DFI

SD170

Mini-ITX Industrial Motherboard
User's Manual

Preliminary Version

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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.

Table of Contents

About this Manual

This manual can be downloaded from the website, or acquired as an electronic file included in the optional CD/DVD. The manual is subject to change and update without notice, and may be based on editions that do not resemble your actual products. Please visit our website or contact our sales representatives for the latest editions.

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 consequencial 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 SD170 board

- One Serial ATA cable (500mm)

- One I/O shield

- One M2*5 Screw with spring washer

- One COM port cable (250mm)

- One battery addendum

Optional Items

- USB 2.0 cable

- COM cable

- SATA cable

- Thermal Solution (heatsink with or without fan)

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, LGA 1151 Socket • Core™ i7-7700 Processor, Quad Core, 8M Cache, 3.6GHz (4.2GHz), 65W • Core™ i5-7500 Processor, Quad Core, 6M Cache, 3.4GHz (3.8GHz), 65W • Core™ i3-7101E Processor, Dual Core, 3M Cache, 3.9GHz , 65W 6th Generation Intel® Core™ Processors, LGA 1151 Socket • Core™ i7-6700, Quad Core, 8M Cache, 3.4GHz (4.0GHz), 65W • Core™ i7-6700TE, Quad Core, 8M Cache, 2.4GHz (3.4GHz), 35W • Core™ i5-6500, Quad Core, 6M Cache, 3.2GHz (3.6GHz), 65W • Core™ i5-6500TE, Quad Core, 6M Cache, 2.3GHz (3.3GHz), 35W • Core™ i3-6100, Dual Core, 3M Cache, 3.7GHz, 47W • Core™ i3-6100TE, Dual Core, 4M Cache, 2.7GHz, 35W • Pentium® G4400, Dual Core, 3M Cache, 3.3GHz, 47W • Pentium® G4400TE, Dual Core, 3M Cache, 2.4GHz, 35W • Celeron® Processor G3900, Dual Core, 2M Cache, 2.8GHz, 65W • Celeron® Processor G3900TE, Dual Core, 2M Cache, 2.6GHz, 35W
	Chipset	Intel® H110
	Memory	Two 260-pin SODIMM, up to 32GB Dual Channel DDR4 2133MHz
	BIOS	Insyde SPI 128Mbit
GRAPHICS	Controller	Intel® HD Gen 9 Graphics
	Display	Intel® HD Gen 9 Graphics 1 x VGA, resolution up to 1920x1200 @ 60Hz 1 x HDMI 1.4, resolution support up to 4K @ 24Hz 1 x DP++, resolution up to 4096x2304 @ 60Hz
	Feature	OpenGL 5.0, DirectX 12, OpenCL 2.1 HW Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H265, VP8, VP9 HW Encode: MPEG2, AVC/H264, JPEG, HEVC/H265, VP8, VP9
	Triple Displays	VGA + HDMI + DP++
EXPANSION	Interface	1 x PCIe x16 (Gen 3) 1 x Full-size Mini PCIe (USB2.0/SATA, PCIe x1 shared with M.2) 1 x SIM slot 1 x M.2 2280 M key (PCIe x1/SATA, additional optional PCIe x1 shared with Mini PCIe)
ETHERNET	Controller/Phy	4 x Intel® I210AT PCIe (10/100/1000Mbps) or Intel® I211AT PCIe (10/100/1000Mbps) by request
REAR I/O	Ethernet	4 x GbE (RJ-45)
	Serial	1 x RS232/RS422/RS485
	USB	2 x USB 3.0 Type A
	Display	1 x VGA, 1 x HDMI 1.4, and 1 x DP++

INTERNAL I/O	Serial	1 x RS-232/422/485 2 x RS-232 (w/power)
	USB	2 x USB 3.0 4 x USB 2.0 1 x USB 2.0 Type A connector for Watchdog Timer
	Audio	1 x S/PDIF 1 x Front audio (Line-out and Mic-in)
	SATA	2 x SATA 3.0 (up to 6Gb/s)
	DIO	1 x 16-bit DIO
	LPC	1 x LPC
	SMBus	1 x SMBus
WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
SECURITY	TPM	fTPM2.0 or DTPM2.0 (optional)
Power	ATX	4-pin 12V connector 24-pin connector
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 Debian 8 (with VESA graphic driver) CentOS 7 (with VESA graphic driver)
	Linux	
ENVIRONMENT	Temperature	Operating: 0 to 60°C Storage: -40 to 85°C
	Humidity	Operating: 5 to 90% RH
MECHANICAL	Dimensions	Mini-ITX Form Factor: 170mm (6.7") x 170mm (6.7") Top Side: 20mm, Bottom Side: 3mm, PCB: 1.6mm

► 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 DP++, HDMI, and VGA interfaces for diaplay 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

Four Intel® I210AT PCI Express Gigabit Ethernet controllers for four individual LAN ports are equpped to support data transmission at 1Gbps .

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 accessibl external Plug and Play peripherals.

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.

Chapter 2 - Hardware Installation

► Board Layout
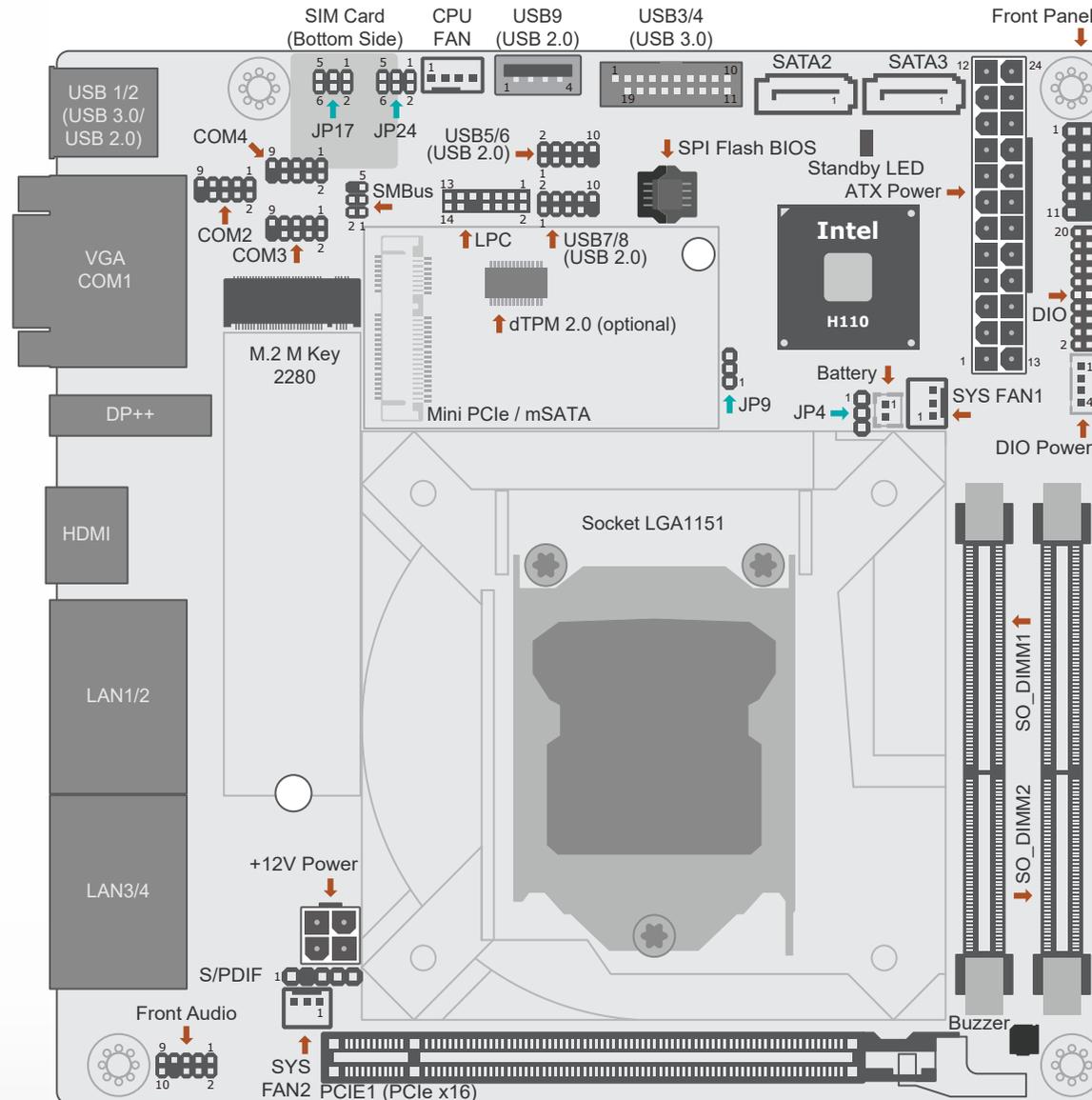
Important:
Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching 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.

► Standby Power LED
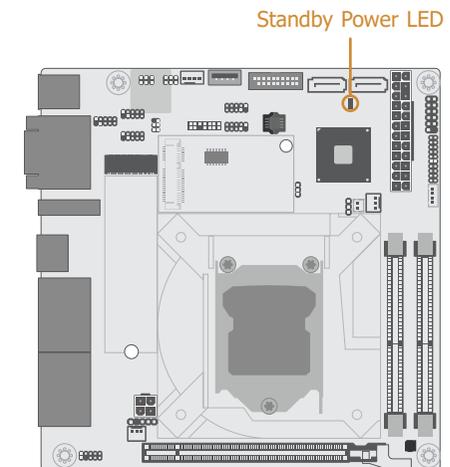
Standby Power LED

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.

► System Memory

DDR4_1
DDR4_2

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.

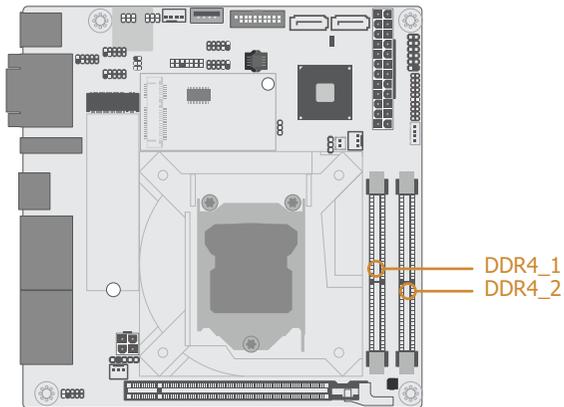|	
Single Channel	DIMMs are on the same channel. DIMMs in a channel can be identical or completely different. However, we highly recommend using identical DIMMs. Not all slots need to be populated.
Dual Channel	DIMMs of the same memory configuration are on different channels.

Features

- Two 260-pin DDR4 SO-DIMM vertical sockets

- Supports 2133 MHz DDR4 SDRAM

- Dual channel memory interface

- Supports maximum of 32GB system memory

► **System Memory**

Installing the SO-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 SO-DIMM vertical socket on the system board

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

Retention Notch

↓ Notch

≪ **DDR4 SO-DIMM**

↑ Key
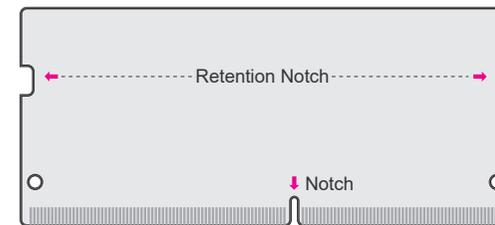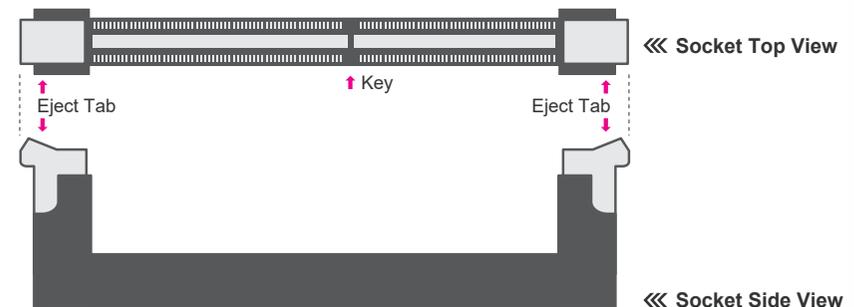
Eject Tab   Eject Tab

≪ **Socket Top View**

≪ **Socket Side View**

► **System Memory**　　► **Installing the SO-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.

Step 1

Step 2

Step 3
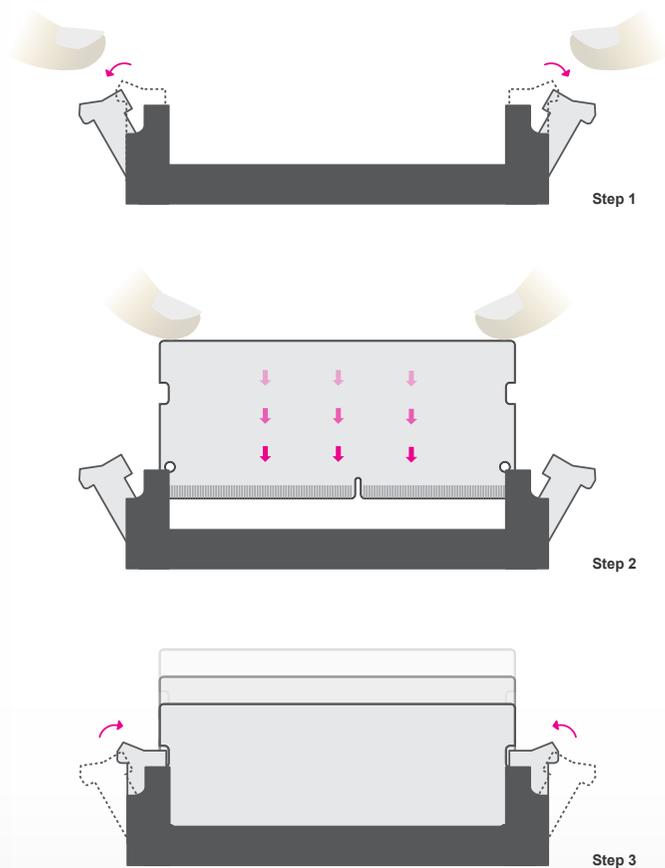
► **System Memory**

Removing the SO-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.

