E19891

E500 G9

WORKSTATION SYSTEM

USER GUIDE

E19891
First Edition
June 2022

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Chapter 3: Motherboard Information

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Safety information

Electrical Safety

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional devices to or from the system, contact a qualified service technician or your dealer. Ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you service.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

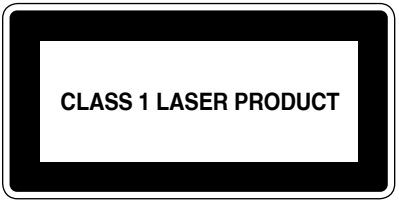
Operation Safety

- Servicing of this product or units is to be performed by trained service personnel only.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, make sure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.

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

Lithium-Ion Battery Warning

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



Heavy System

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

About this guide

Audience

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

Contents

This guide contains the following parts:

1. **Chapter 1: Product Introduction**

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

2. **Chapter 2: Hardware Setup**

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

3. **Chapter 3: Motherboard Information**

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

4. **Chapter 4: BIOS Setup**

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

5. **Chapter 5: RAID Configuration**

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

Conventions used in this guide

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

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

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

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

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

Typography

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

References

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

ASUS websites

The ASUS websites provide updated information for all ASUS hardware and software products. Visit https://www.asus.com for more information.

1 Product Introduction

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

1.1 System package contents

Check your system package for the following items.

Model Name	E500 G9
Accessories	1 x E500 G9 Support DVD 1 x AC Power Cable 1 x COM port Cable
Optional Items	Smart Card Reader Anti-Virus CD pack Print port cable DVD-RW Keyboard and mouse

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

1.2 Serial number label

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

1.3 E500 G9 specifications summary

The ASUS E500 G9 is a workstation featuring the ASUS W680/SYS motherboard.

Processor / System Bus		1 x Socket (LGA1700) Intel® 12th Generation Core™ i9/i7/i5/i3 processors * **Please refer to www.asus.com for Intel® CPU support list.**
Core Logic		Intel® W680 Chipset
Memory	**Total Slots**	4 (2-channel per CPU, 4 DIMM per CPU)
	Capacity	Maximum up to 128GB (UDIMM)
	Memory Type	DDR5 4400/3600 MHz,ECC/ non-ECC UDIMM * **Memory frequency support also depends on the CPU installed. Please refer to www.asus.com for latest memory AVL update.**
	Memory Size	32GB, 16GB, 8GB (UDIMM) * **Please refer to www.asus.com for latest memory AVL update.**
Expansion Slots	**Total PCI/PCI-X /PCI-E Slots**	5
	Slot Type	Slot 1: PCIe x16 slot, Gen5 x16 or x8 Link, from CPU (shared with Slot 3, x8/x8) Slot 2: PCIe x1, Gen3 x1, from PCH Slot 3: PCIe x16 slot, Gen5 x8 Link, from CPU Slot 4: PCIe x16 slot, Gen4 x4 Link from PCH Slot 5: PCIe x16 slot, Gen3 x4 Link, from PCH
	M.2	1 x M.2 2280/2260/2242 PCIe Gen4 x4 ,from CPU 1 x M.2 2280/2260/2242 PCIe Gen3 x4 ,from PCH 1 x M.2 22110/2280/2260/2242 PCIe Gen4 x4 ,from PCH 1x M.2 2330 PCIe Gen3 x1 (for WIFI module) (Supports Intel® Optane memory)
Disk Controller	**SATA Controller**	**Intel® W680 Chipset:** 8 x SATA 6Gb/s Intel® RST (Windows) (Supports software RAID 0, 1, 10 & 5)
Storage Bays	**Storage Bay**	3 x Internal 3.5” Storage bays 1 x Internal 2.5” Storage bays
	MB on-board Connectors	3 x M.2 connectors 8 x SATA 7-pin connectors
	Default Cable	4 x SATA 6G cables

(continued on the next page)

E500 G9 specifications summary

Networking	2 x Intel® I225-LM 2.5GbE LAN
VGA	CPU Integrated (Intel® UHD) Multi-VGA output support: DVI-D/HDMI™/DisplayPort/VGA - Supports DVI-D with Max resolution 1920 x 1200@60 Hz - Supports HDMI™ 1.4 with Max resolution 4096 x 2160@24 Hz - Supports DisplayPort 1.4 with Max resolution 4096 x 2160@60 Hz - Supports VGA with Max resolution 1920 x 1200@60 Hz
Graphic	Up to 1 GPU Card
Audio	Realtek® ALC897 7.1-Channel High Definition Audio CODEC
Auxiliary Storage Device Bay (Floppy / Optical Drive)	2 x 5.25" media bays ODD/DVD-RW (optional)
Front I/O	1 x USB 3.2 Gen 2x2 port 2 x USB 3.2 Gen 1 ports 1 x USB 2.0 ports 1 x Headphone jack 1 x Microphone jack
Rear I/O	2 x USB 3.2 Gen 2 ports (1 x Type A port, 1 x USB Type-C® port) 4 x USB 3.2 Gen 1 ports 1 x HDMI™ port 1 x DisplayPort 1 x DVI-D port 1 x VGA port 2 x LAN ports (RJ-45) 1 x 7.1-channel Audio I/O ports (5+1 Audio jacks)
Switch/LED	Front Switch/LED: 1 x Power switch/LED 1 x Reset switch 1 x HDD Access LED
Security Options	Trusted Platform Module (TPM 2.0)
Other Options	LPT port

(continued on the next page)

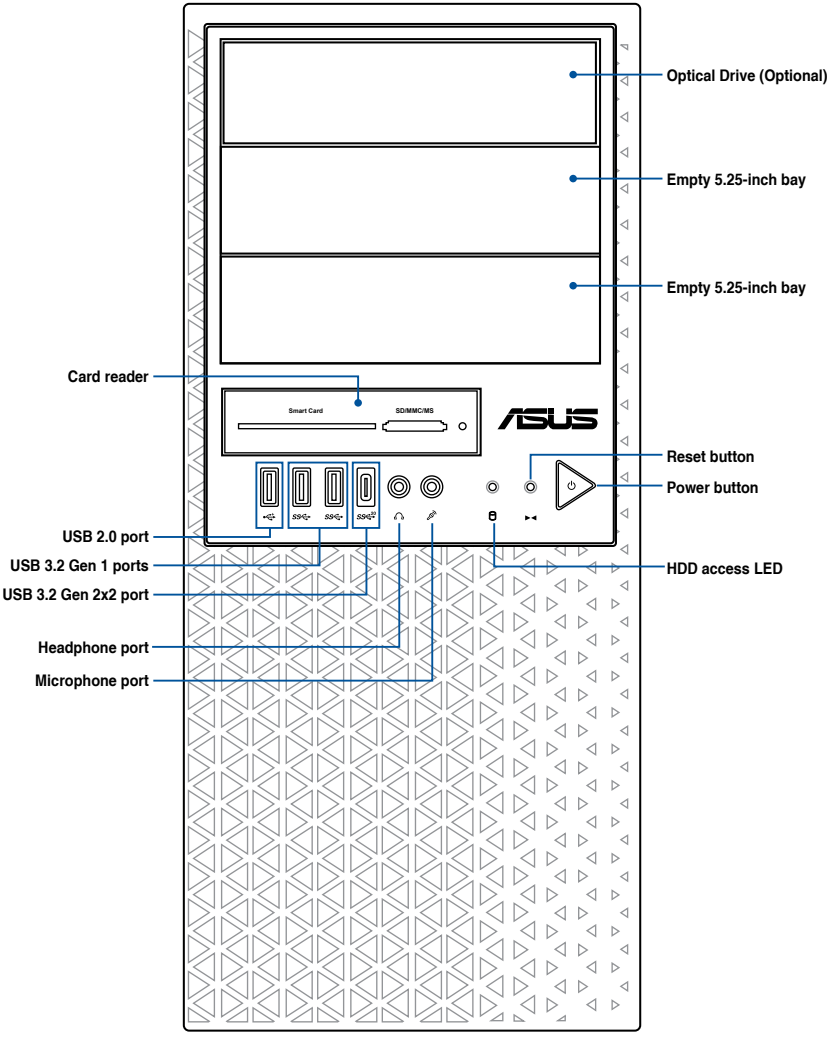
E500 G9 specifications summary

OS Support	Windows® 11 Pro for Workstation * **Refer to https://www.asus.com/event/Server/OS_support_list/OS.html for the latest OS support.**
Management Software	ASUS Control Center support
Regulatory Compliance	BSMI, CE, FCC, Energy Star
Dimension (HH x WW x DD)	423 mm x 190 mm x 435 mm 16.7" x 7.48" x 17.1"
Net Weight Kg (CPU, DRAM & HDD not included)	9.9 Kg
Gross Weight Kg (CPU, DRAM & HDD not included, Packing included)	12.1 Kg
Power Supply and Rating	300W Bronze ATX Power Supply (100-127/220-240Vac, 6-3A, 50-60Hz, Class I) 550W Gold ATX Power Supply (100-240Vac, 9-4.5A, 50-60Hz) 750W Gold ATX Power Supply (100-240Vac, 9-4.5A, 50/60Hz)
Environment	Operating temperature: 10°C ~ 35°C Non operating temperature: -40°C ~ 70°C Non operating humidity: 20% ~ 90% (Non condensing)

Specifications are subject to change without notice.

1.4 Front panel features

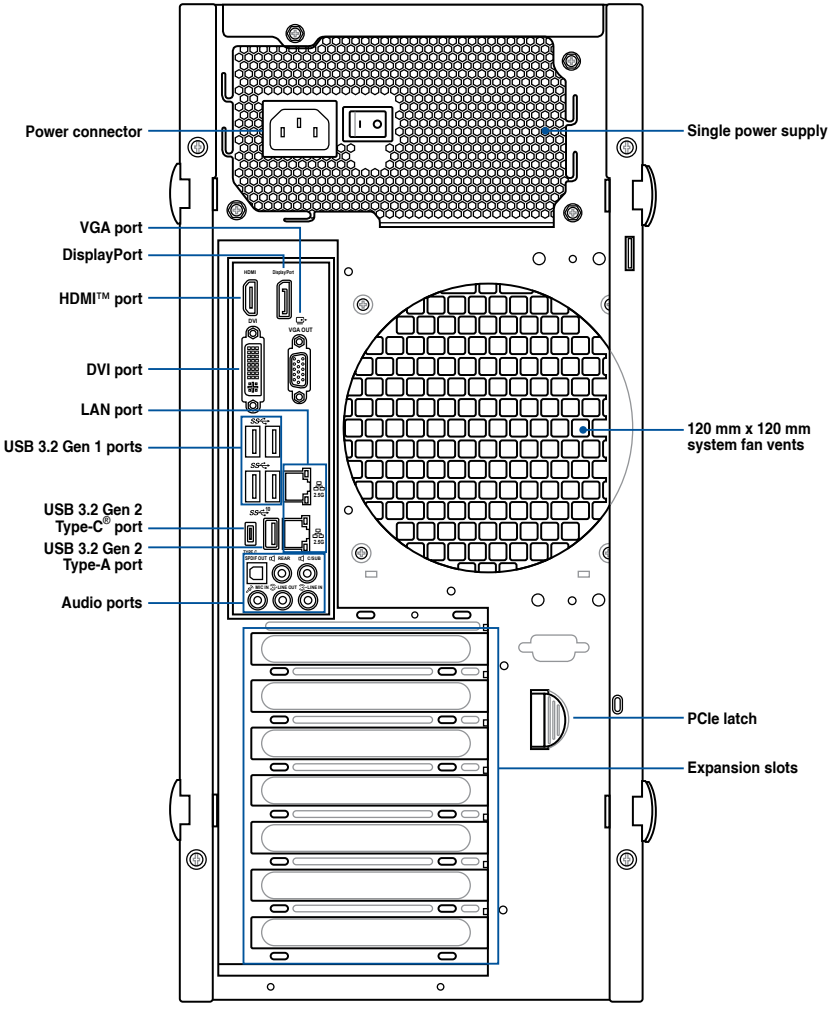
The E500 G9 workstation features a simple yet stylish front panel design. The power and reset buttons, LED indicators, optical drive, and USB ports are all conveniently located at the front panel for easy access.



Refer to the Front panel LEDs section for the LED descriptions.

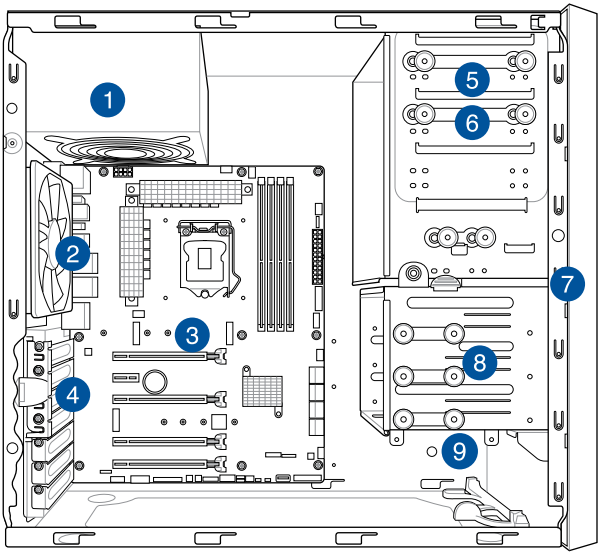
1.5 Rear panel features

The rear panel includes a slot for the motherboard rear I/O ports, expansion slots, a vent for the system fan, and the power supply module.



1.6 Internal features

The ASUS E500 G9 Pedestal server system includes the basic components as shown:



1. Power supply unit
2. 120 mm x 120 mm system fan
3. ASUS W680/SYS motherboard
4. Expansion card locks
5. Optical drive (Optional)
6. 1 x 5.25-inch drive bay
7. Front I/O board (hidden)
8. 3 x 3.5-inch Internal storage bays
9. 1 x 2.5-inch Internal storage bay

Turn off the system power and detach the power supply before removing or replacing any system component.

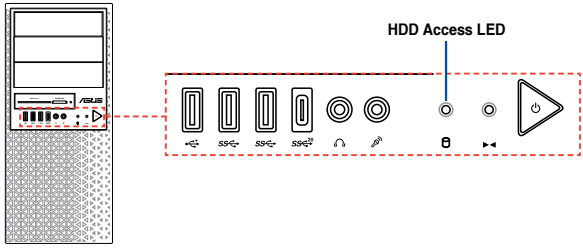
The barebone server does not include a floppy disk drive. If you need to use a floppy disk, connect the USB floppy disk drive to any of the USB ports on the front or rear panel.

WARNING

HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER BODY PARTS AWAY

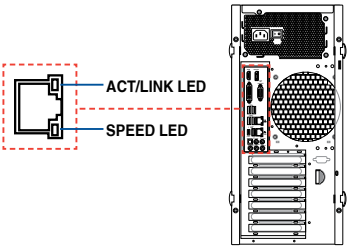
1.7 LED information

1.7.1 Front panel LEDs



LED	Icon	Display status	Description
HDD Access LED		OFF	No activity
		Blinking	Read/write data into the HDD

1.7.2 Rear panel LEDs



Intel® I225-LM 2.5G LAN ports LED indications

Activity Link LED		Speed LED	
Status	Description	Status	Description
Off	No link	Off	10/100 Mbps connection
Green	Linked	Orange	1 Gbps connection
Green (Blinking)	Data activity	Green	2.5 Gbps connection
Green (Blinking then steady)	Ready to wake up from S5 mode		

You can disable the LAN controllers in BIOS. Due to hardware design, the LAN1 port's LEDs may continue to blink even when disabled.

