

# **SD331-C236/Q170**

## **MicroATX Industrial Motherboard**

### **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 B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference 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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## 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.

## 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.

- One SD331-C236/Q170 motherboard
- One COM port cable (Length: 300mm, 2 x COM ports)
- One Serial ATA data cable (Length: 500mm)
- One I/O shield

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance to the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

## Optional Items

- USB 2.0 port cable (Length: 350/398mm)
- USB 3.0 port cable (Length: 320mm)
- COM port cable (Length: 300mm, 2 x COM ports)
- Serial ATA data cable (Length: 500mm)
- Thermal solution (For 35W, Height: 37.3mm)
- Thermal solution (For 65W, Height: 72.8mm)
- Thermal solution (For 95W, Height: 69.3mm)
- LPC EXT-RS232 module (4 x RS232 ports)
- LPC EXT-RS485 module (4 x RS485 ports)

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance to the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

## Before Using the System Board

Before using the system board, prepare basic system components.

If you are installing the system board in a new system, you will need at least the following internal components.

- A CPU
- Memory module
- Storage devices such as hard disk drive, etc.

You will also need external system peripherals you intend to use which will normally include at least a keyboard, a mouse and a video display monitor.

# Chapter 1 - Introduction

## Specifications

<b>SYSTEM</b>	Processor	SD331-C236/Q170: 7th Generation Intel® Core™ Processors, LGA 1151 Socket Intel® Core™ i7-7700 Processor, Quad Core, 8M Cache, 3.6GHz (4.2GHz), 65W Intel® Core™ i7-7700T Processor, Quad Core, 8M Cache, 2.9GHz (3.8GHz), 35W Intel® Core™ i5-7500 Processor, Quad Core, 6M Cache, 3.4GHz (3.8GHz), 65W Intel® Core™ i5-7500T Processor, Quad Core, 6M Cache, 2.7GHz (3.3GHz), 35W Intel® Core™ i3-7101E Processor, Dual Core, 3M Cache, 3.9GHz, 54W Intel® Core™ i3-7101TE Processor, Dual Core, 3M Cache, 3.4GHz, 35W Intel® Celeron® Processor G3930E, Dual Core, 2M Cache, 2.9GHz, 54W Intel® Celeron® Processor G3930TE, Dual Core, 2M Cache, 2.7GHz, 35W 6th Generation Intel® Core™ Processors, LGA 1151 Socket 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, 4M Cache, 3.7GHz, 65W Intel® Core™ i3-6100TE Processor, Dual Core, 4M Cache, 2.7GHz, 35W Intel® Pentium® Processor G4400, Dual Core, 3M Cache, 3.3GHz, 65W Intel® Pentium® Processor G4400TE, Dual Core, 3M Cache, 2.9GHz, 35W Intel® Celeron® Processor G3900, Dual Core, 2M Cache, 2.8GHz, 65W Intel® Celeron® Processor G3900TE, Dual Core, 2M Cache, 2.6GHz, 35W SD331-C236 Additional Support: Intel® Xeon® Processor E3-1275 v6, Quad Core, 8M Cache, 3.8GHz (4.2GHz), 80W (ECC Supported)
	Chipset	SD331-C236: Intel® C236 Chipset SD331-Q170: Intel® Q170 Chipset
	Memory	SD331-C236: Four 288-pin ECC DIMM up to 64GB Dual Channel DDR4 1866/2133MHz SD331-Q170: Four 288-pin DIMM up to 64GB Dual Channel DDR4 1866/2133MHz
	BIOS	Insyde SPI 128Mbit
	<b>GRAPHICS</b>	Controller
	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, 1 x DVI-I (DVI-D signal), 1 x DP++ VGA: resolution up to 1920x1200 @ 60Hz DVI-I (DVI-D signal): resolution up to 1920x1200 @ 60Hz DP++: resolution up to 4096x2160 @ 60Hz
	Triple Displays	VGA + DVI-I (DVI-D signal) + DP++
<b>EXPANSION</b>	Interface	2 x PCIe x16 (1 x16 or 2 x8 signal) (Gen 3) 2 x PCIe x4 (Gen 3)
<b>AUDIO</b>	Audio Codec	Realtek ALC888S-VD2-GR
<b>ETHERNET</b>	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)
<b>REAR I/O</b>	Ethernet	2 x GbE (RJ-45)
	USB	4 x USB 3.0 2 x USB 2.0
	Serial	1 x RS-232/422/485 (RS-232 w/ power) (DB-9)

<b>REAR I/O</b>	PS/2	1 x PS/2 (mini-DIN-6)	
	Display	1 x VGA, 1 x DVI-I (DVI-D signal), 1 x DP++	
	Audio	1 x Line-in (available upon request) 1 x Line-out 1 x Mic-in	
<b>INTERNAL I/O</b>	Serial	1 x RS-232/422/485 (RS-232 w/ power) (2.54mm pitch) 4 x RS-232 (2.54mm pitch)	
	USB	SD331-C236: 4 x USB 3.0 (2.00mm pitch) 4 x USB 2.0 (2.54mm pitch) SD331-Q170: 4 x USB 3.0 (2.00mm pitch) 2 x USB 2.0 (2.54mm pitch) + 1 x Vertical USB 2.0 (type A)	
	Audio	1 x Audio (Line-out/Mic-in) (available upon request) 1 x S/PDIF	
	SATA	6 x SATA 3.0 (up to 6Gb/s) RAID 0/1/5/10	
	DIO	1 x 8-bit DIO	
	LPC	1 x LPC (supports LPC EXT-RS232/RS485 module)	
	SMBus	1 x SMBus	
	<b>WATCHDOG TIMER</b>	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
	<b>SECURITY</b>	TPM	Available Upon Request
	<b>POWER</b>	Type	ATX
Connector		8-pin ATX 12V power 24-pin ATX power	
Consumption		SD331-C236: Typical: Xeon 80W: 12V @ 3.43A (41.18Watt) Max.: Xeon 80W: 12V @ 6.87A (82.41Watt)	
RTC Battery		CR2032 Coin Cell	
<b>OS SUPPORT</b>		Windows 7 (/WES7) 32/64-bit Windows 8.1 (64-bit) Windows 10 IoT Enterprise 64-bit Note: 7th Gen Intel Core processors only support Win 10. Debian 8 (with VESA graphic driver) CentOS 7 (with VESA graphic driver) Ubuntu 15.10 (Intel graphic driver available)	
<b>ENVIRONMENT</b>	Temperature	Operating: 0 to 60°C Storage: -40 to 85°C	
	Humidity	Operating: 5 to 90% RH Storage: 5 to 90% RH	
	MTBF	374,618 hrs @ 25°C; 211,926 hrs @ 45°C; 133,291 hrs @ 60°C Calculation Model: Telcordia Issue 2, Method Case 3 Environment: GB, GC – Ground Benign, Controlled	
<b>MECHANICAL</b>	Dimensions	microATX Form Factor, 244mm (9.6") x 244mm (9.6")	

## Features

### • Watchdog Timer

The Watchdog Timer function allows your application to regularly “clear” the system at the set time interval. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

### • DDR4

DDR4 delivers increased system bandwidth and improves performance. The advantages of DDR4 provide an extended battery life and improve the performance at a lower power than DDR3/DDR2.

### • Graphics

The integrated Intel® HD graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today's and tomorrow's business applications. Supports 1 x VGA, 1 x DVI-I (DVI-D signal) and 1 x DP++ interfaces for triple display outputs.

### • PCI Express

PCI Express is a high bandwidth I/O infrastructure that possesses the ability to scale speeds by forming multiple lanes. The x4 PCI Express lane supports transfer rate of 4 Gigabyte per second (2 directions). The PCI Express architecture also supports high performance graphics infrastructure by enhancing the capability of a PCIe x16 Gen 3 at 16GB/s bandwidth.

### • Serial ATA

Serial ATA is a storage interface that is compliant with SATA 1.0a specification. With speed of up to 6Gb/s (SATA 3.0), it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s.

### • Gigabit LAN

Two Intel® Gigabit LAN controllers (Intel® I210AT PCIe and Intel® I219LM PCIe) support up to 1Gbps data transmission.

### • Audio

The Realtek ALC888S-VD2-GR audio codec provides 5.1-channel High Definition audio output.

### • Wake-On-PS/2

This function allows you to use the PS/2 keyboard or PS/2 mouse to power-on the system.



#### **Important:**

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

### • Wake-On-LAN

This feature allows the network to remotely wake up a Soft Power Down (Soft-Off) PC. It is supported via the onboard LAN port or via a PCI LAN card that uses the PCI PME (Power Management Event) signal. However, if your system is in the Suspend mode, you can power-on the system only through an IRQ or DMA interrupt.



#### **Important:**

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

### • Wake-On-USB

This function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state.



#### **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  $\geq 1.5\text{A}$ . For 3 or more USB ports, the 5V\_standby power source of your power supply must support  $\geq 2\text{A}$ .

### • ACPI STR

The system board is designed to meet the ACPI (Advanced Configuration and Power Interface) specification. ACPI has energy saving features that enables PCs to implement Power Management and Plug-and-Play with operating systems that support OS Direct Power Management. ACPI when enabled in the Power Management Setup will allow you to use the Suspend to RAM function.

With the Suspend to RAM function enabled, you can power-off the system at once by pressing the power button or selecting “Standby” when you shut down Windows® without having to go through the sometimes tiresome process of closing files, applications and operating system. This is because the system is capable of storing all programs and data files during the entire operating session into RAM (Random Access Memory) when it powers-off.



#### **Important:**

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

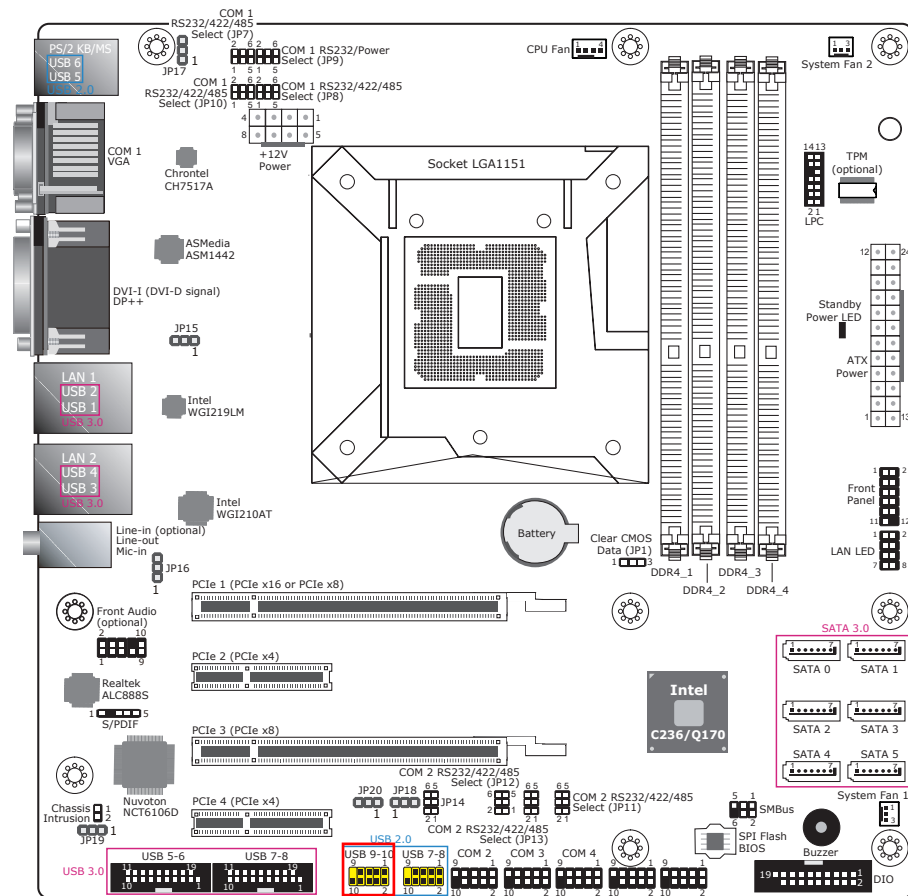
- **USB**

The system board supports the new USB 3.0. It is capable of running at a maximum transmission speed of up to 5 Gbit/s (625 MB/s) and is faster than USB 2.0 (480 Mbit/s, or 60 MB/s) and USB 1.1 (12Mb/s). USB 3.0 reduces the time required for data transmission, reduces power consumption, and is backward compatible with USB 2.0. It is a marked improvement in device transfer speeds between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.



# Chapter 2 - Hardware Installation

## Board Layout

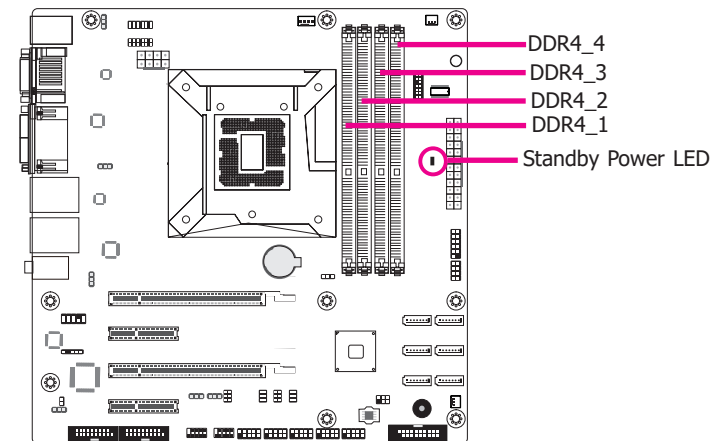


\*This USB type will vary by its chipset.  
 SD331-Q170 : Vertical USB  
 SD331-C236 : USB Pin Header

**Important:** Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures 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.

## System Memory

**Important:** When the Standby Power LED lights red, it indicates that there is power on the system board. Power-off the PC then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.



## Features

- Four 288-pin ECC DIMM up to 64GB (SD331-C236)  
 Four 288-pin DIMM up to 64GB (SD331-Q170)
- Dual Channel DDR4 1866/2133 MHz

The system board supports the following memory interface.

### Single Channel (SC)

Data will be accessed in chunks of 64 bits (8B) from the memory channels.

### Dual Channel (DC)

Data will be accessed in chunks of 128 bits from the memory channels. Dual channel provides better system performance because it doubles the data transfer rate.

<b>Single Channel</b>	DIMMs are on the same channel. DIMMs in a channel can be identical or completely different. However, we highly recommend using identical DIMMs. Not all slots need to be populated.
<b>Dual Channel</b>	DIMMs of the same memory configuration are on different channels.

## Installing the DIMM Module



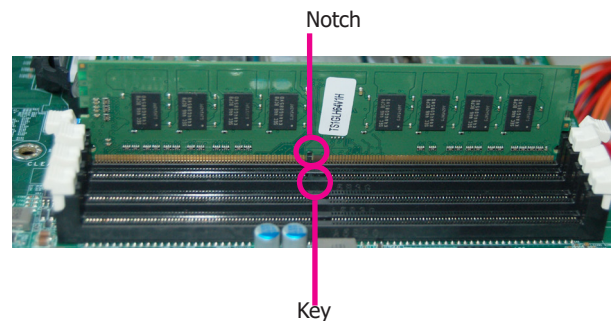
### Note:

The system board used in the following illustrations may not resemble the actual board. These illustrations are for reference only.

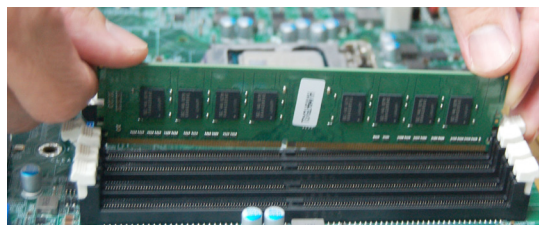
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the DIMM socket on the system board.
4. Push the "ejector tabs" which are at the ends of the socket to the side.



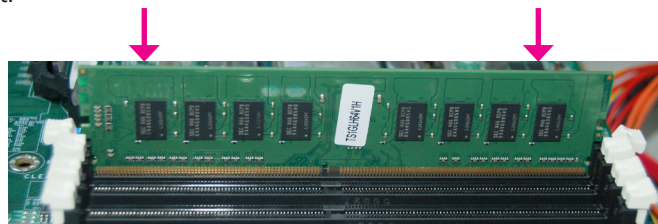
5. Note how the module is keyed to the socket.



- Grasping the module by its edges, position the module above the socket with the “notch” in the module aligned with the “key” on the socket. The keying mechanism ensures the module can be plugged into the socket in only one way.



- Seal the module vertically, pressing it down firmly until it is completely seated in the socket.



- The ejector tabs at the ends of the socket will automatically snap into the locked position to hold the module in place.



## CPU

The system board is equipped with a surface mount LGA 1151 socket. This socket is exclusively designed for installing a LGA 1151 packaged Intel CPU.



### Important:

- 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.
- 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

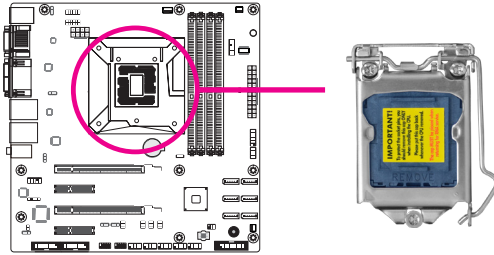


### Note:

The system board used in the following illustrations may not resemble the actual board. These illustrations are for reference only.

## Installing the CPU

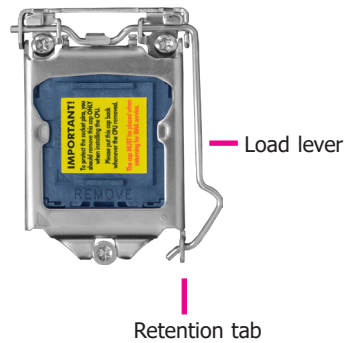
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the LGA 1151 CPU socket on the system board.



### Important:

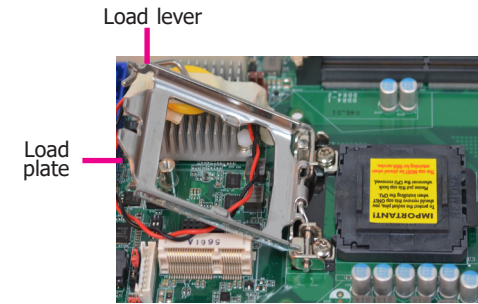
The CPU socket must not come in contact with anything other than the CPU. Avoid unnecessary exposure. Remove the protective cap only when you are about to install the CPU.

4. 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.

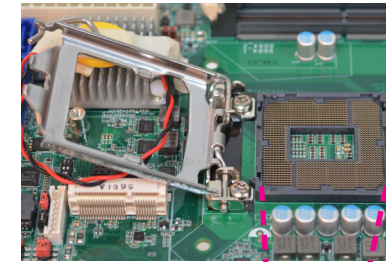


5. Lifting the load lever will at the same time lift the load plate.

Lift the load lever up to the angle shown on the photo.

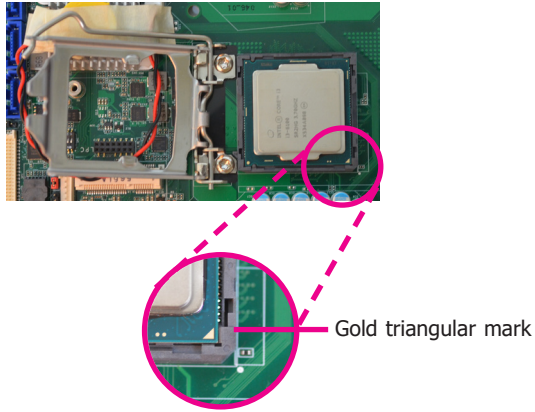


6. Remove the protective cap from the CPU socket. The cap is used to protect the CPU socket against dust and harmful particles. Remove the protective cap only when you are about to install the CPU.

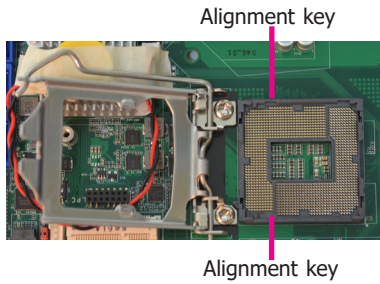


Protective cap

7. 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.

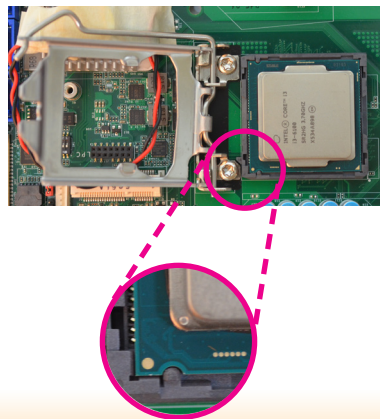


The CPU's notch will at the same time fit into the socket's alignment key.



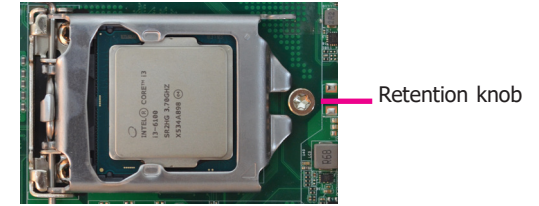
**Important:**

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

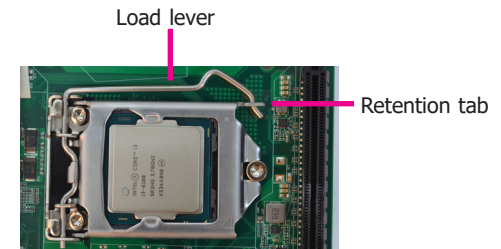


8. Close the load plate then push the load lever down.

While closing the load plate, make sure the front edge of the load plate slides under the retention knob.



9. Hook the load lever under the retention tab.



## 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.



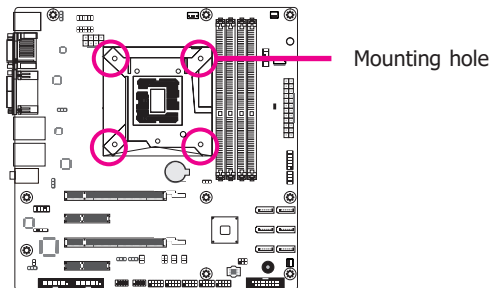
### Note:

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.

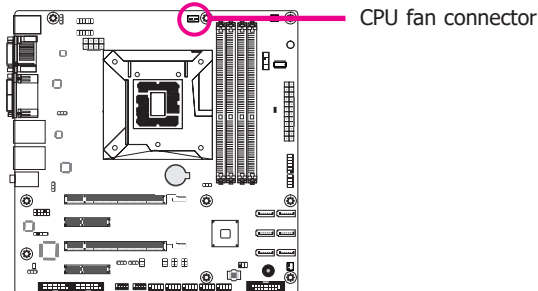
1. Before you install the fan / heat sink, you must apply a thermal paste onto the top of the CPU. The thermal paste is usually supplied when you purchase the fan / heat sink assembly. Do not spread the paste all over the surface. When you later place the heat sink on top of the CPU, the compound will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

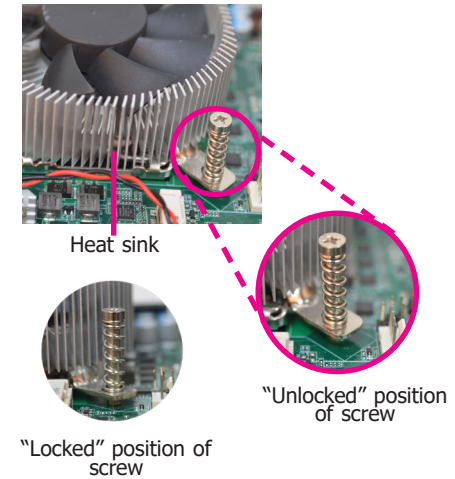
2. Place the heat sink on top of the CPU. The 4 screw around the heat sink, which are used to secure the heat sink onto the system board, must match the 4 mounting holes around the socket.



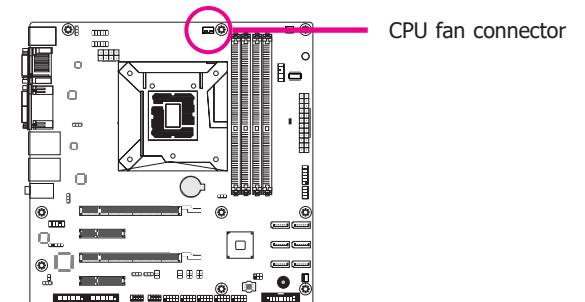
3. Orient the heat sink such that the CPU fan's cable is nearest the CPU fan connector.