Step 1

Step 2

Step 3
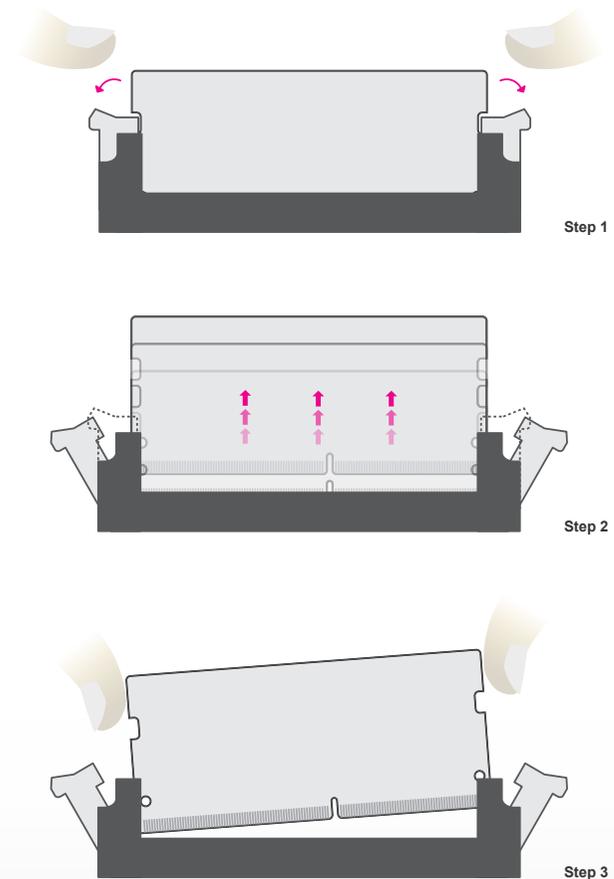
► CPU

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.

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.
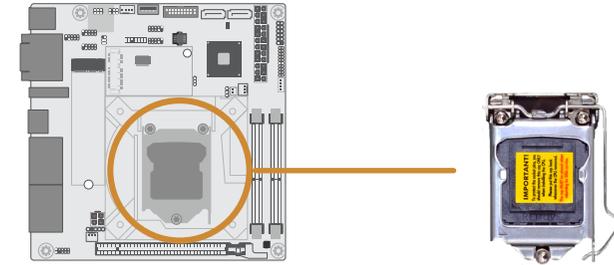
3. Locate the LGA 1151 CPU socket on the system board.

> **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.

Load lever

Retention tab

► CPU   ►   Installing the CPU

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

Load lever

Load plate

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

Protective cap

7-1. 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.

Golden triangular mark

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

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

Alignment key
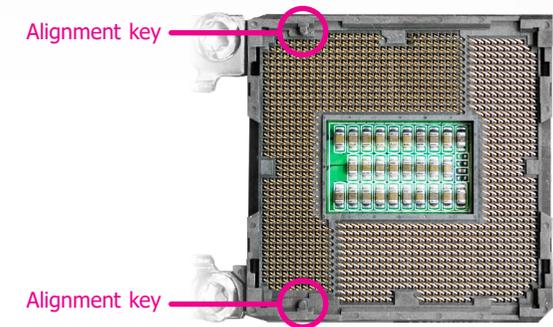
Alignment key

7-3. The CPU's notch will fit into the socket's alignment key when it's seated in the correct orientation.
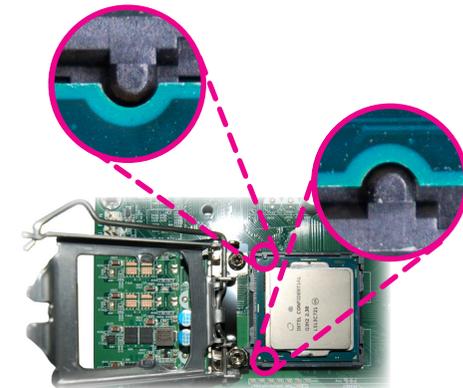
8. Close the load plate then push the load lever down.

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

Load lever
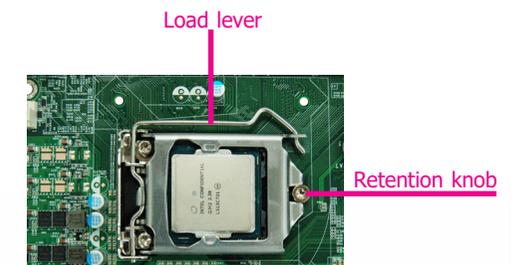
Retention knob

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 circula-
tion 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.

CPU fan connector
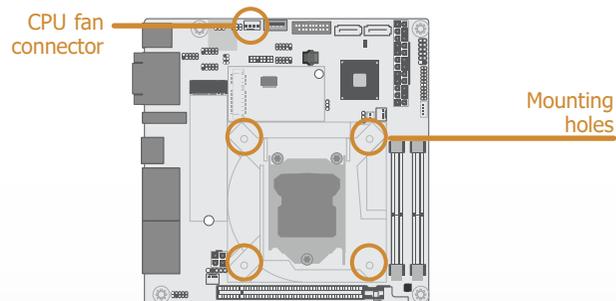
Mounting holes

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

Heat sink

"Unlocked" position of push-pin

"Locked" position of push-pin
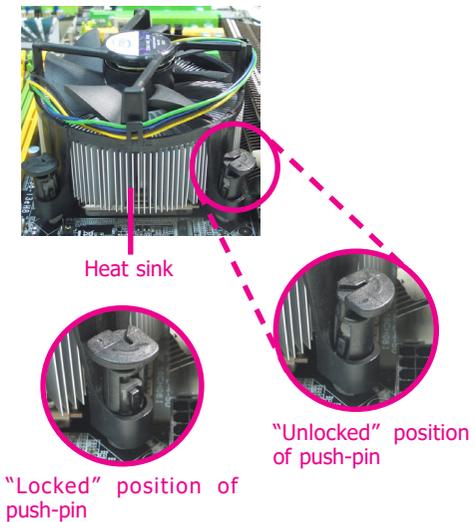
5. Connect the CPU fan's cable to the CPU fan connector on the system board.

► Jumper Settings

Clear CMOS

JP4
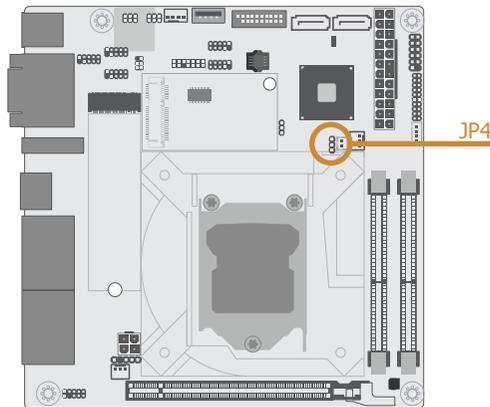
If any anomaly of the followings is encountered —

a) CMOS data is corrupted;

b) you forgot the supervisor or user password;

c) 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.

1. Power-off the system and unplug the power cord.

2. 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.

3. Plug the power cord and power-on the system.

▲ 1-2 On: Normal (default)   ▲ 2-3 On: Clear CMOS

RS232 Power Select
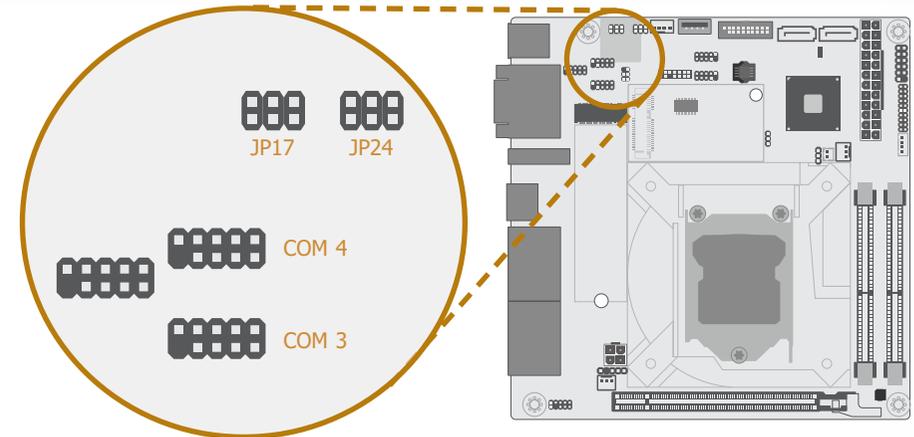
Two internal COM ports support RS232 with power configured via jumper settings of JP17 (COM 3) and JP24 (COM 4).

Configure the RS232 power select setting by putting the jumper cap on the encircled neighboring pins to create a short circuit as illustrated below.

▲ Standard RS232 (default)   ▲ RS232 with power

> **Note:**
> Please refer to the I/O section later in this chapter for more information on the COM ports.

Mini PCIe Signal Select

JP9
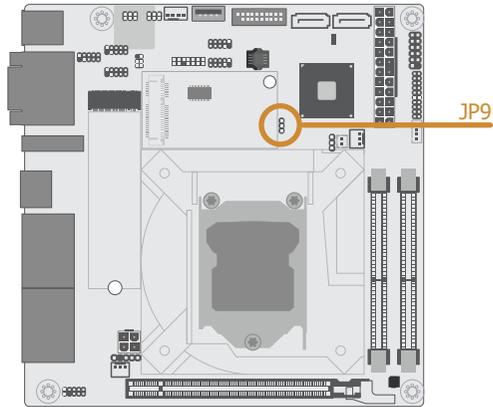
The Mini PCIe Slot can be configured for PCIe x1 signal or mSATA signal via the configuration of JP9 as illustrated below.
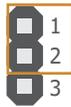
▲ 1-2 On: mSATA (default)
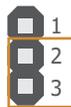
▲ 2-3 On: Mini PCIe (PCIe x1)

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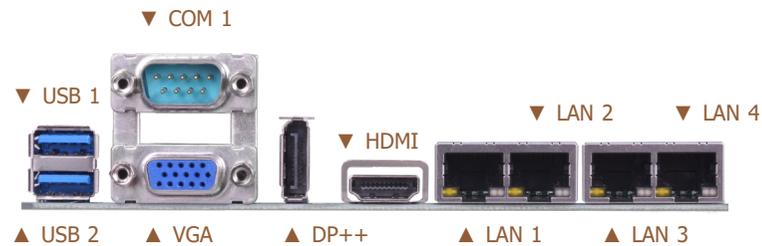
The rear panel I/O ports consist of the following:

- 2 x USB 3.0
- 1 x RS-232/422/485 (DB-9)
- 1 x VGA
- 1 x DP++
- 1 x HDMI 1.4
- 4 x GbE (RJ-45)

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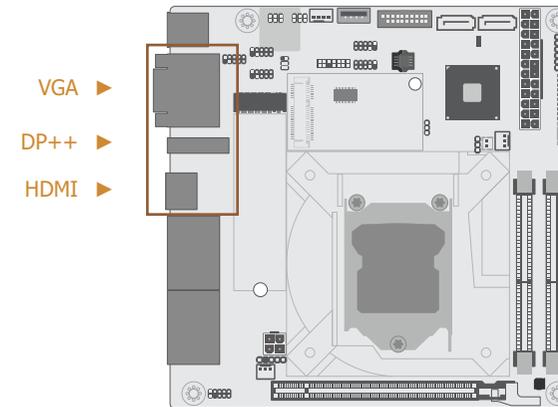
VGA
The VGA port is used for connecting a VGA monitor. Connect the monitor's 15-pin D-shell cable connector to the VGA port. After you plug the monitor's cable connector into the VGA port, gently tighten the cable screws to hold the connector in place.

DP++
The DisplayPort is a digital display interface used to connect a display device such as a computer monitor. It is used to transmit audio and video simultaneously. The interface, which is developed by VESA, delivers higher performance features than any other digital interface.

HDMI 1.4
The HDMI port which carries both digital audio and video signals is used to connect a LCD monitor or digital TV that has the HDMI port.

BIOS Setting
Configure VGA in the Advanced menu ("Video Configuration" submenu) of the BIOS. Refer to Chapter 3 for more information.

Driver Installation
Install the graphics driver. Refer to Chapter 4 for more information.

USB Ports

USB 1 ►
USB 2 ►

USB 3.0

► **Rear I/O Ports**
RJ45 LAN Ports

▼ LAN 2   ▼ LAN 4

▲ LAN 1   ▲ LAN 3

USB allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals. The system board is equipped with two onboard USB 3.0 ports (USB 1&2) at the rear side. For the internal USB 3.0 and 2.0 ports, please refer to the next section.

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.

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 Advanced menu ("PCI Express Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

Driver Installation
Install the LAN drivers. Refer to chapter 4 for more information.

