Mobile Computing Solutions

Vehicle Telematics Computer 1021

PKBX5333 / PKBX5334

User Manual

Published January 2018

DELTA COMPONENTS GmbH · Auweg 27 · D-79761 Waldshut-Tiengen · Tel.: +49/7751/8399-0 · Fax: +49/7751/8399-99
www.delta-components.de E-mail: info@delta-components.de

Contents

Chapter 3: Jumpers and Connectors

Chapter 4: System Setup

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

Appendix B: GPS Feature

Appendix C: Signal Connection of MCU DI/DO

Appendix D: Vehicle Power Management Setup

Appendix E: Power Consumption 61

Appendix F: Pin Definition for the Multiport Cable

PREFACE

Copyright

Disclaimer

The information in this document is subject to change without prior notice and does not represent commitment from DELTA COMPONENTS GmbH. However, users may update their knowledge of any product in use by constantly checking its manual posted on our website: http://www.delta-components.de.
DELTA COMPONENTS GmbH shall not be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of any product, nor for any infringements upon the rights of third parties, which may result from such use. Any implied warranties of merchantability or fitness for any particular purpose is also disclaimed.

Acknowledgements

VTC 1021 series ia a trademark of DELTA COMPONENTS GmbH. All other product names mentioned herein are registered trademarks of their respective owners.

Regulatory Compliance Statements

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

Declaration of Conformity

FCC

This equipment has been tested and verified to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

CE

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

RoHS Compliance

DELTA COMPONENTS GmbH RoHS Environmental Policy and Status Update

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

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

How to recognize DELTA COMPONENTS GmbH 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 DELTA COMPONENTS GmbH naming convention.

Warranty and RMA

DELTA COMPONENTS GmbH Warranty Period

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

DELTA COMPONENTS Return Merchandise Authorization (RMA)

- Customers shall enclose the DELTA COMPONENTS GmbH 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 DELTA COMPONENTS GmbH 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, DELTA COMPONENTS GmbH 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 DELTA COMPONENTS GmbH 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

DELTA COMPONENTS GmbH 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: DELTA COMPONENTS GmbH 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 DELTA COMPONENTS GmbHproducts 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, DELTA COMPONENTS GmbHwill return it to the customer without any charge.

Board Level

- Component fee: DELTA COMPONENTS GmbH 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, DELTA COMPONENTS GmbH 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 needle-nose pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

Safety Precautions

1. Read these safety instructions carefully.

2. Keep this User Manual for later reference.

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

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

5. Keep this equipment away from humidity.

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

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

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

9. 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.

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

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

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

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

14. If one of the following 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.

15. Do not place heavy objects on the equipment.

16. 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.

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

Technical Support and Assistance

1. For the most updated information of DELTA COMPONENTS products, visit DELTA COMPONENTS website at www.delta-components.de

2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
   – Product name and serial number
   – Detailed information of the peripheral devices
   – Detailed information of the installed software (operating system, version, application software, etc.)
   – A complete description of the problem
   – The exact wordings of the error messages

Warning!
1. Handling the unit: carry the unit with both hands and handle it with care.

2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.

Conventions Used in this Manual

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

Caution:
Information to avoid damaging components or losing data.

Note:
Provides additional information to complete a task easily.

Ordering Information

The following information below provides ordering information for VTC 1021.

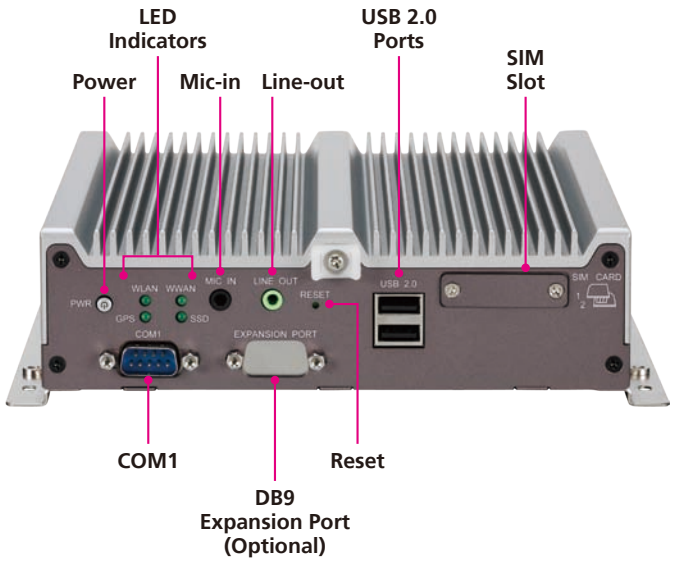
PKBX5333
VTC 1021-BK, w/Intel Atom E3940 QuadCore 1.8GHz
1x VGA, 1x HDMI, 3x COM, 1x CAN, 2x GbE

PKBX5334
VTC 1021-C2K, w/Intel Atom E3940 QuadCore 1.8GHz
1x VGA, 1x HDMI, 3x COM, 1x CAN, 2x GbE, 2x PoE

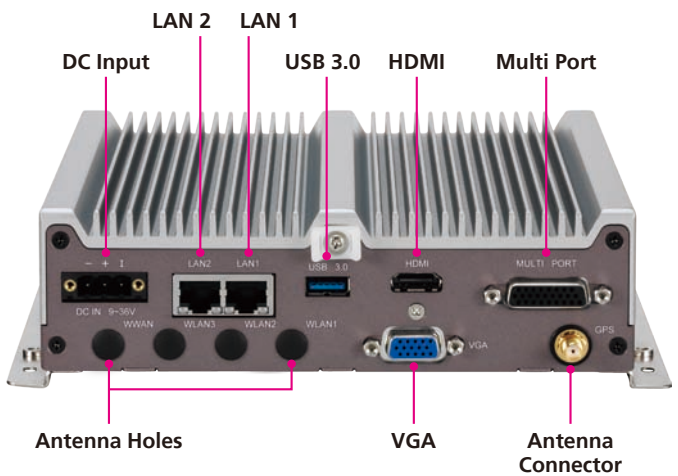
Chapter 1: Product Introduction

Physical Features

VTC 1021-BK Front View

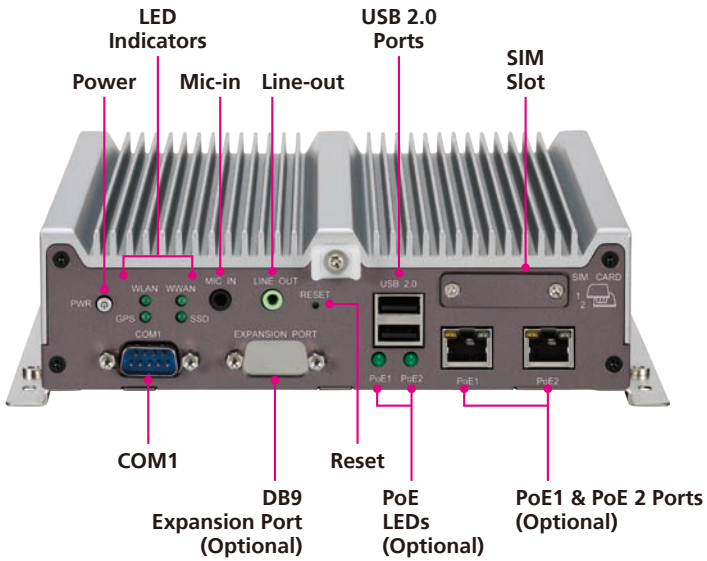


VTC 1021-BK Rear View

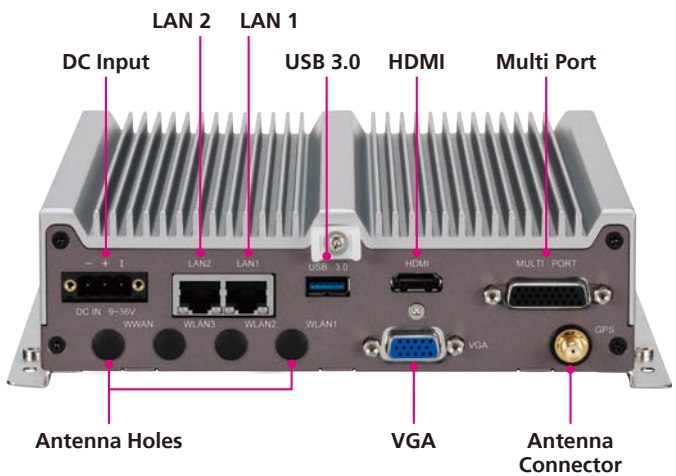


Physical Features

VTC 1021-C2K Front View



VTC 1021-C2K Rear View



VTC 1021 Series Overview

VTC 1021 features next generation Intel Atom® x5-E3940 processor quad core 1.8GHz, with powerful graphics and multimedia enhancement. VTC 1021 is packed rugged, fanless, and 1 DIN compact enclosure for the vehicles with limited space to locate the computer system. Onboard CAN 2.0B and optional OBD interface (SAE J1939) for vehicle diagnostics and driver behavior management. An advanced GPS receiver supports GPS/ Gloness/ QZSS/ Galileo/ Beidou and optional dead reckoning module is also available. VTC 1021 features WLAN and WWAN wireless data and voice connectivity. With dual SIM external access design, it allows user to access SIM card conveniently.

Dual PoE functions (optional) are suited for most PoE devices, including wireless access points, as well as IP cameras. Additional 12VDC output can be provided for external display with easy power wire arrangement. VTC 1021 keeps the flexibility to meet different demands for telematics applications, such as infotainment, fleet management, dispatching system and mobile video surveillance.

VTC 1021 Series Key Features

- Intel Atom® x5-E3940 processor quad core 1.8GHz
- Built-in U-blox M8N GPS, optional dead reckoning support
- Built-in CAN 2.0B. optional OBD2 SAE J1708/ SAE J1939
- 2 x PoE support, total 30W (Optional)
- 3 x DI and 3 x DO support
- Smart power management with Ignition on/ off delay via software control and low voltage protection
- Variety of wireless communication options
- Certified by CE/ FCC/ E13 mark

Hardware Specifications

CPU

- Intel Atom® processor Apollo Lake E3940, 1.80GHz

Memory

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

Storage

- 1 x 2.5" SATA 2.0
- 1 x mSATA for full-size mini-PCIe socket

Expansion

- 1 x Full size mini-PCIe socket (USB 2.0 + PCIe + mSATA)
- 1 x Full size mini-PCIe socket (USB 2.0 + PCIe)
- 1 x Full size mini-PCIe socket (USB 2.0, optional USB 3.0)

Function

- 1 x u-blox NEO-M8N module (support GPS/ Gloness/ QZSS/ Galileo/ Beidou)
- Built-in G-sensor
- TPM 2.0 (BOM Option)

I/O Interface-Front

- 1 x Power button with LED
- 4 x LED for WWAN, WLAN, SSD, GPS
- 1 x Line-out/ Mic-in
- 1 x Reset button
- 1 x DB9 for fully RS232
- 2 x Type A USB 2.0 compliant host, supporting system boot up
- 2 x External accessible SIM card socket (selectable) with cover
- 1 x DB9 for Expansion Port (Optional)
- 2 x RJ45 PoE (Optional, including 2 x PoE LED light)

I/O Interface-Rear

- 1 x Phoenix connector for Power/ GND/ Ignition input
- 1 x Type A USB 3.0 compliant host, supporting system boot up
- 2 x RJ45 10/ 100/ 1000 Fast Ethernet with LED
- 1 x DB15 VGA, resolution up to 1920 x 1080 @ 60Hz
- 1 x HDMI port, resolution up to 3840 x 2160 @ 30Hz
- 1 x DB26 port
  - 1 x CANBus 2.0B
  - 1 x RS232 Tx/ Rx
  - 1 x GPS DR (Optional)
  - 3 x DI and 3 x DO
  - 1 x RS422/ RS485
  - 12V/ 2A DC output
  - GND
- 4 x antenna holes for GPS/ WWAN/ WLAN

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 10
- YOCTO

Dimensions

- 180 mm (W) x 180 mm (D) x 50 mm (H) (7.09” x 7.09” x 1.97”)
- Weight: 1.7 kg

Environment

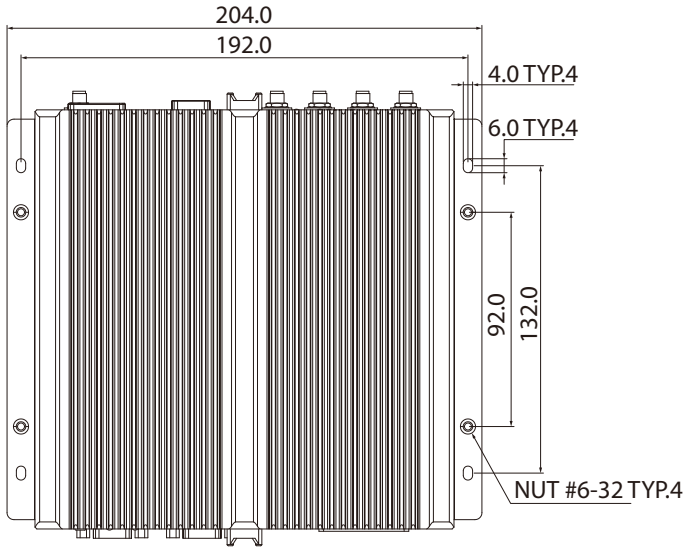
- Temperature:
  Operating temperatures:
  -40°C to 70°C (w/ industrial SSD) with air flow
  -10°C to 50°C (w/ commercial HDD) with air flow
- Storage temperatures:
  -40°C to 85°C with air flow
  Damp Heat Test per EN60068-2-30
- Humidity: IEC 60068-2-3, Damp Heat Steady State Test, 40C, 95%, 48Hrs
- Vibration: IEC 60068-2-64, 2G for SSD or 0.5G for HDD
  Operating: MIL-STD-810G, 514.6C Procedure 1, Category 4
  Storage: MIL-STD-810G, 514.6E Procedure 1, Category 24
- Shock:
  MIL-STD-810G, 516.6 Procedure I, trucks and semi-trailers=40g
  Crash hazard: Procedure V, ground equipment=75g