4. Rotate each screw that are diagonally across the heat sink. Perform the same procedure for the other screws.

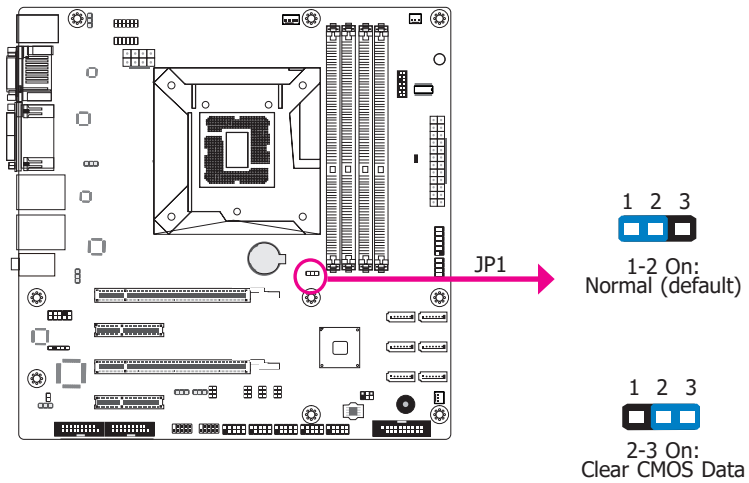


5. Connect the CPU fan's cable to the CPU fan connector on the system board.



## Jumper Settings

### Clear CMOS Data



If you encounter the followings,

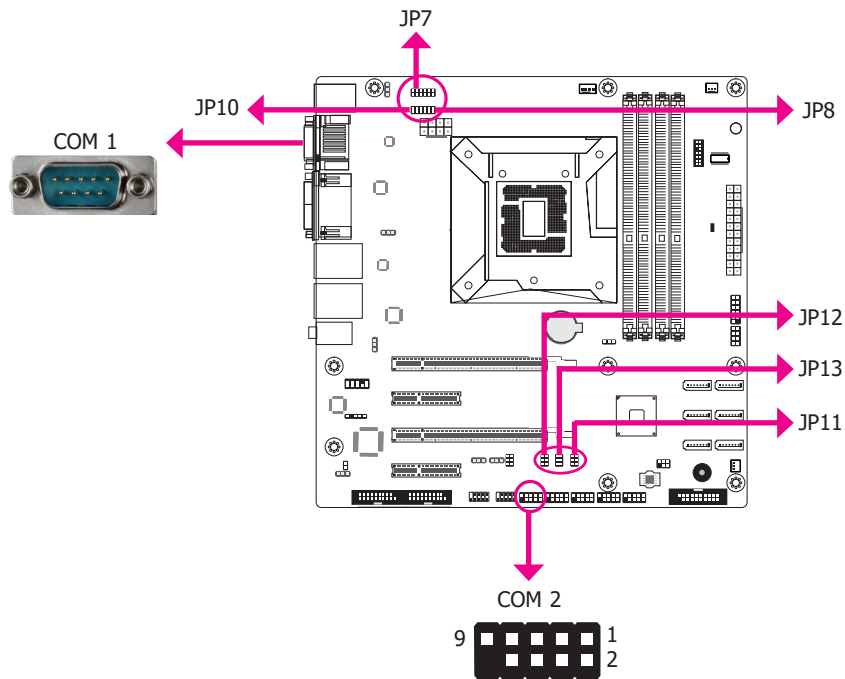
- a) CMOS data becomes corrupted.
- b) You forgot the supervisor or user password.

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

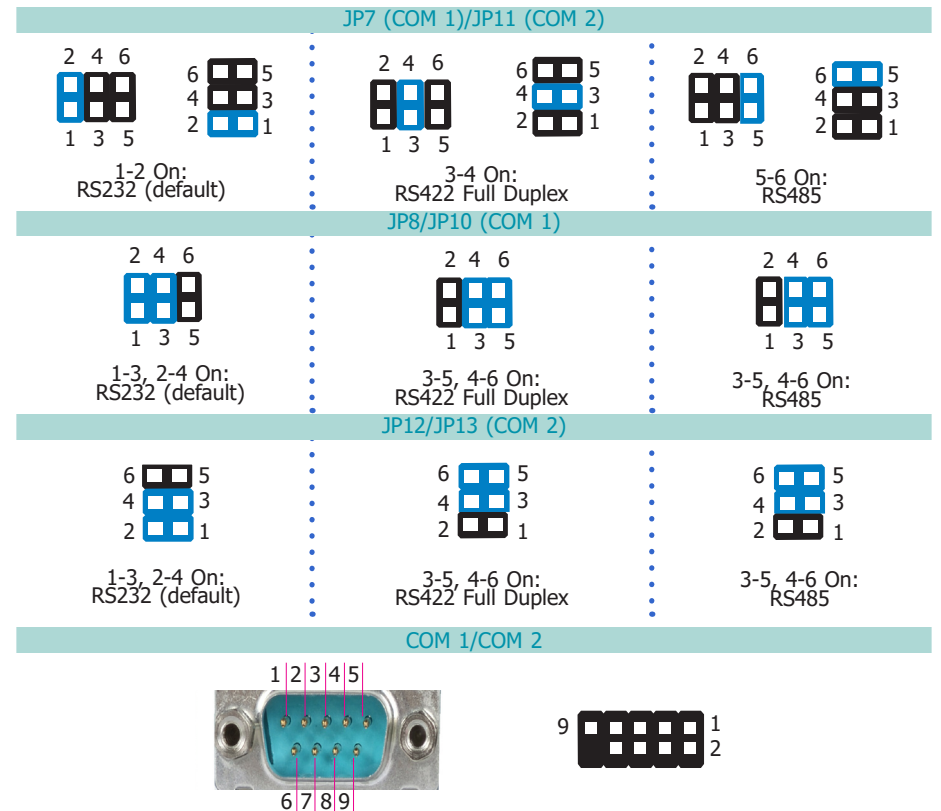
To load the default values stored in the ROM BIOS, please follow the steps below.

1. Power-off the system and unplug the power cord.
2. Set JP1 pins 2 and 3 to On. Wait for a few seconds and set JP1 back to its default setting, pins 1 and 2 On.
3. Now plug the power cord and power-on the system.

## COM1/COM2 RS232/422/485 Select



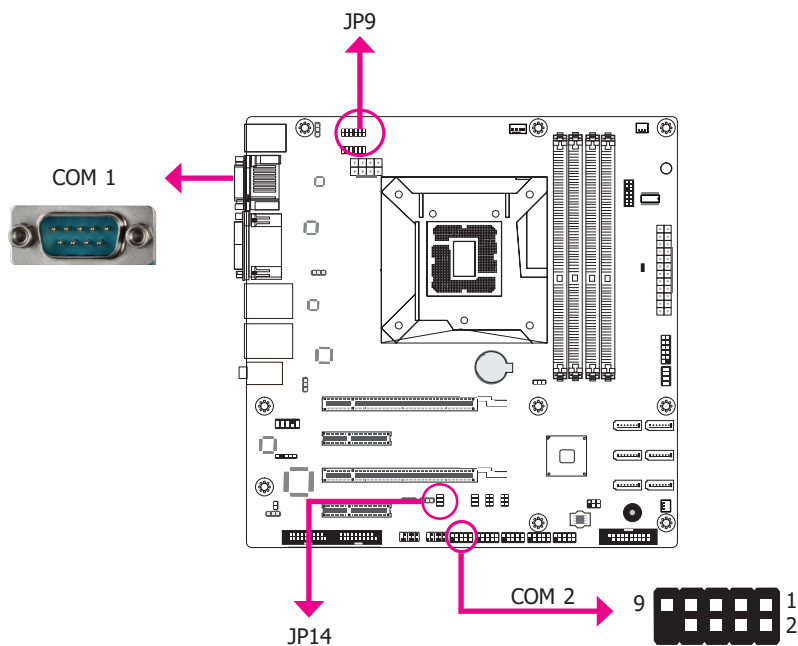
JP7/JP8/JP10 (for COM 1) and JP11/JP12/JP13 (for COM 2) are used to configure the COM ports to RS232, RS422 (Full Duplex) or RS485. When COM 1 RS232/422/485 is selected, JP8 and JP10 must be set in accordance to JP7. When COM 2 RS232/422/485 is selected, JP12 and JP13 must be set in accordance to JP11. The pin functions of the COM ports will vary according to the jumpers' setting.



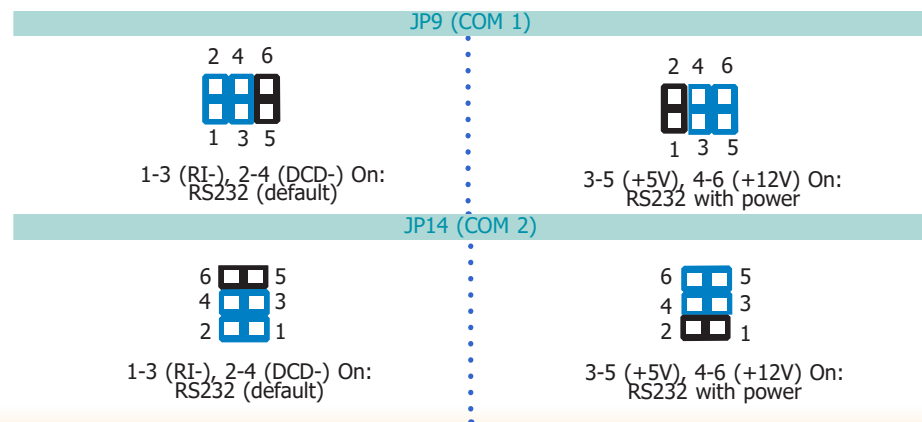
Pin	RS232	RS232 with power	RS422 Full Duplex	RS485
1	DCD-	+12V	RXD+	DATA+
2	RXD	RXD	RXD-	DATA-
3	TXD	TXD	TXD+	N.C.
4	DTR-	DTR-	TXD-	N.C.
5	GND	GND	GND	GND
6	DSR-	DSR-	N.C.	N.C.
7	RTS-	RTS-	N.C.	N.C.
8	CTS-	CTS-	N.C.	N.C.
9	RI-	+5V	N.C.	N.C.



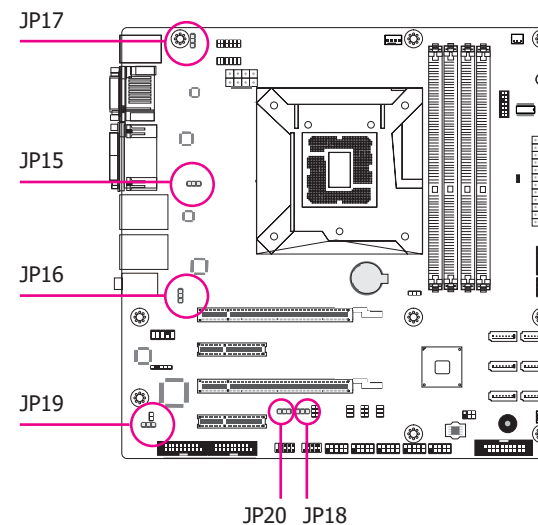
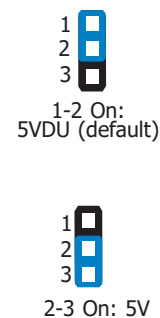
## COM1/COM2 RS232 Power Select



JP9 (for COM 1) and JP14 (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 JP9's and JP14's setting respectively.



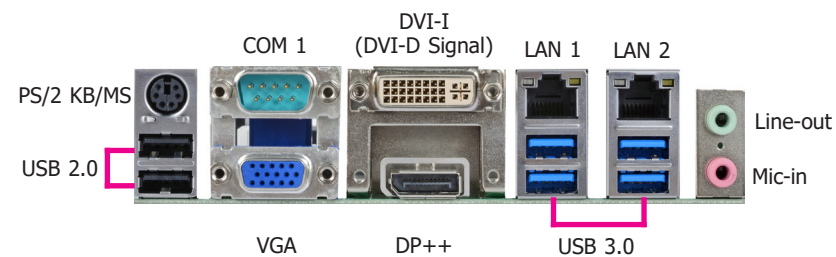
## USB Power Select



The power of the USB connectors' voltage buses can be configured to either 5V DU or 5V. The jumpers are located as illustrated above and correspond to each USB port number as listed below.

Rev. B	USB Port
JP15	USB 1/2 (USB 3.0)
JP16	USB 3/4 (USB 3.0)
JP17	USB 5/6 (USB 2.0)
JP18	USB 7/8/9/10 (USB 2.0)
JP19	USB 5/6 (USB 3.0)
JP20	USB 7/8 (USB 3.0)

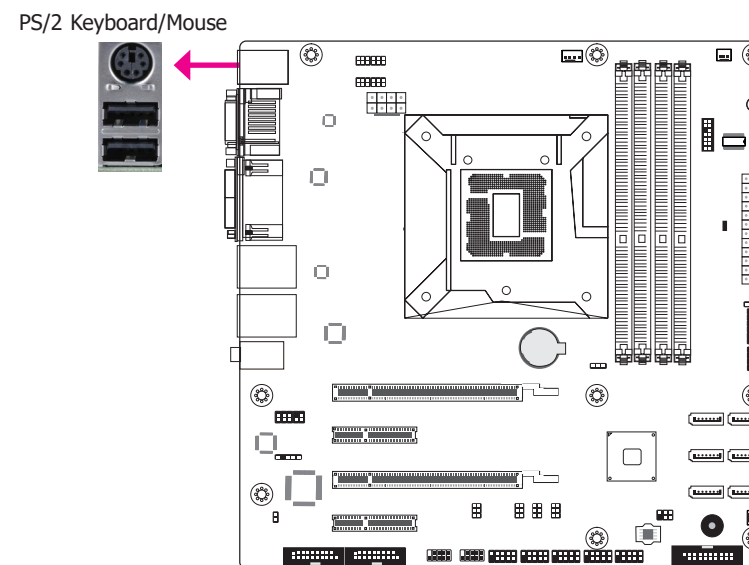
## Rear Panel I/O Ports



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

- 1 PS/2 Keyboard/Mouse port
- 1 Serial COM port
- 1 VGA
- 1 DVI-I (DVI-D Signal) port
- 1 DP ports
- 2 RJ45 LAN ports
- 4 USB 3.0 ports
- 2 USB 2.0 ports
- Line-out jack
- Mic-in jack

## PS/2 Keyboard/Mouse Port



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

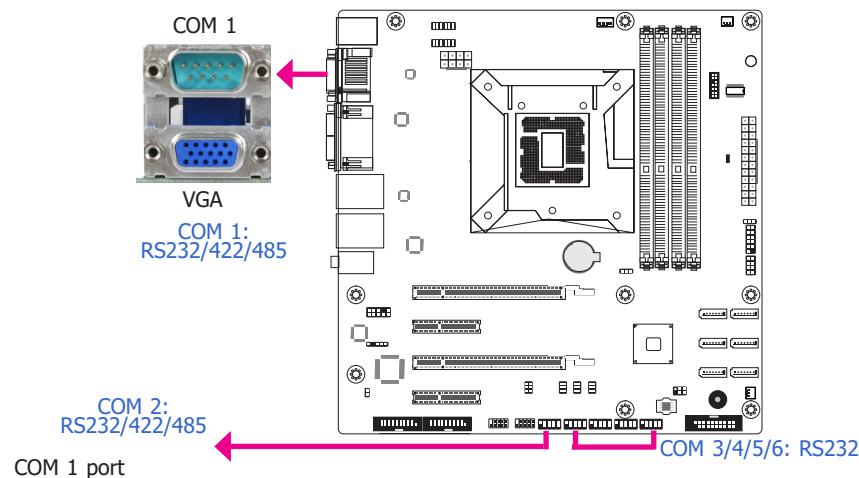
### Wake-On-PS/2 Keyboard/Mouse

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 Power Management Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.

## COM (Serial) Ports



The pin functions of COM 1 port will vary according to JP7's setting. JP9 is 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.

### COM 2 port

The pin functions of COM 2 port will vary according to JP11's setting. JP14 is 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.

COM 3 to COM 6 are fixed at RS232.

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.

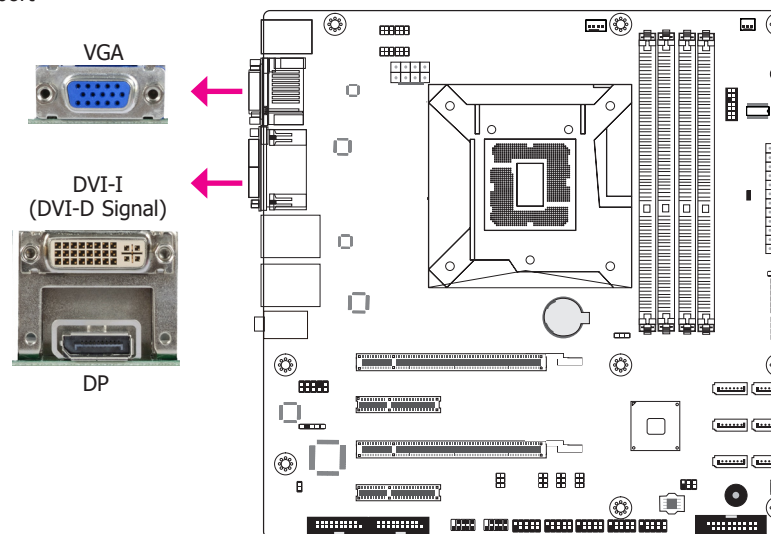
### BIOS Setting

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 VGA port
- 1 DVI-I (DVI-D Signal) port
- 1 DP 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 Port

The DVI-I (DVI-D Signal) port is used to connect an LCD monitor. This port supports DVI-D signal only. Connect the display device's cable connector to the DVI-I port. After plugging the cable connector into the port, gently tighten the cable screws to hold the connector in place.

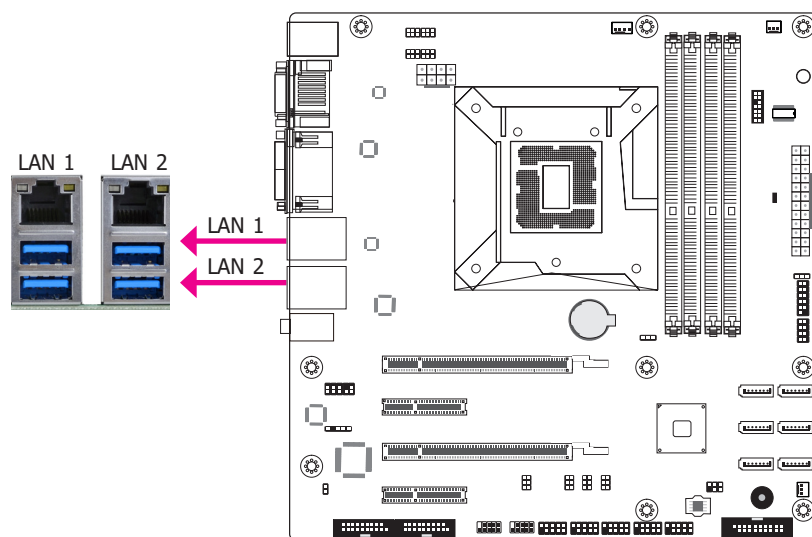
### DP Port

The DP port which carries both digital audio and video signals is used to connect a LCD monitor or digital TV that has the DP 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® I210 PCI Express Gigabit Ethernet controller
- Intel® I219LM Gigabit Ethernet Phy

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

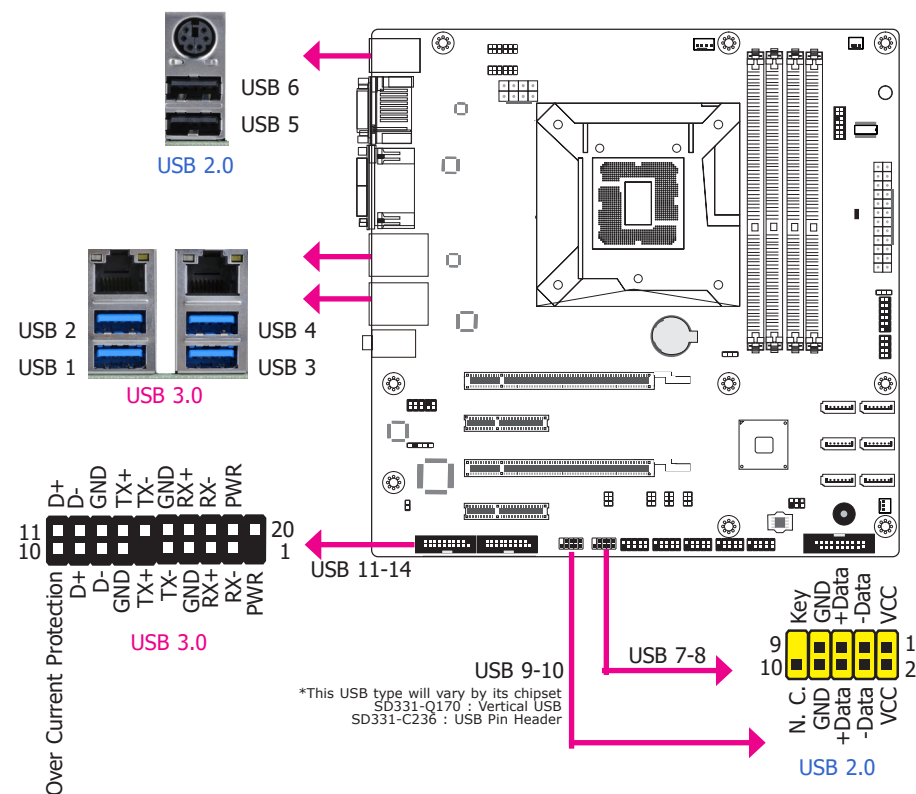
### BIOS Setting

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 two onboard USB 2.0 ports (USB 5-10) and four onboard USB 3.0 ports (USB 1-2/3-4). The 10-pin connectors allow you to connect 4 additional USB 2.0 ports (USB 7-8/9-10). 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

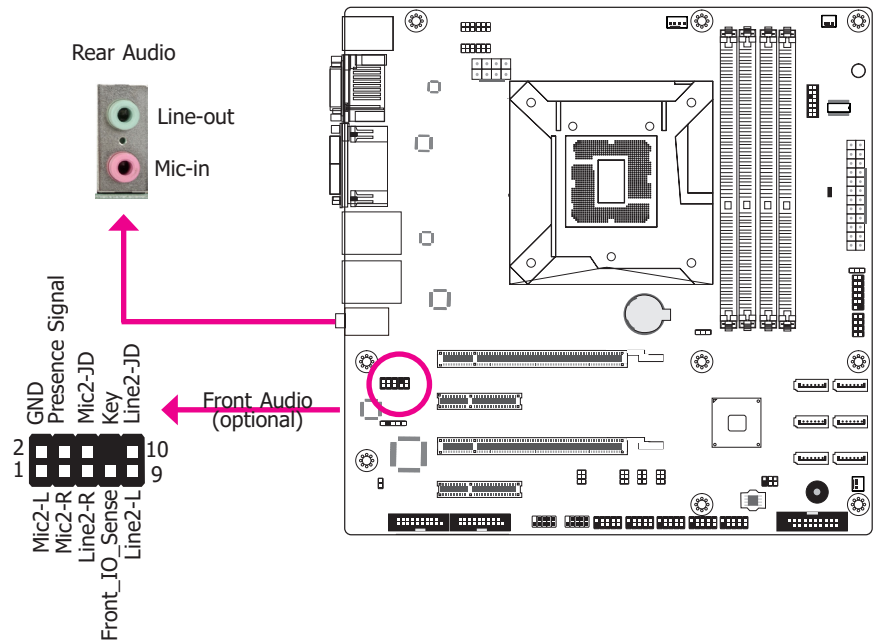
The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state. To use this function:



### 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 (Pink)  
This jack is used to connect an external microphone.

### Front Audio (optional)

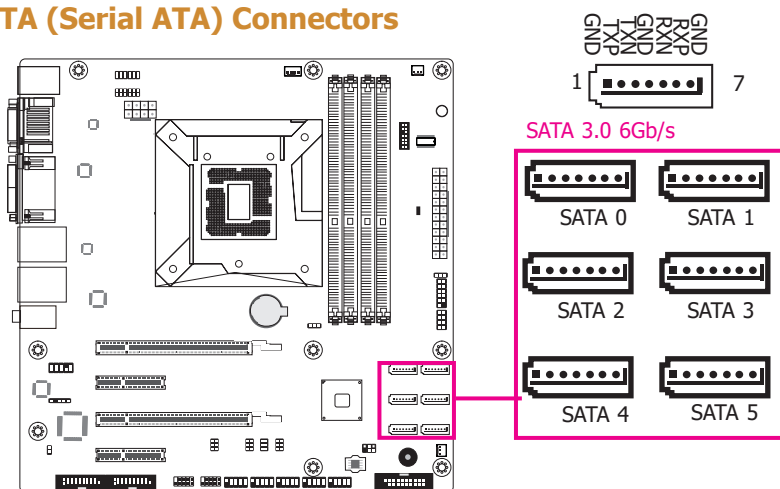
The front audio connector allows you to connect to the second line-out and mic-in jacks that are at the front panel of your system.

