

Mobile Computing Solutions

Vehicle Mount Computer 4020

PKPA1011/-1

User Manual

Published December 2017

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PREFACE

Copyright

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Acknowledgements

VMC 4020 is a trademark. All other product names mentioned herein are registered trademarks of their respective owners.

Regulatory Compliance Statements

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

Declaration of Conformity

FCC

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

CE

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

RoHS Compliance



DELTA COMPONENTS GmbH RoHS Environmental Policy and Status Update

DELTA COMPONENTS GmbH is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2011/65/EU, to be your trusted green partner and to protect our environment.

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

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

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

How to recognize DELTA COMPONENTS GmbH RoHS Products?

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

All new product models launched after January 2013 will be RoHS compliant. They will use the usual DELTA COMPONENTS GmbH naming convention.

Warranty and RMA

DELTA COMPONENTS GmbH Warranty Period

DELTA COMPONENTS GmbH manufactures products that are new or equivalent to new in accordance with industry standard. DELTA COMPONENTS GmbH warrants that products will be free from defect in material and workmanship for 12 months, beginning on the date of invoice by DELTA COMPONENTS GmbH.

DELTA COMPONENTS Return Merchandise Authorization (RMA)

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

- Any products returned by DELTA COMPONENTS GmbH to other locations besides the customers' site will bear an extra charge and will be billed to the customer.

Repair Service Charges for Out-of-Warranty Products

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

System Level

- Component fee: DELTA COMPONENTS GmbH will only charge for main components such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistor, capacitor.
- Items will be replaced with DELTA COMPONENTS GmbH 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, DELTA COMPONENTS GmbH will return it to the customer without any charge.

Board Level

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

Warnings

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

Cautions

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

Safety Information

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

- Read all instructions carefully.
- Do not place the unit on an unstable surface, cart, or stand.
- Follow all warnings and cautions in this manual.
- When replacing parts, ensure that your service technician uses parts specified by the manufacturer.
- Avoid using the system near water, in direct sunlight, or near a heating device.

- The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.

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

Installation Recommendations

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

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

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

Using your fingers can disconnect most of the connections. It is recommended that you do not use 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 DELTA COMPONENTS products, visit DELTA COMPONENTS website at www.delta-components.de
2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
 - Product name and serial number
 - Detailed information of the peripheral devices
 - Detailed information of the installed software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wordings of the error messages

Warning!

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

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.

| Item | Name | Qty |
|------|--------------------|-----|
| 1 | System x 1 | 1 |
| 2 | GPS antenna x 1 | 1 |
| 3 | Screw for SSD x 4 | 4 |
| 4 | System power cable | 1 |

Ordering Information

PKPA1011

VMC 4020-4A0, 12,1" w/ resistive TouchScreen

Intel Atom®x7-E3950, 1.6GHz, 4GB DDR3L, front IP65

PKPA1011-1

VMC 4020-4A1, 12,1" w/ resistive TouchScreen

Intel Atom®x7-E3950, 1.6GHz, 4GB DDR3L, full IP65

Hardware Specifications

LCD Panel

- 12.1-inch TFT LCD panel with LED backlight
- 1024 x 768 pixels (XGA)
- Brightness: 1200 cd/m² (typical)
- Viewing angle: 170° (H): 170°(V)
- Contrast ratio: 750:1 (typical)

Touch Screen Sensor

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

CPU & Chipset

- Intel Atom® x7-E3950 processor dual core 1.6GHz

Memory

- One 204-pin DDR3L 1600MHz SO-DIMM slot (Default: 2GB)

Expandable Storage

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

Expansion

- 3 x full-size mini-PCIe socket (PCIe + USB)
- 1 x full-size mini-PCIe socket (USB)
- 1 x CFast
- 2x Micro SIM slot

I/O Interfaces - Front

- LCD backlight on/off
- Volume control (+/-)
- Brightness control (+/-)
- Light sensor
- 4 x LED indicators (power/battery charging, WLAN, shift, storage)
- F1 ~ F10 programmable function
- 2 x Built-in 2W speakers

I/O Interfaces - Lateral

- Right Side:
 - 1 x CFast card slot
 - 1 x System reset button
 - 1 x USB 2.0 host type A connector
- Left Side:
 - 1 x antenna for WWAN

I/O Interfaces - Bottom (VMC 4020-4A1, IP65)

- 1 x M12 (22 pins)
 - 1 x 10/100/1000, LAN1 (wake up on LAN)
 - 1 x RS232 (Tx/Rx)/RS422/RS485 (RI, 5V/0.5A, 12V/0.5A)
 - 1 x DR (Odometer + Speed)
 - 2 x GPI
 - Source: 9V ~ 60V-in (default)
 - Sink: external 0V ~ 60VDC pull-high selected by software settings
 - Input High "1" Voltage: 3.3 ~ 60 VDC
 - Input Low "0" Voltage: 0 ~ 2 VDC
 - 2 x GPO
 - Source: 9V ~ 60V-in (default)
 - 12V/6mA, 24V/12mA, 36V/18mA, 48V/24mA, 60V/30mA
 - Sink: external max. 0.5A pull high

- 1 x M12 (21 pins)
 - 1 x Mic-in
 - 1 x Line-out
 - 1 x Full RS232/422/485 (RI, 5V/0.5A, 12V/0.5A)
 - 2 x Isolated CANBus 2.0B
 - When installing CAN06, CAN2 becomes J1939/ISO15675-4
 - When installing CAN05, CAN2 becomes J1708
 - 1 x iButton
- 1 x M12 (5 pins)
 - 9V ~ 60V DC in (UPS battery: 12V, 24V, 36V and 48V)
- 1 x M12 (8 pins)
 - Either of DC output or RFID
 - 1 x DC output (12V/2A)
 - 1 x RFID (Tx/Rx, 12V/2A)
- 1 x M12 (8 pins)
 - 1 x 10/100/1000, LAN2 (optional for 802.3af/at)
- 1 x M12 (8 pins)
 - 2 x USB Type A
- 1 x M12 (18 pins)
 - Expansion port
- 1 x GPS Antenna SMA connector (On housing)

I/O Interfaces - Bottom (VMC 4020-4A1, IP65)

- 1 x Mic-in and Line-out
- 2 x RJ45 10/100/1000
 - LAN1, wake up on LAN
 - LAN2, optional for 802.3at
- 1 x USB type A
- 1 x DB9 full RS232/422/485 (RI, 5V/0.5A, 12V/0.5A)
- 1 x 26 pins connector:
 - 1 x full RS232/422/485 (RI, 5V/0.5A, 12V/0.5A)

- 1 x RFID (Tx/Rx)
- 2 x Isolated CAN 2.0B
- 1 x J1939/ISO15765-4 or J1708 (CAN05 or CAN06)
 - When installing CAN06, CAN2 becomes J1939/ISO15675-4
 - When installing CAN05, CAN2 becomes J1708
- 1 x DR (Odometer + Speed)
- 1 x iButton
- 1 x GPI
 - Source: 9V ~ 60V-in (default)
 - Sink: external 0V ~ 60DC pull-high selected by software settings
 - Input High "1" Voltage: 3.3 ~ 60 VDC
 - Input Low "0" Voltage: 0 ~ 2 VDC
- 2 x GPO
 - Source: 9V ~ 60V-in (default)
 - 12V/6mA, 24V/12mA, 36V/18mA, 48V/24mA, 60V/30mA
 - Sink: external external max. 0.5A pull high
- 1 x DB15 for expansion port
- 1 x 3-pin terminal block
 - 9V ~ 60V DC in (UPS battery: 12V, 24V, 36V and 48V)

I/O Interfaces - Top

- 2x Antenna for Wi-Fi

Mechanical

- Cooling system: Fanless
- Enclosure: Aluminum die casting
 - Mounting: VESA 75
- Ingress protection: Complete IP65, or IP65 without covering the bottom
- Dimension: 340mm(W) x 262mm(H) x 87mm(D)
- Weight: 5kg for VMC 4020-4A0 & VMC 4020-4A1

Power Management

- 9V ~ 60V DC in (UPS: 12V, 24V, 36V and 48V)
- Reverse protection/over voltage protection/under voltage protection
- Ignition On/Off control & programmable On/Off delay timing
- Wake up by LAN1, SMS, RTC and ignition

Environment

- Operating temperatures: Ambient with air -30°C to 60°C
- Storage temperatures: -30°C to 70°C
- Relative humidity: 10% to 90% (non-condensing)
- Vibration:
 - Operating: MIL-STD-810G, 514.6 Procedure 1, Category 4
 - Storage: MIL-STD-810G, 514.6 Procedure 1, Category 24
- Shock:
 - Operating: MIL-STD-810G, Method 516.6, Procedure I, trucks and semi-trailers = 40g
 - Crash hazard: MIL-STD-810G, Method 516.6, Procedure V, ground equipment = 75g

Operating System

- Windows 10
- Linux: YOCTO (by request)

Standards/Certifications

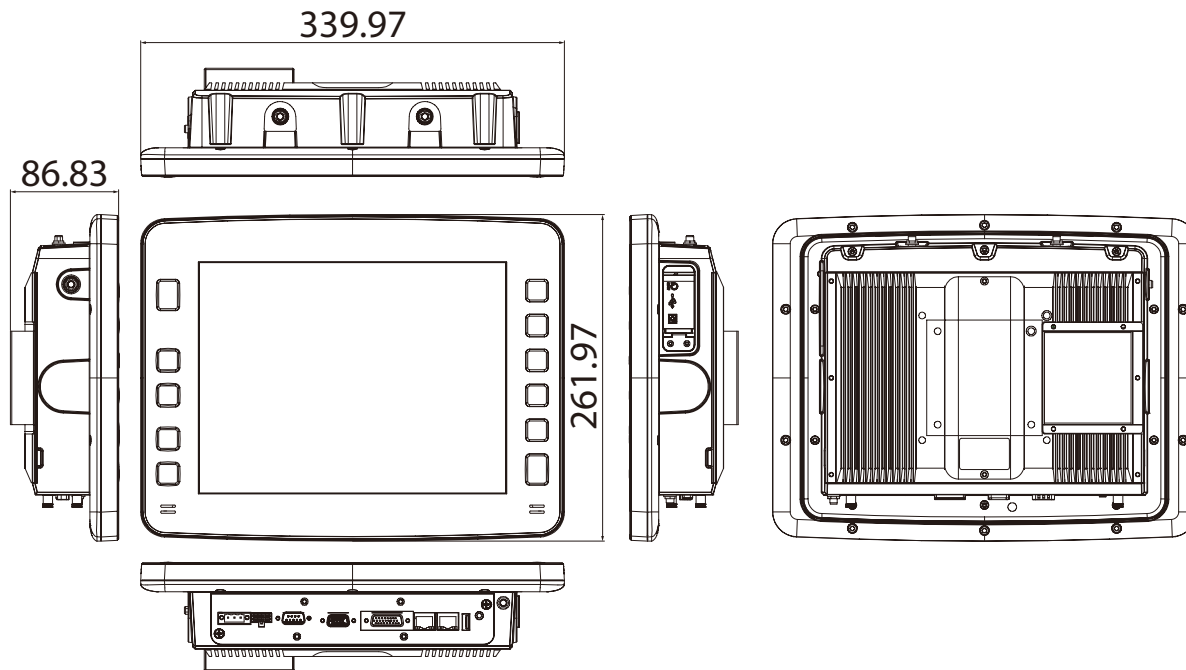
- CE/FCC class B/E13



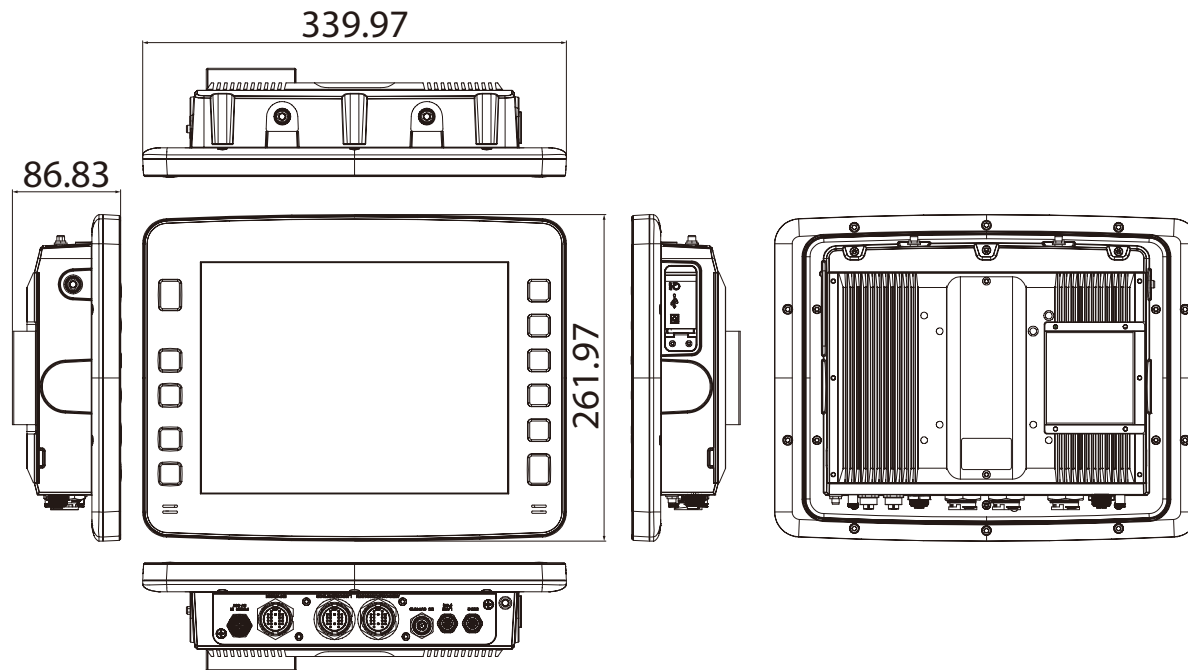
- PoE function (802.3af/at) only works when DC input is 24V.
- When touching the touch panel, the touching strength needs to be appropriate. Users cannot touch with any tool or hard material.

Mechanical Dimensions

VMC 4020-4A0



VMC 4020-4A1



Getting to Know VMC 4020

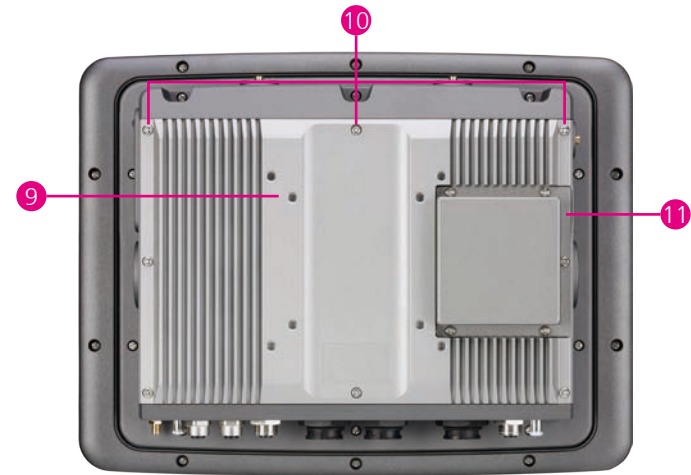
Front View

VMC 4020-4A1 & VMC 4020-4A0



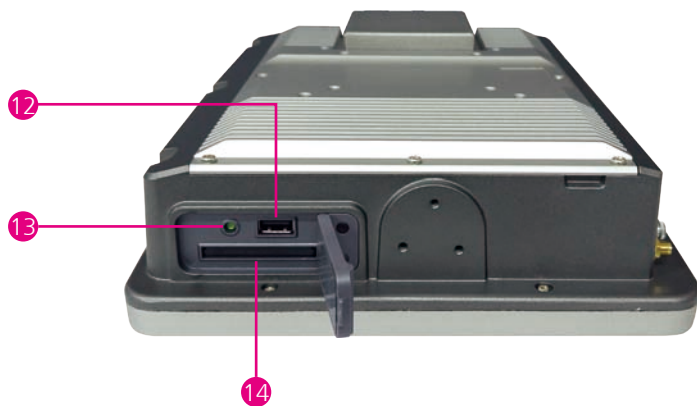
Rear View

VMC 4020-4A1 & VMC 4020-4A0



Right I/O View

VMC 4020-4A1 & VMC 4020-4A0



Left I/O View

VMC 4020-4A1 & VMC 4020-4A0



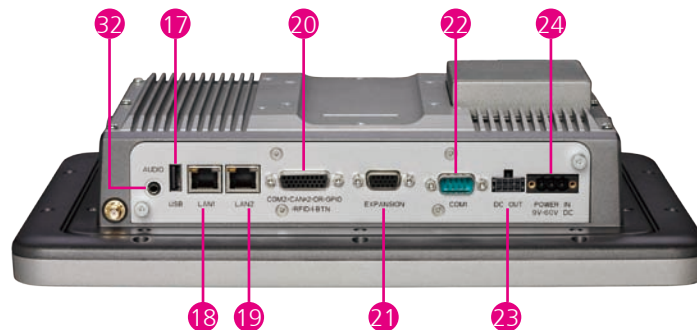
Top I/O View

VMC 4020-4A1 & VMC 4020-4A0

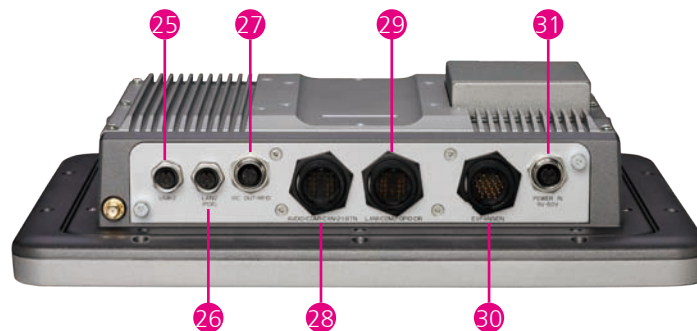


Bottom I/O View

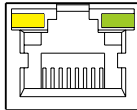
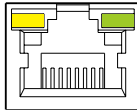
VMC 4020-4A0

