

Hardware Information

This chapter lists the hardware setup procedures that you have to perform when installing system components. It includes description of the jumpers and connectors on the motherboard.

2.1 Before you proceed

Take note of the following precautions before you install motherboard components or change any motherboard settings.



- Unplug the power cord from the wall socket before touching any component.
- Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.
- Hold components by the edges to avoid touching the ICs on them.
- Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.
- Before you install or remove any component, ensure that the power supply is switched
 off or the power cord is detached from the power supply. Failure to do so may cause
 severe damage to the motherboard, peripherals, and/or components.

2.2 Motherboard overview

Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

To optimize the motherboard features, we highly recommend that you install it in an EEB compliant chassis.



Ensure to unplug the chassis power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components!

2.2.1 Placement direction

When installing the motherboard, ensure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

2.2.2 Screw holes

Place ten (10) screws into the holes indicated by circles to secure the motherboard to the chassis.



DO NOT overtighten the screws! Doing so can damage the motherboard.



2.2.3 Workstation W60 Motherboard layout



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2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA 2011-3 socket designed for the Intel[®] Xeon E5-2600 v3 / v4 family processor.

- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. will shoulder the cost of repair only if the damage is shipment/transitrelated.
 - Keep the cap after installing the motherboard. will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA 2011-3 socket.
 - The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.3.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.





Before installing the CPU, ensure that the socket box is facing toward you and the triangle mark is on the top-right position.



2. Press the left load lever down with your thumb (A), move it to the right until it is released from the retention tab (B) then gently lift the load lever (C).



3. Press the right load lever with your thumb (D), then move it to the left until it is released from the retention tab. Lift the load lever (F).



4. Push the left load lever to slightly lift the load plate (G).



Do not insert the load lever into the retention tab.

5. Hold the edge then gently lift the load plate (H).



- 6. Get the CPU.
- Align and position the CPU over the socket ensuring that the triangle mark on the CPU matches the triangle mark on the socket box.
- 8. Install the CPU into the slot.



The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the CPU pins on the socket.

9. Gently push the load plate just enough to let it sit on top of the CPU.



Do not force to close the load plate as it may damage the CPU.





 Push down the right load lever (I) ensuring that the edge of the load plate is fixed and tucked securely under the lever (J) then insert the right load lever under the retention tab (K).



The PnP cap pops out of the load plate when the right load lever is inserted into the retention tab.



Keep the PnP cap. will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the PnP cap on the LGA 2011 socket.



11. Push down the left load lever (L) then insert it under the retention tab (M).



- 12. Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with.
- Ø
- Ensure that the Thermal Interface Material is spread in an even thin layer.
- Some heatsinks come with preapplied Thermal Interface Material. If so, skip this step.





The Thermal Interface Material is toxic and inedible. DO NOT eat it. If it gets into your eyes or touches your skin, wash it off immediately, and seek professional medical help.

 Connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN1 / CPU_FAN2.





DO NOT forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

2.4 System memory

2.4.1 Overview

The motherboard comes with eight (8) Double Data Rate 4 (DDR4) Dual Inline Memory Modules (DIMM) sockets.

The figure illustrates the location of the DDR4 DIMM sockets:



2.4.2 Memory Configurations

You may install 4 GB, 8 GB, 16 GB, and 32 GB RDIMMs or 32 GB and 64 GB LR-DIMMs into the DIMM sockets using the memory configurations in this section.



Refer to Server AVL for the updated list of compatible DIMMs.

- When installing DIMMs, always start from slot A1 (CPU1) and E1 (CPU2).
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is
 recommended that you obtain memory modules from the same vendor.

Single CPU configuration

You can refer to the following recommended memory population for a single CPU configuration.

Single CPU configuration (must be installed on CPU1)				
		DII	MM	
A1 B1 C1 D1				
1 DIMM	√			
2 DIMMs	√	~		
4 DIMMs	√	~	~	~

Dual CPU configuration

You can refer to the following recommended memory population for a dual CPU configuration.

