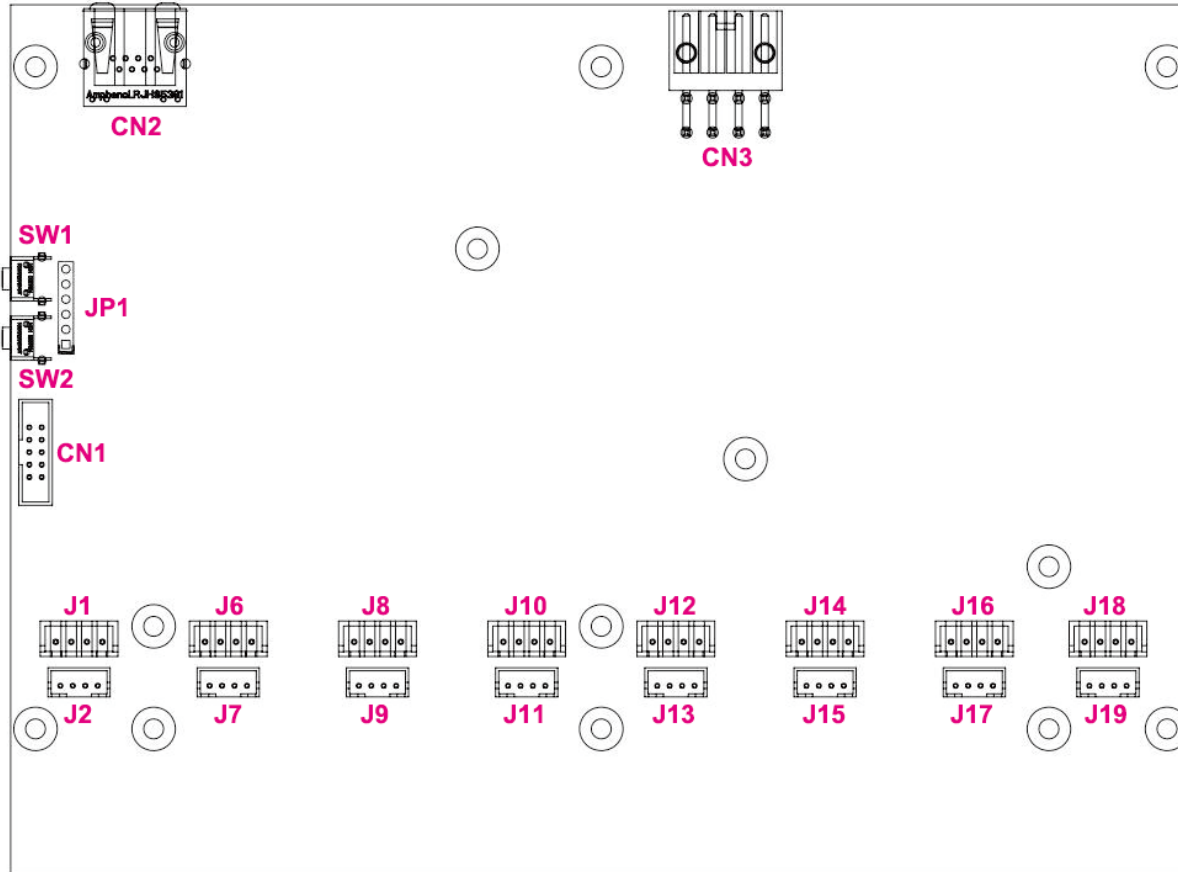
Jumper Settings

(*) for default setting

Voltage Setup Selection (SW3)
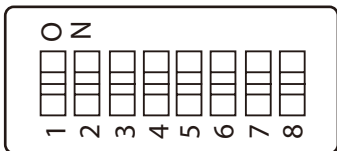
	ON(*)	OFF
SW3.1	GPI0 PULL UP 5V	Don't Care
SW3.2	GPI1 PULL UP 5V	Don't Care
SW3.3	GPI2 PULL UP 5V	Don't Care
SW3.4	GPI3 PULL UP 5V	Don't Care

	ON(*)	OFF
SW3.5	GPO0 PULL UP 5V	Don't Care
SW3.6	GPO1 PULL UP 5V	Don't Care
SW3.7	GPO2 PULL UP 5V	Don't Care
SW3.8	GPO3 PULL UP 5V	Don't Care

Start-up Mode / Pre-Heater Control (SW2)

	ON	OFF
SW2.1	Start up by PW	Start up by Ignition(*)
SW2.2	Pre-Heater on	Pre-Heater off

PCI-104 VI/O Voltage Setting (JP4)
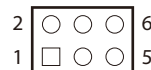
Pin No.	Status	Function Description
(1-3)(2-4) (*)	Short	+3.3V
(3-5)(4-6)	Short	+5V

CMOS Input Voltage Select (SW1, JP5)

Pin No.	Status	Function Description
1-2(*)	Short*	VBAT IN
2-3	Short	Clear CMOS

Connectors

High speed board-to-board connector: COM Express Row A and Row B

A. Connector size: 2 x 110 = 220 pin-header
B. Connector location: J9A
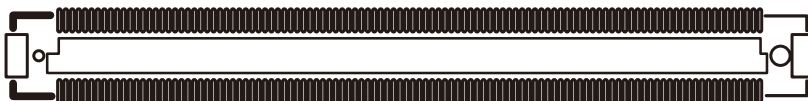
Com Express A&B Connector

Connector pin definition

Row A		Row B		Row A		Row B	
A1	GND	B1	GND	A56	PCIE_TX4-	B56	PCIE_RX4-
A2	GBE0_MDI3-	B2	GBE0_ACT#	A57	GND	B57	GPO3
A3	GBE0_MDI3+	B3	LPC_FRAME#	A58	PCIE_TX3+	B58	PCIE_RX3+
A4	GBE0_LINK100#	B4	LPC_AD0	A59	PCIE_TX3-	B59	PCIE_RX3-
A5	GBE0_LINK1000#	B5	LPC_AD1	A60	GND	B60	GND
A6	GBE0_MDI2-	B6	LPC_AD2	A61	PCIE_TX2+	B61	PCIE_RX2+
A7	GBE0_MDI2+	B7	LPC_AD3	A62	PCIE_TX2-	B62	PCIE_RX2-
A8	GBE0_LINK#	B8	LPC_DRQ0#	A63	GPI1	B63	GPO3
A9	GBE0_MDI1-	B9	LPC_DRQ1#	A64	PCIE_TX1+	B64	PCIE_RX1+
A10	GBE0_MDI1+	B10	LPC_CLK	A65	PCIE_TX1-	B65	PCIE_RX1-
A11	GND	B11	GND	A66	GND	B66	WAKE0#
A12	GBE0_MDI0-	B12	PWRBTN#	A67	GPI2	B67	WAKE1#
A13	GBE0_MDI0+	B13	SMB_CK	A68	PCIE_TX0+	B68	PCIE_RX0+