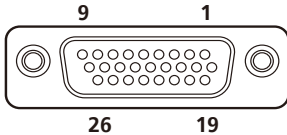
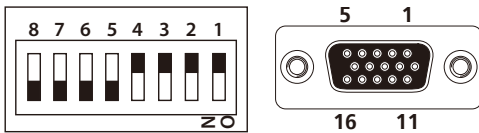


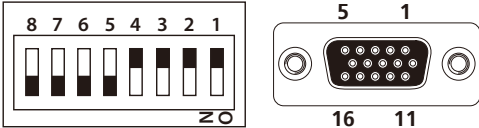
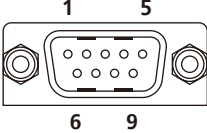
VMC 4020-4A1

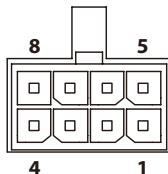

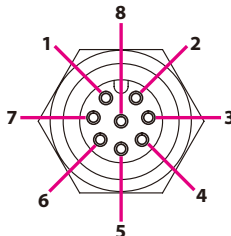
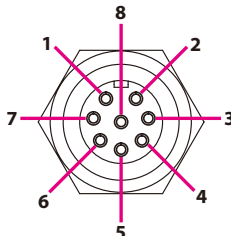


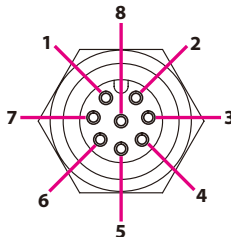
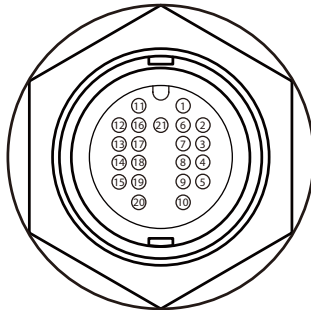
| Item | Function | Description |
|------|-----------------------------|---|
| 1 | Power and Battery LED Light | <p>Green for power and Orange for battery status.</p> <p>Power:</p> <ul style="list-style-type: none"> ▪ Power Off: LED backlight off ▪ Power On: Steady Green ▪ POST to OS: Blinking Green ▪ Enter OS: Steady Green <p>Battery:</p> <ul style="list-style-type: none"> ▪ Above 80%: Steady Orange ▪ Between 20% ~ 80%: LED off ▪ Below 20%: Blinking Orange |
| 2 | Volume Key | Adjust volume up or down by 11 levels. |
| 3 | Brightness Key | <p>We can change the setting between manual and auto (light sensor) in the utility.</p> <p>Manual (default):</p> <ul style="list-style-type: none"> ▪ Adjust brightness up or down by 11 levels. <p>Auto:</p> <ul style="list-style-type: none"> ▪ Adjust brightness up or down automatically, depending on the light sensor. |
| 4 | Speaker | Two speakers inside VMC 4020, 2W for each. |
| 5 | Function Keys and Shift Key | Customer can customize by the utility. When pushing the shift key till it turns to blue light, function keys will change from F1~F5 to F6~F10. |
| 6 | WLAN LED Light | <p>Wi-Fi on: Steady Orange (depending on module).</p> <p>Wi-Fi data activity: Blinking Orange (depending on module).</p> |
| 7 | Storage LED Light | Storage Activity: Blinking LED light (depending on SSD). |
| 8 | Light Sensor | When the light becomes brighter, the brightness of LCD panel will also become brighter accordingly. Brightness control needs to be set to "auto" instead of "manual". |
| 9 | VESA Mounting Holes | 75 x 75 |
| 10 | Screws for Bracket | We provide special bracket for the purpose of cable-relief and pen mounting. |
| 11 | Battery | Battery location. We suggest that the battery is installed in the factory side. |
| 12 | USB Type A | USB Type A: 5V/0.5A. |
| 13 | Reset Button | Turn off the system, and turn on automatically. |

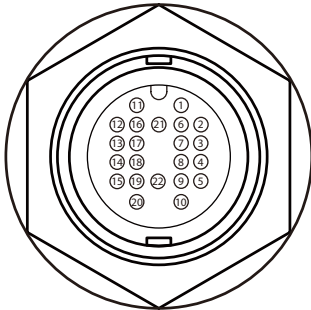
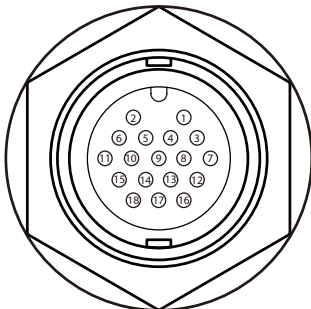
| 14 | CFast Slot | Location for CFast installation. | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------------|--------------|--|------------|------------|------------|------------|---|------------|---|------------|---|------------|---|------------|---|------------|---|------------|---|------------|---|------------|--|
| 15 | Antenna Hole | Antenna hole for WLAN. | | | | | | | | | | | | | | | | | | | | | |
| 16 | Antenna Hole | Antenna hole for WWAN. | | | | | | | | | | | | | | | | | | | | | |
| 17 | USB Type A | 5V/0.5A | | | | | | | | | | | | | | | | | | | | | |
| 18 | LAN1 | 10/100/1000Mbps, RJ45. | | | | | | | | | | | | | | | | | | | | | |
| | | <table><tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>LAN_MDI_0P</td><td>2</td><td>LAN_MDI_0N</td></tr><tr><td>3</td><td>LAN_MDI_1P</td><td>4</td><td>LAN_MDI_2P</td></tr><tr><td>5</td><td>LAN_MDI_2N</td><td>6</td><td>LAN_MDI_1N</td></tr><tr><td>7</td><td>LAN_MDI_3P</td><td>8</td><td>LAN_MDI_3N</td></tr></table> | Pin | Definition | Pin | Definition | 1 | LAN_MDI_0P | 2 | LAN_MDI_0N | 3 | LAN_MDI_1P | 4 | LAN_MDI_2P | 5 | LAN_MDI_2N | 6 | LAN_MDI_1N | 7 | LAN_MDI_3P | 8 | LAN_MDI_3N |  8 1 |
| | | Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | | | |
| | | 1 | LAN_MDI_0P | 2 | LAN_MDI_0N | | | | | | | | | | | | | | | | | | |
| 3 | LAN_MDI_1P | 4 | LAN_MDI_2P | | | | | | | | | | | | | | | | | | | | |
| 5 | LAN_MDI_2N | 6 | LAN_MDI_1N | | | | | | | | | | | | | | | | | | | | |
| 7 | LAN_MDI_3P | 8 | LAN_MDI_3N | | | | | | | | | | | | | | | | | | | | |
| LED (R): 100M = Green, 1G = Yellow. | | | | | | | | | | | | | | | | | | | | | | | |
| LED (L): Activity = Yellow. | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | LAN2 | 10/100/1000Mbps, RJ45. | | | | | | | | | | | | | | | | | | | | | |
| | | <table><tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>LAN_MDI_0P</td><td>2</td><td>LAN_MDI_0N</td></tr><tr><td>3</td><td>LAN_MDI_1P</td><td>4</td><td>LAN_MDI_2P</td></tr><tr><td>5</td><td>LAN_MDI_2N</td><td>6</td><td>LAN_MDI_1N</td></tr><tr><td>7</td><td>LAN_MDI_3P</td><td>8</td><td>LAN_MDI_3N</td></tr></table> | Pin | Definition | Pin | Definition | 1 | LAN_MDI_0P | 2 | LAN_MDI_0N | 3 | LAN_MDI_1P | 4 | LAN_MDI_2P | 5 | LAN_MDI_2N | 6 | LAN_MDI_1N | 7 | LAN_MDI_3P | 8 | LAN_MDI_3N |  8 1 |
| | | Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | | | |
| | | 1 | LAN_MDI_0P | 2 | LAN_MDI_0N | | | | | | | | | | | | | | | | | | |
| 3 | LAN_MDI_1P | 4 | LAN_MDI_2P | | | | | | | | | | | | | | | | | | | | |
| 5 | LAN_MDI_2N | 6 | LAN_MDI_1N | | | | | | | | | | | | | | | | | | | | |
| 7 | LAN_MDI_3P | 8 | LAN_MDI_3N | | | | | | | | | | | | | | | | | | | | |
| LED (R): 100M = Green, 1G = Yellow. | | | | | | | | | | | | | | | | | | | | | | | |
| LED (L): Activity = Yellow. | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |

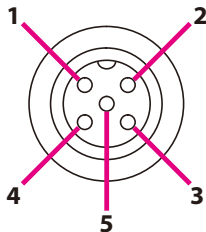

| 20 | DB26 | <div>1 x Full RS232/422/485</div> <div>1 x RFID</div> <div>2 x Isolated CANBus 2.0B</div> <div>1 x DR</div> <div>1 x iButton</div> <div>1 x GPIO</div> <div></div> | <table><tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>CAN_H</td><td>2</td><td>CAN_L</td></tr><tr><td>3</td><td>GPIO_O_0</td><td>4</td><td>GPIO_O_1</td></tr><tr><td>5</td><td>RFID_12V</td><td>6</td><td>RFID_Tx</td></tr><tr><td>7</td><td>COM2_DC</td><td>8</td><td>COM2_Rx_Tx+</td></tr><tr><td>9</td><td>COM2_Tx_Rx+</td><td>10</td><td>CAN2_H</td></tr><tr><td>11</td><td>CAN2_L</td><td>12</td><td>M_CAN_H</td></tr><tr><td>13</td><td>GPIO_DR_GND</td><td>14</td><td>Direction</td></tr><tr><td>15</td><td>RFID_Rx</td><td>16</td><td>COM2_RFID_GND</td></tr><tr><td>17</td><td>COM2_DSR</td><td>18</td><td>COM2_DTR</td></tr><tr><td>19</td><td>ISO_GND</td><td>20</td><td>M_CAN_L</td></tr><tr><td>21</td><td>GPIO_I_0</td><td>22</td><td>I_BTN/GPI_I_I</td></tr><tr><td>23</td><td>Odometer</td><td>24</td><td>COM2_RTS</td></tr><tr><td>25</td><td>COM2_CTS</td><td>26</td><td>COM2_RI#PW</td></tr></table> | Pin | Definition | Pin | Definition | 1 | CAN_H | 2 | CAN_L | 3 | GPIO_O_0 | 4 | GPIO_O_1 | 5 | RFID_12V | 6 | RFID_Tx | 7 | COM2_DC | 8 | COM2_Rx_Tx+ | 9 | COM2_Tx_Rx+ | 10 | CAN2_H | 11 | CAN2_L | 12 | M_CAN_H | 13 | GPIO_DR_GND | 14 | Direction | 15 | RFID_Rx | 16 | COM2_RFID_GND | 17 | COM2_DSR | 18 | COM2_DTR | 19 | ISO_GND | 20 | M_CAN_L | 21 | GPIO_I_0 | 22 | I_BTN/GPI_I_I | 23 | Odometer | 24 | COM2_RTS | 25 | COM2_CTS | 26 | COM2_RI#PW |
|-----|-------------|---|--|-----|------------|-----|------------|---|------------|---|----------|---|----------|---|----------|---|----------|---|------------|---|------------|---|-------------|---|-------------|----|-----------|----|-------------|----|-----------|----|-------------|----|-----------|----|-----------|----|---------------|----|----------|----|----------|----|---------|----|---------|----|----------|----|---------------|----|----------|----|----------|----|----------|----|------------|
| Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | CAN_H | 2 | CAN_L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | GPIO_O_0 | 4 | GPIO_O_1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | RFID_12V | 6 | RFID_Tx | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | COM2_DC | 8 | COM2_Rx_Tx+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | COM2_Tx_Rx+ | 10 | CAN2_H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | CAN2_L | 12 | M_CAN_H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | GPIO_DR_GND | 14 | Direction | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | RFID_Rx | 16 | COM2_RFID_GND | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | COM2_DSR | 18 | COM2_DTR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | ISO_GND | 20 | M_CAN_L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | GPIO_I_0 | 22 | I_BTN/GPI_I_I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | Odometer | 24 | COM2_RTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | COM2_CTS | 26 | COM2_RI#PW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | DB15 | <div>1. Default: CVBS x 3 & Full RS232 & RS232 (Tx/Rx). For COM function, it needs to insert an extra mini PCIe card, and make cable for J7 connector. For CVBS, it is built in by default.</div> <div></div> | <table><tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>CVBS-1_DB1</td><td>2</td><td>DB15-IN2</td></tr><tr><td>3</td><td>DB15-IN3</td><td>4</td><td>DB15-IN4</td></tr><tr><td>5</td><td>DB15-IN5</td><td>6</td><td>CVBS-G_DB6</td></tr><tr><td>7</td><td>CVBS-2_DB7</td><td>8</td><td>DB15-IN8</td></tr><tr><td>9</td><td>DB15-IN9</td><td>10</td><td>DB15-IN10</td></tr><tr><td>11</td><td>CVBS-3_DB11</td><td>12</td><td>DB15-IN12</td></tr><tr><td>13</td><td>DB15-IN13</td><td>14</td><td>DB15-IN14</td></tr><tr><td>15</td><td>DB15-IN15</td><td></td><td></td></tr></table> | Pin | Definition | Pin | Definition | 1 | CVBS-1_DB1 | 2 | DB15-IN2 | 3 | DB15-IN3 | 4 | DB15-IN4 | 5 | DB15-IN5 | 6 | CVBS-G_DB6 | 7 | CVBS-2_DB7 | 8 | DB15-IN8 | 9 | DB15-IN9 | 10 | DB15-IN10 | 11 | CVBS-3_DB11 | 12 | DB15-IN12 | 13 | DB15-IN13 | 14 | DB15-IN14 | 15 | DB15-IN15 | | | | | | | | | | | | | | | | | | | | | | |
| Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | CVBS-1_DB1 | 2 | DB15-IN2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | DB15-IN3 | 4 | DB15-IN4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | DB15-IN5 | 6 | CVBS-G_DB6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | CVBS-2_DB7 | 8 | DB15-IN8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | DB15-IN9 | 10 | DB15-IN10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | CVBS-3_DB11 | 12 | DB15-IN12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | DB15-IN13 | 14 | DB15-IN14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | DB15-IN15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| 21 | DB15 | <p>2. Change to the setting below. CVBS function will be removed. All of the 15 pins can be defined by the user on J7 connector.</p>  | <table><tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>CVBS-G</td><td>2</td><td>DB15-IN2</td></tr><tr><td>3</td><td>DB15-IN3</td><td>4</td><td>DB15-IN4</td></tr><tr><td>5</td><td>DB15-IN5</td><td>6</td><td>CVBS-G_DB6</td></tr><tr><td>7</td><td>CVBS-2_DB7</td><td>8</td><td>DB15-IN8</td></tr><tr><td>9</td><td>DB15-IN9</td><td>10</td><td>DB15-IN10</td></tr><tr><td>11</td><td>CVBS-3_DB11</td><td>12</td><td>DB15-IN12</td></tr><tr><td>13</td><td>DB15-IN13</td><td>14</td><td>DB15-IN14</td></tr><tr><td>15</td><td>DB15-IN15</td><td></td><td></td></tr></table> | Pin | Definition | Pin | Definition | 1 | CVBS-G | 2 | DB15-IN2 | 3 | DB15-IN3 | 4 | DB15-IN4 | 5 | DB15-IN5 | 6 | CVBS-G_DB6 | 7 | CVBS-2_DB7 | 8 | DB15-IN8 | 9 | DB15-IN9 | 10 | DB15-IN10 | 11 | CVBS-3_DB11 | 12 | DB15-IN12 | 13 | DB15-IN13 | 14 | DB15-IN14 | 15 | DB15-IN15 | | | | | | |
|-----|--------------------------------|--|---|-----|------------|-------------|------------|---|--------|----------|----------|---|----------|----------|----------|---|----------|---|------------|---|------------|---|----------|---|----------|-----|-----------|----|-------------|----|-----------|----|-----------|----|-----------|----|-----------|---|---|---|---|---|---|
| Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | CVBS-G | 2 | DB15-IN2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | DB15-IN3 | 4 | DB15-IN4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | DB15-IN5 | 6 | CVBS-G_DB6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | CVBS-2_DB7 | 8 | DB15-IN8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | DB15-IN9 | 10 | DB15-IN10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | CVBS-3_DB11 | 12 | DB15-IN12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | DB15-IN13 | 14 | DB15-IN14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | DB15-IN15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | DB9 (Full RS232/422/485) |  | <table><tr><th>Pin</th><th>RS-232</th><th>RS-485 (2W)</th><th>RS-422</th></tr><tr><td>1</td><td>DCD</td><td>Data+(B)</td><td>TxD-(A)</td></tr><tr><td>2</td><td>RXD</td><td>Data-(A)</td><td>TxD+(B)</td></tr><tr><td>3</td><td>TXD</td><td>-</td><td>RxD+(B)</td></tr><tr><td>4</td><td>DTR</td><td>-</td><td>RxD-(A)</td></tr><tr><td>5</td><td>GND</td><td>GND</td><td>GND</td></tr><tr><td>6</td><td>DSR</td><td>-</td><td>-</td></tr><tr><td>7</td><td>RTS</td><td>-</td><td>-</td></tr><tr><td>8</td><td>CTS</td><td>-</td><td>-</td></tr><tr><td>9</td><td>-</td><td>-</td><td>-</td></tr></table> | Pin | RS-232 | RS-485 (2W) | RS-422 | 1 | DCD | Data+(B) | TxD-(A) | 2 | RXD | Data-(A) | TxD+(B) | 3 | TXD | - | RxD+(B) | 4 | DTR | - | RxD-(A) | 5 | GND | GND | GND | 6 | DSR | - | - | 7 | RTS | - | - | 8 | CTS | - | - | 9 | - | - | - |
| Pin | RS-232 | RS-485 (2W) | RS-422 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | DCD | Data+(B) | TxD-(A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | RXD | Data-(A) | TxD+(B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | TXD | - | RxD+(B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | DTR | - | RxD-(A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | GND | GND | GND | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | DSR | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | RTS | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | CTS | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | - | - | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| 23 | DC Output (12V/2A) |  | <table><tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>MDI1-RST#</td><td>2</td><td>MDI2-SLEEP#</td></tr><tr><td>3</td><td>GND</td><td>4</td><td>GND</td></tr><tr><td>5</td><td>MCU-TX3</td><td>6</td><td>MCU-RX3</td></tr><tr><td>7</td><td>PUSH_BTN-IN#</td><td>8</td><td>OUT_12V</td></tr></table> | Pin | Definition | Pin | Definition | 1 | MDI1-RST# | 2 | MDI2-SLEEP# | 3 | GND | 4 | GND | 5 | MCU-TX3 | 6 | MCU-RX3 | 7 | PUSH_BTN-IN# | 8 | OUT_12V |
|-----|-----------------------------------|--|--|-----|------------|-----|------------|---|------------|---|-------------|---|-----------|---|-----|---|-------------|---|-----------|---|--------------|---|--------------|
| Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | | | | | |
| 1 | MDI1-RST# | 2 | MDI2-SLEEP# | | | | | | | | | | | | | | | | | | | | |
| 3 | GND | 4 | GND | | | | | | | | | | | | | | | | | | | | |
| 5 | MCU-TX3 | 6 | MCU-RX3 | | | | | | | | | | | | | | | | | | | | |
| 7 | PUSH_BTN-IN# | 8 | OUT_12V | | | | | | | | | | | | | | | | | | | | |
| 24 | Power Input |  | <table><tr><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>VIN_GND</td></tr><tr><td>2</td><td>VIN(9~60V)</td></tr><tr><td>3</td><td>IGNITION</td></tr></table> | Pin | Definition | 1 | VIN_GND | 2 | VIN(9~60V) | 3 | IGNITION | | | | | | | | | | | | |
| Pin | Definition | | | | | | | | | | | | | | | | | | | | | | |
| 1 | VIN_GND | | | | | | | | | | | | | | | | | | | | | | |
| 2 | VIN(9~60V) | | | | | | | | | | | | | | | | | | | | | | |
| 3 | IGNITION | | | | | | | | | | | | | | | | | | | | | | |
| 25 | USB 2.0 x 2 |  | <table><tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>USB0_N</td><td>2</td><td>USB0_P</td></tr><tr><td>3</td><td>USB0_VCC5</td><td>4</td><td>GND</td></tr><tr><td>5</td><td>USB1_N</td><td>6</td><td>USB1_P</td></tr><tr><td>7</td><td>USB1_VCC5</td><td>8</td><td>GND</td></tr></table> | Pin | Definition | Pin | Definition | 1 | USB0_N | 2 | USB0_P | 3 | USB0_VCC5 | 4 | GND | 5 | USB1_N | 6 | USB1_P | 7 | USB1_VCC5 | 8 | GND |
| Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | | | | | |
| 1 | USB0_N | 2 | USB0_P | | | | | | | | | | | | | | | | | | | | |
| 3 | USB0_VCC5 | 4 | GND | | | | | | | | | | | | | | | | | | | | |
| 5 | USB1_N | 6 | USB1_P | | | | | | | | | | | | | | | | | | | | |
| 7 | USB1_VCC5 | 8 | GND | | | | | | | | | | | | | | | | | | | | |
| 26 | DC Output (12V/VA) and RFID |  | <table><tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>VCC12_2A</td><td>2</td><td>RDIF_TX</td></tr><tr><td>3</td><td>RFID_RX</td><td>4</td><td>GND</td></tr><tr><td>5</td><td>MDI2_Sleep#</td><td>6</td><td>MDI1_RST#</td></tr><tr><td>7</td><td>GND</td><td>8</td><td>Push-BTN-IN#</td></tr></table> | Pin | Definition | Pin | Definition | 1 | VCC12_2A | 2 | RDIF_TX | 3 | RFID_RX | 4 | GND | 5 | MDI2_Sleep# | 6 | MDI1_RST# | 7 | GND | 8 | Push-BTN-IN# |
| Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | | | | | |
| 1 | VCC12_2A | 2 | RDIF_TX | | | | | | | | | | | | | | | | | | | | |
| 3 | RFID_RX | 4 | GND | | | | | | | | | | | | | | | | | | | | |
| 5 | MDI2_Sleep# | 6 | MDI1_RST# | | | | | | | | | | | | | | | | | | | | |
| 7 | GND | 8 | Push-BTN-IN# | | | | | | | | | | | | | | | | | | | | |

