VT1020

10. 4" Rugged in-Vehicle Terminal

Manual

Regulatory Model/Type
VT1020-ABCXXXXXX
A for power input voltage: can be "L" or "H"
B for touch screen type: can be "R" or blank ,
C for defrost function: can be "D" or blank ,
X for marketing used only : can be alphanumeric or blank

Contents

Safety Precautions

1. Read these safety instructions carefully.
2. Keep this user's 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 an above 40oC 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 volt- age 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. 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 RE- PLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE REC- OMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

Regulatory and Certification

FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded interconnect cables and shielded AC power cable must be employed with this equipment to insure compliance with the pertinent RF emission limits governing this device. Changes or modifications not expressly approved by the system's manufacturer could void the user's authority to operate the equipment.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
This device is operation in 5.15 – 5.25GHz frequency range, then restricted in

indoor use only, Outdoor operations in the 5.15 – 5.25GHz is prohibit.

CE Marking

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. Please contact your local representative for ordering information.
This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

R&TTE

This device complies with the essential requirements of the R&TTE Directive 1999/5/EC.

Lithium Battery Safety Statement

Lithium battery inside. Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by battery manufacturer.

THIS PRODUCT CONTAINS LITHIUM-ION BATTERY PACKS. IT MUST BE DISPOSED OF PROPERLY. CONTACT LOCAL ENVIRONMENTAL AGENCIES FOR INFORMATION ON RECYCLING AND DISPOSAL PLANS IN YOUR AREA.

Chapter 1. Product Introduction

VT1020 is the ultra-rugged in-vehicle terminal with 10.4” high brightness display, is designed for the construction, mining, logistics application.
With IP66 protection rating, wide temperature design, wide power range input, and rich expanding interfaces supporting in-vehicle connectivity, VT1020 is a well thought-out in-vehicle device suitable to overcome the demanding challenge.

Hardware Specifications

Item	Description
Processor	Intel® Bay Trail-I E3845 1.91GHz (Quad Core)
Memory	4GB SO-DIMM DDR3L SDRAM, up to 8GB
Storage	SSD x 1, SD slot x 1
Display	● 10.4-inch XGA (1024 x 768); 70,000 hours backlight life ● 1,000 nits sunlight readable (MIL STD 85762A) to 0.1 nits hyper dimming for night mode operation ● Viewing angel: 140(H)/ 120(V) (CR>10) ● Anti-reflection tempered 5-wire resistive touch panel ● PCT (Gorilla) by request only
Touch Panel	● 5-wire Resistive Touch Screen ● Defrost/Defog function (Option)
Wireless Connectivity	● 802.11 ac/a/b/g/n 2x2 ● Bluetooth 4.0 + HS ● GPS / QZSS or GLONASS ● 1 mini PCIe slot (full size) for cellular module ● External RP-SMA connectors for wireless expansion, SMB for GPS
Item	**Description**
Power Input	● VT1020-HR : 18-60VDC 4.5A ● VT1020-HRD: 18-60VDC 4.5A ● VT1020-LR: 9-32VDC 9A ● VT1020-LRD: 9-32VDC 9A

Battery	2,900mAh, 7.5V
Housing (Mechanical)	Die-cast aluminum alloy, fanless design
Video Capturing	Optional video input up to 4 ports with comprehensive SDK included
Certification	CE, FCC, CB

Operating System Support

- Windows 7 Professional with Service Pack 1 x64
- Windows Embedded 8.1 Industry x64
- Windows Embedded 8 Standard x64
- Windows Embedded Standard 7 x64
- Linux Kernel Version 3.19

Environment

- Operating temperature:
  - -30°C (-22°F) to 55°C (122°F)
  - In accordance with MIL-STD-810G Method 501.5 High Temperature Procedure II – Operation
  - In accordance with MIL-STD-810G Method 502.5 Low Temperature Procedure II – Operation
- Storage temperature:
  - -30°C (-22°F) to 70 °C (158°F)
  - In accordance with MIL-STD-810G Method 501.5 High Temperature Procedure I – Storage
  - In accordance with MIL-STD-810G Method 502.5 Low Temperature Procedure I – Storage
- Relative humidity: 5% to 95% @ 30°C (86°F) to 60°C (140°F) non-condensating in accordance with MIL-STD-810G Method 507.5 Humidity Procedure II Aggravated Cycles
- Vibration Test:
  - Operating: MIL-STD-810G Method 514.6 Procedure 1, Category 4, Fig 514.6C-1

Common carrier (US highway truck vibration exposure); Fig 514.6C-2 Composite two-wheeled trailer; Fig 514.6C-3 Composite wheeled vehicle

- Non-Operating: MIL-STD-810G Method 514.6 Procedure 1, Category 24, Fig 514.6E-1 (General minimum integrity exposure)

- Shock Test:
  - Operation: MIL-STD-810G Method 516.6 Procedure 1 Functional Shock (40g, 11ms)

Non-Operation: MIL-STD-810G Method 516.6 Procedure V Crash Hazard Shock (75g, 8~13ms)

I/O Ports

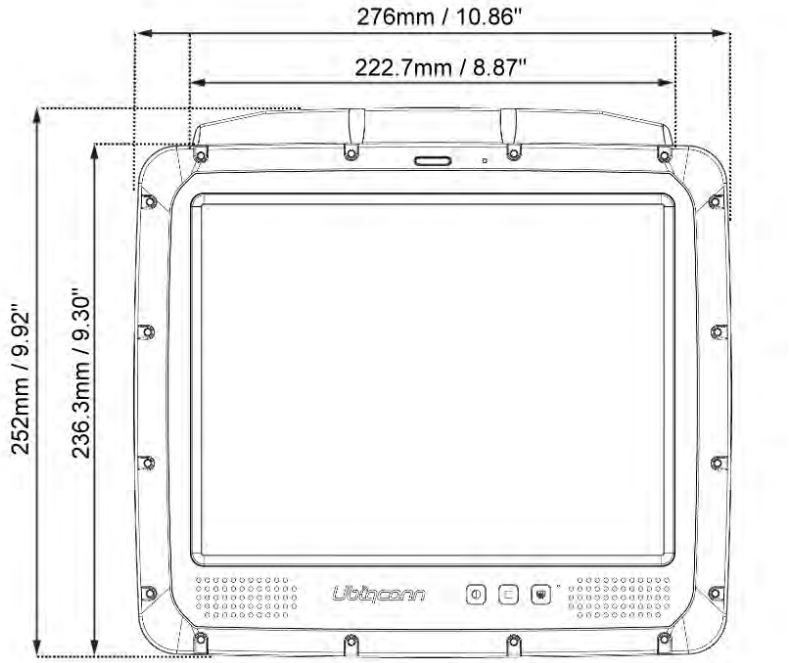
- 2 x RJ45 connector with Gigabit LAN for teaming / redundant function support
- 1 x DB9 male type RS-232 with power supply 0/5/12V (COM1)
- 1 x DB9 male type RS-232 (COM2)
- 1 x DB9 female type RS-232 (COM3)
- 2 x USB (2.0 and 1.x compliant)
- 1 x DB9 female type CAN bus with 2.5KVrms isolation protection and NMEA 2000 physical layer support
- 3KVrms isolation protection for 4 DI + 4 DO
- Stereo microphone x 1 or line-in, stereo HD audio x 1
- Waterproof speakers

Dimension and Weight

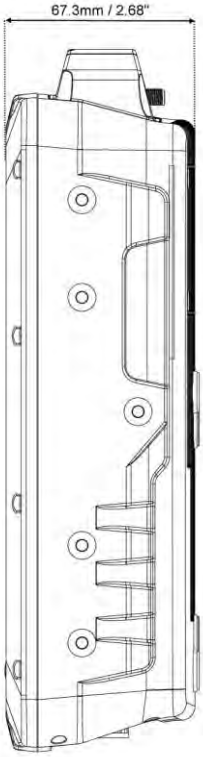
Dimension: 276mm (W) x 252mm (H) x 67.3mm (D)/ 10.86in. (W) x 9.92in. (H) x 2.68in. (D)

Weight: 3.8 kg (include SSD) /8.38 lbs (include SSD)

Front View Dimension:



Side View Dimension:



Package List

Before you begin the installation or configuration process make sure to inspect all components and accessories. Contact your representative if there are any missing or damaged items.
Please verify the delivery of the contents upon receipt

- VT1020 system
- The power supply cable with circular connector plug
- DB9 serial to dual USB cable
- DB9 male to DB9 male for COM3

NOTE: The packaging material has been selected to optimally protect your device. After unpacking, store the original packaging material in the event that you need to return shipment.