	Row A		Row B		Row A		Row B
A14	GBE0_CTREF	B14	SMB_DAT	A69	PCIE_TX0-	B69	PCIE_RX0-
A15	SUS_S3#	B15	SMB_ALERT#	A70	GND	B70	GND
A16	SATA0_TX+	B16	SATA1_TX+	A71	LVDS_A0+	B71	LVDS_B0+
A17	SATA0_TX-	B17	SATA1_TX-	A72	LVDS_A0-	B72	LVDS_B0-
A18	SUS_S4#	B18	SUS_STAT#	A73	LVDS_A1+	B73	LVDS_B1+
A19	SATA0_RX+	B19	SATA1_RX+	A74	LVDS_A1-	B74	LVDS_B1-
A20	SATA0_RX-	B20	SATA1_RX-	A75	LVDS_A2+	B75	LVDS_B2+
A21	GND	B21	GND	A76	LVDS_A2-	B76	LVDS_B2-
A22	SATA2_TX+	B22	SATA3_TX+	A77	LVDS_VDD_EN	B77	LVDS_B3+
A23	SATA2_TX-	B23	SATA3_TX-	A78	LVDS_A3+	B78	LVDS_B3-
A24	SUS_S5#	B24	PWR_OK	A79	LVDS_A3-	B79	LVDS_BKLT_EN
A25	SATA2_RX+	B25	SATA3_RX+	A80	GND	B80	GND
A26	SATA2_RX-	B26	SATA3_RX-	A81	LVDS_ACK+	B81	LVSD_B_CLK+
A27	BATLOW#	B27	WDT	A82	LVDS_ACK-	B82	LVSD_B_CLK+
A28	ATA_ACT#	B28	HDA_SDIN2	A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL
A29	HDA_SYNC	B29	HDA_SDIN1	A84	LVDS_I2C_DAT	B84	VCC_5V_SBY
A30	HDA_RST#	B30	HDA_SDIN0	A85	GPI3	B85	VCC_5V_SBY
A31	GND	B31	GND	A86	NC	B86	VCC_5V_SBY
A32	HDA_BITCLK	B32	SPKR	A87	NC	B87	VCC_5V_SBY
A33	HDA_SDOUT	B33	I2C_CK	A88	PCIE0_CK_REF+	B88	BIOS_DISABLE1#
A34	BIOS_DISABLE0#	B34	I2C_DAT	A89	PCIE0_CK_REF-	B89	VGA_RED
A35	THRMTRIP#	B35	THRM#	A90	GND	B90	GND
A36	USB6-	B36	USB7-	A91	SPI_POWER	B91	VGA_GRN
A37	USB6+	B37	USB7+	A92	SPI_MISO	B92	VGA_BLU
A38	USB_67_OC#	B38	USB_4_5_OC#	A93	GPO0	B93	VGA_HSYNC
A39	USB4-	B39	USB5-	A94	SPI_CLK	B94	VGA_VSYNC
A40	USB4+	B40	USB5+	A95	SPI_MOSI	B95	VGA_I2CCLK
A41	GND	B41	GND	A96	TPM_PP	B96	VGA_I2CDAT

Row A		Row B		Row A		Row B	
A42	USB2-	B42	USB3-	A97	TYPE10#	B97	SPI_CS#
A43	USB2+	B43	USB3+	A98	SER0_TX	B98	RSVD
A44	USB_23_OC#	B44	USB_0_1_OC#	A99	SER0_RX	B99	RSVD
A45	USB0-	B45	USB1-	A100	GND	B100	GND
A46	USB0+	B46	USB1+	A101	SER1_TX	B101	FAN_PWMOUT
A47	VCC_RTC	B47	EXCD1_PERST#	A102	SER1_RX	B102	FAN_TACHIN
A48	EXCD0_CPPE#	B48	EXCD1_CPPE#	A103	LID#	B103	SLEEP#
A49	ECCD0CPPE#	B49	SYS_RESET#	A104	VCC_12V	B104	VCC_12V
A50	ECCD0CPPE#	B50	CB_RESET#	A105	VCC_12V	B105	VCC_12V
A51	GND	B51	GND	A106	VCC_12V	B106	VCC_12V
A52	PCIE_TX5+	B52	PCIE_RX5+	A107	VCC_12V	B107	VCC_12V
A53	PCIE_TX5-	B53	PCIE_RX5-	A108	VCC_12V	B108	VCC_12V
A54	GPIO0	B54	GPIO1	A109	VCC_12V	B109	VCC_12V
A55	PCIE_TX4+	B55	PCIE_RX4+	A110	GND	B110	GND

High speed board-to-board connector: COM Express Row C and Row D

A. Connector size: 2 x 110 = 220 pin-header
B. Connector location: J9B

Com Express C&D Connector

Connector pin definition

Row C		Row D		Row C		Row D	
C1	GND	D1	GND	C56	PEG_RX1-	D56	PEG_TX1+
C2	GND	D2	GND	C57	TYPE1#	D57	TYPE2#
C3	USB_SSRX0-	D3	USB_SSTX0-	C58	PEG_RX2+	D58	PEG_TX2+
C4	USB_SSRX0+	D4	USB_SSTX0+	C59	PEG_RX2-	D59	PEG_TX2-
C5	GND	D5	GND	C60	GND	D60	GND
C6	USB_SSRX1-	D6	USB_SSTX1	C61	PEG_RX3+	D61	PEG_TX3+
C7	USB_SSRX1+	D7	USB_SSTX1+	C62	PEG_RX3-	D62	PEG_TX3-
C8	GND	D8	GND	C63	RSVD	D63	RSVD
C9	USB_SSRX2-	D9	USB_SSTX2-	C64	RSVD	D64	RSVD
C10	USB_SSRX2+	D10	USB_SSTX2+	C65	PEG_RX4+	D65	PEG_TX4+
C11	GND	D11	GND	C66	PEG_RX4-	D66	PEG_TX4-
C12	USB_SSRX3-	D12	USB_SSTX3-	C67	RSVD	D67	GND
C13	USB_SSRX3+	D13	USB_SSTX3+	C68	PEG_RX5+	D68	PEG_TX5+

