



## OPS150-CS

Digital Signage Embedded OPS Computer  
User's Manual



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## Trademarks

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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.

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## 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 consequential damages to the product that has been modified or altered.

## 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 OPS150-CS System

The system 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.

## Optional Items

- DDR4 SO-DIMM (4G/8G/16G)
- M.2 M Key SSD (128G/256G/512G/1TB)
- M.2 E Key Wifi + BT module withtwo antennas
- Microsoft Windows 10 IoT Enterprise 2019

The system 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.



## 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 Precautions

- Use the correct DC / AC input voltage range.
- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging in the power cord.
- There is danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent specifications of batteries recommend by the manufacturer.
- Dispose of used batteries according to local ordinance.
- Keep this system away from humid environments.
- Make sure the system is placed or mounted correctly and stably to prevent the chance of dropping or falling may cause damage.
- The openings on the system shall not be blocked and shall be kept in distance from

other objects to make sure of proper air ventilation to protect the system from over-heating.

- Dress the cables, especially the power cord, so they will not be stepped on, in contact with high temperature surfaces, or cause any tripping hazards.
- Do not place anything on top of the power cord. Use a power cord that has been approved for use with the system and is compliant with the voltage and current ranges required by the system's electrical specifications.
- If the system is to be unused or stored for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- If one of the following occurs, consult a service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated the system.
  - The system has been exposed to moisture.
  - The system is not working properly.
  - The system is physically damaged.
- The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace the outlet.
- Disconnect the system from the electricity outlet before cleaning. Use a damp cloth for cleaning the surface. Do not use liquid or spray detergents for cleaning.

## Chapter 1 - Introduction

### ► Specifications

<b>SYSTEM</b>	<b>Processor</b>	8th/9th Generation Intel® Core™ Processors, LGA 1151 Socket i7-9700TE Octa Core, 12M Cache, 1.8GHz (3.8GHz), 35W i5-9500TE Hexa Core, 9M Cache, 2.2GHz (3.6GHz), 35W i3-9100TE Quad Core, 6M Cache, 2.2GHz (3.2GHz), 35W i7-8700T Hexa Core, 12M Cache, 2.4GHz (4.0GHz), 25W (35W) i5-8500T Hexa Core, 9M Cache, 2.1GHz (3.5GHz), 25W (35W) i3-8300T Quad Core, 8M Cache, 2.5GHz (3.2GHz), 25W (35W)
	<b>Chipset</b>	Intel® H310 Chipset
	<b>Memory</b>	Two 260-pin SODIMM up to 32GB Dual Channel DDR4 2666MHz
	<b>BIOS</b>	Insyde SPI 16Mbit
<b>GRAPHICS</b>	<b>Controller</b>	Intel® HD Graphics 630
	<b>Feature</b>	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
	<b>Display</b>	1 x HDMI 1.4 or 1 x HDMI 2.0 output + 1 x DP 1.2 output (via JAE only) HDMI 1.4: resolution up to 3840x2160 @ 30Hz HDMI 2.0: resolution up to 3840x2160 @ 60Hz DP: resolution up to 4096x2160 @ 60Hz
	<b>Triple Displays</b>	2 x HDMI + 1 x DP
<b>EXPANSION</b>	<b>Interface</b>	1 x M.2 (2280 M Key) (PCIe NVMe x4/SATA 3.0) 1 x M.2 (2230 E Key) (PCIe/USB 2.0)
<b>ETHERNET</b>	<b>Controller</b>	Realtek RTL8111H
<b>LED</b>	<b>Indicators</b>	1 x Power LED 1 x HDD LED
<b>FRONT I/O</b>	<b>Ethernet</b>	1 x GbE (RJ-45)
	<b>Serial</b>	1 x RS-232 (DB-9)
	<b>USB</b>	2 x USB 3.1 Gen1
	<b>Display</b>	1 x HDMI 1.4 output
	<b>Audio</b>	1 x Line-out 1 x Mic-in
	<b>Buttons</b>	1 x Power Button 1 x Reset Button
	<b>Wi-Fi Antenna</b>	2 x Wi-Fi Module Antenna Hole

<b>REAR I/O</b>	<b>OPS Interface</b>	JAE TX25: 1 x HDMI 2.0 1 x DP 1.2 2 x USB 2.0 1 x USB 3.0 1 x UART 1 x Audio out 1 x 12~19V DC-in
	<b>COOLING</b>	<b>Fan</b> Active Cooling
<b>WATCHDOG TIMER</b>	<b>Output &amp; Interval</b>	System Reset, Programmable via Software from 1 to 255 Seconds
<b>OS</b>		Windows 10 Enterprise (64-bit) Linux
<b>MECHANISM</b>	<b>Construction</b>	Aluminum + SGCC
	<b>Dimensions</b>	200mm x 30mm x 119mm (W x H x D)
	<b>Weight</b>	2.64 kg
<b>ENVIRONMENT</b>	<b>Operating Temperature</b>	-5 to 45°C
	<b>Storage Temperature</b>	-40 to 85°C
	<b>Relative Humidity</b>	10 to 90% RH (non-condensing)
	<b>COMPLIANCE</b>	<b>Certification</b> CE/FCC/CCC



The specifications listed here may be based on editions that do not resemble your actual products. Please visit the download page at [go.dfi.com/OPS150-CS](https://go.dfi.com/OPS150-CS), or via the QR code to the right for the latest datasheet.



## ► Features

### OPS Module

Open Pluggable Specification (OPS) is a standard launched by Intel to standardize the architecture between displays and media players. It has flexibility in performance and expandability to meet emerging demands in current digital signage applications. The OPS computer is modularized to fit into the OPS display as an elegant embedded solution.

### 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.

### M.2 Expansion

M.2 is the Next Generation Form Factor (NGFF) which is designed to support multiple modules in applications such as solid-state disk storage, wired/wireless LAN connection, Bluetooth, and etc.

### 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.

### 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.

### 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.

### USB

The system board supports the new USB 3.1 Gen 1. It is capable of running at a maximum transmission speed of USB 3.1 Gen 1 (5 Gbit/s, or 625 MB/s). USB 3.1 reduces the time required for data transmission, reduces power consumption, and is backward compatible with USB 2.0. It is a marked improvement in device transfer speeds between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

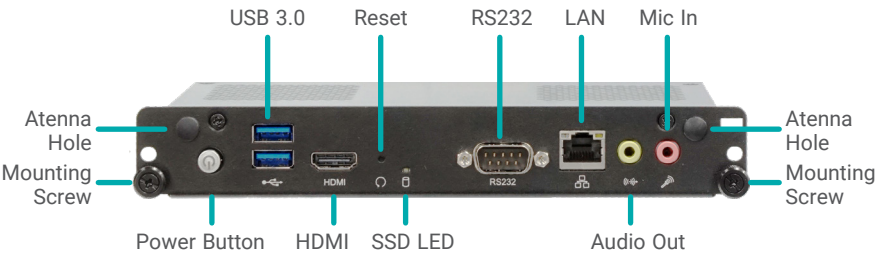
### RTC Timer

The Real Time Clock (RTC) installed on the system board allows your system to automatically power-on on the set date and time.

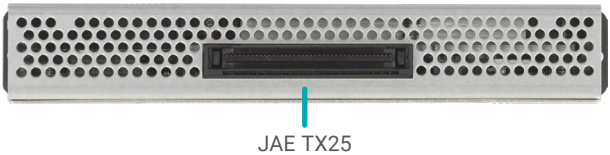
Chapter 2 - Hardware Installation

► Overview

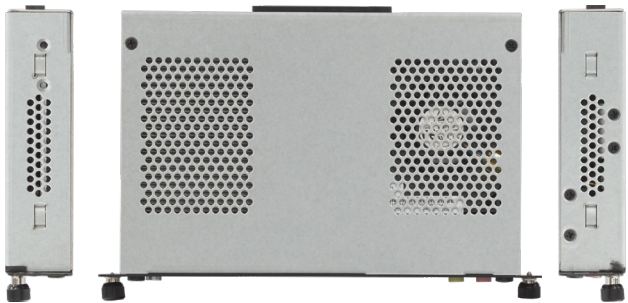
Front Panel



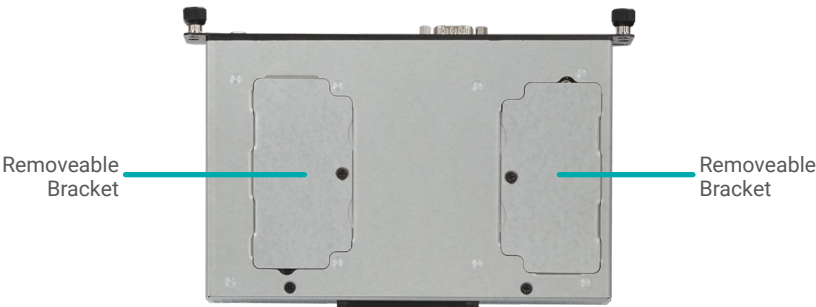
Rear Panel I/O



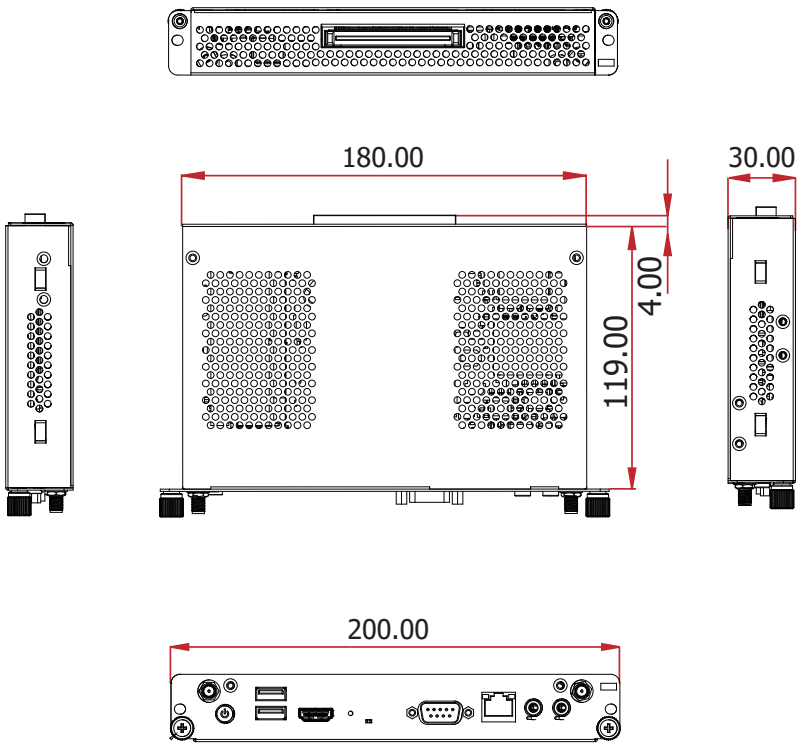
Top and Side View



Bottom View

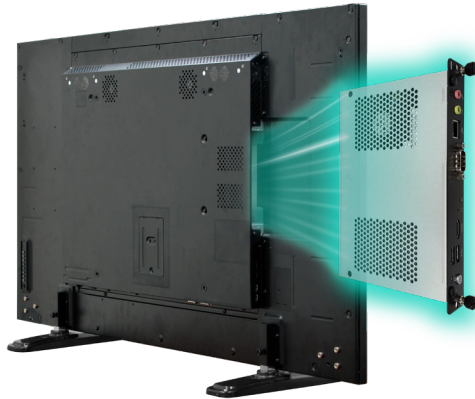


Dimensions



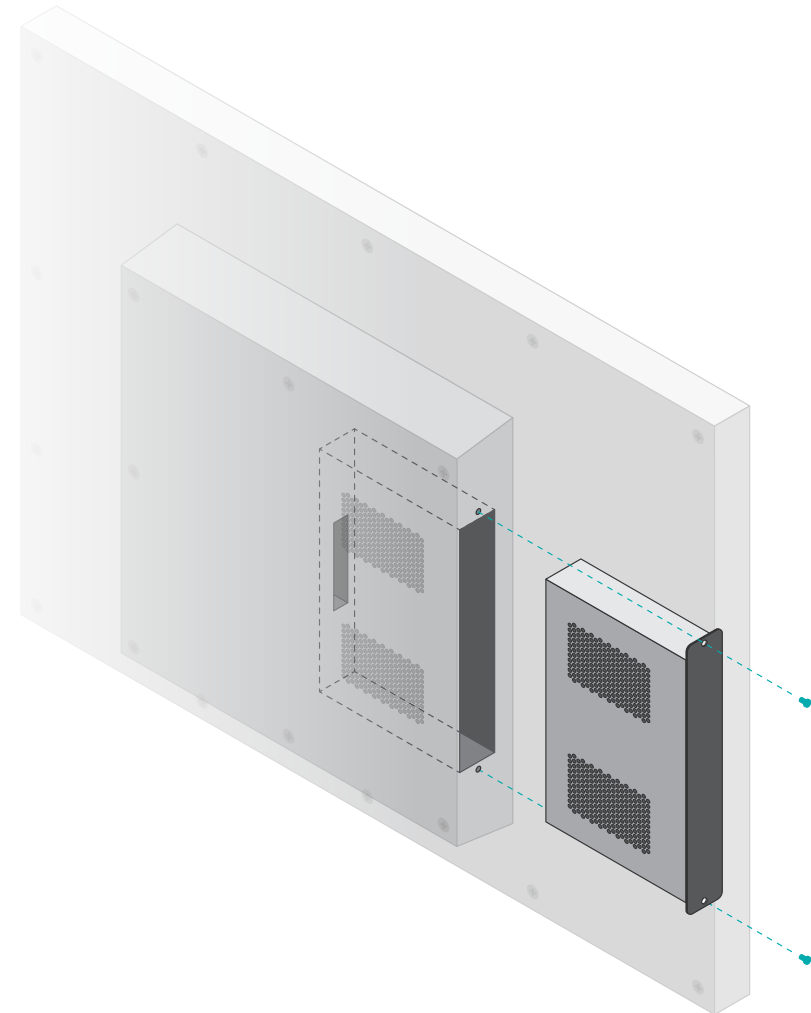
## ► Installation

### Mounting into OPS Display



Please follow the steps and attend to the safety cautions while mounting the OPS module into the OPS display.

1. Power off the OPS display and unplug its power cord to eliminate any chance of electric shock.
2. Insert the OPS module into the OPS slot on the OPS display while making sure the ventilation holes face the exterior of the slot and align with those on the OPS display.
3. Push the module all the way into the slot. The gap between the module panel and the slot shall close up.
4. Insert the mount screws into the mounting screw holes, and fasten them tight.



**Note:**

Two additional spring screws are attached to the front panel and can be used for mounting if the OPS display has tapped screw holes for them.



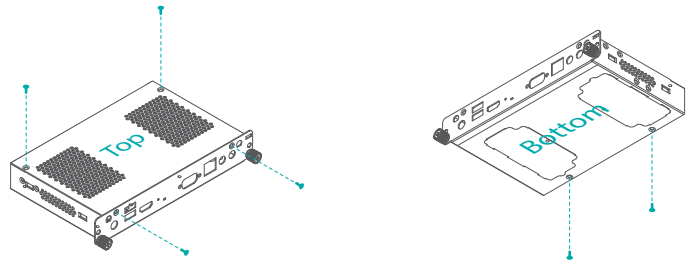
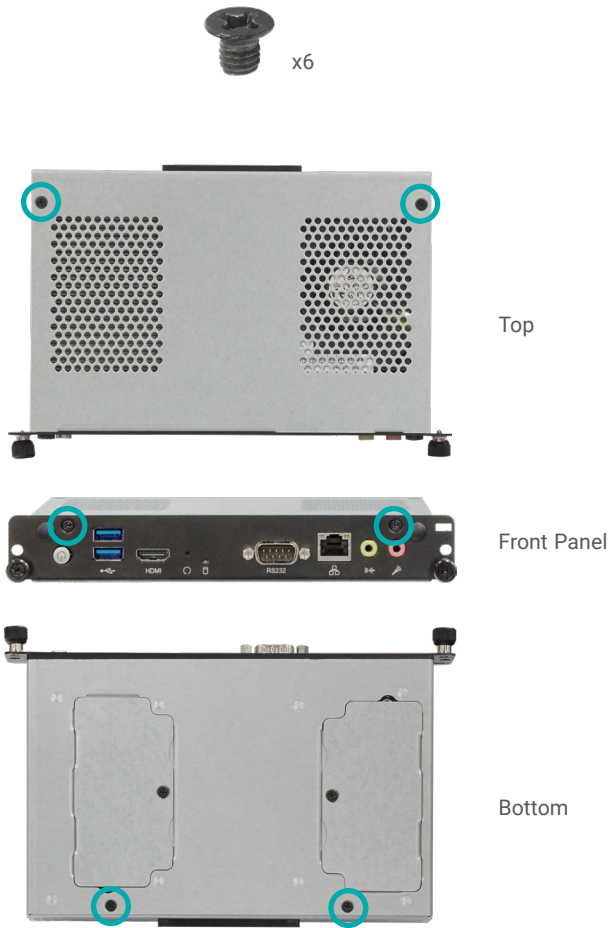
**Important:**

When removing the OPS module, completely cut off the power of both the OPS module and the OPS display, and remove the power cable to rule out any chances of ESD/EOS damage to the system.

