

DFI



PIC-Q170/H110

**Full-Size PICMG 1.3
User's Manual**

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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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About this Manual

An electronic file of this manual is included in the CD. To view the user's manual in the CD, insert the CD into a CD-ROM drive. The autorun screen (Main Board Utility CD) will appear. Click "User's Manual" on the main menu.

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 PIC-Q170/H110 board
- Two Serial ATA cables (500mm)
- One DVD
- Two RS232 cables (160mm)
- One USB cable (350/398mm)

Optional Items

- USB2.0 cable
- COM cable
- SATA cable
- DIO cable
- PS/2 cable
- LPT cable
- DVI-D board with cable

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance with 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.

- CPU
- Memory module
- Storage device such as hard disk drive, CD-ROM, 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

SYSTEM	Processor	7th Generation Intel® Core™ Processors, LGA1151: <ul style="list-style-type: none"> Intel® Core™ i7-7700 Processor, Four Core, 8M, 3.6GHz (4.2GHz), 65W Intel® Core™ i7-7700T Processor, Four Core, 8M, 2.9GHz (3.8GHz), 35W Intel® Core™ i5-7500 Processor, Four Core, 6M, 3.4GHz (3.8GHz), 65W Intel® Core™ i5-7500T Processor, Four Core, 6M, 2.7GHz (3.3GHz), 35W Intel® Core™ i3-7101E Processor, Dual Core, 3M, 3.9GHz, 54W Intel® Core™ i3-7101TE Processor, Dual Core, 3M, 3.4GHz, 35W Intel® Core™ G3930E Processor, Dual Core, 2M, 2.9GHz, 54W Intel® Core™ G3930TE Processor, Dual Core, 2M, 2.7GHz, 35W 6th Generation Intel® Core™ Processors, LGA1151: <ul style="list-style-type: none"> Intel® Core™ i7-6700 Processor, Four Core, 8M, 3.4GHz (4.0GHz), 65W Intel® Core™ i7-6700TE Processor, Four Core, 8M, 2.4GHz (3.4GHz), 35W Intel® Core™ i5-6500 Processor, Four Core, 6M, 3.2GHz (3.6GHz), 65W Intel® Core™ i5-6500TE Processor, Four Core, 6M, 2.3GHz (3.3GHz), 35W Intel® Core™ i3-6100 Processor, Dual Core, 4M, 65W Intel® Core™ i3-6100TE Processor, Dual Core, 4M, 2.7GHz, 35W Intel® Core™ G4400 Processor, Dual Core, 3M, 3.3GHz, 65W Intel® Core™ G4400TE Processor, Dual Core, 3M, 2.9GHz, 35W Intel® Core™ G3900 Processor, Dual Core, 2M, 2.8GHz, 65W Intel® Core™ G3900TE Processor, Dual Core, 2M, 2.6GHz, 35W
	Chipset	Q170/H110
	Memory	Two 288-pin DIMM up to 32GB Dual Channel DDR4 1866/2133MHz
	BIOS	Insyde SPI 128Mbit
GRAPHICS	Display	1 x VGA, resolution up to 1920x1200 @ 60Hz 1 x DVI-D (available upon request), resolution up to 1920x1200 @ 60Hz
	Dual Displays	VGA + DVI-D (available upon request)
EXPANSION	Interface	1 x PCIe x16 Gen. 3 4 x PCIe x1 4 x PCI 1 x M.2 M key 2280 (PCIe/SATA3.0) (Q170 only)
	ETHERNET	Controller/ Phy
REAR I/O	Ethernet	2 x GbE (RJ-45)
	USB	2 x USB 3.0
	Display	1 x VGA 1 x DVI-D (available upon request)

INTERNAL I/O	Serial	2 x RS-232/422/485 (2.54mm pitch) 2 x RS232 (2.54mm pitch)
	USB	2 x USB 3.0 (2.0mm pitch) (Q170 only) 6 x USB 2.0 (2.54mm pitch) (Q170), 4 x USB 2.0 (2.54mm pitch) (H110)
	Audio	1 x Intel High Definition audio interface (by request)
	SATA	4 x SATA 3.0 (up to 6Gb/s)
	DIO	1 x 8-bit DIO
	SMBus	1 x SMBus
	ATX	ATX 12V Power Connector and Expansion Goldfinger
WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
SECURITY	TPM	fTPM2.0 or DTPM2.0 (optional)
OS SUPPORT	Microsoft	Windows 7 (32/64 bit) Windows 8.1 (64 bit) Windows 10 IoT Enterprise (64 bit) Note: 7th Gen Intel Core processors only support Win 10.
	Linux	
ENVIRONMENT	Temperature	Operating: 0 to 60°C Storage: -40 to 85°C
	Humidity	Operating: 5 to 90% RH
MECHANICAL	Dimensions	Full Size PICMG 1.3 338mm (13.3") x 126.39mm (4.98")

► 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 DVI-D (optional) and VGA interfaces for display outputs.

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

Intel® I211AT PCI Express Gigabit Ethernet controller and Intel® I219LM PCI Express Gigabit Ethernet controller support up to 1Gbps data transmission.

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.

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.

Wake-On-PS/2

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

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.

RTC Timer

The RTC installed on the system board allows your system to automatically power-on on the set date and time.

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. The operating session will resume exactly where you left off the next time you power-on the system.

Power Failure Recovery

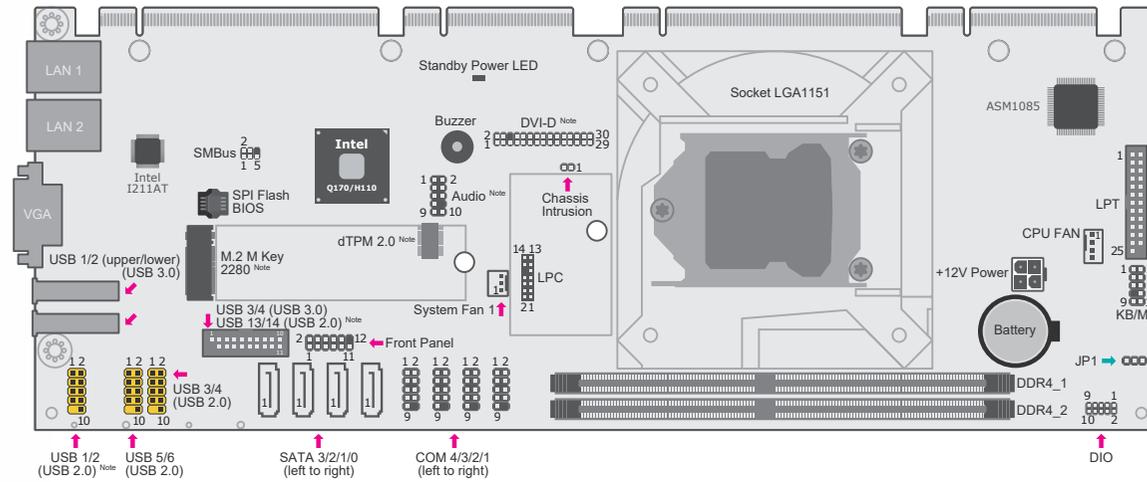
When power returns after an AC power failure, you may choose to either power-on the system manually or let the system power-on automatically.

PICMG® 1.3 (SHB Express™)

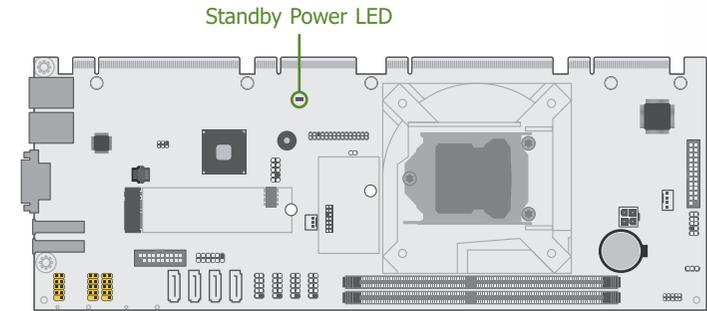
PICMG 1.3 is a form factor developed specially with 20 PCI Express lanes for high-speed I/O expansion via a passive backplane. Full-size (two x16 fingers and two x8 fingers) or half-size (one x16 finger and one x8 finger) form factors of the host board along with electrical requirements are specified. Combinations of lanes and channels of the PCIe edge connectors are also configurable for various applications.

Chapter 2 - Hardware Installation

► Board Layout



► Standby Power LED



Important:

When the Standby Power LED lit 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.



Note:

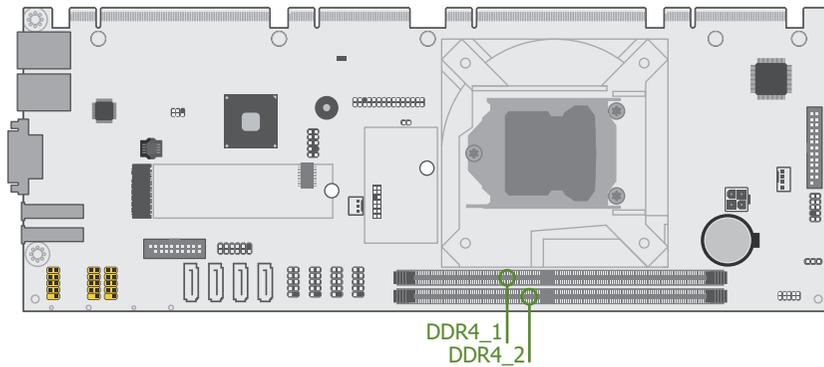
The components may only be present in certain models.



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



The system board supports the following memory interface.

Single Channel (SC)

Data will be accessed in chunks of 64 bits 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.

Single Channel

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.

Dual Channel

DIMMs of the same memory configuration are on different channels.

Features

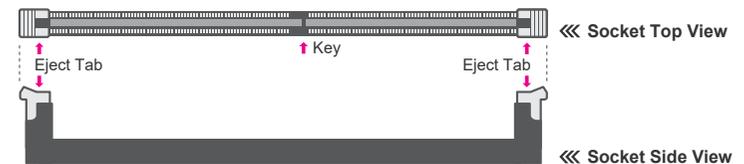
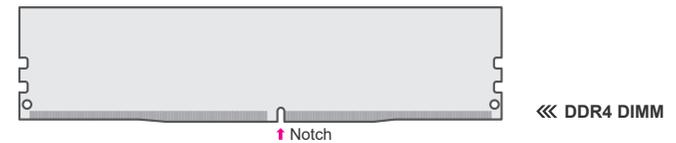
- Two 288-pin DDR4 DIMM sockets
- Supports 1866/2133 MHz DDR4 SDRAM
- Dual channel memory interface
- Supports maximum of 32GB system memory

► System Memory

Installing the DIMM Module

Before installing the memory module, please make sure that the following safety cautions are well-attended.

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. Make sure the notch on memory card is aligned to the key on the socket.



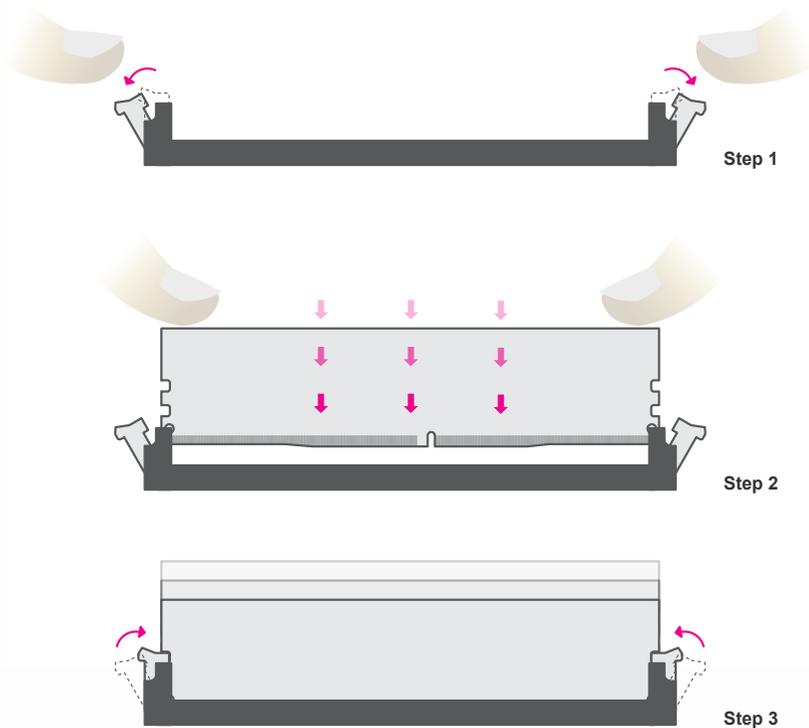
► System Memory ► Installing the DIMM Module

Please follow the steps below to install the memory card into the socket.

Step 1:
Press the eject tabs at both ends of the socket outward and downward to release them from the locked position.

Step 2:
Insert the memory card into the slot while making sure the notch and the key are aligned. Press the card down firmly with fingers while applying and maintaining even pressure on both ends.

Step 3:
The tabs snap automatically to the edges of the card and lock the card in place.



► System Memory

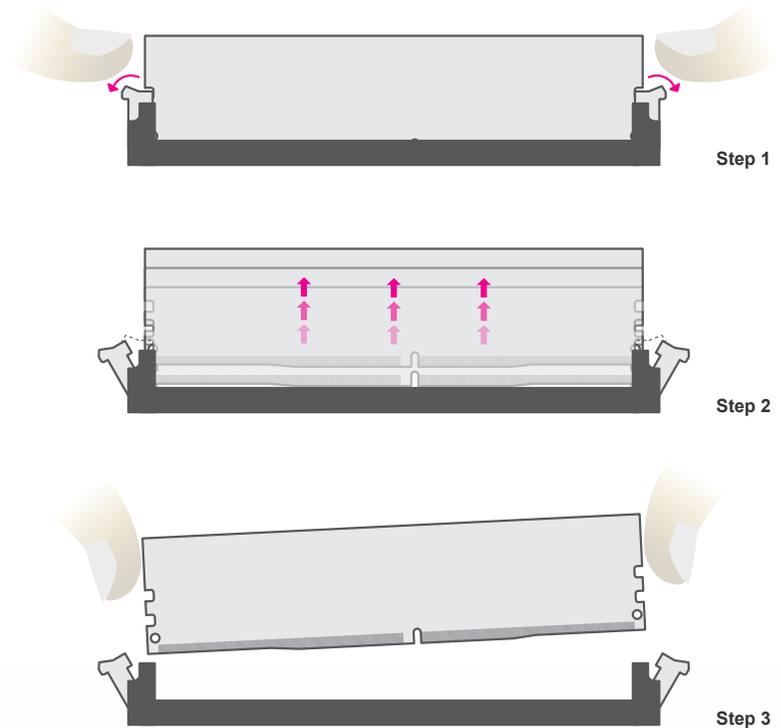
Removing the DIMM Module

Please follow the steps below to remove the memory card from the socket.

Step 1:
Press the eject tabs at both ends of the socket outward and downward to release them from the locked position.

Step 2:
The memory card ejects from the slot automatically.

Step 3:
Hold the card by its edges and remove it from the slot.



► 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:

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

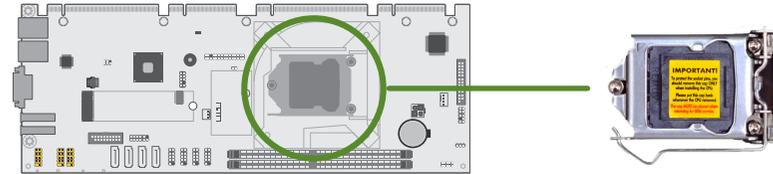


Note:

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

Installing the CPU

1. Make sure the PC and all other peripheral devices connected to it have 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 pressing the load lever down, moving it sideways until to escape the retention tab. Lift the load lever up when it's released.



► CPU ► Installing the CPU

5. Lift the load lever and the load plate all the way up as shown in 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.



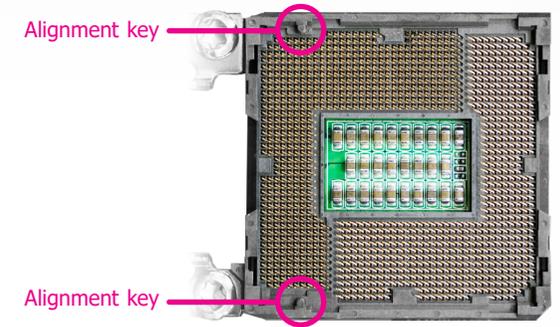
7-1. Insert the CPU into the socket. The gold triangular mark on the CPU must align with the chamfer corner of the CPU socket shown in the photo.



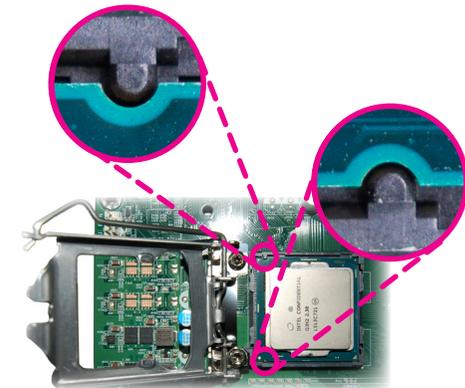
Important:
The CPU will fit in only one orientation and can easily be seated without exerting any force.

► CPU ► Installing the CPU

7-2. Two keys on the socket and notches on the CPU also facilitate alignment.

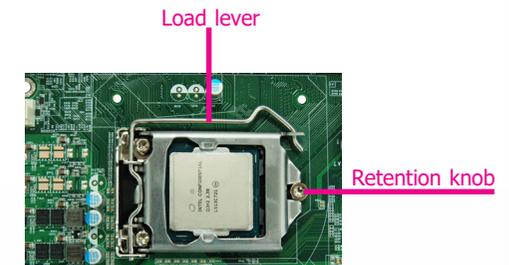


7-3. The CPU's notch will fit into the socket's alignment key when it's seated in the correct orientation.



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. Press down the load lever and hook it under the retention tab.

► CPU

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.



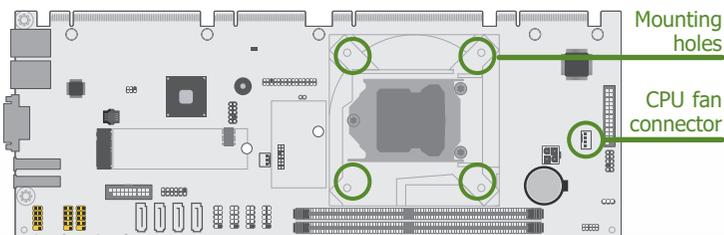
Note:

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.

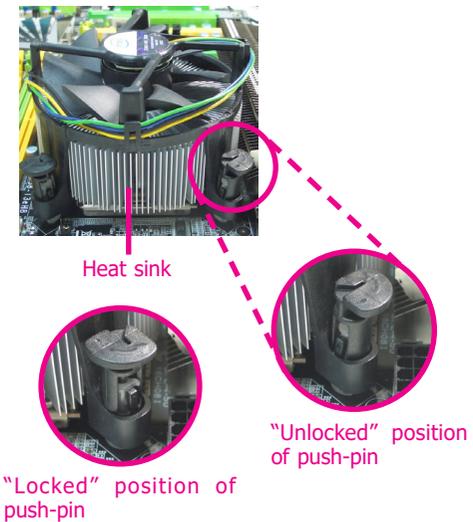
1. Before you install the fan / heat sink, you must apply a thermal paste onto the top of the CPU. The thermal paste is usually supplied when you purchase the fan / heat sink assembly. Do not spread the paste all over the surface. When you later place the heat sink on top of the CPU, the compound will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



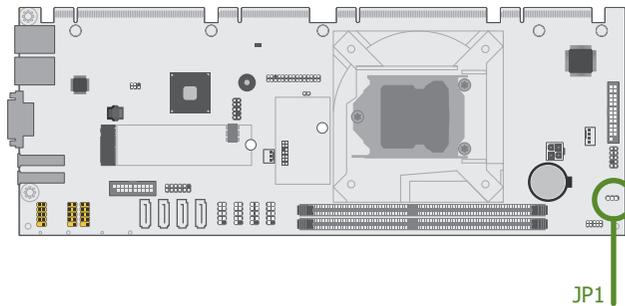
4. Screw tight two of the spring screws at opposite corners into the mounting holes. And then proceed with the other two spring screws.



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

► Jumper Settings

Clear CMOS



If any anomaly of the followings is encountered —

- CMOS data is corrupted;
- you forgot the supervisor or user password;
- failure to start the system due to BIOS mis-configuration

— it is suggested that the system be reconfigured with default values stored in the ROM BIOS. To load the default values stored in the ROM BIOS, please follow the steps below.

- Power-off the system and unplug the power cord.
- Put a jumper cap on JP9's pin 2 and pin 3. Wait for a few seconds and set JP9 back to its default setting, i.e. jumper cap on pin 1 and pin 2.
- Plug the power cord and power-on the system.



▲ 1-2 On: Normal (default)



▲ 2-3 On: Clear CMOS

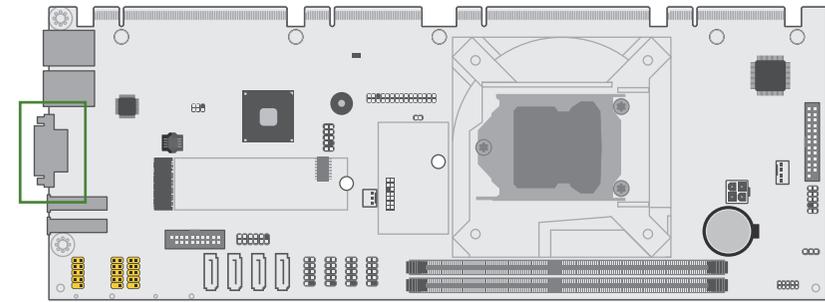
► Rear I/O Ports



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

- 2 LAN ports (LAN 1 & LAN 2)
- 1 VGA port
- 2 USB 3.0 ports (USB 1 & USB 2)

Graphics Display



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.

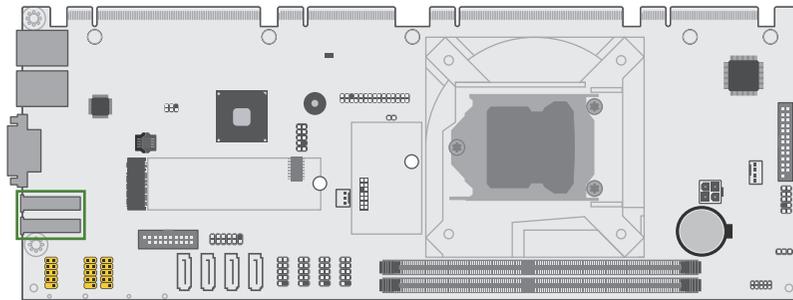
BIOS Setting

Configure VGA in the Chipset menu ("North Bridge Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

Driver Installation

Install the graphics driver. Refer to chapter 6 for more information.

