ESC300 G4

Workstation
User Guide

Contents

Chapter 1: Product Introduction

Chapter 2: Hardware Setup

Contents

Contents

Notices

Federal Communications Commission Statement

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

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

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 manufacturer's 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 to 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.

> The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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)

REACH

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

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.

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.

Australia statement notice

From 1 January 2012 updated warranties apply to all ASUS products, consistent with the Australian Consumer Law. For the latest product warranty details please visit https://www.asus.com/support. Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

If you require assistance please call ASUS Customer Service 1300 2787 88 or visit us at https://www.asus.com/support

Safety information

Electrical Safety

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.

- When adding or removing any additional devices to or from the system, contact a qualified service technician or your dealer. 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 service.

- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

Operation Safety

- Servicing of this product or units is to be performed by trained service personnel only.

- Before operating the server, carefully read all the manuals included with the server package.

- Before using the server, make sure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.

- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.

- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.

> ⚠ This product is equipped with a three-wire power cable and plug for the user's safety. Use the power cable with a properly grounded electrical outlet to avoid electrical shock.

Lithium-Ion Battery Warning

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

CLASS 1 LASER PRODUCT

Heavy System

CAUTION! This server system is heavy. Ask for assistance when moving or carrying the system.

About this guide

Audience

This user guide is intended for system integrators, and experienced users with at least basic knowledge of configuring a server.

Contents

This guide contains the following parts:

1. **Chapter 1: Product Introduction**

    This chapter describes the general features of the server, including sections on front panel and rear panel specifications.

2. **Chapter 2: Hardware Setup**

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

3. **Chapter 3: Motherboard Information**

    This chapter includes the motherboard layout and brief descriptions of the jumpers and internal connectors.

4. **Chapter 4: BIOS Setup**

    This chapter tells how to change system settings through the BIOS Setup menus and describes the BIOS parameters.

5. **Chapter 5: RAID Configuration**

    This chapter provides instructions for setting up, creating and configuring RAID sets using the available utilities.

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 (+).
	Example: <Ctrl> + <Alt> + <Del>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.
	Example: At DOS prompt, type the command line:
	`format A:/S`

References

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

1.   ASUS websites

   The ASUS websites worldwide provide updated information for all ASUS hardware and software products. Refer to the ASUS contact information.

1

Product Introduction

This chapter describes the general features of the server, including sections on front panel and rear panel specifications.

1.1 System package contents

Check your system package for the following items.

Model Name	ESC300 G4
Accessories	1 x ESC300 G4 Support CD
	1 x Windows 10 and Windows 7 Professional Recovery DVD (for OS bundled SKU)
	1 x AC Power Cable
	1 x COM port Cable
Optional Items	Smart Card Reader
	Anti-Virus CD pack
	DVD-RW
	Keyboard and mouse

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

1.2 Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the product's serial number containing 12 characters such as xxS0xxxxxxx shown as the figure below. With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.

1.3 ESC300 G4 specifications summary

The ASUS ESC300 G4 is a workstation featuring the ASUS E3-Pro V5 server board.

Processor / System Bus		LGA1151 socket for Intel® Xeon® E3-1200 v6/v5 series, 7th/6th Generation Intel® Core™, 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 types.
		** Refer to www.asus.com for Intel® CPU support list.
Core Logic		Intel® C232 Chipset
Memory	**Total Slots**	4 (2-channel per CPU, 4 DIMM per CPU)
	Capacity	Maximum up to 64GB (UDIMM)
	Memory Type	4 x DIMM, Max 64GB, DDR4 2400/2133 MHz, ECC/ non-ECC UDIMM
		* Refer to ASUS server AVL for the latest update
	Memory Size	8GB, 16GB(UDIMM)
Expansion Slots	**Total PCI/PCI-X /PCI-E Slots**	7
	Slot Type	1 x PCIe 3.0/2.0 x16 (x16 mode)
		1 x PCIe 3.0/2.0 x16 (max at x4 mode)*1
		2 x PCIe 3.0/2.0 x1 slots
		3 x PCI slots
		* When PCIE x16_2 is occupied by x4 or faster devices, PCIE x1_1 and PCIE x1_2 will be disabled.
Disk Controller	**SATA Controller**	Intel® C232 Chipset with RAID 0/1/5/10 and Intel® Rapid Storage Technology Enterprise support:
		- 6 x Serial ATA 6.0 Gb/s connectors (gray)
		- 1 x M.2 Socket 3 with M key, type 2242/2260/2280 storage devices support (both SATA & PCIE x4 mode)*
		* When the M.2 Socket 3 is operating in SATA mode, SATA port 1 is disabled.
		* M.2 Socket and PCIe X16_2 connector support PCIe mode and share bandwidth. By default, the device detection priority of the system is as follows: SATA Mode M.2 > PCIe X16_2 connector.
Storage Bays	**I = internal A or S will be hot-swappable**	3 x Internal 3.5" HDD Bays
		1 x Internal 2.5" HDD/SSD Bays
Networking	**LAN**	Realtek® RTL8111H Gigabit LAN Controller
Auxiliary Storage Device Bay (Floppy / Optical Drive)		2 x 5.25" media bays
		(Options: No DVD-ROM/DVD-RW)

ESC300 G4 specifications summary

Rear I/O	1 x PS/2 keyboard (purple)
	1 x PS/2 mouse (green)
	1 x LAN (RJ45) port(s)
	4 x USB 3.0
	4 x USB 2.0
	3 x Audio jack(s)
Onboard I/O	1 x M.2 Socket 3 for M Key, type 2242/2260/2280 devices
	1 x COM port
	1 x S/PDIF out header
	2 x USB 3.0 (front)
	2 x USB 2.0 (front) (optional switch to card reader)
OS Support	Windows® 10 (support Preload OS)
	Windows® 7 RS2 32bit/64bit
	* Refer to http://www.asus.com/ for the latest OS support.
Dimension (HH x WW x DD)	423 mm x 190 mm x 435 mm
Net Weight Kg (CPU, DRAM & HDD not included)	12.65 Kg
Power Supply	- 300W 80PLUS Single Power Supply
	- 500W 80PLUS Single Power Supply
Power Rating	100-127 / 220-240Vac, 60-50Hz, 6A/3A, Class I
Environment	Operating temperature: 10°C ~ 35°C
	Non operating temperature: -40°C ~ 70°C
	Non operating humidity: 20% ~ 90% (Non condensing)

Specifications are subject to change without notice.

1.4 Front panel features

The ESC300 G4 workstation features a simple yet stylish front panel design. The power and reset buttons, LED indicators, optical drive, and USB ports are all conveniently located at the front panel for easy access.

Optical Drive (Optional)

Empty 5.25-inch bay

Card reader (optional)*

Power LED

Reset button
Power button

USB 3.0 ports

USB 2.0 ports*
Headphone port
Microphone port

HDD access LED
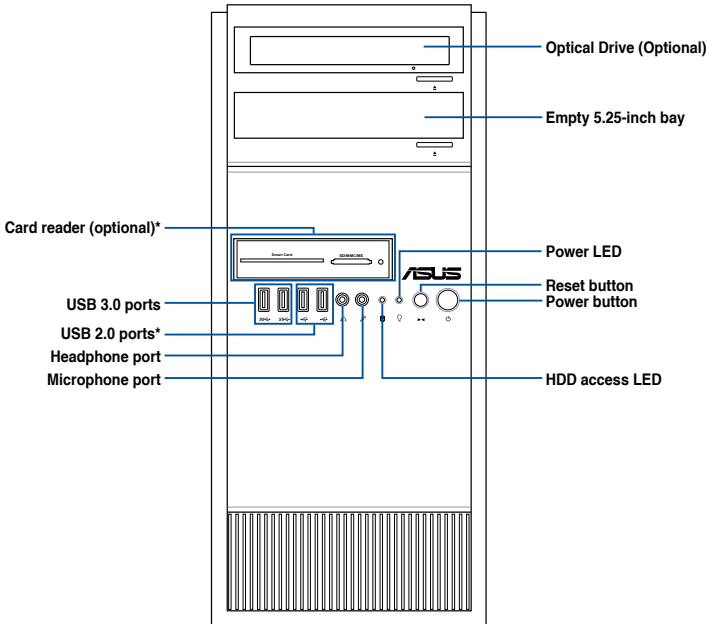
* The USB 2.0 ports are unavailable if the optional card reader is purchased.

Refer to the Front panel LEDs section for the LED descriptions.

1.5 Rear panel features

The rear panel includes a slot for the motherboard rear I/O ports, expansion slots, a vent for the system fan, and the power supply module.

Power connector

PS/2 Mouse port

PS/2 keyboard port

USB 2.0 ports

USB 3.0 ports

LAN port

Audio ports

Single power supply

120 mm x 120 mm system fan vents

PCI-E latch

Expansion slots
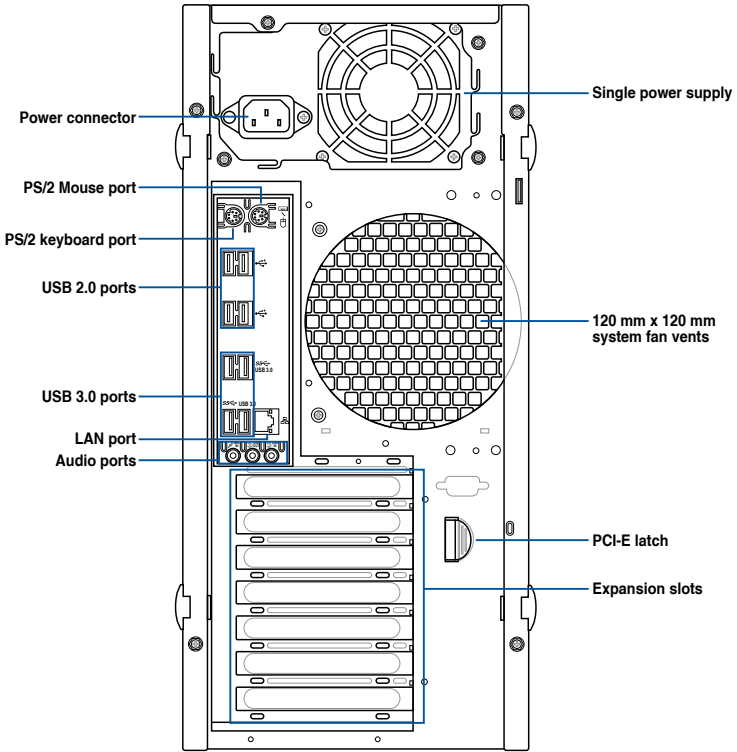
1.6 Internal features

The ASUS ESC300 G4 Pedestal server system includes the basic components as shown:
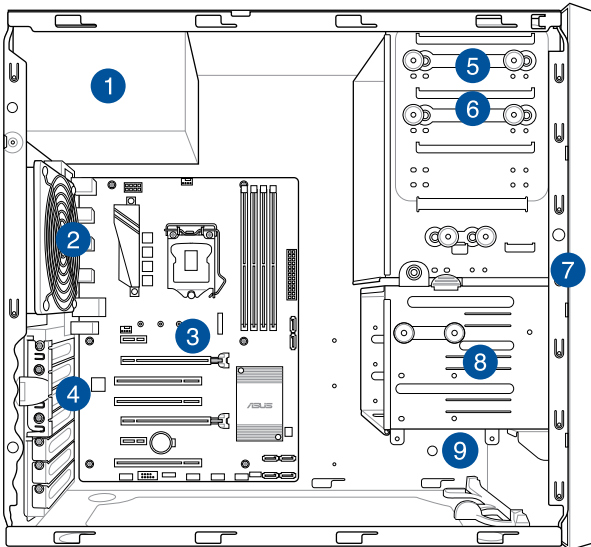
1.   Power supply unit

2.   120 mm x 120 mm system fan (optional)

3.   ASUS E3-PRO V5 Server Board

4.   Expansion card locks

5.   Optical drive (Optional)

6.   1 x 5.25-inch drive bay

7.   Front I/O board (hidden)

8.   3 x 3.5-inch Internal HDD bays

9.   1 x 2.5-inch Internal HDD/SSD bay

> Turn off the system power and detach the power supply before removing or replacing any system component.

> The barebone server does not include a floppy disk drive. If you need to use a floppy disk, connect the USB floppy disk drive to any of the USB ports on the front or rear panel.

