P13R-I

Motherboard

E26383
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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.

Conventions used in this guide

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



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



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



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



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

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key. Example: <Enter> means that you must press the Enter or Return key.
<Key1> + <Key2> + <Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: <Ctrl> + <Alt> + <Del>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets. Example: At the command prompt, type the command line: `format A:/S`

Specifications summary

		P13R-I
Processor support / system bus		1 x Socket V (LGA 1700) Intel® Xeon® 6300 series processors* Intel® Xeon® E series processors* Intel® Pentium™ processors * Up to 95W
Core logic		Intel® C262 Chipset
Form factor		Mini ITX, 6.7” x 6.7”
ASUS features		Fan speed control, ASUS Control Center
Memory	Total slots	2 (2 Channels)
	Voltage	1.1V
	Capacity	Maximum up to 64GB
	Memory type	DDR5 4800/4400/4000/3600 ECC UDIMM
	Memory size	64GB
Expansion slots (SSI location numbers)	Total PCI/PCIe slots	1
	Slot location 1	PCIe x16 slot, x16 Gen5 link
	Slot location 2	-
	Slot location 3	-
	Slot location 4	-
	Slot location 5	-
	Slot location 6	-
	Slot location 7	-
Storage	SATA controller	Intel® C262: 6 x SATA 6Gb/s ports 1 x M.2 (2280 only, supports NVMe PCIe x4 link)
Networking	LAN	2 x Intel® I210-AT2 1 x Mgmt LAN
Graphics		Aspeed AST2600 64MB

(continued on the next page)

		P13R-I
Onboard I/O connectors	TPM header	1
	PSU connector	24-pin ATX power connector 8-pin ATX 12V power connector
	USB connector/ header	2 x USB 3.2 Gen 2 (rear) 2 x USB 3.2 Gen 1 (rear) 1 x USB 3.2 Gen 1 (header, 2 ports)
	Fan header	2 x 4-pin headers
	Chassis intrusion	1
	Front LAN LED	2
	Serial port header	1
	M.2 connector	1
Rear I/O connectors	External USB port	2 x USB 3.2 Gen 2 (rear) 2 x USB 3.2 Gen 1 (rear)
	VGA port	1
	RJ-45	2 x GbE LAN 1 x Mgmt LAN
Management solution	Software	ASUS Control Center Enterprise (optional)
	Out of Band remote management	Onboard ASMB11-iKVM for KVM-over-IP
Monitoring		CPU temperature, fan RPM
Environment		Operating temperature: 10°C ~ 50°C* Non-operating temperature: -40°C ~ 70°C Non-operating humidity: 20% ~ 90% (Non-condensing) * **The boundary condition above is based on a 8.3W of PCH TDP specification. If the LFM estimate is higher than an acceptable value from the customer, ASUS can provide a boundary condition with raw power for reference**

Specifications are subject to change without notice.

1 Product Introduction

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

1.1 Welcome!

Thank you for buying an ASUS® P13R-I motherboard!

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

1.2 Package contents

Before you start installing the motherboard and hardware devices on it, check your motherboard package for the following items:

Items		Standard Gift Box Pack	Standard Bulk Pack
I/O Shield		1	1
Cable	2-in-1 SATA 6G cable	1	-
	COM port cable	1	-
Accessory	Metal Plate for LGA1700	1	1
Packaging Qty.		1 pc per carton	10 pcs per carton

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

1.3 Serial number label

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



1.4 Special features

1.4.1 Product highlights

Latest processor technology

This motherboard supports the latest Intel® Xeon® / Pentium™ processors in LGA1700 package, which have memory and PCI Express controller integrated to support 2-channel (2 DIMMs) DDR5 memory and PCI Express 5.0 lanes. The Intel® Xeon® processors have improved CPU performance and integrated voltage regulators making it one of the most powerful and energy efficient CPUs in the world.

DMI Speed 4.0 x8

Improvement for a significant upgrade over traditional 4.0 x4.

Intel® Turbo Boost

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

Intel® Hyper Threading

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

Intel® EM64T

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

DDR5 memory support

The motherboard supports DDR5 memory that features faster clock frequencies and higher data transfer rates of 4800 MT/s (million transfers per second). DDR5 offers a lower voltage standard of 1.1V that reduces memory power demand and provides improved performance.

PCI Express 5.0

PCI Express® 5.0 (PCIe 5.0) delivers 32 GT/s bandwidth, which is double the speed of PCIe 4.0, offering lower power consumption, better lane scalability and backwards compatibility. This motherboard is PCIe 5.0 ready to support a diverse array of graphics, storage and networking – enabling flexible scalability for demanding or increasing workloads.

PCI Express 4.0

PCI Express 4.0 (PCIe 4.0) is the PCI Express bus standard that provides twice the performance and speed of PCIe 3.0. It provides an optimal graphics performance, unprecedented data speed, and seamless transition with its complete backward compatibility with PCIe 1.0 to PCIe 3.0 devices.

Intel® I210AT2 LAN Solution

The motherboard comes with two Gigabit LAN controllers and ports which provide a total solution for your networking needs. The onboard Intel® I210-AT2 Gigabit LAN controllers use the PCI Express interface and could achieve network throughput close to Gigabit bandwidth.

Enhanced Intel SpeedStep Technology (EIST)

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

Serial ATA III technology

The motherboard supports the Serial ATA III 6 Gb/s technology through the Serial ATA interface and Intel® C262 chipset. Get enhanced scalability, faster data retrieval, double the bandwidth of current bus systems with up to 6Gbps data transfer rates.

USB 3.2 Gen 1 (5Gbps) / Gen 2 (10Gbps) technology

The motherboard implements the USB 3.2 Gen 1 / Gen 2 technology with data transfer speeds of up to 5Gbps or 10Gbps, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.

Temperature, fan, and voltage monitoring

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

1.4.2 Innovative ASUS features

ASUS Fan Speed technology

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

2 Hardware Information

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 motherboard components or change any motherboard settings.



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

2.2 Motherboard overview

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

To optimize the motherboard features, we highly recommend that you install it in an ATX 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!

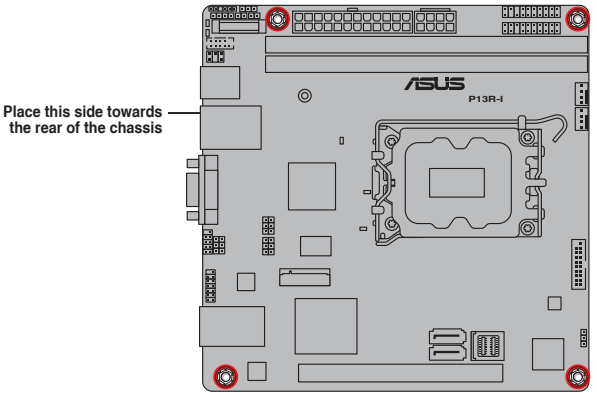
2.2.1 Placement direction

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.

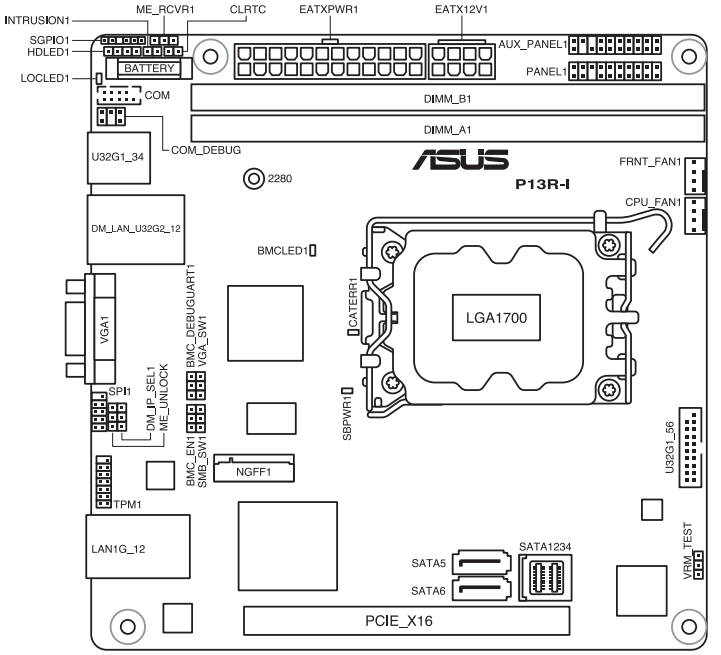
2.2.2 Screw holes

Secure the motherboard to the chassis using the eight screws indicated in the illustration below.

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



2.2.3 Motherboard layout



2.2.4 Layout contents

Slots/sockets		Page
1.	CPU socket	2-7
2.	DIMM sockets	2-12
3.	PCIe slots	2-14
4.	M.2 socket	2-15

Jumpers		Page
1.	Baseboard Management Controller setting (3-pin BMC_EN1)	2-16
2.	Clear RTC RAM setting (2-pin CLRTC)	2-17
3.	DMLAN setting (3-pin DM_IP_SEL1)	2-18
4.	ME firmware force recovery setting (3-pin ME_RCVR1)	2-18

Onboard LEDs		Page
1.	Baseboard Management Controller LED (BMCLED1)	2-19
2.	Catastrophic Error LED (CATERR1)	2-19
3.	Location LED (LOCLED1)	2-20
4.	Standby Power LED (SBPWR1)	2-20

Rear panel connectors		Page
1.	USB 3.2 Gen 1 ports	2-21
2.	Dedicated Management LAN port (DM_LAN1)	2-21
3.	VGA port	2-21
4.	LAN ports	2-21
5.	USB 3.2 Gen 2 ports	2-21

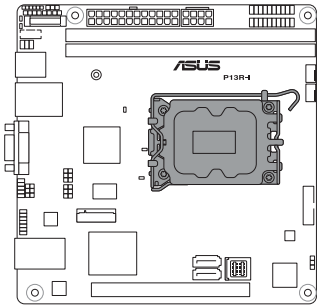
Internal connectors		Page
1.	Serial port connector (10-1 pin COM)	2-23
2.	ATX power connectors (24-pin EATXPWR1; 8-pin EATX12V1)	2-24
3.	Fan connectors (4-pin CPU_FAN1; FRNT_FAN1)	2-25
4.	Hard disk activity LED connector (4-pin HDLED1)	2-25
5.	Chassis intrusion connector (2-pin INTRUSION1)	2-26
6.	System panel connector (20-1 pin PANEL1)	2-27
7.	SATA connectors (SATA1234; SATA5-6)	2-28
8.	Serial General Purpose Input/Output connector (6-1 pin SGPIO1)	2-28
9.	Trusted Platform Module connector (14-1 pin TPM1)	2-29
10.	USB 3.2 Gen 1 connector (20-1 pin U32G1_56)	2-29
11.	Auxiliary panel connectors (20-2 pin AUX_PANEL1)	2-30

2.3 Central Processing Unit (CPU)

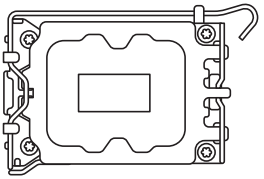
The motherboard comes with a surface mount LGA1700 socket designed for Intel® Xeon® and Intel® Pentium™ processors.

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

The motherboard illustration is for reference only. The location for the CPU socket is the same for all motherboards of this series.



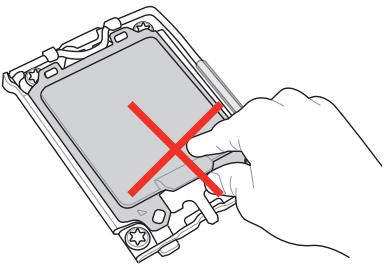
LGA1700



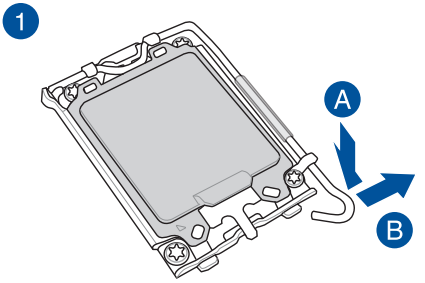
2.3.1 Installing the CPU

Ensure that you install the correct CPU designed for the LGA1700 socket only. DO NOT install a CPU designed for other sockets on the LGA1700 socket.

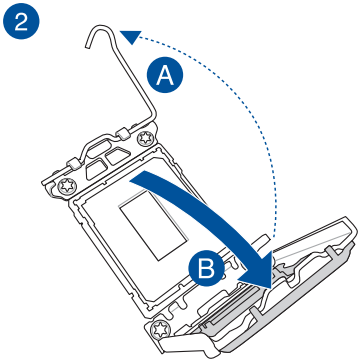
- Ensure that all power cables are unplugged before installing the CPU.
- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard 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.
- 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.

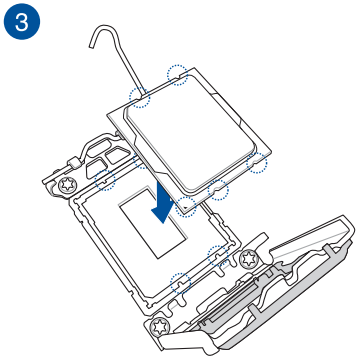


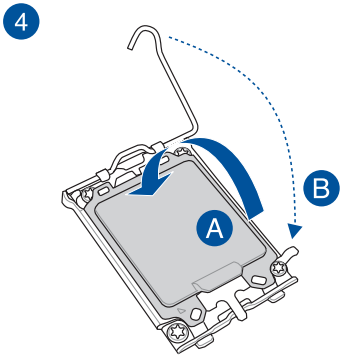
Do not remove the PnP cap yet from the CPU socket. Doing so may bend the pins of the socket.

