PRIME Z390-A

Motherboard

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E14498
First Edition
August 2018

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Safety information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Ensure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, ensure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.
- Your motherboard should only be used in environments with ambient temperatures between 0°C and 40°C.

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About this guide

This user guide contains the information you need when installing and configuring the motherboard.

How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product Introduction**

  This chapter describes the features of the motherboard and the new technology it supports. It includes description of the switches, jumpers, and connectors on the motherboard.

- **Chapter 2: Basic Installation**

  This chapter lists the hardware setup procedures that you have to perform when installing system components.

- **Chapter 3: BIOS Setup**

  This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

- **Chapter 4: RAID Support**

  This chapter describes the RAID configurations.

Where to find more information

Refer to the following sources for additional information and for product and software updates.

1. **ASUS website**

   The ASUS website (www.asus.com) provides updated information on ASUS hardware and software products.

2. **Optional documentation**

   Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

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Conventions used in this guide

To ensure that you perform certain tasks properly, take note of the following symbols used throughout this manual.



DANGER/WARNING: Information to prevent injury to yourself when trying to complete a task.



CAUTION: Information to prevent damage to the components when trying to complete a task.



IMPORTANT: Instructions that you MUST follow to complete a task.



NOTE: Tips and additional information to help you complete a task.

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key. Example: <Enter> means that you must press the Enter or Return key.
<Key1> + <Key2> + <Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).

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PRIME Z390-A specifications summary

CPU	Intel® Socket 1151 for Intel® Core™ 9000 series, 8th Generation Core™ i7 / i5 / i3, Pentium® and Celeron® processors Supports 14nm CPU Supports Intel® Turbo Boost Technology 2.0* *** Intel® Turbo Boost Technology 2.0 support depends on the CPU type.** **** Refer to www.asus.com for CPU support list.**
Chipset	Intel® Z390 Chipset
Memory	4 x DIMM, max. 64GB DDR4 4133+(OC)* / 4000(OC)* / 3866(OC)* / 3733(OC)* / 3600(OC)* / 3466(OC)* / 3400(OC)* / 3333(OC)* / 3300(OC)* / 3200(OC)* / 3000(OC)* / 2800(OC)* / 2666 / 2400 / 2133 MHz, non-ECC, un-buffered memory Dual channel memory architecture Supports Intel® Extreme Memory Profile (XMP) *** The maximum memory frequency supported varies by processor. Please refer to Memory QVL(Qualified Vendors List) for details.**
Expansion Slots	**Intel® Socket 1151 for Intel® Core™ 9000 series, 8th Generation Core™ i7 / i5 / i3, Pentium® and Celeron® processors** 2 x PCIe 3.0/2.0 x16 slots (supports x16, x8/x8, x8/x4+x4, x8+x4+x4/x0) **Intel® Z390 Chipset** 3 x PCI Express 3.0/2.0 x1 slots - PCIEX16_1 slot supports up to 3 Intel® PCIe NVME SSDs via a Hyper M.2 X16 series Card. - PCIEX16_2 slot supports up to 2 Intel® PCIe NVME SSDs via a Hyper M.2 X16 series Card* 1 x PCIe 3.0 x16 slot (max. at x4 mode)** *** Hyper M.2 X16 series card sold separately. Install a Hyper M.2 X16 series card and enable this card under BIOS settings.** **** The PCIe x16_3 slot shares bandwidth with SATA_5 and SATA_6. The PCIe x16_3 is default set at x2 mode.**
Multi-GPU Support	Supports NVIDIA® 2-Way/Quad-GPU SLI™ Technology Supports AMD® 3-Way/Quad-GPU CrossFireX™ Technology
Graphic	Integrated Graphics Processor- Intel® UHD Graphics support Multi-VGA output support: HDMI/DisplayPort port - Supports HDMI 1.4b with max. resolution 4096 x 2160@30Hz - Supports DisplayPort 1.2 with max. resolution 4096 x 2304@60Hz Supports Intel® InTru™ 3D/Quick Sync Video/Clear Video HD Technology/Insider™
USB	**Intel® Z390 Chipset** - 1 x USB 3.1 Gen 1 front panel TypeC™ connector - 4 x USB 3.1 Gen 2 ports (3 Type-A [teal blue], 1 TypeC™ at back panel) - 4 x USB 3.1 Gen 1 ports (2 ports at back panel [blue], 2 ports at mid-board) - 6 x USB 2.0 ports (2 ports at back panel [black], 4 ports at mid-board)

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PRIME Z390-A specifications summary

Storage	**Intel® CPU support with Intel® Rapid Storage Technology (RAID 0 & RAID 1)** - PCIEX16_1 slot supports up to 3 Intel® PCIe NVME SSDs via a Hyper M.2 X16 series Card* - PCIEX16_2 slot supports up to 2 Intel® PCIe NVME SSDs via a Hyper M.2 X16 series Card* **Intel® Z390 Chipset support with Intel Rapid Storage Technology (RAID 0, 1, 5, 10)** - 1 x M.2_1 Socket 3 with M Key, type 2242/2260/2280/2280 storage devices support (both SATA & PCIE mode)** - 1 x M.2_2 Socket 3 with M Key, type 2242/2260/2280/22110 storage devices support (PCIE x4 mode) - 6 x SATA 6.0 Gb/s ports - Ready for Intel® Optane Memory *** Hyper M.2 X16 series card sold separately. Install a Hyper M.2 X16 series card and enable this card under BIOS settings.** **** The M.2_1 socket shares bandwidth with SATA_1 port when using M.2 SATA devices. Adjust BIOS settings to use a SATA device.**
LAN	Intel® I219-V Gigabit LAN ASUS LAN Guard ASUS Turbo LAN Utility
Audio	**Realtek® S1220A 8-channel high definition audio CODEC featuring Crystal Sound 3** - Impedance sense for front and rear headphone outputs - High quality 120dB SNR stereo playback output and 113dB SNR recording input - Internal audio Amplifier to enhance the highest quality sound for headphone and speakers - Power pre-regulator reduces power input noise to ensure consistent performance - Unique de-pop circuit to reduce start-up popping noise to audio outputs - Separate layer for left and right track, ensuring both sound deliver equal quality - Audio shielding ensures precise analog/digital separation and greatly reduced multi-lateral interference - Premium Japan-made audio capacitors - Supports up to 32-Bit/192kHz playback* - Supports jack-detection, multi-streaming, front panel jack-retasking (MIC) - Optical S/PDIF out port at back I/O **Audio Features:** - DTS® Headphone: X™ *** Due to limitations in HDA bandwidth, 32-Bit/192kHz is not supported for 8-Channel audio. 32-Bit/192kHz is only available under Windows® 10.**

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PRIME Z390-A specifications summary

ASUS Special Features	**5-Way Optimization by Dual Intelligent Processors 5** - 5-Way Optimization tuning key perfectly consolidates TPU Insight, EPU Guidance, DIGI+ VRM, Fan Expert 4, and Turbo App - DIGI+ VRM: Digital 8+1phase power design with Dr. MOS - Fan Xpert 4: Fan Auto Tuning function and multiple thermistors selection for optimized system cooling control - TPU Insight - EPU Guidance - Turbo App: system performance tuning, network priority, and audio scene configuration for selected applications. - Procool Power connector design **ASUS OptiMem II** - Improved DDR4 stability **UEFI BIOS** - CrashFree BIOS 3 - EZ Flash 3 - EZ Tuning Wizard **AURA** - Aura Lighting Control - Aura RGB Strip Headers **ASUS Exclusive Features** - MemOK! II - ASUS NODE: hardware control interface - 3D Printing Friendly design - Turbo LAN - ASUS Ai Charger - ASUS AI Suite 3 **ASUS 5X Protection III** - ASUS SafeSlot Core: Fortified PCIe with solid soldering - ASUS LANGuard: Protects against LAN surges, lightning strikes and static-electricity discharges! - ASUS Overvoltage Protection: World-class circuit-protecting power design - ASUS Stainless-Steel Back I/O: 3X corrosion-resistance for greater durability! - DIGI+ VRM: Digital 8+1phase power design with Dr. MOS **Q-Design** - ASUS Q-Shield - ASUS Q-LED (CPU, DRAM, VGA, Boot Device LED) - ASUS Q-Slot - ASUS Q-DIMM - ASUS Q-Connector

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PRIME Z390-A specifications summary

ASUS Quiet Thermal Solution	- ASUS Fan Xpert 4 - Stylish Fanless Design: MOS Heat-sink with dual thermal pads design, PCH and M.2 Heatsink
Back I/O Ports	1 x PS/2 keyboard/mouse combo port 1 x HDMI port 1 x DP port 2 x USB 2.0 ports 2 x USB 3.1 Gen1 ports [blue] 4 x USB 3.1 Gen2 ports (3 x Type-A [teal blue] and 1 x TypeC™ ports) 1 x LAN (RJ45) port 5 x Audio jacks 1 x Optical S/PDIF out
Internal I/O Ports	1 x USB 3.1 Gen 1 front panel TypeC™ connector 1 x USB 3.1 Gen 1 header supports additional 2 USB 3.1 Gen 1 ports (19-pin) 3 x USB 2.0 headers support additional 6 USB 2.0 ports 6 x SATA 6Gb/s ports 1 x M.2 Socket 3 with M Key, type 2242/2260/2280 storage devices support (both SATA & PCIe 3.0 x 4 modes) 1 x M.2 Socket 3 with M Key, type 2242/2260/2280/22110 storage devices support (PCIe 3.0 x 4 mode) 1 x 4-pin CPU FAN connector 1 x 4-pin CPU_OPT fan connector 2 x 4-pin Chassis fan connectors 1 x M.2 FAN connector 1 x 4-pin AIO_PUMP connector 1 x 4-pin W_PUMP+ connector 1 x EXT_FAN header 1 x Thermal sensor connector 1 x 24-pin EATX power connector 1 x 8-pin EATX 12V power connector 2 x Aura RGB headers 1 x MemOK! II switch 1 x Node connector 1 x Power-on button 1 x Thunderbolt header (5-pin) for ASUS ThunderboltEX series support 1 x Clear CMOS jumper (2-pin) 1 x COM port 1 x TPM header 1 x CPU OV header 1 x Front panel audio connector (AAFP) 1 x System Panel(Q-Connector)

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PRIME Z390-A specifications summary

BIOS	128 Mb Flash ROM, UEFI AMI BIOS, PnP, SM BIOS 3.1, ACPI 6.1, Multi-language BIOS, ASUS EZ Flash 3, CrashFree BIOS 3, F11 EZ Tuning Wizard, F6 Qfan Control, F3 My Favorites, Last Modified log, F9 Search, F12 PrintScreen, and ASUS DRAM SPD (Serial Presence Detect) memory information
Manageability	WfM 2.0, DMI 3.0, WOL by PME, PXE
Support DVD	Drivers ASUS Utilities ASUS EZ Update Anti-virus software (OEM version)
Operating System Support	Windows® 10 64-bit
Form Factor	ATX Form Factor, 12” x 9.6” (30.5 cm x 24.4 cm)

Specifications are subject to change without notice. Please refer to the ASUS website for the latest specifications.

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Package contents

Check your motherboard package for the following items.

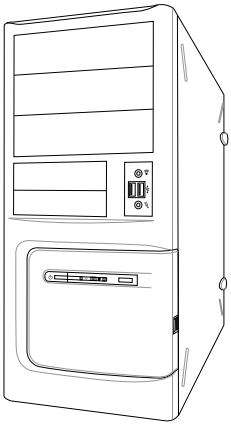
Motherboard	1 x PRIME Z390-A motherboard
Cables	3 x Serial ATA 6.0Gb/s cables
Accessories	1 x SLI™ HB Bridge (2-WAY-M) 1 x ASUS Q-Shield 1 x Q-connector 1 x M.2 screw package 1 x CPU FAN Holder
Application DVD	1 x motherboard support DVD
Documentation	1 x User guide



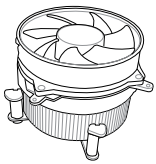
If any of the above items is damaged or missing, contact your retailer.

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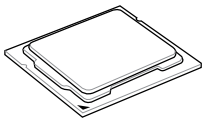
Installation tools and components



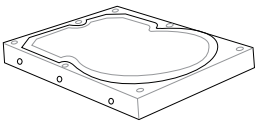
PC chassis



Intel® LGA1151 compatible CPU Fan



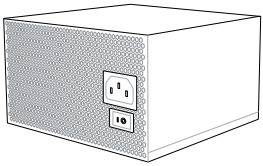
Intel® LGA1151 CPU



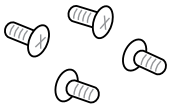
SATA hard disk drive



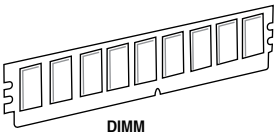
Phillips (cross) screwdriver



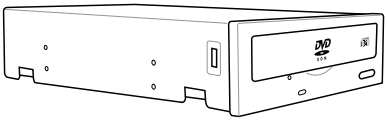
Power supply unit



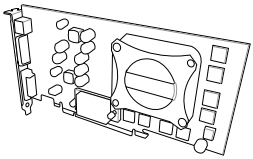
1 bag of screws



DIMM



SATA optical disc drive (optional)



Graphics card (optional)



M.2 SSD module (optional)

The tools and components above are not included in the motherboard package.

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Product Introduction

1

1.1 Motherboard overview

1.1.1 Before you proceed

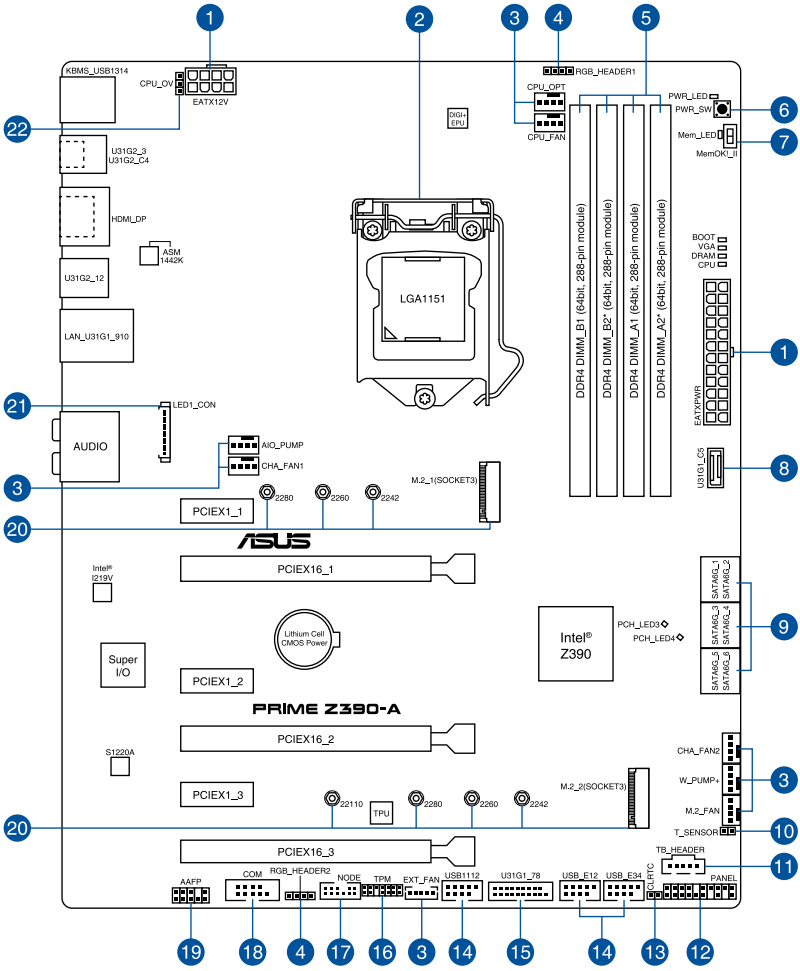
Take note of the following precautions before you install motherboard components or change any motherboard settings.



