

Product Introduction

1.1 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.
- Before handling components, use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, 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 ATX 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, or components.

1.2 Motherboard overview

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



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

1.2.1 Placement direction

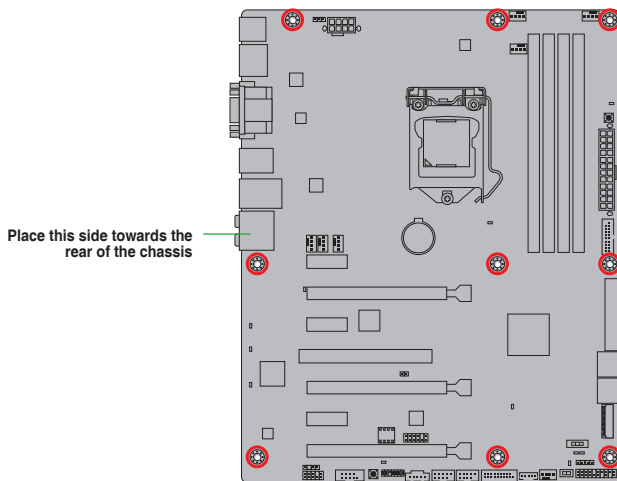
When installing the motherboard, place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis.

1.2.2 Screw holes

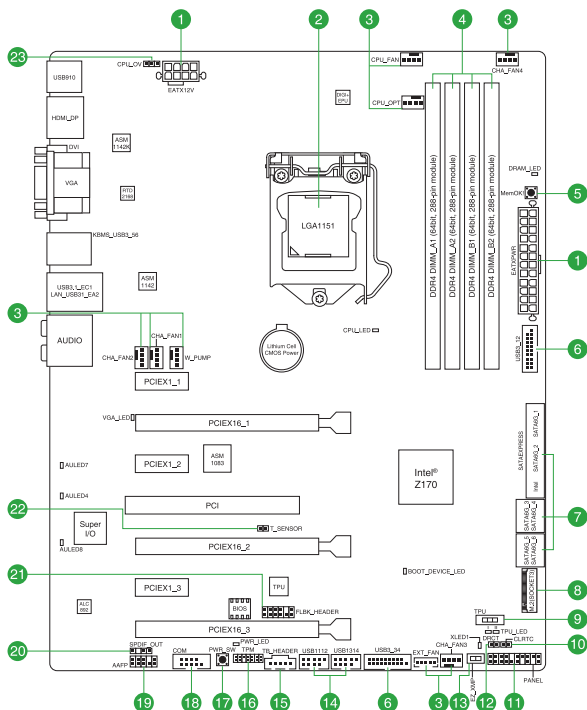
Place nine screws into the holes indicated by circles to secure the motherboard to the chassis.



Do not overtighten the screws! Doing so can damage the motherboard.



1.2.3 Motherboard layout

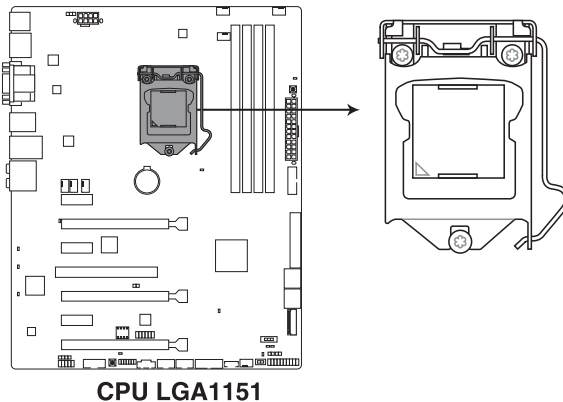


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Connectors/Jumpers/Slots/LED	Page
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2. Intel® LGA1151 CPU socket	1-4
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22. T_Sensor connector (2-pin T_SENSOR)	1-32
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1.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1151 socket designed for the 6th Generation Intel® Core™ i7 / Intel® Core™ i5 / Intel® Core™ i3, Pentium®, and Celeron® processors.

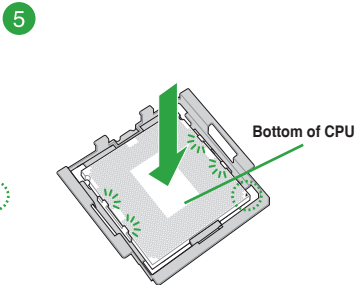
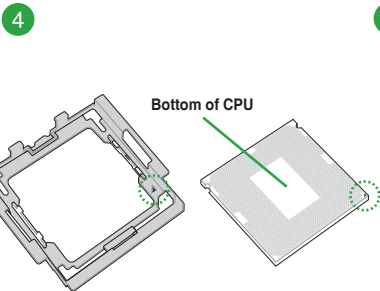
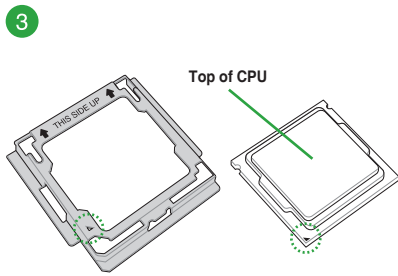
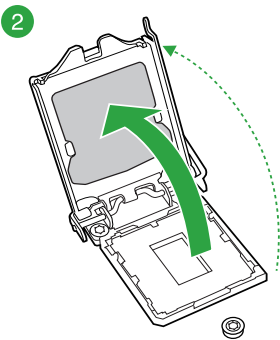
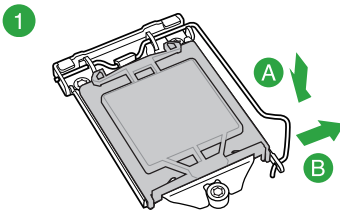
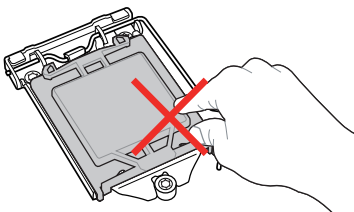


Ensure that you install the correct CPU designed for LGA1151 socket only. DO NOT install a CPU designed for other sockets on the LGA1151 socket.

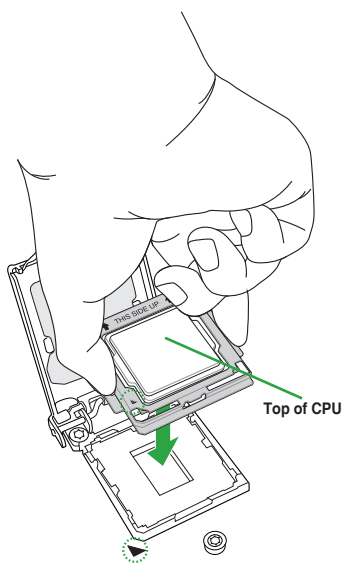


- Ensure that all power cables are unplugged before installing the CPU.
- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1150 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.

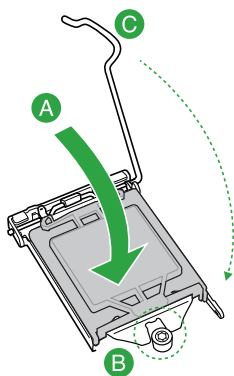
1.3.1 Installing the CPU



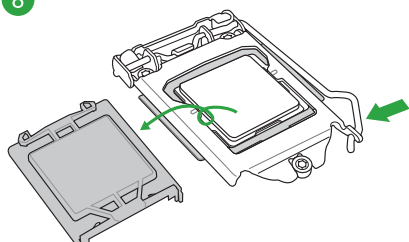
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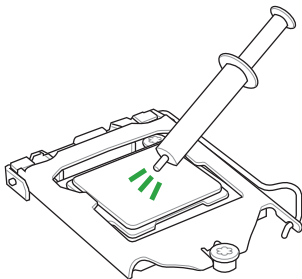
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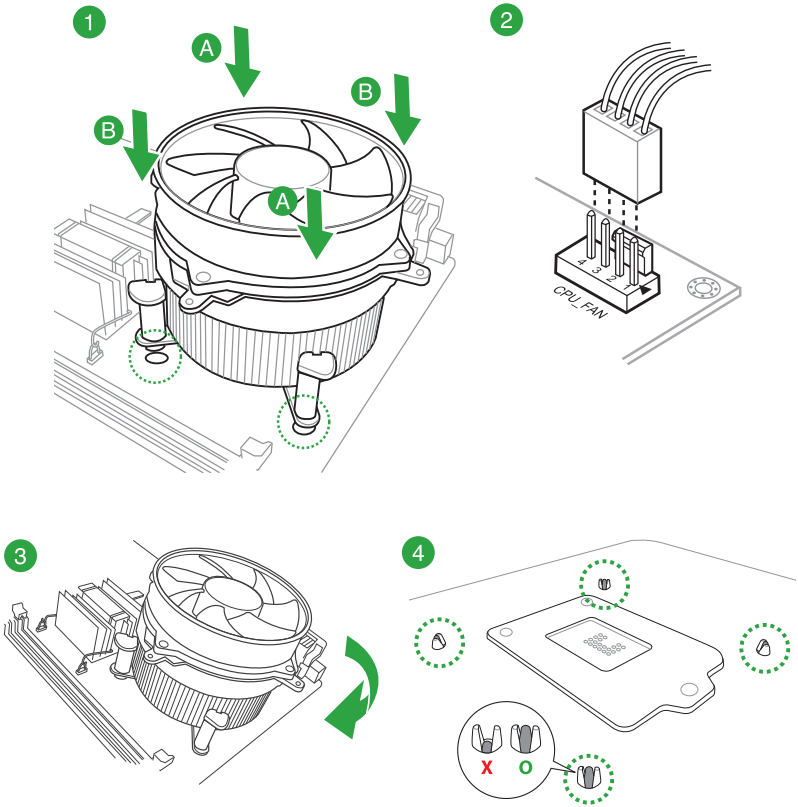