Row C		Row D		Row C		Row D	
C14	GND	D14	GND	C69	PEG_RX5-	D69	PEG_TX5-
C15	DDI1_PAIR6+	D15	DDI1_CTRLCLK	C70	GND	D70	GND
C16	DDI1_PAIR6-	D16	DDI1_CTRLDATA	C71	PEG_RX6+	D71	PEG_TX6+
C17	RSVD	D17	RSVD	C72	PEG_RX6-	D72	PEG_TX6-
C18	RSVD	D18	RSVD	C73	GND	D73	GND
C19	PCIE_RX6+	D19	PCIE_RX6+	C74	PEG_RX7+	D74	PEG_TX7+
C20	PCIE_RX6-	D20	PCIE_RX6-	C75	PEG_RX7-	D75	PEG_TX7-
C21	GND	D21	GND	C76	GND	D76	GND
C22	PCIE_RX7+	D22	PCIE_RX7+	C77	RSVD	D77	RSVD
C23	PCIE_RX7-	D23	PCIE_RX7-	C78	PEG_RX8+	D78	PEG_TX8+
C24	DDI1_HPD	D24	RSVD	C79	PEG_RX8-	D79	PEG_TX8-
C25	DDI1_PAIR4+	D25	RSVD	C80	GND	D80	GND
C26	DDI1_PAIR4-	D26	DDI1_PAIR0+	C81	PEG_RX9+	D81	PEG_TX9+
C27	RSVD	D27	DDI1_PAIR0-	C82	PEG_RX9-	D82	PEG_TX9-
C28	RSVD	D28	RSVD	C83	RSVD	D83	RSVD
C29	DDI1_PAIR5+	D29	DDI1_PAIR1+	C84	GND	D84	GND
C30	DDI1_PAIR5-	D30	DDI1_PAIR1-	C85	PEG_RX10+	D85	PEG_TX10+
C31	GND	D31	GND	C86	PEG_RX10-	D86	PEG_TX10-
C32	DDI2_CTRL_CLK	D32	DDI1_PAIR2+	C87	GND	D87	GND
C33	DDI2_CTRL_DATA	D33	DDI1_PAIR2-	C88	PEG_RX11+	D88	PEG_TX11+
C34	DDI2_DDC_AUX	D34	DDI1_DDC_AUX	C89	PEG_RX11-	D89	PEG_TX11-
C35	RSVD	D35	RSVD	C90	GND	D90	GND
C36	DDI3_CTRL_DATA	D36	DDI1_PAIR3+	C91	PEG_RX12+	D91	PEG_TX12+
C37	DDI3_DDC_AUX	D37	DDI1_PAIR3-	C92	PEG_RX12-	D92	PEG_TX12-
C38	DDI3_DDC_AUX	D38	RSVD	C93	GND	D93	GND
C39	DDI3_PAIR0+	D39	DDI2_PAIR0+	C94	PEG_RX13+	D94	PEG_TX13+
C40	DDI3_PAIR0-	D40	DDI2_PAIR0-	C95	PEG_RX13-	D95	PEG_TX13-
C41	GND	D41	GND	C96	GND	D96	GND

Row C		Row D		Row C		Row D	
C42	DDI3_PAIR1+	D42	DDI2_PAIR1+	C97	RSVD	D97	RSVD
C43	DDI3_PAIR1-	D43	DDI2_PAIR1-	C98	PEG_RX14+	D98	PEG_TX14+
C44	DDI3_HPD	D44	DDI2_HPD	C99	PEG_RX14-	D99	PEG_TX14-
C45	RSVD	D45	RSVD	C100	GND	D100	GND
C46	DDI3_PAIR2+	D46	DDI2_PAIR2+	C101	PEG_RX15+	D101	PEG_TX15+
C47	DDI3_PAIR2-	D47	DDI2_PAIR2-	C102	PEG_RX15-	D102	PEG_TX15-
C48	RSVD	D48	RSVD	C103	GND	D103	GND
C49	DDI3_PAIR3+	D49	DDI2_PAIR3+	C104	VCC_12V	D104	VCC_12V
C50	DDI3_PAIR3-	D50	DDI2_PAIR3-	C105	VCC_12V	D105	VCC_12V
C51	GND	D51	GND	C106	VCC_12V	D106	VCC_12V
C52	PEG_RX0+	D52	PEG_TX0+	C107	VCC_12V	D107	VCC_12V
C53	PEG_RX0-	D53	PEG_TX0-	C108	VCC_12V	D108	VCC_12V
C54	TYPE0#	D54	PEG_LANE_RV#	C109	VCC_12V	D109	VCC_12V
C55	PEG_RX1+	D55	PEG_TX1+	C110	GND	D110	GND

PCIe x16 (CN12)

A. Connector size: PCI-E slot 164 pin
B. Connector location:
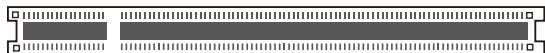
Connector pin definition

Row A		Row B		Row A		Row B	
A1	PRSNT1#	B1	VCC12	A44	PERn6	B44	GND
A2	VCC12	B2	VCC12	A45	GND	B45	PETp7
A3	VCC12	B3	CC12	A46	GND	B46	PETn7
A4	GND	B4	GND	A47	PERp7	B47	GND
A5	TCK	B5	SMCLK	A48	PERn7	B48	PRSNT2#_3
A6	TDI	B6	SMDAT	A49	GND	B49	GND
A7	TDO	B7	GND	A50	RSVD	B50	PETp8
A8	TMS	B8	VCC3	A51	GND	B51	PETn8
A9	VCC3	B9	TRST#	A52	PERp8	B52	GND
A10	VCC3	B10	3VSB	A53	PERn8	B53	GND
A11	PERST#	B11	WAKE#	A54	GND	B54	PETp9
A12	GND	B12	VCC12	A55	GND	B55	PETn9
A13	REFCLK+	B13	GND	A56	PERp9	B56	GND
A14	REFCLK-	B14	PETp0	A57	PERn9	B57	GND
A15	GND	B15	PETn0	A58	GND	B58	PETp10
A16	PERp0	B16	GND	A59	GND	B59	PETn10
A17	PERn0	B17	PRSNT2#_1	A60	PERp10	B60	GND
A18	GND	B18	GND	A61	PERn10	B61	GND
A19	VCC12	B19	PETp1	A62	GND	B62	PETp11
A20	GND	B20	PETn1	A63	GND	B63	PETn11

