NEXCOM

NEXCOM International Co., Ltd.

Mobile Computing Solutions
Vehicle Mount Computer
VMC 3000/4000 Series
User Manual

www.nexcom.com

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Preface

Copyright

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Acknowledgements

VMC 3000 and VMC 4000 are trademarks of NEXCOM International Co., Ltd. All other product names mentioned herein are registered trademarks of their respective owners.

Regulatory Compliance Statements

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

Declaration of Conformity

FCC

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

CE

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

RoHS Compliance

NEXCOM RoHS Environmental Policy and Status Update

NEXCOM is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 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.

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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 package that you received is complete. Your package should have all the items listed in the following table.

VMC 3000/VMC 3500

Item	Part No.	Description	Qty
1	4NCPM00302X00	Terminal Blocks 3P Phoenix Contact	1
2	50311F0100X00	Round Head Screw w/Spring+Flat Washer P3x6 NI	8
3	50311F0385X00	P Head Screw w/Spring+Flat Washer P6x14 NI+NYLOK	8
4	5043330404X00	HDD Bracket	1
5	60233SAM05X00	GPS Antenna 5M	1
6	602DCD1006X00	DVD Driver	1

VMC 3001/VMC 3501

Item	Part No.	Description	Qty
1	50311F0100X00	Round Head Screw w/Spring+Flat Washer P3x6 Ni	8
2	50311F0354X00	P Head Screw #6-32X8 DIA6 Ni Nylok+Nyseal	8
3	50311F0385X00	P Head Screw w/Spring+Flat Washer P6x14 Ni+Nylok	8
4	5043330404X00	HDD Bracket	1
5	60233SAM05X00	GPS Antenna 5M	1
6	602DCD1006X00	DVD Driver	1
7	603POW0012X00	Power Cable Waterproof 3-pin L=150mm	1

VMC 4011/VMC 4511

Item	Part No.	Description	Qty
1	50311F0100X00	Round Head Screw w/Spring+Flat Washer P3x6 Ni	8
2	50311F0354X00	P Head Screw #6-32X8 DIA6 Ni Nylok+Nyseal	8
3	50311F0385X00	P Head Screw w/Spring+Flat Washer P6x14 Ni+Nylok	6
4	5040420048X00	SSD Bracket	1
5	5044440484X00	Thermal Pad 100X40x0.5mm	1
6	5060200120X00	Thermal Pad 25X25x1mm	1
7	602DCD1006X00	DVD Driver	1
8	6030000047X00	Waterproof 22P Female to DB9 Male X3 L=1000Mm	1
9	603ANT0115X00	GPS/Glonass Antenna L=5000mm	1
10	603POW0012X00	Power Cable Waterproof 3-pin L=150Mm	1

Ordering Information

The following provides ordering information.

- **VMC 3000 (P/N: 10VC0300003X0)**
  - 10.4" rugged vehicle mount computer with Intel® Atom™ D2550, 1G DDR3, touch screen, IP65 front panel

- **VMC 3001 (P/N: 10VC0300100X0)**
  - 10.4" rugged vehicle mount computer with Intel® Atom™ D2550, 1G DDR3, touch screen, IP65

- **VMC 3500 (P/N: 10VC0350000X0)**
  - 10.4" rugged vehicle mount computer with Intel® Core™ i7, 2GB DDR3, touch screen, IP65 front panel

- **VMC 3501 (P/N: 10VC0350100X0)**
  - 10.4" rugged vehicle mount computer with Intel® Core™ i7, 2GB DDR3, touch screen, IP65

- **VMC 4011-K (P/N: 10VC0401100X0)**
  - VMC4011-K 12.1"(XGA, 1300Nits) vehicle mount computer, w/ RS422/485, 2G Ram, Waterproof

- **VMC 4511-K (P/N: 10VC0451100X0)**
  - VMC4511-K 12.1"(XGA, 1300Nits) vehicle mount computer, Core i7, w/ RS422/485, 2G Ram, Waterproof

Chapter 1: Product Introduction

Overview

VMC 3000 and VMC 3001 Series Front View

VMC 3000 Series Rear View

VMC 4000 and VMC 4001 Series Front View

VMC 4001 Series Rear View

Key Features

- 10.4/12.1" XGA TFT LCD monitor
  (VMC 3000 series is 10.4", VMC 4000 series is 12.1")
- Compact and fanless design
- Built-in Intel® Core™ i7-2610UE and Intel® Atom™ D2550 processor
- Automatic/ manual brightness control
- On screen F1~F10 function key
- Wake on RTS/SMS

- Variety wireless communication options
- Robust design with Die-cast aluminum front panel
- All enclosure compliant with NEMA4/ IP65 (bottom side on some models are not compliant with NEMA4/ IP65)
- Wide range DC input from 9~36V
- Optional sunlight readable solution with 1200nits(typ.) (VMC 3000 series)
- Optional sunlight readable solution with 1300nits(typ.) (VMC 4000 series)

1   VMC 3000/4000 Series User Manual

VMC 3000/4000 series, 10.4/12.1-inch all in one robust vehicle mount computer, is designed for the transportation, warehouses and material handling application. Adopting the latest high performance processor Intel® Core™ i7 or energy efficiency Atom™ processor, it integrates the high resolution LCD with the brightness of 400/600 nits and 5-wire resistive touch sensor.

VMC 3000/4000 series is extreme ruggedness, the aluminum enclosure compliant with IP65 is designed against vibration, dust, moisture and chemical impacts. It does not compromise with its space to scarify its functional features. It provides RS-232, USB 2.0, CFast, LAN and two Mini-PCIe extensions for variety communication options.

The latitude of mounting methods offers easy installation in the vehicles. Thus, the VMC 3000/4000 series is an ideal solution for vehicle terminal on forklifts, straddle carriers, truck, mining vehicles, construction machines and marine.

Hardware Specifications

VMC 3000/3001 and VMC 4000/4001/4011

General

- Cooling System: fanless
- Enclosure: die-cast aluminum
- Mounting: support VESA 75/100, panel and stand mounting
- Three SMA type antenna connectors of BT/ Wi-Fi / WWAN
- Power Input: 9~36VDC input with Ignition
- Power Consumption: 26W typical
- Ingress Protection: IP65
- Dimension:
  VMC 3000/3001: 290mm (W) x 230mm (H) x 68mm (D)
  (11.4" x 9" x 2.7")
  VMC 4000/4001: 340mm (W) x 262mm (H) x 75.1mm (D)
  (13.3" x 10.3" x 2.9")
- Weight:
  VMC 3000/3001: 3kg, 6.61Lb
  VMC 4000/4001: 3.5kg, 7.72Lb

LCD Panel

LCD Panel for VMC 3000/3001
- 10.4-inch TFT LCD panel with LED backlight
- 1024 x 768 pixels (XGA)
- Brightness: 400 cd/m² (typical)
- Optional high brightness for sunlight-readable with 1200cd/m²(typ.)
- Contrast ratio: 500:1 (typical)

LCD Panel for VMC 4000/4001/4011
- 12.1-inch TFT LCD panel with LED backlight
- 1024 x 768 pixels (XGA)
- Brightness: 600 cd/m² (typical)
- Optional high brightness for sunlight-readable with 1300cd/m²(typ.) (VMC 4011)
- Contrast ratio: 700:1 (typical)

Touch Screen Sensor

- 5-wire resistant touch
- Anti-glare coating surface
- Transmission rate: 81 ± 3%

CPU & Chipset

- Intel® Atom™ D2550 1.86GHz
- Intel® ICH10R

Memory

- One 204-pin DDR3 1333MHz SO-DIMM slot (up to 4GB)

Expandable Storage

- 1x CFast
- 1x 2.5" SATA SSD bay

Expansion

- 1x Mini-PCIe socket (PCIe + USB) for WLAN option
- 1x Mini-PCIe socket (USB) x 1 for WWAN option
- 1x CAN Bus module with J1939 for option

I/O Interfaces - Front

- On screen display buttons x 5
  Power on/off
  Volume control (+/-)
  Brightness control (+/-)
- Light sensor
- 4x LED indicators (Power on/off, Storage, Warning, Shift)
- F1~ F10 functions key
- 2x built-in 2W speakers

I/O Interfaces - Lateral

- 1x CFast card slot
- System reset button
- USB 2.0 host type A connector

I/O Interface-Bottom

VMC 3000
- Power connector (power, ignition, ground)
- 1x RS-232
- 1x RS-232 with either 0, 5 or 12V on pin 9 for external devices
- 2x USB 2.0 Type A
- 1x 10/100/1000Base-T
- 1x Mic-in, 1x Line-out
- 1x 4GPI and 4GPO or CAN Bus with J1939 optional
  Digital Input (source type; 0~30V)
  Digital Output (sink type; 20mA max)
- SMBus to support VTK 61B back up smart battery with charger
- 1x SMA-type GPS antenna connector
- 1x 6-pin for DC output (5V/1A & 12V/1A)

VMC 3001 (Waterproof)
- 1x 3 pin for power input (power, ignition, ground)
- 1x DB9 for full RS232
- 1x 10/100/1000Base-T (water proof type RJ45)
- 1x USB (water proof USB type A)
- 1x 6-pin for Mic in, line out
- 1x 10-pin for CANBus with J1939 optional, GPI x 2 and GPO x 2
- 1x 6-pin for DC output (5V/1A & 12V/1A)
- 1x 3-pin for DC input

I/O Interface-Bottom for VMC 4000
- Power connector (power, ignition, ground)
- 1x 6-pin 5V/12V DC output
- 2x USB 2.0 Type A
- 2x 10/100/1000Base-T
- 1x 6-pin for DC output (5V/1A & 12V/1A)
- 1x Mic-in, 1x Line-out
- 1x DB26 Multi-I/O connector
  - 1x COM for RS-232/422/485 (default RS-232)
  - 1x COM for RS-232 TX/RX
  - 1x GPIO (2x DI, 2x DO)
  - 1x CAN Bus
  - 1x DB9 for RS-232 full

I/O Interface-Bottom for VMC 4001/4011
- Power connector (power, ignition, ground)
- 1x Circle type 6-pin CONN for 5V/12V DC output
- 1x Circle type 10pin CONN for CAN Bus x 1 or CAN Bus and GPIO x 2
- 1x Circle type 6pin CONN for Mic-in, 1x Line-out
- 1x Circle type 22pin CONN Multi-I/O connector for
  - 1x COM for RS-232/422/485 (default RS-232)
  - 1x COM for RS-232 TX/RX
  - 1x RS-232 with either 0, 5 or 12V on pin 9 for external devices
- 1x Circle type 8pin CONN for USB 2.0
- 1x Circle type 8pin CONN for Giga LAN x 2

Communication Module

- 1x GPS module
- 1x WLAN and Bluetooth combo module for optional
- 1x WWAN module for optional

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
- Support S3/S4 suspend mode; wake on RTC/ SMS
- Note: LAN wake up function is only available in S3 mode

VMC 3500/3501 and VMC 4500/4501/4511

General

- Cooling System: fanless
- Enclosure: die-cast aluminum
- Mounting: support VESA 75/100, panel and stand mounting
- Three SMA type antenna connectors of BT/ Wi-Fi / WWAN
- Power Input: 9~36VDC input with Ignition
- Power Consumption: 26W typical
- Ingress Protection: IP65
- Dimension:
  VMC 3500/3501: 290mm (W) x 230mm (H) x 68mm (D)
  (11.4" x 9" x 2.7")
  VMC 4500/4501: 340mm (W) x 262mm (H) x 75.1mm (D)
  (13.3" x 10.3" x 2.9")
- Weight:
  VMC 3500/3501: 3kg, 6.61lbs
  VMC 4500/4501: 3.5kg, 7.72lbs

LCD Panel

LCD Panel for VMC 3500/3501
- 10.4-inch TFT LCD panel with LED backlight
- 1024 x 768 pixels (XGA)
- Brightness: 400 cd/m² (typical)
- Optional high brightness for sunlight-readable with 1200cd/m²(typ.)
- Contrast ratio: 500:1 (typical)

LCD Panel for VMC 4500/4501/4511
- 12.1-inch TFT LCD panel with LED backlight
- 1024 x 768 pixels (XGA)
- Brightness: 600 cd/m² (typical)
- Optional high brightness for sunlight-readable with 1300cd/m²(typ.) (VMC 4011/4511)
- Contrast ratio: 700:1 (typical)

Touch Screen Sensor

- 5-wire resistant touch
- Anti-glare coating surface
- Transmission rate: 81 ± 3%

CPU & Chipset

- Intel® Core™ i7 2610UE 1.5GHz
- Intel® QM67

Memory

- One 204-pin DDR3 1333MHz SO-DIMM slot (up to 4GB)

Expandable Storage

- 1x CFast
- 1x 2.5" SATA SSD bay

Expansion

- 1x Mini-PCIe socket (PCIe + USB) for WLAN option
- 1x Mini-PCIe socket (USB) x 1 for WWAN option
- 1x CAN Bus module with J1939 for option

I/O Interface-Front

- On screen display buttons x 5
  Power on/off
  Volume control (+/-)
  Brightness control (+/-)
- Light sensor
- 4x LED indicators (Power on/off, Storage, Warning, Shift)
- F1~ F10 functions key
- 2x built-in 2W speakers

I/O Interfaces - Lateral

- 1x CFast card slot
- System reset button
- USB 2.0 host type A connector

I/O Interface-Bottom

VMC 3500
- Power connector (power, ignition, ground)
- 1x RS-232
- 1x RS-232 with either 0, 5 or 12V on pin 9 for external devices
- 2x USB 2.0 Type A
- 1x 10/100/1000Base-T
- 1x Mic-in, 1x Line-out
- 1x 4GPI and 4GPO or CAN Bus with J1939 optional
  Digital Input (source type; 0~30V)
  Digital Output (sink type; 20mA max)
- SMBus to support VTK 61B back up smart battery with charger
- 1x SMA-type GPS antenna connector
- 1x 6-pin for DC output (5V/1A & 12V/1A)

VMC 3501
- 1x 3 pin for power input (power, ignition, ground)
- 1x DB9 for full RS232
- 1x 10/100/1000Base-T (water proof type RJ45)
- 1x USB (water proof USB type A)
- 1x 6-pin for Mic in, line out
- 1x 10-pin for CANBus with J1939 optional, GPI x 2 and GPO x 2
- 1x 6-pin for DC output (5V/1A & 12V/1A)
- 1x 3-pin for DC input

I/O Interface-Bottom for VMC 4500
- Power connector (power, ignition, ground)
- 1x 6-pin 5V/12V DC output

- 2x USB 2.0 Type A
- 2x 10/100/1000Base-T
- 1x 6-pin for DC output (5V/1A & 12V/1A)
- 1x Mic-in, 1x Line-out
- 1x DB26 Multi-I/O connector
  - 1x COM for RS-232/422/485 (default RS-232)
  - 1x COM for RS-232 TX/RX
  - 1x GPIO (2x DI, 2x DO)
  - 1x CAN Bus
  - 1x DB9 for RS-232 full

I/O Interface-Bottom for VMC 4501/4511
- Power connector (power, ignition, ground)
- 1x Circle type 6-pin CONN for 5V/12V DC output
- 1x Circle type 10pin CONN for CAN Bus x 1 or CAN Bus and GPIO x 2
- 1x Circle type 6pin CONN for Mic-in, 1x Line-out
- 1x Circle type 22pin CONN Multi-I/O connector for
  - 1x COM for RS-232/422/485 (default RS-232)
  - 1x COM for RS-232 TX/RX
  - 1x RS-232 with either 0, 5 or 12V on pin 9 for external devices
- 1x Circle type 8pin CONN for USB 2.0
- 1x Circle type 8pin CONN for Giga LAN x 2

Communication Module

- 1x GPS module
- 1x WLAN and Bluetooth combo module for optional
- 1x WWAN module for optional

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
- Support S3/S4 suspend mode; wake on RTC/ SMS
- Note: LAN wake up function is only available in S3 mode

Mechanical Dimensions

VMC 3000 Series

VMC 3000/VMC 3500
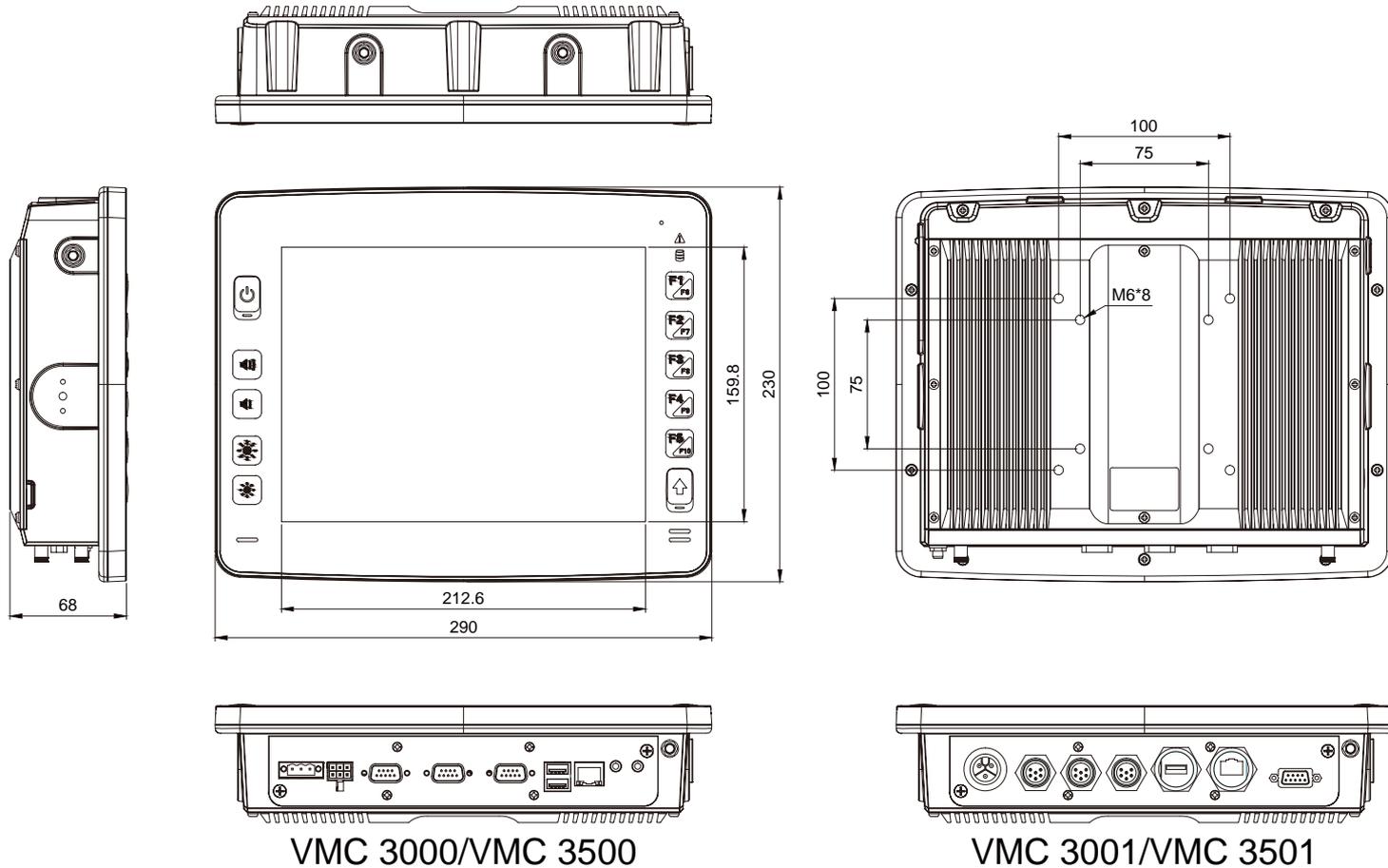
VMC 3001/VMC 3501
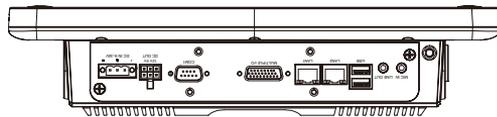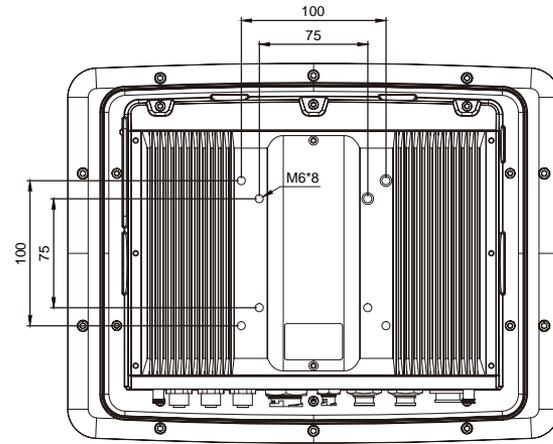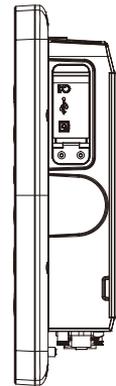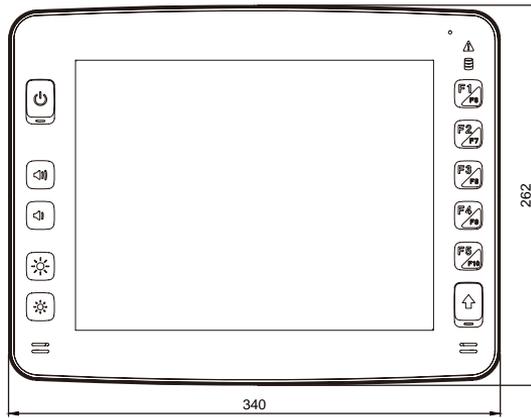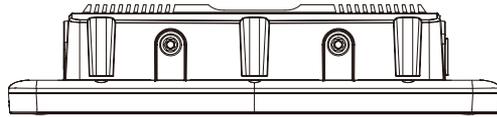
VMC 4000 Series

VMC 4000/VMC 4500
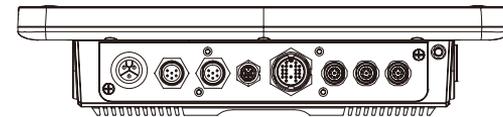
VMC 4001/VMC 4501

Exploded View Drawing

Rear Cover Heatsink

Rear Cover

CPU Heatsink

CPU Board

Driver Board

PCB Bracket

Lateral Cover

HDD

Main PCB Board

I/OW Board

LCD

Speaker

Top Cover

Membrane with T/S
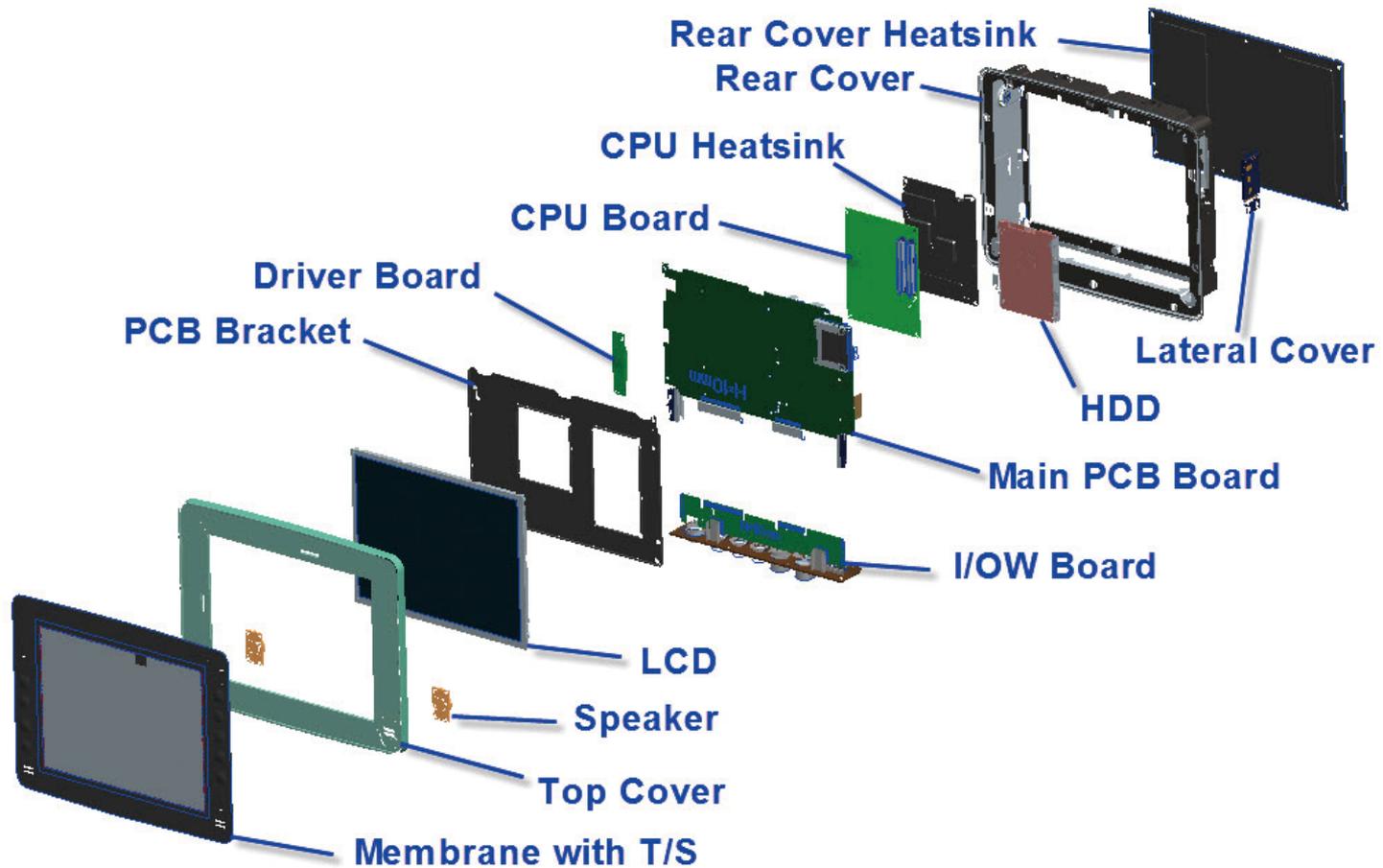
Getting to Know VMC 3000

VMC 3000/4000 Series Front View
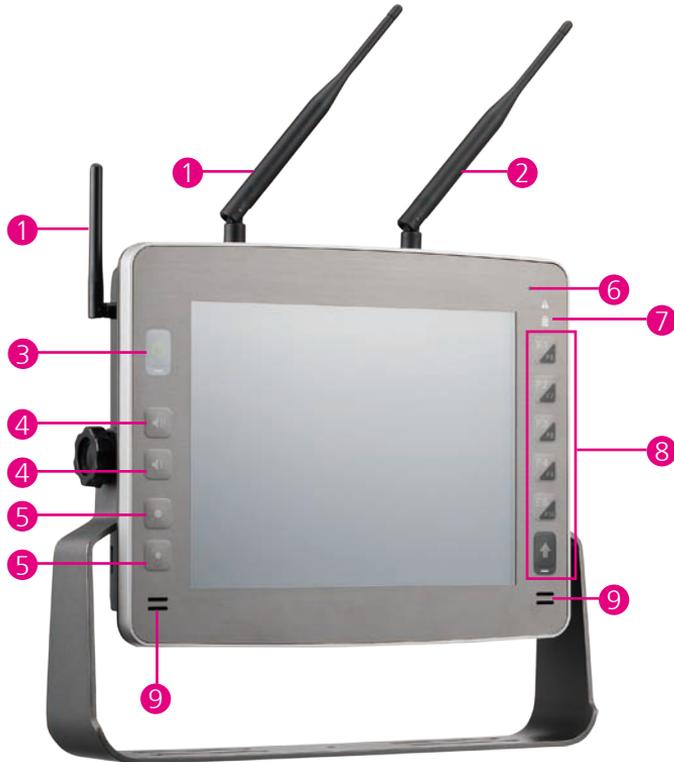
VMC 3000/4000 Series Rear View

