



**NEXCOM International Co., Ltd.**

**Mobile Computing Solutions**  
**Vehicle Telematics Computer**  
**VTC 1010**  
User Manual

# Contents

## Preface

|   |      |
|---|------|
| Copyright .....                         | v    |
| Disclaimer .....                        | v    |
| Acknowledgements .....                  | v    |
| Regulatory Compliance Statements .....  | v    |
| Declaration of Conformity.....          | v    |
| RoHS Compliance .....                   | vi   |
| Warranty and RMA .....                  | vii  |
| Technical Support and Assistance.....   | x    |
| Conventions Used in this Manual.....    | x    |
| Global Service Contact Information..... | xi   |
| Package Contents.....                   | xiii |

## Chapter 1: Product Introduction

|                              |   |
|------------------------------|---|
| Physical Features.....       | 1 |
| Front View.....              | 1 |
| Rear View.....               | 1 |
| Overview .....               | 2 |
| Key Features .....           | 2 |
| Hardware Specifications..... | 3 |
| Connector Numbering .....    | 5 |

## Chapter 2: External Connectors Pinout Description

|  |   |
|--|---|
| LED Indicators (PWR, Status, LAN & GPIO) ..... | 6 |
| LED Indicators (SSD, GPS, WLAN & WWAN).....    | 6 |

|                          |    |
|--------------------------|----|
| USB 3.0 Port.....        | 7  |
| Audio Jack 3.5mm.....    | 7  |
| SD Card Connector .....  | 8  |
| SIM1 Socket.....         | 8  |
| SIM2 Socket.....         | 9  |
| Event Button .....       | 9  |
| Reset Button.....        | 10 |
| Power Input.....         | 10 |
| Multiport Connector..... | 11 |
| VGA Connector.....       | 12 |
| RS232 Connector .....    | 12 |
| Line-out .....           | 13 |
| Mic-in.....              | 13 |
| DisplayPort .....        | 14 |
| USB 2.0 Port.....        | 14 |
| LAN Connector.....       | 15 |

## Chapter 3: Jumpers and Switches

|  |    |
|--|----|
| Before You Begin .....                                   | 16 |
| Precautions .....  | 16 |
| Jumper Settings .....                                    | 17 |
| VTC 1010 Jumper and Switch Settings.....                 | 19 |
| CMOS Clear Switch.....                                   | 19 |
| Voltage Selector (For CN10 Connector).....               | 19 |
| WWAN Module Selector (For Wake-Up & Voice on CN10) ..... | 20 |
| RTC Battery Connector .....                              | 20 |

- External Thermal Sensor Module.....21
- Debug 80 Port Connector .....21
- VGA Connector .....22
- COM Port Connector .....22
- High Speed UART Connector .....23
- OBDII Module Connector .....23
- Capture Card Connector .....24
- Capture Card Connector .....24
- 5V Output.....25
- Event Button Connector .....25
- SATA HDD Connector.....26
- MCU Debug Port.....26
- GAL Download Port.....27
- MCU Download Port .....27
- GPIO Setting.....28
- Voltage Setup Selection.....28
- FAN Connector.....29
- VIOB-GPS-DR01.....29
- GPS Module Connector.....30
- MCU GPIO Connector.....30
- PCIe Connector .....31
- Expand Connector.....31
  - Mini-PCIe (USB + PCIe).....32
  - Mini-PCIe (mSATA or PCIe [default]) .....33
  - Mini-PCIe (USB + PCIe).....34
  - Mini-PCIe (USB).....35

**Chapter 4: Mechanical Dimensions.....36**

**Chapter 5: System Setup**

- Removing the Chassis Cover .....37
- Installing the First WWAN Module .....38

- Installing the Second WWAN Module .....40
- Installing a Wireless LAN Module .....42
- Installing a SATA SSD Drive .....44
- Installing a SO-DIMM .....45
- Installing a Capture Card .....45

**Appendix A: Software Demo Utility for I/O Ports of Function Control**

- Menu Screen .....46
  - 1.1 Status .....47
  - 1.2 GPIO Setting.....48
  - 1.3 MCU GPIO Setting.....48
  - 1.4 WDT Setting .....49
  - 1.5 3G Module .....49
  - 1.6 RS-422/RS-485 .....50
  - 1.7 Power On Delay Time .....50
  - 1.8 Power Off Delay Time .....50
  - 1.9 Wake Up Function .....51
  - 2.0 Mini-PCIe Module Power On/Off .....51
  - 2.1 CAN Bus Setting .....52

**Appendix B: GPS Feature**

- uBlox-NEO M8 Overview.....53
- Technical Specifications.....53

**Appendix C: Pin Definition for the Multiport Cable**

- P1 Connector Pinout.....56
- P2 to P17 Connector Pinouts .....56
  - Power Output Connector .....56
  - RS232 Connector .....56
  - GPIO + CAN Bus 2.0B Connector .....57
  - OBDII Connector .....57

|                           |    |
|---------------------------|----|
| USB Connector.....        | 58 |
| RS422/485 Connector ..... | 58 |
| Reset Button.....         | 59 |
| Odometer Connector .....  | 59 |
| A/V1 Jack .....           | 60 |
| A/V2 Jack .....           | 60 |
| A/V3 Jack .....           | 61 |
| A/V4 Jack .....           | 61 |
| Front Audio .....         | 62 |
| Center Audio.....         | 62 |
| Surround Audio.....       | 63 |
| Rear Audio .....          | 63 |

### **Appendix D: Signal Connection of DI/DO**

|                              |    |
|------------------------------|----|
| GPIO Pinout Description..... | 64 |
| SW1 Setting.....             | 64 |
| Digital Input.....           | 65 |
| Digital Output.....          | 66 |

### **Appendix E: Vehicle Power Management Setup**

|  |    |
|--|----|
| External Power Output Setting .....        | 67 |
| Startup and Shutdown Voltage Setting ..... | 67 |
| Power-on Delay Setting .....               | 69 |
| Power-off Delay Setting .....              | 71 |

### **Appendix F: Power Consumption.....73**

# Preface

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## Acknowledgements

VTC 1010 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 B 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 B 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.

## e13 Mark

The “e” mark is the proof of compliance with directives (laws) required by the European Union. The Council of European communities in Brussels issues these directives and all members must accept approved products.

e13 - Luxembourg

For more information, visit [http://www.tuv.com/jp/en/\\_e\\_mark\\_and\\_e\\_mark\\_homologation\\_for\\_vehicles\\_vehicle\\_components\\_.html](http://www.tuv.com/jp/en/_e_mark_and_e_mark_homologation_for_vehicles_vehicle_components_.html).

## 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. HCP series products (Blade Server) which are manufactured by NEXCOM are covered by a three year warranty period.

### NEXCOM Return Merchandise Authorization (RMA)

- Customers shall enclose the “NEXCOM RMA Service Form” with the returned packages.
- Customers must collect all the information about the problems encountered and note anything abnormal or, print out any on-screen messages, and describe the problems on the “NEXCOM RMA Service Form” for the RMA number apply process.
- Customers can send back the faulty products with or without accessories (manuals, cable, etc.) and any components from the card, such as CPU and RAM. If the components were suspected as part of the problems, please note clearly which components are included. Otherwise, NEXCOM is not responsible for the devices/parts.
- Customers are responsible for the safe packaging of defective products, making sure it is durable enough to be resistant against further damage and deterioration during transportation. In case of damages occurred during transportation, the repair is treated as “Out of Warranty.”
- Any products returned by NEXCOM to other locations besides the customers’ site will bear an extra charge and will be billed to the customer.

### Repair Service Charges for Out-of-Warranty Products

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

#### System Level

- Component fee: NEXCOM will only charge for main components such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistor, capacitor.
- Items will be replaced with NEXCOM products if the original one cannot be repaired. Ex: motherboard, power supply, etc.
- Replace with 3rd party products if needed.
- If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

#### Board Level

- Component fee: NEXCOM will only charge for main components, such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistors, capacitors.
- If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

## Warnings

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

## Cautions

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

## Safety Information

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

- Read all instructions carefully.
- Do not place the unit on an unstable surface, cart, or stand.
- Follow all warnings and cautions in this manual.
- When replacing parts, ensure that your service technician uses parts specified by the manufacturer.
- Avoid using the system near water, in direct sunlight, or near a heating device.
- The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.
- The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

## Installation Recommendations

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

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

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

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



## Safety Precautions

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

## Technical Support and Assistance

1. For the most updated information of NEXCOM products, visit NEXCOM's website at [www.nexcom.com](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.
3. CompactFlash: Turn off the unit's power before inserting or removing a CompactFlash storage card.

## Conventions Used in this Manual



### Warning:

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



### Caution:

Information to avoid damaging components or losing data.



### Note:

Provides additional information to complete a task easily.

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## Package Contents

Before continuing, verify that the VTC 1010 series package that you received is complete. Your VTC 1010 series package should have all the items listed in the following table.

| Item | P/N           | Name   | Specification   | Qty |
|------|---------------|--|---|-----|
| 1    | 4NCPM00302X00 | (T)Terminal Blocks 3P Phoenix Contact:1777992              | 5.08mm Male DIP Green                                   | 1   |
| 2    | 50311F0100X00 | (H)Round Head Screw w/Spring+Flat Washer Long<br>FEI:P3x6L | P3x6 iso/SW6x0.5 NI                                     | 4   |
| 3    | 50311F0110X00 | (H)Flat Head Screw Long FEI:F3x5ISO+NYLOK NIGP             | F3x5 NI NYLOK   | 4   |
| 4    | 5040420015X00 | VTC 1010 HDD Bracket VER:A PANADVANCE                      | 95.35x112x12 SPCC NI PAINTING                           | 1   |
| 5    | 60233AT134X00 | SATA Cable ST:MD-6102069                                   | SATA7P/L 180D TO 90D L=75mm                             | 1   |
| 6    | 60233PW197X00 | SATA Power Cable Best:900-0415-070R                        | Female Connector 15P to Housing 4P PIT:2.54mm<br>L:70mm | 1   |
| 7    | 602DCD0769X00 | (N)VTC 1010 CD Driver VER:1.0                              | JCL   | 1   |
| 8    | 6030000039X00 | Composite Cable for VTC 1010 ST:13-210-E012                | DMS 60PIN L=300mm                                       | 1   |
| 9    | 603VED0001X00 | Capture Card Cable for MPX-885 ST:VT-1009F2 27-54          | IDC10P PH:1.24x2.54 TI PH:1.27x1.27 L=90mm              | 1   |

## Ordering Information

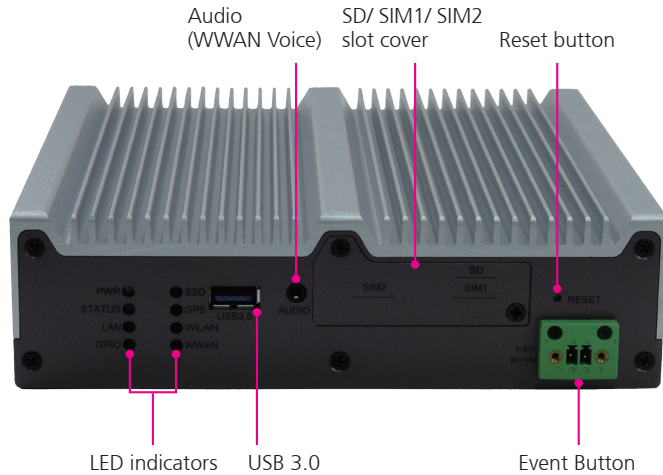
The following provides ordering information for VTC 1010.

- **VTC 1010-BK (P/N: 10V00101000X0)**  
Intel® Atom™ processor E3827 1.75GHz CPU, 2GB DDR3L SO-DIMM,  
VGA/DP Output, 1x LAN, 2x RS-232, 1x RS-422/485, 3x DI, 3x DO, 3x  
USB, 12VDC output

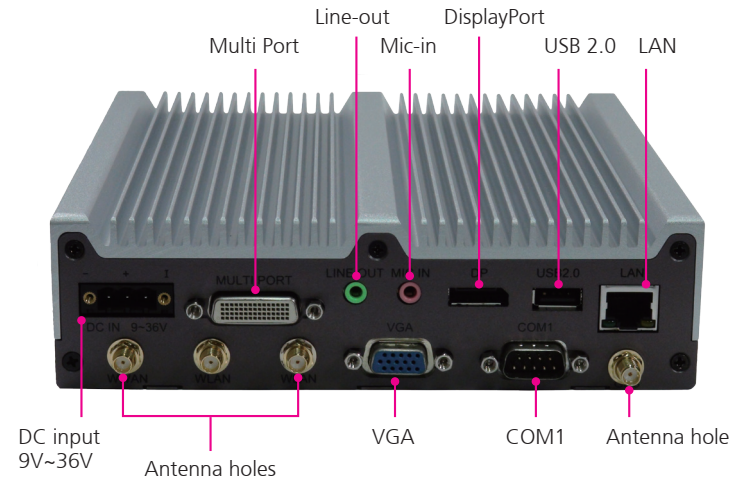
# Chapter 1: Product Introduction

## Physical Features

### Front View



### Rear View



## Overview

VTC 1010 features next generation Intel® Atom™ processor E3827, 1.75GHz, with powerful graphic and multimedia enhancement. VTC 1010 is packed rugged, fanless, and 1 DIN compact enclosure. It is specifically designed to comply with stringent MIL-STD-810G military standard. VTC 1010 comes with built-in CAN BUS 2.0B interface and optional OBDII (ASE J1939/ J1708) port to monitor the vehicle operating status real-time and troubleshoot a non-working vehicle. With dual SIM card design, it allows the choice of the best service carrier network and minimizes roaming cost. VTC 1010 can be configured to work with two independent WWAN connections and can effectively increase the bandwidth for faster massive data transfer over the air. VTC 1010 also supports two-way voice communication. Equipped with intelligent vehicle power management, VTC 1010 can be waked up by ignition, timer, or remote dial-up for flexible operation or maintenance. VTC 1010 can satisfy different demands for versatile telematics applications, such as infotainment, fleet management, dispatching system and mobile video surveillance.

