NEXCOM International Co., Ltd.

Mobile Computing Solutions
Vehicle Telematics Computer
VTC 7250-7C8
User Manual

www.nexcom.com

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PREFACE

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Acknowledgements

VTC 7250 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.

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.

v

VTC 7250 User Manual

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.

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.

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.

4. SIM: Do not insert or remove the SIM card when the **system** is **powered** on. Always **power** off the **system** before inserting or removing the SIM card.

Safety Precautions

- Read these safety instructions carefully.

- Keep this User Manual for later reference.

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

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

- Keep this equipment away from humidity.

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

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

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

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

- 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.

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

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

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

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

- 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.

- Do not place heavy objects on the equipment.

- 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.

- 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.

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.

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.

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Package Contents

Before continuing, verify that the VTC 7250 package that you received is complete.
Your VTC 7250 package should have all the items listed in the following table.

Item	P/N	Name	Specification	Qty
1	603ANT0115X00	GPS/GLONASS Antenna SANAV:SM-76G	SMA Male L=5000mm	1
2		VTC 7250 DVD Driver VER:1.0		1
3	4NCPF00510X00	Terminal Blocks 5P Phoenix Contact:1778014	5.08mm Female DIP Green	1
4	50333P0028X00	Washer for SMA CONN KANG YANG:WS6-0.8(B)	12.8x6.4x0.8mm PC Black	8
5	50333P0027X00	Washer for SMA CONN KANG YANG:TW-181	13x1.8mm Nylon 66 Natural	8
6	603POW0234X00	Power Cable 8-pin to 6-pin 12V DC OUT SUNJET:SLNEX822910	ATX 2x4 PIT:3.0mm to ATX 2x3 PIT:4.2mm UL1007 22AWG L=200mm	1
7	50311F0581X00	I Head Bolts Screw LONG FEI:I3x15.8 ISO NIGP	I3x5.8 AXISx2.8mm SCREWx3mm	8
8	5061000004X00	Damper Anti-Vibrate Grommet KANG YANG:TGM-50G(B)	D7xH2.8mm TPE COLOR: Black	8

CHAPTER 1: PRODUCT INTRODUCTION

Physical Features

Front View

Antenna Hole · Antenna Hole · Antenna Hole · Antenna Hole

ultraONE+ · VGA · USB 3.1 · LED Indicators

SSD/HDD · HDMI · SIM2 SIM3 · SSD/HDD · Reset Button · Power Button

Rear View

Antenna Hole · Antenna Hole · Antenna Hole · Antenna Hole

Line-out · USB 3.1 · CAN/DIO · COM1 · COM2 · DC OUT · DC IN 9V-36V

Mic-in · LAN · PoE 1-4 · COM3 · PoE 5-8
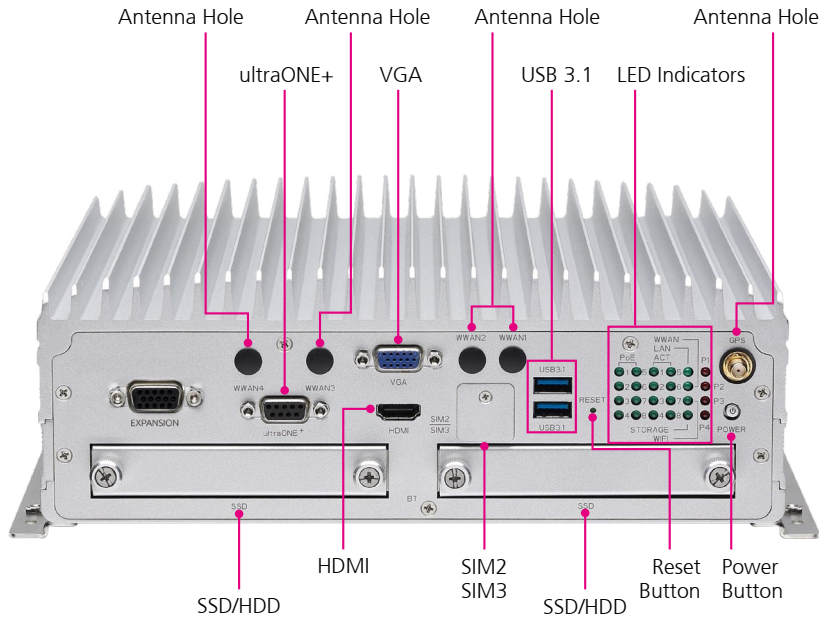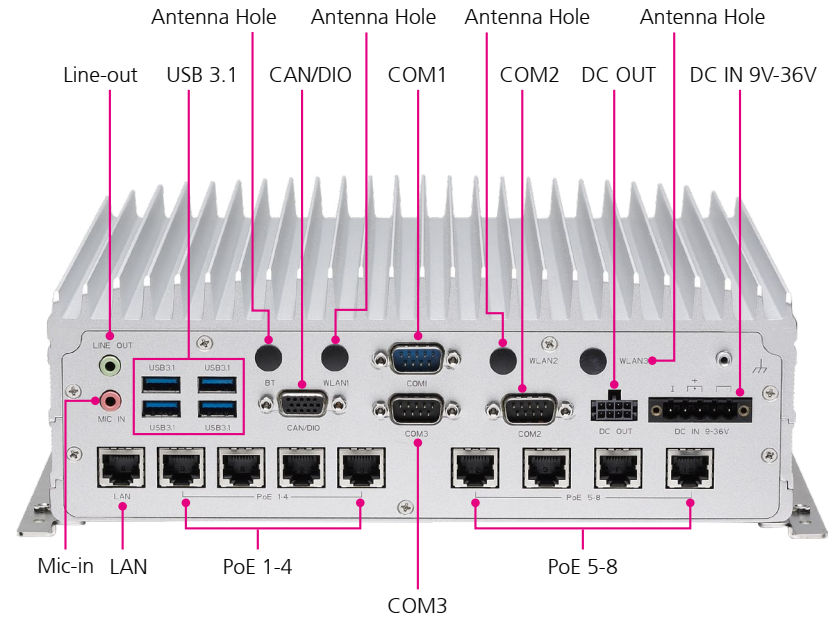
Hardware Specifications

CPU

- 8th generation Intel® Core™ (Coffee Lake-S) i7-8700T, up to 4 GHz, 35W, 6 core
- Compatible Intel® processor (by request)

Chipset

- Intel® Q370 platform controller hub

Memory

- 2-Channel 260-pin DDR4 SO-DIMM sockets up to 32GB/channel (64GB for two channels, non-ECC up to 2666 MHz), default 4GB + 4GB industrial grade memory

Video Output

- Chipset Intel® UHD Graphics 630
- 1 x HDMI 1.4b up to 4096 x 2160@30Hz
- 1 x VGA up to 1920 x 1200@60Hz
- 1 x ultraONE+ compatible with specific monitor

Storage

- 2 x 2.5" SATA 3.0 external SSD (compatible with 15mm height), RAID 0/1 supported
- 2 x mSATA 3.0 (shared with mini-PCIe slot)

Expansion

- 1 x M.2 3042 (default) Key B socket (USB 2.0, USB 3.1) for LTE/5G NR module with dual SIM
- 1 x Full-size mini-PCIe socket (USB 2.0) for LTE with dual SIM. Optional M.2 3042 Key B (USB 2.0, USB 3.1) for LTE/5G NR module

- 1 x Full-size mini-PCIe socket (USB 2.0, PCIe 3.0 & SATA 3.0 [auto detection])
- 1 x Full-size mini-PCIe socket (USB 2.0, PCIe 3.0 & SATA 3.0 [BIOS selection])

GNSS and Onboard Sensor

- 1 x Default U-blox NEO-M8N GNSS module for GPS/Glonass/QZSS/Galileo/Beidou
- Optional M8U/M8L modules with dead reckoning available
- TPM 2.0 by Infineon SLB9665TT2 (optional)
- G Sensor (3-axis, 10-bit resolution)

LAN and Power over Ethernet

- 8-Port LAN, 10/100/1000 Mbps I210-IT GbE, PoE 802.3af/at, max. 60W
- 1-Port LAN, 10/100/1000 Mbps I210-IT GbE

I/O Interface-Front

- 24 x LED indicators (including 4 x programmable LEDs)
- 1 x HDMI 1.4b
- 1 x VGA
- 1 x ultraONE+ for 10M video + audio output + 24VDC output
- 2 x USB 3.1 type A (5V/1A)
- 2 x Externally accessible SIM card sockets
- 2 x 2.5" removable SSD trays
- 1 x Reset button
- 1 x Power button
- 5 x SMA antennas

I/O Interface-Rear

- 8 x PoE 802.3af/at (Max. 60W)
- 1 x RJ45 LAN port, 10/100/1000 Mbps

- 1 x 5-pin terminal block for 9V~36V DC
- 1 x Mic-in, 1 x Line-out
- 1 x Connector (4 x 2) for 12VDC/2A output, power button, 2 x MDI
- 2 x DB9 for full RS232
- 1 x DB9 for full RS232/422/485 (RI, 5V/0.5A, 12V/0.5A)
- 1 x DB15
  - 1 x Isolated CANBus 2.0B
  - 1 x GPS DR (optional)
  - 4 x DI and 4 x DO
- 4 x SMA antennas
- 4 x USB 3.1 type A (5V/1A)

Power Management & Software Support

- Selectable boot-up & shut-down voltage for low power protection by software
- Setting 8-level power on/off delay time by software
- Support S3/S4 suspend mode
- 10~255 seconds WDT support, setup by software
- SDK (Windows/Linux) including utility and sample code

Operating System

- Windows 10/Linux/YOCTO (by request)

Dimensions

- 260 x 256 x 90.1 (W x D x H) (mm)

Weight

- 5.8kg

Environment

- Operating temperatures
  - -20°C~60°C (w/industrial SSD) with air flow
- Storage temperatures: -40°C~80°C
- Relative humidity: 90% (non-condensing)
- Vibration (random)
  - 2g@5~500 Hz (in operation, SSD)
- Vibration (SSD)
  - Operating: MIL-STD-810G, Method 514.6, Category 4, common carrier US highway truck vibration exposure
  - Storage: MIL-STD-810G, Method 514.6, Category 24, minimum integrity test
- Shock (SSD)
  - Operating: MIL-STD-810G, Method 516.6, Procedure I, functional shock=40g
  - Non-operating: MIL-STD-810G, Method 516.6, Procedure V, crash hazard shock test=75g

Certifications

- CE approval
- FCC Class A
- E13 Mark

Connector Numbering

The following diagrams indicate the numbers of the connectors. Use these numbers to locate the connectors' respective pinout assignments on chapter 2 of the manual.
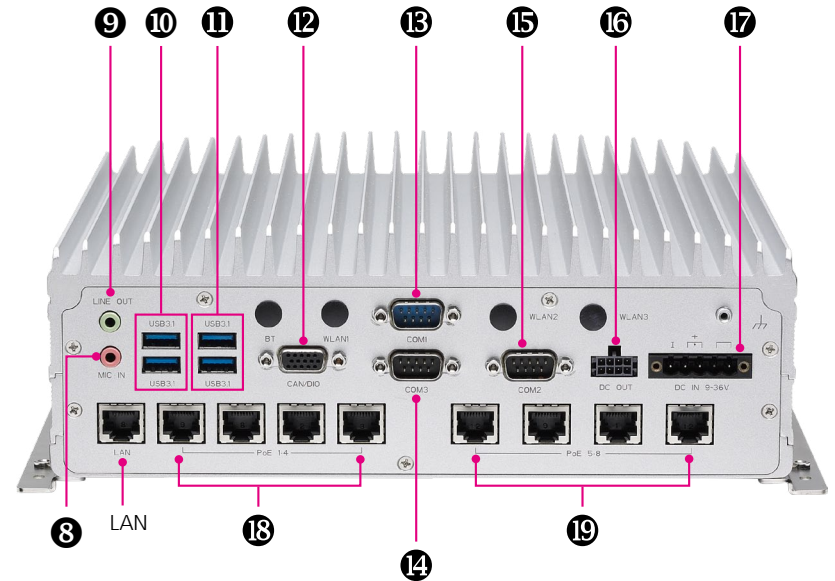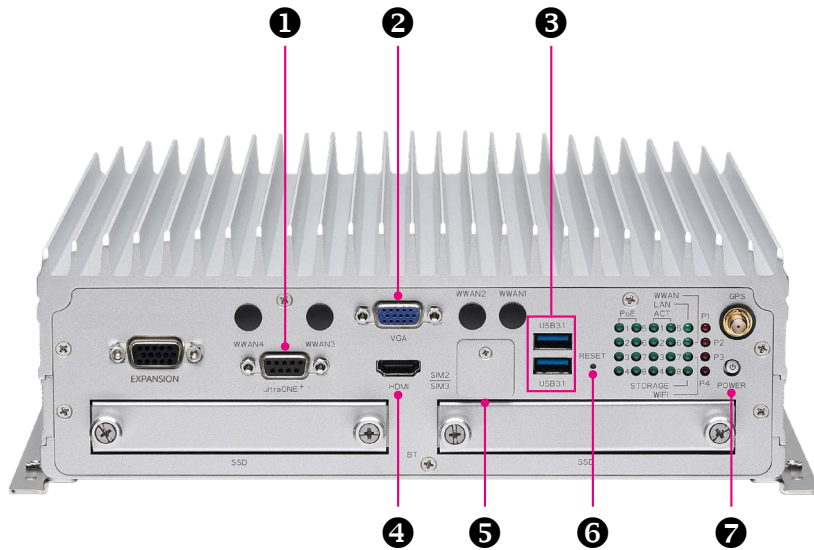
CHAPTER 2: EXTERNAL CONNECTORS PINOUT DESCRIPTION

ultraONE+ Connector

Connector number: 1
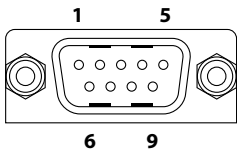
Pin	Definition	Pin	Definition
1	USB D-	2	GND
3	FPT LINKIII D-	4	POWER BUTTON
5	24V	6	USB D+
7	FPT LINKIII D+	8	24V ENABLE DETECT
9	GND		

