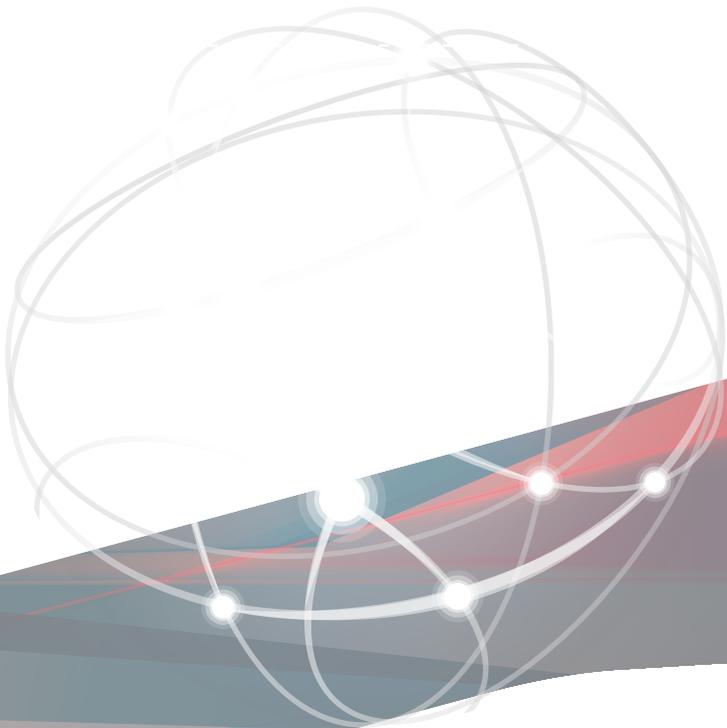


KRPA-U16

User Guide



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Contents

Safety information.....	vi
About this guide.....	vii
KRPA-U16 specifications summary.....	ix

Chapter 1: Product Introduction

1.1	Welcome!.....	1-2
1.2	Package contents.....	1-2
1.3	Serial number label.....	1-2

Chapter 2: Hardware Information

2.1	Before you proceed.....	2-2
2.2	Motherboard overview.....	2-3
2.2.1	Placement direction.....	2-3
2.2.2	Screw holes.....	2-3
2.2.3	Motherboard layout.....	2-4
2.3	Central Processing Unit (CPU).....	2-6
2.3.1	Installing the CPU.....	2-6
2.4	System memory.....	2-10
2.4.1	Overview.....	2-10
2.4.2	Memory Configurations.....	2-10
2.4.3	Installing a DIMM on a single clip DIMM socket.....	2-11
2.5	Expansion slots.....	2-12
2.5.1	Installing an expansion card.....	2-12
2.5.2	Configuring an expansion card.....	2-12
2.5.3	Interrupt assignments.....	2-13
2.6	Jumpers.....	2-15
2.7	Onboard LEDs.....	2-19
2.8	Connectors.....	2-22
2.8.1	Rear panel connectors.....	2-22
2.8.2	Internal connectors.....	2-23

Chapter 3: Powering Up

3.1	Starting up for the first time.....	3-2
3.2	Powering off the computer.....	3-3
3.2.1	Using the OS shut down function.....	3-3
3.2.2	Using the dual function power switch.....	3-3

Contents

Chapter 4: BIOS Setup

4.1	Managing and updating your BIOS	4-2
4.1.1	ASUS CrashFree BIOS 3 utility.....	4-2
4.1.2	ASUS EZ Flash Utility	4-3
4.1.3	BUPDATER utility	4-4
4.2	BIOS setup program	4-6
4.2.1	BIOS menu screen.....	4-7
4.2.2	Menu bar	4-7
4.2.3	Menu items.....	4-8
4.2.4	Submenu items	4-8
4.2.5	Navigation keys.....	4-8
4.2.6	General help.....	4-8
4.2.7	Configuration fields	4-8
4.2.8	Pop-up window.....	4-8
4.2.9	Scroll bar	4-8
4.3	Main menu	4-9
4.3.1	System Date [Day xx/xx/xxxx].....	4-9
4.3.2	System Time [xx:xx:xx]	4-9
4.4	Performance Tuning menu	4-10
4.5	Advanced menu	4-12
4.5.1	Trusted Computing.....	4-13
4.5.2	PSP Firmware Versions	4-13
4.5.3	APM Configuration	4-14
4.5.4	Onboard LAN Configuration.....	4-15
4.5.5	Serial Port Console Redirection.....	4-16
4.5.6	CPU Configuration	4-19
4.5.7	PCI Subsystem Settings	4-19
4.5.8	USB Configuration	4-20
4.5.9	CSM Configuration.....	4-21
4.5.10	NVMe Configuration.....	4-22
4.5.11	SATA Configuration	4-23
4.5.12	Tls Auth Configuration.....	4-23
4.5.13	Network Stack Configuration.....	4-24
4.5.14	AMD Mem Configuration Status.....	4-25
4.5.15	iSCSI Configuration.....	4-25
4.6	Chipset menu	4-26

Contents

4.7	Security menu	4-27
4.8	Boot menu	4-31
4.9	Tool menu	4-32
4.10	Save & Exit menu	4-32
4.11	AMD CBS menu	4-34
4.11.1	CPU Common Options	4-34
4.11.2	DF Common Options	4-35
4.11.3	UMC Common Option	4-36
4.11.4	NBIO Common Options	4-39
4.11.5	FCH Common Options	4-42
4.11.6	NTB Common Options	4-43
4.12	Event Logs menu	4-44
4.12.1	Change Smbios Event Log Settings	4-44
4.12.2	View Smbios Event Log	4-44
4.13	Server Mgmt menu	4-45

Chapter 5: Driver Installation

5.1	Running the Support DVD	5-2
------------	--------------------------------------	------------

Appendix

KRPA-U16 block diagram	A-2
Q-Code table	A-3
Notices	A-6
Simplified EU Declaration of Conformity	A-9
ASUS contact information	A-10

Safety information

Electrical safety

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

Operation safety

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



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



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

About this guide

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

How this guide is organized

This user guide contains the following parts:

- **Chapter 1: Product Introduction**
This chapter describes the features of the motherboard and the new technologies it supports.
- **Chapter 2: Hardware Information**
This chapter lists the hardware setup procedures that you have to perform when installing system components. It includes description of the switches, jumpers, and connectors on the motherboard.
- **Chapter 3: Powering Up**
This chapter describes the power up sequence and ways of shutting down the system.
- **Chapter 4: BIOS Setup**
This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.
- **Chapter 5: Driver Installation**
This chapter provides instructions for installing the necessary drivers for different system components.
- **Appendix: Reference Information**
This appendix includes additional information that you may refer to when configuring the motherboard.

Where to find more information

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

1. **ASUS websites**
The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.
2. **Optional documentation**
Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions used in this guide

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



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



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



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



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

Typography

Bold text

Indicates a menu or an item to select.

Italics

Used to emphasize a word or a phrase.

<Key>

Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.

Example: <Enter> means that you must press the Enter or Return key.

<Key1> + <Key2> + <Key3>

If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).

Example: <Ctrl> + <Alt> +

Command

Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.

Example: At DOS prompt, type the command line:

format A: /S

KRPA-U16 specifications summary

Model Name		KRPA-U16
Processor Support		1 x SocketSP3 AMD EPYC™ 7002 & 7003 Series processors * Refer to www.asus.com for CPU support list.
Form Factor		EEB, 12" x 13" (305mm x 330mm)
Memory	Total Slots	16 (8-channel)
	Memory Type	DDR4 3200/2933/2666 RDIMM/LR-DIMM/LR-DIMM3DS * Refer to www.asus.com for the latest memory AVL update.
	Memory Size	32GB, 16GB, 8GB(RDIMM) 64GB, 32GB (LRDIMM) 128GB, 64GB (LRDIMM3DS) * Refer to www.asus.com for the latest memory AVL update.
Expansion Slots	Total PCI/PCI-X/PCI-E Slots	5+1
	Slot Location 1	PCIe 3.0 x16 (x16 link) FL
	Slot Location 2	-
	Slot Location 3	PCIe 3.0 x16 (x16 link, if Slot 4 is occupied switch to x8 link) FL
	Slot Location 4	PCIe 3.0x 8 (x8 link q-switch from Slot 3) HL
	Slot Location 5	PCIe 4.0 x8 (x8 link) HL
	Slot Location 6	PCIe 4.0 x24 (x16 link + x8 link) HL
	Slot Location 7	-
	Additional Slot 1	OCPC 2.0 Mezzanine card (x16 link)
Additional Slot 2	-	
Storage	SATA Controller	CPU Integrated 4 x SATA3 6Gb/s ports 12 x SATA3 6Gb/s ports by 3 Mini-SAS HD connectors 1 x M.2 connector (2242/2260/2280/22110) both SATA & PCIe mode
	NVMe Controller	6 x Oculink ports (Gen3 x4 link)
	SAS Controller	Optional Kits: - ASUS PIKE II 3108II 8i-240 PD 2G SAS HW RAID card Support SAS 12Gbps
Networking	LAN	1 x Dual Port Intel I350-AM2 Gigabit LAN Controller 1 x Management Port
Graphic	VGA	Aspeed AST2500 64MB

(continued on the next page)

KRPA-U16 specifications summary

Model Name		KRPA-U16
Onboard I/O Connectors		1 x USB 3.0 header (for front panel) 1 x USB 3.0 port (Type-A vertical) 1 x Micro SD Card slot 1 x Serial port header 1 x VGA header (for front panel) 8 x FAN header (4-pin) 1 x TPM header 1 x Chassis Intruder header (2-pin)
Rear I/O Connectors		2 x USB 3.0 ports 1 x VGA port 2 x RJ-45 GbE LAN ports 1 x RJ-45 Management port
Management Solution	Software	ASUS Control Center (Classic)
	Out of Band Remote Management	On-Board ASMB9-iKVM for KVM-over-IP
Weight		Net Weight : 1.4 Kg Gross Weight : 2.5 Kg
Environment		Operating temperature: 10°C ~ 35°C Non operating temperature: -40°C ~ 70°C Non operating humidity: 20% ~ 90% (Non condensing)

* Specifications are subject to change without notice.

Product Introduction

1

This chapter describes the motherboard features and the new technologies it supports.

1.1 Welcome!

Congratulations and thank you for buying an ASUS® KRPA-U16 motherboard!

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

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

1.2 Package contents

Check your motherboard package for the following items.

	Standard Gift Box Pack	Standard Bulk Pack
I/O Shield	1	10
SATA 6Gbps Cable	4	40
Support DVD	1	10
Motherboard	1	10



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

1.3 Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the motherboard's serial number containing 12 characters xxS2xxxxxxx shown in the figure below. With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.



Hardware Information

2

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

2.1 Before you proceed

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



-
- Unplug the power cord from the wall socket before touching any component.
 - Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.
 - Hold components by the edges to avoid touching the ICs on them.
 - Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.
 - Before you install or remove any component, ensure that the power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.
-

2.2 Motherboard overview

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

To optimize the features of your motherboard, we highly recommend that you install it in an ATX 2.2 compliant chassis.



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

2.2.1 Placement direction

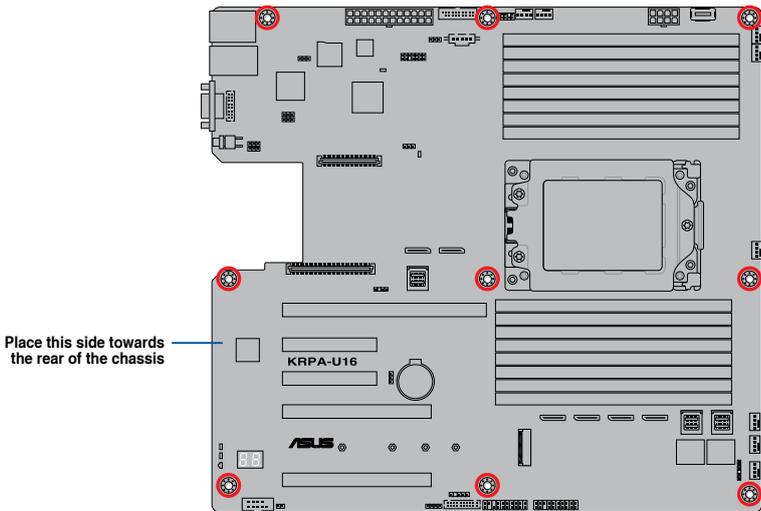
When installing the motherboard, ensure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

2.2.2 Screw holes

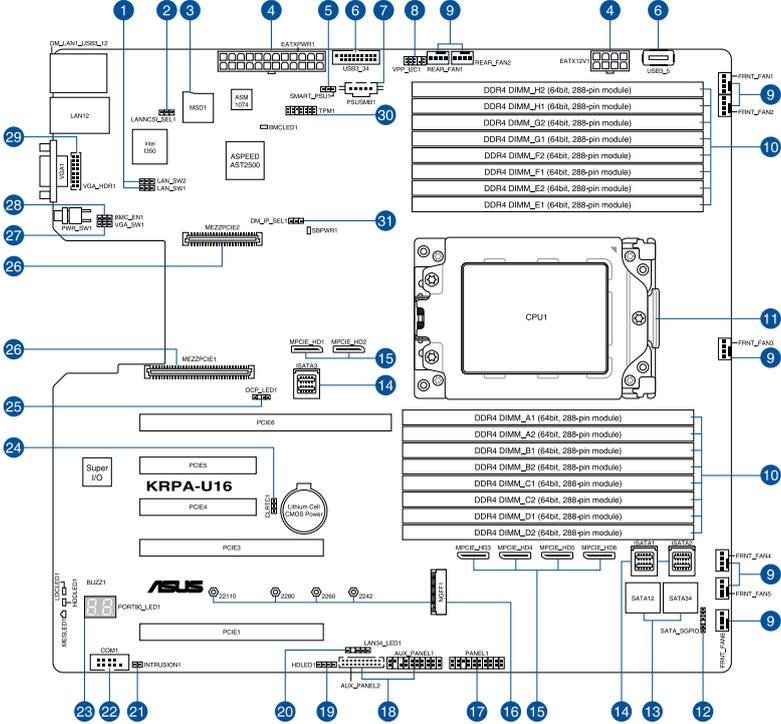
Place nine (9) screws into the holes indicated by circles to secure the motherboard to the chassis.



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



2.2.3 Motherboard layout



Layout contents

Internal connectors / Sockets / Jumpers / LEDs	Page
1. LAN controller settings (3-pin LAN_SW1-2)	2-16
2. LANNCSI setting (3-pin LANNCSI_SEL1)	2-18
3. Micro SD card slot (MSD1)	2-32
4. ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1)	2-26
5. Smart Ride Through (SmaRT) setting (3-pin SMART_PSU1)	2-18
6. USB 3.0 connector (20-1 pin USB3_34; 4-pin Type-A USB3_5)	2-24
7. Power Supply SMBus connector (5-pin PSUSMB1)	2-23
8. VPP_I2C1 connector (10-1 pin VPP_I2C1)	2-24
9. Front and rear fan connectors (4-pin FRNT_FAN1-6, REAR_FAN1-2)	2-25
10. CPU socket	2-6
11. DDR4 DIMM sockets	2-10
12. Serial General Purpose Input/Output connector (6-1 pin SATA_SGPIO1)	2-33
13. Serial ATA connectors (7-pin SATA1-4)	2-23
14. Mini-SAS HD connectors (1SATA1-3)	2-33
15. OCuLink connectors (MPCIE_HD1-6)	2-30
16. M.2 (NGFF) connectors (NGFF1)	2-31
17. System panel connector (20-1 pin PANEL1)	2-27
18. Auxiliary panel connector (20-2 pin AUX_PANEL1, 20-pin AUX_PANEL2)	2-28
19. Hard disk activity LED connector (4-pin HDLED1)	2-29
20. LAN Activity LED connector (5-1 pin LAN34_LED1)	2-25
21. Chassis Intrusion connectors (2-pin INTRUSION)	2-30
22. Serial port connector (10-1 pin COM1)	2-34
23. Q-Code LEDs	2-21
24. Clear RTC RAM (3-pin CLRRTC1)	2-15
25. OCP LAN Activity LED connector (4-1 pin OCP_LED1)	2-32
26. Mezzanine PCIE card connectors (MEZZPCIE1-2)	2-31
27. VGA controller setting (3-pin VGA_SW1)	2-16
28. BMC Setting (3-pin BMC_EN1)	2-17
29. VGA connector (10-1 pin VGA_HDR1)	2-29
30. Trusted Platform Module connector (14-1 pin TPM1)	2-26
31. DMLAN setting (3-pin DM_IP_EN1)	2-17

2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount Socket SP3 designed for the AMD EPYC™ 7002 and 7003 Series.

