



NEXCOM International Co., Ltd.

Mobile Computing Solutions
Vehicle Telematics Computer
VTC 1000
User Manual

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Preface

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Acknowledgements

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Regulatory Compliance Statements

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

Declaration of Conformity

FCC

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

CE

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

RoHS Compliance

NEXCOM RoHS Environmental Policy and Status Update



NEXCOM is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2002/95/EU, to be your trusted green partner and to protect our environment.

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

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

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

How to recognize NEXCOM RoHS Products?

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

All new product models launched after January 2006 will be RoHS compliant. They will use the usual NEXCOM naming convention.

Warranty and RMA

NEXCOM Warranty Period

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

NEXCOM Return Merchandise Authorization (RMA)

- ❌ Customers shall enclose the “NEXCOM RMA Service Form” with the returned packages.
- ❌ Customers must collect all the information about the problems encountered and note anything abnormal or, print out any on-screen messages, and describe the problems on the “NEXCOM RMA Service Form” for the RMA number apply process.
- ❌ Customers can send back the faulty products with or without accessories (manuals, cable, etc.) and any components from the card, such as CPU and RAM. If the components were suspected as part of the problems, please note clearly which components are included. Otherwise, NEXCOM is not responsible for the devices/parts.
- ❌ Customers are responsible for the safe packaging of defective products,

making sure it is durable enough to be resistant against further damage and deterioration during transportation. In case of damages occurred during transportation, the repair is treated as “Out of Warranty.”

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

Repair Service Charges for Out-of-Warranty Products

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

System Level

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

Board Level

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

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

Warnings

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

Cautions

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

Safety Information

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

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

- When replacing parts, ensure that your service technician uses parts specified by the manufacturer.
- Avoid using the system near water, in direct sunlight, or near a heating device.
- The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.

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

Installation Recommendations

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

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

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

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

Safety Precautions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.
7. Do not leave this equipment in either an unconditioned environment or in a above 40°C storage temperature as this may damage the equipment.
8. The openings on the enclosure are for air convection to protect the equipment from overheating. DO NOT COVER THE OPENINGS.
9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
10. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
13. Never pour any liquid into an opening. This may cause fire or electrical shock.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. If one of the following situations arises, get the equipment checked by service personnel:
 - a. The power cord or plug is damaged.
 - b. Liquid has penetrated into the equipment.
 - c. The equipment has been exposed to moisture.
 - d. The equipment does not work well, or you cannot get it to work according to the user's manual.
 - e. The equipment has been dropped and damaged.
 - f. The equipment has obvious signs of breakage.
16. Do not place heavy objects on the equipment.
17. The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.
18. **CAUTION:** DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
19. The computer is provided with CD drives that comply with the appropriate safety standards including IEC 60825.

Technical Support and Assistance

1. For the most updated information of NEXCOM products, visit NEXCOM's website at www.nexcom.com.
2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
 - Product name and serial number
 - Detailed information of the peripheral devices
 - Detailed information of the installed software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wordings of the error messages

Warning!

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

Conventions Used in this Manual



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



Caution: Information to avoid damaging components or losing data.



Note: Provides additional information to complete a task easily.

Battery - Safety Measures

Caution

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

Safety Warning



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

Resetting the Date and Time



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

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Package Contents

Before continuing, verify that the VTC 1000 package that you received is complete. Your VTC 1000 package should have all the items listed in the following table.

Item	P/N	Name	Specification	Qty
1	5044440031X00	RUBBER FOOT		4
2	5043330404X00	HDD BRACKET		1
3	60233PW197X00	SATA POWER CABLE	FEMALE CONNECTOR 15P TO HOUSING 4P PIT:2.54mm L:70mm	1
4	60233ATA13X00	SATA CABLE	L:70mm 90° TO 180° CONNECTOR	1
5	50311F0100X00	ROUND HEAD SCREW	P3x6 iso/SW6x0.5 NI	8
6	60233SAM05X00	GPS ANTENNA	5M /SMA180P	1
7	602DCD0393X00	CD DRIVER		1

Ordering Information

The following provides ordering information for VTC 1000.

- **VTC 1000 (P/N: 10V00620009X0)**
 - Intel® Atom™ E640 1.0Ghz processor with 1GB DDR2, GPS module and GPS antenna

- **VTC 1000-2G (P/N: 10V00100002X0)**
 - Intel® Atom™ E640 1.0Ghz processor with 2GB DDR2, GPS module and GPS antenna, and VGA output

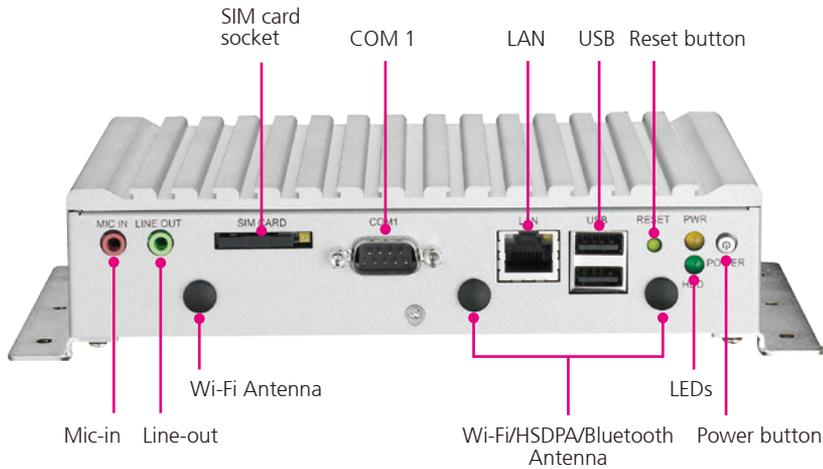
- **VTC 1000-LV (P/N: 10V00100003X0)**
 - Intel® Atom™ E640 1.0Ghz processor with 1GB DDR2, GPS module and GPS antenna, and LVDS output

- **VTC 1000-DK (P/N: 10V00100004X0)**
 - Intel® Atom™ E640 1.0Ghz processor with 1GB DDR2, GPS module in support of dead-reckoning and GPS antenna, and VGA output

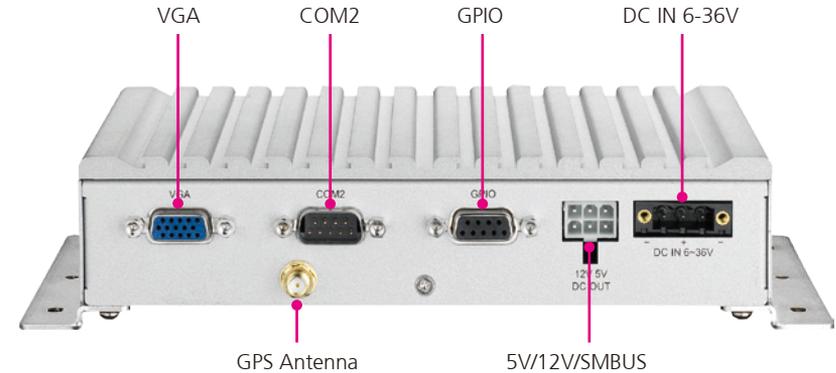
Chapter 1: Product Introduction

Physical Features

Front View



Rear View



Overview

The VTC 1000 is an innovative in-vehicle computer for use in any car, truck, or even for maritime applications. The design itself makes the system available as a complete system allowing the user to easily define and build requirements.

VTC 1000 fulfills vehicle industry requirements. The design itself is in compliance with vehicle industrial standard such as eMark. More features required for in-vehicle operations, such as power ignition delay control, low-power protection and SMBus connection, etc., are continued from NEXCOM's other in-vehicle computer products.

The GPS function navigates drivers to ultimate the fleet management. Optional, 3.5G, GPRS, and Bluetooth availability make VTC 1000 ready for wider coverage and future trend. Multiple display connections make VTC 1000 an ideal choice for in-vehicle signage platforms as well.