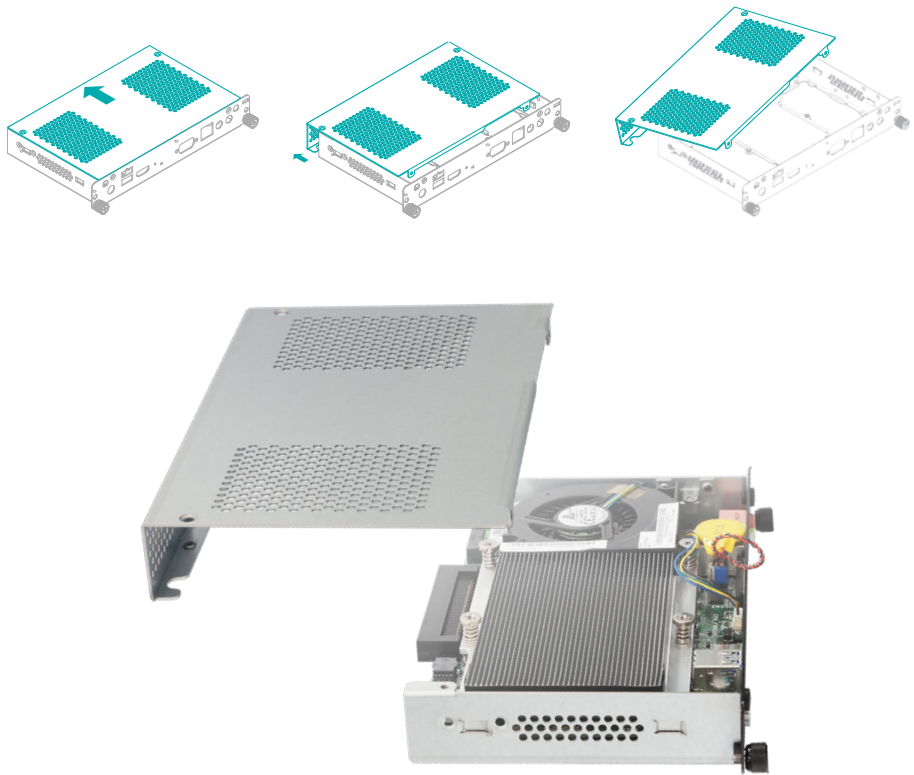
► Assembly

Top Cover

The top cover can be removed to reveal the internal I/O connectors and cables. The top metal cover is secured onto the chassis with six F3\*4 zinc-coated screws – two on the front panel, two on the top, and the other two on the bottom. Use a Phillips screwdriver to unscrew them.



After the six above-mentioned screws are removed, place the system on a stable work surface, and slide the cover towards the rear before removing it.

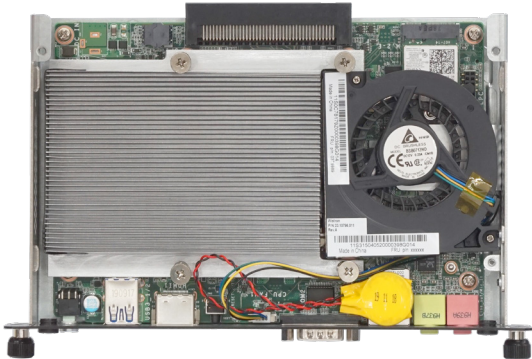




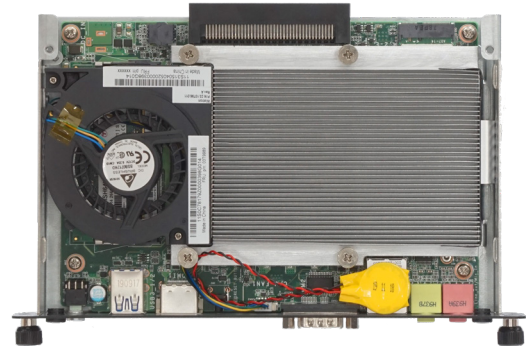
► Assembly

Heatsink and Fan

The Heatsink and Fan can be mounted in two manners — fan on the right and heatsink on the left, or fan on the left and heatsink on the right. The fan is mounted onto the heatsink and a fan bracket screwed onto either side of the chassis. Please attend to the



Config 1: Fan on the right and heatsink on the left



Config 2: Fan on the left and heatsink on the right

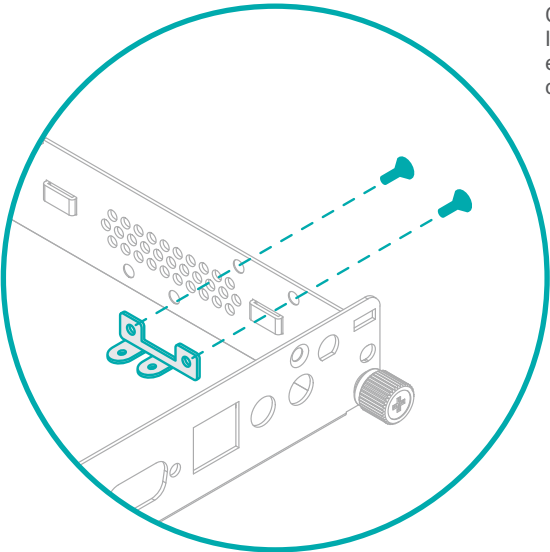
Installation Steps Overview

- Step 1: Fan Bracket Installation
- Step 2: Heatsink Installation
- Step 3: PCH Heat Spreader Installation
- Step 4: Fan Installation

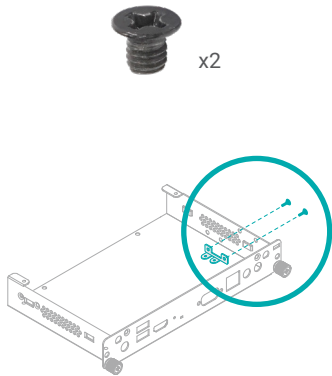
Step 1: Fan Bracket Installation

Install/remove the fan bracket by screwing/unscrewing the two screws at either side of the chassis's exterior.

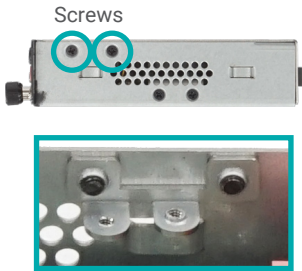
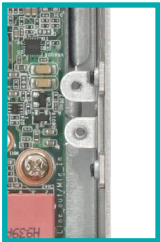
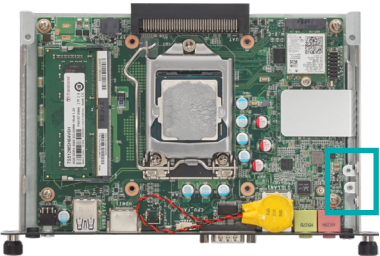
Config 1: Fan on the right and heatsink on the left



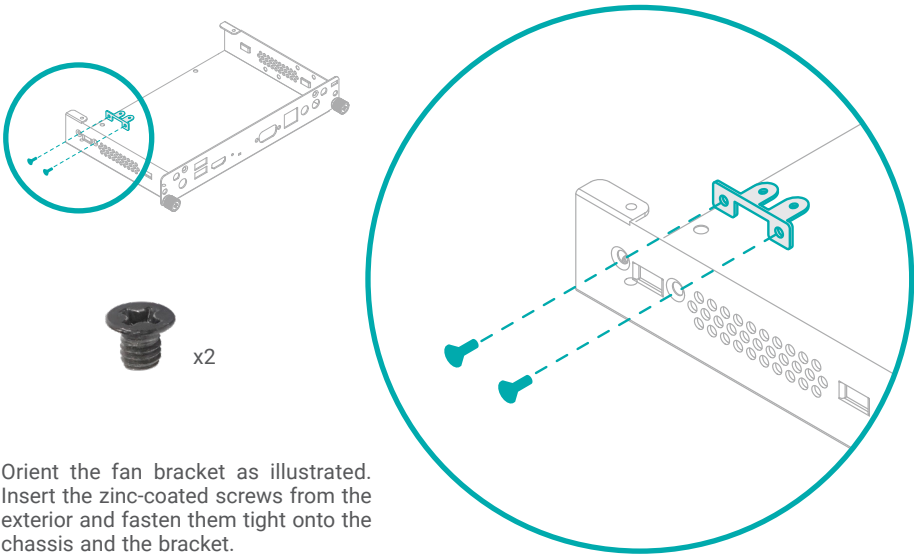
Orient the fan bracket as illustrated. Insert the zinc-coated screws from the exterior and fasten them tight onto the chassis and the bracket.



When installed correctly, the locations of the bracket and the screws shall resemble the following photos.

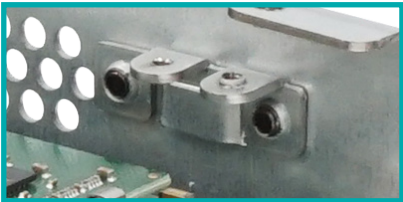


Config 2: Fan on the left and heatsink on the right



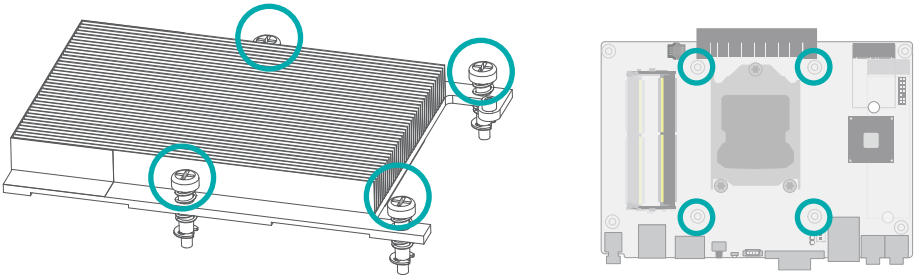
Orient the fan bracket as illustrated. Insert the zinc-coated screws from the exterior and fasten them tight onto the chassis and the bracket.

When installed correctly, the locations of the bracket and the screws shall resemble the following photos.



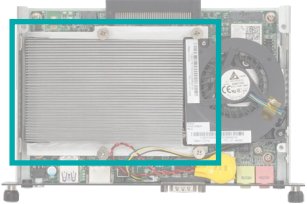
Step 2: Heatsink Installation

Install/remove the heatsink by screwing/unscrewing two of the spring screws at opposite corners, and then proceed with the other two spring screws. Please make sure the system board is secured onto the base of the chassis before installing the heatsink.

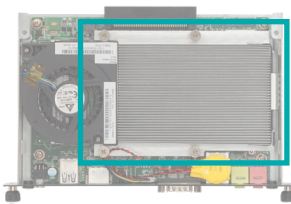


Orient the heatsink so that it is seated in correspondence to the configuration of your choice.

Config 1: Fan on the right and heatsink on the left



Config 2: Fan on the left and heatsink on the right



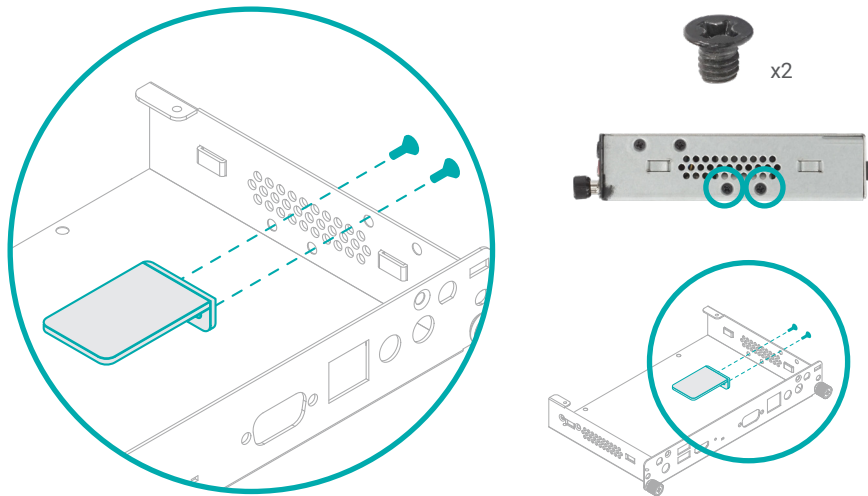
**Important:**

Since the springs of the screws are highly resilient and lopsidedness of the screwed-on heatsink may cause uneven pressure and possible damage to the CPU and board, it is highly suggested that, during the installation/disassembly, the heat-sink is applied additional pressure to remain parallel to the board.



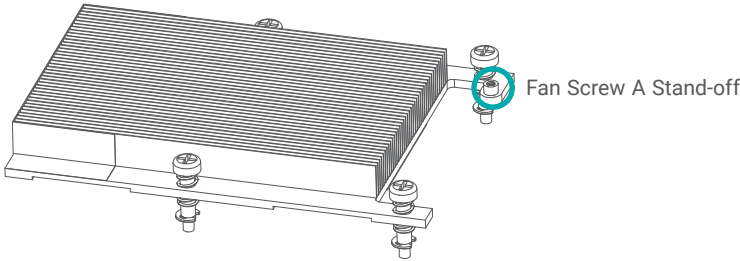
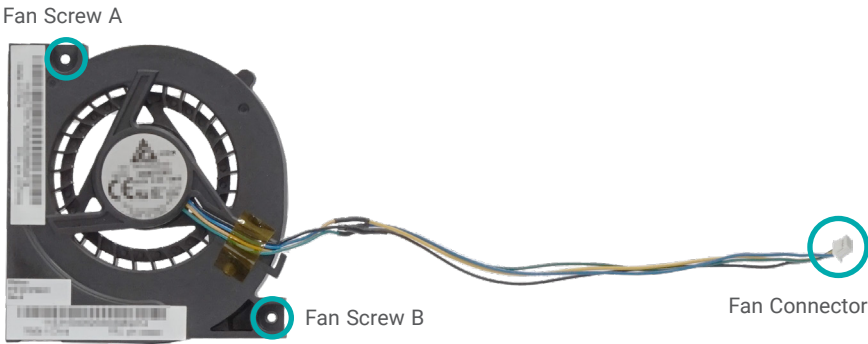
Step 3: PCH Heat Spreader Installation

The heat spreader is attached to the right side of the chassis via two zinc-coated screws. Please make sure the system board is secured onto the base of the chassis before installing the heat spreader.



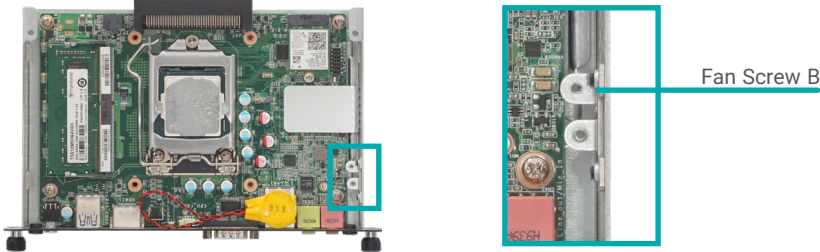
Step 4: Fan Installation

The fan is designed to fit into the space between the heatsink and the chassis wall. Align the flat side of the fan to the heatsink, seat Fan Screw A on top of the Fan Screw A Stand-off, and Fan Screw B on one of the screw holes on the fan bracket.

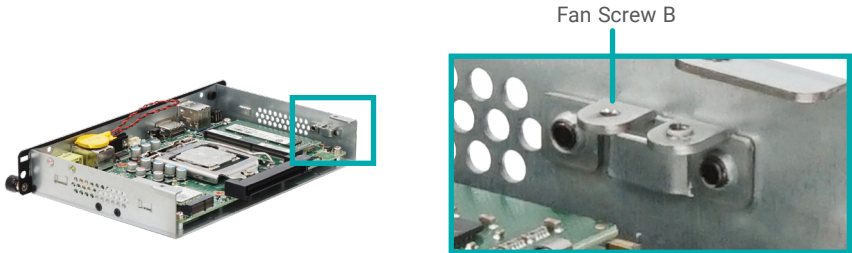


The fan bracket can be installed onto either side of the chassis wall as instructed previously. The two configurations are shown in the photos below:

Config 1: Fan on the right and heatsink on the left

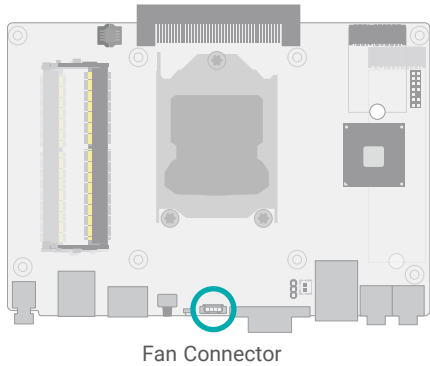


Config 2: Fan on the left and heatsink on the right

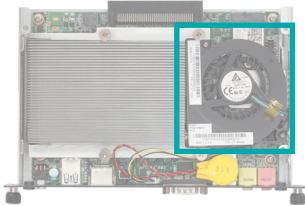


► Assembly ► Heatsink and Fan

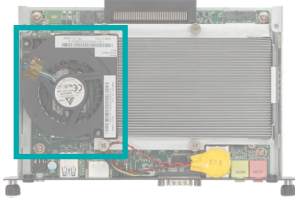
Plug/unplug the fan connector, and place the fan in the space between the heatsink and the chassis wall.