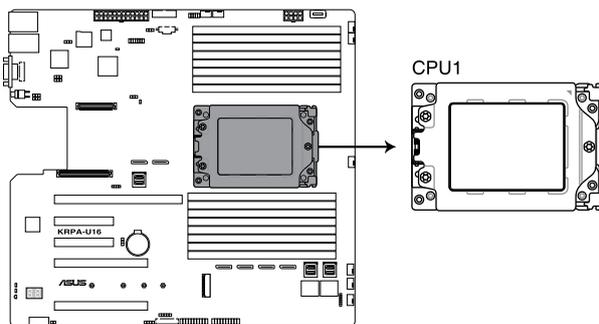


- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if 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 Socket SP3.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.3.1 Installing the CPU

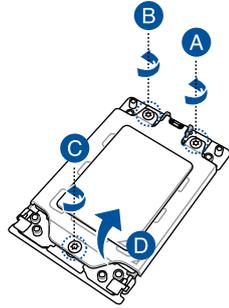
To install the CPU:

1. Locate the CPU socket on the motherboard.

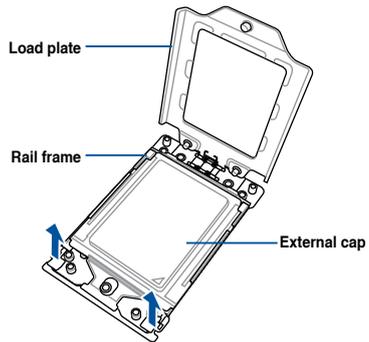


KRPA-U16 CPU SP3 Socket

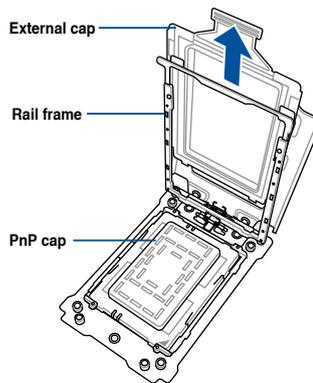
2. Loosen each screw one by one in the sequence shown on the socket to open the load plate.



3. Slightly lift open the rail frame.



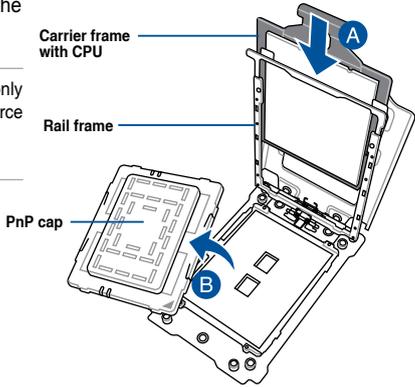
4. Slide the external cap out of the rail frame.



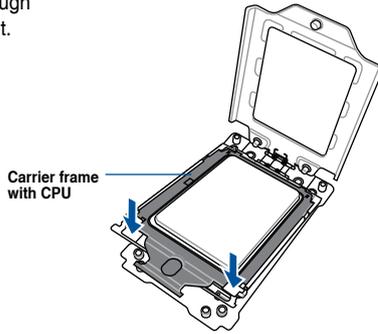
- Slide the carrier frame with CPU into the rail frame, then remove the PnP cap.



The carrier frame with CPU fits in only one correct orientation. DO NOT force the carrier frame with CPU into the rail frame.



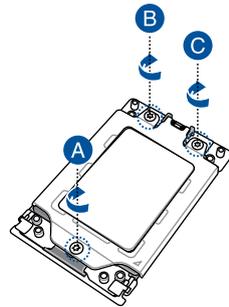
- Gently push the rail frame just enough to let it sit on top of the CPU socket.



- Close the load plate just enough to let it sit on top of the CPU, then secure each screw one by one in the sequence shown on the socket to completely secure the load plate.



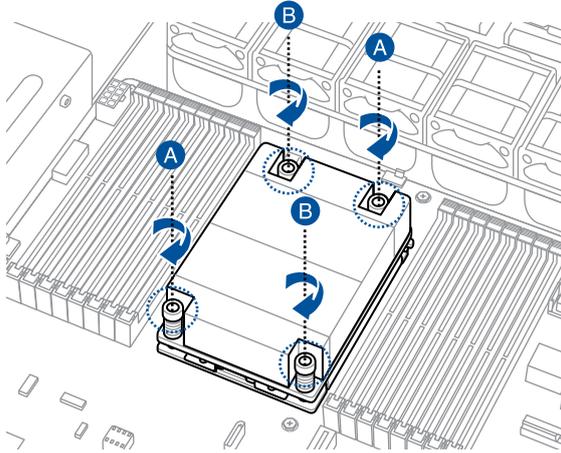
The load plate screws are T20 models. A torque value of 16.1 ± 1.2 kgf-cm (14.0 ± 1.0 lbf-in) is recommended.



- 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 complete the installation.



The heatsink screws are T20 models. A torque value of 16.1 ± 1.2 kgf-cm (14.0 ± 1.0 lbf-in) is recommended.

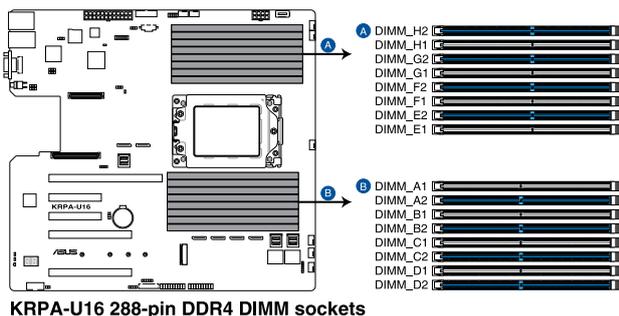


2.4 System memory

2.4.1 Overview

The motherboard comes with sixteen (16) Double Data Rate 4 (DDR4) Dual Inline Memory Modules (DIMM) sockets.

The figure illustrates the location of the DDR4 DIMM sockets:



2.4.2 Memory Configurations

You may install 32GB, 16GB, 8GB, 4GB RDIMM, 64GB, 32GB LRDIMM, or 128GB, 64GB LRDIMM 3DS into the DIMM sockets using the memory configurations in this section.

Memory configurations	DIMM															
	A1	A2	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2	H1	H2
1 DIMM						✓										
2 DIMMs						✓		✓								
4 DIMMs						✓		✓								✓
8 DIMMs		✓		✓		✓		✓		✓		✓		✓		✓
10 DIMMs		✓		✓		✓	✓	✓	✓	✓		✓		✓		✓
12 DIMMs		✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓		✓
14 DIMMs		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
16 DIMMs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓



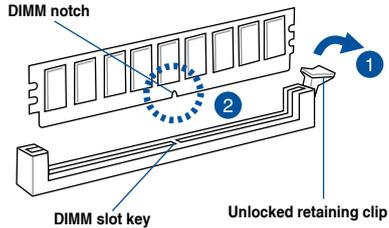
- 6 DIMM configuration is not recommended for AMD EPYC™ 7002 Series processors.
- When mixing 2DPC and 1DPC, ensure that each channel's total DIMM size should be equal. The DIMM size of 2DPC should equal to that of 1DPC, for example, if 2DPC is using a 32GB memory module (32GB * 2), then a 64GB memory module should be installed for 1DPC.
- All memory modules for 2DPC should be the same.
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.

2.4.3 Installing a DIMM on a single clip DIMM socket



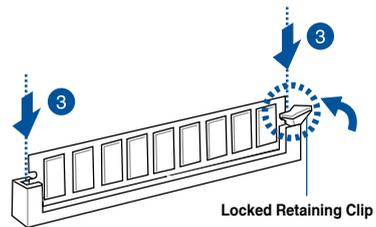
Ensure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

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.



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.

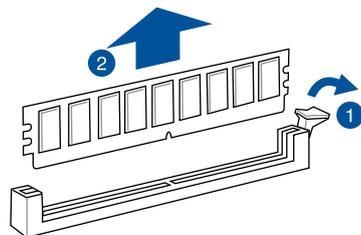
3. Hold the DIMM by both of its ends then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clip snaps back into place and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.



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

Removing a DIMM from a single clip DIMM socket

1. Press the retaining clip outward to unlock the DIMM.
2. Remove the DIMM from the socket.



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

2.5 Expansion slots

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



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

2.5.1 Installing an expansion card

To install an expansion card:

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Remove the system unit cover (if your motherboard is already installed in a chassis).
3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw you removed earlier.
6. Replace the system cover.

2.5.2 Configuring an expansion card

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

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 4 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the tables on the next page.
3. Install the software drivers for the expansion card.



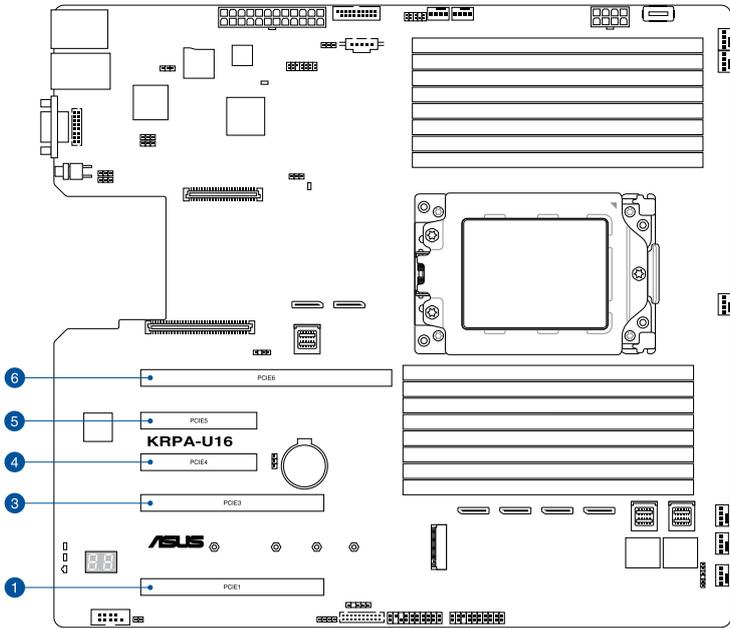
When using PCI cards on shared slots, ensure that the drivers support "Share IRQ" or that the cards do not need IRQ assignments. Otherwise, conflicts will arise between the two PCI groups, making the system unstable and the card inoperable.

2.5.3 Interrupt assignments

Standard Interrupt assignments

IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	-	Programmable Interrupt
3*		
4*	12	Communications Port (COM1)
5*	13	--
6		
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*		
15*		

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



No.(Slot location)	Short Description
PCIe6	PCIe 4.0 x24 (x16 link + x8 link) HL
PCIe5	PCIe 4.0 x8 (x8 link) HL
PCIe4	PCIe 3.0x 8 (x8 link q-switch from slot-2) HL
PCIe3	PCIe 3.0 x16 (x16 link, if Slot3 is occupied switch to x8 link) FL
PCIe1	PCIe 3.0 x16 (x16 link) FL

2.6 Jumpers

1. Clear RTC RAM (3-pin CLRRTC1)

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:

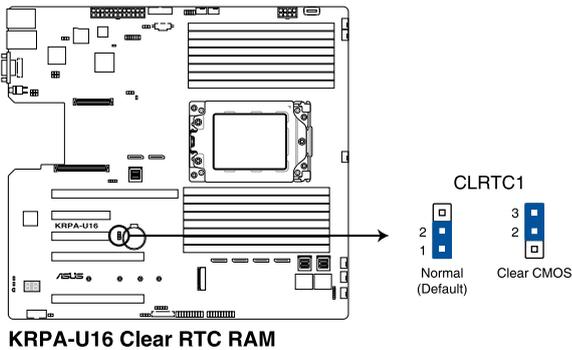
1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from the default pins 1–2 to pins 2–3. Keep the cap on pins 2–3 for about 5 to 10 seconds, then move the cap back to pins 1–2.
3. Plug the power cord and turn ON the computer.
4. Hold down the key during the boot process and enter BIOS setup to re-enter data.



DO NOT remove the cap on CLRRTC jumper default position except when clearing the RTC RAM. Removing the cap will cause system boot failure!

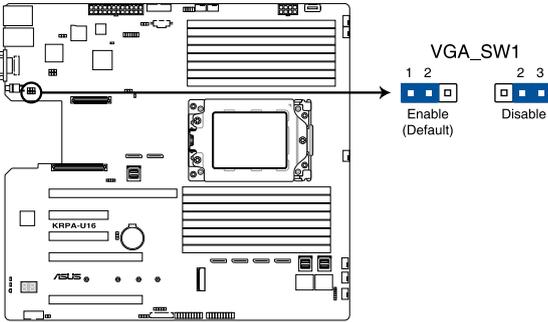


If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.



2. VGA controller setting (3-pin VGA_SW1)

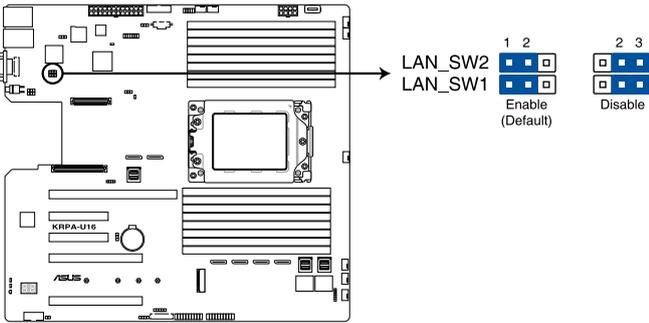
This jumper allows you to enable or disable the onboard VGA controller. Set to pins 1–2 to activate the VGA feature.



KRPA-U16 VGA controller setting

3. LAN controller settings (3-pin LAN_SW1-2)

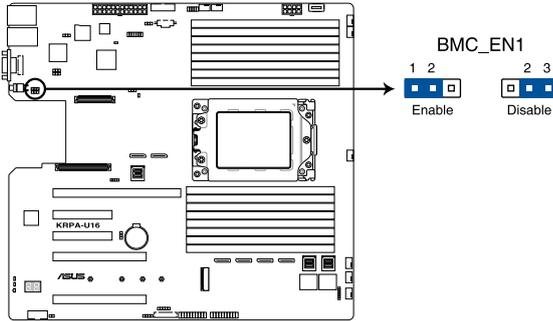
These jumpers allow you to enable or disable the onboard LAN_SW1 or LAN_SW2. Set to pins 1-2 to activate the Gigabit LAN feature.



