Vehicle Mount Computer VMC 3020
PKPA1007

User Manual

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Preface

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Acknowledgements

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Regulatory Compliance Statements

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

Declaration of Conformity

FCC

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

CE

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

RoHS Compliance

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

DELTA COMPONENTS Return Merchandise Authorization (RMA)

- Customers shall enclose the DELTA COMPONENTS 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 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 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 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

NDELTA COMPONENTS 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 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 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 will return it to the customer without any charge.

Board Level

- Component fee: DELTA COMPONENTS 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 COMPONENTSwill 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. CompactFlash: Turn off the unit's power before inserting or removing a CompactFlash storage card.

Conventions Used in this Manual

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

Caution:
Information to avoid damaging components or losing data.

Note:
Provides additional information to complete a task easily.

Battery - Safety Measures

Caution

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

Safety Warning

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

Resetting the Date and Time

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

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	SSD bracket kit x 1	1
3	SATA power cable	1
4	SATA signal cable	1
5	Screw x 8	8
6	Washer for screws x 4	4
7	Washer for SSD bracket x 4	4
8	System power cable	1
9	DVD	1

Ordering Information

The following provides ordering information.

- **VMC 3020 (P/N: PKPA1007)**
  - 10.4” Rugged Vehicle Mount Computer with ATOM x5-E3930, 2GB RAM, Resistive Touch and Front IP65 w/o Heater

Chapter 1: Product Introduction

Overview

VMC 3020 Front View

VMC 3020 Rear View

Key Features

- 10.4” XGA TFT LCD monitor
- Aluminum die-casting and fanless design
- Built-in Intel® Atom™ x5-E3930 processor, 1.8GHz
- Automatic/manual brightness control
- Heater supported (optional)
- On screen F1 ~ F10 programmable function keys
- 5V/12V power supply for accessories
- Military standard for vibration and shock
- UPS Battery supported (optional)
- iButton and RFID for ID identification
- Wide range DC input from 9V~60V DC in
- Sunlight readable capability: 1,200nits LCD brightness

Hardware Specifications

LCD Panel

- 10.4-inch TFT LCD panel with LED backlight
- 1024 x 768 pixels (XGA)
- Brightness: 1200 cd/m² (typical)
- Viewing angle: 140° (H):120°(V)
- Contrast ratio: 500:1 (typical)

Touch Screen Sensor

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

CPU & Chipset

- Intel® Atom™ x5-E3930 processor dual core 1.8GHz

Memory

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

Expandable Storage

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

Expansion

- 1x half-size mini-PCIe socket (PCIe + USB) for WLAN option
- 1x full-size mini-PCIe socket (USB) x 1 for WWAN option
- 1x M.2 key-E (PCIe + SDIO + UART + USB) for WLAN option
- 1x SIM slot

I/O Interfaces - Front

- 5x on screen display buttons
  Power on/off
  Volume control (+/-)
  Brightness control (+/-)
- Light sensor
- 4x LED indicators (power/battery charging, WLAN, shift, storage)
- F1 ~ F10 programmable function keys
- 2x Built-in 2W speakers

I/O Interfaces - Lateral

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

I/O Interface-Bottom

- 1x Power Switch (ATX mode)
- Lockable power connector (power, ignition, ground)
- 2x RS232 (full signals, RI, 0V, 5V/1.5A, 12V/1.5A)
- 1x DB15
  - 1x Isolated CAN 2.0B
  - 1x iButton
  - 1x RFID (12V/1A. 5V/1A, 4pin)
  - 1x Optional RS232 Tx/Rx (share with GPS UART) *Note 1
  - 2x GPI
    Sink type: 5VDC TTL (default)
    Source type: 3 ~ 28VDC

  - 2x GPO
    Sink type: 5VDC TTL (default), max current: 20mA
    Source type: 3 ~ 28VDC, max current: 150mA
- 1x Powered USB (5V/1.5A, 12V/1.5A)
- 1x USB Type A (5V/1A)
- 1x Mic-in, 1x Line-out
- 1x Antenna for GPS

I/O Interface-Top

- 2x Antenna for Wi-Fi

Mechanical

- Cooling system: Fanless
- Enclosure: Aluminum die casting
  Mounting: VESA 75/100 & desktop mounting
- Ingress protection: front panel IP65
- Dimension: 289.98mm (W) x 229.97mm (H) x 77.95mm (D), including battery
- Weight: 3kg, 6.61lb

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 SMS, RTC and ignition

Operating System

- Windows 10
- Linux: YOCTO

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= 20g
  Crash hazard: MIL-STD-810G, Method 516.6, Procedure V, ground equipment= 75g

Standards/Certifications

- CE/FCC class B/E13

Note 1: When installing the GPS module (M8L) for DR function, Tx will change to direction and Rx will change to odometer. The original RS232 Tx and Rx cannot be used anymore.

