

# **GIGABYTE™**

## **MW32-SP0**

Intel® Socket LGA1151 processor motherboard

### User Manual

Rev. 2.0

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In order to assist in the use of this product, GIGABYTE provides the following types of documentation:

- User Manual: detailed information & steps about the installation, configuration and use this product (e.g. motherboard, server barebones), covering hardware and BIOS.
- User Guide: detailed information about the installation & use of an add-on hardware or software component (e.g. BMC firmware, rail-kit) compatible with this product.
- Quick Installation Guide: a short guide with visual diagrams that you can reference easily for installation purposes of this product (e.g. motherboard, server barebones).

Please see the support section of the online product page to check the current availability of these documents

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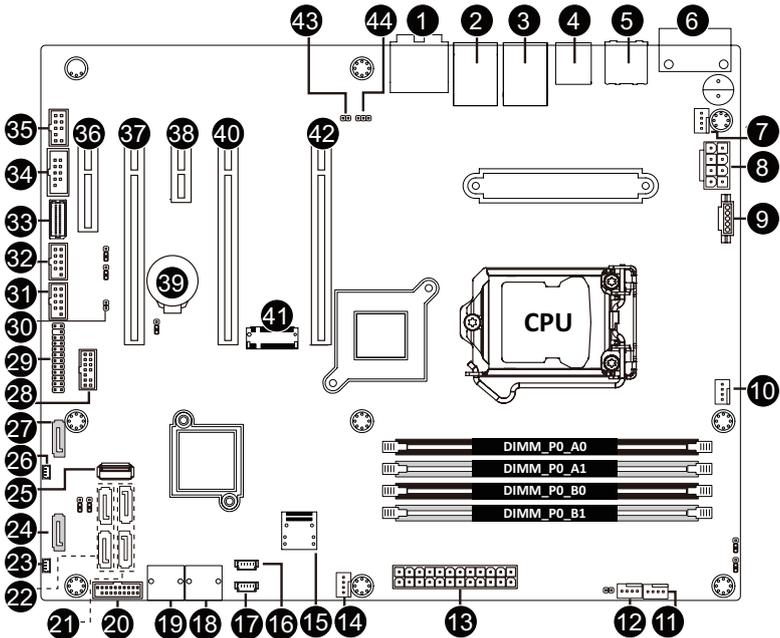
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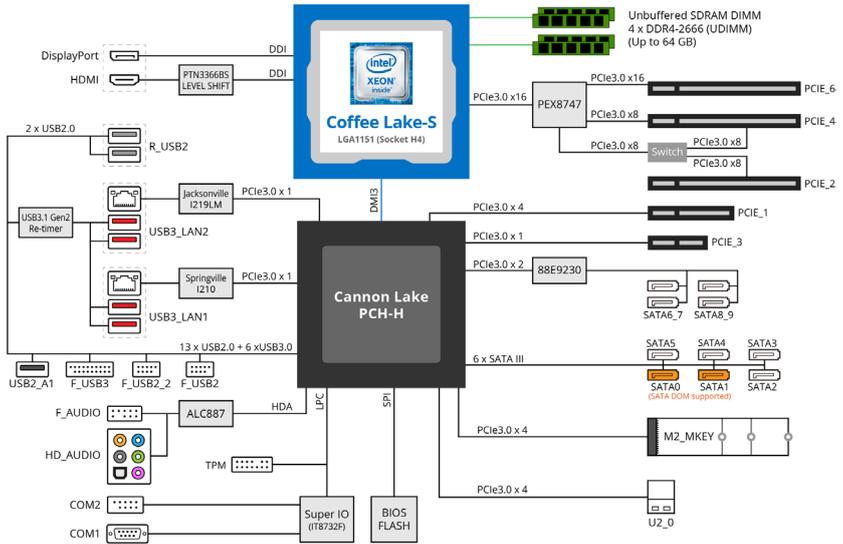
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# MW32-SP0 Motherboard Layout



Item	Code	Description
1	HD_AUDIO	Audio Connectors
2	USB3_LAN1	GbE Ethernet LAN Port #1(top) / USB3.1 Ports (bottom)
3	USB3_LAN2	GbE Ethernet LAN Port #2(top) / USB3.1 Ports (bottom)
4	R_USB2	USB 2.0 Ports
5	DP_HDMI	Display Port (top) / HDMI Port (bottom)
6	COM1	Serial Port
7	SYS_FAN0	System Fan Connector #0
8	P12V_AUX1	8 Pin Power Connector (for CPU)
9	PMBUS	PMBus Connector
10	CPU0_FAN	CPU Fan Connector
11	SYS_FAN1	System Fan Connector #1
12	SYS_FAN2	System Fan Connector #2
13	ATX1	24 Pin Main Power Connector
14	SYS_FAN3	System Fan Connector #3
15	U2_0	SlimLine 4i Connector (PCIe Signal)
16	SATA_SGP1	SATA SGPIO Header #1
17	SATA_SGP2	SATA SGPIO Header #2
18	SATA_6_7	SATA III 6Gb/s Connectors
19	SATA_8_9	SATA III 6Gb/s Connectors
20	F_USB3	USB3.1 Gen1 Connector
21	SATA3/SATA5	SATA III 6Gb/s Connectors
22	SATA2/SATA4	SATA III 6Gb/s Connectors
23	SATA_DOM1	SATA Port 1 DOM Power Connector
24	SATA1	SATA III 6Gb/s Connector
25	USB2_A1	Type A USB 2.0 Connector
26	SATA_DOM0	SATA Port 0 DOM Power Connector
27	SATA0	SATA III 6Gb/s Connector
28	TPM	TPM Module Connector
29	FP_1	Front Panel Header
30	CASE_OPEN	Case Open Intrusion Alert Header
31	F_USB2_2	USB 2.0 Header #2
32	F_USB2	USB 2.0 Header #1
33	BP_1	HDD Back Plane Board Header
34	COM2	Serial Port Cable Connector
35	F_AUDIO	Front Audio Connector
36	PCIE_1	PCI Express x4 Slot (PCIe x4 Signal)
37	PCIE_2	PCI Express x16 Slot (PCIe x8 Signal)
38	PCIE_3	PCI Express x1 Slot (PCIe x1 Signal)
39	BATTERY	System Battery
40	PCIE_4	PCI Express x16 Slot (PCIe x16 Signal)
41	M2_0	M.2 Slot (PCIe Gen3 x4, Support NGFF-2280, M-Key)
42	PCIE_6	PCI Express x16 Slot (PCIe x16 Signal)
43	SPDIF_OUT	S/PDIF Out Header
44	SPDIF_IN	S/PDIF In Header

# Block Diagram



# Chapter 1 Hardware Installation

## 1-1 Installation Precautions

The motherboard contains numerous delicate electronic circuits and components which can become damaged as a result of electrostatic discharge (ESD). Prior to installation, carefully read the user's manual and follow these procedures:

- Prior to installation, do not remove or break motherboard S/N (Serial Number) sticker or warranty sticker provided by your dealer. These stickers are required for warranty validation.
- Always remove the AC power by unplugging the power cord from the power outlet before installing or removing the motherboard or other hardware components.
- When connecting hardware components to the internal connectors on the motherboard, make sure they are connected tightly and securely.
- When handling the motherboard, avoid touching any metal leads or connectors.
- It is best to wear an electrostatic discharge (ESD) wrist strap when handling electronic components such as a motherboard, CPU or memory. If you do not have an ESD wrist strap, keep your hands dry and first touch a metal object to eliminate static electricity.
- Prior to installing the motherboard, please have it on top of an antistatic pad or within an electrostatic shielding container.
- Before unplugging the power supply cable from the motherboard, make sure the power supply has been turned off.
- Before turning on the power, make sure the power supply voltage has been set according to the local voltage standard.
- Before using the product, please verify that all cables and power connectors of your hardware components are connected.
- To prevent damage to the motherboard, do not allow screws to come in contact with the motherboard circuit or its components.
- Make sure there are no leftover screws or metal components placed on the motherboard or within the computer casing.
- Do not place the computer system on an uneven surface.
- Do not place the computer system in a high-temperature environment.
- Turning on the computer power during the installation process can lead to damage to system components as well as physical harm to the user.
- If you are uncertain about any installation steps or have a problem related to the use of the product, please consult a certified computer technician.

## 1-2 Product Specifications

	CPU	<ul style="list-style-type: none"> <li>◆ Intel® Xeon® Processor E-2100/ E-2200 series</li> <li>◆ 8th Gen. Intel Core™ i3/ Pentium®/ Celeron® Processors</li> </ul>
	Chipset	<ul style="list-style-type: none"> <li>◆ Intel® C246 Express Chipset</li> </ul>
	Memory	<ul style="list-style-type: none"> <li>◆ 4 x DIMM slots</li> <li>◆ Dual channel memory architecture</li> <li>◆ Supports 1.2V DDR4 memory</li> <li>◆ ECC UDIMM modules supported</li> <li>◆ Up to 64GB</li> <li>◆ Supported speeds: 2666/2400 MHz</li> </ul>
	Onboard Graphics	<ul style="list-style-type: none"> <li>◆ Intel® HD Graphics</li> <li>◆ 1 x Display Port 1.2 version; Maximum Resolution: 4096x2160@60Hz / 3840x2160@60Hz</li> <li>◆ 1 x HDMI Port 1.4 version;Maximum Resolution: 4096x2160@24Hz</li> <li>◆ Supports for up to 2 displays at the same time</li> <li>◆ Maximum shared memory of 1GB</li> </ul>
	Audio	<ul style="list-style-type: none"> <li>◆ Realtek® ALC887 Controller</li> <li>◆ Supports 2/ 4/ 5.1/ 7.1 Channel Configurations</li> </ul>
	LAN	<ul style="list-style-type: none"> <li>◆ 2 x GbE LAN ports (Intel® I210 and I219LM)</li> </ul>
	Expansion Slots	<ul style="list-style-type: none"> <li>◆ 2 x PCI Express x16 slots from PCIe switch<sup>(Note)</sup>; running at Gen3 x16</li> <li>◆ 1 x PCI Express x1 slot from Intel® C246 PCH; running at Gen3 x1</li> <li>◆ 1 x PCI Express x16 slot from PCIe switch<sup>(Note)</sup>; running at Gen3 x8</li> <li>◆ 1 x PCI Express x4 slot from Intel® C246 PCH; running at Gen3 x4</li> <li>◆ 1 x M.2 slot: <ul style="list-style-type: none"> <li>- M-key</li> <li>- PCIe Gen3 x4 per slot</li> <li>- Supports NGFF-2280/2260/2242 cards</li> <li>- Intel® Optane™ Memory Ready</li> </ul> </li> <li>◆ 1 x U.2 slot: <ul style="list-style-type: none"> <li>- Slimline SAS type</li> <li>- PCIe Gen3 x4 per slot</li> </ul> </li> </ul>
	Storage Interface	<ul style="list-style-type: none"> <li>◆ 10 x SATA III 6Gb/s connectors <ul style="list-style-type: none"> <li>- 6 units from Intel® C246 PCH</li> <li>- 4 units from Marvell® 88SE9230 Controller</li> </ul> </li> <li>◆ SATA0/SATA1 support SATA DOM</li> </ul>
	RAID	<ul style="list-style-type: none"> <li>◆ Intel® SATA RAID 0/1/10/5</li> <li>◆ Marvell® SATA RAID 0/1/10</li> </ul>

(Note) PCIe\_4 (Gen3 x 16 bus) supports Gen3 x8 only when PCIe\_2 (Gen3 x8 bus) is installed.

 <b>Internal I/O Connectors</b>	<ul style="list-style-type: none"> <li>◆ 1 x 24-pin ATX Main Power Connector</li> <li>◆ 1 x 8-pin ATX 12V Power Connector</li> <li>◆ 10 x SATA III 6Gb/s Ports</li> <li>◆ 1 x USB 2.0 Vertical Type A Port</li> <li>◆ 1 x CPU Fan Header</li> <li>◆ 4 x System Fan Headers</li> <li>◆ 1 x USB 3.1 Header (Gen1, 5Gb/s)</li> <li>◆ 2 x USB 2.0 Headers</li> <li>◆ 1 x TPM header</li> <li>◆ 1 x COM Port Header</li> <li>◆ 1 x Front Audio Header</li> <li>◆ 1 x S/PDIF-In Header</li> <li>◆ 1 x S/PDIF-Out Header</li> <li>◆ 1 x Front panel header</li> <li>◆ 1 x HDD Back Plane Board Header</li> <li>◆ 2 x SATA GPIO Header</li> <li>◆ 1 x JTAG Header</li> <li>◆ 1 x Chassis Intrusion Header</li> <li>◆ 1 x PMBus Connector</li> <li>◆ 2 x SATA DOM Connectors</li> </ul>
 <b>Rear I/O Connectors</b>	<ul style="list-style-type: none"> <li>◆ 1 x Serial port</li> <li>◆ 1 x HDMI port</li> <li>◆ 1 x Display Port</li> <li>◆ 2 x RJ45 ports</li> <li>◆ 4 x USB 3.1 ports (Gen2; 10Gb/s)</li> <li>◆ 2 x USB 2.0 ports</li> <li>◆ 5 x Audio Jacks</li> <li>◆ 1 x Optical S/PDIF-Out</li> </ul>
 <b>TPM</b>	<ul style="list-style-type: none"> <li>◆ 1 x TPM header</li> </ul>
 <b>Form Factor</b>	<ul style="list-style-type: none"> <li>◆ ATX</li> <li>◆ 305mm W x 244mm D</li> </ul>
<p>GIGABYTE reserves the right to make any changes to the product specifications and product-related information without prior notice.</p>	