## Key Features

- Intel® Atom™ processor E3827, 1.75GHz
- Dual SIM cards + dual WWAN modules support
- Built-in U-blox M8N GPS, optional Dead Reckoning support
- Built-in CAN 2.0B. Optional CAN/OBDII Combo Module (SAE J1939/ CAN2.0B by DIP Switch)
- 4x Mini-PCIe expansions
- Wake on RTC/SMS via WWAN module
- Compliant with MIL-STD-810G
- Built-in G-sensor, Gyroscope, and e-Compass sensors



## Hardware Specifications

### CPU

- Intel® Atom™ processor E3827, dual core 1.75GHz

### Memory

- 1x 204-pin DDR3L SO-DIMM socket support 1066MHz / 1333MHz up to 8GB. Default 2GB

### Storage

- 1x 2.5" SATA 2.0
- 1x SD card socket

### Expansion

- 1x full size Mini-PCIe socket (USB 2.0)
- 1x full size Mini-PCIe socket (USB 2.0 + PCIe)
- 1x full size Mini-PCIe socket (mSATA or PCIe)
- 1x half size Mini-PCIe socket (USB 2.0 + PCIe)

### Function

- 1x default U-blox M8N GPS module (72-channel, GPS, GLONASS, BeiDou, SBAS) or optional modules with Dead Reckoning support
- Built-in G-sensor, Gyroscope, and e-Compass sensors

### I/O Interface-Front

- 8x LED for power, system status, storage, WWAN, WLAN, GPS, LAN, GPIO
- 2x external accessible SIM card socket (selectable) with cover
- 1x audio jack 3.5mm for WWAN voice communication, including 1x Mic-in and 1x Line-out
- 1x external accessible SD card socket with cover
- 1x event button (trigger type)
- 1x reset button
- 1x type A USB 3.0 compliant host, supporting system boot up.

### I/O Interface-Rear

- 1x 9~36VDC input with ignition and 11W typical power consumption
- 1x type A USB 2.0 compliant host, supporting system boot up
- 1x RJ45 10/100/1000 Fast Ethernet with LED
- 1x phone jack 3.5mm for Mic-in (for WWAN voice communication)
- 1x phone jack 3.5mm for Line-out (for PC audio)
- 1x DB-15 VGA. Resolution up to 2500 x 1600 @60Hz
- 1x DP port. Resolution up to 2500 x 1600 @60Hz
- 1x DB-9 for RS-232
- 4x antenna hole for GPS/ WWAN/ WLAN/ BT
- 1x LHF 60-pin connector
  - 1x 6-pin power connector, 12VDC output (max: 1A)
  - 1x type A female USB 2.0 compliant host, supporting system boot up.
  - 1x DB-9 RS-232
  - 1x DB-9 RS-422/ 485
  - 1x DB-9 female 3x DI and 3x DO. Onboard CAN 2.0B signals (Programmable Digital Input)
    - Input Voltage (Internal Type): 5VDC TTL (default)
    - Input Voltage (Source Type): 3~12VDC
  - (Programmable Digital Output)
    - Digital Output (Sink Type): 5VDC TTL (default), max current: 20mA
    - Digital Output (Source Type): 3~24VDC, max current: 150mA
  - 1x DB-9 for optional ODBII module (ASE J1939 or J1708)
  - 1x DB-9 for optional GPS Dead Reckoning module
  - 4x BNC connector video-in for optional 4-channel video capture card
  - 4x audio connector for 7.1 channel audio output (front, center/ woofer, rear surround, side surround)

### Power Management

- Selectable boot-up & shut-down voltage for low power protection by software

- Setting 8-level power on/off delay time by software
- Status of ignition and low voltage can be detected by software
- Support S3/ S4 suspend mode

### Operating System

- Windows 8 Professional, WES8
- Windows 7, WES7
- Tizen IVI
- Fedora

### Dimensions

- 180 mm (W) x 180 mm (D) x 50 mm (H) (7.09" x 7.09" x 1.97")
- 1.7kg

### Construction

- Fanless
- Aluminum fin top cover and front/ rear panels
- SECC bottom enclosure

### Environment

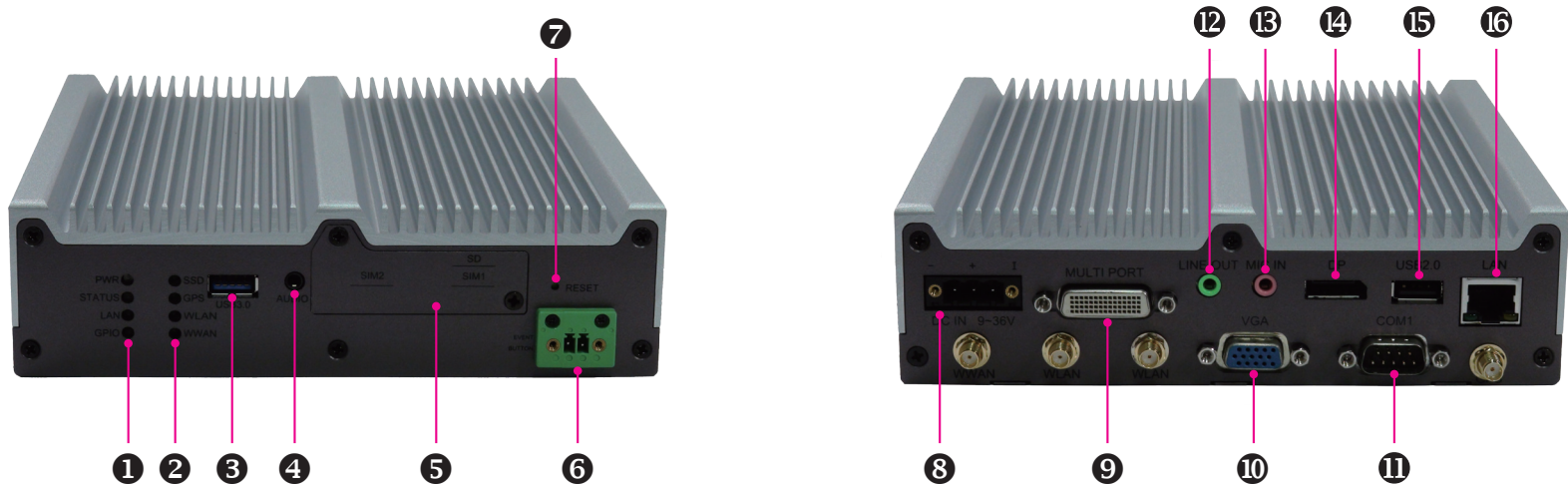
- Operating temperatures: -30°C to 70°C (w/ industrial SSD) with air flow  
-10°C to 50°C (w/ commercial HDD) with air flow
- Storage temperatures: -35°C to 85°C
- Relative humidity: 10% to 90% (non-condensing)
- Vibration (random): 1g@5~500 Hz (in operation, SSD)
- Vibration (SSD):  
Operating: MIL-STD-810G, 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=20g  
Non-Operating: MIL-STD-810G, Method 516.6, Procedure V, crash hazard shock test=75g

### Certifications

- CE approval
- FCC Class B
- E13 Mark

## Connector Numbering

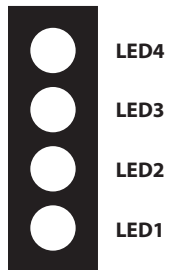
The following diagrams indicate the numbers of the connectors. Use these numbers to locate the connectors' respective pinout assignments on chapter 2 of the manual.



# Chapter 2: External Connectors Pinout Description

## LED Indicators (PWR, Status, LAN & GPIO)

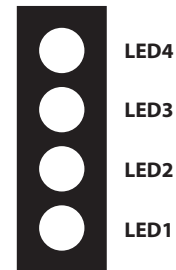
Connector Number: 1



| LED           | LED Behavior   |
|---------------|--|
| LED1 (GPIO)   | Off (Default)<br>Green: On. Programmable by user.        |
| LED2 (LAN)    | Green: Link<br>Blinking: Active                          |
| LED3 (HEALTH) | Steady Green: System ready<br>Steady Red: System booting |
| LED4 (POWER)  | Blue: Power good<br>Red: Power failure                   |

## LED Indicators (SSD, GPS, WLAN & WWAN)

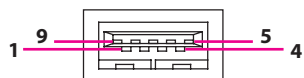
Connector Number: 2



| LED         | LED Behavior                             |
|-------------|--|
| LED1 (WWAN) | Green: WWAN On                           |
| LED2 (WLAN) | Green: WLAN Connected. Off: Disconnected |
| LED3 (GPS)  | Green: GPS power On                      |
| LED4 (SSD)  | Green: Storage access                    |

## USB 3.0 Port

Connector Number: 3



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | 5V         | 2   | USB_N      |
| 3   | USB_P      | 4   | GND        |
| 5   | USB3_RXN   | 6   | USB3_RXP   |
| 7   | GND        | 8   | USB3_TXN   |
| 9   | USB3_TXP   |     |            |

## Audio Jack 3.5mm

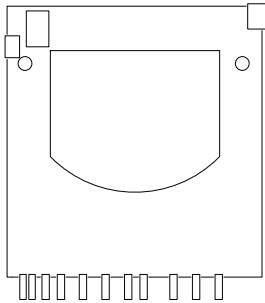
Connector Number: 4



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | MIC-C1     | 2   | GND        |
| 3   | FRONT_RC1  | 4   | FRONT_LC1  |
| 5   | CON DET    | G1  | GND        |
| G2  | GND        |     |            |

## SD Card Connector

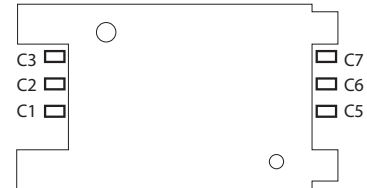
Connector Number: 5



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | D3         | 2   | CMD        |
| 3   | GND        | 4   | VDD        |
| 5   | CLK        | 6   | GND        |
| 7   | D0         | 8   | D1         |
| 9   | D2         | WP  | WP         |
| Cd  | CDZ        | SC  | GND        |
| G   | GND        |     |            |

## SIM1 Socket

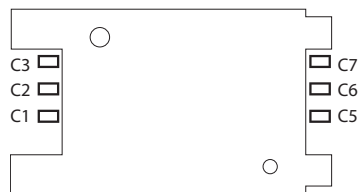
Connector Number: 5



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| C1  | UIM1_PWR2  | C5  | GND        |
| C2  | UIM1_RST2  | C6  | NC         |
| C3  | UIM1_CLK2  | C7  | UIM1_DAT2  |

## SIM2 Socket

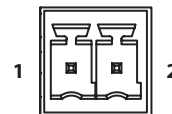
Connector Number: 5



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| C1  | UIM2_PWR2  | C5  | GND        |
| C2  | UIM2_RST2  | C6  | NC         |
| C3  | UIM2_CLK2  | C7  | UIM2_DAT2  |

## Event Button

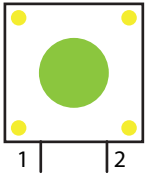
Connector Number: 6



| Pin | Definition  |
|-----|-------------|
| 1   | Front Event |
| 2   | GND         |

## Reset Button

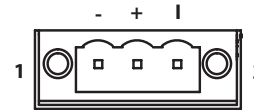
Connector Number: 7



| Pin       | Definition |
|-----------|------------|
| 1-2 Open  | NORMAL     |
| 1-2 Short | RESET#     |

## Power Input

Connector Number: 8

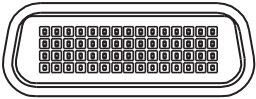


| Pin | Definition |
|-----|------------|
| 1   | GND_IN     |
| 2   | V_IN       |
| 3   | IGNITION   |



## Multiport Connector

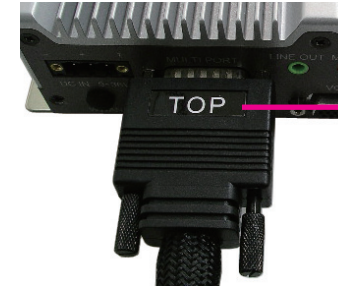
Connector Number: 9



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | OUT_12V    | 16  | CEN_JD     |
| 2   | SP_DTR_3   | 17  | CEN_C      |
| 3   | SP_TXD_3   | 18  | LFE_C      |
| 4   | GPIO1      | 19  | AGND       |
| 5   | GPIO2      | 20  | RS485_-    |
| 6   | USB1_POWER | 21  | RS485_+    |
| 7   | USB_2N_L   | 22  | ISO_GND    |
| 8   | USB_2P_L   | 23  | ISO_GND    |
| 9   | USB_GND    | 24  | ISO_GND    |
| 10  | RS422_TX-  | 25  | ISO_GND    |
| 11  | RS422_TX+  | 26  | GPIO3      |
| 12  | AGND       | 27  | GPIO4      |
| 13  | FRONT_L_C  | 28  | SP_RXD_3   |
| 14  | FRONT_R_C  | 29  | SP_DCD_3   |
| 15  | FRONT_JD   | 30  | OUT_12V    |



When connecting the multiport cable, please make sure the top side labeled "TOP" is facing upwards.