2 Hardware Setup

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

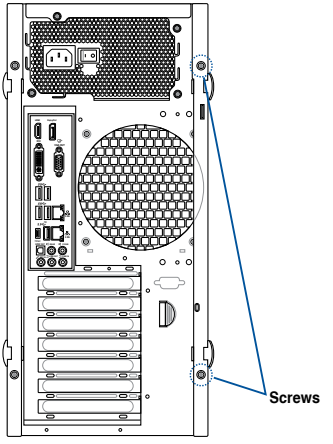
2.1 Chassis cover

2.1.1 Removing the side cover

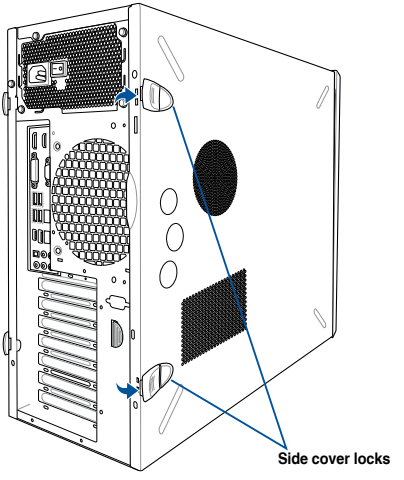
- Ensure that you unplug the power cord before removing the side cover.
- Take extra care when removing the side cover. Keep your fingers from components inside the chassis that can cause injury, such as the CPU fan, rear fan, and other sharp-edged parts.
- The images of the system shown in this section are for reference purposes only and may not exactly match the model you purchase.

To remove the side cover:

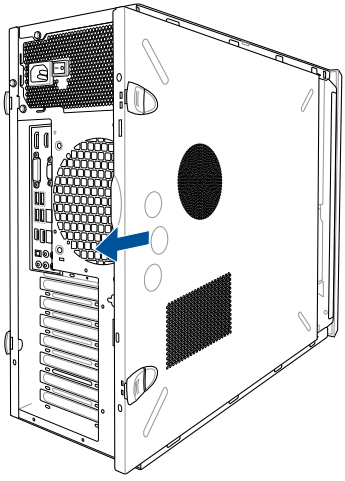
1. Remove the two screws that secure the side cover.



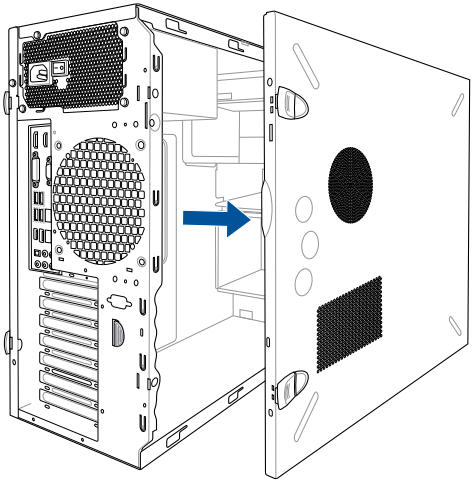
2. Press the side cover locks outward.



3. Slightly pull the side cover toward the rear just enough to detach it from the chassis.

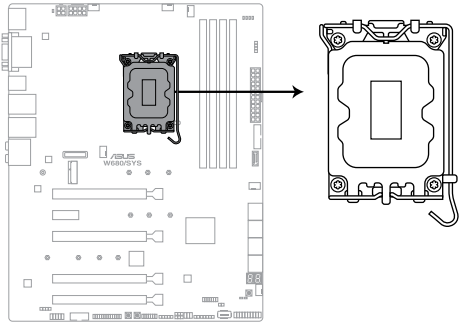


4. Remove the cover and set it aside.



2.2 CPU installation

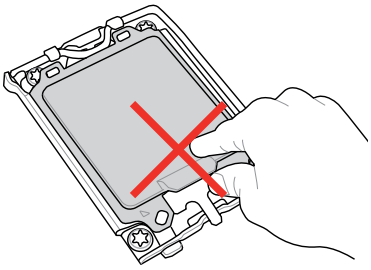
The motherboard comes with a surface mount LGA1700 socket for Intel® 12th Generation Core™ i9/i7/i5/i3 processors.

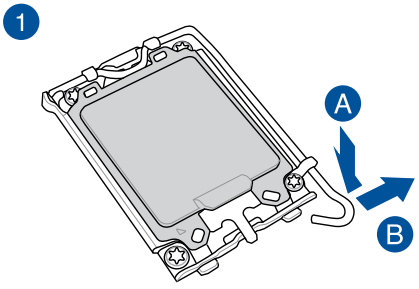


W680/SYS CPU LGA1700

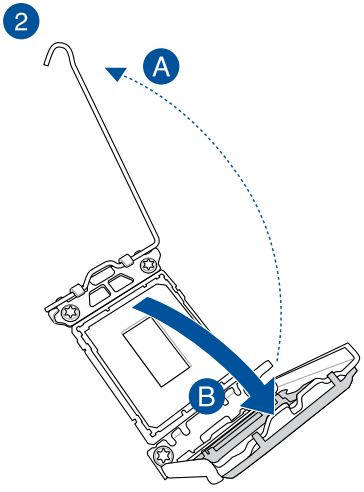
Ensure that you install the correct CPU designed for LGA1700 socket only. DO NOT install a CPU designed for other sockets on the LGA1700 socket.

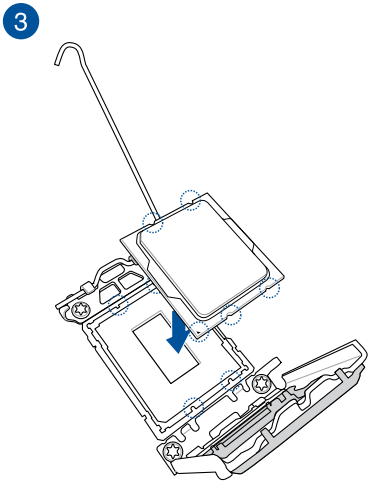
- Ensure that all power cables are unplugged before installing the CPU.
- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard 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 LGA1700 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.

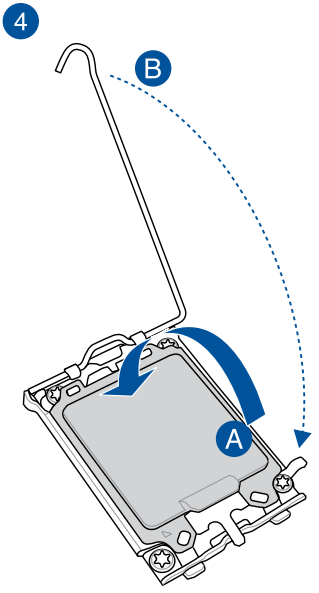


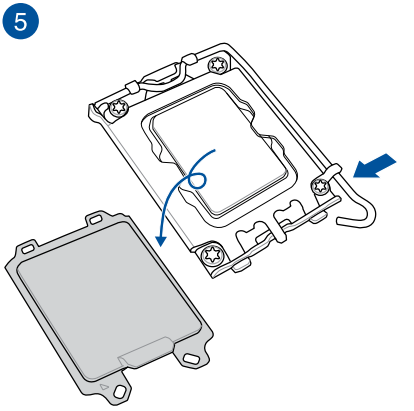


Take caution when lifting the load lever, ensure to hold onto the load lever when releasing the load lever. Letting go of the load lever immediately after releasing it may cause the load lever to spring back and cause damage to your motherboard.






4
B
A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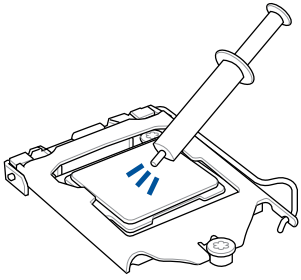
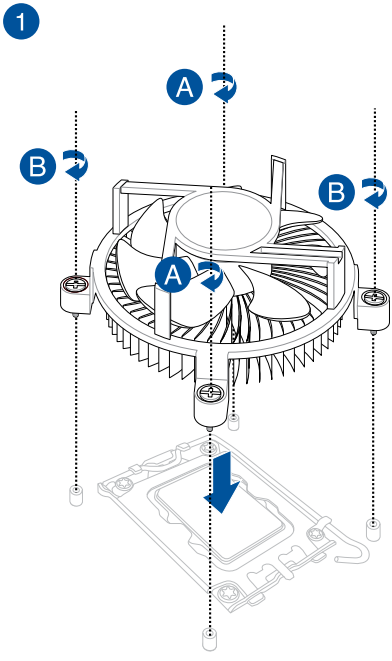
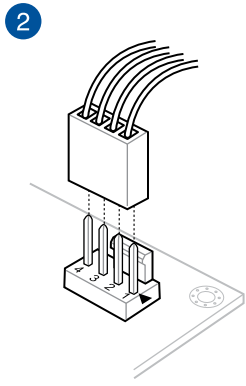
2.3 Cooling system installation



Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan, if necessary.

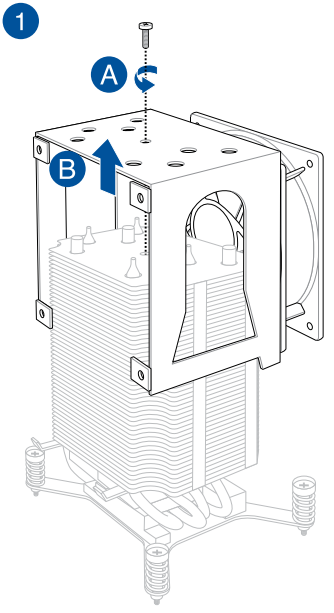
CPU heatsink and fan assembly for 65W

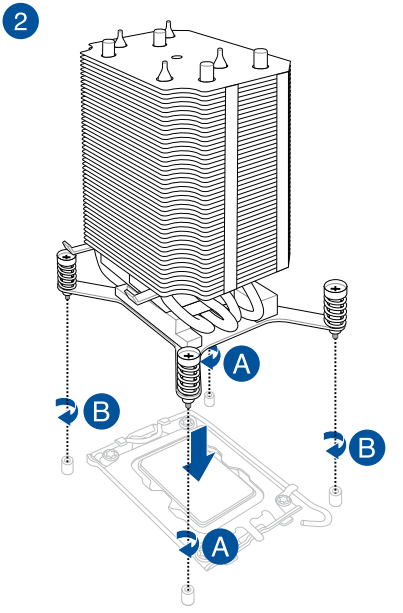


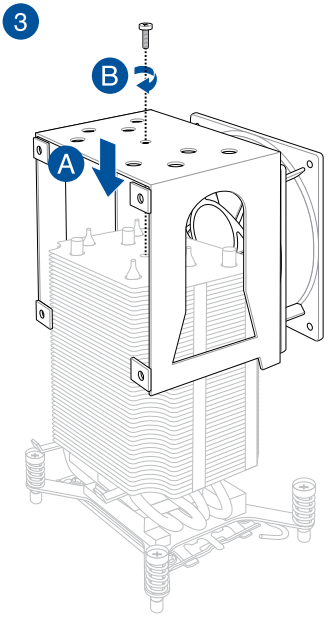


A screwdriver with a torque value of 4.5±0.5kgf-cm is recommended.

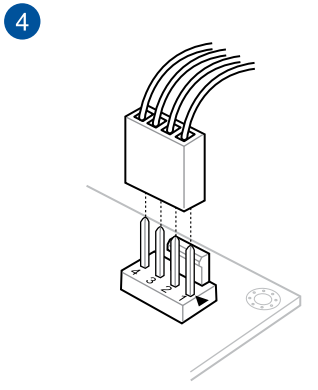
CPU heatsink and fan assembly for 125W







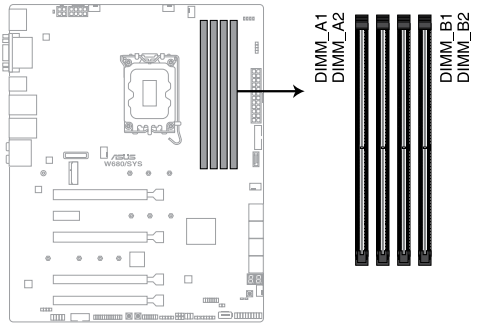
A screwdriver with a torque value of 3.5±0.5kgf-cm is recommended.



2.4 System memory

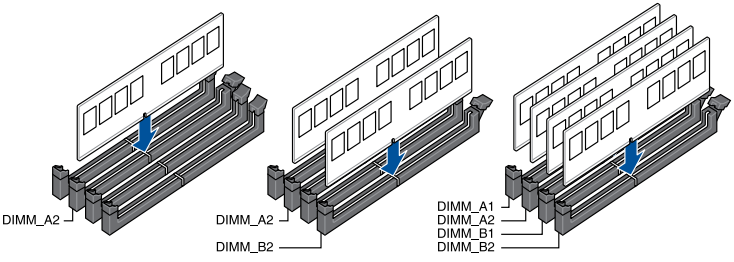
The motherboard comes with four DDR 5 (Double Data Rate 5) Dual Inline Memory Modules (DIMM) slots.

A DDR5 module is notched differently from a DDR, DDR2, DDR3, or DDR4 module. DO NOT install a DDR, DDR2, DDR3, or DDR4 memory module to the DDR5 slot.



W680/SYS 288-pin DDR5 DIMM sockets

Recommended memory configurations



DIMM configuration				
	A1	A2	B1	B2
1 DIMM		•		
2 DIMMs		•		•
4 DIMMs	•	•	•	•

Memory configurations

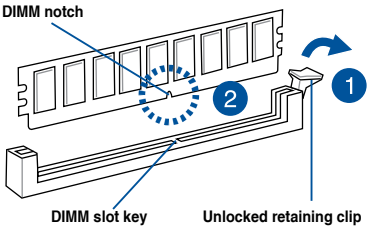
You may install 8 GB 16 GB, and 32 GB unbuffered DDR5 DIMMs into the DIMM sockets.

You may install varying memory sizes in Channel A and Channel B. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.

- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value.
- For system stability, use a more efficient memory cooling system to support a full memory load (4 DIMMs) or overclocking condition.
- Always install the DIMMS with the same CAS Latency. For an optimum compatibility, we recommend that you install memory modules of the same version or data code (D/C) from the same vendor. Check with the vendor to get the correct memory modules.
- Visit the ASUS website for the latest QVL.

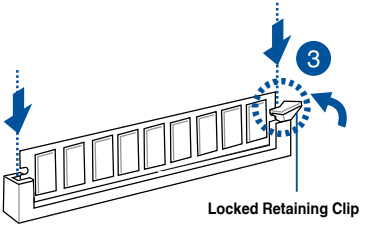
2.4.1 Installing a DIMM on a single clip DIMM socket

1. Unlock a DIMM socket by pressing the retaining clip outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.



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.

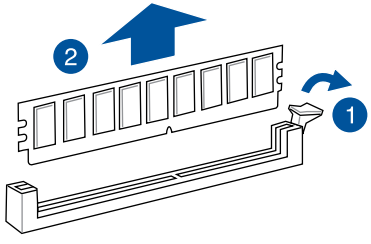


Always insert the DIMM into the socket vertically to prevent DIMM notch damage.

- To install two or more DIMMs, refer to the user guide bundled in the motherboard package.
- Refer to the ASUS website for qualified vendor lists of the memory modules.