### Driver Installation

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

## I/O Connectors

### SATA (Serial ATA) Connectors



### Features

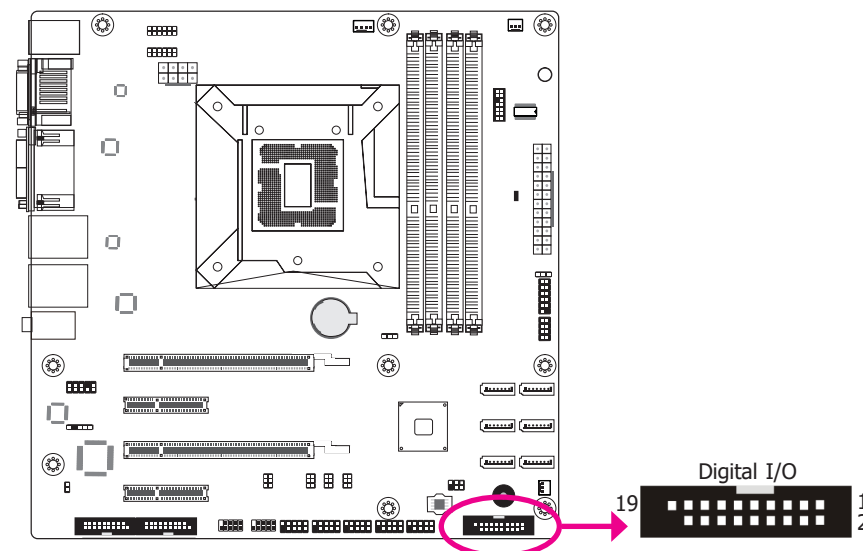
- 6 Serial ATA ports
  - 6 SATA 3.0 ports with data transfer rate up to 6Gb/s (SATA 0, SATA 1, SATA 2, SATA 3, SATA 4, SATA 5)
- Integrated Advanced Host Controller Interface (AHCI) controller
- Supports Intel® Smart Response Technology
- Supports RAID 0, RAID 1, RAID 5, RAID 10

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.

### 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.

## Digital I/O Connector

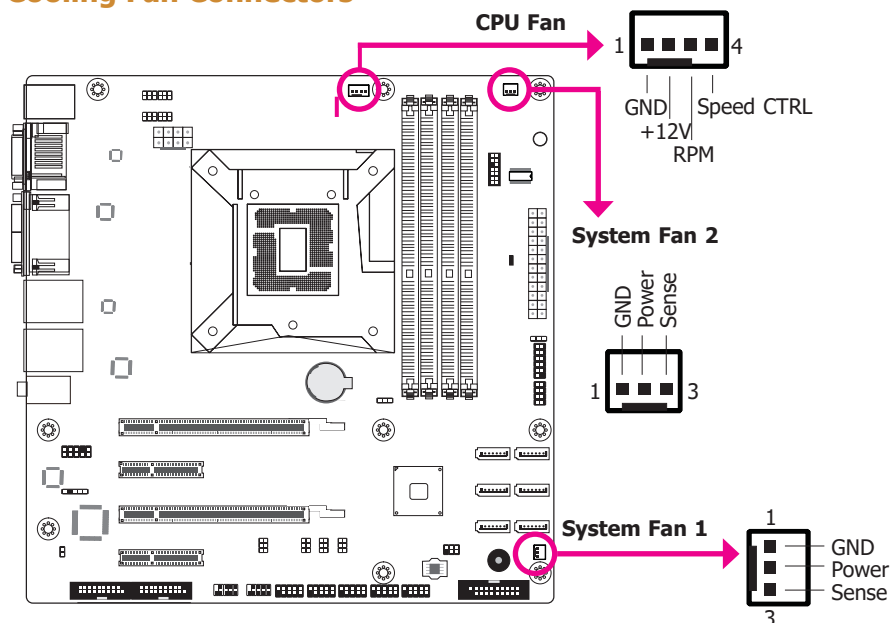


The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to these connectors. The pin functions of the 8-bit digital I/O connector are listed below.

### 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 DU
15	DIO1	16	+5V DU
17	DIO0	18	GND
19	GND	20	NC

## Cooling Fan Connectors

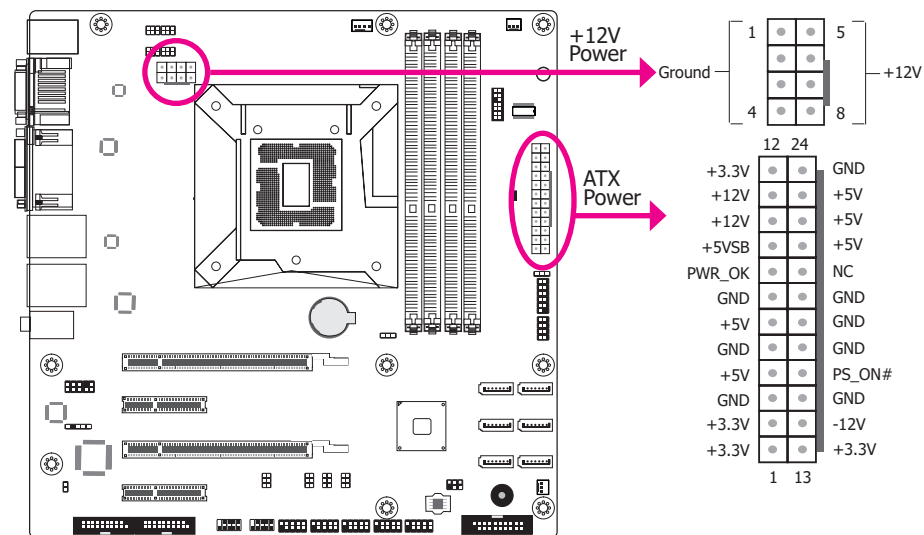


These fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

### 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.

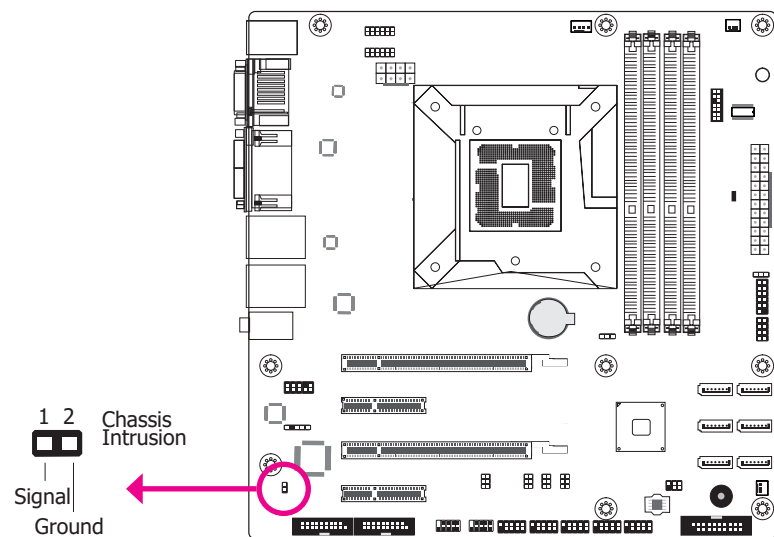
The system board requires a minimum of 300 Watt power supply to operate. Your system configuration (CPU power, amount of memory, add-in cards, peripherals, etc.) may exceed the minimum power requirement. To ensure that adequate power is provided, we strongly recommend that you use a minimum of 400 Watt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



### Important:

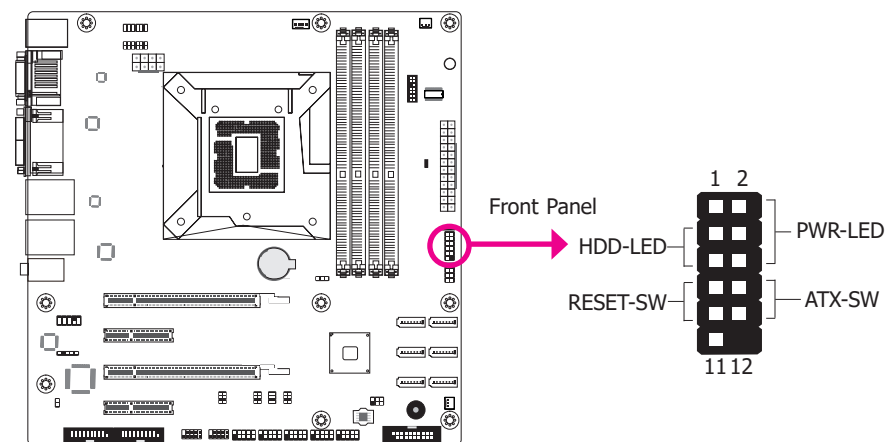
Insufficient power supplied to the system may result in instability or the add-in boards and peripherals not functioning properly. Calculating the system's approximate power usage is important to ensure that the power supply meets the system's consumption requirements.

## 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 - Reset Switch

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

### Power\_Button

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

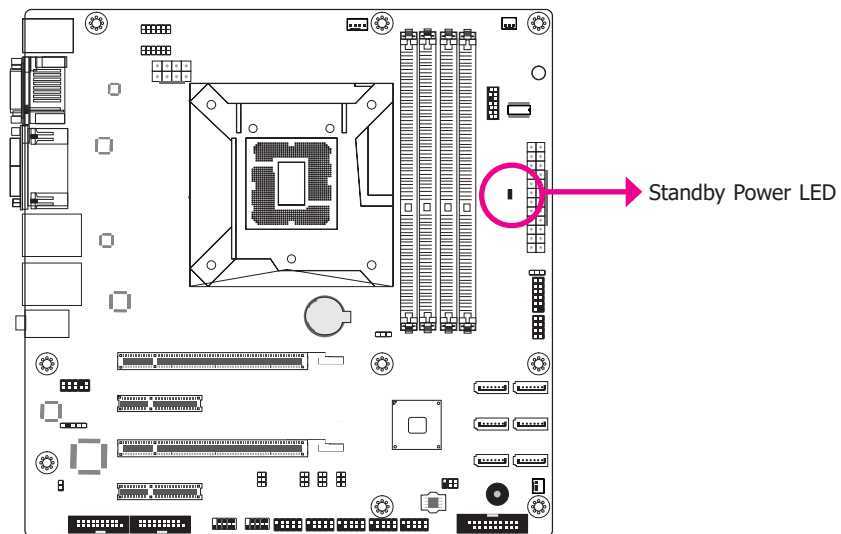
### PWR-LED - Power/Standby LED

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

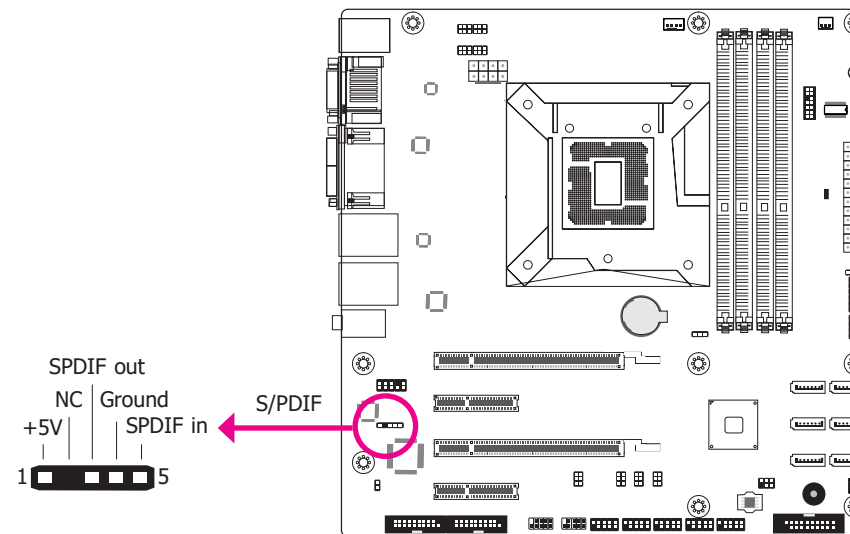


## Standby Power LED



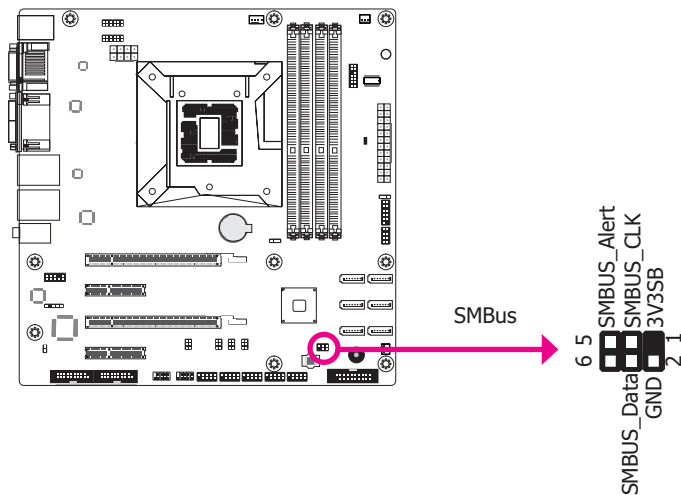
This LED will lit red when the system is in the standby mode. It indicates that there is power on the system board. Power-off the PC and then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

## S/PDIF Connector



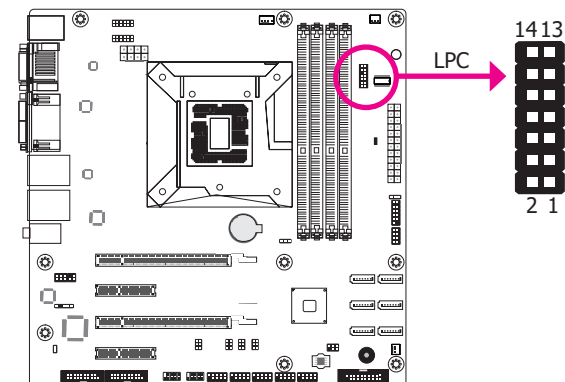
The S/PDIF connector is used to connect an external S/PDIF port. Your S/PDIF port may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then connect the audio cable to the S/PDIF connector. Make sure pin 1 of the audio cable is aligned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

## SMBus Connector



The SMBus (System Management Bus) connector is used to connect SMBus devices. It is a multiple device bus that allows multiple chips to connect to the same bus and enable each one to act as a master by initiating data transfer.

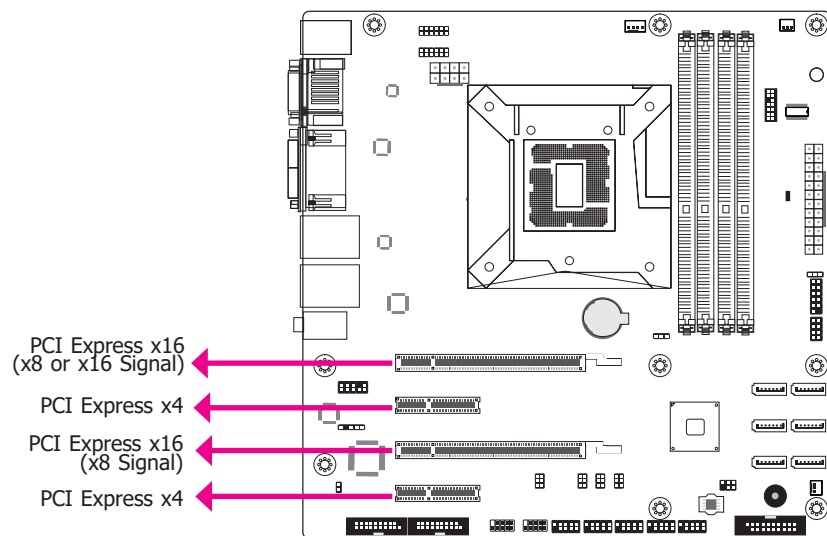
## LPC Connector



The Low Pin Count Interface was defined by Intel® Corporation to facilitate the industry's transition towards legacy free systems. It allows the integration of low-bandwidth legacy I/O components within the system, which are typically provided by a Super I/O controller. Furthermore, it can be used to interface firmware hubs, Trusted Platform Module (TPM) devices and embedded controller solutions. Data transfer on the LPC bus is implemented over a 4 bit serialized data interface, which uses a 33MHz LPC bus clock. For more information about LPC bus refer to the Intel® Low Pin Count Interface Specification Revision 1.1'. The table below indicates the pin fuctions of the LPC connector.

Pins	Pin Assignment	Pins	Pin Assignment
1	L_CLK	2	L_AD1
3	L_RST#	4	L_AD0
5	L_FRAME#	6	3V3
7	L_AD3	8	GND
9	L_AD2	10	Key
11	INT_SERIRQ	12	GND
13	5VSB	14	5V

## 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.

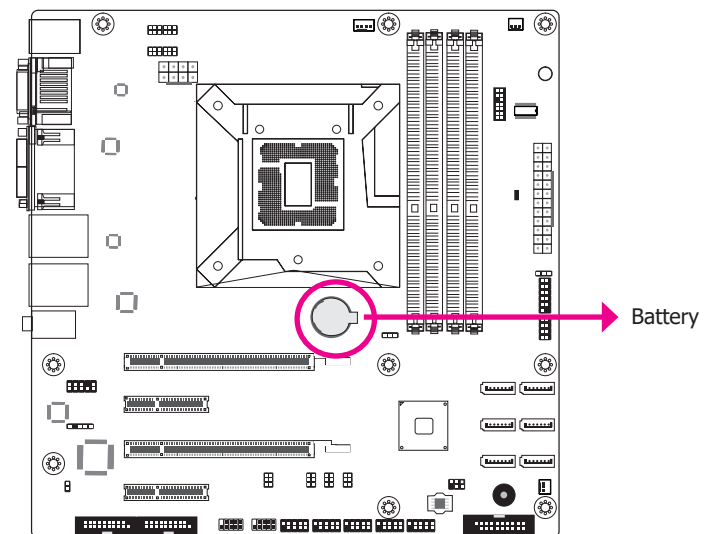
### PCI Express x8 Slot

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.

## 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 3 - 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 <Del> 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.
+ / <F5> (plus key)	Scrolls forward through the values or options of the highlighted field.
- / <F6> (minus key)	Scrolls backward through the values or options of the highlighted field.
Tab	Select a field.
<F1>	Displays general help
<F9>	Optimized defaults
<F10>	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.

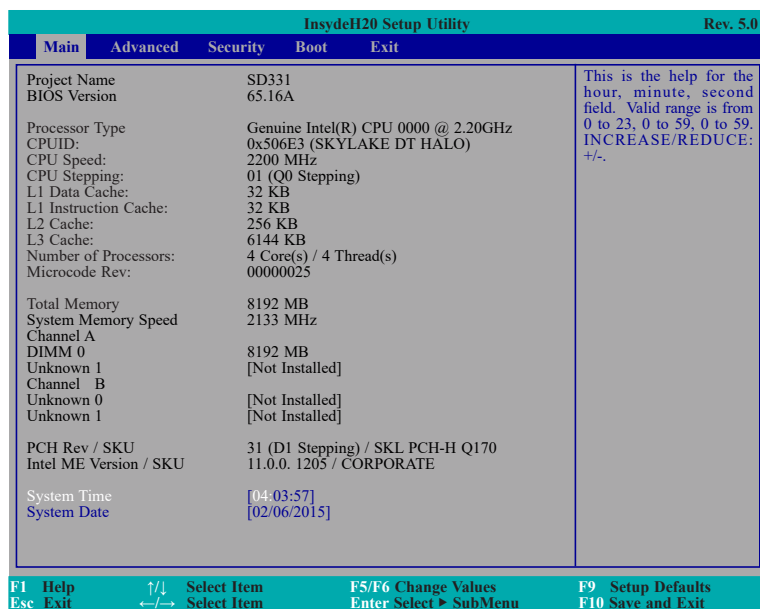
### Submenu

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.



### 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.

### System Date

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

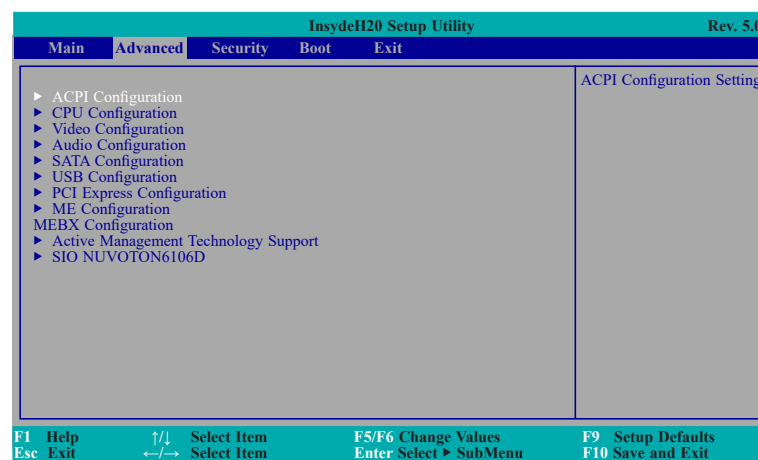
## Advanced

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.



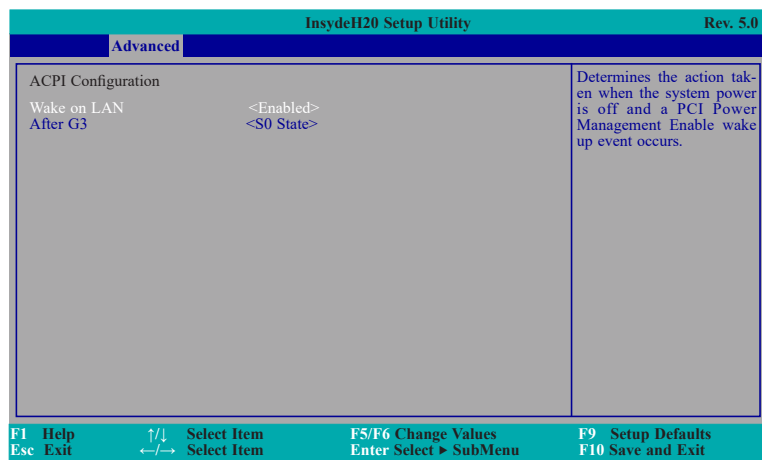
### Important:

Setting incorrect field values may cause the system to malfunction.



## 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

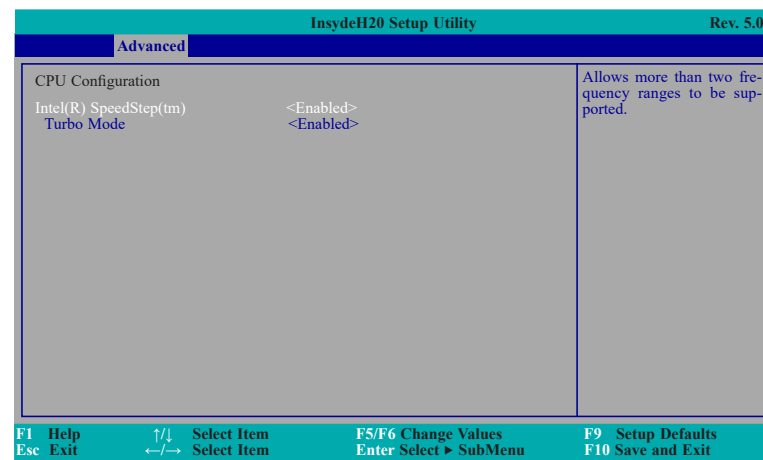
This field is to specify what state to go when power is re-applied after a power failue (G3 state).

**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)

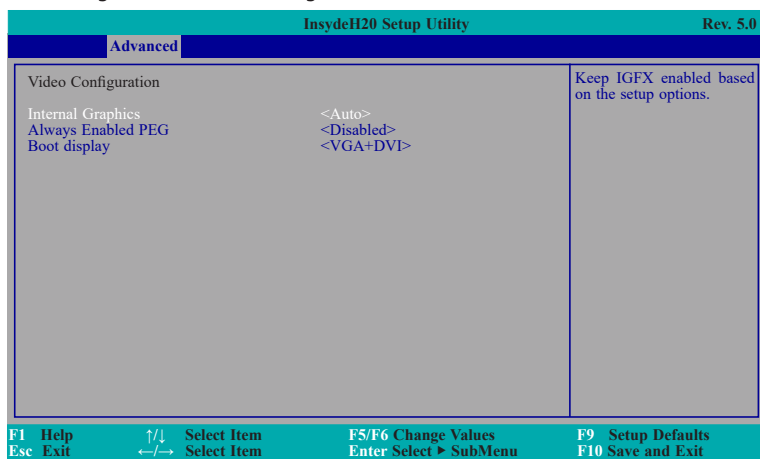
This field is used to enable or disable the Intel Enhanced SpeedStep Technology.

