V2616A Hardware User's Manual

Edition 4.0, February 2017

www.moxa.com/product

MOXA®

V2616A Hardware User's Manual

The software described in this manual is furnished under a license agreement and may be used only in accordance with the terms of that agreement.

Copyright Notice

Trademarks

The MOXA logo is a registered trademark of Moxa Inc.
All other trademarks or registered marks in this manual belong to their respective manufacturers.

Disclaimer

Information in this document is subject to change without notice and does not represent a commitment on the part of Moxa.

Moxa provides this document as is, without warranty of any kind, either expressed or implied, including, but not limited to, its particular purpose. Moxa reserves the right to make improvements and/or changes to this manual, or to the products and/or the programs described in this manual, at any time.

Information provided in this manual is intended to be accurate and reliable. However, Moxa assumes no responsibility for its use, or for any infringements on the rights of third parties that may result from its use.

This product might include unintentional technical or typographical errors. Changes are periodically made to the information herein to correct such errors, and these changes are incorporated into new editions of the publication.

Technical Support Contact Information

www.moxa.com/support

Moxa Americas		Moxa China (Shanghai office)	
Toll-free:	1-888-669-2872	Toll-free:	800-820-5036
Tel:	+1-714-528-6777	Tel:	+86-21-5258-9955
Fax:	+1-714-528-6778	Fax:	+86-21-5258-5505
Moxa Europe		**Moxa Asia-Pacific**	
Tel:	+49-89-3 70 03 99-0	Tel:	+886-2-8919-1230
Fax:	+49-89-3 70 03 99-99	Fax:	+886-2-8919-1231
Moxa India			
Tel:	+91-80-4172-9088		
Fax:	+91-80-4132-1045		

Table of Contents

1

Introduction

This chapter gives a general overview of the V2616A computer's hardware features and specifications.

The following topics are covered in this chapter:

❑ **Overview**
❑ **Package Checklist**
❑ **Product Features**
❑ **Hardware Specifications**
❑ **Hardware Block Diagram**

Overview

The V2616A series of embedded computers are based on the Intel Core i5/i7 processor, and feature 2 RS-232/422/485 serial ports, dual Gigabit Ethernet ports, 3 USB 2.0 ports, and dual VGA/DVI-D video output. V2616A computers are compliant with mandatory sections of EN 50155, making them ideal for railway and other industrial transport applications. V2616A computers come with a CFast socket that provides ample and secure data buffering or additional storage expansion, as well as 2 hot-swappable storage trays that accept 2.5" solid state or hard disk storage drives, and may be arranged in software RAID 1 arrays to give full data redundancy.

Package Checklist

Each model ships with the following items:

- V2616A embedded computer
- 2 storage tray keys
- Power cable (CBL-M12FF5PPJ21-BK-15-IP68)
- Documentation and software CD or DVD
- Quick installation guide (printed)
- Warranty card
- 2 5-pin terminal blocks

NOTE: Please notify your sales representative if any of the above items are missing or damaged.

Product Features

V2616A embedded computers have the following features:

- Compliant with EN 50121-4
- Complies with all EN 50155 mandatory test items*
- IEC 61373 certified for shock and vibration resistance
- Two hot-swappable SATA storage trays for 2.5″ SSDs or HDDs
- 24 to 110 VDC wide range isolated power input
- Easy battery replacement
- Smart Recovery for manual or automatic system recovery
- SynMap for system health monitoring

*This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: www.moxa.com/doc/specs/EN_50155_Compliance.pdf

Hardware Specifications

Computer
CPU:
• Intel® Core™ i5-3610ME dual-core processor (3M Cache, 2.7 GHz) for V2616A-C5 series
• Intel® Core™ i7-3517UE dual-core processor (4M Cache, 1.7 GHz) for V2616A-C7-T series
• Intel® Core™ i7-3612QE quad-core processor (6M Cache, 2.1 GHz) for V2616A-C8 series
OS (pre-installed): Linux or Windows Embedded Standard 7
System Chipset: Mobile Intel HM65 Express Chipset
System Memory: 16 GB capacity, 4 GB pre-installed: 2 slot of 8 GB DDR3-1600 SO-DIMM SDRAM
USB: 3 USB 2.0 compliant hosts; 2 with type A connectors supporting system bootup, 1 with M12 connector

Storage
Built-in: 8 GB CFast to store OS
Storage Expansion: 2 hot-swappable storage trays for 2.5″ SATA SSD or HDD

HDD Support: 1 internal SATA-II storage connector for 2.5″ SSD or HDD

Expansion Slot:

1 full-size/half-size mini PCIe socket with 1 SIM card socket.   Mini PCIe socket supports power on/off control

Other Peripherals

Audio: Line-in, line-out (M12 X-coded)

Display

Graphics Controller: Intel® HD Graphics 4000 (integrated)

VGA Interface: DB15 female connector, max. resolution 2048 x 1536

DVI Interface: DVI-D connector (Chrontel CH7307 SDVO to DVI transmitter), max. resolution 1920 x 1200

Ethernet Interface

LAN: 2 auto-sensing 10/100/1000 Mbps ports (M12 X-coded)

Serial Interface

Serial Standards: 2 software-selectable RS-232/422/485 ports (DB9 male)

Isolation Protection: 1.5 kV

ESD Protection: 4 kV for all signals

Serial Signals

RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND

RS-422: TxDA(-), TxDB(+), RxDB(+), RxDA(-), GND

RS-485-4w: TxDA(-), TxDB(+), RxDB(+), RxDA(-), GND

RS-485-2w: DataA(-), DataB(+), GND

Serial Communication Parameters

Data Bits: 5, 6, 7, 8

Stop Bits: 1, 1.5, 2

Parity: None, Even, Odd, Space, Mark

Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485

Baudrate: 50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)

Digital Input

Input Channels: 6, source type

Input Voltage: 0 to 30 VDC at 25 Hz

Digital Input Levels for Dry Contacts:

• Logic level 0: Close to GND

• Logic level 1: Open

Digital Input Levels for Wet Contacts:

• Logic level 0: +3 V max.

• Logic level 1: +10 V to +30 V (Source to DI)

Isolation Protection: 3 kV

Digital Output

Output Channels: 2, sink type

Output Current: Max. 200 mA per channel

On-state Voltage: 24 VDC nominal, open collector to 30 VDC

Connector Type: 10-pin screw terminal block (6 DI points, 2 DO points, DI Source, GND)

Isolation: 3 kV optical isolation

LEDs

System: 1 Power, 1 Storage

LAN: 2 100M/Link, 2 1000M/Link

Serial: 2 TX, 2 RX

Physical Characteristics

Housing: Aluminum

Weight: 5 kg

Dimensions (with mounting ear): 287 x 290 x 101 mm (11.29 x 11.41 x 3.97 in)

Mounting: wall

Environmental Limits

Operating Temperature: (without HDD installed)

Standard models: -25 to 55°C (-13 to 131°F)

Wide temp. models: -40 to 70°C (-40 to 158°F)

Storage Temperature: (with SSD installed) -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Anti-vibration: EN 50155 standard

Anti-shock: EN 50155 standard

Power Requirements

Input Voltage: 24 to 110 VDC, M12 connector

Note: 24 and 110 VDC are EN 50155 compliant

Power Requirements:

• 60 W (no SSD/HDD attached)

• 2.5 A @ 24 VDC to 0.55 A @ 110 VDC (no SSD/HDD attached)

Power Button: On/off (rear panel)

Standards and Certifications

Safety: UL 60950-1, CSA C22.2 No. 60950-1-07, EN 60950-1

EMC: EN 55032 Class A, EN 61000-3-2 Class D, EN 61000-3-3, EN 55024, FCC Part 15 Subpart B Class A

Rail Traffic: EN 50155*, EN 50121-4, IEC 61373

Green Product: RoHS, CRoHS, WEEE

*This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: www.moxa.com/doc/specs/EN_50155_Compliance.pdf

Reliability

Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting 1-255 second system reset, software programmable

Warranty

Warranty Period: 3 years

Details: See www.moxa.com/warranty

Note: These hardware specifications describe the embedded computer unit itself, but not its official accessories. In particular, the wide temperature specification does not apply to accessories such as power adapters and cables.

Hardware Block Diagram

2
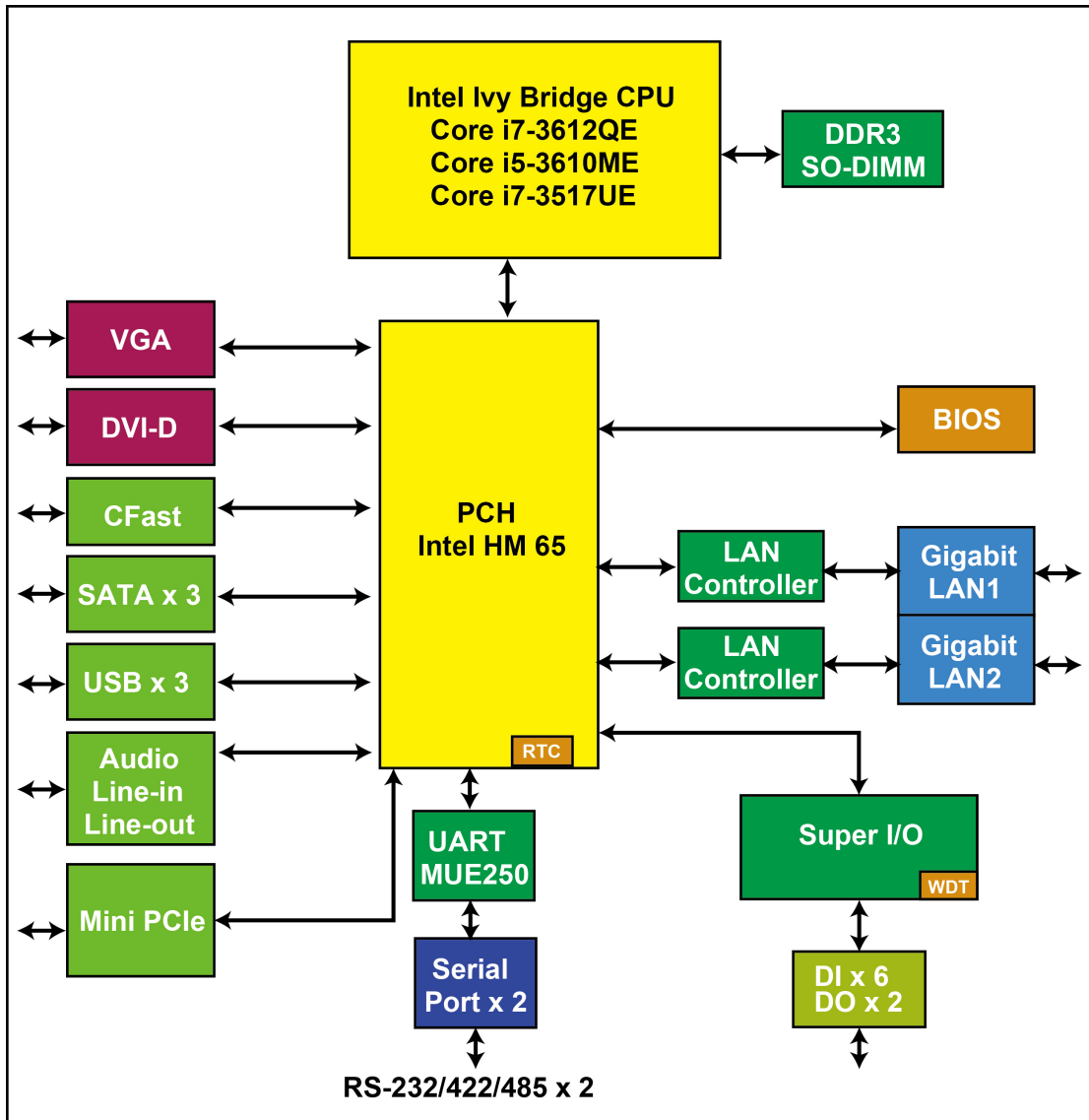
Hardware Introduction

V2616A embedded computers are compact and built rugged for use in industrial applications. LED indicators help you monitor performance and identify trouble spots, multiple serial ports allow you to connect a variety of devices for wireless operation, and the reliable and stable hardware platform lets you devote your attention to developing your applications, rather than diddling with low-level APIs and device drivers.