VGA Connector

Connector number: 2
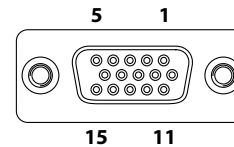
Pin	Definition	Pin	Definition
1	VGA_RED	2	VGA_GREEN
3	VGA_BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	+5V	10	GND
11	NC	12	VGA_DATA
13	VGA_HS	14	VGA_VS
15	VGA_CLK		

Dual USB 3.1 Port

Connector number: 3
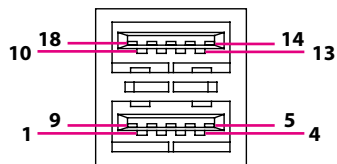
Pin	Definition	Pin	Definition
1	5V	2	USB_1N
3	USB_1P	4	GND
5	USB3_RX1N	6	USB3_RX1P
7	GND	8	USB3_TX1N
9	USB3_TX1P	10	5V
11	USB_2N	12	USB_2P
13	GND	14	USB3_RX2N
15	USB3_RX2P	16	GND
17	USB3_TX2N	18	USB3_TX2P

HDMI Connector

Connector number: 4
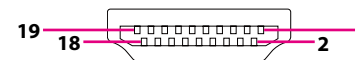
Pin	Definition	Pin	Definition
1	HDMI_TX2P	2	GND
3	HDMI_TX2N	4	HDMI_TX1P
5	GND	6	HDMI_TX1N
7	HDMI_TX0P	8	GND
9	HDMI_TX0N	10	HDMI_CLK_P
11	GND	12	HDMI_CLK_N
13	NC	14	NC
15	HDMI_SCL	16	HDMI_SDA
17	GND	18	HDMI_P5V
19	HDMI_HPD		

SIM2 and SIM3 Sockets

Connector number: 5
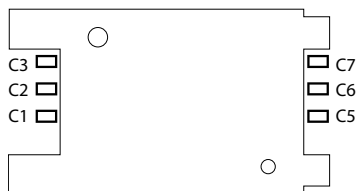
Reset Button

Connector number: 6

SIM2

Pin	Definition	Pin	Definition
C1	UIM_PWR	C5	NC
C2	UIM_RST	C6	UIM_DAT
C3	UIM_CLK	C7	NC
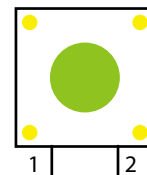
Pin	Definition
1	GND
2	RST_BTN#

SIM3

Pin	Definition	Pin	Definition
C1	UIM_PWR	C5	NC
C2	UIM_RST	C6	UIM_DAT
C3	UIM_CLK	C7	SIM SELECT

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Power Button

Connector number: 7

Mic-in Connector

Connector number: 8

Pin	Definition	Pin	Definition
1	GND	2	HW_BT#
3	HW_BT#	4	GND
A1	PWRLED_A	C1	PWRLED_C
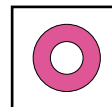
Pin	Definition	Pin	Definition
1	GND	2	MIC RIGHT
3	GND	4	MIC DETECT
5	MIC LIFT		

Line-out Connector

Connector number: 9

Dual USB 3.1 Port

Connector number: 10
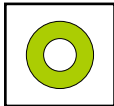
Pin	Definition	Pin	Definition
22	FRONT OUT RIGHT	23	GND
24	FRONT OUT DETECT	25	FRONT LIFT
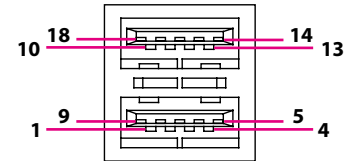
Pin	Definition	Pin	Definition
1	5V	2	USB_5N
3	USB_5P	4	GND
5	USB3_RX5N	6	USB3_RX5P
7	GND	8	USB3_TX5N
9	USB3_TX5P	10	5V
11	USB_6N	12	USB_6P
13	GND	14	USB3_RX6N
15	USB3_RX6P	16	GND
17	USB3_TX6N	18	USB3_TX6P

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Dual USB 3.1 Port

Connector number: 11
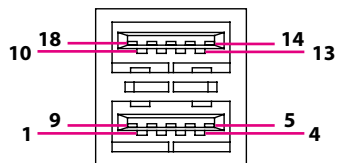
Pin	Definition	Pin	Definition
1	5V	2	USB_3N
3	USB_3P	4	GND
5	USB3_RX3N	6	USB3_RX3P
7	GND	8	USB3_TX3N
9	USB3_TX3P	10	5V
11	USB_4N	12	USB_4P
13	GND	14	USB3_RX4N
15	USB3_RX4P	16	GND
17	USB3_TX4N	18	USB3_TX4P

CAN/DIO Multiport Connector

Connector number: 12
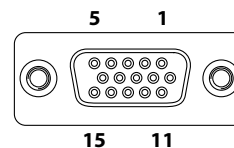
Pin	Definition	Pin	Definition
1	CAN H	2	ODOMETER
3	GPO3	4	GPI1
5	GPO0	6	CAN L
7	DIRECTION	8	GND
9	GPI2	10	GPO1
11	CAN GND	12	GND
13	GPI3	14	GPO2
15	GPI0		

COM1 RS232 Connector

Connector number: 13
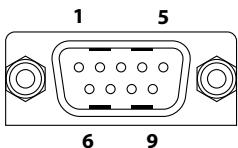
Pin	Definition	Pin	Definition
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	RI1		

COM3 RS-232/RS422/RS485 Connector

Connector number: 14
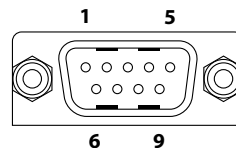
Pin	Definition	Pin	Definition
1	RS232 DCD#/RS422 TX- / RS485_DATA-	2	RS232 RX/RS422_TX+ / RS485_DATA+
3	RS232 TX/RS422_RX+	4	RS232 DTR#/RS422_RX-
5	GND	6	DSR#
7	RTS#	8	CTS#
9	RI#/12V/5V		

COM2 RS232 Connector

Connector number: 15
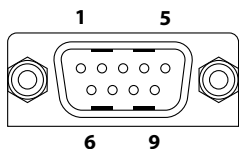
Pin	Definition	Pin	Definition
1	DCD2	2	RXD2
3	TXD2	4	DTR2
5	GND	6	DSR2
7	RTS2	8	CTS2
9	RI2		

DC Out Connector

Connector number: 16
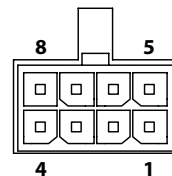
Pin	Definition	Pin	Definition
1	RESET BUTTON##	2	SLEEP BUTTON##
3	GND	4	GND
5	RS232 TX	6	RS232 RX
7	POWER BUTTON#	8	12V

9V-36V DC Power Input

Connector number: 17
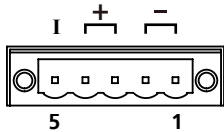
Pin	Definition	Pin	Definition
1	GND	2	GND
3	VIN	4	VIN
5	IGNITION		

PoE1 to PoE4 Ports

Connector number: 18
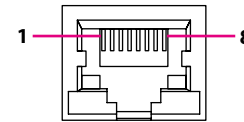
Pin	Definition	Pin	Definition
1	LANX_MDI_0P	2	LANX_MDI_0N
3	LANX_MDI_1P	4	LANX_MDI_2P
5	LANX_MDI_2N	6	LANX_MDI_1N
7	LANX_MDI_3P	8	LANX_MDI_3N

Red 'X' denotes the port number.

PoE5 to PoE8 Ports

Connector number: 19
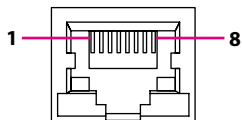
Pin	Definition	Pin	Definition
1	LANX_MDI_0P	2	LANX_MDI_0N
3	LANX_MDI_1P	4	LANX_MDI_2P
5	LANX_MDI_2N	6	LANX_MDI_1N
7	LANX_MDI_3P	8	LANX_MDI_3N

Red 'X' denotes the port number.

CHAPTER 3: JUMPERS AND SWITCHES

This chapter describes how to set the jumpers on the VTC 7250 motherboard.

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.

Jumper Settings

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)
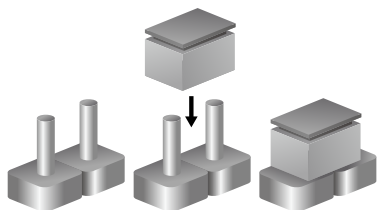
Three-Pin Jumpers: Pins 1 and 2 are Short
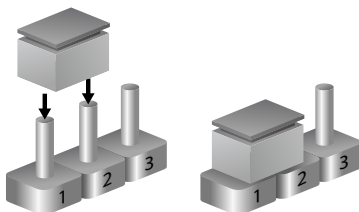
VTC 7250 System Components

The VTC 7250 consists of a motherboard and PoE board. This chapter describes the location and pinout assignment of the jumpers and connectors on each component.

Locations of the Jumpers and Connectors for the Motherboard

Top View

Bottom View

JP7

J9
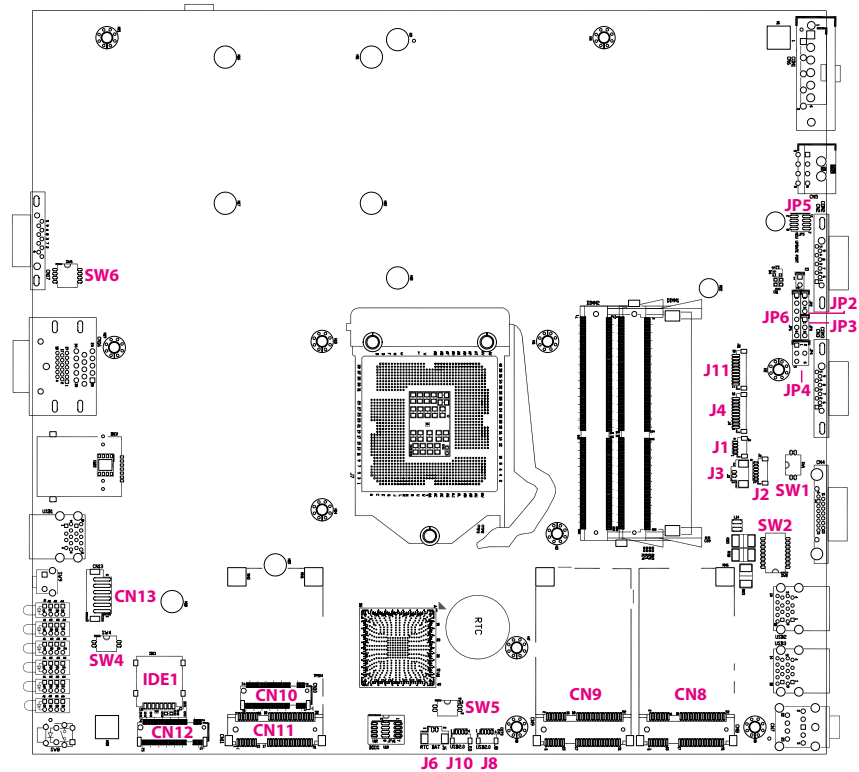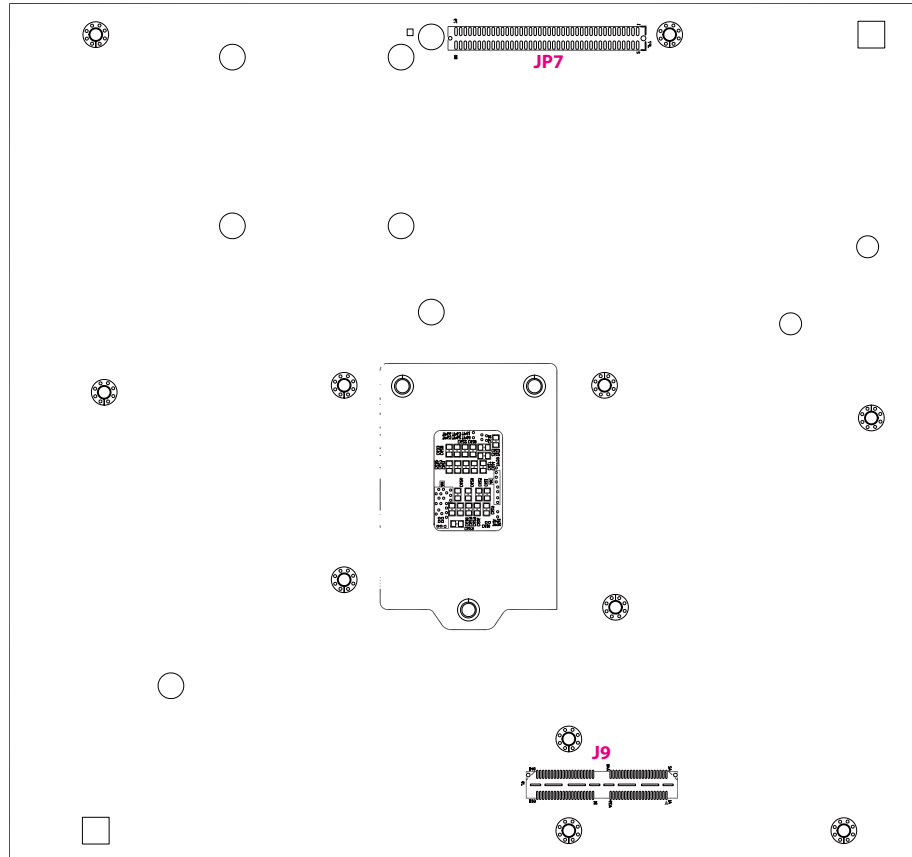
DIP Switch Settings