Row A		Row B		Row A		Row B	
A21	PERp1	B21	GND	A64	PERp11	B64	GND
A22	PERn1	B22	GND	A65	PERn11	B65	GND
A23	GND	B23	PETp2	A66	GND	B66	PETp12
A24	GND	B24	PETn2	A67	GND	B67	PETn12
A25	PERp2	B25	GND	A68	PERp12	B68	GND
A26	PERn2	B26	GND	A69	PERn12	B69	GND
A27	GND	B27	PETp3	A70	GND	B70	PETp13
A28	GND	B28	PETn3	A71	GND	B71	PETn13
A29	PERp3	B29	GND	A72	PERp13	B72	GND
A30	PERn3	B30	RSVD	A74	GND	B74	PETp14
A31	GND	B31	PRSNT2#_2	A75	GND	B75	PETn14
A32	VCC12	B32	GND	A76	PERp14	B76	GND
A33	VCC12	B33	PETp4	A77	PERn14	B77	GND
A34	GND	B34	PETn4	A78	GND	B78	PETp15
A35	PERp4	B35	GND	A79	GND	B79	PETn15
A36	PERn4	B36	GND	A80	PERp15	B80	GND
A37	GND	B37	PETp5	A81	PERn15	B81	PCIE_CLK4P
A38	GND	B38	PETn5	A82	GND	B82	PCIE_CLK4N
A39	PERp5	B39	GND				
A40	PERn5	B40	GND				
A41	GND	B41	PETp6				
A42	GND	B42	PETn6				
A43	PERp6	B43	GND				

PCI-104 Connector (CN7)

Connector location:

```
A1 ●●●●●●●●●●●●●●●●●●●●●●●●●●●●●● A30
B1 ●●●●●●●●●●●●●●●●●●●●●●●●●●●●●● B30
C1 ●●●●●●●●●●●●●●●●●●●●●●●●●●●●●● C30
D1 ●●●●●●●●●●●●●●●●●●●●●●●●●●●●●● D30
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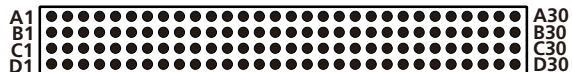
Connector pin definition

Pin	A	B	C	D
1	GND	Reserved	+5	AD00
2	VI/O	AD02	AD01	+5V
3	AD05	GND	AD04	AD03
4	C/BE0#	AD07	GND	AD06
5	GND	AD09	AD08	GND
6	AD11	VI/O	AD10	M66EN
7	AD14	AD13	GND	AD12
8	+3.3V	C/BE1#	AD15	+3.3V
9	SERR#	GND	Reserved	PAR
10	GND	PERR#	+3.3V	Reserved
11	STOP#	+3.3V	LOCK#	GND
12	+3.3V	TRDY#	GND	DEV SEL#
13	FRAME#	GND	IRDY#	+3.3V
14	GND	AD16	+3.3V	C/BE2#
15	AD18	+3.3V	AD17	GND

Pin	A	B	C	D
16	AD21	AD20	GND	AD19
17	+3.3V	AD23	AD22	+3.3V
18	IDSEL0	GND	IDSEL1	IDSEL2
19	AD24	C/BE3#	VI/O	IDSEL3
20	GND	AD26	AD25	GND
21	AD29	+5V	AD28	AD27
22	+5V	AD30	GND	AD31
23	REQ0#	GND	REQ1#	VI/O
24	GND	REQ2#	+5V	GNT0#
25	GNT1#	VI/O	GNT2#	GND
26	+5V	CLK0	GND	CLK1
27	CLK2	+5V	CLK3	GND
28	GND	INTD#	+5V	RST#
29	+12V	INTA#	INTB#	INTC#
30	-12V	REQ3#	GNT3#	GND

Main board LED Indicator Connector (CN6, CN24)

A. Connector size: 2 x 7 = 14-pin header, (2.0mm pitch)
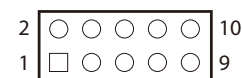B. Connector location:

```
13 │ ○ ○ ○ ○ ○ ○ □ │ 1
14 │ ○ ○ ○ ○ ○ ○ ○ │ 2
```
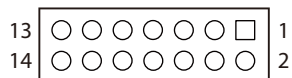
Connector pin definition

Pin	Definition	Pin	Definition
1	SATA_ACT#	2	3.5G_LED#
3	GPS_LED#	4	LED_WLAN1#
5	LAN0_LED_ACT#	6	LAN_LED_ACT#
7	PreHeaterEnLED	8	PB
9	RST_L_Z	10	+V3.3ALW
11	GND	12	VCC5
13	GND	14	VCC3

RS422/485 Connector (CN19)

A. Connector size: 2 x 5 = 10-pin header, (2.0mm pitch)
B. Connector location:

```
2 │ ○ ○ ○ ○ ○ │ 10
1 │ □ ○ ○ ○ ○ │ 9
```

Connector pin definition

Pin	Definition	Pin	Definition
1	RS422_RX+/RS485_+	2	RS422_RX-/RS485_-
3	RS422_TX+	4	RS422_TX-
5	GND	6	NC
7	NC	8	NC
9	NC	10	NC

RS232 Connector (CN22, CN23)

A. Connector size: 2 x 5 = 10-pin header, (2.0mm pitch)
B. Connector location:
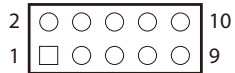
```
2  ○ ○ ○ ○ ○  10
1  □ ○ ○ ○ ○  9
```

Connector pin definition

Pin	Definition	Pin	Definition
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	RI1	10	NC

RS232 Connector (CN21)

A. Connector size: 2 x 5 = 10-pin header, (2.0mm pitch)
B. Connector location:

```
2  ○ ○ ○ ○ ○  10
1  □ ○ ○ ○ ○  9
```
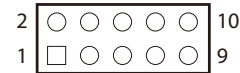
Connector pin definition

Pin	Definition	Pin	Definition
1	TX6	2	RX6
3	TX7	4	RX7
5	GND	6	TX8
7	RX8	8	TX9
9	RX9	10	NC

GPIO Connector (CN20)

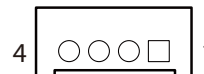A. Connector size: 2 x 5 = 10-pin header, (2.0mm pitch)
B. Connector location:
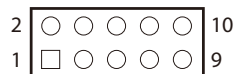
Connector pin definition

Pin	Definition	Pin	Definition
1	INPUT_1 PORT	2	INPUT_2 PORT
3	INPUT_3 PORT	4	INPUT_4 PORT
5	GND	6	OUTPUT_1 PORT
7	OUTPUT_2 PORT /	8	OUTPUT_3 PORT
9	OUTPUT_4 PORT	10	NC

LAN Connector (a. J11, J14 / b. J12, J15 / c. J7, J8)

A. Connector size: JST-1x4-180-2.5mm-MALE+JST-1x4-180-2.0mm-MALE
B. Connector location:

Connector pin definition

a. 2.5mm MALE

Pin	Definition	Pin	Definition
1	LAN_MDI_0P_R	2	LAN_MDI_0N_R
3	LAN_MDI_1P_R	4	LAN_MDI_1N_R

b. 2mm MALE

Pin	Definition	Pin	Definition
1	LAN_MDI_2P_R	2	LAN_MDI_2N_R
3	LAN_MDI_3P_R	4	LAN_MDI_3N_R

LAN Connector (CN17)

A. Connector size: RJ-45
B. Connector location:
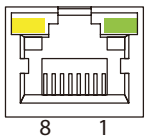
Connector pin definition

Pin	Definition	Pin	Definition
1	LAN1_MDI_1N	2	LAN1_MDI_1P
3	LAN1_MDI_2N	4	LAN1_MDI_2P
5	LAN1_MDI_3N	6	LAN1_MDI_3P
7	LAN1_MDI_4N	8	LAN1_MDI_4P

VGA Connector (CN29)

A. Connector size: DB15
B. Connector location:
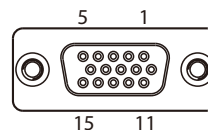
Connector pin definition

Pin	Definition	Pin	Definition
1	RED	2	GREEN
3	BLUE	4	Gnd
5	Gnd	6	Gnd
7	Gnd	8	Gnd
9	VCC	10	Gnd
11	Gnd	12	DDCDAT
13	Hsync	14	Vsync
15	DDCCLK	16	OPEN

HDMI Connector 1 (CN27)

Connector location:
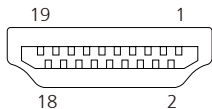
Connector pin definition

Pin	Definition	Pin	Definition
1	HDMI1_DATA2-P	2	GND
3	HDMI1_DATA2-N	4	HDMI1_DATA1-P
5	GND	6	HDMI1_DATA1-N
7	HDMI1_DATA0-P	8	GND
9	HDMI1_DATA0-N	10	HDMI1_CLK-P
11	GND	12	HDMI1_CLK-N
13	NC	14	NC
15	HDMI1_DDC_SCL	16	HDMI1_DDC_SDA
17	GND	18	VCC5
19	HDMI1_HPD_R		

HDMI Connector 2 (CN28)

Connector location:
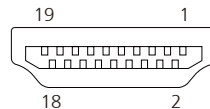
Connector pin definition

Pin	Definition	Pin	Definition
1	HDMI2_DATA2-P	2	GND
3	HDMI2_DATA2-N	4	HDMI2_DATA1-P
5	GND	6	HDMI2_DATA1-N
7	HDMI2_DATA0-P	8	GND
9	HDMI2_DATA0-N	10	HDMI2_CLK-P
11	GND	12	HDMI2_CLK-N
13	NC	14	NC
15	HDMI2_DDC_SCL	16	HDMI2_DDC_SDA
17	GND	18	VCC5
19	HDMI2_HPD_R		

GAL Programmer Pin Header (JP1)

A. Connector size: 1 x 6 = 6-pin header
B. Connector location:

1 ▢ ○ ○ ○ ○ ○ 6

Connector pin definition

Pin	Definition	Pin	Definition
1	VCC3	2	GND
3	TCK	4	TDO
5	TDI	6	TMS

MCU Programmer Pin Header (JP2)

A. Connector size: 1 x 5 = 5-pin header
B. Connector location:

1 ▢ ○ ○ ○ ○ 5

Connector pin definition

Pin	Definition	Pin	Definition
1	+3.3ALW	2	C2D
3	MRST	4	C2CK
5	GND		

MCU COM Port (JP3)

A. Connector size: 1 x 3 = 3-pin header