Removing a DIMM from a single clip DIMM socket

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



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

2.5 Front panel cover

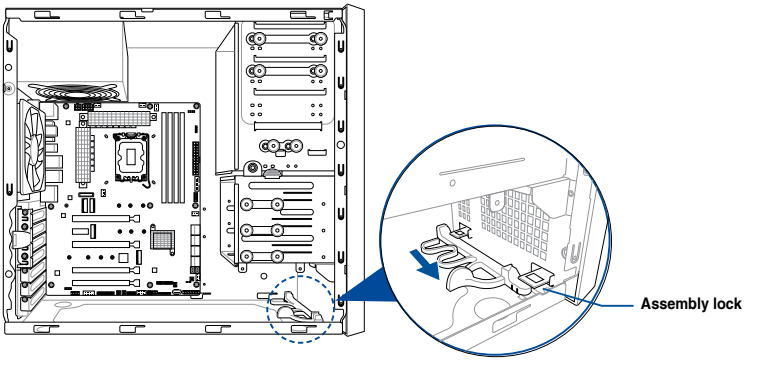
Before you can install a 5.25-inch drive, you should first remove the front panel cover.

Ensure to unplug the power cable before installing or removing any system components. Failure to do so may cause damage to the motherboard and other system components!

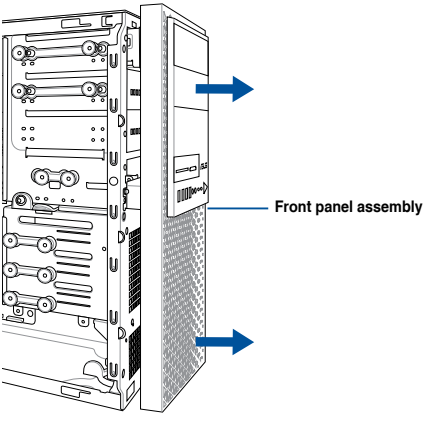
2.5.1 Removing the front panel cover

To remove the front panel cover:

1. Locate the front panel assembly lock then slide it outward to unlock the latches that secure the front panel cover to the chassis.

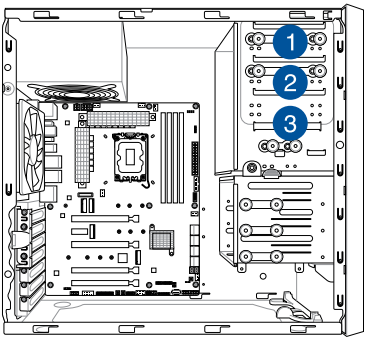


2. Remove the front panel assembly from the chassis and set it aside.



2.6 5.25-inch drives

This system comes with three 5.25-inch drive bays located on the upper front section of the chassis.

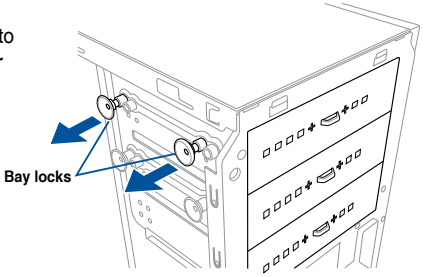


If your system came with an optical drive, the optical drive occupies the topmost bay (1). The lower bays (2 and 3) are available for additional 5.25-inch optical, zip, or floppy disk drives.

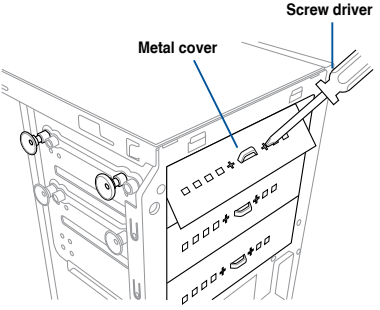
Installing a 5.25-inch drive

To install a 5.25-inch drive:

1. Remove the front panel cover. Refer to the **Removing the front panel cover** section for more information.
2. Pull the bay locks outward.

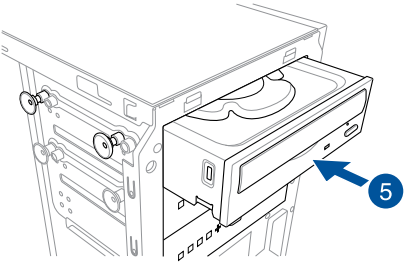


3. Remove the metal cover of the bay you intend to use.

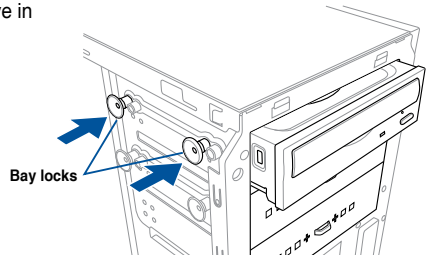


Take extra care when removing the metal cover. Use tools such as a screw driver to bend and remove the metal cover to avoid physical injury.

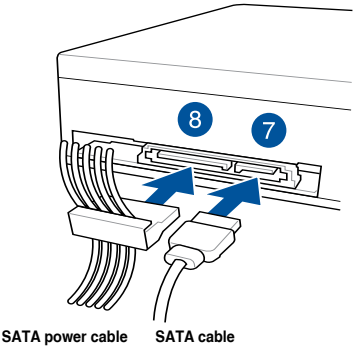
4. Prepare the 5.25-inch drive.
5. Insert and carefully push the drive into the bay until its screw holes align with the holes on the bay.



6. Push the bay locks to secure the drive in place.



7. Connect the SATA cable to the SATA connector of the drive.
8. Connect a SATA power cable from the power supply to the power connector of the drive.
9. Reinstall the front panel cover.



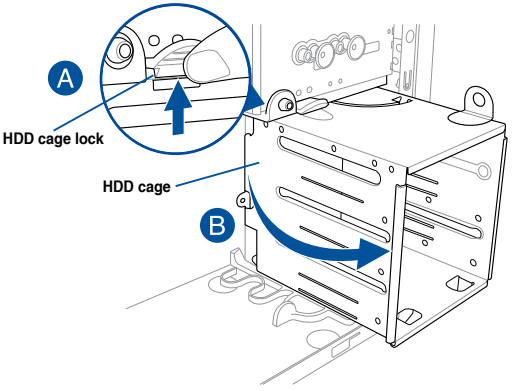
2.7 Hard disk drives (HDD)

The server system supports three (3) 3.5-inch Serial ATA hard disk drives via the hard disk drive bays and one 2.5-inch HDD/SSD drive at the bottom of the HDD cage.

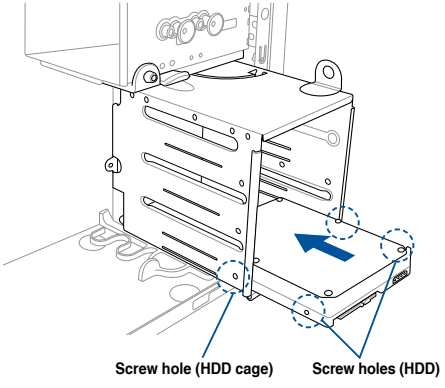
Installing 3.5-inch HDDs

To install 3.5-inch Serial ATA hard disk drives:

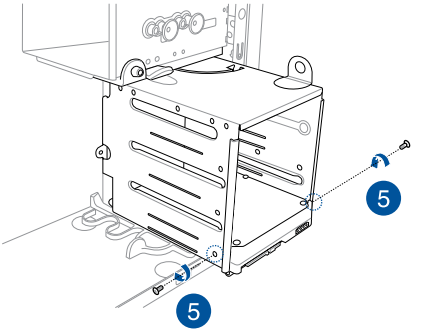
1. Remove the side cover of the chassis. Refer to the **Removing the side cover** section for more information.
2. Prepare the 3.5-inch HDD and the bundled set of screws.
3. Locate the HDD cage lock, press it up (A), then swing the HDD cage outwards (B) until it clicks in place.



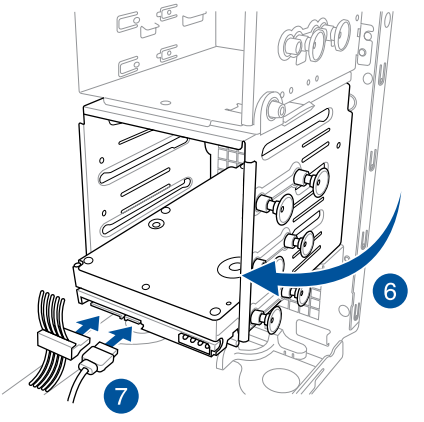
4. Align and insert the 3.5-inch HDD into the drive bay ensuring that the screw holes on the HDD matches the screw holes on the HDD cage.



5. Secure the 3.5-inch HDD to the HDD cage using the bundled set of screws.



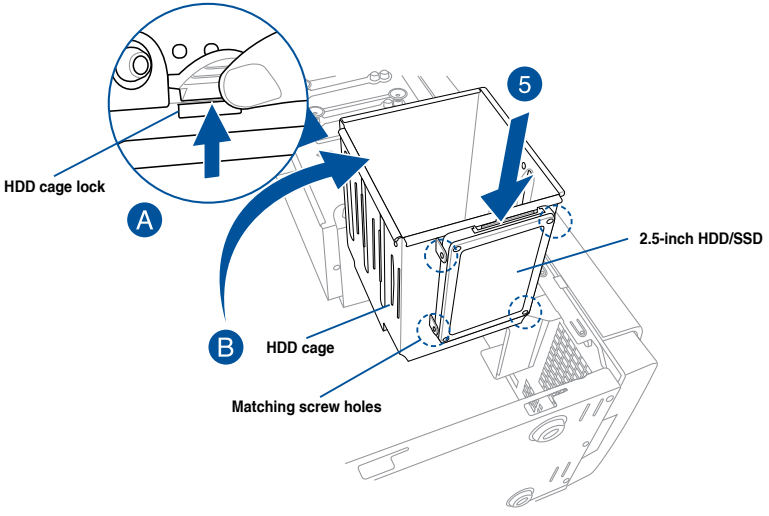
6. Swing the HDD cage inwards until it clicks back into place.
7. Connect the SATA cable and SATA power cable to the 3.5-inch HDD.



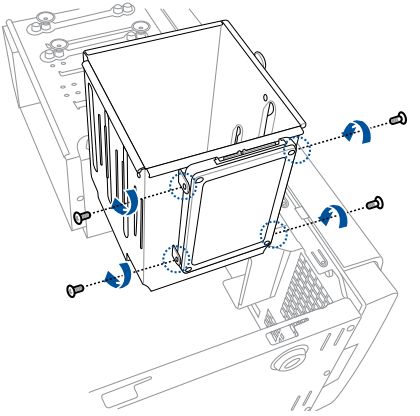
Installing 2.5-inch HDD/SSD

To install a 2.5-inch HDD/SSD:

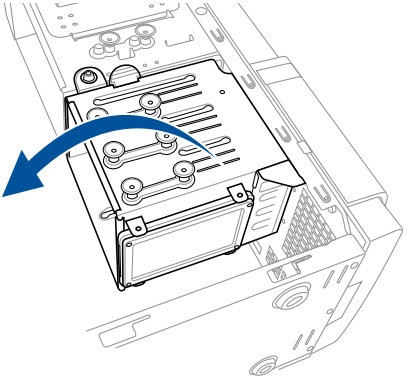
1. Remove the side cover of the chassis. Refer to the **Removing the side cover** section for more information.
2. Prepare the 2.5-inch HDD/SDD and the bundled set of screws.
3. Lay the system on its side on a flat and stable surface.
4. Locate the HDD cage lock, press it up (A), then swing the HDD cage outwards (B).
5. Align and insert the 2.5-inch HDD/SSD into the drive bay as shown. Push it all the way until its screw holes align with the holes on the drive bay.



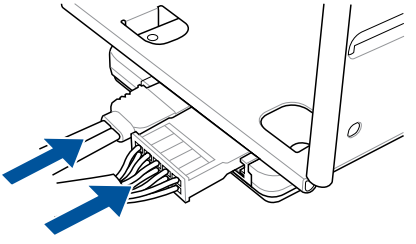
6. Secure the 2.5-inch HDD/SSD to the HDD cage using the bundled set of screws.



7. Swing the HDD cage inwards until it clicks back into place.

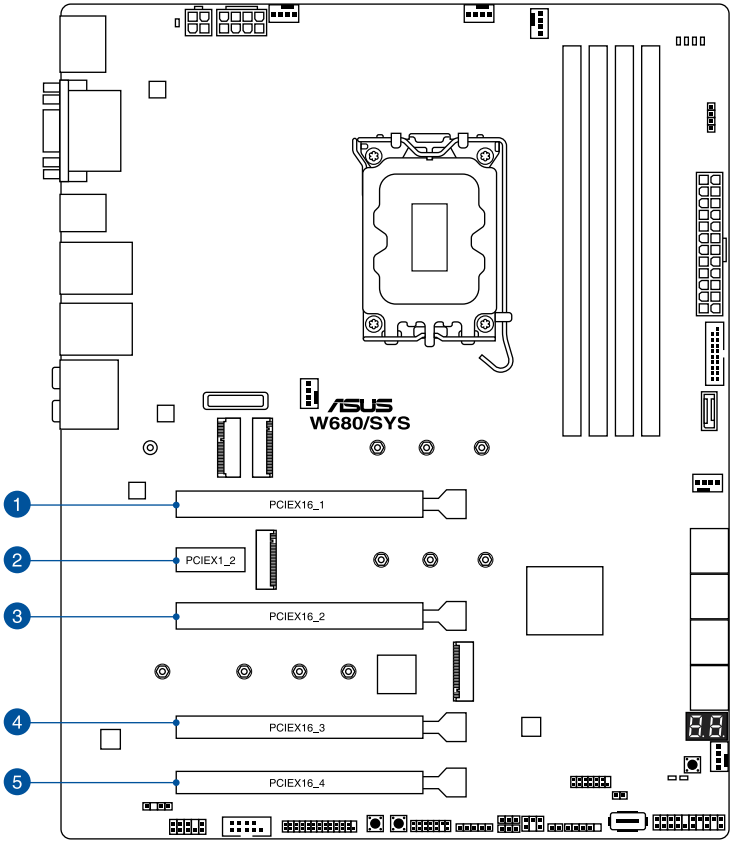


8. Connect a SATA cable and a SATA power cable to the 2.5-inch HDD/SSD.



2.8 Expansion slots

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



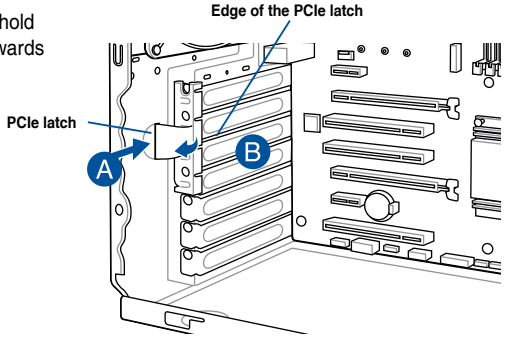
Slot No.	Slot Description
1	PCIE x16_1 slot
2	PCIE x1_2 slot
3	PCIE x16_2 slot
4	PCIE x16_3 slot
5	PCIE x16_4 slot

2.8.1 Installing an expansion card

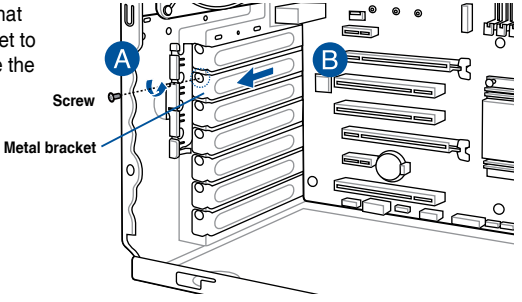
To install an expansion card:

1. Lay the system on its side on a flat, stable surface.

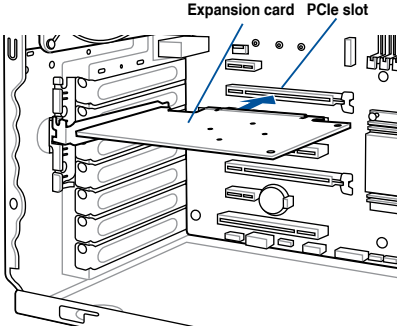
2. Press the PCIe latch (A), hold it by its edge then lift it towards the rear (B).