WARNING
HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER BODY PARTS AWAY

1.7 LED information

1.7.1 Front panel LEDs
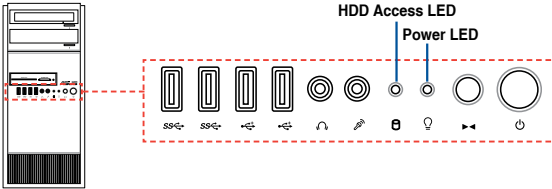
LED	Icon	Display status	Description
Power LED		ON	System power ON
HDD Access LED		OFF Blinking	No activity Read/write data into the HDD

1.7.2 Rear panel LEDs
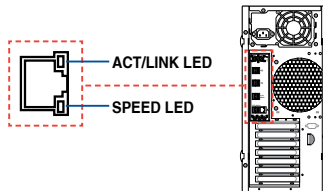
ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection

Hardware Setup

2

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

2.1　Chassis cover

2.1.1　Removing the side cover

- Ensure that you unplug the power cord before removing the side cover.

- Take extra care when removing the side cover. Keep your fingers from components inside the chassis that can cause injury, such as the CPU fan, rear fan, and other sharp-edged parts.

- The images of the barebone server shown in this section are for reference purposes only and may not exactly match the model you purchase.

To remove the side cover:

1. Remove the two screws that secure the side cover.

Screws
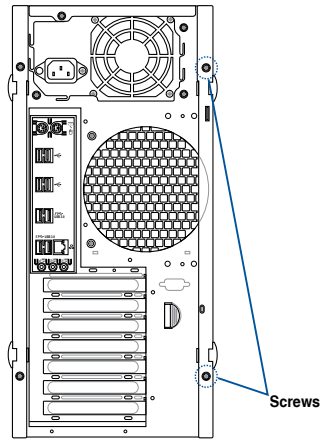
2. Press the side cover locks outward.

Side cover locks
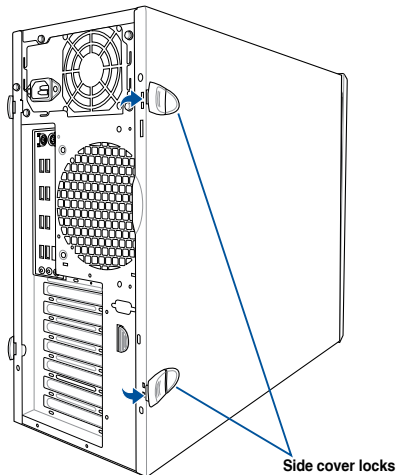
3. Slightly pull the side cover toward the rear just enough to detach it from the chassis.
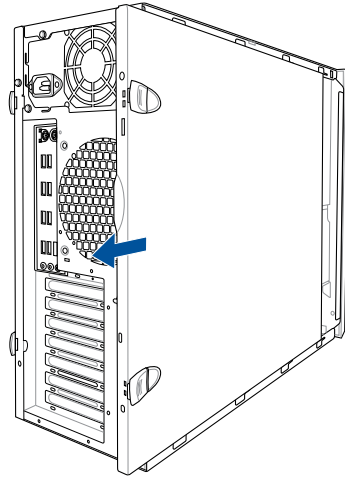
4. Remove the cover and set it aside.
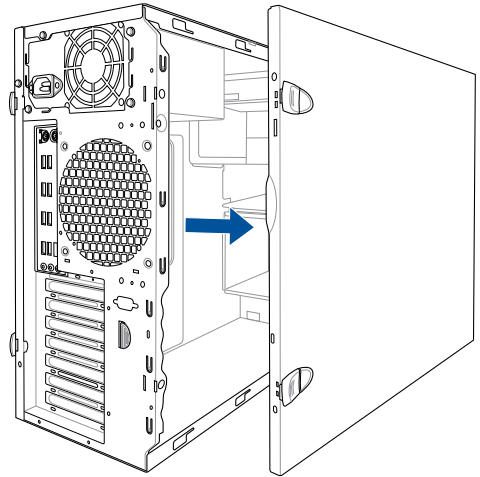
2.2   CPU installation

This motherboard comes with a surface mount LGA1151 socket designed for Intel® Xeon® E3-1200 v6/v5 series, 7th/6th Generation Intel® Core™, Pentium®, and Celeron® processors.
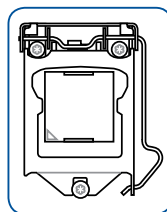
Unplug all power cables before installing the CPU.

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

- 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.

- 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.

1

Load lever

A

B

Retention tab

2

Load plate

3

CPU notches

Gold
triangle
mark

Alignment
key

Alignment
key

4

Load lever

C

A

B

Retention
lock

5

Load lever

Retention tab
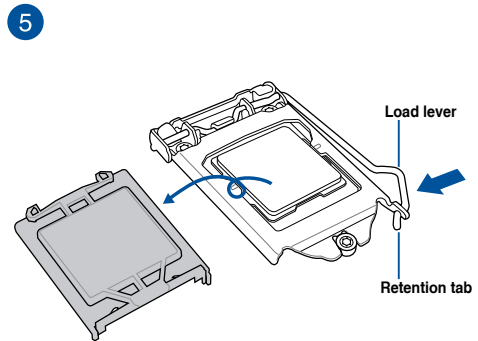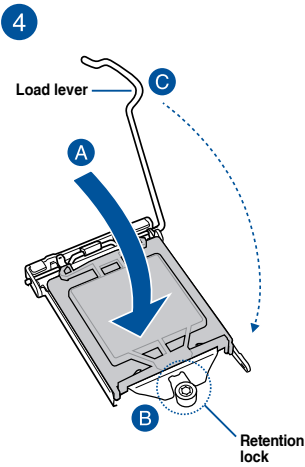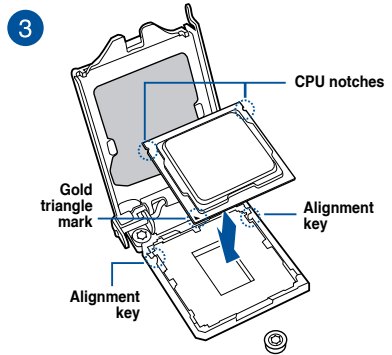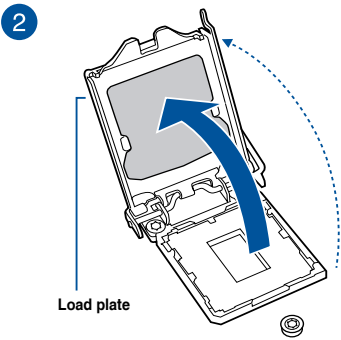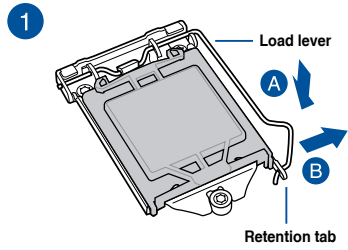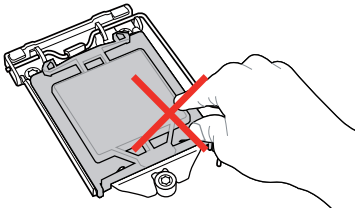
2.3   CPU heatsink and fan assembly installation
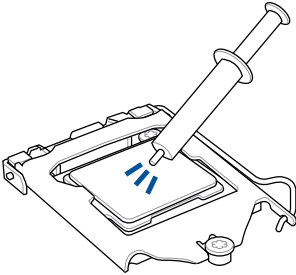
Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan, if necessary.

To install the CPU heatsink and fan assembly
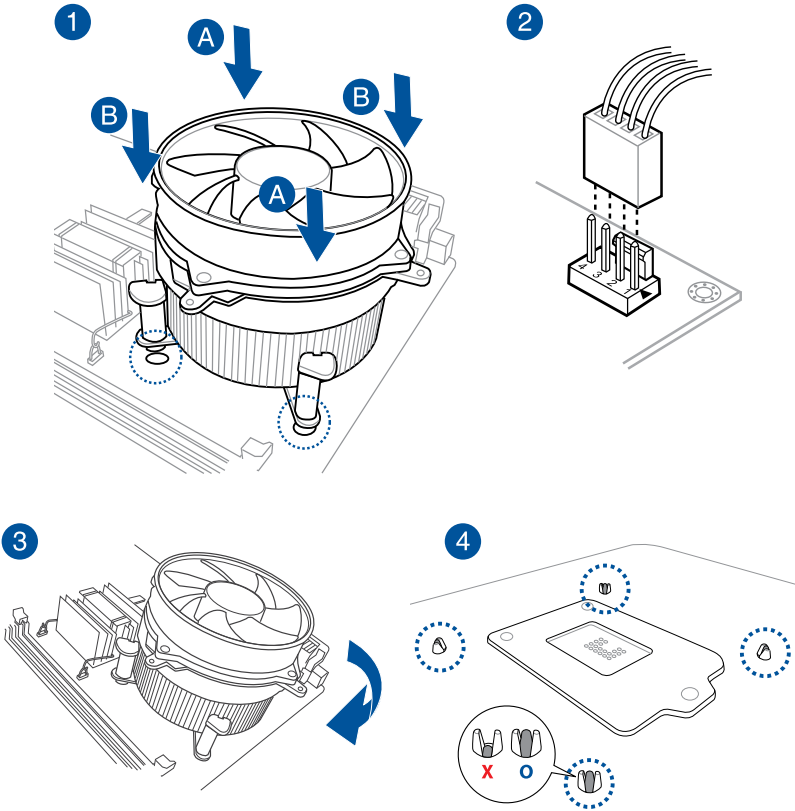
2.4   System memory

The motherboard comes with four DDR 4 (Double Data Rate 4) 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.

Channel	Sockets
Channel A	DIMM_A1 & DIMM_A2
Channel B	DIMM_B1 & DIMM_B2

DIMM_A1
DIMM_A2

DIMM_B1
DIMM_B2

Recommended memory configurations

DIMM_A2

DIMM_A2

DIMM_B2

DIMM_A1
DIMM_A2
DIMM_B1
DIMM_B2
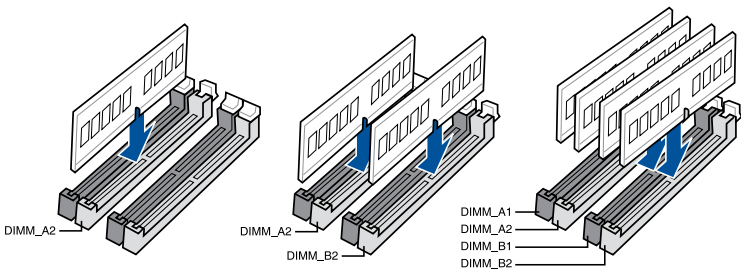
Memory configurations

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

- You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.

- Always install DIMMs with the same CAS latency. For optimal compatibility, we recommend that you install memory modules of the same version or date code (D/C) from the same vendor. Check with the retailer to get the correct memory modules.

- Due to the memory address limitation on 32-bit Windows® OS, when you install 4GB or more memory on the motherboard, the actual usable memory for the OS can be about 3GB or less. For effective use of memory, we recommend that you do any of the following:

  a)   Use a maximum of 3GB system memory if you are using a 32-bit Windows® OS.

  b)   Install a 64-bit Windows® OS when you want to install 4 GB or more on the motherboard.

  c)   For more details, refer to the Microsoft® support site at http://support.microsoft.com/kb/929605/en-us.

- 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).

- Visit the ASUS website for the latest QVL.

2.4.1   Installing a DIMM on a single clip DIMM socket

1.   Unlock a DIMM socket by pressing the retaining clip outward.

2.   Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.

DIMM notch

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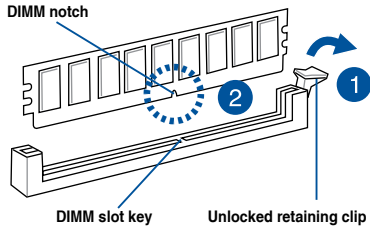
A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

3.   Hold the DIMM by both of its ends then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clip snaps back into place and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.

Locked Retaining Clip
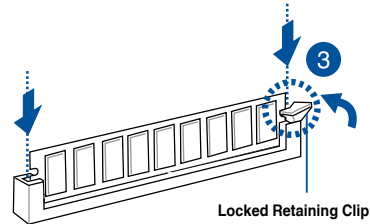
Always insert the DIMM into the socket vertically to prevent DIMM notch damage.

- To install two or more DIMMs, refer to the user guide bundled in the motherboard package.