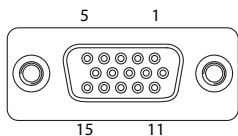
This side facing upwards

| Pin | Definition   | Pin | Definition |
|-----|--------------|-----|------------|
| 31  | GND          | 46  | SIDE_JD    |
| 32  | SP_CTS_3     | 47  | SIDE_R_C   |
| 33  | SP_DSR_3     | 48  | SIDE_L_C   |
| 34  | GPIO5        | 49  | AGND       |
| 35  | GPIO6        | 50  | C1708_1_L  |
| 36  | CAP2_A       | 51  | C1708_1_H  |
| 37  | CAN1_H       | 52  | DIRECTION  |
| 38  | CAN1_L       | 53  | ODOMETER   |
| 39  | CAN_M_L      | 54  | 1PPS       |
| 40  | CAN_M_H      | 55  | CAP2_B     |
| 41  | REAR_PANIC   | 56  | CAP1_A     |
| 42  | AGND         | 57  | CAP1_B     |
| 43  | SURR_OUT_L_C | 58  | SP_RTS_3   |
| 44  | SURR_OUT_R_C | 59  | SP_RI_3    |
| 45  | SURR_JD      | 60  | GND        |

## VGA Connector

Connector size: DB15, Female

Connector Number: 10

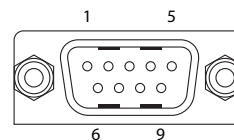


| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | Red        | 2   | Green      |
| 3   | Blue       | 4   | NC         |
| 5   | Gnd        | 6   | Red_RTN    |
| 7   | Green_RTN  | 8   | Blue_RTN   |
| 9   | +5V        | 10  | GND        |
| 11  | NC         | 12  | I2C_Data   |
| 13  | H SYNC     | 14  | V SYNC     |
| 15  | I2C_CLK    |     |            |

## RS232 Connector

Connector size: DB9, Male

Connector Number: 11



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | DCD        | 2   | RXD        |
| 3   | TXD        | 4   | DTR        |
| 5   | GND        | 6   | DSR        |
| 7   | RTS        | 8   | CTS        |
| 9   | RI         |     |            |

## Line-out

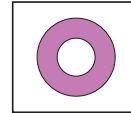
Connector Number: 12



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | Line2 LC   | 2   | Line2 JD   |
| 3   | NC         | 4   | Line2 RC   |
| 5   | GND        | 6   | GND        |

## Mic-in

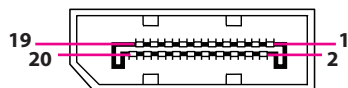
Connector Number: 13



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | Mic1 C     | 2   | Mic2 JD    |
| 3   | NC         | 4   | Mic1 CL    |
| 5   | GND        | 6   | GND        |

## DisplayPort

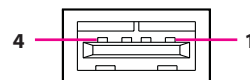
Connector Number: 14



| Pin | Definition  | Pin | Definition  |
|-----|-------------|-----|-------------|
| 1   | DPO_DATA0_P | 2   | GND         |
| 3   | DPO_DATA0_N | 4   | DPO_DATA1_P |
| 5   | GND         | 6   | DPO_DATA1_N |
| 7   | DPO_DATA2_P | 8   | GND         |
| 9   | DPO_DATA2_N | 10  | DPO_DATA3_P |
| 11  | GND         | 12  | DPO_DATA3_N |
| 13  | CONFIG1     | 14  | CONFIG2     |
| 15  | DPC0_AUXP_C | 16  | GND         |
| 17  | DPC0_AUXN_C | 18  | HPD         |
| 19  | RETURN      | 20  | DPO_PWR     |

## USB 2.0 Port

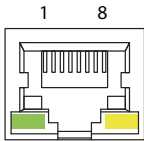
Connector Number: 15



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | 5V         | 2   | USB_N      |
| 3   | USB_P      | 4   | GND        |

## LAN Connector

Connector Number: 16



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | MDI0P      | 2   | MDI0N      |
| 3   | MDI1P      | 4   | MDI2P      |
| 5   | MDI2N      | 6   | MDI1N      |
| 7   | MDI3P      | 8   | MDI3N      |
| 9   | LED1-      | 10  | LED1+      |
| 11  | LED2-      | 12  | LED2+      |

# Chapter 3: Jumpers and Switches

This chapter describes how to set the jumpers on the motherboard. Note that the following procedures are generic for all VTC 1010 series.

## Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
  - A Philips screwdriver
  - A flat-tipped screwdriver
  - A set of jewelers screwdrivers
  - A grounding strap
  - An anti-static pad
- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.
- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environment tend to have less static electricity than

dry environments. A grounding strap is warranted whenever danger of static electricity exists.

## Precautions

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

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

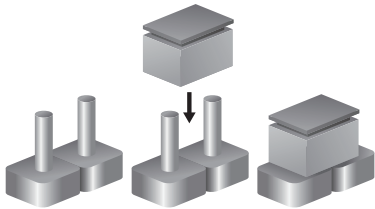
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

## Jumper Settings

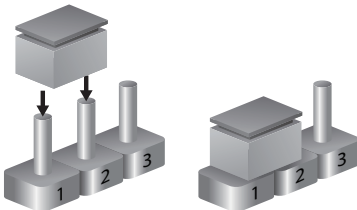
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just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



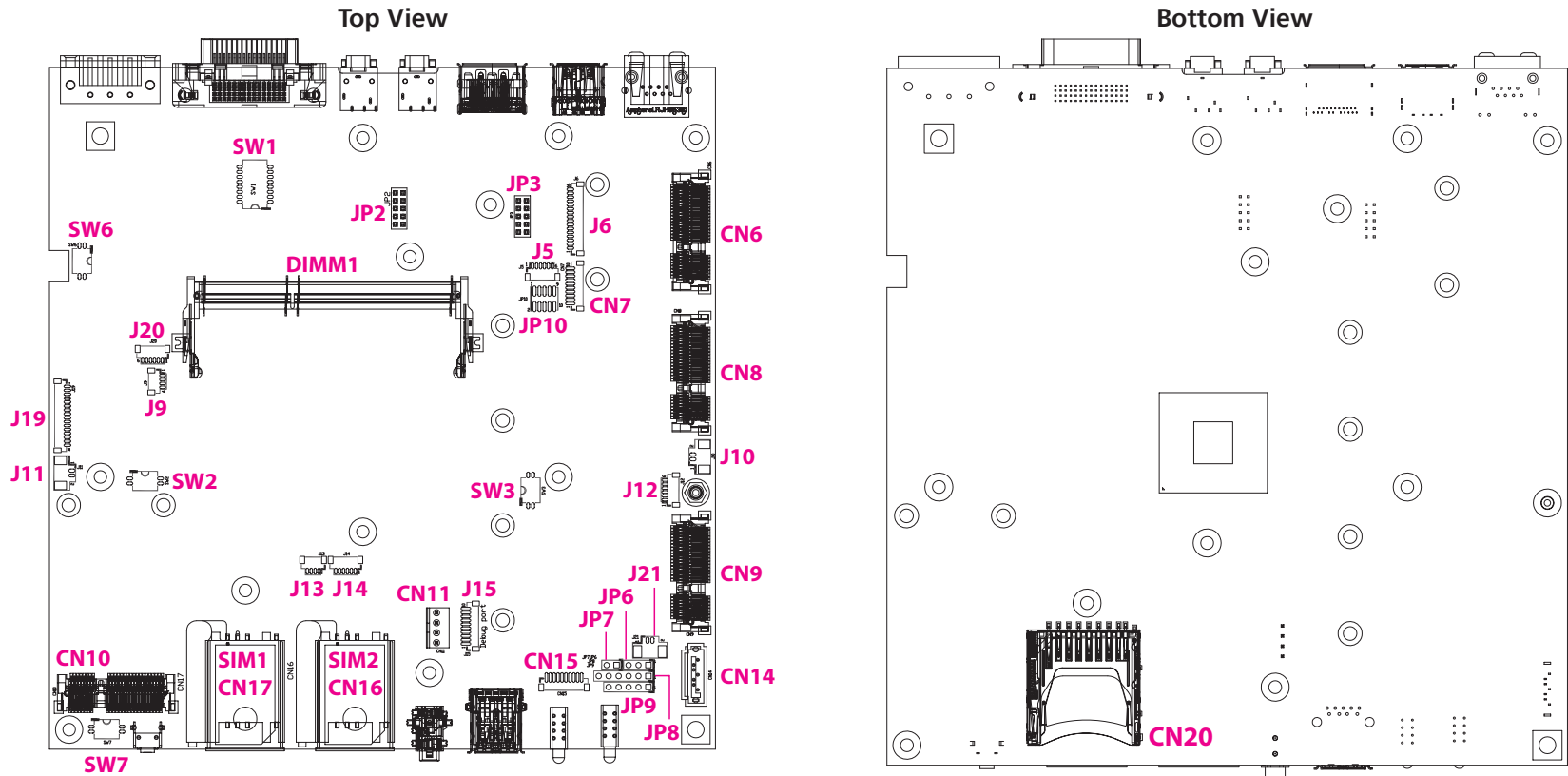
Three-Pin Jumpers: Pins 1 and 2 are Short



# VTC 1010 Connector Specification & Jumper Setting

## VTC 1010 carrier board placement

The figure below is the carrier board used in the VTC 1010 system. It shows the locations of the jumpers and connectors.

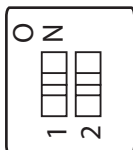




## VTC 1010 Jumper and Switch Settings

### CMOS Clear Switch

Connector location: SW2



|       | On         | Off    |
|-------|------------|--------|
| SW2.1 | Clear CMOS | Normal |
| SW2.2 | Clear ME   | Normal |

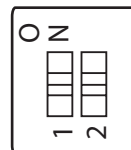
#### Default Settings:

|       |     |
|-------|-----|
| SW2.1 | Off |
| SW2.2 | Off |

Note: Once CMOS is cleared and the power connector is plugged in, VTC 1010 will power on and power off automatically in the first Power-On. After first Power-On, VTC 1010 will work normally.

### Voltage Selector (For CN10 Connector)

Connector location: SW6



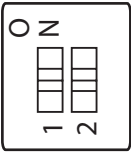
|       | 3.3V | 3.6V |
|-------|------|------|
| SW6.1 | Off  | On   |
| SW6.2 | Off  | On   |

#### Default Settings:

|       |     |
|-------|-----|
| SW6.1 | Off |
| SW6.2 | Off |

## WWAN Module Selector (For Wake-Up & Voice on CN10)

Connector location: SW7



|                | WWAN HE910<br>Wake-Up & Voice | WWAN CM8000<br>Wake-Up & Voice | WWAN<br>MC8090/8092 |
|----------------|-------------------------------|--------------------------------|---------------------|
| SW7.1          | On                            | Off                            | Off                 |
| SW7.2          | Off                           | On                             | On                  |
| Digital Voice* | HE910 (I2S)                   | Disabled (default)             | MC8090(PCM)         |

### Default Settings:

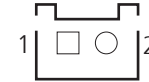
|       |     |
|-------|-----|
| SW7.1 | Off |
| SW7.2 | On  |

\*Digital voice is selectable in BIOS.

## RTC Battery Connector

Connector size: 1 x 2 = 2-pin header (1.25mm)

Connector location: J11



| Pin | Definition |
|-----|------------|
| 1   | GND        |
| 2   | RTC_BAT    |

## External Thermal Sensor Module

Connector size: 1 x 2 = 2-pin header

Connector location: JP7



| Pin | Definition |
|-----|------------|
| 1   | Sensor     |
| 2   | Sensor     |

## Debug 80 Port Connector

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

Connector location: J15



| 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       |

## VGA Connector

Connector size: 1 x 16 = 16-pin header (1.0mm)

Connector location: J6



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | GND        | 2   | VGA +5V    |
| 3   | VGA_CLK    | 4   | VGA_DATA   |
| 5   | VGA_VS     | 6   | VGA_HS     |
| 7   | GND        | 8   | GND        |
| 9   | GND        | 10  | VGA_GND    |
| 11  | VGA_BLUE   | 12  | VGA_GND    |
| 13  | VGA_GREEN  | 14  | VGA_GND    |
| 15  | VGA_RED    | 16  | M_DET      |

## COM Port Connector

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

Connector location: CN7



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | GND        | 2   | GND        |
| 3   | CTS        | 4   | DSR        |
| 5   | DTR        | 6   | RXD        |
| 7   | RI         | 8   | RTS        |
| 9   | TXD        | 10  | DCD        |

## High Speed UART Connector

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

Connector location: CN15

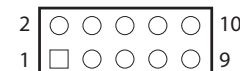


| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | GND        | 2   | SIO_RTS_1  |
| 3   | SIO_TXD_1  | 4   | SIO_CTS_1  |
| 5   | SIO_RXD_1  | 6   | GND        |
| 7   | SIO_CTS_0  | 8   | SIO_RXD_0  |
| 9   | SIO_RTS_0  | 10  | SIO_TXD_0  |

## OBDII Module Connector

Connector size: 2 x 5 = 10-pin header (2.0mm)

Connector location: JP2 & JP3



### JP2

| Pin | Definition    | Pin | Definition    |
|-----|---------------|-----|---------------|
| 1   | CAN2.0B_H     | 2   | CAN_1939_H    |
| 3   | CAN2.0B_L     | 4   | CAN_1939_L    |
| 5   | GND           | 6   | GND           |
| 7   | ANALOG-Input1 | 8   | ANALOG-Input2 |
| 9   | ANALOG-Input3 | 10  | ANALOG-GND    |

### JP3

| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | TXD        | 2   | RXD        |
| 3   | CAN_DI1    | 4   | CAN_DO1    |
| 5   | GND        | 6   | GND        |
| 7   | NC         | 8   | NC         |
| 9   | CAN_M_VCC5 | 10  | NC         |

## Capture Card Connector

(Connector for SC330 video capture card)

Connector size: 1 x 6 = 6-pin header (1.0mm)

Connector location: J5



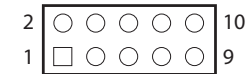
| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | GND        | 2   | CAP2_B     |
| 3   | CAP2_A     | 4   | CAP1_B     |
| 5   | CAP1_A     | 6   | GND        |

## Capture Card Connector

(Connector for MPX-885 video capture card)

Connector size: 2 x 5 = 10-pin header (1.27mm)

Connector location: JP10

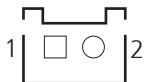


| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | CAP1_A     | 2   | CAP1_B     |
| 3   | CAP2_A     | 4   | CAP2_B     |
| 5   | GND        | 6   | NC         |
| 7   | NC         | 8   | NC         |
| 9   | NC         | 10  | NC         |

## 5V Output

Connector size: 1 x 2 = 2-pin header (1.25mm)

Connector location: J21



| Pin | Definition |
|-----|------------|
| 1   | +          |
| 2   | -          |

## Event Button Connector

Connector size: 1 x 2 = 2-pin header (1.25mm)

Connector location: J10



J10

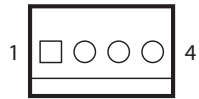
| Pin | Definition  |
|-----|-------------|
| 1   | GND         |
| 2   | FRONT_EVENT |

## SATA HDD Connector

Connector size: CN11, 1 x 4 = 4-pin header (2.54mm)

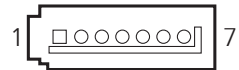
CN14, 1 x 7 = 7-pin header (1.27mm)