Config 1: Fan on the right and heatsink on the left



Config 2: Fan on the left and heatsink on the right



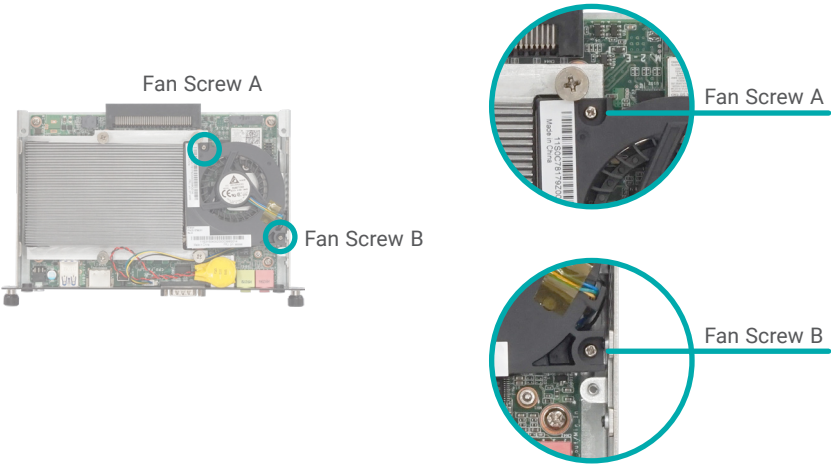
**Note:**  
The fan cable is recommended to be routed under the fan. Routing the cable over the top of the fan may result in difficulty in closing up the top cover.

Install/remove the fan by screwing/unscrewing the two M2\*4 round-head screws at two locations – Fan Screw A and Fan Screw B – with regard to the two heatsink and fan configurations.

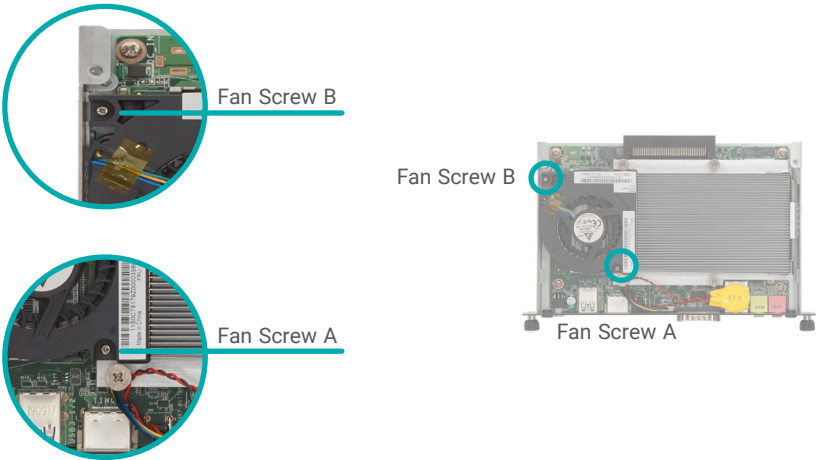


x2

Config 1: Fan on the right and heatsink on the left



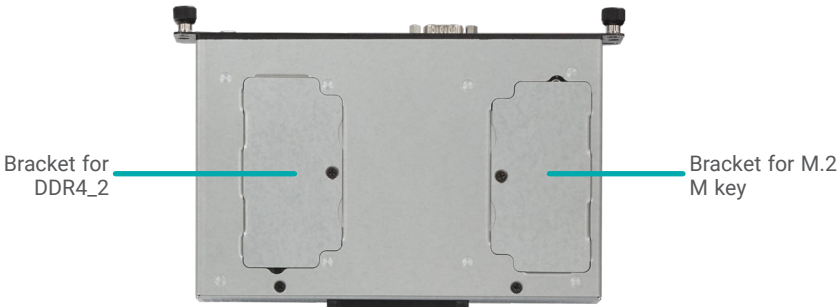
Config 2: Fan on the left and heatsink on the right



► Assembly

Module Bracket

One DDR4 socket and the M.2 M key socket are located on the bottom of the system board, and can be accessed by removing the module bracket located at the bottom of the chassis without having to disassemble the board from the chassis.



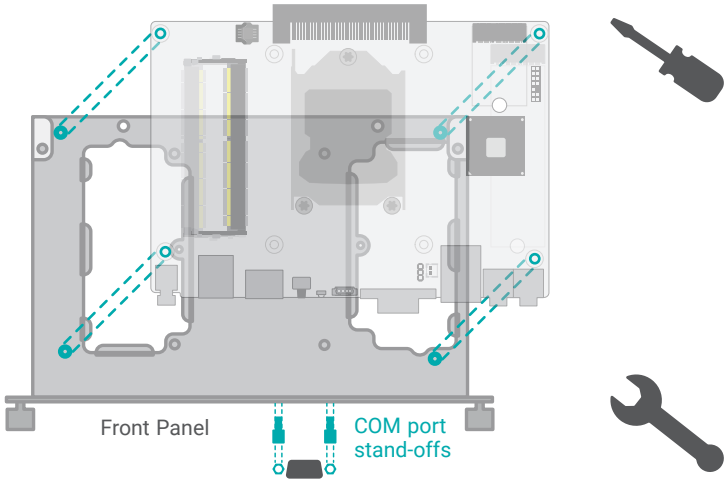
Place the system on a stable work surface with its bottom side facing up. Unscrew the zinc-coated screw.



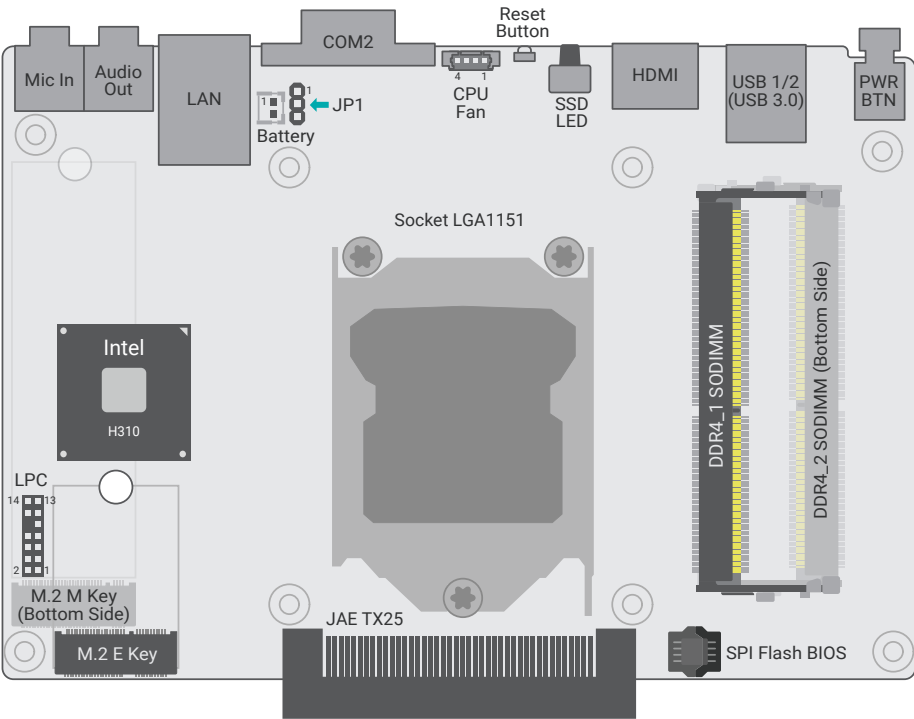
Lift up the bracket at the side closer to the screw hole and remove it to reveal the socket.

System Board

The system board is secured onto the four stand-offs welded onto the base of the chassis via four spring screws, and is in addition secured by the COM port stand-offs.



► Board Layout

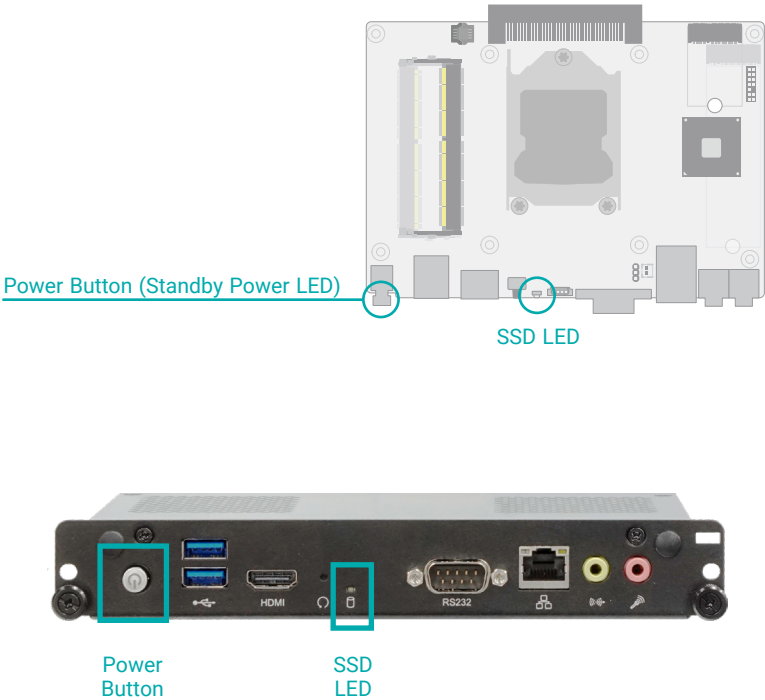


**Note:**  
The M.2 M key and DDR4\_2 sockets are located at the bottom side, and can be accessed via the module covers on the bottom of the chassis without having to remove the board from the chassis.



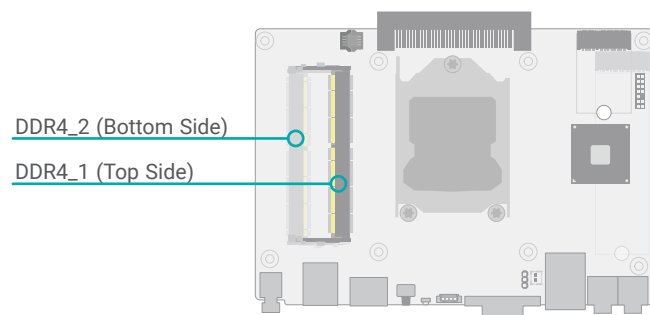
**Important:**  
Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and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

► LEDs



**Important:**  
When the Standby Power LED lights up, 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



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 SO-DIMM up to 32GB
- Dual Channel DDR4 2666MHz

## Installing the SO-DIMM Module

DDR4\_1 can be installed only after

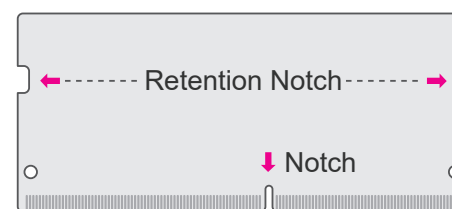
- 1) the top cover is removed,
- 2) and the heatsink and fan are removed.

DDR4\_2 can be installed only after

- 1) the module bracket on the bottom of the chassis is removed as instructed previously,
- 2) or the system board is removed from the chassis, which is neither necessary nor recommended.

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

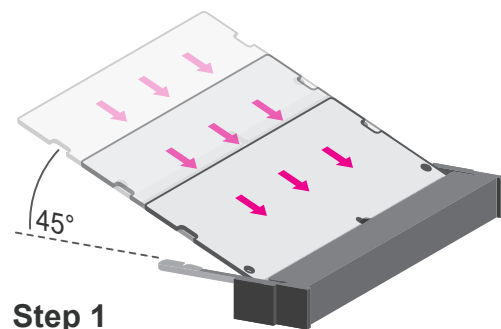


««« DDR4 SO-DIMM



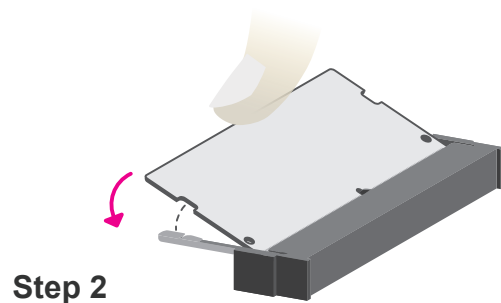
««« Socket Top View

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



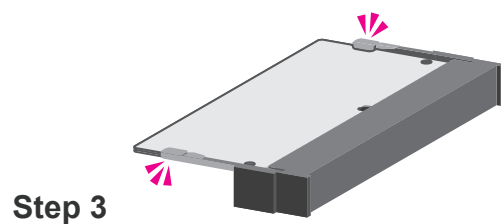
**Step 1:**

Insert the memory card into the slot while making sure 1) the notch and the key are aligned, and 2) the non-connector end rises approximately 45 degrees horizontally. Press the card firmly into the socket while applying and maintaining even pressure on both ends.



**Step 2:**

Press the end of the card far from the socket down while making sure the retention notch and the clip align as indicated by the dotted line in the illustration. If the retention notch and the clip do not align, please remove the card and re-insert it. Press the card all the way down.



**Step 3:**

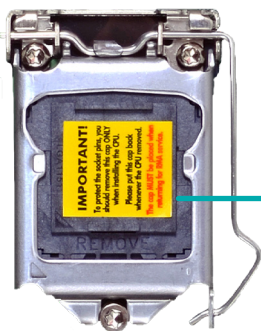
The clips snap automatically and abruptly to the retention notches of the card sounding a distinctive click, and lock the card in place. Inspect that the clip sits in the notch. If not, please pull the clips outward, release and remove the card, and mount it again.

## ► 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.



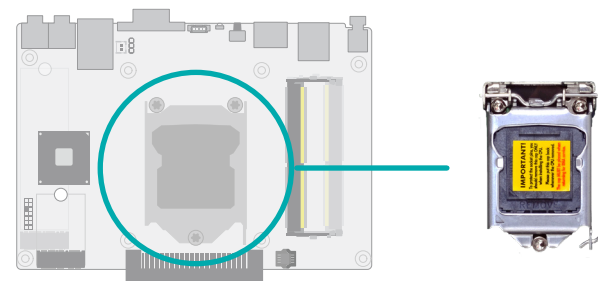
Protective cap

**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, and remove the heatsink and fan as previously instructed in this chapter.



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

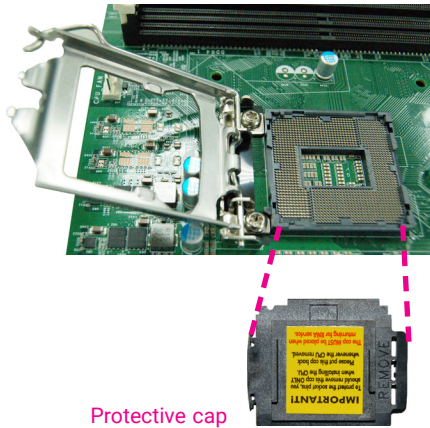


CPU ▶ Installing the CPU

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



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



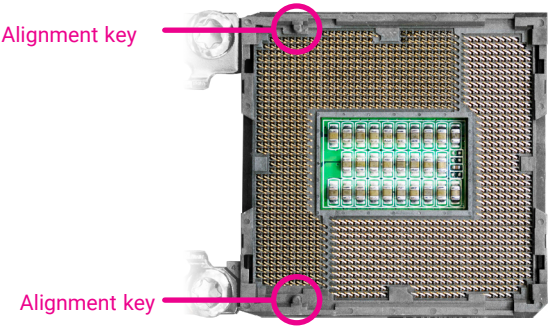
7-1. Insert the CPU into the socket. The gold triangular mark on the CPU must align with the chamfer corner of the CPU socket shown in the photo.