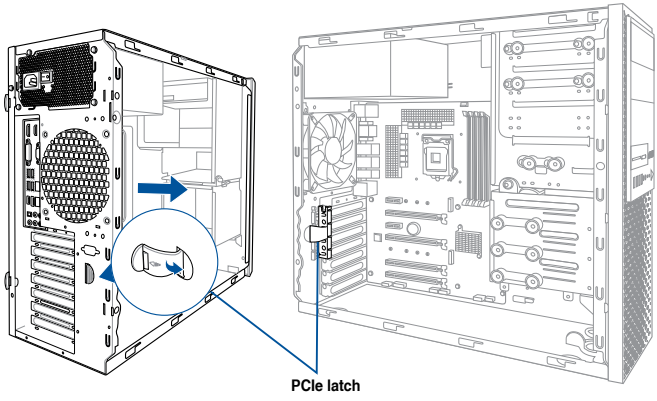
3. Remove the screw (A) that secures the metal bracket to the chassis then remove the metal bracket (B).



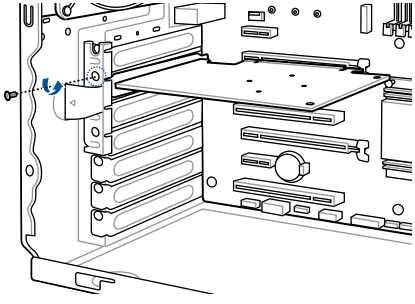
4. Align and insert the expansion card into the PCIe slot.



5. Lift the PCIe latch inwards until it clicks into place securing the expansion card to the chassis.



6. (Optional) Replace the screw of the metal bracket.



2.8.2 Configuring an expansion card

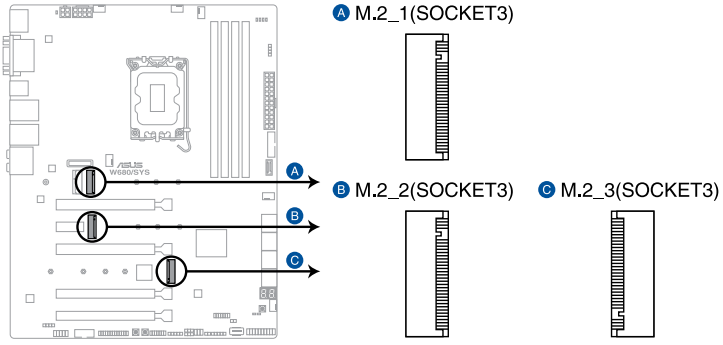
VGA configuration	PCI Express operating mode		
	PCIe 5.0 x16_1 (gray)	PCIe 5.0 x16_2	PCIe 4.0 x16_3
Single VGA/PCIe card	x16 (Recommended for single VGA card)	N/A	N/A
Dual VGA/PCIe cards	x8	x8	N/A
Triple VGA/PCIe cards	x8	x8	x4

- In single VGA card mode, use the PCIe 5.0 x16_1 slot for a PCI Express x16 graphics card to get better performance.
- We recommend that you provide sufficient power when running CrossFireX™ mode.
- Connect a chassis fan to the motherboard connector labeled **CHA_FAN1** when using multiple graphics cards for better thermal environment.
- Connect the M.2_1 heatsink fan to the motherboard connector labeled **CHA_FAN2**.

2.8.3 Installing M.2 (NGFF) cards

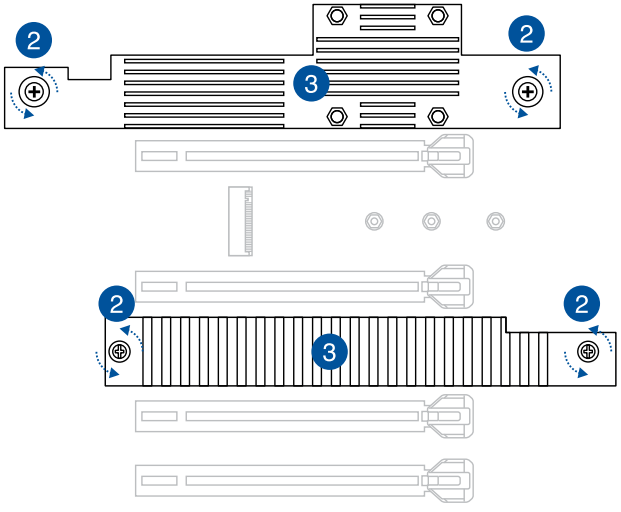
To install an M.2 card:

1. Locate the M.2 connector (M.2(SOCKET3)) on the motherboard.

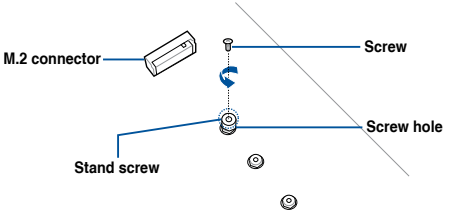


W680/SYS M.2 socket

2. Completely loosen the screws on the heatsink.
3. Remove the heatsinks.



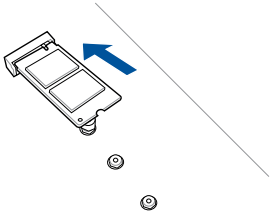
4. Remove the screw on the stand screw.



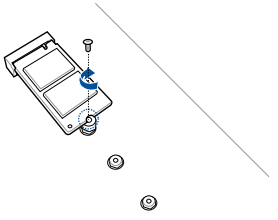
Please pay attention when removing the screw, the stand screw might be removed together with it.

5. (optional) Remove the stand screw, then secure it to the screw hole of the M.2 card length you wish to install an M.2 to.

6. Align and insert the M.2 card into the M.2 connector (M.2(SOCKET3)).



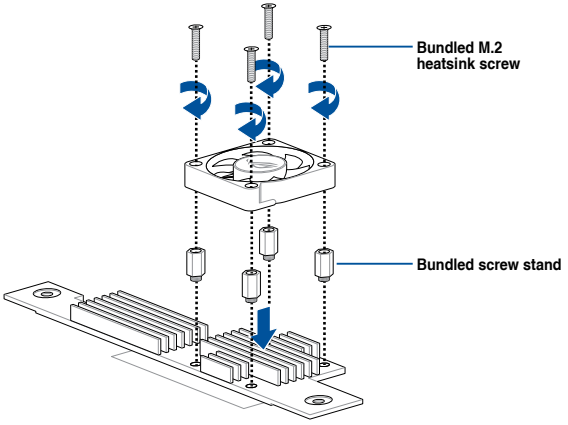
7. Secure the M.2 card with the screw you removed in step 4.



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

8. Repeat steps 4 to 7 to install an M.2 to another M.2 connector.

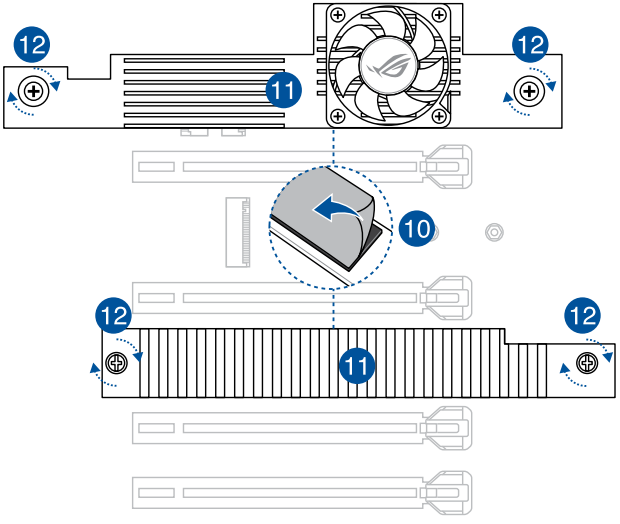
9. (optional) Secure the bundled M.2 fan to the M.2_1 heatsink using the four (4) bundled M.2 heatsink screws and screw stands.



10. Remove the plastic film from the thermal pads on the bottom of the heatsinks.

11. Replace the heatsinks.

12. Secure the heatsinks using the screws previously loosened.



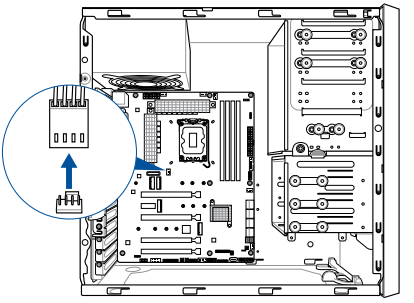
13. (optional) Connect the M.2_1 heatsink fan to the **CHA_FAN2** connector on your motherboard if you installed the M.2 heatsink fan in step 9.

2.9 System fan

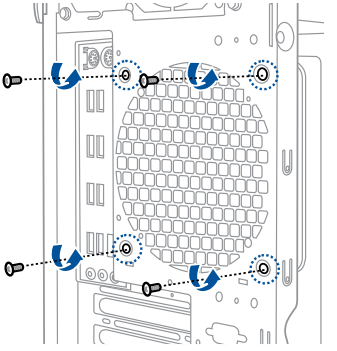
This section describes how to remove the system fan in the event that you need to install or remove previously installed or new system components, or when the system fan needs to be replaced because it was damaged or became defective.

To remove the system fan:

1. Disconnect the system fan cable from the CHA_FAN1 connector on the motherboard.

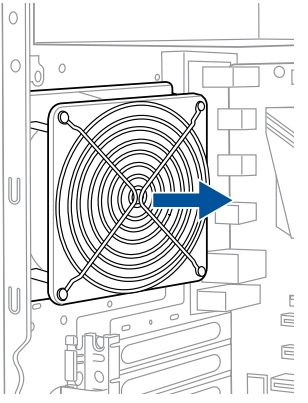


2. Remove the four system fan screws at the rear panel. Keep the screws for later use.



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

3. Remove the system fan.



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

2.10 BIOS update utility

USB BIOS FlashBack™

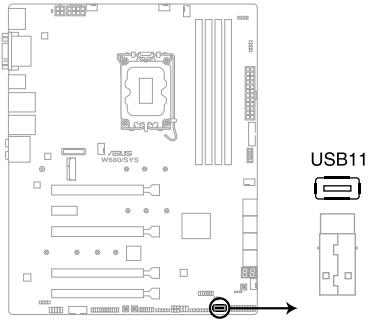
USB BIOS FlashBack™ allows you to easily update the BIOS without entering a bootable environment, ideal for BIOS recovery, rollback, or updates to support new CPUs. Simply insert a USB storage device to the USB port (the USB port is marked the I/O shield) then press the USB BIOS FlashBack™ button for three seconds to start the update process.

To use USB BIOS FlashBack™:

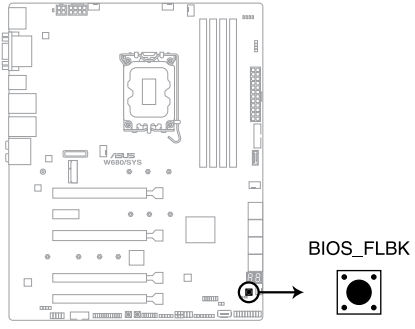
1. Download the latest BIOS from the support site at www.asus.com/support/ and save it to a USB storage device.

- We recommend you to use a USB 2.0 storage device to save the latest BIOS version for better compatibility and stability.
- When downloading or updating the BIOS file, rename it as **W680S.CAP** for this motherboard.

2. Insert the USB storage device to the USB FlashBack™ port.
3. Shut down your computer.



4. On your motherboard, press the BIOS FlashBack™ button for three seconds until the FlashBack™ LED blinks three times, indicating that the BIOS FlashBack™ function is enabled.



W680/SYS BIOS_FLBK button

Refer to section **Onboard LEDs** for more information of the FlashBack™ LED.

5. Wait until the light goes out, indicating that the BIOS updating process is completed.

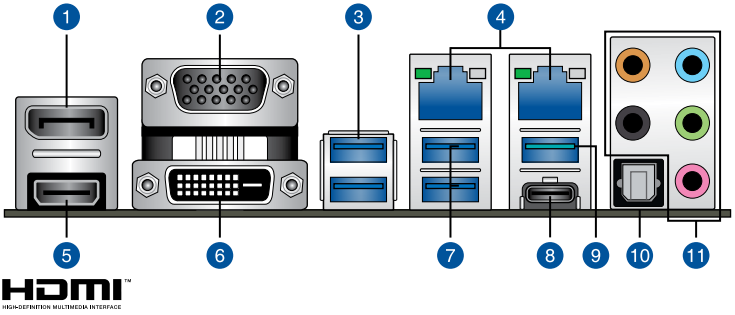
For more BIOS update utilities in BIOS setup, refer to the section **Updating BIOS** in Chapter 4.

- Do not unplug portable disk, power system, or short the CLRTC header while BIOS update is ongoing, otherwise update will be interrupted. In case of interruption, please press and hold the BIOS_FLBK button for 3 seconds again to restart the process.
- If the light flashes for five seconds and turns into a solid light, this means that the BIOS FlashBack™ is not operating properly. Please check the following when this happens:
  - The USB drive should only contain a single partition.
  - The USB drive should be formatted to a FAT32, FAT16, or NTFS filesystem.
  - The BIOS filename should be correctly named, and in the root folder of the USB drive.
  - If the problem persists, the USB drive may not be compatible, please try another USB drive of a different brand/model.

  Then retry the flashback by pressing the BIOS FlashBack™ button for three seconds until the FlashBack™ LED starts to blink.

