RS700-E9 Series

RS700-E9-RS4
RS700-E9-RS12

1U Rackmount Server User Guide

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Safety information

Electrical Safety

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

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

- When adding or removing any additional devices to or from the system, 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.

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

Operation Safety

- Any mechanical operation on this server must be conducted by certified or experienced engineers.

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

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

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

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

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

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

Lithium-Ion Battery Warning

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

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

Heavy System

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

About this guide

Audience

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

Contents

This guide contains the following parts:

1. **Chapter 1: Product Introduction**

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

2. **Chapter 2: Hardware Information**

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

3. **Chapter 3: Installation Options**

   This chapter describes how to install optional components into the barebone server.

4. **Chapter 4: Motherboard Information**

   This chapter gives information about the motherboard that comes with the server. This chapter includes the motherboard layout, jumper settings, and connector locations.

5. **Chapter 5: BIOS Setup**

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

6. **Chapter 6: RAID Configuration**

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

7. **Chapter 7: Driver Installation**

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

Conventions

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 the DOS prompt, type the command line: **format A:/S**

References

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

1. **ASUS Control Center (ACC) user guide**

    This manual tells how to set up and use the proprietary ASUS server management utility. Visit asuscontrolcenter.asus.com for more information.

2. **ASUS websites**

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

Product Introduction

This chapter describes the general features of the chassis kit. It includes sections on front panel and rear panel specifications.

1.1 System package contents

Check your system package for the following items.

Model Name	RS700-E9-RS4	RS700-E9-RS12
Chassis	ASUS R12F 1U Rackmount Chassis	ASUS R12F 1U Rackmount Chassis
Motherboard	ASUS Z11PP-D24 Server Board	ASUS Z11PP-D24 Server Board
Component	1 x 550W/800W 80 PLUS Platinum Power Supply	1 x 800W 80 PLUS Platinum Power Supply
	1 x 3.5-inch Storage Device Backplane	1 x 2.5-inch storage device Backplane
	4 x Hot-swap 3.5-inch Storage Device trays	12 x Hot-swap 2.5-inch Storage Device trays
	1 x Front Panel Board	1 x Front Panel Board
	2 x Riser Card	2 x Riser Card
	8 x System Fans (40 mm x 40 mm x 56 mm)	8 x System Fans (40 mm x 40 mm x 56 mm)
		1 x PCIE-NVME4-OCuLink card
Accessories	1 x RS700-E9-RS4 Support CD	1 x RS700-E9-RS12 Support CD
	1 x Bag of Screws	1 x Bag of Screws
	2 x CPU Heatsink	2 x CPU Heatsink
	2 x AC Power Cable	2 x AC Power Cable
	2 x LGA3647-P0 NRW-NF-CPU CARRIER	2 x LGA3647-P0 NRW-NF-CPU CARRIER
	1 x LGA3647-P0 NRW-F-CPU CARRIER	1 x LGA3647-P0 NRW-F-CPU CARRIER
Optional Items	1 x Redundant 550W/800W 80 PLUS Platinum Power Supply (Second PSU)	1 x Redundant 800W 80PLUS Platinum Power Supply (Second PSU)
	1 x Friction Rail Kit	1 x Friction Rail Kit
	1 x Slim type DVD-RW	

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

1.2 Serial number label

The product's serial number contains 12 characters such as xxS0xxxxxxxx and printed on the sticker at the server's front cover.

The correct serial number of the product is required if you need to request for support from the ASUS Technical Support team.

1.3   System specifications

The ASUS RS700-E9 Series features the ASUS Z11PP-D24 server board. The server supports Intel® Xeon® Scalable Processors Family Series (Intel® Xeon® Scalable Processors Family Series with OMNI-PATH FABRIC supported on CPU2) plus other latest technologies through the chipsets onboard.

Model Name		RS700-E9-RS4	RS700-E9-RS12
Motherboard		Z11PP-D24	
Processor Support		2 x Socket P0 (LGA 3647) Intel® Xeon® Scalable Processors Family (165W / 145W) Intel® Xeon® Scalable Processors Family with OMNI-PATH FABRIC (supported on CPU2) UPI 10.4 GT/s	2 x Socket P0 (LGA 3647) Intel® Xeon® Scalable Processors Family (165W) Intel® Xeon® Scalable Processors Family with OMNI-PATH FABRIC (supported on CPU2) UPI 10.4 GT/s
Core Logic		Intel® Lewisburg PCH C621	
Memory	Total Slots	24 (6-channel per CPU, 12 DIMM per CPU)	
	Capacity	Maximum up to 3072GB	
	Memory Type	DDR4 2666/2400 RDIMM/LR-DIMM/LR-DIMM 3DS *** Refer to ASUS server AVL for the latest update**	
	Memory Size	4GB, 8GB, 16GB, 32GB (RDIMM) 32GB, 64GB (LRDIMM) 64GB, 128GB (LRDIMM 3DS) *** Refer to ASUS server AVL for the latest update**	
Expansion Slots	Total PCI/PCI-X/PCI-E/PIKE Slots	3+1	
	Slot Type	1 x PCI-E x16 (Gen3 x16 link), FH, HL 1 x PCI-E x16 (Gen3 x8 link), LP, HL 1 x PCI-E x8 (Gen3 x8 link), LP, HL 1 x OCP 2.0 Mezzanine (Gen3 x16 link)	1 x PCI-E x16 (Gen3 x16 link), FH, HL (Default for NVME4-OCuLink Card) 1 x PCI-E x16 (Gen3 x8 link), LP, HL 1 x PCI-E x8 (Gen3 x8 link), LP, HL 1 x OCP 2.0 Mezzanine (Gen3 x16 link)
Disk Controller	SATA Controller	**Intel® Lewisburg PCH** - 10 x SATA 6Gb/s ports + 1 x M.2 connector (SATA 6Gb/s & PCI-E Gen3 x4 link) or 9 x SATA 6Gb/s ports + 2 x M.2 connector (SATA 6Gb/s & PCI-E Gen3 x4 link) **Intel® RSTe** (for Windows and Linux; Support software RAID 0, 1, 10 & 5)	
	SAS Controller	**Optional:** ASUS PIKE II 3008 8-port SAS HBA card ASUS PIKE II 3108 8-port SAS HW RAID card 12G SAS Support	

Model Name		RS700-E9-RS4	RS700-E9-RS12
Storage Bays	I = internal A or S will be hot-swappable	4 x 2.5" or 3.5" Hot-swap Storage Bays 2 x M.2 2242/2260/2280/22110 (supports SATA/PCIE M.2, SATA RAID)	12 x 2.5" Hot-swap Storage Bays (4 x Default NVMe, 4 x Hybrid NVMe/SAS/SATA, 4 x Hybrid SAS/SATA) 2 x M.2 2242/2260/2280/22110 (supports SATA/PCIE M.2, SATA RAID)
Networking	LAN	1 x Dual Port Intel I350-AM2 Gigabit LAN controller 1 x Management Port	
Graphic	VGA	Aspeed AST2500 64MB	
Auxiliary Storage Device Bay (Floppy / Optical Drive)		Optional: 1 x Slim type Optical Drive Bay	N/A
I/O ports, Switches, and LEDs		**Front I/O Ports:** 2 x USB 3.0 ports 1 x VGA port **Rear I/O Ports:** 2 x USB 3.0 ports 1 x VGA port 2 x RJ-45 GbE LAN ports 1 x RJ-45 Mgmt LAN port **Rear Switch/LED:** 1 x Q-Code/Port 80 LED 1 x Power switch 1 x Message LED 1 x Storage device LED 1 x Location LED **Front Switch/LED:** 1 x Power switch/LED 1 x Location switch/LED 1 x Message LED 1 x Storage device LED LAN 1-4 LEDs *** LAN 3-4 for Mezzanine card use**	**Rear I/O Ports:** 2 x USB 3.0 ports 1 x VGA port 2 x RJ-45 GbE LAN ports 1 x RJ-45 Mgmt LAN port **Rear Switch/LED:** 1 x Power switch 1 x Q-Code/Port 80 LED 1 x Message LED 1 x Storage device LED 1 x Location LED **Front Switch/LED:** 1 x Power switch/LED 1 x Location LED 1 x Message LED 1 x Storage device LED LAN 1-2 LED
Management Solution	Out of Band Remote Hardware	On-Board ASMB9-iKVM for KVM-over-IP	
	Software	ASUS Control Center (Classic)	

(continued on the next page)

Chapter 1: Product Introduction

Model Name	RS700-E9-RS4	RS700-E9-RS12
OS Support	Windows® Server 2016 Windows® Server 2012 R2 RedHat® Enterprise Linux SuSE® Linux Enterprise Server CentOS Scientific Linux Ubuntu Fedora *** Refer to http://www.asus.com for the latest OS support.**	
Regulatory Compliance	BSMI, CE, C-TICK, FCC (ClassA)	
Dimension (HH x WW x DD)	686 mm x 444 mm x 44 mm(1U) 27" x 17.48" x 1.73"	
Net Weight Kg (CPU, DRAM & storage device not included)	16.5 Kg	16.8 Kg
Gross Weight Kg (CPU, DRAM & storage device not included, Packing include)	18.05 Kg	18.35 Kg
Power Supply (different configuration by region)	1+1 Redundant 800W/550W 80 PLUS Platinum Power Supply Rating: 100-127Vac/200-240Vac, 9.4A/4.72A, 47-63Hz Class I or 240Vdc, 3.5A (800W) 100-127/200-240Vac, 7A/3.4A, 47-63Hz Class I or 240Vdc, 3.5A (550W) (240Vdc only for China)	1+1 Redundant 800W 80 PLUS Platinum Power Supply Rating: 100-127Vac/200-240Vac, 9.4A/4.72A, 47-63Hz Class I or 240Vdc, 4.6A (240Vdc only for China)
Environment	Operating temperature: 10°C ~ 35°C Non operating temperature: -40°C ~ 60°C Non operating humidity: 20% ~ 90% (Non condensing)	

*Specifications are subject to change without notice.

1.4   Front panel features

The barebone server displays a simple yet stylish front panel with easily accessible features. The power and reset buttons, LED indicators, slim type optical drive (optional on RS700-E9-RS4 only), two USB ports (on RS700-E9-RS4 only), and VGA port (on RS700-E9-RS4 only) are located on the front panel.

> Refer to section **1.7 LED information** for the LED descriptions.

RS700-E9-RS4

Rack screw   Bay 1   Bay 2   Bay 3   Bay 4   Rack screw

Optical drive (optional)   Asset tag

LAN 4 LED   VGA port
LAN 3 LED
LAN 2 LED   USB ports
LAN 1 LED   Reset button
Message LED   Location button
Storage device LED   Power button

RS700-E9-RS12

Rack screw   Bay 10   Bay 12

Bay 1   Bay 3   Bay 5   Bay 7   Bay 9   Bay 11   Rack screw

Bay 2   Bay 4   Bay 6   Bay 8   Power button

Asset tag

Power LED
Message LED   LAN 1 LED
Location LED   LAN 2 LED
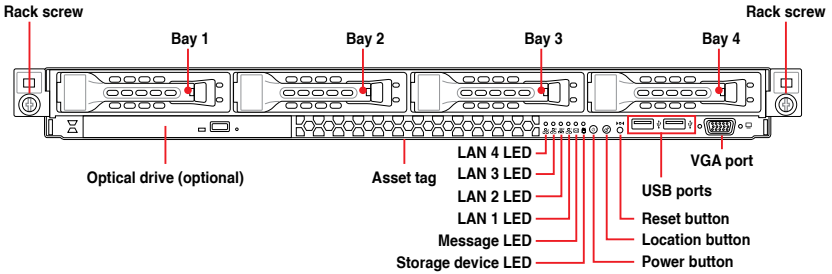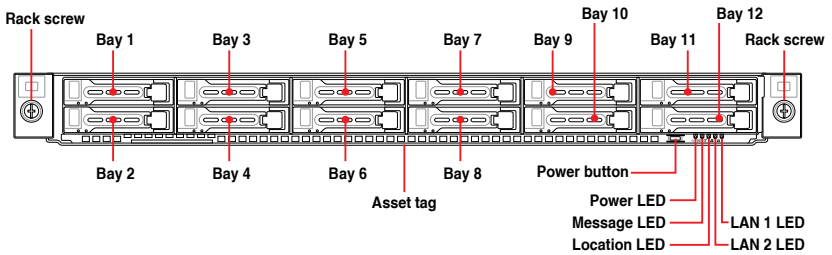
> • Bay 1 to bay 4 supports hybrid SAS/SATA.
>
> • Bay 5 to bay 8 supports hybrid NVMe/SAS/SATA.
>
> • Bay 9 to bay 12 supports NVMe by default.

1.5 Rear panel features

The rear panel includes the expansion slots, system power sockets, and rear fans. The middle part includes the I/O shield with openings for the rear panel connectors on the motherboard.

Expansion slots

Expansion slot

Redundant Power supply and Power cord connector

USB ports **VGA port**

Power button

Q-Code LED

Management LAN port 1*

LAN port 1

LAN port 2

Storage device LED

Message LED

Location LED
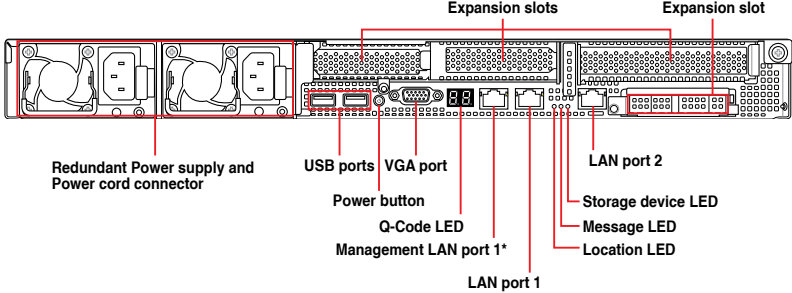
*This port is for ASUS ASMB9-iKVM only.

1.6   Internal features

The barebone server includes the basic components as shown.

RS700-E9-RS4
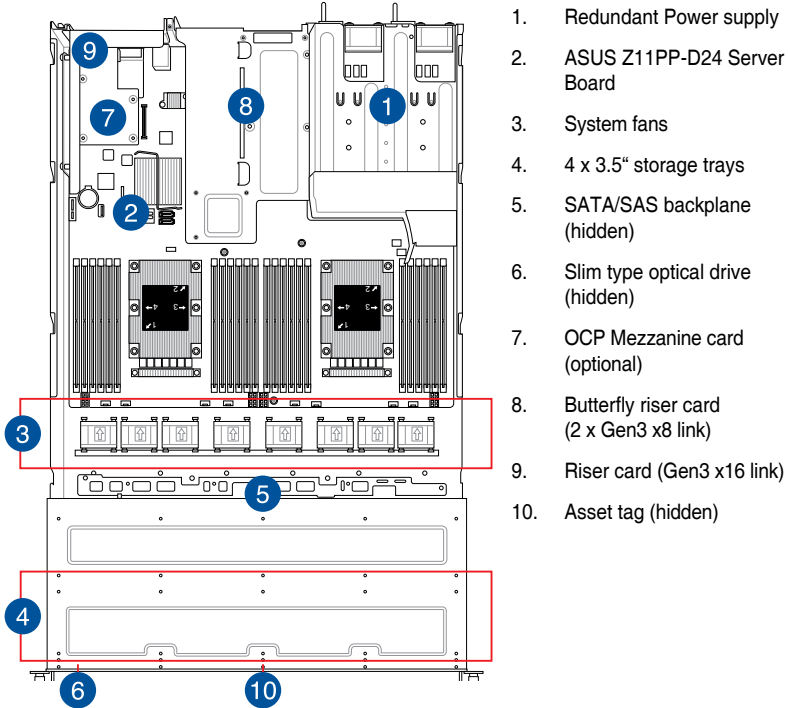
1. Redundant Power supply

2. ASUS Z11PP-D24 Server Board

3. System fans

4. 4 x 3.5" storage trays

5. SATA/SAS backplane (hidden)

6. Slim type optical drive (hidden)

7. OCP Mezzanine card (optional)

8. Butterfly riser card (2 x Gen3 x8 link)

9. Riser card (Gen3 x16 link)

10. Asset tag (hidden)

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

A protection film is pre-attached to the front cover before shipping. Please remove the protection film before turning on the system for proper heat dissipation.

WARNING
HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER BODY PARTS AWAY

RS700-E9-RS12
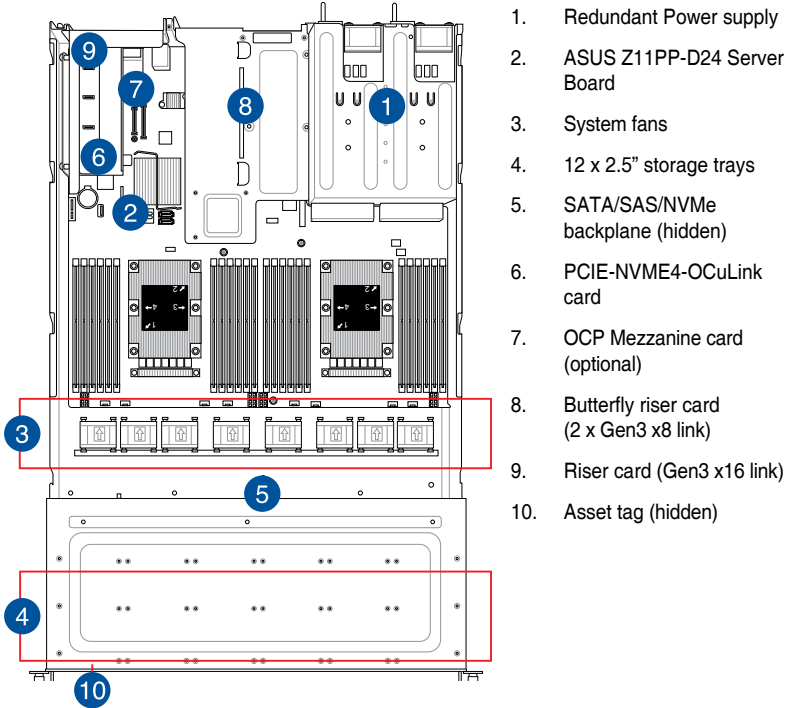
1. Redundant Power supply

2. ASUS Z11PP-D24 Server Board

3. System fans

4. 12 x 2.5" storage trays

5. SATA/SAS/NVMe backplane (hidden)

6. PCIE-NVME4-OCuLink card

7. OCP Mezzanine card (optional)

8. Butterfly riser card (2 x Gen3 x8 link)

9. Riser card (Gen3 x16 link)

10. Asset tag (hidden)

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

A protection film is pre-attached to the front cover before shipping. Please remove the protection film before turning on the system for proper heat dissipation.

WARNING
HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER BODY PARTS AWAY

1.7 LED information

1.7.1 Front panel LEDs

RS700-E9-RS4

LAN 4 LED
LAN 3 LED
LAN 2 LED
LAN 1 LED

Location button with LED
Power button with LED
Storage device LED
Message LED

RS700-E9-RS12

Power button

Power LED
Message LED
Location LED

LAN 1 LED
LAN 2 LED
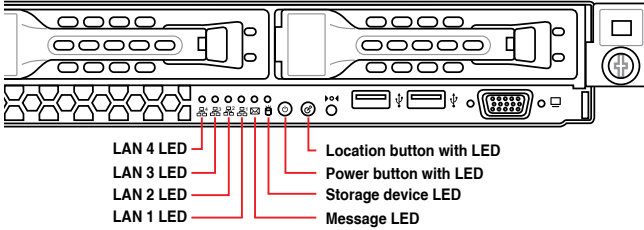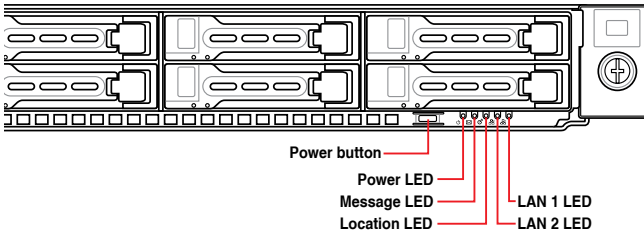
LED	Icon	Display status	Description
Power LED	⏻	ON	System power ON
Storage Device Access LED	🖴	OFF Blinking	No activity Read/write data into the storage device
Message LED	✉	OFF ON	System is normal; no incoming event A hardware monitor event is indicated
Location LED	⌾	OFF ON	Normal status Location switch is pressed (Press the location switch again to turn off)
LAN LEDs	⧉	OFF Blinking ON	No LAN connection LAN is transmitting or receiving data LAN connection is present

1.7.2   Storage device status LED

RS700-E9-RS4

Red LED

Green LED

RS700-E9-RS12

Green LED
Red LED
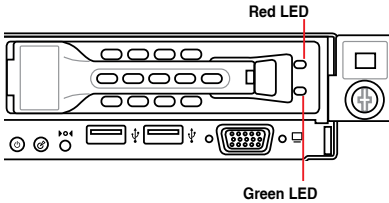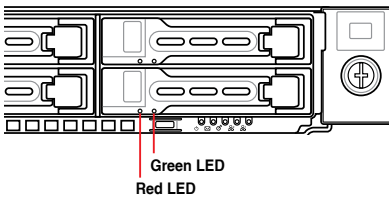
SATA/SAS Storage Device LED Description		
GREEN	ON	SATA/SAS storage device power ON
RED	ON	Storage device has failed and should be swapped immediately
GREEN/ RED	Blinking	RAID rebuilding
GREEN/ RED	Blinking	Locate
GREEN/ RED	OFF	Storage device not found
GREEN	Blinking	Read/write data from/into the SATA/SAS storage device

1.7.3 LAN (RJ-45) LEDs

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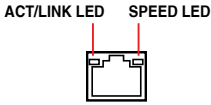
ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection

1.7.4 Rear panel LEDs

Q-Code LED

Storage device LED
Message LED
Location LED
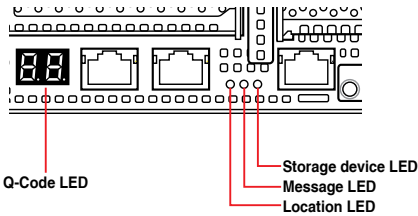
LED	Display status	Description
Storage Device Access LED	OFF Blinking	No activity Read/write data into the storage device
Message LED	OFF ON	System is normal; no incoming event A hardware monitor event is indicated
Location LED	OFF ON	Normal status Location switch is pressed (Press the location switch again to turn off)

1.7.5   Q-Code table

Action	PHASE	POST CODE	TYPE	DESCRIPTION
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

Hardware Information

2

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

2.1 Chassis cover

Removing the rear cover

To remove the rear cover:

1. Remove the two (2) screws on both sides of the cover with a Phillips screwdriver.
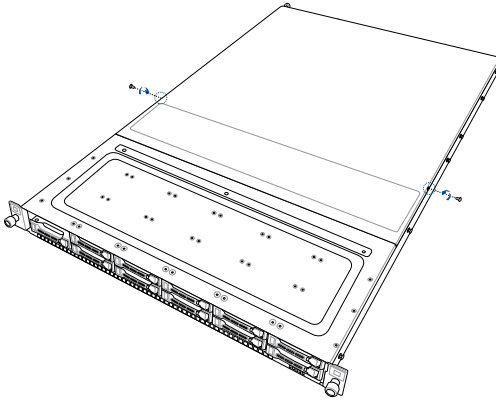
2. Loosen the thumbscrew on the rear panel to release the rear cover from the chassis.
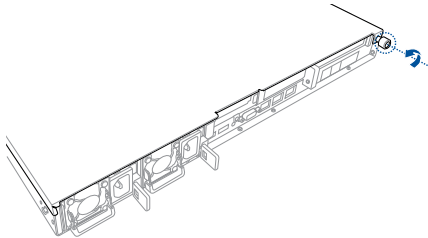
3. Firmly hold the cover and slide it towards the rear panel for about half an inch until it is disengaged from the chassis.

4. Lift the cover from the chassis.
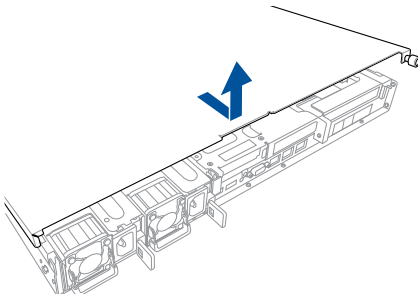
2.2 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA 3647 socket designed for the Intel®
Xeon® Scalable Processors Family Series (supported on CPU1 and CPU2) and Intel® Xeon®
Scalable Processors Family Series with OMNI-PATH FABRIC (supported on CPU2).

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

- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA 3647 socket.

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

2.2.1 Installing the CPU and heatsink

To install a CPU:

1. Remove the rear cover. For more information, see the section **Chassis cover**.

2. Remove the air ducts, and then remove the PnP caps from the CPU sockets.

✎
Keep the PnP cap. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the PnP cap on the LGA 3647 socket.

CPU1
(CPU socket 1)

CPU2
(CPU socket 2)
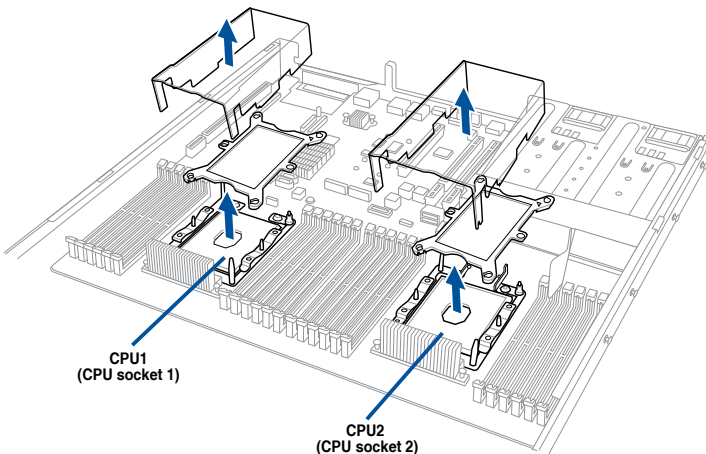
3. Align the triangle mark on the CPU with the triangle mark on the CPU Carrier (A), then install the CPU into the CPU Carrier until it clicks firmly into place (B), and then install the CPU Carrier into the heatsink until it clicks firmly in place (C).

> Ensure that the triangle mark on the CPU matches the triangle mark on the CPU Carrier.

CPU Carrier

C

A

B

Triangle mark

CPU
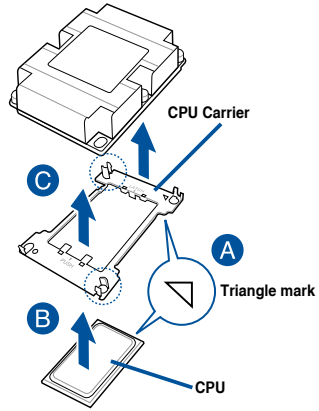
4. Align the CPU and CPU Carrier in the correct orientation, and then place the heatsinks on top of the CPU sockets.