1.3.2 CPU heatsink and fan assembly installation

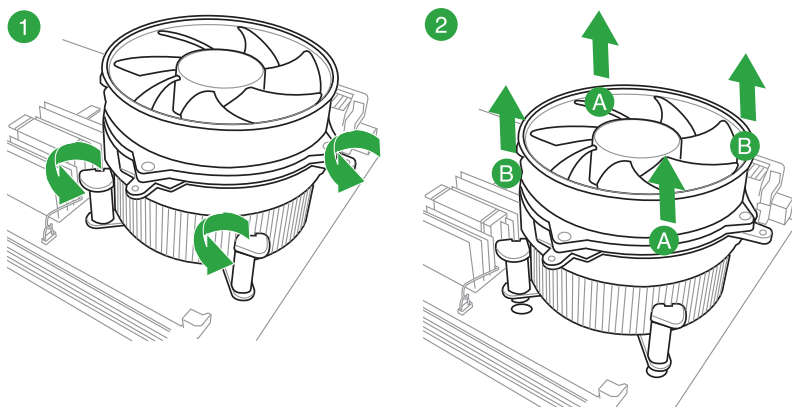


Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan, if necessary.

To install the CPU heatsink and fan assembly



To uninstall the CPU heatsink and fan assembly



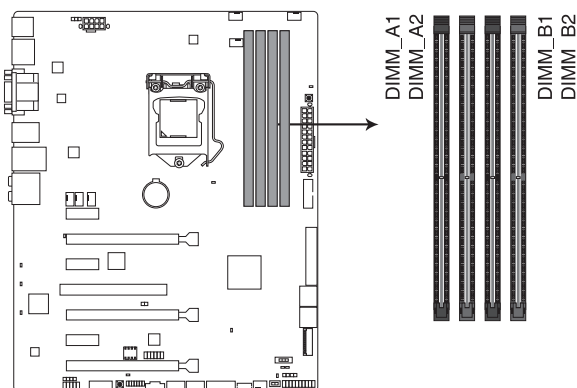
1.4 System memory

1.4.1 Overview

The motherboard comes with four Double Data Rate 4 (DDR4) Dual Inline Memory Modules (DIMM) slots.

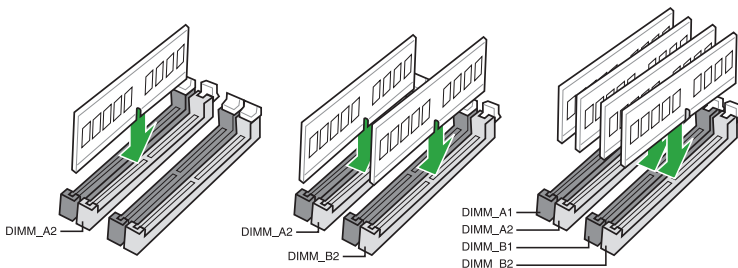


A DDR4 module is notched differently from a DDR, DDR2, or DDR3 module. DO NOT install a DDR, DDR2, or DDR3 memory module to the DDR4 slot.



288-pin DDR4 DIMM socket

Recommended memory configurations



1.4.2 Memory configurations

You may install 1 GB, 2 GB, 4 GB, 8GB, and 16 GB unbuffered non-ECC DDR4 DIMMs into the DIMM sockets. You can refer to the recommended memory population below.



- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- Always install DIMMs with the same CAS latency. For optimal compatibility, we recommend that you install memory modules of the same version or date code (D/C) from the same vendor. Check with the retailer to get the correct memory modules.
- Due to the memory address limitation on 32-bit Windows® OS, when you install 4GB or more memory on the motherboard, the actual usable memory for the OS can be about 3GB or less. For effective use of memory, we recommend that you do any of the following:
 - a) Use a maximum of 3GB system memory if you are using a 32-bit Windows® OS.
 - b) Install a 64-bit Windows® OS when you want to install 4 GB or more on the motherboard.
 - c) For more details, refer to the Microsoft® support site at <http://support.microsoft.com/kb/929605/en-us>.
- This motherboard does not support DIMMs made up of 512 Mb (64 MB) chips or less.



- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value. To operate at the vendor-marked or at a higher frequency, refer to section **2.5 Ai Tweaker** menu for manual memory frequency adjustment.
- For system stability, use a more efficient memory cooling system to support a full memory load (4 DIMMs).
- Visit the website for the latest QVL.

Z170-A Motherboard Qualified Vendors Lists (QVL)

DDR4 3400 (O.C.) MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1	2	4
CORSAIR	CMD16GX4M4B3400C16 ver. 4.23	16GB(4GB*4)	SS	Samsung	K4A4G085WD	16-18-18-38	1.35V	•		

DDR4 3333 (O.C.) MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1	2	4
G.SKILL	F4-3333C16D-8GTZ	8GB(4GB*2)	SS	SK Hynix	H5AN4G8NMFR	16-18-18-38	1.35V	•		
G.SKILL	F4-3333C16Q-16GRKD	16GB(4GB*4)	SS	Samsung	K4A4G085WD	16-16-16-36	1.35V	•		
CORSAIR	CMD16GX4M4B3333C16 ver.4.23	16GB(4GB*4)	SS	Samsung	K4A4G085WD	16-18-18-36	1.35V	•		
A-DATA	AX4U3333W4G16	16GB(4GB*4)	SS	SK Hynix	H5AN4G8NMFR	16-16-16-36	1.35V	•		

DDR4 3300 (O.C.) MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1	2	4
G.SKILL	F4-3300C16Q-16GRK	16GB(4GB*4)	SS	SK Hynix	H5AN4G8NMFR	16-16-16-36	1.35V	•	•	
G.SKILL	F4-3300C16D-8GTZ	8GB(4GB*2)	SS	Samsung	K4A4G085WD	16-18-18-38	1.35V	•	•	
CORSAIR	CMD16GX4M4B3300C16	16GB(4GB*4)	SS	Samsung	K4A4G085WD	16-18-18-36	1.35V	•		

DDR4 3200 (O.C.) MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1	2	4
G.SKILL	F4-3200C16Q-16GRR	16GB(4GB*4)	SS	SK Hynix	H5AN4G8NMFR	16-16-16-36	1.35V	•	•	
G.SKILL	F4-3200C16Q-16GRB	16GB(4GB*4)	SS	SK Hynix	H5AN4G8NMFR	16-16-16-36	1.35V	•	•	
G.SKILL	F4-3200C16Q-16GRRK	16GB(4GB*4)	SS	SK Hynix	H5AN4G8NMFR	16-16-16-36	1.35V	•	•	
AVEXIR	AVD4U32001604G-4BZ1	16GB(4GB*4)	SS	SK Hynix	H5AN4G8NMFR	16-18-18-36	1.35V	•		
AVEXIR	AVD4U32001604G-4CIR	16GB(4GB*4)	SS			16-18-18-36	1.35V	•		
CORSAIR	CMD16GX4M4A3200C16	16GB(4GB*4)	SS			16-18-18-36	1.35V	•		
GEIL	GPR416GB3200C15QC	16GB(4GB*4)	SS			15-15-15-35	1.35V	•		
Kingston	HX432C16PB2K4/16	16GB(4GB*4)	SS			16-16-16-39	1.35V	•		
Panram	PUD43200C164G4NUJW	16GB(4GB*4)	SS			16-18-18-39	1.35V	•		