KRPA-U16 LAN controller setting

4. BMC Setting (3-pin BMC_EN1)

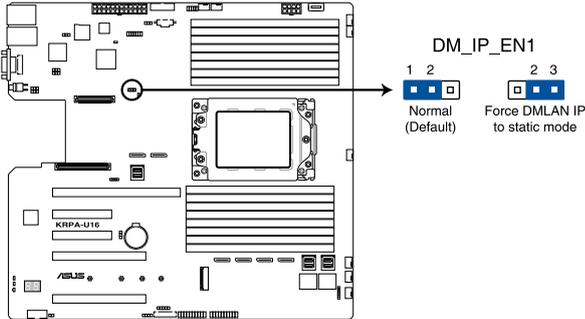
This jumper allows you to enable or disable the Baseboard Management Controller (ASMB9).



KRPA-U16 BMC setting

5. DMLAN setting (3-pin DM_IP_EN1)

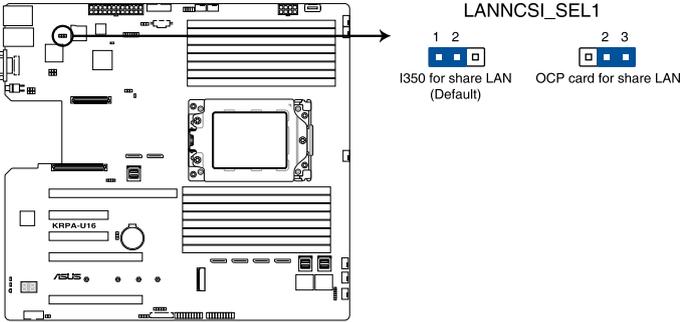
This jumper allows you to select the DMLAN setting. Set to pins 2-3 to force the DMLAN IP to static mode (IP=10.10.10.10, submask=255.255.255.0).



KRPA-U16 DMLAN setting

6. LANNCISI setting (3-pin LANNCISI_SEL1)

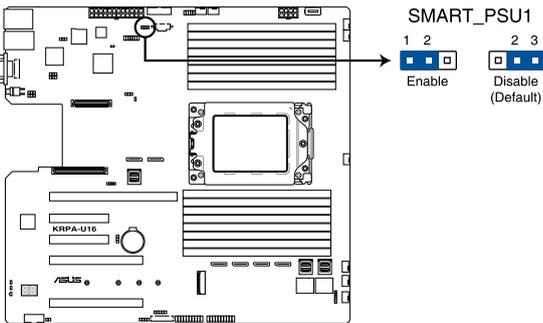
This jumper allows you to select which LAN NCSI to function.



KRPA-U16 LANNCISI setting

7. 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.

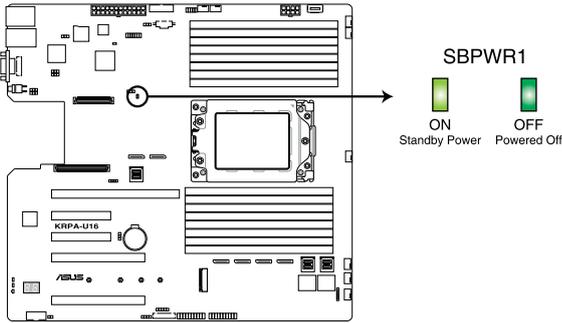


KRPA-U16 Smart Ride Through setting

2.7 Onboard LEDs

1. Standby Power LED (SBPWR1)

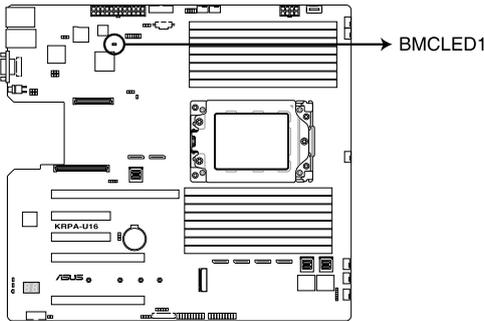
The motherboard comes with a standby power LED. The green LED lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration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



KRPA-U16 Standby Power LED

2. BMC LED (BMCLED1)

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



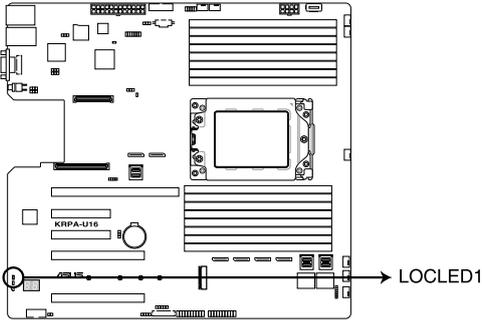
KRPA-U16 BMC LED



This LED functions only when you enable ASUS ASMB9.

3. Location LED (LOCLED1)

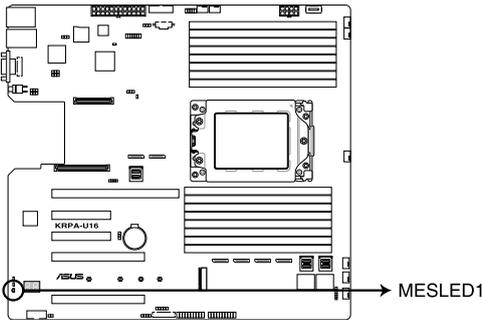
This onboard LED lights up when the Location button on the server is pressed or when triggered by a system management software. The Location LED helps visually locate and quickly identify the server in error on a server rack.



KRPA-U16 Location LED

4. Message LED (MESLED1)

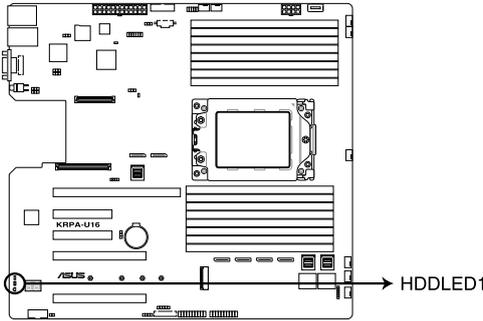
This onboard LED lights up to red when there is a BMC event log is generated.



KRPA-U16 MESLED

5. Hard disk activity LED (HDDLED1)

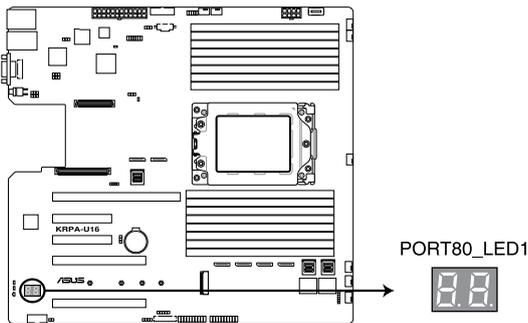
This LED is for the storage devices connected to the onboard SATA, or SATA/SAS add-on card. The read or write activities of any device connected to the onboard SATA, or SATA/SAS add-on card causes the rear panel LED to light up.



KRPA-U16 Storage device activity LED

6. Q-Code LEDs

The Q-Code LED design provides you with a 2-digit error code that displays the system status. Refer to the Q-Code table on the next page for details.



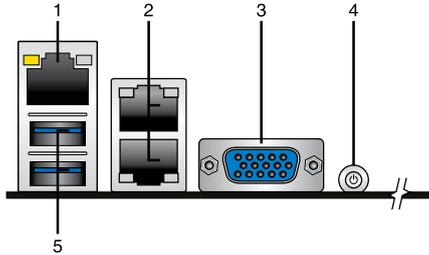
KRPA-U16 Q-Code LED



- The Q-Code LEDs provide the most probable cause of an error code as a starting point for troubleshooting. The actual cause may vary from case to case.
- Please refer to the Q-Code table in the **Appendix** section for more details.

2.8 Connectors

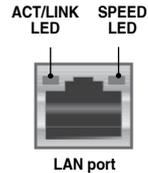
2.8.1 Rear panel connectors



1. **RJ-45 port for iKVM.** This RJ-45 port functions only when you install ASMB9 management card.
2. **RJ-45 port for LAN 1 and LAN 2.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.
3. **Video Graphics Adapter port.** This port is for a VGA monitor or other VGA-compatible devices.
4. **Power-on Button.** Press this button to turn on the system.
5. **USB 3.2 Gen 1 ports 1 and 2.** These two 4-pin USB ports are available for connecting USB 3.2 Gen 1 devices.

LAN port LED indications

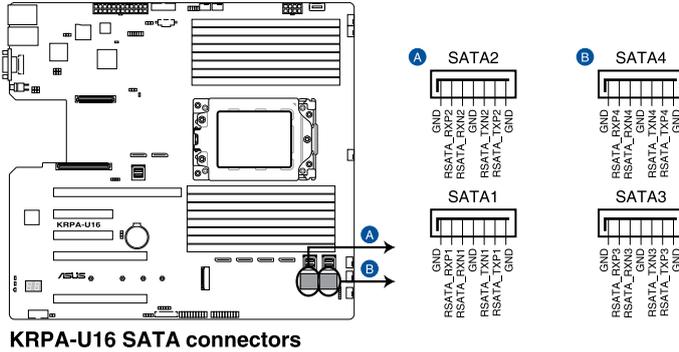
Activity/Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection



2.8.2 Internal connectors

1. Serial ATA connectors (7-pin SATA1-4)

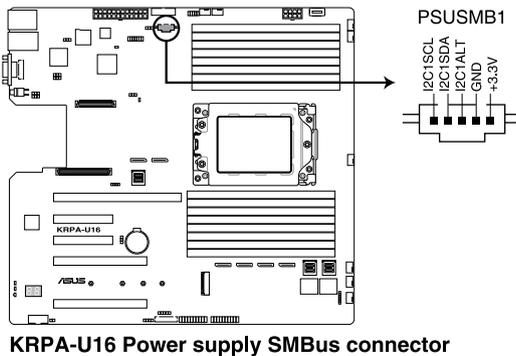
These connectors, controlled by AMD integrated SATA controller, are for the Serial ATA signal cables for Serial ATA drives (SATA 1 connector is used for the optical drive by default).



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

2. Power Supply SMBus connector (5-pin PSUSMB1)

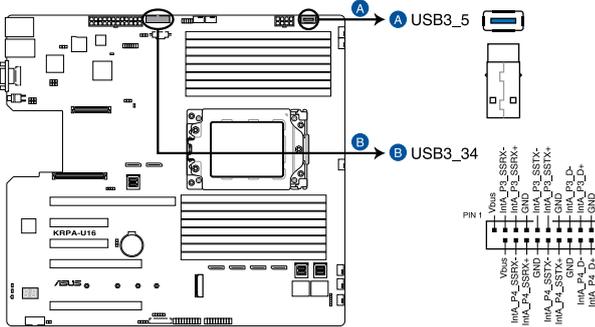
This connector allows you to connect SMBus (System Management Bus) to the PSU (power supply unit) to read PSU information. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.



This connector functions only when you enable ASUS ASMB9.

3. USB 3.0 connector (20-pin USB3_34; 4-pin Type-A USB3_5)

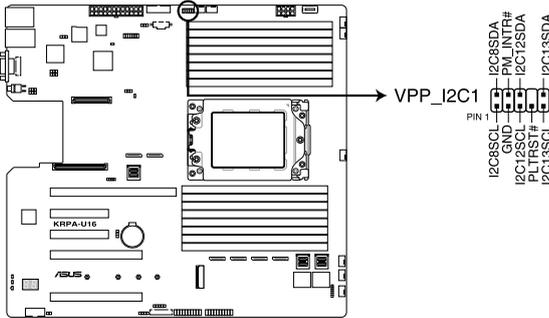
The 20-pin connector allows you to connect a USB 3.0 module for additional USB 3.0 front or rear panel ports. The 4-pin USB (Universal Serial Bus) Type-A port is available for connecting USB 3.0 devices.



KRPA-U16 USB 3.0 connectors

4. VPP_I2C1 connector (10-1 pin VPP_I2C1)

This connector is used for the sensor readings.



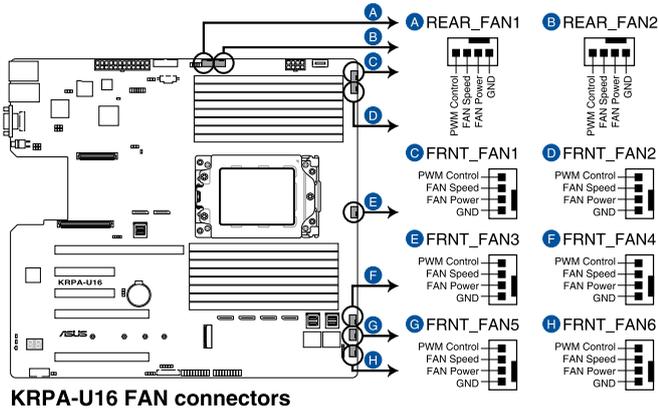
KRPA-U16 VPP_I2C1 connector

5. Front and rear fan connectors (4-pin FRNT_FAN1-6, REAR_FAN1-2)

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

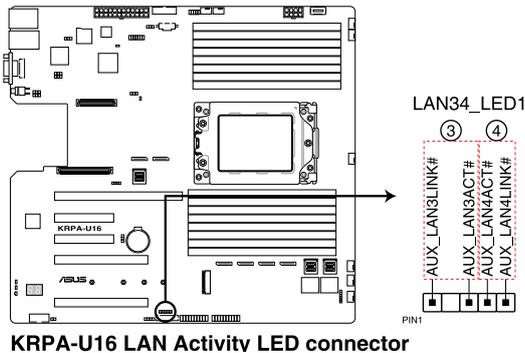


- DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components.
- These are not jumpers! DO NOT place jumper caps on the fan connectors!
- All fans feature the ASUS Smart Fan technology.



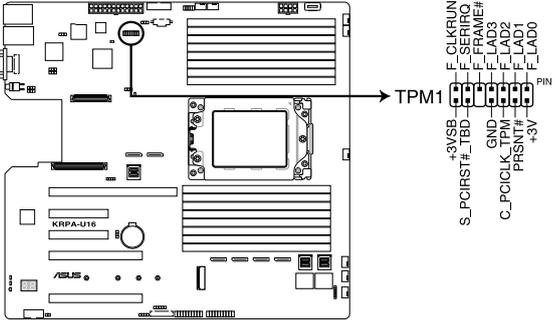
6. LAN Activity LED connector (5-1 pin LAN34_LED1)

These leads are for 10G LAN activity LEDs on the front panel. Connect the LAN LED cable to the backplane for LAN activity indication.



7. Trusted Platform Module connector (14-1 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.



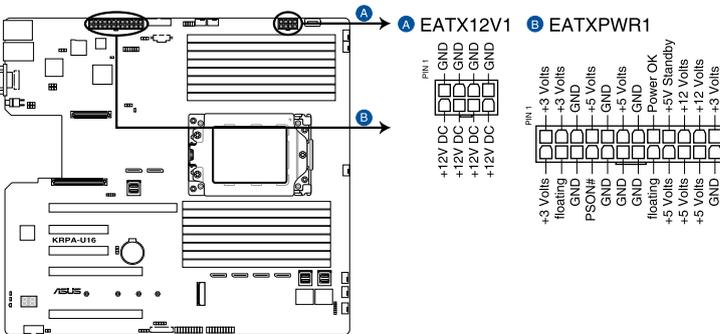
KRPA-U16 Trusted Platform Module connector

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

These connectors are for the ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.