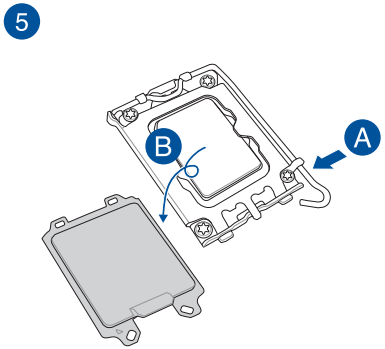


Take caution when lifting the load lever, ensure to hold onto the load lever when releasing the load lever. Letting go of the load lever immediately after releasing it may cause the load lever to spring back and cause damage to your motherboard.


2
A
B


3

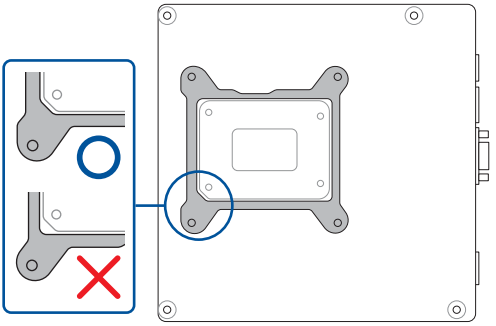

4
A
B


5
B
A

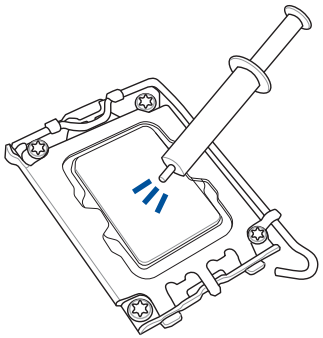
2.3.2 Installing the CPU backplate

Remove the release liner from the CPU backplate, then install the CPU backplate onto the rear side of the motherboard.

Ensure that the slanted corner on the backplate aligns with the corresponding corner on the motherboard. Failure to do so may cause damage to your system.

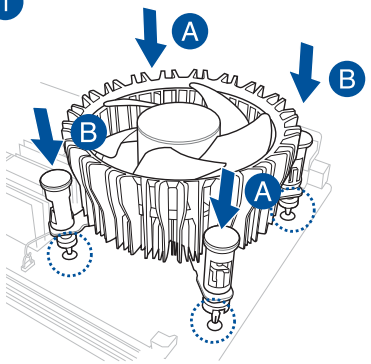


2.3.3 Installing the CPU heatsink

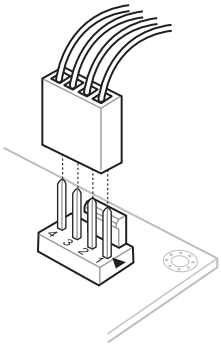


If you purchased a separate CPU heatsink and fan assembly, ensure that the Thermal Interface Material is properly applied to the CPU heatsink or CPU before you install the heatsink and fan assembly.

1



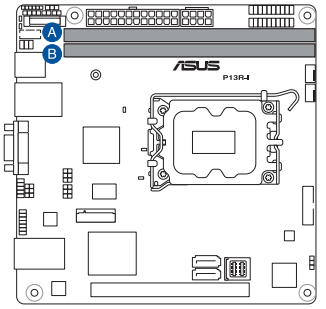
2



2.4 System memory

2.4.1 Overview

The motherboard comes with two Double Data Rate 5 (DDR5) Dual Inline Memory Modules (DIMM) sockets.





2.4.2 Memory configurations

This section provides recommended memory configurations when installing DIMMs.

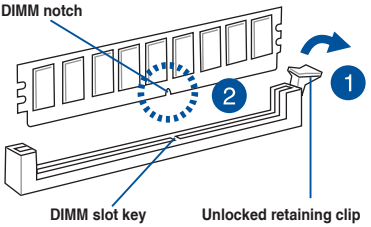
- Refer to ASUS Server AVL for the updated list of compatible DIMMs.
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.

Recommended configuration		
	A1	B1
1 DIMM	•	
2 DIMMs	•	•

2.4.3 Installing a DIMM

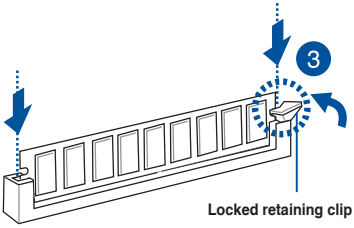
Ensure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

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.

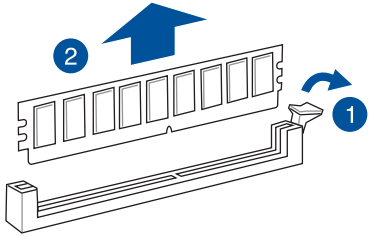
3. Hold the DIMM by both of its ends then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clip snaps back into place and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.



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

The following subsections describe the slots and the expansion cards that they support.

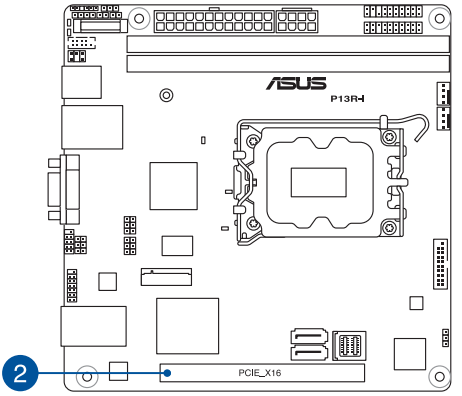
Ensure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.

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 bracket opposite the slot that you intend to use. Keep the screw for later use.
3. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
4. Secure the card to the chassis with the screw you removed earlier.

2.5.2 PCI Express slots

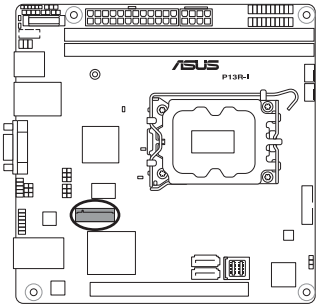


No. (Slot Location)	Short Description	
1 (Slot 1)	PCIE_X16	PCIe x16 slot (x16 Gen5 link)

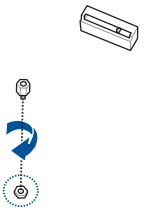
2.6 M.2 sockets

- M.2 socket 1 (NGFF1) supports 2280-type M.2 modules.
- M.2 modules are sold separately.
- The motherboard illustration is for reference only. The motherboard layout and appearance may vary depending on the model, but the installation steps remain the same.

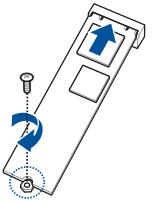
1. Locate the M.2 socket (NGFF1) on the motherboard.



2. Install the stand screw into the hole corresponding to the M.2 module.



3. Align and insert the M.2 module into the M.2 socket, then secure the M.2 module with the bundled M.2 screw.

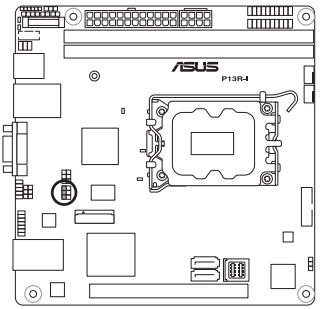


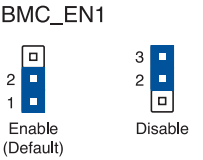
2.7 Jumpers

The motherboard illustration is for reference only. The motherboard layout and appearance may vary depending on the model, but the locations for these jumpers/LEDs/connectors remain the same.

1. Baseboard Management Controller setting (3-pin BMC_EN1)

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





2. Clear RTC RAM setting (2-pin CLRTC)

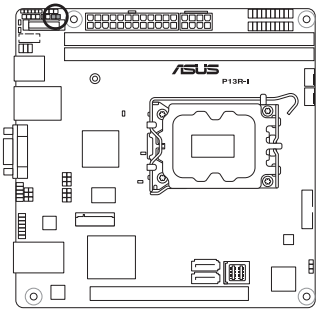
This jumper allows you to clear the CMOS memory system setup parameters by erasing the CMOS Real Time Clock (RTC) RAM data. The onboard button cell battery powers the RAM data in CMOS.

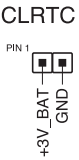
To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Short-circuit pin 1-2 with a metal object or jumper cap for about 5-10 seconds.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

DO NOT short-circuit the pins except when clearing the RTC RAM. Short-circuiting or placing a jumper cap will cause system boot failure!

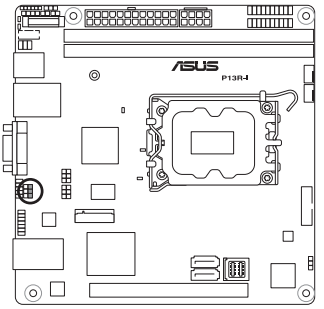
- If the steps above do not help, remove the onboard battery and short the two pins again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the battery.
- Due to chipset behavior, AC power off is required to enable C.P.R. function. You must turn off and on the power supply or unplug and plug the power cord before rebooting the system.



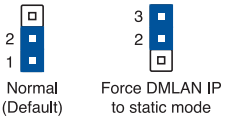


3. DMLAN setting (3-pin DM_IP_SEL1)

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

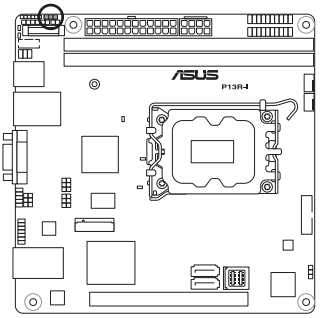


DM_IP_SEL1



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

Set to pins 2-3 to force the management engine to boot in recovery mode if the management engine becomes corrupted.



ME_RCVR1

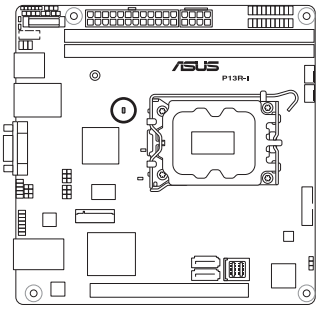


2.8 Onboard LEDs

The motherboard illustration is for reference only. The motherboard layout and appearance may vary depending on the model, but the locations for these jumpers/LEDs/connectors remain the same.

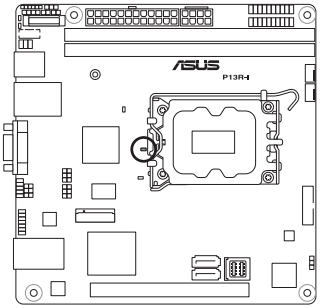
1. Baseboard Management Controller LED (BMCLED1)

The BMC LED will blink continuously when the BMC is operating normally.



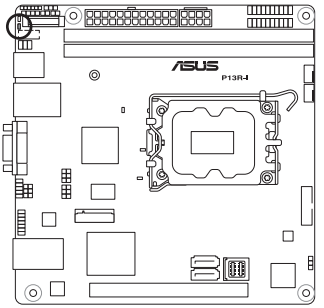
2. Catastrophic Error LED (CATERR1)

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



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.

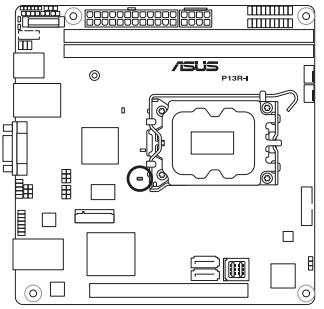


LOCLED1



4. 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 components. The illustration below shows the location of the onboard LED.



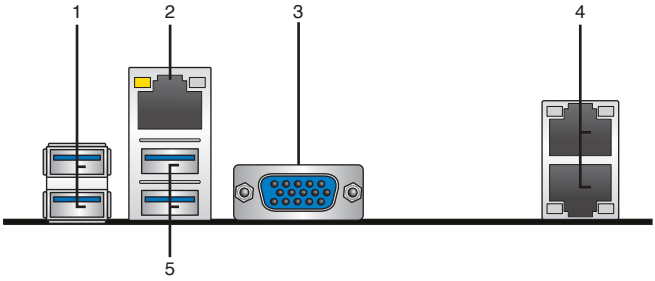
SBPWR1



ON	OFF
Standby Power	Powered Off

2.9 Connectors

2.9.1 Rear panel connectors

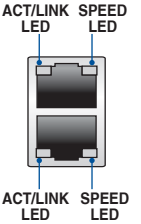


1. **USB 3.2 Gen 1 ports:** These USB ports are available for connecting USB devices.
2. **Dedicated Management LAN port (DM_LAN1):** This RJ-45 port functions only when you enable the ASMB11 Management card.
3. **VGA port:** This port is for a VGA monitor or other VGA-compatible devices.
4. **LAN ports:** These ports allows Gigabit connection to a Local Area Network (LAN) through a network hub.
5. **USB 3.2 Gen 2 ports:** These USB ports are available for connecting USB devices.

Intel® I210-AT2 LAN port LED indications

Activity/Link LED	
Status	Description
OFF	No link
GREEN	Linked
BLINKING	Data activity

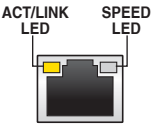
Speed LED	
Status	Description
OFF	10 Mbps connection
ORANGE	100 Mbps connection
GREEN	1 Gbps connection



Dedicated Management LAN port (DM_LAN1) LED indications

Activity/Link LED	
Status	Description
OFF	No link
YELLOW	Linked
BLINKING	Data activity

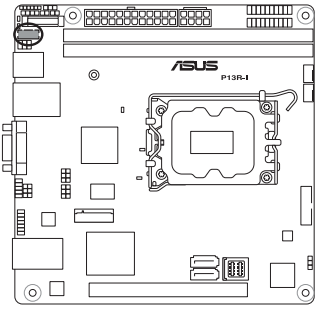
Speed LED	
Status	Description
OFF	10 Mbps connection
ORANGE	100 Mbps connection
GREEN	1 Gbps connection

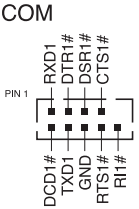


2.9.2 Internal connectors

1. Serial port connector (10-1 pin COM)

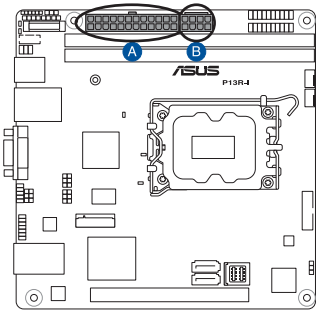
This connector is for the serial (COM) port. Connect the serial port module cable to the connector, then install the module to a slot opening at the back of the system chassis.