Features

- LAN 1/2/3/4: Intel® I210AT (I211AT by request) PCIe GbE Controller

▶ **Rear I/O Ports**

COM (Serial) Ports
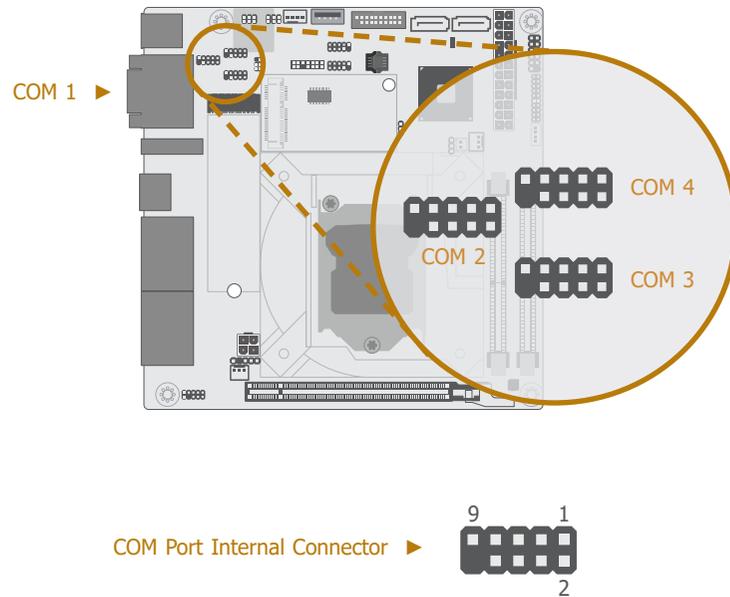
The pin assignment of each mode mentioned above is listed below.

COM 1 ▶

COM 4

COM 2

COM 3

9   1

COM Port Internal Connector ▶

2

▼ COM Port Pin Assignment

Pin	RS232	RS232 with PWR (COM 1 only)	RS422 Full Duplex	RS485
1	DCD-	+12V	TXD-	Data-
2	RD	RD	TXD+	Data+
3	TD	TD	RXD+	N.C.
4	DTR-	DTR-	RXD-	N.C.
5	GND	GND	GND	GND
6	DSR-	DSR-	N.C.	N.C.
7	RTS-	RTS-	N.C.	N.C.
8	CTS-	CTS-	N.C.	N.C.
9	RI-	5V	N.C.	N.C.

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 (Rear Port) and COM 2 (Internal Port) support three serial modes, i.e. RS232, RS422, and RS485. COM 3 and COM 4 (Internal Ports) support Standard RS232 as well as RS232 with Power. Serial modes of COM 1 and COM 2 are configured via BIOS settings as instructed in the next chapter. RS232 with/without power of COM 3 and COM 4 can be configured via jumper settings as previously instructed in this chapter.

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

USB Ports

USB9 (USB 2.0 Type A) ▼   USB3/4 (USB 3.0) ▼

◄ USB 5/6 (USB 2.0)

◄ USB 7/8 (USB 2.0)

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

In addition to the rear USB 3.0 ports as introduced previously in this chapter, the system board is equipped with internal USB 3.0 and USB 2.0 ports as illustrated above.

The internal USB pin headers may be connected to 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.
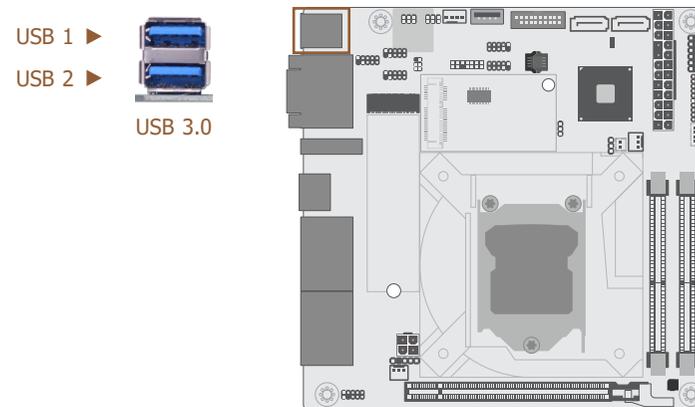
BIOS Setting
Configure the onboard USB in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

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 S state(s).

▼ USB 5/6 & 7/8 (USB 2.0) Pin Header Pin Assignment
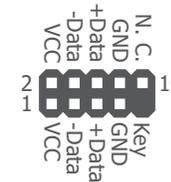
▼ USB 3/4 (USB 3.0) Box Header Pin Assignment

Pin	Assignment	Pin	Assignment
1	VCC	11	Data5+
2	USB3_RX6-	12	Data5-
3	USB3_RX6+	13	GND
4	GND	14	USB3_TX5+
5	USB3_TX6-	15	USB3_TX5-
6	USB3_TX6+	16	GND
7	GND	17	USB3_RX5+
8	Data6-	18	USB3_RX5-
9	Data6+	19	VCC
10	5V		

SMBus Connector

▼ SMBus Connector

5
2   1

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	---

Front Panel

▼ Front Panel Connector

1   2

HD-LED   PWR-LED

RESET   ATX-SW

11   12
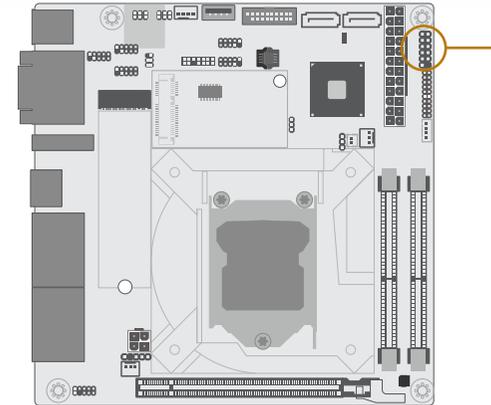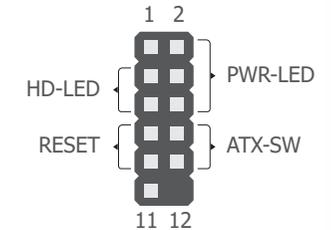
▼ Front Panel Pin Assignment

	Pin	Assignment		Pin	Assignment
	1	N.C.		2	LED Power
HD-LED	3	HDD Power	PWR-LED	4	LED Power
	5	Signal		6	Signal
RESET	7	Ground	ATX-SW	8	Ground
	9	Signal		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**

Power

◄ ATX Power

◄ +12V Power
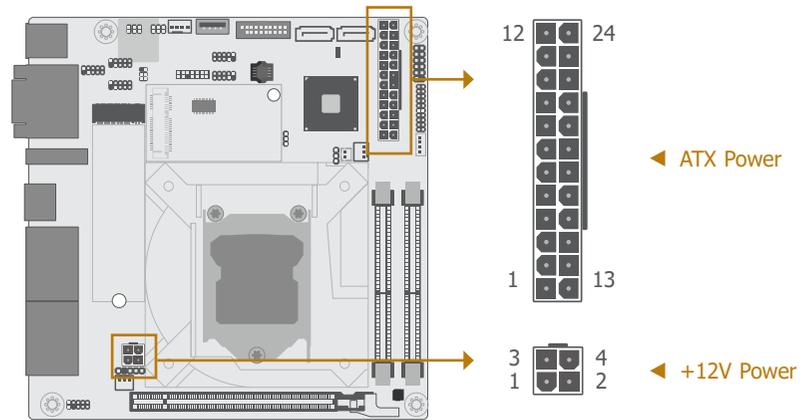
▼ 4-pin Power Pin Assignment

Pin	Assignment
1	GND
2	GND
3	+12V
4	+12V

▼ 24-pin Power Pin Assignment

Pin	Assignment	Pin	Assignment
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON#
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWR_OK	20	NC
9	+5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND

Use a power supply that complies with the ATX12V Power Supply Design Guide Version 1.1. An ATX12V power supply unit has a standard 24-pin ATX main power connector that must be inserted into the 24-pin connector. The 4-pin +12V power connector enables the delivery of more +12VDC current to the processor's Voltage Regulator Module (VRM).

The power connectors from the power supply unit are designed to fit the 24-pin and 4-pin connectors in only one orientation. Make sure to find the proper orientation before plugging the connectors.

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

Important:
Insufficient power supplied to the system may result in instability or malfunction of the add-in boards and peripherals. Calculating the system's approximate power usage is important to ensure that the power supply meets the system's consumption requirements.

► **Internal I/O Connectors**

Digital I/O

◄ Digital I/O Connector

◄ Digital I/O Power

► **Internal I/O Connectors**

SATA (Serial ATA) Connectors

▼ SATA 2   ▼ SATA 3
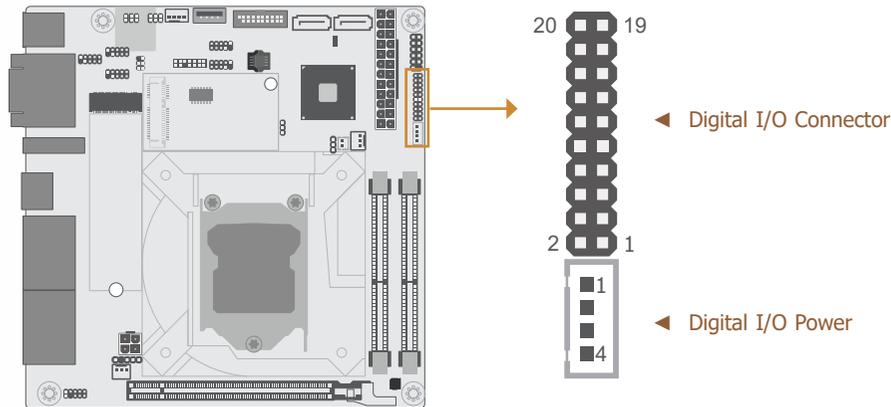
The 16-bit Digital I/O connector provides powering-on function to external devices that are connected to these connectors.
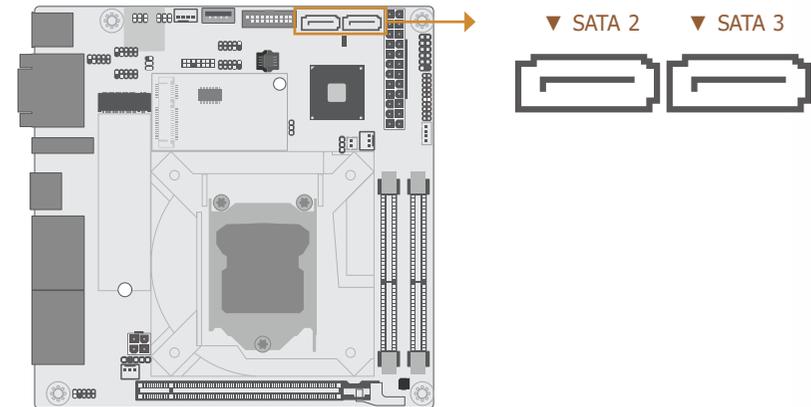
The Serial ATA (SATA) connectors are used to connect the Serial ATA device. SATA 3.0 is supported by the five SATA ports and provides data rate up to 6Gb/s. Connect one end of the Serial ATA cable to a SATA connector and the other end to your Serial ATA device.

BIOS Setting
Configure the Serial ATA drives in the Advanced menu ("SATA Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.
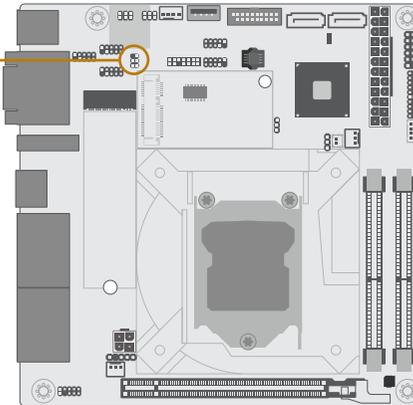
▼ Digital I/O Pin Assignment

Pin	Assignment	Pin	Assignment
1	DIO_0	2	DIO_8
3	DIO_1	4	DIO_9
5	DIO_2	6	DIO_10
7	DIO_3	8	DIO_11
9	DIO_4	10	DIO_12
11	DIO_5	12	DIO_13
13	DIO_6	14	DIO_14
15	DIO_7	16	DIO_15
17	GND	18	GND
19	GND	20	GND

▼ Digital I/O Power Pin Assignment

Pin	Assignment
1	+12V
2	GND
3	5VDU
4	5V
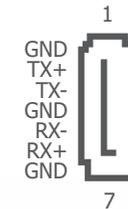
▲ SATA 3.0 Pin Assignment

▶ **Internal I/O Connectors**

Cooling Fan Connectors

▲ CPU Fan

▼ System Fan 1

▼ System Fan 2
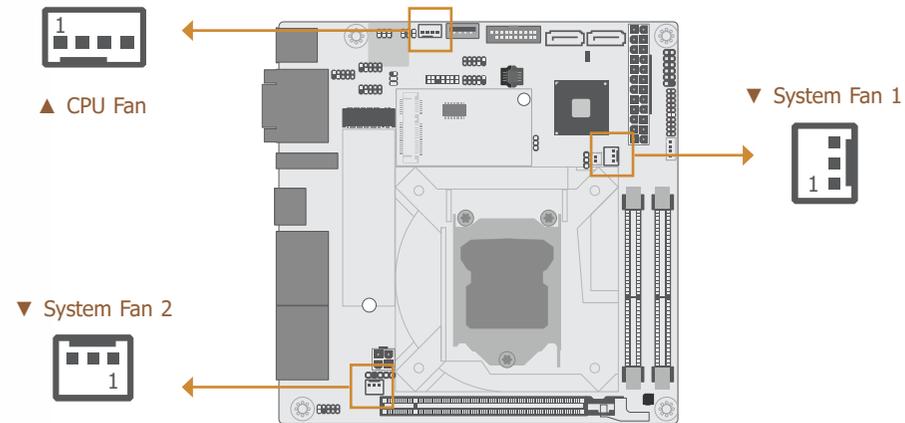
▼ 3-pin Fan Pin Assignment

Pin	Assignment
1	Ground
2	Power
3	Sense

▼ 4-pin 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.