► Rear I/O Ports
USB Ports



USB allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals. The PIC-Q170/H110 is equipped with two onboard USB 3.0 ports (USB 1&2) at the rear side.

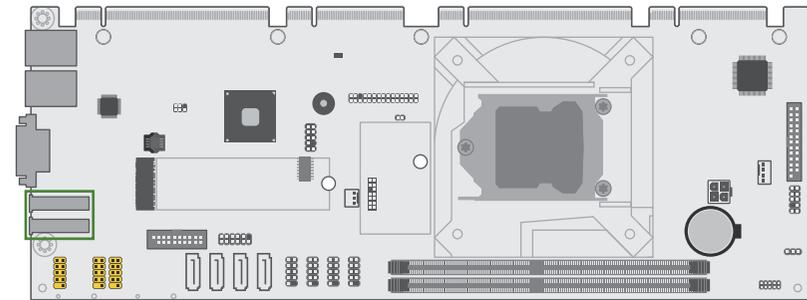
BIOS Setting

Configure the onboard USB in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to chapter 3 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.

► Rear I/O Ports
RJ45 LAN Ports



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 in the Chipset menu ("South Bridge Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

Driver Installation

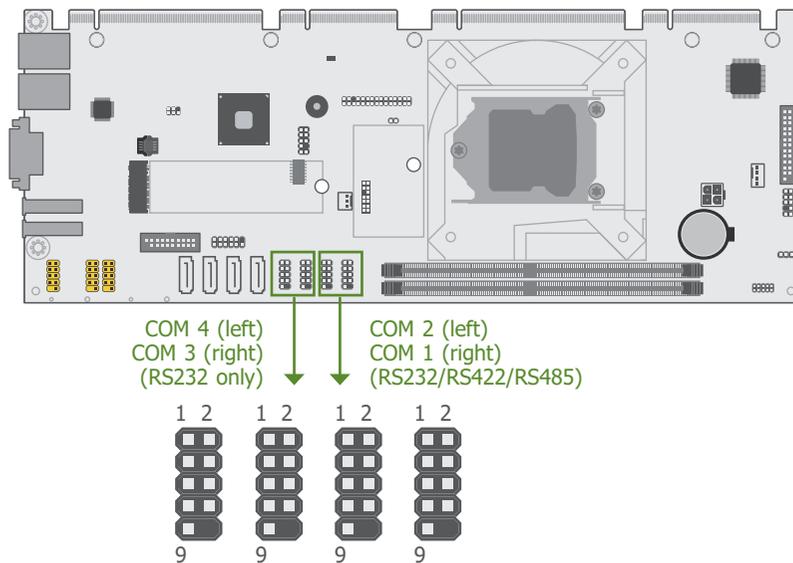
Install the LAN drivers. Refer to chapter 6 for more information.

Features

- LAN 1: Intel® I219LM (Q170) / I219V (H110) LAN PHY GbE Controller
- LAN 2: Intel® I211AT PCIe GbE Controller

► Internal I/O Connectors

COM (Serial) Ports



▼ COM Port Pin Assignment

Pin	RS232	RS422 Full Duplex	RS485
1	DCD-	TXD-	Data-
2	RD	TXD+	Data+
3	TD	RXD+	N.C.
4	DTR-	RXD-	N.C.
5	GND	GND	GND
6	DSR-	N.C.	N.C.
7	RTS-	N.C.	N.C.
8	CTS-	N.C.	N.C.
9	RI-	N.C.	N.C.

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.

COM 1 and COM 2 support three serial modes, i.e. RS232, RS422, and RS485. COM 3 & COM 4 support only RS232. Serial mode is configured in BIOS.

BIOS Setting

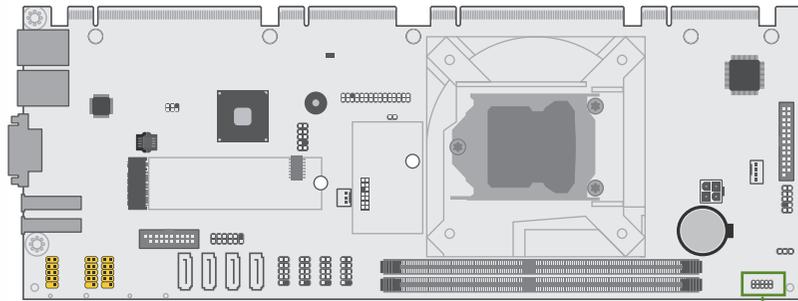
Configure the serial ports in the Advanced menu ("Super IO Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

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.

► Internal I/O Connectors

Digital I/O Connector



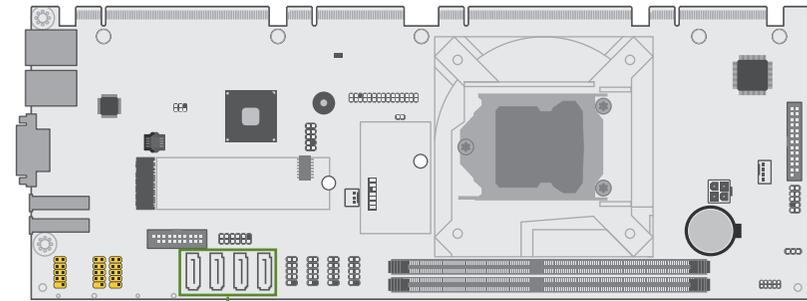
The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to these connectors.

▼ Digital I/O Pin Assignment

Pin	Assignment	Pin	Assignment
1	DIO_7	2	DIO_6
3	DIO_5	4	DIO_4
5	DIO_3	6	DIO_2
7	DIO_1	8	DIO_0
9	5V	10	GND

► Internal I/O Connectors

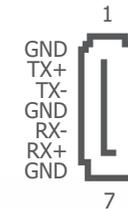
SATA (Serial ATA) Connectors



The Serial ATA (SATA) connectors are used to connect the Serial ATA device. SATA 3.0 is supported by the five SATA ports and provides data rate up to 6Gb/s. Connect one end of the Serial ATA cable to a SATA connector and the other end to your Serial ATA device.

BIOS Setting

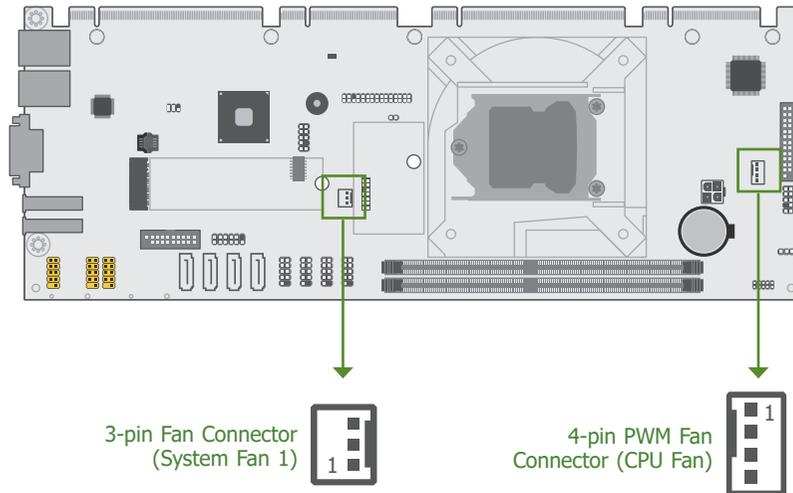
Configure the Serial ATA drives in the Advanced menu ("SATA Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.



▲ SATA 3.0 Pin Assignment

► Internal I/O Connectors

Cooling Fan Connectors



▼ 3-pin Fan Pin Assignment

Pin	Assignment
1	Ground
2	Power
3	Sense

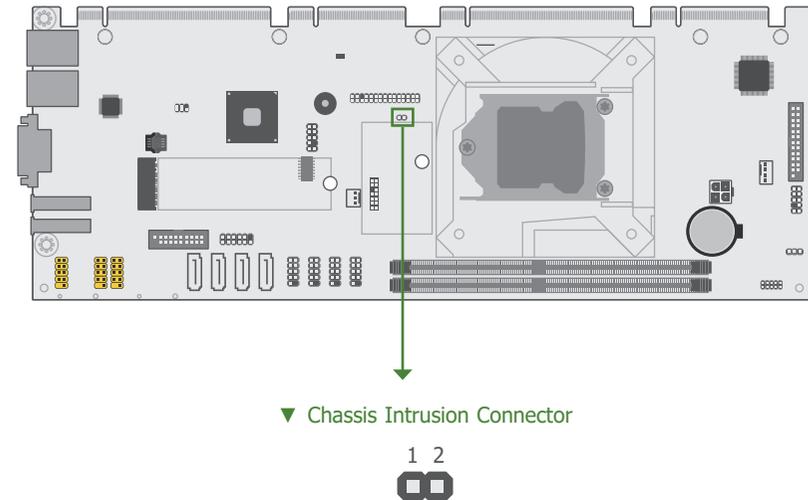
▼ PWM Fan Pin Assignment

Pin	Assignment
1	Ground
2	Power
3	Sense
4	Speed Control

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. The 4-pin fan provides PWM to modulate fan speed whereas the 3-pin fans do not.

► Internal I/O Connectors

Chassis Intrusion Connector



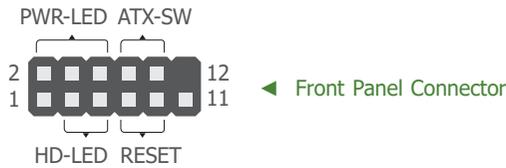
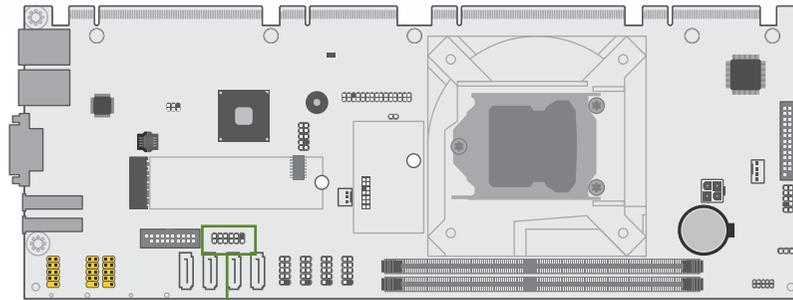
▼ Chassis Intrusion Pin Assignment

Pin	Assignment	Pin	Assignment
1	Signal	2	GND

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.

► Internal I/O Connectors

Front Panel Connector



▼ Front Panel Pin Assignment

Pin	Assignment	Pin	Assignment
1	N.C.	2	LED Power
3	HDD Power	PWR-LED 4	LED Power
5	Signal	6	Signal
7	Ground	8	Ground
9	Signal	ATX-SW 10	Signal
11	N.C.	12	---

HDD-LED - Hard Disk Drive LED

Lighting of the LED indicates that the hard drive is being accessed.

RESET - Reset Switch

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

PWR-LED - Power/Standby LED

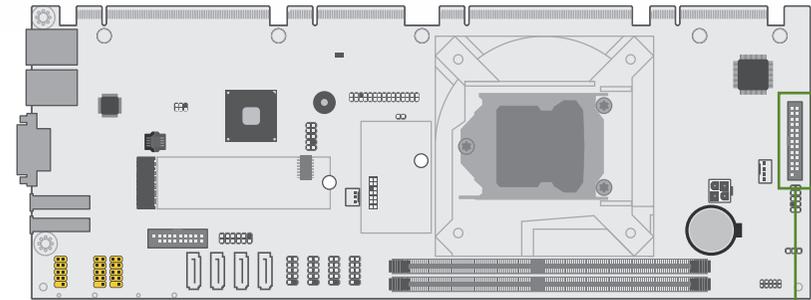
When the system's power is on, this LED will light up. When the system is in the S1 (POS - Power On Suspend) state, it will blink at 1-second intervals. When the system is in the S3 (STR - Suspend To RAM) state, it will blink at 4-second intervals.

ATX-SW - ATX Power Switch

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

► Internal I/O Connectors

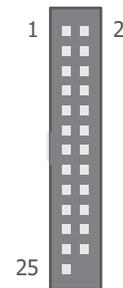
LPT Connector



▼ LPT Pin Assignment

Pin	Assignment	Pin	Assignment
1	Strobe	2	Auto Feed
3	Data_Out_0	4	ERP_WAKE
5	Data_Out_1	6	INIT
7	Data_Out_2	8	Select Printer
9	Data_Out_3	10	GND
11	Data_Out_4	12	GND
13	Data_Out_5	14	GND
15	Data_Out_6	16	GND
17	Data_Out_7	18	GND
19	ACK	20	GND
21	Busy	22	GND
23	Paper End	24	GND
25	Select	26	---

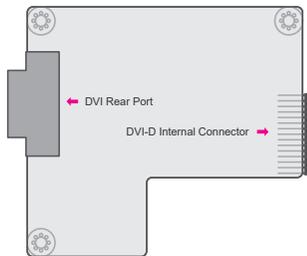
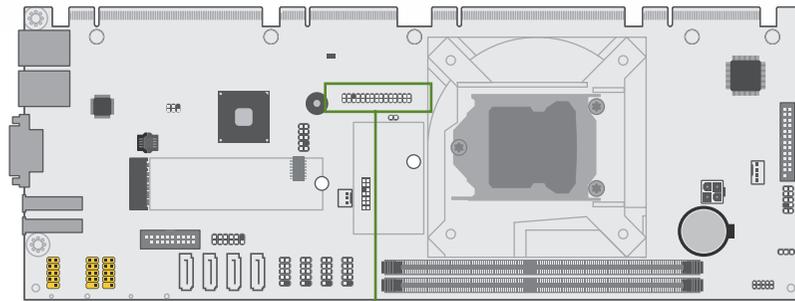
▼ LPT Connector



The LPT port is for interfacing your PC to a parallel printer. It supports SPP, ECP and EPP.

SPP (Standard Parallel Port)	Allows normal speed operation but in one direction only.
ECP (Extended Capabilities Port)	Allows parallel port to operate in bidirectional mode and at a speed faster than the SPP's data transfer rate.
EPP (Enhanced Parallel Port)	Allows bidirectional parallel port operation at maximum speed.

► Internal I/O Connectors
DVI-D Connector



◀ PIC-DVI Card with Cable (optional)

The DVI-D connector is used to connect to PIC-DVI card which converts the connector to a rear DVI port for chassis rear connection. Use the cable that comes with the PIC-DVI card to connect the system board to the PIC-DVI card.

BIOS Setting

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

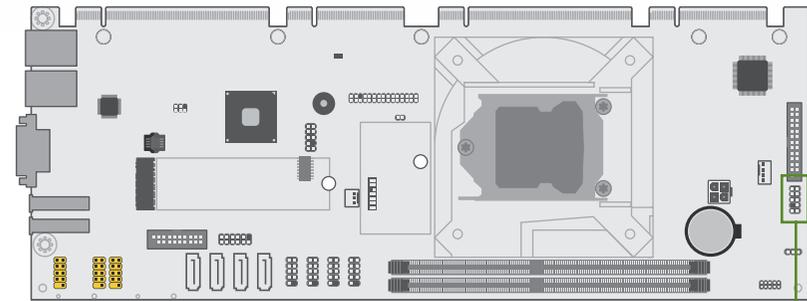
Driver Installation

Install the graphics driver. Refer to the chapter 6 for more information.

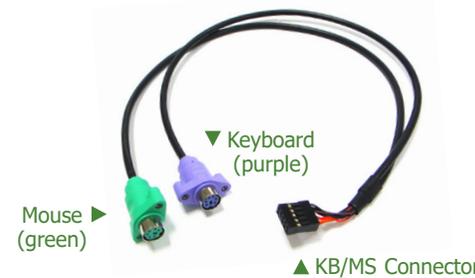


Note:
 The PIC-DVI card is an optional accessory and may not be included in your shipment. Please contact your sales representative for details.

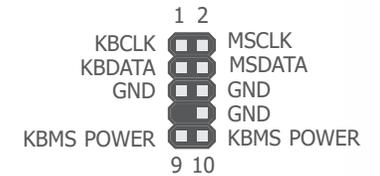
► Internal I/O Connectors
KB/MS Connector



▼ KB/MS Cable



▼ KB/MS Connector



The Keyboard/Mouse connector is used to connect PS/2 keyboard and PS/2 mouse by means of a PS/2 cable.

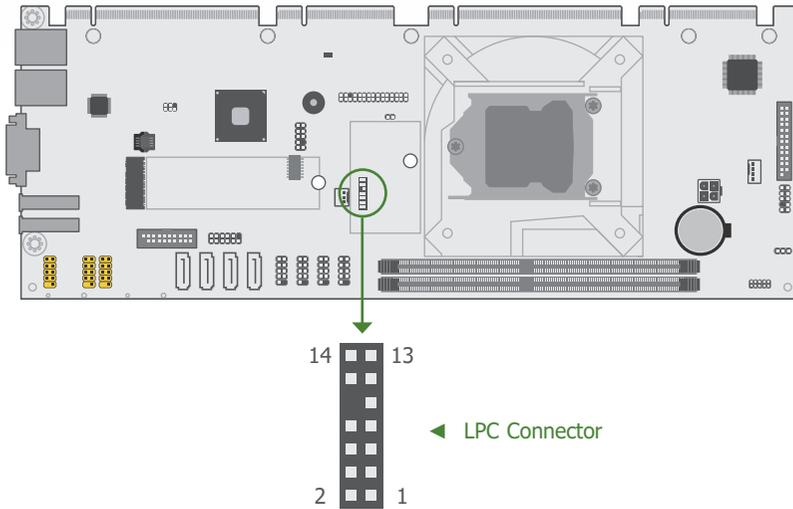
Connecting the PS/2 Cable

The system board package comes with a PS/2 cable. Connect one end of the cable to the KB/ Mouse connector. The other ends are used to connect a PS/2 keyboard and a PS/2 mouse.

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.

► Internal I/O Connectors
LPC Connector



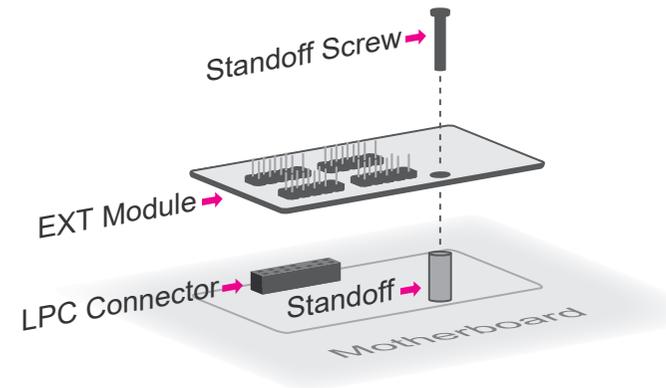
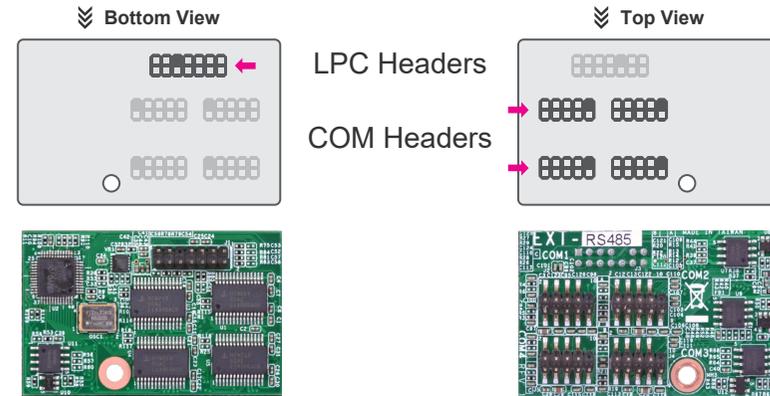
The Low Pin Count Interface was defined by Intel® Corporation to facilitate the industry’s transition towards legacy free systems. It allows the integration of low-bandwidth legacy I/O components within the system, which are typically provided by a Super I/O controller. Furthermore, it can be used to 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 functions of the LPC connector.

▼ LPC Pin Assignment

Pin	Assignment	Pin	Assignment
1	L_CLK	2	L_LAD1
3	L_RST#	4	L_LAD0
5	L_FRAME#	6	3.3V
7	L_LAD3	8	GND
9	L_LAD2	10	---
11	SERIRQ	12	GND
13	5VSB	14	5V

► Internal I/O Connectors ► LPC Connector
External COM Port Module

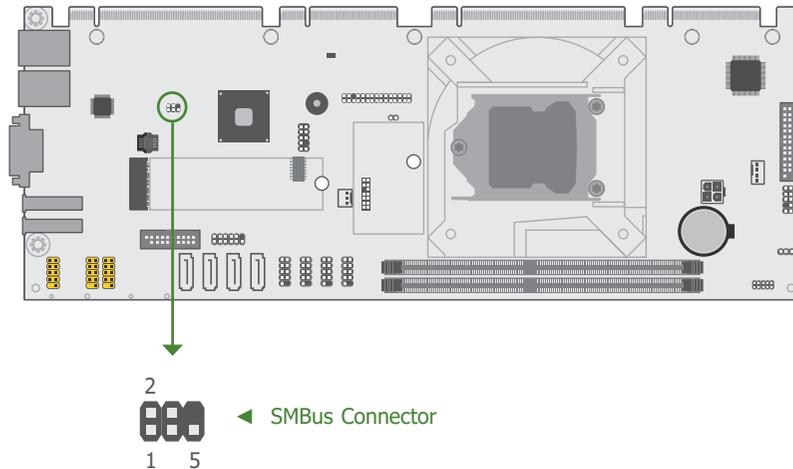
The external COM port modules — EXT-RS232 and EXT-RS485 — are designed by DFI’s proprietary technology, and support four additional COM ports per module. The EXT-RS232/RS485 card is connected to the motherboard via the LPC connector and secured by a standoff as illustrated below.



Note:
 The EXT-RS232/RS485 modules are optional peripherals that are not included in the standard package. For more information, please contact DFI sales representatives or visit go.dfi.com/EXT-RS232, and go.dfi.com/EXT-RS485.