The following topics are covered in this chapter:

❑ **Appearance**
❑ **Dimensions**
❑ **LED Indicators**
❑ **Real Time Clock**

Appearance

<u>**Front View**</u>

Protection Lock   Protection Lock   Hot-Swappable LED

Hot-Swappable Trays   Hot-Swap Button
for HDD/SSD x 2
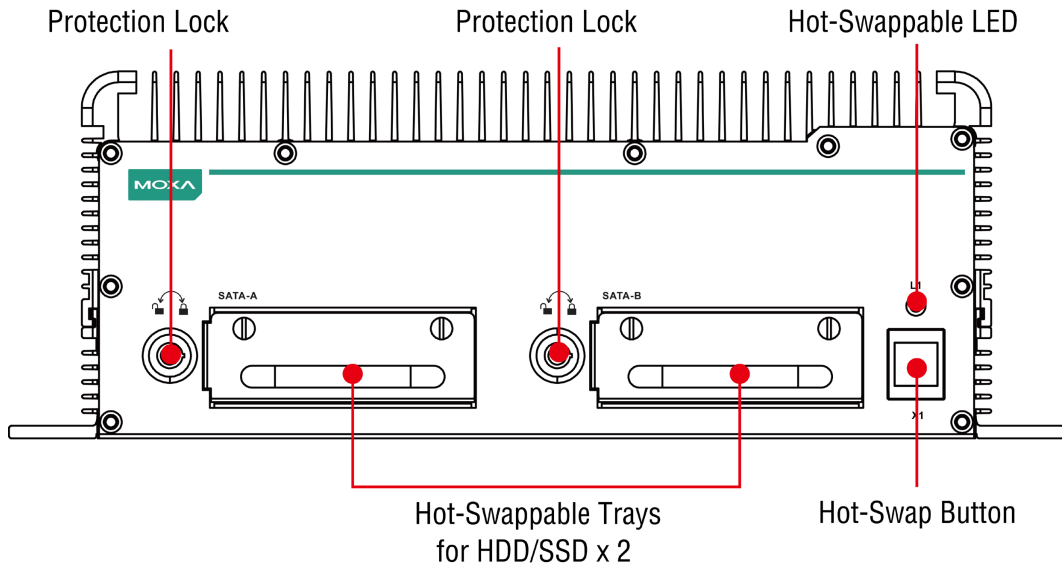
<u>**Rear View**</u>
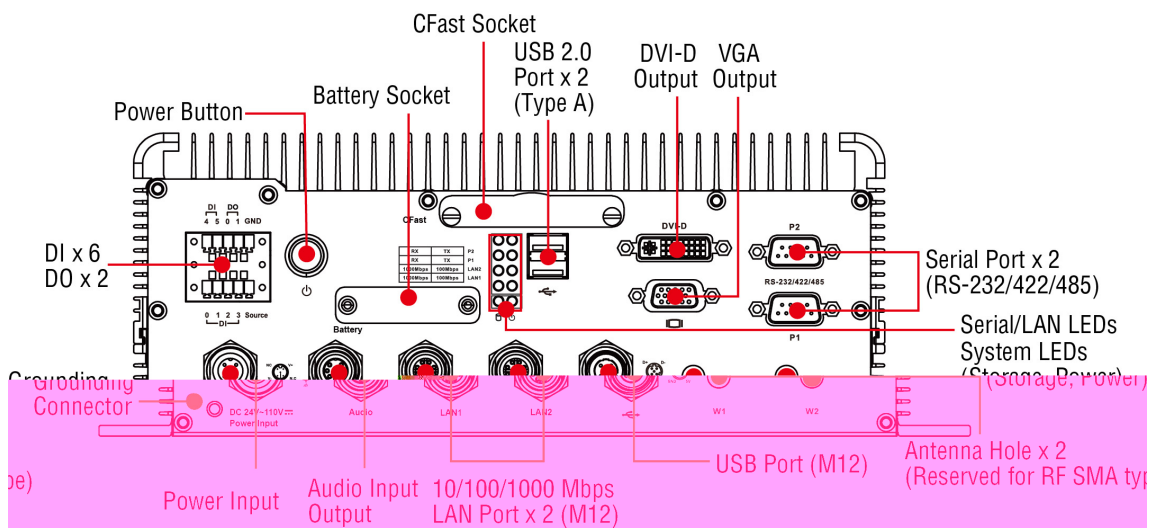
Dimensions
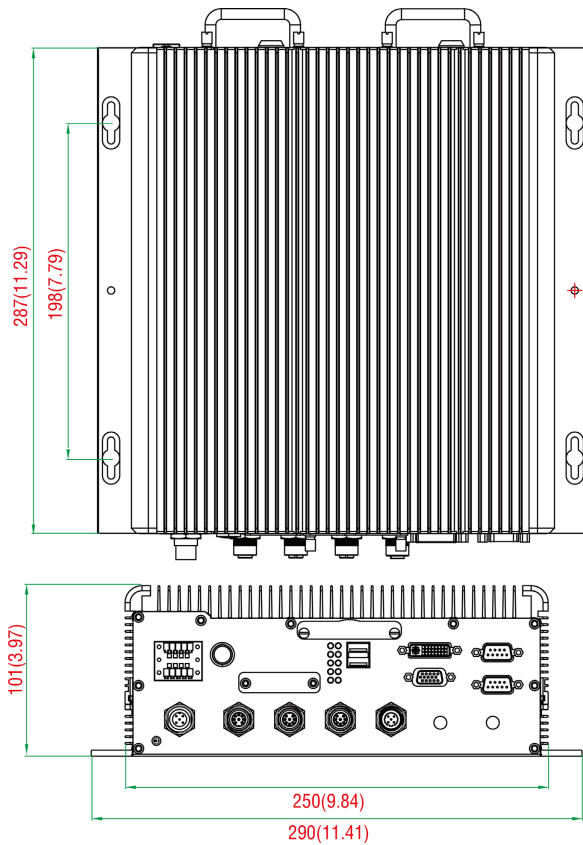
LED Indicators

LED Name	LED Color	LED Function
Power	Green	Power is on and functioning normally
	Off	Power is off, or has failed
Storage	Yellow	CFast card/HDD/SSD is transmitting data.
	Off	CFast card/HDD/SSD is not transmitting data.
LAN (1, 2)	Green	100 Mbps Ethernet mode
	Yellow	1000 Mbps Ethernet mode
	Off	10 Mbps or no activity
Tx (P1-P2)	Green	Serial ports P1-P2 transmitting data
	Off	Serial ports P1-P2 not transmitting data
Rx (P1-P2)	Yellow	Serial ports P1-P2 receiving data
	Off	Serial ports P1-P2 not receiving data
L1	Red	Programmable. By default, two disks ready to be removed.
	Blinking	Programmable. By default, disks inserted into incorrect storage tray.
	Off	Programmable. By default, two disks inserted into correct storage trays.

Real Time Clock

The embedded computer's real-time clock is powered by a lithium battery. We strongly recommend that you **NOT** replace the lithium battery on your own. If the battery needs to be changed, contact the Moxa RMA service team.

ATTENTION

There is a risk of explosion if the wrong type of battery is used. To avoid this potential danger, always be sure to use the correct type of battery. Contact the Moxa RMA service team if you need to replace your battery.

Caution

Dispose of used batteries in a suitable manner. Consult the manufacturer of your battery for more details.

3

Hardware Connection Description

In this chapter, we show how to connect the embedded computers to the network and to a variety of common devices.

The following topics are covered in this chapter:

❑ **Installing the V2616A**

❑ **Wiring Requirements**

    ➢ Connecting the Power

    ➢ Grounding the Unit

❑ **Connecting Data Transmission Cables**

    ➢ Connecting to the Network

    ➢ Connecting to a Serial Device

❑ **Installing a CFast Card**

❑ **Connecting an Audio Input**

❑ **Digital Input/Output**

❑ **Connecting to a VGA Monitor**

❑ **Connecting to a DVI-D Monitor**

❑ **Connecting to the USB Ports**

❑ **Installing an Internal Storage Device**

❑ **Making a Storage Drive Hot-Swappable**

❑ **Upgrading the Memory Module**

❑ **Installing the Mini PCIe Module**

Installing the V2616A

<u>**Wall or Cabinet Mounting**</u>

The V2616A comes with two wall-mounting brackets. Use two screws per side to attach the V2616A to a wall or cabinet.

Screws   Screws
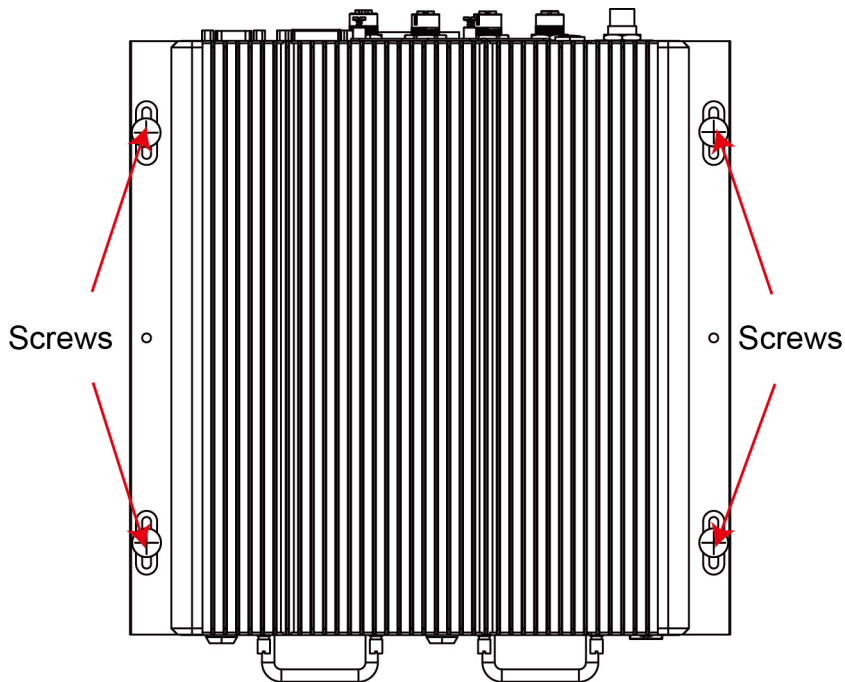
Wiring Requirements

This section describes how to connect peripheral devices to the embedded computer.

You should read and follow these common safety precautions before proceeding with the installation of any electronic device:

• Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.

ATTENTION
Do not run signal or communication wiring together with power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.

• Use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
• Keep input wiring and output wiring separate.
• It is advisable to label the wiring to all devices in the system.

> ⚠️ **ATTENTION**
>
> **Safety First!**
>
> Be sure to disconnect the power cord before installing and/or wiring your V2616A.
>
> **Wiring Caution!**
>
> Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.
>
> If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.
>
> **Temperature Caution!**
>
> Be careful when handling the unit. When the unit is plugged in, the internal components generate heat, and consequently the outer casing may feel hot to the touch.

