



**NEXCOM International Co., Ltd.**

**Mobile Computing Solutions**  
**Vehicle Telematics Computer**  
**VTC 7252 Series**  
User Manual

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# PREFACE

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## Acknowledgements

VTC 7252-7C4IP 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.

## 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](http://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 7252-7C4IP package that you received is complete. Your VTC 7252-7C4IP package should have all the items listed in the following table.

Item	P/N	Name	Qty
1	50311F0270X00	Round Head Screw w/Spring+Flat Washer Long Fei:P3x7L	8
2	50333P0027X00	Washer for SMA Connector Kang Yang:TW-181	6
3	50333P0028X00	Washer for SMA Connector Kang Yang:WS6-0.8(B)	6
4	5061200061X00	SMA Washer Twin Adhesive for IP65 VER:A S.W.	6
5	6012200052X00	PE Zipper Bag #8	1
6	6012200053X00	PE Zipper Bag #3	1
7	602DCD1675X00	VTC 7252-7C4IP DVD Driver VER:1.0	1
8	603ANT0314X00	GPS/GLONASS/BDS Active Antenna Cable UNICTRON:EG-2B-CS-B01	1
9	603ATA0157X00	SATA Cable ST:MD-6109095	2
10	603POW0407X00	Power Cable ST:ST-2005011	1
11	5050301015X00	Mini Card Heatsink For VTC7252-7C4IP VER:A SHYUNG SHUHNΦ20x18mm AL5052	2
12	5060200181X00	Thermal Pad E-LIN 25x25x2mm S3S K=2.0w/mk	2
13	50311F0270X00	(H)Round Head Screw w/Spring+Flat Washer Long Fei:P3x7L P3x7 iso/SW6x0.5 NI	2

## Ordering Information

The following provides ordering information for VTC 7252-7C4IP.

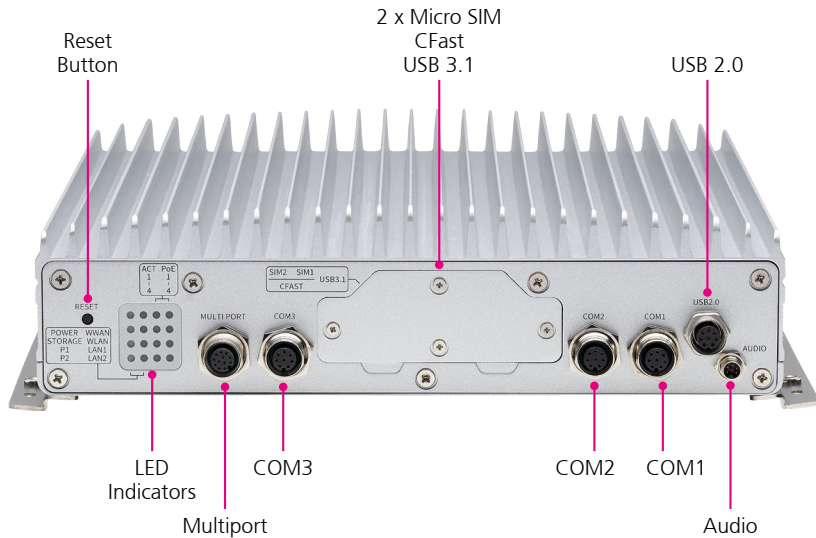
- **VTC 7252-7C4IP (P/N: 10V00725200X0)**

9th generation Intel® Core™ i7-9700TE, 2 x 4 GB industrial grade memory, VGA output, 2 x internal 2.5" tray, 1 x CFast, 2 x LAN, 4 x PoE 802.3af/at (total 60W), 2 x mini-PCIe slot, 2 x M.2 slot, 2 x SIM socket, 2 x USB 3.1, 2 x RS232 (full), 1 x full RS232/422/485, 3 x DI & 3 x DO

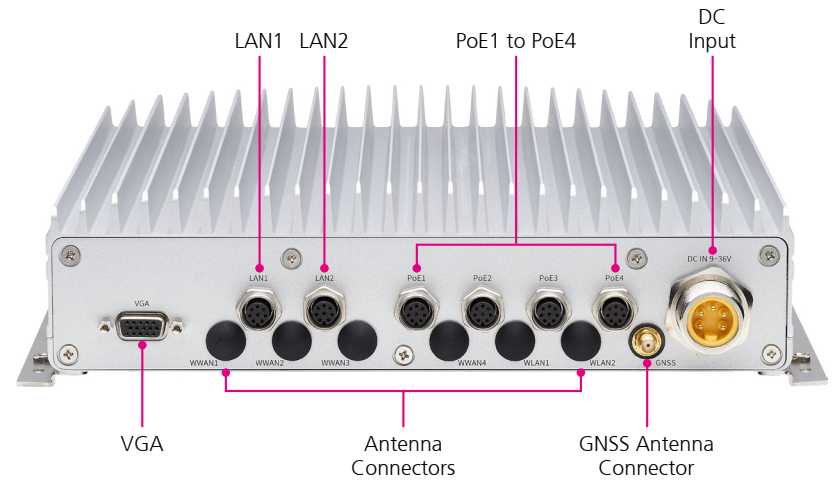
# CHAPTER 1: PRODUCT INTRODUCTION

## VTC 7252-7C4IP Physical Features

Front View



Rear View



# Hardware Specifications

## CPU

- 9th generation Intel® Core™ i7-9700TE, up to 3.8 GHz, 35W, 8 Core

## Chipset

- Intel® C246 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 VGA up to 1920 x 1200 @ 60Hz
- 1 x HDMI (4096 x 2160 @ 30Hz) (option)

## Storage

- 2 x 2.5" SATA 3.0 internal SSD (tray: 9.5mm height), RAID 0/1/5/10 supported
- 2 x mSATA 3.0 (occupied mini-PCIe socket)

## Expansion

- 1 x M.2 3042/3050/5052 Key B (USB 2.0, USB 3.2 Gen 2x1) for LTE/5G NR
- 2 x Full size mini-PCIe socket (USB 2.0, PCIe 3.0 & SATA 3.0 [BIOS selection])
- 1 x M.2 2230 Key E (USB 2.0, 2 x PCIe 3.0) for Wi-Fi. (BOM option)  
1 x Full size mini-PCIe socket (USB 2.0, PCIe 3.0)

## GNSS and Onboard Sensor

- 1 x Default U-blox NEO-M8N GNSS module for GPS/Glonass/QZSS/Galileo/Beidou, optional modules with dead reckoning available
- TPM 2.0 by Infineon SLB9665TT2.0 (BOM option)
- 1 x 3D accelerometer and 3D gyroscope

## Power over Ethernet

- 4 x Independent LAN, 10/100/1000 Mbps Intel® I210-IT GbE, PoE 802.3af/at max. 60W
- 2 x LAN, 10/100/1000 Mbps (1 for I219 support iAMT and WOL)

## I/O Interface-Front

- 1 x Reset button
- 16 x LED indicators (including 2 x programmable LED)
- 2 x USB 3.2 Gen 2x1 type A (5V/0.9A) with cover
- 2 x External Micro SIM slot with cover
- 1 x CFast with cover
- 1 x 6-pin for audio (1 x mic-in [mono] 1 x line-out [L + R]). (option)  
Additional 1 x mic-in (mono) and 1 x line-out (L + R)
- 1 x M12 8-pin for 2 x USB 2.0 (5V/0.5A)
- 1 x M12 8-pin for 2 x USB 2.0 (5V/0.5A)
- 1 x M12 8-pin for full RS-232/422/485
- 2 x M12 8-pin for full RS-232
- 1 x M12 12-pin
  - 2 x Isolated CAN Bus 2.0B
  - 3 x DI, and 3 x DO
  - GND



- 1 x 8-pin for M12 (internal reservation)
  - 12VDC (2A) output
  - RS-232 (TX & RX)
  - Remote power button
  - Reset button
  - Sleeping mode button

### I/O Interface-Rear

- 1 x VGA
- 2 x M12 A-code LAN port, 10/100/1000 Mbps
- 4 x M12 A-code PoE port, 10/100/1000 Mbps
- 1 x M12 5-Pin DC Input with Ignition
- 7 x SMA antenna hole (WWAN[4]/WLAN[2]/GNSS[1])

### Power Management & Software Support

- Power input 9~36VDC
- Cranking voltage: 6V~9V (< 30 seconds)
- Reverse protection, OCP & UVP
- Selectable boot-up & shut-down voltage for low power protection by software
- Setting 8-level power on/off delay time by software
- 10~255 seconds WDT support, setup by software
- SDK (Windows/Linux) including utility and sample code

### Operating System

- Windows 10
- Linux

### Dimensions

- 256 x 256.4 x 66.5 (W x D x H) (mm)

### Weight

- 4.5kg

### Environment

- Operating temperatures
  - -30°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

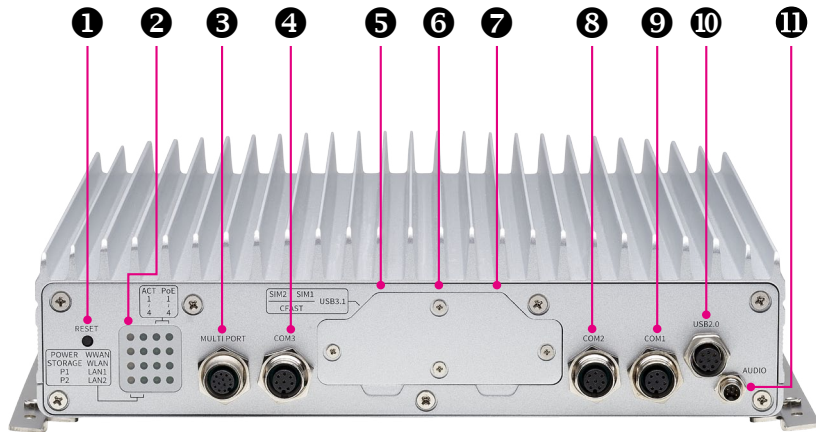
### Certifications

- CE approval
- FCC Class A
- E-Mark (E13)
- IP65 Compliance

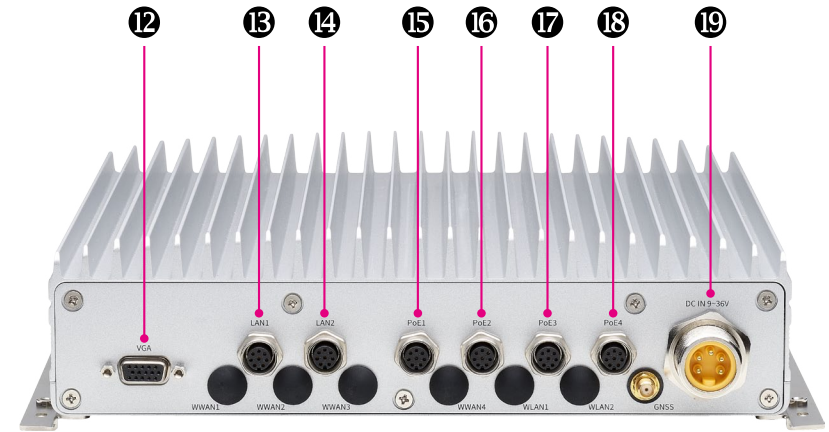
## Connector Numbering

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.

### Front View



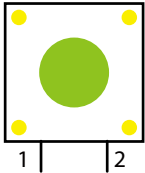
### Rear View



# CHAPTER 2: EXTERNAL CONNECTORS PINOUT DESCRIPTION

## Reset Button

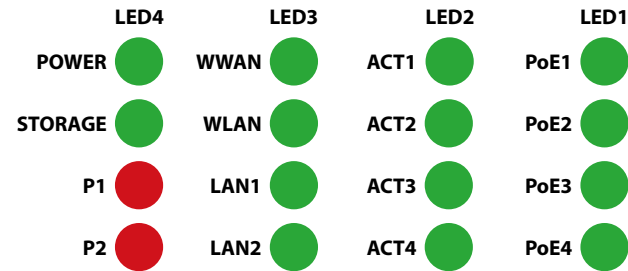
Connector number: 1



Pin	Definition
1	GND
2	RST_BTN#

## LED Indicators

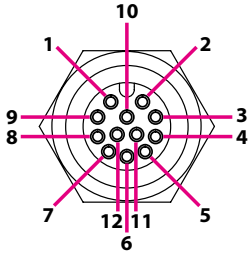
Connector number: 2



LED4	LED3	LED2	LED1
Power	WWAN	PoE ACT1	PoE PWR1
Storage	WLAN	PoE ACT2	PoE PWR2
Program 1	LAN1	PoE ACT3	PoE PWR3
Program 2	LAN2	PoE ACT4	PoE PWR4

## M12 Multiport Connector

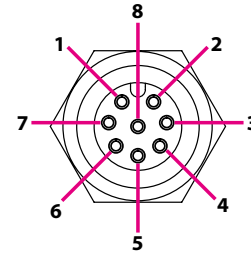
Connector Number: 3



Pin	Definition	Pin	Definition
1	DI1	2	DI2
3	DI3	4	DO1
5	DO2	6	DO3
7	GND	8	CAN1 L
9	CAN1 H	10	CAN2 L
11	CAN2 H	12	GND

## M12 COM3 Connector

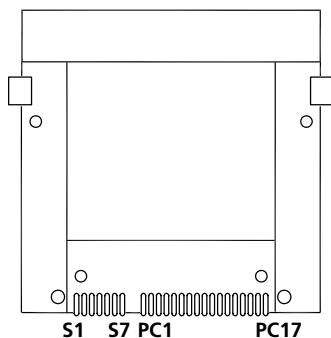
Connector Number: 4



Pin	Definition	Pin	Definition
1	DCD (TX-)	2	RX (TX+)
3	TX (RX+)	4	DTR (RX+)
5	GND	6	DSR
7	RTS	8	CTS

## CFast Card Slot

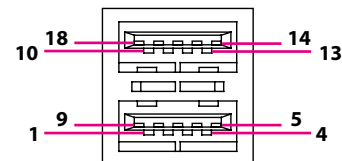
Connector number: 5



Pin	Definition	Pin	Definition
S1	GND	S2	SATA-TXP
S3	SATA-TXN	S4	GND
S5	SATA-RXN	S6	SATA-RXP
S7	GND	PC1	CDI
PC2	GND	PC3	NC
PC4	NC	PC5	NC
PC6	NC	PC7	GND
PC8	NC	PC9	NC
PC10	NC	PC11	NC
PC12	NC	PC13	CFAST_VCC3
PC14	CFAST_VCC3	PC15	GND
PC16	GND	PC17	CDO

## Dual USB 3.1 Port

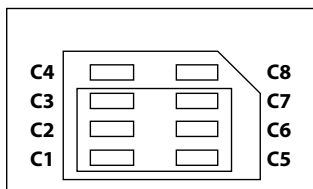
Connector number: 6



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

## Micro SIM1/SIM2 Slots

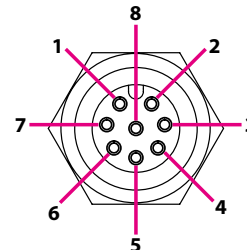
Connector number: 7



Pin	Definition	Pin	Definition
C1	UIM_PWR	C5	GND
C2	UIM_RST	C6	NC
C3	UIM_CLK	C7	UIM_DAT
C4	NC	C8	NC
		CD	CD

