TS100-E9-PI4

**Pedestal Server
User Guide**

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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 the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment 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.

Canadian Department of Communications Statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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.

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

Heavy System

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

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/

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 Information**

    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.

6   **Chapter 6: Driver Installation**

    This chapter provides instructions for installing the necessary drivers for different system components.

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 Server Web-based Management (ASWM) user guide**

    This manual tells how to set up and use the proprietary ASUS server management utility.

2. **ASUS websites**

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

Product Introduction

1

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	TS100-E9-PI4
Chassis	ASUS T11 Pedestal Chassis
Motherboard	ASUS P10S-X Server Board
Component	1 x 500W Single Power Supply 1 x 120 mm x 120 mm System fan 4 x SATA Cables 1 x Front I/O Board
Accessories	1 x TS100-E9-PI4 Support CD (with User's Guide) 1 x ASWM DVD 1 x Bag of Screws 1 x AC Power Cable 1 x CPU Heatsink
Optional Items	DVD optical drive

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 xxS0xxxxxxxx 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   System specifications

The ASUS TS100-E9-PI4 is a pedestal barebone server system featuring the ASUS P10S-X server board. The server supports Intel® LGA1151 Xeon® E3-1200 v5 processors with the latest technologies through the chipsets onboard.

Model Name		TS100-E9-PI4
Processor / System Bus		1 x socket LGA1151
		Intel® Xeon® Processor E3-1200 v5 Product Family
Core Logic		Intel® C232 Chipset
Memory	Total Slots	4 UDIMM (2 Channels)
	Capacity	Maximum up to 64 GB (UDIMM)
	Memory Type	DDR4 2133 ECC/non-ECC UDIMM
	Memory Size	4 GB, 8 GB, 16 GB (UDIMM)* *** Please refer to Memory AVL(Authorized Vendors List) for details.**
Expansion Slots	Total PCI/PCI-X/ PCI-E Slots	7
	Slot Type	1 x PCI-E x16 (Gen3 x16 link)
		1 x PCI-E x8 (Gen3 x4 link)
		4 x PCI 32 bit/33 MHz
		1 x MIO slot
Storage		Intel® C232: - 6 * SATA 6Gb/s ports Intel® RSTe (Windows & Linux) (Support software RAID 0, 1, 10 & 5)
HDD Bays	I = internal A or S = hot-swappable	3 x Internal 3.5-inch HDD Bays
		1 x Internal 2.5-inch HDD/SSD Bays
Networking	LAN	2 x Intel® I210AT controller
Graphic	VGA	Aspeed 1400 64MB
Auxiliary Storage FDD / CD / DVD		3 x 5.25-inch media bays
		(Options: No ODD / DVD-RW)
Onboard I/O		1 x External Serial Port
		2 x RJ-45 ports
		4 x USB 3.0 ports (Front x 2, Rear x 2)
		4 x USB 2.0 ports (Front x 2, Rear x 2)
		1 x VGA port
		1 x PS/2 keyboard/mouse port

(continued on the next page)

System specifications

OS Support		Windows® Server 2012
		Windows® Server 2012 R2
		RedHat® Enterprise Linux
		SuSE® Linux Enterprise Server
		CentOS
		VMware
		Citrix XenServer
		* Visit http://www.asus.com/ for the latest OS support.
Anti-virus Software		Optional Anti-Virus CD Pack
Management Solution	**Software**	ASUS ASWM Enterprise
Dimension (HH x WW x DD)		436.8 mm x 200 mm x 478.8 mm
Net Weight Kg (CPU, DRAM & HDD not inclu ded)		15 Kg
Power Supply		500W Bronze 80PLUS Single Power Supply
Power Rating		100–240V, 10A-6A, 50-60Hz, 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 TS100-E9-PI4 Pedestal server 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 fron panel for easy access.

Optical Drive (Optional)

Empty 5.25-inch bay

Microphone port
Headphone port
USB 2.0 ports

HDD access LED
Power LED

Reset button
Power button

USB 3.0 ports
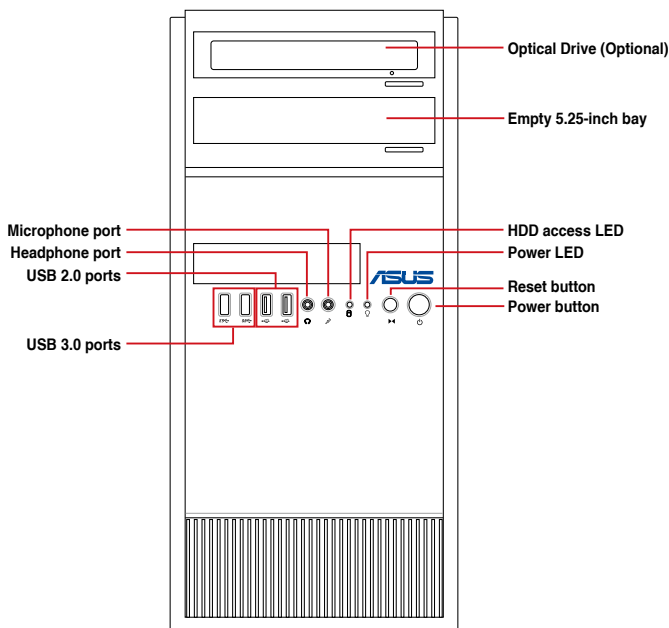
- Refer to the Front panel LEDs section for the LED descriptions.
- The Microphone and Headphone port are available if you install an optional Add-on Audio card into your system.

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.

500W Bronze Single power supply

Power connector

PS/2 keyboard / mouse port

USB 2.0 ports

USB 3.0 ports

Serial port

120 mm x 120 mm system fan vents

VGA port

Gigabit LAN port 1

Gigabit LAN port 2

PCI-E latch

Expansion slots
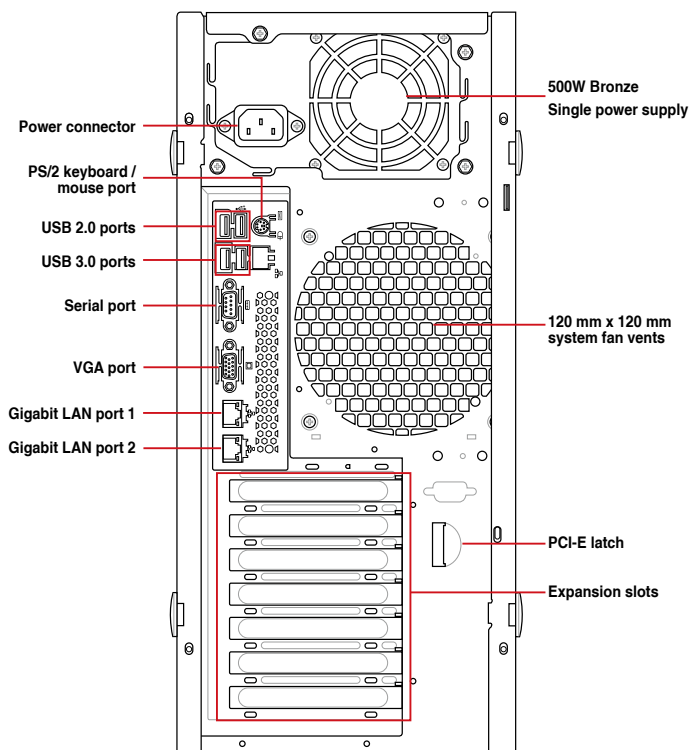
1.6   Internal features

The TS100-E9-PI4 Pedestal server sytem includes the basic components as shown:
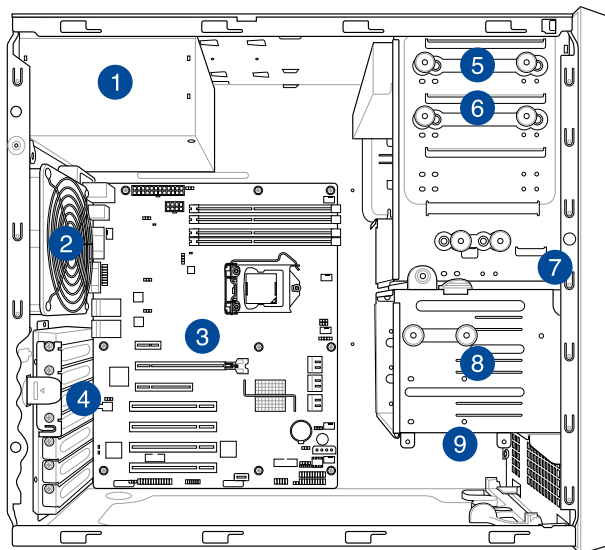
1. Power supply unit

2. 120 mm x 120 mm system fan

3. ASUS P10S-X 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

HDD Access LED
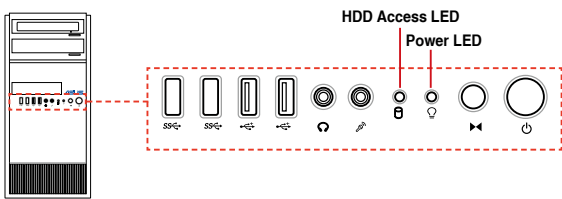
Power LED

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

ACT/LINK LED
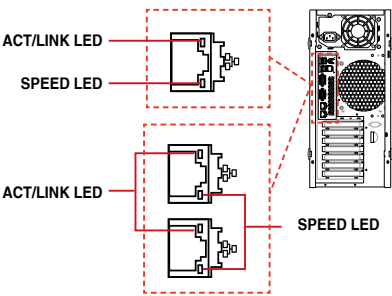
SPEED LED

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 Information

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
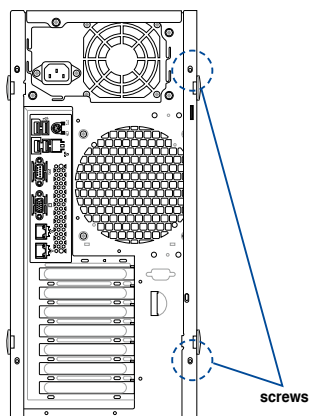
2. Press the side cover locks outward.

side cover locks
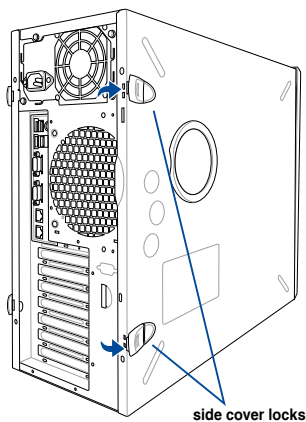
3. Slightly pull the side cover toward the rear just enough to detach it from the chassis.
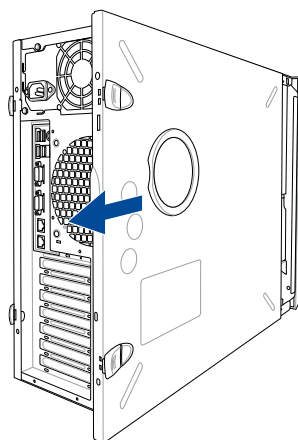
4. Remove the cover and set it aside.
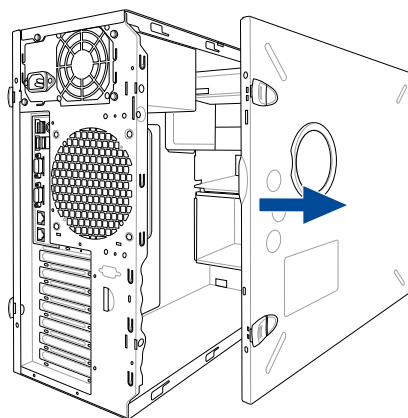
2.2   Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1151 socket designed for the Intel® Xeon® E3-1200 v5 processor.

- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.

- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1151 socket.

- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.2.1   Installing the CPU

To install the CPU:

1.   Locate the CPU socket on the motherboard.

P10S-X CPU LGA1151
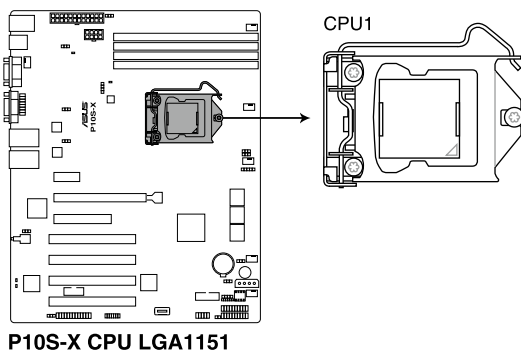
Before installing the CPU, ensure that the socket box is facing toward you and the load lever is on your right.

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

⚠️ Do not remove the PnP cap yet from the CPU socket. Doing so may bend the pins of the socket.
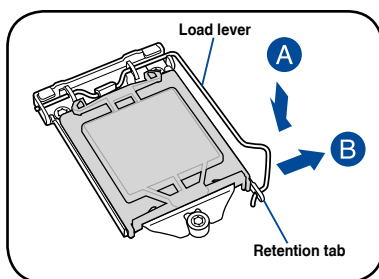
3.   Lift the load lever until the load plate is completely lifted.
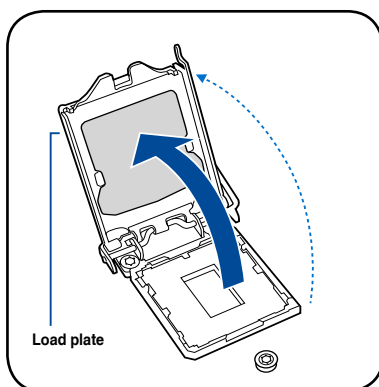
4.   Position the CPU above the socket, ensuring that the gold triangle mark is on the bottom-left corner of the socket, then fit the CPU notches to the socket's alignment keys.

⚠️ The CPU fits in only one orientation. DO NOT force the CPU into the socket to prevent bending the pins on the socket and damaging the CPU.
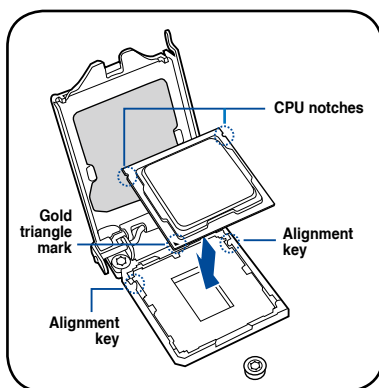
5. Close the load plate (A), ensuring that
    the front edge of the load plate slides
    under the retention lock (B) then push
    down the load lever (C).

Load lever

C

A

Retention lock

B
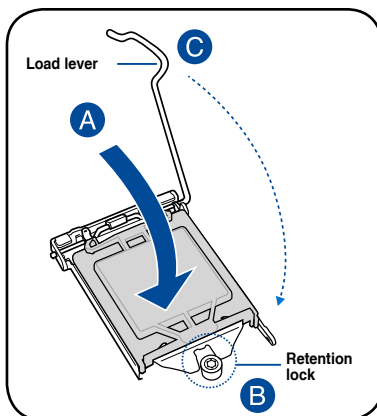
6. Insert the load lever under the retention tab to remove the PnP cap from the CPU
    socket.

Load lever

Retention tab
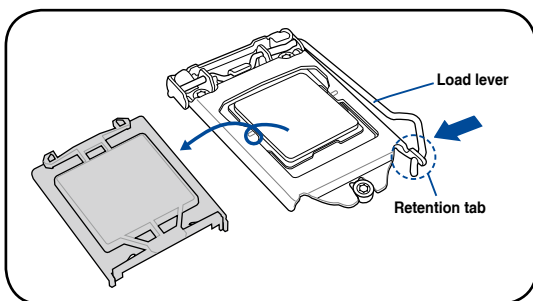
7. Apply some Thermal Interface Material
    to the exposed area of the CPU that the
    heatsink will be in contact with, ensuring
    that it is evenly spread in a thin layer.

Some heatsinks come with pre-
applied Thermal Interface Material. If
so, skip this step.

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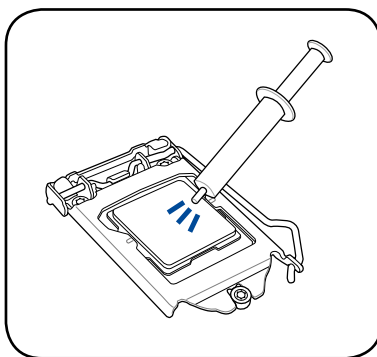
2.2.2   Installing the CPU heatsink and fan assembly

To install the CPU heatsink and fan assembly
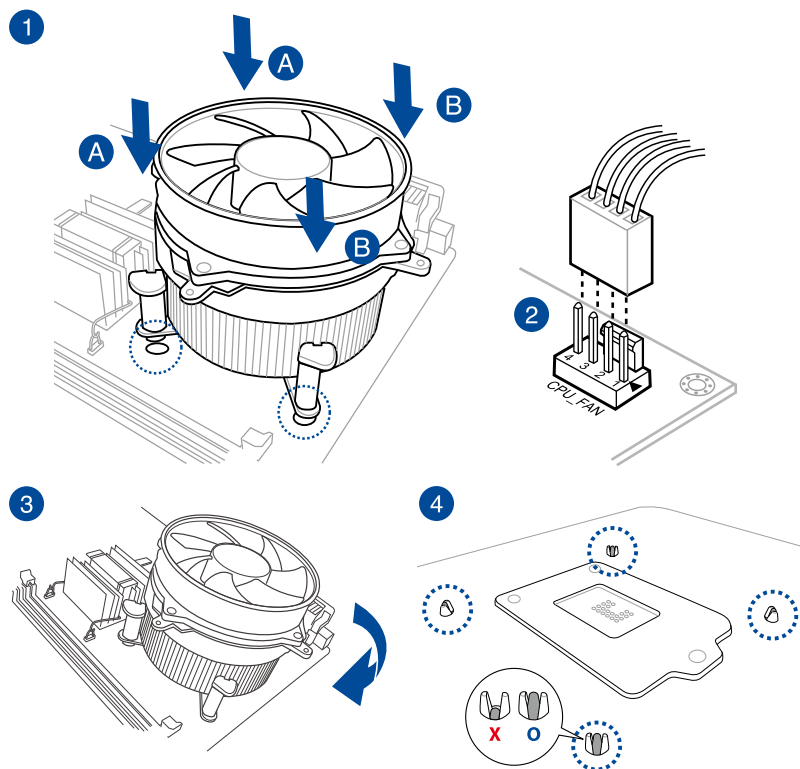
5. Connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN1.

CPU_FAN1

PWM Control
FAN Speed
FAN Power
GND

P10S-X Fan connector
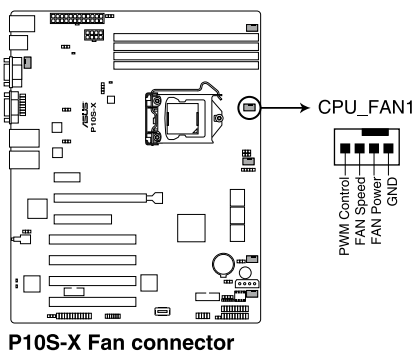
DO NOT forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

2.2.3 Uninstalling the CPU heatsink and fan

To uninstall the CPU heatsink and fan:

1. Disconnect the CPU fan cable from the connector on the motherboard.

2. Rotate each fastener counterclockwise.

3. Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the motherboard.
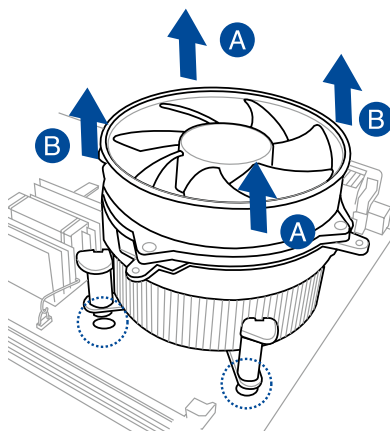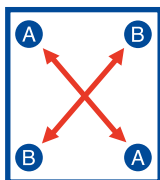
4. Carefully remove the heatsink and fan assembly from the motherboard.

2.3 System memory

2.3.1 Overview

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

> ⚠️ 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.

The figure illustrates the location of the DDR4 DIMM sockets:
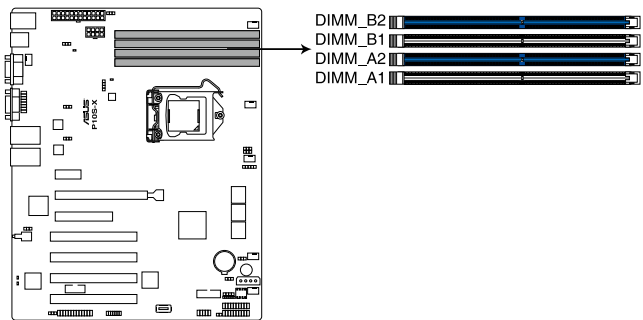
P10S-X 288-pin DDR4 DIMM sockets

2.3.2 Memory Configurations

You may install unbuffered DDR4 DIMMs into the DIMM sockets using the memory configurations in this section.

Memory Configuration				
DIMM Slot Per Channel	DIMM Populated per Channel	DIMM Type	Speed	Rank per DIMM
2	1	Unbuffered DDR4	2133	Single Rank, Dual Rank
2	2	Unbuffered DDR4	2133	Single Rank, Dual Rank

> • Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.
> • Start installing the DIMMs in slots A2 and B2 (Blue).

2.3.3   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**
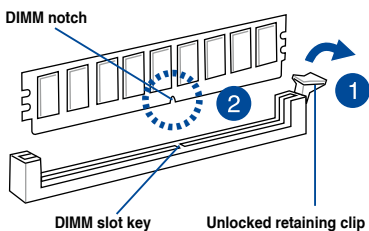
> A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

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
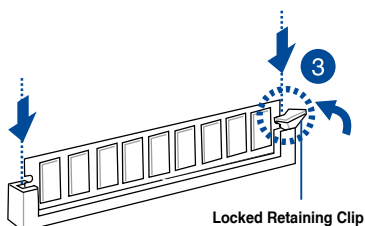
> Always insert the DIMM into the socket vertically to prevent DIMM notch damage.