Dual CPU configuration								
DIMM								
	A1	B1	C1	D1	E1	F1	G1	H1
2 DIMMs	\checkmark				\checkmark			
4 DIMMs	\checkmark	✓			~	~		
8 DIMMs	~	~	~	~	~	~	~	~

2.4.3 Installing a DIMM on a single clip DIMM socket

- 1. Press the retaining clip outward to unlock the DIMM socket.
- Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.



A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

 Hold the DIMM at both ends then insert the DIMM into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clip clicks into place and the DIMM is seated securely in place.



Always insert the DIMM into the socket VERTICALLY to prevent DIMM notch damage.

- To install two or more DIMMs, refer to the user guide bundled with the motherboard package.
 - Refer to the user guide for qualified vendor lists of the memory modules.

Removing a DIMM from a single clip DIMM socket

- 1. Press the retaining clip outward to unlock the DIMM.
- 2. Remove the DIMM from the socket.





Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

2.5 Expansion slots

In the future, you may need to install expansion cards. The following subsections describe the slots and the expansion cards that they support.



Ensure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.

2.5.1 Installing an expansion card

To install an expansion card:

- 1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
- 2. Remove the system unit cover (if your motherboard is already installed in a chassis).
- Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
- 4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
- 5. Secure the card to the chassis with the screw you removed earlier.
- 6. Replace the system cover.

2.5.2 Configuring an expansion card

After installing the expansion card, configure it by adjusting the software settings.

- 1. Turn on the system and change the necessary BIOS settings, if any. See **Chapter 4** for information on BIOS setup.
- 2. Assign an IRQ to the card.



Refer to the table **Standard Interrupt assignments** in section **Interrupt assignments** for more information.

3. Install the software drivers for the expansion card.



When using PCI cards on shared slots, ensure that the drivers support "Share IRQ" or that the cards do not need IRQ assignments. Otherwise, conflicts may arise between the two PCI groups, making the system unstable and the card inoperable.

2.5.3 Interrupt assignments

Standard Interrupt assignments

IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	-	Programmable Interrupt
3*	11	Communications Port (COM2)
4*	12	Communications Port (COM1)
5*	13	
6	14	Floppy Disk Controller
7*	15	
8	3	System CMOS/Real Time Clock
9*	4	ACPI Mode when used
10*	5	IRQ Holder for PCI Steering
11*	6	IRQ Holder for PCI Steering
12*	7	PS/2 Compatible Mouse Port
13	8	Numeric Data Processor
14*	9	Primary IDE Channel
15*	10	Secondary IDE Channel

* These IRQs are usually available for ISA or PCI devices.

2.5.4 PCI Express x16 slot (x16 link)

The onboard PCIE 1 and 3 provide one x16 Gen3 link to CPU1 (Auto switch to x8 link if PCIE 2 and 4 are occupied); The onboard PCIE 5 and 7 provide one x16 Gen3 link to CPU2. These slots support VGA cards and various server class high performance add-on cards.

2.5.5 PCI Express x16 slot (x8 link)

The onboard PCIE 6 provides one x8 Gen3 link to CPU2; The onboard PCIE 2 and 4 provide one x8 Gen3 link to CPU1. These slot support VGA Cards and various server class high performance add-on cards.

Motherboard Layout



PCIE 1	1 x PCIE x16 (x16 Gen3 Link) (Near CPU socket. Auto switch to x8 Link if slot 2 is occupied)
PCIE 2	1 x PCIE X16 (x8 Gen3 Link)
PCIE 3	1 x PCIE x16 (x16 Gen3 Link) (Auto switch to x8 Link if slot 4 is occupied)
PCIE 4	1 x PCIE X16 (x8 Gen3 Link)
PCIE 5	1 x PCIE x16 (x16 Gen3 Link)
PCIE 6	1 x PCIE x16 (x8 Gen3 Link)
PCIE 7	1x PCIE x16 (x16 Gen3 Link)

2.6 Onboard buttons and switches

Onboard switches allow you to fine-tune performance when working on a bare or opencase system. This is ideal for overclockers and gamers who continually change settings to enhance system performance.