## 1-3 Installing the CPU and CPU Cooler

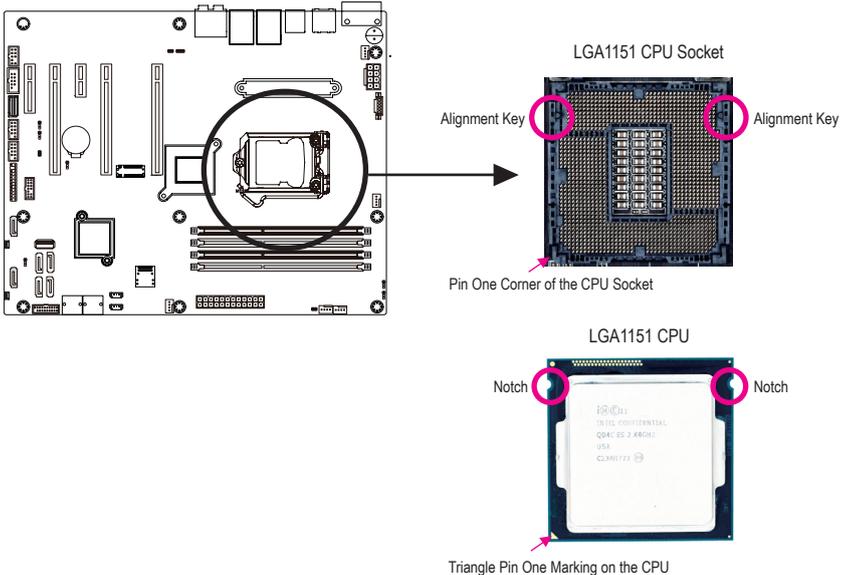


Read the following guidelines before you begin to install the CPU:

- Make sure that the motherboard supports the CPU.
- Always turn off the computer and unplug the power cord from the power outlet before installing the CPU to prevent hardware damage.
- Locate the pin one of the CPU. The CPU cannot be inserted if oriented incorrectly. (Or you may locate the notches on both sides of the CPU and alignment keys on the CPU socket.)
- Apply an even and thin layer of thermal grease on the surface of the CPU.
- Do not turn on the computer if the CPU cooler is not installed, otherwise overheating and damage of the CPU may occur.
- Set the CPU host frequency in accordance with the CPU specifications. It is not recommended that the system bus frequency be set beyond hardware specifications since it does not meet the standard requirements for the peripherals. If you wish to set the frequency beyond the standard specifications, please do so according to your hardware specifications including the CPU, graphics card, memory, hard drive, etc.

### 1-3-1 Installing the CPU

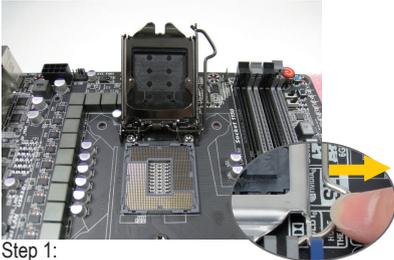
A. Locate the alignment keys on the motherboard CPU socket and the notches on the CPU.



B. Follow the steps below to correctly install the CPU into the motherboard CPU socket.

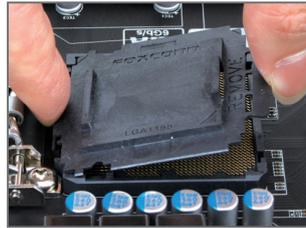


**Before installing the CPU, make sure to turn off the computer and unplug the power cord from the power outlet power plug to prevent any damage to prevent damage to the CPU.**



Step 1:

Gently press the CPU socket lever handle down and away from the socket with your finger. Then completely lift the CPU socket lever and the metal load plate will be lifted as well.



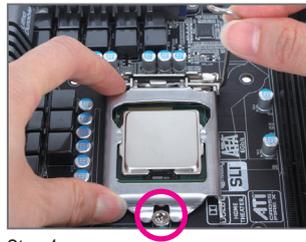
Step 2:

Remove the CPU socket cover as shown. Hold your index finger down on the rear grip of the socket cover and use your thumb to lift up the front edge (next to the "REMOVE" mark) and then remove the cover. (DO NOT touch socket contacts. To protect the CPU socket, always replace the protective socket cover when the CPU is not installed.)



Step 3:

Hold the CPU with your thumb and index fingers. Align the CPU pin one (triangle marking) with the pin one corner of the CPU socket (or you may align the CPU notches with the socket alignment keys). Gently insert the CPU into position.



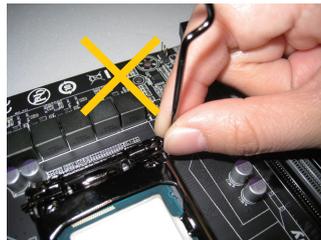
Step 4:

Once the CPU is properly inserted, use one hand to hold the socket lever and use the other to lightly replace the load plate. When replacing the load plate, make sure the front end of the load plate is under the shoulder screw.



Step 5:

Push the CPU socket lever back into its locked position.



**NOTE:**

Hold the CPU socket lever by the handle, not by the lever base position.

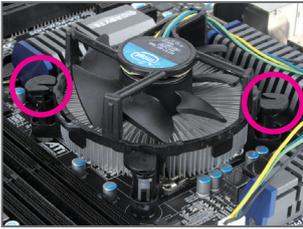
### 1-3-2 Installing the CPU Cooler

Follow the steps below to correctly install the CPU cooler on the motherboard. (The following procedure uses Intel® boxed cooler as the example cooler.)



**Step 1:**

Apply a thin, even layer of thermal paste onto the surface of the installed CPU.



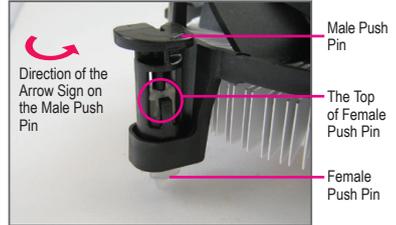
**Step 3:**

Place the cooler atop the CPU, aligning the four push pins through the pin holes on the motherboard. Push down on the push pins diagonally.



**Step 5:**

After the installation, check the back of the motherboard. If the push pin is inserted as the picture above shows, the installation is complete.



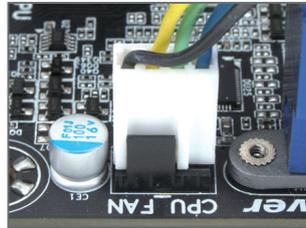
**Step 2:**

Before installing the cooler, note the direction of the arrow sign  on the male push pin. (Turning the push pin along the direction of the arrow is for removing the cooler, and the opposite direction is for installing it.)



**Step 4:**

You should hear a "click" when pushing down each push pin. Check that the Male and Female push pins are joined closely. (Refer to your CPU cooler installation manual for instructions on installing the cooler.)



**Step 6:**

Finally, attach the power connector of the CPU cooler to the CPU fan header (CPU\_FAN) on the motherboard.



Use extreme care when removing the CPU cooler because the thermal grease/tape between the CPU cooler and CPU may adhere to the CPU. Inadequately removing the CPU cooler may damage the CPU.

## 1-4 Installing the Memory



Read the following guidelines before you begin to install the memory:

- Make sure that the motherboard supports the memory. It is recommended to use memory of the same capacity, brand, speed, and chips.
- Always turn off the computer and unplug the power cord from the power outlet before installing the memory to prevent hardware damage.
- Memory modules have a foolproof design. A memory module can be installed in only one direction. If you are unable to insert the memory, switch the direction.

### 1-4-1 Installing a Memory



**Before installing a memory module, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the memory module.**

**Be sure to install DDR4 UDIMMs on this motherboard.**

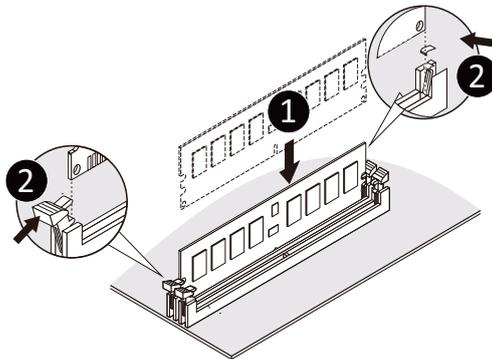
#### Installation Step:

Step 1. Insert the UDIMM memory module vertically into the UDIMM slot, and push it down.

Step 2. Close the plastic clip at both edges of the UDIMM slots to lock the UDIMM module.

Note: For dual-channel operation, UDIMMs must be installed in matched pairs.

Step 3. Reverse the installation steps when you wish to remove the UDIMM module.



Type	Ranks Per DIMM and Data Width	Supported Voltage	Speed (MT/s); Slot Per Channel (SPC) and DIMM Per Channel (DPC)	
			2 Slot Per Channel	
			1DPC	2DPC
UDIMM Unbuffered DDR4 ECC	SR, DR	1.2V	2133/ 2400/ 2666	2133/ 2400/ 2666
UDIMM Unbuffered DDR4 non-ECC	SR, DR	1.2V	2133/ 2400/ 2666	2133/ 2400/ 2666

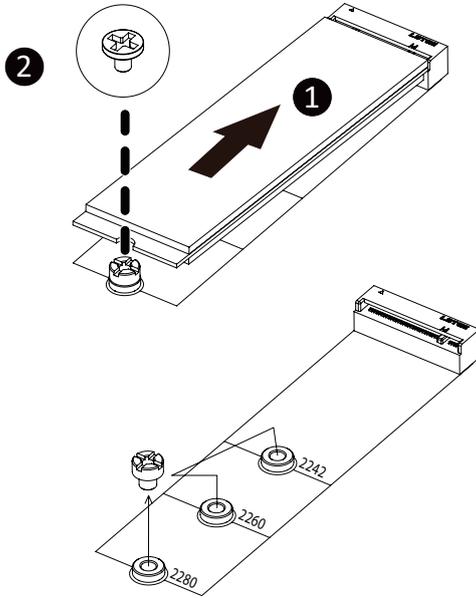
- All channels in system run at the fastest common frequency.
- Mixing ECC and non-ECC UDIMMs anywhere on the platform is not supported.
- UDIMM 2666 two DIMMs per channel (2DPC) is supported when channel is populated with the same UDIMM memory module.

# 1-5 Installing the M.2 SSD Module

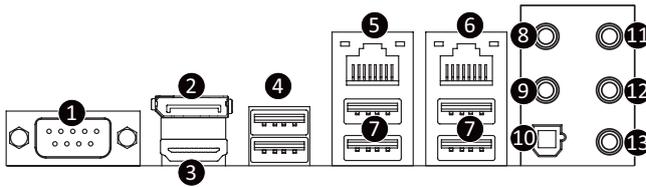
Follow the steps below to install a M.2 SSD module on your motherboard.

Step1. Insert the M.2 SSD module into the slot.

Step2. Secure it with the screw, tightening as necessary to fasten the M.2 SSD module in place.



## 1-6 Back Panel Connectors



### 1 Serial Port

Connects to serial-based mouse or data processing devices.

### 2 Display Port

DisplayPort delivers high quality digital imaging and audio, supporting bi-directional audio transmission. DisplayPort can support both DPCP and HDCP 2.2 content protection mechanisms. It provides improved visuals supporting Rec. 2020 (Wide Color Gamut) and High Dynamic Range (HDR) for Blu-ray UHD playback. You can use this port to connect your DisplayPort-supported monitor. Note: The DisplayPort Technology can support a maximum resolution of 4096x2160@60 Hz but the actual resolutions supported depend on the monitor being used.

### 3 HDMI 1.4 Port

The HDMI port supports HDCP 2.2 and Dolby TrueHD and DTS HD Master Audio formats. It also supports up to 192KHz/16bit 8-channel LPCM audio output. You can use this port to connect your HDMI-supported monitor. The maximum supported resolution is 4096x2160@30 Hz, but the actual resolutions supported are dependent on the monitor being used.

### 4 USB 2.0 Port

The USB port supports the USB 2.0 specification. Use this port for USB devices.

### 5 RJ-45 LAN Port

The Gigabit Ethernet LAN port provides Internet connection at up to 1 Gbps data rate. See the section below for a description of the states of the LAN port LEDs.

### 6 RJ-45 LAN Port

The Gigabit Ethernet LAN port provides Internet connection at up to 1 Gbps data rate. See the section below for a description of the states of the LAN port LEDs.

### 7 USB 3.1 Gen2 Port

The USB 3.1 Gen 2 port supports the USB 3.1 Gen 2 specification and is compatible to the USB 2.0 specification. Use this port for USB devices.

### 8 Center/Subwoofer Speaker Out Jack (Orange)

Use this audio jack to connect center/subwoofer speakers in a 5.1/7.1-channel audio configuration.

### 9 Rear Speaker Out Jack (Black)

Use this audio jack to connect Rear speakers in a 4/5.1/7.1-channel audio configuration.

### 10 Optical S/PDIF Out Connector

This connector provides digital audio out to an external audio system that supports digital optical audio. Before using this feature, ensure that your audio system provides an optical digital audio in connector.

### 11 Line In Jack (Blue)

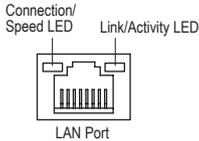
The default Line In jack. Use this audio jack for line in devices such as an optical drive, walkman, etc

### 12 Line Out Jack (Green)

The default Line Out jack. Use this audio jack for a headphone or 2-channel speaker. This jack can be used to connect front speakers in a 4/5.1/7.1-channel audio configuration.

### 13 Mic In (Pink)

The default MIC In jack. A microphone can be connected to the MIC In jack.