DDR4 3000 (O.C.) MHz capability

Vendors	Part No.	Size	SS/ DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1	2	4
G.SKILL	F4-3000C15Q-32GRR	32GB(8GB*4)	DS	SK Hynix	H5AN4G8NMFR	15-15-15-35	1.35V	•		
G.SKILL	F4-3000C15Q-32GRB	32GB(8GB*4)	DS	SK Hynix	H5AN4G8NMFR	15-15-15-35	1.35V	•		
G.SKILL	F4-3000C15Q-32GRK	32GB(8GB*4)	DS	SK Hynix	H5AN4G8NMFR	15-15-15-35	1.35V	•		
G.SKILL	F4-3000C16Q-32GRR	32GB(8GB*4)	DS	SK Hynix	H5AN4G8NMFR	16-16-16-36	1.35V	•		
G.SKILL	F4-3000C16Q-32GRB	32GB(8GB*4)	DS	SK Hynix	H5AN4G8NMFR	16-16-16-36	1.35V	•		
G.SKILL	F4-3000C16Q-32GRK	32GB(8GB*4)	DS	SK Hynix	H5AN4G8NMFR	16-16-16-36	1.35V	•		
G.SKILL	F4-3000C15Q-16GRR	16GB(4GB*4)	SS	SK Hynix	H5AN4G8NMFR	15-15-15-35	1.35V	•	•	
G.SKILL	F4-3000C15Q-16GRB	16GB(4GB*4)	SS	SK Hynix	H5AN4G8NMFR	15-15-15-35	1.35V	•	•	
G.SKILL	F4-3000C15Q-16GRK	16GB(4GB*4)	SS	SK Hynix	H5AN4G8NMFR	15-15-15-35	1.35V	•	•	
G.SKILL	F4-3000C15Q2-32GRK	32GB(4GB*8)	SS	SK Hynix	H5AN4G8NMFR	15-15-15-35	1.35V	•	•	
G.SKILL	F4-3000C15D-8GTZ	8GB(4GB*2)	SS	Samsung	K4A4G085WD	15-15-15-35	1.35V	•	•	
AVEXIR	AVD4U30001604G-4CI	16GB(4GB*4)	SS	SK Hynix	H5AN4G8NMFR	16-18-18-36	1.35V	•	•	
AVEXIR	AVD4U30001504G-4BZ1	16GB(4GB*4)	SS	SK Hynix	H5AN4G8NMFR	15-15-15-35	1.35V	•	•	
AVEXIR	AVD4U30001608G-4CI	32GB(8GB*4)	DS	SK Hynix	H5AN4G8NMFR	16-18-18-36	1.35V	•		
Kingston	HX430C15PB2K4/16	16GB(4GB*4)	SS			15-16-16-39	1.35V	•	•	
CORSAIR	CMD16GX4M4B3000C15	16GB(4GB*4)	SS	Samsung	K4A4G085WD	15-17-17-35	1.35V	•	•	
CORSAIR	CMK16GX4M4B3000C15	16GB(4GB*4)	SS	Samsung	K4A4G085WD	15-17-17-35	1.35V	•	•	
Panram	PUD43000C154G4NJW	16GB(4GB*4)	SS			15-17-17-35	1.35V	•	•	
Asint	SLB404G08-EWWHMX	16GB(8GB*2)	SS	SK Hynix	H5AN4G8NMFR	15-15-15-44	1.35V	•		

DDR4 2800 (O.C.) MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1	2	4
ADATA	AX4U2800W4G17	32GB(4GB*8)	DS	-	-	17-17-17-36	1.2	•	•	•
ADATA	AX4U2800W8G17	8GB	DS	-	-	15-15-15-36	1.2	•	•	•
Apacer	78.BAGM8.AF20B(XMP)	4GB	SS	-	-	17-17-17-36	-	•	•	•
Apacer	78.CAGM8.AF30B(XMP)	8GB	DS	-	-	17-17-17-36	-	•	•	•
AVEXIR	AVD4U28001504G-4CIR(XMP)	4GB	SS	-	-	15-15-15-35	1.35	•	•	•
AVEXIR	AVD4U28001608G-4CIR(XMP)	32GB(4GB*8)	DS	-	-	16-16-16-36	1.2	•	•	
CORSAIR	CMD16GX4M4A2800C16(Ver4.23)(XMP)	16GB(4GB*4)	SS	-	-	16-18-18-36	1.2	•	•	•
CORSAIR	CMD16GX4M4A2800C16(Ver5.29)	16GB(4GB*4)	SS	-	-	16-18-18-36	1.2	•	•	•
CORSAIR	CMD32GX4M4A2800C16(Ver5.29)(XMP)	32GB(8GB*4)	DS	-	-	18-18-18-36	1.2	•	•	•
CORSAIR	CMK16GX4M4A2800C16(Ver4.23)(XMP)	16GB(4GB*4)	SS	-	-	16-16-18-36	1.2	•	•	•

(continued on the next page)

DDR4 2800 (O.C.) MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1	2	4
CORSAIR	CMK16GX4M4A2800C16(Ver5.29)	16GB(4GB*4)	SS	-	-	16-18-18-36	1.2	•	•	•
CORSAIR	CMK32GX4M4A2800C16(Ver5.29)(XMP)	32GB(8GB*4)	DS	-	-	16-18-18-36	1.2	•	•	•
G.SKILL	F4-2800C15Q2-64GRK(XMP)	64GB(8GB*8)	DS	-	-	15-16-16-35	1.25	•	•	•
G.SKILL	F4-2800C16Q-16GRR(XMP)	16GB(4GB*4)	SS	-	-	16-16-16-36	1.2	•	•	•
G.SKILL	F4-2800C16Q-32GRR(XMP)	32GB(8GB*4)	DS	-	-	16-16-16-36	1.2	•	•	•
Kingston	HX428C14PBK4/16(XMP)	16GB(4GB*4)	SS	-	-	14-15-15-40	1.35	•	•	•
Panram	PUD42800C164G4NUJW(XMP)	16GB(4GB*4)	SS	-	-	16-18-18-36	1.25	•	•	•

DDR4 2666 (O.C.) MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1	2	4
AVEXIR	AVD4U26661504G-4CIR(XMP)	4GB	SS	-	-	15-15-15-35	1.2	•	•	•
AVEXIR	AVD4U26661608G-4CIR(XMP)	32GB (4GB*8)	DS	-	-	16-16-16-36	1.2	•	•	•
CORSAIR	CMD128GX4M8A2666C15(Ver4.31)(XMP)	128GB (8GB*16)	DS	-	-	15-17-17-35	1.2	•	•	•
CORSAIR	CMD16GX4M4A2666C15(Ver4.23)(XMP)	16GB (4GB*4)	SS	-	-	15-17-17-35	1.2	•	•	•
CORSAIR	CMD16GX4M4A2666C16(Ver4.23)(XMP)	16GB (4GB*4)	SS	-	-	16-18-18-35	1.2	•	•	•
CORSAIR	CMD16GX4M4A2666C16(Ver5.29)(XMP)	16GB (4GB*4)	SS	-	-	16-18-18-35	1.2	•	•	•
CORSAIR	CMD32GX4M4A2666C15(Ver4.23)(XMP)	32GB (8GB*4)	DS	-	-	15-17-17-35	1.2	•	•	•
CORSAIR	CMD32GX4M4A2666C15(Ver5.29)(XMP)	32G (8GB*4)	DS	-	-	15-17-17-35	1.2	•	•	•
CORSAIR	CMD32GX4M4A2666C16(Ver4.23)(XMP)	32GB (8GB*4)	DS	-	-	16-18-18-35	1.2	•	•	•
CORSAIR	CMK16GX4M4A2666C15(Ver4.23)(XMP)	16GB (4GB*4)	SS	-	-	15-17-17-35	1.2	•	•	•
CORSAIR	CMK16GX4M4A2666C15(Ver5.29)(XMP)	16GB (4GB*4)	SS	-	-	15-17-17-35	1.2	•	•	•
CORSAIR	CMK16GX4M4A2666C16(Ver4.23)(XMP)	16GB (4GB*4)	SS	-	-	16-18-18-35	1.2	•	•	•
CORSAIR	CMK16GX4M4A2666C16(Ver5.29)(XMP)	16GB (4GB*4)	SS	-	-	16-18-18-35	1.2	•	•	•
CORSAIR	CMK32GX4M4A2666C15(Ver4.23)(XMP)	32GB (8GB*4)	DS	-	-	15-17-17-35	1.2	•	•	•
CORSAIR	CMK32GX4M4A2666C15(Ver5.29)(XMP)	32GB (8GB*4)	DS	-	-	15-17-17-35	1.2	•	•	•
CORSAIR	CMK32GX4M4A2666C16(Ver5.29)(XMP)	32GB (8GB*4)	DS	-	-	16-16-18-35	1.2	•	•	•
CORSAIR	CMK32GX4M4A2666C16R(Ver4.23)(XMP)	32GB (8GB*4)	DS	-	-	16-18-18-35	1.2	•	•	•
G.SKILL	F4-2666C15Q-16GRR(XMP)	16GB (4GB*4)	SS	-	-	15-15-15-35	1.2	•	•	•
G.SKILL	F4-2666C15Q-32GRR(XMP)	32GB (8GB*4)	DS	-	-	15-15-15-35	1.2	•	•	•