Chapter 2. Hardware Installation

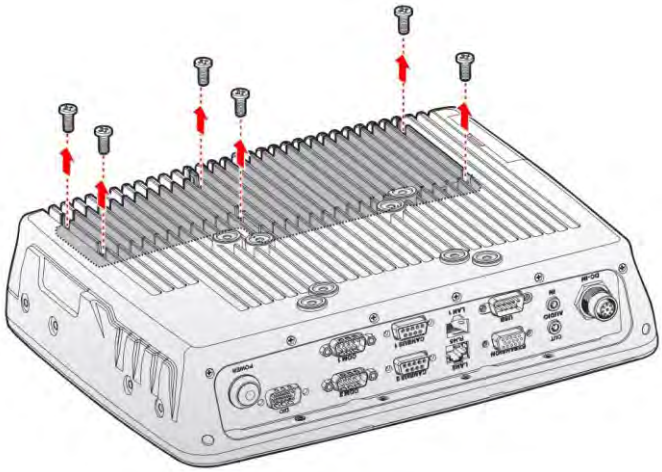
This chapter provides information for the installation and removal of RAM, SSD and mini PCIe card.

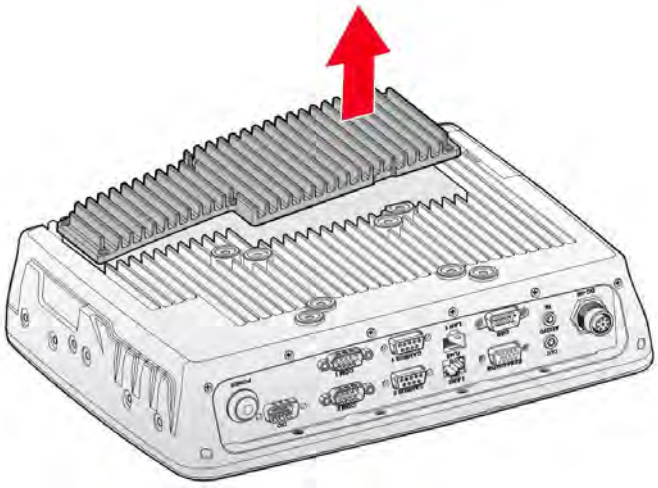
RAM Module

Prevention of EMI interference in this device is not guaranteed if the original components are replaced.
A single DIMM module slot is available for memory expansion. The device supports up to 8GB of SO-DIMM DDR3L SDRAM.

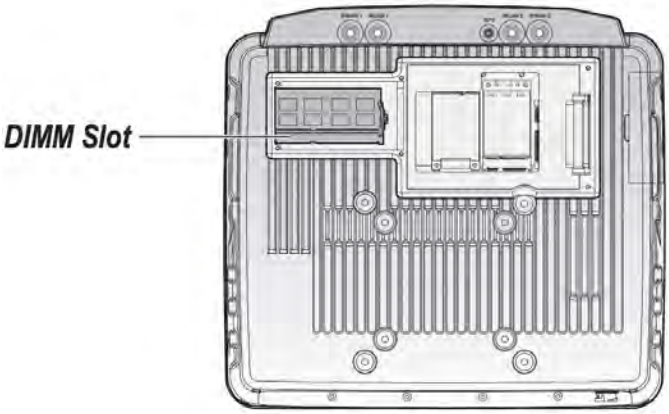
Installing/Removing a RAM Module

1. Shut down the system properly and disconnect from all power sources.
2. Un-mount the device from the mounting apparatus; make sure that the display surface is protected.
3. Remove the screws securing the service cover and remove the cover.

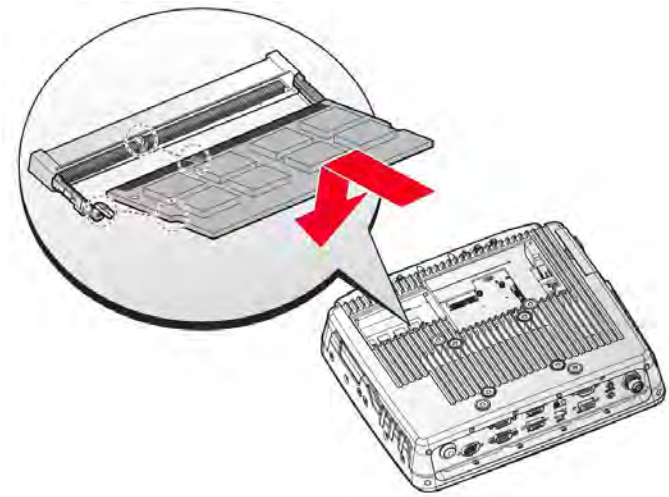


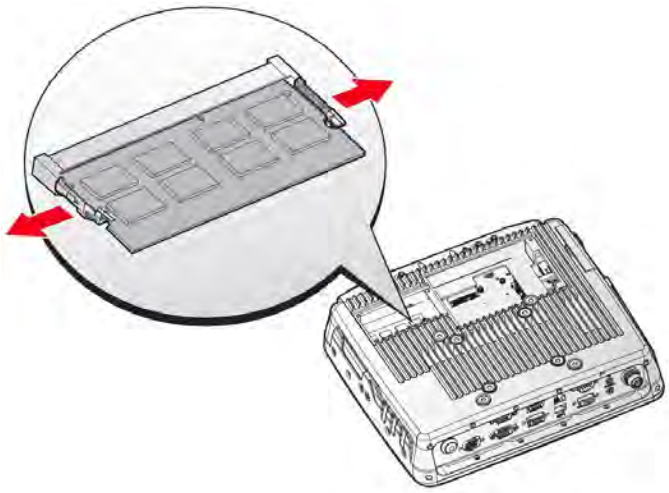


4. Locate the RAM module slot, see the following image.



5. Insert the RAM module into the slot and press it down until the clips lock or pull the locking levers to unlock the DIMM and remove it from slot.





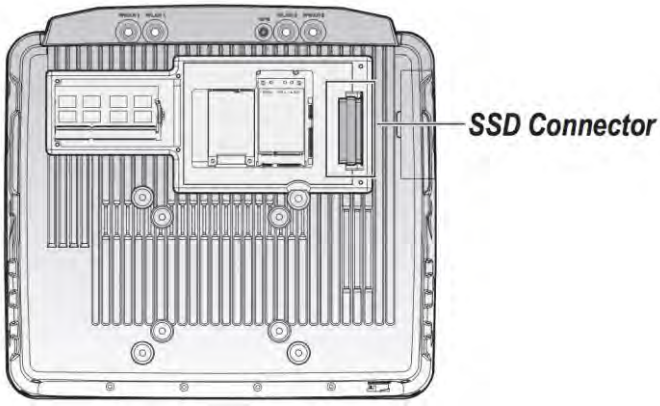
6. Replace the service cover.