B. Connector location:

1 □ ○ ○ 3

Connector pin definition

Pin	Definition
1	TX
2	RX
3	GND

Serial-ATA Power Input (CN9, CN11, CN14, CN16)

A. Connector size: 1 x 4 = 4-pin header
B. Connector location:

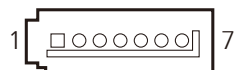1 □ ○ ○ ○ 4

Connector pin definition

Pin	Definition	Pin	Definition
1	VCC12	2	GND
3	GND	4	VCC5

Serial-ATA 2.0 (CN13, CN15)

A. Connector size: 1 x 7 = 7-pin SATA connector
B. Connector location:

Connector pin definition

Pin	Definition	Pin	Definition
1	GND	2	SATA_TXP0 -
3	SATA_TXN0	4	GND
5	SATA_RXN0	6	SATA_RXP0
7	GND		

Serial-ATA 3.0 (CN8, CN10)

A. Connector size: 1 x 7 = 7-pin SATA connector
B. Connector location:
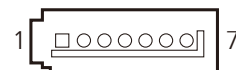
Connector pin definition

Pin	Definition	Pin	Definition
1	GND	2	SATA_TXP0 -
3	SATA_TXN0	4	GND
5	SATA_RXN0	6	SATA_RXP0
7	GND		

USB connector (J13, J16)

A. Connector size: JST-1x4-180-2.5mm-MALE+JST-1x4-180-2.0mm-MALE
B. Connector location:

Connector pin definition

a. 2.5mm MALE

Pin	Definition	Pin	Definition
1	USB6-	2	USB6+
3	VCC5	4	Ground

b. 2mm MALE

Pin	Definition	Pin	Definition
1	USB7-	2	USB7+
3	VCC5	4	Ground

Pre-Heater Sensor Connector (J6)

A. Connector size: 1 x 3 = 3-pin header
B. Connector location:
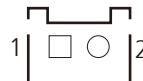
Connector pin definition

Pin	Definition
1	3.3V
2	MCU ADC1

USB Connectors (CN25)

Connector location:
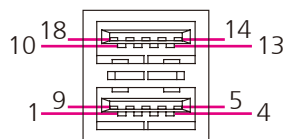
Connector pin definition

Pin	Definition	Pin	Definition
1	VCC	2	USB0-
3	USB0+	4	GND
5	USB3_RX0-	6	USB3_RX0+
7	GND	8	USB3_TX0-
9	USB3_TX0+	10	VCC
11	USB1-	12	USB1+
13	GND	14	USB3_RX1-
15	USB3_RX1+	16	GND
17	USB3_TX1-	18	USB3_TX1+

Mini-PCIe (WLAN1) (CN4)

Connector location:
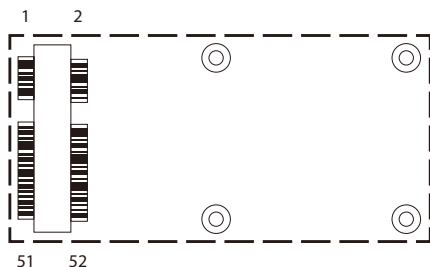
Connector pin definition

Pin	Definition	Pin	Definition
1	WAKE#	2	+V3.3S
3	NC	4	GND
5	NC	6	+V1.5S
7	CLKREQ#	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	DISABLE#
21	GND	22	PERST#
23	PERn0	24	+3.3S
25	PERp0	26	GND

Pin	Definition	Pin	Definition
27	GND	28	+V1.5S
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
33	PETp0	34	GND
35	GND	36	USB_D-
37	NC	38	USB_D+
39	NC	40	GND
41	NC	42	LED_WWAN#
43	NC	44	LED_WLAN#
45	NC	46	LED_WPAN#
47	NC	48	+V1.5S
49	NC	50	GND
51	NC	52	+V3.3S

Mini-PCIe (WLAN2) (CN5)

Connector location:
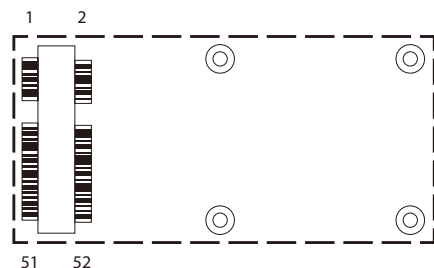
Connector pin definition

Pin	Definition	Pin	Definition
1	WAKE#	2	+V3.3S
3	NC	4	GND
5	NC	6	+V1.5S
7	CLKREQ#	8	USIM PWR
9	GND	10	USIM DATA
11	REFCLK-	12	USIM CLK
13	REFCLK+	14	USIM RST
15	GND	16	NC
17	NC	18	GND
19	NC	20	DISABLE#
21	GND	22	PERST#
23	PERn0	24	+3.3S
25	PERp0	26	GND

Pin	Definition	Pin	Definition
27	GND	28	+V1.5S
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
33	PETp0	34	GND
35	GND	36	USB_D-
37	NC	38	USB_D+
39	NC	40	GND
41	NC	42	LED_WWAN#