Mechanical Dimensions

VMC 3020

Getting to Know VMC 3020

VMC 3020 Front View

VMC 3020 Rear View

VMC 3020 Bottom I/O View

VMC 3020 Right I/O View

VMC 3020 Left I/O View

VMC 3020 Top I/O View

Item	Function	Description
1	Power and Battery LED Light	Green for power and Orange for battery status. Power: ▪ Power Off: LED off ▪ Power On: Steady Green ▪ POST to OS: Blinking Green ▪ Enter OS: Steady Green Battery: ▪ Above 80%: Steady Orange ▪ Between 20% ~ 80%: LED off ▪ Below 20%: Blinking Orange
2	Volume Key	Adjust volume up or down by 10 levels.
3	Brightness Key	We can change the setting between manual and auto (light sensor) in the utility. Manual (default): ▪ Adjust brightness up or down by 10 levels. Auto: ▪ Adjust brightness up or down automatically, depending on the light sensor.
4	Speaker	Two speakers inside VMC 3020, 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	Wi-Fi on: Steady Orange (depending on module). Wi-Fi data activity: Blinking Orange (depending on module).
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	Grounding Screw	For grounding purpose.
10	Power Switch	ATX mode. When power is received and ignition is turned on, the system will turn on automatically. When ignition is off, you need to push this power switch to turn on the system. We can turn off or turn on the system through this switch.
11	Line-out	For audio/sound output.
12	Mic-in	For voice/microphone input.
13	Powered USB	Powered USB: 12V/1.5A USB Type A: 5V/1A

<table>
<tr><td>14</td><td>USB</td><td>USB Type A: 5/1A</td></tr>
<tr><td>15</td><td>LAN</td><td>10/100/1000Mbps
<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>

</td></tr>
<tr><td>16</td><td>CANBus 2.0B/RFID/
RS232 (or GPS)/GPIO</td><td>1x DB15
▪ 1x Isolated CAN 2.0B
▪ 1x iButton (1-wire)
▪ 1x RFID (12V/5V, 4pin, 1A)
▪ 1x RS232 Tx/Rx: Default
When GPS module is installed, this pin becomes GPS UART.
▪ 2x GPI
Sink type: 5VDC TTL (default)
Source type: 3 ~ 28VDC
▪ 2x GPO
Sink type: 5VDC TTL (default), max current: 20mA
Source type: 3 ~ 28VDC, max current: 150mA
<table>
<tr><th>Pin</th><th>Definition</th><th>Pin</th><th>Definition</th></tr>
<tr><td>1</td><td>RFID_TX</td><td>2</td><td>RX5_ODOMETER</td></tr>
<tr><td>3</td><td>GPI1</td><td>4</td><td>GPO1</td></tr>
<tr><td>5</td><td>CAN1_L</td><td>6</td><td>RFID_RX</td></tr>
<tr><td>7</td><td>GND</td><td>8</td><td>1PPS</td></tr>
<tr><td>9</td><td>IBUTTON</td><td>10</td><td>CAN1_H</td></tr>
<tr><td>11</td><td>RFID_PWR</td><td>12</td><td>TX5_DIRECTION</td></tr>
<tr><td>13</td><td>GPI0</td><td>14</td><td>GPO0</td></tr>
<tr><td>15</td><td>ISO_GND</td><td></td><td></td></tr>
</table>

</td></tr>
</table>

17, 18	RS232	2x DB9 ▪ 2x DB9 RS232 (RI, 0V, 5V/1.5A, 12V/1.5A) by jumper setting CN9 for COM1 CN12 for COM2

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

COM1 & COM2

▪ RS232 Power Jumper Selection

CN9 CN12	Function
1,2 3,4	OUTPUT 12V
3,4 5,6	RI
5,6 7,8	RI
7,8 9,10	OUTPUT 5V

RS232 Power Jumper

<table>
<tr><td>19</td><td>Power Input</td><td>9V~60V wide-range DC in for UPS: 12V, 24V, 36V and 48V.

