



RM641-SD
Desktop Box IPC
User's Manual

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Changes after the publication's first release will be based on the product's revision. The website will always provide the most updated information.

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Trademarks

Product names or trademarks appearing in this manual are for identification purpose only and are the properties of the respective owners.

FCC and DOC Statement on Class A

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 residential installation. 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. 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.

Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

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About this Manual

An electronic file of this manual can be obtained from the DFI website at www.dfi.com. To download the user's manual from our website, please go to "Support" > "Download Center." On the Download Center page, select your product or type the model name and click "Search" to find all technical documents including the user's manual for a specific product.

Warranty

1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
4. We will not be liable for any indirect, special, incidental or consequential damages to the product that has been modified or altered.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
2. Wear an antistatic wrist strap.
3. Do all preparation work on a static-free surface.
4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.



Important:

Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

To avoid damage to the system:

- Use the correct AC input voltage range.

To reduce the risk of electric shock:

- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

Battery:

- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.

Safety Precautions

- Use the correct DC input voltage range.
- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.
- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.
- Keep this system away from humidity.
- Place the system on a stable surface. Dropping it or letting it fall may cause damage.
- The openings on the system are for air ventilation to protect the system from overheating. **DO NOT COVER THE OPENINGS.**
- Place the power cord in such a way that it will not be stepped on. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the system and that it matches the voltage and current marked on the system's electrical range label.
- If the system will not be used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- If one of the following occurs, consult a service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated the system.
 - The system has been exposed to moisture.
 - The system is not working properly.
 - The system dropped or is damaged.
 - The system has obvious signs of breakage.
- 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 the outlet.
- Disconnect the system from the DC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.

About the Package

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

- 1 RM641 system unit
- 1 SATA Cable
- 1 Quick Installation Guide

Chapter 1 - Introduction

Overview



Front View



Rear View

Key Features

Model Name	RM641-SD
Processor	6th generation Intel® Core™ processors
Chipset	Intel® Q170 Chipset
LAN	2 LAN ports
COM	1 COM port
Display	1 HDMI, 1 VGA, DVI-I (DVI-D signal)
USB	2 USB 2.0 ports at the rear panel I/O ports; 4 USB 3.0 ports at the rear panel I/O ports
Audio	Realtek ALC888S-VD2-GR

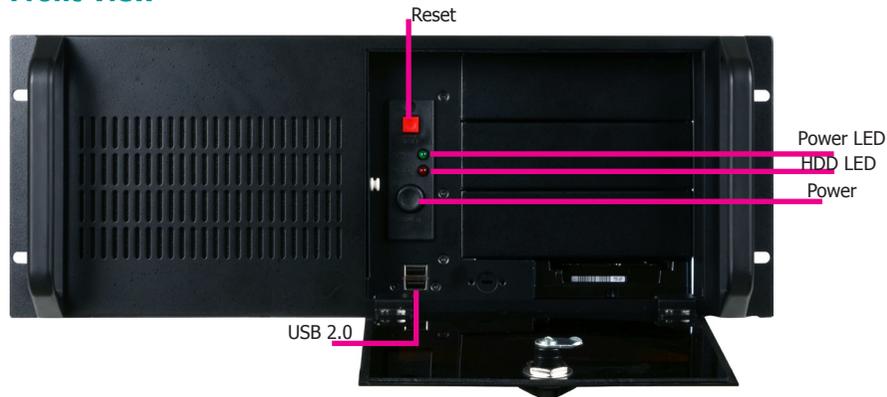
Specifications

Processor System	Processor	LGA 1151 Socket 6th Generation Intel® Core™ Processors Intel® Core™ i7-6700 Processor, Quad Core, 8M Cache, 3.4GHz (4.0GHz), 65W Intel® Core™ i7-6700TE Processor, Quad Core, 8M Cache, 2.4GHz (3.4GHz), 35W Intel® Core™ i5-6500 Processor, Quad Core, 6M Cache, 3.2GHz (3.6GHz), 65W Intel® Core™ i5-6500TE Processor, Quad Core, 6M Cache, 2.3GHz (3.3GHz), 35W Intel® Core™ i3-6100 Processor, Dual Core, 3M Cache, 3.7GHz, 47W Intel® Core™ i3-6100TE Processor, Dual Core, 4M Cache, 2.7GHz, 35W Intel® Pentium® Processor G4400, Dual Core, 3M Cache, 3.3GHz, 47W Intel® Pentium® Processor G4400TE, Dual Core, 3M Cache, 2.4GHz, 35W
	Chipset	Intel® Q170 Chipset
	Memory	Four 288-pin DIMM up to 64GB; Dual Channel DDR4 1866/2133MHz
	BIOS	Insyde SPI 128Mbit
Graphics	Controller	Intel® HD Gen 9 Graphics
	Feature	OpenGL 5.0, DirectX 12, OpenCL 2.1 HW Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H265, VP8, VP9 HW Encode: MPEG2, AVC/H264, JPEG, HEVC/H265, VP8, VP9
	Display	1 x VGA (resolution up to 1920x1200 @ 60Hz) 1 x DVI-I (DVI-D signal, resolution up to 1920x1200 @ 60Hz) 1 x HDMI (resolution up to 4096x2160 @ 24Hz)
	Triple Displays	VGA + DVI-I (DVI-D signal) + HDMI
Storage		3 x 5.25" Optical Drive Bays (Front Accessible) 1 x 3.5"/2.5" SATA 3.0 Drive Bay (Front Accessible)
EXPANSION	Interface	2 PCIe x16 (1 x16 or 2 x8 signal) (Gen 3) 2 PCIe x4 (Gen 3) 3 PCI
AUDIO	Audio Codec	Realtek ALC888S-VD2-GR
Ethernet	Controller	1 x Intel® I210AT PCIe (10/100/1000Mbps) 1 x Intel® I219LM PCIe with iAMT11.0 (10/100/1000Mbps) (only Core i7/i5 supports iAMT)
LED	Indicators	1 x Power LED 1 x HDD LED
Front I/O	USB	2 x USB 2.0 (available upon request)
	Front Door	1 x Drive Panel Door With Keylock
	Buttons	1 x Power Switch 1 x Reset Switch

REAR I/O	Ethernet	2 x GbE (RJ-45)
	Serial	1 x RS-232/422/485 (RS-232 w/ power) (DB-9)
	USB	4 x USB 3.0 2 x USB 2.0
	PS/2	1 x PS/2 (mini-DIN-6)
	Display	1 x VGA 1 x DVI-I (DVI-D signal) 1 x HDMI
	Audio	1 x Line-in (available upon request) 1 x Line-out 1 x Mic-in
	Buttons	1 x ATX Switch
Cooling	Fan	2 x 92cm System Fan with Quick Access Filter
WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
POWER	Supply	ATX PS/2 Power Supply 500W AC Power Input : 90~264V
OS SUPPORT		Windows 7 (/WES7) 32/64-bit Windows 8.1 (64-bit) Windows 10 IoT Enterprise 64-bit Debian 8 (with VESA graphic driver) CentOS 7 (with VESA graphic driver) Ubuntu 15.10 (Intel graphic driver available)
MECHANISM	Construction	SECC
	Mounting	Flexible Hold Down Bar
	Dimensions (W x H x D)	483mm x 177mm x 451mm
	Weight	TBD
ENVIRONMENT	Operating Temperature	0 to 45°C
	Storage Temperature	-20 to 60°C
	Relative Humidity	0 to 90% RH (non-condensing)
STANDARDS AND CERTIFICATIONS	Shock	Operating: 3G Non-operating: 3G
	Vibration	Operating: Random 5~500Hz 1G Non-operating: Sweep Sine 10~500Hz 1.5G
	Package Drop	ISTA Project 1A
	Certification	TBD

Getting to Know the RM641-SD

Front View



Power Button

Press to power on or power off the system.

Reset Button

Press to reset the system.

Power LED

Indicates the power status of the system.

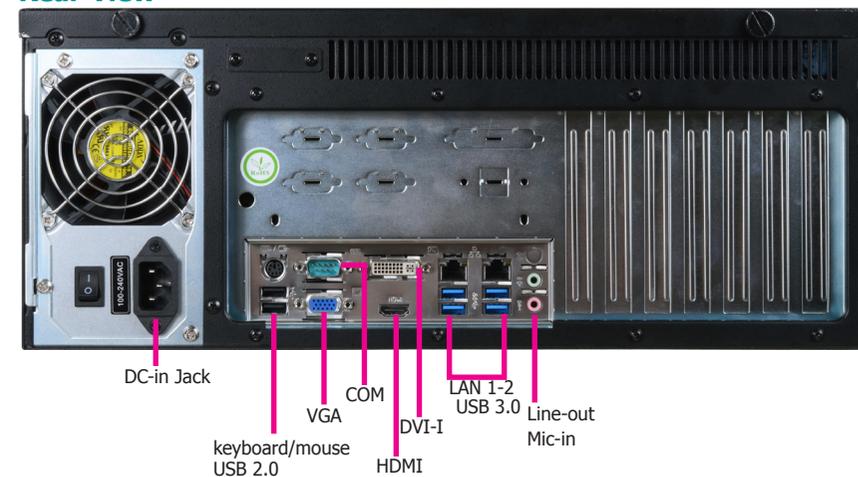
HDD LED

Indicates the status of the hard drive.

USB Ports

Used to connect USB 2.0/1.1 devices.

Rear View



DC-in jack

Used to plug a power adapter.

Keyboard/mouse

Used to connect to a PS/2 keyboard or mouse

COM Port

Used to connect serial devices.

VGA Port

Used to connect to a VGA display.

DVI-I

Used to connect to a DVI-I display (DVI-D signal).

HDMI Port

Used to connect a HDMI device.

USB 2.0 and 3.0 Ports

Used to connect USB 2.0/3.0 devices.

LAN 1-2 Ports

Used to connect the system to a local area network.

Line-out jack

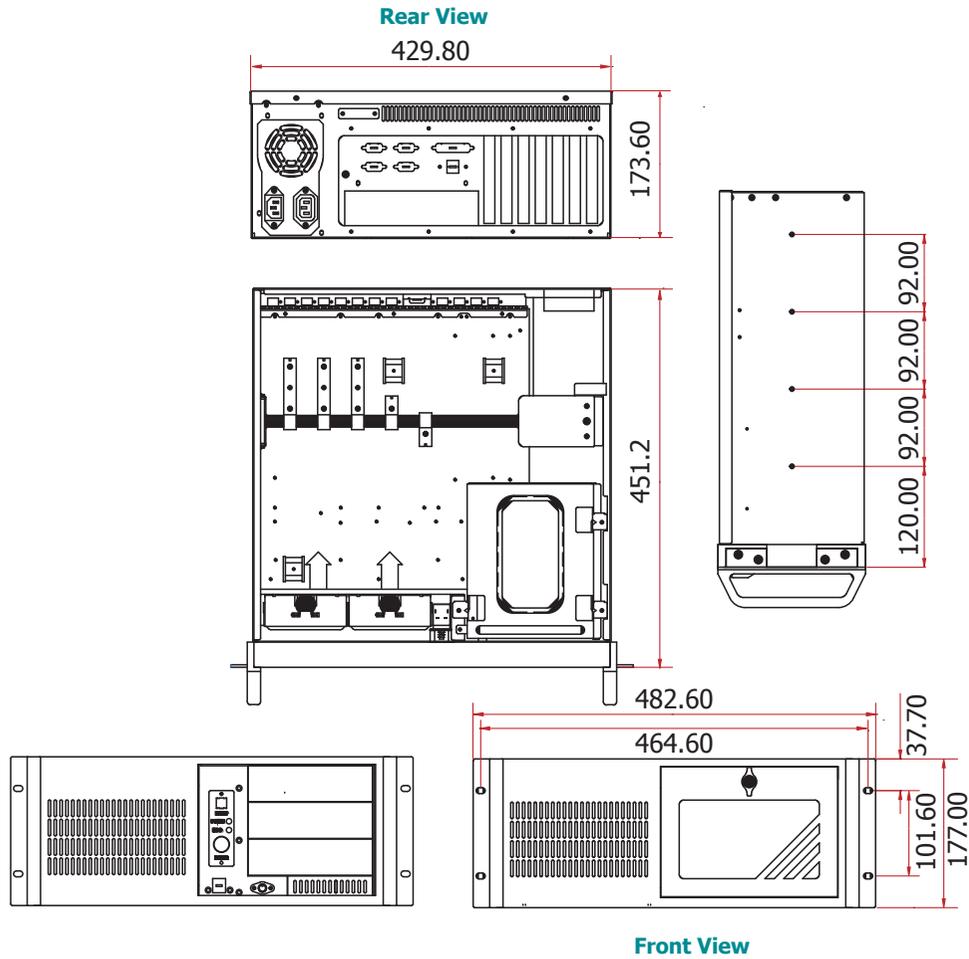
Used to connect to a speaker.

Mic-in jack

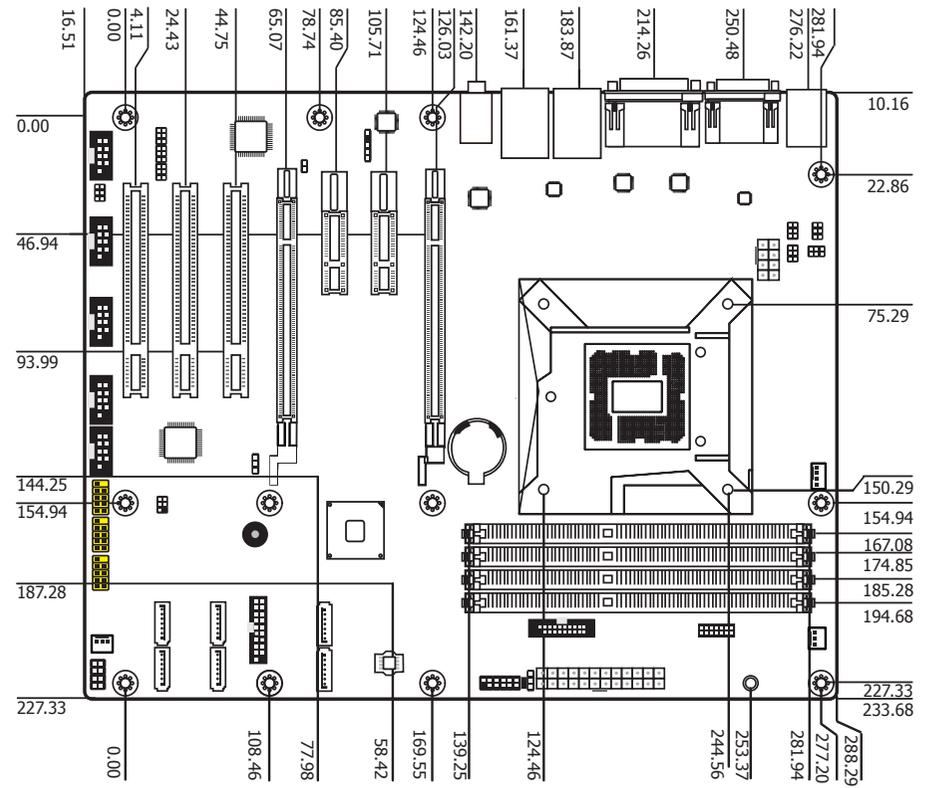
Used to connect to a microphone.

Mechanical Dimensions

Chassis Dimensions



Motherboard Dimensions



Chapter 2 - Getting Started

Preparing the System

Before you start using the system, you need the following items:

- AC power adapter
- CD-ROM drive (for installing software/drivers)

Installing Devices

The following are devices that can be installed in the system.

- Memory module
- CPU
- SATA hard drive
- PCI/PCIe expansion card

Configuring the BIOS

To get you started, you may need to change configurations such as the date, time and the type of hard disk drive.

1. Power-on the system.
2. After the memory test, the message "Press DEL to run setup" will appear on the screen. Press the Delete key to enter the AMI BIOS setup utility.

Installing the Operating System

Most operating system software can be installed using a DVD (and DVD burner) or bootable USB drive.

Please refer to your operating system manual for instructions on installing an operating system.

Installing the Drivers

The system requires you to install drivers for some devices to operate properly. Refer to the Supported Software chapter for instructions on installing the drivers.

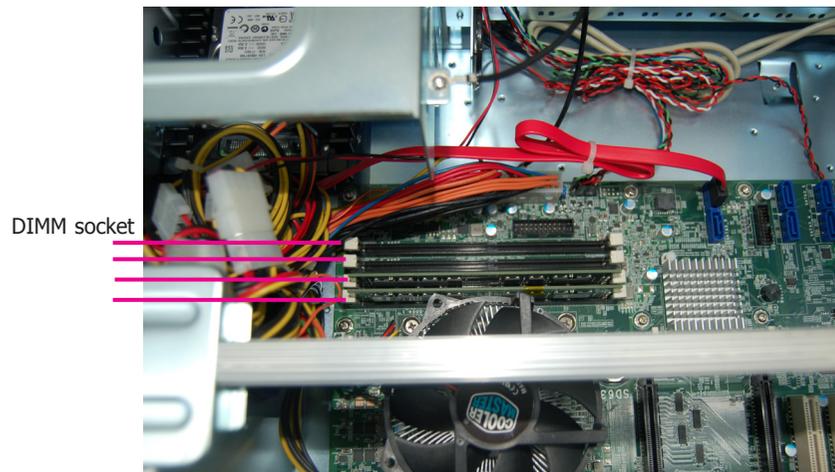
Chapter 3 - Installing the Device

Removing the Chassis Cover

1. Make sure the system and all other peripheral devices connected to it have been powered-off.
2. Disconnect all power cords and cables.
3. Remove the 2 mounting screws to open the top cover.

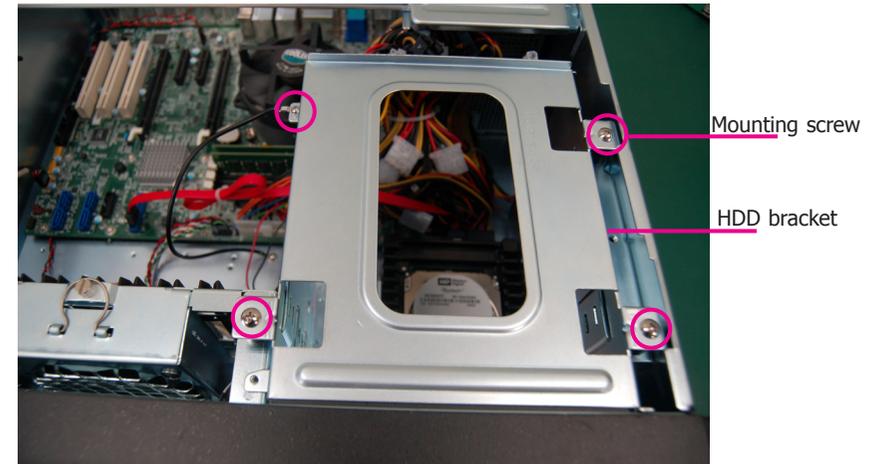


4. The DIMM sockets are readily accessible after removing the chassis cover.

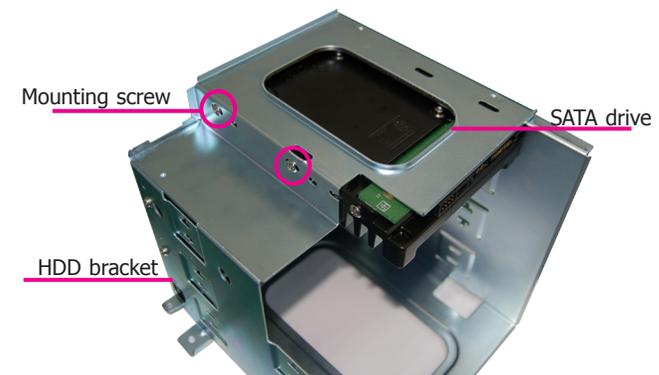


Installing the SATA Drive

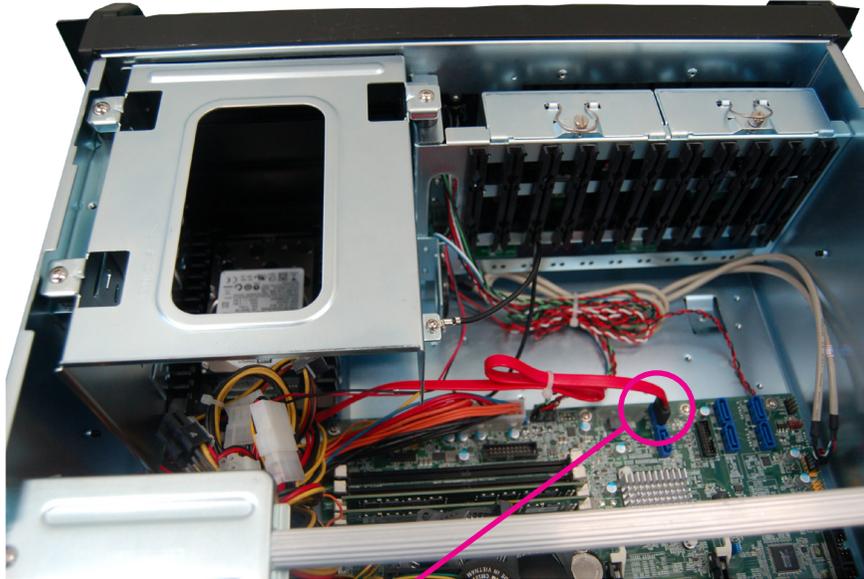
1. Unfasten the 4 mounting screws that secure HDD bracket to the system.



2. Align the mounting holes of the SATA drive with the mounting holes on the HDD brackets and then use the mounting screws to secure the drive in place.



3. Connect the SATA data cable and the SATA power cable to the connectors on the SATA drive.

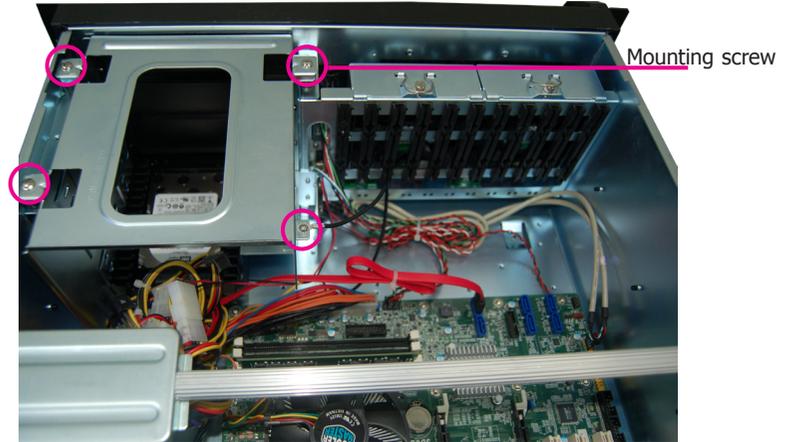


SATA port

SATA power and data connector



4. Secure the HDD bracket back to the system.



Mounting screw

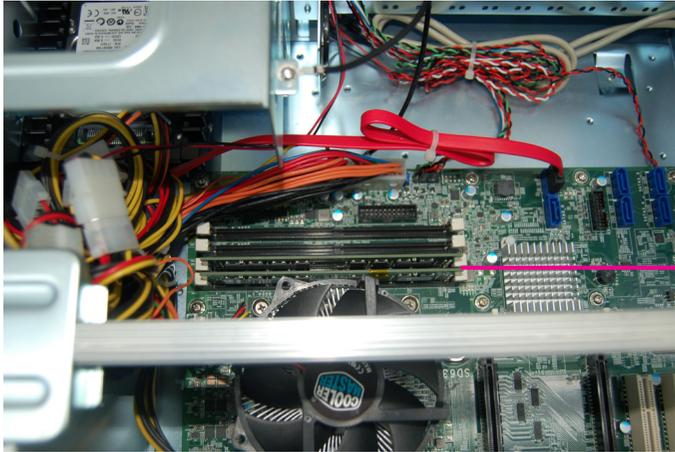


Note:

The system can accommodate 4 disks (3.5" or 2.5"). However, 3.5" to 5.25" or 2.5" to 5.25" drive mounting bracket adapters will be required to install HDDs in the optical bays.

Installing the DIMM module

1. The DIMM socket is located on the system board. Note the key on the socket. The key ensures that the memory module can be plugged into the socket in one direction only.



DIMM socket

Installing the CPU

1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the LGA 1151 CPU socket on the system board.



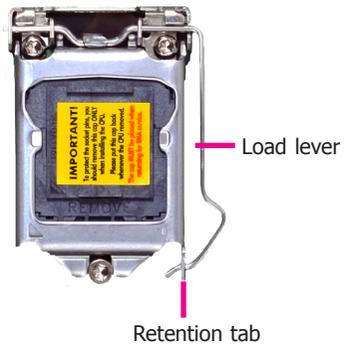
Important:

1. Before you proceed, make sure (1) the LGA 1151 socket comes with a protective cap, (2) the cap is not damaged and (3) the socket's contact pins are not bent. If the cap is missing or the cap and/or contact pins are damaged, contact your dealer immediately.
2. Make sure to keep the protective cap. RMA requests will be accepted and processed only if the LGA 1151 socket comes with the protective cap.

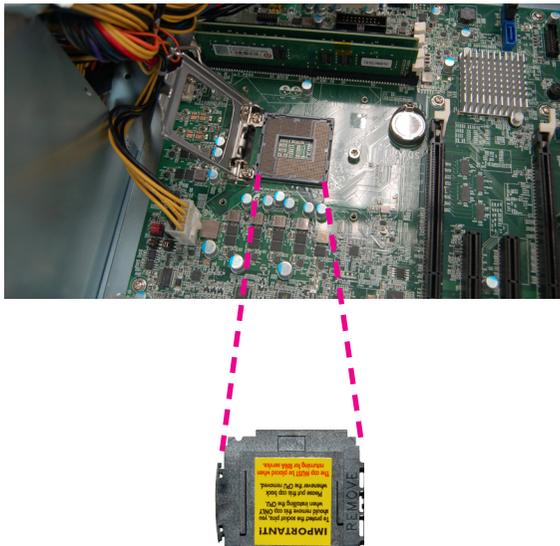


Protective Cap

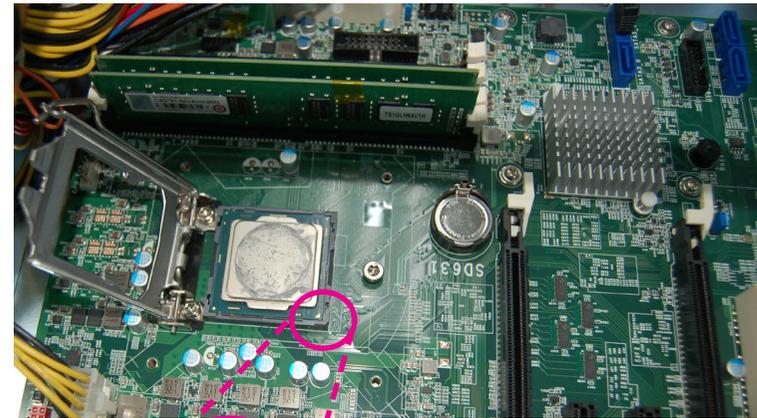
- Unlock the socket by pushing the load lever down, moving it sideways until it is released from the retention tab; then lift the load lever up.



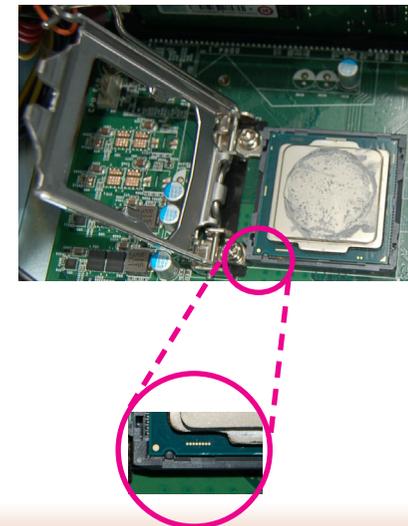
- Lift the load lever to lift the load plate. Lift the load lever up to the angle shown on the photo.



- Insert the CPU into the socket. The gold triangular mark on the CPU must align with the corner of the CPU socket shown on the photo.



Important: The CPU will fit in only one orientation and can easily be inserted without exerting any force.



Installing the fan and heat sink

The CPU must be kept cool by using a CPU fan with heat sink. Without sufficient air circulation across the CPU and heat sink, the CPU will overheat damaging both the CPU and system board.