SSD Module

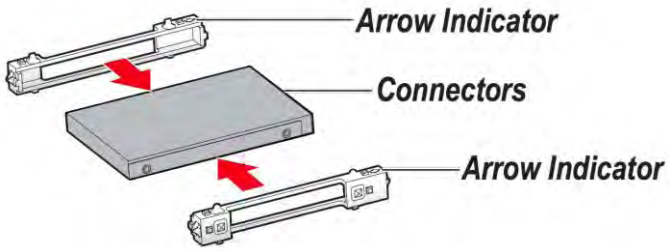
Prevention of EMI interference in this device is not guaranteed if the original components are replaced.

Installing an SSD Module

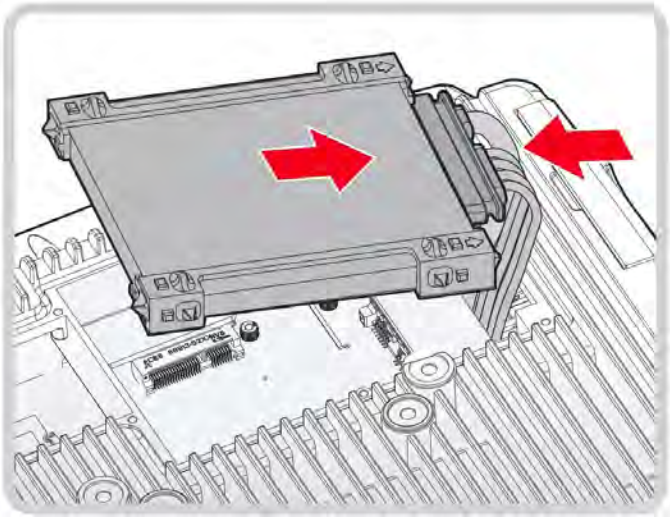
1. Shut down the system properly and disconnect from all power sources.
2. Un-mount the device from the mounting apparatus; make sure that the display surface is protected.
3. Remove the screws securing the service cover and remove the cover.
4. Locate the SSD connector on the VT1020.



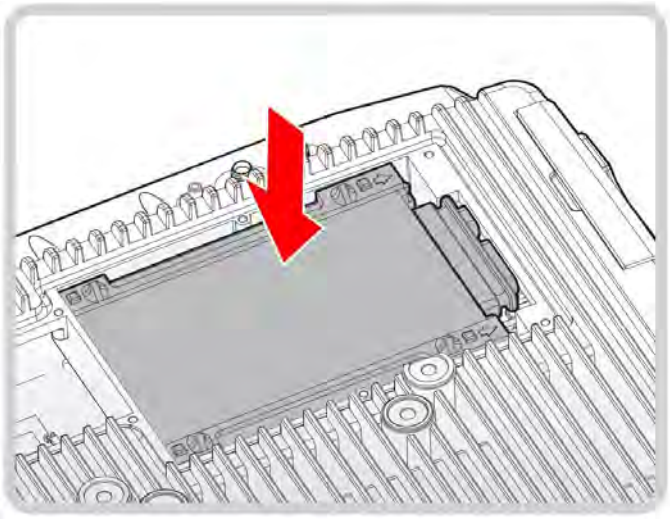
5. Align the arrow indicators on the silicone guard strips to the front (connector side) of the SSD module.
6. Insert the guard strips over the sides of the SSD module.



7. Grasp the SATA cable from the SSD bay and pull it forward to release it from its enclosure.
8. Align the SATA cable with the connectors on the SSD module.
9. Connect the SSD to the SATA cable.



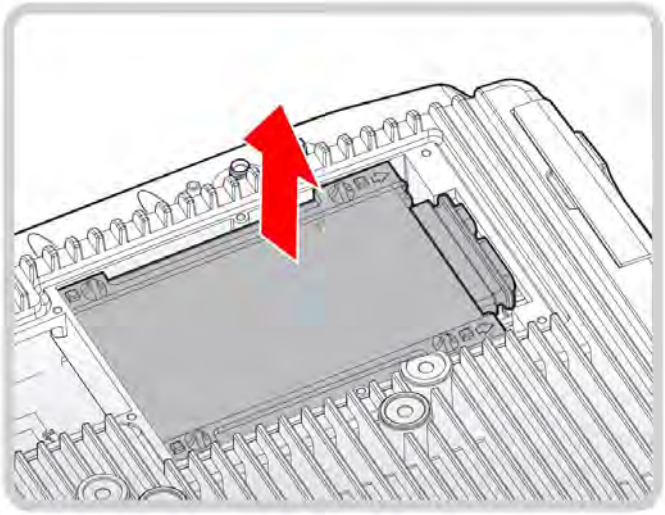
10. Hold the SSD module with one hand. With the other hand push in the SATA cabling underneath the chassis. It is necessary to tuck the cables in to allow for enough space to install the SSD module.
11. Angle the SSD connectors into the SSD bay to correctly seat the SSD module.
12. Lower the rear of the SSD in the bay and press it down gently to seat it correctly.



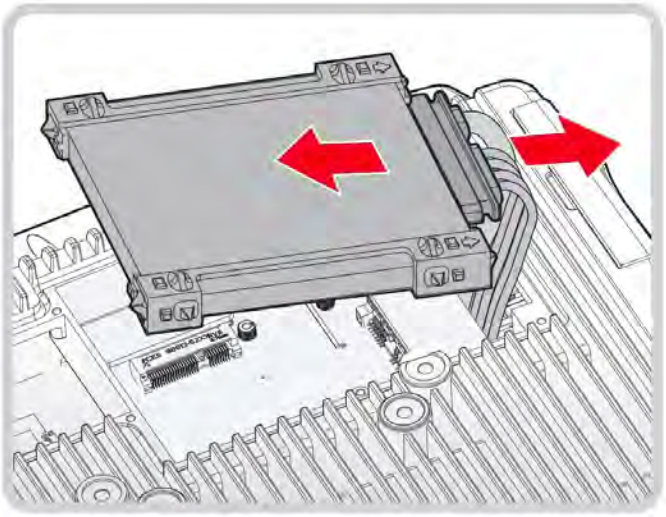
13. Replace the service cover.

Removing an SSD Module

1. Shut down the system properly and disconnect from all power sources.
2. Un-mount the device from the mounting apparatus; make sure that the display surface is protected.
3. Remove the screws securing the service cover and remove the cover.
4. It may be necessary to grasp the silicone guard strip and gently pull them up to remove the SSD module from the bay. For best results, pull up on the rear of the SSD module. The SSD module angles up.
5. Slide the SSD module out of the bay.

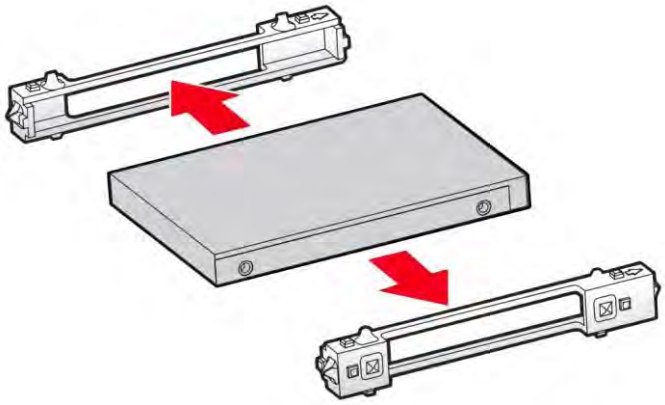


6. Disconnect the SSD module from the SATA cable.



7. Remove the silicone guard strips from the SSD module. Do not throw them away the guard strips away.

   Keep the guard strips for later use on the replacement SSD module.