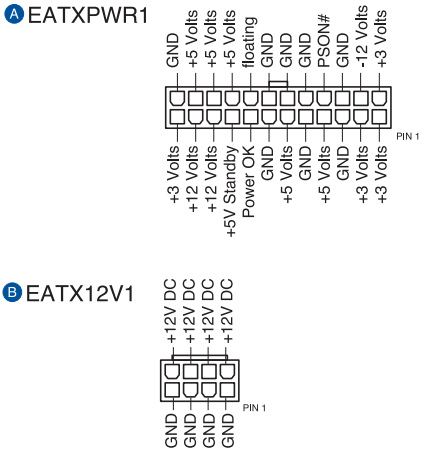




2. ATX power connectors (24-pin EATXPWR1; 8-pin EATX12V1)

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.

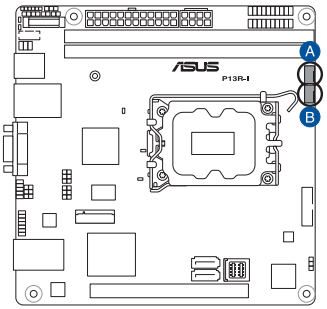


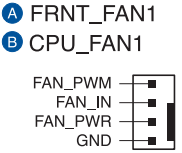


- DO NOT forget to connect the 24-pin and the 8-pin power plugs; otherwise, the system will not boot up.
- Use of a power supply unit (PSU) with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power 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.

3. Fan connectors (4-pin CPU_FAN1; FRNT_FAN1)

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

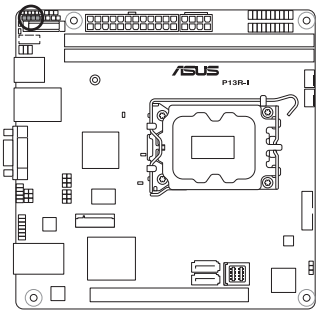


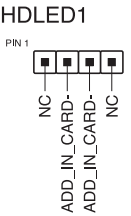


- DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components.
- These are not jumpers! DO NOT place jumper caps on the fan connectors!
- All fans feature the ASUS Smart Fan technology.

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

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

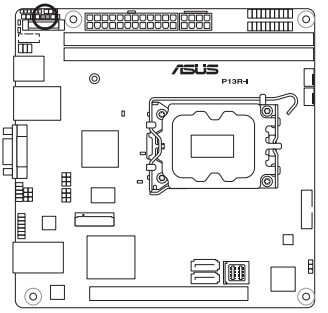


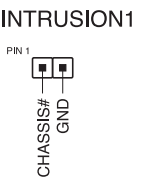


5. Chassis intrusion connector (2-pin INTRUSION1)

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

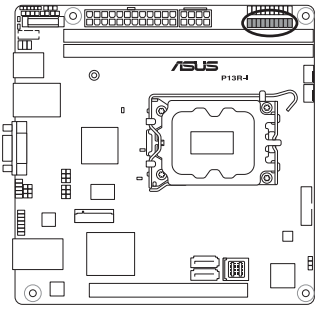
By default, the pin labeled “Chassis Signal” and “Ground” are shorted with a jumper cap. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.

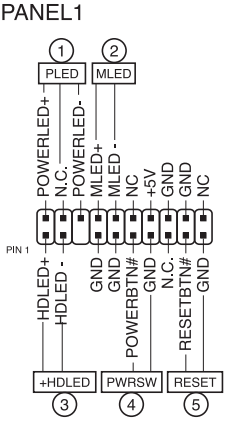




6. System panel connector (20-1 pin PANEL1)

This connector supports several chassis-mounted functions.





- **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.

- **Message LED (2-pin MLED)**

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

- **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.

- **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. Pressing the power switch for more than four (4) seconds while the system is ON turns the system OFF.

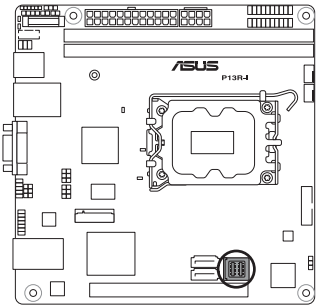
- **Reset button (2-pin RESET)**

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

7. SATA connectors (SATA1234; SATA5-6)

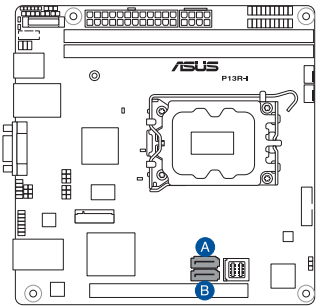
These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allow up to 6Gb/s of data transfer rate.

If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 10, or RAID 5 configuration.

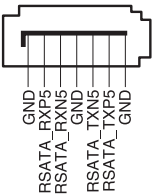


SATA1234



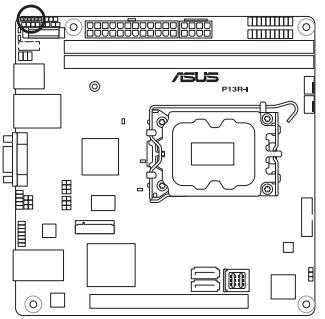


A SATA5
B SATA6

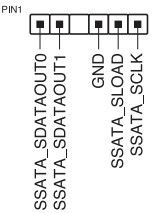


8. Serial General Purpose Input/Output connector (6-1 pin SGPIO1)

The SGPIO connector is used for the SGPIO interface that controls the LED pattern generation, device information, and general purpose data.

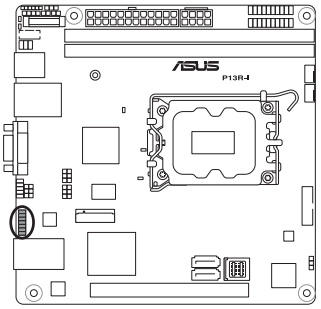


SGPIO1

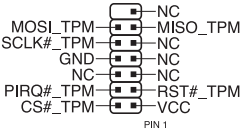


9. Trusted Platform Module connector (14-1 pin TPM1)

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.

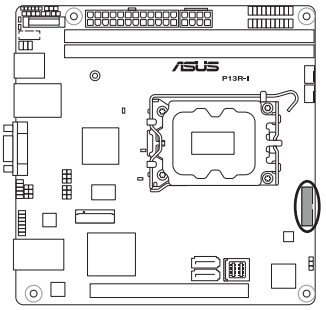


TPM1

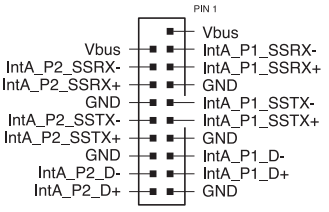


10. USB 3.2 Gen 1 connector (20-1 pin U32G1_56)

This connector allows you to connect a USB 3.2 Gen 1 module for additional USB 3.2 Gen 1 front or rear panel ports. The USB 3.2 Gen 1 connector provides data transfer speeds of up to 5 Gb/s.

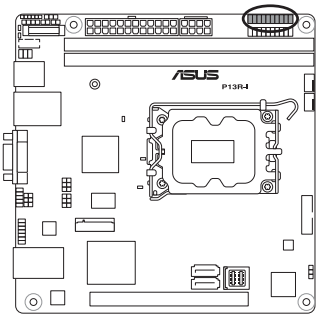


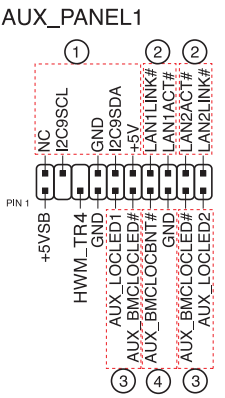
U32G1_56



11. Auxiliary panel connectors (20-2 pin AUX_PANEL1)

These connectors are for additional front panel features including front panel SMB, locator LED and switch, chassis intrusion, and LAN LEDs.





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

  This 6-1 pin connector is for the front panel SMBus cable.

- **LAN activity LED (2-pin LAN1-2LINK, LAN1-2ACT)**

  This 2-pin connector is for the Gigabit LAN activity LEDs on the front panel.

- **Locator LED (2-pin AUX_LOCLED1-2)**

  This 2-pin connector is 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.

- **Locator Button/Switch (2-pin AUX_BMCLOCBNT)**

  This 2-pin connector is for the locator button on the front panel. This button queries the state of the system locator.

3

Powering Up

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. While the tests are running, additional messages will 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 <Del> key to enter the BIOS Setup. Follow the instructions in the **BIOS setup** chapter.

3.2 Shutting down the computer

3.2.1 Using the OS shut down function

Using Windows® Server:

1. Press <Ctrl>+<Alt>+<Del>.
2. Click on the Power icon on the lower right side of the screen.
3. Select **Shut down**.
4. In the Shutdown Event Tracker, select an option that best describes why you want to shut down the computer, then click **Continue**.

3.2.2 Using the power switch

Press the power switch for less than four seconds to shut down the computer.



- Pressing the power switch for more than four seconds or before the operating system has loaded will force a shutdown.
- Depending on operating system settings, pressing the power switch may shut down the computer, put the computer to sleep, or do nothing.

4

BIOS Setup

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

4.1 Managing and updating your BIOS

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

1. **ASUS CrashFree BIOS 3**

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

2. **ASUS EzFlash**

   Updates the BIOS using a USB flash disk.

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.

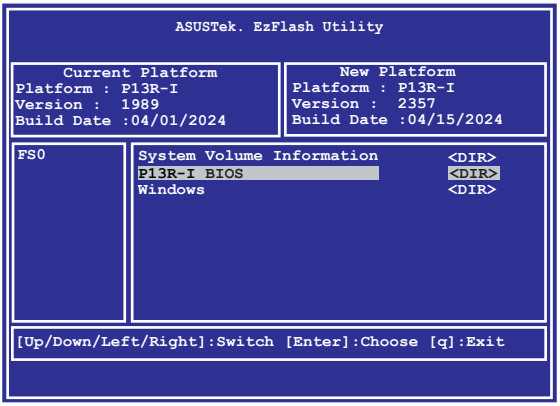
4.1.2 ASUS EZ Flash Utility

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 **Start ASUS EZ Flash**. Press <Enter>.



3. Press the Left/Right arrow keys 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 Left/Right arrow keys to switch to the **Folder Info** field.
6. Press the Up/Down arrow keys to find the BIOS file, 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.

4.2 BIOS setup program

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

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

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

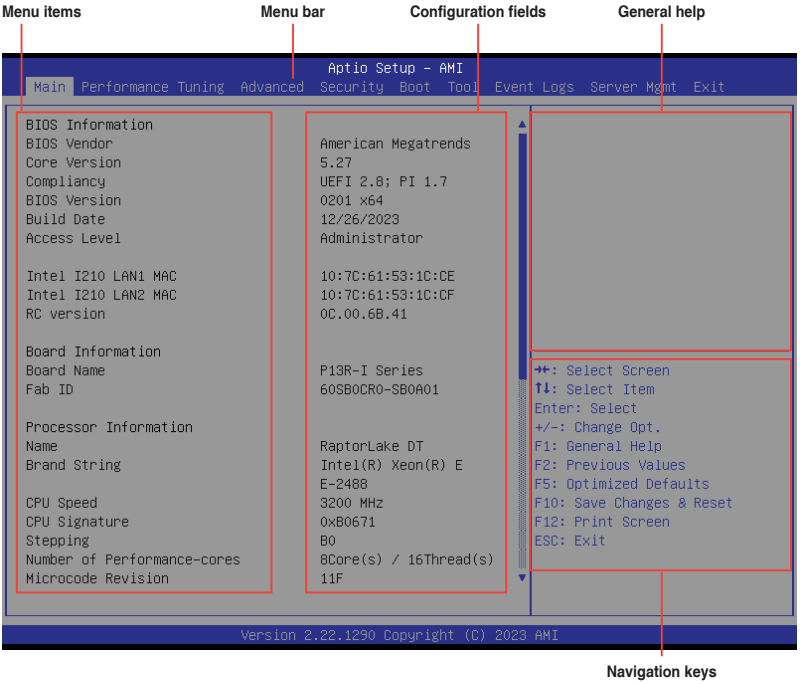
The firmware chip on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

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

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

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Press <F5> and select **Yes** to load the BIOS default settings.
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

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
Security	For changing the security settings
Boot	For changing the system boot configuration
Tool	For configuring options for special functions
Event Logs	For changing the event log settings
Server Mgmt	For changing the Server Mgmt settings
Exit	For selecting the exit options

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

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.

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>.

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.

General help

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

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.

Pop-up window

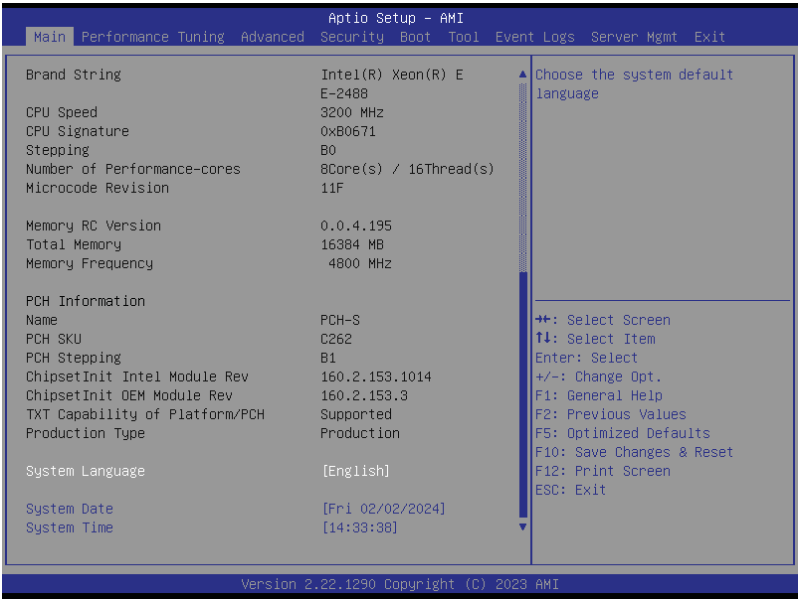
Select a menu item and press <Enter> to display a pop-up window with the configuration options for that item.