Connector location: CN11 & CN14



CN11

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



CN14

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

## MCU Debug Port

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

Connector location: JP6



| Pin | Definition |
|-----|------------|
| 1   | TX6        |
| 2   | RX6        |
| 3   | GND        |



## GAL Download Port

Connector size: 1 x 6 = 6-pin header (2.54mm)

Connector location: JP8



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

## MCU Download Port

Connector size: 1 x 5 = 5-pin header (2.54mm)

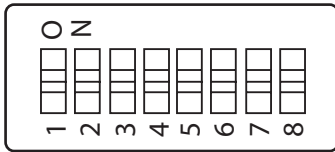
Connector location: JP9



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | V3.3ALW    | 2   | C2D        |
| 3   | MRST       | 4   | C2CK       |
| 5   | GND        |     |            |

## GPIO Setting

Connector location: SW1



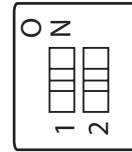
| SW    | On           | Off        |
|-------|--------------|------------|
| SW1.1 | Pull up VCC5 | Don't care |
| SW1.2 | Pull up VCC5 | Don't care |
| SW1.3 | Pull up VCC5 | Don't care |
| SW1.4 | Pull up VCC5 | Don't care |
| SW1.5 | Pull up VCC5 | Don't care |
| SW1.6 | Pull up VCC5 | Don't care |
| SW1.7 | NC           | NC         |
| SW1.8 | NC           | NC         |

### Default Settings:

|       |    |
|-------|----|
| SW1.1 | On |
| SW1.2 | On |
| SW1.3 | On |
| SW1.4 | On |
| SW1.5 | On |
| SW1.6 | On |
| SW1.7 | On |
| SW1.8 | On |

## Voltage Setup Selection

Connector location: SW3



|                 |     |     |            |
|-----------------|-----|-----|------------|
| PowerSW (SW3.1) | Off | Off | On         |
| 12V 24V (SW3.2) | Off | On  | Don't Care |
|                 | 12V | 24V | 9~36V      |

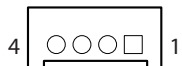
### Default Settings:

| Power Range (9~36V) |            |
|---------------------|------------|
| SW3.1               | On         |
| SW3.2               | Don't Care |

## FAN Connector

Connector size: 1 x 4 = 4-pin header

Connector location: J9

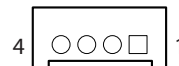


| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | GND        | 2   | Power      |
| 3   | FAN_TACT   | 4   | FAN_CTRL   |

## VIOB-GPS-DR01

Connector size: 1 x 4 = 4-pin header

Connector location: J13



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | GND        | 2   | IPPS       |
| 3   | ODOMETER   | 4   | DIRECTION  |

## GPS Module Connector

Connector size: 1 x 6 = 6-pin header

Connector location: J14



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | GPS_BAT    | 2   | GPS_LED    |
| 3   | GPS_CTX    | 4   | GPS_CRX    |
| 5   | GND        | 6   | VCC3_GPS   |

## MCU GPIO Connector

Connector size: 1 x 6 = 6-pin header

Connector location: J12



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | GND        | 2   | MCU GPO2   |
| 3   | MCU GPO1   | 4   | MCU GPI2   |
| 5   | MCU GPI1   | 6   | GND        |

## PCIe Connector

Connector size: 1 x 16 = 16-pin header

Connector location: J19

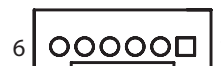


| Pin | Definition  | Pin | Definition |
|-----|-------------|-----|------------|
| 1   | GND         | 2   | PCIE_CLKN  |
| 3   | PCIE_CLKP   | 4   | GND        |
| 5   | PCIE_RXN    | 6   | PCIE_RXP   |
| 7   | GND         | 8   | PCIE_TXN   |
| 9   | PCIE_TXP    | 10  | GND        |
| 11  | USBHUB_3N   | 12  | USBHUB_3P  |
| 13  | GND         | 14  | PLTRST     |
| 15  | EXP_Disable | 16  | GND        |

## Expand Connector

Connector size: 1 x 6 = 6-pin header

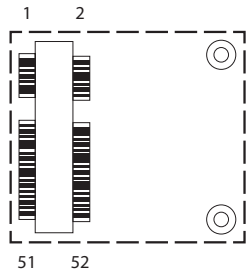
Connector location: J20



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1   | GND        | 2   | GND        |
| 3   | GND        | 4   | 12VSB      |
| 5   | 12VSB      | 6   | 12VSB      |

## Mini-PCIe (USB + PCIe)

Connector location: CN6

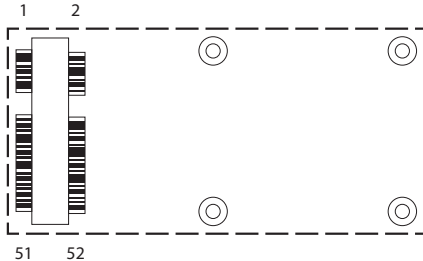


| Pin | Definition | Pin | Definition   |
|-----|------------|-----|--------------|
| 1   | WAKE#      | 2   | +V3.3A_MINI1 |
| 3   | NC         | 4   | GND          |
| 5   | NC         | 6   | +V1.5S_MINI1 |
| 7   | CLK_REQ#   | 8   | NC           |
| 9   | GND        | 10  | NC           |
| 11  | PCIE_CLK#  | 12  | NC           |
| 13  | PCIE_CLK   | 14  | NC           |
| 15  | GND        | 16  | NC           |
| 17  | NC         | 18  | GND          |
| 19  | NC         | 20  | WLAN_DIS#    |
| 21  | GND        | 22  | RESET#       |
| 23  | PCIE_RX_N  | 24  | +V3.3A_MINI1 |
| 25  | PCIE_RX_P  | 26  | GND          |

| Pin | Definition   | Pin | Definition   |
|-----|--------------|-----|--------------|
| 27  | GND          | 28  | +V1.5S_MINI1 |
| 29  | GND          | 30  | SMBCLK       |
| 31  | PCIE_TX_N    | 32  | SMBDAT       |
| 33  | PCIE_TX_P    | 34  | GND          |
| 35  | GND          | 36  | USB-         |
| 37  | GND          | 38  | USB+         |
| 39  | +V3.3A_MINI1 | 40  | GND          |
| 41  | +V3.3A_MINI1 | 42  | NC           |
| 43  | GND          | 44  | WLAN_LED#    |
| 45  | NC           | 46  | NC           |
| 47  | NC           | 48  | +V1.5S_MINI1 |
| 49  | NC           | 50  | GND          |
| 51  | BT_EN        | 52  | +V3.3A_MINI1 |

## Mini-PCIe (mSATA or PCIe [default])

Connector location: CN9



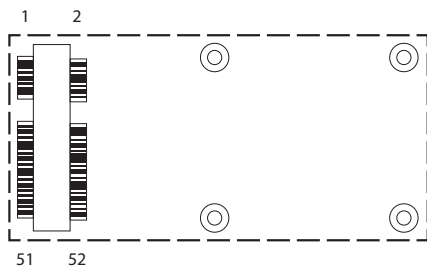
| Pin | Definition  | Pin | Definition     |
|-----|-------------|-----|----------------|
| 1   | WAKE#       | 2   | +V3.3_MINI_3   |
| 3   | NC          | 4   | GND            |
| 5   | NC          | 6   | +V1.5S_MINI_3  |
| 7   | CLKREQ      | 8   | NC             |
| 9   | GND         | 10  | NC             |
| 11  | REFCLK-     | 12  | NC             |
| 13  | REFCLK+     | 14  | NC             |
| 15  | GND         | 16  | NC             |
| 17  | NC          | 18  | GND            |
| 19  | NC          | 20  | MINICARD3_DIS# |
| 21  | GND         | 22  | WLAN_RESET#    |
| 23  | SATA_RXPO_C | 24  | +V3.3_MINI_3   |
| 25  | SATA_RXNO_C | 26  | GND            |

| Pin | Definition   | Pin | Definition    |
|-----|--------------|-----|---------------|
| 27  | GND          | 28  | +V1.5S_MINI_3 |
| 29  | GND          | 30  | SMBCLK        |
| 31  | SATA_TXNO_C  | 32  | SMBDAT        |
| 33  | SATA_TXPO_C  | 34  | GND           |
| 35  | GND          | 36  | USB_D-        |
| 37  | GND          | 38  | USB_D+        |
| 39  | +V3.3_MINI_3 | 40  | GND           |
| 41  | +V3.3_MINI_3 | 42  | WWAN_LED#     |
| 43  | GND          | 44  | NC            |
| 45  | NC           | 46  | NC            |
| 47  | NC           | 48  | +V1.5S_MINI_3 |
| 49  | NC           | 50  | GND           |
| 51  | CTRL0        | 52  | +V3.3_MINI_3  |

## Mini-PCle (USB + PCIe)

Connector location: CN8

SIM Socket: SIM 2 (CN16)



| Pin | Definition  | Pin | Definition     |
|-----|-------------|-----|----------------|
| 1   | PCIE_WAKE#2 | 2   | +V3.3A_MINI_2  |
| 3   | NC          | 4   | GND            |
| 5   | NC          | 6   | +V1.5S_MINI_2  |
| 7   | CLK_REQ#2   | 8   | UIM2_PWR2_MINI |
| 9   | GND         | 10  | UIM2_DAT2_MINI |
| 11  | PCIE_CLK#2  | 12  | UIM2_CLK2_MINI |
| 13  | PCIE_CLK2   | 14  | UIM2_RST2_MINI |
| 15  | GND         | 16  | NC             |
| 17  | NC          | 18  | GND            |
| 19  | NC          | 20  | PCIE2_DIS#     |
| 21  | GND         | 22  | PCIE2_RST#     |
| 23  | PCIE_RX_N2  | 24  | +V3.3A_MINI_2  |
| 25  | PCIE_RX_P2  | 26  | GND            |

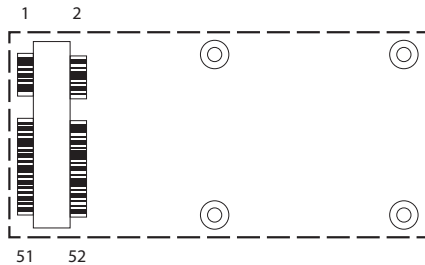
| Pin | Definition    | Pin | Definition    |
|-----|---------------|-----|---------------|
| 27  | GND           | 28  | +V1.5S_MINI_2 |
| 29  | GND           | 30  | SMBCLK        |
| 31  | PCIE_TX_N2    | 32  | SMBDAT        |
| 33  | PCIE_TX_P2    | 34  | GND           |
| 35  | GND           | 36  | USB-          |
| 37  | GND           | 38  | USB+          |
| 39  | +V3.3A_MINI_2 | 40  | GND           |
| 41  | +V3.3A_MINI_2 | 42  | NC            |
| 43  | GND           | 44  | PCIE2_LED     |
| 45  | NC            | 46  | NC            |
| 47  | NC            | 48  | +V1.5S_MINI_2 |
| 49  | NC            | 50  | GND           |
| 51  | NC            | 52  | +V3.3A_MINI_2 |



## Mini-PCle (USB)

Connector location: CN10

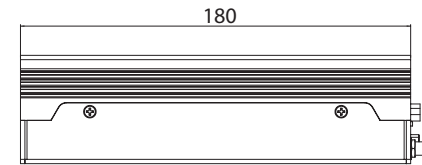
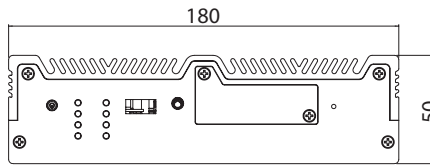
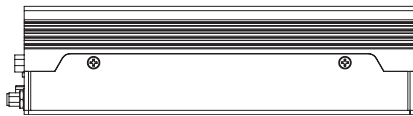
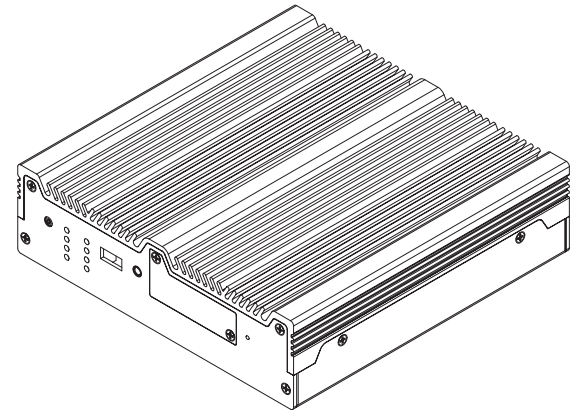
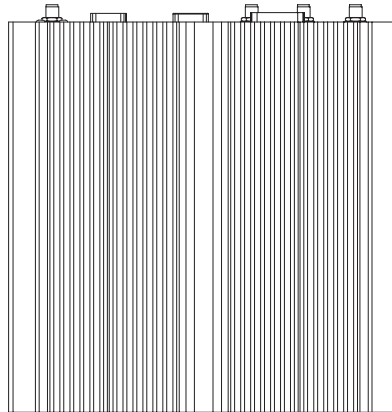
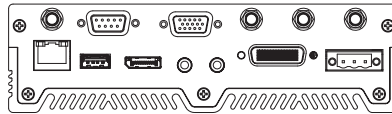
SIM Socket: SIM1 (CN17)



| Pin | Definition    | Pin | Definition    |
|-----|---------------|-----|---------------|
| 1   | MINI_MIC_P    | 2   | +V3.3A_MINI_4 |
| 3   | MINI_MIC_N    | 4   | GND           |
| 5   | MINI_SPK_PRR  | 6   | NC            |
| 7   | U_GND         | 8   | UIM_PWR2      |
| 9   | GND           | 10  | UIM_DAT2      |
| 11  | VCC_MSM26_DIG | 12  | UIM_CLK2      |
| 13  | NC            | 14  | UIM_RST2      |
| 15  | GND           | 16  | NC            |
| 17  | NC            | 18  | GND           |
| 19  | NC            | 20  | 3.5G_DIS#     |
| 21  | GND           | 22  | 3.5G_RST#     |
| 23  | NC            | 24  | +V3.3A_MINI_4 |
| 25  | NC            | 26  | GND           |

| Pin | Definition    | Pin | Definition    |
|-----|---------------|-----|---------------|
| 27  | GND           | 28  | NC            |
| 29  | GND           | 30  | NC            |
| 31  | NC            | 32  | SMS_RI_3.5G_R |
| 33  | UMTS_RESET#_R | 34  | GND           |
| 35  | GND           | 36  | USB-          |
| 37  | GND           | 38  | USB+          |
| 39  | +V3.3A_MINI_4 | 40  | GND           |
| 41  | +V3.3A_MINI_4 | 42  | 3.5G_LED#_R   |
| 43  | GND           | 44  | NC            |
| 45  | PCM_CLK       | 46  | NC            |
| 47  | PCM_RX        | 48  | NC            |
| 49  | PCM_TX        | 50  | GND           |
| 51  | PCM_SYNC      | 52  | +V3.3A_MINI_4 |