> The CPU and CPU Carrier fits in only one correct orientation. DO NOT force the CPU and CPU Carrier into the socket to prevent damaging the CPU pins on the socket.

5. Twist each of the four screws with a screwdriver just enough to attach the heatsink to the motherboard. When the four screws are attached, tighten them one by one in a diagonal sequence to completely secure the heatsink.

> The heatsink screws are T30 models. A torque value of 12 inch-lbf is recommended.

CPU1 (CPU socket 1)

CPU2 (CPU socket 2)
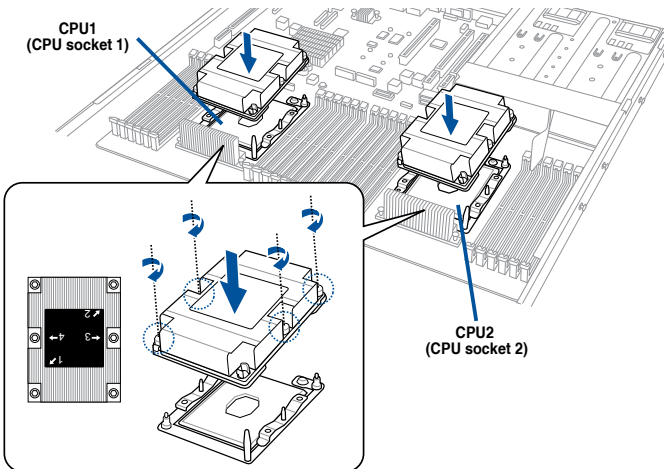
6. Reinstall the air ducts.

CPU1
(CPU socket 1)

CPU2
(CPU socket 2)
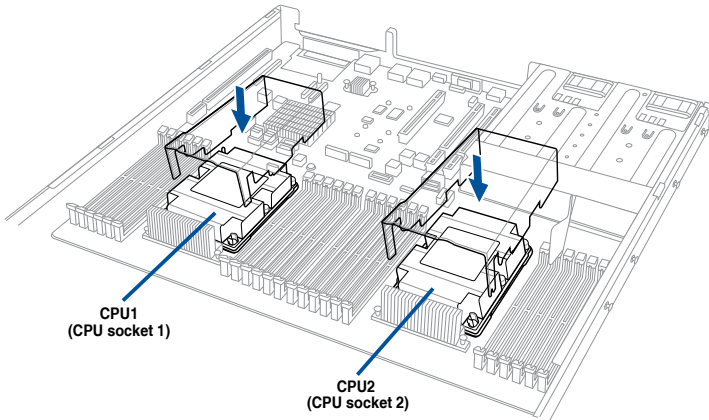
2.3 System memory

2.3.1 Overview

The motherboard comes with 24 Double Data Rate 4 (DDR4) Dual Inline Memory Modules (DIMM) sockets.

The figure illustrates the location of the DDR4 DIMM sockets:

DIMM_J1
DIMM_J2
DIMM_H1
DIMM_H2
DIMM_G1
DIMM_G2

DIMM_K2
DIMM_K1
DIMM_L2
DIMM_L1
DIMM_M2
DIMM_M1

DIMM_C1
DIMM_C2
DIMM_B1
DIMM_B2
DIMM_A1
DIMM_A2

DIMM_D2
DIMM_D1
DIMM_E2
DIMM_E1
DIMM_F2
DIMM_F1

Z11PP-D24 288-pin DDR4 DIMM sockets
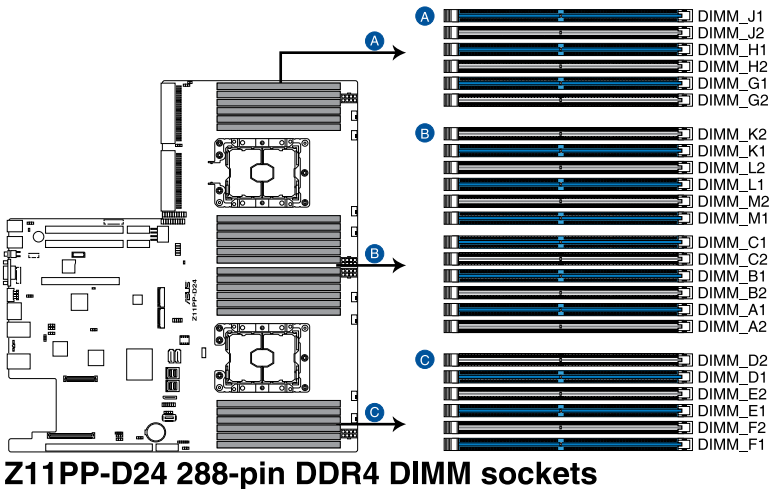
2.3.2 Memory Configurations

You may install 4 GB, 8 GB, 16 GB, and 32 GB RDIMMs; 32 GB, and 64 GB LRDIMMs; and 64GB and 128GB LRDIMMs (3DS) into the DIMM sockets using the memory configurations in this section.

- Refer to ASUS Server AVL for the updated list of compatible DIMMs.
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.

1 CPU Configuration (must be on CPU1)						
	DIMM_A2	DIMM_A1	DIMM_B2	DIMM_B1	DIMM_C2	DIMM_C1
1 DIMM		•				
2 DIMMs		•				
4 DIMMs		•		•		
6 DIMMs		•		•		•
8 DIMMs	•	•		•		•
12 DIMMs	•	•	•	•	•	•

1 CPU Configuration (must be on CPU1)						
	DIMM_D2	DIMM_D1	DIMM_E2	DIMM_E1	DIMM_F2	DIMM_F1
1 DIMM						
2 DIMMs		•				
4 DIMMs		•		•		
6 DIMMs		•		•		•
8 DIMMs	•	•		•		•
12 DIMMs	•	•	•	•	•	•

2 CPU Configuration						
	DIMM_A2	DIMM_A1	DIMM_B2	DIMM_B1	DIMM_C2	DIMM_C1
2 DIMMs		•				
4 DIMMs		•				
8 DIMMs		•		•		
12 DIMMs		•		•		•
16 DIMMs	•	•		•		•
20 DIMMs	•	•	•	•		•
24 DIMMs	•	•	•	•	•	•

2 CPU Configuration						
	DIMM_D2	DIMM_D1	DIMM_E2	DIMM_E1	DIMM_F2	DIMM_F1
2 DIMMs						
4 DIMMs		•				
8 DIMMs		•		•		
12 DIMMs		•		•		•
16 DIMMs	•	•		•		•
20 DIMMs	•	•	•	•		•
24 DIMMs	•	•	•	•	•	•

2 CPU Configuration						
	DIMM_G2	DIMM_G1	DIMM_H2	DIMM_H1	DIMM_J2	DIMM_J1
2 DIMMs		•				
4 DIMMs		•				
8 DIMMs		•		•		
12 DIMMs		•		•		•
16 DIMMs	•	•		•		•
20 DIMMs	•	•	•	•		•
24 DIMMs	•	•	•	•	•	•

2 CPU Configuration						
	DIMM_K2	DIMM_K1	DIMM_L2	DIMM_L1	DIMM_M2	DIMM_M1
2 DIMMs						
4 DIMMs		•				
8 DIMMs		•		•		
12 DIMMs		•		•		•
16 DIMMs	•	•		•		•
20 DIMMs	•	•	•	•		•
24 DIMMs	•	•	•	•	•	•

2.3.3 Installing a DIMM on a single clip DIMM socket

Ensure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

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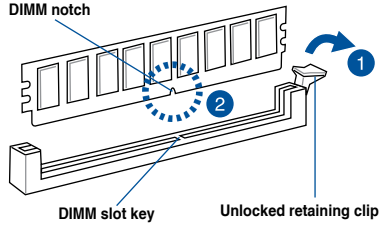
A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

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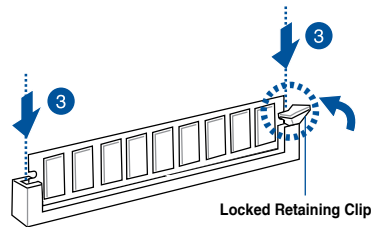
Always insert the DIMM into the socket vertically to prevent DIMM notch damage.

2.3.4 Removing a DIMM from a single clip DIMM socket

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

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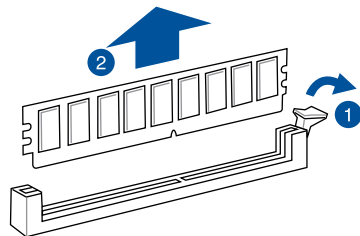
Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

2.4   Hard disk drives

RS700-E9-RS4

The system supports four (4) 2.5" or 3.5" hot-swap SATA/SAS hard disk drives. The hard disk drive installed on the drive tray connects to the motherboard SATA/SAS ports via the SATA/SAS backplane (SAS drives require an optional ASUS PIKE II card).

To install a 3.5" hot-swap SATA/SAS storage device:

1.   Push the spring lock to the right (A) then pull the tray lever outward (B) to release the drive tray. The drive tray ejects slightly after you pull out the lever.

Tray lever

B

A

Spring lock

2.   Firmly hold the tray lever and pull the drive tray out of the bay.

3.   Place the drive tray on a flat and stable surface.

4.   Prepare the SATA/SAS storage device and the bundled set of screws.

5.   Place the SATA/SAS storage device
      into the tray then secure it with four
      screws.

6.   Insert the drive tray and storage device
      assembly all the way into the depth of
      the bay until just a small fraction of the
      tray edge protrudes.

        When installed, the SATA/SAS connector on the drive connects to the SATA/SAS interface
        on the backplane.

7.   Push the tray lever until it clicks and
      secures the drive tray in place.

        The drive tray is correctly placed
        when its front edge aligns with the
        bay edge.

8.   Repeat steps 1 to 7 to install the other
      SATA/SAS storage devices.

To install a 2.5" hot-swap SATA/SAS storage device:

1.   Push the spring lock to the right (A) then pull the tray lever outward (B) to release the drive tray. The drive tray ejects slightly after you pull out the lever.

Tray lever   **B**   **A**

                                                                    Spring lock

2.   Firmly hold the tray lever and pull the drive tray out of the bay.

3.   Place the drive tray on a flat and stable surface.

4.   Prepare the SATA/SAS storage device and the bundled set of screws.

5.   Place the SATA/SAS storage device into the tray then secure it with four screws.

6.   Insert the drive tray and storage device assembly all the way into the depth of the bay until just a small fraction of the tray edge protrudes.

When installed, the SATA/SAS connector on the drive connects to the SATA/SAS interface on the backplane.

7.   Push the tray lever until it clicks and secures the drive tray in place.

The drive tray is correctly placed when its front edge aligns with the bay edge.

8.   Repeat steps 1 to 7 to install the other SATA/SAS storage devices.

RS700-E9-RS12

The system supports twelve (12) 2.5" hot-swap SATA/SAS/NVMe storage devices. The storage device installed on the storage tray connects to the motherboard SATA/SAS/NVMe ports via the SATA/SAS/NVMe backplane (SAS drives require an optional ASUS PIKE II card).

To install a 2.5" hot-swap SATA/SAS/NVMe storage device:

1. Push the spring lock to the right (A) then pull the tray lever outward (B) to release the storage tray. The storage tray ejects slightly after you pull out the lever.

Tray lever

Spring lock
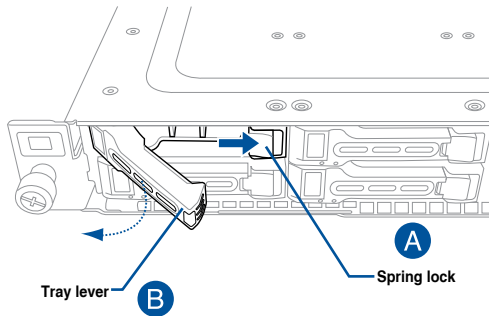
2. Firmly hold the tray lever and pull the storage tray out of the bay.
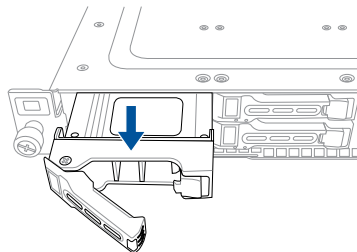
3. Place the storage tray on a flat and stable surface.

4. Prepare the SATA/SAS/NVMe storage device and the bundled set of screws.
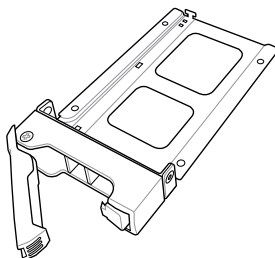
5.   Place the SATA/SAS/NVMe storage
       device into the tray then secure it with
       four screws.
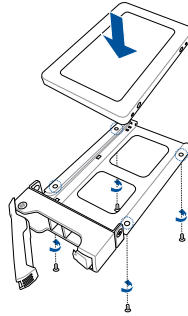
6.   Insert the storage tray and storage
       device assembly all the way into the
       depth of the bay until just a small
       fraction of the tray edge protrudes.
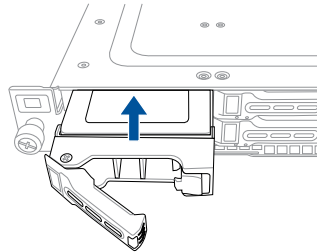
When installed, the SATA/SAS/NVMe connector on the storage device connects to the
SATA/SAS/NVMe interface on the backplane.

7.   Push the tray lever until it clicks and
       secures the storage tray in place.

The storage tray is correctly placed
when its front edge aligns with the
bay edge.
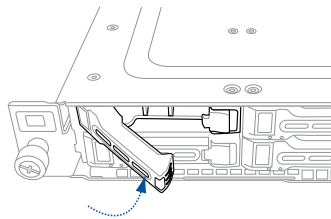
8.   Repeat steps 1 to 7 to install the other
       SATA/SAS/NVMe storage devices.

2.5 Expansion slot

The barebone server comes with two PCIE slots - PCIE1 and PCIE2. These slots are pre-installed with a riser card bracket and a butterfly riser card bracket for installing PCIE expansion cards. You need to remove these expansion card brackets if you want to install PCIE expansion cards.

2.5.1 Installing an expansion card to the riser card bracket

The pre-installed riser card bracket on the PCIE1 slot supports Full-Height (FH) and Half-Length (HL) PCIE x16 expansion cards.

To install a PCIE x16 (Gen3 x16 link) FH or HL card on the riser card bracket:

1. Firmly hold the riser card bracket, then pull it up to detach it from the PCIE x24 slot on the motherboard.

PCIE x24 slot
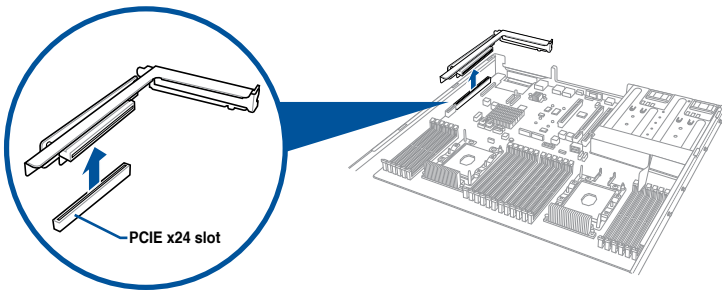
2. Remove the screw from the metal cover (A), then remove the metal cover (B) from the riser card bracket.
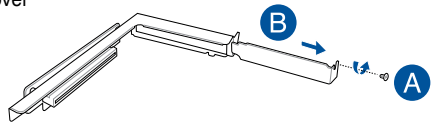
3. Install the PCIE expansion card into the riser card bracket (A), then secure the expansion card with the screw (B).
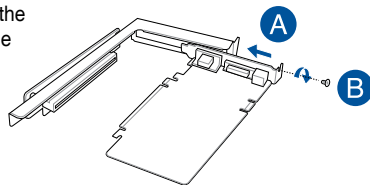
4. Install the riser card bracket and the PCIE expansion card assembly into the PCIE connector on the motherboard. Ensure that the golden connectors of the riser card bracket is firmly seated in place.
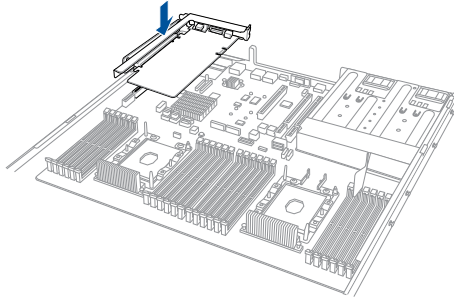
2.5.2 Installing an expansion card to the butterfly riser card bracket

The pre-installed butterfly riser card bracket on the PCIE2 slot has one PCIE x8 slot and one PCIE x16 slot. Although the PCIE x16 slot is physically longer than the PCIE x8 slot, both of these slots provides x8 Gen3 links.

The PCIE x8 slot supports proprietary cards such as ASUS PIKE II series cards. Install your proprietary cards into this slot to maximize its use.

To install PCI-E x8 (Gen3 x8 link), proprietary cards to the butterfly riser card bracket:

1. Remove the screw that secures the butterfly riser card bracket to the chassis.
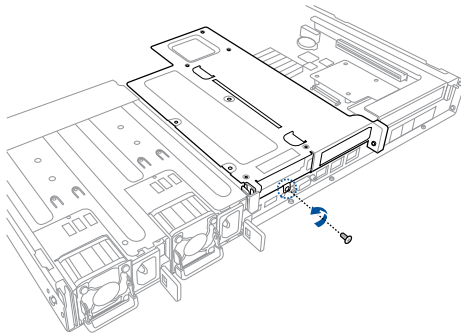
2. Firmly hold the butterfly riser card bracket, then pull it up to detach it from the PCIE x16 slot on the motherboard.
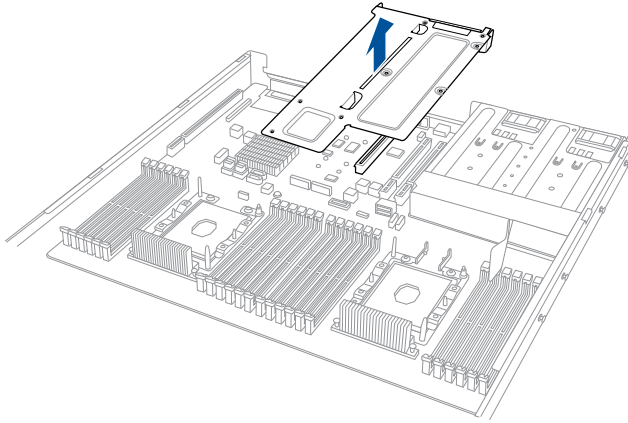
3. Place the butterfly riser card bracket on a flat and stable surface.

4. Remove the screws from the metal covers (A), then remove the metal covers (B) from the butterfly riser card bracket.
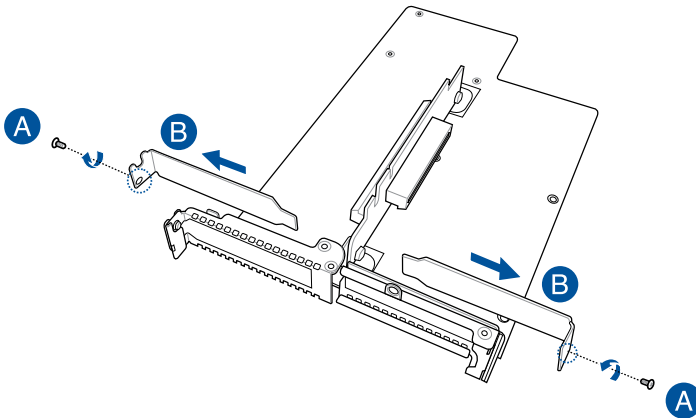
5. Install the PCIE expansion cards into the butterfly riser card bracket (A), then secure the expansion cards with the screws (B).
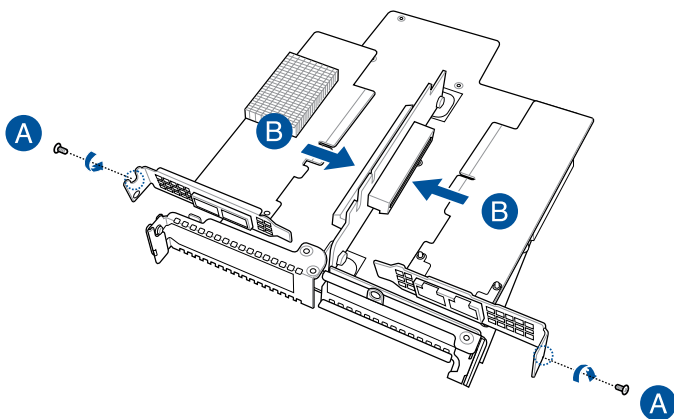
6. Reinstall the butterfly riser card bracket and the PCIE expansion card assembly into the PCIE connector on the motherboard (A) and secure it with the screw (B). Ensure that the golden connectors of the butterfly riser card bracket is firmly seated in place.
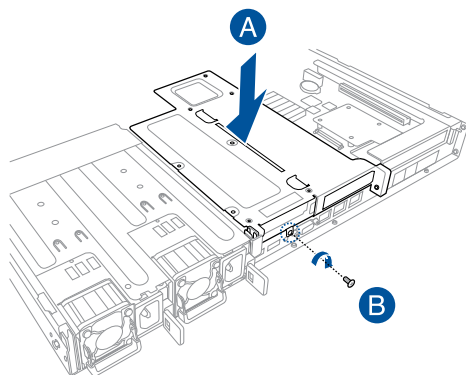
2.5.3   Installing an ASUS PIKE II card

1.   Prepare the ASUS PIKE II card.

> If your expansion card is pre-installed with a proprietary card bracket, proceed to step 4.

Card bracket

2.   Remove the two screws on the ASUS PIKE II card (A), then remove the card bracket (B).
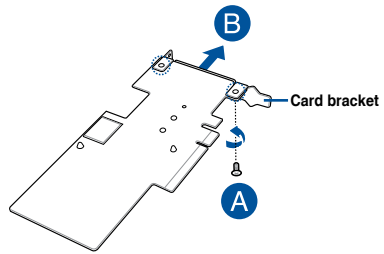
3.   Secure the ASUS PIKE II card and the metal cover (proprietary card bracket) with the two screws.
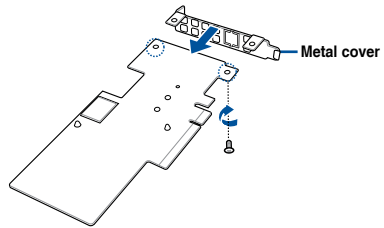
Metal cover

4.   Connect the mini-SAS HD cable to the ASUS PIKE II card.
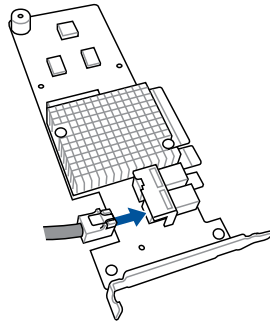
5.   Install the ASUS PIKE II card and the metal cover assembly to the riser card bracket or butterfly riser card bracket. Ensure that the metal cover is inserted and firmly seated in place.

> Refer to section **2.5.1 Installing an expansion card to the riser card bracket** or **2.5.2 Installing an expansion card to the butterfly riser card bracket** for the steps on installing an expansion card to the riser card bracket or butterfly riser card bracket.

6.   Remove the default cable from the motherboard and the backplane.
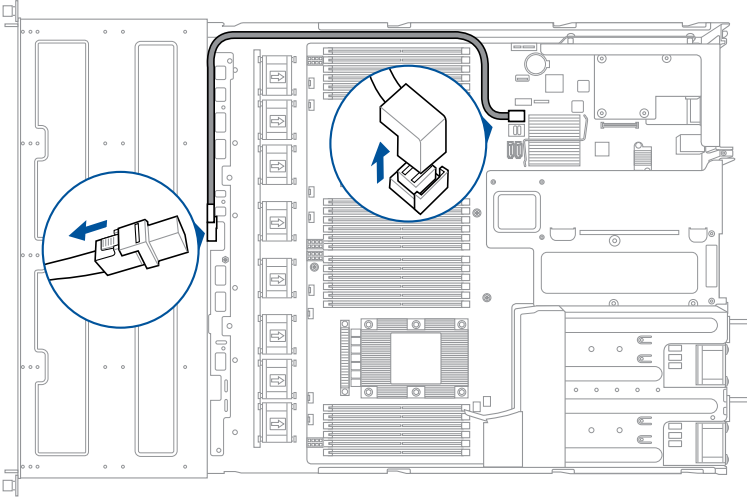
7.   Connect the mini-SAS HD cable to the backplane.
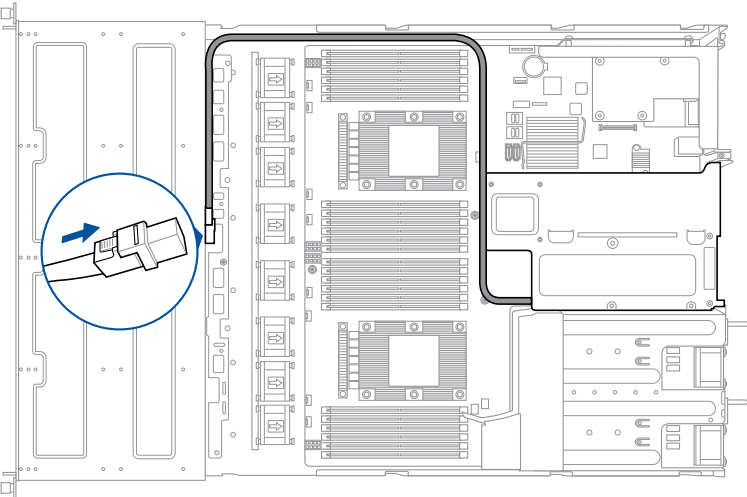
The illustrations shown above are for reference only.

2.5.4   Installing an ASUS HFI-OMNI card

When you install a Intel® Xeon® Scalable Processors Family Series with OMNI-PATH FABRIC to socket 2, you can install an ASUS HFI-OMNI card to the x8 slot on the butterfly riser card bracket and enjoy all the benefits of the 100G Intel® Omni-Path Architecture.