BIOS Setting
Configure the Smart Fan function in the Advanced menu ("SIO NUVOTON6106D" submenu) of the BIOS. Refer to chapter 3 for more information.

▶ **Internal I/O Connectors**

LPC
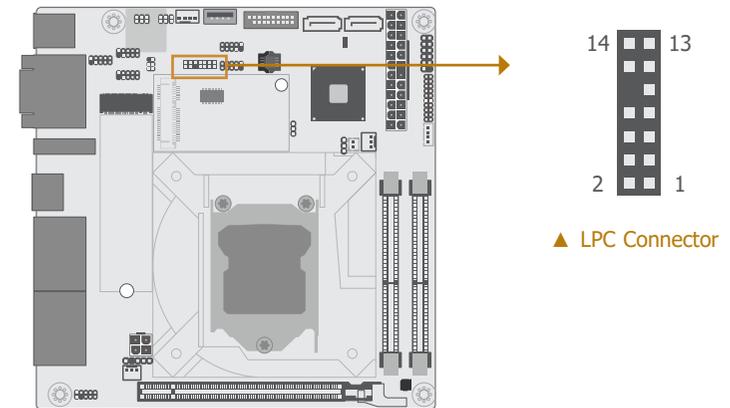
▲ LPC Connector

▼ 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

The LPC connector is used for debugging.

► **Internal I/O Connectors**

Expansion Slots

SIM

M.2 M Key

Mini PCIe

PCIE1 (PCIe x16)
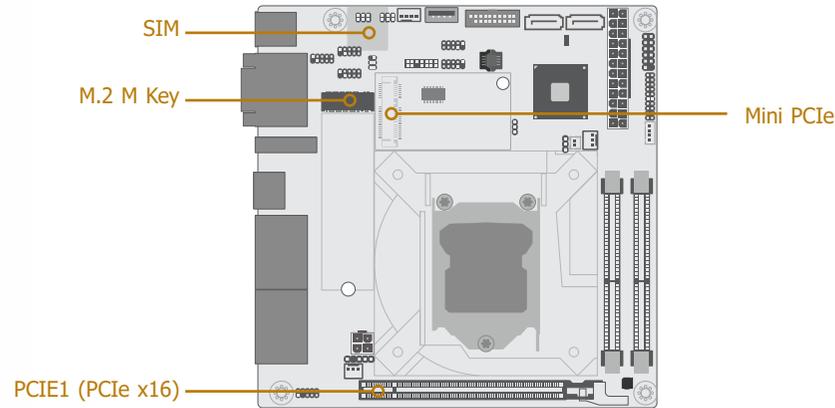
PCI Express x16 Slot

Install a PCI Express x16 graphics card that complies to the PCI Express specifications into the PCI Express x16 slot. To install a graphics card into the x16 slot, align the graphics card to the socket and perpendicularly to the board, be cautious in aligning the locations of notch and key, and then press the card down firmly until it is completely seated. The retaining clip of the slot will close up automatically to hold the graphics card in place.

M.2 Socket

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 form factor stand-off for the M.2 M key socket, allowing a 22mm x 80mm M.2 module to fit onto the board.

Mini PCI Express Slot

The full-size Mini PCIe socket supports the installation of a Mini PCIe card or an mSATA card. To switch between these two signals, please refer to the "Jumper Settings" section for more previously in this chapter for more information.

BIOS Setting

Configure PCIe root ports in the Advanced menu ("PCI Express Configuration" submenu) of the BIOS. Refer to chapter 3 for more information.

► **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.

≫ **M.2 Module**   ≫ **M.2 Socket**

Notch ➡

Stand-off ➡

Key ➡

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 against the stand-off.

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.

Installing the Mini PCIe Card

Before installing the Mini PCIe module into the Mini PCIe 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 Mini PCIe socket on the system board

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

≫ **Mini PCIe Module**   ≫ **Mini PCIe Socket**

Stand-off ➜

Notch ➜   Key ➜

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 against the stand-off.

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.

Battery

Battery

2 GND
1 3.3V

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

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.

S/PDIF

▼ S/PDIF Connector

1　　　　5
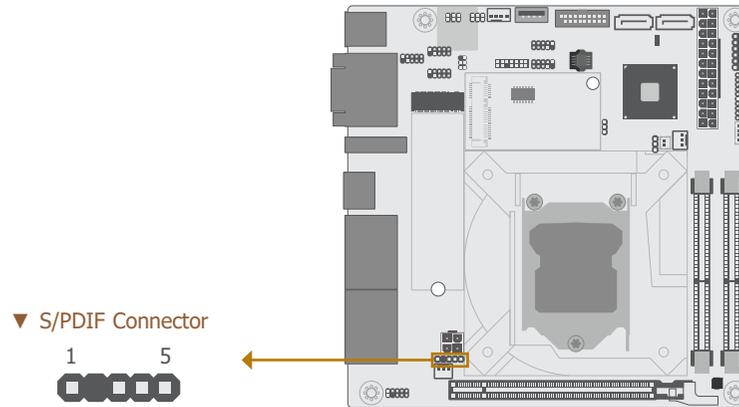
▼ S/PDIF Pin Assignment

Pin	Assignment	Pin	Assignment
1	+5V	2	---
3	SPDIF Out	4	GND
5	SPDIF In		

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

Front Audio

▼ Front Audio

9　　　　　　　1
10　　　　　　2
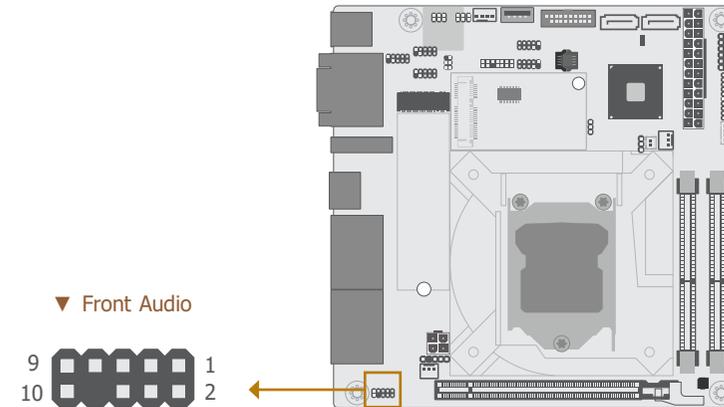
▼ Front Audio Pin Assignment

Pin	Assignment	Pin	Assignment
1	Mic-L	2	GND
3	Mic-R	4	N.C.
5	Line-Out-R	6	Mic-JD (sense)
7	GND	8	KEY
9	Line-Out-L	10	Line-JD (sense)

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

Chapter 3 - BIOS Setup

► Overview

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

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

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

Default Configuration

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

Entering the BIOS Setup Utility

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

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

Legends

Keys	Function
Right / 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.

```
                    InsydeH2O Setup Utility                    Rev. 5.0
 Main   Advanced   Security   Boot   Exit

 Project Name            SD170                 This is the help for the
 BIOS Version            B195.24A              hour, minute, second field.
                                               Valid range is from 0 to 23,
 Processor Type          Intel(R) Core(TM) i7-6700TE CPU G4400 @ 2.4 GHz
 CPUID                   0x506E3 (SKYLAKE DT HALO)   0 to 59, 0 to 59. INCREASE/
 CPU Speed               2400 MHz              REDUCE: +/-.
 CPU Stepping            03 (R0/S0/N0 Stepping)
 L1 Data Cache           32 KB
 L1 Instruction Cache    32 KB
 L2 Cache                256 KB
 L3 Cache                8192 KB
 Number Of Processors    4 Core(s) / 8 Thread(s)
 Microcode Rev           000000CC

 Total Memory            4096 MB
 System Memory Speed     2133 MHz
 DIMM 0                  [Not Installed]
 DIMM 1                  4096 MB

 PCH Rev / SKU           31 (D1 Stepping) / SKL PCH-H H110
 Intel ME Version / SKU  11.8.55.3510 / CONSUMER

 System Time             [15:35:35]
 System Date             [11/07/2019]


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

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.

```
                    InsydeH2O Setup Utility                    Rev. 5.0
 Main   Advanced   Security   Boot   Exit

 ▶ACPI Configuration                           ACPI Configuration Setting
 ▶CPU Configuration
 ▶Video Configuration
 ▶Audio Configuration
 ▶SATA Configuration
 ▶USB Configuration
 ▶PCI Express Configuration
 ▶ME Configuration
 ▶UEFI Device Manager
 ▶SIO NUVOTON6106D
 ▶Console Redirection









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

► **Advanced**

ACPI Configuration

```
InsydeH2O Setup Utility                              Rev. 5.0
  Advanced

ACPI Configuration                            Determines the action tak-
                                              en when the system power
Wake On LAN        <Disabled>                 is off and a PCI Power
After G3           <Always On>                Management Enable wake
Wake On RTC        <Enabled>                  up event occurs.
Wake up time       [00:00:00]




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

```
InsydeH2O Setup Utility                              Rev. 5.0
  Advanced

ACPI Configuration                            Support display logo with
                                              ACPI BGRT table.
Wake On LAN        <Disabled>
After G3           <Always On>
BGRT Logo          <Enabled>
Wake On RTC        <Enabled>
Wake up time       [00:00:00]




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

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.
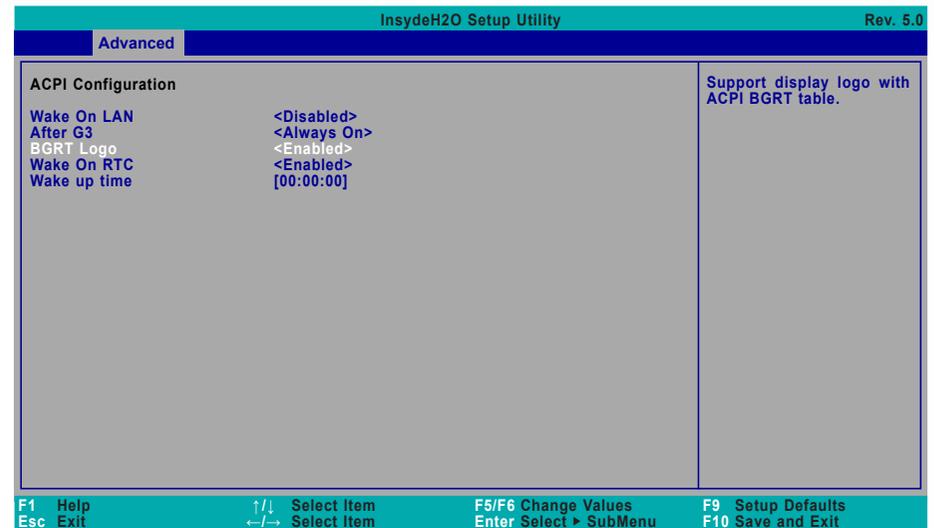
BGRT Logo

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.

```
                        InsydeH2O Setup Utility                    Rev. 5.0
 ┌──────────┐
 │ Advanced │
 └──────────┘

 CPU Configuration                              Determines the action tak-
                                                en when the system power
 Intel Speed Step        <Enabled>              is off and a PCI Power
 Turbo mode              <Enabled>              Management Enable wake
 CPU C States            <Enabled>              up event occurs.
 Hyper-threading         <Enabled>

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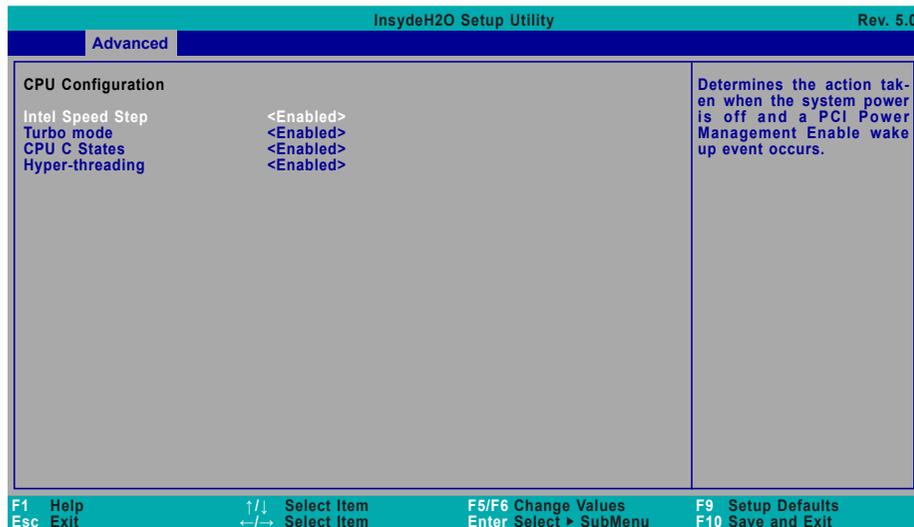
Intel Speed Step

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

```
                        InsydeH2O Setup Utility                    Rev. 5.0
 ┌──────────┐
 │ Advanced │
 └──────────┘

 Video Configuration                            Select which of IGFX/PEG/PCI Graphics
                                                device should be Primary Display.
 Primary Display            <Auto>
 Integrated Graphics Device <Auto>              Initial priority :
 Boot display               <Auto>              AUTO: PEG -> PCIe -> PCI -> IGFX
                                                IGFX: IGFX -> PEG -> PCIe -> PCI
                                                PEG: PEG -> PCIe -> PCI -> IGFX
                                                PCI: PCI -> PCIe -> PEG -> IGFX

                        ┌──────────────────┐
                        │ Primary  Display │
                        ├──────────────────┤
                        │ Auto             │
                        │ IGFX             │
                        │ PEG              │
                        │ PCI              │
                        └──────────────────┘

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

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, DP+HDMI, DP+VGA, HDMI+DP, HDMI+VGA, VGA+DP, VGA+HDMI.