1. Power-on

The motherboard comes with a power-on switch that allows you to power up or wake up the system. The switch also lights up when the system is plugged to a power source indicating that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows the location of the onboard power-on switch.



2. Reset button (RESET)

Press the reset switch to reboot the system.



3. Dr. Power switch (DR_POWER)

Toggle this switch to enable or disable the Dr. Power feature of the system.



2.7 Onboard LEDs

1. Memory Error LED (ERR_DIMMA1, ERR_DIMMB1, ERR_DIMMC1, ERR_DIMMD1, ERR_DIMME1, ERR_DIMMF1, ERR_DIMMG1, ERR_DIMMH1)

These LEDs light up to indicate an error in its nearby DIMM.



2. Baseboard Management Controller LED (BMC_LED1)

The BMC LED works with the ASMB8 management device and indicates its initiation status. When the PSU is plugged and the system is OFF, ASMB8 management device starts system initiation for about one (1) minute. The BMC LED blinks after system initiation finishes.



3. Location LED (LOCLED2)

This onboard LED lights up when the Location button on the server is pressed or when triggered by a system management software. The Location LED helps visually locate and quickly identify the server in error on a server rack.



4. CATT LED (CATTERR_LED1)

The CATT LED indicates that the system has experienced a fatal or catastrophic error and cannot continue to operate.



5. CPU Warning LED (ERR_CPU1, ERR_CPU2)

The CPU warning LEDs light up to indicate failure on either CPU1, CPU2, or both. This onboard LED lights up when the Location button on the server is pressed or when triggered by a system management software. The Location LED helps visually locate and quickly identify the server in error on a server rack.



6. M2 LED (M2_LED)

This LED lights up to indicate that the installed M.2 (NGFF) card is being accessed.



7. Dr. Power LED (PGLED3)

This LED near the Dr. Power switch lights up when the Dr. Power switch is on Enable.



8. Q-Code LED (LED1)

The Q-Code LED design provides you the 2-digit display, allowing you to know the system status. Refer to the Q-code table below for details.



Q-Code table

Code	Description	
00	Not used	
01	Power on. Reset type detection (soft/hard).	
02	AP initialization before microcode loading	
03	System Agent initialization before microcode loading	
04	PCH initialization before microcode loading	
06	Microcode loading	
07	AP initialization after microcode loading	
08	System Agent initialization after microcode loading	
09	PCH initialization after microcode loading	
0A	Initialization after microcode loading	
0B	Cache initialization	
0C – 0D	Reserved for future AMI SEC error codes	
<u>0E</u>	Microcode not found	
0F	Microcode not loaded	
10	PEI Core is started	
<u>11 – 14</u>	Pre-memory CPU initialization is started	
15 – 18	Pre-memory System Agent initialization is started	
<u> 19 – 1C</u>	Pre-memory PCH initialization is started	
2B – 2F	Memory initialization	
30	Reserved for ASL (see ASL Status Codes section below)	

Q-Code table (continued)