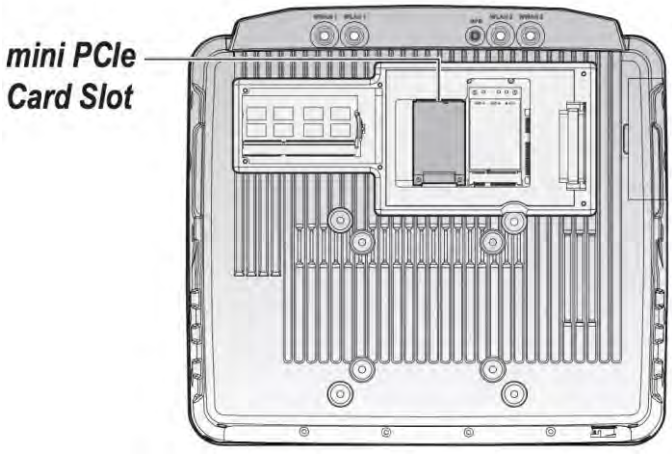


8. Replace the service cover.

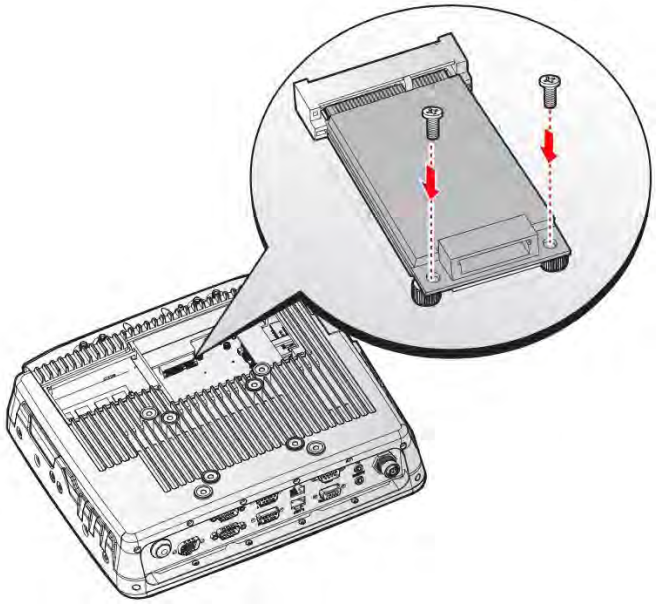
Installing/Removing the mini-PCIe Cards

The mini-PCIe card for the performance extension of your system can be installed Video. Please follow the guideline for installation.

1. Shut down the system properly and disconnect from all power sources.
2. Un-mount the device from the mounting apparatus; make sure that the display surface is protected.
3. Open the service cover; mini PCIe card slots are under the SSD, so please remove the SSD module first.
4. Locate the mini PCIe slot, see the following image, designated for a video card.



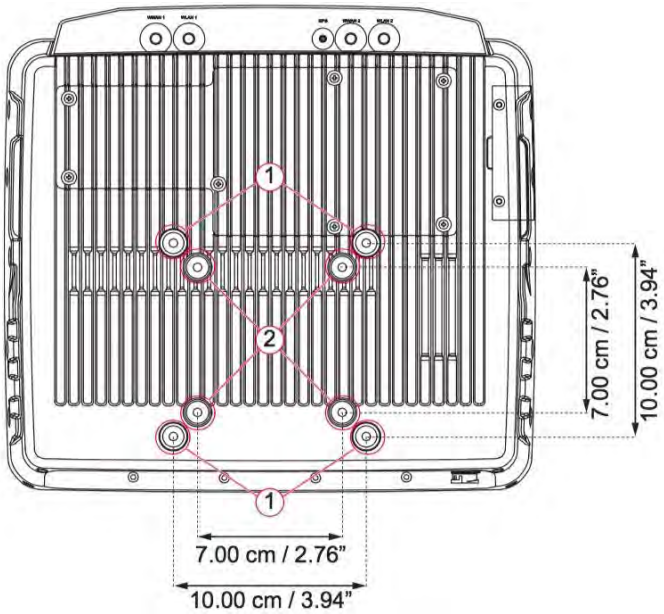
5. Fasten/Loosen the corresponding screws, install/remove the card.



6. Install the SSD module and then replace the service cover.

Chapter 3. Hardware Mounting

The VT1020 supports two types of standard VESA mounting, it support VESA 75 mounting and VESA 100 mounting.



Notes: *To prevent any damage or injury, make sure the mounting bracket is securely attached.*

The VT1020 also supports two types of VESA mounts.

VESA 100 Mounting Option

VESA 100 mounting option, M5 thread
The VT1020 supports a standard VESA version MIS-D, 100, C (100 mm distance quadrate order, M5 thread, deepness 7.5 mm) through the four drill holes on the back side of the device.

VESA 75 Mounting Option

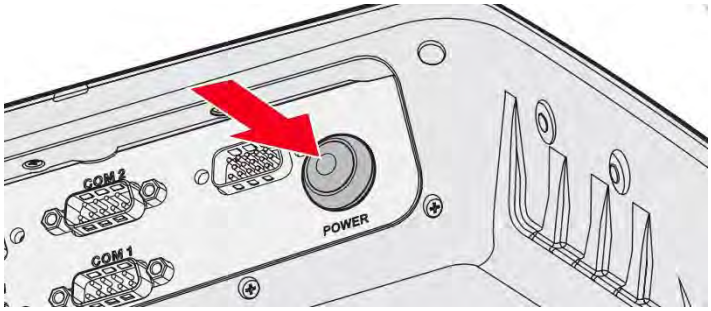
VESA 75 mounting option, M5 thread
The VT1020 supports a standard VESA version MIS-D, 75, C (75 mm distance quadrate order, M5 thread, deepness 7.5 mm) through the four drill holes on the back side of the device.

Chapter 4. Start up

Powering the System

Starting Up the System

Connect the power cable to power input connector and then, press the power switch for 2 seconds. The system will be turned on.



Powering Down the System

The VT1020 can be powered down by using the power switch or through the Windows operating system.
To power down the device, press the power switch 5 seconds, the system will be turned off.

Brightness and Dimming Control

Adjust the brightness of the display to setup optimal conditions in Sunlight or Night mode operations.

- Press the  button to decrease the brightness to Night mode.
- Press the  button to increase the brightness to Sunlight mode.

LED Status

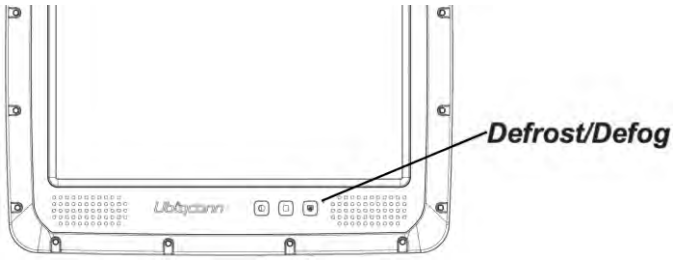
See the following description.

Color	Description
None	Hyper dimming mode or shut down.
Green	Normal.
Red	Battery mode.

Defrost/Defog Option

The touch screen equipped with optional for defrost and defog function for users who use the device in extreme temperature environments.

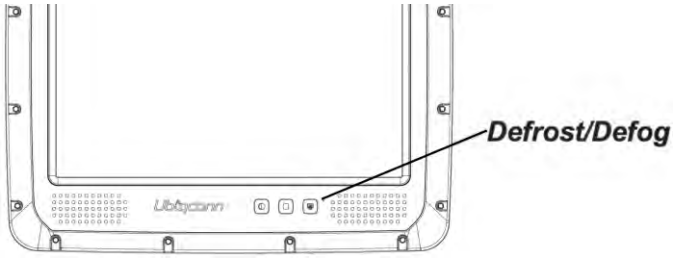
Enabling Defrost Function



In extreme cold conditions (moving into a cold environment), press the  button to

enable the defrost function and allow the device to heat up the screen to 2 degrees. The defrost function is automatically shuts off once the temperature reaches 2 degrees.