▶ **Advanced**

Audio Configuration

InsydeH2O Setup Utility	Rev. 5.0

Advanced	

Audio Configuration

Azalia   <Enabled>

Control Detection of the HD-Audio device.

Auto = HDA will be enabled if present, disabled otherwise.

Disabled = HDA will be unconditionally disabled.

Enabled = HDA will be unconditionally enabled.

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

Azalia

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

▶ **Advanced**

SATA Configuration

InsydeH2O Setup Utility	Rev. 5.0

Advanced	

SATA Configuration

SATA Controller(s)   <Enabled>
SATA Speed   <Auto>
SATA Mode Selection   <AHCI>
Serial ATA Port 0   [Not Installed]
   Port 0   <Enabled>
   Hot Plug   <Disabled>
Serial ATA Port 1   [Not Installed]
   Port 0   <Enabled>
   Hot Plug   <Disabled>
Serial ATA Port 2   [Not Installed]
   Port 0   <Enabled>
   Hot Plug   <Disabled>
Serial ATA Port 3   [Not Installed]
   Port 0   <Enabled>
   Hot Plug   <Disabled>

Enable or Disable SATA Device.

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

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).

SATA Port 0-3/Hot Plug

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

► **Advanced**

USB Configuration

```
                        InsydeH2O Setup Utility                    Rev. 5.0
 ┌──────────┐
 │ Advanced │
 └──────────┘
 USB Configuration                                    USB  keyboard/mouse/
                                                      storage  support  under UEFI
 Legacy USB Support           <Enabled>               environment.
 XHCI Hand-off                <Disabled>




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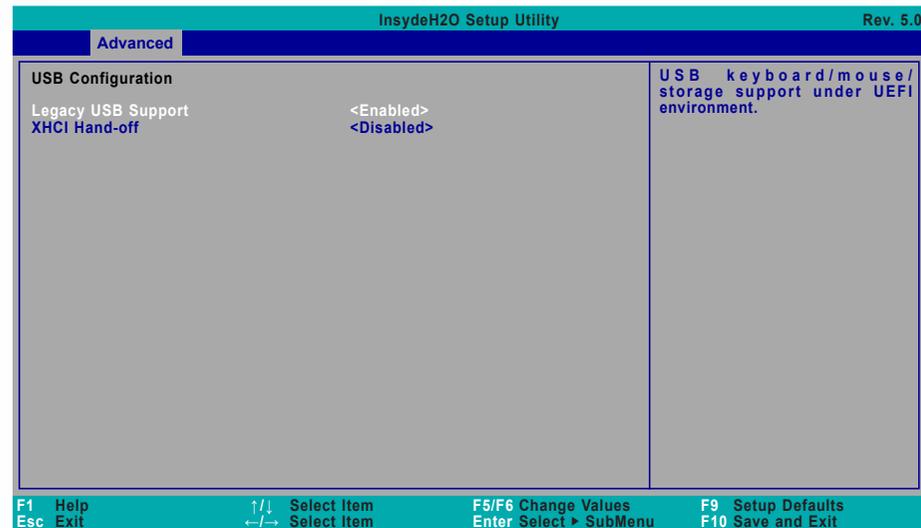
Legacy USB Support

Enabled   Enable Legacy USB support.

Disabled   Keep USB devices available only for EFI applications.

XHCI Hand-off

Enable or disable XHCI Hand-off.

► **Advanced**

PCI Express Configuration

```
                        InsydeH2O Setup Utility                    Rev. 5.0
 ┌──────────┐
 │ Advanced │
 └──────────┘
 PCI Express Configuration                            PEG PCI Express Port setting

 ►PCIE1
 ►LAN1
 ►LAN2
 ►LAN3
 ►LAN4
 ►M.2
 ►Mini PCIe




 F1   Help          ↑/↓   Select Item    F5/F6 Change Values      F9   Setup Defaults
 Esc  Exit          ←/→   Select Item    Enter Select ► SubMenu   F10  Save and Exit
```
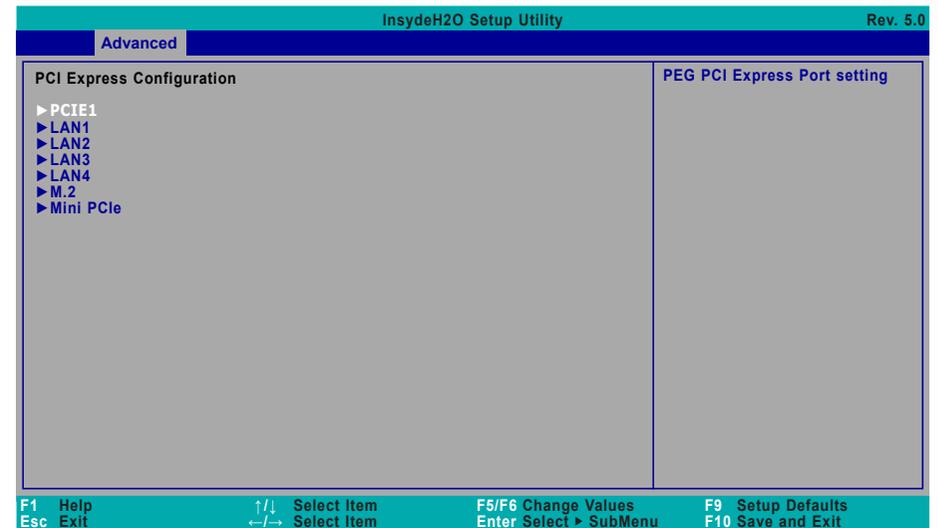
Select one of the PCI Express channels and press enter to configure the following settings.

PCIE1/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. Gen 3 is only available for the PCIE1 port. 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

Configure Management Engine related settings in this page.

InsydeH2O Setup Utility	Rev. 5.0
Advanced	

```
ME Configuration                                          Enable/disable to flash ME re-
                                                          gion.
Me Fw Image Re-Flash              <Disabled>
```

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

Me Fw Image Re-Flash

Enabled   Allow the user to re-write the ME firmware.

Disabled   ME firmware re-write is not allowed.

▶ **Advanced**

Debug Configuration

This section configures Debug setting.

InsydeH2O Setup Utility	Rev. 5.0
Advanced	

```
Debug Configuration                                       Enable it to output debug
                                                          message from COM port.
Dynamic EFI DEBUG                 <On>
EFI debug print level             [0x8000004F]
EFI debug serial port             [0x3F8]
EFI debug baud rate               [115200]
```
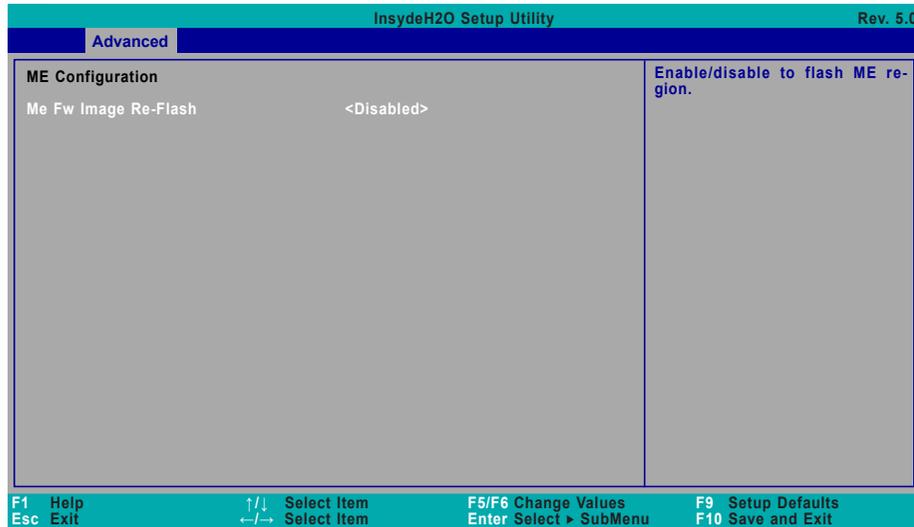
```
F1   Help      ↑/↓   Select Item    F5/F6 Change Values        F9  Setup Defaults
Esc  Exit      ←/→   Select Item    Enter Select ▶ SubMenu     F10 Save and Exit
```
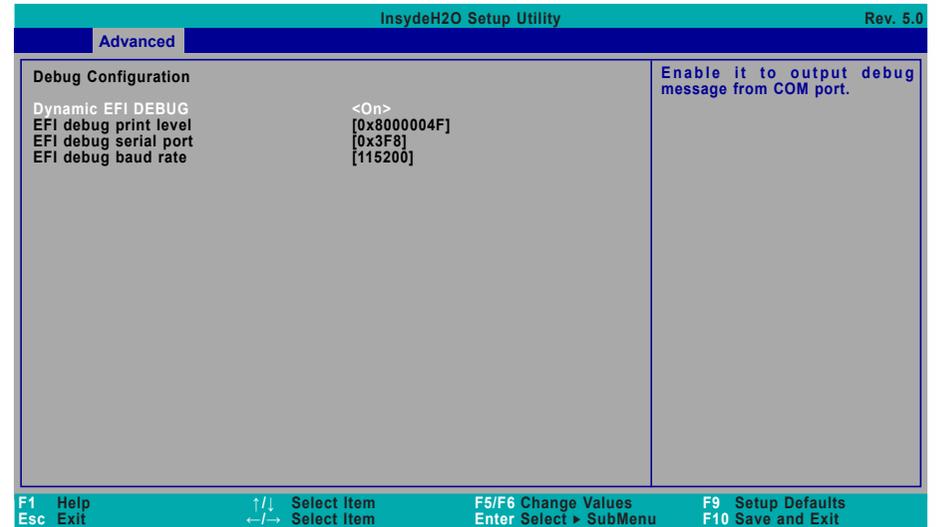
Dynamic EFI DEBUG

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.

```
                     InsydeH2O Setup Utility                    Rev. 5.0
      Advanced

 UEFI Device Manager                              UEFI Device Manager Setting

 UEFI Device Manager




           ┌──────────────────────────────────────────────┐
           │ Exit BIOS Setup Utility and launch Device Manager !! │
           │                    [OK]                       │
           └──────────────────────────────────────────────┘