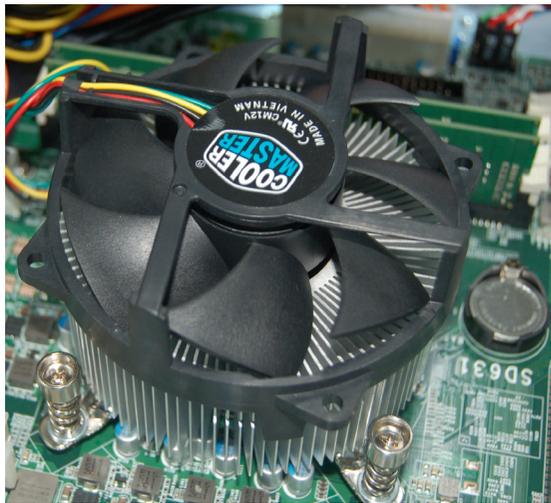
Note:

A boxed Intel® processor already includes the CPU fan and heat sink assembly. If your CPU was purchased separately, make sure to only use Intel®-certified fan and heat sink.

1. Before you install the fan / heat sink, you must apply a thermal paste onto the top of the CPU. The thermal paste is usually supplied when you purchase the fan / heat sink assembly. Do not spread the paste all over the surface. When you later place the heat sink on top of the CPU, the compound will disperse evenly.

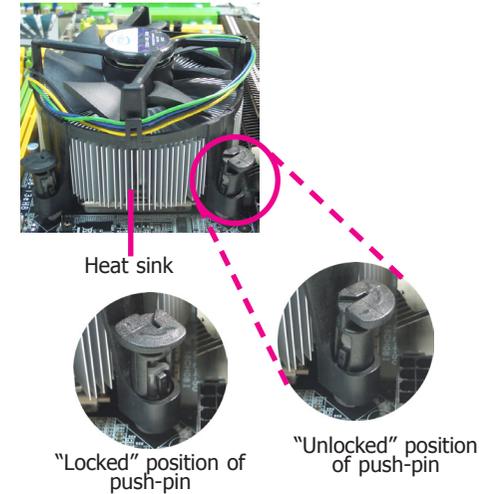
Some heat sinks come with a patch of pre-applied thermal paste. Do not apply thermal paste if the fan / heat sink already has a patch of thermal paste on its underside. Peel the strip that covers the paste before you place the fan / heat sink on top of the CPU.

2. Place the heat sink on top of the CPU. The 4 push-pins around the heat sink, which are used to secure the heat sink onto the system board, must match the 4 mounting holes around the socket.



4. Rotate each push-pin according to the direction of the arrow shown on top of the pin.

Push down two pushpins that are diagonally across the heat sink. Perform the same procedure for the other two push-pins.

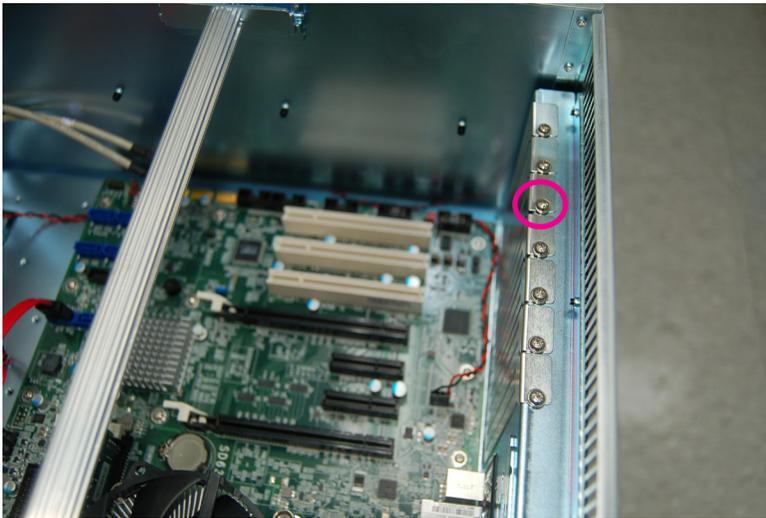


5. Connect the CPU fan's cable to the CPU fan connector on the system board.



Installing the PCI/PCIe expansion card

1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Take off the card bracket secured on the system's chassis.

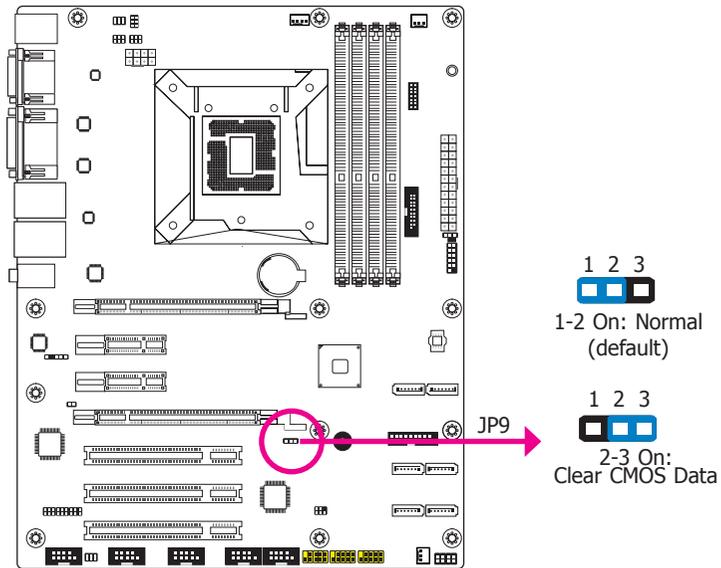


4. Install the PCIe expansion card on the system.
5. Secure the PCIe expansion card to the system with the screws.



Chapter 4 - Jumper Settings

Clear CMOS Data



If you encounter the followings,

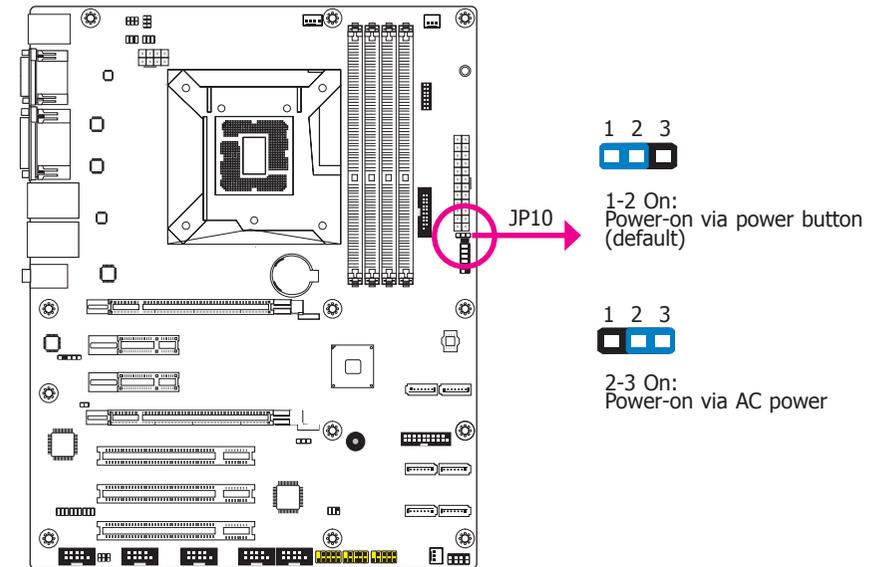
- CMOS data becomes corrupted.
- You forgot the supervisor or user password.

you can reconfigure the system with the default values stored in the ROM BIOS.

To load the default values stored in the ROM BIOS, please follow the steps below.

- Power-off the system and unplug the power cord.
- Set JP9 pins 2 and 3 to On. Wait for a few seconds and set JP9 back to its default setting, pins 1 and 2 On.
- Now plug the power cord and power-on the system.

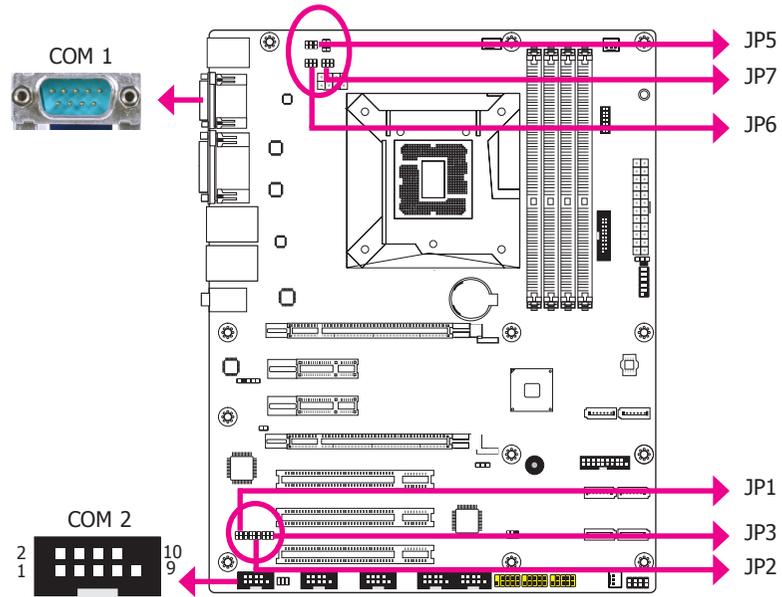
Power-on Select



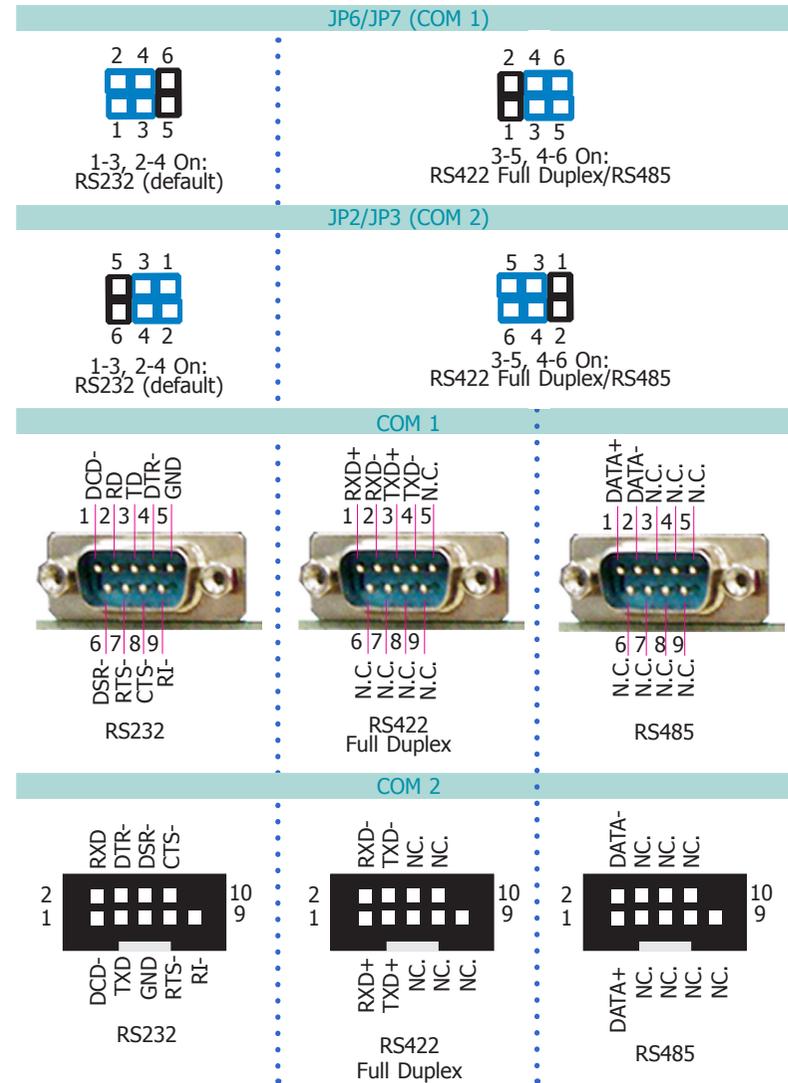
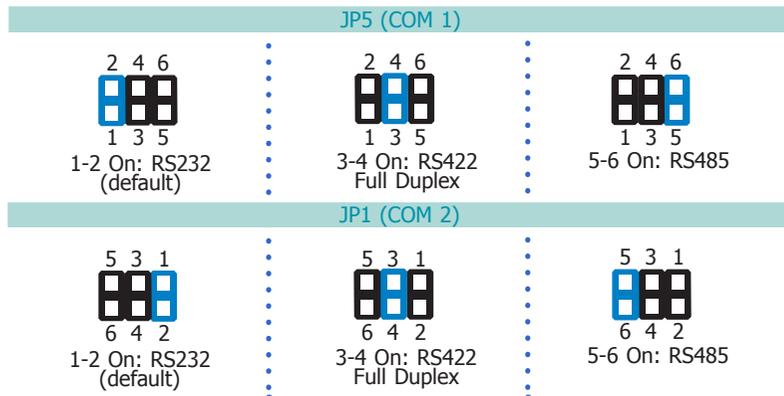
JP10 is used to select the method of powering on the system. If you want the system to power-on whenever AC power comes in, set JP10 pins 2 and 3 to On. If you want to use the power button, set pins 1 and 2 to On.

When using JP10 "Power-On" feature to power the system back on after a power failure occurs, the system may not power on if the power lost is resumed within 5 seconds (power flicker).

COM1/COM2 RS232/422/485 Select



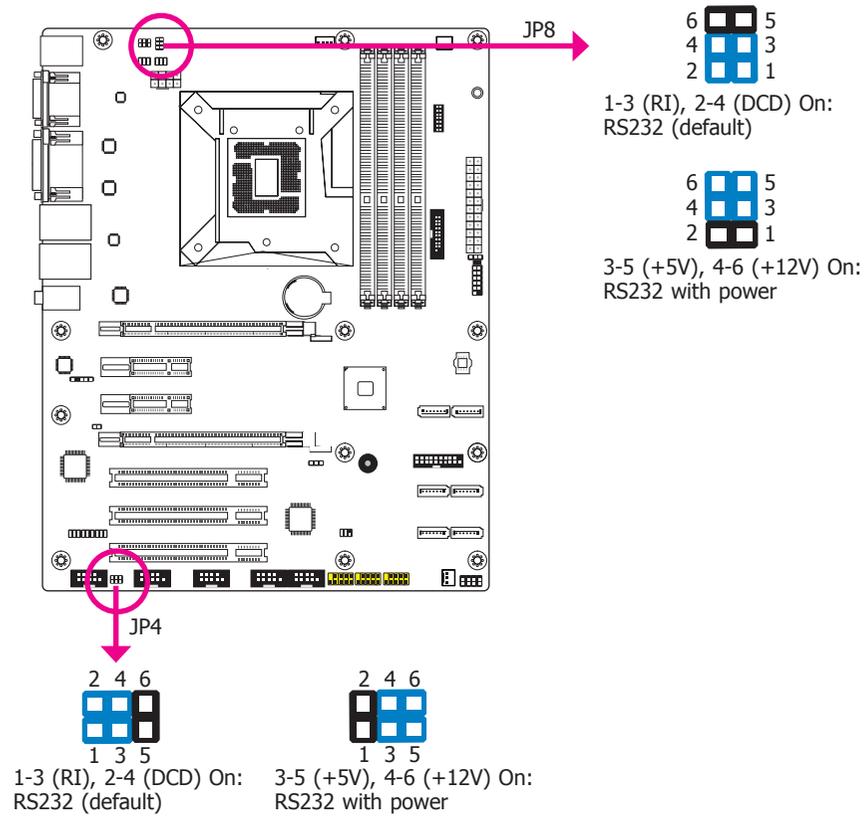
JP5 (for COM1) and JP1 (for COM2) are used to configure the COM ports to RS232, RS422 (Full Duplex) or RS485. The pin functions of the COM ports will vary according to the jumper's setting.



Note:

- When COM 1 RS232/422/485 is selected, JP6 and JP7 must be set in accordance to JP5.
- When COM 2 RS232/422/485 is selected, JP2 and JP3 must be set in accordance to JP1.

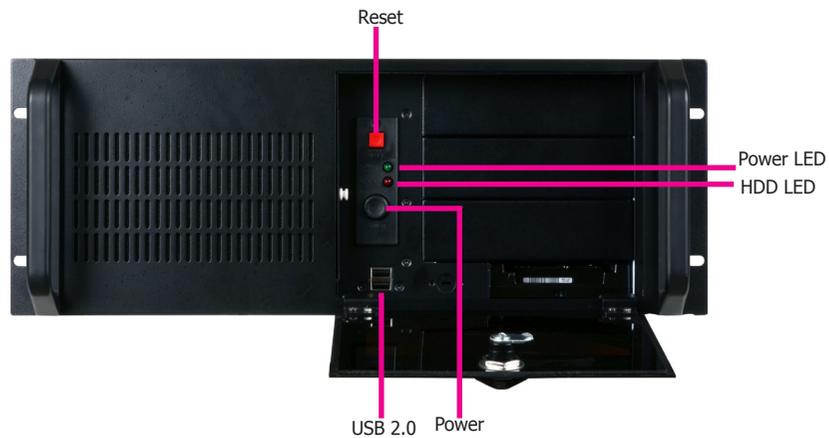
COM1/COM2 RS232/Power Select



JP8 (for COM 1) and JP4 (for COM 2) are used to configure Serial COM ports to pure RS232 or RS232 with power. The pin functions of COM 1 and COM 2 will vary according to JP8's and JP4's setting respectively.

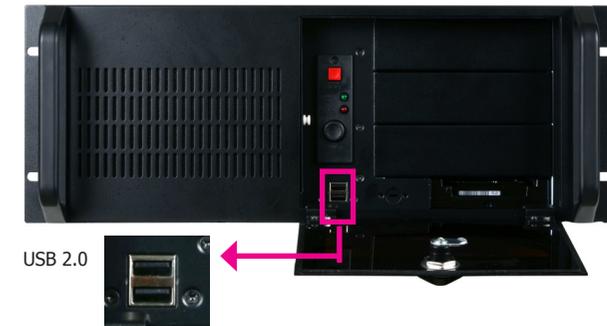
Chapter 5 - Ports and Connectors

Front Panel I/O Ports



The front panel I/O consists of 2 USB 2.0 ports

USB Ports



The USB device allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

- **BIOS Setting**

Configure the onboard USB in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to chapter 7 for more information.

- **Wake-On-USB Keyboard/Mouse**

The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state. To use this function:

- **Jumper Setting**

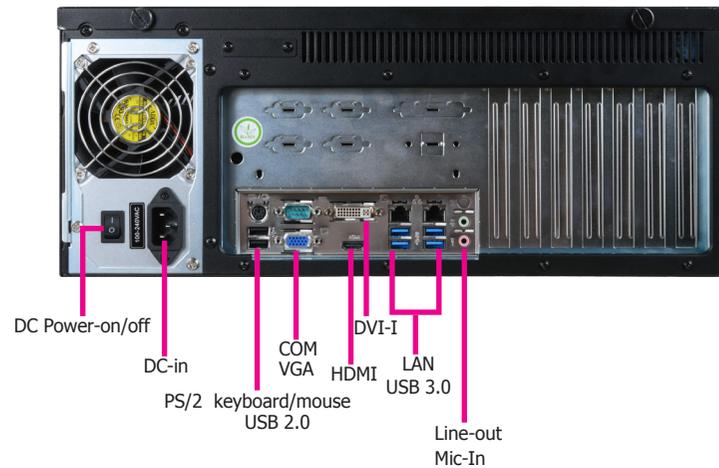
JP25 must be set to "2-3 On: +5V_standby". Refer to "USB Power Select" in chapter 4 for more information.



Important:

If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V_standby power source of your power supply must support $\geq 1.5A$. For 3 or more USB ports, the +5V_standby power source of your power supply must support $\geq 2A$.

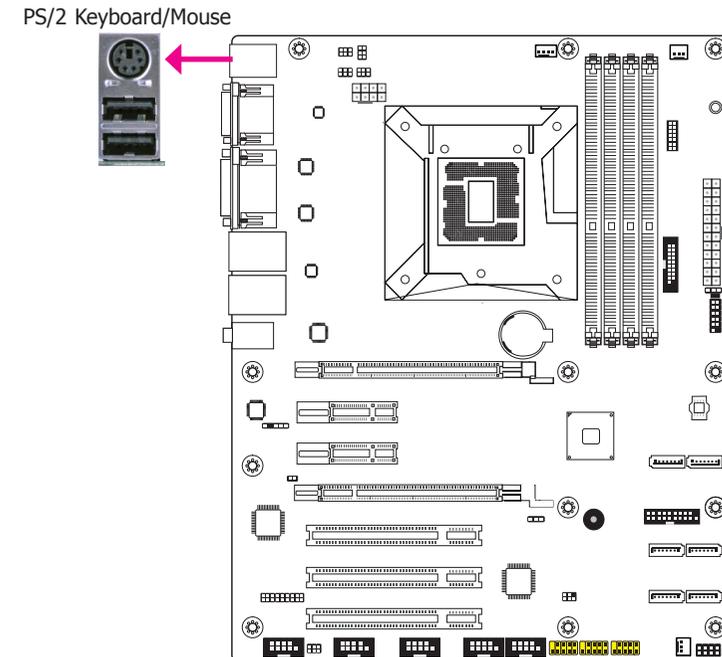
Rear Panel I/O Ports



The rear panel I/O consists of the following ports:

- DC power-on/off
- 1 12V DC-in jack
- 1 PS2 Keyboard/mouse
- 2 USB 2.0
- 1 COM port
- 1 VGA port
- 1 DVI-I port
- 1 HDMI port
- 2 LAN ports
- 4 USB 3.0 ports
- 1 Line-out & Mic-In

PS/2 Keyboard/Mouse Port



This rear I/O port is used to connect a PS/2 keyboard/mouse. The PS/2 mouse port uses IRQ12.

Wake-On-PS/2 Keyboard/Mouse

The Wake-On-PS/2 Keyboard/Mouse function allows you to use the PS/2 keyboard or PS/2 mouse to power-on the system. To use this function:

• BIOS Setting

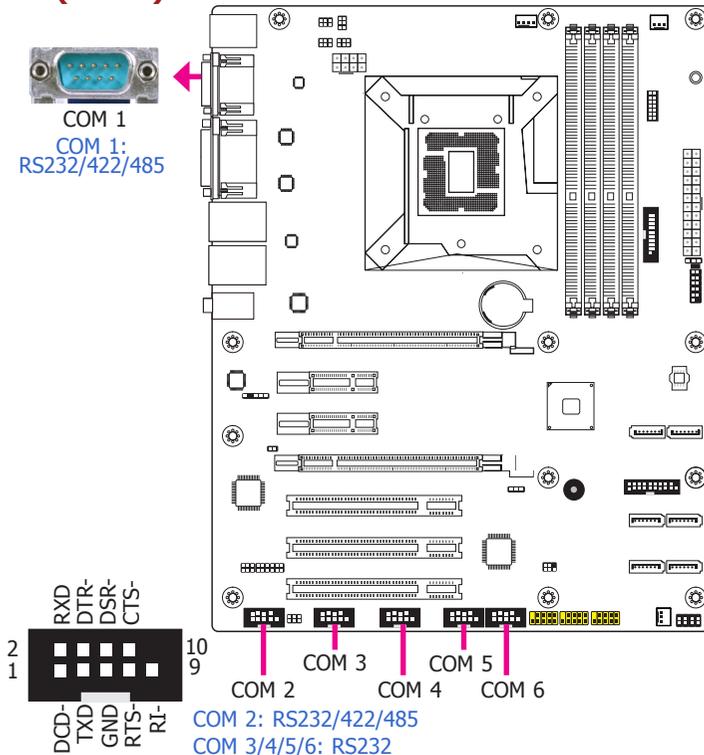
Configure the wake-up function of PS/2 keyboard/mouse in the Advanced menu ("ACPI Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.



Important:

The +5V_standby power source of your power supply must support $\geq 720\text{mA}$.

COM (Serial) Ports



COM 3 to COM 6 are fixed at RS232.

The pin functions of COM 1 and COM 2 port will vary according to JP5's (for COM 1) and JP1's (for COM 2) setting. JP8 (for COM 1) and JP4 (COM 2) are used to configure Serial COM ports to pure RS232 or RS232 with power. Refer to "COM1/COM2 RS232/422/485 Select" and "COM1/COM2 RS232/Power Select" in this chapter for more information.

The serial ports are asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices.

Connecting External Serial Ports

Your COM port may come mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then insert the serial port cable to the COM connector. Make sure the colored stripe on the ribbon cable is aligned with pin 1 of the COM connector.

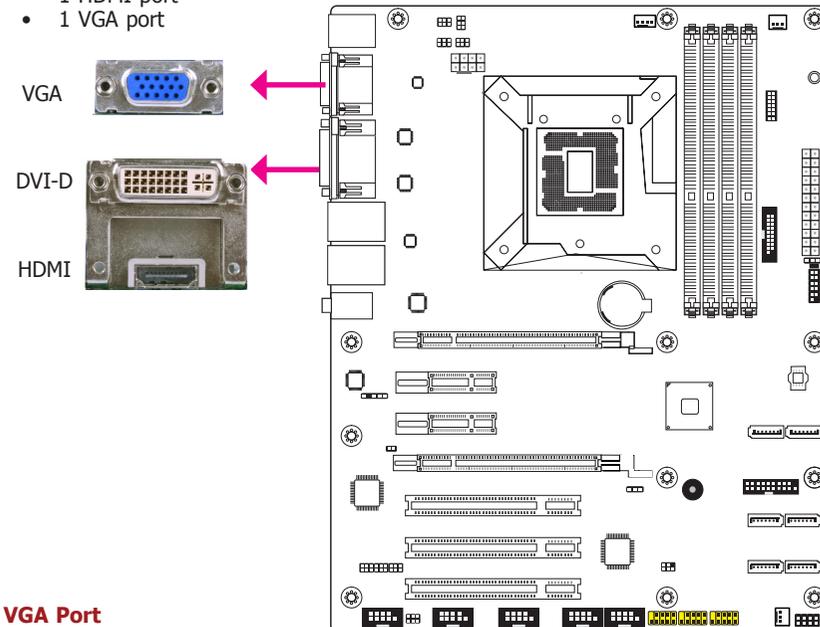
BIOS Setting

Configure the serial COM ports in the Advanced menu ("SIO NUVOTON6106D" submenu) of the BIOS. Refer to the chapter 3 for more information.

Graphics Interfaces

The display ports consist of the following:

- 1 DVI-I(DVI-D Signal) port
- 1 HDMI port
- 1 VGA port



VGA Port

The VGA port is used for connecting a VGA monitor. Connect the monitor's 15-pin D-shell cable connector to the VGA port. After you plug the monitor's cable connector into the VGA port, gently tighten the cable screws to hold the connector in place.

DVI-I(DVI-D Signal) Port

The DVI-I(DVI-D Signal) port is used to connect a digital LCD monitor or LCD TV.

Connect the display device's cable connector to the DVI-I(DVI-D Signal) port at location CN13. After you plug the cable connector into the DVI-I(DVI-D Signal) port, gently tighten the cable screws to hold the connector in place.

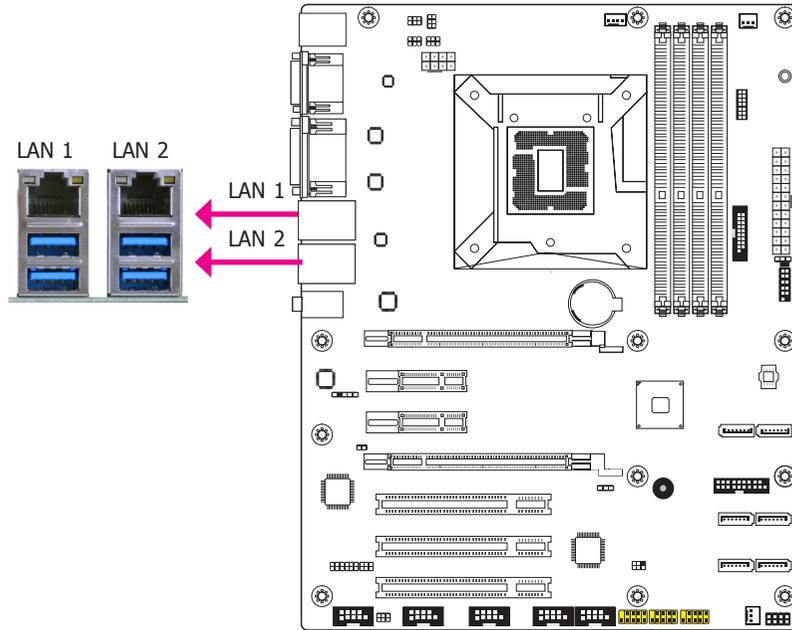
HDMI Port

The HDMI port which carries both digital audio and video signals is used to connect a LCD monitor or digital TV that has the HDMI port.

BIOS Setting

Configure the display devices in the Advanced menu ("Video Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.

RJ45 LAN Ports



Features

- Intel® I210AT PCI Express Gigabit Ethernet controller
- Intel® I219LM Gigabit Ethernet Phy with iAMT11.0 (10/100/1000Mbps) (only Core i7/i5 supports iAMT)

The LAN port allows the system board to connect to a local area network by means of a network hub.