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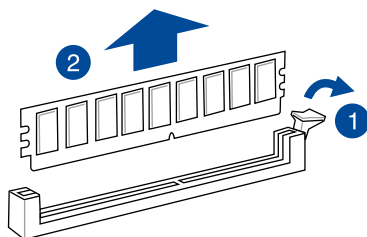
> Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

2.4 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!

2.4.1 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
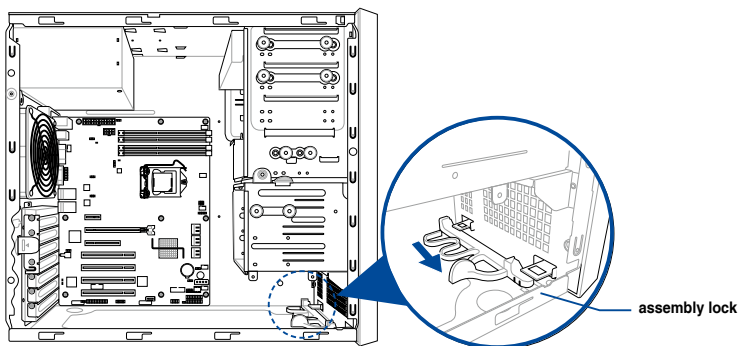
2. Remove the front panel assembly from the chassis and set it aside.

front panel assembly
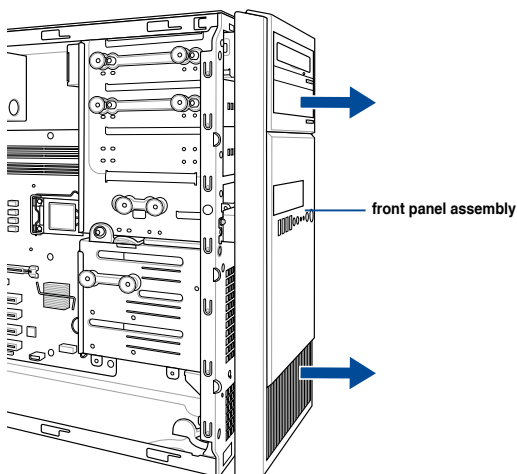
2.5   5.25-inch drives

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.
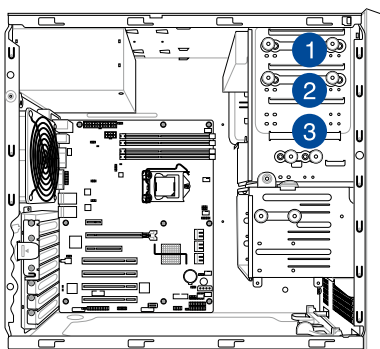
Installing a 5.25-inch drive

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
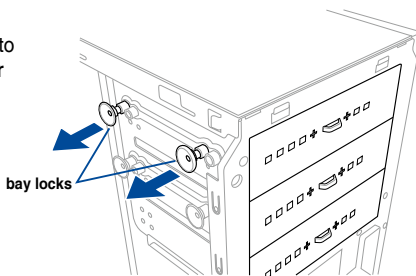
3. Remove the metal cover of the bay you intend to use.

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
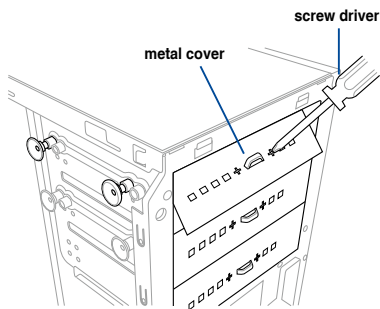
4.   Prepare the 5.25-inch drive.

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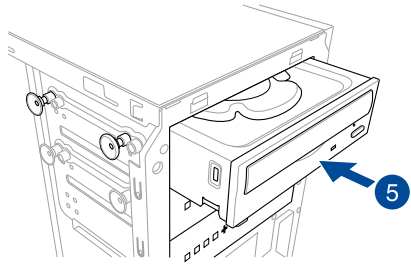
6.   Push the bay locks to secure the drive in
      place.

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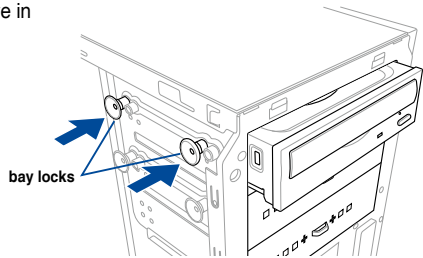
7.   Connect the SATA cable to the SATA
      connector of the drive.

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
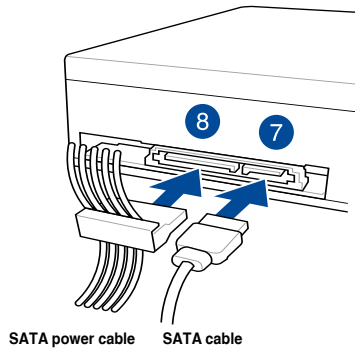
2.6 Hard disk drives (HDD)

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.

HDD cage lock
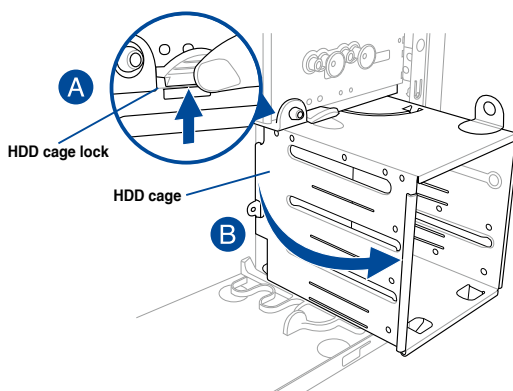
HDD cage

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.

screw hole (HDD cage)   **screw holes (HDD)**
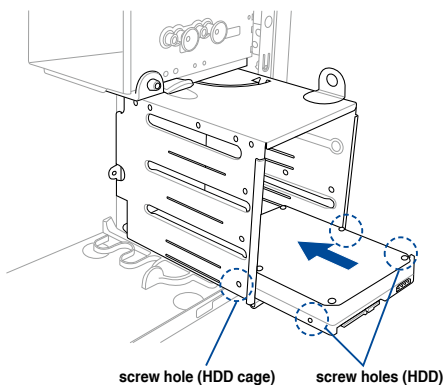
5.	Secure the 3.5-inch HDD to the HDD cage using the bundled set of screws.
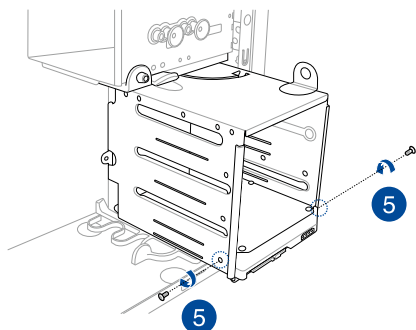
6.	Swing the HDD cage inwards until it clicks back into place.

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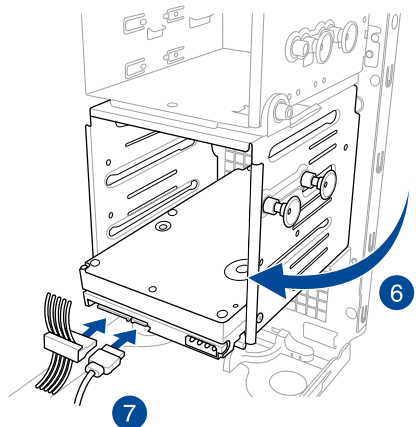
Installing 2.5-inch HDD/SSD

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.

HDD cage lock

A

B HDD cage

matching screw holes

5
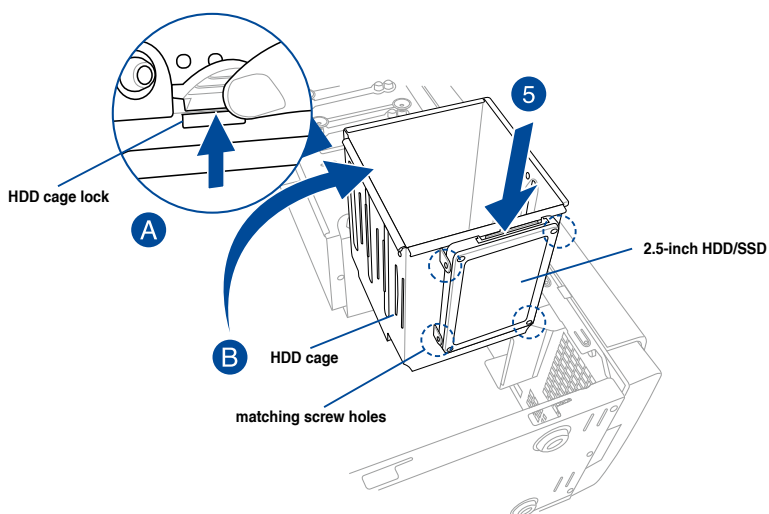
2.5-inch HDD/SSD

6.   Secure the 2.5-inch HDD/SSD to the HDD cage using the bundled set of screws.
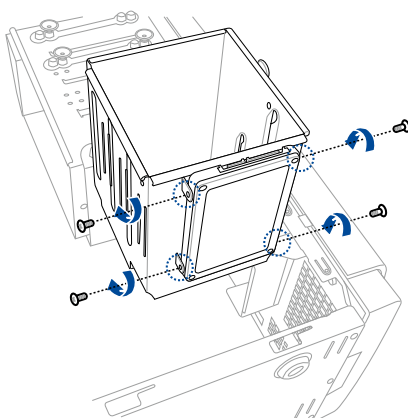
7.   Swing the HDD cage inwards until it clicks back into place.
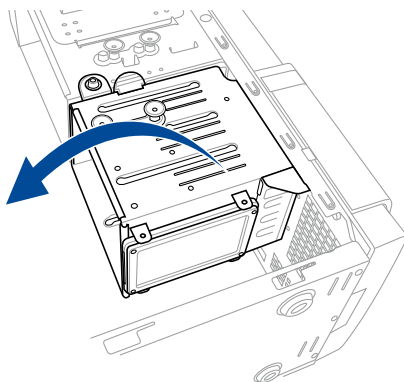
8.   Connect a SATA cable and a SATA power cable to the 2.5-inch HDD/SSD.
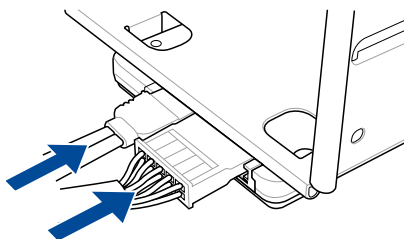
2.7 Expansion cards

The system has expansion slots on the rear panel that allows you to install expansion cards or additional components.

Ensure to unplug the power cord before installing or removing expansion cards. Failure to do so may cause severe damage to the motherboard and other system components!

Read the documentation of the expansion card and make the necessary hardware settings for the card before installing them.

2.7.1 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
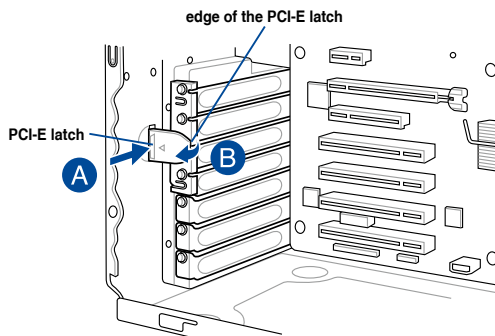
PCI-E latch

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

screw
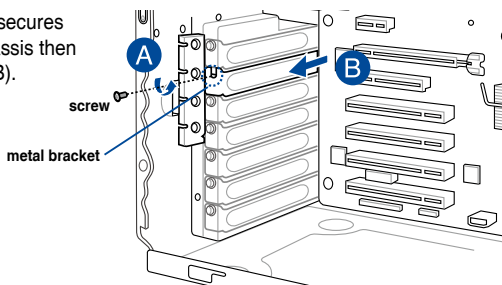
metal bracket

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

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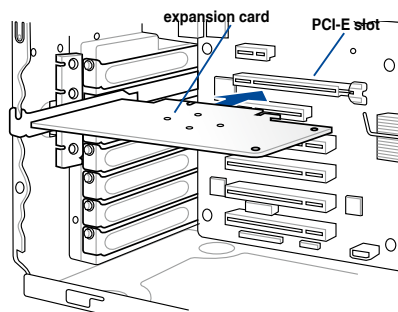
5.   Lift the PCI-E latch inwards until it clicks into place securing the expansion card to the
      chassis.

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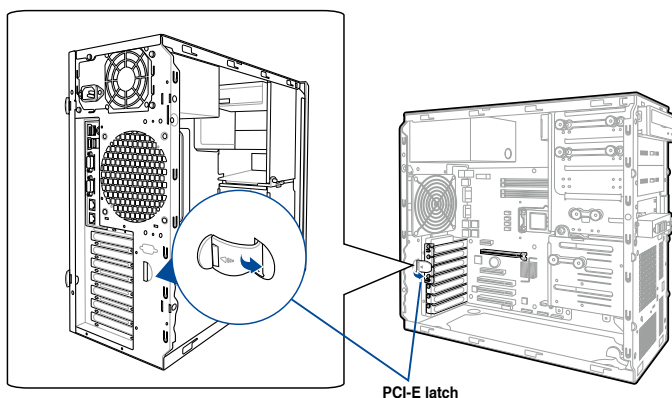
6.   (Optional) Replace the screw of the
      metal bracket.
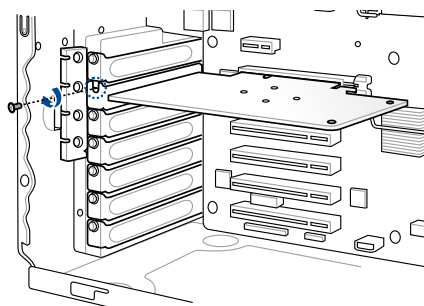
2.7.2 Configuring an expansion card

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

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 5 for information on BIOS setup.

2. Assign an IRQ to the card. Refer to the following tables.

3. Install the software drivers for the expansion card.

Standard Interrupt assignments

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

2.8 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 REAR_FAN1 connector on the motherboard.
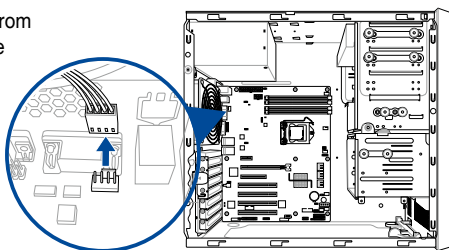
2. Remove the four system fan screws at the rear panel. Keep the screws for later use.

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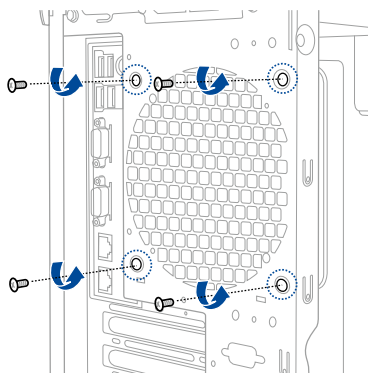
3. Remove the system fan.

   Follow the previous instructions in reverse order if you want to reinstall the system fan.
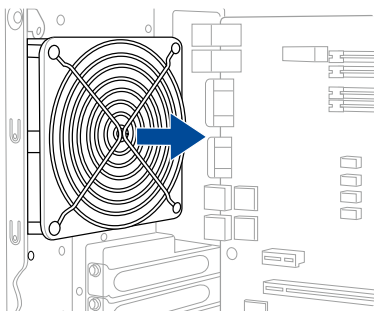
2.9 Cable connections

![note icon] • The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you will remove pre-installed components to install additional devices.

   • Refer to Chapter 3 for detailed information on the connectors.
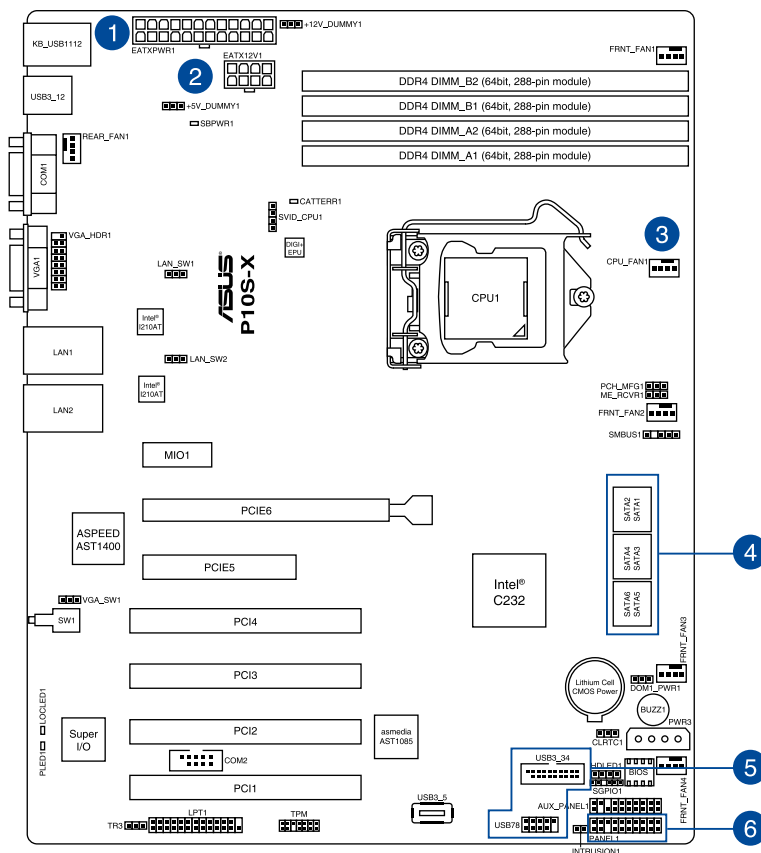
Standard cables connected to the motherboard

1. 24-pin ATX power connector (from power supply to motherboard)

2. 8-pin ATX 12V power connector (from power supply to motherboard)

3. System fan connector (from system fan to motherboard)

4. SATA conectors (system default; from motherboard to SATA devices)

5. USB connectors (from motherboard to front I/O board)

6. System panel connector (from motherboard to front I/O board)

Motherboard Information

3

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

3.1 Motherboard layout
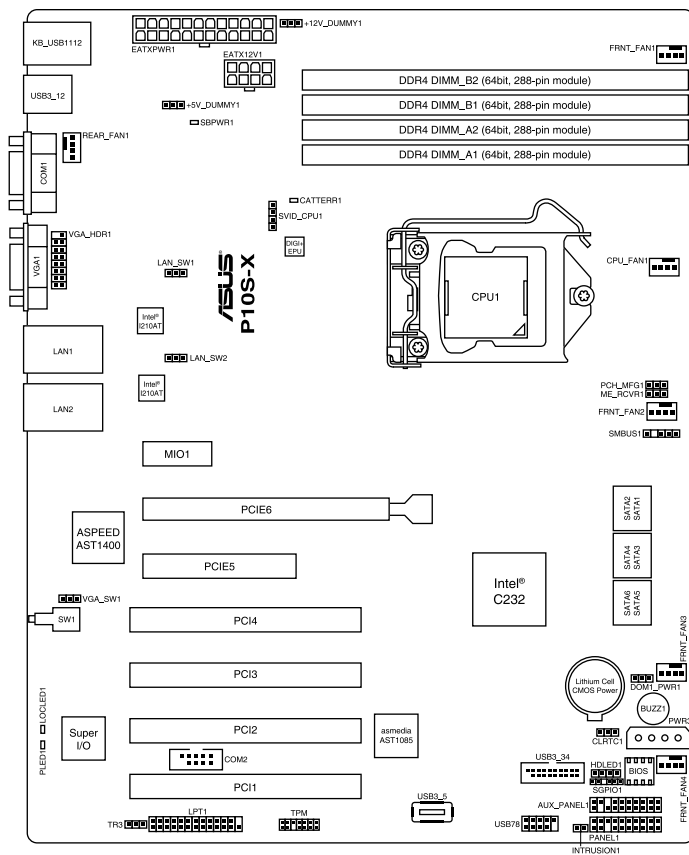
Layout contents

Jumpers		Page
1.	Clear RTC RAM (CLRTC1)	3-4
2.	VGA controller setting (3-pin VGA_SW1)	3-5
3.	LAN controller setting (3-pin LAN_SW1, LAN_SW2)	3-5
4.	ME firmware force recovery setting (3-pin ME_RCVR1)	3-6

Internal connectors		Page
1.	Serial ATA 6.0 Gbps connector (7-pin SATA 6Gbps 1-6 connector [Light Blue])	3-7
2.	Hard disk activity LED connector (4-pin HDLED1)	3-7
3.	USB 2.0 connector (10-1 pin USB78)	3-8
4.	USB 3.0 connector (20-1 pin USB3_34, A-Type USB3_5)	3-8
5.	CPU, front, and rear fan connectors (4-pin FRNT_FAN1-4, REAR_FAN1, CPU_FAN1)	3-9
6.	Serial General Purpose Input/Output connector (6-1 pin SGPIO1)	3-9
7.	Trusted Platform Module connector (14-1 pin TPM)	3-10
8.	VGA connector (16-1 pin VGA_HDR1)	3-10
9.	Serial port connector (10-1 pin COM2)	3-11
10.	LPT connector (26-1 pin LPT1)	3-11
11.	ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1)	3-12
12.	System panel connector (20-1 pin PANEL1)	3-13
13.	Auxiliary panel connector (20-2 pin AUX_PANEL1)	3-14
14.	Chassis intrusion connector (2-pin INTRUSION1)	3-15
15.	System Management Bus (SMBUS) connector (5-1 pin SMBUS1)	3-15

3.2   Jumpers

1.   **Clear RTC RAM (3-pin CLRTC1)**

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

To erase the RTC RAM:

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

2.   Move the jumper cap from pins 1–2 (default) to pins 2–3. Keep the cap on pins

2–3 for about 5–10 seconds, then move the cap back to pins 1–2.