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DDR4 2666 (O.C.) MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1	2	4
G.SKILL	F4-2666C16Q2-64GRB(XMP)	64GB (8GB*8)	DS	-	-	16-16-16-36	1.2	•	•	•
ISDT	IMA41GU6MFR8N-CF0(XMP)	8GB	DS	ISDT	I5AN4G8NMFR	15-15-15-35	1.2	•	•	•
ISDT	IMA451U6MFR8N-CF0(XMP)	4GB	SS	ISDT	I5AN4G8NMFR	15-15-15-35	1.2	•	•	•
Team	TCD44G2666C15ABK(XMP)	4GB	SS	Samsung	K4A4G085WD	15-15-15-35	1.2	•	•	•
Team	TCD48G2666C15ABK(XMP)	32GB (8GB*4)	DS	Team	TCD48G2666C15ABK	15-15-15-35	1.2	•	•	•

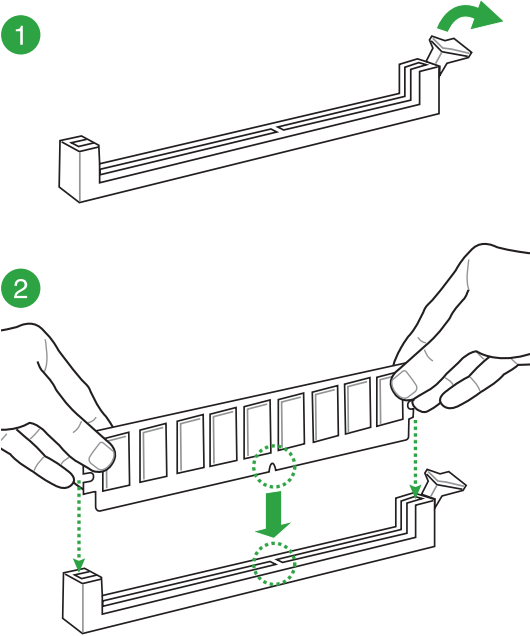
DDR4 2400 (O.C.) MHz capability

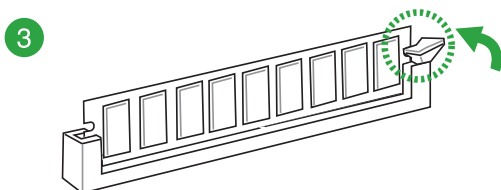
Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1	2	4
AVEXIR	AVD4U24001604G-4CIR(XMP)	4GB	SS	-	-	16-16-16-36	1.2	•	•	•
AVEXIR	AVD4U24001608G-4M	32GB (4GB*8)	DS	SK Hynix	H5AN4G8NMFRFC	16-16-16-39	1.2	•	•	•
AVEXIR	AVD4U24001608G-4M (XMP)	32GB (4GB*8)	DS	SK Hynix	H5AN4G8NMFRFC	16-16-16-36	1.2	•	•	•
CORSAIR	CMD16GX4M4A2400C14 (Ver4.23)(XMP)	16GB (4GB*4)	SS	-	-	14-16-16-31	1.2	•	•	•
CORSAIR	CMD32GX4M4A2400C14 (Ver4.23)(XMP)	32GB (8GB*4)	DS	-	-	14-16-16-31	1.2	•	•	•
CORSAIR	CMK16GX4M4A2400C14 (Ver4.23)(XMP)	16GB (4GB*4)	SS	-	-	14-16-16-31	1.2	•	•	•
CORSAIR	CMK32GX4M4A2400C14 (Ver4.23)(XMP)	32GB (8GB*4)	DS	-	-	14-16-16-31	1.2	•	•	•
Crucial	BLS4G4D240FSA.8FAD	4GB	SS	-	-	16-16-16-40	1.2	•	•	•
Crucial	BLS4G4D240FSA.8FAR (XMP)	4GB	SS	-	-	17-16-16-39	1.2	•	•	•
Crucial	BLS8G4D240FSA.16FAD	8GB	DS	-	-	16-16-16-40	1.2	•	•	•
Crucial	BLS8G4D240FSA.16FAR (XMP)	8GB	DS	-	-	17-16-16-39	1.2	•	•	•
G.SKILL	F4-2400C15Q-16GRR	16GB (4GB*4)	SS	-	-	15-15-15-35	1.2	•	•	•
G.SKILL	F4-2400C15Q2-128GRK (XMP)	128GB (16GB*8)	DS	-	-	15-15-15-35	1.2	•	•	•
G.SKILL	F4-2400C15Q-32GRR	32GB (8GB*4)	DS	-	-	15-15-15-35	1.2	•	•	•
Kingston	HX424C12PB2K4/16	16GB (4GB*4)	SS	-	-	15-15-15-36	1.2	•	•	•
Panram	PUD42400C154G4NJW	16GB (4GB*4)	SS	-	-	15-15-15-35	1.2	•	•	•
Panram	PUD42400C158G4NJW	32GB (8GB*4)	DS	-	-	15-15-15-35	1.2	•	•	•
Team	TED44GM2400C16BK	4GB	SS	Samsung	K4A4G085WD	16-16-16-39	1.2	•	•	•
Team	TED48GM2400C16BK	8GB	DS	Samsung	K4A4G085WD	16-16-16-39	1.2	•	•	•
V-color	TD4GBC17-UH	4GB	SS	V-color	DW3J0460HM	15-15-15-36	1.2	•	•	•

DDR4 2133 MHz capability

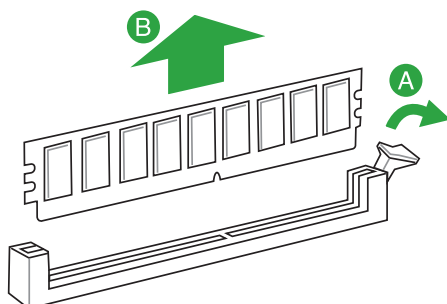
Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1	2	4
ADATA	AD4U2133W4G15-B	4GB	SS	SK Hynix	H5AN4G8NMFR7FC	15-15-15-36	-	*	*	*
ADATA	AD4U2133W8G15	8GB	DS	SK Hynix	H5AN4G8NMFR7FC	15-15-15-36	1.2	*	*	*
Apacer	78.B1GM3.AF00B	4GB	SS	SK Hynix	H5AN4G8NMFR7FC	15-15-15-36	1.2	*	*	*
Apacer	78.C1GM3.AF10B	8GB	DS	SK Hynix	H5AN4G8NMFR7FC	15-15-15-36	1.2	*	*	*
AVEXIR	AVD4U21331504G-4M	4GB	SS	AVEXIR	512X8DDR4	15-15-15-35	1.2	*	*	*
Century	CD8G-D4U2133	8GB	DS	SK Hynix	H5AN4G8NMFR7FC	15-15-15-36	-	*	*	*
CORSAIR	CMK16GX4M4A2133C13 (Ver4.23)(XMP)	16GB (4GB*4)	SS	-	-	13-15-15-28	1.2	*	*	*
CORSAIR	CMK32GX4M4A2133C13 (Ver4.23)(XMP)	32GB (8GB*4)	DS	-	-	13-15-15-28	1.2	*	*	*
CORSAIR	CMK64GX4M8A2133C13 (Ver4.23)(XMP)	64GB (8GB*8)	DS	-	-	13-15-15-28	1.2	*	*	*
CORSAIR	CMV4GX4M1A2133C15	4GB	SS	-	-	15-15-15-36	1.2	*	*	*
CORSAIR	CMV8GX4M1A2133C15	8GB	DS	-	-	15-15-15-36	1.2	*	*	*
G.SKILL	F4-2133C15Q-16GRR	16GB (4GB*4)	SS	-	-	15-15-15-35	1.2	*	*	*
G.SKILL	F4-2133C15Q-32GRR	32GB (8GB*4)	DS	-	-	15-15-15-35	-	*	*	*
ISDT	IMA41GU6MFR8N-TF0	8GB	DS	ISDT	I5AN4G8NMFR	15-15-15-35	1.2	*	*	*
ISDT	IMA451U6MFR8N-TF0	4GB	SS	ISDT	I5AN4G8NMFR	15-15-15-35	1.2	*	*	*
Panram	PUD42133C134G4NJW	16GB (4GB*4)	SS	-	-	13-13-13-35	1.2	*	*	*
Panram	PUD42133C138G4NJW	32GB (8GB*4)	DS	-	-	13-13-13-35	1.2	*	*	*
Panram	PUD42133C154G2VS	8GB (4GB*2)	SS	SK Hynix	H5AN4GBNMFR7FC	15-15-15-36	1.2	*	*	*
Panram	PUD42133C154GNJK	4GB	SS	-	-	15-15-15-36	1.2	*	*	*
Panram	PUD42133C158G2VS	16GB (8GB*2)	DS	SK Hynix	H5AN4GBNMFR7FC	15-15-15-36	1.2	*	*	*
Panram	PUD42133C158GNJK	8GB	DS	-	-	15-15-15-36	1.2	*	*	*
Samsung	M378A1G43DB0-CPB	8GB	DS	Samsung	K4A4G085WD	15-15-15-36	-	*	*	*
SanMax	SMD-4G28HP-21P	4GB	SS	SK Hynix	H5AN4G8NMFR7FC	15-15-15-37	-	*	*	*
SanMax	SMD-8G28HP-21P	8GB	DS	SK Hynix	H5AN4G8NMFR7FC	15-15-15-37	-	*	*	*
SK Hynix	HMA82GU6MFR8N-TF	16GB	DS	SK Hynix	H5AN8G8NMFR7FC	15-15-15-36	-	*	*	*
SUPER TALENT	FBU2B008GM	8GB	DS	Micron	D9RGQ	15-15-15-36	1.2	*	*	*
Team	TED44GM2133C15ABK	4GB	SS	SK Hynix	H5AN4G8NMFR7FC	15-15-15-36	1.2	*	*	*
Transcend	TS1GLH64V1H	8GB	DS	Samsung	K4A4G085WD	15-15-15-37	-	*	*	*
Transcend	TS512MLH64V1H	4GB	SS	Samsung	K4A4G085WD	15-15-15-37	-	*	*	*
UMAX	84G44G93MC-210MCLGF15	4GB	SS	Micron	D9RGQ	15-15-15-36	-	*	*	*
UMAX	84G48G93MC-210MCGNGF15	8GB	DS	Micron	D9RGQ	15-15-15-36	-	*	*	*