Key Features

- Built-in Intel® Atom E640 processor
- Mini card expansion interface for WLAN and 3.5G module
- Wide range DC input from 6~36V
- Power ignition on/off delay controlled by software
- Low battery power protection setting by software
- G-Sensor support (± 2 g Dual Axis Accelerometer)
- Built-in U-blox 6 GPS, optional Dead Reckoning support
- Availability of GPS, GPRS/UMTS/HSDPA
- Support CAN Bus 2.0B
- Wake-On by RTC
- Support RS-232, RS-422/485 and GPIO
- e13 Mark certification

Hardware Specifications

Main Chipset

- Intel® EG20T

CPU

- Intel® Atom™ E640 1.0GHz

Memory

- On board 1GB DDR2 800MHz

Expansion

- Mini PCIe socket (USB) x 1 (for 3.5G module)
- 1x Bluetooth module (optional)
- Mini PCIe socket (PCIe + USB) x 1 (for WLAN module)
- 1x default U-blox UBX-G6010 GPS module (50-channel and GALILEO) or optional modules with Dead Reckoning or GLONASS support

I/O Interfaces - Front

- 2x LEDs for power status and SSD status
- 1x COM port (RS-232)
- 2x USB ports
- 1x RJ45 for 10/ 100/ 1000 Ethernet
- 1x SIM card socket
- 1x system reset button
- 1x Mic-In, 1x Line-Out (for WWAN voice communication)
- Power button
- 3x mounting holes SMA-type for WWAN/WLAN/BT

I/O Interfaces - Rear

- 1x DB9 COM port (2 x RS485) <Default> or (2 x RS422) or (1 x RS422 + 1x RS485) selected by BIOS setting
- 1x DB9 port, 4x GPI and (2x GPO + CAN Bus 2.0B<Default>) or (4x GPO) selected by BIOS setting
- 1x DB15 VGA port
- 1x DC output (5V/1A, 12V/1A)
- 1x DC input via 3-pin connector
- 1x mounting holes SMA-type for GPS

Expandable Storage

- 1x SATA 2.5" SSD Bay

Power Management

- Selectable boot-up & shut-down voltage for low power protection
- HW design ready for 8-level delay time on/off at user's self configuration
- Power on/off ignition, software detectable
- Supports S4 suspend mode ; Wake-On by RTC

G-Sensor

- ±2g Dual Axis Accelerometer

Dimensions

- 180mm (W) x 120mm (D) x 40mm (H) (7.1" x 4.7" x 1.6")

Construction

- Aluminum top case with metal sheet

Environment

- Operating temperatures:
Ambient with air:
-20°C to 70°C (SSD)
- Storage temperatures: -40°C to 80°C
- Relative humidity: 10% to 90% (Non-condensing)
- Vibration (random): 2g@5~500 Hz with SSD
- Vibration (with SSD)
Operating: MIL-STD-810F, Method 514.5, Category 20, Ground Vehicle – Highway Truck
Storage: MIL-STD-810F, Method 514.5, Category 24, Integrity Test
- Shock (with SSD)
 - Operating: MIL-STD-810F, Method 516.5, Procedure I, Trucks and semi-trailers=20g
 - Crash Hazard: MIL-STD-810F, Method 516.5, Procedure V, Ground equipment=75g

Certifications

- CE approval
- FCC Class B
- e13 Mark

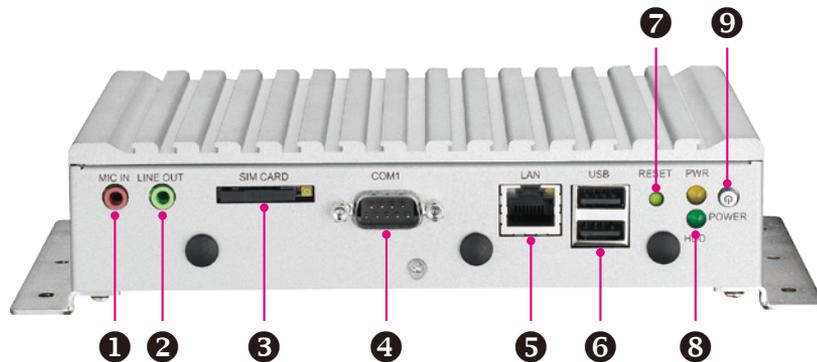
Power Management

- Power-on delay time is selectable by BIOS to disable and enable in 10sec / 30sec / 1min / 5min / 10 min / 15min / 30min / 1hr.
- Power-off delay time is selectable by BIOS to disable and enable in 20sec / 1min / 5min / 10min / 30min / 1hr / 6hr / 18hr.
- S4 suspend mode
- Ignition On/Off status detectable by SW
- Low battery status detectable by SW
- Shut down system automatically when the system's internal temperature is over 80°C.
- VTC 1000 will automatically shut down 5 minutes after the duration of low battery voltage is over 60 sec. User can detect this situation via software.
- If the ignition is off and the system is still on after 3 minutes, VTC 1000 will shut down automatically.
- If the ignition is off, the user can detect this status via the software.
- If the ignition is turned on again and the power-off delay is in progress, VTC 1000 will cancel the delay function and will continue to operate normally.
- If the ignition is turned on again and the power-off delay ended, VTC 1000 will shut down completely and power-on again automatically.
- If the ignition is turned off again and power-on delay is in progress, VTC 1000 will cancel the delay and stay in power-off status.
- If the ignition is turned off again and the power-on delay ended (in BIOS process), VTC 1000 will shut down immediately.
- If VTC 1000 is off, only below 10mA is used.

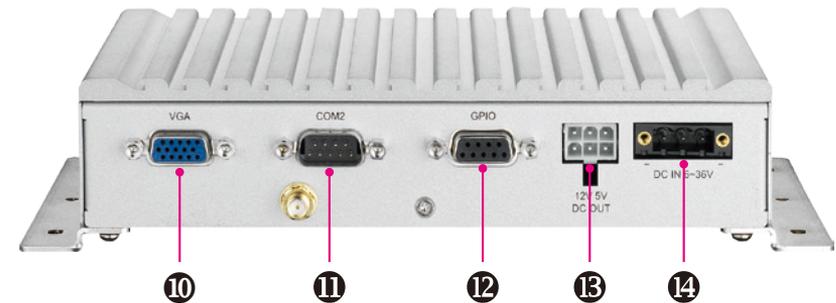
Connector Numbering

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

Front View



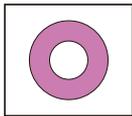
Rear View



Chapter 2: External Connectors Pinout Description

Mic-in

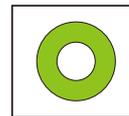
Connector Number: 1



Pin	Definition	Pin	Definition
1	NC	2	MIC_JD
3	NC	4	MIC_OUT-L
5	GND	6	GND

Line-out

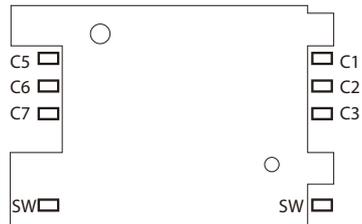
Connector Number: 2



Pin	Definition	Pin	Definition
1	FRONT_OUT_RC	2	FRONT_JD
3	NC	4	FRONT_OUT_LC
5	GND	6	GND

SIM1 Socket

Connector Number: 3

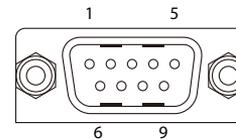


Pin	Definition	Pin	Definition
C1	POWER VOLTAGE	C5	GND
C2	RESET SIGNAL	C6	VPP:PROGRAM VOLTAGE
C3	CLOCK SIGNAL	C7	I/O
SW	Contact present switch		

COM1 Connector RS232

Connector size: DB9, Male

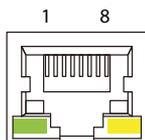
Connector Number: 4



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

LAN Connector

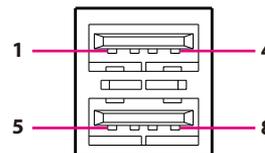
Connector Number: 5



Pin	Definition	Pin	Definition
1	TX+	2	TX-
3	RX+	4	N/C1
5	N/C2	6	RX-
7	N/C3	8	N/C4
9	LAN Speed LED	10	+3.3V
11	LAN Link LED	12	+3.3V

USB Connector

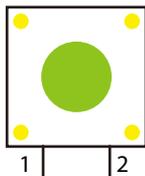
Connector Number: 6



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

Reset Button

Connector Number: 7



Pin	Definition
1	GND
2	RST_BTN#

Power On and IDE Active LED

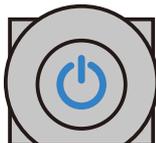
Connector Number: 8



Pin	Definition
T1	POWER LED
B1	HDD LED

Power Button

Connector Number: 9

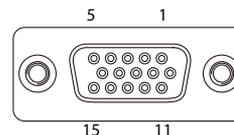


Pin	Definition	Pin	Definition
1	GND	2	NC
3	+V3.3ALW	4	NC
5	VCC5_S	6	GND

VGA Connector

Connector size: DB15, Female

Connector Number: 10



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

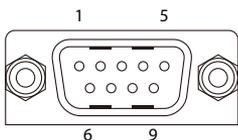
COM2 Connector RS422/485

Connector size: DB9, Male

Connector Number: 11

(2x RS485<Default>) or

(2x RS422) or (1x RS422 + 1x RS485) selected by BIOS setting



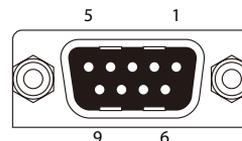
Pin	Definition	Pin	Definition
1	RS422_RX+_A RS485+_A	2	RS422_RX-_A RS485-_A
3	RS422_TX+_A	4	RS422_TX-_A
5	GND	6	RS422_RX-_B / RS485+_B
7	RTS/ RS485_RX-	8	RS422_TX+_B
9	RS422_TX-_B		

GPIO and CAN Bus 2.0B Connector

Connector size: DB9, Female

Connector Number: 12

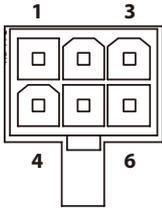
4x GPI, 2x GPO, 1x CAN Bus 2.0B (Default). 4x GPO can be selected by BIOS setting.