| 27 | LAN2 | 10/100/1000Mbps, M12.  | <table><tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>LAN2_MDI_0P (PSE_V+)</td><td>2</td><td>LAN2_MDI_0N (PSE_V+)</td></tr><tr><td>3</td><td>LAN2_MDI_1P (PSE_V-)</td><td>4</td><td>LAN2_MDI_1N (PSE_V-)</td></tr><tr><td>5</td><td>LAN2_MDI_2P</td><td>6</td><td>LAN2_MDI_2N</td></tr><tr><td>7</td><td>LAN2_MDI_3P</td><td>8</td><td>LAN2_MDI_3N</td></tr></table> | Pin | Definition | Pin | Definition | 1 | LAN2_MDI_0P (PSE_V+) | 2 | LAN2_MDI_0N (PSE_V+) | 3 | LAN2_MDI_1P (PSE_V-) | 4 | LAN2_MDI_1N (PSE_V-) | 5 | LAN2_MDI_2P | 6 | LAN2_MDI_2N | 7 | LAN2_MDI_3P | 8 | LAN2_MDI_3N | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|-----------------------------|--|---|-----|------------|-----|------------|---|-------------------------|---|-------------------------|---|-------------------------|---|-------------------------|---|-------------|---|-------------|---|-------------|---|-------------|---|-----|----|----|----|----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-------|----|-------|----|-----|----|-------|----|-------|--|--|
| Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | LAN2_MDI_0P (PSE_V+) | 2 | LAN2_MDI_0N (PSE_V+) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | LAN2_MDI_1P (PSE_V-) | 4 | LAN2_MDI_1N (PSE_V-) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | LAN2_MDI_2P | 6 | LAN2_MDI_2N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | LAN2_MDI_3P | 8 | LAN2_MDI_3N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | 21-pin Waterproof Connector |  | <table><tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>SURR_OUT_L</td><td>2</td><td>SURR_JD</td></tr><tr><td>3</td><td>SURR_OUT_R</td><td>4</td><td>MIC_OUT_R</td></tr><tr><td>5</td><td>MIC_JD</td><td>6</td><td>GND</td></tr><tr><td>7</td><td>IBUTTON_R</td><td>8</td><td>RI</td></tr><tr><td>9</td><td>DCD</td><td>10</td><td>RX</td></tr><tr><td>11</td><td>TX</td><td>12</td><td>DTR</td></tr><tr><td>13</td><td>GND</td><td>14</td><td>DSR</td></tr><tr><td>15</td><td>RTS</td><td>16</td><td>CTS</td></tr><tr><td>17</td><td>CAN2H</td><td>18</td><td>CAN2L</td></tr><tr><td>19</td><td>GND</td><td>20</td><td>CAN1H</td></tr><tr><td>21</td><td>CAN1L</td><td></td><td></td></tr></table> | Pin | Definition | Pin | Definition | 1 | SURR_OUT_L | 2 | SURR_JD | 3 | SURR_OUT_R | 4 | MIC_OUT_R | 5 | MIC_JD | 6 | GND | 7 | IBUTTON_R | 8 | RI | 9 | DCD | 10 | RX | 11 | TX | 12 | DTR | 13 | GND | 14 | DSR | 15 | RTS | 16 | CTS | 17 | CAN2H | 18 | CAN2L | 19 | GND | 20 | CAN1H | 21 | CAN1L | | |
| Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | SURR_OUT_L | 2 | SURR_JD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | SURR_OUT_R | 4 | MIC_OUT_R | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | MIC_JD | 6 | GND | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | IBUTTON_R | 8 | RI | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | DCD | 10 | RX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | TX | 12 | DTR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | GND | 14 | DSR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | RTS | 16 | CTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | CAN2H | 18 | CAN2L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | GND | 20 | CAN1H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | CAN1L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| 29 | 22-pin Waterproof Connector |  | <table><tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>RI</td><td>2</td><td>TX-</td></tr><tr><td>3</td><td>TX+</td><td>4</td><td>RX+</td></tr><tr><td>5</td><td>RX-</td><td>6</td><td>GND</td></tr><tr><td>7</td><td>LANOP</td><td>8</td><td>LANON</td></tr><tr><td>9</td><td>LAN1P</td><td>10</td><td>LAN1N</td></tr><tr><td>11</td><td>LAN2P</td><td>12</td><td>LAN2N</td></tr><tr><td>13</td><td>LAN3P</td><td>14</td><td>LAN3N</td></tr><tr><td>15</td><td>GPI-0</td><td>16</td><td>GPI-1</td></tr><tr><td>17</td><td>GPO-1</td><td>18</td><td>GPO-0</td></tr><tr><td>19</td><td>GND</td><td>20</td><td>DR_GND</td></tr><tr><td>21</td><td>DIRECTION</td><td>22</td><td>DODMETER</td></tr></table> | Pin | Definition | Pin | Definition | 1 | RI | 2 | TX- | 3 | TX+ | 4 | RX+ | 5 | RX- | 6 | GND | 7 | LANOP | 8 | LANON | 9 | LAN1P | 10 | LAN1N | 11 | LAN2P | 12 | LAN2N | 13 | LAN3P | 14 | LAN3N | 15 | GPI-0 | 16 | GPI-1 | 17 | GPO-1 | 18 | GPO-0 | 19 | GND | 20 | DR_GND | 21 | DIRECTION | 22 | DODMETER |
|----|-----------------------------|--|---|------------|------------|------------|------------|---|-----|---|--------|---|--------|---|--------|---|--------|---|----------|---|----------|---|----------|---|----------|----|-------|----|-------|----|-------|----|-------|----|-------|----|-------|----|-------|----|-------|----|-----------|----|-----|----|--------|----|-----------|----|----------|
| | | | Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1 | RI | 2 | TX- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 3 | TX+ | 4 | RX+ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 5 | RX- | 6 | GND | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 7 | LANOP | 8 | LANON | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 9 | LAN1P | 10 | LAN1N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 11 | LAN2P | 12 | LAN2N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 13 | LAN3P | 14 | LAN3N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 15 | GPI-0 | 16 | GPI-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 17 | GPO-1 | 18 | GPO-0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 19 | GND | 20 | DR_GND | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 21 | DIRECTION | 22 | DODMETER | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | 18-pin Waterproof Connector |  | <table><tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>GND</td><td>2</td><td>VIDEO1</td></tr><tr><td>3</td><td>VIDEO2</td><td>4</td><td>VIDEO3</td></tr><tr><td>5</td><td>AUDIO1</td><td>6</td><td>CVBS1 IN</td></tr><tr><td>7</td><td>CVBS2 IN</td><td>8</td><td>CVBS3 IN</td></tr><tr><td>9</td><td>CVBS GND</td><td>10</td><td>DCD</td></tr><tr><td>11</td><td>RX</td><td>12</td><td>TX</td></tr><tr><td>13</td><td>DTR</td><td>14</td><td>GND</td></tr><tr><td>15</td><td>DSR</td><td>16</td><td>RTS</td></tr><tr><td>17</td><td>CTS</td><td>18</td><td>RI/5V/12V</td></tr></table> | Pin | Definition | Pin | Definition | 1 | GND | 2 | VIDEO1 | 3 | VIDEO2 | 4 | VIDEO3 | 5 | AUDIO1 | 6 | CVBS1 IN | 7 | CVBS2 IN | 8 | CVBS3 IN | 9 | CVBS GND | 10 | DCD | 11 | RX | 12 | TX | 13 | DTR | 14 | GND | 15 | DSR | 16 | RTS | 17 | CTS | 18 | RI/5V/12V | | | | | | | | |
| | | | Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1 | GND | 2 | VIDEO1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 3 | VIDEO2 | 4 | VIDEO3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 5 | AUDIO1 | 6 | CVBS1 IN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 7 | CVBS2 IN | 8 | CVBS3 IN | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 9 | CVBS GND | 10 | DCD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 11 | RX | 12 | TX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 13 | DTR | 14 | GND | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 15 | DSR | 16 | RTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 17 | CTS | 18 | RI/5V/12V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| 31 | Power Connector |  | <table> <tr> <th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr> <tr> <td>1</td><td>VIN(9~60V)</td><td>2</td><td>VIN(9~60V)</td></tr> <tr> <td>3</td><td>VIN_GND</td><td>4</td><td>VIN_GND</td></tr> <tr> <td>5</td><td>IGNITION</td><td></td><td></td></tr> </table> | Pin | Definition | Pin | Definition | 1 | VIN(9~60V) | 2 | VIN(9~60V) | 3 | VIN_GND | 4 | VIN_GND | 5 | IGNITION | | |
|-----|-----------------|---|---|-----|------------|-----|------------|---|------------|---|------------|---|---------|---|---------|---|----------|--|--|
| Pin | Definition | Pin | Definition | | | | | | | | | | | | | | | | |
| 1 | VIN(9~60V) | 2 | VIN(9~60V) | | | | | | | | | | | | | | | | |
| 3 | VIN_GND | 4 | VIN_GND | | | | | | | | | | | | | | | | |
| 5 | IGNITION | | | | | | | | | | | | | | | | | | |
| 32 | Audio Connector | <p>Audio x 1 and Mic-in x 1</p>  | | | | | | | | | | | | | | | | | |

CHAPTER 2: JUMPERS AND CONNECTORS

This chapter describes how to set the jumpers on the motherboard. Note that the following procedures are generic for VMC 4020.

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 connected to a power supply can be extremely dangerous.

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

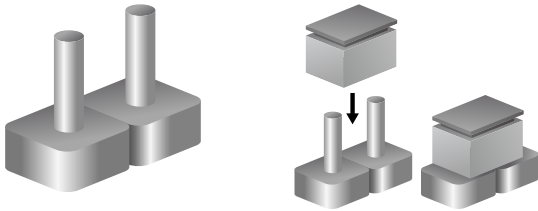
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal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

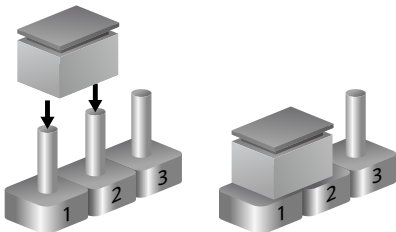
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is **short**. If you remove the jumper cap, or place the jumper cap on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



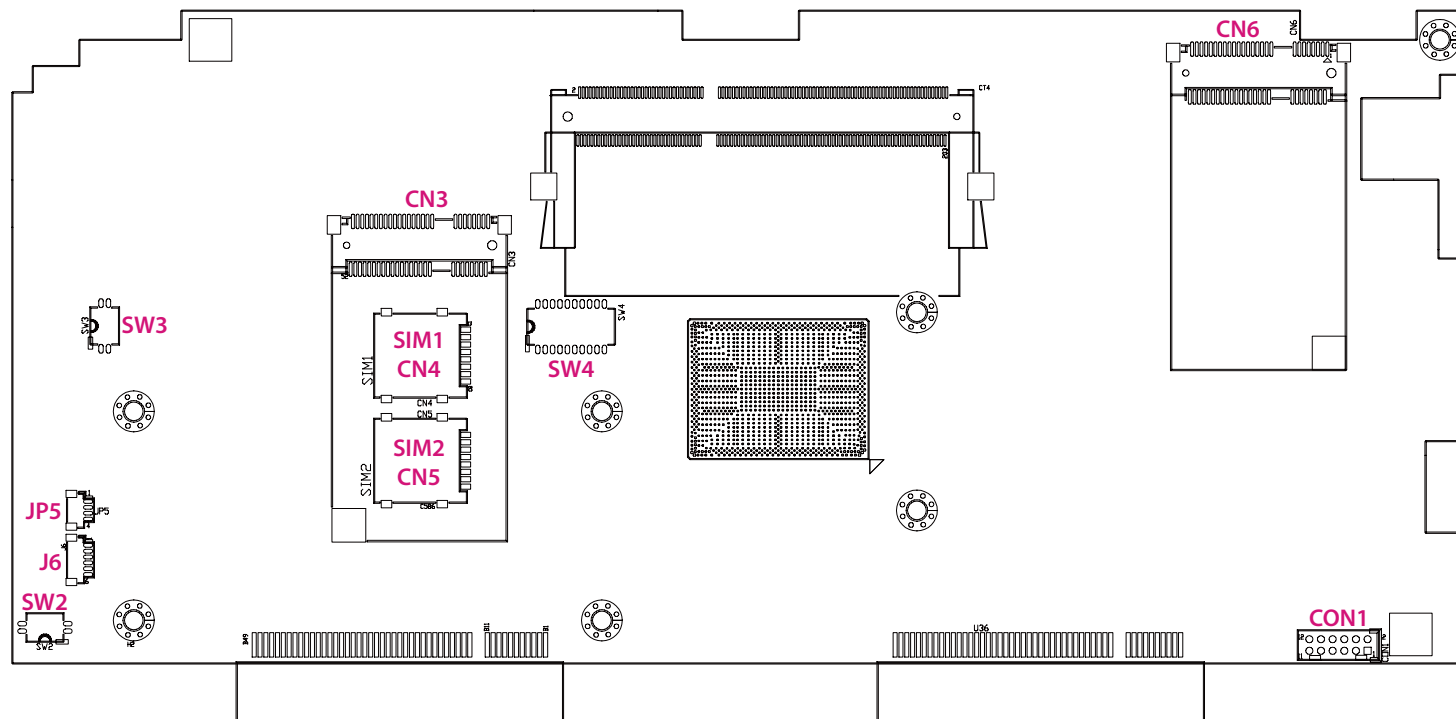
Three-Pin Jumpers: Pins 1 and 2 Are Short



Locations of the Jumpers and Connectors for the VMC 4020 Mainboard

The jumper and connector locations labeled below are for the VMC 4020 mainboard.
All of the pin numbers are marked on the PCB.

