P10S-V/4L

Motherboard

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

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

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

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

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

REACH

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

Safety information

Electrical safety

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

- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.

- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.

- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.

- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.

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

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.

- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.

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

- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.

- Place the product on a stable surface.

- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

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 http://support.asus.com. 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 http://support.asus.com

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`

P10S-V/4L Specifications Summary

Processor Support / System Bus		1 * Socket LGA1151 Intel® Xeon® processor E3-1200 v5 product family Intel® Core™ i3 processors Intel® Pentium™ processors Intel® Celeron™ processors
Core Logic		Intel® C236 Chipset
Form Factor		ATX, 12 in. x 9.6 in.
ASUS Features	**Fan Speed Control**	✓
	Rack Ready (Rack and Pedestal dual use)	✓
	ASWM Enterprise	✓
Memory	**Total Slots**	4 (2 Channels)
	Voltage	1.2V
	Capacity	Maximum up to 64GB
	Memory Type	DDR4 2133 ECC/non-ECC UDIMM
	Memory Size	16GB
Expansion Slots (follow SSI Location number)	**Total PCI/PCI-E Slots**	6
	Slot Location 1	1 x PCI 32bit/33 MHz
	Slot Location 2	1 x PCI 32bit/33 MHz
	Slot Location 3	1 x PCI 32bit/33 MHz
	Slot Location 4	1 x PCI 32bit/33 MHz
	Slot Location 5	1 x PCI-E x8 (x4 Gen3 link)
	Slot Location 6	1 x PCI-E x16 (x16 Gen3 link)
	Slot Location 7	MIO slot
Storage	**SATA Controller**	**Intel® C236:** - 8 * SATA 6Gb/s ports - Intel® Rapid Storage Technology Enterprise (RSTe) supports software RAID 0, 1, 10, & 5 (Windows & Linux)
	SAS Controller	**Optional Kits:** - ASUS PIKE II 3008 Series SAS 12G RAID card - ASUS PIKE II 3108 Series SAS 12G HW RAID card

* Refer to www.asus.com for the complete list of supported CPUs.

(continued on the next page)

Networking	LAN	4 x Intel® I210
Graphic	VGA	Aspeed AST1400 64MB
Onboard I/O Connectors	TPM Header	1
	PSU Connector	24-pin ATX power connector + 8-pin ATX 12V power connector
	SATA DOM Power Connector	4-pin power connector
	USB Connector/ Header	1 x USB 3.0 pin header (up to 2 devices) 1 x USB 2.0 pin header (up to 2 devices) 1 x USB 3.0 connector (Type A USB socket)
	Fan Header	6 x 4 pin headers
	Chassis Intruder	1
	Front LAN LED	4
	Device Power Connector	4-pin power connector
	VGA Header	1
	LPT	1
Rear I/O Connectors	External Serial Port	1
	External USB Port	2 x USB 3.0 2 x USB 2.0
	VGA Port	1
	RJ-45	4 x GbE LAN
	PS/2 KB/Mouse	1
Management Solution	Software	ASWM Enterprise
Monitoring	CPU Temperature	✓
	FAN RPM	✓
Environment		Operation temperature: 10°C – 35°C (50°F – 95°F) Non operation temperature: -40°C – 70°C (-40°F – 158°F) Non operation humidity: 20% – 90% (Non condensing)

Specifications are subject to change without notice.

Chapter 1:
Product Introduction

1

Chapter summary

This chapter describes the motherboard features and the new technologies it supports. This chapter contains the following sections:

1.1   Welcome!

Thank you for buying an ASUS® P10S-V/4L motherboard!

The motherboard delivers a host of new features and latest technologies, making it another standout in the long line of ASUS quality motherboards!

Before you start installing the motherboard and hardware devices on it, check the items in your package with the list below.

1.2   Package contents

Check your motherboard package for the following items.

Items		Standard Gift Box Pack	Standard Bulk Pack
I/O Shield		1	1
Cables	SATA 6G cable	8	--
Application CD	Support DVD	1	1 pc per carton
	ASWM Enterprise SDVD	1	1 pc per carton
Accessory	Metal Plate for LGA1151	1	1
Packaging Qty.		1 pc per carton	10 pcs per carton

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

1.3 Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the motherboard's serial number containing 12 characters **xxS2xxxxxxxx** 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.

```
P10S-V/4L                    Made
                              in
                              China
||||| || | ||| ||| ||| ||||| |||||   合格
      xxS2xxxxxxxx
```

1.4 Special features

1.4.1 Product highlights

Latest processor technology

This motherboard supports the latest Intel® Xeon® Processor E3-1200 v5/ Core™ i3 series in LGA1151 package, which has memory and PCI Express controller integrated to support 2-channel (4 DIMMs) DDR3 memory and 16 PCI Express 3.0 lanes. The Intel® Xeon® E3-1200 v5 have improve CPU performance and integrated voltage regulators making it one of the most powerful and energy efficient CPU in the world.

Intel® Turbo Boost

Intel® Turbo Boost automatically allows the processor to run faster than the marked frequency if the processor is operating below its power, current, and temperature specification limits. This technology increases performance of both multi-threaded and single-threaded workloads.

Intel® Hyper Threading

The thread-level parallelism on each processor makes more efficient use of the processor resources, higher processing throughout and improved performance on today's multi-threaded software.

Intel® EM64T

The motherboard supports Intel® processors with the Intel® EM64T (Extended Memory 64 Technology). The Intel® EM64T feature allows your computer to run on 64-bit operating systems and access larger amounts of system memory for faster and more efficient computing.

DDR4 memory support

The motherboard supports DDR4 memory that features faster clock frequencies and higher data transfer rates of 2133 MT/s (million transfers per second). DDR4 offers a lower voltage standard of 1.2V that reduces memory power demand and provides improved performance.

PCI Express 3.0

PCI Express 3.0 (PCIe 3.0) is the PCI Express bus standard that provides twice the performance and speed of PCIe 2.0. It provides an optimal graphics performance, unprecedented data speed, and seamless transition with its complete backward compatibility to PCIe 1.0/2.0 devices.

Intel® I210AT LAN Solution

The motherboard comes with four Gigabit LAN controllers and ports which provide a total solution for your networking needs. The onboard Intel® I210AT Gigabit LAN controllers use the PCI Express interface and could achieve network throughput close to Gigabit bandwidth.

Enhanced Intel SpeedStep Technology (EIST)

The Enhanced Intel SpeedStep Technology (EIST) intelligently manages the CPU resources by automatically adjusting the CPU voltage and core frequency depending on the CPU loading and system speed or power requirement.

Serial ATA III technology

The motherboard supports the Serial ATA III 6 Gb/s technology through the Serial ATA interface and Intel® C236 chipset. Get enhanced scalability, faster data retrieval, double the bandwidth of current bus systems with up to 6Gbps data transfer rates.

USB 2.0 technology

The motherboard implements the Universal Serial Bus (USB) 2.0 specification that dramatically increases the connection speed from the 12 Mbps bandwidth on USB 1.1 to a fast 480 Mbps on USB 2.0. USB 2.0 is backward compatible with USB 1.1.

USB 3.0 technology

The motherboard implements the USB 3.0 technology with data transfer speeds of up to 5Gbps, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.

Temperature, fan, and voltage monitoring

The CPU temperature is monitored to prevent overheating and damage. The system fan rotations per minute (RPM) is monitored for timely failure detection. The chip monitors the voltage levels to ensure stable supply of current for critical components.

1.4.2   Innovative ASUS features

ASUS Fan Speed technology

The ASUS Fan Speed technology smartly adjusts the fan speeds according to the system loading to ensure quiet, cool, and efficient operation.

ASUS MIO Audio card

The ASUS MIO audio card is a discrete 8-channel high definition audio (High Definition Audio previously codenamed Azalia) CODEC that enables the clearest high quality audio output. It has jack-sensing feature, retasking functions, and multi-streaming technology that simultaneously send different audio streams to different destinations for high-end sound quality.

Chapter 2:
Hardware Information

Chapter summary

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. This chapter contains the following sections:

2.1 Before you proceed

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

- Unplug the power cord from the wall socket before touching any component.

- Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.

- Hold components by the edges to avoid touching the ICs on them.

- Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.

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

2.2   Motherboard overview

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

To optimize the motherboard features, we highly recommend that you install it in an ATX 1.1 compliant chassis.

> Ensure to unplug the chassis power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components!

2.2.1   Placement direction

When installing the motherboard, ensure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

2.2.2   Screw holes

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

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

Place this side towards the rear of the chassis

2.2.3 Motherboard layout

Motherboard layout diagram labels: +12V_DUMMY1, EATXPWR1, EATX12V1, FRNT_FAN1, KB_USB1112, DDR4 DIMM_B2 (64bit, 288-pin module), USB3_12, +5V_DUMMY1, DDR4 DIMM_B1 (64bit, 288-pin module), SBPWR1, DDR4 DIMM_A2 (64bit, 288-pin module), REAR_FAN1, DDR4 DIMM_A1 (64bit, 288-pin module), COM1, CATTERR1, SVID_CPU1, VGA_HDR1, DIGI EPU, CPU_FAN1, VGA1, Intel® I210AT, LAN_SW1, LAN_SW2, CPU1, Intel® I210AT, LAN12, LAN_SW3, LAN34, Intel® I210AT, PCH_MFG1, ME_RCVR1, FRNT_FAN2, SMBUS1, Intel® I210AT, MIO1, LAN_SW4, SATA2, SATA1, PCIE6, SATA4, SATA3, ASPEED AST1400, PCIE5, SATA6, SATA5, Intel® C236, SATA8, SATA7, VGA_SW1, SW1, PCI4, FRNT_FAN3, PCI3, Lithium Cell CMOS Power, DDM1, PWR1, BUZZ1, PWR3, Super I/O, PCI2, asmedia AST1085, SGPIO1, CLRTC1, USB3_34, BIOS, HDLED1, PLED1, LOCLED1, PCI1, LAN34_LED1, AUX_PANEL1, FRNT_FAN4, USB3_5, TR3, LPT, TPM, USB78, PANEL1, INTRUSION, P10S-V/4L, ASUS

2.2.4   Layout contents

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2.	Hard disk activity LED connector (4-pin HDLED1)	2-29
3.	USB 2.0 connector (10-1 pin USB78)	2-29
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5.	CPU, front, and rear fan connectors (4-pin FRNT_FAN1, REAR_FAN1, CPU_FAN1, FRNT_FAN2, FRNT_FAN3. FRNT_FAN4)	2-30
6.	Serial General Purpose Input/Output connector (6-1 pin SGPIO1)	2-31
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8.	VGA connector (16-1 pin VGA_HDR1))	2-32
9.	SATA DOM power connector (4-pin PWR3)	2-32
10.	ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1)	2-33
11.	System panel connector (20-1 pin PANEL1)	2-34
12.	Auxiliary panel connector (20-2 pin AUX_PANEL1)	2-35
13.	Chassis intrusion connector (2-pin INTRUSION1)	2-36
14.	LAN34_LED connector (5-1 pin LAN34_LED1)	2-36
15.	LPT connector (26-1 pin LPT1)	2-37
16.	System Management Bus (SMBUS) connector (5-1 pin SMBUS1)	2-37

2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1151 socket designed for the Intel® Xeon® E3-1200 v5 and Intel® Core™ i3 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.
>
> • 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.

2.3.1 Installing the CPU

To install the CPU:

1. Locate the CPU socket on the motherboard.

P10S-V/4L CPU LGA1151
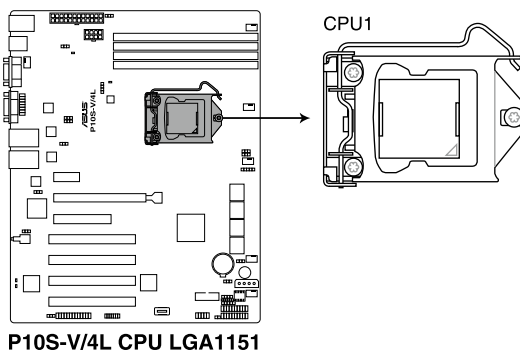
> ✏️ Before installing the CPU, ensure that the socket box is facing toward you and the load lever is on your right.

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.

Load lever

Retention tab
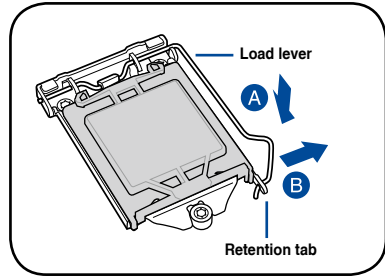
3. Lift the load lever until the load plate is completely lifted.

Load plate
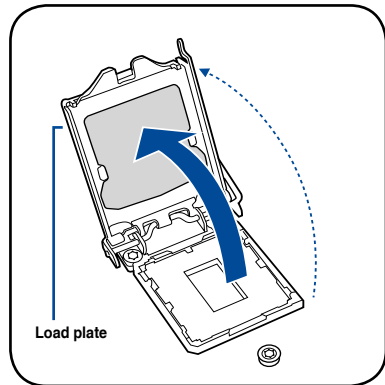
4. Position the CPU above the socket, ensuring that the gold triangle mark is on the bottom-left corner of the socket, then fit the CPU notches to the socket's alignment keys.

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.