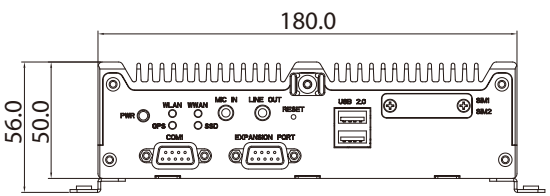
Certifications

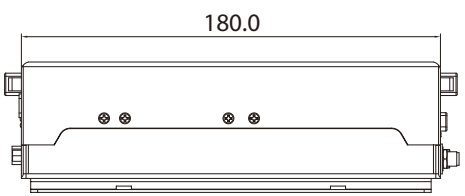
- CE approval
- FCC Class A
- E13 mark

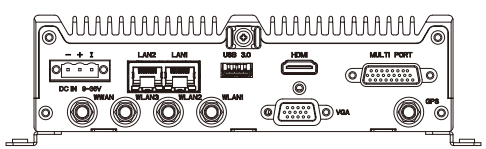
Mechanical Dimensions

VTC 1021-BK

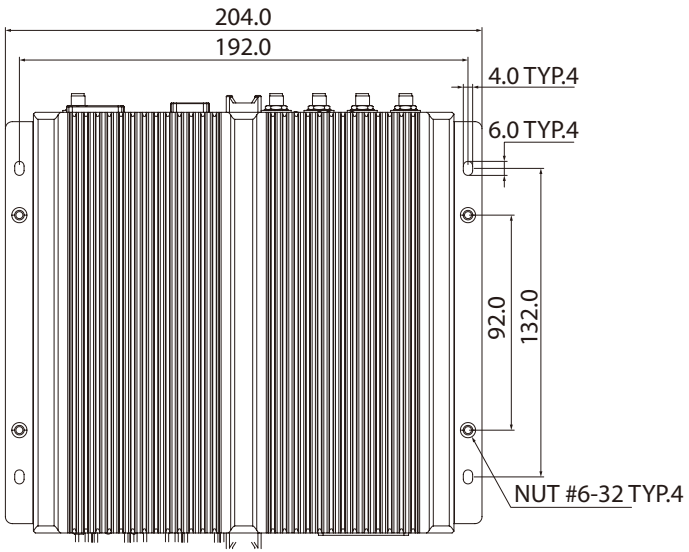


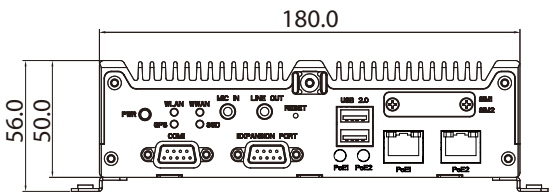


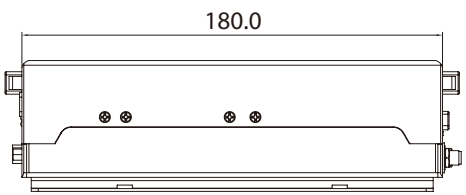


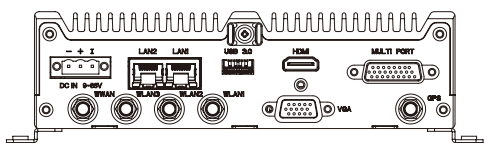


VTC 1021-C2K


204.0
192.0
4.0 TYP.4
6.0 TYP.4
92.0
132.0
NUT #6-32 TYP.4


180.0
56.0
50.0

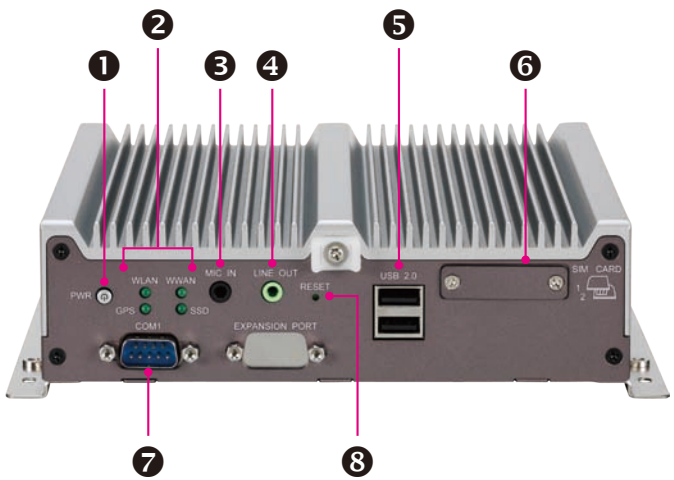

180.0



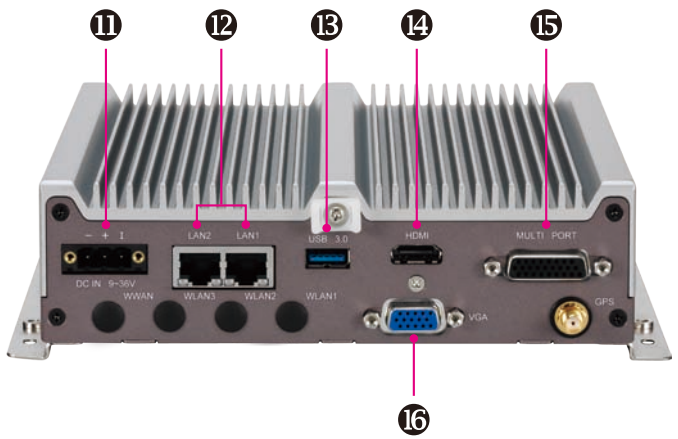
Connector Numbering

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.

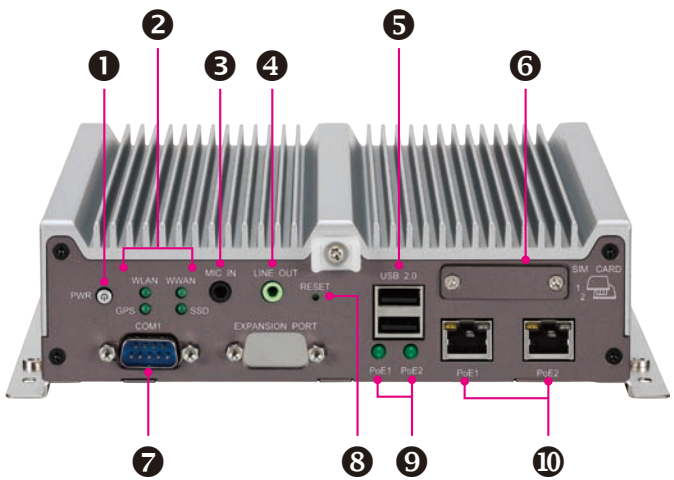
VTC 1021-BK Front View



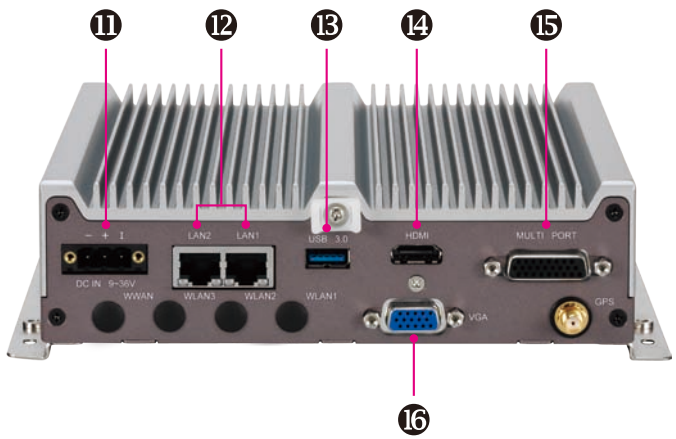
VTC 1021-BK Rear View



VTC 1021-C2K Front View



VTC 1021-C2K Rear View



Chapter 2: External Connectors Pinout Description

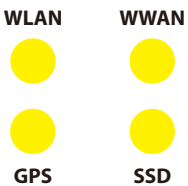
Power Button

Connector number: 1

Pin	Definition	Pin	Definition
1	GND	2	PWRBT_IN#
3	PWRBT_IN#	4	GND
A1	LED_A	C1	LED_C

LED Indicators (WLAN, WWAN, GPS and SSD)

Connector number: 2



LED	Description
WLAN	Blink: Active
WWAN	Blink: Active
GPS	Light On: Active
SSD	Blink: Active

Mic-in Connector

Connector number: 3

Pin	Definition	Pin	Definition
1	GND	2	Mic-in (Left Channel)
3	GND	4	Detect
5	NC		

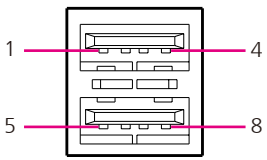
Line-out Connector

Connector number: 4

Pin	Definition	Pin	Definition
22	GND	23	Mic-in (Left Channel)
24	GND	25	Detect

Dual USB 2.0 Port

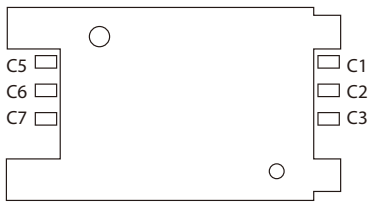
Connector number: 5



Pin	Definition	Pin	Definition
1	VCC	2	DATA1-
3	DATA1+	4	GND
5	VCC	6	DATA-
7	DATA+	8	GND

SIM1 and SIM2 Slot

Connector number: 6



SIM1

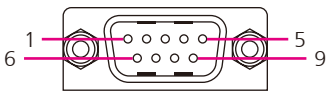
Pin	Definition	Pin	Definition
C1	UIM1_POWER	C2	UIM1_RST
C3	UIM1_CLK	C5	GND
C6	NC	C7	UIM1_DATA

SIM2

Pin	Definition	Pin	Definition
C1	UIM2_POWER	C2	UIM2_RST
C3	UIM2_CLK	C5	GND
C6	NC	C7	UIM2_DATA

COM 1 Port

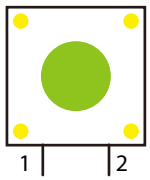
Connector number: 7



Pin	Definition	Pin	Definition
1	DCD_2	2	RXD_2
3	TXD_2	4	DTR_2
5	GND	6	DSR_2
7	RTS_2	8	CTS_2
9	RI/PW	10	NC

Reset Button

Connector number: 8



Pin	Definition
1	GND
2	RESET

Press this button to restart the system.

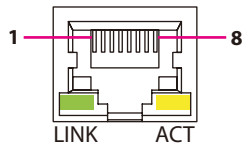
PoE1 and PoE2 LED Indicators

Connector number: 9

LED	Description
PoE1	Light On: Active
PoE2	Light On: Active

PoE1 and PoE2 Ports

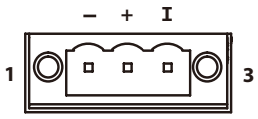
Connector number: 10



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+

DC Power Input

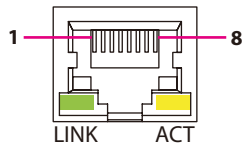
Connector number: 11



Pin	Definition
1	GND_IN
2	V_IN
3	IGNITION

LAN1 and LAN2 Ports

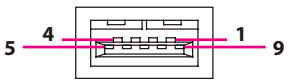
Connector number: 12



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+

USB 3.0 Port

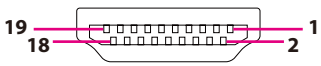
Connector number: 13



Pin	Definition	Pin	Definition
1	VCC	2	USB0_N
3	USB0_P	4	GND
5	USB3_RXN	6	USB3_RXP
7	GND	8	USB3_TXN
9	USB3_TXP		

HDMI

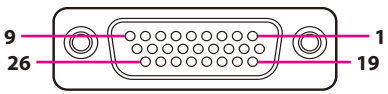
Connector number: 14



Pin	Definition	Pin	Definition
1	HDMI_TX2P_L	2	GND
3	HDMI_TX2N_L	4	HDMI_TX1P_L
5	GND	6	HDMI_TX1N_L
7	HDMI_TX0P_L	8	GND
9	HDMI_TX0N_L	10	HDMI_CLK_P_L
11	GND	12	HDMI_CLK_N_L
13	NC	14	NC
15	HDMI_SCL	16	HDMI_SDA
17	GND	18	HDMI_P5V
19	HDMI_HPD		

Multi Port Connector

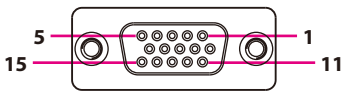
Connector number: 15



Pin	Definition	Pin	Definition
1	RS485_+	2	GND
3	GPI2	4	GPI1
5	GPI0	6	GND
7	GPO2	8	GPO1
9	GPO0	10	RS485_-
11	RS422_TX+	12	RS422_TX-
13	GND	14	COM_RXD_2
15	COM_TXD_2	16	GND
17	CAN_L	18	CAN_H
19	GND	20	MCU_RXD_3
21	MCU_TXD_3	22	GND
23	ODOMETER	24	DIRECTION
25	GND	26	12VOUT

VGA Connector

Connector number: 16



Pin	Definition	Pin	Definition
1	RED	2	GREEN
3	BLUE	4	CH7517_SPC
5	GND	6	M_DET
7	VGA_GND	8	VGA_GND
9	VGA_VCC	10	GND
11	CH7517_SPD	12	VGA_DAT
13	VGA_HS	14	VGA_VS
15	VGA_CLK		

Chapter 3: Jumpers and Connectors

This chapter describes how to set the jumpers and connectors on the VTC 1021 series motherboard.