1.   Install a Intel® Xeon® Scalable Processors Family Series with OMNI-PATH FABRIC to CPU socket 2.

> Refer to section **2.2 Central Processing Unit (CPU)** for the steps on installing a CPU.
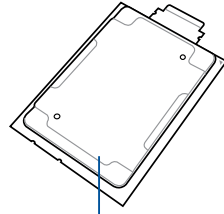
Intel® Xeon® Scalable Processors Family Series with OMNI-PATH FABRIC

2.   Remove the screw that secures the butterfly riser card bracket to the chassis.
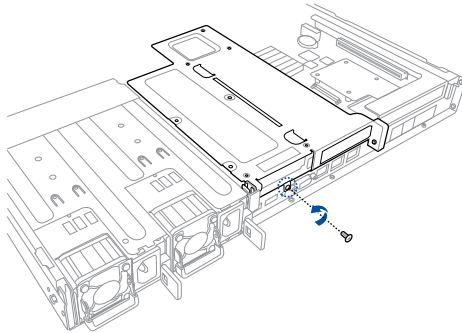
3. Firmly hold the butterfly riser card bracket, then pull it up to detach it from the PCIE x16 slot on the motherboard.
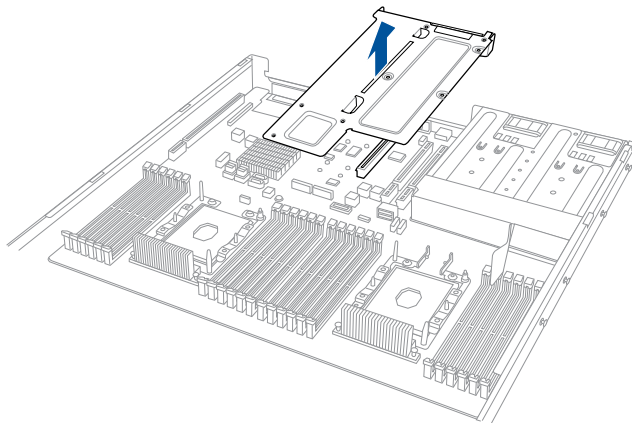
4. Place the butterfly riser card bracket on a flat and stable surface.

5. Remove the screw from the metal cover (A), then remove the metal cover (B) from the butterfly riser card bracket.
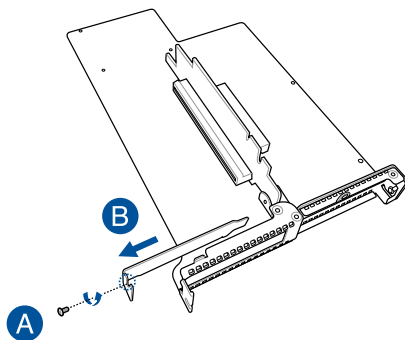
6. Prepare the ASUS HFI-OMNI card.

7. Remove the internal OMNI-PATH cable connector cap from the internal OMNI-PATH cable.
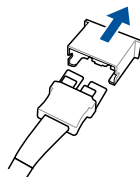
8.	Connect the internal OMNI-PATH cables (A) and the OMNIP cable to the ASUS HFI-OMNI card (B), install the ASUS HFI-OMNI card into the x16 slot on the butterfly riser card bracket (C), then secure it with the screw (D).

PCIE x16 slot
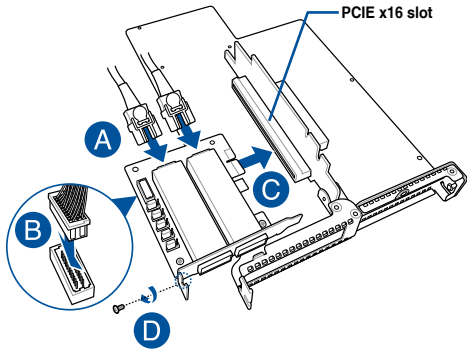
9.	Connect the other end of the internal OMNI-PATH cable into the Intel® Xeon® Scalable Processors Family Series with OMNI-PATH FABRIC (A), lift the metal clip on the internal OMNI-PATH cable (B) and secure it down to the metal socket hooks on the CPU socket (C).

Metal clip

Metal clip

Metal clip

Socket hooks
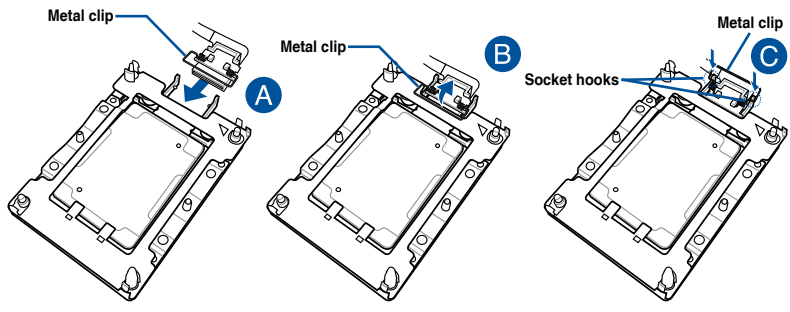
10. Connect the other end of the OMNIP cable to the motherboard.
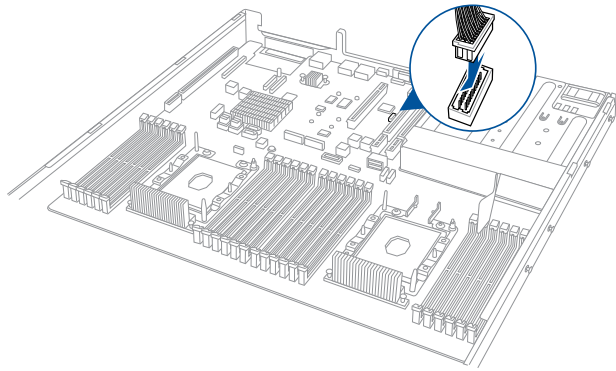
11. Reinstall the butterfly riser card bracket and the ASUS HFI-OMNI card assembly into the PCIE connector on the motherboard (A) and secure it with the screw (B). Ensure that the golden connectors of the butterfly riser card bracket is firmly seated in place.
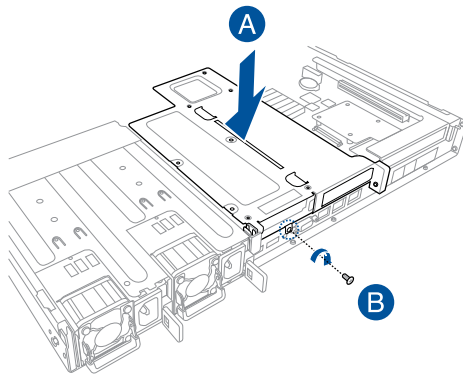
2.5.5 Replacing the ASUS PCIE-NVME4-OCuLink card on the riser card bracket (for RS700-E9-RS12 only)

The ASUS PCIE-NVME4-OCuLink card pre-installed on the riser card bracket on the PCIE1 allows your server system to support NVME storage devices on Bay 9 to Bay 12.

To replace an ASUS PCIE-NVME4-OCuLink card on the riser card bracket:

1.   Remove the OCuLink cables from its corresponding slots.
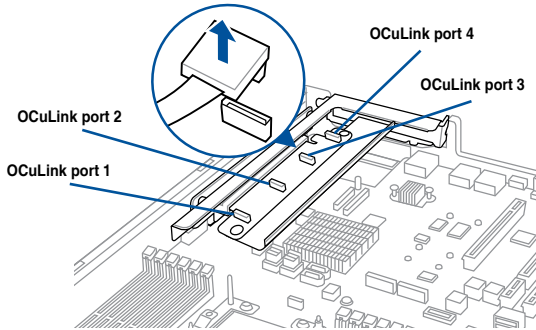
2.   Firmly hold the riser card bracket and ASUS PCIE-NVME4-OCuLink card assembly, then pull it up to detach it from the PCIE x24 slot on the motherboard.
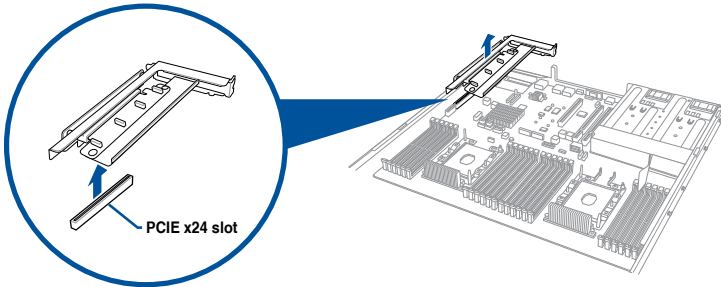
3.   Remove the screw from the metal cover (A), then remove the ASUS PCIE-NVME4-OCuLink card (B) from the riser card bracket.
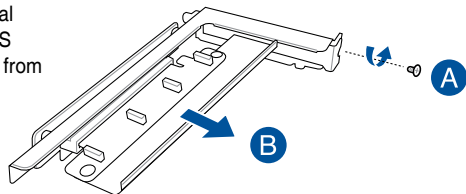
4.   Prepare the replacement ASUS PCIE-NVME4-OCuLink card.

5.   Install the replacement ASUS PCIE-NVME4-OCuLink card into the riser card bracket (A), then secure it with the screw (B).
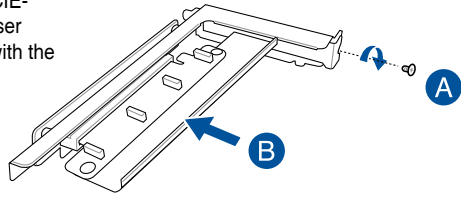
6.   Install the riser card bracket and ASUS PCIE-NVME4-OCuLink card assembly into the PCIE connector on the motherboard. Ensure that the golden connectors of the riser card bracket is firmly seated in place.
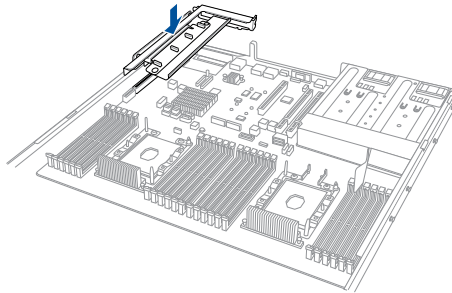
7.   Reconnect the OCuLink cables to its corresponding slots.
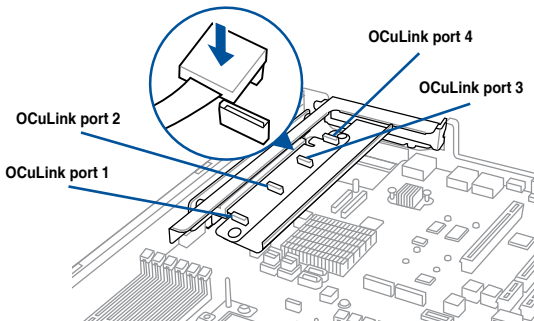
2.5.6 Installing ASUS PCIE-NVME2-OCuLink cards to the butterfly riser card bracket (optional for RS700-E9-RS12)

You can install additional ASUS PCIE-NVME2-OCuLink cards to your RS700-E9-RS12 system via the pre-installed butterfly riser card bracket on the PCIE2 slot to support NVME storages on Bay 5 to Bay 8.

To install ASUS PCIE-NVME2-OCuLink cards to the butterfly riser card bracket:

1. Remove the screw that secures the butterfly riser card bracket to the chassis.
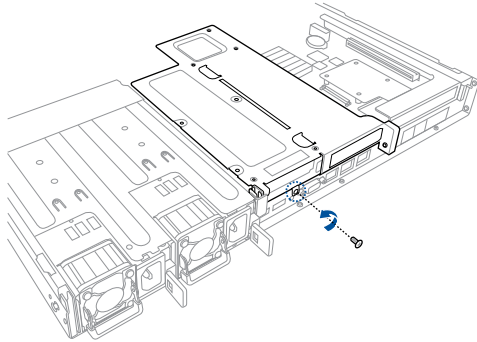
2. Firmly hold the butterfly riser card bracket, then pull it up to detach it from the PCIE x16 slot on the motherboard.
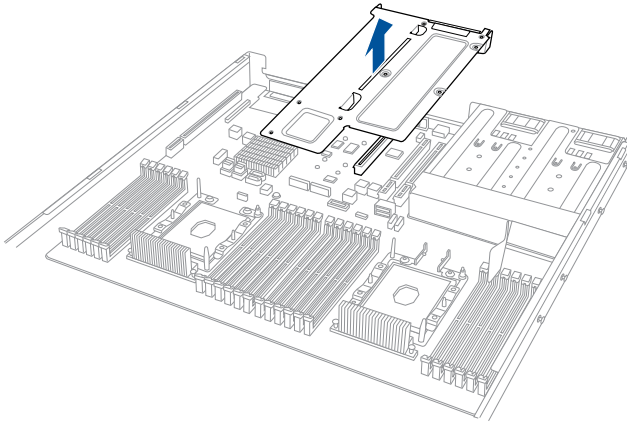
3. Place the butterfly riser card bracket on a flat and stable surface.

4. Remove the screws from the metal covers (A), then remove the metal covers (B) from the butterfly riser card bracket.
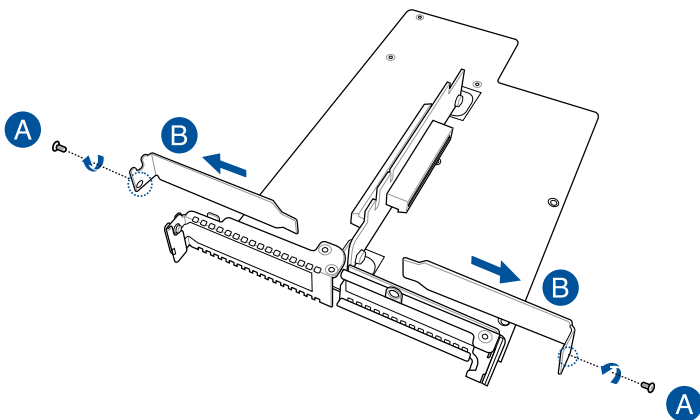
5. Connect the OCuLink cables into the corresponding slots (A), install the ASUS PCIE-NVME2-OCuLink cards into the butterfly riser card bracket (B), then secure the ASUS PCIE-NVME2-OCuLink cards with the screws (C).
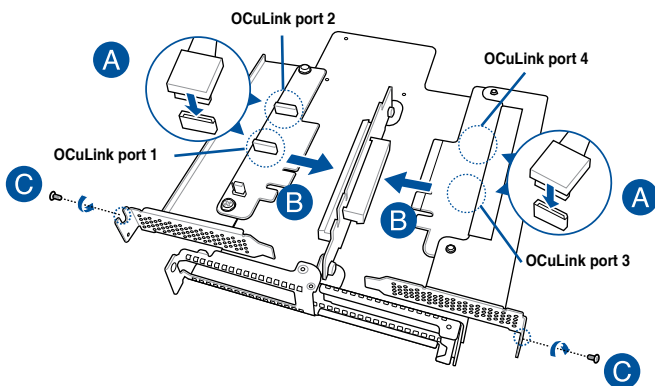
6. Connect the OCuLink cables to the backplane.
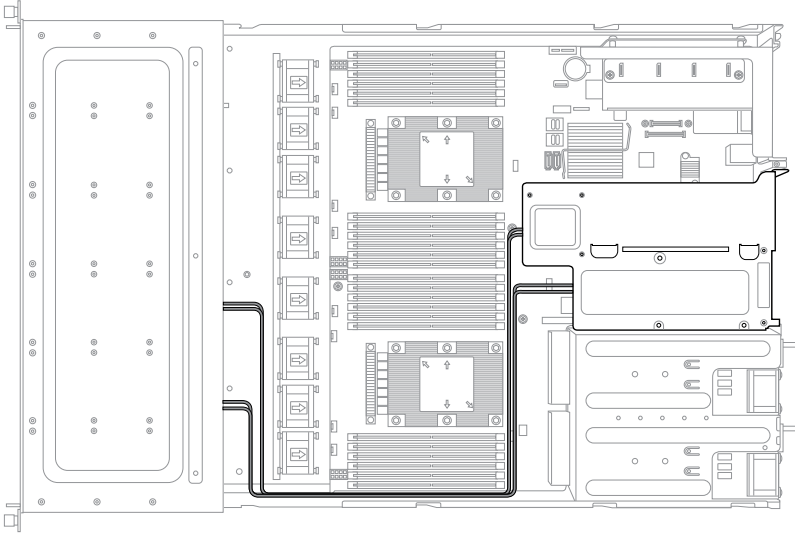
The illustration shown above is for reference only.

7. Reinstall the butterfly riser card bracket and the ASUS PCIE-NVME2-OCuLink card assembly into the PCIE connector on the motherboard (A) and secure it with the screw (B). Ensure that the golden connectors of the butterfly riser card bracket is firmly seated in place.
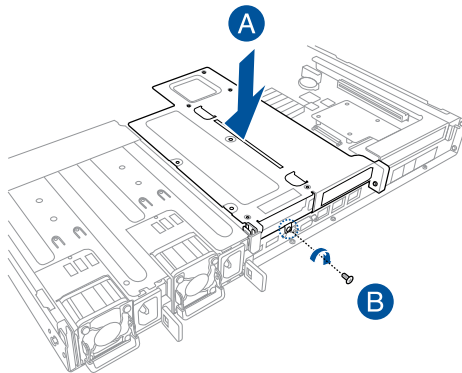
2.5.7 Configuring an expansion card

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 5 for information on BIOS setup.

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

3.   Install the software drivers for the expansion card.

Standard Interrupt assignments

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

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

2.5.8 Installing Mezzanine cards

To install a Mezzanine card:

1. Locate the Mezzanine card connector on your motherboard.
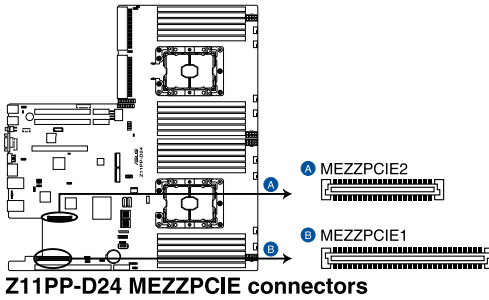
A MEZZPCIE2

B MEZZPCIE1

Z11PP-D24 MEZZPCIE connectors

2. Firmly hold the riser card bracket, then pull it up to detach it from the PCIE x16 slot on the motherboard.
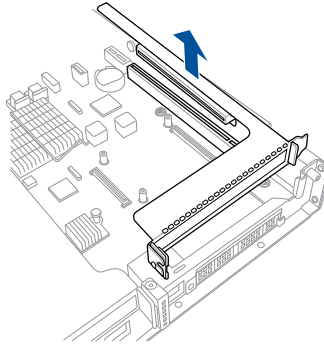
3. Remove the screw from the metal cover (A), then remove the metal cover (B) from chassis.
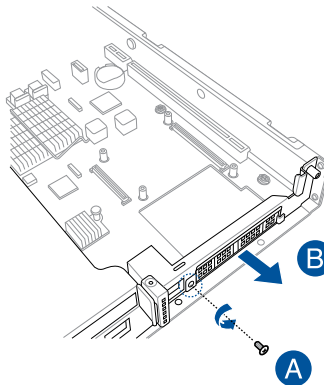
4. Select the slots that are going to be used for your Mezzanine card, then use a screwdriver and pry the corresponding slots until it pops off.
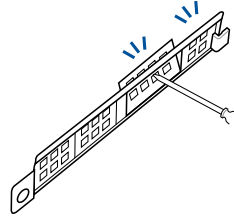
5. Prepare the Mezzanine card.

6. Insert the ports of the Mezzanine card into the mounting hole on the chassis, then insert the golden connector of the Mezzanine card into the OCP connector on the motherboard.

    Ensure that the stand screws on the motherboard is aligned and matched to the screw holes of the Mezzanine card.

OCP connector

Ports

Stand screws

Mounting hole
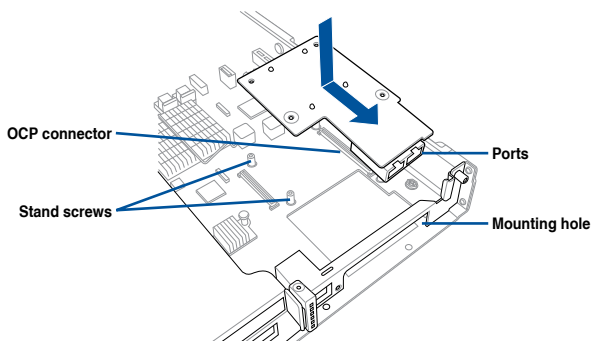
7. Secure the Mezzanine card with four bundled screws.
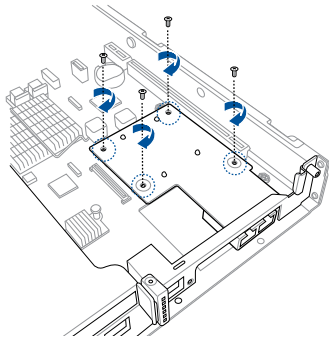
8.   Reinstall the metal cover (A) and
      secure it with the screw (B).
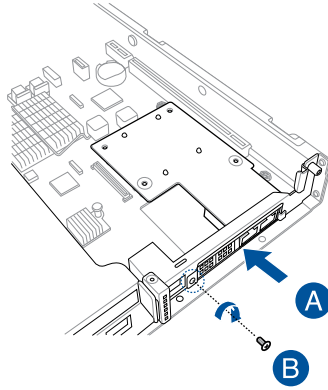
9.   Install the riser card bracket into the
      PCIE connector on the motherboard.
      Ensure that the golden connectors
      of the riser card bracket is firmly
      seated in place.
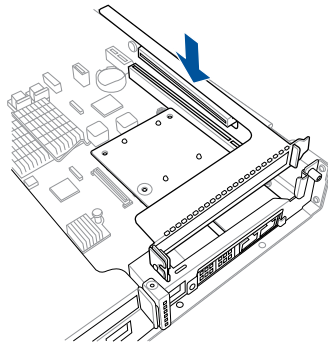
2.5.9 Installing M.2 (NGFF) cards

To install an M.2 (NGFF) card:

1. Locate the M.2 (NGFF) connectors on your motherboard.

NGFF2

NGFF1

Z11PP-D24 NGFF1 connector
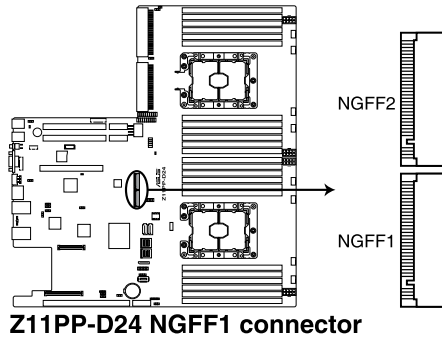
2. Remove the top screw and the stand from the motherboard.

Top screw **Stand screw**
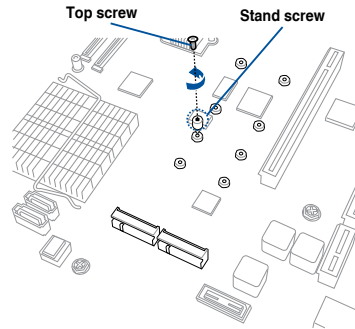
3. Select an appropriate screw hole on the motherboard for your M.2 card, then secure the stand to the motherboard.
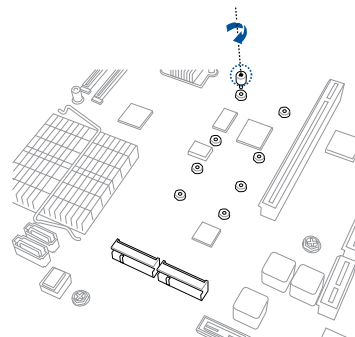
4.   Prepare the M.2 card.

5.   Align and insert the M.2 card into the
      M.2 connector on the motherboard.

      Ensure that the golden connector
      of the M.2 card is inserted firmly in
      place and that the screw hole on the
      M.2 card matches the stand screw
      on the motherboard.
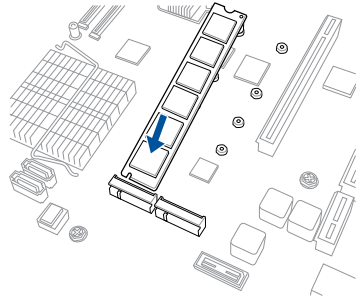
6.   Secure the M.2 card with the top
      screw.

      Ensure that the M.2 card is
      positioned between the top screw
      and the stand screw before
      securing it.
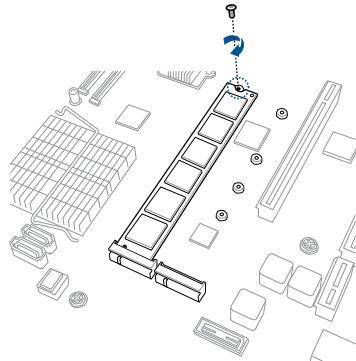
2.6 Cable connections

- The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you are going to remove pre-installed components to install additional devices.
- Refer to Chapter 4 for detailed information on the connectors.
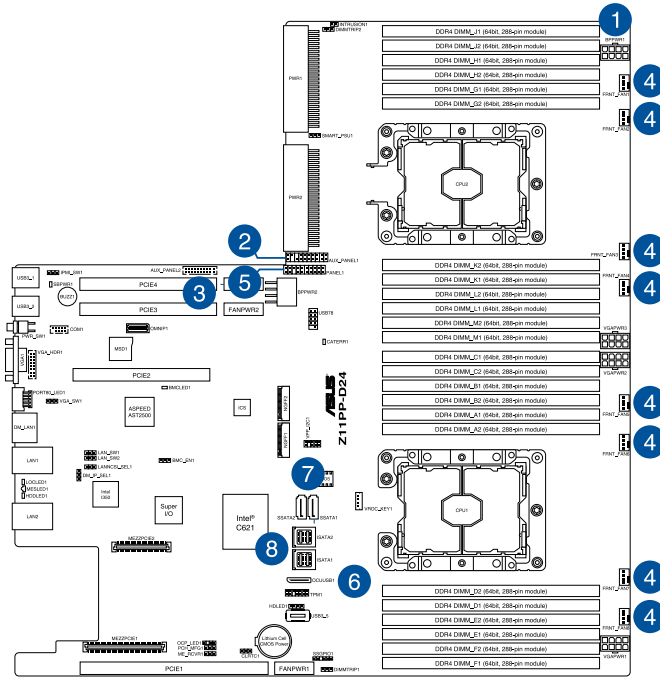
Pre-connected system cables

1. 8-pin BPPWR1 power connector (from power supply to backplane)

2. Auxiliary panel 1 connector (from motherboard to front I/O board)

3. Auxiliary panel 2 connector (from motherboard to front I/O board)

4. System fan connectors (from motherboard FAN1-8 to system fans)

5. Panel connector (from motherboard to front I/O board)

6. OCU-USB to USB connector (from motherboard to front I/O board)

7. SATA connectors (from motherboard to SATA/SAS backplane board)

8. ISATA connectors (from motherboard to SATA/SAS backplane board)

2.7 SATA/SAS backplane cabling

RS700-E9-RS4

Connects a 8-pin plug from motherboard

Connects the data cable connected to the motherboard

Connect the SATA/SAS storage devices

RS700-E9-RS12

Connects the data cable connected to the ASUS PCIE-NVME4-OCuLink card on the riser card bracket for Bay 9 to Bay 12

Connects the data cable connected to the optional ASUS PCIE-NVME2-OCuLink card on the butterfly riser card bracket for Bay 5 to Bay 8

Connects a 4-pin plug from motherboard

Connects the data cable connected to the motherboard

Connects the data cable connected to the motherboard

Connects a 8-pin plug from motherboard

Connects to SATA/SAS drives

Connects to NVMe/SAS/SATA drives

Connects to NVMe drives by default

2.8 Removable/optional components

This section explains how to install optional components into the system and covers the following components:

1. System fans

2. Redundant power supply module

3. Slim type optical drive (optional)

Ensure that the system is turned off before removing any components.