RTC Clear Selection

Connector location: SW5
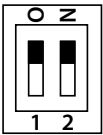
SW	RTC (Pin1)	SRTC/ME (Pin2)
OFF	Normal	Normal
ON	Clear CMOS	Clear ME

CAN Bus Impedance Control

Connector location: SW1
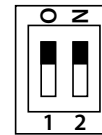
SW	RTC (Pin1)	SRTC/ME (Pin2)
1~2 ON	120 OHM	1~2 ON
1~2 OFF	Non	1~2 OFF

Input Voltage Setup Selection

Connector location: SW4
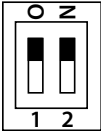
POWERSW (Pin1)	12V24V (Pin2)	Result
OFF	OFF	12V
OFF	ON	24V
ON	ON	9~36V

LVDS Resolution Control

Connector location: SW6
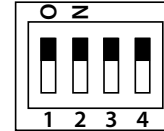
SW [3:0]	Function
0000	800 x 600 18-bit Single Port
0001	1024 x 768 18-bit Single Port
0010	1024 x 768 24-bit Single Port
0011	1280 x 768 18-bit Single Port
0100	1280 x 800 18-bit Single Port
0101	1280 x 960 18-bit Single Port
0110	800 x 480 18-bit Single Port
0111	1366 x 768 18-bit Single Port
1000	1366 x 768 24-bit Single Port

GPIO Pull High Selection Switch

Connector location: SW2
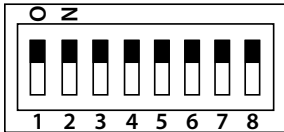
Pin	ON	OFF
1	GPI1 Internal Pull High (Default)	External Pull High
2	GPI2 Internal Pull High (Default)	External Pull High
3	GPI3 Internal Pull High (Default)	External Pull High
4	GPI4 Internal Pull High (Default)	External Pull High
5	GPO1 Internal Pull High (Default)	External Pull High
6	GPO2 Internal Pull High (Default)	External Pull High
7	GPO3 Internal Pull High (Default)	External Pull High
8	GPO4 Internal Pull High (Default)	External Pull High

Internal Connectors

COM1 RS232 DB9 Connector

Connector size: 1 x 10 = 10-pin header (1.0mm)
Connector location: J11

SIM Card Slot

Connector location: IDE1

Pin	Definition	Pin	Definition
1	GND	2	GND
3	CTS1	4	DSR1
5	DTR1	6	RXD1
7	RI1	8	RTS1
9	TXD1	10	DCD1
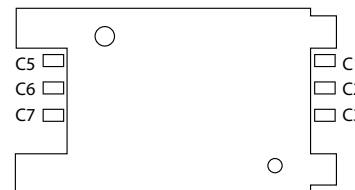
Pin	Definition	Pin	Definition
C1	UIM_PWR	C5	NC
C2	UIM_RST	C6	UIM_DAT
C3	UIM_CLK	C7	NC

GPS Wire to Board Connector

Connector size: 1 x 6 = 6-pin header
Connector location: J2
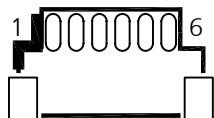
Pin	Definition	Pin	Definition
1	3.3V	2	GPS LED
3	TX	4	RX
5	GND	6	3.3V

GPS Wire to Board Connector

Connector size: 1 x 4 = 4-pin header
Connector location: J1
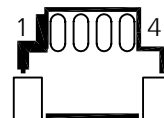
Pin	Definition	Pin	Definition
1	GND	2	NC
3	ODOMETER	4	DIRECTION

GPS Battery Connector
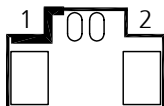
Connector size: 1 x 2 = 2-pin header
Connector location: J3

Pin	Definition
1	GND
2	VBAT

RTC Battery Connector

Connector size: 1 x 2 = 2-pin header
Connector location: J6
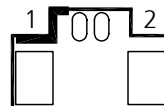
Pin	Definition
1	GND
2	VBAT

RTC Battery Connector

Connector size: 1 x 6 = 6-pin header
Connector location: CN13
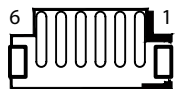
Pin	Definition	Pin	Definition
1	GND	2	FAN1 CONTROL
3	FAN1 SPEED	4	GND
5	FAN2 SPEED	6	FAN2 CONTROL

Debug 80 Port Connector

Connector size: 1 x 10 = 10-pin header (1.0mm)
Connector location: J4
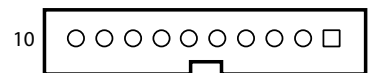
Pin	Definition	Pin	Definition
1	GND	2	PCIRST#
3	33M_CLK	4	LPC_FRAME#
5	LPC_AD3	6	LPC_AD2
7	LPC_AD1	8	LPC_AD0
9	VCC3	10	VCC3

USB Connectors (Reserved)

Connector size: 1 x 4 = 4-pin header (1.0mm)
Connector location: J8 and J10
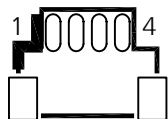
Pin	Definition	Pin	Definition
1	VCC	2	D-
3	D+	4	GND

CAN-MCU Update Port

Connector size: 1 x 6 = 6-pin header (2.54mm)
Connector location: JP6
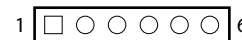
Pin	Definition	Pin	Definition
1	3.3V	2	SWDIO
3	SWDCLK	4	SWO
5	RESET#	6	GND

CAN-MCU Debug Port

Connector size: 1 x 3 = 3-pin header (2.54mm)
Connector location: JP3

1 ☐ ○ ○ 3
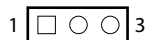
Pin	Definition
1	TX
2	RX
3	GND

MCU Debug Port

Connector size: 1 x 3 = 3-pin header (2.54mm)
Connector location: JP2

1 ☐ ○ ○ 3
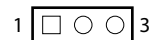
Pin	Definition
1	TX
2	RX
3	GND

MCU Download Port

Connector size: 2 x 4 = 8-pin header (1.27mm)
Connector location: JP5

COM3 RI/12V/5V Select Jumper

Connector size: 2 x 3 = 6-pin header
Connector location: JP4
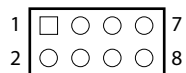
Pin	Definition	Pin	Definition
1	3.3V	2	MCU_TRST
3	MCU_TCK	4	MCU_TDO
5	MCU_RST	6	MCU_TDI
7	MCU_TMS	8	GND
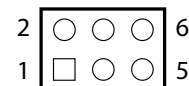
Pin	Definition
3-1	12V
3-4	RI
3-5	5V

Mini-PCIe for USB/PCIe/mSATA

Connector location: CN8
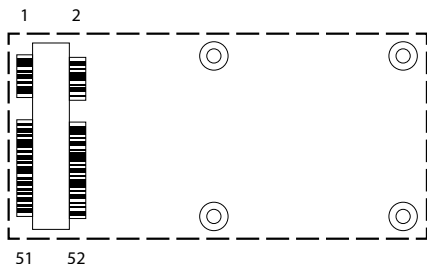
Pin	Definition	Pin	Definition
1	NC	2	+V3.3_MINI_2
3	NC	4	GND
5	NC	6	+V1.5S_MINI_2
7	CLKREQ#2	8	NC
9	GND	10	NC
11	MINICARD2_CN	12	NC
13	MINICARD2_CP	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	MINIPCIE2_DIS#
21	GND	22	MINIPCIE2_RST#
23	PCIE_RXP17_SATA_RXP4_R	24	+V3.3_MINI_2
25	PCIE_RXN17_SATA_RXN4_R	26	GND

Pin	Definition	Pin	Definition
27	GND	28	+V1.5S_MINI_2
29	GND	30	W_SM2_C
31	PCIE_TXN17_SATA_TXN4_C	32	W_SM2_D
33	PCIE_TXP17_SATA_TXP4_C	34	GND
35	GND	36	USB_10N_T
37	GND	38	USB_10P_T
39	+V3.3_MINI_2	40	GND
41	+V3.3_MINI_2	42	NC
43	GND	44	MINIPCIE2_WLAN_LED#_R
45	NC	46	NC
47	NC	48	+V1.5S_MINI_2
49	NC	50	GND
51	SSD4_DETECT	52	+V3.3_MINI_2

Mini-PCIe for USB/PCIe

Connector location: CN9
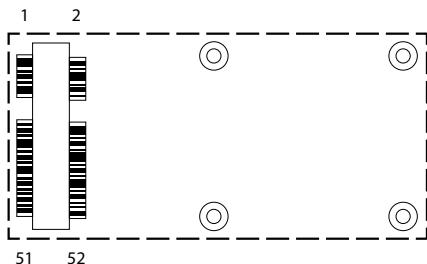
Pin	Definition	Pin	Definition
1	NC	2	+V3.3_MINI_3
3	NC	4	GND
5	NC	6	+V1.5S_MINI_3
7	CLKREQ#3	8	NC
9	GND	10	NC
11	PCIE_CN3	12	NC
13	PCIE_CP3	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	MINIPCIE3_DIS#
21	GND	22	MINIPCIE3_RST#
23	PE_RX18N_R	24	+V3.3_MINI_3
25	PE_RX18P_R	26	GND

Pin	Definition	Pin	Definition
27	GND	28	+V1.5S_MINI_3
29	GND	30	W_SM3_C
31	PE_TX18N_C	32	W_SM3_D
33	PE_TX18P_C	34	GND
35	GND	36	USB_11N_T
37	GND	38	USB_11P_T
39	+V3.3_MINI_3	40	GND
41	+V3.3_MINI_3	42	NC
43	GND	44	MINIPCIE3_WLAN_LED#_R
45	NC	46	NC
47	NC	48	+V1.5S_MINI_3
49	NC	50	GND
51	MBT_DIS#_R	52	+V3.3_MINI_3

Mini-PCIe for USB

Connector location: CN11
SIM socket: SIM 2 (default)
SIM socket: SIM 3
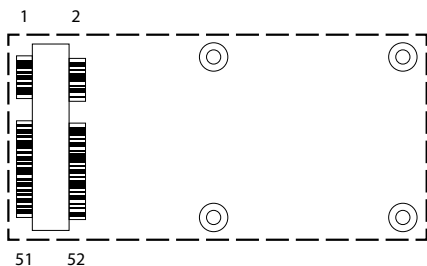
Pin	Definition	Pin	Definition
1	NC	2	+3.3V
3	NC	4	GND
5	NC	6	+1.5V
7	PCIE CLOCK REQUEST#	8	NC
9	GND	10	NC
11	PCIE_CLKN3	12	NC
13	PCIE_CLKP3	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	PCIE3 DISABLE#
21	GND	22	PCIE3 RESET#
23	PCIE_RXP3	24	+3.3V
25	PCIE_RXN3	26	GND