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

External SMBus, 12V and 5V Power Output

Connector Number: 13



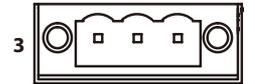
Pin	Definition	Pin	Definition
1	5V	2	12V
3	SMBus Clock	4	GND
5	GND	6	SMBus Data

+5 VDC (1A) and +12VDC (1A) power output and SMBus
(w/o VTK 33M-01 connection)

+5 VDC (0.5A) and +12VDC (0.5A) power output and SMBus
(w/ VTK 33M-01 connection)

DC Power Input

Connector Number: 14



Pin	Definition
1	IGNITION
2	6V-36V
3	GND

** Use power cable (+) with fuse for system protection

Chapter 3: Jumpers and Connectors

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

Before You Begin

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

components. Humid environment tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

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

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

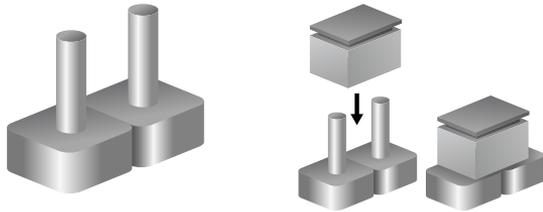
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal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

Jumper

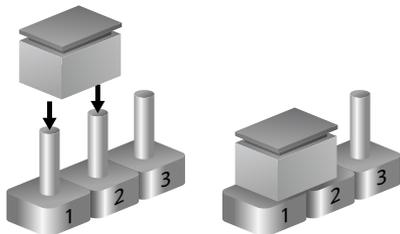
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is **short**. If you remove the jumper cap, or place the jumper cap on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

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

Two-Pin Jumpers: Open (Left) and Short (Right)

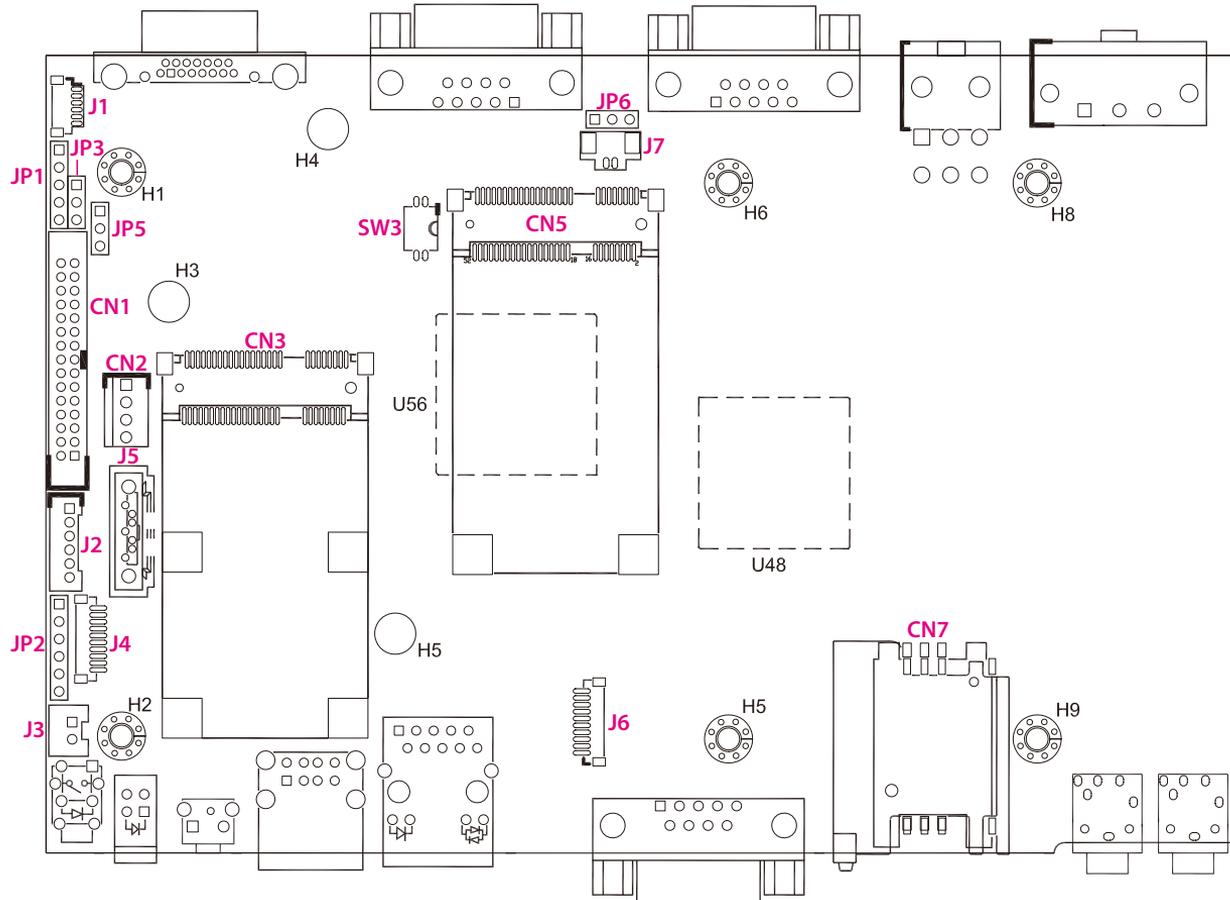


Three-Pin Jumpers: Pins 1 and 2 Are Short



Locations of the Jumpers and Connectors

The figure below is the mainboard used in the VTC 1000 system. It shows the locations of the jumpers and connectors.



Jumper Settings

LVDS Power Input Voltage Select

Connector size: 1 x 3 = 3-pin header

Connector location: JP5



Pin	Status	Function Description
1-2	Short	+5V IN
2-3 (*)	Short (*)	+3.3V IN

CMOS Input Voltage Select

Connector size: 1 x 3 = 3-pin header

Connector location: JP6



Pin	Status	Function Description
1-2 (*)	Short (*)	VBAT IN
2-3	Short	Clear CMOS

Button Power

Connector size: 1 x 2 = 2-pin header

Connector location: J3

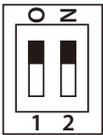


Pin	Function Description
1	3.3V
2	GND

DIP Switch Settings

Voltage Setup Selection

Connector location: SW3



SW3 / Setup Voltage	12V (*)	24V	6V~36V all can start
SW3.1	OFF	OFF	ON
SW3.2	OFF	ON	Don't Care

Default: 12VDC

Connectors

MCU Programmer Pin Header

Connector size: 1 x 5 = 5-pin header

Connector location: JP1



Connector pin definition

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

GAL Programmer Pin Header

Connector size: 1 x 6 = 6 pin-header

Connector location: JP2



Connector pin definition

Pin	Definition	Pin	Definition
1	+3.3V	2	GND
3	TCK	4	TDO
5	TDI	6	TMS

MCU COM Port

Connector size: 1 x 3 = 3 pin-header

Connector location: JP3



Connector pin definition

Pin	Definition
1	TX
2	RX
3	GND

Serial-ATA Power Input

Connector size: 1 x 4 = 4-pin header

Connector location: CN2



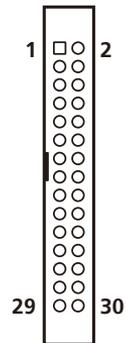
Connector pin definition

Pin	Definition
1	+V12S
2	GND
3	GND
4	+V5S

LVDS Connector + USB

Connector size: 2 x 15 = 30-pin header (2.0mm)

Connector location: CN1



Connector pin definition

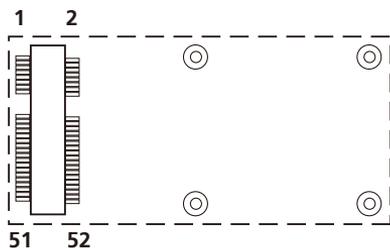
Pin	Definition	Pin	Definition
1	LVDS_CLK	2	LVDS_DAT
3	Panel_VDD	4	LVDS_1(OUT0)
5	LVDS_9(OUT3)	6	LVDS_0(OUT0#)
7	LVDS_8(OUT3#)	8	Panel_VDD
9	LVDS_GND	10	LVDS_GND
11	LVDS_7(CLK)	12	LVDS_3(OUT1)
13	LVDS_6(CLK#)	14	LVDS_2(OUT1#)
15	LVDS_GND	16	LVDS_GND

Connector pin definition

Pin	Definition	Pin	Definition
17	LVDS_5(OUT2)	18	Panel_backlight(+12V)
19	LVDS_4(OUT2#)	20	Panel_backlight(+12V)
21	LVDS_GND	22	Power on push button
23	USB_2#	24	USB_GND
25	USB_2	26	USB_VCC (+5V)
27	USB_GND	28	USB_GND
29	Panel_backlight(+12V)	30	GND