- 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.

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1.1.2 Motherboard layout



Refer to **1.1.9 Internal connectors** and **2.2.1 Rear I/O connection** for more information about rear panel connectors and internal connectors.

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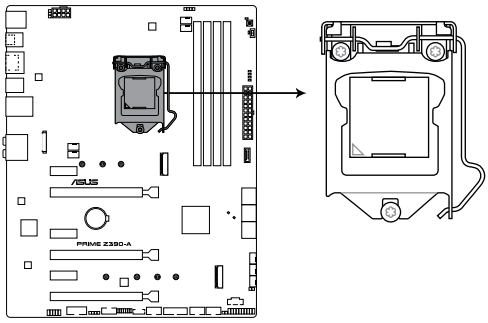
Layout contents

Connectors/Jumpers/Buttons and switches/Slots	Page
1. ATX power connectors (24-pin EATXPWR; 8-pin EATX12V)	1-20
2. LGA1151 CPU Socket	1-4
3. Fan and pump connectors (4-pin CPU_FAN; 4-pin CPU_OPT; 5-pin EXT_FAN; 4-pin W_PUMP+; 4-pin AIO_PUMP; 4-pin CHA_FAN1-2; 4-pin M.2_FAN)	1-18
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7. MemOK! II switch (MemOK!_II)	1-10
8. USB 3.1 Gen 1 Type-C™ front panel connector (U31G1_C5)	1-15
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12. System panel connector (20-3 pin PANEL)	1-21
13. Clear RTC RAM jumper (2-pin CLRTC)	1-11
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21. LED connector (8-pin LED1_CON)	1-25
22. CPU Over Voltage jumper (3-pin CPU_OV)	1-12

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1.1.3 Central Processing Unit (CPU)

This motherboard supports the Intel® Socket 1151 for Intel® Core™ 9000 series, 8th Generation Core™ i7/ i5/ i3, Pentium® and Celeron® processors, with memory and PCI Express controllers integrated to support dual-channel (4 DIMM) DDR4 memory and 16 PCI Express 3.0/2.0 lanes.



PRIME Z390-A CPU LGA1151

Ensure that you install the correct CPU designed for LGA1151 socket only. DO NOT install a CPU designed for LGA1150, LGA1155, and LGA1156 sockets in the LGA1151 socket.

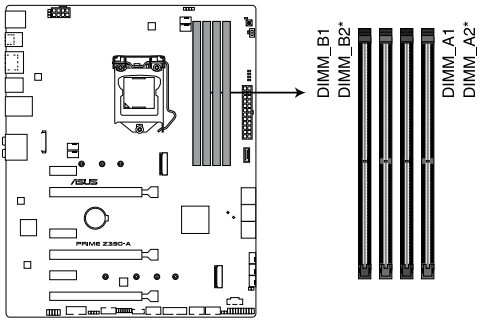
- Ensure that all power cables are unplugged before installing the CPU.
- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/ transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1151 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.

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1.1.4 System memory

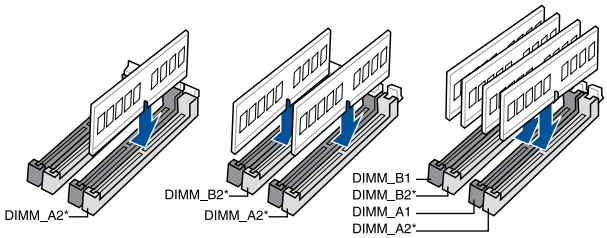
The motherboard comes with four Double Data Rate 4 (DDR4) Dual Inline Memory Modules (DIMM) slots.

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.



PRIME Z390-A 288-pin DDR4 DIMM socket

Recommended memory configurations



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Memory configurations

You may install 2 GB, 4 GB, 8 GB and 16 GB unbuffered and non-ECC DDR4 DIMMs into the DIMM sockets.

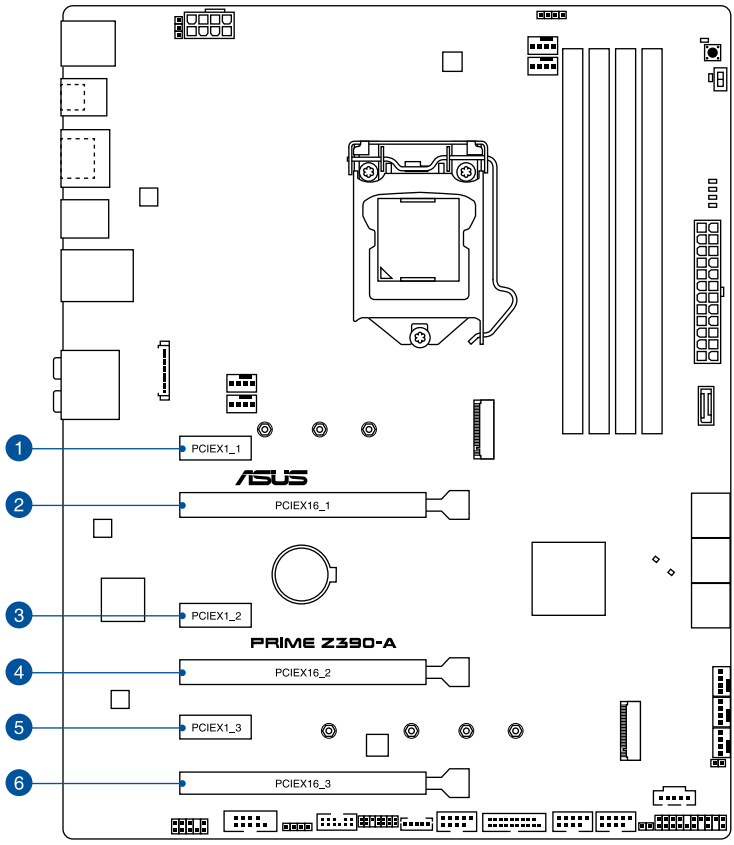


- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value.
- For system stability, use a more efficient memory cooling system to support a full memory load (4 DIMMs) or overclocking condition.
- Always install the DIMMS with the same CAS Latency. For an optimum compatibility, we recommend that you install memory modules of the same version or data code (D/C) from the same vendor. Check with the vendor to get the correct memory modules.
- Visit the ASUS website for the latest QVL.

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1.1.5 Expansion slots

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



Slot No.	Slot Description
1	PCIe 3.0 x1_1 slot
2	PCIe 3.0 x16_1 slot
3	PCIe 3.0 x1_2 slot
4	PCIe 3.0 x16_2 slot
5	PCIe 3.0 x1_3 slot
6	PCIe 3.0 x16_3 slot

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VGA Configuration	PCIe operating mode	
	PCIEX16_1	PCIEX16_2
Single VGA/PCIe card	x16 (Recommend for single VGA)	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_FAN1-2 when using multiple graphics cards for better thermal environment.
- The PCIe x16_3 slot shares bandwidth with SATA6G_56. The PCIe x16_3 is set at x2 mode by default.

Hyper M.2 X16 series card configuration	PCI Express 3.0 operating mode	
	PCIEX16_1	PCIEX16_2
2 Intel® SSD on CPU support	-	x4+x4
3 Intel® SSD on CPU support	x8+x4+x4	-

- Hyper M.2 X16 series card sold separately
- Enable the Hyper M.2 X16 series card under BIOS settings.

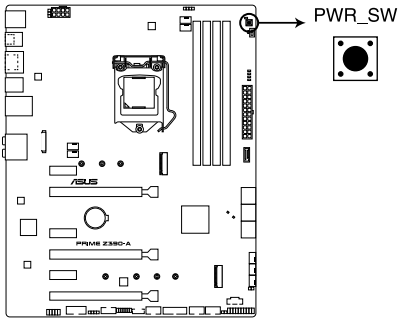
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1.1.6 Onboard buttons and switches

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. Power-on button (PWR_SW)

The motherboard comes with a power-on button that allows you to power up or wake up the system. The LED near 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.

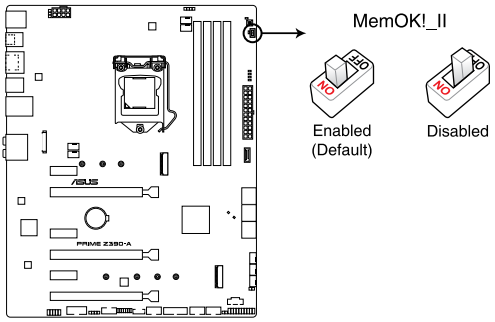


PRIME Z390-A Power on button

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2. MemOK! II switch (MemOK!_II)

Installing DIMMs that are not compatible with the motherboard may cause system boot failure. The switch is enabled by default, allowing memory re-training when the motherboard is unresponsive due to memory problems. The Mem_LED will light up while re-training, and turn off when the re-training is complete.



PRIME Z390-A MemOK!_II switch

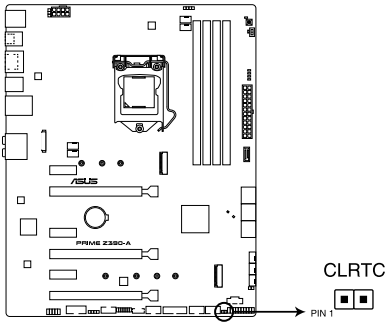
- Refer to section **1.1.8 Onboard LEDs** for the exact location of the Mem_LED.
- The DRAM LED also lights up when the DIMM is not properly installed. Turn off the system and reinstall the DIMM before using the MemOK! II function.
- The MemOK! II switch does not function under Windows® OS environment.
- During the tuning process, the system loads and tests pretest profiles. It takes about 30 seconds for the system to test one set of profiles. If the test fails, the system reboots and tests the next set of profiles. The system will reboot multiple times when training, once the system has completed the training process the Mem_LED will turn off, please refrain from doing anything before the Mem_LED turns off.
- Due to memory tuning requirement, the system automatically reboots when each profile is tested.
- 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, then set the MemOK! II switch to disabled.
- Ensure to replace the DIMMs with ones recommended in the Memory QVL (Qualified Vendors Lists) at www.asus.com.
- We recommend that you download and update to the latest BIOS version from www.asus.com after using the MemOK! II function.

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1.1.7 Jumper

1. Clear RTC RAM jumper (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.



PRIME Z390-A Clear RTC RAM jumper

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 <Delete> key during the boot process and enter BIOS setup to re-enter data.

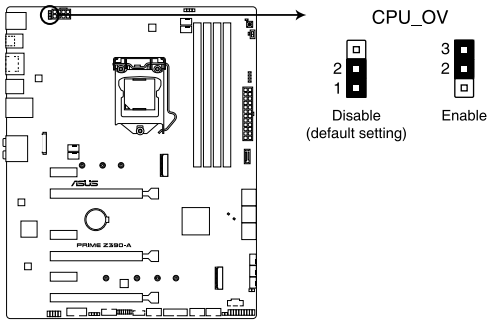
Except when clearing the RTC RAM, never place a metal object or jumper cap on the CLRTC jumper. Placing a metal object or jumper cap will cause system boot failure!

- If the steps above do not help, remove the onboard battery and place a metal object or jumper cap again to clear the CMOS RTC RAM data. After the CMOS clearance, 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 C.P.R. (CPU Parameter Recall) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings to default values.
- Due to the chipset behavior, AC power off is required to enable C.P.R. function. You must turn off and turn on the power supply or unplug and plug the power cord before rebooting the system.

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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.



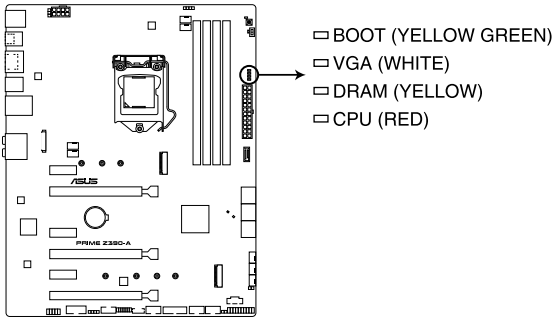
PRIME Z390-A CPU Over Voltage jumper

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1.1.8 Onboard LEDs

1. Q LEDs (BOOT_LED, VGA_LED, DRAM_LED, CPU_LED)

Q LEDs check key components (CPU, DRAM, VGA card, and booting devices) in sequence during motherboard booting process. If an error is found, the corresponding LED remains lit until the problem is solved. This user-friendly design provides an intuitive way to locate the root problem within seconds.

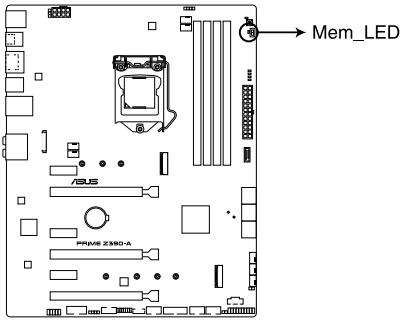


PRIME Z390-A CPU/ DRAM/ BOOT/ VGA LED

The Q LEDs provide the most probable cause of an error code as a starting point for troubleshooting. The actual cause may vary from case to case.

2. Memory LED (Mem_LED)

The Mem_LED will light up and remain lit while the MemOK! II function is in use. When the re-training is complete, the Mem_LED will turn off.



PRIME Z390-A Mem_LED

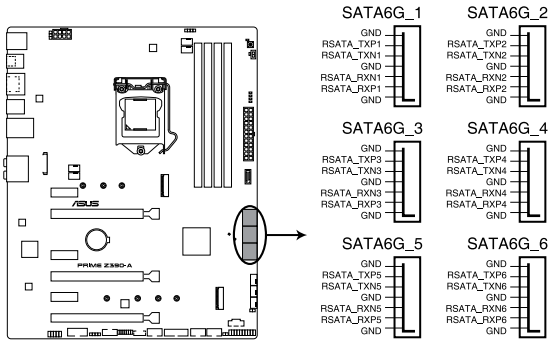
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1.1.9 Internal connectors

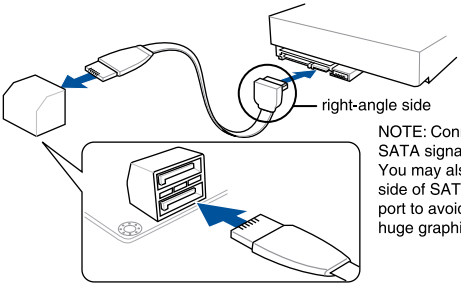
1. Intel® Z390 Serial ATA 6 Gb/s connectors (7-pin SATA6G_12; SATA6G_34; SATA6G_56)

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® Z390 chipset.



PRIME Z390-A Intel® Serial ATA 6 Gb/s connectors



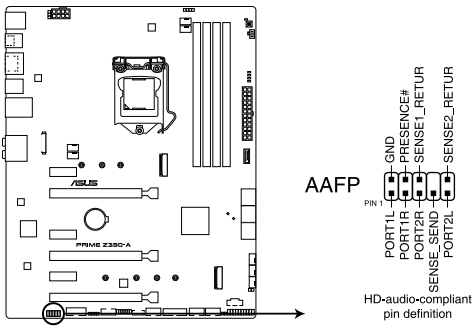
NOTE: Connect the right-angle side of SATA signal cable to SATA device. You may also connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.