2.11 Motherboard rear and audio connection

2.11.1 Rear I/O connection



Rear panel connectors			
1.	DisplayPort	7.	USB 3.2 Gen 1 ports 3 and 4
2.	VGA port	8.	USB 3.2 Gen 2 Type-C® port C1
3.	USB 3.2 Gen 1 ports 5 and 6	9.	USB 3.2 Gen 2 port
4.	Intel® LAN I225-LM ports	10.	Optical S/PDIF Out port
5.	HDMI™ port	11.	Audio I/O ports*
6.	DVI-D port		

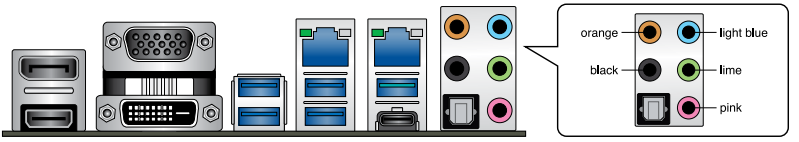
*** : Refer to the table below for audio port definitions.**

*** Audio 2, 4, 5.1 or 7.1-channel configuration**

Port	Headset / 2-channel	4-channel	5.1-channel	7.1-channel
Light Blue	Line In	Line In	Line In	Side Speaker Out
Lime	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Orange	–	–	Center/Sub woofer	Center/Sub woofer
Black	–	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out

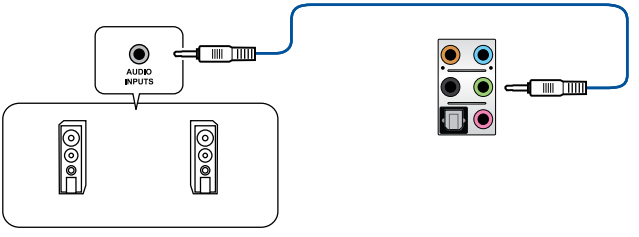
2.11.2 Audio I/O connections

Audio I/O ports

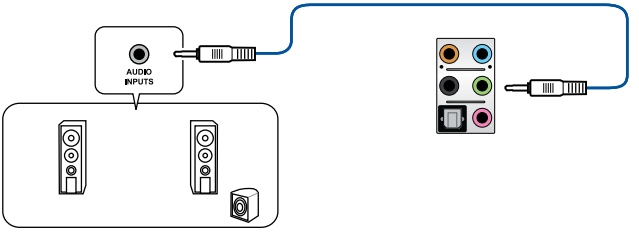


Connect to Headphone and Mic

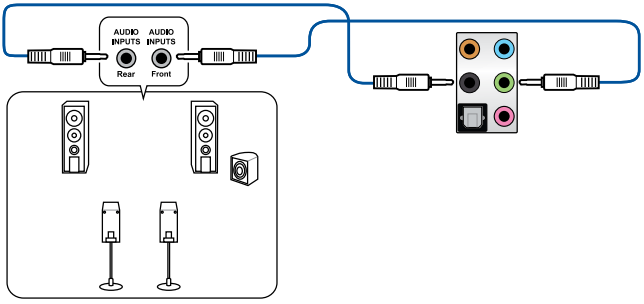
Connect to Stereo Speakers



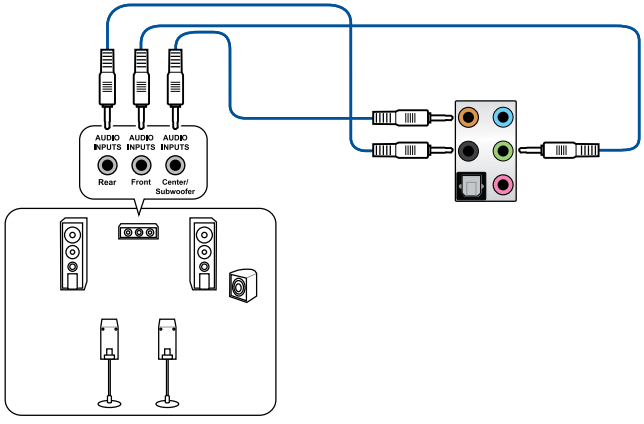
Connect to 2-channel Speakers



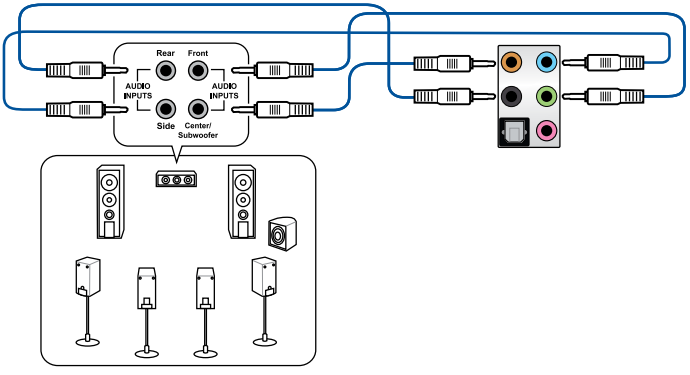
Connect to 4-channel Speakers



Connect to 5.1-channel Speakers



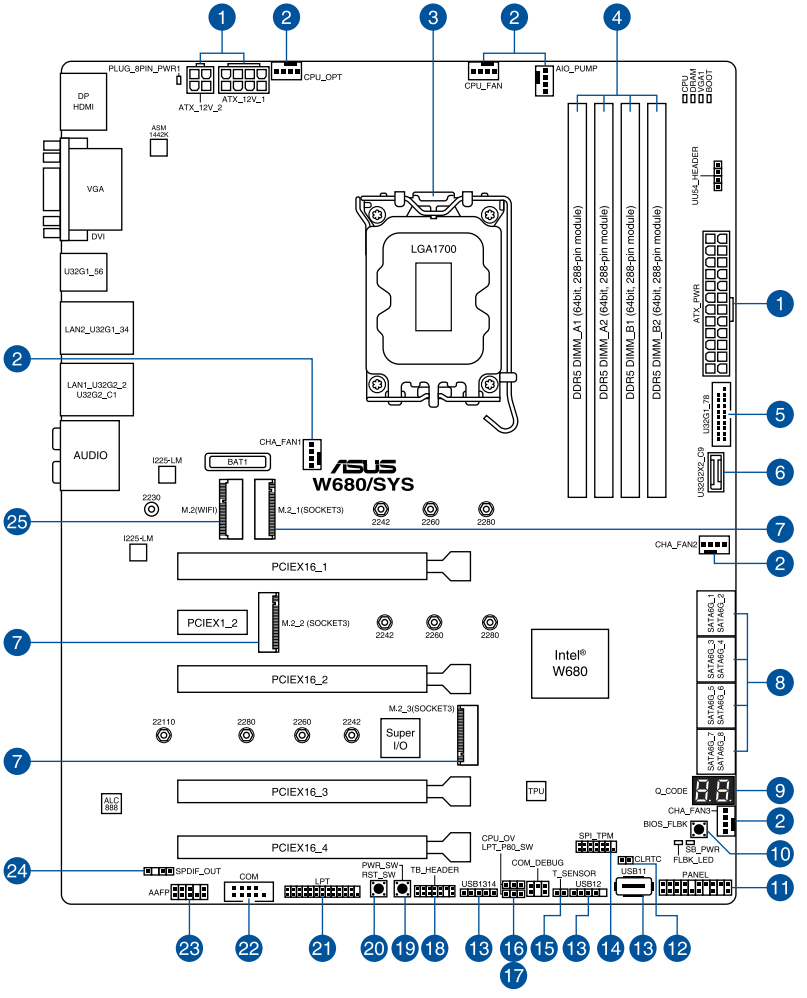
Connect to 7.1-channel Speakers



3 Motherboard Information

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

3.1 Motherboard layout



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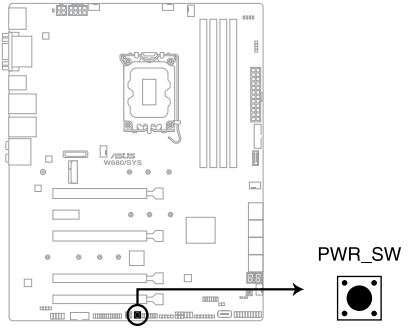
3.2 Onboard buttons and switches

Onboard buttons and switches allow you to fine-tune performance when working on a bare or open-case system. This is ideal for overclockers and gamers who continually change settings to enhance system performance.

1. Power-on button

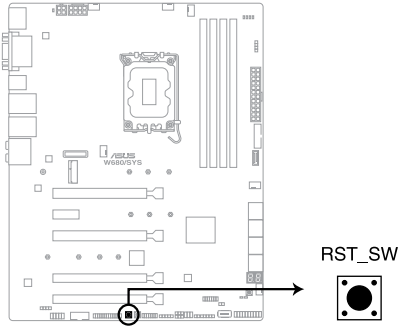
The motherboard comes with a power-on button that allows you to power up or wake up the system. The button also lights up when the system is plugged to a power source indicating that you should shut down the system and unplug the power cable before removing or installing any motherboard component.



W680/SYS Power on button

2. Reset button

Press the reset button to reboot the system.



W680/SYS Reset button

3.3 Jumpers

1. Clear RTC RAM header

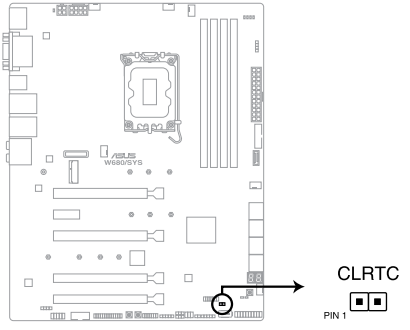
This header allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Use a metal object such as a screwdriver to short the two pins.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

Except when clearing the RTC RAM, never short-circuit the CLRTC header. Shorting the CLRTC header will cause system boot failure!

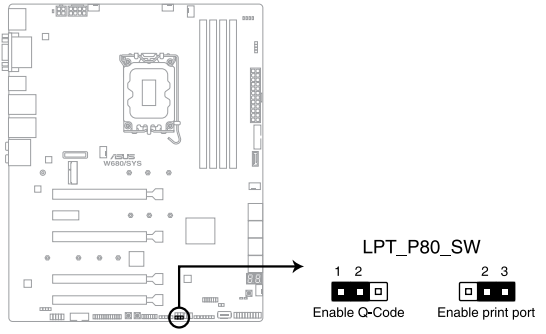
If the steps above do not help, remove the onboard battery and short the two pins again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the battery.



W680/SYS Clear RTC RAM

2. LPT and Q-Code jumper

This jumper allows you to enable either LPT (Line Printing Thermal) connector or Q-Code at a time.



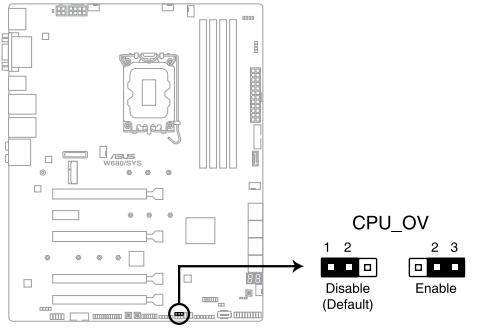
W680/SYS LPT_P80_SW setting

To switch between LPT and Q-Code:

1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap to switch between LPT and Q-Code.
3. Plug the power cord and turn ON the computer.

3. CPU Over Voltage jumper

The CPU Over Voltage jumper allows you to set a higher CPU voltage for a flexible overclocking system (depending on the type of the installed CPU). Set to pins 2-3 to increase the CPU voltage setting, or set to pins 1-2 to use the default CPU voltage setting.

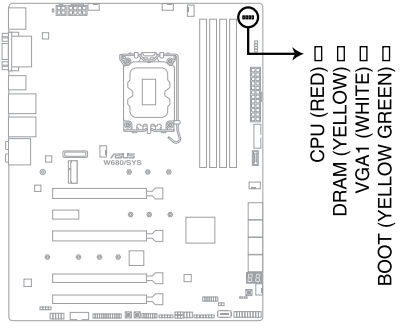


W680/SYS CPU Over Voltage setting

3.4 Onboard LEDs

1. Q LED (CPU, DRAM, VGA, BOOT)

Q LED checks key components (CPU, DRAM, VGA card, and booting devices) in sequence during motherboard booting process. If an error is found, the corresponding LED remains lit until the problem is solved. This user-friendly design provides an intuitive way to locate the root problem within seconds.

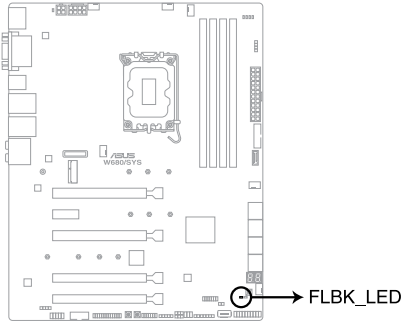


W680/SYS Q LEDs

The Q LEDs provide the most probable cause of an error code as a starting point for troubleshooting. The actual cause may vary from case to case.

2. USB BIOS FlashBack™ LED

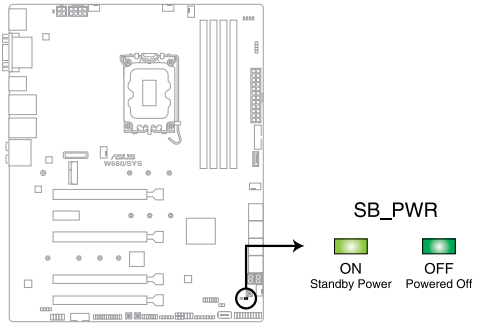
The BIOS FlashBack™ LED flashes when you press the BIOS FlashBack™ button for BIOS update.



W680/SYS FLBK LED

3. Standby Power LED

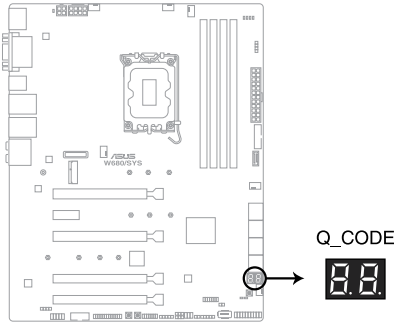
The Standby Power LED lights up to indicate that the system is ON, in sleep mode, in soft-off mode, or connected to a power source. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component.



W680/SYS Standby Power LED

4. Q-Code LED

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

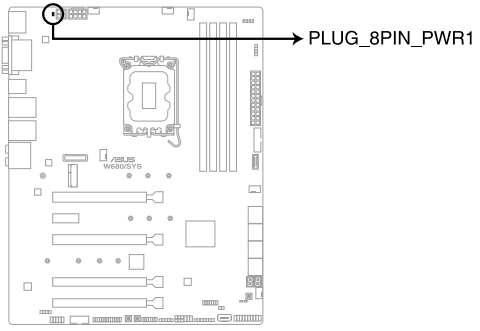


W680/SYS Q-Code LED

The Q-Code LED provides the most probable cause of an error code as a starting point for troubleshooting. The actual cause may vary from case to case.

5. 8-pin Power Plug LED

The 8-pin Power Plug LED lights up to indicate that the 8-pin power plug is not connected.



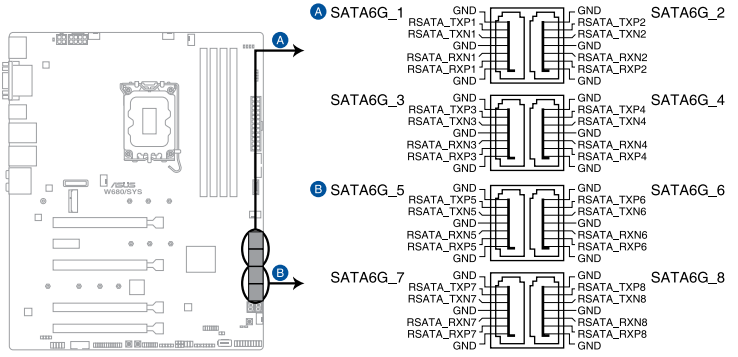
W680/SYS PLUG_8PIN_PWR1 LED

3.5 Internal connectors

1. Intel® Serial ATA 6 Gb/s connectors

These connectors connect to Serial ATA 6 Gb/s hard disk drives via Serial ATA 6 Gb/s signal cables.

If you installed Serial ATA hard disk drives, you can create a RAID 0, 1, 5, and 10 configuration with the Intel® Rapid Storage Technology enterprise through the onboard Intel® W680 chipset.

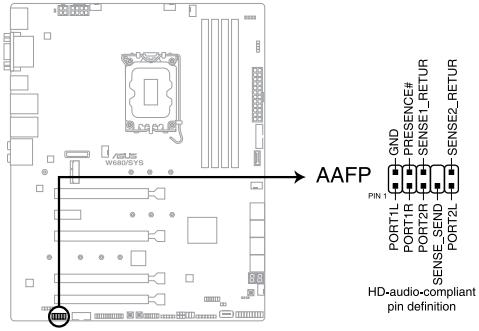


W680/SYS Intel® Serial ATA 6 Gb/s connectors

To create a RAID set with the connected storage devices, please refer to the Chapter 5.

2. Front Panel Audio connector

This connector is for a chassis-mounted front panel audio I/O module that supports HD Audio. Connect one end of the front panel audio I/O module cable to this connector.

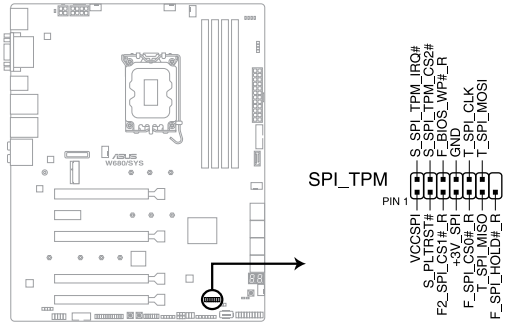


W680/SYS Front panel audio connector

We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.