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, and language.



System Language

Allows you to set the system language.

System Date [MM/DD/YYYY]

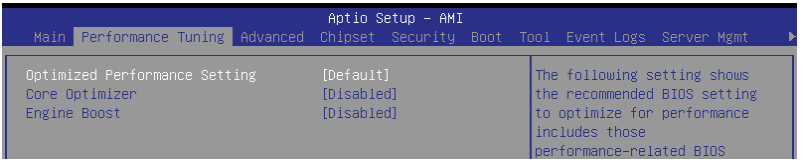
Allows you to set the system date.

System Time [HH:MM:SS]

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.

This function will reset some BIOS settings that you have changed back to their default values. Please check your BIOS settings again.

The following item appears only when **Power Balancer** is set to **[Disabled]**, or if Optimized Performance Setting is set to **[Default]** or **[By Benchmark]**.

Core Optimizer [Disabled]

Allows you to keep the processor operating at the turbo highest frequency for the maximum performance.
Configuration options: [Disabled] [Auto] [Manual]

The following item appears only when you set **Core Optimizer** to **[Manual]**.

CPU Max frequency [XXXX]
The default value for this option will be the maximum supported frequency of the CPU installed and may vary between different CPUs.

The following item appears only when **Optimized Performance Setting** is set to **[Default] or [By Benchmark]**.

Engine Boost [Disabled]

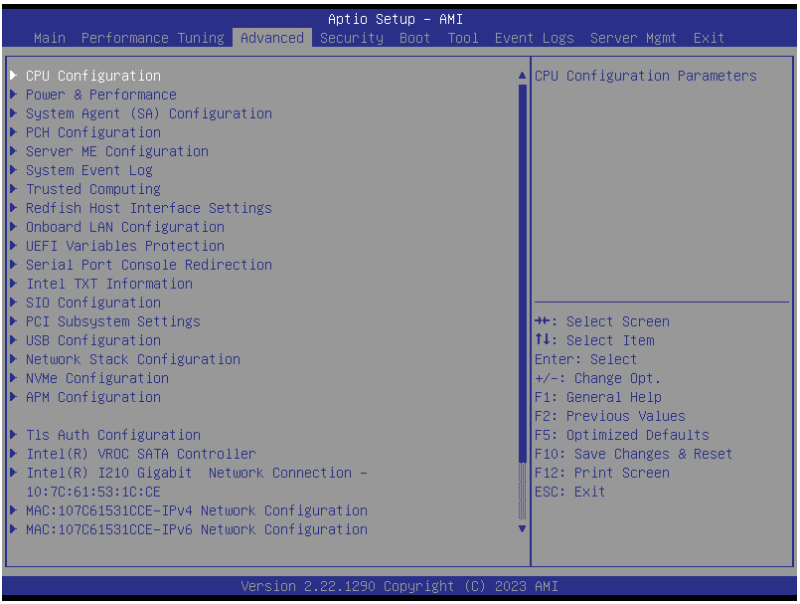
Enable this item to boost the CPU's frequency. Recommended operation at an ambient temperature of 25°C or below for optimized performance.
Configuration options: [Disabled] [Level1] [Level2] [Level3(Max)]

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

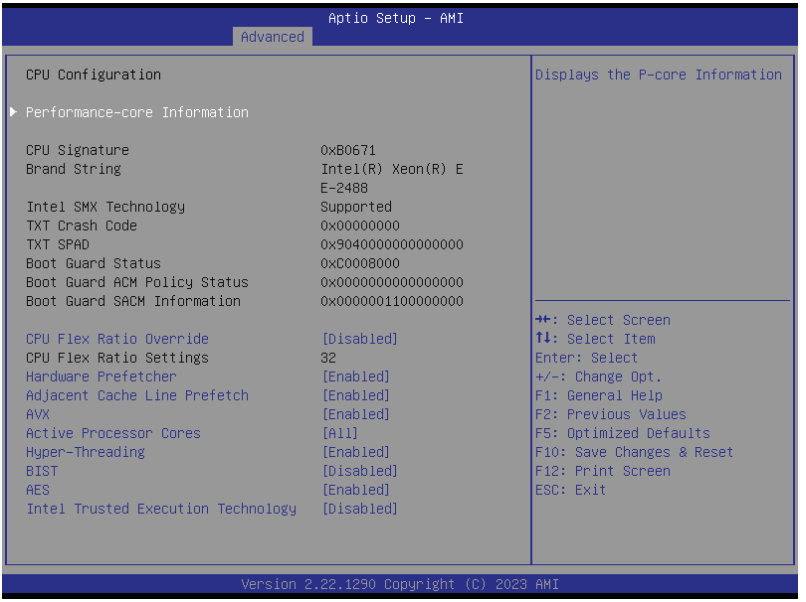
4.5 Advanced menu

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 CPU Configuration



Performance-core Information

Allows you to view performance-core information.

CPU Flex Ratio Override [Disabled]

Configuration options: [Disabled] [Enabled]

The following items are only available when **CPU Flex Ratio Override** is set to **[Enabled]**.

CPU Flex Ratio Settings [32]

Allows you to set the CPU Flex Ratio.

Hardware Prefetcher [Enabled]

Configuration options: [Disabled] [Enabled]

Adjacent Cache Line Prefetch [Enabled]

Configuration options: [Disabled] [Enabled]

AVX [Enabled]

Configuration options: [Disabled] [Enabled]

Active Processor Cores [All]

Configuration options: [All] [1] [2] [3]

Hyper-Threading [Enabled]

Configuration options: [Disabled] [Enabled]

BIST [Disabled]

Configuration options: [Disabled] [Enabled]

AES [Enabled]

Configuration options: [Disabled] [Enabled]

Intel Trusted Execution Technology [Disabled]

Configuration options: [Disabled] [Enabled]

4.5.2 Power & Performance



CPU - Power Management Control

Boot performance mode [Turbo Performance]

Configuration options: [Max Battery] [Max Non-Turbo Performance] [Turbo Performance]

Intel(R) SpeedStep(tm) [Enabled]

Configuration options: [Disabled] [Enabled]

Race To Halt (RTH) [Enabled]

Configuration options: [Disabled] [Enabled]

Intel(R) Speed Shift Technology [Native Mode]

Configuration options: [Disabled] [Native Mode] [Out of Band Mode]

The following items are only available when **Intel(R) Speed Shift Technology** is set to **[Disabled]** or **[Native Mode]**.

Per Core P State OS control mode [Enabled]
Configuration options: [Disabled] [Enabled]

HwP Autonomous Per Core P State [Enabled]
Configuration options: [Disabled] [Enabled]

HwP Autonomous EPP Grouping [Enabled]
Configuration options: [Disabled] [Enabled]

HwP Fast MSR Support [Disabled]
Configuration options: [Disabled] [Enabled]

HDC Control [Enabled]

Configuration options: [Disabled] [Enabled]

Turbo Mode [Enabled]

Configuration options: [Disabled] [Enabled]

C-States [Enabled]

Configuration options: [Disabled] [Enabled]

The following items are only available when **C-States** is set to **[Enabled]**.

Enhanced C-States [Enabled]
Configuration options: [Disabled] [Enabled]

C-State Auto Demotion [C1]
Configuration options: [Disabled] [C1]

C-State Un-demotion [C1]
Configuration options: [Disabled] [C1]

Package C-State Demotion [Enabled]
Configuration options: [Disabled] [Enabled]

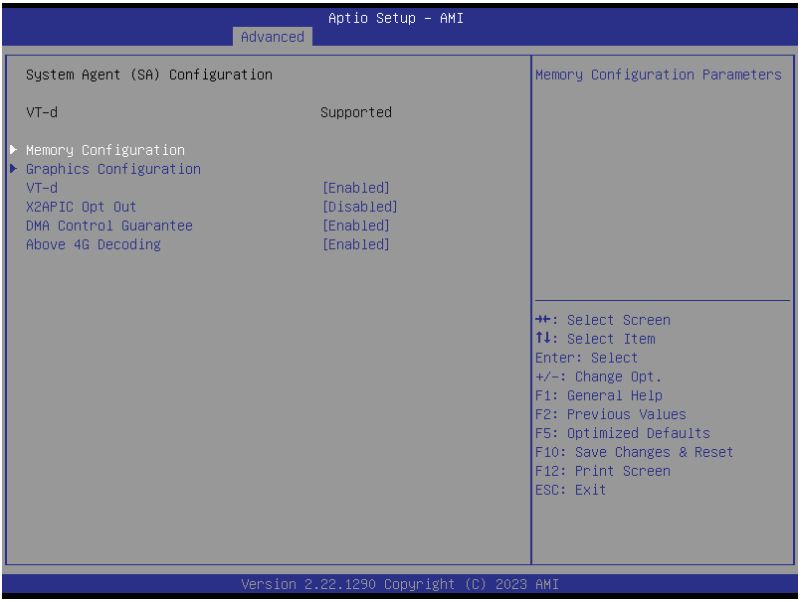
Package C-State Un-demotion [Enabled]
Configuration options: [Disabled] [Enabled]

Package C-state Limit [Auto]
Configuration options: [C0/C1] [C2] [C3] [C6] [C7] [C7S] [C8] [C9] [C10] [CPU Default] [Auto]

Thermal Monitor [Enabled]

Configuration options: [Disabled] [Enabled]

4.5.3 System Agent (SA) Configuration



Memory Configuration

Allows you to configure Memory options.

Graphics Configuration

Allows you to configure Graphics options.

VT-d [Enabled]

Configuration options: [Disabled] [Enabled]

The following items are only available when **VT-d** is set to **[Enabled]**.

X2APIC Opt Out [Disabled]

Configuration options: [Disabled] [Enabled]

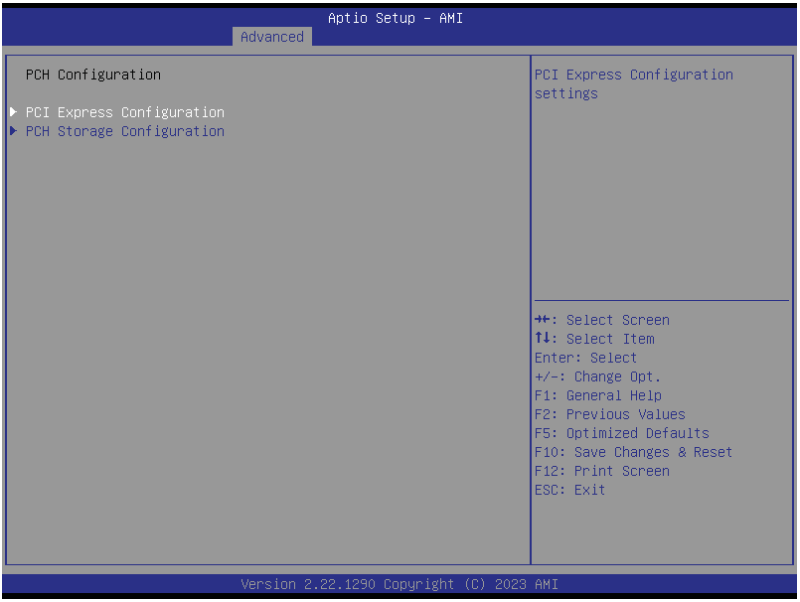
DMA Control Guarantee [Enabled]

Configuration options: [Disabled] [Enabled]

Above 4G Decoding [Enabled]

Configuration options: [Disabled] [Enabled]

4.5.4 PCH Configuration



PCI Express Configuration

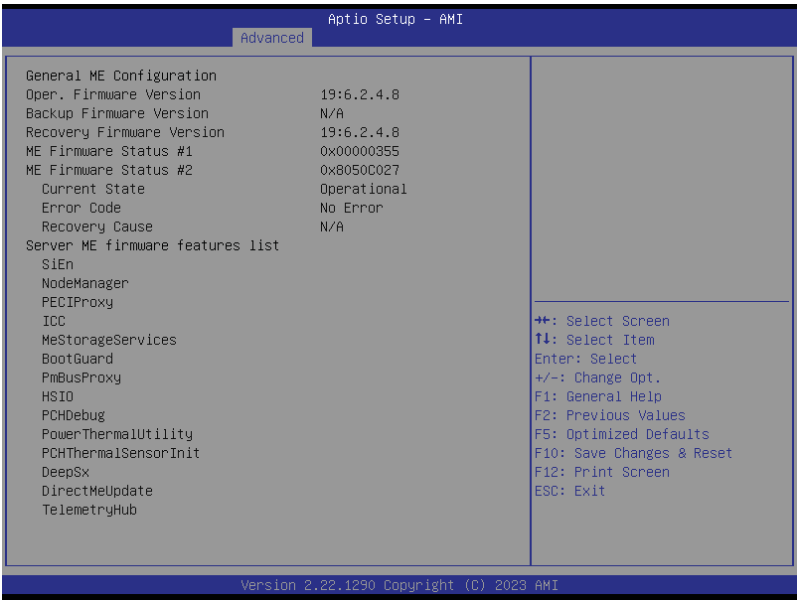
Allows you to configure PCI Express options.