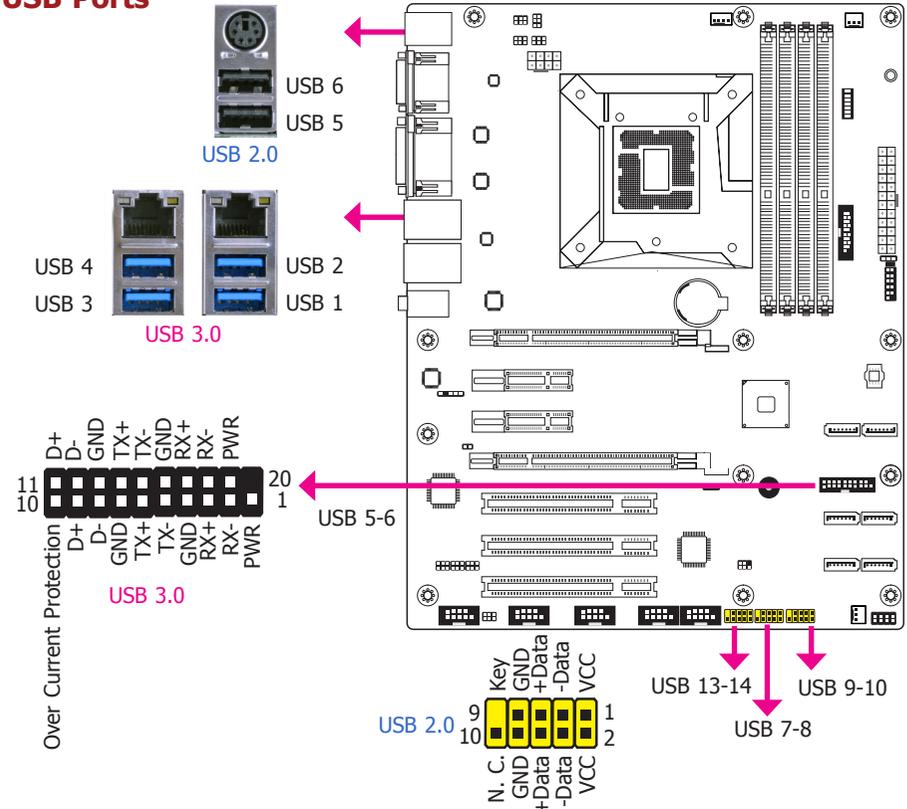
BIOS Setting

Configure the onboard LAN ports in the Advanced menu (“ACPI Configuration” submenu) of the BIOS. Refer to the chapter 3 for more information.

Driver Installation

Install the LAN drivers. Refer to the Chapter 4 for more information.

USB Ports



The USB device allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

The system board is equipped with four onboard USB 3.0/2.0/1.1 ports (USB 1-4) and two onboard USB 2.0/1.1 ports (USB 5-6). The 10-pin connector allows you to connect 2 additional USB 2.0/1.1 ports (USB 7-8/9-10/13-14). The additional USB ports may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis and then insert the USB port cables to a connector.

BIOS Setting

Configure these onboard USB devices in the Advanced menu (“USB Configuration” submenu) of the BIOS. Refer to the chapter 3 for more information.

Driver Installation

You may need to install the proper drivers in your system operation to use the USB device. Refer to your operating system’s manual or documentation for more information.

Wake-On-USB Keyboard/Mouse

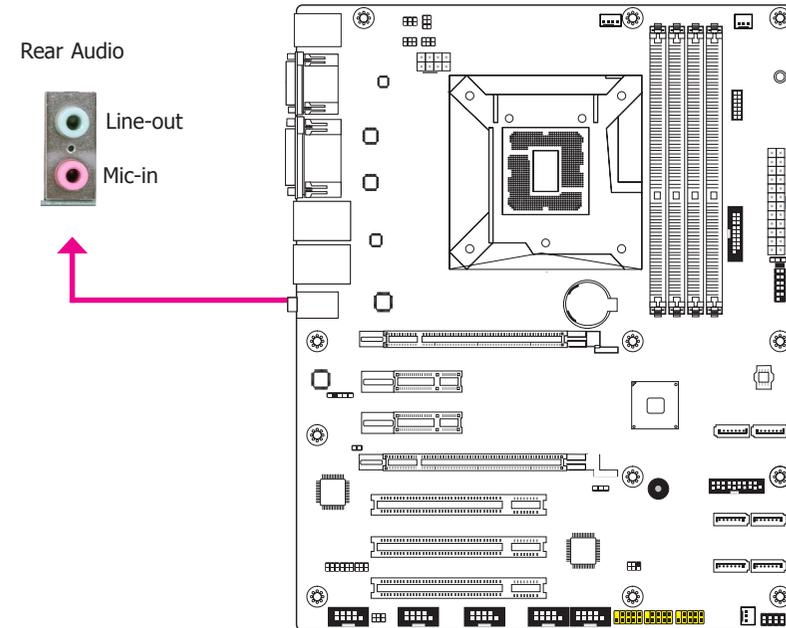
The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state. To use this function:



Important:

If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V_standby power source of your power supply must support $\geq 1.5A$. For 3 or more USB ports, the +5V_standby power source of your power supply must support $\geq 2A$.

Audio



Rear Audio

The system board is equipped with 2 audio jacks. A jack is a one-hole connecting interface for inserting a plug.

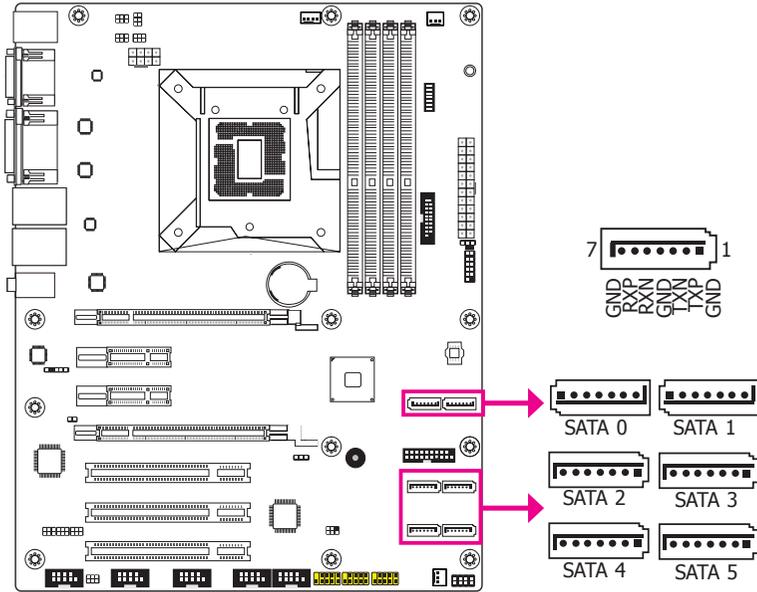
- Line-out Jack (Lime)
This jack is used to connect a headphone or external speakers.
- Mic-in Jack (Pink)
This jack is used to connect an external microphone.

Driver Installation

Install the audio driver. Refer to the chapter 4 for more information.

I/O Connectors

SATA (Serial ATA) Connectors



Features

- 6 Serial ATA ports
 - 6 SATA 3.0 ports with data transfer rate up to 6Gb/s (SATA 0, SATA 1, SATA 2, SATA 3, SATA 4, SATA 5)

The Serial ATA connectors are used to connect Serial ATA devices. Connect one end of the Serial ATA data cable to a SATA connector and the other end to your Serial ATA device.

The system board package comes with a power cable that must be connected from the system board's peripheral power connector to the SATA drive's power connector in order to provide power to the drive.

BIOS Setting

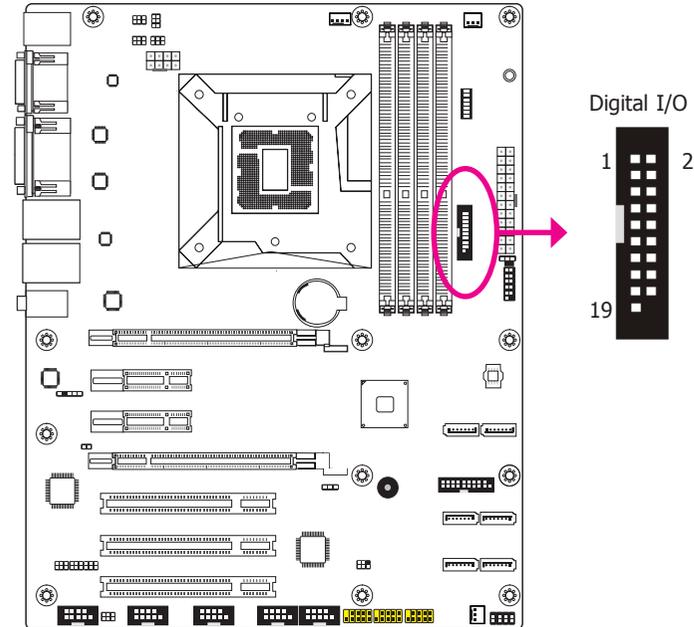
Configure the Serial ATA drives in the Advanced menu ("SATA Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.



Note:

Some 3rd party SATA Gen 2 speed device controllers used on the system board paired with the Intel® 8 series chipset are intermittently detected. Before using SSD devices or mSATA SSD devices, please check whether the device and the cable which are used on the system board conform to Intel's official regulations.

Digital I/O Connector

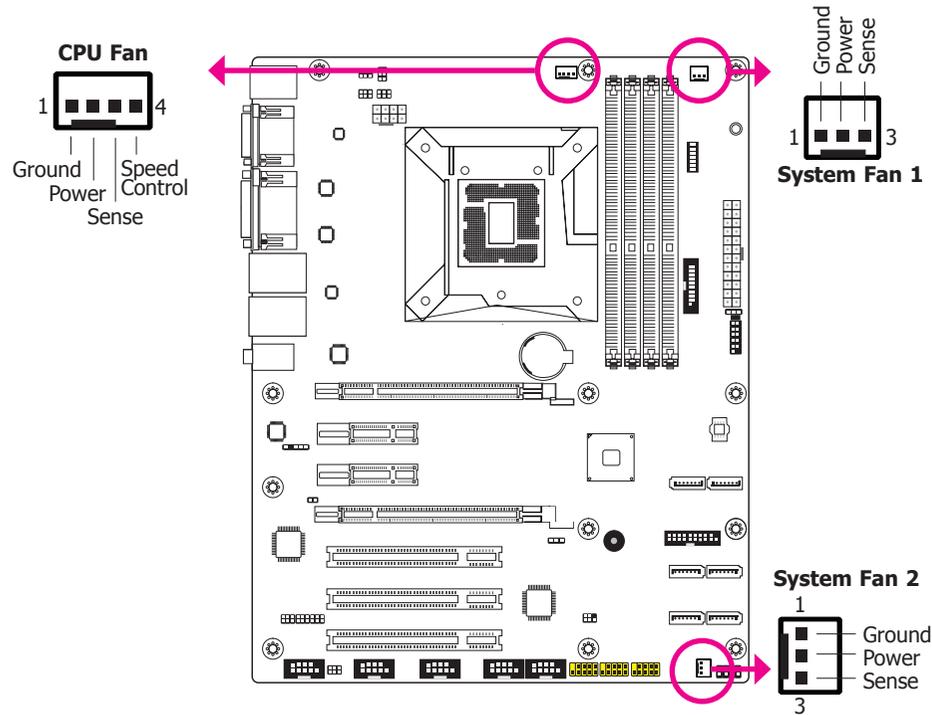


The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to these connectors.

Digital I/O Connector

Pins	Pin Assignment	Pins	Pin Assignment
1	GND	2	+12V
3	DIO7	4	+12V
5	DIO6	6	GND
7	DIO5	8	+5V
9	DIO4	10	+5V
11	DIO3	12	GND
13	DIO2	14	+5V_Standby
15	DIO1	16	+5V_Standby
17	DIO0	18	GND
19	GND		

Cooling Fan Connectors

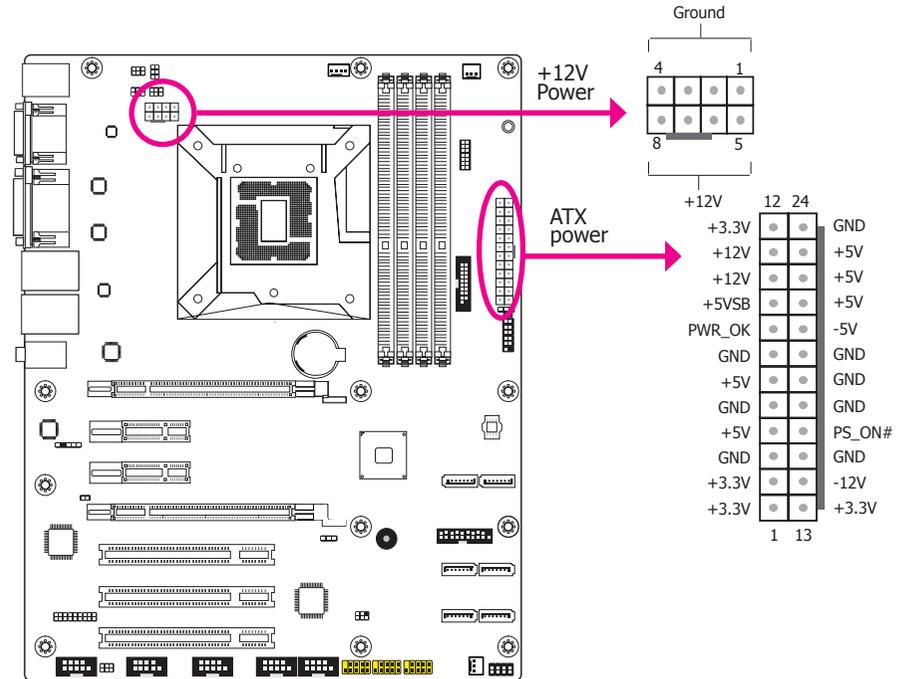


These fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

BIOS Setting

The Advanced menu ("SIO NUVOTON6106D" submenu) of the BIOS will display the current speed of the cooling fans. Refer to chapter 3 for more information.

Power Connectors



Use a power supply that complies with the ATX12V Power Supply Design Guide Version 1.1. An ATX12V power supply unit has a standard 24-pin ATX main power connector that must be inserted into the 24-pin connector. The 8-pin +12V power connector enables the delivery of more +12VDC current to the processor's Voltage Regulator Module (VRM).

The power connectors from the power supply unit are designed to fit the 24-pin and 8-pin connectors in only one orientation. Make sure to find the proper orientation before plugging the connectors.

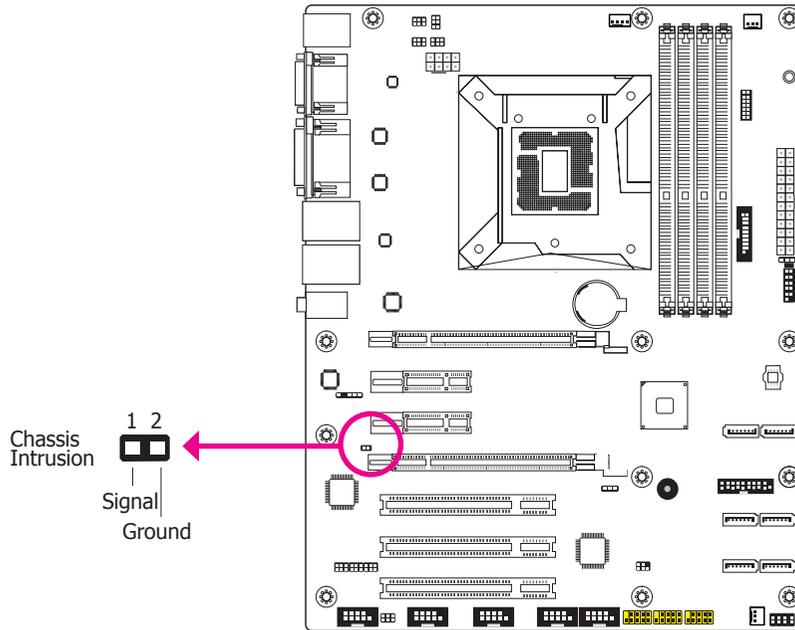
The system board requires a minimum of 300 Watt power supply to operate. Your system configuration (CPU power, amount of memory, add-in cards, peripherals, etc.) may exceed the minimum power requirement. To ensure that adequate power is provided, we strongly recommend that you use a minimum of 400 Watt (or greater) power supply.



Important:

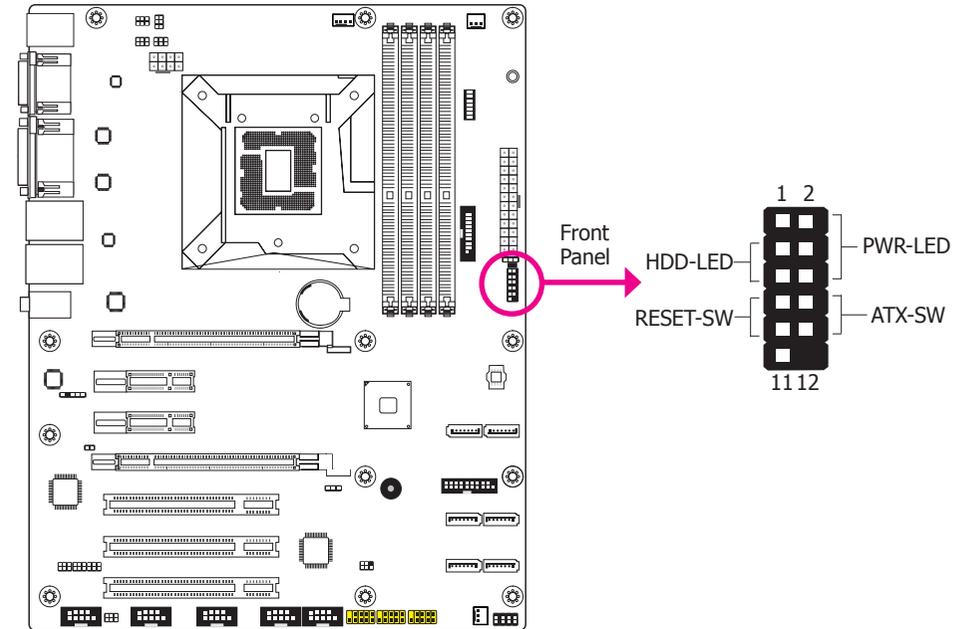
Insufficient power supplied to the system may result in instability or the add-in boards and peripherals not functioning properly. Calculating the system's approximate power usage is important to ensure that the power supply meets the system's consumption requirements.

Chassis Intrusion Connector



The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will sound only when the system restarts.

Front Panel Connector



HDD-LED - HDD LED

This LED will light when the hard drive is being accessed.

RESET SW - Reset Switch

This switch allows you to reboot without having to power off the system.

ATX-SW - ATX Power Switch

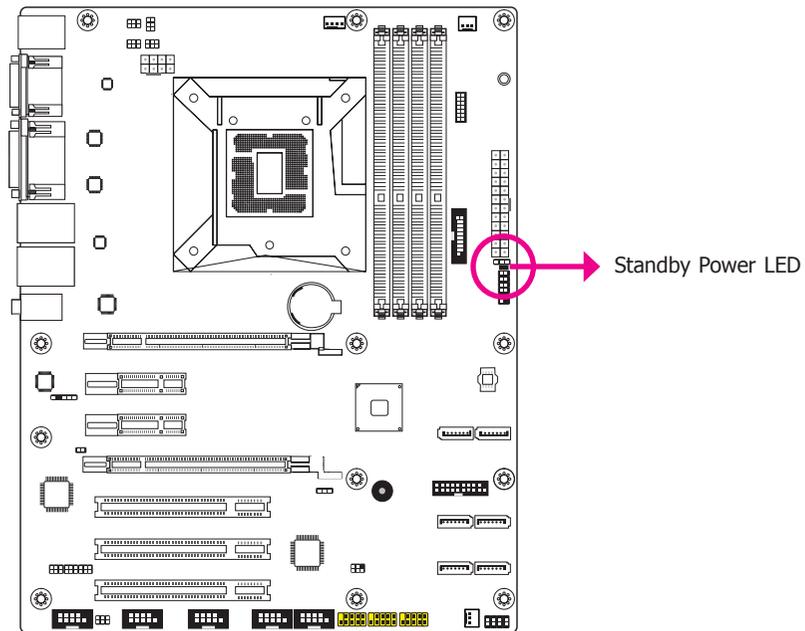
This switch is used to power on or off the system.

PWR-LED - Power/Standby LED

When the system's power is on, this LED will light. When the system is in the S1 (POS - Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 4 seconds.

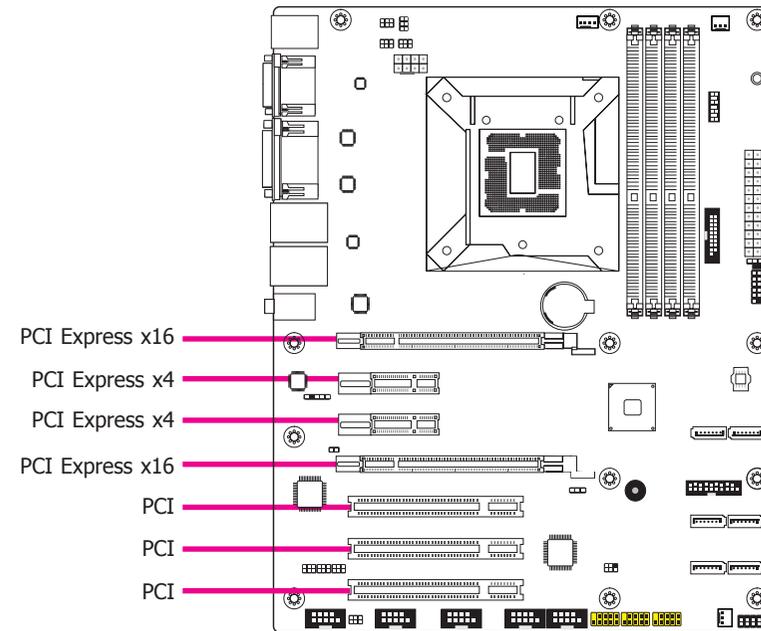
	Pin	Pin Assignment		Pin	Pin Assignment
HDD-LED	3	HDD Power	PWR-LED	2	LED Power
	5	Signal		4	LED Power
RESET SW	7	Ground	ATX-SW	6	Signal
	9	RST Signal		8	Ground
	11	N.C.		10	Signal

Standby Power LED



This LED will lit red when the system is in the standby mode. It indicates that there is power on the system board. Power-off the PC and then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

Expansion Slots



PCI Express x16 Slot

Install PCI Express x16 graphics card, that comply to the PCI Express specifications, into the PCI Express x16 slot. To install a graphics card into the x16 slot, align the graphics card above the slot then press it down firmly until it is completely seated in the slot. The retaining clip of the slot will automatically hold the graphics card in place.

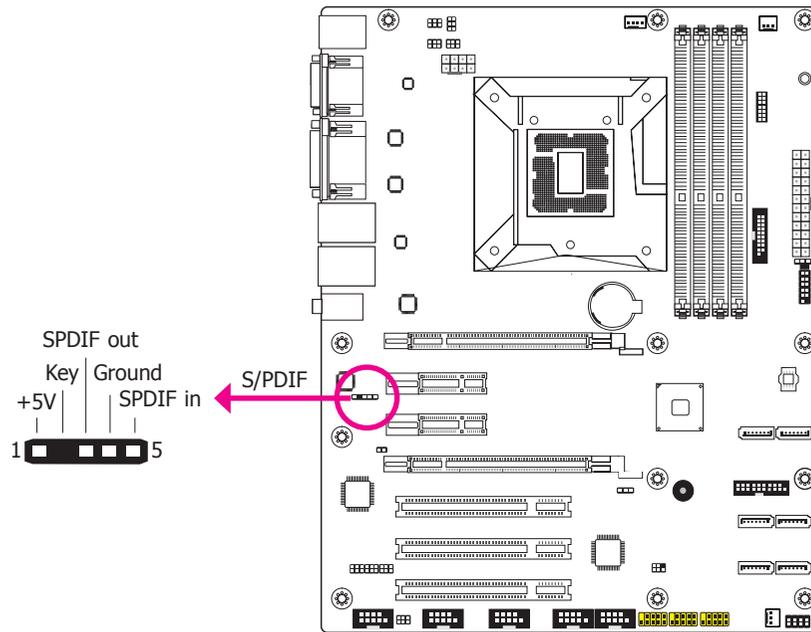
PCI Slot

The PCI slot supports expansion cards that comply with PCI specifications. You can install a PCI expansion card or a customized riser card designed for only 2 PCI slots expansion (for low profile PCI card only) into the PCI slot.

PCI Express x4 Slot

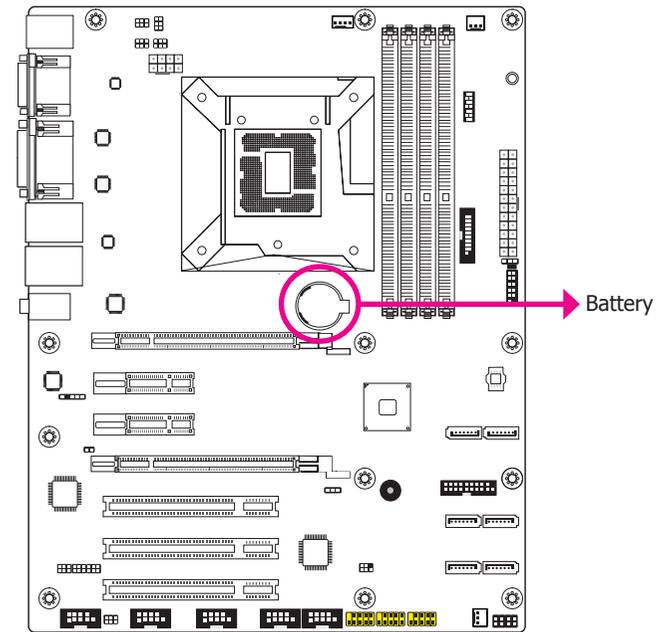
Install PCI Express cards such as network cards or other cards that comply to the PCI Express specifications into the PCI Express x4 slot.

S/PDIF Connector



The S/PDIF connector is used to connect an external S/PDIF port. Your S/PDIF port may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then connect the audio cable to the S/PDIF connector. Make sure pin 1 of the audio cable is aligned with pin 1 of the S/PDIF connector.

Battery



The lithium ion battery powers the real-time clock and CMOS memory. It is an auxiliary source of power when the main power is shut off.

Safety Measures

- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.

Chapter 6 - BIOS Setup

Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board. The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.

It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.



Note:

The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are keyboard commands. The commands are available at the right side of each setup screen.

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message "Press DEL to run setup" will appear on the screen. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and keys simultaneously.

Legends

Keys	Function
Right and Left arrows	Moves the highlight left or right to select a menu.
Up and Down arrows	Moves the highlight up or down between submenu or fields.
<Esc>	Exit to the BIOS Setup Utility.
+ (plus key)	Scrolls forward through the values or options of the highlighted field.
- (minus key)	Scrolls backward through the values or options of the highlighted field.
Tab	Select a field.
<F1>	Displays general help
<F2>	Pervious values
<F3>	Optimized defaults
<F4>	Saves and resets the setup program.
<Enter>	Press <Enter> to enter the highlighted submenu.

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

When "►" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

Insyde BIOS Setup Utility

Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.

InsydeH20 Setup Utility		Rev. 5.0
Main	Advanced	Security Boot Exit
Project Name	SD631	This is the help for the hour, minute, second field. Valid range is from 0 to 23, 0 to 59, 0 to 59. INCREASE/REDUCE: +/-.
BIOS Version	66.16A	
Processor Type	Intel(R) Core(TM) i7-6700TE CPU @ 2.40GHz	
CPUID:	0x506E3 (SKYLAKE DT HALO)	
CPU Speed:	2400 MHz	
CPU Stepping:	03 (R0/S0 Stepping)	
L1 Data Cache:	32 KB	
L1 Instruction Cache:	32 KB	
L2 Cache:	256 KB	
L3 Cache:	8192 KB	
Number of Processors:	4 Core(s) / 8 Thread(s)	
Microcode Rev:	0000006A	
Total Memory	8192MB	
System Memory Speed	2133 MHz	
Channel A		
DIMM 0	8192 MB	
Unknown 1	[Not Installed]	
Channel B		
Unknown 0	[Not Installed]	
Unknown 1	[Not Installed]	
PCH Rev / SKU	31 (D1 Stepping) / SKL PCH-H C236	
Intel ME Version / SKU	11.0.0.1205 / CORPORATE	
System Time	[10:33:40]	
System Date	[06/20/2016]	
F1 Help	↑/↓ Select Item	F5/F6 Change Values
Esc Exit	←/→ Select Item	Enter Select ► SubMenu
		F9 Setup Defaults
		F10 Save and Exit

System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1980 to 2099.

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.