3. TPM connector

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

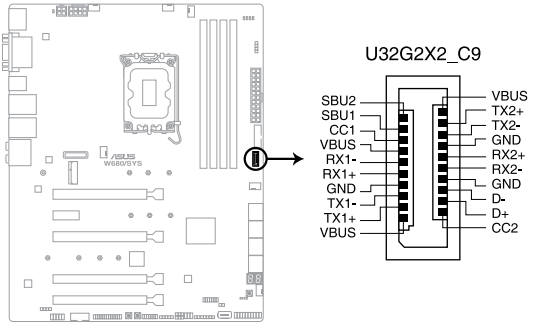


W680/SYS SPI_TPM connector

The TPM module is purchased separately.

4. USB 3.2 Gen 2x2 Type-C® Front Panel connector

The USB 3.2 Gen 2x2 Type-C® connector allows you to connect a USB 3.2 Gen 2x2 Type-C® module for additional USB 3.2 Gen 2x2 ports on the front panel. The USB 3.2 Gen 2x2 Type-C® connector provides data transfer speeds of up to 20 Gb/s.

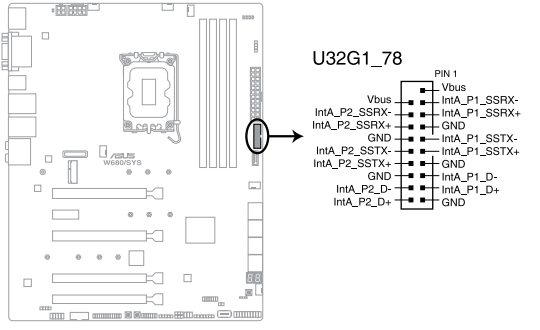


W680/SYS USB 3.2 Gen 2 connector

The USB 3.2 Gen 2x2 Type-C® module is purchased separately.

5. USB 3.2 Gen 1 connector

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. With an installed USB 3.2 Gen 1 module, you can enjoy all the benefits of USB 3.2 Gen 1 including faster data transfer speeds of up to 5 Gb/s, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.



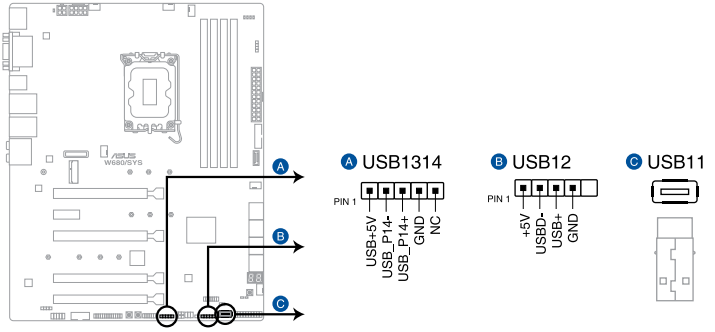
W680/SYS USB 3.2 Gen 1 connector

The USB 3.2 Gen 1 module is purchased separately.

The plugged USB 3.2 Gen 1 device may run on xHCI or EHCI mode depending on the operating system's setting.

6. USB 2.0 connectors

The 10-1 pin connector allows you to connect a USB 2.0 module for additional USB 2.0 front or rear panel ports. The 4-pin USB (Universal Serial Bus) Type-A port is available for connecting USB 2.0 devices. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.

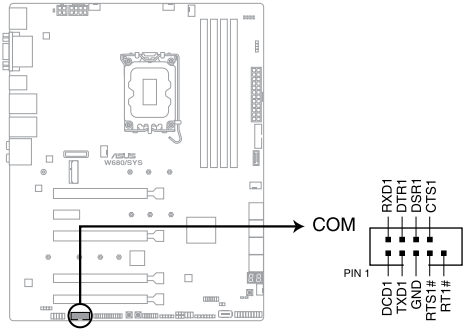


W680/SYS USB 2.0 connectors

DO NOT connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!

7. Serial Port connector

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

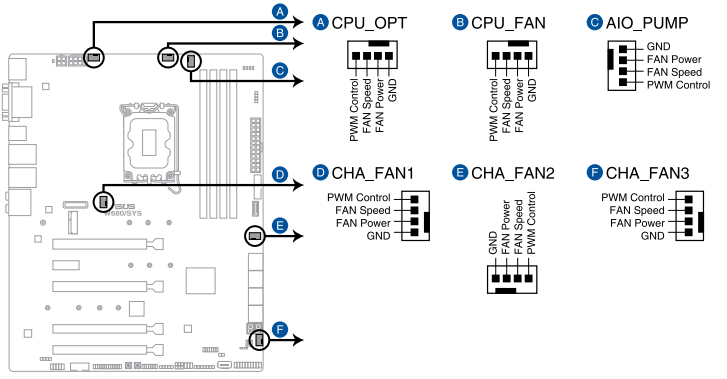


W680/SYS Serial port connector

The serial port module is purchased separately.

8. Fan connectors

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.

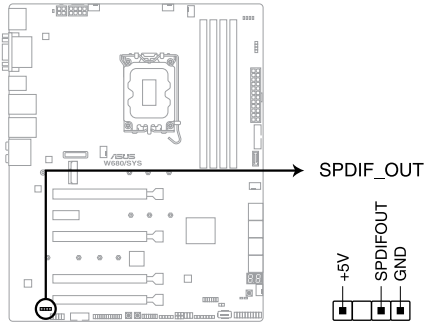


W680/SYS FAN connectors

- 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!
- Ensure that the CPU fan cable is securely installed to the CPU fan connector.

9. Digital Audio connector

This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port. Connect the S/PDIF Out module cable to this connector, then install the module to a slot opening at the back of the system chassis.

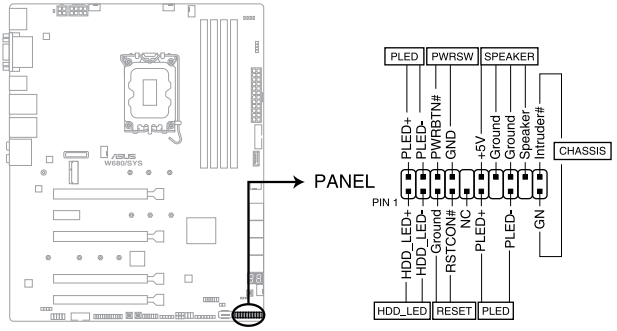


W680/SYS Digital audio connector

The S/PDIF module is purchased separately.

10. System panel connector

This connector supports several chassis-mounted functions.



W680/SYS System panel connector

- **System power LED (2-pin or 3-1 pin PLED)**

  The 2-pin or 3-1 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.

- **Hard disk drive activity LED (2-pin HDD_LED)**

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

- **System warning speaker (4-pin SPEAKER)**

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

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

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

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

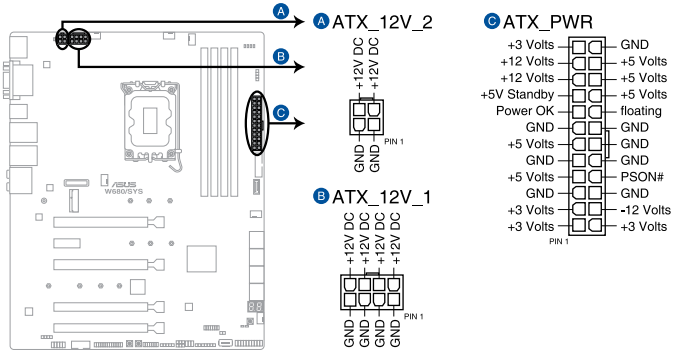
  This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

- **Chassis intrusion connector (2-pin CHASSIS)**

  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.

11. ATX power connectors

These connectors are for 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.

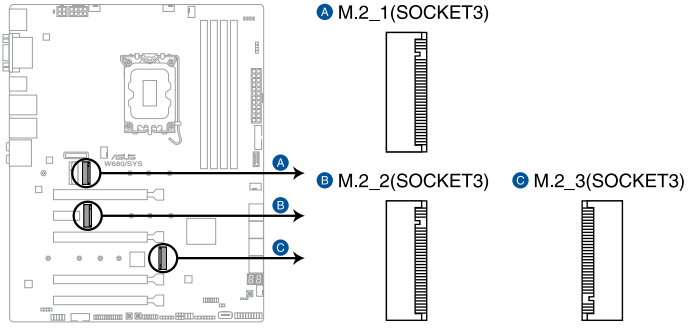


W680/SYS ATX power connectors

- DO NOT forget to connect the 24-pin and the 8-pin power plugs, or 24-pin and 4-pin power plugs (for 300W PSUs); otherwise, the system will not boot up.
- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 350W.
- When using a 300W PSU that only has a 4-pin 12V power connector, the **8-pin Power Plug LED** may light up when the 4-pin 12V connector is connectd. This is normal and will not affect the motherboard powering up and other functions.
- DO NOT forget to connect the 8-pin EATX12V power plug. Otherwise, the system will not boot.
- We recommend that you use a PSU with a higher power output when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- If you want to use two or more high-end PCI Express x16 cards, use a PSU with 1000W power or above to ensure the system stability.

12. M.2 sockets

These sockets allow you to install M.2 SSD modules.



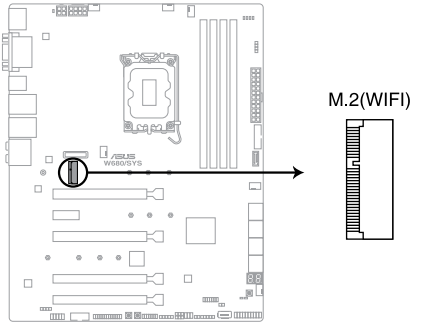
W680/SYS M.2 socket

- M.2_1 socket supports PCIe 4.0 x4 M Key design and type 2242 / 2260 / 2280 PCIe storage devices.
- M.2_2 socket supports PCIe 3.0 x4 M Key design and type 2242 / 2260 / 2280 PCIe storage devices.
- M.2_3 socket supports PCIe 4.0 x4 M Key design and type 2242 / 2260 / 2280 / 22110 PCIe storage devices.
- These sockets support IRST (Intel® Rapid Storage Technology).
- The M.2_1 socket does not support Intel® Optane memory.

The M.2 SSD module is purchased separately.

13. M.2 slot (Key E)

The M.2 Wi-Fi slot allows you to install an M.2 Wi-Fi module (E-key, type 2230).

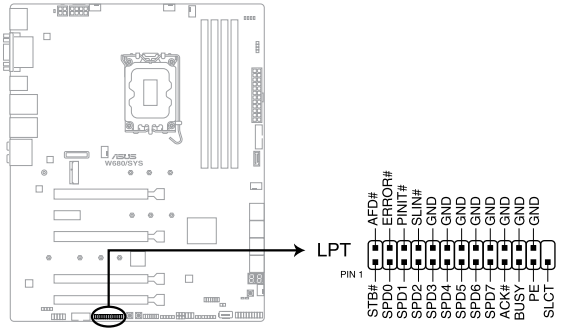


W680/SYS M.2(WIFI) slot

- The M.2 Wi-Fi module may come pre-installed on selected models.
- The M.2 Wi-Fi module is purchased separately.

14. LPT connector

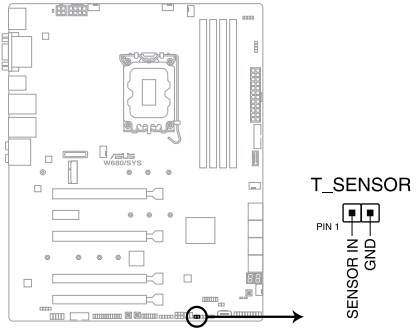
The LPT (Line Printing Terminal) connector supports devices such as a printer. LPT standardizes as IEEE 1284, which is the parallel port interface on IBM PC-compatible computers.



W680/SYS Parallel port connector

15. Thermal Sensor connector

The Thermal Sensor connector allows you to connect a sensor to monitor the temperature of the devices and the critical components inside the motherboard. Connect the thermal sensor and place it on the device or the motherboard's component to detect its temperature.

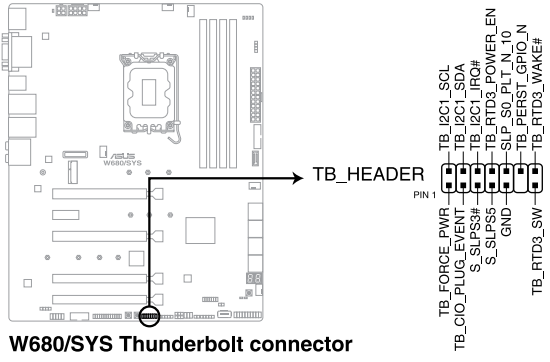


W680/SYS Thermal Sensor connector

The thermal sensor is purchased separately.

16. Thunderbolt™ connector (14-1 pin TB_HEADER)

The Thunderbolt™ connector allows you to connect an add-on Thunderbolt™ I/O card that supports Intel®'s Thunderbolt™ Technology, allowing you to connect Thunderbolt™-enabled devices to form a daisy-chain configuration.



W680/SYS Thunderbolt connector

- The add-on Thunderbolt™ I/O card and Thunderbolt™ cables are purchased separately.
- Please visit the official website of your purchased Thunderbolt™ card for more details on compatibility.

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 Knowing BIOS

The new ASUS UEFI BIOS is a Unified Extensible Interface that complies with UEFI architecture, offering a user-friendly interface that goes beyond the traditional keyboard-only BIOS controls to enable a more flexible and convenient mouse input. You can easily navigate the new UEFI BIOS with the same smoothness as your operating system. The term "BIOS" in this user manual refers to "UEFI BIOS" unless otherwise specified.

BIOS (Basic Input and Output System) stores system hardware settings such as storage device configuration, overclocking settings, advanced power management, and boot device configuration that are needed for system startup in the motherboard CMOS. In normal circumstances, the default BIOS settings apply to most conditions to ensure optimal performance. **DO NOT change the default BIOS settings** except in the following circumstances:

- An error message appears on the screen during the system bootup and requests you to run the BIOS Setup.
- You have installed a new system component that requires further BIOS settings or update.

Inappropriate BIOS settings may result to instability or boot failure. **We strongly recommend that you change the BIOS settings only with the help of a trained service personnel**.

- When downloading or updating the BIOS file for your motherboard, rename it as **W680S.CAP**. The name of the CAP file varies depending on models. Refer to the user manual that came with your motherboard for the name.
- The screenshots in this manual are for reference only, please refer to the latest BIOS version for settings and options.
- BIOS settings and options may vary due to different BIOS release versions. Please refer to the latest BIOS version for settings and options.

4.2 BIOS setup program

Use the BIOS Setup to update the BIOS or configure its parameters. The BIOS screen include navigation keys and brief onscreen help to guide you in using the BIOS Setup program.

Entering BIOS at startup

To enter BIOS Setup at startup, press <Delete> or <F2> during the Power-On Self Test (POST). If you do not press <Delete> or <F2>, POST continues with its routines.

Entering BIOS Setup after POST

To enter BIOS Setup after POST:

- Press <Ctrl>+<Alt>+<Delete> simultaneously.
- Press the reset button on the system chassis.
- Press the power button to turn the system off then back on. Do this option only if you failed to enter BIOS Setup using the first two options.

After doing either of the three options, press <Delete> key to enter BIOS.

- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Ensure that a USB mouse is connected to your motherboard if you want to use the mouse to control the BIOS setup program.
- If the system becomes unstable after changing any BIOS setting, load the default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit** menu or press hotkey **<F5>**. See section **Exit menu** for details.
- If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value. See your motherboard manual for information on how to erase the RTC RAM.
- The BIOS setup program does not support Bluetooth devices.

BIOS menu screen

The BIOS Setup program can be used under two modes: **EZ Mode** and **Advanced Mode**. You can change modes from **Setup Mode** in **Boot menu** or by pressing the <F7> hotkey.