Enabling Defog Function



In environments where an extreme temperature changes occurs, cold to hot temperature change, the display can fog up. To enable the defog function, press the  button to enable the function. The device heats up to 35 degrees. Once the 35 degree temperature is achieved, the function automatically shuts off.

Notes: Once the device reaches 35 degrees, the function automatically shuts off. Pressing the Defrost/Defog key does not re-enable the function.

Calibrating the Touch Screen

The touch screens of all VT1020 devices that come delivered with an operating system (Windows or Linux) are already calibrated.

You may need to calibrate your screen if you tap on one area and it registers in a different area of the screen. Make sure you use the stylus to complete the alignment process.

1. Tap **Start** > **All Programs** > **HIDeGalaxTouch Tool** > **HIDeGalaxTouch Tool**. The HIDeGalaxTouch Tool appears.
2. Tap 4 Points Calibration, 9 Points Linearization or 25 Points Linearization to begin the process. The calibration process beings and calibration points are displayed on the screen.
3. Tap each calibration point as directed by the process.
4. Tap and hold until the display shows OK.
5. Continue to follow the instructions until the process is finished.
6. Once calibration is achieved a prompt displays. Tap **OK** to complete the calibrate process.

VT1020 Configuration Options

In additional to setting in Windows Control Panel, VT1020 also provide the utility, uPanel, to set the configuration including power management and system setup. Please refer the Chapter 6 for configuration setting in uPanel.

Date and Time

Use the following to set the Date and Time.

- Press **FN Key** > press or tap **Control Panel** > **Clock, Language an Region** > **Date and Time**

Power Management

Use the following to set the power management options.

- Press **FN Key** > press or tap **Control Panel** > **Hardware and Sound** > **Power Options**

Speaker Volume

Use the following to set the speaker volume.

- Press **FN Key** > press or tap **Start** > **Control Panel** > **Hardware and Sound** > **Sound**

Connect Bluetooth Devices

- Use the following to set the speaker volume. ☐Press **FN Key** > press or tap **Control Panel** > **Bluetooth Devices**

Restart/Shutdown

- Use the Windows interface to restart or shut down the VT1020. ☐To restart: Press **FN Key** > press or tap **Start** > arrow next to Shut down > **Restart**

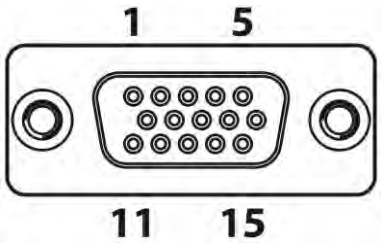
- To shut down: Press **FN Key** > press or tap **Start** > **Shut down**

Chapter 5. Jumpers and Connectors

External Connectors Pin Assignments

Use this section as a reference for the pin assignments of the various ports available on the VT1020.

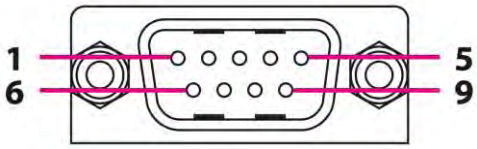
DIO Port



Pin	Signal
1	Digital OUT-1
2	Digital OUT-2
3	Digital OUT-3
4	Digital OUT-4
5	Digital IN-1
6	Digital IN-2
7	Digital IN-3
8	Digital IN-4
9	No connected
10	No connected

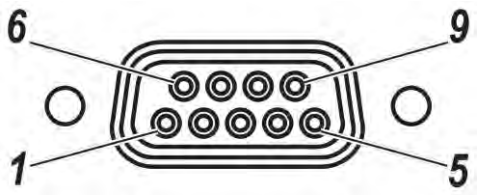
11	No connected
12	No connected
13	No connected
14	GND
15	GND

RS-232 Port (COM1)



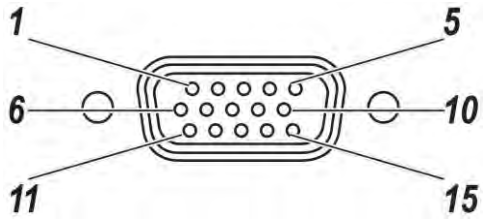
Pin	Signal	Description
1	DCD	Data carrier detect (input)
2	RXD	Receive data (input)
3	TXD	Transmit data (output)
4	DTR	Data terminal ready (output)
5	GND	Signal/power ground
6	DSR	Data set ready (input)
7	RTS	Request to send (output)
8	CTS	Clear to send (input)
9	RI / PWR	Bar code scanner power (1 A max) or Ring indicator (input)

CAN BUS Ports



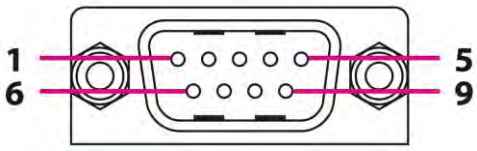
Pin	Signal	Description
1	CAN_L	CAN_L bus line dominant low 5V level
2	-	No connected
3	CAN_H	CAN_H bus line dominant high 5V level
4	GND	GND
5	GND	GND
6	-	No connected
7	-	No connected
8	-	No connected
9	-	No connected

Expansion Port



Pin	Signal	Description
1	CH1: Audio Left	Audio left input
2	CH2: Video	Video input
3	CH2: Audio Right	Audio right input
4	NC	No connected
5	CH3: Audio Right	Audio right input
6	CH1: Video	Video
7	CH1: Audio Right	Audio right input
8	CH2: Audio Left	Audio left input
9	CH3: Video	Video
10	CH3: Audio Left	Audio left input
11	CH4: Video	Video
12	GND	GND
13	CH4: Audio Left	Audio left input
14	CH4: Audio Right	Audio right input
15	GND	GND

USB Port



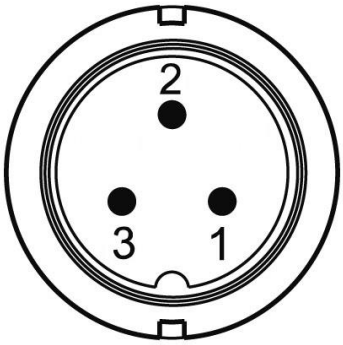
Pin	Signal
1	USB2_D-
2	USB2_D+
3	GND
4	USB1_D+
5	USB1_D-
6	GND
7	USB2_PWR
8	USB1_PWR
9	Not used

We provide the DB9 to standard USB type A connector cable.

Please contact your local representative for ordering information

Power Connector

If you are connecting to an external DC/DC supply, you must apply power to DC+. If you are connecting to 10 to 60V vehicle power, connect power to V In+.