Connecting the Power

Connect the 24 to 110 VDC power line with M12 connector to the V2616A computer. If the power is supplied properly, the **Ready** LED will glow a solid green after a 25 to 30 second delay.

Grounding the Unit
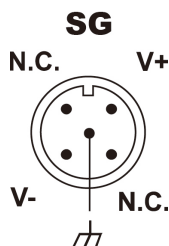
SG: The **Shielded Ground** (sometimes called **Protected Ground**) contact is the central pin of the power input connector. Connect the SG wire to an appropriately grounded metal surface.

Connecting Data Transmission Cables

This section describes how to connect V2616A embedded computers to a network and serial devices.

Connecting to the Network

Two 10/100/1000 Mbps Ethernet ports using M12 X-coded connectors are located on the rear panel.

> ⚠️ **ATTENTION**
>
> There is risk of damage to the M12 X-coded cable due to improper installation or removal.
>
> Before you attach an M12 X-coded cable to an Ethernet port on the V2616A, read the instructions carefully.
>
> The M12 X-coded cable is designed with locking mechanisms to prevent pin misalignment. Make sure that you properly align the indicator and notches when connecting the cable.
>
> Do NOT insert the cable into a port with excessive force.

The following figure shows the Ethernet port location on the rear panel.

PIN	Con.
1	DA+
2	DA−
3	DB+
4	DB−
5	DD+
6	DD−
7	DC−
8	DC+

10/100/1000 Mbps
LAN Port x 2 (M12 X-coded)
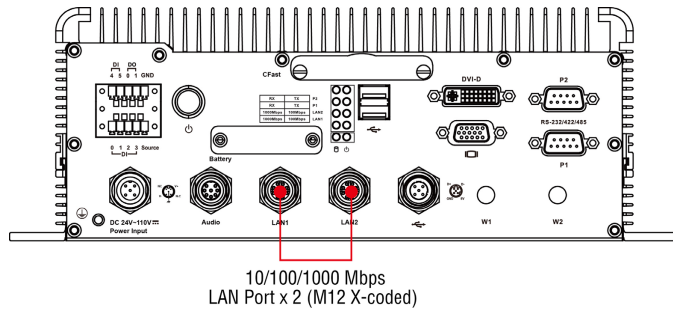
Follow the steps below to connect an M12 X-coded cable:

1. Obtain an M12 X-coded cable.

   The following table shows the Ethernet connector and cable options. For more information, please contact your local Moxa sales representative.

Model Name	Type	Description
CBL-M12XMM8PRJ45-BK-100-IP67	Cable and connector	1-meter X-coded M12-to-RJ45 Cat-5E UTP Gigabit Ethernet cable, 8-pin male M12 connector, IP67-rated.
M12X-8PMM-IP67	Connector	Field-installation X-coded screw-in Gigabit Ethernet connector, 8-pin male, M12 connector, IP67-rated.

NOTE	For best performance and transmission quality, Moxa strongly recommends that you use cables and connectors from Phoenix Contact.

2. Depending on your M12 X-coded cable, orient the cable so that:
   • The indicator on the M12 X-coded cable aligns with the key notch on the port, or

   • The notch on the M12 X-coded cable pin core aligns with the notch on the port socket.

Schematic diagram   Schematic diagram
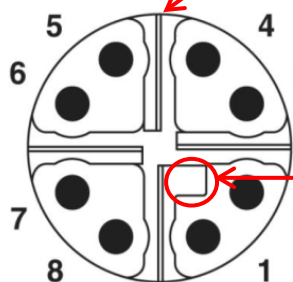
Pin assignment of M12 plug, 8-pos., X-coded, pin side view
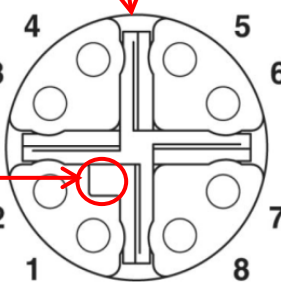
M12 socket pin assignment, 8-pos, view of socket side

3. Connect the M12 X-coded cable to the port.

NOTE   Do NOT push the M12 X-coded cable into the port with excessive force.

4. Turn to tighten the interlock screw without using a mechanical tool (such as a screw wrench).

Aligned

Interlock screw
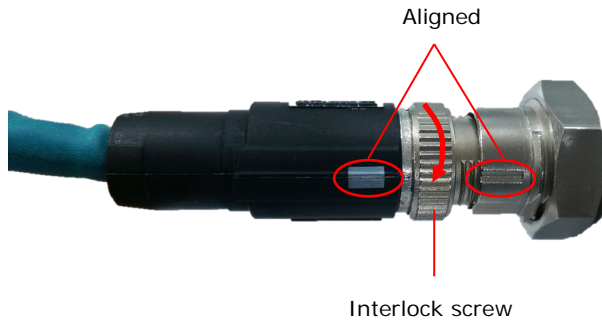
Connecting to a Serial Device

Use a serial cable to plug your serial device into the embedded computer's serial port. Serial ports P1 to P2 have male DB9 connectors and can be configured for RS-232, RS-422, or RS-485 using software. The pin assignments are shown in the table at the top of the next page.

Serial Port x 2
(RS-232/422/485)

DB9 Male Port

1 2 3 4 5

6 7 8 9
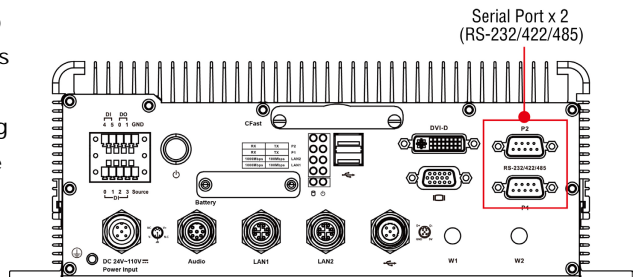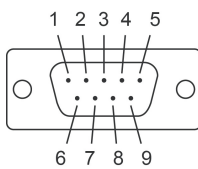
RS-232/422/485 Pinouts

Pin	RS-232	RS-422	RS-485-4W	RS-485-2W
1	DCD	TxDA(-)	TxDA(-)	–
2	RxD	TxDB(+)	TxDB(+)	–
3	TxD	RxDB(+)	RxDB(+)	DataB(+)
4	DTR	RxDA(-)	RxDA(-)	DataA(-)
5	GND	GND	GND	GND
6	DSR	–	–	–
7	RTS	–	–	–
8	CTS	–	–	–

NOTE   This is the pin assignment for the computer-side connectors on the V2616A. If you are wiring peripheral-side connectors for a serial cable, you will need to match the pin assignment.

Installing a CFast Card

The V2616A embedded computers come with a CFast card socket. To install a card, follow these instructions:

1. Disconnect the V2616A from its power source.
2. The CFast socket is located on the center of the rear panel. Unscrew the CFast socket cover.

3. Insert the CFast card into the socket. Make sure you insert it in the correct direction. When finished, fasten the socket cover with screws.

4. If you need to remove the CFast card, simply push the card inward to activate the spring-locking mechanism, and gently remove it once it pops out.

ATTENTION

The V2616A embedded computer does not support the CFast hot swap and PnP (Plug and Play) functions. Please remember you **must** cut power first, before inserting or removing the CFast card.

In addition, please note that the operating system of the V2616A (Linux or Windows Embedded Standard 7) is stored on the CFast card, so if you change out the card you will need to re-install the operating system. For details on how to automate this, refer to the **System Recovery** section of the V2616A software manual.

Connecting an Audio Input

The V2616A comes with an M12 X-coded audio input/output connector, allowing users to connect a speaker or an earphone.

Pin	Audio
1	Line-in, right
2	GND
3	Line in plug-in detected
4	Line-in, left
5	Line-out, left
6	Line out, plug-in detected
7	Line-out, right
8	GND
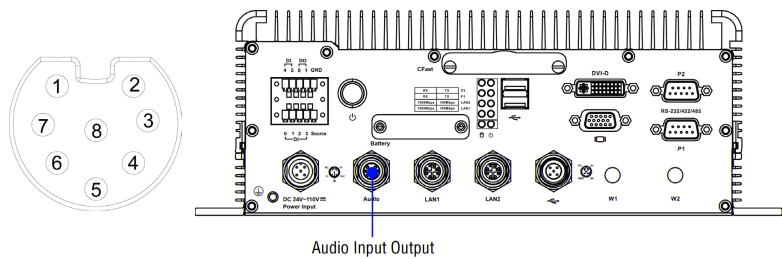
Audio Input Output

NOTE   This is the pin assignment for the computer-side connectors on the V2616A shell. If you are wiring peripheral-side connectors for an audio cable, you will need to **mirror** the pin assignment.

Digital Input/Output

The V2616A comes with a 6-ch digital input and a 2-ch digital output through a terminal block connector. The pin assignments and the wiring methods are shown below.

DI Wiring: Dry Contact   **DI Wiring: Wet Contact**   **DO Wiring: Dry Contact**
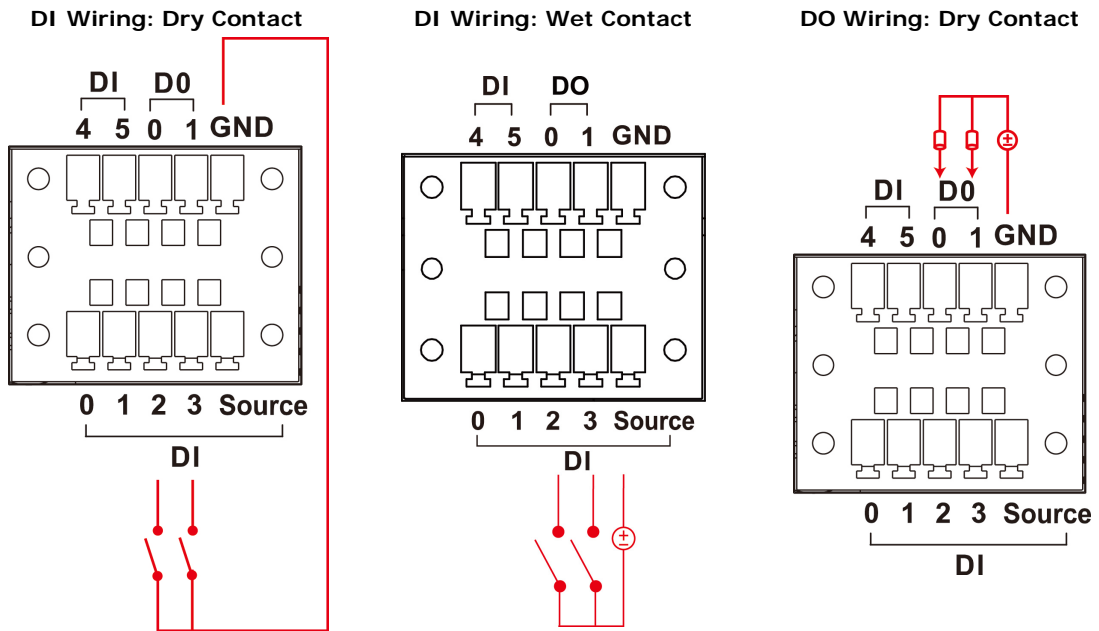
NOTE   If you are using wet contacts, you must connect **source** to power. In addition, both DI and DO can only be wired as **sink** type**s**

Connecting to a VGA Monitor

The V2616A comes with a D-Sub 15-pin female connector on the front panel to connect a VGA monitor. To ensure that the monitor image remains clear, be sure to tighten the monitor cable after connecting it to the V2616A. The location and the pin assignments of the video outputs are shown in the diagram below.