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

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

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

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

CLRTC1

Normal (Default)   Clear CMOS
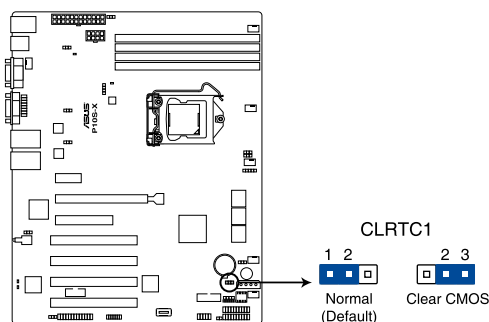
P10S-X Clear RTC RAM

2. **VGA controller setting (3-pin VGA_SW1)**

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

VGA_SW1

1 2   2 3

Enable   Disable
(Default)
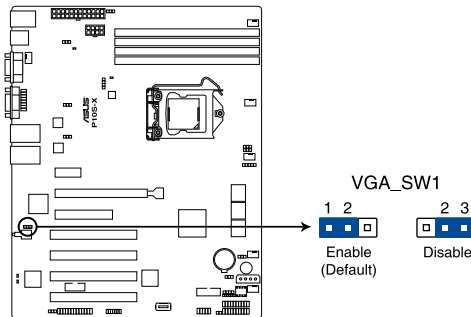
P10S-X VGA setting

3. **LAN controller setting (3-pin LAN_SW1, LAN_SW2)**
   These jumpers allows you to enable or disable the onboard Intel® I210 Gigabit LAN controllers. Set to pins 1-2 to activate the Gigabit LAN feature.

A   A   LAN_SW1   1 2   2 3

                     Enable   Disable
                     (Default)

B   B   LAN_SW2   1 2   2 3

                     Enable   Disable
                     (Default)
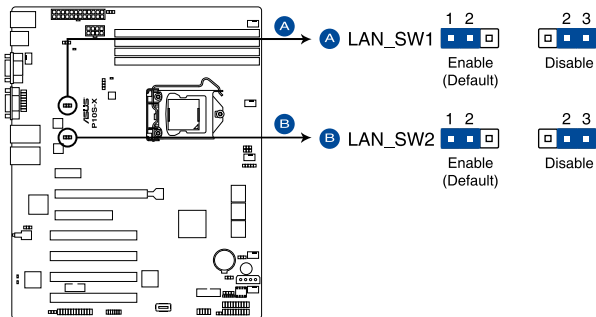
P10S-X LAN setting

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

This jumper allows you to force Intel Management Engine (ME) boot from recovery mode when ME become corrupted.
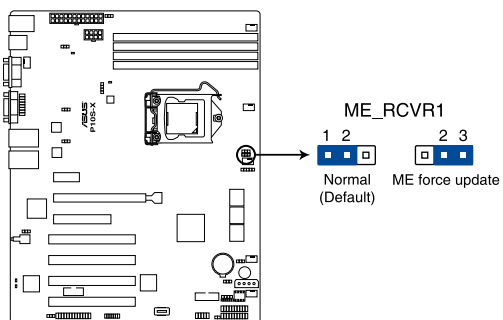
P10S-X ME recovery setting

3.3 Internal connectors

1. **Serial ATA 6.0 Gbps connectors (7-pin SATA 6Gbps_1-6 connector [Light Blue])**

    Supported by the Intel® C232 chipset, these connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allows up to 6Gb/s of data transfer rate.

    If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 10, or RAID 5 configuration.
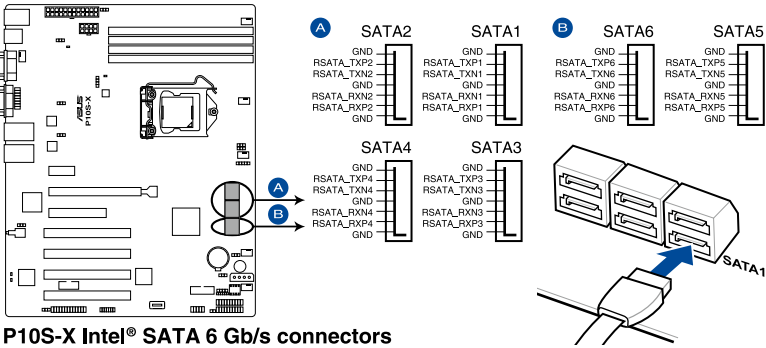
P10S-X Intel® SATA 6 Gb/s connectors

> The actual data transfer rate depends on the speed of Serial ATA hard disks installed.

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

    This LED connector is for the storage add-on card cable connected to the SATA or SAS add-on card. The read or write activities of any device connected to the SATA or SAS add-on card causes the front panel LED to light up.
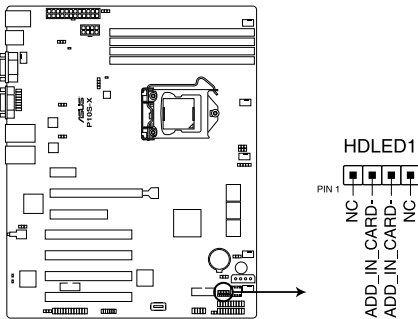
P10S-X Hard disk activity LED connector

3. **USB 2.0 connector (10-1 pin USB78)**

   These connectors are for USB 2.0 ports. Connect the USB module cables to these connectors. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.

P10S-X USB2.0 connector
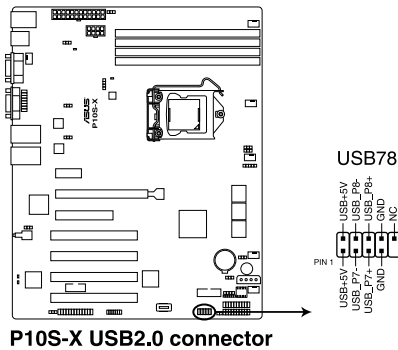
4. **USB 3.0 connector (20-1 pin USB3_34, A-Type USB3_5)**

   These connectors allow 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.

P10S-X USB3.0 connectors
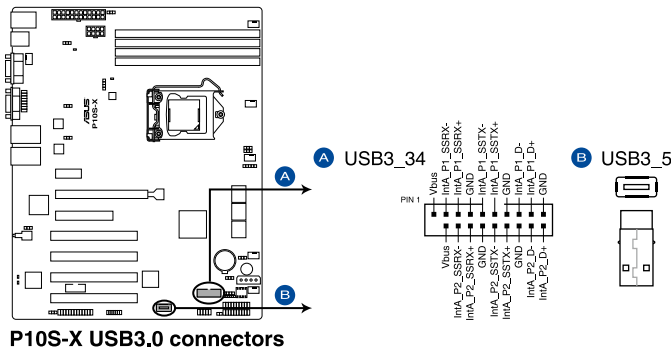
5. **CPU, front, and rear fan connectors (4-pin FRNT_FAN1-4, REAR_FAN1, CPU_FAN1)**

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

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

- These are not jumpers! DO NOT place jumper caps on the fan connectors!

- All fans feature the ASUS Smart Fan technology.

P10S-X Fan connectors
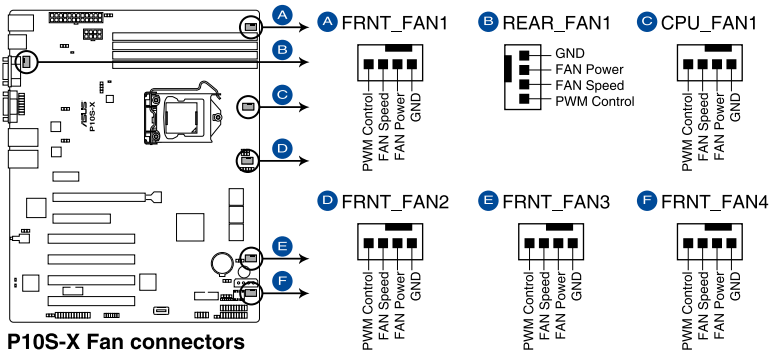
6. **Serial General Purpose Input/Output connector (6-1 pin SGPIO1)**

The SGPIO 1 connector is used for the Intel Rapid Storage Technology Enterprise SGPIO interface that controls the LED pattern generation, device information, and general purpose data.
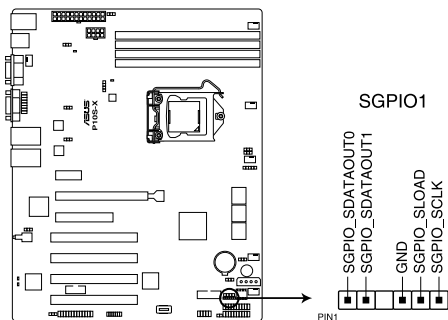
P10S-X SGPIO connector

7. **Trusted Platform Module connector (14-1 pin TPM)**

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

P10S-X TPM connector
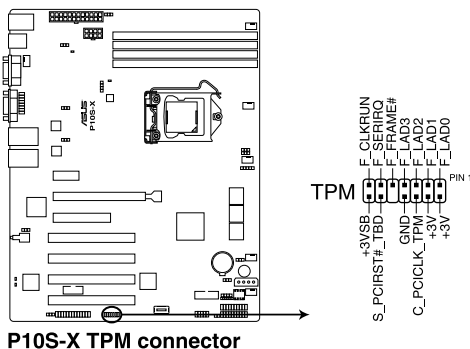
8. **VGA connector (16-1 pin VGA_HDR1)**

   This connector supports the VGA High Dynamic-Range interface.

P10S-X Internal VGA connector
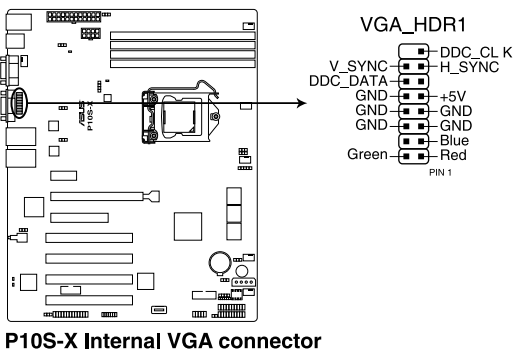
9. Serial port connector (10-1 pin COM2)

This connector is for the serial (COM) port. Connect the serial port module cable to the connector, then install the module to a slot opening at the back of the system chassis.
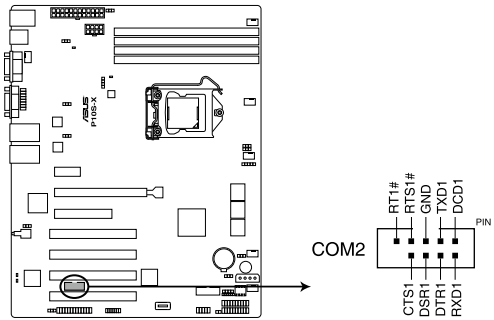
P10S-X Serial port connector

10. LPT connector (26-1 pin LPT1)

The LPT (Line Printing Terminal) connector supports devices such as a printer. LPT standardizes as IEEE 1284, which is the parallel port interface on IBM PC-compatible computers.
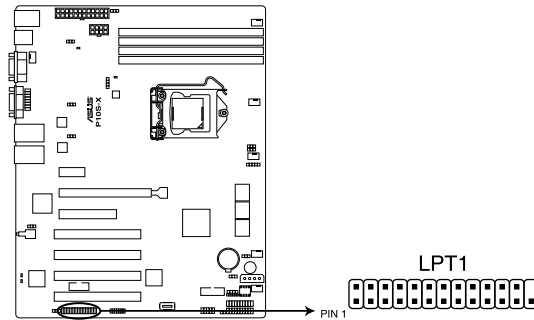
P10S-X LPT1 connector

11.   ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1)

These connectors are for the 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.

- DO NOT forget to connect the 24-pin and the 8-pin power plugs; otherwise, the system will not boot up.

- Use of a power supply unit (PSU) with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.

- This motherboard supports ATX2.0 PSU or later version.

- Ensure that your PSU can provide at least the minimum power required by your system.

P10S-X ATX power connectors
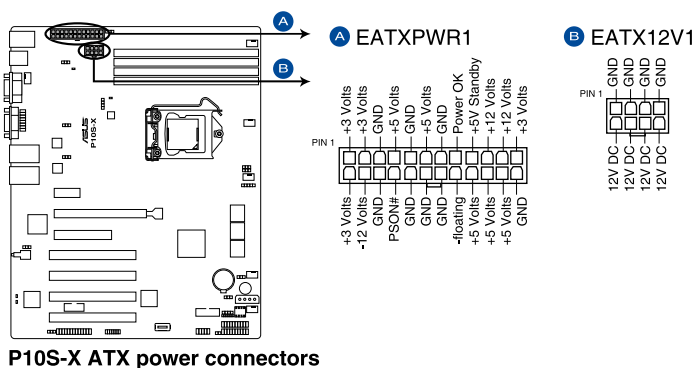
12. System panel connector (20-1 pin PANEL1)

This connector supports several chassis-mounted functions.

P10S-X System panel connector
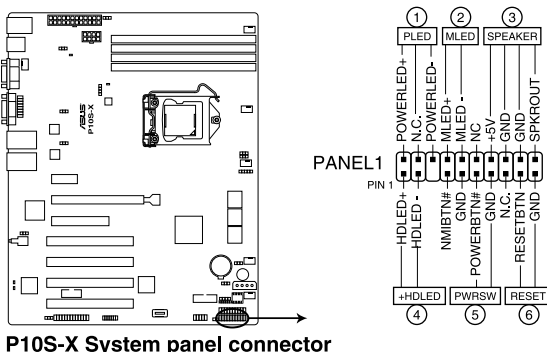
1. System power LED (3-pin PLED)

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

2. Message LED (2-pin MLED)

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

3. System warning speaker (4-pin SPEAKER)

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

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

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

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

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

6. Reset button (2-pin RESET)

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

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

This connector is for additional front panel features including front panel SMB, locator LED and switch, chassis intrusion, and LAN LEDs.
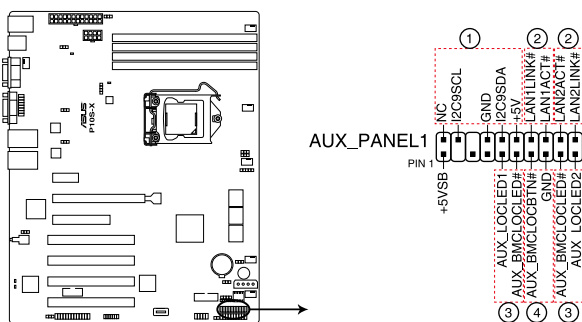
P10S-X Auxiliary panel connector

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

These connectors connect the front panel SMBus cable.

2. LAN activity LED (2-pin LAN1LINK and 2-pin LAN2LINK)

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

3. Locator LED (2-pin AUX_LOCLED1 and 2-pin AUX_LOCLED2)

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

4. Locator Button/Switch (2-pin AUX_BMCLOCBNT)

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

14. **Chassis intrusion connector (2-pin INTRUSION1)**

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

    By default, the pin labeled "Chassis Signal" and "Ground" are shorted with a jumper cap. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.

    INTRUSION1

    PIN 1

    CHASSIS#   GND

    P10S-X Chassis Intrusion connector
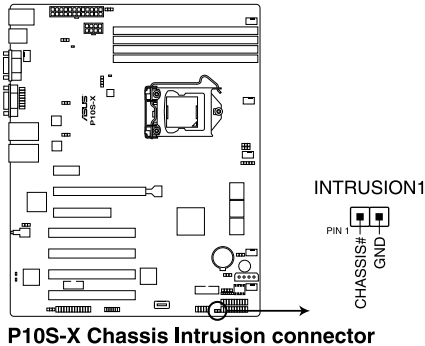
15. **System Management Bus (SMBUS) connector (5-1 pin SMBUS1)**

    This connector controls the system and power management-related tasks. This connector processes the messages to and from devices rather than tripping the individual control lines.

    SMBUS1

    PIN 1

    CHIL_PROG   SDA   GND   SCL

    P10S-X SMBUS connector

4
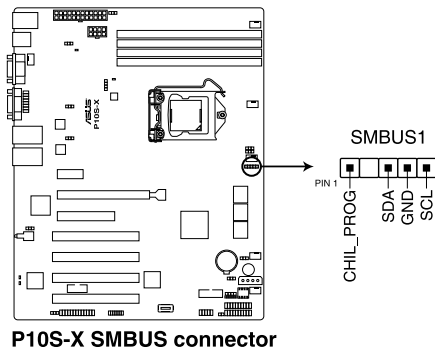
BIOS Setup

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 Managing and updating your BIOS

The following utilities allow you to manage and update the motherboard Basic Input/Output System (BIOS) setup:

1. **ASUS CrashFree BIOS 3**

   To recover the BIOS using a bootable USB flash disk drive when the BIOS file fails or gets corrupted.

2. **ASUS EzFlash**

   Updates the BIOS using a USB flash disk.

3. **BUPDATER**

   Updates the BIOS in DOS mode using a bootable USB flash disk drive.

Refer to the corresponding sections for details on these utilities.

> Save a copy of the original motherboard BIOS file to a bootable USB flash disk drive in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the BUPDATER utility.

4.1.1 ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 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 update a corrupted BIOS file using a USB flash drive that contains the updated BIOS file.

> Prepare a USB flash drive containing the updated motherboard BIOS before using this utility.

Recovering the BIOS from a USB flash drive

To recover the BIOS from a USB flash drive:

1. Insert the USB flash drive with the original or updated BIOS file to one USB port on the system.

2. The utility will automatically recover the BIOS. It resets the system when the BIOS recovery finished.

> DO NOT shut down or reset the system while recovering the BIOS! Doing so would cause system boot failure!

> The recovered BIOS may not be the latest BIOS version for this motherboard. Visit the ASUS website at www.asus.com to download the latest BIOS file.

4.1.2 ASUS EzFlash Utility

The ASUS EzFlash Utility feature allows you to update the BIOS using a USB flash disk without having to use a DOS-based utility.

Download the latest BIOS from the ASUS website at www.asus.com before using this utility.

The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be the same as shown.

To update the BIOS using EzFlash Utility:

1.   Insert the USB flash disk that contains the latest BIOS file to the USB port.

2.   Enter the BIOS setup program. Go to the **Tool** menu to select **ASUS EzFlash Utility** and press <Enter> to enable it.

```
                ASUS Tek. EzFlash Utility

      Current Platform                  New Platform
Platform : P10S-X               Platform : P10S-X
Version :   0200                Version :   0206
Build Date :07/20/2015          Build Date :08/01/2015

FS0           System Volume Information          <DIR>
              P10S-X BIOS                        <DIR>
              Windows                            <DIR>




[Up/Down/Left/Right]:Switch [Enter]:Choose [q]:Exit
```
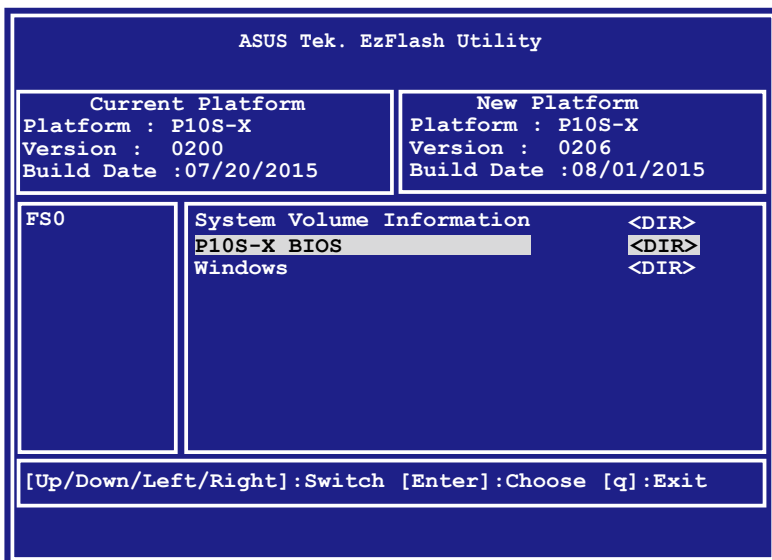
3.   Press <Tab> to switch to the **Drive** field.

4.   Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS then press <Enter>.

5.   Press <Tab> to switch to the **Folder Info** field.

6.   Press the Up/Down arrow keys to find the BIOS file then press <Enter>.

7.   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. Press <F5> and select **Yes** to load the BIOS default settings.

4.1.3   BUPDATER utility

The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be the same as shown.

The BUPDATER utility allows you to update the BIOS file in DOS environment using a bootable USB flash disk drive with the updated BIOS file.

Updating the BIOS file

To update the BIOS file using the BUPDATER utility:

1.   Visit the ASUS website at www.asus.com and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable USB flash disk drive.

2.   Download the BUPDATER utility (BUPDATER.exe) from the ASUS support website at support.asus.com to the bootable USB flash disk drive you created earlier.