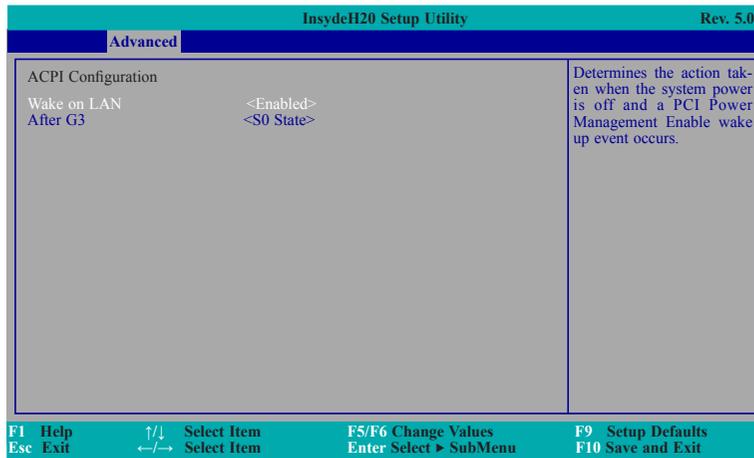
Important:

Setting incorrect field values may cause the system to malfunction.

InsydeH20 Setup Utility		Rev. 5.0
Main	Advanced	Security Boot Exit
▶ ACPI Configuration		ACPI Configuration Setting
▶ CPU Configuration		
▶ Video Configuration		
▶ Audio Configuration		
▶ SATA Configuration		
▶ USB Configuration		
▶ PCI Express Configuration		
▶ ME Configuration		
MEBX Configuration		
▶ Active Management Technology Support		
▶ SIO NUVOTON6106D		
F1 Help	↑/↓ Select Item	F5/F6 Change Values
Esc Exit	←/→ Select Item	Enter Select ► SubMenu
		F9 Setup Defaults
		F10 Save and Exit

ACPI Settings

This section is used to configure the system ACPI parameters.



Wake on LAN

This field use to enable or disable the LAN signal to wake up the system.

After G3

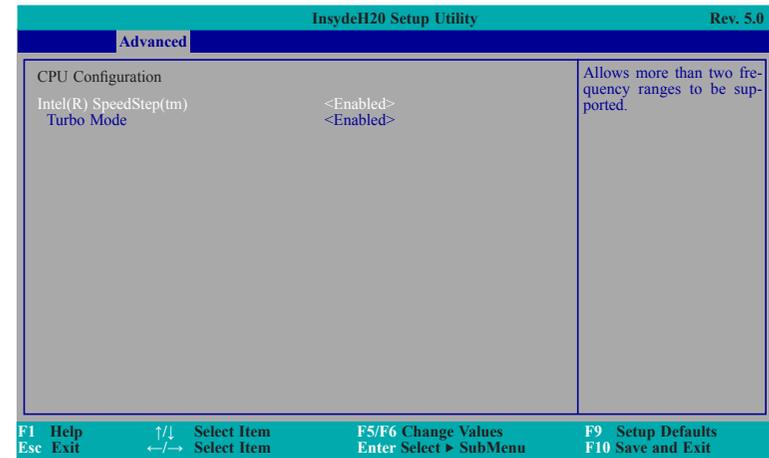
This field is to specify what state to go when power is re-applied after a power failure (G3 state).

S0 State The system working state.

S5 State Off, except for trickle current to devices such as the power button.

CPU Configuration

This section is used to configure the CPU.



Intel(R) SpeedStep(tm)

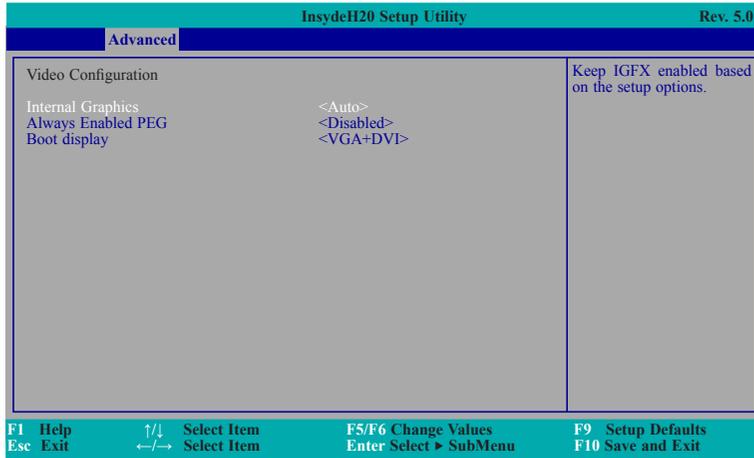
This field is used to enable or disable the Intel Enhanced SpeedStep Technology.

Turbo Mode

Enable or disable the turbo mode.

Video Configuration

This section configures the video settings.



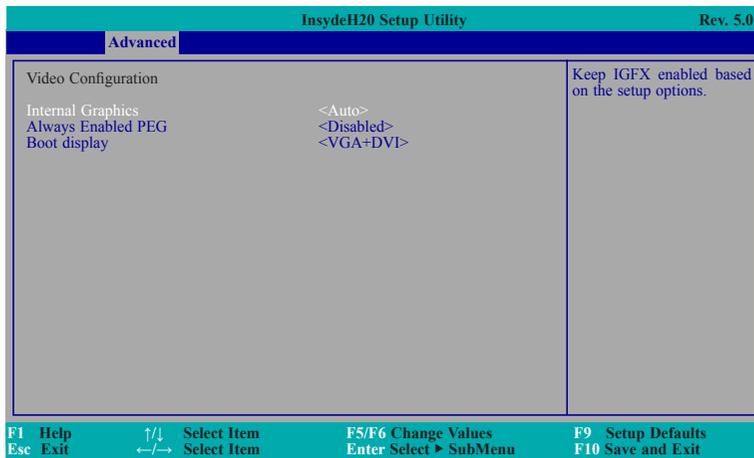
Note:

To control "Primary Display" & "Boot Display", first go to "Boot" menu and select different "Boot Type" (page 37).

Boot Type : Legacy Boot Type -> Hide Primary Display & Show Boot Display

Boot Type : UEFI Boot Type -> Show Primary Display & Hide Boot Display

Boot Type : Dual Boot Type -> Show Primary Display & Show Boot Display



Internal Graphics

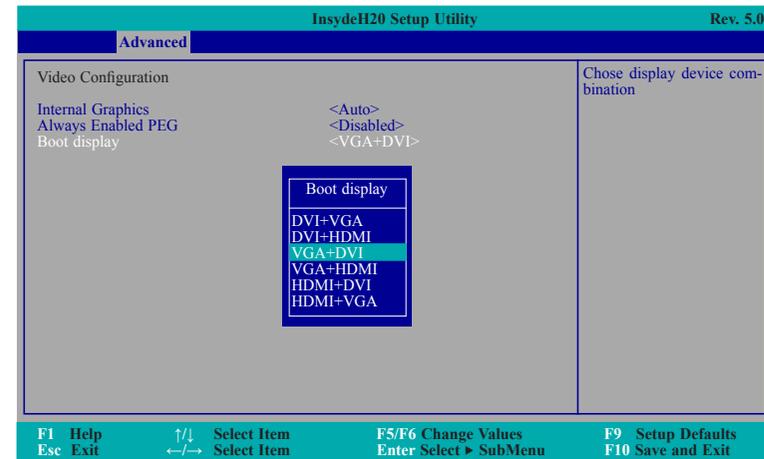
Keep IGFX enabled or disabled based on the setup options.

Always Enabled PEG

Enable or disable the PEG function.

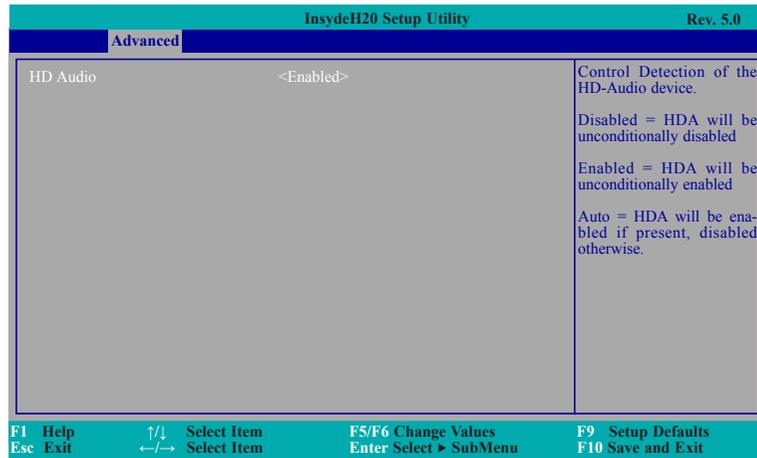
Boot display

Set the display device combination.



Audio Configuration

This section is used to configure the audio settings.



HD Audio

Control the detection of the HD-Audio device.

Disabled

HDA will be unconditionally disabled.

Enabled

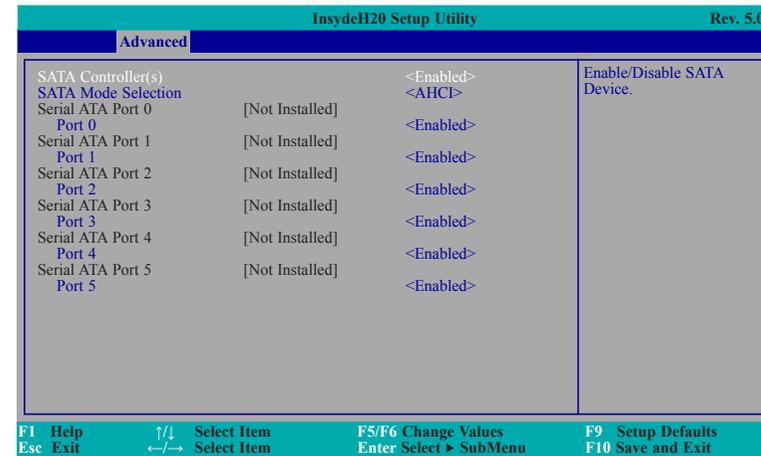
HDA will be unconditionally enabled.

Auto

HDA will be enabled if present, disabled otherwise.

SATA Configuration

This section is designed to select the SATA controller and the type of hard disk drive which are installed in your system unit.



SATA Controller(s)

This field is used to enable or disable Serial ATA devices.

SATA Mode Selection

The mode selection determines how the SATA controller(s) operates.

AHCI Mode

This option allows the Serial ATA devices to use AHCI (Advanced Host Controller Interface).

RAID Mode

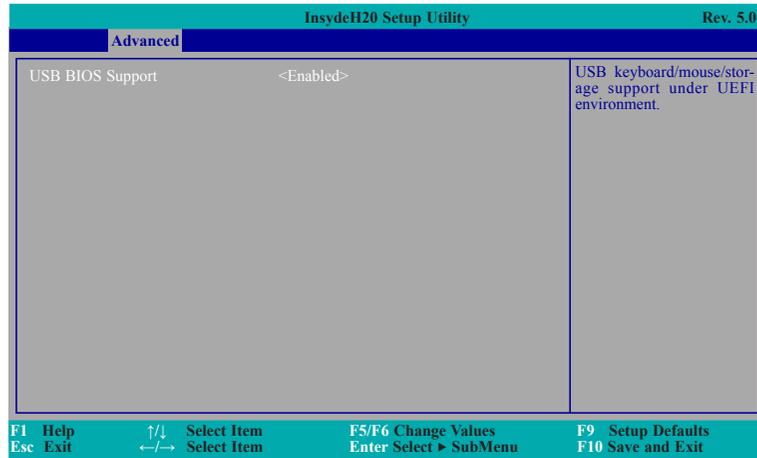
This option allows you to create RAID or Intel Matrix Storage configuration on Serial ATA devices.

Serial ATA Port 0, 1, 2, 3, 4, and 5

This field is used to enable or disable the serial ATA port.

USB Configuration

This section is used to configure the parameters of the USB device.



USB BIOS Support

Disabled

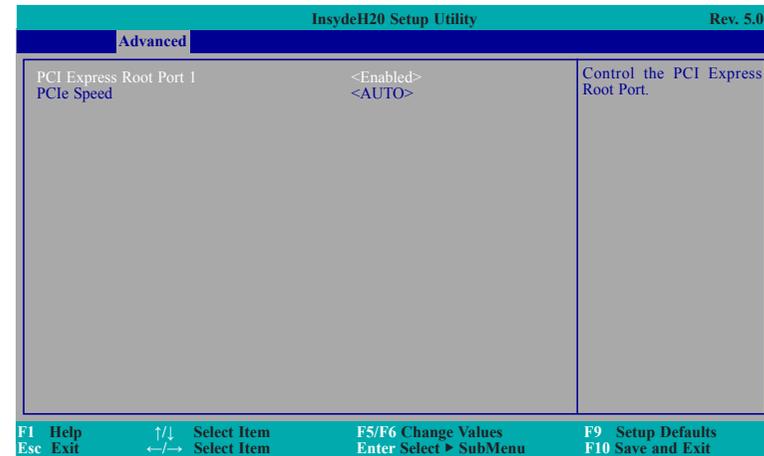
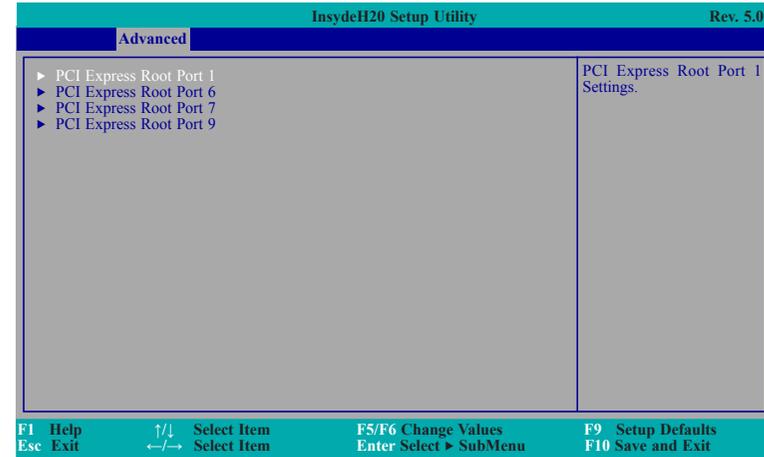
Disable USB keyboard/mouse/storage support under UEFI environment.

Enabled

Enable USB keyboard/mouse/storage support under UEFI environment.

PCI Express Configuration

This section configures settings relevant to PCI Express root ports.



PCI Express Root Port

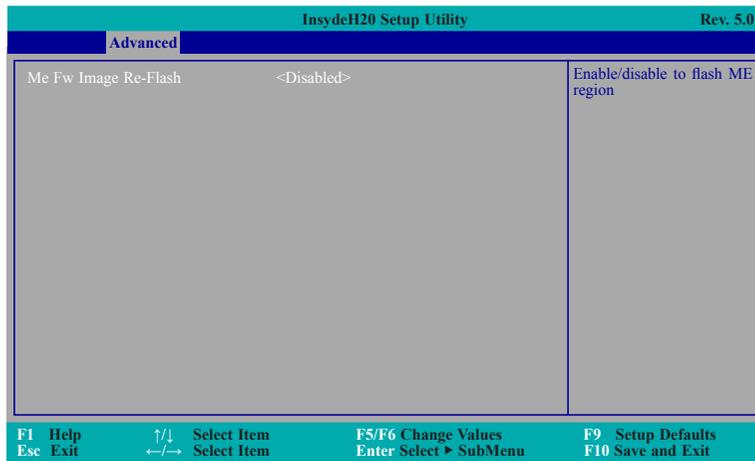
This field is used to enable or disable the PCI Express Root Port.

PCIe Speed

Select the speed of the PCI Express Root Port: Auto, Gen1, Gen2 or Gen3.

ME Configuration

This section is used to configure the parameters of the USB device.

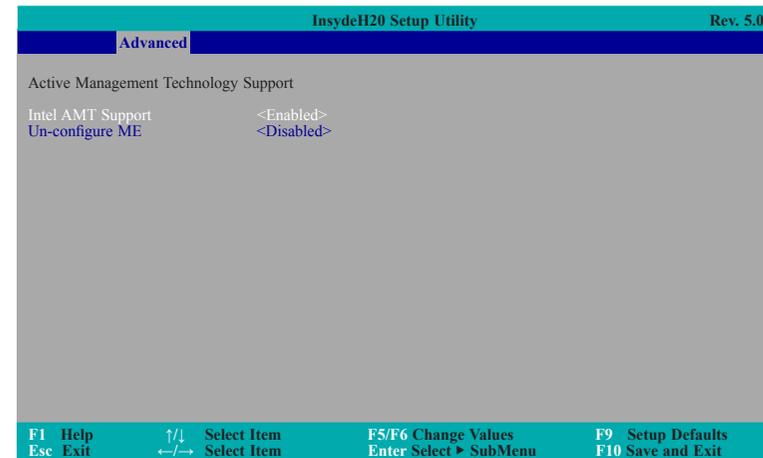


Me Fw Image Re-Flash

This field is used to enable or disable the flash ME region.

Active Management Technology Support

The section allows users to enable or disable the Intel® Active Management Technology (Intel® AMT) BIOS extension. Please refer to **Chapter 6** for more information.



Intel AMT Support

This field is used to enable or disable Intel(R)Active Management Technology BIOS Extension.

Un-Configure ME

This field is used to enable or disable un-figuring ME without password.

SIO NUVOTON6106D

This section configures the system super I/O chip parameters.

InsydeH20 Setup Utility		Rev. 5.0
Advanced		
SYS Smart Fan Control	<Enable>	Enable/Disable Smart Fan
Boundary 1	[30]	
Boundary 2	[40]	
Boundary 3	[50]	
Boundary 4	[60]	
Fan Speed Count 1	[30]	
Fan Speed Count 2	[40]	
Fan Speed Count 3	[50]	
Fan Speed Count 4	[75]	
CPU Smart Fan Control	<Enable>	
Boundary 1	[30]	
Boundary 2	[40]	
Boundary 3	[50]	
Boundary 4	[60]	
Fan Speed Count 1	[30]	
Fan Speed Count 2	[40]	
Fan Speed Count 3	[50]	
Fan Speed Count 4	[75]	
SYS Smart Fan 2 Control	<Enable>	
Boundary 1	[30]	
Boundary 2	[40]	
Boundary 3	[50]	
Boundary 4	[60]	

F1 Help ↑/↓ Select Item F5/F6 Change Values F9 Setup Defaults
 Esc Exit ←/→ Select Item Enter Select ► SubMenu F10 Save and Exit

SYS/CPU Smart Fan/Fan 2 Control

Enable or disable the system/CPU smart fan/fan 2.

Boundary 1 to Boundary 4

Set the boundary temperature. The range is from 0-127°C.

Fan Speed Count 1 to Fan Speed Count 4

Set the fan speed. The range is from 1-100%.

InsydeH20 Setup Utility		
Advanced		
Fan Speed Count 1	[30]	Configure Serial port using options: [Disable] No Configuration [Enable] User Configuration[Auto] EFI/OS chooses configuration
Fan Speed Count 2	[40]	
Fan Speed Count 3	[50]	
Fan Speed Count 4	[75]	
COM Port 1	<Enable>	
Base I/O Address	<3F8>	
Interrupt	<IRQ4>	
RS485 Auto Flow	<Disable>	
COM Port 2	<Enable>	
Base I/O Address	<2F8>	
Interrupt	<IRQ3>	
RS485 Auto Flow	<Disable>	
COM Port 3	<Enable>	
Base I/O Address	<3E8>	
Interrupt	<IRQ4>	
COM Port 4	<Enable>	
Base I/O Address	<2E8>	
Interrupt	<IRQ3>	
COM Port 5	<Enable>	
Base I/O Address	<2F0>	
Interrupt	<IRQ4>	
COM Port 6	<Enable>	
Base I/O Address	<2E0>	
Interrupt	<IRQ3>	
WDT	<Disable>	
Case Open	<Disable>	
AC Power Loss	<Disable>	
►PC Health Status	<Always off>	

F1 Help ↑/↓ Select Item F5/F6 Change Values F9 Setup Defaults
 Esc Exit ←/→ Select Item Enter Select ► SubMenu F10 Save and Exit

Serial Port 1 to Serial Port 6

Configure the settings to use the serial port.

Disable No configuration

Enable User configuration

RS485 Auto Flow

Enable or disable RS485 auto flow.

WDT

Enable or disable the watchdog function. A counter will appear if you select to enable WDT. Input any value between 1 to 255 seconds.

Case Open

Enable or disable the case open.

AC Power Loss

Set the AC power loss always off/on.



Note:

SYS Smart Fan, CPU Smart Fan Control, and SYS Smart Fan 2 Control can be switched to <Disable>. When they are disabled, it will enable "Fix Fan Speed Count".

PC Health Status

This section displays the hardware health monitor.

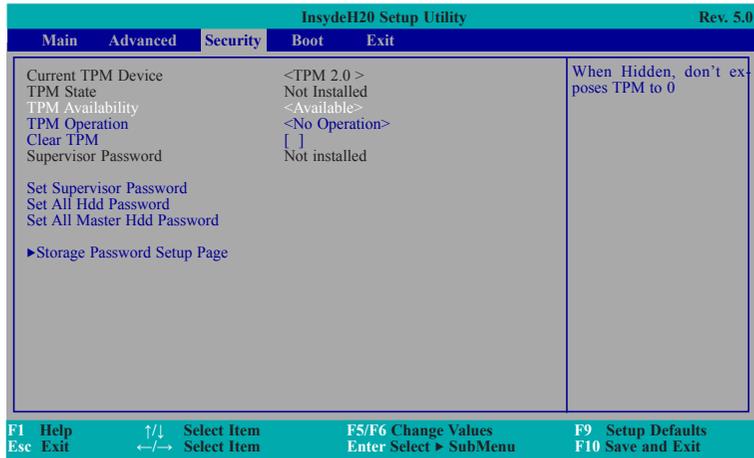
InsydeH20 Setup Utility		
Advanced		
SYS Smart Fan Control	<Disable>	Enable/Disable Smart Fan
Fix Fan Speed Count	[50]	
CPU Smart Fan Control	<Disable>	
Fix Fan Speed Count	[50]	
SYS Smart Fan 2 Control	<Disable>	
Fix Fan Speed Count	[50]	
COM Port 1	<Enable>	
Base I/O Address	<3F8>	
Interrupt	<IRQ4>	
RS485 Auto Flow	<Disable>	
COM Port 2	<Enable>	
Base I/O Address	<2F8>	
Interrupt	<IRQ3>	
RS485 Auto Flow	<Disable>	
COM Port 3	<Enable>	
Base I/O Address	<3E8>	
Interrupt	<IRQ4>	
COM Port 4	<Enable>	
Base I/O Address	<2E8>	
Interrupt	<IRQ3>	
COM Port 5	<Enable>	
Base I/O Address	<2F0>	
Interrupt	<IRQ4>	

F1 Help	↑/↓ Select Item	F5/F6 Change Values	F9 Setup Defaults
Esc Exit	←/→ Select Item	Enter Select ► SubMenu	F10 Save and Exit

InsydeH20 Setup Utility		
Advanced		
SYS Smart Fan Control	<Disable>	Enable/Disable Smart Fan
Fix Fan Speed Count	[50]	
CPU Smart Fan Control	<Disable>	
Fix Fan Speed Count	[50]	
SYS Smart Fan 2 Control	<Disable>	
Fix Fan Speed Count	[50]	
COM Port 1	<Enable>	
Base I/O Address	<3F8>	
Interrupt	<IRQ4>	
RS485 Auto Flow	<Disable>	
COM Port 2	<Enable>	
Base I/O Address	<2F8>	
Interrupt	<IRQ3>	
RS485 Auto Flow	<Disable>	
COM Port 3	<Enable>	
Base I/O Address	<3E8>	
Interrupt	<IRQ4>	
COM Port 4	<Enable>	
Base I/O Address	<2E8>	
Interrupt	<IRQ3>	
COM Port 5	<Enable>	
Base I/O Address	<2F0>	
Interrupt	<IRQ4>	

F1 Help	↑/↓ Select Item	F5/F6 Change Values	F9 Setup Defaults
Esc Exit	←/→ Select Item	Enter Select ► SubMenu	F10 Save and Exit

Security



TPM Availability

Set the TPM availability.

TPM Operation

Enable or disable the storage and endorsement hierarchy. This option will automatically return to No-Operation.

Clear TPM

Remove all TPM context associated with a specific owner.

Set Supervisor Password

Set the supervisor's password and the length of the password must be greater than one character.

Set All Hdd Password

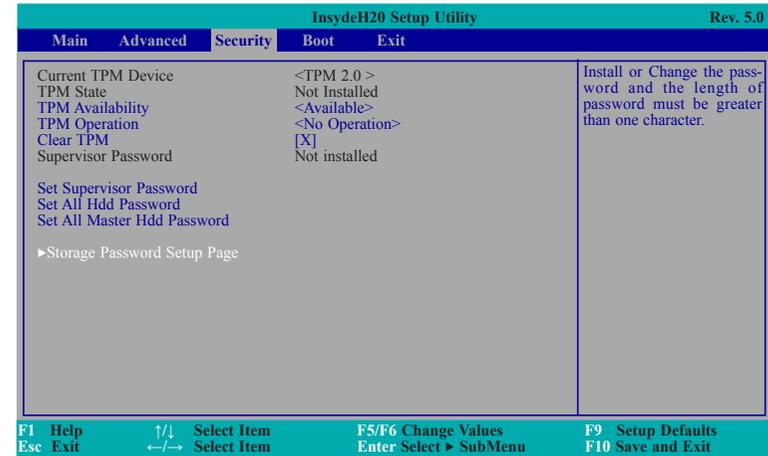
Set all HDD password and suggest the length of password greater than one character. This item can be displayed when any security mode of HDD is not Lock.

Set All Master Hdd Password

Set all master HDD password and suggest the length of password greater than one character. This item can be displayed when any security mode of HDD is not Lock.

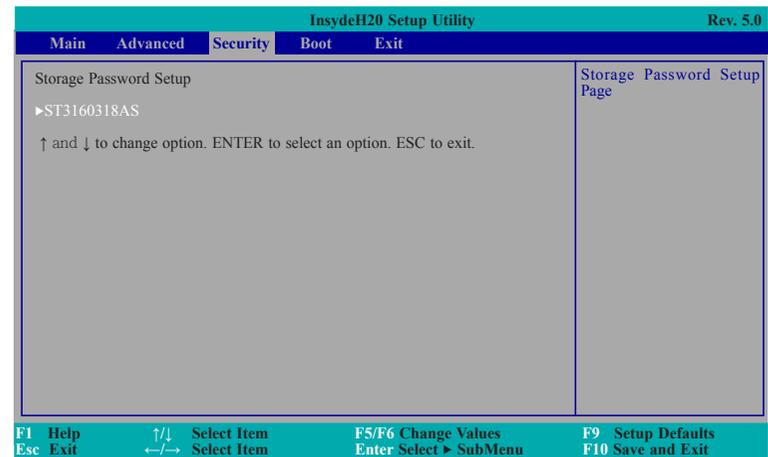
Storage Password Setup Page

This section configures the status control when the power failure occurs.



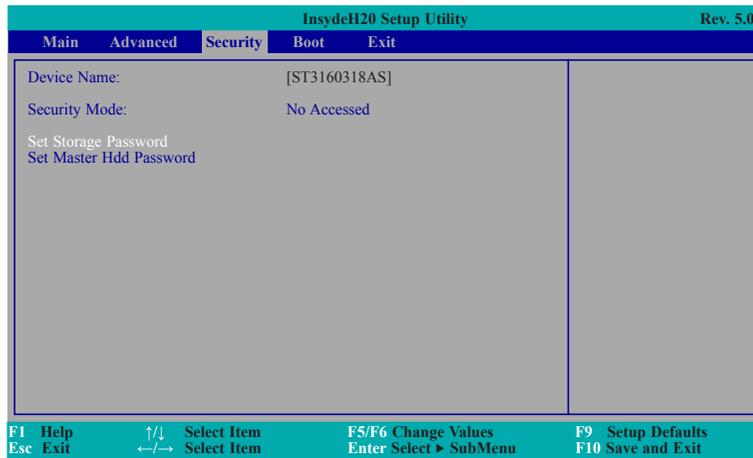
Storage Password Setup Page

This option allows you to set up storage password.



ST3160318AS (Device Name)

This option allows you to go to Storage Password List Help.



Security Mode Description

Lock: HDD security status is enable and lock.

Unlock: HDD security status is enable and lock.

Change: HDD security status is unlock and user changes to the new password.

Disable: Remove HDD password from device.

No Access: HDD Security status is not enabled when entering SCU.

Set Storage Password

Set all HDD password and suggest the length of password greater than one character.
How to clear HDD password: only press "Enter" when set new password.