- Refer to the user guide for qualified vendor lists of the memory modules.

Removing a DIMM from a single clip DIMM socket

1.   Press the retaining clip outward to unlock the DIMM.

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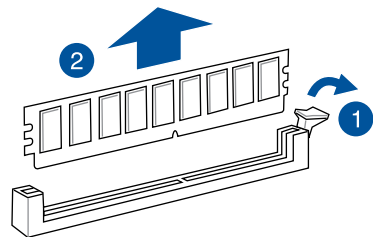
Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

2.5 Front panel cover

Before you can install a 5.25-inch drive, you should first remove the front panel cover.

⚠ Ensure to unplug the power cable before installing or removing any system components. Failure to do so may cause damage to the motherboard and other system components!

2.5.1 Removing the front panel cover

To remove the front panel cover:

1. Locate the front panel assembly lock then slide it outward to unlock the latches that secures the front panel cover to the chassis.

Assembly lock
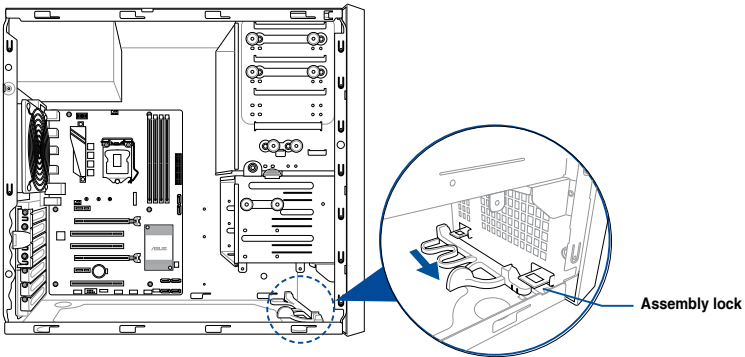
2. Remove the front panel assembly from the chassis and set it aside.

Front panel assembly
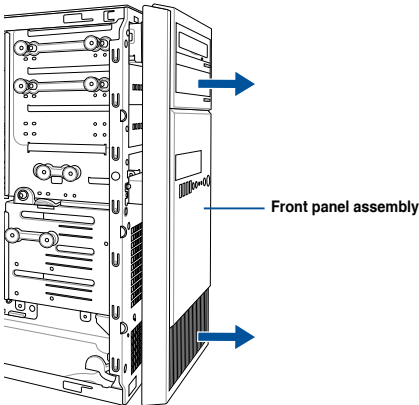
2.6   5.25-inch drives

This system comes with three 5.25-inch drive bays located on the upper front section of the chassis.

> If your system came with an optical drive, the optical drive occupies the topmost bay (1). The lower bays (2 and 3) are available for additional 5.25-inch optical, zip, or floppy disk drives.
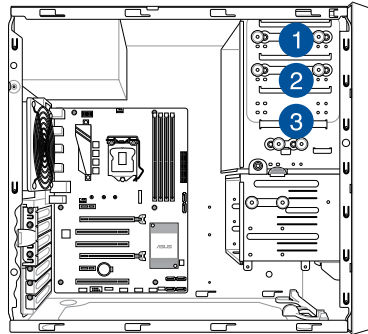
Installing a 5.25-inch drive

To install a 5.25-inch drive:

1.   Remove the front panel cover. Refer to the **Removing the front panel cover** section for more information.

2.   Pull the bay locks outward.

Bay locks

3.   Remove the metal cover of the bay you intend to use.
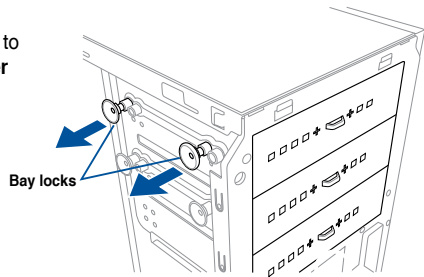
> Take extra care when removing the metal cover. Use tools such as a screw driver to bend and remove the metal cover to avoid physical injury.

Screw driver

Metal cover
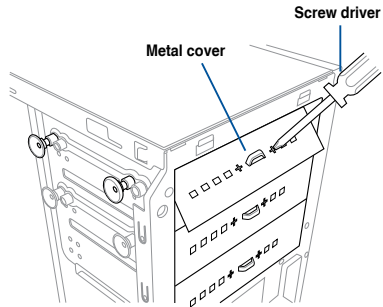
4. Prepare the 5.25-inch drive.

5. Insert and carefully push the drive into the bay until its screw holes align with the holes on the bay.
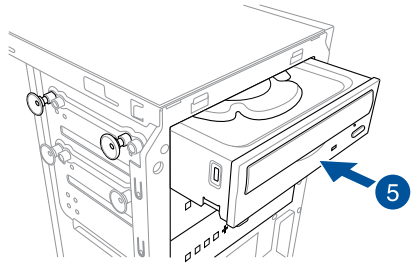
6. Push the bay locks to secure the drive in place.

Bay locks
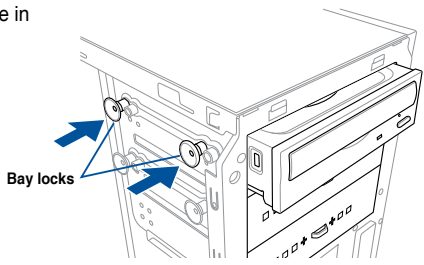
7. Connect the SATA cable to the SATA connector of the drive.

8. Connect a SATA power cable from the power supply to the power connector of the drive.

9. Reinstall the front panel cover.

SATA power cable   **SATA cable**
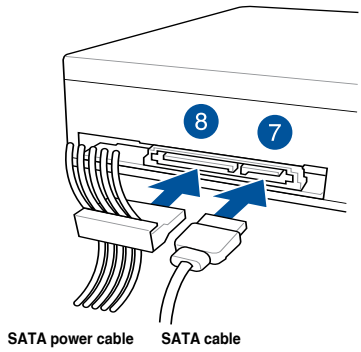
2.7   Hard disk drives (HDD)

The server system supports three (3) 3.5-inch Serial ATA hard disk drives via the hard disk drive bays and one 2.5-inch HDD/SSD drive at the bottom of the HDD cage.

Installing 3.5-inch HDDs

To install 3.5-inch Serial ATA hard disk drives:

1.   Remove the side cover of the chassis. Refer to the **Removing the side cover** section for more information.

2.   Prepare the 3.5-inch HDD and the bundled set of screws.

3.   Locate the HDD cage lock, press the it up (A), then swing the HDD cage outwards (B) until it clicks in place.
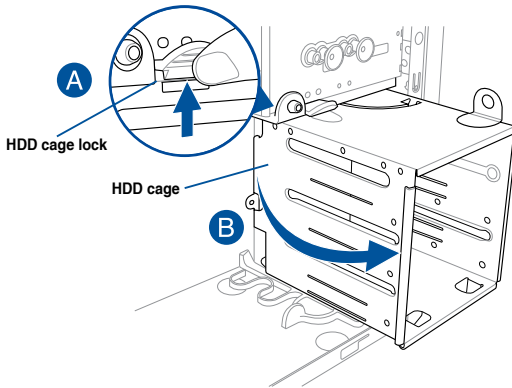
4.   Align and insert the 3.5-inch HDD into the drive bay ensuring that the screw holes on the HDD matches the screw holes on the HDD cage.
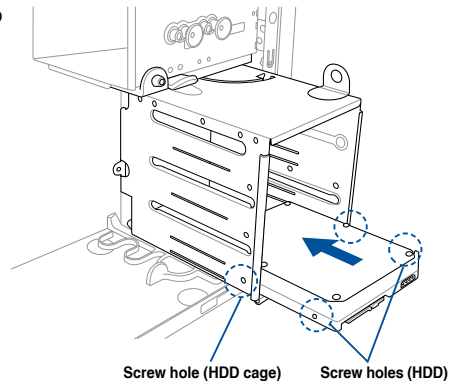
5.   Secure the 3.5-inch HDD to the HDD cage using the bundled set of screws.
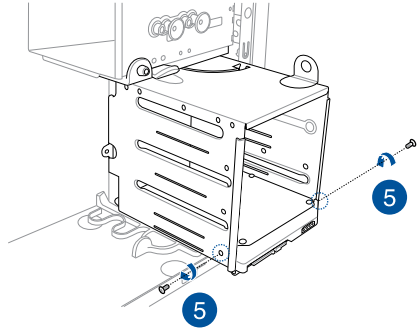
6.   Swing the HDD cage inwards until it clicks back into place.

7.   Connect the SATA cable and SATA power cable to the 3.5-inch HDD.
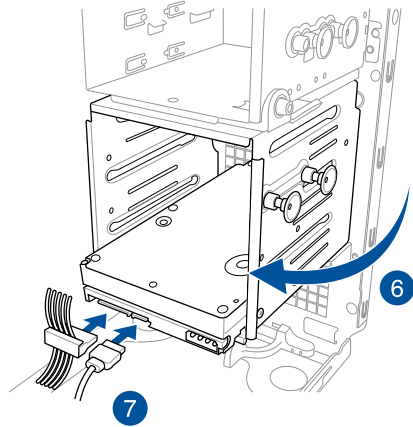
Installing 2.5-inch HDD/SSD

To install a 2.5-inch HDD/SSD:

1.   Remove the side cover of the chassis. Refer to the **Removing the side cover** section for more information.

2.   Prepare the 2.5-inch HDD/SDD and the bundled set of screws.

3.   Lay the system on its side on a flat and stable surface.

4.   Locate the HDD cage lock, press it up (A), then swing the HDD cage outwards (B).

5.   Align and insert the 2.5-inch HDD/SSD into the drive bay as shown. Push it all the way until its screw holes align with the holes on the drive bay.
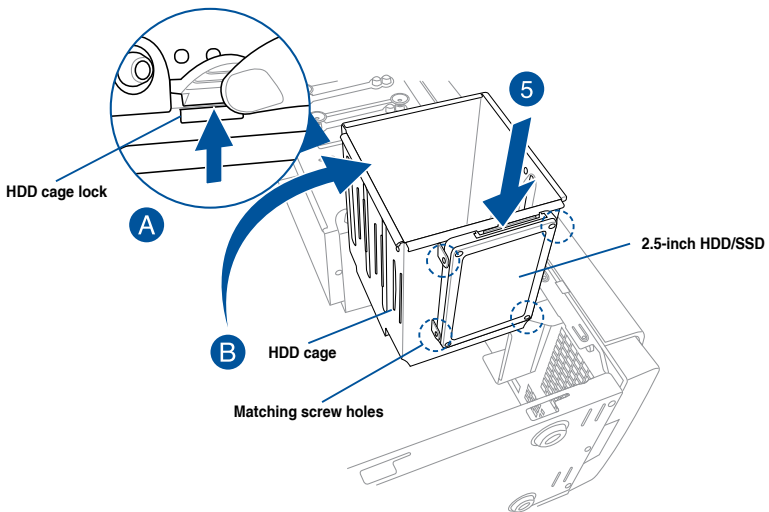
6. Secure the 2.5-inch HDD/SSD to the HDD cage using the bundled set of screws.
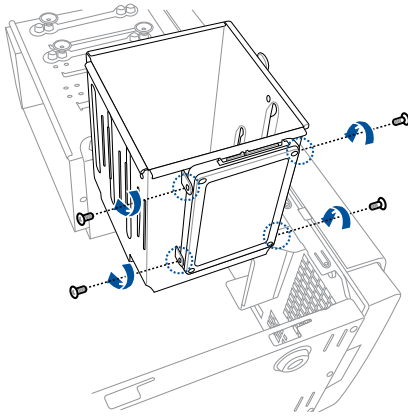
7. Swing the HDD cage inwards until it clicks back into place.
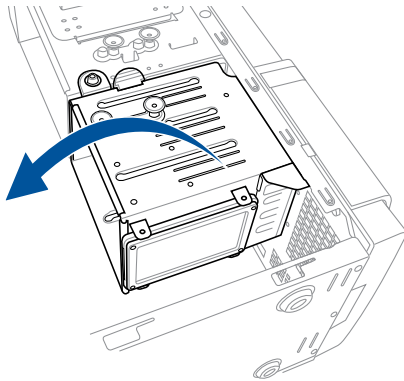
8. Connect a SATA cable and a SATA power cable to the 2.5-inch HDD/SSD.
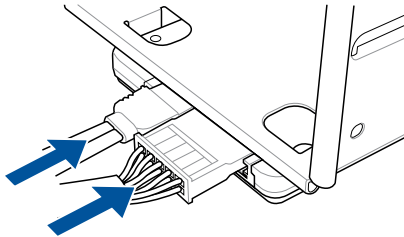
2.8 Expansion slots

Unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.
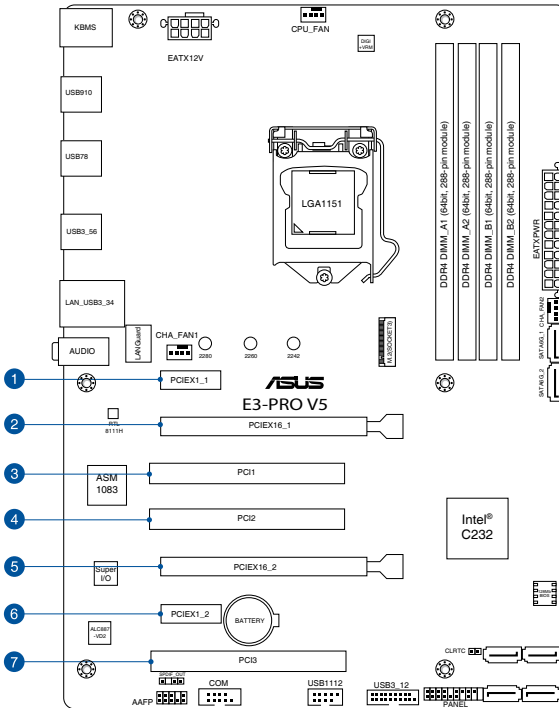
Slot No.	Slot Description
1	PCIe 3.0/2.0 x1_1 slot
2	PCIe 3.0/2.0 x16_1 slot
3	PCI1 slot
4	PCI2 slot
5	PCIe 3.0/2.0 x16_2 slot (max at x4 mode)
6	PCIe 3.0/2.0 x1_2 slot
7	PCI3 slot

2.8.1   Installing an expansion card

To install an expansion card:

1.   Lay the system on its side on a flat, stable surface.

2.   Press the PCI-E latch (A), hold it by its edge then lift it towards the rear (B).

Edge of the PCI-E latch
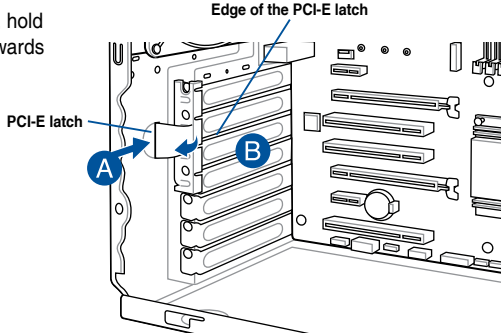
PCI-E latch

3.   Remove the screw (A) that secures the metal bracket to the chassis then remove the metal bracket (B).

Screw
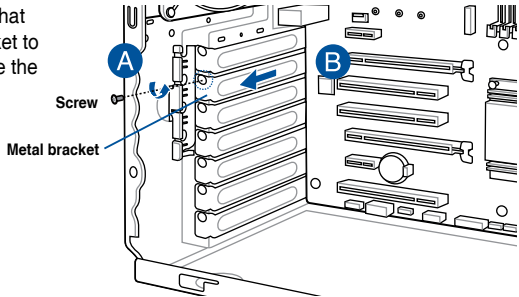
Metal bracket

4. Align and insert the expansion card into the PCI-E slot.

Expansion card   PCI-E slot
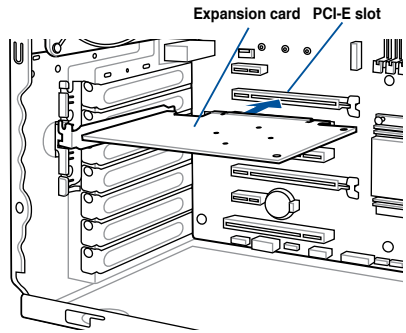
5. Lift the PCI-E latch inwards until it clicks into place securing the expansion card to the chassis.

PCI-E latch
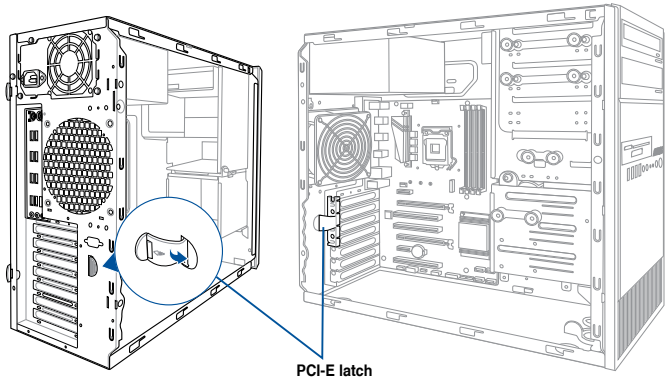
6. (Optional) Replace the screw of the metal bracket.
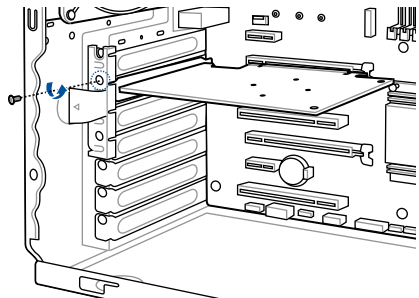
2.8.2   Configuring an expansion card

VGA configuration	PCI Express operating mode	
	PCIe 3.0 x16_1 (gray)	**PCIe 3.0 x16_2**
Single VGA/PCIe card	x16 (Recommended for single VGA card)	N/A
Dual VGA/PCIe cards	x16	x4

- In single VGA card mode, use the PCIe 3.0 x16_1 slot (gray) for a PCI Express x16 graphics card to get better performance.
- We recommend that you provide sufficient power when running CrossFireX™ mode.
- Connect a chassis fan to the motherboard connector labeled CHA_FAN1/2 when using multiple graphics cards for better thermal environment.

IRQ assignments for this motherboard

	A	B	C	D	E	F	G	H
HD Audio Controller	shared	–	–	–	–	–	–	–
XHCI	shared	–	–	–	–	–	–	–
SATA Controller	shared	–	–	–	–	–	–	–
LAN Controller	–	–	–	shared	–	–	–	–
PCIEx1_1	shared	–	–	–	–	–	–	–
PCIEx1_2	–	shared	–	–	–	–	–	–
PCIEx16_1	shared	–	–	–	–	–	–	–
PCIEx16_2	shared	–	–	–	–	–	–	–
M.2	shared	–	–	–	–	–	–	–
Asmedia PCIE to PCI Controller	–	–	shared	–	–	–	–	–

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

2.8.3   Installing M.2 (NGFF) cards

To install an M.2 card:

1.   Locate the M.2 connector (M.2(SOCKET3)) on the motherboard.

2.   Remove the screw on the stand screw.

3.   Prepare the M.2 card.

4.   Align and insert the M.2 card into the M.2 connector (M.2(SOCKET3)).

5.   Secure the M.2 card with the screw you removed in step 2.
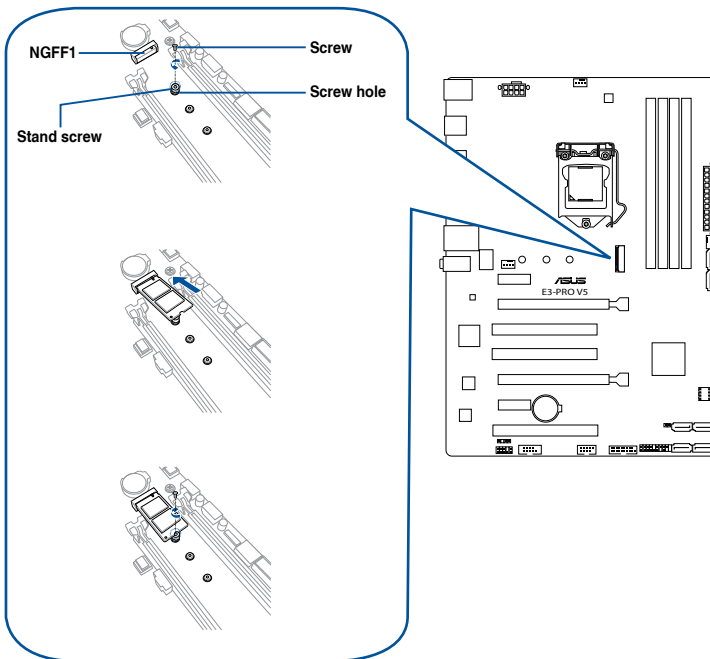
> •   Please pay attention when removing the screw, the stand screw might be removed together with it.
>
> •   Ensure that the M.2 card is positioned between the screw and the stand screw before securing it.

2.9   System fan

This section describes how to remove the system fan in the event that you need to install or remove previously installed or new system components, or when the system fan needs to be replaced because it was damaged or became defective.

To remove the system fan:

1.   Disconnect the system fan cable from the CHA_FAN1 connector on the motherboard.
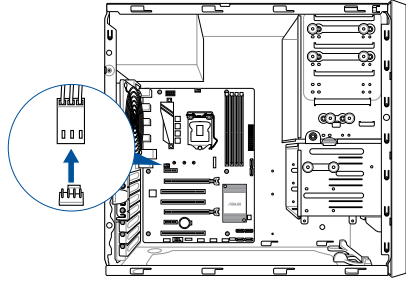
2.   Remove the four system fan screws at the rear panel. Keep the screws for later use.

Hold the system fan with one hand while removing the system fan screws.
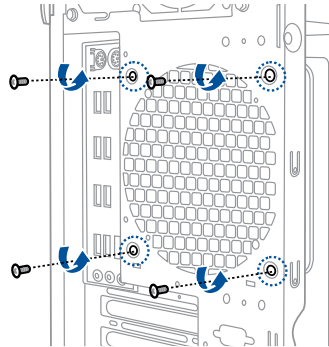
3.   Remove the system fan.

Follow the previous instructions in reverse order if you want to reinstall the system fan.
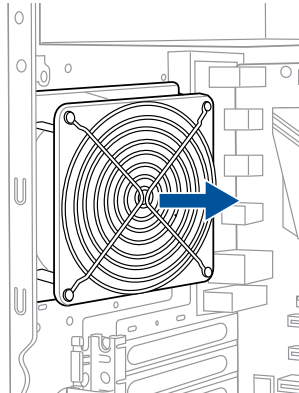
2.10 Motherboard rear and audio connection
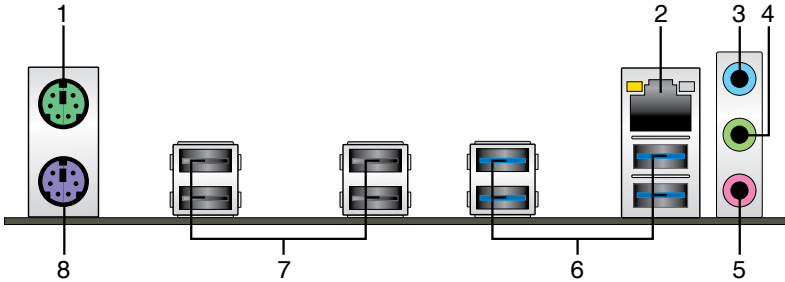
Rear panel connectors			
1.	PS/2 Mouse port (green)	5.	Microphone port (pink)**
2.	LAN (RJ-45) port*	6.	USB 3.0 ports
3.	Line In port (light blue)**	7.	USB 2.0 ports
4.	Line Out port (lime)**	8.	PS/2 keyboard port (purple)

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

- Due to USB 3.0 controller limitations, USB 3.0 devices can only be used under a Windows® OS environment and after USB 3.0 driver installation.

- The plugged USB 3.0 device may run on xHCI or EHCI mode, depending on the operating system's setting.

- USB 3.0 devices can only be used for data storage.

- We strongly recommend that you connect USB 3.0 devices to USB 3.0 ports for faster and better performance from your USB 3.0 devices.

* LAN ports LED indications

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

Activity Link LED   Speed LED

LAN port
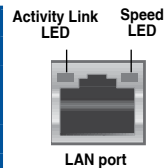
** Audio 2.1, 4.1, 5.1 or 7.1-channel configuration

Port	Headset 2.1-channel	4.1-channel	5.1-channel	7.1-channel
Light Blue (Rear panel)	Line In	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out
Lime (Rear panel)	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink (Rear panel)	Mic In	Mic In	Bass/Center	Bass/Center
Lime (Front panel)	—	—	—	Side Speaker Out

Motherboard Information

3

This chapter includes the motherboard layout and brief descriptions of the jumpers and internal connectors.