PCH Storage Configuration

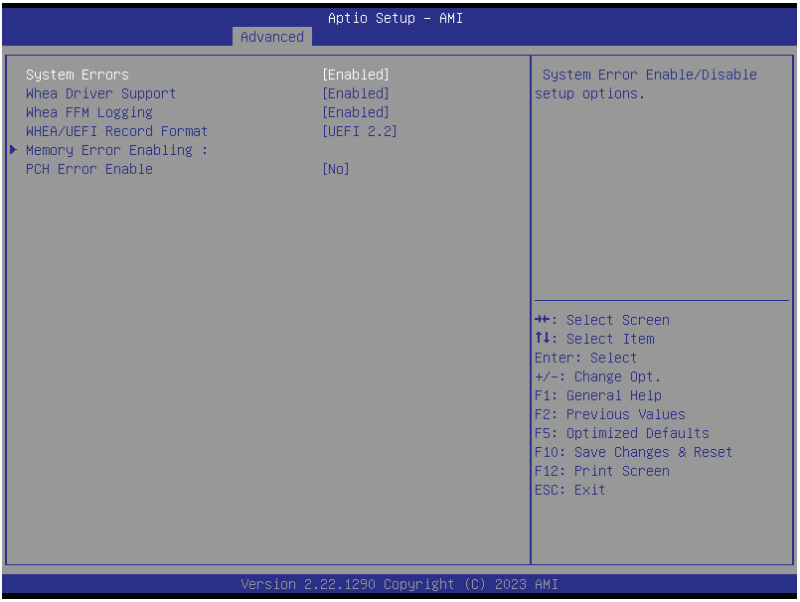
Allows you to configure PCH Storage options.

4.5.5 Server ME Configuration

Displays the Server ME Technology parameters on your system. Scroll using <Page Up> / <Page Down> keys to see more items.



4.5.6 System Event Log



System Errors [Enabled]

Configuration options: [Disable Link] [Enabled]

The following items are only available when **System Errors** is set to **[Enabled]**.

Whea Driver Support [Enabled]

Configuration options: [Disabled] [Enabled]

The following items are only available when **Whea Driver Support** is set to **[Enabled]**.

Whea FFM Logging [Enabled]

Configuration options: [Disable Link] [Enabled]

WHEA/UEFI Record Format [UEFI 2.2]

Configuration options: [UEFI 2.2] [UEFI 2.3.1]

Memory Error Enabling

Allows you to configure Memory Error Enabling options.

PCH Error Enable [No]

Configuration options: [No] [Yes]

The following items are only available when **PCH Error Enable** is set to **[Yes]**.

PCI/PCI Error Enabling

Allows you to configure PCI/PCI Error Enabling options.

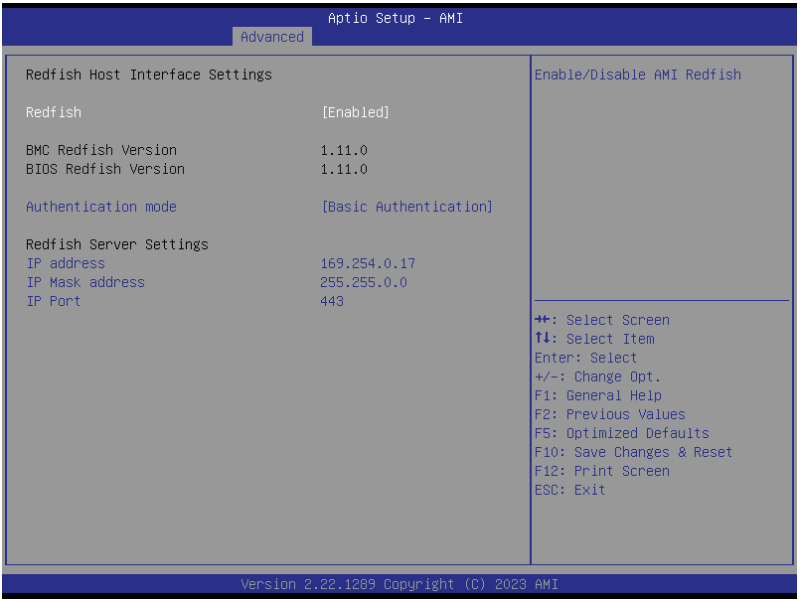
4.5.7 Trusted Computing



Security Device Support [Enabled]

Configuration options: [Disabled] [Enabled]

4.5.8 Redfish Host Interface Settings



Redfish [Enabled]

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

The following items are only available when **Redfish** is set to **[Enabled]**.

Authentication mode [Basic Authentication]

Configuration options: [Basic Authentication] [Session Authentication]

IP address

Enter the IP address.

IP Mask address

Enter the IP Mask address.

IP Port

Enter the IP Port.

4.5.9 Onboard LAN Configuration



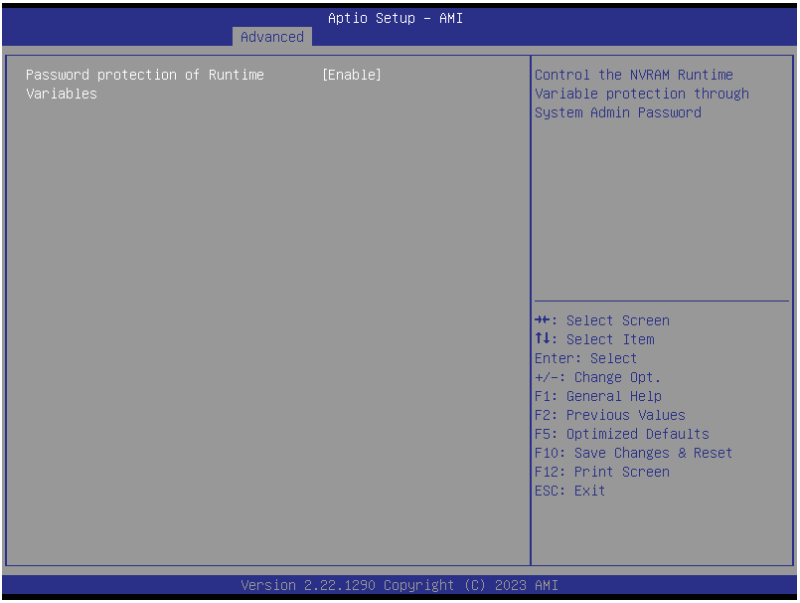
Onboard I210 LAN Configuration

Intel I210 LAN1-2

LAN Enable [Enabled]

Configuration options: [Disabled] [Enabled]

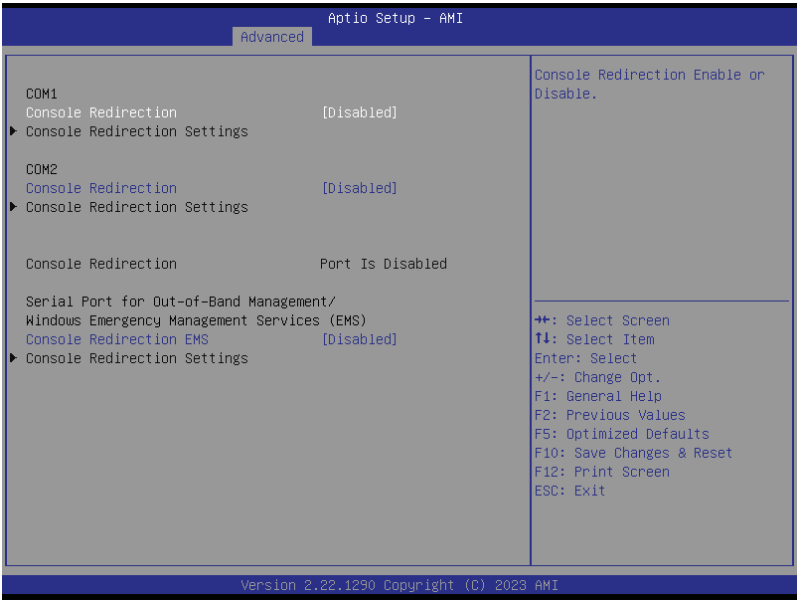
4.5.10 UEFI Variables Protection



Password protection of Runtime Variables [Enabled]

Configuration options: [Disabled] [Enabled]

4.5.11 Serial Port Console Redirection



Terminal Type [VT100Plus]

Allows you to set the terminal type.

[VT100]	ASCII char set.
[VT100Plus]	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 [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]

Console Redirection EMS [Disabled]

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



The following items are only available when **Console Redirection EMS** is set 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 (Disabled)]

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]

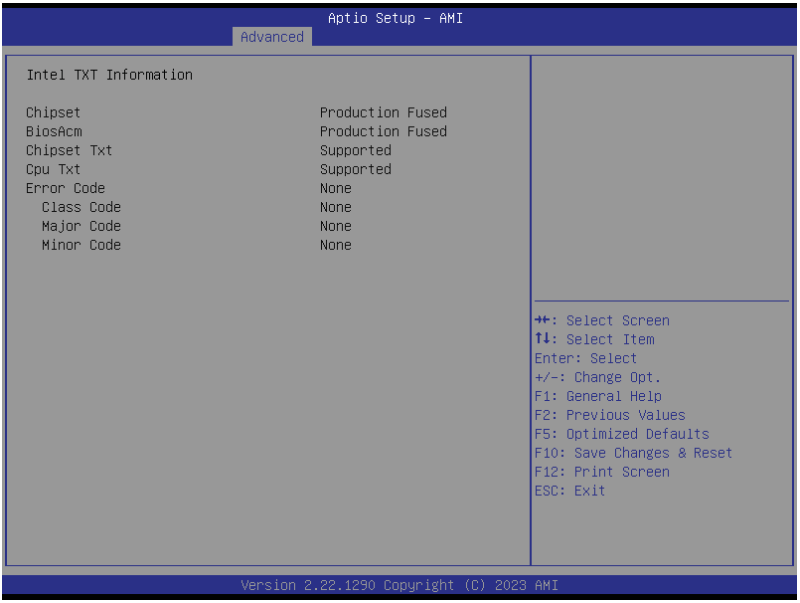
Bits per second [115200]

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]

4.5.12 Intel TXT Information



4.5.13 SIO Configuration



Logical Devices state on the left side of the control, reflects the current Logical Device state. Changes made during Setup Session will be shown after you restart the system.

[*Active*] Serial Port 1 / [*Active*] Serial Port 2 (SOL)

Allows you to view and set basic properties of the SIO Logical device such as the IO Base, IRQ Range, DMA Channel, and Device Mode.

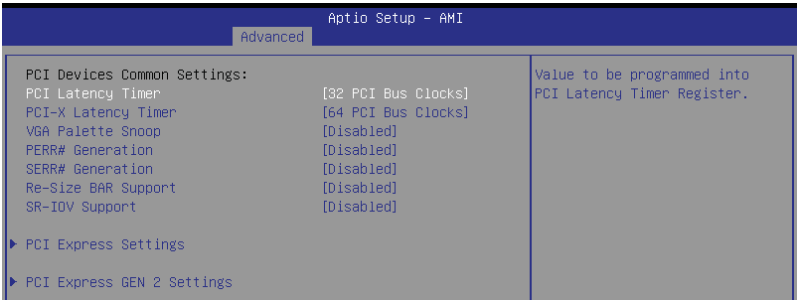
Use This Device [Enabled]

Allows you to enable or disable this Logical Device.
Configuration options: [Disabled] [Enabled]

The following items are only available when **Use This Device** is set to **[Enabled]**.

Possible [Use Automatic Settings]
Configuration options: [Use Automatic Settings] [IO=3F8h; IRQ=4; DMA;] [IO=3F8h; IRQ=3, 4, 5, 7, 9, 10, 11, 12; DMA;] [IO=2F8h; IRQ=3, 4, 5, 7, 9, 10, 11, 12; DMA;] [IO=3E8h; IRQ=3, 4, 5, 7, 9, 10, 11, 12; DMA;] [IO=2E8h; IRQ=3, 4, 5, 7, 9, 10, 11, 12; DMA;]

4.5.14 PCI Subsystem Settings



PCI Latency Timer [32 PCI Bus Clocks]

Configuration options: [32 PCI Bus Clocks] [64 PCI Bus Clocks] [96 PCI Bus Clocks] [128 PCI Bus Clocks] [160 PCI Bus Clocks] [192 PCI Bus Clocks] [224 PCI Bus Clocks] [248 PCI Bus Clocks]

PCI-X Latency Timer [64 PCI Bus Clocks]

Configuration options: [32 PCI Bus Clocks] [64 PCI Bus Clocks] [96 PCI Bus Clocks] [128 PCI Bus Clocks] [160 PCI Bus Clocks] [192 PCI Bus Clocks] [224 PCI Bus Clocks] [248 PCI Bus Clocks]

VGA Palette Snoop [Disabled]

Configuration options: [Disabled] [Enabled]

PERR# Generation [Disabled]

Configuration options: [Disabled] [Enabled]

SERR# Generation [Disabled]

Configuration options: [Disabled] [Enabled]

Re-Size BAR Support [Disabled]

Configuration options: [Disabled] [Auto]

SR-IOV Support [Disabled]

Configuration options: [Disabled] [Enabled]

PCI Express Settings

Allows you to configure PCI Express options.

PCI Express GEN 2 Settings

Allows you to configure PCI Express Gen 2 options.

4.5.15 USB Configuration



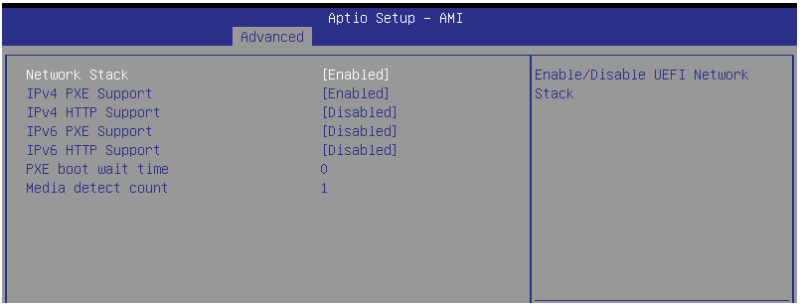
XHCI Hand-off [Enabled]

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: [Disabled] [Enabled]

USB Mass Storage Driver Support [Enabled]

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

4.5.16 Network Stack Configuration



Network Stack [Enabled]

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

The following items appear only when **Network Stack** is set to **[Enabled]**.