Connection/Speed LED:

State	Description
Yellow On	1 Gbps data rate
Green On	100 Mbps data rate
Off	10 Mbps data rate

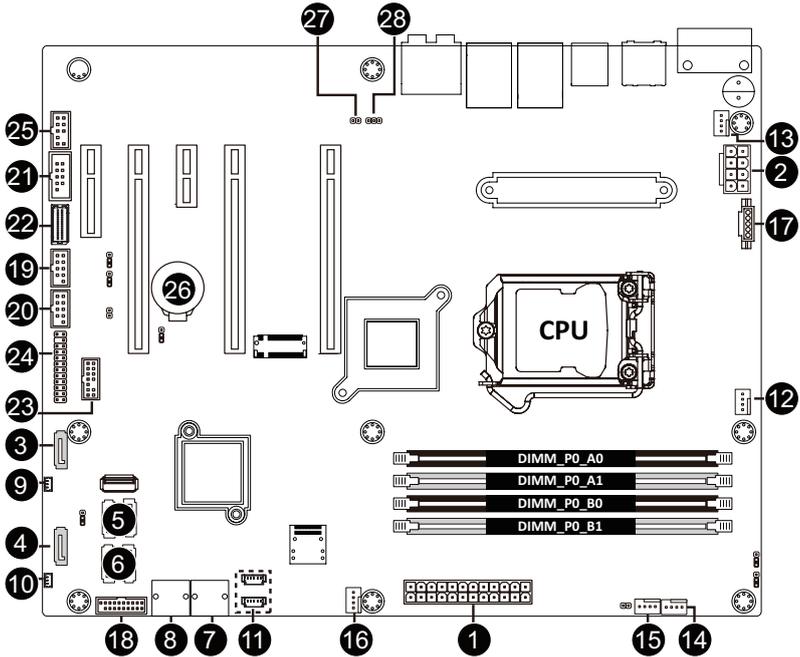
Activity LED:

State	Description
Blinking	Data transmission or receiving is occurring
Off	No data transmission or receiving is occurring



- When removing the cable connected to a back panel connector, first remove the cable from your device and then remove it from the motherboard.
- When removing the cable, pull it straight out from the connector. Do not rock it side to side to prevent an electrical short inside the cable connector.

# 1-7 Internal Connectors



1) ATX	15) SYS_FAN2
2) ATX_12V	16) SYS_FAN3
3) SATA0 (Support SATA DOM Power)	17) PMBUS
4) SATA1(Support SATA DOM Power)	18) F_USB3
5) SATA2/SATA3	19) F_USB2
6) SATA4/SATA5	20) F_USB2_2
7) SATA6/SATA7	21) COM2
8) SATA8/SATA9	22) BP_1
9) SATA_DOM0	23) TPM
10) SATA_DOM1	24) FP_1
11) SATA_SGP1/SATA_SGP2	25) F_AUDIO
12) CPU0_FAN	26) BATTERY
13) SYS_FAN0	27) SPDIF_OUT
14) SYS_FAN1	28) SPDIF_IN



Read the following guidelines before connecting external devices:

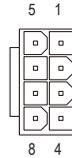
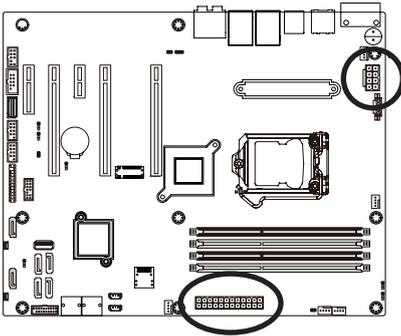
- First make sure your devices are compliant with the connectors you wish to connect.
- Before installing the devices, be sure to turn off the devices and your computer. Unplug the power cord from the power outlet to prevent damage to the devices.
- After installing the device and before turning on the computer, make sure the device cable has been securely attached to the connector on the motherboard.

## 1/2) ATX/ATX\_12V (2x12 Main Power Connector and 2x4 12V Power Connector)

With the use of the power connector, the power supply can supply enough stable power to all the components on the motherboard. Before connecting the power connector, first make sure the power supply is turned off and all devices are properly installed. The power connector possesses a foolproof design. Connect the power supply cable to the power connector in the correct orientation. The 12V power connector mainly supplies power to the CPU. If the 12V power connector is not connected, the computer will not start.

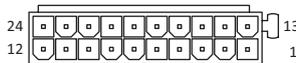


To meet expansion requirements, it is recommended that a power supply that can withstand high power consumption be used (500W or greater). If a power supply is used that does not provide the required power, the result can lead to an unstable or unbootable system.



ATX\_12V

Pin No.	Definition
1	GND
2	GND
3	GND
4	GND
5	+12V
6	+12V
7	+12V
8	+12V

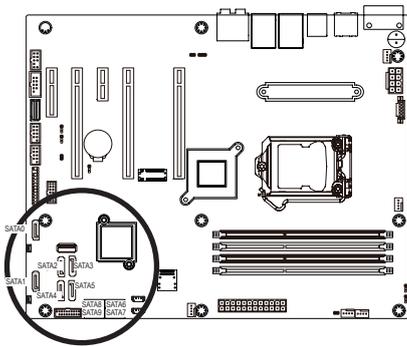


ATX

Pin No.	Definition	Pin No.	Definition
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	Power Good	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND

### 3/4/5/6/7/8) SATA0/SATA1/SATA2/SATA3/SATA4/SATA5/SATA6/SATA7/SATA8/SATA9 (SATA 6Gb/s Connectors)

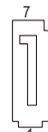
The SATA connectors conform to SATA 6Gb/s standard and are compatible with SATA 3Gb/s standard. Each SATA connector supports a single SATA device.



Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND



SATAIII\_2



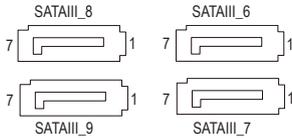
SATAIII\_3



SATAIII\_4

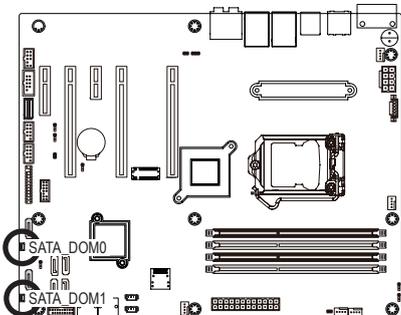


SATAIII\_5



### 9/10) SATA\_DOM0/ SATA\_DOM1 Power Connector

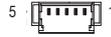
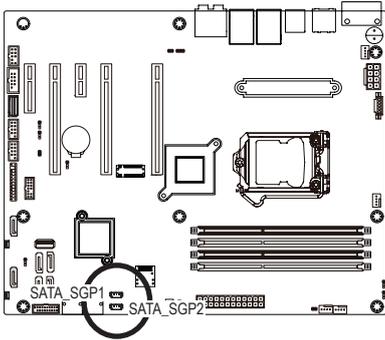
SATA-DOM (Disk on Module) is available to allow for standalone boot and diagnostics direct through SATA connections on the board.



Pin No.	Definition
1	5V for SATA DOM
2	GND
3	No Connect

### 11) SATA\_SGP1/ SATA\_SGP2(SATA SGPIO) Connector

Serial General Purpose Input/Output (SGPIO) is a communication method used between a host bus adapter (HBA) and a main board. Ommoleni dolor moluptaeria pella peritio. Unt.

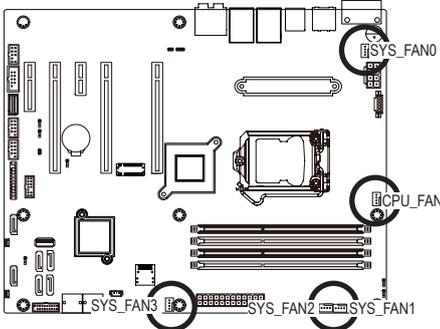


Pin No.	Definition
1	Data Out
2	Ground
3	No Connect
4	Load
5	Clock

### 12/13/14/15/16) CPU\_FAN/ SYS\_FAN0/ SYS\_FAN1/ SYS\_FAN2/ SYS\_FAN3

#### (CPU Fan/System Fan Headers)

The motherboard has one 4-pin CPU fan header (CPU\_FAN), and two 4-pin (SYS\_FAN) system fan headers. Most fan headers possess a foolproof insertion design. When connecting a fan cable, be sure to connect it in the correct orientation (the black connector wire is the ground wire). The motherboard supports CPU fan speed control, which requires the use of a CPU fan with fan speed control design. For optimum heat dissipation, it is recommended that a system fan be installed inside the chassis.



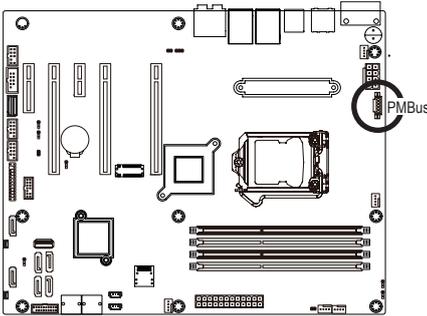
Pin No.	Definition
1	GND
2	+12V
3	Sense
4	Speed Control



- Be sure to connect fan cables to the fan headers to prevent your CPU and system from overheating. Overheating may result in damage to the CPU or the system may hang.
- These fan headers are not configuration jumper blocks. Do not place a jumper cap on the headers.

## 17) PMBus Connector

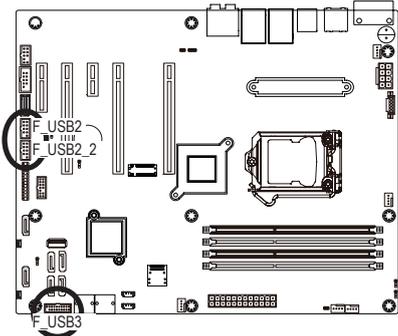
The Power Management Bus (PMBus) is a variant of the System Management Bus (SMBus) which is targeted at digital management of power supplies.



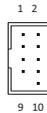
Pin No.	Definition
1	PMBus Clock
2	PMBus Data
3	PMBus Alert
4	GND
5	3.3V Sense

## 18/19/20) F\_USB3/ F\_USB2/ F\_USB2\_2 (USB 3.0/ 2.0 Headers)

The headers conform to USB 2.0/ 3.0 specification. Each USB header can provide two USB ports via an optional USB bracket. For purchasing the optional USB bracket, please contact the local dealer.



USB 2.0 Header



Pin No.	Definition
1	Power (5V)
2	Power (5V)
3	USB DX-
4	USB DY-
5	USB DX+
6	USB DY+
7	GND
8	GND
9	No Pin
10	No Connect

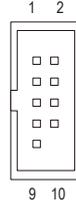
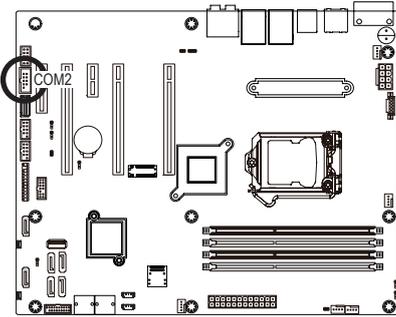
USB 3.1 Gen1 Header



Pin No.	Definition	Pin No.	Definition
1	Power	11	IntA_P2_D+
2	IntA_P1_SSRX-	12	IntA_P2_D-
3	IntA_P1_SSRX+	13	GND
4	GND	14	IntA_P2_SSTX+
5	IntA_P1_SSTX-	15	IntA_P2_SSTX-
6	IntA_P1_SSTX+	16	GND
7	GND	17	IntA_P2_SSRX+
8	IntA_P1_D-	18	IntA_P2_SSRX-
9	IntA_P1_D+	19	Power
10	No Connect	20	No Pin

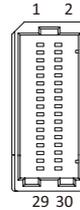
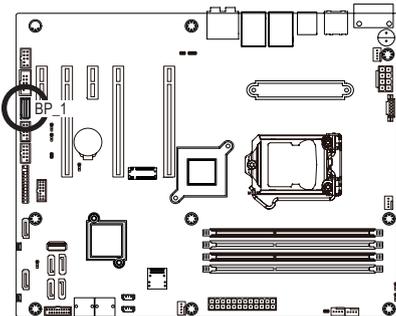
## 21) COM2 (Serial Port Cable Connector)

The COM header can provide one serial port via an optional COM port cable. For purchasing the optional COM port cable, please contact the local dealer.



Pin No.	Definition
1	NDCD-
2	NSIN
3	NSOUT
4	NDTR-
5	GND
6	NDSR-
7	NRTS-
8	NCTS-
9	NRI-
10	No Pin

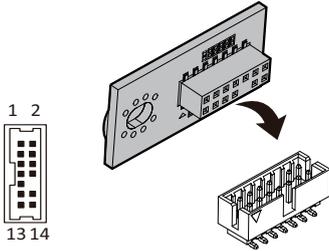
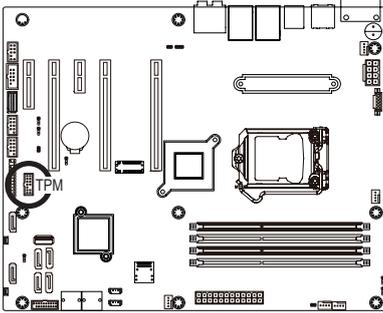
## 22) BP\_1 (HDD Backplane Board Header)



Pin No.	Definition	Pin No.	Definition
1	Reserved	2	No Connect
3	GND	4	No Connect
5	No Connect	6	GND
7	No Connect	8	PLD_Program_EN
9	GLLED_AMB_N	10	GLLED_GRN_N
11	FAN_IRQ_N	12	Reserved
13	BP_SCL	14	GND
15	BP_SDA	16	BP_RST_N
17	No Connect	18	GND
19	No Connect	20	No Connect
21	No Connect	22	GND
23	No Connect	24	GND
25	No Connect	26	GND
27	No Connect	28	GND
29	P_3V3_AUX	30	P_3V3_AUX

### 23) TPM (Trusted Platform Module Connector)

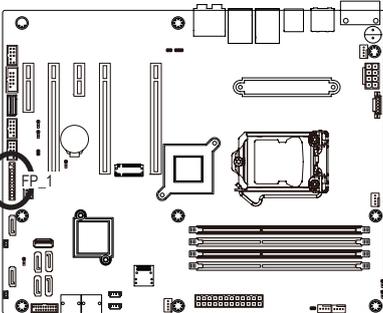
Trusted Platform Module (TPM) is an international standard for a secure cryptoprocessor, a dedicated microcontroller designed to secure hardware through integrated cryptographic keys.