Code	Description	
31	Memory Installed	
32 - 36	CPU post-memory initialization	
37 – 3A	Post-Memory System Agent initialization is started	
3B – 3E	Post-Memory PCH initialization is started	
4F	DXE IPL is started	
50 - 53	Memory initialization error. Invalid memory type or incompatible memory speed	
54	Unspecified memory initialization error	
55	Memory not installed	
56	Invalid CPU type or Speed	
57	CPU mismatch	
58	CPU self test failed or possible CPU cache error	
59	CPU micro-code is not found or micro-code update is failed	
5A	Internal CPU error	
5B	Reset PPI is not available	
<u>5C – 5F</u>	Reserved for future AMI error codes	
E0	S3 Resume is stared (S3 Resume PPI is called by the DXE IPL)	
E1	S3 Boot Script execution	
E2	Video repost	
E3	OS S3 wake vector call	
<u>E4 – E7</u>	Reserved for future AMI progress codes	
<u>E8</u>	S3 Resume Failed	
<u>E9</u>	S3 Resume PPI not Found	
EA	S3 Resume Boot Script Error	
EB	S3 OS Wake Error	
EC – EF	Reserved for future AMI error codes	
<u>F0</u>	Recovery condition triggered by firmware (Auto recovery)	
<u>F1</u>	Recovery condition triggered by user (Forced recovery)	
F2	Recovery process started	
F3	Recovery firmware image is found	
_F4	Recovery firmware image is loaded	
<u>F5 – F7</u>	Reserved for future AMI progress codes	
F8	Recovery PPI is not available	
<u>F9</u>	Recovery capsule is not found	
FA	Invalid recovery capsule	
FB – FF	Reserved for future AMI error codes	
60	DXE Core is started	
61	NVRAM initialization	
62	Installation of the PCH Runtime Services	

Q-Code table (continued)

Code	Description		
63 - 67	CPU DXE initialization is started		
68	PCI host bridge initialization		
69	System Agent DXE initialization is started		
6A	System Agent DXE SMM initialization is started		
6B – 6F	System Agent DXE initialization (System Agent module specific)		
70	PCH DXE initialization is started		
71	PCH DXE SMM initialization is started		
72	PCH devices initialization		
73 – 77	PCH DXE Initialization (PCH module specific)		
78	ACPI module initialization		
79	CSM initialization		
7A – 7F	Reserved for future AMI DXE codes		
90	Boot Device Selection (BDS) phase is started		
91	Driver connecting is started		
92	PCI Bus initialization is started		
93	PCI Bus Hot Plug Controller Initialization		
94	PCI Bus Enumeration		
95	PCI Bus Request Resources		
96	PCI Bus Assign Resources		
97	Console Output devices connect		
98	Console input devices connect		
99	Super IO Initialization		
9A	USB initialization is started		
9B	USB Reset		
9C	USB Detect		
9D	USB Enable		
<u>9E – 9F</u>	Reserved for future AMI codes		
<u>A0</u>	IDE initialization is started		
<u>A1</u>	IDE Reset		
<u>A2</u>	IDE Detect		
<u>A3</u>	IDE Enable		
_A4	SCSI initialization is started		
A5	SCSI Reset		
_A6	SCSI Detect		
_A7	SCSI Enable		
A8	Setup Verifying Password		
A9	Start of Setup		
AA	Reserved for ASL (see ASL Status Codes section below)		
AB	Setup Input Wait		

Q-Code table (continued)

Code	Description		
AC	Reserved for ASL (see ASL Status Codes section below)		
AD	Ready To Boot event		
AE	Legacy Boot event		
AF	Exit Boot Services event		
B0	Runtime Set Virtual Address MAP Begin		
B1	Runtime Set Virtual Address MAP End		
B2	Legacy Option ROM Initialization		
B3	System Reset		
B4	USB hot plug		
B5	PCI bus hot plug		
B6	Clean-up of NVRAM		
B7	Configuration Reset (reset of NVRAM settings)		
<u> B8– BF</u>	Reserved for future AMI codes		
D0	CPU initialization error		
D1	System Agent initialization error		
D2	PCH initialization error		
D3	Some of the Architectural Protocols are not available		
D4	PCI resource allocation error. Out of Resources		
D5	No Space for Legacy Option ROM		
D6	No Console Output Devices are found		
D7	No Console Input Devices are found		
D8	Invalid password		
D9	Error loading Boot Option (LoadImage returned error)		
DA	Boot Option is failed (StartImage returned error)		
DB	Flash update is failed		
DC	Reset protocol is not available		