VMC 4020 Mainboard



Internal Connectors and DIP Switch Settings

RTC Battery Switch

Connector location: SW3

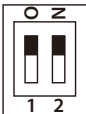


| Switch | Function |
|---------|-----------------|
| 1~2 ON | Clear CMOS & ME |
| 1~2 OFF | Normal |

1-2 Off: default

Power Input Voltage Selection & Security Switch

Connector location: SW2



| Switch | Function |
|-------------|-----------------------------|
| 1~2 ON | Vin=9-60V |
| 1 ON, 2 OFF | iButton / RFID Security OFF |
| 1 OFF, 2 ON | Vin=24V |
| 1~2 OFF | Vin=12V |

1-2 On: default

WWAN Switch

Connector location: SW4

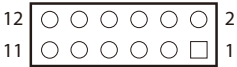


| Switch | Module | Brand |
|--|----------------|--------|
| 2, 3, 5, 6, 8, 9, 10 -> ON 1, 4, 7 -> OFF | SIM5360E | SIMCOM |
| 1, 4, 5, 6, 8, 9, 10 -> ON 2, 3, 7 -> Off | VIOB-WWAN-HDA0 | ublox |
| 1, 4, 5, 6, 8, 9, 10 -> On 2, 3, 7 -> Off | HE910 | Telit |
| 1, 4, 5, 6, 8, 9, 10 -> On 2, 3, 7 -> Off | LE910 | Telit |

Backup Battery Connector

Connector size: 2x6 12-pin header, 2.0mm pitch

Connector location: CON1

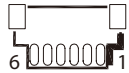


| Pin | Definition | Pin | Definition |
|-----|---------------|-----|-------------|
| 1 | BTA_SDA | 2 | BTA_SCL |
| 3 | BATT- | 4 | BATT+ |
| 5 | BATT- | 6 | BATT+ |
| 7 | BATT- | 8 | BATT+ |
| 9 | BATT- | 10 | BATT+ |
| 11 | INSERT DETECT | 12 | BAT_DISABLE |

GPS Connector

Connector size: 1x6 6-pin header, 1.0mm pitch

Connector location: J6

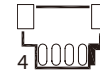


| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | VBAT | 2 | NC |
| 3 | TX | 4 | RX |
| 5 | GND | 6 | VCC3 |

GPS-DR Connector

Connector size: 1x4 4-pin header, 1.0mm pitch

Connector location: JP5

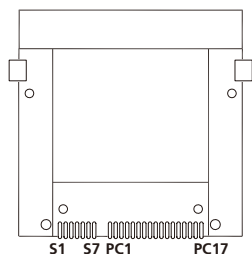


| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | GND | 2 | 1PPS |
| 3 | ODOMETER | 4 | DIRECTION |

CFast

Connector type: Standard CFast connector

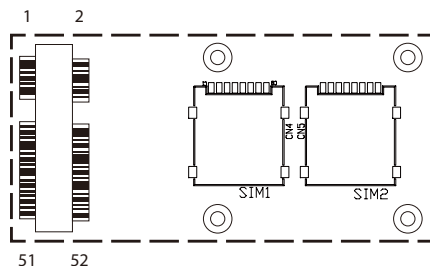
Connector location: CN7



| Pin | Definition | Pin | Definition |
|------|------------|------|------------|
| S1 | GND | S2 | SATA_TXP |
| S3 | SATA_TXN | S4 | GND |
| S5 | SATA_RXN | S6 | SATA_RXP |
| S7 | GND | | |
| PC1 | CFAST_CDI | PC2 | GND |
| PC3 | NC | PC4 | NC |
| PC5 | NC | PC6 | NC |
| PC7 | GND | PC8 | CFAST_LED1 |
| PC9 | CFAST_LED2 | PC10 | NC |
| PC11 | NC | PC12 | NC |
| PC13 | VCC3 | PC14 | VCC3 |
| PC15 | GND | PC16 | GND |
| PC17 | CFAST_CDO | | |

Mini-PCle Connector with USB Signal and SIM1 & SIM2 Slots

Connector location: CN3

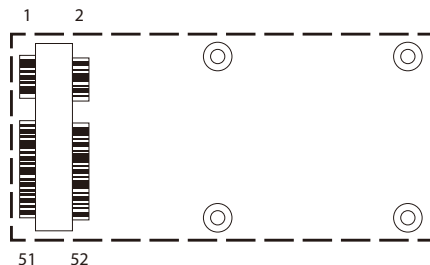


| Pin | Definition | Pin | Definition |
|-----|---------------------------------|-----|------------|
| 1 | SMS_WAKE2# | 2 | VCC3 |
| 3 | NC | 4 | GND |
| 5 | NC | 6 | NC |
| 7 | NC | 8 | UIM_PWR |
| 9 | GND | 10 | UIM_DAT |
| 11 | VCC_MSM26-DIG | 12 | UIM_CLK |
| 13 | NC | 14 | UIM_RST |
| 15 | GND | 16 | NC |
| 17 | U2_TXD_R | 18 | GND |
| 19 | U2_RXD_R | 20 | 3.5G_DIS# |
| 21 | GND | 22 | 3.5G_RST# |
| 23 | USB3-RXN (MC74XX BOM Option) | 24 | VCC3 |
| 25 | USB3-RXP (MC74XX BOM Option) | 26 | GND |

| Pin | Definition | Pin | Definition |
|-----|--|-----|------------|
| 27 | GND | 28 | NC |
| 29 | GND | 30 | NC |
| 31 | USB3-TXN (MC74XX BOM Option) | 32 | SMS_WAKE1# |
| 33 | USB3-TXP (MC74XX BOM Option) / UMTS_RST# | 34 | GND |
| 35 | GND | 36 | USB_N |
| 37 | GND | 38 | USB_P |
| 39 | VCC3 | 40 | GND |
| 41 | VCC3 | 42 | WWAN_LED# |
| 43 | GND | 44 | NC |
| 45 | PCM_CLK | 46 | NC |
| 47 | PCM_RX_SW | 48 | NC |
| 49 | PCM_TX_SW | 50 | GND |
| 51 | PCM_SYNC | 52 | VCC3 |

Mini-PCle Connector with USB and PCIe Signal

Connector location: CN6



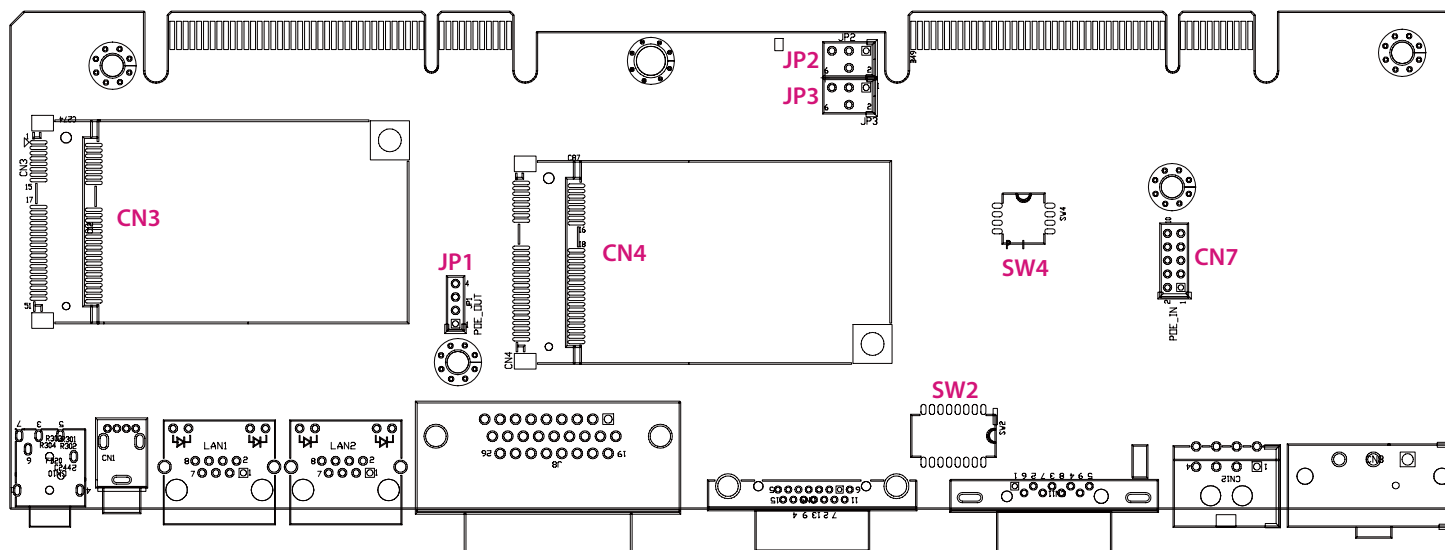
| Pin | Definition | Pin | Definition |
|-----|------------|-----|-------------|
| 1 | NC | 2 | +V3.3_MINI |
| 3 | NC | 4 | GND |
| 5 | NC | 6 | +V1.5S_MINI |
| 7 | NC | 8 | NC |
| 9 | GND | 10 | NC |
| 11 | PCIE_CLK# | 12 | NC |
| 13 | PCIE_CLK | 14 | NC |
| 15 | GND | 16 | NC |
| 17 | NC | 18 | GND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

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

Locations of the Jumpers and Connectors for the VMC 4020-4A0 I/O Board

The jumper and connector locations labeled below are for the VMC 4020-4A0 I/O board.
All of the pin numbers are marked on the PCB.

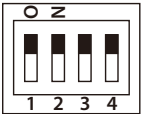
VMC 4020-4A0 I/O Board



Internal Connectors and DIP Switch Settings

GPIO DIP Switch

Connector location: SW4



GPI

| Switch | Function |
|-------------------------------------|-------------|
| 1~2 ON (Internal Pull-High Vin) | Low active |
| 1~2 OFF (External Pull-High Vin) | High active |

1-2 On: default

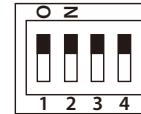
GPO

| Switch | Function |
|-------------------------------------|--|
| 3~4 ON (Internal Pull-High Vin) | Vin = 12V, I = 6mA, P = 0.072W Vin = 24V, I = 12mA, P = 0.144W Vin = 36V, I = 18mA, P = 0.648W Vin = 48V, I = 24mA, P = 1.152W Vin = 60V, I = 30mA, P = 1.8W |
| 3~4 OFF (External Pull-High Vin) | Vin(max) = 36V I: 0.5A (@TA = 25°C) I: 0.23A (@TA = 85°C) |

3-4 On: default

CAN Function Switch

Connector location: SW1



CAN1

| Switch | Function |
|---------|-----------------------|
| 1~2 ON | 120Ω Terminal Enable |
| 1~2 OFF | 120Ω Terminal Disable |

1-2 On: default

CAN2

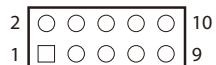
| Switch | Function |
|---------|-----------------------|
| 3~4 ON | 120Ω Terminal Enable |
| 3~4 OFF | 120Ω Terminal Disable |

3-4 On: default

PoE Board Power Input

Connector size: 2x5 10-pin header, 2.0mm pitch

Connector location: CN7



| Pin | Definition | Pin | Definition |
|-----|-------------|-----|------------|
| 1 | VIN (9~36V) | 2 | GND |
| 3 | VIN (9~36V) | 4 | GND |
| 5 | VIN (9~36V) | 6 | GND |
| 7 | POE_POK | 8 | POE_PWR_EN |
| 9 | VCC5 | 10 | GND |

PoE Board Power Output

Connector size: 1x4 4-pin header, 2.0mm pitch

Connector location: JP1



| Pin | Definition | Pin | Definition |
|-----|--------------------|-----|--------------------|
| 1 | PSE_OUT_P (54V_V+) | 2 | PSE_OUT_N (54V_V-) |
| 3 | POE_LED0# | 4 | POE_LED1# |

COM1 Power Selection

Connector size: 2x3 6-pin header, 2.54mm pitch

Connector location: JP2



| Pin | Function |
|-----|----------|
| 1~2 | +12V |
| 3~5 | +5V |
| 3~4 | RI |

COM2 Power Selection

Connector size: 2x3 6-pin header, 2.54mm pitch

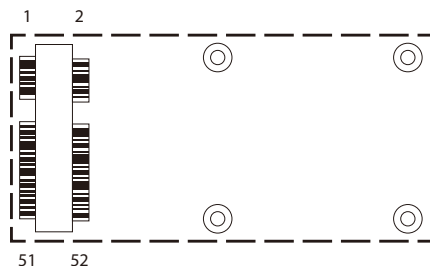
Connector location: JP3



| Pin | Function |
|-----|----------|
| 1~2 | +12V |
| 3~5 | +5V |
| 3~4 | RI |

Mini-PCle Connector with USB and PCIe Signal

Connector location: CN3

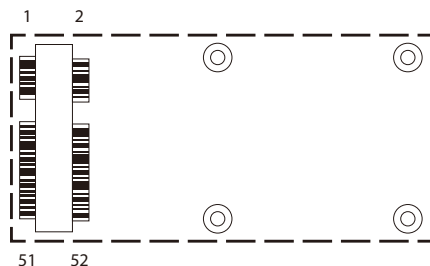


| Pin | Definition | Pin | Definition |
|-----|------------|-----|-------------|
| 1 | NC | 2 | +V3.3_MINI |
| 3 | NC | 4 | GND |
| 5 | NC | 6 | +V1.5S_MINI |
| 7 | NC | 8 | NC |
| 9 | GND | 10 | NC |
| 11 | PCIE_CLK# | 12 | NC |
| 13 | PCIE_CLK | 14 | NC |
| 15 | GND | 16 | NC |
| 17 | NC | 18 | GND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

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

Mini-PCle Connector with USB and PCIe Signal

Connector location: CN4



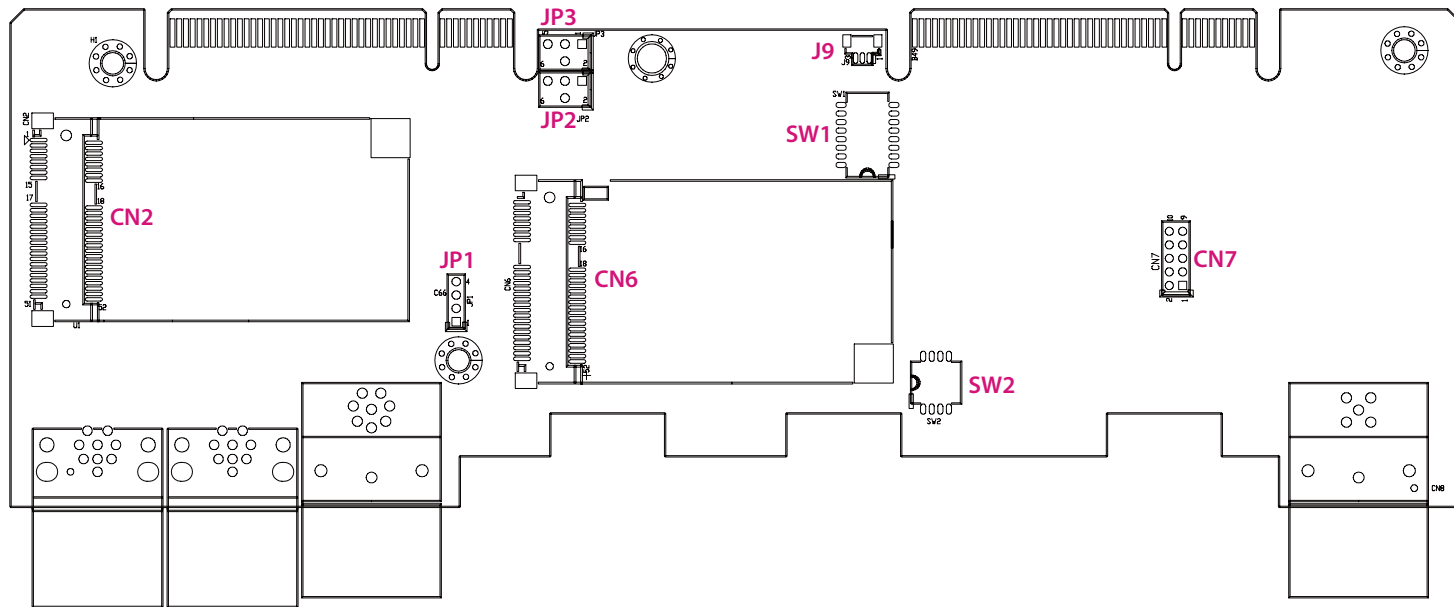
| Pin | Definition | Pin | Definition |
|-----|------------|-----|-------------|
| 1 | NC | 2 | +V3.3_MINI |
| 3 | NC | 4 | GND |
| 5 | NC | 6 | +V1.5S_MINI |
| 7 | NC | 8 | NC |
| 9 | GND | 10 | NC |
| 11 | PCIE_CLK# | 12 | NC |
| 13 | PCIE_CLK | 14 | NC |
| 15 | GND | 16 | NC |
| 17 | NC | 18 | GND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

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

Locations of the Jumpers and Connectors for the VMC 4020-4A1 Waterproof I/O Board

The jumper and connector locations labeled below are for the VMC 4020-4A1 waterproof I/O board.
All of the pin numbers are marked on the PCB.