► Internal I/O Connectors

SMBus Connector



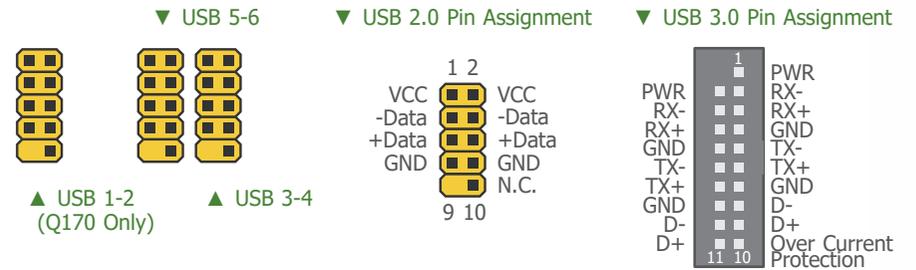
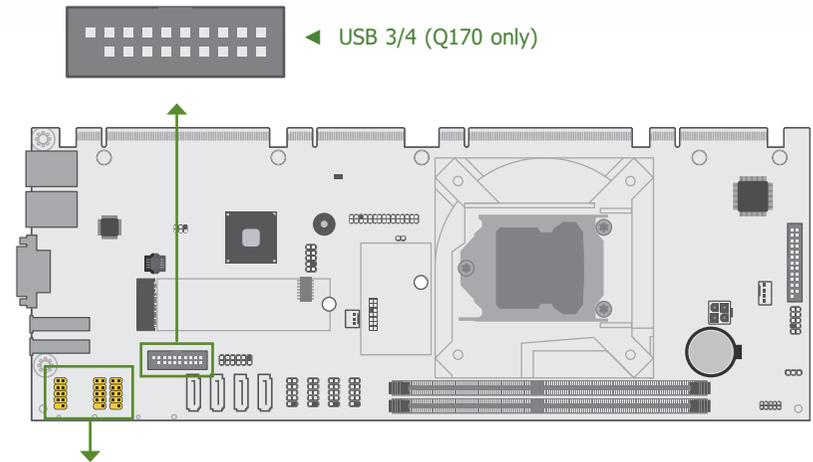
The SMBus (System Management Bus) connector is used to connect the SMBus device. It is a multiple device bus that allows multiple chips to connect to the same bus and enable each one to act as a master by initiating data transfer.

▼ SMBus Pin Assignment

Pin Assignment	Pin Assignment
1 3V3SB	2 GND
3 SMBus_Clock	4 SMBus_DATA
5 SMBus_Alert	6 ---

► Internal I/O Connectors

USB Headers



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

On PIC-Q170, the three internal 10-pin connectors allow for 6 additional USB 2.0 ports (USB 1-2/3-4/5-6). The internal 20-pin connector allows for 2 additional USB 3.0 ports (USB 3-4).

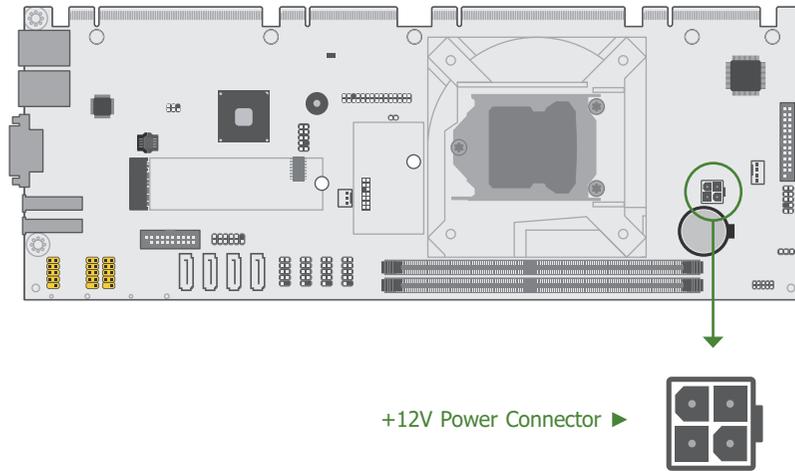
On PIC-H110, two internal 10-pin connectors allow for 4 additional USB 2.0 ports (USB 3-4/5-6).

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 the onboard USB in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

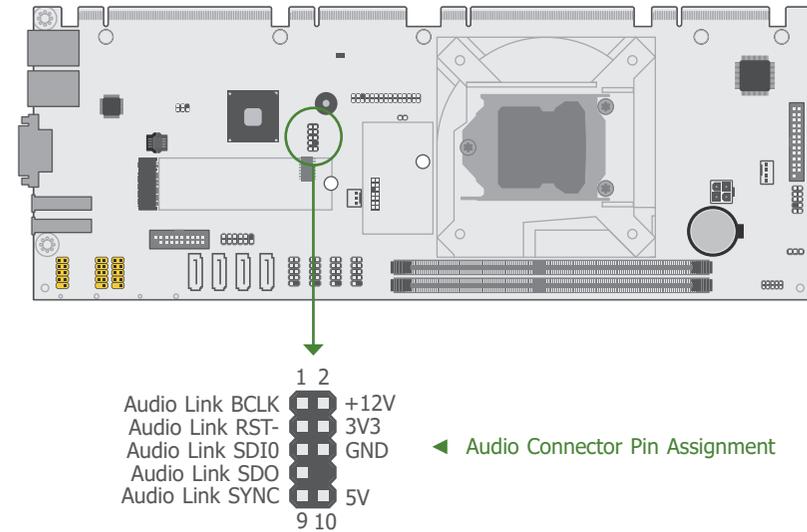
► Internal I/O Connectors
12V DC Power



+12V Power Connector ►

Connect a 4-pin power cord to the vertical type power connector for DC supply. Using a voltage higher than the recommended range may result in failure in booting the system or causing damage to the system board. A power adaptor/converter is necessary when the power source on site does not comply with the power specifications of the board.

► Internal I/O Connectors
Audio Connector



◀ Audio Connector Pin Assignment

The audio connector allows for HD audio signal connectivity via a 10-pin header.

Driver Installation

Install the audio driver. Refer to Chapter 6 for more information.

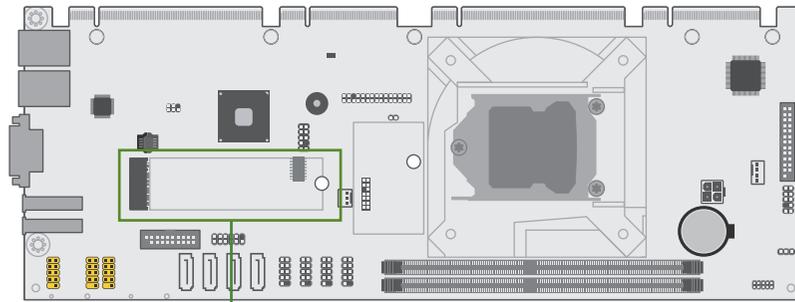


Note:

The Audio Connector is an optional component and may not be included in your shipment. Please contact your sales representative for details.

► Internal I/O Connectors

Expansion Slot



M.2 2280 M Key

M.2 Socket (Q170 only)

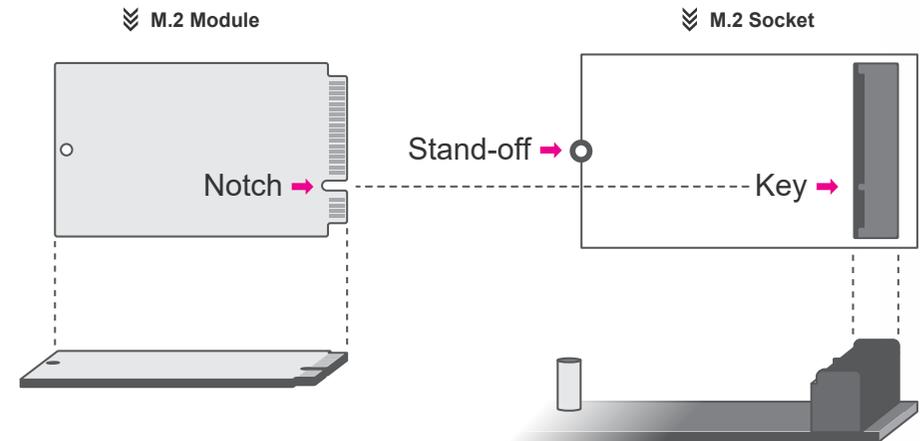
The M.2 socket is the Next Generation Form Factor (NGFF) which is designed to support multiple modules and make the M.2 more suitable in application for solid-state storage. The board preserves a stand-off for the M.2 M key socket, allowing a 22mm x 80mm M.2 module to fit onto the board.

► Internal I/O Connectors ► Expansion Slots

Installing the M.2 Module

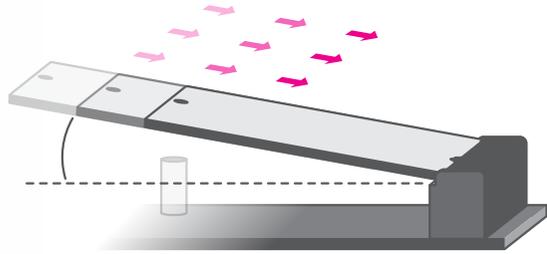
Before installing the M.2 module into the M.2 socket, please make sure that the following safety cautions are well-attended.

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 M.2 socket on the system board
4. Make sure the notch on card is aligned to the key on the socket.
5. Make sure the standoff screw is removed from the standoff.

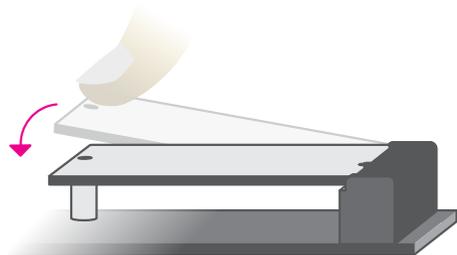


► Internal I/O Connectors ► Expansion Slots

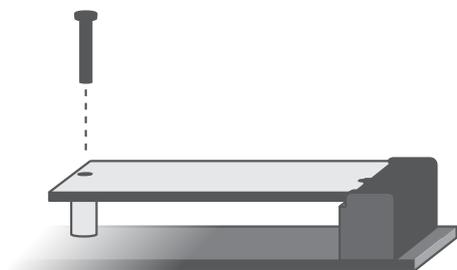
Please follow the steps below to install the card into the socket.



Step 1:
Insert the card into the socket at an angle while making sure the notch and key are perfectly aligned.



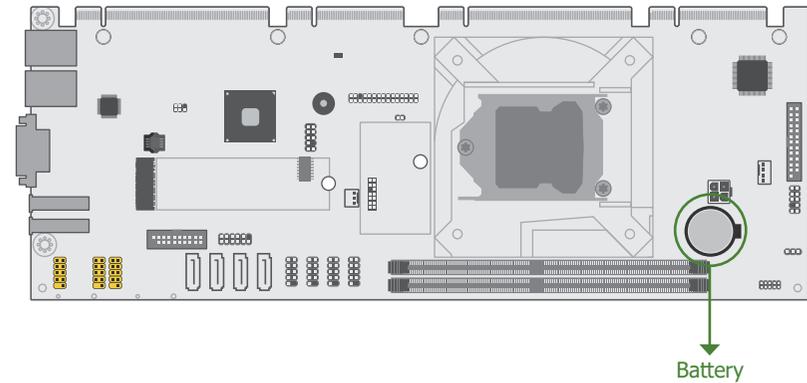
Step 2:
Press the end of the card far from the socket down until the gap between the card and the stand-off closes up.



Step 3:
Screw tight the card onto the stand-off with a screw driver and a stand-off screw until the gap between the card and the stand-off closes up. The card should be lying parallel to the board when it's correctly mounted.

► Internal I/O Connectors

Battery



The lithium ion battery addendum supplies power to the real-time clock and CMOS memory as an auxiliary source of power when the main power is shut off.

Safety Measures

- There exists explosion hazard if the battery is incorrectly installed.
- Replace only with the same or equivalent type recommended by the manufacturer.
- Dispose of used batteries according to local ordinances.

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 keys simultaneously.

Legends

Keys	Function
Right / Left arrow	Move the highlight left or right to select a menu
Up / Down arrow	Move the highlight up or down between submenus or fields
<Enter>	Enter the highlighted submenu
+ (plus key)/F6	Scroll forward through the values or options of the highlighted field
- (minus key)/F5	Scroll backward through the values or options of the highlighted field
<F1>	Display general help
<F9>	Optimized defaults
<F10>	Save and Exit
<Esc>	Return to previous menu

Scroll Bar

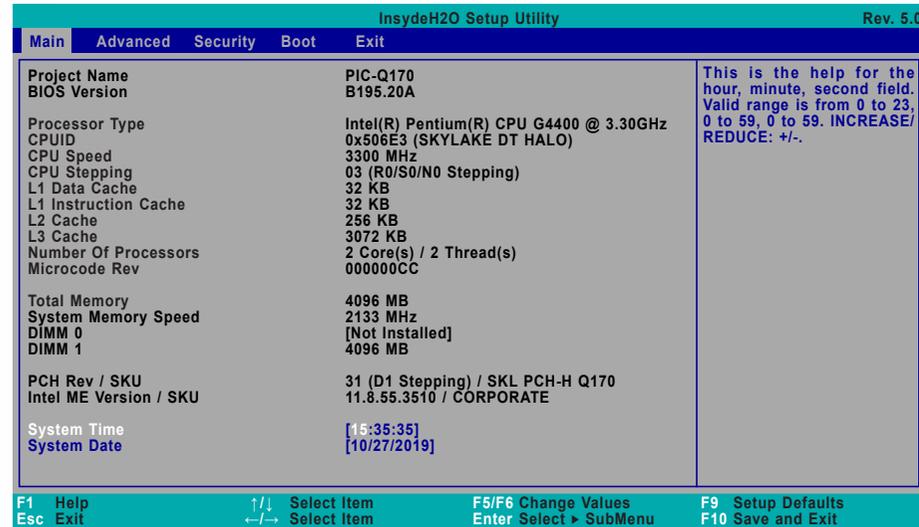
When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

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>.

► 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 <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from 01 to 12. Date displays the date, from 01 to 31. Year displays the year, from 2005 to 2099.

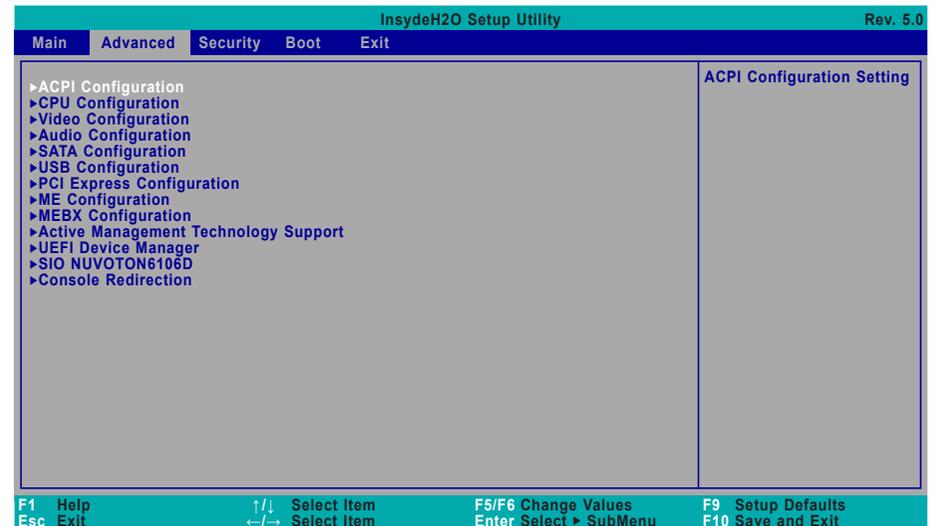
► Advanced

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.



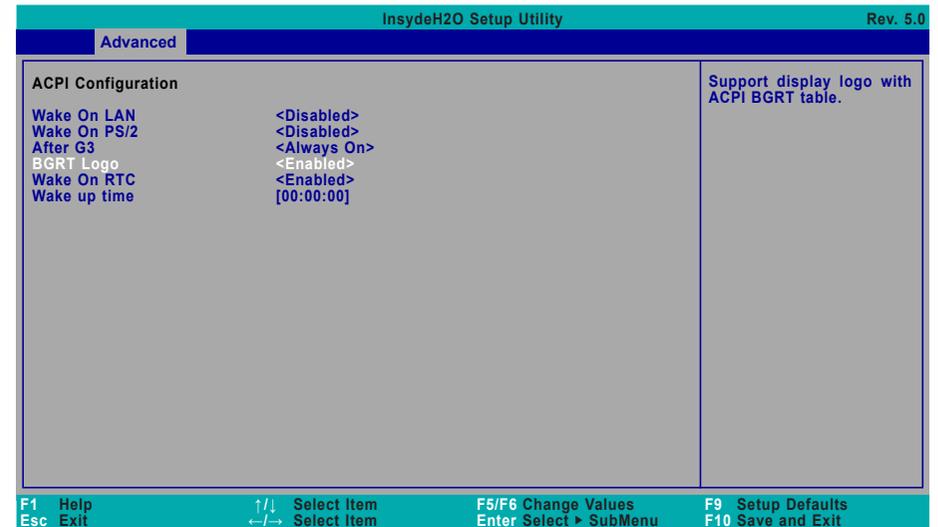
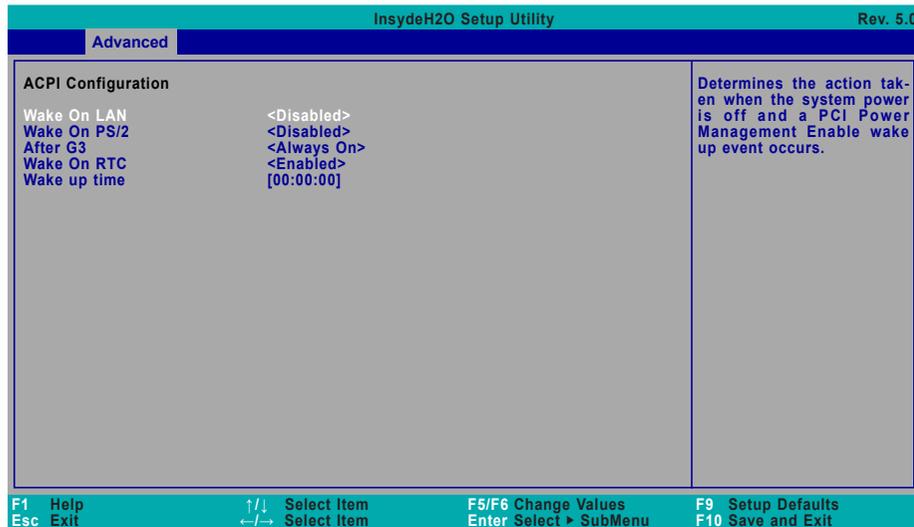
Important:

Setting incorrect field values may cause the system to malfunction.



► **Advanced**

ACPI Configuration



Wake On LAN

Enable or Disable this field to allow LAN signal to power up the system.

Wake On PS/2

Enable or Disable this field to allow PS/2 keyboard or mouse signal to power up the system.

After G3

This field is to specify what state the system should be in when power is re-applied after a power failure.

- Always On** The system automatically powers on after power failure.
- Always Off** The system remains power off after power failure. Power-on signal input is required to power up the system.

Wake On RTC

When Enabled, the system will automatically wake up from S4/S5 state at a designated time every day via the Real-time clock (RTC) battery.

[Wake up time]

Configure the time of day the system will wake on RTC — [HH:MM:SS]. This field will only appear when "Wake On RTC" is enabled.

BGRT Logo

This field is used to enable or disable to support display logo with ACPI BGRT table. This field is only available when Quiet Boot is enabled.

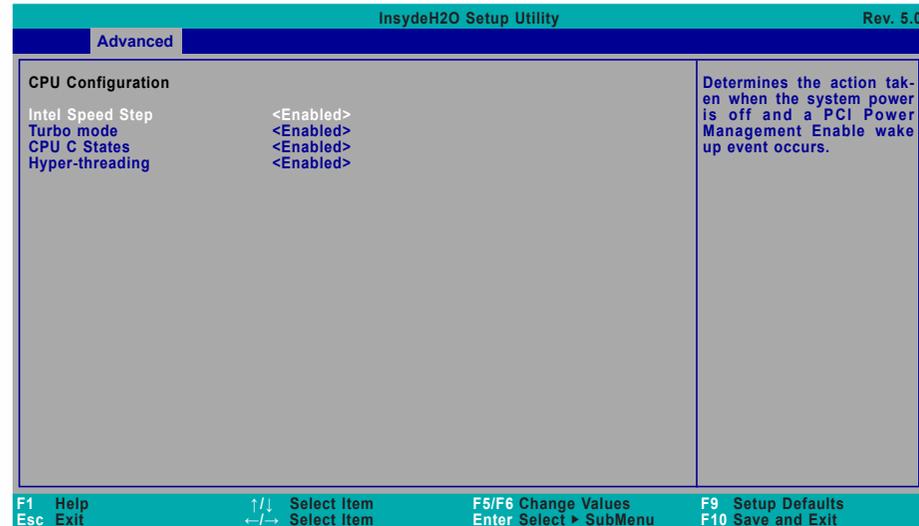


Note: To enable "Quiet Boot", please refer to the Boot menu section in this chapter for more information.

► **Advanced**

CPU Configuration

Configure CPU processing related settings in this page.



Intel Speed Step

This field is used to enable or disable the Enhanced Intel SpeedStep® Technology (EIST), which helps optimize the balance between system’s power consumption and performance. After it is enabled in the BIOS, EIST features can then be enabled via the operating system’s power management.

Turbo Mode

Enable or disable turbo mode of the processor. This field will only be displayed when “Intel Speed Step” is enabled. This field is not available when the equipped CPU does not support Turbo Mode.

CPU C States

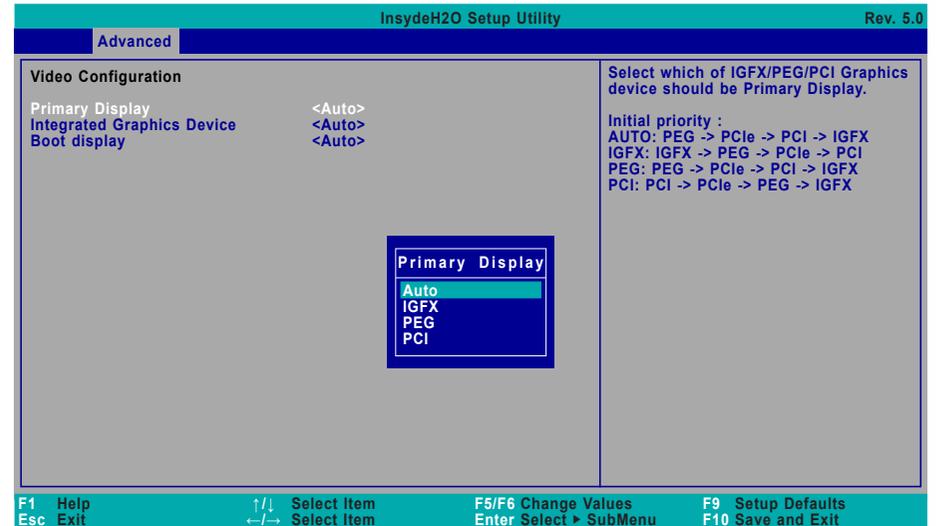
Enable or disable CPU Power Management. It allows CPU to go to C States when it’s not 100% utilized.