Set Master Hdd Password

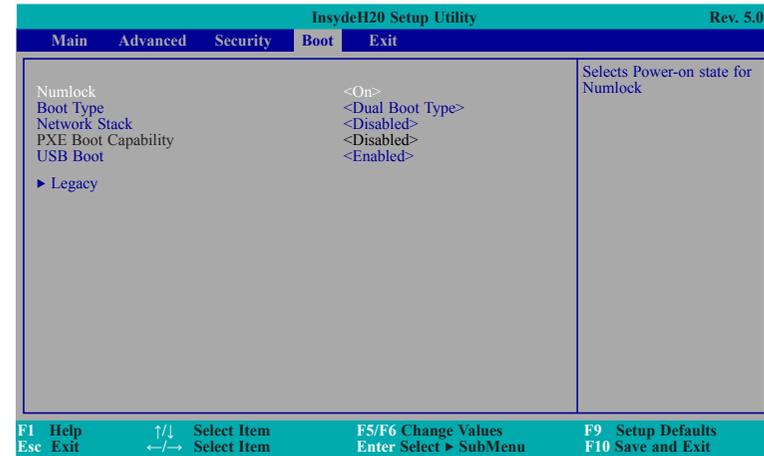
Set master HDD password and suggest the length of password greater than one character.

When security mode is Lock, input master HDD password to unlock HDD.

Master HDD password is valid when HDD password is set.

Only pressing "Enter" would clear HDD password and make HDD security disable when set new master HDD password.

Boot



Numlock

Select the power-on state for numlock.

Boot Type

Select the boot type. The options are Dual Boot Type, Legacy Boot Type or UEFI Boot Type.

If you select "Dual Boot" or "UEFI Boot", the "Network Stack", "PXE Boot Capability" and "USB Boot" will show up.

If you select "Legacy Boot", "PXE Boot to LAN" and "USB Boot" will show up.



Note:

If the boot type is set to UEFI, the method for RAID volume creation will be different. Please refer to Chapter 8 - RAID for more information.

Network Stack

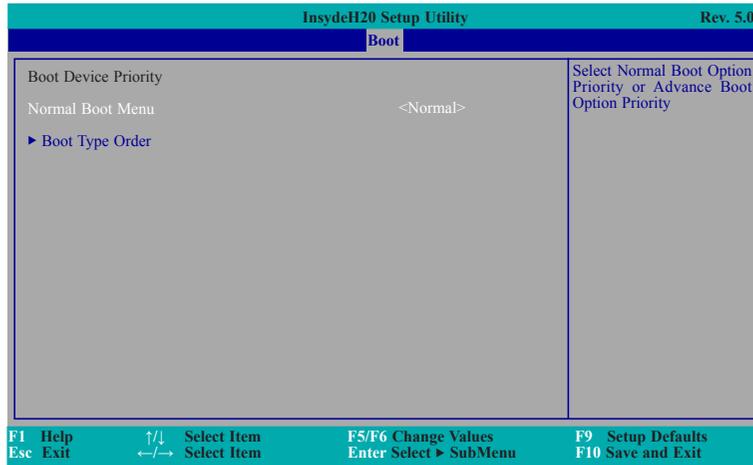
This field is used to enable or disable network stack.

PXE Boot Capability

Disabled : Support Network Stack
UEFI PXE : IPv4/IPv6
Legacy : Legacy PXE OPROM only

USB Boot

Enable or disable the booting to USB boot devices.



Normal Boot Menu

Normal

Based on the boot normal priority, it determines the EFI device first or the legacy device first.

Advance

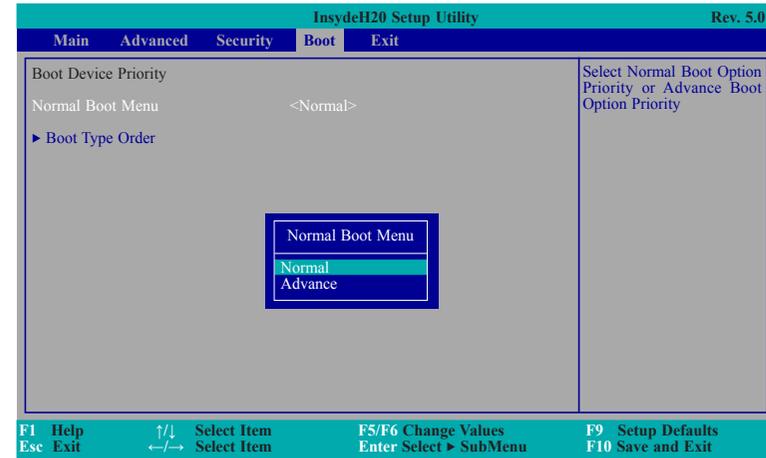
All boot devices follow the user's selection sequence.

Boot Type Order

Select the priority of boot type: Normal Boot or Advance Boot.

Legacy

This section is used to set legacy boot order.



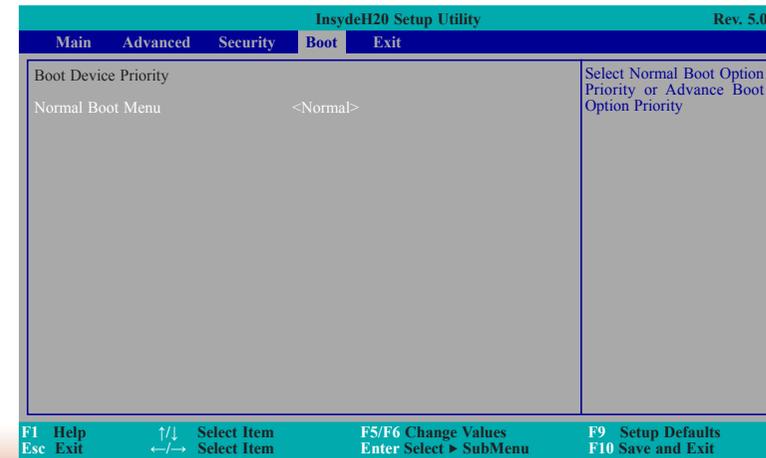
Normal Boot Menu

Normal

Based on the boot normal priority, it determines the EFI device first or the legacy device first.

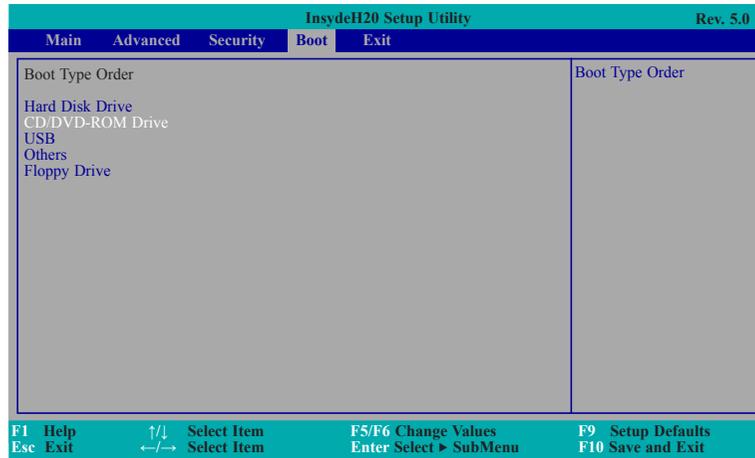
Advance

All boot devices follow the user's selection sequence. Use + and - keys to arrange the priority of the listed boot devices.

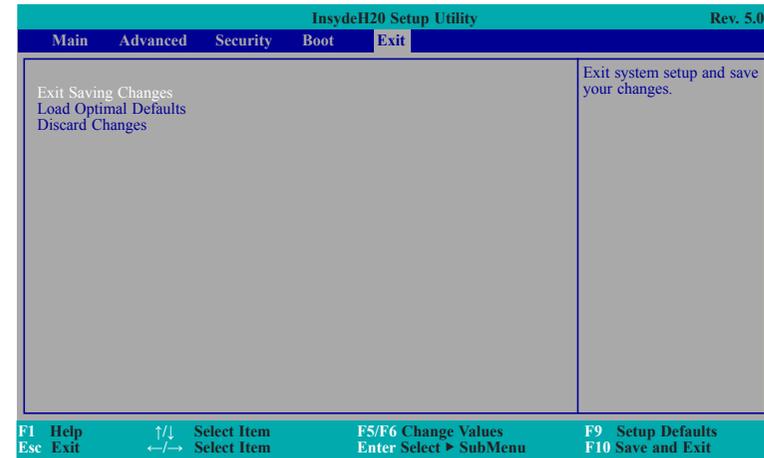


Boot Type Order

Use + and - keys to arrange the sequence of storage devices that the system's hardware checks for the operating system's boot files. The first device in the order list has the first boot priority. For example, to boot from a floppy drive instead of a hard drive, place the floppy drive ahead of the hard drive in priority.



Exit



Exit Saving Changes

Select this field and then press <Enter> to exit the system setup and save your changes.

Load Optimal Defaults

Select this field and then press <Enter> to load optimal defaults.

Discard Changes

Select this field and then press <Enter> to exit the system setup without saving your changes.

Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility. Please contact technical support or your sales representative for the files and specific instructions about how to update BIOS with the flash utility.

When you download the given BIOS file, you may find a BIOS flash utility attached with the BIOS file. This is the utility for performing BIOS updating procedure. For your convenience, we will also provide you with an auto-execution file in the BIOS file downloaded. This auto-execution file will bring you directly to the flash utility menu soon after system boots up and finishes running the boot files in your boot disk.

```

Read file successfully. (path= "platform.ini")

Information
Please do not remove the AC power

Insyde H20FFT (Flash Firmware Tool) Version (SEG) 100.00.08.10
Copyright(c) 2012 - 2016, Insyde Software Corp. All Rights Reserved.

Initializing
Current BIOS Model name: SD631-Q170/C236
New BIOS Model name: SD631-Q170/C236

Current BIOS version: 65.05A
New BIOS version: 65.05A

Updating Block at FFFF000h
0%      25%      50%      75%      100%
|-----|-----|-----|-----|
C:\SD631-Q170\C236>_
  
```

Notice: BIOS SPI ROM

1. The Intel® Management Engine has already been integrated into this system board. Due to the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.
2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.
3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.



Note:

- a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
- b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical person's instructions to confirm that the MAC address should be burned or not.

Chapter 7 - Supported Software

Some devices of the system require drivers from hardware manufactures to operate properly. The system may come with a CD/DVD that contains drivers, utilities and software applications. Insert the CD into a CD-ROM drive. The auto-run screen (Mainboard Utility CD) will appear. If the "Autorun" does not automatically start, please go to the root directory of the CD and double-click "Setup".

If your product package does not include a CD/DVD, you can download the latest drivers from the DFI Download Center:

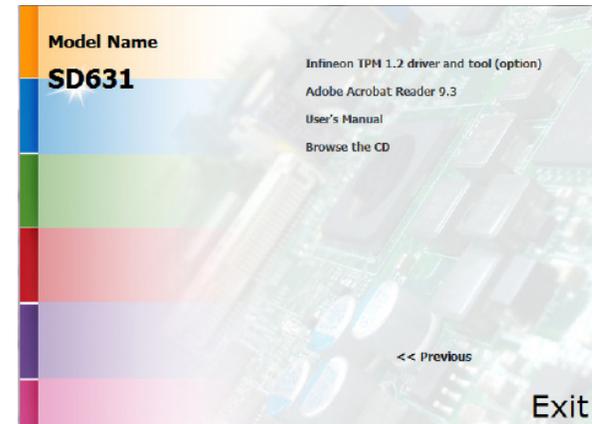
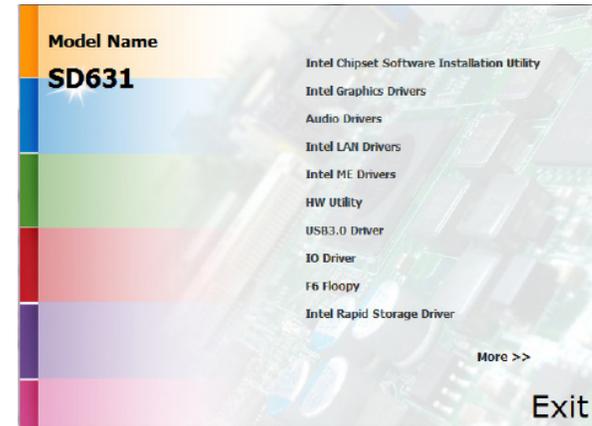
<http://www.dfi.com/DownloadCenter>

Once you are in the Download Center page, select your product or type the model name and click "Search" to find product-related resources such as documentation and drivers.

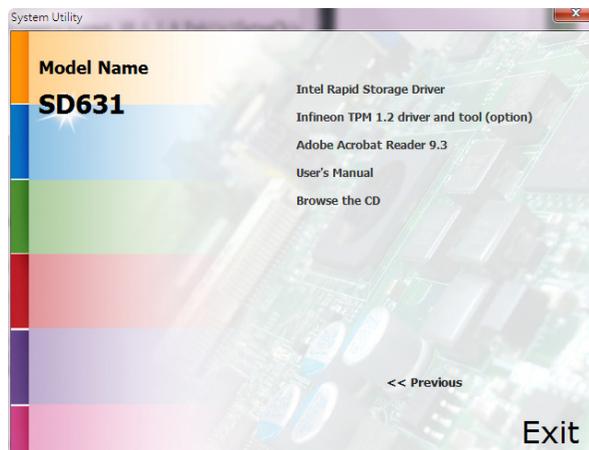
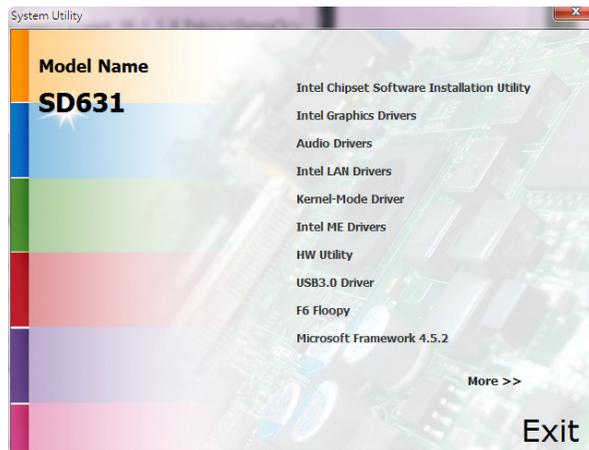
For Windows 10



For Windows 8.1



For Windows 7



Intel Chipset Software Installation Utility

The Intel Chipset Software Installation Utility is used for updating Windows® INF files so that the Intel chipset can be recognized and configured properly in the system.

To install the utility, click "Intel Chipset Software Installation Utility" on the main menu.

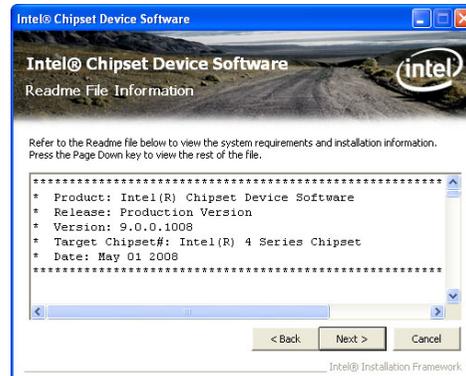
1. Setup is ready to install the utility. Click Next.



2. Read the license agreement then click Yes.



- Go through the readme document for more installation tips then click Next.



- Click Finish to exit setup.



Intel Graphics Drivers

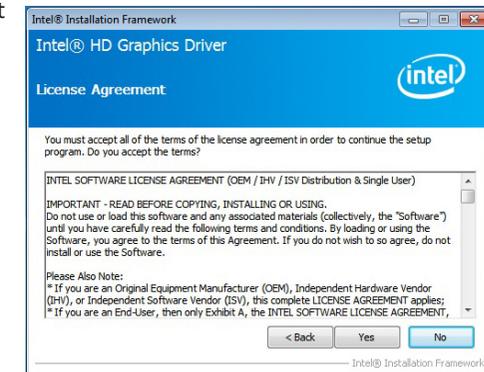
To install the driver, click "Intel Graphics Drivers" on the main menu.

- Setup is now ready to install the graphics driver. Click Next.

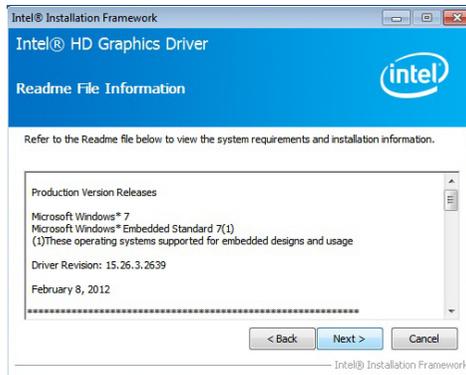


By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 7/Windows 8.1/Windows 10 desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.

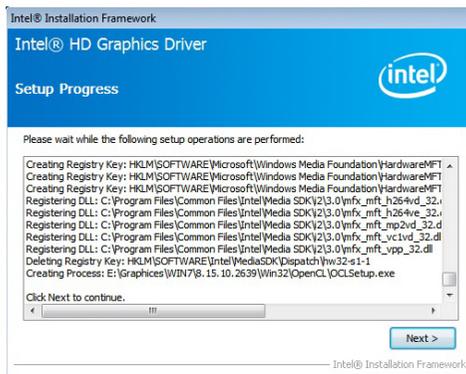
- Read the license agreement then click Yes.



- Go through the readme document for system requirements and installation tips then click Next.

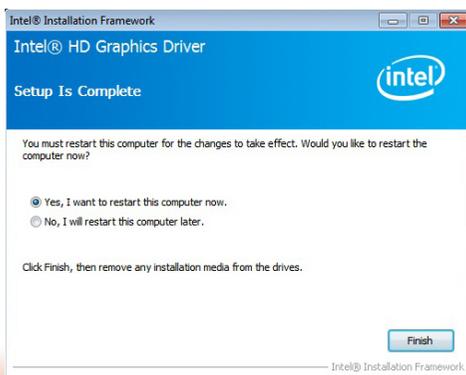


- Setup is now installing the driver. Click Next to continue.



- Click "Yes, I want to restart this computer now" then click Finish.

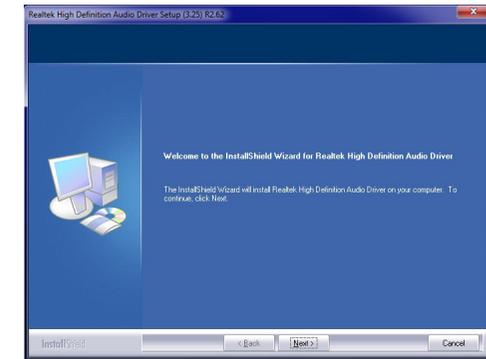
Restarting the system will allow the new software installation to take effect.



Audio Drivers

To install the driver, click "Audio Drivers" on the main menu.

- Setup is ready to install the driver. Click Next.



- Click "Yes, I want to restart my computer now" then click Finish.

Restarting the system will allow the new software installation to take effect.



Intel LAN Drivers

To install the driver, click "Intel LAN Drivers" on the main menu.

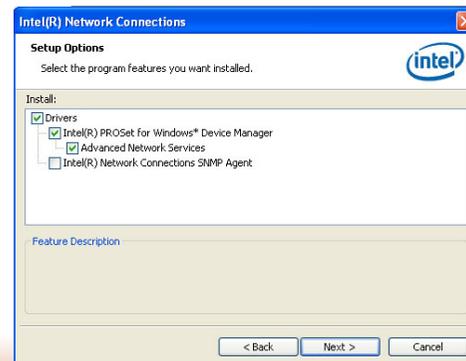
1. Setup is ready to install the driver. Click Next.



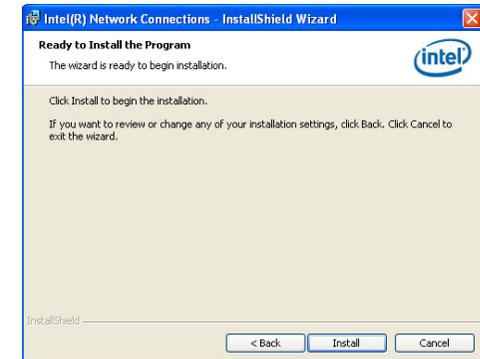
2. Click "I accept the terms in the license agreement" then click "Next".



3. Select the program features you want installed then click Next.



4. Click Install to begin the installation.



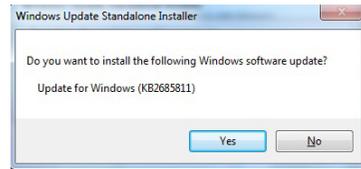
5. After completing installation, click Finish.



Kernel Mode Driver Framework (For Windows 7 only)

To install the driver, click "Kernel Mode Driver Framework" on the main menu.

1. Click "Yes" to install the update.



2. The update is installed now.



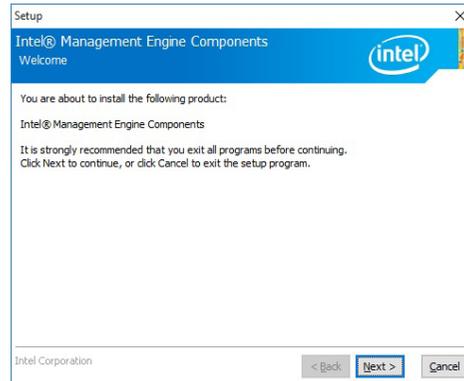
3. Click "Restart Now" to restart your computer when the installation is complete.



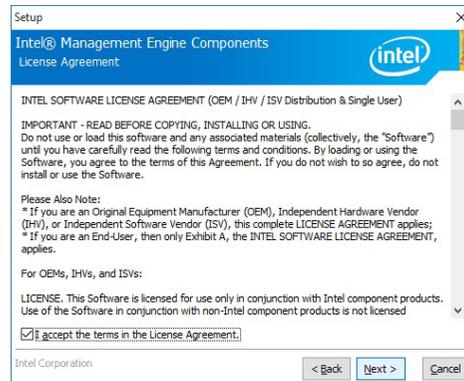
Intel Management Engine Drivers

To install the driver, click "Intel Management Engine Drivers" on the main menu.

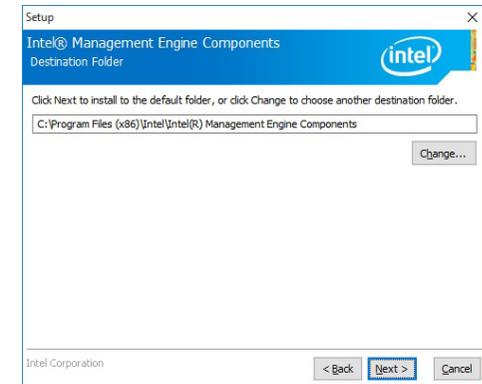
1. Setup is ready to install the driver. Click Next.



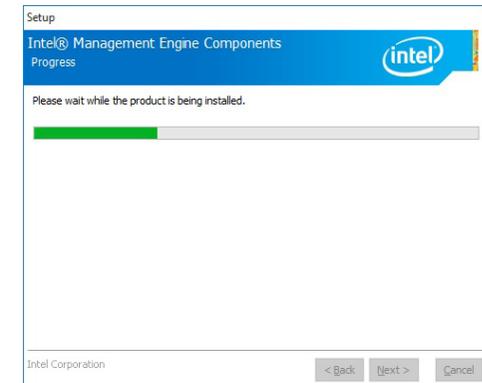
2. Read the license agreement then click Next.



3. Setup is currently installing the driver. After installation has completed, click Next.



4. Please wait while the product is being installed.



5. After completing installation, click Finish.



HW Utility

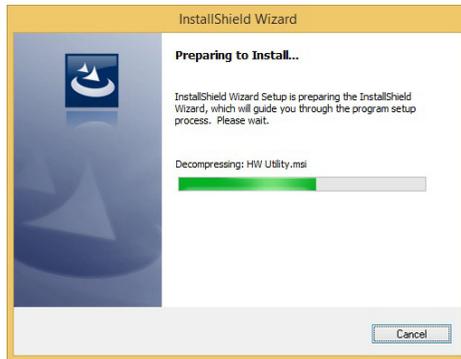
HW Utility provides information about the board, Watchdog, and DIO. To access the utility, click "HW Utility" on the main menu.



Note:

If you are using Windows 7 or later versions, you need to access the operating system as an administrator to be able to install the utility.

1. Setup is ready to install the driver.



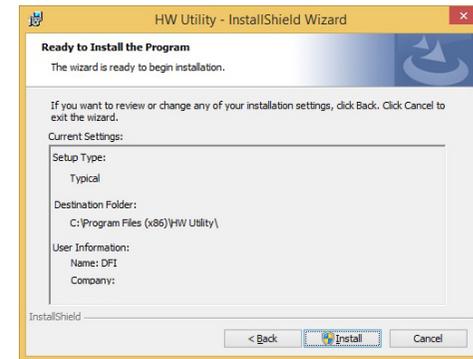
2. Click "Next" to continue.



3. Read the license agreement then click "I accept the terms in the license agreement". Click "Next".



4. The wizard is ready to begin installation. Click "Install".



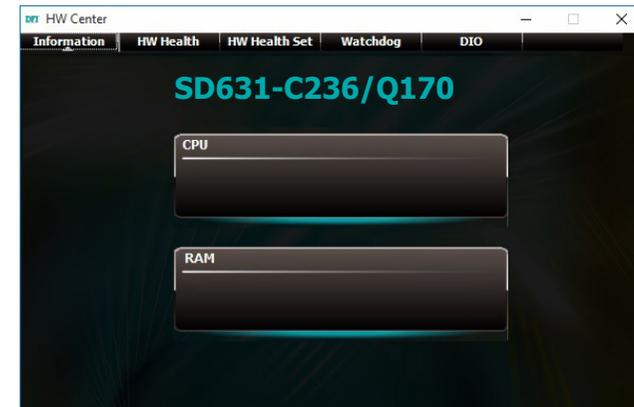
5. Please wait while the program features are being installed.



6. After completing installation, click "Finish".



The HW Utility icon will appear on the desktop. Double-click the icon to open the utility.



Information



Note:

Note: The screenshot displayed above is for illustrative purpose only, and may not resemble the actual screen.

The SD631-C236/Q170 HW Utility features the following tabs: Information, HW Health, HW Healthset, Watchdog, and DIO. Click on the tabs to access information about the board.

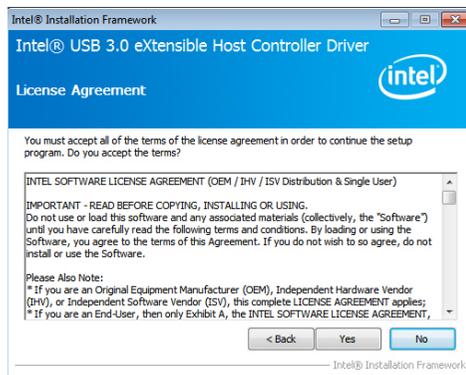
Intel USB 3.0 Drivers (For Windows 7 and Windows 8.1)

To install the driver, click "Intel USB 3.0 Driver" on the main menu.

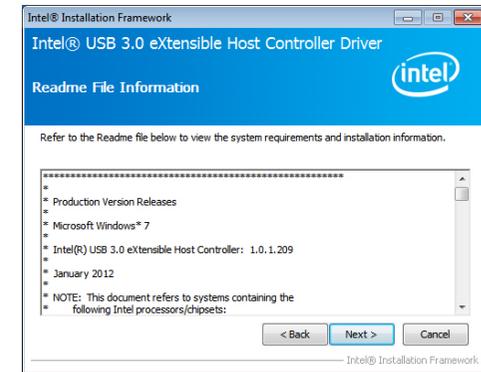
1. Setup is ready to install the driver. Click Next.



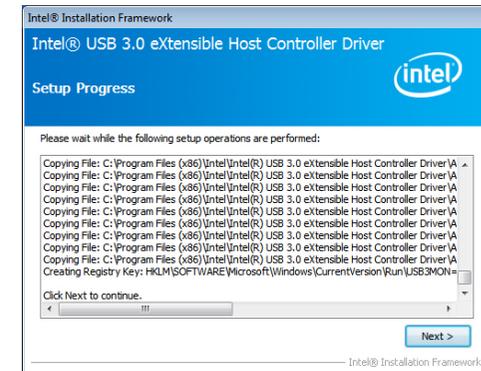
2. Read the license agreement then click Yes.



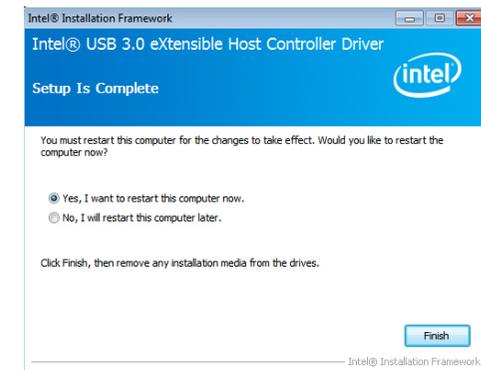
3. Go through the readme document for more installation tips then click Next.