 F1   Help          ↑/↓   Select Item    F5/F6 Change Values    F9   Setup Defaults
 Esc  Exit          ←/→   Select Item    Enter Select ▶ SubMenu F10  Save and Exit
```
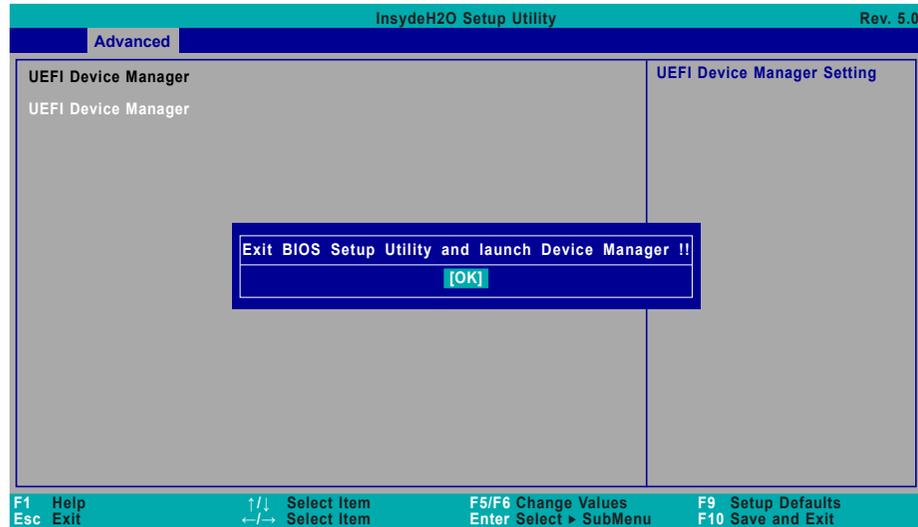
Press "Enter" and "OK" to enter UEFI Device Manager setup page. More device settings can be configured in the UEFI Device Manager, including LAN, Network Stacks, and etc.
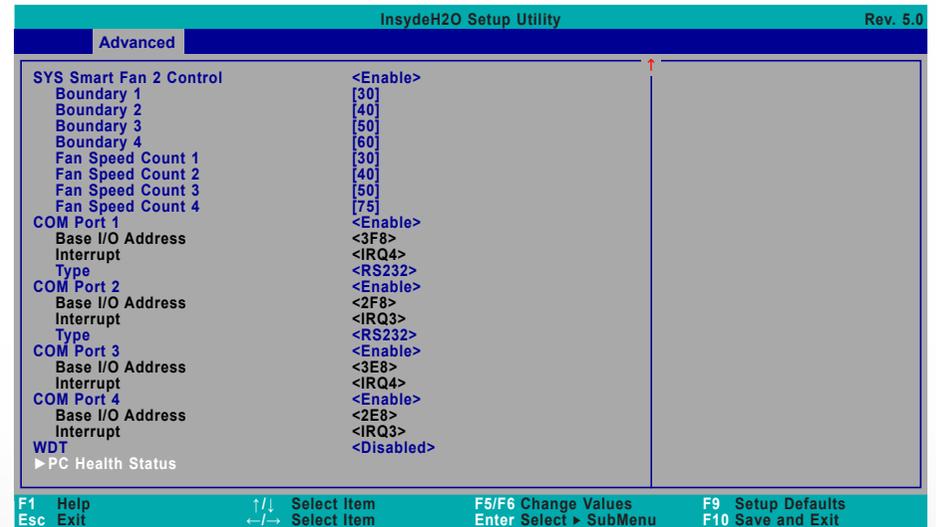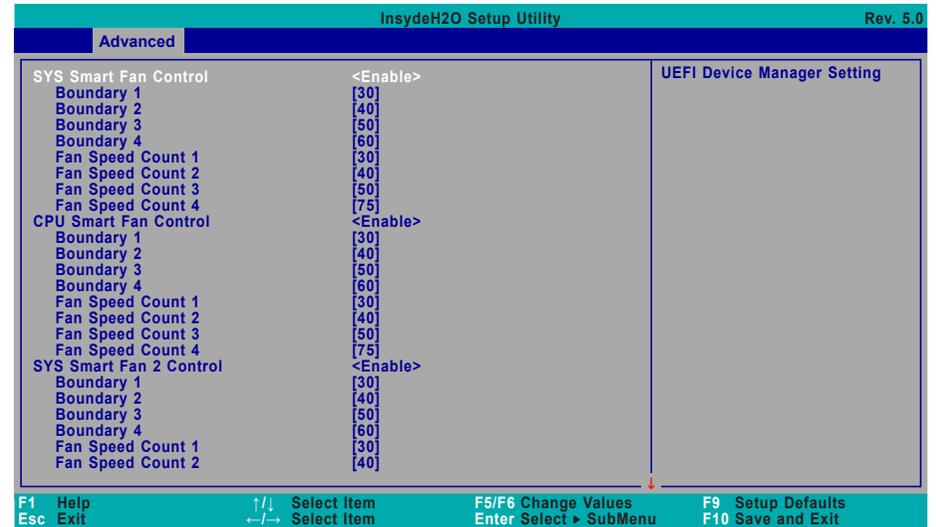
Note:
Network Device will not be configurable in Device Manager if "Network Stack" is disabled in the "Boot" menu.

► **Advanced**

SIO NUVOTON6106D

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

```
                     InsydeH2O Setup Utility                    Rev. 5.0
      Advanced

 SYS Smart Fan Control              <Enable>     UEFI Device Manager Setting
     Boundary 1                     [30]
     Boundary 2                     [40]
     Boundary 3                     [50]
     Boundary 4                     [60]
     Fan Speed Count 1              [30]
     Fan Speed Count 2              [40]
     Fan Speed Count 3              [50]
     Fan Speed Count 4              [75]
 CPU Smart Fan Control              <Enable>
     Boundary 1                     [30]
     Boundary 2                     [40]
     Boundary 3                     [50]
     Boundary 4                     [60]
     Fan Speed Count 1              [30]
     Fan Speed Count 2              [40]
     Fan Speed Count 3              [50]
     Fan Speed Count 4              [75]
 SYS Smart Fan 2 Control            <Enable>
     Boundary 1                     [30]
     Boundary 2                     [40]
     Boundary 3                     [50]
     Boundary 4                     [60]
     Fan Speed Count 1              [30]
     Fan Speed Count 2              [40]

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

```
                     InsydeH2O Setup Utility                    Rev. 5.0
      Advanced

 SYS Smart Fan 2 Control            <Enable>
     Boundary 1                     [30]
     Boundary 2                     [40]
     Boundary 3                     [50]
     Boundary 4                     [60]
     Fan Speed Count 1              [30]
     Fan Speed Count 2              [40]
     Fan Speed Count 3              [50]
     Fan Speed Count 4              [75]
 COM Port 1                         <Enable>
     Base I/O Address               <3F8>
     Interrupt                      <IRQ4>
     Type                           <RS232>
 COM Port 2                         <Enable>
     Base I/O Address               <2F8>
     Interrupt                      <IRQ3>
     Type                           <RS232>
 COM Port 3                         <Enable>
     Base I/O Address               <3E8>
     Interrupt                      <IRQ4>
 COM Port 4                         <Enable>
     Base I/O Address               <2E8>
     Interrupt                      <IRQ3>
 WDT                                <Disabled>
 ▶ PC Health Status

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

▶ **Advanced**   ▶   **SIO NUVOTON6106D**

Smart Fan

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.

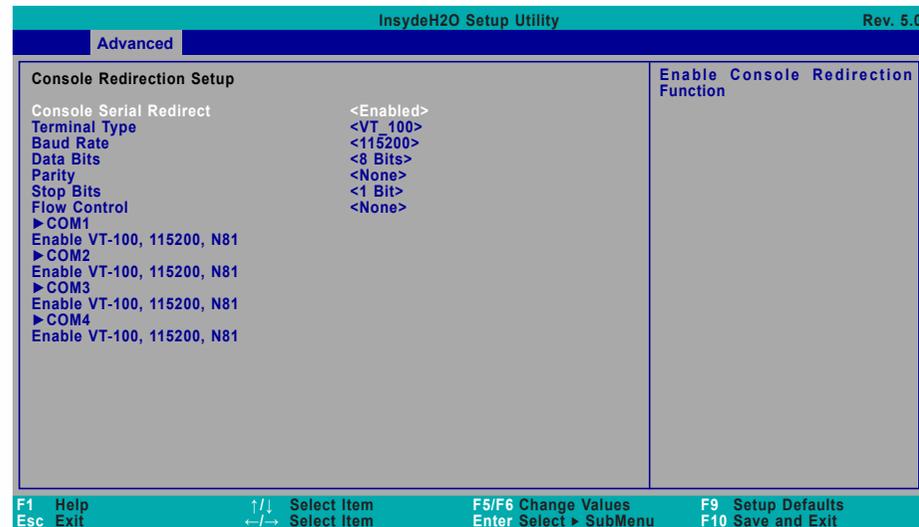▶ **Advanced**   ▶   **SIO NUVOTON6106D**

▶ **PC Health Status**

This section displays the PC health status.

InsydeH2O Setup Utility	Rev. 5.0
Advanced	

PC Health Status

Voltage
VBAT	3.072 V
VCORE	0.784 V
VDDQ	1.184 V
5V	4.939 V
+12V	11.616 V

Temperature
System (°C/°F)	35.0 C/ 95.0 F
CPU (°C/°F)	42.0 C/ 107.6 F

Fan Speed
SYS FAN	0 RPM
CPU FAN	2561 RPM
SYS FAN 2	0 RPM

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

► **Advanced**

Console Redirection

Configure COM port serial settings in the submenu.

	InsydeH2O Setup Utility	Rev. 5.0
	Advanced	

```
Console Redirection Setup                              Enable Console Redirection
                                                        Function
Console Serial Redirect        <Enabled>
Terminal Type                  <VT_100>
Baud Rate                      <115200>
Data Bits                      <8 Bits>
Parity                         <None>
Stop Bits                      <1 Bit>
Flow Control                   <None>
►COM1
Enable VT-100, 115200, N81
►COM2
Enable VT-100, 115200, N81
►COM3
Enable VT-100, 115200, N81
►COM4
Enable VT-100, 115200, N81
```

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

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.

	InsydeH2O Setup Utility	Rev. 5.0
	Advanced	

```
Port Enable                    <Enabled>
Use Global Setting             <Disabled>
Terminal Type                  <VT_100>
Baud Rate                      <115200>
Data Bits                      <8 Bits>
Parity                         <None>
Stop Bits                      <1 Bit>
Flow Control                   <None>
```

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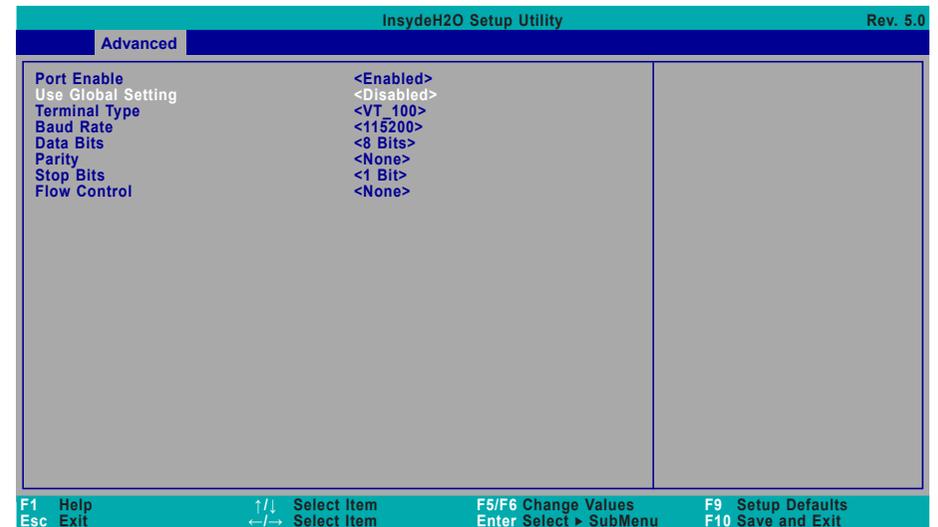
Port Enable

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

```
                         InsydeH2O Setup Utility                        Rev. 5.0
  Main    Advanced    Security    Boot    Exit

  Current TPM Device        <TPM 2.0 (FTPM)>              When Hidden, don't ex-
  TPM State                 All Hierarchies Enabled, UnOwned   poses TPM to 0
  TPM Availability          <Available>
  TPM Operation             <No Operation>
  Clear TPM                 [ ]

  Supervisor Password       Not installed

  Set Supervisor Password

                            ┌─────────────────────┐
                            │  TPM  Availability   │
                            │  Available           │
                            │  Hidden              │
                            └─────────────────────┘



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

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

```
                         InsydeH2O Setup Utility                        Rev. 5.0
  Main    Advanced    Security    Boot    Exit

  Numlock                   <On>                         Select Power-on state for
  Boot Type                 <Dual Boot Type>             Numlock
  Network Stack             <Disabled>
  PXE Boot capability       <Disabled>
  USB Boot                  <Enabled>
  Quiet Boot                <Disabled>

  ▶EFI
  ▶Legacy







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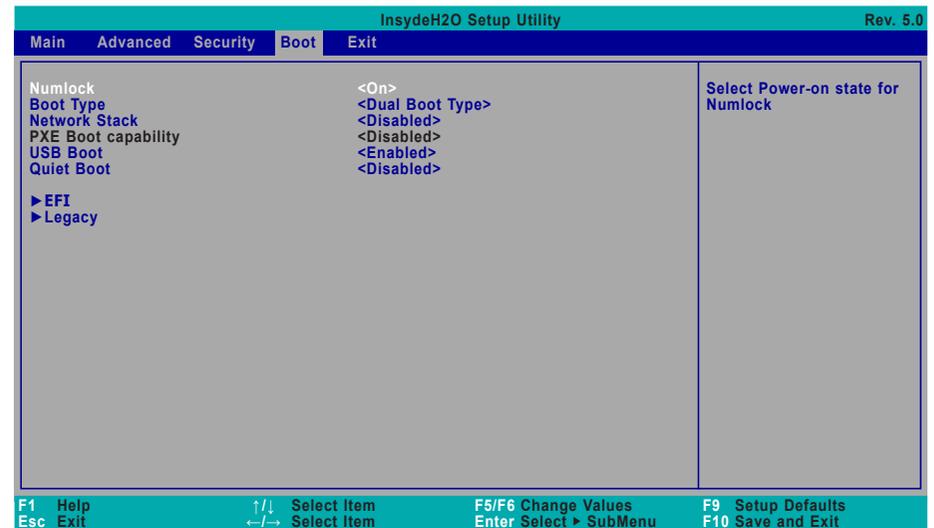
Numlock

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   Suppoort 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".