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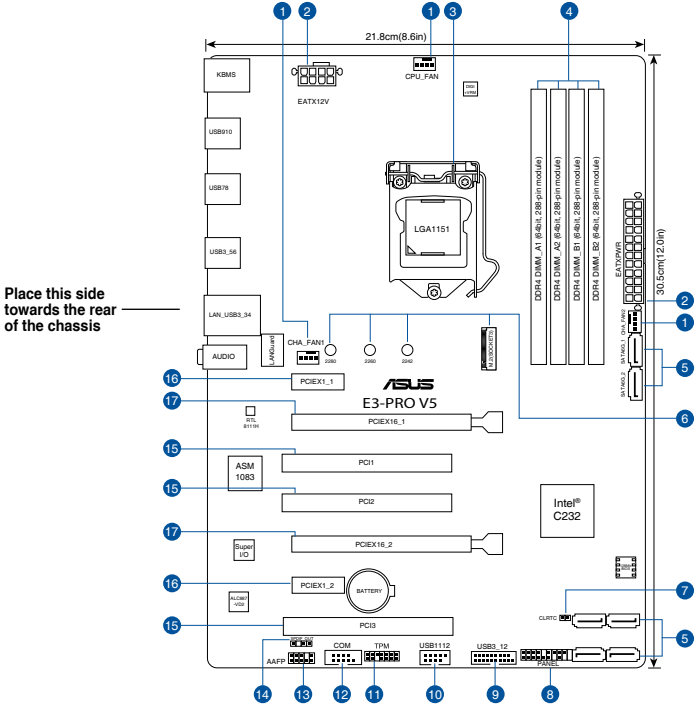
Unplug the power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components.

Layout contents

Connectors/Jumpers/Slots/LED	Page
1. CPU and chassis fan connectors (4-pin CPU_FAN, 4-pin CHA_FAN1/2)	3-4
2. ATX power connectors (24-pin EATXPWR, 8-pin EATX12V)	3-4
3. Intel® LGA1151 CPU socket	3-4
4. DDR4 DIMM slots	3-5
5. Intel® C232 SATA 6.0Gb/s ports (SATA6G_1~6)	3-5
6. M.2 Socket3	3-5
7. Clear RTC RAM (2-pin CLRTC)	3-6
8. System panel connector (20-5 pin F_PANEL)	3-6
9. USB 3.0 connector (20-1 pin USB3_12)	3-7
10. USB 2.0 connector (10-1 pin USB1112)	3-7
11. TPM connector (14-1 pin TPM)	3-7
12. Serial Port Connector (10-1 pin COM)	3-7
13. Front panel audio connector (10-1 pin AAFP)	3-8
14. Digital audio connector (4-1 pin SPDIF_OUT)	3-8
15. PCI slots	3-8
16. PCI Express 3.0/2.0 x1 slots	3-8
17. PCI Express 3.0/2.0 x16 slots	3-8

1. **CPU and chassis fan connectors (4-pin CPU_FAN, 4-pin CHA_FAN1/2)**

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

    Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors! The CPU_FAN connector supports a CPU fan of maximum 1A (12 W) fan power.

    Only the 4-pin CPU fan supports the ASUS Fan Xpert 2+ feature.

    CPU_FAN   CHA_FAN

    CPU FAN PWM
    CPU FAN IN
    CPU FAN PWR
    GND

    CHA FAN PWM
    CHA FAN IN
    CHA FAN PWR
    GND
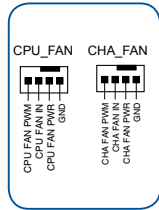
2. **ATX power connectors (24-pin EATXPWR, 8-pin EATX12V)**

    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.

    - We recommend that you use an EATX 12V Specification 2.0-compliant power supply unit (PSU) with a minimum of 300W power rating. This PSU type has 24-pin and 8-pin power plugs.

    - DO NOT forget to connect the 8-pin EATX +12V power plug. Otherwise, the system will not boot up.

    - We recommend that you use a PSU with higher power output when configuring a system with more power-consuming devices or when you intend to install additional devices. The system may become unstable or may not boot up if the power is inadequate.

    EATX12V

    GND — +12V DC
    GND — +12V DC
    GND — +12V DC
    GND — +12V DC
    PIN 1

    EATXPWR

    +3 Volts — GND
    +12 Volts — +5 Volts
    +12 Volts — +5 Volts
    +5V Standby — +5 Volts
    Power OK — -5 Volts
    GND — GND
    +5 Volts — GND
    GND — PSON#
    +5 Volts — GND
    GND — -12 Volts
    +3 Volts — +3 Volts
    PIN 1
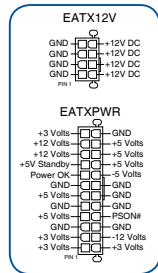
3. **Intel® LGA1151 CPU socket**

    This motherboard comes with a surface mount LGA1151 socket designed for Intel® Xeon® E3-1200 v6/v5 series, 7th/6th Generation Intel® Core™, Pentium®,and Celeron® processors.

    For more details, refer to **2.2 CPU installation**.

4. DDR4 DIMM slots

Install 2 GB, 4 GB, 8 GB, and 16 GB unbuffered U-DIMM ECC DDR4 DIMMs into these DIMM sockets.

For more details, refer to **2.4 System memory**.

5. Intel® C232 SATA 6.0Gb/s ports (7-pin SATA6G_1~6)

These ports connect to SATA 6.0 Gb/s hard disk drives via SATA 6.0 Gb/s signal cables.

When using hot-plug and NCQ, set the **SATA Mode Selection** item in the BIOS to [AHCI].

SATA6G

GND
RSATA_TXP
RSATA_TXN
GND
RSATA_RXN
RSATA_RXP
GND
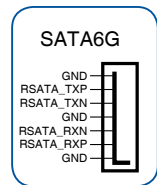
6. M.2 socket 3

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

- This socket supports M Key and 2242/2260/2280 storage devices.

- When the M.2 Socket 3 is operating in SATA mode, SATA port 1 will be disabled.

- M.2 Socket and PCIe X16_2 connector support PCIe mode and share bandwidth. By default, the device detection priority of the system is as follows: SATA Mode M.2 > PCIe X16_2 connector.

- When using Intel® Desktop Responsiveness technologies with PCIe M.2 device, ensure to set up the Windows® UEFI operating system under RAID mode.

M.2(SOCKET3)
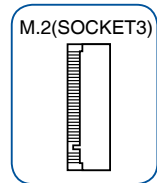
7. **Clear RTC RAM (2-pin CLRTC)**

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

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.

2. Use a metal object such as a screwdriver to short the two pins.

3. Plug the power cord and turn ON the computer.

4. Hold down the <**Del**> key during the boot process and enter BIOS setup to re-enter data.

CLRTC

+3V_BAT
GND

PIN 1
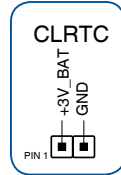
If the steps above do not help, remove the onboard battery and short the two pins again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the battery.

8. **System panel connector (20-5 pin F_PANEL)**

This connector supports several chassis-mounted functions.

- **System power LED (4-pin PWR_LED)**

This 4-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

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

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

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

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

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

This connector is for the system power button.

- **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.

PANEL

+PWR_LED- PWR_SW SPEAKER

PLED+
PLED-
PWRBTN#
GND
+5V
GND
GND
Speaker

PIN 1

HDD_LED+
HDD_LED-
GND
RSTCON#
NC
PLED+
PLED-
PLED-

+HDD_LED- RESET +PWR_LED-
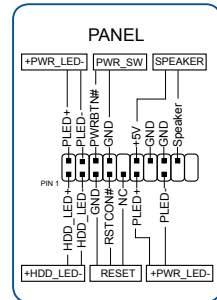
9. USB 3.0 connector (20-1 pin USB3_12)

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

USB3_12

GND	IntA_P2_D+
IntA_P1_D+	IntA_P2_D-
IntA_P1_D-	GND
GND	IntA_P2_SSTX+
IntA_P1_SSTX+	IntA_P2_SSTX-
IntA_P1_SSTX-	GND
GND	IntA_P2_SSRX+
IntA_P1_SSRX+	IntA_P2_SSRX-
IntA_P1_SSRX-	USB3+5V
USB3+5V	

PIN 1
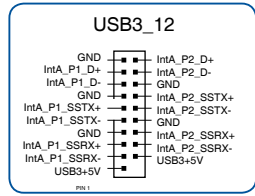
10. USB 2.0 connector (10-1 pin USB1112)

This connector is for USB 2.0 ports. Connect the USB module cable to any of this connector, then install the module to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specifications and supports up to 480Mbps connection speed.

USB1112

USB+5V
USB_P11-
USB_P11+
GND
NC

PIN 1

USB+5V
USB_P12-
USB_P12+
GND
GND

Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!
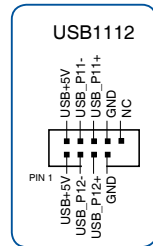
11. TPM connector (14-1 pin TPM)

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

TPM

F_CLKRUN
F_SERIRQ
F_FRAME#
F_LAD3
F_LAD2
F_LAD1
F_LAD0

PIN 1

S_PCIRST#_TBD
+3VSB
GND
C_PCICLK_TPM
+3V
+3V

The TPM module is purchased separately.
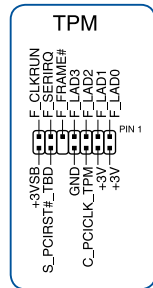
12. Serial port connector (10-1 pin COM)

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.

COM

RXD
DTR
DSR
CTS

PIN 1

DCD
TXD
GND
RTS
RI
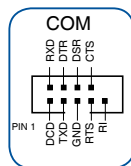
13. Front panel audio connector (10-1 pin AAFP)

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

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

- If you want to connect a high-definition front panel audio module to this connector, set the **Front Panel Type** item in the BIOS setup to [HD]. If you want to connect an AC'97 front panel audio module to this connector, set the item to [AC97]. By default, this connector is set to [HD].
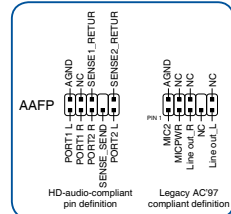
14. Digital audio connector (4-1 pin SPDIF_OUT)

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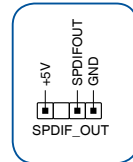
15. PCI slots

The PCI slots support cards such as LAN card, SCSI card, USB card, and other cards that comply with the PCI specifications.

16. PCI Express 3.0/2.0 x1 slots

This motherboard has two PCI Express 3.0/2.0 x1 slots that support PCI Express x1 network cards, SCSI cards, and other cards that comply with the PCI Express specifications.

17. PCI Express 3.0/2.0 x16 slots

This motherboard supports two PCI Express 3.0/2.0 x16 graphic cards that comply with the PCI Express specifications.

4

BIOS Setup

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

4.1   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 **E30G4.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.

4.2   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> during the Power-On Self Test (POST). If you do not press <Delete>, 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 **4.10 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 **1.2.6 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.

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.

4.2.1   EZ Mode

By default, the EZ Mode screen appears when you enter the BIOS setup program. 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.

Displays the system properties of the selected mode. Click < or > to switch EZ System Tuning modes

Displays the CPU/motherboard temperature, CPU voltage output, CPU/chassis/power fan speed, and SATA information

Selects the display language of the BIOS setup program

Creates storage RAID and configures system overclocking

Enables or disables the SATA RAID mode for Intel Rapid Storage Technology

Displays the CPU Fan's speed. Click the button to manually tune the fans

Loads optimized default settings

Saves the changes and resets the system

Click to go to Advanced mode

Search on the FAQ

Click to display boot devices

Selects the boot device priority

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

4.2.2 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.

> To switch from EZ Mode to Advanced Mode, click **Advanced Mode(F7)** or press the <F7> hotkey.