- The PCIe x16_3 slot shares bandwidth with SATA6G_56. The PCIe x16_3 is set at x2 mode by default.
- The M.2_1 socket shares bandwidth with SATA_1 port when using M.2 SATA devices. Adjust BIOS settings to use a SATA device.
- These connectors are set to [**AHCI**] by default. If you intend to create a Serial ATA RAID set using these connectors, set the SATA Mode Selection item in the BIOS to [**Intel RST Premium With Intel Optane System Acceleration (RAID)**].
- For more information on configuring your RAID sets, please refer to the **RAID Configuration Guide** which you can find at https://www.asus.com/support.

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

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

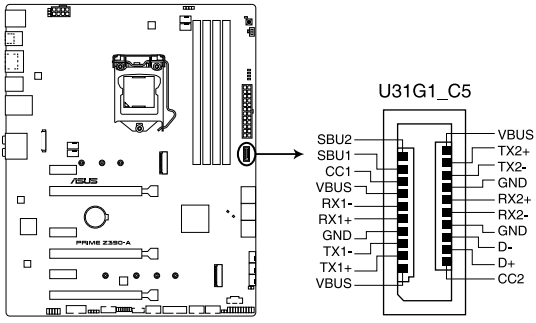


PRIME Z390-A Front panel audio connector

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.

3. USB 3.1 Gen 1 Type-C™ front panel connector (U31G1_C5)

This connector allows you to connect a USB 3.1 Gen 1 module for additional USB 3.1 Gen 1 front or rear panel ports. With an installed USB 3.1 Gen 1 module, you can enjoy all the benefits of USB 3.1 Gen 1 including faster data transfer speeds of up to 5 Gb/s, faster charging time for USB-chargeable devices, and optimized power efficiency.



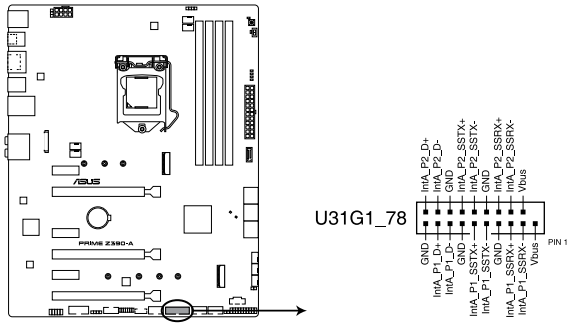
PRIME Z390-A USB 3.1 Gen 1 Type-C™ front panel connector

The USB 3.1 Gen 1 module is purchased separately.

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4. USB 3.1 Gen 1 connector (20-1 pin U31G1_78)

This connector allows you to connect a USB 3.1 Gen 1 module for additional USB 3.1 Gen 1 front or rear panel ports. With an installed USB 3.1 Gen 1 module, you can enjoy all the benefits of USB 3.1 Gen 1 including faster data transfer speeds of up to 5 Gb/s, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.



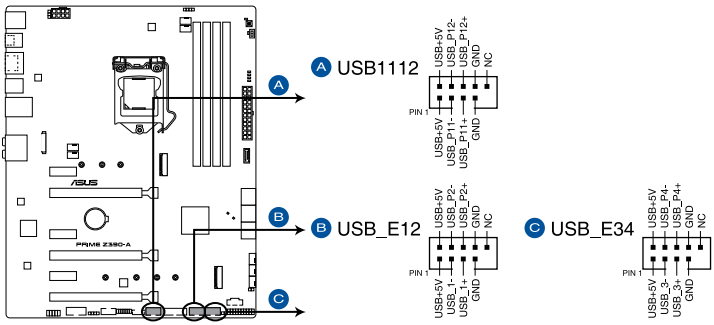
PRIME Z390-A USB 3.1 Gen 1 connector

The USB 3.1 Gen 1 module is purchased separately.

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5. USB 2.0 connectors (10-1 pin USB_E12; USB_E34; USB_1112)

These connectors are for the USB 2.0 ports. Connect the USB module cable to this connector, then install the module to a slot opening at the back of the system chassis. This USB connector complies with USB 2.0 specification that supports up to 480 MBps connection speed.



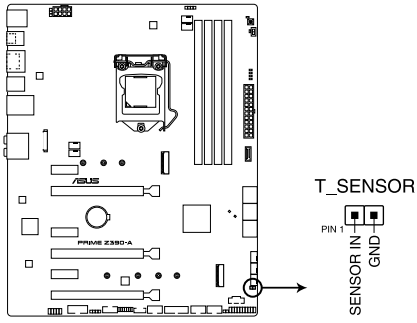
PRIME Z390-A USB 2.0 connectors

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

The USB 2.0 module is purchased separately.

6. Thermal 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.



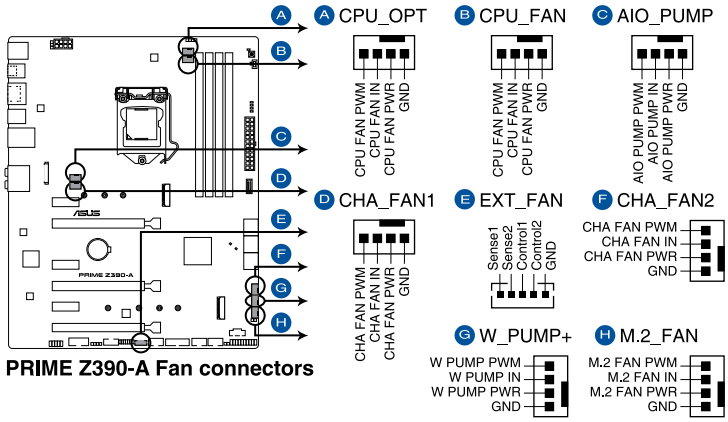
PRIME Z390-A T_SENSOR connector

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7. Fan and pump connectors (4-pin CPU_FAN; 4-pin CPU_OPT; 5-pin EXT_FAN; 4-pin W_PUMP+; 4-pin AIO_PUMP; 4-pin CHA_FAN1-2; 4-pin M.2_FAN)

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.

The EXT_FAN connector is only for the fan extension card. For more details on the fan extension card, please refer to the **To install Fan Extension Card** section in this guide.



PRIME Z390-A Fan connectors

- 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!
- Ensure to fully insert the fan cable to the fan connector.

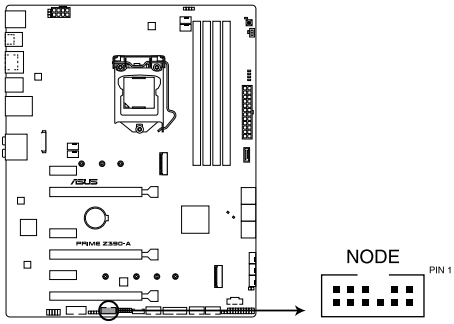
- The FAN Extension card is purchased separately.
- W_PUMP+ function support depends on water cooling device.
- Connect the fan of your water cooling kit to the W_PUMP+ connector.

Header	Max. Current	Max. Power	Default Speed	Shared Control
CPU_FAN	1A	12W	Q-Fan Controlled	A
CPU_OPT	1A	12W	Q-Fan Controlled	A
CHA_FAN1	1A	12W	Q-Fan Controlled	-
CHA_FAN2	1A	12W	Q-Fan Controlled	-
AIO_PUMP	1A	12W	Full-Speed	-
W_PUMP+	3A	36W	Full-Speed	-
M.2	1A	12W	Q-Fan Controlled	-

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8. Node connector (12-1 pin NODE)

This connector allow you to connect a compatible PSU.

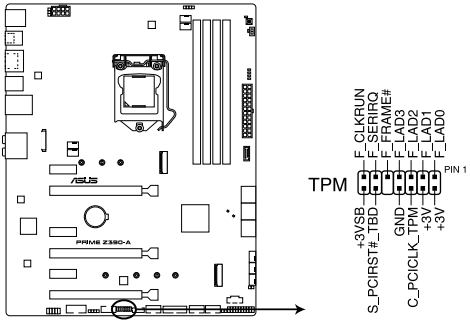


PRIME Z390-A NODE

Visit www.asus.com for more information about the devices and the latest compatibility list.

9. TPM connector (14-1 pin TPM)

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



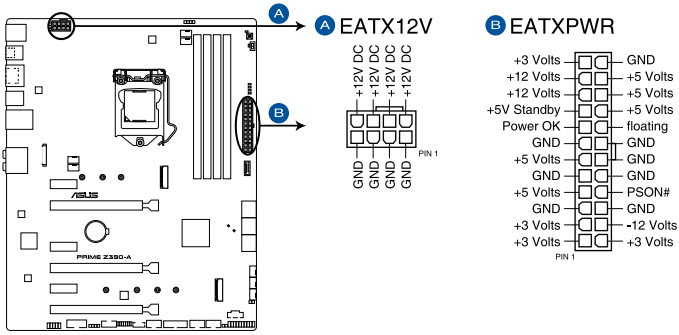
PRIME Z390-A TPM connector

The TPM module is purchased separately.

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10. 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.



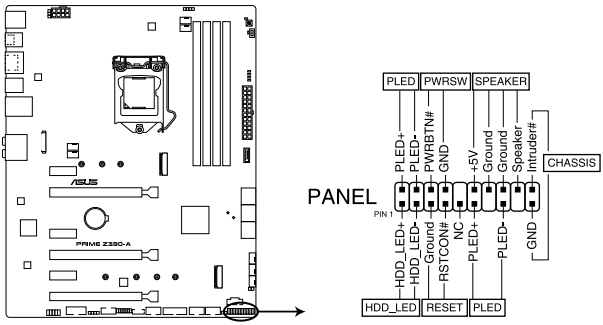
PRIME Z390-A ATX power connectors

- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12V Specification 2.0 (or later version) and provides a minimum power of 350 W.
- Do not forget to connect the 8-pin EATX12V power plug. Otherwise, the system will not boot.
- We recommend that you use a PSU with a higher power output when configuring a system with more power-consuming 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 PCIe x16 cards, use a PSU with 1000W power or above to ensure the system stability.

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

This connector supports several chassis-mounted functions.



PRIME Z390-A System panel connector

- **System power LED (2-pin or 3-1 pin PLED)**

  The 2-pin or 3-1 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 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 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.

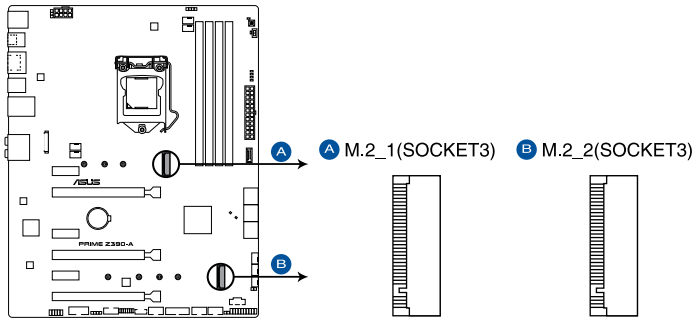
- **Chassis intrusion connector (2-pin CHASSIS)**

  This connector is for a chassis-mounted intrusion detection sensor or switch. Connect one end of the chassis intrusion sensor or switch cable to this connector. The chassis intrusion sensor or switch sends a high-level signal to this connector when a chassis component is removed or replaced. The signal is then generated as a chassis intrusion event.

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12. M.2 sockets (M.2_1 (Socket 3); M.2_2 (Socket 3))

These sockets allow you to install M.2 SSD modules.



PRIME Z390-A M.2 sockets

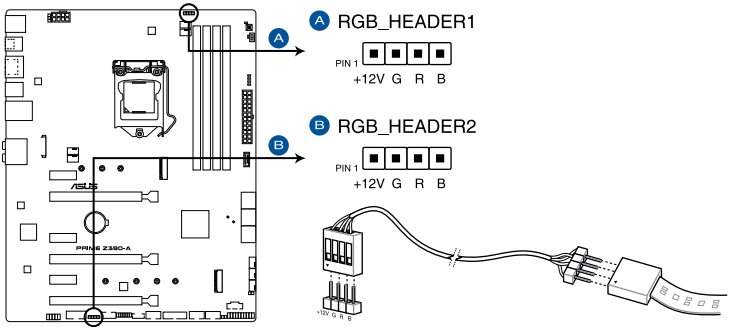
- M.2_1 socket supports PCIe 3.0 x4 and SATA mode M Key design and type 2242 / 2260 / 2280 PCIe and SATA storage devices.
- M.2_2 socket supports PCIe 3.0 x4 M Key design and type 2242 / 2260 / 2280 / 22110 PCIe storage devices.
- These sockets support IRST (Intel® Rapid Storage Technology).

- When the M.2_1(Socket 3) is operating in SATA mode, SATA port 1 (SATA6G_1) will be disabled.
- The M.2 SSD module is purchased separately.

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13. AURA RGB headers (4-pin RGB_HEADER1-2)

These connectors are for RGB LED strips.



PRIME Z390-A RGB_HEADER connectors

The RGB header supports 5050 RGB multi-color LED strips (12V/G/R/B), with a maximum power rating of 3A (12V), and no longer than 3 m.

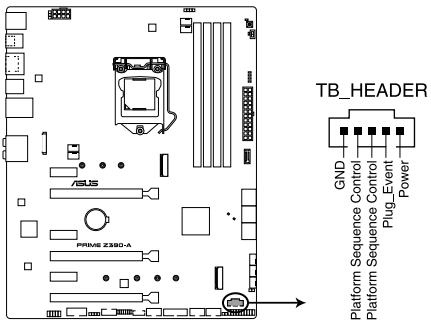
Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, or components.

- Actual lighting and color will vary with LED strips.
- If your LED strip does not light up, check if the RGB LED extension cable and the RGB LED strip is connected in the correct orientation, and the 12V connector is aligned with the 12V header on the motherboard.
- The LED strip will only light up when the system is operating.
- The LED strips are purchased separately.

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14. 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.

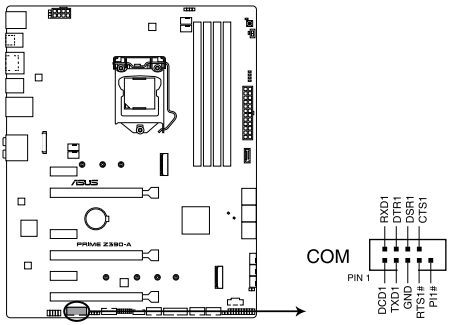


PRIME Z390-A Thunderbolt header

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

15. 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.



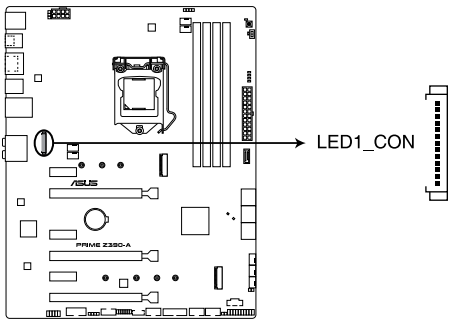
PRIME Z390-A Serial port connector

The COM module is purchased separately.

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16. LED connector (8-pin LED1_CON)

This LED connector is for connecting LED strips on your back I/O cover.