### Turbo Mode

Enable or disable the turbo mode.

## Video Configuration

This section configures the video settings.



### Internal Graphics

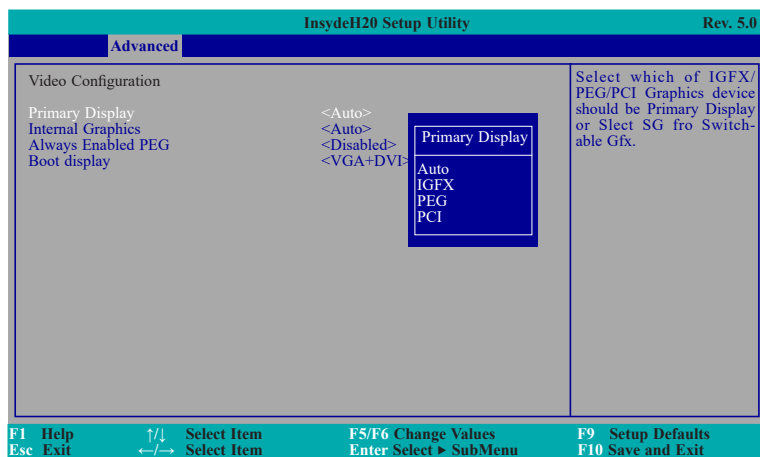
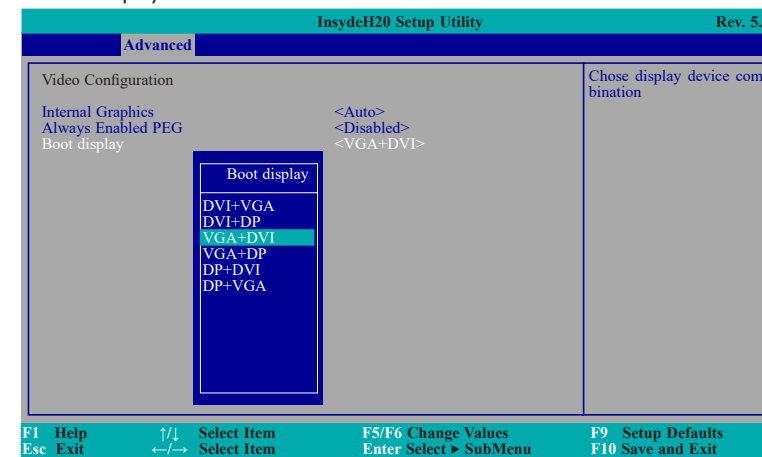
Keep IGFX enabled or disabled based on the setup options.

### Always Enabled PEG

Enable or disable the PEG function.

## Boot display

Set the display device combination.



### Note:

In order to control "Primary Display" & "Boot Display", you need to go to Boot tab and select different "Boot Type" (Boot Section, Page 41)

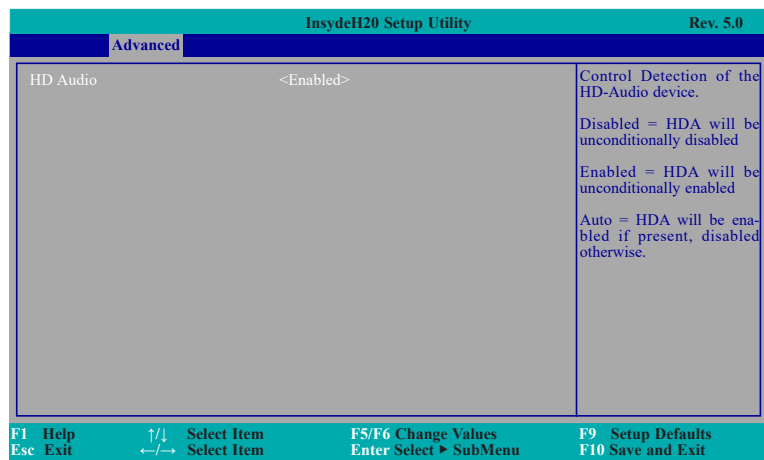
Boot Type : Legacy Boot Type -> Hide Primary Display & Show Boot Display

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

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

## 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.

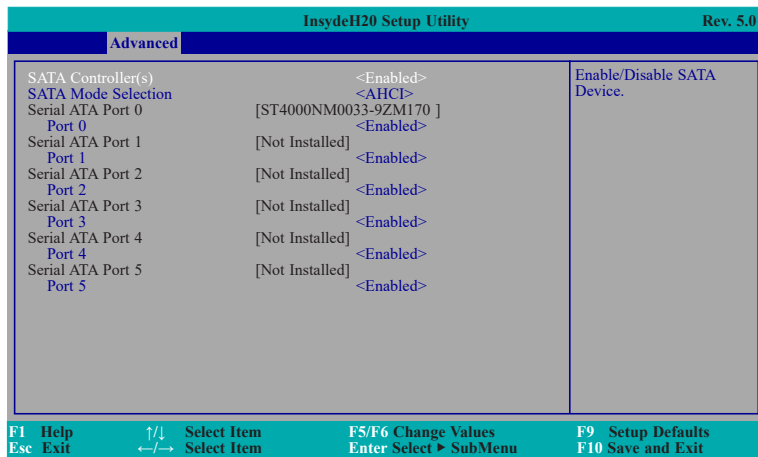
#### Auto

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

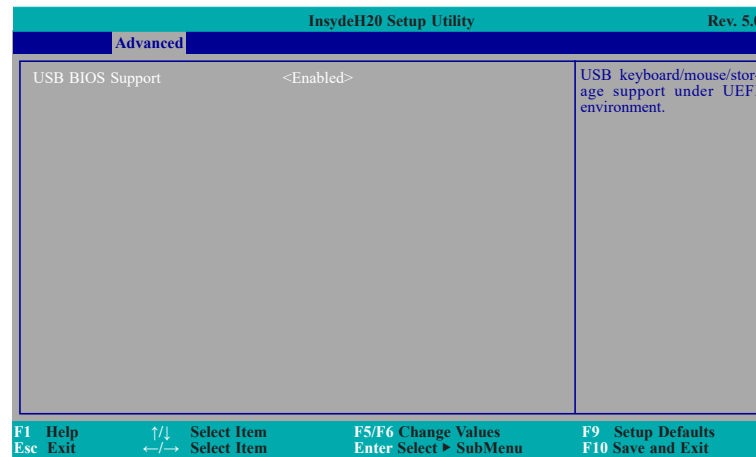
This option allows you to create RAID or Intel Matrix Storage configuration on Serial ATA devices.

### 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

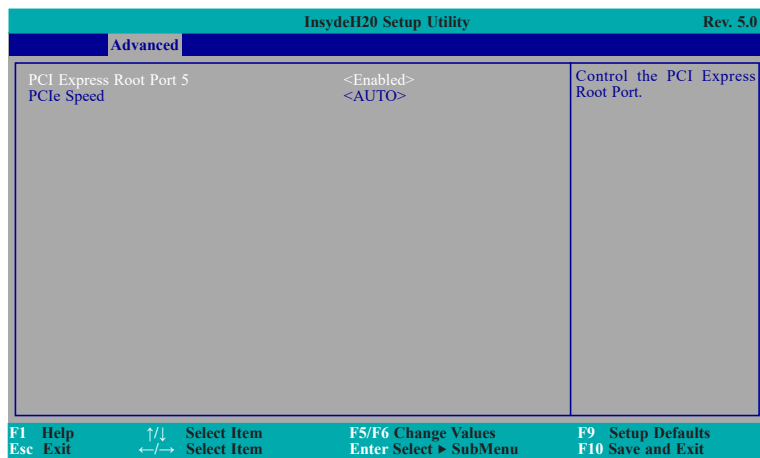
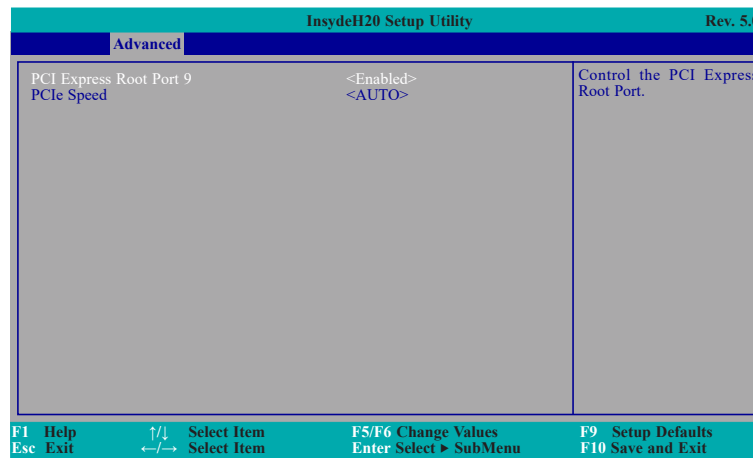
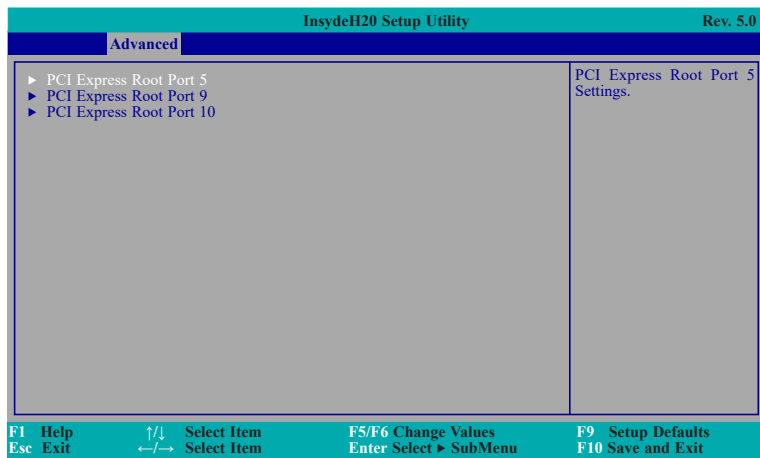
Disable USB keyboard/mouse/storage support.

#### Enabled

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

## PCI Express Configuration

This section configures settings relevant to PCI Express root ports.



### PCI Express Root Port

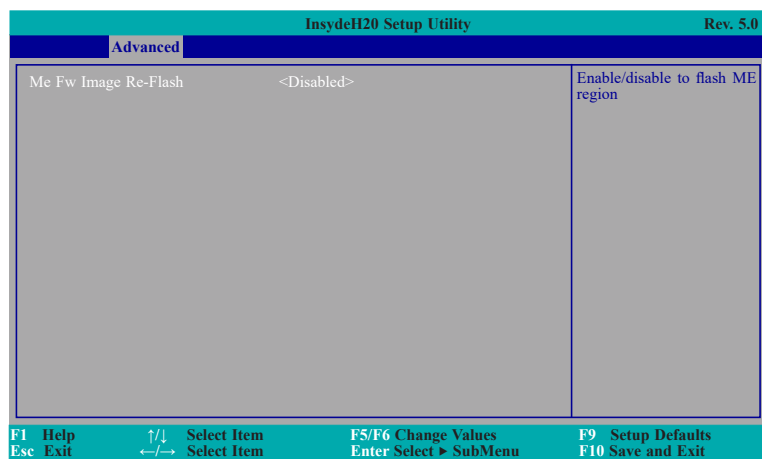
This field is used to enable or disable the PCI Express Root Port.

### PCIe Speed

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

## ME Configuration

This section configures settings relevant to flash ME region.

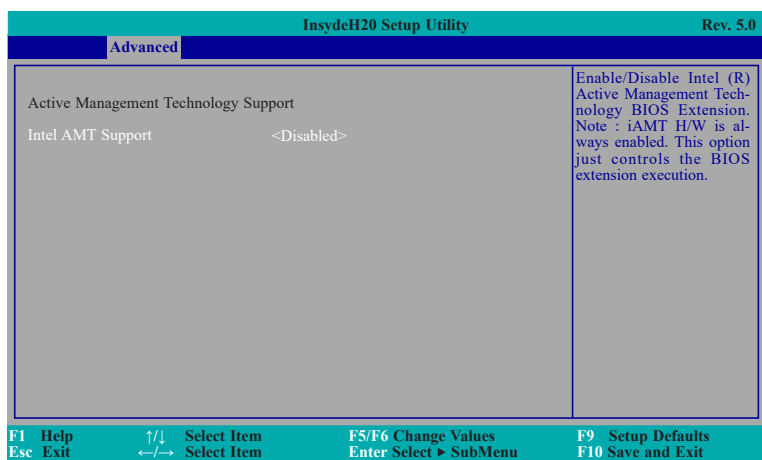


### Me Fw Image Re-Flash

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

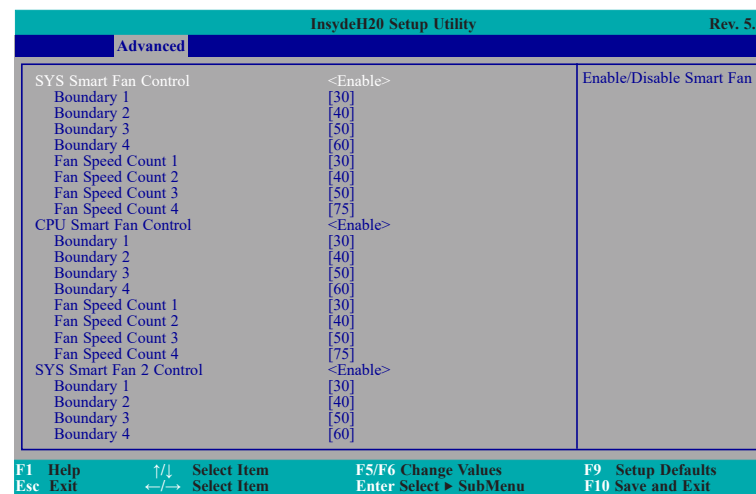
## Active Management Technology Support

The section allows users to enable or disable the Intel® Active Management Technology (Intel® AMT) BIOS extension. Refer to chapter 5 for more information.



## SIO NUVOTON6106D

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



### SYS/CPU Smart Fan/Fan 2 Control

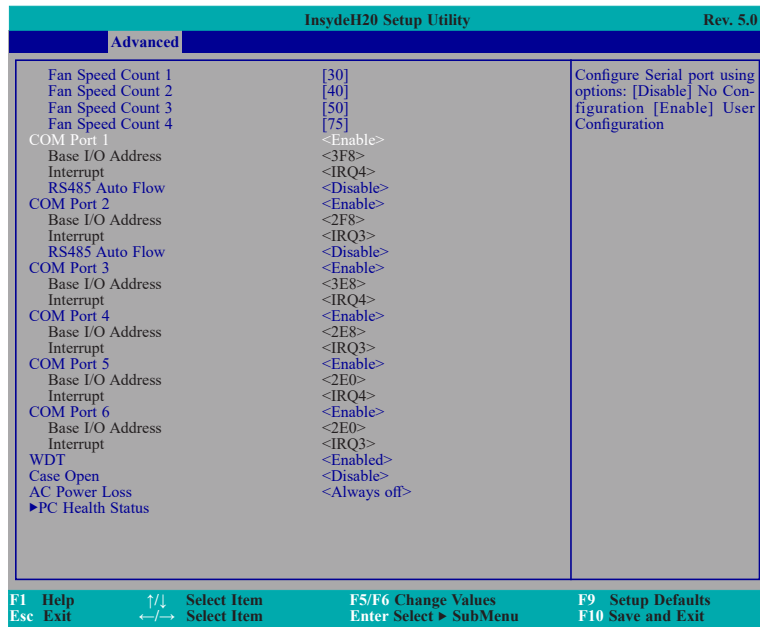
Enable or disable the system/CPU smart fan/fan 2.

### 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%.



### Serial Port 1 to Serial Port 6

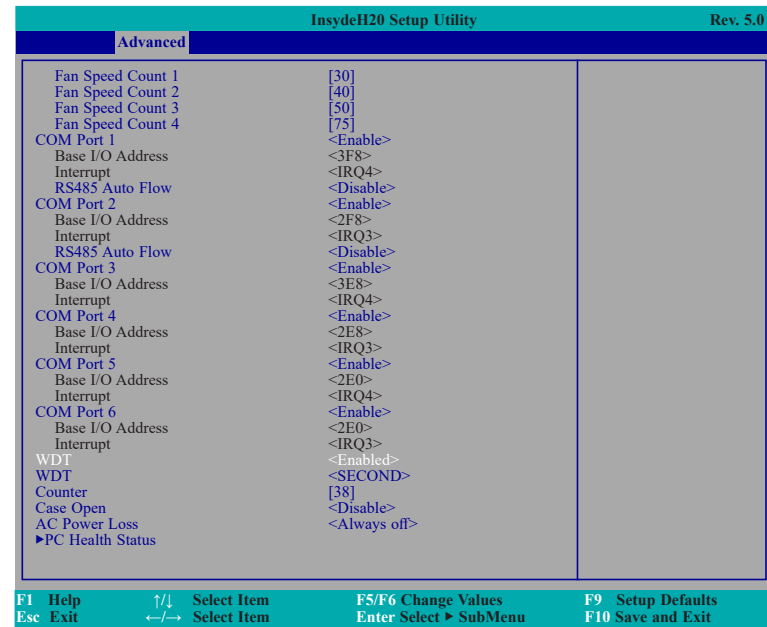
Configure the settings to use the serial port.

**Disable** No configuration

**Enable** User configuration

### RS485 Auto Flow

Choose RS485 auto flow to be enabled or disabled.



### WDT

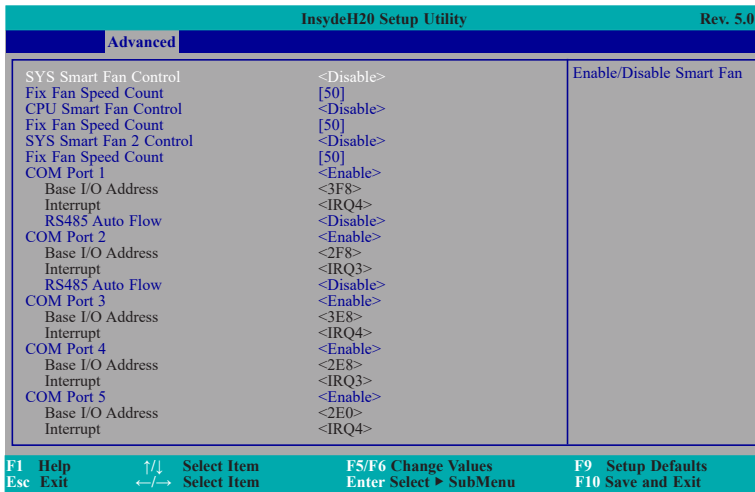
Enable or disable the watchdog function. A counter will appear if you select to enable WDT. Input any value between 1 to 255.

### Case Open

Enable or disable the case open.

### AC Power Loss

Set the AC power loss always off/on.

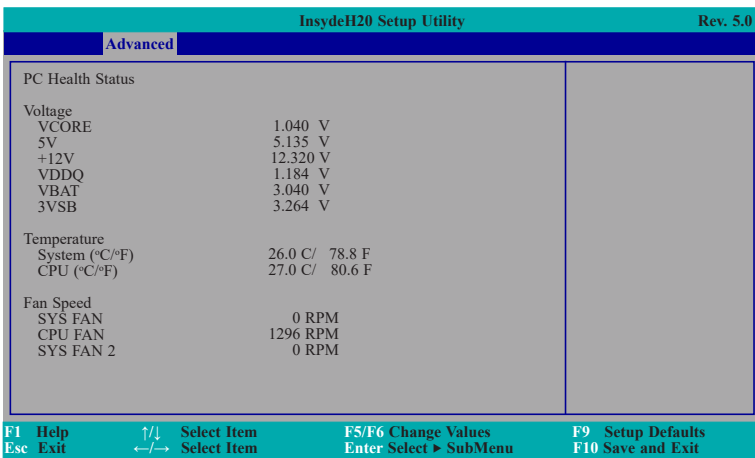


**Note:**

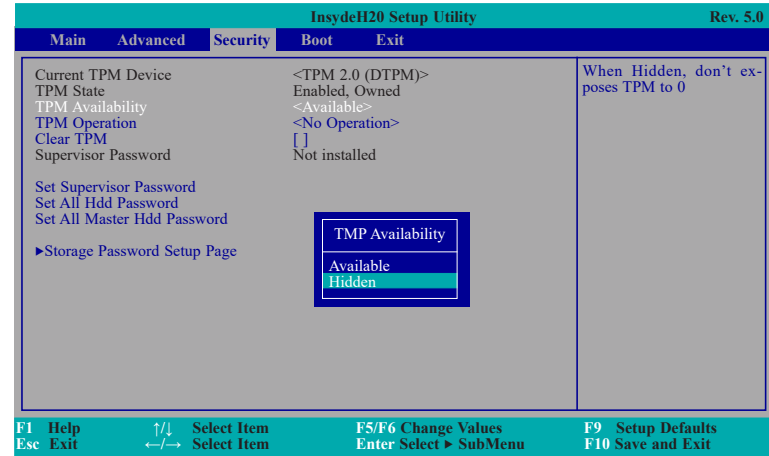
Smart Fan, Fan2 and CPU Smart Fan Control can be switched to <Disable>. When they are disabled, it will enable "Fix Fan Speed Count".

**PC Health Status**

This field only displays the PC health status.



**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.

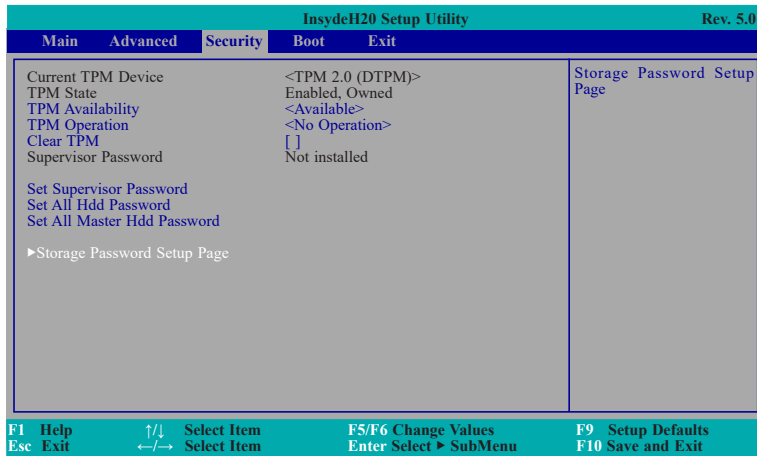
**Set All Hdd Password**

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**

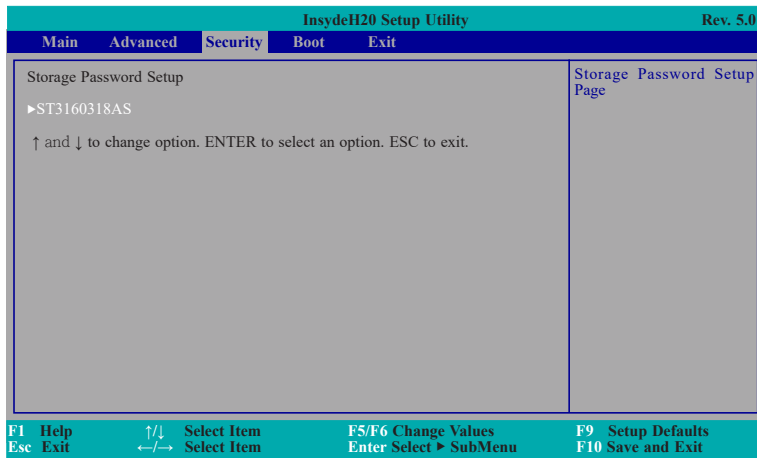
Set all master HDD password and suggest the length of password greater than one character. This item can be displayed when any security mode of HDD is not Lock.