3.   Boot the system in DOS mode, then at the prompt, type:

BUPDATER /i[filename].CAP

where [filename] is the latest or the original BIOS file on the bootable USB flash disk drive, then press <Enter>.

```
A:\>BUPDATER /i[file name]CAP
```

The utility verifies the file, then starts updating the BIOS file.
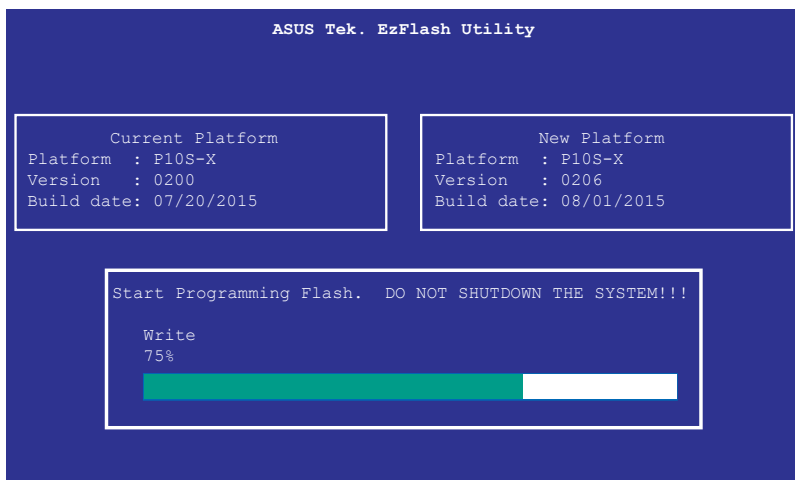
```
                      ASUS Tek. EzFlash Utility



         Current Platform                           New Platform
 Platform  : P10S-X                         Platform  : P10S-X
 Version   : 0200                           Version   : 0206
 Build date: 07/20/2015                     Build date: 08/01/2015


        Start Programming Flash.  DO NOT SHUTDOWN THE SYSTEM!!!

           Write
           75%
```

DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

The utility returns to the DOS prompt after the BIOS update process is completed.

4.   Reboot the system from the hard disk drive.

```
   The BIOS update is finished! Please restart your system.

   C:\>
```
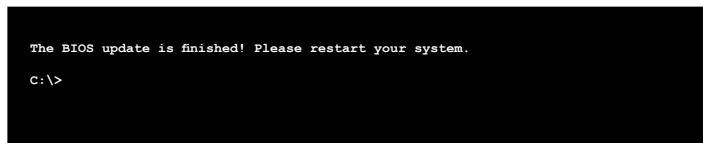
4.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section **4.1 Managing and updating your BIOS**.

Use the BIOS Setup program when you are installing a motherboard, reconfiguring your system, or prompted to "Run Setup." This section explains how to configure your system using this utility.

Even if you are not prompted to use the Setup program, you can change the configuration of your computer in the future. For example, you can enable the security password feature or change the power management settings. This requires you to reconfigure your system using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM of the firmware chip.

The firmware chip on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, restart the system by pressing <Ctrl>+<Alt>+<Del>, or by pressing the reset button on the system chassis. You can also restart by turning the system off then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Press <F5> and select **Yes** to load the BIOS default settings.

- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.

- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

4.2.1 BIOS menu screen

Menu items   Menu bar   Configuration fields   General help

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Event Logs

  BIOS Information                                      Choose the system default
  Model Name                    P10S-X                  language
  BIOS Version                  0301 x64
  Build Date                    09/14/2015 21:27:51

  Processor Information
  Brand String                  Intel(R) Core(TM)
                                i5-6400T CPU @ 2.20GHz
  Frequency                     2500 MHz
  Number of Processors          4Core(s) / 4Thread(s)

  Memory Information
  Total Memory                  4096 MB
  Memory Frequency              2133 MHz

  System Language               [English]              →←: Select Screen
                                                       ↑↓: Select Item
  System Date                   [Thu 09/10/2015]       Enter: Select
  System Time                   [20:11:35]             +/-: Change Opt.
                                                       F1: General Help
  Access Level                  Administrator          F2: Previous Values
                                                       F5: Optimized Defaults
                                                       F10: Save Changes & Reset
                                                       ESC: Exit

            Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

                                                              Navigation keys

4.2.2 Menu bar

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

Main   For changing the basic system configuration

Advanced   For changing the advanced system settings

Security   For changing the security settings

Boot   For changing the system boot configuration

Monitor   For displaying the system temperature, power status, and changing the fan settings

Tool   For configuring options for special functions

Save & Exit   For selecting the save & exit options

Event Logs   For changing the event log settings

To select an item on the menu bar, press the right or left arrow key on the keyboard until the desired item is highlighted.

4.2.3   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 (Advanced, Event Logs, Boot, Monitor, Security, Tool, Save & Exit, and Event Logs) on the menu bar have their respective menu items.

4.2.4   Submenu items

A solid triangle before each item on any menu screen means that the item has a submenu. To display the submenu, select the item and press <Enter>.

```
            Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
      Main   Advanced   Security   Boot   Monitor   Tool   Save & Exit   Event Logs

 ▶ Trusted Computing                                      Trusted Computing Settings
 ▶ Chipset Configuration
 ▶ Platform Configuration
 ▶ CPU Configuration
 ▶ SATA Configuration
```
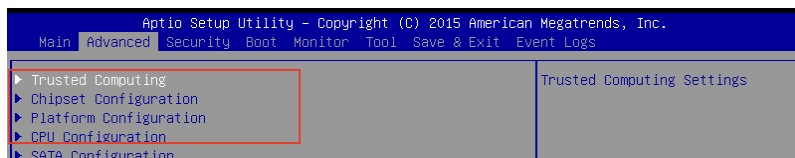
4.2.5   Navigation keys

At the bottom right corner of a menu screen are the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings.

4.2.6   General help

At the top right corner of the menu screen is a brief description of the selected item.

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

4.2.8   Pop-up window

Select a menu item and press <Enter> to display a pop-up window with the configuration options for that item.

4.2.9   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.

4.3 Main menu

When you enter the BIOS Setup program, the Main menu screen appears. The Main menu provides you an overview of the basic system information, and allows you to set the system date and time.

```
                 Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
   Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Event Logs

   BIOS Information                                      Choose the system default
   Model Name               P10S-X                       language
   BIOS Version             0301 x64
   Build Date               09/14/2015 21:27:51

   Processor Information
   Brand String             Intel(R) Core(TM)
                            i5-6400T CPU @ 2.20GHz
   Frequency                2500 MHz
   Number of Processors     4Core(s) / 4Thread(s)

   Memory Information
   Total Memory             4096 MB
   Memory Frequency         2133 MHz                    ↔: Select Screen
                                                        ↑↓: Select Item
   System Language          [English]                   Enter: Select
                                                        +/-: Change Opt.
   System Date              [Thu 09/10/2015]            F1: General Help
   System Time              [20:11:35]                  F2: Previous Values
                                                        F5: Optimized Defaults
   Access Level             Administrator               F10: Save Changes & Reset
                                                        ESC: Exit



                 Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

4.3.1 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

4.3.2 System Time [xx:xx:xx]

Allows you to set the system time.

4.4   Advanced menu

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

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

```
                    Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
       Main   Advanced   Security   Boot   Monitor   Tool   Save & Exit   Event Logs

    OS Type                              [Windows UEFI mode]      Configure system as
  ▶ Trusted Computing                                            UEFI/Legacy mode
  ▶ Chipset Configuration
  ▶ Platform Configuration
  ▶ CPU Configuration
  ▶ SATA Configuration
  ▶ Network Stack Configuration
  ▶ CSM Configuration

  ▶ NVMe controller and Drive information
  ▶ iSCSI Configuration

                                                               ⇄: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F5: Optimized Defaults
                                                               F10: Save Changes & Reset
                                                               F12: Print Screen
                                                               ESC: Exit

                    Version 2.17.1254. Copyright (C) 2016 American Megatrends, Inc.
```

OS Type [Windows UEFI mode]

Allows you to configure your system as UEFI mode or Legacy mode.

[Windows UEFI mode]   Configure system as UEFI mode.

[Other OS]   Configure system as Legacy mode.

4.4.1 Trusted Computing

```
                Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

    Configuration                                                    Enables or Disables BIOS
      Security Device Support           [Enable]                     support for security device.
      Device Select                     [Auto]                       O.S. will not show Security
                                                                     Device. TCG EFI protocol and
                                                                     INT1A interface will not be
    Current Status Information                                       available.
      NO Security Device Found
```

Configuration

Security Device Support [Enabled]

Allows you to enable or disable the BIOS support for security device.
Configuration options: [Disabled] [Enabled]

Device Select [Auto]

Allows you to restrict support to selected device. Auto will support both devices.
Configuration options: [TPM 1.2] [TPM 2.0] [Auto]

4.4.2 Chipset Configuration

```
                Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

  ▶ System Agent (SA) Configuration                                  System Agent (SA) Parameters
  ▶ PCH-IO Configuration
  ▶ Intel Server Platform Services
  ▶ Intel TXT Information
  ▶ PCI/PCIE Subsystem Settings
```

System Agent (SA) Configuration

Allows you to set System Agent (SA) parameters.

```
                Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

    System Agent Bridge Name          Skylake                       VT-d capability
    SA PCIe Code Version              1.3.0.0
    VT-d                              Supported

    VT-d                              [Enabled]
    Above 4GB MMIO BIOS assignment    [Disabled]

  ▶ DMI/OPI Configuration
  ▶ PEG Port Configuration
  ▶ Memory Configuration
```

VT-d [Enabled]

Allows you to enable virtualization technology function on memory control hub.
Configuration options: [Enabled] [Disabled]

Above 4GB MMIO BIOS assignment [Disabled]

Allows you to enable or disable above 4GB MemoryMappedIO BIOS assignment. When aperture size is set to 2048 MB, this is disabled automatically.
Configuration options: [Enabled] [Disabled]

DMI/OPI Configuration

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

    DMI/OPI Configuration                                    Set DMI Speed Gen1/Gen2/Gen3

    DMI                              X4  Gen3

    DMI Max Link Speed              [Auto]
    DMI Vc1 Control                 [Disabled]
    DMI Vcm Control                 [Enabled]
    DMI Link ASPM Control           [L1]
```
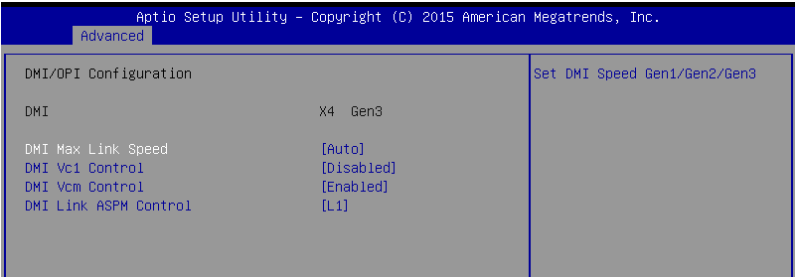
DMI Max Link Speed [Auto]

Allows you to set the DMI speed.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

DMI Vc1 Control [Disabled]

Allows you to enable or disable DMI Vc1.
Configuration options: [Enabled] [Disabled]

DMI Vcm Control [Enabled]

Allows you to enable or disable DMI Vcm.
Configuration options: [Enabled] [Disabled]

DMI Link ASPM Control [L1]

This item is for the control of the Active State Power Management on SA side of the DMI link.
Configuration options: [Disabled] [L1]

PEG Port Configuration

```
                 Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

 PEG Port Configuration                                      Enable or Disable the Root Port

 PEG 0:1:0                           Not Present
    Enable Root Port                 [Auto]
    Max Link Speed                   [Auto]
    Max Link Width                   [Auto]
    Power Down Unused Lanes          [Auto]
    ASPM                             [Auto]
 PEG0 Max Payload size               [Auto]
 Program PCIe ASPM after OpROM       [Disabled]

                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F5: Optimized Defaults
                                                             F10: Save Changes & Reset
                                                             ESC: Exit

                 Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

PEG 0:1:0

Enable Root Port [Auto]

Allows you to enable or disable the root port.
Configuration options: [Disabled] [Enabled] [Auto]

Max Link speed [Auto]

Allows you to configure PEG 0:1:0 Max Speed.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

Max Link Width [Auto]

Allows you to force PEG link to retrain selected value.
Configuration options: [Auto] [Force X1] [Force X2] [Force X4] [Force X8]

Power Down Unused Lanes [Auto]

Allows you to power down unused lanes.

[Disabled]   No power saving
[Auto]   BIOS will power down unused lanes based in the max
              possible link width

ASPM [Auto]

Allows you to configure the PCIE ASPM.
Configuration options: [Disabled] [Auto] [ASPM L0s] [ASPM L1] [ASPM L0sL1]

PEG0 Max Payload size [Auto]

Allows you to set the PEG0 max payload size.
Configuration options: [Auto] [128 TLP] [256 TLP]

Program PCIe ASPM after OpRom [Disabled]

Allows you to select when to program the PCIe ASPM.
[Disabled]   PCIe ASPM will be programmed before OpROM.
[Enabled]   PCIe ASPM will be programmed after OpROM.

Memory Configuration

```
               Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
     Advanced

 Memory Configuration                                          Maximum Memory Frequency
                                                               Selections in MHz.
 Memory RC Version              1.3.0.0
 Memory Frequency               2133 MHz
 Total Memory                   4096 MB
 DIMM#0                         4096 MB
 DIMM#1                         Not Present
 DIMM#2                         Not Present
 DIMM#3                         Not Present

 Maximum Memory Frequency       [Auto]
 Max TOLUD                      [Dynamic]
 Memory Scrambler               [Enabled]
 Memory Remap                   [Enabled]
                                                               ++: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F5: Optimized Defaults
                                                               F10: Save Changes & Reset
                                                               ESC: Exit



               Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Maximum Memory Frequency [Auto]

Allows you to set the maximum memory frequency.
Configuration options: [Auto] [1067] [1333] [1600] [1867] [2133] [2400] [2667] [2933] [3200]

Max TOLUD [Dynamic]
Allows you to set the maximum value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.
Configuration options: [Dynamic] [1 GB] [1.25 GB] [1.5 GB] [1.75 GB] [2 GB] [2.25 GB] [2.5 GB] [2.75 GB] [3 GB] [3.25 GB] [3.5 GB]

Memory Scrambler [Enabled]

Set this item to enable or disable memory scrambler support.
Configuration options: [Enabled] [Disabled]

Memory Remap [Enabled]

Allows you to enable or disable memory remap above 4GB.
Configuration options: [Enabled] [Disabled]

PCH-IO Configuration

Allows you to set PCH-IO parameters.

```
                  Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

   Intel PCH RC Version            1.3.0.0                    PCI Express Configuration
                                                             settings
 ▶ PCI Express Configuration
 ▶ USB Configuration
 ▶ HD Audio Configuration

   CLKRUN# Logic                   [Enabled]
   Serial IRQ Mode                 [Continuous]
   High Precision Timer            [Enabled]




                                                             ↔: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F5: Optimized Defaults
                                                             F10: Save Changes & Reset
                                                             ESC: Exit




                  Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

PCI Express Configuration

```
                  Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

   PCI Express Configuration                                 Enable or disable PCI Express
                                                             Clock Gating for each root
   PCI Express Clock Gating        [Enabled]                 port.
   DMI Link ASPM Control           [Enabled]
```

PCI Express Clock Gating [Enabled]

Allows you to enable or disable PCI Express Clock Gating for each root port.
Configuration options: [Disabled] [Enabled]

DMI Link ASPM Control [Enabled]

Allows you to enable or disable the control of Active State Power Management on SA side of the DMI link.
Configuration options: [Disabled] [Enabled]

USB Configuration

Advanced

USB Configuration		Precondition work on USB host controller and root ports for faster enumeration.
USB Precondition	[Disabled]	
xDCI Support	[Disabled]	
USB Port Disable Override	[Disabled]	

USB Precondition[Disabled]

Allows you to precondition work on USB host controller and root ports for faster enumeration.
Configuration options: [Enabled] [Disabled]

xDCI Support [Disabled]

Allows you to enable or disable xDCI (USB OTG Device).
Configuration options: [Disabled] [Enabled]

USB Port Disable Override [Disabled]

Allows you to enable or disable the corresponding USB port from reporting a Device Connection to the controller
Configuration options: [Disabled] [Select Per-Pin]

HD Audio Configuration

Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Advanced

HD Audio Configuration		Control Detection of the HD-Audio device.
HD Audio	[Auto]	Disabled = HDA will be

HD Audio [Auto]

Allows you to control detection of the HD-Audio device.

[Disabled]	HDA will be unconditionally disabled.
[Enabled]	HDA will be unconditionally enabled.
[Auto]	HDA will be enabled if present, otherwise it will be disabled.

CLKRUN# Logic [Enabled]

Allows you to enable or disable the CLKRUN# logic to stop the PCI clocks.
Configuration options: [Disabled] [Enabled]

Serial IRQ Mode [Continuous]

Allows you to configure Serial IRQ mode.
Configuration options: [Quiet] [Continuous]

High Precision Timer [Enabled]

Allows you to enable or disable the High Precision Event Timer.
Configuration options: [Disabled] [Enabled]

Intel Server Platform Services

```
           Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Advanced

 Intel Server Platform Services Configuration
 ME BIOS Interface Ver              1.2
 SPS Version                        2308.0.3.36

 ME FW Status Value      :          0xF0345
 ME FW State             :          SPS ME FW Active
 ME FW Operation State   :          M0 without UMA
 ME FW Error Code        :          No Error
 ME NM FW Status Value   :          0x0
 BIOS Booting Mode       :          Power Optmized mode
 Cores Disabled          :          0
 ME FW SKU Information    :          SiEn
 End-of-POST Status      :          EOP disabled in POST

                                               →←: Select Screen
                                               ↑↓: Select Item
                                               Enter: Select
                                               +/-: Change Opt.
                                               F1: General Help
                                               F2: Previous Values
                                               F5: Optimized Defaults
                                               F10: Save Changes & Reset
                                               ESC: Exit

           Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Intel TXT Information

```
           Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Advanced

 Intel TXT Information

 Chipset                            Production Fused
 BiosAcm                            Production Fused
 Chipset Txt                        Supported
 Cpu Txt                            Supported
 Error Code                         None
   Class Code                       None
   Major Code                       None
   Minor Code                       None
```

PCI/PCIE Subsystem Settings

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Advanced

                                                                Value to be programmed into
   PCI Devices Common Settings:                                 PCI Latency Timer Register.
   PCI Latency Timer                   [32 PCI Bus Clocks]
   PERR# Generation                    [Disabled]
   SERR# Generation                    [Disabled]
   Load RT32 Image                     [Enabled]
   VGA Priority                        [Offboard Device]


 ▶ PCIe slot opROM option
```
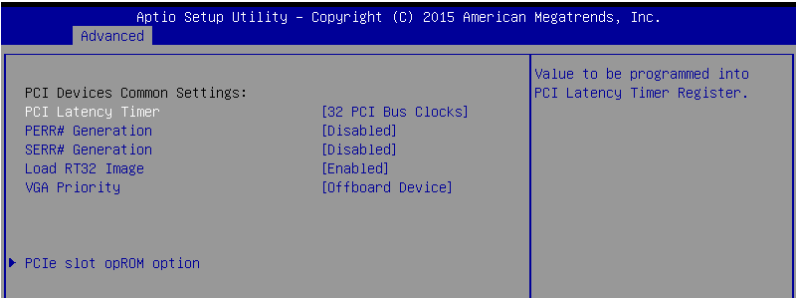
PCI Latency Timer [32 PCI Bus Clocks]

Allows you to set the value to be programmed into PCI Latency Timer Register.
Configuration options: [32 PCI Bus Clocks] [64 PCI Bus Clocks] [96 PCI Bus Clocks] [128 PCI Bus Clocks] [160 PCI Bus Clocks] [192 PCI Bus Clocks] [224 PCI Bus Clocks] [248 PCI Bus Clocks]

PERR# Generation [Disabled]

Allows you to enable or disable PCI Device tp generation PERR#.
Configuration options: [Disabled] [Enabled]

SERR# Generation [Disabled]

Allows you to enable or disable PCI Device tp generation SERR#.
Configuration options: [Disabled] [Enabled]

Load RT32 Image [Enabled]

Allows you to enable or disable RT32 Image Loading.
Configuration options: [Disabled] [Enabled]

VGA Priority [Offboard Device]

This allows you to prioritize between the onboard and offboard video device to be found.
Configuration options: [Onboard Device] [Offboard Device]

PCIe slot opROM option

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Advanced

   PCIE Slot Option Rom Setting                                 Enabled/Disabled PCIE6 Option
   PCIE6  Option Rom                   [Enabled]                Rom
   PCIE5  Option Rom                   [Enabled]
```
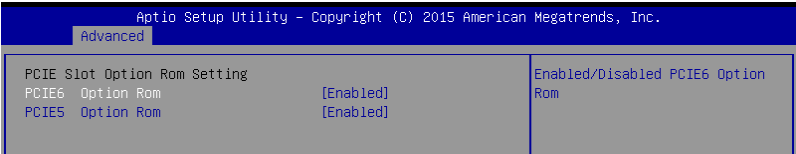
PCIE5/ PCIE6 Option ROM [Enabled]

Allows you to enable or disable the PCIE5 / PCIE6 Option ROM.
Configuration options: [Disabled] [Enabled]

4.4.3 Platform Configuration

```
           Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Advanced

 ▶ USB Configuration                               USB Configuration Parameters
 ▶ NVMe Configuration
 ▶ Onboard LAN Configuration
 ▶ Super IO Configuration
 ▶ Serial Port Console Redirection
 ▶ ACPI Settings
 ▶ APM
 ▶ SMART Settings
 ▶ WHEA Configuration
```

USB Configuration

```
           Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Advanced

 USB Configuration                                 Enables Legacy USB support.
                                                   AUTO option disables legacy
 USB Controllers:                                  support if no USB devices are
     1 XHCI                                         connected. DISABLE option will
 USB Devices:                                       keep USB devices available
     1 Drive, 1 Keyboard, 1 Mouse                   only for EFI applications.

 Legacy USB Support                  [Enabled]
 XHCI Hand-off                       [Disabled]
 USB Mass Storage Driver Support     [Enabled]
 Port 60/64 Emulation                [Enabled]

 USB hardware delays and time-outs:
 USB transfer time-out               [20 sec]     ↔: Select Screen
 Device reset time-out               [20 sec]     ↑↓: Select Item
 Device power-up delay               [Auto]       Enter: Select
                                                  +/-: Change Opt.
 Mass Storage Devices:                            F1: General Help
 JetFlashTranscend 4GB 8.07          [Auto]       F2: Previous Values
```

Legacy USB Support [Enabled]

[Disabled]   The USB devices can be used only for the BIOS setup program. It cannot be recognized in boot devices list.