Mini-PCle (For WLAN, PCIe + USB)

Connector location: CN3

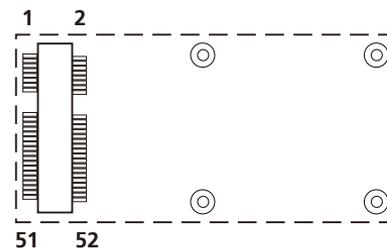


Connector pin definition

Pin	Definition	Pin	Definition	Pin	Definition	Pin	Definition
1	WAKE#	2	+V3.3S	27	GND	28	+V1.5S
3	NC	4	GND	29	GND	30	SMB_CLK
5	NC	6	+V1.5S	31	PETn0	32	SMB_DATA
7	CLKREQ#	8	NC	33	PETp0	34	GND
9	GND	10	NC	35	GND	36	USB_D-
11	REFCLK-	12	NC	37	NC	38	USB_D+
13	REFCLK+	14	NC	39	NC	40	GND
15	GND	16	NC	41	NC	42	LED_WWAN#
17	NC	18	GND	43	NC	44	LED_WLAN#
19	NC	20	DISABLE#	45	NC	46	LED_WPAN#
21	GND	22	PERST#	47	NC	48	+V1.5S
23	PERn0	24	+3.3S	49	NC	50	GND
25	PERp0	26	GND	51	NC	52	+V3.3S

Mini-PCle (For WWAN, USB)

Connector location: CN5



Connector pin definition

Pin	Definition	Pin	Definition	Pin	Definition	Pin	Definition
1	MIC +	2	+V3.3S	27	GND	28	NC
3	MIC -	4	GND	29	GND	30	NC
5	SPK +	6	NC	31	NC	32	NC
7	GND	8	USIM PWR	33	RESET	34	GND
9	GND	10	USIM DATA	35	GND	36	USB_D-
11	VCC MSM26_DIG	12	USIM CLK	37	GND	38	USB_D+
13	NC	14	USIM RST	39	+V3.3S	40	GND
15	GND	16	NC	41	+V3.3S	42	LED_WWAN#
17	NC	18	GND	43	GND	44	NC
19	NC	20	W_DISABLE#	45	NC	46	NC
21	GND	22	NC	47	NC	48	NC
23	NC	24	NC	49	NC	50	GND
25	NC	26	GND	51	NC	52	+V3.3S

GPS Connector

Connector size: 1 x 6 = 6-pin header

Connector location: J1



Connector pin definition

Pin	Definition
1	+V3.3S
2	GND
3	SP_RX1
4	SP_TX1
5	GPS_LED#
6	GPS_BAT

LVDS Power Connector

Connector size: 1 x 6 = 6-pin header

Connector location: J2



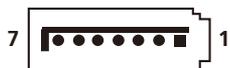
Connector pin definition

Pin	Definition	Pin	Definition
1	Panel_backlight	2	Panel_VDD
3	GND	4	GND
5	LVDS_PANEL	6	LVDS_BIASON

SATA Port

Connector size: Standard Serial ATAII 7P (1.27mm)

Connector location: J5



Connector pin definition

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

Bluetooth Connector

Connector size: 1 x 10 = 10-pin header

Connector location: J6



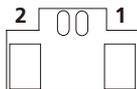
Connector pin definition

Pin	Definition	Pin	Definition
1	GND	2	USB_6P_L
3	USB_6N_L	4	NC
5	NC	6	BT_AUDIO_EN_R
7	NC	8	BT_3.3V
9	NC	10	GND

RTC Battery Connector

Connector size: 1 x 2 = 2-pin header

Connector location: J7



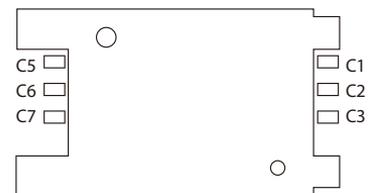
Connector pin definition

Pin	Definition
1	GND
2	VBAT1

SIM Card Connector

(Internal type, optional)

Connector location: CN7

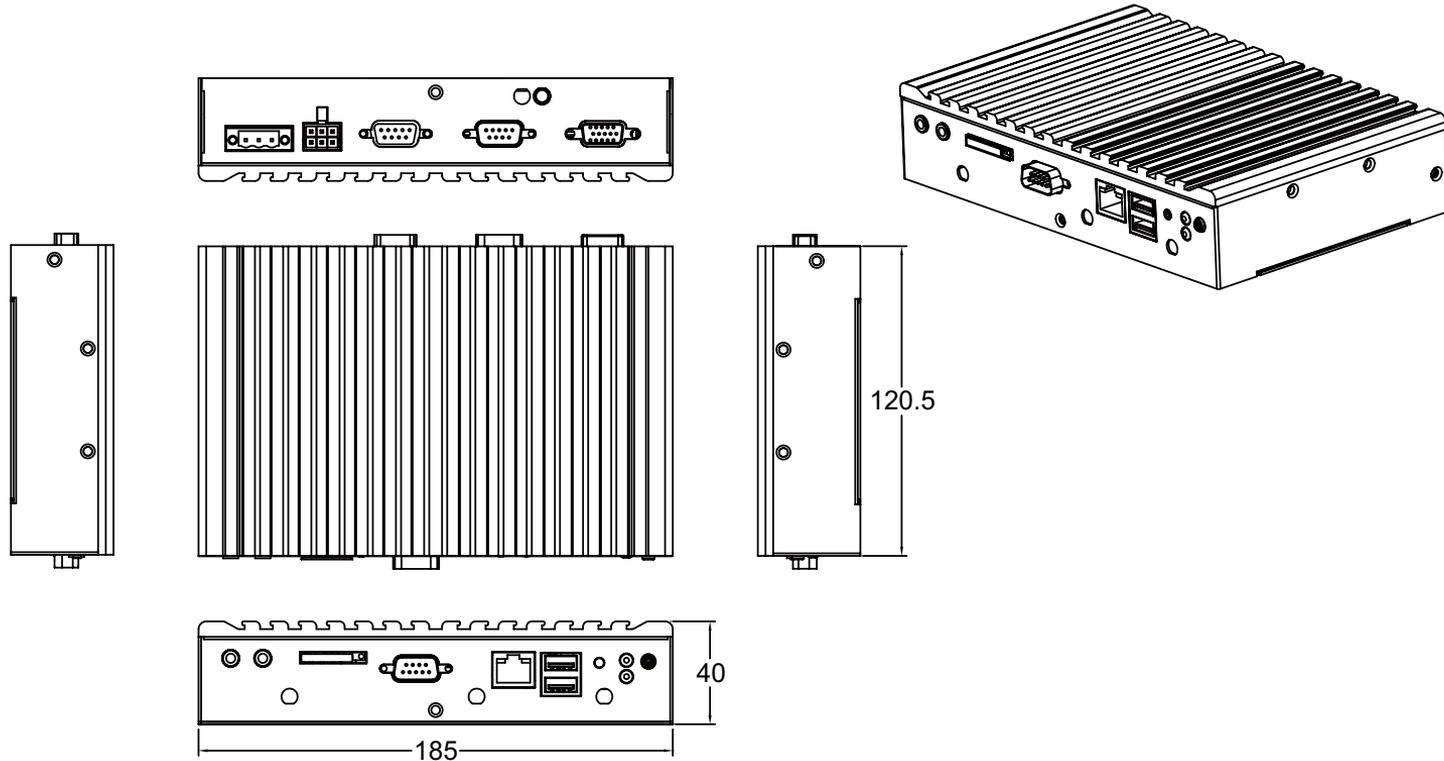


Connector pin definition

Pin	Definition	Pin	Definition
C1	POWER VOLTAGE	C5	GND
C2	RESET SIGNAL	C6	VPP:PROGRAM VOLTAGE
C3	CLOCK SIGNAL	C7	I/O

Chapter 4: Mechanical Dimensions

VTC 1000



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.

1. The screws on the chassis are used to secure the cover to the chassis. Remove these screws and put them in a safe place for later use
2. Lift the cover upward then remove it from the chassis.



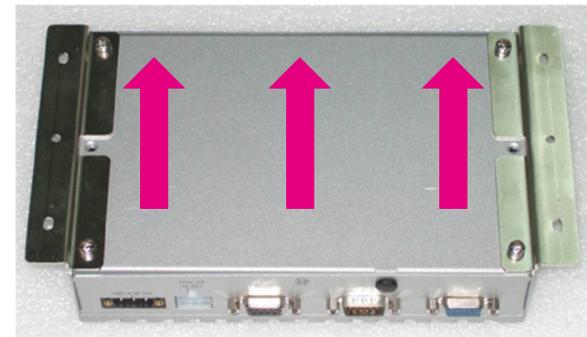
Front View



Rear View



Base



Installing a GPRS/UMTS/HSDPA Module

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



Mini PCI Express slot



GPRS/UMTS/HSDPA module

Mini PCI Express slot

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

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



Attach RF cable to the module

5. Mount the other end of the cable to the antenna mounting hole located at the front panel of the chassis.



Installing a Bluetooth Module

1. The USB header shown below is used to install a Bluetooth module.
2. The mounting stud as shown in the illustration below.