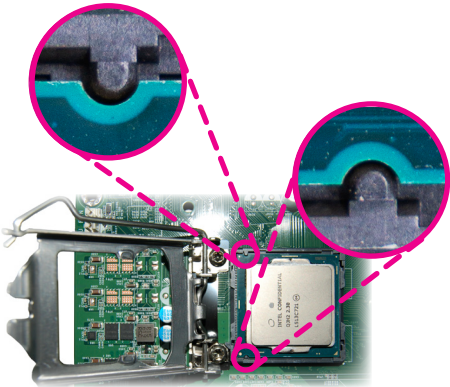
**Important:**  
The CPU will fit in only one orientation and can easily be seated without exerting any force.

CPU ▶ Installing the CPU

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

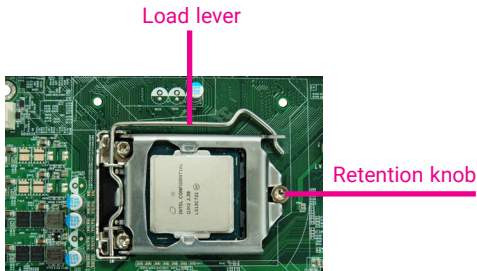


7-3. The CPU's notch will fit into the socket's alignment key when it's seated in the correct orientation.



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

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

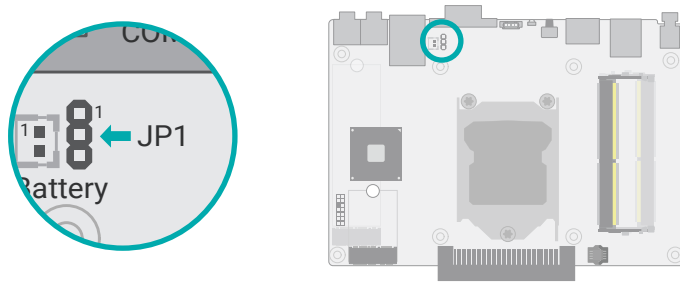


9. Press down the load lever and hook it under the retention tab.



## ► Jumper Settings

### Clear CMOS (JP1)



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 JP2's pin 2 and pin 3. Wait for a few seconds and set JP2 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.



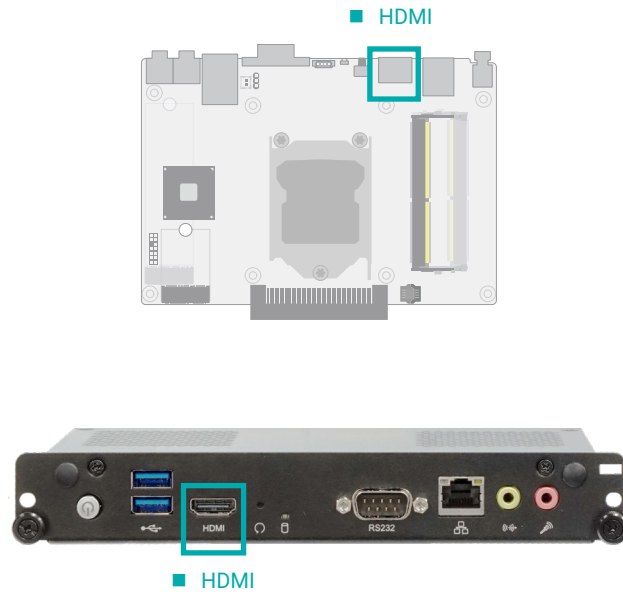
■ 1-2 On: Normal (default)



■ 2-3 On: Clear CMOS

## ► I/O Ports

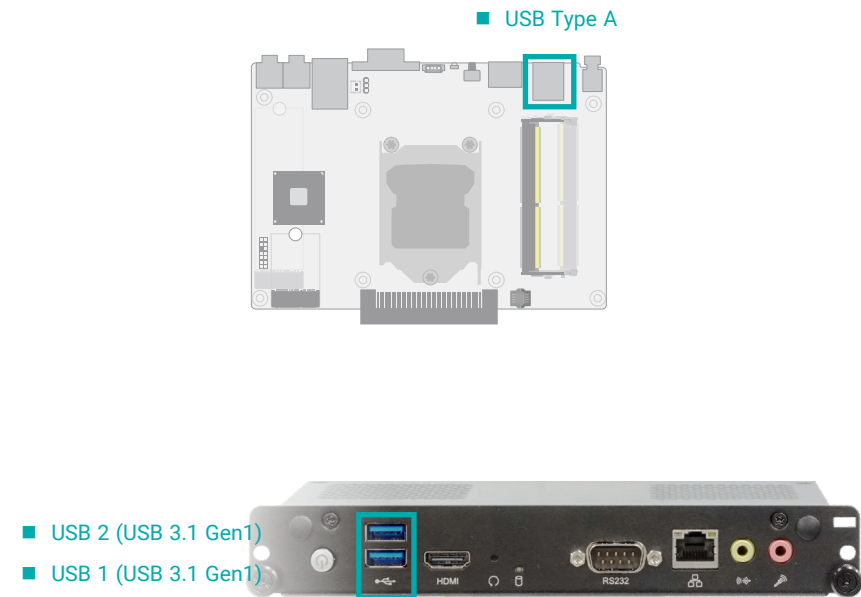
### Graphics Display



#### HDMI

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.

### USB Ports



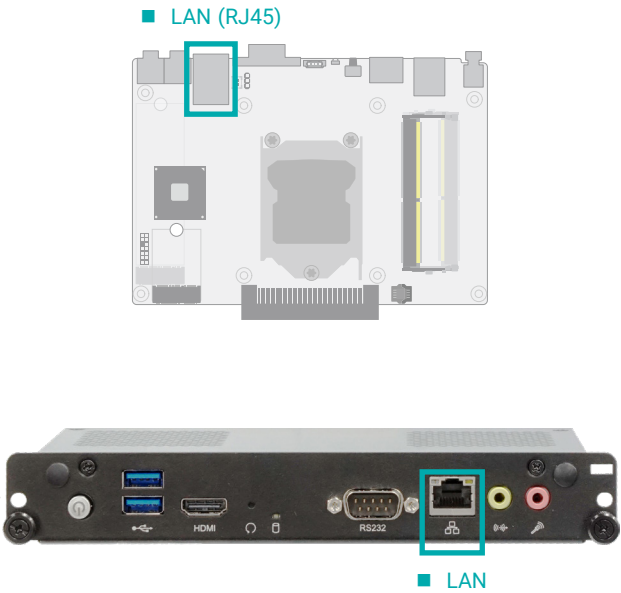
USB allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals. The system board is equipped with multiple USB Type A ports at the front panel – two USB 3.1 Gen1 ports.

#### 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.

I/O Ports

RJ45 LAN Ports



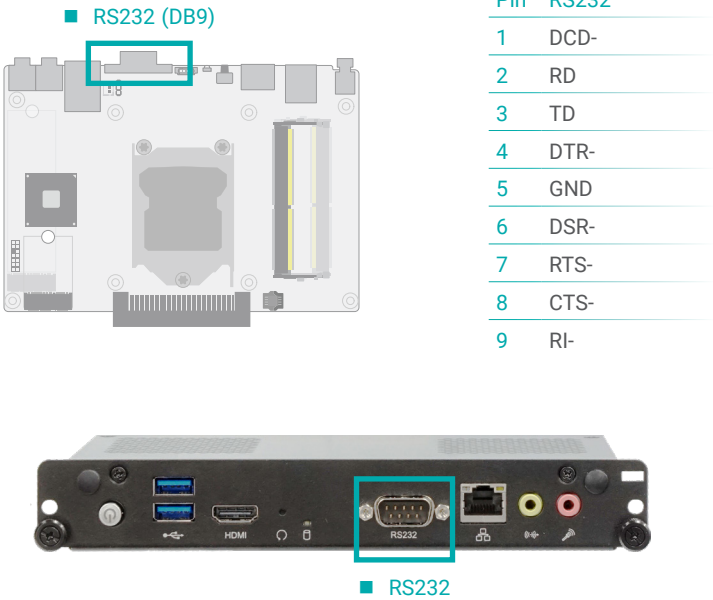
The LAN port allows the system board to connect to a local area network by means of a network hub.

Features

- Realtek RTL8111H GbE Lan controller

I/O Ports

COM (Serial) Port

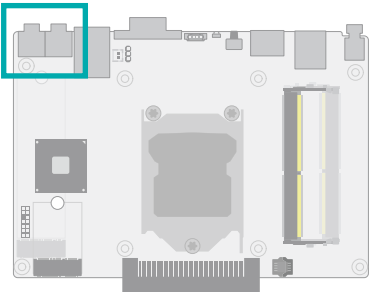


The serial ports are asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices.

I/O Ports

Audio

Line Out and Mic In



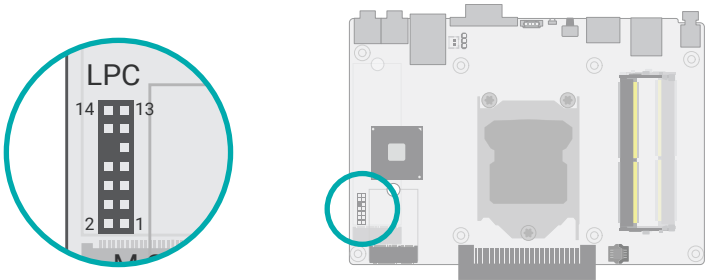
Audio Ports

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

I/O Ports

LPC

The LPC connector is used for debugging.

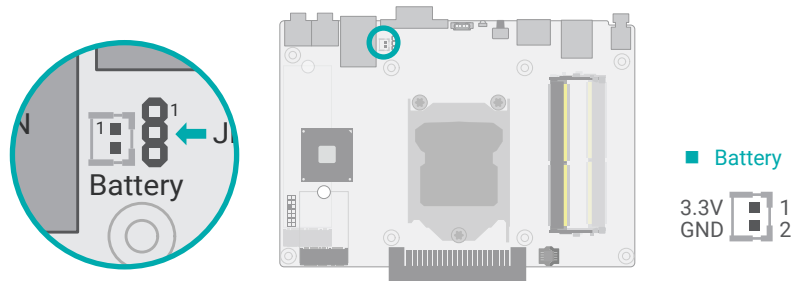


LPC Pin Assignment

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

I/O Ports

Battery



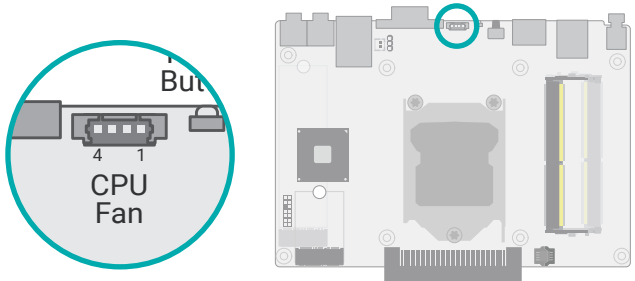
The external lithium ion battery supplies power to the real-time clock and CMOS memory as an auxiliary source of power when the main power is shut off.

Safety Measures

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

I/O Ports

CPU Fan



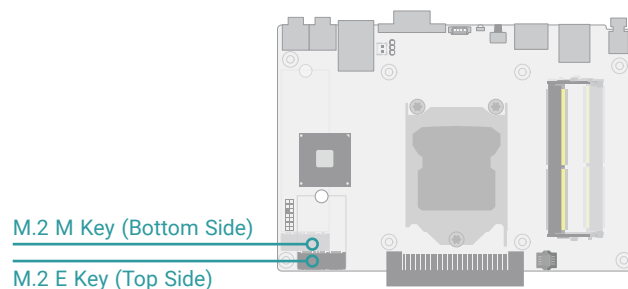
These fan connectors are used to connect to cooling fans. Cooling fans provide adequate air circulation throughout the chassis and dissipate heat to prevent overheating of the system board and components.

3-pin Fan Pin Assignment

Pin	Assignment
1	GND
2	12V
3	CPU FAN IN
4	CPU FAN Out

► I/O Ports

## Expansion Slots



### M.2 Sockets

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 space and standoffs for the M.2 M Key socket (22mm x 80mm) on the bottom side, and the M.2 E Key socket (22mm x 30mm) on the top side.



**Note:**

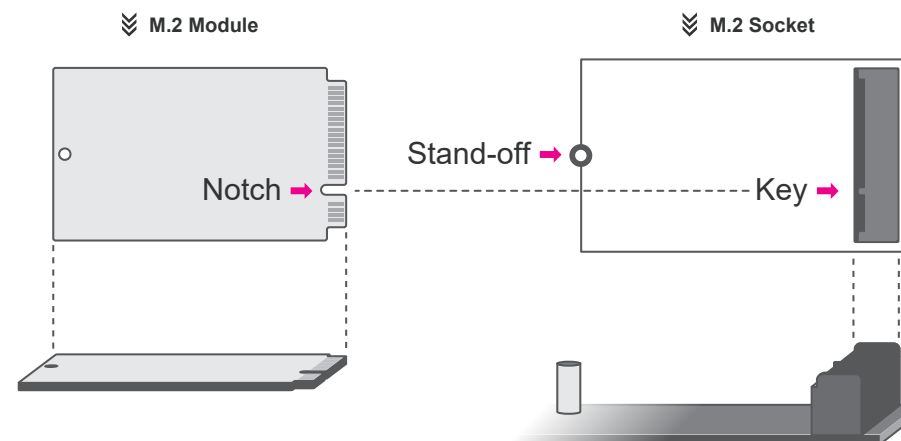
The M.2 E Key socket can only be accessed after the top cover, the heatsink or the fan are removed. The M.2 M key can be accessed by opening the module bracket on the bottom of the chassis as previously instructed in this chapter.

► I/O Ports

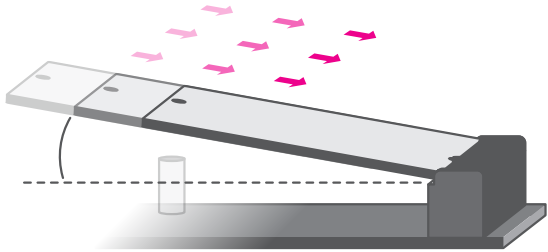
## Installing the M.2 Module

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

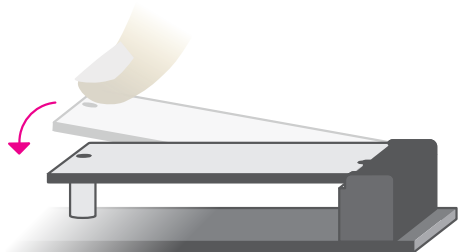
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the M.2 socket on the system board
4. Make sure the notch on card is aligned to the key on the socket.
5. Make sure the standoff screw is removed from the standoff.



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 Wifi Antenna for the M.2 E Key Wifi Module (Optional)

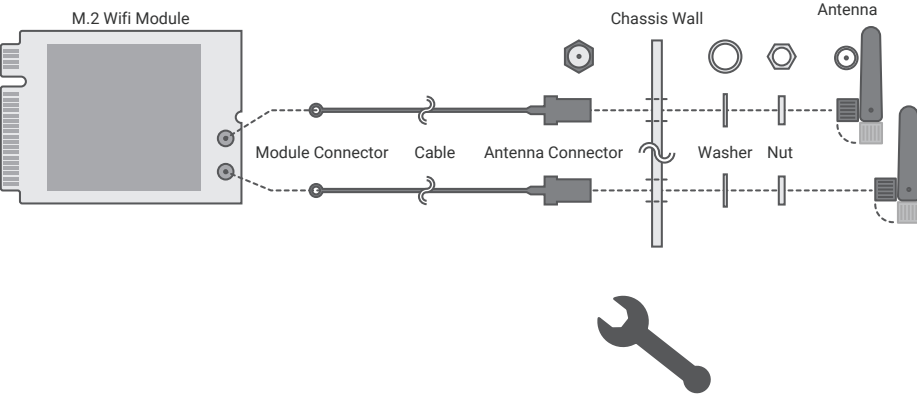
Before installing the antennas for the M.2 E Key wifi module, please make sure that the following safety cautions are well-attended.

1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.

To access the M.2 E key wifi module, remove the top cover, heatsink and fan as instructed previously in this chapter. Remove the two black rubber plugs at the front panel to reveal the antenna holes.

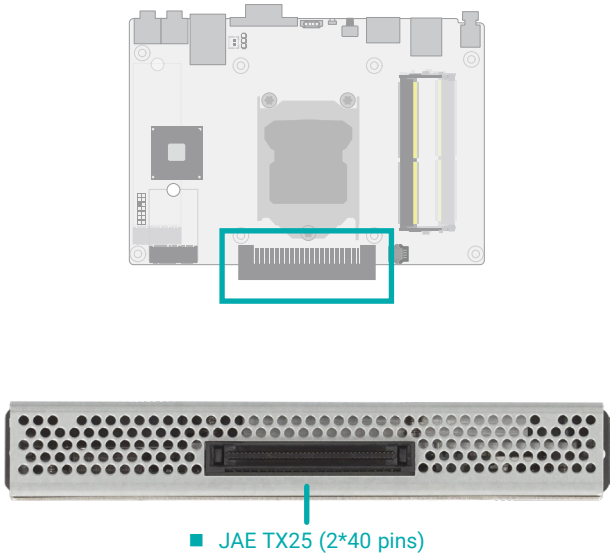


Connect the cable to the Wifi module, screw the antenna connector through the antenna holes on the front panel with washers and nuts, and screw on the antennas as illustrated below.