1.4.3 DIMM installation





To remove a DIMM



1.5 Expansion slots

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



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

1.5.1 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).
3. 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.

1.5.2 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 2 for information on BIOS setup.
2. Assign an IRQ to the card.
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 arise between the two PCI groups, making the system unstable and the card inoperable.

1.5.3 PCI slot

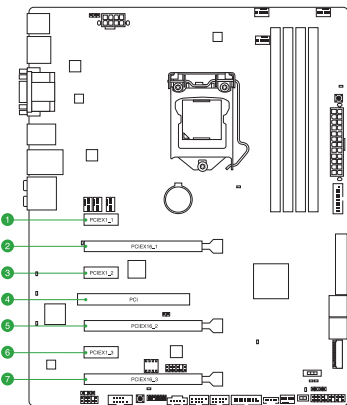
The PCI slot supports cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI specifications.

1.5.4 PCI Express 3.0 / 2.0 x1 slots

This motherboard supports PCI Express x1 network cards, SCSI cards, and other cards that comply with the PCI Express specifications.

1.5.5 PCI Express 3.0 / 2.0 x16 slots

This motherboard supports PCI Express x16 network cards, SCSI cards, and other cards that comply with the PCI Express specifications.



Slot No. Expansion slot	
1	PCIe 3.0/2.0 x1_1 slot
2	PCIe 3.0/2.0 x16_1 slot
3	PCIe 3.0/2.0 x1_2 slot
4	PCI slot
5	PCIe 3.0/2.0 x16_2 slot
6	PCIe 3.0/2.0 x1_3 slot
7	PCIe 3.0/2.0 x16_3 slot

VGA configuration	PCI Express 3.0 operating mode	
	PCIe 3.0/2.0 x16_1	PCIe 3.0/2.0 x16_2
Single VGA/PCIe card	x16 (single VGA recommended)	N/A
Dual VGA/PCIe card	x8	x8



- We recommend that you provide sufficient power when running CrossFireX™ or SLI™ mode.
- Connect a chassis fan to the motherboard connector labeled CHA_FAN1-4 when using multiple graphics cards for better thermal environment.

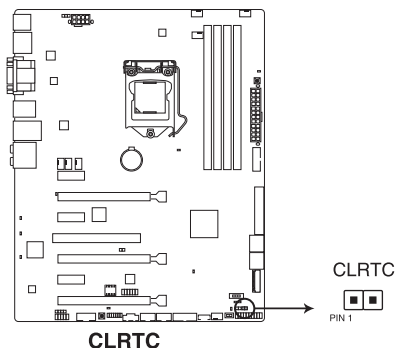
IRQ assignments for this motherboard

	A	B	C	D
PCIe x16_1	Shared	–	–	–
PCIe x16_2	Shared	–	–	–
PCIe x16_3	Shared	–	–	–
PCIe x1_1	–	Shared	–	–
PCIe x1_2	–	–	Shared	–
PCIe x1_3	–	–	–	Shared
SMBUS Controller	Shared	–	–	–
Intel SATA Controller	Shared	–	–	–
Intel LAN	Shared	–	–	–
Intel xHCI	Shared	–	–	–
HD Audio	Shared	–	–	–
ASMedia Controller	Shared	–	–	–
PCI Slot	–	–	Shared	–

1.6 Jumpers

1. Clear RTC RAM (2-pin CLRTC)

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. Short-circuit pin 1-2 with a metal object or jumper cap for about 5-10 seconds.
3. Plug the power cord and turn ON the computer.
4. Hold down the key during the boot process and enter BIOS setup to re-enter data.



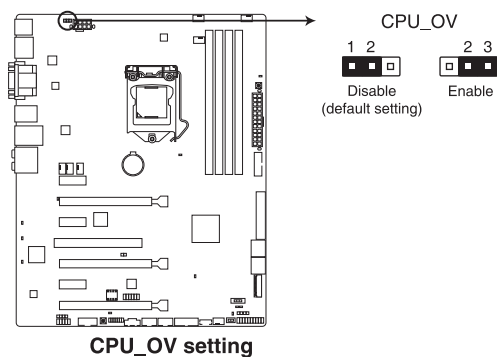
Except when clearing the RTC RAM, never short-circuit the CLRTC jumper. Shorting the CLRTC jumper will cause system boot failure!



- If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the battery.
- You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the CPU Parameter Recall (C.P.R.) feature. Shut down and reboot the system, then the BIOS automatically resets parameter settings to default values.
- Due to chipset behavior, AC power off is required to enable C.P.R. function. You must turn off and on the power supply or unplug and plug the power cord before rebooting the system.

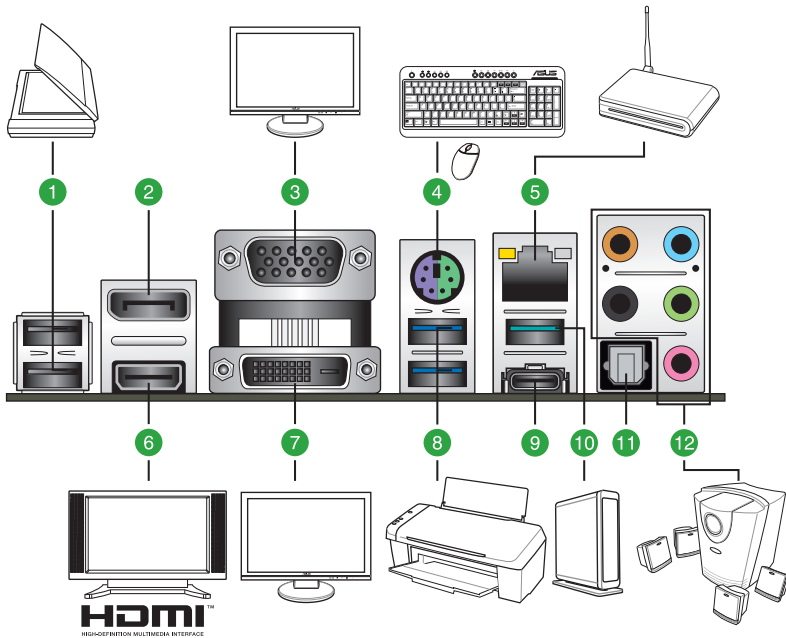
2. CPU Over Voltage jumper (3-pin CPU_OV)

The CPU Over Voltage jumper allows you to set a higher CPU voltage for a flexible overclocking system, depending on the type of the installed CPU. To gain more CPU voltage setting, insert the jumper to pins 2-3. To go back to its default CPU voltage setting, insert the jumper to pins 1-2.