Before You Begin

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

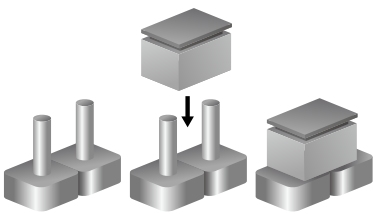
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal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

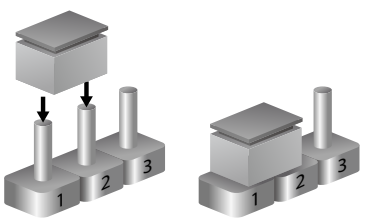
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just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



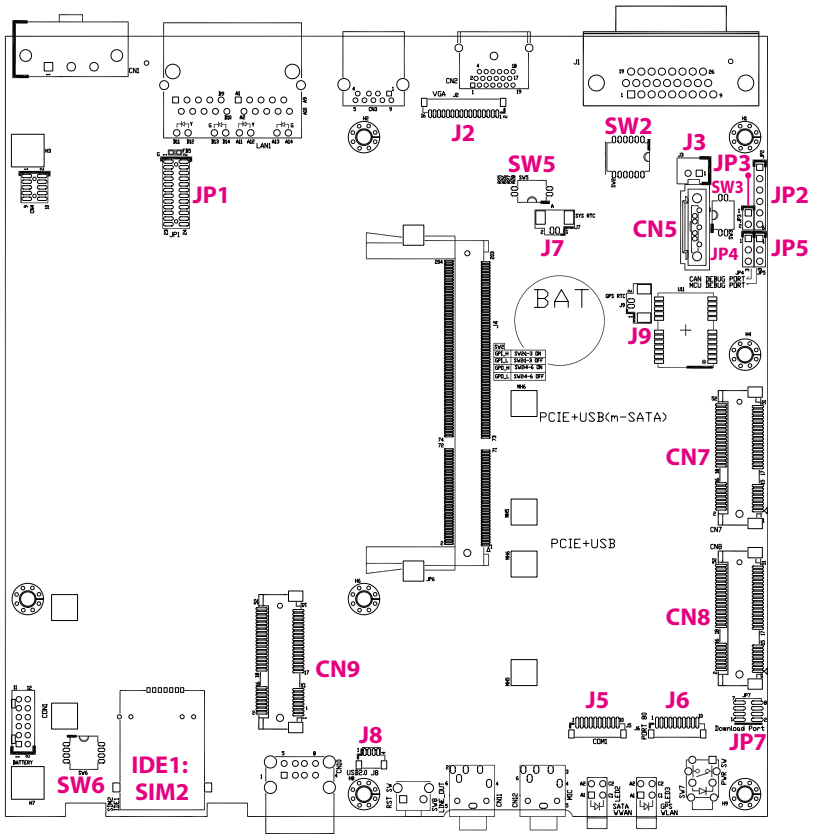
Three-Pin Jumpers: Pins 1 and 2 are Short



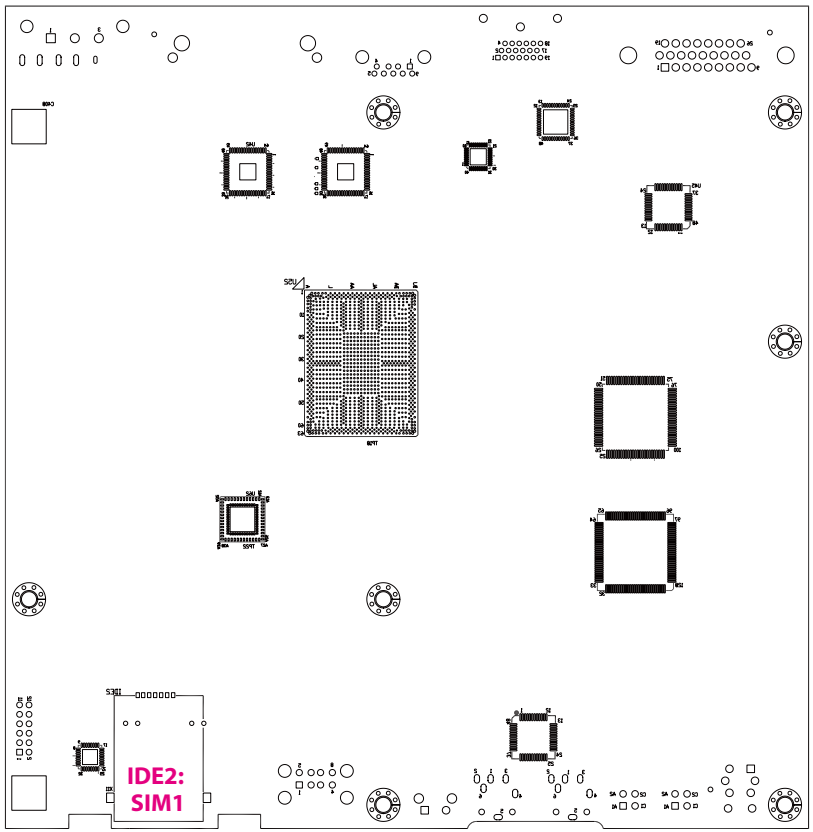
Locations of the Jumpers and Connectors

This chapter lists the location and pinout assignment of the jumpers and connectors on the VTC 1021 series motherboard.

Top View



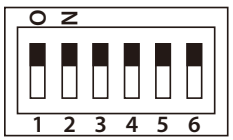
Bottom View



Connector Pin Definitions

GPIO Pull High Switch

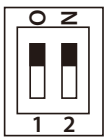
Connector type: DIP switch
Connector location: SW2



SW	On (Default)	Off
SW2.1	Pull up VCC5	Don't care
SW2.2	Pull up VCC5	Don't care
SW2.3	Pull up VCC5	Don't care
SW2.4	Pull up VCC5	Don't care
SW2.5	Pull up VCC5	Don't care
SW2.6	Pull up VCC5	Don't care

Input Voltage Control Switch

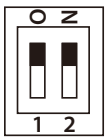
Connector type: DIP switch
Connector location: SW3



Pin	Definition
1 Off, 2 Off	12V
1 Off, 2 On	24V
1 On, 2 On	9~36V (Default)

RTC Switch

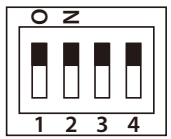
Connector type: DIP switch
Connector location: SW5



Pin	Definition
1 Off, 2 Off	RTC Normal (Default) ME Normal (Default)
1 On, 2 On	RTC Clear CMOS ME Clear

WWAN Module Selector

Connector type: DIP switch
Connector location: SW6

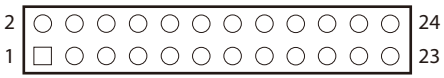


	WWAN HE910/LE910 Wake-Up & Voice*	WWAN SIM5360E Wake-Up & Voice	WWAN MC7304/MC7354 Wake-Up & Voice
SW6.1	On	Off	Off
SW6.2	Off	On	On
SW6.3	Off	On	On
SW6.4	On	Off	Off
Digital Voice**	HE910 (I2S)	PCM	MC73xx(PCM)

*Default Settings
**Digital voice is selectable in BIOS.

PoE Signal Connector

Connector type: 2x12 24-pin header, 1.27mm pitch
Connector location: JP1



Pin	Definition	Pin	Definition
1	GND	2	VCC5
3	USB_7N	4	VCC3
5	USB_7P	6	VCC3
7	PMU_PLTRST#	8	GND
9	PCIE_TXP5	10	PCIE_TXP4
11	PCIE_TXN5	12	PCIE_TXN4
13	GND	14	GND
15	PCIE_RXP5	16	PCIE_RXP4
17	PCIE_RXN5	18	PCIE_RXN4
19	GND	20	GND
21	MINI_CLKP5	22	MINI_CLKP4
23	MINI_CLKN5	24	MINI_CLKN4

CAN-MCU Update Port

Connector type: 1x6 6-pin header, 2.54mm pitch
Connector location: JP2

Pin	Definition	Pin	Definition
1	3.3V	2	SWDIO
3	SWDCLK	4	SWO
5	nRESET	6	GND

CAN-MCU Boot

Connector type: 1x2 2-pin header, 2.54mm pitch
Connector location: JP3

Pin	Definition
1	GND
2	MCU_BOOT
Short when MCU update	

CAN-MCU Debug Port Jumper

Connector type: 1x3 3-pin header, 2.54mm pitch
Connector location: JP4

Pin	Definition
1	TX
2	RX
3	GND

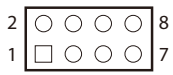
MCU Debug Port Jumper

Connector type: 1x3 3-pin header, 2.54mm pitch
Connector location: JP5

Pin	Definition
1	MCU_TXD
2	MCU_RXD
3	GND

MCU Download Port

Connector type: 2x4 8-pin header, 1.27mm pitch
Connector location: JP7



Pin	Definition	Pin	Definition
1	3V3ALW	2	MCU_TRST
3	MCU_TCK	4	MCU_TDO
5	MCU_RST	6	MCU_TDI
7	MCU_TMS	8	GND

VGA Wafer

Connector type: 1x16 16-pin header, 1.0mm pitch
Connector location: J2

Pin	Definition	Pin	Definition
1	GND	2	+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	VGA_GND

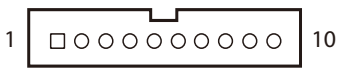
SATA Power

Connector type: 1x2 2-pin header, 2.5mm pitch
Connector location: J3

Pin	Definition
1	VCC5
2	GND

COM1 Connector

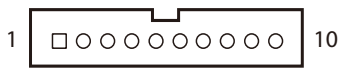
Connector type: 1x10 10-pin header, 1.0mm pitch
Connector location: J5



Pin	Definition	Pin	Definition
1	GND	2	GND
3	RI_1	4	DTR_1
5	CTS_1	6	TXD_1
7	RTS_1	8	RXD_1
9	DSR_1	10	DCD_1

Debug 80 Port Connector

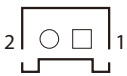
Connector type: 1x10 10-pin header, 1.0mm pitch
Connector location: J6



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

RTC Battery Connector

Connector type: 1x2 2-pin header, 1.25mm pitch
Connector location: J7



Pin	Definition
1	GND
2	VBAT

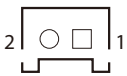
Internal USB Connector

Connector type: 1x4 4-pin header, 1.0mm pitch
Connector location: J8

Pin	Definition	Pin	Definition
1	VCC	2	D-
3	D+	4	GND

RTC Battery Connector

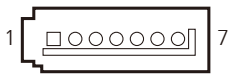
Connector type: 1x2 2-pin header, 1.25mm pitch
Connector location: J9



Pin	Definition
1	GND
2	GPS_VBAT

SATA HDD Connector

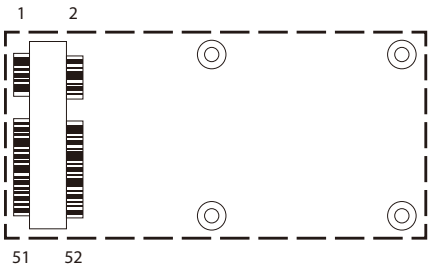
Connector type: Standard Serial ATA 7P (1.27mm, SATA-M-180)
Connector location: CN5



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

Mini-PCIe for USB/PCIe

Connector location: CN8

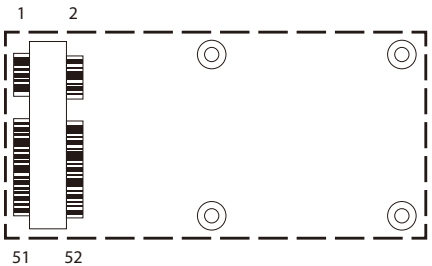


Pin	Definition	Pin	Definition
1	NC	2	3.3V
3	NC	4	GND
5	NC	6	1.5V
7	PCIE_CLKREQ#	8	NC
9	GND	10	NC
11	PCIE_CLK_N2	12	NC
13	PCIE_ CLK_P2	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	PCIE_DIS#
21	GND	22	PCIE_RST#
23	PCIE_RX2N	24	3.3V
25	PCIE_RX2P	26	GND