## M12 COM2 Connector

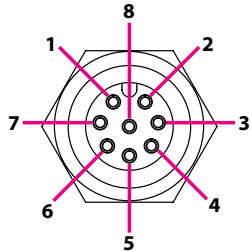
Connector Number: 8



Pin	Definition	Pin	Definition
1	DCD (TX-)	2	RX (TX+)
3	TX (RX+)	4	DTR (RX+)
5	GND	6	DSR
7	RTS	8	CTS

## M12 COM1 Connector

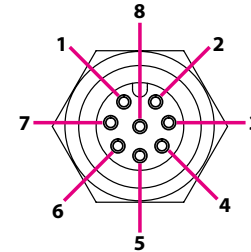
Connector Number: 9



Pin	Definition	Pin	Definition
1	DCD (TX-)	2	RX (TX+)
3	TX (RX+)	4	DTR (RX+)
5	GND	6	DSR
7	RTS	8	CTS

## M12 USB 2.0 Connector

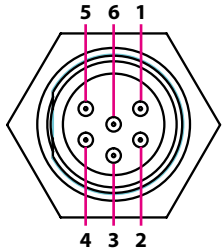
Connector Number: 10



Pin	Definition	Pin	Definition
1	USB_3N	2	USB_3P
3	USB20_POWER	4	GND
5	USB_4N	6	USB_4P
7	USB20_POWER	8	GND

## M12 Audio Connector

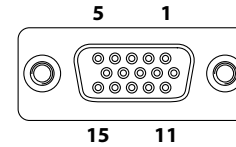
Connector Number: 11



Pin	Definition	Pin	Definition
1	GND	2	MIC_Jdetect
3	MIC_L	4	Line out_R
5	Line out_Jdetect	6	Line out_L

## VGA Connector

Connector number: 12

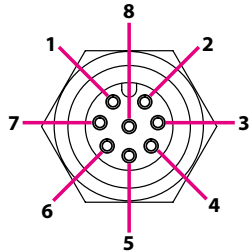


Pin	Definition	Pin	Definition
1	VGA_RED	2	VGA_GREEN
3	VGA_BLUE	4	GND
5	GND	6	GND
7	GND	8	GND
9	VGA_+5V	10	GND
11	GND	12	VGA_DATA
13	VGA_HS	14	VGA_VS
15	VGA_CLK		



## M12 LAN1 & LAN2 Connector

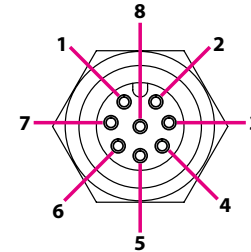
Connector Number: 13 & 14



Pin	Definition	Pin	Definition
1	LAN_MDI0P	2	LAN_MDI0N
3	LAN_MDI1P	4	LAN_MDI1N
5	LAN_MDI2P	6	LAN_MDI2N
7	LAN_MDI3P	8	LAN_MDI3N

## PoE1 to PoE4 Ports

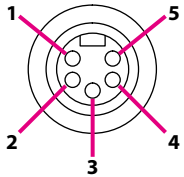
Connector Number: 15 to 18



Pin	Definition	Pin	Definition
1	LAN_MDI0P	2	LAN_MDI0N
3	LAN_MDI1P	4	LAN_MDI1N
5	LAN_MDI2P	6	LAN_MDI2N
7	LAN_MDI3P	8	LAN_MDI3N

## DC Input

Connector Number: 19



Pin	Definition	Pin	Definition
1	VIN	2	VIN
3	GND_IN	4	GND_IN
5	IGNITION		

# CHAPTER 3: JUMPERS AND CONNECTORS

This chapter describes how to set the jumpers on the VTC 7252-7C4IP 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:

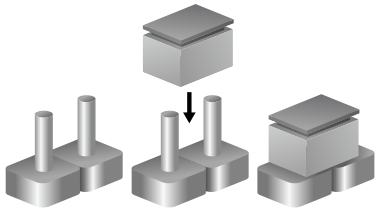
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal 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

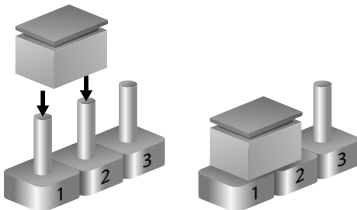
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just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

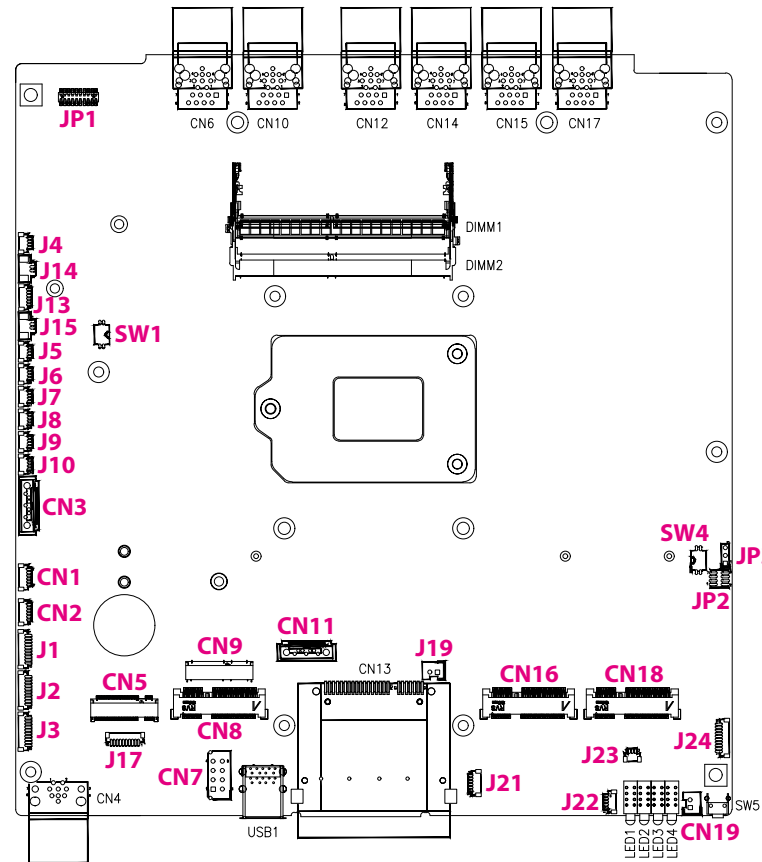


Three-Pin Jumpers: Pins 1 and 2 are Short



## VTC 7252-7C4IP Connector Specification & Jumper Setting

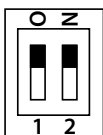
The figure below is the carrier board used in the VTC 7252-7C4IP system. It shows the locations of the jumpers and connectors.



## Jumper and DIP Switch Settings

### RTC Clear Selection

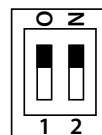
Connector location: SW1



SW	RTC (Pin1)	SRTC/ME (Pin2)
OFF	Normal	Normal
ON	Clear CMOS	Clear ME

### Input Voltage Control Selection

Connector location: SW4



POWERSW (Pin1)	12V24V (Pin2)	Result
OFF	OFF	12VDC
OFF	ON	24VDC
ON	ON	9~36VDC (Default)

## Internal Connectors

### COM1 RS232 Connector

Connector size: 1 x 10 = 10-pin header

Connector location: J3

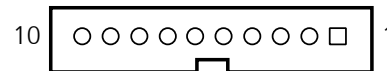


Pin	Definition	Pin	Definition
1	GND	2	GND
3	SP_CTS1	4	SP_DSR1
5	SP_DTR1	6	SP_RXD1
7	SP_RI1	8	SP_RTS1
9	SP_TXD1	10	SP_DCD1

### COM2 RS232 Connector

Connector size: 1 x 10 = 10-pin header

Connector location: J2



Pin	Definition	Pin	Definition
1	GND	2	GND
3	SP_CTS2	4	SP_DSR2
5	SP_DTR2	6	SP_RXD2
7	SP_RI2	8	SP_RTS2
9	SP_TXD2	10	SP_DCD2

### COM3 RS232/RS422/RS485 Connector

Connector size: 1 x 10 = 10-pin header

Connector location: J1



Pin	Definition	Pin	Definition
1	GND	2	GND
3	CM3_CTS#	4	CM3_DSR#
5	CM3_DTR#_RX-	6	CM3_RX_TX+
7	CM3_RI#_PW	8	CM3_RTS#
9	CM3_TX_RX+	10	CM3_DCD#_TX-

### DIO Connector

Connector size: 1 x 10 = 10-pin header

Connector location: J24



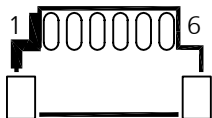
Pin	Definition	Pin	Definition
1	GND	2	GND
3	DO4	4	DO3
5	DO2	6	DO1
7	DI4	8	DI3
9	DI2	10	DI1



## Audio Phone Jack

Connector size: 1 x 6 = 6-pin header

Connector location: CN1 and CN2

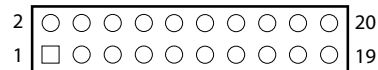


Pin	Definition	Pin	Definition
1	Front_out_L / Surr_out_L	2	Front_out_JD / Surr_out_JD
3	Front_out_R / Surr_out_R	4	MIC_L / MIC_R
5	MIC_JD	6	AGND

## HDMI Connector

Connector size: 2 x 10 = 20-pin header

Connector location: JP1

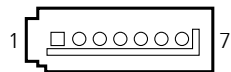


Pin	Definition	Pin	Definition
1	HDMI_GND	2	HDMI_HPD
3	HDMI_P5V	4	GND
5	HDMI_SDA	6	HDMI_SCL
7	NC	8	NC
9	HDMI_CLK_N	10	GND
11	HDMI_CLK_P	12	HDMI_TX0N
13	GND	14	HDMI_TX0P
15	HDMI_TX1N	16	GND
17	HDMI_TX1P	18	HDMI_TX2N
19	GND	20	HDMI_TX2P

## SATA Connector 1

Connector size: 1 x 7 = 7-pin header

Connector location: CN3

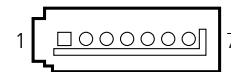


Pin	Definition	Pin	Definition
1	GND	2	SATA-TXP0
3	SATA-TXN0	4	SATA_PCIE_DETPO
5	SATA-RXN0	6	SATA-RXP0
7	GND		

## SATA Connector 2

Connector size: 1 x 7 = 7-pin header

Connector location: CN11

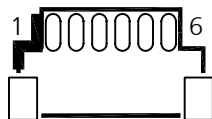


Pin	Definition	Pin	Definition
1	GND	2	SATA-TXP1
3	SATA-TXN1	4	SATA_PCIE_DETP1
5	SATA-RXN1	6	SATA-RXP1
7	GND		

## GPS Wire to Board Connector

Connector size: 1 x 6 = 6-pin header

Connector location: J13

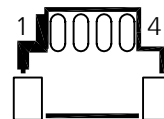


Pin	Definition	Pin	Definition
1	3.3V_BAT	2	NC
3	TX	4	RX
5	GND	6	3.3V

## GPS Wire to Board Connector (DR to GPS Module)

Connector size: 1 x 4 = 4-pin header

Connector location: J4

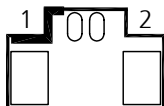


Pin	Definition	Pin	Definition
1	GND	2	NC
3	ODOMETER	4	DIRECTION

## GPS Battery Connector

Connector size: 1 x 2 = 2-pin header

Connector location: J14

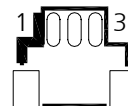


Pin	Definition
1	GND
2	VBAT

## GPS Wire to Board Connector (DR IN)

Connector size: 1 x 3 = 3-pin header

Connector location: J23

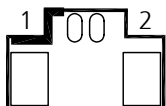


Pin	Definition	Pin	Definition
1	ODOMETER	2	DIRECTION
3	GND		

## RTC Battery Connector

Connector size: 1 x 2 = 2-pin header

Connector location: J15

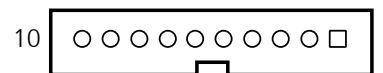


Pin	Definition
1	GND
2	VBAT

## Debug 80 Port Connector

Connector size: 1 x 10 = 10-pin header

Connector location: J17

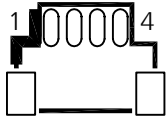


Pin	Definition	Pin	Definition
1	GND	2	PLTRST#
3	LPC_CLK	4	LPC_FRAME#
5	LPC_AD3	6	LPC_AD2
7	LPC_AD1	8	LPC_AD0
9	LPC_SERIRQ	10	VCC3

## USB Connectors

Connector size: 1 x 4 = 4-pin header

Connector location: J5, J6, J7, J8, J9 and J10

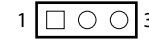


Pin	Definition	Pin	Definition
1	GND	2	USB_P
3	USB_N	4	POWER

## MCU Debug Port

Connector size: 1 x 3 = 3-pin header

Connector location: JP3

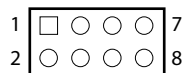


Pin	Definition
1	TX
2	RX
3	GND

## MCU Download Port

Connector size: 2 x 4 = 8-pin header

Connector location: JP2

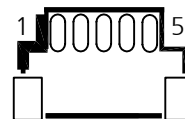


Pin	Definition	Pin	Definition
1	3.3V	2	MCU_RST
3	MCU_TRST	4	MCU_TDI
5	MCU_TCK	6	MCU_TMS
7	MCU_TDO	8	GND

## Dual CAN Connector

Connector size: 1 x 4 = 4-pin header

Connector location: J22

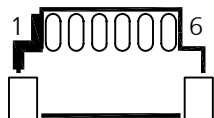


Pin	Definition	Pin	Definition
1	CAN2_H	2	CAN2_L
3	GND	4	CAN1_H
5	CAN1_L		

## CAN1 Download Connector

Connector size: 1 x 6 = 6-pin header

Connector location: J21

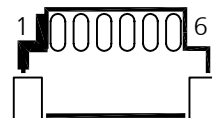


Pin	Definition	Pin	Definition
1	VCC3	2	GND
3	TCK	4	TDO
5	TDI	6	TMS

## CAN2 Download Connector

Connector size: 1 x 6 = 6-pin header

Connector location: J20



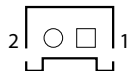
Pin	Definition	Pin	Definition
1	VCC3	2	GND
3	TCK	4	TDO
5	TDI	6	TMS



## V2X Power Connector

Connector size: 1 x 2 = 2-pin header

Connector location: J19

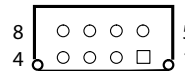


Pin	Definition
1	5VDC
2	GND

## DC Out Connector

Connector size: 2 x 4 = 8-pin header

Connector location: CN7

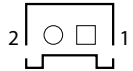


Pin	Definition	Pin	Definition
1	12VDC	2	PUSH_BTN_PWRIN
3	EXT_RX	4	EXT_TX
5	GND	6	GND
7	PUSH_BT_SLEEPIN	8	PUSH_BTN_RSTIN