IPv4 PXE Support [Enabled]

Enables or disables the IPv4 PXE Boot Support. If disabled, IPv4 PXE boot option will not be created.
Configuration options: [Disabled] [Enabled]

IPv4 HTTP Support [Disabled]

Enables or disables the IPv4 HTTP Boot Support. If disabled, IPv4 PXE 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 PXE boot option will not be created.
Configuration options: [Disabled] [Enabled]

PXE boot wait time [0]

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

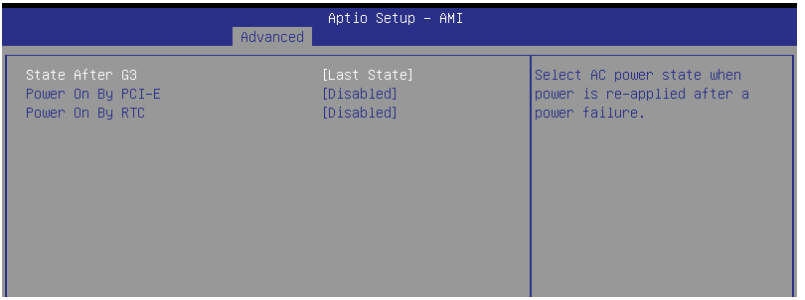
Media detect count [1]

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

4.5.17 NVMe Configuration



4.5.18 APM Configuration



State After G3 [Last State]

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

Power On By PCI-E [Disabled]

[Disabled] Disables PCIe devices from generating a wake event.

[Enabled] Allows PCIe devices to generate a wake event.

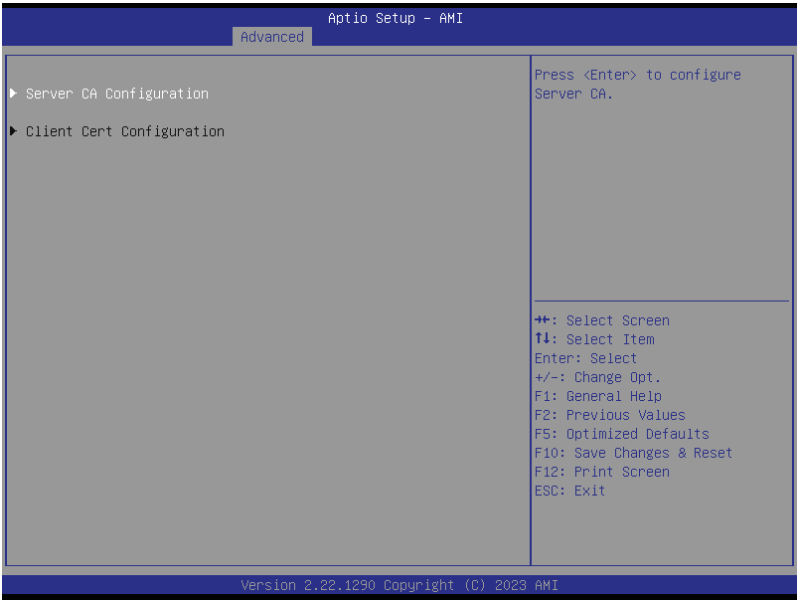
Power On By RTC [Disabled]

[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.

4.5.19 T1s Auth

Allows you to configure the Server Certificate Authority (CA).



Server / Client CA Configuration

Enroll Cert

Allows you to enroll a certificate using a certificate file or manually input a certificate GUID.

Enroll Cert Using File

Allows you to enroll a certificate using a certificate file. You will be prompted to select a storage device and navigate to the location of the certificate file.

Cert GUID

Allows you to enroll a certificate by manually inputting the certificate GUID.

Commit Changes and Exit

Exit Server CA configuration after saving the changes.

Discard Changes and Exit

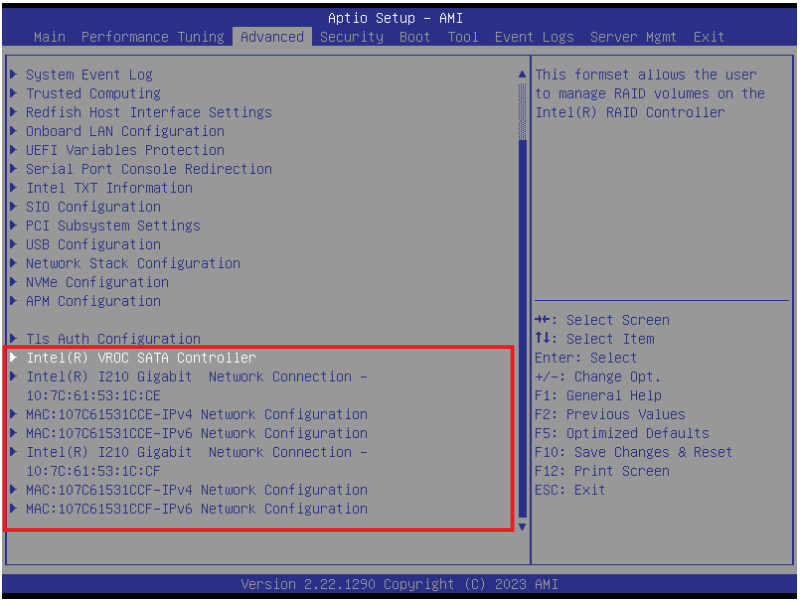
Exit Server CA configuration without saving any changes.

Delete Cert

Allows you to delete the certificate.

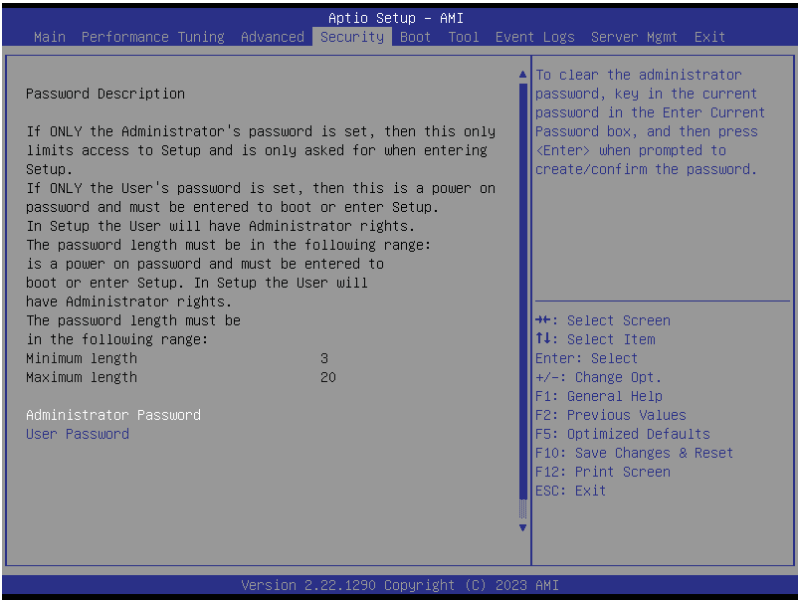
4.5.20 Third-party UEFI driver configurations

Additional configuration options for third-party UEFI drivers installed to the system will appear in the section marked in red in the screenshot below.



4.6 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 [Disabled]

Secure Boot feature is Active if Secure Boot is set to **[Enabled]**, Platform Key (PK) is enrolled and the System is in User mode. Mode change requires a platform reset.
Configuration options: [Disabled] [Enabled]

Secure Boot Mode [Custom]

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

The following items are available only when **Secure Boot Mode** is set to **[Custom]**.

Install Default Secure Boot Keys

This option will load the default secure boot keys, including the PK (Platform key), KEK (key-exchange key), db (signature database), and dbx (revoked signature database). All the secure boot keys states will change from unloaded to loaded. Save changes and reset the system for the changes to take effect.

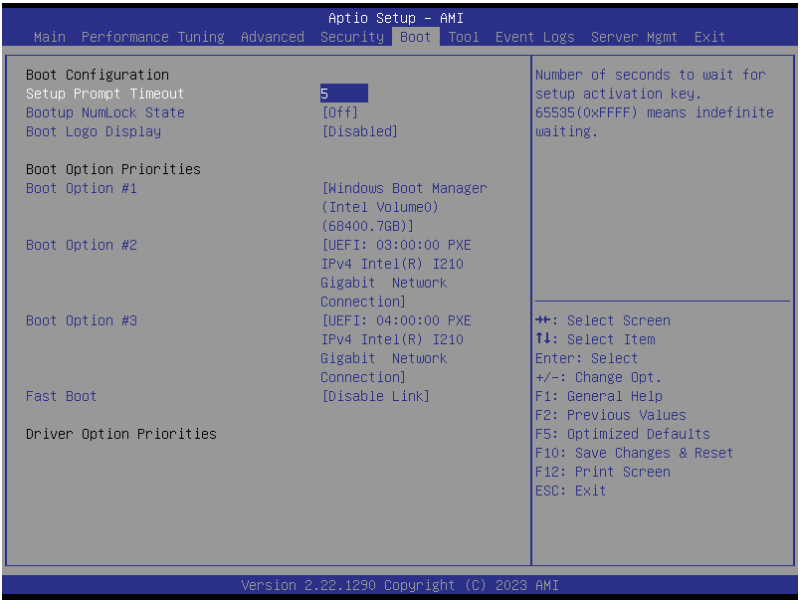
Clear Secure Boot Keys

This option will delete all previously applied secure boot keys, including the PK (Platform key), KEK (key-exchange key), db (signature database), and dbx (revoked signature database). All the secure boot keys states will change from unloaded to loaded. Save changes and reset the system for the changes to take effect.

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.

4.7 Boot menu



Setup Prompt Timeout [5]

Allows you to set the number of seconds that the firmware waits before initiating the original default boot selection. 65535(OxFFFF) means indefinite waiting. Use the <+> or <-> to adjust the value.

Bootup NumLock State [Off]

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

Boot Logo Display [Disabled]

[Disabled]	Hide the logo during POST.
[Enabled]	Display the logo during POST.

Boot Option Priorities

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.

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

Fast Boot [Disable Link]

Allows you to enable or disable boot with initialization of a minimal set of devices required to launch active boot option. This has no effect for BBS boot options.
Configuration options: [Disable Link] [Enabled]

4.8 Tool menu



Start ASUS EzFlash

Allows you to start the ASUS EzFlash BIOS ROM Utility. Refer to the **ASUS EzFlash Utility** section for details.

IPMI Hardware Monitor

Allows you to start the IPMI hardware monitor.

ASUS SMBIOS Viewer

Allows you to start the ASUS SMBIOS Viewer.

ASUS Storage Viewer

Allows you to start the ASUS Storage Viewer.

4.9 Event Logs menu



4.9.1 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.

Smbios Event Log [Enabled]

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

The following item appears only when **Smbios Event Log** is set to **[Enabled]**.

Erase Event Log [No]

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

When Log is Full [Do Nothing]

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

Log System Boot Event [Enabled]

Configuration options: [Disabled] [Enabled]

MECI [1]

Allows you to set the Multiple Event Count Increment.

MECI [60]

Allows you to set the Multiple Event Time Window.

Log EFI Status Code [Enabled]

Configuration options: [Disabled] [Enabled]

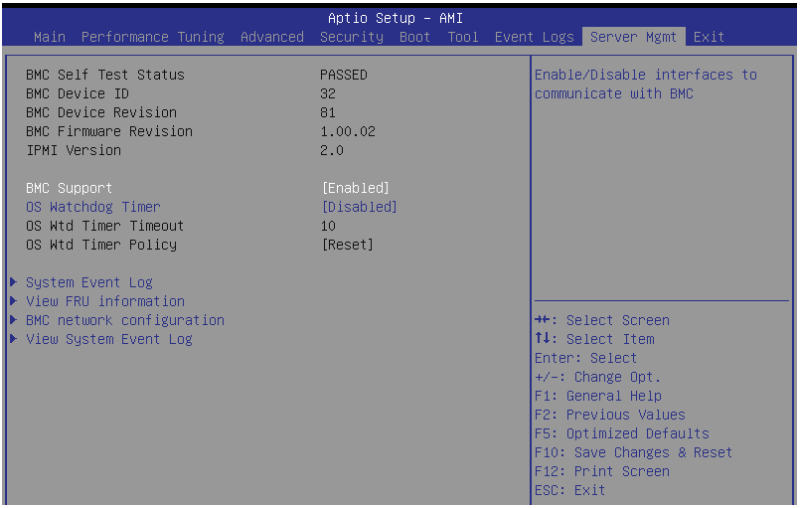
Convert EFI Status Codes to Standard Smbios Type [Disabled]

Configuration options: [Disabled] [Enabled]

4.9.2 View Smbios Event Log

Press <Enter> to view all Smbios event logs.

4.10 Server Mgmt menu



BMC Support [Enabled]

Configuration options: [Disabled] [Enabled]

The following items appear only when **BMC Support** is set to **[Enabled]**.

OS Watchdog Timer [Disabled]

Configuration options: [Disabled] [Enabled]

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

OS Wtd Timer Timeout [10]
Allows you to set the OS watchdog timer timeout in minutes.

OS Wtd Timer Policy [Reset]
Configuration options: [Do Nothing] [Reset] [Power Down] [Power Cycle]

System Event Log

Allows you to configure System Event Log options.

View FRU Information

Allows you to view the FRU information.