PRIME Z390-A LED card connector

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Basic Installation

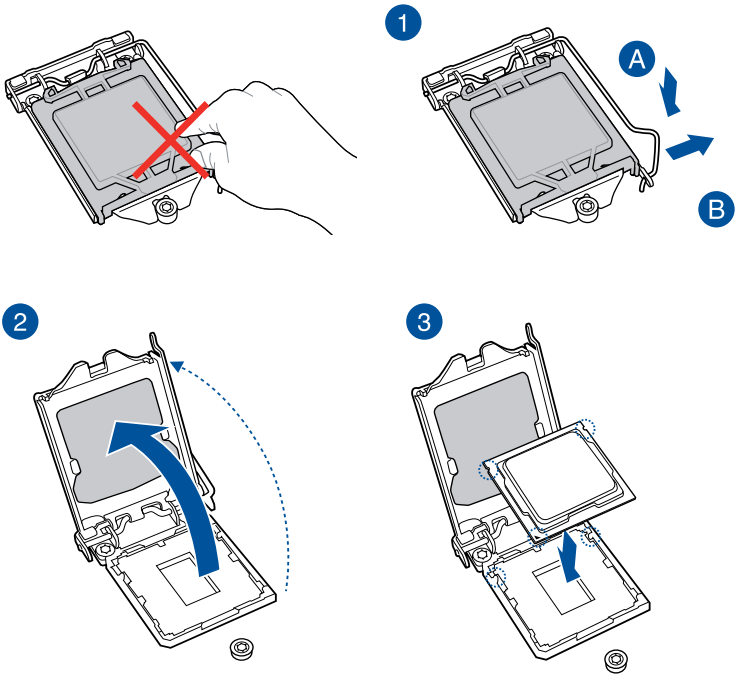
2

2.1 Building your PC system

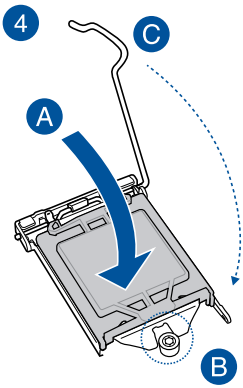
The diagrams in this section are for reference only. The motherboard layout may vary with models, but the installation steps are the same for all models.

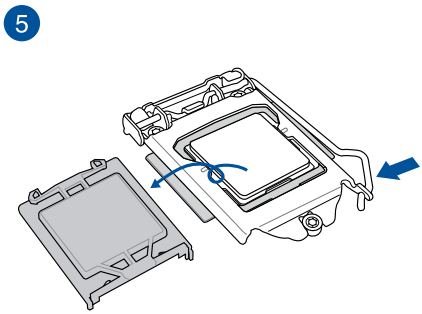
2.1.1 CPU installation

- Ensure that you install the correct CPU designed for LGA1151 socket only. DO NOT install a CPU designed for LGA1155 and LGA1156 sockets on the LGA1151 socket.
- ASUS will not cover damages resulting from incorrect CPU installation/removal, incorrect CPU orientation/placement, or other damages resulting from negligence by the user.

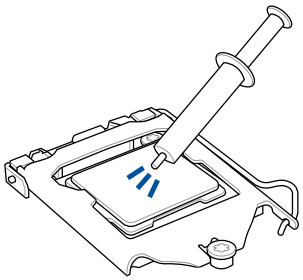


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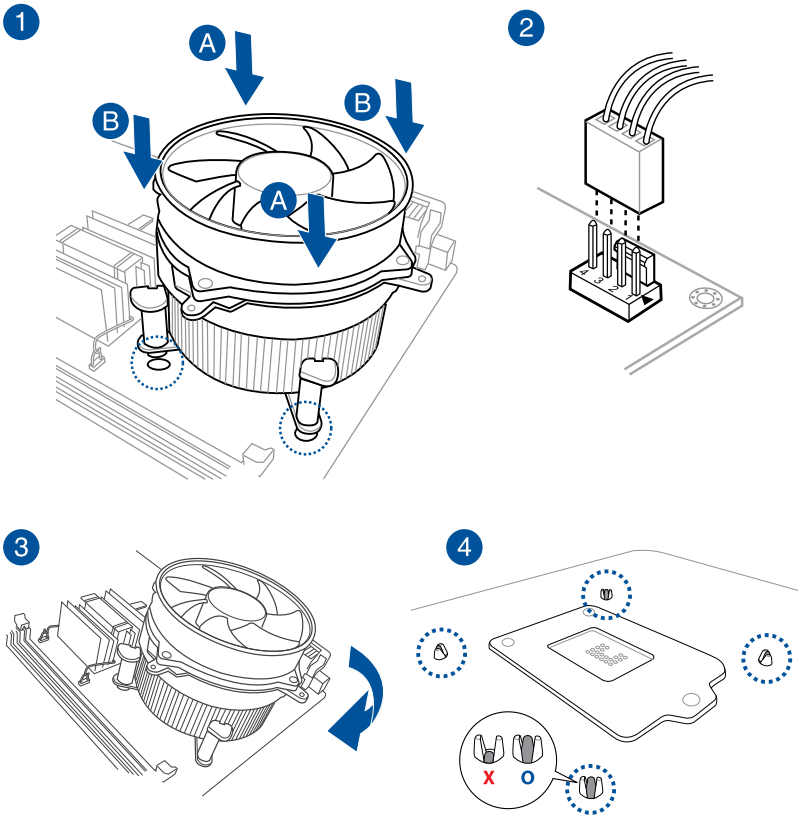
2.1.2 Cooling system installation



Apply Thermal Interface Material to the CPU cooling system and CPU before you install the cooling system, if necessary.

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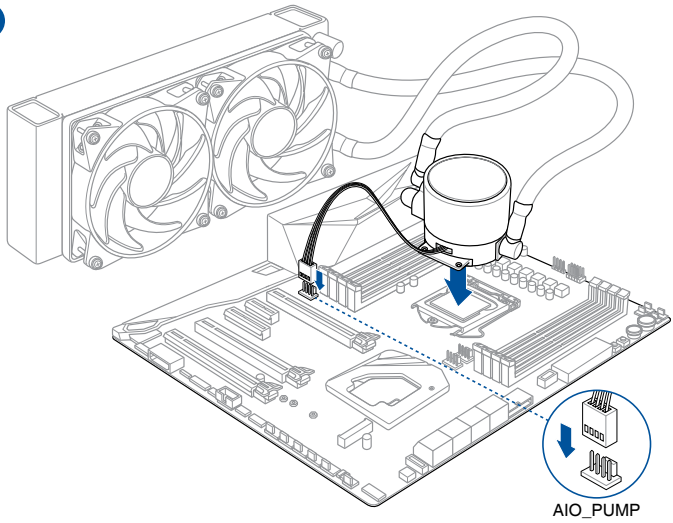
To install a CPU heatsink and fan assembly



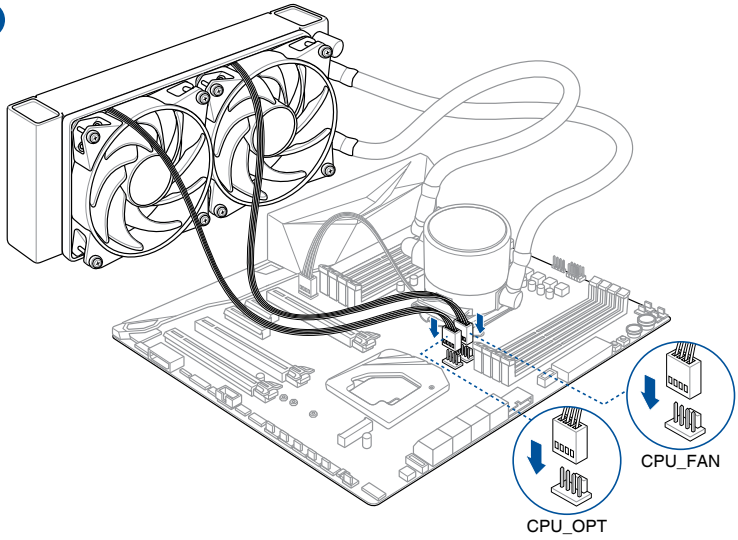
E14498_PRIME Z390-A_UM.indb 3 8/22/2018 10:21:01

To install an AIO cooler

1



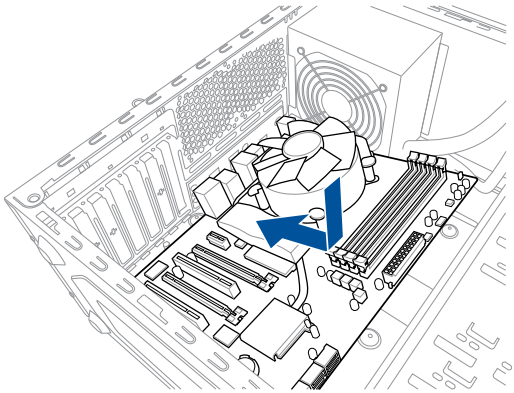
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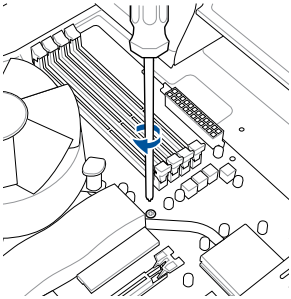
E14498_PRIME Z390-A_UM.indb 4 8/22/2018 10:21:02

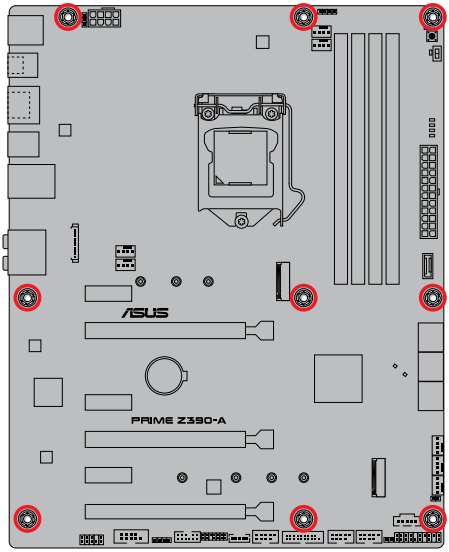
2.1.3 Motherboard installation

1. Place the motherboard into the chassis, ensuring that its rear I/O ports are aligned to the chassis' rear I/O panel.



2. Place nine (9) screws into the holes indicated by circles to secure the motherboard to the chassis.

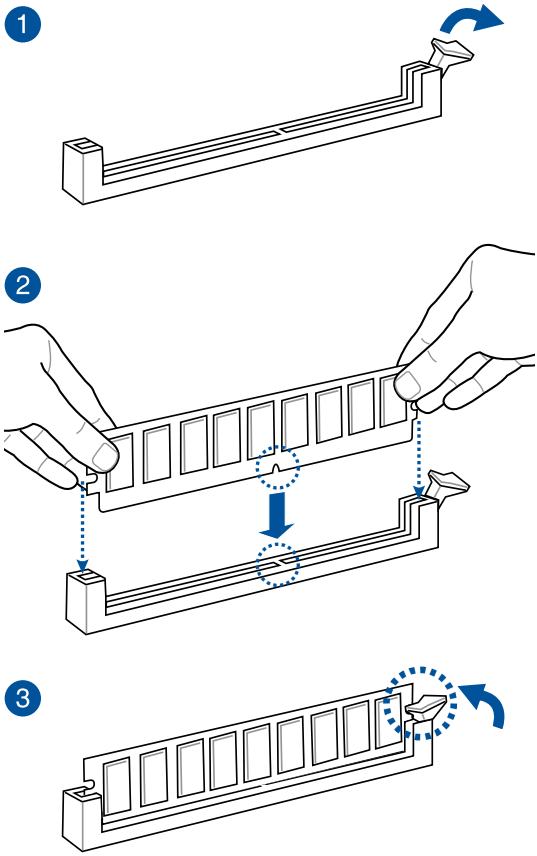




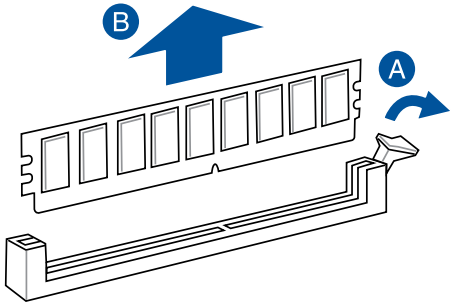
DO NOT overtighten the screws! Doing so can damage the motherboard.

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2.1.4 DIMM installation



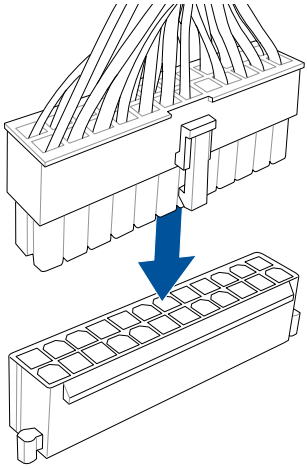
To remove a DIMM



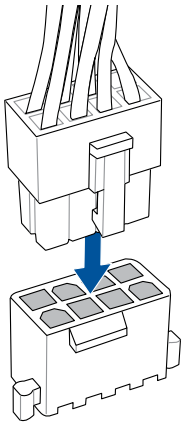
E14498_PRIME Z390-A_UM.indb 6 8/22/2018 10:21:02

2.1.5 ATX power connection

1



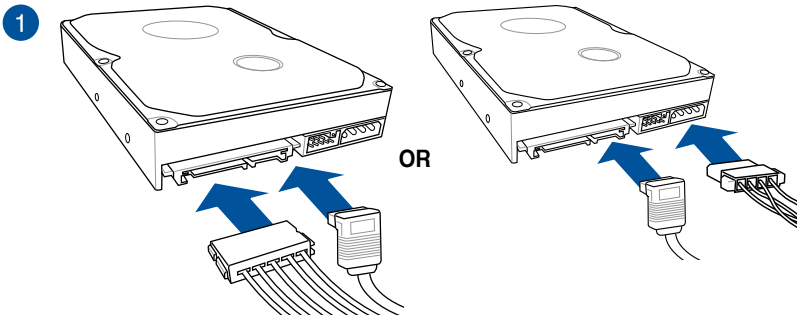
2

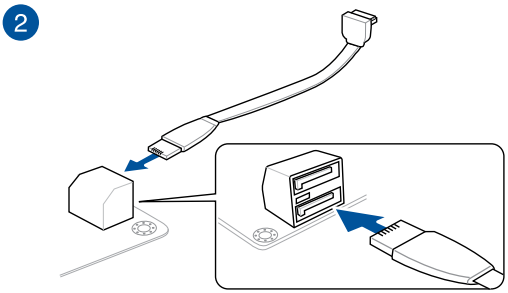


Ensure to connect the 8-pin power plug, or connect both the 8-pin and 4-pin power plugs.