<table><tr><th>Pin</th><th>Definition</th></tr><tr><td>1</td><td>Power (+)</td></tr><tr><td>2</td><td>GND (-)</td></tr><tr><td>3</td><td>Ignition (I)</td></tr></table>
</td></tr>
<tr><td>20</td><td>VESA Mounting Holes</td><td>75mm x 75mm, or 100mm x 100mm.</td></tr>
<tr><td>21</td><td>Screws for Bracket</td><td>We provide special bracket for the purpose of cable-relief and pen mounting.</td></tr>
<tr><td>22</td><td>Battery</td><td>Battery location.</td></tr>
<tr><td>23</td><td>USB Type A</td><td>USB Type A: 5V/0.5A</td></tr>
<tr><td>24</td><td>Reset Button</td><td>Turn off the system, and turn on automatically.</td></tr>
<tr><td>25</td><td>CFast Slot</td><td>Location for CFast installation.</td></tr>
<tr><td>26</td><td>Antenna Hole</td><td>Antenna hole for GPS.</td></tr>
<tr><td>27</td><td>Antenna Hole</td><td>Antenna hole for WWAN.</td></tr>
<tr><td>28</td><td>Antenna Hole</td><td>Antenna hole for WLAN.</td></tr>
</table>

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 3020.

Before You Begin

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

Precautions

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

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

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

Jumper

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

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

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

Three-Pin Jumpers: Pins 1 and 2 Are Short

Locations of the Jumpers and Connectors

The jumper and connector locations labeled below are for VMC 3020.
All of the pin numbers are marked on the PCB.

Mainboard

Internal Connectors and DIP Switch Settings

WWAN Switch Selection

Connector location: SW6

	SW6.1	SW6.2	SW6.3	SW6.4	SW6.5	SW6.6	SW6.7	SW6.8
VIOB-WWAN-HDA0 (I2S)	On	Off	Off	On	Off	Off	On	Off
Telit HE910G (I2S)	On	Off	Off	On	Off	Off	On	Off
Telit LE910 (I2S)	On	Off	Off	On	Off	Off	On	Off
Sierra Wireless MC7304(PCM)	Off	On	On	Off	Off	Off	On	Off

CANBus Impedance Control

Connector location: SW4

Pin	Function
1~2 ON	120 OHM
1~2 OFF	Non

GPIO High-Low Switch

Connector location: SW5

Pin	Definition
1~2 ON	GPI Pull-High
3~4 ON	GPO Pull-High

Power Input Voltage Selection & iButton/RFID Security On/Off

Connector location: SW2

POWER SW (Pin1)	12V24V (Pin2)	Function
OFF	OFF	12V
OFF	ON	24V
ON	ON	9-60V
ON	OFF	SECURITY OFF

Battery Connector

Connector size: 2x6 12-pin header, 2.0mm pitch
Connector location: CON17

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 or COM3 (Tx/Rx) Selection

Connector size: 2x4 8-pin header, 2.0mm pitch
Connector location: JP3 and JP4

JP3 & JP4	Function
1~2 3~4	DR Mode
5~6 7~8	RS232 Mode

GPS Signal and Power

Connector size: 1x6 6-pin header, 1.0mm pitch
Connector location: J3

Pin	Definition	Pin	Definition
1	GPS_BAT	2	LED Power
3	GPS_TXD	4	GPS_RXD
5	GND	6	VCC3

GPS DR Function (Odometer and Direction)

Connector size: 1x4 4-pin header, 1.0mm pitch
Connector location: J4

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

When installing the GPS module (M8L) for DR function,
Tx will change to direction and Rx will change to odometer.
The original RS232 Tx and Rx cannot be used anymore.

Debug Port

Connector size: 1x10 10-pin header, 1.0mm pitch
Connector location: J11

Pin	Definition	Pin	Definition
1	GND	2	PCIRST#
3	33M_CLK	4	LPC_FRAME#
5	LPC_AD3	6	LPC_AD2
7	LPC_AD1	8	LPC_AD0
9	VCC3	10	VCC3

MCU Debug Port

Connector type: 1x3 3-pin header, 2.54mm pitch
Connector location: JP1

Pin	Settings
1	TX
2	RX
3	GND

MCU Download Port

Connector size: 2x4 8-pin header, 1.27mm pitch
Connector location: JP2

Pin	Definition	Pin	Definition
1	3.3V	2	MCU_TRST
3	MCU_TCK	4	MCU_TDO
5	MCU_RST	6	MCU_TDI
7	MCU_TMS	8	GMD