CPU notches

Gold triangle mark

Alignment key

Alignment key
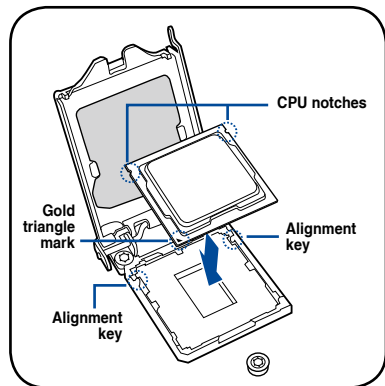
5. Close the load plate (A), ensuring that the front edge of the load plate slides under the retention lock (B) then push down the load lever (C).
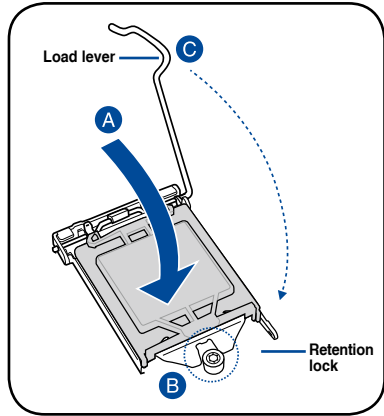
6. Insert the load lever under the retention tab to remove the PnP cap from the CPU socket.
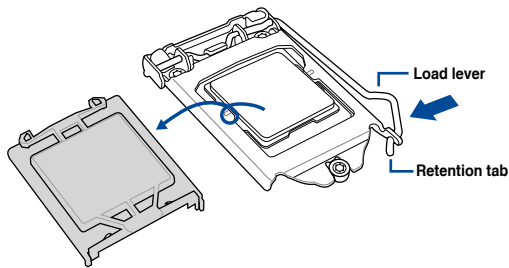
7. Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is evenly spread in a thin layer.

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.
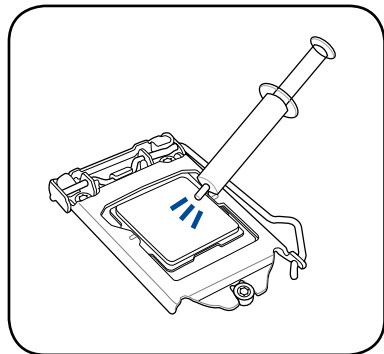
2.3.2 Installing the CPU heatsink

The Intel® LGA1151 processor requires a specially designed CPU heatsink to ensure optimum thermal condition and performance.

- When you buy a boxed Intel® processor, a specially designed CPU heatsink or a CPU heatsink with a CPU fan assembly is included depending on the package. If you buy a CPU separately, ensure that you use only Intel® certified multi-directional CPU heatsink or CPU heatsink with CPU fan.

- Use an LGA1151-compatible CPU heatsink and CPU fan assembly only. The LGA1151 socket is incompatible with the LGA775 and LGA1366 sockets in size and dimension.

If you purchased a separate CPU heatsink and fan assembly, ensure that the Thermal Interface Material is properly applied to the CPU heatsink or CPU before you install the heatsink and fan assembly.

Ensure that you have installed the motherboard to the chassis before you install the CPU fan and heatsink assembly.

To install the CPU heatsink and fan:

1. Place the heatsink on top of the installed CPU, making sure that the four fasteners match the holes on the motherboard.

2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.
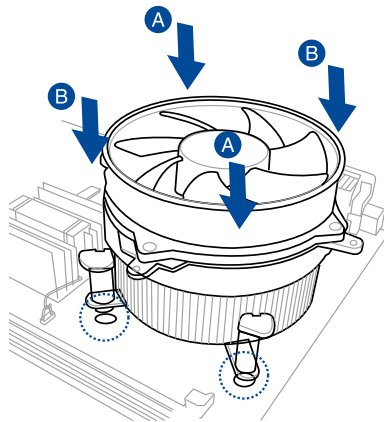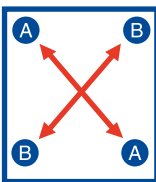
Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector.

3. Connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN1.
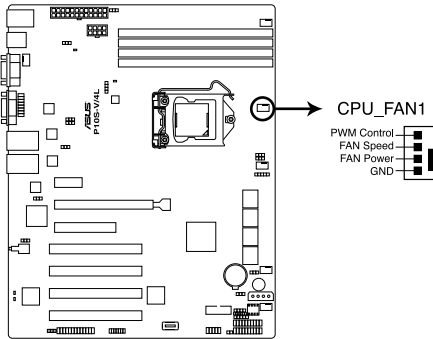
P10S-V/4L CPU FAN connector

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

2.3.3 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.
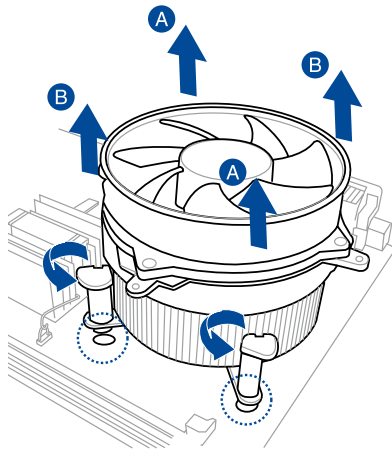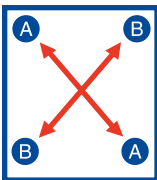
4. Carefully remove the heatsink and fan assembly from the motherboard.

2.3.4   Installing the CPU heatsink in rack

The Intel® LGA1151 processor requires a specially designed heatsink to ensure optimum thermal condition and performance.

- • Ensure that you use qualified heatsink assembly only.
- • Ensure that you have applied the thermal interface material to the top of the CPU before installing the heatsink and fan.

1.   Peel off the sticker on the heatsink metal plate and affix the plate to the back of the motherboard, matching the standoffs to the heatsink screw holes.
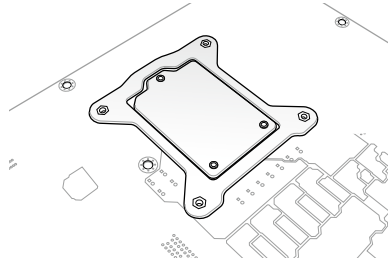
2.   Use a Phillips screwdriver to tighten the four heatsink screws using the recommended sequence below.
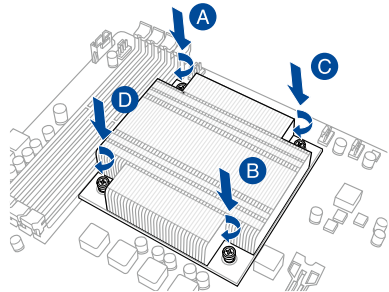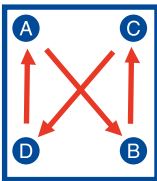
1.   Ensure that the heatsink is not skewed or tilted, otherwise the CPU will overheat.

2.   Do not overtighten the screws. Doing so can damage the CPU.

2.4   System memory

2.4.1   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:
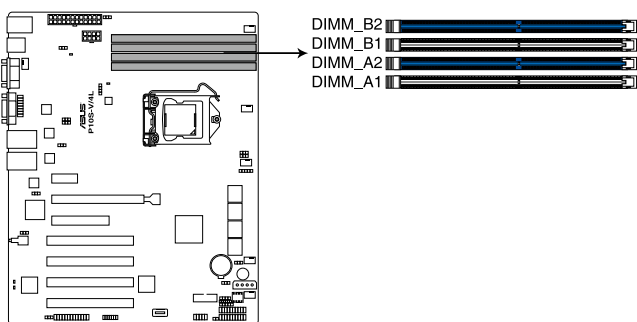
P10S-V/4L 288-pin DDR4 DIMM sockets

2.4.2   Memory configurations

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

UDIMM				
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).

2.4.3　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**
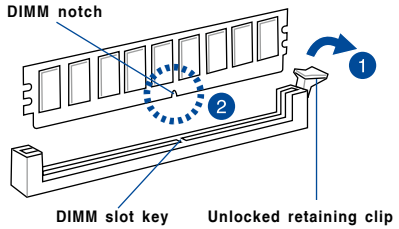
> A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

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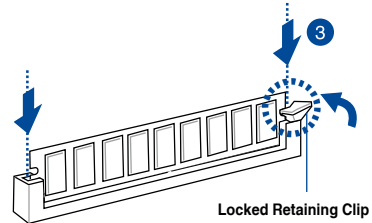
> Always insert the DIMM into the socket vertically to prevent DIMM notch damage.

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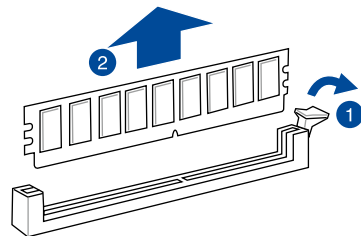
> Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

2.5 Expansion slots

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

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

2.5.1 Installing an expansion card

To install an expansion card:

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.

2. Remove the system unit cover (if your motherboard is already installed in a chassis).

3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.

4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.

5. Secure the card to the chassis with the screw you removed earlier.

6. Replace the system cover.

2.5.2 Configuring an expansion card

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

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 4 for information on BIOS setup.

2. Assign an IRQ to the card. Refer to the tables on the next page.

3. Install the software drivers for the expansion card.

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

2.5.3   Interrupt assignments

Standard Interrupt assignments

IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	-	Programmable Interrupt
3*	-	--
4*	9	Communications Port (COM1)
5*	10	Print Port (LPT1)
6	-	--
7*	-	--
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*	-	--
15*	-	--

* These IRQs are usually available for ISA or PCI devices.

2.5.4   PCI Express x16 slot (x16 link)

The onboard PCIE 6 provides one x16 Gen3 link to CPU. This slot supports VGA cards and various server class high performance add-on cards.

2.5.5   PCI Express x8 slot (x4 link)

The onboard PCIE 5 provide one x4 Gen3 link to the PCH. These slots support various server class high performance add-on cards.

2.5.6   PCI slot

The onboard PCI 1, PCI 2, PCI 3 and PCI 4 supports cards such as LAN, USB, and other cards that complies with PCI specifications.
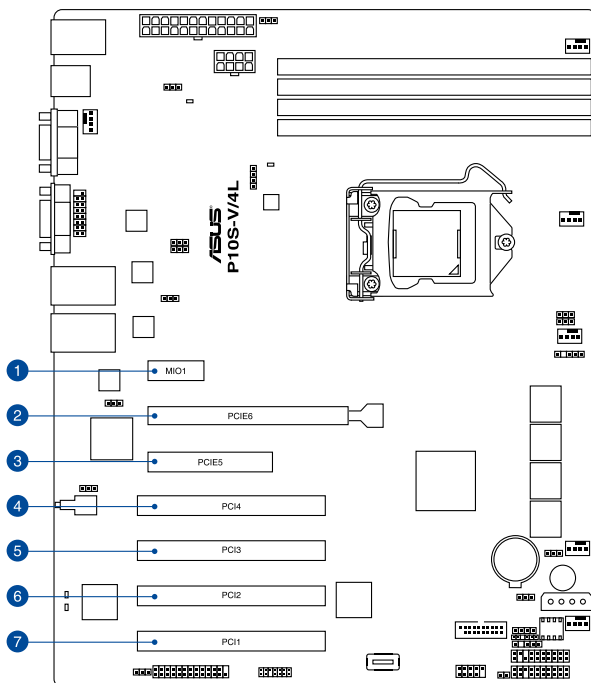
No.(Slot location)	Short Description	
1 (slot 7)	MIO1	1 x MIO slot
2 (slot 6)	PCIE6	1 x PCI-E x16 (x16 Gen3 link)
3 (slot 5)	PCIE5	1 x PCI-E x8 (x4 Gen3 link)
4 (slot 4)	PCI4	1 x PCI
5 (slot 3)	PCI3	1 x PCI
6 (slot 2)	PCI2	1 x PCI
7 (slot 1)	PCI1	1 x PCI

2.5.7 Installing the Audio card

1. Locate the MIO card slot on the motherboard and align the golden fingers of the audio card with the MIO card slot.

2. Insert the audio card into the MIO slot on the motherboard. Ensure that it is completely seated on the card slot.

3. Secure the audio card to the chassis with a screw.
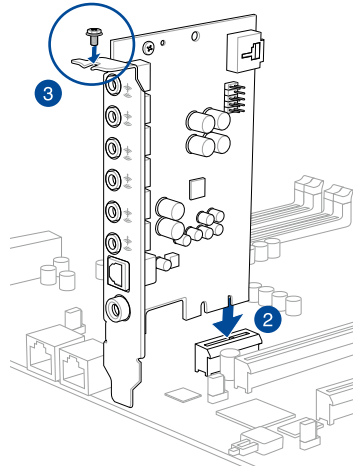
2.6 Onboard LEDs

1. **Standby Power LED (SBPWR1)**

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

SBPWR1

ON
Standby Power

OFF
Powered Off
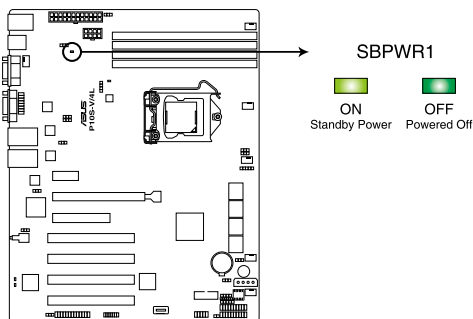
P10S-V/4L Standby Power LED

2. **Power LED (PLED1)**

   This LED lights up when the Power-on button is pressed and the system is on.
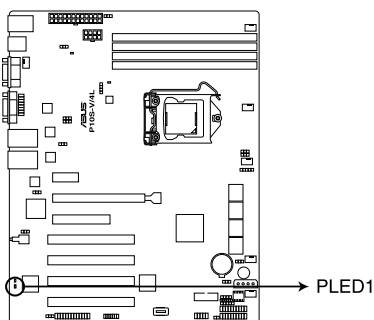
PLED1

P10S-V/4L PLED1

3. **Location LED (LOCLED1)**

The Location LED is an onboard LED that lights up when the Location Button on the front panel is pressed. This LED helps you visually locate the server among other servers especially when you are located at the back of the server rack.
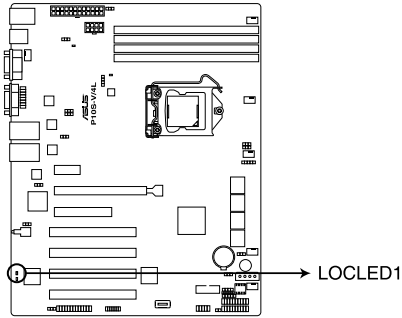
P10S-V/4L Location LED