Pin	Definition	Pin	Definition
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PCIE_TXN3	32	SMB_DATA
33	PCIE_TXP3	34	GND
35	GND	36	USB_5N
37	GND	38	USB_5P
39	+3.3V	40	GND
41	+3.3V	42	NC
43	GND	44	PCIE3_WLAN_LED#
45	NC	46	NC
47	NC	48	+1.5V
49	NC	50	GND
51	BT DISABLE#	52	+3.3V

M.2 B-Key for USB 3.0 + USB 2.0 (Reserved)

Connector location: CN10
SIM socket: SIM 2 (default)
SIM socket: SIM 3

Pin	Definition	Pin	Definition	Pin	Definition	Pin	Definition
1	CONFIG3	2	3.3V	43	NC	44	NC
3	GND	4	3.3V	45	GND	46	NC
5	GND	6	POWER_OFF#	47	NC	48	NC
7	USB_9P_T	8	W1_DIS#	49	NC	50	NC
9	USB_9N_T	10	MINICARD1_WWAN_LED#	51	GND	52	NC
11	NC	20	NC	53	NC	54	NC
21	CONFIG0	22	NC	55	NC	56	SMB_DATA
23	SMS_RI_3.5G_R	24	NC	57	GND	58	SMB_CLK
25	NC	26	W2_DIS#	59	NC	60	NC
27	GND	28	NC	61	NC	62	NC
29	USB3_RXN9_T	30	SW2_RST	63	NC	64	NC
31	USB3_RXP9_T	32	SW2_CLK	65	NC	66	NC
33	GND	34	SW2_DAT	67	RESET#	68	NC
35	USB3_TXN9_T	36	SW2_PWR	69	CONFIG1	70	3.3V
37	USB3_TXP9_T	38	NC	71	GND	72	3.3V
39	GND	40	NC	73	GND	74	3.3V
41	NC	42	NC	75	CONFIG2		

M.2 B-Key for USB 3.0 + USB 2.0

Connector location: CN12
SIM socket: SIM 1 (default)
SIM socket: SIM 2
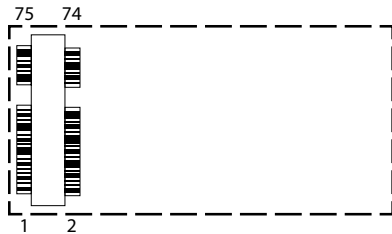
Pin	Definition	Pin	Definition
1	CONFIG3	2	3.3V
3	GND	4	3.3V
5	GND	6	POWER_OFF#
7	USB_7P_T	8	W1_DIS#
9	USB_7N_T	10	LTE_LED_PH
11	NA	20	NA
21	CONFIG0	22	NA
23	NA	24	NA
25	NA	26	W2_DIS#
27	GND	28	NA
29	USB3_PXN7_T	30	SW1_RST
31	USB3_PXP7_T	32	SW1_CLK
33	GND	34	SW1_DAT
35	USB3_TXN7_T	36	SW1_PWR
37	USB3_TXP7_T	38	NA
39	GND	40	NA
41	NA	42	NA

Pin	Definition	Pin	Definition
43	NA	44	NA
45	GND	46	NA
47	NA	48	NA
49	NA	50	NA
51	GND	52	NA
53	NA	54	PEWAKE#
55	NA	56	SM1_D
57	GND	58	SM1_C
59	NA	60	NA
61	NA	62	NA
63	NA	64	NA
65	NA	66	NA
67	RST#	68	SUSCLK_R
69	CONFIG1	70	3.3V
71	GND	72	3.3V
73	GND	74	3.3V
75	CONFIG2		

PoE Power & Low Speed Signal Connector

Connector location: JP7
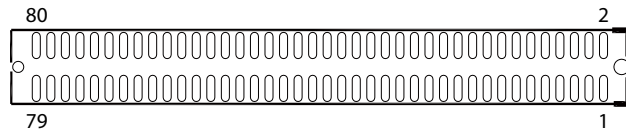
Pin	Definition	Pin	Definition
1	GND	2	VIN_M
3	GND	4	VIN_M
5	GND	6	VIN_M
7	GND	8	VIN_M
9	GND	10	VIN_M
11	GND	12	VIN_M
13	GND	14	VIN_M
15	GND	16	VIN_M
17	NC	18	NC
19	NC	20	NC
21	GND	22	V3.3ALW
23	MCU_I2C1_SCL	24	V3.3ALW
25	MCU_I2C1_SDA	26	EXP_ID_1
27	GND	28	EXP_ID_2
29	PCH_SMB_CLK	30	EXP_ID_3
31	PCH_SMB_DATA	32	EXP_ID_4
33	GND	34	SLP_S3#
35	VCC3_POK	36	SLP_S5#
37	VCC_EN	38	EXP_POE_POK
39	MB_MCU_PSE_PWREN	40	WAKE_ON_LAN_EN

Pin	Definition	Pin	Definition
41	MB_MCU_PSEA_RST	42	LAN_WAEK_N
43	MB_MCU_PSEB_RST	44	PLTRST#_POE
45	IO_USB_PWR_EN	46	GND
47	LAN_POE_LED0	48	LAN10G_ACTIVE_LED0
49	LAN_POE_LED1	50	LAN_ACTIVE_LED1
51	LAN_POE_LED2	52	LAN_ACTIVE_LED2
53	LAN_POE_LED3	54	LAN_ACTIVE_LED3
55	LAN_POE_LED4	56	LAN_ACTIVE_LED4
57	LAN_POE_LED5	58	LAN_ACTIVE_LED5
59	LAN_POE_LED6	60	LAN_ACTIVE_LED6
61	LAN_POE_LED7	62	LAN_ACTIVE_LED7
63	POE_PW_ERR#	64	V3P3_LAN1
65	NC	66	LAN_ACTIVE_LED8
67	POE_INSERT#	68	GND
69	SIO_AGND	70	USB_13N
71	POE_THER	72	USB_13P
73	GND	74	GND
75	USB_12N	76	USB_14N
77	USB_12P	78	USB_14P
79	GND	80	GND

PoE High Speed Signal Connector

Connector location: J9

Pin	Definition	Pin	Definition
A1	PCIE_RXP5	A2	PCIE_TXP5
A3	PCIE_RXN5	A4	PCIE_TXN5
A5	GND	A6	GND
A7	PCIE_RXP6	A8	PCIE_TXP6
A9	PCIE_RXN6	A10	PCIE_TXN6
A11	GND	A12	GND
A13	PCIE_RXP7	A14	PCIE_TXP7
A15	PCIE_RXN7	A16	PCIE_TXN7
A17	GND	A18	GND
A19	PCIE_RXP8	A20	PCIE_TXP8
A21	PCIE_RXN8	A22	PCIE_TXN8
A23	GND	A24	GND
A25	PCIE_RXP14	A26	PCIE_TXP14
A27	PCIE_RXN14	A28	PCIE_TXN14
A29	GND	A30	GND
A31	PCIE_RXP15	A32	PCIE_TXP15
A33	PCIE_RXN15	A34	PCIE_TXN15
A35	GND	A36	GND
A37	PCIE_RXP16	A38	PCIE_TXP16
A39	PCIE_RXN16	A40	PCIE_TXN16

Pin	Definition	Pin	Definition
B1	PCIE_RXP21	B2	PCIE_TXP21
B3	PCIE_RXN21	B4	PCIE_TXN21
B5	GND	B6	GND
B7	PCIE_RXP22	B8	PCIE_TXP22
B9	PCIE_RXN22	B10	PCIE_TXN22
B11	GND	B12	GND
B13	PCIE_RXP23	B14	PCIE_TXP23
B15	PCIE_RXN23	B16	PCIE_TXN23
B17	GND	B18	GND
B19	PCIE_RXP24	B20	PCIE_TXP24
B21	PCIE_RXN24	B22	PCIE_TXN24
B23	GND	B24	GND
B25	PCIE_CLKP5	B26	PCIE_CLKP14
B27	PCIE_CLKN5	B28	PCIE_CLKN14
B29	GND	B30	GND
B31	SATA_TXP0B	B32	SATA_TXP0A
B33	SATA_TXN0B	B34	SATA_TXN0A
B35	GND	B36	GND
B37	SATA_RXN0B	B38	SATA_RXN0A
B39	SATA_RXP0B	B40	SATA_RXP0A

Locations of the Jumpers and Connectors for the PoE Expansion Module (VIOB-POE8-03)

Top View
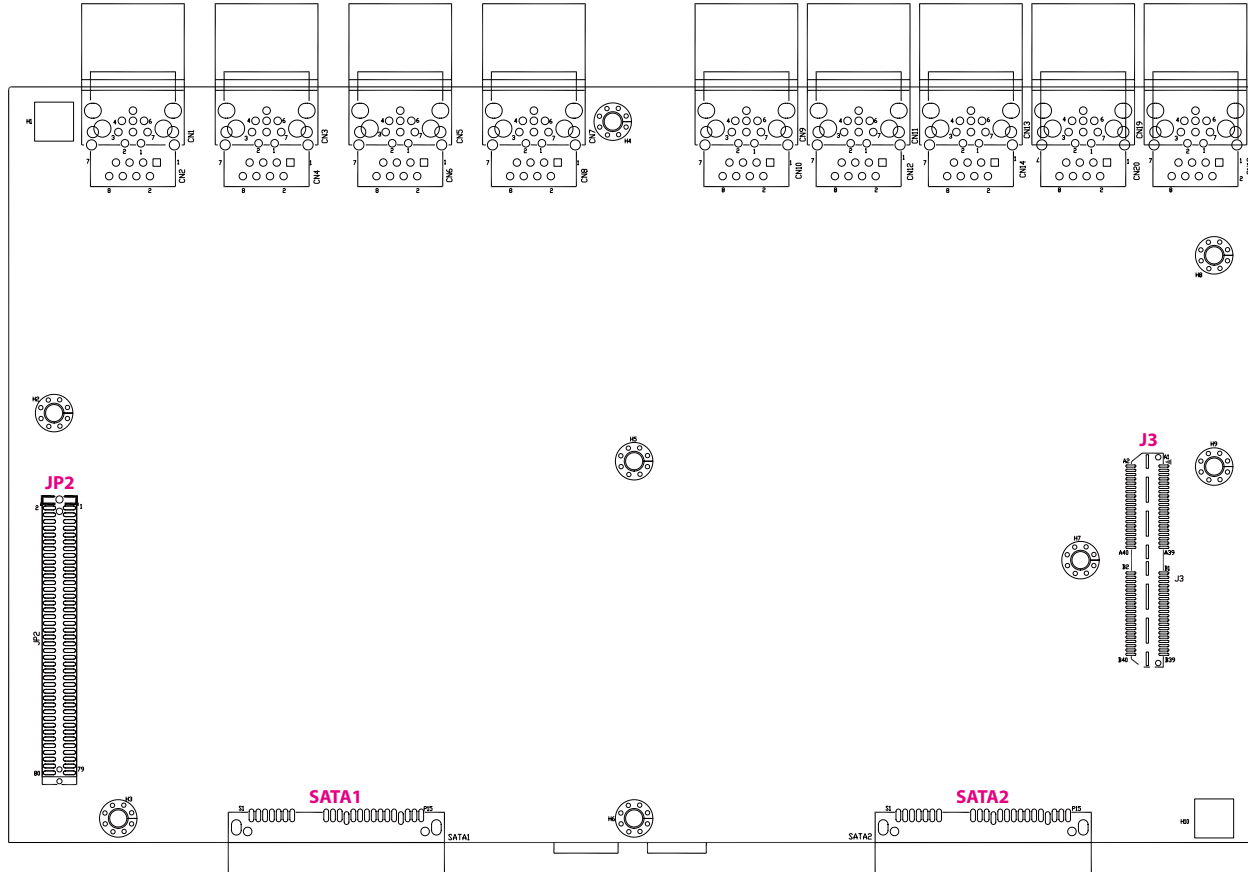
Internal Connectors
SATA Connectors (7-pin and 15-pin)

Connector type: Standard Serial ATA 7P and 15P
Connector location: SATA1 & SATA2
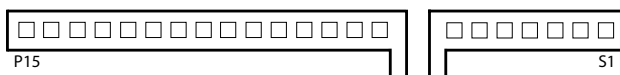
Pin	Definition	Pin	Definition
S1	GND	S2	SATA_TXP
S3	SATA_TXN	S4	GND
S5	SATA_RXN	S6	SATA_RXP
S7	GND	P1	NC
P2	NC	P3	NC
P4	GND	P5	GND
P6	GND	P7	VCC5
P8	VCC5	P9	VCC5
P10	GND	P11	NC
P12	GND	P13	NC
P14	NC	P15	NC