Hyper-threading

Enable or disable Hyper-threading. When it is enabled, a physical core will perform as two logical processors, and the user may experience better computational efficiency of the system. Please make sure that the OS operating on your system is optimized for Hyper-Threading, e.g. Windows and Linux. This field is not available when the equipped CPU does not support Hyper-threading.

► **Advanced**

Video Configuration



Primary Display

Select among Auto, IGFX, PEG, and PCI Graphics devices to be the primary display.

Integrated Graphics Device

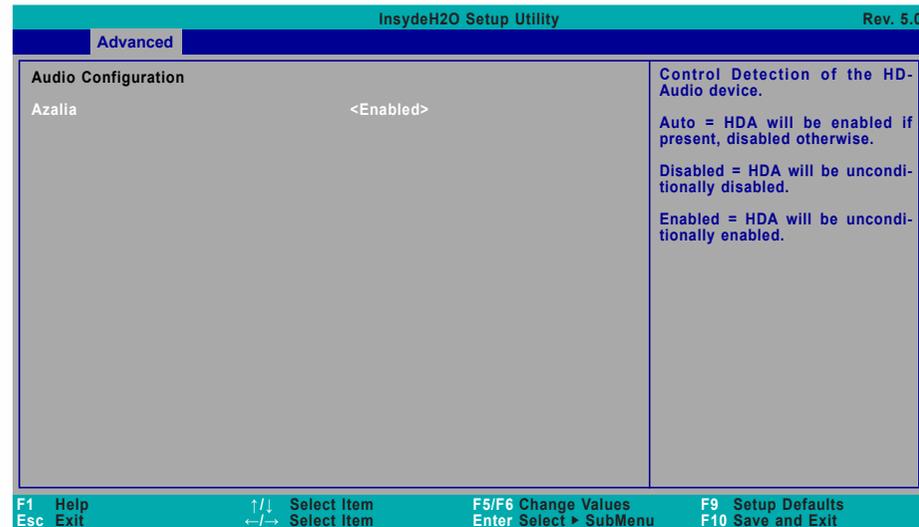
Keep IGFX enabled or disabled based on the setup options.

Boot display

Select the display device during powering up and booting up procedures — Auto, DVI+VGA, or VGA+DVI.

► Advanced

Audio Configuration

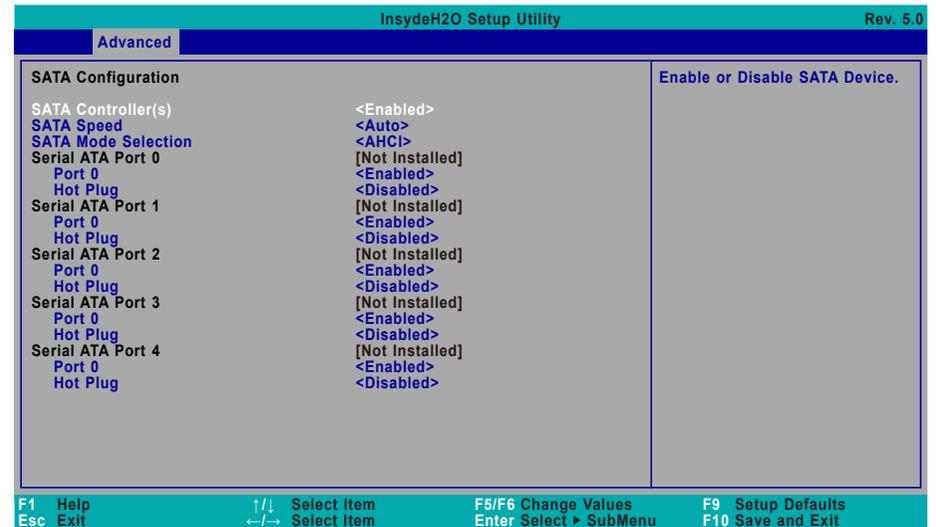


Azalia

Enable or disable Intel High Definition Audio (HDA), also known as Azalia.

► Advanced

SATA Configuration



SATA Controller(s)

Enable or disable the Serial ATA controller. This following fields will only be displayed when this field is enabled.

SATA Speed

Select Serial ATA controller(s) speed — Auto, Gen1 (1.5 Gbit/s), Gen2 (3 Gbit/s) or Gen 3 (6 Gbit/s).

SATA Mode Selection

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

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

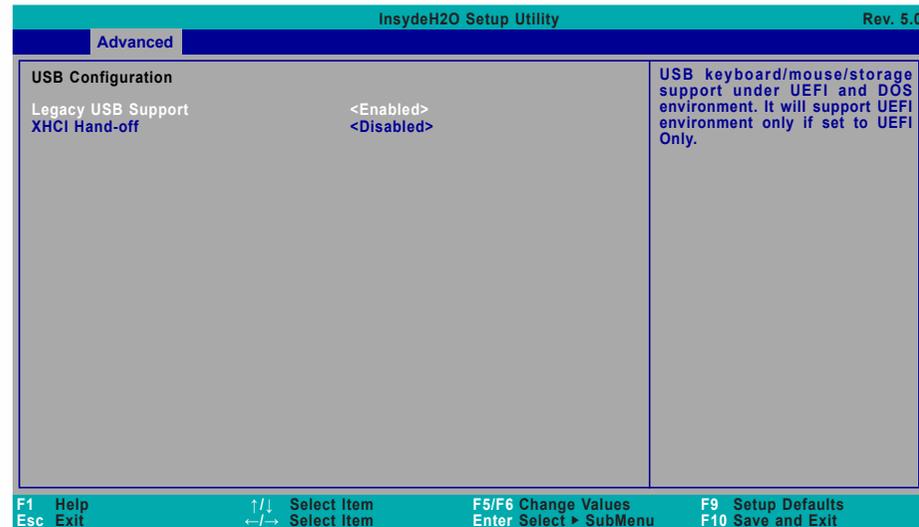
RAID This option allows you to create RAID or Intel Matrix Storage configuration on Serial ATA devices.

SATA Port 0-4/Hot Plug

Enable or disable each Serial ATA port and its hot plug function.

► Advanced

USB Configuration



Legacy USB Support

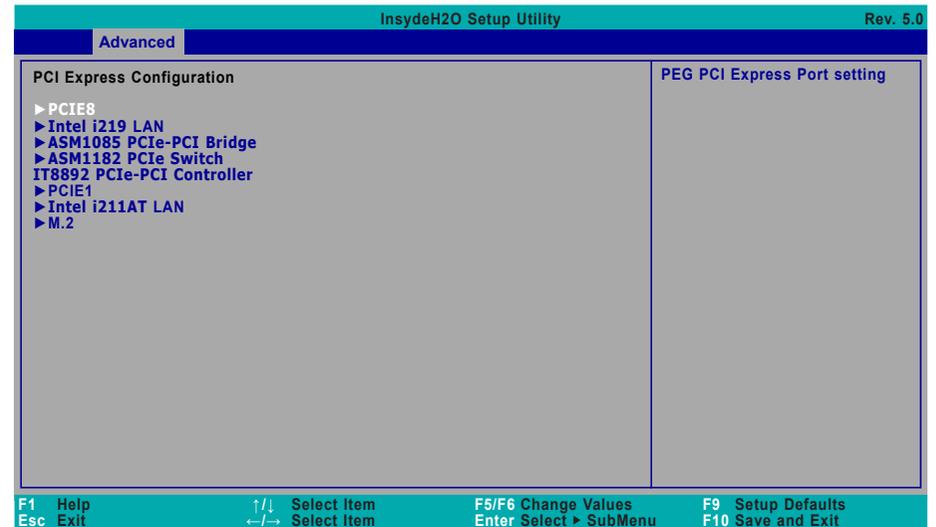
- Enabled** Enable Legacy USB support.
- Disabled** Keep USB devices available only for EFI applications.
- UEFI Only** Only support UEFI devices.

XHCI Hand-off

Enable or disable XHCI Hand-off.

► Advanced

PCI Express Configuration



Select one of the PCI Express channels and press enter to configure the following settings.

PCI Express Root Port

Enable or disable the PCI Express Root Port.

PCIe Speed

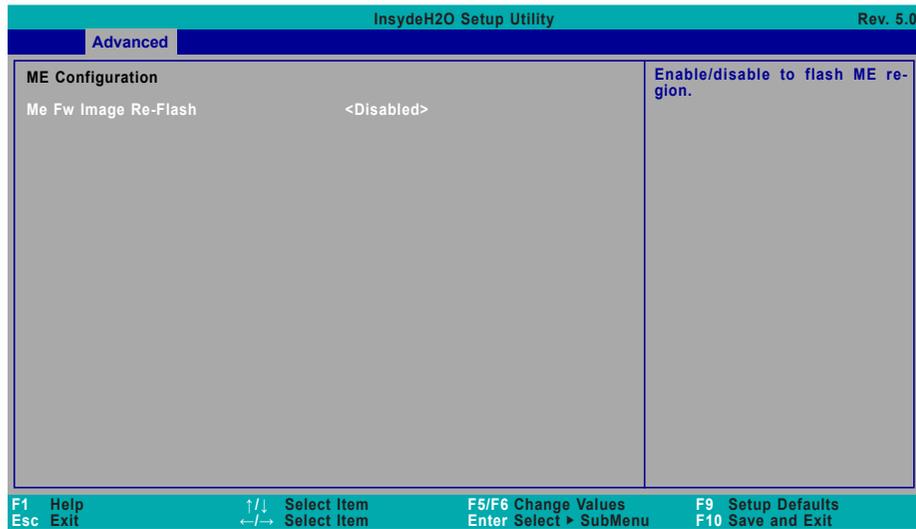
Select PCIe Speed of the current port — AUTO, Gen1, Gen2, or Gen3. This field may not appear when the speed of the port is not configurable.

Hot Plug

Enable or disable hot plug function of the port. This field may not appear when the port does not support hot plug.

► Advanced

ME Configuration

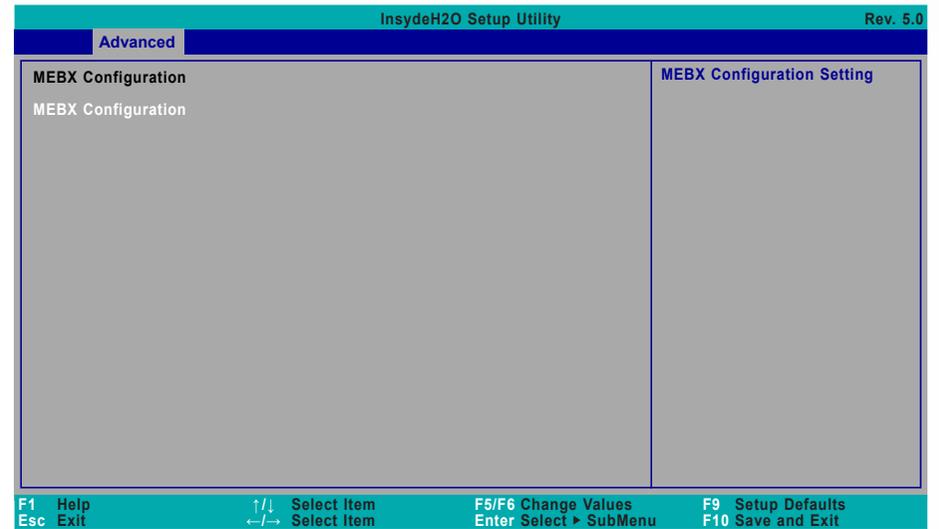


Me Fw Image Re-Flash

- Enabled** Allow the user to re-write the ME firmware.
- Disabled** ME firmware re-write is not allowed.

► Advanced

MEBX Configuration

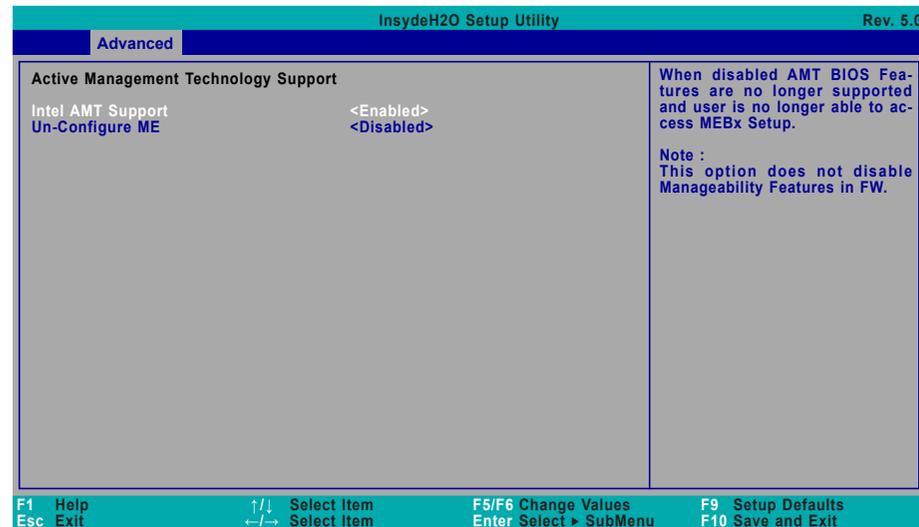


MEBX Configuration

Configure Intel® Active Management Technology (Intel® AMT) in the Intel® Management Engine BIOS Extension (MEBX) setup menu. Please refer to Chapter 4 for instructions.

► **Advanced**

Active Management Technology Support



Intel AMT Support

Enabled Enable AMT. When this field is enabled, the user is allowed to configure AMT settings via MEBX.

Disabled Disable AMT. When this field is disabled, AMT settings cannot be configured and MEBX is not allowed to enter.

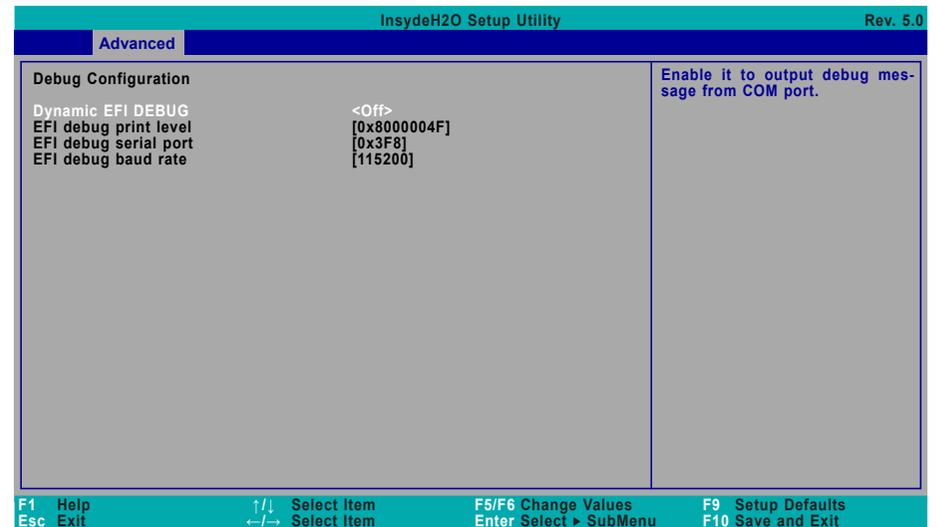
Un-configure ME

Enable or disable ME unconfiguration without password.

► **Advanced**

Debug Configuration

This section configures Debug setting.



Dynamic EFI DEBUG

This field is used to turn on or off the function to output debug message from COM port. When this field is set to "On", the following EFI debug configurations will be displayed.

EFI debug print level

Default value is 0x8000004F.

EFI debug serial port

Default value is 0x3F8.

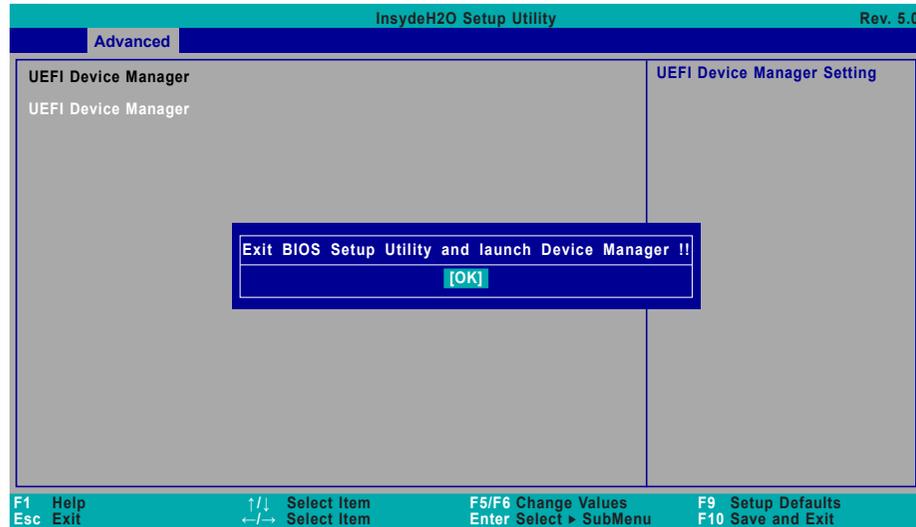
EFI debug baud rate

Default value is 115200.

► **Advanced**

UEFI Device Manager

Configure UEFI device with option ROM, such as LAN card, etc.



Press "Enter" and "OK" to enter UEFI Device Manager setup page. More device settings can be configured in the UEFI Device Manager, including LAN, Network Stacks, UEFI Intel RST and etc.



Note:

Network Device will not be configurable in Device Manager if "Network Stack" is disabled in the "Boot" menu.



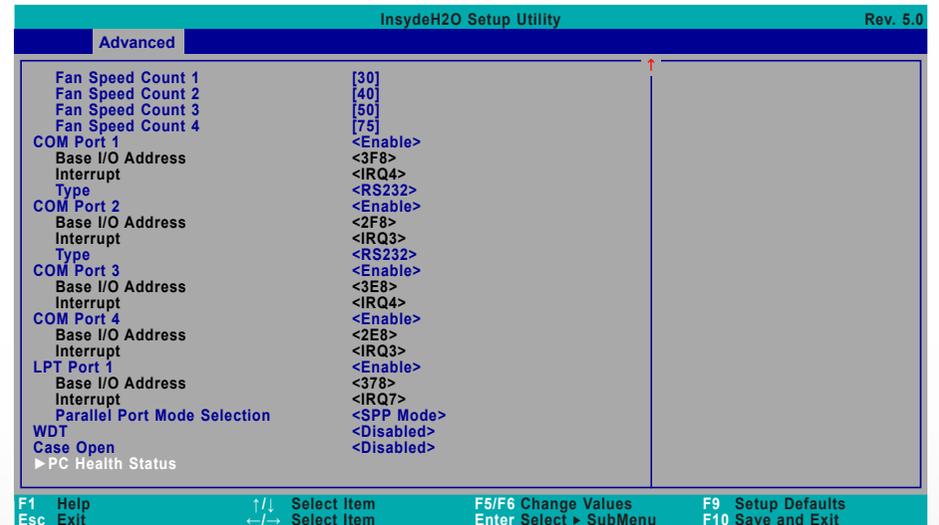
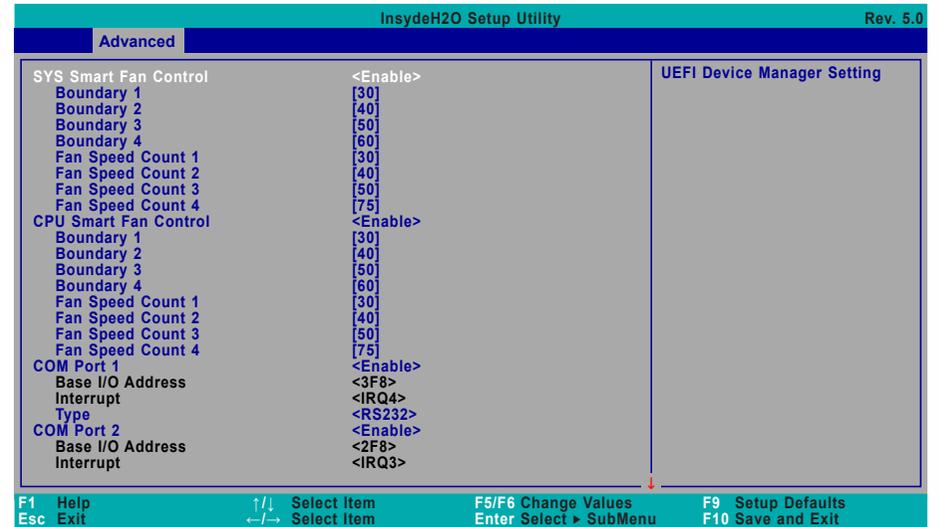
Note:

Intel® Rapid Storage Technology will only be configurable in Device Manager when the "Boot Type" in the "Boot" menu is set to UEFI compatible options.

► **Advanced**

SIO NUVOTON6106D

Configure Super I/O settings in this submenu. Scroll by moving the cursor up or down to reveal more options.



► **Advanced** ► **SIO NUVOTON6106D**

Smart Fan is a fan speed moderation strategy that depends on the current system temperature. When the system temperature goes higher than the Boundary setting, the fan speed will be turned up to the setting of the Fan Speed Count that bears the same index as the Boundary field.

SYS Smart Fan/CPU Smart Fan Control

Enable or disable the system smart fan. When disabled, fan speed will not be controllable according to different system temperatures. Instead, a Fix Fan Speed Count field will be displayed to configure at which speed the fan will always be fixed regardless of system temperature.

▼ **SYS Smart Fan/CPU Smart Fan Control = [Enabled]**

Boundary 1 to Boundary 4

Set the boundary temperatures that determine the fan speeds accordingly, the value ranging from 0-127°C. For example, when the system temperature reaches Boundary 1 setting, the fan speed will be turned up to the designated speed of the Fan Speed Count 1 field.

Fan Speed Count 1 to Fan Speed Count 4

Set the fan speed, the value ranging from 1-100%, 100% being full speed. The fans will operate according to the specified boundary temperatures above-mentioned.

▼ **SYS Smart Fan/CPU Smart Fan Control = [Disabled]**

Fix Fan Speed Count

Set the fan speed, the value ranging from 1-100%, 100% being full speed. The fans will always operate at the specified speed regardless of gauged temperatures.

COM Port 1 to COM Port 4

Enables or disables the serial ports (COM). The following bracketed fields will only appear when the port is enabled.

Type

Select the COM port serial mode — RS422, RS232, or RS485. This field is not available for COM 3 and COM 4, which only support RS232.

WDT

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

▼ **WDT = [Enable]**

COUNTER

Set the timeout value of the WDT — 1-255 seconds.