You may need to remove previously installed component or factory shipped components when installing optional components.

2.8.1 System fans

To uninstall the system fans:

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

2. Lift the fan, then set it aside.

3. Repeat steps 1 to 2 to uninstall the other system fans.
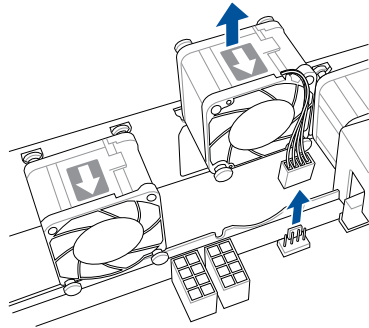
To reinstall the system fans:

1. Insert the fan into the fan cage. The airflow directional arrow on the fan should point towards the system rear panel.

2. Connect the system fan cable to the fan connector on the motherboard.
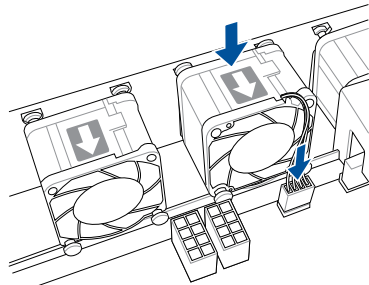
2.8.2   Redundant power supply module

To replace a failed redundant power supply module:

1.   Lift up the power supply module lever.
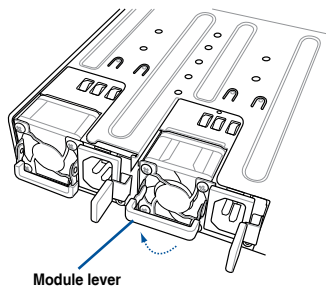
Module lever

2.   Hold the power supply module lever
      and press the PSU latch, then pull the
      power supply module out of the system
      chassis.

B   A

Module lever   **PSU latch**
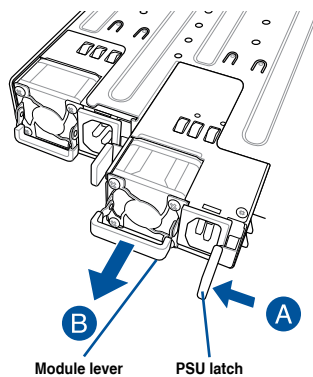
3.   Prepare the replacement power supply
      module.

4.   Insert the replacement power supply
      module into the chassis then push it
      inwards until the latch locks into place.
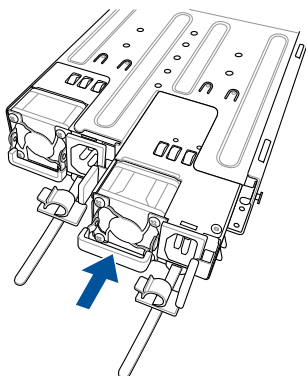
2.8.3   Replacing optical drive (optional for RS700-E9-RS4)

This server system supports a slim-type optical disk drive.

To replace the optical disk drive:

1.   Remove the screw that secures the optical drive and set it aside.
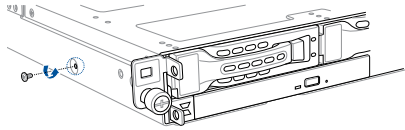
2.   Push the spring lock to the right (A) to remove the SATA/SAS drive tray, then pull the tray lever outward (B).

      The drive tray ejects slightly after you pull out the lever (C).

3.   Hold the tray lever and pull the drive tray out of the bay.

Spring lock

Tray lever
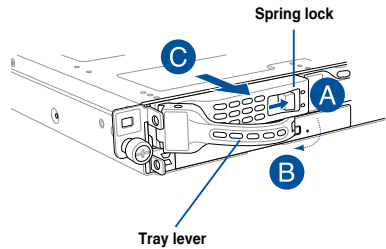
4.   Pull the optical drive module out of the drive bay.
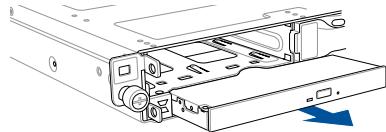
5.   Carefully insert the replacement optical disk drive module into the drive bay until it is securely seated in place.
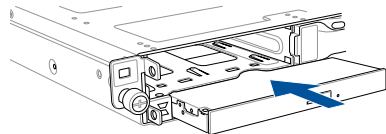
6.   Carefully insert the drive tray and push it all the way to the depth of the bay until just a small fraction of the tray edge protrudes.
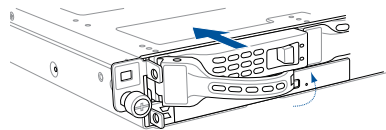
7.   Push the tray lever until it clicks, and secure the drive tray in place. The drive tray is correctly placed when its front edge aligns with the bay edge.

8.   Secure the optical drive with the screw that you removed in step 1.
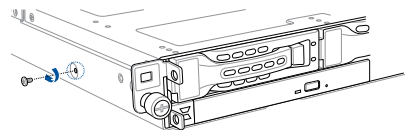
Installation Options

3

This chapter describes how to install the optional components and devices into the barebone server.

3.1 Tool-less Friction Rail Kit

The tool less design of the rail kit allows you to easily install the rack rails into the server rack without the need for additional tools. The kit also comes with a metal stopping bracket that can be installed to provide additional support and stability to the server.

The tool-less rail kit package includes:

Fixing latches   **Set of screws**   **Latch screws**   **Rail Washers**   **Rail screws**
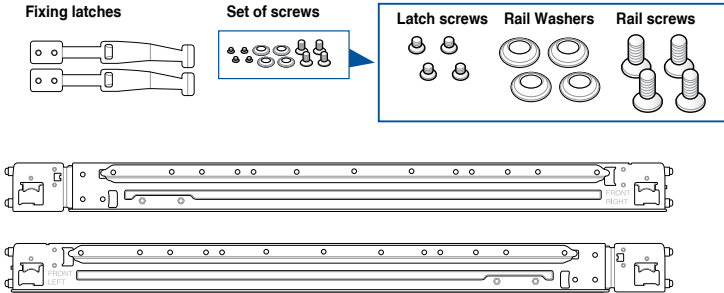
Installing the tool-less rack rail

To install the tool-less rack rails into the rack:

1. Secure the two fixing latches to the two sides of the server using the set of latch screws.

The locations of the screw holes vary with different server models. Refer to your server user manual for details.
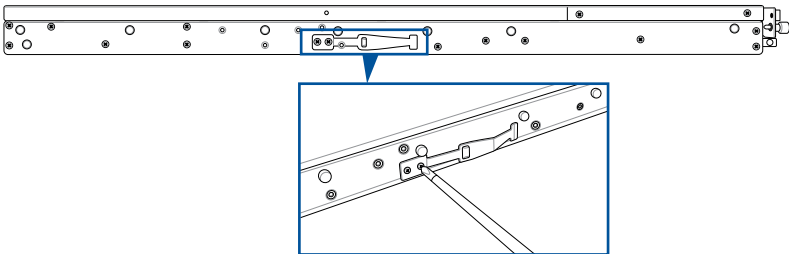
2. Select a desired space and place the appropriate rack rail (left and right) on opposite positions on the rack.

A 1U space is consists of three square mounting holes with two thin lips on the top and the bottom.

Thin lips
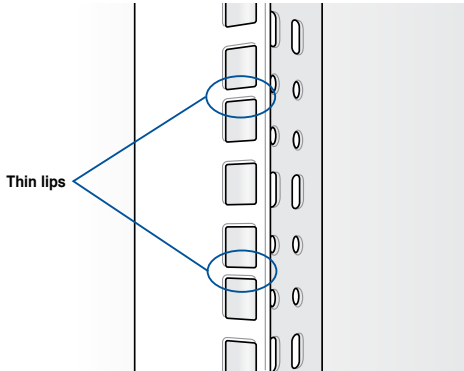
3. Press the spring lock, then insert the studs into the selected square mounting holes on the rack post.

4. Press the spring lock on the other end of rail then insert the stud into the mounting hole on the rack post. Extend the rack rail, if necessary.

5. Perform steps 3 to 4 for the other rack rail.

Ensure that the installed rack rails (left and right) are aligned, secured, and stable in place.
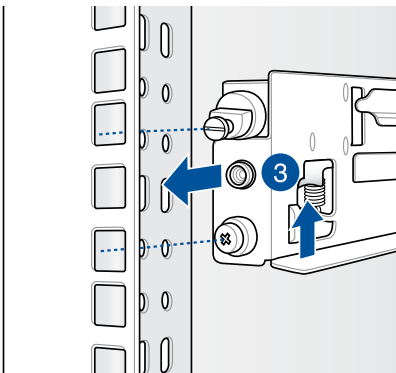
6.   Lift the server chassis and insert it into the rack rail.

✎   •   Ensure that the rack rail cabinet and the rack posts are stable and standing firmly on a
        level surface.

     •   We strongly recommend that at least two able-bodied persons perform the steps
        described in this guide.

     •   We recommend the use of an appropriate lifting tool or device, if necessary.
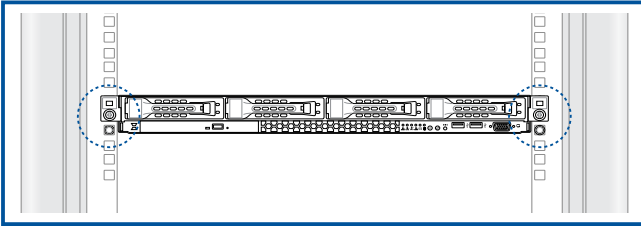
✎   Ensure to include the side knots on the two sides of the server in the rack rail holders.

✎   The illustrations shown above are for reference only.

3.2   Rail kit dimensions
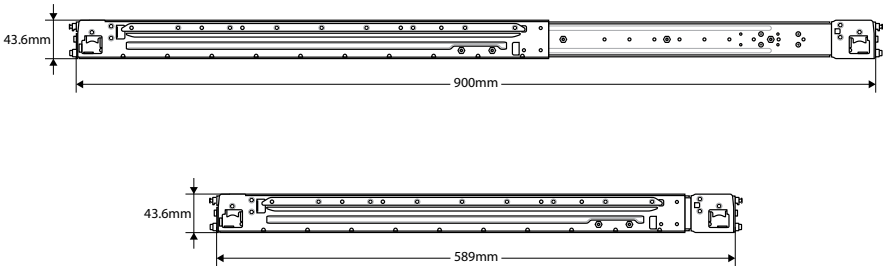
Motherboard Information

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

4

4.1 Motherboard layout
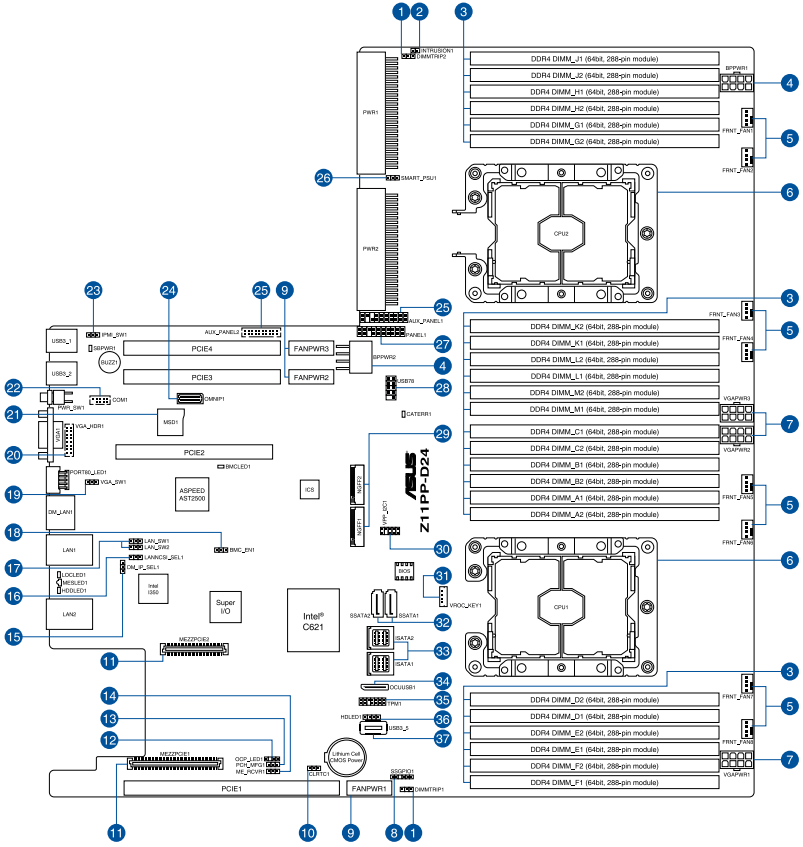
Layout contents

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32. Serial ATA connectors (7-pin SSATA1-2)	4-13
33. Mini-SAS HD connector (ISATA1-2)	4-13
34. USB 3.0 connectors (OCUUSB1)	4-25
35. TPM connector (20-1 pin TPM1)	4-16
36. Hard disk activity LED connector (4-pin HDLED1)	4-14
37. USB 3.0 connectors (Type A USB3_5)	4-14

4.2 Jumpers

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

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

   To erase the RTC RAM:

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

   2. Move the jumper cap from pins 1–2 (default) to pins 2–3. Keep the cap on pins 2–3 for about 5–10 seconds, then move the cap back to pins 1–2.

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

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

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

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

Z11PP-D24 Clear RTC RAM

CLRTC1

1 2 — Normal (Default)

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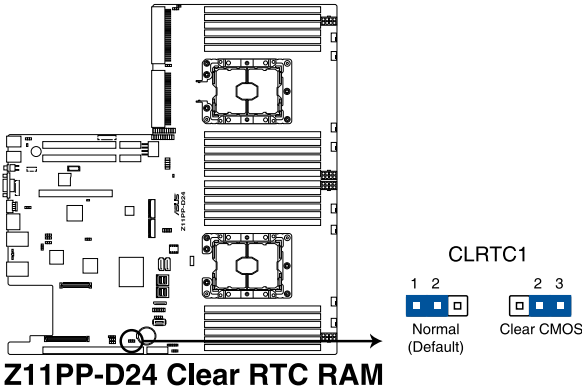
2. **VGA controller setting (3-pin VGA_SW1)**

   This jumper allows you to enable or disable the onboard VGA controller. Set to pins 1–2 to activate the VGA feature.
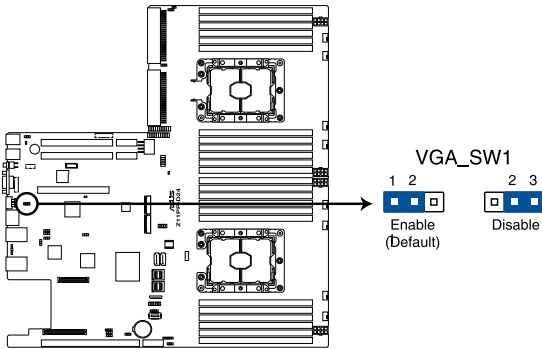
Z11PP-D24 VGA setting

3. **LAN controller setting (3-pin LAN_SW1, LAN_SW2)**

   These jumpers allow you to enable or disable the onboard Intel® I350-AM2 Gigabit LAN1/2 controller. Set to pins 1–2 to activate the Gigabit LAN feature.
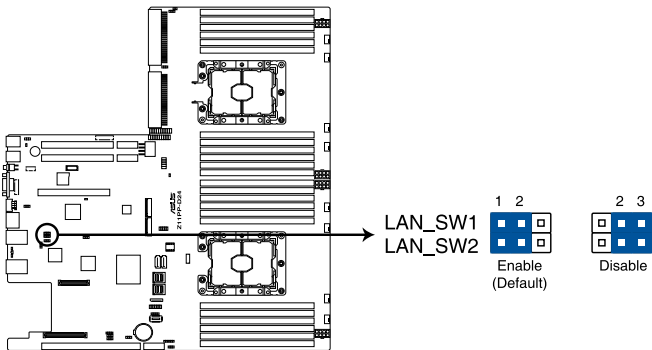
Z11PP-D24 LAN setting

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

   This jumper allows you to quickly recover the Intel Management Engine (ME) firmware when it becomes corrupted.

ME_RCVR1

1 2   2 3

Normal (Default)   Force ME Recovery

Z11PP-D24 ME recovery setting
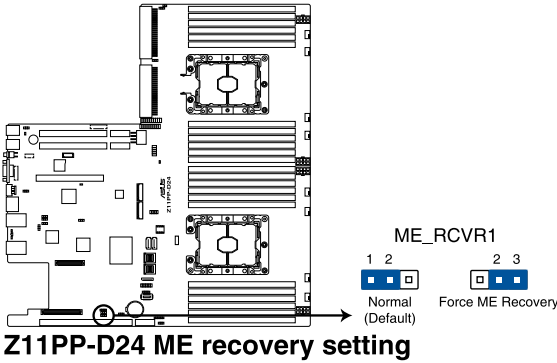
5. **Baseboard Management Controller setting (3-pin BMC_EN1)**

   This jumper allows you to enable (default) or disable on-board BMC. Ensure to set this BMC jumper to enabled to avoid system fan control and hardware monitor error.

BMC_EN1

1 2   2 3

Enable (Default)   Disable

Z11PP-D24 BMC setting
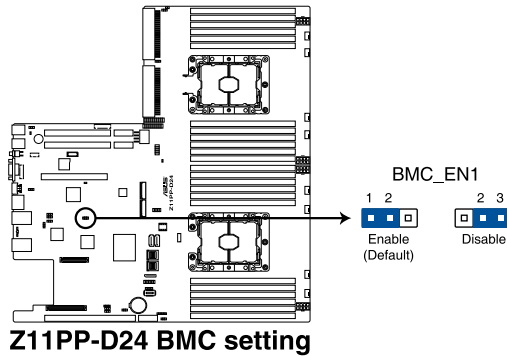
6. **DDR4 thermal event setting (3-pin DIMMTRIP1, DIMMTRIP2)**

    This jumper allows you to enable or disable DDR4 DIMM thermal sensing event pin.

DIMMTRIP2

1 2   Enable (Default)

2 3   Disable

DIMMTRIP1

1 2   Enable (Default)

2 3   Disable

Z11PP-D24 Thermaltrip setting
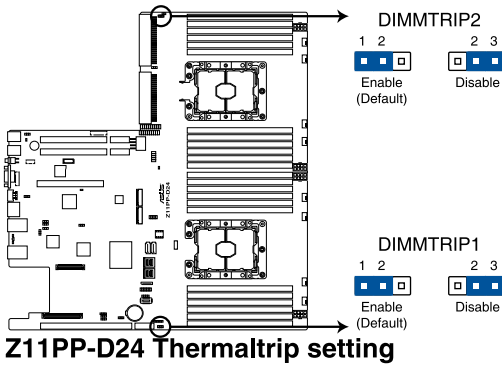
7. **PCH_MFG1 setting (3-pin PCH_MFG1)**

    This jumper allows you to update the BIOS ME block.

PCH_MFG1

1 2   Normal (Default)

2 3   Security override

Z11PP-D24 PCH_MFG setting
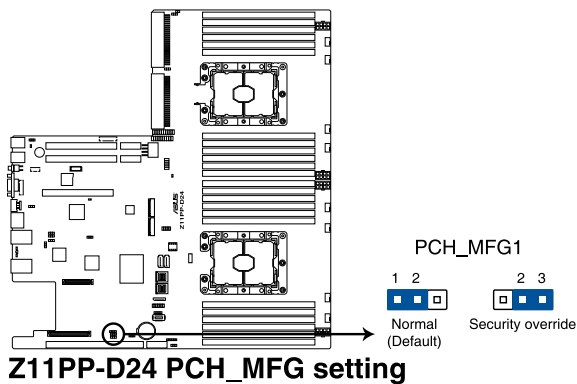
8.	**Smart Ride Through (SmaRT) setting (3-pin SMART_PSU1)**

This jumper allows you to enable or disable the Smart Ride Through (SmaRT) function. This feature is enabled by default. Set to pins 2-3 to disable it. When enabled, SmaRT allows uninterrupted operation of the system during an AC loss event.

SMART_PSU1

1 2   2 3

Enable   Disable
(Default)
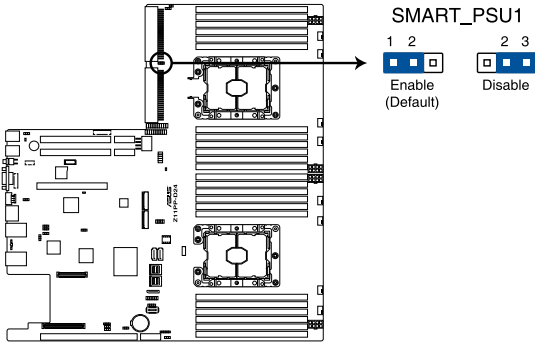
Z11PP-D24 PMBus 1.2 PSU setting

9.	**DMLAN setting (3-pin DM_IP_SEL1)**

This jumper allows you to select the DMLAN setting. Set to pins 2-3 to force the DMLAN IP to static mode (IP=10.10.10.10, submask=255.255.255.0).

DM_IP_SEL1

3
2
2
1

Normal   Force DMLAN IP
(Default)   to static mode
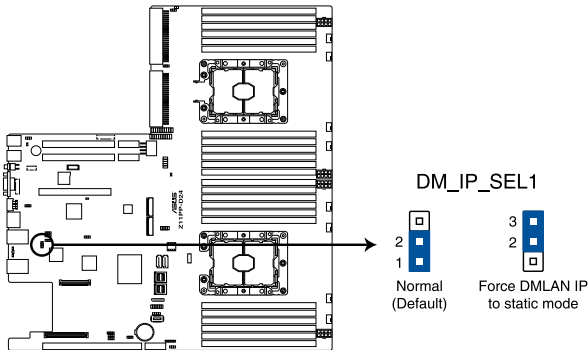
Z11PP-D24 DM_IP_SEL1 setting

10. **LANNCSI setting (3-pin LANNCSI_SEL1)**

    This jumper allows you to select which LAN NCSI to function.
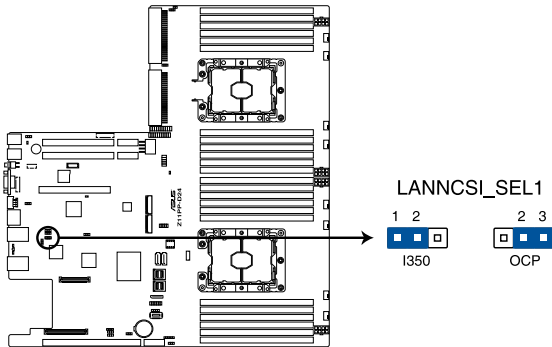
Z11PP-D24 LANNCSI_SEL1 setting

11. **IPMI SW setting (3-pin IPMI_SW1)**

    This jumper allows you to select which protocol in the GPU sensor to function.
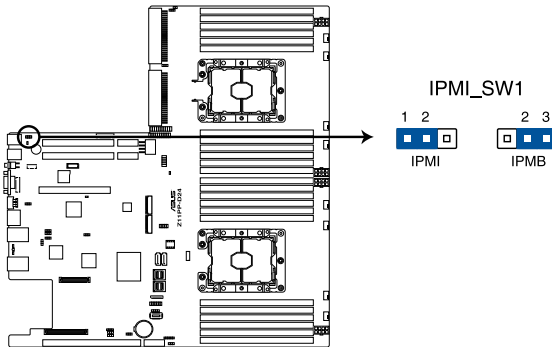
Z11PP-D24 IPMI_SW1 setting

4.3 Internal 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 — AC Power Off

   Z11PP-D24 Standby Power LED
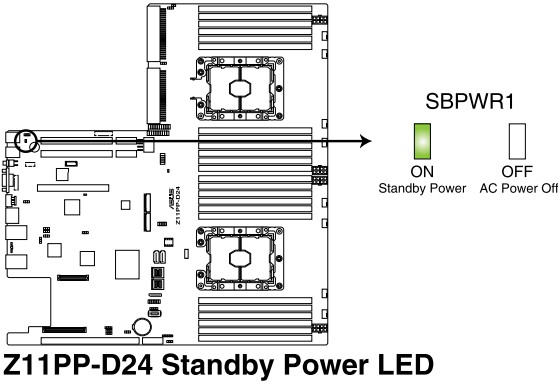
2. **Location LED (LOCLED1)**

   This onboard LED lights up when the Location button on the server is pressed or when triggered by a system management software. The Location LED helps visually locate and quickly identify the server in error on a server rack.

   LOCLED1

   Z11PP-D24 Location LED
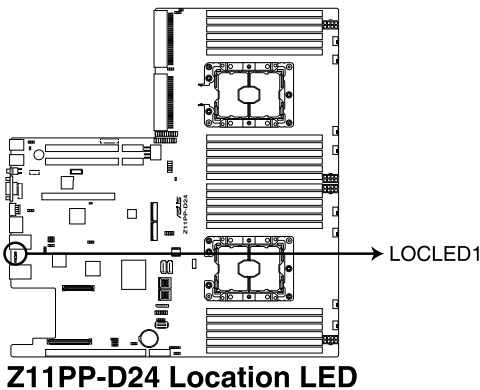
3. **Hard disk activity LED (HDDLED1)**

This LED is for the storage devices connected to the onboard SATA, or SATA/SAS add-on card. The read or write activities of any device connected to the onboard SATA, or SATA/SAS add-on card causes the rear panel LED to light up.

HDDLED1

Z11PP-D24 HDD LED
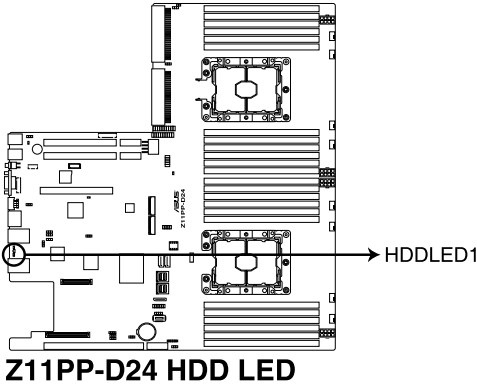
4. **Message LED (MESLED1)**

This onboard LED lights up to red when there is a BMC event log is generated.

MESLED1

Z11PP-D24 MESLED
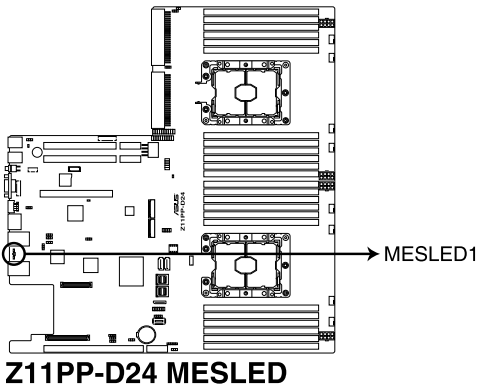
5.   BMC LED (BMCLED1)

The BMC LED lights up to indicate that the on-board BMC is functional.