# Chapter 4: Mechanical Dimensions



# Chapter 5: 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.



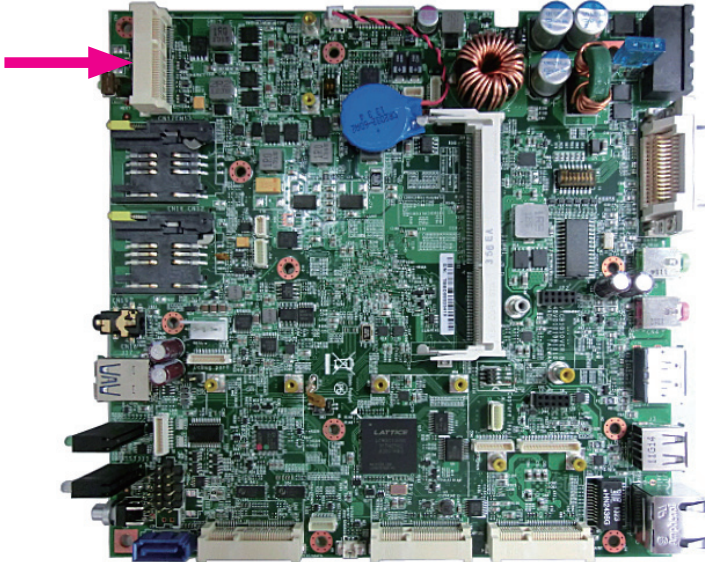
Front View



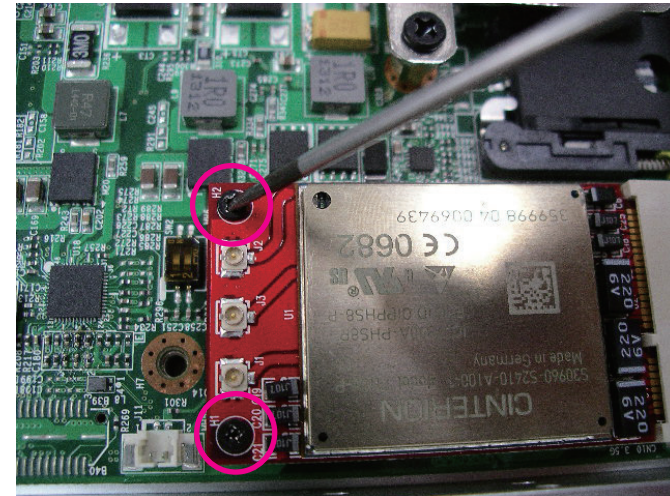
Rear View

## Installing the First WWAN Module

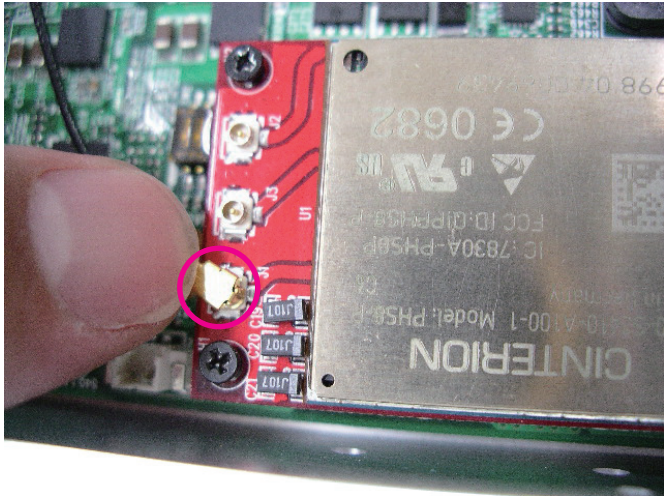
1. The Mini PCI Express slot (CN10) shown below is used to install a WWAN communication module such as GPRS, UMTS or HSDPA module. This WWAN module is paired with SIM socket 1.



2. Insert the module into the Mini PCI Express slot at a 45 degree 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.



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

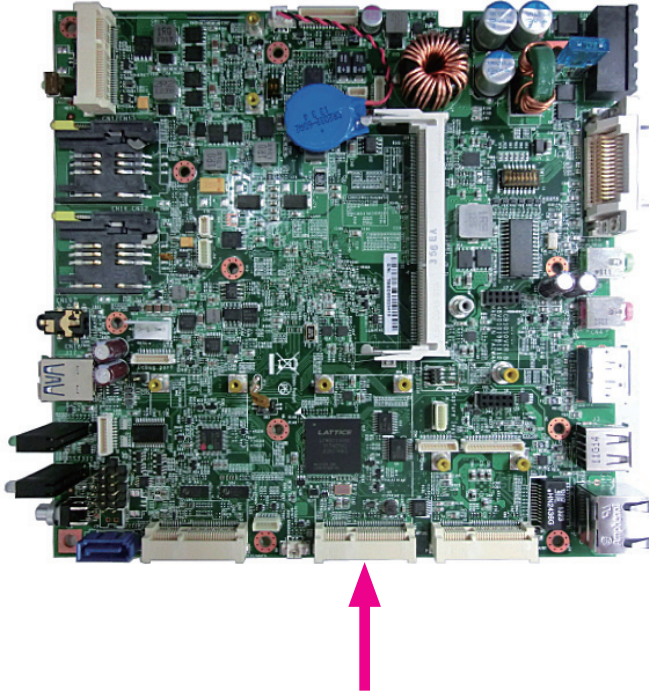


4. Mount the other end of the cable to the antenna mounting hole (WWAN) located at the front panel of the chassis.

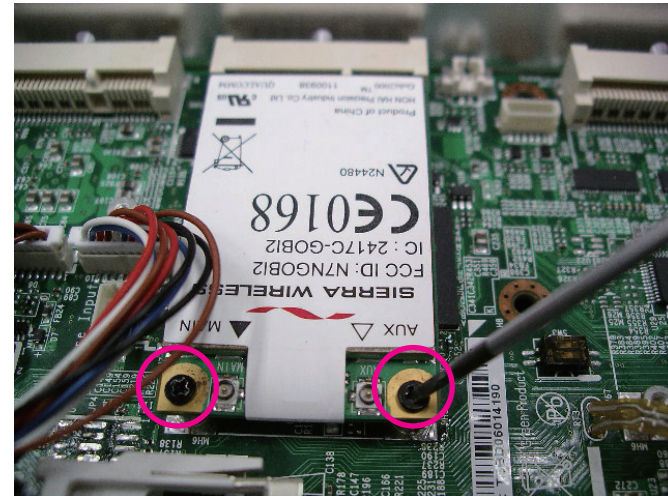


## Installing the Second WWAN Module

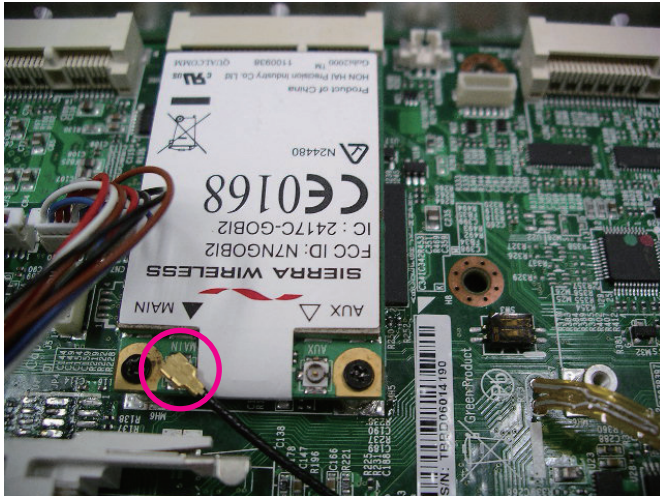
1. The Mini PCI Express slot (CN8) shown below is used to install a WWAN communication module such as GPRS, UMTS or HSDPA module. This WWAN module is paired with SIM socket 2.



2. Insert the module into the Mini PCI Express slot at a 45 degree 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.



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

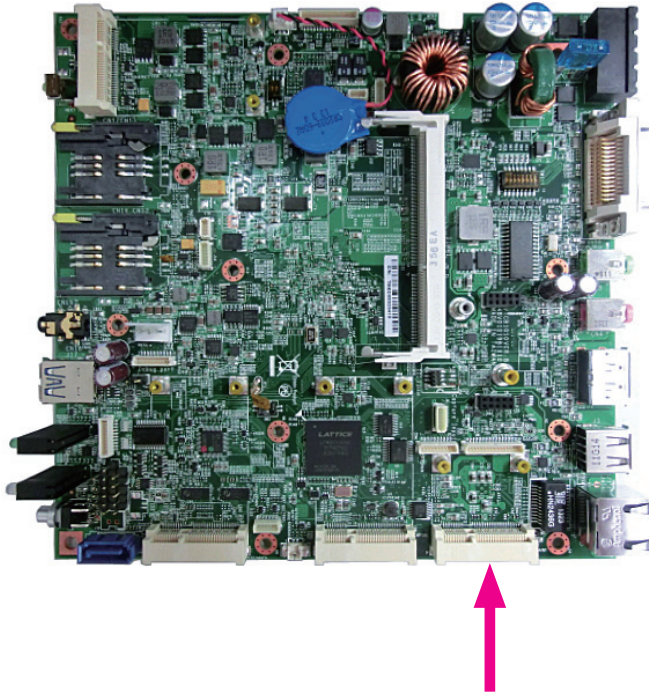


4. Mount the other end of the cable to the antenna mounting hole (WWAN) located at the front panel of the chassis.



## Installing a Wireless LAN Module

1. The Mini PCI Express slot (CN6) shown below is used to install a wireless LAN module.

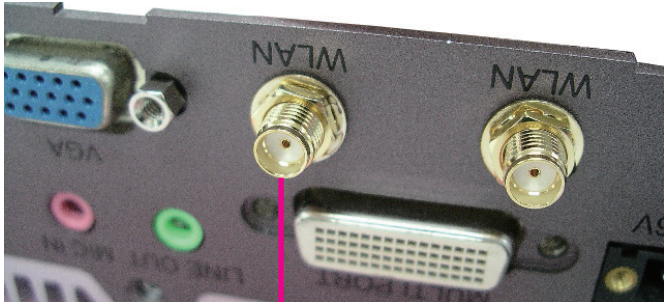


2. Insert the module into the Mini PCI Express slot at a 45 degrees angle until the gold-plated connector on the edge of the module completely disappears inside the slot. Then fasten screws into the mounting holes to secure the module, and attach one end of the RF cable onto the module.





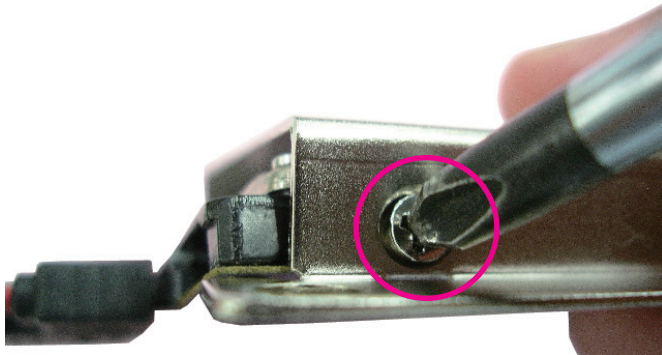
3. Mount the other end of the cable to the antenna mounting hole (WLAN) located at the front panel of the chassis.



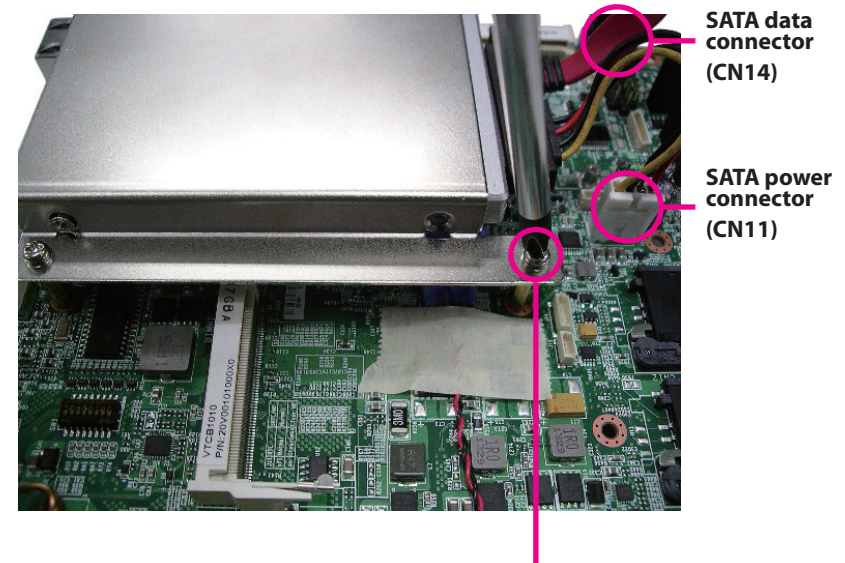
**WLAN  
antenna hole**

## Installing a SATA SSD Drive

1. Place the SSD drive into the HDD mounting bracket and then tighten the four screws.



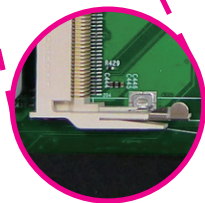
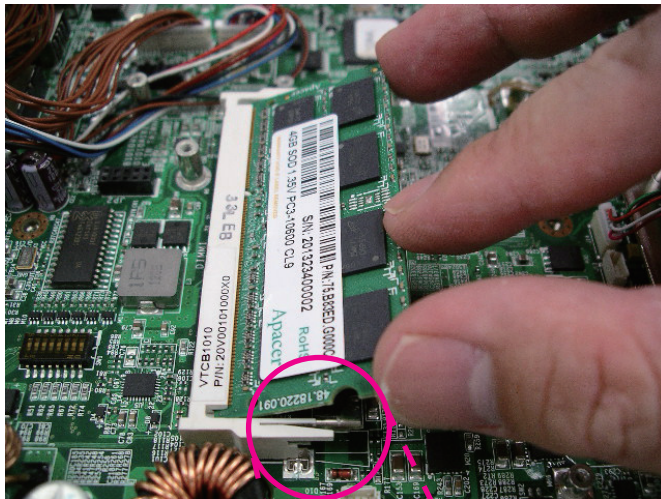
2. Fasten the HDD bracket within the chassis and connect the SATA data and power cable onto connectors CN14 and CN11.