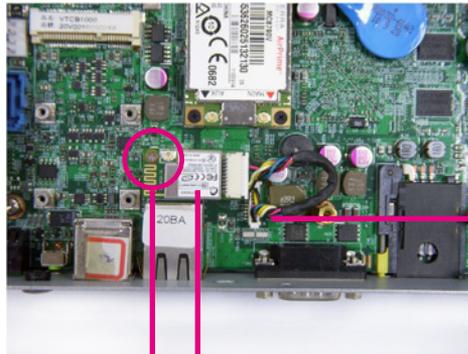


USB header



Mounting stud

3. Push the module down then secure it with a mounting screw.



Mounting screw

Bluetooth module

Cable connector

4. Attach one end of the RF cable onto the module and Mount the other end of the cable to the Bluetooth mounting hole located at the front panel of the chassis.



Attach RF cable to the module

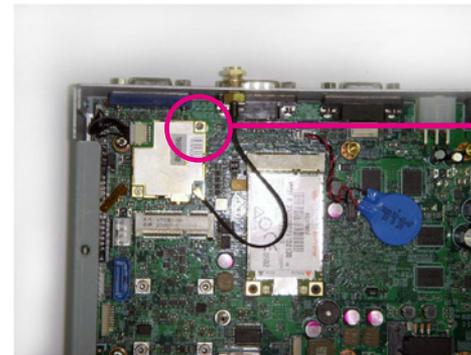
Installing a GPS Module

1. The USB header shown below is used to install a GPS module.



USB header

2. Push the module down then secure it with a mounting screw.



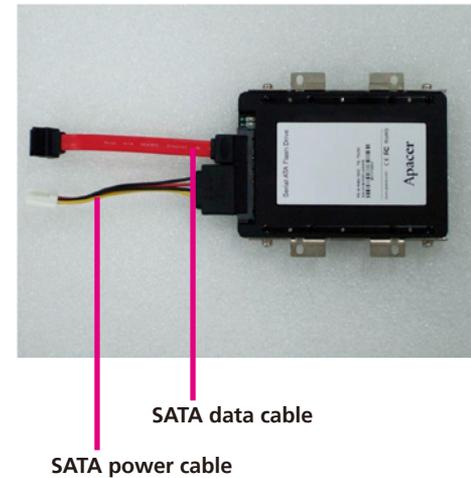
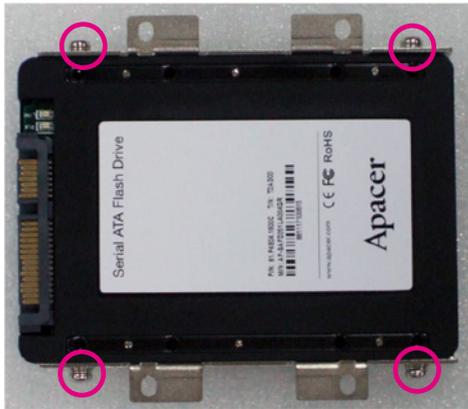
Mounting stud

3. Attach one end of the RF cable onto the module and Mount the other end of the cable to the Bluetooth mounting hole located at the rear panel of the chassis.

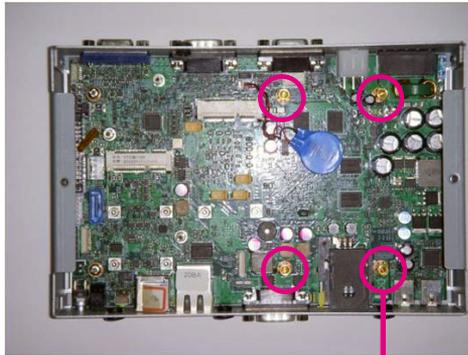


Installing SSD Drive

1. Place the SSD drive into the bracket and then tighten the four screws.
(The bracket is in the accessory box)
2. Connect SATA data cable and power cable to the SSD drive.



3. Align the screws with the mounting studs on the main board. Tighten the screws to secure the drive to the chassis.



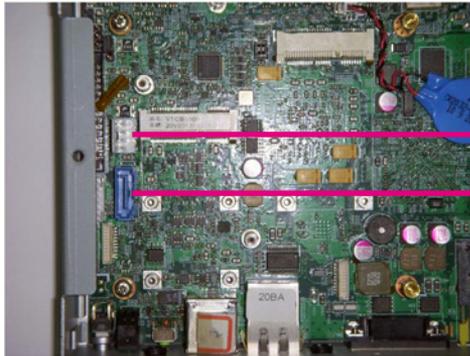
Mounting stud



Head bolt screw

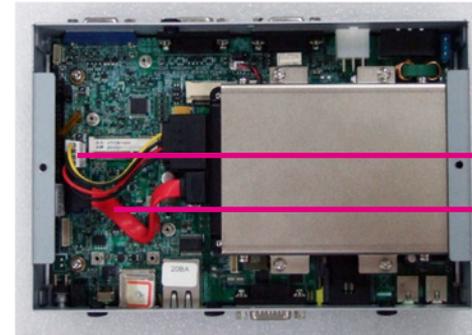
4. Locate for the SATA connector and the power connector. on the board.

5. Connect both cable to the motherboard.



Power connector

SATA connector



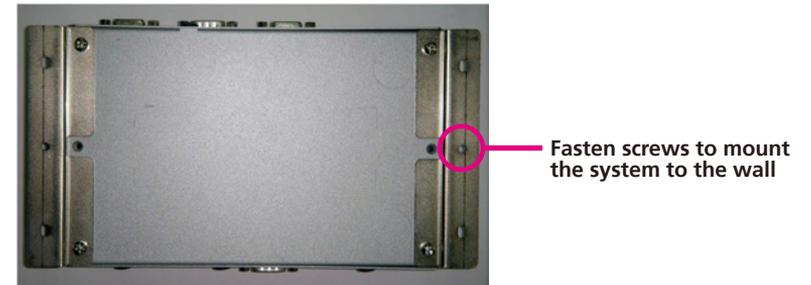
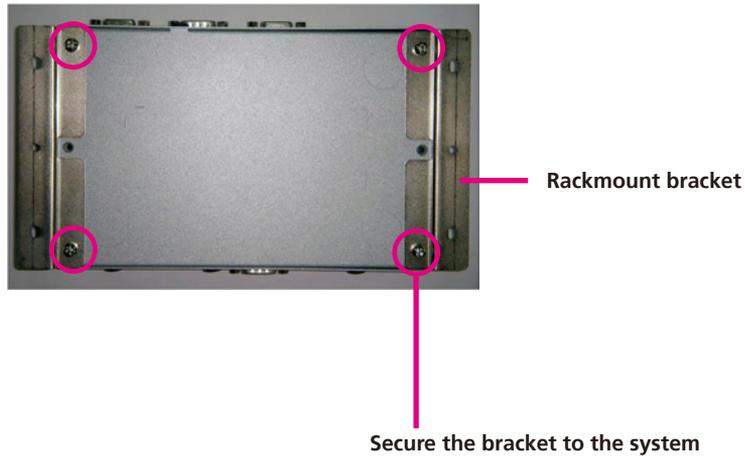
SATA power cable

SATA data cable

Rackmount Brackets

The rackmount brackets provide a convenient and economical way of mounting the system on the wall.

1. The mounting holes are located at the bottom of the system. Secure the brackets on each side of the system using the provided mounting screws.
2. Now mount the system on the wall by fastening screws through the bracket's mounting holes.



Appendix A: I/O Address Function

GPIO LED / UMTS LED / Ignition Status

I/O port : 0EE0H

Bit	Function Description
Bit 0	GPIO LED 0: OFF (*) 1: ON
Bit 1	UMTS LED 0: LED for Wireless (*) 1: LED for 3.5G and Wireless
Bit 2	Ignition (read only) 0: OFF 1: ON
Bit 3	Status of Car Battery 0: Car Battery is OK 1: Car Battery is Low voltage

(*) Default setting

Capacity of NEXCOM battery (8 bits)

I/O port : 0EE1H

	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
Description	8 bits data (Bit 7 is highest bit of data)							

Voltage of NEXCOM battery (8 bits)

I/O port : 0EE2H

	Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
Description	8 bits data (Bit 7 is highest bit of data)							

Status of NEXCOM battery (8 bits)

I/O port : 0EE3H

Bit	Function Description
Bit 0	Status for G sensor detection 0: Normal 1: Abnormal (X-axis or Y-axis degree is about 90 or -90)
Bit 1	Power mode 0: 24V system 1: 12V system
Bit 2	Fan mode 0: Auto 1: Always on
Bit 3	Status of Smart battery 0: No discharging 1: Discharging
Bit 4	Status of Fan R 0: Well 1: Failed
Bit 5	Status of Fan R 0: Action 1: Inaction
Bit 6	Status of Fan L 0: Well 1: Failed
Bit 7	Status of Fan L 0: Action 1: Inaction

GPIO

I/O port : 0EE4H

Bit	Function Description
Bit 0-3	GPO 0-3
Bit 4-7	GPI 0-3

WDT

I/O port : 0EE5H

Bit	Function Description
Bit 3	WDT Disable/Enable 0: Disable (*) 1: Enable

Bit 2, 1, 0: Time Setting

Bit 2~0	Time (sec)
000	1 (*)
001	2
010	4
011	8
100	16
101	32
110	64
111	128

Auto clear WDT timer when reading/writing I/O port 0EE5H.