4. Setup is currently installing the driver. After installation has completed, click Next.



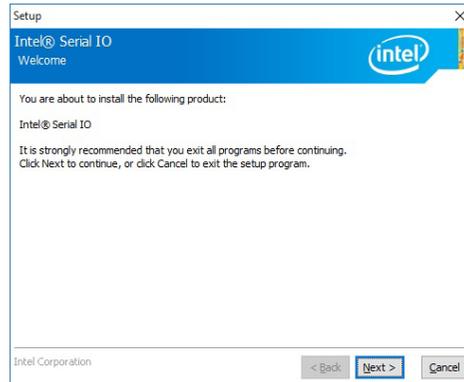
5. After completing installation, click Finish.



IO Driver (For Windows 8.1 and Windows 10)

To install the driver, click "Intel Serial IO Driver" on the main menu

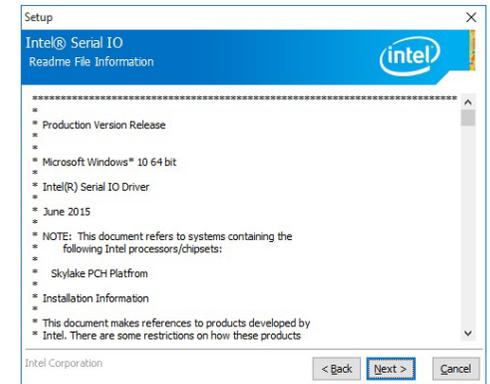
1. Setup is ready to install the driver. Click Next.



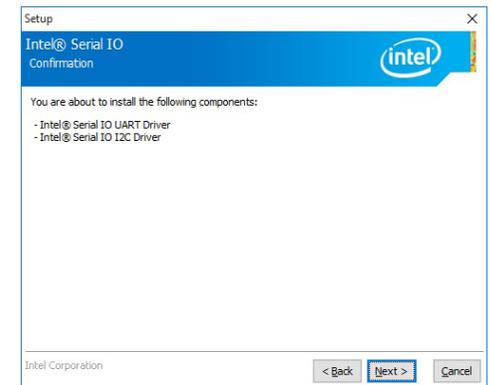
2. Read the license agreement then click Yes. Click "I accept the terms in the License Agreement" then click Next.



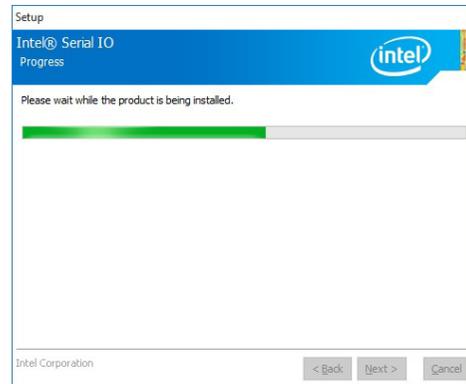
3. Read the file information then click Next.



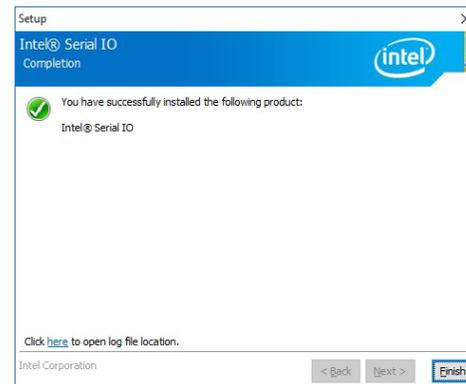
4. Setup is ready to install the driver. Click Next.



5. Setup is now installing the driver.



6. Click Finish.



Microsoft Framework 4.5.2 (For Windows 7)

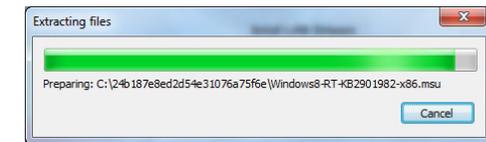


Note:

Before installing Microsoft Framework 4.5.2, make sure you have updated your Windows 7 operating system to Service Pack 3.

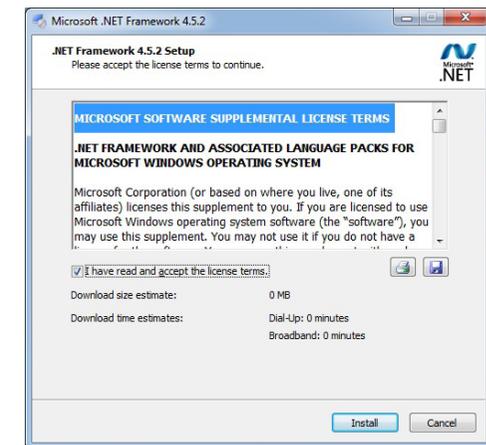
To install the driver, click "Microsoft Framework 4.5.2" on the main menu.

1. Setup is now extracting files.

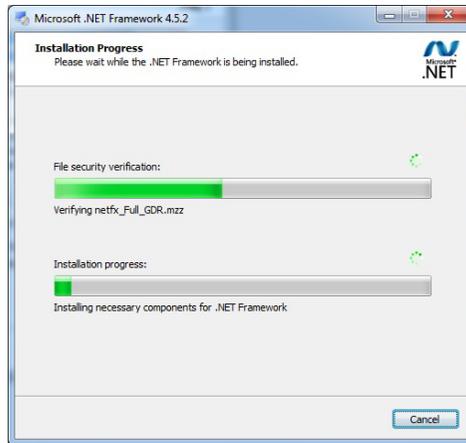


2. Read the license agreement carefully.

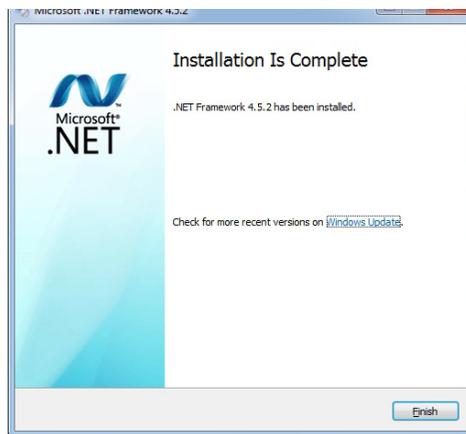
Click "I have read and accept the terms of the License Agreement" then click Install.



3. Setup is now installing the driver.



4. Click Finish.



Intel Rapid Storage Technology

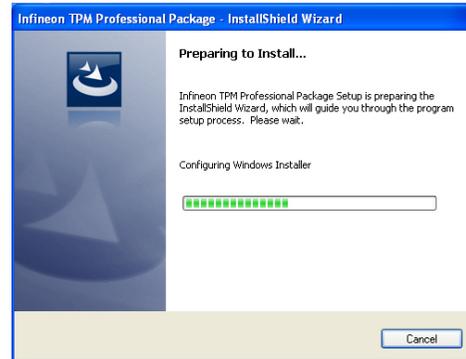
The Intel Rapid Storage Technology is a utility that allows you to monitor the current status of the SATA drives. It enables enhanced performance and power management for the storage subsystem.

To install the driver, click "Intel Rapid Storage Technology" on the main menu. Please refer to next chapter for more information.

Infinion TPM 1.2 Driver and Tool (optional)

To install the driver, click "Infinion TPM driver and tool (option)" on the main menu.

1. The setup program is preparing to install the driver.



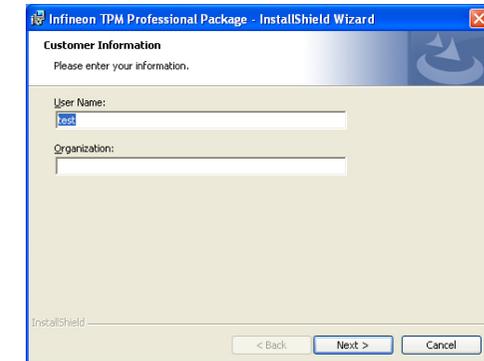
2. The setup program is now ready to install the utility. Click Next.



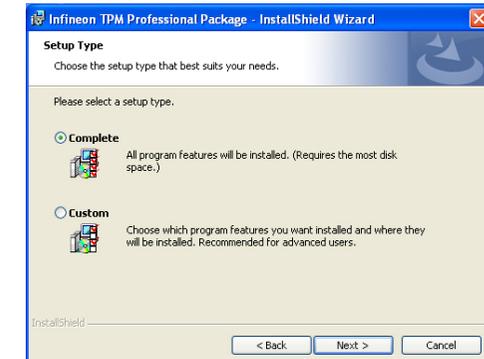
3. Click "I accept the terms in the license agreement" and then click "Next".



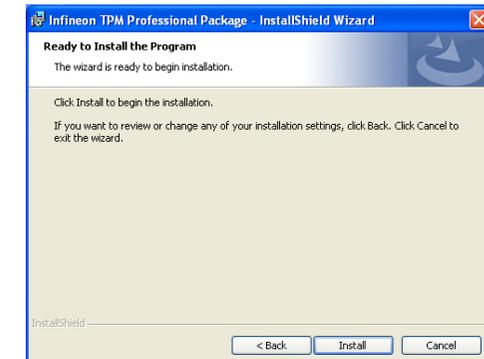
4. Enter the necessary information and then click Next.



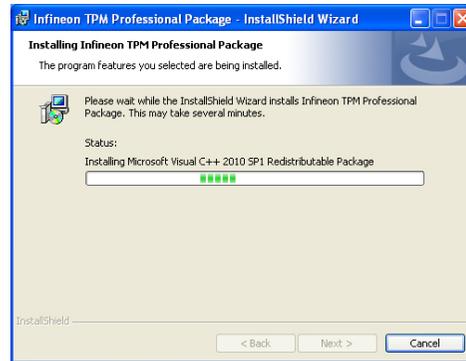
5. Select a setup type and then click Next.



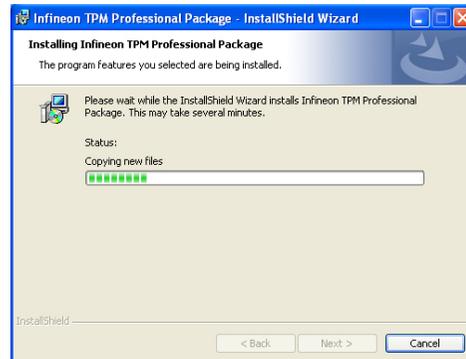
6. Click Install.



7. TPM requires installing the Microsoft Visual C++ package prior to installing the utility. Click Install.



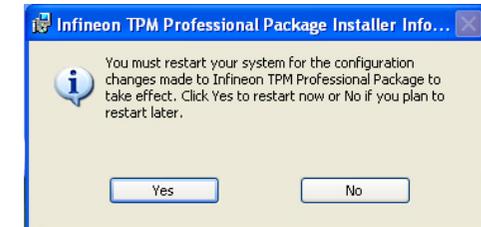
8. The setup program is currently installing the Microsoft Visual C++ package.



9. Click Finish.



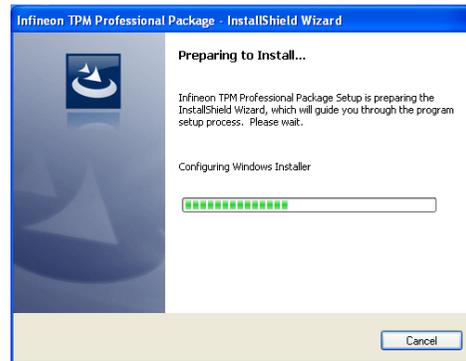
10. Click "Yes" to restart your system.



Infineon TPM Driver and Tool (optional)

To install the driver, click "Infineon TPM driver and tool (option)" on the main menu.

1. The setup program is preparing to install the driver.



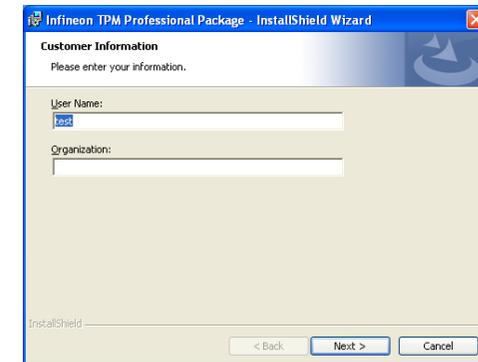
2. The setup program is now ready to install the utility. Click Next.



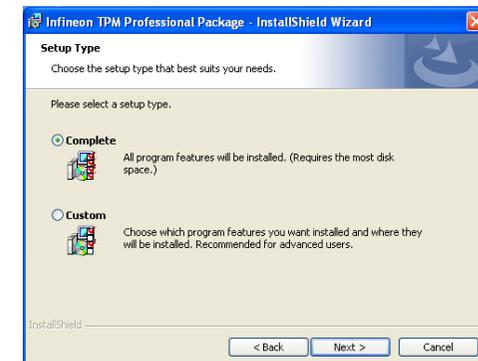
3. Click "I accept the terms in the license agreement" and then click "Next".



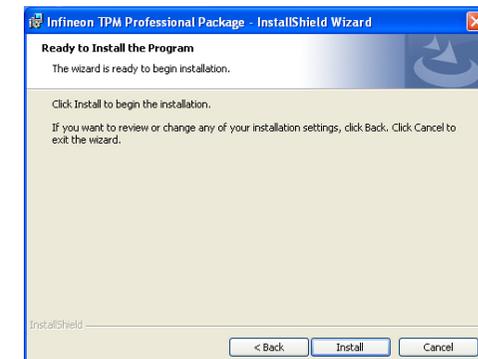
4. Enter the necessary information and then click Next.



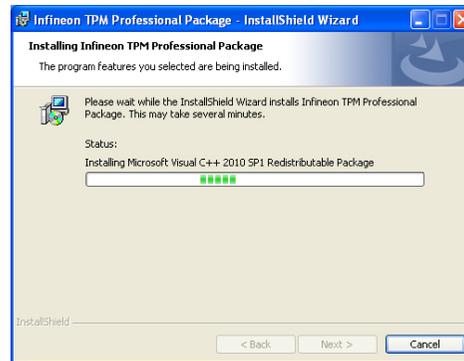
5. Select a setup type and then click Next.



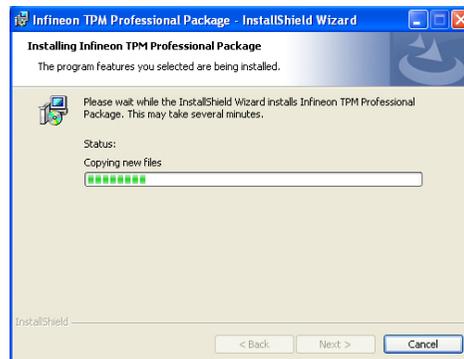
6. Click Install.



7. TPM requires installing the Microsoft Visual C++ package prior to installing the utility. Click Install.



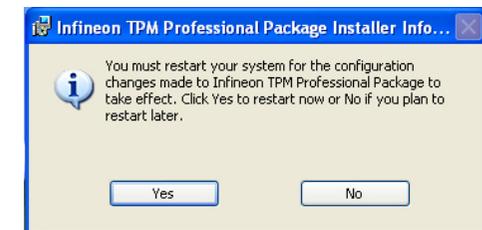
8. The setup program is currently installing the Microsoft Visual C++ package.



9. Click Finish.



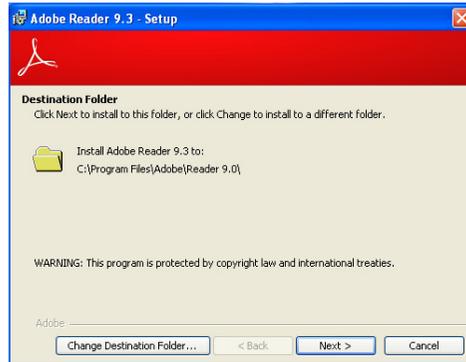
10. Click "Yes" to restart your system.



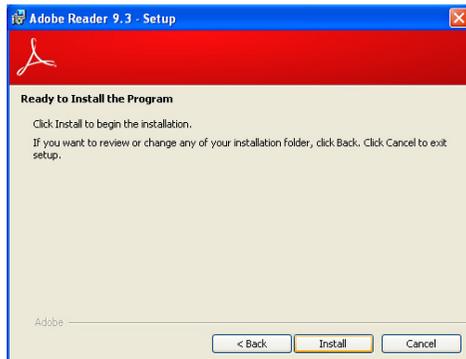
Adobe Acrobat Reader 9.3

To install the reader, click "Adobe Acrobat Reader 9.3" on the main menu.

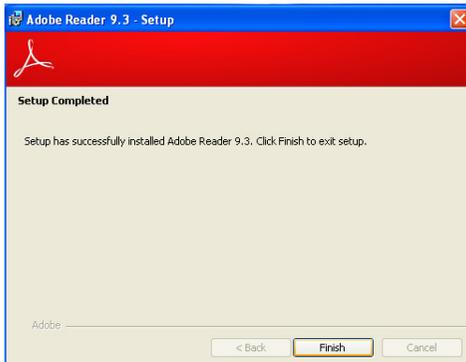
1. Click Next to install or click Change Destination Folder to select another folder.



2. Click Install to begin installation.



3. Click Finish to exit installation.



Chapter 8 - RAID

The system board allows configuring RAID on Serial ATA drives. It supports RAID 0, RAID 1, RAID 5 and RAID 10.

RAID Levels

RAID 0 (Striped Disk Array without Fault Tolerance)

RAID 0 uses two new identical hard disk drives to read and write data in parallel, interleaved stacks. Data is divided into stripes and each stripe is written alternately between two disk drives. This improves the I/O performance of the drives at different channel; however it is not fault tolerant. A failed disk will result in data loss in the disk array.

RAID 1 (Mirroring Disk Array with Fault Tolerance)

RAID 1 copies and maintains an identical image of the data from one drive to the other drive. If a drive fails to function, the disk array management software directs all applications to the other drive since it contains a complete copy of the drive's data. This enhances data protection and increases fault tolerance to the entire system. Use two new drives or an existing drive and a new drive but the size of the new drive must be the same or larger than the existing drive.

RAID 5

RAID 5 stripes data and parity information across hard drives. It is fault tolerant and provides better hard drive performance and more storage capacity.

RAID 10 (Mirroring and Striping)

RAID 10 is a combination of data striping and data mirroring providing the benefits of both RAID 0 and RAID 1. Use four new drives or an existing drive and three new drives for this configuration.

RAID Level	Min. Drives	Protection	Description
RAID 0	2	None	Data striping without redundancy
RAID 1	2	Single Drive Failure	Disk mirroring
RAID 5	3	Single Drive Failure	Block-level data striping with distributed parity
RAID 10	4	1 Disk Per Mirrored Stripe (not same mirror)	Combination of RAID 0 (data striping) and RAID 1 (mirroring)

Settings

To enable the RAID function, the following settings are required.

1. Connect the Serial ATA drives.
2. Enable Serial ATA in the Insyde BIOS.
3. Create a RAID volume.
- 3-1. Create a RAID volume if the boot type is UEFI.
4. Install the Intel Rapid Storage Technology Utility.

Step 1: Connect the Serial ATA Drives

Refer to chapter 2 for details on connecting the Serial ATA drives.



Important:

1. Make sure you have installed the Serial ATA drives and connected the data cables otherwise you won't be able to enter the RAID BIOS utility.
2. Treat the cables with extreme caution especially while creating RAID. A damaged cable will ruin the entire installation process and operating system. The system will not boot and you will lost all data in the hard drives. Please give special attention to this warning because there is no way of recovering back the data.

Step 2: Enable RAID in the Insyde BIOS

1. Power-on the system then press to enter the main menu of the Insyde BIOS.
2. Go to "Advanced" menu, and select the "SATA Configuration" menu.
3. Change the "SATA Mode Selection" to "RAID" mode.
4. Save the changes in the "Save & Exit" menu.
5. Reboot the system.

Step 3: Create a RAID Volume

1. When the Intel® RST option ROM status screen displays during POST, press <Ctrl> and <I> simultaneously to enter the option ROM user interface.
2. Select 1: Create RAID Volume and press <Enter>.
3. Use the up or down arrow keys to select the RAID level and press <Enter>.
4. Use the up or down arrow keys to select the strip size and press <Enter>.
5. Press <Enter> to select the physical disks.
6. Use the up or down arrow keys to scroll through the list of hard drives and press <Space> to select the drive.
7. Press <Enter>.
8. Select the volume size and press <Enter>. You must select less than one hundred percent of the available volume space to leave space for the second volume.
9. Press <Enter> to create the volume.
10. At the prompt, press <Y> to confirm volume creation.
11. Select 4: Exit and press <Enter>.
12. Press <Y> to confirm exit.



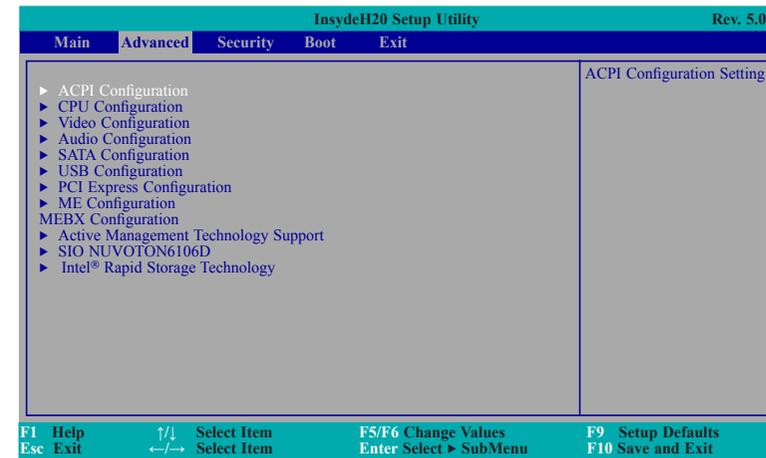
Note:

These steps are cited from the Intel® Support site, "Set Up a System with Intel® Matrix RAID Technology" (Article ID: 000005789).
<http://www.intel.com/content/www/us/en/support/boards-and-kits/000005789.html>

Step 3-1: Create a RAID Volume if the boot type is UEFI

If the boot type is set to UEFI, RAID volume creation will be different. Please use the following steps to create RAID volumes. To set the boot type, enter the Insyde BIOS and go to "Boot" > "Boot type".

1. Go to the "Advanced" menu of the Insyde BIOS.
2. The "Intel® Rapid Storage Technology" menu appears. Enter this menu.

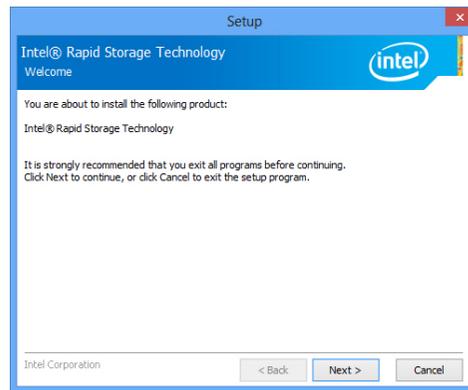


3. The screen displays all available drives. Select "Create RAID volume" to create a RAID volume".
4. Use the up or down arrow keys to select the RAID level and press <Enter>.
5. Use the up or down arrow keys to scroll through the list of hard drives and press <Space> to select the drive.
6. Press <Enter>.
7. Use the up or down arrow keys to select the strip size and press <Enter>.
8. Enter the volume size and press <Enter>.
9. At the prompt, press <Y> to confirm volume creation.

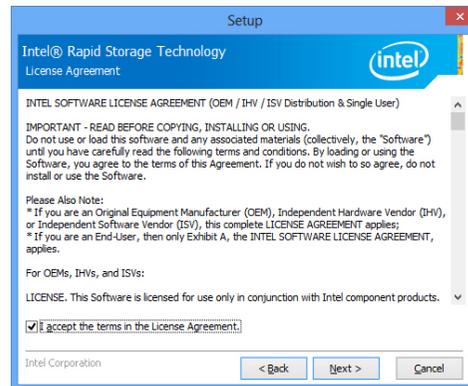
Step 4: Install the Intel Rapid Storage Technology Utility

The Intel Rapid Storage Technology Utility can be installed from within Windows. It allows RAID volume management (create, delete, migrate) from within the operating system. It will also display useful SATA device and RAID volume information. The user interface, tray icon service and monitor service allow you to monitor the current status of the RAID volume and/or SATA drives. It enables enhanced performance and power management for the storage subsystem.

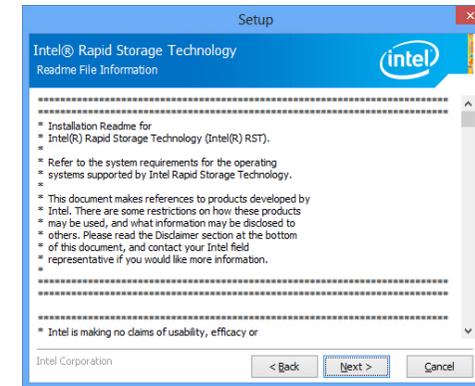
1. Insert the provided DVD into an optical drive.
2. Click "Intel Rapid Storage Technology Utility" on the main menu.
3. Setup is ready to install the utility. Click Next.



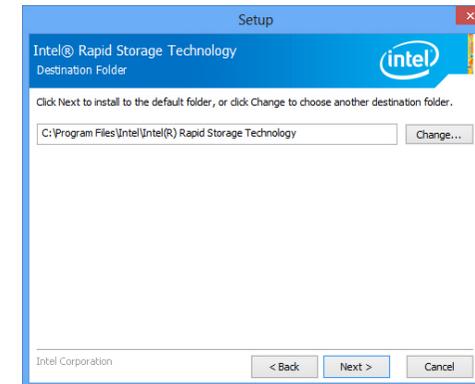
4. Read the license agreement and click "I accept the terms in the License Agreement." Then, click Next.



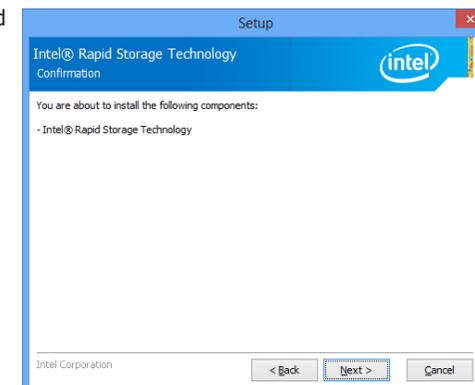
5. Go through the readme document to view system requirements and installation information then click Next.



6. Click Next to install to the default folder or click change to choose another destination folder.



7. Confirm the installation and click Next.



8. Click “Yes, I want to restart this computer now” to complete the installation and then click Finish.



Chapter 9 - Intel AMT Settings

Overview

Intel Active Management Technology (Intel® AMT) combines hardware and software solution to provide maximum system defense and protection to networked systems.

The hardware and software information are stored in non-volatile memory. With its built-in manageability and latest security applications, Intel® AMT provides the following functions.

- **Discover**

Allows remote access and management of networked systems even while PCs are powered off; significantly reducing desk-side visits.

- **Repair**

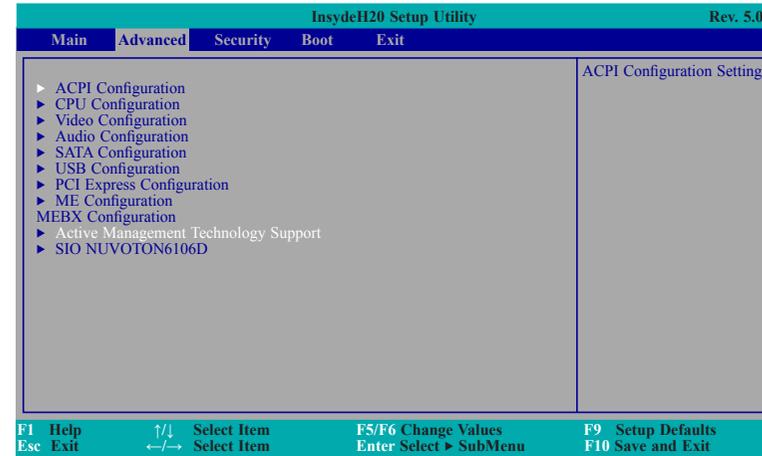
Remotely repair systems after OS failures. Alerting and event logging help detect problems quickly to reduce downtime.