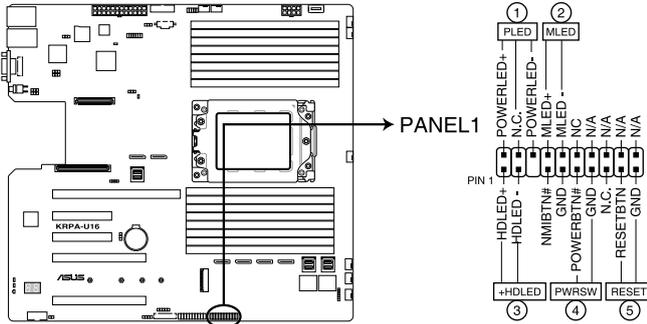
- DO NOT forget to connect the 24-pin and the 8-pin power plugs; otherwise, the system will not boot up.
- Use of a power supply unit (PSU) with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- This motherboard supports ATX2.0 PSU or later version.
- Ensure that your PSU can provide at least the minimum power required by your system.



KRPA-U16 ATX power connectors

9. System panel connector (20-1 pin PANEL1)

This connector supports several chassis-mounted functions.



KRPA-U16 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. 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.

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

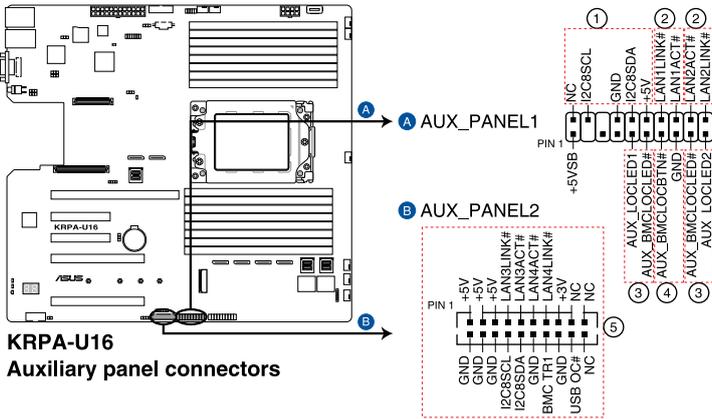
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

5. 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.



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, 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)

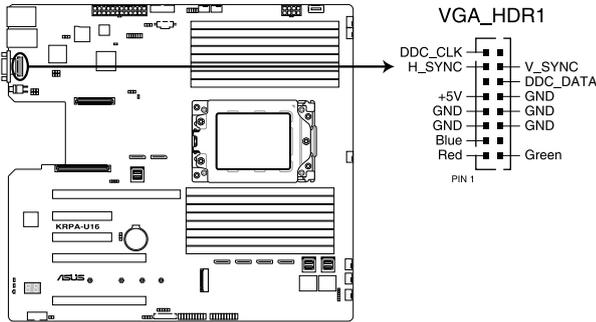
These leads are for the locator button on the front panel. This button queries the state of the system locator.

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. VGA connector (10-1 pin VGA_HDR1)

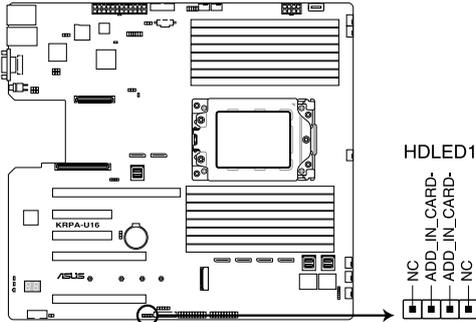
This connector supports the VGA High Dynamic-Range interface.



KRPA-U16 Internal VGA connector

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

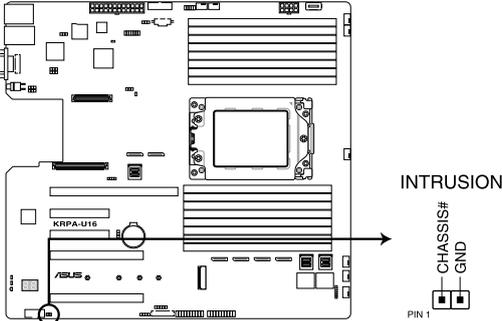
This LED connector is for the storage add-on card cable connected to the SATA or SAS add-on card. The read or write activities of any device connected to the SATA or SAS add-on card causes the front panel LED to light up.



KRPA-U16 Storage device activity LED connector

13. Chassis Intrusion connectors (2-pin INTRUSION)

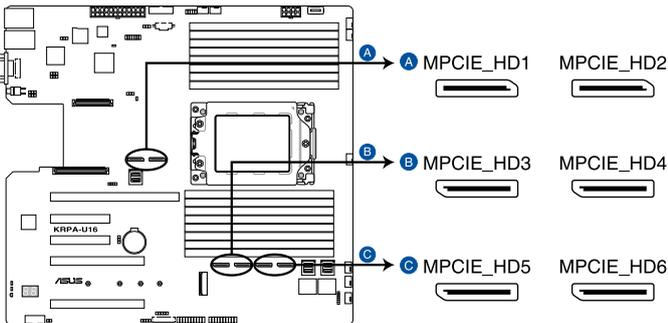
This lead is for the intrusion detection feature for chassis with intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high level signal to these leads to record a chassis intrusion event. The default setting is short CASEOPEN and GND pin by jumper cap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



KRPA-U16 Chassis Intrusion connector

14. OcuLink connectors (MPCIE_HD1-6)

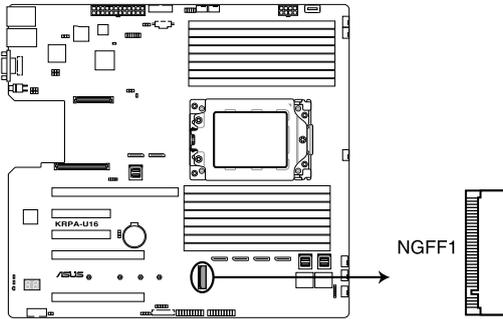
Connects the PCIE signal to the NVME port on the backplane.



KRPA-U16 OCUPCIE connectors

15. M.2 (NGFF) connectors (NGFF1)

This connector allows you to install M.2 devices.



KRPA-U16 M.2 (NGFF) connector



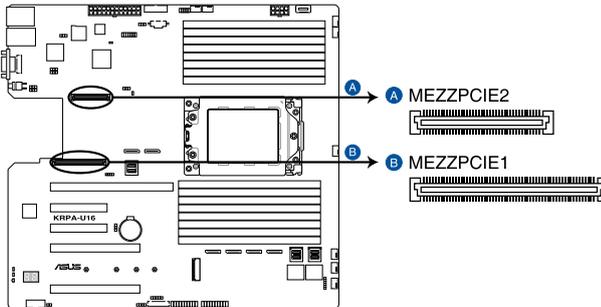
This connector supports type 2242/2260/2280/22110 devices on both PCI-E and SATA interface.



The M.2 (NGFF) device is purchased separately.

16. Mezzanine PCIe card connectors (MEZZPCIE1-2)

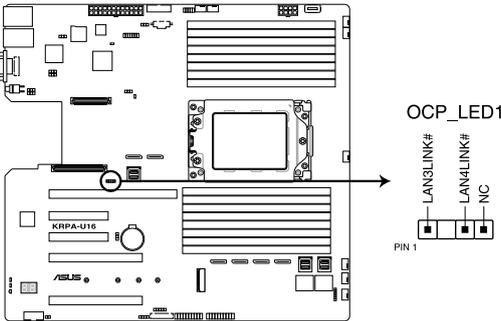
The Mezzanine PCIe connector supports Open Compute Project (OCP) cards.



KRPA-U16 Mezzanine PCIe card connectors

17. OCP LAN Activity LED connector (4-1 pin OCP_LED1)

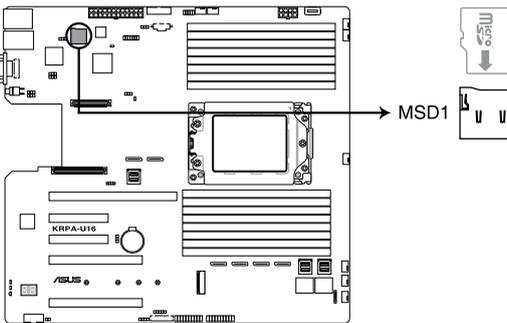
OCP LAN LED connector supports OCP LAN card Active LED.



KRPA-U16 OCP LAN Activity LED connector

18. Micro SD card slot (MSD1)

Your motherboard supports SD Memory Card v2.00 (SDHC) / v3.00 (SDXC).



KRPA-U16 Micro SD card slot



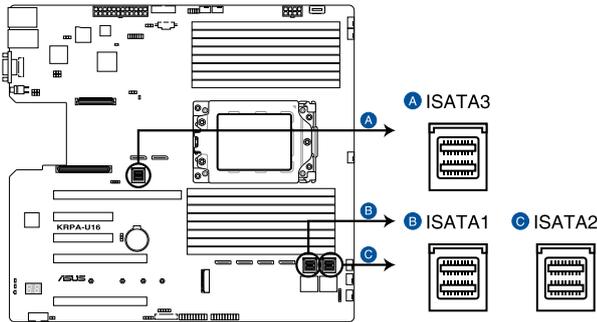
Disconnect all power (including redundant PSUs) from the existing system before you add or remove a Memory Card, then reboot the system to access the Memory Card.



- This Micro SD card slot functions only when you enable ASUS ASMB9.
- 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. Mini-SAS HD connectors (ISATA1-3)

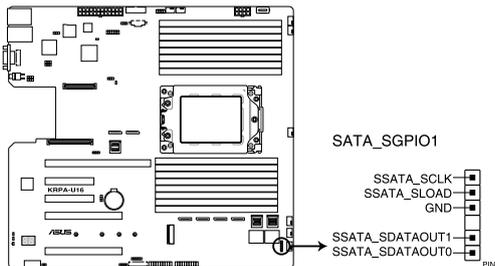
This motherboard comes with mini Serial Attached SCSI (SAS) HD connectors, the storage technology that supports Serial ATA. Each connector supports up to four devices.



KRPA-U16 Mini-SAS HD connectors

20. Serial General Purpose Input/Output connector (6-1 pin SATA_SGPIO1)

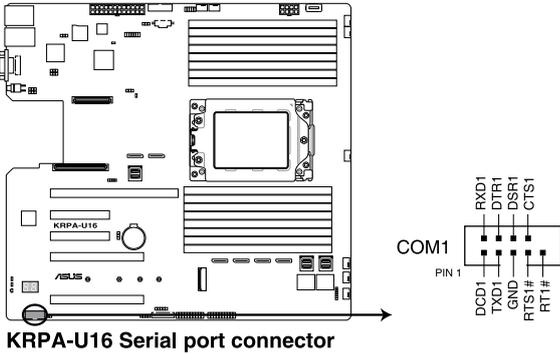
The Serial General Purpose Input/Output (SGPIO) connector allows you to connect the Intel Rapid Storage Technology Enterprise SGPIO interface. The SGPIO interface controls the LED pattern generation, device information, and general purpose data.



KRPA-U16 SATA_SGPIO1 connector

21. Serial port connector (10-1 pin COM1)

This connector is for the serial COM port. Connect the serial port module cable to one of these connectors, then install the module to a slot opening at the back of the system chassis.



The COM module is purchased separately.

Powering Up

3

This chapter describes the power up sequence, and ways of shutting down the system.

3.1 Starting up for the first time

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

The system then runs the power-on self-test or POST and additional messages appear on the screen. If you do not see anything within 30 seconds from the time you turned on the power, the system may have failed a power-on test. Check the jumper settings and connections or call your retailer for assistance.

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

3.2 Powering off the computer

3.2.1 Using the OS shut down function

Using Windows® Server 2012 R2:

1. Press <Ctrl>+<Alt>+.
2. Click on the Power icon on the lower right side of the screen.
3. Select **Shut down**.
4. In the *Shutdown Event Tracker*, select the **Other (Planned)** option in the selection list. Otherwise, select the option that best describes why you want to shut down the computer.
5. Click **Continue**.

Using Windows® Server 2016:

1. Press <Alt>+<F4>.
2. In the *What do you want the computer to do?*, select **Shut down**.
3. In the *Shutdown Event Tracker*, select the **Other (Planned)** option in the selection list. Otherwise, select the option that best describes why you want to shut down the computer.
4. Click **OK**.

3.2.2 Using the dual function power switch

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



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

BIOS Setup

4

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

4.1 Managing and updating your BIOS

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

1. **ASUS CrashFree BIOS 3**

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

2. **ASUS EzFlash**

Updates the BIOS using a USB flash disk.

3. **BUPDATER**

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

Refer to the corresponding sections for details on these utilities.



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

4.1.1 ASUS CrashFree BIOS 3 utility

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



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

Recovering the BIOS from a USB flash drive

To recover the BIOS from a USB flash drive:

1. Insert the USB flash drive with the original or updated BIOS file to one USB port on the system.
2. The utility will automatically recover the BIOS. It resets the system when the BIOS recovery finished.



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



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

4.1.2 ASUS EZ Flash Utility

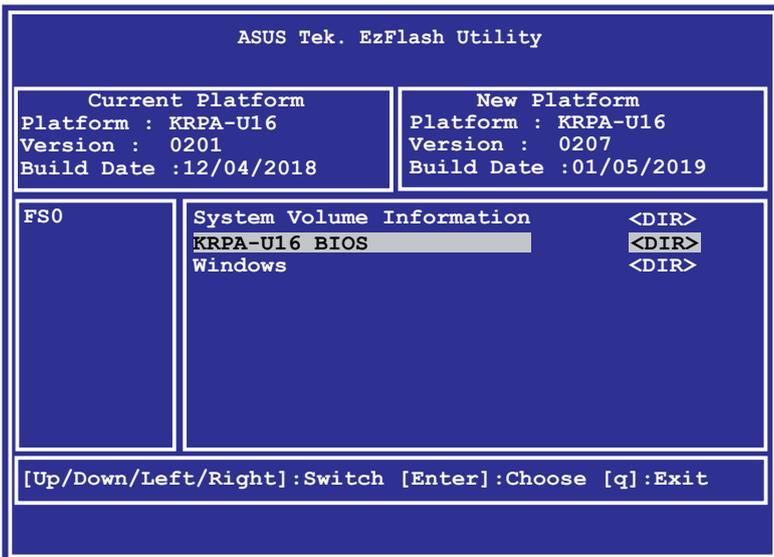
The ASUS EZ Flash Utility feature allows you to update the BIOS without having to use a DOS-based utility.



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>.



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.

