



D1500

MS-S3551

Server Motherboard
User Guide

Contents

Regulatory Notices..... 4

Safety Information 6

Specifications..... 7

Overview of Components 9

Rear I/O Panel..... 10

 UID LED Button 10

 COM Port 10

 VGA Port 10

 USB 3.2 Gen 1 Port (USB 3.2 Gen 1/ USB 2.0) 10

 GbE RJ45 LAN Port (for mgmt.)..... 11

 GbE RJ45 LAN Port 11

 10GBase-T RJ45 LAN Port..... 11

Block Diagram 12

CPU Socket 14

 CPU & Heatsink Installation 15

Memory Slots..... 16

 DIMMA1~2, DIMMB1~2: DDR5 DIMM Slots 16

 Recommended Memory Population 16

 Installing Memory Modules 17

Storage Connectors 18

 Storage Specifications 18

 M2_1~2: M.2 Slots (M Key, PCIe 4.0 x4, 22110/ 2280) 19

 Installing M.2 SSD..... 19

 JNVME2~3, JNVME4_SATA1, JNVME1_SATA2 : Slimline SAS 4i Connectors 20

Expansion Slots 21

 PCIE_1~2: PCIe Expansion Slots..... 21

Revision

V1.0, 2023/12

Power Connectors.....	22
JPWR2: 24-Pin Main Power Connector	22
JPWR1: 8-Pin 12V Power Connector	23
SATAPWR1: 4-Pin Power Connector	23
Cooling Connectors.....	24
SYSFAN1~7: Fan Connectors.....	24
USB Connectors	25
JUSB1: USB 3.2 Gen 1 Connector	25
JUSB2: USB 3.2 Gen 1/ USB 2.0 Type-A Connector	25
Other Connectors and Components	26
JFP1: Front Panel Connector	26
JTPM1: SPI TPM Box Header.....	27
JCOM1: COM Port Header.....	27
JGPIO1: GPIO Header.....	28
JPMBUS1: PMBus Connector	28
FP_I2C_1, RBP_I2C_1~2: I2C Box Headers.....	29
JIPMB1: IPMB Connector	29
JCI1: Chassis Intrusion Header	30
BAT1: CMOS Battery	31
Replacing CMOS battery.....	31
Jumpers	32
Onboard LEDs.....	33
BMC_LED1~2: BMC Heartbeat LEDs.....	33
LED_H1, LED_L1: Port 80 Debug LEDs.....	33

Regulatory Notices

WEEE Statement

Under the European Union ("EU") Directive on Waste Electrical and Electronic Equipment, Directive 2012/19/EU, products of "electrical and electronic equipment" cannot be discarded as municipal waste anymore and manufacturers of covered electronic equipment will be obligated to take back such products at the end of their useful life.



Chemical Substances Information

In compliance with chemical substances regulations, such as the EU REACH Regulation (Regulation EC No. 1907/2006 of the European Parliament and the Council), MSI provides the information of chemical substances in products at:

<https://csr.msi.com/global/index>

CE Conformity

Hereby, Micro-Star International CO., LTD declares that this device is in compliance with the essential safety requirements and other relevant provisions set out in the European Directive.



FCC-A Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.



Notice 1

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2

Shielded interface cables and AC power cord, if any, must be used in order to comply with the emission limits.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

Battery Information

Please take special precautions if this product comes with a battery.

- Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
- Avoid disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, which can result in an explosion.
- Avoid leaving a battery in an extremely high temperature or extremely low air pressure environment that can result in an explosion or the leakage of flammable liquid or gas.
- Do not ingest battery. If the coin/button cell battery is swallowed, it can cause severe internal burns and can lead to death. Keep new and used batteries away from children.

European Union:



Batteries, battery packs, and accumulators should not be disposed of as unsorted household waste. Please use the public collection system to return, recycle, or treat them in compliance with the local regulations.

BSMI:



廢電池請回收

For better environmental protection, waste batteries should be collected separately for recycling or special disposal.

California, USA:



The button cell battery may contain perchlorate material and requires special handling when recycled or disposed of in California.

For further information please visit:

<http://www.dtsc.ca.gov/hazardouswaste/perchlorate/>

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Technical Support

If a problem arises with your product and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please visit <https://eps.msi.com/support> for further guidance.

Safety Information

- Always read the safety instructions carefully.
- Keep this User's Manual for future reference.
- Keep this equipment away from humidity.
- Lay this equipment on a reliable flat surface before setting it up.
- The openings on the enclosure are for air convection hence protects the equipment from overheating. **Do not cover the openings.**
- Make sure the voltage of the power source and adjust properly before connecting the equipment to the power inlet.
- Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
- Always unplug the power cord before inserting any add-on card or module.
- All cautions and warnings on the equipment should be noted.
- Never pour any liquid into the opening that could damage or cause electrical shock.
- If any of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well or you can not get it work according to User's Manual.
 - The equipment has dropped and damaged.
 - The equipment has obvious sign of breakage.
- **Do not leave this equipment in an environment unconditioned, storage temperature above 60°C (140°F), it may damage the equipment.**