I/O Ports

OPS Display



The JAE TX25 connector is used for mounting the OPS module onto an OPS display.

Pin	Function	Pin	Function
1	DDI1_TX3_DN	41	N.C.
2	DDI1_TX3_DP	42	N.C.
3	GND	43	N.C.
4	DDI1_TX2_DN	44	N.C.
5	DDI1_TX2_DP	45	N.C.

6	GND	46	N.C.
7	DDI1_TX1_DN	47	N.C.
8	DDI1_TX1_DP	48	N.C.
9	GND	49	N.C.
10	DDI1_TX0_DN	50	SYSFANOUT1
11	DDI1_TX0_DP	51	RXD_UART_SIO
12	GND	52	TXD_UART_SIO
13	DDI1_AUX_DN	53	GND
14	DDI1_AUX_DP	54	USB3_RX3_DN
15	DDPB_HPD	55	USB3_RX3_DP
16	GND	56	GND
17	-HDMI_CLK_CON	57	USB3_TX3_DN
18	+HDMI_CLK_CON	58	USB3_TX3_DP
19	GND	59	GND
20	-HDMI0_CON	60	USBP_6N
21	+HDMI0_CON	61	USBP_6P
22	GND	62	GND
23	-HDMI1_CON	63	USBP_8N
24	+HDMI1_CON	64	USBP_8P
25	GND	65	CEC
26	-HDMI2_CON	66	USBP_7N
27	+HDMI2_CON	67	USBP_7P
28	GND	68	GND
29	DDC_SDA_C	69	LINE_OUT2_L_B2B
30	DDC_SCL_C	70	LINE_OUT2_R_B2B
31	HPD_HMTX	71	CEC
32	GND	72	GND
33	19VSB/12VSB	73	PWR_BTN-
34	19VSB/12VSB	74	SYSPWROK_OPS_B2B
35	19VSB/12VSB	75	GND
36	19VSB/12VSB	76	GND
37	19VSB/12VSB	77	GND
38	19VSB/12VSB	78	GND
39	19VSB/12VSB	79	GND
40	19VSB/12VSB	80	GND



## Chapter 3 - BIOS Settings

### ► 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
<F2>	Display previous values
<F9>	Optimized defaults
<F10>	Save and Exit
<Esc>	Return to previous menu

#### Scroll Bar

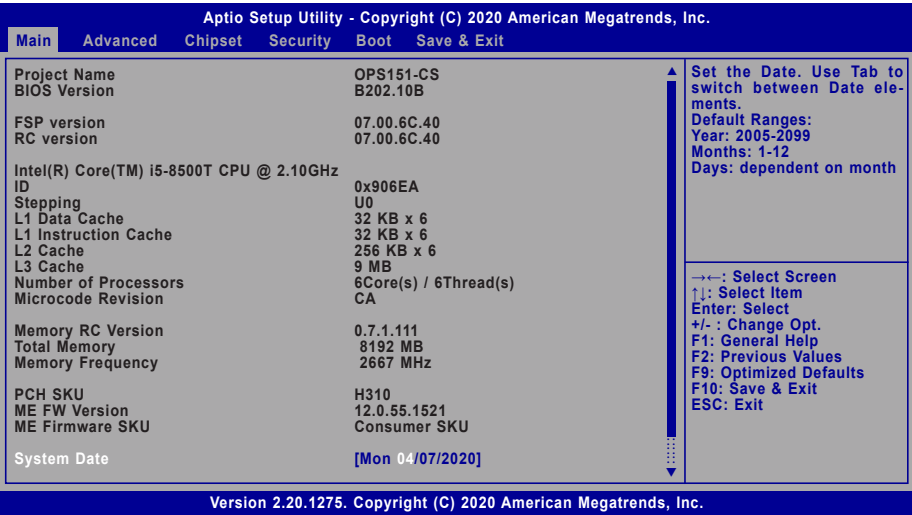
When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

#### Submenu

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

► Main

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



System Date

The date format is <month>, <date>, <year>. Press "Tab" to switch to the next field and press "-" or "+" to modify the value.

System Time

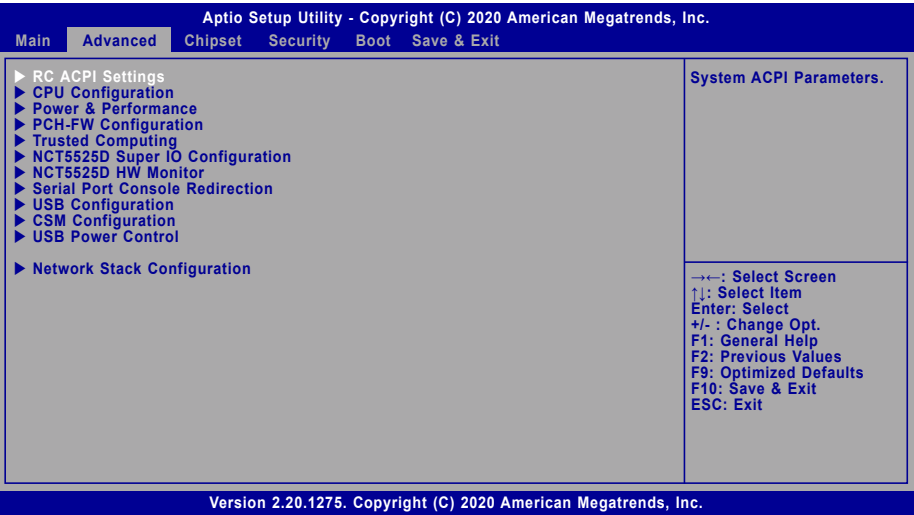
The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

► Advanced

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



**Important:**  
Setting incorrect field values may cause the system to malfunction.



► Advanced

RC ACPI Configuration

Advanced

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.

RC ACPI Configuration		Enable or disable System wake on alarm event. When enabled, System will wake on the hr:min::sec specified
Wake system from S5	[Enabled]	
Wake up hour	0	
Wake up minute	0	
Wake up second	0	
State After G3	[S0 State]	

→←: Select Screen  
↑↓: Select Item  
Enter: Select  
+/-: Change Opt.  
F1: General Help  
F2: Previous Values  
F9: Optimized Defaults  
F10: Save & Exit  
ESC: Exit

Version 2.20.1275. Copyright (C) 2020 American Megatrends, Inc.

Wake system from S5 via RTC

When Enabled, the system will automatically power up at a designated time every day. Once it's switched to [Enabled], please set up the time of day — hour, minute, and second — for the system to wake up.

State After G3

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

- S0 State

The system automatically powers on after power failure.
- S5 State

The system enter soft-off state after power failure. Power-on signal input is required to power up the system.
- Last State

The system automatically the last state right before the power failure.

► Advanced

CPU Configuration

Advanced

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.

CPU Configuration		When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Intel (VMX) Virtualization Technology	[Enable]	
Active Processor Cores	[All]	
Hyper-Threading	[Enable]	

→←: Select Screen  
↑↓: Select Item  
Enter: Select  
+/-: Change Opt.  
F1: General Help  
F2: Previous Values  
F9: Optimized Defaults  
F10: Save & Exit  
ESC: Exit

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Intel (VMX) Virtualization Technology


When this field is set to Enabled, the VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

Active Processor Cores

Select number of cores to enable in each processor package: all or 1.

Hyper-threading

Enables this field for Windows XP and Linux which are optimized for Hyper-Threading technology. Select disabled for other OSes not optimized for Hyper-Threading technology. When disabled, only one thread per enabled core is enabled.



Note:

Some of the fields may not be available when the features are not supported by the equipped CPU.

## ► Advanced

## Power &amp; Performance

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.			
Advanced			
Power & Performance		Allows more than two frequency ranges to be supported.	
Intel(R) SpeedStep(tm) [Enabled]			
Turbo Mode [Enabled]			
C states [Enabled]			
		→←: Select Screen ↑↓: Select Item Enter: Select +/- : Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit	
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## Intel(R) SpeedStep(tm)

This field is used to enable or disable the Intel SpeedStep® Technology, 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 EIST is enabled.

## C states

Enable or disable CPU Power Management. It allows CPU to enter "C states" when it's idle and nothing is executing.

**Note:**

Some of the fields may not be available when the features are not supported by the equipped CPU.

## ► Advanced

## PCH-FW Configuration

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Advanced			
ME State	[Enabled]	When Disabled ME will be put into ME Temporarily Disabled Mode.	
► Firmware Update Configuration	[Enabled]		
		→←: Select Screen ↑↓: Select Item Enter: Select +/- : Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit	
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## ME State

When this field is set to Disabled, ME will be put into ME Temporarily Disabled Mode.

## ► Firmware Update Configuration

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.			
Advanced			
Me FW Image Re-Flash	[Disable]	Enable/Disable Me FW Image Re-Flash function.	
		→←: Select Screen ↑↓: Select Item Enter: Select +/- : Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit	
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## Me FW Image Re-Flash

This field is used to enable or disable the ME FW Image Re-Flash function, which allows the user to update the ME firmware.

► Advanced

Trusted Computing

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Advanced

TPM20 Device Found	403.1	Enables or Disables BIOS support for security device. O.S will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Firmware Version	INTC	
Vendor:		
Security Device Support	[Enable]	
Pending operation	[None]	

→←: Select Screen  
↑↓: Select Item  
Enter: Select  
+/- : Change Opt.  
F1: General Help  
F2: Previous Values  
F9: Optimized Defaults  
F10: Save & Exit  
ESC: Exit

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Security Device Support

This field is used to enable or disable BIOS support for the security device such as an TPM 2.0 to achieve hardware-level security via cryptographic keys.

Pending operation

To clear the existing TPM encryption, select "TPM Clear" and restart the system. This field is not available when "Security Device Support" is disabled.

► Advanced

NCT5525D Super IO Configuration

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Advanced

NCT5525D Super IO Configuration		WatchDog Timer Unit Selection
Super IO Chip	NCT5525D	
WatchDog Timer Unit	[Second]	
SuperIO WatchDog Timer	0	

► Serial Port 1 Configuration

→←: Select Screen  
↑↓: Select Item  
Enter: Select  
+/- : Change Opt.  
F1: General Help  
F2: Previous Values  
F9: Optimized Defaults  
F10: Save & Exit  
ESC: Exit


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WatchDog Timer Unit

Select WatchDog Timer Unit — Second or Minute.

SuperIO WatchDog Timer

Set SuperIO WatchDog Timer Timeout value. The range is from 0 (disabled) to 255.



**Note:**  
The sub-menu is detailed in following sections.

▶ Serial Port 1 Configuration

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Advanced

Serial Port 1 Configuration

Serial Port [Enabled]  
Device Settings IO=3F8h; IRQ=4;

Enable or Disable Serial Port (COM)

→←: Select Screen  
↑↓: Select Item  
Enter: Select  
+/- : Change Opt.  
F1: General Help  
F2: Previous Values  
F9: Optimized Defaults  
F10: Save & Exit  
ESC: Exit

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Serial Port

Enable or disable the current serial COM port.



**Note:**  
The actual number of serial ports may differ.

NCT5525D HW Monitor

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.

Advanced

Pc Health Status

▶ Smart Fan Function

System temperature : +37 °C  
CPU temperature : +33 °C  
CPU\_Fan1 Speed : 1717 RPM  
VBAT : +3.056 V  
VIN2 : +0.896 V  
VIN0 : +5.116 V  
AVSB : +3.376 V  
3VSB : +3.376 V  
3VCC : +3.376 V

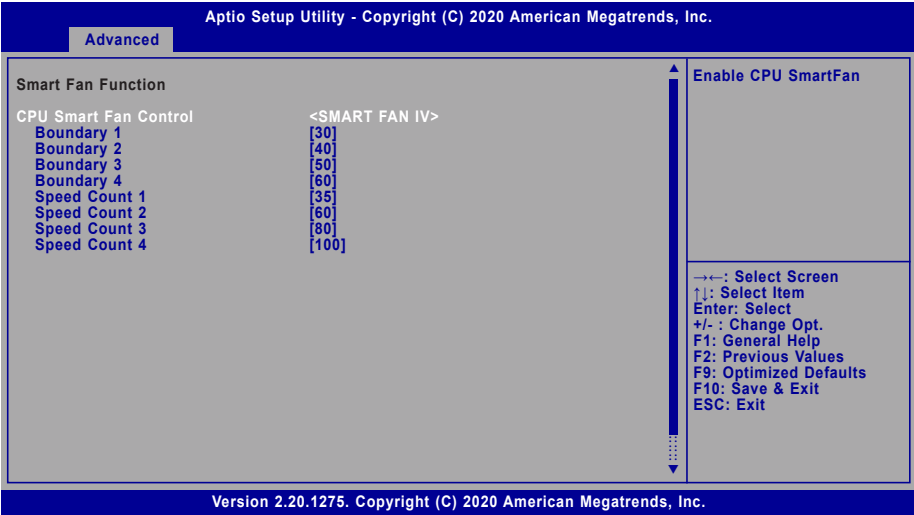
Smart Fan function setting

→←: Select Screen  
↑↓: Select Item  
Enter: Select  
+/- : Change Opt.  
F1: General Help  
F2: Previous Values  
F9: Optimized Defaults  
F10: Save & Exit  
ESC: Exit

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This section displays the system's health information, i.e. voltage readings, CPU and system temperatures, and fan speed readings.

▶ Smart Fan Function



Smart Fan is a fan speed moderation strategy dependent 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.

▼ CPU Smart Fan Control = [SMART FAN IV]

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.

Speed Count 1 to Speed Count 4

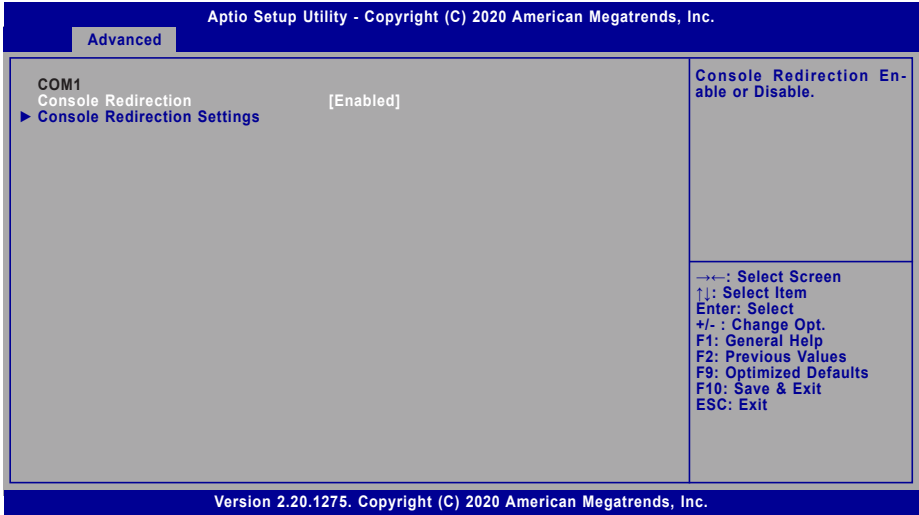
Set the fan speed, the value ranging from 1-100%, 100% being full speed. The fans will operate according to the specified boundary temperatures above-mentioned.

▼ CPU Smart Fan Control = [Manual mode]

Manual PWM Setting

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.

Serial Port Console Redirection



Console Redirection

By enabling Console Redirection of a COM port, the sub-menu of console redirection settings will become available for configuration as detailed in the following.



**Note:**  
The actual number of serial ports may differ.

## ► Advanced ► Serial Port Console Redirection

## ► Console Redirection Settings

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Advanced

COM1  
Console Redirection Settings

Terminal Type	[VT100+]
Bits per second	[115200]
Data Bits	[8]
Parity	[None]
Stop Bits	[1]
Flow Control	[None]

Enable CPU SmartFan

→←: Select Screen  
↑↓: Select Item  
Enter: Select  
+/- : Change Opt.  
F1: General Help  
F2: Previous Values  
F9: Optimized Defaults  
F10: Save & Exit  
ESC: Exit

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Configure the serial settings of the current COM port.

**Terminal Type**

Select terminal type: VT100, VT100+, VT-UTF8 or ANSI.

**Bits per second**

Select serial port transmission speed: 9600, 19200, 38400, 57600 or 115200.

**Data Bits**

Select data bits: 7 bits or 8 bits.

**Parity**

Select parity bits: None, Even, Odd, Mark or Space.

**Stop Bits**

Select stop bits: 1 bit or 2 bits.