4.1.3 BUPDATER utility



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

The BUPDATER utility allows you to update the BIOS file in 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:

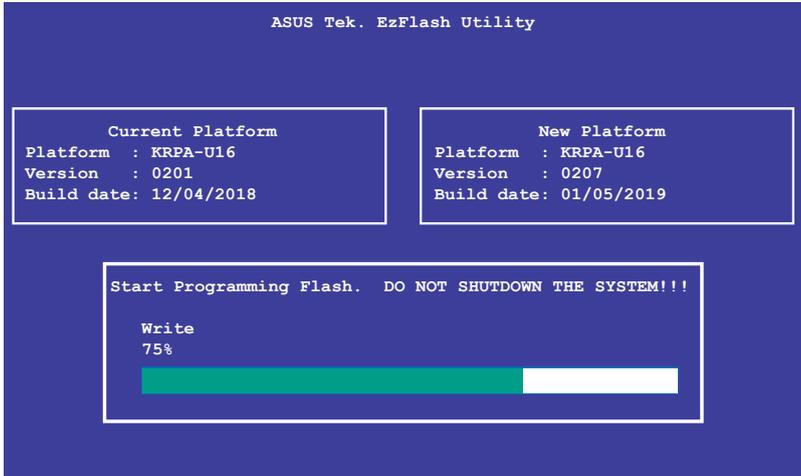
1. Visit the ASUS website at www.asus.com and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable USB flash disk drive.
2. Copy the BUPDATER utility (BUPDATER.exe) from the ASUS support website at <https://www.asus.com/support> to the bootable USB flash disk drive you 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
```

- The utility verifies the file, then starts updating the BIOS file.



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

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



4.2 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 during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

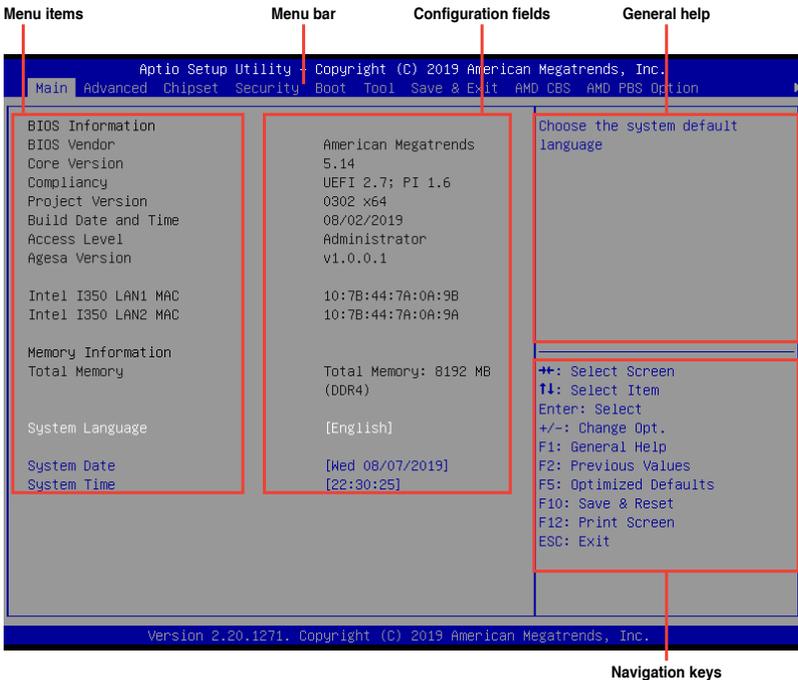
If you wish to enter Setup after POST, restart the system by pressing <Ctrl>+<Alt>+<Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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.
-

4.2.1 BIOS menu screen



4.2.2 Menu bar

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

Main	For changing the basic system configuration
Performance Tuning	For changing the performance settings
Advanced	For changing the advanced system settings
Chipset	For changing the chipset 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
AMD CBS	For configuring AMD CBS settings
AMD PBS Option	For configuring AMD PBS settings
Event Logs	For changing the event log settings
Server Mgmt	For changing the Server Mgmt settings

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

4.2.3 Menu items

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

The other items (such as **Advanced**) on the menu bar have their respective menu items.

4.2.4 Submenu items

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

4.2.5 Navigation keys

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

4.2.6 General help

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

4.2.7 Configuration fields

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

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

4.2.8 Pop-up window

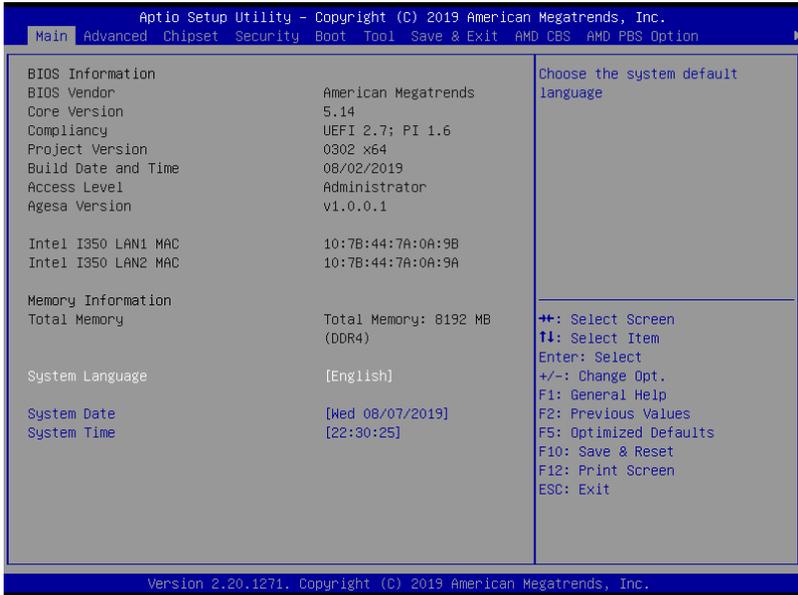
Select a menu item and press <Enter> to display a pop-up window with the configuration options for that item.

4.2.9 Scroll bar

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

4.3 Main menu

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



4.3.1 System Date [Day xx/xx/xxxx]

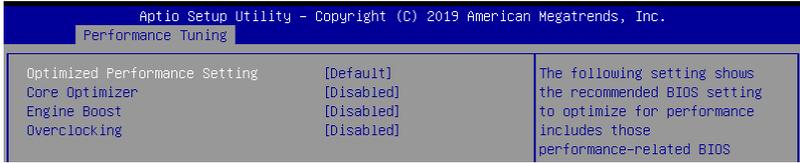
Allows you to set the system date.

4.3.2 System Time [xx:xx:xx]

Allows you to set the system time.

4.4 Performance Tuning menu

The Performance Tuning menu items allow you to change performance related settings for different scenarios.



Optimized Performance Setting [Default]

Allows you to select performance settings for different scenarios.

[Default] Default settings.

[By Benchmark] Optimize for different kinds of benchmarks. Select this option, then select a benchmark type from the >> list.

[By Workload] Optimize for different kinds of workloads. Select this option, then select a workload type from the >> list.

Configuration options:

[Peak Frequency Optimized] - Applies settings with performance and power consumption balance. Recommended for users that need higher performance.

[Latency Optimized] - Applies settings with low latency results. Recommended for latency-sensitive users.

[Power Efficient Optimized] - Applies settings with power efficiency. Recommended for general users.

[HPC] - Applies settings with optimized compute capability. Recommend for traditional HPC applications.



Core Optimizer and **Engine Boost** appear only when you set **Optimized Performance Setting** to **[Default]** or **[By Benchmark]**.

Core Optimizer [Disabled]

Enable this item to keep the processor operating at the turbo frequency.

Configuration options: [Disabled] [Enabled]



Linux support may vary by version of the OS.

Engine Boost [Disabled]

Enable this item to boost the CPU's frequency.

Configuration options: [Disabled] [Level1] [Level2] [Level3(Max)]

Overclocking [Disabled]

Enable this item to increase the CPU's clock.

Configuration options: [Disabled] [Level1] [Level2] [Level3(Max)]



Operate with an ambient temperature of 25°C or lower for optimized performance.



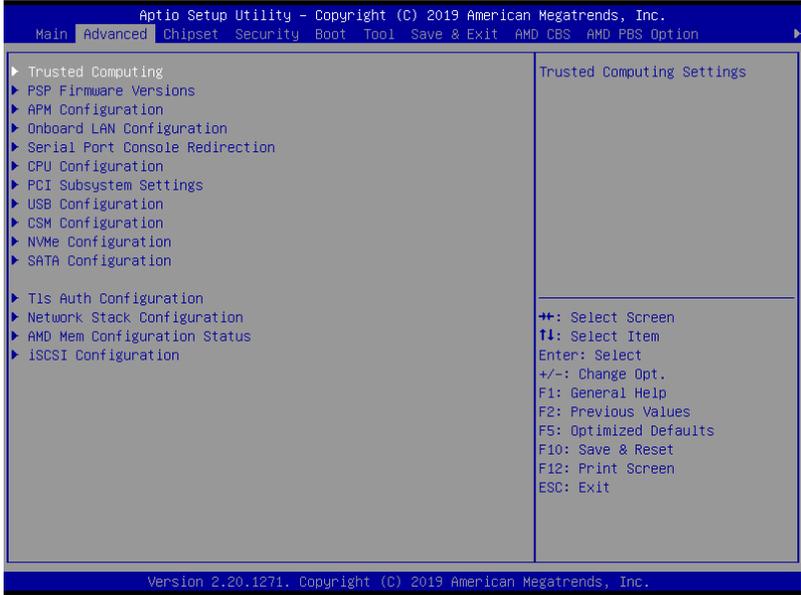
Please note that overclocking might cause component damage or system crashes, which may reduce the lifespan of the system and the CPU. Use this tool at your own risk.

4.5 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.



4.5.1 Trusted Computing

Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.		
Advanced		
Configuration		
Security Device Support	[Enable]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and TPM interface will not be
NO Security Device Found		

Configuration

Security Device Support [Disabled]

Allows you to enable or disable the BIOS support for security device.

Configuration options: [Disabled] [Enabled]

4.5.2 PSP Firmware Versions

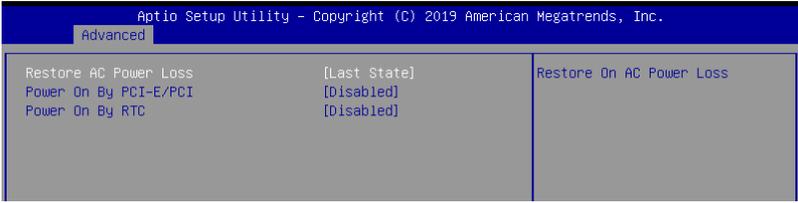
This page displays the PSP firmware versions.

Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.		
Advanced		
PSP Firmware Versions		
PSP Directory Level 1 (Fixed)		
PSP Recovery BL Ver	FF.C.0.68	
SMU FW Version	0.36.74.0	
ABL Version	00000000	
APCB Version	0000	
APDB Version	0000	
APPB Version	0000	
PSP Directory Level 2 (Updateable)		
PSP BootLoader Version	0.C.0.68	
SMU FW Version	0.36.74.0	
ABL Version	00000000	
APCB Version	0000	
APDB Version	0000	
APPB Version	0000	
		++: Select Screen
		↑↓: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F5: Optimized Defaults
		F10: Save & Reset
		F12: Print Screen
		ESC: Exit

Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.

4.5.3 APM Configuration

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



Restore AC Power Loss [Last State]

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

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

Power On By PCI-E/PCI [Disabled]

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

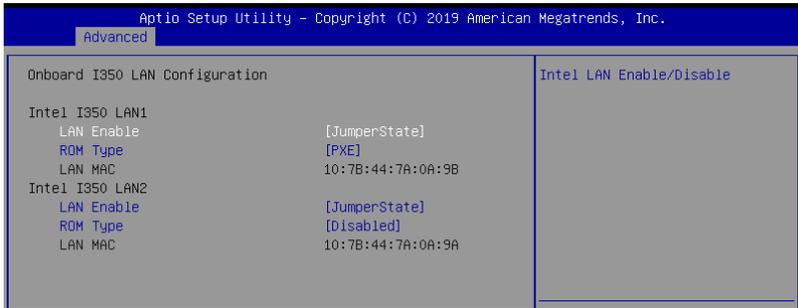
[Enabled] Enables the PCIE devices to generate a wake event.

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.

4.5.4 Onboard LAN Configuration



Onboard I350 LAN Configuration

Intel LAN1 I350

LAN Enable [JumperState]

Allows you to enable or disable the Intel LAN.

Configuration options: [Disabled] [JumperState]



The following items appear only when **LAN Enable** is set to [JumperState].

ROM Type [PXE]

Allows you to select the Intel LAN ROM type.

Configuration options: [PXE] [iSCSI] [Disabled]

Intel LAN2 I350

LAN Enable [JumperState]

Allows you to enable or disable the Intel LAN.

Configuration options: [Disabled] [JumperState]



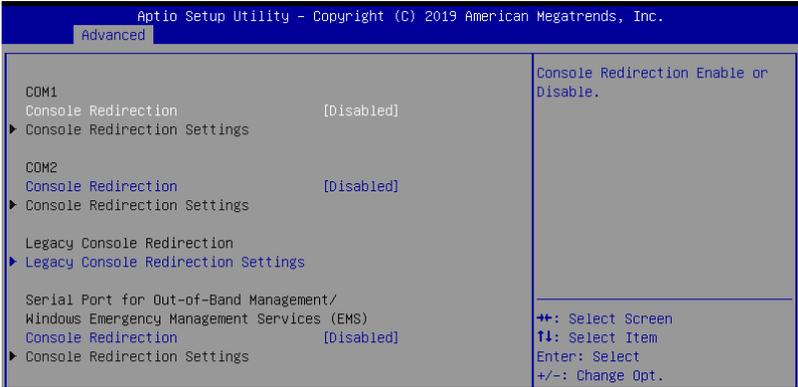
The following items appear only when **LAN Enable** is set to [JumperState].

ROM Type [Disabled]

Allows you to select the Intel LAN ROM type.

Configuration options: [PXE] [iSCSI] [Disabled]

4.5.5 Serial Port Console Redirection



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 [ANSI]

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 [115200]

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 [None]

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]

Resolution 100x31 [Disabled] [Enabled]

This allows you to enable or disable extended terminal resolution.

Configuration options: [Disabled] [Enabled]

Putty Keypad [VT100]

This allows you to select the FunctionKey and Keypad on Putty.

Configuration options: [VT100] [LINUX] [XTERMR6] [SCO] [ESCN] [VT400]

Legacy Console Redirection Settings**Redirection COM Port [COM1]**

Allows you to select a COM port to display redirection of Legacy OS and Legacy OPRM Messages.

Configuration options: [COM1] [COM2]

Resolution [80x24]

This allows you to set the number of rows and columns supported on the Legacy OS.

Configuration options: [80x24] [80x25]

Redirect After POST [Always Enable]

This setting allows you to specify if Bootloader is selected than Legacy console redirection.

Configuration options: [Always Enable] [Bootloader]

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]

4.5.6 CPU Configuration

This page displays the CPU node information.



SVM Mode [Enabled]

Allows you to enable or disable SVM Mode.

Configuration options: [Disabled] [Enabled]

SMEE [Enabled]

Allows you to enable or disable SMEE.

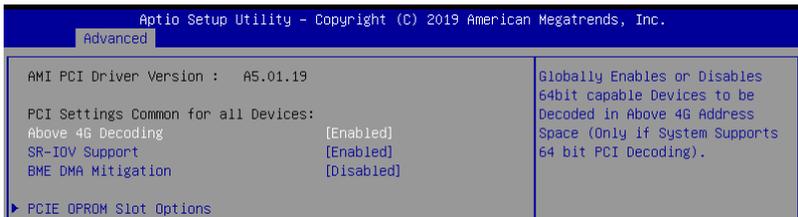
Configuration options: [Disabled] [Enabled]

Node 0 Information

This page displays the Node 0 Information.

4.5.7 PCI Subsystem Settings

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



Above 4G Decoding [Enabled]

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 [Enabled]

This option enables or disables Single Root IO Virtualization Support if the system has SR-IOV capable PCIe devices.

Configuration options: [Disabled] [Enabled]

BME DMA Mitigation [Disabled]

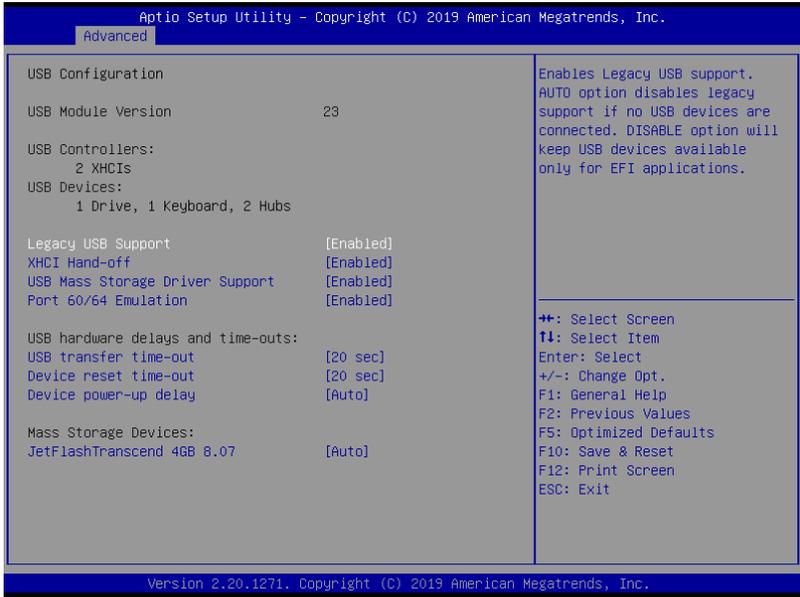
This allows you to enable or disable re-enabling Bus Master Attribute disabled during PCI enumeration for PCI Bridges after SMM locked.

Configuration options: [Disabled] [Enabled]

PCIE OPROM Slot Options

This page allows you to enable or disable OpROM on each PCIe Slot.

4.5.8 USB Configuration



Legacy USB Support [Enabled]

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

XHCI Hand-off [Enabled]

Allows you to enable or disable workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
Configuration options: [Enabled] [Disabled]

USB Mass Storage Driver Support [Enabled]

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

Port 60/64 Emulation [Enabled]

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

USB hardware delays and time-outs

USB transfer time-out [20 sec]

Allows you to select time-out value for Control, Bulk, and Interrupt transfers.

Configuration options: [1 sec] [5 sec] [10 sec] [20 sec]

Device reset time-out [20 sec]

Allows you to select time-out value for USB mass storage device Start Unit command.

Configuration options: [10 sec] [20 sec] [30 sec] [40 sec]

Device power-up delay [Auto]

Allows you to select maximum time the device will take before it properly reports itself to the Host Controller.

Configuration options: [Auto] [Manual]

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]

4.5.9 CSM Configuration



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.

HDD Connection Order [Adjust]

This option allows you to change the HDD order required for some OSes.
Configuration options: [Adjust] [Keep]

Boot Option filter [Legacy only]

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

Network / Storage / Video [Legacy]

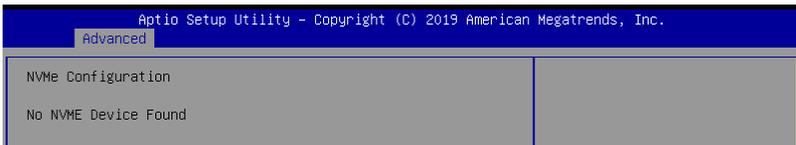
This option allows you to control the execution of UEFI and Legacy PXE / Storage / Video OpROM.
Configuration options: [UEFI] [Legacy]

Other PCI devices [Legacy]

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

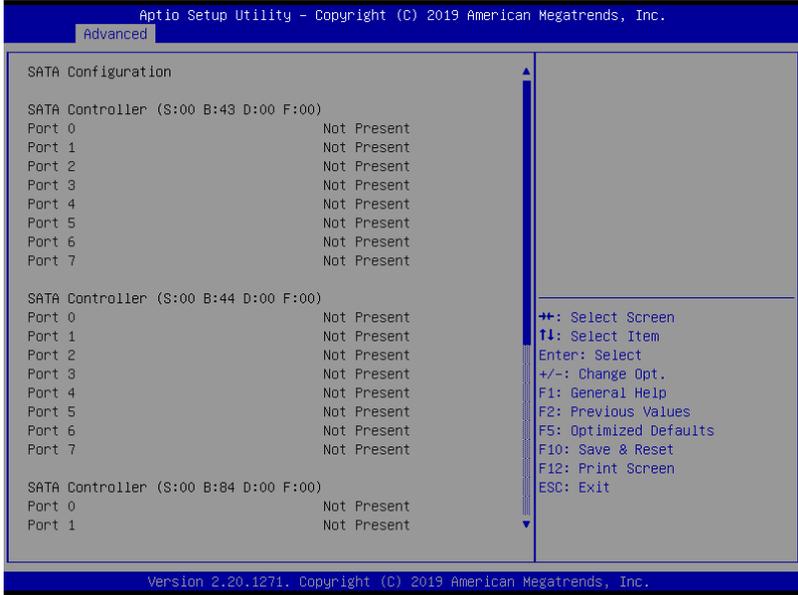
4.5.10 NVMe Configuration