ACPI/ASL Checkpoints

Code	Description
0x01	System is entering S1 sleep state
0x02	System is entering S2 sleep state
0x03	System is entering S3 sleep state
0x04	System is entering S4 sleep state
0x05	System is entering S5 sleep state
0x10	System is waking up from the S1 sleep state
0x20	System is waking up from the S2 sleep state
0x30	System is waking up from the S3 sleep state
0x40	System is waking up from the S4 sleep state
0xAC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
0xAA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

2.8 Jumpers

1. Clear RTC RAM (CLRTC1)

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

- 1. Turn OFF the computer and unplug the power cord.
- 2. Move the jumper cap from pins 1–2 (default) to pins 2–3. Keep the cap on pins 2–3 for about 5–10 seconds, then move the cap back to pins 1–2.
- 3. Plug the power cord and turn ON the computer.
- Hold down the key during the boot process and enter BIOS setup to reenter data.



Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!



If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.



2. VGA controller setting (VGA_SW1)

This jumper allows you to enable or disable the onboard VGA controller. Set to pins 1-2 to activate the VGA feature.



3. SMBUS connection setting (TESLA_M_SW)

This jumper allows you to select the connection to BMC or PHC for PCIE 1/3/5/7 SMBUS.



4. RAID selection jumper setting (3-pin RAID_SEL1)

This jumper allows you to select the PCH SATA RAID mode to use LSI MegaRAID software or Intel[®] Rapid Storage Technology enterprise 3.0 RAID. Place the jumper caps over pins 1–2 if you want to use the LSI MegaRAID software RAID Utility (default); otherwise, place the jumper caps to pins 2–3 to use the Intel[®] Rapid Storage Technology Enterprise Option ROM Utility.



5. ME firmware force recovery setting (3-pin ME_RCVR1)

This jumper allows you to force Intel Management Engine (ME) boot from recovery mode when ME become corrupted.



6. DDR4 thermal event setting (3-pin DIMMTRIP1)

This jumper allows you to enable or disable DDR4 DIMM thermal sensing event pin.



7. PMBus 1.2 PSU select jumper (3-pin SMART_PSU1)

This jumper allows you to select PSU PMBus version. Set to pins 1–2 for PMBus, set to pins 2–3 for others.



2.9 Connectors



2.9.1 Rear panel connectors

- 1. **PS/2 mouse and keyboard port.** This port is for a PS/2 mouse or keyboard.
- 2. **Q-Code Logger button.** This button allows you to check Q-Code event logs. For more information, refer to the **Using the Q-Code logger** section of this user guide.
- 3. **Optical S/PDIF Out port.** This port connects to Sony/Philips Digital Interconnect Format (S/PDIF) compliant devices or amplified speakers.
- 4. USB 3.0 ports 5 and 6. These Universal Serial Bus (USB) ports are available for connecting USB 3.0 devices.
- LAN 2 port (RJ-45). This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.
- LAN 1 port (RJ-45 port for LAN1 and BMC share). This port allows Gigabit connector to a Local Area Network (LAN) through a network hub for BMC management function.
- 7. 8-channel Audio I/O. These audio ports connects to stereo audio sources or devices.
- USB 2.0 ports 7 and 8. These Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
- USB BIOS Flashback button. Press this button to easily update the BIOS without entering the existing BIOS or operating system. For more information, refer to the Using the USB BIOS Flashback section of this user guide.
- 10. USB 3.0 ports 3 and 4. These Universal Serial Bus (USB) ports are available for connecting USB 3.0 devices.
- 11. USB 3.0 ports 1 and 2. These Universal Serial Bus (USB) ports are available for connecting USB 3.0 devices.