Heater Power

Connector size: 1x4 4-pin header, 2.0mm pitch
Connector location: J19

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

Heater Thermal Control

Connector type: 1x2 JST, 2-pin header, 2.5mm pitch
Connector location: J2

Pin	Definition
1	GND
2	Thermal

Half-size Mini-PCIe Connector (Wi-Fi and Bluetooth)

Connector location: CN13

Pin	Definition	Pin	Definition
1	PCIE_WAKE#0	2	3.3V
3	NC	4	GND
5	NC	6	1.5V
7	PCIE_CLKREQ0#	8	NC
9	GND	10	NC
11	PCIE_CLKN0	12	NC
13	PCIE_CLKP0	14	NC
15	GND	16	NC
17	MCU_TX2_3.5G	18	GND
19	MCU_RX2_3.5G	20	PCIE0_DIS#
21	GND	22	PLTRST_3P3#
23	PCIE_RXN0	24	3.3V
25	PCIE_RXP0	26	GND

Pin	Definition	Pin	Definition
27	GND	28	1.5V
29	GND	30	SMB_SOC_CLK
31	PCIE_TXN0	32	SMB_SOC_DATA
33	PCIE_TXP0	34	GND
35	GND	36	USB_3N
37	GND	38	USB_3P
39	3.3V	40	GND
41	3.3V	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	1.5V
49	NC	50	GND
51	BT_EN	52	3.3V

Full-size Mini-PCIe Connector (WWAN)

Connector location: CN16

Pin	Definition	Pin	Definition
1	SMS_RI_3.5G_R	2	3.3V
3	NC	4	GND
5	NC	6	NC
7	NC	8	UIM_PWR
9	GND	10	UIM_DAT
11	NC	12	UIM_CLK
13	NC	14	UIM_RST
15	GND	16	NC
17	MCU_TX2_3.5G	18	GND
19	MCU_RX2_3.5G	20	3.5G_DIS#
21	NC	22	3.5G_RST#
23	NC	24	3.3V
25	NC	26	GND

Pin	Definition	Pin	Definition
27	GND	28	GND
29	NC	30	3.5G_GPS_SMB_CLK
31	NC	32	3.5G_GPS_SMB_DATA
33	3.5G_RST#	34	GND
35	GND	36	USB_2N
37	GND	38	USB_2P
39	3.3V	40	GND
41	3.3V	42	NC
43	GND	44	3.5G_GPS_EXTINT
45	PCM_CLK	46	GPS_TXD_3.5G
47	PCM_RX	48	3.5G_GPSPWREN
49	PCM_TX	50	GND
51	PCM_SYNC	52	3.3V

M.2 Connector

Connector location: CN5

Pin	Definition	Pin	Definition
1	GND	2	NGFF_3V3
3	M2D+	4	NGFF_3V3
5	M2D-	6	M2_WLAN_LED#
7	GND	8	NC
9	SDIO_CLK	10	NC
11	SDIO_CMD	12	NC
13	SDIO_DA0	14	NC
15	SDIO_DA1	16	NC
17	SDIO_DA2	18	GND
19	SDIO_DA3	20	UART_WAK#
21	NGFF_SDIO_WAKE_N	22	M2_RX
23	SDIO_RST#	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	M2_TX
33	GND	34	M2_CTS#
35	PCIE_T_P2	36	M2_RTS#
37	PCIE_T_N2	38	NC

Pin	Definition	Pin	Definition
39	GND	40	NC
41	PCIE_R_P2	42	NC
43	PCIE_R_N2	44	NC
45	GND	46	NC
47	PCIE_C_R2	48	NC
49	PCIE_C_R#2	50	NC
51	GND	52	M2_RST#_R
53	CLKREQ#2	54	BT_DIS#_R
55	PEWAKE2N	56	WIFI_DIS#_R
57	GND	58	M2_I2C_DATA
59	NC	60	M2_I2C_CLK
61	NC	62	NC
63	GND	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	72	NGFF_3V3
73	NC	74	NGFF_3V3
75	GND		

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 3020 can be accessed after removing the screws.

Installing a SSD

1. The accessory box includes the following assembling parts below:

2. Tighten the four black screws to the mounting holes marked in red to fix the SSD onto the bracket.

3. Attach the black washers onto the mounting holes.

4.
   a. Place the white washers on the screws.
   b. Insert the SATA power and signal cable onto the connectors marked in red.
   c. Attach cable onto SSD.
   d. Fix (screws + white washer) the SSD with bracket onto the mounting location, marked in red.

Installing a WLAN & Bluetooth Module

The half-size mini-PCIe is used for WLAN module (USB + PCIe signal). The M.2 Key E slot is also used for WLAN module (PCIe + SDIO + UART + USB). Regarding the module support list, please consult with your local DELTA COMPONENTS representative.