Mounting screws

## Installing a SO-DIMM

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.

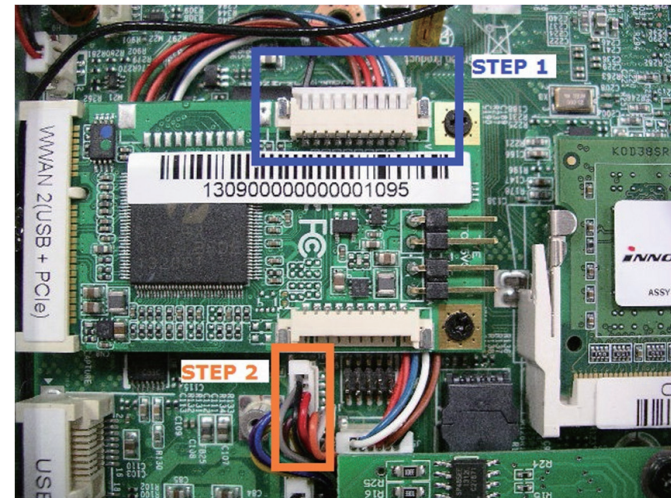


Ejector tab

## Installing a Capture Card

**Model: Yuan SC330 N4**

1. Connect capture card cable onto the capture card.
2. Connect capture card cable to the J5 connector on VTC 1010.

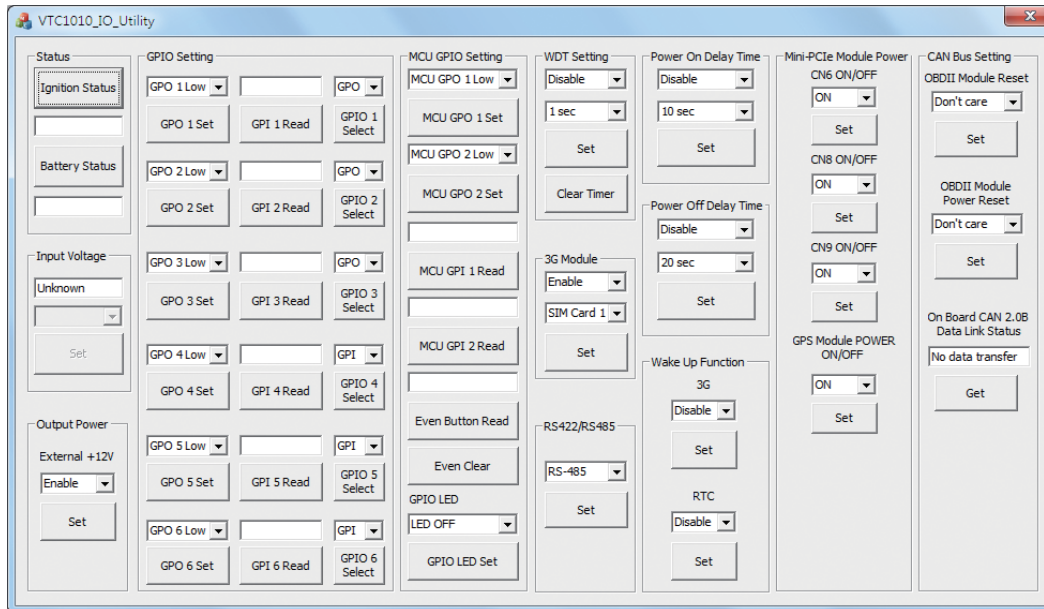


# Appendix A: Software Demo Utility for I/O Ports of Function Control

NEXCOM's software demo utility enables users to test and control different I/O port functions on the VTC 1010. This document 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



## 1.1 Status

### 1.1.1 Ignition Status

Press the button of Ignition Status, the signal of ignition will be shown.

ON ..... Signal of ignition is high.

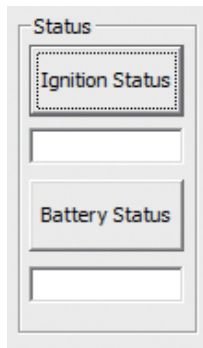
OFF ..... Signal of ignition is low.

### 1.1.2 Battery Status

Press the button of Battery Status, the status of battery voltage will be shown.

Low voltage ..... Car battery is at low voltage.

OFF ..... Car battery is not at low voltage.



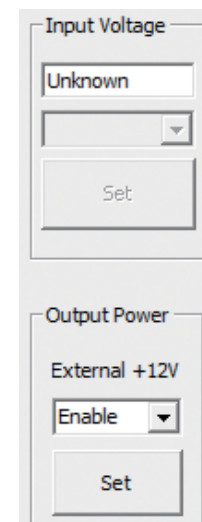
### 1.1.3 Input Voltage

Shows the setting of input voltage on SW3.

### 1.1.4 Output Power

External +12V

Enables or disables the output of 12VDC.



## 1.2 GPIO Setting

### 1.2.1 GPIO Select

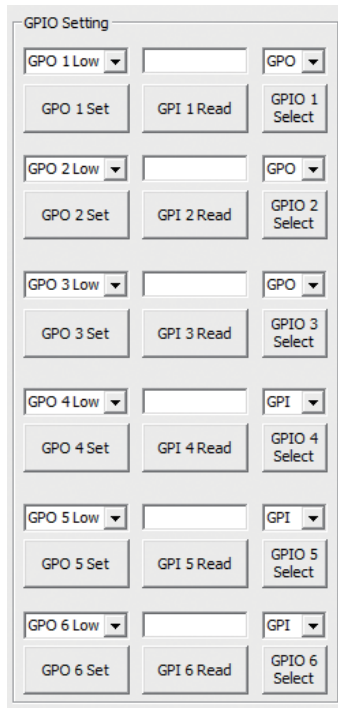
Defines GPIO port as GPO or GPI.

### 1.2.2 GPO Set

Selects the GPO ports and makes the output low or high.

### 1.2.3 GPI Read

Reads the status of GPI.



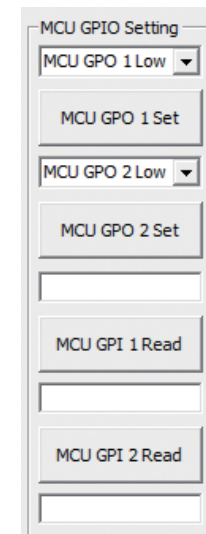
## 1.3 MCU GPIO Setting

### 1.3.1 MCU GPO Set

Selects MCU GPO ports and makes the output low or high.

### 1.3.2 MCU GPI Status

Shows the status of the MCU GPI.

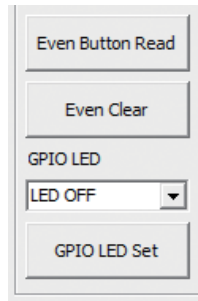


### 1.3.3 Even Button Read

Shows the status of the Event Button.

### 1.3.4 GPIO LED

Sets the On/Off of the GPIO LED on front panel.



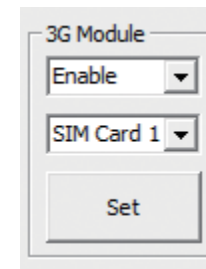
### 1.4 WDT Setting

Enables or disables the WDT function. There are 9 selections of time. The timer of WDT can also be cleared by button.



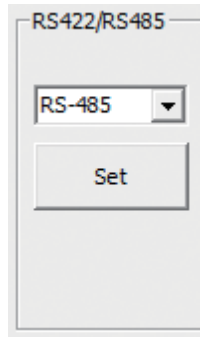
### 1.5 3G Module

Enables or disables the WWAN function. SIM card 1 or SIM card 2 can also be selected for the WWAN module.



## 1.6 RS-422/RS-485

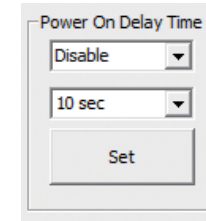
Selects RS-422 or RS-485



A dialog box titled "RS422/RS485" with a dropdown menu showing "RS-485" and a "Set" button below it.

## 1.7 Power On Delay Time

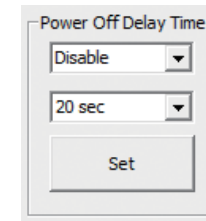
Enables or disables the power on delay time function. There are 8 selections of delay time.



A dialog box titled "Power On Delay Time" with a dropdown menu showing "Disable", a second dropdown menu showing "10 sec", and a "Set" button below it.

## 1.8 Power Off Delay Time

Enables or disables the power off delay time function. There are 8 selections of delay time.



A dialog box titled "Power Off Delay Time" with a dropdown menu showing "Disable", a second dropdown menu showing "20 sec", and a "Set" button below it.



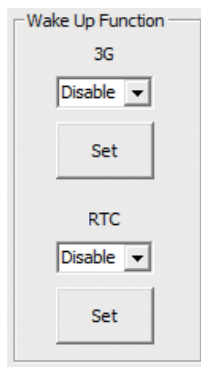
## 1.9 Wake Up Function

### 1.9.1 3G

Enables or disables the wake up function for the WWAN module on mini-PCIe socket (CN10).

### 1.9.2 RTC

Enables or disables the RTC wake up function. The timer setting of RTC is located in BIOS setting.



Wake Up Function

3G

Disable

Set

RTC

Disable

Set

## 2.0 Mini-PCIe Module Power On/Off

### 2.0.1 CN6 On/Off

Power on or off CN6.

### 2.0.2 CN8 On/Off

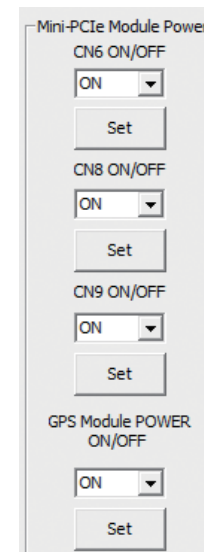
Power on or off CN8.

### 2.0.3 CN9 On/Off

Power on or off CN9.

### 2.0.4 GPS Module Power On/Off

Power on or off the GPS module.



Mini-PCIe Module Power

CN6 ON/OFF

ON

Set

CN8 ON/OFF

ON

Set

CN9 ON/OFF

ON

Set

GPS Module POWER ON/OFF

ON

Set

## 2.1 CAN Bus Setting

### 2.1.1 OBDII Module Reset

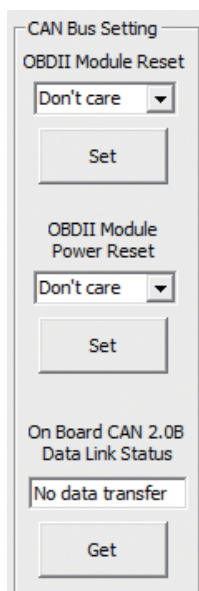
Reset OBDII module.

### 2.1.2 OBDII Module Power Reset

Reset the power of OBDII module.

### 2.1.3 On Board CAN2.0B Data Link Status

Reads the connection status of CAN2.0B



The screenshot shows a vertical window titled "CAN Bus Setting". It contains three sections:

- OBDII Module Reset:** A dropdown menu with "Don't care" selected and a "Set" button below it.
- OBDII Module Power Reset:** A dropdown menu with "Don't care" selected and a "Set" button below it.
- On Board CAN 2.0B Data Link Status:** A text box displaying "No data transfer" and a "Get" button below it.