Low Speed Board to Board Connector

Connector location: JP2
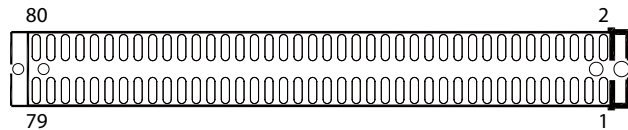
Pin	Definition	Pin	Definition
1	VIN_M(9-36V)	2	GND
3	VIN_M(9-36V)	4	GND
5	VIN_M(9-36V)	6	GND
7	VIN_M(9-36V)	8	GND
9	VIN_M(9-36V)	10	GND
11	VIN_M(9-36V)	12	GND
13	VIN_M(9-36V)	14	GND
15	VIN_M(9-36V)	16	GND
17	NC	18	NC
19	NC	20	NC
21	+V3.3ALW	22	GND
23	+V3.3ALW	24	MCU_I2C3_SCL_M
25	EXP_ID_1	26	MCU_I2C3_SDA_M
27	EXP_ID_2	28	GND
29	EXP_ID_3	30	SMB_CLK
31	EXP_ID_4	32	SMB_DATA
33	PM_SLP_S3#	34	GND
35	PM_SLP_S5#	36	VCC3_POK
37	EXP_POE_ALLPOK	38	VCC_EN
39	WAKE_ON_LAN_EN	40	MB_MCU_PSE_PWREN

Pin	Definition	Pin	Definition
41	LAN_WAEK_N	42	MB_MCU_PSEA_RST
43	PMU_PLTRST#	44	MB_MCU_PSEB_RST
45	GND	46	IO_USB_PWR_EN
47	LAN_10G_ACT#	48	POE1_LED#
49	LAN1_1G_ACT#	50	POE2_LED#
51	LAN2_1G_ACT#	52	POE3_LED#
53	LAN3_1G_ACT#	54	POE4_LED#
55	LAN4_1G_ACT#	56	POE5_LED#
57	LAN5_1G_ACT#	58	POE6_LED#
59	LAN6_1G_ACT#	60	POE7_LED#
61	LAN7_1G_ACT#	62	POE8_LED#
63	V3P3_LAN1	64	POE_ERRLED#
65	NC	66	NC
67	GND	68	GND
69	USB_13N	70	X550_THERM-DN
71	USB_13P	72	X550_THERM-DP
73	GND	74	GND
75	USB_14N	76	USB_15N
77	USB_14P	78	USB_15P
79	GND	80	GND

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High Speed Board to Board Connector

Connector location: J3

Pin	Definition	Pin	Definition
A1	PCIE_RXP5	A2	PCIE_TXP5
A3	PCIE_RXN5	A4	PCIE_TXN5
A5	GND	A6	GND
A7	PCIE_RXP6	A8	PCIE_TXP6
A9	PCIE_RXN6	A10	PCIE_TXN6
A11	GND	A12	GND
A13	PCIE_RXP7	A14	PCIE_TXP7
A15	PCIE_RXN7	A16	PCIE_TXN7
A17	GND	A18	GND
A19	PCIE_RXP8	A20	PCIE_TXP8
A21	PCIE_RXN8	A22	PCIE_TXN8
A23	GND	A24	GND
A25	PCIE_RXP14	A26	PCIE_TXP14
A27	PCIE_RXN14	A28	PCIE_TXN14
A29	GND	A30	GND
A31	PCIE_RXP15	A32	PCIE_TXP15
A33	PCIE_RXN15	A34	PCIE_TXN15
A35	GND	A36	GND
A37	PCIE_RXP16	A38	PCIE_TXP16
A39	PCIE_RXN16	A40	PCIE_TXN16

Pin	Definition	Pin	Definition
B1	PCIE_RXP21	B2	PCIE_TXP21
B3	PCIE_RXN21	B4	PCIE_TXN21
B5	GND	B6	GND
B7	PCIE_RXP22	B8	PCIE_TXP22
B9	PCIE_RXN22	B10	PCIE_TXN22
B11	GND	B12	GND
B13	PCIE_RXP23	B14	PCIE_TXP23
B15	PCIE_RXN23	B16	PCIE_TXN23
B17	GND	B18	GND
B19	PCIE_RXP24	B20	PCIE_TXP24
B21	PCIE_RXN24	B22	PCIE_TXN24
B23	GND	B24	GND
B25	PCIE_CLKP5	B26	PCIE_CLKP14
B27	PCIE_CLKN5	B28	PCIE_CLKN14
B29	GND	B30	GND
B31	SATA_TXP1	B32	SATA_TXP0
B33	SATA_TXN1	B34	SATA_TXN0
B35	GND	B36	GND
B37	SATA_RXP1	B38	SATA_RXP0
B39	SATA_RXN1	B40	SATA_RXN0

CHAPTER 4: 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. Remove the screws on the front panel.

2. Remove the screws on the rear panel.
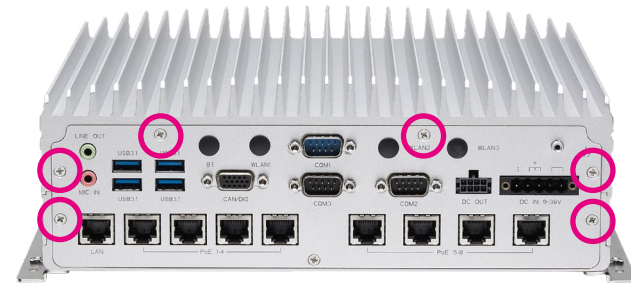
3. Remove the mounting bracket screws on the bottom of the enclosure.

4. After removing the brackets, loosen the screws on the bottom then remove the chassis top cover.

Removing the CPU

1. Locate the CPU socket and unlock the socket by pushing the load lever down, moving it sideways until it is released from the retention tab; then lift the load lever up.

Load Lever   **Retention Tab**

2. Lift the load plate up and remove the CPU from the socket.
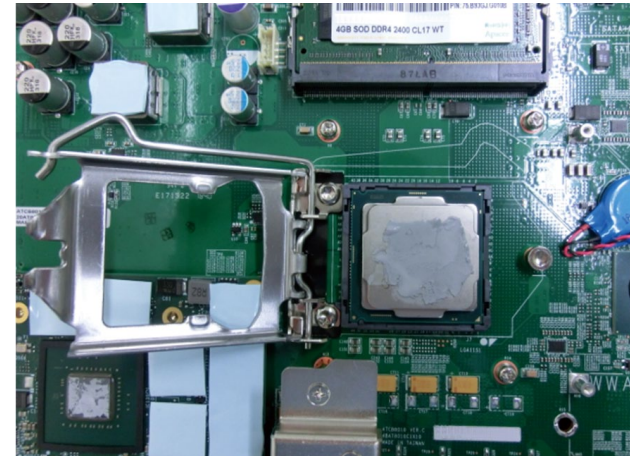
Removing the Memory Module

1. Push the ejector tabs which are at the ends of the socket outward. Then lift up the module and remove it from the socket.
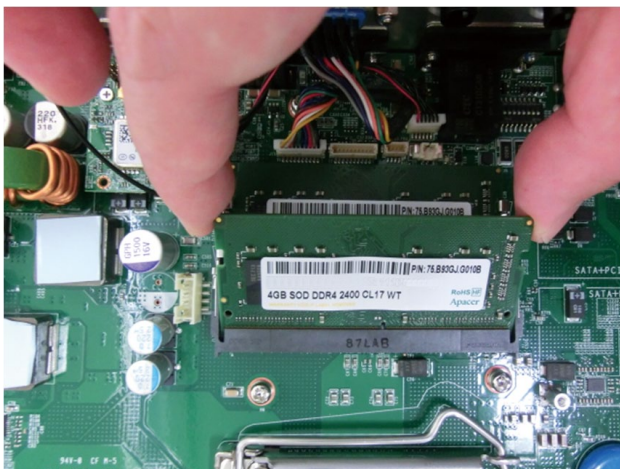
Installing a WWAN Module (Mini-PCIe)

1. Locate the WWAN Mini PCI Express slot (CN11). 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. Then fasten screws into the mounting holes to secure the module.
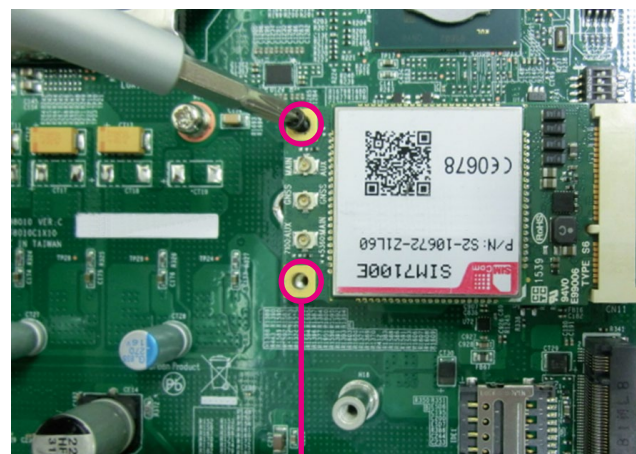
Mounting Screws

Installing a WWAN Module (M.2)

1. Locate the M.2 slot (CN10). Insert the module into the M.2 slot at a 45 degrees angle until the gold-plated connector on the edge of the module completely disappears inside the slot. Then fasten a screw into the mounting hole to secure the module.
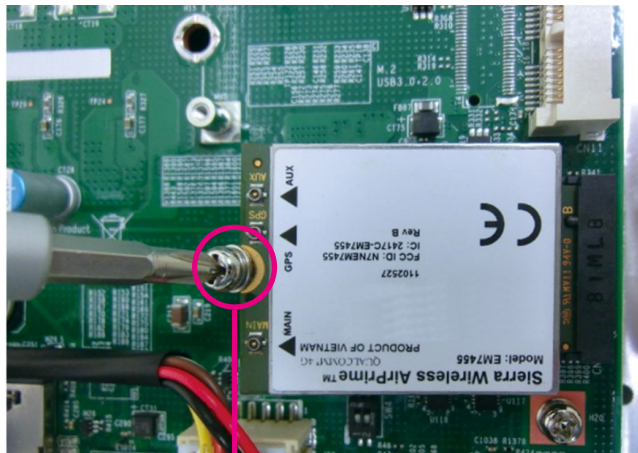
Mounting Screw

Installing a WLAN Module (Half Mini-PCIe)

1. Locate the WLAN Mini PCI Express slot (CN9). 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. Then fasten a screw into the mounting hole to secure the module.
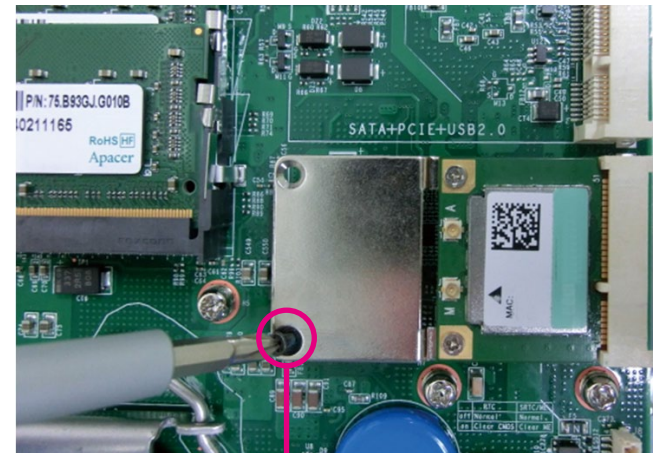
Mounting Screw

Installing a SIM Card

1. Remove the SIM card cover.

2. Insert the SIM card into the SIM card slot.

3. Close the cover and secure it to the original position.

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Installing a SSD/HDD Drive

1. The SSD/HDD bays on the front are used to install 2.5" hard drives. Loosen the thumb screws and remove the cover.

Thumb Screws
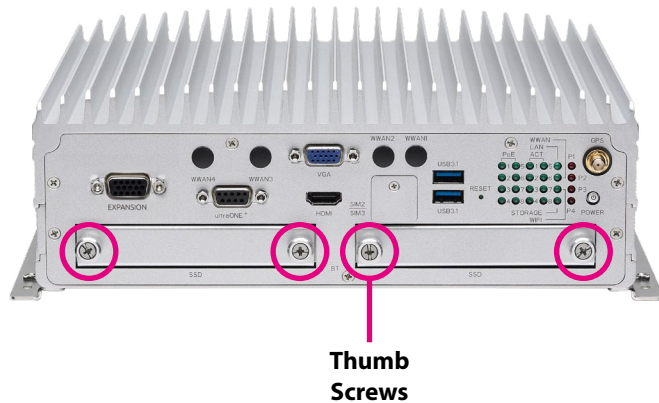
2. Place the storage drive into the drive bay with the SATA data and power connector facing towards the end. Align the storage drive's mounting holes with the mounting holes on the drive bay, and use the provided screws to secure the storage drive in place.
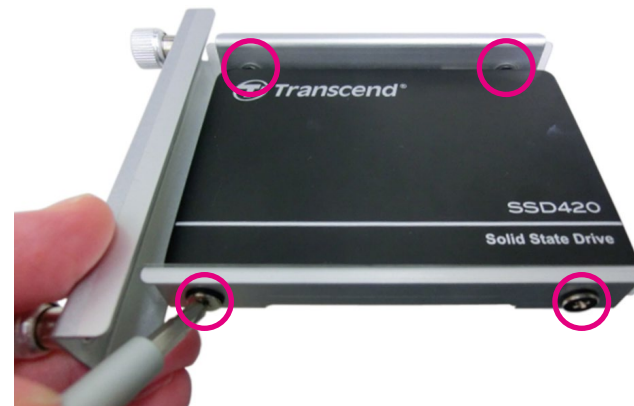
3. Insert the drive bay back to its original position and secure the thumb screws.