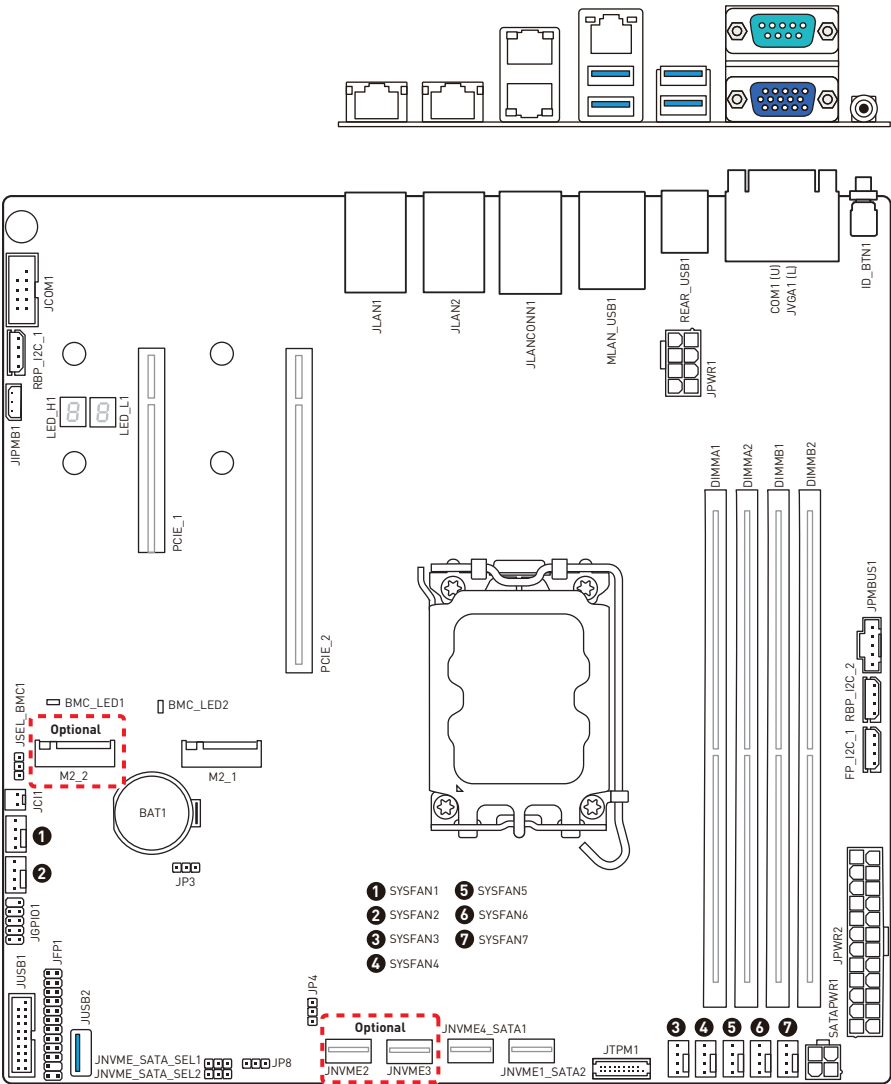
Specifications

Description	
Form factor	Micro-ATX
Dimensions	244 x 244mm [9.6 x 9.6 inches]
Processor	• 1 x Intel® Raptor Lake-E Xeon® Processors - E-2400, 8 cores, Max TDP 95W • Intel® Alder Lake-S Pentium® G7400/ G7400T Processors - Max TDP 46W
Chipset	Intel® C266 Chipset
Memory	4 x DDR5 memory slots, 2DPC, supporting memory speeds up to 4800MT/s, UDIMM ECC/non-ECC (AVL list only) up to 128GB.
Networking	• 2 x 10GBase-T RJ45 LAN ports - Intel® Ethernet controller X710-AT2 - JLAN1~2 supports NCSI* • 2 x GbE RJ45 LAN ports - Intel® Ethernet controller 1210-AT - JLANCONN1 (L) supports NCSI* * Only one NCSI LAN port can be enabled at a time, JLAN1, JLAN2, or JLANCONN1 (lower).
Server Management	• ASPEED AST2600 IPMI 2.0 with iKVM support • 1 x GbE RJ45 Mgmt. (Realtek® RTL8211FD-CG-PHY)
Storage	• 2 x M.2 M-Key slots - M2_1: PCIe 4.0 x4, 22110/ 2280 - M2_2: PCIe 4.0 x4, 22110/ 2280 (MUX via NVMe) • 4 x Slimline SAS 4i - JNVME2: 1x NVMe , share with M2_2* - JNVME3: 1x NVMe - JNVME4_SATA1: 4x SATA 3.0 or 1x NVMe - JNVME1_SATA2: 4x SATA 3.0 or 1x NVMe *The M2_2 and JNVME2 slots cannot operate simultaneously.
Expansion Slots	• 1 x PCIe 5.0 x16 slot (PCIe_2: Gen 5.0 x16 from CPU) • 1 x PCIe 4.0 x8 slot (PCIe_1: Gen 4.0 x4 from CPU)
Rear I/O	• 4 x USB 3.2 Gen 1 Type-A ports (USB 3.2 Gen 1/ USB 2.0) • 2 x 10GBase-T RJ45 LAN ports • 2 x GbE RJ45 LAN ports • 1 x GbE RJ45 LAN port (Mgmt.) • 1 x COM port • 1 x VGA port • 1 x UID LED button
Internal USB Connectors	• 1 x USB 3.2 Gen 1 connector • 1 x USB 3.2 Gen 1 Type-A connector

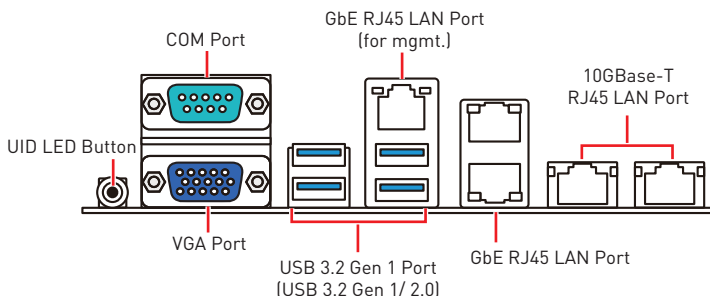
Continued on next column

Description	
System Connectors	• 1 x Front panel connector • 1 x SPI TPM box header • 1 x COM port header • 1 x GPIO header • 1 x PMBus connector • 3 x I2C box headers • 1 x IPMB connector • 1 x Chassis intrusion header
Cooling Connectors	7 x 4-pin System PWM fan connectors
Power Connectors	• 1 x 24-pin main power connector • 1 x 8-pin 12V power connector • 1 x 4-pin power connector
Jumpers	• 1 x CPLD power-on jumper • 1 x Clear CMOS jumper • 1 x Clear password jumper • 2 x SATA & NVMe select jumpers • 1 x SPI switch jumper
LED Features	• 2 x BMC heartbeat LEDs • 2 x Port 80 debug LEDs
Security	SPI TPM 2.0 header
Environment	• Operating Temperature: 0°C ~ 45°C • Non-operating Relative Humidity: 0% ~ 85% (non-condensing)
Certification	CE, FCC (Class A)

Overview of Components



Rear I/O Panel



UID LED Button

The UID (Unit Identification) button help users identify and locate a system, especially in high-density rack environments.

COM Port

A COM port, also called a serial port or DB9 connector, is a communication interface for transferring data between a computer and external devices such as barcode scanners, printers, and credit card machines. It's commonly used for **initial system configuration and diagnostics** on server boards and for connecting legacy devices that lack modern interfaces. Users can connect a specially configured serial cable to establish a serial connection.