Pin	Definition	Pin	Definition
27	GND	28	1.5V
29	GND	30	SCL
31	PCIE_TXN2	32	SDA
33	PCIE_TXP2	34	GND
35	GND	36	USB_5N
37	GND	38	USB_5P
39	3.3V	40	GND
41	3.3V	42	NC
43	GND	44	PCIE_WLAN_LED#
45	NC	46	NC
47	NC	48	1.5V
49	NC	50	GND
51	MBT_DIS#_R	52	3.3V

Mini-PCIe for USB/PCIe/mSATA

Connector location: CN7



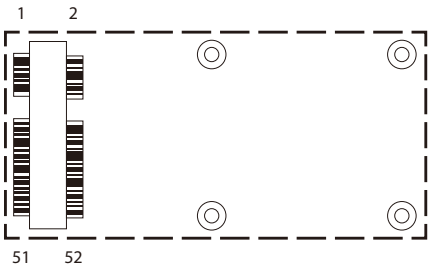
Pin	Definition	Pin	Definition
1	NC	2	3.3V
3	NC	4	GND
5	NC	6	1.5V
7	NC	8	NC
9	GND	10	NC
11	PCE_CLK_N 3	12	NC
13	PCE_CLK_P3	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	PCIE3_DIS#
21	GND	22	PCIE3_RST#
23	PCIE_RX_N3/SATA_RXP1	24	3.3V
25	PCIE_RX_P3/SATA_RXN1	26	GND

Pin	Definition	Pin	Definition
27	GND	28	1.5V
29	GND	30	SCL
31	PCIE_TX_N3/SATA_TXN1	32	SDA
33	PCIE_TX_P3/SATA_RXN1	34	GND
35	GND	36	USB_4N
37	GND	38	USB_4P
39	3.3V	40	GND
41	3.3V	42	NC
43	GND	44	PCIE3_WLAN_LED#
45	NC	46	NC
47	NC	48	1.5V
49	NC	50	GND
51	CTRL0	52	3.3V

When CTRL=0, CN7 is mSATA.
When CTRL=1, CN7 is PCIe device.

Mini-PCIe for WWAN Module

Connector location: CN9



Pin	Definition	Pin	Definition
1	SMS_RING#	2	3.3V
3	NC	4	GND
5	NC	6	3.3V
7	U_GND	8	UIM_PWR
9	GND	10	UIM_DAT
11	VCC_MSM26_DIG	12	VCC_MSM26_DIG
13	NC	14	UIM_RST
15	GND	16	NC
17	MCU_RX2	18	GND
19	MCU_TX2	20	3.5G_DIS#
21	GND	22	3.5G_RST#
23	USB3_RXN	24	3.3V
25	USB3_RXP	26	GND

Pin	Definition	Pin	Definition
27	GND	28	NC
29	GND	30	NC
31	USB3_TXN	32	NC
33	USB3_TXNP/UMTSRST	34	GND
35	GND	36	USB_1N
37	GND	38	USB_1P
39	3.3V	40	GND
41	3.3V	42	3.5G_LED
43	GND	44	NC
45	PCM_CLK	46	NC
47	PCM_RX_SW	48	NC
49	PCM_TX_SW	50	GND
51	PCM_SYNC	52	3.3V

Chapter 4: System Setup

Removing the Chassis Cover

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

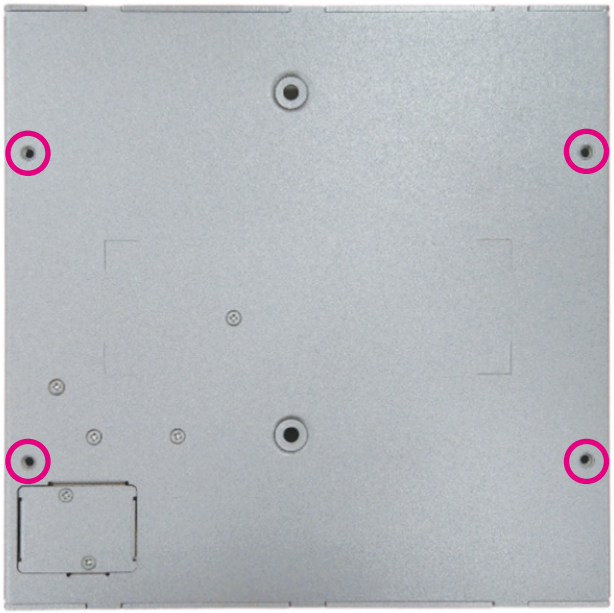
1. The screws and nuts circled on the front, side, rear and bottom are used to secure the chassis. Remove these screws and nuts and put them in a safe place for later use.

Front View

Right View

Left View

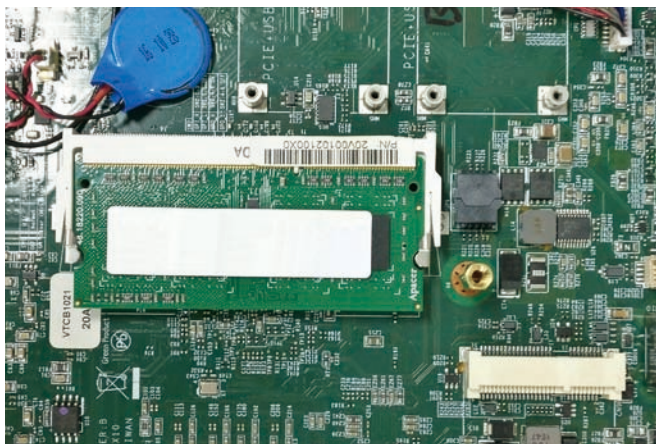
Rear View



Bottom View

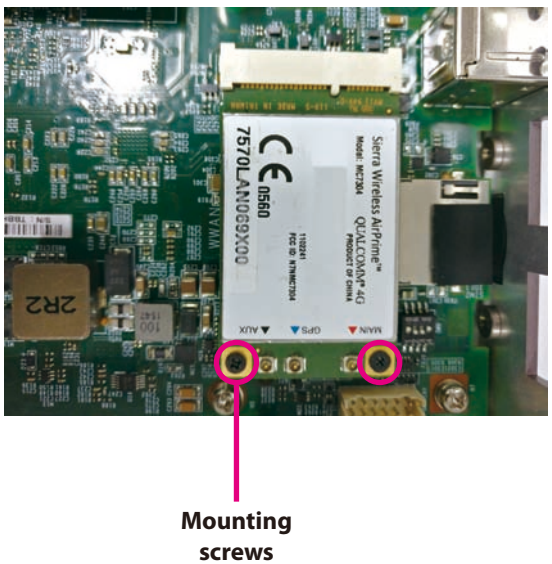
Installing a SO-DIMM

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.



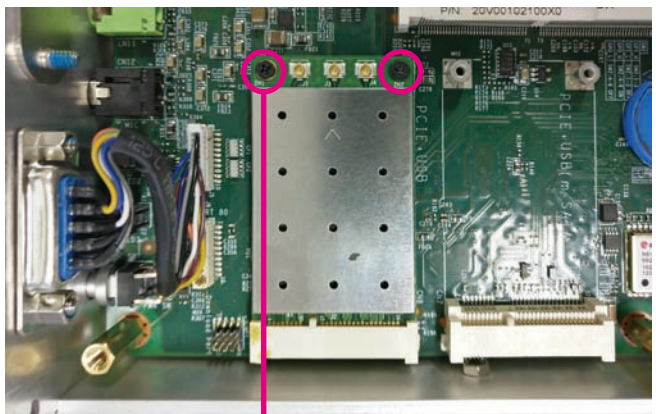
Installing a WWAN Module

1. Locate the WWAN Mini PCI Express slot (CN10). 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.



Installing a WLAN Module (Full Mini-PCIe)

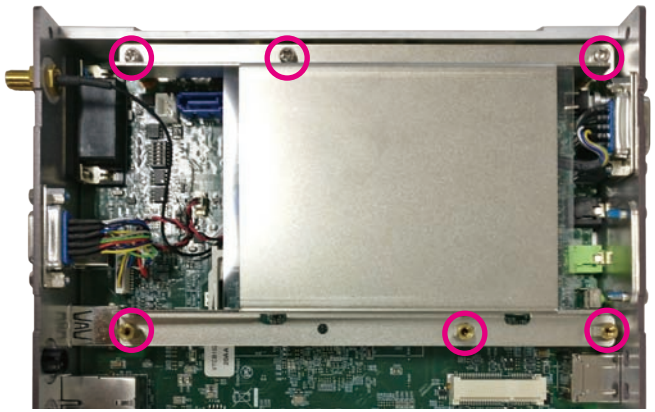
1. Locate the WLAN Mini PCI Express slot (CN17). Insert the module into the Mini PCI Express slot at a 45 degrees angle until the gold-plated connector on the edge of the module completely disappears inside the slot. Then fasten screws into the mounting holes to secure the module.



Mounting screws

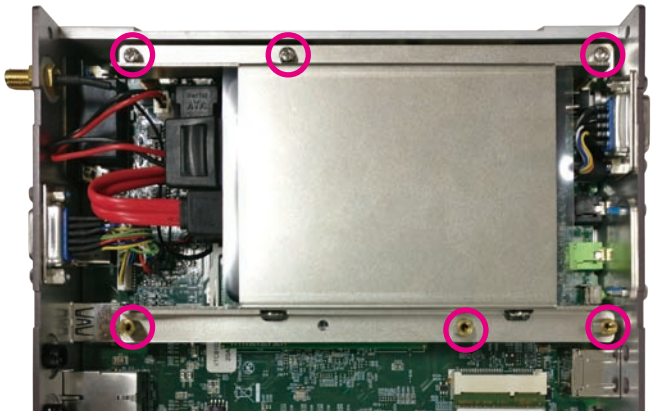
Installing an SSD/HDD Drive

1. Loosen the screws on the SSD/HDD drive bay and take the drive bay out.



2. Insert the SSD/HDD into the drive bay with the SATA data and power connector facing towards the end. Align the SSD/HDD mounting holes with the mounting holes on the drive bay, and use the provided gaskets and screws to secure the hard drive in place.

3. Insert the drive bay back in the SSD/HDD slot and tighten the screws to secure it in place.



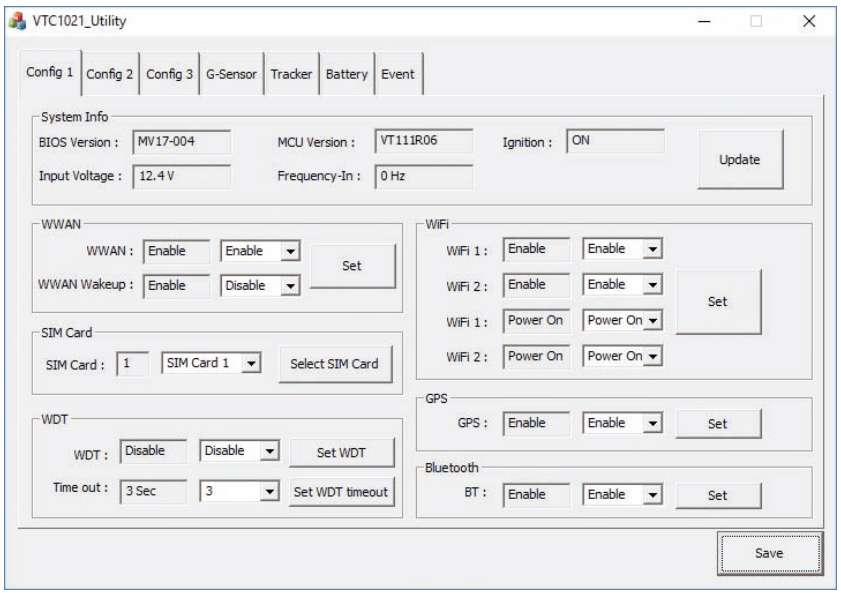
Appendix A:
Software Demo Utility for I/O Ports of Function Control

DELTA COMPONENTS ´software demo utility enables users to test and control different I/O port functions on the VTC 1021 series. This document shows how to use the utility.