APPENDIX A:
SOFTWARE DEMO UTILITY FOR I/O PORTS OF FUNCTION CONTROL

Menu Screen
1. Config1
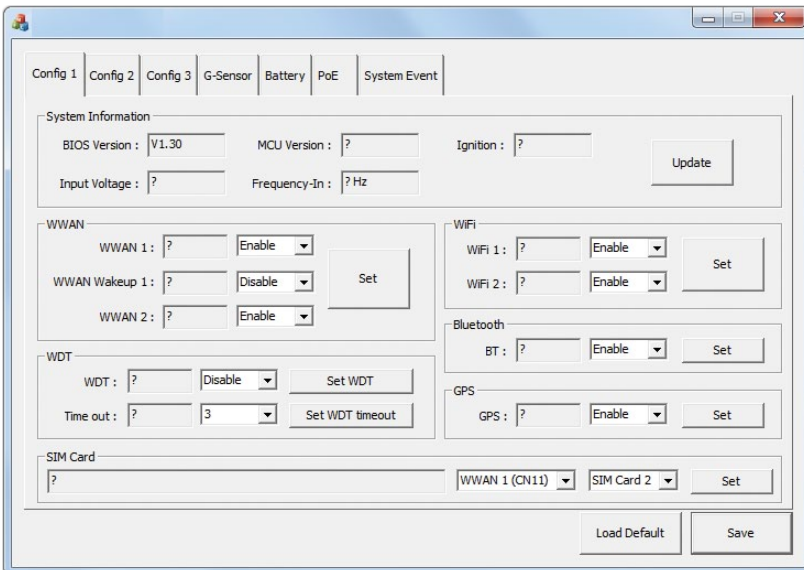
1.1 System Information

Displays basic information of the system.
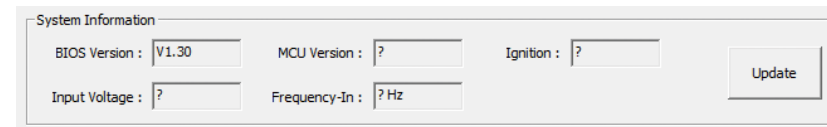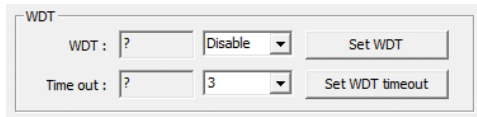
1.2 WWAN

Enables or disables the WWAN function and the wake-up function.
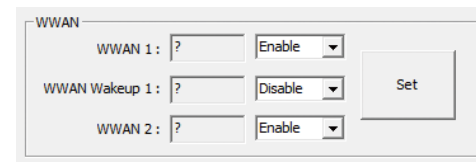
1.3 WDT

Enables or disables the watchdog function. WDT timeout timer can be configured.
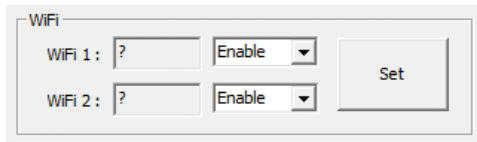
1.4 WiFi

Enables or disables the WiFi function.
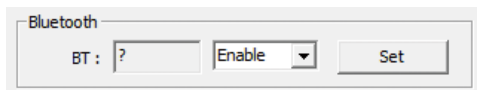
1.5 Bluetooth

Enables or disables the Bluetooth function.
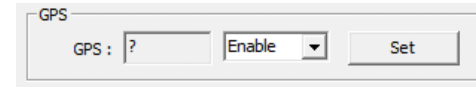
1.6 GPS

Enables or disables the GPS function.
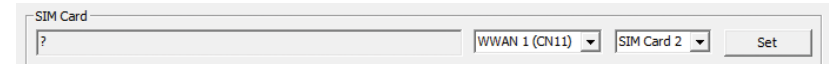
1.7 SIM Card

Selects the SIM Card for WWAN.
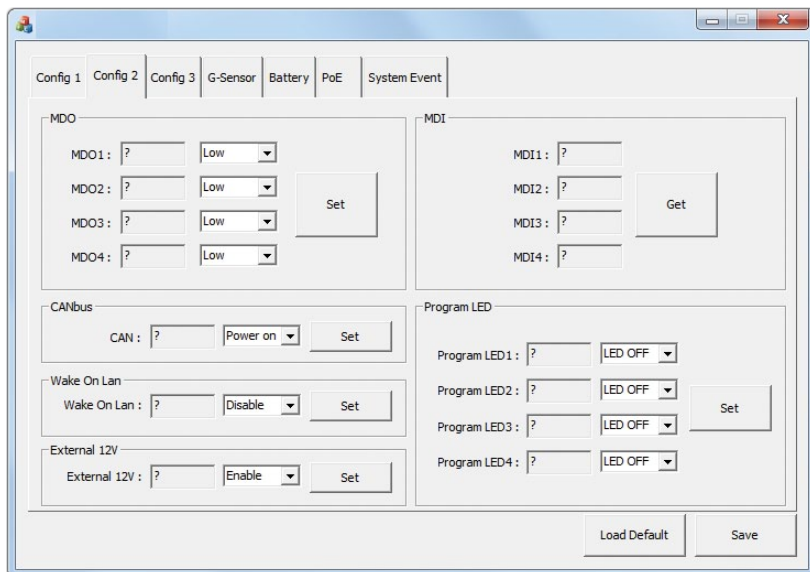
2. Config2

2.1 GPO

Configures GPO as high voltage level or low voltage level.
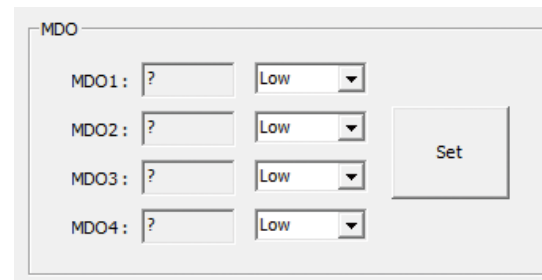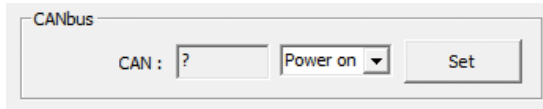
2.2 GPI

Reads the status (voltage level) of GPI.
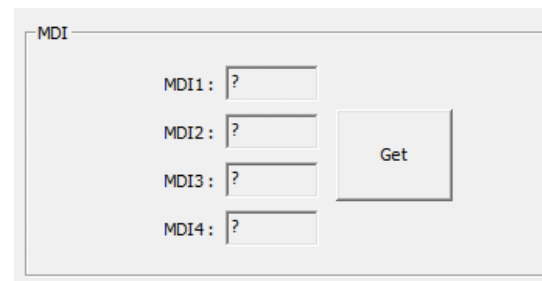
2.3 CAN Bus

Enables or disables the CAN Bus function.
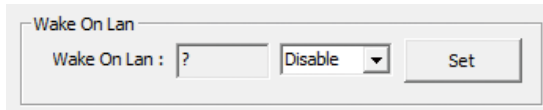
CANbus

CAN : [?] [Power on ▾]   [Set]

2.4 Wake On LAN

Enables or disables the Wake On LAN function on LAN.
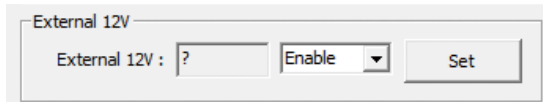
Wake On Lan

Wake On Lan : [?] [Disable ▾]   [Set]

2.5 External 12V

Enables or disables the 12VDC power output.
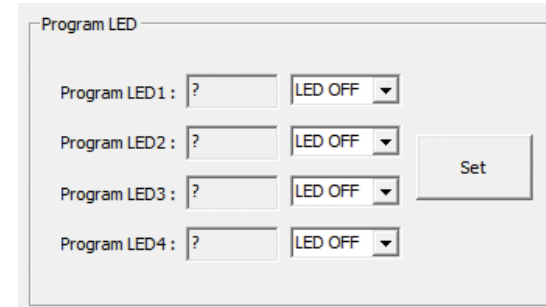
External 12V

External 12V : [?] [Enable ▾]   [Set]

2.6 Programmable LED

Turns On/Off LED light.

Program LED

Program LED1 : [?] [LED OFF ▾]

Program LED2 : [?] [LED OFF ▾]   [Set]

Program LED3 : [?] [LED OFF ▾]

Program LED4 : [?] [LED OFF ▾]

3. Config3

3.1 Low Battery Voltage Protection

Enables or disables low battery voltage protection function. Once it is enabled, one of 4 types of voltage levels can be selected.

3.2 Power Type

Shows one of the following power types for input voltage:

- 12VDC
- 24VDC
- 9~36VDC

3.3 Delay On/Off Timer

Enables or disables the Delay On/Off function. Once this function is enabled, the delay timer can be configured.

3.4 RTC Wake Up Timer

Enables or disables the RTC Wake Up function. Once this function is enabled, the timer can be configured.
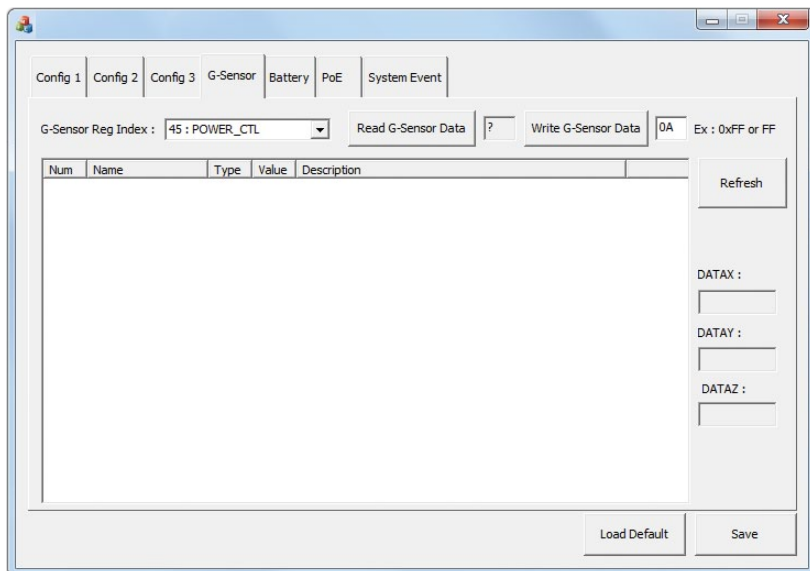
4. G-Sensor

4.1 G-Sensor Registers

Selects the registers inside G-Sensor to read or write the data.
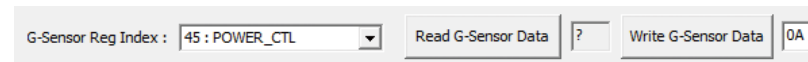
4.2 Register Table

Shows the value of all registers in G-Sensor, once the Refresh button is pressed.
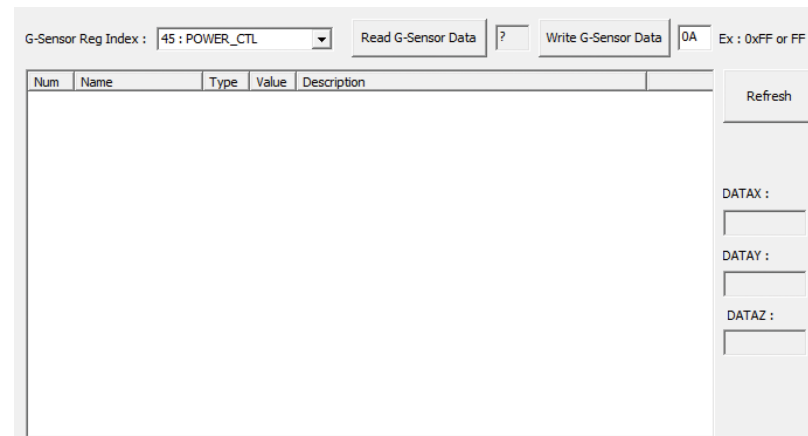
5. PoE
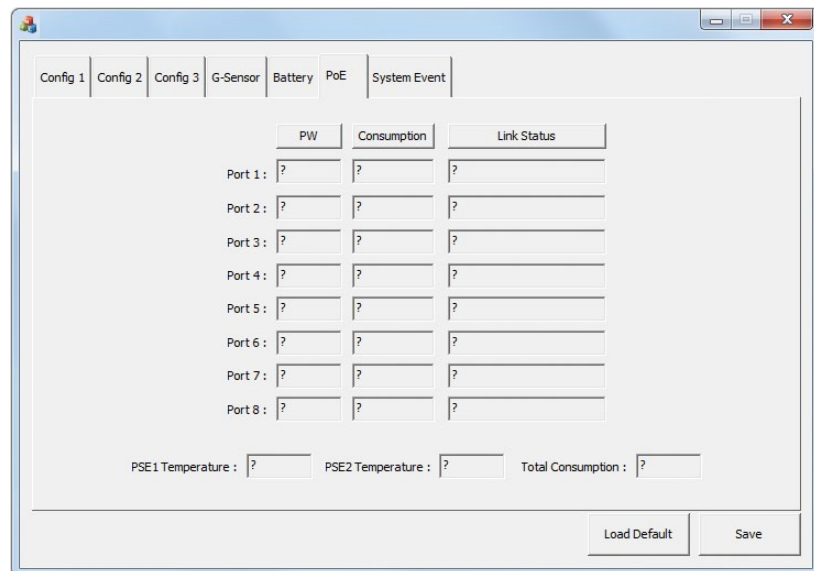
5.1 PoE
Shows the status of PoE power output.