# 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 (I2C 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<br>GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1<br>SBAS L1 C/A: WAAS, EGNOS, MSAS<br>Galileo-ready E1B/C (NEO-M8N) |           |          |
| <b>Nav. update rate<sup>1</sup></b> | Single GNSS: up to 18 Hz<br>Concurrent GNSS: up to 10 Hz   |           |          |
| <b>Position accuracy</b>            | 2.0 m CEP  |           |          |
|                                     |  | NEO-M8N/Q | NEO-M8M  |
| <b>Acquisition</b>                  | 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<br>AssistNow GNSS Offline (up to 35 days)<br>AssistNow Autonomous (up to 6 days)<br>OMA SUPL & 3GPP compliant        |           |          |
| <b>Oscillator</b>                   | TCXO (NEO-M8N/Q),<br>Crystal (NEO-M8M)   |           |          |
| <b>RTC crystal</b>                  | Built-in   |           |          |
| <b>Noise figure</b>                 | On-chip LNA (NEO-M8M). Extra LNA for<br>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)<br>2.7 V to 3.6 V (NEO-M8N/Q)                        |
| <b>Power consumption<sup>2</sup></b> | 23 mA @ 3.0 V (continuous)<br>5 mA @ 3.0 V Power Save Mode<br>(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<br>1 USBV2.0 full speed 12 Mbit/s<br>1 SPI (optional)<br>1 DDC (I <sup>2</sup> C compliant) |
| <b>Digital I/O</b>       | Configurable timepulse<br>1 EXTINT input for Wakeup  |
| <b>Timepulse</b>         | Configurable 0.25 Hz to 10 MHz   |
| <b>Protocols</b>         | NMEA, UBX binary, RTCM   |

## Package

24 pin LCC (Leadless Chip Carrier): 12.2 x 16.0 x 2.4 mm, 1.6 g

Pinout

|                            |                 |           |    |
|----------------------------|-----------------|-----------|----|
| 13                         | GND             | GND       | 12 |
| 14                         | ANT_ON/Reserved | RF_IN     | 11 |
| 15                         | Reserved        | GND       | 10 |
| 16                         | Reserved        | VCC_RF    | 9  |
| 17                         | Reserved        | RESET_N   | 8  |
| <b>NEO-M8<br/>Top View</b> |                 |           |    |
| 18                         | SDA             | VDD_USB   | 7  |
| 19                         | SCL             | USB_DP    | 6  |
| 20                         | TxD             | USB_DM    | 5  |
| 21                         | RxD             | EXTINT    | 4  |
| 22                         | V_BCKP          | TIMEPULSE | 3  |
| 23                         | VCC             | D_SEL     | 2  |
| 24                         | GND             | Reserved  | 1  |

## Environmental data, quality & reliability

|                        |   |
|------------------------|---|
| <b>Operating temp.</b> | -40° C to 85° C   |
| <b>Storage temp.</b>   | -40° C to 85° C (NEO-M8N/Q)<br>-40° C to 105° C (NEO-M8M) |

**RoHS compliant (lead-free)**

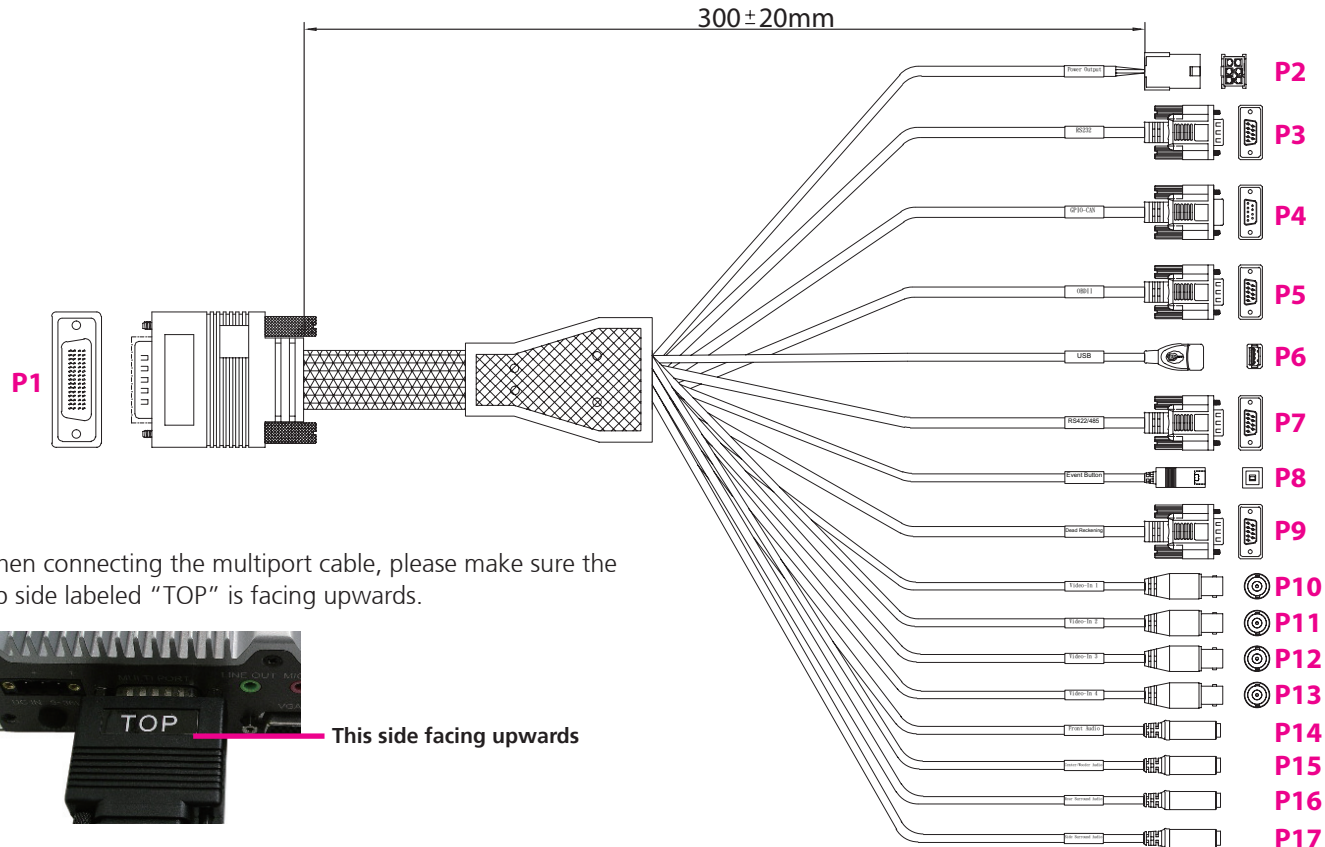
**Qualification according to ISO 16750**

**Manufactured and fully tested in ISO/TS 16949 certified production sites**

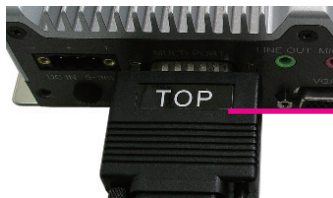
**Uses u-blox M8 chips qualified according to AEC-Q100**

# Appendix C: Pin Definition for the Multiport Cable

The multiport consists of a 60-pin connector (P1) and multiple output connectors. The tables in this appendix list the pin signals of the P1 connector and its corresponding pin signals to the output connectors.

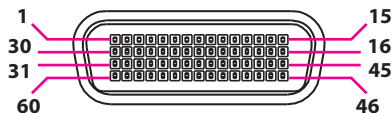


When connecting the multiport cable, please make sure the top side labeled "TOP" is facing upwards.



This side facing upwards

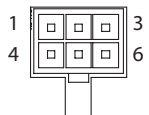
## P1 Connector Pinout



## P2 to P17 Connector Pinouts

### Power Output Connector

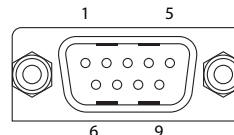
Connector type: 2x3 6-pin header  
 Connector location: P2



| P1 Pin | P2 Pin     | Definition |
|--------|------------|------------|
| 1      | 2          | OUT_12V    |
| 30     | 2          | OUT_12V    |
| 31     | 5          | GND        |
| 60     | 5          | GND        |
|        | 1, 3, 4, 6 | NC         |

## RS232 Connector

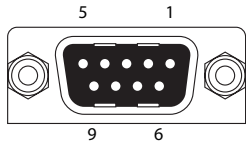
Connector type: DB9, Male  
 Connector location: P3



| P1 Pin | P3 Pin | Definition |
|--------|--------|------------|
| 29     | 1      | SP_DCD_3   |
| 28     | 2      | SP_RXD_3   |
| 3      | 3      | SP_TXD_3   |
| 2      | 4      | SP_DTR_3   |
| 22     | 5      | ISO_GND    |
| 33     | 6      | SP_DSR_3   |
| 58     | 7      | SP_RTS_3   |
| 32     | 8      | SP_CTS_3   |
| 59     | 9      | SP_RL_3    |

## GPIO + CAN Bus 2.0B Connector

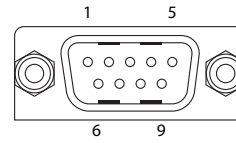
Connector type: DB9, Female  
Connector location: P4



| P1 Pin | P4 Pin | Definition |
|--------|--------|------------|
| 4      | 1      | GPIO1      |
| 5      | 2      | GPIO2      |
| 26     | 3      | GPIO3      |
| 27     | 4      | GPIO4      |
| 23     | 5      | ISO_GND    |
| 34     | 6      | GPIO5      |
| 37     | 7      | CAN1_H     |
| 38     | 8      | CAN1_L     |
| 35     | 9      | GPIO6      |

## OBDII Connector

Connector type: DB9, Male  
Connector location: P5



| P1 Pin | P5 Pin     | Definition |
|--------|------------|------------|
| 39     | 3          | CAN_M_L    |
| 50     | 4          | C1708_1_L  |
| 24     | 5          | ISO_GND    |
| 40     | 8          | CAN_M_H    |
| 51     | 9          | C1708_1_H  |
|        | 1, 2, 6, 7 | NC         |

## USB Connector

Connector type: USB Female, Type A

Connector location: P6

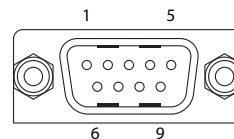


| P1 Pin | P6 Pin | Definition       |
|--------|--------|------------------|
| 6      | 1      | USB1_POWER (+5V) |
| 7      | 2      | USB_2N_L (-)     |
| 8      | 3      | USB_2P_L (+)     |
| 9      | 4      | USB_GND (GND)    |

## RS422/485 Connector

Connector type: DB9, Male

Connector location: P7



| P1 Pin | P7 Pin     | Definition |
|--------|------------|------------|
| 21     | 1          | RS485_+    |
| 20     | 2          | RS485_-    |
| 11     | 3          | RS422_TX+  |
| 10     | 4          | RS422_TX-  |
| 25     | 5          | ISO_GND    |
|        | 6, 7, 8, 9 | NC         |



## Reset Button

Connector location: P8

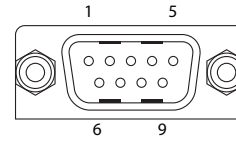


| P1 Pin | P8 Pin | Definition     |
|--------|--------|----------------|
| 41     | 1      | Rear Panic (+) |
| 22     | 2      | ISO_GND (-)    |

## Odometer Connector

Connector type: DB9, Male

Connector location: P9

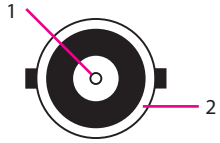


| P1 Pin | P9 Pin        | Definition |
|--------|---------------|------------|
| 52     | 1             | DIRECTION  |
| 53     | 3             | ODOMETER   |
| 54     | 5             | 1PPS       |
| 23     | 6             | ISO_GND    |
|        | 2, 4, 7, 8, 9 | NC         |

## A/V1 Jack

Connector type: BNC

Connector location: P10

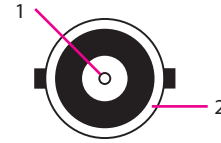


| P1 Pin | P10 Pin | Definition  |
|--------|---------|-------------|
| 56     | 1       | CAP1_A (+)  |
| 22     | 2       | ISO_GND (-) |

## A/V2 Jack

Connector type: BNC

Connector location: P11

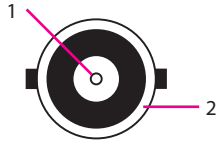


| P1 Pin | P11 Pin | Definition  |
|--------|---------|-------------|
| 57     | 1       | CAP1_B (+)  |
| 23     | 2       | ISO_GND (-) |

## A/V3 Jack

Connector type: RCA

Connector location: P12

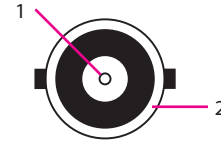


| P1 Pin | P12 Pin | Definition  |
|--------|---------|-------------|
| 36     | 1       | CAP2_A (+)  |
| 24     | 2       | ISO_GND (-) |

## A/V4 Jack

Connector type: RCA

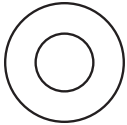
Connector location: P13



| P1 Pin | P13 Pin | Definition  |
|--------|---------|-------------|
| 55     | 1       | CAP2_B (+)  |
| 25     | 2       | ISO_GND (-) |

## Front Audio

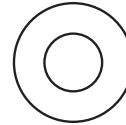
Connector type: TRS 3.5mm  
Connector location: P14



| P1 Pin | P14 Pin | Definition     |
|--------|---------|----------------|
| 12     | 1       | AGND           |
| 13     | 2       | FRONT_L_C      |
| 15     | 4       | Jack Detection |
| 14     | 5       | FRONT_R_C      |

## Center Audio

Connector type: TRS 3.5mm  
Connector location: P15

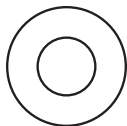


| P1 Pin | P15 Pin | Definition     |
|--------|---------|----------------|
| 19     | 1       | AGND           |
| 17     | 2       | CEN_C          |
| 16     | 4       | Jack Detection |
| 18     | 5       | LFE_C          |

## Surround Audio

Connector type: TRS 3.5mm

Connector location: P16

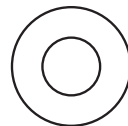


| P1 Pin | P16 Pin | Definition     |
|--------|---------|----------------|
| 42     | 1       | AGND           |
| 43     | 2       | SURR_OUT_L_C   |
| 45     | 4       | Jack Detection |
| 44     | 5       | SURR_OUT_R_C   |

## Rear Audio

Connector type: TRS 3.5mm

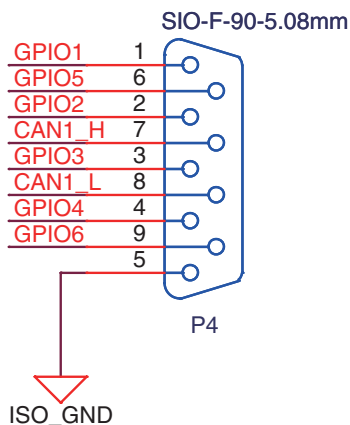
Connector location: P17



| P1 Pin | P17 Pin | Definition     |
|--------|---------|----------------|
| 49     | 1       | AGND           |
| 48     | 2       | SIDE_L_C       |
| 46     | 4       | Jack Detection |
| 47     | 5       | SIDE_R_C       |

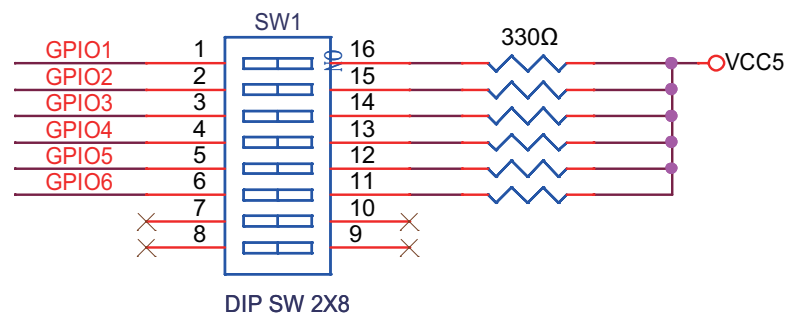
# Appendix D: Signal Connection of DI/DO

## GPIO Pinout Description



Note: By default, pin 1, 2 and 3 are configured for GPO, while pin 4, 5 and 6 are configured for GPI.