M.2 **Half-size Mini-PCIe**

Installing a WWAN Module

The full-size mini-PCIe is used for WAN module (USB signal). Regarding the module support list, please consult with your local DELTA COMPONENTS representative.

Full-size Mini-PCIe

Installing a GPS Module

1. When installing the GPS-02 (M8L) module for DR function, please insert the cable onto the correct connectors.

   Red: GPS signal and power
   Blue: Odometer and direction

2. When installing the GPS-02 (M8N) module, please insert the cable onto the correct connectors.

   Red: GPS signal and power

Installing a Battery

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

2. Place the battery into the battery cover.

3. Insert the cable onto the connector marked in red. Then, screw the battery cover onto the system.

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

DELTA COMPONENTS' software demo utility helps users to test and control different functions on the VMC 3020. This section shows how to use the utility. Users can refer to the source codes in the CD to develop their applications.

WWAN

Enables or disables the power of the mini-PCIe slot, designed for WWAN function.

WWAN Wake Up

Enables or disables the wake-up function of WWAN module.

Heater Function

Heater will start to work when the low temperature reaches -20°C.

Heater Power

Heater starts to work immediately.

Low Battery Voltage Protection

Configures the protection level of the min. and max. voltages.

Power Input Type

Configures the value of power input.

Delay Time

Configures the timing of delay on and delay off.

RTC Wake Up Timer

Configures the timer settings.

Alarm: Set the timing of waking up the system.

RTC: Set the timing in MCU. Current timing on the MCU will not be set until the users configures it.

Shows the value of the registers and brief description of these values. For further details, please contact with your local DELTA COMPONENTS representative.

Num	Name	Type	Value	Description
0	DEVID	R	E5	Device ID
1~28	Reserved			Reserved; do not access
29	THRESH_TAP	R/W	00	Tap threshold
30	OFSX	R/W	00	X-axis offset
31	OFSY	R/W	00	Y-axis offset
32	OFSZ	R/W	00	Z-axis offset
33	DUR	R/W	00	Tap duration
34	Latent	R/W	00	Tap latency
35	Window	R/W	00	Tap window
36	THRESH_ACT	R/W	00	Activity threshold
37	THRESH_INACT	R/W	00	Inactivity threshold
38	TIME_INACT	R/W	00	Inactivity time
39	ACT_INACT_CTL	R/W	00	Axis enable control for activity and inactivity detection
40	THRESH_FF	R/W	00	Free-fall threshold
41	TIME_FF	R/W	00	Free-fall time
42	TAP_AXES	R/W	00	Axis control for single tap/double tap
43	ACT_TAP_STATUS	R	00	Source of single tap/double tap
44	BW_RATE	R/W	0A	Data rate and power mode control
45	POWER_CTL	R/W	0A	Power-saving features control
46	INT_ENABLE	R/W	00	Interrupt enable control
47	INT_MAP	R/W	00	Interrupt mapping control
48	INT_SOURCE	R	83	Source of interrupts
49	DATA_FORMAT	R/W	00	Data format control
50	DATAX0	R	07	X-Axis Data 0
51	DATAX1	R	01	X-Axis Data 1
52	DATAY0	R	04	Y-Axis Data 0

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

If the password is forgotten, please refer to the setting of SW2 in chapter 2 of the user manual to turn the security off.

Num	CRC	Serial number	Family
1	35	00 00 17 2A 2B B4	01
2	8F	00 00 18 AD 56 DF	01
3	B0	00 00 18 AD 53 EF	01
4	DF	00 00 18 AD 76 1E	01
5	3B	00 00 18 AD 18 64	01
6	91	00 00 18 AD 52 5A	01
7	00	00 00 00 00 00 00	00
8	00	00 00 00 00 00 00	00
9	00	00 00 00 00 00 00	00
10	00	00 00 00 00 00 00	00
11	00	00 00 00 00 00 00	00
12	00	00 00 00 00 00 00	00
13	00	00 00 00 00 00 00	00
14	00	00 00 00 00 00 00	00
15	00	00 00 00 00 00 00	00
16	00	00 00 00 00 00 00	00
17	00	00 00 00 00 00 00	00
18	00	00 00 00 00 00 00	00
19	00	00 00 00 00 00 00	00
20	00	00 00 00 00 00 00	00
21	00	00 00 00 00 00 00	00

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

If the password is forgotten, please refer to the setting of SW2 in chapter 2 of the user manual to turn the security off.