VMC 3000/3500

VMC 3001/3501
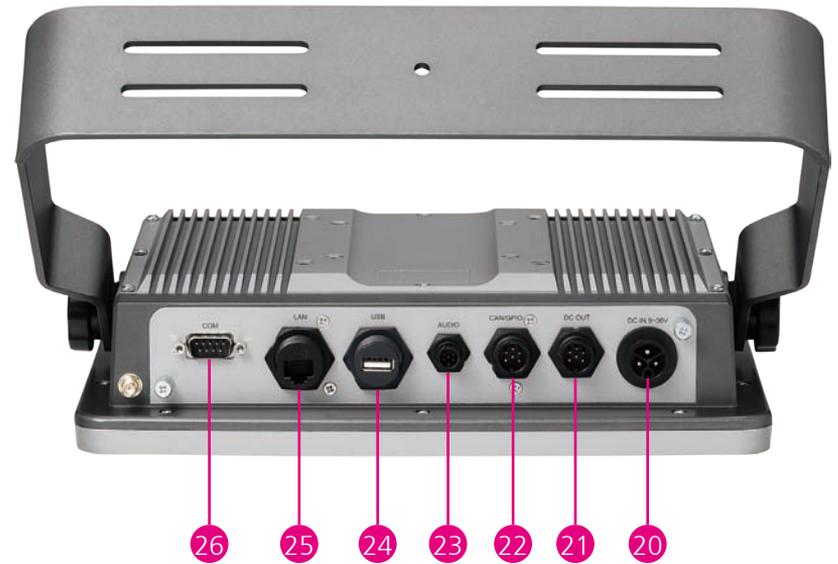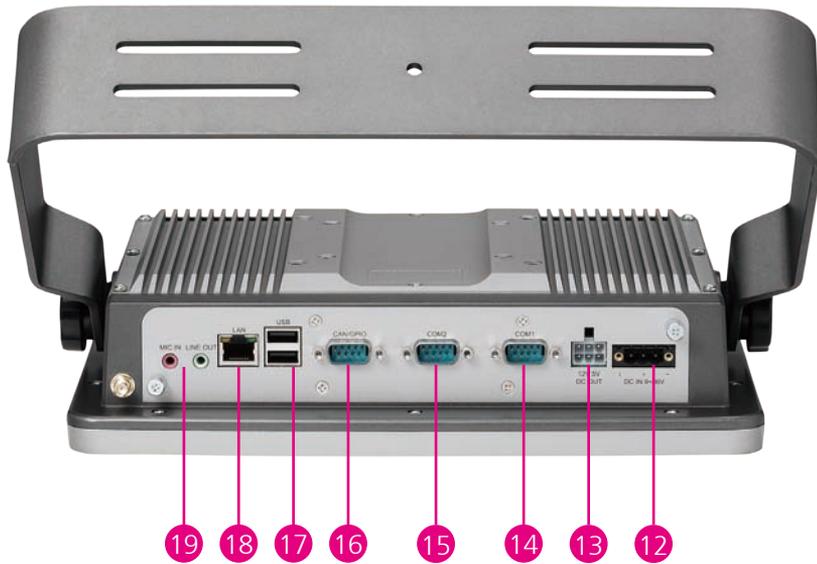
VMC 4000/VMC 4500
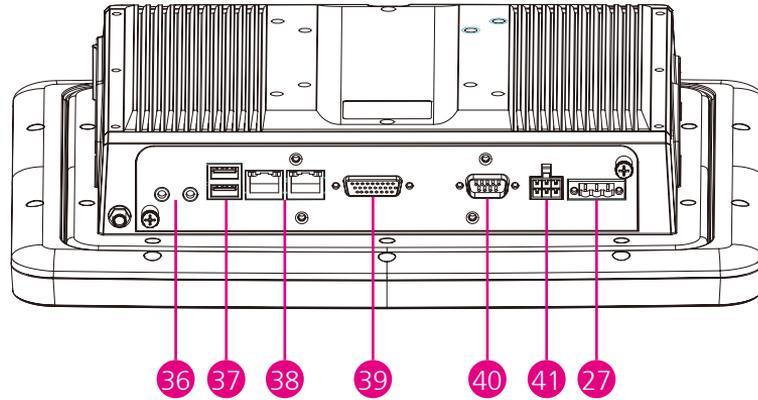
VMC 4001/VMC 4501

Item	Function	Description
1	Antenna Holes	The 2 external antenna mounting holes are used to mount and connect the antenna to a WLAN module and Bluetooth module.
2	Antenna Holes	The external antenna mounting holes are used to mount and connect the antenna to a WWAN module.
3	Power Key	• When the ignition is from "low" to "high", VMC will turn on automatically. • When the ignition is "high", press the power button 5sec to turn on/off VMC. • When the ignition is from "high" to "low", VMC will turn off automatically. • When the ignition is "low", pressing the power button will not turn on VMC. • When you press it for 1 second, the display will turn on/off.
4	Volume Key	Audio volume can be adjusted in 10 levels using the buttons.
5	Brightness Control Key	There are two modes for Brightness Control: Manual Mode and Auto Mode. The Manual Mode is via brightness control key to adjust the LCD brightness, it can be adjusted in 10 levels using the "+" or "-" buttons.
6	Light Sensor	Light sensors can adjust a display's backlight, which improves the power savings and optimizing the display's viewability.
7	Warning Indicator	When ambient temperature is over 50°C, the warning indicator will be red.
8	Function Key	There are five buttons and 10 function keys on the VMC3000 series. The first stage is F1~F5, second stage is F6~F10. When you press the shift key, the shift key will turn blue lights, the function key will be changed to the second stage.
9	Speaker	VMC3000 includes the dual speaker, the specification is 2W/ 4Ω.
10	VESA Mounting Hole	There are VESA mounting hole of 75 x 75 and 100 x 100 on the rear cover.
11	U-Shaped Mounting	The optional U-shaped mounting kit.
12, 20, 27, 35	Power Input Connector	9 ~ 36VDC power Input.
13, 21, 34, 41	SMBus, 5V/12V Power Output	SMBus, power output from vehicle power 5V@1A & 12V@1A DC output.
14, 26, 40	COM1	DB9 RS-232 connector with either 0, 5 or 12V on pin 9 for external devices.
15	COM2	DB9 RS-232 connector.

Item	Function	Description
16, 22, 33	CAN/ GPIO	**VMC3000 Series** CAN and GPIO connector, Default: 3 x GPI and 3 x GPO Option: 1 x CANbus (Installing CAN module) **VMC4000 Series** CAN and GPIO connector, Default: 2 x GPI and 2 x GPO Option: 1 x CANbus (Installing CAN module)
17, 24, 30, 37	USB Port	The USB port complies with USB 2.0 specifications. (VMC 3000 Series) Dual USB port complies with USB 2.0 specifications. (VMC 4000 Series)
18, 25, 28, 29, 38	LAN Port	The LAN port is an RJ45 interface with integrated LEDs and supports 10/100/1000Mbps Ethernet data transfer rates. The LAN port supports 10/100/1000Mbps Ethernet data transfer rates.
19, 23, 32, 36	Audio	**Line-out** Line-out is a stereo output for connecting external speakers. **Mic-in** Mic-in receives monophonic input from an external microphone.
31	Multi I/O port	Integrate the following COM interface - 1 x COM for RS-232/422/485 (default RS-232) - 1 x COM for RS-232 TX/RX - 1 x RS-232 with either 0, 5 or 12V on pin 9 for external devices
39	Multi I/O port	Integrate the following interface - 1 x COM for RS-232/422/485 (default RS-232) - 1 x COM for RS-232 TX/RX - 1 x GPIO (2 x DI, 2 x DO) - 1 x CAN Bus - 1 x DB9 for RS-232 full

External I/O Interface

VMC 3000/ 3500

CAN Bus and GPIO Connector

Connector size: DB-9 female port, 9-pin D-Sub
Connector location: CN5

COM2 RS-232 Connector

Connector size: DB-9 male port, 9-pin D-Sub
Connector location: CN6
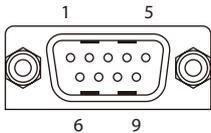
Pin	Definition	Pin	Definition
1	GAL_GPO2_R	7	GAL_GPI1_R
2	GAL_GPO1_R	8	CANH_GAL_GPI3
3	CANL_GAL_GPO3	9	C1708H_GAL_GPI4
4	C1708L_GAL_GPO4	MH1	CH_GND
5	GND	MH2	CH_GND
6	GAL_GPI2_R		
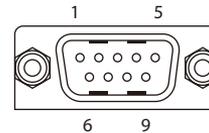
Pin	Definition	Pin	Definition
1	SP_DCD_2	7	SP_RTS_2
2	SP_RXD_2	8	SP_CTS_2
3	SP_TXD_2	9	SP_RI_2
4	SP_DTR_2	MH1	CH_GND
5	COM2_GND	MH2	CH_GND
6	SP_DSR_2		

COM1 RS-232 Connector

Connector size: DB-9 male port, 9-pin D-Sub
Connector location: CN9

Pin	Definition	Pin	Definition
1	SP_DCD_1	7	SP_RTS_1
2	SP_RXD_1	8	SP_CTS_1
3	SP_TXD_1	9	COM_RI_PWR
4	SP_DTR_1	MH1	CH_GND
5	COM1_GND	MH2	CH_GND
6	SP_DSR_1		

5V/12V Power Output Connector

Connector location: CN8

Pin	Definition	Pin	Definition
1	5V_OUT	4	GND
2	12V_OUT	5	GND
3	MSMB_CLK	6	MSMB_DATA

Power Input Connector

Connector location: CN9

1 3
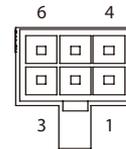
Pin	Definition	Pin	Definition
1	VIN_GND1	NH1	NC
2	VIN	NH2	NC
3	IGNITION_F		

VMC 3001/ 3501

COM1 RS-232 Connector

Connector size: DB-9 male port, 9-pin D-Sub
Connector location: CN9

Audio Connector

Pin	Definition	Pin	Definition
1	SP_DCD_1	6	SP_DSR_1
2	SP_RXD_1	7	SP_RTS_1
3	SP_TXD_1	8	SP_CTS_1
4	SP_DTR_1	9	COM_RI_PWR
5	COM_GND	10	

Pin	Definition	Pin	Definition
1	FRONT_L_F	5	MIC_JD
2	FRONT_JD	6	AGND
3	FRONT_R_F		
4	MIC_JD_F		

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VMC 3000/4000 Series User Manual

CAN and GPIO Connector

Pin	Definition	Pin	Definition
1	GAL_GPIO_GND	6	CAN_GND
2	GAL_GPI1_R	7	CAN1_L
3	GAL_GPO1_R	8	CAN1_H
4	GAL_GPI2_R	9	C1708_1_L
5	GAL_GPO2_R	10	C1708_1_H

DC Input Connector

Pin	Definition	Pin	Definition
1	VIN	3	GND
2	IGNITION_F		

DC Output Connector
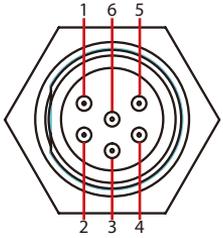
Pin	Definition	Pin	Definition
1	GND	5	MSMB_CLK
2	12V_OUT	6	GND
3	5V_OUT		
4	MSMB_DATA		

External I/O Interface

VMC 4000

RS-232/422/485 (COM2), RS-232 (COM3), CAN Bus and GPIO Connector

Connector size: DB-26 female port, 26-pin D-Sub
Connector location: J3
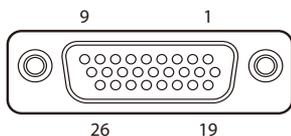
Pin	Definition	Pin	Definition
1	SP_RI_2	15	C1708_2_L
2	SP_DTR_2	16	GAL_GPI2_R
3	COM2_CTS_-	17	GAL_GPO2_R
4	CAN_GPS	18	SP_RXD_3
5	CAN_ODOMETER	19	SP_DSR_2
6	C1708_2_H	20	SP_DCD_2
7	GAL_GPI1_R	21	COM2_GND
8	GAL_GPO1_R	22	CAN_GND
9	SP_TXD_3	23	CAN_GPIO22
10	COM2_TXD_+	24	CAN_DIRECTION
11	COM2_RTS_+	25	GAL_GPIO_GND
12	COM2_RXD_-	26	COM3_GND
13	CAN1_H	MH1	CH_GND
14	CAN1_L	MH2	CH_GND

COM1 RS-232 Connector

Connector size: DB-9 male port, 9-pin D-Sub
Connector location: CN7

Pin	Definition	Pin	Definition
1	SP_DCD_1	7	SP_RTS_1
2	SP_RXD_1	8	SP_CTS_1
3	SP_TXD_1	9	COM_RI_PWR
4	SP_DTR_1	MH1	CH_GND
5	COM1_GND	MH2	CH_GND
6	SP_DSR_1		

5V/12V Power Output Connector

Connector location: CN8
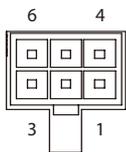
Pin	Definition	Pin	Definition
1	5V_OUT	4	GND
2	12V_OUT	5	GND
3	MSMB_CLK	6	MSMB_DATA

Power Input Connector

Connector location: CN9

Pin	Definition	Pin	Definition
1	VIN_GND1	NH1	NC
2	VIN	NH2	NC
3	IGNITION_F		

Speaker-out

Connector size: 3.5mm TRS
Connector location: CN2

Mic-in

Connector size: 3.5mm TRS
Connector location: CN1

Pin	Definition	Pin	Definition
1	SURR_OUT_R_CA	4	SURR_OUT_L_CA
2	LINE_OUTD#	5	AUDIO_GND
3	NC	6	AUDIO_GND

Pin	Definition	Pin	Definition
1	NC	4	MIC_OUT
2	MIC_JD	5	AUDIO_GND
3	NC	6	AUDIO_GND

VMC 4001

Multi I/O Connector
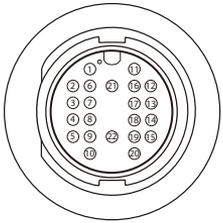
Pin	Definition	Pin	Definition
1	SP_TXD_3	12	COM2_CTS_-
2	SP_RXD_3	13	SP_DCD_1
3	SP_DCD_2	14	SP_RXD_1
4	COM3_GND	15	SP_TXD_1
5	COM2_TXD_+	16	SP_DTR_1
6	COM2_RXD_-	17	COM1_GND
7	COM2_GND	18	SP_DSR_1
8	SP_DTR_2	19	SP_RTS_1
9	COM2_RTS_+	20	SP_CTS_1
10	SP_DSR_2	21	COM_RI_PWR
11	SP_RI_2	22	COM_CH_GND

Power Input Connector
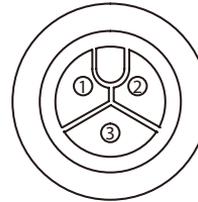
Pin	Definition	Pin	Definition
1	VIN	3	GND
2	IGNITION_F		

Audio Connector
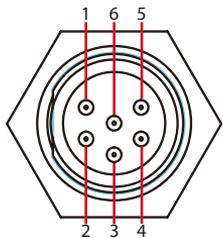
Pin	Definition	Pin	Definition
1	FRONT_L_F	5	MIC_JD
2	FRONT_JD	6	AGND
3	FRONT_R_F		
4	MIC_JD_F		

CAN and GPIO Connector
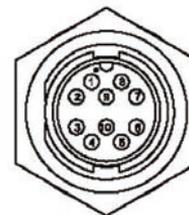
Pin	Definition	Pin	Definition
1	GAL_GPIO_GND	6	CAN_GND
2	GAL_GPI1_R	7	CAN1_L
3	GAL_GPO1_R	8	CAN1_H
4	GAL_GPI2_R	9	C1708_1_L
5	GAL_GPO2_R	10	C1708_1_H

DC Output Connector
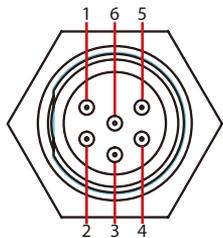
Pin	Definition	Pin	Definition
1	GND	5	MSMB_CLK
2	12V_OUT	6	GND
3	5V_OUT		
4	MSMB_DATA		

LAN Connector
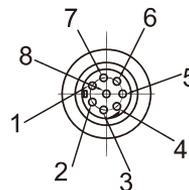
Pin	Definition	Pin	Definition
1	LAN1_MDI_1N	2	LAN1_MDI_1P
3	LAN1_MDI_2N	4	LAN1_MDI_2P
5	LAN1_MDI_3N	6	LAN1_MDI_3P
7	LAN1_MDI_4N	8	LAN1_MDI_4P

USB 2.0 Connector
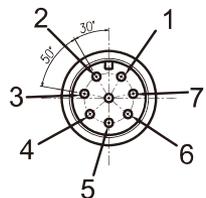
Pin	Definition	Pin	Definition
1	USB_D-	2	USB_D+
3	USB_VCC	4	USB_GND
5	USB_D-	6	USB_D+
7	USB_VCC	8	USB_GND

Chapter 2: System Setup

System Power On

Power Source Setup

The typical power consumption requirement for VMC 3000/3001 series is 26W, for VMC3500/3501 series is 32W. Please select the right adapter or car battery to power on the VMC products.

If the VMC does not have ignition signal, please use a cable to short the Vin and ignition pin.

Note: The typical power consumption stated above is measured without the use of any extended modules such as Mini PCI-E and CFast card modules, or 5V/12V DC output power.

Power Key Functions

The power key can power on/off the system as well as turn on/off the display.

Power Key

- When the ignition is from "low" to "high", VMC will turn on automatically.
- When the ignition is "high", press and hold the power button for 5 seconds to turn on/off VMC.
- When the ignition is from "high" to "low", VMC will turn off automatically.
- When the ignition is "low", pressing the power button will not turn on VMC.
- When you short the Vin and ignition pin, press and hold the power button for 5 seconds to turn on/off VMC.
- When you press it for 1 second, the display will turn on/off.

Installing a WLAN or WWAN module

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

1. Remove these screws and put them in a safe place for later use.

2. Remove the rear cover of the VMC 3000 series.
The Mini PCI Express slot shown below is used to install a WLAN module or 3.5G communication module such as GPRS, UMTS or HSDPA module.

For WLAN and WWAN module

For WWAN module
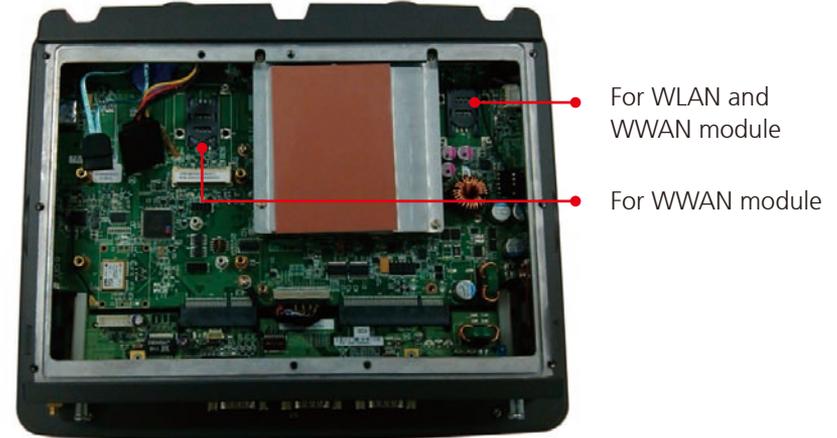
3. Insert the module into the Mini PCI Express slot at a 45 degrees angle until the gold-plated connector on the edge of the module completely disappears inside the slot. And then attach RF cable to the module.

4. Install the rear cover.

Installing a SATA SSD Drive

1. Place the SSD drive into the tray and then tighten the four screws.

2. Connect the SATA data cable and the power cable to the SATA connector at the rear of the SSD drive.

3. Align the mounting holes on the tray to the mounting holes on the
   board, then tighten the screws to secure the drive to the chassis.
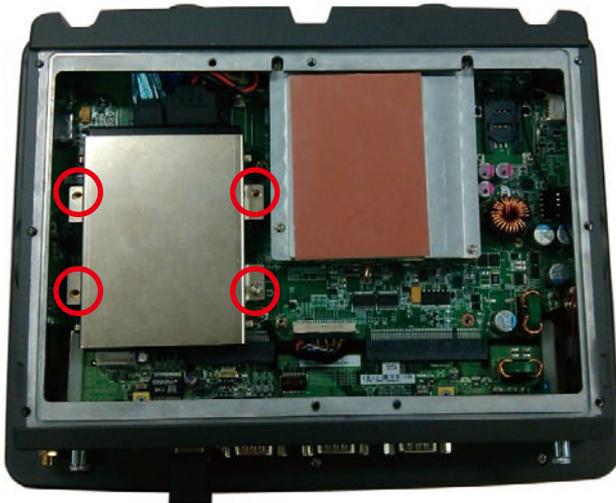
Installing a CAN Bus module

1. The pin header shown below is used to install a CAN Bus module.
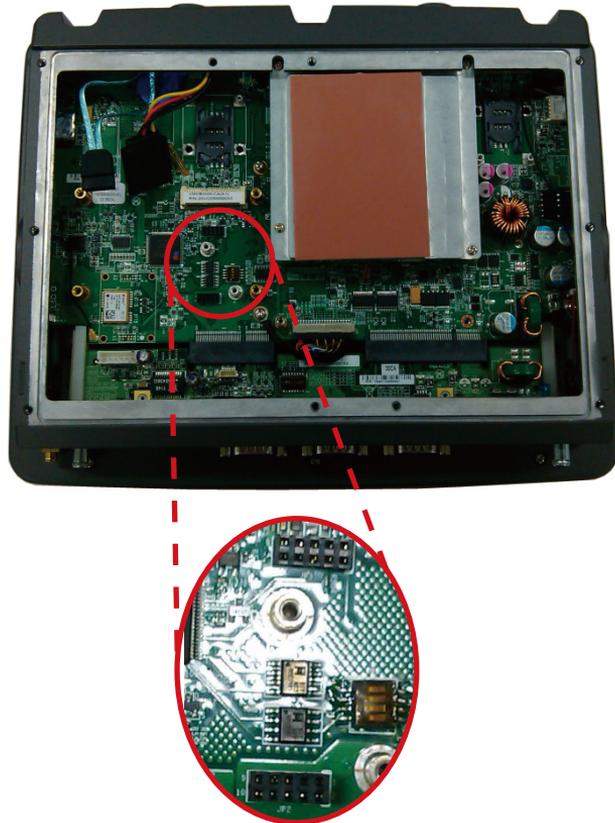
2. Insert the CAN Bus module pin connector into the pin header of the motherboard. Push the module down then secure it with a mounting screw.

CAN Bus Module
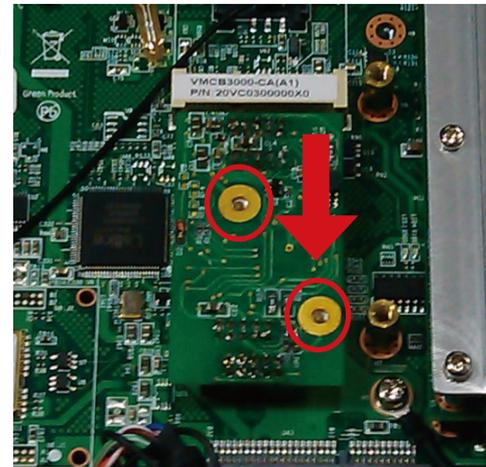
Push the module down

Chapter 3: Using the GPS Feature

The VMC has a built-in GPS receiver module by default. Global Positioning System (GPS) uses a constellation of 24 (up to 32) 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.
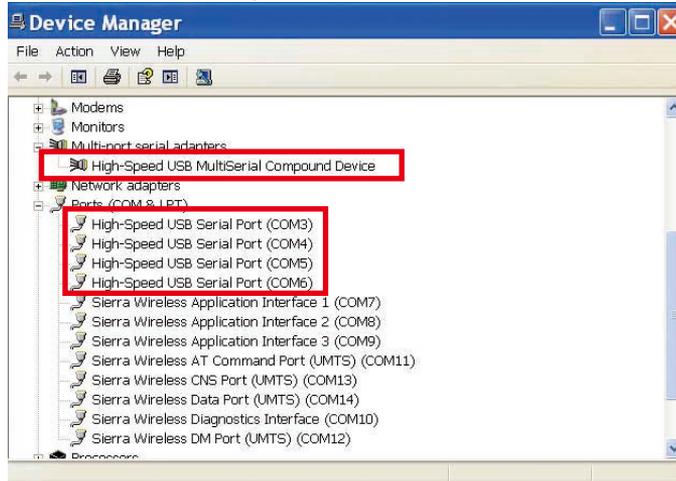
2. Insert the Installation Disc into CD-Rom drive and execute the "Gpsinfo. exe" file (the file also saved in C:\Utility\GPS_Utility).
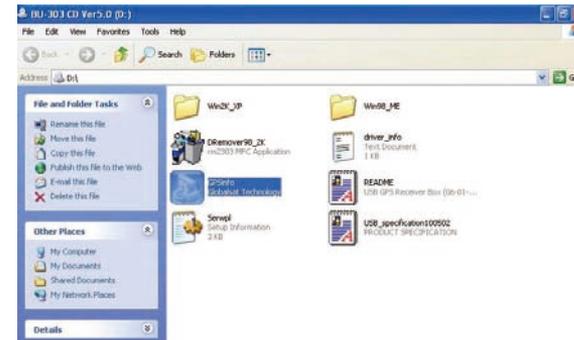
3. Follow the given instructions to complete the installation.
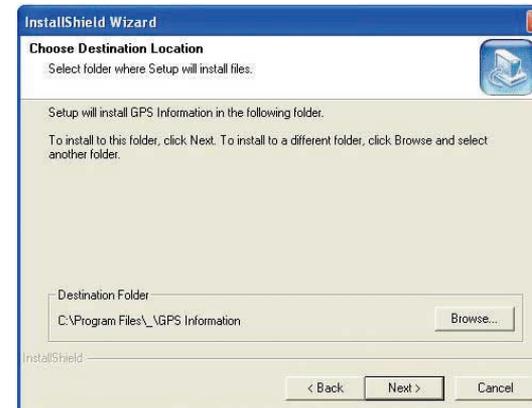
4. When the setup complete, press <Finish>.