VGA Port

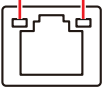
The DB15-pin female connector is provided for monitors.

USB 3.2 Gen 1 Port (USB 3.2 Gen 1/ USB 2.0)

The USB (Universal Serial Bus) port is for attaching USB devices such as keyboards, mouse, or other USB-compatible devices. USB 3.2 Gen 1 supports data transfer rates up to **5 Gbps** while USB 2.0 supports data transfer rates up to **480 Mbps**.

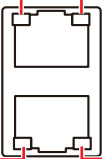
GbE RJ45 LAN Port (for mgmt.)

Connect a specially configured RJ45 console cable to this jack for network routers/switches to communicate with the system through a serial connection.

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

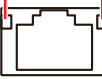
GbE RJ45 LAN Port

The standard RJ-45 LAN jack is for connection to the Local Area Network (LAN). You can connect a network cable to it.

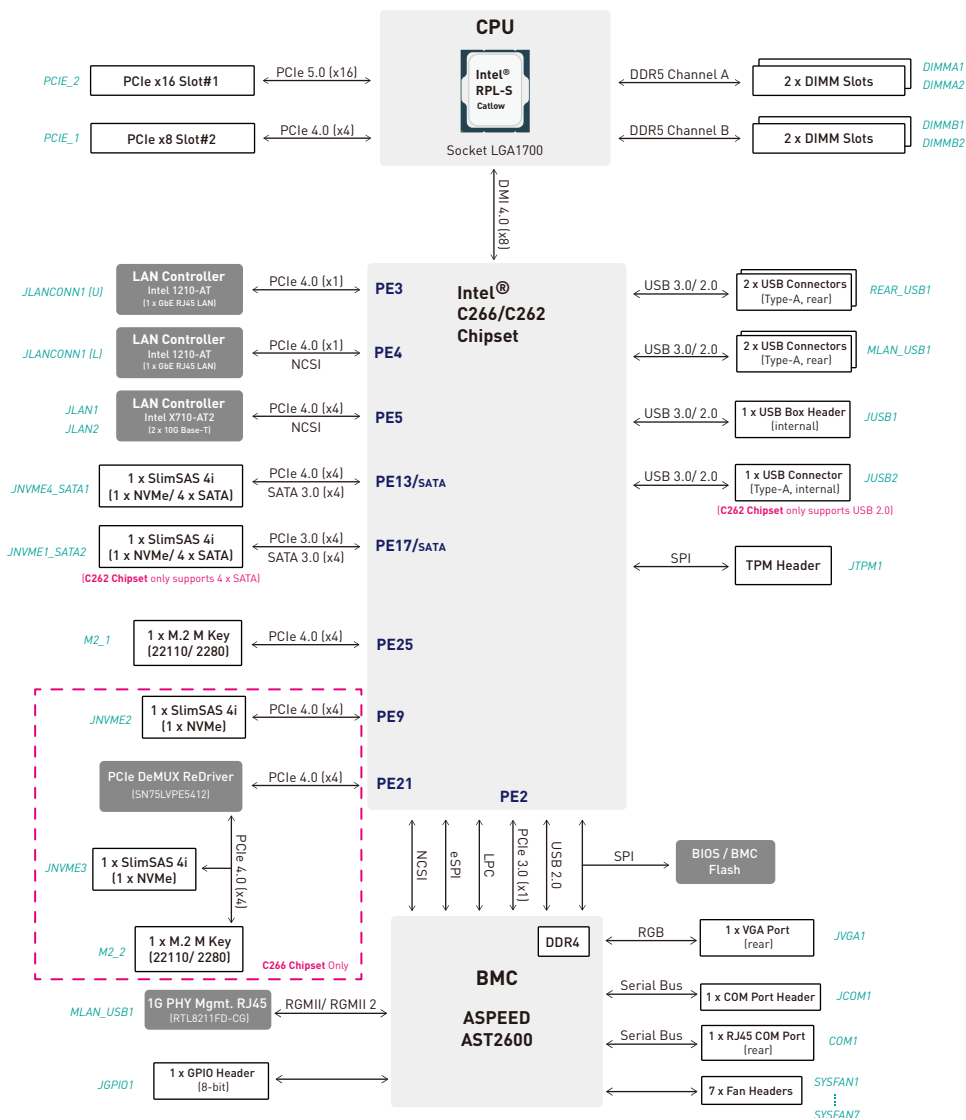
Link/ Activity LED			Speed LED	
Status	Description		Status	Description
 Off	No link		 Off	10 Mbps
 Green	Linked		 Orange	100 Mbps
 Blinking	Data activity		 Green	1 Gbps

10GBase-T RJ45 LAN Port

The standard RJ-45 LAN jack is for connection to the Local Area Network (LAN). You can connect a network cable to it.

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

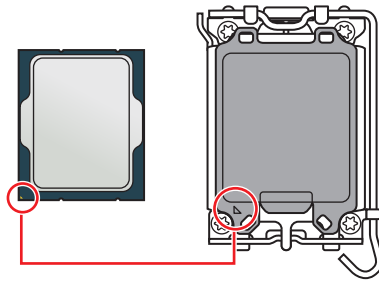
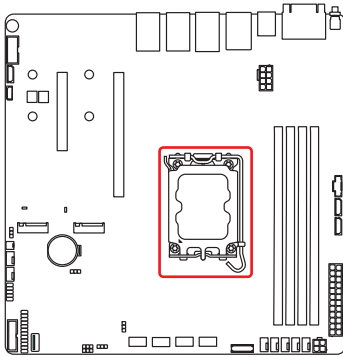
Block Diagram