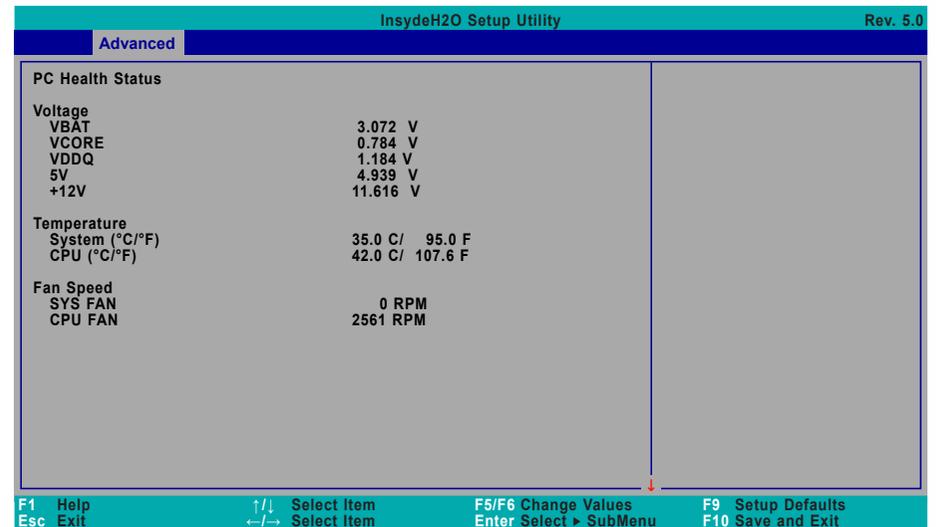
Case Open

Enable or disable the case open detection function.

► **Advanced** ► **SIO NUVOTON6106D**

► **PC Health Status**

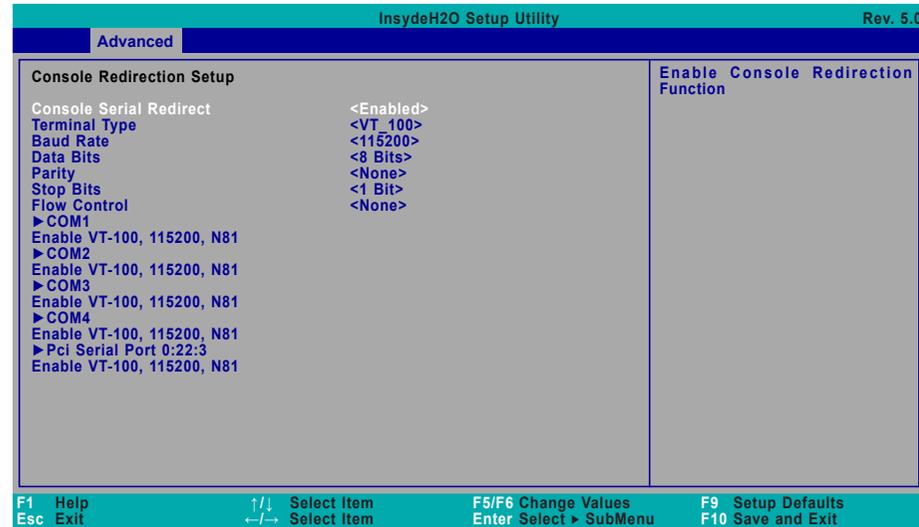
This section displays the PC health status.



► **Advanced**

Console Redirection

Configure COM port serial settings in the submenu.



Terminal Type

Select terminal type — VT_100, VT_100+, VT_UTF8 or PC_ANSI.

Baud Rate

Select baud rate — 115200, 57600, 38400, 19200, 9600, 4800, 2400 or 1200.

Data Bits

Select data bits — 7 bits or 8 bits.

Parity

Select parity bits — none, even or odd.

Stop Bits

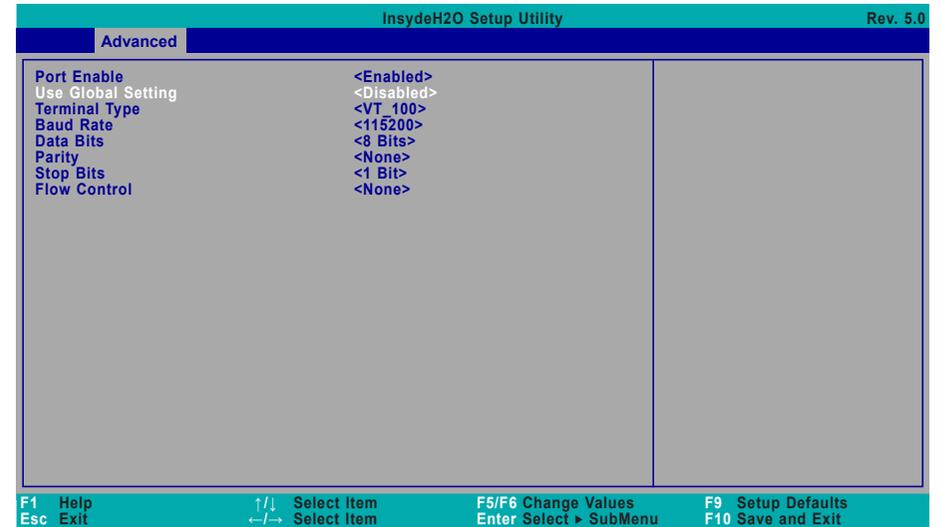
Select stop bits — 1 bit or 2 bits.

Flow Control

Select flow control type — none, RTS/CTS or XON/XOFF.

► **COM1/COM2/COM3/COM4/Pci Serial Port 0:22:3**

Configure individual COM port serial settings in the submenu.



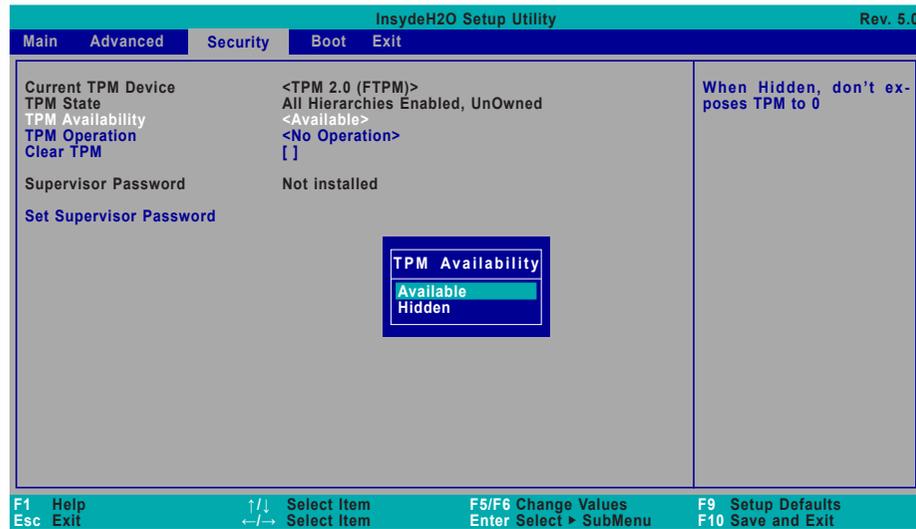
Port Enable

This field is used to enable or disable the COM port to redirect the console.

Use Global Setting

This field is to enable or disable using the global setting. When "Use Global Setting" is enabled, settings of the current port will dependent on Console Redirection settings. When "Use Global Setting" is disabled, settings of the current port can be configured independently in this section.

► Security



TPM Availability

Set the TPM availability — Available, or Hidden.

TPM Operation

Select one of the supported operation to change TPM state.

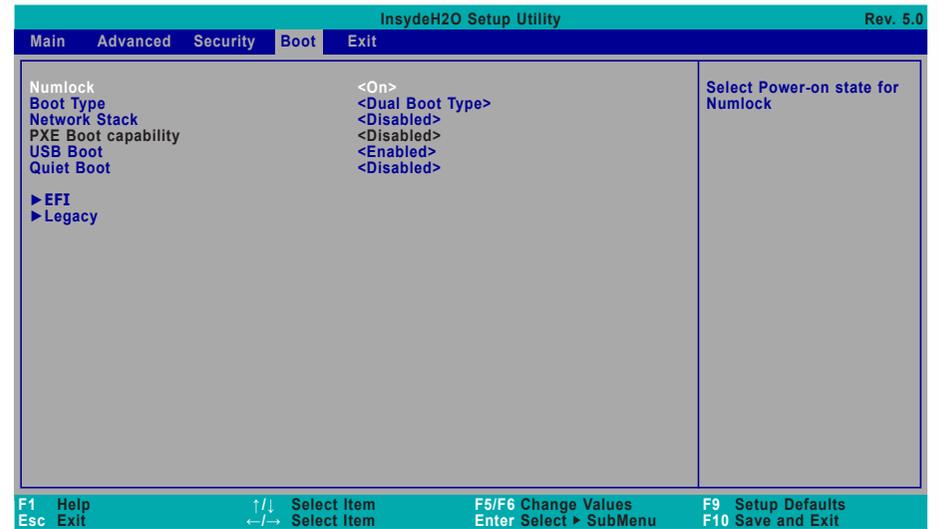
Clear TPM

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 longer than one character.

► Boot



Numlock

Select the power-on state for numlock.

Boot Type

Select the boot type — UEFI Boot Type, Legacy Boot Type or Dual Boot Type. If you select “UEFI Boot Type” or “Dual Boot Type”, the “Network Stack”, “PXE Boot capability”, “USB Boot” and “Quiet Boot” will show up. If you select “Legacy Boot Type”, “PXE Boot to LAN”, “USB Boot” and “Quiet Boot” will show up.



Note:

Please press F10 to save the settings and re-start the system board after changing "Boot Type".

Network Stack

This field is used to enable or disable network stacks, i.e. IPv4 or IPv6 network protocols.

► **Boot**

PXE Boot capability

This field is only available when "Boot Type" is set to "UEFI Boot Type" or "Dual Boot Type", and when "Network Stack" is enabled.

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

PXE Boot to LAN

Enable or disable Boot into the Pre-boot Execution Environment (PXE) stored in the LAN. This field is only available when "Boot Type" is set to "Legacy Boot Type" or "Dual Boot Type", and when "Network Stack" is enabled.

USB Boot

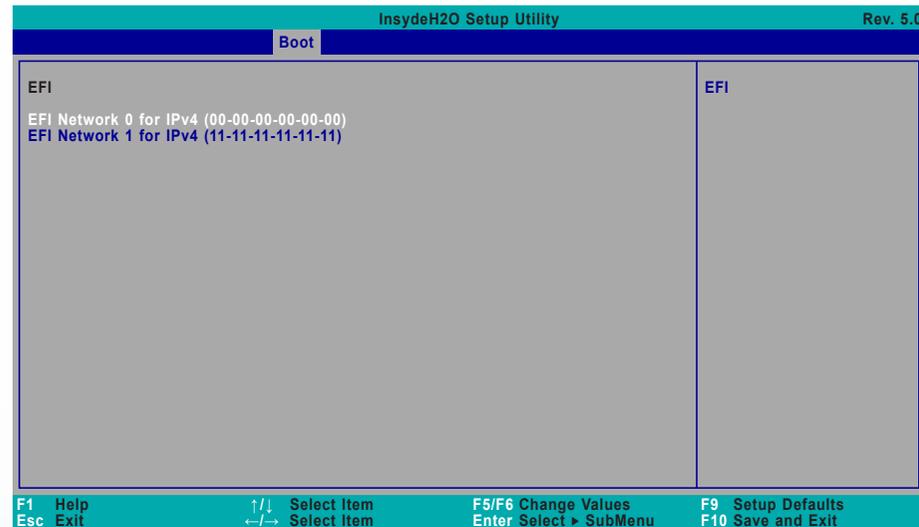
Enable or disable booting to USB boot devices.

Quiet Boot

Enable or disable booting in text mode.

► **EFI**

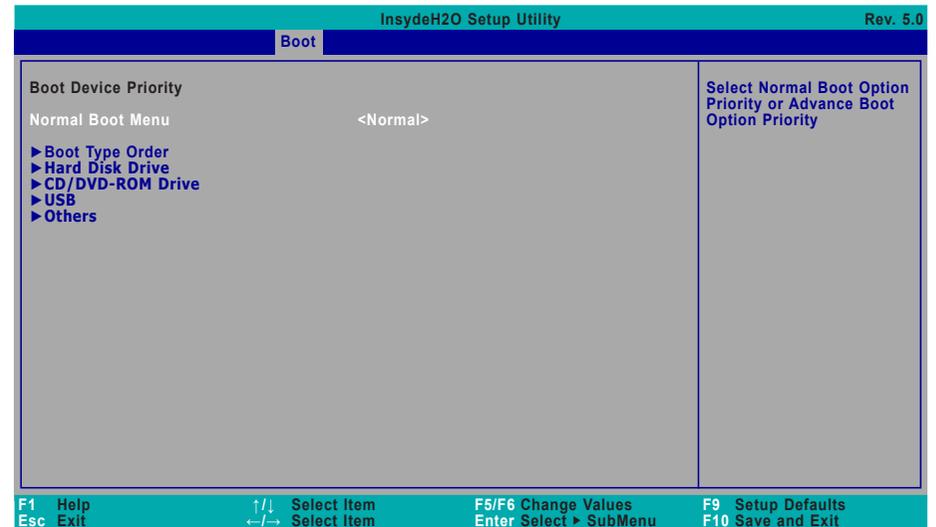
Configure boot priorities in this submenu. Press -/+ or F5/F6 to move the highlighted item down/up the priority list. This field is only available when "Boot Type" is set to "UEFI Boot Type" or "Dual Boot Type".



► **Boot**

► **Legacy**

Configure boot priorities in this submenu. Re-arrange the order by pressing -/+ or F5/F6 to move the highlighted item down/up the priority list. This field is only available when "Boot Type" is set to "Legacy Boot Type" or "Dual Boot Type".



Normal Boot Menu

Select a priority arranging method.

- Normal** Boot priority is arranged according to the type of the storage devices, and the configured order.
- Advance** Boot priority is arranged according to the configured order regardless of the type of the storage devices.

► **Boot Type Order**

Arrange the priority of types of the storage devices.

► **Hard Disk Drive / ► CD/DVD-ROM Drive / ► USB / ► Others**

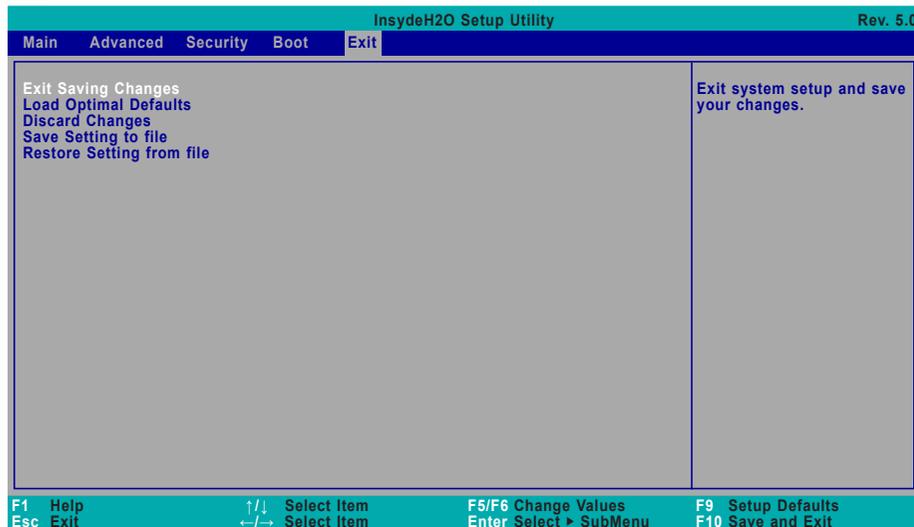
Arrange the priority of the storage devices in each category. The submenu will not be displayed when there is no available storage device of the type.



Note:

When a desired LAN port for PXE boot is not listed as a boot device, please confirm that the "PXE Boot to LAN", "PXE boot capability", "Network Stack" and the LAN controller of the said LAN (go to "Advanced" > "PCI Express Configuration") are enabled. Please press F10 to save the settings and re-start the system board for the settings to take effect.

► Exit



Exit Saving Changes

Select Yes and press <Enter> to exit the system setup and save your changes.

Load Optimal Defaults

Select YES and press <Enter> to load optimal defaults.

Discard Changes

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

Save Setting to file

Select this option to save BIOS configuration settings to a USB flash device.

Restore Setting from file

This field will appear only when a USB flash device is detected. Select this field to restore setting from the USB flash device.

► 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. For updating Insyde BIOS in UEFI mode, you may refer to the how-to video at <https://www.dfi.com/tw/knowledge/video/31>.

► 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 - 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

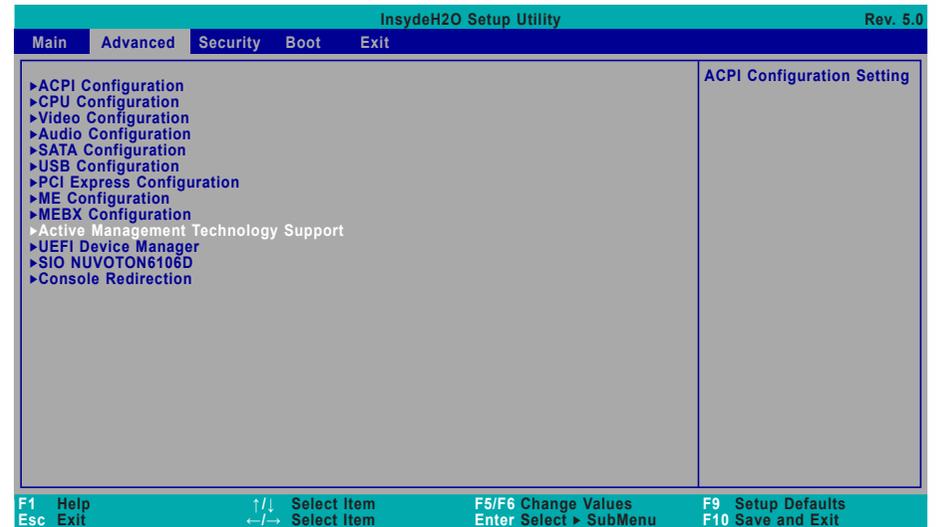
Remotely repair systems after OS failures. Alerting and event logging help detect problems quickly to reduce downtime.

Protect

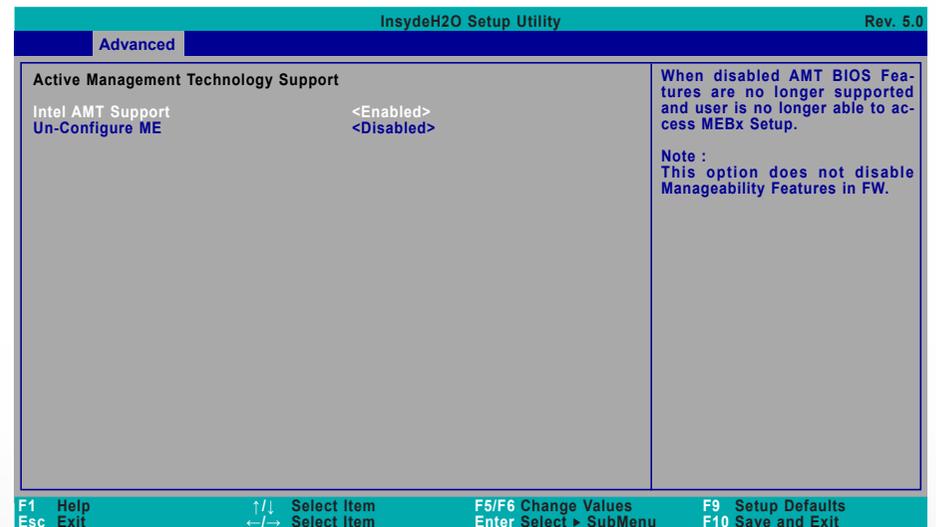
Intel AMT's System Defense capability remotely updates all systems with the latest security software. It protects the network from threats at the source by proactively blocking incoming threats, reactively containing infected clients before they impact the network, and proactively alerting when critical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

► Enabling Intel® AMT in the Insyde BIOS

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

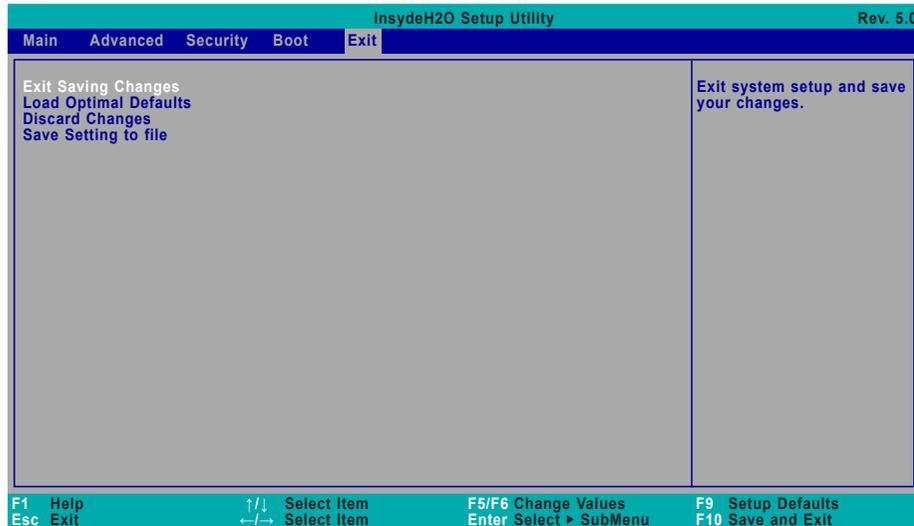


3. Set the Intel AMT Support field to Enabled.



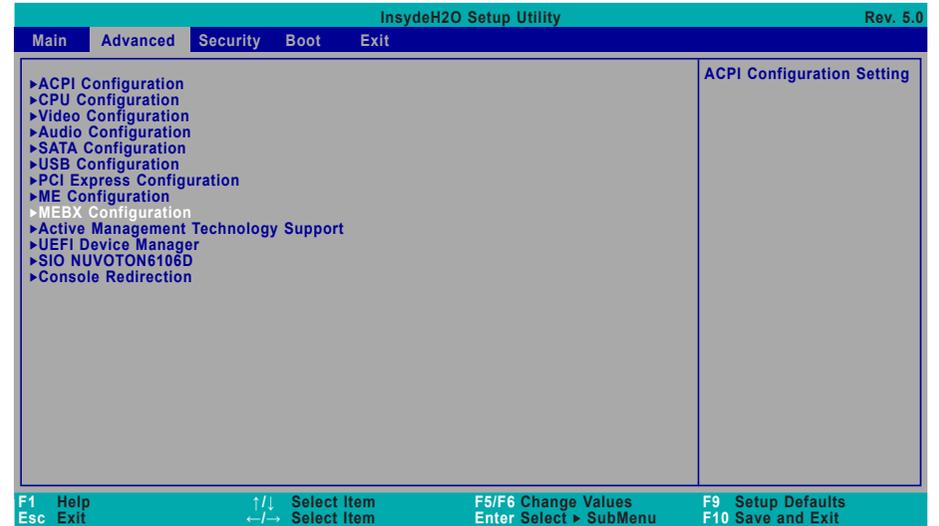
► **Enabling Intel® AMT in the Insyde BIOS**

4. In the Exit menu, select Exit Saving Changes or press F10, and then select Yes and press Enter.

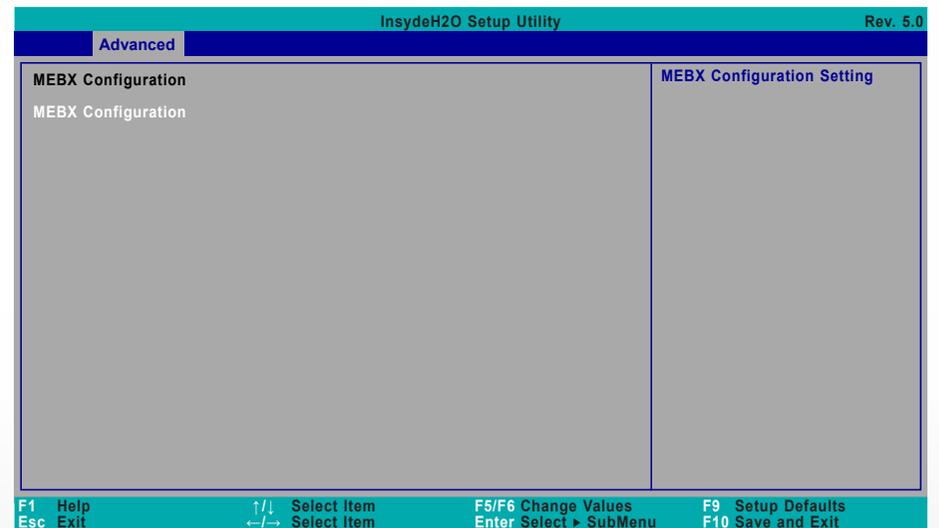


► **Entering Management Engine BIOS Extension (MEBX)**

1. After the system reboots, press to enter the main menu of the Insyde BIOS.
2. In the Advanced menu, select MEBX Configuration.