[Enabled]   Enables the support for USB devices on legacy operating systems (OS).

[Auto]   Allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled.

XHCI Hand-off [Disabled]

This item is set to [Disabled] by default for the EHCI (enhanced host controller interface) support by XHCI drivers in operating systems.

[Disabled]   Support XHCI by XHCI drivers for operating systems with XHCI support.

[Enabled]   Support XHCI by BIOS for operating systems without XHCI support.

USB Mass Storage Driver Support [Enabled]

Allows you to enable or disable the USB Mass Storage driver support.
Configuration options: [Disabled] [Enabled]

Port 60/64 Emulation [Enabled]

This allows you to enable the I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
Configuration options: [Disabled] [Enabled]

USB hardware delays and time-outs

USB transfer time-out [20 sec]

Allows you to select the USB transfer time-out value.
Configuration options: [1 sec] [5 sec] [10 sec] [20 sec]

Device reset time-out [20 sec]

Allows you to select the USB device reset time-out value.
Configuration options: [10 sec] [20 sec] [30 sec] [40 sec]

Device power-up delay [Auto]

This allows you to set the maximum time the device will take before it properly reports itself to the Host Controller.
Configuration options: [Auto] [Manual]

Mass Storage Devices

Allows you to select the mass storage device emulation type for devices connected.
Configuration options: [Auto] [Floppy] [Forced FDD] [Hard Disk] [CD-ROM]

NVMe Configuration

You may view the NVMe controller and Drive information if a NVMe device is connected.

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Advanced

  NVMe controller and Drive information
```

Onboard LAN Configuration

```
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       Advanced

   Onboard LAN Configuration                                   Intel LAN Enable/Disable

   INTEL LAN1 MAC:                    30:5A:3A:AD:AD:A6
   INTEL LAN2 MAC:                    30:5A:3A:AD:AD:A7
   Intel LAN1 Enable                 [Enabled]
   Intel LAN ROM Type                [PXE]
   Intel LAN2 Enable                 [Enabled]
   Intel LAN ROM Type                [Disabled]


                                                             ↔: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F5: Optimized Defaults
                                                             F10: Save Changes & Reset
                                                             ESC: Exit


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```

Intel LAN1 Enable [Enabled]

Allows you to enable or disable the Intel LAN.
Configuration options: [Disabled] [Enabled]

Intel LAN ROM Type [PXE]

Allows you to select the Intel LAN ROM type.
Configuration options: [Disabled] [PXE] [iSCSI]

Intel LAN2 Enable [Enabled]

Allows you to enable or disable the Intel LAN.
Configuration options: [Disabled] [Enabled]

Intel LAN ROM Type [Disabled]

Allows you to select the Intel LAN ROM type.
Configuration options: [Disabled] [PXE] [iSCSI]

Super IO Configuration

```
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   Super IO Configuration                                      Set Parameters of Serial Port 1

   Super IO Chip                     NCT6791D
 ▶ Serial Port 1 Configuration
 ▶ Serial Port 2 Configuration
```
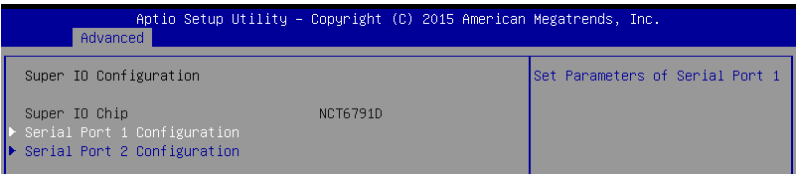
Serial Port 1 Configuration

Allows you to set the parameters of Serial Port 1.

```
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  Serial Port 1 Configuration                             Enable or Disable Serial Port
                                                          (COM)
  Serial Port                          [Enabled]
  Device Settings                      IO=3F8h; IRQ=4;

  Change Settings                      [Auto]
```

Serial Port [Enabled]

Allows you to enable or disable Serial Port.
Configuration options: [Disabled] [Enabled]

Change Settings [Auto]

Allows you to choose the setting for Super IO device.
Configuration options: [Auto] [IO=3F8h; IRQ=4;] [IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;] [IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;] [IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;] [IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;]

Serial Port 2 Configuration

Allows you to set the parameters of Serial Port 2.

```
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      Advanced

  Serial Port 2 Configuration                             Enable or Disable Serial Port

  Serial Port                          [Enabled]
  Device Settings                      IO=2F8h; IRQ=3;

  Change Settings                      [Auto]
  Change Settings                      [Standard Serial Port
                                       Mode]
```

Serial Port [Enabled]

Allows you to enable or disable Serial Port.
Configuration options: [Disabled] [Enabled]

Change Settings [Auto]

Allows you to choose the setting for Super IO device.
Configuration options: [Auto] [IO=3F8h; IRQ=4;] [IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;] [IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;] [IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;] [IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;]

Change Settings [Standard Serial Port Mode]

Allows you to choose the setting for Super IO device.
Configuration options: [Standard Serial Port Mode] [IrDA Active pulse 1.6uS] [IrDA Active pulse 3/16 bit time] [ASKIR Mode]

Serial Port Console Redirection

```
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       Advanced

      COM1                                                Console Redirection Enable or
      Console Redirection              [Disabled]         Disable.
    ▶ Console Redirection Settings

      COM2
      Console Redirection              [Disabled]
    ▶ Console Redirection Settings

      Legacy Console Redirection
    ▶ Legacy Console Redirection Settings

      Serial Port for Out-of-Band Management/
      Windows Emergency Management Services (EMS)         ↔: Select Screen
      Console Redirection              [Disabled]         ↑↓: Select Item
    ▶ Console Redirection Settings                        Enter: Select
```

COM1 / COM2

Console Redirection [Enabled]

Allows you to enable or disable the console redirection feature.
Configuration options: [Disabled] [Enabled]

The following item appears only when you set **Console Redirection** to [**Enabled**].

Console Redirection Settings

This item becomes configurable only when you enable the **Console Redirection** item. The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

```
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       Advanced

      COM1                                                Emulation: ANSI: Extended
      Console Redirection Settings                        ASCII char set. VT100: ASCII
                                                          char set. VT100+: Extends
      Terminal Type                    [VT-UTF8]          VT100 to support color,
      Bits per second                  [57600]            function keys, etc. VT-UTF8:
      Data Bits                        [8]                Uses UTF8 encoding to map
      Parity                           [None]             Unicode chars onto 1 or more
      Stop Bits                        [1]                bytes.
      Flow Control                     [Hardware RTS/CTS]
      VT-UTF8 Combo Key Support        [Enabled]
      Recorder Mode                    [Disabled]
      Legacy OS Redirection Resolution [80x24]
      Putty KeyPad                     [VT100]
      Redirection After BIOS POST      [Always Enable]    ↔: Select Screen
                                                          ↑↓: Select Item
```

Terminal Type [VT-UTF8]

Allows you to set the terminal type.

[VT100]   ASCII char set.
[VT100+]   Extends VT100 to support color, function keys, et.
[VT-UTF8]   Uses UTF8 encoding to map Unicode chars onto 1 or more bytes
[ANSI]   Extended ASCII char set

Bits per second [57600]

Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Configuration options: [9600] [19200] [38400] [57600] [115200]

Data Bits [8]

Configuration options: [7] [8]

Parity [None]

A parity bit can be sent with the data bits to detect some transmission errors. [Mark] and [Space] parity do not allow for error detection.

[None]	None
[Even]	parity bit is 0 if the num of 1's in the data bits is even
[Odd]	parity bit is 0 if num of 1's in the data bits is odd
[Mark]	parity bit is always 1
[Space]	parity bit is always 0

Stop Bits [1]

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning.) The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
Configuration options: [1] [2]

Flow Control [Hardware RTS/CTS]

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
Configuration options: [None] [Hardware RTS/CTS]

VT-UTF8 Combo Key Support [Enabled]
Allows you to enable the VT-UTF8 Combo Key Support for ANSI/VT100 terminals.
Configuration options: [Disabled] [Enabled]

Recorder Mode [Disabled]

With this mode enabled only text will be sent. This is to capture Terminal data.
Configuration options: [Disabled] [Enabled]

Legacy OS Redirection Resolution [80x24]

Allows you to set the number of rows and columns supported on the Legacy OS.
Configuration options: [80x24] [80x25]

Putty Keypad [VT100]

Allows you to select the FunctionKey and Keypad on Putty.
Configuration options: [VT100] [LINUX] [XTERMR6] [SCO] [ESCN] [VT400]

Redirection After BIOS POST [Always Enable]

Allows you to specify if Bootloader is selected than Legacy console redirection.
Configuration options: [Always Enable] [Bootloader]

Legacy Console Redirection Settings

```
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        Advanced

  Legacy Serial Redirection Port          [COM1]              Select a COM port to display
                                                              redirection of Legacy OS and
                                                              Legacy OPROM Messages
```

Legacy Serial Redirection Port [COM1]

Allows you to select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.
Configuration options: [COM1] [COM2]

Serial Port for Out-of-Band Management/

Windows Emergency Management Services (EMS)

Console Redirection [Disabled]

Allows you to enable or disable the console redirection feature.
Configuration options: [Disabled] [Enabled]

The following item appears only when you set **Console Redirection** to **[Enabled]**.

```
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        Advanced

  Out-of-Band Mgmt Port          COM1                   VT-UTF8 is the preferred
  Terminal Type                  [VT-UTF8]              terminal type for out-of-band
  Bits per second                [115200]               management. The next best
  Flow Control                   [None]                 choice is VT100+ and then
  Data Bits                      8                       VT100. See above, in Console
  Parity                         None                    Redirection Settings page, for
  Stop Bits                      1                       more Help with Terminal
                                                         Type/Emulation.
```

Console Redirection Settings

Out-of-Band Mgmt Port [COM1]

Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.
Configuration options: [COM1] [COM2]

Terminal Type [VT-UTF8]

Allows you to set the terminal type for out-of-band management.
Configuration options: [VT100] [VT100+] [VT-UTF8] [ANSI]

Bits per second [115200]

Allows you to set the serial port transmission speed.
Configuration options: [9600] [19200] [57600] [115200]

Flow Control [None]

Allows you to set the flow control to prevent data loss from buffer overflow.
Configuration options: [None] [Hardware RTS/CTS] [Software Xon/Xoff]

ACPI Settings

```
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     Advanced

 ACPI Settings                                                  Enables or Disables System
                                                               ability to Hibernate (OS/S4
 Enable Hibernation              [Enabled]                      Sleep State). This option may
 ACPI Sleep State                [S3 (Suspend to RAM)]          be not effective with some OS.
```

Enable Hibernation [Enabled]

Allows you to enable or disable the ability of the system to hibernate (OS/S4 Sleep State).

Configuration options: [Disabled] [Enabled]

> This option may be not be effective with some OS.

ACPI Sleep State [S3 (Suspend to RAM)]

Allows you to select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
Configuration options: [Suspend Disabled] [S3 (Suspend to RAM)]

APM

Allows you to configure the Advance Power Management (APM) settings.

```
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          Advanced

    Restore AC Power Loss          [Last State]              Specify what state to go to
    Power On By PCI                [Disabled]                when power is re-applied after
    Power On By PCIE               [Disabled]                a power failure (G3 state).
    Power On By Ring               [Disabled]
    Power On By RTC                [Disabled]
```

Restore AC Power Loss [Last State]

When set to **[Power Off]**, the system goes into off state after an AC power loss. When set to **[Power On]**, the system will reboot after an AC power loss. When set to **[Last State]**, the system goes into either off or on state, whatever the system state was before the AC power loss.

Configuration options: [Power Off] [Power On] [Last State]

Power On By PCI [Disabled]

Allows you to enable or disable the Wake-on-LAN feature of Intel LAN.

Configuration options: [Disabled] [Enabled]

Power On By PCIE [Disabled]

[Disabled]   Disables the PCIE devices to generate a wake event.
[Enabled]   Enables the PCIE devices to generate a wake event.

Power On By Ring [Disabled]

[Disabled]   Disables the Ring devices to generate a wake event.
[Enabled]   Enables the Ring devices to generate a wake event.

This item functions only if there is a serial port (COM1) connector on the motherboard

Power On By RTC [Disabled]

[Disabled]   Disables RTC to generate a wake event.
[Enabled]   When set to [Enabled], the items RTC Alarm Date (Days) and Hour/Minute/
                  Second will become user-configurable with set values.

SMART Settings

```
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          Advanced

    SMART Settings                                           Run SMART Self Test on all
                                                             HDDs during POST.
    SMART Self Test                [Enabled]
```

SMART Self Test [Enabled]

Allows you to run SMART Self Test on all HDDs during POST.
Configuration options: [Disabled] [Enabled]

WHEA Configurations

```
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     Advanced

  WHEA Support                         [Enabled]         Enable or disable Windows
                                                         Hardware Error Architecture.
```

WHEA Support [Enabled]

This item allows you to enable or disable the WHEA support.
Configuration options: [Disabled] [Enabled]

4.4.4 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically
detects. Some items may not appear if your CPU does not support the related functions.

```
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     Advanced

  CPU Configuration                                   ▲  Number of cores to enable in
                                                         each processor package.
  Intel(R) Core(TM) i5-6400T CPU @ 2.20GHz
  CPU Signature               506E3
  Microcode Patch             24
  Max CPU Speed               2200 MHz
  Min CPU Speed               800 MHz
  CPU Speed                   2500 MHz
  Processor Cores             4
  Hyper Threading  Technology Not Supported
  Intel VT-x Technology       Supported
  Intel SMX Technology        Supported
  64-bit                      Supported
  EIST Technology             Supported          ▶←→: Select Screen
  CPU C3 state                Supported          ↑↓: Select Item
  CPU C6 state                Supported          Enter: Select
  CPU C7 state                Supported          +/-: Change Opt.
                                                 F1: General Help
  L1 Data Cache               32 kB x 4          F2: Previous Values
  L1 Code Cache               32 kB x 4          F5: Optimized Defaults
  L2 Cache                    256 kB x 4         F10: Save Changes & Reset
  L3 Cache                    6 MB               ESC: Exit

  Hyper-threading             [Enabled]
  Active Processor Cores      [All]           ▼

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```

Navigate to the second page of the screen to see the rest of items in this menu by pressing
the Up or Down arrow keys.

To quickly go to the last item of the second page, press the **Page Down** button. Press the
Page Up button to go back to the first item in the first page.

```
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        Advanced

    L2 Cache                        256 kB x 4        ▲    Enables or Disables Intel(R)
    L3 Cache                        6 MB                   TXT(LT) support.

    Hyper-threading                 [Enabled]
    Active Processor Cores          [All]
    Intel Virtualization Technology [Enabled]
    Hardware Prefetcher             [Enabled]
    Adjacent Cache Line Prefetch    [Enabled]
    CPU AES                         [Enabled]
    Boot performance mode           [Turbo Performance]
    HardWare P states (HWP)         [Disabled]
    Intel(R) SpeedStep(tm)          [Enabled]
      Turbo Mode                    [Enabled]
    Configurable TDP Boot Mode      [Nominal]         ┌─────────────────────────────
    Configurable TDP Lock           [Disabled]        →←: Select Screen
    CTDP BIOS control               [Disabled]        ↑↓: Select Item
    CPU C states                    [Enabled]         Enter: Select
      Enhanced C-states             [Enabled]         +/-: Change Opt.
      C-State Auto Demotion         [C1 and C3]       F1: General Help
      C-State Un-demotion           [C1 and C3]       F2: Previous Values
      Package C state demotion      [Disabled]        F5: Optimized Defaults
      Package C state undemotion    [Disabled]        F10: Save Changes & Reset
    CState Pre-Wake                 [Enabled]         ESC: Exit
    Package C State limit           [AUTO]
    CFG lock                        [Enabled]         ▼
    Intel TXT(LT) Support           [Disabled]

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```

Hyper-threading [Enabled]

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]

Active Processor Cores [All]

Allows you to select the number of CPU cores to activate in each processor package.
Configuration options: [All] [1] [2] [3]

Intel Virtualization Technology [Enabled]

When set to **[Enabled]**, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Configuration options: [Disabled] [Enabled]

Hardware Prefetcher [Enabled]

Allows you to enable or disable the MLC streamer prefetcher.
Configuration options: [Disabled] [Enabled]

Adjacent Cache Line Prefetch [Enabled]

This item allows you to enable or disable prefetching of adjacent cache lines.
Configuration options: [Disabled] [Enabled]

CPU AES [Enabled]

Allows you to enable or disable the CPU Advance Encryption Standard instructions.
Configuration options: [Disabled] [Enabled]

Boot performance mode [Turbo Performance]

Allows you to select the CPU performance state during system boot before the operating system takes control. The CPU runs at a selected performance ratio based on CPU configuration.
Configuration options: [Max Non-Turbo Performance] [Turbo Performance]

HardWare P states (HWP) [Disabled]

Allows you to enable or disable HWP support.
Configuration options: [Disabled] [Enabled]

Intel(R) SpeedStep(tm) [Enabled]

Allows your system to adjust the CPU's voltage and cores frequency, resulting in decreased power consumption and heat production.
[Disabled]   The CPU runs at its default speed.
[Enabled]   The system controls the CPU speed.

> 🖉 The following item appears only when you set **Intel(R) SpeedStep(tm)** to **[Enabled]**.

Turbo Mode [Enabled]

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: [Disabled] [Enabled]

CPU C states [Enabled]

Allows you to enable or disable the CPU C states.
Configuration options: [Disabled] [Enabled]

> 🖉 The following items appear only when you set the **CPU C states** to [**Enabled**].

Enhanced C-States [Enabled]
This item allows you to enable or disable C1E. When **[Enabled]** is selected, CPU will switch to minimum speed when all cores enter C-State.
Configuration options: [Disabled] [Enabled]

C-State Auto Demotion [C1 and C3]

Allows you to enable or disable the demotion of the C-State.
Configuration options: [Disabled] [C1] [C3] [C1 and C3]

C-State Un-demotion [C1 and C3]

Allows you to enable or disable the un-demotion of the C-State.
Configuration options: [Disabled] [C1] [C3] [C1 and C3]

Package C state demotion [Disabled]

Allows you to enable or disable the Package C state demotion.
Configuration options: [Disabled] [Enabled]

Package C state undemotion [Disabled]

Allows you to enable or disable the Package C state undemotion.
Configuration options: [Disabled] [Enabled]

CState Pre-Wake [Enabled]

Allows you to enable or disable the CState Pre-Wake. Selecting **[Disabled]** will set bit 30 of
POWER_CTL MSR(0x1FC) to 1 to disable the CState Pre-Wake.
Configuration options: [Disabled] [Enabled]

Package C State limit [AUTO]

Allows you set the Package C State limit.
Configuration options: [C0/C1] [C2] [C3] C6] [C7] [C7s] [C8] [AUTO]

CFG lock [Enabled]

Allows you to configure MSR 0xE2[15], CFG lock bit.
Configuration options: [Disabled] [Enabled]

Intel TXT(LT) Support [Disabled]

Allows you to enable or disable the Intel(R) TXT(LT) support.
Configuration options: [Disabled] [Enabled]

4.4.5   SATA Configuration

```
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       Advanced

 SATA Controller(s)                     [Enabled]          ▲  Enable or disable SATA Device.
 SATA Mode Selection                    [AHCI]
▶ Software Feature Mask Configuration

 SATA Port 1                            Empty
   Software Preserve                    Unknown
   Port 1                               [Enabled]
   Mechanical Presence Switch           [Enabled]
   Spin Up Device                       [Disabled]
   SATA Device Type                     [Hard Disk Drive]
   Device Sleep                         [Disabled]
   SATA DEVSLEP Idle Timeout Config     [Disabled]
 SATA Port 2                            Empty
   Software Preserve                    Unknown               ⮀: Select Screen
   Port 2                               [Enabled]             ⭥: Select Item
   Mechanical Presence Switch           [Enabled]             Enter: Select
   Spin Up Device                       [Disabled]            +/-: Change Opt.
   SATA Device Type                     [Hard Disk Drive]     F1: General Help
   Device Sleep                         [Disabled]            F2: Previous Values
   SATA DEVSLEP Idle Timeout Config     [Disabled]            F5: Optimized Defaults
 SATA Port 3                            Empty                 F10: Save Changes & Reset
   Software Preserve                    Unknown               ESC: Exit
   Port 3                               [Enabled]
   Mechanical Presence Switch           [Enabled]
   Spin Up Device                       [Disabled]         ▼

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```

SATA Controller(s) [Enabled]

Allows you to enable or disable the SATA Device.
Configuration options: [Enabled] [Disabled]

SATA Mode Selection [AHCI]

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.

Software Feature Mask Configuration