- **Protect**

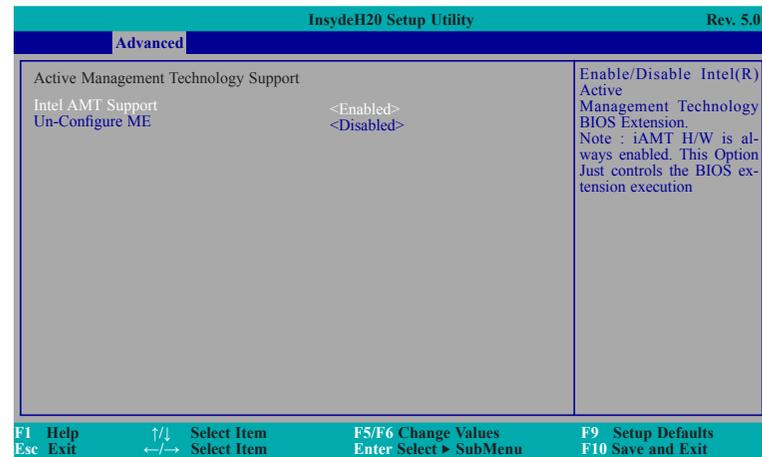
Intel AMT's System Defense capability remotely updates all systems with the latest security software. It protects the network from threats at the source by proactively blocking incoming threats, reactively containing infected clients before they impact the network, and proactively alerting when critical software agents are removed.

Enable Intel® AMT in the Insyde BIOS

1. Power-on the system then press to enter the main menu of the Insyde BIOS.
2. In the **Advanced** menu, select **Active Management Technology Support**.



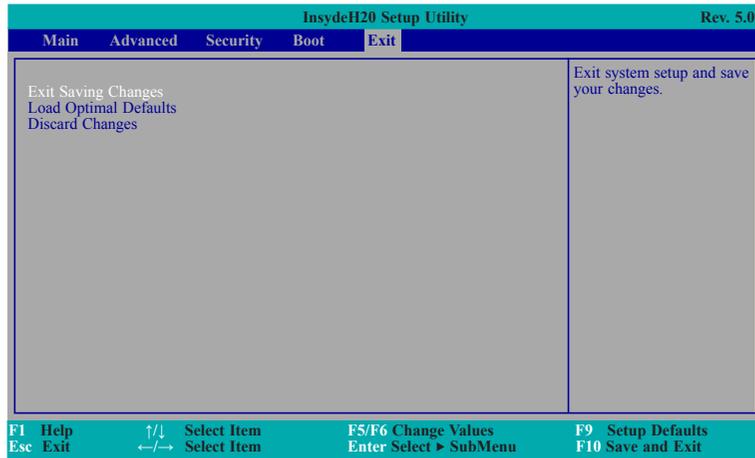
3. In the **Advanced** menu, select **Enable** in the **AMT** field.



Un-Configure ME

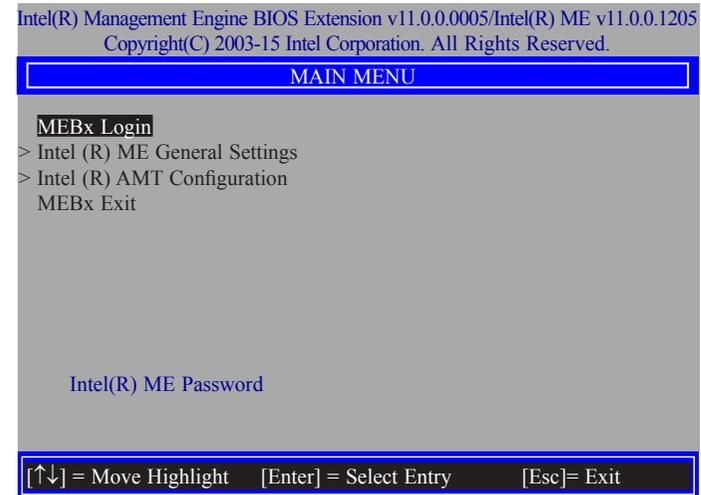
Un-configure ME without password. You can select enabled or disabled.

4. In the **Exit** menu, select **Exit Saving Changes** then select **OK**.



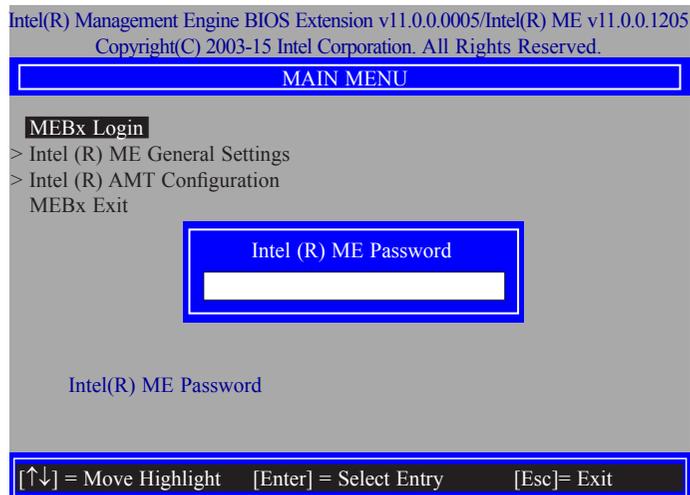
Enable Intel® AMT in the Intel® Management Engine BIOS Extension (MEBX) Screen

1. When the system reboots, you will be prompted for a password. The default password is "**admin**". Enter the default password in the space provided under Intel(R) ME Password then press Enter.

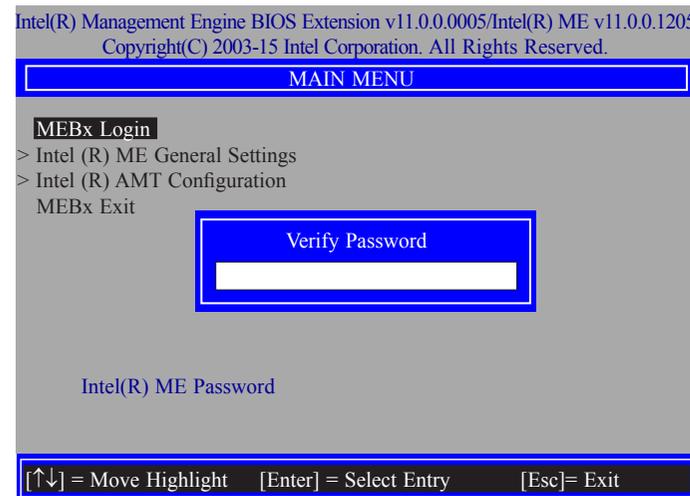


2. Enter a password in the space provided under Intel(R) ME Password then press Enter. The password must include:

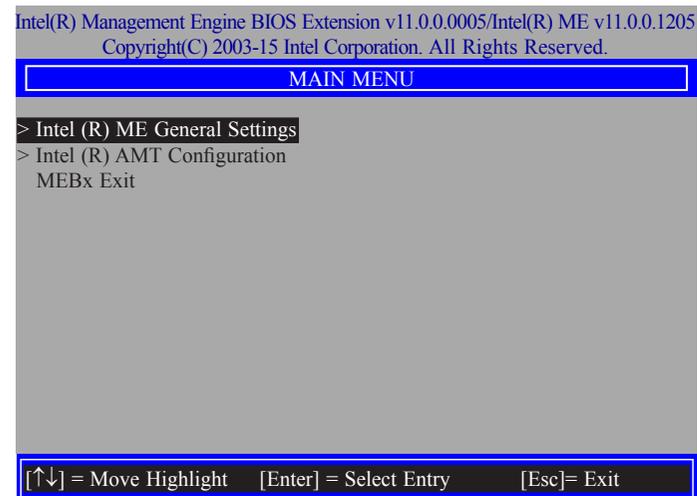
- 8-32 characters
- Strong 7-bit ASCII characters excluding : , and " characters
- At least one digit character (0, 1, ...9)
- At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, \$, ;)
- Both lower case and upper case characters



3. You will be asked to verify the password. Enter the same new password in the space provided under Verify Password then press Enter.



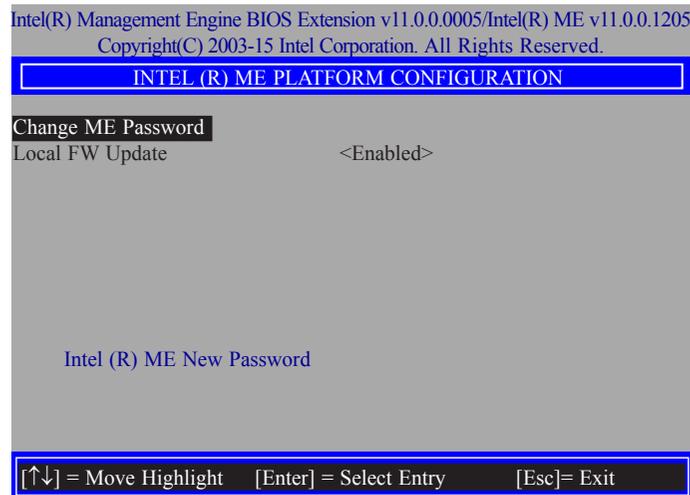
4. Select **Intel(R) ME General Settings** then press Enter.



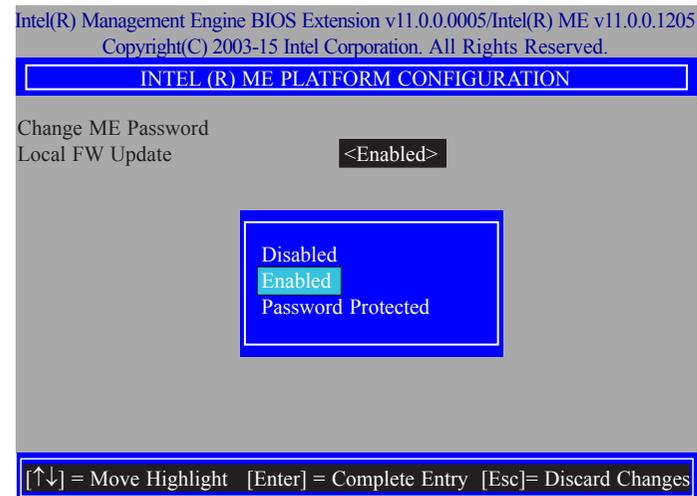
5. Select **Change Intel(R) ME Password** then press Enter.

You will be prompted for a password. The default password is "admin". Enter the default password in the space provided under Intel(R) ME New Password then press Enter.

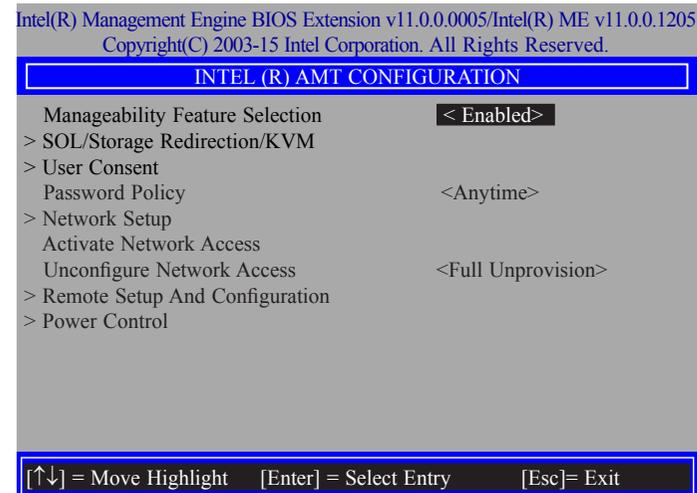
- 8-32 characters
- Strong 7-bit ASCII characters excluding : , and " characters
- At least one digit character (0, 1, ...9)
- At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, \$, ;)
- Both lower case and upper case characters



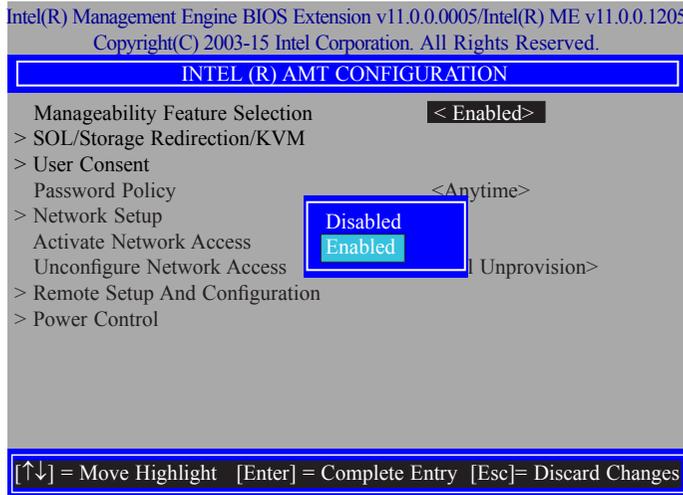
6. Select **Local FW Update** then press Enter. Select **Enabled** or **Disabled** or **password Protected** then press Enter.



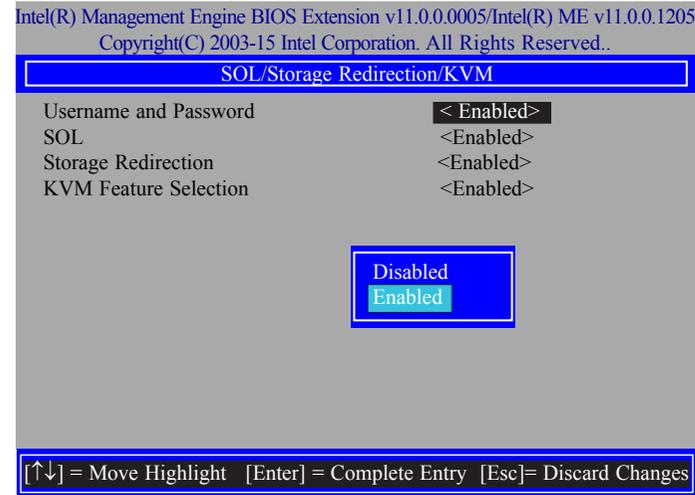
7. Select Previous Menu until you return to the **Main Menu**. Select **Intel(R) AMT Configuration** then press Enter.



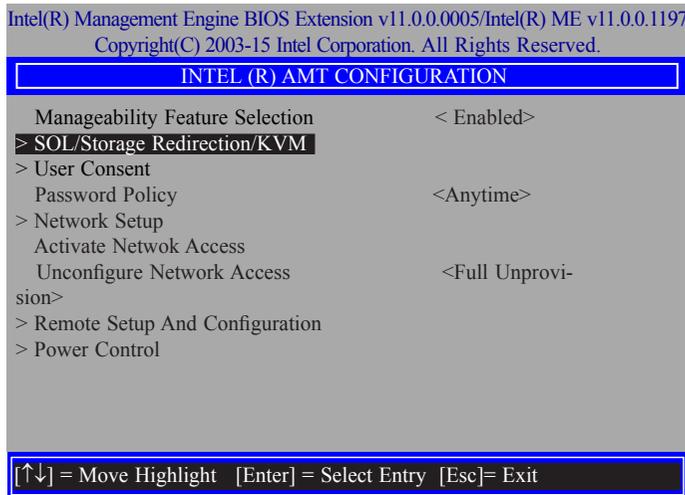
8. In the **Intel(R) AMT Configuration** menu, select **Manageability Feature Selection** then press Enter. Select **Enabled** or **Disabled** then press Enter.



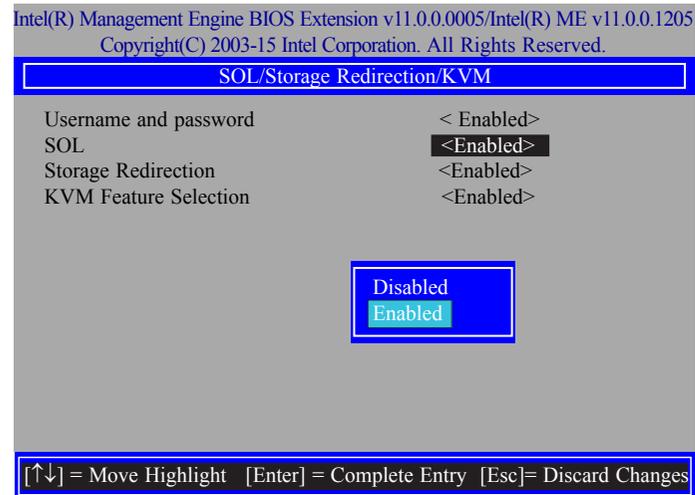
10. In the **SOL/Storage Redirection/KVM** menu, select **Username and Password** then press Enter. Select **Enabled** or **Disabled** then press Enter.



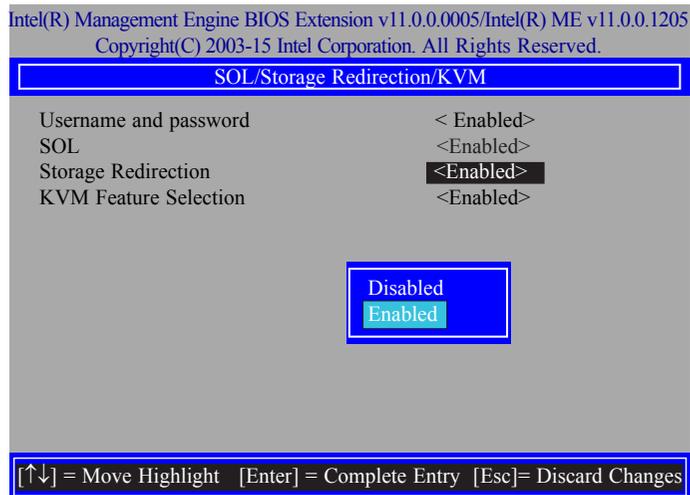
9. In the **Intel(R) AMT Configuration** menu, select **SOL/Storage Redirection/KVM** then press Enter.



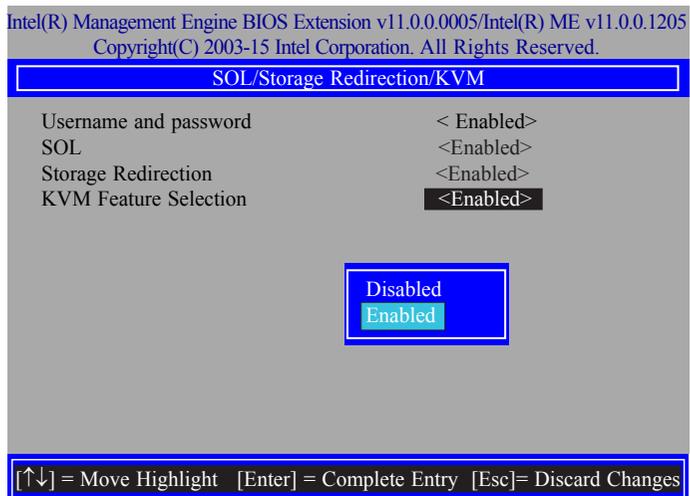
11. In the **SOL/Storage Redirection/KVM** menu, select **SOL** then press Enter. Select **Enabled** or **Disabled** then press Enter.



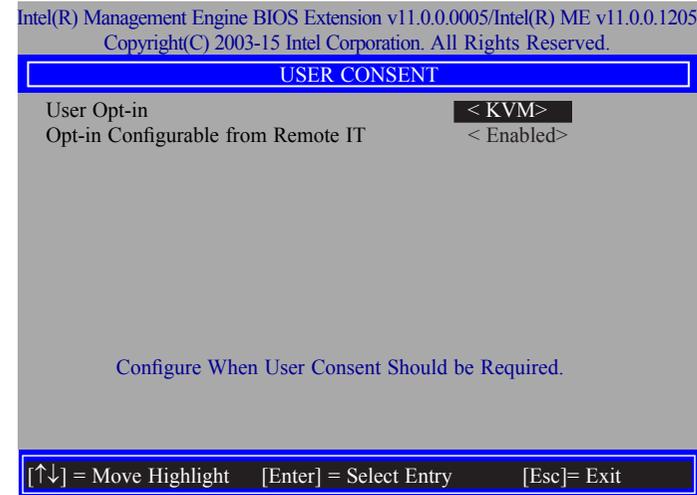
12. In the **SOL/Storage Redirection/KVM** menu, select **Storage Redirection** then press Enter. Select **Enabled** or **Disabled** then press Enter.



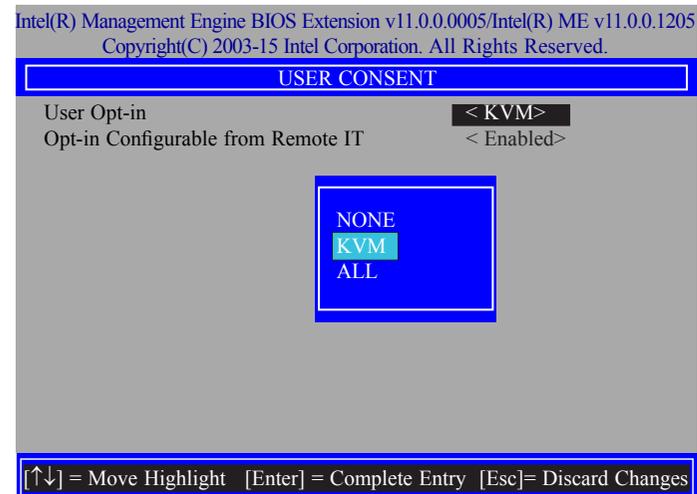
13. In the **SOL/IDER/KVM** menu, select **KVM Feature Selection** then press Enter. Select **Enabled** or **Disabled** then press Enter.



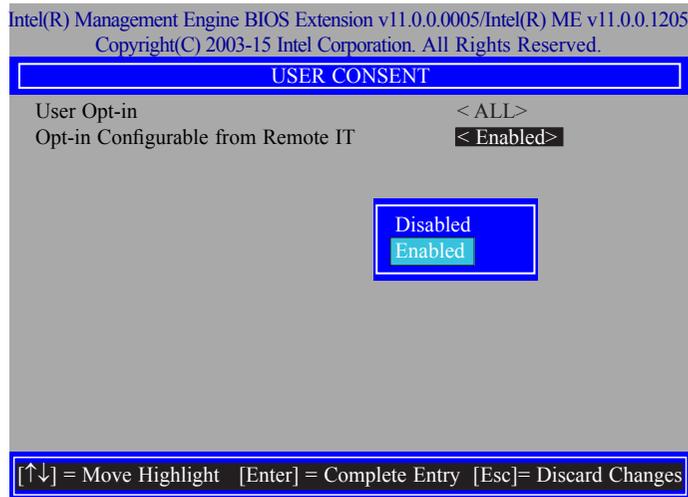
14. Select Previous Menu until you return to the **Intel(R) AMT Configuration** menu. Select **User Consent** then press Enter.



15. In the **User Consent** menu, select **User Opt-in** then press Enter. Select **None** or **KVM** or **ALL** then press Enter.

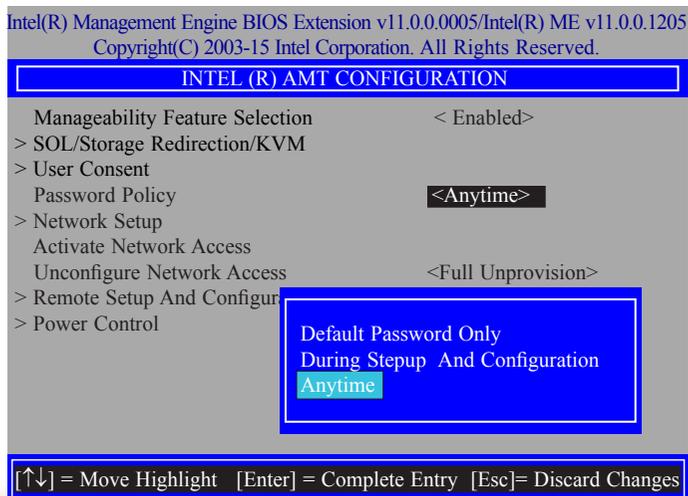


- In the **User Consent** menu, select **Opt-in Configurable from Remote IT** then press Enter. Select **Enabled** or **Disable Remote Control of KVM Opt-in Policy** then press Enter.

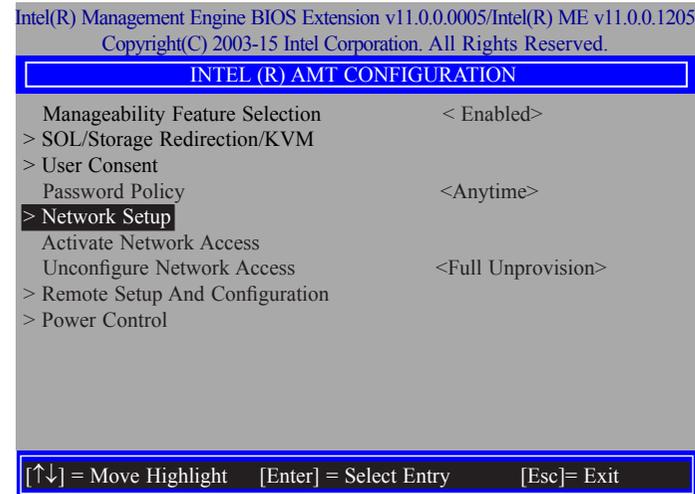


- Select Previous Menu until you return to the **Intel(R) AMT Configuration** menu. Select **Password Policy** then press Enter.

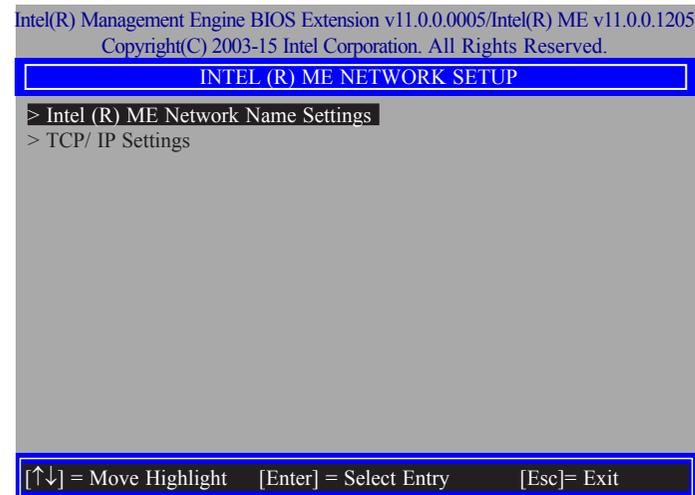
You may choose to use a password only during setup and configuration or to use a password anytime the system is being accessed.



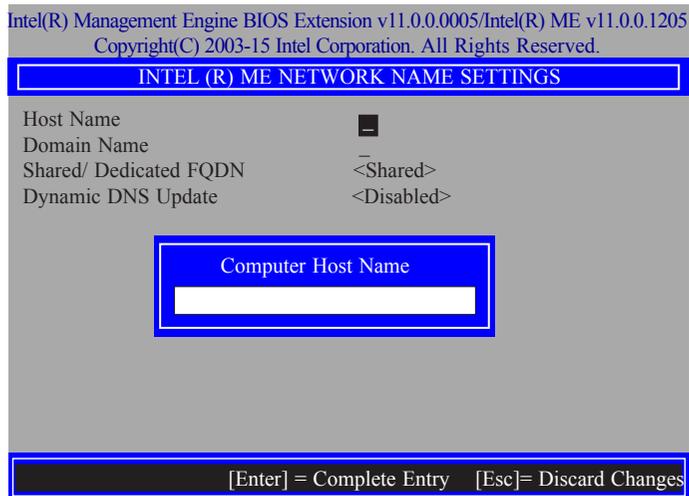
- In the **Intel(R) AMT Configuration** menu, select **Network Setup** then press Enter.



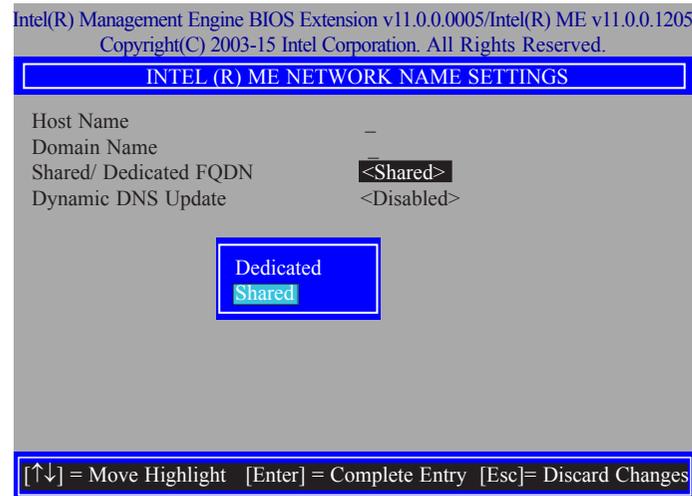
- In the **Intel(R) ME Network Setup** menu, select **Intel(R) ME Network Name Settings** then press Enter.