3. Select MEBX Configuration and press Enter.

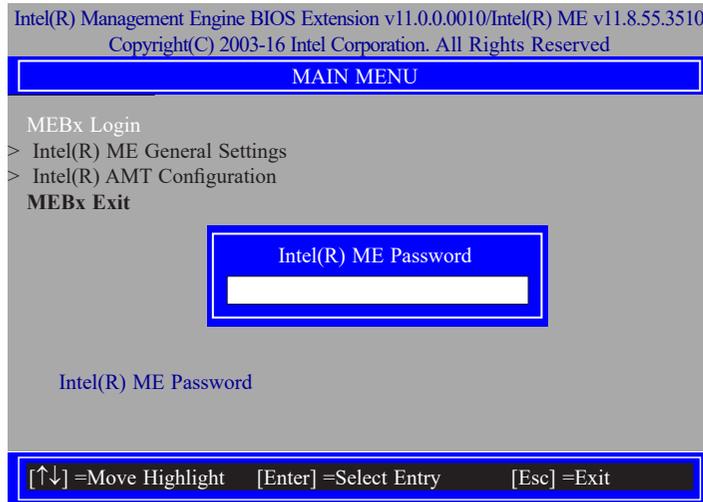


► **MEBX**

Main Menu

Select **MEBx Login** under Main Menu and press Enter. A prompt that requires password input will show up.

1. Enter the default password "admin".



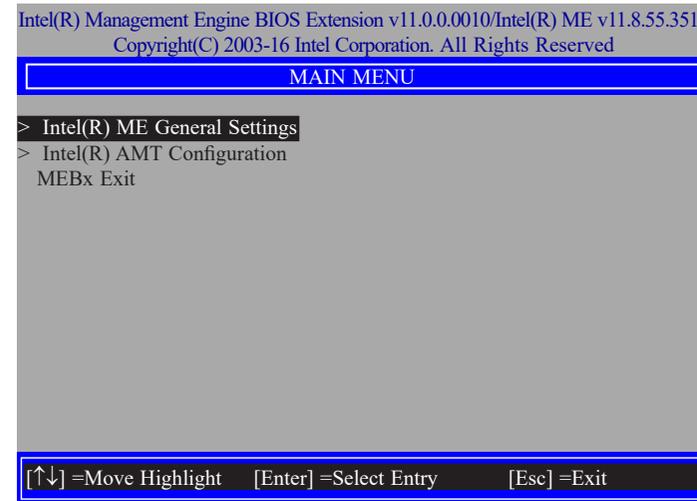
2. Enter a new password and then press Enter. The password must include
 - 8-32 characters;
 - Strong 7-bit ASCII characters excluding : , and " characters;
 - At least one digit character (0, 1, ...9);
 - At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, \$, ;);
 - At least one lower case and one upper case characters.
3. Enter the new password again to verify the new password.



► **MEBX**

Intel(R) ME General Settings

Select **Intel(R) ME General Settings** under Main Menu and then press Enter.

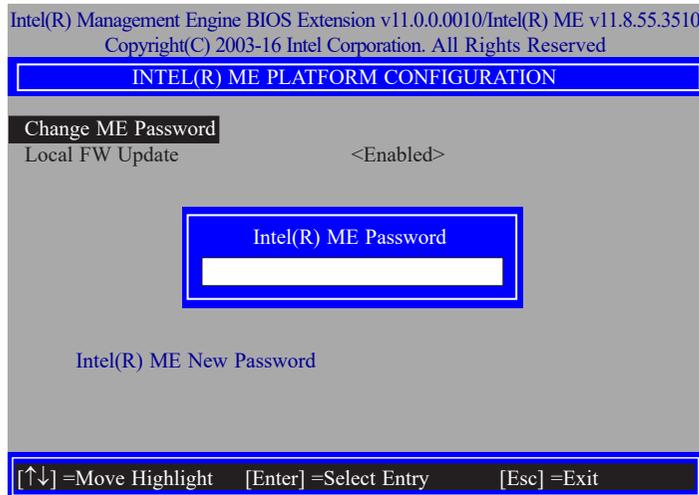


► MEBX ► Intel(R) ME General Settings

Change ME Password

If you want to change ME password, select **Change ME Password** and then press Enter. A prompt that requires password input will show up.

1. Enter the current password and then press Enter.



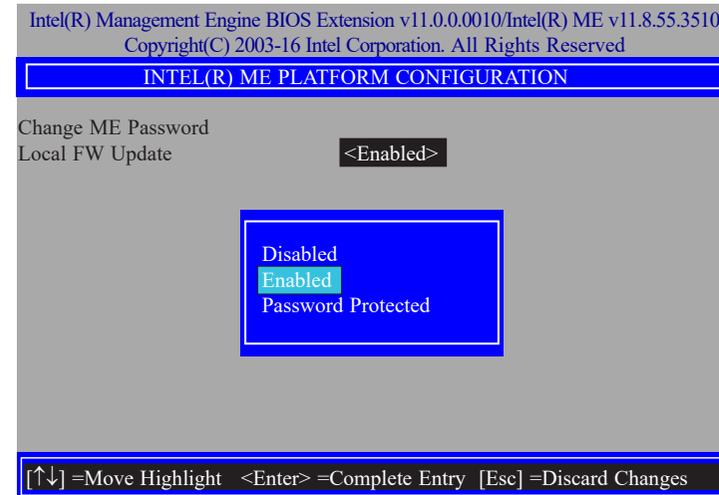
2. Enter a new password and then press Enter. The password must include
 - 8-32 characters;
 - Strong 7-bit ASCII characters excluding : , and " characters;
 - At least one digit character (0, 1, ...9);
 - At least one 7-bit ASCII non alpha-numeric character, above 0x20, (e.g. !, \$, ;);
 - At least one lower case and one upper case characters.
3. Enter the new password again to verify the new password.



► MEBX ► Intel(R) ME General Settings

Local FW Update

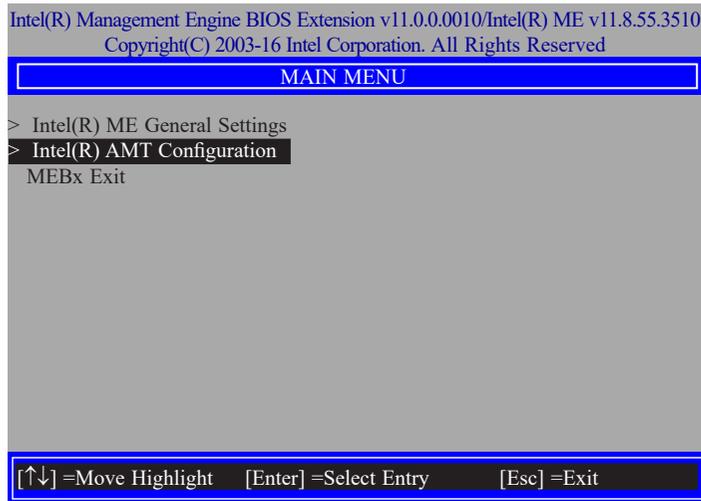
Select **Local FW Update** then press Enter. Select **Enabled** or **Disabled** or **Password Protected** then press Enter.



► **MEBX**

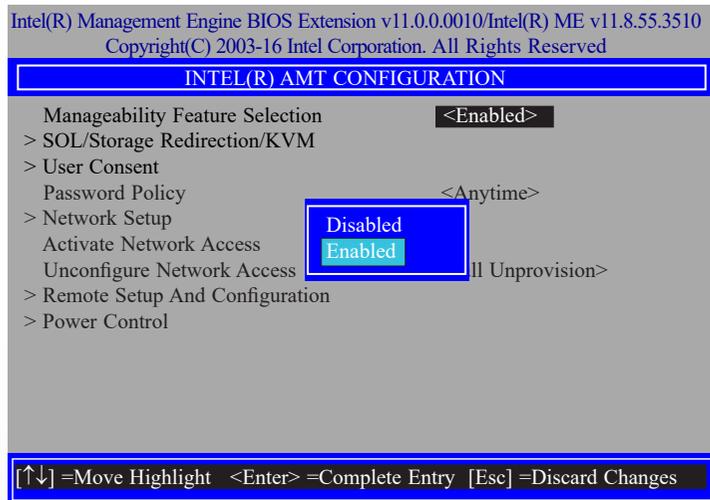
Intel(R) AMT Configuration

Select **Intel(R) AMT Configuration** under Main Menu and then press Enter.



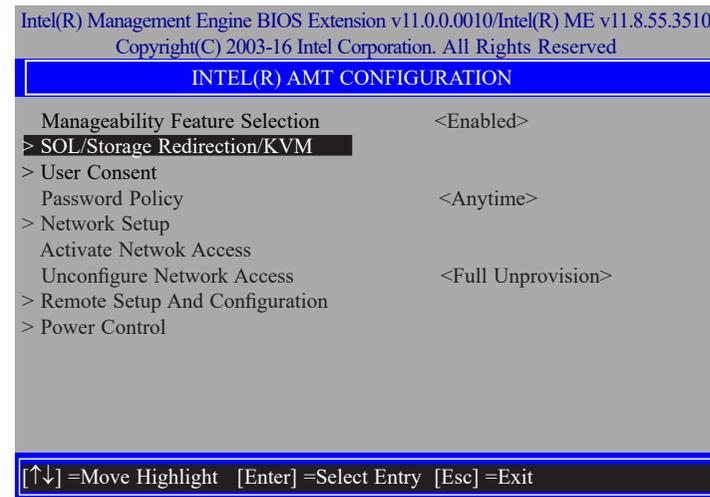
Manageability Feature Selection

Select **Enabled** or **Disabled** then press Enter. When disabled, all the following fields will be hidden. After disabling the field, system restart is required.



► **MEBX** ► **Intel(R) AMT Configuration**

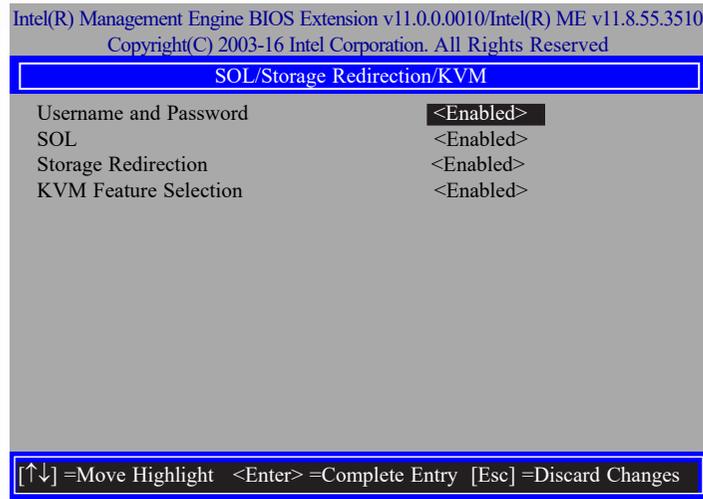
> **SOL/Storage Redirection/KVM**



Press Enter to enter the submenu.

► MEBX ► Intel(R) AMT Configuration

> SOL/Storage Redirection/KVM



Move the cursor to select a field and press Enter to display options.

Username and Password

Select Enabled or Disabled then press Enter.

SOL

Select Enabled or Disabled then press Enter.

Storage Redirection

Select Enabled or Disabled then press Enter.

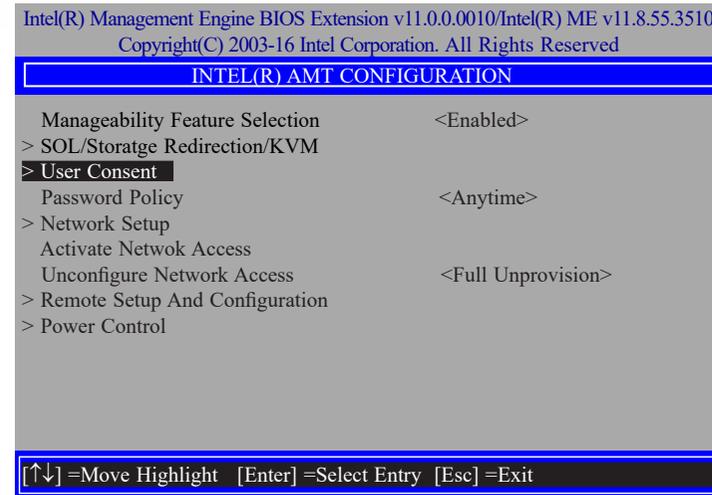
KVM Feature Selection

Select Enabled or Disabled then press Enter.



► MEBX ► Intel(R) AMT Configuration

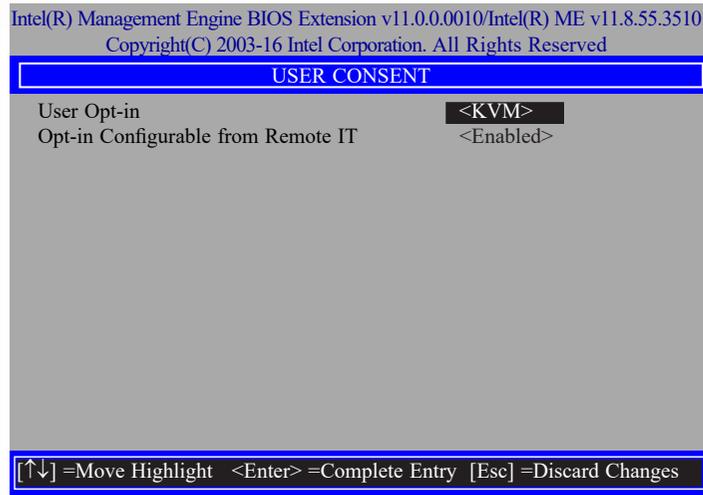
> User Consent



Press Enter to enter the submenu.

► MEBX ► Intel(R) AMT Configuration

> User Consent



Move the cursor to select a field and press Enter to display options.

User Opt-in

Select **NONE** or **KVM** or **ALL** then press Enter.



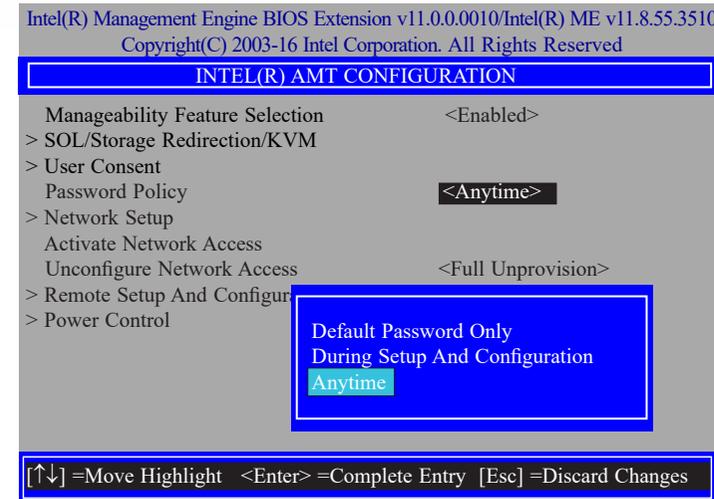
Opt-in Configurable from Remote IT

Select **Enabled** or **Disabled** then press Enter.



► MEBX ► Intel(R) AMT Configuration

Password Policy

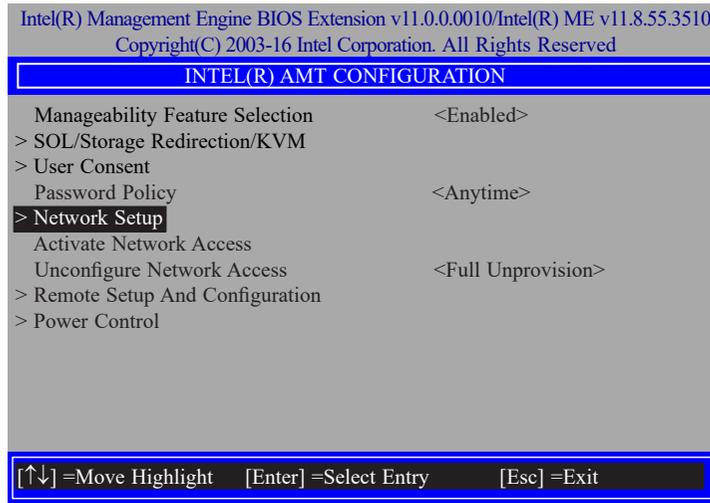


Under the **Intel(R) AMT Configuration** menu, select **Password Policy** then press Enter. You may choose to use a password only during setup and configuration or to use a password anytime the system is being accessed.

► MEBX ► Intel(R) AMT Configuration

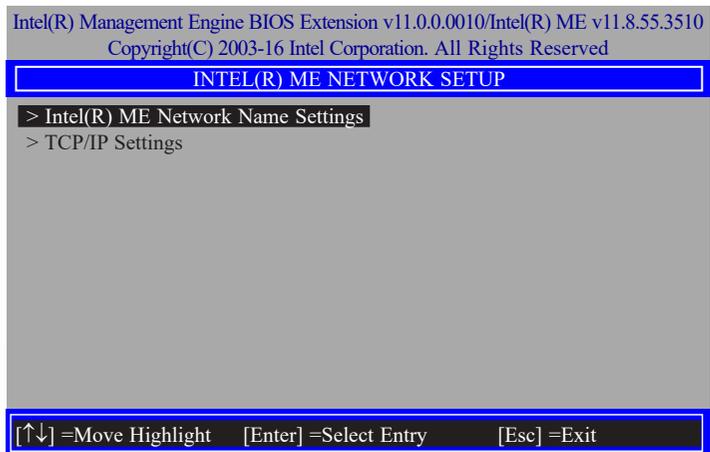
> Network Setup

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

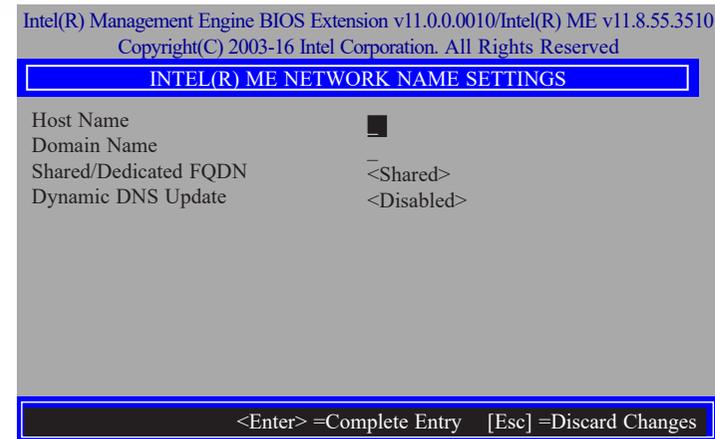


> Intel(R) ME Network Name Settings

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



Move the cursor to select a field and press Enter to display options.



Host Name

Enter the computer's host name and then press Enter.



Domain Name

Enter the computer's domain name and then press Enter.



Shared/Dedicated FQDN

Select **Shared** or **Dedicated** and then press Enter.



► **MEBX** ► **Intel(R) AMT Configuration**
 > **Network Setup** > **Intel(R) ME Network Name Settings**

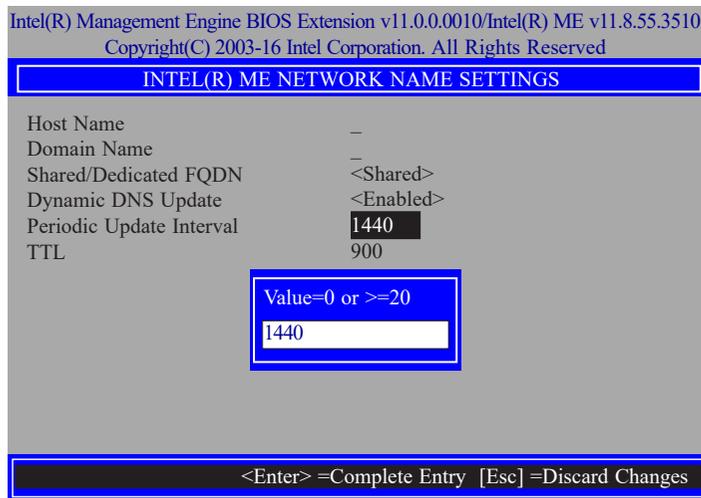
Dynamic DNS Update

Select Enabled or Disabled then press Enter. When Dynamic DNS Update is Enabled, the following fields will show up.



Periodic Update Interval

Enter a value and then press Enter.