**Flow Control**

Select flow control type: None or Hardware RTS/CTS.

## ► Advanced

## USB Configuration

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Advanced

USB Configuration

Legacy USB Support	[Enabled]	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	[Enabled]	
USB Mass Storage Driver Support	[Enabled]	

→←: Select Screen  
↑↓: Select Item  
Enter: Select  
+/- : Change Opt.  
F1: General Help  
F2: Previous Values  
F9: Optimized Defaults  
F10: Save & Exit  
ESC: Exit

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**Legacy USB Support**

- Enabled** Enable Legacy USB support.
- Disabled** Keep USB devices available only for EFI applications.
- Auto** Disable Legacy support if no USB devices are connected.

**XHCI Hand-off**

Enable or disable XHCI Hand-off.

**USB Mass Storage Driver Support**

Enable or disable USB Mass Storage Driver Support.



► Advanced

## CSM Configuration

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.	
Advanced	
Compatibility Support Module Configuration	
CSM Support	[Enabled]
Boot option filter	[UEFI only]
Option ROM execution	
Network	[Do not launch]
Storage	[UEFI]
Video	[UEFI]
Other PCI devices	[UEFI]
→←: Select Screen ↑↓: Select Item Enter: Select +/- : Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit	
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### CSM Support

This section is used to enable or disable CSM Support. The following fields are only available when "CSM Support" is enabled.

#### Boot option filter

This field controls Legacy/UEFI ROMs priority.

#### Network

This field controls the execution of UEFI and Legacy Network OpROM.

#### Storage

This field controls the execution of UEFI and Legacy Storage OpROM.

#### Video

This field controls the execution of UEFI and Legacy Video OpROM.

#### Other PCI devices

This field determines OpROM execution policy for devices other than Network, Storage or Video.

► Advanced

## USB Power Control

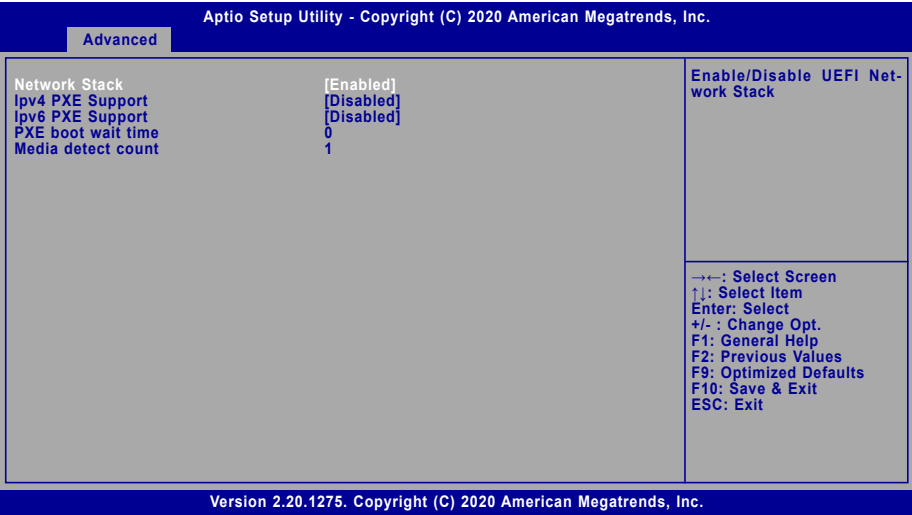
Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.	
Advanced	
USB3_1/2/3&USB2_7/8	[5V_Dual]
5V_Dual: Support system wake up from S3/S4 by USB KB&MS 5V: No support system wake up from S3/S4 by USB KB&MS	
→←: Select Screen ↑↓: Select Item Enter: Select +/- : Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit	
Version 2.20.1275. Copyright (C) 2020 American Megatrends, Inc.	

### USB3\_1/2/3&USB2\_7/8

Select between 5V\_Dual (5VDU) and 5V for the USB power channel. To support Wake-on-USB, please select 5V\_Dual.

► Advanced

Network Stack Configuration



Network Stack

Enable or disable UEFI network stack. The following fields will appear when this field is enabled.

IPv4 PXE Support

Enable or disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

IPv6 PXE Support

Enable or disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

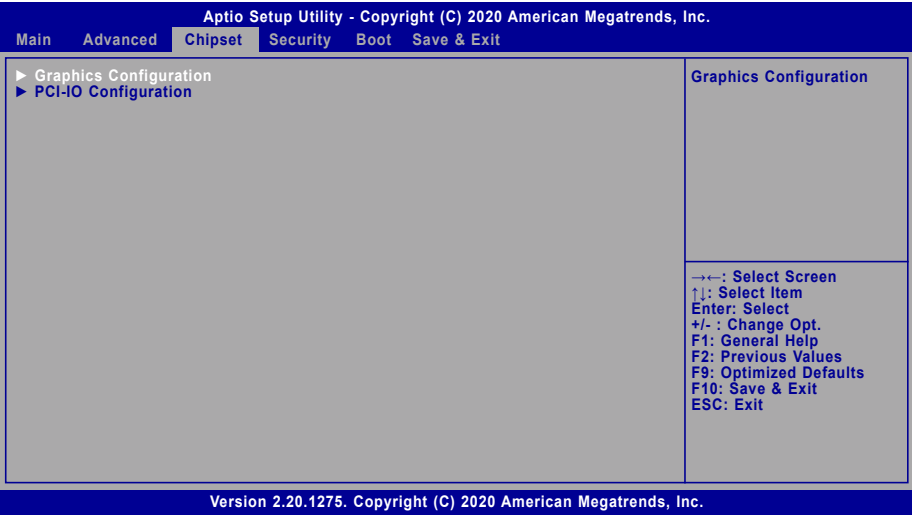
PXE boot wait time

Set the wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

Media detect count

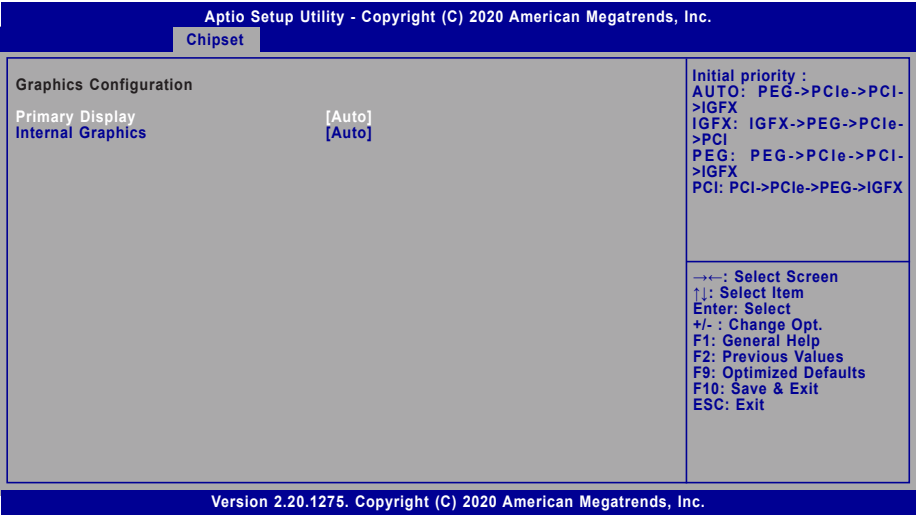
Set the number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

► Chipset



► Chipset

Graphics Configuration



Primary Display

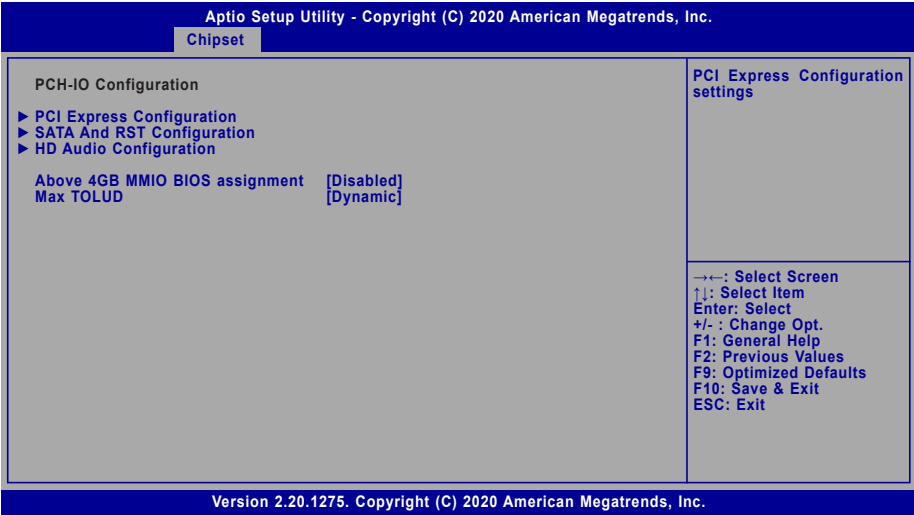
Select which of IGFX/PEG/PCI Graphics device to be the primary display.

Internal Graphics

Keep IGFX enabled based on the setup options.

► Chipset

PCH-IO Configuration



Above 4GB MMIO BIOS assignment

Enable/Disable above 4GB MemoryMappedIO BIOS assignment. This is enabled automatically when Aperture Size is set to 2048MB.

Max TOLUD

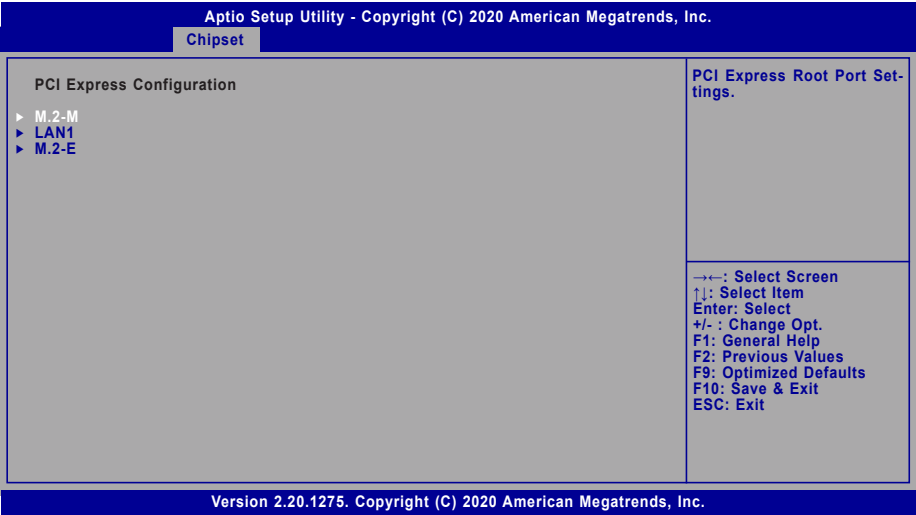
Assign the maximum value of Top Of Lower Usable DRAM (TOLUD). Select to specify a fixed value, or select "Dynamic" so that the assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.



**Note:**  
The sub-menus are detailed in following sections.

► Chipset ► PCH-IO Configuration

PCI Express Configuration



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

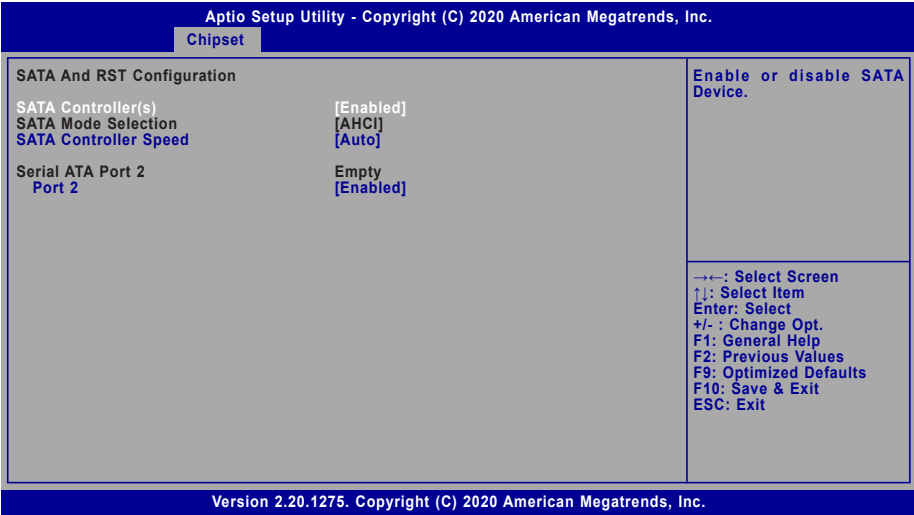
M.2-M / LAN1 / M.2-E

Enable or disable the PCI Express Root Port.

PCIe Speed

Select PCIe Speed of the current port — AUTO, Gen1, Gen 2, 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.

SATA And RST Configuration



SATA Controller(s)

This field is used to enable or disable the Serial ATA controller.

SATA Speed

This field is used to select SATA speed generation limit: Auto, Gen1, Gen2 or Gen3.

SATA Mode Selection

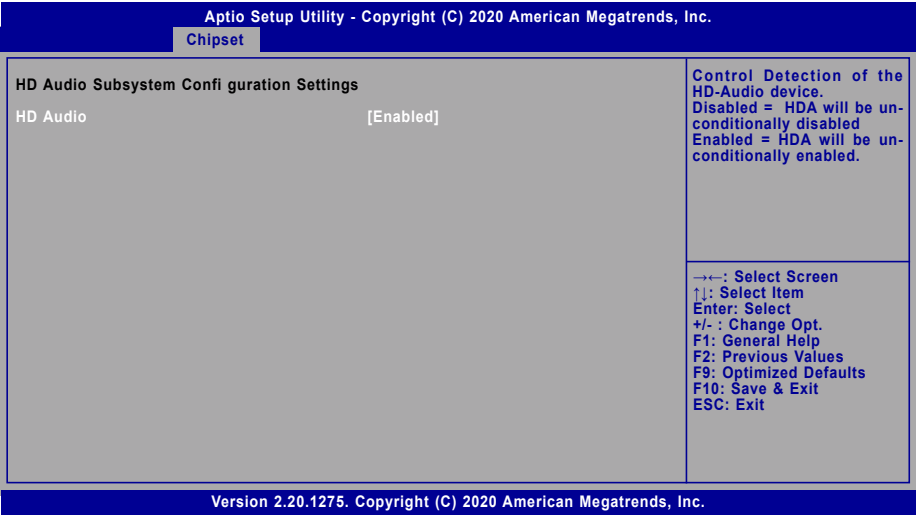
The mode selection determines how the SATA controller(s) operates.

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

Port 2

Enable or disable the Serial ATA port.

HD Audio Configuration



HD Audio

Control the detection of the HD Audio device.

- Disabled** HDA will be unconditionally disabled.
- Enabled** HDA will be unconditionally enabled.

► Security

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MainAdvancedChipsetSecurityBootSave & Exit

Password Description

Minimum length3

Maximum length20

Administrator Password

► Secure Boot

Set Administrator Password

→←: Select Screen

↑↓: Select Item

Enter: Select

+/-: Change Opt.

F1: General Help

F2: Previous Values

F9: Optimized Defaults

F10: Save & Exit

ESC: Exit

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Administrator Password

Set the administrator password. To clear the password, input nothing and press enter when a new password is asked. Administrator Password will be required when entering the BIOS.

User Password

Set the user password. To clear the password, input nothing and press enter when a new password is asked. User Password will be required when powering up the system.

► Security

Secure Boot

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Security

System Mode

Vendor Keys

Secure Boot

Secure Boot Customization

► Restore Factory Keys

► Reset To Setup Mode

Setup

Not Modified

[Disabled]

Not Active

[Custom]

Secure Boot activated when: Secure Boot is enabled Platform Key(PK) is enrolled, System mode is User/Deployed, and CSM is disabled

→←: Select Screen

↑↓: Select Item

Enter: Select

+/-: Change Opt.

F1: General Help

F2: Previous Values

F9: Optimized Defaults

F10: Save & Exit

ESC: Exit

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Secure Boot

The Secure Boot store a database of certificates in the firmware and only allows the Oses with authorized signatures to boot on the system. To activate Secure Boot, please make sure that "Secure Boot" is "[Enabled]", Platform Key (PK) is enrolled, "System Mode" is "User", and CSM is disabled. After enabling/disabling Secure Boot, please save the configuration and restart the system. When configured and activated correctly, the Secure Boot status will be "Active".

Secure Boot Customization

Select the secure boot mode – Standard or Custom. When set to Custom, the following fields will be configurable for the user to manually modify the key database.