Component Contents

Component	Page
CPU Socket	14
Memory Slots	16
DIMMA1~2, DIMMB1~2: DDR5 DIMM Slots	16
Storage Connectors	18
M2_1~2: M.2 Slots (M Key, PCIe 4.0 x4, 22110/ 2280)	19
JNVME2~3, JNVME4_SATA1, JNVME1_SATA2 : Slimline SAS 4i Connectors	20
Expansion Slots	21
PCIE_1~2: PCIe Expansion Slots	21
Power Connectors	22
JPWR2: 24-Pin Main Power Connector	22
JPWR1: 8-Pin 12V Power Connector	23
SATAPWR1: 4-Pin Power Connector	23
Cooling Connectors	24
SYSFAN1~7: Fan Connectors	24
USB Connectors	25
JUSB1: USB 3.2 Gen 1 Connector	25
JUSB2: USB 3.2 Gen 1/ USB 2.0 Type-A Connector	25
Other Connectors and Components	26
JFP1: Front Panel Connector	26
JTPM1: SPI TPM Box Header	27
JCOM1: COM Port Header	27
JGPIO1: GPIO Header	28
JPMBUS1: PMBus Connector	28
FP_I2C_1, RBP_I2C_1~2: I2C Box Headers	29
JIPMB1: IPMB Connector	29
JCI1: Chassis Intrusion Header	30
BAT1: CMOS Battery	31
Jumpers	32
Onboard LEDs	33
BMC_LED1~2: BMC Heartbeat LEDs	33
LED_H1, LED_L1: Port 80 Debug LEDs	33

CPU Socket



Introduction to the LGA1700 CPU

The surface of the LGA1700 CPU has four notches and a golden triangle to assist in correctly lining up the CPU for motherboard placement. The golden triangle is the Pin 1 indicator.

Important

- **Overheating** will seriously damage the CPU and system. Always make sure the heatsink/ cooler can work properly to protect the CPU from overheating. Make sure that you apply an even layer of thermal paste (or thermal tape) between the CPU and the heatsink/ cooler to enhance heat dissipation.
- While **replacing the CPU**, always turn off the power supply or unplug the power supply's power cord from the grounded outlet first to ensure the safety of CPU.
- Confirm if your CPU heatsink/ cooler is firmly installed before turning on your system.
- If you purchased a separate CPU and heatsink/ cooler, Please refer to the documentation in the heatsink/ cooler package for more details about installation.
- Whenever CPU is not installed, always protect your CPU socket pins with the plastic cap covered.
- Do not touch the CPU socket pins to avoid damage.
- Read the CPU status in BIOS.

CPU & Heatsink Installation

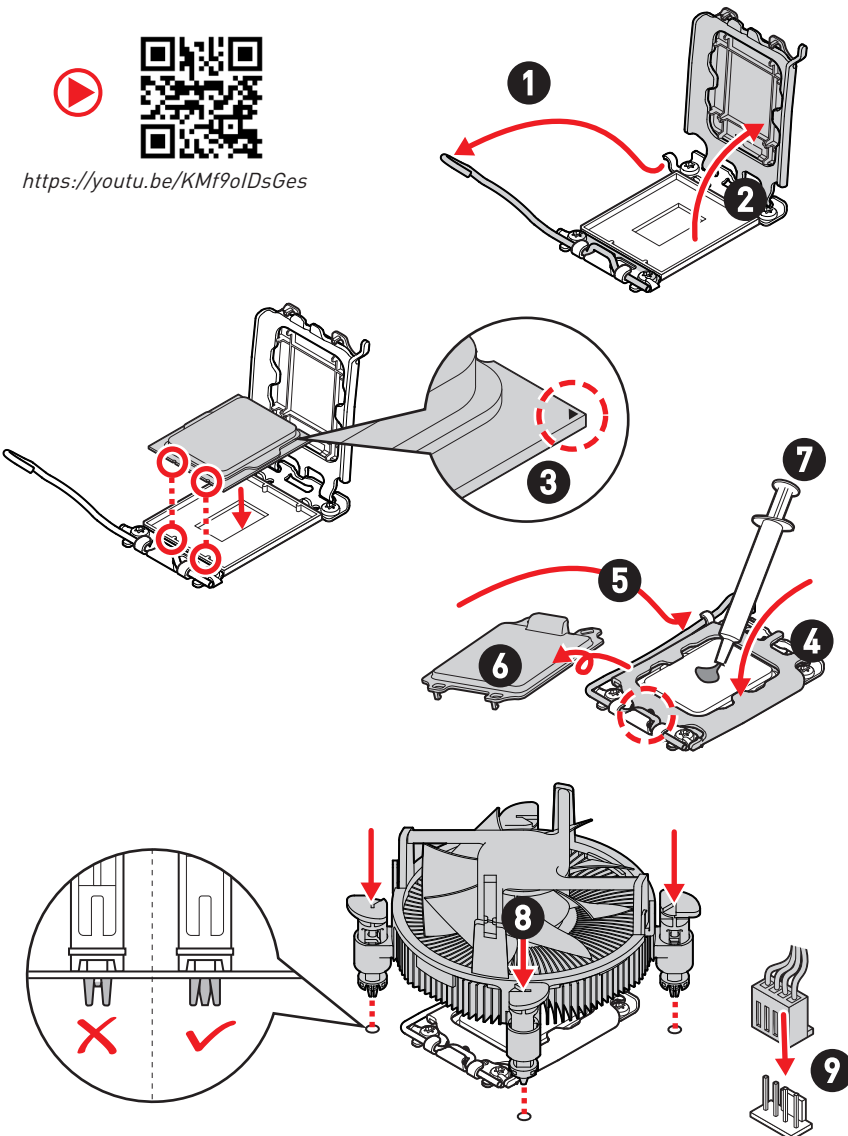
Use appropriate ground straps, gloves and ESD mats to protect yourself from electrostatic discharge (ESD) while installing the processor.



Images are for illustration purposes only; actual parts may vary.