→ LOCLED1

4. **CATT ERR LED (CATTERR1)**

The CATT ERR LED indicates that the system has experienced a fatal or catastrophic error and cannot continue to operate.
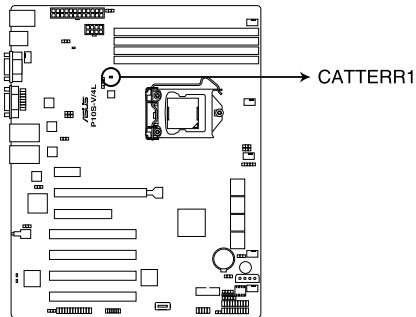
→ CATTERR1

P10S-V/4L CATTERR1 LED

2.7   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

1 2   2 3

Normal   Clear CMOS
(Default)
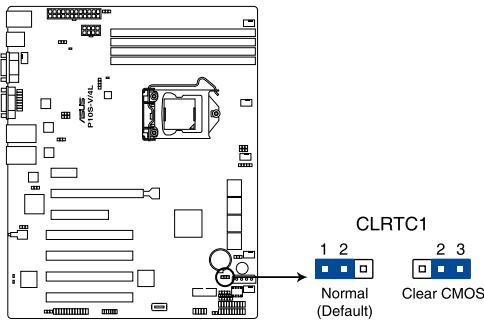
P10S-V/4L Clear RTC RAM

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.
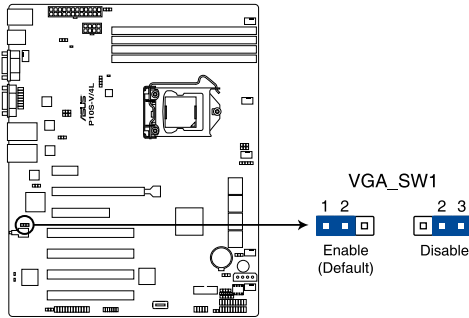
P10S-V/4L VGA setting

3. **LAN controller setting (3-pin LAN_SW1, LAN_SW2, LAN_SW3, LAN_SW4)**
    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.
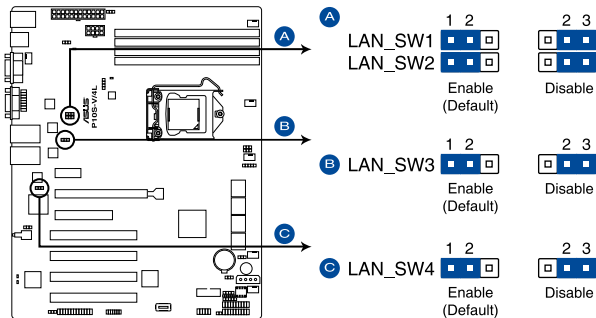
P10S-V/4L LAN setting

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.

ME_RCVR1

Normal (Default)

ME force update
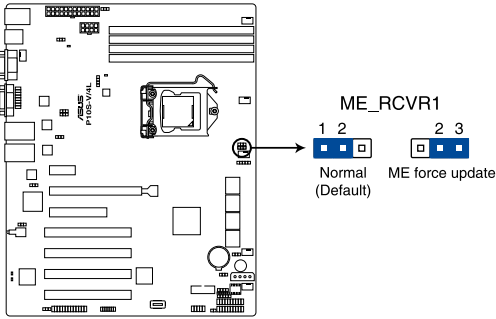
P10S-V/4L ME recovery setting

2.8   Connectors

2.8.1   Rear panel connectors
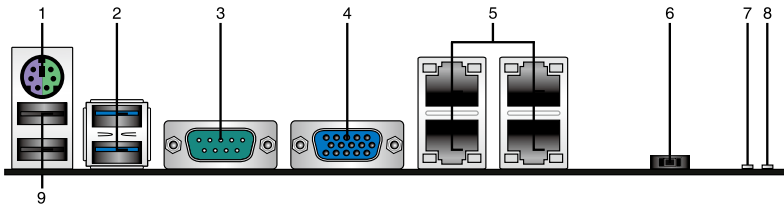
1. **PS/2 keyboard/mouse port (purple/green).** This port is for a PS/2 keyboard or mouse.

2. **USB 3.0 ports 1 and 2.** These two 4-pin USB ports are available for connecting USB 3.0 devices.

3. **Serial port (COM1).** This 9-pin communication port is for pointing devices. It is also used for serial interface for data transfer.

4. **Video Graphics Adapter port.** This port is for a VGA monitor or other VGA-compatible devices.

5. **RJ-45 ports for LAN 1-4.** These ports allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

6. **Power-on Button.** Press this button to turn on the system.

7. **Location LED.** The Location LED is an onboard LED that lights up when the Location Button on the front panel is pressed. This LED helps you visually locate the server among other servers especially when you are located at the back of the server rack.

8. **Power LED.** This LED lights up when the Power-on button is pressed and the system is on.

9. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

LAN port LED indications

Activity/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
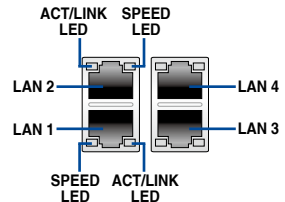
2.8.2 Q-Code table

Action	PHASE	POST CODE	TYPE	DESCRIPTIONz
Normal boot	Security Phase	1	Progress	First post code(POWER_ON_POST_CODE)
		2	Progress	Load BSP microcode(MICROCODE_POST_CODE)
		3	Progress	Perform early platform initialization
		4	Progress	Set cache as ram for PEI phase(CACHE_ENABLED_POST_CODE)
		5	Progress	Establish Stack
		6	Progress	CPU Early init.(CPU_EARLY_INIT_POST_CODE)
	PEI(Pre-EFI initialization) phase	10	Progress	PEI Core Entry
		11	Progress	PEI cache as ram CPU initial
		15	Progress	NB initialize before installed memory
		19	Progress	SB initialize before installed memory
		0	MRC Progress	MRC_INITIALIZATION_START
		10	MRC Progress	MRC_CMD_PLOT_2D
		1B	MRC Progress	MRC_FAST_BOOT_PERMITTED
		1C	MRC Progress	MRC_RESTORE_NON_TRAINING
		1D	MRC Progress	MRC_PRINT_INPUT_PARAMS
		1E	MRC Progress	MRC_SET_OVERRIDES_PSPD
		20	MRC Progress	MRC_SPD_PROCESSING
		21	MRC Progress	MRC_SET_OVERRIDES
		22	MRC Progress	MRC_MC_CAPABILITY
		23	MRC Progress	MRC_MC_CONFIG
		24	MRC Progress	MRC_MC_MEMORY_MAP
		25	MRC Progress	MRC_JEDEC_INIT_LPDDR3
		26	MRC Progress	MRC_RESET_SEQUENCE
		27	MRC Progress	MRC_PRE_TRAINING
		28	MRC Progress	MRC_EARLY_COMMAND
		29	MRC Progress	MRC_SENSE_AMP_OFFSET
		2A	MRC Progress	MRC_READ_MPR
		2B	MRC Progress	MRC_RECEIVE_ENABLE
		2C	MRC Progress	MRC_JEDEC_WRITE_LEVELING
		2D	MRC Progress	MRC_LPDDR_LATENCY_SET_B
		2E	MRC Progress	MRC_WRITE_TIMING_1D
		2F	MRC Progress	MRC_READ_TIMING_1D
		30	MRC Progress	MRC_DIMM_ODT
		31	MRC Progress	MRC_EARLY_WRITE_TIMING_2D
		32	MRC Progress	MRC_WRITE_DS
		33	MRC Progress	MRC_WRITE_EQ
		34	MRC Progress	MRC_EARLY_READ_TIMING_2D
		35	MRC Progress	MRC_READ_ODT
		36	MRC Progress	MRC_READ_EQ
		37	MRC Progress	MRC_READ_AMP_POWER
		38	MRC Progress	MRC_WRITE_TIMING_2D
		39	MRC Progress	MRC_READ_TIMING_2D
		3A	MRC Progress	MRC_CMD_VREF
		3B	MRC Progress	MRC_WRITE_VREF_2D
		3C	MRC Progress	MRC_READ_VREF_2D
		3D	MRC Progress	MRC_POST_TRAINING
		3E	MRC Progress	MRC_LATE_COMMAND
		3F	MRC Progress	MRC_ROUND_TRIP_LAT
		40	MRC Progress	MRC_TURN_AROUND
		41	MRC Progress	MRC_CMP_OPT
		42	MRC Progress	MRC_SAVE_MC_VALUES
		43	MRC Progress	MRC_RESTORE_TRAINING
		44	MRC Progress	MRC_RMT_TOOL
		45	MRC Progress	MRC_WRITE_SR
		46	MRC Progress	MRC_DIMM_RON
		47	MRC Progress	MRC_RCVEN_TIMING_1D
		48	MRC Progress	MRC_MR_FILL
		49	MRC Progress	MRC_PWR_MTR
		4A	MRC Progress	MRC_DDR4_MAPPING
		4B	MRC Progress	MRC_WRITE_VOLTAGE_1D
		4C	MRC Progress	MRC_EARLY_RDMPR_TIMING_2D
		4D	MRC Progress	MRC_FORCE_OLTM
		50	MRC Progress	MRC_MC_ACTIVATE

(continued on the next page)

Action	PHASE	POST CODE	TYPE	DESCRIPTION
Normal boot	PEI(Pre-EFI initialization) phase	51	MRC Progress	MRC_RH_PREVENTION
		52	MRC Progress	MRC_GET_MRC_DATA
		58	MRC Progress	MRC_RETRAIN_CHECK
		5A	MRC Progress	MRC_SA_GV_SWITCH
		5B	MRC Progress	MRC_ALIAS_CHECK
		5C	MRC Progress	MRC_ECC_CLEAN_START
		5D	MRC Progress	MRC_DONE
		5F	MRC Progress	MRC_CPGC_MEMORY_TEST
		60	MRC Progress	MRC_TXT_ALIAS_CHECK
		61	MRC Progress	MRC_ENG_PERF_GAIN
		68	MRC Progress	MRC_MEMORY_TEST
		69	MRC Progress	MRC_FILL_RMT_STRUCTURE
		70	MRC Progress	MRC_SELF_REFRESH_EXIT
		71	MRC Progress	MRC_NORMAL_MODE
		7D	MRC Progress	MRC_SSA_PRE_STOP_POINT
		7E	MRC Progress	MRC_NO_MEMORY_DETECTED
		7F	MRC Progress	MRC_SSA_STOP_POINT
		55	MRC Progress	MRC_MEM_INIT_DONE
		32	Progress	CPU Init.
		34	Progress	CPU Init.
		36	Progress	CPU Init.
		4F	Progress	DXE Initial Program Load(IPL)
	DXE(Driver Execution Environment) phase	60	Progress	DXE Core Started
		61	Progress	DXE NVRAM Init.
		62	Progress	SB run-time init.
		63	Progress	DXE CPU Init
		68	Progress	NB Init.
		69	Progress	NB Init.
		6A	Progress	NB Init.
		70	Progress	SB Init.
		71	Progress	SB Init.
		72	Progress	SB Init.
		78	Progress	ACPI Init.
		79	Progress	CSM Init.
	BDS(Boot Device Selection) phase	90	Progress	BDS started
		91	Progress	Connect device event
		92	Progress	PCI Bus Enumeration.
		93	Progress	PCI Bus Enumeration.
		94	Progress	PCI Bus Enumeration.
		95	Progress	PCI Bus Enumeration.
		96	Progress	PCI Bus Enumeration.
		97	Progress	Console outout connect event
		98	Progress	Console input connect event
		99	Progress	AMI Super IO start
		9A	Progress	AMI USB Driver Init.
		9B	Progress	AMI USB Driver Init.
		9C	Progress	AMI USB Driver Init.
		9D	Progress	AMI USB Driver Init.
		b2	Progress	Legacy Option ROM Init.
		b3	Progress	Reset system
		b4	Progress	USB hotplug
		b6	Progress	NVRAM clean up
		b7	Progress	NVRAM configuration reset
		A0	Progress	IDE, AHCI Init.
		A1	Progress	IDE, AHCI Init.
		A2	Progress	IDE, AHCI Init.
		A3	Progress	IDE, AHCI Init.
		FF–00	Progress	Wait BMC ready(duration: 120 seconds).
		A8	Progress	BIOS Setup Utility password verify
		A9	Progress	BIOS Setup Utility start
		AB	Progress	BIOS Setup Utility input wait
		AD	Progress	Ready to boot event
		AE	Progress	Legacy boot event
	Operating system phase	AA	Progress	APIC mode
		AC	Progress	PIC mode

2.8.3 Internal connectors

1. Serial ATA 6.0 Gbps connectors (7-pin SATA 6Gbps_1-8 connector [Light Blue])

Supported by the Intel® C236 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.
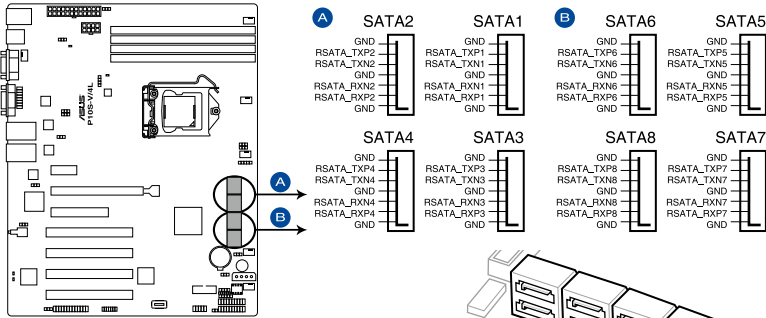
P10S-V/4L Intel® SATA 6 Gb/s connectors
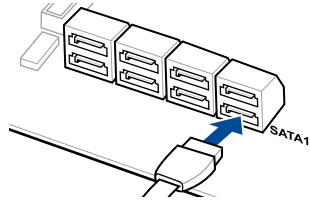
The actual data transfer rate depends on the speed of Serial ATA hard disks installed.

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.