- Only USB 2.0 port 7 supports the USB Charger+ function
- Only USB 3.0 port 5 and 6 supports the AI Charger+ function

LAN port LED indications

LAN port

Activity/Link LED			Speed LED	
Status	Description	Status	Description	
OFF	No link	OFF	10 Mbps connection	
Green	Linked	Orange	100 Mbps connection	
Blinking	Data activity	Green	1 Gbps connection	



Management LAN port

Activity/Link LED		Speed LED		
Status	Description	Status	Description	
OFF	No link	OFF	10 Mbps connection	
Orange	Linked	Orange	100 Mbps connection	
Blinking	Data activity	Green	1 Gbps connection	



Audio 2, 4, 6, or 8-channel configuration

Port	Headset 2-channel	4-channel	6-channel	8-channel
Light Blue	Line In	Line In	Line In	Line In
Lime	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Orange	-	-	Center/Subwoofer	Center/Subwoofer
Black	-	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out
Gray	-	-	Side Speaker Out*	Side Speaker Out

* For Windows[®] 8.1 only.

** For more information on the Audio I/o connections, see the Audio I/O connections section on the Appendix chapter.

Using the Q-Code logger

Q-Code Logger allows you to easily check Q-Code event logs without opening the system's case.

To use the Q-Code logger:

- 1. Insert the USB storage device to the dedicated Q-Code logger USB port.
- Press the Q-Code logger button for three seconds until the Flashback LED blinks three times, indicating that the Q-Code logger function is enabled.



Using the USB Flashback

USB BIOS Flashback allows you to easily update the BIOS without entering BIOS or operating system.

To use USB Flashback:

- 1. Download the latest BIOS file from the website.
- 2. Extract and rename the BIOS image file to Z10PEWS.CAP.
- 3. Copy Z10PEWS.CAP to the root directory of your USB storage device.
- Turn off the system and connect the USB storage device to the USB BIOS Flashback port.
- 5. Press the USB BIOS Flashback button.



A flashing light indicates that the BIOS Flashback function is enabled. The light goes out when the process of updating the BIOS is complete.

USB BIOS Flashback port



USB BIOS Flashback button

2.9.2 Internal connectors

1. Hard disk activity LED connector (4-pin HDLED1)

This LED connector is for the storage add-on card cable connected to the SATA or SAS add-on card. The read or write activities of any device connected to the SATA or SAS add-on card causes the front panel LED to light up.



2. USB 2.0 connectors (10-1 pin USB910)

These connectors are for USB 2.0 ports. Connect the USB module cables to connectors USB78 and USB910, then install the modules to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.



3. USB 3.0 connector (20-1 pin USB3_34; USB3_E12)

This connector allows you to connect a USB 3.0 module for additional USB 3.0 front or rear panel ports. With an installed USB 3.0 module, you can enjoy all the benefits of USB 3.0 including faster data transfer speeds of up to 5Gbps, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.



4. CPU, front and rear fan connectors (4-pin CPU_FAN1-2, FRNT_FAN1-5, REAR_FAN1-2)

The fan connectors support cooling fans. Connect the fan cables to the fan connectors on the motherboard, ensuring that the black wire of each cable matches the ground pin of the connector.

DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components.

- These are not jumpers! DO NOT place jumper caps on the fan connectors!
- All fans feature the Fan Speed Control technology.



5. Power supply SMBus connector (PSUSMB1)

This connector supplies power for low-speed system management communications.



6. Serial port connectors (10-1 pin COM1)

These connectors are for the serial (COM) port. Connect the serial port module cable to one of these connectors, then install the module to a slot opening at the back of the system chassis.



7. Serial ATA 6.0/3.0 Gb/s connectors (7-pin SATA_1-4 [gray], SSATA_1-4 [black])

These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allows up to 6 Gbps of data transfer rate.

If you installed Serial ATA hard disk drives, you can use a software RAID solution to create a RAID 0, RAID 1, RAID 5, or a RAID 10 configuration. For more information on the SATA RAID solutions supported on this motherboard, refer to the **RAID Configuration** chapter of this user guide.



8. SATAEXPRESS connectors (7-pin SATAEXPRESS1 [upper port]; SATAEXPRESS2 [lower port])

These connectors connect to Serial ATA 6 Gb/s hard disk drives via Serial ATA 6 Gb/s signal cables.



• ASMedia storage controller can only support AHCI mode.