## Power Button Connector

Connector size: 1 x 2 = 2-pin header

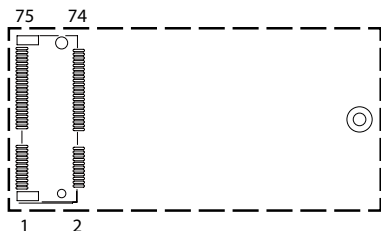
Connector location: CN19



Pin	Definition
1	HW_BT#
2	GND

## M.2 Key E Socket with USB 2.0 + 2 x PCIe 3.0 (For Wi-Fi/BT)

Connector location: CN9

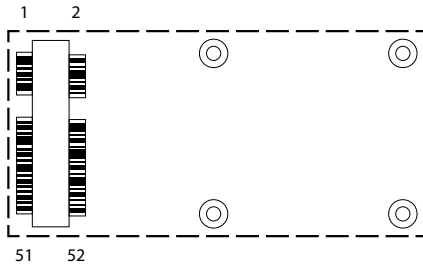


Pin	Definition	Pin	Definition
1	GND	2	+V3.3A
3	USB_D+	4	GND
5	USB_D-	6	M2E_LED1#
7	GND	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	M2E_LED2#
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	NC	32	NC
33	GND	34	NC
35	PCIE0_TXP	36	NC
37	PCIE0_TXN	38	TPU_SYS_RSTN_EN
39	GND	40	PMIC0_EN_M2_OD_3P3
41	PCIE0_RXP	42	PMIC1_EN_M2_OD_3P3

Pin	Definition	Pin	Definition
43	PCIE0_RTXN	44	NC
45	GND	46	NC
47	PCIE0_REFCLKP	48	NC
49	PCIE0_REFCLKN	50	M2E_SUSCLK (NC_BOM Option)
51	GND	52	PERST0#_M2_3P3
53	CLKREQ0#_M2_3P3	54	M2E_DISABLE2#
55	GND	56	M2E_DISABLE1#
57	GND	58	NC
59	PCIE1_TXP	60	NC
61	PCIE1_TXN	62	I2C_ALERT#_M2_3P3
63	GND	64	NC
65	PCIE1_RXP	66	PERST1#_M2_3P3
67	PCIE1_RXN	68	CLKREQ#_M2_3P3
69	GND	70	NC
71	PCIE1_REFCLKP	72	+V3.3A
73	PCIE1_REFCLKN	74	+V3.3A
75	GND		

**(BOM Optional)****Full-size Mini-PCle Socket with USB 2.0 + PCIe 3.0 (For Wi-Fi/BT)**

Connector location: CN8

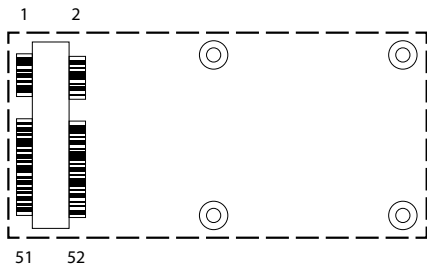


Pin	Definition	Pin	Definition
1	RI (NC)	2	+V3.3A
3	NC	4	GND
5	NC	6	+V1.5S
7	PCIE_CLKREQ#	8	NC
9	GND	10	NC
11	PCIE_CLKN	12	NC
13	PCIE_CLKP	14	NC
15	GND	16	GND
17	NC	18	GND
19	NC	20	MINIPCI2_DIS#
21	GND	22	P2_RST#
23	PCIE_RXN	24	+V3.3A
25	PCIE_RXP	26	GND

Pin	Definition	Pin	Definition
27	GND	28	+V1.5S
29	GND	30	NC
31	PCIE_TXN	32	NC
33	PCIE_TXP	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+V3.3A	40	GND
41	+V3.3A	42	NC
43	NC	44	NC
45	NC	46	NC
47	NC	48	+V1.5S
49	NC	50	GND
51	NC	52	+V3.3A

## Full-size Mini-PCIe Socket with USB 2.0 + PCIe 3.0/SATA 3.0 (For Wi-Fi/BT/mSATA/C-V2X/DSRC)

Connector location: CN16/CN18



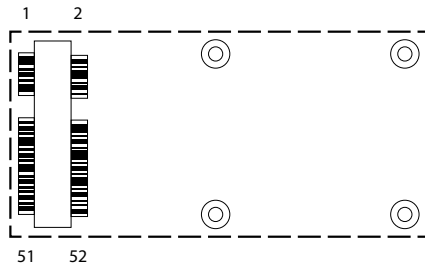
Please be noted that you have to select the mSATA setting in the BIOS setup menu for CN18.

Pin	Definition	Pin	Definition
1	NC	2	+V3.3A
3	NC	4	GND
5	NC	6	+V1.5S
7	PCIE_CLKREQ#	8	NC
9	GND	10	NC
11	PCIE_CLKN	12	NC
13	PCIE_CLKP	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	MINIPCI2_DIS#
21	GND	22	P2_RST#
23	PCIE_RXN	24	+V3.3A
25	PCIE_RXP	26	GND

Pin	Definition	Pin	Definition
27	GND	28	+V1.5S
29	GND	30	NC
31	PCIE_TXN	32	NC
33	PCIE_TXP	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+V3.3A	40	GND
41	+V3.3A	42	NC
43	NC	44	NC
45	NC	46	NC
47	NC	48	+V1.5S
49	NC	50	GND
51	MSATA_DET#	52	+V3.3A

## Full-size Mini-PCIe Socket with USB 2.0 + PCIe 3.0/SATA 3.0 (For Wi-Fi/BT/mSATA)

Connector location: CN18



Pin	Definition	Pin	Definition
1	NC	2	+V3.3A
3	NC	4	GND
5	NC	6	+V1.5S
7	PCIE_CLKREQ#	8	NC
9	GND	10	NC
11	PCIE_CLKN	12	NC
13	PCIE_CLKP	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	MINIPCI2_DIS#
21	GND	22	P2_RST#
23	PCIE_RXN	24	+V3.3A
25	PCIE_RXP	26	GND

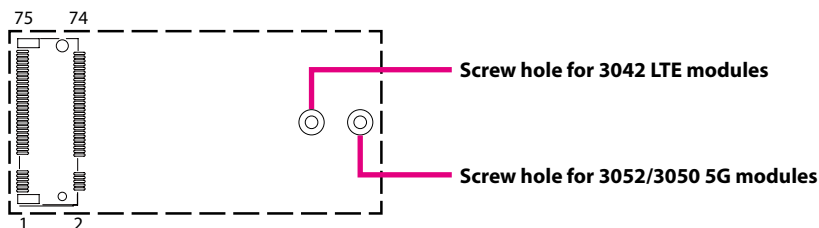
Pin	Definition	Pin	Definition
27	GND	28	+V1.5S
29	GND	30	NC
31	PCIE_TXN	32	NC
33	PCIE_TXP	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+V3.3A	40	GND
41	+V3.3A	42	NC
43	NC	44	NC
45	NC	46	NC
47	NC	48	+V1.5S
49	NC	50	GND
51	MSATA_DET#	52	+V3.3A

## M.2 3042/3050/3052 Key B Socket with USB 2.0 + USB 3.2 Gen 2×1 (For LTE/5G NR)

Connector location: CN5

SIM socket: SIM 1-1

SIM socket: SIM 1-2



Pin	Definition	Pin	Definition
1	M2A_CONFIG3	2	+V3.3A
3	GND	4	+V3.3A
5	GND	6	M2B1_POWER_OFF#
7	USB_P	8	M2A_W1_DIS#
9	USB_N	10	WWAN1_LED#
11	NC	20	WWAN1_BUS_SEL
21	M2A_CONFIG0	22	VUSB_DET
23	SMS1_RI_3.5G	24	EM9190_P1
25	NC	26	M2A_W2_DIS#
27	GND	28	PLA_S2#
29	USB3_RXN	30	UIM1_RST
31	USB3_RXP	32	UIM1_CLK
33	GND	34	UIM1_DAT
35	USB3_TXN	36	UIM1_PWR
37	USB3_TXP	38	EM9190_P2
39	GND	40	SIM2_DETECT
41	PCIE_RXN (NC_BOM Option)	42	UIM2_DAT (NC_BOM Option)

Pin	Definition	Pin	Definition
43	PCIE_RXP (NC_BOM Option)	44	UIM2_CLK (NC_BOM Option)
45	GND	46	UIM2_RST (NC_BOM Option)
47	PCIE_TXN (NC_BOM Option)	48	UIM2_PWR (NC_BOM Option)
49	PCIE_TXP (NC_BOM Option)	50	W1_PERST# (NC_BOM Option)
51	GND	52	PCIE_CLKREQ# (NC_BOM Option)
53	PCIE_CLKN (NC_BOM Option)	54	M2A_PEWAKE#
55	PCIE_CLKP (NC_BOM Option)	56	M2B1_SM1_D
57	GND	58	M2B1_SM1_C
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	SIM1_DETECT
67	P1_3.5G_RST#	68	M2A_SUSCLK
69	M2A_CONFIG1	70	+V3.3A
71	GND	72	+V3.3A
73	GND	74	+V3.3A
75	M2A_CONFIG2		

## CHAPTER 4: SYSTEM SETUP

### Removing the Chassis Cover



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.

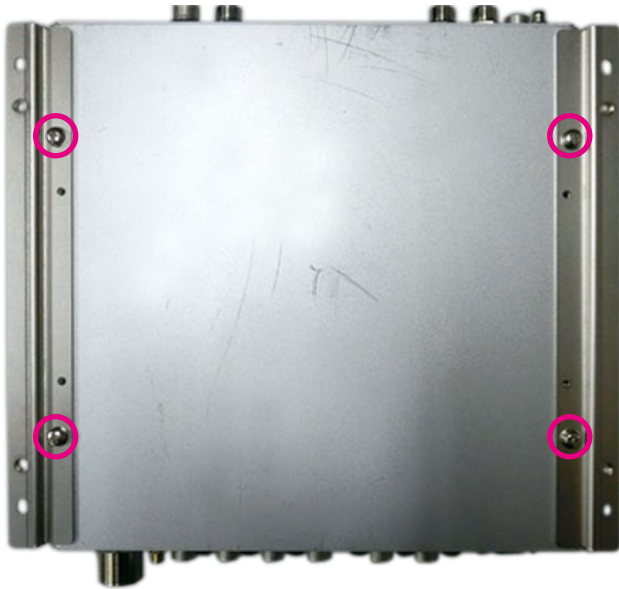


2. Remove the screws on the rear panel.

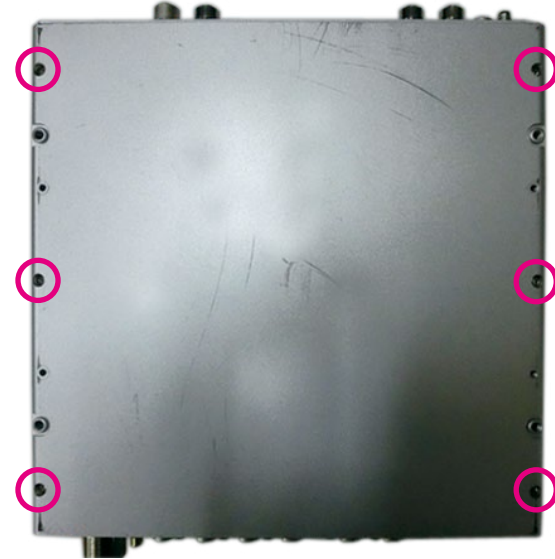




3. Remove the mounting bracket screws on the bottom of the enclosure.

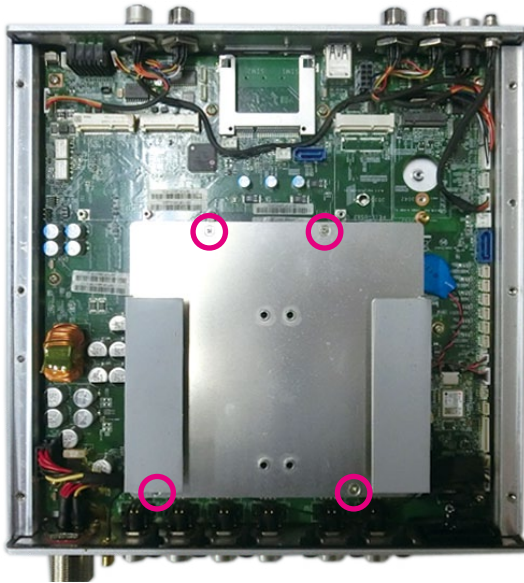


4. After removing the brackets, loosen the screws on the bottom then remove the chassis top cover.

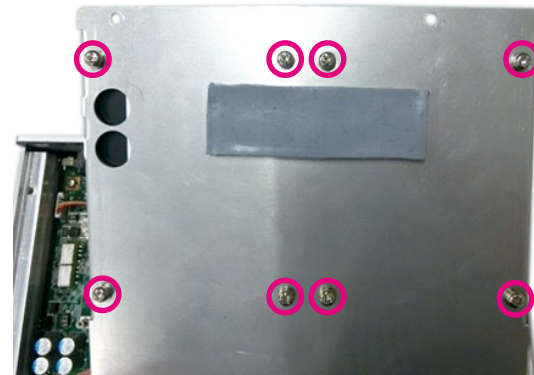


## Installing a Storage Drive

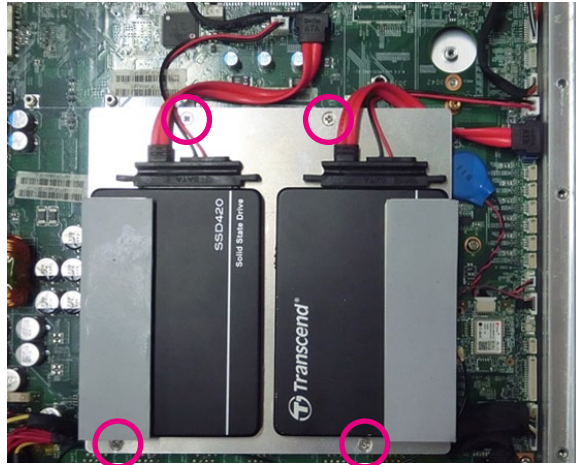
1. With the chassis top cover removed, remove the screws on the storage bracket.



2. Align the mounting holes on the storage drives to the mounting holes on the bracket, then turn to the bottom side of the bracket and use the provided screws to secure the storage drives in place.



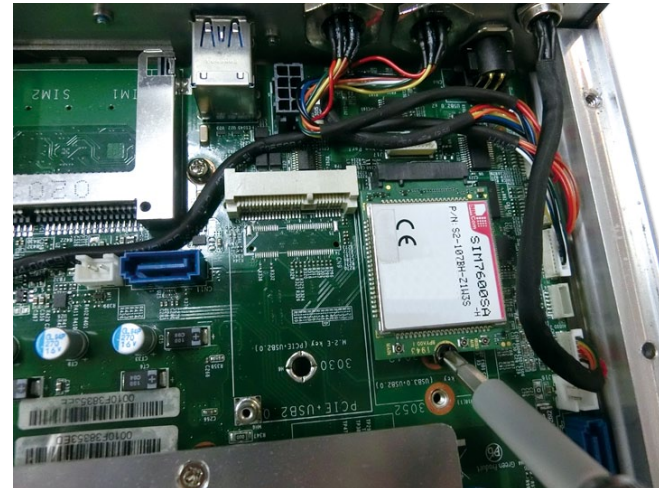
3. Connect the SATA cables and power cables. Then reinstall the storage bracket onto the mainboard using the screws removed earlier.