```
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        Advanced

  RAID0                             [Enabled]          Enable or disable RAID0
  RAID1                             [Enabled]          feature.
  RAID10                            [Enabled]
  RAID5                             [Enabled]
  Intel Rapid Recovery Technology   [Enabled]
  OROM UI and BANNER                [Enabled]
  HDD Unlock                        [Enabled]
  LED Locate                        [Enabled]
  IRRT Only on eSATA                [Enabled]
  Smart Response Technology         [Enabled]
  OROM UI Normal Delay              [4 sec]
  RST Force Form                    [Disabled]
```

RAID0 [Enabled]

Allows you to enable or disable the RAID0 feature.
Configuration options: [Disabled] [Enabled]

RAID1 [Enabled]

Allows you to enable or disable the RAID1 feature.
Configuration options: [Disabled] [Enabled]

RAID10 [Enabled]

Allows you to enable or disable the RAID10 feature.
Configuration options: [Disabled] [Enabled]

RAID5 [Enabled]

Allows you to enable or disable the RAID5 feature.
Configuration options: [Disabled] [Enabled]

Intel Rapid Recovery Technology [Enabled]

Allows you to enable or disable the Intel Rapid Recovery Technology.
Configuration options: [Disabled] [Enabled]

OROM UI and BANNER [Enabled]

[Disabled]   No OROM banner or information will be displayed if all disks and RAID volumes are Normal.

[Enabled]   OROM UI is shown.

HDD Unlock [Enabled]

Selecting **[Enabled]** will indicate that the HDD password unlock in the OS is enabled.
Configuration options: [Disabled] [Enabled]

LED Locate [Enabled]

Selecting **[Enabled]** will indicate that the LED/SGPIO hardware is attached and ping to locate feature is enabled on the OS.
Configuration options: [Disabled] [Enabled]

IRRT Only on eSATA [Enabled]

[Disabled]   Any RAID volume can span internal and eSATA drives.

[Enabled]   Only IRRT volumes can span internal and eSATA drives.

Smart Response Technology [Enabled]

Allows you to enable or disable the Smart Response Technology.
Configuration options: [Disabled] [Enabled]

OROM UI Normal Delay [4 sec]

Allows you to select the delay time of the OROM UI Splash Screen in a normal status.
Configuration options: [2 sec] [4 sec] [6 sec] [8 sec]

RST Force Form [Disabled]

Allows you to enable or disable Form for Intel Rapid Storage Technology.
Configuration options: [Disabled] [Enabled]

SATA Port 1 / SATA Port 2 / SATA Port 3 / SATA Port 4 / SATA Port 5 / SATA Port 6

Port 1 / Port 2 / Port 3 / Port 4 / Port 5 / Port 6 [Enabled]

Allows you to enable or disable the SATA port
Configuration options: [Disabled] [Enabled]

Mechanical Presence Switch [Enabled]

Allows control of reporting if this port has a Mechanical Presence Switch.
Configuration options: [Disabled] [Enabled]

Spin Up Device [Disabled]

Selecting **[Enabled]** will start a COMERSET initialization sequence to the device on an edge detect from 0 to 1.
Configuration options: [Disabled] [Enabled]

SATA Device Type [Hard Disk Drive]

Allows you to set whether the SATA port is connected to Solid State Drive or Hard Disk Drive.
Configuration options: [Hard Disk Drive] [Solid State Drive]

Device Sleep [Disabled]

Allows you to enable or disable the mSata for RTD3.
Conifguration Options: [Disabled] [Enabled]

SATA DEVSLEP Idle Timeout Config [Disabled]

Allows you to enable or disable SATA DTIO Config.
Configuration options: [Disabled] [Enabled]

4.4.6   Network Stack Configuration

Network Stack [Disabled]

Allows you to enable or disable UEFI Network Stack.
Configuration options: [Disabled] [Enabled]

Ipv4 PXE Support [Enabled]

Enables or disables the Ipv4 PXE Boot Support. If disabled, Ipv4 PXE boot option will not be created.
Configuration options: [Disable] [Enable]

Ipv6 PXE Support [Enabled]

Enables or disables the Ipv6 PXE Boot Support. If disabled, Ipv6 PXE boot option will not be created.
Configuration options: [Disable] [Enable]

PXE boot wait time [0]

Set the wait time to press ESC key to abort the PXE boot. Use the <+> or <-> to adjust the value. The values range from 0 to 5.

Media detect count [1]

Set the number of times presence of media will be checked. Use the <+> or <-> to adjust the value. The values range from 1 to 50.

4.4.7   CSM Configuration

```
            Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
      Advanced

  Compatibility Support Module Configuration            Enable/Disable CSM Support.

  CSM Support                      [Enabled]

  CSM16 Module Version             07.76

  GateA20 Active                   [Upon Request]
  Option ROM Messages              [Force BIOS]

  Boot option filter               [Legacy only]

  Option ROM execution

  Network                          [Legacy]         ↔: Select Screen
  Storage                          [Legacy]         ↑↓: Select Item
  Video                            [Legacy]         Enter: Select
  Other PCI devices                [Legacy]         +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F5: Optimized Defaults
                                                    F10: Save Changes & Reset
                                                    ESC: Exit



            Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

CSM Support [Enabled]

This option allows you to enable or disable CSM Support.
Configuration options: [Disabled] [Enabled]

GateA20 Active [Upon Request]

This allows you to set the GA20 option.
[Upon Request]   GA20 can be disabled using BIOS services.
[Always]   Do not allow disabling GA20; this option is useful when any RT code is
                          executed above 1MB

Option ROM Messages [Force BIOS]

This allows you to set the display mode for option ROM.
Configuration options: [Force BIOS] [Keep Current]

Boot Option filter [Legacy only]

This option allows you to control the Legacy/UEFI ROMs priority.
Configuration options: [UEFI and Legacy] [Legacy only] [UEFI only]

Network / Storage / Video [Legacy]

This option allows you to control the execution of UEFI and Legacy PXE/ Storage/ Video
OpROM.
Configuration options: [UEFI] [Legacy]

Other PCI devices [Legacy]

This item determines the OpROM execution policy for devices other than Network, Storage,
or Video.
Configuration options: [UEFI] [Legacy]

4.4.8   NVMe controller and Drive information

You may view the NVMe controller and Drive information if an NVMe device is connected.

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
         Advanced

  NVMe controller and Drive information

  No NVME Device Found
```
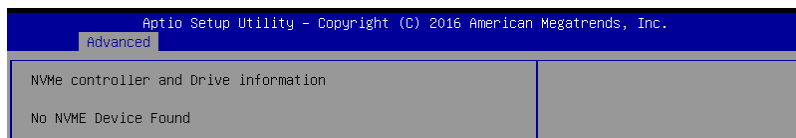
4.4.9   iSCSI Configuration

Allows you to configure the iSCSi parameters.

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
         Advanced

  iSCSI Initiator Name                          The worldwide unique name of
                                                iSCSI Initiator. Only IQN
▶ Add an Attempt                                format is accepted.Range is
                                                from 4 to 223
▶ Delete Attempts

▶ Change Attempt Order
```
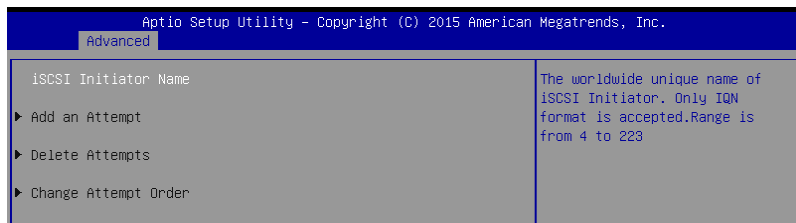
4.5   Security Menu

This menu allows a new password to be created or a current password to be changed. The menu also enables or disables the Secure Boot state and lets the user configure the System Mode state.

```
          Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
    Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Event Logs

  Password Description                                     Set Administrator Password

  If ONLY the Administrator's password is set,
  then this only limits access to Setup and is
  only asked for when entering Setup.
  If ONLY the User's password is set, then this
  is a power on password and must be entered to
  boot or enter Setup. In Setup the User will
  have Administrator rights.
  The password length must be
  in the following range:
  Minimum length                        3
  Maximum length                       20
                                                         ↔: Select Screen
                                                         ↑↓: Select Item
  Administrator Password                                 Enter: Select
  User Password                                          +/–: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
▶ Secure Boot menu                                       F5: Optimized Defaults
                                                         F10: Save Changes & Reset
                                                         ESC: Exit


          Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Administrator Password

To set an administrator password:

1. Select the Administrator Password item and press <Enter>.

2. From the Create New Password box, key in a password, then press <Enter>.

3. Confirm the password when prompted.

To change an administrator password:

1. Select the Administrator Password item and press <Enter>.

2. From the Enter Current Password box, key in the current password, then press <Enter>.

3. From the Create New Password box, key in a new password, then press <Enter>.

4. Confirm the password when prompted.

> To clear the administrator password, follow the same steps as in changing an administrator password, but press <Enter> when prompted to create/confirm the password.

User Password

To set a user password:

1.   Select the User Password item and press <Enter>.

2.   From the Create New Password box, key in a password, then press <Enter>.

3.   Confirm the password when prompted.

To change a user password:

1.   Select the User Password item and press <Enter>.

2.   From the Enter Current Password box, key in the current password, then press <Enter>.

3.   From the Create New Password box, key in a new password, then press <Enter>.

4.   Confirm the password when prompted.

Secure Boot Menu

This item allows you to customize the Secure Boot settings.
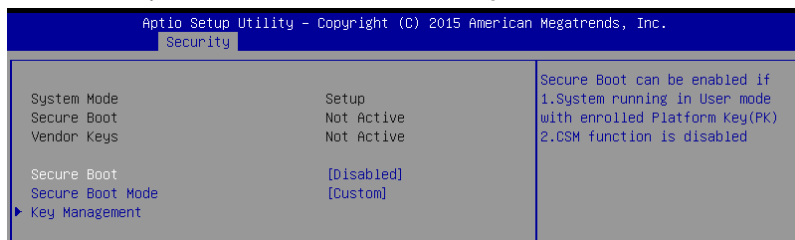
Secure Boot Control [Disabled]

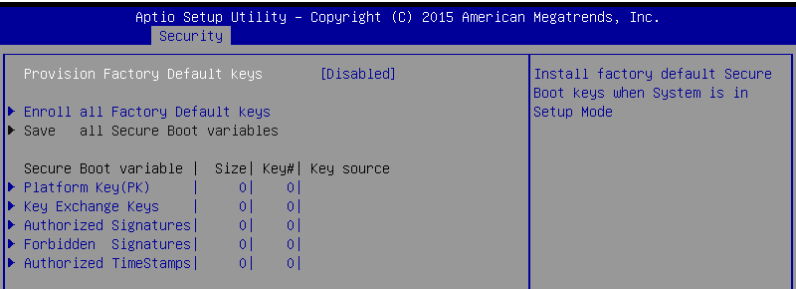This item allows you to enable or disable the Secure Boot flow control.
Configuration options: [Disabled] [Enabled]

Secure Boot Mode [Custom]

This item allows you to select the mode of the Secure boot to change Execution policy and Secure Boot Key management. Configuration options: [Standard] [Custom]

Key Management

This item only appears when you set the Secure Boot Mode to [Custom]. This allows you to modify Secure Boot variables and set Key Management page.

```
              Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
                Security

   Provision Factory Default keys        [Disabled]               Install factory default Secure
                                                                  Boot keys when System is in
 ▶ Enroll all Factory Default keys                                Setup Mode
 ▶ Save  all Secure Boot variables

   Secure Boot variable |  Size| Key#| Key source
 ▶ Platform Key(PK)      |     0|    0|
 ▶ Key Exchange Keys     |     0|    0|
 ▶ Authorized Signatures |     0|    0|
 ▶ Forbidden  Signatures |     0|    0|
 ▶ Authorized TimeStamps |     0|    0|
```

Provision Factory Default Keys [Disabled]

Configuration options: [Disabled] [Enabled]

Enroll All Factory Default Keys

This item will ask you if you want to Install Factory Default secure variables. Select Yes if you want to load the default secure variables, otherwise select No.
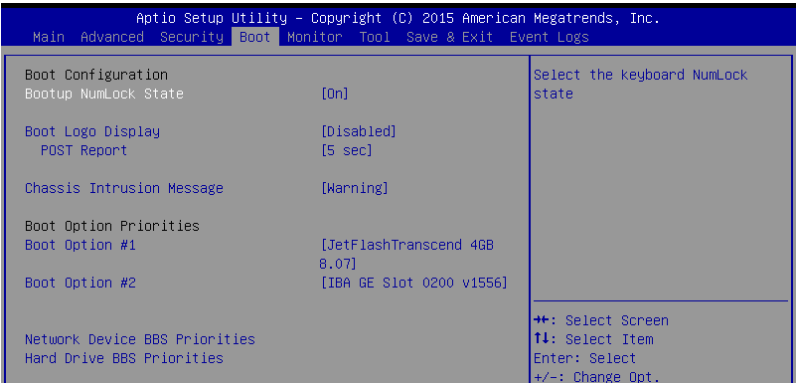
Platform Key (PK)

Configuration options: [Set New Key] [Delete]

Key Exchange Keys / Authorized Signatures / Forbidden Signatures / Authorized TimeStamps

Configuration options: [Set New Key] [Delete] [Append]

4.6   Boot Menu

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

```
              Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
     Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Event Logs

   Boot Configuration                                             Select the keyboard NumLock
   Bootup NumLock State              [On]                         state

   Boot Logo Display                 [Disabled]
     POST Report                     [5 sec]

   Chassis Intrusion Message         [Warning]

   Boot Option Priorities
   Boot Option #1                    [JetFlashTranscend 4GB
                                     8.07]
   Boot Option #2                    [IBA GE Slot 0200 v1556]

                                                                 ++: Select Screen
   Network Device BBS Priorities                                 ↑↓: Select Item
   Hard Drive BBS Priorities                                     Enter: Select
                                                                 +/–: Change Opt.
```

Bootup NumLock State [On]

Allows you to select the power-on state for the NumLock.
Configuration options: [Off] [On]

Boot Logo Display [Disabled]

Allows you to enable or disable the full screen logo display feature.
[Auto]   Auto adjustment for Windows requirements
[Full Screen]   Maximize the boot logo size.
[Disabled]   Hide the logo during POST.

POST Report [5 sec]

Allows you to set the desired POST Report waiting time from 1 to 10 seconds.
Configuration options: [1 sec] – [10 sec] [Until Press ESC]

Chassis Intrusion Message [Warning]

Allows you to set an action when chassis intrusion has occured.
[Warning]   Warning beep and pause at intrusion message for 3 seconds.
[Halt]   Halt at intrusion message.

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 select the boot device during system startup, press <F8> when ASUS Logo appears.

- To access Windows OS in Safe Mode, please press <F8> after POST.

Set the booting order of network devices.
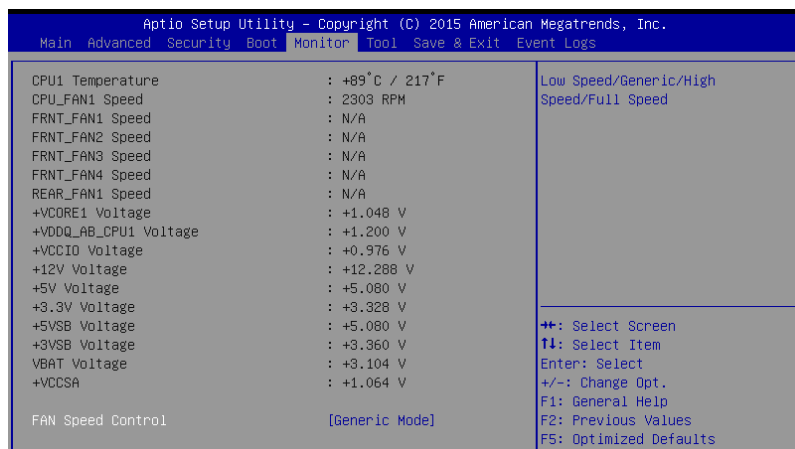
Boot Option #1 [IBA GE Slot 0100 v1556]

Configuration options: [IBA GE Slot 0100 v1566] [Disabled]

Network Device BBS Priorities

These items appear only when you connect SATA ODD or hard drive to the SATA ports and
allow you to set the booting order of the SATA devices.

4.7   Monitor Menu

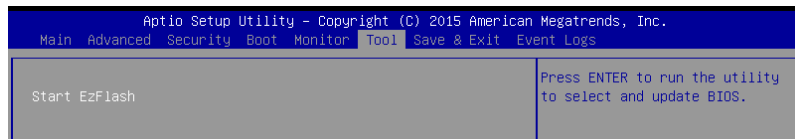The Monitor menu displays the system temperature/power status, and allows you to change the fan settings.

```
               Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Event Logs

      CPU1 Temperature                   : +89˚C / 217˚F              Low Speed/Generic/High
      CPU_FAN1 Speed                     : 2303 RPM                   Speed/Full Speed
      FRNT_FAN1 Speed                    : N/A
      FRNT_FAN2 Speed                    : N/A
      FRNT_FAN3 Speed                    : N/A
      FRNT_FAN4 Speed                    : N/A
      REAR_FAN1 Speed                    : N/A
      +VCORE1 Voltage                    : +1.048 V
      +VDDQ_AB_CPU1 Voltage              : +1.200 V
      +VCCIO Voltage                     : +0.976 V
      +12V Voltage                       : +12.288 V
      +5V Voltage                        : +5.080 V
      +3.3V Voltage                      : +3.328 V
      +5VSB Voltage                      : +5.080 V          →←: Select Screen
      +3VSB Voltage                      : +3.360 V          ↑↓: Select Item
      VBAT Voltage                       : +3.104 V          Enter: Select
      +VCCSA                             : +1.064 V          +/-: Change Opt.
                                                             F1: General Help
      FAN Speed Control                  [Generic Mode]      F2: Previous Values
                                                             F5: Optimized Defaults
```

Fan Speed Control [Generic Mode]

Allows you to set the fan speed.

Configuration options: [Generic Mode] [High Speed Mode] [Full Speed Mode]

4.8   Tool menu

The Tool menu items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.
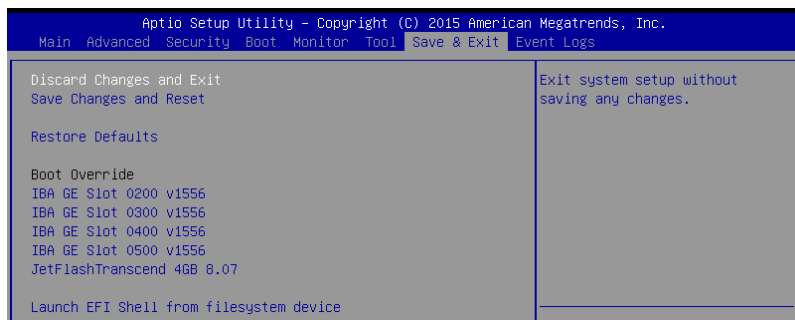
```
               Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Event Logs

      Start EzFlash                                          Press ENTER to run the utility
                                                             to select and update BIOS.
```

ASUS EZ Flash

Allows you to run ASUS EZ Flash BIOS ROM Utility when you press <Enter>. Refer to the ASUS EZ Flash Utility section for details.

4.9 Save & Exit menu

The Exit menu items allow you to save or discard your changes to the BIOS items.

```
                 Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Event Logs

    Discard Changes and Exit                              Exit system setup without
    Save Changes and Reset                                saving any changes.

    Restore Defaults

    Boot Override
    IBA GE Slot 0200 v1556
    IBA GE Slot 0300 v1556
    IBA GE Slot 0400 v1556
    IBA GE Slot 0500 v1556
    JetFlashTranscend 4GB 8.07

    Launch EFI Shell from filesystem device
```

Pressing <Esc> does not immediately exit this menu. Select one of the options from this menu or <F10> from the legend bar to exit.

Discard Changes and Exit

Exit System setup without saving any changes.

Save Changes and Reset

Reset the system setup after saving the changes.

Restore Defaults

Restore/load default values for all the setup options.

Boot Override

These items displays the available devices. The 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.

Launch EFI Shell from filesystem device

Attempts to launch EFI Shell application (Shell.efi) from one of the available filesystem devices.

4.10 Event Logs menu

The Event Logs menu items allow you to change the event log settings and view the system event logs.

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
     Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Event Logs

  ▶ Change Smbios Event Log Settings            Press <Enter> to change the
  ▶ View Smbios Event Log                       Smbios Event Log configuration.
```
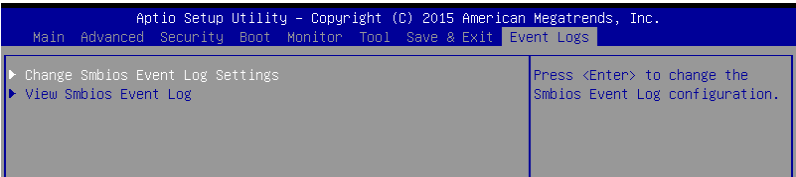
4.10.1 Change Smbios Event Log Settings

Press <Enter> to change the Smbios Event Log configuration.