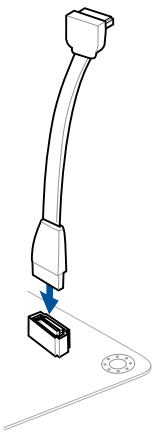
E14498_PRIME Z390-A_UM.indb 7 8/22/2018 10:21:02

2.1.6 SATA device connection





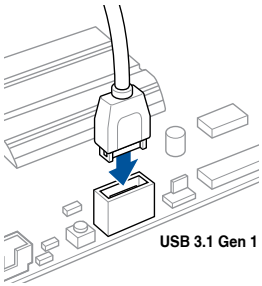
OR



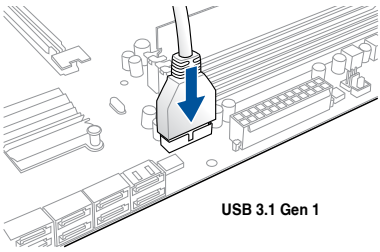
E14498_PRIME Z390-A_UM.indb 8 8/22/2018 10:21:03

2.1.7 Front I/O connector

To install USB 3.1 Gen 1 front panel connector

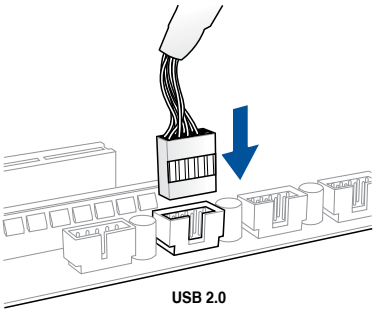


To install USB 3.1 Gen 1 connector

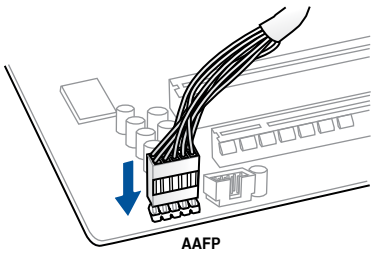


This connector will only fit in one orientation. Push the connector until it clicks into place.

To install USB 2.0 connector



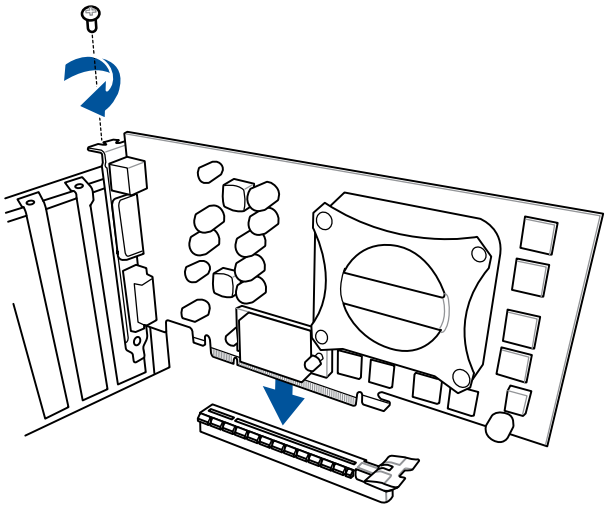
To install front panel audio connector



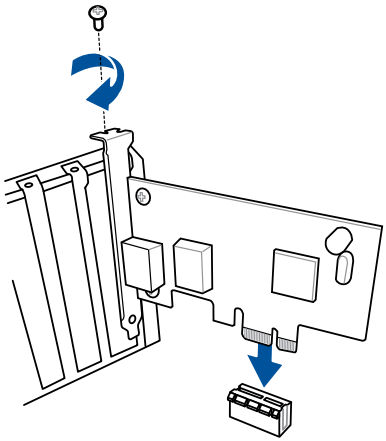
E14498_PRIME Z390-A_UM.indb 9 8/22/2018 10:21:03

2.1.8 Expansion card installation

To install PCIe x16 cards



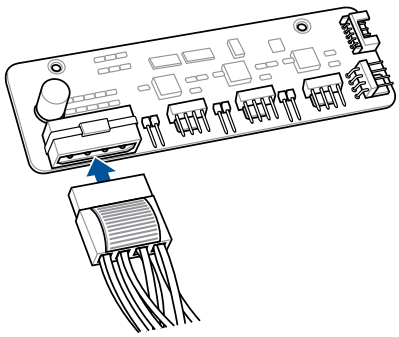
To install PCIe x1 cards



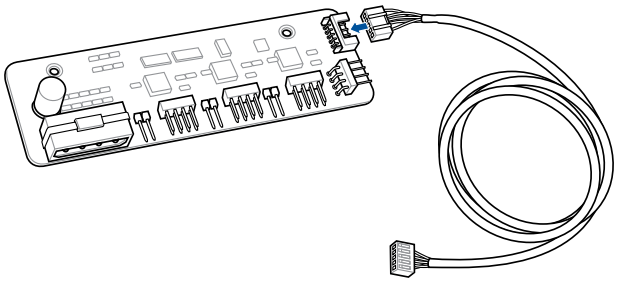
E14498_PRIME Z390-A_UM.indb 10 8/22/2018 10:21:03

To install FAN EXTENSION CARD

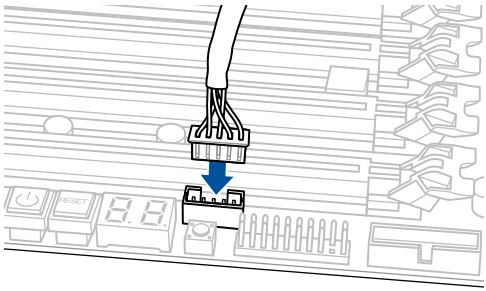
1



2



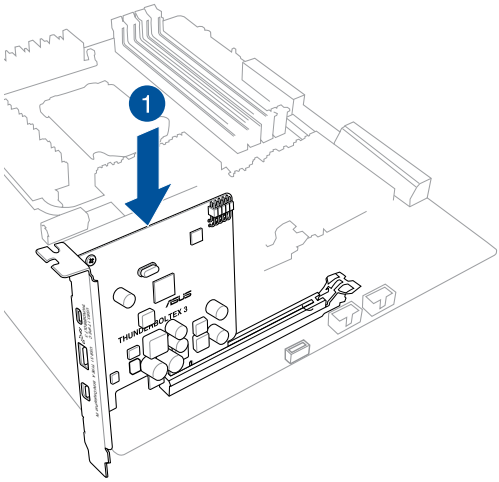
3

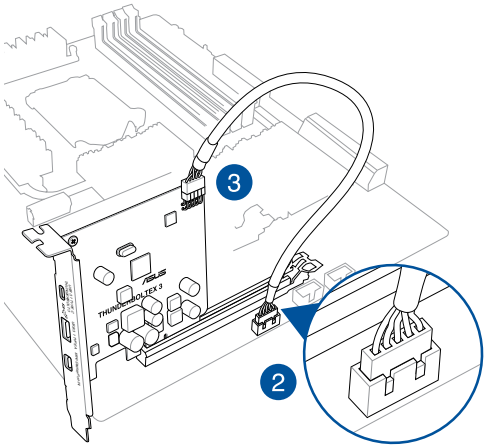


- The illustrations in this section are for reference only. The motherboard layout may vary with models, but the installation steps are the same for all models.
- The FAN Extension card is purchased separately.

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To install ThunderboltEX 3 card



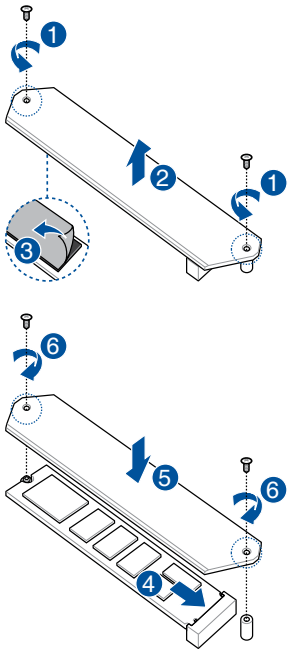


- The illustrations in this section are for reference only. The motherboard layout may vary with models, but the installation steps are the same for all models.
- The ThunderboltEX 3 card is purchased separately.

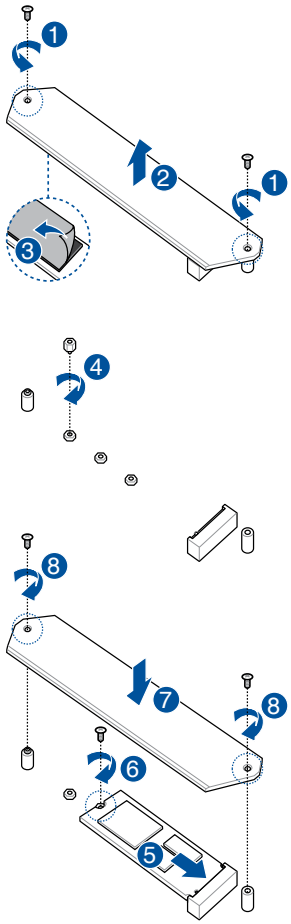
E14498_PRIME Z390-A_UM.indb 12 8/22/2018 10:21:04

2.1.9 M.2 installation

For type 22110 M.2 on M.2_2 socket



For type 2242 / 2260 / 2280 M.2 on M.2_2 socket

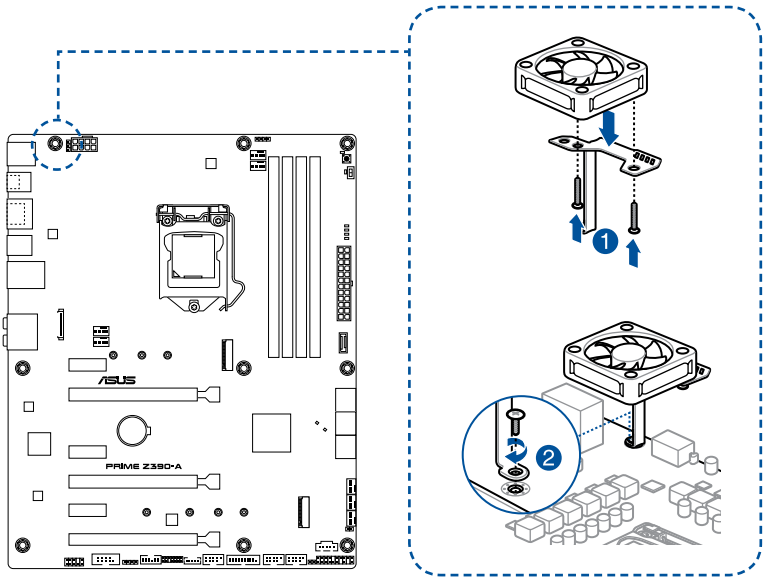


The M.2 is purchased separately.

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2.1.10 ASUS fan holder installation

To install the ASUS fan holder and fan



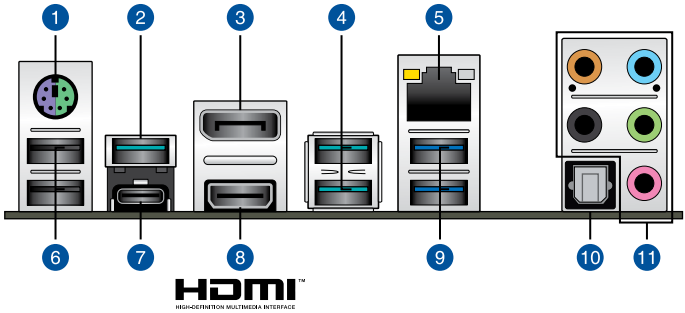
When using high performance settings whilst overclocking, ensure to install the fan holder for additional fan(s).

- You may install 12V (1A, 12W), 40mm x 40mm fans or 50mm x 50mm fans.
- Ensure to the use the bundled screws that came with your fans.
- Fans are purchased separately.

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2.2 Motherboard rear and audio connections

2.2.1 Rear I/O connection



Rear panel connectors	
1.	PS/2 mouse/keyboard combo port
2.	USB 3.1 Gen 2 Type-A port 3
3.	DisplayPort
4.	USB 3.1 Gen 2 Type-A ports 1 and 2
5.	LAN (RJ-45) port*
6.	USB 2.0 Type-A ports 13 and 14
7.	USB 3.1 Gen 2 Type-C™ port C4
8.	HDMI port
9.	Intel® USB 3.1 Gen 1 ports 9 and 10
10.	Optical S/PDIF OUT port
11.	Audio I/O ports**

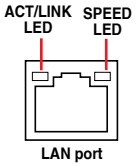
*** and ** : Refer to the tables on the next page for LAN port LEDs, and audio port definitions.**

- USB 3.1 Gen 1/Gen 2 devices can only be used as data storage only.
- We strongly recommend that you connect your devices to ports with matching data transfer rate. Please connect your USB 3.1 Gen 1 devices to USB 3.1 Gen 1 ports and your USB 3.1 Gen 2 devices to USB 3.1 Gen 2 ports for faster and better performance for your devices.
- Due to the design of the Intel chipset, all USB devices connected to the USB 3.1 Gen 1 ports are controlled by the xHCI controller. Some legacy USB devices must update their firmware for better compatibility.

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* 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
BLINKING	Data activity	GREEN	1 Gbps connection



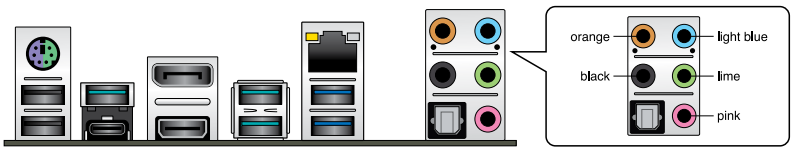
** Audio 2, 4, 5.1 or 7.1-channel configuration

Port	Headset 2-channel	4-channel	5.1-channel	7.1-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/Sub woofer	Center/Sub woofer
Black	–	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out

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2.2.2 Audio I/O connections

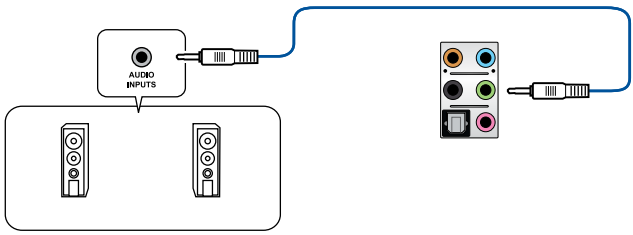
Audio I/O ports



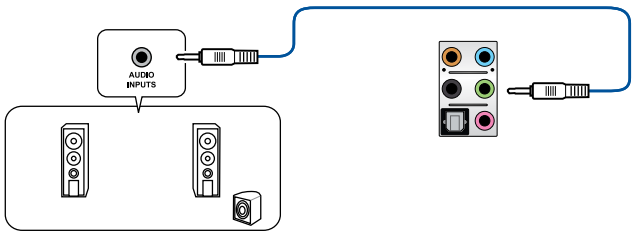
Connect to Headphone and Mic



Connect to Stereo Speakers

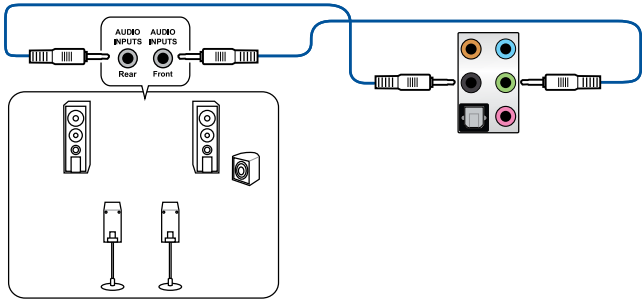


Connect to 2-channel Speakers

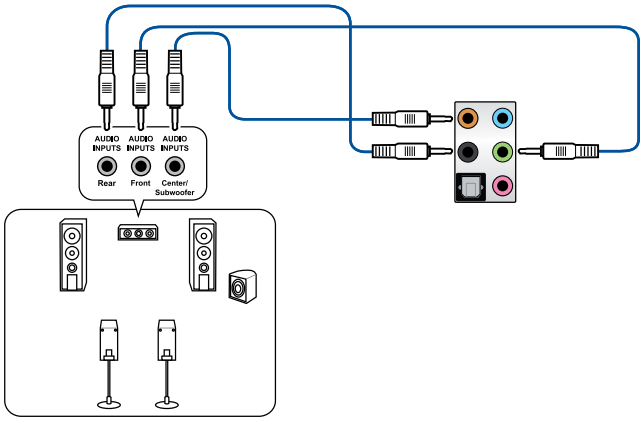


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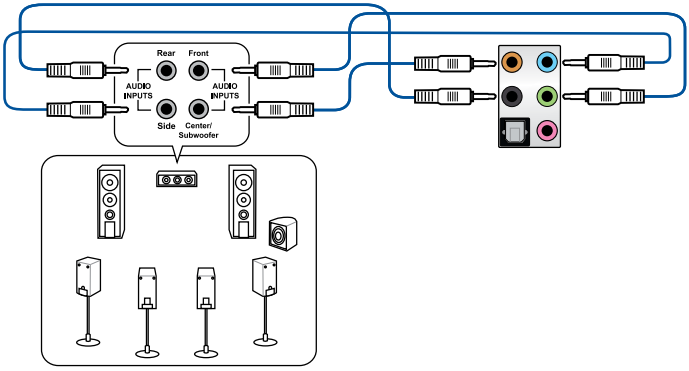
Connect to 4-channel Speakers



Connect to 5.1-channel Speakers



Connect to 7.1-channel Speakers



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2.3 Starting up for the first time

1. After making all the connections, replace the system case cover.
2. Ensure that all switches are off.
3. Connect the power cord to the power connector at the back of the system chassis.
4. Connect the power cord to a power outlet that is equipped with a surge protector.
5. Turn on the devices in the following order:
   a. Monitor
   b. External storage devices (starting with the last device on the chain)
   c. System power
6. After applying power, the system power LED on the system front panel case lights up. For systems with ATX power supplies, the system LED lights up when you press the ATX power button. If your monitor complies with the “green” standards or if it has a “power standby” feature, the monitor LED may light up or change from orange to green after the system LED turns on.