## Installing a WWAN Module (M.2)

### For LTE Module, 3042:

1. Locate the WWAN M.2 slot (CN5). 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.



### For 5G NR Module, 3050/3052:

1. Locate the WWAN M.2 slot (CN5). 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.



### Installing a Wi-Fi Module (M.2)

1. Locate the WWAN M.2 slot (CN9). Insert the Wi-Fi 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.





## Installing a Wi-Fi/mSATA Module (Mini-PCle)

1. Locate the mini PCI Express slot (CN16 and CN18). Insert the Wi-Fi/mSATA 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.



**mSATA Module**



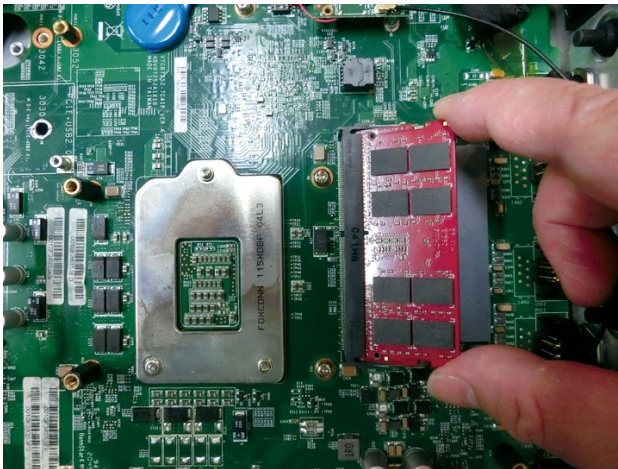
**Wi-Fi Module**



Please be noted that you have to select the mSATA setting in the BIOS setup menu for CN18.

## Installing a SO-DIMM Memory Module

1. Push the ejector tabs which are at the ends of the socket outward. Then insert the module into the socket at an approximately 30 degrees angle. Apply firm even pressure to each end of the module until it slips down into the socket. The contact fingers on the edge of the module will almost completely disappear inside the socket.



## Inserting SIM Cards

1. Remove the SIM/CFast card cover on the front panel and insert the SIM cards. Please take note of the Micro SIM card installation direction as printed on the chassis.



**Installation direction  
for top slot**



**Installation direction  
for top slot**

## Inserting a CFast Card

1. Remove the SIM/CFast card cover on the front panel and insert the CFast card. Please take note of the CFast card installation direction as printed on the chassis.



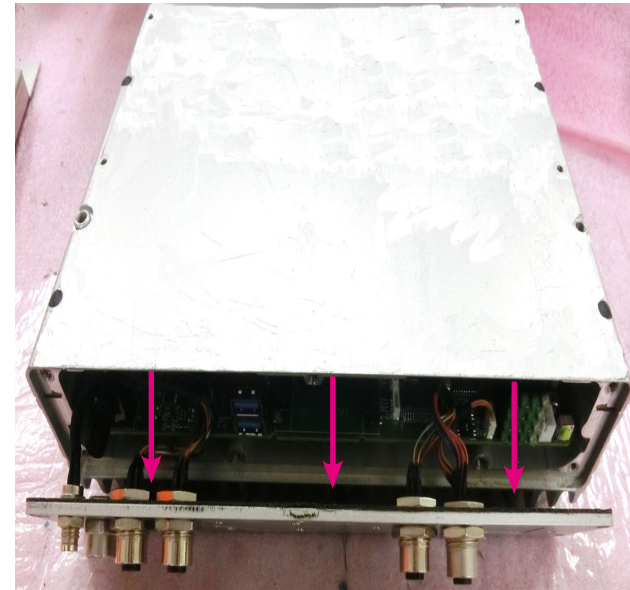
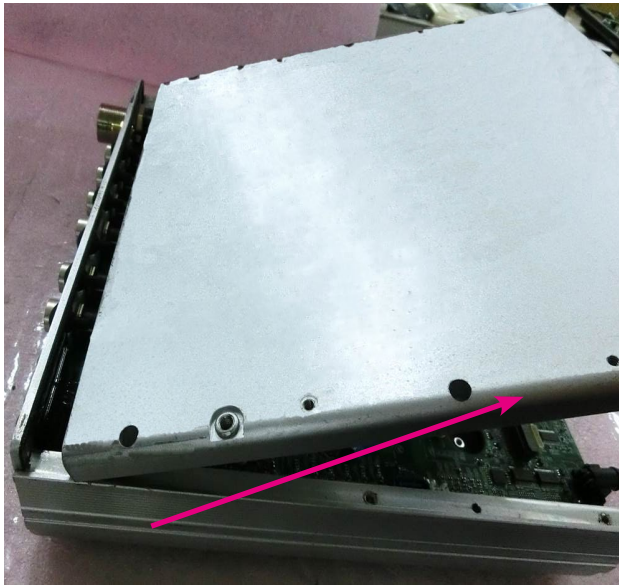
**Installation direction  
for top slot**



## Installing Heatsink for LTE/5G and mSATA Modules

If LTE/5G or mSATA module is used, use heatsink and thermal pad in the accessory package for heat dissipation.

1. In order to protect the water seal strip on the rear panel, make the bottom cover slop upwards from the chassis before opening the bottom cover.
2. Before adding heatsink for LTE/5G or mSATA module, remove the screws on the front panel.



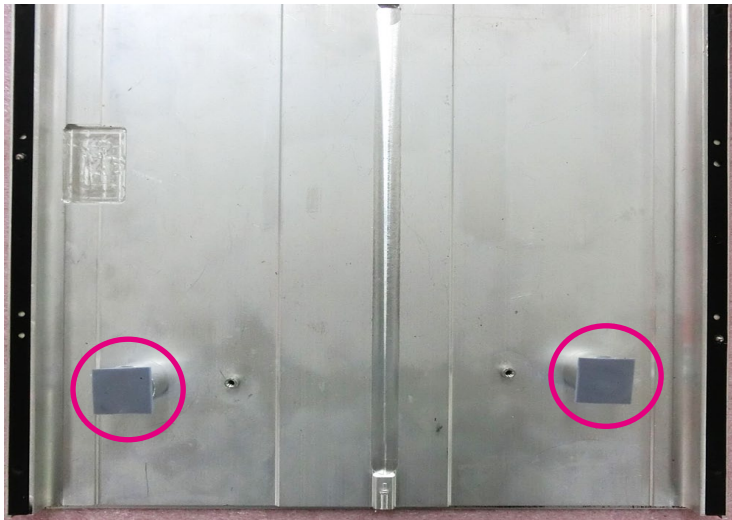
3. If using LTE/5G or mSATA module, fix the heatsink by using screws.



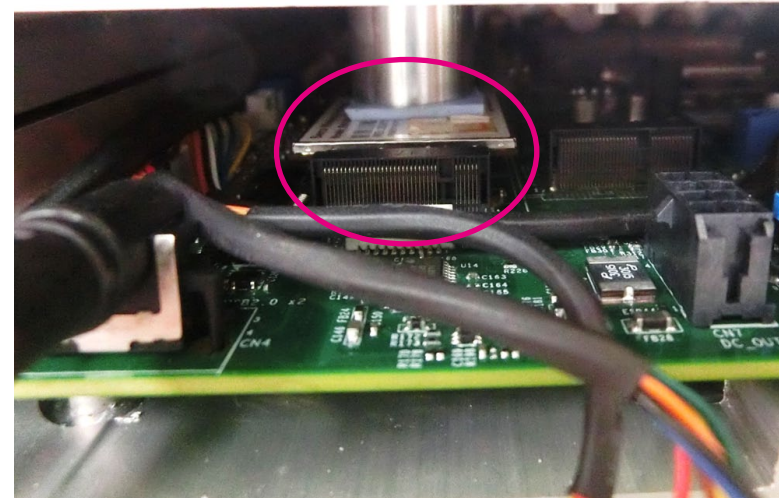
4. If LTE/5G and mSATA modules are used simultaneously, fix two heat-sinks by using screws.



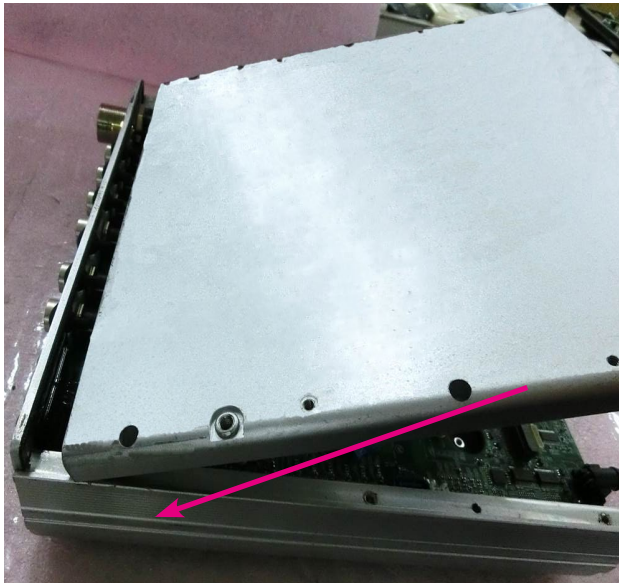
5. If LTE/5G and mSATA modules are used simultaneously, fix two heatsinks by using screws and attach thermal pads on the top of the heatsinks.



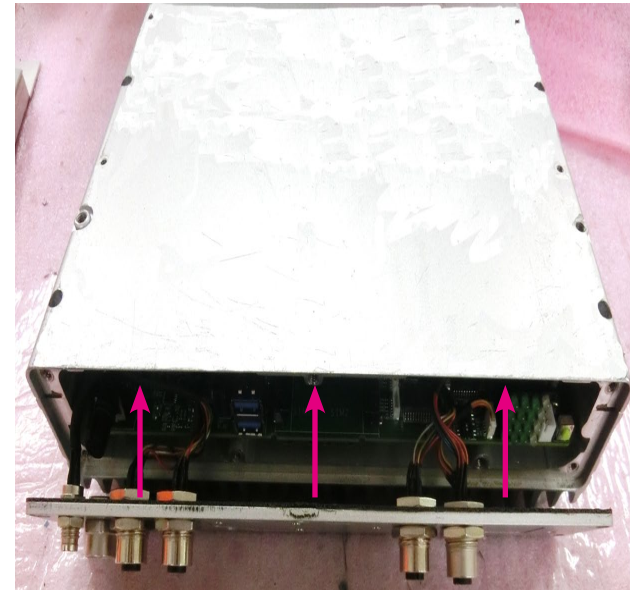
6. Make sure the thermal pad is attached on the module firmly.



7. In order to protect the water seal strip on the rear panel, make sure the bottom cover slopes downward of the chassis before closing the bottom cover.



8. Fasten the screws on the front panel.



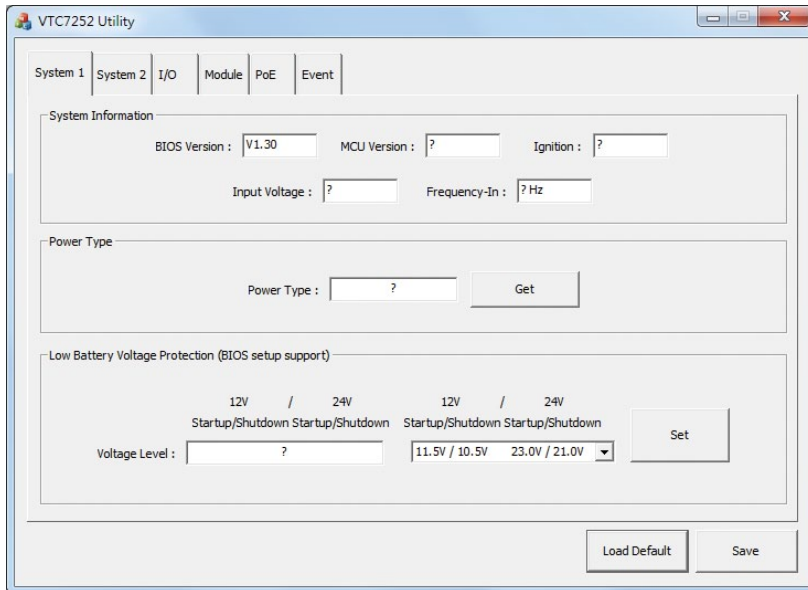
# APPENDIX A:

## SOFTWARE DEMO UTILITY FOR I/O PORTS OF FUNCTION CONTROL

NEXCOM's software demo utility enables users to test and control different I/O port functions on VTC 7252. This section shows how to use the utility. There are also source code files of the utility in the CD. Users can refer to the source codes to develop their applications.

### Menu Screen

#### 1. System 1



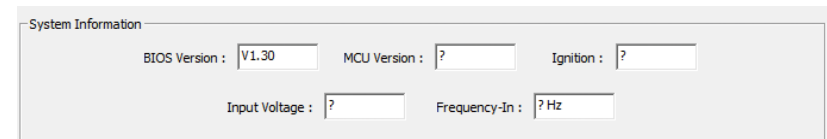
The screenshot shows the VTC7252 Utility window with the 'System 1' tab selected. The interface includes several sections:

- System Information:** Contains input fields for BIOS Version (V1.30), MCU Version (?), Ignition (?), Input Voltage (?), and Frequency-In (? Hz).
- Power Type:** Features a dropdown menu for Power Type (currently ?) and a 'Get' button.
- Low Battery Voltage Protection (BIOS setup support):** Includes two sets of dropdown menus for 12V and 24V Startup/Shutdown voltage levels. The 24V dropdown is currently set to 11.5V / 10.5V, 23.0V / 21.0V. A 'Set' button is present.
- Buttons:** 'Load Default' and 'Save' buttons are located at the bottom right.

#### 1.1 System Information

Displays basic information of the system.

- BIOS Version: Shows the BIOS version.
- MCU Version: Shows the MCU version.
- Ignition: Shows the status of ignition.
  - ON: Signal of ignition is high.
  - OFF: Signal of ignition is low.
- Input Voltage: Shows the voltage level of power-in.
- Frequency-In: Shows the voltage frequency.



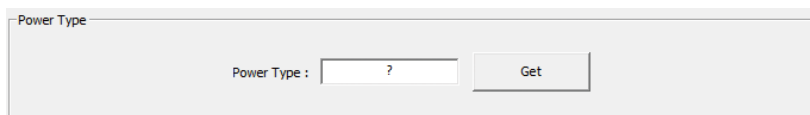
This close-up shows the 'System Information' section with the following fields:

- BIOS Version: V1.30
- MCU Version: ?
- Ignition: ?
- Input Voltage: ?
- Frequency-In: ? Hz

## 1.2 Power Type

Shows the DIP switch setting of input voltage.

- If the setting is 12V: 12V is shown.
- If the setting is 24V: 24V is shown.
- If the setting is 9V~36V: 9V~36V is shown.