1.7 Connectors

1.7.1 Rear panel connectors



Rear panel connectors	
1. USB 2.0 ports 910	7. DVI-D port
2. DisplayPort	8. USB 3.0 ports 56 (supports USB 3.1 Boost)
3. VGA port	9. USB Type-C port EC1 (supports USB 3.1 Boost)
4. PS/2 keyboard/mouse port	10. LAN_USB31_EA2 (supports USB 3.1 Boost)
5. LAN port*	11. Optical S/PDIF Out port
6. HDMI port	12. Audio I/O ports**

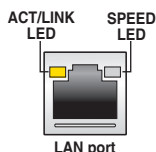
* and **: Refer to the tables on the next page for LAN port LEDs and audio port definitions.



- The plugged USB 3.0 device will run on xHCI mode.
- USB 3.0 devices can only be used for data storage.
- We strongly recommend that you connect USB 3.0 devices to USB 3.0 ports for faster and better performance from your USB 3.0 devices.
- Due to the design of the Intel® chipset, all USB devices connected to the USB 2.0 and USB 3.0 ports are controlled by the xHCI controller. Some legacy USB devices must update their firmware for better compatibility.
- Multi-VGA output supports up to three displays under Windows® OS environment, two displays under BIOS, and one display under DOS.
- Intel display architecture design supports the following maximum supported pixel clocks (Pixel Clock = H total x V Total x Frame Rate (Screen refresh rate)):
 - DVI port: 148 MHz
 - DisplayPort: 675 MHz
 - VGA port: 210 MHz
 - HDMI port: 300 MHz

* LAN ports LED indications

Activity Link LED		Speed LED	
Status	Description	Status	Description
Off	No link	Off	10 Mbps connection
Orange	Linked	Orange	100 Mbps connection
Orange (Blinking)	Data activity	Green	1 Gbps connection
Orange (Blinking then steady)	Ready to wake up from S5 mode		



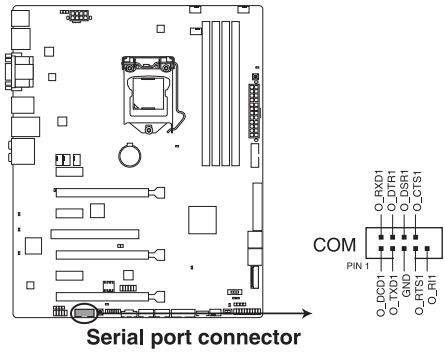
**Audio 2, 4, 6, or 8-channel configuration

Port	Headset 2-channel	4-channel	6-channel	8-channel
Light Blue	Line In	Line In	Line In	Side Speaker Out
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

1.7.2 Internal connectors

1. Serial port connector (10-1 pin COM)

This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis.

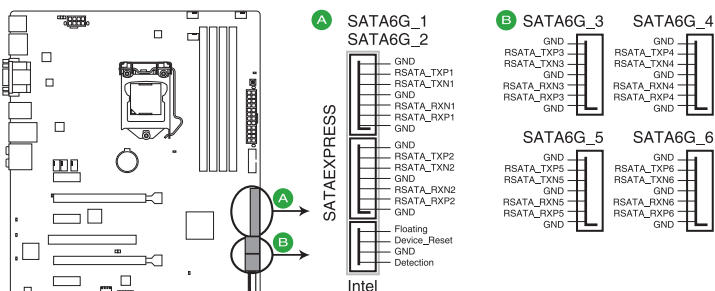


The COM module is purchased separately.

2. Intel® Z170 Serial ATA 6.0 Gb/s connectors (7-pin SATA6G_12, SATA6G_34, SATA6G_56, SATA Express)

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

If you installed Serial ATA hard disk drives, you can create a RAID 0, 1, 5, and 10 configuration with the Intel® Rapid Storage Technology through the onboard Intel® Z170 chipset.



Intel® SATA 6 Gb/s connectors



These connectors are set to **[AHCI Mode]** by default. If you intend to create a Serial ATA RAID set using these connectors, set the SATA Mode item in the BIOS to **[RAID Mode]**. Refer to section 2.6.5 PCH Storage Configuration for details.



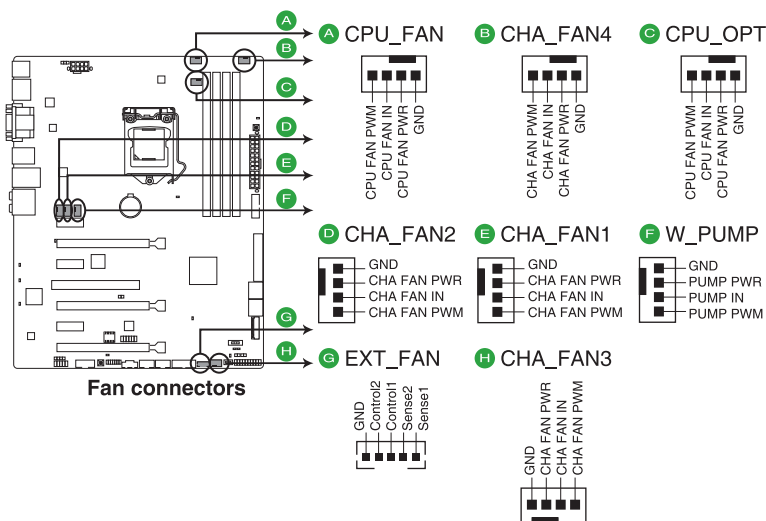
- The M.2 socket shares SATA ports with SATA Express. Only one SATA device could be activated. To use an M.2 SATA device, refer to section 2.6.8 Onboard Devices Configuration regarding the BIOS switch.
- The SATAEXPRESS connector can support one SATA Express device or two SATA devices.

3. CPU, water pump, CPU optional, extension, and chassis fan connectors (4-pin CPU_FAN; 3-pin W_PUMP; 4-pin CPU_OPT; 5-pin EXT_FAN; 4-pin CHA_FAN1-4)

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! The CPU_FAN connector supports a CPU fan of maximum 1 A (12 W) fan power.
- Ensure that the CPU fan cable is securely installed to the CPU fan connector.



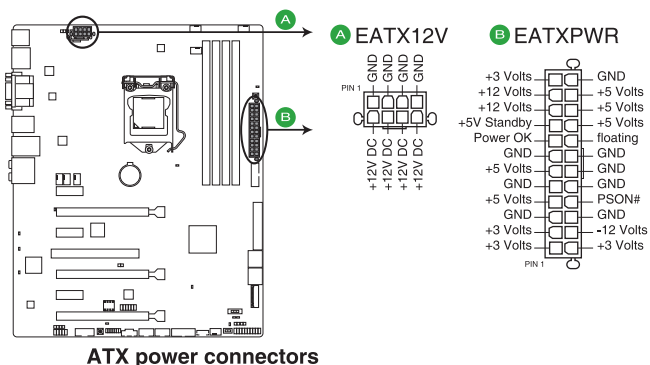
- The CPU_FAN connector supports the CPU fan of maximum 1A (12 W) fan power.
- W_PUMP function support depends on water cooling device.
- The CPU_FAN connector and CHA_FAN connectors support the FAN Xpert 3 feature.
- The CPU fan connector detects the type of CPU fan installed and automatically switches the control modes. To configure the CPU fan's control mode, go to **Advanced Mode > Monitor > CPU Q-Fan Control** item in BIOS.
- The chassis fan connectors support DC and PWM modes. To set these fans to DC or PWM, go to **Advanced Mode > Monitor > Chassis Fan 1/4 Q-Fan Control** items in BIOS.



The FAN EXTENSION CARD is purchased separately.

4. ATX power connectors (24-pin EATXPWR, 8-pin EATX12V)

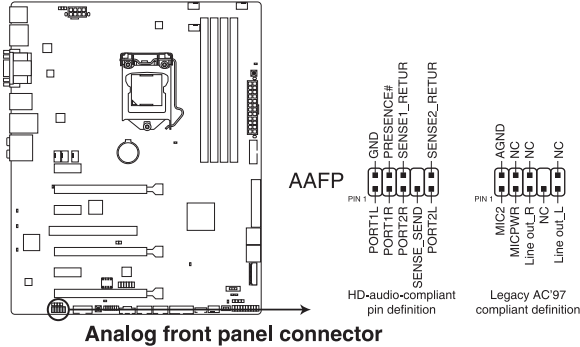
These connectors are for ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.



- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 350 W.
- DO NOT forget to connect the 4-pin/8-pin ATX +12V power plug. Otherwise, the system will not boot up.
- We recommend that you use a PSU with higher power output when configuring a system with more power-consuming devices or when you intend to install additional devices. The system may become unstable or may not boot up if the power is inadequate.
- If you want to use two or more high-end PCI Express x16 cards, use a PSU with 1000W power or above to ensure the system stability.
- If you are uncertain about the minimum power supply requirement for your system, refer to the Recommended Power Supply Wattage Calculator.