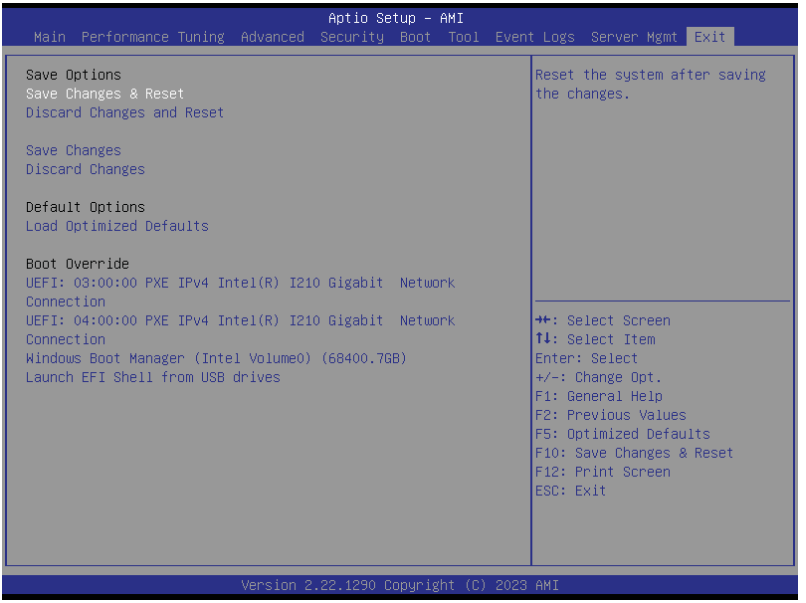
BMC Network Configuration

Allows you to configure BMC network options.

View System Event Log

Allows you to view the System Event log.

4.11 Exit menu



Save Changes and Reset

Reset the system after saving the changes.

Discard Changes and Reset

Reset 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.

Load Optimized Defaults

Restore/load default values for all the setup options.

Boot Override

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

Launch EFI Shell from USB drives

This item allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available filesystem devices.

5 RAID Configuration

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

5.1 Setting up RAID

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

5.1.1 RAID definitions

RAID 0 *(Data striping)* optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 *(Data mirroring)* copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.



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

5.1.2 Installing hard disk drives

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

To install the SATA hard disks for RAID configuration:

1. Install the SATA hard disks into the drive bays following the instructions in the system user guide.
2. Connect a SATA signal cable to the signal connector at the back of each drive and to the SATA connector on the motherboard.
3. Connect a SATA power cable to the power connector on each drive.

5.1.3 Setting the RAID item in BIOS

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

To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Advanced** Menu > **PCH Configuration** > **PCH Storage Configuration**, then press <Enter>.
3. Set **SATA Mode Selection** to **[Intel RSTe Premium With Intel Optane System Acceleration]**.
4. Press <F10> to save your changes and exit the BIOS Setup.



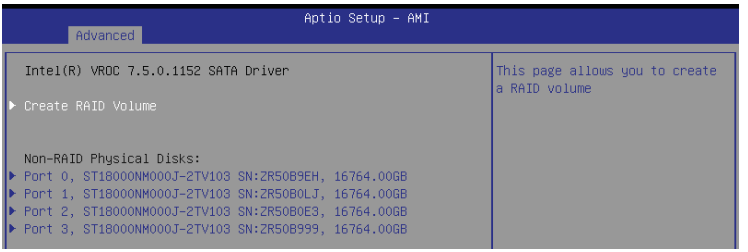
Refer to the **BIOS Setup** chapter for details on entering and navigating through the BIOS Setup.

5.2 Intel® Virtual Raid on CPU in BIOS

This feature allows you to do CPU RAID functions with Intel® CPU RSTe.

1. Enter the BIOS Setup during POST.
2. Go to the **Advanced** menu **> Intel(R) VROC SATA Controller** then press <Enter> to display the Intel® Virtual Raid on CPU menu.

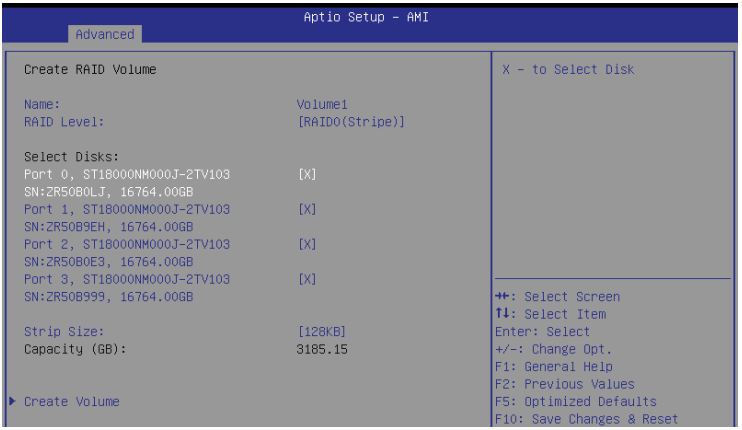
Refer to the **BIOS Setup** chapter for details on entering and navigating through the BIOS Setup.



5.2.1 Creating a RAID set

To create a RAID set:

1. From the Intel® Virtual Raid on CPU menu, select **Create RAID Volume** and press <Enter>. The following screen appears:



2. When the **Name** item is selected, enter a name for the RAID set and press <Enter>.
3. When the **RAID Level** item is selected, press <Enter> to select the RAID level to create, and then press <Enter>.
4. Under Select Disks, press <Enter> and select **X** for the disks you want to include in the RAID set.
5. When the **Strip Size** item is selected, press <Enter> to select strip size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available strip size values range from 4 KB to 128 KB. The following are typical values:
   - RAID 0: 128 KB
   - RAID 10: 64 KB
   - RAID 5: 64 KB



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

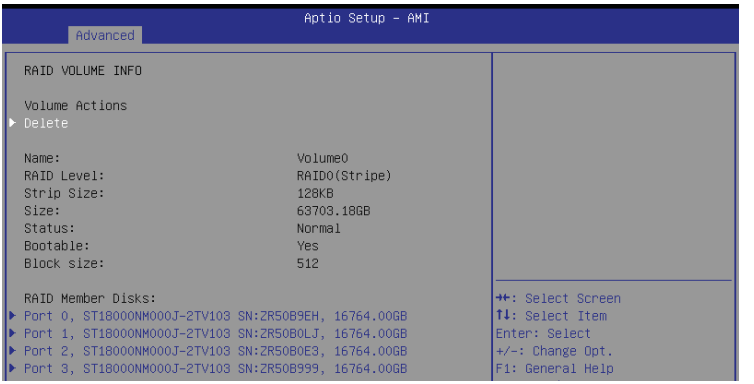
6. When the **Capacity (GB)** item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.
7. When the **Create Volume** item is selected, press <Enter> to create the RAID volume and return to the Intel® Rapid Storage Technology menu.

5.2.2 Deleting a RAID set

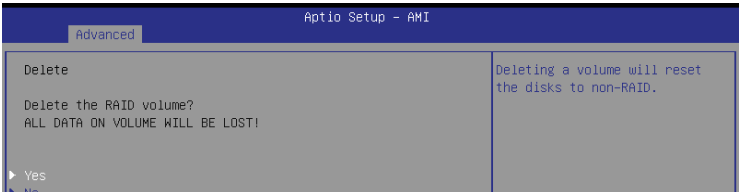
Be cautious when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the Intel® Virtual Raid on CPU menu, select the RAID volume you want to delete and press <Enter>. The following screen appears:



2. When the **Delete** item is selected, press <Enter>, then select **Yes** to delete the RAID volume and return to the Intel® Virtual Raid on CPU menu, or select **No** to cancel.



5.3 Intel® Rapid Storage Technology enterprise (Windows)

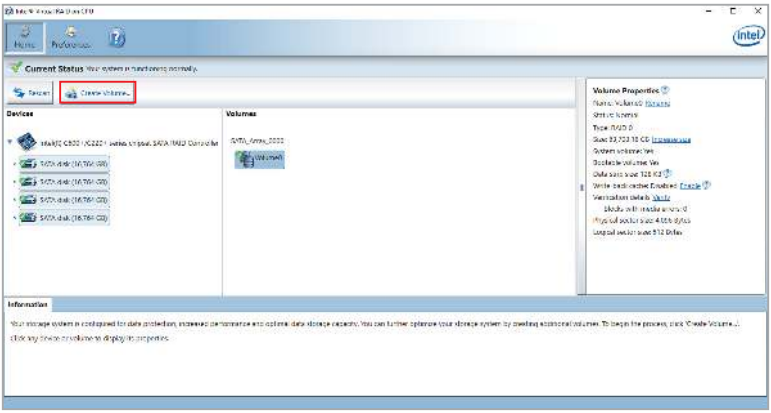
The Intel® Rapid Storage Technology enterprise allows you to create RAID 0, RAID 1, RAID 10 (RAID 1+0), and RAID 5 set(s) from Serial ATA hard disk drives that are connected to the Serial ATA connectors supported by the Southbridge.

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

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

1. Turn on the system and go to the windows desktop.
2. Click the **Intel(R) Virtual RAID on CPU** icon to display the main menu.

   Your storage system is configured for data protection, increased performance and optimal data storage capacity. You can create additional volumes to further optimize your storage system.

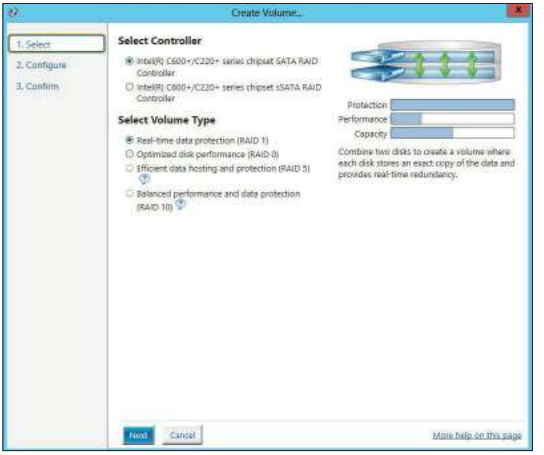


You can click **Rescan** to re-scan any attached hard disks.

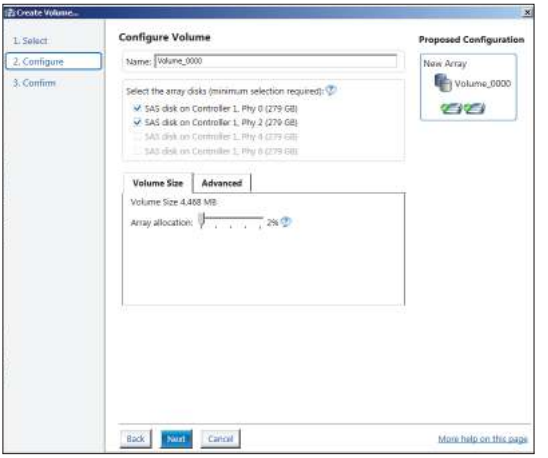
5.3.1 Creating a RAID set

To create a RAID set:

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



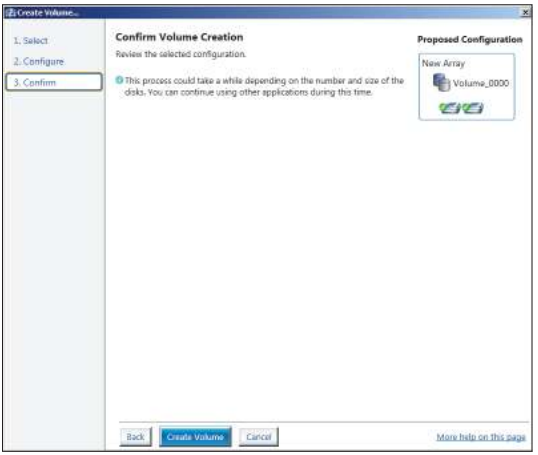
3. Enter a name for the RAID set, then select the array disks.
4. Select **Volume Size** tab, you can drag the bar to decide the volume size.
5. Click **Next**.



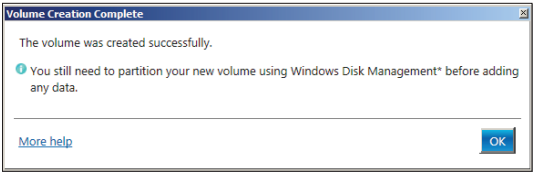
- If you do not want to keep the data on one of the selected disks, select **NO** when prompted.
- If you want to **Enable volume write-back cache** or **Initialize volume**, click **Advanced**.

6. Confirm the volume creation, than click **Create Volume** to continue.

This process could take a while depending on the number and size of the disks. You can continue using other applications during this time.

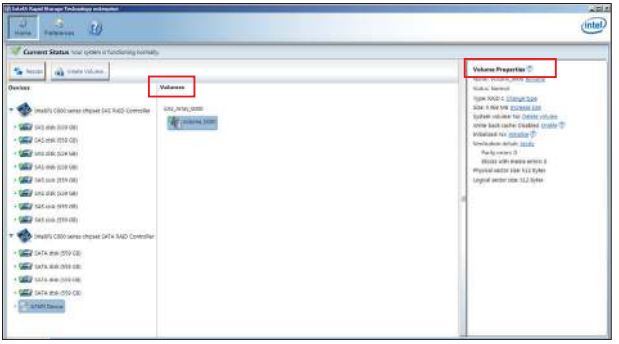


7. Wait until the process is completed, then click **OK** when prompted.



You still need to partition your new volume using Windows Disk Management before adding any data.

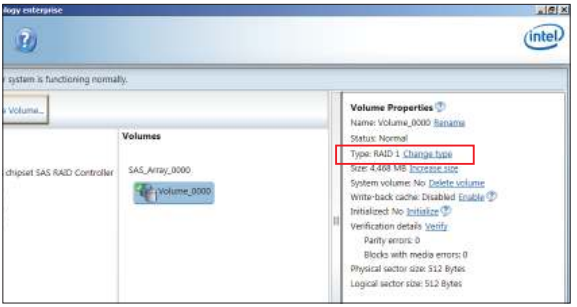
The RAID set is displayed in the **Volumes** list and you can change the settings in **Volume Properties**.