43	NC	44	LED_WLAN#
45	NC	46	LED_WPAN#
47	NC	48	+V1.5S
49	NC	50	GND
51	NC	52	+V3.3S

Mini-PCIe (WWAN) (CN3)

Connector location:

Connector pin definition
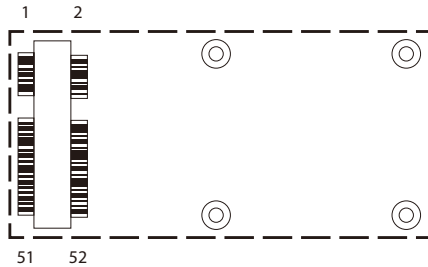
Pin	Definition	Pin	Definition	Pin	Definition	Pin	Definition
1	MIC +	2	+V3.3S	27	GND	28	NC
3	MIC -	4	GND	29	GND	30	NC
5	SPK +	6	NC	31	NC	32	NC
7	GND	8	USIM PWR	33	RESET	34	GND
9	GND	10	USIM DATA	35	GND	36	USB_D-
11	VCC_MSM26_DIG	12	USIM CLK	37	GND	38	USB_D+
13	NC	14	USIM RST	39	+V3.3S	40	GND
15	GND	16	NC	41	+V3.3S	42	LED_WWAN#
17	NC	18	GND	43	GND	44	NC
19	NC	20	W_DISABLE#	45	NC	46	NC
21	GND	22	NC	47	NC	48	NC
23	NC	24	NC	49	NC	50	GND
25	NC	26	GND	51	NC	52	+V3.3S

Antenna Switch Connector (J2)

A. Connector size: JST-1x4-180-1mm-MALE
B. Connector location:

Connector pin definition

Pin	Definition	Pin	Definition
1	VCC3	2	RF_BYPASS1
3	RF_BYPASS2	4	GND

SIM CARD Connector For WLAN (CN1, CN2)

SIM (CN1) is for Mini-PCIe (CN3)
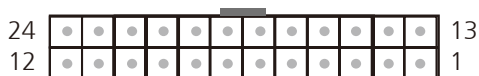SIM (CN2) is for Mini-PCIe (CN4)

Connector location:
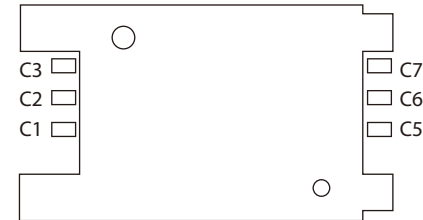
Connector pin definition

Pin	Definition	Pin	Definition
C1	Power Voltage	C2	Reset Signal
C3	Clock Signal	C5	GND
C6	VPP:Program Voltage	C7	I/O

Power Input (CN18)

A. Connector size: 2 x 12 = 24-pin header
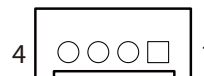B. Connector location:

Pre-heater Power Connector (J3)

A. Connector size: JST-1x4-180-1mm-MALE
B. Connector location:

Connector pin definition

Pin	Definition	Pin	Definition
1	GND	13	PSE 12V
2	GND	14	PSE 12V
3	GND	15	PSE 12V
4	GND	16	PSE 12V
5	GND	17	12V
6	GND	18	12V
7	GND	19	12V
8	GND	20	12V
9	GND	21	12V
10	GND	22	12V
11	GND	23	12V
12	AGND	24	IGNITION

Connector pin definition

Pin	Definition	Pin	Definition
1	VCC12	2	GND
3	GND	4	VCC12

Line-in, Mic-in, Speaker (CN26)

Connector location:

Line-in

Line-out

Mic-in

Power On & SSD or HD Active LED

Connector location:

A1   A3
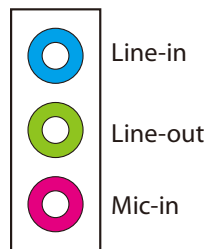
Connector pin definition

Pin	Definition	Pin	Definition
1	AGND	2	MICIN_L_CN
3	MIC_JD	4	AGND
5	MICIN_R_CN	6	
		22	SURR_OUT_L_CA
23	SURR_JD	24	AGND
25	SURR_OUT_R_CA		
32	LINEIN_L_CN	33	LINEIN_JD
34	AGND	35	LINEIN_R_CN

Connector pin definition

LED No.	Function Description
A1	POWER LED
A2	SATA LED
A3	GPS LED

WLAN & WWAN & LAN Active LED

Connector location:

A1 ● ● ● ● A4

Connector pin definition

LED No.	Function Description
A1	WWAN LED
A2	WLAN LED
A3	LAN0_LED
A4	LAN1_LED

PSE LAN Active LED

Connector location:

A1 ● ● ● ● A4   B1 ● ● ● ● B4

Connector pin definition

LED No.	Function Description
A1	PSE_A1_ACT#_LED
A2	PSE_A2_ACT#_LED
A3	PSE_A3_ACT#_LED
A4	PSE_A4_ACT#_LED

Connector pin definition

LED No.	Function Description
B1	PSE_B1_ACT#_LED
B2	PSE_B2_ACT#_LED
B3	PSE_B3_ACT#_LED
B4	PSE_B4_ACT#_LED