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
                                                              Event Logs

  Enabling/Disabling Options                    Change this to enable or
  Smbios Event Log            [Enabled]         disable all features of Smbios
                                                Event Logging during boot.
  Erasing Settings
  Erase Event Log             [No]
  When Log is Full            [Do Nothing]

  Smbios Event Log Standard Settings
  Log System Boot Event       [Disabled]
  MECI                        1
  METW                        60
                                                ➜←: Select Screen
  Custom Options                                ↑↓: Select Item
  Log OEM Codes               [Enabled]         Enter: Select
  Convert OEM Codes           [Disabled]        +/-: Change Opt.
                                                F1: General Help
  NOTE: All values changed here do not take effect   F2: Previous Values
        until computer is restarted.
```

All values changed here do not take effect until computer is restarted.

Enabling/Disabling Options

Smbios Event Log [Enabled]

Change this to enable or disable all features of Smbios Event Logging during boot.
Configuration options: [Disabled] [Enabled]

Erasing Settings

Erase Event Log [No]

Choose options for erasing Smbios Event Log. Erasing is done prior to any logging activation during reset.
Configuration options: [No] [Yes, Next reset] [Yes, Every reset]

When Log is Full [Do Nothing]

Allows you to choose options for reactions to a full Smbios Event Log.
Configuration options: [Do Nothing] [Erase Immediately]

Smbios Event Log Standard Settings

Log System Boot Event [Disabled]

Allows you to enable or disable logging of System boot event.
Configuration options: [Enabled] [Disabled]

MECI [1]

Also known as Multiple Event Count Increment, and allows you to set the value for the
number of occurences of a duplicate event that must pass before the multiple-event counter
of log entry is updated. Use the <+> and <-> keys to adjust the value.
Configuration options: [1] - [255]

METW [60]

Also known as Multiple Time Event Window, and allows you to set the value for the number of
minutes which must pass between duplicate log entries which utilize a multiple-event counter.
Use the <+> and <-> keys to adjust the value.
Configuration options: [0] - [99]

Custom Options

Log OEM Codes [Enabled]

Allows you to enable or disable the logging of EFI Status Codes as OEM codes (if not already
converted to legacy).
Configuration options: [Disabled] [Enabled]

Convert OEM Codes [Disabled]

Allows you to enable or disable the converting of EFI Status Codes to Standard Smbios
Types (not all may be translated).
Configuration options: [Disabled] [Enabled]

RAID Configuration

5

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

5.1 Setting up RAID

The motherboard comes with the Intel® C232 controller that supports **Intel® Rapid Storage Technology enterprise Option ROM Utility** with RAID 0, RAID 1, RAID 10, and RAID 5 support (for Windows® OS only).

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 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.

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.

If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support DVD to a floppy disk before you install an operating system to the selected hard disk drive.

5.1.2 Installing hard disk drives

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

To install the SATA hard disks for RAID configuration:

1. Install the SATA hard disks into the drive bays following the instructions in the system user guide.

2. Connect a SATA signal cable to the signal connector at the back of each drive and to the SATA connector on the motherboard.

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

5.1.3 Setting the RAID mode in BIOS

You must set the RAID mode in the BIOS Setup to be able to launch the RAID utilities before you can create a RAID set from the SATA hard disk drives attached to the SATA connectors supported by Intel® C232 chipset.

To do this:

1. Enter the BIOS Setup during POST.

2. Go to the **Advanced** Menu > **SATA Configuration**, then press <Enter>.

3. Set **SATA Mode** to [RAID].

4. Press <F10> to save your changes and exit the BIOS Setup.

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

5.1.4 RAID configuration utilities

Depending on the RAID connectors that you use, you can create a RAID set using the utilities embedded in each RAID controller. For example, use the **Intel® Rapid Storage Technology enterprise SATA Option ROM Utility** if you installed Serial ATA hard disk drives on the Serial ATA connectors supported by the Intel® C232 chipset.

5.2 Intel® Rapid Storage Technology enterprise SATA Option ROM Utility

The Intel® Rapid Storage Technology enterprise SATA Option ROM utility allows you to create RAID 0, RAID 1, RAID 10 (RAID 1+0), and RAID 5 set from Serial ATA hard disk drives that are connected to the Serial ATA connectors supported by the Southbridge.

> Before you proceed, ensure that you have installed the Serial ATA hard disk drives, and have set the correct SATA mode in the BIOS setup. You can refer to **the Installing hard disk drives** and **5.1.3 Setting the RAID mode in BIOS** section for more information.

To launch the Intel® Rapid Storage Technology enterprise SATA 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 enterprise - SATA Option ROM - 3.6.0.1023
           Copyright(C) 2003-12 Intel Corporation.   All Rights Reserved.
    ═══════════════════════════════[ MAIN MENU ]═══════════════════════════════
         1. Create RAID Volume              3. Reset Disks to Non-RAID
         2. Delete RAID Volume              4. Exit


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

      Physical Disks:
      ID  Drive Model    Serial #              Size     Type/Status(Vol ID)
      0   ST3300656SS    HWAS0000991753TR      279.3GB     Non-RAID Disk
      1   ST3300656SS    37VN00009846RAJ1      279.3GB     Non-RAID Disk
      2   ST3300656SS    397600009846UEDY      279.3GB     Non-RAID Disk
      3   ST3300656SS    GWC50000991756G6      279.3GB     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.

5.2.1 Creating a RAID set

To create a RAID set:

1. From the utility main menu, select **1. Create RAID Volume** and press <Enter>.

2. Key in a name for the RAID set and press <Enter>.

```
Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
         Copyright(C) 2003-12 Intel Corporation.  All Rights Reserved.
============================[ CREATE VOLUME MENU ]============================
                        Name:  Volume0
                  RAID Level:  RAID0(Strips)
                       Disks:  Select Disks
                  Strip Size:  128KB
                    Capacity:  0.0  GB
                        Syne:  N/A
                               Create Volume


==================================[ HELP ]===================================



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




  [↑↓]Change        [TAB]-Next        [ESC]-Previous Menu      [ENTER]-Select
```

3. Press the up/down arrow keys to select a RAID Level that you wish to create then press <Enter>.

4. From the **Disks** item field, press <Enter> to select the hard disk drives that you want to include in the RAID set.

```
=============================[ SELECT DISKS ]=============================

 Port   Drive Model    Serial #               Size         Status
 0      ST3300656SS    HWAS0000991753TR       279.3GB      Non-RAID Disk
 1      ST3300656SS    37VN00009846RAJ1       279.3GB      Non-RAID Disk
 2      ST3300656SS    397600009846UEDY       279.3GB      Non-RAID Disk
 3      ST3300656SS    GWC50000991756G6       279.3GB      Non-RAID Disk

               Select 2 disks to create volume.

  === [↑↓]-Prev/Next [TAB]-(M)aster [SPACE]-(R)ecovery [ENTER]-Done ===
```
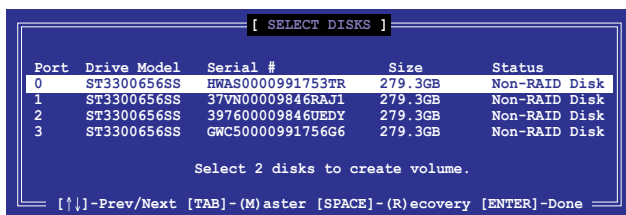
5. Use the up/down arrow keys to move the selection bar then press <Space> to select a disk. A small triangle before the Port number marks the selected drive. Press <Enter> when you are done.

6.   Use the up/down arrow keys to select the stripe size for the RAID array (for RAID 0,
       10 and 5 only) then press <Enter>. The available stripe size values range from 4 KB to
       128 KB. The following are typical values:
       RAID 0:   128KB
       RAID 10:   64KB
       RAID 5:   64KB

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

7.   In the **Capacity** field item, key in the RAID volume capacity that you want to use and
       press <Enter>. The default value field indicates the maximum allowed capacity.

8.   Press <Enter> to start creating the RAID volume.

9.   From the following warning message, press <Y> to create the RAID volume and return
       to the main menu, or press <N> to go back to the **CREATE VOLUME** menu.

```
            WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.

         Are you sure you want to create this volume? (Y/N):
```
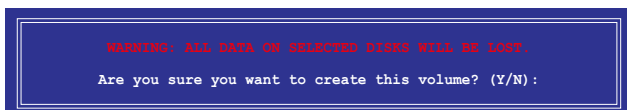
5.2.2   Deleting a RAID set

⚠️ Take caution 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>.

2.   From the Delete Volume Menu, press the up/down arrow keys to select the RAID set you want to delete then press <Del>.

```
    Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
          Copyright(C) 2003-12 Intel Corporation.  All Rights Reserved.
    ═════════════════════════════ [ 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
```

3.   Press <Y> to confirm deletion of the selected RAID set and return to the utility main menu, or press <N> to return to the **DELETE VOLUME** menu.

```
                      ════ [ 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 volume "Volume0"? (Y/N):
```
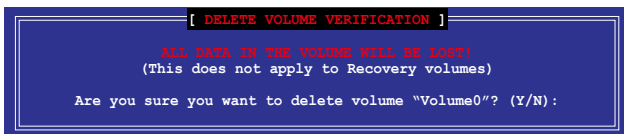
5.2.3 Resetting disks to Non-RAID

![warning icon] Take caution before you reset a RAID volume hard disk drive to non-RAID. Resetting a RAID volume hard disk drive deletes all internal RAID structure on the drive.

To reset a RAID set:

1. From the utility main menu, select **3. Reset Disks to Non-RAID** and press <Enter>.

2. Press the up/down arrow keys to select the drive(s) or disks of the RAID set you want to reset, then press <Space>. A small triangle before the Port number marks the selected drive. Press <Enter> when you are done.

```
========================[ RESET RAID DATA ]========================
          Resetting RAID disk will remove its RAID structures
          and revert it to a non-RAID disk.

     WARNING: Resetting a disk causes all data on the disk to be lost.
     (This does not apply to Recovery volumes)

     Port  Drive Model   Serial #           Size       Status
     0     ST3300656SS   HWAS0000991753TR   279.3GB    Member Disk
     1     ST3300656SS   37VN00009846RAJ1   279.3GB    Member Disk

               Select the disks that should be reset.

===== [↑↓]-Previous/Next [SPACE]-Selects [ENTER]-Selection Complete =====
```

3. Press <Y> in the confirmation window to reset the drive(s) or press <N> to return to the utility main menu.

5.2.4 Exiting the Intel® Rapid Storage Technology enterprise SATA Option ROM utility

To exit the utility:

1. From the utility main menu, select **4. Exit** then press <Enter>.

2. Press <Y> to exit or press <N> to return to the utility main menu.

```
══════════════════[ CONFIRM EXIT ]══════════════════

           Are you sure you want to exit? (Y/N):
```
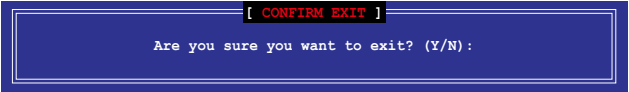
5.2.5 Rebuilding the RAID

This option is only for the RAID 1 set.

Rebuilding the RAID with other non-RAID disk

If any of the SATA hard disk drives included in the RAID 1 array failed, the system displays the status of the RAID volume as "**Degraded**" during POST. You can rebuild the RAID array with other installed non-RAID disks.

To rebuild the RAID with other non-RAID disk:

1. During POST, press <Ctrl>+<I> at the prompt to enter the Intel Rapid Storage Technology option ROM utility.

2. If there is a non-RAID SATA Hard Disk available, the utility will prompt you to rebuild the RAID. Press the up/down arrow keys to select the destination disk then Press <Enter> to start the rebuilding process, or press <ESC> to exit.

```
══════════════[ DEGRADED VOLUME DETECTED ]══════════════

 "Degraded" volume and disk available for rebuilding detected. Selectign
 a disk initiates a rebuild. Rebuild completes in the operating system.

   Select the port of destination disk for rebuilding (ESC to exit):
   Port  Drive Model    Serial #              Size
   X     XXXXXXXXXXX    XXXXXXXX              XXX.GB


══════════════[↑↓]-Previous/Next [ENTER]-Select [ESC]-Exit══════════════
```
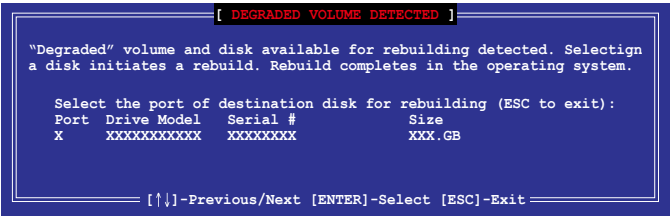
Select a destination disk with the same size as the original hard disk.

3. The utility immediately starts rebuilding after the disk is selected. When done, the status of the degraded RAID volume is changed to **"Rebuild"**.