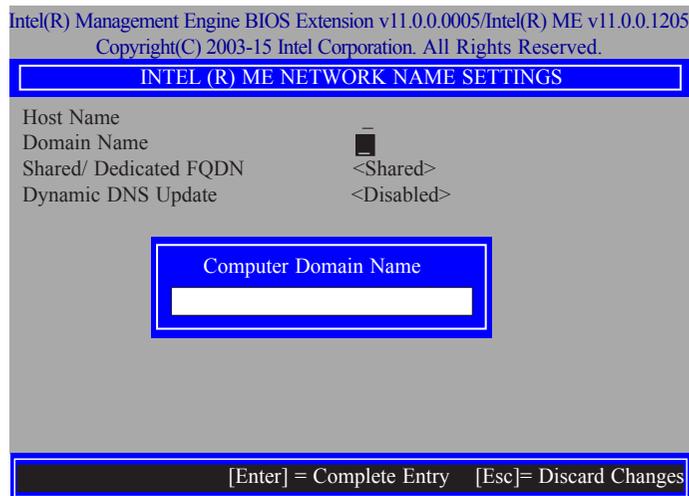
20. In the **Intel(R) ME Network Name Settings** menu, select **Host Name** then press Enter. Enter the computer's host name then press Enter.



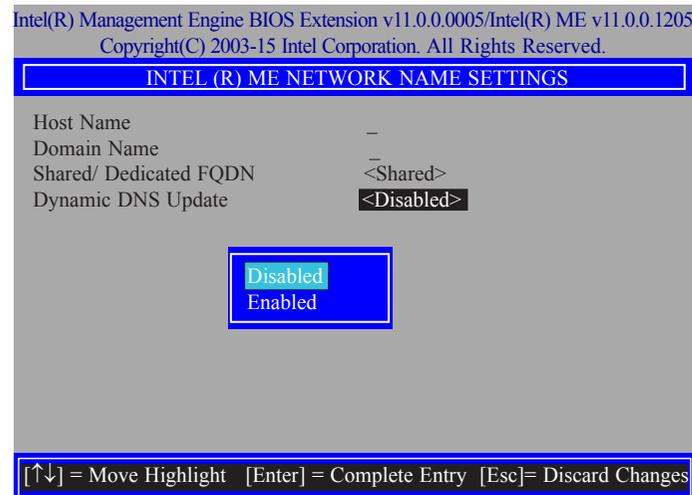
22. Select **Shared/Dedicated FQDN** then press Enter. Select **Shared** or **Dedicated** then press Enter.



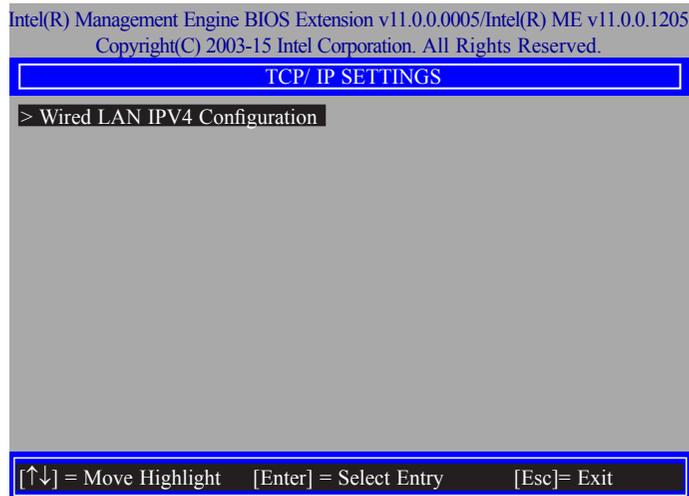
21. Select **Domain Name** then press Enter. Enter the computer's domain name then press Enter.



23. Select **Dynamic DNS Update** then press Enter. Select **Enabled** or **Disabled** then press Enter.



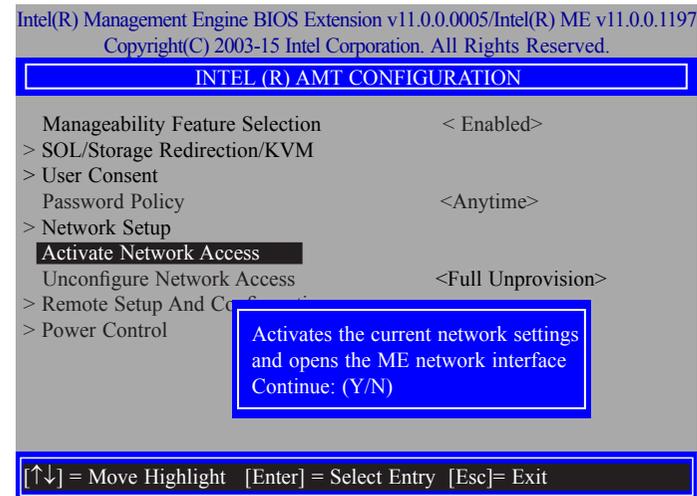
24. Select Previous Menu until you return to the **Intel(R) ME Network Setup** menu. Select **TCP/IP Settings** then press Enter.



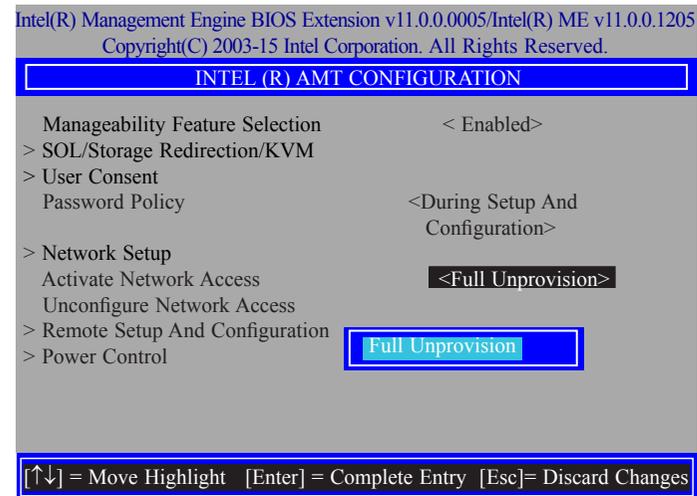
25. In the **TCP/IP Settings** menu, select **Wired LAN IPV4 Configuration** then press Enter.



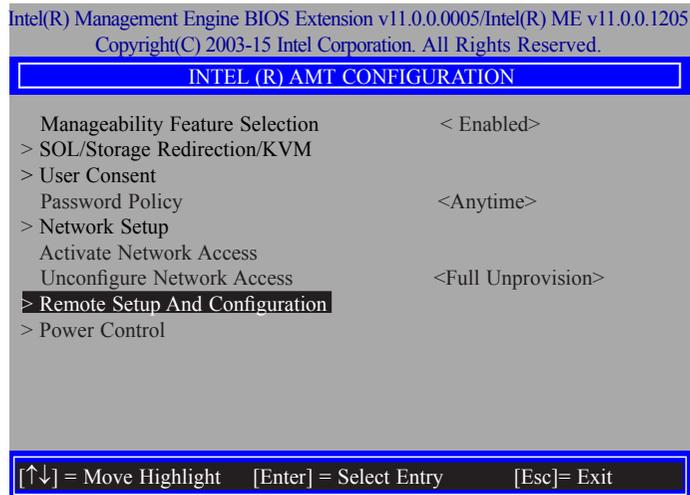
26. In the **Intel(R) AMT Configuration** menu, select **Activate Network Access** then press Enter. Press **Y** then press Enter.



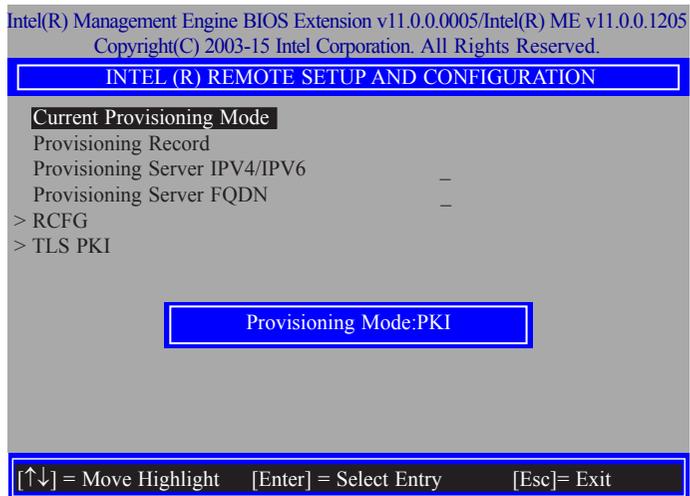
27. In the **Intel(R) AMT Configuration** menu, select **Unconfigure Network Access** then press Enter.



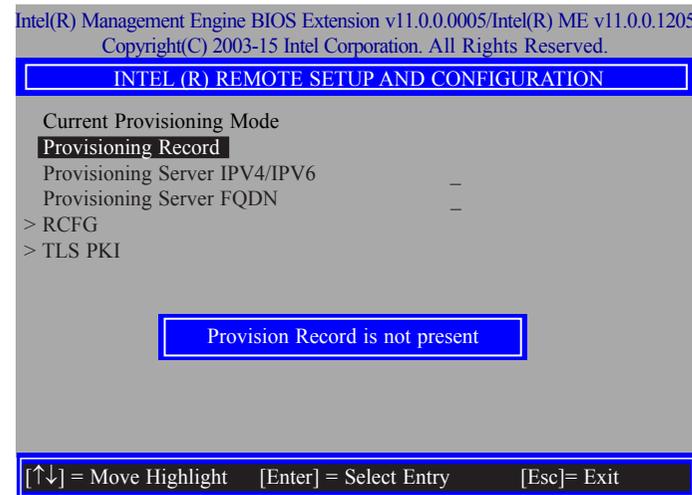
28. In the **Intel(R) AMT Configuration** menu, select **Remote Setup And Configuration** then press Enter.



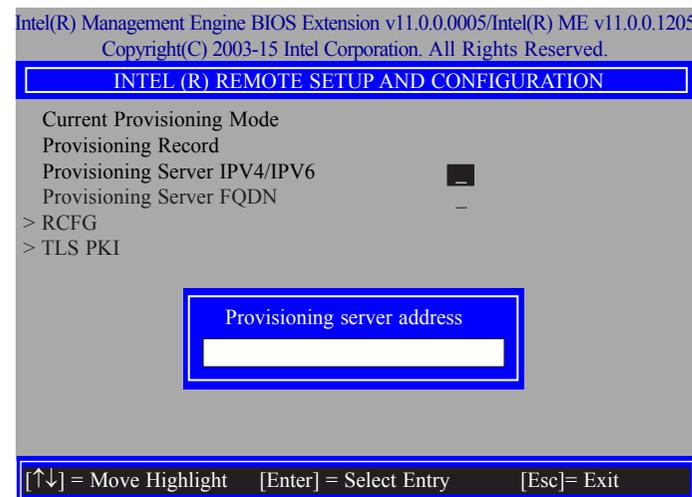
29. In the **Intel(R) Remote Setup And Configuration** menu, select **Current Provisioning Mode** then press Enter.



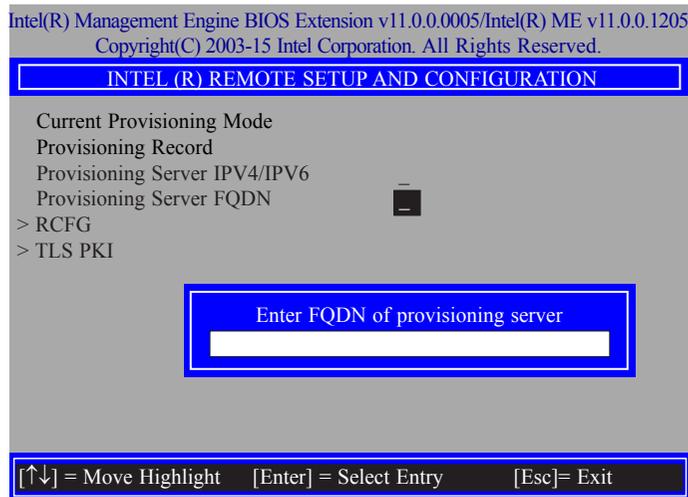
30. In the **Intel(R) Remote Setup And Configuration** menu, select **Provisioning Record** then press Enter.



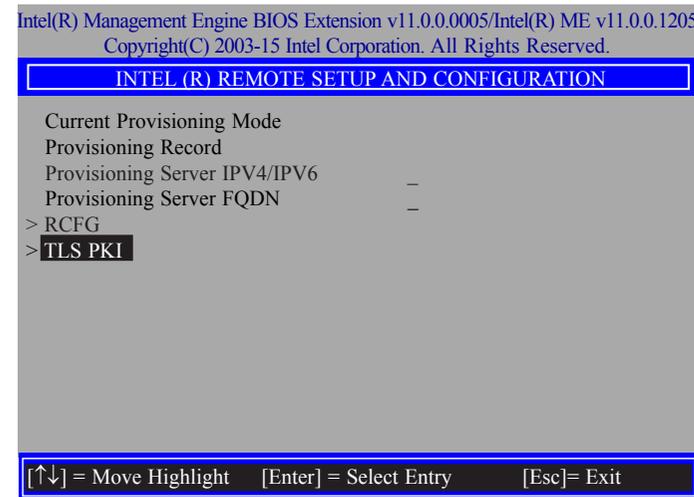
31. In the **Intel(R) Remote Setup And Configuration** menu, select **Provisioning server IPV4/IPV6**, enter the Provisioning server address then press Enter.



32. In the **Intel(R) Remote Setup And Configuration** menu, select **Provisioning server FQDN**, enter the FQDN of Provisioning server then press Enter.



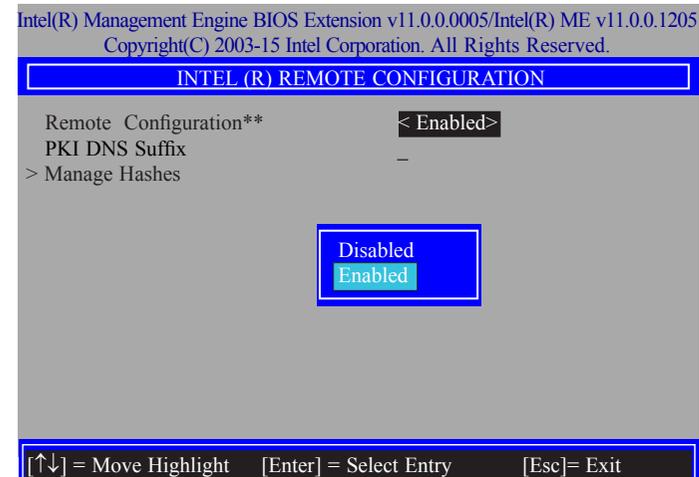
34. In the **Intel(R) Remote Setup And Configuration** menu, select **TLS PKI** then press Enter.



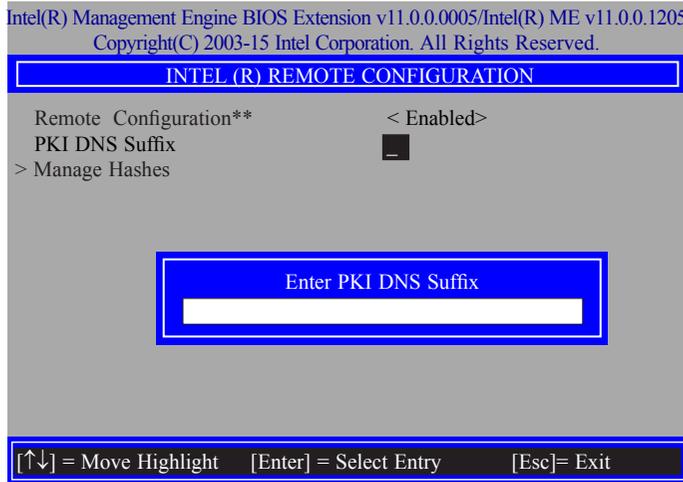
33. In the **Intel(R) Remote Setup And Configuration** menu, select **RCFG** then press Enter, and select **Start Configuration** Y/N then press enter.



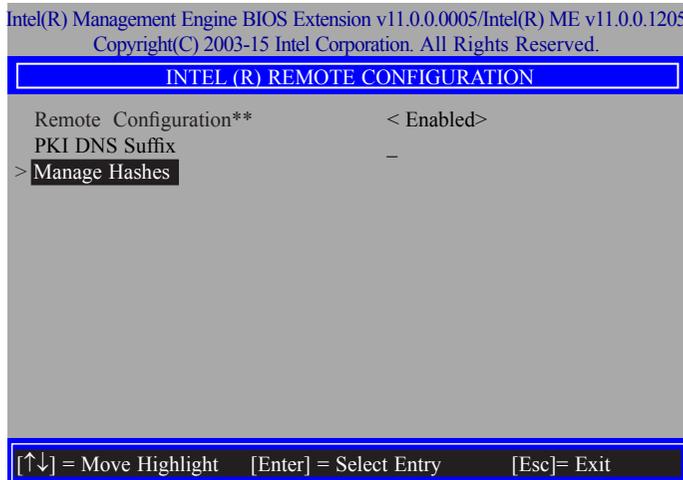
35. In the **Intel(R) Remote Configuration** menu, select **Remote Configuration**** then press Enter, select **Enabled** or **Disabled** then press Enter.



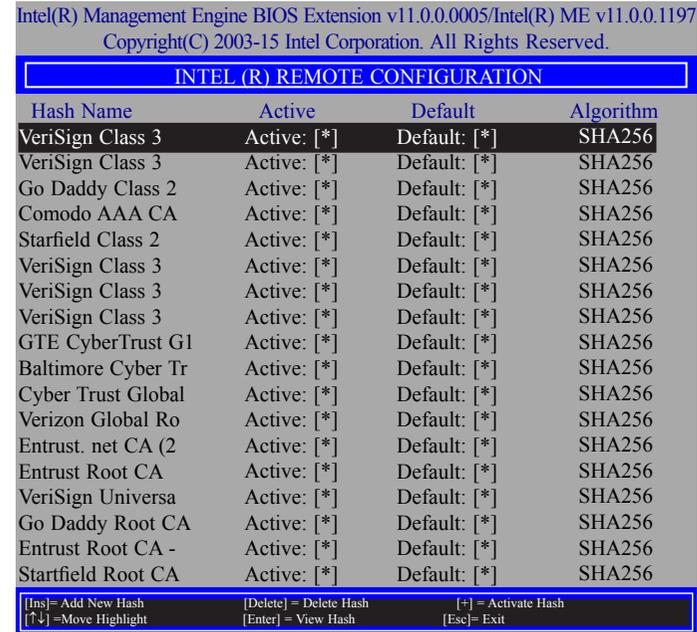
36. Select **PKI DNS Suffix**, Enter the PKI DNS Suffix then press Enter.



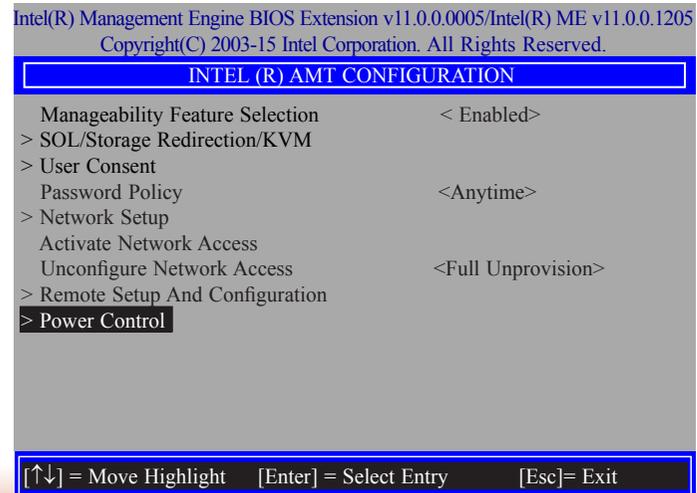
37. Select **Manage Hashes** then press Enter, and select one of hash name.



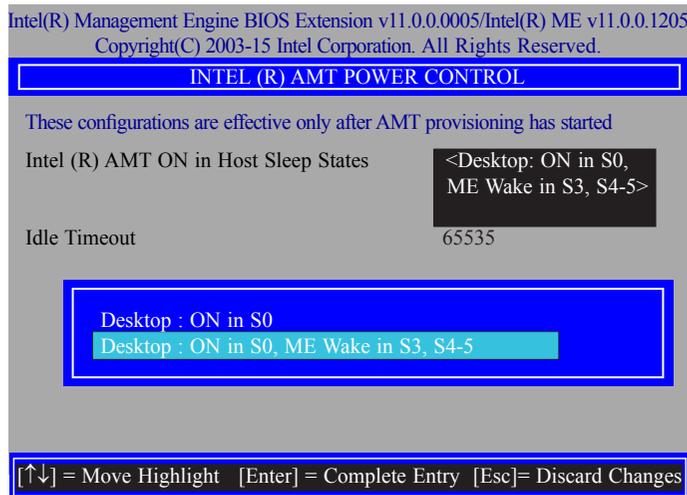
38. In the **Intel(R) Remote Configuration** menu, select **Manage Hashes** then press Enter.



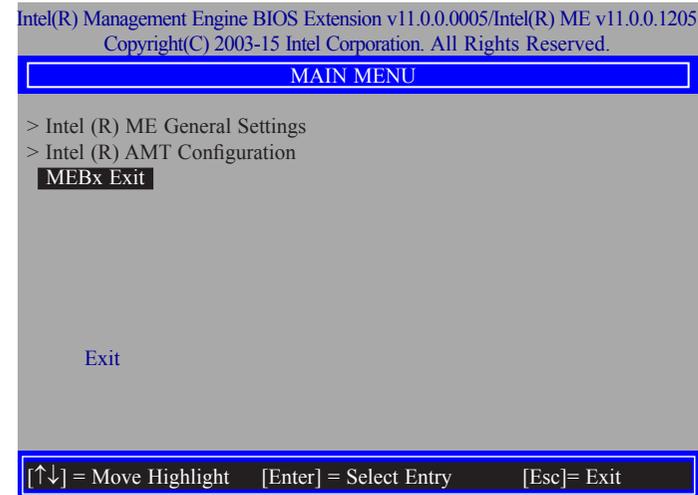
39. In the **Intel(R) AMT Configuration** menu, select **Power Control** then press Enter.



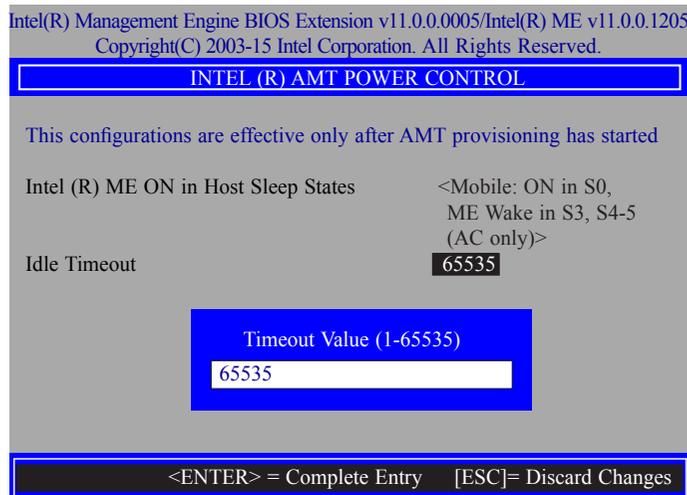
40. In the **Intel(R) AMT Power Control** menu, select **Intel(R) AMT ON in Host Sleep States** then press Enter. Select an option then press Enter.



42. Select Previous Menu until you return to the **Main Menu**. Select **Exit** then press Enter. Type **Y** then press Enter.



41. In the **Intel(R) AMT Power Control** menu, select **Idle Timeout** then press Enter. Enter the timeout value (1-65535).



Appendix A - System Error Message

When the BIOS encounters an error that requires the user to correct something, either a beep code will sound or a message will be displayed in a box in the middle of the screen and the message, PRESS F1 TO CONTINUE, CTRL-ALT-ESC or DEL TO ENTER SETUP, will be shown in the information box at the bottom. Enter Setup to correct the error.

Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list indicates the error messages for all Awards BIOSes:

CMOS BATTERY HAS FAILED

The CMOS battery is no longer functional. It should be replaced.



Important:

Danger of explosion if battery incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the battery manufacturer's instructions.

CMOS CHECKSUM ERROR

Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

DISPLAY SWITCH IS SET INCORRECTLY

The display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, either turn off the system and change the jumper or enter Setup and change the VIDEO selection.

FLOPPY DISK(S) fail (80)

Unable to reset floppy subsystem.

FLOPPY DISK(S) fail (40)

Floppy type mismatch.

Hard Disk(s) fail (80)

HDD reset failed.

Hard Disk(s) fail (40)

HDD controller diagnostics failed.

Hard Disk(s) fail (20)

HDD initialization error.

Hard Disk(s) fail (10)

Unable to recalibrate fixed disk.

Hard Disk(s) fail (08)

Sector Verify failed.

Keyboard is locked out - Unlock the key

The BIOS detects that the keyboard is locked. Keyboard controller is pulled low.

Keyboard error or no keyboard present

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

Manufacturing POST loop

System will repeat POST procedure infinitely while the keyboard controller is pull low. This is also used for the M/B burn in test at the factory.

BIOS ROM checksum error - System halted

The checksum of ROM address F000H-FFFFH is bad.

Memory test fail

The BIOS reports memory test fail if the memory has error(s).

Appendix B - Troubleshooting Checklist

Troubleshooting Checklist

This chapter of the manual is designed to help you with problems that you may encounter with your personal computer. To efficiently troubleshoot your system, treat each problem individually. This is to ensure an accurate diagnosis of the problem in case a problem has multiple causes.

Some of the most common things to check when you encounter problems while using your system are listed below.

1. The power switch of each peripheral device is turned on.
2. All cables and power cords are tightly connected.
3. The electrical outlet to which your peripheral devices are connected is working. Test the outlet by plugging in a lamp or other electrical device.
4. The monitor is turned on.
5. The display's brightness and contrast controls are adjusted properly.
6. All add-in boards in the expansion slots are seated securely.
7. Any add-in board you have installed is designed for your system and is set up correctly.

Monitor/Display

If the display screen remains dark after the system is turned on:

1. Make sure that the monitor's power switch is on.
2. Check that one end of the monitor's power cord is properly attached to the monitor and the other end is plugged into a working AC outlet. If necessary, try another outlet.
3. Check that the video input cable is properly attached to the monitor and the system's display adapter.
4. Adjust the brightness of the display by turning the monitor's brightness control knob.

The picture seems to be constantly moving.

1. The monitor has lost its vertical sync. Adjust the monitor's vertical sync.
2. Move away any objects, such as another monitor or fan, that may be creating a magnetic field around the display.
3. Make sure your video card's output frequencies are supported by this monitor.

The screen seems to be constantly wavering.

1. If the monitor is close to another monitor, the adjacent monitor may need to be turned off. Fluorescent lights adjacent to the monitor may also cause screen wavering.

Power Supply

When the computer is turned on, nothing happens.

1. Check that one end of the AC power cord is plugged into a live outlet and the other end properly plugged into the back of the system.
2. Make sure that the voltage selection switch on the back panel is set for the correct type of voltage you are using.
3. The power cord may have a "short" or "open". Inspect the cord and install a new one if necessary.

Floppy Drive

The computer cannot access the floppy drive.

1. The floppy diskette may not be formatted. Format the diskette and try again.
2. The diskette may be write-protected. Use a diskette that is not write-protected.
3. You may be writing to the wrong drive. Check the path statement to make sure you are writing to the targeted drive.
4. There is not enough space left on the diskette. Use another diskette with adequate storage space.

Hard Drive

Hard disk failure.

1. Make sure the correct drive type for the hard disk drive has been entered in the BIOS.
2. If the system is configured with two hard drives, make sure the bootable (first) hard drive is configured as Master and the second hard drive is configured as Slave. The master hard drive must have an active/bootable partition.

Excessively long formatting period.

If your hard drive takes an excessively long period of time to format, it is likely a cable connection problem. However, if your hard drive has a large capacity, it will take a longer time to format.

Serial Port

The serial device (modem, printer) doesn't output anything or is outputting garbled characters.

1. Make sure that the serial device's power is turned on and that the device is on-line.
2. Verify that the device is plugged into the correct serial port on the rear of the computer.
3. Verify that the attached serial device works by attaching it to a serial port that is working and configured correctly. If the serial device does not work, either the cable or the serial device has a problem. If the serial device works, the problem may be due to the onboard I/O or the address setting.
4. Make sure the COM settings and I/O address are configured correctly.

Keyboard

Nothing happens when a key on the keyboard was pressed.

1. Make sure the keyboard is properly connected.
2. Make sure there are no objects resting on the keyboard and that no keys are pressed during the booting process.

System Board

1. Make sure the add-in card is seated securely in the expansion slot. If the add-in card is loose, power off the system, re-install the card and power up the system.
2. Check the jumper settings to ensure that the jumpers are properly set.
3. Verify that all memory modules are seated securely into the memory sockets.
4. Make sure the memory modules are in the correct locations.
5. If the board fails to function, place the board on a flat surface and seat all socketed components. Gently press each component into the socket.
6. If you made changes to the BIOS settings, re-enter setup and load the BIOS defaults.