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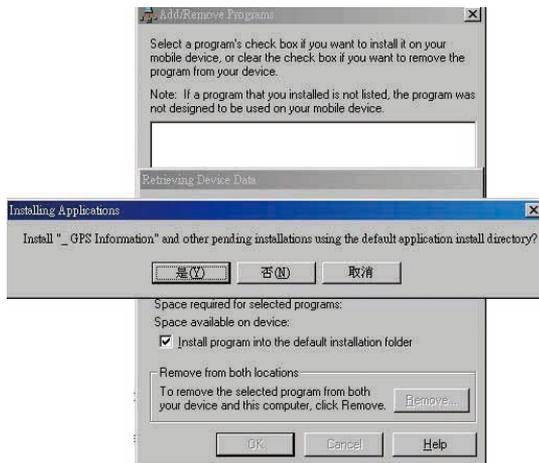
Setup Window Screenshot

Double click GpsInfo_Vista icon from Desktop to start GPS.
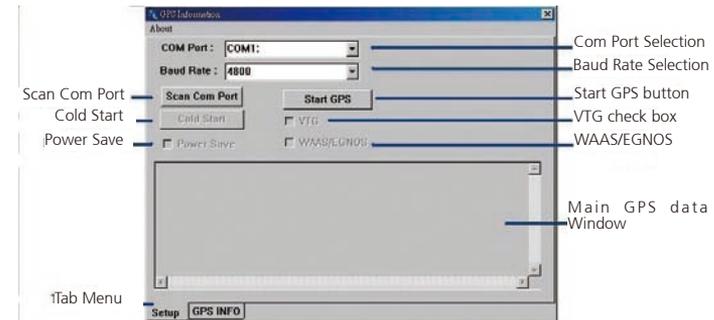
- Scan Com Port" - Scan all available communication port for GPS reception

- "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 38400)**

- "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
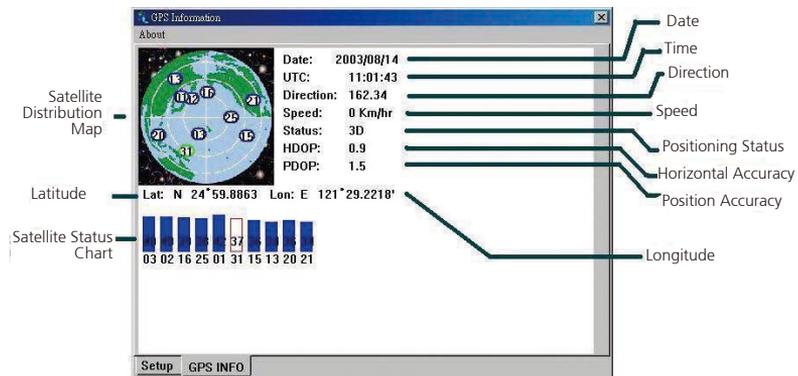
- "Satellite Distribution Map" – Display the position of all connected Satellites
  - A unique number is assigned to each satellite.
  - Red circle indicates that the satellite location is known from almanac information; however, the satellite is not currently being tracked.
  - Green circle indicates that the satellite is being tracked; how ever, 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.

Chapter 4: Jumpers and Connectors for VMC 3000 Series

This chapter describes how to set the jumpers on the motherboard. Note that the following procedures are generic for all VMC 3000 series.

Before You Begin

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

- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
  - A Philips screwdriver
  - A flat-tipped screwdriver
  - A set of jewelers Screwdrivers
  - A grounding strap
  - An anti-static pad

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

- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic com-ponents. 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 con-nected 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 com-ponents 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 main board which is the board used in the VMC system. It shows the locations of the jumpers and connectors.

Main Board
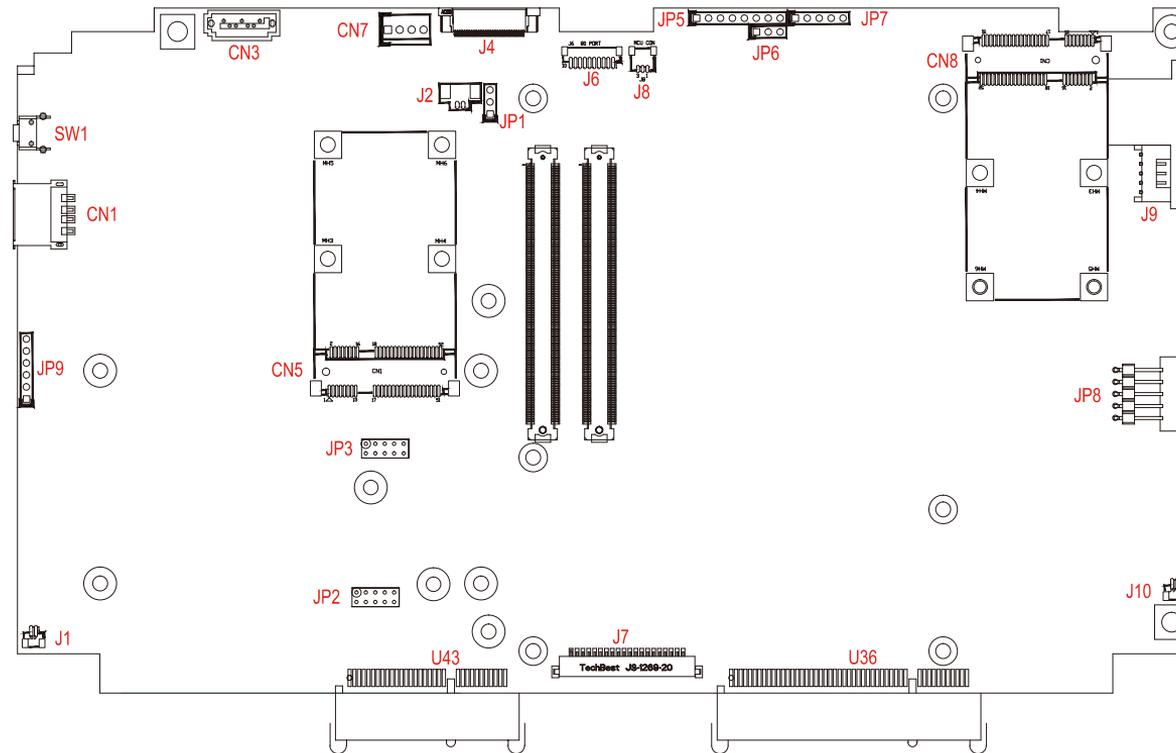
The figure below is the IO board used in the VMC system. It shows the locations of the jumpers and connectors.

I/O Board
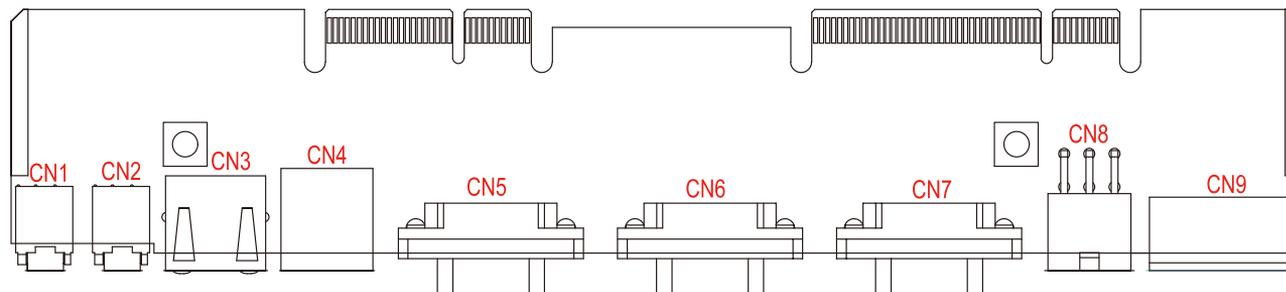
Waterproof I/O Board
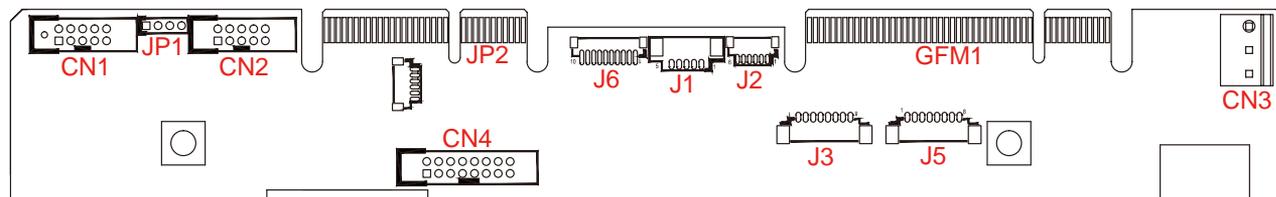
Internal Connectors and Jumper Settings

Membrane Key FPC Connector

Connector size: 1x30 30-pin header, 0.5mm pitch
Connector location: J4

Pin	Definition	Pin	Definition
1	GND	2	GND
3	SATA LED PWR	4	SATA LED
5	LIGHT SENSOR INPUT	6	LIGHT SENSOR PWR
7	S3 MODE LED PWR	8	S3 MODE LED
9	ERR LED PWR	10	ERR LED
11	SHIFT LED PWR	12	SHIFT LED
13	SHIFR KEY	14	F5 KEY
15	F4 KEY	16	F3 KEY
17	F2 KEY	18	F1 KEY
19	KSO	20	GND
21	GND	22	VOLUME UP KEY
23	VOLUME DOWN KEY	24	PANEL BRIGHTNESS UP KEY
25	PANEL BRIGHTNESS DOWN KEY	26	PWR ON LED PWR
27	PWR ON LED	28	POWER BOTTOM
29	GND	30	GND

Port 80 Connector

Connector size: 1mm Wafer 10-pin 180°
Connector location: J6
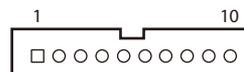
Pin	Definition	Pin	Definition
1	GND	2	CB_RESET
3	LPC_CLK	4	LPC_FRAME
5	LPC_AD3	6	LPC_AD2
7	LPC_AD1	8	LPC_AD0
9	VCC3	10	VCC3

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CANbus Input Connector

Connector size: 2x5 10-pin header, 2.0mm pitch
Connector location: JP3
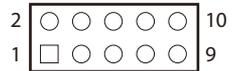
Pin	Definition	Pin	Definition
1	CAN_TXD	2	CAN_RXD
3	CAN_DI	4	CAN_DO
5	GND	6	GND
7	NC	8	NC
9	VCC_CAN	10	VCC12

CANbus Output Connector

Connector size: 2x5 10-pin header, 2.0mm pitch
Connector location: JP2
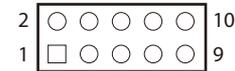
Pin	Definition	Pin	Definition
1	CAN1_HI	2	C1708_H
3	CAN1_LOW	4	C1708_LOW
5	GND	6	GND
7	NC	8	NC
9	VCC_CAN	10	VCC12

GAL Programmer PIN Header

Connector size: 1x6 6-pin header, 2.54mm pitch
Connector location: JP9

1 ☐ ○ ○ ○ ○ ○ 6

Pin	Definition	Pin	Definition
1	VCC3_3	2	GND
3	TCK	4	TDO
5	TDI	6	TMS

Touch Controller Connector

Connector size: 1x5 5-pin header, 2.54mm pitch
Connector location: JP8

1 ☐ ○ ○ ○ ○ 5

Pin	Definition	Pin	Definition
1	Left_X-	2	Top_Y-
3	Sense	4	Right_X+
5	Bottom_Y+		

MCU Programmer Pin Header

Connector size: 1x5 5-pin header, 2.54mm pitch
Connector location: JP7

1 □ ○ ○ ○ ○ 5

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

Backlight Control Connector

Connector size: 1x5 5-pin header, 2.0mm pitch
Connector location: J9

5 ○ ○ ○ ○ □ 1

Pin	Definition	Pin	Definition
1	Black light EN	2	Black light adjust
3	Black light adjust_L	4	GND
5	Backlight VCC		

MCU COM Port

Connector size: 1x3 3-pin header, 2.54mm pitch
Connector location: JP6

1 ☐ ○ ○ 3

Pin	Definition
1	TX
2	RX
3	GND

Temp Sensor

Connector size: 1x2 2-pin header
Connector location: JP5

1 ☐ ○ 2

Pin	Definition
1	SENSOR+
2	GND

Serial-ATA

Connector size: Standard Serial ATAII 7P (1.27mm, SATA-M-180)
Connector location: CN3

Serial-ATA Power Input

Connector size: 1x4 4-pin header
Connector location: CN7
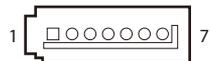
Pin	Definition	Pin	Definition
1	GND	2	SATA_TXP0 -
3	SATA_TXN0	4	GND
5	SATA_RXN0	6	SATA_RXP0
7	GND		

Pin	Definition	Pin	Definition
1	12V	2	GND
3	GND	4	VCC5

Mini-PCIe Connector (3.5G)

Connector location: CN5
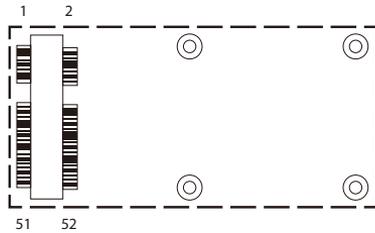
Pin	Definition	Pin	Definition
1	MIC +	2	+V3.3S
3	MIC -	4	GND
5	SPK +	6	NC
7	GND	8	USIM PWR
9	GND	10	USIM DATa
11	VCC_MSM26_DIG	12	USIM CLK
13	NC	14	USIM RST
15	GND	16	NC
17	NC	18	GND
19	NC	20	W_DISABLE#
21	GND	22	NC
23	NC	24	NC
25	NC	26	GND

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

Mini-PCIe Connector (WLAN)

Connector location: CN8
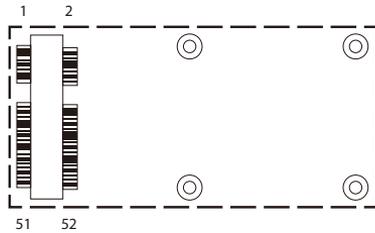
Pin	Definition	Pin	Definition
1	WAKE#	2	+V3.3S
3	NC	4	GND
5	NC	6	+V1.5S
7	CLKREQ#	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	DISABLE#
21	GND	22	PERST#
23	PERn0	24	+3.3S
25	PERp0	26	GND

Pin	Definition	Pin	Definition
27	GND	28	+V1.5S
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
33	PETp0	34	GND
35	GND	36	USB_D-
37	NC	38	USB_D+
39	NC	40	GND
41	NC	42	LED_WWAN#
43	NC	44	LED_WLAN#
45	NC	46	LED_WPAN#
47	NC	48	+V1.5S
49	NC	50	GND
51	NC	52	+V3.3S

SIM Card Connectors

Connector location: CN6 and CN9
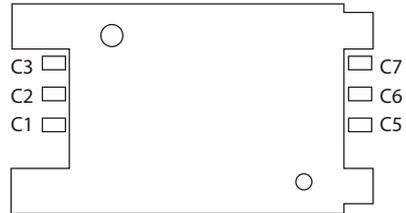
Pin	Definition	Pin	Definition
C1	POWER VOLTAGE	C2	RESET SIGNAL
C3	CLOCK SIGNAL	C5	GND
C6	VPP:PROGRAM VOLTAGE	C7	I/O
SW	Contact present switch		

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Internal Connectors and Jumper Settings
I/O Board

LAN Connector

Connector size: RJ45 port with LEDs
Connector location: CN3
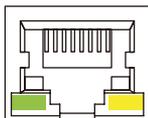
Pin	Definition	Pin	Definition
1	LAN_MDI_0P_R	8	LAN_MDI_3N_R
2	LAN_MDI_0N_R	9	LAN_LINK#
3	LAN_MDI_1P_R	10	3VSB
4	LAN_MDI_2P_R	11	LAN_ACTLED#
5	LAN_MDI_2N_R	12	3VSB
6	LAN_MDI_1N_R	MH1	CH_GND
7	LAN_MDI_3P_R	MH2	CH_GND

USB Connector

Connector size: RJ45 port with LEDs
Connector location: CN4
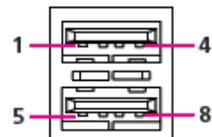
Pin	Definition	Pin	Definition
1	USB0/1_FP	7	USB_1P_L
2	USB_0N_L	8	USB_GND
3	USB_0P_L	MH1	CH_GND
4	USB_GND	MH2	CH_GND
5	USB0/1_FP	MH3	CH_GND
6	USB_1N_L	MH4	CH_GND
7	LAN_MDI_3P_R	MH2	CH_GND

Speaker-out

Connector size: 3.5mm TRS
Connector location: CN2

Pin	Definition	Pin	Definition
1	SURR_OUT_R_CA	4	SURR_OUT_L_CA
2	LINE_OUTD#	5	AUDIO_GND
3	NC	6	AUDIO_GND

Mic-in

Connector size: 3.5mm TRS
Connector location: CN1

Pin	Definition	Pin	Definition
1	NC	4	MIC_OUT
2	MIC_JD	5	AUDIO_GND
3	NC	6	AUDIO_GND

Internal Connectors and Jumper Settings

Waterproof I/O Board

Power Input Connector
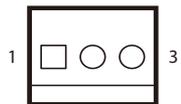
Connector size: 1x3 3-pin header
Connector location: CN3

Power Output Connector

Connector size: 1x8 8-pin header
Connector location: J5

Pin	Definition
1	IGNITION_F
2	VINGND
3	VIN

Pin	Definition	Pin	Definition
1	MSMB_DATA	6	5V_OUT
2	MSMB_CLK	7	12V_OUT
3	GND	8	12V_OUT
4	GND	MH1	GND
5	GND	MH2	GND

LAN Connector

Connector size: 2x5 10-pin header
Connector location: CN2
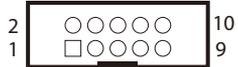
Pin	Definition	Pin	Definition
1	LAN_MDI_0P_R	6	LAN_GND
2	LAN_MDI_1P_R	7	LAN_MDI_2P_R
3	LAN_MDI_0N_R	8	LAN_MDI_3P_R
4	LAN_MDI_1N_R	9	LAN_MDI_2N_R
5	LAN_GND	10	LAN_MDI_3N_R

LAN LED

Connector size: 1x4 4-pin header
Connector location: JP1

Pin	Definition	Pin	Definition
1	3VSB	3	3VSB
2	LAN_ACTLED#	4	LAN_LINK#

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VMC 3000/4000 Series User Manual

USB Connector

Connector size: 1x5 5-pin header
Connector location: J1

5 | ○○○○○□ | 1

Pin	Definition	Pin	Definition
1	USB0/1_FP	5	CH_GND
2	USB_0N_L	MH1	GND
3	USB_0P_L	MH2	GND
4	USB_GND		

Audio Connector

Connector size: 1x6 6-pin header
Connector location: J2

1 | □○○○○○ | 6

Pin	Definition	Pin	Definition
1	FRONT_L_F	5	MIC_JD
2	FRONT_JD	6	AGND
3	FRONT_R_F	MH1	AGND
4	MIC_JD_F	MH2	AGND

CANbus Connector

Connector size: 1x8 8-pin header
Connector location: J3

Pin	Definition	Pin	Definition
1	CAN_GND	6	C1708_1_L
2	GND	7	C1708_1_H
3	CAN1_L	8	GND
4	CAN1_H	MH1	GND
5	GND	MH2	GND

COM1 Connector

Connector size: 2x5 10-pin header
Connector location: CN1
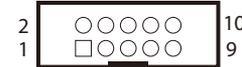
Pin	Definition	Pin	Definition
1	SP_DCD_1	6	SP_DSR_1
2	SP_RXD_1	7	SP_RTS_1
3	SP_TXD_1	8	SP_CTS_1
4	SP_DTR_1	9	COM_RI_PWR
5	COM_GND	10	COM_CH_GND

Chapter 5: Jumpers and Connectors for VMC 4000 Series

This chapter describes how to set the jumpers on the motherboard. Note that the following procedures are generic for all VMC 4000 series.

Before You Begin

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

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

  • A Philips screwdriver
  • A flat-tipped screwdriver
  • A set of jewelers Screwdrivers
  • A grounding strap
  • An anti-static pad

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

• Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environment tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

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

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

• Always disconnect the unit from the power outlet whenever you are working inside the case.

• If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.

• Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.

• Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.

• Use correct screws and do not over tighten screws.

Jumper

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 carry board used in the VMC system. It shows the locations of the jumpers and connectors.

Carry Board
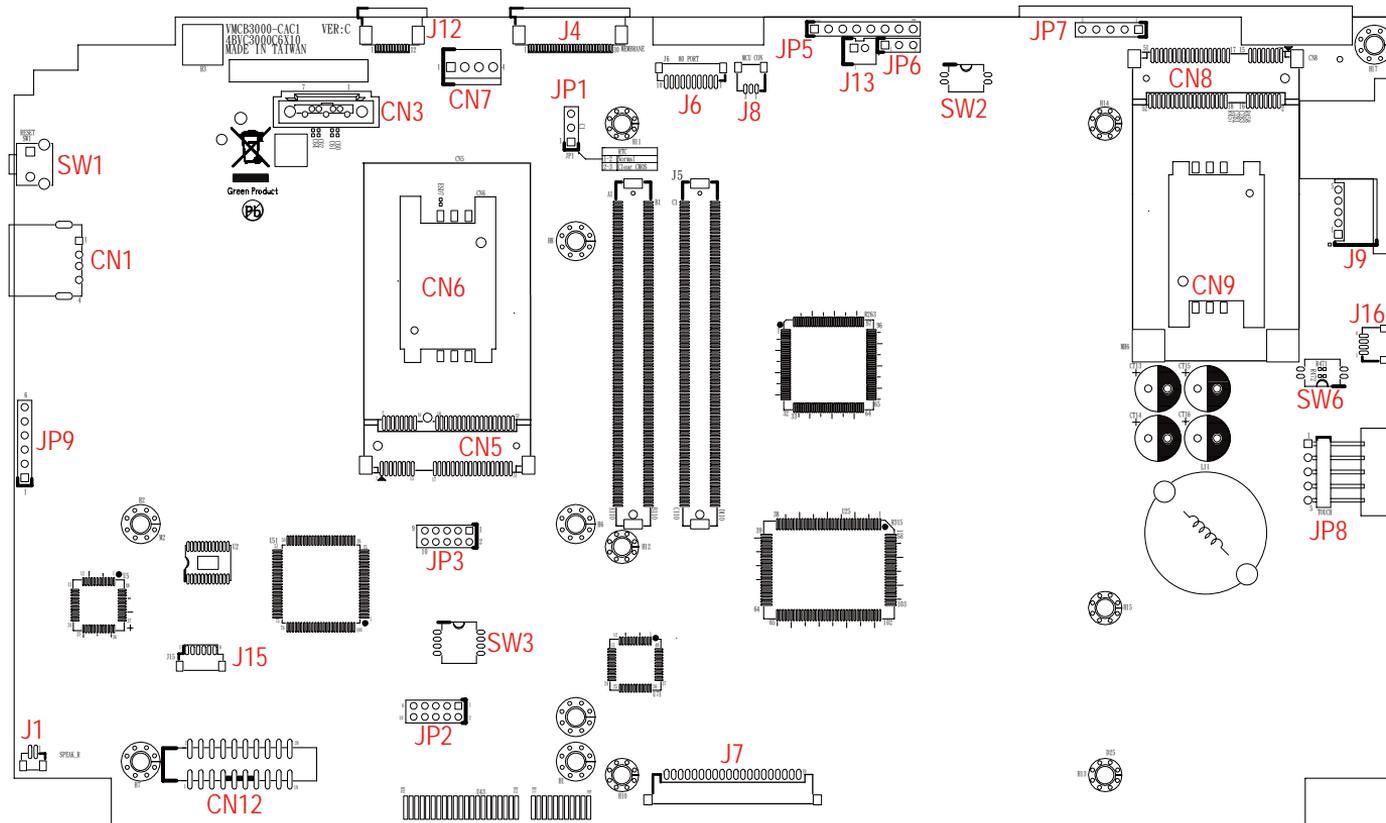
Internal Connectors and Jumper Settings for Carry Board

Input Voltage Select

Voltage Setup Selection

Connector size: 2-pin DIP switch
Connector location: SW2
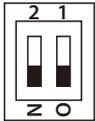
Pin	12V	24V	9V~36V (*) all can start
SW2.1	OFF	OFF	ON
SW2.2	OFF	ON	Don't Care

(*) Default Setting

Panel Setup Selection

Connector size: 2-pin DIP switch
Connector location: SW4
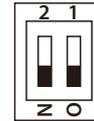
Pin	10.4(*)	12	15	Don't Care
SW4.1	OFF	OFF	ON	ON
SW4.2	OFF	ON	OFF	ON

(*) Default Setting

GPIO Setup Selection

Connector size: 4-pin DIP switch
Connector location: SW3
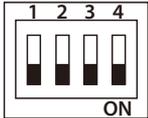
Pin	GPIO Pull High(*)	GPIO Open Drain
SW3.1	ON	OFF
SW3.2	ON	OFF
SW3.3	ON	OFF
SW3.4	ON	OFF

(*) Default Setting

Jumper Settings

CMOS Input Voltage Select

Connector size: 1x3 3-pin header
Connector location: JP1

1 ▢ ○ ○ 3

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

MCU Download

Connector size: 1x5 5-pin header
Connector location: JP7

1 ▢ ○ ○ ○ ○ 5

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

GAL Download

Connector size: 1x6 6-pin header
Connector location: JP9

1 ☐ ○ ○ ○ ○ ○ 6

Pin	Definition	Pin	Definition
1	+V3.3S	4	TDO
2	GND	5	TDI
3	TCK	6	TMS

MCU COM Port

Connector size: 1x3 3-pin header
Connector location: JP6

1 ☐ ○ ○ 3

Pin	Definition
1	TX
2	RX
3	GND

EC Download

Connector size: 1x8 8-pin header
Connector location: JP5

1 [□ ○ ○ ○ ○ ○ ○ ○] 8

Pin	Definition	Pin	Definition
1	+V3.3	5	EC_TDI
2	NC	6	EC_TMS
3	EC_TCK	7	RDY#
4	EC_TDO	8	GND

EC Programmer Pin Header

Connector size: 1x6 6-pin header
Connector location: JP5

1 [□ ○ ○ ○ ○ ○] 6

Pin	Definition	Pin	Definition
1	VCC3	2	NC
3	TCK	4	TDO
5	TDI	6	TMS
7	RDY#	8	GND

MCU Programmer Pin Header

Connector size: 1x6 6-pin header
Connector location: JP7

Panel Driver Board Connector

Connector size: 1x5 5-pin header, 2.0mm pitch
Connector location: J9

Pin	Definition	Pin	Definition
1	+3.3ALW	2	C2D
3	MRST	4	C2CK
5	GND		
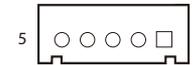
Pin	Definition	Pin	Definition
1	Panel_backlight	2	GND
3	L_BLK_ADJ	4	BLK_ADJ_RE
5	L_BLK_EN		

Serial-ATA Power Input

Connector size: 1x4 4-pin header
Connector location: CN7

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

Serial-ATA

Connector size: Standard Serial ATA 7P (1.27mm, SATA-M-180)
Connector location: CN3
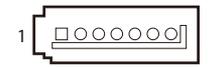
Pin	Definition	Pin	Definition
1	GND	2	SATA_TX0P
3	SATA_TX0N	4	GND
5	SATA_RX0N	6	SATA_RX0P
7	GND		

USB

Connector size: USB 2.0 port, Type A
Connector location: CN1
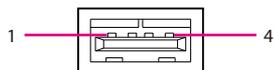
Pin	Definition	Pin	Definition
1	VCC	2	DATA_6P
3	DATA_6N	4	GND

Membrane Key FPC Connector

Connector size: 1x30 30-pin header, 0.5mm pitch
Connector location: J4

Pin	Definition	Pin	Definition
1	GND	2	GND
3	SATA LED PWR	4	SATA LED
5	LIGHT SENSOR INPUT	6	LIGHT SENSOR PWR
7	S3 MODE LED PWR	8	S3 MODE LED
9	ERR LED PWR	10	ERR LED
11	SHIFT LED PWR	12	SHIFT LED
13	SHIFR KEY	14	F5 KEY
15	F4 KEY	16	F3 KEY
17	F2 KEY	18	F1 KEY
19	KSO	20	GND
21	GND	22	VOLUME UP KEY
23	VOLUME DOWN KEY	24	PANEL BRIGHTNESS UP KEY
25	PANEL BRIGHTNESS DOWN KEY	26	PWR ON LED PWR
27	PWR ON LED	28	POWER BOTTOM
29	GND	30	GND

Speaker Connector

Connector size: 1x2 2-pin header, 1.0mm pitch
Connector location: J10 and J1

J10

Pin	Definition
1	FRONT_A_L+_RF
2	FRONT_A_L-_RF

J1

Pin	Definition
1	FRONT_A_R+_RF
2	FRONT_A_R-_RF

Reset Button

Connector location: SW1
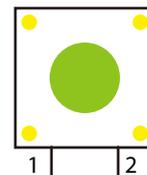
Pin	Definition
1	GND
2	RST_BTN#