## Storage Password Setup Page



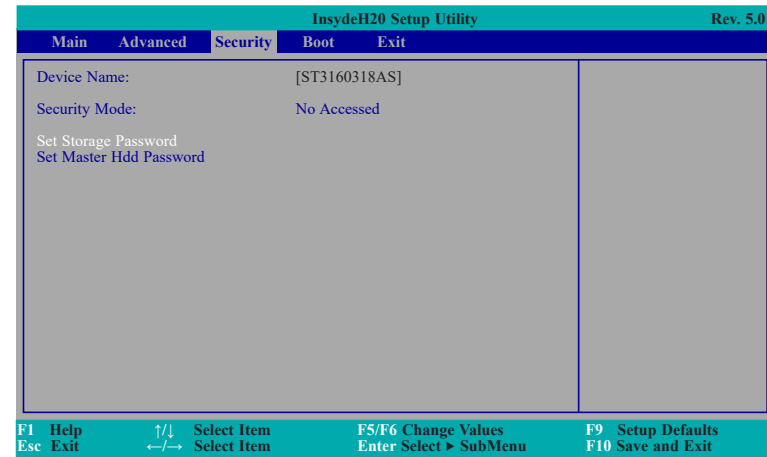
### Storage Password Setup Page

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

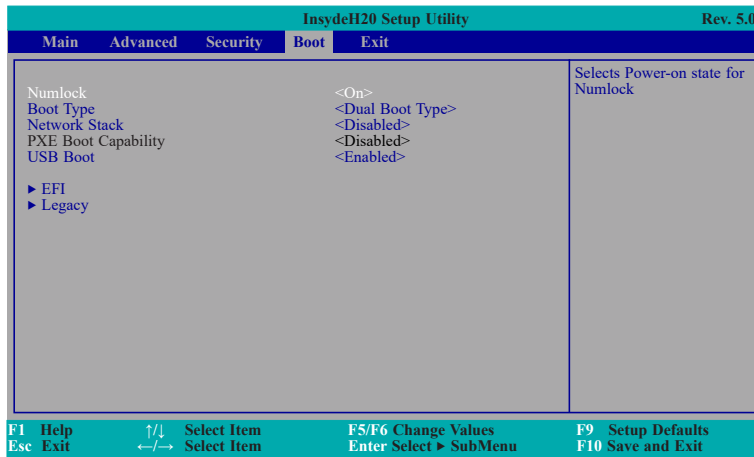
Set master HDD password and suggest the length of password greater than one character.

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.

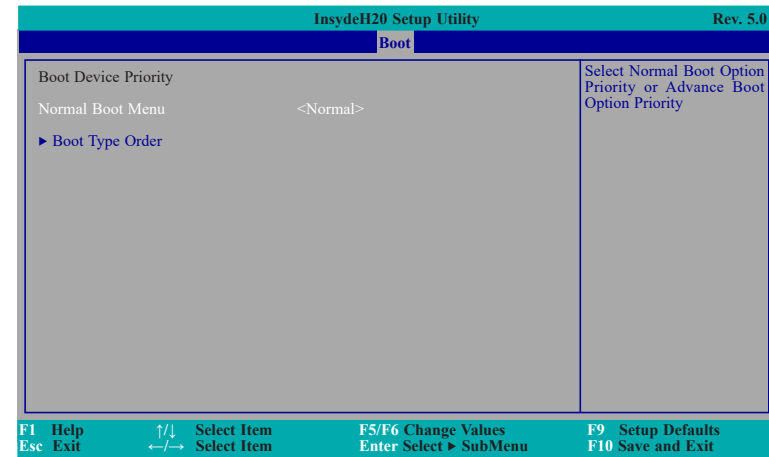
If you select "Legacy Boot", "PXE Boot to LAN" and "USB Boot" will show up.

### 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

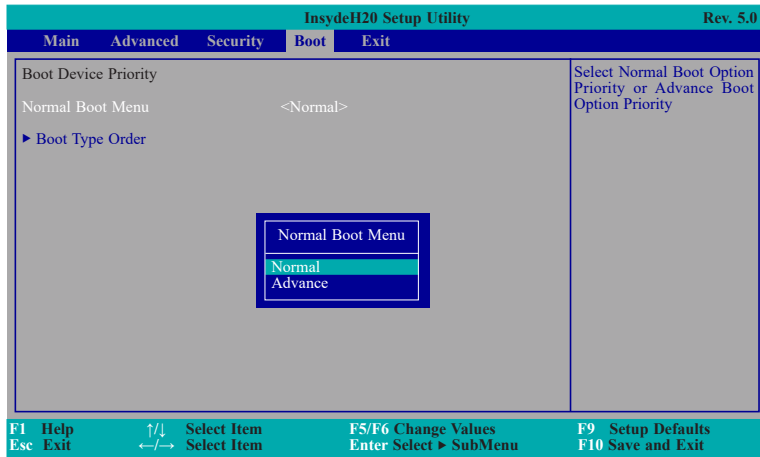
All boot devices follow the user's selection sequence.

### Boot Type Order

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

## Legacy

This section is used to set legacy boot order.



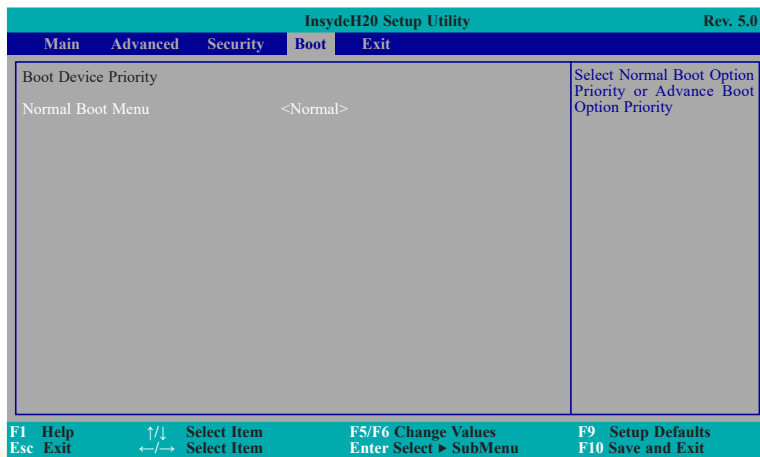
## Normal Boot Menu

### Normal

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

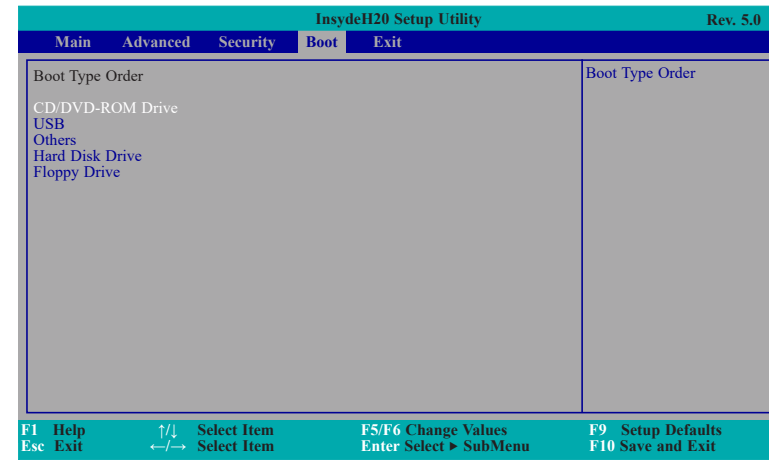
### Advance

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



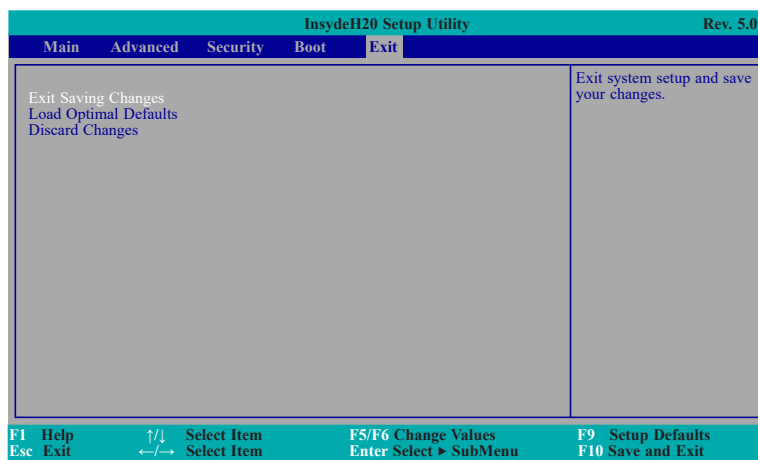
## Boot Type Order

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.

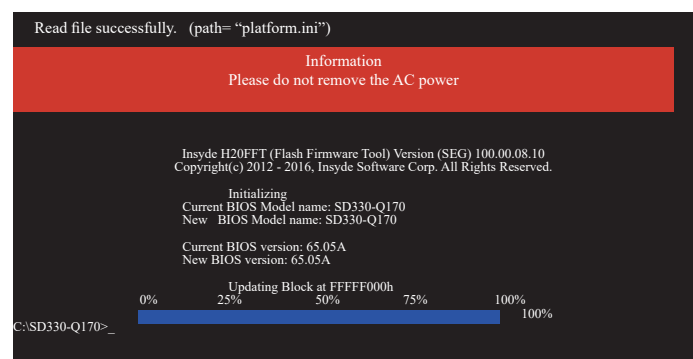
### Discard Changes

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.



## 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:**

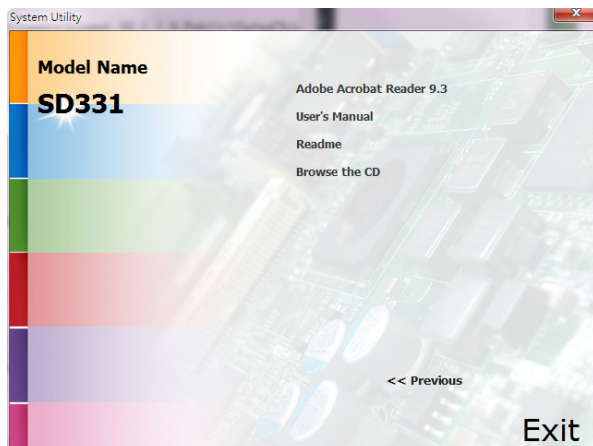
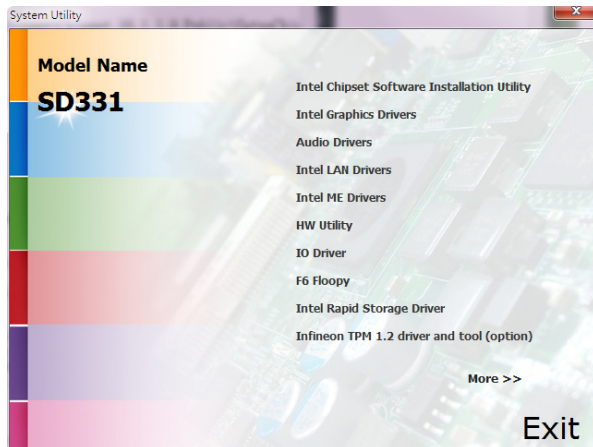
- a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
- b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical person's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

## Chapter 4 - Supported Software

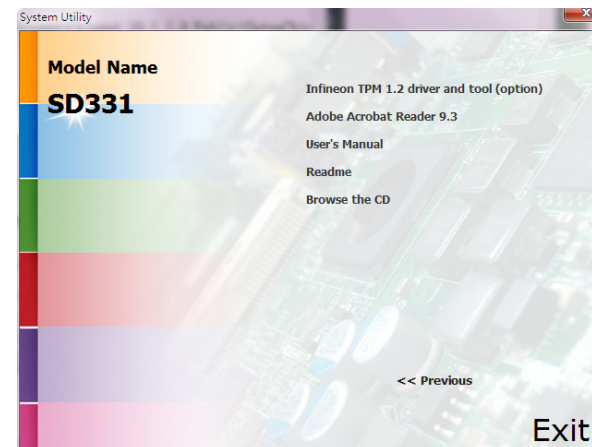
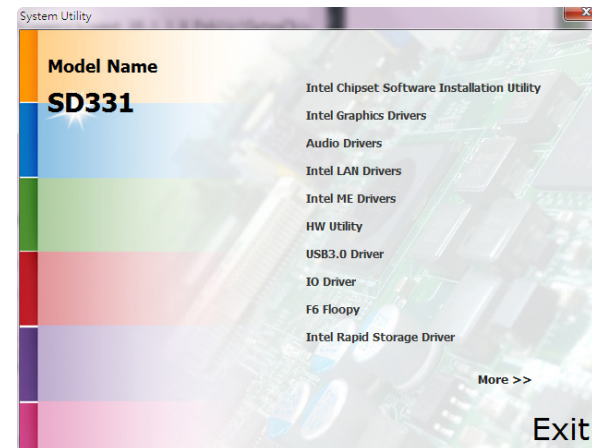
The DVD that came with the system board contains drivers, utilities and software applications required to enhance the performance of the system board.

Insert the DVD into a DVD-ROM drive. The autorun screen (Mainboard Utility DVD) will appear. If after inserting the DVD, "Autorun" did not automatically start (which is, the Mainboard Utility DVD screen did not appear), please go directly to the root directory of the DVD and double-click "Setup".

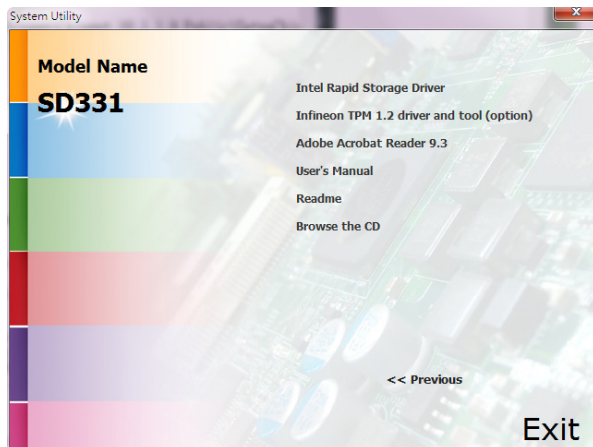
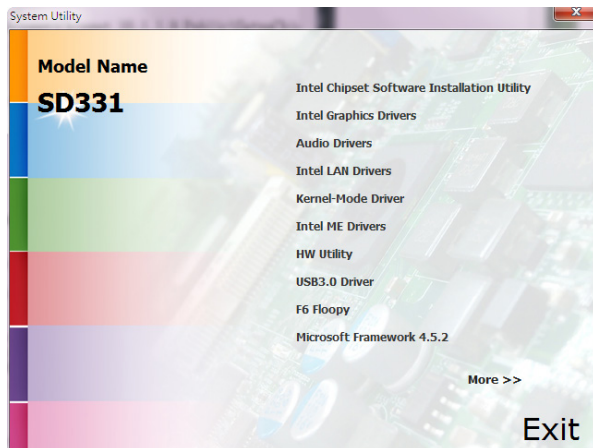
### For Windows 10 (64 bit)



### For Windows 8.1 (64 bit)



## 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.



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



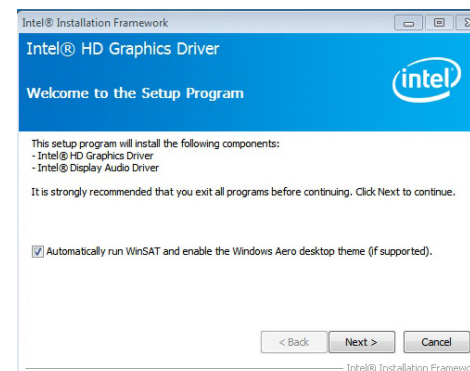
4. Click Finish to exit setup.



## Intel Graphics Drivers

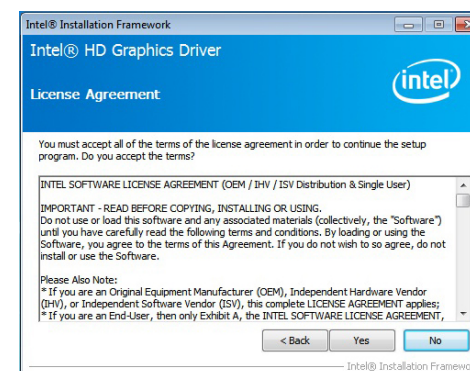
To install the driver, click "Intel Graphics Drivers" on the main menu.

1. 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.

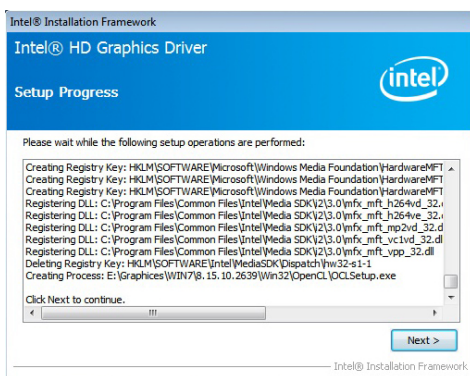
2. Read the license agreement then click Yes.



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

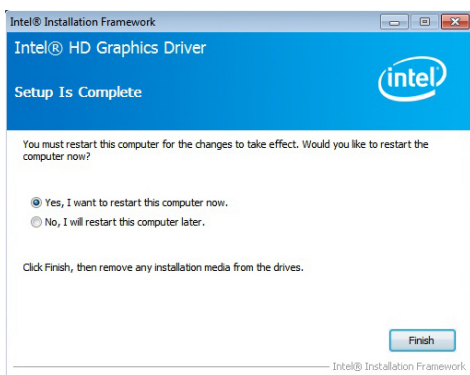


- Setup is now installing the driver. Click Next to continue.



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

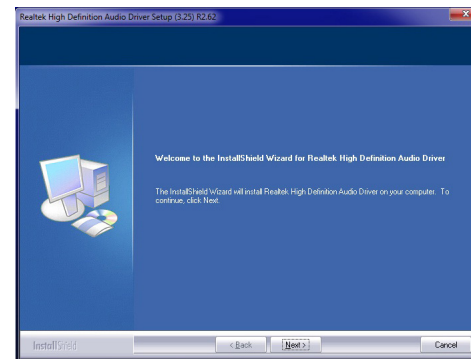
Restarting the system will allow the new software installation to take effect.



## Audio Drivers

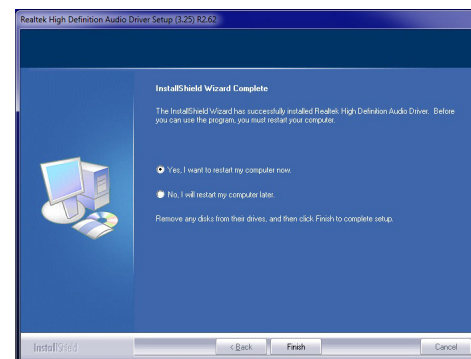
To install the driver, click "Audio Drivers" on the main menu.

- 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.



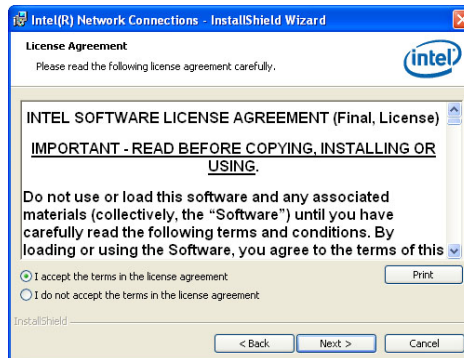
## Intel LAN Drivers

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

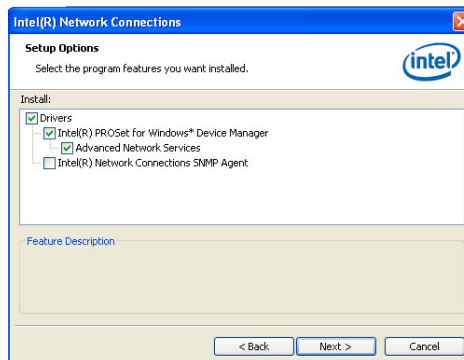
1. Setup is ready to install the driver. Click Next.



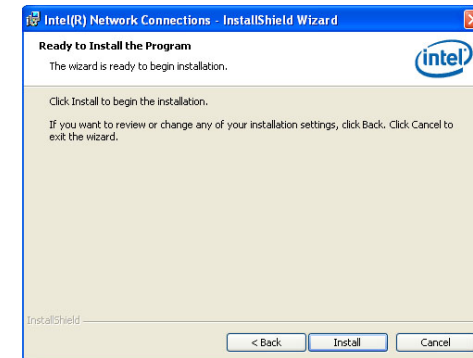
2. Click "I accept the terms in the license agreement" then click "Next".



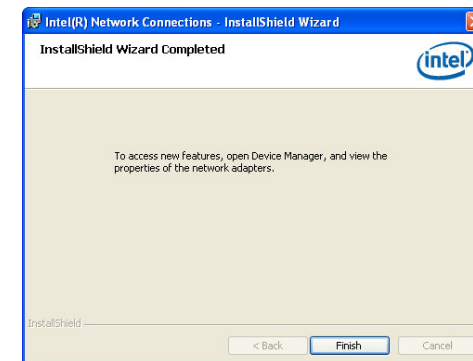
3. Select the program features you want installed then click Next.



4. Click Install to begin the installation.



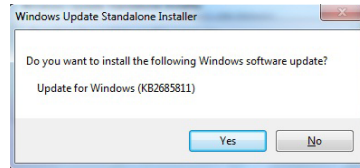
5. After completing installation, click Finish.



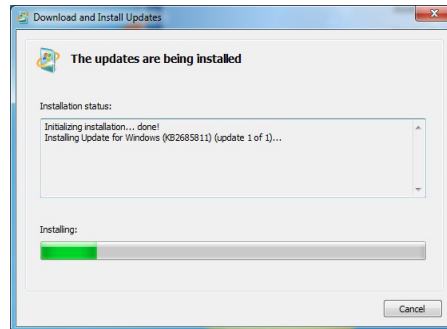
## Kernel Mode Driver Framework (For Windows 7 only)

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

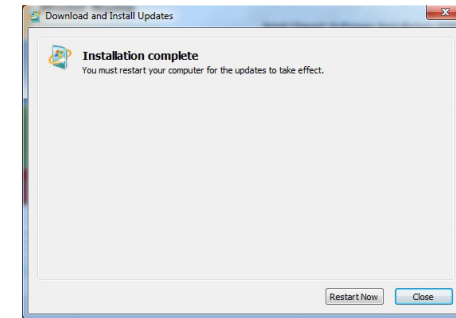
1. Click "Yes" to install the update.



2. The update is installed now.



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

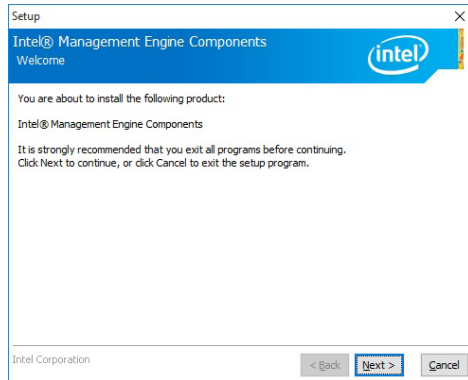




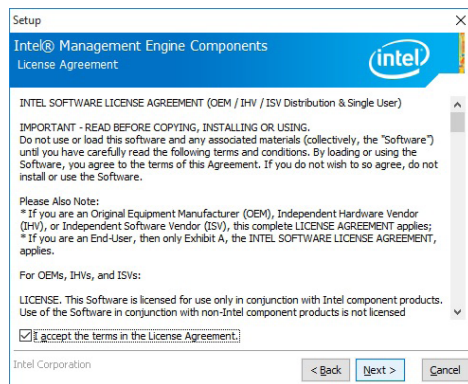
## Intel Management Engine Drivers

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

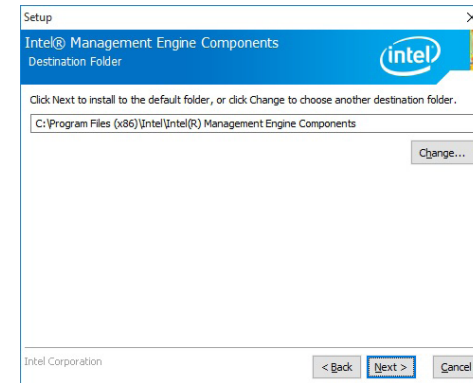
1. Setup is ready to install the driver. Click Next.



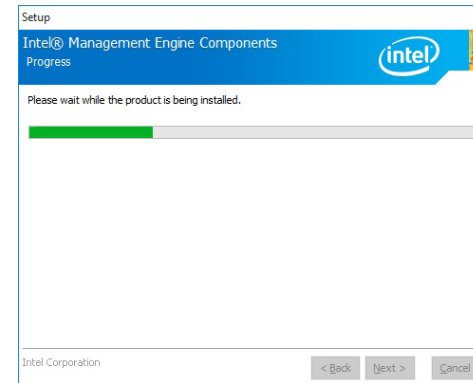
2. Read the license agreement then click Next.



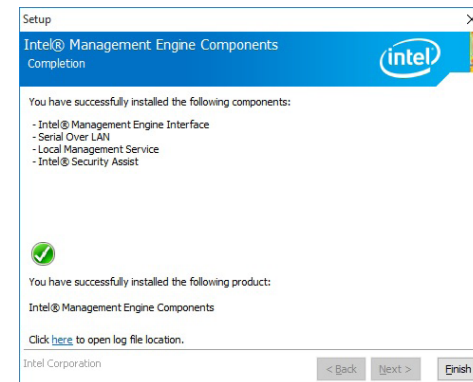
3. Setup is currently installing the driver. After installation has completed, click Next.