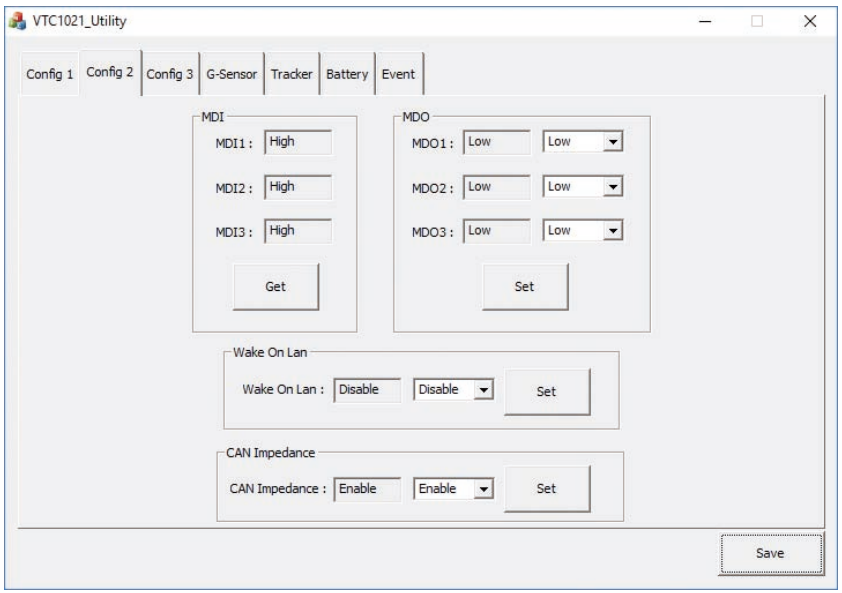
There are also source code files of the utility in the CD. Users can refer to the source codes to develop their applications.

Menu Screen

Config1



Config2



1. Config1

1.1 System Info

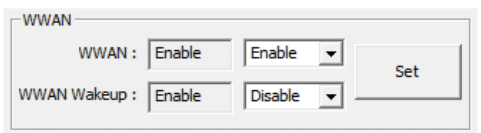
BIOS Version: Shows the BIOS Version.
MCU Version: Shows the MCU Version.
Ignition: Shows the signal of ignition.

- ON: Signal of ignition is high.
- OFF: Signal of ignition is low.

Input Voltage: Shows the voltage level of power-in.
Frequency-In: Shows the frequency of speed pulse signal.

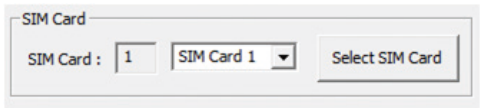
1.2 WWAN

Enables or disables the WWAN function on CN9 Mini-PCIe socket.
Enables or disables the WWAN wakeup function on CN9 Mini-PCIe socket.
The setting can also be cleared by the Set button.



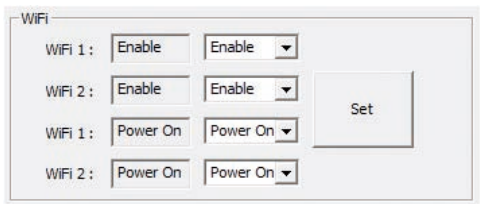
1.3 SIM Card

Selects SIM Card 1 or SIM Card 2 to configure settings.
The setting can also be cleared by the Set button.



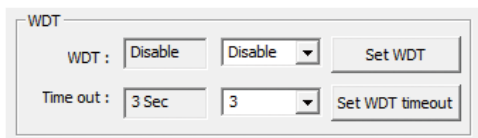
1.4 WiFi

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



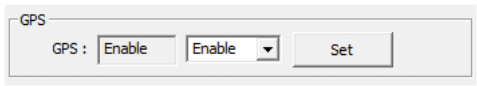
1.5 WDT

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



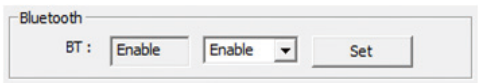
1.6 GPS

Enables or disables the GPS function.



1.7 Bluetooth

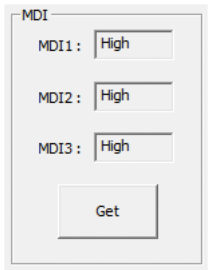
Enables or disables the Bluetooth function.



2. Config2

2.1 MDI

Defines MDI port as High or Low.

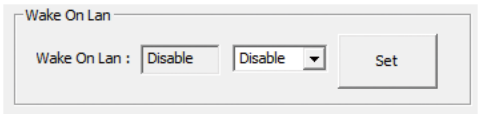


2.2 MDO

Defines MDO port as High or Low.

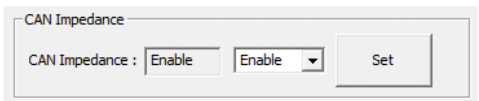
2.3 Wake On LAN

Enables or disables the Wake On LAN function.

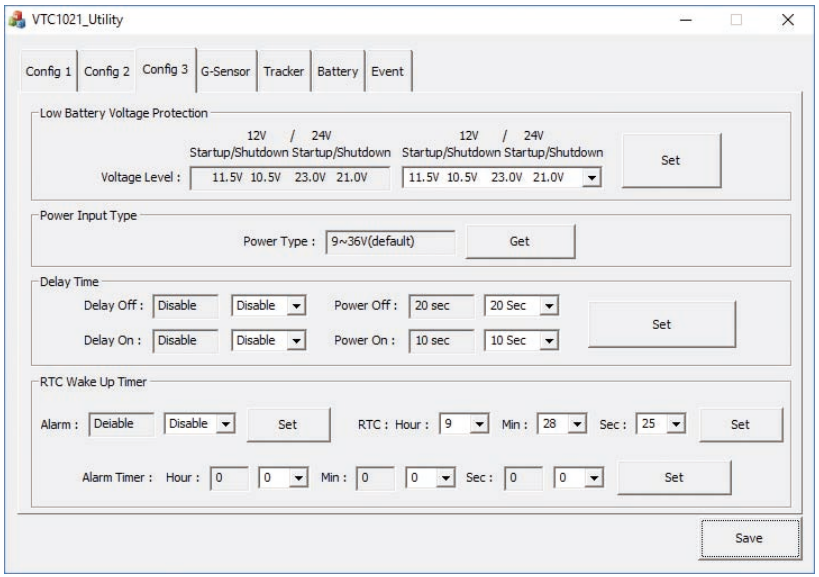


2.4 CAN Impedance

Enables or disables the CAN Impedance function.

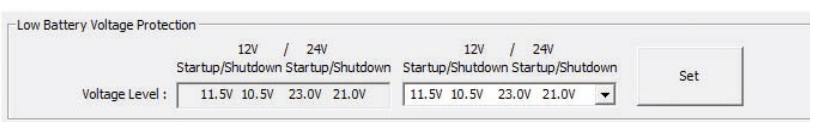


3. Config3



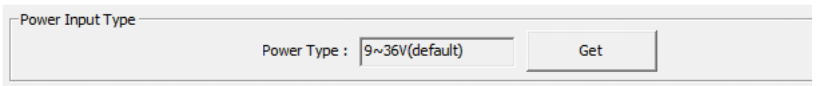
3.1 Low Battery Voltage Protection

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



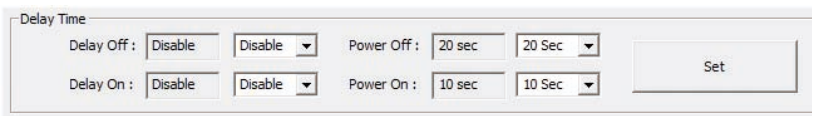
3.2 Power Input Type

Shows the setting of input voltage in SW DIP switch.
If the setting is 12V: 12V is shown.
If the setting is 24V: 24V is shown.
If the setting is 9V~36V: 9V~36V is shown.



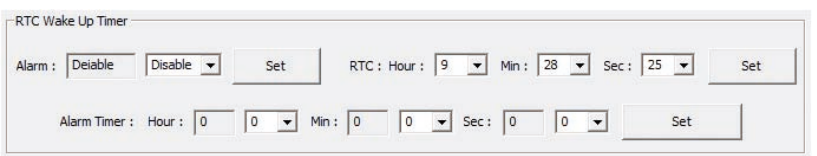
3.3 Delay Time

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

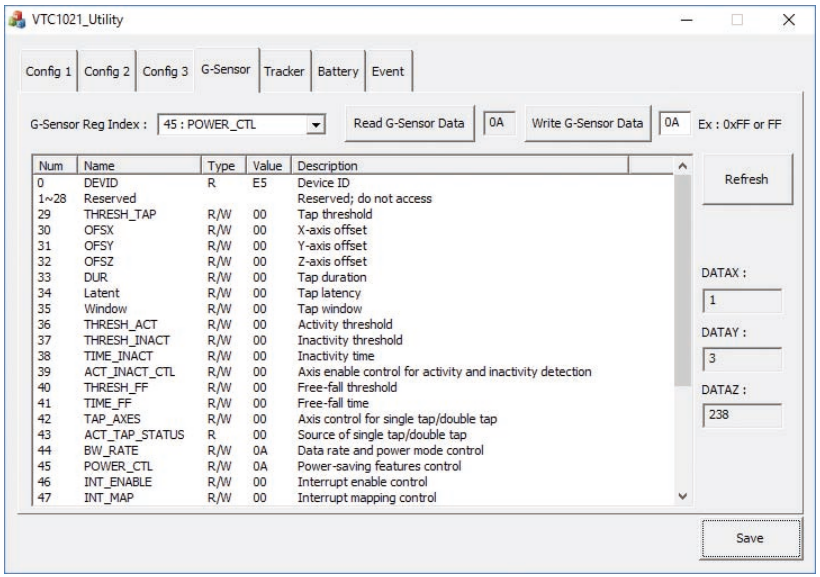


3.4 RTC Wake Up Timer

Enables or disables the RTC wake up function. The timer setting of RTC and Alarm Timer can be configured.

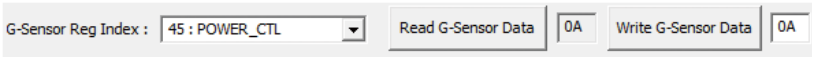


4. G-Sensor



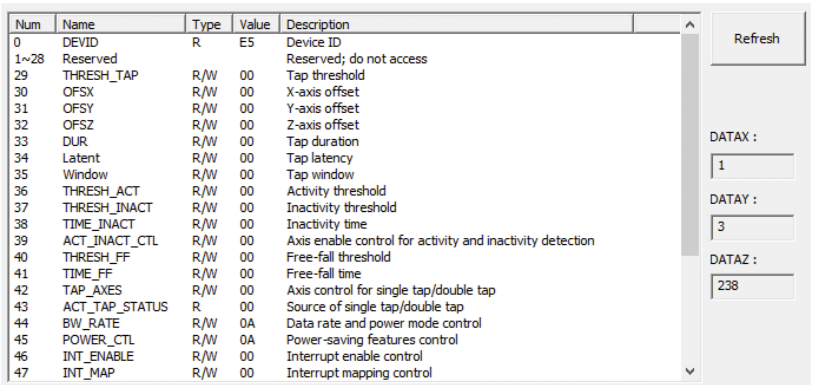
4.1 G-Sensor Register Index

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

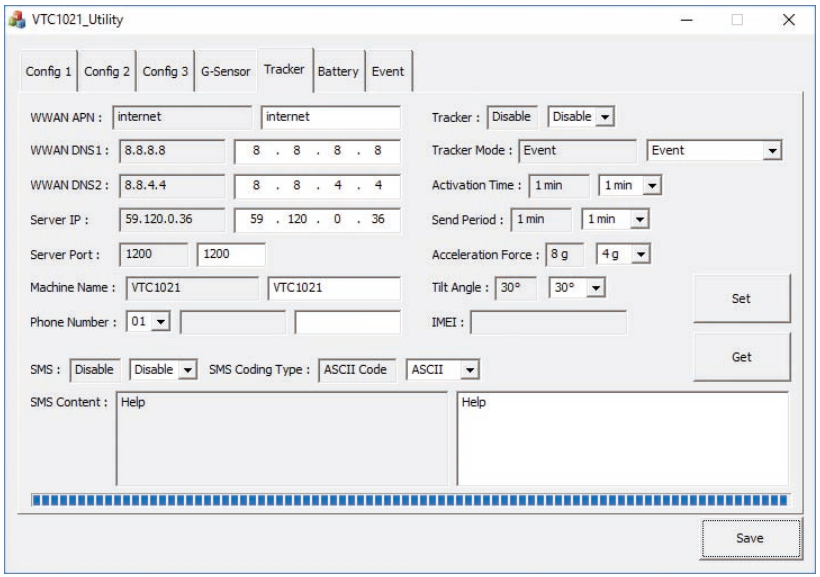


4.2 Register Table

Shows the value of all registers in G-Sensor, once the Refresh Button is pressed.

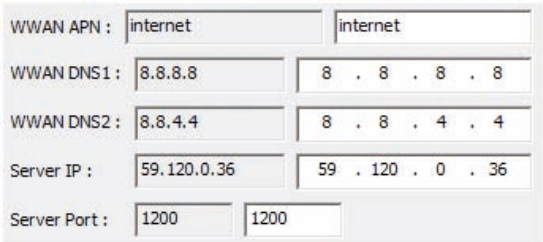


5. Tracker



5.1 Network Settings

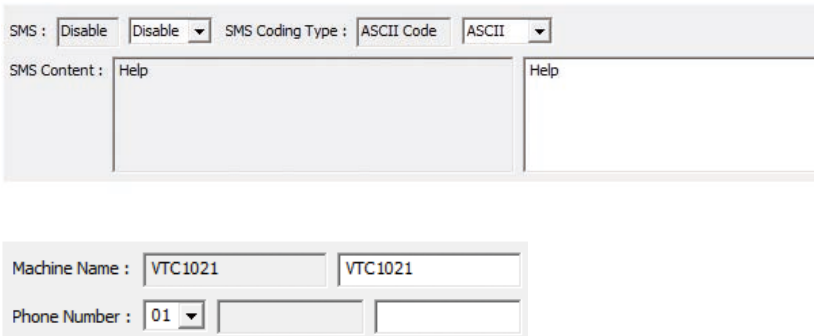
Configures the network settings for the server.