HDLED1

PIN 1

NC
ADD_IN_CARD-
ADD_IN_CARD-
NC
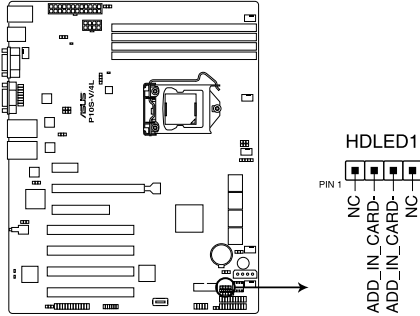
P10S-V/4L Hard disk activity LED connector

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.

USB78

USB+5V
USB_P8-
USB_P8+
GND
NC

PIN 1

USB+5V
USB_P7-
USB_P7+
GND
GND
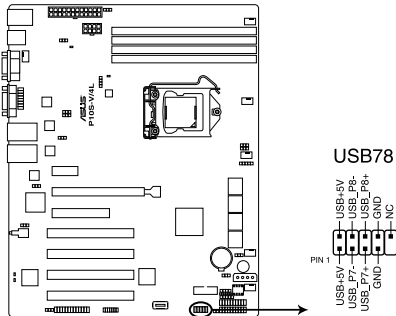
P10S-V/4L USB2.0 connector

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-V/4L USB3.0 connectors
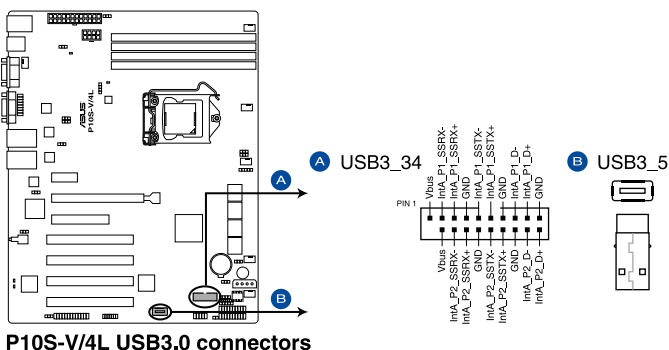
5. **CPU, front, and rear fan connectors**

(4-pin FRNT_FAN1, REAR_FAN1, CPU_FAN1, FRNT_FAN2, FRNT_FAN3, FRNT_FAN4)

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-V/4L Fan connectors
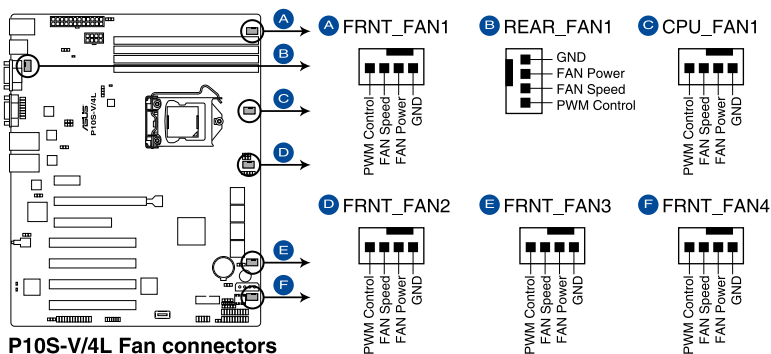
6.   Serial General Purpose Input/Output connector (6-1 pin SGPIO1)

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.
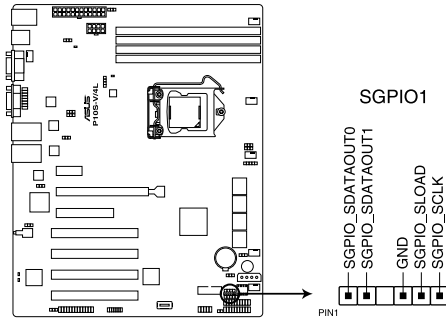
P10S-V/4L SGPIO connector

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.
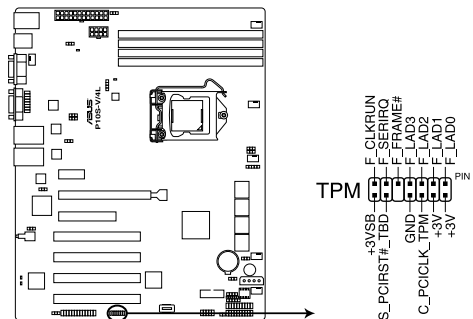
P10S-V/4L TPM connector

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

This connector supports the VGA High Dynamic-Range interface.

VGA_HDR1

V_SYNC — DDC_CL K
DDC_DATA — H_SYNC
GND — +5V
GND — GND
GND — GND
— Blue
Green — Red

PIN 1
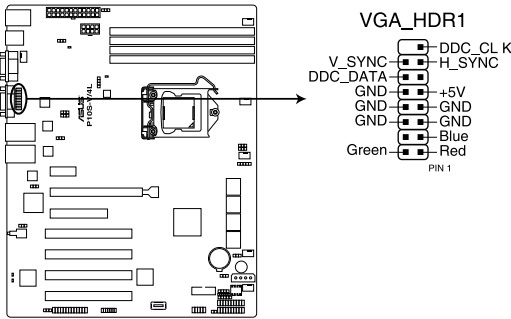
P10S-V/4L Internal VGA connector

9.   **SATA DOM power connector (4-pin PWR3)**

This 4-pin connector is for 5V power of a certain SATA DOM (Disk on Module) device when using an appropriate cable.

PWR3

+5V GND GND +12V
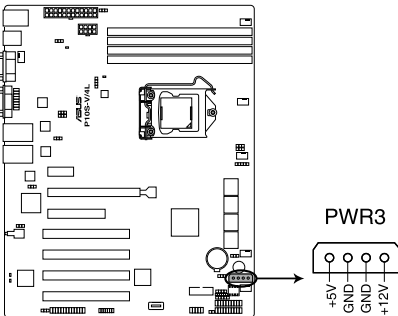
P10S-V/4L Power connector

- The SATA DOM power connector is for output power only. It has a maximum output current of 1A.

- Ensure that the power of the SATA DOM device that you will use is less than 1A.

10. **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.
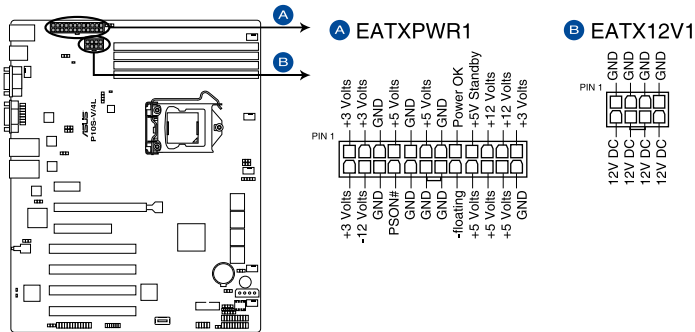
P10S-V/4L ATX power connectors

11. **System panel connector (20-1 pin PANEL1)**

This connector supports several chassis-mounted functions.
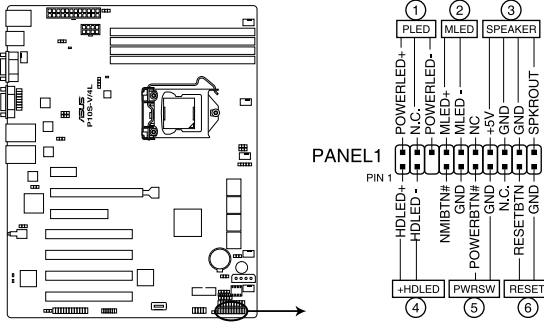
P10S-V/4L System panel connector

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.

12. 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.
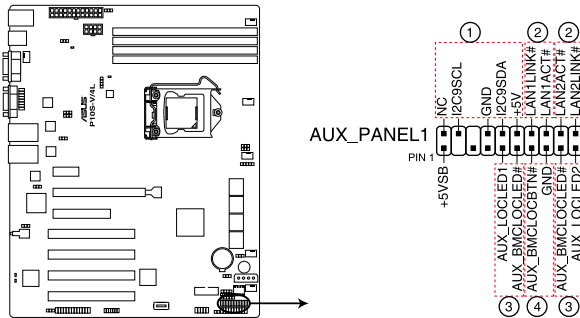
P10S-V/4L Auxiliary panel connector

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

These LEDs connect the front panel SMBus cable.

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

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

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

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

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

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

13. **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.
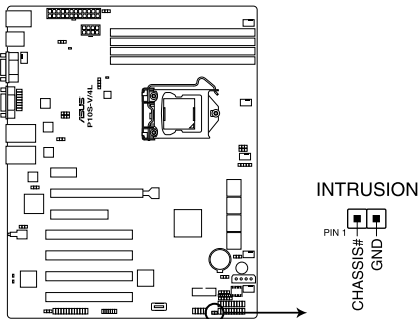
P10S-V/4L Chassis Intrusion connector

14. **LAN34_LED connector (5-1 pin LAN34_LED1)**

These LEDs are for Gigabit LAN activity LEDs on the front panel. Connect the LAN LED cable to the backplane for LAN activity indication.
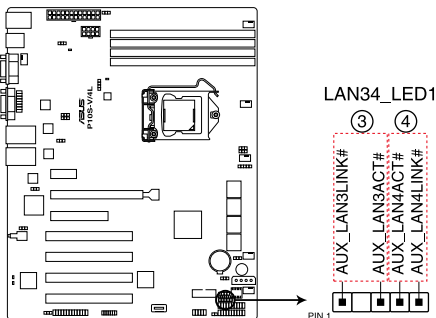
P10S-V/4L LAN3 & LAN4 LED

15. **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-V/4L LPT connector
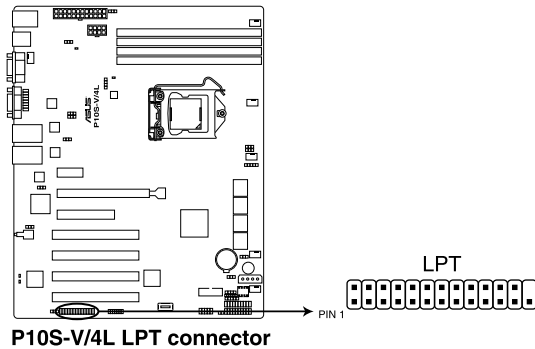
16. **System Management Bus (SMBUS) connector (5-1 pin SMBUS1)**

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.

P10S-V/4L SMBUS connector
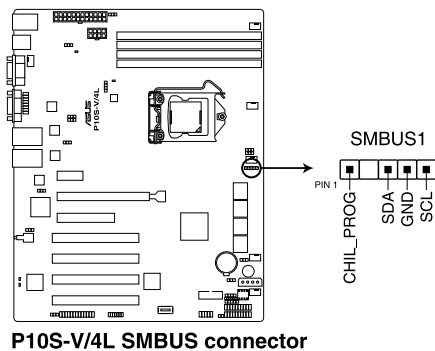
Chapter 3:
Powering Up

Chapter summary

This chapter describes the power up sequence, and ways of shutting down the system. This chapter contains the following sections:

3.1   Starting up for the first time

1.   After making all the connections, replace the system case cover.

2.   Be sure that all switches are off.

3.   Connect the power cord to the power connector at the back of the system chassis.

4.   Connect the power cord to a power outlet that is equipped with a surge protector.

5.   Turn on the devices in the following order:

   a.   Monitor

   b.   External storage devices (starting with the last device on the chain)

   c.   System power

6.   After applying power, the system power LED on the system front panel case lights up. For systems with ATX power supplies, the system LED lights up when you press the ATX power button. If your monitor complies with "green" standards or if it has a "power standby" feature, the monitor LED may light up or switch between orange and green after the system LED turns on.

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

BIOS Beep codes	
Beep	**Error condition**
1 short	Power supply surges detected during the previous power on.
1 short	No Keyboard Detected.
1 short, 2 short	No DIMM Detected.
1 short, 8 short	No VGA Detected.
2 long	Chassis Intrusion.
2 long	BIOS-image Crash Detected.

7.   At power on, hold down the <Del> key to enter the BIOS Setup. Follow the instructions in Chapter 4.

3.2 Powering off the computer

3.2.1 Using the OS shut down function

Using Windows® Server 2008 R2:

1. Click the **Start** button, move the cursor to the triangle on the right of Log off, then click **Shut Down**.

2. From the **Shutdown Event Tracker**, select the option that best describes why you want to shut down the computer.

3. Ensure that the **Planned** check box is checked.

4. If necessary, key in comments.

5. Click **OK**.

Using Windows® Server 2012:

1. Press <Ctrl>+<Alt>+<Del>.

2. Click on the Power icon on the lower right side of the screen.

3. Select **Shut down**.

4. In the Shutdown Event Tracker, select the **Other (Planned)** option in the selection lists. Otherwise, select the option that best describes why you want to shut down the computer.

5. Click **Continue**.

3.2.2 Using the dual function power switch

While the system is ON, press the power switch for less than four seconds to put the system to sleep mode or to soft-off mode, depending on the BIOS setting.

Pressing the power switch for more than four seconds lets the system enter the soft-off mode regardless of the BIOS setting.

Chapter 4:
BIOS Setup

Chapter summary

4

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

This chapter contains the following sections:

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-V/4L           Platform : P10S-V/4L
 Version  :  0200               Version  :  0206
 Build Date :07/20/2015         Build Date :08/01/2015

 FS0            System Volume Information           <DIR>
                P10S-V/4L BIOS                      <DIR>
                Windows                             <DIR>




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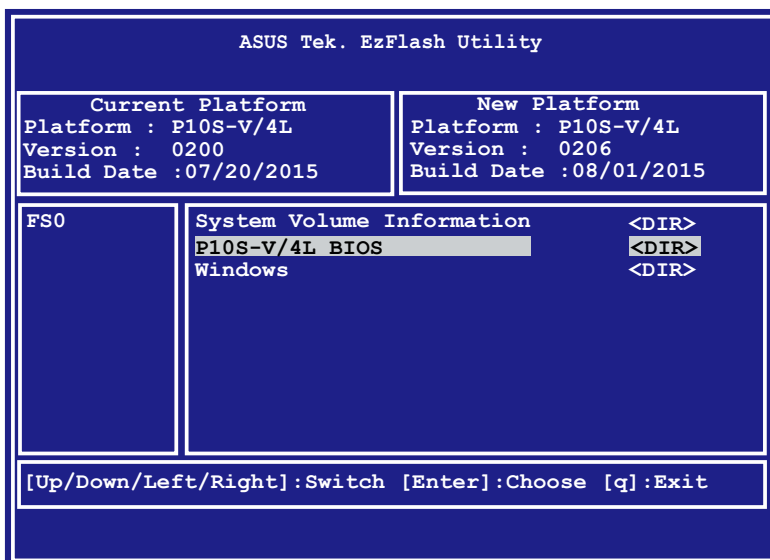
3.   Press <Tab> to switch to the **Drive** field.