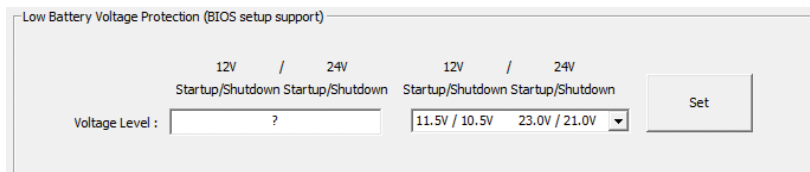


Power Type

Power Type :

## 1.3 Low Battery Voltage Protection

Sets the Low Battery Voltage Protection Startup/Shutdown voltage level during 12V/24V.



Low Battery Voltage Protection (BIOS setup support)

	12V / 24V	12V / 24V	
	Startup/Shutdown	Startup/Shutdown	Startup/Shutdown
Voltage Level :	<input type="text" value="?"/>	<input type="text" value="11.5V / 10.5V"/> <input type="text" value="23.0V / 21.0V"/>	<input type="button" value="Set"/>



## 2. System 2

VTC7252 Utility

System 1 System 2 I/O Module PoE Event

Power On/Off Delay Timer (BIOS setup support)

Power Off Delay : ? [Disable] Delay Off Time : ? 20 Sec [Set]

Power On Delay : ? [Disable] Delay On Time : ? 10 Sec [Set]

RTC Wake Up Timer (BIOS setup support)

RTC Wake Up : ? [Disable] [Set]

Timer Setting : Hour : ? 0 Min : ? 0 Sec : ? 0 [Set]

Watchdog Timer

WDT : ? [Disable] [Set WDT]

Time interval : ? 3 [Set time interval]

[Load Default] [Save]

### 2.1 Power On/Off Delay Timer

Enables or disables the delay time function. There are several selections of delay time.

Power On/Off Delay Timer (BIOS setup support)

Power Off Delay : ? [Disable] Delay Off Time : ? 20 Sec [Set]

Power On Delay : ? [Disable] Delay On Time : ? 10 Sec [Set]

### 2.2 RTC Wake Up Timer

Enables or disables the system wake up function. Once this function is enabled, the timer setting of wake up can be configured.

RTC Wake Up Timer (BIOS setup support)

RTC Wake Up : ? [Disable] [Set]

Timer Setting : Hour : ? 0 Min : ? 0 Sec : ? 0 [Set]

### 2.3 Watchdog Timer

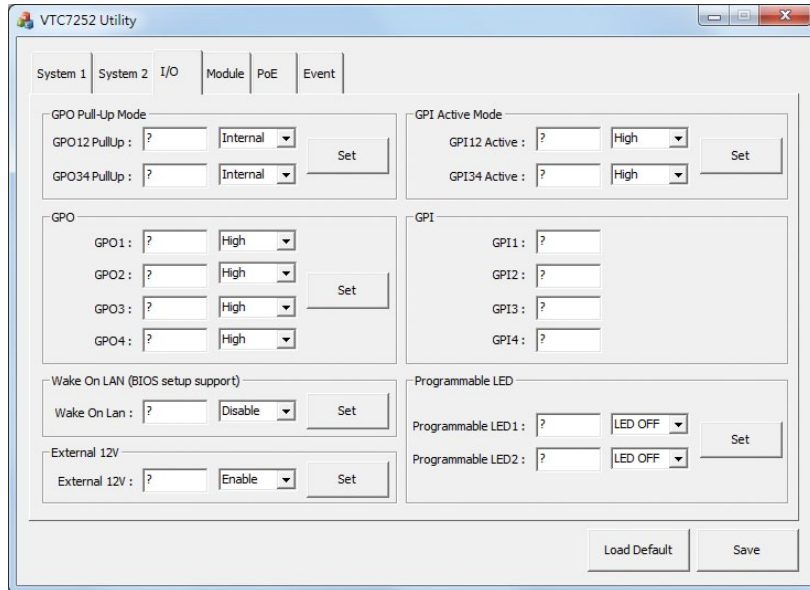
Enables or disables the WDT function. There are several selections of time. The timer of WDT can also be cleared by the Set WDT button.

Watchdog Timer

WDT : ? [Disable] [Set WDT]

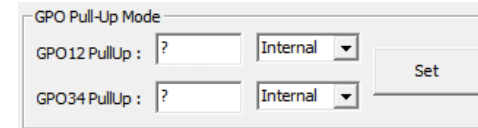
Time interval : ? 3 [Set time interval]

### 3. I/O



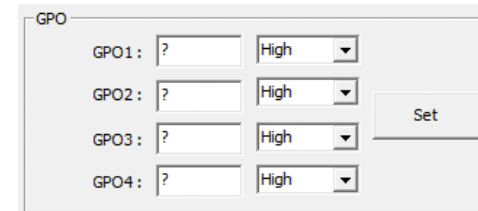
#### 3.1 GPO Pull-Up Mode

Configures the GPO pull-up mode as internal or external.



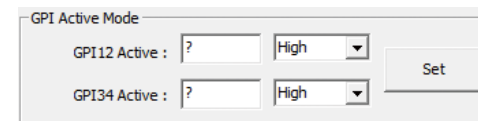
#### 3.2 GPO

Configures GPO as high voltage level or low voltage level.



#### 3.3 GPI Active Mode

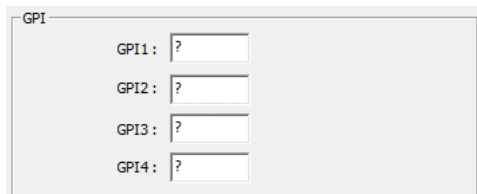
Reads the status (High or Low) of GPI active mode.





### 3.4 GPI

Reads the status (input voltage level) of GPI.



GPI

GPI1 : ?

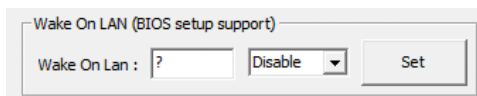
GPI2 : ?

GPI3 : ?

GPI4 : ?

### 3.5 Wake on LAN

Enables or disables the Wake On LAN function on LAN (Intel i219).

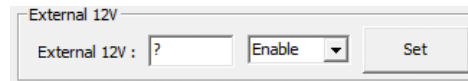


Wake On LAN (BIOS setup support)

Wake On Lan : ? Disable Set

### 3.6 External 12V DC

Enables or disables the external 12V function.

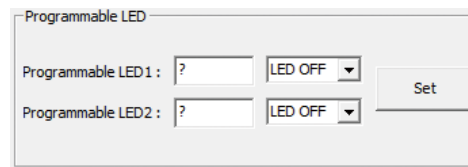


External 12V

External 12V : ? Enable Set

### 3.7 Programmable LED

Defines the programmable LEDs as ON or OFF.

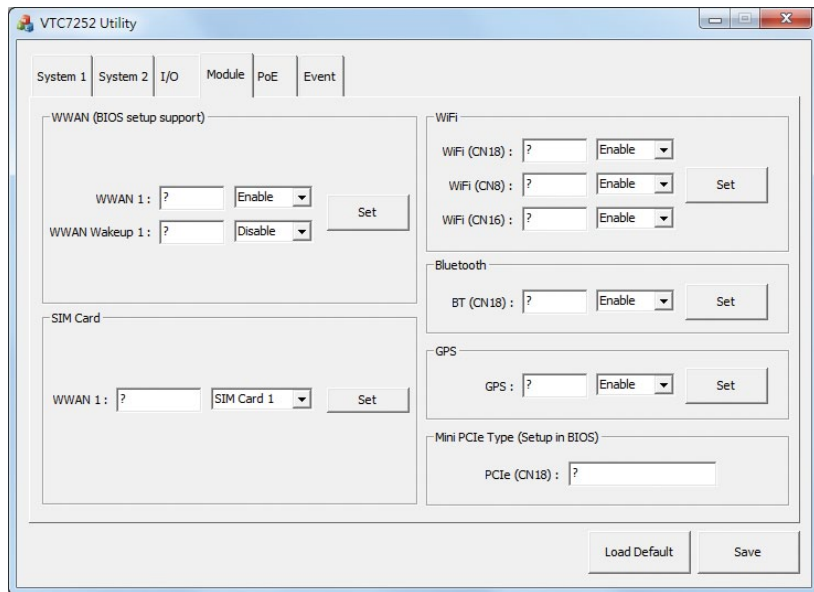


Programmable LED

Programmable LED 1 : ? LED OFF Set

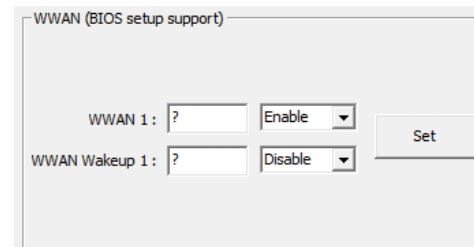
Programmable LED 2 : ? LED OFF Set

## 4. Module



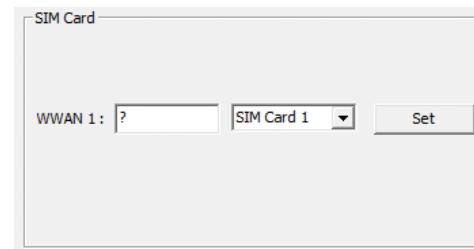
### 4.1 WWAN

Enables or disables the WWAN1 function.  
 Enables or disables the WWAN1 wakeup function.  
 The setting can also be cleared by the Set button.



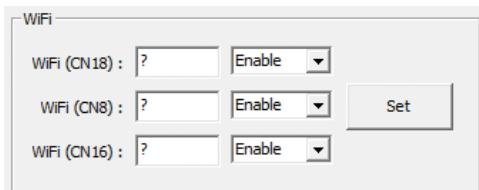
### 4.2 SIM Cards

Selects whether the SIM card setting on WWAN is from SIM card 1 or SIM card 2.  
 The setting can also be cleared by the Set button.



### 4.3 WiFi

Enables or disables the Wi-Fi module function on the CN18 mini PCIe socket.  
 Enables or disables the Wi-Fi module function on the CN8 mini PCIe socket.  
 Enables or disables the Wi-Fi module function on the CN16 mini PCIe socket.  
 The setting can also be cleared by the Set button.



WiFi

WiFi (CN18) : ? Enable ▾

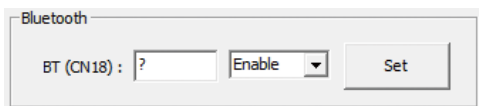
WiFi (CN8) : ? Enable ▾

WiFi (CN16) : ? Enable ▾

Set

### 4.4 Bluetooth

Enables or disables the BT function on the CN18 mini PCIe socket.  
 The setting can also be cleared by the Set button.



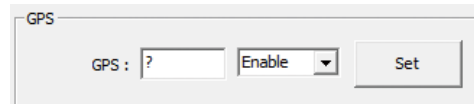
Bluetooth

BT (CN18) : ? Enable ▾

Set

### 4.5 GPS

Enables or disables the GPS function.



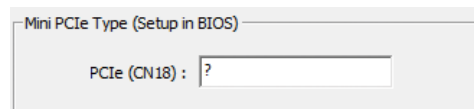
GPS

GPS : ? Enable ▾

Set

### 4.6 Mini PCIe Type

Selects the slot type (SATA/USB/PCIe) on the CN18 mini PCIe socket.

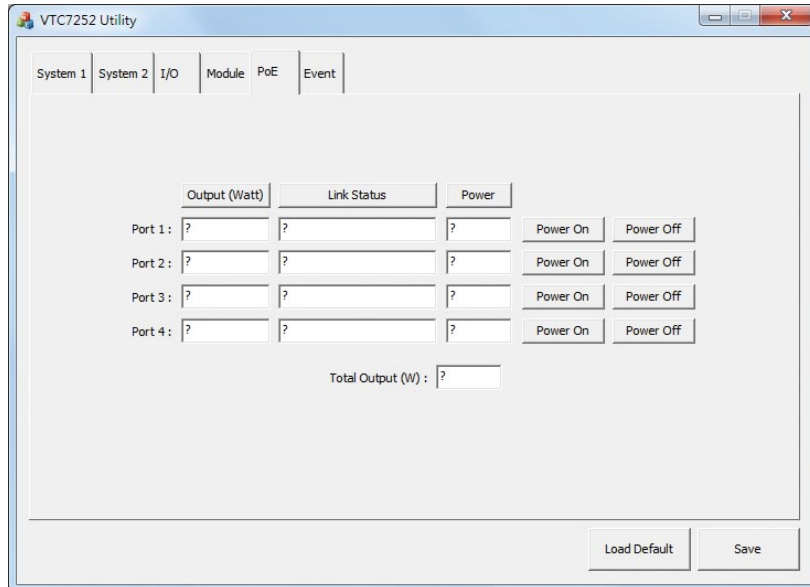


Mini PCIe Type (Setup in BIOS)

PCIe (CN18) : ?

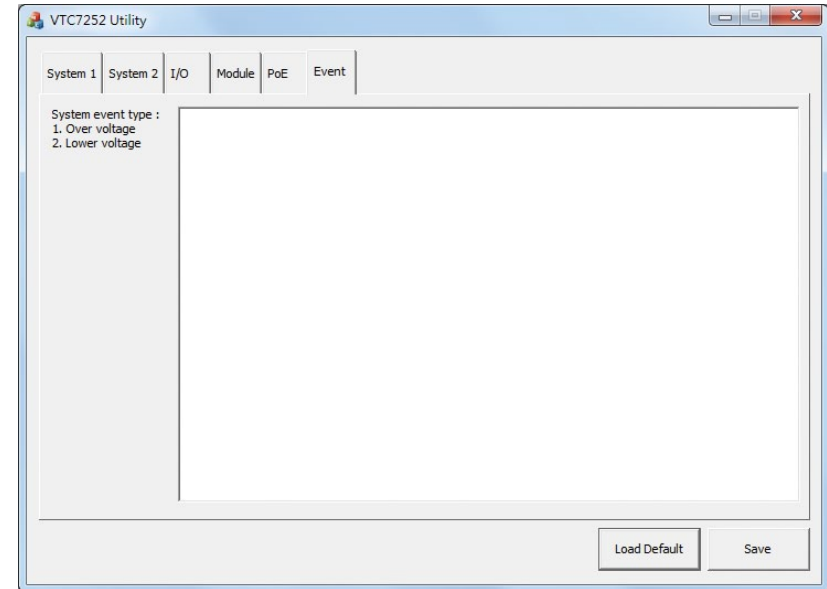
## 5. PoE

The PoE menu tab displays the status (Power on or Power off) of the PoE ports and other PoE related information.



1. Press the Power On button or Power Off button to turn on or turn off PoE power output.
2. Show the power output (watt) of each PoE port and total power output.