(*) Default setting

Onboard Module Disable/Enable(1)

I/O port : 0EE6H

Bit	Function Description
Bit 0	3.5G module 0: Disable 1: Enable (*)
Bit 1	WLAN module 0: Disable 1: Enable (*)
Bit 2	External +12V power 0: Disable 1: Enable (*)
Bit 3	External +5V power 0: Disable 1: Enable (*)
Bit 4	
Bit 5	Wake on RTC module 0: Disable (*) 1: Enable
Bit 6	CAN bus Port 0: Disable 1: Enable (*)

GAL Download control

I/O port : 0EEBH

Restart the Setup Command

Enable byte
AA

Startup Time Setting

I/O port: 0EECH(clock Timer)

Bit0~7: the hour value(hexadecimal)

I/O port: 0EEDH(clock Timer)

Bit0~7: the minute value(hexadecimal)

I/O port: 0EEEH(User setting Time)

Bit0~7: the hour value(hexadecimal)

I/O port: 0EEFH(User setting Time)

Bit0~7: the minute value(hexadecimal)

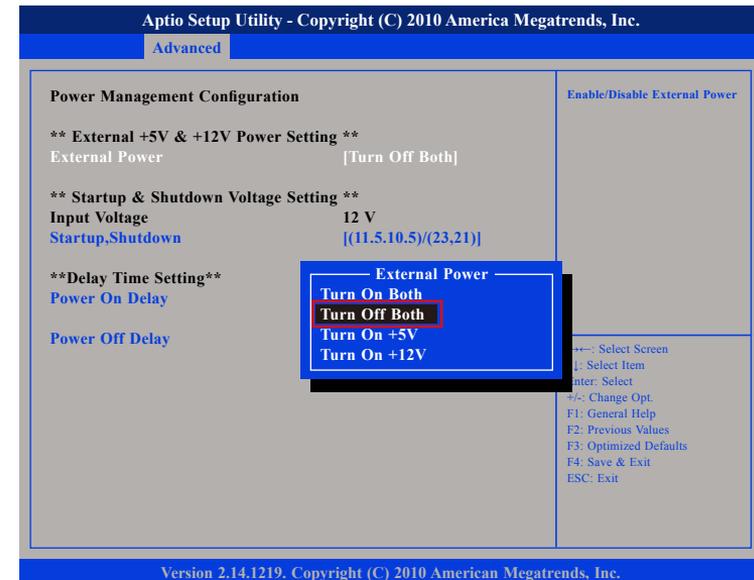
Appendix B: Vehicle Power Management Setup

External Power Output Setting

External +12V and +5V Turn On Simultaneously

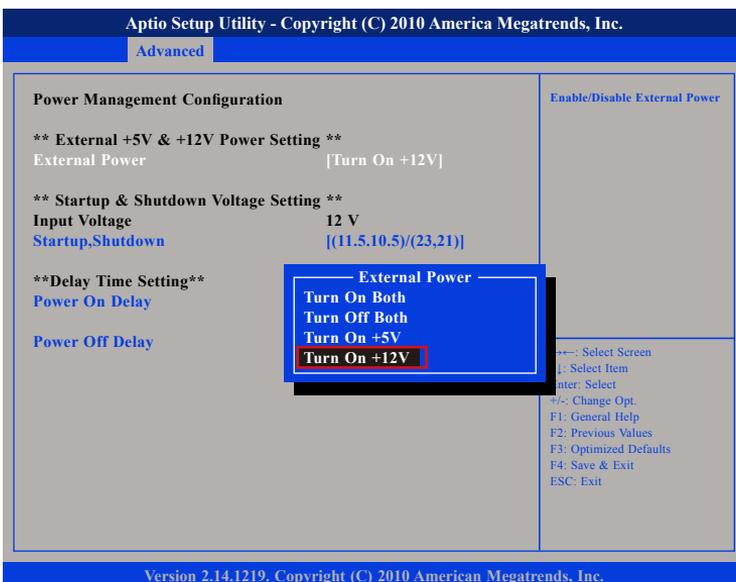


External +12V and +5V Turn Off Simultaneously



External Power Output Setting

External +12V Turn On Only



External +5V Turn On Only



Startup and Shutdown Voltage Setting (12V)



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

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

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

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

Startup and Shutdown Voltage Setting (24V)



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

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

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

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

Startup and Shutdown Voltage Setting (6V-36V)



If the input voltage setting is 6V~36V ignore the startup/shutdown setting.

Power-on Delay Setting

Disable Power-on Delay

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Advanced

Power Management Configuration ** External +5V & +12V Power Setting ** External Power [Turn On Both] ** Startup & Shutdown Voltage Setting ** Input Voltage [12V] Startup,Shutdown [11.5V , 10.5V] **Delay Time Setting** Power On Delay [Disabled] Power Off Delay [Disabled]	Enable/Disable External Power →←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Enable Power-on Delay

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

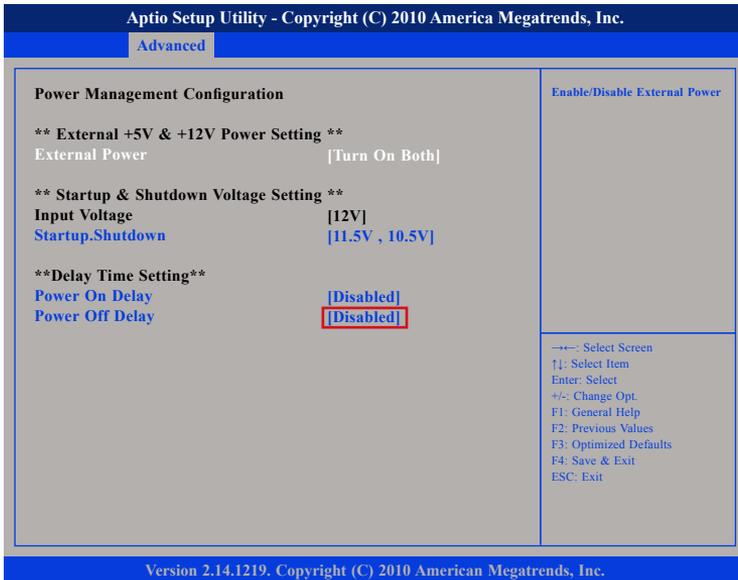
Input Voltage [48V] Startup,Shutdown [46V , 44V] **Delay Time Setting** Power On Delay [Enabled] Delay On Time selection [10 sec] Power Off Delay [Disabled]	Enable/Disable External Power →←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help
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Input Voltage Startup,Shutdown **Delay Time Setting** Power On Delay Delay On Time selection Power Off Delay	Options 10 sec 30 sec 1 min 5 min 10 min 15 min 30 min 1 hour	Enable/Disable External Power →←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help
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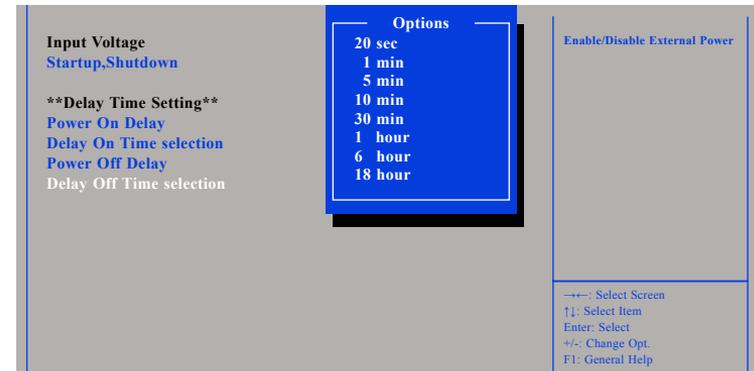
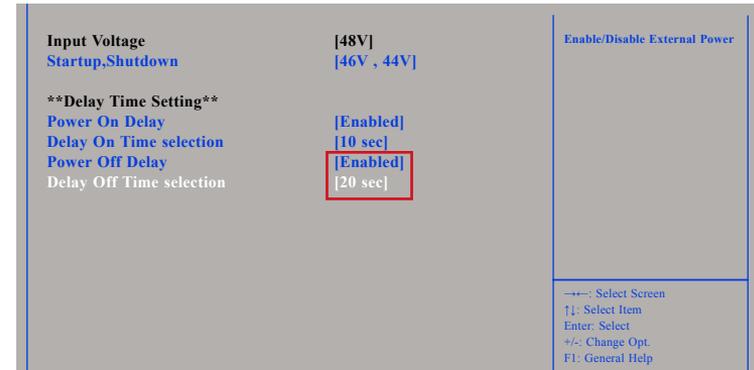
Power-on Delay Setting