This page will display the NVMe controller and drive information.



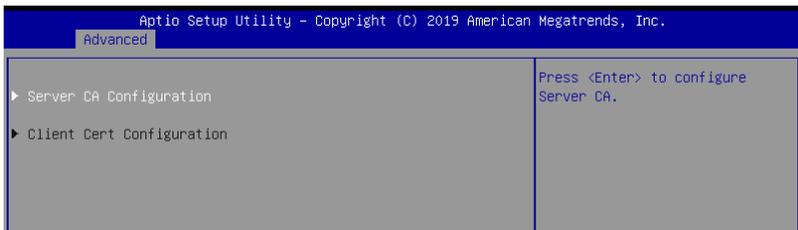
4.5.11 SATA Configuration

This page will display the SATA controller and drive information.

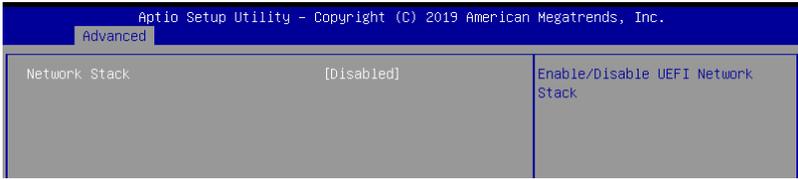


4.5.12 Tls Auth Configuration

Allows you to configure the Tls parameters.



4.5.13 Network Stack Configuration



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]

IPSEC Certificate [Disabled]

This item allows you to enable or disable IPSEC Certificate for Ikev.

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.

4.5.14 AMD Mem Configuration Status

Allows you to view the memory status.

Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.		
Advanced		
▶ Socket 0		Socket-specific memory configuration status
▶ Socket 1		
Mbist Test Enable	Disabled, 0xD003	
Mbist Aggressor Enable	Disabled, 0xD000	
Mbist Per Bit Slave Die Report	0x0000, 0xC000	
Dram Temp Controlled Refresh	Disabled, 0xC000	
Enable		
User Timing Mode	Disabled, 0xC015	
User Timing Value	Disabled, 0xC015	

4.5.15 iSCSI Configuration

Allows you to configure the iSCSI parameters.

Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.	
Advanced	
iSCSI Initiator Name	The worldwide unique name of iSCSI Initiator. Only IQN format is accepted. Range is from 4 to 223
▶ Add an Attempt	
▶ Delete Attempts	
▶ Change Attempt Order	

4.6 Chipset menu

The Chipset menu items allow you to change the Chipset settings.



PCIe Link Training Type [1 Step]

Allows you to select the PCIe training in 1 or 2 steps.

Configuration options: [1 Step] [2 Step]

PCIe Compliance Mode [Off]

Allows you to select the PCIe Compliance Mode.

Configuration options: [On] [Off]

North Bridge

Memory Configuration

Socket 0 Information

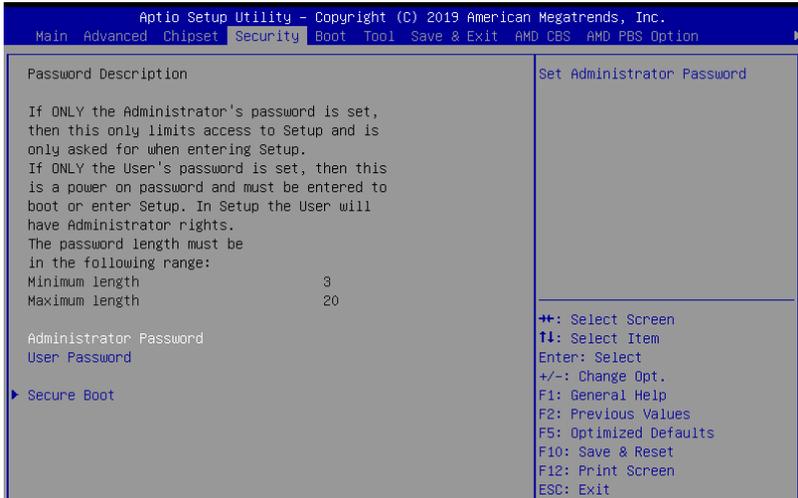
This item displays the memory information on Socket 0.

Socket 1 Information

This item displays the memory information on Socket 1.

4.7 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.



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:

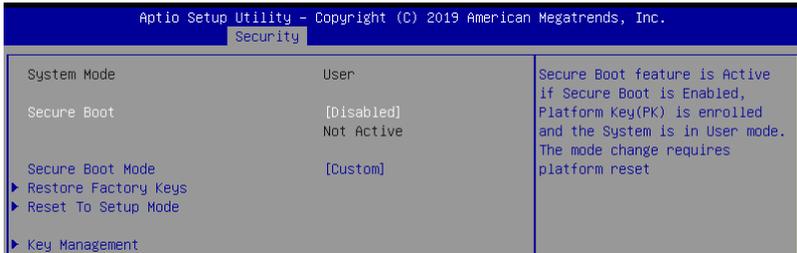
1. Select the User Password item and press <Enter>.
2. From the Enter Current Password box, key in the current password, then press <Enter>.
3. From the Create New Password box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

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.



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]

Restore Factory Keys

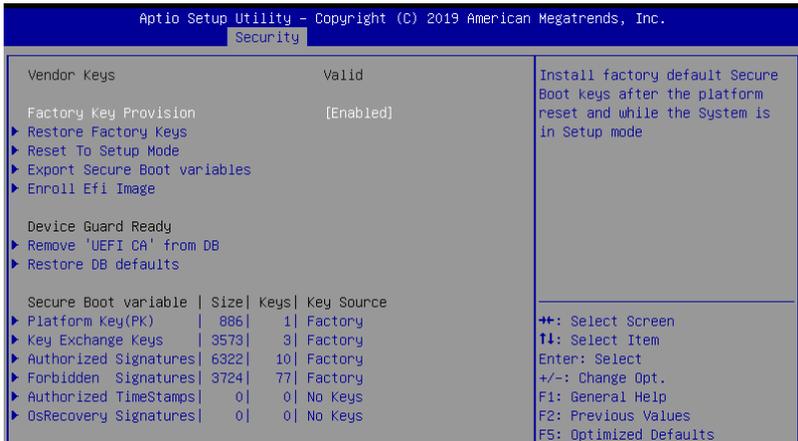
This option will force the system to User Mode, and install factory default Secure Boot key databases.

Reset to Setup Mode

This option will delete all Secure Boot key databases from NVRAM.

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.



Factory Key Provision [Enabled]

Allows you to provision factory default Secure Boot keys when the system is in Setup Mode.

Configuration options: [Disabled] [Enabled]

Restore Factory keys

This item will install all Factory Default keys.

Reset to Setup Mode

This item appears only when you load the default Secure Boot keys. This item allows you to clear all default Secure Boot keys.

Export 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.

Enroll Efi Image

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

Configuration options: [Set New] [Append]

Device Guard Ready

Remove 'UEFI CA' from DB

Remove Microsoft UEFI CA from Secure Boot DB.

Restore DB defaults

Restore DB variable to factory defaults.

Platform Key (PK)

Configuration options: [Details] [Export] [Update] [Delete]

Key Exchange Keys (KEK) / Authorized Signatures (DB) / Forbidden Signatures (DBX)

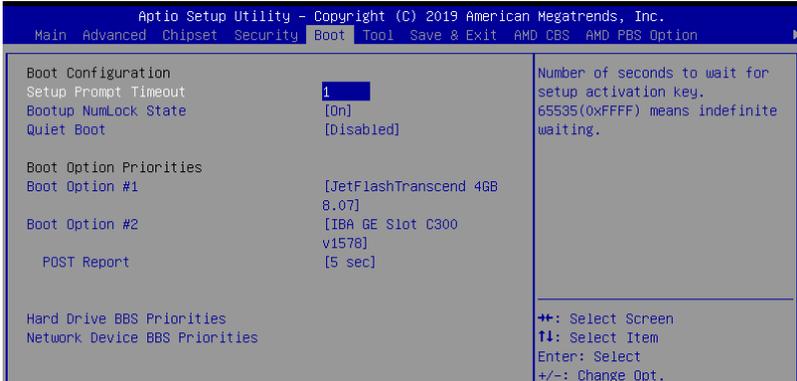
Configuration options: [Details] [Export] [Update] [Append] [Delete]

Authorized TimeStamps (DBT) / OsRecovery Signatures

Configuration options: [Update] [Append]

4.8 Boot menu

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



Setup Prompt Timeout [1]

Allows you to set the number of seconds to wait for setup activation key.

Bootup NumLock State [On]

Allows you to select the power-on state for the NumLock.

Configuration options: [Off] [On]

Quiet Boot [Disabled]

Allows you to enable or disable Quiet Boot.

Configuration options: [Disabled] [Enabled]

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.



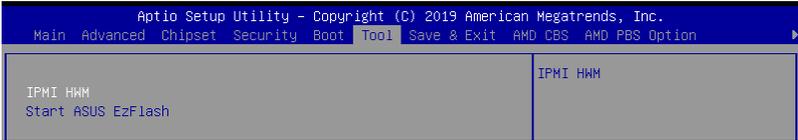
- To select the boot device during system startup, press <F8> when ASUS Logo appears.
- To access Windows OS in Safe Mode, please press <F8> after POST.

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.

4.9 Tool menu

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



IPMI HWM

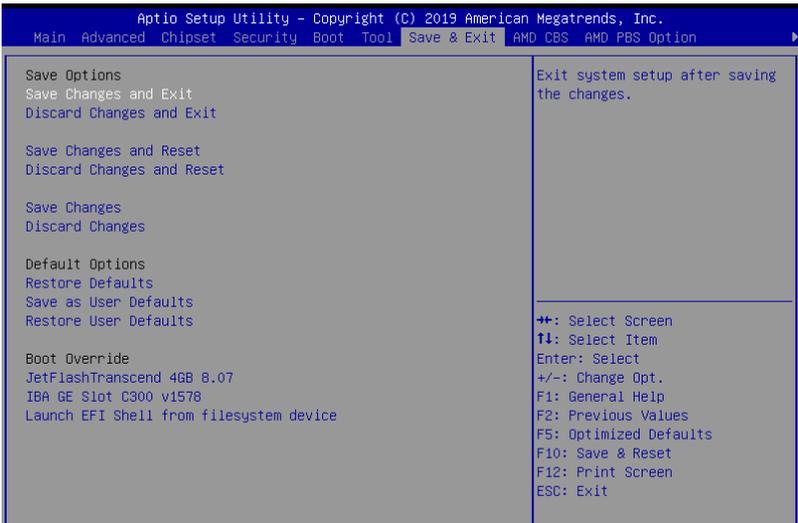
Allows you to run the IPMI hardware monitor.

Start EZ Flash

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

4.10 Save & Exit menu

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





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

Save Changes and Exit

Exit system setup after saving the changes.

Discard Changes and Exit

Exit system setup without saving any changes.

Save Changes and Reset

Rest system setup after saving the changes.

Discard Changes and Rest

Rest system setup without saving any changes.

Save Changes

Save changes done so far to any of the setup options.

Discard Changes

Discard changes done so far to any of the setup options.

Restore Defaults

Restore/load default values for all the setup options.

Save as User Defaults

Save all the current setup options as user default values.

Restore as User Defaults

Restore/load user default values for all the setup options.

Boot Override

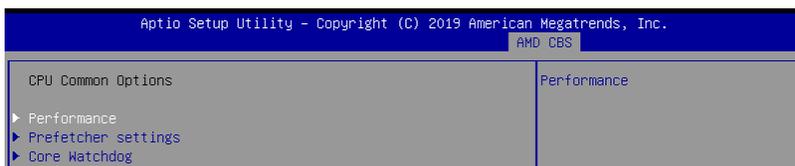
These items displays the available devices. The device items that appears on the screen depends on the number of devices installed in the system. Click an item to start booting from the selected device.

4.11 AMD CBS menu

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



4.11.1 CPU Common Options



Performance

Custom Core Pstates

This option allows you to enable Core Pstates. Read the disclaimer and select **I Accept** to continue.

CCD/Core/Thread Enablement

This option allows you to enable CCD/Core/Thread Enablement. Read the disclaimer and select **I Accept** to continue.

Prefetcher settings

L1 Stream HW Prefetcher [Auto]

This option allows you to enable or disable L1 Stream HW Prefetcher. Configuration options: [Disabled] [Enabled] [Auto]

L2 Stream HW Prefetcher [Auto]

This option allows you to enable or disable L2 Stream HW Prefetcher. Configuration options: [Disabled] [Enabled] [Auto]

Core Watchdog

Core Watchdog Timer Enable [Auto]

This option allows you to enable or disable Core Watchdog Timer. Configuration options: [Disabled] [Enabled] [Auto]

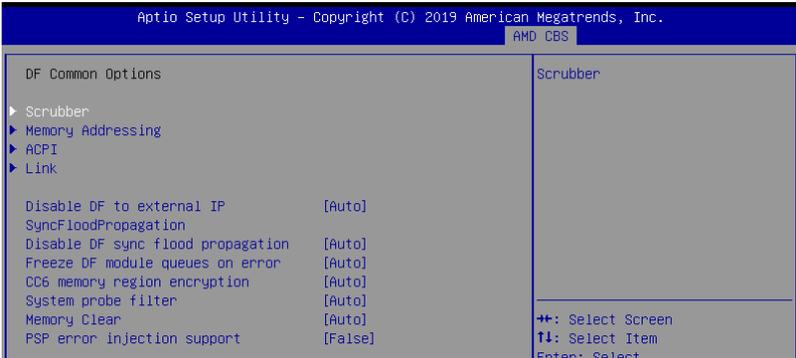
Core Performance Boost [Auto]

Configuration options: [Disabled] [Auto]

Global C-state Control [Auto]

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

4.11.2 DF Common Options



Scrubber

DRAM scrub time [Auto]

Configuration options: [Disabled] [1 hour] [4 hours] [8 hours] [16 hours] [24 hours] [48 hours] [Auto]

Poison scrubber control [Auto]

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

Redirect scrubber control [Auto]

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

Redirect scrubber limit [Auto]

Configuration options: [2] [4] [Infinite] [Auto]

Memory Addressing

NUMA nodes per socket [Auto]

Configuration options: [NPS0] [NPS1] [NPS2] [NPS4] [Auto]

Memory interleaving [Auto]

This option allows you to control fabric level memory interleaving.

Configuration options: [Disabled] [Auto]

Memory interleaving size [Auto]

This option allows you to control the memory interleaving size.

Configuration options: [256 Bytes] [512 Bytes] [1 KB] [2 KB] [Auto]

1TB remap [Auto]

Configuration options: [Do not remap] [Attempt to remap] [Auto]

DRAM map inversion Auto

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

Disable DF to external IP SyncFloodPropagation [Auto]

Configuration options: [Sync flood disabled] [Sync flood enabled] [Auto]

Disable DF sync flood propagation [Auto]

Configuration options: [Sync flood disabled] [Sync flood enabled] [Auto]

Freeze DF module queues on error [Auto]

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

CC6 memory region encryption [Auto]

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

System probe filter [Auto]

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

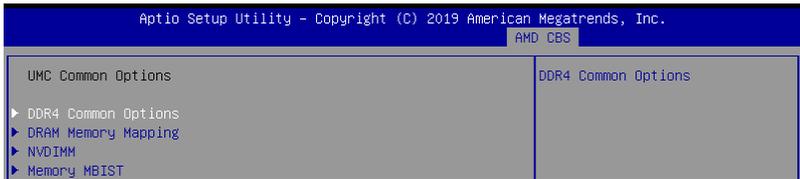
Memory Clear [Auto]

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

PSP error injection support [False]

Configuration options: [False] [True]

4.11.3 UMC Common Option



DDR4 Common Options

DRAM Timing Configuration

This option allows you to set memory overclock settings. Read the disclaimer and select **I Accept** to continue.

DRAM Controller Configuration

Power Down Options

Power Down Enable [Auto]

This option allows you to enable or disable DDR power down mode.
Configuration options: [Disabled] [Enabled] [Auto]

Cmd2T [Auto]

This option allows you to select between 1T and 2T mode on ADDR/CMD.
Configuration options: [1T] [2T] [Auto]

Gear Down Mode [Auto]

This option allows you to select the Gear Down Mode.

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

CAD Bus Configuration

CAD Bus Timing User Controls [Auto]

This option allows you to set the setup time on CAD bus signals to Auto or manual.

Configuration options: [Manual] [Auto]

CAD Bus Drive Strength User Controls [Auto]

This option allows you to set the Drive Strength on CAD bus signals to Auto or manual.

Configuration options: [Manual] [Auto]

Data Bus Configuration

Data Bus Configuration User Controls [Auto]

This option allows you to interleave memory blocks across DRAM chip selects for node 0.

Configuration options: [Auto] [Manual]



The following item appears only when **Data Bus Configuration User Controls** is set to **[Manual]**.

***RttNom* [Auto]**

Configuration options: [Rtt_Nom Disable] [RZQ/4] [RZQ/2] [RZQ/6] [RZQ/1] [RZQ/5] [RZQ/3] [RZQ/7] [Auto]

***RttWr* [Auto]**

Configuration options: [Dynamic ODT Off] [RZQ/2] [RZQ/1] [Hi-Z] [RZQ/3] [Auto]

***RttPark* [Auto]**

Configuration options: [Rtt_PARK Disable] [RZQ/4] [RZQ/2] [RZQ/6] [RZQ/1] [RZQ/5] [RZQ/3] [RZQ/7] [Auto]

Common RAS

Data Poisoning [Auto]

This option allows you to enable or disable Data Poisoning.

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

DRAM Post Package Repair [Disabled]

Configuration options: [Disabled] [Enabled]

RCD Parity [Auto]

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

DRAM Address Command Parity Retry [Auto]

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

Write CRC Enable [Auto]

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

DRAM Write CRC Enable and Retry Limit [Auto]

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

Disable Memory Error Injection [True]

Configuration options: [False] [True]

ECC Configuration***DRAM ECC Symbol Size [Auto]***

This option allows you to set the DRAM ECC Symbol Size.

Configuration options: [Auto] [x4] [x8]

DRAM ECC Enable [Auto]

This option allows you to enable or disable DRAM ECC.