RTC Battery Connector

Connector type: 1x2 2-pin header
Connector location: J2
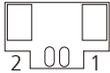
Pin	Definition
1	GND
2	VBAT1

GPS JST Connector

Connector type: 1x6 JST, 6-pin header
Connector location: J14

Pin	Definition	Pin	Definition
1	GPS_BAT	2	Power_LED
3	GPS_TXD3	4	GPS_TXD3
5	GND	6	VCC3
MH1	GND	MH2	GND

CANbus Input Connector

Connector size: 2x5 10-pin header
Connector location: JP3

```
2 ○ ○ ○ ○ ○ 10
1 □ ○ ○ ○ ○ 9
```
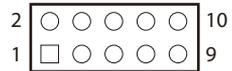
Pin	Definition	Pin	Definition
1	CAN_TXD	2	CAN_RXD
3	CAN_DI	4	CAN_DO
5	GND	6	GND
7	NC	8	NC
9	VCC_CAN	10	CAN_12V

CANbus Output Connector

Connector size: 2x5 10-pin header
Connector location: JP2

```
2 ○ ○ ○ ○ ○ 10
1 □ ○ ○ ○ ○ 9
```
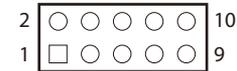
Pin	Definition	Pin	Definition
1	CAN1_H	2	C1708_1_H
3	CAN1_L	4	C1708_1_L
5	GND	6	GND
7	NC	8	NC
9	NC	10	NC

VMC 4000 I/O Board
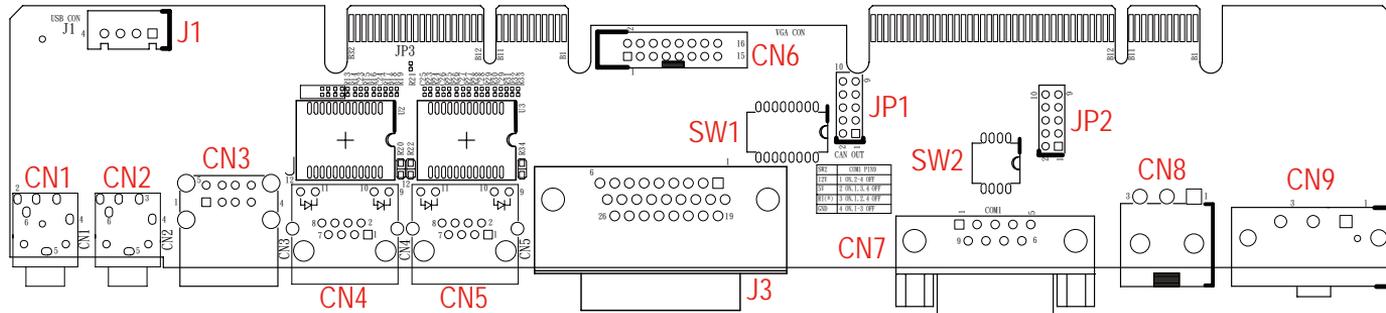
RS232/485/422 Mode Selection for COM2

Connector size: 8-pin DIP switch
Connector location: SW1
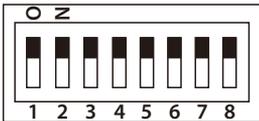
Pin	Definition	Pin	Definition
1	SP_TXD_2	2	RS485_+
3	SP_RXD_2	4	RS485_-
5	SP_RTS_2	6	RS422_TX+
7	SP_CTS_2	8	RS422_TX-
9	COM2_CTS_-	10	COM2_CTS_-
11	COM2_RTS_+	12	COM2_RTS_+
13	COM2_RXD_-	14	COM2_RXD_-
15	COM2_TXD_+	16	COM2_TXD_+

Pin	RS232 (*)	RS485	RS422
SW1.1	ON	OFF	OFF
SW1.2	OFF	ON	ON
SW1.3	ON	OFF	OFF
SW1.4	OFF	ON	ON
SW1.5	ON	OFF	OFF
SW1.6	OFF	OFF	ON
SW1.7	ON	OFF	OFF
SW1.8	OFF	OFF	ON

(*) Default Setting

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CANbus/GPS DR Mode Selection

Connector size: 8-pin DIP switch
Connector location: SW3
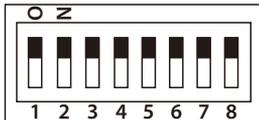
Pin	Definition	Pin	Definition
1	C1708_1_H	2	1PPS_GPS
3	C1708_1_L	4	ODOMETER
5	CAN2_H	6	GPIO22_GPS
7	CAN2_L	8	DIRECTION
9	CAN_DIRECTION	10	CAN_DIRECTION
11	CAN_GPIO22	12	CAN_GPIO22
13	CAN_ODOMETER	14	CAN_ODOMETER
15	CAN_GPS	16	CAN_GPS

Pin	CANbus (*)	GPS DR
SW3.1	ON	OFF
SW3.2	OFF	ON
SW3.3	ON	OFF
SW3.4	OFF	ON
SW3.5	ON	OFF
SW3.6	OFF	ON
SW3.7	ON	OFF
SW3.8	OFF	ON

(*) Default Setting

COM1 RI/Power Switch

Connector size: 4-pin DIP switch
Connector location: SW2

VGA Connector

Connector size: 2x8 16-pin header
Connector location: CN6
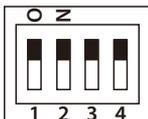
Pin	Definition	Pin	Definition
1	COM_12V	2	COM_5V
3	SP_RI_1	4	GND
5	COM_RI_PWR	6	COM_RI_PWR
7	COM_RI_PWR	8	COM_RI_PWR

Pin	12V	5V	RI (*)	GND
SW2.1	ON	OFF	OFF	OFF
SW2.2	OFF	ON	OFF	OFF
SW2.3	OFF	OFF	ON	OFF
SW2.4	OFF	OFF	OFF	ON

(*) Default Setting

Pin	Definition	Pin	Definition
1	VGA_RED	2	VGA_GREEN
3	VGA_BLUE	4	VGA_GND
5	VGA_GND	6	RGB_GND
7	RGB_GND	8	RGB_GND
9	VGA_+5V	10	VGA_GND
11	VGA_GND	12	VGA_DATA
13	VGA_HS	14	VGA_VS
15	VGA_CLK	16	NC

CANbus Input Connector

Connector size: 2x5 10-pin header
Connector location: JP2

2 | ○ ○ ○ ○ ○ | 10
1 | □ ○ ○ ○ ○ | 9

Pin	Definition	Pin	Definition
1	CAN2_TXD	2	CAN2_RXD
3	GAL_GPO4_DI	4	GAL_GPI4_DO
5	GND	6	GND
7	NC	8	NC
9	CAN_VCC	10	NC

CANbus Output Connector

Connector size: 2x5 10-pin header
Connector location: JP1

2 | ○ ○ ○ ○ ○ | 10
1 | □ ○ ○ ○ ○ | 9

Pin	Definition	Pin	Definition
1	CAN2_H	2	C1708_2_H
3	CAN2_L	4	C1708_2_L
5	GND	6	GND
7	NC	8	NC
9	NC	10	NC

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VMC 3000/4000 Series User Manual
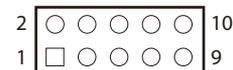
USB Connector

Connector size: 1x4 4-pin header
Connector location: J1

Pin	Definition	Pin	Definition
1	USB0/1_FP	2	USB_0#
3	USB_0	4	UGND_2

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VMC 4001 Waterproof I/O Board
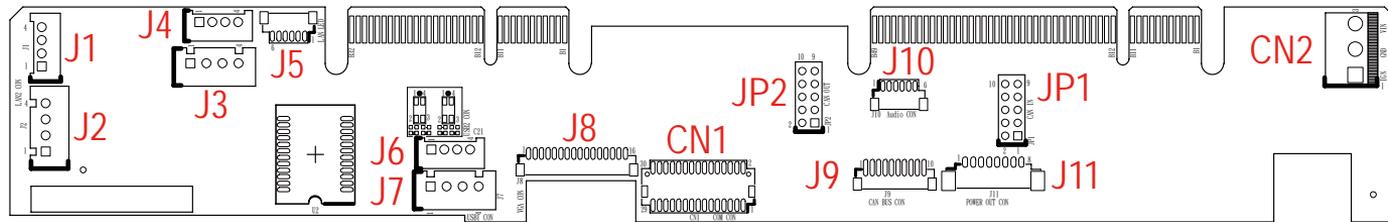
GPIO1.2/CAN2 Mode Selection

Connector size: 8-pin DIP switch
Connector location: SW1
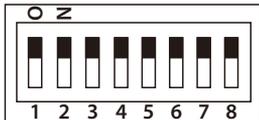
Pin	Definition	Pin	Definition
1	GAL_GPO1_R	2	C1708_2_L
3	GAL_GPO2_R	4	C1708_2_H
5	GAL_GPI2_R	6	CAN2_H
7	GAL_GPI1_R	8	CAN2_L
9	GPI1_CANL	10	GPI1_CANL
11	GPI2_CANH	12	GPI2_CANH
13	GPO2_C1708H	14	GPO2_C1708H
15	GPO1_C1708L	16	GPO1_C1708L

Pin	GPIO1.2 (*)	CAN2
SW1.1	ON	OFF
SW1.2	OFF	ON
SW1.3	ON	OFF
SW1.4	OFF	ON
SW1.5	ON	OFF
SW1.6	OFF	ON
SW1.7	ON	OFF
SW1.8	OFF	ON

(*) Default Setting

RS232/RS485/RS422 Mode Selection for COM2

Connector size: 8-pin DIP switch
Connector location: SW3
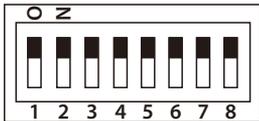
Pin	Definition	Pin	Definition
1	SP_CTS_2	2	RS422_TX-
3	SP_RTS_2	4	RS422_TX+
5	SP_RXD_2	6	RS485_-
7	SP_TXD_2	8	RS485_+
9	COM2_TXD_+	10	COM2_TXD_+
11	COM2_RXD_-	12	COM2_RXD_-
13	COM2_RTS_+	14	COM2_RTS_+
15	COM2_CTS_-	16	COM2_CTS_-

Pin	RS232 (*)	RS485	RS422
SW1.1	ON	OFF	OFF
SW1.2	OFF	OFF	ON
SW1.3	ON	OFF	OFF
SW1.4	OFF	OFF	ON
SW1.5	ON	OFF	OFF
SW1.6	OFF	ON	ON
SW1.7	ON	OFF	OFF
SW1.8	OFF	ON	ON

(*) Default Setting

COM1 RI/Power Switch

Connector size: 4-pin DIP switch
Connector location: SW2

Power Input Connector

Connector size: 1x3 3-pin header
Connector location: CN2

Pin	Definition	Pin	Definition
1	COM_12V	2	COM_5V
3	SP_RI_1	4	GND
5	COM_RI_PWR	6	COM_RI_PWR
7	COM_RI_PWR	8	COM_RI_PWR

Pin	Definition
1	IGNITION_F
2	VIN_GND1
3	VIN

Pin	12V	5V	RI (*)	GND
SW2.1	ON	OFF	OFF	OFF
SW2.2	OFF	ON	OFF	OFF
SW2.3	OFF	OFF	ON	OFF
SW2.4	OFF	OFF	OFF	ON

(*) Default Setting

Power Output Connector

Connector size: 1x8 8-pin header
Connector location: J11

1 □□□□□□□□ 8

Pin	Definition	Pin	Definition
1	MSMB_DATA	2	MSMB_DATA
3	GND	4	GND
5	GND	6	5V_OUT
7	12V_OUT	8	12V_OUT
MH1	GND	MH2	GND

USB Connector

Connector size: 1x4 4-pin header
Connector location: J7

4 ○ ○ ○ □ 1
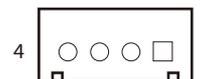
Pin	Definition	Pin	Definition
1	USB_2#	2	USB_2
3	USB2/3_FP	4	UGND_2

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USB Connector

Connector size: 1x4 4-pin header
Connector location: J6
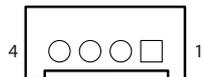
Pin	Definition	Pin	Definition
1	USB_3#	2	USB_3
3	USB2/3_FP	4	UGND_3

Audio Connector

Connector size: 1x6 6-pin header
Connector location: J10

Pin	Definition	Pin	Definition
1	FRONT_L_F	2	FRONT_JD
3	FRONT_R_F	4	MIC_JD_F
5	MIC_JD	6	AGND
MH1	AGND	MH2	AGND

LAN1 Connector

Connector size: 1x4 4-pin header
Connector location: J3
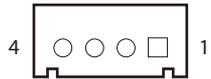
Pin	Definition	Pin	Definition
1	LAN_MDI_0P_R	2	LAN_MDI_0N_R
3	LAN_MDI_1P_R	4	LAN_MDI_1N_R

LAN1 Connector

Connector size: 1x4 4-pin header
Connector location: J4
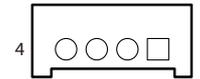
Pin	Definition	Pin	Definition
1	LAN_MDI_2P_R	2	LAN_MDI_2N_R
3	LAN_MDI_3P_R	4	LAN_MDI_3N_R

LAN2 Connector

Connector size: 1x4 4-pin header
Connector location: J2
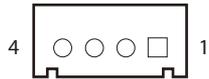
Pin	Definition	Pin	Definition
1	LAN1_MDI_0P_R	2	LAN1_MDI_0N_R
3	LAN1_MDI_1P_R	4	LAN1_MDI_1N_R

LAN2 Connector

Connector size: 1x4 4-pin header
Connector location: J1
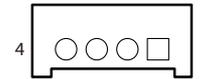
Pin	Definition	Pin	Definition
1	LAN1_MDI_2P_R	2	LAN1_MDI_2N_R
3	LAN1_MDI_3P_R	4	LAN1_MDI_3N_R

LAN LED Connector

Connector size: 1x6 6-pin header
Connector location: J5

1 ▯□□□□□ 6

Pin	Definition	Pin	Definition
1	3VSB	2	LAN_ACTLED#
3	GND	4	3VSB
5	LAN1_ACTLED#	6	GND
MH1	GND	MH2	GND

CANbus/GPIO Connector

Connector size: 1x10 10-pin header
Connector location: J9

1 ▯□□□□□□□□□ 10
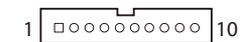
Pin	Definition	Pin	Definition
1	CAN1_L	2	CAN1_H
3	C1708_1_L	4	C1708_1_L
5	CAN_GPIO_GND	6	GPI1_CANL
7	GPI2_CANH	8	GPO1_C1708L
9	GPO1_C1708L	10	CAN_GPIO_GND
MH1	GND	MH2	GND

CANbus Input Connector

Connector size: 2x5 10-pin header
Connector location: JP1
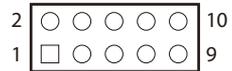
Pin	Definition	Pin	Definition
1	CAN2_TXD	2	CAN2_RXD
3	GAL_GPO4_DI	4	GAL_GPI4_DO
5	GND	6	GND
7	NC	8	NC
9	CAN_VCC	10	NC

CANbus Output Connector

Connector size: 2x5 10-pin header
Connector location: JP2
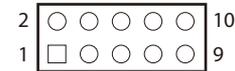
Pin	Definition	Pin	Definition
1	CAN2_H	2	C1708_2_H
3	CAN2_L	4	C1708_2_L
5	GND	6	GND
7	NC	8	NC
9	NC	10	NC

VGA Connector

Connector size: 1x16 16-pin header
Connector location: J8
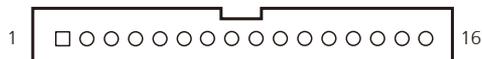
Pin	Definition	Pin	Definition
1	VGA_GND	2	VGA_+5V
3	VGA_CLK	4	VGA_DATA
5	VGA_VS	6	VGA_HS
7	VGA_GND	8	VGA_GND
9	VGA_GND	10	RGB_GND
11	VGA_BLUE	12	RGB_GND
13	VGA_GREEN	14	RGB_GND
15	VGA_RED	16	NC
MH1	GND	MH2	GND

COM Connector

Connector size: 2x15 30-pin header
Connector location: CN1
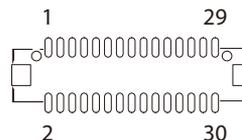
Pin	Definition	Pin	Definition
1	USBPWR_1PPS	2	USBP_ODOMETER
3	USBGND_DIRECTION	4	USBN_GPIO22_GPS
5	SP_TXD_3	6	SP_RXD_3
7	SP_DCD_2	8	COM3_GND
9	COM2_TXD_+	10	COM2_RXD_-
11	COM2_GND	12	SP_DTR_2
13	COM2_RTS_+	14	SP_DSR_2
15	SP_RI_2	16	COM2_CTS_-
17	SP_DCD_1	18	SP_RXD_1
19	SP_TXD_1	20	SP_DTR_1
21	COM1_GND	22	SP_DSR_1
23	SP_RTS_1	24	SP_CTS_1
25	COM_RI_PWR	26	COM_CH_GND
27	NC	28	NC
29	NC	30	NC

Chapter 6: Function Key Code Constants

Visual Basic Reference

Constant	Value	Description	Constant	Value	Description
vbKeyF1	112	F1 key	vbKeyF6	117	F6 key
vbKeyF2	113	F2 key	vbKeyF7	118	F7 key
vbKeyF3	114	F3 key	vbKeyF8	119	F8 key
vbKeyF4	115	F4 key	vbKeyF9	120	F9 key
vbKeyF5	116	F5 key	vbKeyF10	121	F10 key

Note: Source by Microsoft website

http://msdn.microsoft.com/en-us/library/aa243025(v=VS.60).aspx

"How to capture a pressed function keys", please refer to the Microsoft technical support website

http://support.microsoft.com/kb/822492/en-us

Key code value for ActionScript 2.0 in Adobe Flash

http://help.adobe.com/en_US/AS2LCR/Flash_10.0/help.html?content=00000520.html

Extended ASCII Keyboard Codes

Char.	Meaning Hex	Octal	Binary	
F1 key	59	3B	073	00111011
F2 key	60	3C	074	00111100
F3 key	61	3D	075	00111101
F4 key	62	3E	076	00111110
F5 key	63	3F	077	0011111
F6 key	64	40	100	01000000
F7 key	65	41	101	01000001
F8 key	66	42	102	01000010
F9 key	67	43	103	01000011
F10 key	68	44	104	01000100

Chapter 7: Touchscreen Installation Guide

This chapter describes how to install drivers and other software that enables your touchscreen controller to work with various operating systems.

The touchscreen support the following operating systems:

O.S. Driver	DOS	2000/XP/2003/VISTA/7/8	Linux (Kernel 2.6 & X-Windows Mode)	Win CE (4.2/5.0/6.0/7.0)
USB Driver		✓	✓	✓

7.1 Install PenMount Windows Universal Driver (for 2000/XP/XPT/XPE/2003/VISTA/7/WES7/2008/8)

Before installing **PenMount Windows Universal Driver**, you must have had installed one of the operating systems from Windows 2000/XP/XPT/XPE/2003/VISTA/7/WES7/2008/8 in your computer, and one of PenMount control boards from 6200x, 6202B, 6300x, or 6500x must have been installed.

Before installing PenMount Windows Universal driver V2.4.0.306, you may modify the default options from \PenMount Universal Driver V2.4.0.306\Driver\Install.ini:

Install	USB	1. Install PenMount USB driver.
		0. Uninstall PenMount USB driver.
	COM	1. Install PenMount RS232 driver.
		0. Uninstall PenMount RS232 driver.
	MMonitor	1. Install PenMount driver for multi-device recognition.
		0. Uninstall PenMount driver for multi-device recognition.
	ENUM	1. Install PenMount driver for non-pnp device recognition.
		0. Uninstall PenMount driver for non-pnp device recognition.
Option	TouchReport	1. The default setting of Windows 2k/XP/Vista/7 is mouse mode.
		2. The default setting of Windows 2k/XP is mouse mode; the default setting of Windows 7/ Vista is digitizer mode.
	EdgeOffset	0, 5, 10, 15, 20, 25, 30 are the default values for edge compensation.
	Smoothing	1. Turn on the smoothing function.
		0. Turn off the smoothing function.

	Operation	The default settings of operating mode: 0. Pen Input Emulation 2. Mouse Emulation 1. Click on Touch 3. Click on Release
	CalibOffset	This function is unable to be modified.
	RBtnPressNHold	0. Turn on long-pressed right key function. 1. Turn off long-pressed right key function.
Serial	ScanAllPorts	1. Turn on "Scan All Ports" to confirm PenMount RS232 device. 0. Turn off "Scan All Ports" for the confirmation of PenMount RS232 device.

	COM3=xxxx,yyyy	To set up the permanent system COM port for PenMount RS232 driver.
		COM3-to correct it to be correspondent with the actual COM PORT.
		xxxx-the supporting item number: 9000/ 6000 or PCI.
		yyyy-the baud rate 19200 or 9600 of item 6000 or item 9000;
		     baud rate 38400 is only for PCI items.
		# Please note that the information above must be correct, so that the device
		   can just work normally, and ENUM must be set as 1.
		Example: COM1= PCI, 38400
		       # Permanently install PCI RS232 38400bps at COM1
		       COM3= 6000,19200
		       #Permanently install PM6000 RS-232 19200bps at COM3
		       COM4=9000,9600
		       #Permanently install PM9000 RS-232 9600bps at COM4

PS. Set the symbol";" in front of the parameter, which means not to perform the parameter.

Example:

; TouchReport =2, it will not be installed as Digitizer mode directly in Windows 7, the user can select Digitizer or mouse mode during the installation procedure.

; COM1=PCI,38400, it will not install the driver at COM1 permanently.

7.1.1 Install PenMount Mouse Driver in Windows 2000/XP/XPT/XPE/2003/VISTA/7/WES7/2008/8

If you have an older PenMount driver installed on your system, uninstall it first and follow the steps below to install **PenMount Windows Universal Driver**:

Plug in your PenMount 6000 control board and install **PenMount Windows Universal Driver**. Make sure the driver is installed before control board is plugged. Then the driver will have the assigned COM port or USB port detect PenMount device.

To install the driver:

1. In folder **PenMount Universal Driver**, find "**Setup.exe**" and run it.
2. A **License Agreement** window appears. Click "**I Agree**" and "**Next**".
3. When ready to install the program, click "**Install**".
4. Installation takes some time.
5. When the warning message screen appears, please click "**Continue Anyway**" to continue.

6. When the window below shows up, please select "yes" for installing PenMount as mouse mode; select "no" for digitizer mode. If your operating system doesn't support Windows tablet input, digitizer device can't be used, therefore you have to select "yes" here, otherwise after the installation the touch doesn't work after re-booting.
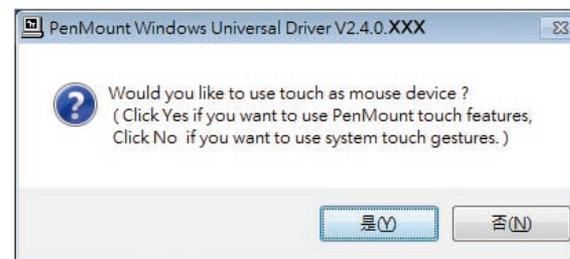
7. A window notifying of installation completion appears. Click "**Finish**".

   NOTE: If you are installing the driver with Microsoft WHQL, you will see the screen in step 6 directly instead of step 5.

8. Then restart operating system.

   As soon as driver installation finishes, both the icons of **PenMount Monitor** and **Gesture AP** show up in the notification area.

7.1.2 Install PenMount Digitizer Driver in Windows XPT/VISTA/7/WES7/2008/8

The installation steps of the default settings are consistent with XP. When you select "no" for step 6, PenMount will be installed as a digitizer device; If your operating system doesn't support Windows tablet input, digitizer device can't be used, therefore you have to select "yes" here, otherwise after the installation the touch doesn't work after re-booting.

After the installation, you will see the difference that a **PenMount Control** Panel icon shows up on the desktop without a icon in the notification area. See the screenshot below:
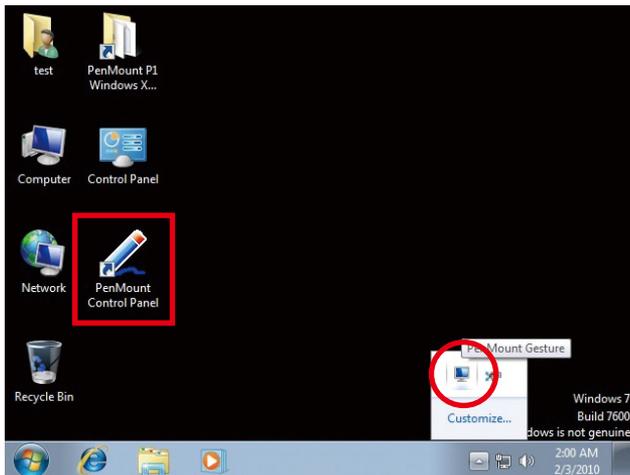
7.1.3 Configure Touchscreen In PenMount mouse driver

Click on the **PenMount Monitor** icon in the notification area and select **Control Panel** from the menu.

On **PenMount Control Panel** you are able to see the device of PenMount 6000 USB/RS-232 detected by your system under **Device** tab. Select a device and click the **Configure** button.
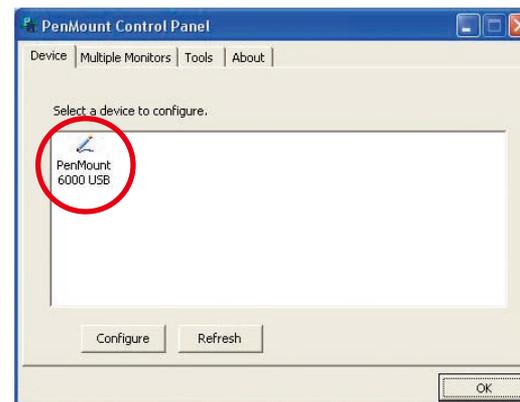
7.1.4 PenMount Control Panel

The functions under **PenMount Control Panel** are:

Device
In this window, you can find out how many devices are detected by your system.

Calibrate
This function offers two ways to calibrate your touchscreen. '**Standard Calibration**' adjusts most touchscreens while '**Advanced Calibration**' adjusts aging touchscreens.

Standard Calibration	Click this button and arrows appear pointing to red squares. Use your finger or stylus to touch the red squares in sequence. After the fifth red point calibration is complete. To skip, press '**ESC**'.
Advanced Calibration	**Advanced Calibration** uses 9, 16 or 25 points to effectively calibrate touch panel linearity of aged touchscreens. Click this button and touch the red squares in sequence with a stylus. To skip, press '**ESC**'.
Command Calibration	**Command call calibration function. Use command mode call calibration function, this can uses 4, 9, 16 or 25 points to calibrate.** E.g. Please run ms-dos prompt or command prompt. c:\Program Files\PenMount Universal Driver\DMCCtrl.exe -calibration 4 (Standard Calibration) DMCCtrl.exe - calibration ($) 4=Standard Calibration 4 9=Advanced Calibration 9 16=Advanced Calibration 16 25=Advanced Calibration 25

To calibrate your touchscreen:

1. Please select a device then click "**Configure**". You can also double click the device too.

2. Click "**Standard Calibration**" to start standard calibration or "**Advanced Calibration**" to start Advanced Calibration.

NOTE: The older a touchscreen is, the more calibration points of the **Advanced Mode** it needs. For an optimal accuracy we suggest to use a stylus to make the advanced calibration.

Plot Calibration Data	Check this function to have touch panel linearity comparison graph appear when you finish **Advanced Calibration**. The black lines reflect the ideal linearity assumed by PenMount's application program while the blue lines show the approximate linearity calculated by PenMount's application program as the result of user's execution of **Advance Calibration**.
Turn off EEPROM storage	This function disables the write-in of calibration data in **Controller**. This function is enabled by default.