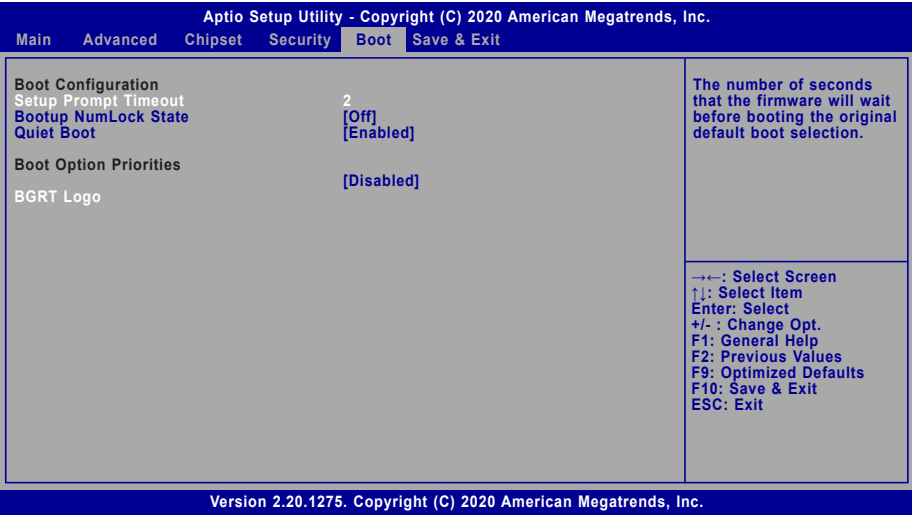
Restore Factory Keys

Force system to User Mode. Load OEM-defined factory defaults of keys and databases onto the Secure Boot. Press Enter and a prompt will show up for you to confirm.

Reset To Setup Mode

Clear the database from the NVRAM, including all the keys and signatures installed in the Key Management menu. Press Enter and a prompt will show up for you to confirm.

► Boot



Setup Prompt Timeout

Set the number of seconds to wait for the setup activation key. 65535 (0xFFFF) denotes indefinite waiting.

Bootup NumLock State

Select the keyboard NumLock state: On or Off.

Quiet Boot

This section is used to enable or disable quiet boot option.

Boot Option Priorities

Rearrange the system boot order of available boot devices.

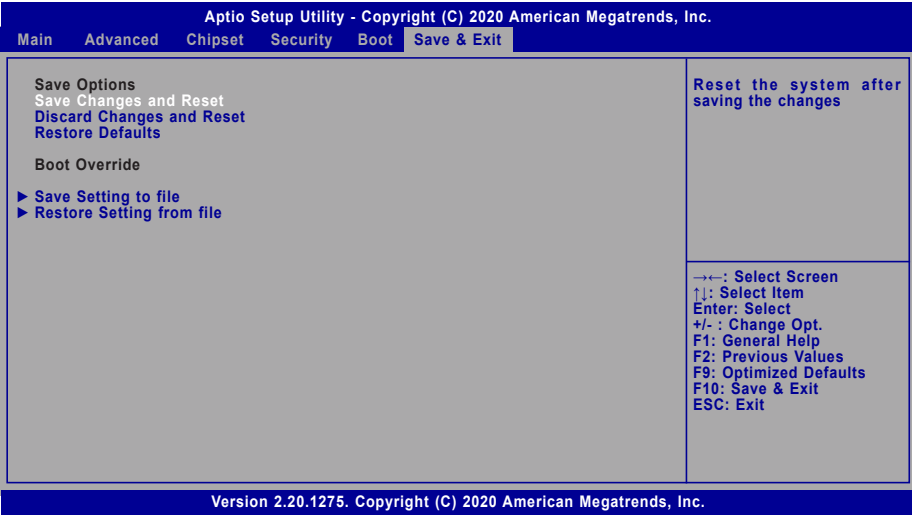
BGRT Logo

It is used to enable or disable to support display logo with ACPI BGRT table.



**Note:**  
If “Boot option filter” of “CSM Configuration” is set to “UEFI and Legacy” or “UEFI only” and “Quiet Boot” is set to enabled, “BGRT Logo” will show up for configuration. Refer to the Advanced > CSM Configuration for more information.

► Save & Exit



Save Changes and Reset

To save the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system after saving all changes made.

Discard Changes and Reset

To discard the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system setup without saving any changes.

Restore Defaults

To restore and load the optimized default values, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore the default values of all the setup options.

Boot Override

Move the cursor to an available boot device and press Enter, and then the system will immediately boot from the selected boot device. The Boot Override function will only be effective for the current boot. The “Boot Option Priorities” configured in the Boot menu will not be changed.

► Save Setting to file

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

► Restore Setting from file

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

## ► Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility. Please contact technical support or your sales representative for the files and specific instructions about how to update BIOS with the flash utility. For updating AMI BIOS in UEFI mode, you may refer to the how-to video at <https://www.dfi.com/Knowledge/Video/5>.

## ► Notice: BIOS SPI ROM

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

**Note:**

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

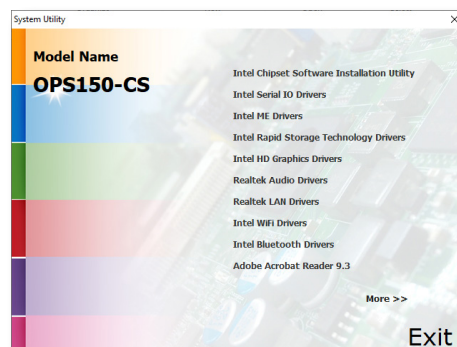


## Chapter 4 - Supported Software

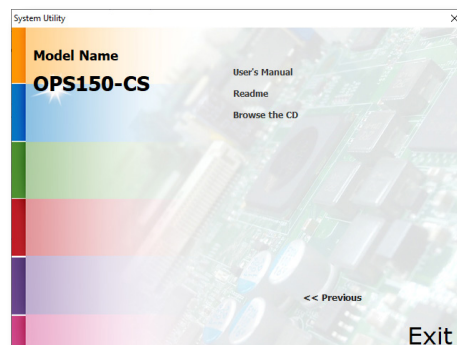
Install drivers, utilities and software applications that are required to facilitate and enhance the performance of the system board. You may acquire the software from your sales representatives, from an optional DVD included in the shipment, or from the website download page at <https://www.dfi.com/DownloadCenter>.

### ► Auto-run Menu

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



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



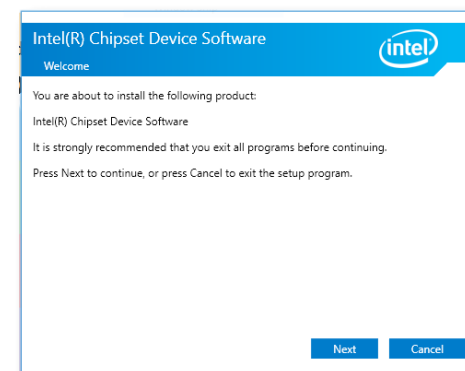
**Note:**

This step can be ignored if the applications are downloaded standalone files.

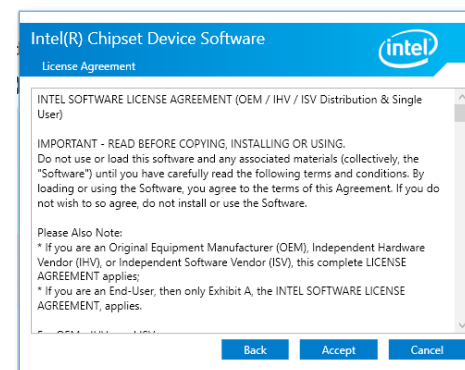
### ► Intel Chipset Software Installation Utility

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.

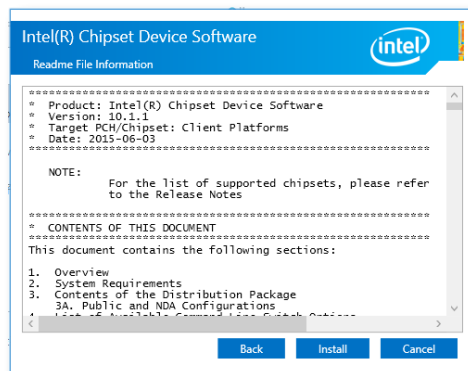
1. Setup is ready to install the utility. Click "Next".



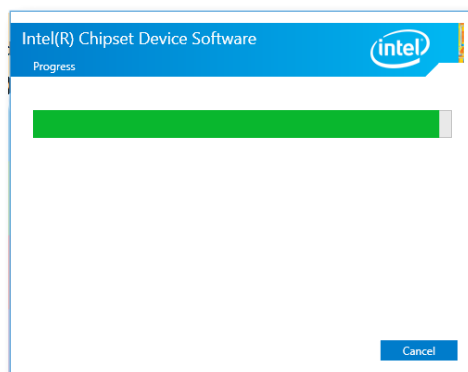
2. Read the license agreement then click "Accept".



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

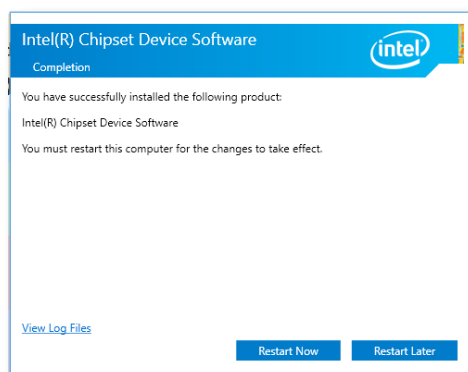


- The step displays the installing status in the progress.



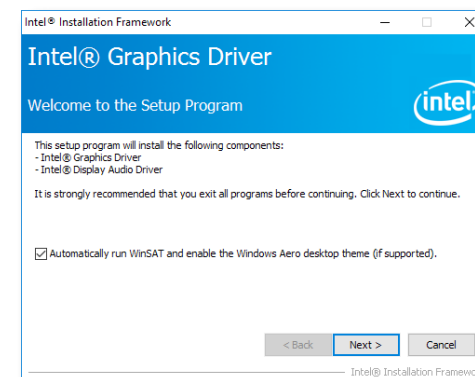
- After completing installation, click "Restart Now" to exit setup.

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



## ► Intel HD Graphics Drivers

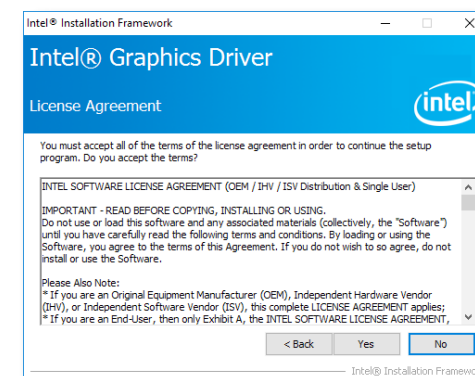
- Setup is now ready to install the graphics driver. Click "Next".



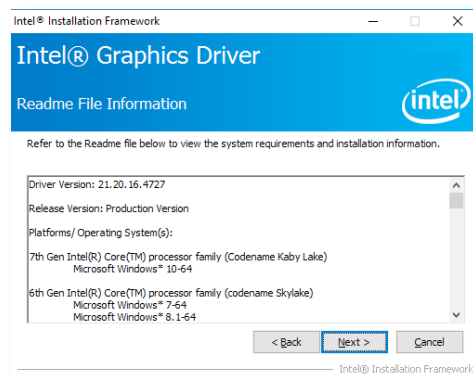
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 10 desktop appears. The "blank screen"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

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

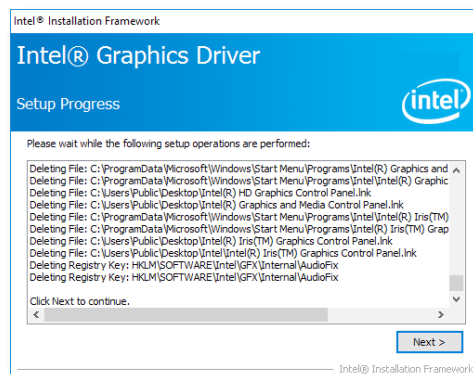
- Read the license agreement then click "Yes".



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

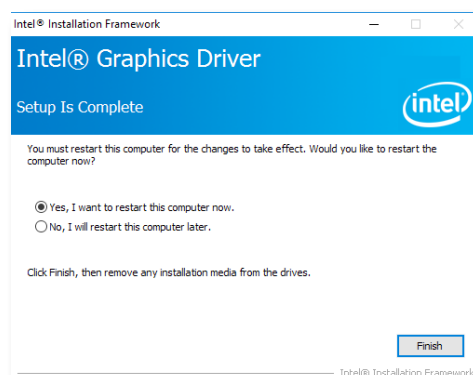


- Setup is now installing the driver. Click "Next" to continue.



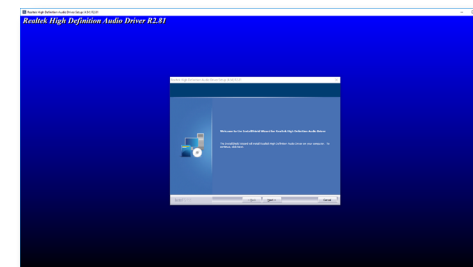
- Click "Yes, I want to restart this computer now" then click "Finish".

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



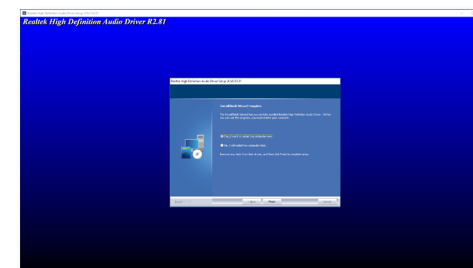
## ► Realtek Audio Drivers

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



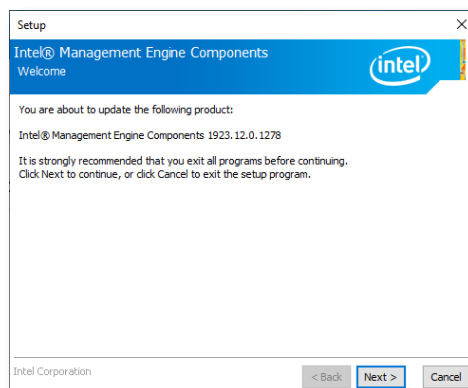
- Click "Yes, I want to restart my computer now" then click "Finish".

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

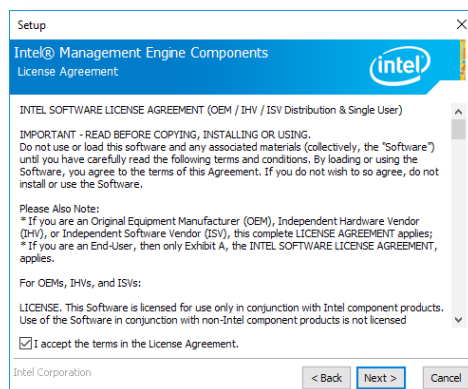


## ► Intel ME Drivers

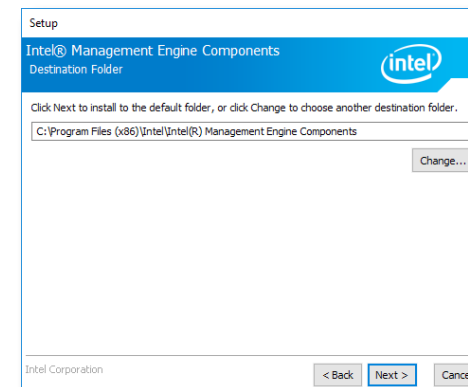
1. Setup is ready to install the driver. Click "Next".



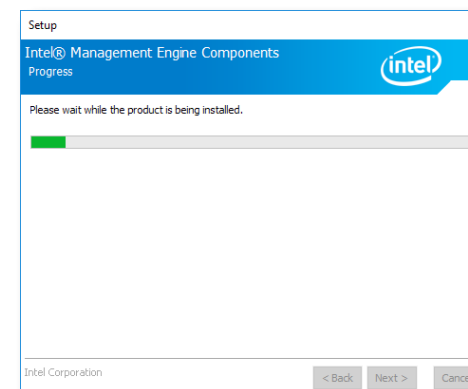
2. Read the license agreement then tick "I accept the terms in the License Agreement". Click "Next".



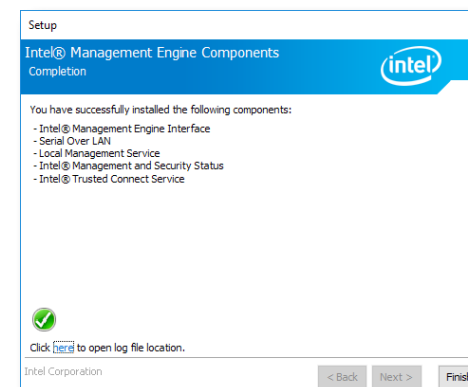
3. Click "Next" to install to the default folder, or click "Change" to choose another destination folder.