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

DRAM UECC Retry [Auto]

This option allows you to enable or disable DRAM UECC Retry.

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

Security**TSME [Auto]**

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

Data Scramble [Auto]

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

DRAM Memory Mapping**Chipselect Interleaving [Auto]**

This option allows you to interleave memory blocks across DRAM chip selects for node 0.

Configuration options: [Disabled] [Auto]

BankGroupSwap [Auto]

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

Address Hash Bank [Auto]

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

Address Hash CS [Auto]

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

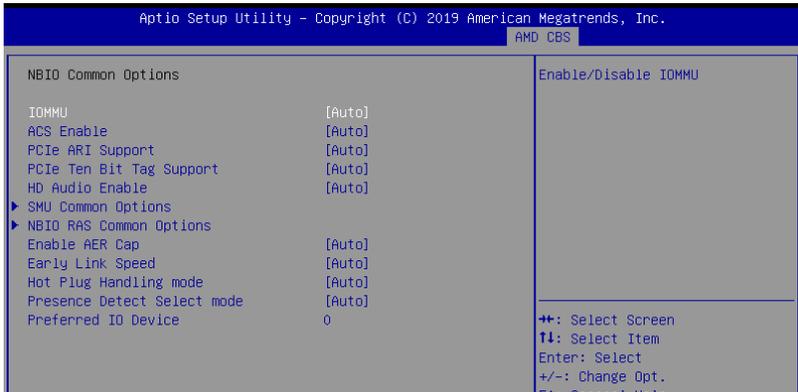
Address Hash Rm [Auto]

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

SPD Read Optimization [Auto]

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

4.11.4 NBIO Common Options



IOMMU [Auto]

This option allows you to enable or disable IOMMU.

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

ACS Enable [Auto]

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

PCIe ARI Support [Auto]

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

PCIe Ten Bit Tag Support [Auto]

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

SMU Common Options

Determinism Control [Auto]

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

cTDP Control [Manual]

This option allows you to set the cTDP.

Configuration options: [Manual] [Auto]



The following item appears only when **cTDP Control** is set to **[Manual]**.

cTDP [200]

This option allows you to set the cTDP value.

Package Power Limit Control [Manual]

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



The following item appears only when **cTDP Control** is set to **[Manual]**.

Package Power Limit [240]

This option allows you to set the cTDP value.

APBDIS [Auto]

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

DF Cstates [Auto]

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

CPPC [Auto]

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

BoostFmaxEn [Auto]

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

NBIO RAS Common Options

Determinism Control [Auto]

Configuration options: [Manual] [Auto]

NBIO RAS Global Control [Auto]

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

NBIO RAS Control [MCA]

Configuration options: [MCA] [Legacy] [Disabled]

Egress Poison Severity High

This option allows you to set the Egress Poison Severity High value.

Egress Poison Severity Low

This option allows you to set the Egress Poison Severity Low value.

NBIO SyncFlood Generation [Auto]

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

NBIO SyncFlood Reporting [Disabled]

Configuration options: [Disabled] [Enabled]

Egress Poison Mask High

This option allows you to set the Egress Poison Mask High value.

Egress Poison Mask Low

This option allows you to set the Egress Poison Mask Low value.

Uncorrected Converted to Poison Enable Mask High

This option allows you to set the Uncorrected Converted to Poison Enable Mask High value.

Uncorrected Converted to Poison Enable Mask Low

This option allows you to set the Uncorrected Converted to Poison Enable Mask Low value.

System Hub Watchdog Timer

This option allows you to set the System Hub Watchdog Timer value.

SLINK Read Response OK [Disabled]

Configuration options: [Disabled] [Enabled]

SLINK Read Response Error Handling [Log Error in MCA]

Configuration options: [Log Error in MCA][Enabled] [Trigger MCOMMIT error]

Log Poison Data from SLINK [Disabled]

Configuration options: [Disabled] [Enabled]

PCIe Aer Reporting Mechanism [Auto]

Configuration options: [Firmware First] [OS First] [MCA] [Auto]

Edpc Control [Disabled]

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

NBIO Poison Consumption [Auto]

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

Sync Flood on PCIe Fatal Error [Auto]

Configuration options: [True] [False] [Auto]

Enable AER Cap [Auto]

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

Early Link Speed [Auto]

Configuration options: [Gen1] [Gen2] [Auto]

Hot Plug Handling mode [Auto]

Configuration options: [A0 Mode] [OS First (No Error Handling)]
[OS First (Error Handling - Not Implemented)]
[Firmware First (Not Implemented)] [Auto]

Presence Detect Select mode [Auto]

Configuration options: [OR] [AND] [Auto]

4.11.5 FCH Common Options



USB Configuration Options

XHCI Controller0 enable [Auto]

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

XHCI Controller1 enable [Auto]

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

USB ecc SMI Enable [Auto]

Configuration options: [Off] [Enabled] [Auto]

MCM USB

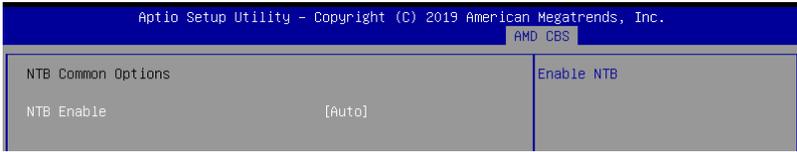
XHCI2 enable (Socket1) [Auto]

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

XHCI3 enable (Socket1) [Auto]

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

4.11.6 NTB Common Options



NTB Enable [Auto]

Configuration options: [Enabled] [Auto]



The following item appears only when **NTB Enable** is set to **[NTB Enable]**.

NTB Location [Auto]

Configuration options: [Auto] [Socket0-Die0] [Socket0-Die1] [Socket0-Die2]
[Socket0-Die3] [Socket1-Die0] [Socket1-Die1]
[Socket1-Die2] [Socket1-Die3]

NTB active on PCIeCore [Auto]

Configuration options: [Auto] [Core0] [Core1]

NTB Mode [Auto]

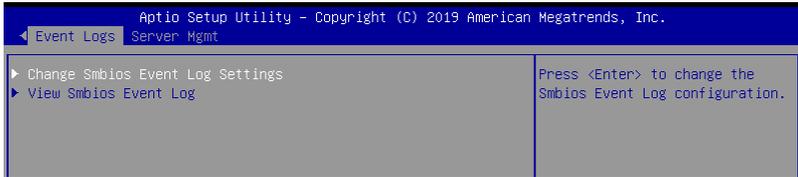
Configuration options: [NTB Disabled] [NTB Primary] [NTB Secondary]
[NTB Random] [Auto]

Link Speed [Auto]

Configuration options: [MAX Speed] [Gen 1] [Gen 2] [Gen 3] [Auto] [Gen 4]

4.12 Event Logs menu

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



4.12.1 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]

Smbios Event Log Standard Settings

Log System Boot Event [Disabled]

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

MECI [1]

Multiple Event Count Increment (MECI). The number of occurrences of a duplicate event that must pass before the multiple-event counter associated with the log entry is updated, specified as a numeric value in the range 1 to 255.

METW [60]

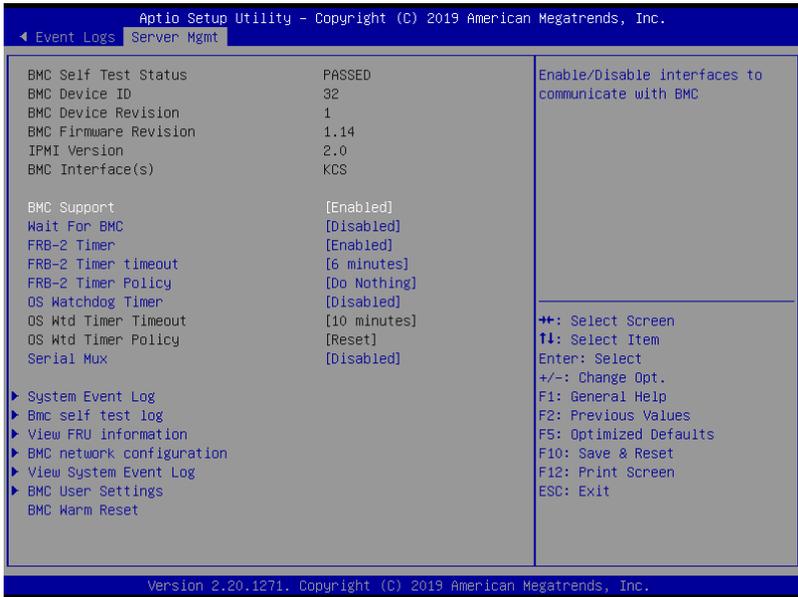
Multiple Event Time Windows (METW). The number of minutes which must pass between duplicate log entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.

4.12.2 View Smbios Event Log

Press <Enter> to view all smbios event logs.

4.13 Server Mgmt menu

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



BMC Support [Enabled]

Configuration options: [Disabled] [Enabled]

Wait For BMC [Disabled]

Configuration options: [Disabled] [Enabled]

FRB-2 Timer [Enabled]

Configuration options: [Disabled] [Enabled]

FRB-2 Timer timeout [6 minutes]

Configuration options: [3 minutes] [4 minutes] [5 minutes] [6 minutes]

FRB-2 Timer Policy [Do Nothing]

Configuration options: [Do Nothing] [Reset] [Power Down] [Power Cycle]

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 of 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.

SEL Components [Enabled]

This option allows you to enable or disable SEL Components.

Configuration options: [Disabled] [Enabled]



The following items is configurable only when the **SEL Components** is set to **[Enabled]**.

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]

Log EFI Status Codes [Error code]

Configuration options: [Disabled] [Both] [Error code] [Progress code]

BMC self test log

Erase Log [Yes, On every reset]

Configuration options: [Yes, On every reset] [No]

When log is full [Clear Log]

Configuration options: [Clear Log] [Do not log any more]

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.

Driver Installation

5

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

5.1 Running the Support DVD

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.

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

1. **Drivers** - Shows the available device drivers that the system detects.
2. **Utilities** - Displays the software applications and utilities that the motherboard supports.
3. **Manual** - Provides the link to the user guide(s).



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

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

Appendix



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

Q-Code table

Code	Description
00	Not used
02	microcode
03	CACHE_ENABLED
04	PCH initialization
06	CPU_EARLY_INIT
10	PEI Core is started
11 – 14	Pre-memory CPU initialization is started
15 – 18	Pre-memory System Agent initialization is started
19 – 1C	Pre-memory PCH initialization is started
2B – 2F	Memory initialization
30	Reserved for ASL (see ASL Status Codes section below)
31	Memory Installed
32 – 36	CPU post-memory initialization
37 – 3A	Post-Memory System Agent initialization is started
3B – 3E	Post-Memory PCH initialization is started
4F	DXE IPL is started
50 – 53	Memory initialization error. Invalid memory type or incompatible memory speed
4F	DXE IPL is started
54	Unspecified memory initialization error
55	Memory not installed
56	Invalid CPU type or Speed
57	CPU mismatch
58	CPU self test failed or possible CPU cache error
59	CPU micro-code is not found or micro-code update is failed
5A	Internal CPU error
5B	Reset PPI is not available
5C – 5F	Reserved for future AMI error codes
E0	S3 Resume is started (S3 Resume PPI is called by the DXE IPL)
E1	S3 Boot Script execution
E2	Video repost
E3	OS S3 wake vector call
E4 – E7	Reserved for future AMI progress codes
E8	S3 Resume Failed
E9	S3 Resume PPI not Found
EA	S3 Resume Boot Script Error
EB	S3 OS Wake Error
EC – EF	Reserved for future AMI error codes
F0	Recovery condition triggered by firmware (Auto recovery)
F1	Recovery condition triggered by user (Forced recovery)
F2	Recovery process started
F3	Recovery firmware image is found
F4	Recovery firmware image is loaded
F5 – F7	Reserved for future AMI progress codes
F8	Recovery PPI is not available
F9	Recovery capsule is not found

(continued on the next page)

Code	Description
FA	Invalid recovery capsule
FB – FF	Reserved for future AMI error codes
60	DXE Core is started
61	NVRAM initialization
62	Installation of the PCH Runtime Services
63 – 67	CPU DXE initialization is started
68	PCI host bridge initialization
69	System Agent DXE initialization is started
6A	System Agent DXE SMM initialization is started
6B – 6F	System Agent DXE initialization (System Agent module specific)
70	PCH DXE initialization is started
71	PCH DXE SMM initialization is started
72	PCH devices initialization
73 – 77	PCH DXE Initialization (PCH module specific)
78	ACPI module initialization
79	CSM initialization
7A – 7F	Reserved for future AMI DXE codes
90	Boot Device Selection (BDS) phase is started
91	Driver connecting is started
92	PCI Bus initialization is started
93	PCI Bus Hot Plug Controller Initialization
94	PCI Bus Enumeration
95	PCI Bus Request Resources
96	PCI Bus Assign Resources
97	Console Output devices connect
98	Console input devices connect
99	Super IO Initialization
9A	USB initialization is started
9B	USB Reset
9C	USB Detect
9D	USB Enable
9E – 9F	Reserved for future AMI codes