TTL

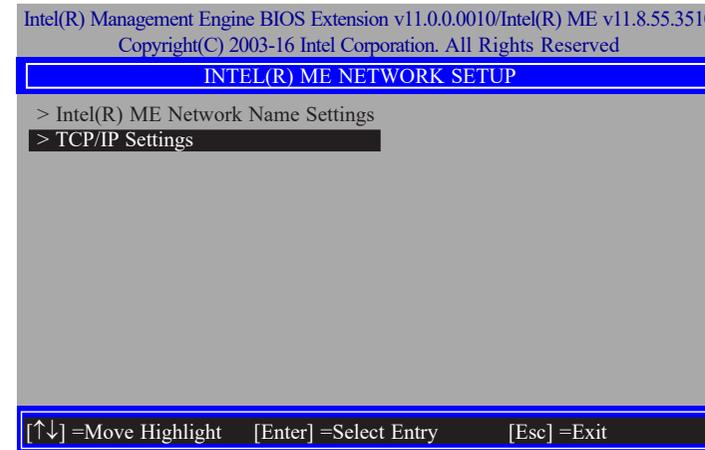
Enter a value for the Time-to-live (TTL) field and then press Enter.



► **MEBX** ► **Intel(R) AMT Configuration**
 > **Network Setup**

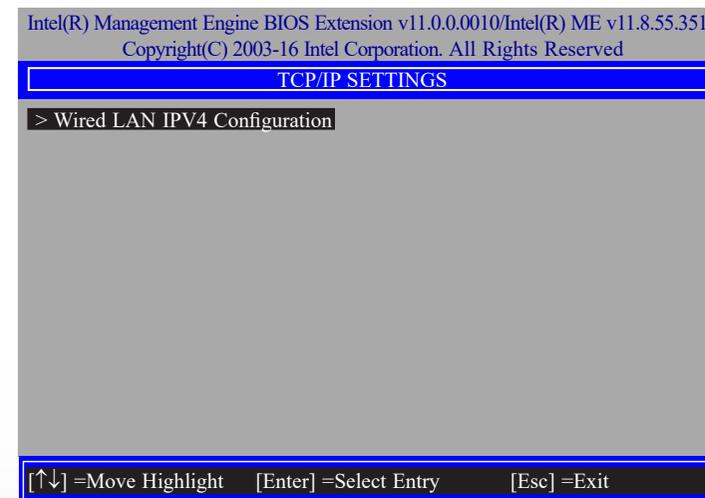
> TCP/IP Settings

Under the Intel(R) ME Network Setup menu, select TCP/IP Settings and then press Enter.



> Wired LAN IPV4 Configuration

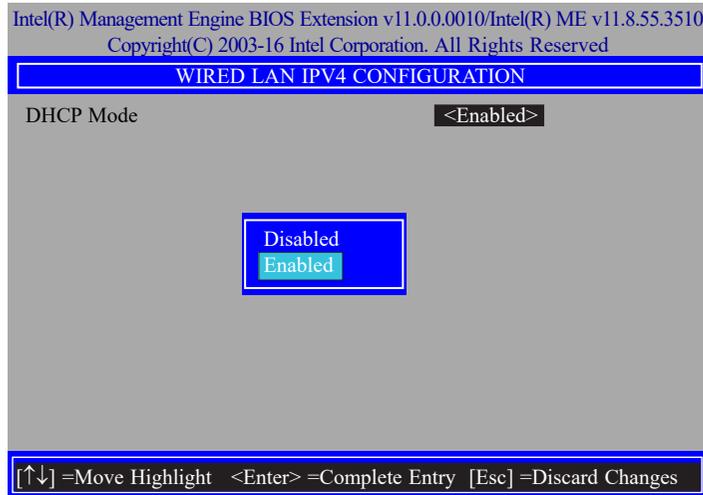
Under **TCP/IP Settings**, select **Wired LAN IPV4 Configuration** and then press Enter.



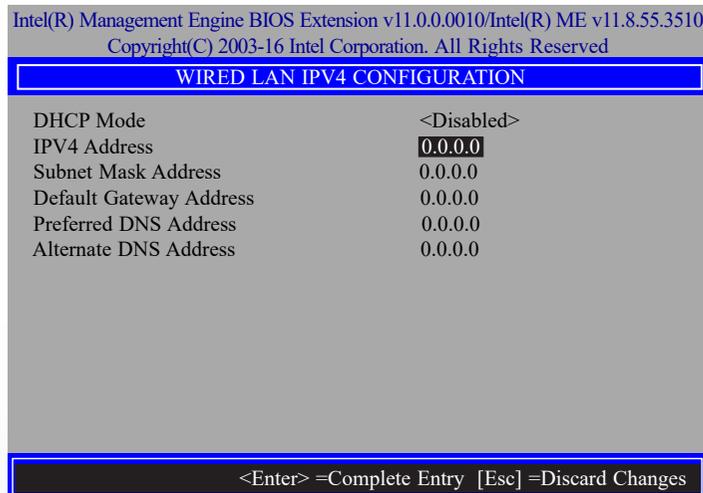
► **MEBX** ► **Intel(R) AMT Configuration**
 > **Network Setup** > **TCP/IP Settings**

DHCP Mode

Select **Enabled** or **Disabled** then press Enter. Please make sure there is a DHCP server in the network when this field is enabled.



When DHCP is **Disabled**, please manually input a static route by configuring the fields as shown below.



IPv4 Address

Assign a valid and available IP address to the system. Insert a value from 0.0.0.0 to 255.255.255.255 in IPv4 format.

IP address (e.g. 123.123.123.100)

Subnet Mask Address

Insert a value from 0.0.0.0 to 255.255.255.255 in IPv4 format.

Subnet mask (e.g. 255.255.255.0)

Default Gateway Address

Insert a value from 0.0.0.0 to 255.255.255.255 in IPv4 format.

Default Gateway address

Preferred DNS Address

Insert a value from 0.0.0.0 to 255.255.255.255 in IPv4 format.

Preferred DNS address

Alternate DNS Address

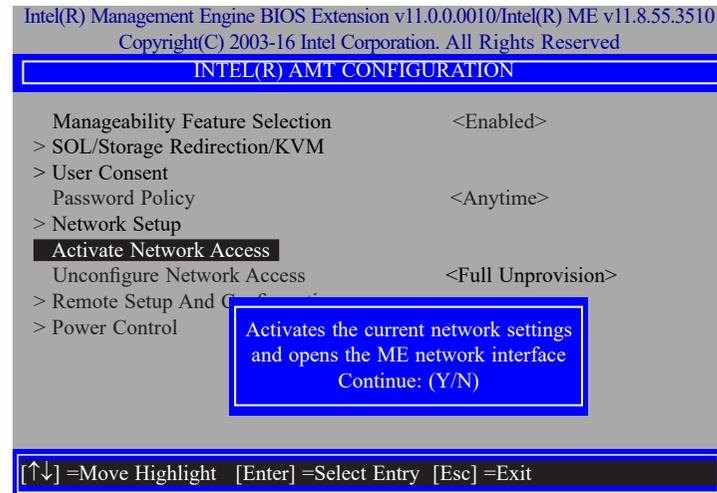
Insert a value from 0.0.0.0 to 255.255.255.255 in IPv4 format.

Alternate DNS address

► MEBX ► Intel(R) AMT Configuration

Activate Network Access

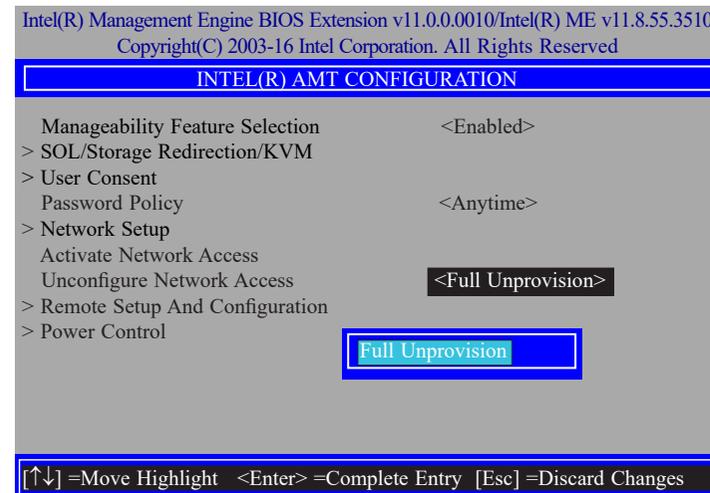
Under the **Intel(R) AMT Configuration** menu, select **Activate Network Access** and press Enter, and then press Y to activate the ME network connection with the settings configured previously, or press N to abort.



► MEBX ► Intel(R) AMT Configuration

Unconfigure Network Access

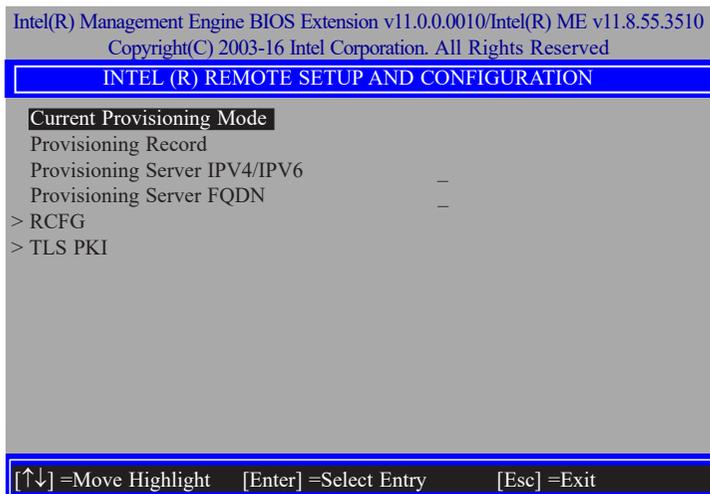
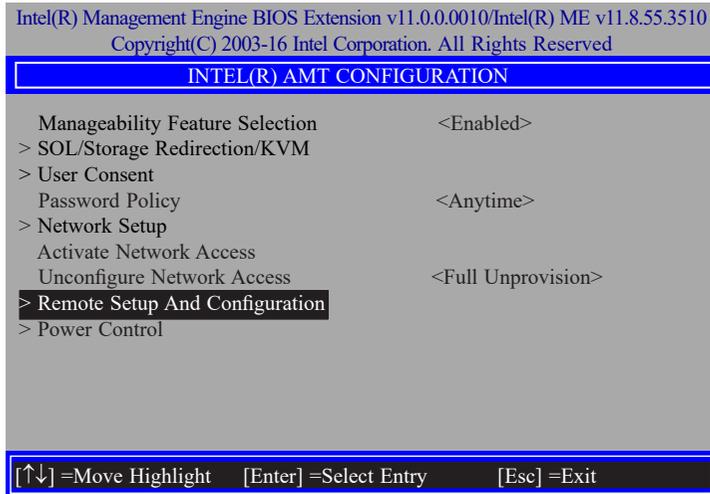
Under the **Intel(R) AMT Configuration** menu, select **Unconfigure Network Access** and press Enter, and then press Enter to fully deactivate the ME network connection and reset configuration to factory default. Press Y to confirm or N to abort.



► MEBX ► Intel(R) AMT Configuration

> Remote Setup And Configuration

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



Current Provisioning Mode

The current mode — Public Key Infrastructure (PKI) — is displayed.



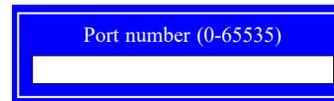
Provisioning Record

Press Enter to view the record.



Provisioning Server IPV4/IPV6

Enter the address of the server then press Enter, and then insert the TCP/UDP port number.



Provisioning Server FQDN

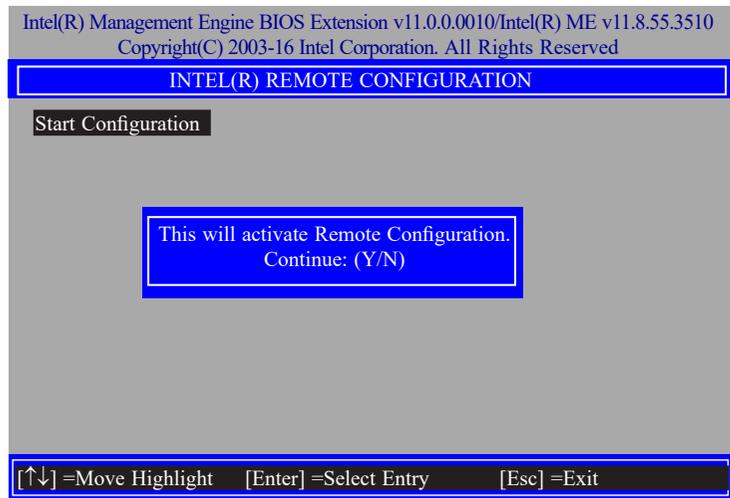
Enter the Fully Qualified Domain Name (FQDN) of the server and then press Enter.



► MEBX ► Intel(R) AMT Configuration
 > Remote Setup And Configuration

> RCFG

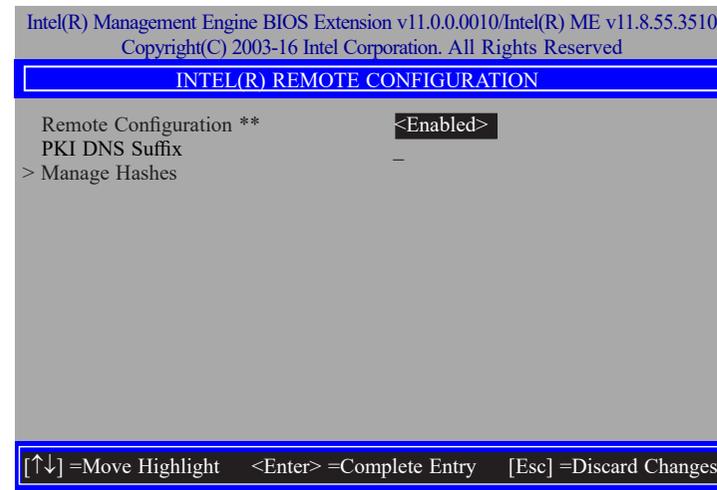
Press Enter, select **Start Configuration**, and then press Enter to activate Remote Configuration (RCFG). Press Y to confirm or N to abort.



► MEBX ► Intel(R) AMT Configuration
 > Remote Setup And Configuration

> TLS PKI

The system adopts PKI for encryption and authentication, and the TLS protocol for communication security to ensure remote configuration safety.



Remote Configuration **

Select **Enabled** or **Disabled** then press Enter.



PKI DNS Suffix

Specify the DNS Suffix of the PKI server, and then press Enter.



► MEBX ► Intel(R) AMT Configuration
 > Remote Setup And Configuration > TLS PKI

> Manage Hashes

Select a hash name and then press the following keys to execute a function.

- Insert — enter a custom hash certificate name,
- Delete — delete a hash
- Enter — view hash information
- + — activate or deactivate a hash
- Esc — exit

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.55.3510
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INTEL(R) REMOTE CONFIGURATION

Hash Name	Active	Default	Algorithm
VeriSign Class 3	Active: [*]	Default: [*]	SHA256
VeriSign Class 3	Active: [*]	Default: [*]	SHA256
Go Daddy Class 2	Active: [*]	Default: [*]	SHA256
Comodo AAA CA	Active: [*]	Default: [*]	SHA256
Starfield Class 2	Active: [*]	Default: [*]	SHA256
VeriSign Class 3	Active: [*]	Default: [*]	SHA256
VeriSign Class 3	Active: [*]	Default: [*]	SHA256
VeriSign Class 3	Active: [*]	Default: [*]	SHA256
GTE CyberTrust G1	Active: [*]	Default: [*]	SHA256
Baltimore Cyber Tr	Active: [*]	Default: [*]	SHA256
Cyber Trust Global	Active: [*]	Default: [*]	SHA256
Verizon Global Ro	Active: [*]	Default: [*]	SHA256
Entrust. net CA (2	Active: [*]	Default: [*]	SHA256
Entrust Root CA	Active: [*]	Default: [*]	SHA256
VeriSign Universa	Active: [*]	Default: [*]	SHA256
Go Daddy Root CA	Active: [*]	Default: [*]	SHA256
Entrust Root CA -	Active: [*]	Default: [*]	SHA256
Startfield Root CA	Active: [*]	Default: [*]	SHA256

[Ins] =Add New Hash [Delete] =Delete Hash [+] =Activate Hash
 [↑↓] =Move Highlight [Enter] =View Hash [Esc] =Exit

► MEBX ► Intel(R) AMT Configuration
 > Power Control

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

Intel(R) Management Engine BIOS Extension v11.0.0.0010/Intel(R) ME v11.8.55.3510
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INTEL(R) AMT POWER CONTROL

These configurations are effective only after AMT provisioning has started

Intel(R) AMT ON in Host Sleep States <Desktop: ON in S0, ME Wake in S3, S4-5>

Idle Timeout 65535

[↑↓] =Move Highlight <Enter> =Complete Entry [Esc] =Discard Changes

Intel(R) AMT ON in Host Sleep States

Select an option and then press Enter.

Desktop: ON in S0
 Desktop: ON in S0, ME Wake in S3, S4-5

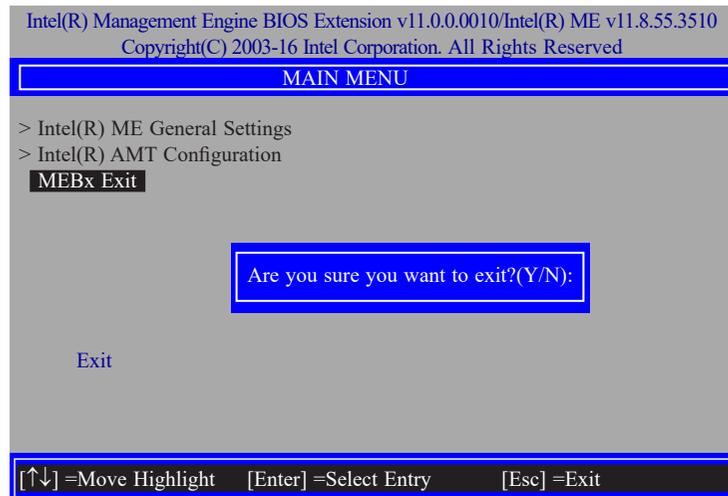
Idle Timeout

Enter a timeout value and press Enter.

Timeout Value (1-65535)
 65535

► MEBX**MEBx Exit**

Under the Main Menu, select MEBx Exit and then press Enter. Press Y to confirm or N to abort.



Chapter 5 - RAID

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

► RAID Levels

RAID 0 (Striped Disk Array without Fault Tolerance)

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

RAID 1 (Mirroring Disk Array with Fault Tolerance)

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

RAID 5

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

RAID 10 (Mirroring and Striping)

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

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

► Setup Procedure

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

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

Step 1: Install SATA Drives

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



Important:

1. Please make sure the SATA drives that you are to create a RAID volume with are connected and powered, and are able to be detected by the system. Otherwise, the RAID BIOS utility would not be accessible.
2. While creating a RAID volume, please make sure the system, drives, and cables are perfectly steady and mounted correctly. Disturbance during creating a RAID volume will result in irreversible data corruption stored on the drive.

Step 2: Enable RAID in the Insyde BIOS

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

► Setup Procedure

Step 3: Create a RAID Volume

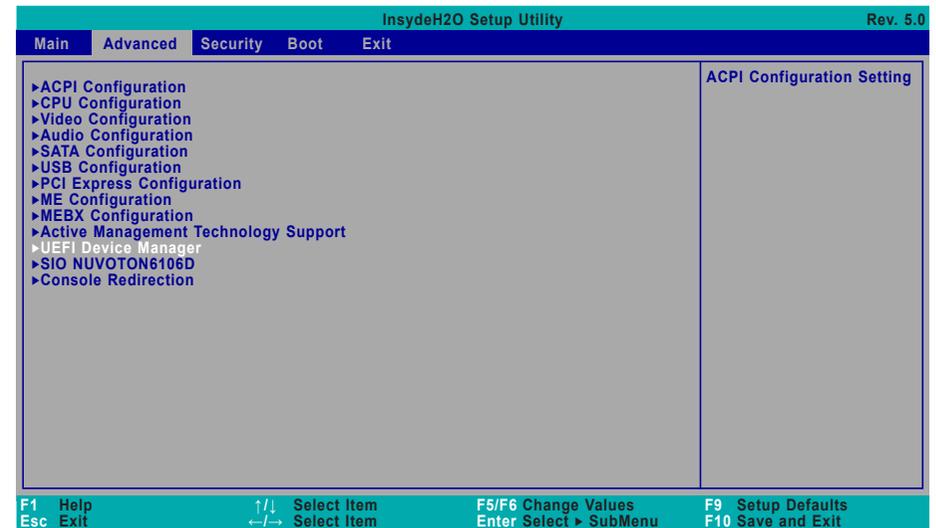
1. When the Intel® RST option ROM status screen displays during POST, press <Ctrl> and <I> simultaneously to enter the option ROM user interface.
2. Select 1: Create RAID Volume and press <Enter>.
3. Create a volume name and press <Enter>.
4. Use the up or down arrow keys to select the RAID level and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

► Setup Procedure

Step 3-1: Create a RAID Volume in UEFI Mode

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

1. Go to the "Advanced" menu in the Insyde BIOS and select "UEFI Device Manager".



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

► **Setup Procedure**

Step 4: Install Intel Rapid Storage Technology

The Intel Rapid Storage Technology can be installed from within Windows. It allows you to display, manage (create, delete, migrate), and monitor SATA and RAID volume via user-friendly and icon-driven UI, and enables enhanced performance and power management for your storage subsystems.

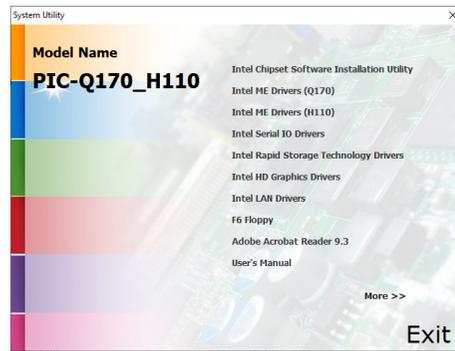
Please refer to Chapter 6 for more instructions on installing Intel Rapid Storage Technology.

Chapter 6 - Supported Software

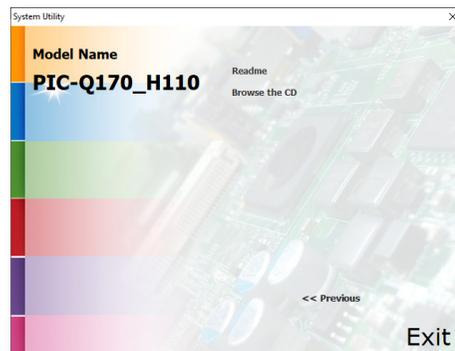
Please insert the DVD-ROM into your optical drive to install drivers, utilities and software applications required to enhance the performance of the system board. You may also acquire your software from your sales representatives or from the website download page at <https://www.dfi.com/DownloadCenter>.