Pin No.	Definition	Pin No.	Definition
1	Clock	2	P_3V3_AUX
3	LPC_RST	4	P3V3
5	LPC_LAD0	6	IRQ_SERIAL
7	LPC_LAD1	8	No Connect
9	LPC_LAD2	10	No Pin
11	LPC_LAD3	12	GND
13	LPC_FRAME_N	14	GND

### 24) FP\_1 (Front Panel Header)

Connect the power switch, reset switch, speaker, chassis intrusion switch/sensor and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.

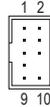
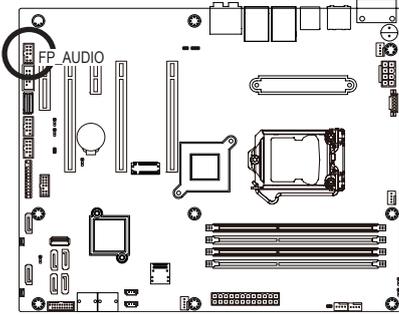


Pin No.	Definition	Pin No.	Definition
1	Power LED+	2	5V Standby
3	No Pin	4	No Connect
5	Power LED-	6	No Connect
7	HDD LED+	8	No Connect
9	HDD LED-	10	No Connect
11	Power Button	12	LAN1 Active LED+
13	GND	14	LAN1 Link LED-
15	Reset Button+	16	SMBus Data
17	GND	18	SMBus Clock
19	No Connect	20	Case Open
21	No Connect	22	LAN2 Active LED+
23	NMI Switch-	24	LAN2 Link LED-

 The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

## 25) F\_AUDIO (Front Audio Connector)

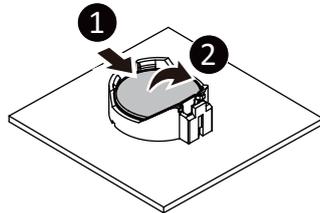
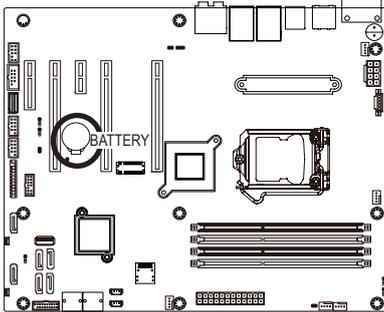
The front audio connector supports Intel High Definition audio (HD) and AC'97 audio. You may connect your chassis front audio module to this header. Make sure the wire assignments of the module connector match the pin assignments of the motherboard header. Incorrect connection between the module connector and the motherboard header will make the device unable to work or even damage it.



Pin No.	Definition
1	MIC2_L
2	GND
3	MIC2_R
4	P3V3
5	LINE2_R
6	MIC2_JD
7	F_Audio_Sense
8	No Pin
9	LINE2_L
10	LINE2_JD

## 26) BATTERY (Battery Socket)

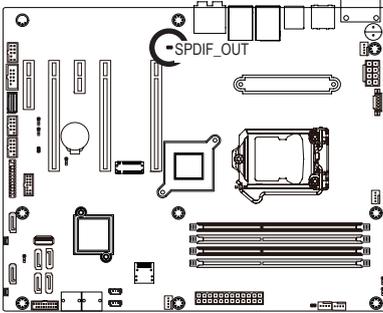
The battery provides power to keep the values (such as BIOS configurations, date, and time information) in the CMOS when the computer is turned off. Replace the battery when the battery voltage drops to a low level, or the CMOS values may not be accurate or may be lost.



- Always turn off your computer and unplug the power cord before replacing the battery.
- Replace the battery with an equivalent one. Danger of explosion if the battery is replaced with an incorrect model.
- Contact the place of purchase or local dealer if you are not able to replace the battery by yourself or uncertain about the battery model.
- Used batteries must be handled in accordance with local environmental regulations.

### 27) SPDIF\_OUT (S/PDIF Out Header)

This header supports digital S/PDIF Out and connects a S/PDIF digital audio cable (provided by expansion cards) for digital audio output from your motherboard to certain expansion cards like graphics cards and sound cards. For example, some graphics cards may require you to use a S/PDIF digital audio cable for digital audio output from your motherboard to your graphics card if you wish to connect an HDMI display to the graphics card and have digital audio output from the HDMI display at the same time. For information about connecting the S/PDIF digital audio cable, carefully read the manual for your expansion card.

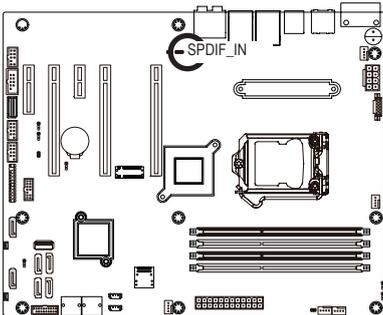


1 

Pin No.	Definition
1	SPDIF-OUT
2	GND

### 28) SPDIF\_IN (S/PDIF In Header)

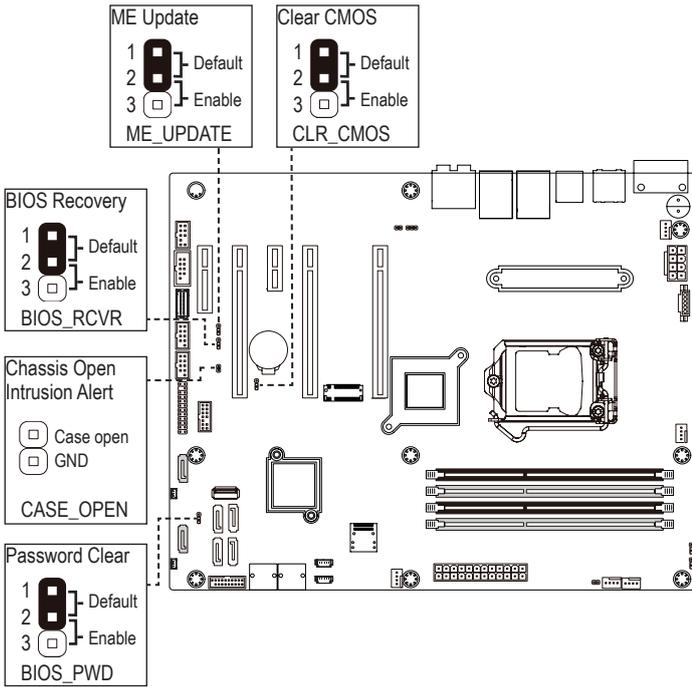
This header supports digital S/PDIF In and can connect to an audio device that supports digital audio out via an optional S/PDIF In cable. For purchasing the optional S/PDIF In cable, please contact the local dealer



1 

Pin No.	Definition
1	P_5V_AUX
2	SPDIF-IN
3	GND

# 1-8 Jumper Settings



Jumper Name	Jumper Setting
ME Update	1-2: Normal operation (Default) 2-3: Enable ME Update
Clear Supervisor Password	1-2: Normal operation (Default) 2-3: Skip Supervisor password
Clear CMOS	1-2: Normal operation (Default) 2-3: Clear CMOS data
Chassis Open Intrusion Alert	1-2: Normal operation (Default)
BIOS Recovery	1-2: Normal operation (Default) 2-3: Enable BIOS Recovery

## Chapter 2 BIOS Setup

BIOS (Basic Input and Output System) records hardware parameters of the system in the EFI on the motherboard. Its major functions include conducting the Power-On Self-Test (POST) during system startup, saving system parameters, loading the operating system etc. The BIOS includes a BIOS Setup program that allows the user to modify basic system configuration settings or to activate certain system features. When the power is turned off, the battery on the motherboard supplies the necessary power to the CMOS to keep the configuration values in the CMOS.

To access the BIOS Setup program, press the <DEL> key during the POST when the power is turned on.



- BIOS flashing is potentially risky, if you do not encounter any problems when using the current BIOS version, it is recommended that you don't flash the BIOS. To flash the BIOS, do it with caution. Inadequate BIOS flashing may result in system malfunction.
- It is recommended that you not alter the default settings (unless you need to) to prevent system instability or other unexpected results. Inadequately altering the settings may result in system's failure to boot. If this occurs, try to clear the CMOS values and reset the board to default values. (Refer to the **Exit** section in this chapter or introductions of the battery/clearing CMOS jumper in Chapter 1 for how to clear the CMOS values.)

### BIOS Setup Program Function Keys

<<-><->>	Move the selection bar to select the screen
<↑><↓>	Move the selection bar to select an item
<+>	Increase the numeric value or make changes
<->	Decrease the numeric value or make changes
<Enter>	Execute command or enter the submenu
<Esc>	Main Menu: Exit the BIOS Setup program Submenus: Exit current submenu
<F1>	Show descriptions of general help
<F3>	Restore the previous BIOS settings for the current submenus
<F9>	Load the Optimized BIOS default settings for the current submenus
<F10>	Save all the changes and exit the BIOS Setup program

■ **Main**

This setup page includes all the items of the standard compatible BIOS.

■ **Advanced**

This setup page includes all the items of AMI BIOS special enhanced features.

(ex: Auto detect fan and temperature status, automatically configure hard disk parameters.)

■ **Chipset**

This setup page includes all the submenu options for configuring the functions of the Platform Controller Hub.

■ **Server Management**

Server additional features enabled/disabled setup menus.

■ **Security**

Change, set, or disable supervisor and user password. Configuration supervisor password allows you to restrict access to the system and BIOS Setup.

A supervisor password allows you to make changes in BIOS Setup.

A user password only allows you to view the BIOS settings but not to make changes.

■ **Boot**

This setup page provides items for configuration of the boot sequence.

■ **Save & Exit**

Save all the changes made in the BIOS Setup program to the CMOS and exit BIOS Setup. (Pressing <F10> can also carry out this task.)

Abandon all changes and the previous settings remain in effect. Pressing <Y> to the confirmation message will exit BIOS Setup. (Pressing <Esc> can also carry out this task.)

## 2-1 The Main Menu

Once you enter the BIOS Setup program, the Main Menu (as shown below) appears on the screen. Use arrow keys to move among the items and press <Enter> to accept or enter other sub-menu.

### Main Menu Help

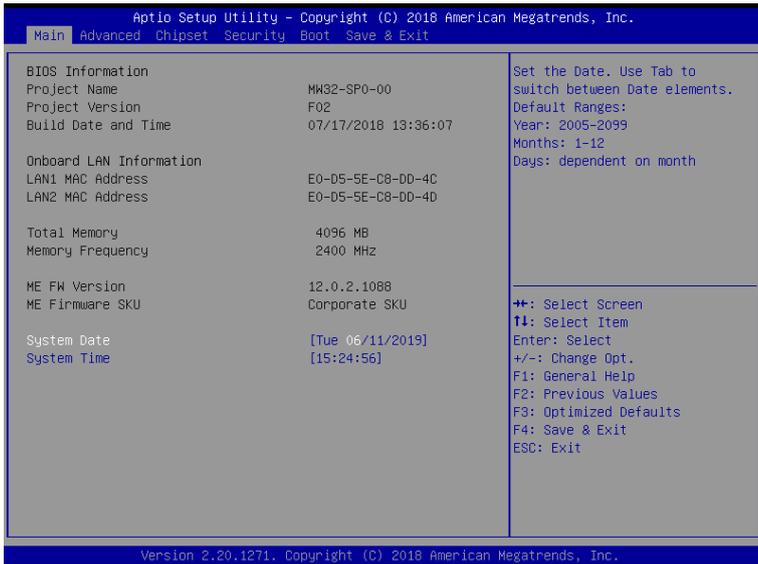
The on-screen description of a highlighted setup option is displayed on the bottom line of the Main Menu.

### Submenu Help

While in a submenu, press <F1> to display a help screen (General Help) of function keys available for the menu. Press <Esc> to exit the help screen. Help for each item is in the Item Help block on the right side of the submenu.



- When the system is not stable as usual, select the **Restore Defaults** item to set your system to its defaults.
- The BIOS Setup menus described in this chapter are for reference only and may differ by BIOS version.