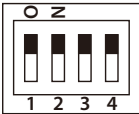
VMC 4020-4A1 Waterproof I/O Board



Internal Connectors and DIP Switch Settings

GPIO DIP Switch

Connector location: SW2



GPI

| Switch | Function |
|-------------------------------------|-------------|
| 1~2 ON (Internal Pull-High Vin) | Low active |
| 1~2 OFF (External Pull-High Vin) | High active |

1-2 On: default

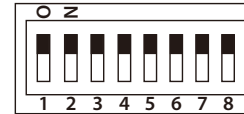
GPO

| Switch | Function |
|-------------------------------------|---|
| 3~4 ON (Internal Pull-High Vin) | $V_{in} = 12V, I = 6mA, P = 0.072W$ $V_{in} = 24V, I = 12mA, P = 0.144W$ $V_{in} = 36V, I = 18mA, P = 0.648W$ $V_{in} = 48V, I = 24mA, P = 1.152W$ $V_{in} = 60V, I = 30mA, P = 1.8W$ |
| 3~4 OFF (External Pull-High Vin) | $V_{in(max)} = 36V$ $I: 0.5A (@TA = 25^{\circ}C)$ $I: 0.23A (@TA = 85^{\circ}C)$ |

3-4 On: default

CAN Function Switch

Connector location: SW1



CAN1

| Switch | Function |
|---------|-----------------------|
| 1~2 ON | 120Ω Terminal Enable |
| 1~2 OFF | 120Ω Terminal Disable |

1-2 On: default

CAN2

| Switch | Function |
|---------|-----------------------|
| 3~4 ON | 120Ω Terminal Enable |
| 3~4 OFF | 120Ω Terminal Disable |

3-4 On: default

CAN2 & OBD

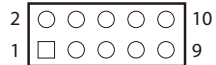
| Switch | Function |
|---------------------------|---------------------------|
| 5, 7 -> ON 6, 8 -> OFF | CAN2 Output |
| 5, 7 -> OFF 6, 8 -> ON | VIOB-CAN-05/06 OBD Output |

5 & 7 On, 6 & 8 Off: default

PoE Board Power Input

Connector size: 2x5 10-pin header, 2.0mm pitch

Connector location: CN7



| Pin | Definition | Pin | Definition |
|-----|-------------|-----|------------|
| 1 | VIN (9~36V) | 2 | GND |
| 3 | VIN (9~36V) | 4 | GND |
| 5 | VIN (9~36V) | 6 | GND |
| 7 | POE_POK | 8 | POE_PWR_EN |
| 9 | VCC5 | 10 | GND |

PoE Board Power Output

Connector size: 1x4 4-pin header, 2.0mm pitch

Connector location: JP1



| Pin | Definition | Pin | Definition |
|-----|--------------------|-----|--------------------|
| 1 | PSE_OUT_P (54V_V+) | 2 | PSE_OUT_N (54V_V-) |
| 3 | POE_LED0# | 4 | POE_LED1# |

COM1 Power Selection

Connector size: 2x3 6-pin header, 2.54mm pitch

Connector location: JP2



| Pin | Function |
|-----|----------|
| 1~2 | +12V |
| 3~5 | +5V |
| 3~4 | RI |

COM2 Power Selection

Connector size: 2x3 6-pin header, 2.54mm pitch

Connector location: JP3



| Pin | Function |
|-----|----------|
| 1~2 | +12V |
| 3~5 | +5V |
| 3~4 | RI |

CAN05 and CAN06 Connector

Connector size: 1x3 3-pin header, 1.0mm pitch

Connector location: J9



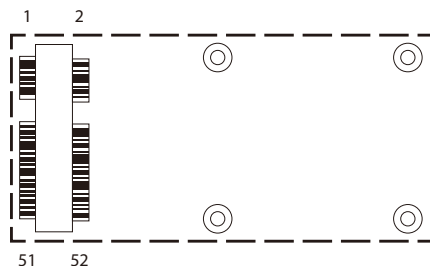
| Pin | Definition | Pin | Definition |
|-----|----------------|-----|----------------|
| 1 | (J1708/1939)_H | 2 | (J1708/1939)_L |
| 3 | GND | | |



When inserting a cable from the CAN05 or CAN06 module, CAN2 on the I/O will change to support CAN05 or CAN06.

Mini-PCle Connector with USB and PCIe Signal

Connector location: CN2

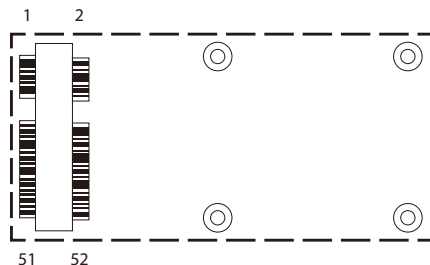


| Pin | Definition | Pin | Definition |
|-----|------------|-----|-------------|
| 1 | NC | 2 | +V3.3_MINI |
| 3 | NC | 4 | GND |
| 5 | NC | 6 | +V1.5S_MINI |
| 7 | NC | 8 | NC |
| 9 | GND | 10 | NC |
| 11 | PCIE_CLK# | 12 | NC |
| 13 | PCIE_CLK | 14 | NC |
| 15 | GND | 16 | NC |
| 17 | NC | 18 | GND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

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

Mini-PCle Connector with USB and PCIe Signal

Connector location: CN6



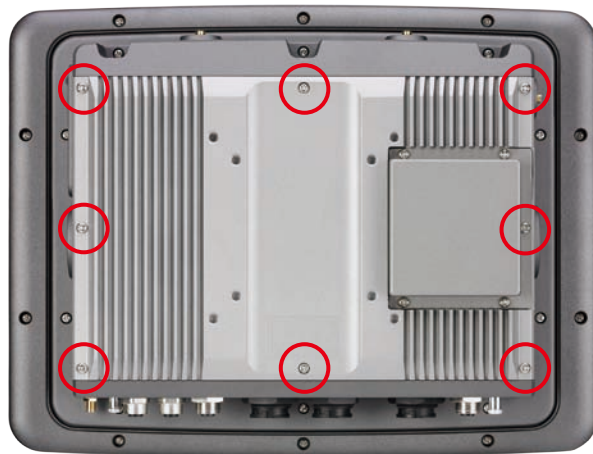
| Pin | Definition | Pin | Definition |
|-----|------------|-----|-------------|
| 1 | NC | 2 | +V3.3_MINI |
| 3 | NC | 4 | GND |
| 5 | NC | 6 | +V1.5S_MINI |
| 7 | NC | 8 | NC |
| 9 | GND | 10 | NC |
| 11 | PCIE_CLK# | 12 | NC |
| 13 | PCIE_CLK | 14 | NC |
| 15 | GND | 16 | NC |
| 17 | NC | 18 | GND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

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

CHAPTER 3: INSTALLATION OF SSD AND MODULES



Before installing any SSD or modules, please loosen the screws marked in red first. The motherboard inside VMC 4020 can be accessed after removing the screws.

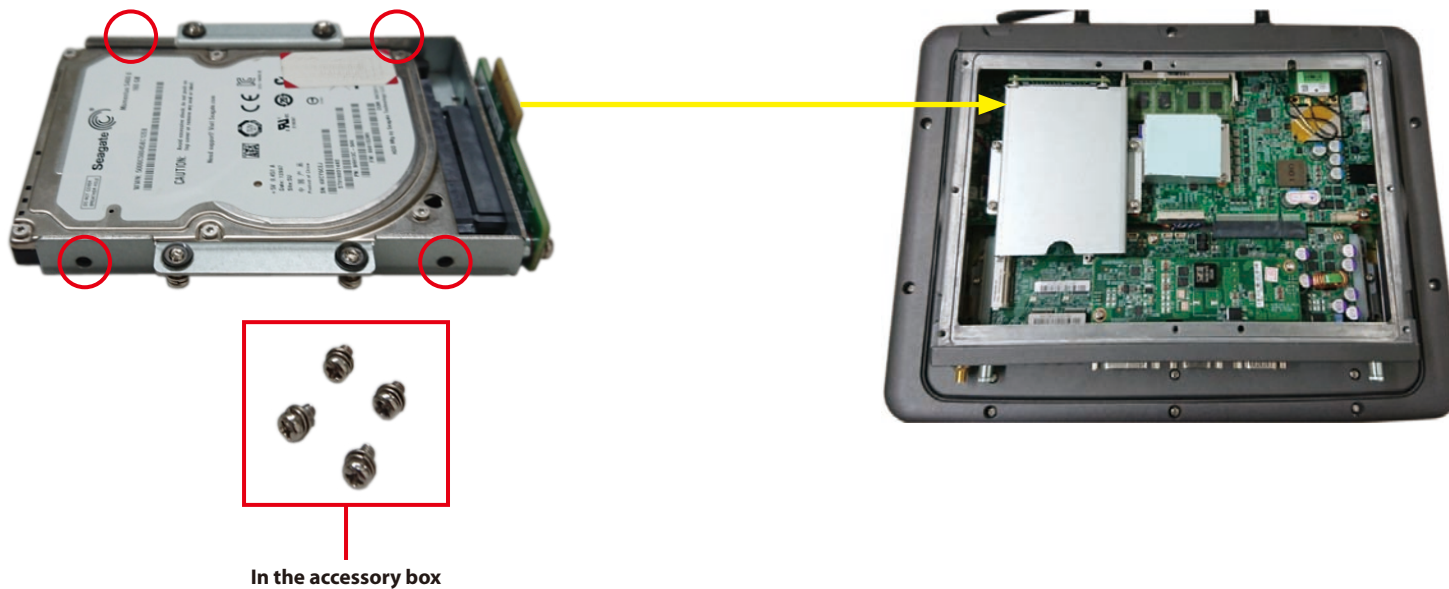


Installing an SSD/HDD

1. Loosen the screws marked in red first and take the SSD/HDD kit out.



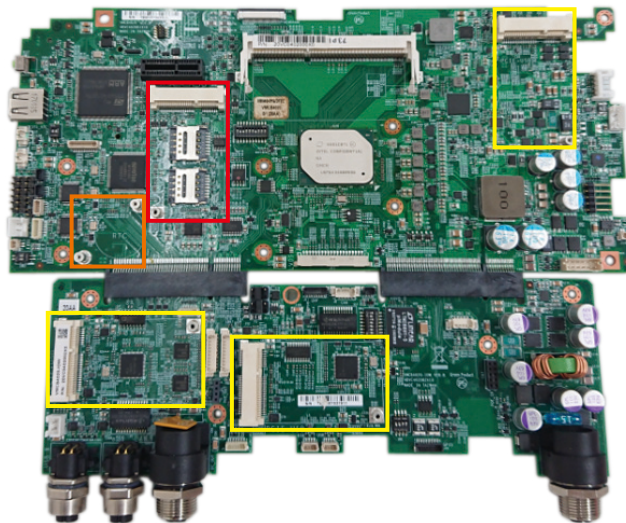
2. Secure the SSD/HDD into the SSD/HDD kit, and then screw the SSD/HDD kit back to the mainboard.



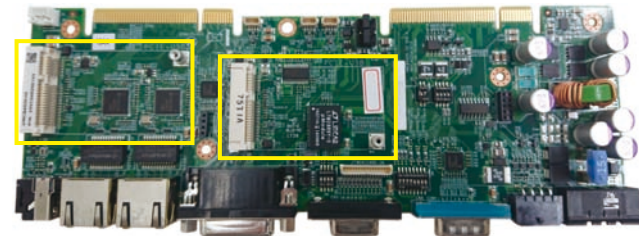
Installing External Modules

1. Install the external modules to the respective connectors marked below.
The full size mini-PCIe marked in red below is used for WWAN purposes (USB signal). The full size mini-PCIe marked in yellow is used for other purposes, such as for installing Wi-Fi modules (USB and PCIe signal).

The two nuts marked in orange are used for GPS modules. The JP5 connector is used for DR while the J6 connector is used for GPS.



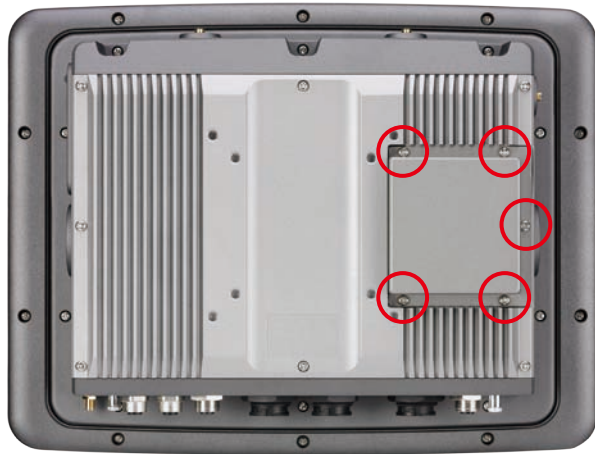
VMC 4020-4A1



VMC 4020-4A0

Installing a Battery

1. Loosen the screws marked in red and remove the battery cover.



2. Place the battery into the battery cover as below.

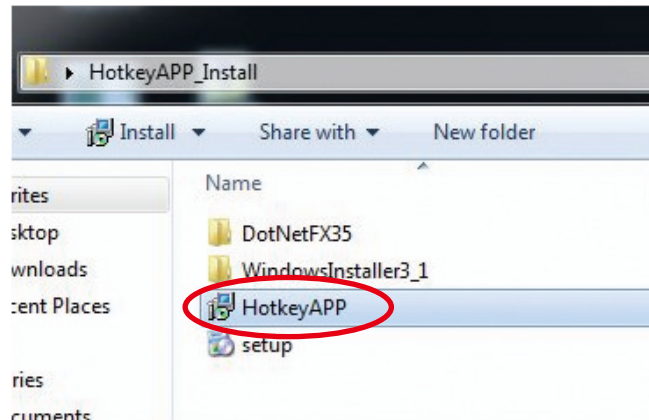


CHAPTER 4: SOFTWARE

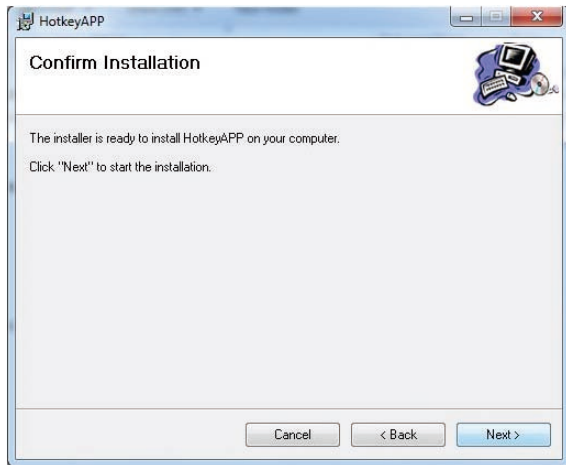
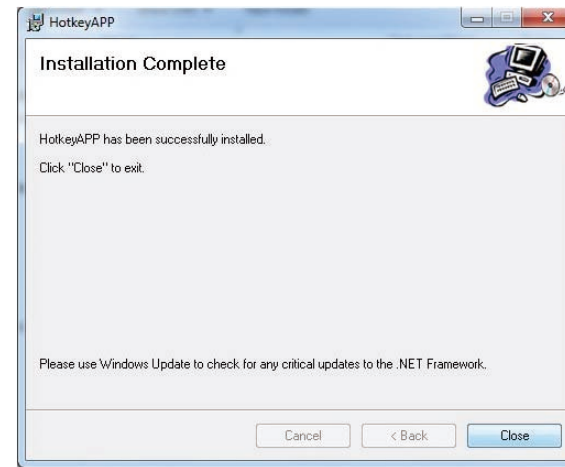
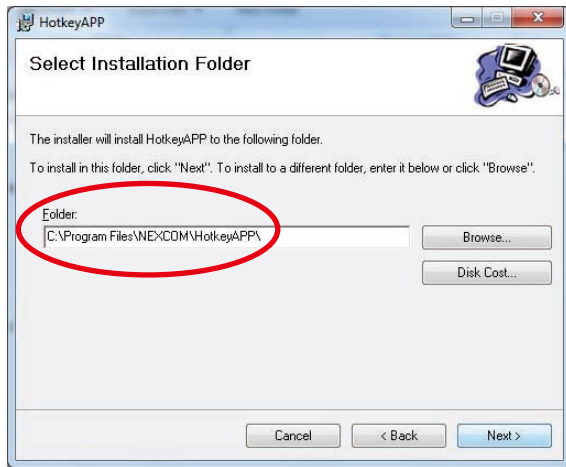
HOTKEY SETUP PROCEDURE