The BIOS settings and options for each motherboard may differ slightly with the options in this manual. Please refer to the BIOS of your motherboard for the settings and options.

4.2.1 EZ Mode

The EZ Mode provides you an overview of the basic system information, and allows you to select the display language, system performance, mode and boot device priority. To access the Advanced Mode, select Advanced Mode or press the <F7> hotkey for the advanced BIOS settings.

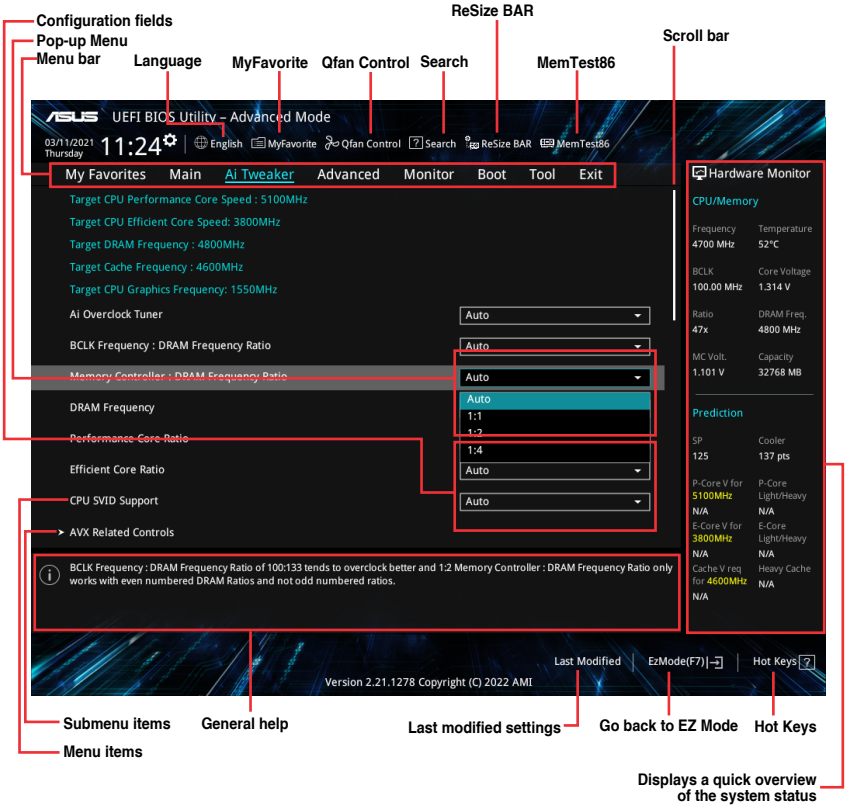
The default screen for entering the BIOS setup program can be changed. Refer to the **Setup Mode** item in section **Boot menu** for details.

The boot device options vary depending on the devices you installed to the system.

4.2.2 Advanced Mode

The Advanced Mode provides advanced options for experienced end-users to configure the BIOS settings. The figure below shows an example of the Advanced Mode. Refer to the following sections for the detailed configurations.

To switch from EZ Mode to Advanced Mode, click **Advanced Mode(F7)** or press the <F7> hotkey.



Menu bar

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

My Favorites	For saving the frequently-used system settings and configuration.
Main	For changing the basic system configuration
Ai Tweaker	For changing the overclocking settings
Advanced	For changing the advanced system settings
Monitor	For displaying the system temperature, power status, and changing the fan settings.
Boot	For changing the system boot configuration
Tool	For configuring options for special functions
Exit	For selecting the exit options and loading default settings

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 (My Favorites, Ai Tweaker, Advanced, Monitor, Boot, Tool, and Exit) on the menu bar have their respective menu items.

Submenu items

A greater than sign (>) before each item on any menu screen means that the item has a submenu. To display the submenu, select the item and press <Enter>.

Language

This button above the menu bar contains the languages that you can select for your BIOS. Click this button to select the language that you want to display in your BIOS screen.

MyFavorite

This button above the menu bar shows all BIOS items in a Tree Map setup. Select frequently-used BIOS settings and save it to MyFavorites menu. You may also access this item by pressing the <F3> key on the keyboard.

Refer to section **My Favorites** for more information.

QFan Control

This button above the menu bar displays the current settings of your fans. Use this button to manually tweak the fans to your desired settings. You may also access this item by pressing the <F6> key on the keyboard.

Refer to section **QFan Control** for more information.

Search

This button allows you to search for BIOS items by entering its name, enter the item name to find the related item listing. You may also access this item by pressing the <F9> key on the keyboard.

ReSize BAR

This button allows you to turn ReSize BAR function on or off.

[On]	Enable ReSize BAR support to fully harness GPU memory. CSM (Compatibility Support Module) will be disabled.
[Off]	ReSize BAR support will be disabled.

MemTest86

This button above the menu bar allows you to activate MemTest86. MemTest86 can be used to scan and detect if there are problems with your memory. For more information on using MemTest86, please refer to www.asus.com/support.

- Please save all changes made before using MemTest86.
- There will be a few seconds of loading time after clicking the MemTest86 button.

Hot keys

This button contains the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings.

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.

General help

At the bottom of the menu screen is a brief description of the selected item. Use <F12> key to capture the BIOS screen and save it to the removable storage device.

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.

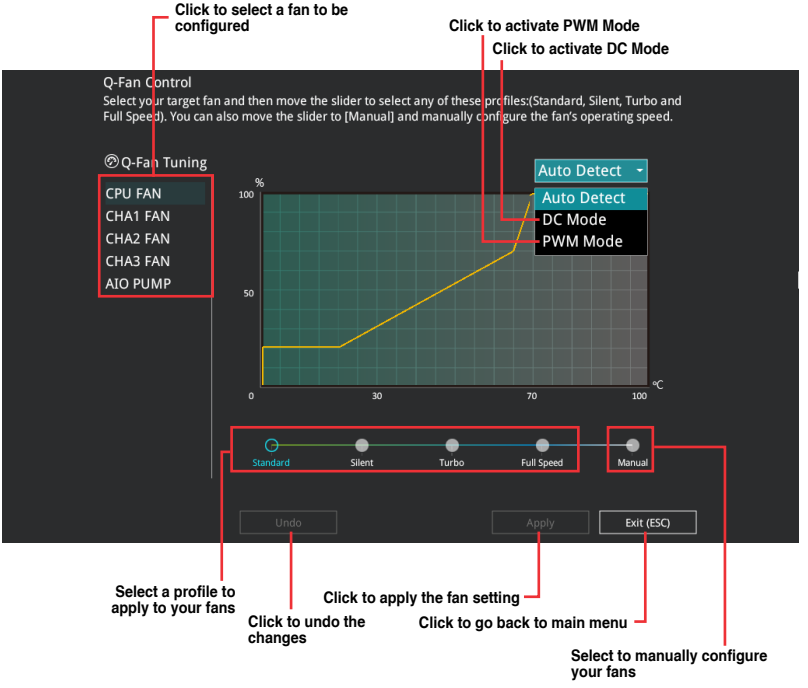
A configurable field is highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options.

Last Modified button

This button shows the items that you last modified and saved in BIOS Setup.

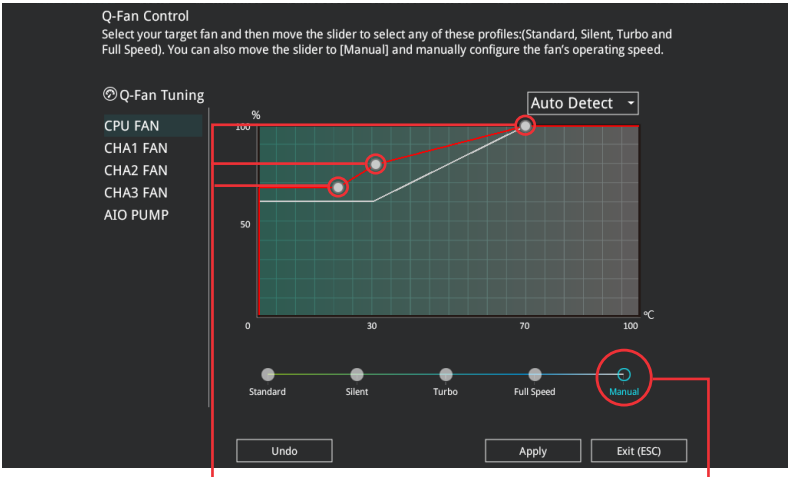
4.2.3 Q-Fan Control

The QFan Control allows you to set a fan profile or manually configure the operating speed of your CPU and chassis fans.



Configuring fans manually

Select **Manual** from the list of profiles to manually configure your fans' operating speed.

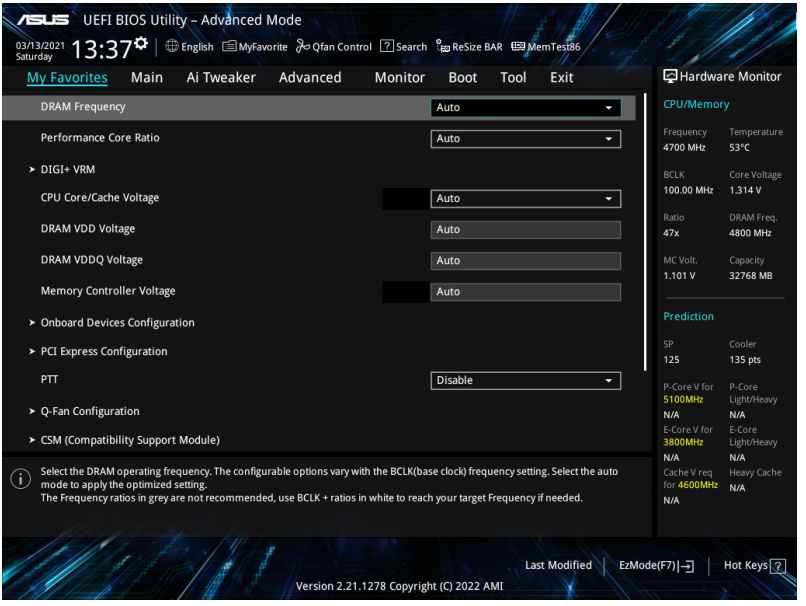


To configure your fans:

1. Select the fan that you want to configure and to view its current status.
2. Click and drag the speed points to adjust the fans' operating speed.
3. Click **Apply** to save the changes then click **Exit (ESC)**.

4.3 My Favorites

My Favorites is your personal space where you can easily save and access your favorite BIOS items.

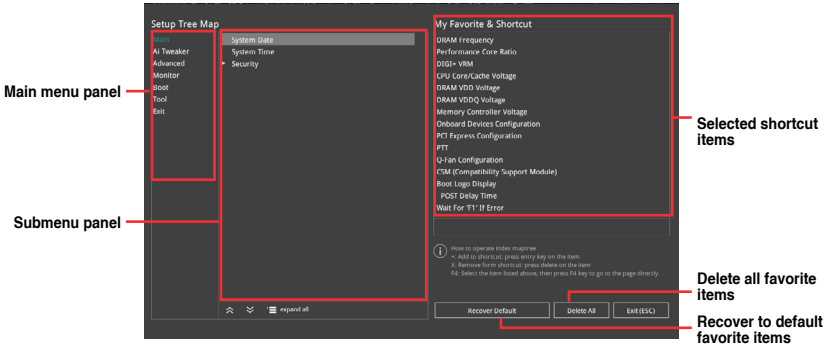


My Favorites comes with several performance, power saving, and fast boot related items by default. You can personalize this screen by adding or removing items.

Adding items to My Favorites

To add BIOS items:

1. Press <F3> on your keyboard or click **MyFavorite** from the BIOS screen to open Setup Tree Map screen.
2. On the Setup Tree Map screen, select the BIOS items that you want to save in My Favorites screen.



3. Select an item from main menu panel, then click the submenu that you want to save as favorite from the submenu panel and click + or press <Enter> on your keyboard.

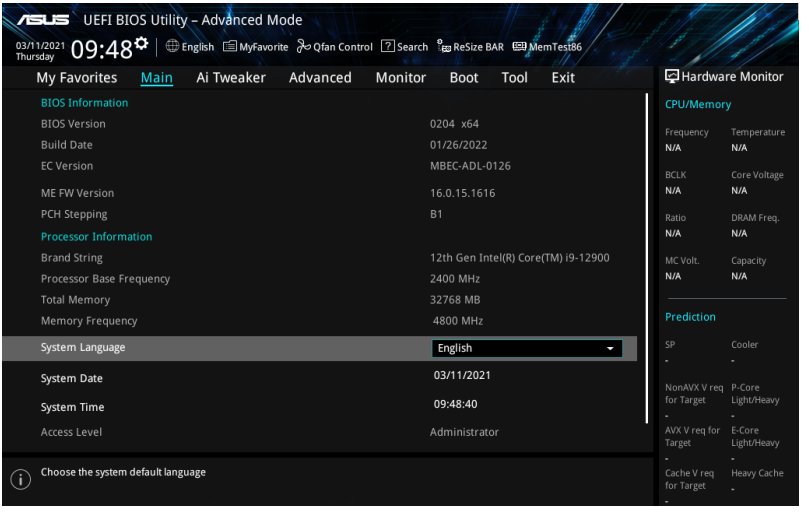
You cannot add the following items to My Favorite items:

- Items with submenu options
- User-managed items such as language and boot order
- Configuration items such as Memory SPD Information, system time and date.

4. Click **Exit (ESC)** or press <Esc> key to close Setup Tree Map screen.
5. Go to My Favorites menu to view the saved BIOS items.

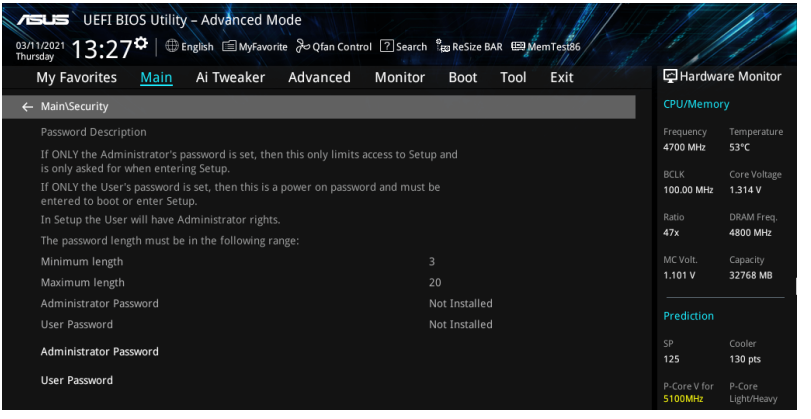
4.4 Main menu

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



Security

The Security menu items allow you to change the system security settings.



- If you have forgotten your BIOS password, erase the CMOS Real Time Clock (RTC) RAM to clear the BIOS password. See the motherboard for information on how to erase the RTC RAM via the Clear CMOS jumper.
- The Administrator or User Password items on top of the screen show the default **[Not Installed]**. After you set a password, these items show **[Installed]**.

Administrator Password

If you have set an administrator password, we recommend that you enter the administrator password for accessing the system. Otherwise, you might be able to see or change only selected fields in the BIOS setup program.

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. Re-type to confirm the password then select **OK**.

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. Re-type to confirm the password then select **OK**.

To clear the administrator password, follow the same steps as in changing an administrator password, but leave other fields blank then select **OK** to continue. After you clear the password, the **Administrator Password** item on top of the screen shows **[Not Installed]**.

User Password

If you have set a user password, you must enter the user password for accessing the system. The User Password item on top of the screen shows the default **[Not Installed]**. After you set a password, this item shows **[Installed]**.