APN: internet (default). It can be adjusted based on users' situation.
DNS1: 8.8.8.8 (default). It can be adjusted based on users' situation.
DNS2: 8.8.4.4 (default)
Server IP: 59.120.0.36 (default). It can be adjusted based on users' situation.
Server Port: 1200 (default). It can be adjusted based on users' situation.

5.2 SMS and Phone Number

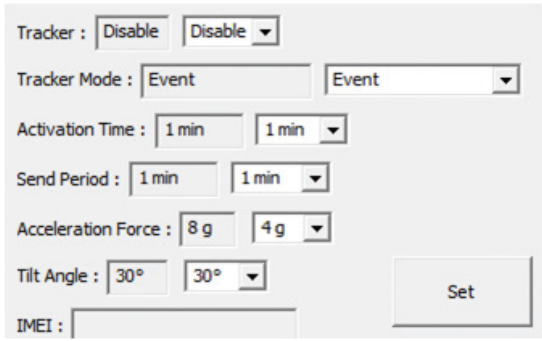
Configures the SMS content and phone numbers for delivering SMS message.



If SMS Control is enabled, once event is triggered (defined by Acceleration Force & Tilt Angle), SMS Message will be sent to the phone numbers that are registered automatically. There are up to 10 phone numbers that can be registered. SMS Content can be defined inside the text field.

5.3 Tracker Settings

Configures settings for the tracker.



If Tracker function is "Enable" and Tracker Mode is "Event", once event is triggered (defined by Acceleration Force & Tilt Angle), following information will be sent to server.

If Tracker function is "Enable" and Tracker Mode is "Continue", following information will be sent to server, based on the interval time defined in Send Period.

(Information)
Date: YYMMDD
Time: HHMMSS
GPS Status: 0: Searching 1: Fixed
GPS Latitude
GPS Longitude
G Sensor X value: 0 ~ 65535
G Sensor Y value: 0 ~ 65535
G Sensor Z value: 0 ~ 65535

Activation Time: Define when tracker function starts after ignition signal becomes low.

Send Period: Define the interval time to send the information to server, when Tracker Mode is "Continue".

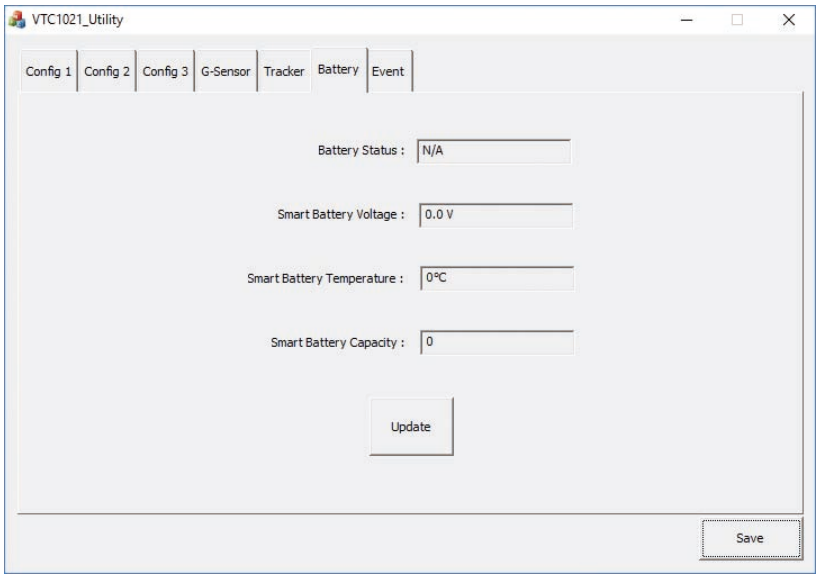
Acceleration Force: Define the value of G-sensor that triggers the event.

Tilt Angle: Define the value of tilt angle that triggers the event.

IMEI: IMEI of WWAN module will be shown.

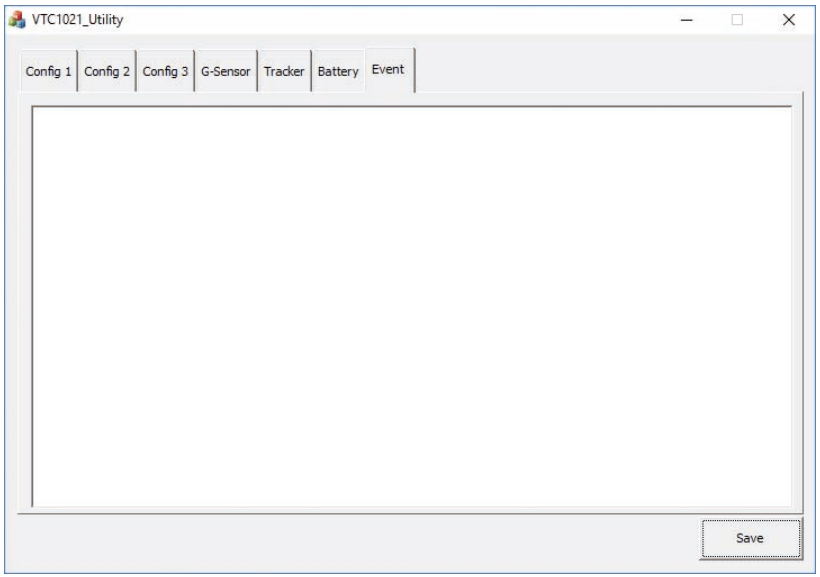
Note:
It is required to press the Save Button for saving the settings made in the Utility.

6. Battery



Press the Update button to show the backup battery related information.

7. Event



Shows the Event of VTC 1021.

Appendix B: GPS Feature

uBlox-NEO M8N 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 form factor allows easy migration from previous NEO generations. Sophisticated RF-architecture and interference suppression ensure maximum performance even in GNSS-hostile environments.

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

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

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

Technical Specifications

Features

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

Features cont.

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

[1] For NEO-M8M/Q

Electrical data

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

[2] NEO-M8M

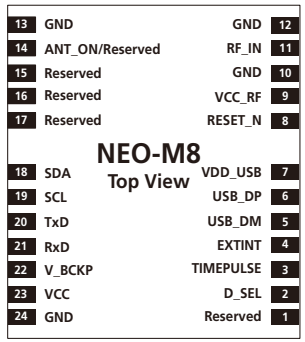
Interfaces

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

Package

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

Pinout



Environmental data, quality & reliability

Operating temp.	–40° C to 85° C
Storage temp.	–40° C to 85° C (NEO-M8N/Q) –40° C to 105° C (NEO-M8M)

RoHS compliant (lead-free)

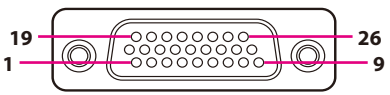
Qualification according to ISO 16750

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

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

Appendix C: Signal Connection of MCU DI/DO

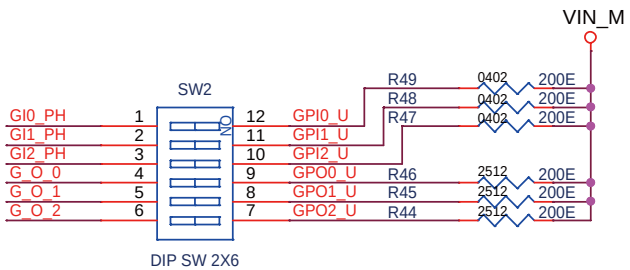
Multi Port Pinout Description



Pin	Definition	Pin	Definition
1	RS485_+	2	GND
3	GPI2	4	GPI1
5	GPI0	6	GND
7	GPO2	8	GPO1
9	GPO0	10	RS485_-
11	RS422_TX+	12	RS422_TX-
13	GND	14	COM_RXD_2
15	COM_TXD_2	16	GND
17	CAN_L	18	CAN_H
19	GND	20	MCU_RXD_3
21	MCU_TXD_3	22	GND
23	ODOMETER	24	DIRECTION
25	GND	26	12VOUT

GPIO and CAN Terminal Setting

Connector location: SW2

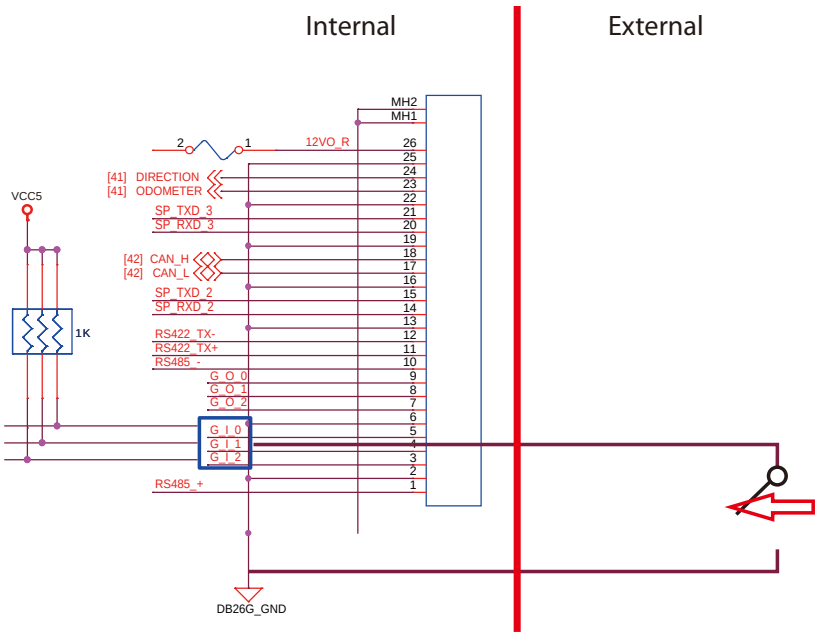


SW	On (Default)	Off
SW2.1	Pull up VCC5	Don't care
SW2.2	Pull up VCC5	Don't care
SW2.3	Pull up VCC5	Don't care
SW2.4	Pull up VCC5	Don't care
SW2.5	Pull up VCC5	Don't care
SW2.6	Pull up VCC5	Don't care

Digital Input

Wet Contact (Default):
The GPI signals have a pull up resistor to 5V internally.

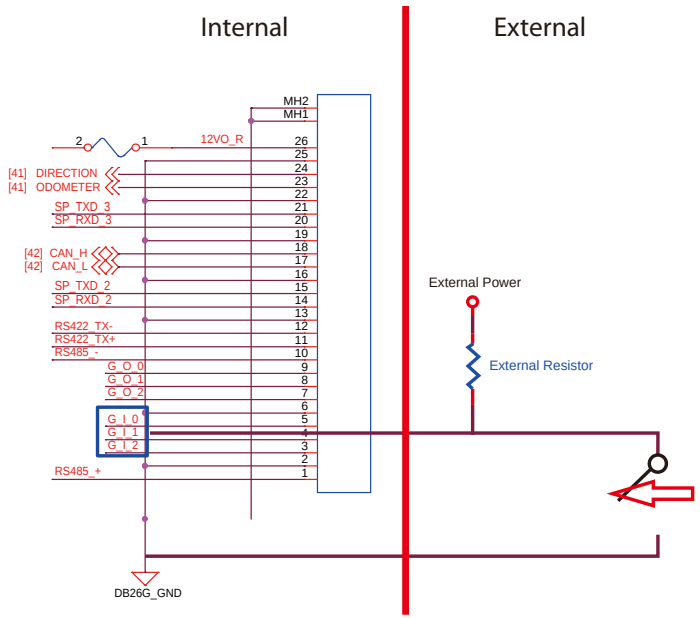
The figure below shows how to connect an external output source to one of the input channels.



External Switch	Port	DI Register
On (Short)	GND	0
Off (Open)	OPEN	1

Dry Contact:
The GPI needs to switch to "OFF" state. The GPI signal will not have a pull up resistor internally when you switch "SW2" to "OFF" state.