Installing Function Key App

1. Double click "HotkeyAPP.exe"

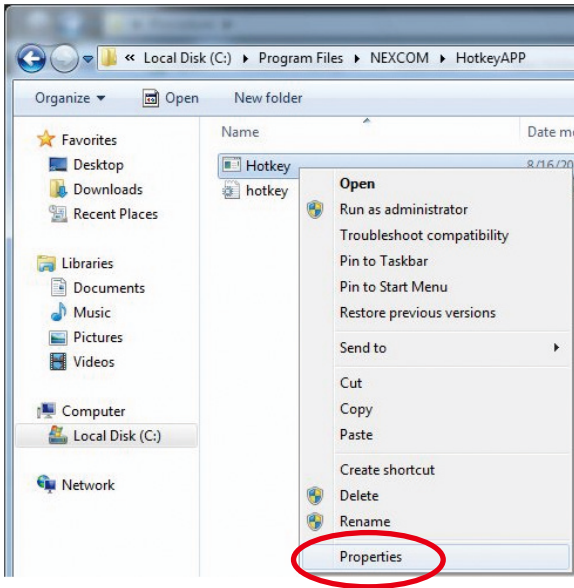


2. Select the installation folder and complete the installation.

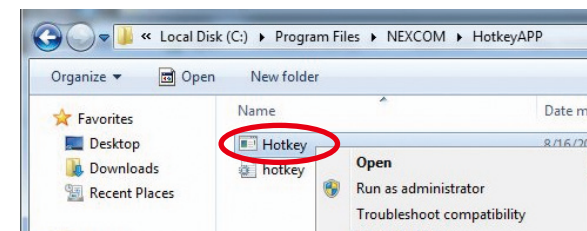
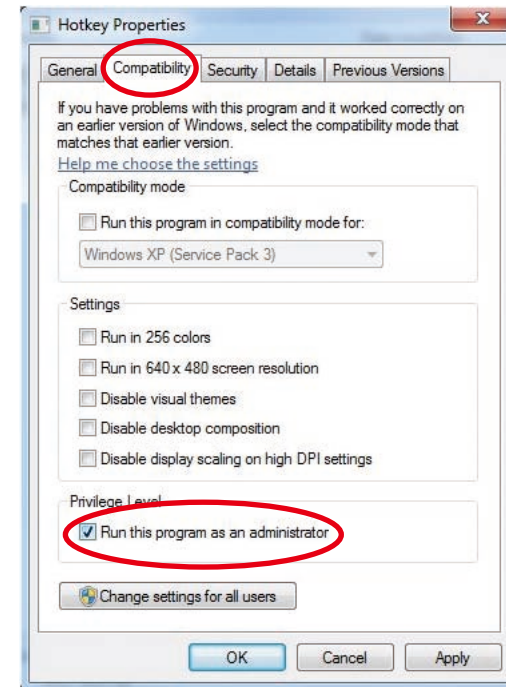


Applying Administrator Authority

1. Right click "**Hotkey.exe**" in installation folder, then select "**properties**".

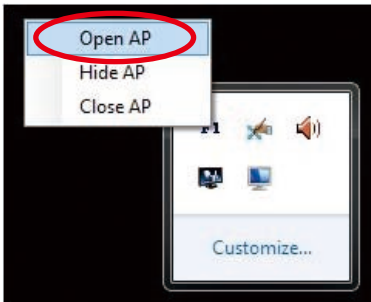
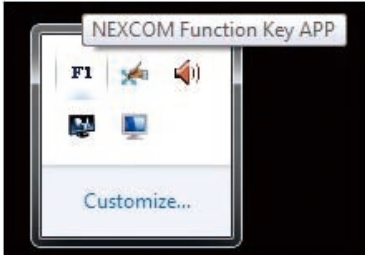


2. Switch to the **Compatibility** tab, then check "**Run this program as an administrator**". Click "**OK**", then execute "**Hotkey.exe**".

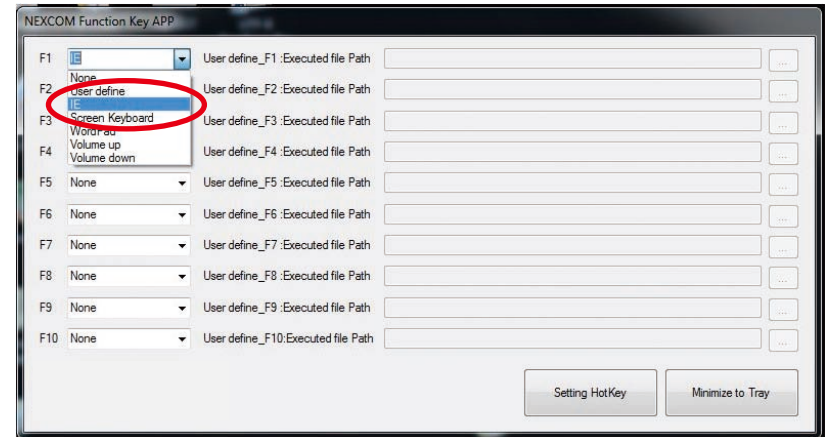


Setup Hotkey Function

1. Right click "F1 icon" in system bar, then select "Open AP".

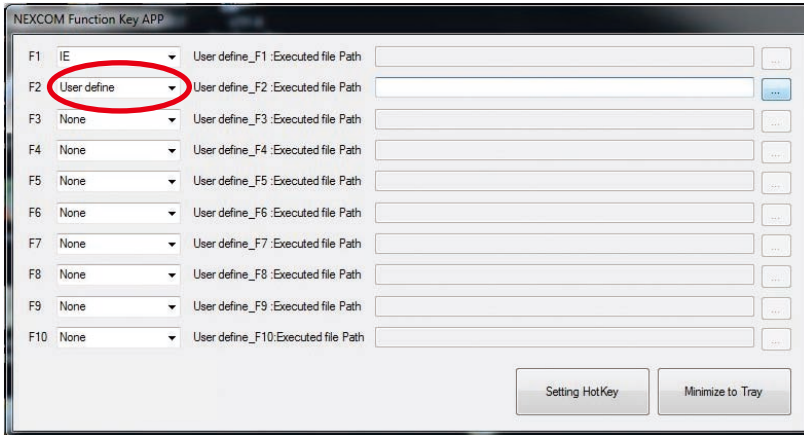


2. Select function from dropdown list, F1 to F10



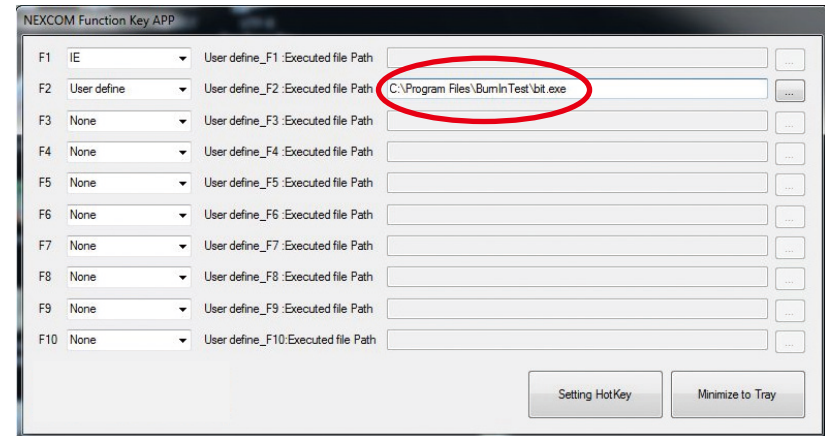
Setup Hotkey Function - User Define

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 (LED light is bright)
Hotkey = F6 to F10



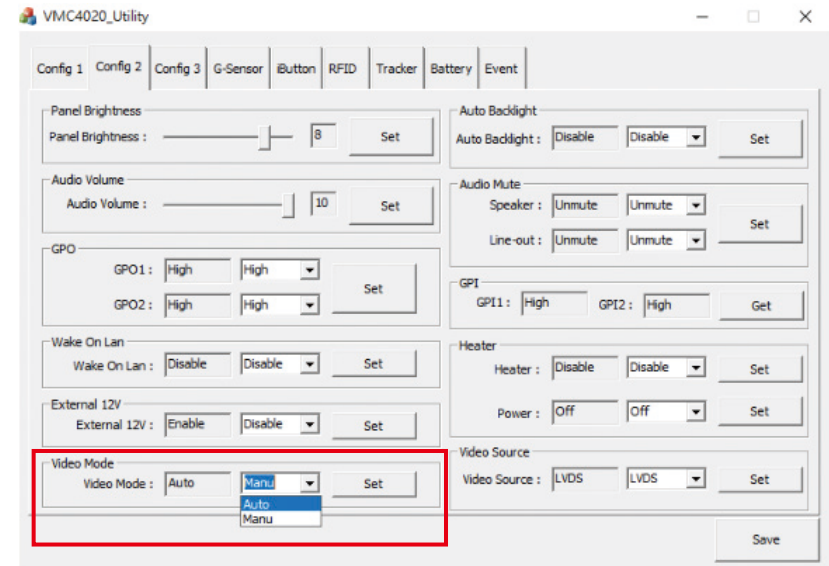
DEMO UTILITY

The software demo utility helps users to test and control different functions on the VMC 4020. This section shows how to use the utility. Users can refer to the source codes in the CD to develop their applications.

CVBS (Analog Camera)

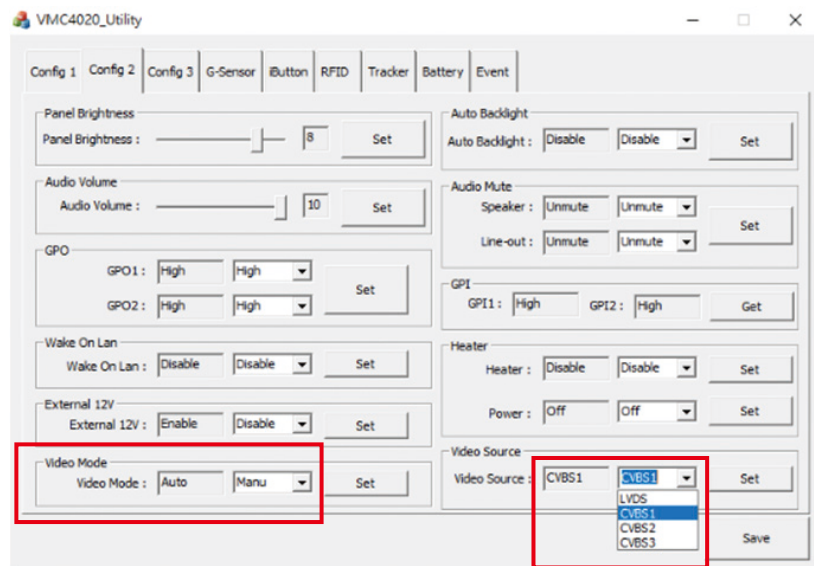
There are two modes for video input (analog, CVBS). One is Auto mode, and the another is Manu mode.

For Auto mode, video content will be shown when the camera powers on. If there are more than one camera powering on at the same time, the video shown will be the first number of the camera, from 1, 2, to 3 (one camera only).



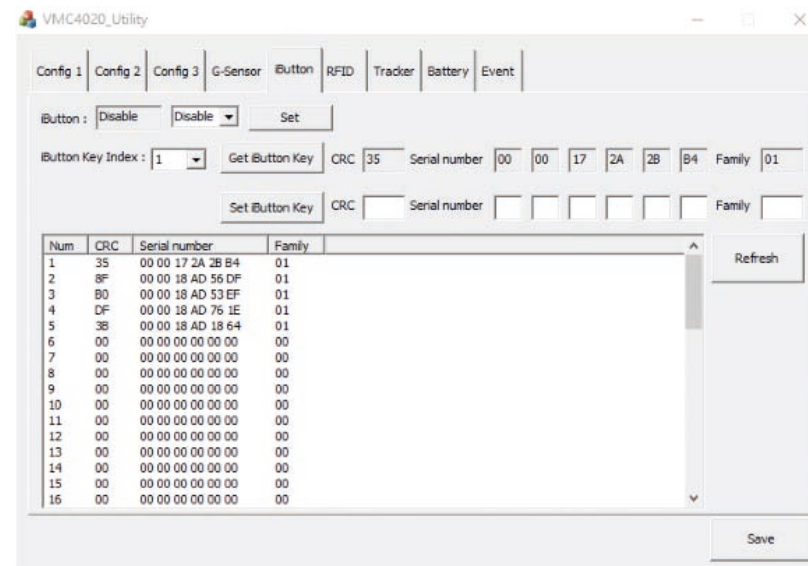
CVBS (Analog Camera)

For Manu mode, the video content shown will be based on the customer's desired content. LVDS option is used to show the OS in the system.



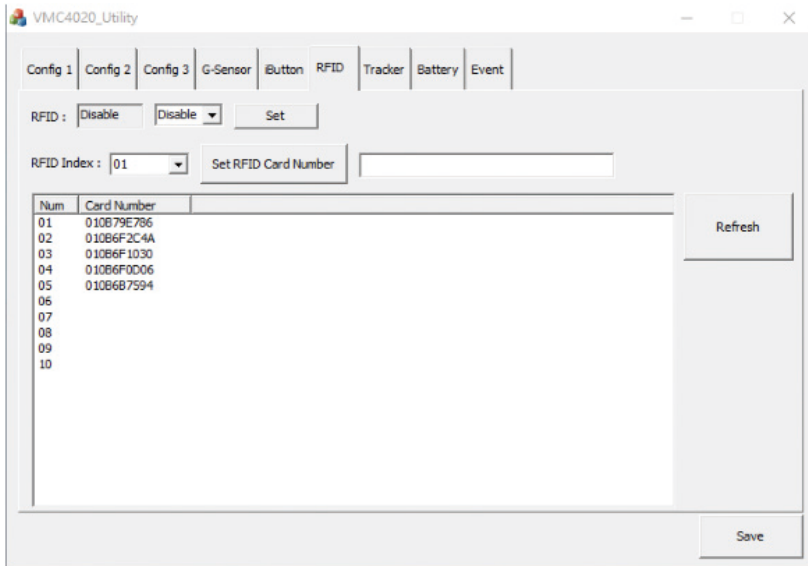
iButton

Configures and reads the value of iButton into the system. Default is 50 sets.



RFID

Configures and reads the value of RFID into the system. Default is 10 sets.

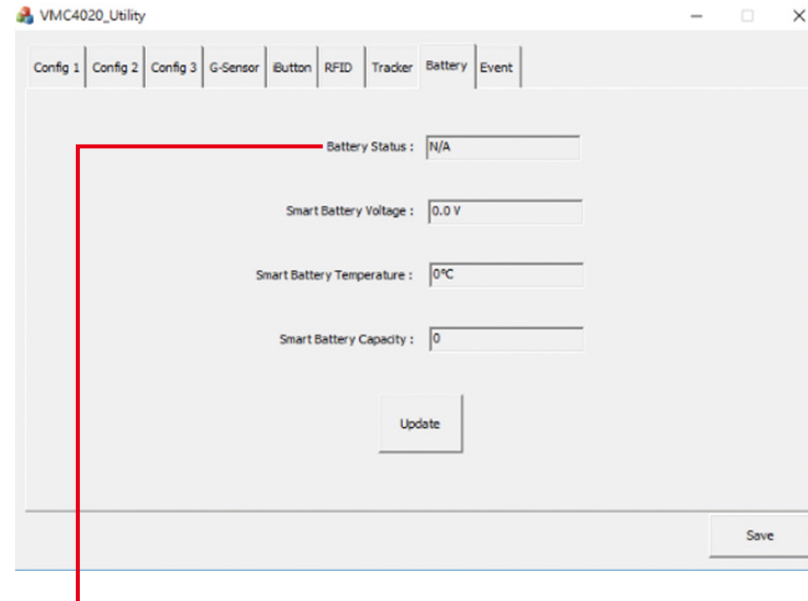


The screenshot shows the 'RFID' tab in the VMC4020_Utility software. It features a 'Disable' button and a dropdown menu set to 'Disable', with a 'Set' button next to it. Below this is an 'RFID Index' dropdown set to '01' and a 'Set RFID Card Number' text field. A table lists RFID card numbers for indices 01 through 10. A 'Refresh' button is to the right of the table, and a 'Save' button is at the bottom right.

| Num | Card Number |
|-----|-------------|
| 01 | 010B79E786 |
| 02 | 010B6F2C4A |
| 03 | 010B6F1030 |
| 04 | 010B6F0D06 |
| 05 | 010B6B7594 |
| 06 | |
| 07 | |
| 08 | |
| 09 | |
| 10 | |

Battery

Reads the status of the battery.



The screenshot shows the 'Battery' tab in the VMC4020_Utility software. It displays the following fields: 'Battery Status' (N/A), 'Smart Battery Voltage' (0.0 V), 'Smart Battery Temperature' (0°C), and 'Smart Battery Capacity' (0). An 'Update' button is located below these fields. A red line is drawn on the left side of the window, extending from the top to the bottom.