4. Please wait while the product is being installed.



5. After completing installation, click Finish.



## HW Utility

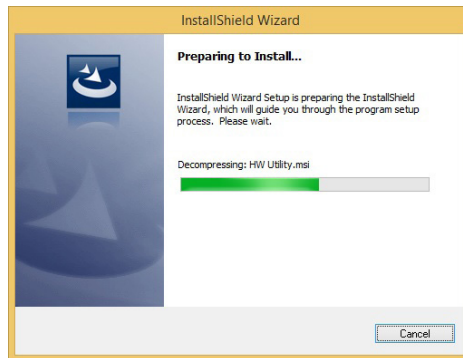
HW Utility provides information about the board, Watchdog, and DIO. To access the utility, click "HW Utility" on the main menu.



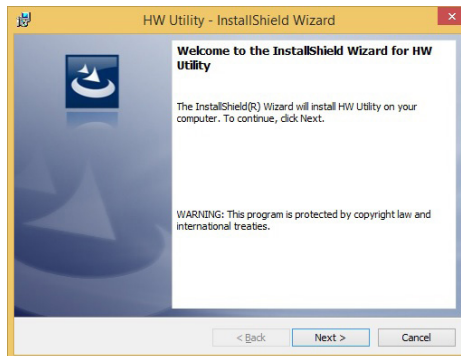
### Note:

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.

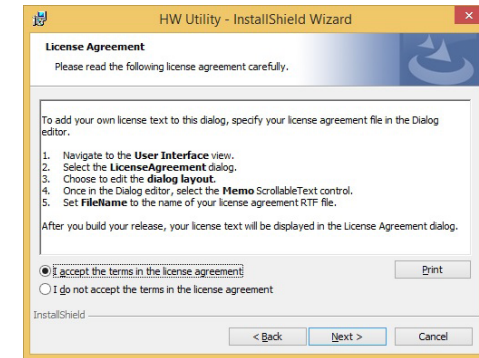
1. Setup is ready to install the driver.



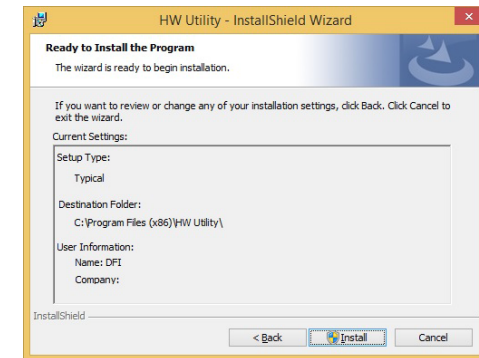
2. Click "Next" to continue.



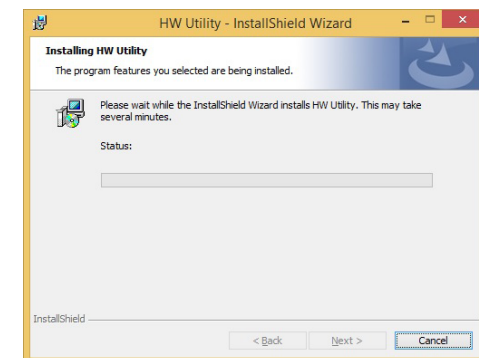
3. Read the license agreement then click "I accept the terms in the license agreement". Click "Next".



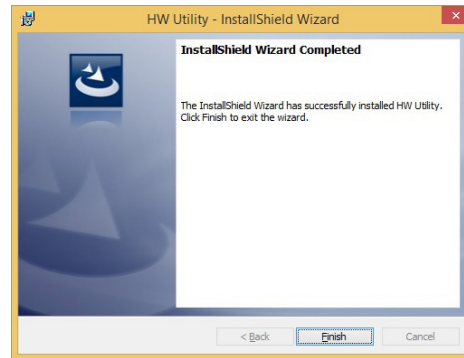
4. The wizard is ready to begin installation. Click "Install".



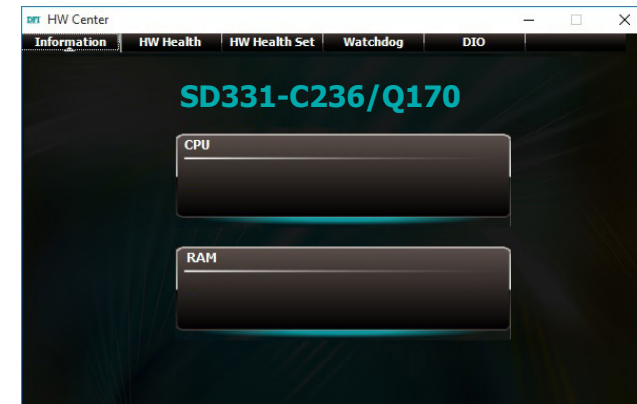
5. Please wait while the program features are being installed.



6. After completing installation, click "Finish".



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



**Note:**

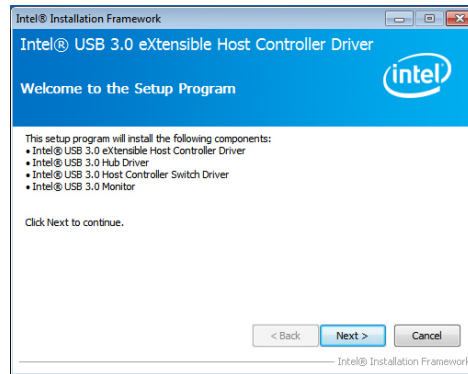
Note: The screenshot displayed above is for illustrative purpose only, and may not resemble the actual screen.

The SD331-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.

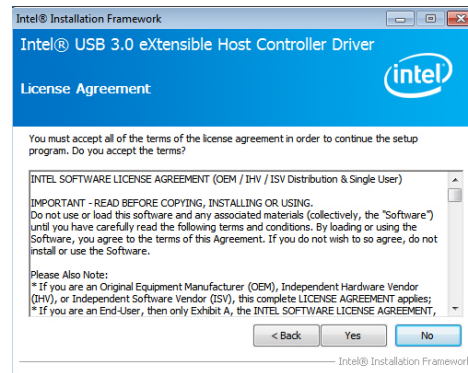
## Intel USB 3.0 Drivers (For Windows 7 and Windows 8.1)

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

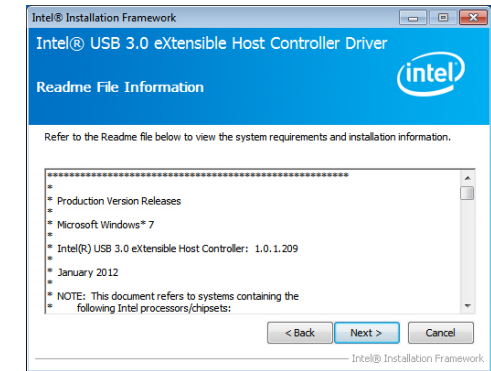
1. Setup is ready to install the driver. Click Next.



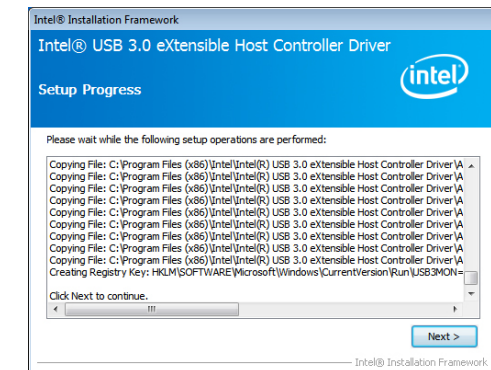
2. Read the license agreement then click Yes.



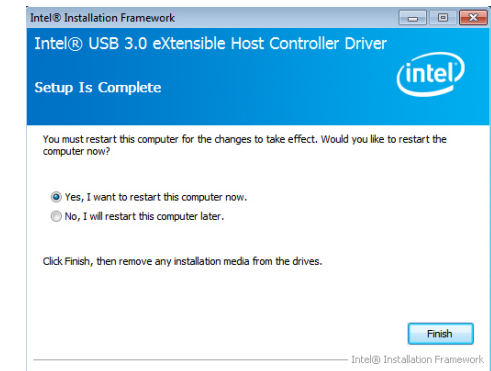
3. Go through the readme document for more installation tips then click Next.



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



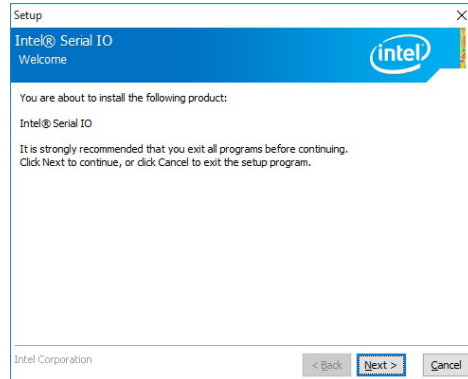
5. After completing installation, click Finish.



## IO Driver (For Windows 8.1 and Windows 10)

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

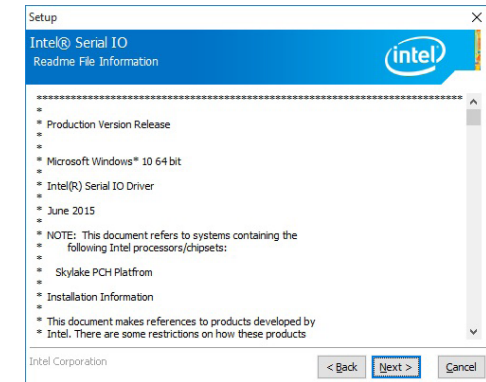
1. Setup is ready to install the driver.  
Click Next.



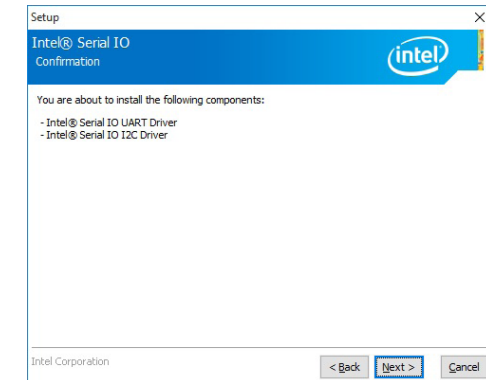
2. Read the license agreement carefully.  
Click "I accept the terms in the License Agreement" then click Next.



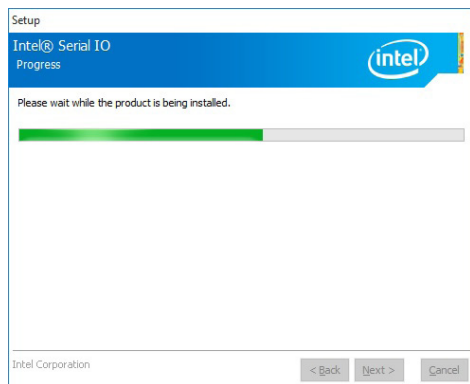
3. Read the file information then click Next.



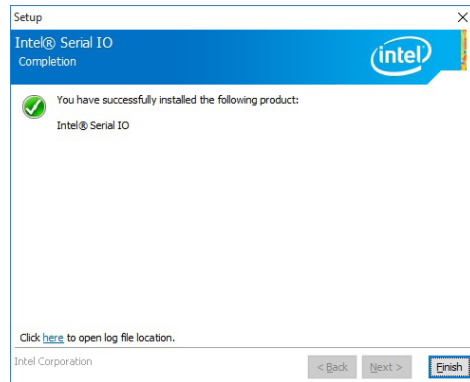
4. Setup is ready to install the driver.  
Click Next.



5. Setup is now installing the driver.



6. Click Finish.



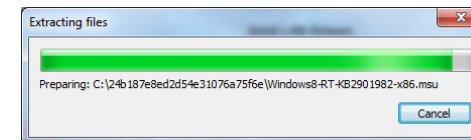
## Microsoft Framework 4.5.2 (For Windows 7)



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

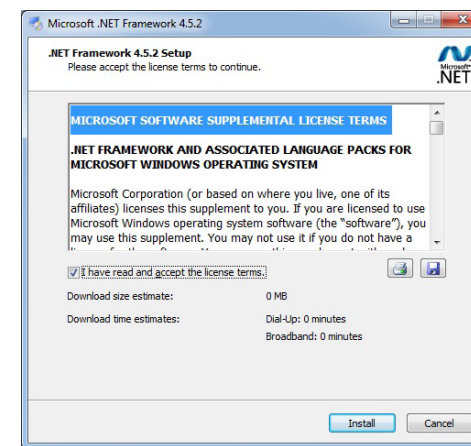
To install the driver, click "Microsoft Framework 4.5.2" on the main menu.

1. Setup is now extracting files.

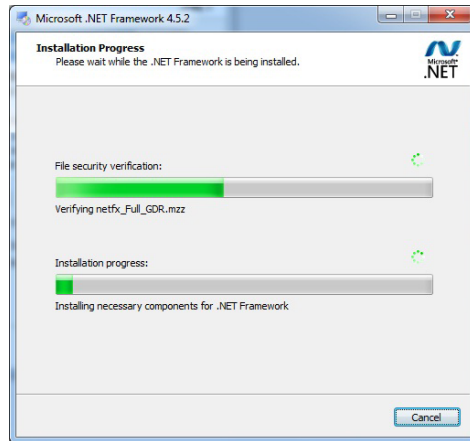


2. Read the license agreement carefully.

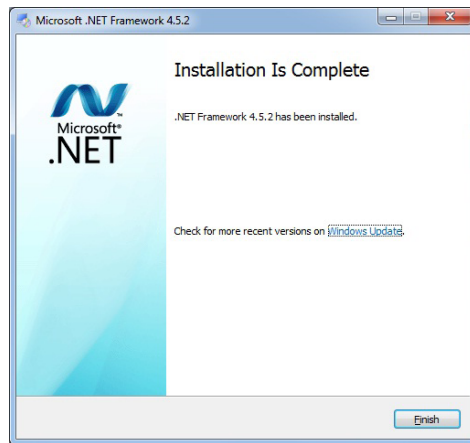
Click "I have read and accept the terms of the License Agreement" then click Install.



3. Setup is now installing the driver.



4. Click Finish.



## Intel Rapid Storage Technology

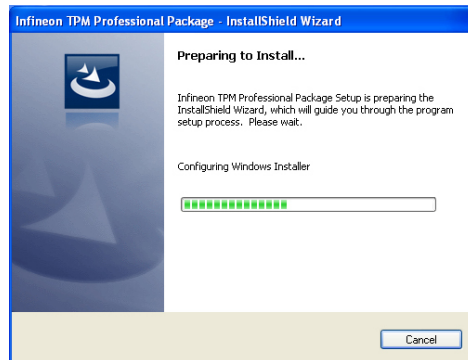
The Intel Rapid Storage Technology is a utility that allows you to monitor the current status of the SATA drives. It enables enhanced performance and power management for the storage subsystem.

To install the driver, click "Intel Rapid Storage Technology" on the main menu. Please refer to **Chapter 5** for more information.

## Infineon TPM 1.2 Driver and Tool (optional)

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

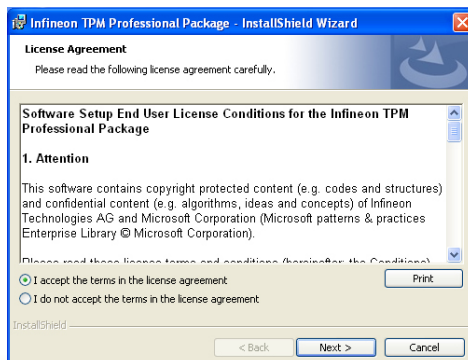
1. The setup program is preparing to install the driver.



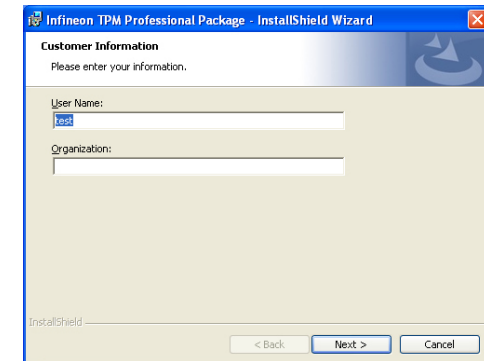
2. The setup program is now ready to install the utility. Click Next.



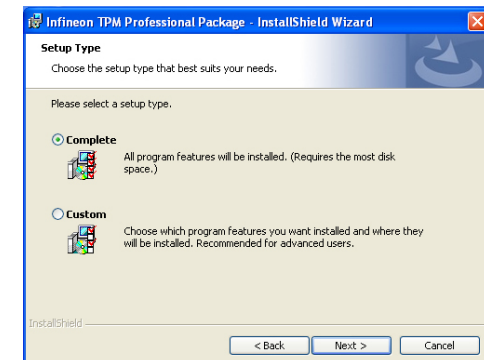
3. Click "I accept the terms in the license agreement" and then click "Next".



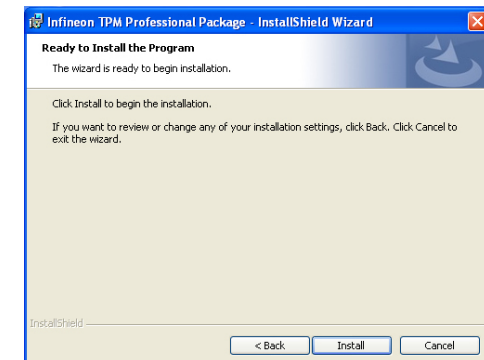
4. Enter the necessary information and then click Next.



5. Select a setup type and then click Next.

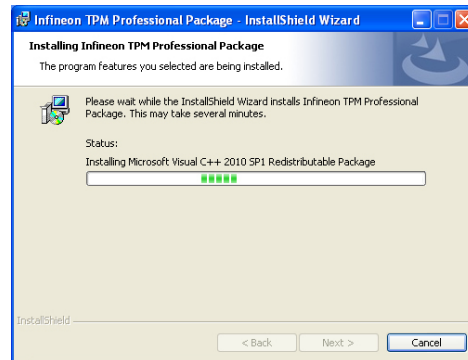


6. Click Install.

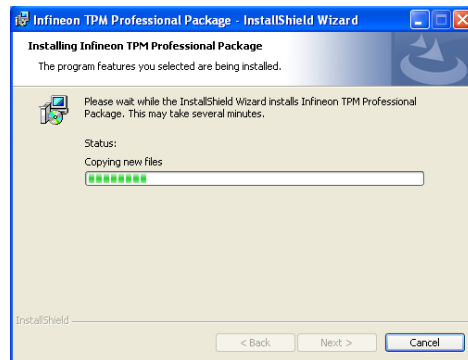




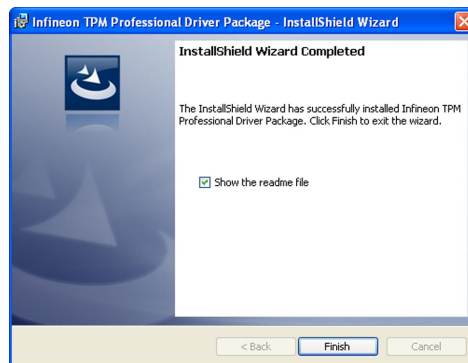
7. TPM requires installing the Microsoft Visual C++ package prior to installing the utility. Click Install.



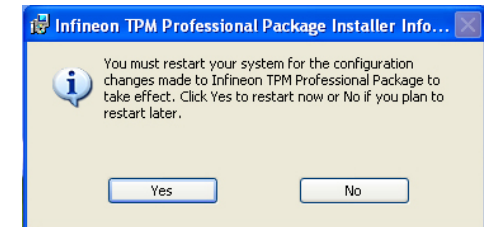
8. The setup program is currently installing the Microsoft Visual C++ package.



9. Click Finish.



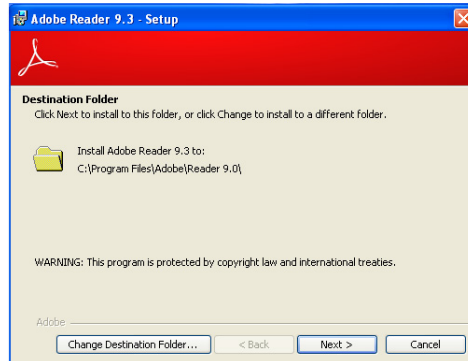
10. Click "Yes" to restart your system.



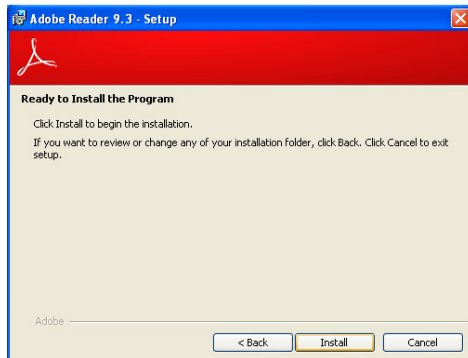
## Adobe Acrobat Reader 9.3

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

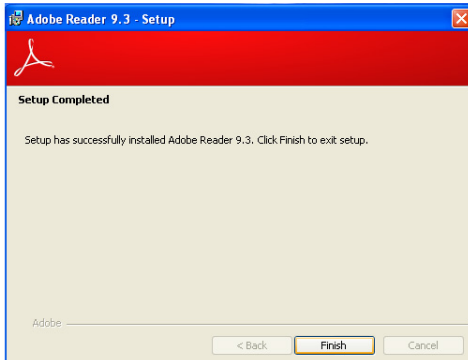
1. Click Next to install or click Change Destination Folder to select another folder.



2. Click Install to begin installation.



3. Click Finish to exit installation.



## Chapter 5 - 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**

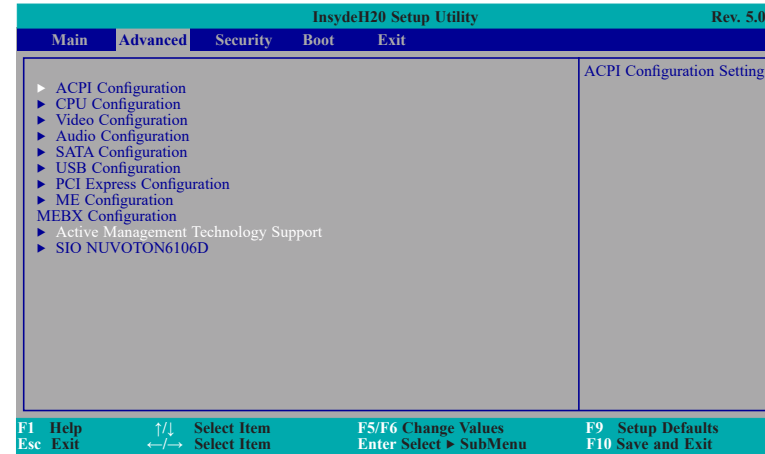
Remotely repair systems after OS failures. Alerting and event logging help detect problems quickly to reduce downtime.

- **Protect**

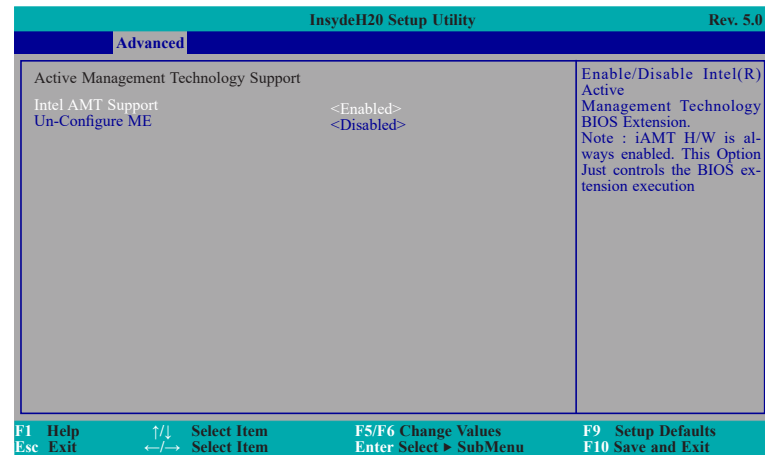
Intel AMT's System Defense capability remotely updates all systems with the latest security software. It protects the network from threats at the source by proactively blocking incoming threats, reactively containing infected clients before they impact the network, and proactively alerting when critical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

### Enable Intel® AMT in the Insyde BIOS

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



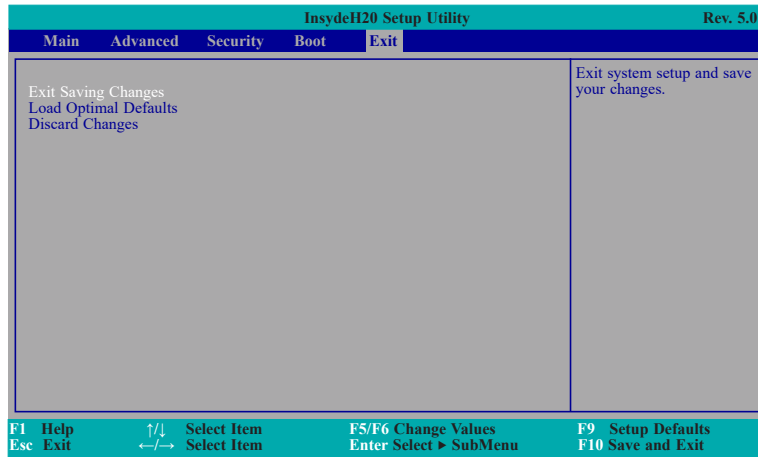
3. In the **Advanced** menu, select **Enable** in the **AMT** field.