```
                   InsydeH2O Setup Utility              Rev. 5.0
                        Boot

   EFI                                          EFI

   EFI Network 0 for IPv4 (00-00-00-00-00-00)
   EFI Network 1 for IPv4 (11-11-11-11-11-11)




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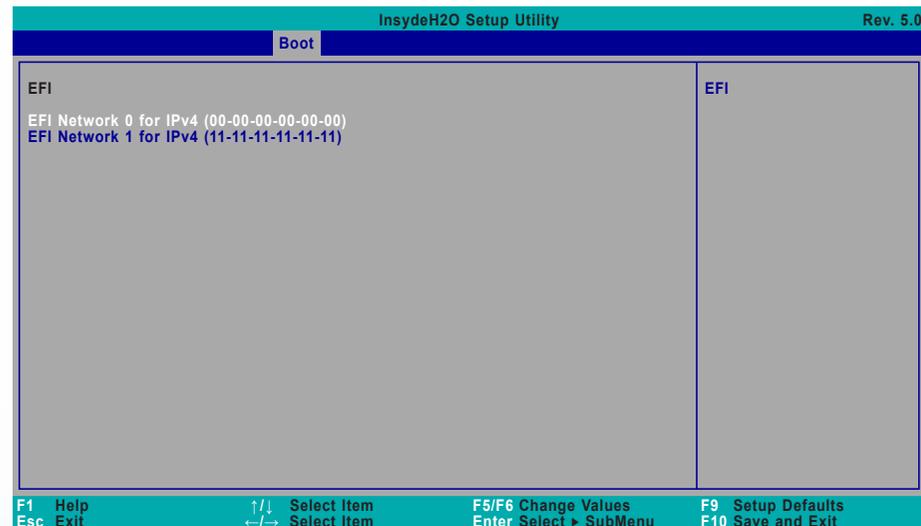
► **Boot**