5.2 Output (W)
Shows the power output of each PoE port.

5.3 Link Status
Shows the status of PoE link.
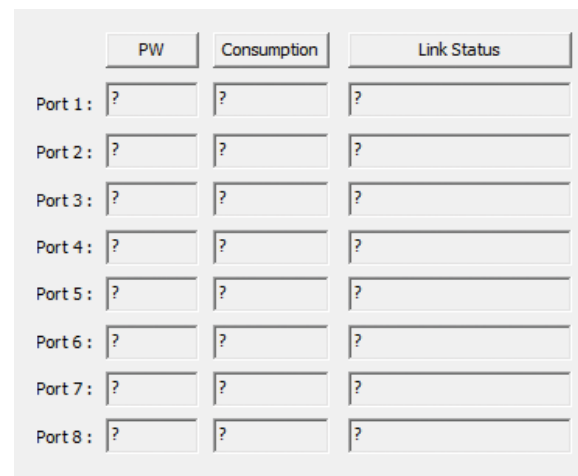
5.4 Total Output (W)
Shows the total power output of all PoE ports.

6. System Event
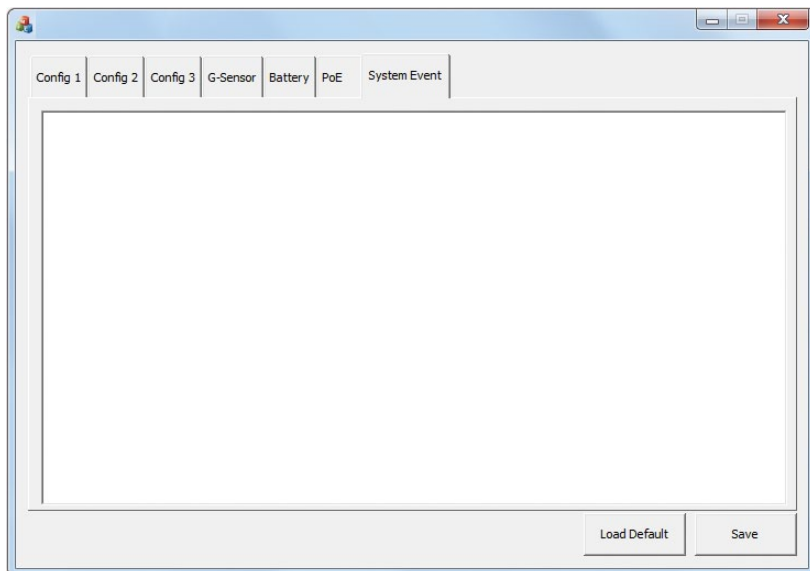
The System Event tab shows the following alarm messages:

1. Over voltage alarm
2. Lower voltage alarm
3. Over temperature alarm
4. Lower temperature alarm
5. Fan error alarm

Appendix B: GPS Feature

uBlox-NEO M8 Overview

The NEO-M8 series of standalone concurrent GNSS modules is built on the exceptional performance of the u-blox M8 GNSS (GPS, GLONASS, Galileo, BeiDou, QZSS and SBAS) engine in the industry proven NEO form factor.

The NEO-M8 series provides high sensitivity and minimal acquisition times while maintaining low system power. The NEO-M8M is optimized for cost sensitive applications, while NEO-M8N and NEO-M8Q provide best performance and easier RF integration. The NEO form factor allows easy migration from previous NEO generations. Sophisticated RF-architecture and interference suppression ensure maximum performance even in GNSS-hostile environments.

The NEO-M8 combines a high level of robustness and integration capability with flexible connectivity options. The future-proof NEO-M8N includes an internal Flash that allows simple firmware upgrades for supporting additional GNSS systems. This makes NEO-M8 perfectly suited to industrial and automotive applications.

The DDC (I^2C compliant) interface provides connectivity and enables synergies with most u-blox cellular modules. For RF optimization the NEO-M8N/Q features an additional front-end LNA for easier antenna integration and a front-end SAW filter for increased jamming immunity.

u-blox M8 modules use GNSS chips qualified according to AEC-Q100, are manufactured in ISO/TS 16949 certified sites, and fully tested on a system level. Qualification tests are performed as stipulated in the ISO16750 standard: "Road vehicles – Environmental conditions and testing for electrical and electronic equipment".

Technical Specifications

Features

Receiver type	72-channel u-blox M8 engine GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1 SBAS L1 C/A: WAAS, EGNOS, MSAS Galileo-ready E1B/C (NEO-M8N)		
Nav. update rate[1]	Single GNSS: up to 18 Hz		
	Concurrent GNSS: up to 10 Hz		
Position accuracy	2.0 m CEP		
		NEO-M8N/Q	NEO-M8M
Acquisition	Cold starts:	26 s	27 s
	Aided starts:	2 s	4 s
	Reacquisition:	1 s	1 s
Sensitivity	Tracking & Nav:	−167 dBm	−164 dBm
	Cold starts:	−148 dBm	−147 dBm
	Hot starts:	−156 dBm	−156 dBm
Assistance	AssistNow GNSS Online AssistNow GNSS Offline (up to 35 days) AssistNow Autonomous (up to 6 days) OMA SUPL & 3GPP compliant		
Oscillator	TCXO (NEO-M8N/Q), Crystal (NEO-M8M)		
RTC crystal	Built-in		
Noise figure	On-chip LNA (NEO-M8M). Extra LNA for lowest noise figure (NEO-M8N/Q)		

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Features cont.

Anti jamming	Active CW detection and removal. Extra onboard SAW band pass filter (NEO-M8N/Q)
Memory	ROM (NEO-M8M/Q) or Flash (NEO-M8N)
Supported antennas	Active and passive
Odometer	Travelled distance
Data-logger	For position, velocity, and time (NEO-M8N)

[1] For NEO-M8M/Q

Electrical data

Supply voltage	1.65 V to 3.6 V (NEO-M8M)
	2.7 V to 3.6 V (NEO-M8N/Q)
Power consumption[2]	23 mA @ 3.0 V (continuous) 5 mA @ 3.0 V Power Save Mode (1 Hz, GPS only)
Backup Supply	1.4 to 3.6 V

[2] NEO-M8M

Interfaces

Serial interfaces	1 UART 1 USBV2.0 full speed 12 Mbit/s 1 SPI (optional) 1 DDC (I²C compliant)
Digital I/O	Configurable timepulse 1 EXTINT input for Wakeup
Timepulse	Configurable 0.25 Hz to 10 MHz
Protocols	NMEA, UBX binary, RTCM

VIOB-GPS-02 Module Connector Pin Definitions

J2 (GPS Side)   **J9 (PC Side)**

J2 Pin Definition

Pin	Definition	Pin	Definition
1	GPS_3V3	2	GND
3	GPS_TXD_M	4	GPS_RXD_M
5	NC	6	+V3.3ALW

J9 Pin Definition

Pin	Definition	Pin	Definition
1	GPS_BAT	2	GPS_LED#
3	GPS_TX	4	GPS_RX
5	GND	6	VCC3_GPS

COM Port for GPS: COM 4
Baud Rate: 9600

APPENDIX C: SIGNAL CONNECTION OF MCU DI/DO

GPIO Pinout Description
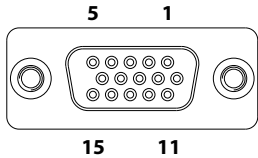
Pin	Definition	Pin	Definition
1		2	
3	GPO3	4	GPI1
5	GPO0	6	
7		8	
9	GPI2	10	GPO1
11		12	
13	GPI3	14	GPO2
15	GPI0		

Digital Input

CN12 connector for GPI signal (digital signal input). The CN12 connector has 4 digital input channels by default.

Wet Contact (default)
The SW2 switch needs to switch to "ON" state. The GPI signals have a pull up resistor to Vin Voltage internally.

The figure below shows how to connect an external source to one of the input channels.
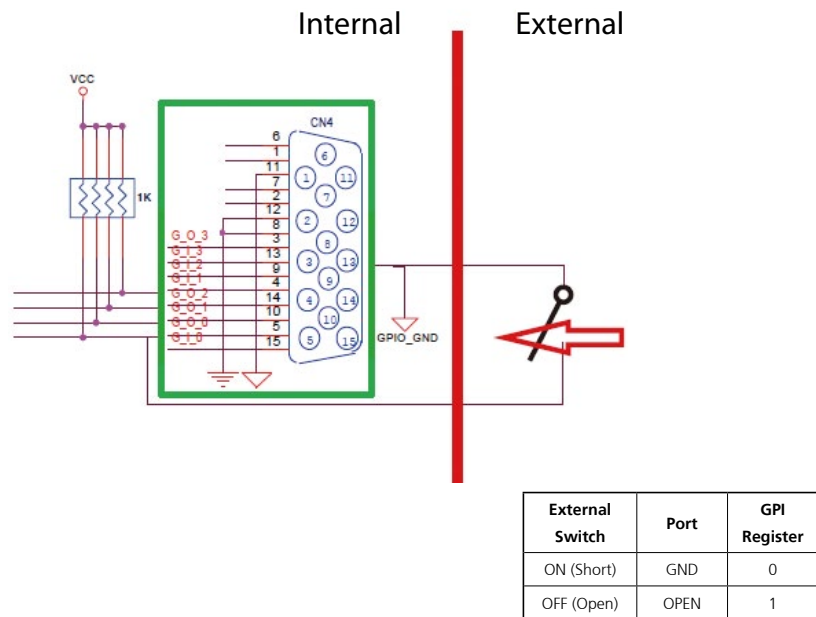
Dry Contact:
The SW2 switch needs to switch to "Low" state. The GPI signal will not have a pull up resistor internally.

The figure below shows how to connect an external source to one of the input channels.

External Switch	Port	GPI Register
ON (Short)	GND	0
OFF (Open)	OPEN	1

External Switch	Port	GPI Register
ON (Short)	GND	0
OFF (Open)	HIGH	1
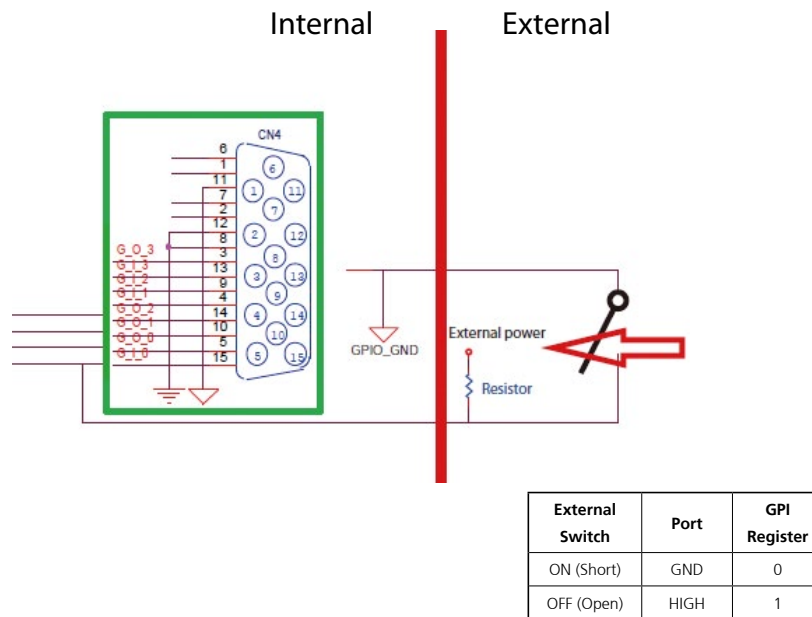
Digital Output

CN12 connector for GPO signal (digital signal output). The CN12 connector has 4 digital output channels by default.