5. **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.



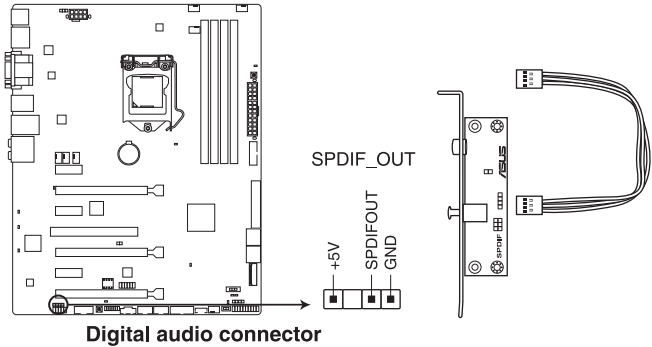
Analog front panel connector



- 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 Audio]. 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 Audio]. See section **2.6.8 Onboard Devices Configuration** for details.

6. **Digital audio connector (4-1 pin SPDIF_OUT)**

This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port. 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.



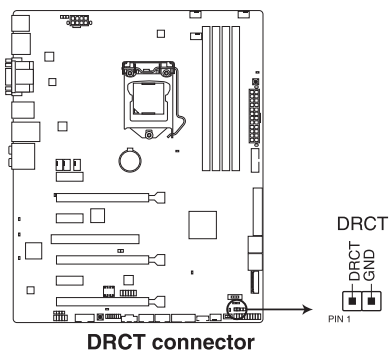
Digital audio connector



The S/PDIF module is purchased separately.

7. DirectKey connector (2-pin DRCT)

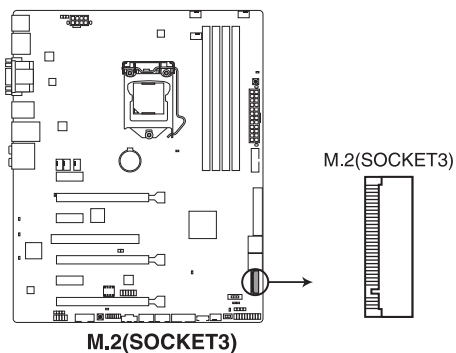
This connector is for the chassis-mounted button that supports the DirectKey function. Connect the button cable that supports DirectKey, from the chassis to this connector on the motherboard.



Ensure that your chassis comes with the extra button cable that supports the DirectKey feature. Refer to the technical documentation that came with the chassis for details.

8. M.2 socket 3

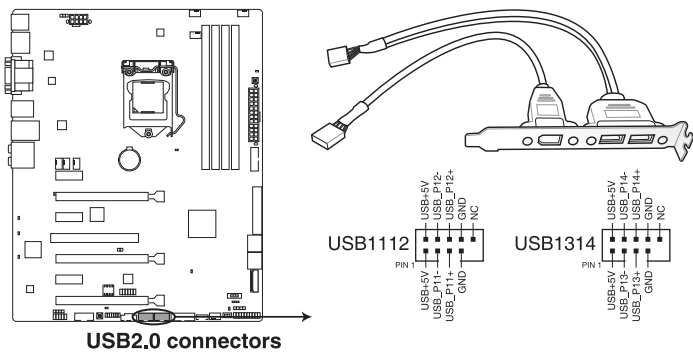
This socket allows you to install an M.2 (NGFF) SSD module.



- This socket supports M Key and type 2242/2260/2280/22110 storage devices.
- The M.2 (NGFF) SSD module is purchased separately.
- The M.2 shares SATA mode with SATA Express. Change this item before installing M.2 SATA devices.

9. **USB 2.0 connectors (10-1 pin USB1112, USB1314)**

These connectors are for USB 2.0 ports. Connect the USB module cable to any of these connectors, then install the module to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specifications and supports up to 480 Mb/s connection speed.



Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!



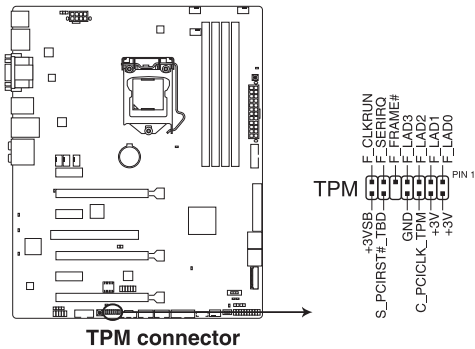
The USB 2.0 module is purchased separately.



These connectors are based on xHCI specification. We recommend you to install the related driver to fully use the USB 2.0 ports under Windows® 7.

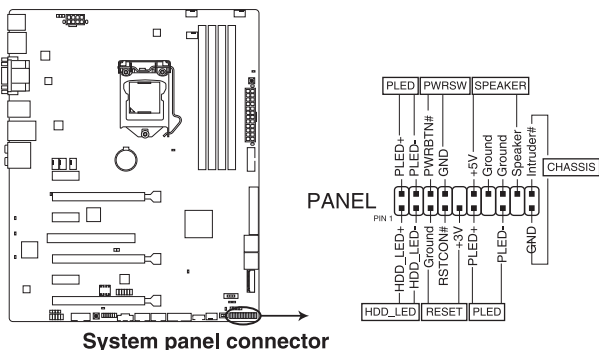
10. **TPM connector (14-1 pin TPM)**

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



11. System panel connector (20-3 pin PANEL)

This connector supports several chassis-mounted functions.



- **System power LED (2-pin or 3-pin PWR_LED)**

The 2-pin or 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.

- **Hard disk drive activity LED (2-pin HDD_LED)**

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.

- **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.

- **ATX power button/soft-off button (2-pin PWR_SW)**

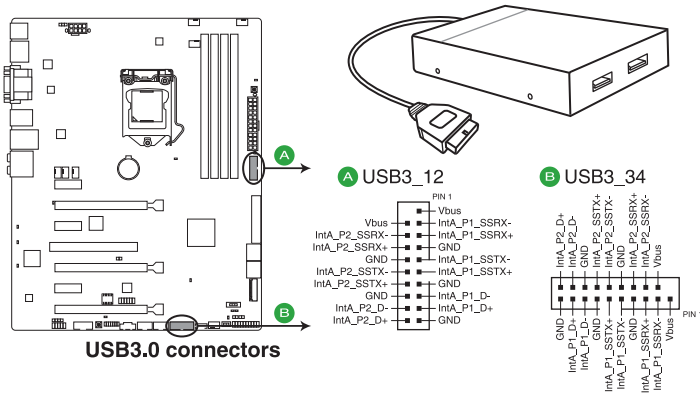
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the operating system settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **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.

12. **USB 3.0 connectors (20-1 pin USB3_12, USB3_34)**

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 5 Gb/s, faster charging time for USB-chargable devices, optimized power efficiency, and backward compatibility with USB 2.0.



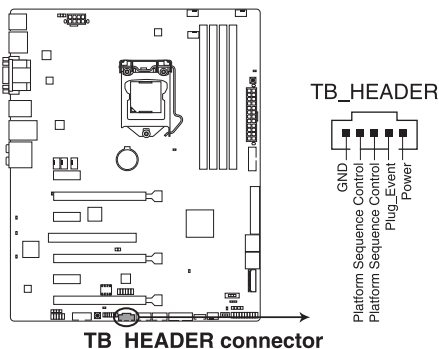
The USB 3.0 module is purchased separately.



- These connectors are based on xHCI specification. We recommend you to install the related driver to fully use the USB 3.0 ports under Windows® 7.
- The plugged USB 3.0 device will run on xHCI mode.
- These USB 3.0 ports support native UASP transfer standard in Windows® 8 / Windows® 8.1 and Turbo Mode when using USB 3.0 Boost feature.

13. Thunderbolt header (5-pin TB_HEADER)

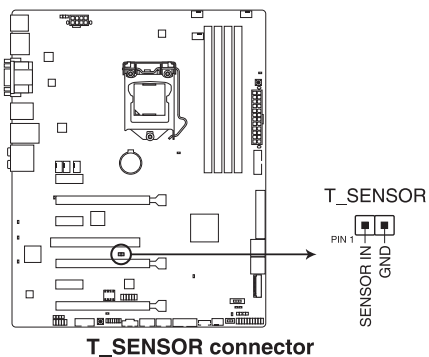
This connector is for the add-on Thunderbolt I/O card that supports Intel's Thunderbolt Technology, allowing you to connect up to six Thunderbolt-enabled devices and a DisplayPort-enabled display in a daisy-chain configuration.



The add-on Thunderbolt I/O card and Thunderbolt cables are purchased separately.