Configuration fields
Pop-up Menu
Menu bar   **Language**   **MyFavorite(F3)**   **Qfan Control(F6)**   **EZ Tuning Wizard(F11)**   **Scroll bar**   **Quick Note (F9)**   **Hot Keys**

UEFI BIOS Utility – Advanced Mode

04/13/2017 Thursday 11:23 ⊕ English MyFavorite(F3) Qfan Control(F6) EZ Tuning Wizard(F11) Quick Note(F9) Hot Keys

My Favorites   Main   Ai Tweaker   Advanced   Monitor   Boot   Tool   Exit

Target CPU Turbo-Mode Frequency : 4000MHz
Target DRAM Frequency : 2133MHz
Target Cache Frequency : 4000MHz

CPU Core Ratio   Auto
DRAM Odd Ratio Mode   Auto
                                                        Sync All Cores
                                                        Per Core
DRAM Frequency
EPU Power Saving Mode   Disabled
CPU SVID Support   Auto
➤ DRAM Timing Control
➤ DIGI+ VRM
➤ Internal CPU Power Management
CPU Core/Cache Current Limit Max.   Auto

[Auto]: The system will adjust all core ratios automatically.
[Sync All Cores]: Configure a core ratio limit to synchronize all cores.
[Per Core]: Configure the core ratio limit per core.

Hardware Monitor

CPU
Frequency   Temperature
3700 MHz   37°C
BCLK   Core Voltage
100.0 MHz   1.152 V
Ratio
37x

Memory
Frequency   Voltage
2133 MHz   1.200 V
Capacity
16384 MB

Voltage
+12V   +5V
12.096 V   5.040 V
+3.3V
3.392 V

Last Modified   EzMode(F7)→   Search on FAQ

Version 2.17.1246. Copyright (C) 2017 American Megatrends, Inc.

Menu items   **General help**   **Last modified settings**   **Go back to EZ Mode**

Search on the FAQ

Displays the CPU temperature, CPU, and memory voltage output

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 **4.3 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 **4.2.3 QFan Control** for more information.

EZ Tuning Wizard (F11)

This button above the menu bar allows you to view and tweak the overclocking settings of your system. It also allows you to change the motherboard's SATA mode from AHCI to RAID mode.

Refer to section **4.2.4 EZ Tuning Wizard** for more information.

Quick Note (F9)

This button above the menu bar allows you to key in notes of the activities that you have done in BIOS.

- The Quick Note function does not support the following keyboard functions: delete, cut, copy, and paste.

- You can only use the alphanumeric characters to enter your notes.

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:

Hot keys

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

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 top right corner 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.

Last Modified button

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

4.2.3   QFan Control

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

Click to select a fan to be configured

Click to activate PWM Mode

Click to activate DC Mode

Q-Fan Control
Select your target fan and then move the slider to select any of these profiles: Standard, Silent, Turbo and Full Speed). You can also move the slider to Manual and manually configure the fan's operating speed.

⊘ Optimize All

CPU FAN
CHA1 FAN
CHA2 FAN

%
100

50

0   30   70   100   ℃

Standard   Silent   Turbo   Full Speed   Manual

Undo   Apply   Exit (ESC)

Select a profile to apply to your fans

Click to apply the fan setting

Click to undo the changes

Click to go back to main menu

Select to manually configure your fans

Configuring fans manually

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

Speed points

Select to manually configure your fans
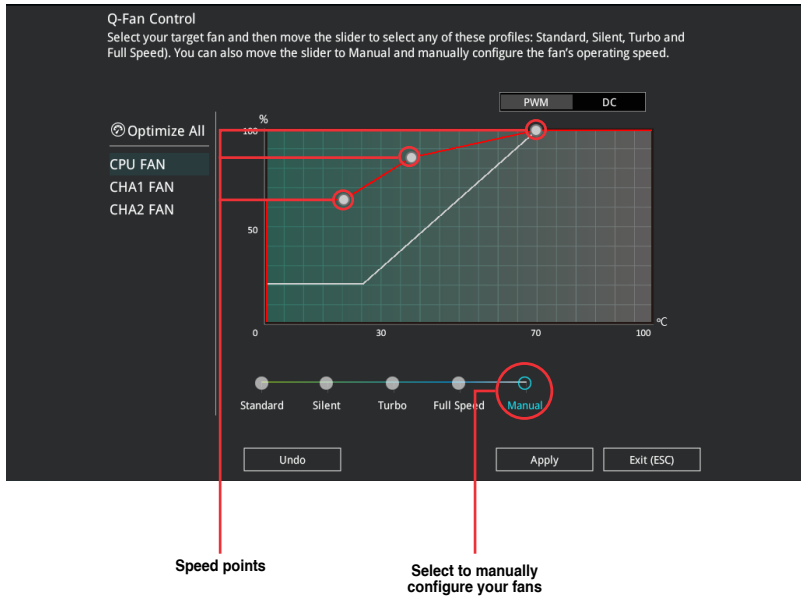
To configure your fans:
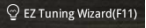
1. Select the fan that you want to configure and to view its current status.

2. Click and drag the speed points to adjust the fans' operating speed.

3. Click **Apply** to save the changes then click **Exit (ESC)**.

4.2.4   EZ Tuning Wizard

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

Creating RAID

To create RAID:

1.   Press <F11> on your keyboard or click � EZ Tuning Wizard(F11) from the BIOS screen to open EZ Tuning Wizard screen.

2.   Click **Next**.

- Ensure that your HDDs have no existing RAID volumes.

- Ensure to connect your HDDs to Intel® SATA connectors.
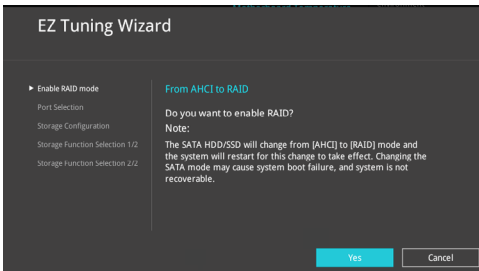
3.   Select SATA to set [RAID] mode, then click **Next**.
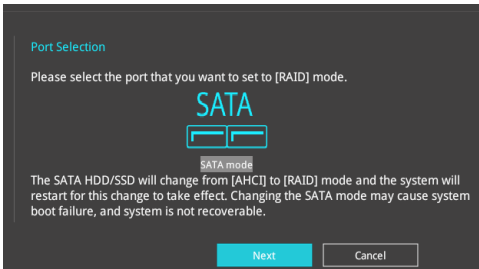
4. Select the type of storage for your RAID, **Easy Backup** or **Super Speed**, then click **Next**.
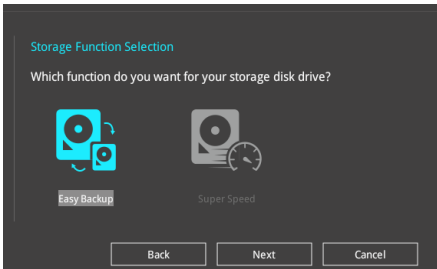
a. For Easy Backup, click **Next** then select from **Easy Backup (RAID 1)** or **Easy Backup (RAID 10)**.
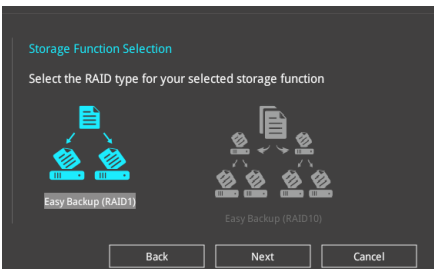
You can only select Easy Backup (RAID 10) if you connect four (4) HDDs.

b. For Super Speed, click **Next** then select from **Super Speed (RAID 0)** or **Super Speed (RAID 5)**.
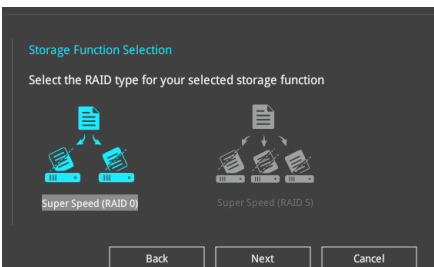
5. After selecting the type of RAID, click **Next** then click **Yes** to continue the RAID setup.

6. After the RAID setup is done, click **Yes** to exit the setup then click **OK** to reset your system.

4.3   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.

Adding items to My Favorites

To add BIOS items:

1. Press <F3> on your keyboard or click [(F3)MyFavorite] 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.

Main menu panel

Submenu panel

Selected shortcut items

Delete all favorite items

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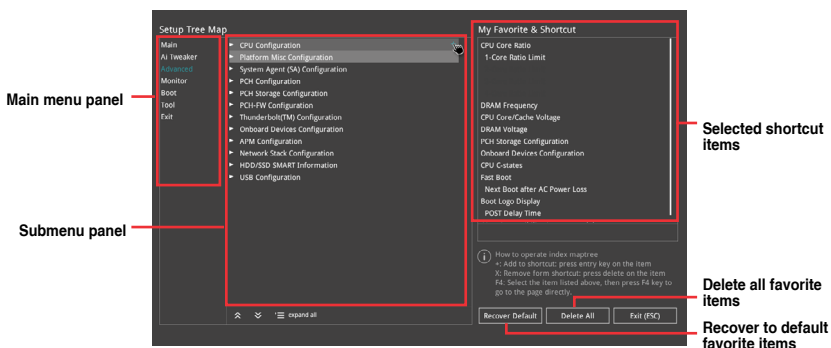
3. Select an item from main menu panel, then click the submenu that you want to save as favorite from the submenu panel and click [+] or press <Enter> on your keyboard.

> 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.

4.4   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 **3.1 Motherboard layout** for
        information on how to erase the RTC RAM via the CLRTC header.

   •   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]**.

4.5   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.

CPU Core Ratio

This item allows you to set the CPU core ratios.

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

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] - [DDR4-4266MHz]

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]

4.6 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.

4.6.1 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.

Hyper-threading

This item allows a hyper-threading processor to appear as two logical processors, allowing the operating system to schedule two threads or processors simultaneously.

Configuration options: [Disabled] [Enabled]

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]

4.6.2 Platform Misc Configuration

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

4.6.3 System Agent (SA) Configuration

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

4.6.4   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]

4.6.5   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: [Disabled] [Enabled]

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.
[RAID]   Set to [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]

4.6.6   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 **3.1 Motherboard layout** for the location of the USB ports.

4.6.7   Onboard Devices Configuration

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

HD Audio Controller

This item allows you to use the Azalia High Definition Audio Controller

Configuration options: [Disabled] [Enabled]

M.2/PCIEX16_2 Switch Control

[Auto]   The system automatically detects the connected device and set a higher priority to M.2 over PCIEX16_2. When M.2 and PCIEX16_2 devices are connected independently, the system can detect both. When M.2 and PCIEX16_2 devices are connected at the same time, the system can only detect M.2 devices.

[M.2]   Only M.2 devices can be detected.

[PCIEX16_2]   Only PCIEX16_2 devices can be detected.

Realtek LAN Controller

This item allows you to enable or disable the Realtek LAN controllers.

Configuration options: [On] [Off]

4.6.8   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)]

4.6.9   Network Stack Configuration

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

4.6.10   Intel TXT Information

This menu displays the Intel TXT information.

4.6.11   HDD/SSD SMART Information

This menu displays the SMART information of the connected devices.

> NVM Express devices do not support SMART information.

4.7   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.

4.8   Boot menu

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

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.

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
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 Device
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
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
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.

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.

4.9 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]

4.9.1 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 **4.11.2 ASUS EZ Flash 3**.

4.9.2 ASUS Overclocking Profile

This item allows you to store or load multiple BIOS settings.

Load from 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.

4.9.3 ASUS SPD Information

This item allows you to view the DRAM SPD information.

4.10   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.

4.11   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.

4.11.1   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.

4.11.2   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.**
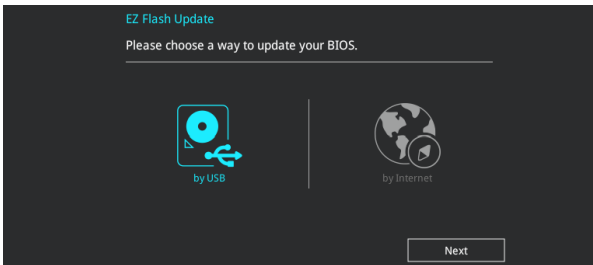
4.   Press <Tab> to switch to the Drive field.

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.
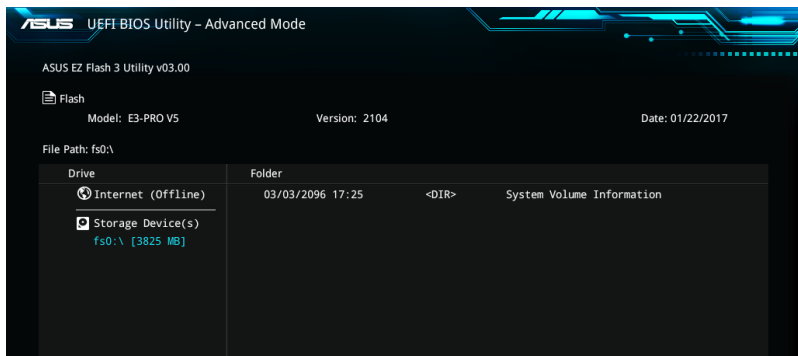
- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.