- These SATA ports are for data drives only.
- The SATAEXPRESS1-2 connectors can support one SATA Express device or two SATA devices.

9. Serial General Purpose Input/Output connector (6-1 pin SGPIO1, SSGPIO1)

The SGPIO1 and SSGPIO1 connectors are used for the Intel Rapid Storage Technology Enterprise SGPIO interface that controls the LED pattern generation, device information, and general purpose data. SGPIO1 is the jumper for SATA1~4. SSGPIO1 is the jumper for SSATA1~4.



10. M.2 (NGFF) connector (NGFF1)

This connector allows you to install an M.2 device.





This connector supports type 2260 / 2280 / 22110 devices on both PCI-E and SATA interface.



The M.2 (NGFF) device is purchased separately

11. Trusted Platform Module connector (20-1 pin TPM1)

This connector supports a Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.



12. EATX power connectors (24-pin EATXPWR1; 8-pin EATX12V1/EATX12V2; 6-pin EATX12V3)

These connectors are for an EATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.



- DO NOT forget to connect the 24+8+8-pin power plugs; otherwise, the system will not boot up.
- We recommend that you connect the 6-pin EATX 12V3 power cable when installing more than two GPU or video graphics card.
- Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- This motherboard supports EATX2.0 PSU or later version.
- Ensure that your power supply unit (PSU) can provide at least the minimum power required by your system.



13. Chassis Intrusion (2-pin INTRUSION1)

These leads are for the intrusion detection feature for chassis with intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high level signal to these leads to record a chassis intrusion event. The default setting is short CHASSIS# and GND pin by jumper cap to disable the function.



14. System panel connector (20-1 pin PANEL1)

This connector supports several chassis-mounted functions.



(1) System power LED (3-pin PLED)

This 3-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

(2) Message LED (3-pin PLED)

This 2-pin connector is for the message LED cable that connects to the front message LED. The message LED is controlled by Hardware monitor to indicate an abnormal event occurrence.

(3) System warning speaker (4-pin SPEAKER)

This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

(4) Hard disk drive activity LED (2-pin +HDLED)

This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The HDD LED lights up or flashes when data is read from or written to the HDD.

(5) Power button/soft-off button (2-pin PWRSW)

This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

(6) Reset button (2-pin RESET)

This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

15. Auxiliary panel connector (20-2 pin AUX_PANEL1)

This connector is for additional front panel features including front panel SMB, locator LED and switch, and LAN LEDs.



(1) Front panel SMB (6-1 pin FPSMB)

These leads connect the front panel SMBus cable.

(2) LAN activity LED (2-pin LAN12_LED)

These leads are for Gigabit LAN activity LEDs on the front panel.

(3) Locator LED (2-pin LOCATORLED1 and 2-pin LOCATORLED2)

These leads are for the locator LED1 and LED2 on the front panel. Connect the Locator LED cables to these 2-pin connector. The LEDs will light up when the Locator button is pressed.

(4) Locator Button/Swich (2-pin LOCATORBTN)

These leads are for the locator button on the front panel. This button queries the state of the system locator.

16. Digital audio connector (4-1 pin SPDIF_OUT)

This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port(s). Connect the S/PDIF Out module cable to this connector, then install the module to a slot opening at the back of the system chassis.





The S/PDIF module is purchased separately.

17. ASMB8 header (14-1 pin ASMB8)

The ASMB8 connector on the motherboard supports an Server Management Board 8 Series.



18. VGA connector (VGA_HDR1)

This connector supports the VGA High Dynamic-Range interface.



19. Front panel audio connector (10-1 pin AAFP)

This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC'97 audio standard. Connect one end of the front panel audio I/O module cable to this connector.



We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.

 If you want to connect a high-definition front panel audio module to this connector, set the Front Panel Type item in the BIOS setup to [HD]; if you want to connect an AC'97 front panel audio module to this connector, set the item to [AC97]. By default, this connector is set to [HD].