BMCLED1

Z11PP-D24 BMC LED
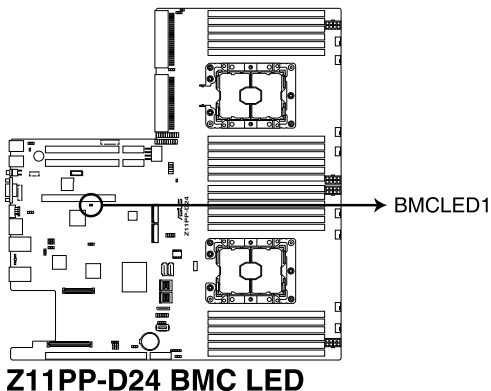
6.   CATT LED (CATTERR1)

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

CATERR1

Z11PP-D24 CATERR1 LED
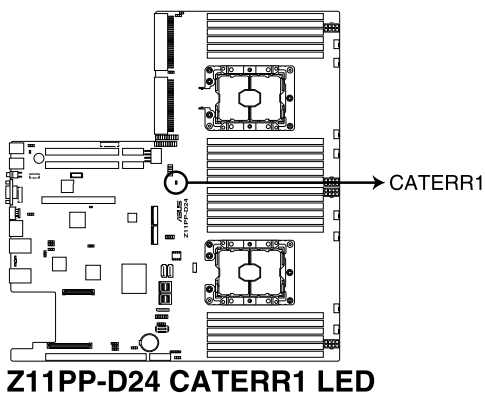
4.4 Internal connectors

1. **Serial ATA connectors (7-pin SSATA1-2)**

   These connectors, controlled by Intel® C621 chipset, are for the Serial ATA signal cables for Serial ATA hard disk drives (SATA 1 connector is used for the optical drive by default).

   > If the SATA M.2 (NGFF1) slot is occupied, the SSATA2 slot will be disabled.
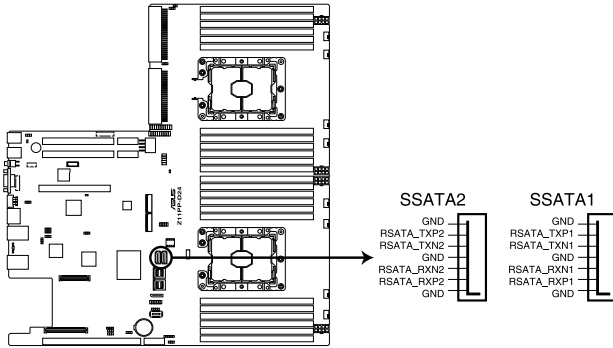
   Z11PP-D24 SSATA connectors

2. **Mini-SAS HD connector (ISATA1-2)**

   This motherboard comes with mini Serial Attached SCSI (SAS) HD connectors, the storage technology that supports Serial ATA. Each connector supports up to four devices.
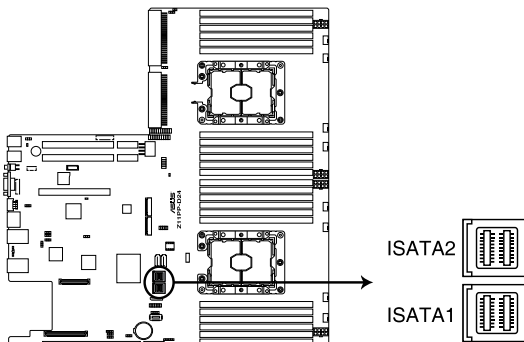
   Z11PP-D24 ISATA connectors

3. **USB 3.0 connectors (Type A USB3_5)**

   The USB3_5 connector is for Type-A USB 3.0 devices. You can enjoy all the benefits of USB 3.0 including faster data transfer speeds of up to 5 Gbps, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.

USB3_5
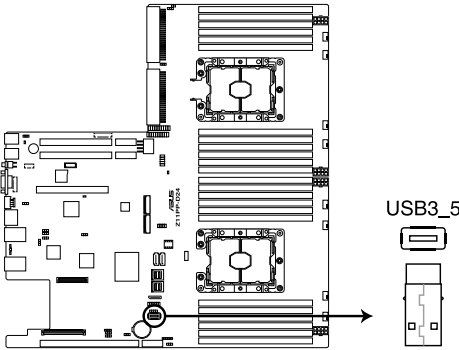
Z11PP-D24 USB 3.0 connector

4. **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

NC
ADD_IN_CARD-
ADD_IN_CARD-
NC
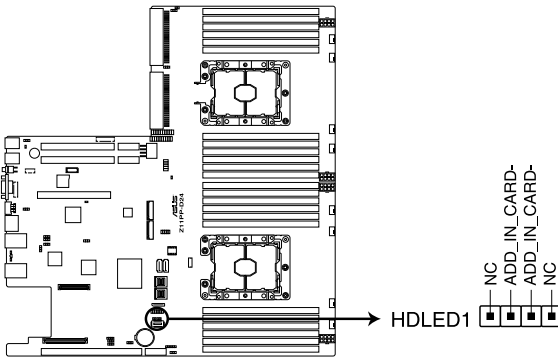
Z11PP-D24 Hard disk activity LED connector

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

This connector is for USB 2.0 ports. Connect the USB module cable to the connector, and then install the module to a slot opening at the back of the system chassis. The USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.
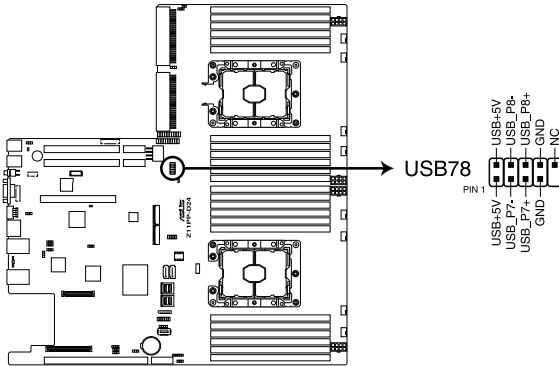
Z11PP-D24 USB 2.0 connector

The USB port module is purchased separately.

6. **Fan power connectors (FANPWR1-3)**

These connectors are for the power supply plugs that connects to additional fans. 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.
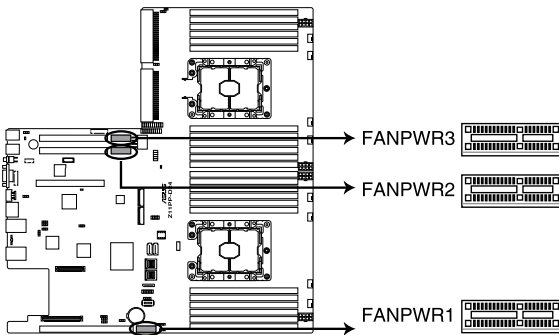
Z11PP-D24 FANPWR

7. **System fan connectors (4-pin FAN1-8)**

The fan connectors support cooling fans of 0.8A–1.0A (12 W max.) or a total of 6.4 A–8.0 A (96 W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure 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!

Z11PP-D24 FAN connectors
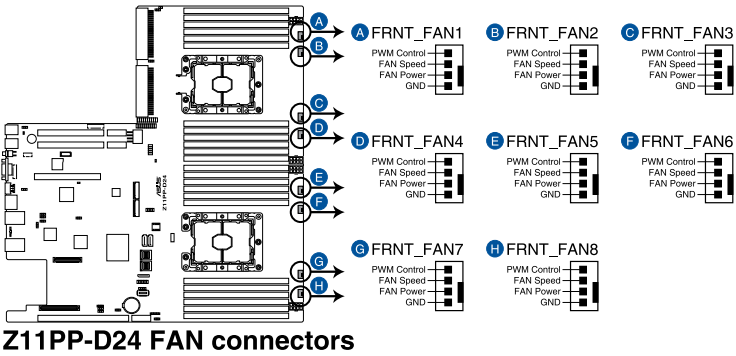
8. **TPM connector (20-1 pin TPM1)**

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.

Z11PP-D24 TPM connector
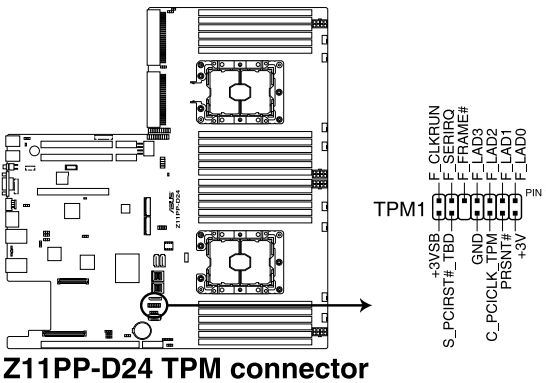
9. **System panel connector (20-pin PANEL1)**

This connector supports several chassis-mounted functions.

Z11PP-D24 System panel connector
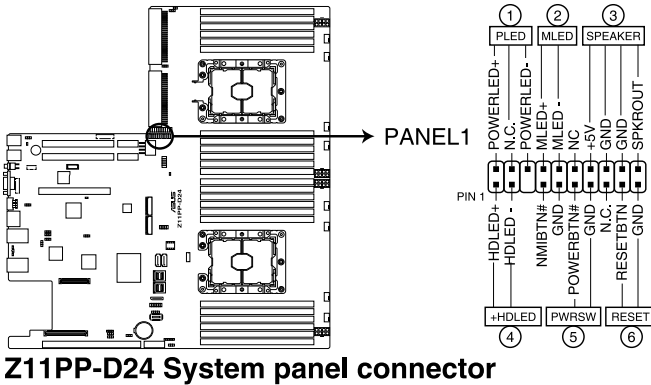
1. **System power LED (3-pin PLED)**

   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 the BMC 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 LED lights up or flashes when data is read from or written to the HDD.

5. **ATX power button/soft-off button (2-pin PWRSW)**

   This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the 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.

10. **Auxiliary panel connector (20-2 pin AUX_PANEL1, 20-pin AUX_PANEL2)**

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

Z11PP-D24
Auxiliary panel connector
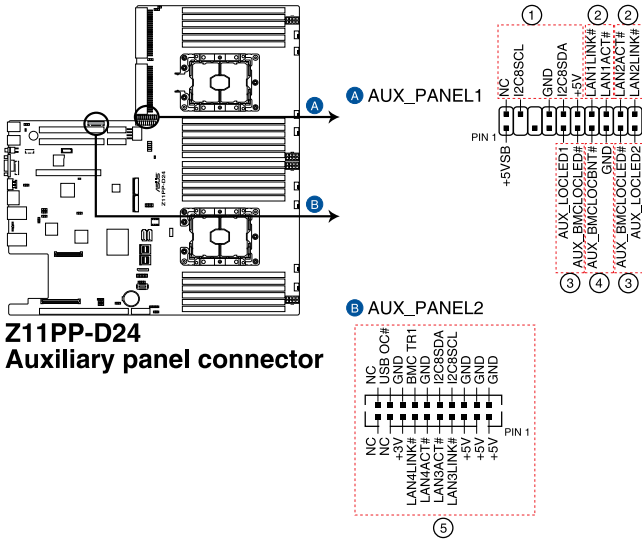
1. **Front panel SMB (6-1 pin FPSMB)**

These leads connect the front panel SMBus cable.

2. **LAN activity LED (2-pin LAN1_LED, LAN2_LED)**

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

3. **Locator LED (2-pin LOCATORLED1, 2-pin LOCATORLED2)**

These leads 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 LOCATORBTN)**

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

5. **LAN activity LED and USB port (2-pin LAN3_LED, LAN4_LED, USB ports)**

These leads are for the Gigabit LAN activity LEDs and USB ports on the front panel.

11. **Back panel power connectors (8-pin BPPWR1-2)**

These connectors are for the power supply plugs that connects to the back panel. 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.
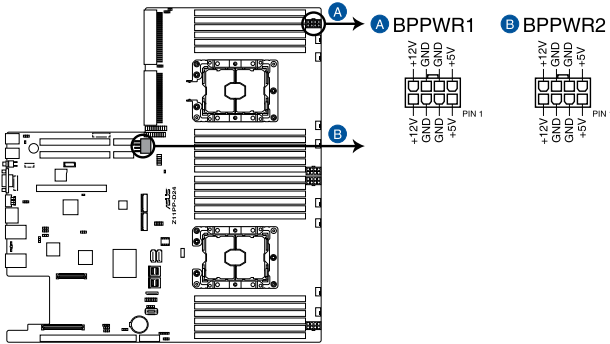
Z11PP-D24 BP power connectors

DO NOT connect VGA cards to these connectors. Doing so may cause system boot errors and permanent damage to your motherboard or device.

12. **VGA power connectors (8-pin VGAPWR1-3)**

These connectors are for the power supply plugs that connects to the VGA card. 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.
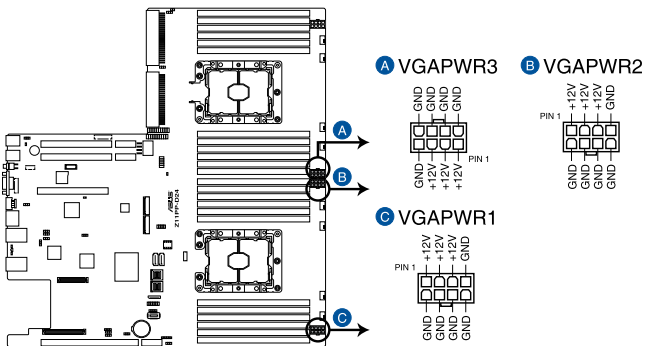
Z11PP-D24 VGA power connectors

DO NOT connect the back panel to these connectors. Doing so may cause system boot errors and permanent damage to your motherboard or device.

13. **VGA connector (16-pin VGA_HDR1)**

    This connector supports the VGA High Dynamic-Range interface.

    VGA_HDR1

    DDC_CLK
    H_SYNC — V_SYNC
    DDC_DATA
    +5V — GND
    GND — GND
    GND — GND
    Blue
    Red — Green

    PIN 1
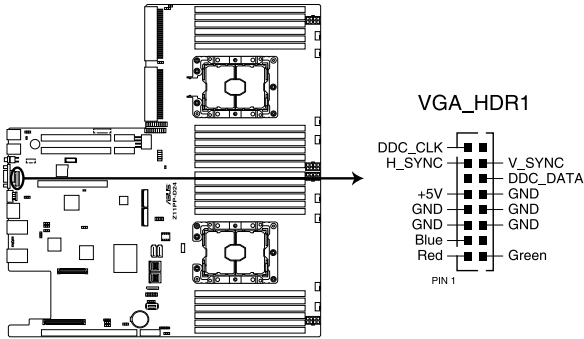
    Z11PP-D24 Internal VGA connector

14. **Chassis Intrusion (2-pin INTRUSION1)**

    These leads are for the intrusion detection feature for chassis with intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high level signal to these leads to record a chassis intrusion event. The default setting is to short the CHASSIS# and the GND pin by a jumper cap to disable the function.

    INTRUSION1

    CHASSIS#
    GND

    PIN 1
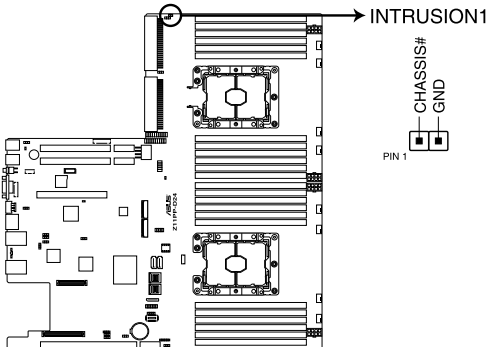
    Z11PP-D24 Chassis Intrusion connector

15. Mezzanine PCIE card connectors (MEZZPCIE1-2)

The MEZZPCIE1-2 connector supports Open Compute Project (OCP) cards.

A MEZZPCIE2

B MEZZPCIE1

Z11PP-D24 MEZZPCIE connectors
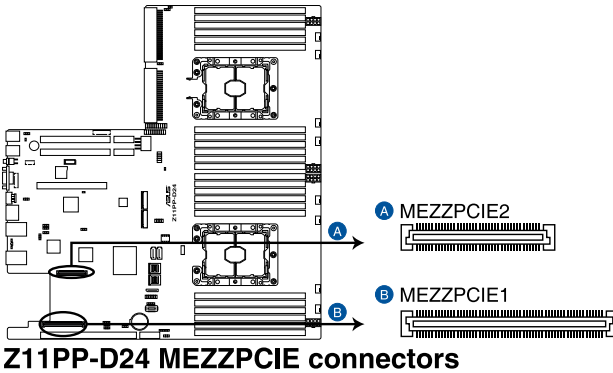
16. M.2 (NGFF) card connectors (NGFF1-2)

These connectors allow you to install M.2 devices.

NGFF2

NGFF1

Z11PP-D24 NGFF1 connector
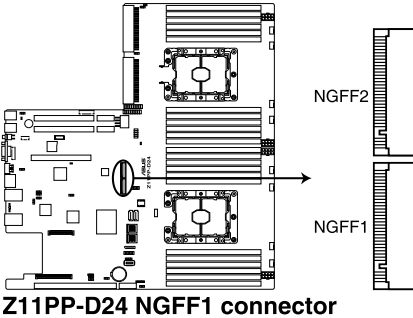
- This connector supports type 2242 / 2260 / 2280 / 22110 devices on both PCI-E and SATA interface.

- If the SATA M.2 (NGFF1) slot is occupied, the SSATA2 slot will be disabled.

The M.2 (NGFF) device is purchased separately

17. **Serial port connector (10-1 pin COM1)**

This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis.
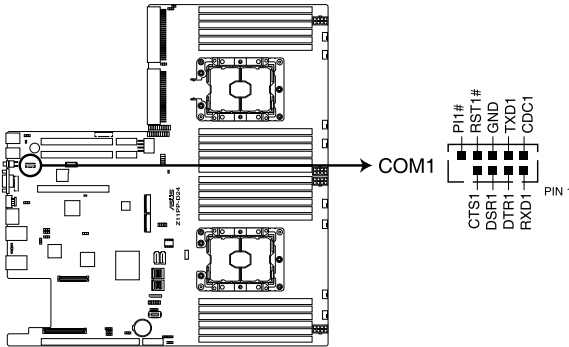
Z11PP-D24 Serial port connector

The COM module is purchased separately.

18. **Micro SD card slot (MSD1)**

Your motherboard supports SD Memory Card v2.00 (SDHC) / v3.00 (SDXC).
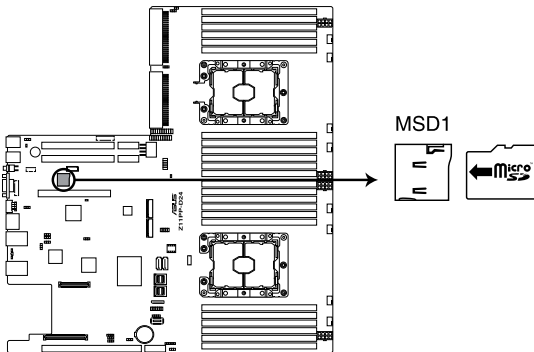
Z11PP-D24 MSD1

Disconnect all power (including redundant PSUs) from the existing system before you add or remove a Memory Card, then reboot the system to access the Memory Card.

Some memory cards may not be compatible with your motherboard. Ensure that you use only compatible memory cards to prevent loss of data, damage to your device, or memory card, or both.

19. VROC_KEY connector (4-pin VROC_KEY)

This connector allows you to connect a KEY module to support Intel VMD RAID function.

VROC_KEY1

KEY2
GND
KEY1
GND
PIN 1

Z11PP-D24 VROC_KEY1
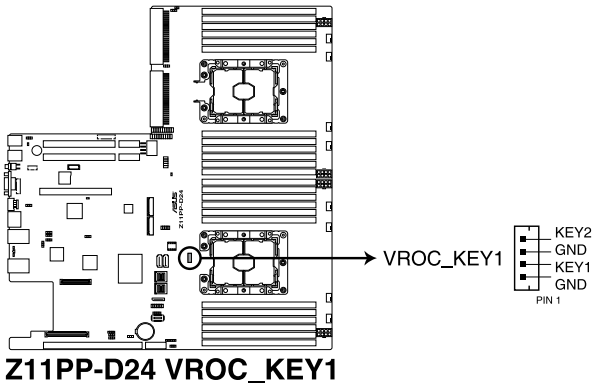
20. Serial General Purpose Input/Output connector (6-1 pin SSGPIO1)

The SSGPIO 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.

SSGPIO1

SSATA_SDATAOUT0
SSATA_SDATAOUT1
GND
SSATA_SLOAD
SSATA_SCLK

PIN1

Z11PP-D24 SSGPIO1 connector
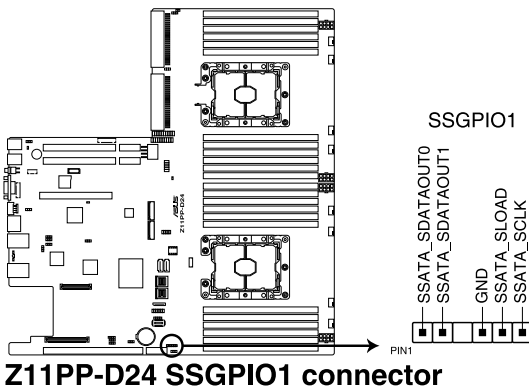
21. OCP LAN Activity LED connector (4-1 pin OCP_LED1)

OCP LAN LED connector supports OCP LAN card Active LED.

OCP_LED1

LAN3LINK#
LAN4LINK#
NC

PIN 1

Z11PP-D24 OCP_LED1 connector
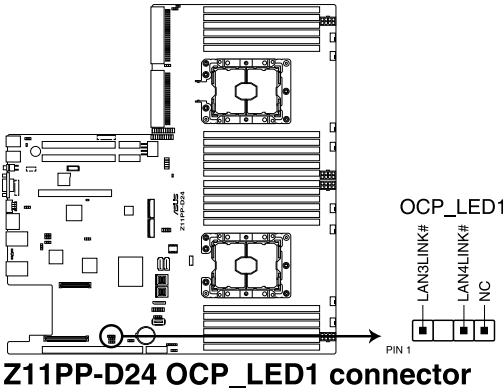
22. OMNIP connector (24-pin OMNIP1)

This connector allows you to provide sideband signals from the fabric CPU to a HFI-OMNI supported ASUS card.

OMNIP1

GND
+VPPDDR
+VPPDDR_PWRGD
+12V
GND
LED HFI1#
MODPRST_HFI1#
GND
GND
LED HFI0#
MODPRST_HFI0#
GND

SDA
SCL
+3V
+3V
IRQ_HFI1#
RST_HFI1#
HFI1_SDA
HFI1_SCL
IRQ_HFI0#
RST_HFI0#
HFI0_SDA
HFI0_SCL

Z11PP-D24 OMNIP1
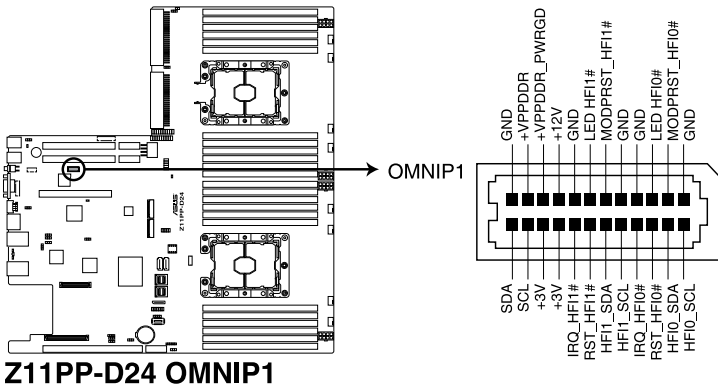
23. VPP_I2C1 connector (10-1 pin VPP_I2C1)

This connector is used for the Intel VMD function and sensor readings.

Z11PP-D24 VPP_I2C1 connector
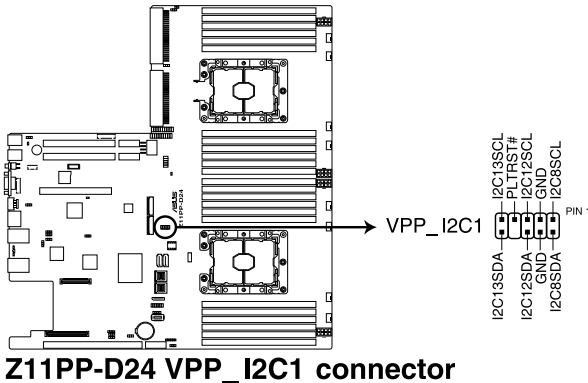
24. USB 3.0 connectors (OCUUSB1)

Connect a compatible USB module cable to the OCUUSB1 connector, and then install the module to a slot opening at the back or front of the system chassis. You can enjoy all the benefits of USB 3.0 including faster data transfer speeds of up to 5 Gbps, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0. (OCUUSB1 connector is used for the front USB panel by default).

Z11PP-D24 OCUUSB1
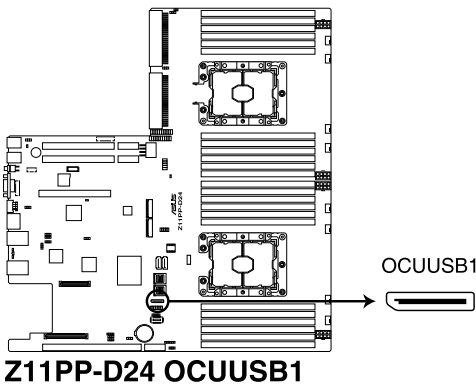
The USB port module is purchased separately.

BIOS Setup

5

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

5.1 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.

5.1.1 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.

5.1.2 ASUS EZ Flash Utility

The ASUS EZ Flash Utility feature allows you to update the BIOS without having to use a DOS-based utility.

> Before you start using this utility, download the latest BIOS from the ASUS website at www.asus.com.