Setting
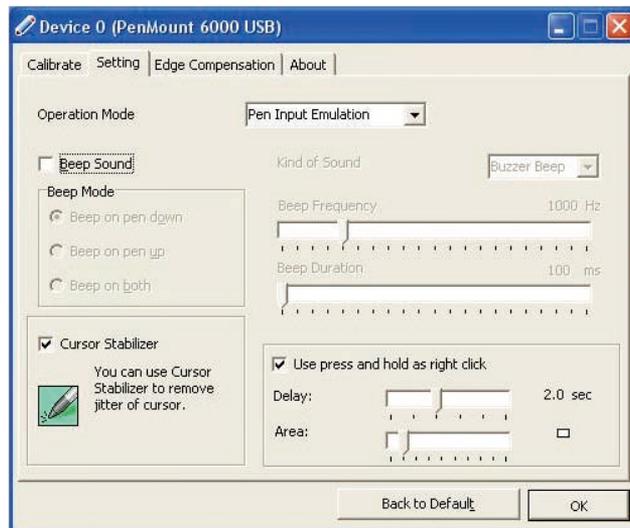
Operation Mode		This mode enables and disables mouse's ability of dragging on-screen icons—useful for configuring POS terminals.
	Pen Input Emulation	Select this mode and mouse will emulate Windows Vista pen input device operation, by which no mouse event will be sent until the touch is dragged out of range or released from the screen.
	Mouse Emulation	Select this mode and mouse functions as normal and allows dragging of icons.
	Click on Touch	Select this mode and mouse only provides a click function, and dragging is disabled.
	Click on Release	Select this mode and mouse only provides a click function when the touch is released.
Beep Sound	**Enable Beep Sound**	turns beep function on and off.
	Beep on Pen Down	beep occurs when pen comes down.
	Beep on Pen Up	beep occurs when pen is lifted up.
	Beep on both	beep occurs when comes down and is lifted up.
	Beep Frequency	modifies sound frequency.
	Beep Duration	modifies sound duration.

| Cursor Stabilizer | Enable the function support to prevent cursor shake. |
| Use press and hold as right click | You can set the time out and area for you need |

Edge Compensation
This page is the edge compensation settings. You can adjust the settings from 0 to 30 for accommodating the difference of each touch panel.

About
This panel displays information about the PenMount controller and driver version.
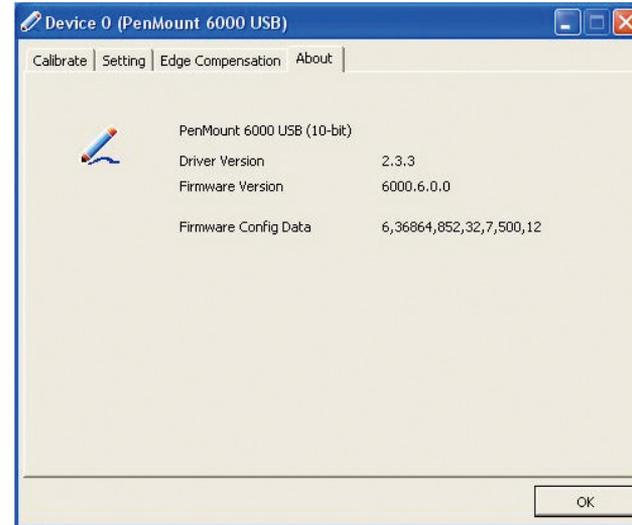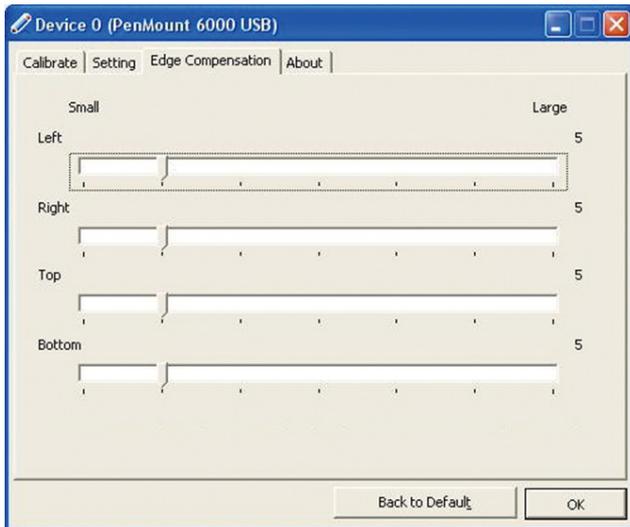
7.1.5 PenMount Monitor Menu Icon

PenMount Monitor icon (PM) appears in the notification area of Windows system when you turn on **PenMount Monitor** in **PenMount** utility.

PenMount Monitor has the following functions:
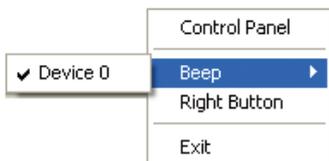
Control Panel	Open PenMount **Control Panel**.
Beep	Setting **Beep** function for each device.
Right Button	When you select this function, a mouse icon appears in the right-bottom of the screen. Click this icon to switch between **Right** and **Left Button** functions.
Exit	Exits the **PenMount Monitor** function.

7.1.6 PenMount Rotating Function

PenMount Windows Universal Driver supports several display rotating software packages and auto-detects rotate function (0°, 90°, 180°, 270°). The display rotating software package supported in Windows 2000, XP 32bit, Vista 32/64bit are:

1. Intel Display Driver Rotate Function.
2. ATI Display Driver Rotate Function.
3. nVidia Display Driver Rotate Function.
4. SMI Display Driver Rotate Function.
5. Portrait's Pivot Screen Rotation Software.

Configure Rotate Function in Windows XP 64bit

1. There is a "**Screen Rotation Monitor**" button that appears only in the PenMount driver utilities for Windows XP 64bit system.
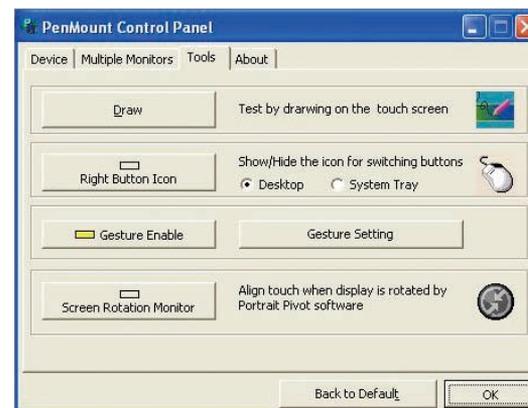
2. On enabling "**Screen Rotation Monitor**", you will see a screen like below:
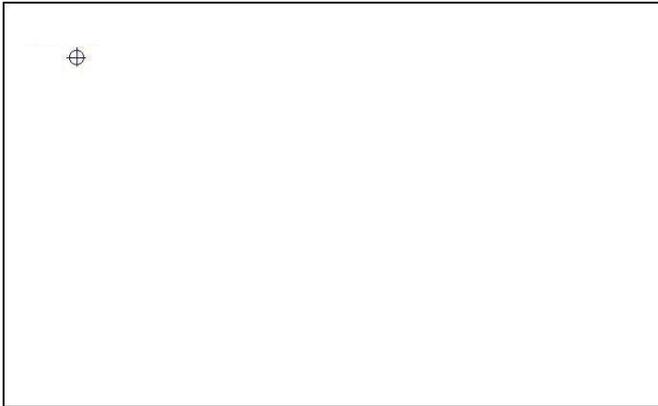
3. Choose rotate function (0°, 90°, 180°, 270°) in the 3rd party software. The calibration screen will appear automatically. Touch this point and rotation is mapped.

   NOTE: Rotate function is disabled if you use **Monitor Mapping**.

7.1.7 The Touchscreen Configure of PenMount Digitizer Driver

With PenMount Windows Universal V2.2.0.283 and the later versions, since the touchscreen is automatically installed as a digitizer device in Windows Vista/7, the functions built in Windows Vista / 7 such as rotation, multi-monitor, flicks, and context menu function (which launches a context menu by user's long-pressing on touchscreen rather than clicking the right mouse button or pressing the application key on the keyboard) will be supported.

To configure touchscreen in PenMount Digitizer driver:

Double-click on the **PenMount Control Panel** icon on the Desktop.

On **PenMount Control Panel** you are able to see the device of PenMount 6000 USB/RS-232 detected by your system under **Device** tab. Select a device and click the **Configure** button.
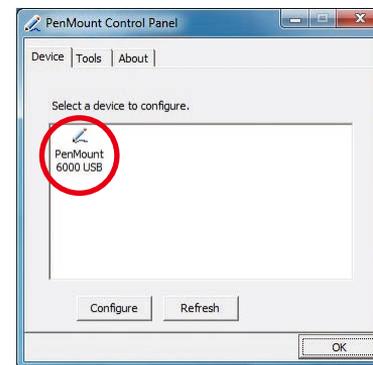
7.1.7.1 PenMount Control Panel

The functions under **PenMount Control Panel** are:

Device
In this window, you can find out how many devices are detected on your system.

Calibrate
This function offers two ways to calibrate your touchscreen. '**Standard Calibration**' adjusts most touchscreens while '**Advanced Calibration**' adjusts aging touchscreens.

Standard Calibration	Click this button and arrows appear pointing to red squares. Use your finger or stylus to touch the red squares in sequence. After the fifth red point calibration is complete. To skip, press '**ESC**'.
Advanced Calibration	**Advanced Calibration** uses 9, 16 or 25 points to effectively calibrate touch panel linearity of aged touchscreens. Click this button and touch the red squares in sequence with a stylus. To skip, press '**ESC**'.
Command Calibration	**Command call calibration function. Use command mode call calibration function, this can uses 4, 9, 16 or 25 points to calibrate.** E.g. Please run ms-dos prompt or command prompt. c:\Program Files\PenMount Universal Driver\DMCCtrl.exe -calibration 4 (Standard Calibration) DMCCtrl.exe - calibration ($) 4= Standard Calibration 4 9= Advanced Calibration 9 16= Advanced Calibration 16 25= Advanced Calibration 25

To calibrate your touchscreen:

1. Please select a device then click "**Configure**". You can also double click the device too.

2. Click "**Standard Calibration**" to start standard calibration or "**Advanced Calibration**" to start Advanced Calibration.

NOTE: The older a touchscreen is, the more calibration points of the **Advanced Mode** it needs. For an optimal accuracy we suggest to use a stylus to make the advanced calibration.

Plot Calibration Data

Check this function to have touch panel linearity comparison graph appear when you finish **Advanced Calibration**. The black lines reflect the ideal linearity assumed by PenMount's application program while the blue lines show the approximate linearity calculated by PenMount's application program as the result of user's execution of **Advance Calibration**.

Turn off EEPROM storage

This function disables the write-in of calibration data in **Controller**. This function is enabled by default.

Edge Compensation

This page is the edge compensation settings. You can adjust the settings from 0 to 30 for accommodating the difference of each touch panel.

About

This panel displays information about the PenMount controller and driver version.
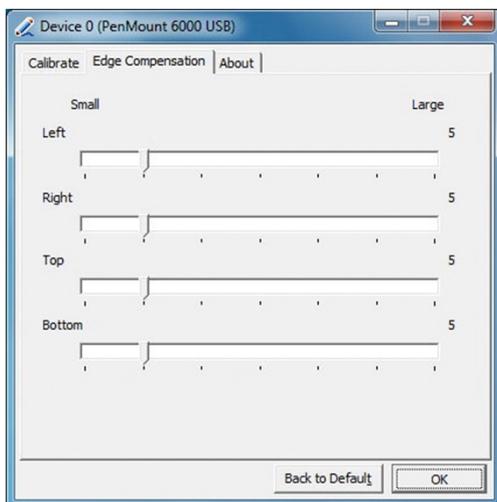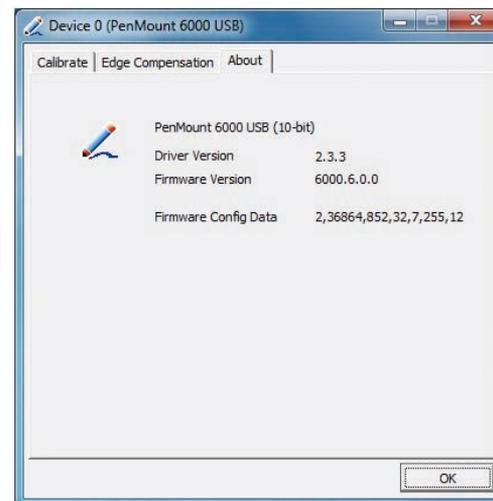
7.1.8 Uninstall PenMount Windows Universal Driver

1. Go to **Control Panel**. Click "**Add/Remove program**". Select "**PenMount Universal Driver**". Click "**Change/Remove**" button.
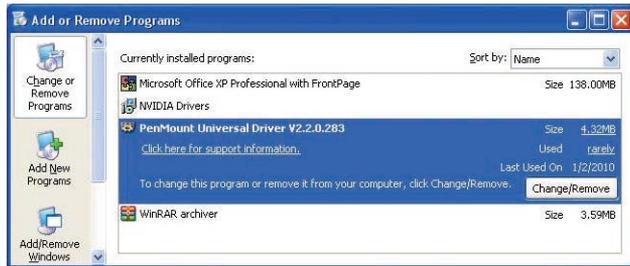
2. Select '**Uninstall**' to remove **PenMount Windows Universal Driver**.

7.2 Install PenMount Linux X Window USB Driver

Before installing **PenMount Linux X Window USB Driver**, you must have had Linux X Window installed and running on your computer.

PenMount Linux X Window USB Drivers support the following operating systems:

	USB
Ubuntu 6.06/ 6.10/ 7.04/ 7.10/ 8.04/ 8.10/ 9.04/ 9.10/ 10.04/ 10.10/ 11.04/ 11.10/12.04 32_64bit	✓
Debian 4.0/ 5.0 32_64bit/ 6.0	✓
Debian 3.1	✘
Fedora 4/5/6/7/89/10/11/12/13 /14/15/16/17 32_64bit	✓
Fedora Core4_64bit	✘
Fedora Core3	✘
Fedora Core2	✘
Slackware12.0/12.1	✓
Slackware10.0	✘
Red Hat 9.0	✘
Red Hat 7.3/8.0	✓
OpenSuse 10.1/ 10.2/ 10.3/ 11/ 11.1/ 11.2/ 11.3/ 11.4/ 12.1 32_64bit	✓
Suse 10.0	✘
Suse 9.2/9.3	✘
Suse 8.0/9.0/9.1	✘

Cent OS 5.2/ 5.3/ 5.4/ 5.5/ 6.0/ 6.2 32_64bit	✓
Linux XFree86 4.x.x	✘
Linux XFree86 3.3.6	✘
Linux For GPM	✓
QNX 6.4.1/ 6.5	✓
QNX 6.3.2	✘
QNX 6.2	✘
Android	✓

7.2.1 Install PenMount Linux X Window USB Driver

See the readme file included in the driver folder.

7.2.2 Calibration Utilities

See the readme file included in the driver folder.

7.3 Install PenMount WinCE Driver

Before installing **PenMount WinCE Driver**, you must have WinCE system installed and running in your device.

7.3.1 Install PenMount WinCE Driver

Please see the readme file included in the driver folder.

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Chapter 8: Touchscreen Driver Software Functions

This chapter will guide you to the special software functions that configure and adjust the PenMount controller and touchscreen hardware. Please note that not all of the functions are available for every driver. See the following table for drivers' software functions and their availability for specific interface and systems:

Software Function	DOS	2000/XP/2003	VISTA/7/8	WinCE	Linux
Standard Calibration	✓	✓	✓	✓	✓
Advanced Calibration		✓	✓	✓	✓
Multiple Monitors		✓	✓		
Multi Device		✓	✓		
Rotation		✓	✓		
Operation Mode		✓	✓		
Drawing mode	✓	✓	✓	✓	
Beep Sound	✓	✓	✓		✓
Beep sound adjustable		✓	✓		
Wake up function		✓	✓		
Showing linearity		✓	✓		
Right button		✓	✓	✓	✓
Hide cursor	✓				
Double click area and speed adjustable		✓	✓		
About		✓	✓		
Edge Compensation		✓	✓		
Refresh		✓	✓		

Remark: With PenMount Windows Universal V2.2.0.283 and later versions, since the touchscreen is automatically installed as a digitizer device in Windows Vista/7/8, the functions which are built within Windows Vista/ 7/ 8 such as rotation, multi-monitors, flicks, and context menu function (which launches a context menu by user's long-pressing on touchscreen rather than clicking the right-mouse button or pressing the application key on the keyboard) will be supported.

The following content in this chapter deals mainly with **PenMount Windows Universal Driver (for 2000/XP/2003/VISTA/7/8)**. For this driver, the function of **Tools** should be made known to you first. When you click the PenMount icon in the notification area and select "**Control Panel**" from the menu, "**PenMount Control Panel**" with the four tags "**Device**", "**Multiple-Monitors**", "**Tools**", "**About**" will appear as the screenshot below:
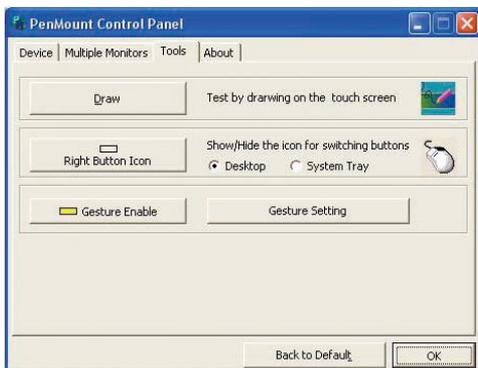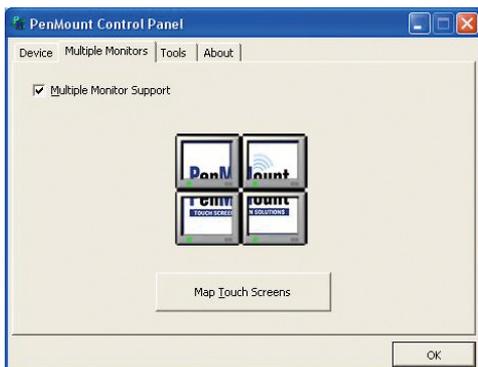
The buttons on such "**PenMount Control Panel**" have the following functions:

Draw	Tests or demonstrates the **PenMount** touchscreen operation.
Right Button Icon	Enable right button function. The icon can show on **Desktop** or in the **notification area**.
Gesture Enable	Enable/configure **Gesture AP** to support PenMount gestures recognition.
Screen Rotation Monitor	The function supports **nVidia**, **Intel**, **SMI** or **ATI** and software such as **Portrait Pivot Pro** rotation automatic detection.

8.1 Standard Calibration

Standard Calibration function lets you match the touchscreen to your display so that the point you touch is accurately tracked on screen. **Standard Calibration** only requires four points for calibration and one point for confirmation. Under normal circumstance **Standard Calibration** is all you need to perform an accurate calibration.

8.2 Advanced Calibration

Advanced Calibration function improves the accuracy of calibration by using more involved engineering calculations. Use this function only if you have tried the **Standard Calibration** and there is still a discrepancy in the way the touchscreen maps to the display. You can choose 9, 16 or 25 points to calibrate, though we suggest that you first try 9 points, if it is still not tracking well then try 16 or 25 points. The more points you use for calibration, the greater the accuracy. Errors in calibration may occur due to viewing angle, or individual skill, and there may be little difference in using 16 or 25 points. Note that a stylus is recommended for the most accurate results.

8.3 Rotation

There are currently a number of software packages on the market that support rotating monitors 0°, 90°, 180°, and 270°. However you will not be able to use a touchscreen unless it is matched to the appropriate rotation. Our rotation configuration function allows you to easily match the touchscreen when you rotate your monitor.

If you use a rotating monitor you will need a display card such as from **nVidia**, **Intel**, **SMI** or **ATI** and software such as **Portrait Pivot Pro**. For software operation and features, please refer to your software manual.

Configuring the rotation function is easy. Select this option and a 'point' appears for you to touch. Once the point is touched the software driver understands which degree you plan to rotate your display. The rotation function supports 90, 180 and 270 degrees rotation.

8.4 Draw

Tests or demonstrates the PenMount touchscreen operation. The display shows touch location. Click **Draw** to start. Touch the screen with your finger or a stylus and the drawing screen registers touch activity such **left**, **right**, **up**, **down**, **pen up**, and **pen down**.

Touch the screen with your finger or a stylus and the drawing screen registers touch activity such **left**, **right**, **up**, **down**, **pen up**, and **pen down**.

Click **Menu** button for more functions.
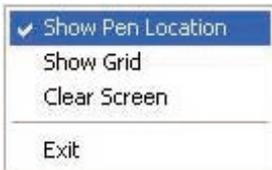
Show Pen Location is to show the locations where pen comes down and lifted up on the monitor.
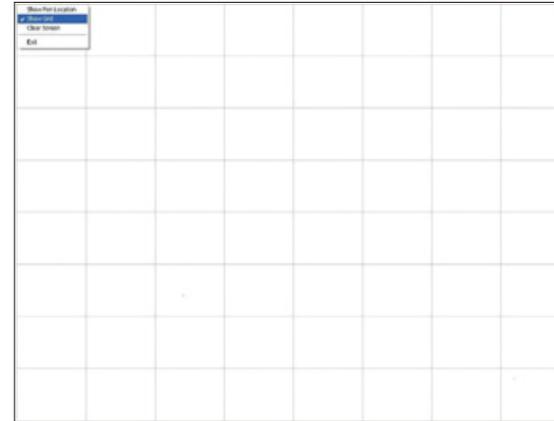
Show Grid is to show grid on the entire monitor. This is for linearity test.
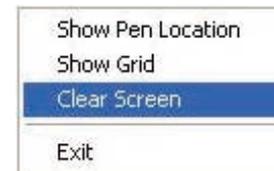
Select **Clear Screen** to clear drawing.
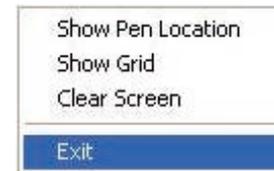
Select **Exit** to quit draw function.

8.5 Mouse Operation Mode

Mouse Operation Mode enables and disables mouse's ability of dragging onscreen icons, which is applicable to the configuration of POS terminals.

Pen Input Emulation	Select this mode and mouse will emulate Windows Vista pen input device operation, by which no mouse event will be sent until the touch is dragged out of range or released from the screen.
Mouse Emulation	Select this mode and mouse functions as normal and allows dragging of icons.
Click on Touch	Select this mode and mouse only provides a click function, and dragging is disabled.
Click on Release	Select this mode and mouse only provides a click function when the touch is released.

8.6 Beep Sound

All of PenMount's drivers support the beep sound function; however some PC systems may only offer a fixed buzzer sound.

8.7 Beep Sound Adjustable

Software drivers for Windows systems let the user adjust the frequency and length of the beep sound. The drivers let the user adjust the desired touchscreen sound, as well as turn the sound off.

8.8 Wake Up Function

Wake Up function lets the user touch the screen and wake the system up from 'suspend' mode.

8.9 Plot Calibration Data

Plot Calibration Data function displays the touchscreen linearity map, which is available if the PenMount driver provides an **Advance Calibration** function. When touchscreens age their touch linearity declines. This non-linearity is apparent when the touched point on the touchscreen is not the same as the point on the display. The **Plot Calibration Data** function shows the linearity status of the touchscreen. This is only a support function for the user. The exact linearity of a touchscreen requires a linearity test machine.

8.10 Right Button

Right Button function simulates the right button function of a mouse. Click the right button and the user can only touch the screen once and the driver changes the touch definition to the left button.

8.11 Hide Cursor

Hide Cursor function keeps the cursor arrow and other cursor symbols from appearing when using the touchscreen. The cursor appears when user turns this function off.

8.12 Cursor Offset

Cursor Offset function lets the user adjust the position of the touch point to a desired location away from the real touch point.

8.13 Double Click Area and Speed

Double Click Area and Speed function lets the user adjust the double click area and speed to their personal preference.

8.14 About

This option shows the exact version of the drivers and controller firmware. Updated drivers are available for downloading on the PenMount website at http://www.penmount.com/
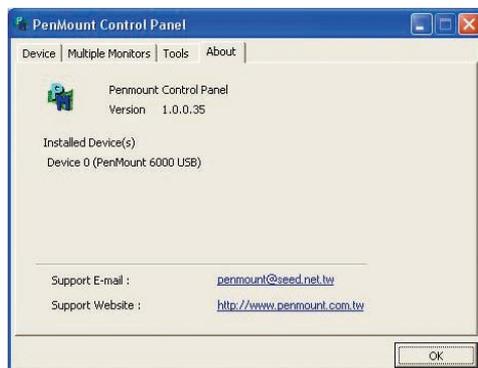
8.15 Edge Compensation

In PenMount **Control Panel**, when any of the detected PenMount device is selected and the **Configure** button is pressed, you will be able to see the **Edge Compensation** tag, which is for **Advanced Calibration**. You can adjust the settings from 0 to 30 for accommodating the difference of each touch panel. (Note: **Edge Compensation** is only supported by PenMount Windows Universal Driver (for Windows 2000/XP/2003/VISTA).)
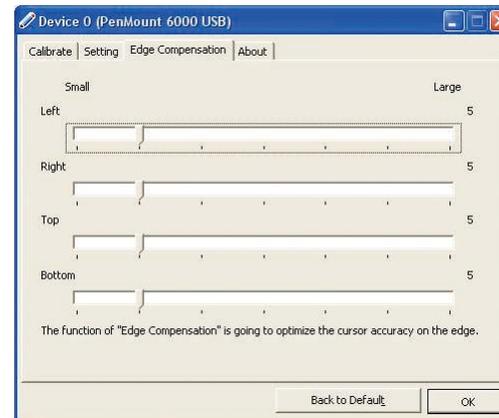
8.16 Refresh

If you installed PenMount driver package 2.1.0.187 and after, you can click the **Refresh** button on PenMount **Control Panel** to detect the newly attached PenMount devices. (Note: **Refresh** is only supported by PenMount Windows Universal Driver (for Windows 2000/XP/2003/VISTA).)
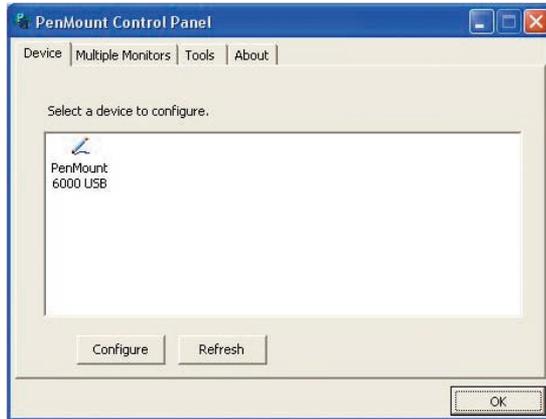
Chapter 9: PenMount Gesture AP for Windows

This chapter will guide you to the PenMount Gesture AP that is applicable in Windows.

9.1 Invoke PenMount Gesture AP

1. To run PenMount Gesture AP.

In the notification, right-click on the PenMount icon and select **Gesture Enable** from the menu. A **PenMount Gesture** AP icon will show up in the notification area. See the illustration below. **PenMount Gesture AP** is running.
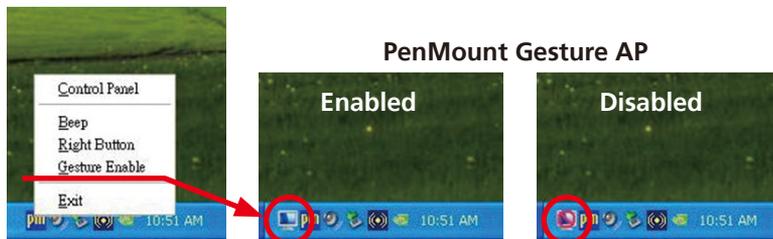
or

In **PenMount Control Panel**, select **Tools** tab and press **Gesture Enable** button. **PenMount Gesture AP** icon shows up in the notification area. **PenMount Gesture AP** is running.