   The system then runs the power-on self tests (POST). While the tests are running, the BIOS beeps (refer to the BIOS beep codes table) or additional messages appear on the screen. If you do not see anything within 30 seconds from the time you turned on the power, the system may have failed a power-on test. Check the jumper settings and connections or call your retailer for assistance.

BIOS Beep	Description
One short beep	VGA detected Quick boot set to disabled No keyboard detected
One continuous beep followed by two short beeps then a pause (repeated)	No memory detected
One continuous beep followed by three short beeps	No VGA detected
One continuous beep followed by four short beeps	Hardware component failure

7. At power on, hold down the <Delete> key to enter the BIOS Setup. Follow the instructions in Chapter 3.

2.4 Turning off the computer

While the system is ON, press the power button for less than four seconds to put the system on sleep mode or soft-off mode, depending on the BIOS setting. Press the power button for more than four seconds to let the system enter the soft-off mode regardless of the BIOS setting.

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BIOS Setup

3

3.1 Knowing BIOS

The new ASUS UEFI BIOS is a Unified Extensible Interface that complies with UEFI architecture, offering a user-friendly interface that goes beyond the traditional keyboard-only BIOS controls to enable a more flexible and convenient mouse input. You can easily navigate the new UEFI BIOS with the same smoothness as your operating system. The term "BIOS" in this user manual refers to "UEFI BIOS" unless otherwise specified.

BIOS (Basic Input and Output System) stores system hardware settings such as storage device configuration, overclocking settings, advanced power management, and boot device configuration that are needed for system startup in the motherboard CMOS. In normal circumstances, the default BIOS settings apply to most conditions to ensure optimal performance. **DO NOT change the default BIOS settings** except in the following circumstances:

- An error message appears on the screen during the system bootup and requests you to run the BIOS Setup.
- You have installed a new system component that requires further BIOS settings or update.

Inappropriate BIOS settings may result to instability or boot failure. **We strongly recommend that you change the BIOS settings only with the help of a trained service personnel**.

- When downloading or updating the BIOS file, rename it as **PZ390A.CAP** for this motherboard.
- BIOS settings and options may vary due to different BIOS release versions. Please refer to the latest BIOS version for settings and options.

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3.2 BIOS setup program

Use the BIOS Setup to update the BIOS or configure its parameters. The BIOS screen include navigation keys and brief onscreen help to guide you in using the BIOS Setup program.

Entering BIOS at startup

To enter BIOS Setup at startup, press <Delete> or <F2> during the Power-On Self Test (POST). If you do not press <Delete> or <F2>, POST continues with its routines.

Entering BIOS Setup after POST

To enter BIOS Setup after POST:

- Press <Ctrl>+<Alt>+<Delete> simultaneously.
- Press the reset button on the system chassis.
- Press the power button to turn the system off then back on. Do this option only if you failed to enter BIOS Setup using the first two options.

After doing either of the three options, press <Delete> key to enter BIOS.

- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Ensure that a USB mouse is connected to your motherboard if you want to use the mouse to control the BIOS setup program.
- If the system becomes unstable after changing any BIOS setting, load the default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit** menu or press hotkey **<F5>**. See section **3.10 Exit Menu** for details.
- If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value. See section **1.1.6 Onboard buttons and switches** for information on how to erase the RTC RAM via the Clear CMOS button.
- The BIOS setup program does not support the Bluetooth devices.

Please visit ASUS website for the detailed BIOS content manual.

BIOS menu screen

The BIOS Setup program can be used under two modes: **EZ Mode** and **Advanced Mode**. You can change modes from **Setup Mode** in **Boot menu** or by pressing the <F7> hotkey.

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3.2.1 EZ Mode

The EZ Mode provides you an overview of the basic system information, and allows you to select the display language, system performance, mode and boot device priority. To access the Advanced Mode, select **Advanced Mode** or press the <F7> hotkey for the advanced BIOS settings.

The default screen for entering the BIOS setup program can be changed. Refer to the **Setup Mode** item in section **Boot menu** for details.



The boot device options vary depending on the devices you installed to the system.

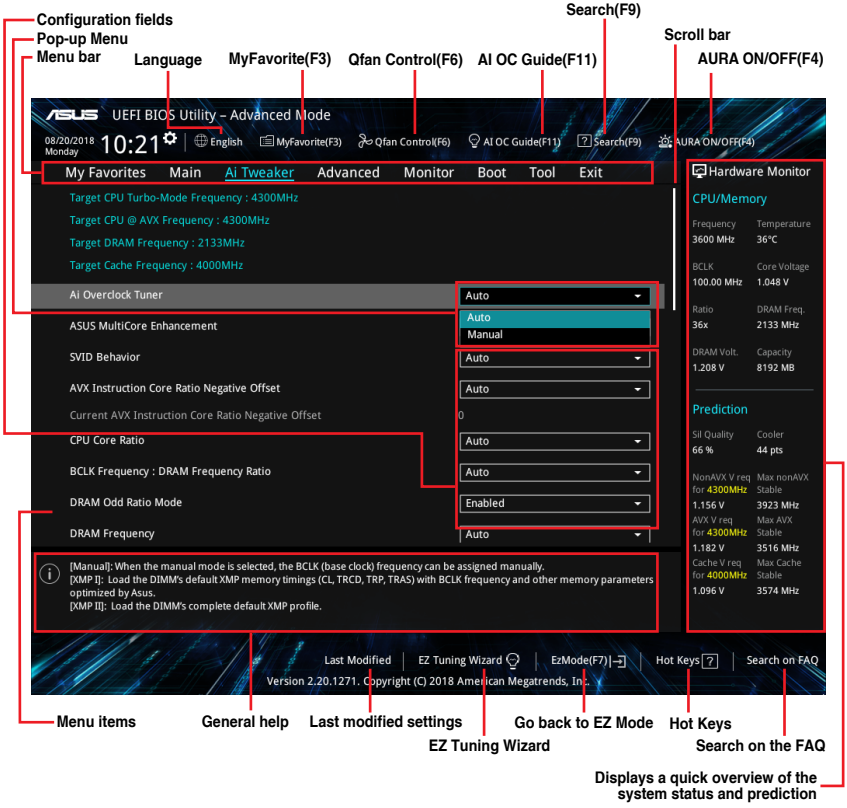
Chapter 3

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3.2.1 Advanced Mode

The Advanced Mode provides advanced options for experienced end-users to configure the BIOS settings. The figure below shows an example of the Advanced Mode. Refer to the following sections for the detailed configurations.

The default screen for entering the BIOS setup program can be changed. Refer to the **Setup Mode** item in section **Boot menu** for details.



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Menu bar

The menu bar on top of the screen has the following main items:

My Favorites	For saving the frequently-used system settings and configuration.
Main	For changing the basic system configuration
Ai Tweaker	For changing the overclocking settings
Advanced	For changing the advanced system settings
Monitor	For displaying the system temperature, power status, and changing the fan settings.
Boot	For changing the system boot configuration
Tool	For configuring options for special functions
Exit	For selecting the exit options and loading default settings

Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting **Main** shows the Main menu items.

The other items (My Favorites, Ai Tweaker, Advanced, Monitor, Boot, Tool, and Exit) on the menu bar have their respective menu items.

Submenu items

A greater than sign (>) before each item on any menu screen means that the item has a submenu. To display the submenu, select the item and press <Enter>.

Language

This button above the menu bar contains the languages that you can select for your BIOS. Click this button to select the language that you want to display in your BIOS screen.

My Favorites(F3)

This button above the menu bar shows all BIOS items in a Tree Map setup. Select frequently-used BIOS settings and save it to MyFavorites menu.

Refer to section **3.3 My Favorites** for more information.

Q-Fan Control(F6)

This button above the menu bar displays the current settings of your fans. Use this button to manually tweak the fans to your desired settings.

Refer to section **3.2.3 QFan Control** for more information.

AI OC Guide(F11)

This button above the menu bar allows you to view the descriptions of AI overclocking and enable it.

- Refer to section **3.2.4 AI OC Guide** for more information.
- This function is only enabled when using an unlocked CPU.

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Search (F9)

This button allows you to search for BIOS items by entering its name, enter the item name to find the related item listing.

AURA (F4)

This button allows you to turn the RGB LED lighting or functional LED on or off.

[All On]: All LEDs (Aura or Functional) will be enabled.

[Aura Only]: Aura LEDs will be enabled and functional LEDs will be disabled.

[Aura Off]: Aura LEDs will be disabled, however functional LEDs will still be enabled.

[Stealth Mode]: All LEDs (Aura and Functional) will be disabled.

Search on FAQ

Move your mouse over this button to show a QR code, scan this QR code on your mobile device to connect to the BIOS FAQ web page of the ASUS support website. You can also scan the following QR code:

Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the Up/Down arrow keys or <Page Up> / <Page Down> keys to display the other items on the screen.

General help

At the bottom of the menu screen is a brief description of the selected item. Use <F12> key to capture the BIOS screen and save it to the removable storage device.

Configuration fields

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable.

A configurable field is highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options.

Hot keys

This button contains the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings.

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EZ Tuning Wizard

This button above the menu bar allows you to view and configure the RAID settings of your system.

Refer to section **3.2.5 EZ Tuning Wizard** for more information.

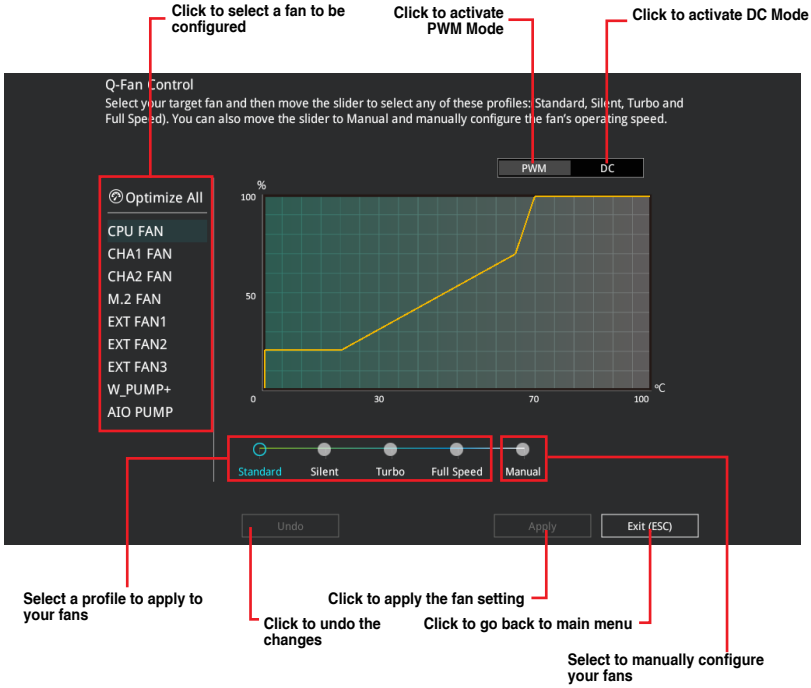
Last Modified button

This button shows the items that you last modified and saved in BIOS Setup.

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3.2.3 QFan Control

The QFan Control allows you to set a fan profile or manually configure the operating speed of your CPU and chassis fans.

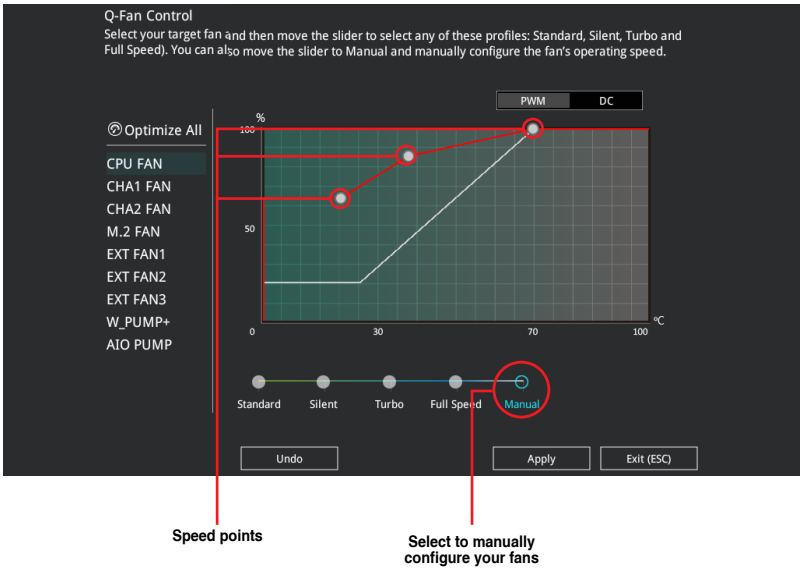


Chapter 3

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Configuring fans manually

Select **Manual** from the list of profiles to manually configure your fans' operating speed.



To configure your fans:

1. Select the fan that you want to configure and to view its current status.
2. Click and drag the speed points to adjust the fans' operating speed.
3. Click **Apply** to save the changes then click **Exit (ESC)**.