To update the BIOS using EZ Flash Utility:

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

2. Enter the BIOS setup program. Go to the **Tool** menu then select **ASUS EZ Flash Utility**. Press <Enter>.

```
                        ASUS Tek. EzFlash Utility


        Current Platform                         New Platform
Platform  : Z11PP-D24                    Platform  : Z11PP-D24
Version   : 0215                         Version   : 0217
Build date: 01/13/2017                   Build date: 02/20/2017


FS0
FS1



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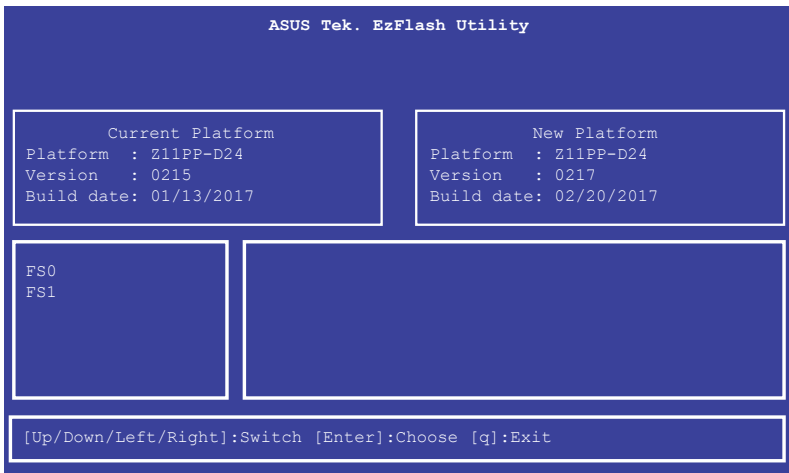
3. Press <Tab> to switch to the **Drive** field.

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, and then press <Enter> to perform the BIOS update process. Reboot the system when the update process is done.

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

> Ensure to load the BIOS default settings to ensure system compatibility and stability. Press <F5> and select **Yes** to load the BIOS default settings.

5.1.3   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 the 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.   Copy the BUPDATER utility (BUPDATER.exe) from the ASUS support website at www.asus.com/support 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
    ```

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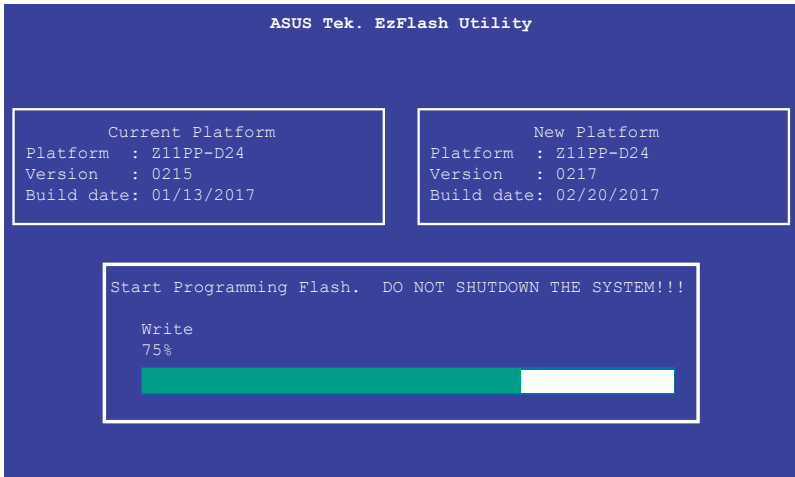
```
                        ASUS Tek. EzFlash Utility



        Current Platform                        New Platform
Platform  : Z11PP-D24                    Platform  : Z11PP-D24
Version   : 0215                         Version   : 0217
Build date: 01/13/2017                   Build date: 02/20/2017



      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!

5. The utility returns to the DOS prompt after the BIOS update process is completed. Reboot the system from the hard disk drive.

```
The BIOS update is finished! Please restart your system.
C:\>
```

5.2   BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section **5.1 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>+<Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and 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.

5.2.1   BIOS menu screen

Menu items   **Menu bar**   **Configuration fields**   **General help**

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
  Main  Advanced  Platform Configuration  Socket Configuration  Event Logs  Server Mgmt      ▶

  BIOS Information                                      Set the Date. Use Tab to
  BIOS Vendor                American Megatrends        switch between Date elements.
  Core Version               5.12                       Default Ranges:
  Compliancy                 UEFI 2.5; PI 1.4           Year: 2005-2099
  Project Version            0203 x64                   Months: 1-12
  Build Date                 01/24/2017                 Days: dependent on month
  RC Revision                116.R01

  Memory Information
  Total Memory               16384 MB

  System Date                [Wed 03/08/2017]
  System Time                [17:55:34]
                                                        ↔: Select Screen
  Access Level               Administrator              ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
  INTEL LAN1 MAC:            00-e0-18-81-01-42          F1: General Help
  INTEL LAN2 MAC:            00-e0-18-81-01-42          F2: Previous Values
                                                        F5: Optimized Defaults
                                                        F10: Save Changes & Reset
                                                        F12: Print Screen
                                                        ESC: Exit


                Version 2.19.1266. Copyright (C) 2017 American Megatrends, Inc.
```

Navigation keys

5.2.2   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
Platform Configuration	For changing the platform settings
Socket Configuration	For changing the socket settings
Event Logs	For changing the event log settings
Server Mgmt	For changing the Server Mgmt settings
Security	For changing the security settings
Boot	For changing the system boot configuration
Tool	For configuring options for special functions
Save & Exit	For selecting the exit options

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

5.2.3   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 (such as Advanced) on the menu bar have their respective menu items.

5.2.4   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 then press <Enter>.

5.2.5   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.

5.2.6   General help

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

5.2.7   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.

5.2.8   Pop-up window

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

5.2.9   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.

5.3 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, time, language, and security settings.

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
    Main  Advanced  Platform Configuration  Socket Configuration  Event Logs  Server Mgmt

    BIOS Information                                          Set the Date. Use Tab to
    BIOS Vendor                 American Megatrends           switch between Date elements.
    Core Version                5.12                          Default Ranges:
    Compliancy                  UEFI 2.5; PI 1.4              Year: 2005-2099
    Project Version             0203 x64                      Months: 1-12
    Build Date                  01/24/2017                    Days: dependent on month
    RC Revision                 116.R01

    Memory Information
    Total Memory                16384 MB

    System Date                 [Wed 03/08/2017]
    System Time                 [17:55:34]
                                                              →←: Select Screen
    Access Level                Administrator                 ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
    INTEL LAN1 MAC:             00-e0-18-81-01-42             F1: General Help
    INTEL LAN2 MAC:             00-e0-18-81-01-42             F2: Previous Values
                                                              F5: Optimized Defaults
                                                              F10: Save Changes & Reset
                                                              F12: Print Screen
                                                              ESC: Exit


              Version 2.19.1266. Copyright (C) 2017 American Megatrends, Inc.
```

5.3.1 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

5.3.2 System Time [xx:xx:xx]

Allows you to set the system time.

5.4   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) 2017 American Megatrends, Inc.
      Main  Advanced  Platform Configuration  Socket Configuration  Event Logs  Server Mgmt      ▶

 ▶ Trusted Computing                                             Trusted Computing Settings
 ▶ ACPI Settings
 ▶ Super IO Configuration
 ▶ Onboard LAN Configuration
 ▶ Serial Port Console Redirection
 ▶ APM
 ▶ PCI Subsystem Settings
 ▶ Network Stack Configuration
 ▶ CSM Configuration
 ▶ NVMe Configuration
 ▶ USB Configuration

 ▶ iSCSI Configuration
 ▶ Intel(R) Virtual RAID on CPU
                                                               ▶←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F5: Optimized Defaults
                                                               F10: Save Changes & Reset
                                                               F12: Print Screen
                                                               ESC: Exit


              Version 2.19.1266. Copyright (C) 2017 American Megatrends, Inc.
```

5.4.1 Trusted Computing

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
        Advanced
┌──────────────────────────────────────────────────┬──────────────────────────────┐
│ Configuration                                      │ Enables or Disables BIOS     │
│   Security Device Support           [Enable]       │ support for security device. │
│   NO Security Device Found                         │ O.S. will not show Security  │
│                                                    │ Device. TCG EFI protocol and │
│                                                    │ INT1A interface will not be  │
│                                                    │ available.                   │
│                                                    │                              │
└──────────────────────────────────────────────────┴──────────────────────────────┘
```

Configuration

Security Device Support [Disabled]

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

5.4.2 ACPI Settings

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
        Advanced
┌──────────────────────────────────────────────────┬──────────────────────────────┐
│ ACPI Settings                                      │ Enables or Disables BIOS ACPI│
│                                                    │ Auto Configuration.          │
│ Enable ACPI Auto Configuration      [Disabled]     │                              │
│                                                    │                              │
│ Enable Hibernation                  [Enabled]      │                              │
│                                                    │                              │
│                                                    │                              │
│                                                    │                              │
└──────────────────────────────────────────────────┴──────────────────────────────┘
```
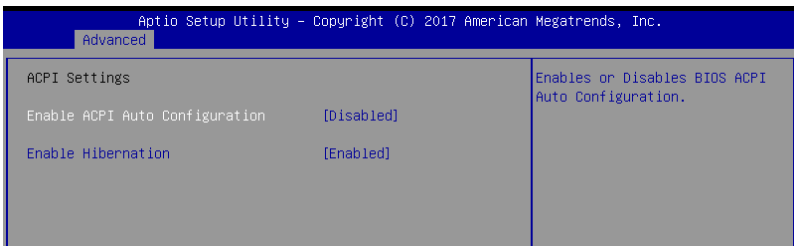
Enable ACPI Auto Configuration [Disabled]

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

Enable Hibernation [Enabled]

Allows you to enable or disable the ability of the system to hibernate (OS/Sleep State).
Configuration options: [Disabled] [Enabled]

This option may be not effective with some OS.

5.4.3   Super IO Configuration

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
        Advanced

   Super IO Configuration                                    Set Parameters of Serial Port
                                                             1 (COMA)
   Super IO Chip                        NCT6793D
 ▶ Serial Port 1 Configuration
```
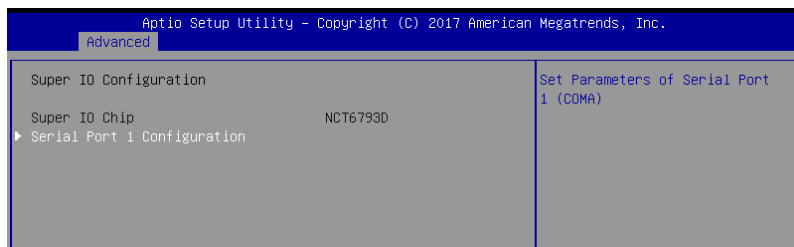
Serial Port 1 Configuration

Allows you to set the parameters of Serial Port 1.

Serial Port [Enabled]

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

> The following item appears only when you set **Serial Port** to **[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;]

5.4.4 Onboard LAN I350 IO Configuration

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
      Advanced

   Onboard LAN Configuration                                    Intel LAN Enable/Disable

   INTEL LAN1 MAC:              00-e0-18-81-01-42
   INTEL LAN2 MAC:              00-e0-18-81-01-42
   Intel LAN1 Enable           [Enabled]
   Intel LAN1 ROM Type         [PXE]
   Intel LAN2 Enable           [Enabled]
   Intel LAN2 ROM Type         [Disabled]
```
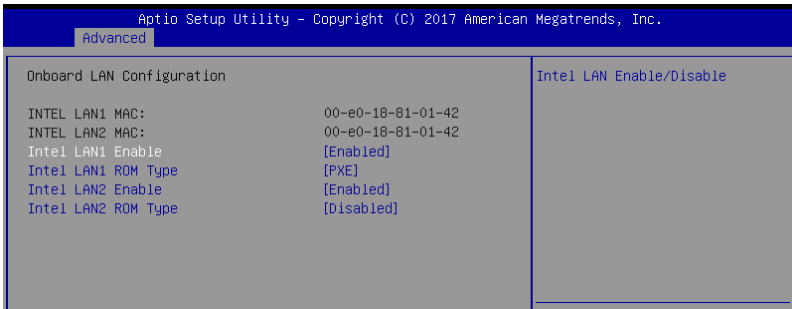
Intel LAN1 Enable [Enabled]

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

The following items appear only when **Intel LAN1 Enable** is set to **[Enabled]**.

Intel LAN 1 ROM Type [PXE]

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

Intel LAN2 Enable [Enabled]

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

The following items appear only when **Intel LAN2 Enable** is set to **[Enabled]**.

Intel LAN 2 ROM Type [Disabled]

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

5.4.5 Serial Port Console Redirection

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
         Advanced

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

   COM2
   Console Redirection                    [Disabled]
 ▶ Console Redirection Settings

   Legacy Console Redirection
 ▶ Legacy Console Redirection Settings

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

COM1/COM2

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]**.

Console Redirection Settings

These items become 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.

Terminal Type [VT-UTF8]

Allows you to set the terminal type.

[VT100]   ASCII char set.
[VT100+]   Extends VT100 to support color, function keys, etc.
[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]

This allows you to enable the VT -UTF8 Combination 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]

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

Putty Keypad [VT100]

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

Redirection After BIOS POST [Always Enable]

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

Legacy Console Redirection Settings

Legacy Console Redirection Port [COM1]

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

Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

Console Redirection [Disabled]

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

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

Console Redirection Settings

Out-of-Band Mgmt Port [COM1]

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

Terminal Type [VT-UTF8]

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.
Configuration options: [VT100] [VT100+] [VT-UTF8] [ANSI]

Bits per second [115200]

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.
Configuration options: [9600] [19200] [57600] [115200]

Flow Control [None]

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.
Configuration options: [None] [Hardware RTS/CTS] [Software Xon/Xoff]

5.4.6 APM

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

```
                 Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
      Advanced

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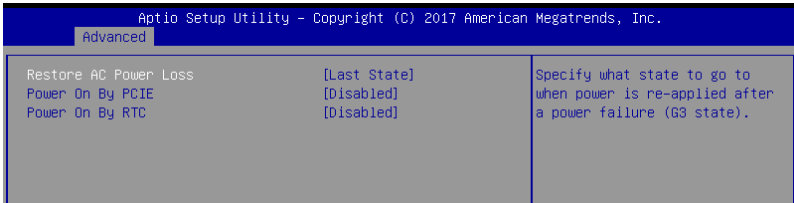
Restore AC Power Loss [Last State]

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 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 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.

5.4.7   PCI Subsystem Settings

Allows you to configure PCI, PCI-X, and PCI Express Settings.

```
             Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
       Advanced

  PCI Devices Common Settings:                           Enables or Disables 64bit
  Above 4G Decoding                  [Disabled]          capable Devices to be Decoded
  SR-IOV Support                     [Enabled]           in Above 4G Address Space
                                                         (Only if System Supports 64
                                                         bit PCI Decoding).

▶ PCIE OPROM Slot Options
```
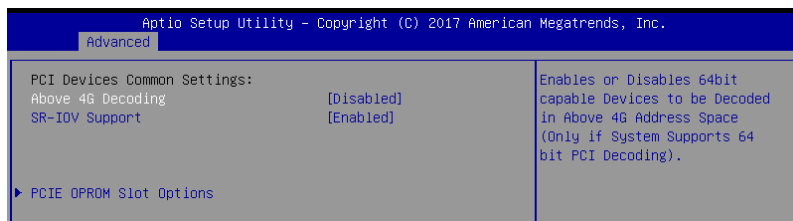
Above 4G Decoding [Disabled]

Allows you to enable or disable 64-bit capable devices to be decoded in above 4G address space. It only works if the system supports 64-bit PCI decoding.
Configuration options: [Disabled] [Enabled]

SR-IOV Support [Disabled]

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

PCIE OPROM Slot Options

PCIE1-3 Slot OPROM [Enabled]

This option allows you to enable or disable the OPROM of the PCIe slots.
Configuration options: [Disabled] [Enabled]

MEZZ1 Slot OPROM [Enabled]

This option allows you to enable or disable the OPROM of the MEZZ slot.
Configuration options: [Disabled] [Enabled]

5.4.8   Network Stack Configuration

```
             Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
      Advanced

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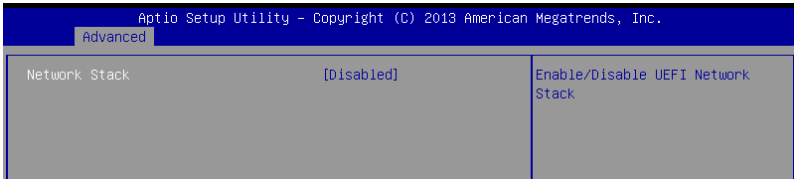
Network stack [Disabled]

Enables or disables the network stack feature.
Configuration options: [Disable] [Enable]

> The following item appears only when **Network stack** is set to **[Enabled]**.

Ipv4 PXE Support [Disabled]

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

Ipv4 HTTP Support [Disabled]

Enables or disables the Ipv4 HTTP Boot Support. If disabled, Ipv4 HTTP boot option will not be created.
Configuration options: [Disabled] [Enabled]

Ipv6 PXE Support [Disabled]

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

Ipv6 HTTP Support [Disabled]

Enables or disables the Ipv6 HTTP Boot Support. If disabled, Ipv6 HTTP boot option will not be created.
Configuration options: [Disabled] [Enabled]

PXE boot wait time [0]

Wait time to press ESC key to abort the PXE boot.

Media detect time [1]

Wait time (in seconds) to detect media.

5.4.9   CSM Configuration

```
              Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
        Advanced

   Compatibility Support Module Configuration              Enable/Disable CSM Support.

   CSM Support                          [Enabled]

   CSM16 Module Version                 07.81

   GateA20 Active                       [Upon Request]
   Option ROM Messages                  [Force BIOS]
   INT19 Trap Response                  [Immediate]

   Boot option filter                   [Legacy only]

   Option ROM execution
                                                         ↔: Select Screen
   Network                              [Legacy]         ↑↓: Select Item
   Storage                              [Legacy]         Enter: Select
   Video                                [Legacy]         +/-: Change Opt.
   Other PCI devices                    [Legacy]         F1: General Help
                                                         F2: Previous Values
```

CSM Support [Enabled]

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

> The following item appears only when **CSM Support** is set to **[Enabled]**.

GateA20 Active [Upon Request]

This allows you to set the GA20 option.
Configuration options: [Upon Request] [Always]

Option ROM Messages [Force BIOS]

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

INT19 Trap Response [Immediate]

[Immediate]   Execute the trap right away.
[Postponed]   Execute the trap during legacy boot.

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]

5.4.10 NVMe Configuration

This page will display the NVMe controller and drive information.

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
        Advanced

 NVMe controller and Drive information

 No NVME Device Found
```

5.4.11 USB Configuration

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
        Advanced

 USB Configuration                                    Enables Legacy USB support.
                                                      AUTO option disables legacy
 USB Module Version                   17              support if no USB devices are
                                                      connected. DISABLE option will
 USB Controllers:                                     keep USB devices available
     1 XHCI                                           only for EFI applications.
 USB Devices:
     6 Drives, 2 Keyboards, 2 Mice, 2 Hubs

 Legacy USB Support                   [Enabled]
 USB Mass Storage Driver Support      [Enabled]

                                                      ↔: Select Screen
 Mass Storage Devices:                                ↑↓: Select Item
 JetFlashTranscend 4GB 8.07           [Auto]          Enter: Select
 AMI Virtual CDROM0 1.00              [Auto]          +/-: Change Opt.
 AMI Virtual Floppy0 1.00             [Auto]          F1: General Help
 AMI Virtual HDisk0 1.00              [Auto]          F2: Previous Values
 AMI Virtual CDROM1 1.00              [Auto]          F5: Optimized Defaults
 AMI Virtual CDROM2 1.00              [Auto]          F10: Save Changes & Reset
```

Legacy USB Support [Enabled]

Allows you to enable or disable Legacy USB device support.
Configuration options: [Enabled] [Disabled] [Auto]

USB Mass Storage Driver Support [Enabled]

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

Mass Storage Devices

AMI Virtual CDROM0-2 / Floppy / HDisk0 1.00 [Auto]

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

5.4.12 iSCSI Configuration

Allows you to configure the iSCSi parameters.

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
      Advanced

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

 ▶ Change Attempt Order
```
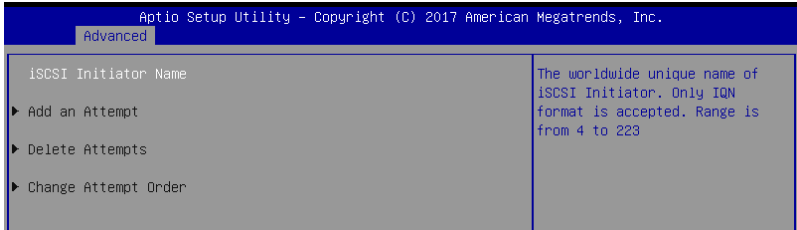
5.4.13 Intel(R) RSTe RAID Controller

Allows you to configure the view the RAID volumes and VMD controllers on the system.

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
      Advanced

  Intel(R) VROC with VMD Technology 5.0.0.1156

  No RAID volumes on the system

  No Intel VMD Controllers on the sy
```
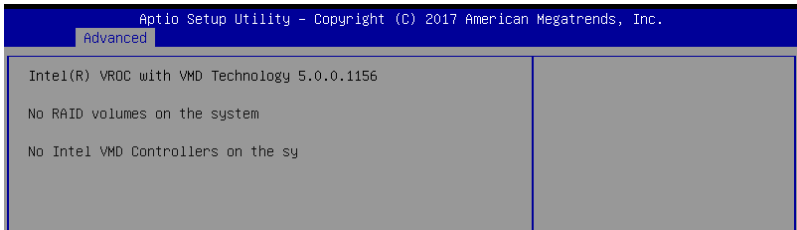
5.5 Platform Configuration menu

The IntelRCSetup menu items allow you to change the platform settings.

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
      Main  Advanced  Platform Configuration  Socket Configuration  Event Logs  Server Mgmt    ▶

 ▶ PCH Configuration                               Displays and provides option
 ▶ Miscellaneous Configuration                     to change the PCH Settings
 ▶ Server ME Configuration
 ▶ Runtime Error Logging

 -------------------------------------------------
 Setup Warning:
 Setting items on this Screen to incorrect values
 may cause system to malfunction!
```

5.5.1 PCH Configuration

```
          Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
                    Platform Configuration

  PCH Configuration                              Enable/Disable Intel(R) IO
  ---------------------------------------------  Controller Hub devices

▶ PCH Devices
▶ PCI Express Configuration
▶ PCH SATA Configuration
▶ PCH sSATA Configuration
▶ USB Configuration
▶ Security Configuration
```

PCH Devices

Board Capability [DeepSx]

[SUS_PWR_DN_ACK]   Send.

[DeepSx]   Show DeepSx Policies.

DeepSx Power Policies [Disabled]

Allows you to configure the DeepSx Mode configuration.
Configuration options: [Disabled] [Enabled in S5] [Enabled in S4 and S5]

GP27 Wake From DeepSx [Disabled]

Allows you to enable or disable GP27 Wake From DeepSx.
Configuration options: [Disabled] [Enabled]

PCI Express Configuration

PCI-E ASPM Support (Global) [L1 Only]

Allows you to select ASPM support for all downstream devices.
Configuration options: [Per individual port] [L1 Only]

PCH DMI ASPM [Platform-POR]

Allows you to configure the PCH DMI ASPM.
Configuration options: [Platform-POR] [ASPM L1] [Disabled]

PCH SATA Configuration

SATA Controller [Enabled]

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

Configure sSATA as [AHCI]

Allows you to identify the SATA port connected to Solid State Drive or Hard Disk Drive.
Configuration options: [IDE] [AHCI] [RAID]

Support Aggressive Link Power Management [Enabled]

Allows you to enable or disable the Support Aggressive Link Power (SALP) Management.
Configuration options: [Disabled] [Enabled]

SATA Port 0-7

> **Port 0-7**
> Allows you to enable or disable the SATA port.
> Configuration options: [Disabled] [Enabled]

PCH sSATA Configuration

sSATA Controller [Enabled]

Allows you to enable or disable the sSATA Controller.
Configuration options: [Disabled] [Enabled]

Configure sSATA as [AHCI]

Allows you to identify the SATA port connected to Solid State Drive or Hard Disk Drive.
Configuration options: [IDE] [AHCI] [RAID]

Support Aggressive Link Power Management [Enabled]

Allows you to enable or disable the Support Aggressive Link Power (SALP)
Management.
Configuration options: [Disabled] [Enabled]

sSATA Port 0-2

> **Port 0-2**
> Allows you to enable or disable the SATA port.
> Configuration options: [Disabled] [Enabled]

USB Configuration

USB Precondition [Disabled]

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

XHCI Manual Mode [Disabled]

This option is used by validation.
Configuration options: [Disabled] [Enabled]

> The following items appears only when the **XHCI Manual Mode** is set to **[Enabled]**.

> **Trunk Clock Gating (BTCG) [Enabled]**
> Allows you to enable or disable BTCG.
> Configuration options: [Disabled] [Enabled]

> **Enable USB 3.0 pins [Disable all pins]**
> Allows you to enable or disable USB 3.0 pins or on a per pin basis.
> Configuration options: [Select Per-Pin] [Disable all pins] [Enable all pins]

USB Per-Connector Disable [Disabled]

Allows you to enable or disable each of the USB physical connectors. Once a
connector is disabled, any USB devices plugged into the connector will not be detected
by BIOS or OS.
Configuration options: [Disabled] [Enabled]

The following items appears only when the **USB Per-Connector Disable** is set to **[Enabled]**.