PenMount Gesture AP

Enabled **Disabled**

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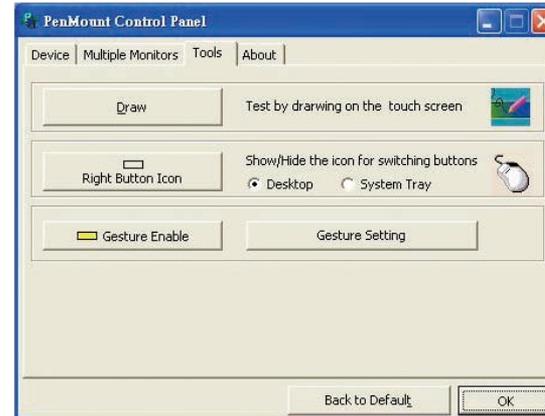
9.2 Configure PenMount Gesture AP

To configure PenMount Gesture AP.

1. Right-click on the **PenMount Gesture AP** icon in the notification area, select **Gesture Setting** from the menu that appears. See the illustration below.

or

Select **Tools** tab and click **Gesture Setting** button in **PenMount Control Panel**.

2. **[Gesture Setting]** window displays.
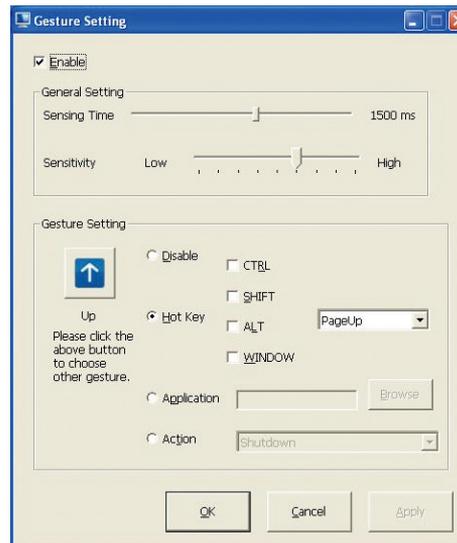
3. 15 **PenMount Gestures** are provided in total.

PenMount Gestures for Windows XP

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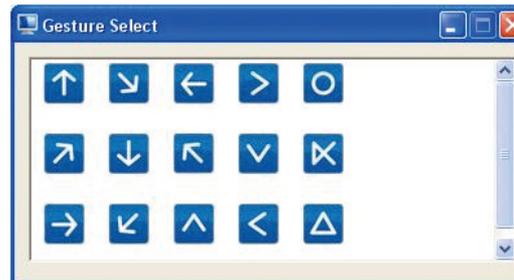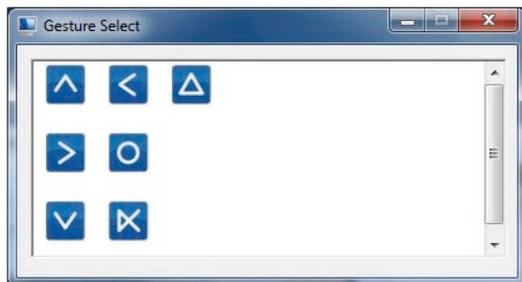
PenMount Gestures for Windows Vista / 7/ 8

In the **[Gesture Setting]** window, you can proceed to configure **PenMount Gesture AP**:

See picture below.

a.	**Enable/disable Check Box**. Select/deselect the box to enable/disable Pen-Mount Gestures.
b.	**General Setting Box**
b-1.	**Sensing Time** - Move the slider to adjust **PenMount Gestures Sensing Time** between 200 ms (0.2 sec) and 2500 (2.5 sec). The shorter the sensing time is configured, the faster the gesture has to be done.
b-2.	**Sensitivity** – Move the slider to adjust how sensitive you want your finger stroke on the touchsceen to be sensed.
c	**Gesture Settings Group Box**. This group box allows you to individually configure each gesture.
d	**Gesture Select Button**. Press this button to select the specific gesture you are going to configure. When the gesture icon turns to blue, it is enabled. When it is gray, it is disabled. See the following for details.
d-1.	**Disable Button**. When this button is selected, the gesture is disabled.
d-2.	**Hot-key Configure Button**. Configure the hot-keystrokes for specific gesture. The hot-key can include up to 5 keystrokes. When that gesture is sensed, the configured keystrokes will be reported.
d-3.	**Application Invoke** Button. Configure to invoke a specific application with particular gesture. So that when the gesture is sensed, the specific application will run.
d-4.	**Action Configure Button**. Configure to make use of **PenMount Gesture AP**'s built-in shortcuts. So that when a particular gesture is sensed, a specific action will be taken. **PenMount Gesture AP** have the following shortcuts built in:

Note: For **Disable touch function**, after touch function is disabled, the mouse-pointer won't move following your finger sliding on the touchscreen and your finger tapping won't trigger any action, however, gestures will still be sensed.

(If you select Disable touch function, the curser will not react to finger movement on the touch screen and the tapping will not trigger any program action. However, the gesture recognition is still functioning.)

9.3 PenMount Gestures' Default Values in Windows XP

↑	Page Up	↓	Page Down
←	Backward (Left Arrow)	→	Forward (Right Arrow)
↗	Copy (Ctrl + C)	↘	Paste (Ctrl + V)
↙	Undo (Ctrl + Z)	↖	Delete
∧	Zoom in ([Pad] +)	∨	Zoom out ([Pad] -)
<	Rotate Counter Clockwise (Ctrl + L)	>	Rotate Clockwise (Ctrl + K)
△	Open On-Screen Keyboard (Execute OSK.EXE)	O	Save Document (Ctrl + S)
✕	Close Program (Alt + F4)		

Chapter 10: Hotkey Setup Procedure

Installing NEXCOM Function Key App

1. Double click "**HotkeyAPP.exe**"
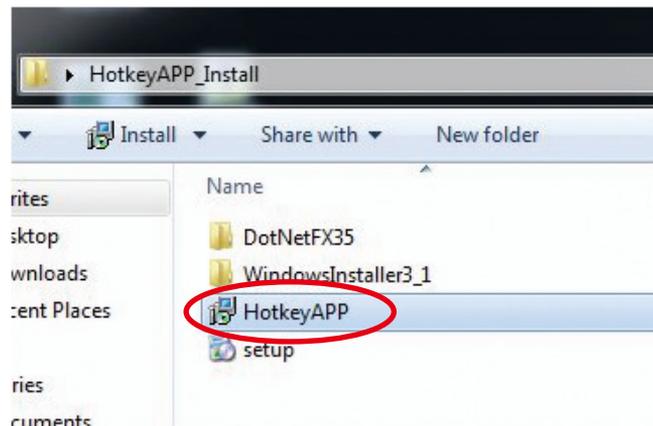
2. Select the installation folder and complete the installation.
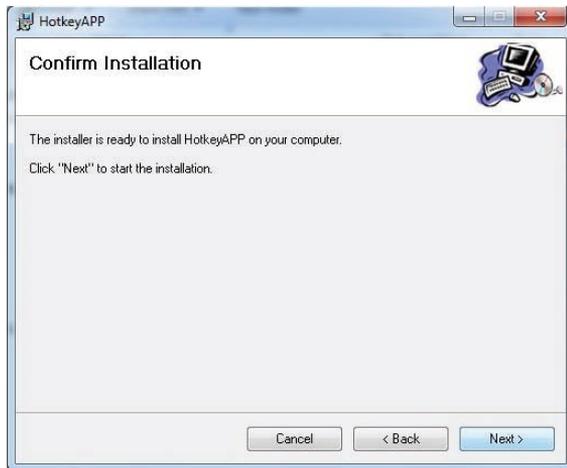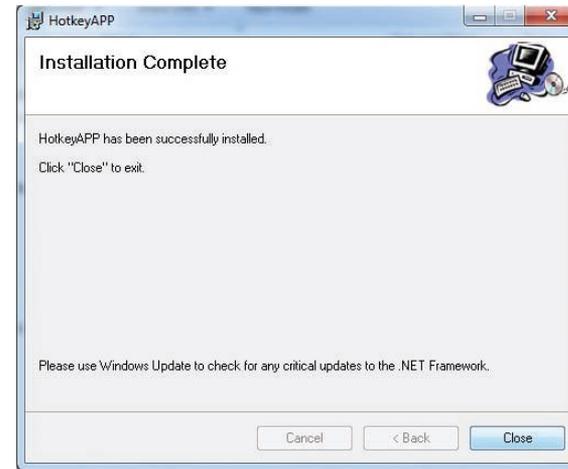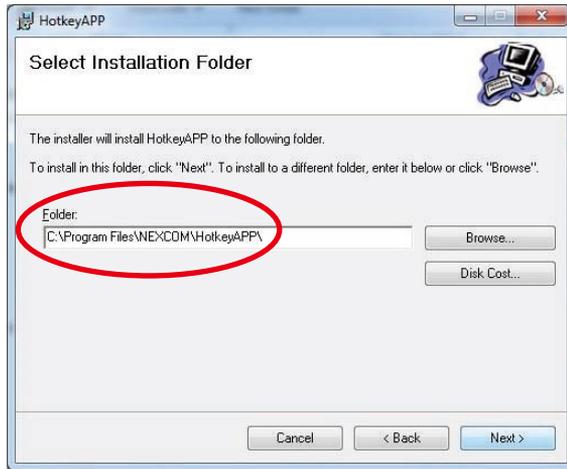
Applying Administrator Authority

1. Right click "**Hotkey.exe**" in installation folder, then select "**properties**".
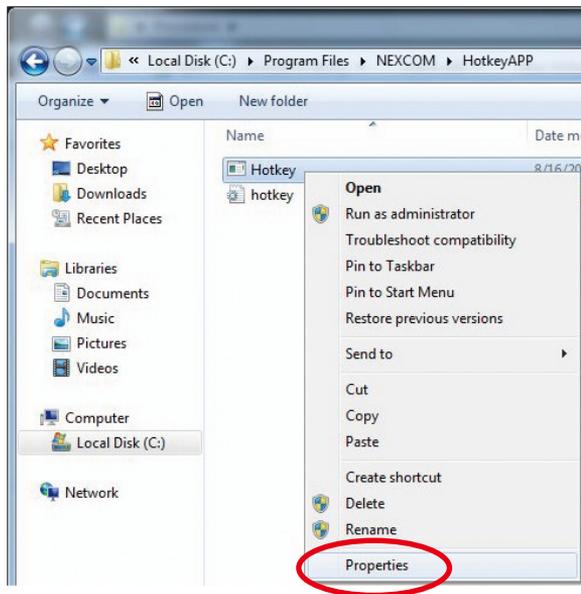
2. Switch to the **Compatibility** tab, then check "**Run this program as an administrator**". Click "**OK**", then execute "**Hotkey.exe**".
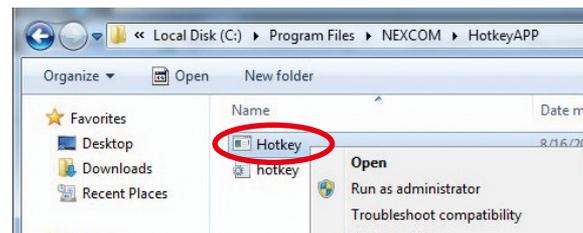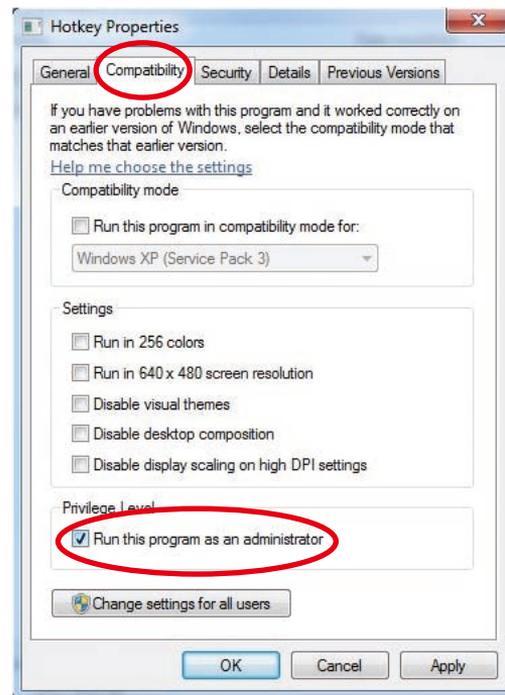
Setup Hotkey Function

1. Right click "F1 icon" in system bar, then select "Open AP".
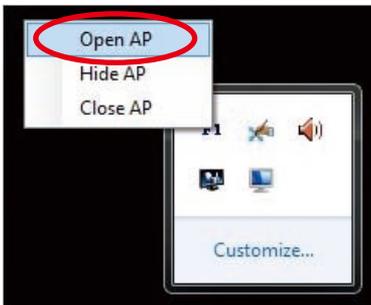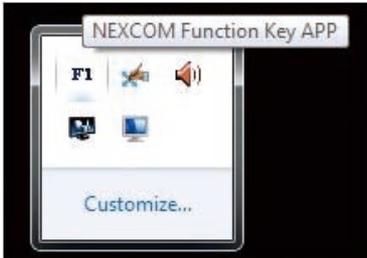
2. Select function from dropdown list, F1 to F10
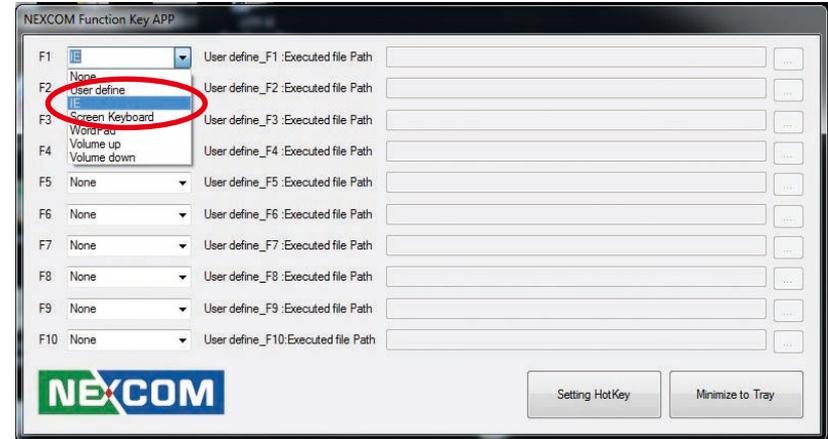
Setup Hotkey Function - User Define

1. Select "**User define**" from dropdown list
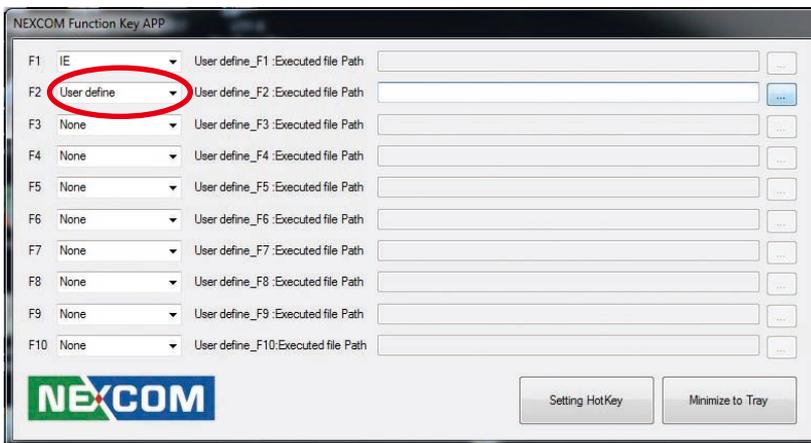
2. Select application program via [...] button.
   The "**Executed file Path**" will show the complete path.
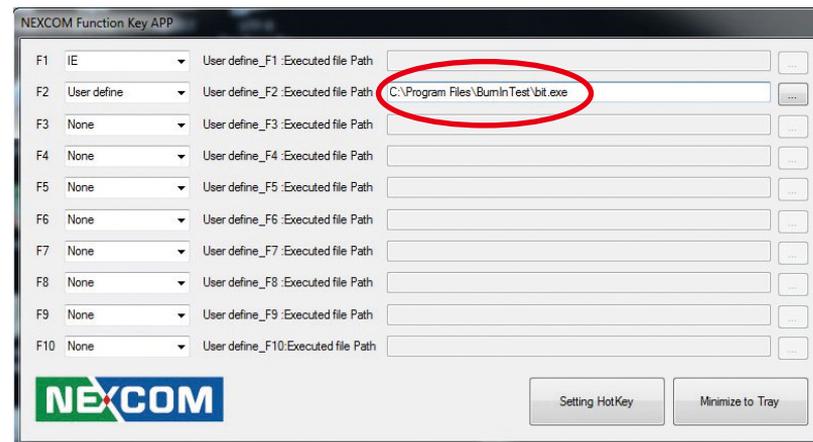
How to Switch Hotkey Button

Normal mode:
Shift function inactive
Hotkey = F1 to F5

Shift mode:
Shift function active
Hotkey = F6 to F10

Appendix A: I/O Address Function

VMC 3000 Series

IO ADDRESS:0EE0H~0EEFH

(*) for default setting

1. Ignition_status/ Battery_status/12V_status/

I/O port : 0EE0H

Bit 0: Reseversion

Bit 1: Reseversion

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

Bit 4: Status of +12V output

0: circuit normal(under 4A)

1: over circuit(over 4A)

Bit 5: Status of Car Battery bypass output

0: circuit normal(under 4A)

1: over circuit(over 4A)

Bit 4 and Bit 5: The action will delay 10ms~15ms

2. Capacity of NEXCOM battery (8 bits)
I/O port :0EE1H

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit1	Bit 0
Description	8 bits data (Bit 7 is highest bit of data)							

3. Voltage of NEXCOM battery (8 bits)
I/O port : 0EE2H

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit1	Bit 0
Description	8 bits data (Bit 7 is highest bit of data)							

4. Status of NEXCOM battery (8 bits)

I/O port : 0EE3H

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

5. GPIO

I/O port : 0EE4H

Bit0~3: GPO0~3

Bit4~7: GPI0~3

6. WDT
I/O port: 0EE5H

Bit3: WDT DISABLE\ENABLE

0: DISABLE(*)

1: ENABLE

BIT 2, 1, 0: time setting

BIT2~0	Time(sec)
000	1(*)
001	2
010	4
011	8
100	16
101	32
110	64
111	128

Auto clear WDT timer when read/write I/O port 0EE5H.

7. Onboard Module Disable/Enable(1)
I/O port : 0EE6H

Bit0: 3.5G MODULE

0: DISABLE

1: ENABLE (*)

Bit1: WLAN MODULE

0: DISABLE

1: ENABLE(*)

Bit2: EXTERNAL +12V power

0: DISABLE

1: ENABLE (*)

Bit3: By Pass Car battery power

0: DISABLE

1: ENABLE(*)

Bit4: Wake on 3.5G MODULE

0: DISABLE(*)

1: ENABLE

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VMC 3000/4000 Series User Manual

Bit5: Wake on RTC MODULE

0: DISABLE(*)

1: ENABLE

Bit6: Power on/off CAN BUS MODULE

0: OFF

1: ON (*)

Bit7: Status of COM PORT

0: CAN BUS(*)

1: MCU Download

8. Delay Time Setting

I/O port : 0EE7H

Bit7: Power On Delay

0: DISABLE(*)

1: ENABLE

Bit6: Power Off Delay

0: DISABLE(*)

1: ENABLE

Delay On Time Setting

BIT5~3	Time
000	10 sec
001	30 sec
010	1 min
011	5 min
100	10 min
101	15 min
110	30 min
111	1 hour

Delay Off Time Setting

BIT5~3	Time
000	10 sec
001	30 sec
010	1 min
011	5 min
100	10 min
101	15 min
110	30 min
111	1 hour

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9. Startup and Shutdown Voltage Control

I/O port : 0EE8H

Only set by switch on motherboard(read only)

BIT3~2	Input Voltage
11	12V
10	24V
01	6~36V
00	6~36V

When input voltage 12V

BIT1~0	Input Voltage 12V	
00	Startup	Shutdown
	11.5V	10.5V
01	Startup	Shutdown
	12V	11V
10	Startup	Shutdown
	12.5V	11V
11	Startup	Shutdown
	12.5V	11.5V

When input voltage 24V

BIT1~0	Input Voltage 24V	
00	Startup	Shutdown
	23V	21V
01	Startup	Shutdown
	24V	22V
10	Startup	Shutdown
	25V	22V
11	Startup	Shutdown
	25V	23V

10. Setup Command

I/O port : 0EE9H

Restart the Setup Command

Enable byte
AA

Using end byte to tell the data flow end

Data	End byte
(Delay time)(Startup/Shutdown voltage setting)	55

11. Onboard CAN Module(Optional Module)

I/O port : 0EEAH

Bit1: Restart or Reset CANBUS Module

0: Don't care

1: RESET CAN Module

Bit4: CANBUS Data link detect

0: No data transfer

1: Data link (auto detect)

12. GAL Download control

I/O port: 0EEBH

Data	End byte
GAL CODE Download	AA

Note: Don't initialize this address

13. 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)

IO ADDRESS: 0ED0H~0EDFH

I/O port: 0ED0H addresses uses delivery internal data

1. **MCU version byte   (8 bits)**
   I/O port : 0EDEH

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit1	Bit 0
Description	8 bits data (Bit 7 is highest bit of data)							

2. **GAL version byte   (8 bits)**
   I/O port : 0EDFH

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit1	Bit 0
Description	8 bits data (Bit 7 is highest bit of data)							

VMC 4000 Series

G-sensor device I2C address: = 0x1D

Datasheet download

1. G-sensor (ANALOG DEVICES - ADXL345-EP)

http://www.analog.com/static/imported-files/data_sheets/ADXL345-EP.pdf

IO ADDRESS: 0EE0H~0EEFH I/O port : 0EE0H

(*) for default setting

2. Ignition_status/ Battery_status/12V_status /

I/O port : 0EE0H

Bit 0: Reseversion

Bit 1: Reseversion

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

Bit 4: Status of +12V output

0: circuit normal(under 4A)

1: over circuit(over 4A)

Bit 5: Status of Car Battery bypass output

0: circuit normal(under 4A)

1: over circuit(over 4A)

Bit 4 and Bit 5: The action will delay 10ms~15ms

2. Capacity of NEXCOM battery (8 bits)

I/O port: 0EE1H

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Description	8 bits data (Bit 7 is highest bit of data)							

3. Voltage of NEXCOM battery (8 bits)

I/O port: 0EE2H

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Description	8 bits data (Bit 7 is highest bit of data)							

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4. Status of NEXCOM battery_VTK61B_20131105
I/O port : 0EE3H

Bit 0: Power Mode
0: 12V system
1: 24V system

Bit 1: Car Threshold
0: Low Level(10.5V/21V)
1: High Level(12V/24V)

Bit 2: Car Volt
0: Vin >= Volt_Threshold_L(9V/20.5V)
1: Vin <= Volt_Threshold_L(9V/20.5V)

Bit 3: Backup CAP
0: Battery capacity >= 10%
1: Battery capacity <= 10%

Bit 4: Output Type
0: Use Car Battery
1: Use Backup Battery

Bit 5: Bat Charge
0: Battery no charging
1: Battery is charging

Bit 6: Bat Discharge
0: Battery no discharging
1: Battery discharging

Bit 7: Temp Alarm
0: Battery no over temperature and >= 4°C
1: Battery over temperature and <= 4°C

5. GPIO
I/O port : 0EE4H

Bit0~3: GPO0~2
Bit4~7: GPI0~2

6. WDT

I/O port: 0EE5H

Bit3: WDT DISABLE\ENABLE

0: DISABLE(*)

1: ENABLE

BIT 3, 2, 1, 0: time setting

BIT3~0	Time(sec)
0000	1(*)
0001	2
0010	4
0011	8
0100	16
0101	32
0110	64
0111	128
1000	256

Auto clear WDT timer when read/write I/O port 0EE5H.

7. Onboard Module Disable/Enable(1)

I/O port : 0EE6H

Bit0: 3.5G MODULE

0: DISABLE

1: ENABLE (*)

Bit1: WLAN MODULE

0: DISABLE

1: ENABLE(*)

Bit2: EXTERNAL +12V power

0: DISABLE

1: ENABLE (*)

Bit3: By Pass Car battery power

0: DISABLE

1: ENABLE(*)

Bit4: Wake on 3.5G MODULE

0: DISABLE(*)

1: ENABLE

Bit5: Wake on RTC MODULE

0: DISABLE(*)

1: ENABLE

Bit6: Power on/off CAN/CAN2 BUS MODULE

0: OFF

1: ON(*)

Bit7: Status of COM PORT (for COM4 switch)

0: GPS (*)

1: MCU Download

8. Delay Time Setting

I/O port : 0EE7H

Bit7: Power On Delay

0: DISABLE(*)

1: ENABLE

Bit6: Power Off Delay

0: DISABLE(*)

1: ENABLE

Delay On Time Setting

BIT5~3	Time
000	10 sec
001	30 sec
010	1 min
011	5 min
100	10 min
101	15 min
110	30 min
111	1 hour

Delay Off Time Setting

BIT2~0	Time
000	20 sec
001	1 min
010	5 min
011	10 min
100	30 min
101	1 hour
110	6 hour
111	18 hour

9. Startup and Shutdown Voltage Control

I/O port : 0EE8H

Only set by switch on motherboard(read only)

BIT3~2	Input Voltage
11	12V
10	24V
01	6~36V
00	6~36V

When input voltage 12V

BIT1~0	Input Voltage 12V	
00	Startup	Shutdown
	11.5V	10.5V
01	Startup	Shutdown
	12V	11V
10	Startup	Shutdown
	12.5V	11V
11	Startup	Shutdown
	12.5V	11.5V

When input voltage 24V

BIT1~0	Input Voltage 24V	
00	Startup	Shutdown
	23V	21V
01	Startup	Shutdown
	24V	22V
10	Startup	Shutdown
	25V	22V
11	Startup	Shutdown
	25V	23V

10. Setup Command
I/O port : 0EE9H

Restart the Setup Command

Enable byte
AA

Using end byte to tell the data flow end

Data	End byte
(Delay time)(Startup/Shutdown voltage setting)	55

11. Onboard CAN Module(Optional Module)
I/O port : 0EEAH

Bit1: Restart or Reset CANBUS Module
0: Don't care
1: RESET CAN Module

Bit2: CAN2_DI Data link detect
0: No data transfer
1: Data link (auto detect)

Bit4: CANBUS Data link detect
0: No data transfer
1: Data link (auto detect)

Bit5: CAN2_DO Data link detect
0: No data transfer
1: Data link (auto detect)

12. GAL Download control
I/O port: 0EEBH

Data	End byte
GAL CODE Download	AA

Note: Don't initialize this address

13. 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)

IO ADDRESS: 0ED0H~0EDFH

I/O port: 0ED0H addresses uses delivery internal data

1. MCU version byte   (8 bits)
   I/O port : 0EDEH

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Description	8 bits data (Bit 7 is highest bit of data)							

2. GAL version byte   (8 bits)
   I/O port : 0EDFH

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Description	8 bits data (Bit 7 is highest bit of data)							

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IO ADDRESS: I/O port: 0ED1H

Bit0: WLAN2_DIS

0: Disable

1: Enable (*)

Bit1: GPS_PWR_EN

0: Disable

1: Enable (*)

Bit2: Modem_PWR_EN

0: ON (*)

1: OFF

Bit3: Modem_SEL

0: ON (*)

1: OFF

Bit4: COM2 RS485/RS422

0: COM2 RS485 (*)

1: COM2 RS422

Bit5: COM2 RS232 / RS485_RS422

0: COM2 RS232 (*)

1: COM2 RS485/RS422

IO ADDRESS: I/O port: 0EDCH

Bit 5-7: Type

000: VTC

001: VMC

010: nROK

Bit 0-4: Model

Currently VMC 3000-C1 is 00000 = 3000 ; 00001 = 3000C1

Bit 0-4: 00001

Bit 5-7: 001

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Appendix B: Vehicle Power Management Setup

External Power Output Setting

External +12V and +5V Turn On Simultaneously

External +12V and +5V Turn Off Simultaneously

Left screen:

Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.