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.
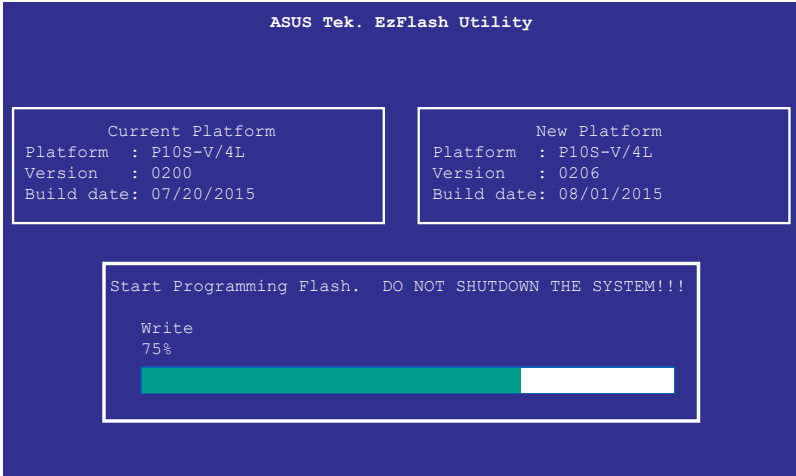
```
                       ASUS Tek. EzFlash Utility




        Current Platform                        New Platform
Platform  : P10S-V/4L                    Platform  : P10S-V/4L
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:\>
```
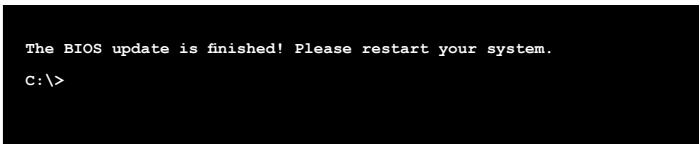
4.2 BIOS setup program

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-V Series                language
  BIOS Version                    0206 x64
  Build Date                      08/03/2015 10:39:00

  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
  BIOS Sub Version                S5080301                      ↑↓: Select Item
                                                                Enter: Select
  System Language                 [English]                     +/-: Change Opt.
                                                                F1: General Help
  System Date                     [Thu 02/26/2009]              F2: Previous Values
  System Time                     [00:13:25]                    F5: Optimized Defaults
                                                                F10: Save Changes & Reset
  Access Level                    Administrator                 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
```
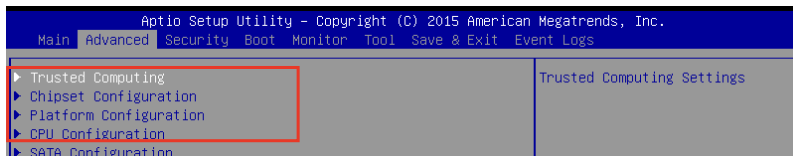
4.2.5   Navigation keys

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-V Series                language
      BIOS Version                  0206 x64
      Build Date                    08/03/2015 10:39:00

      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
      BIOS Sub Version              S5080301                    →←: Select Screen
                                                                ↑↓: Select Item
      System Language               [English]                  Enter: Select
                                                                +/-: Change Opt.
      System Date                   [Thu 02/26/2009]            F1: General Help
      System Time                   [00:13:25]                  F2: Previous Values
                                                                F5: Optimized Defaults
      Access Level                  Administrator               F10: Save Changes & Reset
                                                                ESC: Exit



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```

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) 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
   ▶ Network Stack Configuration
   ▶ CSM Configuration

   ▶ iSCSI Configuration




                                                   ↔: 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.
```

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          │ Control various DMI functions.│
│ SA PCIe Code Version                 1.2.0.0          │                           │
│ 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]
```
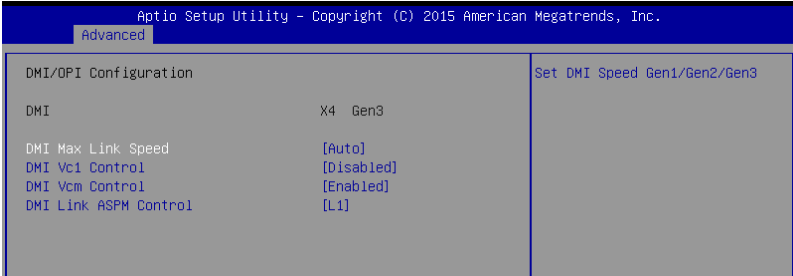
DMI Max Link Speed [Auto]

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                          x16  Gen1
    Enable Root Port                 [Auto]
    Max Link Speed                   [Auto]
    ASPM                             [Auto]
    Max Link Width                   [Auto]
    Power Down Unused Lanes          [Auto]
    De-emphasis Control              [-3.5 dB]
    OBFF                             [Enabled]
    LTR                              [Enabled]
  PEG0 Max Payload size              [Auto]
  Program PCIe ASPM after OpROM      [Disabled]
  PCIe Spread Spectrum Clocking      [Enabled]
  Control                                               →←: 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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```

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]

ASPM [Auto]

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

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

De-emphasis Control [-3.5 dB]

Allows you to configure the De-emphasis control on PEG.
Configuration options: [-6 dB] [-3.5 dB]

OBFF [Enabled]

Allows you to enable or disable the CPU PEG (0,1,0) OBFF.
Configuration options: [Disabled] [Enabled]

LTR [Enabled]

Allows you to enable or disable the CPU PEG (0,1,0) Latency Reporting.
Configuration options: [Disabled] [Enabled]

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.

PCIe Spread Spectrum Clocking Control [Enabled]

Allows you to enable or disable the Spread Spectrum Clocking for compliance testing.
Configuration options: [Disabled] [Enabled]

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]             ↔: Select Screen
   Memory Remap                   [Enabled]             ↑↓: 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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```

Maximum Memory Frequency [Auto]

Allows you to set the maximum memory frequency.
Configuration options: [Auto] [1067] [1200] [1333] [1400] [1600] [1800] [1867] [2000]
[2133] [2200] [2400] [2600]

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.

```
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     Advanced

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


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```

PCI Express Configuration

```
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  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

```
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         Advanced

  USB Configuration                                          Precondition work on USB host
                                                             controller and root ports for
  USB Precondition                    [Disabled]             faster enumeration.


  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]

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

```
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          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



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```

Intel TXT Information

```
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          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

```
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    Advanced

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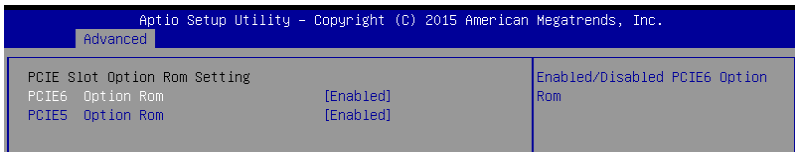
PCIE5/ PCIE6 Option ROM [Enabled]

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

```
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        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
                                                            F5: Optimized Defaults
```

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]

Onboard LAN Configuration

```
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        Advanced

    Onboard LAN Configuration                                        Intel LAN Enable/Disable

    INTEL LAN1 MAC:                  14:DD:A9:0B:E8:5F
    INTEL LAN2 MAC:                  14:DD:A9:0B:E8:60
    INTEL LAN3 MAC:                  14:DD:A9:0B:E8:61
    INTEL LAN4 MAC:                  14:DD:A9:0B:E8:62
    Intel LAN1 Enable               [Enabled]
    Intel LAN ROM Type              [PXE]
    Intel LAN2 Enable               [Enabled]
    Intel LAN ROM Type              [Disabled]
    Intel LAN3 Enable               [Enabled]
    Intel LAN ROM Type              [Disabled]
    Intel LAN4 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



                Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```
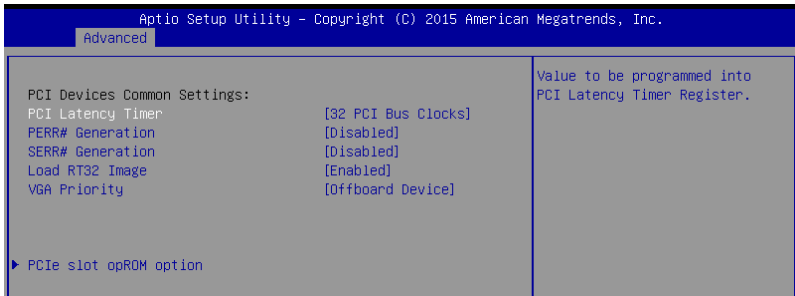
Intel LAN1 Enable [Enabled]

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 / LAN3 / LAN4 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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        Advanced

    Super IO Configuration                                           Set Parameters of Serial Port
                                                                     1 (COMA)
    Super IO Chip                          NCT6791D
  ▶ Serial Port 1 Configuration
```
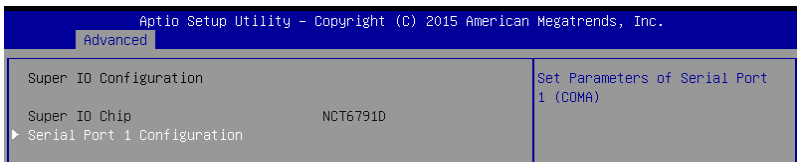
Serial Port 1 Configuration

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]
```
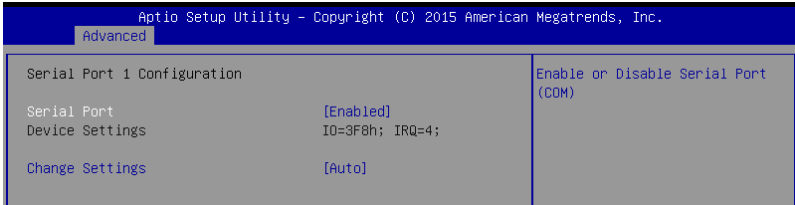
Serial Port [Enabled]

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 Console Redirection

```
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        Advanced

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

COM1

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
                                                           Enter: Select
```

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
```
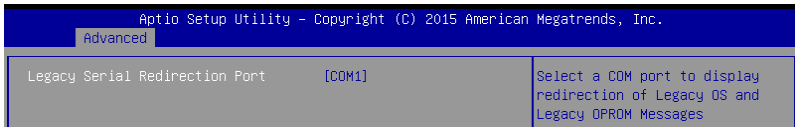
Legacy Serial Redirection Port [COM1]

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

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.
```
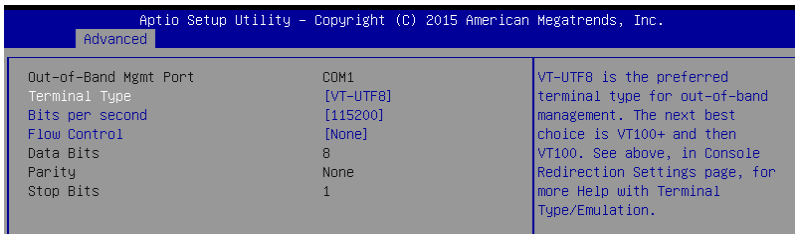
Console Redirection Settings

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]
```
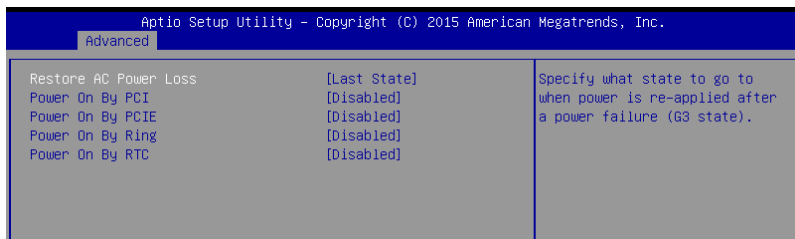
Restore AC Power Loss [Last State]

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]
```
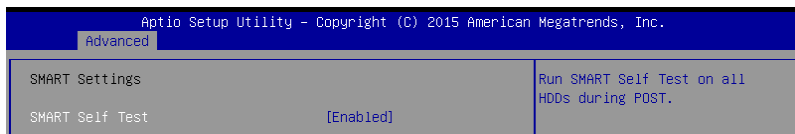
SMART Self Test [Enabled]

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

 Active Processor Cores          [All]
 Intel Virtualization Technology [Enabled]          ▼