- 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 **4.10 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.**

EZ Flash Update
Please choose a way to update your BIOS.

by USB   by Internet

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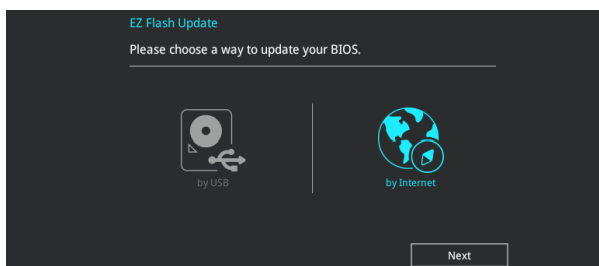
3. Press the Left/Right arrow keys to select an Internet connection method, and then press <Enter>.

Network Connection
Choose an internet connection method

DHCP   PPPoE   FixIP

255.X.X.X

Next   Cancel
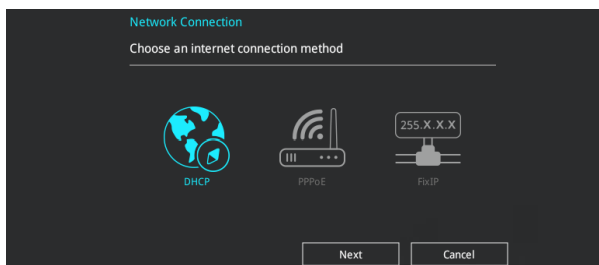
4. Follow the onscreen instructions to complete the update.

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 **4.10 Exit Menu** for details.

4.11.3   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!

RAID Configuration

5

This chapter provides instructions for setting up, creating, and configuring RAID sets using the available utilities.

5.1 RAID configurations

The motherboard supports Intel® Rapid Storage Technology enterprise Option ROM Utility with RAID 0, RAID 1, RAID 10, and RAID 5 support.

If you want to install a Windows® operating system to a hard disk drive included in a RAID set, you have to create a RAID driver disk and load the RAID driver during OS installation. Refer to section **5.2 Creating a RAID driver disk** for details.

5.1.1 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.

5.1.2 Installing Serial ATA hard disks

The motherboard supports Serial ATA hard disk drives. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SATA hard disks for a RAID configuration:

1. Install the SATA hard disks into the drive bays.

2. Connect the SATA signal cables.

3. Connect a SATA power cable to the power connector on each drive.

5.1.3 Intel® Rapid Storage Technology in UEFI BIOS

To enter the Intel® Rapid Storage Technology in UEFI BIOS:

1. Enter the BIOS Setup during POST.

2. Go to the **Advanced** menu **> PCH Storage Configuration**, then press <Enter>.

3. Set the SATA Controller Mode Selection item to **[RAID Mode]**.

4. Go to the **Boot** menu > **CSM (Compatibility Support Module)** > **Launch CSM**, then set the item to **[Disabled]**.

5. Save your changes and exit the BIOS Setup, then enter the BIOS Setup again.

6. Go to the **Advanced** menu **> Intel(R) Rapid Storage Technology**, then press <Enter> to display the Intel® Rapid Storage Technology menu.

Refer to Chapter 4 for details on entering and navigating through the BIOS Setup.

Due to chipset limitation, when SATA ports are set to RAID mode, all SATA ports run at RAID mode together.
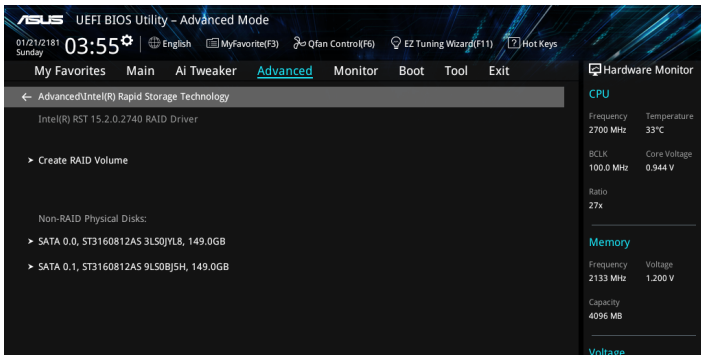
Creating a RAID set

To create a RAID set:

1. From the Intel® Rapid Storage Technology menu, select **Create RAID Volume** and press <Enter>. The following screen appears:
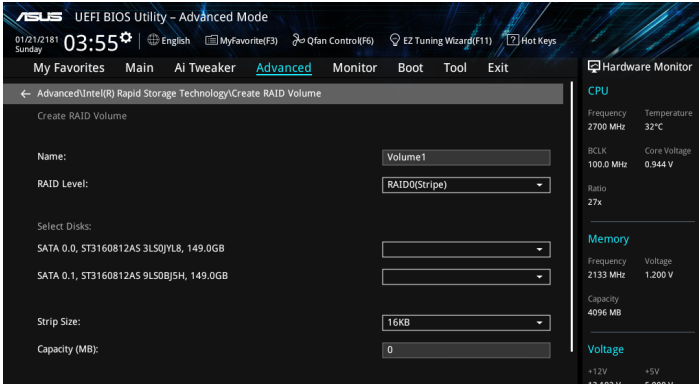
2. When the Name item is selected, enter a name for the RAID set and press <Enter>.

3. When the RAID Level item is selected, press <Enter> to select the RAID level to create, and then press <Enter>.

4. Under Select Disks, press <Enter> and select **X** for the disks you want to include in the RAID set.
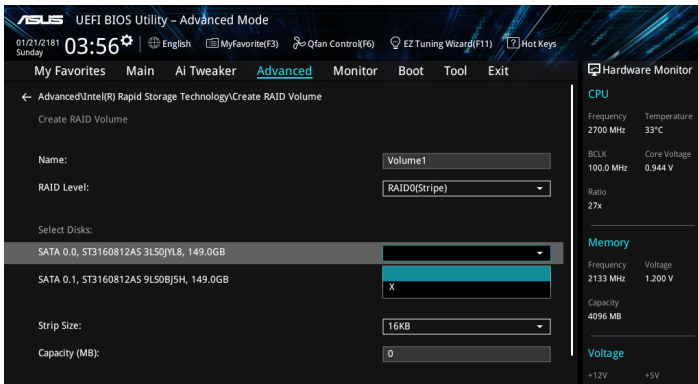
5.	When the Strip Size item is selected, press <Enter> to select strip size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available strip size values range from 4 KB to 128 KB. The following are typical values:

-	RAID 0: 128 KB

-	RAID 10: 64 KB

-	RAID 5: 64 KB

> We recommend a lower strip size for server systems, and a higher strip size for multimedia computer systems used mainly for audio and video editing.
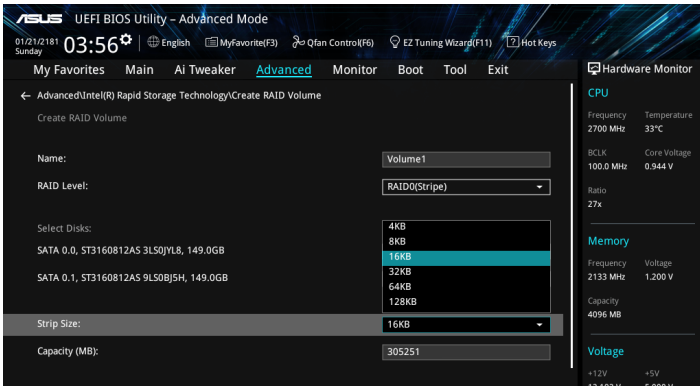
6.	When the **Capacity (MB)** item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.

7.	When the **Create Volume** item is selected, press <Enter> to create the RAID volume and return to the Intel® Rapid Storage Technology menu.
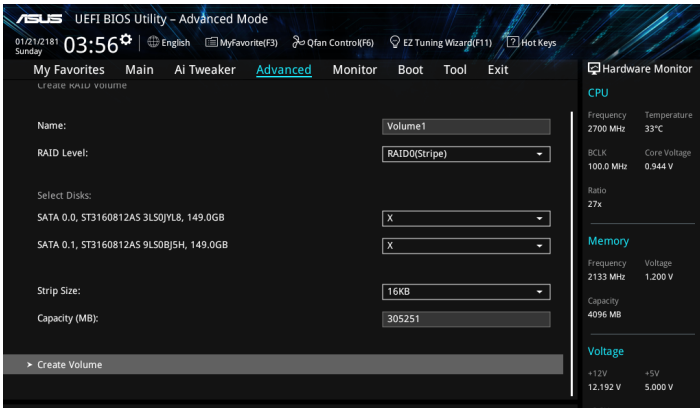
Deleting a RAID set

Be cautious when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the Intel® Rapid Storage Technology menu, select the RAID volume you want to delete and press <Enter>. The following screen appears:
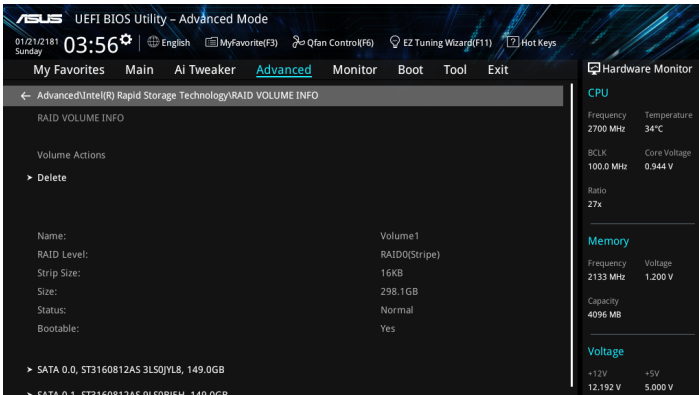
2. When the **Delete** item is selected, press <Enter>, then select **Yes** to delete the RAID volume and return to the Intel® Rapid Storage Technology menu, or select **No** to cancel.
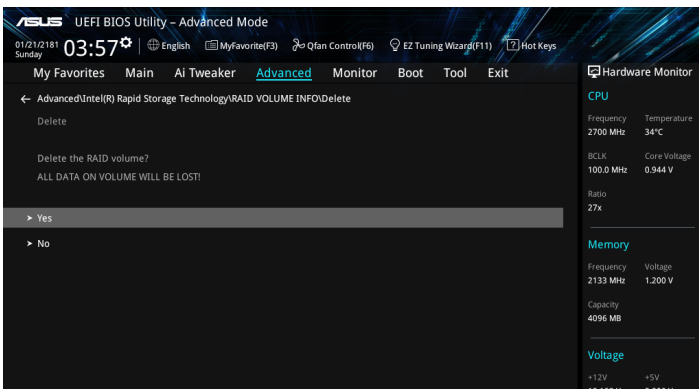
5.1.4   Intel® Rapid Storage Technology Option ROM utility

To enter the Intel® Rapid Storage Technology Option ROM utility:

1.   Turn on the system.

2.   During POST, press <Ctrl> + <I> to display the utility main menu.

```
        Intel(R) Rapid Storage Technology - Option - v10.5.1.1070
        Copyright(C) 2003-14 Intel Corporation. All Rights Reserved.

================================[ MAIN MENU ]===============================

        1.  Create RAID Volume         4.  Recovery Volume Options
        2.  Delete RAID Volume         5.  Acceleration Options
        3.  Reset Disks to Non-RAID    6.  Exit


=========================[ DISK/VOLUME INFORMATION ]========================
    RAID Volumes:
    None defined.

    Physical Devices:
    Port   Device Model   Serial #        Size      Type/Status(Vol ID)
    0      ST3160812AS    9LS0HJA4        149.0GB   Non-RAID Disk
    1      ST3160812AS    9LS0F4HL        149.0GB   Non-RAID Disk
    2      ST3160812AS    3LS0JYL8        149.0GB   Non-RAID Disk
    3      ST3160812AS    9LS0BJ5H        149.0GB   Non-RAID Disk



[↑↓]-Select              [ESC]-Exit           [ENTER]-Select Menu
```

The navigation keys at the bottom of the screen allow you to move through the menus and select the menu options.