Advanced

Power Management Configuration

** External +5V & +12V Power Setting **
External Power   [Turn Off Both]

** Startup & Shutdown Voltage Setting **
Input Voltage   12 V
Startup,Shutdown   [(11.5,10.5)/(23,21)]

Delay Time Setting
Power On Delay

Power Off Delay

External Power
- Turn On Both
- Turn Off Both
- Turn On +5V
- Turn On +12V

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

Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.

Right screen:

Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.

Advanced

Power Management Configuration

** External +5V & +12V Power Setting **
External Power   [Turn Off Both]

** Startup & Shutdown Voltage Setting **
Input Voltage   12 V
Startup,Shutdown   [(11.5,10.5)/(23,21)]

Delay Time Setting
Power On Delay

Power Off Delay

External Power
- Turn On Both
- Turn Off Both
- Turn On +5V
- Turn On +12V

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

Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.

Vehicle Power Management Setup

External Power Output Setting

External +12V Turn On Only

Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.	
Advanced	
Power Management Configuration	Enable/Disable External Power
** External +5V & +12V Power Setting **	
External Power [Turn Off Both]	
** Startup & Shutdown Voltage Setting **	
Input Voltage 12 V	
Startup,Shutdown [(11.5,10.5)/(23,21)]	
Delay Time Setting External Power	
Power On Delay Turn On Both	→←: Select Screen
Turn Off Both	↑↓: Select Item
Power Off Delay Turn On +5V	Enter: Select
Turn On +12V	+/-: Change Opt.
	F1: General Help
	F2: Previous Values
	F3: Optimized Defaults
	F4: Save & Exit
	ESC: Exit
Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.	

External +5V Turn On Only

Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.	
Advanced	
Power Management Configuration	Enable/Disable External Power
** External +5V & +12V Power Setting **	
External Power [Turn Off Both]	
** Startup & Shutdown Voltage Setting **	
Input Voltage 12 V	
Startup,Shutdown [(11.5,10.5)/(23,21)]	
Delay Time Setting External Power	
Power On Delay Turn On Both	→←: Select Screen
Turn Off Both	↑↓: Select Item
Power Off Delay Turn On +5V	Enter: Select
Turn On +12V	+/-: Change Opt.
	F1: General Help
	F2: Previous Values
	F3: Optimized Defaults
	F4: Save & Exit
	ESC: Exit
Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.	

Vehicle Power Management Setup

Startup and Shutdown Voltage Setting

```
            Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
    Advanced

  Power Management Configuration                        Startup,Shutdown Setting

  ** External +5V & +12V Power Setting **
  External Power                    [Turn Off Both]

  ** Startup & Shutdown Voltage Setting **
  Input Voltage                     12 V
  Startup,Shutdown                  [(11.5,10.5)/(23,21)]

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



            Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

1.

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.

Vehicle Power Management Setup

Startup and Shutdown Voltage Setting

```
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        Advanced

    Power Management Configuration                      Startup,Shutdown Setting

    ** External +5V & +12V Power Setting **
    External Power                        [Turn Off Both]

    ** Startup & Shutdown Voltage Setting **
    Input Voltage                         24 V
    Startup,Shutdown                      [(11.5,10.5)/(23,21)]

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


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```

2.

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.

Vehicle Power Management Setup

Startup and Shutdown Voltage Setting

```
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   Advanced

   Power Management Configuration                      Startup,Shutdown Setting

   ** External +5V & +12V Power Setting **
   External Power                   [Turn Off Both]

   ** Startup & Shutdown Voltage Setting **
   Input Voltage                    6-36V
   Startup,Shutdown                 [(11.5,10.5)/(23,21)]

   **Delay Time Setting**
   Power On Delay                   [Disable]

   Power Off Delay                  [Disable]
                                                       →←: 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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```

4.

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

Vehicle Power Management Setup

Power-on Delay Setting

Disable Power-on Delay

```
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Advanced

Power Management Configuration                          Options
                                                   11.5V , 10.5V
** External +5V & +12V Power Setting **            12.0V , 11.0V
External Power                  [Turn On Both]     12.5V , 11.0V
                                                   12.5V , 11.5V
** Startup & Shutdown Voltage Setting **
Input Voltage                   12V
Startup,Shutdown                [11.5V , 10.5V]

**Delay Time Setting**
Power On Delay                  [Disabled]

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

```
External Power                  [Turn On Both]     30 sec
                                                   1 min
** Startup & Shutdown Volta    Options             5 min
Input Voltage                                      10 min
Startup,Shutdown               10 sec              15 min
                               30 sec              30 min
                                1 min              1 hour
**Delay Time Setting**          5 min
Power On Delay                 10 min
Delay On Time selection        15 min              →←: Select Screen
Power Off Delay                30 min              ↑↓: Select Item
                                1 hour             Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
```

Vehicle Power Management Setup

Power-on Delay Setting

Disable Power-off Delay

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Advanced	

Power Management Configuration		**Options**
		11.5V , 10.5V
** External +5V & +12V Power Setting **		12.0V , 11.0V
External Power	[Turn On Both]	12.5V , 11.0V
		12.5V , 11.5V
** Startup & Shutdown Voltage Setting **		
Input Voltage	12V	
Startup,Shutdown	[11.5V , 10.5V]	
Delay Time Setting		
Power On Delay	[Disabled]	
Power Off Delay	[Disabled]	
		→←: 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-off Delay

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

		6 hour
Delay Time Setting		18 hour
Power On Delay	[Enabled]	
Delay On Time selection	[10 sec]	
Power Off Delay	[Enabled]	→←: Select Screen
Delay Off Time selection	[20 sec]	↑↓: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help

		1 min
External Power	[Turn On Both]	5 min
		10 min
** Startup & Shutdown Voltage		30 min
Input Voltage	**Options**	1 hour
Startup,Shutdown	20 sec	6 hour
	1 min	18 hour
	5 min	
Delay Time Setting	10 min	
Power On Delay	30 min	
Delay On Time selection	1 hour	→←: Select Screen
Power Off Delay	6 hour	↑↓: Select Item
Delay Off Time selection	18 hour	Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values

Appendix C: Power Consumption

Test Equipment/Tool
DUT#1: VMC 3000 with 8GB SSD, 3.5G MC8790V, WLAN-QCOM Q802XKN, CFAST CARD and CAN BUS module
DUT#2: VMC 3000 with 8GB SSD
Windows 7
Burn-in software: version 5.3

Test Condition
Room temperature
Power supply graduation: 12V 5A

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

Unit	S0	S3	S4	S5
DUT#1	2.07A	0.12A	0.007A	0.007A
DUT#2	1.79A	0.18A	0.024A	0.024A

* Device: N/A

Test Equipment/Tool
DUT#1: VMC 3500 with 8GB SSD, 3.5G MC8790V, WLAN-QCOM Q802XKN, CFAST CARD and CAN BUS module
DUT#2: VMC 3500 with 8GB SSD
Windows 7
Burn-in software: version 5.3

Test Condition
Room temperature
Power supply graduation: 12V 5A

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

Unit	S0	S3	S4	S5
DUT#1	2.57A	0.28A	0.007A	0.007A
DUT#2	2.30A	0.34A	0.012A	0.012A

* Device: N/A

Appendix D: SMS and Dial Wake-up Setting

Utilizing sleep mode on the Cinterion PHS8 3.5G module and allowing for remote wake up via SMS or dial.

A. BIOS setting

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

(3) Change the value to "Enable" for "Wake On 3.5G Module."

Appendix E: RTC Wake-up Setting

(1) Press <Enter> on "Advanced" of the main menu screen.

(2) Select "Module Management."

(3) Change the value to "Enable" for "RTC Alarm Time."

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

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Advanced

Module Management

		User Setting Hour.
WLAN Module	[Enable]	
3.5G Module	[Enable]	
Wake On 3.5G Module	[Disable]	
RTC Alarm Time	[Enable]	
User Setting Hour	17	
User Setting Minute	58	

→←: 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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(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."

Appendix F: Auto Backlight Setting

(1) Press <Enter> on "Advanced" of the main menu screen.

(2) Select "Intel IGD Configuration."

```
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    Main      Advanced     Boot     Security    Save & Exit

    ► ACPI Settings                                    Config Intel IGD Settings.
    ► CPU Configuration
    ► Power Management Configuration
    ► Module Management
    ► Intel IGD Configuration
    ► SATA Configuration
    ► USB Configuration
    ► W83792D H/W Monitor
    ► Super IO Configuration

                                                       →←: 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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```

(3) Change the value to "Enable" for "Auto-BackLight Select."

```
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     Advanced

    Intel IGD Configuration                            Enable or Disable
                                                       Auto-BackLight function.
    Auto-BackLight Select          [Disabled]



                              ┌── Auto-BackLight Select ──┐
                              │ Disable                    │
                              │ Enable                     │  →←: 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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```

(4) 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."

After the setup procedure is completed, the light sensors can auto-adjust a display's backlight.

Appendix G: BIOS Update

(1) Locate the "afuwin32" setup file in the "afuwin32" folder.

(2) Start the "afuwingui" setup program.
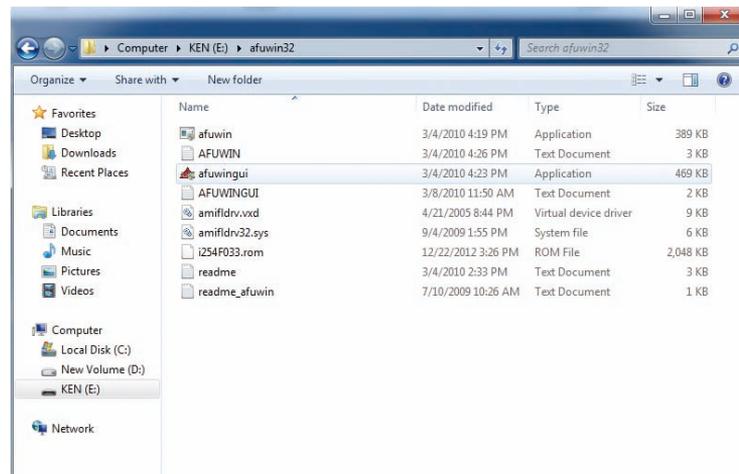
(3) Press the "OK" button when prompted with a pop-up window.
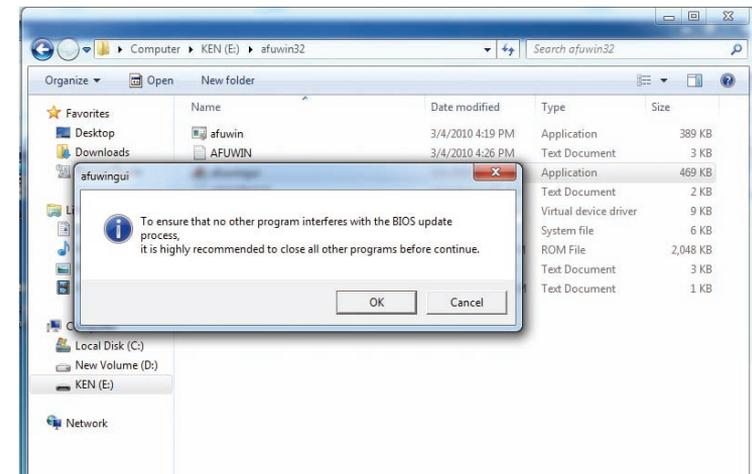
(4) Press the "Open" button.

(5) Select the BIOS file.

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VMC 3000/4000 Series User Manual
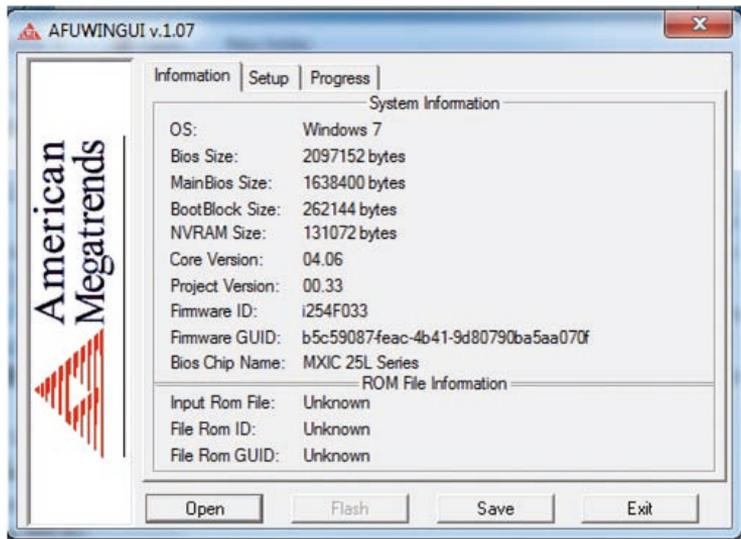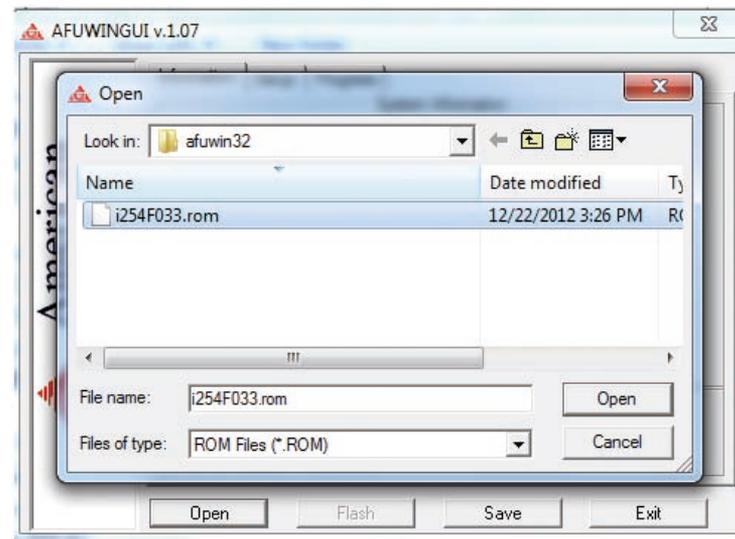
(6) Check all the options in "Block Options" and then press the "Flash" button.
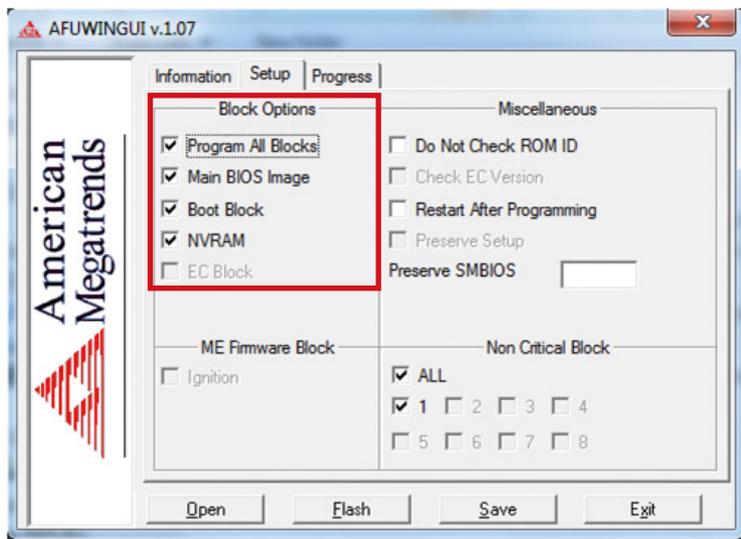
(7) The BIOS will be updated automatically, when the update is completed, please restart the VMC.
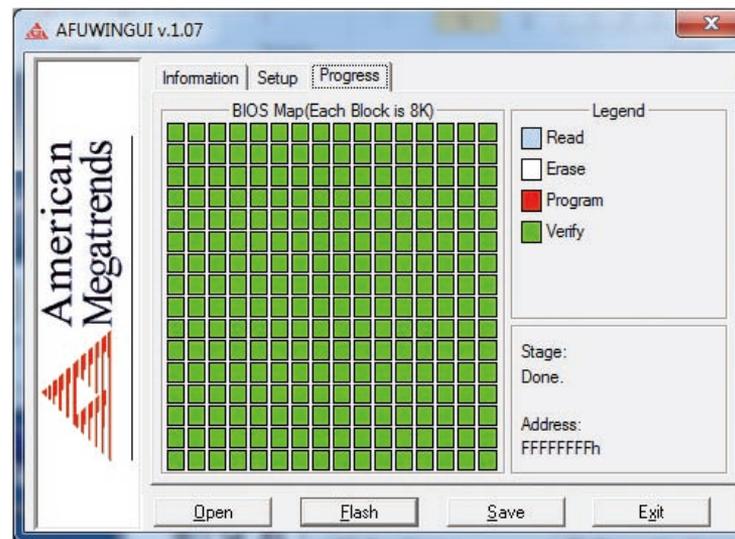
Appendix H: CAN Module Setup and Command

VMC 3000 series offer an option to integrate the CAN BUS module, VIOX-CAN01, into VMC 3000 system. The form factor of this VIOX-CAN01 is proprietary and it can support either SAE J1939 or SAE J1708 via connection in the first time. The maximum VIOX-CAN01 installed in VMC 3000 series is up to three units. Please note they are factory option.

VIOX-CAN01 Setup

When you start connecting VMC 3000 device to CAN bus device, you need a terminal program to send and receive data. To use the terminal program, please follow the setting below.
(1) Set the proper corresponding "COM" port and its data rate is 9600
(2) Set data bits at 9, stop bit at 1 and no parity bits.

After the setting, you will see the prompt with ">" character. This indicates that the device is in the idle state and ready to receive characters on the COM port.

If you do not see prompt string, please reset the device with ATR (reset) command and then press the return key:
>ATR or >AT R (spaces are optional; and case is in-sensitive).
You can also type HEX code instead:
"41", "54", "5A", "0D"

If you see the strange characters instead of ">", you may set the incorrect baud rate. Please check baud rate. If you send the incorrect command, the device will show a single question mark ("?") to indicate your input is not understood. If VMC 3000 fails to link to the BUS, it will show "PLEASE REBOOT".

Once VMC 3000 connect to BUS, it will start to try which protocol is connected either J1939 or J1708. Once it is determined, it will only accept the successful protocol next time unless using ATR command to reset it. This means you can change the protocol by reset command. After the reset command, please power off the device and turn on it again.

In case, the device cannot find correct protocol after 180 seconds, it will enter sleeping mode for power saving.

There are several output format available for the different application including:
(1) Simple Data by ASCII Code
(2) Raw Data
(3) Packaged Messages by ASCII or HEX code.

The default setting is Simple Data Format. The device will send messages out after it communicates with vehicle successfully. The output format can be changed via setting the AT command. Please refer the following section of AT command.

AT Command Summary

@1	AT@1: Display version information
BRxy	Setting RS232 baud rate. xy is baud rate parameter. ATBR09: 9600 ATBR19: 19200 ATBR38: 38400 ATBR57: 57600 ATBR99: 115200
Eh	ATE0: echo off(Default) ATE1; echo on
T	ATT: Terminate sending. To use ATS will continue it.
I	ATI : Request vehicle ID, the length is variable. 1.) J1708: Output format: ASCII code Byte 0:0x2A Byte 1: Vehicle ID byte 1 Byte 2: Vehicle ID byte 2 Byte N:Vehicle ID byte N Byte N+1: Check Sum=Byte 1+Byte2+.......+Byte N Byte N+2:0x0D Byte N+3:0x0A N: Max 20 2.)J1939 Byte 0:0x2A Byte 1: Vehicle ID byte 1 Byte 2: Vehicle ID byte 2 Byte N:Vehicle ID byte N Byte N+1: Check Sun= Byte1+Byte2 +.....ByteN Byte N+1:0x0D Byte N+2:0x0A N: Max 35

PA	ATPA: Print data by ASCII CODE format
PH	ATR: Clear protocol and distance (D1 ,D2)memory, the ATR command clear current protocol then continue learning next new protocol.
RJ	ATRJ: Request J1939 FMS High Resolution Total Vehicle Distance #33~#36
RH	ATRH: Request Hino Truck Total vehicle distance (#33~#36)
S	ATS: Continue auto-send data every 100~200ms. To use ATT will terminal it.
SS	ATSS: Auto- send Simple Data every 100~200 ms. Refer to Simple Data format Protocol
SP	ATSP: Auto-send Packaging Messages every 100~200 ms. Refer to Packaging Messages protocol.
SR	ATSR: Auto-send J1939/J1708 Raw Data, Refer to Raw Data Protocol.
X	ATX: Request to send data of alternate, data format as ATS/ATSP command. For J1939 protocol: Packing1→Packing2→Packing 3→Packing4→Packing5→Packing6→Packing1 For J1708 protocol: Packing1→Packing2→Packing 3→Packing4→Packing5→ Packing1
#xy	AT#xy: The command will print designated data by ASCII code. "xy" is data address, it is decimal. J1708: 00~53 J1939: 00~99. EX: AT#01 , to get speed high byte.

Simple Data Protocol: (ASCII CODE)

Data	Description
HEAD	@
Byte 0	,
Byte 1	Speed , (0~255) KM/HR
Byte 2	,
Byte 3	RPM High Byte (RPMHB)
Byte 4	,
Byte 5	RPM Low Byte(RPMLB) , RPM=RPMHB*256+RPMLB
Byte 6	,
Byte 7	Engine Loading, (0~100%)
Byte 8	,
Byte 9	Battery Voltage (BV), = (BV+100)/10 (v)
Byte 10	,
Byte 11	Engine Temperature(ET), =ET-40°C
Byte 12	,
Byte 13	Throttle position 0~100 %
Byte 14	,
Byte 15	Status , Note 2
Byte 16	,
Byte 17	MAF (0~255), MAF RATE= MAF * 3;
Byte 18	,
Byte 19	Distance : D1
Byte 20	,
Byte 21	Distance: D2
Byte 22	,
Byte 23	FU, Average Fuel Economy (km/L) =Fu /10
Byte 24	,

Byte 25	Check sum (odd numbers)= Byte1+ Byte3+Byte5+ Byte7+Byte9+Byte11+ Byte13+ Byte15+Byte17+ Byte19+Byte21+Byte23
Byte 26	Carry return (0x0D)
Byte 27	Line feed (0x0A)

Simple Data Protocol: (HEX CODE)

Data	Description
HEAD	@ (=0x40)
Byte 1	Speed , (0~255) KM/HR
Byte 2	RPM High Byte (RPMHB)
Byte 3	RPM Low Byte(RPMLB) , RPM=RPMHB*256+RPMLB
Byte 4	Engine Loading, (0~100%)
Byte 5	Battery Voltage (BV), = (BV+100)/10 (v)
Byte 6	Engine Temperature(ET), =ET-40°C
Byte 7	Engine Loading, (0~100%)
Byte 8	Status , Note 2
Byte 9	MAF (0~255), MAF RATE= MAF * 3;
Byte 10	Distance: D1
Byte 11	Distance: D2
Byte 12	FU, Average Fuel Economy (km/L) =Fu /10
Byte 13	TCheck sum (odd numbers)= Byte1+ Byte2+Byte3+ Byte4+ Byte5+Byte6+ Byte7+ Byte8+Byte9+ Byte10+ Byte11+Byte12
Byte 14	Carry return (0x0D)
Byte 15	Line feed (0x0A)

NOTE:
1.) Data format : ASCII CODE
@ , 7 8 , 0 E , 7 0 , 0 0 ,0 3 , 9 8 , 2 8 , Status ,MAF,D1,D2,Fu,CS
speed=78 km/hr
rpm=0x0E70= 3696
2.) status:
Bit 7:
0: Normal
1: Emergency Braking (Acceleration < - 6 m/s2)
Bit 6:
0: Brake OFF
1: Brake ON
Bit 5:
0: Clutch OFF
1: clutch ON
Bit 4:
0: Cruise Control OFF
1: Cruise Control ON
Bit 3:
0: Brake (ON/OFF) unavailable
1: Brake(ON/OFF) available
Bit 2:
0:Clutch (ON/OFF) unavailable
1: Clutch (ON/OFF) available
Bit 1:
0: Cruise Control (ON/OFF) unavailable
1: Cruise Control (ON/OFF) available
Bit 0:
0: NORMAL
1: DTC ON
2.) Distance = D1*256+D2
3.) Average Fuel Economy =Fu /10

J1939 Raw Data Protocol (HEX CODE)

Support for J1939 PGN / SPN access as defined in the J1939 standards. This function will report all PGNs and their source node on the J1939 network.

Each SPN under this function should be set to a size of 32 bits.

J1939	Format	
Byte 0	@ (=0x40)	
Byte 1	Bit4,3,2: Priority Bit0: Data Page Bit1,5,6,7:Reversed	
Byte 2	PDU Format (PF)	PGN
Byte 3	PDU Specific (PS)	
Byte 4	Source Address	
Byte 5	Data1	
Byte 6	Data2	
Byte 7	Data3	
Byte 8	Data4	
Byte 9	Data5	
Byte 10	Data6	
Byte 11	Data7	
Byte 12	Data8	
Byte 13	Check Sum	
Byte 14	0x0D	
Byte 15	0x0A	

J1708 Raw Data Protocol (HEX CODE)

This function will report all MID and PID that broadcasting on the J1708 network. Its data length is not fixed, please refer to SAEJ1708.

J1939	Format	PIDs 128-191	PIDs 0-127
Byte 0	@ (= 0x40)	@ (= 0x40)	@ (= 0x40)
Byte 1	Message identification (MID)	MID	MID
Byte 2	Parameter identification (PID)	PID	PID
Byte 3	Number of data bytes	Data1	Data1
Byte 4	Data 1	Data2	Check Sum
Byte 5	Data 2	Check Sum	0x0D
Byte 6	……..	0x0D	0x0A
Byte 7	Data N	0x0A	
Byte 8	Check Sum		
Byte 9	0x0D		
Byte 10	0x0A		

PIDs 0-127 describe data parameters that are one byte long.
PIDs 128-191 describe data parameters that consist of two bytes.
PIDs 192-253 The first byte following these PIDs will contain the number of data parameter bytes.

EX:
MID=128

0x40	0x80	0x15	0x01	0x32	0xC8	0x0D	0x0A
64	128	21	1	50	200	130	10

PID=21 (Engine ECU temperature)
Data=50

J1939 Packaged Messages Protocol

S	ATS: send packaged messages by turns.

Response HEX CODE (default) after ATPH command		
Packing 1: Byte 0:" @" ,(0x40) Byte 1: "1", (0x31) Byte 2: #00 Byte 3: #01 ...... Byte 19:#17 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A	Packing 2: Byte 0: " @" ,(0x40) Byte 1: "2",(0x32) Byte 2: #18 Byte 3: #19 ...... Byte 19:#35 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A	Packing 3: Byte 0: " @" ,(0x40) Byte 1: "3",(0x33) Byte 2: #36 Byte 3: #37 ...... Byte 19:#53 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A
Packing 4: Byte 0:" @" ,(0x40) Byte 1: "a",(0x41) Byte 2: #54 Byte 3: #55 ...... Byte 19:#71 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A	Packing 5: Byte 0: " @" ,(0x40) Byte 1: "b",(0x42) Byte 2: #72 Byte 3: #73 ...... Byte 19:#89 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A	Packing 6: Byte 0: " @" ,(0x40) Byte 1: "c",(0x43) Byte 2: #90 Byte 3: #91 ...... Byte 14:#102 Byte 19:0 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A

NOTE :
1. AT#00 ~ AT#102 respond ASCII CODE format data.
2. Packing 6, Byte15~Byte19 not defined (set to "0")
3. After ATPA command, byte 21& 22 were ignored.
4. This is the common J1939 measurement overview showing which measurements are available. Note that not all measurements are supported by the individual engines.