DB15 Female Connector
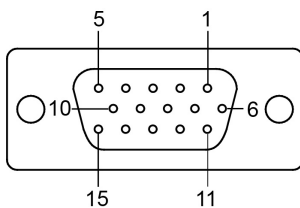
Pin No.	Signal Definition		Pin No.	Signal Definition
1	Red		9	VCC
2	Green		10	GND
3	Blue		11	NC
4	NC		12	DDC2B Data
5	GND		13	HSYNC
6	GND		14	VSYNC
7	GND		15	DDC2B Clock
8	GND			
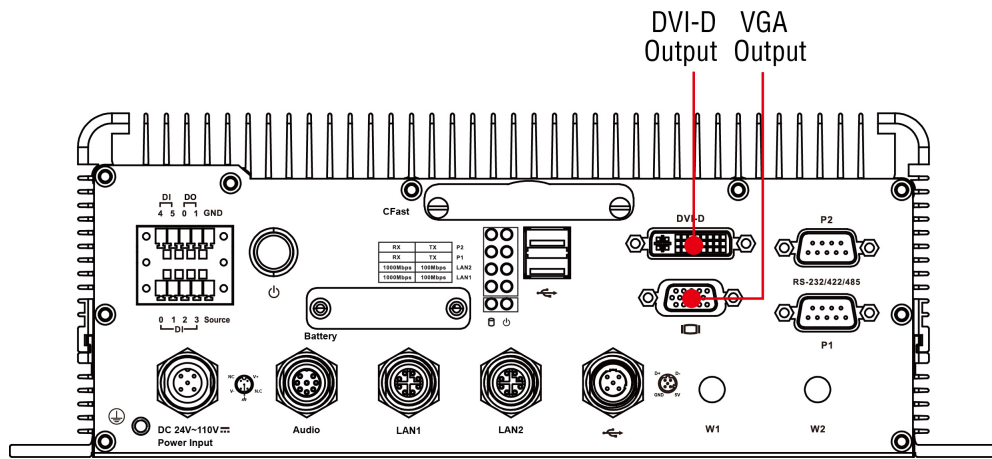
Connecting to a DVI-D Monitor

The V2616A computer also comes with a DVI-D output for DVI video. Use the cable to connect the DVI-D output to the monitor; if you must rewire a cable, refer to the following table for pin assignments.

DVI-D Connector
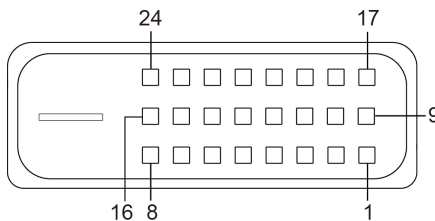
Pin	Signal Definition	Pin	Signal Definition
1	T.M.D.S. Data2-	13	N/C
2	T.M.D.S. Data2+	14	+5V Power
3	T.M.D.S. Data2 Shield	15	Ground (return for +5V, HSync, and VSync)
4	N/C	16	Hot Plug Detect
5	N/C	17	T.M.D.S. Data0-
6	DDC Clock	18	T.M.D.S. Data0+
7	DDC Data	19	T.M.D.S. Data0 Shield
8	N/C	20	N/C
9	T.M.D.S. Data1-	21	N/C
10	T.M.D.S. Data1+	22	T.M.D.S. Clock Shield
11	T.M.D.S. Data1 Shield	23	T.M.D.S. Clock+
12	N/C	24	T.M.D.S. Clock-

Connecting to the USB Ports

On its rear panel the V2616A has an X-coded M12 USB 2.0 port, as well as 2 type A USB 2.0 ports. The hosts can be used for an external flash disk or hard drive for storing large amounts of data. You can also use these USB hosts to connect to a keyboard or a mouse. See the following figures for the locations of the USB ports and the M12 X-coded connector pin assignment.

Pin	USB
1	D+
2	D-
3	+5V
4	GND
5	N.C.
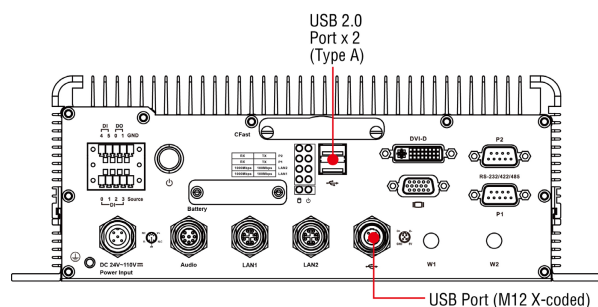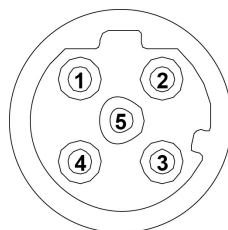
NOTE   This is the pin assignment for the computer-side USB ports on the V2616A shell. If you are wiring peripheral-side connectors for a USB cable, you will need to **mirror** the pin assignment.

Installing an Internal Storage Device

The V2616A computer comes with an internal storage tray that allows users to install a 2.5-inch SATA storage device, such as a hard disk or a SSD drive. Take the following steps to install your storage device.

1. Remove the 6 screws from the V2616A's rear panel.
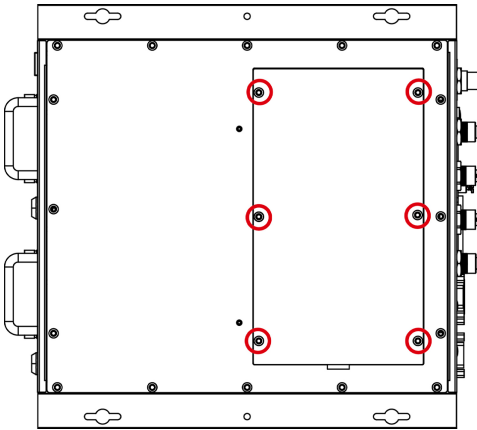
2. Install the hard disk onto the internal storage kit. Connect the cable and connector.

3. Fasten the two screws on each side of the hard disk (total of four).

4. Install the storage kit into the V2616A computer. Fasten four screws on the kit, and connect the cable the power onto the V2616A's main board.
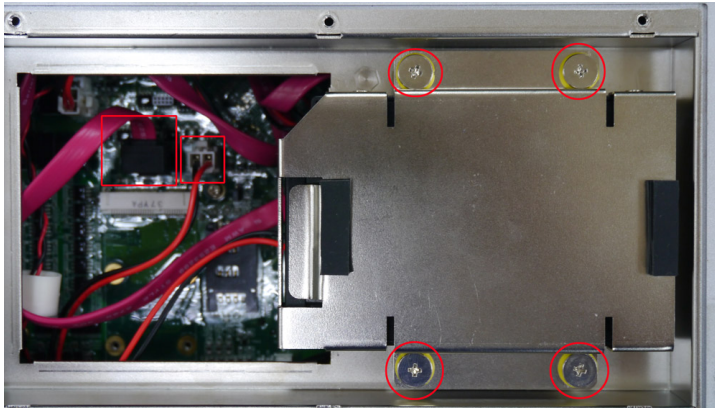
5. Replace the cover onto the back of the computer.

Making a Storage Drive Hot-Swappable

V2616A computers come with 2 faceplates over the storage drive trays; users may attach storage drives to the faceplates to install additional storage media, such as hard disks (HDD) or solid-state drives (SSD). The following section gives instructions for installing the storage devices into the hot-swap trays.

1. The two faceplates on the front panel of the V2616A may be locked, for extra storage security.
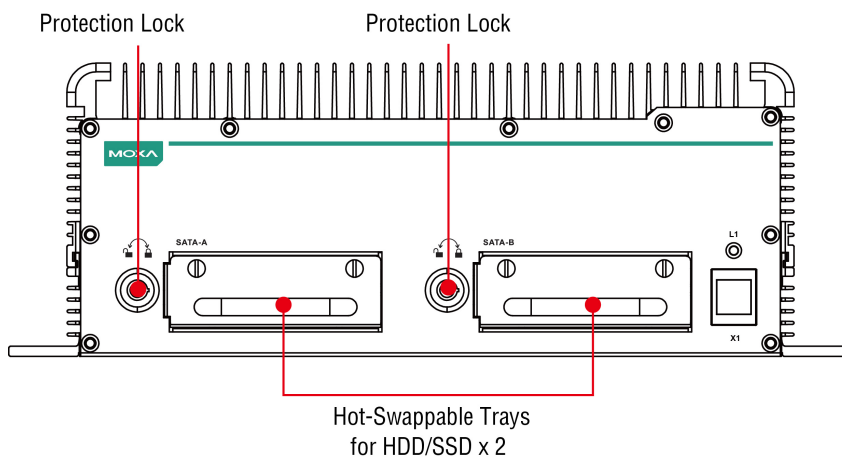
2. Rotate the key counterclockwise to unlock the protection lock.

3. Pull out the faceplate by unscrewing the thumbscrews in the upper corners, and then remove the plate. Fasten the storage drive to the faceplate flange as shown below, using the two flathead screws that were shipped with your V2616A.
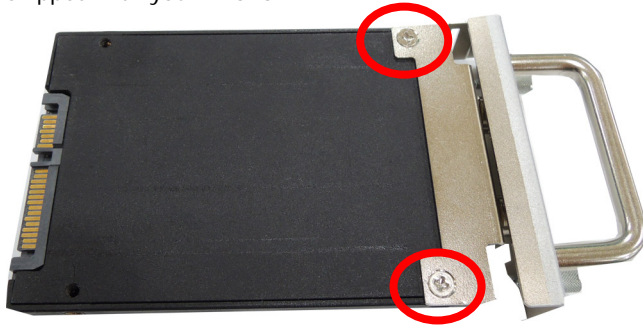
> ### ATTENTION
>
> To successfully fit the disk into the slot, use the flathead screws to fasten the hard disk to the tray.
>
> *Do not* use the roundhead screws, since they may prevent you from being able to insert the tray into the slot.
>
> Roundhead   Flathead

4. Carefully align the drive with the drive slot, and gently insert the drive into the computer, taking care that it slides smoothly and firmly into the SATA mounts.

5. When finished, turn the key clockwise to activate the lock and tighten the thumbscrews. Use the same method to install a hard disk in second storage tray.

As these are hot-swappable storage trays, you can replace the storage disks while the computer is still powered on. Follow these steps:

1. Push the hot-swap button, located on the lower right of the front panel.
2. Observe the L1 LED indicator (marked in the diagram below). When the LED starts blinking, the system will start to unmount the storage disk.
3. When the LED stops blinking, you may remove the storage drive.