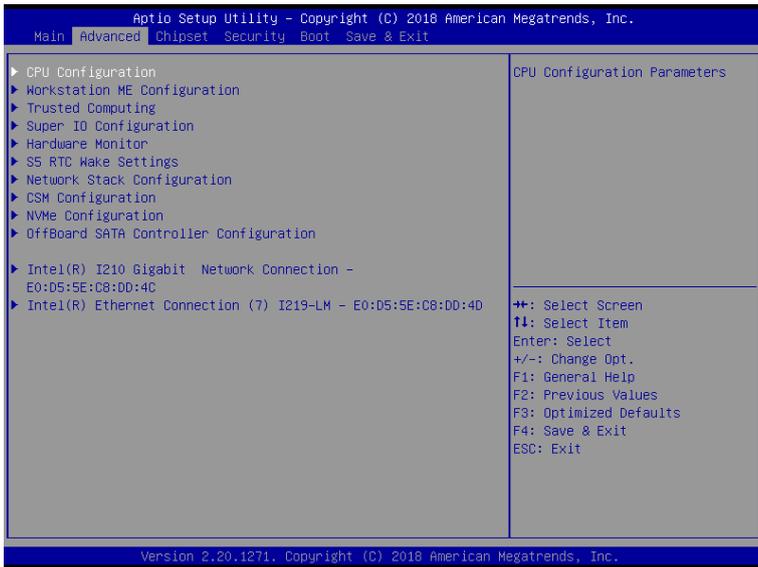
Parameter	Description
BIOS Information	
Core Version	Displays the Core version information
Project Name	Displays the project name information.
Project Version	Displays version number of the BIOS setup utility.
Build Date and Time	Displays the date and time when the BIOS setup utility was created.
Onboard LAN Information	
LAN1 MAC Address <sup>(Note1)</sup>	Displays the LAN1 MAC address information.
LAN2 MAC Address <sup>(Note1)</sup>	Displays the LAN2 MAC address information.
Total Memory <sup>(Note2)</sup>	Displays the total memory size of the installed memory.
Memory Frequency <sup>(Note2)</sup>	Displays the frequency information of the installed memory.
ME FW Version	Displays the ME firmware version.
ME Firmware SKU	Displays the ME firmware SKU information.
System Date	Set the system date following the weekday-month-day-year format.
System Time	Set the system time following the hour-minute-second format.

(Note1) The number of LAN ports listed will depend on the motherboard / system model.

(Note2) This section will display capacity and frequency information of the memory that the customer has installed.

## 2-2 Advanced Menu

The Advanced Menu displays submenu options for configuring the function of various hardware components. Select a submenu item, then press <Enter> to access the related submenu screen.



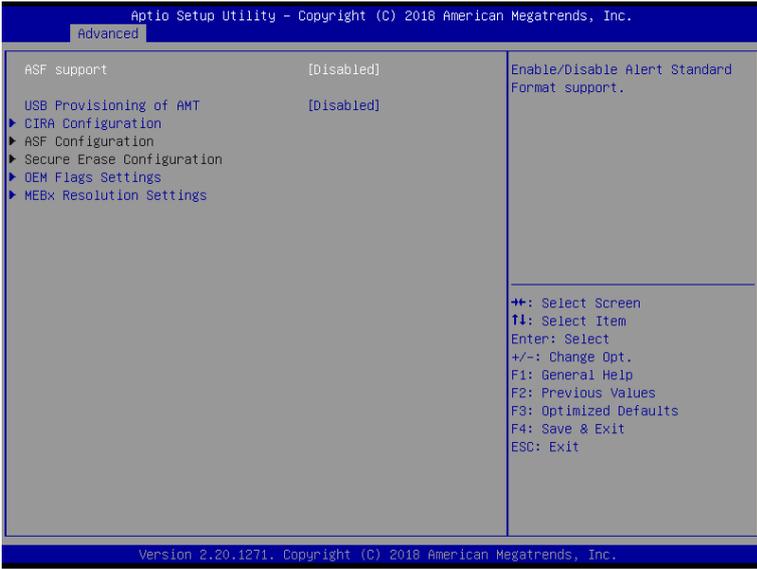
## 2-2-1 CPU Configuration



Parameter	Description
CPU Configuration	
Type / ID / Speed / L1 Data Cache / L1 Instruction Cache / L2 Cache/ L3 Cache/ L4 Cache	Displays the technical specifications for the installed processor
VMX	Displays if Virtual Machine Extensions are supported for the installed processor.
SMX/TXT	Displays if Intel SMX/TXT Technology are supported for the installed processor.
Software Guard Extensions (SGX)	Enable/Disable the Intel® Software Guard Extensions technology. This feature allows legal software to operate in a safe environment and protects the software against attacks from malicious software. The Software Controlled option allows you to enable or disable this feature with an Intel-provided application. Default setting is <b>Software Controlled</b> .
Hardware Prefetcher	Enable/Disable CPU Hardware Prefetcher. Options available: Enabled/Disabled. Default setting is <b>Enabled</b> .

Parameter	Description
Adjacent Cache Line Prefetch	Enable/Disable Adjacent Cache Line Prefetch. Options available: Enabled/Disabled. Default setting is <b>Enabled</b> .
Intel (VMX) Virtualization Technology	Enable/Disable Intel Virtualization Technology function. Options available: Enabled/Disabled. Default setting is <b>Disabled</b> .

## 2-2-2 Workstation ME Configuration



Parameter	Description
ASF Support	Enable/Disable Alert Standard Format (ASF). Options available: Enabled/Disabled. Default setting is <b>Disabled</b> .
USB Provisioning of AMT	Enable/Disable AMT USB Provisioning function. Options available: Enabled/Disabled. Default setting is <b>Disabled</b>
CIRA Configuration	Press [Enter] to configure advanced items. <ul style="list-style-type: none"> <li>◆ Activate Remote Assistance Process <ul style="list-style-type: none"> <li>– Enable/Disable Trigger CIRA boot<sup>(Note)</sup>.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Disabled</b>.</li> </ul> </li> <li>◆ CIRA Timeout <ul style="list-style-type: none"> <li>– Configure the CIRA Timer timeout. <b>Please note that this item is configurable when the Remote Assistance Process is Enabled.</b></li> </ul> </li> </ul>

(Note) Network Access must be activated first from MEBx Setup.

Parameter	Description
ASF Configuration	<p>Press [Enter] to configure advanced items.  <b>Please note that this item is configurable when the ASF Support is set to Enabled.</b></p> <ul style="list-style-type: none"> <li>◆ PET Progress <ul style="list-style-type: none"> <li>– Enable/Disable PET Events progress to receive PET events or not.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Enabled.</b></li> </ul> </li> <li>◆ WatchDog <ul style="list-style-type: none"> <li>– Enable/Disable WatchDog Timer.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Disabled.</b></li> </ul> </li> <li>◆ OS Timer <ul style="list-style-type: none"> <li>– Configure OS Timer. <b>Please note that this item is configurable when the WatchDog is set to Enabled.</b></li> </ul> </li> <li>◆ BIOS Timer <ul style="list-style-type: none"> <li>– Configure BIOS Timer. <b>Please note that this item is configurable when the WatchDog is set to Enabled.</b></li> </ul> </li> <li>◆ ASF Sensors Table <ul style="list-style-type: none"> <li>– Enable/Disable to add ASF Sensors Table into ASF! ACPI table.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Disabled.</b></li> </ul> </li> </ul>
Secure Erase Configuration	<p>Press [Enter] to configure advanced items.  <b>Please note that this item is configurable when the ASF Support is set to Enabled.</b></p> <ul style="list-style-type: none"> <li>◆ Secure Erase Mode <ul style="list-style-type: none"> <li>– Configure Secure Erase module behavior.</li> <li>– Options available: Simulated/Real. Default setting is <b>Simulated.</b></li> </ul> </li> <li>◆ Force Secure Erase <ul style="list-style-type: none"> <li>– Enable/Disable Force Secure Erase on next boot.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Disabled.</b></li> </ul> </li> </ul>

Parameter	Description
OEM Flags Settings	<p>Press [Enter] to configure advanced items.</p> <ul style="list-style-type: none"> <li>◆ MEBx Hotkey Pressed <ul style="list-style-type: none"> <li>– Enable/Disable automatic MEBx hotkey press.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Disabled</b>.</li> </ul> </li> <li>◆ MEBx Selection Screen<sup>(Note)</sup> <ul style="list-style-type: none"> <li>– Enable/Disable MEBx Selection Screen.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Disabled</b>.</li> </ul> </li> <li>◆ Hide Unconfigure ME Confirmation Prompt <ul style="list-style-type: none"> <li>– Enable/Disable Hide Unconfigure ME confirmation prompt when attempting ME unconfiguration.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Disabled</b>.</li> </ul> </li> <li>◆ MEBx OEM Debug Menu Enable <ul style="list-style-type: none"> <li>– Enable/Disable OEM debug menu in MEBx.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Disabled</b>.</li> </ul> </li> <li>◆ Unconfigure ME <ul style="list-style-type: none"> <li>– Enable/Disable Unconfigure ME with resetting MEBx Password to default.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Disabled</b>.</li> </ul> </li> </ul>
MEBx Resolution Settings	<p>Press [Enter] to configure advanced items.</p> <ul style="list-style-type: none"> <li>◆ Non-UI Mode Resolution <ul style="list-style-type: none"> <li>– Configure resolution for non-UI text mode.</li> <li>– Options available: Auto, 80x25, 100x31. Default setting is <b>Auto</b>.</li> </ul> </li> <li>◆ UI Mode Resolution <ul style="list-style-type: none"> <li>– Configure resolution for UI text mode.</li> <li>– Options available: Auto, 80x25, 100x31. Default setting is <b>Auto</b>.</li> </ul> </li> <li>◆ Graphics Mode Resolution <ul style="list-style-type: none"> <li>– Configure resolution for graphics mode.</li> <li>– Options available: Auto, 640x480, 800x600, 1024x768. Default setting is <b>Auto</b>.</li> </ul> </li> </ul>

(Note) Network Access must be activated from MEBx Setup for this screen to be displayed.

## 2-2-3 Trusted Computing



Parameter	Description
Configuration	
Security Device Support	Enable/Disable the TPM support feature. Options available: Enable/Disable. Default setting is <b>Enable</b> .
Current Status Information	Displays current TPM status information.

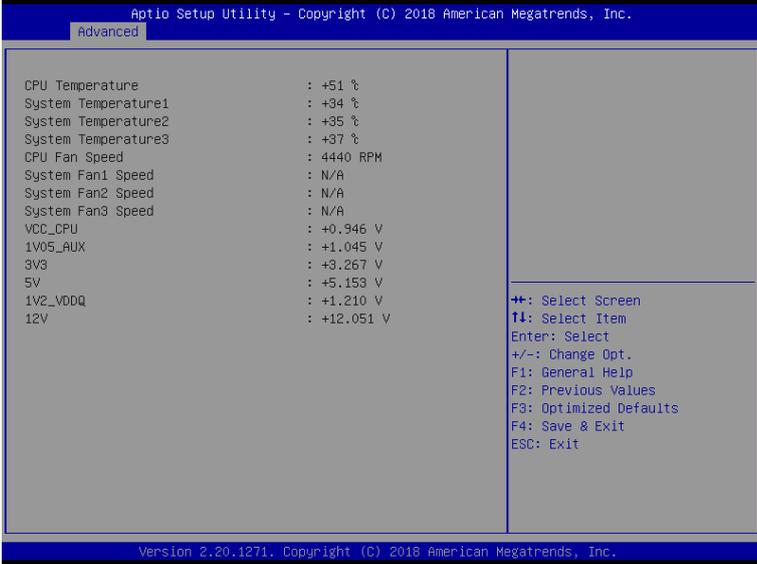
## 2-2-4 Super IO Configuration



Parameter	Description
Serial Port 1/2 Configuration	Press [Enter] to configure advanced items.

Parameter	Description
Serial Port 1/2 Configuration	<ul style="list-style-type: none"> <li>◆ Serial Port <ul style="list-style-type: none"> <li>– When set to Enabled allows you to configure the serial port settings. When set to Disabled, displays no configuration for the serial port.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Enabled</b>.</li> </ul> </li> <li>◆ Device Settings <ul style="list-style-type: none"> <li>– Displays the serial port base I/O address and IRQ.</li> </ul> </li> <li>◆ Change Settings: <ul style="list-style-type: none"> <li>– Configures the serial port base I/O address and IRQ. <ul style="list-style-type: none"> <li>» Serial Port 1 : <ul style="list-style-type: none"> <li>Auto;</li> <li>IO=3F8h; IRQ=4;</li> <li>IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;</li> <li>IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;</li> <li>IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;</li> <li>IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;</li> <li>Default setting is <b>Auto</b>.</li> </ul> </li> <li>» Serial Port 2 : <ul style="list-style-type: none"> <li>Auto;</li> <li>IO=2F8h; IRQ=3;</li> <li>IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;</li> <li>IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;</li> <li>IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;</li> <li>IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;</li> <li>Default setting is <b>Auto</b>.</li> </ul> </li> </ul> </li> </ul> </li> </ul>

## 2-2-5 Hardware Monitor



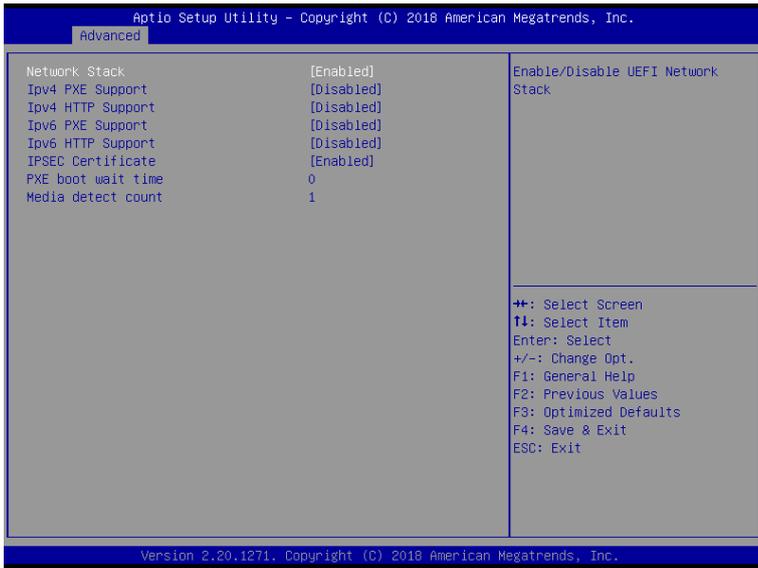
Parameter	Description
CPU Temperature	Displays the CPU temperature information.
System Temperature 1/ 2/ 3	Displays the System temperature information.
CPU Fan Speed	Displays the RPM (Ratio Per Minute) of CPU Fan speed.
System Fan 1/ 2/ 3 Speed	Displays the RPM (Ratio Per Minute) of System Fan 1/ 2/ 3 speed.
VCC-CPU/ 1V05_AUX/ 3V3/ 5V/ 1V2_VDDQ/ 12V	Displays the CPU/ System voltages information.