#00	Speed Low Byte (SLB)
#01	Speed High Byte (SHB) speed=(SHB*256+SLB)/256

#02	B7	B6	B5	B4	B3	B2	B1	B0
	Clutch switch		Brake switch		NOT USED		Cruise control active	
	00 = pedal released 01 = pedal depressed		00 = pedal released 01 = pedal depressed				00 = switched off 01 = switched on	

#03	B7	B6	B5	B4	B3	B2	B1	B0
	B7: Emergency brake(-6m/s2) B6: speed up (6m/s2) B5: Double Emergency brake (over -12m/s2) 1: Enable, 0:Disable			PTO state 00000 = off/disabled 00101 = Set 11111 = not available				

#04	0.4 % / Bit gain, Accelerator Pedal Position(APP) , 0 to 100 % APP= Data* 0.4
#05	Engine Total Fuel used 0,5 L / Bit gain , ETF1
#06	Engine Total Fuel used 0,5 L / Bit gain , ETF2
#07	Engine Total Fuel used 0,5 L / Bit gain , ETF3
#08	Engine Total Fuel used 0,5 L / Bit gain , ETF4 Engine Total Fuel used =((ETF4*256*256*256)+(ETF3*256*256)+(ETF2*256)+ETF1)*0.5
#09	Fuel Level (FL) , 0 to 100 %, 0.4 %/bit Fuel Level=FL*0.4
#10	RPM Low byte, RL
#11	RPM High byte, RH RPM= (RH*256+ RL)* 0.125

B7	B6	B5	B4	B3	B2	B1	B0
	NOT USED			Engine Starter Mode			

#12

B7: 1, Total Vehicle Distance is provided by vehicle ECU
0, Total Vehicle Distance is calculation value
B3~B0:
0000 start not requested
0001 starter active, gear not engaged
0010 starter active, gear engaged
0011 start finished; starter not active after having been actively engaged ?
(after 50ms mode goes to 0000)?
0100 starter inhibited due to engine already running
0101 starter inhibited due to engine not ready for start (preheating)
0110 starter inhibited due to driveline engaged
0111 starter inhibited due to active immobilizer
1000 starter inhibited due to starter over-temp
1001-1011 Reserved
1100 starter inhibited - reason unknown
1101 error
1111 not available

#13

Axle location The value 0xFF indicates not available.

B7	B6	B5	B4	B3	B2	B1	B0
Axle location Bit-mapped position number counting front to back facing forward F = not available position number, counting front to back on the vehicle. B7,B6,B5,B4 Axle location Bit-mapped position number counting front to back facing forward.				Tire location Bit-mapped counting left to right facing forward F = not available The low order 4 bits represent a position number, counting left to right when facing in the direction of normal vehicle travel			

#	Description
#14	Axle weight 0.5 kg / Bit gain (Low Byte),AWL
#15	Axle weight 0.5 kg / Bit gain (High Byte), AWH Weight=(AWH*256+AWL)*0.5
#16	Engine total hours of Operation, EH1
#17	Engine total hours of Operation, EH2
#18	Engine total hours of Operation, EH3
#19	Engine total hours of Operation, EH4 Accumulated time=((EH4*256*256*256)+(EH3*256*256)+(EH2*256)+EH1)*0.05
#20 | #27	Vehicle identification number, aabbccddeeffgghh (If the Vehicle ID contains more than 8 Bytes then #20~#27 are "00", please use ATI command to request.
#20	aa
#21	bb
#22	cc
#23	dd
#24	ee
#25	ff
#26	gg
#27	hh
#28	Engine Percent Load At Current Speed (0~125 %)
#29 | #32	SW-version supported for trucks, Version number in the format ab.cd where this byte represents ASCII code #29 : "a" , #30: 'b', #31:'c' , #32:'d'
#33 | #36	High Resolution Total Vehicle Distance, 5 m/bit, 0 to 21,055,406 km =((D4*256*256*256)+(D3*256*256)+(D2*256)+D1)*0.005 (KM)
#33	D1
#34	D2

#35	D3
#36	D4
#37 | #38	The distance which can be traveled by the vehicle before the next service inspection is required SERV=(V2*256+V1)*5-160635 (KM)
#37	V1
#38	V2

#39	B7	B6	B5	B4	B3	B2	B1	B0
	Vehicle motion(B7,B6): 00 = Vehicle motion not detected 01 = vehicle motion detected		Driv. 2 working stat state (B5,B4,B3)。G 000 = Rest 001 = Driver available 010 = Work 011 = Drive 110 = Error 111 = not available			Driv. 1 working state (B2,B1,B0): 000 = Rest 001 = Driver available 010 = Work 011 = Drive 110 = Error 111 = not avaiable		

#40	B7	B6	B5	B4	B3	B2	B1	B0
	Vehicle Overspeed		Driver 1 card		Driver 1 time related state			
	Vehicle Over speed (B7,B6)。GIndicates whether the vehicle is exceeding the legal speed limit set in the tachograph. 00 = No over speed 01 = Over speed Driver 1 card (B5,B4) 00 = Card not present 01 = Card present Driver 1 time related state (B3,B2,B1,B0)。GIndicates if the driver approaches or exceeds working time limits (or other limits). 0000 = normal 0001 = 15 min bef. 4.5 h 0010 = 4.5 h reached 0011 = 15 min bef. 9 h 0100 = 9 h reached 0101 = 15 min bef. 16 h 0110 = 16h reached 1110 = Error 1111 = not available								

#41	B7	B6	B5	B4	B3	B2	B1	B0
	NOT USED		Driver 2 card (B5,B4) 00 = Card not present 01= Card present		Driver 2 time related state (B3,B2,B1,B0)。GIndicates if the driver approaches or exceeds working time limits (or other limits). 0000 = normal 0001 = 15 min bef. 4.5 h 0010 = 4.5 h reached 0011 = 15 min bef. 9 h 0100 = 9 h reached 0101 = 15 min bef. 16 h 0110 = 16h reached 1110 = Error 1111 = not available			

#42	B7	B6	B5	B4	B3	B2	B1	B0
	Direction indicator		Tachgraph performance		Handling information		System event	
	Direction indicator (B7,B6)。G 00 = Forward 01 = Reverse Tachgraph performance (B5,B4) 00 = Normal performance 01 = Performance analysis Handling information (B3,B2) 00 = no handling information 01 = handling information System event (B1,B0) 00 = no tachogr. Event 01 = tachogr. Event								

#43 | #44	Tachogr. vehicle speed 1/256 km/h Bit gain Speed= ((VS2*256)+VS1)/256
#43	VS1
#44	VS2

#45	Engine Coolant Temperature(ECT) , -40 to 210 deg C ECT=data-40°C
#46	Engine Turbocharger Boost Pressure(ETBP), 2 kPa/bit , 0~500 KPA ETPB=data *2 (KPA)
#47	Engine Intake Manifold 1 Temperature(EIMT) , -40 to 210 deg C EIMT=data-40°C
#48	Bit7,6 Anti-Lock Braking (ABS) Active。G 00 - ABS passive but installed 01 - ABS active 10 – Reserved 11 - Not available Bit5~Bit0: Resvered.
#49	Brake Pedal Position (BPP), 0.4 %/bit, 0~100% BPP=data*0.4 (%)
#50	Parking and/or Trailer Air Pressure(PTAP), 8 kPa/bit PTAP=data *8 (KPA)
#51	Service Brake Air Pressure Circuit #1 (SBAPC1), 8 kPa/bit SBAPC1=data*8 (KPA)
#52	Service Brake Air Pressure Circuit #2 (SBAPC2), 8 kPa/bit SBAPC2=data*8 (KPA)
#53	Parking Brake Switch 00 = Parking brake not set 01 = Parking brake set
#54	Bit 1 ,Bit 0: Diagnostics supported 00 = diagnostics is not supported 01 = diagnostics is supported 10 = reserved 11 = don´t care Bit 3 ,Bit 2: Requests supported 00 = request is not supported 01= request is supported 10 = reserved 11 = don´t care Bit4~Bit7:Resvered

#55 | #56	Ambient Air Temperature: Temperature of air surrounding vehicle. AAT=(AATH* 256+AATL)*0.03125 -273 deg C #55: AATL #56: AATH
#57	Door Control 1: Bit 7,Bit6: Status 2 of doors 00 = all bus doors disabled 01 = at least 1 bus door enabled 10 = error 11 = not available Bit 5, Bit4: Ramp/Wheel chairlift 00 = inside bus 01 = outside bus 10 = Error 11 = not available Bit 3,2,1,0 : Position of doors 0000 = at least 1 door is open 0001 = closing last door 0010 = all doors closed 1110 = Error 1111 = not available
#58 | #56	Door Control 2, #58~#65 Lock Status: locked→doors cannot be operated by the driver or a passenger unlocked→door may be operated by the driver or a passenger Open Status: closed→door is completely closed open→door is not completely closed Enable Status: disabled→door cannot be opened by a passenger enabled→door can be opened by a passenger

	B7	B6	B5	B4	B3	B2	B1	B0
#58	Bit 7, Bit 6: Lock Status Door 2 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit 5,Bit 4: Enable Status Door 1 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit 3,Bit 2: Open Status Door 1 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit 1,Bit 0: Lock Status Door 1 00 = Unlocked 01 = Locked 10 = Error 11 = Not available	

	B7	B6	B5	B4	B3	B2	B1	B0
#59	Bit 7, Bit 6: Open Status Door 3 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit 5, Bit 4: Lock Status Door 3 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit 3, Bit 2: Enable Status Door 2 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit 1, Bit 0: Open Status Door 2 00 = Closed 01 = Open 10 = Error 11 = Not available	

	B7	B6	B5	B4	B3	B2	B1	B0
#60	Bit 7, Bit 6: Enable Status Door 4 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit 5, Bit 4: Open Status Door 4 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit 3, Bit 2: Lock Status Door 4 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit 1, Bit 0: Enable Status Door 3 00 = Disabled 01 = Enabled 10 = Error 11 = Not available	

	B7	B6	B5	B4	B3	B2	B1	B0
#61	Bit 7, Bit 6: Lock Status Door 6 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit 5, Bit 4: Enable Status Door 5 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit 3, Bit 2: Open Status Door 5 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit 1, Bit 0: Lock Status Door 5 00 = Unlocked 01 = Locked 10 = Error 11 = Not available	

	B7	B6	B5	B4	B3	B2	B1	B0
#62	Bit 7, Bit 6: Open Status Door 7 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit 5, Bit 4: Lock Status Door 7 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit 3, Bit 2: Enable Status Door 6 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit1, Bit 0: Open Status Door 6 00 = Closed 01 = Open 10 = Error 11 = Not available	

	B7	B6	B5	B4	B3	B2	B1	B0
#63	Bit 7, Bit 6: Enable Status Door 8 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit 5, Bit 4: Open Status Door 8 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit 3, Bit 2: Lock Status Door 8 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit1, Bit 0: Enable Status Door 7 00 = Disabled 01 = Enabled 10 = Error 11 = Not available	

	B7	B6	B5	B4	B3	B2	B1	B0
#64	Bit 7, Bit 6: Lock Status Door 10 00 = Unlocked 01 = Locked 10 = Error 11 = Not available		Bit 5, Bit 4: Enable Status Door 9 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit 3, Bit 2: Open Status Door 9 00 = Closed 01 = Open 10 = Error 11 = Not available		Bit1, Bit 0: Lock Status Door 9 00 = Unlocked 01 = Locked 10 = Error 11 = Not available	

	B7	B6	B5	B4	B3	B2	B1	B0
#65	Bit 3, Bit 2: Enable Status Door 10 00 = Disabled 01 = Enabled 10 = Error 11 = Not available		Bit1, Bit 0: Open Status Door 10 00 = Closed 01 = Open 10 = Error 11 = Not available					

#66 | #71	Time / Date: #66 : Second=data * 0.25 #67 : Minutes=data #68 : Hours=data #69 : Month=data #70 : Day=data * 0.25 #71 : Year=data-1985 (1985 to 2235 years)

Alternator Status

	B7	B6	B5	B4	B3	B2	B1	B0
#72	Bit 7, Bit6: Alternator Status 4 00 = not charging 01 = charging 10 = error 11 = not available		Bit 5, Bit4: Alternator Status 3 00 = not charging 01 = charging 10 = error 11 = not available		Bit 3, Bit 2: Alternator Status 2 00 = not charging 01 = charging 10 = error 11 = not available		Bit 1, Bit 0: Alternator Status 1 00 = not charging 01 = charging 10 = error 11 = not available	

#73	Selected Gear = data -125negative gear are reverse gears 00000000 = neutral 11111011 = park
#74	Current Gear=data-125 negative gear are reverse gears 00000000 = neutral 11111011 = park
#75 | #76	Bellow Pressure Front Axle Left Information of the pressure of the air suspension bellow at the left side of the front axle Pressure= ((BPFAL2*256)+BPFAL1)* 0.1 ,KPA
#75	BPFAL1
#76	BPFAL2
#77 | #78	Bellow Pressure Front Axle Right Information of the pressure of the air suspension bellow at the left side of the front axle Pressure= ((BPFAR2*256)+BPFAR1)* 0.1 ,KPA
#77	BPFAR1
#78	BPFAR2
#79 | #80	Bellow Pressure Rear Axle Left Information of the pressure of the air suspension bellow at the left side of the front axle Pressure= ((BPRAL2*256)+BPRAL1)* 0.1 ,KPA
#79	BPRAL1
#80	BPFAR2
#81 | #82	Bellow Pressure Rear Axle Right Information of the pressure of the air suspension bellow at the left side of the front axle Pressure= ((BPRAR2*256)+BPRAR1)* 0.1 ,KPA

#81	BPRAL1						
#82	BPFAR2						
#83 | #90	Driver's Identification (Driver 1 & Driver 2 identification)						
	#83	#84	#85	#86	#87	#88	#89	#90
	The driver ID is only available if a digital tachograph is present						
#91 | #92	Engine Fuel Rate (EFR). Amount of fuel consumed by engine per liter of hour. EFR=(EFR2*256+EFR1)* 0.05 , L/h Data Range: 0 to 3,212.75 L/h						
#91	EFR1						
#92	EFR2						
#93 | #94	Engine Instantaneous Fuel Economy(EIFE). Current fuel economy at current vehicle velocity. EIFE=(EIFE2*256+EIFE1) / 512 , km/L Data Range: 0 to 125.5 km/L						
#95 | #102	FMS Tell Tale Status						
	#95	#96	#97	#98	#99	#100	#101	#102
	The Tell Tale Status information is derived from information displayed to the driver's dashboard.						
#95	Bit 3,2,1,0: Telltale Block ID Bit 7,6,5,4: Telltale Status 1 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available						

#96	Bit 3,2,1,0: Telltale Status 2 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 3 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available
#97	Bit 3,2,1,0: Telltale Status 4 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 5 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available

#98	Bit 3,2,1,0: Telltale Status 6 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 7 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available
#99	Bit 3,2,1,0: Telltale Status 8 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 9 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available

#100	Bit 3,2,1,0: Telltale Status 10 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 11 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available
#101	Bit 3,2,1,0: Telltale Status 12 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 13 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available

#102	Bit 3,2,1,0: Telltale Status 14 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available Bit 7,6,5,4: Telltale Status 15 1000 = off 1001 = Cond. Red 1010 = Cond. Yellow 1011 = Cond. Info 1100–1110 = Reserved 1111 = not available

J1708 Packaged Messages Protocol

S	Once AT1708 SLEEP, it can wake it up. Start to send data by 3 packing, response HEX CODE		
	Packing 1: Byte 0: " @ " , 0x40; Byte 1: 4 Byte 2: #00 Byte 3: #01 Byte 4: #02 Byte 5: #03 Byte 6: #04 Byte 7: #05 Byte 8: #06 Byte 9: #07 Byte 10: #08 Byte 11: #09 Byte 12: #10 Byte 13: #11 Byte 14: #12 Byte 15: #13 Byte 16: #14 Byte 17: #15 Byte 18: #16 Byte 19: #17 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A	Packing 2: Byte 0: " @ " , 0x40; Byte 1: 5 Byte 2: #18 Byte 3: #19 Byte 4: #20 Byte 5: #21 Byte 6: #22 Byte 7: #23 Byte 8: #24 Byte 9: #25 Byte 10: #26 Byte 11: #27 Byte 12: #28 Byte 13: #29 Byte 14: #30 Byte 15: #31 Byte 16: #32 Byte 17: #33 Byte 18: #34 Byte 19: #35 Byte 20: Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A	Packing 3: Byte 0: " @ " , 0x40; Byte 1: 6 Byte 2: #36 Byte 3: #37 Byte 4: #38 Byte 5: #39 Byte 6: #40 Byte 7: #41 Byte 8: #42 Byte 9: #43 Byte 10: #44 Byte 11: #45 Byte 12: #46 Byte 13: #47 Byte 14: #48 Byte 15: #49 Byte 16: #50 Byte 17: #51 Byte 18: #52 Byte 19: #53 Byte 20:Check sum = Byte2 + ..+Byte 19 Byte 21: 0X0D Byte 22: 0X0A

Packing 4 & 5 will display only there is trouble code occurrence.		
Packing 4: Byte 0: " @ " Byte 1: 7 Byte 2:a Byte 3:b Byte 4:c Byte 5:a Byte 6:b Byte 7:c Byte 8:a Byte 9:b Byte 10:c Byte 11:a Byte 12:b Byte 13:c Byte 14:a Byte 15:b Byte 16:c Byte 17: Check sum = Byte2 + ..+Byte 21 Byte 18: 0X0D Byte 19: 0X0A	Packing 5: Byte 0: " @ " Byte 1: 8 Byte 2:a Byte 3:b Byte 4:c Byte 5:a Byte 6:b Byte 7:c Byte 8:a Byte 9:b Byte 10:c Byte 11:a Byte 12:b Byte 13:c Byte 14:a Byte 15:b Byte 16:c Byte 17: Check sum = Byte2 + ..+Byte 21 Byte 18: 0X0D Byte 19: 0X0A	

a — MID
b — SID or PID of a standard diagnostic code.
C — Diagnostic code character.
    Bits 4-1: Failure mode identifier (FMI)

NOTE : The #00~#52 command respond that data are ASCII code.

#00 | #01	Road Speed—Indicated vehicle velocity Maximum Range: 0.0 to 205.2 km/h (0.0 to 127.5 mph) speed=(SHB*256+SLB)/256
#00	Speed Low Byte (SLB)
#01	Speed High Byte (SHB)
#02	Cruise Control Status—State of the vehicle velocity control system (active, not active), and system switch (on, off), for various system operating modes. Bit 8: cruise mode 1=active/0=not active Bit 7: clutch switch 1=on/0=off Bit 6: brake switch 1=on/0=off Bit 5: accel switch 1=on/0=off Bit 4: resume switch 1=on/0=off Bit 3: coast switch 1=on/0=off Bit 2: set switch 1=on/0=off Bit 1: cruise control switch 1=on/0=off
#03	Brake Stroke Status—Identifies the current state of the vehicle foundation brakes. Bit 8-5: Axle number 1 to 16 (represented as 0 to 15) Bit 4-2: Brake status/Stroke adjustment 000 = OK 001 = Out of adjustment 010 = Delay brake return 011 = Brake pads worn 100 = Delayed brake application 101 = Reserved 110 = Error 111 = Not available Bit 1: 1 = Left wheel, 0 = Right wheel

#04	Percent Accelerator Pedal Position(PAPP)—Ratio of actual accelerator pedal position to maximum pedal position. Maximum Range: 0.0 to 102.0% PAPP= Data* 0.4
#05 | #08	Total Fuel Used (Natural Gas)—Accumulated amount of fuel used during vehicle operation. Maximum Range: 0.0 to 2 147 483 648 kg (0.0 to 4 724 464 025 lb) TFU=((ETF4*256*256*256)+(ETF3*256*256)+(ETF2*256)+ETF1)*0.473
#05	Engine Total Fuel used 0473 L / Bit gain , ETF1
#06	Engine Total Fuel used 0,473 L / Bit gain , ETF2
#07	Engine Total Fuel used 0,473 L / Bit gain , ETF3
#08	Engine Total Fuel used 0,473 L / Bit gain , ETF4
#09	Fuel Level—Ratio of volume of fuel to the total volume of the primary fuel storage container. Maximum Range: 0.0 to 127.5% Fuel Level=FL * 0.5 %
#10 | #11	Engine Speed (RPM)—Rotational velocity of crankshaft. Maximum Range: 0.0 to 16383.75 rpm RPM= (RH*256+ RL)* 0.25
#10	RPM Low byte, RL
#11	RPM High byte, RH
#12	Engine Oil Pressure(EOP)—Gage pressure of oil in engine lubrication system as provided by oil pump. Maximum Range: 0.0 to 879.0 kPa (0.0 to 127.5 lbf/in2) EOP=data * 3.45 KPA
#13	Throttle Position(TP)—The position of the valve used to regulate the supply of a fluid, usually air or fuel/air mixture, to an engine. 0% represents no supply and 100% is full supply. Maximum Range: 0.0 to 102.0% TP= data * 0.4%

#14	Cargo Weight—The force of gravity of freight carried. Maximum Range: 0.0 to 1 166 056.9 N (0.0 to 262 140.0 lbf) (Low Byte),AWL
#15	(High Byte), AWH Weight=(AWH*256+AWL)* 17.792 N
#16	Total Engine Hours(TEH)—Accumulated time of operation of engine. Maximum Range: 0.0 to 214 748 364.8 h TEH=((EH4*256*256*256)+(EH3*256*256)+(EH2*256)+EH1)*0.05
#16	Engine total hours of Operation, EH1
#17	Engine total hours of Operation, EH2
#18	Engine total hours of Operation, EH3
#19	Engine total hours of Operation, EH4
#20 | #27 #85 | #96	Vehicle Identification Number—Vehicle Identification Number (VIN) as assigned by the vehicle manufacturer. Vehicle identification number, aabbccddeeffgghh "ATI" command can show max 20 character VIN
#20	aa
#21	bb
#22	cc
#23	dd
#24	ee
#25	ff
#26	gg
#27	hh

#28	PTO Engagement Control Status PTO output status: Bits 8-5: Reserved—all bits set to 1 Bits 4-3: PTO #2 engagement actuator status Bits 2-1: PTO #1 engagement actuator status NOTE—Each status will be described using the following nomenclature: 00 Off/Not active 01 On/Active 10 Error condition 11 Not available
#29 | #30	Average Fuel Economy AFE=((AFE2*256)+AFE1) *1.660 72 x 10-3 km/L
#29	AFE1
#30	AFE2
#31 | #32	Mass Air Flow—Mass air flow measured at the fresh air intake MAF=((MAF2*256)+MF1)* 0.125 kg/min
#31	MAF1
#32	MAF2
#33 | #36	Total Vehicle Distance(TVD)—Accumulated distance travelled by vehicle during its operation. Maximum Range: 0.0 to 691489743 km (0.0 to 429 496 729.5 mi) Bit Resolution: 0.161 km (0.1 mi) TVD=((D4*256*256*256)+(D3*256*256)+(D2*256)+D1)*0.161 (KM) If vehicle dose not provide TVD, AT1708 replace the information with the calculated distance, deviation is 0.5%, The first time connection AT1708 please command ATR to clear distance memory.

#33	D1
#34	D2
#35	D3
#36	D4
#37 | #38	Fuel Rate (Instantaneous)—Amount of fuel consumed by engine per unit of time. Maximum Range: 0.0 to 1.076 65 L/s FR=(V2*256+V1) * 16.428 x 106 L/s
#37	V1
#38	V2
#39 | #40	Total Vehicle Hours(TVH)—Accumulated time of operation of vehicle. Maximum Range: 0.0 to 214 748 364.8 h TVH=((H4*256*256*256)+(H3*256*256)+(H2*256)+H1)*0.05 (H)
#39	H1
#40	H2
#41	H3
#42	H4
#43	Reserved
#44	Percent Engine Load(PEL)—Ratio of current output torque to maximum torque available at the current engine speed. Maximum Range: 0.0 to 127.5% PEL=data * 0.5%
#45	Engine Coolant Temperature(ECT) , Maximum Range: 0.0 to 255.0 °F ECT= data °F
#46	Boost Pressure (BP)—Gage pressure of air measured downstream on the compressor discharge side of the turbocharger. Maximum Range: 0.0 to 219.8 kPa (0.0 to 31.875 lbf/in2) PB=data * 0.862 (KPA)

#47	Intake Manifold Temperature (IMT)—Temperature of precombustion air found in intake manifold of engine air supply system. Maximum Range: 0.0 to 255.0 °F IMT=data °F
#48	ABS Control Status Bits 8-7: ABS off-road function switch Bits 6-5: ABS retarder control Bits 4-3: ABS brake control Bits 2-1: ABS warning lamp 00 Off/Not active 01 On/Active 10 Error condition 11 Not available
#49	Parking Brake Switch Status—Identifies the state (active/inactive) of the parking brake switch. Bit 8: 1=active/0=inactive Bits 7-1: Undefined
#50	Brake Application Pressure (BAP) Maximum Range: 0.0 to 1055 kPa (0.0 to 153.0 lbf/in2) BAP=data *4.14 kPa
#51	Brake Primary Pressure (BPP)—Gage pressure of air in the primary, or supply side, of the air brake system. Maximum Range: 0.0 to 1055 kPa (0.0 to 153.0 lbf/in2) BPP=data* 4.14 (KPA)
#52	Brake Secondary Pressure—Gage pressure of air in the secondary, or service side, of the air brake system. Maximum Range: 0.0 to 1055 kPa (0.0 to 153.0 lbf/in2) BPP=data* 4.14 (KPA)
#53	Road Speed Limit Status :State (active or not active) of the system used to limit maximum vehicle velocity. Bit 8: 1=active/0=not active Bits 7-1: Undefined

J1708 Command Example

1.)   >AT#h,

Response: "Data1" "Data2" "H0D" "H3E" by ASCII CODE.

EX1:

AT#1, to get vehicle speed, if speed is 255,

Display,

FF

>

(H46,H46, H0D,H3E).

2.) Trouble code :

40 37 80 8 CA 80 A AA 80 B AA 80 C AA 80 1 AA FC D A

Trouble code :

MID 128(H80)

PID 8(H8)

Diagnostic code character (CA), FMI= A , bit4~bit1

4.) ATI : request vehicle ID,

2A	31	47	31	4A	46	32	37	57	37	47	4A	31	37	38	32	32	37	0	0	0	27	0D	0A
	1	G	1	G	F	2	7	W	8	G	J	1	7	8	2	2	7				CS		

Country Manufactured	1	U.S.A.(1 or 4), Canada (2), Mexico (3), Japan (J), Korea (K), England (S), Germany (W), Italy (Z)
Manufacturer	G	
Vehicle Type	1	
Vehicle Features	JF27W	
Accuracy Check Digit	8	
Model Year	G	1988 (J), 1989 (K), 1990 (L), 1991 (M), 1992 (N), 1993 (P), 1994 (R), 1995 (S), 1996 (T), 199 7(V), 1998 (W), 1999 (X), 2000 (Y), 2001(1), 2002 (2), 2003 (3).....
Production Plant	J	
Sequential Number	178227	The sequence of the vehicle for production as it rolled of the manufacturers assembly line.

Appendix I: Setting Up Power Cable for Ignition Function

Our power connector has 3 pins: Ignition / VCC / GND. When using power from a battery, Ignition must be in contact with the VCC, or it can contact a switch, simulated engine start, to start the system.

Below is an example for your reference.