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



External Switch	Port	DI Register
On (Short)	GND	0
Off (Open)	HIGH	1

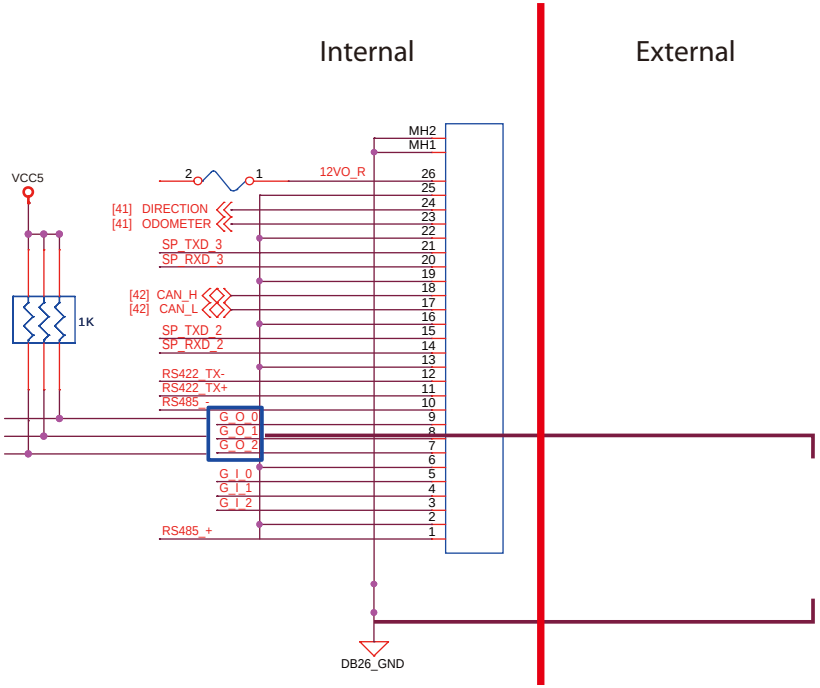
Digital Output

CN connector for GPO signal (digital signal output).

The CN connector has 3 digital output channels by default. The signal connection of CN supports two connected methods for output signal type. The output signal has two states, one is low level (driven to 0V from GPO signal), and the other is open (high voltage is provided from external device).

Wet Contact (Default):
The SW2 switch needs to switch to "ON" state. The GPO signal will have a pull up resistor to 5V internally when you switch "SW2" to "ON" state. The output signal has two states, one is low level (driven to 0V from GPO signal), and the other is high level (driven to 5V from GPO signal).

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

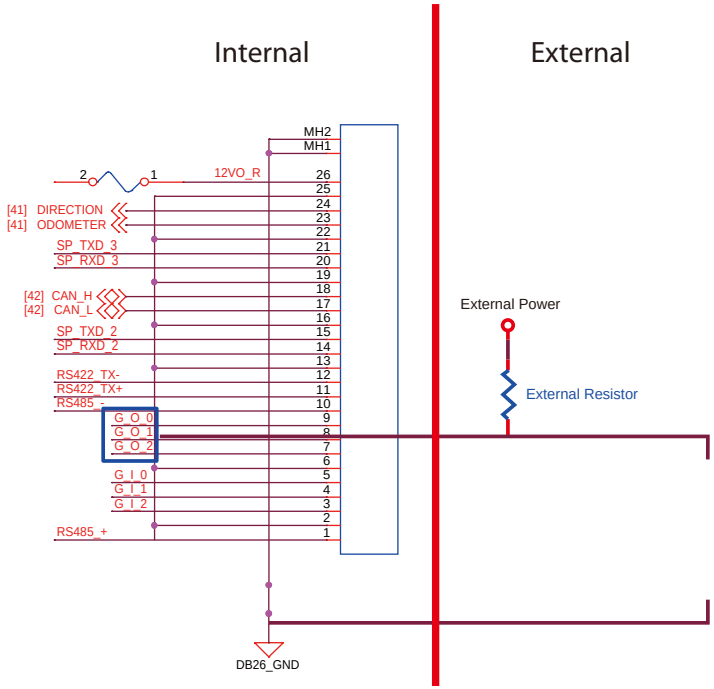


GPO Register	Port
1	HIGH
0	GND

Dry Contact:
Each channel can accept 3~18Vdc voltage, and it is able to drive 150mA current for low level.

The SW2 switch needs to switch to "OFF" state. The GPO signal will not have a pull up resistor internally when you switch "SW2" to "OFF" state.

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

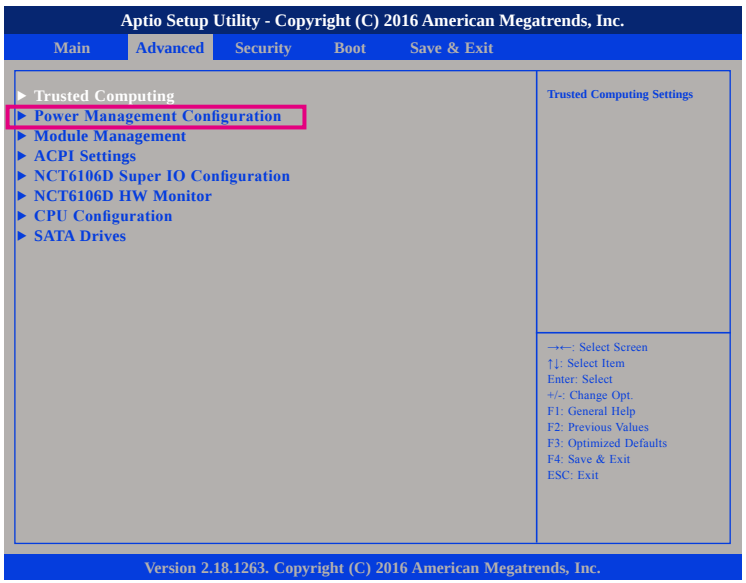


GPO Register	Port
1	OPEN
0	GND

Appendix D: Vehicle Power Management Setup

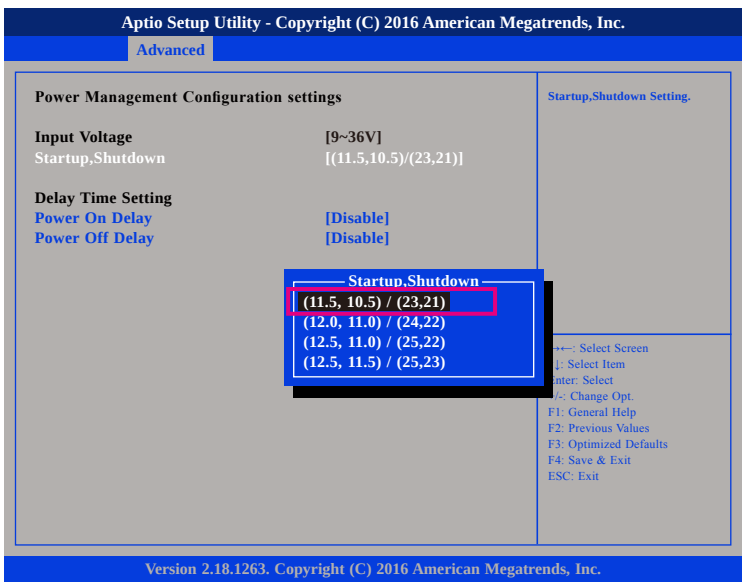
Entering BIOS Menu

In the BIOS menu, go to **Advanced→Power Management Configuration**.



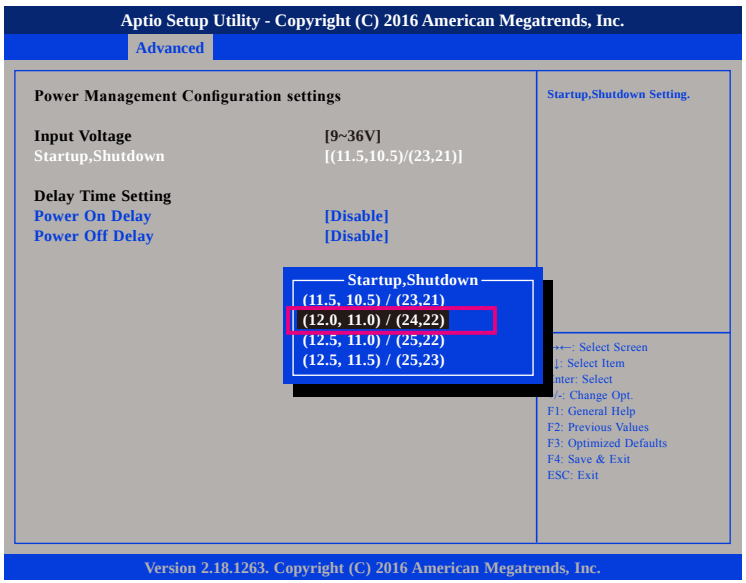
Startup and Shutdown Voltage Setting

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.



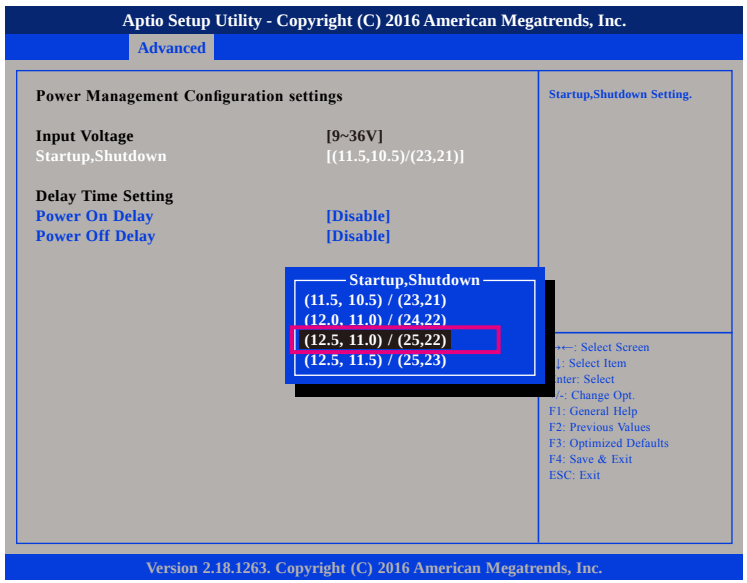
Set the startup voltage to 12.0V or 24V and the shutdown voltage to 11.0V or 22V

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.



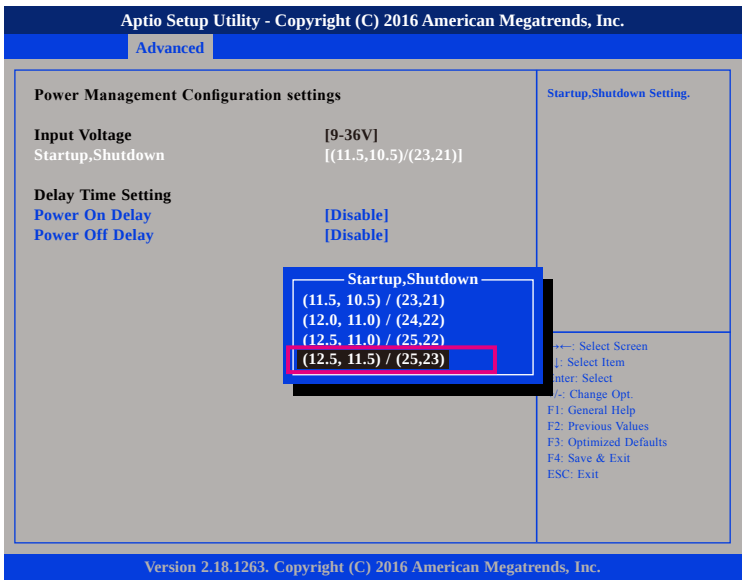
Set the startup voltage to 12.5V or 25V and the shutdown voltage to 11.0V or 22V

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.