Disable Power-on Delay



Enable Power-off Delay

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



Appendix C: Using the GPS Feature

Module: DGM-U252T

Chip:

▪ **Receiver Type:**

- 50-channel u-blox UBX-G6010 chip
- GALILEO
- GPS L1 C/A code
- SBAS: WAAS, EGNOS, MSAS, GAGAN

▪ **Navigation Update Rate:**

- Up to 5 Hz

▪ **Accuracy Position:**

- < 2.5 m autonomous
- < 2.0 m SBAS

▪ **Acquisition:**

- Cold starts: 26s
- Aided starts: 1s
- Hot starts: 1s

▪ **Sensitivity:**

- Tracking: -162 dBm
- Cold starts: -160 dBm
- Hot starts: -148 dBm

AGPS

Supports Assist Now® Online and Offline, OMA SUPL compliant.

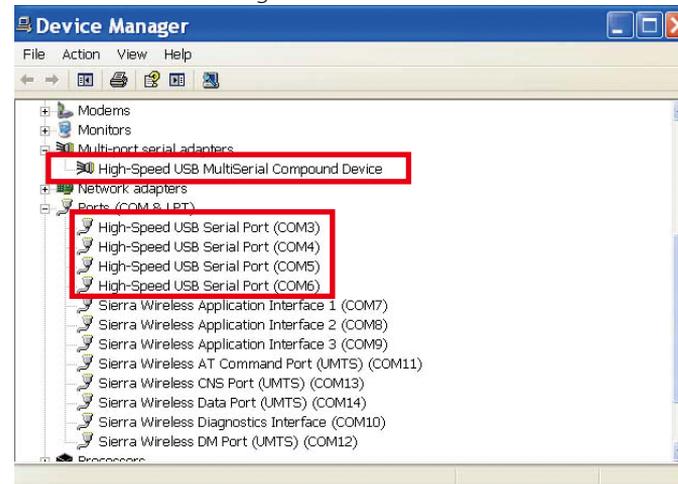
The VTC has a built-in u-blox UBX-G6010 GPS receiver module by default. Global Positioning System (GPS) uses a constellation of 50 medium earth orbit satellites to transmit and receive microwave signals to determine its current location.

You need to install the third-party GPS navigation software to take advantage of the GPS feature.

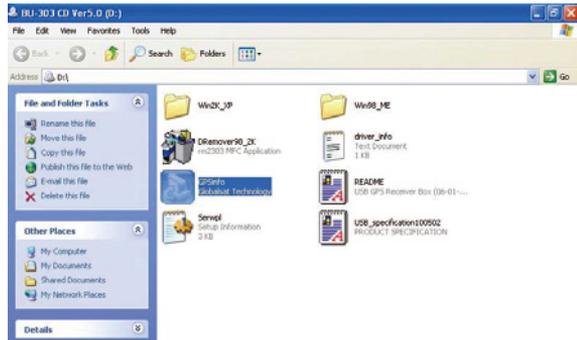
Setup and Using GPS Information

Users can use the GPSinfo.exe program to verify that the GPS is correctly configured and working properly. Also, users can use the GPSinfo.exe program to enable WAAS/EGNOS and power saving mode.

1. Go to Device Manager to ensure the device is installed correctly.



2. Insert the Installation Disc into CD-Rom drive and execute the "Gpsinfo.exe" file (the file also saved in C:\Utility\GPS_Utility).



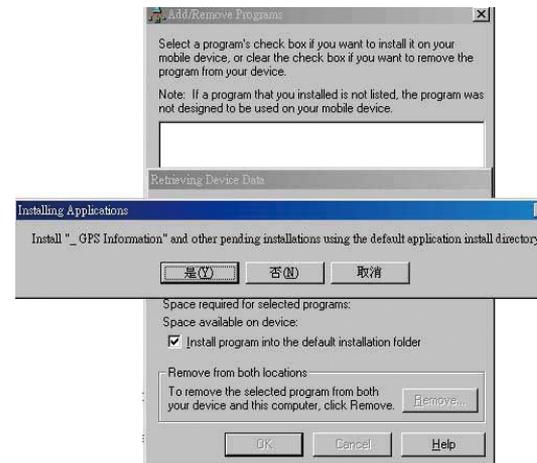
4. When the setup complete, press <Finish>.



3. Follow the given instructions to complete the installation.

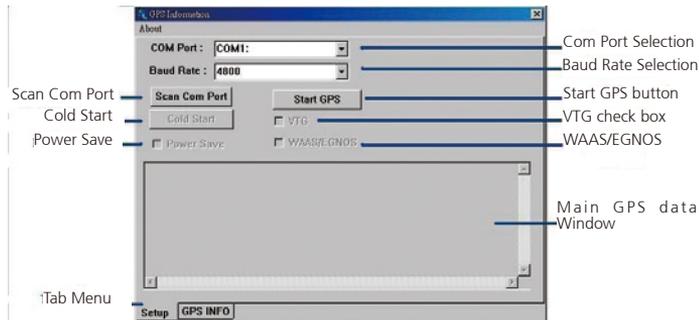


5. Once the installation is completed, installation of GPS Information onto PDA device will be launched automatically. Select <Yes> to continue.



Setup Window Screenshot

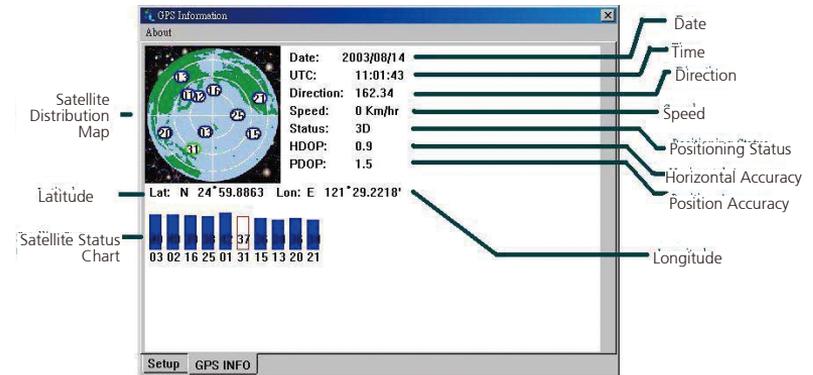
Double click GpsInfo_Vista icon from Desktop to start GPS.



- "Scan Com Port" - Scan all available communication port for GPS reception
- "Cold Start" - Cold start the GPS receiver
- "Power Save" - Check the box to enable/disable the Power Save Mode (the option is available only when a GPS device is found)
- "Tab Menu" - Switch between Setup and GPSINFO windows
- "Com Port Selection" - Select the appropriate communication port where GPS receiver is configured (it may be necessary to try several communication ports until the right one is found)
- "Baud Rate Selection" - Select the appropriate transferring rate (**Please set the baud rate at 9600**)
- "Start GPS button" - Turn on/off the GPS device
- "VTG check box" - Some navigation or map software requires to receive VTG data output for during operation. Check the box to activate the VTG data output.

- "WAAS/EGNOS" - Check the box to activate WAAS/EGNOS in order to increase the accuracy of positioning
- "Main GPS data Window" - Display data received by GPS device.

GPS Info Window Screenshot



- "Satellite Distribution Map" - Display the position of all connected Satellites
 - A unique number is assigned to each satellite.
 - Red circle indicates that the satellite location is known from almanac information; however, the satellite is not currently being tracked.
 - Green circle indicates that the satellite is being tracked; however, it is not being used in the current position solution.
 - Blue circle indicates that is being tracked and is being used in the current position.