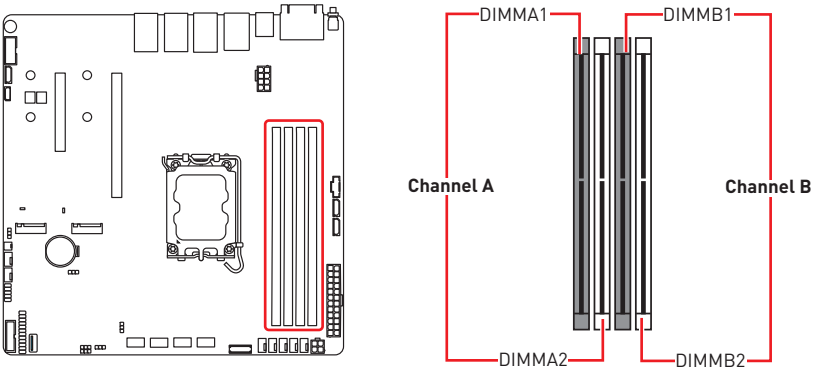


<https://youtu.be/KMf9oIDsGes>



Memory Slots

DIMMA1~2, DIMMB1~2: DDR5 DIMM Slots



Recommended Memory Population

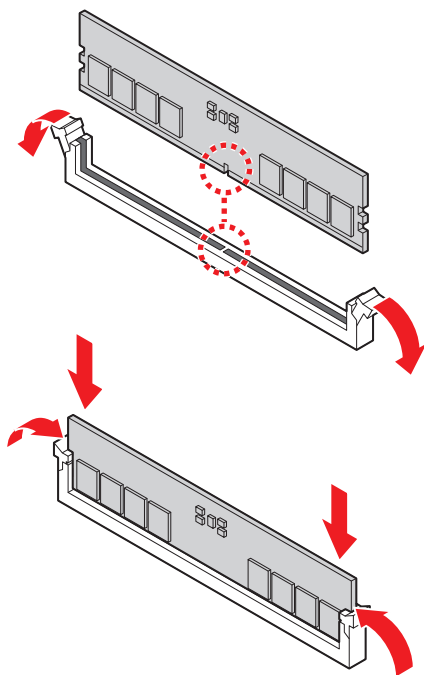
Quantity of DIMMs		1	2			3	4	
Channel A	DIMMA1				V		V	V
	DIMMA2	V	V		V	V	V	V
Channel B	DIMMB1			V		V		V
	DIMMB2		V	V		V	V	V
"V" indicates a populated DIMM slot.								

Important

- Only support **UDIMM**.
- There should be at least 1 DDR5 DIMM populated.
- Paired memory installation for Max performance.
- If only **1 DIMM** is populated in a channel, then populate it in the **DIMMA2** slot.
- Populate identical DIMM modules in each memory channel, matching speed, capacity, and rank for ensuring system stability.
- We don't suggest other memory installation.

Installing Memory Modules

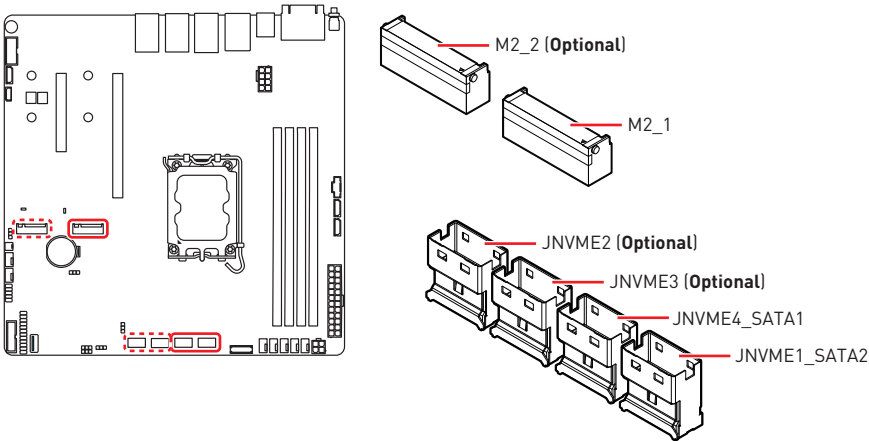
1. Open the side clips to unlock the DIMM slot.
2. Insert the DIMM vertically into the slot, ensuring that the off-center notch at the bottom aligns with the slot.
3. Push the DIMM firmly into the slot until it clicks and the side clips automatically close.
4. Verify that the side clips have securely locked the DIMM in place.



Important

You can barely see the golden finger if the memory module is properly inserted in the DIMM slot.

Storage Connectors



Storage Specifications

Connector	Description
M2_1	PCIe 4.0 x4, 16GT/s
M2_2	PCIe 4.0 x4, 16GT/s
JNVME2	PCIe 4.0 x4, 16GT/s
JNVME3	PCIe 4.0 x4, 16GT/s
JNVME4_SATA1	PCIe 4.0 x4, 16GT/s
	SATA 3.0 6Gb/s (default)
JNVME1_SATA2	PCIe 3.0 x4, 8GT/s
	SATA 3.0 6Gb/s (default)

M2_1~2: M.2 Slots (M Key, PCIe 4.0 x4, 22110/ 2280)

Please install the M.2 solid-state drive (SSD) into the M.2 slot as shown below.

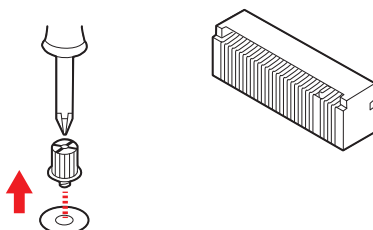
Installing M.2 SSD



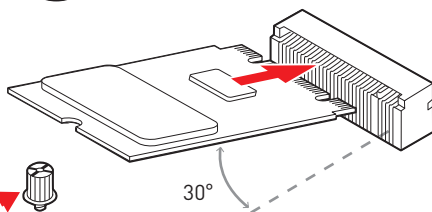
Video Demonstration

Watch the video to learn how to
Install M.2 SSD.

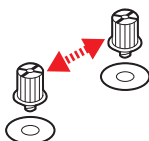
1. Loosen the M.2 riser screw from the motherboard.



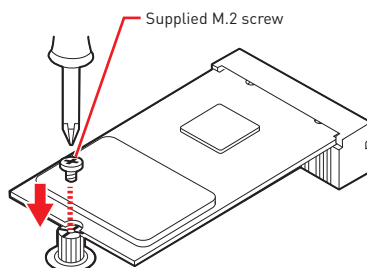
2. Set the M.2 riser screw at the appropriate location based on the length of your M.2 SSD.



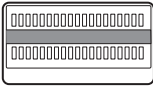
3. Insert your M.2 SSD into the M.2 slot at a 30-degree angle.