Battery Status

- Battery installed or not installed
- Charging
- Charging finished
- Discharging
- Charging stop

BIOS POWER MANAGEMENT

Entering BIOS

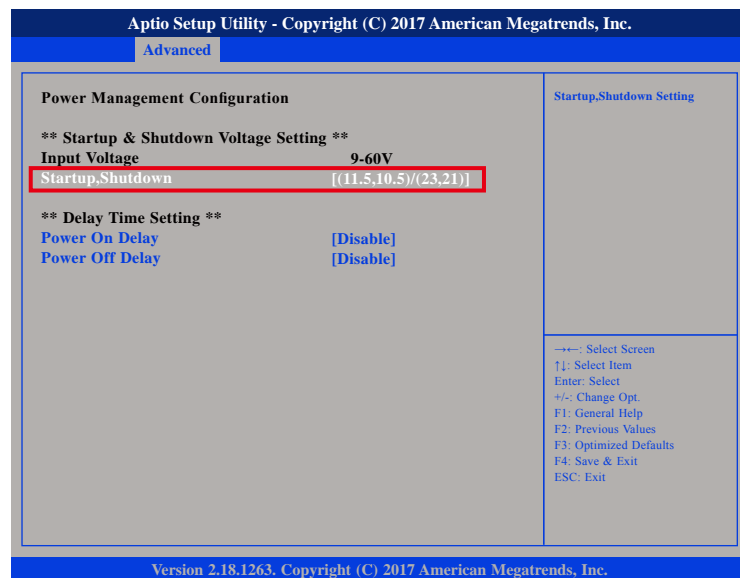
Enter the BIOS and go to Advanced ➔ Power Management Configuration.



Setting for Delay-on & Delay-off & Voltage Setting for Turn-on or Turn-off of the System

Configure the voltage of start-up or shutdown of the system.

Click the Startup,Shutdown option marked in red.



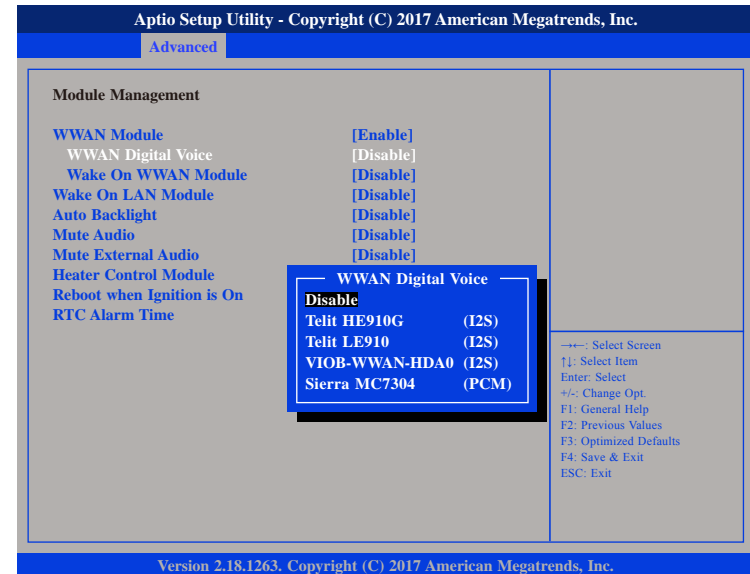
WWAN Module Management

Enter the BIOS and go to Advanced ➔ Module Management.

If users need the voice function via Telecom carrier, please make sure the correct WWAN module is selected.



| WWAN Module | Option in BIOS |
|-----------------------|----------------|
| Telit: LE910 | LE910 |
| Telit: HE910G | HE910G |
| uBlox: VIOB-WWAN-HDA0 | VIOB-WWAN-HDA0 |
| Sierra: MC7304 | MC7304 |
| SIMCOM: SIM5603E | MC7304 |
| EC25-E | MC7304 |



TOUCHSCREEN DRIVER INSTALLATION

This section 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:

- Windows 2000/XP/2003/Vista/7/8
- (Kernel 2.6 & X-Windows Mode
- Windows CE (4.2/5.0/6.0/7.0)

Installing 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.

Installing 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**:

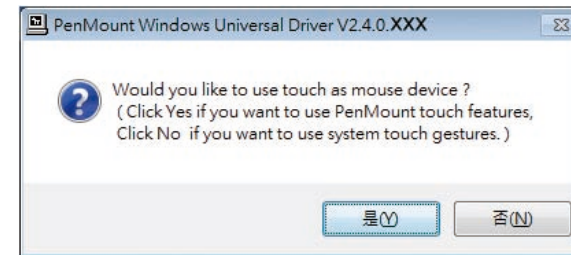
Plug in your PenMount 6000 control board and install **PenMount Windows Universal Driver**. Make sure the driver is installed before control board is plugged. Then the driver will have the assigned COM port or USB port detect PenMount device.

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.

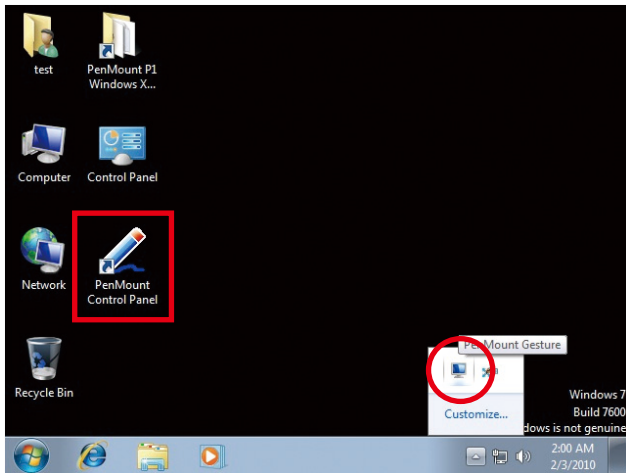
As soon as driver installation finishes, both the icons of **PenMount Monitor**  and **Gesture AP**  show up in the notification area.



Installing PenMount Digitizer Driver in Windows XP/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:

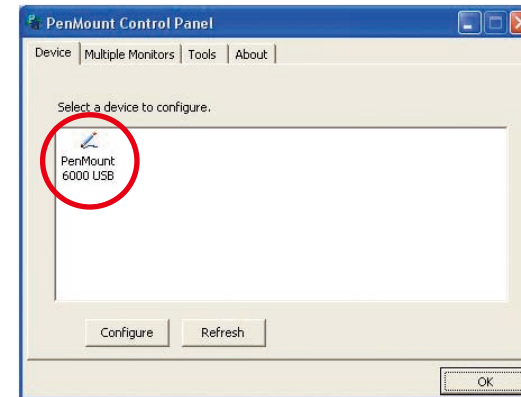


Configuring Touchscreen in PenMount Mouse Driver

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.

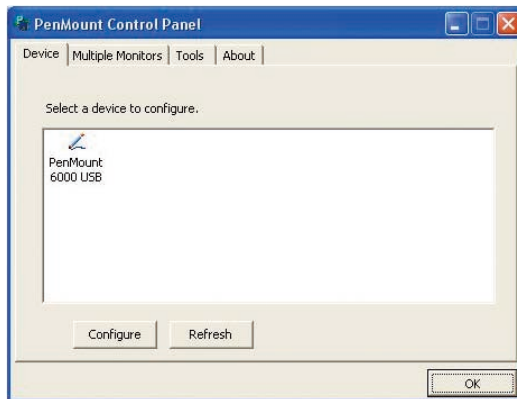


PenMount Control Panel

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

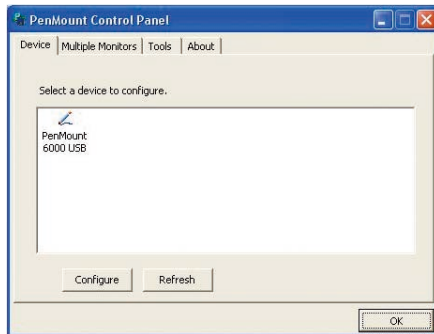
Command call calibration function. Use command mode call calibration function, this can uses 4, 9, 16 or 25 points to calibrate.

E.g. Please run ms-dos prompt or command prompt.
c:\Program Files\PenMount Universal Driver\DMCCtrl.exe
-calibration 4 (Standard Calibration)

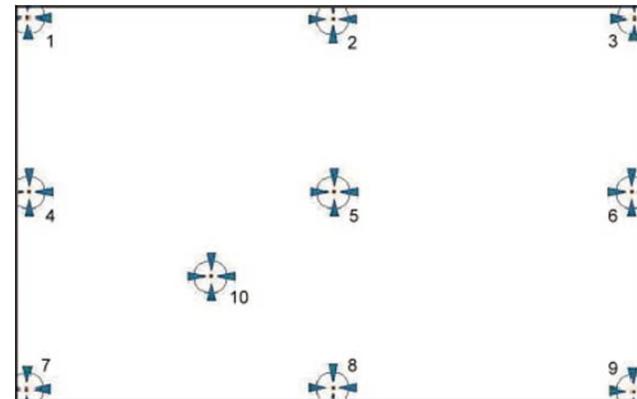
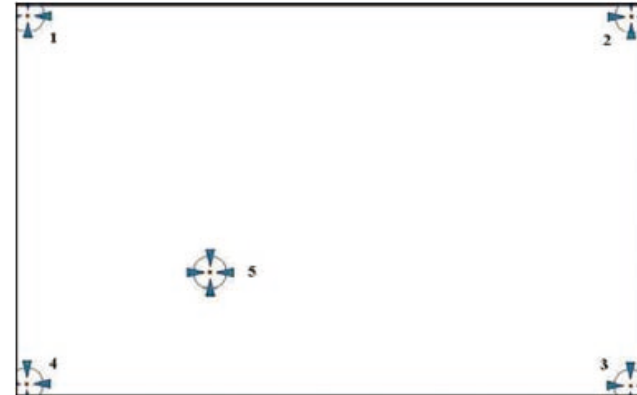
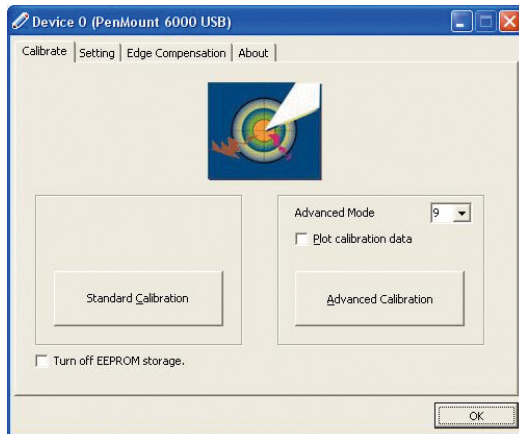
DMCCtrl.exe - calibration (\$)
4=Standard Calibration 4
9=Advanced Calibration 9
16=Advanced Calibration 16
25=Advanced Calibration 25

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.

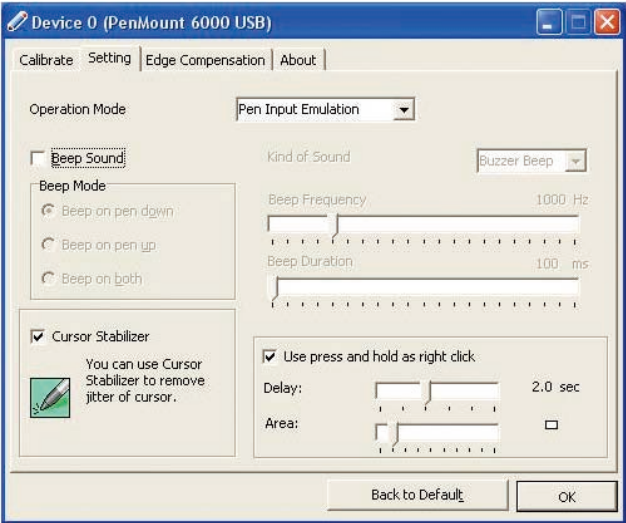
Plot Calibration Data

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

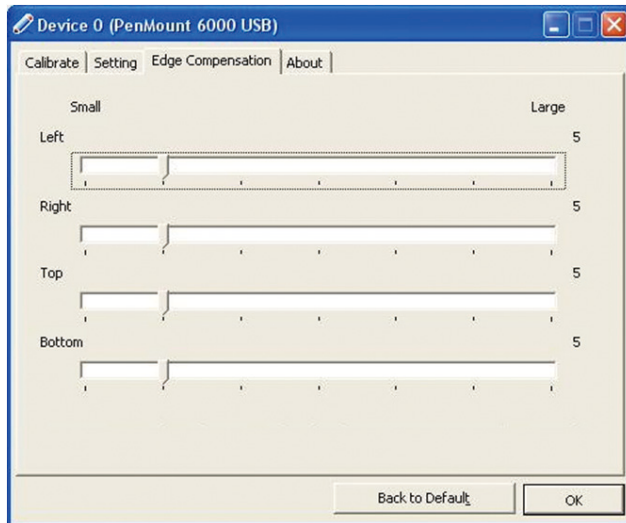
Enable the function support to prevent cursor shake.

Use press and hold as right click

You can set the time out and area for you need

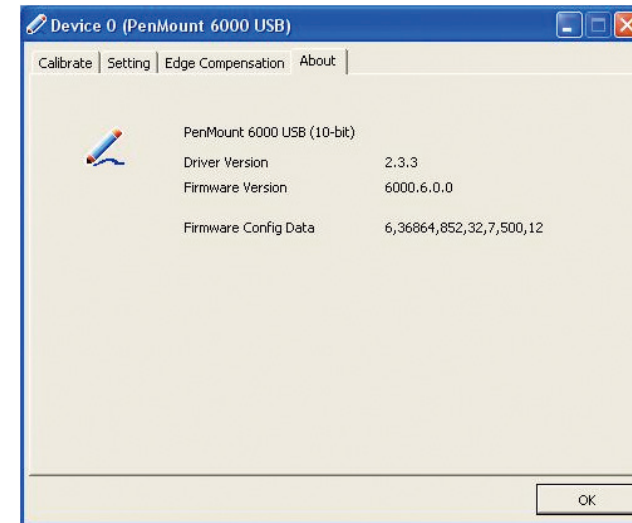
Edge Compensation

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.

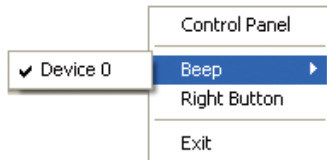


PenMount Monitor Menu Icon

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.

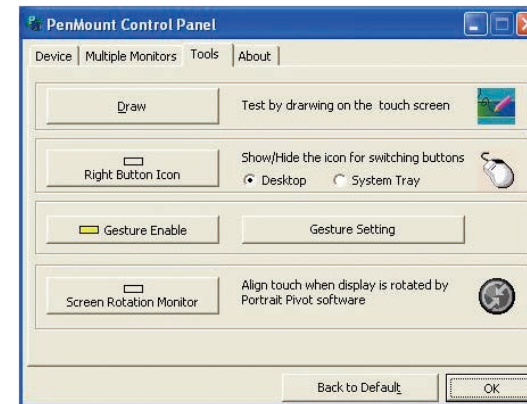
PenMount Rotating Function

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:

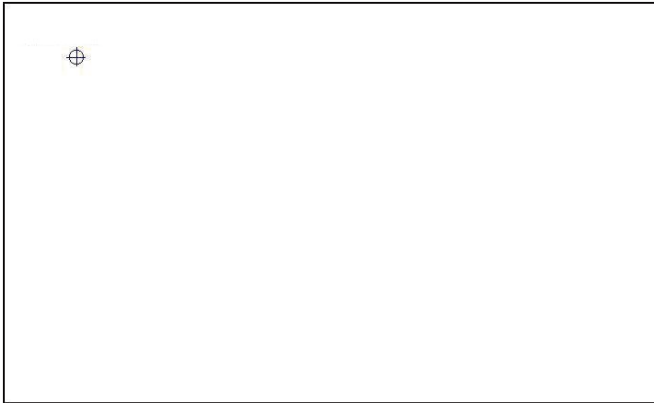
1. Intel Display Driver Rotate Function.
2. ATI Display Driver Rotate Function.
3. nVidia Display Driver Rotate Function.
4. SMI Display Driver Rotate Function.
5. Portrait's Pivot Screen Rotation Software.

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**.

Touchscreen Configuration of PenMount Digitizer Driver

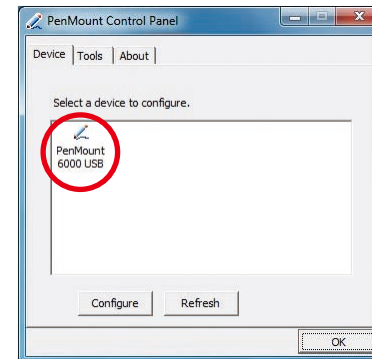
With PenMount Windows Universal V2.2.0.283 and the later versions, since the touchscreen is automatically installed as a digitizer device in Windows Vista/7, the functions built in Windows Vista / 7 such as rotation, multi-monitor, flicks, and context menu function (which launches a context menu by user's 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.