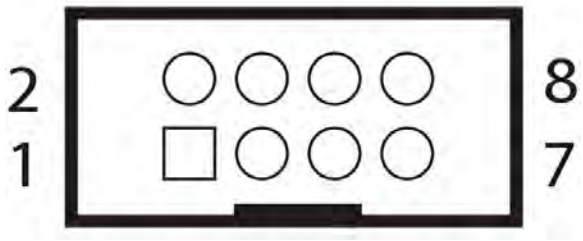


Pin	Signal
1	DC+
2	GND
3	DC-

Internal Connectors Pin Assignment

Power Connector

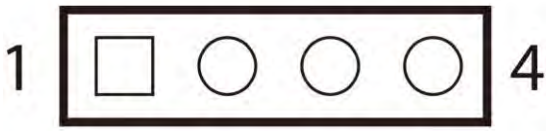
Location: CN12



Mainboard side	Power Board	
1	1	ADPIN+
2	2	GND
3	3	ADPIN+
4	4	GND
5	5	ADPIN+
6	6	GND
7	7	ADPIN+
8	8	GND

LED Connector

Location: CN18



Mainboard side	LED side	
1	1	PMU3V
2	2	LEDG_VCC
3	3	LEDR_VCC
4	4	GND

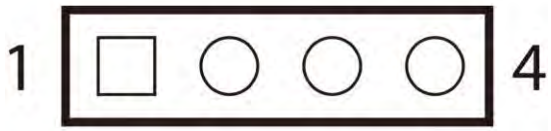
Resistive Touch Screen Connector

Location: CN25

Mainboard side	Touch for Resistor	Signal
1	5	X+/UL
2	4	Y+/UR
3	3	PROBE
4	2	X-/LR
5	1	Y-/LL

GPS Connector

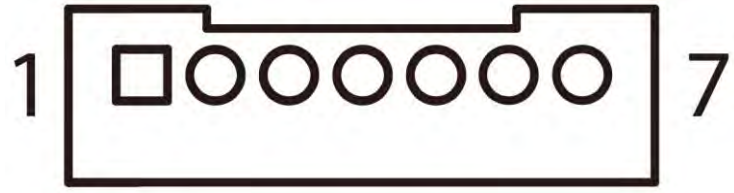
Location: CN15



Mainboard side	GPS side	Signal
1	1	GPS_3VIN
2	2	GPS_3VIN
3	3	GND
4	4	GND

Battery Connector

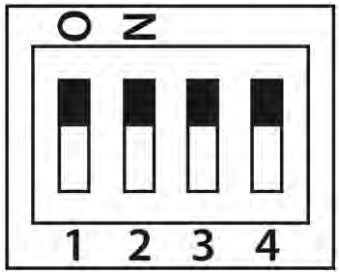
Location: CN28



Mainboard side	Signal
7	BAT_VCC
6	BAT_VCC
5	SMDAT
4	SMCLK
3	BIN1
2	GND
1	GND

Power Input Voltage

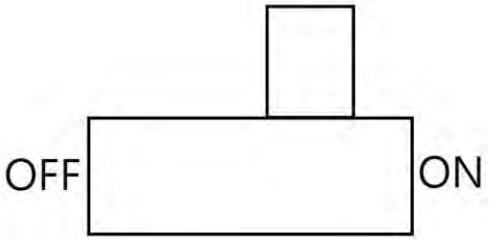
Location: CN9



Pin	Status	Function
1	Reserve	Reserve
2	OFF: 12V / ON: 24V	12V / 24V
3	OFF / ON	BIOS_RECOVER#
4	Reserve	Reserve

Internal Battery Source Setting

Location: CN10



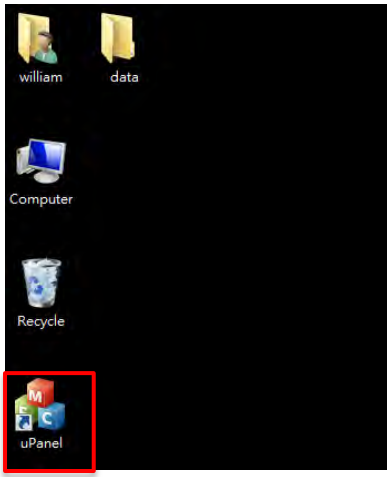
Pin	Status	Function
1	ON	Internal Battery ON
2	OFF	Internal Battery OFF

Chapter 6. uPANEL Setting

uPanel is an utility to configure the device for your demo or test. We also provide the corresponding SDK for your application development. The utility is auto-running in background while the system turn on. This section is to brief what function are included in uPanel and how to set up.

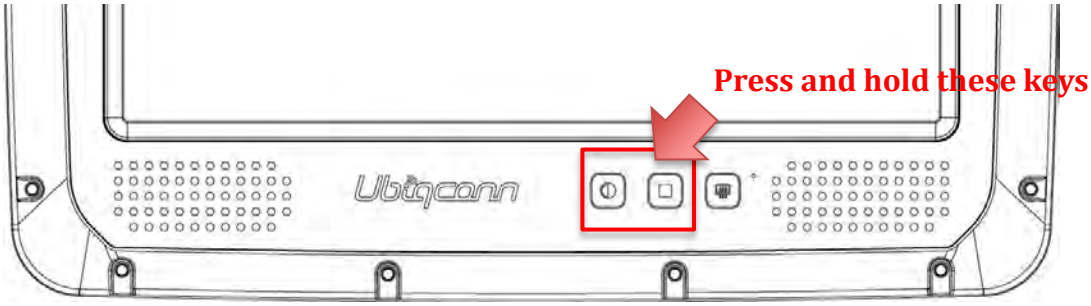
1. Device Information
   Provide the system hardware, software, and firmware version information.
2. Vehicle Status
   This section is to demo how to read the vehicle information such as vehicle battery voltage, fuel, speed and so on while connecting with vehicle OBDII or SAE J1939. We use the simulator to run the demo.
3. Communication Setting
   This is to enable / disable WiFi/BT and configure the related setting.
4. System Status & Setting
   This section contains the major configuration of the system device. Power management, wake up event, IO configuration, brightness and watchdog timer setting are included.
5. Location & Sensor
   GPS configuration setting and temperature status

Double click the uPanel icon into the utility if uPanel is not running in background



Click the icon you like to configure or “EXIT” to quit uPanel.

For any reason, if you like to load the default setting of uPanel, please press and hold the “Brightness and Dimming Control” and “FN Key” for 6 seconds.



Chapter 7. Main BIOS Setting

VT1020 is equipped with a Phoenix BIOS, which is stored in EEPROM chip.

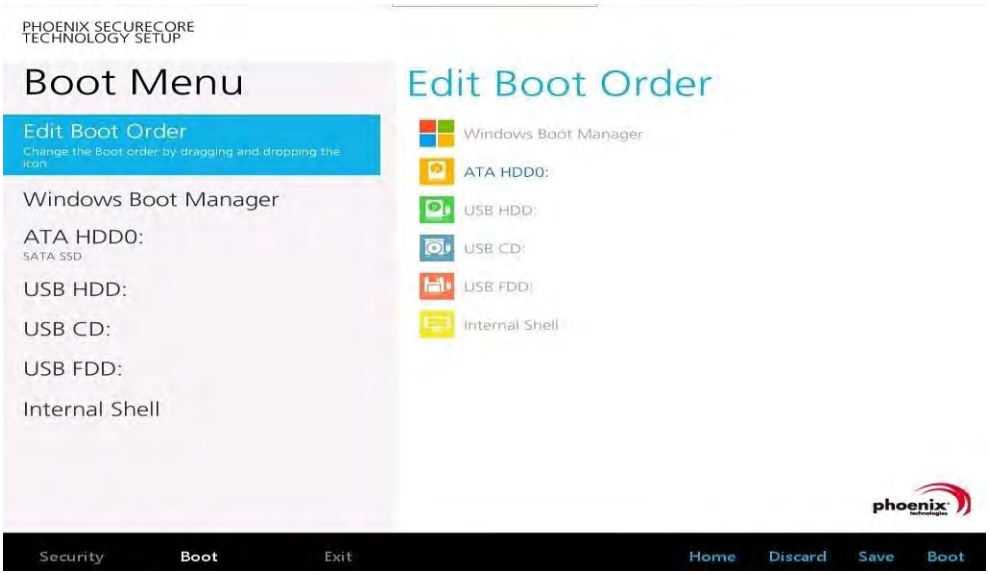
This chapter provides information for BIOS main feature setting in hardware system.

When the system turn on, press <F2> to enter Setup

The system displays the BIOS setup interface, you can select what functions do you want to change.