L1 LED Indicator

Hot-Swap Button
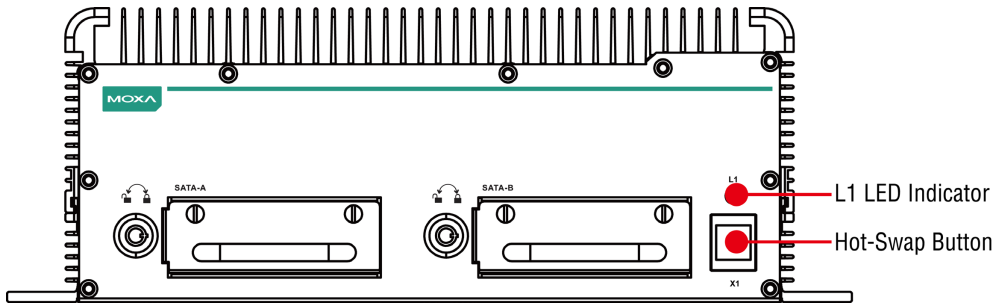
Upgrading the Memory Module

V2616A embedded computers come with two 204-pin, DDR3-1600 SODIMM memory slots that can provide up to 16 GB of memory. One 4 GB memory module is installed at the factory. To upgrade a memory module, follow these instructions:

1. Disconnect the V2616A from the power source.
2. Remove the 21 screws that secure the back panel to the case. See the following figure for details.
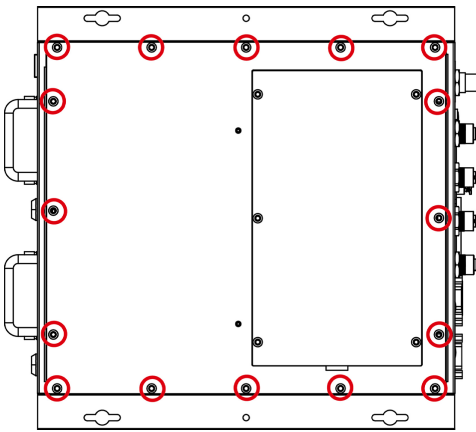
3. Pull up the back cover of the computer; you will now see the memory sockets on the main board.
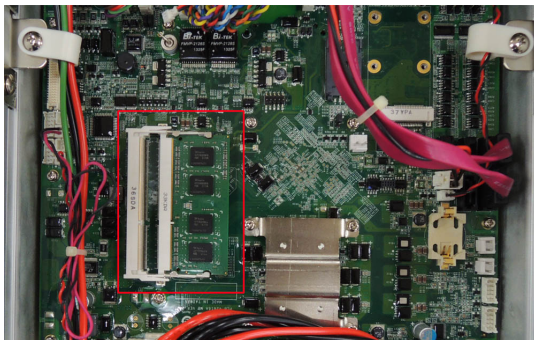
4. Carefully remove the module by pushing the latches on both sides of the module, freeing it to be removed.
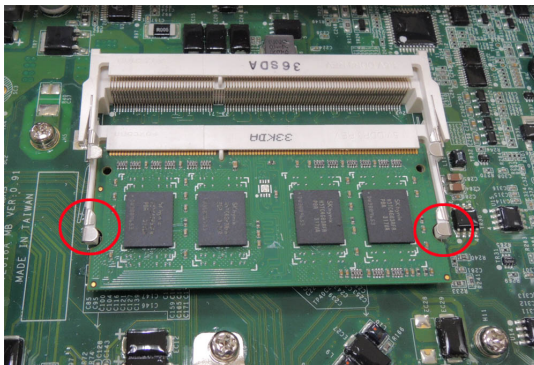
5. After removing the memory card, install the new module by gently but firmly inserting it into the RAM slot. Before securing the card in place, be sure you have aligned the indentations on each side of the card with the mechanical locks that will hold it in place (shown at right, in the red circles).

    Once the card is properly aligned, gently push the card down, until it locks in place. You should hear an audible click; before continuing, make sure the latches are firmly in place.
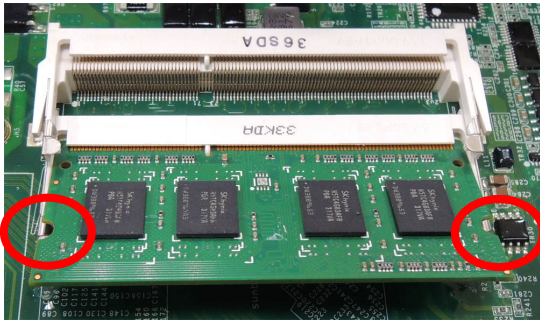
6. When finished, replace the back cover of the V2616A computer.

Installing the Mini PCIe Module

The V2616A computer comes with a mini PCIe socket, allowing users to install a mini PCIe module like those used for cellular communications. Follow these steps to installation a module.

1. Pull up the back cover of the computer; you will be able to see the mini PCIe socket on the main board.
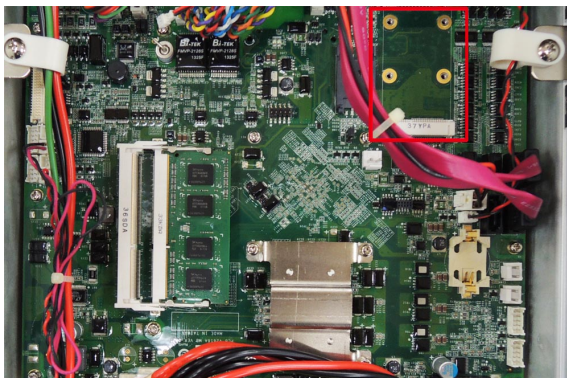
2. Install the module into the socket. Fasten two screws on one end of the module. In addition, pull up the SIM card holder beside the socket.
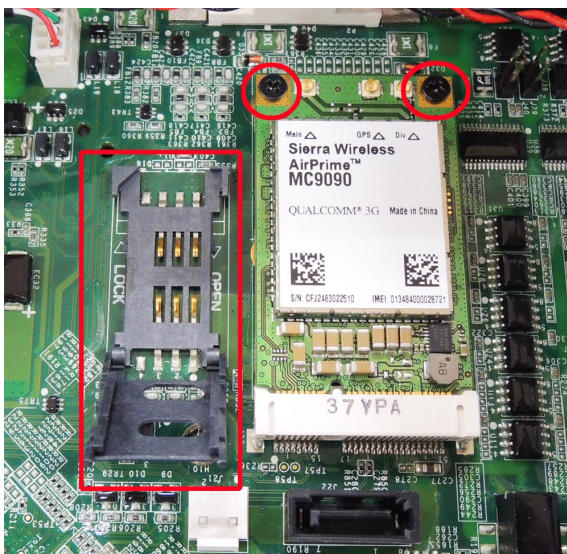
3. Insert the SIM card in the holder by first dropping the holder into place (flush with the board), and then locking it down by sliding it into place.

4. Connect the cellular antenna cable to the module.

5. Pass the connector of the antenna cable through the antenna hole on the rear panel of the computer. You may use either the W1 or W2 hole. Pass the locking washer over the outer end of the connector first, and then fasten the nut to lock the connector against the face of the computer.
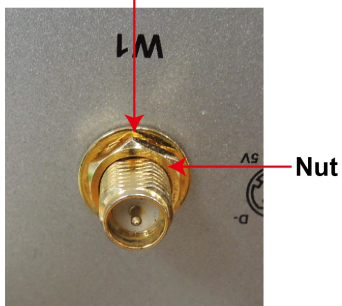
NOTE	The cellular module, cable, connector, and antenna are not included in the product package, and must be purchased separately.

4

BIOS Setup

In this chapter, we describe the V2616A computer's BIOS settings. The BIOS is a set of input/output control routines for peripherals. The BIOS is used to initialize basic peripherals and help boot the operating system before the operating system is loaded. The BIOS setup allows the user to modify the system configurations of these basic input/output peripherals. All of the configurations are stored in the CMOS RAM, which receives power from a backup battery when the computer is not receiving power from an external power source. The system information will be retained after the system reboots or the power is disconnected.

The following topics are covered in this chapter:

❏ **Entering the BIOS Setup**

❏ **Main Information**

❏ **Advanced Settings**

  ➢ Boot Configuration

  ➢ HDC Configuration

  ➢ Video Configuration

  ➢ Chipset Configuration

  ➢ PCI Express Configuration

  ➢ Hardware Monitor

  ➢ SMART RECOVERY Info

❏ **Security Settings**

  ➢ Set Supervisor Password

❏ **Power Settings**

  ➢ Turbo Mode

  ➢ Auto Wake on S5

  ➢ Wake on LAN

❏ **Boot Settings**

  ➢ Boot Type

  ➢ PXE Boot to LAN

  ➢ Add Boot Options

  ➢ USB Boot

  ➢ EFI Device First

  ➢ Boot Delay Time

  ➢ Legacy

❏ **Exit Settings**

  ➢ Exit Saving Changes

  ➢ Save Change Without Exit

  ➢ Exit Discarding Changes

  ➢ Load Optimal Defaults

  ➢ Load Custom Defaults

  ➢ Save Custom Defaults

  ➢ Discard Changes

❏ **Upgrading the BIOS**

Entering the BIOS Setup

To enter the BIOS setup utility, press the **F2** key while the system is booting up. The main **BIOS Setup** screen will appear. You will see four options:

Continue: Continue to boot up
Boot Manager: Select the device to boot up
Boot From File: Select the UEFI boot up file
SCU: Enter the BIOS configuration.

Click **SCU** to enter the **BIOS configuration**.
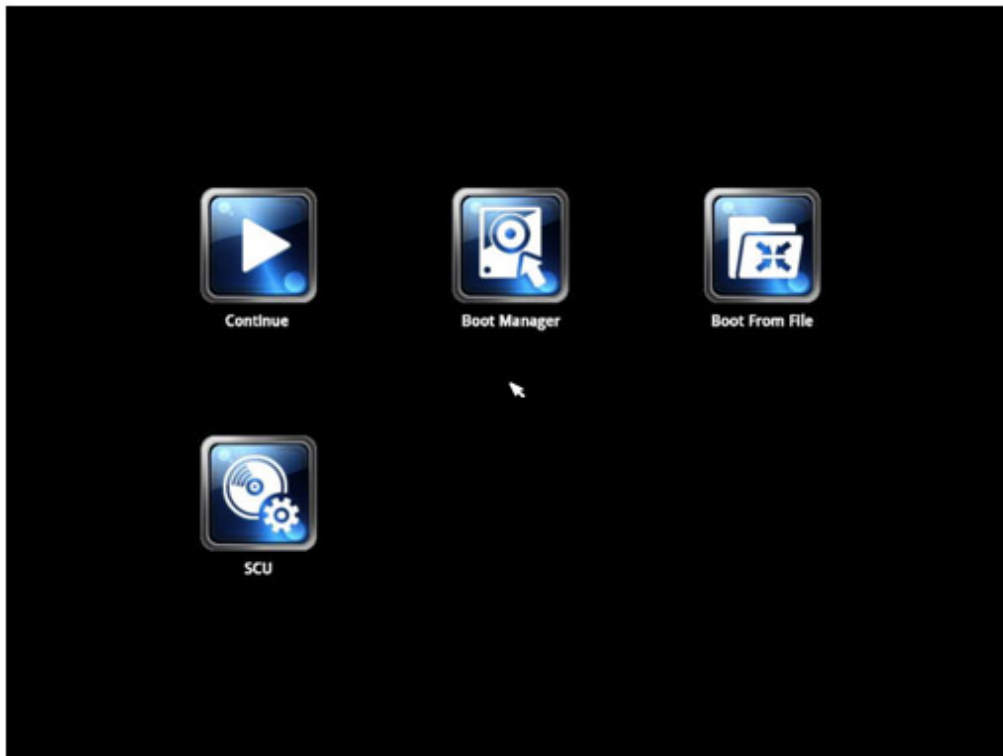
When you click SCU, a basic description of each function key will be listed at the bottom of the screen. Refer to these descriptions to learn how to use them.

F1: General Help
F5/F6: Change Values
F9: Setup Defaults
F10: Save and Exit
↑↓: Select Item
← →: Select Menu
ESC: Exit
ENTER: Select or go to Submenu.