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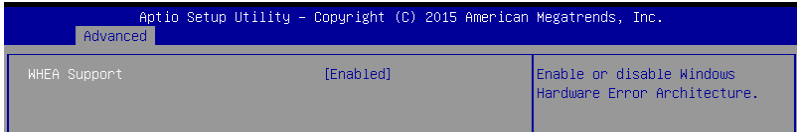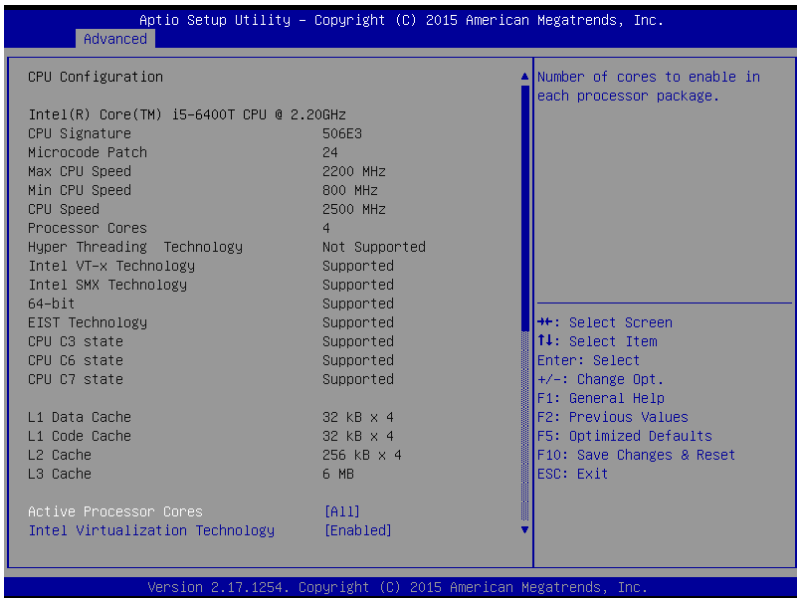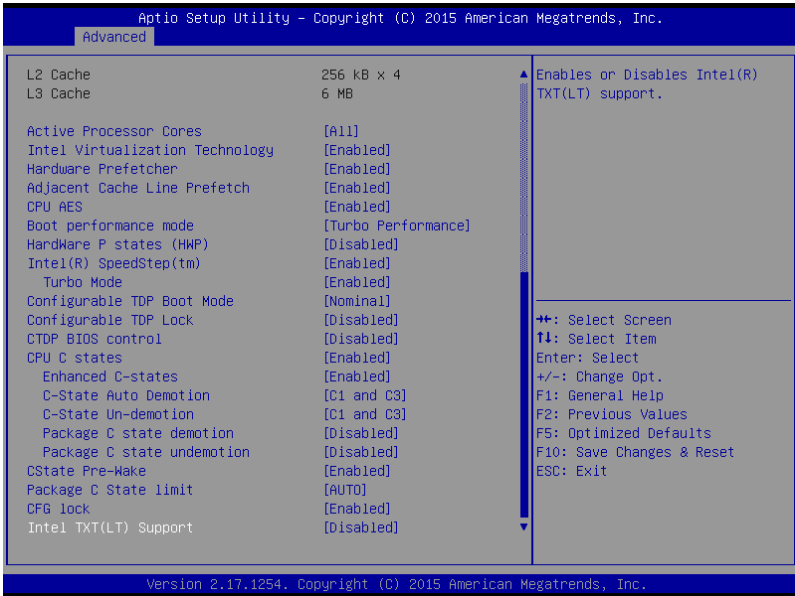
Navigate to the second page of the screen to see the rest of items in this menu by pressing the Up or Down arrow keys.

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.

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

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

  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]                ┌────────────────────────────
  CTDP BIOS control                 [Disabled]                →←: Select Screen
  CPU C states                      [Enabled]                 ↑↓: Select Item
    Enhanced C-states               [Enabled]                 Enter: Select
    C-State Auto Demotion           [C1 and C3]               +/-: Change Opt.
    C-State Un-demotion             [C1 and C3]               F1: General Help
    Package C state demotion        [Disabled]                F2: Previous Values
    Package C state undemotion      [Disabled]                F5: Optimized Defaults
  CState Pre-Wake                   [Enabled]                 F10: Save Changes & Reset
  Package C State limit             [AUTO]                    ESC: Exit
  CFG lock                          [Enabled]
  Intel TXT(LT) Support             [Disabled]                ▼

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```

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 Battery] [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]

Configurable TDP Boot Mode [Nominal]

Allows you to configure TDP mode. Selecting **[Deactivate]** will set MSR to Nominal and MMIO to Zero.
Configuration Options: [Nominal] [Down] [Up] [Deactivate]

Configurable TDP Lock [Disabled]

Allows you to configure TDP mode lock to set the lock bits on TURBO_ACTIVATION_RATIO and CONFIG_TDP_CONTROL. When CTDP Lock is enabled, Custom ConfigTDP count will be forced to 1 and Custom configTDP Boot Index will be forced to 0.
Configuration Options: [Disabled] [Enabled]

CTDP BIOS control [Disabled]

Allows you to enable or disable CTDP control via runtime ACPI BIOS methods. This "BIOS only" feature does not require EC or driver support.
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.
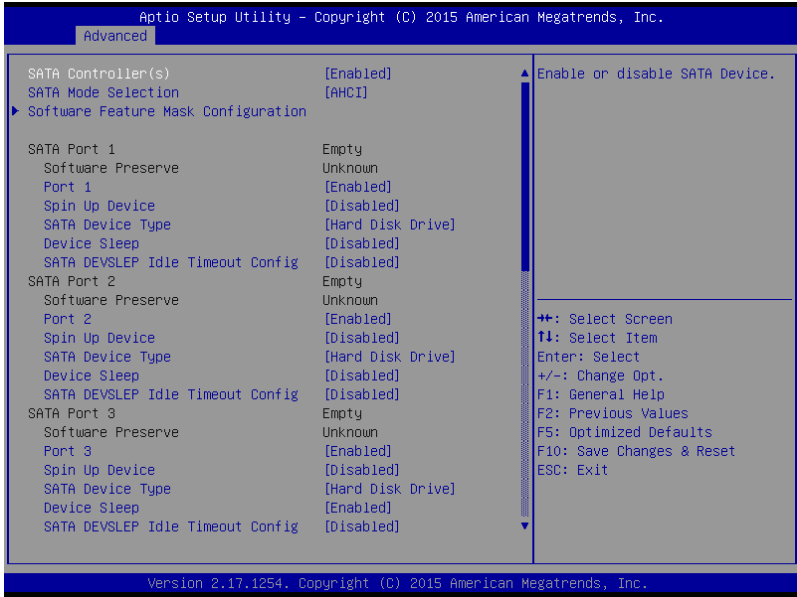Configuration options: [Disabled] [Enabled]

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

```
                    Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
           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]
      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
      Port 2                            [Enabled]                      ←→: Select Screen
      Spin Up Device                    [Disabled]                     ↑↓: Select Item
      SATA Device Type                  [Hard Disk Drive]              Enter: Select
      Device Sleep                      [Disabled]                     +/-: Change Opt.
      SATA DEVSLEP Idle Timeout Config  [Disabled]                     F1: General Help
    SATA Port 3                         Empty                          F2: Previous Values
      Software Preserve                 Unknown                        F5: Optimized Defaults
      Port 3                            [Enabled]                      F10: Save Changes & Reset
      Spin Up Device                    [Disabled]                     ESC: Exit
      SATA Device Type                  [Hard Disk Drive]
      Device Sleep                      [Enabled]
      SATA DEVSLEP Idle Timeout Config  [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

```
          Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      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 / SATA Port 7 / SATA Port 8

Port 1 / Port 2 / Port 3 / Port 4 / Port 5 / Port 6 / Port 7 / Port 8 [Enabled]

Allows you to enable or disable the SATA port
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

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

Network Stack                          [Disabled]              Enable/Disable UEFI Network
                                                               Stack
```

Network Stack [Disabled]

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

> The following items appear only when you set the **Network Stack** to [**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.
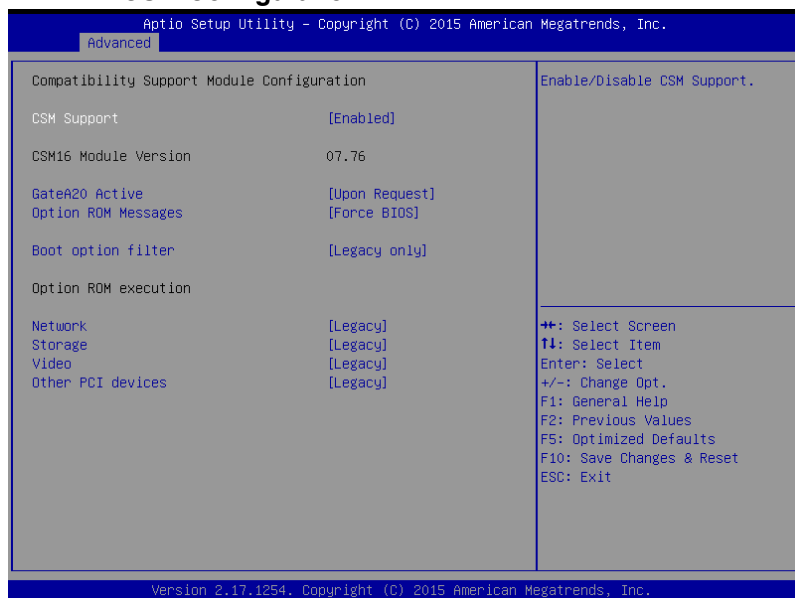Configuration options: [Disable] [Enable]

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   iSCSI Configuration

Allows you to configure the iSCSi parameters.
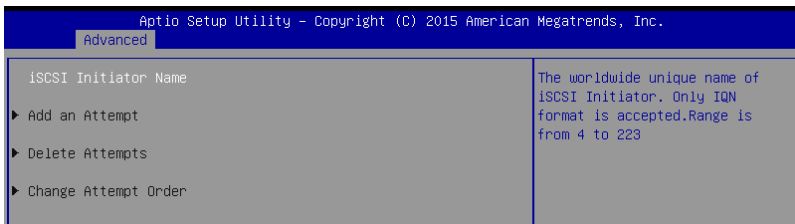
4.5   Security Menu

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
      Administrator Password                                 ↑↓: Select Item
      User Password                                          Enter: Select
      Clear User Password                                    +/-: Change Opt.
                                                             F1: General Help
    ▶ Secure Boot menu                                       F2: Previous Values
                                                             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.

To clear a user password:

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

2.   Select **Yes** from the Warning message window then press <Enter>.

Secure Boot Menu

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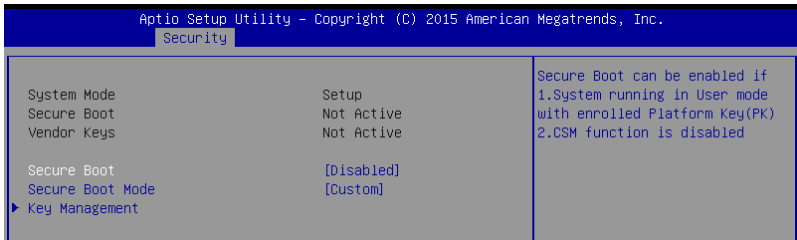
Secure Boot Control [Disabled]

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

Configuration options: [Set New] [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]


   Network Device BBS Priorities                           ↔: Select Screen
   Hard Drive BBS Priorities                               ↑↓: Select Item
                                                           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 0200 v1556]

Configuration options: [IBA GE Slot 0200 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.
```
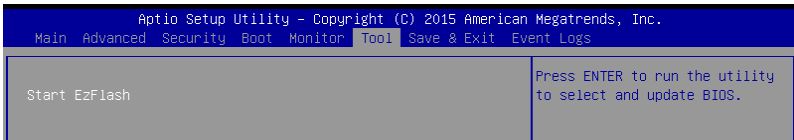
ASUS EZ Flash

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.
```
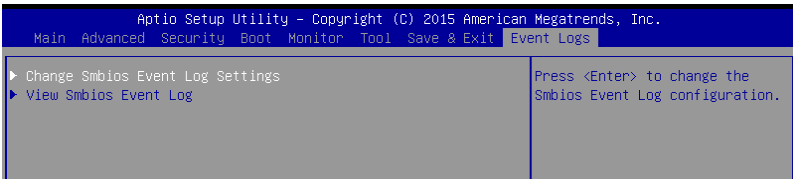
4.10.1   Change Smbios Event Log Settings

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

  Custom Options
  Log OEM Codes                 [Enabled]                 ↔: Select Screen
  Convert OEM Codes             [Disabled]                ↑↓: Select Item
                                                          Enter: Select
  NOTE: All values changed here do not take effect        +/-: Change Opt.
        until computer is restarted.                      F1: General Help
                                                          F2: Previous Values
```

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]

Chapter 5:
RAID Configuration

5

Chapter summary

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

This chapter contains the following sections:

5.1   Setting up RAID

The motherboard comes with the Intel® C236 controller that supports **Intel® Rapid Storage Technology enterprise Option ROM Utility** with RAID 0, RAID 1, RAID 10, and RAID 5 support (for both Windows® OS and Linux).

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® C236 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® C236 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 sections **5.1.2 Installing hard disk drives** and **5.1.3 Setting the RAID mode in BIOS** 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 ──┘
```
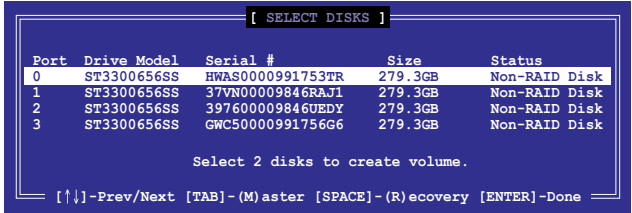
5. Use the up/down arrow keys to move the selection bar then press <Space> to select a disk. A small triangle before the Port number marks the selected drive. Press <Enter> when you are done.

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):
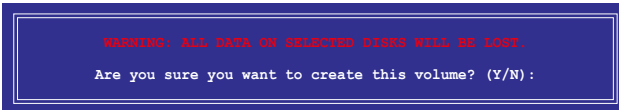
5.2.2   Deleting a RAID set

⚠️ 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

⚠️ 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):
```
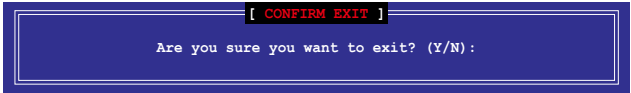
5.2.5 Rebuilding the RAID

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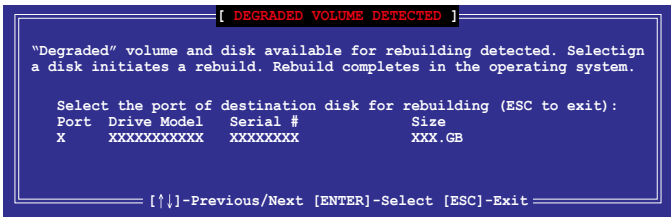
Select a destination disk with the same size as the original hard disk.