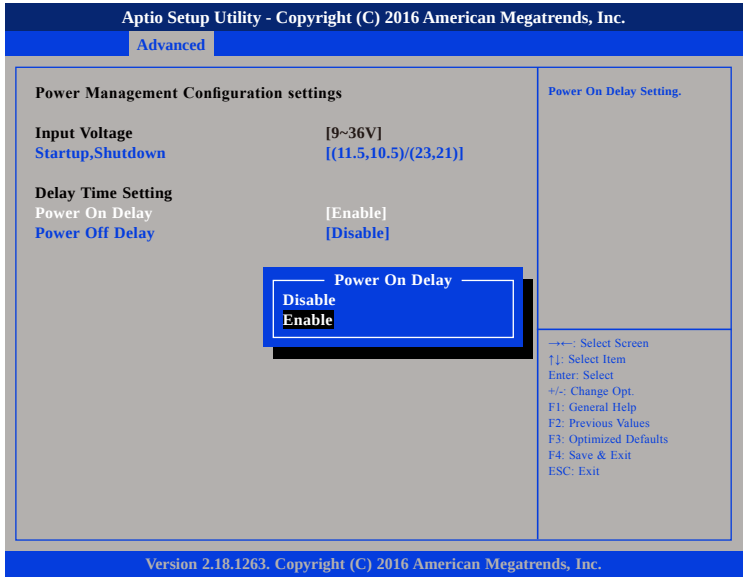


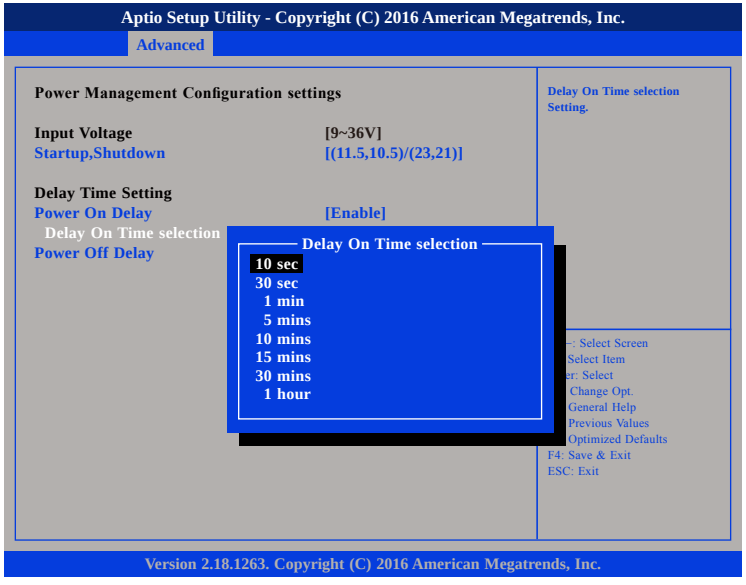
Power-on Delay Setting

Disable Power-on Delay

Enable Power-on Delay

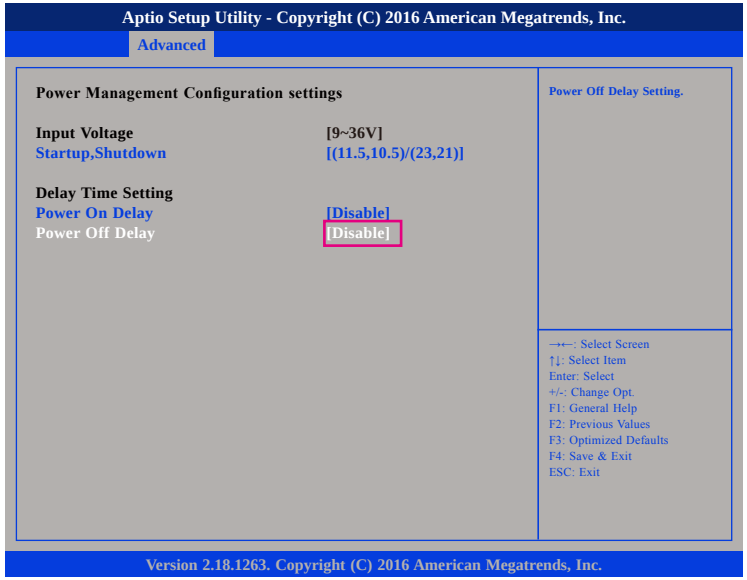
Delay time can be set at 10sec/30sec/1min./5mins./10mins./15mins./30mins./1hour.





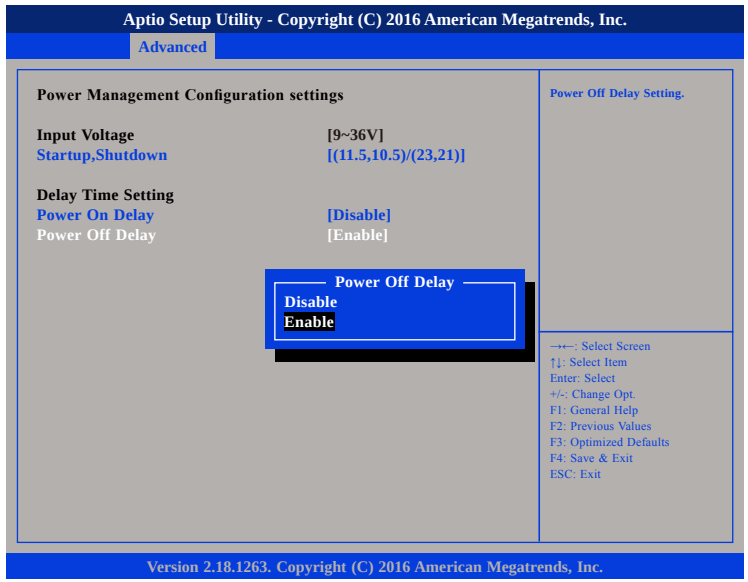
Power-off Delay Setting

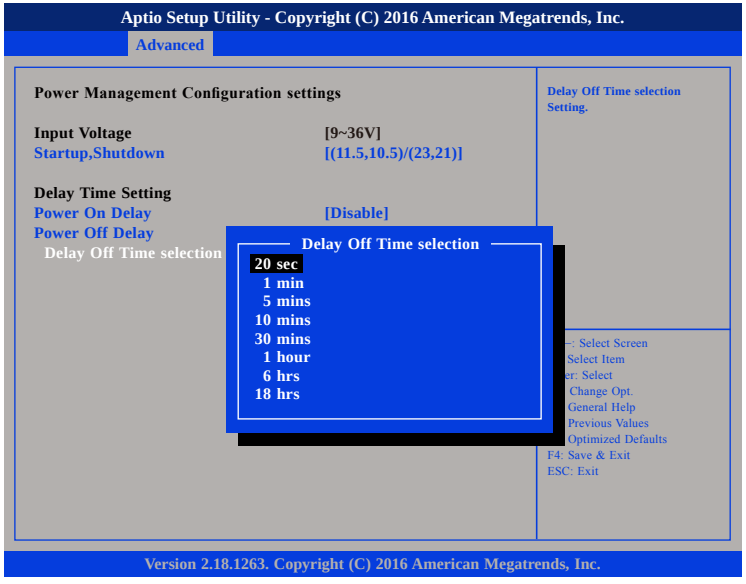
Disable Power-off Delay



Enable Power-off Delay

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




Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
Advanced
Power Management Configuration settings
Input Voltage [9~36V]
Startup,Shutdown [(11.5,10.5)/(23,21)]
Delay Time Setting
Power On Delay [Disable]
Power Off Delay
Delay Off Time selection
Delay Off Time selection
20 sec
1 min
5 mins
10 mins
30 mins
1 hour
6 hrs
18 hrs
Delay Off Time selection Setting.
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2016 American Megatrends, Inc.

Appendix E: Power Consumption

OS: Windows 10

Burn-in Software: Version 6.0

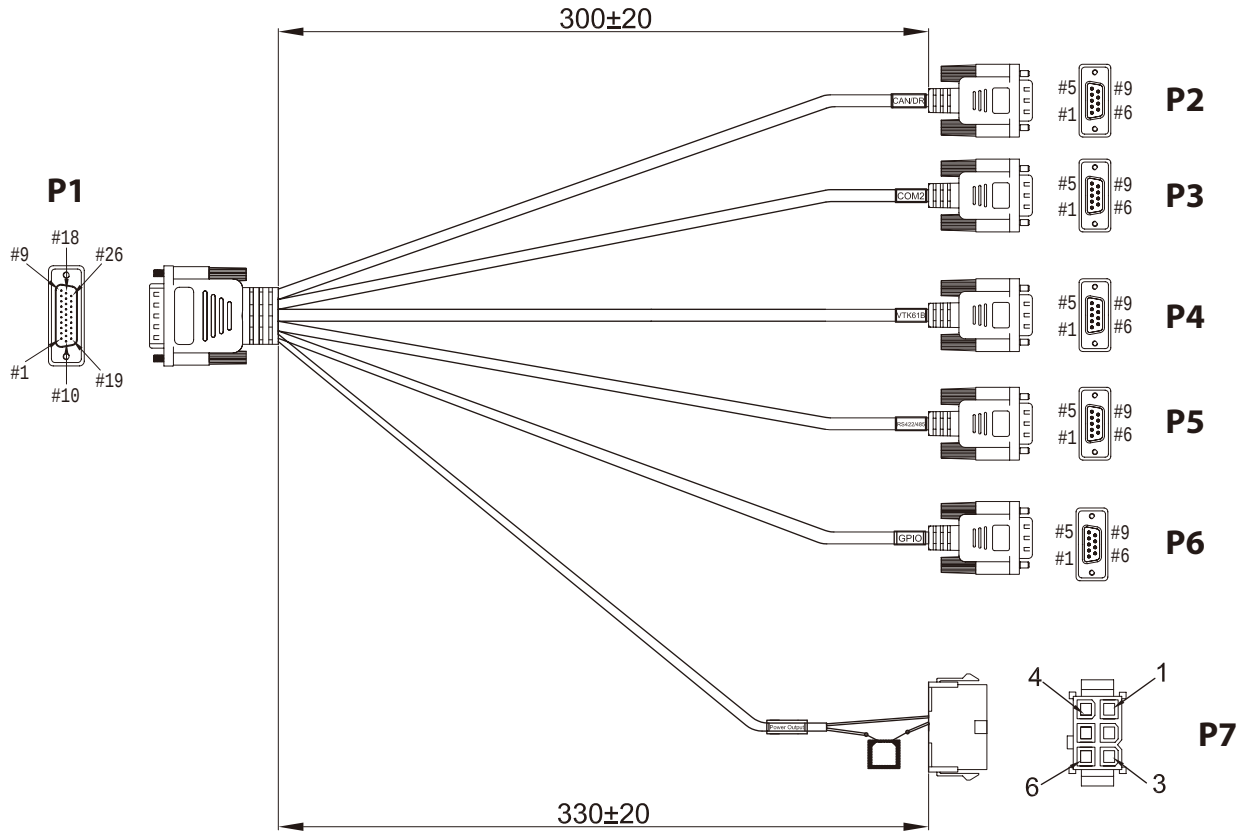
Device:
Idle: Into OS (SSD) + Display (VGA) + All module not link and not transmit + mSATA + Keyboard/Mouse.

Full: Into OS (SSD) + Display (VGA) + All module only 3G link player video + ping external net + mSATA + Keyboard/Mouse + headphone + Run burn in + USB device trans + CAN trans + COM trans + GPS link.

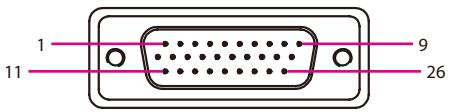
Device	Test Case		Result	
			Current(A)	Watt(W)
Burn-in Mode (VTC 1021)	Idle State	12V	0.96	11.52
		24V	0.53	12.72
		36V	0.38	13.68
	Full State	12V	2.04	24.48
		24V	1.06	25.44
		36V	0.72	25.92
	Full State + Loading	12V	4.86	58.32
		24V	2.33	55.92
		36V	1.60	57.6
Burn-in Mode (VTC 1021 with PoE)	Idle State	12V	1.01	12.12
		24V	0.57	13.68
		36V	0.42	15.12
	Full State	12V	2.01	24.12
		24V	1.02	24.48
		36V	0.70	25.2
	Full State + Loading	12V	12.22	146.64
		24V	5.02	120.48
		36V	3.33	119.88

Appendix F: Pin Definition for the Multiport Cable

The multiport consists of a 26-pin connector 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.



P1 Connector Pinout

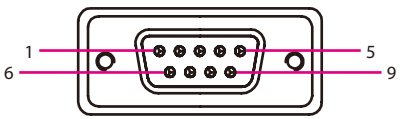


Pin	Definition	Pin	Definition
1	RS485_+	2	GND
3	GPI2	4	GPI1
5	GPI0	6	GND
7	GPO2	8	GPO1
9	GPO0	10	RS485_-
11	RS422_TX+	12	RS422_TX-
13	GND	14	COM_RXD_2
15	COM_TXD_2	16	GND
17	CAN_L	18	CAN_H
19	GND	20	MCU_RXD_3
21	MCU_TXD_3	22	GND
23	ODOMETER	24	DIRECTION
25	GND	26	12VOUT

P2 to P7 Connector Pinouts

CAN/DR Connector

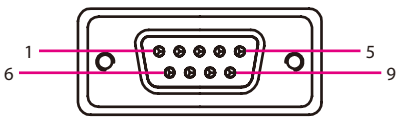
Connector location: P2



P1 Pin	P2 Pin	Definition
17	5	CAN_L
18	3	CAN_H
19	2	GND
23	7	ODOMETER
24	6	DIRECTION

COM2 Connector

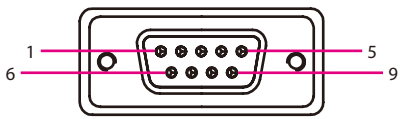
Connector location: P3



P1 Pin	P3 Pin	Definition
14	2	COM_RXD_2
15	3	COM_TXD_2
16	5	GND

VTK61B Connector

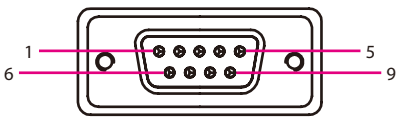
Connector location: P4



P1 Pin	P4 Pin	Definition
20	2	MCU_RXD_3
21	3	MCU_TXD_3
22	5	GND

RS-422/RS-485 Connector

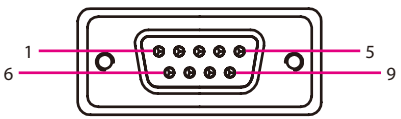
Connector location: P5



P1 Pin	P5 Pin	Definition
1	3	RS485_+
2	5	GND
10	4	RS485_-
11	2	RS422_TX+
12	1	RS422_TX-

GPIO Connector

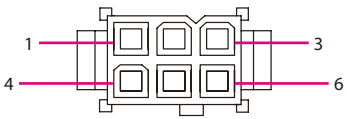
Connector location: P6



P1 Pin	P6 Pin	Definition
3	3	GPI2
4	2	GPI1
5	1	GPI0
6	5	GND
7	8	GPO2
8	7	GPO1
9	6	GPO0

DC Out Connector

Connector location: P7



P1 Pin	P7 Pin	Definition
25	2	GND
26	5	12VOUT