4. Please wait while the product is being installed.

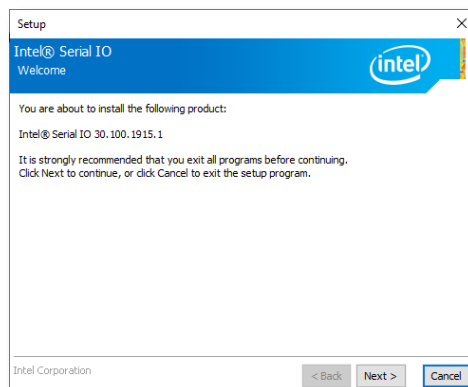


5. After completing installation, click "Finish".



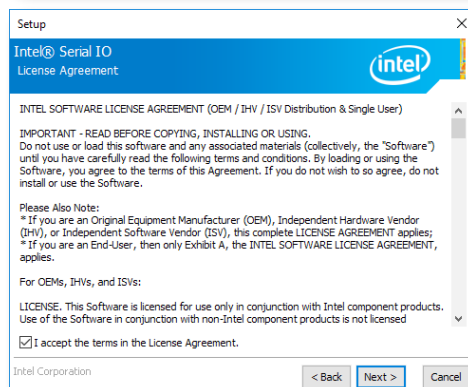
## ► Intel Serial IO Drivers

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

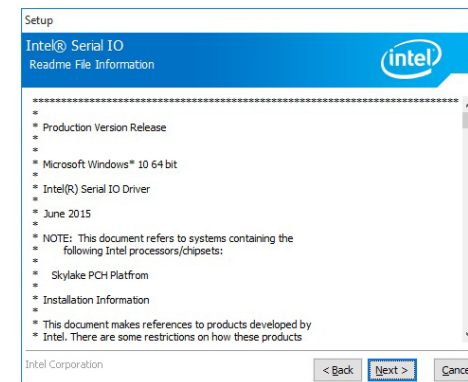


2. Read the license agreement carefully.

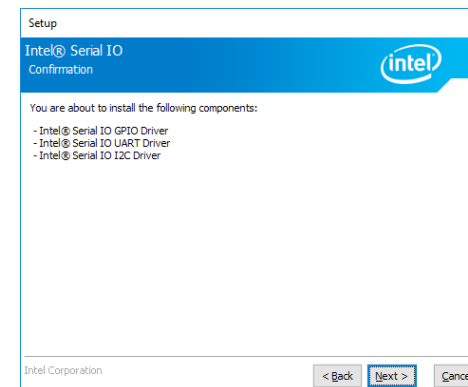
Tick "I accept the terms in the License Agreement" then click "Next".



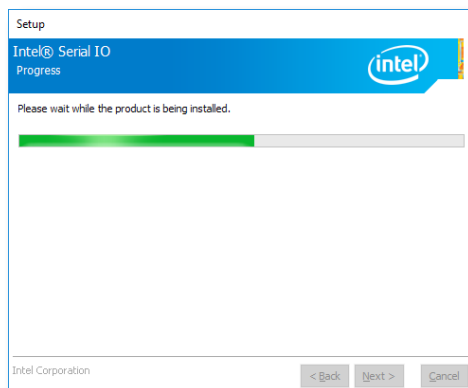
3. Go through the readme document for system requirements and installation tips then click "Next".



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

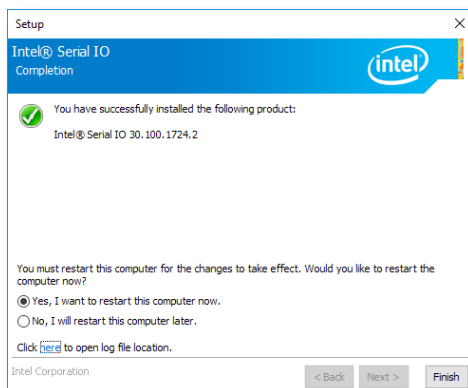


5. Setup is now installing the driver.



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

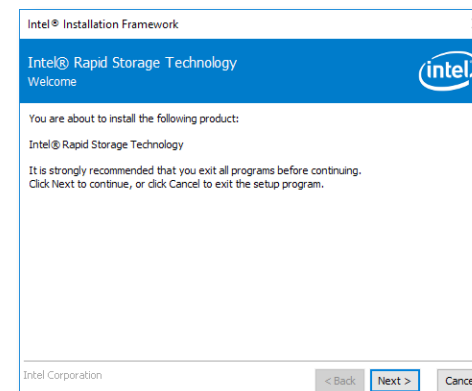
Restarting the system will allow the new software installation to take effect.



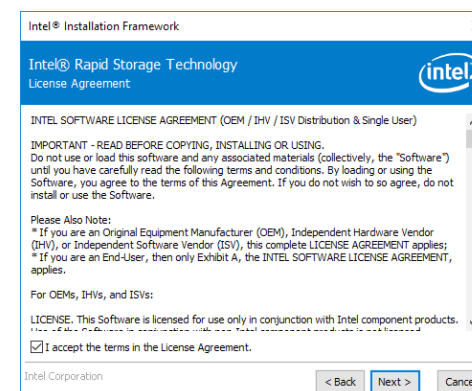
## ► Intel Rapid Storage Technology

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

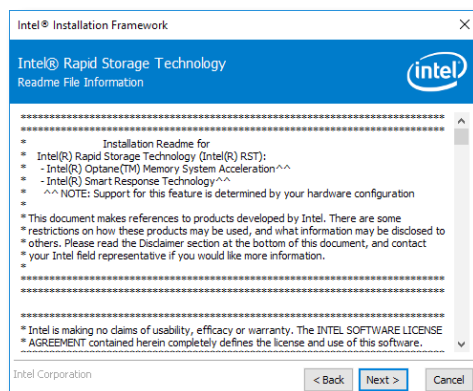
1. Setup is ready to install the utility. Click "Next".



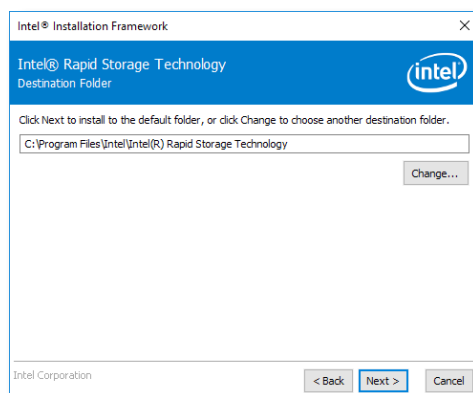
2. Read the license agreement and click "I accept the terms in the License Agreement". Then, click "Next".



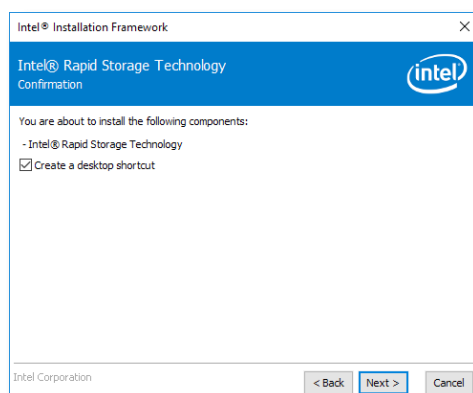
- Go through the readme document to view system requirements and installation information then click "Next".



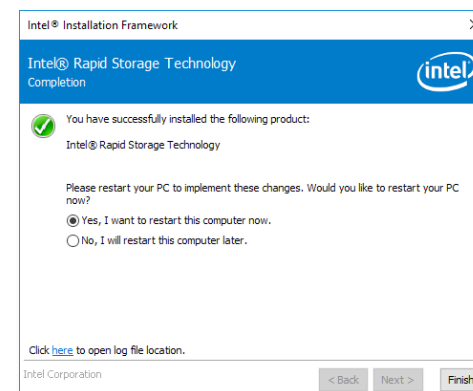
- Click "Next" to install to the default folder or click "Change" to choose another destination folder".



- Confirm the installation and click "Next".



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

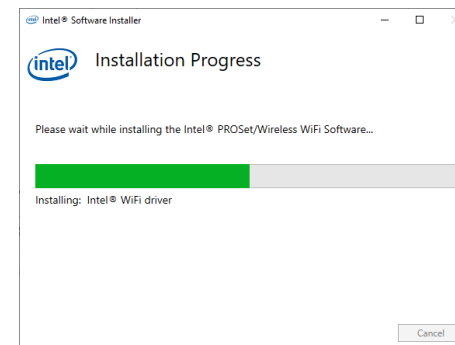


## ► Intel Wi-Fi Drivers

1. The installer is ready to install the WiFi driver. Click "Next" to start.



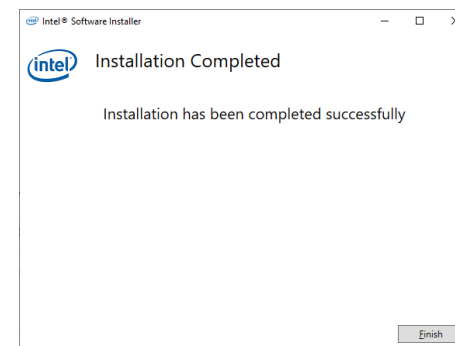
3. Wait for the installer to finish installation.



2. Reader the agreement thoroughly, check the "I agree box", and click "Next" to proceed.



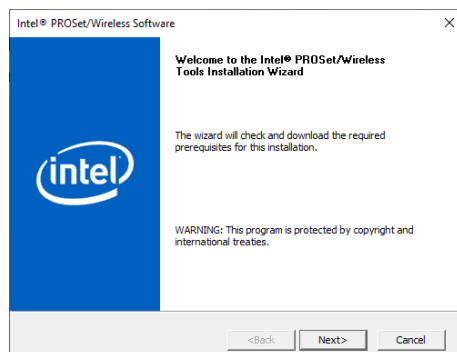
4. Click "Finish" to complete.



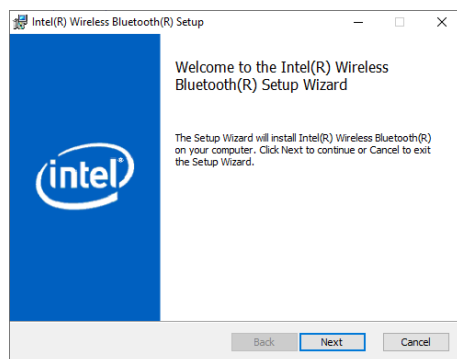


## ► Intel Bluetooth Drivers

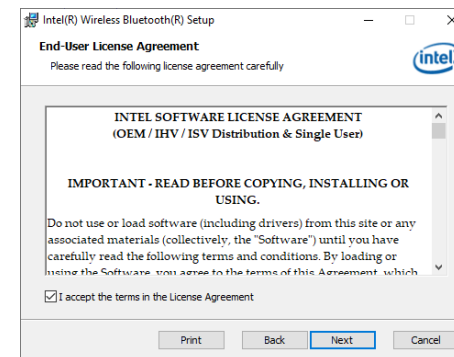
1. The installer is ready to install the driver. Click "Next" to start.



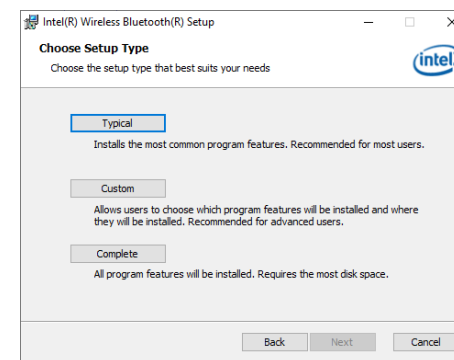
2. Click "Next" to proceed.



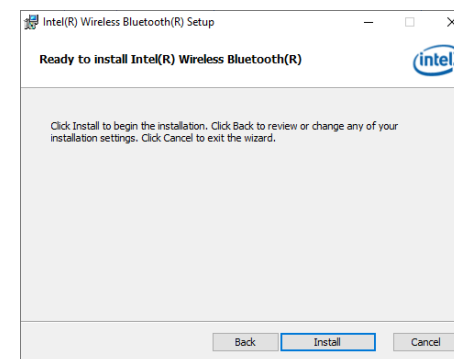
3. Reader the agreement thoroughly, check the "I agree box", and click "Next" to proceed.



4. Select a setup suit and click "Next" to proceed.

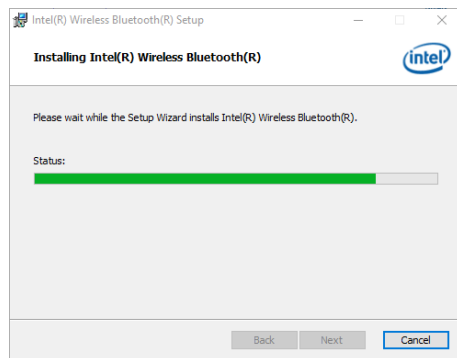


5. Click "Install" to start the installation.

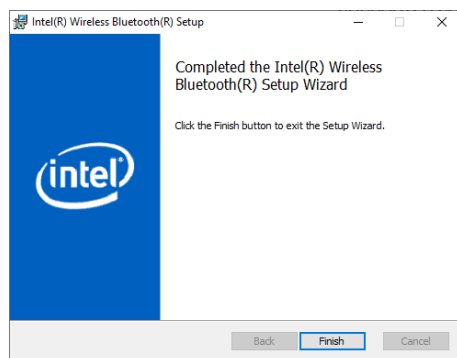


## ► Realtek LAN Driver

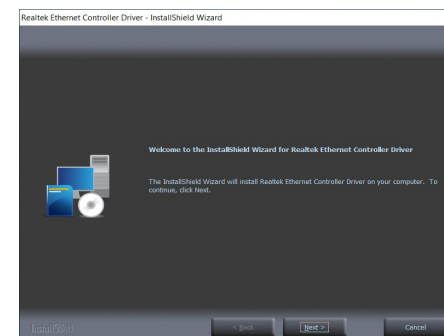
- Wait for the installer to finish installation.



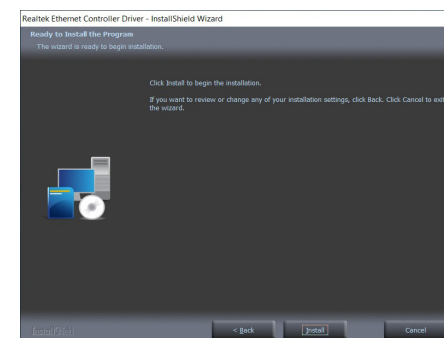
- Click "Finish" to complete.



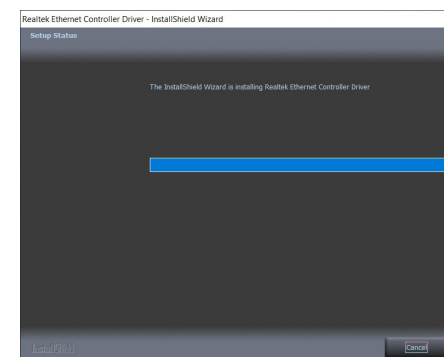
- Setup is ready to install the driver. Click "Next".



- Click "Install" to begin the installation.

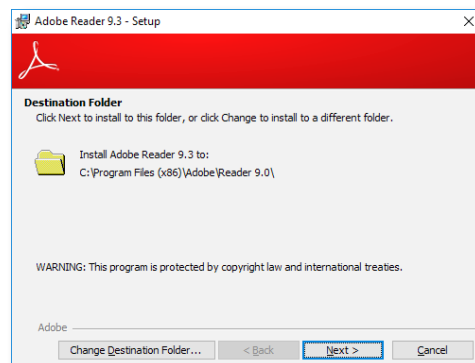


- The step displays the installing status in the progress.

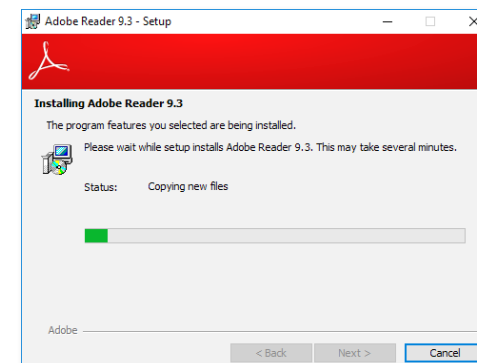


## ► Adobe Acrobat Reader 9.3

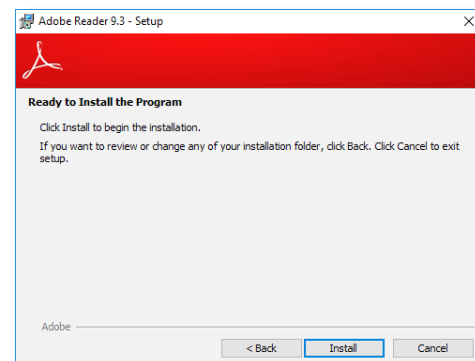
1. Click "Next" to install or click "Change Destination Folder" to select another folder.



3. Setup is now installing the driver.



2. Click "Install" to begin installation.



4. Click "Finish" to exit installation.