A0	IDE initialization is started
A1	IDE Reset
A2	IDE Detect
A3	IDE Enable
A4	SCSI initialization is started
A5	SCSI Reset
A6	SCSI Detect
A7	SCSI Enable
A8	Setup Verifying Password
A9	Start of Setup
AA	Reserved for ASL (see ASL Status Codes section below)
AB	Setup Input Wait

(continued on the next page)

Code	Description
AC	Reserved for ASL (see ASL Status Codes section below)
AD	Ready To Boot event
AE	Legacy Boot event
AF	Exit Boot Services event
B0	Runtime Set Virtual Address MAP Begin
B1	Runtime Set Virtual Address MAP End
B2	Legacy Option ROM Initialization
B3	System Reset
B4	USB hot plug
B5	PCI bus hot plug
B6	Clean-up of NVRAM
B7	Configuration Reset (reset of NVRAM settings)
B8– BF	Reserved for future AMI codes
D0	CPU initialization error
D1	System Agent initialization error
D2	PCH initialization error
D3	Some of the Architectural Protocols are not available
D4	PCI resource allocation error. Out of Resources
D5	No Space for Legacy Option ROM
D6	No Console Output Devices are found
D7	No Console Input Devices are found
D8	Invalid password
D9	Error loading Boot Option (LoadImage returned error)
DA	Boot Option is failed (StartImage returned error)
DB	Flash update is failed
DC	Reset protocol is not available

ACPI/ASL Checkpoints (under OS)

Code	Description
03	System is entering S3 sleep state
04	System is entering S4 sleep state
05	System is entering S5 sleep state
30	System is waking up from the S3 sleep state
40	System is waking up from the S4 sleep state
AC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
AA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

Notices

Federal Communications Commission Statement

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

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

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

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



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

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

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

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

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

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

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

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>.

Japan statement notice

This product cannot be directly connected to the Internet (including public wireless LAN) of a telecom carrier (mobile network companies, landline network companies, Internet providers, etc.). When connecting this product to the Internet, be sure to connect it through a router or switch.

Declaration of compliance for product environmental regulation

ASUS follows the green design concept to design and manufacture our products, and makes sure that each stage of the product life cycle of ASUS product is in line with global environmental regulations. In addition, ASUS disclose the relevant information based on regulation requirements.

Please refer to <http://csr.asus.com/Compliance.htm> for information disclosure based on regulation requirements ASUS is complied with:

EU REACH and Article 33

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>.

EU RoHS

This product complies with the EU RoHS Directive. For more details, see <http://csr.asus.com/english/article.aspx?id=35>

India RoHS

This product complies with the "India E-Waste (Management) Rules, 2016" and prohibits use of lead, mercury, hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) in concentrations exceeding 0.1% by weight in homogenous materials and 0.01% by weight in homogenous materials for cadmium, except for the exemptions listed in Schedule II of the Rule.

Vietnam RoHS

ASUS products sold in Vietnam, on or after September 23, 2011, meet the requirements of the Vietnam Circular 30/2011/TT-BCT.

Các sản phẩm ASUS bán tại Việt Nam, vào ngày 23 tháng 9 năm 2011 trở về sau, đều phải đáp ứng các yêu cầu của Thông tư 30/2011/TT-BCT của Việt Nam.

Turkey RoHS

AEEE Yönetmeliğine Uygundur

ASUS Recycling/Takeback Services

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



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



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

Simplified EU Declaration of Conformity

English ASUSTeK Computer Inc. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of related Directives. Full text of EU declaration of conformity is available at: www.asus.com/support

Français ASUSTeK Computer Inc. déclare par la présente que cet appareil est conforme aux critères essentiels et autres clauses pertinentes des directives concernées. La déclaration de conformité de l'UE peut être téléchargée à partir du site Internet suivant : www.asus.com/support

Deutsch ASUSTeK Computer Inc. erklärt hiermit, dass dieses Gerät mit den wesentlichen Anforderungen und anderen relevanten Bestimmungen der zugehörigen Richtlinien übereinstimmt. Der gesamte Text der EU-Konformitätserklärung ist verfügbar unter: www.asus.com/support

Italiano ASUSTeK Computer Inc. con la presente dichiara che questo dispositivo è conforme ai requisiti essenziali e alle altre disposizioni pertinenti con le direttive correlate. Il testo completo della dichiarazione di conformità UE è disponibile all'indirizzo: www.asus.com/support

Русский Компания ASUS заявляет, что это устройство соответствует основным требованиям и другим соответствующим условиям соответствующих директив. Подробную информацию, пожалуйста, смотрите на www.asus.com/support

Български С настоящото ASUSTeK Computer Inc. декларира, че това устройство е в съответствие със съществените изисквания и другите приложни постановления на свързаните директиви. Пълният текст на декларацията за съответствие на ЕС е достъпен на адрес: www.asus.com/support

Hrvatski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj skladan s bitnim zahtjevima i ostalim odgovarajućim odredbama vezanih direktiva. Cijeli tekst EU izjave o sukladnosti dostupan je na: www.asus.com/support

Čeština Společnost ASUSTeK Computer Inc. tímto prohlašuje, že toto zařízení splňuje základní požadavky a další příslušná ustanovení souvisejících směrnic. Plně znění prohlášení o shodě EU je k dispozici na adrese: www.asus.com/support

Dansk ASUSTeK Computer Inc. erklærer hermed, at denne enhed er i overensstemmelse med hovedkravene og andre relevante bestemmelser i de relaterede direktiver. Hele EU-overensstemmelseserklæringen kan findes på: www.asus.com/support

Nederlands ASUSTeK Computer Inc. verklaart hierbij dat dit apparaat voldoet aan de essentiële vereisten en andere relevante bepalingen van de verwante richtlijnen. De volledige tekst van de EU-verklaring van conformiteit is beschikbaar op: www.asus.com/support

Eesti Käesolevaga kinnitab ASUSTeK Computer Inc, et see seade vastab asjakohaste direktiivide olulistele nõuetele ja teisteles asjaspeputuvatele sätetele. EL vastavusdeklaratsiooni täielik tekst on saadaval järgmisel aadressil: www.asus.com/support

Suomi ASUSTeK Computer Inc. ilmoittaa täten, että tämä laite on asiaankuuluvien direktiivien olennaisten vaatimusten ja muiden tätä koskevien säädösten mukainen. EU-yhdenmukaisuusilmoituksen koko teksti on luettavissa osoitteessa: www.asus.com/support

Ελληνικά Με το παρόν, η ASUSTeK Computer Inc. δηλώνει ότι αυτή η συσκευή συμμορφώνεται με τις θεμελιώδεις απαιτήσεις και άλλες σχετικές διατάξεις των Οδηγών της ΕΕ. Το πλήρες κείμενο της δήλωσης συμμορφότητας είναι διαθέσιμο στη διεύθυνση: www.asus.com/support

Magyar Az ASUSTeK Computer Inc. ezennel kijelenti, hogy ez az eszköz megfelel a kapcsolódó irányelvek lényeges követelményeinek és egyéb vonatkozó rendelkezéseinek. Az EU megfeleléségi nyilatkozat teljes szövege innen letölthető: www.asus.com/support

Latviski ASUSTeK Computer Inc. ar šo paziņo, ka šī ierīce atbilst saistīto Direktīvu būtiskajām prasībām un citiem citiem saistītajiem nosacījumiem. Pilns ES atbilstības paziņojuma teksts pieejams šeit: www.asus.com/support

Lietuvių „ASUSTeK Computer Inc.“ šiuo tvirtina, kad šis įrenginys atitinka pagrindinius reikalavimus ir kitas svarbias susijusių direktyvų nuostatas. Visą ES atitikties deklaracijos tekstą galima rasti: www.asus.com/support

Norsk ASUSTeK Computer Inc. erklærer herved at denne enheten er i samsvar med hovedsaklige krav og andre relevante forskrifter i relaterte direktiver. Fullstendig tekst for EU-samsvarserklæringen finnes på: www.asus.com/support

Polski Firma ASUSTeK Computer Inc. niniejszym oświadczca, że urządzenie to jest zgodne z zasadniczymi wymogami i innymi właściwymi postanowieniami powiązanych dyrektyw. Pełny tekst deklaracji zgodności UE jest dostępny pod adresem: www.asus.com/support

Português A ASUSTeK Computer Inc. declara que este dispositivo está em conformidade com os requisitos essenciais e outras disposições relevantes das Diretivas relacionadas. Texto integral da declaração da UE disponível em: www.asus.com/support

Română ASUSTeK Computer Inc. declară că acest dispozitiv se conformează cerințelor esențiale și altor prevederi relevante ale directivelor conexe. Textul complet al declarației de conformitate a Uniunii Europene se găsește la: www.asus.com/support

Srpski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj u saglasnosti sa osnovnim zahtjevima i drugim relevantnim odredbama povezanih Direktiva. Pun tekst EU deklaracije o usaglasnosti je dostupan da adres: www.asus.com/support

Slovensky Spoločnosť ASUSTeK Computer Inc. týmto vyhlasuje, že toto zariadenie vyhovuje základným požiadavkám a ostatným príslušným ustanoveniam príslušných smerníc. Celý text vyhlásenia o zhode pre štáty EÚ je dostupný na adrese: www.asus.com/support

Slovenščina Spoločnosť ASUSTeK Computer Inc. izjavlja, da je ta naprava skladna z bistvenimi zahtevami in drugimi ustreznimi določbami povezanih direktiv. Celotno besedilo EU-izjave o skladnosti je na voljo na spletnem mestu: www.asus.com/support

Español Por la presente, ASUSTeK Computer Inc. declara que este dispositivo cumple los requisitos básicos y otras disposiciones pertinentes de las directivas relacionadas. El texto completo de la declaración de la UE de conformidad está disponible en: www.asus.com/support

Svenska ASUSTeK Computer Inc. förklarar härmed att denna enhet överensstämmer med de grundläggande kraven och andra relevanta föreskrifter i relaterade direktiv. Fulltext av EU-försäkran om överensstämmelse finns på: www.asus.com/support

Українська ASUSTeK Computer Inc. заявляє, що цей пристрій відповідає основним вимогам та іншим відповідним положенням відповідних Директив. Повний текст декларації відповідності стандартам ЄС доступний на: www.asus.com/support

Türkçe ASUSTeK Computer Inc., bu aygıtın temel gereksinimlerle ve ilişkili Yönergelerin diğer ilgili koşullarıyla uyumlu olduğunu beyan eder. AB uygunluk bildiriminin tam metni şu adreste bulunabilir: www.asus.com/support

Bosanski ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj usklađen sa bitnim zahtjevima i ostalim odgovarajućim odredbama vezanih direktiva. Cijeli tekst EU izjave o usklađenosti dostupan je na: www.asus.com/support

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