- "Latitude" – User's current latitude is displayed in N/S degree (North/South Hemisphere) format
- "Satellite Status Chart" – display the status of each connected satellite
 - The number under each bar marks corresponding Satellite, and the height of each bar represents the strength of the satellite.
 - Red bar indicates that the satellite location is known from almanac information; however, the satellite is not currently being tracked.
 - Green solid bar indicates that the satellite is being tracked; however, it is not being used in the current position solution.
 - Blue bar indicates that the tracked and is being used in the current position.
- "Date" – display the current date in (dd/mm/yy) format.
- "Time" – display the current (UTC) time in (hh:mm:ss) format.
- "Direction" – display the current direction from 000.0° to 359.9°
- "Speed" – Display the current moving speed in km/hour
- "Positioning Status" - Three Modes
 1. No Fix
 2. 2D Positioning
 3. 3D Positioning
- "Horizontal Accuracy" - Range from 0.5 to 99.9, the smaller the better
- "Position Accuracy" - Range from 0.5 to 99.9, the smaller the better
- "Longitude" – Display current longitude in E/W (East/West Hemisphere) Time (hhmmss)

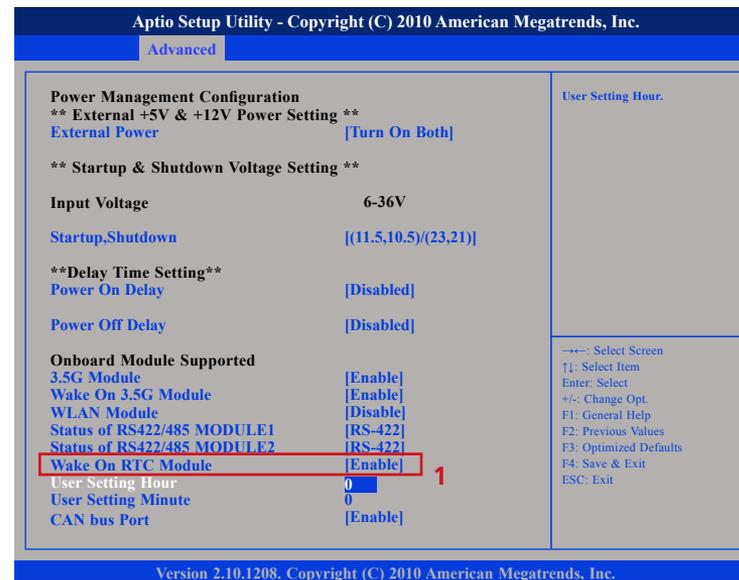
GPS Information Instructions

1. Make sure that the GPS device is properly inserted.
2. Start GPS Information Software.
3. Choose and select the proper communication port. (It might be necessary to try each available port to find the right one since the default communication port varies according to different hardware device.)
4. Click "Start GPS button" to activate the GPS receiver.
5. Upon successful connection, GPS output data should be displayed in "Main GPS data Window". If no data is observed, make sure the GPS receiver is working and properly inserted. Otherwise choose another communication port.
6. Satellite status can be observed in the "GPS Info Window". Use the "Tab Menu" to switch between Setup window and GPS info window.
7. Please make sure to de-activate the GPS device before exiting this program.

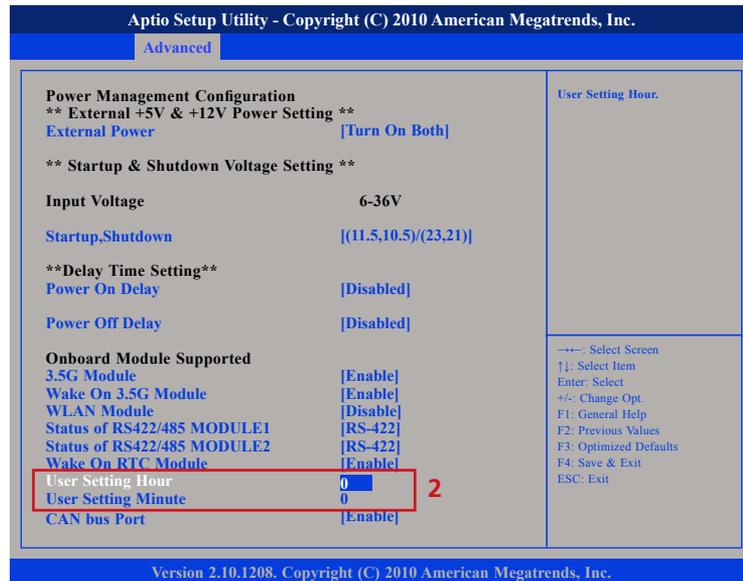
Appendix D: RTC Wake-up setting

- (1) Press <Enter> on "BIOS Setting" of the main menu screen.
- (2) Select "Module Management"

- (3) Change the value to "Enable" for "Wake On RTC Module"



(4) You can key in the value for "User Setting Hour"(0~23) and "User Setting Minute" (0~59)



(5) After you have finished with the Setup, press <ESC> to go back to the main menu and then press "Enter" on "Save Changes and Reset"



Note. SMS wake-up function only works in S3, S4 or S5 mode and the ignition off.

Appendix E: Pin Definition for GPS Dead Reckoning Module

-- VIOB-GPS-DR01

S2532DR Overview



The S2532DR GPS Dead-Reckoning receiver module combines GPS position data, gyroscope data (measuring turning angle), and odometer data (measuring distance traveled) to formulate position solution. This enables accurate navigation solution in poor signal environment or signal blocked area such as inside tunnels. The S2532DR is ideal for applications requiring accurate continuous navigation with 100% availability.

The S2532DR features 65 channel GPS receiver with fast time to first fix and improved -148dBm cold start sensitivity. The superior cold start sensitivity allows it to acquire, track, and get position fix autonomously in difficult weak signal environment. The receiver's -161dBm tracking sensitivity allows continuous position coverage in nearly all application environments. The high performance search engine is capable of testing 8,000,000 time-frequency hypotheses per second, offering industry-leading signal acquisition and TTFF speed.

Technical Specifications

Receiver Type	L1 C/A code, 65-channel Venus 6 engine
Accuracy	Position 2.5m CEP Velocity 0.1m/sec Time 300ns
Startup Time	1 second hot start under open sky < 29 second warm start under open sky (average) 29 second cold start under open sky (average)
Reacquisition	1s
Sensitivity	-148dBm cold start -161dBm tracking
Update Rate	1Hz
Operational Limits	Altitude < 18,000m or velocity < 515m/s
Serial Interface Protocol	3.3V LVTTTL level NMEA-0183 V3.01 PGGA, GPGLL, GPGSA, GPGSV, GPRMC, GPVTG*1 38400 baud, 8, N, 1
Datum	Default WGS-84 User definable
Input Voltage	3.3V DC +/-10%
Input Current	~40mA tracking
Dimension	25mm L x 32mm W
Weight	5g
Interface Connector	two 12-pin male header, 1.27mm pitch
Operating Temperature	-40oC ~ +85oC
Storage Temperature	-55 ~ +100oC
Humidity	5% ~ 95%

VI0B-GPS-DR01 consists of S2532DR and cables.
Here are the connector and cable pin definition for VI0B-GPS-DR01.

(1) Connect VI0B-GPS-DR01 and DB9 Cable

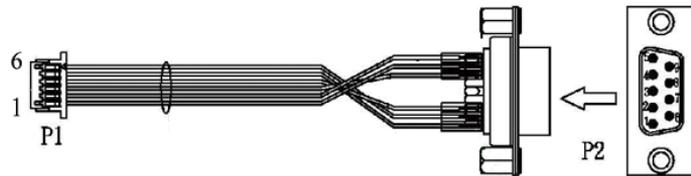
(On VI0B-GPS-DR01)

- A. Connector type: 1x6 6-pin header
- B. Connector location: J1



- C. GPS module to DB9 Cable (6P TO D-SUB-9M)

Note: In order to fix the additional DB9 connector, increasing the height of enclosure is necessary.



(2) Connect VI0B-GPS-DR01 and VTC 1000 CPU Board with Cable

(On VI0B-GPS-DR01)

- A. Connector type: 1x6 6-pin header
- B. Connector location: J2



(On VTC 1000 CPU Board)

- A. Connector type: 1x6 6-pin header
- B. Connector location: J1



Connector pin definition of P1

Pin	Definition	Pin	Definition
1	GND	4	GPIO22
2	DIRECTION	5	1PPS
3	ODOMETER	6	GND

Connector pin definition of P2

Pin	Definition	Pin	Definition
1	1PPS	6	GND
2	GPIO22	7	NC
3	NC	8	NC
4	ODOMETER	9	GND
5	DIRECTION		

Connector pin definition of J1

Pin	Definition	Pin	Definition
1	+V3.3S	4	SP_TX1
2	GND	5	GPS_LED#
3	SP_RX1	6	GPS_BAT

Appendix F: Power Consumption

Test Equipment/Tool

DUT#1 : VTC1000 with SSD (Apacer commercial serial ATA flash Drive 16G)

DUT#2 : VTC1000 with SSD (Apacer commercial serial ATA flash Drive 16G) +3.5G MODULE(MC8790V PCI EXPRESS MINI CARD)

Windows XP

Burn-in Software: Version 5.0

Test Condition

Room temperature

Power supply graduation: 12V 5A

Test Procedure:

1. Start of all function at DUT and measure power consumption.
2. Get system into suspend mode and measure power consumption.

Unit	Idle Mode	100% Burn-in Mode	S3	S4	S5
DUT#1	1.03A	1.18A	90mA	10mA	10mA
DUT#2	1.13A	1.24A	140mA	50mA	50mA

* Device: N/A