#### Un-Configure ME

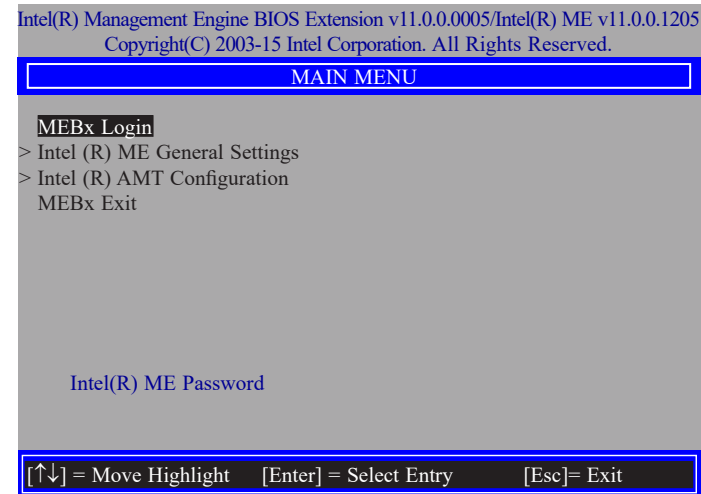
Un-configure ME without password. You can select enabled or disabled.

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



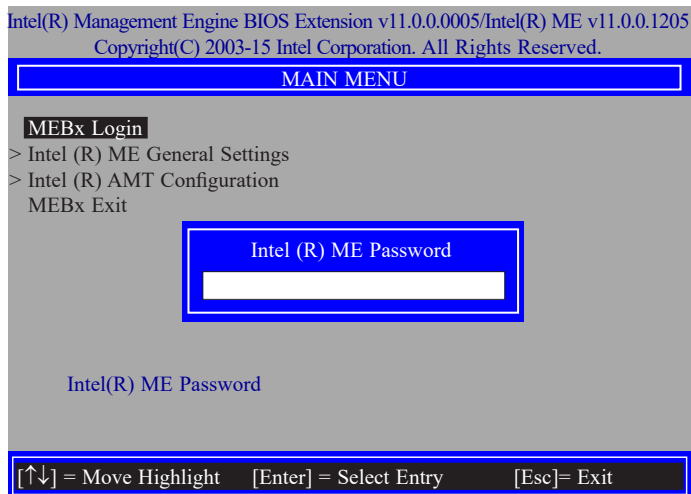
## Enable Intel® AMT in the Intel® Management Engine BIOS Extension (MEBX) Screen

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.

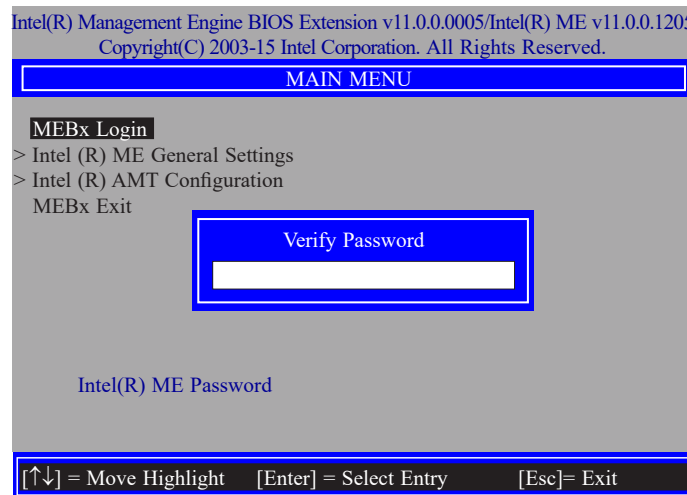


2. Enter a password in the space provided under Intel(R) ME Password then press Enter. The password must include:

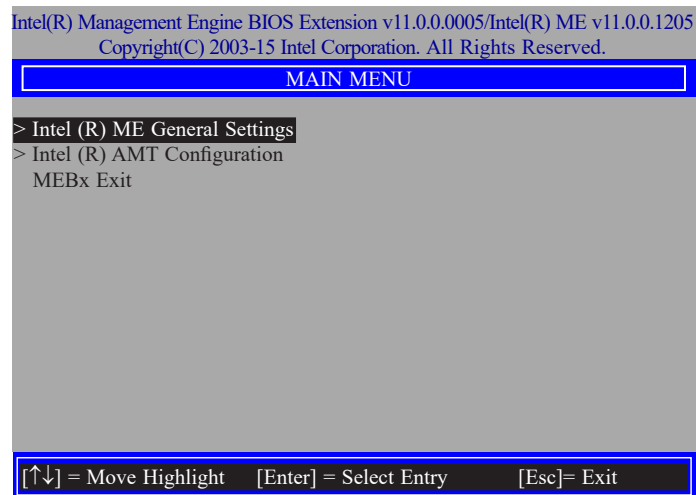
- 8-32 characters
- Strong 7-bit ASCII characters excluding : , and " characters
- At least one digit character (0, 1, ...9)
- At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, \$, ;)
- Both lower case and upper case characters



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



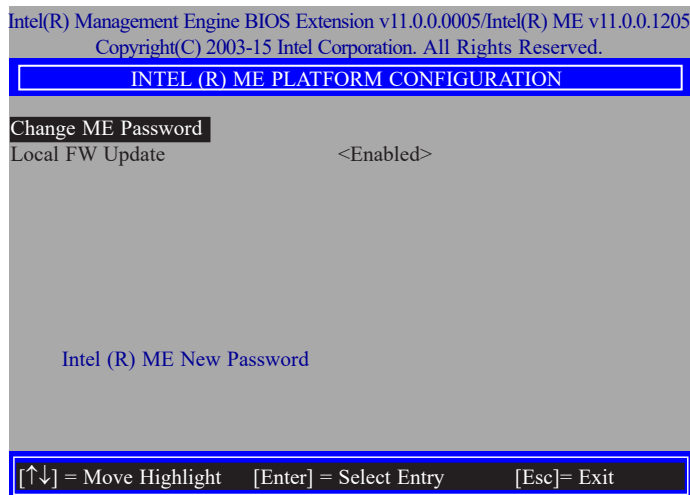
4. Select **Intel(R) ME General Settings** then press Enter.



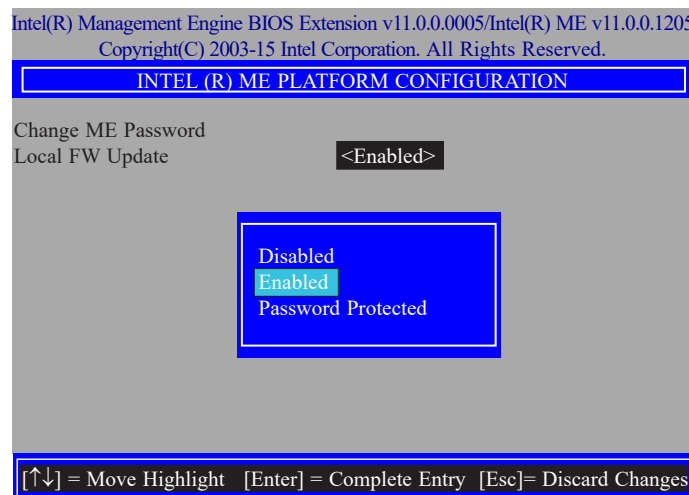
- Select **Change Intel(R) ME Password** then press Enter.

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.

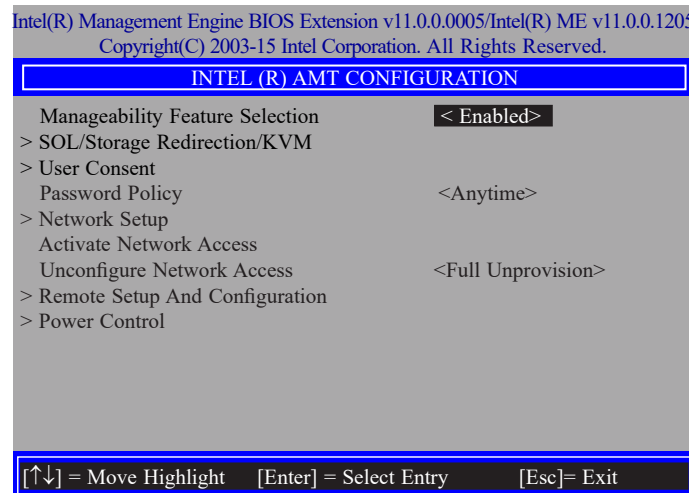
- 8-32 characters
- Strong 7-bit ASCII characters excluding : , and " characters
- At least one digit character (0, 1, ...9)
- At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, \$, ;)
- Both lower case and upper case characters



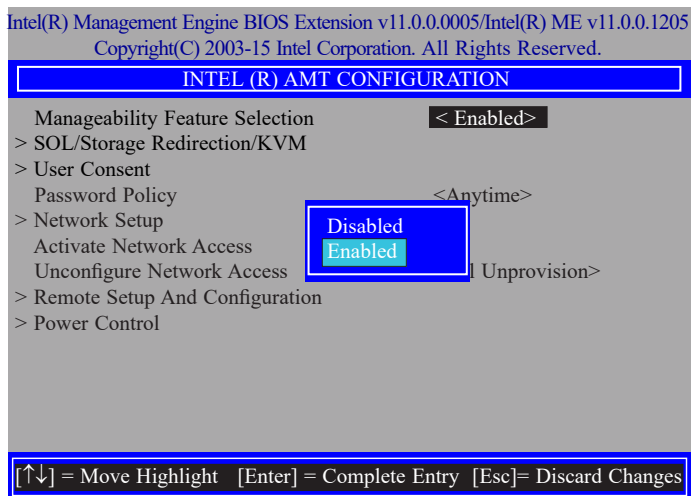
- Select **Local FW Update** then press Enter. Select **Enabled** or **Disabled** or **password Protected** then press Enter.



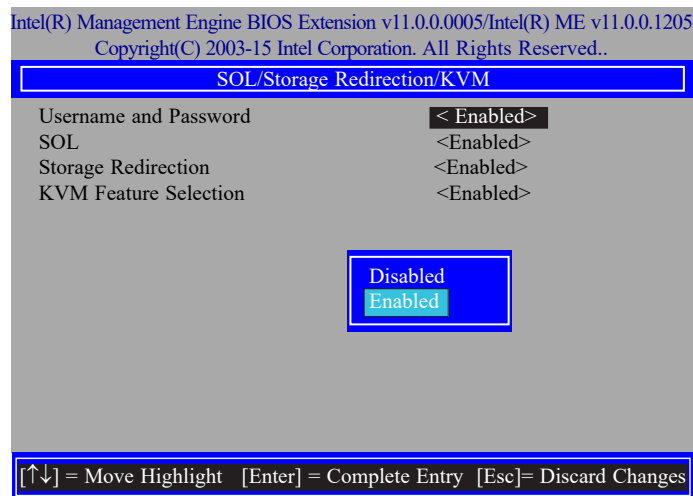
- Select Previous Menu until you return to the **Main Menu**. Select **Intel(R) AMT Configuration** then press Enter.



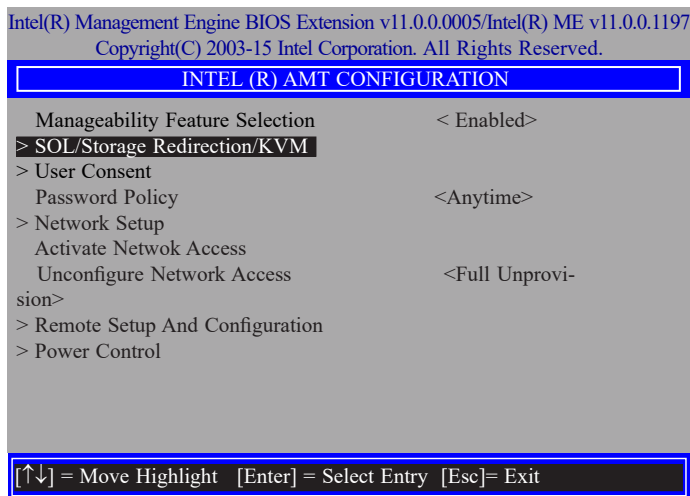
8. In the **Intel(R) AMT Configuration** menu, select **Manageability Feature Selection** then press Enter. Select **Enabled** or **Disabled** then press Enter.



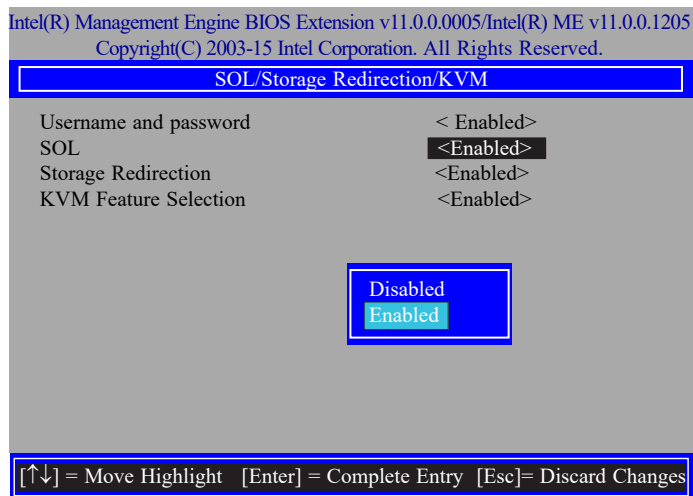
10. In the **SOL/Storage Redirection/KVM** menu, select **Username and Password** then press Enter. Select **Enabled** or **Disabled** then press Enter.



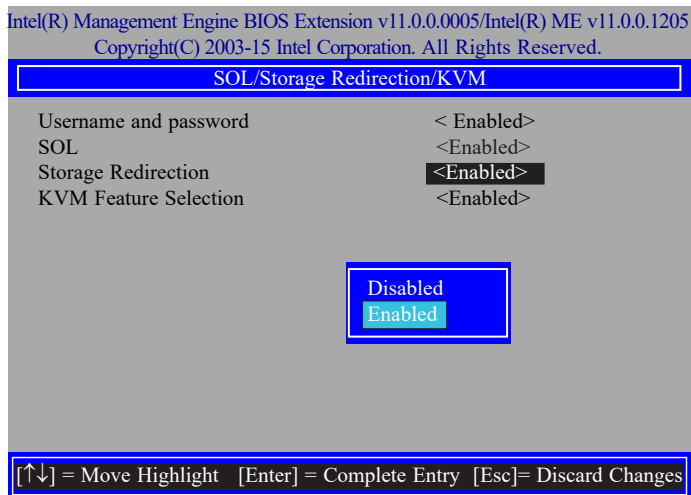
9. In the **Intel(R) AMT Configuration** menu, select **SOL/Storage Redirection/KVM** then press Enter.



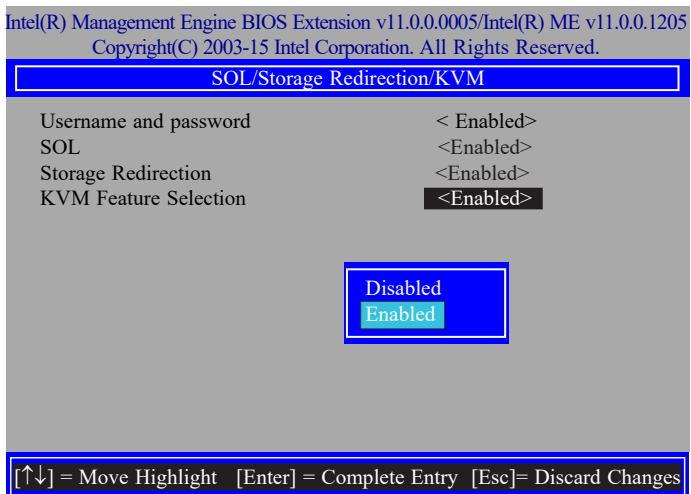
11. In the **SOL/Storage Redirection/KVM** menu, select **SOL** then press Enter. Select **Enabled** or **Disabled** then press Enter.



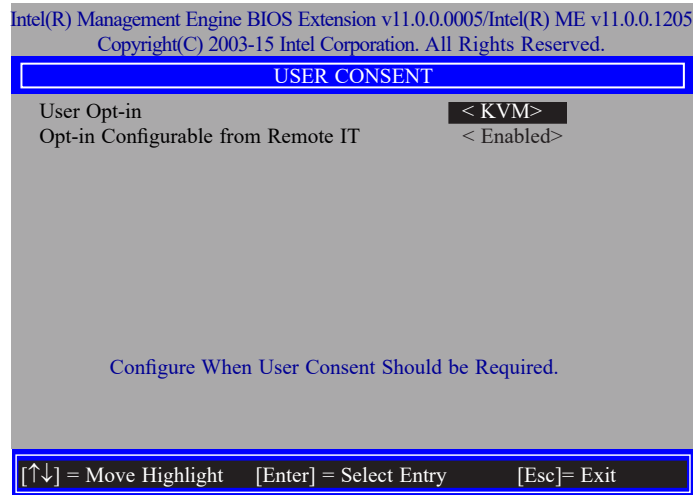
12. In the **SOL/Storage Redirection/KVM** menu, select **Storage Redirection** then press Enter. Select **Enabled** or **Disabled** then press Enter.



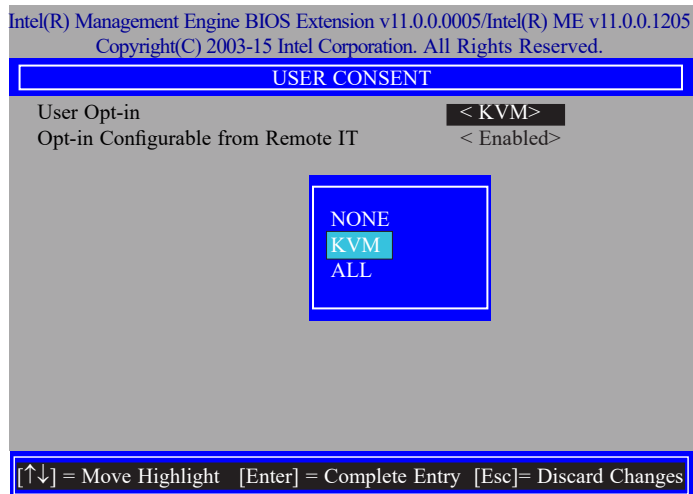
13. In the **SOL/IDER/KVM** menu, select **KVM Feature Selection** then press Enter. Select **Enabled** or **Disabled** then press Enter.



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

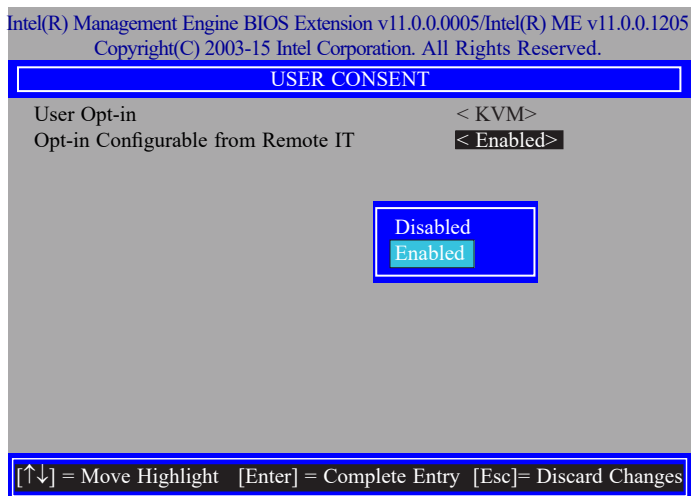


15. In the **User Consent** menu, select **User Opt-in** then press Enter. Select **None** or **KVM** or **ALL** then press Enter.



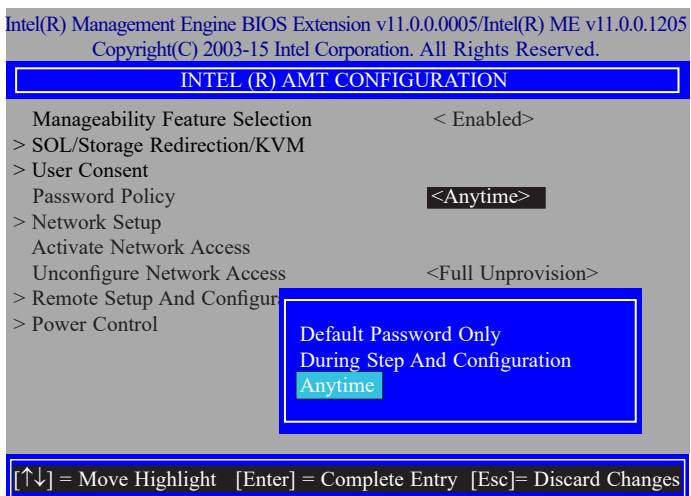


16. In the **User Consent** menu, select **Opt-in Configurable from Remote IT** then press Enter. Select **Enabled** or **Disable Remote Control of KVM Opt-in Policy** then press Enter.

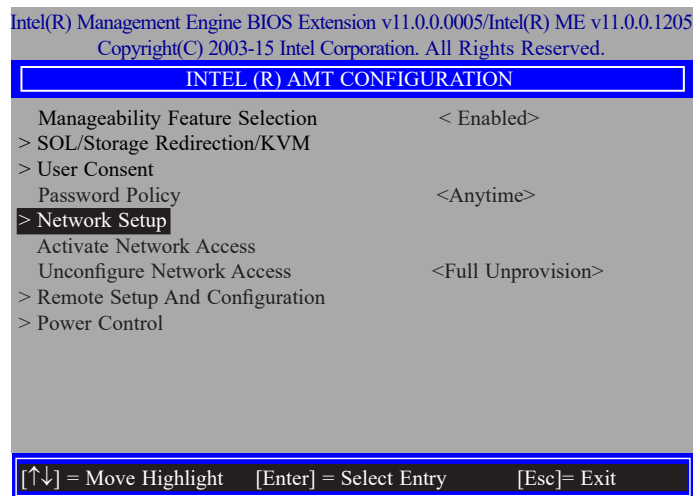


17. Select Previous Menu until you return to the **Intel(R) AMT Configuration** menu. Select **Password Policy** then press Enter.

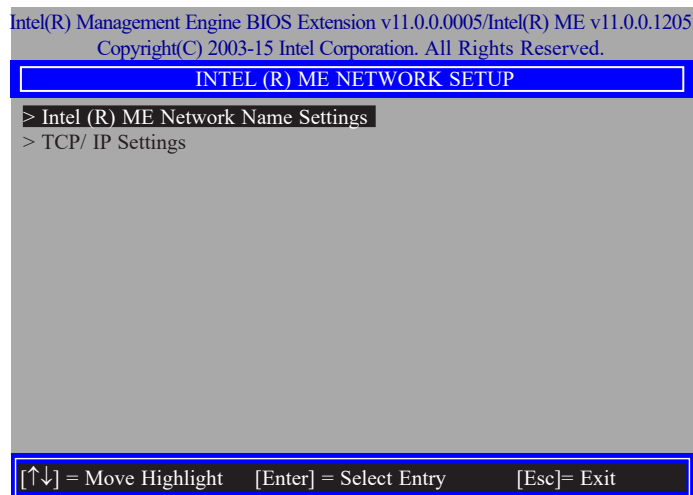
You may choose to use a password only during setup and configuration or to use a password anytime the system is being accessed.



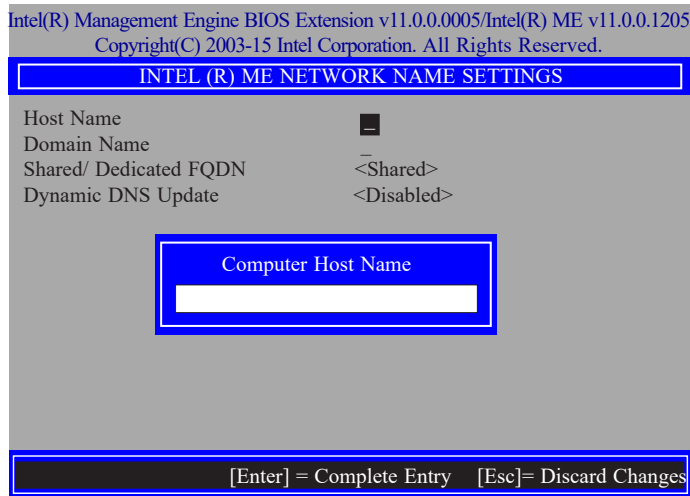
18. In the **Intel(R) AMT Configuration** menu, select **Network Setup** then press Enter.