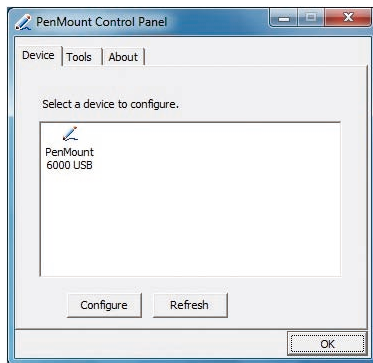


PenMount Control Panel

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

Device

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



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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

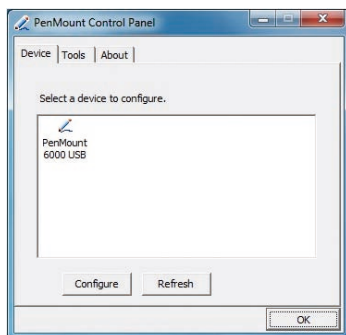
9= Advanced Calibration 9

16= Advanced Calibration 16

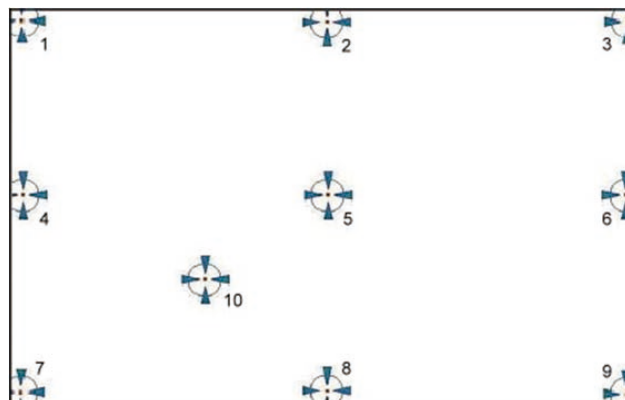
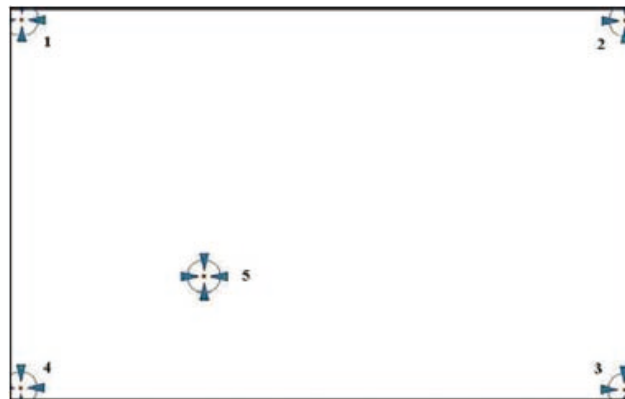
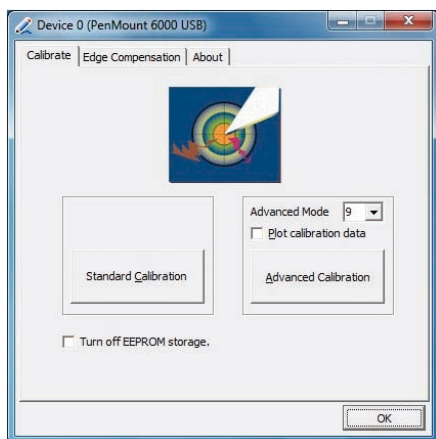
25= Advanced Calibration 25

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

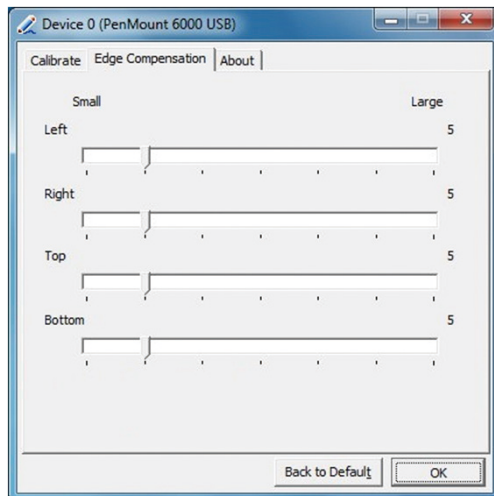
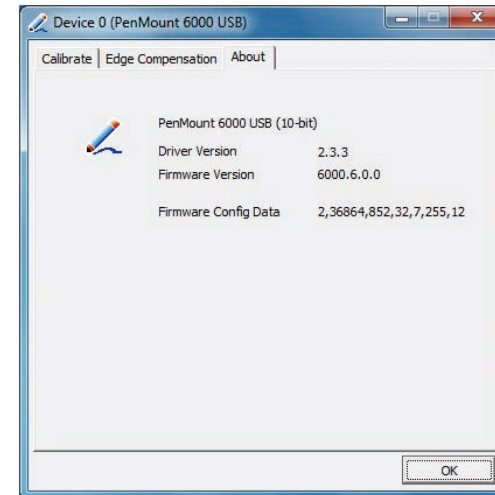
This function disables the write-in of calibration data in **Controller**. This function is enabled by default.

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.

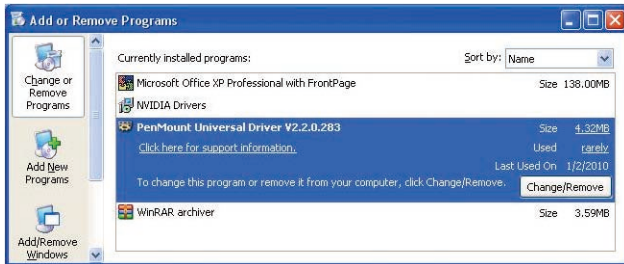
About

This panel displays information about the PenMount controller and driver version.

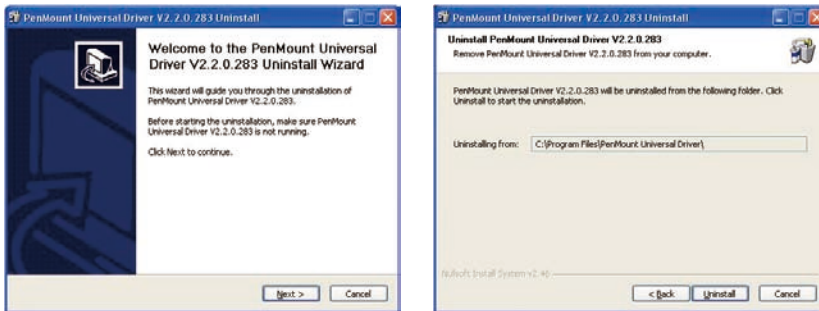


Uninstalling PenMount Windows Universal Driver

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**.



Installing 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 4/5/6/7/8/9/10/11/12/13 /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 | ✓ |

Installing PenMount Linux X Window USB Driver

See the readme file included in the driver folder.

Calibration Utilities

See the readme file included in the driver folder.

Installing PenMount WinCE Driver

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

Installing PenMount WinCE Driver

Please see the readme file included in the driver folder.

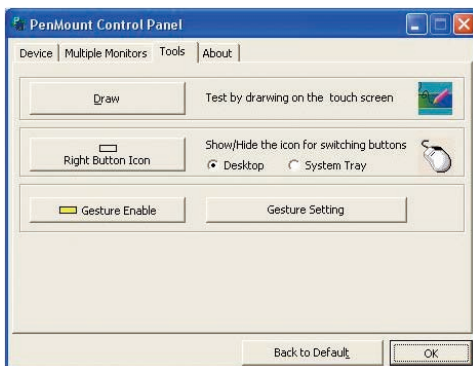
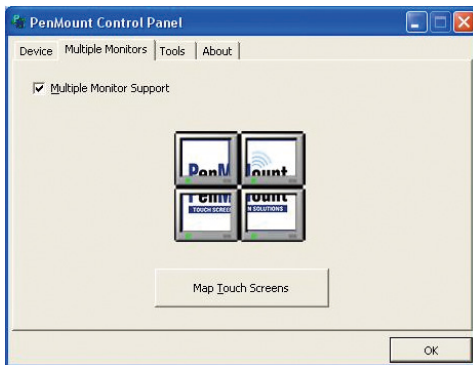
TOUCHSCREEN DRIVER SOFTWARE FUNCTIONS

This section 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 section 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.

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.

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.

Rotation

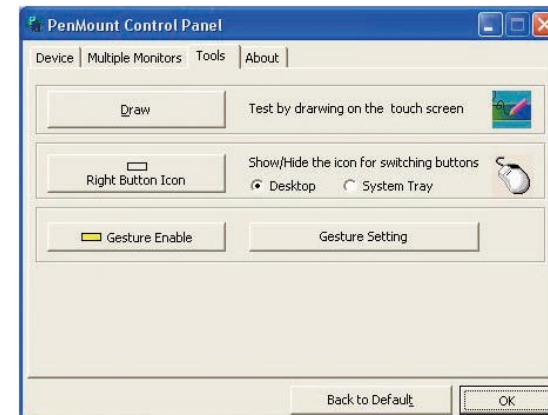
There are currently a number of software packages on the market that support rotating monitors 0°, 90°, 180°, and 270°. However you will not be able to use a touchscreen unless it is matched to the appropriate rotation. Our rotation configuration function allows you to easily match the touchscreen when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

Draw

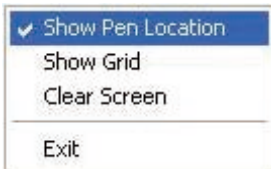
Tests or demonstrates the PenMount touchscreen operation. The display shows touch location. Click **Draw** to start. Touch the screen with your finger or a stylus and the drawing screen registers touch activity such **left**, **right**, **up**, **down**, **pen up**, and **pen down**.



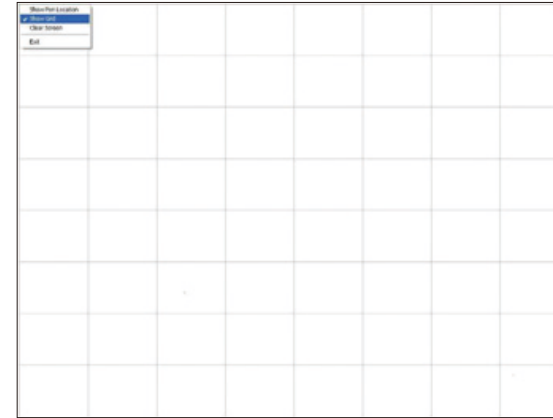
Touch the screen with your finger or a stylus and the drawing screen registers touch activity such **left, right, up, down, pen up, and pen down**.



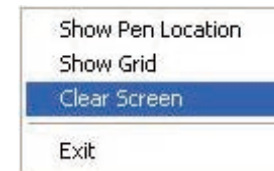
Click **Menu** button for more functions.



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.

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. |

Beep Sound

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

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 touch-screen sound, as well as turn the sound off.

Wake Up Function

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

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.

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.

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.

Cursor Offset

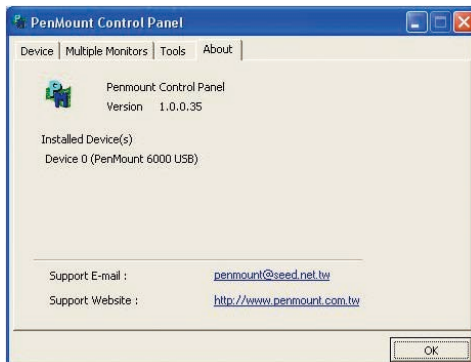
Cursor Offset function lets the user adjust the position of the touch point to a desired location away from the real touch point.

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.

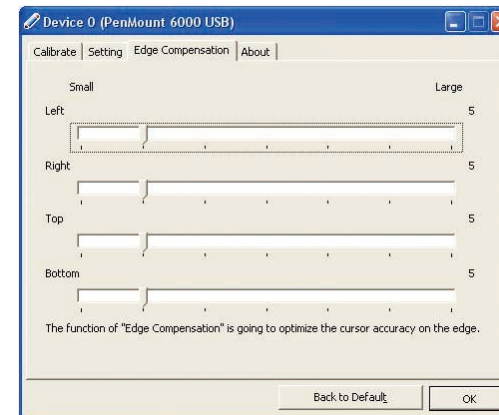
About

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/>



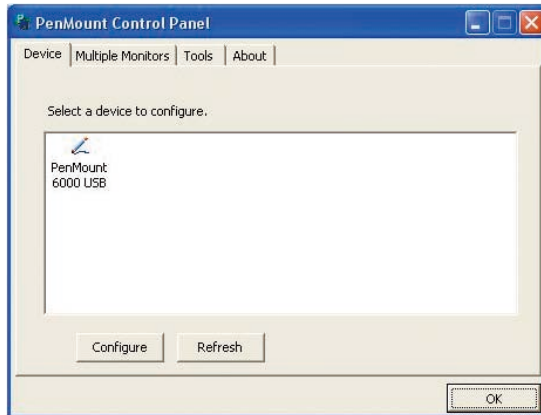
Edge Compensation

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).)



Refresh

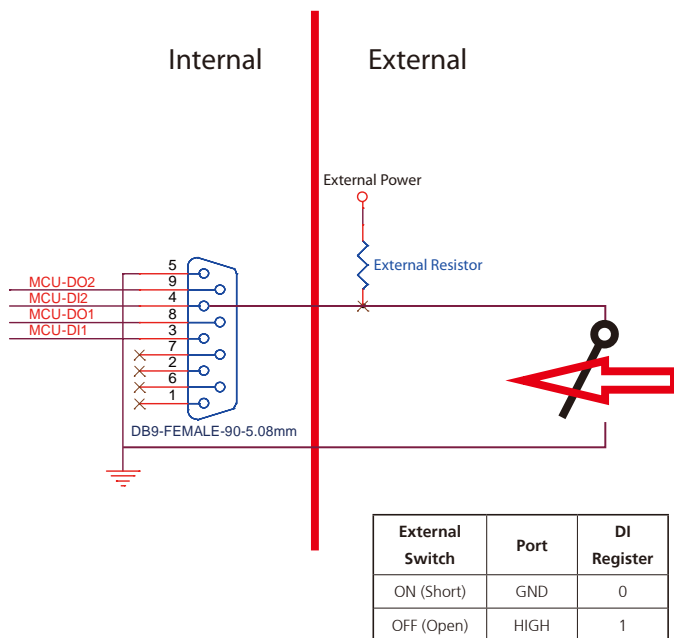
If you installed PenMount driver package 2.1.0.187 and after, you can click the **Refresh** button on PenMount **Control Panel** to detect the newly attached PenMount devices. (Note: **Refresh** is only supported by PenMount Windows Universal Driver (for Windows 2000/XP/2003/VISTA).)



APPENDIX A: GPIO CONNECTION

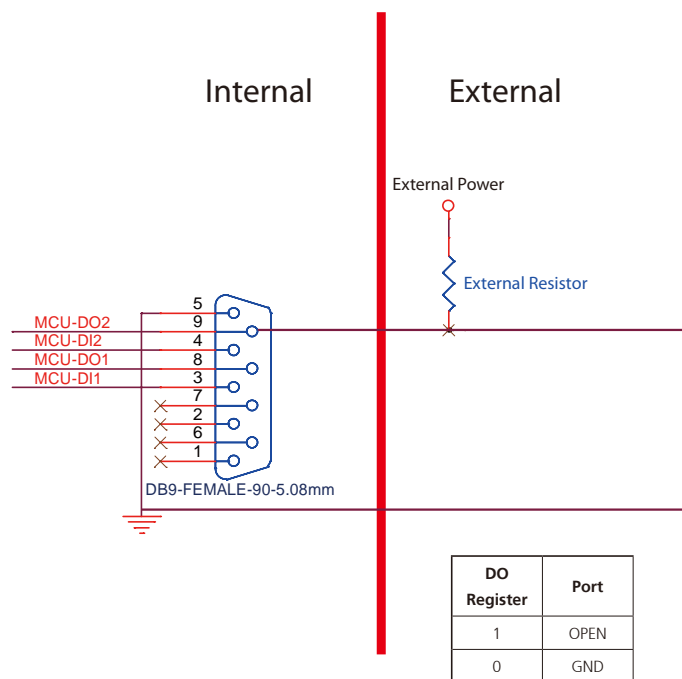
Digital Input

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



Digital Output

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



APPENDIX B: POWER CONSUMPTION

Configuration

1. Idle: Display brightness Max.
2. Full: Display brightness Max. + Sound volume max + 3G link + WiFi + GPS link + BURN-IN (100%) + CFast + Play video

| System Status | | Result | | |
|----------------------|--------------|--------|-------|--------|
| VMC 4020 in S0 State | Idle State | 12V | 2.345 | 28.14 |
| | | 24V | 1.081 | 25.944 |
| | | 36V | 0.889 | 32.004 |
| | | 48V | 0.672 | 32.256 |
| | | 60V | 0.54 | 32.4 |
| | Full Loading | 12V | 3.73 | 44.76 |
| | | 24V | 1.88 | 45.12 |
| | | 36V | 1.33 | 47.88 |
| | | 48V | 1.087 | 52.176 |
| | | 60V | 0.936 | 56.16 |



APPENDIX C: GPS FEATURE

uBlox-NEO M8 Overview

The NEO-M8 series of standalone concurrent GNSS modules is built on the exceptional performance of the u-blox M8 GNSS (GPS, GLONASS, Galileo, BeiDou, QZSS and SBAS) engine in the industry proven NEO form factor.

The NEO-M8 series provides high sensitivity and minimal acquisition times while maintaining low system power. The NEO-M8M is optimized for cost sensitive applications, while NEO-M8N and NEO-M8Q provide best performance and easier RF integration. The NEO form factor allows easy migration from previous NEO generations. Sophisticated RF-architecture and interference suppression ensure maximum performance even in GNSS-hostile environments.

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

The DDC (I2C compliant) interface provides connectivity and enables synergies with most u-blox cellular modules. For RF optimization the NEO-M8N/Q features an additional front-end LNA for easier antenna integration and a front-end SAW filter for increased jamming immunity.

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

Test Software

Users can visit the uBlox website to download the test tool: u-center. In the website, users can find the user manual of this test tool.

Technical Specifications

Features

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

Features cont.

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

¹ For NEO-M8M/Q

Electrical data

| | |
|--------------------------------------|--|
| Supply voltage | 1.65 V to 3.6 V (NEO-M8M) 2.7 V to 3.6 V (NEO-M8N/Q) |
| Power consumption² | 23 mA @ 3.0 V (continuous) 5 mA @ 3.0 V Power Save Mode (1 Hz, GPS only) |
| Backup Supply | 1.4 to 3.6 V |

² NEO-M8M

Interfaces

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

Package

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

Pinout

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

Environmental data, quality & reliability

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

RoHS compliant (lead-free)

Qualification according to ISO 16750

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

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