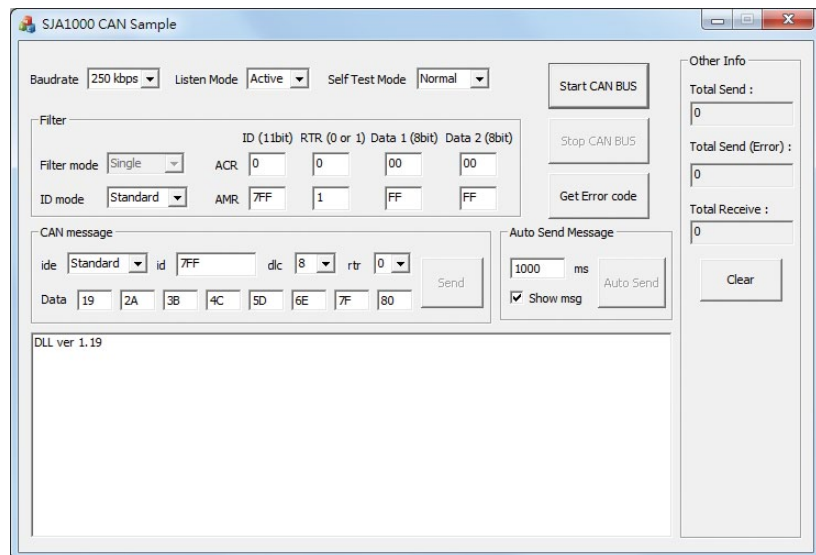
## 6. Event



The Event menu tab shows the events of VTC 7252.

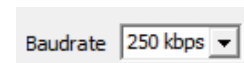
1. Over voltage alarm
2. Lower voltage alarm

## 7. CAN Utility



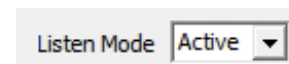
### 7.1 CAN Speed

Press the Set button to set up the CAN Speed.



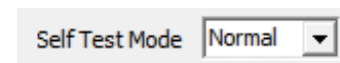
### 7.2 Listen Mode

There are Normal Mode and Listen Mode. In Listen Mode, CAN controller would give no acknowledge to the CAN-bus.



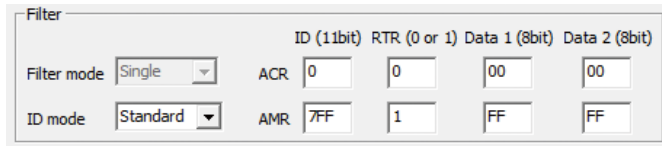
### 7.3 Self Test Mode

In Self Test Mode, a full node test is possible without any other active node on the bus.



## 7.4 Filter

In single filter configuration, receiving standard or extended frame messages.

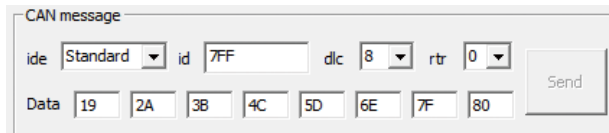


Filter configuration window showing the following settings:

Filter mode	ACR	ID (11bit)	RTR (0 or 1)	Data 1 (8bit)	Data 2 (8bit)
Single	0	0	00	00	
ID mode	AMR				
Standard	7FF	1	FF	FF	

## 7.5 CAN message

Click the drop-down list to set up Message then press the Send button to send those CAN information.



CAN message configuration window showing the following settings:

ide	id	dlc	rtr	Data
Standard	7FF	8	0	19, 2A, 3B, 4C, 5D, 6E, 7F, 80

Send button

## 7.6 Auto Send Message

Set the time interval in the textbox and press the Auto Send button to send Message automatically or you can press Stop CAN BUS to stop the operation.



Auto Send Message configuration window showing the following settings:

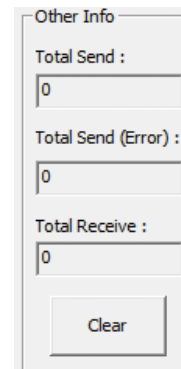
Time Interval	Unit	Action
1000	ms	Auto Send
<input checked="" type="checkbox"/> Show msg		

## 7.7 Other Info

Shows the statistics of sent messages.

Shows the statistics of the sent error messages.

Shows the statistics of received messages.

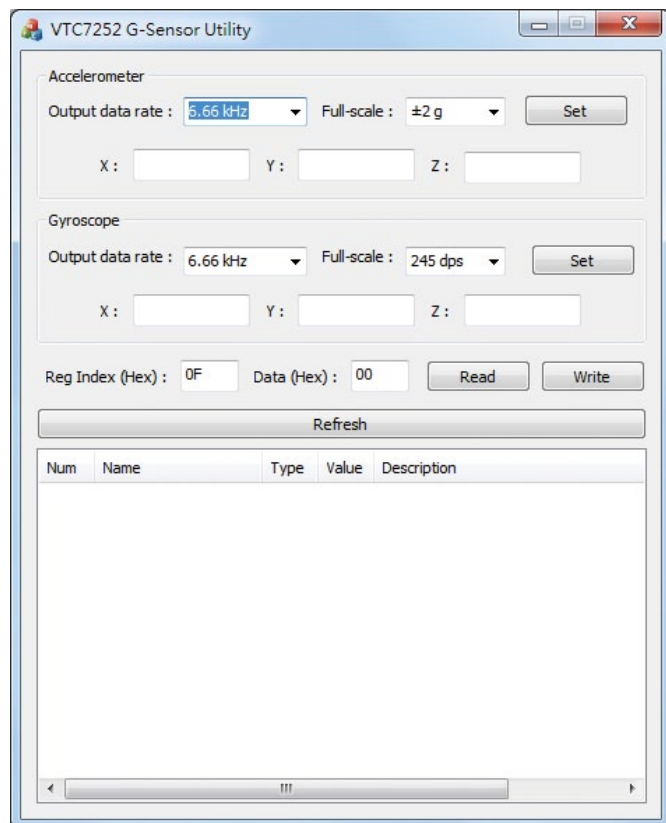


Other Info statistics window showing the following values:

Statistic	Value
Total Send :	0
Total Send (Error) :	0
Total Receive :	0

Clear button

## 8. G-Sensor



### 8.1 Accelerometer

Acceleration range and linear acceleration output data rate can be selected by pressing the Set button.

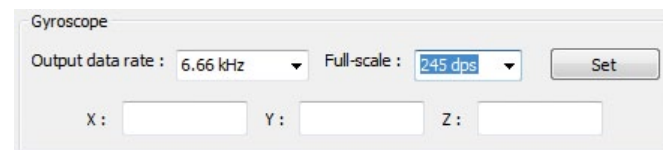
X-Axis data, Y-Axis data and Z-Axis data can be retrieved by pressing the Set button.



### 8.2 Gyroscope

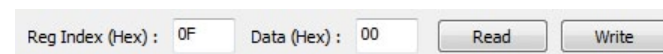
Acceleration range and angular rate range can be selected by pressing the Set button.

X-Axis data, Y-Axis data and Z-Axis data can be get by pressing the Set button.



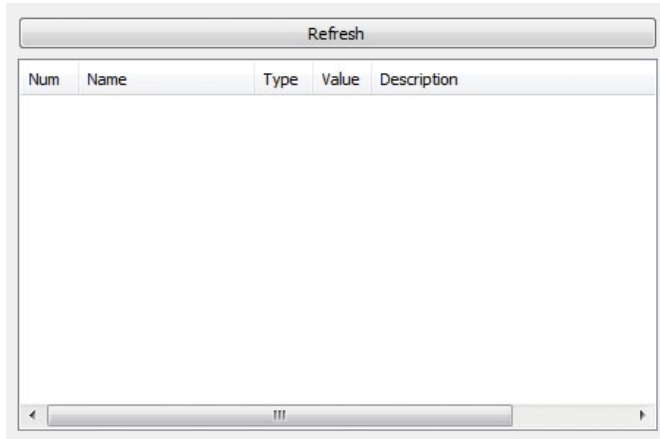
### 8.3 Sensor Register Index

Selects the registers inside the sensor to read or write the data.



## 8.4 Register Table

Shows the value of all registers in the sensor, once the Refresh button is pressed.



Num	Name	Type	Value	Description
-----	------	------	-------	-------------



# APPENDIX B: GNSS 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<sup>2</sup>C 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

<b>Receiver type</b>	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)		
<b>Nav. update rate<sup>1</sup></b>	Single GNSS: up to 18 Hz Concurrent GNSS: up to 10 Hz		
<b>Position accuracy</b>	2.0 m CEP		
<b>Acquisition</b>		NEO-M8N/Q	NEO-M8M
	Cold starts:	26 s	27 s
	Aided starts:	2 s	4 s
	Reacquisition:	1 s	1 s
<b>Sensitivity</b>			
	Tracking & Nav:	-167 dBm	-164 dBm
	Cold starts:	-148 dBm	-147 dBm
	Hot starts:	-156 dBm	-156 dBm
<b>Assistance</b>	AssistNow GNSS Online AssistNow GNSS Offline (up to 35 days) AssistNow Autonomous (up to 6 days) OMA SUPL & 3GPP compliant		
<b>Oscillator</b>	TCXO (NEO-M8N/Q), Crystal (NEO-M8M)		
<b>RTC crystal</b>	Built-in		
<b>Noise figure</b>	On-chip LNA (NEO-M8M). Extra LNA for lowest noise figure (NEO-M8N/Q)		

## Features cont.

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

<sup>1</sup> For NEO-M8M/Q

## Electrical data

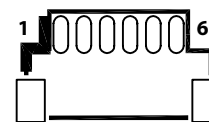
<b>Supply voltage</b>	1.65 V to 3.6 V (NEO-M8M) 2.7 V to 3.6 V (NEO-M8N/Q)
<b>Power consumption<sup>2</sup></b>	23 mA @ 3.0 V (continuous) 5 mA @ 3.0 V Power Save Mode (1 Hz, GPS only)
<b>Backup Supply</b>	1.4 to 3.6 V

<sup>2</sup> NEO-M8M

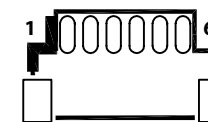
## Interfaces

<b>Serial interfaces</b>	1 UART 1 USBV2.0 full speed 12 Mbit/s 1 SPI (optional) 1 DDC (I <sup>2</sup> C compliant)
<b>Digital I/O</b>	Configurable timepulse 1 EXTINT input for Wakeup
<b>Timepulse</b>	Configurable 0.25 Hz to 10 MHz
<b>Protocols</b>	NMEA, UBX binary, RTCM

## VIOB-GPS-02 Module Connector Pin Definitions



J2 (GPS Side)



J13 (PC Side)

### J2 Pin Definition

Pin	Definition	Pin	Definition
1	3.3V	2	GPS LED
3	TX	4	RX
5	GND	6	3.3V

### J13 Pin Definition

Pin	Definition	Pin	Definition
1	3.3V	2	GPS LED
3	TX	4	RX
5	GND	6	3.3V

### COM Port for GNSS: COM 4 Baud Rate: 9600

# APPENDIX C: GNSS WITH DEAD RECKONING FEATURE

## uBlox-NEO M8L Overview

The NEO-M8L standalone concurrent GNSS module with 3D dead-reckoning (DR) is built on the exceptional performance of the u-blox M8 concurrent GNSS (GPS, GLONASS, Galileo-ready<sup>1</sup>, BeiDou, QZSS and SBAS) engine in the compact and industry proven NEO form factor.

The NEO-M8L delivers a complete, self-contained solution for road-vehicle Automotive Dead Reckoning (ADR) applications in an exceptionally compact 16 x 12 mm form-factor. The module combines information from GNSS, on-board 3-Dimensional inertial sensors, and speed data from the vehicle to deliver continuous navigation in road-vehicle applications. Its size and features make it suitable for aftermarket and first-fit navigation and Telematics applications. Position measurement rates of up to 2 Hz are available with optional extrapolation (based on vehicle dynamics) extending reporting rates to 20 Hz. Inertial sensor measurements are available to external applications at rates up to 10 Hz.

For ease of application, both hardware and message interfaces are supported for vehicle speed. u-blox' ADR and GNSS technologies deliver continuous and accurate positioning throughout the journey. u-blox' tightly-coupled navigation solution delivers significant improvements in navigation accuracy, especially in difficult urban environments. Dead reckoning sensors in conjunction with speed information from the vehicle also provide navigation before GNSS signals are acquired and during periods of complete signal loss. The introduction of three dimensional sensing and signal processing (for both acceleration and direction) extend accurate navigation to urban multi-level highways and car-parks as well as extending dead-reckoned range in tunnels and urban canyons. 3D sensing also enables flexibility in orientation of the receiver with respect to the vehicle frame.

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-M8L module includes an internal Flash that allows simple firmware upgrades. These features make the NEO-M8L perfectly suited to industrial and automotive applications. UART, SPI and DDC (I<sup>2</sup>C compatible) interfaces provide connectivity and enable synergies with most u-blox cellular modules.

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

u-blox' AssistNow Assistance services supply aiding information, such as ephemeris, almanac and time, reducing the time to first fix significantly and improving acquisition sensitivity. The u-blox M8 generation extends validities of AssistNow Offline data (up to 35 days) and AssistNow Autonomous data (up to 6 days), providing the benefits of faster acquisition for longer durations since last use.

---

<sup>1</sup> With future flash firmware update.

## Technical Specifications

Parameter	Specification			
<b>Receiver type</b>	72-channel u-blox M8 engine GPS L1C/A, SBAS L1C/A, QZSS L1C/A GLONASS L1OF, BeiDou B1, Galileo E1B/C <sup>2</sup>			
GNSS	GPS & GLONASS	GPS & BeiDou	GPS	
<b>Time-To-First-Fix<sup>3</sup></b>	Cold start	27 s	28 s	30 s
	Hot start	1.5 s	1.5 s	1.5 s
	Aided starts <sup>4</sup>	4 s	6 s <sup>5</sup>	3 s
<b>Sensitivity<sup>6</sup></b>	Tracking & Navigation <sup>7</sup>	-160 dBm	-160 dBm	-160 dBm
	Reacquisition	-159 dBm	-159 dBm	-159 dBm
	Cold start	-147 dBm	-147 dBm	-147 dBm
	Hot start	-156 dBm	-156 dBm	-156 dBm
Navigation	GPS & GLONASS	GPS & BeiDou	GPS	
<b>Horizontal Position accuracy<sup>8</sup></b>	Autonomous	2.5 m	2.5 m	2.5 m
	SBAS	2.0 m	2.0 m	2.0 m
<b>Velocity accuracy<sup>9</sup></b>		0.05 m/s	0.05 m/s	0.05 m/s
<b>Heading accuracy<sup>9</sup></b>		0.3 degree	0.3 degree	0.3 degree
<b>ADR position error<sup>10</sup></b>	Gyro + speed pulse + accelerometer		typ. 3 % of distance travelled without GNSS	
<b>Frequency of time pulse signal</b>			0.25 Hz ... 10 MHz	
<b>Maximum navigation rate (High Rate output)<sup>11</sup></b>			20 Hz	

Navigation	GPS & GLONASS	GPS & BeiDou	GPS	
<b>Maximum navigation rate (Measurement rate)</b>		2 Hz		
<b>Navigation latency<sup>12</sup></b>		300 ms nominal		
<b>Maximum sensor measurement message output rate</b>		10 Hz		
<b>Sensor measurement message output bandwidth<sup>13</sup></b>		nominal 50% of output rate		
<b>Accuracy of time pulse signal</b>	RMS 99%	30 ns 60 ns	30 ns 60 ns	30 ns 60 ns
<b>Operational limits</b>	Dynamics		≤ 4G	
	Altitude		50,000m	
	Velocity		500 m/s	

<sup>2</sup> Ready to support Galileo E1B/C when available with a flash firmware update

<sup>3</sup> All signals at -130 dBm

<sup>4</sup> Dependent on aiding data connection speed and latency

<sup>5</sup> BeiDou assisted acquisition is not available

<sup>6</sup> Demonstrated with a good external LNA

<sup>7</sup> Optimized for best navigation performance with dead-reckoning

<sup>8</sup> GNSS fix available, CEP, 50%, 24 hours static, -130dBm, > 6 SVs

<sup>9</sup> GNSS fix available, 50% @ 30 m/s

<sup>10</sup> Typical road and vehicle conditions

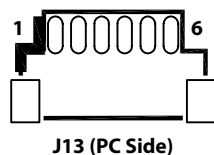
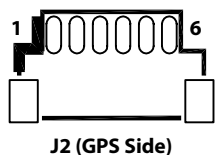
<sup>11</sup> For update rates > 2 Hz, extrapolation techniques are applied.