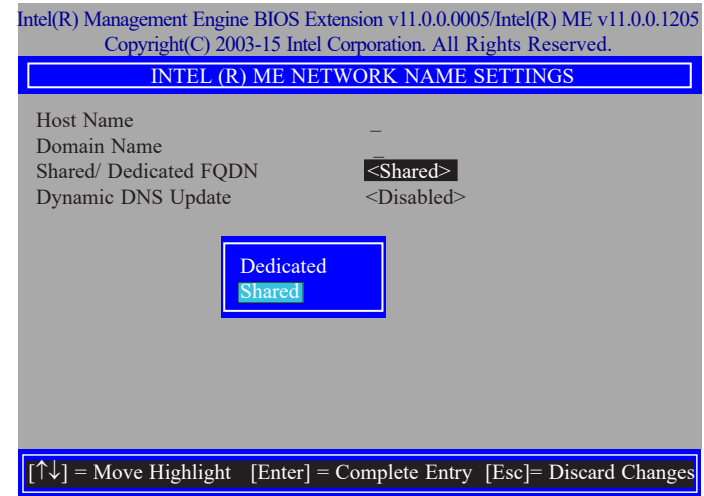
19. In the **Intel(R) ME Network Setup** menu, select **Intel(R) ME Network Name Settings** then press Enter.



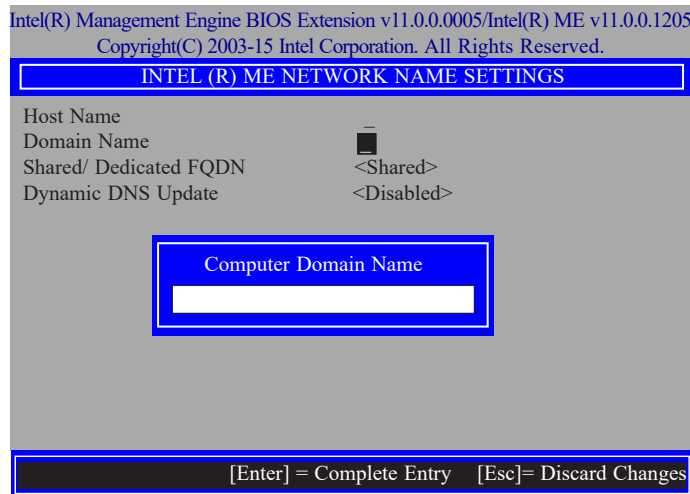
20. In the **Intel(R) ME Network Name Settings** menu, select **Host Name** then press Enter. Enter the computer's host name then press Enter.



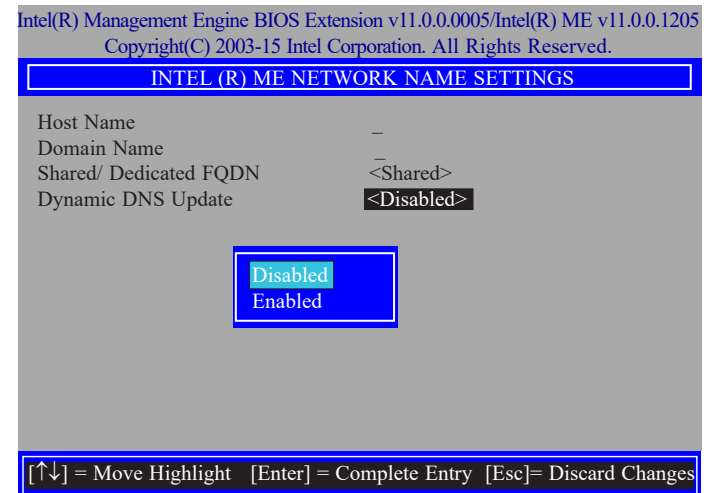
22. Select **Shared/Dedicated FQDN** then press Enter. Select **Shared** or **Dedicated** then press Enter.



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



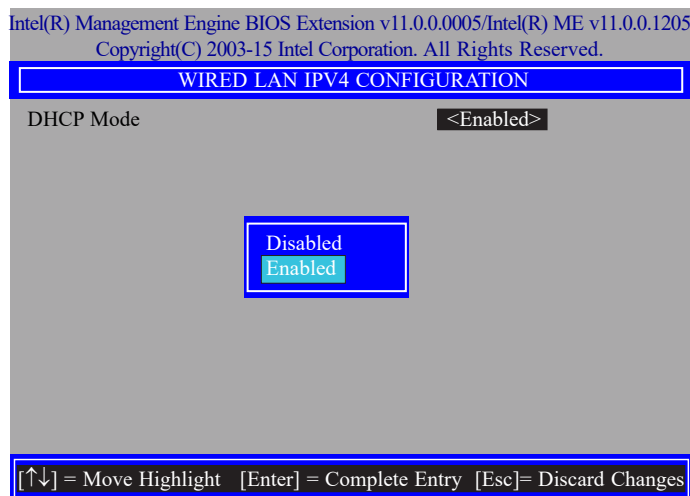
23. Select **Dynamic DNS Update** then press Enter. Select **Enabled** or **Disabled** then press Enter.



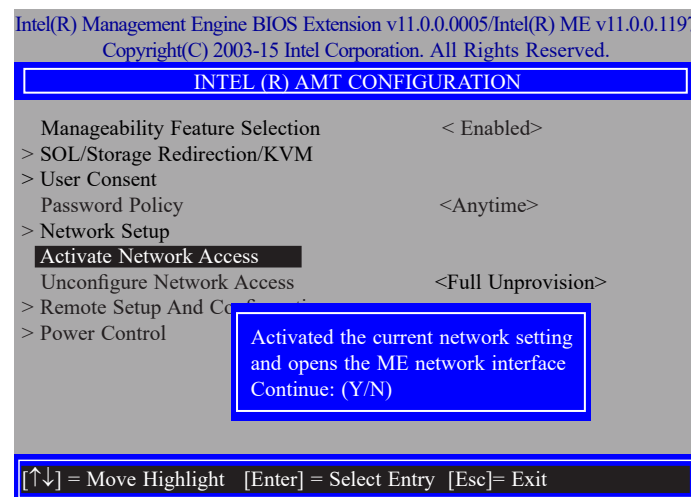
24. Select Previous Menu until you return to the **Intel(R) ME Network Setup** menu. Select **TCP/IP Settings** then press Enter.



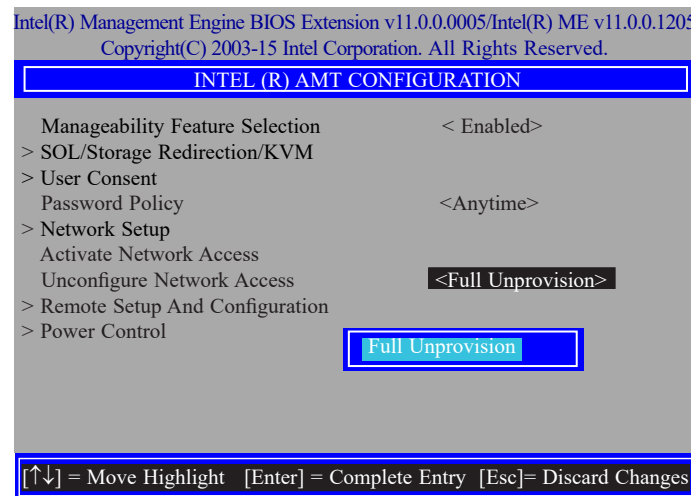
25. In the **TCP/IP Settings** menu, select **Wired LAN IPV4 Configuration** then press Enter.



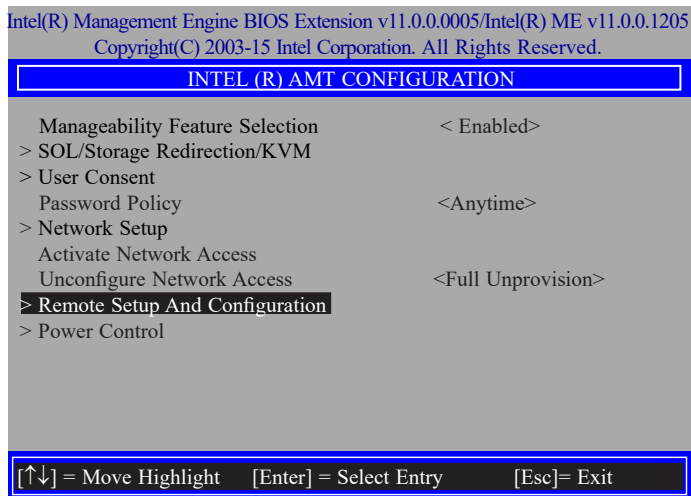
26. In the **Intel(R) AMT Configuration** menu, select **Activate Network Access** then press Enter. Press **Y** then press Enter.



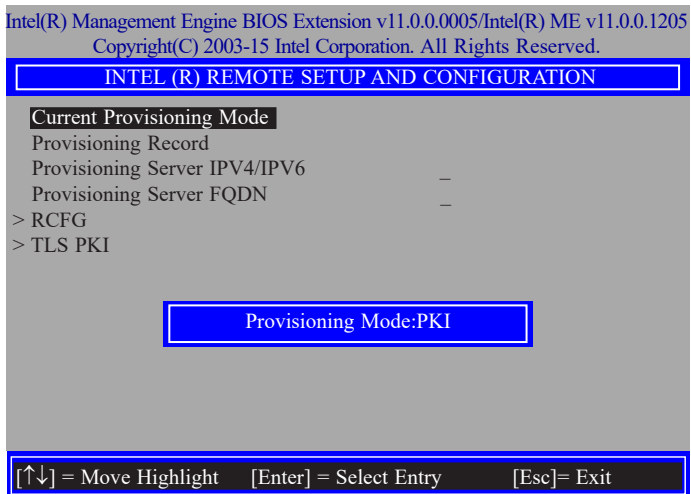
27. In the **Intel(R) AMT Configuration** menu, select **Unconfigure Network Access** then press Enter.



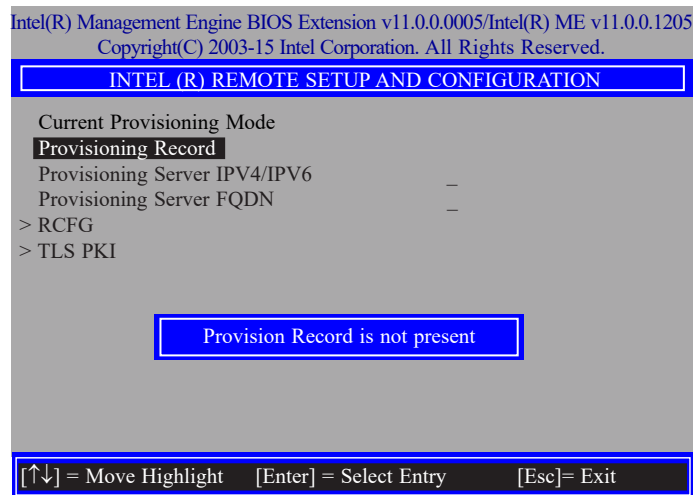
28. In the **Intel(R) AMT Configuration** menu, select **Remote Setup And Configuration** then press Enter.



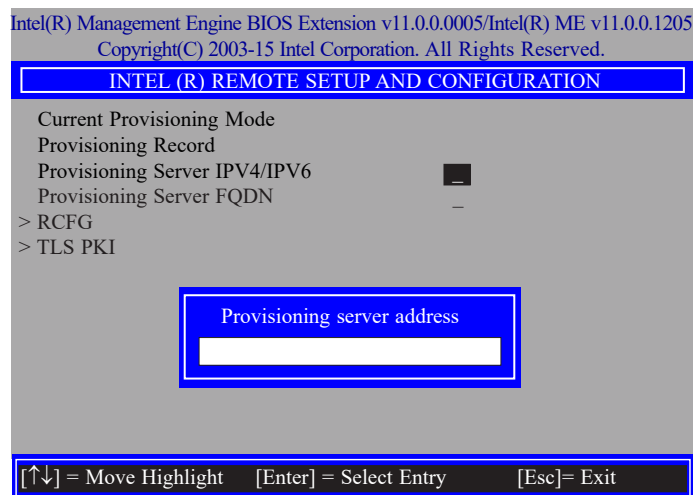
29. In the **Intel(R) Remote Setup And Configuration** menu, select **Current Provisioning Mode** then press Enter.



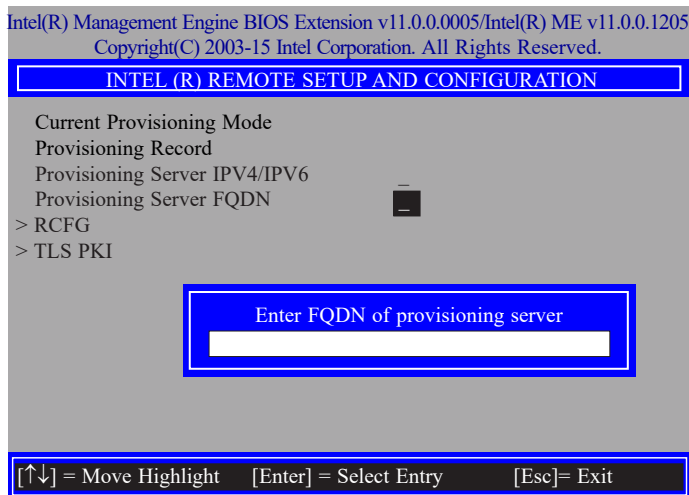
30. In the **Intel(R) Remote Setup And Configuration** menu, select **Provisioning Record** then press Enter.



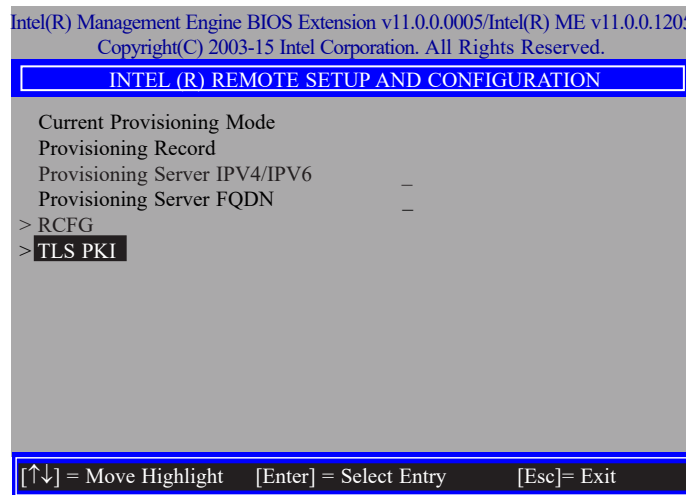
31. In the **Intel(R) Remote Setup And Configuration** menu, select **Provisioning server IPV4/IPV6**, enter the Provisioning server address then press Enter.



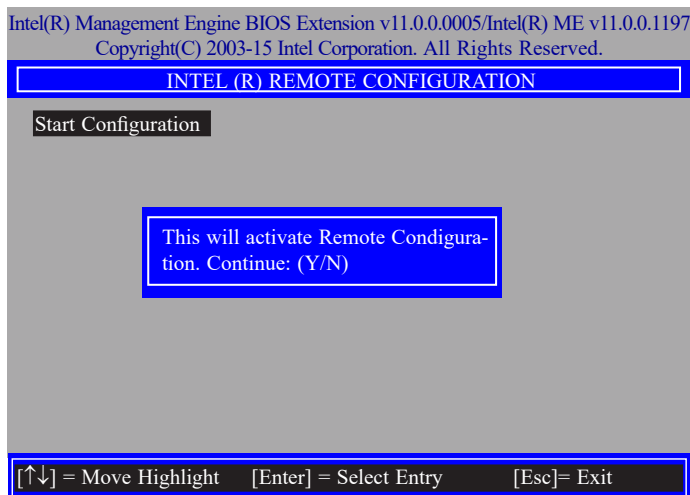
32. In the **Intel(R) Remote Setup And Configuration** menu, select **Provisioning server FQDN**, enter the FQDN of Provisioning server then press Enter.



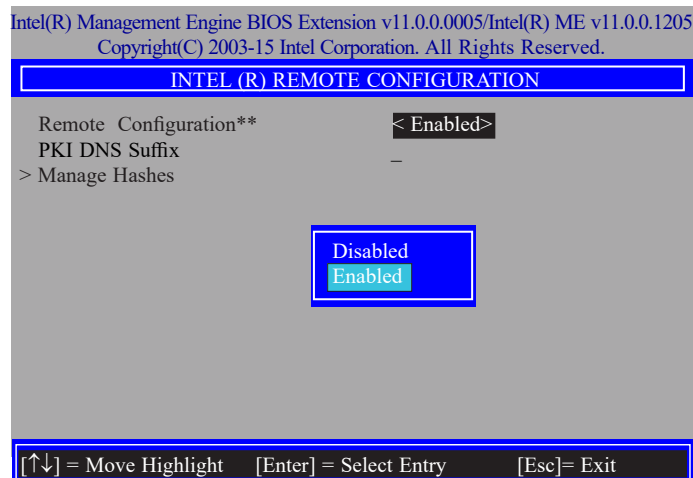
34. In the **Intel(R) Remote Setup And Configuration** menu, select **TLS PKI** then press Enter.



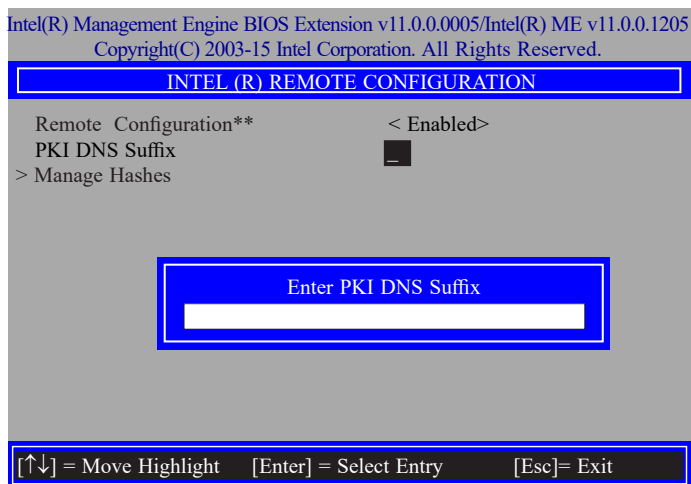
33. In the **Intel(R) Remote Setup And Configuration** menu, select **RCFG** then press Enter, and select **Start Configuration** Y/N then press enter.



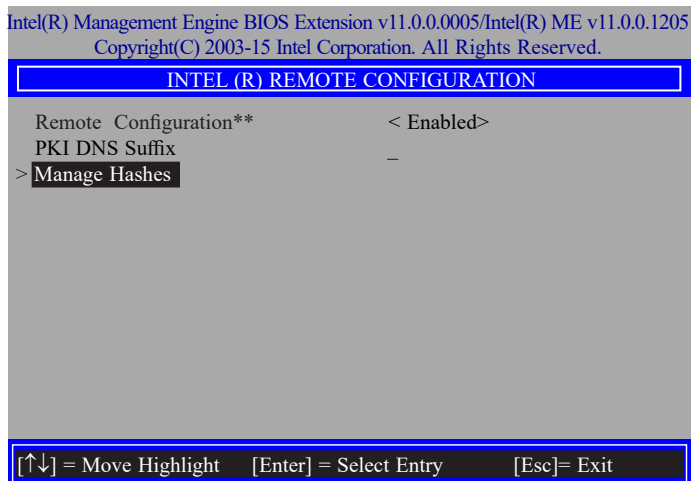
35. In the **Intel(R) Remote Configuration** menu, select **Remote Configuration\*\*** then press Enter, select **Enabled** or **Disabled** then press Enter.



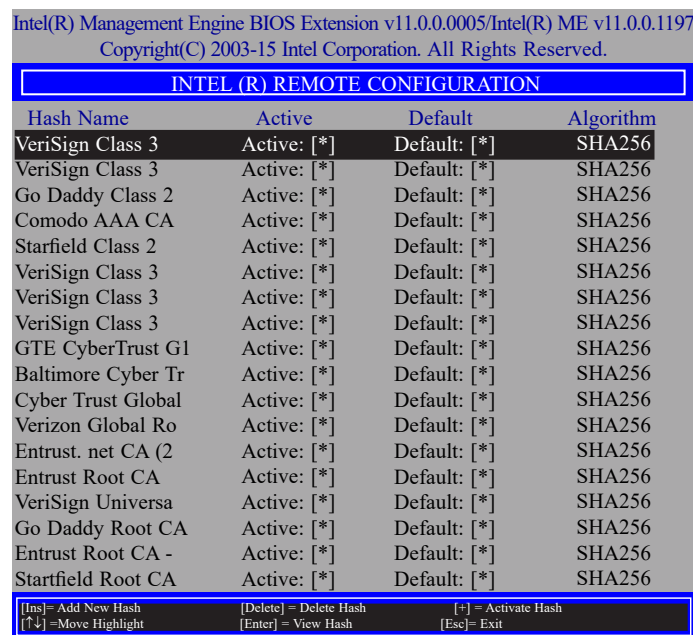
36. Select **PKI DNS Suffix**, Enter the PKI DNS Suffix then press Enter.



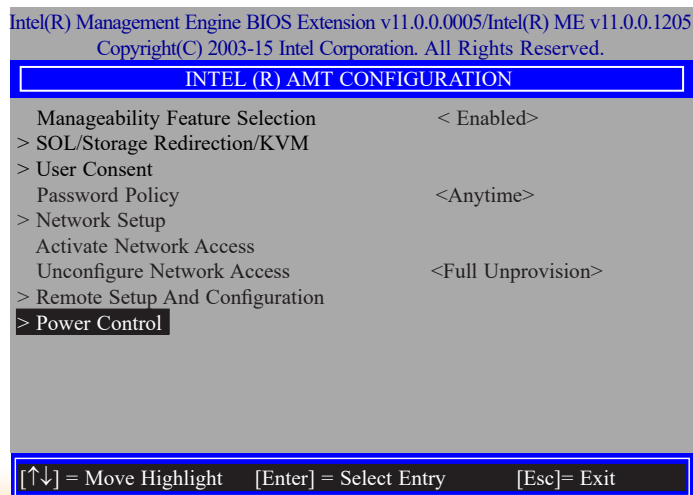
37. Select **Manage Hashes** then press Enter, and select one of hash name.



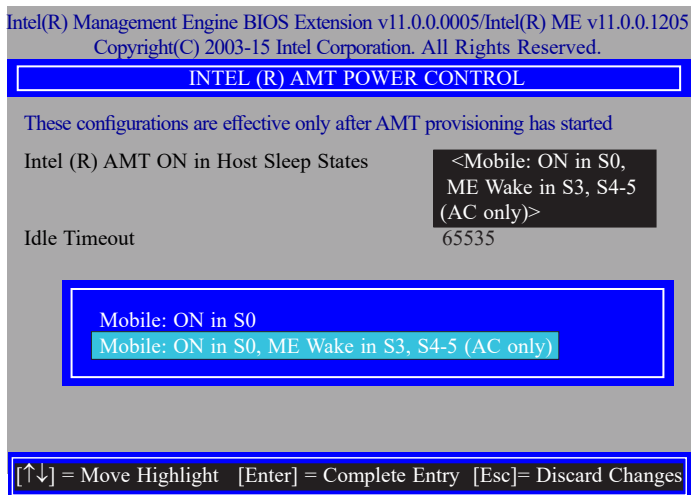
38. In the **Intel(R) Remote Configuration** menu, select **Manage Hashes** then press Enter.



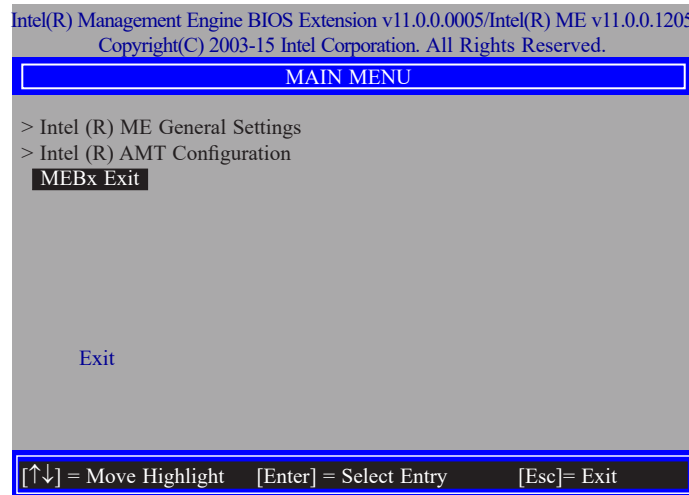
39. In the **Intel(R) AMT Configuration** menu, select **Power Control** then press Enter.



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).