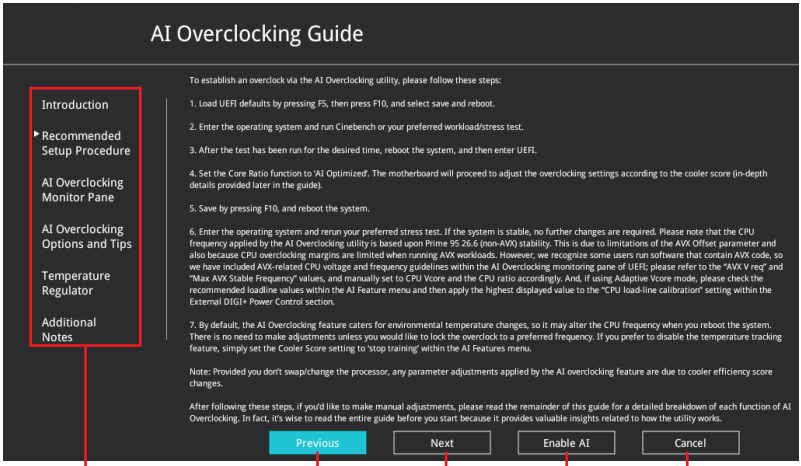
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3.2.4 AI OC Guide

- The screenshot shown in this section is for reference purposes only, and may not exactly match what you see on your screen.
- This function is only enabled when using an unlocked CPU.

The AI OC Guide allows you to enable the Ai Overclocking feature, or view a quick guide of the Ai Overclocking feature which highlights the recommended setup procedure and descriptions of the AI Overclocking.

Clicking on **Enable AI** will enable Ai Overclocking.



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3.2.5 EZ Tuning Wizard

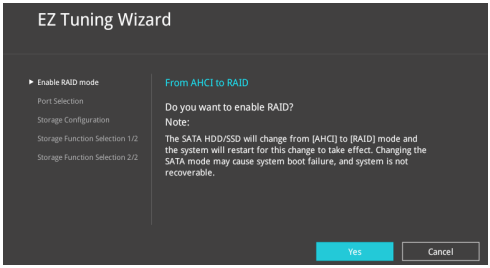
EZ Tuning Wizard allows you to easily set RAID in your system using this feature.

Creating RAID

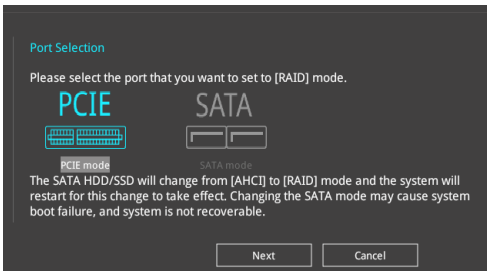
To create RAID:

1. Click **EZ Tuning Wizard** from the BIOS screen to open EZ Tuning Wizard screen.
2. Click **Yes** to enable RAID.

- Ensure that your HDDs have no existing RAID volumes.
- Ensure to connect your HDDs to Intel® SATA connectors.

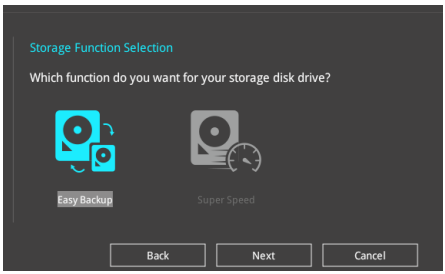


3. Select the port that you want to set to [RAID] mode, **PCIE** or **SATA**, then click **Next**.

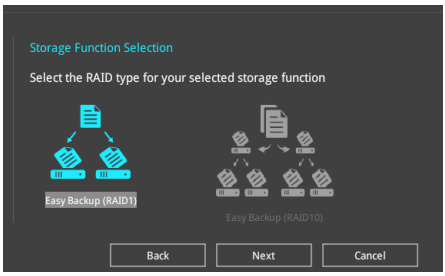


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4. Select the type of storage for your RAID, **Easy Backup** or **Super Speed**, then click **Next**.

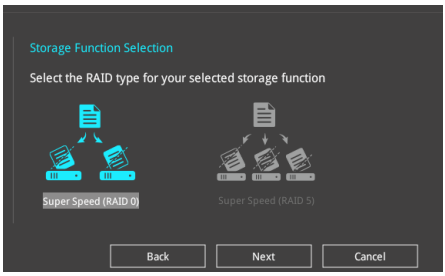


a. For Easy Backup, click **Next** then select from **Easy Backup (RAID 1)** or **Easy Backup (RAID 10)**.



You can only select Easy Backup (RAID 10) if you connect four (4) HDDs.

b. For Super Speed, click **Next** then select from **Super Speed (RAID 0)** or **Super Speed (RAID 5)**.

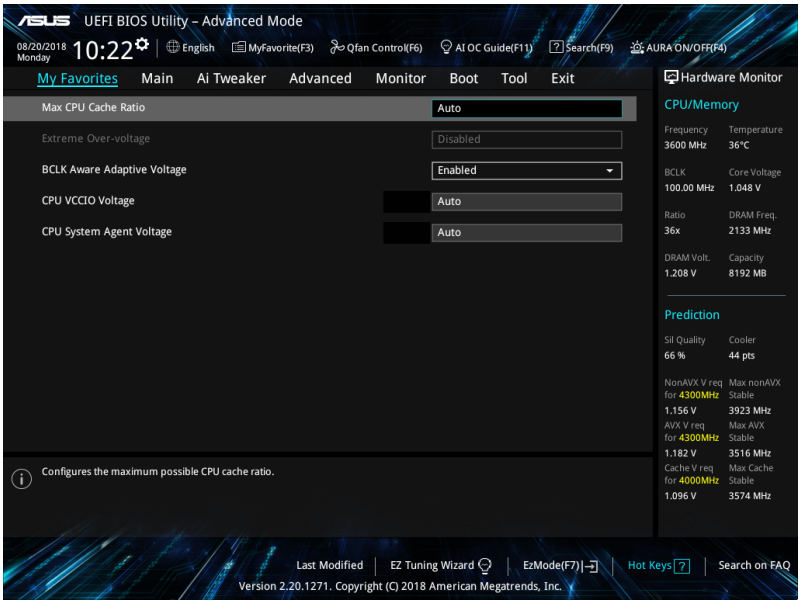


5. After selecting the type of RAID, click **Next** then click **Yes** to continue the RAID setup.
6. After the RAID setup is done, click **Yes** to exit the setup then click **OK** to reset your system.

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3.3 My Favorites

My Favorites is your personal space where you can easily save and access your favorite BIOS items.



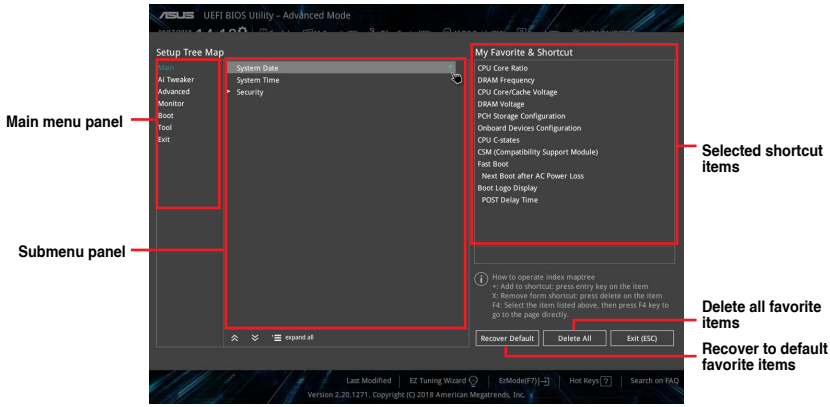
My Favorites comes with several performance, power saving, and fast boot related items by default. You can personalize this screen by adding or removing items.

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Adding items to My Favorites

To add BIOS items:

1. Press <F3> on your keyboard or click **MyFavorites(F3)** from the BIOS screen to open Setup Tree Map screen.
2. On the Setup Tree Map screen, select the BIOS items that you want to save in My Favorites screen.



3. Select an item from main menu panel, then click the submenu that you want to save as favorite from the submenu panel and click + or press <Enter> on your keyboard.

You cannot add the following items to My Favorite items:

- Items with submenu options
- User-managed items such as language and boot order
- Configuration items such as Memory SPD Information, system time and date.

4. Click **Exit (ESC)** or press <Esc> key to close Setup Tree Map screen.
5. Go to My Favorites menu to view the saved BIOS items.

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3.4 Main menu

The Main menu screen appears when you enter the Advanced Mode of the BIOS Setup program. The Main menu provides you an overview of the basic system information, and allows you to set the system date, time, language, and security settings.

Security

The Security menu items allow you to change the system security settings.

- If you have forgotten your BIOS password, erase the CMOS Real Time Clock (RTC) RAM to clear the BIOS password. See section **2.3.1 Rear I/O connection** for information on how to erase the RTC RAM via the Clear CMOS button.
- The Administrator or User Password items on top of the screen show the default **[Not Installed]**. After you set a password, these items show **[Installed]**.

3.5 Ai Tweaker menu

The Ai Tweaker menu items allow you to configure overclocking-related items.

Be cautious when changing the settings of the Ai Tweaker menu items. Incorrect field values can cause the system to malfunction

The configuration options for this section vary depending on the CPU and DIMM model you installed on the motherboard.

Ai Overclock Tuner

Allows you to select the CPU overclocking options to achieve the desired CPU internal frequency. Configuration options:

[Auto]	Loads the optimal settings for the system.
[Manual]	Allows you to individually set overclocking parameters.
[XMP I]	If you install memory modules supporting the eXtreme Memory Profile (X.M.P.) Technology, choose this item to load the DIMM's default XMP memory timings (CL, TRCD, TRP, TRAS) with BCLK frequency and other memory parameters optimized by ASUS.
[XMP II]	If you install memory modules supporting the eXtreme Memory Profile (X.M.P.) Technology, choose this item to load the DIMM's complete default XMP profile.

The [XMP I] and [XMP II] configuration option appears only when you install memory modules supporting the eXtreme Memory Profile (X.M.P.) Technology.

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The following item appears only when you set the Ai Overclocking Tuner to **[XMP I]**, **[XMP II]**, or **[Manual]**.

BCLK Frequency

This item allows you to set the BCLK (base clock) frequency to enhance the system performance. Use the <+> or <-> to adjust the value.

We recommend you to set the value based on the CPU specification, as high BCLK frequencies may damage the CPU permanently.

ASUS MultiCore Enhancement

[Auto] This item allows you to maximize the oveclocking performance optimized by ASUS core ratio settings.

[Disabled] This item allows you to set to default core ratio settings.

CPU Core Ratio

This item allows you to set the CPU core ratios.

Configuration options: [Auto] [Sync All Cores] [Per Core] [AI Optimized]

The **[AI Optimized]** item appears only when you use an unlocked CPU.

DRAM Frequency

This item allows you to set the memory operating frequency. The configurable options vary with the BCLK (base clock) frequency setting. Select the auto mode to apply the optimized setting.

Configuration options: [Auto] [DDR4-800MHz] - [DDR4-8533MHz]

Internal CPU Power Management

The subitems in this menu allow you to set the CPU ratio and features.

Intel(R) SpeedStep(tm)

Allows the operating system to dynamically adjust the processor voltage and cores frequency to decrease the average power consumption and decrease average heat production. Configuration options: [Auto] [Enabled] [Disabled]

Turbo Mode

Allows you to enable your processor cores to run faster than the base operating frequency when it is below power, current and specification limit. Configuration options: [Disabled] [Enabled]

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3.6 Advanced menu

The Advanced menu items allow you to change the settings for the CPU and other system devices.

Be cautious when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.

3.6.1 Platform Misc Configuration

The items in this menu allow you to change the ASPM for PCH and SA PCI Express.

3.6.2 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects.

The items in this menu may vary based on the CPU installed.

CPU Power Management Configuration

This item allows you to manage and configure the CPU's power.

Intel(R) SpeedStep(tm)

This item allows more than two frequency to be supported.
Configuration options: [Auto] [Enabled] [Disabled]

Turbo Mode

This item allows you to automatically set the CPU cores to run faster than the base operating frequency when it is below the operating power, current and temperature specification limit.
Configuration options: [Enabled] [Disabled]

CPU C-States

This item allows you to set the power saving of the CPU states.
Configuration options: [Auto] [Disabled] [Enabled]

3.6.3 System Agent (SA) Configuration

The items in this menu allow you to adjust the Link Speed for PEG Port and Multi-Monitor.

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3.6.4 PCH Configuration

The items in this menu allow you to adjust the PCH PCI Express speed.

PCI Express Configuration

This item allows you to configure the PCI Express slots.

PCIe Speed

This item allows your system to automatically select the PCI Express port speed.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

3.6.5 PCH Storage Configuration

While entering Setup, the BIOS automatically detects the presence of SATA devices. The SATA Port items show **Not Present** if no SATA device is installed to the corresponding SATA port.

SATA Controller(s)

This item allows you to enable or disable the SATA Device.

Configuration options: [Enabled] [Disabled]

SATA Mode Selection

This item allows you to set the SATA configuration.

[AHCI]	Set to [AHCI] when you want the SATA hard disk drives to use the AHCI (Advanced Host Controller Interface). The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.
[Intel RST Premium With Intel Optane System Acceleration(RAID)]	Set to [Intel RST Premium With Intel Optane System Acceleration(RAID)] when you want to create a RAID configuration from the SATA hard disk drives.

SMART Self Test

SMART (Self-Monitoring, Analysis and Reporting Technology) is a monitoring system that shows a warning message during POST (Power-on Self Test) when an error occurs in the hard disks.

Configuration options: [On] [Off]

SATA6G_1(Gray) - SATA6G_6(Gray)

SATA6G_1(Gray) - SATA6G_6(Gray)

This item allows you to enable or disable the selected SATA port.
Configuration options: [Disabled] [Enabled]

Hot Plug

These items appears only when the SATA Mode Selection is set to [**AHCI**] and allows you to enable or disable SATA Hot Plug Support.
Configuration options: [Disabled] [Enabled]

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3.6.6 PCH-FW Configuration

This item allows you to configure the firmware TPM.

3.6.7 Thunderbolt(TM) Configuration

The items in this menu allow you to configure Thunderbolt settings.

3.6.8 Onboard Devices Configuration

The items in this menu allow you to switch between PCIe Lanes and configure onboard devices.

HD Audio

This item allows you to enable or disable the High Definition Audio.

Configuration options: [Disabled] [Enabled]

Intel LAN Controller

This item allows you to enable or disable the Intel LAN controller.

Configuration options: [Disabled] [Enabled]

LED lighting

When system is in working state

This item allows you to turn the RGB LED lighting on or off when the system is in the working state.

Configuration options: [On] [Off]

When system is in sleep, hibernate or soft off states

This item allows you to turn the RGB LED lighting on or off when the system is in the sleep, hibernate or soft off states.

Configuration options: [On] [Off]

M.2_1 Configuration

[Auto]	Auto-detects the M.2 device mode. If a SATA device is detected, SATA6G_2 will be disabled.
[SATA mode]	Only supports M.2 SATA devices. Please note that SATA6G_2 port cannot be used in this mode.
[PCIE mode]	Only supports M.2 PCIE devices.

PCIEX16_3 Bandwidth

[X2]	Run at X2 mode with SATA6G_56 enabled.
[X4]	Run at X4 mode for higher performance with SATA6G_56 disabled.

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3.6.9 APM Configuration

The items in this menu allow you to set system wake and sleep settings.

ErP Ready

This item allows you to switch off some power at S4+S5 or S5 to get the system ready for ErP requirement. When set to **[Enabled]**, all other PME options are switched off.