## 2-2-6 S5 RTC Wake Settings



Parameter	Description
Wake System from S5	Enable/Disable system wake on alarm event. Options available: Disabled/Fixed Time. When Fixed Time enabled, system will wake on the hr::min::sec specified. Default setting is <b>Enable</b> .

## 2-2-7 Network Stack Configuration



Parameter	Description
Network Stack	Enable/Disable the UEFI network stack. Options available: Enabled/Disabled. Default setting is <b>Enabled</b> .
Ipv4 PXE Support <sup>(Note)</sup>	Enable/Disable the Ipv4 PXE feature. Options available: Enabled/Disabled. Default setting is <b>Enabled</b> .
Ipv4 HTTP Support <sup>(Note)</sup>	Enable/Disable the Ipv4 HTTP feature. Options available: Enabled/Disabled. Default setting is <b>Disabled</b> .
Ipv6 PXE Support <sup>(Note)</sup>	Enable/Disable the Ipv6 PXE feature. Options available: Enabled/Disabled. Default setting is <b>Disabled</b> .
Ipv6 HTTP Support <sup>(Note)</sup>	Enable/Disable the Ipv6 HTTP feature. Options available: Enabled/Disabled. Default setting is <b>Disabled</b> .
PXE boot wait time <sup>(Note)</sup>	Press the <+> / <-> keys to increase or decrease the desired values.
Media detect count <sup>(Note)</sup>	Press the <+> / <-> keys to increase or decrease the desired values.

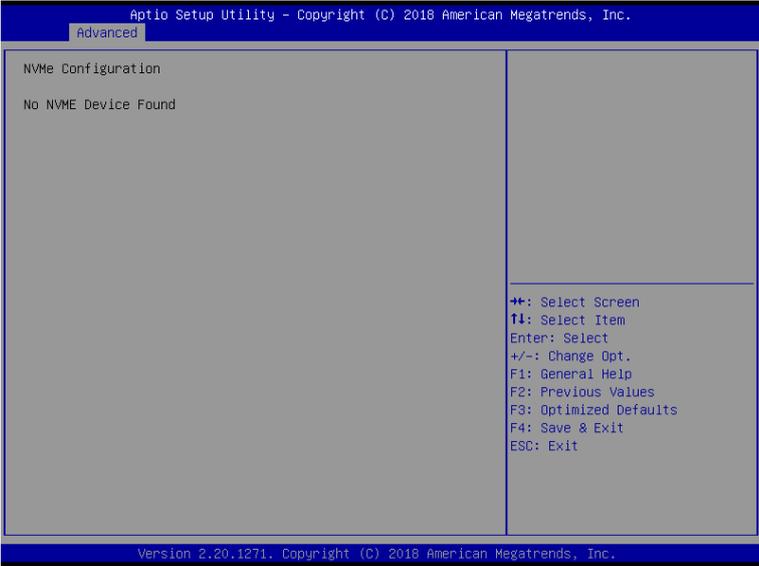
(Note) This item appears when **Network Stack** is set to **Enabled**.

## 2-2-8 CSM Configuration



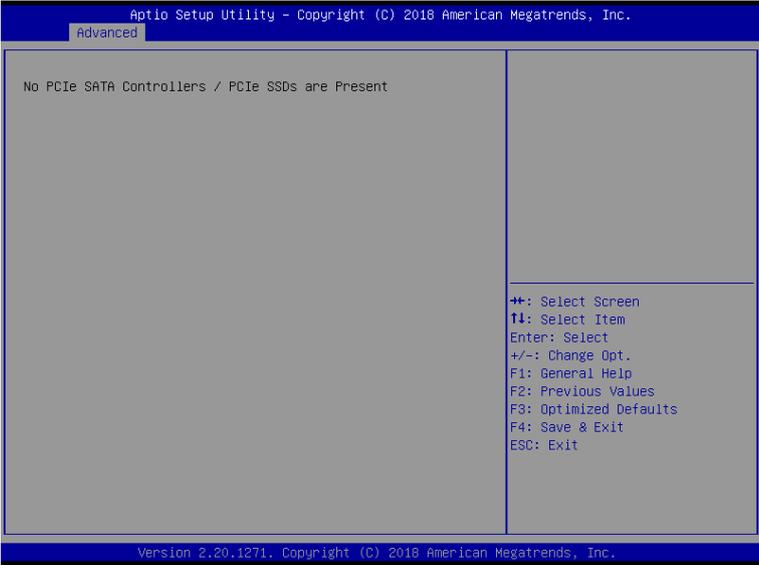
Parameter	Description
Compatibility Support Module Configuration	
CSM Support	Enable/Disable CSM Support. Options available: Enabled/Disabled. Default setting is <b>Disabled</b> .

## 2-2-9 NVMe Configuration



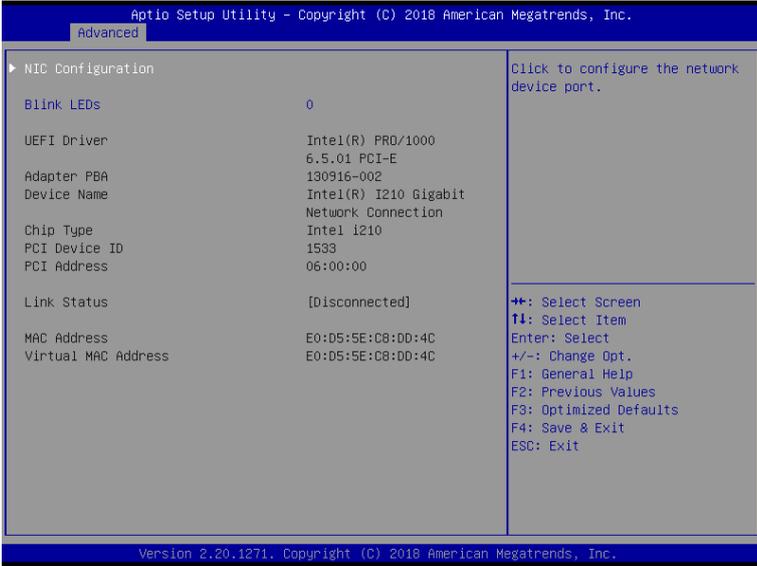
Parameter	Description
NVMe Configuration	Displays the NVMe devices connected to the system

## 2-2-10 OffBoard SATA Controller Configuration



Parameter	Description
Offboard SATA Controller Configuration	Displays the information on your PCIe SATA controllers/ PCIe SSD if installed

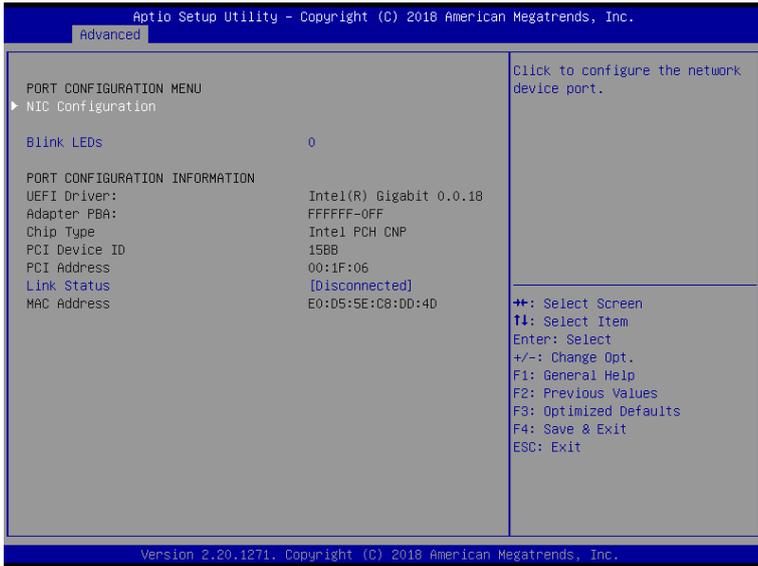
## 2-2-11 Intel(R) I210 Gigabit Network Connection



Parameter	Description
NIC Configuration	<p>Press [Enter] to configure advanced items.</p> <ul style="list-style-type: none"> <li>◆ Link Speed <ul style="list-style-type: none"> <li>– Allows for automatic link speed adjustment.</li> <li>– Options available: Auto Negotiated, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half, 100 Mbps Full. Default setting is <b>Auto Negotiated</b>.</li> </ul> </li> <li>◆ Wake On LAN <ul style="list-style-type: none"> <li>– Enables power on of the system via LAN. Note that configuring Wake on LAN in the operating system does not change the value of this setting, but does override the behavior of Wake on LAN in OS controlled power states.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Enabled</b>.</li> </ul> </li> </ul>
Blink LEDs	Identifies the physical network port by blinking the associated LED. Press the numeric keys to adjust desired values.
UEFI Driver	Displays the technical specifications for the Network Interface Controller.
Adapter PBA	Displays the technical specifications for the Network Interface Controller.
Device Name	Displays the technical specifications for the Network Interface Controller.

<b>Parameter</b>	<b>Description</b>
Chip Type	Displays the technical specifications for the Network Interface Controller.
PCI Device ID	Displays the technical specifications for the Network Interface Controller.
PCI Address	Displays the technical specifications for the Network Interface Controller.
Link Status	Displays the technical specifications for the Network Interface Controller.
MAC Address	Displays the technical specifications for the Network Interface Controller.
Virtual MAC Address	Displays the technical specifications for the Network Interface Controller.

## 2-2-12 Intel(R) I219-LM Ethernet Connection

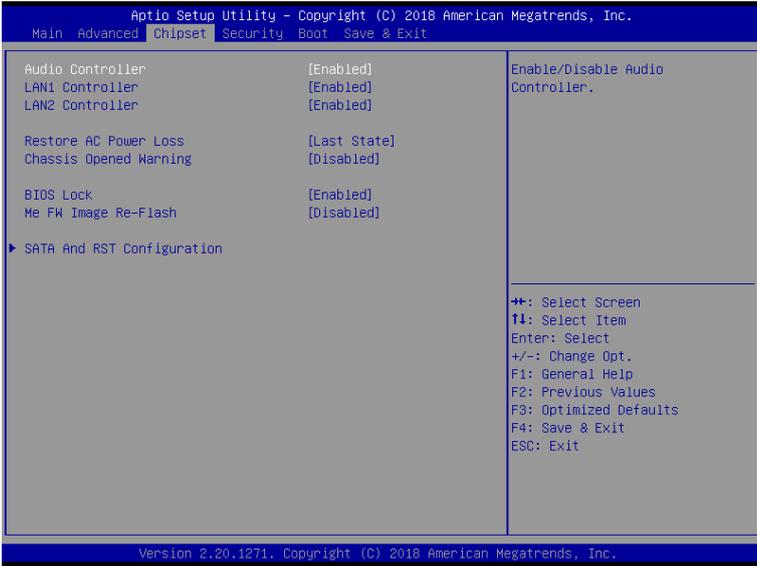


Parameter	Description
PORT CONFIGURATION MENU	
NIC Configuration	<p>Press [Enter] to configure advanced items.</p> <ul style="list-style-type: none"> <li>◆ Link Speed           <ul style="list-style-type: none"> <li>– Allows for automatic link speed adjustment.</li> <li>– Options available: Auto Negotiated, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half, 100 Mbps Full. Default setting is <b>Auto Negotiated</b>.</li> </ul> </li> <li>◆ Wake On LAN           <ul style="list-style-type: none"> <li>– Enables power on of the system via LAN. Note that configuring Wake on LAN in the operating system does not change the value of this setting, but does override the behavior of Wake on LAN in OS controlled power states.</li> <li>– Options available: Enabled/Disabled. Default setting is <b>Enabled</b>.</li> </ul> </li> </ul>
Blink LEDs	Identifies the physical network port by blinking the associated LED. Press the numeric keys to adjust desired values.

<b>Parameter</b>	<b>Description</b>
PORT CONFIGURATION INFORMATION	
UEFI Driver	Displays the technical specifications for the Network Interface Controller.
Adapter PBA	Displays the technical specifications for the Network Interface Controller.
Chip Type	Displays the technical specifications for the Network Interface Controller.
PCI Device ID	Displays the technical specifications for the Network Interface Controller.
PCI Address	Displays the technical specifications for the Network Interface Controller.
Link Status	Displays the technical specifications for the Network Interface Controller.
MAC Address	Displays the technical specifications for the Network Interface Controller.

## 2-3 Chipset Setup Menu

Chipset Setup menu displays submenu options for configuring the function of Platform Controller Hub(PCH). Select a submenu item, then press <Enter> to access the related submenu screen.