5.3.2 Changing a Volume Type

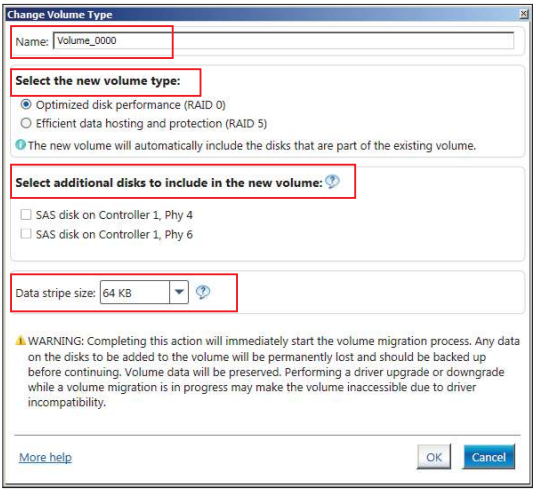
To change the volume type in **Volume Properties**:

1. Click the SATA array items you want to change in **Volumes** field.
2. From the **Volume Properties** field, select **Type:RAID 1 Change type**.



3. You can change the **Name**, **Select the new volume type**, and **Select additional disks to include in the new volume** if needed.
4. Select the **Data stripe size** for the RAID array (for RAID 0, 10 and 5 only), and click **OK**. The available stripe size values range from 4 KB to 128 KB. The following are typical values:

RAID 0: 128KB
RAID 10: 64KB
RAID 5: 64KB



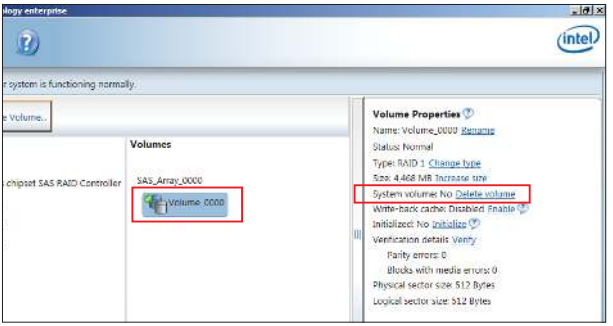
We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

5.3.3 Deleting a volume

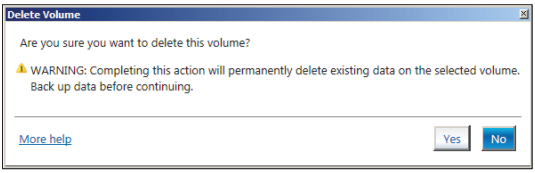
Be cautious when deleting a volume. You will lose all data on the hard disk drives. Before you proceed, ensure that you back up all your important data from your hard drives.

To delete a volume:

1. From the utility main menu, select the volume (exp. Volume_0000) in **Volumes** field you want to delete.



2. Select **Delete volume** in **Volume Properties** field. The following screen appears.

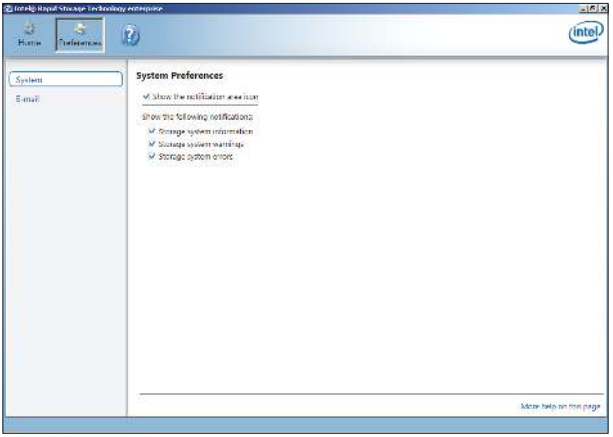


3. Click **Yes** to delete the volume and return to the utility main menu, or click **No** to return to the main menu.

5.3.4 Preferences

System Preferences

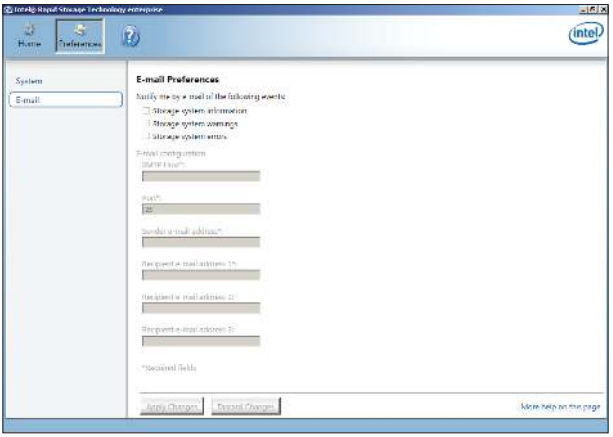
Allow you to set to show the notification area icon and show system information, warning, or errors here.



E-Mail Preferences

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

- Storage system information
- Storage system warnings
- Storage system errors



6 Driver Installation

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

6.1 RAID driver installation

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

6.1.1 Creating a USB flash drive with RAID drive

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

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

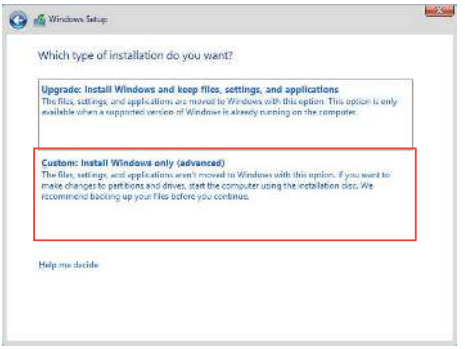
1. Place the motherboard support DVD in the optical drive.
2. Connect a USB flash drive to your system.
3. Click on the optical drive to browse the contents of the support DVD.
4. Click **Drivers** > **C25x INTEL RAID** > **Windows**> **Driver** and then copy the RAID driver folder to the USB flash drive.

6.1.2 Installing the RAID controller driver

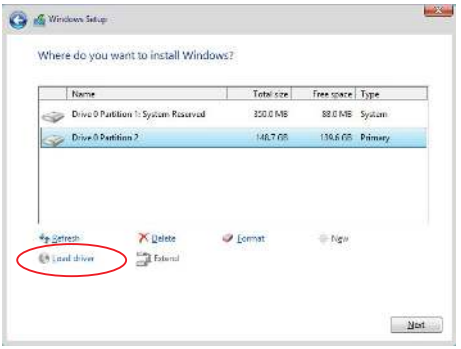
During Windows® Server 2012 R2, 2016, or 2019 OS installation

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

1. Boot the computer using the Windows® Server installation disc. Follow the onscreen instructions to start installing Windows® Server.
2. When prompted to choose a type of installation, click **Custom: Install Windows only (advanced)**.



3. Click **Load Driver**.



4. A message appears reminding you to insert the installation media containing the driver of the RAID controller driver (the installation media can be a CD, DVD, or USB flash drive).
   - If you have only one optical drive installed in your system, eject the Windows OS installation disc and replace with the motherboard Support DVD into the optical drive.
   - Or you may connect a USB flash drive containing the RAID controller driver.

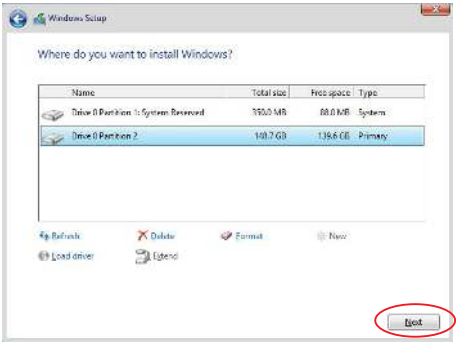
   Click **Browse** to continue.



5. Locate the driver in the corresponding folder of the Support DVD or USB flash drive and then click **OK** to continue.
6. Select the RAID controller driver you need from the list and click **Next**.

7. When the system finishes loading the RAID driver,
   - Replace the motherboard Support DVD with the Windows Server installation disc.
   - Remove the USB flash drive.

   Select the drive to install Windows and click **Next**.



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

6.2 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.

The contents of the support DVD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) for the latest updates on software and utilities.

The 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).

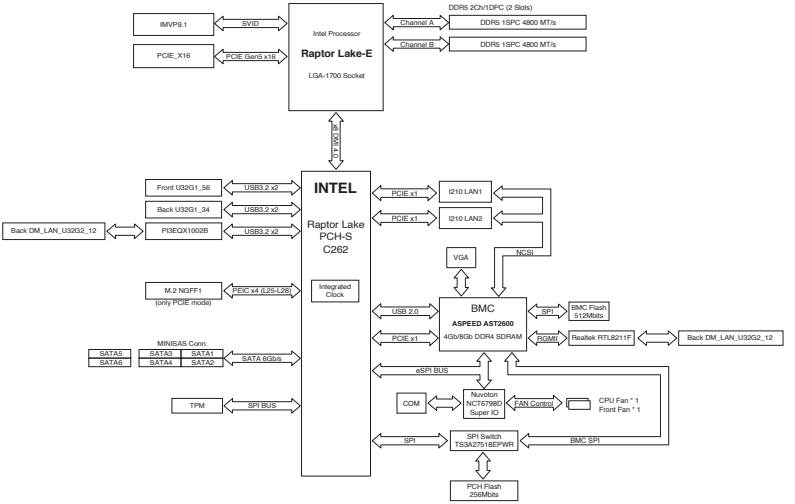
You need an internet browser installed in your OS to view the User Guide.

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.

Block diagram



Q-Code table

POST CODE	DESCRIPTION
0x10	PEI, core start
0x11	PEI, Pre-CPU initial
0x15	PEI, Pre-North bridge initial
0x19	PEI, Pre-South bridge initial
0x2B	PEI, Read memory SPD
0x2C	PEI, Detect memory
0x2D	PEI, Check memory timing
0x2E	PEI, Check memory configuration
0x2F	PEI, Memory initial
0x31	PEI, Memory installed
0x32	PEI, CPU initial
0x33	PEI, CPU cache initial
0x34	PEI, CPU AP initial
0x35	PEI, Check CPU BAP
0x36	PEI, CPU SMM initial
0x37	PEI, North bridge initial
0x3B	PEI, South bridge initial
0x4F	PEI, Prepare for DXE
0x60	DXE, core start
0x61	DXE, NVRAM initial
0x62	DXE, South bridge initial
0x63	DXE, CPU initial
0x68	DXE, North bridge Host Bridge initial
0x69	DXE, North bridge initial
0x6A	DXE, North bridge SMM initial
0x70	DXE, South bridge initial
0x71	DXE, South bridge SMM initial
0x72	DXE, South bridge devices initial
0x78	DXE, ACPI initial
0x79	DXE, CSM initial
0x90	DXE, BDS phase start
0x91	DXE, BDS connect drivers
0x92	DXE, PCI initial start
0x93 – 0x94	DXE, PCI initial
0x95	DXE, PCI check resource
0x96	DXE, PCI assign resource
0x97	DXE, Connect Console Out devices. (ex. VGA)
0x98	DXE, Connect Console In devices. (ex. Keyboard/Mouse)
0x99	DXE, Super IO initial
0x9A – 0x9D	DXE, USB initial
0xA0 – 0xA3	DXE, SATA initial
0xA4 – 0xA7	DXE, SCSI initial
0xA8	DXE, BIOS Setup verifying password
0xA9	DXE, BIOS Setup start
0xAB	DXE, BIOS Setup wait for input
0xAD	DXE, EFI ready to boot
0xAE	DXE, Legacy boot
0xAF	DXE, Exit boot services
0xB0	DXE, Set address map start
0xB1	DXE, Set address map end
0xB2	DXE, Legacy option ROM initial
0xB3	DXE, Reset system

(continued on the next page)

POST CODE	DESCRIPTION
0xB4	DXE, USB hot plug
0xB5	DXE, PCI hot plug
0xB6	DXE, NVRAM cleanup
0xB7	DXE, Configuration reset
0x50	PEI, Invalid memory type
0x50	PEI, Invalid memory speed
0x51	PEI, Check memory SPD fail
0x52	PEI, Invalid memory size
0x52	PEI, Memory mismatch
0x53	PEI, Memory not detected
0x53	PEI, Memory none useful
0x54	PEI, Memory error
0x55	PEI, Memory not installed
0x56	PEI, Invalid CPU type
0x56	PEI, Invalid CPU speed
0x57	PEI, CPU mismatch
0x58	PEI, CPU self-test failed
0x58	PEI, CPU cache error
0x59	PEI, CPU microcode update failed
0x59	PEI, CPU no microcode
0x5A	PEI, CPU internal error
0x5A	PEI, CPU error
0x5B	PEI, Reset not available
0xD0	DXE, CPU error
0xD1	DXE, North bridge error
0xD2	DXE, South bridge error
0xD3	DXE, ARCH protocol not available
0xD4	DXE, PCI out of resource
0xD5	DXE, Legacy option ROM no space
0xD6	DXE, No console out device
0xD7	DXE, No console in device
0xD8	DXE, Invalid password
0xD9	DXE, Boot option load error
0xDA	DXE, Boot option failed
0xDB	DXE, Flash update failed
0xDC	DXE, Reset not available

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-003(B)/NMB-003(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-003(B)/NMB-003(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

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 https://esg.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, Authorization, and Restriction of Chemicals) regulatory framework, we publish the chemical substances in our products at ASUS REACH website at https://esg.asus.com/Compliance.htm.

EU RoHS

This product complies with the EU RoHS Directive. For more details, see https://esg.asus.com/Compliance.htm

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.

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Các sản phẩm ASUS bán tại Việt Nam, vào ngày 23 tháng 9 năm2011 trở về sau, đều phải đáp ứng các yêu cầu của Thông tư 30/2011/TT-BCT của Việt Nam.

Türkiye 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 https://esg.asus.com/en/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.

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.

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

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

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Service and Support

Visit our multi-language website at https://www.asus.com/support.

FCC COMPLIANCE INFORMATION

Per FCC Part 2 Section 2.1077(a)



Responsible Party:	**Asus Computer International**
Address:	**48720 Kato Rd., Fremont, CA 94538**
Phone/Fax No:	**(510)739-3777/(510)608-4555**

hereby declares that the product

Product Name :	**Motherboard**
Model Number :	**P13R-I**

compliance statement:

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

Ver. 180125