<sup>12</sup> Dependent on signal conditions but measurements are delivered with time-stamp corresponding to measurement time

<sup>13</sup> Higher bandwidths are used for navigation

<sup>14</sup> Assuming Airborne < 4 g platform

## VIOB-GPS-DR02/VTK-GPS-DR02 Module Connector Pin Definitions



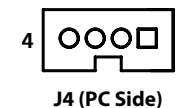
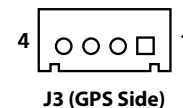
### J2 Pin Definition

Pin	Definition	Pin	Definition
1	3.3V	2	GPS LED
3	TX	4	RX
5	GND	6	3.3V

### J13 Pin Definition

Pin	Definition	Pin	Definition
1	3.3V	2	GPS LED
3	TX	4	RX
5	GND	6	3.3V

**COM Port for GNSS: COM 4**  
**Baud Rate: 9600**



### J3 Pin Definition

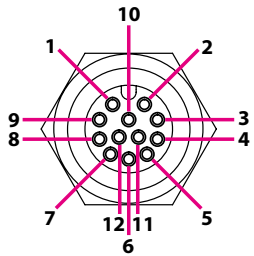
Pin	Definition	Pin	Definition
1	DR_DIRECTIO_M_R	2	DR_ODOMETER_M_R
3	1PPS_R	4	GND

### J4 Pin Definition

Pin	Definition	Pin	Definition
1	GND	2	1PPS
3	DR_ODOMETER_M	4	DR_DIRECTIO_M

# APPENDIX D: SIGNAL CONNECTION OF DI/DO

## GPIO Pinout Description



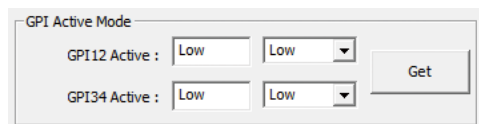
Pin	Definition	Pin	Definition
1	DI1	2	DI2
3	DI3	4	DO1
5	DO2	6	DO3
7	GND	8	CAN1 L
9	CAN1 H	10	CAN2 L
11	CAN2 H	12	GND

## Digital Input

The GPIO connector (DIO, connector number: 3) for GPI signal (digital signal input). The GPIO has 3 digital input channels by default.

### Wet Contact (default)

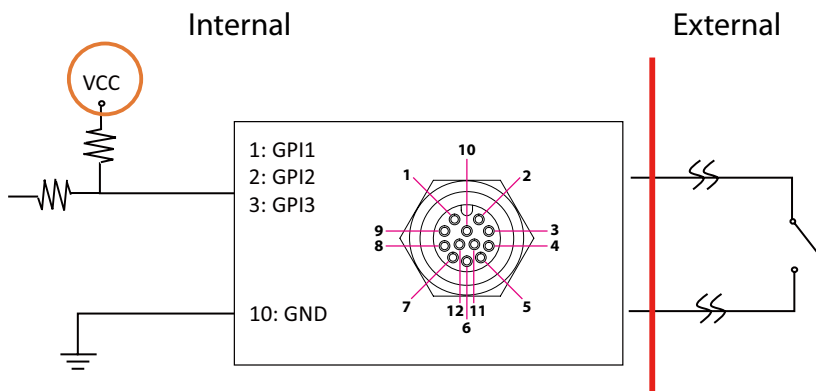
The "GPI Active" needs to set to "Low" in Software Demo Utility as shown below or SDK. The GPI signals have a pull up resistor to Vin Voltage internally.



Note: Example of GPI 1 and GPI 2 as a pair, and GPI 3 as a single.

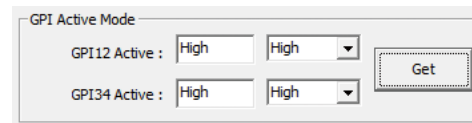
The figure below shows how to connect an external output source to one of the input channels.

### Internal Sourcing (Default)



### Dry Contact:

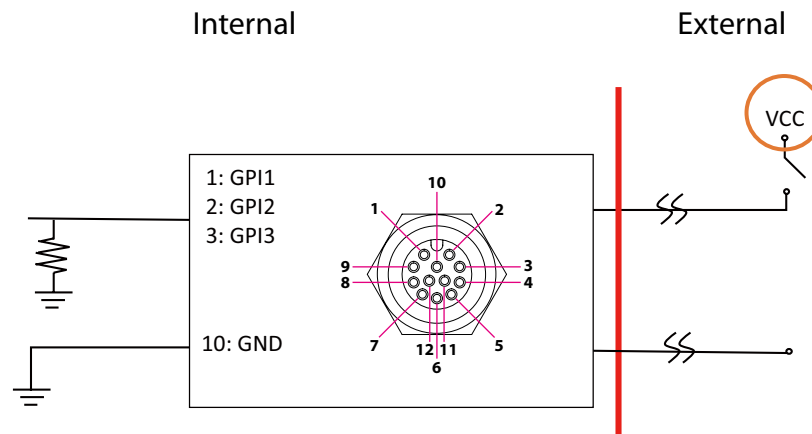
The "GPI Active" needs to set to "High" in Software Demo Utility as shown below or SDK. The GPI signal will not have a pull up resistor internally.



Note: Example of GPI 1 and GPI 2 as a pair, and GPI 3 as a single.

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

### External Sourcing



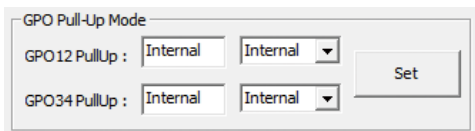
## Digital Output

The GPIO (DIO, connector number: 3) connector for GPO signal (digital signal output). The GPIO connector has 3 digital output channels by default.

The signal connection of GPIO supports two connected methods for output signal type. The output signal has two states, one is low level (driven to 0V from GPO signal) other is open (high voltage is provided from external device).

Wet Contact (default)

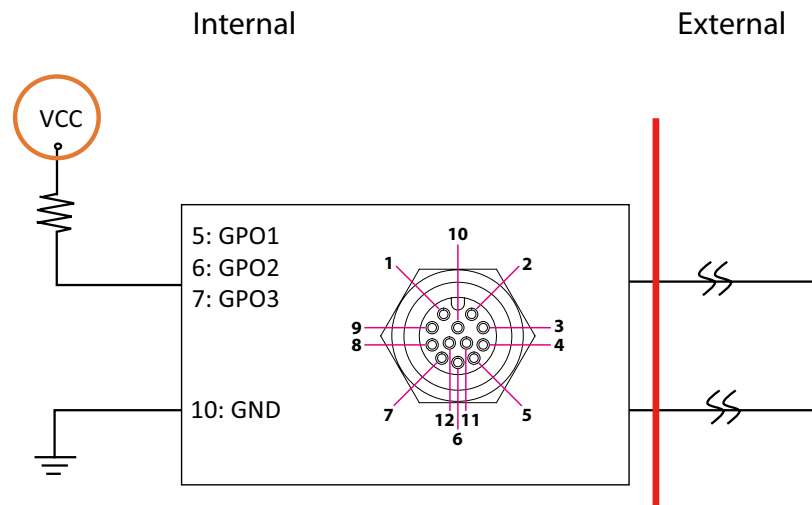
The “GPO PullUp” needs to set to “Internal” in Software Demo Utility as shown below or SDK. The GPO signal will have a pull up resistor to Vin Voltage internally.



Note: Example of GPO 1 and GPO 2 as a pair, and GPO 3 as a single.

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

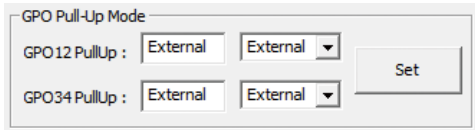
### Internal Sourcing (Default)





Dry Contact

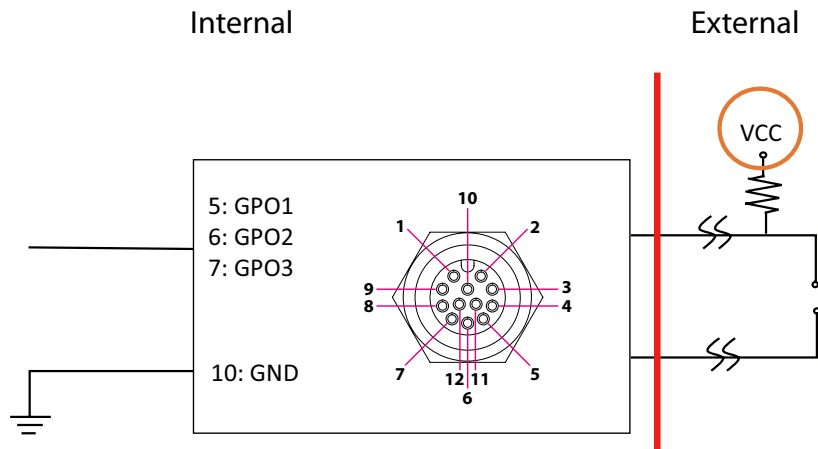
The "GPO PullUp" needs to set to "External" in Software Demo Utility as shown below or SDK. The GPO signal will not have a pull up resistor internally.



Note: Example of GPO 1 and GPO 2 as a pair, and GPO 3 as a single.

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

**External Sourcing**



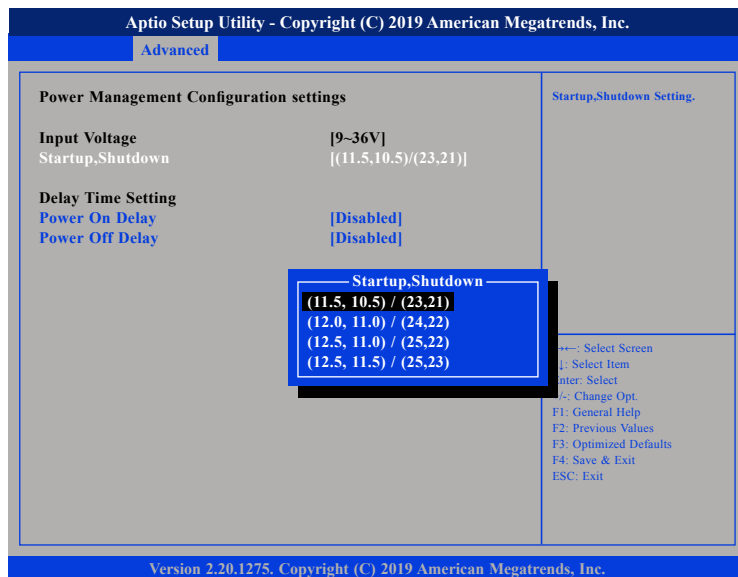
# APPENDIX E: VEHICLE POWER MANAGEMENT SETUP

## 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.

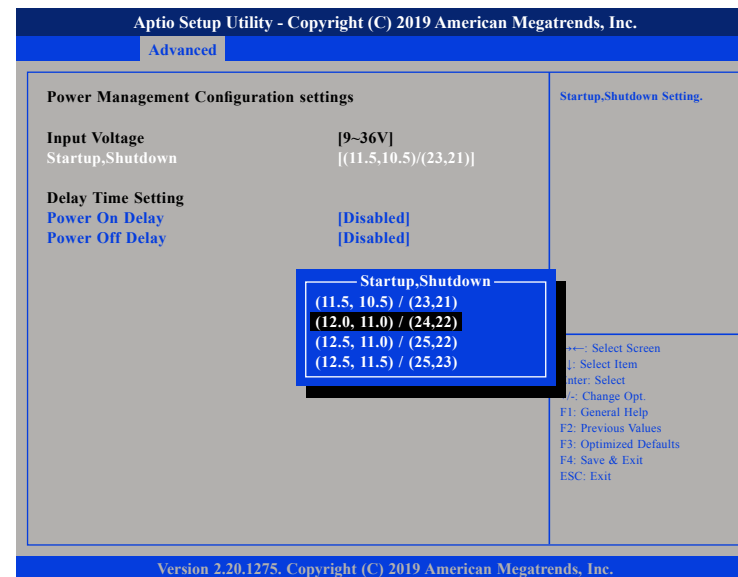
If the input voltage is 24V: the startup voltage to 23V and the shutdown voltage to 21V.



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.



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

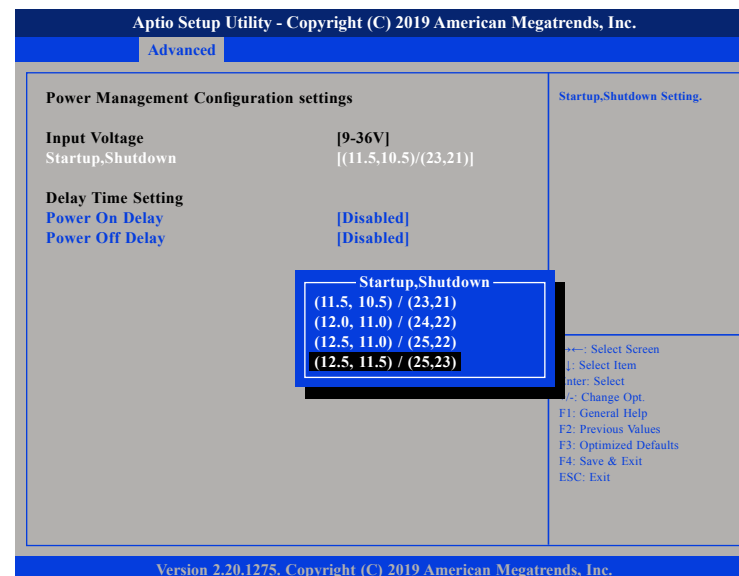
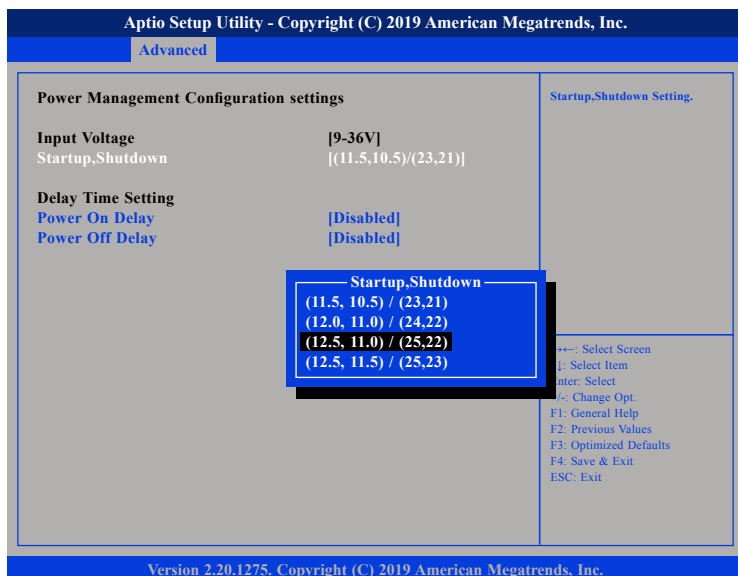
If the input voltage is 12V: the startup voltage to 12.5V and the shutdown voltage to 11V.