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 utility.

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 supported by the Southbridge.

> 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.
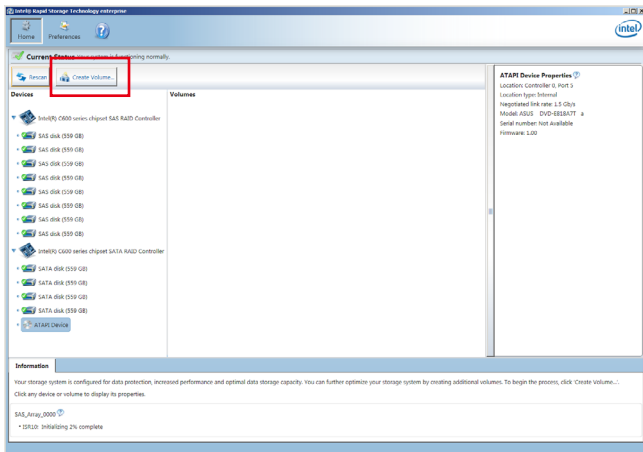
> You can click **Rescan** to re-scan any attached hard disks.

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**.
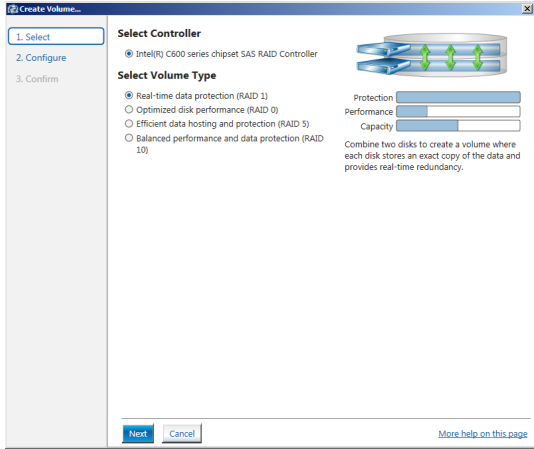
2.   Key in a name for the RAID set, then select the array disks.

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

4.   Click **Next**.
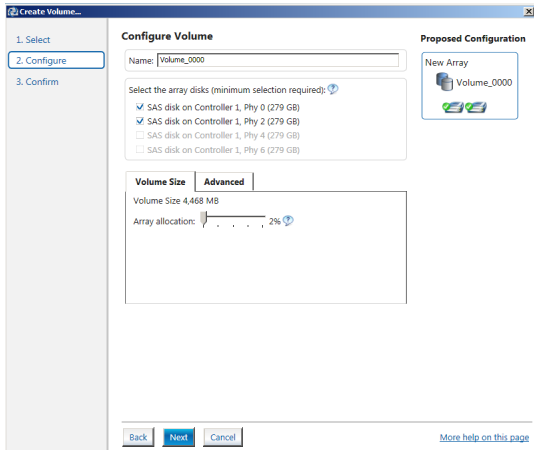
- If you do not want to keep the data on one of the selected disks, select **NO** when prompted.

- 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.
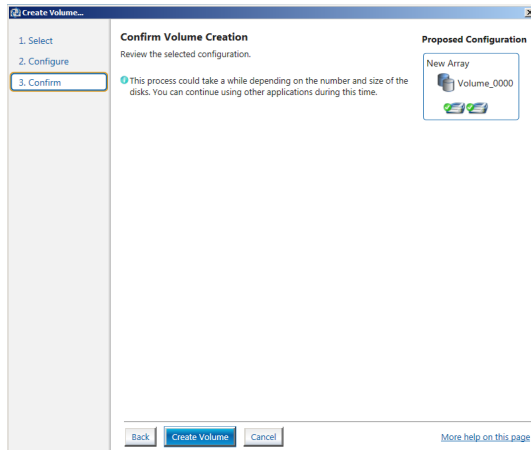
6. Wait until the process is completed, then click **OK** when prompted.
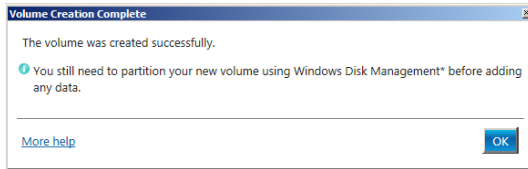
> You still need to partition your new volume using Windows Disk Management before adding any data.

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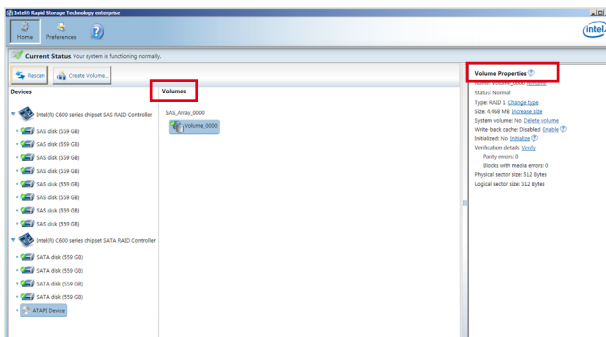
5.3.2 Changing a Volume Type

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**.
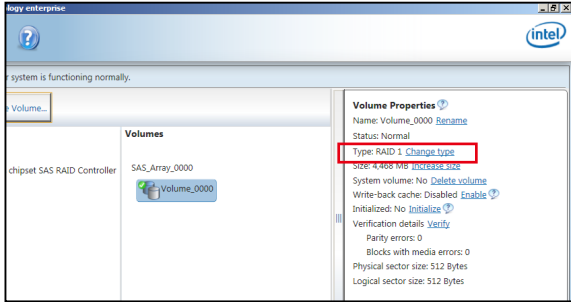
3. You can also change the **Name**, **Select the new volume type**, and **Select additional disks to include in the new volume** if needed.

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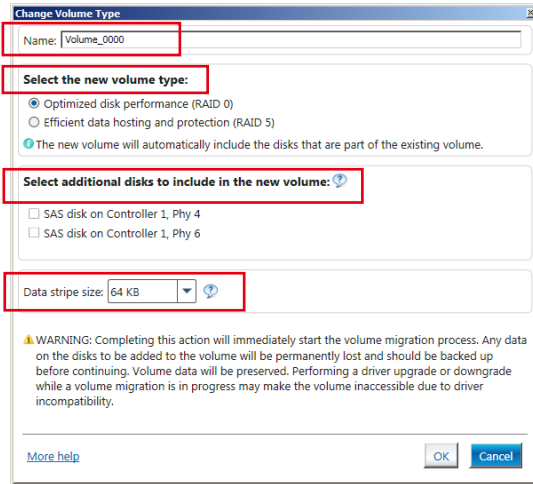
We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

5.3.3 Deleting a volume

![warning icon] 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.
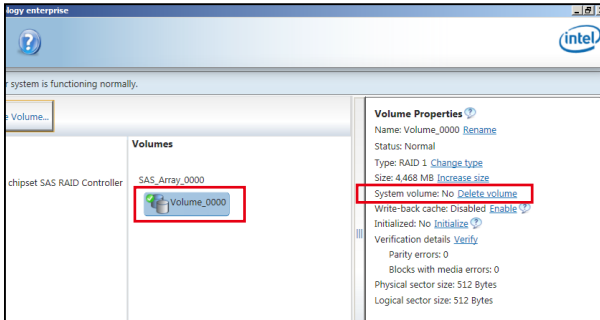
2.   From the **Volume Properties** field, select **Delete volume**.

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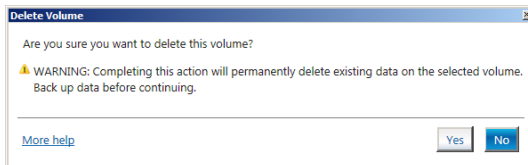
5.3.4   Preferences

System Preferences

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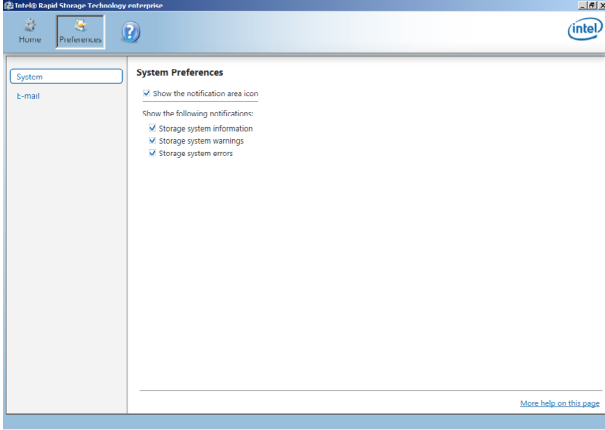
E-Mail Preferences

Allow you to set to sent e-mail of the following events:
*   Storage system information
*   Storage system warnings
*   Storage system errors
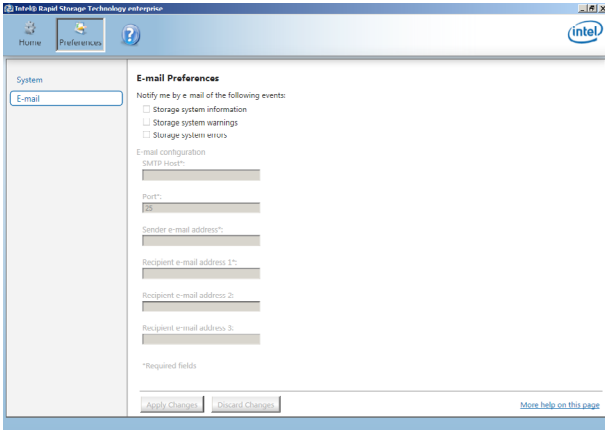
Chapter 6:
Driver Installation

Chapter summary

6

This chapter provides the instructions for installing the necessary drivers for different system components in both Linux® and Windows® Operating Systems.

This chapter contains the following sections:

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 2008 OS installation

To install the RAID controller driver when installing Windows® Server 2008 OS

1. Boot the computer using the Windows® Server 2008 OS installation disc. Follow the screen instructions to start installing Windows Server 2008.

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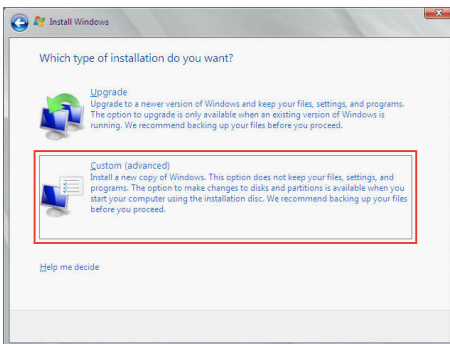
3. Click **Load Driver**.
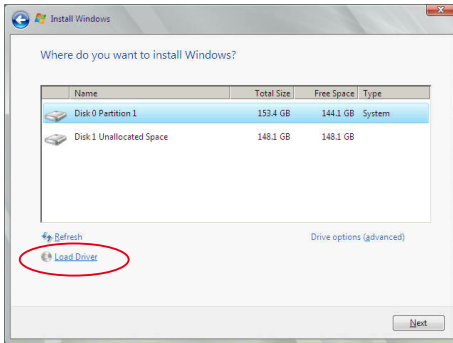
4. A message appears reminding you to insert the installation media containing the driver of the RAID controller driver (the installation media can be a CD, DVD, or USB flash drive).

   - 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.
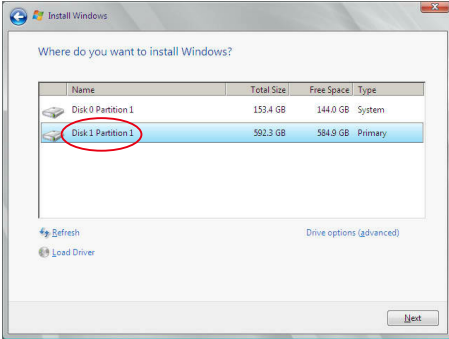
8.   Follow succeeding screen instructions to continue.

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 2008 R2 and 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

The main screen of the Support DVD looks exactly the same on the Windows® Server 2008 R2 and on the Windows® Server 2012 Operating System (OS).

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-V/4L user guide.