Set Boot Sequence

This section enable the user define and modify the boot options of bootable devices.

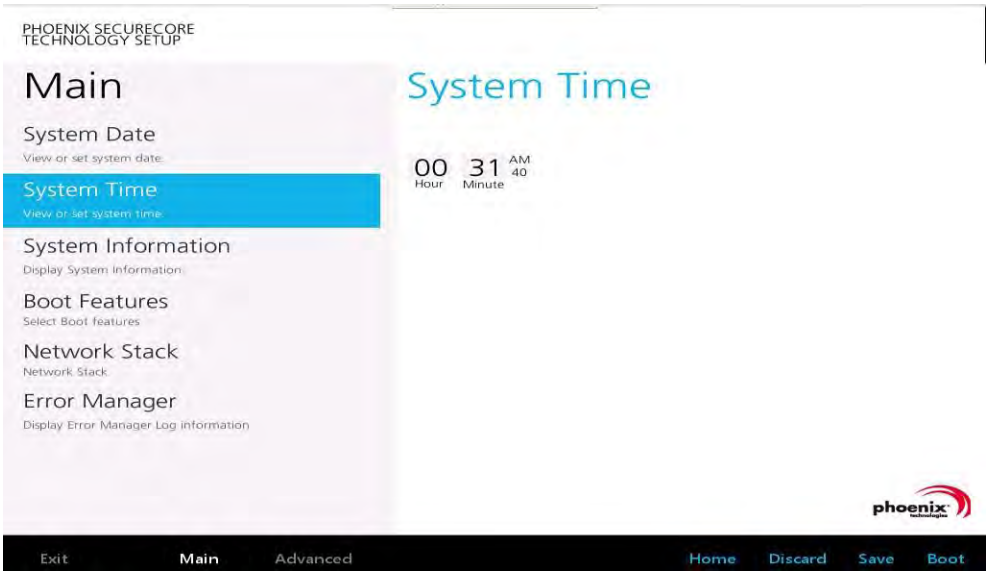


Set the system configuration

Used the Main menu for basic system configuration , user can setting the system date, time and drive parameters and related settings via the HDD Sub-menu.

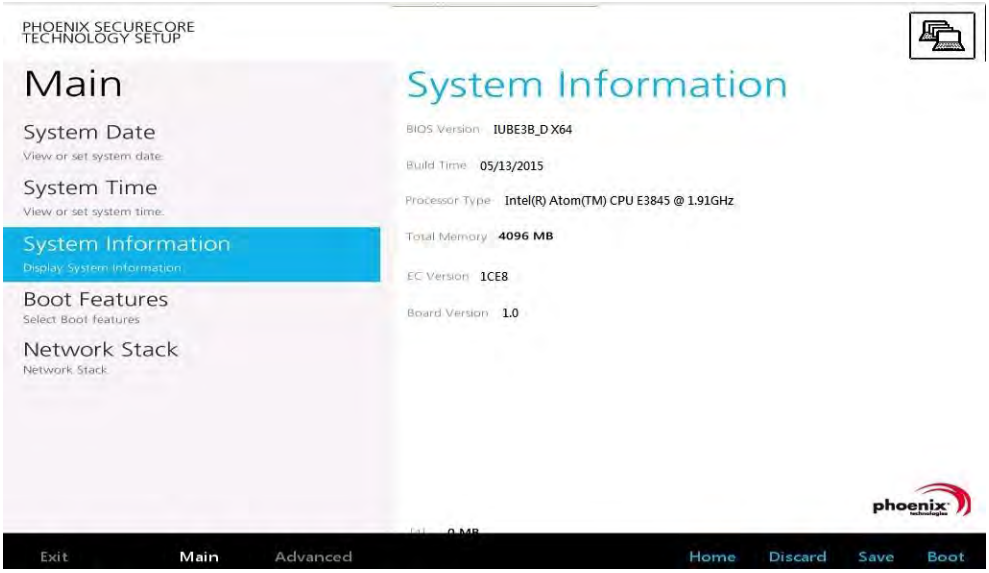
Setting the System Date

Setting the System Time



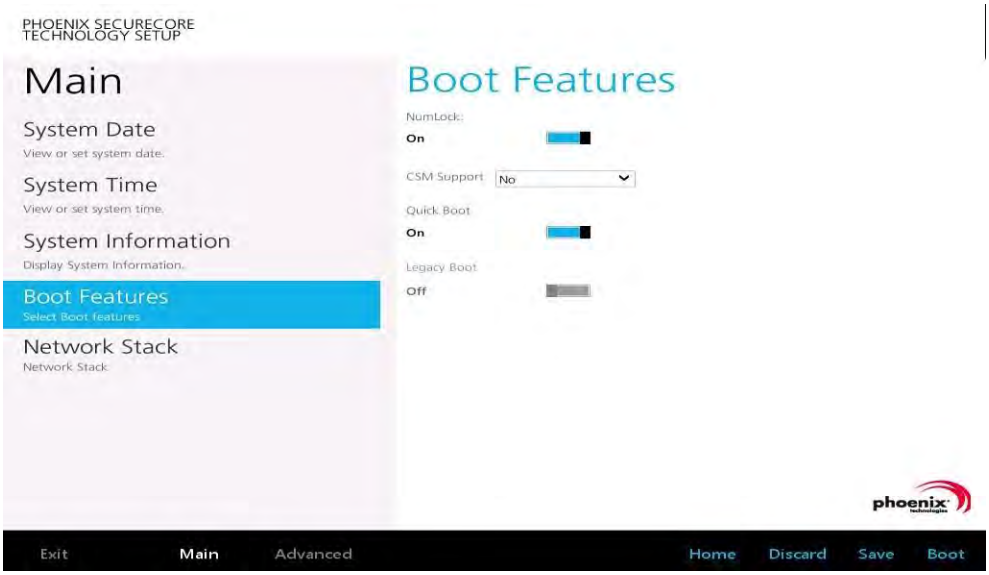
System Information

Display the system configuration information such as CPU, Memory size, firmware version.



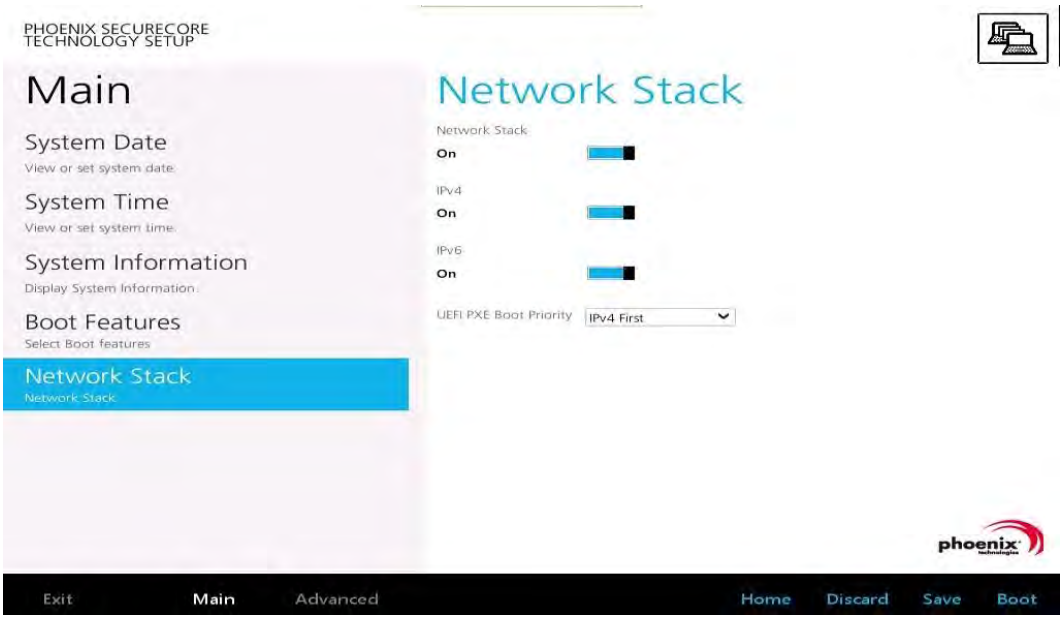
Boot Features

User can set the boot options for CSM support or Quick Boot, please note if the operating system is Windows 8, please setting [Off] for “Legacy Boot”