Main Information

The main page shows basic system information, including model name, BIOS version, and CPU type.

```
                          InsydeH2O Setup Utility                    Rev. 3.7
 Main  Advanced  Security  Power  Boot  Exit

 MODEL NAME               V2616A                      This is the help for the hour, minute,
 BIOS Version             V1.00S10                    second field. Valid range is from 0 to
 Processor Type           Intel(R) Core(TM) i7-3517UE CPU @ 1.70GHz  23, 0 to 59, 0 to 59. INCREASE/REDUCE : +
 System Bus Speed         100 MHz                     /-.
 System Memory Speed      1600 MHz
 Cache RAM                256 KB
 Total Memory             4096 MB
 System Time              [21:14:15]
 System Date              [03/12/2012]




 F1  Help         ↑↓ Select Item      F5/F6 Change Values       F9  Setup Defaults
 Esc Exit         ↔ Select Menu       Enter Select ▶ SubMenu    F10 Save and Exit
```

Note: "Processor Type" depends on which product model you are using.

Advanced Settings

The **Advanced Features** screen will appear when you select "Advanced" from the main menu.

```
                          InsydeH2O Setup Utility                    Rev. 3.7
 Main  Advanced  Security  Power  Boot  Exit

                                                      Configures Boot Settings.
 ▶Boot Configuration
 ▶HDC Configuration
 ▶Video Configuration
 ▶Chipset Configuration
 ▶PCI Express Configuration
 ▶Hardware Monitor
 ▶SMART RECOVERY Info

        .




 F1  Help         ↑↓ Select Item      F5/F6 Change Values       F9  Setup Defaults
 Esc Exit         ↔ Select Menu       Enter Select ▶ SubMenu    F10 Save and Exit
```

Boot Configuration

This item allows you to configure the initial status of the Numlock key when the computer boots up.

```
                                    InsydeH20 Setup Utility                              Rev. 3.7
         Advanced

  Boot Configuration                                            Selects Power-on state for Numlock

  Numlock                              <On>




  F1  Help            ↑↓ Select Item      F5/F6 Change Values        F9   Setup Defaults
  Esc Exit            ↔  Select Menu      Enter Select ▶ SubMenu     F10  Save and Exit
```
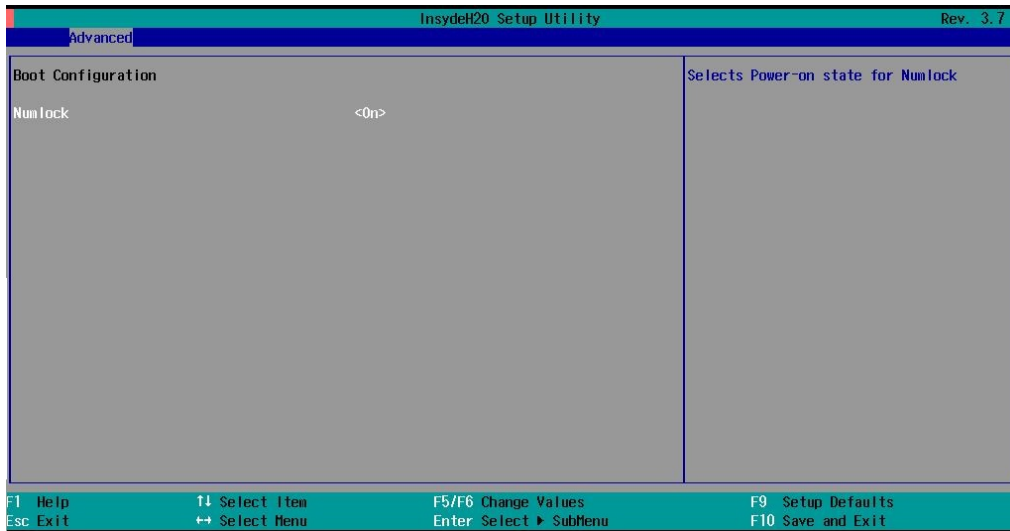
Options: On (default), Off

HDC Configuration

The host drive controller can be configured for IDE or AHCI mode (default).

When AHCI mode is selected, the following screen will appear.

```
                                    InsydeH20 Setup Utility                              Rev. 3.7
         Advanced

  HDC Configuration                                             Set Harddisk Controller Configure Type

  HDC Configure As                     <AHCI>
  AHCI SALP                            <Enabled>
  SATA Port 0 HotPlug                  <Disabled>
  SATA Port 1 HotPlug                  <Enabled>
  SATA Port 2 HotPlug                  <Enabled>
  SATA Port 3 HotPlug                  <Enabled>
  SATA Port 4 HotPlug                  <Enabled>

  ▶Serial ATA Port 0      [Not Installed]
  ▶Serial ATA Port 1      [Not Installed]
  ▶Serial ATA Port 2      [Not Installed]
  ▶Serial ATA Port 3      [Not Installed]
  ▶Serial ATA Port 4      [Not Installed]




  F1  Help            ↑↓ Select Item      F5/F6 Change Values        F9   Setup Defaults
  Esc Exit            ↔  Select Menu      Enter Select ▶ SubMenu     F10  Save and Exit
```

Serial ATA Port 0 to 4

This setting allows you to display information about the installed drives.

AHCI SALP

Note that the "AHCI SALP" setting will only appear when AHCI mode is selected. This item allows you to enable aggressive **link power management** (SALP) in AHCI. SALP enables the host bus adapter to conserve power by directly detecting when a SATA drive is no longer processing information and then immediately shifting it into suspended or sleep mode without waiting for software processes to initiate a power-down process. Host Capability Register bit 26.

Options: Enabled (default), Disabled

SATA Port 0 to 4—HotPlug

This item allows you to enable/disable hotplug capabilities (the ability to remove the drive while the computer is running) for installed storage drives.

Options: Disabled (default for Port 0), Enabled (default for Port 1 to Port 4)

Video Configuration

This item allows you to configure the Internal Graphics Device (IGD) for things like memory allocation (**DVMT**).

```
                            InsydeH20 Setup Utility                           Rev. 3.7
      Advanced

 Video Configuration                                      Internal Graphic Device Options

 ▶ Internal Graphic Device






















 F1  Help            ↑↓ Select Item       F5/F6 Change Values         F9  Setup Defaults
 Esc Exit            ↔ Select Menu        Enter Select ▶ SubMenu      F10 Save and Exit
```
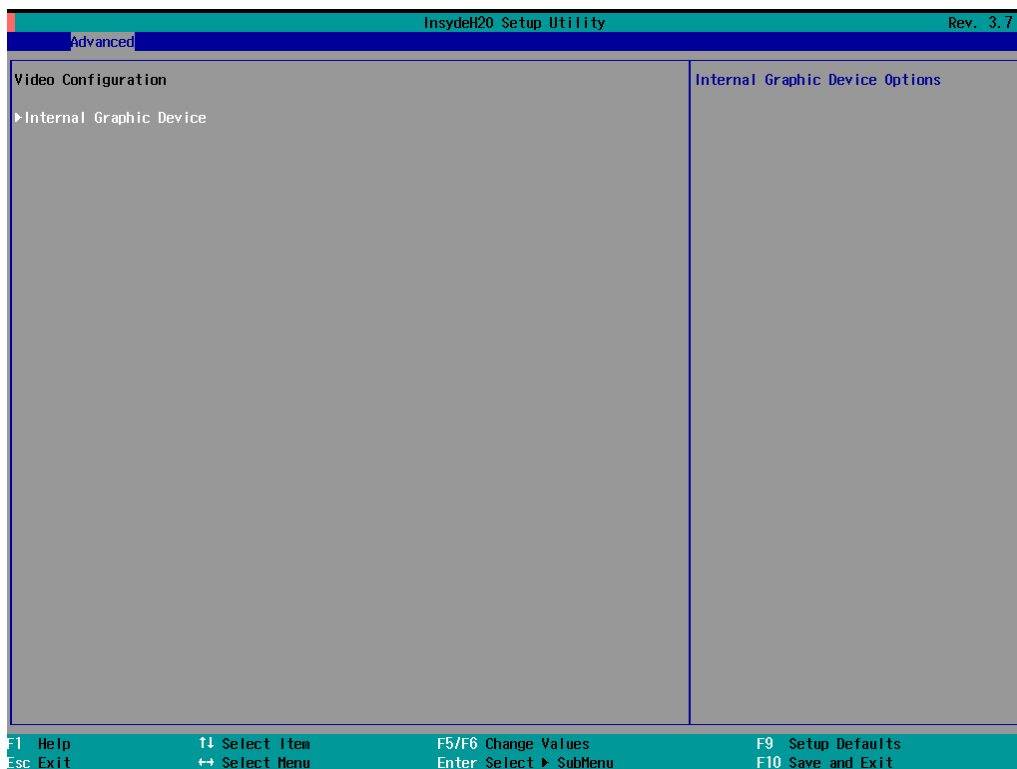
Internal Graphics Device

This option allows you to enable/disable the internal graphics device.

```
                            InsydeH20 Setup Utility                              Rev. 3.7
      Advanced
 Internal Graphic Device                                    Select DVMT5.0 Pre-Allocated(Fixed)
                                                            Graphics Memory size used by the Internal
 IGD - DVMT Pre-Allocated            <64 MB>                 Graphics Device.
 IGD - DVMT Size                     <256 MB>
 IGD - Boot Type                     <VBIOS Default>




 F1  Help              ↑↓ Select Item        F5/F6 Change Values         F9  Setup Defaults
 Esc Exit              ↔  Select Menu         Enter Select ▶ SubMenu      F10 Save and Exit
```

IGD—DVMT Pre-Allocated

This item allows you to configure the pre-allocated memory capacity of the IGD. Pre-allocated graphics memory is invisible to the operating system.

Options: 64 MB (default), 32 MB, 96 MB, 128 MB, 256 MB, 512 MB

DVMT is a BIOS solution where "the optimum amount of memory is dynamically allocated and de-allocated as needed for balanced graphics and system performance, through Intel® Direct AGP and a highly efficient memory utilization scheme. DVMT ensures the most efficient use of available system memory resources for maximum 2D/3D graphics performance.

IGD—DVMT Size

This item allows you to configure the maximum amount of memory DVMT will use when allocating additional memory for the IGD.

Options: 256 MB (default), 128 MB, Max

IGD—Boot Type

This item allows you to select the video device activated during POST.

Options: VBIOS Default (default), VGA, DVI

Chipset Configuration

This item allows you to configure the chipset settings.

```
                              InsydeH20 Setup Utility                              Rev. 3.7
     Advanced

 Chipset Configuration                                        This item can't mask chipset 4 seconds
                                                              force shutdown function
 Setup Warning:
 Setting items on this screen to incorrect values
 may cause your system to malfunction!

 Power ON after Power Fail            <ON>
 Power Button                         <Enabled>
 DIO Set as                           <Digital Input>
 DO-0 Level                           <High>
 DO-1 Level                           <High>

 F1  Help           ↑↓ Select Item      F5/F6 Change Values      F9  Setup Defaults
 Esc Exit           ↔  Select Menu      Enter Select ▶ SubMenu   F10 Save and Exit
```

Power ON after Power Fail

This item allows you to configure whether or not the computer automatically powers up after a system crash. When set to ON, the computer will automatically power up after a system crash; when set to OFF, it won't automatically power up after a system crash.

Options: ON (default), OFF

Power Button

This item allows you to enable/disable the power button. If the power button is enabled, you can press the power button to power on or power off the computer. If the power button is disabled, you will need to press the power button for more than four seconds to power off the computer.

Options: Enabled (default), Disabled

DIO Set as

This item allows you to set the DIO as Digital Input or Reset.

Options: Digital Input (default), Reset#

DO-0 Level

This item allows you set the DO-0 as high or low.

Options: High (default), Low

DO-1 Level

This item allows you set the DO-1 as high or low.

Options: High (default), Low.