You need an internet browser installed in your OS to view the User Guide.
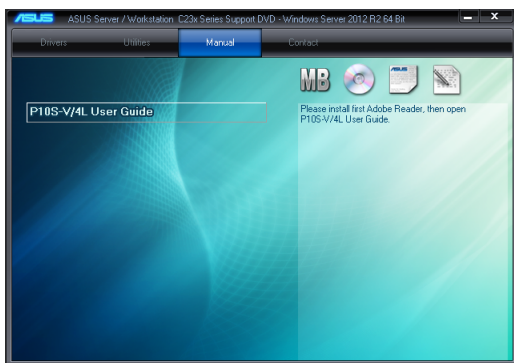
6.3.4 Contact information menu

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.
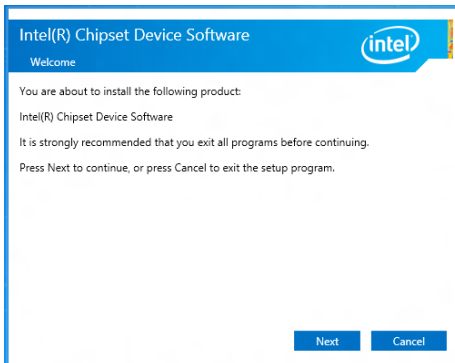
6. Select **Yes** to accept the terms of the **License Agreement** and continue the process.
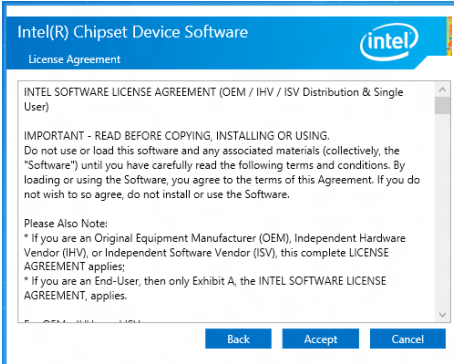
7. Read the **Readme File Information** and press **Next** to continue the installation.
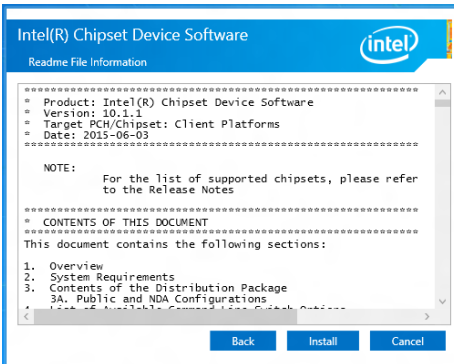
8. Toggle **Yes, I want to restart the computer now** and click **Finish** to complete the setup process.
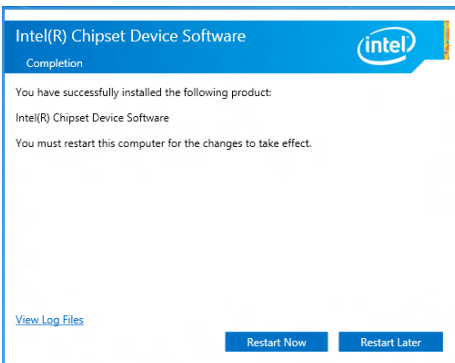
6.4 Installing the Intel® I210 Gigabit Adapters driver

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

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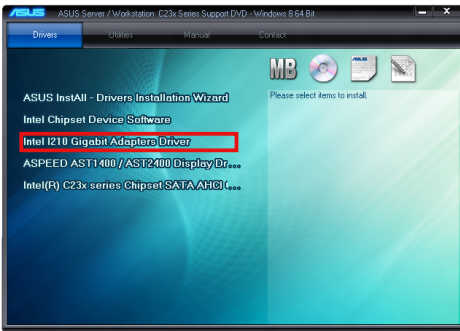
5.   Click **Install Drivers and Software** option to begin installation.
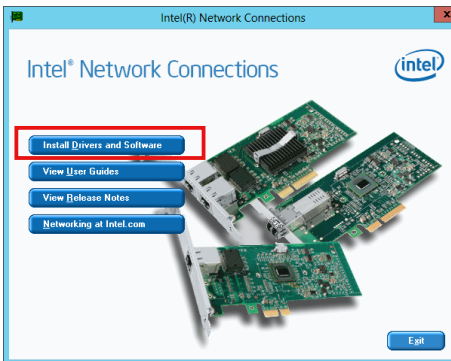
6.	Click **Next** when the **Intel(R) Network Connections–InstallShield Wizard** window appears.
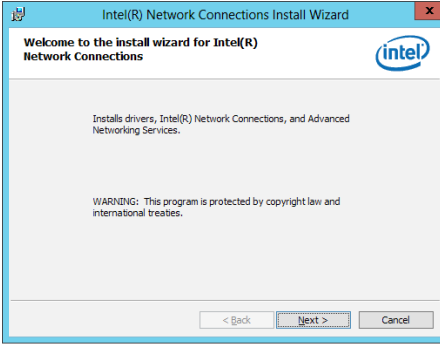
7.	Tick **I accept the terms in the license agreement** and click **Next** to continue.
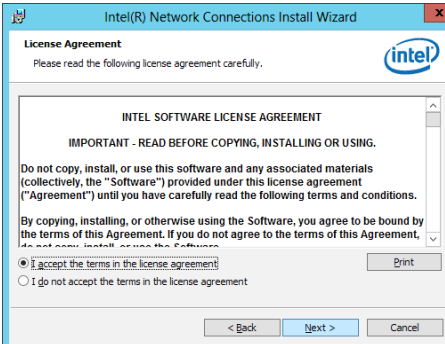
8.	From the **Setup Options** window, click **Next** to start the installation.

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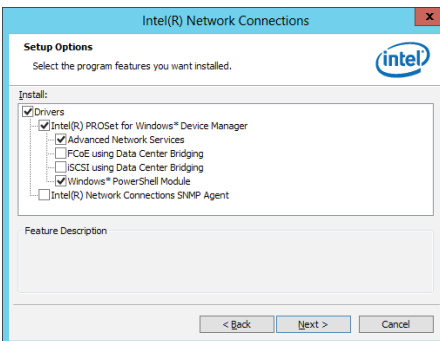
9.   Click **Install** to start the installation.
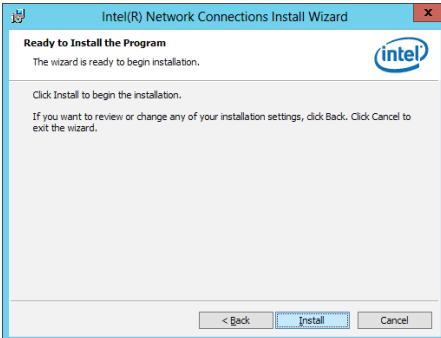
10.   When the installation is done, press **Finish** to complete the installation.
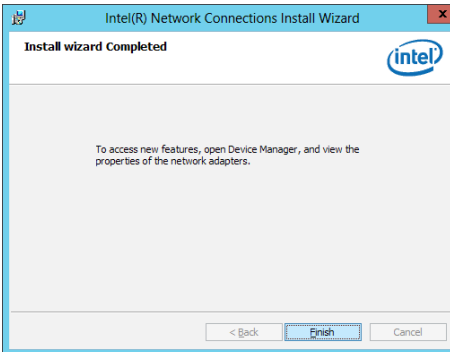
6.5 Installing the VGA driver

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.
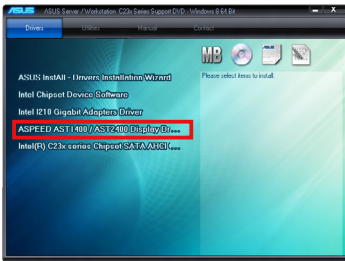
5. From the installation window, click **Next** to start the installation.

6. Click **Install** to proceed with the installation.
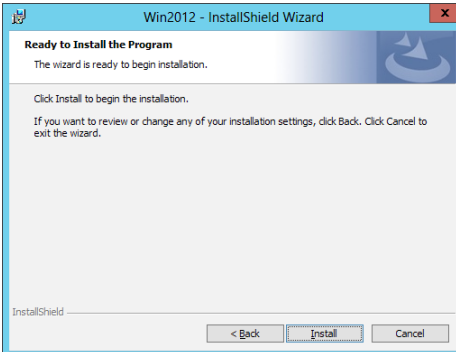
7. Click **Finish** to complete the installation.
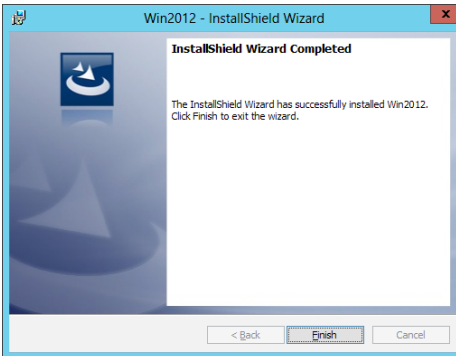
Appendix

P10S-V/4L block diagram

			DDR4
x16 Slot			DDR4
PCIE6	x16 Gen3	Intel® Xeon E3-1200 v5 Processor	DDR4
			DDR4

Intel® Xeon E3-1200 v5 Processor

x16 Slot — PCIE6 — x16 Gen3

DDR4
DDR4
DDR4
DDR4

DMI3.0

PCI Bridge

PCI1
PCI2
PCI3
PCI4

x1

HD Audio

MIO

x8 Slot
PCIE5 — x4 Gen3

8 ports — SATA3

4 ports — USB 2.0

5 ports — USB 3.0

Intel® PCH C236

x1 — Intel® I210 — GbE
x1 — Intel® I210 — GbE
x1 — Intel® I210 — GbE
x1 — Intel® I210 — GbE

x1 — ASPEED AST1400 — D-Sub

LPC — TPM
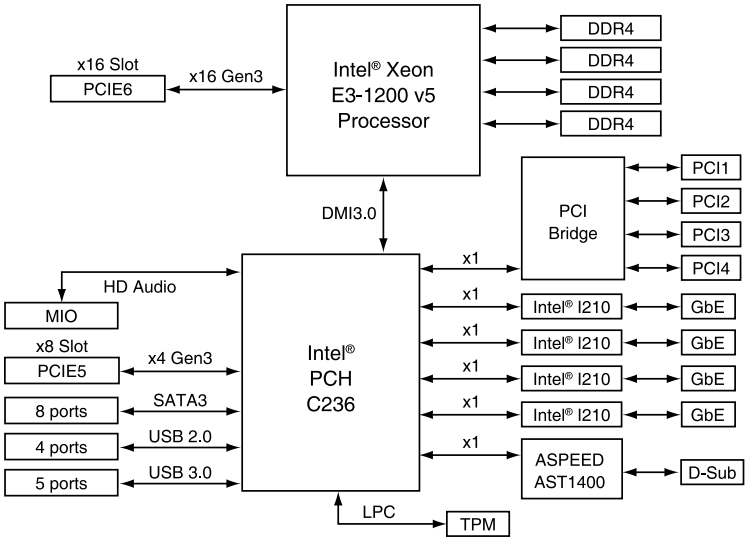
ASUS contact information

ASUSTeK COMPUTER INC.

Address   15 Li-Te Road, Peitou, Taipei, Taiwan 11259
Telephone   +886-2-2894-3447
Fax   +886-2-2890-7798
E-mail   info@asus.com.tw
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   15 Li-Te Road, Peitou, Taipei, Taiwan 11259
Telephone   +886-2-2894-3447
Fax   +886-2-2890-7798
E-mail   info@asus.com.tw
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.508, Chundong Road, Xinzhuang Industrial Zone,
                           Minhang District, Shanghai, China.
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
Online Support   http://support.asus.com/techserv/techserv.aspx

ASUS contact information

ASUS Holland BV (The Netherlands)

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

Technical Support

Telephone	+31-(0)591-5-70292
Fax	+31-(0)591-666853
E-mail	advance.rma.eu@asus.com
Online Support	http://support.asus.com/techserv/techserv.aspx

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

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

Technical Support

Telephone	+48-225718033
Online Support	http://support.asus.com/techserv/techserv.aspx

ASK-Service (Russia and CIS)

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

Technical Support

Telephone	008-800-100-ASUS (008-800-100-2787)
Online Support	http://vip.asus.com/eservice/techserv.aspx?SLanguage=ru

EC Declaration of Conformity

We, the undersigned,

Manufacturer:	ASUSTeK COMPUTER INC.
Address:	4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN
Authorized representative in Europe:	ASUS COMPUTER GmbH
Address, City:	HARKORT STR. 21-23, 40880 RATINGEN
Country:	GERMANY

declare the following apparatus:

Product name :	**Motherboard**
Model name :	**P10S-V/4L**

conform with the essential requirements of the following directives:

☒**2004/108/EC-EMC Directive**
☒ EN 55022:2010+AC:2011
☒ EN 61000-3-2:2006+A2:2009
☐ EN 55013:2001+A1:2003+A2:2006
☒ EN 55024:2010
☒ EN 61000-3-3:2013
☐ EN 55020:2007+A11:2011

☐**1999/5/EC-R&TTE Directive**
☐ EN 300 328 V1.8.1(2012-06)
☐ EN 300 440-1 V1.6.1(2010-08)
☐ EN 300 440-2 V1.4.1(2010-08)
☐ EN 301 511 V9.0.2(2003-03)
☐ EN 301 908-1 V5.2.1(2011-05)
☐ EN 301 908-2 V5.2.1(2011-07)
☐ EN 301 893 V1.7.1(2012-06)
☐ EN 302 544-2 V1.1.1(2009-01)
☐ EN 302 623 V1.1.1(2009-01)
☐ EN 50360:2001
☐ EN 62479:2010
☐ EN 50385:2002
☐ EN 62311:2008
☐ EN 301 489-1 V1.9.2(2011-09)
☐ EN 301 489-3 V1.4.1(2002-08)
☐ EN 301 489-4 V1.4.1(2009-05)
☐ EN 301 489-7 V1.3.1(2005-11)
☐ EN 301 489-9 V1.4.1(2007-11)
☐ EN 301 489-17 V2.2.1(2012-09)
☐ EN 301 489-24 V1.5.1(2010-09)
☐ EN 302 326-2 V1.2.2(2007-06)
☐ EN 302 326-3 V1.3.1(2007-09)
☐ EN 301 357-2 V1.4.1(2008-11)
☐ EN 302 291-1 V1.1.1(2005-07)
☐ EN 302 291-2 V1.1.1(2005-07)
☐ EN 50566:2013

☒**2006/95/EC-LVD Directive**
☒ EN 60950-1: 2006 / A12: 2011
☐ EN 60950-1: 2006 / A2: 2013
☐ EN 60065:2002 / A12: 2011

☐**2009/125/EC-ErP Directive**
☐ Regulation (EC) No. 1275/2008
☐ Regulation (EC) No. 642/2009
☐ Regulation (EC) No. 278/2009
☐ Regulation (EU) No. 617/2013

☒**2011/65/EU-RoHS Directive** Ver. 150326
☒**CE marking**

(EC conformity marking)

CE

Position : **CEO**
Name : **Jerry Shen**

Declaration Date: 07/08/2015

DECLARATION OF CONFORMITY
Per FCC Part 2 Section 2. 1077(a)

Responsible Party Name: **Asus Computer International**

Address: **800 Corporate Way, Fremont, CA 94539,**

Phone/Fax No: **(510)739-3777/(510)608-4555**

hereby declares that the product

Product Name : Motherboard

Model Number : P10S-V/4L

Conforms to the following specifications:

☒ FCC Part 15, Subpart B, Unintentional Radiators

Supplementary Information:

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

Representative Person's Name : _____**Steve Chang / President**_____

Signature : _____

Date : : _____**Aug. 07, 2015**_____

Ver. 140331