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

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

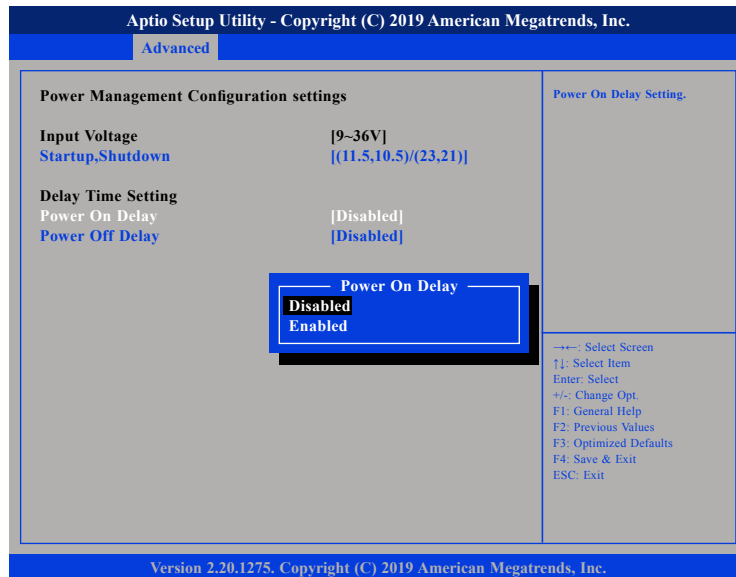
If the input voltage is 12V: the startup voltage to 12.5V and the shutdown voltage to 11.5V.

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



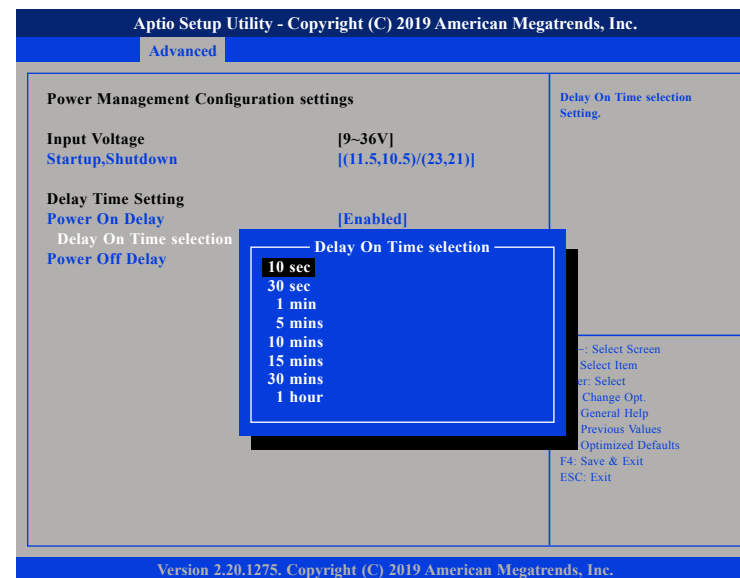
## Power-on Delay Setting

### Disable Power-on Delay



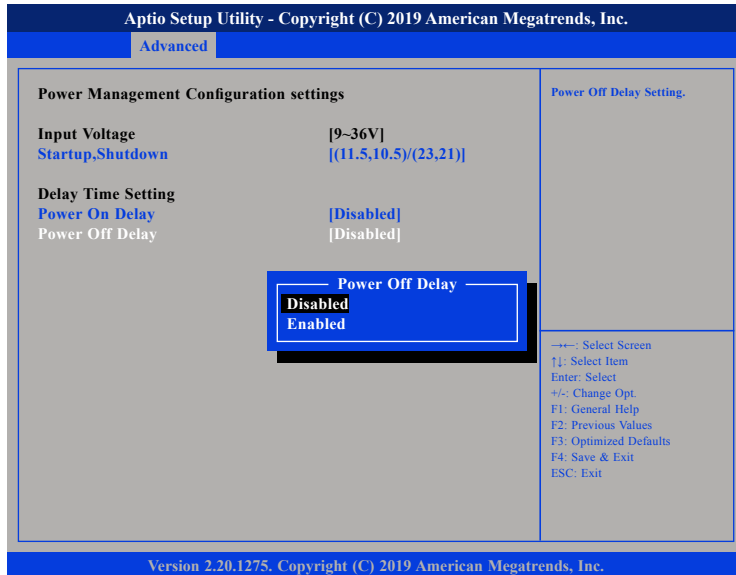
## Enable Power-on Delay

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



# Power-off Delay Setting

## Disable Power-off Delay



## Enable Power-off Delay

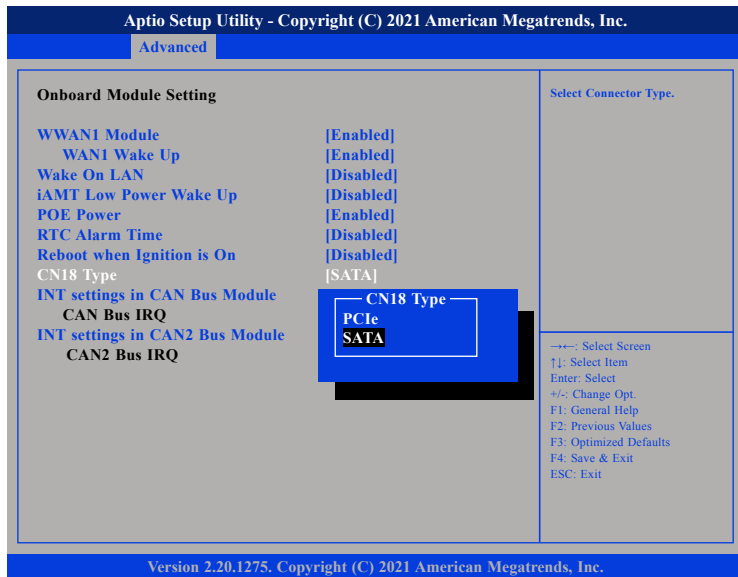
Delay time can be set at 20 sec./1 min./5 min./10 min./30 min./1 hour/6 hour/18 hour.



## WLAN and mSATA Setting

### Selecting the application type of the CN3 signal

For Wi-Fi or mini-PCIe module, please select **PCIe** (PCIe + USB 2.0).  
 For mSATA module, please select **SATA**.



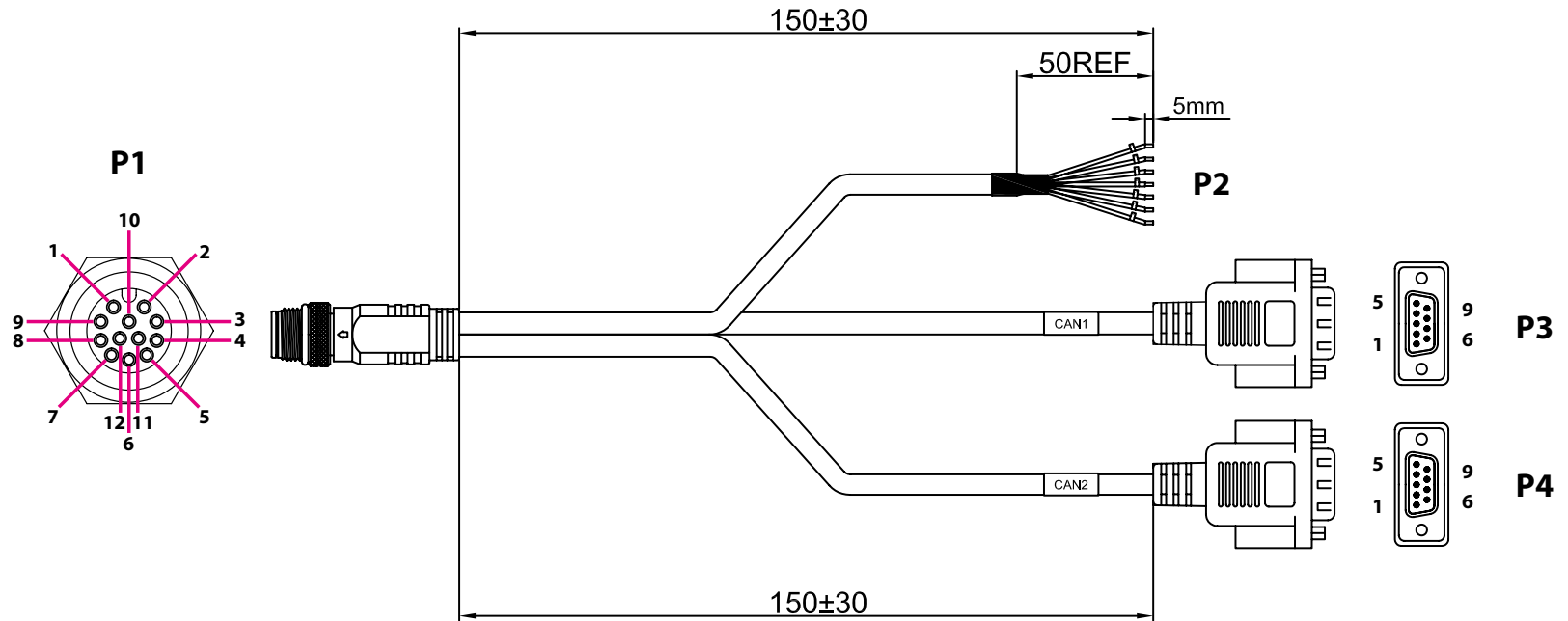
### Selecting the application type of the CN4 signal

For Wi-Fi or mini-PCIe module, please select **PCIe** (PCIe + USB 2.0).  
 For mSATA module, please select **SATA**.

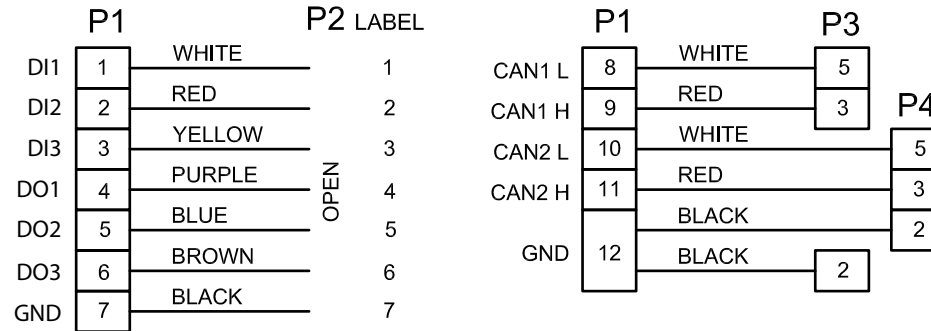




# APPENDIX F: PIN DEFINITION FOR THE MULTIPORT CABLE



## Pinout Description



## APPENDIX G: COM PORT TABLE

COM Port	Function
COM 1	RS232
COM 2	RS232
COM 3	RS232 / 422 / 485
COM 4	GNSS
COM 6	MCU

# APPENDIX H: POWER CONSUMPTION

## Test Equipment/Tool

- VTC 7252-7C4IP
- Windows 10 Enterprise Evaluation 1809 Build 17763.107 RS5
- Burn-in
- All modules

## Test Condition

Room temperature

## Test Procedure

Idle state, Full state, Full+loading state and IGN OFF state.

Idle	Full	Full + load
<ul style="list-style-type: none"> <li>▪ Into OS</li> <li>▪ Display x 3</li> <li>▪ Keyboard &amp; mouse</li> <li>▪ Audio</li> <li>▪ All storages (Storage x 2, total 14w)</li> <li>▪ Modules (mSATA x 2 + ZQ802XRACB + EM7430)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Idle state</li> <li>▪ Modules (EM7430)</li> <li>▪ Mini card dummy load (3.3w + 4.36w + 4.36w)</li> <li>▪ Burn in at 100% (CPU + 2D + 3D + Disk + Sound + RAM + Video Playback + GPU)</li> <li>▪ Play video</li> <li>▪ COM transmission (COM1 + COM2 + COM3)</li> <li>▪ GPS link</li> </ul>	<ul style="list-style-type: none"> <li>▪ Full load state</li> <li>▪ USB 3.0 dummy load (5V/1A x 4)</li> <li>▪ USB 2.0 dummy load (5V/0.5A x 4)</li> <li>▪ PoE dummy load (30w x 2)</li> </ul>

## Pass/Fail Criteria:

1. Start all of the functions on VTC 7252-7C4IP and measure power consumption.
2. Set the system into suspend mode and measure power consumption.

Item	Device	Test Case		Result			
				Average		Peak	
		Configuration	Voltage	Current(A)	Watt(W)	Current(A)	Watt(W)
1	S0 State i7-9700TE 35W	Idle State	12V	1.51	18.12	5.42	65.04
			24V	0.79	18.96	2.91	69.84
			36V	0.53	19.08	1.98	71.28
		Full State (Burn-in)	12V	6.07	72.84	9.26	111.12
			24V	3.05	73.2	4.43	106.32
			36V	2.05	73.8	3.07	110.52
		Full State + Loading	12V	7.22	86.64	9.98	119.76
			24V	3.66	87.84	4.81	115.44
			36V	2.49	89.64	3.34	120.24
		Full State + Loading (+ PoE 60W)	12V	12.91	154.92	18.04	216.48
			24V	6.49	155.76	7.51	180.24
			36V	4.35	156.6	5.08	182.88
2	S0 State E-2278GEL 35W	Idle State	12V	1.45	17.4	5.54	66.48
			24V	0.76	18.24	2.92	70.08
			36V	0.52	18.72	2.09	75.24
		Full State (Burn-in)	12V	5.96	71.52	9.73	116.76
			24V	3.02	72.48	4.07	97.68
			36V	2.03	73.08	3.06	110.16
		Full State + Loading	12V	7.23	86.76	10.91	130.92
			24V	3.63	87.12	5.01	120.24
			36V	2.44	87.84	3.53	127.08
		Full State + Loading (+ PoE 60W)	12V	12.97	155.64	17.59	211.08
			24V	6.51	156.24	7.86	188.64
			36V	3.93	155.52	5.22	187.92

Item	Device	Test Case		Result			
				Average		Peak	
		Configuration	Voltage	Current(A)	Watt(W)	Current(A)	Watt(W)
3	S3 State	Full State Sleep Mode	12V	0.92	11.04	N/A	N/A
			12V wake up WWAN	0.94	11.28	N/A	N/A
4	IGN OFF	Full State IGNITION OFF	12V	0.032	0.384	N/A	N/A
			12V wake up WWAN	0.07	0.84	N/A	N/A
			24V	0.057	1.368	N/A	N/A
			24V wake up WWAN	0.079	1.896	N/A	N/A
			36V	0.084	3.024	N/A	N/A
			36V wake up WWAN	0.103	3.708	N/A	N/A