The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

The utility supports maximum four hard disk drives for RAID configuration.

Creating a RAID set

To create a RAID set:

1. From the utility main menu, select **1. Create RAID Volume** and press <Enter>. The following screen appears:

```
         Intel(R) Rapid Storage Technology - Option - v10.5.1.1070
         Copyright(C) 2003-14 Intel Corporation. All Rights Reserved.

                          [CREATE VOLUME MENU]
                         Name:    Volume 0
                   RAID Level:
                        Disks:
                   Strip Size:
                     Capacity:
                         Sync:
                          Create volume


                               [HELP]


         Enter a unique volume name that has no special characters
         and is 16 characters or less.



  [↑↓]-Select              [ESC]-Exit        [ENTER]-Select Menu
```
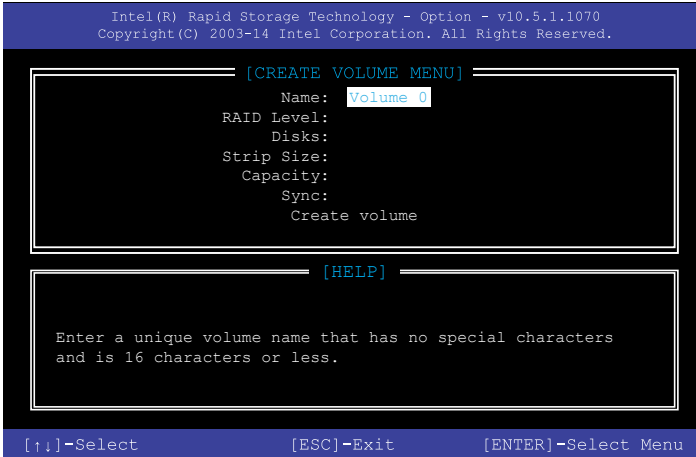
2. Enter a name for the RAID set and press <Enter>.

3. When the RAID Level item is selected, press the up/down arrow key to select a RAID level to create, and then press <Enter>.

4. When the Disks item is selected, press <Enter> to select the hard disk drives you want to include in the RAID set. The SELECT DISKS screen appears:

```
                            [SELECT DISKS]

     Port   Device Model    Serial #      Size       Status
     0      ST3160812AS     9LS0HJA4      149.0GB    Non-RAID Disk
     1      ST3160812AS     9LS0F4HL      149.0GB    Non-RAID Disk
     2      ST3160812AS     3LS0JYL8      149.0GB    Non-RAID Disk
     3      ST3160812AS     9LS0BJ5H      149.0GB    Non-RAID Disk

          Select 2 to 6 to use in creating the volume.


  [↑↓]-Prev/Next  [SPACE]-SelectDisk  [ENTER]-Done
```

5.	Use the up/down arrow key to select a drive, and then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.

6.	Use the up/down arrow key to select the strip size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available strip size values range from 4 KB to 128 KB. The following are typical values:

-	RAID 0: 128 KB

-	RAID 10: 64 KB

-	RAID 5: 64 KB

We recommend a lower strip size for server systems, and a higher strip size for multimedia computer systems used mainly for audio and video editing.

7.	When the **Capacity** item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.

8.	When the **Create Volume** item is selected, press <Enter>. The following warning message appears:

```
WARNING:  ALL DATA ON SELECTED DISKS WILL BE LOST.
Are you sure you want to create this volume? (Y/N)
```

9.	Press <Y> to create the RAID volume and return to the main menu, or <N> to go back to the CREATE VOLUME menu.

Deleting a RAID set

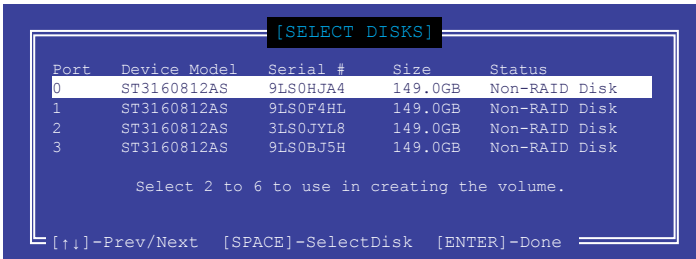⚠ Be cautious when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1.   From the utility main menu, select **2. Delete RAID Volume** and press <Enter>. The following screen appears:

```
                        ═══════[DELETE VOLUME MENU]═══════
    Name        Level           Drives   Capacity   Status    Bootable
    Volume0     RAID0 (Stripe)   2        298.0GB    Normal       Yes




                        ═══════ [HELP] ═══════

          Deleting a volume will reset the disks to non-RAID.

                 WARNING:   ALL DISK DATA WILL BE DELETED.
                 (This does not apply to Recovery volumes)




        [↑↓]-Select   [ESC]-Previous Menu   [DEL]-Delete Volume
```
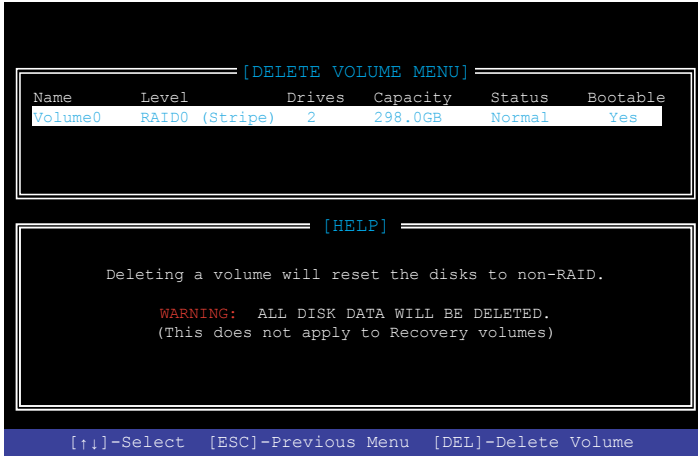
2.   Use the up/down arrow key to select the RAID set you want to delete, and then press <Delete>. The following warning message appears:

```
                    ═══════[DELETE VOLUME VERIFICATION]═══════
                     ALL DATA IN THE VOLUME WILL BE LOST!
             (This does not apply to Recovery volumes)

        Are you sure you want to delete "Volume0"? (Y/N):
```
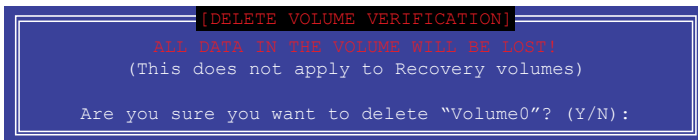
3.   Press <Y> to delete the RAID set and return to the utility main menu, or press <N> to return to the DELETE VOLUME menu.

Exiting the Intel® Rapid Storage Technology Option ROM utility

To exit the utility:

1.	From the utility main menu, select **6. Exit**, then press <Enter>. The following warning message appears:

```
                        [CONFIRM EXIT]
            Are you sure you want to exit? (Y/N):
```
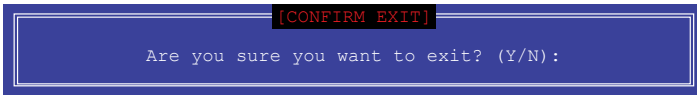
2.	Press <Y> to exit or press <N> to return to the utility main menu.

# 5.2	Creating a RAID driver disk

## 5.2.1	Creating a RAID driver disk in Windows®

To install the RAID driver for Windows® OS:

1.	During the OS installation, click **Load Driver** to allow you to select the installation media containing the RAID driver.

2.	Insert the USB flash drive with RAID driver into the USB port or the support DVD into the optical drive, and then click **Browse**.

3.	Click the name of the device you've inserted, go to **Drivers** > **RAID**, and then select the RAID driver for the corresponding OS version. Click **OK**.

4.	Follow the succeeding screen instructions to complete the installation.

Before loading the RAID driver from a USB flash drive, you have to use another computer to copy the RAID driver from the support DVD to the USB flash drive.

To set up a Windows® UEFI operating system under RAID mode, ensure to load the UEFI driver for your optical drive.

Appendix

A

E3-PRO V5 block diagram

DDR4

DDR4

2DPC, total 4* 288_Pin DDR4
2400/2133/1866/1600/1333
U-DIMM ECC/non-ECC

Skylake(Kaby Lake)
CPU
Up to 95W

X16 Gen3

x16 Slot
PCIEX16_1

DMI3.0

x16 Slot
PCIEX16_2

x4 Gen3

SW1480

x4 Gen3

x4 Gen3

1*M.2

PCH
C232

PCIE Gen3

ASM108X

PCI_1
PCI_2
PCI_3

6* USB3.0 (Rear:4)
6* USB2.0 (Rear:4)

PCIE Gen3

LAN RTL8111H

x1 Slot
PCIEX1_1

x1 Gen3

AZALIA

Realtek ALC887-VD

x1 Slot
PCIEX1_2

x1 Gen3

SATA 6Gb/s

6* SATA3

SPI Flash

TPM

ASUS contact information

ASUSTeK COMPUTER INC.
Address	4F, No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan
Telephone	+886-2-2894-3447
Fax	+886-2-2890-7798
Web site	https://www.asus.com

Technical Support
Telephone	+86-21-38429911
Fax	+86-21-58668722 ext: 9101
Online Support	https://www.asus.com/support/Product/ContactUs/Services/ questionform/?lang=en

ASUSTeK COMPUTER INC. (Taiwan)
Address	4F, No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan
Telephone	+886-2-2894-3447
Fax	+886-2-2890-7798
Web site	https://www.asus.com/tw/

Technical Support
Telephone	+886-2-2894-3447 (0800-093-456)
Online Support	https://www.asus.com/support/Product/ContactUs/Services/ questionform/?lang=zh-tw

ASUSTeK COMPUTER INC. (China)
Address	No. 5077, Jindu Road, Minhang District, Shanghai, China
Telephone	+86-21-5442-1616
Fax	+86-21-5442-0099
Web site	https://www.asus.com.cn

Technical Support
Telephone	+86-20-2804-7506 (400-620-6655)
Online Support	https://www.asus.com/support/Product/ContactUs/Services/ questionform/?lang=zh-cn

ASUS contact information

ASUS COMPUTER INTERNATIONAL (America)

Address	800 Corporate Way, Fremont, CA 94539, USA
Fax	+1-510-608-4555
Web site	https://www.asus.com/us/

Technical Support

Support fax	+1-812-284-0883
General support	+1-812-282-2787
Online support	https://www.asus.com/support/Product/ContactUs/Services/questionform/?lang=en-us

ASUS COMPUTER GmbH (Germany and Austria)

Address	Harkort Str. 21-23, 40880 Ratingen, Germany
Fax	+49-2102-959911
Web site	https://www.asus.com/de/

Technical Support

Telephone	+49-1805-010923
Support Fax	+49-2102-959911
Online support	https://www.asus.com/support/Product/ContactUs/Services/questionform/?lang=de-de

ASUS Czech Service s.r.o. (Europe)

Address	Na Rovince 887, 720 00 Ostrava – Hrabová, Czech Republic
Telephone	+420-596766888
Web site	https://www.asus.com/cz/

Technical Support

Telephone	+420-596-766-891
Fax	+420-596-766-329
E-mail	advance.rma.eu@asus.com
Online Support	https://www.asus.com/support/Product/ContactUs/Services/questionform/?lang=cs-cz

ASUS contact information

ASUS Holland BV (The Netherlands)

Address   Marconistraat 2, 7825GD EMMEN, The Netherlands
Web site   https://www.asus.com/nl/

Technical Support

Telephone   +31-(0)591-5-70292
Fax   +31-(0)591-666853
E-mail   advance.rma.eu@asus.com
Online Support   https://www.asus.com/support/Product/ContactUs/Services/
                 questionform/?lang=nl-nl

ASUS Polska Sp. z o.o. (Poland)

Address   Ul. Postępu 6, 02-676 Warszawa, Poland
Web site   https://www.asus.com/pl/

Technical Support

Telephone   +48-225718033
Online Support   https://www.asus.com/support/Product/ContactUs/Services/
                 questionform/?lang=pl-pl

ASK-Service (Russia and CIS)

Address   г.Москва, ул. Орджоникидзе, д.10, Россия
Telephone   (495) 640-32-75
Web site   https://www.asus.com/ru/

Technical Support

Telephone   008-800-100-ASUS (008-800-100-2787)
Online Support   https://www.asus.com/support/Product/ContactUs/Services/
                 questionform/?lang=ru-ru