```
    Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
            Copyright(C) 2003-12 Intel Corporation.  All Rights Reserved.
    ╔═══════════════════════════════[ MAIN MENU ]═══════════════════════════════╗
    ║       1. Create RAID Volume             3. Reset Disks to Non-RAID         ║
    ║       2. Delete RAID Volume             4. Exit                            ║
    ║                                                                           ║
    ╠═════════════════════════[ DISK/VOLUME INFORMATION]════════════════════════╣
    ║   RAID Volumes:                                   *=Data is Encrypted      ║
    ║   ID    Name      Level1        Strip      Size   Status     Bootable      ║
    ║   1     Volume0   RAID1(Mirror) N/A        149.0GB Rebuild    Yes          ║
    ║                                                                           ║
    ║   Physical Devices:                                                       ║
    ║   Port  Drive Model   Serial #             Size   Type/Status(Vol ID)     ║
    ║   1     ST3160812AS   9LS0F4HL             149.0GB Member Disk(0)          ║
    ║   2     ST3160812AS   3LS0JYL8             149.0GB Member Disk(0)          ║
    ║                                                                           ║
    ║                                                                           ║
    ║   Volumes with "Rebuild" status will be rebuilt within the operating system.║
    ╚═══════════════════════════════════════════════════════════════════════════╝
        [↑↓]-Select              [ESC]-Exit          [ENTER]-Select Menu
```

4. Press <Esc> to exit Intel Rapid Storage Technology and reboot the system.

5. Select **Start > Programs > Intel Rapid Storage > Intel Rapid Storage Console** or click the **Intel Rapid Storage Technology** tray icon to load the Intel Rapid Storage Manager utility.

6. From the **View** menu, select **Advanced Mode** to display the details of the Intel Rapid Storage Console.

7. From the **Volumes view** option, select **RAID volume** to view the rebuilding status. When finished, the status is changed to "**Normal**".

Rebuilding the RAID with a new hard disk

If any of the SATA hard disk drives included in the RAID array failed, the system displays the status of the RAID volume as "**Degraded**" during POST. You may replace the disk drive and rebuild the RAID array.

To rebuild the RAID with a new hard disk:

1. Remove the failed SATA hard disk and install a new SATA hard disk of the same specification into the same SATA Port.

Select a destination disk with the same size as the original hard disk.

2. Reboot the system then follow the steps in section **Rebuilding the RAID with other non-RAID disk**.

5.2.6 Setting the Boot array in the BIOS Setup Utility

You can set the boot priority sequence in the BIOS for your RAID arrays when creating multi-RAID using the Intel® Rapid Storage Technology enterprise SATA Option ROM utililty.

To set the boot array in the BIOS:

Set at least one of the arrays bootable to boot from the hard disk.

1.   Reboot the system and press <Del> to enter the BIOS setup utility during POST.

2.   Go to the **Boot** menu and select the boot option priority.

3.   Use up/down arrow keys to select the boot priority and press <Enter>. See the **Boot menu** section of Chapter 4 for more details.

4.   From the **Exit** menu, select **Save Changes & Exit**, then press <Enter>.

5.   When the confirmation window appears, select **Yes**, then press <Enter>.

5.3 Intel® Rapid Storage Technology enterprise (Windows)

The Intel® Rapid Storage Technology enterprise allows you to create RAID 0, RAID 1, RAID 10 (RAID 1+0), and RAID 5 set(s) from Serial ATA hard disk drives that are connected to the Serial ATA connectors.

You need to manually install the Intel® Rapid Storage Technology enterprise utility on a Windows® operating system. Please refer to the installation instructions in **Chapter 6**.

To enter the Intel® Rapid Storage Technology enterprise utility under Windows operating system:

1. Turn on the system to windows desktop.

2. Click the **Intel® Rapid Storage Technology enterprise** icon to display the main menu.

Your storage system is configured for data protection, increased performance and optimal data storage capacity. You can create additional volumes to further optimize your storage system.
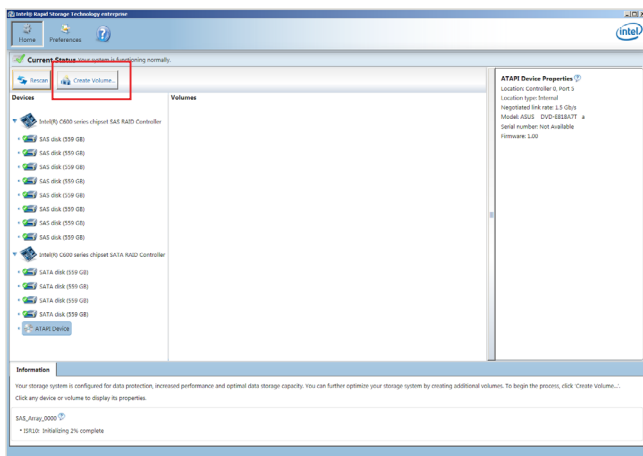
You can click **Rescan** to re-scan any attached hard disks.

5.3.1 Creating a RAID set

To create a RAID set:

1. From the utility main menu, select **Create Volume** then select volume type and click **Next**.
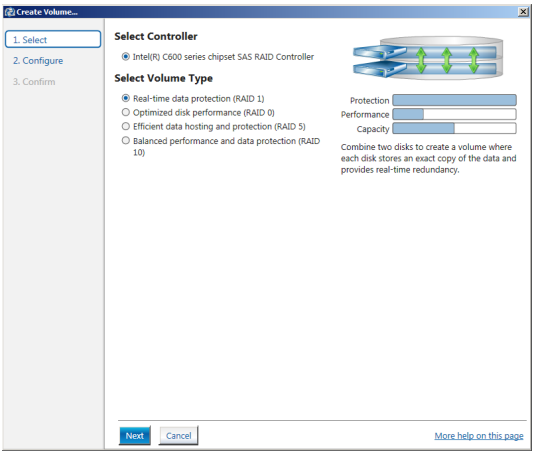
2. Key in a name for the RAID set, then select the array disks.

3. Select the **Volume Size** tab then drag the bar to set the volume size.

4. Click **Next**.
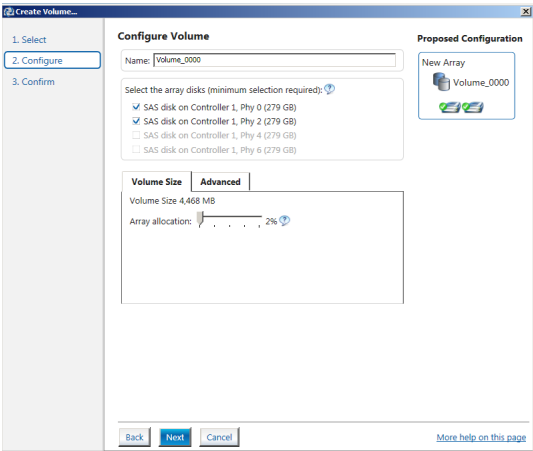
> ✎ • If you do not want to keep the data on one of the selected disks, select **NO** when prompted.
>
> • If you want to **Enable volume write-back cache** or **Initialize volume**, click **Advanced**.

5.	Confirm the volume creation, then click **Create Volume** to continue.

> This process could take a while depending on the number and size of the disks. You can continue using other applications during this time.
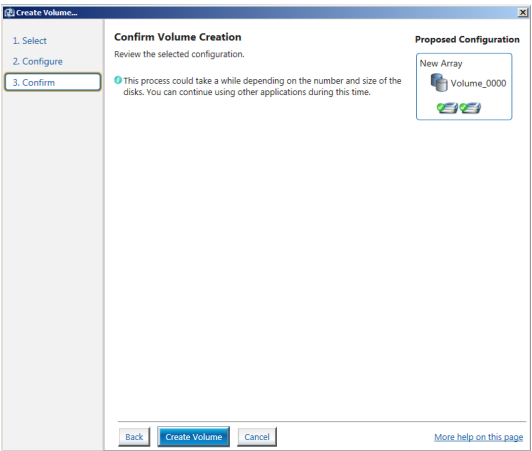
6.	Wait until the process is completed, then click **OK** when prompted.
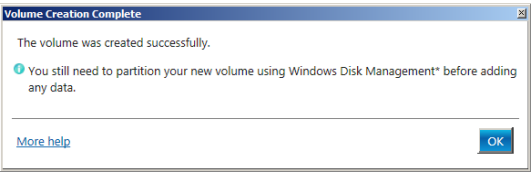
> You still need to partition your new volume using Windows Disk Management before adding any data.

The created RAID set is displayed in the **Volumes** list. If you wish to change the settings, go to **Volume Properties**.
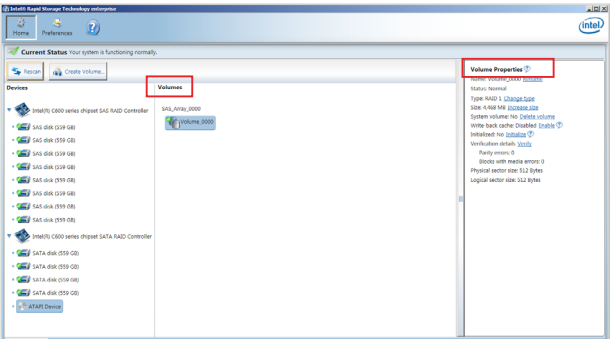
5.3.2   Changing a Volume Type

To change the volume type in **Volume Properties**:

1.   Click the SATA array items you want to change in **Volumes** field.

2   From the **Volume Properties** field, select **Type:RAID 1 Change type**.
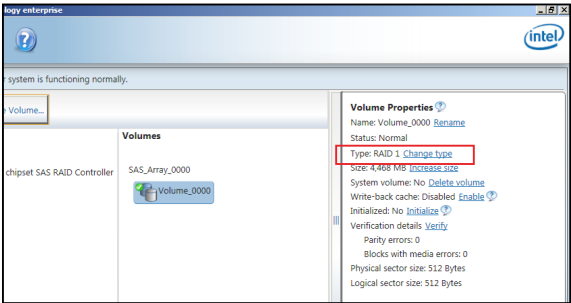
3.   You can also change the **Name**, **Select the new volume type**, and **Select additional disks to include in the new volume** if needed.

4.   Select the **Data stripe size** for the RAID array (for RAID 0, 10 and 5 only) and click **OK**. The available stripe size values range from 4 KB to 128 KB. The following are typical values:
      RAID 0:   128KB
      RAID 10:   64KB
      RAID 5:   64KB
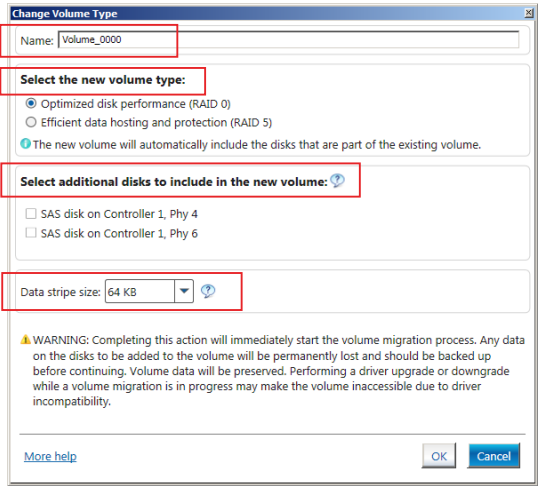
We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

5.3.3   Deleting a volume

> Be cautious when deleting a volume. You will lose all data on the hard disk drives. Before
> you proceed, ensure that you back up all your important data from your hard drives.

To delete a volume:

1.   From the **Volumes** field in the utility main menu, select the volume that you want to
       delete.
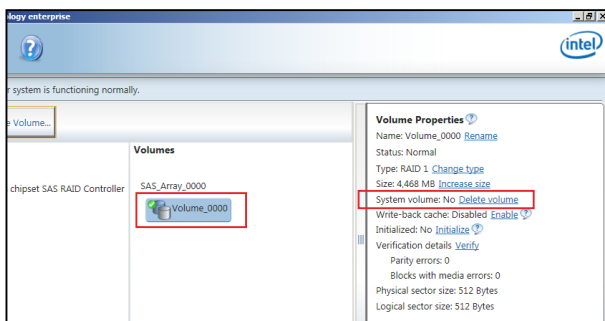
2.   From the **Volume Properties** field, select **Delete volume**.

3.   Click **Yes** to delete the volume and return to the utility main menu, or click **No** to return
       to the main menu.
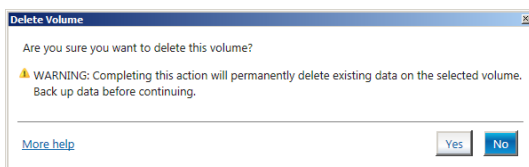
5.3.4 Preferences

System Preferences

Allow you to set to show the notification area icon and show system information, warning, or errors here.
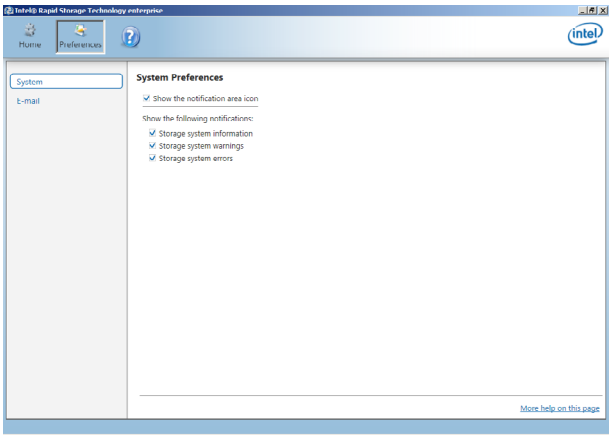
E-Mail Preferences

Allow you to set to sent e-mail of the following events:
* Storage system information
* Storage system warnings
* Storage system errors

Driver Installation

6
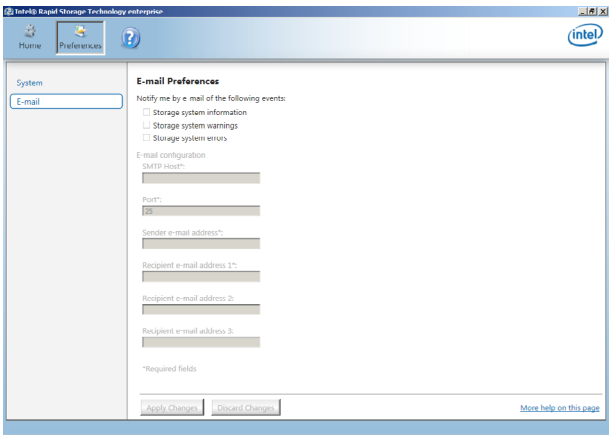
This chapter provides the instructions for installing the
necessary drivers for different system components.

6.1 RAID driver installation

After creating the RAID sets for your server system, you are now ready to install an operating system to the independent hard disk drive or bootable array. This part provides the instructions on how to install the RAID controller drivers during OS installation.

6.1.1 Creating a USB flash drive with RAID driver

When installing Windows® Server OS, you can load the RAID driver from a USB flash drive. You can create a USB flash drive with RAID driver in Windows by copying the files from the support DVD to the USB flash drive.

To copy the RAID driver to a USB flash drive in Windows environment:

1. Place the motherboard support DVD in the optical drive.

2. Connect a USB flash drive to your system.

3. Click on the optical drive to browse the contents of the support DVD.

4. Click **Drivers** > **C23x INTEL RAID** > **Driver** > **Windows** and then copy the **SATA_RAID** driver folder to the USB flash drive.

6.1.2 Installing the RAID controller driver

During Windows® Server 2012 OS installation

To install the RAID controller driver when installing Windows® Server 2012 OS

1. Boot the computer using the Windows® Server 2012 OS installation disc. Follow the screen instructions to start installing Windows Server 2012.

2. When prompted to choose a type of installation, click **Custom (advanced)**.
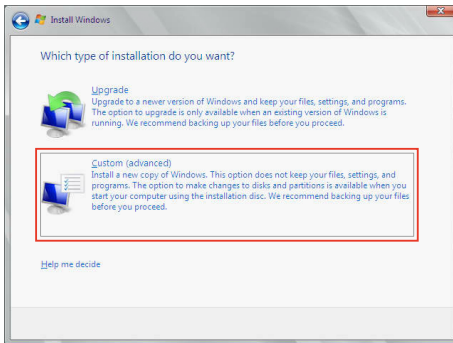
3.	Click **Load Driver**.
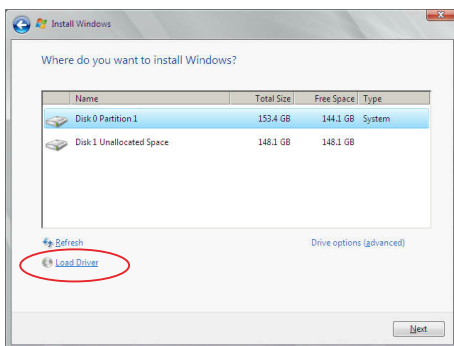
4.	A message appears reminding you to insert the installation media containing the driver of the RAID controller driver (the installation media can be a CD, DVD, or USB flash drive).

•	If you have only one optical drive installed in your system, eject the Windows OS installation disc and replace with the motherboard Support DVD into the optical drive.

•	Or you may connect a USB flash drive containing the RAID controller driver.

Click **Browse** to continue.

5.	Locate the driver in the corresponding folder of the Support DVD or USB flash drive and then click **OK** to continue.

6.	Select the RAID controller driver you need from the list and click **Next**.

7.   When the system finishes loading the RAID driver,

       •   Replace the motherboard Support DVD with the Windows Server installation disc.

       •   Remove the USB flash drive.

       Select the drive to install Windows and click Next.
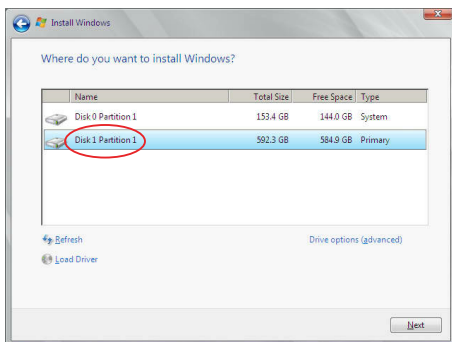
8.   Follow succeeding screen instructions to continue.

6.2   Management applications and utilities installation

The support DVD that is bundled with your motherboard contains drivers, management applications, and utilities that you can install to maximize the features of your motherboard.

⊘
- The contents of the support DVD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) for the latest updates on software and utilities.
- The support DVD is supported on Windows® Server 2012.

6.3   Running the Support DVD

When you place the support DVD into the optical drive, the DVD automatically displays the main screen if Autorun is enabled in your computer. By default, the Drivers tab is displayed.

⊘
If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

The main screen of the Support DVD contains the following tabs:

1.   Drivers

2.   Utilities

3.   Manual

4.   Contact

6.3.1   Drivers menu tab

The Drivers Menu shows the available device drivers if the system detects installed devices. Install the necessary drivers to activate the devices.

6.3.2   Utilities menu tab

The Utilities menu displays the software applications and utilities that the motherboard supports.

6.3.3   Manual menu

The Manual menu provides the link to the P10S-X user guide.

> You need an internet browser installed in your OS to view the User Guide.

6.3.4   Contact information menu

The Contact menu displays the ASUS contact information, e-mail addresses, and useful links if you need more information or technical support for your motherboard.

6.3.5 Installing the Intel® Chipset device Software driver

This section provides the instructions on how to install the Intel® chipset device software on the system.

You need to manually install the Intel® chipset device software on a Windows® Operating System.

To install the Intel® chipset device software:

1. Restart the computer.

2. Log in with **Administrator** privileges.

3. Insert the Motherboard Support DVD to the optical drive.

   The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

---

4. Click **Intel® Chipset Device Software** from the Drivers menu to start the installation.

5. The **Intel(R) Chipset Device Software** window appears. Click **Next** to start installation.
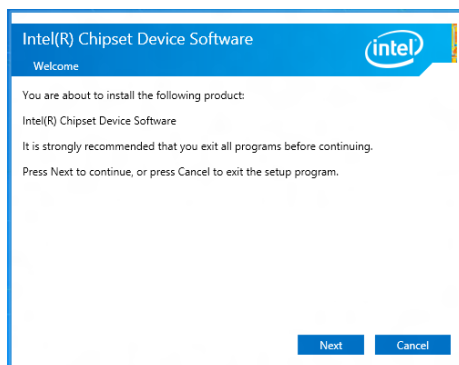
6. Select **Yes** to accept the terms of the **License Agreement** and continue the process.
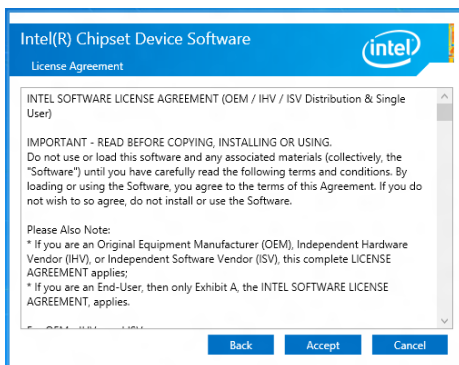
7. Read the **Readme File Information** and press **Next** to continue the installation.
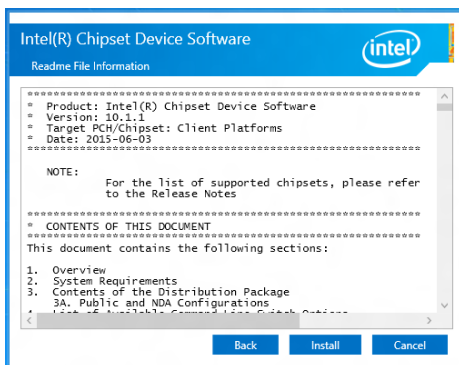
8. Toggle **Yes, I want to restart the computer now** and click **Finish** to complete the setup process.
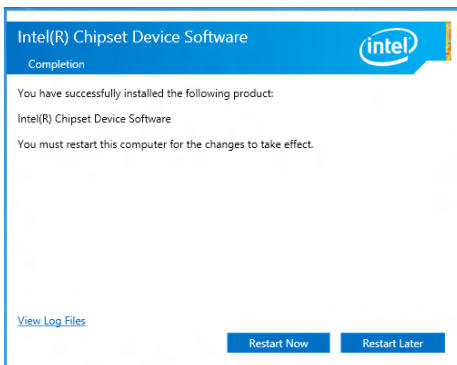
6.4 Installing the Intel® I210 Gigabit Adapters driver

This section provides the instructions on how to install the **Intel® I210 Gigabit Adapter Driver** on the system.

To install the **Intel® I210 Gigabit Adapters Driver** on the Windows® operating system:

1. Restart the computer.

2. Log on with **Administrator** privileges.

3. Insert the motherboard/system support DVD to the optical drive.

> If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. Click **Intel® I210 Gigabit Adapters Drivers** in the **Drivers** menu of the main screen to start the installation.
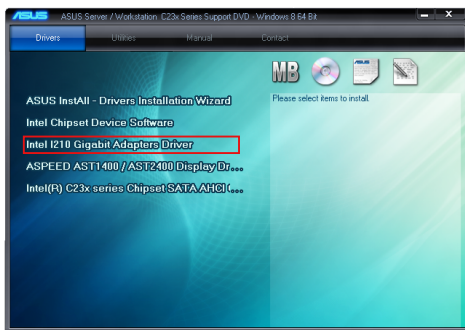
5. Click **Install Drivers and Software** option to begin installation.
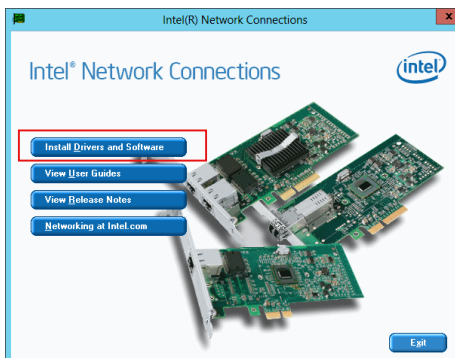
6.   Click **Next** when the **Intel(R) Network Connections–InstallShield Wizard** window appears.
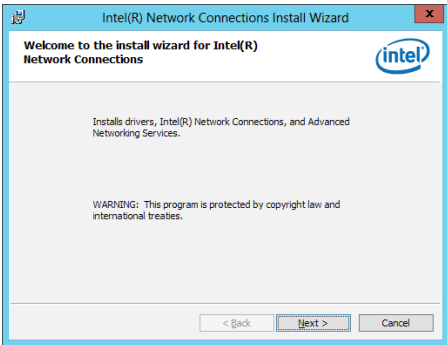
7.   Tick **I accept the terms in the license agreement** and click **Next** to continue.
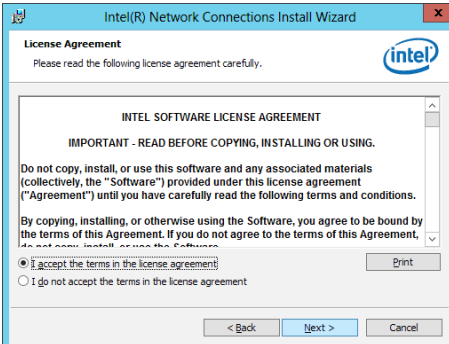
8.   From the **Setup Options** window, click **Next** to start the installation.

> By default, **Intel(R) PROSet for Windows Device Manager** and Windows PowerShell Module are ticked.
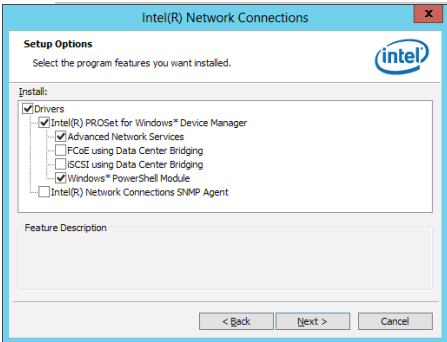
9.   Click **Install** to start the installation.
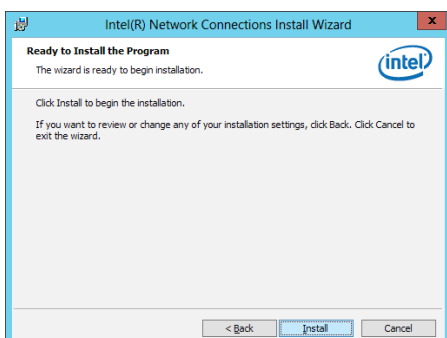
10.   When the installation is done, press **Finish** to complete the installation.
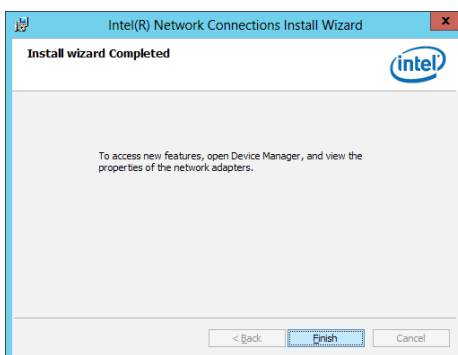
6.5 Installing the VGA driver

This section provides the instructions on how to install the **ASPEED Video Graphics Adapter (VGA)** driver.

To install the **ASPEED VGA** driver:

1. Restart the computer.

2. Log in with A**dministrator** privileges.

3. Insert the Motherboard Support DVD to the optical drive.

   The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

   > If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. From the **Main Menu**, click **ASPEED AST1400/AST2400 Display Driver** on the **Drivers** tab to start the installation.
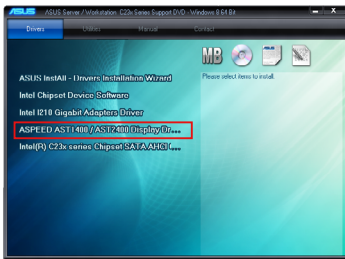
5. From the installation window, click **Next** to start the installation.

6.   Click **Install** to proceed with the installation.
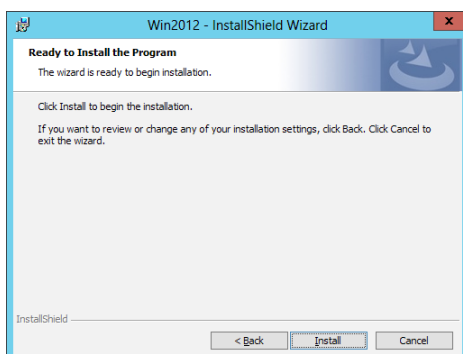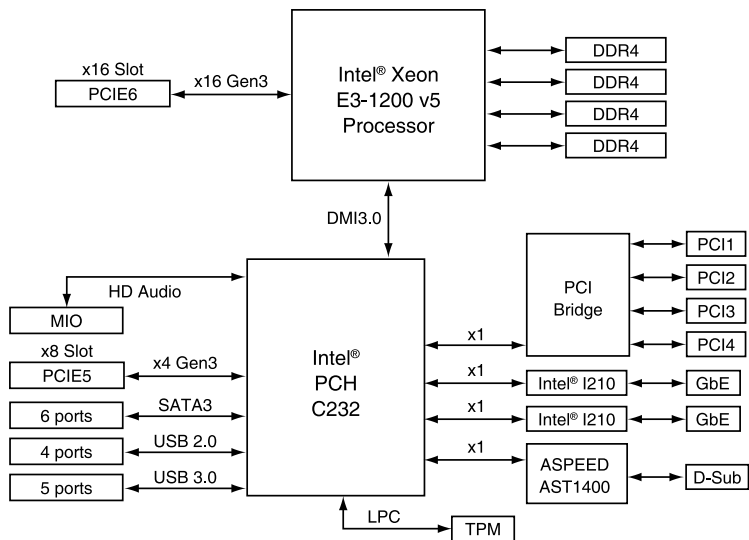

7.   Click **Finish** to complete the installation.
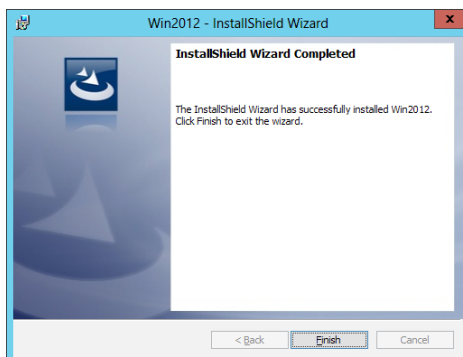
Appendix

This appendix includes additional information that you may refer to when configuring the motherboard.

P10S-X block diagram

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	http://www.asus.com

Technical Support

Telephone	+86-21-38429911
Fax	+86-21-58668722 ext: 9101
Online Support	http://support.asus.com/techserv/techserv.aspx

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	http://www.asus.com.tw

Technical Support

Telephone	+886-2-2894-3447 (0800-093-456)
Online Support	http://support.asus.com/techserv/techserv.aspx

ASUSTeK COMPUTER INC. (China)

Address	No.5077, Jindu Road, Minhang District, Shanghai
Telephone	+86-21-5442-1616
Fax	+86-21-5442-0099
Web site	http://www.asus.com.cn

Technical Support

Telephone	400-620-6655
Online Support	http://support.asus.com/techserv/techserv.aspx

ASUS contact information

ASUS COMPUTER INTERNATIONAL (America)

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

Technical Support

Support fax   +1-812-284-0883
General support   +1-812-282-2787
Online support   http://support.asus.com/techserv/techserv.aspx

ASUS COMPUTER GmbH (Germany and Austria)

Address   Harkort Str. 21-23, D-40880 Ratingen, Germany
Fax   +49-2102-959911
Web site   http://www.asus.de
Online contact   http://www.asus.de/sales

Technical Support

Telephone   +49-1805-010923
Support Fax   +49-2102-959911
Online support   http://support.asus.com/techserv/techserv.aspx

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

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

Technical Support

Telephone   +420-596-766-891
Fax   +420-596-766-329
E-mail   advance.rma.eu@asus.com
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