USB HS Physical Connector #0-13 Disable [Enabled]
Configuration options: [Disabled] [Enabled]

USB SS Physical Connector #0-9 Disable [Enabled]
Configuration options: [Disabled] [Enabled]

Security Configuration

SMM BIOS Write Protect [Enabled]

Allows you to enable or disable SMM BIOS Write Protect.
Configuration options: [Disabled] [Enabled]

5.5.2   Miscellaneous Configuration

```
          Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
                    Platform Configuration

  Miscellaneous Configuration                               Select active Video type
  -----------------------------------------------

  Active Video                        [Offboard Device]
  PMTT ACPI Table                     [Disable]
```

Active Video [Offboard Device]

Allows you to select the video type.
Configuration options: [Auto] [Onboard Device] [Offboard Device]

PMTT ACPI Table [Disabled]

Allows you to enable or disable PMTT ACPI Table for DDR4 only.
Configuration options: [Disabled] [Enabled]

5.5.3   Server ME Configuration

Displays the Server ME Technology parameters on your system.

```
          Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
                    Platform Configuration

  General ME Configuration
  Oper. Firmware Version              0A:4.0.3.137
  Backup Firmware Version             0A:4.0.3.137
  Recovery Firmware Version           0A:4.0.3.137
  ME Firmware Status #1               0x000F0245
  ME Firmware Status #2               0x88116006
    Current State                     Operational
  ME Firmware Features                SiEn
```
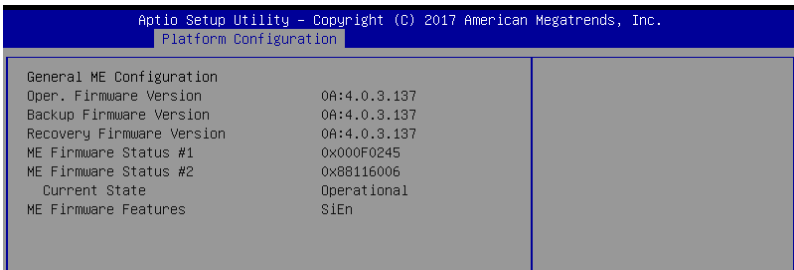
5.5.4   Runtime Error Logging Support

```
           Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
                   Platform Configuration

  Runtime Error Logging                                    System Error Enable/Disable
  -------------------------------------------------        setup options.
  System Errors                         [Enable]
▶ Whea Settings
```
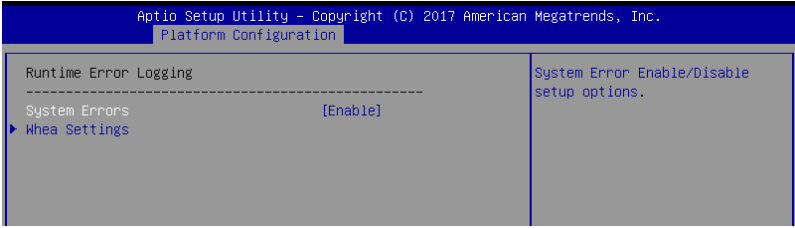
Runtime Error Logging

System Errors [Enabled]

This item allows you to enable or disable System Errors.
Configuration options: [Disabled] [Enabled]

Whea Settings

Whea Support [Disabled]

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

5.6   Socket Configuration menu

The IntelRCSetup menu items allow you to change the socket settings.

```
           Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
     Main   Advanced   Platform Configuration   Socket Configuration   Event Logs   Server Mgmt      ▶

  ▶ Processor Configuration                                Displays and provides option
  ▶ Common RefCode Configuration                           to change the Processor
  ▶ UPI Configuration                                      Settings
  ▶ Memory Configuration
  ▶ IIO Configuration
  ▶ Advanced Power Management Configuration
```

5.6.1 Processor Configuration

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
                                   Socket Configuration
  ┌─────────────────────────────────────────────────────┬──────────────────────────┐
  │ Processor Configuration                            ▲ │ Enables Hyper Threading  │
  │ -------------------------------------------------    │ (Software Method to      │
  │ Processor BSP Revision         50652 - SKX B0        │ Enable/Disable Logical   │
  │ Processor Socket               Socket 1    Socket 2  │ Processor threads.       │
  │ Processor ID                   00050652* |    N/A    │                          │
  │ Processor Frequency            1.600GHz  |    N/A    │                          │
  │ Processor Max Ratio                 10H  |    N/A    │                          │
  │ Processor Min Ratio                 08H  |    N/A    │                          │
  │ Microcode Revision             80000034             │                          │
  │ L1 Cache RAM                      64KB  |    N/A     │                          │
  │ L2 Cache RAM                    1024KB  |    N/A     │                          │
  │ L3 Cache RAM                   11264KB  |    N/A     │                          │
  │ Processor 1 Version            Genuine Intel(R) CPU 00                          │
  │                                00%@                  │ ←→: Select Screen        │
  │ Processor 2 Version            Not Present           │ ↑↓: Select Item          │
  │                                                     │ Enter: Select            │
  │                                                     │ +/-: Change Opt.         │
  │ Hyper-Threading [ALL]          [Enable]             │ F1: General Help         │
  │ Execute Disable Bit            [Enable]             │ F2: Previous Values      │
  │ Enable Intel(R) TXT            [Disable]            │ F5: Optimized Defaults   │
  │ VMX                            [Enable]             │ F10: Save Changes & Reset│
  │ Enable SMX                     [Disable]            │ F12: Print Screen        │
  │ Hardware Prefetcher            [Enable]             │ ESC: Exit                │
  │ Adjacent Cache Prefetch        [Enable]             │                          │
  │ DCU Streamer Prefetcher        [Enable]           ▼ │                          │
  └─────────────────────────────────────────────────────┴──────────────────────────┘
              Version 2.19.1266. Copyright (C) 2017 American Megatrends, Inc.
```

Hyper Threading [Enabled]

Allows you to enable or disable the Hyper-Threading Technology function. When disabled, only one thread per activated core is enabled.
Configuration options: [Disabled] [Enabled]

Execute Disable Bit [Enabled]

XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, Redhat Enterprise 3 Update 3).
Configuration options: [Disabled] [Enabled]

Enable Intel(R) TXT Support [Disabled]

Forces the XD feature log to always return 0 when disabled.
Configuration options: [Disabled] [Enabled]

VMX [Enabled]

Enables the Vanderpool Technology. Takes effect after reboot.
Configuration options: [Disabled] [Enabled]

Enable SMX [Disabled]

Enables the Safer Mode Extensions.
Configuration options: [Disabled] [Enabled]

Hardware Prefetcher [Enabled]

This Item allows you to turn on/off the mid level cache(L2) streamer prefetcher.
Configuration options: [Disabled] [Enabled]

Adjacent Cache Prefetch [Enabled]

This Item allows you to turn on/off prefetching of adjacent cache lines.
Configuration options: [Disabled] [Enabled]

DCU Streamer Prefetcher [Enabled]

This Item allows you to enable or disable prefetcher of next L1 data line.
Configuration options: [Disabled] [Enabled]

DCU IP Prefetcher [Enabled]

This Item allows you to enable or disable prefetch of next L1 line based upon sequential load history.
Configuration options: [Disabled] [Enabled]

LLC Prefetch [Disabled]

This Item allows you to enable or disable LLC Prefetch on all threads.
Configuration options: [Disabled] [Enabled]

DCU Mode [32K 8Way Without ECC]

Configuration options: [32K 8Way Without ECC] [16K 4Way With ECC]

Extended APIC [Disabled]

This Item allows you to enable or disable the extended APIC support.
Configuration options: [Disabled] [Enabled]

AES-NI [Enabled]

This Item allows you to enable or disable the AES-NI support.
Configuration options: [Disabled] [Enabled]

5.6.2   Common RefCode Configuration

```
          Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
                                    Socket Configuration

    Common RefCode Configuration                        Enable or Disable Non uniform
    ------------------------------------------------     Memory Access (NUMA).
    Numa                              [Enable]
```
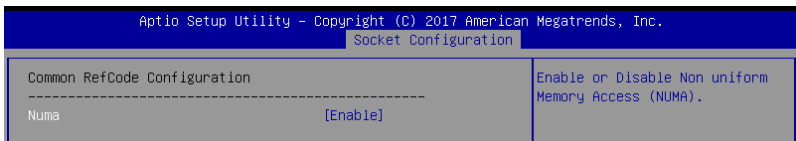
Numa [Enabled]

This item enables or disables the Non uniform Memory Access (NUMA).
Configuration options: [Disabled] [Enabled]

5.6.3   UPI Configuration

```
                                          Socket Configuration

 UPI General Configuration                             UPI Status Help
 ------------------------------------------------
▶ UPI Status
 Link Speed Mode                     [Fast]
 Link Frequency Select               [Auto]
 Link L0p Enable                     [Auto]
 Link L1 Enable                      [Auto]
 Stale AtoS                          [Disable]
 LLC dead line alloc                 [Enable]
```
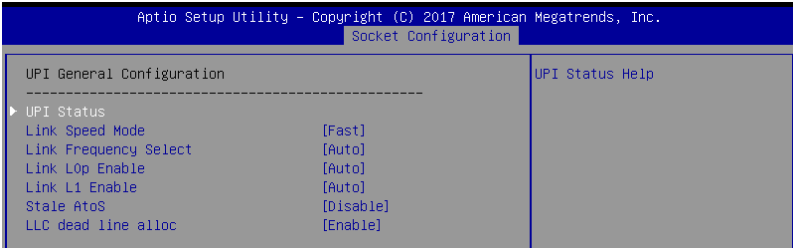
UPI General Configuration

UPI Status

This item displays information about the UPI status.

Link Speed Mode [Fast]

This item allows you to select the UPI link speed as either the fast mode or slow mode.
Configuration options: [Slow] [Fast]

Link Frequency Select [Auto]

This item allows for selecting the UPI link frequency.
Configuration options: [Auto] [9.6 GB/s] [10.4 GB/s] [Use Per Link Setting]

UPI Link0p Enable [Enabled]

Configuration options: [Disabled] [Enabled] [Auto]

UPI Link1 Enable [Enabled]

Configuration options: [Disabled] [Enabled] [Auto]

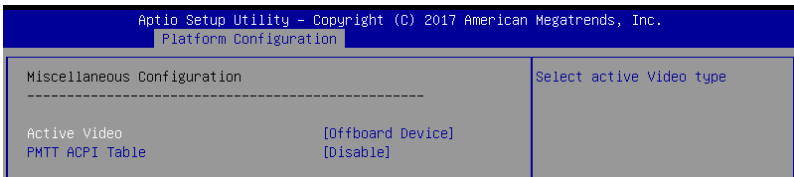### Stale AtoS [Disabled]

Configuration options: [Disabled] [Enabled] [Auto]

LLC dead line alloc [Enabled]

Configuration options: [Disabled] [Enabled] [Auto]

5.6.4   Memory Configuration

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
                                      Socket Configuration

                                                              Enable - Enforces Plan Of
                                                              Record restrictions for DDR4
    -------------------------------------------------         frequency and voltage
    Integrated Memory Controller (iMC)                        programming. Disable -
    -------------------------------------------------         Disables this feature. Auto -
                                                              Sets it to the MRC default
    Enforce POR                        [Auto]                 setting; current default is
    Memory Frequency                   [Auto]                 Enable.
    Data Scrambling for DDR4           [Auto]
  ▶ Memory Topology
  ▶ Page Policy
  ▶ Memory Map
  ▶ Memory RAS Configuration
```

Enforce POR [Auto]

Allows you to enforce POR restrictions for DDR4 frequency and voltage programming.
Configuration options: [Auto] [POR] [Disabled]

Memory Frequency [Auto]

Allows you to select the memory frequency setting.
Configuration options: [Auto] [1800] - [3000-OvrClk]

Data Scrambling for DDR4 [Auto]

Allows you to enable or disable data scrambling.
Configuration options: [Auto] [Disabled] [Enabled]

Memory Topology

Displays memory topology with DIMM population information.

Page Policy

Allows you to configure Page Policy settings.

Page Policy [Disabled]

Configuration options: [Auto] [Closed] [Adaptive]

Memory Map

IMC Interleaving [Auto]

Select different IMC interleaving setting.
Configuration options: [Auto] [1-way Interleave] [2-way Interleave]

Channel Interleaving [Auto]

Select different channel interleaving setting.
Configuration options: [Auto] [1-way Interleave] [2-way Interleave]
                                 [3-way Interleave]

Rank Interleaving [Auto]

Select different rank interleaving setting.
Configuration options: [Auto] [1-way Interleave] [2-way Interleave]
[4-way Interleave] [8-way Interleave]

Memory RAS Configuration

Mirror Mode [Disabled]

Allows you to select Mirror Modes. Mirror Mode will set entire 1LM/2LM memory in system to be mirrored, consequently reducing the memory capacity by half. Enabling Mirror Mode will disable XPT Prefetch.
Configuration options: [Disabled] [Mirror Mode 1LM] [Mirror Mode 2LM]

UEFI ARM Mirror [Disabled]

Allows you to enable or disable UEFI ARM Mirror.
Configuration options: [Disabled] [Enabled]

Memory Rank Sparing [Disabled]

Allows you to enable or disable Memory Rank Sparing
Configuration options: [Disabled] [Enabled]

Patrol Scrub [Enabled]

Allows you to enable or disable Patrol Scrub.
Configuration options: [Disabled] [Enabled]

5.6.5   IIO Configuration

```
              Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
                                    Socket Configuration

   IIO Configuration
   ------------------------------------------------

 ▶ Socket1 Configuration
 ▶ Intel® VT for Directed I/O (VT-d)
 ▶ Intel® VMD technology

    IIO-PCIE Express Global Options
   ========================================
   Pcie Relaxed Ordering                    [Enable]
```
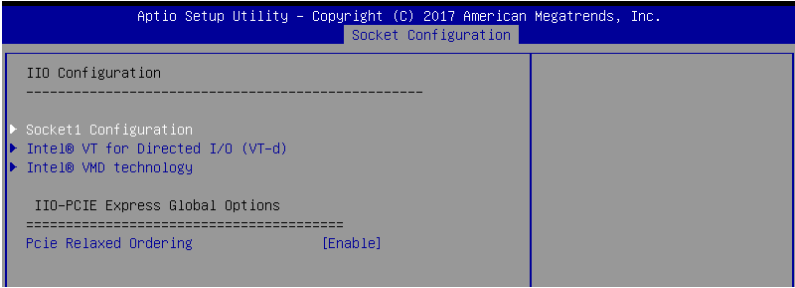
Socket Configuration

PCIE1 / PCIE2 / MEZZPCIE1 Option ROM [Enabled]

Allows you to enable or disable the PCIE1 / PCIE2 / MEZZPCIE1 Option ROM.
Configuration options: [Disabled] [Enabled]

Intel(R) VT for Directed I/O (VT-d)

Intel(R) VT for Directed I/O (VT-d) [Disabled]

Allows you to enable or disable the Intel Virtualization Technology for Directed I/O.
Configuration options: [Disabled] [Enabled]

Intel(R) VMD Technology

Intel(R) VMD for Volume Management Device on Socket 0-3

Allows you to enable or disable the Intel(R) VMD for Volume Management Device
Technology on a specific stack.
Configuration options: [Disabled] [Enabled]

PCI Express Global Options

PCIE relaxed Ordering [Enabled]

Allows you to enable or disable PCIE relaxed Ordering.
Configuration options: [Disabled] [Enabled]

5.6.6 Advanced Power Management Configuration

```
         Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
                              Socket Configuration

    Advanced Power Management Configuration            P State Control Configuration
    --------------------------------------------       Sub Menu, include Turbo, XE
  ▶ CPU P State Control                                and etc.
  ▶ Hardware PM State Control
  ▶ CPU C State Control
  ▶ Package C State Control
  ▶ CPU Thermal Management
```
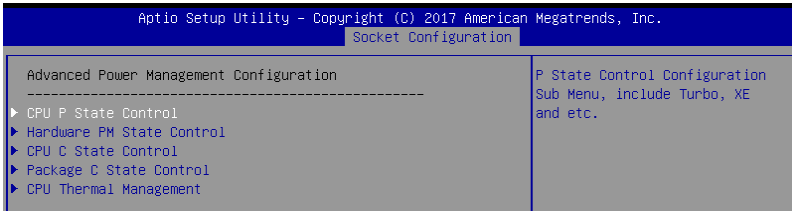
CPU P State Control

Boot performance mode [Max Performance]

Allows you to switch between Boot performance mode.
Configuration options: [Max Performance] [Max Efficient] [Set by Intel Node Manager]

Energy Efficient Turbo [Enabled]

Allows you to enable or disable Energy Efficient Turbo.
Configuration options: [Disabled] [Enabled]

Turbo Mode [Enabled]

Allows you to enable or disable Turbo Mode.
Configuration options: [Disabled] [Enabled]

Hardware PM State Control

Hardware P-States [Native Mode]

Allows you to switch between Hardware P-States mode.
Configuration options: [Disabled] [Native Mode] [Out of Band Mode] [Native Mode with
                       no Legacy Support]

CPI C State Control

Autonomous Core C-State [Disabled]

Allows you to enable or disable Autonomous Core C-State Report.
Configuration options: [Disabled] [Enabled]

CPU C6 Report [Auto]

Allows you to select CPU C6 Report.
Configuration options: [Disabled] [Enabled] [Auto]

OS ACPI Cx [ACPI C2]

Allows you to select OS ACPI Cx Report.
Configuration options: [ACPI C2] [ACPI C3]

Package C State Control

Package C State [Auto]

Allows you to select Package C State.
Configuration options: [C0/C1 state] [C2 state] [C6(non Retention state] [C6(Retention state] [No Limit] [Auto]

CPI Thermal Control

CPI T-State Control

Software Controlled T-States [Disabled]

Allows you to enable or disable Software Controlled T-States.
Configuration options: [Disabled] [Enabled]

5.7   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) 2017 American Megatrends, Inc.
     Main  Advanced  Platform Configuration  Socket Configuration  Event Logs  Server Mgmt

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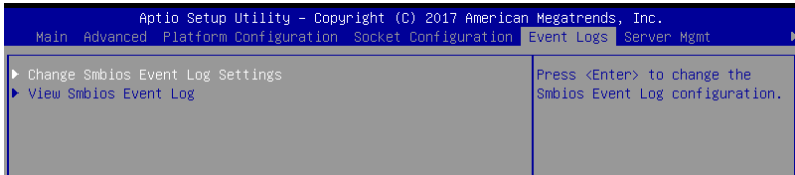
5.7.1   Change Smbios Event Log Settings

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

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]

5.7.2   View Smbios Event Log

Press <Enter> to view all smbios event logs.

5.8 Server Mgmt menu

The Server Management menu displays the server management status and allows you to change the settings.

```
            Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
      Main  Advanced  Platform Configuration  Socket Configuration  Event Logs  Server Mgmt        ▶

   BMC Self Test Status               PASSED                    If enabled, starts a BIOS
   BMC Device ID                      32                        timer which can only be shut
   BMC Device Revision                1                         off by Management Software
   BMC Firmware Revision              1.01                      after the OS loads.  Helps
   IPMI Version                       2.0                       determine that the OS
                                                                successfully loaded or follows
   OS Watchdog Timer                  [Disabled]                the OS Boot Watchdog Timer
   OS Wtd Timer Timeout               [10 minutes]              policy.
   OS Wtd Timer Policy                [Reset]
 ▶ System Event Log
 ▶ BMC network configuration
 ▶ View System Event Log
```

OS Watchdog Timer [Disabled]

This item allows you to start a BIOS timer which can only be shut off by Intel Management Software after the OS loads.
Configuration options: [Disabled] [Enabled]

🖉   The following items is configurable only when the **OS Watchdog Timer** is set to **[Enabled]**.

OS Wtd Timer Timeout [10 minutes]

Allows you to configure the length fo the OS Boot Watchdog Timer.
Configuration options: [5 minutes] [10 minutes] [15 minutes] [20 minutes]

OS Wtd Timer Policy [Reset]

This item allows you to configure the how the system should respond if the OS Boot Watch Timer expires.
Configuration options: [Do Nothing] [Reset] [Power Down]

System Event Log

Allows you to change the SEL event log configuration.

Erase SEL [No]

Allows you to choose options for erasing SEL.
Configuration options: [No] [Yes, On next reset] [Yes, On every reset]

When SEL is Full [Do Nothing]

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

BMC network configuration

The sub-items in this configuration allow you to configure the BMC network parameters.

View System Event Log

This item allows you to view the system event log records.

5.9 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) 2017 American Megatrends, Inc.
     Security  Boot  Tool  Save & Exit

  Password Description                                Set Administrator Password

  If ONLY the Administrator's password is set,
  then this only limits access to Setup and is
  only asked for when entering Setup.
  If ONLY the User's password is set, then this
  is a power on password and must be entered to
  boot or enter Setup. In Setup the User will
  have Administrator rights.
  The password length must be
  in the following range:
  Minimum length                      3
  Maximum length                      20
                                                      →←: Select Screen
                                                      ↑↓: Select Item
  Administrator Password                              Enter: Select
  User Password                                       +/-: Change Opt.
                                                      F1: General Help
▶ Secure Boot                                         F2: Previous Values
                                                      F5: Optimized Defaults
                                                      F10: Save Changes & Reset
                                                      F12: Print Screen
                                                      ESC: Exit
```

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

This item allows you to customize the Secure Boot settings.

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
     Security

     System Mode                    Setup                  Secure Boot activated when
     Secure Boot                    Not Active             Platform Key(PK) is enrolled,
     Vendor Keys                    Active                 System mode is User/Deployed,
                                                           and CSM function is disabled
     Attempt Secure Boot            [Disabled]
     Secure Boot Mode               [Custom]
   ▶ Key Management
```

Attempt Secure Boot [Disabled]

Secure Boot can be enabled if the system is running in User mode with enrolled platform Key (EPK) or if the CSM function is disabled.
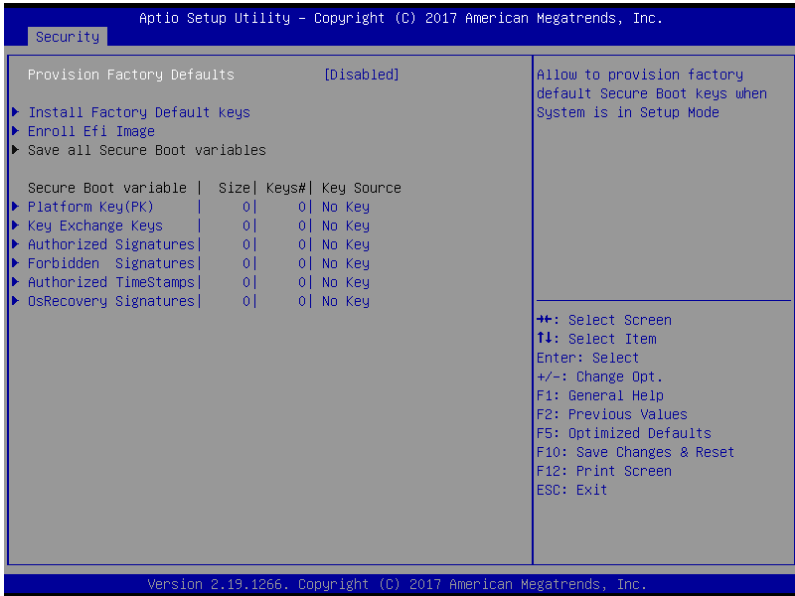Configuration options: [Disabled] [Enabled]

Secure Boot Mode [Custom]

Allows you to set the Secure Boot selector.
Configuration options: [Custom] [Standard]

Key Management

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

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
   Security

   Provision Factory Defaults          [Disabled]          Allow to provision factory
                                                            default Secure Boot keys when
 ▶ Install Factory Default keys                             System is in Setup Mode
 ▶ Enroll Efi Image
 ▶ Save all Secure Boot variables

   Secure Boot variable | Size| Keys#| Key Source
 ▶ Platform Key(PK)     |    0|    0| No Key
 ▶ Key Exchange Keys    |    0|    0| No Key
 ▶ Authorized Signatures|    0|    0| No Key
 ▶ Forbidden  Signatures|    0|    0| No Key
 ▶ Authorized TimeStamps|    0|    0| No Key
 ▶ OsRecovery Signatures|    0|    0| No Key
                                                           ➜←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F5: Optimized Defaults
                                                           F10: Save Changes & Reset
                                                           F12: Print Screen
                                                           ESC: Exit

              Version 2.19.1266. Copyright (C) 2017 American Megatrends, Inc.
```

Provision Factory Defaults [Disabled]

Allows you to provision factory default Secure Boot keys when the system is in Setup Mode.
Configuration options: [Disabled] [Enabled]

Install Factory Default keys

This item will install all Factory Default keys.

Enroll Efi Image

This item will allow the image to run in Secure Boot mode.
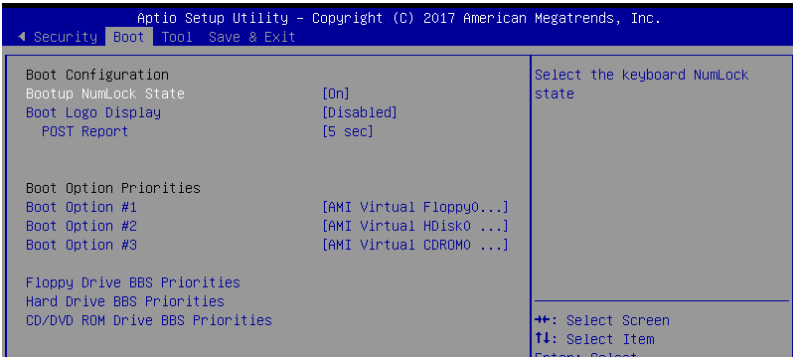
Save All Secure Boot Variables

This item will ask you if you want to save all secure boot variables. Select Yes if you want to save all secure boot variables, otherwise select No.

Platform Key (PK) / Key Exchange Key (KEK) / Authorized Signatures (DB) / Forbidden Signatures (DBX) / Authorized TimeStamps (DBT) / OsRecovery Signatures

Configuration options: [Erase] [Set New] [Save to File]

5.10   Boot menu

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

```
         Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
     ◄ Security  Boot  Tool  Save & Exit

     Boot Configuration                                    Select the keyboard NumLock
     Bootup NumLock State            [On]                  state
     Boot Logo Display               [Disabled]
       POST Report                   [5 sec]


     Boot Option Priorities
     Boot Option #1                  [AMI Virtual Floppy0...]
     Boot Option #2                  [AMI Virtual HDisk0 ...]
     Boot Option #3                  [AMI Virtual CDROM0 ...]

     Floppy Drive BBS Priorities
     Hard Drive BBS Priorities
     CD/DVD ROM Drive BBS Priorities                       ↔: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
```

Bootup NumLock State [On]

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

Boot Logo Display [Auto]

Allows you to enable or disable the full screen logo display feature.
Configuration options: [Auto] [Full Screen] [Disabled]

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]

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
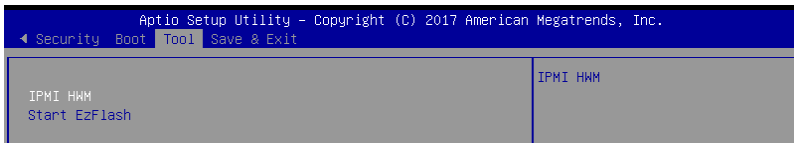installed in the system.

> • 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.

Floppy Drive BBS Priorities / Hard Drive BBS Priorities / CD/DVD ROM Drive BBS Priorities

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

5.11 Tool menu

The Tool menu items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.
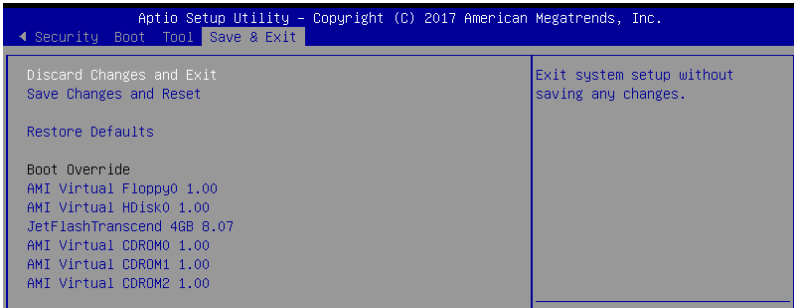
```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
◄ Security  Boot  Tool  Save & Exit

                                                           IPMI HWM
    IPMI HWM
    Start EzFlash
```

IPMI HWM

Allows you to run the IPMI hardware monitor.

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.

5.12 Exit menu

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

```
            Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
    ◄ Security  Boot  Tool  Save & Exit

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

    Restore Defaults

    Boot Override
    AMI Virtual Floppy0 1.00
    AMI Virtual HDisk0 1.00
    JetFlashTranscend 4GB 8.07
    AMI Virtual CDROM0 1.00
    AMI Virtual CDROM1 1.00
    AMI Virtual CDROM2 1.00
```

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 & Exit

Exit System setup without saving any changes.

Save Changes & Reset

Exit 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.

RAID Configuration

6

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

6.1 Setting up RAID

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

6.1.1 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.

6.1.2   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.

6.1.3   Setting the RAID item in BIOS

You must set the RAID item in the BIOS Setup before you can create a RAID set from SATA hard disk drives attached to the SATA connectors supported by Intel® C621 chipset.

To do this:

1.   Enter the BIOS Setup during POST.

2.   Go to the **Platform Configuration menu** Menu > **PCH Configuration** Menu > **PCH SATA Configuration**, then press <Enter>.

3.   Set **Configure sSATA as** to [RAID Mode]

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

> Refer to Chapter 5 for details on entering and navigating through the BIOS Setup.

6.1.4   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** if you installed Serial ATA hard disk drives on the Serial ATA connectors supported by the Intel® C621 chipset.

Refer to the succeeding section for details on how to use the RAID configuration utility.

6.2 Intel® Rapid Storage Technology enterprise SATA/SSATA Option ROM Utility

The Intel® Rapid Storage Technology enterprise SATA/SSATA 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, have set the correct jumper settings of the motherboard, and have set the correct SATA mode in the BIOS setup. You can refer to the **Installing hard disk drives, Setting Jumpers**, and **Setting the RAID mode sections in BIOS** for more information.

To launch the Intel® Rapid Storage Technology enterprise SATA/SSATA 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.
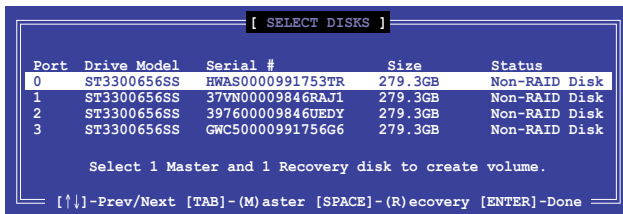
6.2.1   Creating a RAID set

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 1 Master and 1 Recovery disk 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):
```

6.2.2   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):
```

6.2.3 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.

6.2.4   Exiting the Intel® Rapid Storage Technology enterprise SATA/SSATA 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):
```
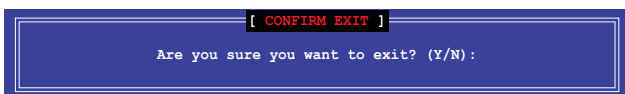
6.2.5   Rebuilding the RAID

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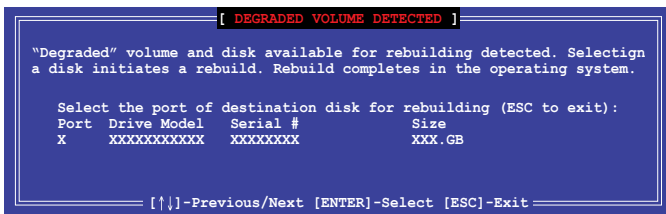
Select a destination disk with the same size as the original hard disk.