Configuration options: [Disabled] [Enable(S4+S5)] [Enable(S5)]

3.6.10 PCI Subsystem Settings

SR-IOV Support [Disabled]

This option enables or disables Single Root IO Virtualization Support if the system has SR-IOV capable PCIe devices.
Configuration options: [Disabled] [Enabled]

3.6.11 USB Configuration

The items in this menu allow you to change the USB-related features.

The **Mass Storage Devices** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

USB Single Port Control

This item allows you to enable or disable the individual USB ports.

Refer to section **1.1.2 Motherboard layout** for the location of the USB ports.

3.6.12 Network Stack Configuration

The items in this menu allow you to configure Ipv4 / Ipv6 PXE support.

3.6.13 NVMe Configuration

This menu displays the NVMe controller and Drive information of the connected devices.

3.6.14 HDD/SSD SMART Information

The items in this menu display the SMART information of the connected devices.

NVM Express devices do not support SMART information.

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3.7 Monitor menu

The Monitor menu displays the system temperature/power status, and allows you to change the fan settings.

Q-fan Configuration

Q-fan Tuning

Click this item to automatically detect the lowest speed and configure the minimum duty cycle for each fan.

WATER PUMP+ / AIO PUMP Control

[Disabled]	Disable the Water Pump control feature.
[Auto]	Detects the type of water pump installed and automatically switches the control modes.
[DC mode]	Enable the Water Pump control in DC mode for 3-pin chassis fan.
[PWM mode]	Enable the Water Pump control in PWM mode for 4-pin chassis fan.

3.8 Boot menu

The Boot menu items allow you to change the system boot options.

Boot Configuration

Fast Boot

[Disabled]	Allows your system to go back to its normal boot speed.
[Enabled]	Allows your system to accelerate the boot speed.

The following items appear only when you set the Fast Boot to **[Enabled]**.

Next Boot after AC Power Loss

[Normal Boot]	Returns to normal boot on the next boot after an AC power loss.
[Fast Boot]	Accelerates the boot speed on the next boot after an AC power loss.

Setup Mode

[Advanced Mode]	This item allows you to go to Advanced Mode of the BIOS after POST.
[EZ Mode]	This item allows you to go to EZ Mode of the BIOS after POST.

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CSM (Compatibility Support Module)

This item allows you to configure the CSM (Compatibility Support Module) items to fully support the various VGA, bootable devices and add-on devices for better compatibility.

Launch CSM

[Auto]	The system automatically detects the bootable devices and the add-on devices.
[Enabled]	For better compatibility, enable the CSM to fully support the non-UEFI driver add-on devices or the Windows® UEFI mode.
[Disabled]	Disable the CSM to fully support the non-UEFI driver add-on devices or the Windows® UEFI mode.

The following items appear only when you set the Launch CSM to **[Enabled]**.

Boot Devices Control [UEFI and Legacy OPROM]
This item allows you to select the type of devices that you want to boot.

Configuration options: [UEFI and Legacy OPROM] [Legacy OPROM only] [UEFI only]

Boot from Network Devices [Legacy only]
This item allows you to select the type of network devices that you want to launch.

Configuration options: [Ignore] [Legacy only] [UEFI driver first]

Boot from Storage Devices [Legacy only]
This item allows you to select the type of storage devices that you want to launch.

Configuration options: [Ignore] [Legacy only] [UEFI driver first]

Boot from PCI-E/PCI Expansion Devices [Legacy only]
This item allows you to select the type of PCI-E/PCI expansion devices that you want to launch.

Configuration options: [Legacy only] [UEFI driver first]

Secure Boot

This item allows you to configure the Windows® Secure Boot settings and manage its keys to protect the system from unauthorized access and malwares during POST.

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Boot Option Priorities

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.

- To access Windows® OS in Safe Mode, press <F8> after POST (Windows® 8 not supported).
- To select the boot device during system startup, press <F8> when the ASUS Logo appears.

Boot Override

These items displays the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system. Click an item to start booting from the selected device.

3.9 Tool menu

The Tool menu items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.

Setup Animator

This item allows you to enable or disable the Setup animator.

Configuration options: [Disabled] [Enabled]

3.9.1 ASUS EZ Flash 3 Utility

This item allows you to run ASUS EZ Flash 3. When you press <Enter>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <Enter> to confirm your choice.

For more details, refer to section **3.11.2 ASUS EZ Flash 3**.

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3.9.2 Secure Erase

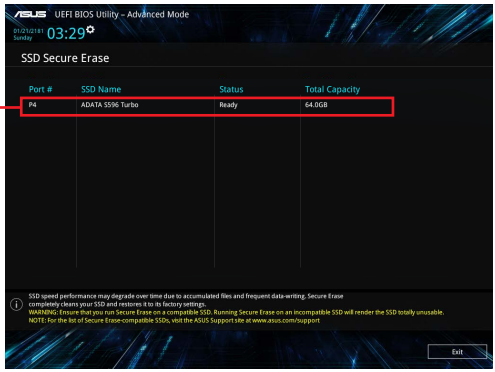
SSD speeds may lower over time as with any storage medium due to data processing. Secure Erase completely and safely cleans your SSD, restoring it to factory performance levels.

Secure Erase is only available in AHCI mode. Ensure to set the SATA mode to AHCI. Click **Advanced > PCH Storage Configuration > SATA Mode Selection > AHCI.**

To launch Secure Erase, click **Tool > Secure Erase** on the Advanced mode menu.

Check the ASUS support site for a full list of SSDs tested with Secure Erase. The drive may become unstable if you run Secure Erase on an incompatible SSD.

- The time to erase the contents of your SSD may take a while depending on its size. Do not turn off the system during the process.
- Secure Erase is only supported on Intel SATA port. For more information about Intel SATA ports, refer to section **1.1.2 Motherboard layout** of this manual.



Displays the available SSDs

Status definition:

- **Frozen.** The frozen state is the result of a BIOS protective measure. The BIOS guards drives that do not have password protection by freezing them prior to booting. If the drive is frozen, a power off or hard reset of your PC must be performed to proceed with the Secure Erase.
- **Locked.** SSDs might be locked if the Secure Erase process is either incomplete or was stopped. This may be due to a third party software that uses a different password defined by ASUS. You have to unlock the SSD in the software before proceeding with Secure Erase.

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3.9.3 ASUS User Profile

This item allows you to save and load multiple BIOS settings profiles.

Load Profile

This item allows you to load the previous BIOS settings saved in the BIOS Flash. Key in the profile number that saved your BIOS settings, press <Enter>, and then select **Yes**.

- DO NOT shut down or reset the system while updating the BIOS to prevent the system boot failure!
- We recommend that you update the BIOS file only coming from the same memory/ CPU configuration and BIOS version.

Profile Name

This item allows you to key in a profile name.

Save to Profile

This item allows you to save the current BIOS settings to the BIOS Flash, and create a profile. Key in a profile number from one to eight, press <Enter>, and then select **Yes**.

Load/Save Profile from/to USB Drive

This item allows you to load or save profile from your USB drive, load and save profile to your USB drive.

3.9.4 ASUS SPD Information

This item allows you to view the DRAM SPD information.

3.9.5 Graphics Card Information

This item displays the information about the graphics card installed in your system.

GPU Post

This item displays the information and recommended configuration for the PCIE slots that the graphics card is installed in your system.

This feature is only supported on selected ASUS graphics cards.

Bus Interface

This item allows you to select the bus interface.

Configuration options: [PCIEX16_1] [PCIEX16_2]

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3.10 Exit menu

The Exit menu items allow you to load the optimal default values for the BIOS items, and save or discard your changes to the BIOS items. You can access the EZ Mode from the Exit menu.

Load Optimized Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select **OK** to load the default values.

Save Changes & Reset

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved. When you select this option or if you press <F10>, a confirmation window appears. Select **OK** to save changes and exit.

Discard Changes & Exit

This option allows you to exit the Setup program without saving your changes. When you select this option or if you press <Esc>, a confirmation window appears. Select **Yes** to discard changes and exit.

Launch EFI Shell from filesystem device

This item allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available filesystem devices.

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3.11 Updating BIOS

The ASUS website publishes the latest BIOS versions to provide enhancements on system stability, compatibility,and performance. However, BIOS updating is potentially risky. If there is no problem using the current version of BIOS, DO NOT manually update the BIOS. Inappropriate BIOS updating may result to system's failure to boot. Carefully follow the instructions in this chapter to update your BIOS when necessary.

Visit http://www.asus.com to download the latest BIOS file for this motherboard.

The following utilities allow you to manage and update the motherboard BIOS setup program.

1. EZ Update: Updates the BIOS in Windows® environment.
2. ASUS EZ Flash 3: Updates the BIOS using a USB flash drive.
3. ASUS CrashFree BIOS 3: Restores the BIOS using the motherboard support DVD or a USB flash drive when the BIOS file fails or gets corrupted.

3.11.1 EZ Update

The EZ Update is a utility that allows you to update the motherboard BIOS in Windows® environment.

- EZ Update requires an Internet connection either through a network or an ISP (Internet Service Provider).
- This utility is available in the support DVD that comes with the motherboard package.

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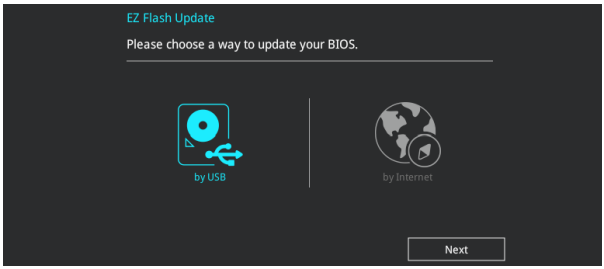
3.11.2 ASUS EZ Flash 3

ASUS EZ Flash 3 allows you to download and update to the latest BIOS through the Internet without having to use a bootable floppy disk or an OS-based utility.

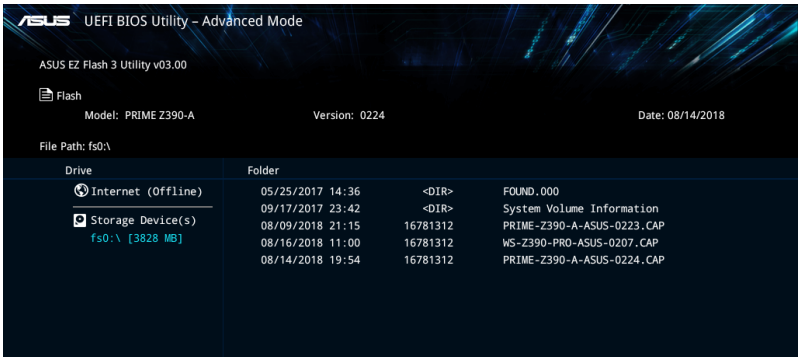
Updating through the Internet varies per region and Internet conditions. Check your local Internet connection before updating through the Internet.

To update the BIOS by USB:

1. Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select **ASUS EZ Flash Utility** and press <Enter>.
2. Insert the USB flash disk that contains the latest BIOS file to the USB port.
3. Select **by USB.**



4. Press <Tab> to switch to the Drive field.
5. Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS, and then press <Enter>.
6. Press <Tab> to switch to the Folder Info field.
7. Press the Up/Down arrow keys to find the BIOS file, and then press <Enter> to perform the BIOS update process. Reboot the system when the update process is done.



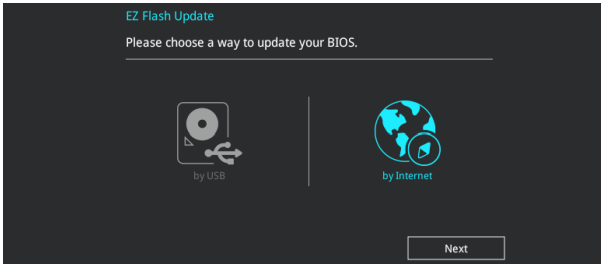
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- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

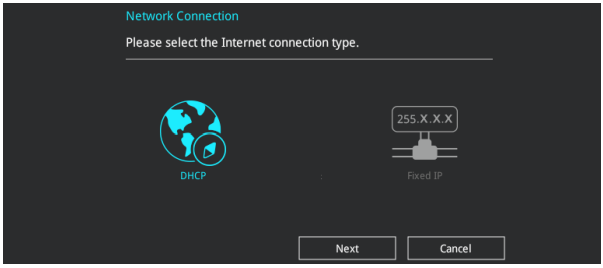
Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the Load Optimized Defaults item under the Exit menu. See section **3.10 Exit Menu** for details.

To update the BIOS by Internet:

1. Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select **ASUS EZ Flash Utility** and press <Enter>.
2. Select **by Internet.**



3. Press the Left/Right arrow keys to select an Internet connection method, and then press <Enter>.



4. Follow the onscreen instructions to complete the update.
5. Reboot the system when the update process is done.

Ensure to load the BIOS default settings to ensure system compatibility and stability. Select the Load Optimized Defaults item under the Exit menu. See section **3.10 Exit Menu** for details.

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3.11.3 ASUS CrashFree BIOS 3

The ASUS CrashFree BIOS 3 utility is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can restore a corrupted BIOS file using the motherboard support DVD or a USB flash drive that contains the BIOS file.

The BIOS file in the motherboard support DVD may be older than the BIOS file published on the ASUS official website. If you want to use the newer BIOS file, download the file at https://www.asus.com/support/ and save it to a USB flash drive.

Recovering the BIOS

To recover the BIOS:

1. Turn on the system.
2. Insert the motherboard support DVD to the optical drive, or the USB flash drive containing the BIOS file to the USB port.
3. The utility automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and enters ASUS EZ Flash 3 automatically.
4. The system requires you to enter BIOS Setup to recover the BIOS setting. To ensure system compatibility and stability, we recommend that you press <F5> to load default BIOS values.

DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!

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RAID Support

4

4.1 RAID configurations

The motherboard comes with the Intel® Rapid Storage Technology that supports RAID 0, RAID 1, RAID 5 and RAID 10 configuration.

For more information on configuring your RAID sets, please refer to the **RAID Configuration Guide** which you can find at https://www.asus.com/support.

4.1.1 RAID definitions

RAID 0 (Data striping) optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 (Data mirroring) copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

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Appendix

Notices

FCC Compliance Information

Responsible Party:	Asus Computer International
Address:	48720 Kato Rd., Fremont, CA 94538, USA
Phone / Fax No:	(510)739-3777 / (510)608-4555

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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Compliance Statement of Innovation, Science and Economic Development Canada (ISED)

This device complies with Innovation, Science and Economic Development Canada licence exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

CAN ICES-3(B)/NMB-3(B)

Déclaration de conformité de Innovation, Sciences et Développement économique Canada (ISED)

Le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAN ICES-3(B)/NMB-3(B)

VCCI: Japan Compliance Statement

Class B ITE

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取扱説明書に従って正しい取り扱いをして下さい。

VCCI－B

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REACH

Complying with the REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals) regulatory framework, we published the chemical substances in our products at ASUS REACH website at http://csr.asus.com/english/REACH.htm.



DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.



DO NOT throw the mercury-containing button cell battery in municipal waste. This symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

ASUS Recycling/Takeback Services

ASUS recycling and takeback programs come from our commitment to the highest standards for protecting our environment. We believe in providing solutions for you to be able to responsibly recycle our products, batteries, other components as well as the packaging materials. Please go to http://csr.asus.com/english/Takeback.htm for detailed recycling information in different regions.

Regional notice for California



WARNING

Cancer and Reproductive Harm -
www.P65Warnings.ca.gov

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ASUS contact information

ASUSTeK COMPUTER INC.

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