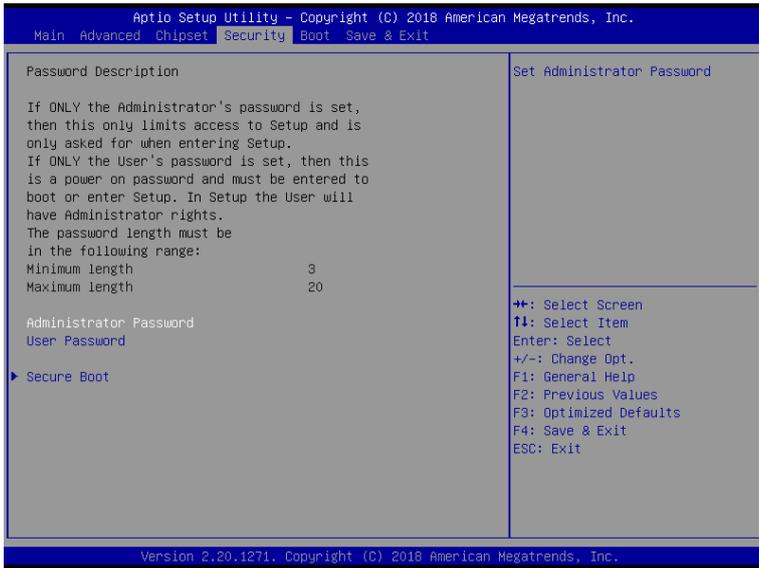


Parameter	Description
Audio Controller <sup>1)</sup>	Enable/ Disable Audio Controller. Options available: Enabled/Disabled. Default setting is <b>Enabled</b> .
LAN1/ LAN2 Controller	Enable/ Disable LAN1/ LAN2 Controller. Options available: Enabled/Disabled. Default setting is <b>Enabled</b> .
Restore AC Power Loss	This option provides user to set the mode of operation if an AC/ Power loss occurs. <ul style="list-style-type: none"> <li>• Power On: System power state when AC cord is re-plugged.</li> <li>• Power Off: Do not power on system when AC power is back.</li> <li>• Last State: Set system to the last state when AC power is removed.</li> </ul> Options available: Power On, Power Off, Last State. Default setting is <b>Last State</b> .
Chassis Opened Warning	Enable/Disable the chassis intrusion alert function. Options available: Enabled, Disabled, Clear. Default setting is <b>Disabled</b> ..

Parameter	Description
BIOS LOCK	Enable/ Disable the PCH BIOS Lock Enable feature. When enabled, ensures the SMM protection of flash. Options available: Enabled/Disabled. Default setting is <b>Enabled</b> .
ME FW Image Re-Flash	Enable/ Disable ME FW Image Re-Flash function. Options available: Enabled/Disabled. Default setting is <b>Disabled</b> .
SATA And RST Configuration	Press [Enter] to configure advanced items. <ul style="list-style-type: none"> <li>◆ SATA Mode Selection               <ul style="list-style-type: none"> <li>– Configures on chip SATA type.</li> <li>– AHCI Mode: When set to AHCI, the SATA controller enables its AHCI functionality. Then the RAID function is disabled and cannot be access the RAID setup utility at boot time.</li> <li>– Intel RST Premium with Intel Optane System Acceleration Mode: When set to RST Premium with Intel Optane System Acceleration for the SATA controller, you will be allowed to access the RAID setup utility at boot time.</li> <li>– Options available: AHCI/Intel RST Premium with Intel Optane System Acceleration. Default setting is <b>AHCI</b>.</li> </ul> </li> <li>◆ SATA Port 0/1/2/3/4/5               <ul style="list-style-type: none"> <li>– The category identifies SATA hard drives that are installed in the computer. System will automatically detect HDD type.</li> </ul> </li> <li>◆ Hot Plug               <ul style="list-style-type: none"> <li>– Enable/ Disable the hot plug capability for each SATA port. Options available: Enabled/Disabled. Default setting is <b>Disabled</b>.</li> </ul> </li> </ul>

## 2-4 Security Menu

The Security menu allows you to safeguard and protect the system from unauthorized use by setting up access passwords.



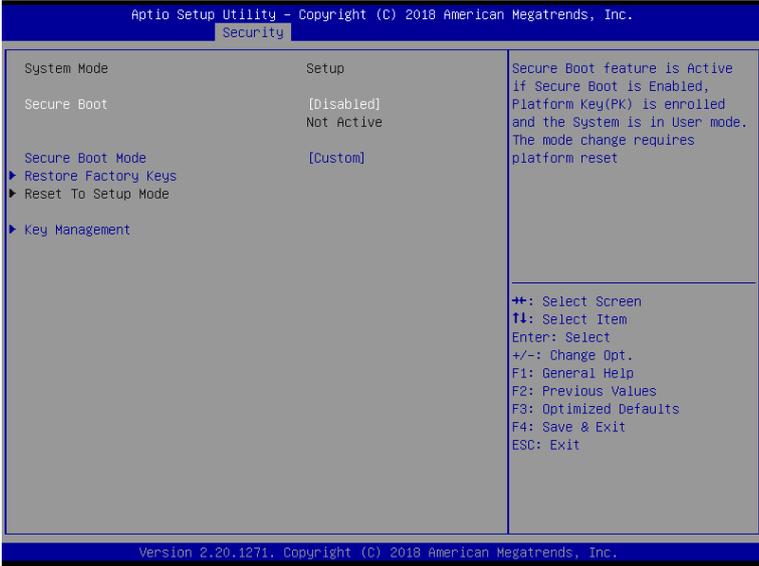
There are two types of passwords that you can set:

- Administrator Password  
Entering this password will allow the user to access and change all settings in the Setup Utility.
- User Password  
Entering this password will restrict a user's access to the Setup menus. To enable or disable this field, a Administrator Password must first be set. A user can only access and modify the System Time, System Date, and Set User Password fields.

Parameter	Description
Administrator Password	Press [Enter] to configure the administrator password.
User Password	Press [Enter] to configure the user password.
Secure Boot	Press [Enter] to configure advanced items.

## 2-4-1 Secure Boot

The Secure Boot submenu is applicable when your device is installed the Windows® 8 (or above) operating system.



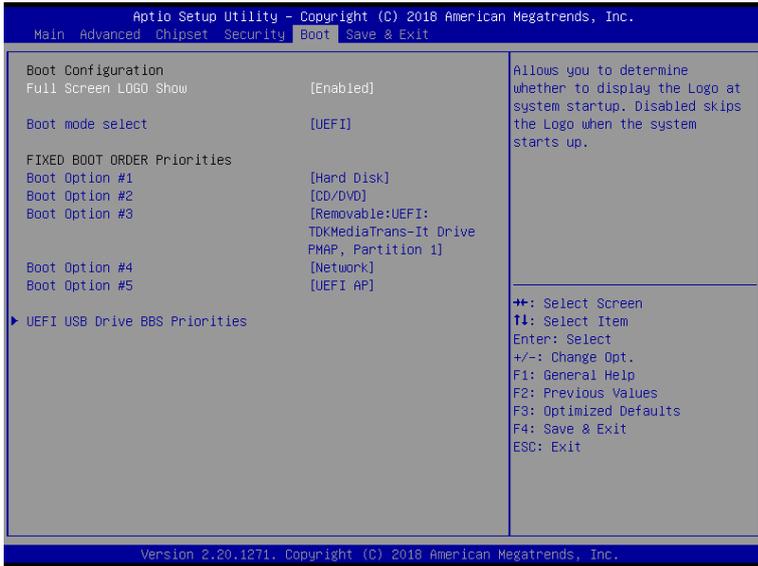
Parameter	Description
System Mode	Displays if the system is in User mode or Setup mode.
Secure Boot	Enable/ Disable the Secure Boot function. Options available:Enabled/Disabled. Default setting is <b>Disabled</b> .
Secure Boot Mode <sup>(Note)</sup>	Secure Boot requires all the applications that are running during the booting process to be pre-signed with valid digital certificates. This way, the system knows all files being loaded before Windows loads to the login screen have not been tampered with. When set to Standard, it will automatically load the Secure Boot keys form the BIOS databases. When set to Custom, you can customize the Secure Boot settings and manually load its keys from the BIOS database. Options available: Standard/Custom. Default setting is <b>Custom</b> .

(Note) Advanced items prompt when this item is set to **Custom**.

Parameter	Description
Key Management	<p data-bbox="335 156 665 180">Press [Enter] to configure advanced items.</p> <p data-bbox="335 185 936 235"><b>Please note that this item is configurable when Secure Boot Mode is set to Custom.</b></p> <ul style="list-style-type: none"> <li data-bbox="335 243 941 352">◆ Factory Key Provision <ul style="list-style-type: none"> <li data-bbox="367 266 941 321">– Allows to provision factory default Secure Boot keys when system is in Setup Mode.</li> <li data-bbox="367 326 899 352">– Options available: Enabled/Disabled. Default setting is <b>Disabled</b>.</li> </ul> </li> <li data-bbox="335 357 925 431">◆ Restore Factory Keys <ul style="list-style-type: none"> <li data-bbox="367 381 925 404">– Installs all factory default keys. It will force the system in User Mode.</li> <li data-bbox="367 409 601 431">– Options available: Yes/No.</li> </ul> </li> <li data-bbox="335 435 899 517">◆ Enroll Efi Image <ul style="list-style-type: none"> <li data-bbox="367 459 899 517">– Press [Enter] to enroll SHA256 hash of the binary into Authorized Signature Database (db).</li> </ul> </li> <li data-bbox="335 522 696 572">◆ Restore DB defaults <ul style="list-style-type: none"> <li data-bbox="367 545 696 572">– Restore DB variable to factory defaults.</li> </ul> </li> <li data-bbox="335 577 893 627">◆ Secure Boot variable <ul style="list-style-type: none"> <li data-bbox="367 600 893 627">– Displays the current status of the variables used for secure boot.</li> </ul> </li> <li data-bbox="335 631 803 744">◆ Platform Key (PK) <ul style="list-style-type: none"> <li data-bbox="367 655 803 682">– Displays the current status of the Platform Key (PK).</li> <li data-bbox="367 686 675 713">– Press [Enter] to configure a new PK.</li> <li data-bbox="367 718 611 744">– Options available: Set New.</li> </ul> </li> <li data-bbox="335 749 941 885">◆ Key Exchange Keys (KEK) <ul style="list-style-type: none"> <li data-bbox="367 773 941 854">– Displays the current status of the Key Exchange Key Database (KEK).</li> <li data-bbox="367 796 904 854">– Press [Enter] to configure a new KEK or load additional KEK from storage devices.</li> <li data-bbox="367 859 675 885">– Options available: Set New/Append.</li> </ul> </li> <li data-bbox="335 890 904 1027">◆ Authorized Signatures (DB) <ul style="list-style-type: none"> <li data-bbox="367 914 904 937">– Displays the current status of the Authorized Signature Database.</li> <li data-bbox="367 937 941 995">– Press [Enter] to configure a new DB or load additional DB from storage devices.</li> <li data-bbox="367 1000 675 1027">– Options available: Set New/Append.</li> </ul> </li> <li data-bbox="335 1031 899 1168">◆ Forbidden Signatures (DBX) <ul style="list-style-type: none"> <li data-bbox="367 1055 899 1078">– Displays the current status of the Forbidden Signature Database.</li> <li data-bbox="367 1078 888 1136">– Press [Enter] to configure a new dbx or load additional dbx from storage devices.</li> <li data-bbox="367 1141 675 1168">– Options available: Set New/Append.</li> </ul> </li> <li data-bbox="335 1172 925 1309">◆ Authorized TimeStamps (DBT) <ul style="list-style-type: none"> <li data-bbox="367 1196 925 1219">– Displays the current status of the Authorized TimeStamps Database.</li> <li data-bbox="367 1219 904 1277">– Press [Enter] to configure a new DBT or load additional DBT from storage devices.</li> <li data-bbox="367 1282 675 1309">– Options available: Set New/Append.</li> </ul> </li> <li data-bbox="335 1313 915 1434">◆ OsRecovery Signatures <ul style="list-style-type: none"> <li data-bbox="367 1337 915 1361">– Displays the current status of the OsRecovery Signature Database.</li> <li data-bbox="367 1361 888 1419">– Press [Enter] to configure a new OsRecovery Signature or load additional OsRecovery Signature from storage devices.</li> <li data-bbox="367 1423 675 1434">– Options available: Set New/Append.</li> </ul> </li> </ul>

## 2-5 Boot Menu

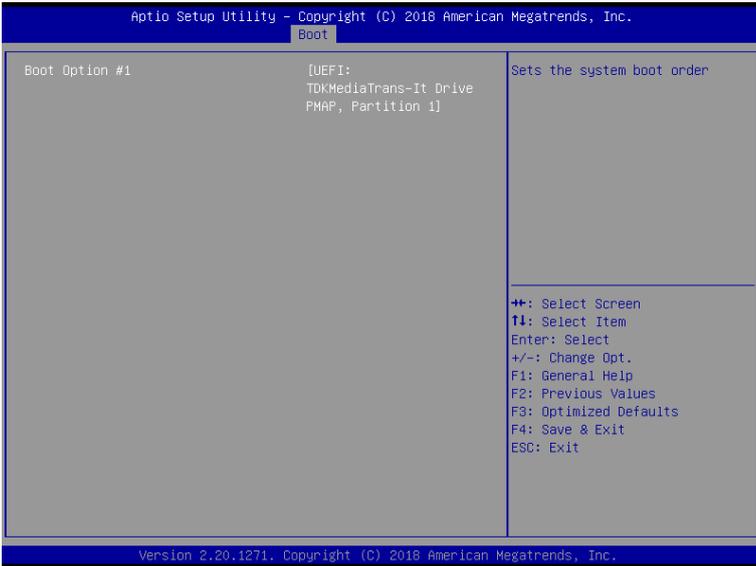
The Boot menu allows you to set the drive priority during system boot-up. BIOS setup will display an error message if the legacy drive(s) specified is not bootable.