► Auto-run Menu

After inserting your DVD-ROM into your optical drive, the System Utility auto-run menu may pop up. Click on the utility or driver that is to be installed on the system. Please refer to the following sections that correspond to your selection for more information.



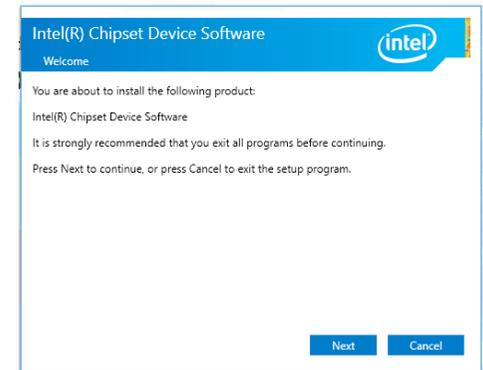
Click "More >>" on the lower right to go to the next page of the auto-run menu, and click "<< Previous" to return to the previous menu.



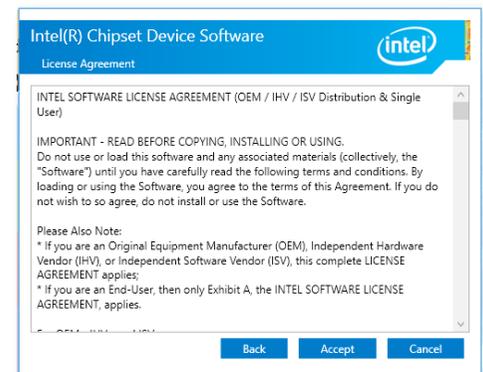
► Intel Chipset Software Installation Utility

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.

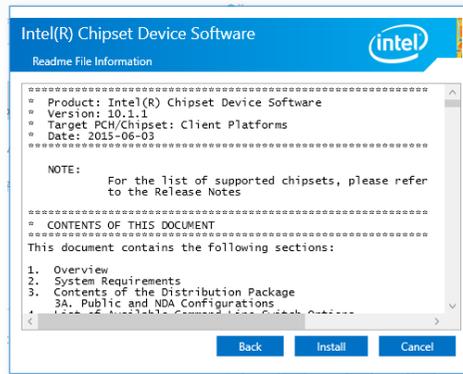
1. Setup is ready to install the utility. Click "Next".



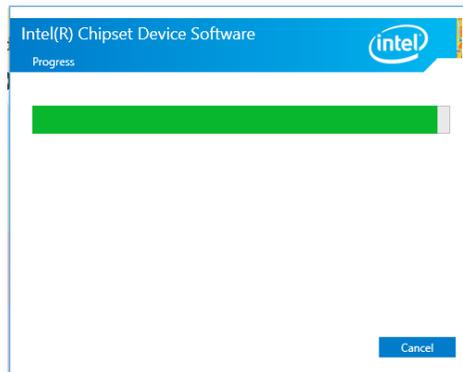
2. Read the license agreement then click "Accept".



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



- The step displays the installing status in the progress.



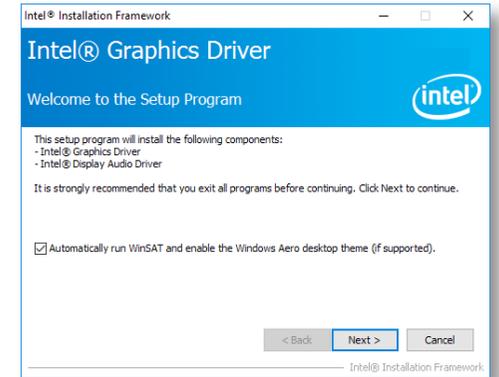
- After completing installation, click "Restart Now" to exit setup.

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



► Intel HD Graphics Drivers

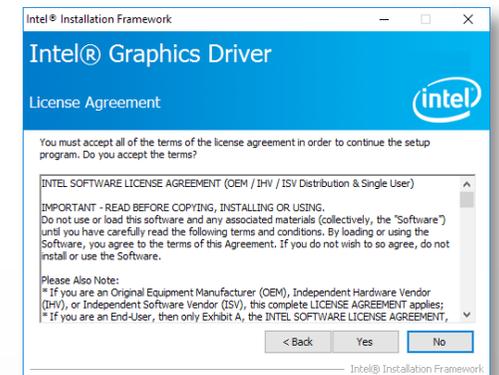
- Setup is now ready to install the graphics driver. Click "Next".



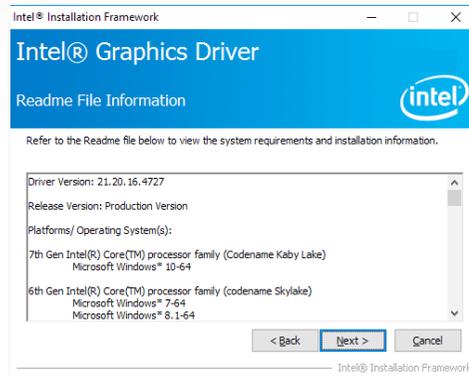
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 10 desktop appears. The "blank screen"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

We recommend that you skip this process by disabling this function then click "Next".

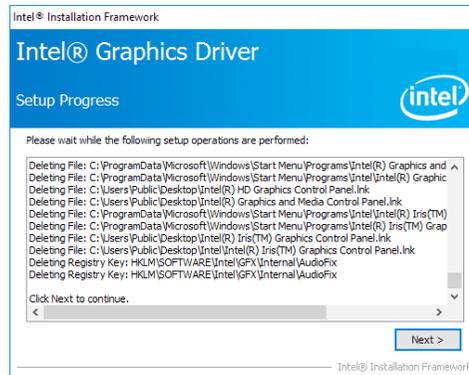
- Read the license agreement then click "Yes".



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

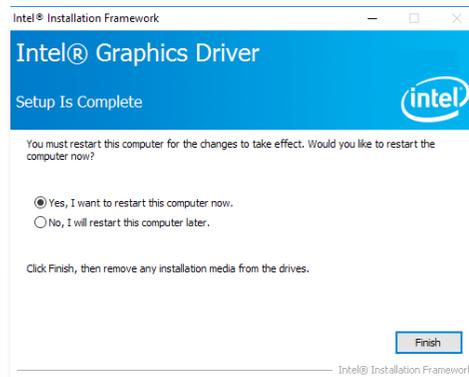


- Setup is now installing the driver. Click "Next" to continue.



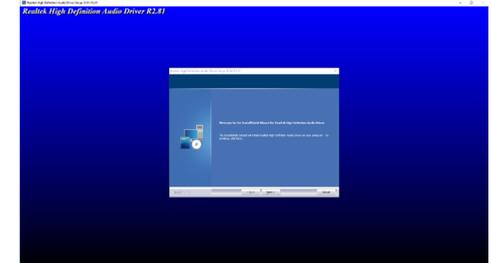
- Click "Yes, I want to restart this computer now" then click "Finish".

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



► Realtek Audio Drivers

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



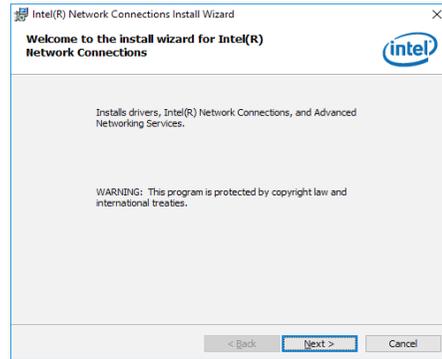
- Click "Yes, I want to restart my computer now" then click "Finish".

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

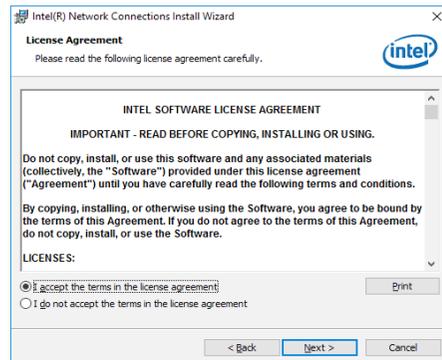


► Intel LAN Drivers

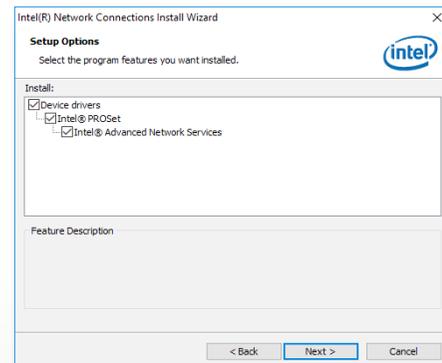
1. Setup is ready to install the driver. Click "Next".



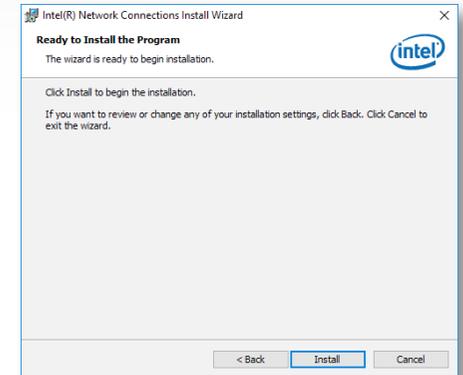
2. Click "I accept the terms in the license agreement" then click "Next".



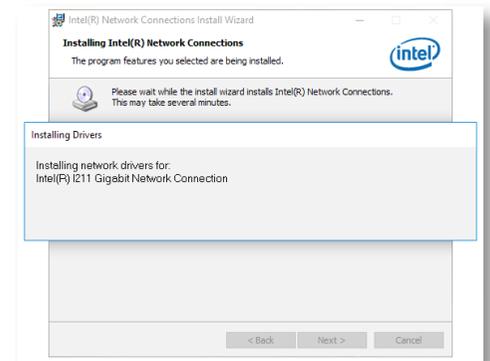
3. Select the program features you want installed then click "Next".



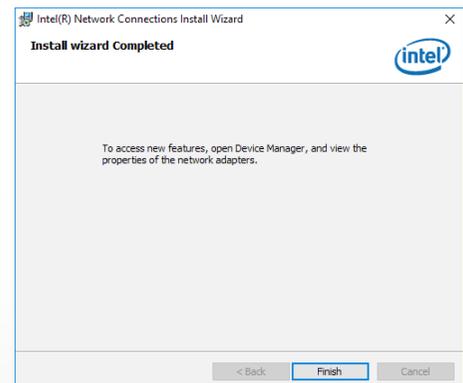
4. Click "Install" to begin the installation.



5. The step displays the installing status in the progress.

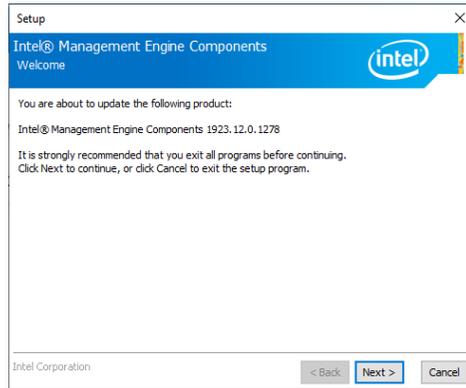


6. After completing installation, click "Finish".

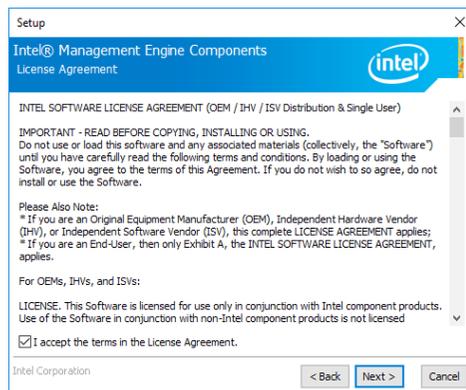


► Intel ME Drivers

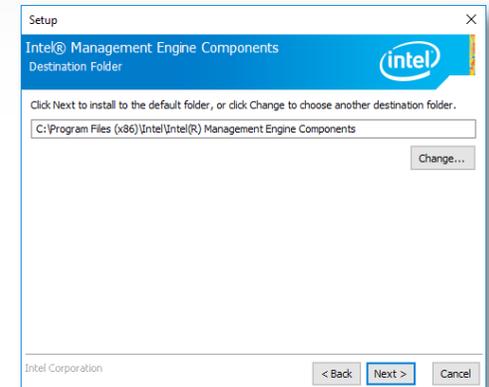
1. Setup is ready to install the driver. Click "Next".



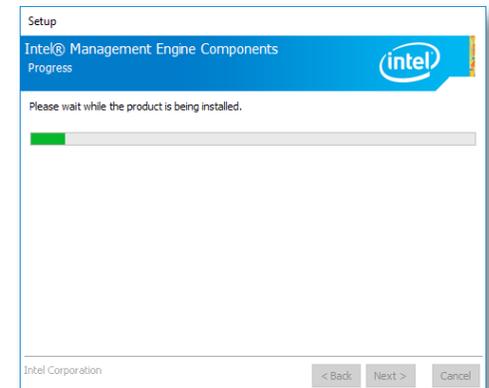
2. Read the license agreement then tick "I accept the terms in the License Agreement". Click "Next".



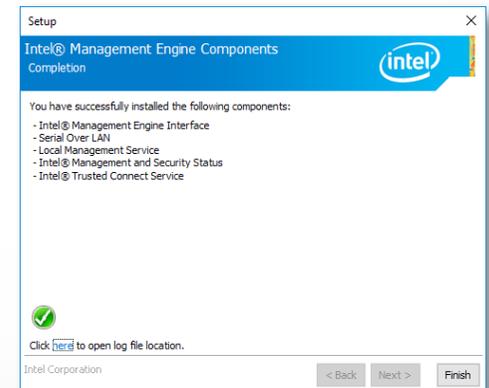
3. Click "Next" to install to the default folder, or click "Change" to choose another destination folder.



4. Please wait while the product is being installed.

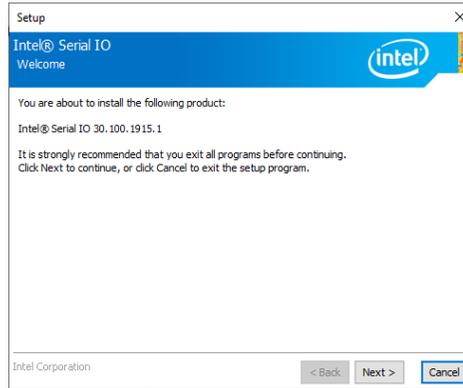


5. After completing installation, click "Finish".



► Intel Serial IO Drivers

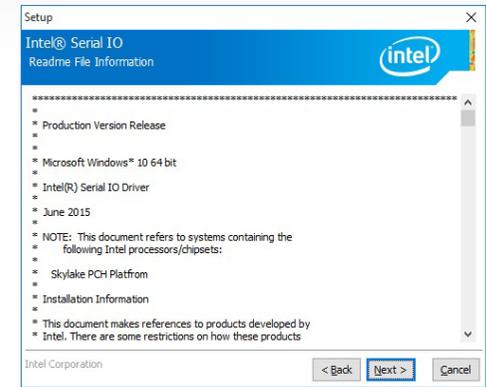
1. Setup is ready to install the driver. Click "Next".



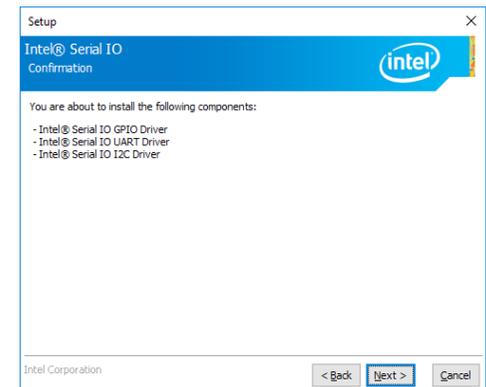
2. Read the license agreement carefully.
Tick "I accept the terms in the License Agreement" then click "Next".



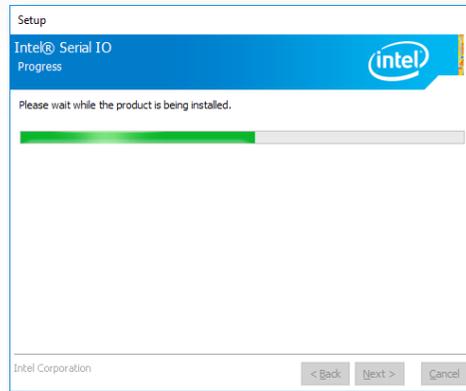
3. Go through the readme document for system requirements and installation tips then click "Next".



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

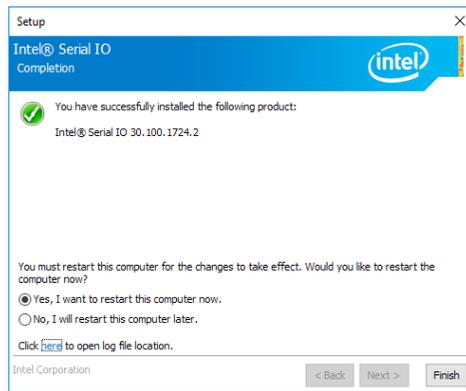


5. Setup is now installing the driver.



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

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

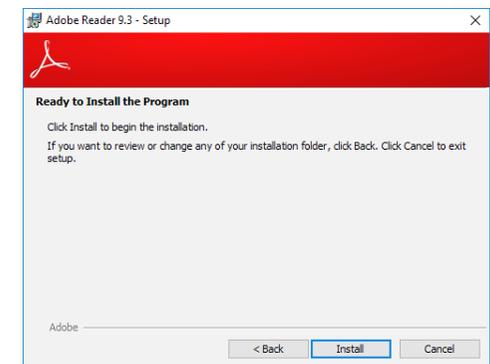


► Adobe Acrobat Reader 9.3

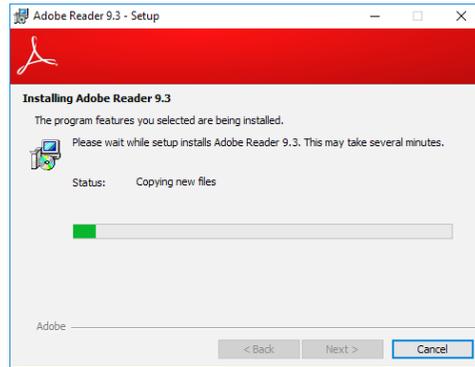
1. Click "Next" to install or click "Change Destination Folder" to select another folder.



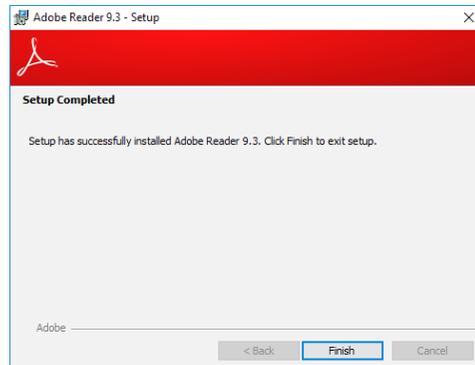
2. Click "Install" to begin installation.



3. Setup is now installing the driver.



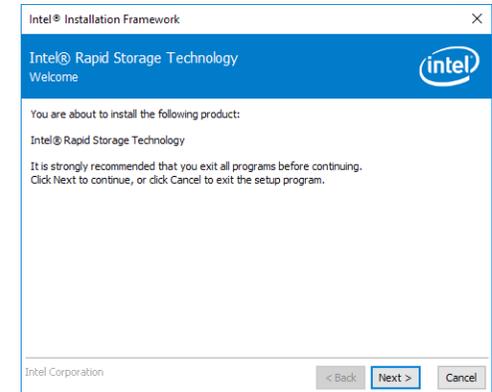
4. Click "Finish" to exit installation.



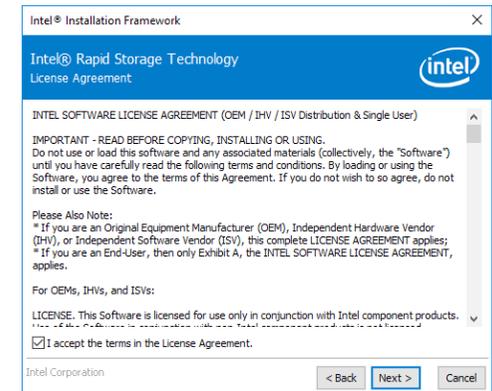
► Intel Rapid Storage Technology

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.

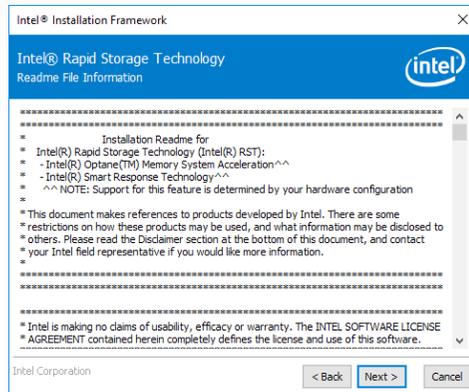
1. Setup is ready to install the utility. Click "Next".



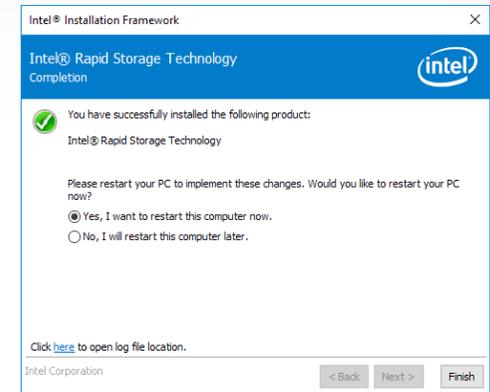
2. Read the license agreement and click "I accept the terms in the License Agreement". Then, click "Next".



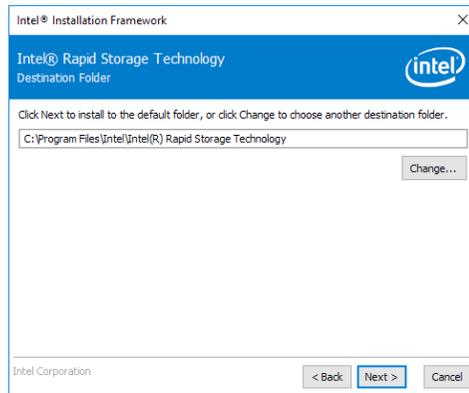
- Go through the readme document to view system requirements and installation information then click "Next".



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



- Click "Next" to install to the default folder or click "Change" to choose another destination folder".



- Confirm the installation and click "Next".