PCI Express Configuration
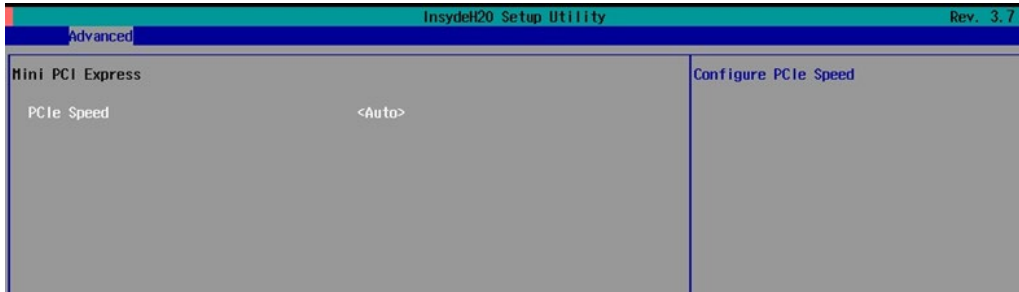
PCIe Speed

This item allows you to configure the speed of the mini PCIe interface.

Options: Auto (default), Gen1, Gen2

Hardware Monitor

This item allows you to view voltage levels, system temperature, and CPU temperature.
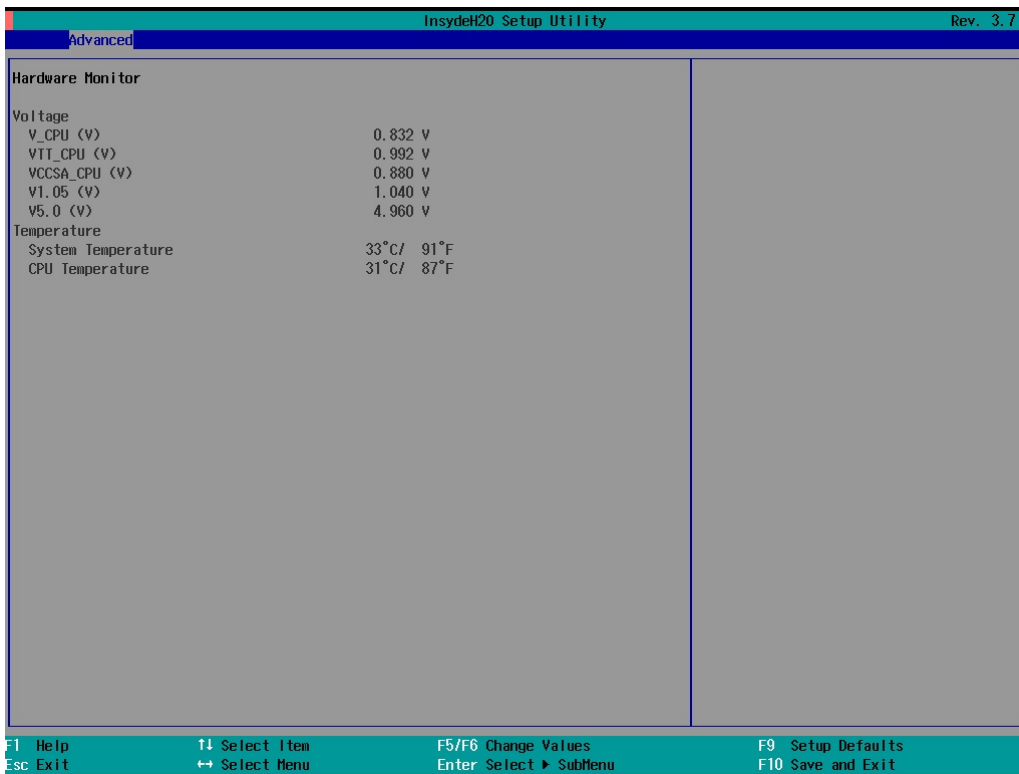
Note that the voltage values are different for different models. The temperature readings shown on the screen are within ±5% of the actual readings. However, the temperature readings are only valid when the ambient temperature is above 0°C.

SMART RECOVERY Info

This item allows you to view Smart Recovery information.

```
                              InsydeH20 Setup Utility                          Rev. 3.7
       Advanced
 SMART RECOVERY Info                                          Load SMART RECOVERY Default to [Manual
                                                             Recovery using USB] MODE, Port to [Any
 SMART RECOVERY Mode           Manual Recovery using USB     USB port]. Please notice that smart
 Port                          Any USB port                  recovery doesn't support RAID mode
 Load SMART RECOVERY Default



                                 .







 F1  Help              ↑↓ Select Item        F5/F6 Change Values          F9   Setup Defaults
 Esc Exit              ↔ Select Menu         Enter Select ▶ SubMenu       F10  Save and Exit
```

Load SMART RECOVERY Default

This item allows you to load the Smart Recovery default value. Refer to the Smart Recovery Website: http://www.moxa.com/product/Smart-Recovery.htm for details

Options: Yes (default), No

Security Settings

This section allows users to configure a supervisor password.

```
                              InsydeH20 Setup Utility                          Rev. 3.7
 Main  Advanced  Security  Power  Boot  Exit
                                                             Install or Change the password and the
 Supervisor Password           Not Installed                length of password  must be greater than
                                                             one character.
 Set Supervisor Password


```

Set Supervisor Password

This item allows you set the supervisor password. Type in the new password, and then retype the password again to confirm.

To delete the password, enter **Set Supervisor Password** using the existing password. Next, leave the new password fields blank, and then press enter.

```
              Set Supervisor Password

 Please type in your new password    [            ]
 Please confirm your new password    [            ]
```

Power Settings

The section allows you to configure power settings.

```
                        InsydeH20 Setup Utility                          Rev. 3.7
   Main  Advanced  Security  Power  Boot  Exit

                                                     Enable processor Turbo Mode.

   Turbo Mode                    <Enabled>

   Auto Wake on S5               <Disabled>
   Wake on LAN                   <Enabled>

















 F1  Help              ↑↓ Select Item       F5/F6 Change Values        F9  Setup Defaults
 Esc Exit              ↔  Select Menu        Enter Select ▶ SubMenu     F10 Save and Exit
```

Turbo Mode

This item allows you to enable or disable the Intel CPU Turbo Boost technology.

Options: Enabled (default), Disabled.

Auto Wake on S5

This item allows you to configure the computer to wake from S5 status. S5 stands for Soft Off, where the PSU remains engaged but power to all other parts of the system is cut. Auto-wake on S5 schedules a soft-reboot at certain periodic times, which can be specified in the BIOS.

Options: Disabled (default); By Every Day (user specifies at what time each day the computer will power up); By Day of Month (user specifies which day of each month the computer will power up)

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                          InsydeH20 Setup Utility                  Rev. 3.7   │
├─────────────────────────────────────────────────────────────────────────────┤
│ Main  Advanced  Security  Power  Boot  Exit                                  │
│                                                                              │
│                                                   Auto wake on S5, By Day of Month or Fixed │
│                                                      time of every day        │
│  Turbo Mode                      <Enabled>                                   │
│                                                                              │
│  Auto Wake on S5                 <By Every Day>                              │
│     Wake on S5 Time              [00:00:00]                                  │
│  Wake on LAN                     <Enabled>                                   │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
├─────────────────────────────────────────────────────────────────────────────┤
│ F1  Help        ↑↓ Select Item      F5/F6 Change Values        F9  Setup Defaults │
│ Esc Exit        ↔ Select Menu       Enter Select ▶ SubMenu     F10 Save and Exit  │
└─────────────────────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                          InsydeH20 Setup Utility                  Rev. 3.7   │
├─────────────────────────────────────────────────────────────────────────────┤
│ Main  Advanced  Security  Power  Boot  Exit                                  │
│                                                                              │
│                                                   Auto wake on S5, By Day of Month or Fixed │
│                                                      time of every day        │
│  Auto Wake on S5                 <By Day of Month>                           │
│     Wake on S5 Time              [00:00:00]                                  │
│     Day of Month                 [1]                                         │
│  Wake on LAN                     <Enabled>                                   │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
│                                                                              │
├─────────────────────────────────────────────────────────────────────────────┤
│ F1  Help        ↑↓ Select Item      F5/F6 Change Values        F9  Setup Defaults │
│ Esc Exit        ↔ Select Menu       Enter Select ▶ SubMenu     F10 Save and Exit  │
└─────────────────────────────────────────────────────────────────────────────┘
```
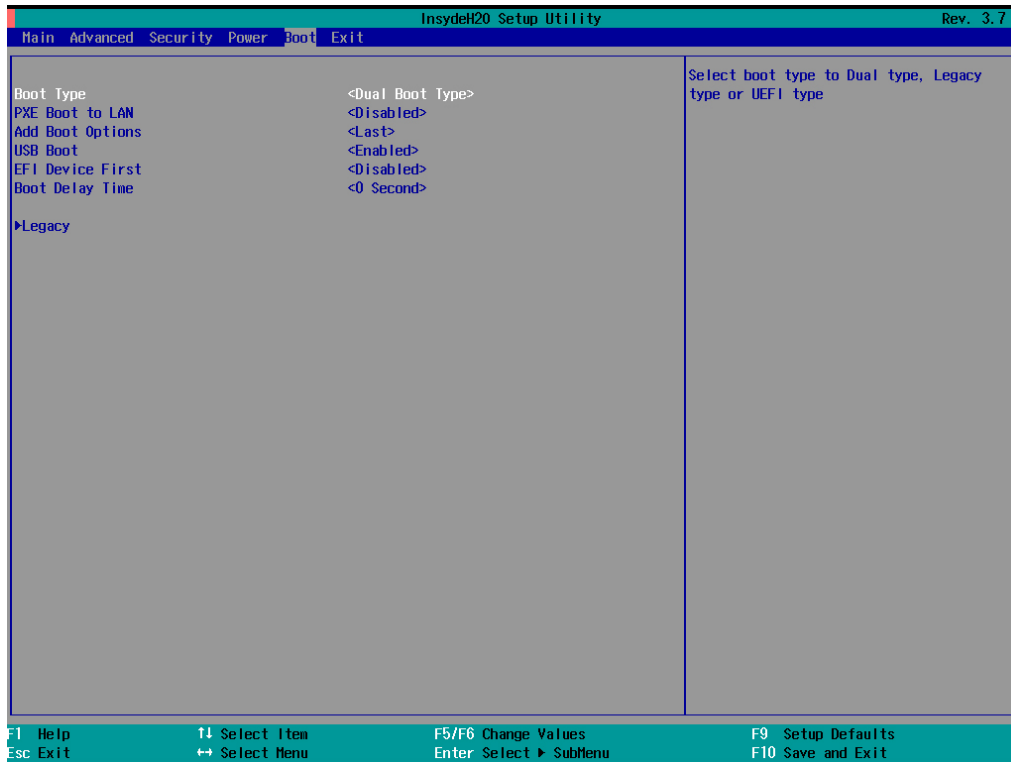
Wake on LAN

This feature is used to wake the system over the LAN from a remote host.

Options: Enabled (default), Disabled.

Boot Settings

The section allows users to configure boot settings.