14. T_Sensor connector (2-pin T_SENSOR)

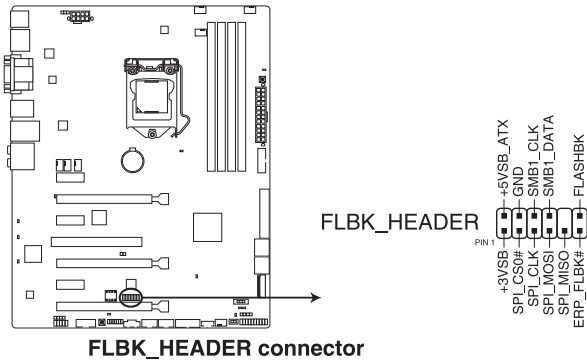
This connector is for the thermistor cable that allows you to monitor the temperature of your motherboard's critical components and connected devices.



The thermistor cable is purchased separately.

15. Flashback header (12-1 pin FLBK_HEADER)

This connector is for the USB BIOS Flashback card that allows you to easily update the BIOS without entering the existing BIOS or operating system.

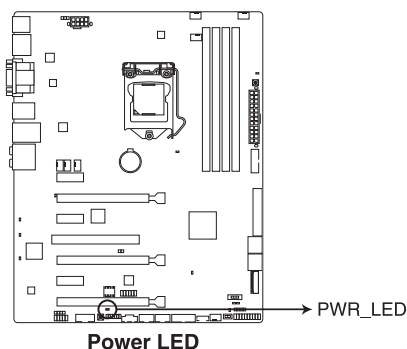


The USB BIOS Flashback card is purchased separately.

1.8 Onboard LEDs

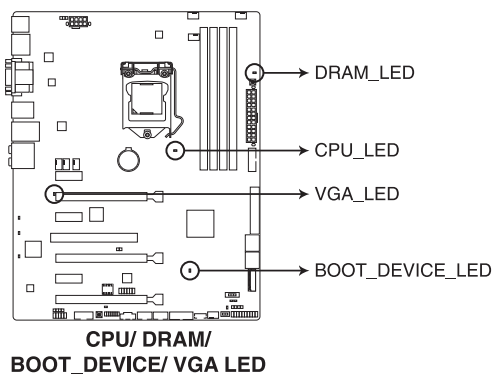
1. Standby Power LED

The motherboard comes with a standby power LED that lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging any motherboard components. The illustration below shows the location of the onboard LED.



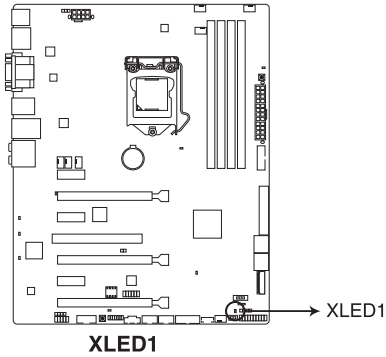
2. POST State LEDs

The POST State LEDs provide the status of these key components during POST (Power-On-Self Test): CPU, memory modules, VGA card, and hard disk drives. If an error is found, the critical component's LED stays lit up until the problem is solved.



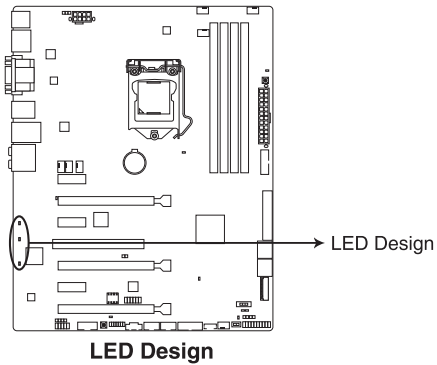
3. EZ XMP LED (XLED1)

This LED lights up when you enable the EZ XMP switch.



4. LED Design

These LEDs light up when the system is fully powered and operating. To turn off the LEDs, refer to BIOS section **2.6.8 Onboard Devices Configuration > LED Design Switch** for details.

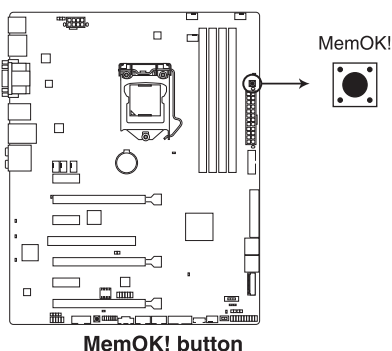


1.9 Onboard buttons and switches

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

1. MemOK! button

Installing DIMMs that are not compatible with the motherboard may cause system boot failure. If the system fail to boot during POST stage and the DRAM_LED near the MemOK! button lights continuously, press the MemOK! button until the DRAM_LED starts blinking. System will begin automatic memory compatibility tuning and reboot for successful boot.



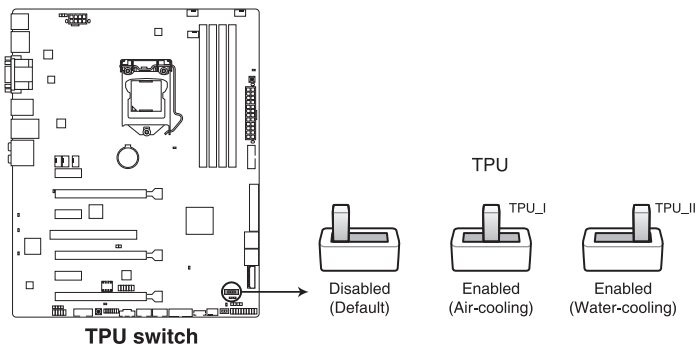
- Refer to section **1.8 Onboard LEDs** for the exact location of the DRAM_LED.
- The DRAM_LED also lights up when the DIMM is not properly installed. Turn off the system and reinstall the DIMM before using the MemOK! function.
- The MemOK! button does not function under Windows® OS environment.
- During the tuning process, the system loads and tests failsafe memory settings. It takes about 30 seconds for the system to test one set of failsafe settings. If the test fails, the system reboots and test the next set of failsafe settings. The blinking speed of the DRAM_LED increases, indicating different test processes.
- Due to memory tuning requirement, the system automatically reboots when each timing set is tested. If the installed DIMMs still fail to boot after the whole tuning process, the DRAM_LED lights continuously. Replace the DIMMs with ones recommended in the Memory QVL (Qualified Vendors Lists) in this user manual.
- If you turn off the computer and replace DIMMs during the tuning process, the system continues memory tuning after turning on the computer. To stop memory tuning, turn off the computer and unplug the power cord for about 5–10 seconds.
- If your system fails to boot up due to BIOS overclocking, press the MemOK! button to boot and load the BIOS default settings. A message will appear during POST reminding you that the BIOS has been restored to its default settings.
- We recommend that you download and update to the latest BIOS version after using the MemOK! function.

2. TPU switch

With its two-level adjustment functions, the TPU allows you to automatically adjust the CPU performance for air-cooling and water-cooling system builds



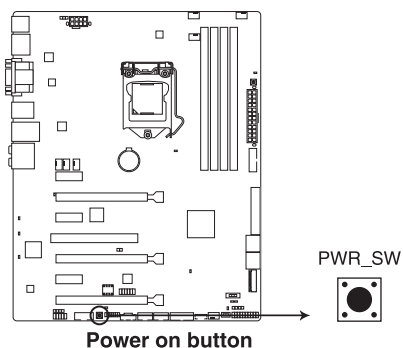
- Enable this switch when the system is powered off.
- Ensure to apply proper Thermal Interface Material to the CPU heatsink and CPU before you set the TPU switch to TPU_II (Water-cooling).



- If you enable this switch under Windows® OS environment, the TPU function will be activated after the next system bootup.
- You may use the 5-Way Optimization and TPU feature in the AI Suite 3 application, adjust the BIOS setup program or enable the TPU switch at the same time. However, the system will use the last setting you have made.

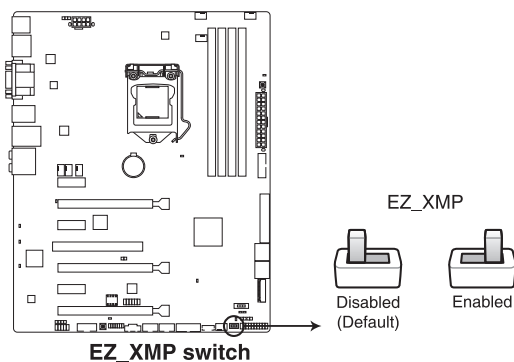
3. Power-on button

The motherboard comes with a power-on button that allows you to power up or wake up the system. The button 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 installing any motherboard component.



4. EZ XMP switch

Enable this switch to overclock the installed DIMMs, allowing you to enhance the DIMM's speed and performance.



The EZ XMP LED (XLED1) lights up when you enable the EZ XMP switch. For the location of the EZ XMP LED, refer to section **1.8 Onboard LEDs**.