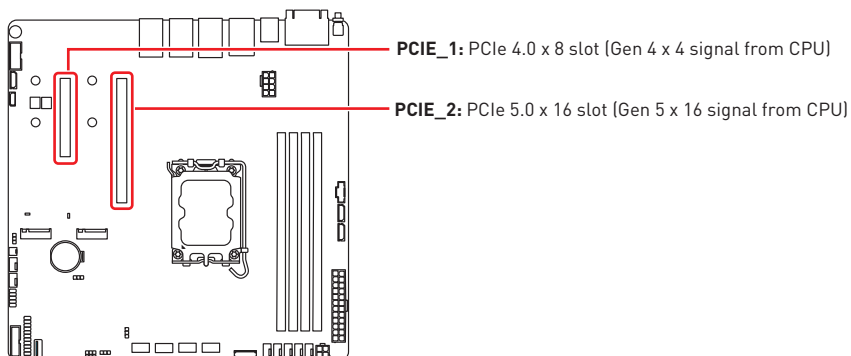
4. Secure the M.2 SSD in place with the supplied M.2 screw.



JNVME2~3, JNVME4_SATA1, JNVME1_SATA2 : Slimline SAS 4i Connectors

JNVME2~3 JNVME4_SATA1 JNVME1_SATA2 A19 A1  B19 B1	A1	GND-12	B1	GND-1
	A2	RXP0	B2	TX0+
	A3	RXN0	B3	TX0-
	A4	GND-11	B4	GND-2
	A5	RXP1	B5	TX1+
	A6	RXN1	B6	TX1-
	A7	GND-10	B7	GND-3
	A8	SB7	B8	SB0
	A9	SB3	B9	SB1
	A10	SB9	B10	SB8
	A11	SB4	B11	SB2
	A12	SB5	B12	SB6
	A13	GND-9	B13	GND-4
	A14	RX2+	B14	TX2+
	A15	RX2-	B15	TX2-
	A16	GND-8	B16	GND-5
	A17	RX3+	B17	TX3+
	A18	RX3-	B18	TX3-
	A19	GND-7	B19	GND-6

Expansion Slots



PCIE_1~2: PCIe Expansion Slots

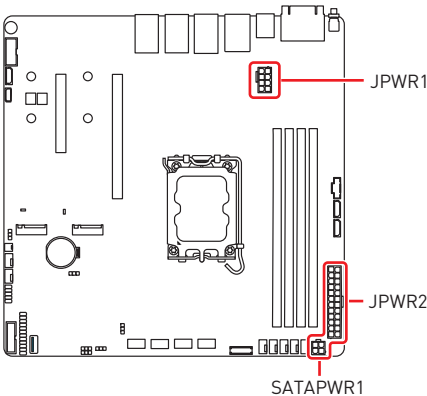
The PCI Express(Peripheral Component Interconnect Express) slots support PCIe interface expansion cards.



Important

When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

Power Connectors



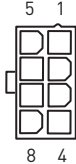
JPWR2: 24-Pin Main Power Connector

This connector allows you to connect an ATX power supply.

JPWR2 12 24 1 13	1	+3.3V	13	+3.3V
	2	+3.3V	14	-12V
	3	GND	15	GND
	4	+5V	16	PS-ON#
	5	GND	17	GND
	6	+5V	18	GND
	7	GND	19	GND
	8	PWR OK	20	Res
	9	5VSB	21	+5V
	10	+12V	22	+5V
	11	+12V	23	+5V
	12	+3.3V	24	GND

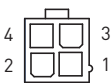
JPWR1: 8-Pin 12V Power Connector

This connector allows you to connect an ATX power supply.

JPWR1 	1	GND	5	P12V
	2	GND	6	P12V
	3	GND	7	P12V
	4	GND	8	P12V

SATAPWR1: 4-Pin Power Connector

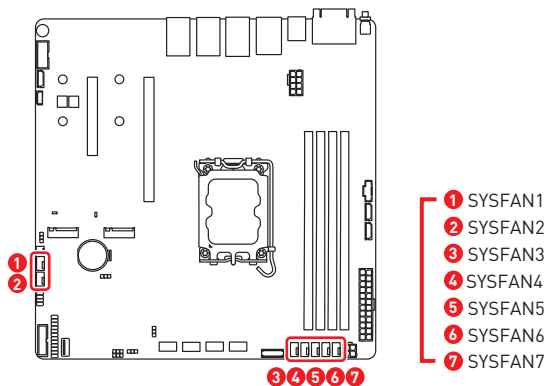
This connector is used to provide power to SATA devices.

SATAPWR1 	1	GND	2	GND
	3	P12V	4	P5V

 Important

Make sure that all power connectors are securely connected to the power supply to ensure stable operation of the motherboard.

Cooling Connectors



SYSFAN1~7: Fan Connectors

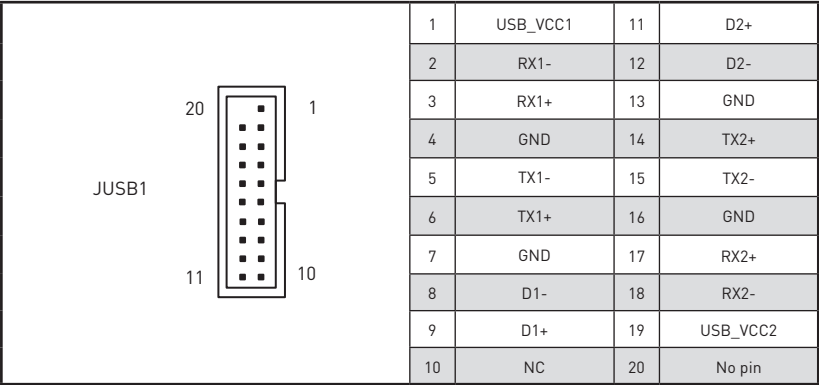
The fan connector supports system cooling fans with +12V. When connecting the wire to the connectors, always note that the red wire is the positive and should be connected to the +12V; the black wire is Ground and should be connected to GND.

SYSFAN1~7 4 1	1	GND
	2	P12V
	3	FAN_TACH
	4	BMC_PWM

USB Connectors

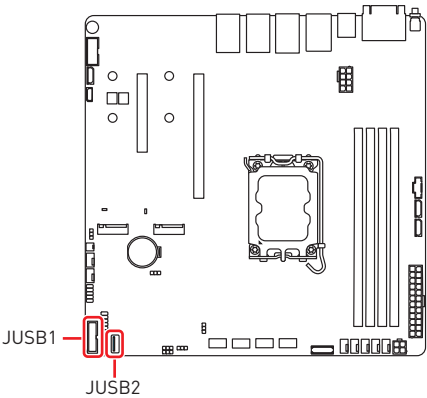
JUSB1: USB 3.2 Gen 1 Connector

This port is backward-compatible with USB 2.0 devices and supports data transfer rate up to **5 Gbps**.