## SW1 Setting



| GPIO (SW1) |              |
|------------|--------------|
| On         | Pull up VCC5 |
| Off        | Don't Care   |

Default Settings:

| GPIO (SW1)  |              |
|-------------|--------------|
| SW1.1~SW1.6 | Pull up VCC5 |

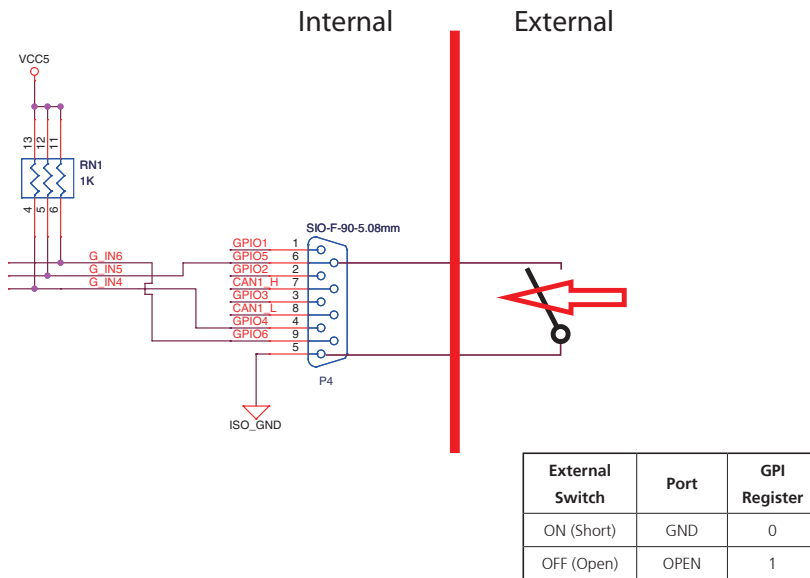
# Digital Input

P4 connector for GPI signal (digital signal input)  
 The P4 has 3 digital input channels by default.

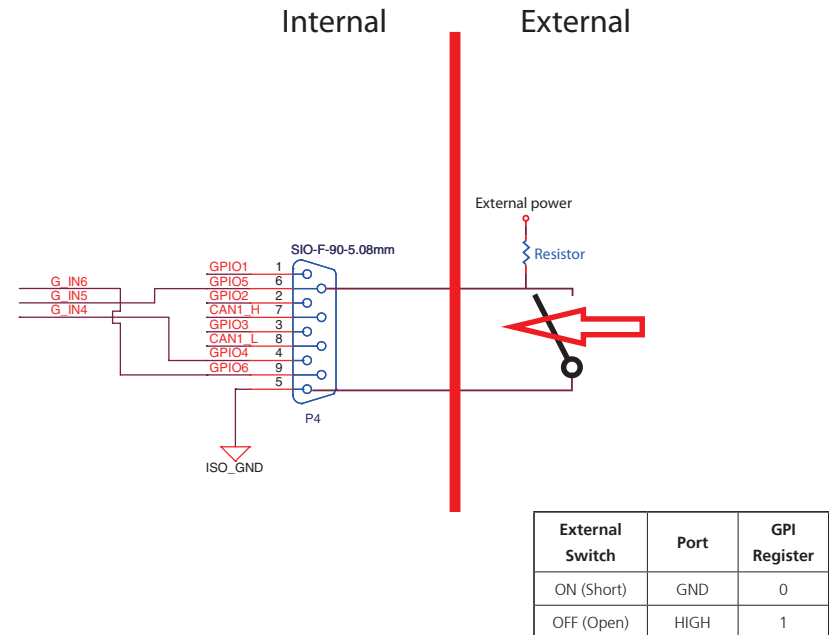
Wet Contact (default)

The GPI signals have a pull up resistor to 5V internally.

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



Dry Contact:



## Digital Output

P4 connector for GPO signal (digital signal output)

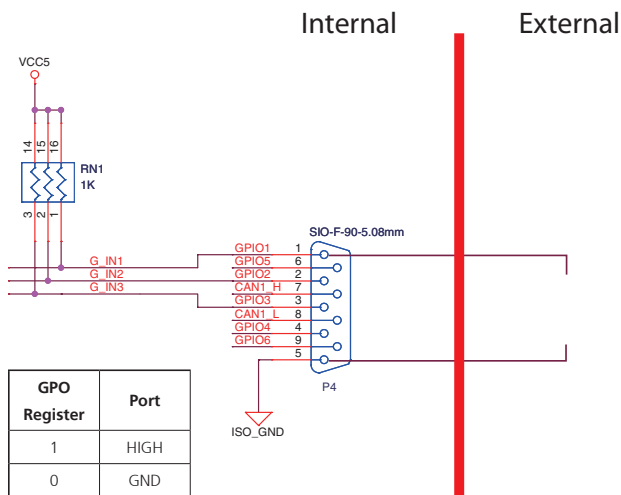
The P4 has 3 digital output channels by default. The signal connection of P4 support two connected methods for output signal type.

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 SW1 needs to switch to "ON" state. The GPO signal will have a pull up resistor to 5V internally when you switch "SW1" to "ON" state. The output signal has two states, one is low level (driven to 0V from GPO signal) other is high level (driven to 5V from GPO signal).

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

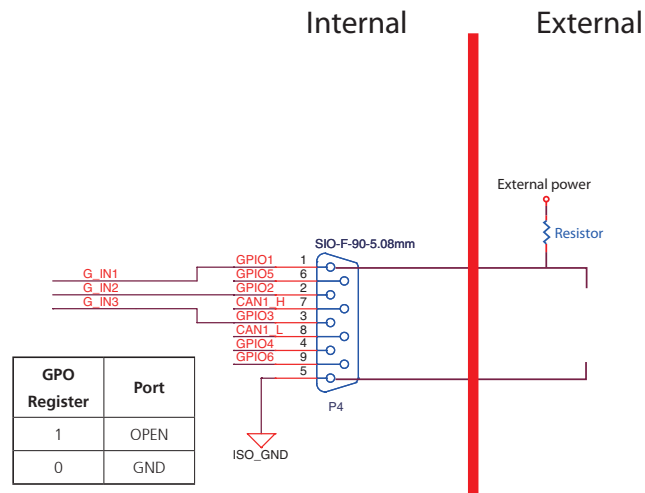


**Dry Contact**

Each channel can accept 3~24Vdc voltage. And it is able to drive 150mA current for low level.

The SW1 needs to switch to "OFF" state. The GPO signal will no have a pull up resistor internally when you switch "SW1" to "OFF" state.

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





# Appendix E: Vehicle Power Management Setup

## External Power Output Setting

VTC 1010 has four modes for external power output setting.

1. External +12V and By Pass Car Battery Turn On Simultaneously
2. External +12V and By Pass Car Battery Turn Off Simultaneously
3. External +12V Turn On Only
4. By Pass Car Battery Turn On Only



## 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.

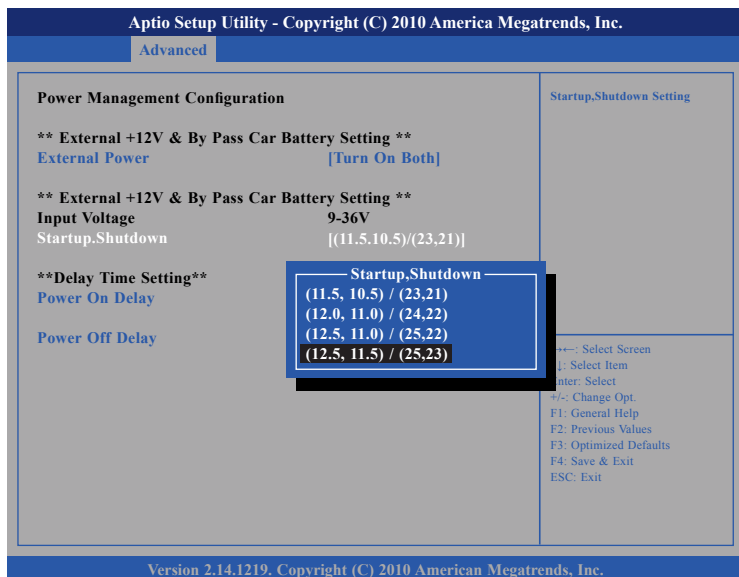
If the input voltage is 24V: the startup voltage to 25V and the shutdown voltage to 22V.



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

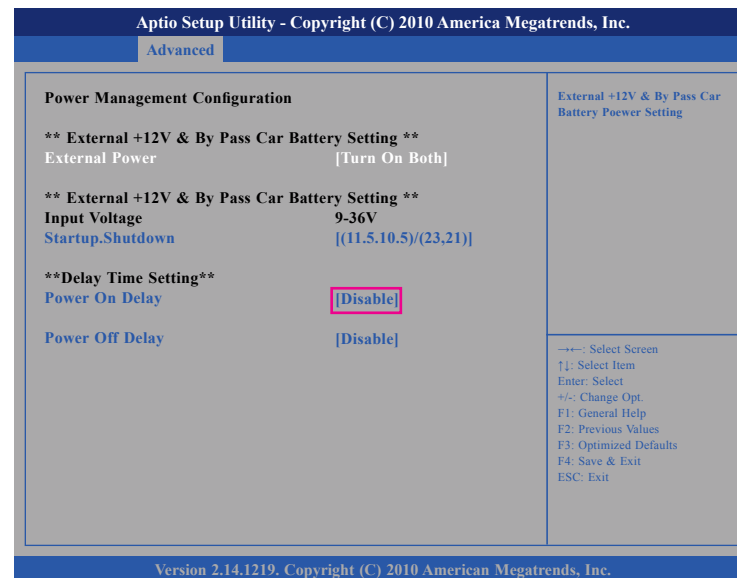
If the input voltage is 12V: the startup voltage to 12.5V and the shutdown voltage to 11.5V.

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



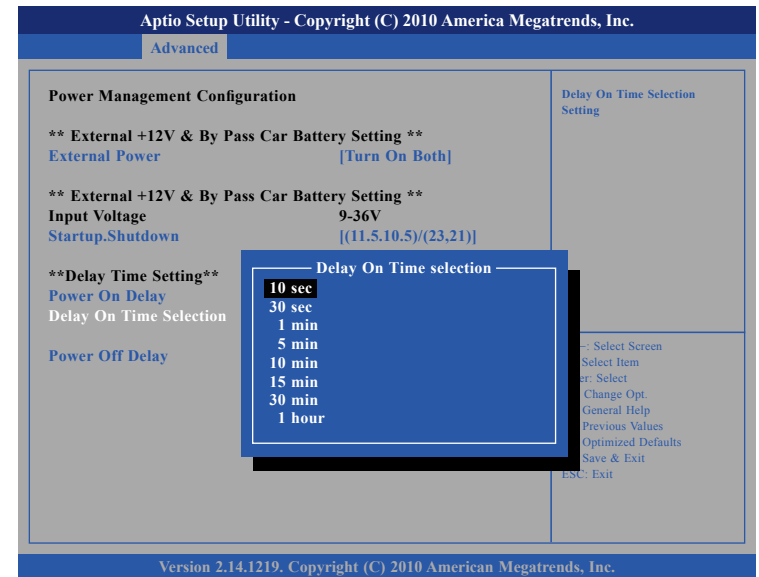
## Power-on Delay Setting

### Disable Power-on Delay



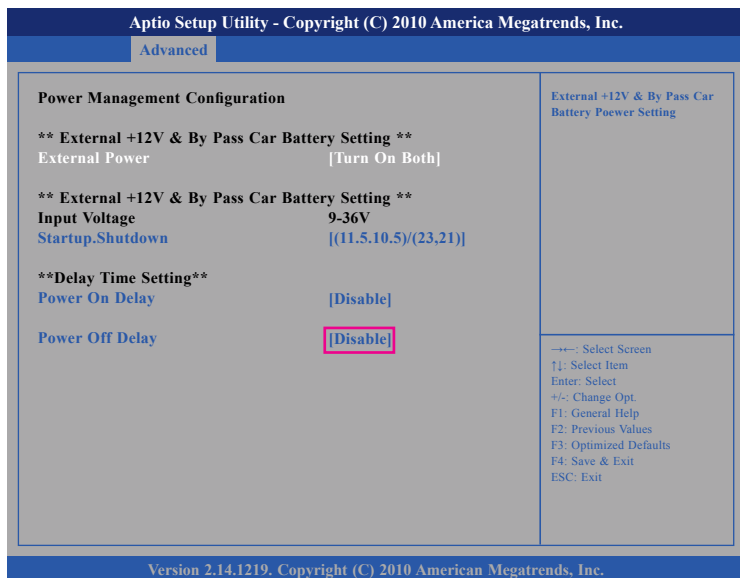
## Enable Power-on Delay

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



# Power-off Delay Setting

## Disable Power-off Delay



## Enable Power-off Delay

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



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Advanced

**Power Management Configuration**

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

**\*\* External +12V & By Pass Car Battery Setting \*\***  
Input Voltage 9-36V  
Startup.Shutdown [(11.5,10.5)/(23,21)]

**\*\*Delay Time Setting\*\***  
Power On Delay  
Power Off Delay  
Delay Off Time Selection

**Delay On Time selection**

- 20 sec
- 1 min
- 5 min
- 10 min
- 30 min
- 1 hour
- 6 hour
- 18 hour

ESC: Exit

--- Select Screen  
Select Item  
er. Select  
Change Opt.  
General Help  
Previous Values  
Optimized Defaults  
Save & Exit

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# Appendix F: Power Consumption

**OS:** Windows 8

**Burn-in Software:** Version 6.0

**Device:** 2G DDR3L and SSD

| Idle Mode | Burn-in Mode | S3       | S4      | S5      |
|-----------|--------------|----------|---------|---------|
| 494mA/12V | 0.92A/12V    | 88mA/12V | 6mA/12V | 6mA/12V |
| 6W        | 11W          | 1.1W     | 0.1W    | 0.1W    |