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**.

6.2.6 Setting the Boot array in the BIOS Setup Utility

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

To set the boot array in the BIOS:

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

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

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

3.   Use up/down arrow keys to select the boot priority and press <Enter>. See the **Boot menu** section of Chapter 5 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>.

6.3 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 7.

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

1. Turn on the system and go to the 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.
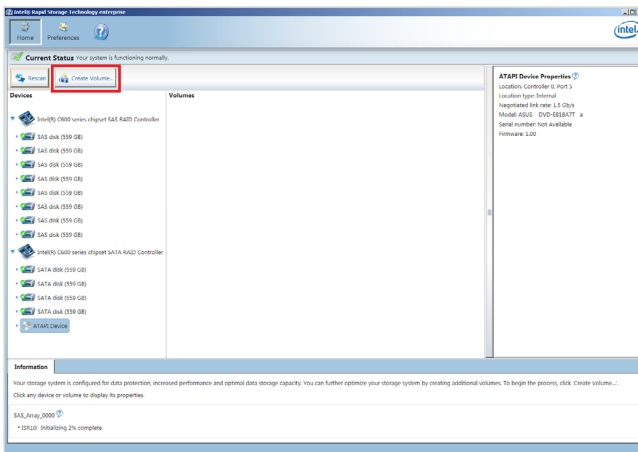
> You can click **Rescan** to re-scan any attached hard disks.

6.3.1   Creating a RAID set

To create a RAID set:

1.   From the utility main menu, select **Create Volume** and select volume type.

2.   Click **Next**.
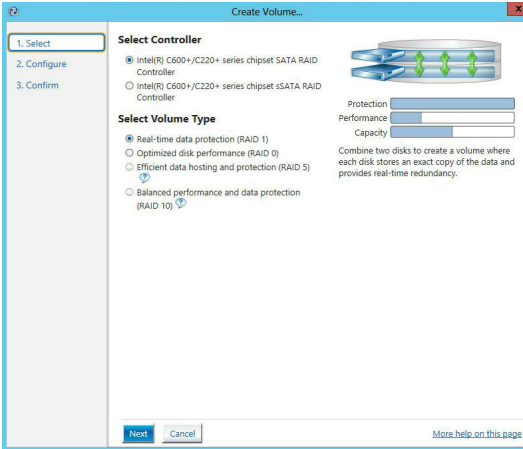
3.   Enter a name for the RAID set, then select the array disks.

4.   Select **Volume Size** tab, you can drag the bar to decide the volume size.

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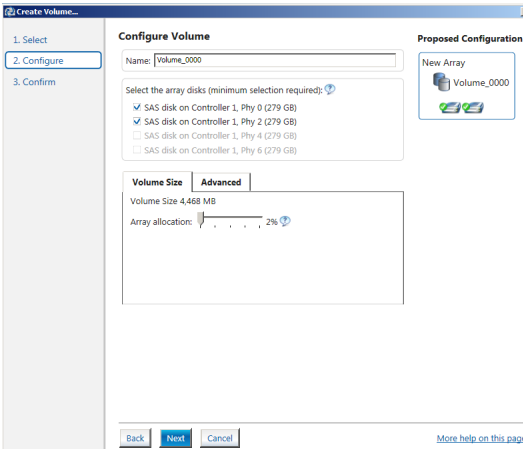
- If you do not want to keep the data on one of the selected disks, select **NO** when prompted.

- If you want to **Enable volume write-back cache** or **Initialize volume**, click **Advanced**.

---

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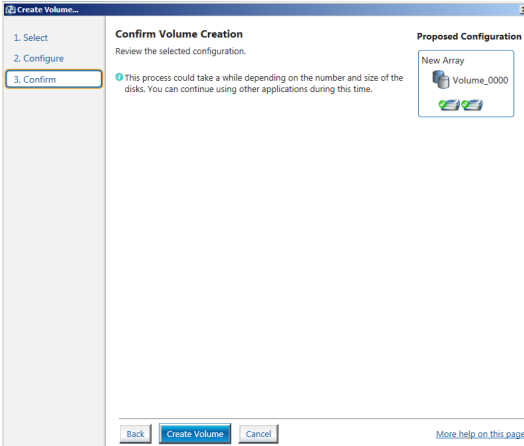
7. Wait until the process is completed, then click **OK** when prompted.
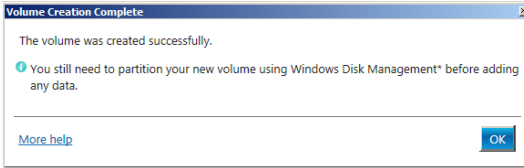
> You still need to partition your new volume using Windows Disk Management before adding any data.

The RAID set is displayed in the **Volumes** list and you can change the settings in **Volume Properties**.
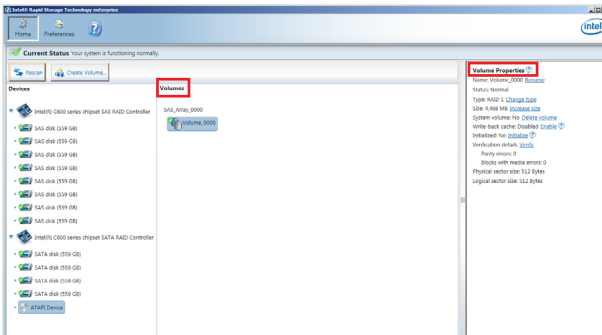
6.3.2   Changing a Volume Type

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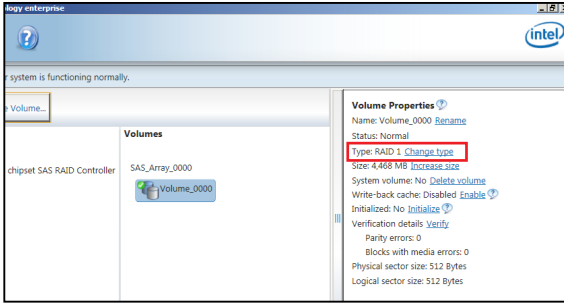
3.   You can change the **Name**, **Select the new volume type**, and **Select additional disks to include in the new volume** if needed.

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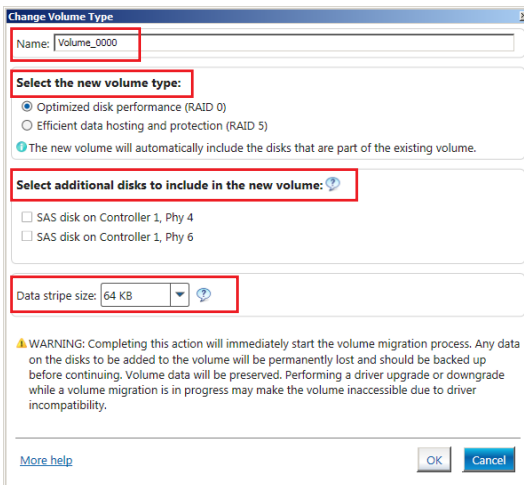
We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

6.3.3   Deleting a volume

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

To delete a volume:

1.   From the utility main menu, select the volume (ex. Volume_0000) in **Volumes** field you want to delete.
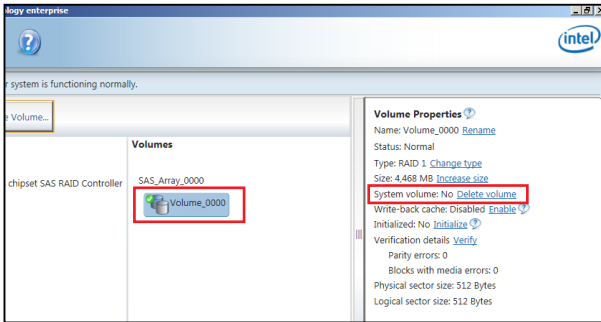
2.   Select **Delete volume** in **Volume Properties** field. The following screen appears.
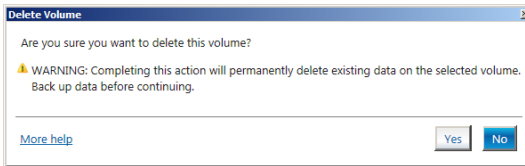
3.   Click **Yes** to delete the volume and return to the utility main menu, or click **No** to return to the main menu.

6.3.4   Preferences

System Preferences

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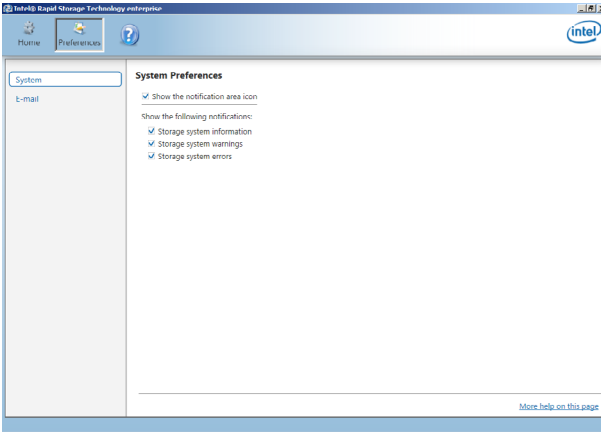
E-Mail Preferences

Allow you to set to sent e-mail of the following events:

- Storage system information

- Storage system warnings

- Storage system errors
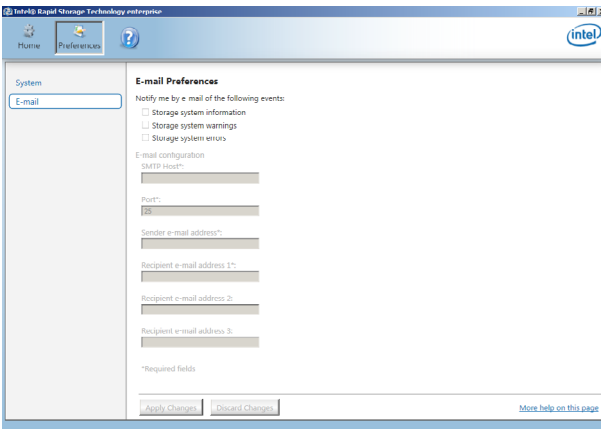
Driver Installation

7

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

7.1 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.

7.1.1 Creating a USB flash drive with RAID drive

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** > **C620 INTEL RAID** > **Windows** > **Driver** and then copy the RAID driver folder to the USB flash drive.

7.1.2 Installing the RAID controller driver

During Windows® Server 2012 R2 OS installation

To install the RAID controller driver when installing Windows® Server 2012 R2 OS:

1. Boot the computer using the Windows® Server 2012 R2 OS installation disc. Follow the screen instructions to start installing Windows Server 2012 R2.

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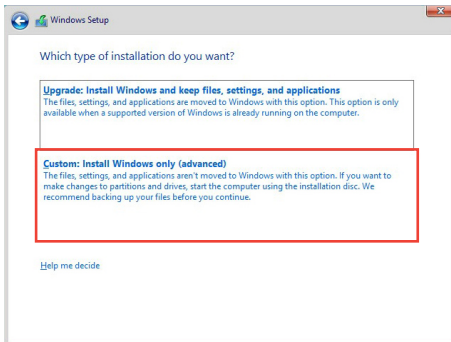
3.   Click **Load Driver**.
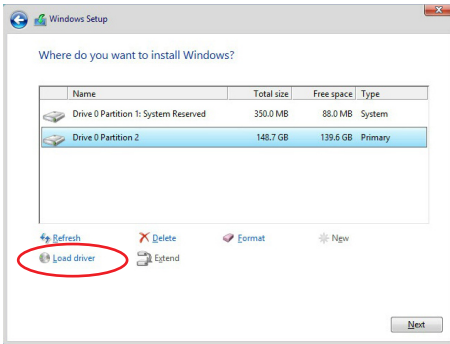
4.   A message appears reminding you to insert the installation media containing the driver of the RAID controller driver (the installation media can be a CD, DVD, or USB flash drive).

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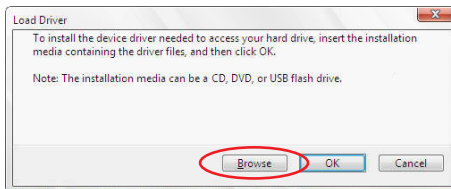
5.   Locate the driver in the corresponding folder of the Support DVD or USB flash drive and then click **OK** to continue.

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**.
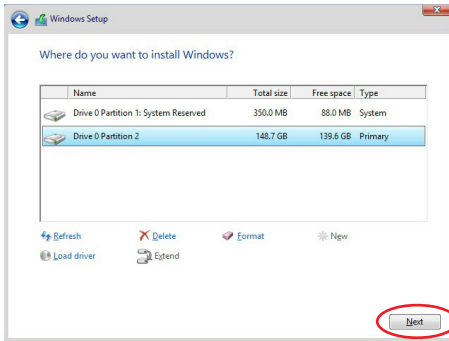
8.   Setup then proceeds with the OS installation. Follow screen instructions to continue.

7.2   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.

1. 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.

2. The support DVD is supported on Windows® Server 2012 R2 and Windows® Server 2016.

7.3   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 2012 R2 and on the Windows® Server 2016 Operating System (OS).

7.3.1   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.
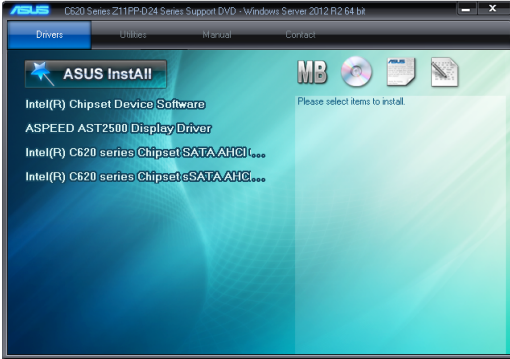
7.3.2   Utilities menu tab

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

7.3.3 Manual menu

The Manual menu provides the link to the Broadcom NetXtreme II Network Adapter user guide.

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

7.3.4 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.
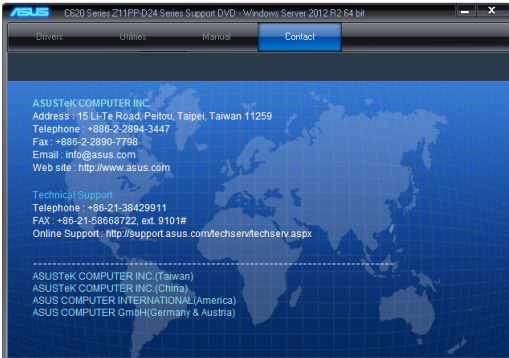
7.4 Intel® chipset device software installation

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, and then log on with **Administrator** privileges.

2. Insert the motherboard/system support DVD into 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.

3. Click the item **Intel® Chipset Device Software** from the menu.
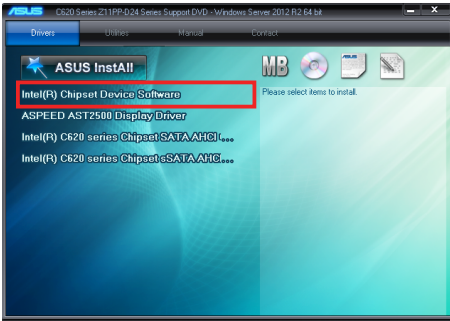
4. The **Intel® Chipset Device Software** window appears. Click **Next** to start the installation.
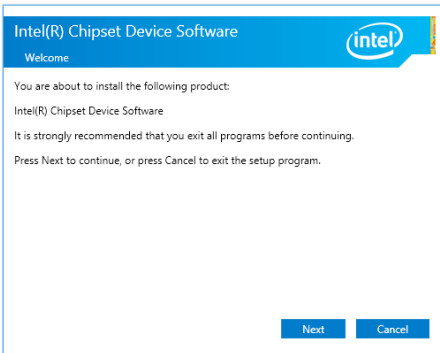
5.   Read the **License Agreement** and click **Accept** to continue the process.
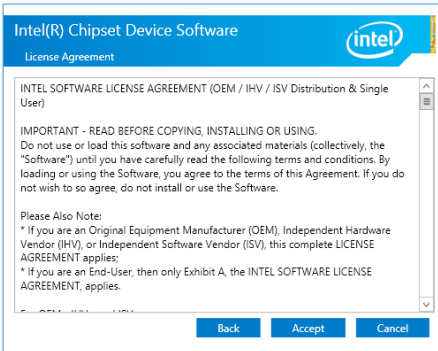
6.   Read the **Readme File Information** and click **Install** to start the installation process.
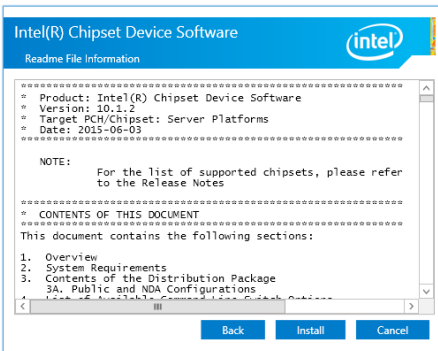
7.   Click **Restart Now** to complete the setup process.
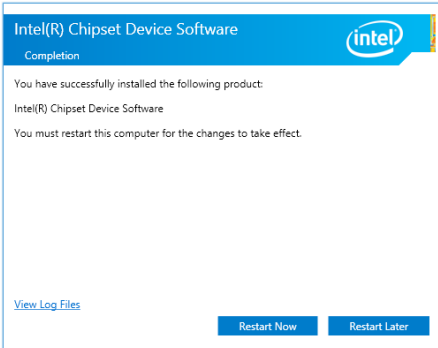
7.5 VGA driver installation

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

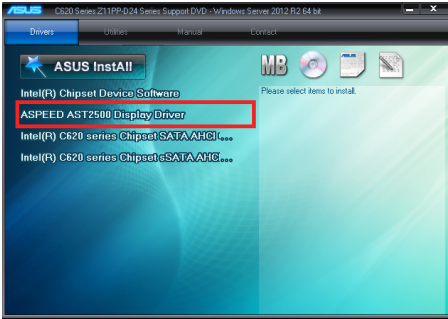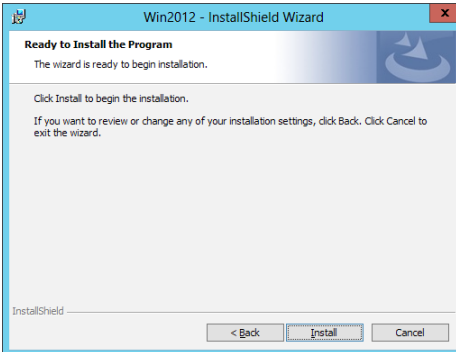You need to manually install the ASPEED VGA driver on a Windows® operating system.

To install the ASPEED VGA driver:

1. Restart the computer, and then log on with **Administrator** privileges.

2. Insert the motherboard/system support DVD into 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.

3. Click the **ASPEED AST2500 Display Driver** to begin installation.
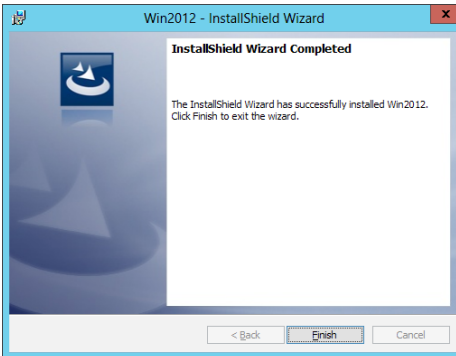

4. From the installation window, click **Next** to start the installation.

5.   Click **Install** to start the installation process.

6.   Click **Finish** to complete the installation.

7.6   Intel® Rapid Storage Technology enterprise 5.0 installation

This section provides the instructions on how to install the Intel® Rapid Storage Technology enterprise 5.0 on the system.

You need to manually install the Intel® Rapid Storage Technology enterprise 5.0 utility on a Windows® operating system.

To install the Intel® Rapid Storage Technology enterprise 5.0 utility:

1. Restart the computer, and then log on with **Administrator** privileges.

2. Insert the motherboard/system support DVD into the optical drive, and navigate to the **Utilities** menu.

3. Click the **Intel® Rapid Storage Technology enterprise 5.0** to begin installation.
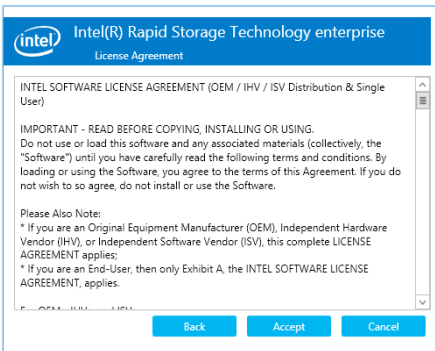

4. The **Intel® Rapid Storage Technology enterprise** window appears. Click **Next** to start the installation.
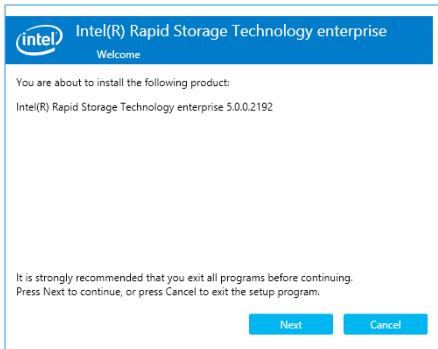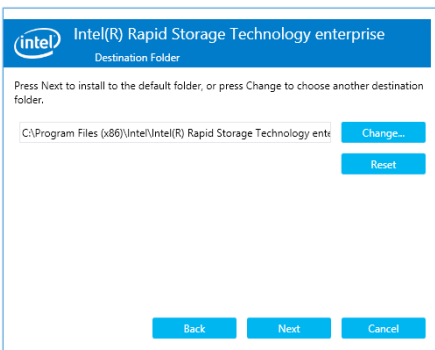
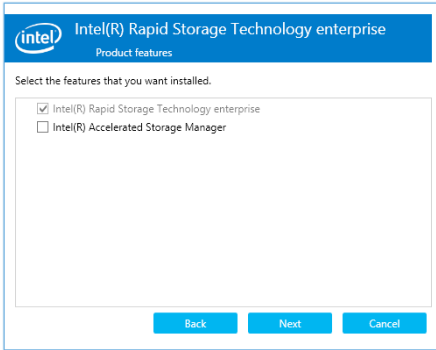5. Read the **Warning** message and click **Next** to continue.
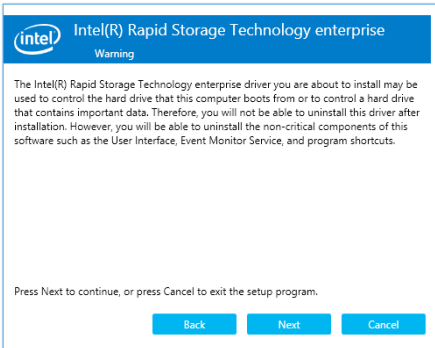
6. Read the **License Agreement** and click **Accept** to continue the process.

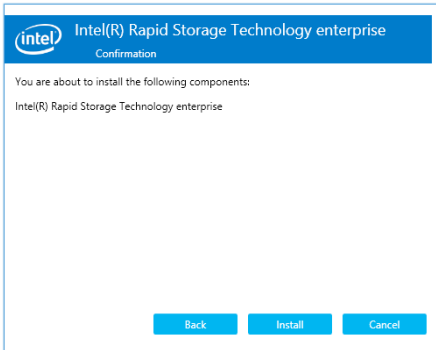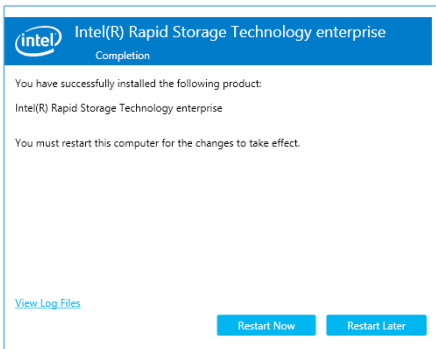7. Select the destination folder and click **Next** to continue.

8. Tick the features that you would like to install and click **Next** to continue.

9. Click **Install** to start the installation process.

10. Click **Restart Now** to complete the setup process.

Appendix

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

Z11PP-D24 block diagram

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 A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

Canadian Department of Communications Statement

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

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

REACH

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

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

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

ASUS Recycling/Takeback Services

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

Australia statement notice

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

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

ASUS contact information

ASUSTeK COMPUTER INC.

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

Technical Support

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

ASUSTeK COMPUTER INC. (Taiwan)

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

Technical Support

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

ASUSTeK COMPUTER INC. (China)

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

Technical Support

Telephone	+86-20-2804-7506 (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, 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