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GPS Connector (J1)

Connector size: 1 x 6 = 6-pin header
Connector location:

6 | ⃝⃝⃝⃝⃝▢ | 1

Connector pin definition

Pin	Definition	Pin	Definition
1	GPS_BAT	2	GPS_LED#
3	SP_TX1	4	SP_RX1
5	GND	6	VCC3

Port 80 Connector (J10)

Connector size: 1 x 10 = 10-pin header
Connector location:

10 | ⃝⃝⃝⃝⃝⃝⃝⃝⃝▢ | 1

Connector pin definition

Pin	Definition	Pin	Definition
1	GND	2	CB_RESET#
3	SIO_CLK	4	LPC_FRAME#
5	LPC_AD3	6	LPC_AD2
7	LPC_AD1	8	LPC_AD0
9	VCC3	10	VCC3

Bluetooth Connector (J4)

Connector size: 1 x 10 = 10-pin header
Connector location:

10 | O O O O O O O O O □ | 1

RTC Battery Connector (J5)

Connector size: 1 x 2 = 2-pin header
Connector location:

1 | □ O | 2

Connector pin definition

Pin	Definition	Pin	Definition
1	GND	2	NC
3	BT_3.3V	4	NC
5	BT_AUDIO_EN_R	6	NC
7	NC	8	USB_2N_L
9	USB_2P_L	10	GND

Connector pin definition

Pin	Definition
1	GND
2	VBAT1

Chapter 3: System Setup

Removing the Chassis Cover

CAUTION! Prior to removing the chassis cover, make sure the unit's power is off and disconnected from the power sources to prevent electric shock or system damage.

1. The screws on the chassis are used to secure the cover to the chassis. Remove these screws and put them in a safe place for later use
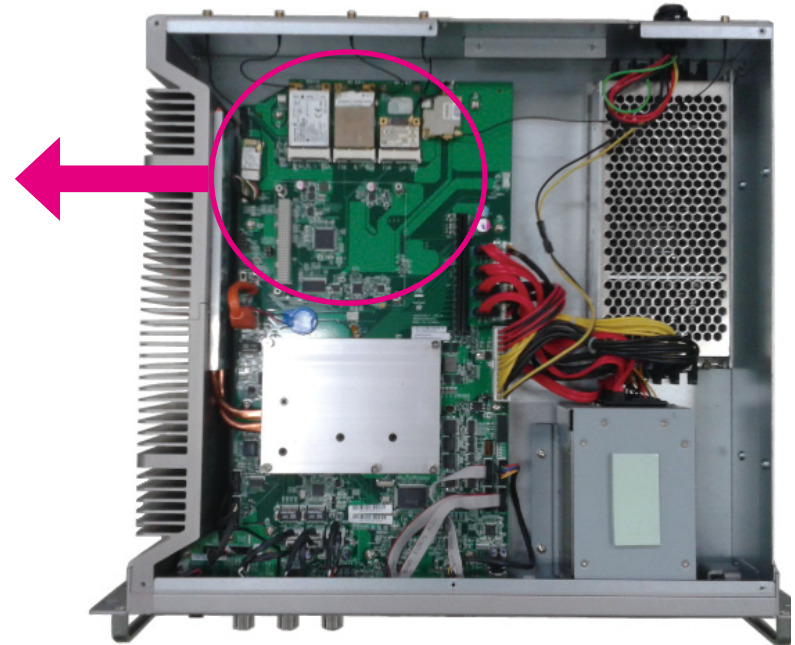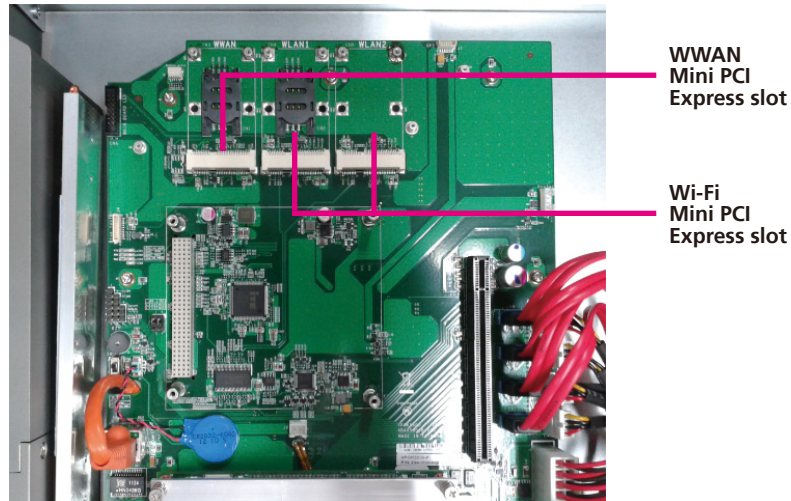
Top View

Left Side View

Right Side View
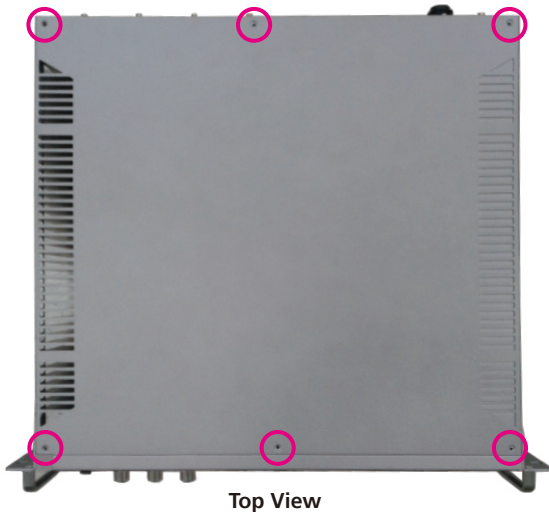
Removing the Chassis Cover

2. Lift the cover upward then remove it from the chassis.

Installing the Wi-Fi and GPRS/UMTS/HSDPA Modules

1. The Mini PCI Express slot shown below is used to install a Wi-Fi, 3.5G communication module such as GPRS, UMTS or HSDPA module.

WWAN Mini PCI Express slot

Wi-Fi Mini PCI Express slot

3. Insert the module into the mini PCI Express slot at a 45 degrees angle until the gold-plated connector on the edge of the module completely disappears inside the slot.

4. Push the module down then secure it with mounting screws.

5. Attach one end of the RF cable onto the module

Installing SSD Drive

1. Open the cover on the right side of the panel.

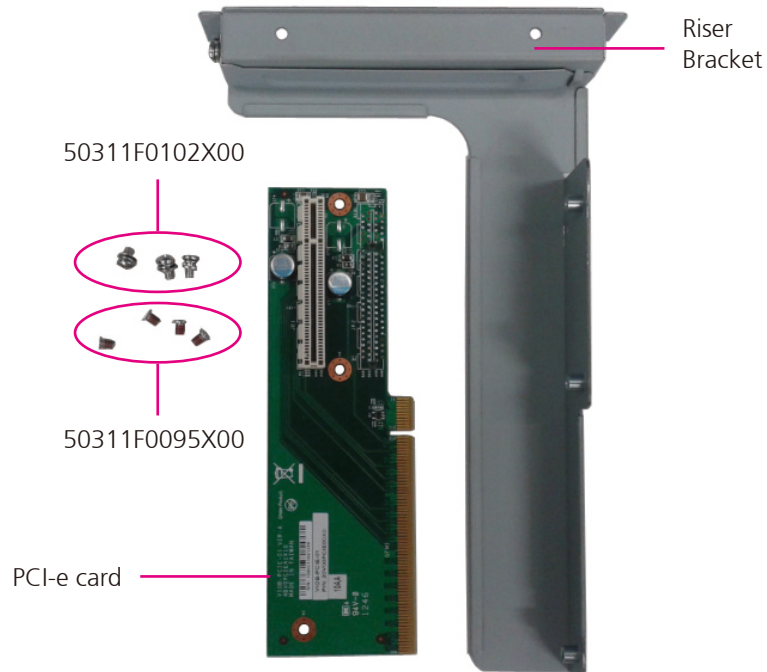2. Press the button to eject the SSD tray.

3. Remove the SSD tray from the chassis, then place the SSD into the tray and fasten the 4 screws.

Installing PCI-e Expansion Card

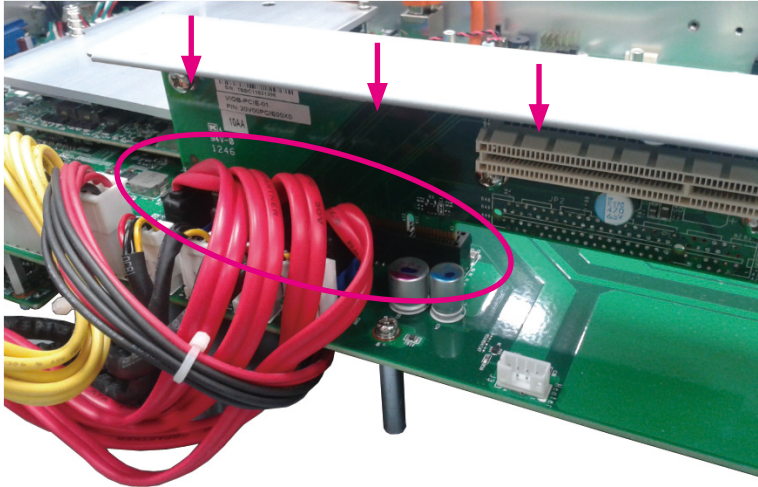1. The PCI-e kit includes the following:

- Riser Bracket x 1
- PCI-e Card x 1
- Screw (50311F0102X00) x 3
- Screw (50311F0095X00) x 4

Riser Bracket

50311F0102X00

50311F0095X00

PCI-e card

2. Fasten PCI-e card to the riser bracket with screw (50311F0102X00) x 3.

3. Plug PCI-e card into carrier PCA.

4. Fasten riser bracket with screw (50311F0095X00) x 4.