▶ 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".

```
                   InsydeH2O Setup Utility              Rev. 5.0
                        Boot

   Boot Device Priority                              Select Normal Boot Option
                                                     Priority or Advance Boot
   Normal Boot Menu              <Normal>            Option Priority

   ▶Boot Type Order
   ▶Hard Disk Drive
   ▶CD/DVD-ROM Drive
   ▶USB
   ▶Others




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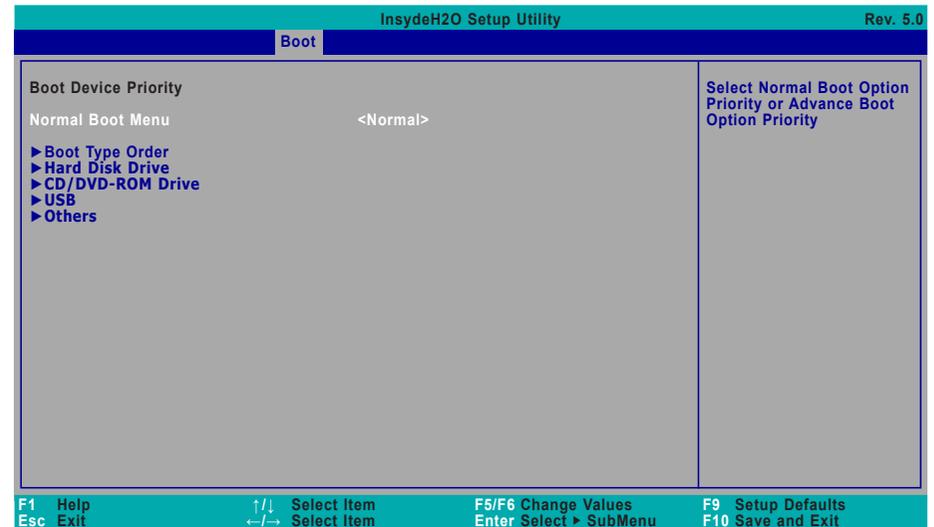
Normal Boot Menu

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.

Chapter 4 - Supported Software

Install drivers, utilities and software applications that are required to facilitate and enhance the performance of the system board. You may acquire the software from your sales representatives, from an optional DVD included in the shipment, 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.

System Utility	×
Model Name **SD170**	Intel Chipset Software Installation Utility Intel ME Drivers Intel Serial IO Drivers Intel Rapid Storage Technology Drivers Intel HD Graphics Drivers Realtek Audio Drivers Intel LAN Drivers F6 Floppy Adobe Acrobat Reader 9.3 User's Manual
	More >>
	Exit
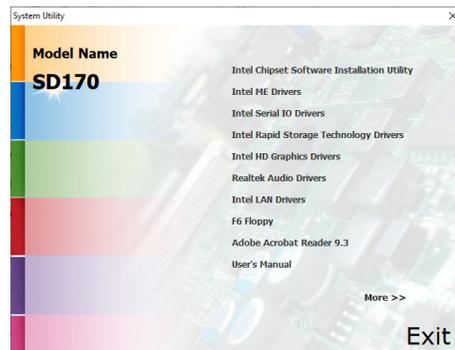
Click "More >>" on the lower right to go to the next page of the auto-run menu, and click "<< Previous" to return to the previous menu.

System Utility	×
Model Name **SD170**	Readme Browse the CD
	<< Previous
	Exit
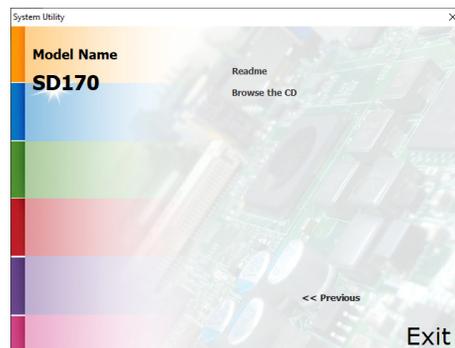
Note:
This step can be ignored if the applications are downloaded standalone files.

► 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".

Intel(R) Chipset Device Software (intel)
Welcome

You are about to install the following product:

Intel(R) Chipset Device Software

It is strongly recommended that you exit all programs before continuing.

Press Next to continue, or press Cancel to exit the setup program.

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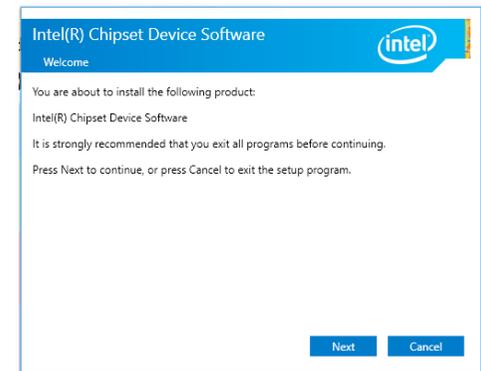
2. Read the license agreement then click "Accept".

Intel(R) Chipset Device Software (intel)
License Agreement

INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)

IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.

Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
* If you are an End-User, then only Exhibit A, the INTEL SOFTWARE LICENSE AGREEMENT, applies.

Back   Accept   Cancel

3. Go through the readme document for more installation tips then click "Install".
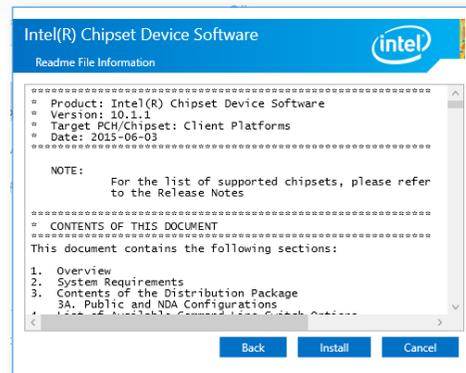
4. The step displays the installing status in the progress.
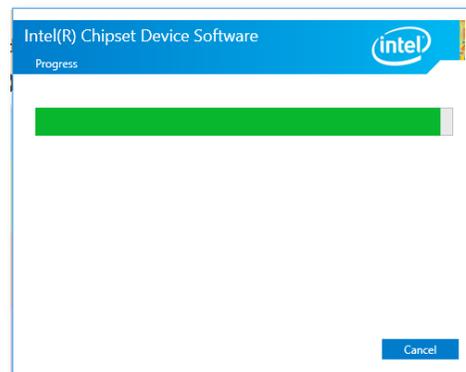
5. After completing installation, click "Restart Now" to exit setup.

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

### ► Intel HD Graphics Drivers

1. Setup is now ready to install the graphics driver. Click "Next".
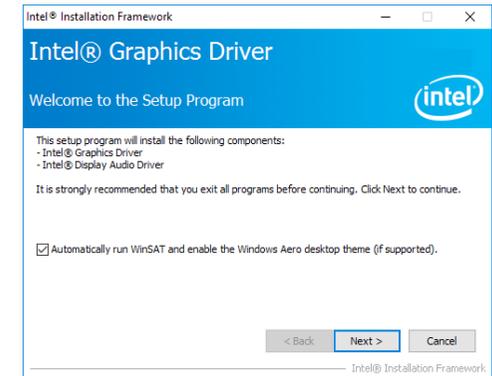
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 10 desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.
We recommend that you skip this process by disabling this function then click "Next".

2. Read the license agreement then click "Yes".
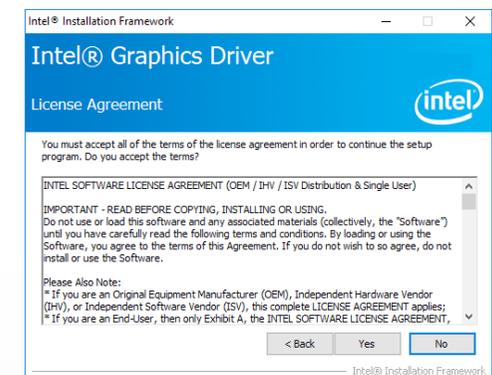
3. Go through the readme document for system requirements and installation tips then click "Next".
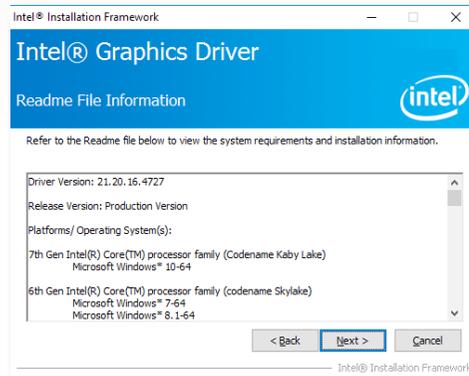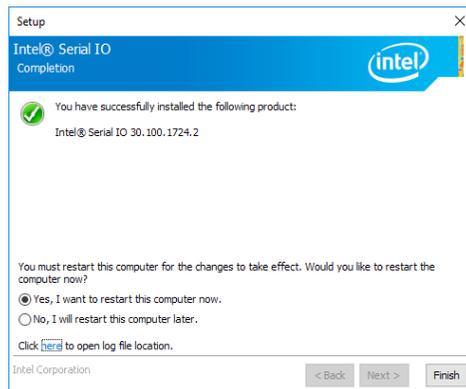

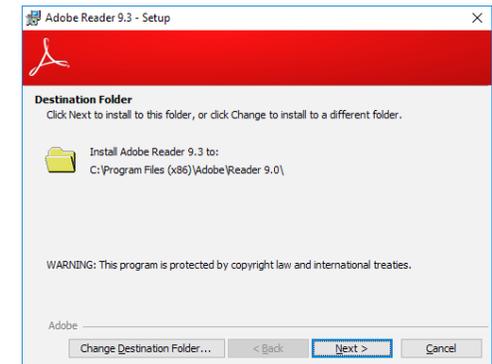4. Setup is now installing the driver. Click "Next" to continue.
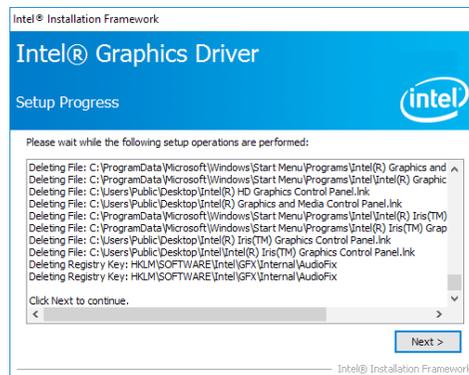
5. Click "Yes, I want to restart this computer now" then click "Finish".

   Restarting the system will allow the new software installation to take effect.
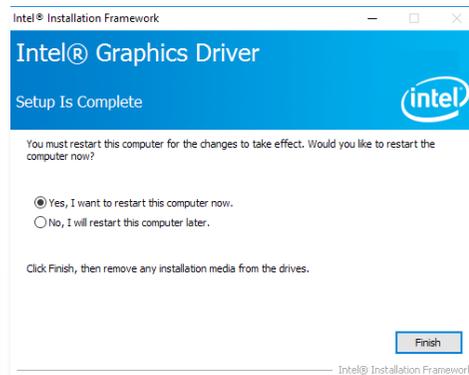
► **Realtek Audio Drivers**

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

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

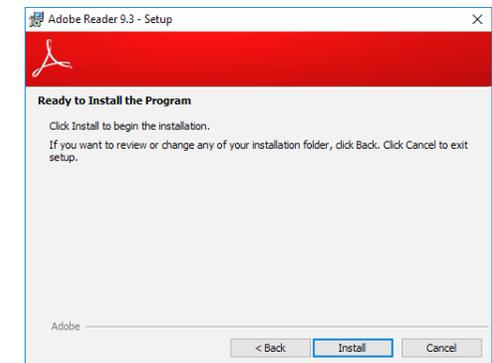   Restarting the system will allow the new software installation to take effect.

► Intel LAN Drivers

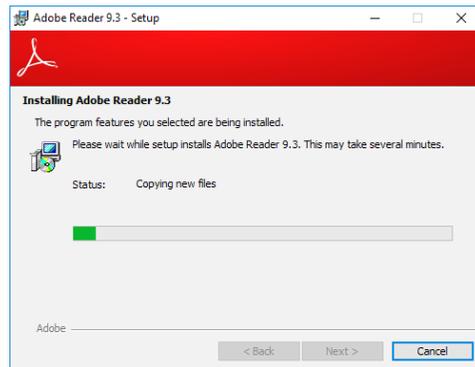1. Setup is ready to install the driver. Click "Next".
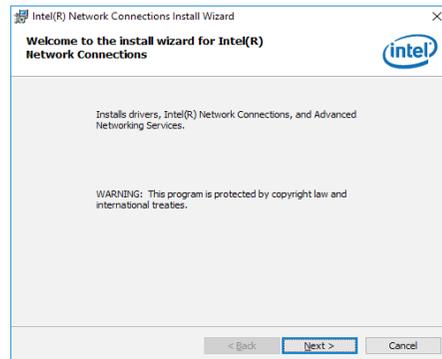
2. Click "I accept the terms in the license agreement" then click "Next".
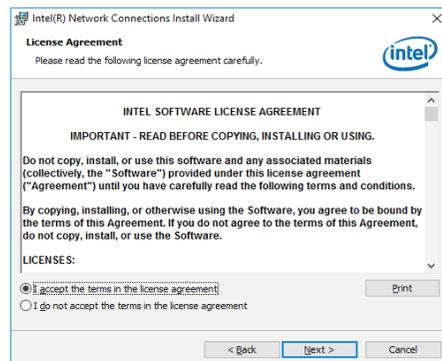
3. Select the program features you want installed then click "Next".
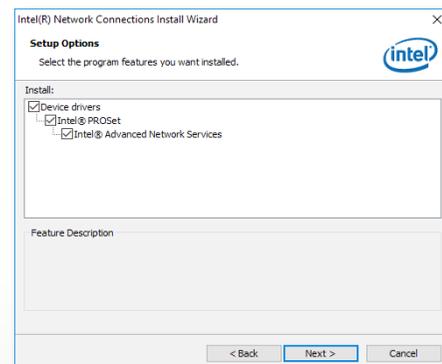
4. Click "Install" to begin the installation.
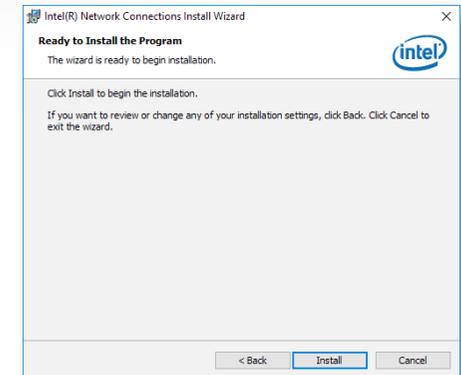
5. The step displays the installing status in the progress.
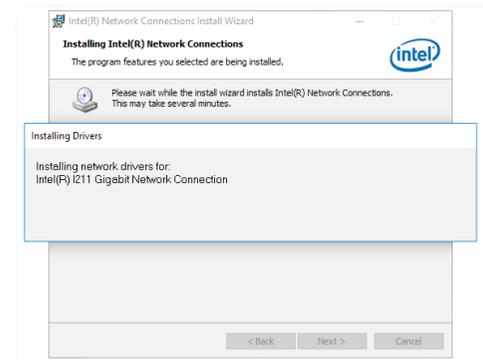
6. After completing installation, click "Finish".
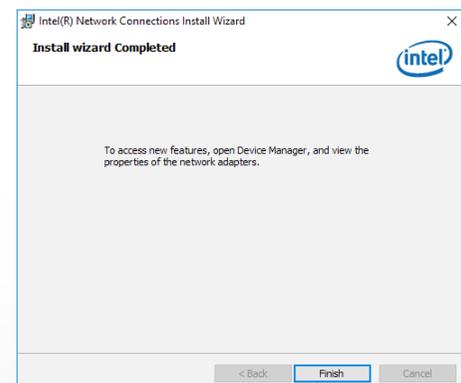
► Intel ME Drivers

1. Setup is ready to install the driver. Click "Next".
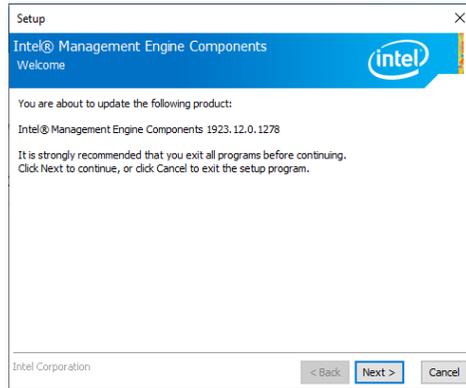
2. Read the license agreement then tick "I accept the terms in the License Agreement". Click "Next".
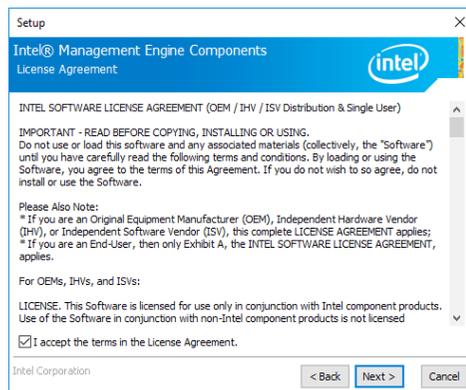
3. Click "Next" to install to the default folder, or click "Change" to choose another destination folder.
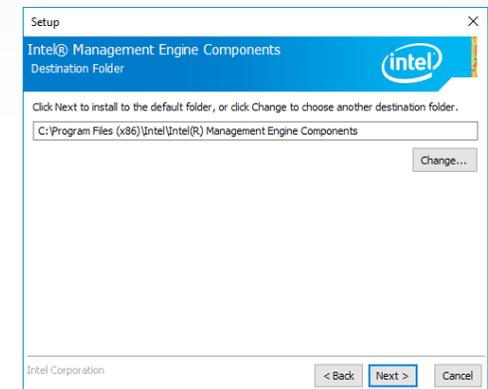
4. Please wait while the product is being installed.
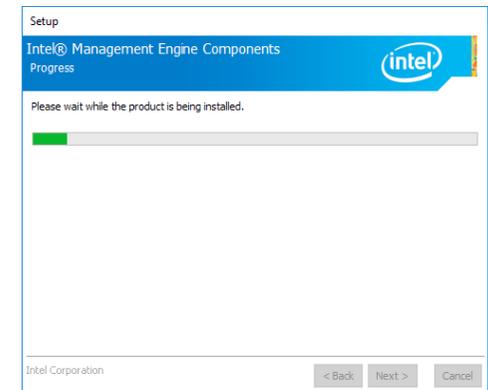
5. After completing installation, click "Finish".
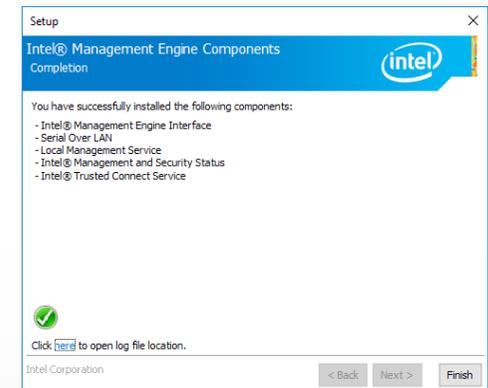
► Intel Serial IO Drivers

1. Setup is ready to install the driver. Click "Next".
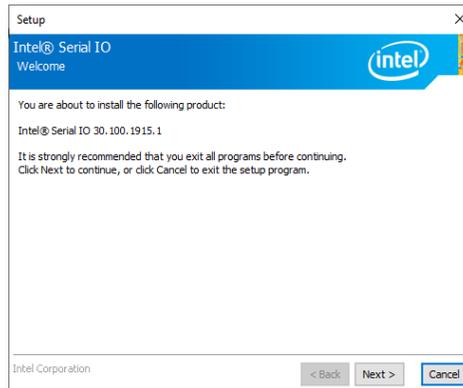
2. Read the license agreement carefully.

   Tick "I accept the terms in the License Agreement" then click "Next".
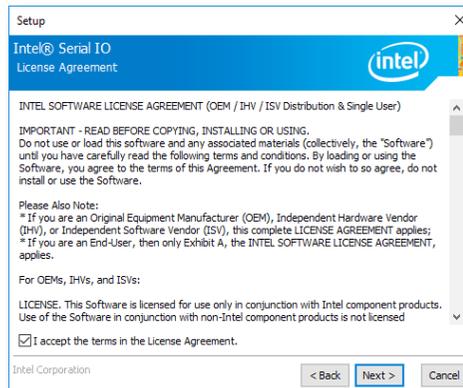
3. Go through the readme document for system requirements and installation tips then click "Next".
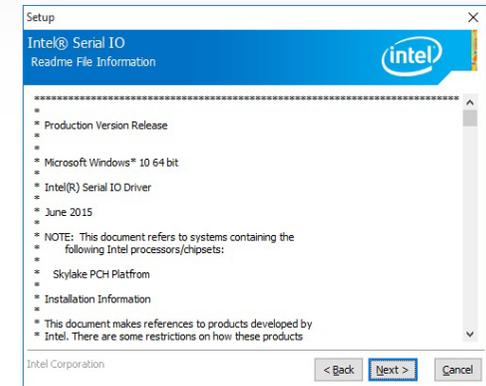
4. Setup is ready to install the driver. Click "Next".
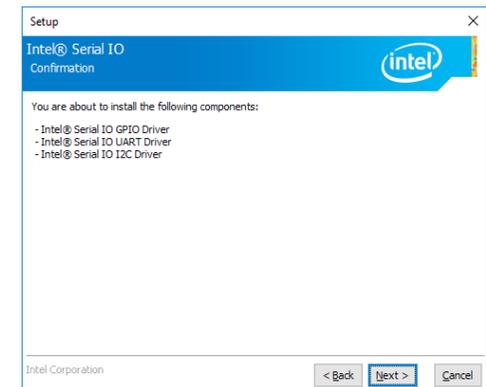
5. Setup is now installing the driver.
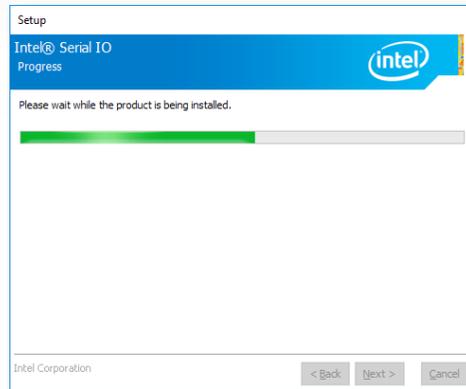
6. Click "Yes, I want to restart this computer now" then click "Finish".

   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.

► **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.

3. Setup is now installing the driver.
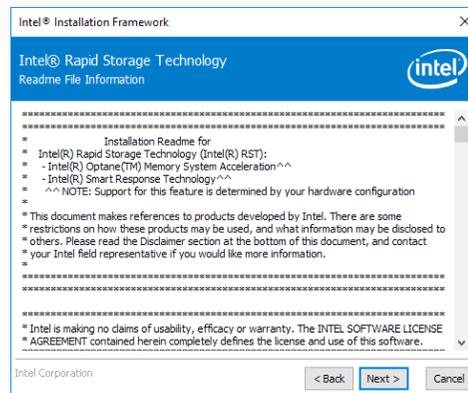
4. Click "Finish" to exit installation.

1. Setup is ready to install the utility. Click "Next".
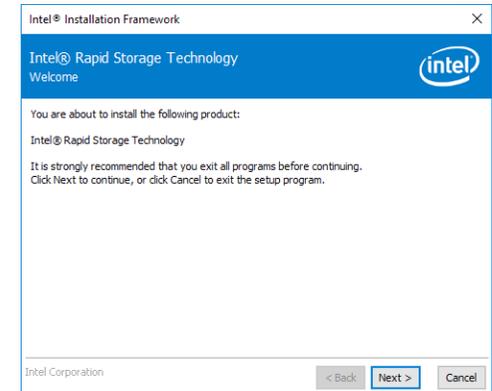
2. Read the license agreement and click "I accept the terms in the License Agreement". Then, click "Next".
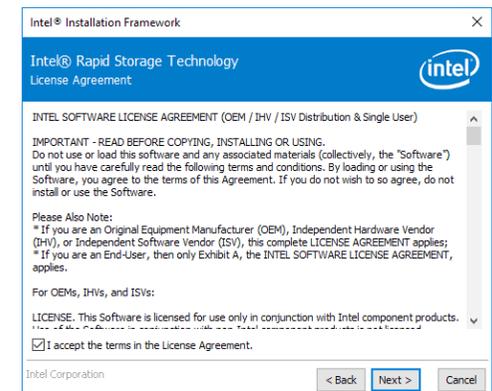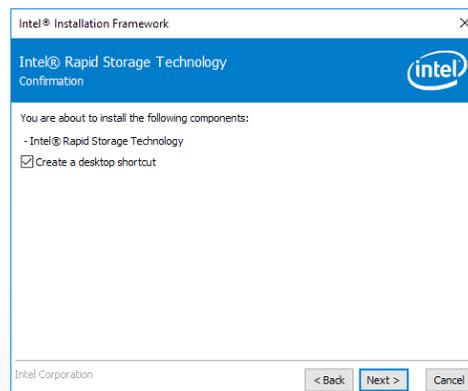
3. Go through the readme docu-
    ment to view system require-
    ments and installation informa-
    tion then click "Next".

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

4. Click "Next" to install to the
    default folder or click "Change
    to choose another destination
    folder".
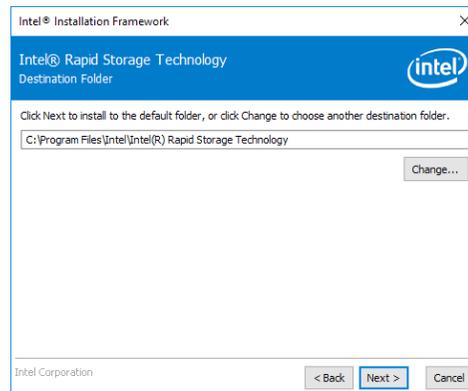
5. Confirm the installation and
    click "Next".