```
                              InsydeH20 Setup Utility                              Rev. 3.7
 Main  Advanced  Security  Power  Boot  Exit

                                                        Select boot type to Dual type, Legacy
 Boot Type                        <Dual Boot Type>      type or UEFI type
 PXE Boot to LAN                  <Disabled>
 Add Boot Options                 <Last>
 USB Boot                         <Enabled>
 EFI Device First                 <Disabled>
 Boot Delay Time                  <0 Second>

 ▶Legacy




 F1  Help            ↑↓ Select Item      F5/F6 Change Values       F9  Setup Defaults
 Esc Exit            ↔ Select Menu       Enter Select ▶ SubMenu    F10 Save and Exit
```

Boot Type

This item allows you to enable/disable the quick boot function.

Options: Dual Boot Type (default), Legacy Boot Type, UEFI Boot Type

PXE Boot to LAN

This item allows you to enable/disable the PXE boot to LAN function.

Options: Disabled (default), Enabled

Add Boot Options

This item allows you to add boot order options for new boot devices on and removable devices, such as a USB drive.

Options: Last (default), First

USB Boot

This item allows you to enable/disable USB boot function..

Options: Enabled (default), Disabled

EFI Device First

This item allows you to determine if the EFI device boots first or the legacy device boots first. If enabled, the EFI device will boot first; if disabled, the legacy device will boot first.

Options: Disabled (default), Enabled

Boot Delay Time

This item allows you to configure the delay time during which users can enter a hot key during POST time.

Options: 0 Second (default), 3 Seconds, 5 Seconds, 10 Seconds

Legacy

Normal Boot Menu

This item allows you to configure the boot menu.
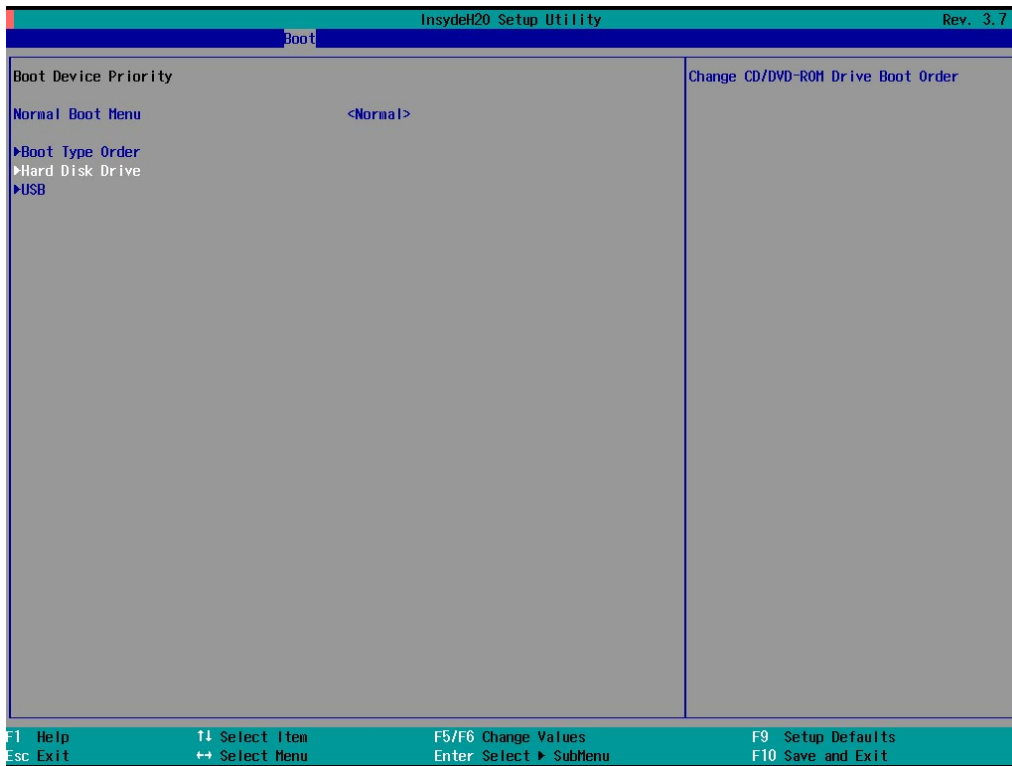
Options: Normal (default), Advance

Boot Type Order

This item allows you to select the boot order. To change values, use the "-" or "F5" key to move down, and the "+" or "F6" key to move up.

Options: Hard Disk Drive (default), CD/DVD-ROM Drive, USB, Others

Hard Disk Drive/USB Drive

This item allows you to view installed devices, such as hard disk drives, USB drives, and CD-ROMs. For example, if you have inserted a USB drive into the computer, it will appear here. You can view and select boot order in the same type storage.

```
                              InsydeH20 Setup Utility                        Rev. 3.7
                        Boot

Boot Device Priority                                    Change CD/DVD-ROM Drive Boot Order

Normal Boot Menu                    <Normal>

▶Boot Type Order
▶Hard Disk Drive
▶USB




F1  Help              ↑↓ Select Item      F5/F6 Change Values        F9  Setup Defaults
Esc Exit              ↔  Select Menu       Enter Select ▶ SubMenu     F10 Save and Exit
```

Exit Settings

The section gives several options for exiting the BIOS environment.

```
                              InsydeH20 Setup Utility                        Rev. 3.7
  Main  Advanced  Security  Power  Boot  Exit

Exit Saving Changes                                     Exit system setup and save your changes.
Save Change Without Exit
Exit Discarding Changes
Load Optimal Defaults
Load Custom Defaults
Save Custom Defaults
Discard Changes




F1  Help              ↑↓ Select Item      F5/F6 Change Values        F9  Setup Defaults
Esc Exit              ↔  Select Menu       Enter Select ▶ SubMenu     F10 Save and Exit
```

Exit Saving Changes

This item allows you to exit the BIOS environment and save the values you have just configured.

Options: Yes (default), No

Save Change Without Exit

This item allows you to save changes without exiting the BIOS environment.

Options: Yes (default), No

Exit Discarding Changes

This item allows you to exit without saving any changes that might have been made to the BIOS.

Options: Yes (default), No

Load Optimal Defaults

This item allows you to revert to the factory default BIOS values.

Options: Yes (default), No

Load Custom Defaults

This item allows you to load custom default values for the BIOS settings.

Options: Yes (default), No

Save Custom Defaults

This item allows you to save the current BIOS values as a "custom default" that may be reverted to at any time by the "load custom defaults" selection just above.

Options: Yes (default), No

Discard Changes

This item allows you to discard all settings you have just configured.

Options: Yes (default), No

Upgrading the BIOS

This section describes how to upgrade the BIOS. However, note that it is easy to permanently damage the computer when upgrading the BIOS. We strongly recommend that you contact Moxa's technical support staff for assistance to obtain all the necessary tools and the most up-to-date advice before attempting to upgrade the BIOS on any Moxa device.

Step 1: Create a Bootable USB Disk

Before upgrading the BIOS, every user should first create a bootable USB RAM drive as a system rescue device. A useful software suite for building USB RAM drives can be found by searching for Rufus, which can then be downloaded and used to create a bootable RAM drive. Take the following steps to create a bootable USB disk using Rufus.

1. Start Rufus and then in the "Device" drop-down list select the USB device that you want to use as a bootable disk.

2. Select **MBR partition scheme for BIOS or UEFI computers** from the "Partition scheme and target system type" drop-down list so it can boot from a legacy BIOS or UEFI.

3. Select **FAT (Default)** from the "File system" drop-down list.

4. Select **16 kilobytes (Default)** from the "Cluster size" drop-down list.

5. Enter a drive name in the "New volume label" input box.

6. Checkmark the **Quick format**, **Create a bootable disk using FreeDOS**, and **Create extended label and icon files** options.

7. Click **Start** to format and create the bootable USB drive.
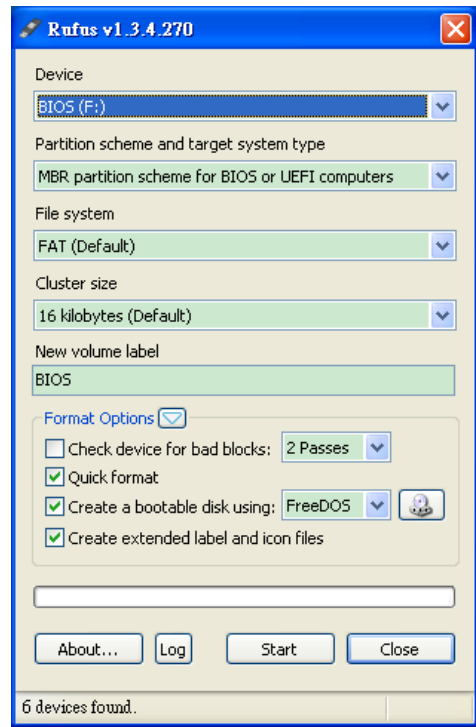
⚠ **ATTENTION**

When you use a USB drive larger than 4 GB, you will need to convert the file system type to FAT32.
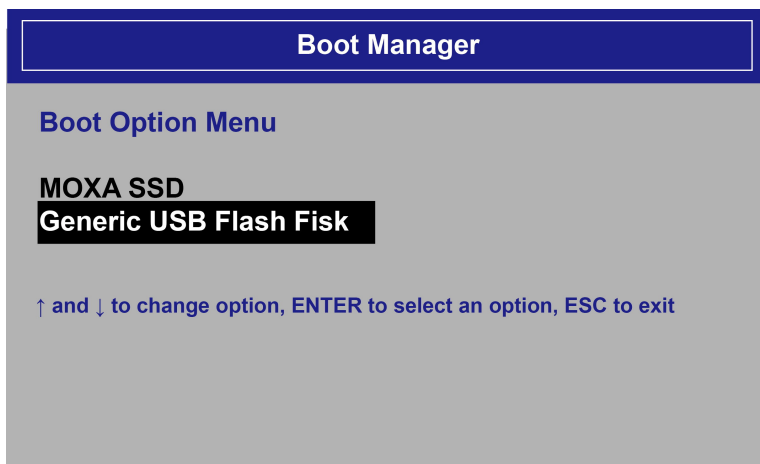

Step 2: Prepare the Upgrade File

You must use the BIOS upgrade installation file to upgrade the BIOS. Contact Moxa's technical department for assistance.

1. Get the BIOS upgrade installation file. The file name should have the following format: **V2616AxxSx.exe** (xx refers to version numbers).
2. Copy the file to the Bootable USB Disk.

Step 3: Run the upgrade program on the V2616A Computer

1. Reboot the computer, and press F2 while booting up to open the Boot Manager.
2. Select USB Disk as the first boot source, and then press Enter to continue.

Boot Manager

Boot Option Menu

MOXA SSD
Generic USB Flash Fisk

↑ and ↓ to change option, ENTER to select an option, ESC to exit

3. When the computer finishes booting up, a DOS screen will open. Go to the directory where the upgrade file is located. For example, if the upgrade file is stored in the V2616A folder, type **cd V2616A**.

```
C:\cd V2616A
```

4. Run the upgrade program by typing **2616A10S6.exe**. Note that the upgrade filename may be different for different versions.

```
C:\ V2616A>2616A10S6.exe
```

5. The upgrade program will run automatically. Wait until the procedure finishes.

```
C:\>V2616A10S6.exe
Reading file...
flash package mode.
Option: -BIOS -C -Desc -ME
```

Please do not remove the AC power!

```
                    Insyde Flash Utility for InsydeH20
                                              Version 1.5t


          Initializing

          Current BIOS Model name: V2616A
          New     BIOS Model name: V2616A


          Current BIOS version: V1.00S06
          New     BIOS version: V1.00S06


          Updating Block at FFDE8000
```

6. When the upgrade is finished, the computer will automatically reboot. You may check the BIOS version on Main page of the BIOS Setup

MODEL NAME	V2616A
BIOS Version	V1.00S06
Processor Type	Intel® Core™ i5-3610ME @ 2.7 GHz

⚠️ **ATTENTION**

Do NOT remove the power supply during a BIOS upgrade, since doing so may cause the system to crash.

A

Regulatory Approval Statement

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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

<u>Class A:</u> FCC Warning! This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the 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 instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

European Community

Warning:

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.