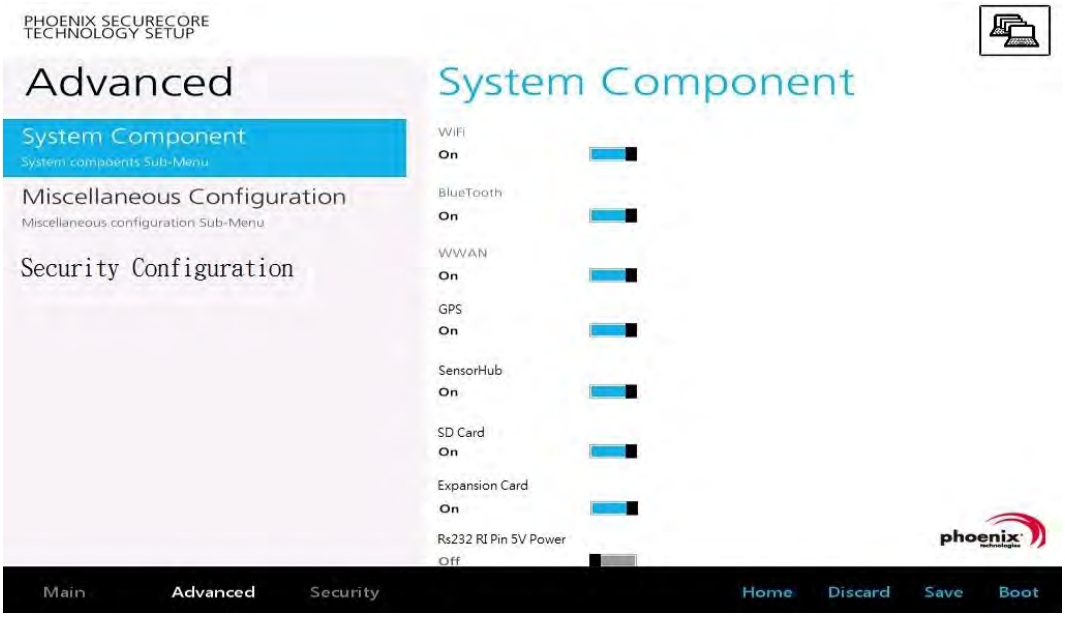
Network Stack

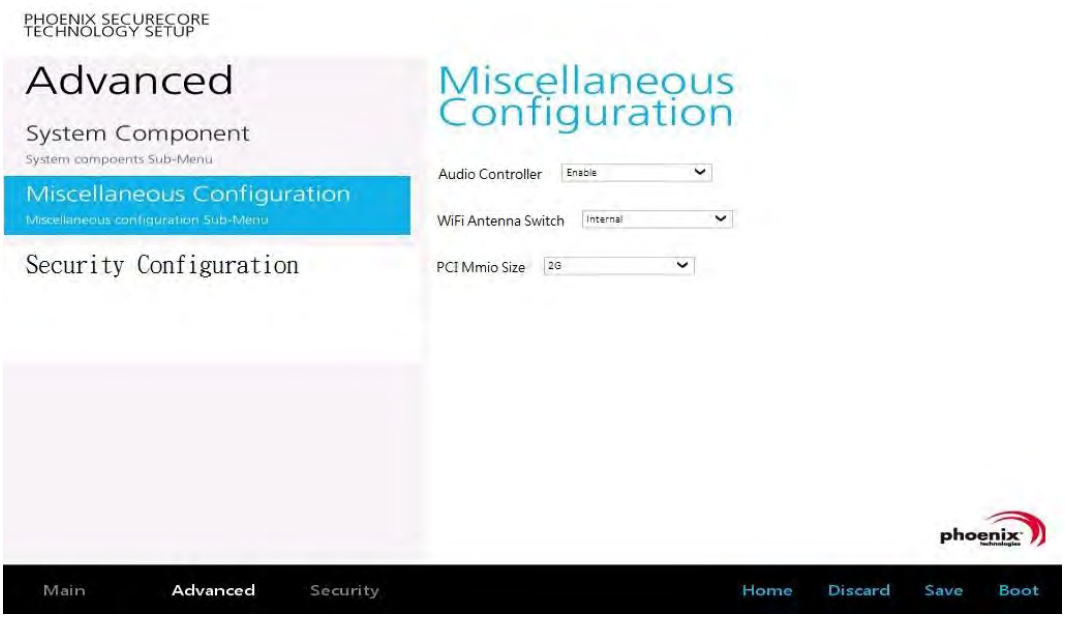
If the system needs to boot by network, enable this function.



Enable/ Disable System Components

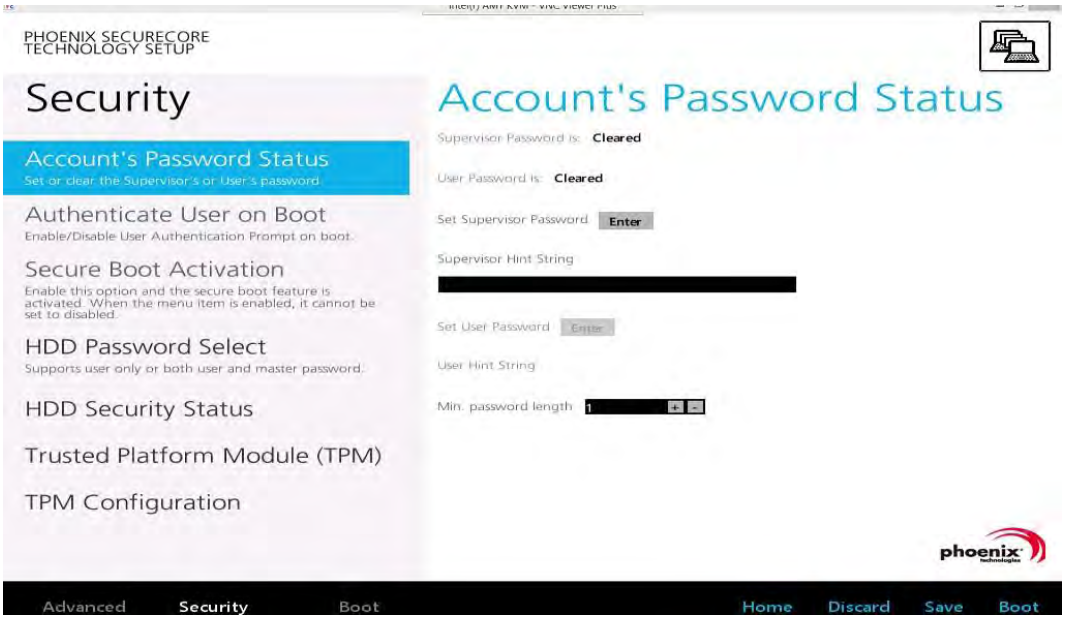
Use Advanced menu to set the system I/0 device function.





Account’s Password Setting

Used the Security Menu can establish the system password to protection for entering the BIOS or system start-up.



HDD Security Setting

To establish password protection to restrict access to the contents of the hard disk drive, the HDD password is written to the system BIOS and to the hard disk drive to ensure that the password can protect your hard disk drive should it be moved to another computer.