Reads the status of the battery.

BIOS Power Management

Entering BIOS

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

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.

Setting for Delay-on & Delay-off

Enable the "Power On Delay" and the timing for delay-on will be available.

Setting for Delay-on & Delay-off

Enable the “Power Off Delay” and the timing for delay-off will be available.

WWAN Module Management

Enter the BIOS and go to Advanced ➔ Module Management.

It is required that the correct module name is selected if the user wants to use the function of “Voice” through WWAN module.

To use the wake-up function (SMS), the setting needs to be set to “enable”.

Setting for Automatic Reboot

Enter the BIOS and go to Advanced ➔ Module Management.

If the user wants to reboot the system automatically when the system turns off, the setting needs to be set to “enable”.

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 pm icon in the notification area. See the screenshot below:

Configuring Touchscreen in PenMount Mouse Driver

Click on the **PenMount Monitor** icon pm 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.

Calibrate

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

Standard Calibration Click this button and arrows appear pointing to red squares. Use your finger or stylus to touch the red squares in sequence. After the fifth red point calibration is complete. To skip, press '**ESC**'.

Advanced Calibration **Advanced Calibration** uses 9, 16 or 25 points to effectively calibrate touch panel linearity of aged touchscreens. Click this button and touch the red squares in sequence with a stylus. To skip, press '**ESC**'.

Command Calibration **Command call calibration function. Use command mode call calibration function, this can uses 4, 9, 16 or 25 points to calibrate.**
E.g. Please run ms-dos prompt or command prompt.
c:\Program Files\PenMount Universal Driver\DMCCtrl.exe -calibration 4 (Standard Calibration)

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

To calibrate your touchscreen:

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

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

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

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

Edge Compensation

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

About

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

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 4/5/6/7/89/10/11/12/13 /14/15/16/17 32_64bit	✓
Fedora Core4_64bit	×
Fedora Core3	×
Fedora Core2	×
Slackware12.0/12.1	✓
Slackware10.0	×
Red Hat 9.0	×
Red Hat 7.3/8.0	✓
OpenSuse 10.1/ 10.2/ 10.3/ 11/ 11.1/ 11.2/ 11.3/ 11.4/ 12.1 32_64bit	✓
Suse 10.0	×
Suse 9.2/9.3	×
Suse 8.0/9.0/9.1	×
Cent OS 5.2/ 5.3/ 5.4/ 5.5/ 6.0/ 6.2 32_64bit	✓
Linux XFree86 4.x.x	×
Linux XFree86 3.3.6	×
Linux For GPM	✓
QNX 6.4.1/ 6.5	✓
QNX 6.3.2	×
QNX 6.2	×
Android	✓

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.

External Switch	Port	DI Register
ON (Short)	GND	0
OFF (Open)	HIGH	1

Digital Output

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

DO Register	Port
1	OPEN
0	GND

Appendix B: Power Consumption

Configuration

1. Windows 10 64-bit + Burn in test.
2. Full + Load: Display brightness max. + Sound volume max. + 3G + Wi-Fi (mini-PCIe) + Wi-Fi (M.2) + SSD + CFast + Play video + Loading (USB x2 + COM_PWR x2 + PowerUSB 12V/5V).

System Status			Result	
S0 State	Idle State	12V	1.28A	15.36W
		24V	0.643A	15.432W
		36V	0.453A	16.308W
		48V	0.364A	17.472W
		60V	0.317A	19.02W
	Full Loading	24V	3.22A	77.28W
		36V	2.07A	74.52W
		48V	1.56A	74.88W
		60V	1.30A	78W

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

COM Port for GPS: COM 3
Baud Rate: 9600

Features

Receiver type	72-channel u-blox M8 engine GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1 SBAS L1 C/A: WAAS, EGNOS, MSAS Galileo-ready E1B/C (NEO-M8N)		
Nav. update rate[1]	Single GNSS: up to 18 Hz Concurrent GNSS: up to 10 Hz		
Position accuracy	2.0 m CEP		
		NEO-M8N/Q	NEO-M8M
Acquisition	Cold starts:	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 consumption[2]	23 mA @ 3.0 V (continuous) 5 mA @ 3.0 V Power Save Mode (1 Hz, GPS only)
Backup Supply	1.4 to 3.6 V

[2] NEO-M8M

Interfaces

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

Package

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

Pinout

Environmental data, quality & reliability

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

RoHS compliant (lead-free)

Qualification according to ISO 16750

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

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