JUSB2: USB 3.2 Gen 1/ USB 2.0 Type-A Connector

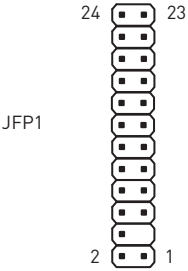
The USB (Universal Serial Bus) port is for attaching USB devices such as keyboard, mouse, or other USB-compatible devices. USB 3.2 Gen 1 supports data transfer rates up to **5 Gbps** while USB 2.0 supports data transfer rates up to **480 Mbps**.

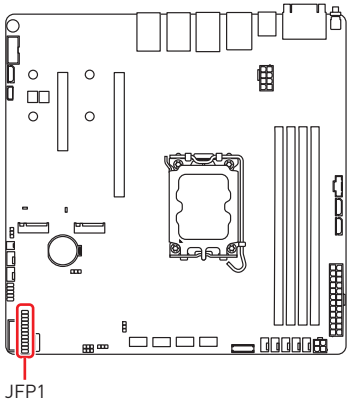


Other Connectors and Components

JFP1: Front Panel Connector

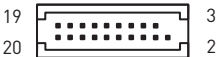
The front panel connector is provided for electrical connection to the front panel switches and LEDs.

	1	PWR_LED+	2	FP_PWR
	3	No pin	4	SYS_ID_LED+
	5	PWR_LED-	6	SYS_ID_LED-
	7	HDD_ACT_LED+	8	SYS_FAULT_LED1-
	9	HDD_ACT_LED-	10	SYS_FAULT_LED2-
	11	PWR_BTN-	12	NIC#1_ACT_LED+
	13	PWR_BTN_GND	14	NIC#1_ACT_LED-
	15	RST_BTN-	16	SMB_SDA
	17	RST_BTN_GND	18	SMB_SCL
	19	SYS_ID_BTN-	20	CHASSIS_INTRUSION
	21	WIRE_TEMP_SENSOR	22	NIC#2_ACT_LED+
	23	REAR_ID_BTN-	24	NIC#2_ACT_LED-



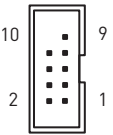
JTPM1: SPI TPM Box Header

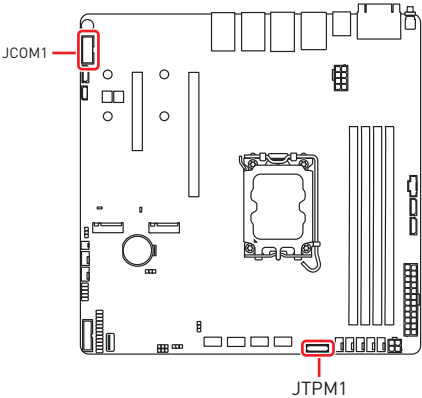
This connector connects to a TPM (Trusted Platform Module) [optional]. Please refer to the TPM security platform manual for more details.

	1	No Pin	2	SPI_TPM_CS0_N
	3	RST_RSMEST_N	4	SPI_PCH_FLASH_CS1_N
	5	GND	6	P3V3_AUX
	7	SPI_TPM_CLK	8	SPI_PCH_I02
	9	SPI_PCH_I03	10	SPI_TPM_MISO
	11	NC	12	SPI_TPM_MOSI
	13	SPI_TPM_CS2_N	14	GND
	15	P3V3_AUX	16	GND
	17	TPM_IRQ_N	18	P3V3_AUX
	19	RST_TPM_N	20	P3V3_AUX

JCOM1: COM Port Header

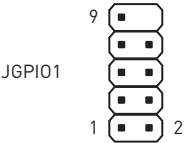
This connector is a 16550A high speed communications port that sends/receives 16 bytes FIFOs. You can attach a serial device to it.

	1	ND CD#_B	2	NSIN_B
	3	NSOUT_B	4	NDTR_B
	5	GND	6	NDSR#_B
	7	NRTS_B	8	NCTS#_B
	9	NRTS#_B	10	No pin



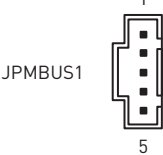
JGPIO1: GPIO Header

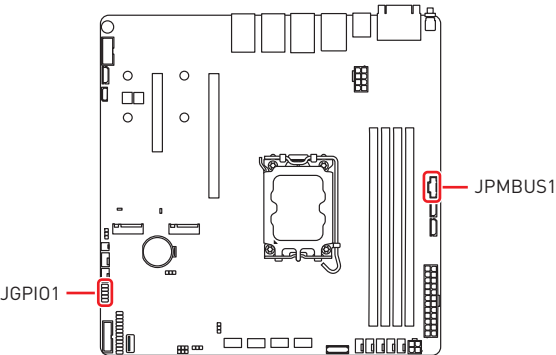
This connector is provided for the General-Purpose Input/Output (GPIO) peripheral module.

	1	USER_GPIO0	2	USER_GPIO1
	3	USER_GPIO2	4	USER_GPIO3
	5	USER_GPIO4	6	USER_GPIO5
	7	USER_GPIO6	8	USER_GPIO7
	9	GND	10	No pin

JPMBUS1: PMBus Connector

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

	1	JPMBUS1_LVC3_SCL
	2	JPMBUS1_LVC3_SDA
	3	SMB_PMBUS_ALERT_N
	4	GND
	5	P3V3_AUX



FP_I2C_1, RBP_I2C_1~2: I2C Box Headers

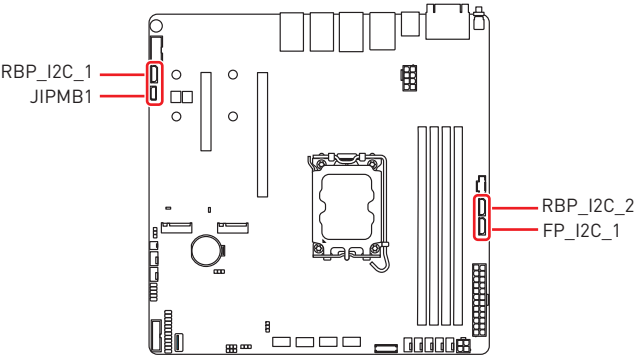
I2C connectors are used to connect to the System Management Bus (SMBus). FBP_I2C_1 is for front HDD backplane, and RBP_I2C_1~2 are for rear HDD backplanes.