The signal connection of CN12 supports two connected methods for output signal type. One is Low level (driven to 0V from GPO signal) other is High level (high voltage is provided from external device).

Wet Contact (default)
The SW2 switch needs to switch to "ON" state. The GPO signal will have a pull up resistor to Vin Voltage internally.

The figure below shows how to connect an external source to one of the output channels.

GPO Register	Port
1	HIGH
0	GND
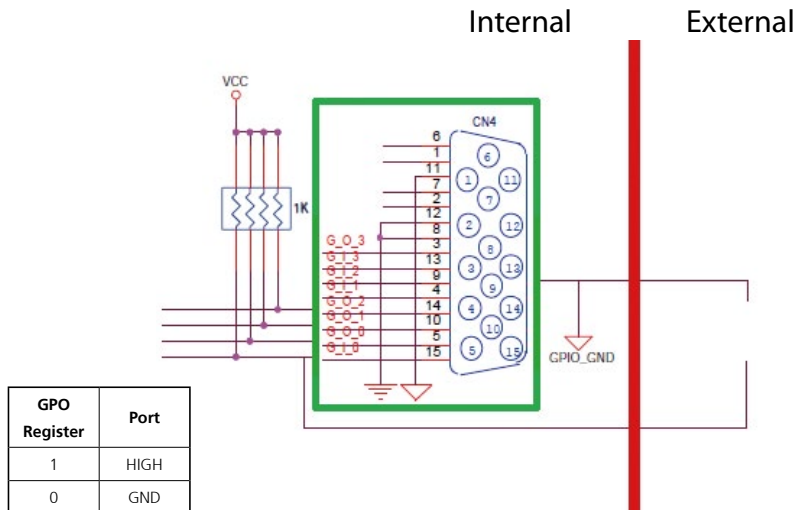
Dry Contact
The SW2 switch needs to switch to "Low" state. The GPO signal will not have a pull up resistor internally.

The figure below shows how to connect an external source to one of the output channels.

GPO Register	Port
1	HIGH
0	GND
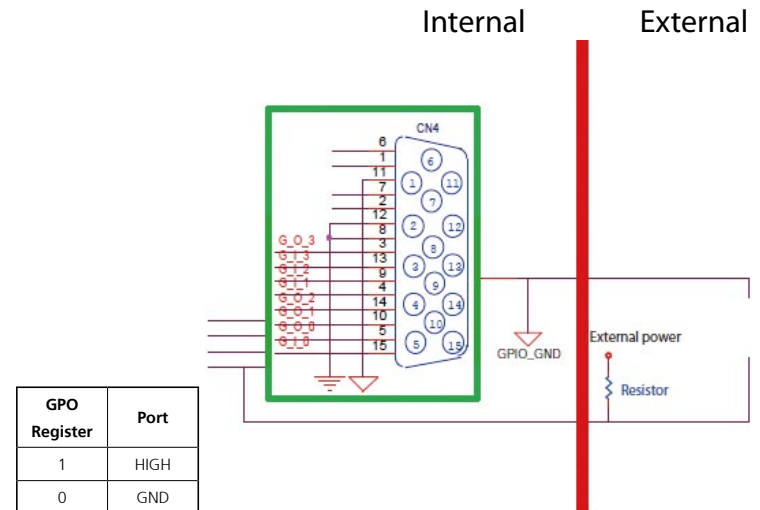
APPENDIX D: VEHICLE POWER MANAGEMENT SETUP

Startup and Shutdown Voltage Setting

Set the startup voltage to 11.5V or 23V and the shutdown voltage to 10.5V or 21V

If the input voltage is 12V: the startup voltage to 11.5V and the shutdown voltage to 10.5V.

If the input voltage is 24V: the startup voltage to 23V and the shutdown voltage to 21V.

```
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  Power Management Configuration                        Startup,Shutdown Setting

  ** External +12V & By Pass Car Battery Setting **
  External Power                    [Turn On Both]

  ** Startup & Shutdown Voltage Setting **
  Input Voltage                     9-36V
  Startup,Shutdown                  [(11.5,10.5)/(23,21)]

  ** Delay Time Setting **          ┌──── Startup,Shutdown ────┐
  Power On Delay                    │ (11.5, 10.5) / (23,21)   │
  Power Off Delay                   │ (12.0, 11.0) / (24,22)   │
                                    │ (12.5, 11.0) / (25,22)   │
                                    │ (12.5, 11.5) / (25,23)   │
                                                        →←: Select Screen
                                                        ↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit

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```

Set the startup voltage to 12.0V or 24V and the shutdown voltage to 11.0V or 22V

If the input voltage is 12V: the startup voltage to 12V and the shutdown voltage to 11V.

If the input voltage is 24V: the startup voltage to 24V and the shutdown voltage to 22V.

```
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   Advanced

  Power Management Configuration                        Startup,Shutdown Setting

  ** External +12V & By Pass Car Battery Setting **
  External Power                    [Turn On Both]

  ** Startup & Shutdown Voltage Setting **
  Input Voltage                     9-36V
  Startup,Shutdown                  [(12.0,11.0)/(24,22)]

  ** Delay Time Setting **          ┌──── Startup,Shutdown ────┐
  Power On Delay                    │ (11.5, 10.5) / (23,21)   │
  Power Off Delay                   │ (12.0, 11.0) / (24,22)   │
                                    │ (12.5, 11.0) / (25,22)   │
                                    │ (12.5, 11.5) / (25,23)   │
                                                        →←: Select Screen
                                                        ↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit

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```

Set the startup voltage to 12.5V or 25V and the shutdown voltage to 11.0V or 22V

If the input voltage is 12V: the startup voltage to 12.5V and the shutdown voltage to 11V.

If the input voltage is 24V: the startup voltage to 25V and the shutdown voltage to 22V.

```
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  Power Management Configuration                          Startup,Shutdown Setting

  ** External +12V & By Pass Car Battery Setting **
  External Power                    [Turn On Both]

  ** Startup & Shutdown Voltage Setting **
  Input Voltage                     9-36V
  Startup,Shutdown                  [(12.5,11.0)/(25,22)]

  ** Delay Time Setting **         ┌── Startup,Shutdown ──┐
  Power On Delay                   │  (11.5, 10.5) / (23,21)  │
  Power Off Delay                  │  (12.0, 11.0) / (24,22)  │
                                   │  (12.5, 11.0) / (25,22)  │
                                   │  (12.5, 11.5) / (25,23)  │   →←: Select Screen
                                   └──────────────────────┘    ↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit


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```

Set the startup voltage to 12.5V or 25V and the shutdown voltage to 11.0V or 22V

If the input voltage is 12V: the startup voltage to 12.5V and the shutdown voltage to 11.5V.

If the input voltage is 24V: the startup voltage to 25V and the shutdown voltage to 23V.

```
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  Power Management Configuration                          Startup,Shutdown Setting

  ** External +12V & By Pass Car Battery Setting **
  External Power                    [Turn On Both]

  ** Startup & Shutdown Voltage Setting **
  Input Voltage                     9-36V
  Startup,Shutdown                  [(12.5,11.5)/(25,23)]

  ** Delay Time Setting **         ┌── Startup,Shutdown ──┐
  Power On Delay                   │  (11.5, 10.5) / (23,21)  │
  Power Off Delay                  │  (12.0, 11.0) / (24,22)  │
                                   │  (12.5, 11.0) / (25,22)  │
                                   │  (12.5, 11.5) / (25,23)  │   →←: Select Screen
                                   └──────────────────────┘    ↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit


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```

Power-on Delay Setting

Disable Power-on Delay

```
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  Power Management Configuration                        Power On Delay Setting

  ** External +12V & By Pass Car Battery Setting **
  External Power                      [Turn On Both]

  ** Startup & Shutdown Voltage Setting **
  Input Voltage                       9-36V
  Startup,Shutdown                    [(12.0,11.0)/(24,22)]

  ** Delay Time Setting **
  Power On Delay        ┌────────── Power On Delay ──────────┐
  Power Off Delay       │ Disabled                           │
                        │ Enabled                            │
                        └────────────────────────────────────┘
                                                      →←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit


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```

Enable Power-on Delay

Delay time can be set at 10sec/30sec/1min./5min./10min./15min./30min./1hour.

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Power Management Configuration

** External +12V & By Pass Car Battery Setting **
External Power   [Turn On Both]

** Startup & Shutdown Voltage Setting **
Input Voltage   9-36V
Startup,Shutdown   [(12.0,11.0)/(24,22)]

** Delay Time Setting **
Power On Delay
Power Off Delay

Power On Delay Setting

┌───── Power On Delay ─────┐
│ Disabled   │
│ Enabled   │
└──────────────────────────┘

→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

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Power Management Configuration

** External +12V & By Pass Car Battery Setting **
External Power   [Turn On Both]

** Startup & Shutdown Voltage Setting **
Input Voltage   9-36V
Startup,Shutdown

** Delay Time Setting **
Power On Delay
  Delay On Time Selection

Power Off Delay

Delay On Time selection Setting

┌───── Delay On Time selection ─────┐
│ 10 sec   │
│ 30 sec   │
│ 1 min   │
│ 5 min   │
│ 10 min   │
│ 15 min   │
│ 30 min   │
│ 1 hour   │
└───────────────────────────────────┘

lect Screen
ct Item
elect
nge Opt.
ral Help
ous Values
mized Defaults
F4: Save & Exit
ESC: Exit

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Power-off Delay Setting

Disable Power-off Delay

```
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 Power Management Configuration                          Power Off Delay Setting

 ** External +12V & By Pass Car Battery Setting **
 External Power                    [Turn On Both]

 ** Startup & Shutdown Voltage Setting **
 Input Voltage                     9-36V
 Startup,Shutdown                  [(12.0,11.0)/(24,22)]

 ** Delay Time Setting **
 Power On Delay               ┌──── Power Off Delay ────┐
   Delay On Time selection    │ Disabled                │
                              │ Enabled                 │
 Power Off Delay              │                         │      →←: Select Screen
   Delay Off Time selection   └─────────────────────────┘      ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit


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```

Enable Power-off Delay

Delay time can be set at 20sec/1min./5min./10min./30min./1hour/6hour/18hour.

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Power Management Configuration

** External +12V & By Pass Car Battery Setting **
External Power   [Turn On Both]

** Startup & Shutdown Voltage Setting **
Input Voltage   9-36V
Startup,Shutdown   [(12.0,11.0)/(24,22)]

** Delay Time Setting **
Power On Delay
  Delay On Time selection

Power Off Delay
  Delay Off Time selection

Power Off Delay Setting

Power Off Delay
Disabled
Enabled

→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

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Power Management Configuration

** External +12V & By Pass Car Battery Setting **
External Power   [Turn On Both]

** Startup & Shutdown Voltage Setting **
Input Voltage   9-36V
Startup,Shutdown

** Delay Time Setting **
Power On Delay
  Delay On Time selection

Power Off Delay
  Delay Off Time selection

Power Off Time selection Setting

Delay Off Time selection
20 sec
1 min
5 min
10 min
30 min
1 hour
6 hour
18 hour

ct Screen
Item
ect
ge Opt.
al Help
us Values
ized Defaults
F4: Save & Exit
ESC: Exit

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APPENDIX E: POWER CONSUMPTION

OS: Windows 10

Burn-in Software

Device:

Idle: Into OS + Display x3 (HDMI + VGA + ultraONE) + All module (unlink) + keyboard & mouse + speaker

Full State: Into OS + Display x3 (HDMI + VGA + ultraONE) + Burn In 100% + module (link) + play video + keyboard & mouse + speaker + COM transmit + GPS link

Full State + Loading: Full state + USB Load (5V/1A) x 4 + DC out (12V/2A) + COM PWR load (12V/1A) + POE (15W) x4

Item	Device	Test Case		Result	
				Current(A)	Watt(W)
1	S0 State	Idle State	12V	4.27	51.24
			24V	2.27	54.48
			36V	1.65	59.4
		Full State	12V	8.29	99.48
			24V	4.31	103.44
			36V	3.22	115.92
		Full State + Loading	12V	14.3	171.6
			24V	7.09	171.16
			36V	4.90	176.4
		Full State + Loading (PoE_60W)	12V	20.41	244.92
			24V	9.73	233.52
			36V	6.60	237.6
2	S3 State	Full State Sleep Mode	12V	0.9A	
3	IGN OFF	Full State IGNITION OFF	12V	10mA	
			24V	10mA	