Parameter	Description
Boot Configuration	
Full Screen LOGO Show	Allows to determine whether to display the Logo at system startup. Disabled skips the Logo when the system starts up. Options available: Enabled/Disabled. Default setting is <b>Enabled</b> .
Boot mode select	Selects the boot mode. Options available: LEGACY/UEFI. Default setting is <b>UEFI</b> .
FIXED BOOT ORDER Priorities	
Boot Option #1 / #2 / #3 / #4 / #5	Press [Enter] to configure the boot priority. By default, the server searches for boot devices in the following sequence: <ol style="list-style-type: none"> <li>1. Hard drive.</li> <li>2. CD-COM/DVD drive.</li> <li>3. USB</li> <li>4. Network.</li> <li>5. UEFI AP.</li> </ol>
UEFI USB Drive BBS Priorities	Press [Enter] to configure the boot priority.

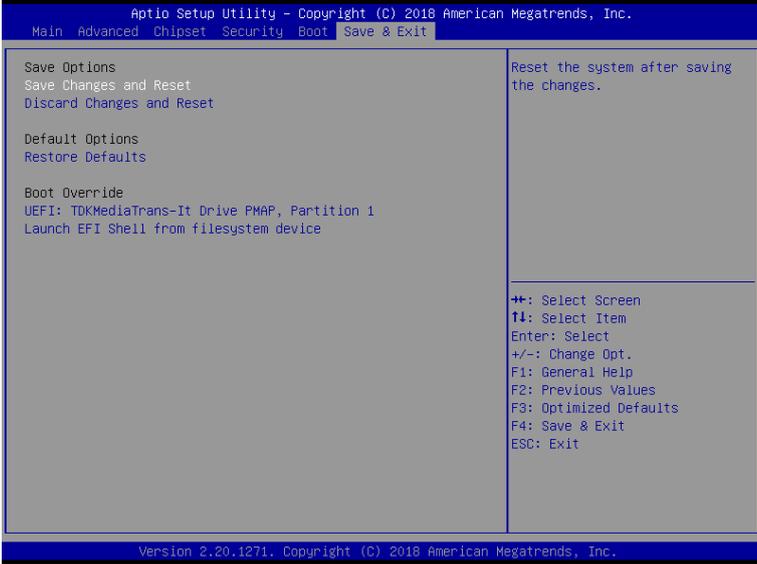
## 2-5-1 UEFI USB Drive BBS Priorities

The UEFI USB drive BBS priorities submenu allows you to specify the boot device priority from the available UEFI USB drives during system boot-up. BIOS setup will display an error message if the legacy drive(s) specified is not bootable.



## 2-6 Save & Exit Menu

The Save & Exit menu displays the various options to quit from the BIOS setup. Highlight any of the exit options then press <Enter>.



Parameter	Description
Save Options	
Save Changes and Reset	Restarts the system after saving the changes made. Options available: Yes/No.
Discard Changes and Reset	Restarts the system without saving any changes. Options available: Yes/No.
Default Options	
Restore Defaults	Loads the default settings for all BIOS setup parameters. Setup Defaults are quite demanding in terms of resources consumption. If you are using low-speed memory chips or other kinds of low-performance components and you choose to load these settings, the system might not function properly. Options available: Yes/No.
Boot Override	Press [Enter] to configure the device as the boot-up drive.

## 2-7 BIOS POST Codes

### 2-7-1 AMI Standard - PEI

PEI_CORE_STARTED	0x10
PEI_CAR_CPU_INIT	0x11
PEI_CAR_NB_INIT	0x15
PEI_CAR_SB_INIT	0x19
PEI_MEMORY_SPD_READ	0x2B
PEI_MEMORY_PRESENCE_DETECT	0x2C
PEI_MEMORY_TIMING	0x2D
PEI_MEMORY_CONFIGURING	0x2E
PEI_MEMORY_INIT	0x2F
PEI_MEMORY_INSTALLED	0x31
PEI_CPU_INIT	0x32
PEI_CPU_CACHE_INIT	0x33
PEI_CPU_AP_INIT	0x34
PEI_CPU_BSP_SELECT	0x35
PEI_CPU_SMM_INIT	0x36
PEI_MEM_NB_INIT	0x37
PEI_MEM_SB_INIT	0x3B
PEI_DXE_IPL_STARTED	0x4F
DXE_CORE_STARTED	0x60
//Recovery	
PEI_RECOVERY_AUTO	0xF0
PEI_RECOVERY_USER	0xF1
PEI_RECOVERY_STARTED	0xF2
PEI_RECOVERY_CAPSULE_FOUND	0xF3
PEI_RECOVERY_CAPSULE_LOADED	0xF4
//S3	
PEI_S3_STARTED	0xE0
PEI_S3_BOOT_SCRIPT	0xE1
PEI_S3_VIDEO_REPOST	0xE2
PEI_S3_OS_WAKE	0xE3

### 2-7-2 AMI Standard - DXE

DXE_CORE_STARTED	0x60
DXE_NVRAM_INIT	0x61
DXE_SBRUN_INIT	0x62
DXE_CPU_INIT	0x63
DXE_NB_HB_INIT	0x68
DXE_NB_INIT	0x69
DXE_NB_SMM_INIT	0x6A

DXE_SB_INIT	0x70
DXE_SB_SMM_INIT	0x71
DXE_SB_DEVICES_INIT	0x72
DXE_ACPI_INIT	0x78
DXE_CSM_INIT	0x79
DXE_BDS_STARTED	0x90
DXE_BDS_CONNECT_DRIVERS	0x91
DXE_PCI_BUS_BEGIN	0x92
DXE_PCI_BUS_HPC_INIT	0x93
DXE_PCI_BUS_ENUM	0x94
DXE_PCI_BUS_REQUEST_RESOURCES	0x95
DXE_PCI_BUS_ASSIGN_RESOURCES	0x96
DXE_CON_OUT_CONNECT	0x97
DXE_CON_IN_CONNECT	0x98
DXE_SIO_INIT	0x99
DXE_USB_BEGIN	0x9A
DXE_USB_RESET	0x9B
DXE_USB_DETECT	0x9C
DXE_USB_ENABLE	0x9D
DXE_IDE_BEGIN	0xA0
DXE_IDE_RESET	0xA1
DXE_IDE_DETECT	0xA2
DXE_IDE_ENABLE	0xA3
DXE_SCSI_BEGIN	0xA4
DXE_SCSI_RESET	0xA5
DXE_SCSI_DETECT	0xA6
DXE_SCSI_ENABLE	0xA7
DXE_SETUP_VERIFYING_PASSWORD	0xA8
DXE_SETUP_START	0xA9
DXE_SETUP_INPUT_WAIT	0xAB
DXE_READY_TO_BOOT	0xAD
DXE_LEGACY_BOOT	0xAE
DXE_EXIT_BOOT_SERVICES	0xAF
RT_SET_VIRTUAL_ADDRESS_MAP_BEGIN	0xB0
RT_SET_VIRTUAL_ADDRESS_MAP_END	0xB1
DXE_LEGACY_OPROM_INIT	0xB2
DXE_RESET_SYSTEM	0xB3
DXE_USB_HOTPLUG	0xB4
DXE_PCI_BUS_HOTPLUG	0xB5
DXE_NVRAM_CLEANUP	0xB6
DXE_CONFIGURATION_RESET	0xB7

### 2-7-3 AMI Standard - ERROR

PEI_MEMORY_INVALID_TYPE	0x50
PEI_MEMORY_INVALID_SPEED	0x50
PEI_MEMORY_SPD_FAIL	0x51
PEI_MEMORY_INVALID_SIZE	0x52
PEI_MEMORY_MISMATCH	0x52
PEI_MEMORY_NOT_DETECTED	0x53
PEI_MEMORY_NONE_USEFUL	0x53
PEI_MEMORY_ERROR	0x54
PEI_MEMORY_NOT_INSTALLED	0x55
PEI_CPU_INVALID_TYPE	0x56
PEI_CPU_INVALID_SPEED	0x56
PEI_CPU_MISMATCH	0x57
PEI_CPU_SELF_TEST_FAILED	0x58
PEI_CPU_CACHE_ERROR	0x58
PEI_CPU_MICROCODE_UPDATE_FAILED	0x59
PEI_CPU_NO_MICROCODE	0x59
PEI_CPU_INTERNAL_ERROR	0x5A
PEI_CPU_ERROR	0x5A
PEI_RESET_NOT_AVAILABLE	0x5B
//Recovery	
PEI_RECOVERY_PPI_NOT_FOUND	0xF8
PEI_RECOVERY_NO_CAPSULE	0xF9
PEI_RECOVERY_INVALID_CAPSULE	0xFA
//S3 Resume	
PEI_MEMORY_S3_RESUME_FAILED	0xE8
PEI_S3_RESUME_PPI_NOT_FOUND	0xE9
PEI_S3_BOOT_SCRIPT_ERROR	0xEA
PEI_S3_OS_WAKE_ERROR	0xEB
DXE_CPU_ERROR	0xD0
DXE_NB_ERROR	0xD1
DXE_SB_ERROR	0xD2
DXE_ARCH_PROTOCOL_NOT_AVAILABLE	0xD3
DXE_PCI_BUS_OUT_OF_RESOURCES	0xD4
DXE_LEGACY_OPROM_NO_SPACE	0xD5
DXE_NO_CON_OUT	0xD6
DXE_NO_CON_IN	0xD7
DXE_INVALID_PASSWORD	0xD8
DXE_BOOT_OPTION_LOAD_ERROR	0xD9
DXE_BOOT_OPTION_FAILED	0xDA
DXE_FLASH_UPDATE_FAILED	0xDB
DXE_RESET_NOT_AVAILABLE	0xDC

## 2-7-4 Intel UPI POST Codes

Initialize KTIRC ininput structure default values	0xA0
Collect info such as SBSP, Boot Mode, Reset type etc	0xA1
Setup IO SADs in SBSP to access the config space	0xA2
Setup up minimum path between SBSP & other sockets Add the node to the tree Parse the LEP of the discovered socket Check if the system has the supported topology Setup the boot path for the parent which is not directly connected to Legacy CPU Setup path from SBSP to the new found node	0xA3
Setup IO SADs in PBSP to access the config space	0xA4
System configurations that require some kind of reset	0xA5
Sync up with PBSPs	0xA6
Topology discovery and route calculation	0xA7
Program final route	0xA8
Program final IO SAD setting	0xA9
Protocol layer and other Uncore settings	0xAA
Transition links to full speed operation	0xAB
Phy layer settings	0xAC
Link layer settings	0xAD
Coherency Settings	0xAE
KTIRC is done	0xAF

## 2-7-5 Intel UPI Error Codes

When system BSP tries to setup path for remote sockets or sends a Boot_Go command to remote socket in SetupSbspPathToAllSockets() or SyncUpPbspForReset(). If the remote socket(s) hasn't checked-in, assert; it is a fatal condition, this error will be logged. No retry. <i>RC Behavior: System Halt</i>	0xD8
When SBSP tries to add this remote socket into system topology tree in SetupSbspPathToAllSockets(), there are some errors occur in the data structure. No retry. <i>RC Behavior: The current Socket is not added to the tree.</i> When SBSP setups the boot path for the parent which is not directly connected to Legacy CPU in SetupSbspPathToAllSockets(). The Child is not an immediate neighbor of Parent. No retry.	0xDA

SAD setup error <i>RC Behavior: System Halt</i>	0xDB
Unsupported topology <i>RC Behavior: System Halt</i>	0xDC
SBSP cannot find KPIRC TXEQ Parameters for this link in GetSocketLinkEparams(). No retry. <i>RC Behavior: System Halt</i>	0xDD

### 2-7-6 Intel MRC POST Codes

Detect DIMM population	0xB0
Set DDR frequency	0xB1
Gather remaining SPD data	0xB2
Program registers on the memory controller level	0xB3
Evaluate RAS modes and save rank information	0xB4
Program registers on the channel level	0xB5
DDRIO Initialization	0xB6
Train DDR	0xB7
Initialize CLTT/OLTT	0xB8
Hardware memory test and init	0xB9
Execute memory init	0xBA
Program memory map and interleaving	0xBB
Program RAS configuration	0xBC
Rank margin tool	0xBD
MRC is done	0xBF

### 2-7-7 Intel MRC Error Codes

No memory was detected	0xE8
Memory test failure	0xEB
Different dimm types are detected installed in the system	0xED
Number of HAs found in system greater than MAX_HA defined in MRC build	0xEE
Indicates a CLTT table structure error	0xEF
Invalid VR mode, unable to set DRAM VDD	0xF0
Failure occurred reserving memory for IOT	0xF1
Reference code assert	0xF2
Unsupported MC frequency set	0xF3
Unable to get current MC frequency	0xF4

### 2-7-8 Intel PM POST Codes

Start of PPM structure initialization	0xD0
PPM CSR programming	0xD1
PPM MSR programming	0xD2
Start of PState transition init	0xD3
PPM exit	0xD4
PPM On ready to boot event	0xD5

### 2-7-9 Intel PM POST Codes

Start of IIO early Initialization	0xE0
Pre Link training	0xE1
Start of Gen3 EQ training	0xE2
Start of PState transition init	0xE3
Gen3 parameters override	0xE4
End of IIO Early Initialization	0xE5
Start of IIO Late initialization	0xE6
PCIE port initialization	0xE7
IOAPIC initialization	0xE8
VTD initialization	0xE9
IOAT initialization	0xEA
DFX initialization	0xEB
NTB initialization	0xEC
Security Initialization	0xED
IIO late initialization	0xEE
IIO On ready to boot event	0xEF

## 2-8 BIOS POST Beep code (AMI standard)

### 2-8-1 PEI Beep Codes

# of Beeps	Description
1	Memory not Installed.
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXE IPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available

### 2-8-2 DXE Beep Codes

# of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met