FP_I2C_1 RBP_I2C_1 RBP_I2C_2		1	NC
		2	I2C_CLK
		3	I2C_DATA
		4	GND

JIPMB1: IPMB Connector

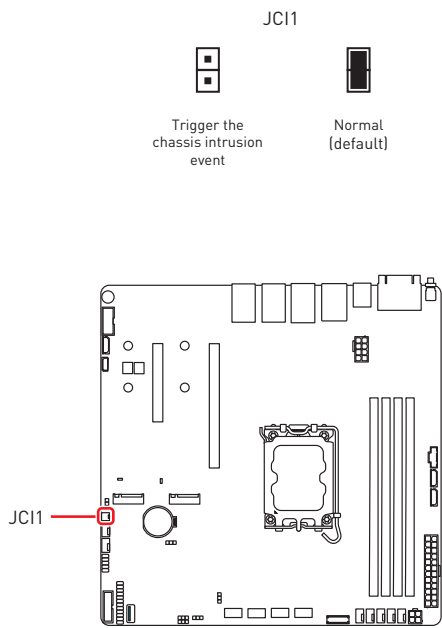
Intelligent Platform Management Bus (IPMB) connector is used to connect various management components, such as Baseboard Management Controller (BMC).

JIPMB1		1	SMB_IPMB_DAT
		2	GND
		3	SMB_IPMB_CLK



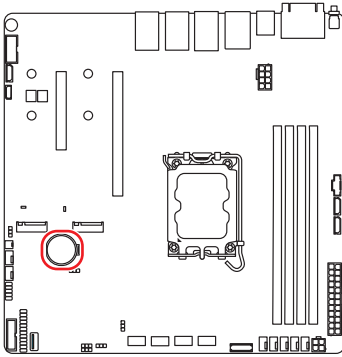
JC11: Chassis Intrusion Header

This connector connects to the chassis intrusion switch cable. If the chassis is opened, the chassis intrusion mechanism will be activated. The system will record this status and show a warning message on the screen. To clear the warning, you must enter the BIOS utility and clear the record.



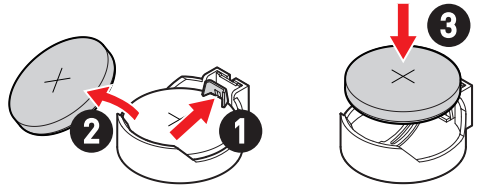
BAT1: CMOS Battery

If the CMOS battery is out of charge, the time in the BIOS will be reset and the data of system configuration will be lost. In this case, you need to replace the CMOS battery.



Replacing CMOS battery

1. Push the retainer clip to free the battery.
2. Remove the battery from the socket.
3. Install the new CR2032 coin-cell battery with the + sign facing up. Ensure that the retainer holds the battery securely.



WARNING

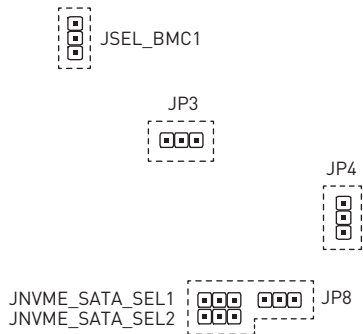
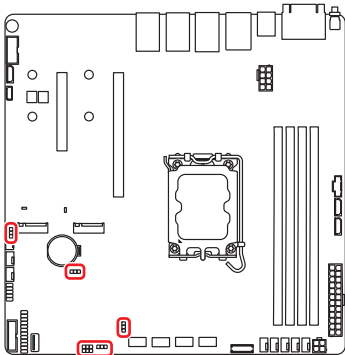
KEEP OUT OF REACH OF CHILDREN

- Swallowing can lead to chemical burns, perforation of soft tissue, can death.
- Severe burns can occur within 2 hours of ingestion.
- If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

Jumpers



Avoid adjusting jumpers when the system is on; it will damage the motherboard.

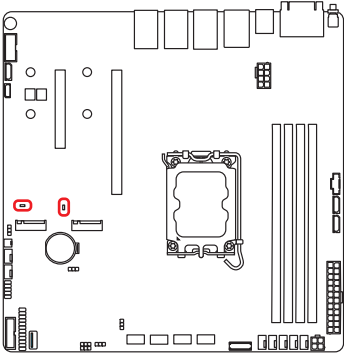


Jumper Name	Default Setting	Description
JP3		CPLD Power-on Jumper
		1-2: Disable (Default) 2-3: Enable
JP4		Clear CMOS Jumper
		1-2: Normal (Default) 2-3: Clear RTC registers
JP8		Clear Password Jumper
		1-2: Normal (Default) 2-3: Clear password
JNVME_SATA_SEL1 (for JNVME_SATA1)		SATA & NVMe Select Jumper
JNVME_SATA_SEL2 (for JNVME_SATA2)		1-2: NVMe 2-3: SATA (Default)
		SATA & NVMe Select Jumper
JSEL_BMC1		1-2: NVMe 2-3: SATA (Default)
		SPI Switch Jumper
JSEL_BMC1		1-2: BMC update BIOS mode 2-3: Normal (Default)

Onboard LEDs

BMC_LED1~2: BMC Heartbeat LEDs

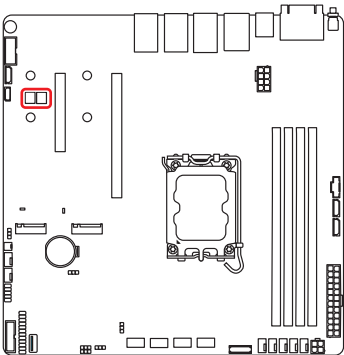
This LED indicates the BMC (Baseboard Management Controller) status.



LED Status	Description
 Off	BMC is not activated
 Blinking	BMC is functioning normally

LED_H1, LED_L1: Port 80 Debug LEDs

The Port 80 Debug LEDs display progress and error codes during and after POST (Power-On Self Test).



Hexadecimal Character Table

Hexadecimal	0	1	2	3	4	5	6	7
LED display	0	1	2	3	4	5	6	7
Hexadecimal	8	9	A	B	C	D	E	F
LED display	8	9	A	b	C	d	E	F



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