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. Re-type to confirm the password then select **OK**.

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. Re-type to confirm the password then select **OK**.

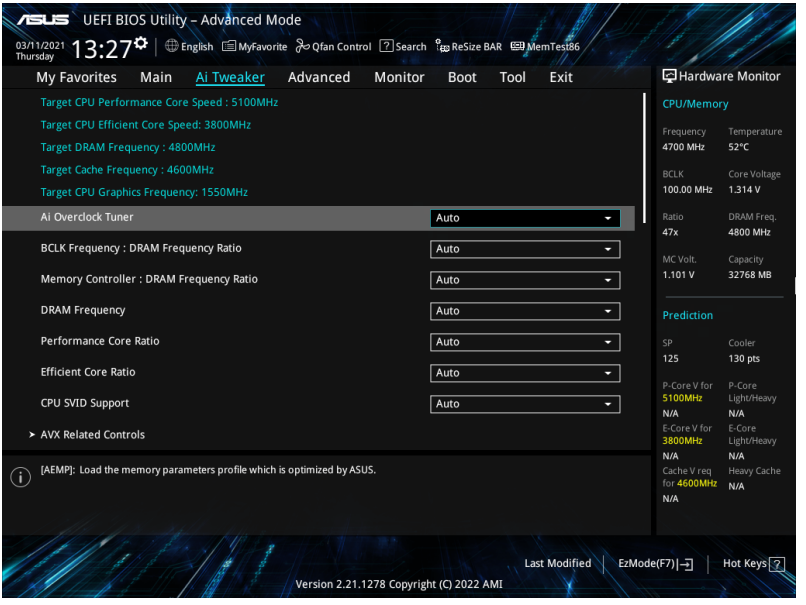
To clear the user password, follow the same steps as in changing a user password, but leave other fields blank then select **OK** to continue. After you clear the password, the **User Password** item on top of the screen shows **[Not Installed]**.

4.5 Ai Tweaker menu

The Ai Tweaker menu items allow you to configure overclocking-related items. Scroll down to display other BIOS items.

Be cautious when changing the settings of the Ai Tweaker menu items. Incorrect field values can cause the system to malfunction.

The configuration options for this section vary depending on the motherboard model, as well as the CPU and DIMM model you installed on the motherboard.



Ai Overclock Tuner

[Auto]	Loads the optimal settings for the system.
[ASUS Enhanced Memory Profile]	Loads the memory parameters profile which is optimized by ASUS.

The following item appears only when **Ai Overclock Tuner** is set to **[ASUS Enhanced Memory Profile]**.

AEMP

Allows you to select your ASUS Enhanced Memory Profile (AEMP). Each profile has its own DRAM frequency, timing and voltage.

BCLK Frequency : DRAM Frequency Ratio

[Auto] The BCLK frequency to DRAM frequency ratio will be set to the optimized setting.

[100:133] The BCLK frequency to DRAM frequency ratio will be set to 100:133.

[100:100] The BCLK frequency to DRAM frequency ratio will be set to 100:100.

Memory Controller : DRAM Frequency Ratio

BCLK Frequency: DRAM Frequency Ratio of 100:133 tends to overclock better and 1:2 Memory Controller: DRAM Frequency Ratio only works with even numbered DRAM Ratios and not odd numbered ratios.
Configuration options: [Auto] [1:1] [1:2] [1:4]

Performance Core Ratio

[Auto] The system will adjust all Performance core ratios automatically.

[Sync All Cores] Configure a core ratio limit to synchronize all Performance cores.

[By Core Usage] Configure the ratio limits for active cores depending on how many Performance cores are being utilized.

[AI Optimized] Use AI to optimize the Performance core ratios.

- The **[AI Optimized]** item appears only when you use an unlocked CPU.
- The following item appears only when **Performance Core Ratio** is set to **[Sync All Cores]**.

ALL-Core Ratio Limit

Enter [Auto] to apply the CPU default Turbo Ratio setting or manually assign a Core ratio limit to synchronize all cores. Use the <+> or <-> to adjust the value.
Configuration options: [Auto] [8] - [47]

The following items appear only when **Performance Core Ratio** is set to **[By Core Usage]**.

1-Core Ratio Limit / 2-Core Ratio Limit / 3-Core Ratio Limit / 4-Core Ratio Limit / 5-Core Ratio Limit / 6-Core Ratio Limit / 7-Core Ratio Limit / 8-Core Ratio Limit

The N-core ratio limit must be higher than or equal to the (N+1)-core ratio limit. (N stands for the number of CPU cores) The core ratio limit cannot be set to [Auto] when the core number is lower than N. The biggest core's ratio limit must be lower than or equal to the second biggest core's ratio limit. Use the <+> or <-> to adjust the value.
Configuration options: [Auto] [24] - [51]

The following item appears only when **Performance Core Ratio** is set to **[AI Optimized]**.

Optimized AVX Frequency

Select [Normal Use] for typical use cases, or select [Heavy AVX] for extreme loads such as Prime 95 AVX.
Configuration options: [Normal Use] [Heavy AVX]

Efficient Core Ratio

[Auto] The system will adjust all Efficient core ratios automatically.

[Sync All Cores] Configure a core ratio limit to synchronize all Efficient cores.

[By Core Usage] Configure the ratio limits for active cores depending on how many Efficient cores are being utilized.

[AI Optimized] Use AI to optimize the Efficient core ratios.

The following item appears only when **Efficient Core Ratio** is set to **[Sync All Cores]**.

ALL-Core Ratio Limit

Ratio Limit for Efficient Cores when N Efficient cores are loaded. Use the <+> or <-> to adjust the value.
Configuration options: [Auto] [8] - [36]

The following items appear only when **CPU Core Ratio** is set to **[By Core Usage]**.

Efficient 1-Core Ratio Limit / Efficient 2-Core Ratio Limit / Efficient 3-Core Ratio Limit / Efficient 4-Core Ratio Limit / Efficient 5-Core Ratio Limit / Efficient 6-Core Ratio Limit / Efficient 7-Core Ratio Limit / Efficient 8-Core Ratio Limit

Ratio Limit for Efficient cores when N Efficient cores are loaded. Use the <+> or <-> to adjust the value.
Configuration options: [Auto] [18] - [38]

CPU SVID Support

Disable this item to stop the CPU from communicating with the external voltage regulator.
Configuration options: [Auto] [Disabled] [Enabled]

AVX Related Controls

AVX2
Allows you to enable or disable the AVX 2 Instructions.
Configuration options: [Auto] [Disabled] [Enabled]

DRAM Timing Control

The sub-items in this menu allow you to set the DRAM timing control features. Use the <+> and <-> keys to adjust the value. To restore the default setting, type [Auto] using the keyboard and press the <Enter> key. You can also select various Memory Presets to load settings suitably tuned for some memory modules.

Changing the values in this menu may cause the system to become unstable! If this happens, revert to the default settings.

Primary Timings

DRAM CAS# Latency
Configuration options: [Auto] [2] - [126]

DRAM RAS# to CAS# Delay
Configuration options: [Auto] [0] - [255]

DRAM RAS# PRE Time
Configuration options: [Auto] [0] - [255]

DRAM RAS# ACT Time
Configuration options: [Auto] [1] - [511]

DRAM Command Rate
Configuration options: [Auto] [1N] [2N] [3N] [N:1]

The following item appears only when **DRAM Command Rate** is set to **[N:1]**.

N to 1 ratio
Number of bubbles between each valid command cycle.
Configurations: [1] - [7]

Secondary Timings

DRAM RAS# to RAS# Delay L
Configuration options: [Auto] [1] - [63]

DRAM RAS# to RAS# Delay S
Configuration options: [Auto] [1] - [127]

DRAM REF Cycle Time
Configuration options: [Auto] [1] - [65535]

DRAM REF Cycle Time 2
Configuration options: [Auto] [1] - [65535]

DRAM REF Cycle Time Same Bank
Configuration options: [Auto] [1] - [2047]

DRAM Refresh Interval
Configuration options: [Auto] [1] - [262143]

DRAM WRITE Recovery Time
Configuration options: [Auto] [1] - [234]

DRAM READ to PRE Time
Configuration options: [Auto] [1] - [255]

DRAM FOUR ACT WIN Time
Configuration options: [Auto] [1] - [511]

DRAM WRITE to READ Delay
Configuration options: [Auto] [1] - [15]

DRAM WRITE to READ Delay L
Configuration options: [Auto] [1] - [15]

DRAM WRITE to READ Delay S
Configuration options: [Auto] [1] - [15]

DRAM CKE Minimum Pulse Width
Configuration options: [Auto] [0] - [127]

DRAM Write Latency
Configuration options: [Auto] [1] - [255]

Skew Control

DDRCRCOMPCTL0/1/2

Ctl0 dqvrefup
Configuration options: [Auto] [0] - [255]

Ctl0 dqvrefdn
Configuration options: [Auto] [0] - [255]

Ctl0 dqodtvrefup
Configuration options: [Auto] [0] - [255]

Ctl0 dqodtvrefdn
Configuration options: [Auto] [0] - [255]

Ctl1 cmdvrefup
Configuration options: [Auto] [0] - [255]

Ctl1 ctlvrefup
Configuration options: [Auto] [0] - [255]

Ctl1 clkvrefup
Configuration options: [Auto] [0] - [255]

Ctl1 ckecsvrefup
Configuration options: [Auto] [0] - [255]

Ctl2 cmdvrefup
Configuration options: [Auto] [0] - [255]

Ctl2 ctlvrefdn
Configuration options: [Auto] [0] - [255]

Ctl2 clkvrefdn
Configuration options: [Auto] [0] - [255]

Tc Odt Control

ODT_READ_DURATION
Configuration options: [Auto] [0] - [15]

ODT_READ_DELAY
Configuration options: [Auto] [0] - [15]

ODT_WRITE_DURATION
Configuration options: [Auto] [0] - [15]

ODT_WRITE_DELAY
Configuration options: [Auto] [0] - [15]

MC0 Dimm0 / MC0 Dimm1 / MC1 Dimm0 / MC1 Dimm1
DQ RTT WR
Configuration options: [0 DRAM Clock] [34 DRAM Clock] [40 DRAM Clock] [48 DRAM Clock] [60 DRAM Clock] [80 DRAM Clock] [120 DRAM Clock] [240 DRAM Clock]

DQ RTT NOM RD
Configuration options: [0 DRAM Clock] [34 DRAM Clock] [40 DRAM Clock] [48 DRAM Clock] [60 DRAM Clock] [80 DRAM Clock] [120 DRAM Clock] [240 DRAM Clock]

DQ RTT NOM WR

Configuration options: [0 DRAM Clock] [34 DRAM Clock] [40 DRAM Clock] [48 DRAM Clock] [60 DRAM Clock] [80 DRAM Clock] [120 DRAM Clock] [240 DRAM Clock]

DQ RTT PARK

Configuration options: [0 DRAM Clock] [34 DRAM Clock] [40 DRAM Clock] [48 DRAM Clock] [60 DRAM Clock] [80 DRAM Clock] [120 DRAM Clock] [240 DRAM Clock]

DQ RTT PARK DQS

Configuration options: [0 DRAM Clock] [34 DRAM Clock] [40 DRAM Clock] [48 DRAM Clock] [60 DRAM Clock] [80 DRAM Clock] [120 DRAM Clock] [240 DRAM Clock]

GroupA CA ODT

Configuration options: [0 DRAM Clock] [40 DRAM Clock] [60 DRAM Clock] [80 DRAM Clock] [120 DRAM Clock] [240 DRAM Clock] [480 DRAM Clock]

GroupA CS ODT

Configuration options: [0 DRAM Clock] [40 DRAM Clock] [60 DRAM Clock] [80 DRAM Clock] [120 DRAM Clock] [240 DRAM Clock] [480 DRAM Clock]

GroupA CK ODT

Configuration options: [0 DRAM Clock] [40 DRAM Clock] [60 DRAM Clock] [80 DRAM Clock] [120 DRAM Clock] [240 DRAM Clock] [480 DRAM Clock]

GroupB CA ODT

Configuration options: [0 DRAM Clock] [40 DRAM Clock] [60 DRAM Clock] [80 DRAM Clock] [120 DRAM Clock] [240 DRAM Clock] [480 DRAM Clock]

GroupB CS ODT

Configuration options: [0 DRAM Clock] [40 DRAM Clock] [60 DRAM Clock] [80 DRAM Clock] [120 DRAM Clock] [240 DRAM Clock] [480 DRAM Clock]

GroupB CK ODT

Configuration options: [0 DRAM Clock] [40 DRAM Clock] [60 DRAM Clock] [80 DRAM Clock] [120 DRAM Clock] [240 DRAM Clock] [480 DRAM Clock]

Pull-up Output Driver Impedance

Configuration options: [34 DRAM Clock] [40 DRAM Clock] [48 DRAM Clock]

Pull-Down Output Driver Impedance

Configuration options: [34 DRAM Clock] [40 DRAM Clock] [48 DRAM Clock]

RTL IOL Control

Round Trip Latency Init Value MC0-1 CHA-B

Configuration options: [Auto] [0] - [255]

Round Trip Latency Max Value MC0-1 CHA-B

Configuration options: [Auto] [0] - [255]

Round Trip Latency Offset Value Mode Sign MC0-1 CHA-B

Configuration options: [-] [+]

Round Trip Latency Offset Value MC0-1 CHA-B

Configuration options: [Auto] [0] - [255]

Round Trip Latency MC0-1 CHA-B R0-7

Configuration options: [Auto] [0] - [255]

Memory Training Algorithms

The items in this menu allows you to enable or disable different Memory Training Algorithms.

Early Command Training

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

SenseAmp Offset Training

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

Early ReadMPR Timing Centering 2D

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

Read MPR Training

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

Receive Enable Training

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

Jedec Write Leveling

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

Early Write Timing Centering 2D

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

Early Read Timing Centering 2D

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

Write Timing Centering 1D

Configuration options: [Disabled] [Enabled]

Write Voltage Centering 1D

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

Read Timing Centering 1D

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

Read Timing Centering with JR

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

Dimm ODT Training*

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

Max RTT_WR

Allows you to cap the maximum RTT_WR in power training.

Configuration options: [ODT OFF] [120 Ohms]

DIMM RON Training*

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

Write Drive Strength/Equalization 2D*

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

Write Slew Rate Training*

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

Read ODT Training*

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

Comp Optimization Traning

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

Read Equalization Training*

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

Read Amplifier Training*

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

Write Timing Centering 2D
Configuration options: [Auto] [Disabled] [Enabled]

Read Timing Centering 2D
Configuration options: [Auto] [Disabled] [Enabled]

Command Voltage Centering
Configuration options: [Auto] [Disabled] [Enabled]

Early Command Voltage Centering
Configuration options: [Auto] [Disabled] [Enabled]

Write Voltage Centering 2D
Configuration options: [Auto] [Disabled] [Enabled]

Read Voltage Centering 2D
Configuration options: [Auto] [Disabled] [Enabled]

Late Command Training
Configuration options: [Disabled] [Enabled] [Auto]

Round Trip Latency
Configuration options: [Auto] [Disabled] [Enabled]

Turn Around Timing Training
Configuration options: [Auto] [Disabled] [Enabled]

CMD CTL CLK Slew Rate
Configuration options: [Auto] [Disabled] [Enabled]

CMD/CTL DS & E 2D
Configuration options: [Auto] [Disabled] [Enabled]

Read Voltage Centering 1D
Configuration options: [Auto] [Disabled] [Enabled]

TxDqTCO Comp Training*
Configuration options: [Auto] [Disabled] [Enabled]

ClkTCO Comp Training*
Configuration options: [Auto] [Disabled] [Enabled]

TxDqsTCO Comp Training*
Configuration options: [Auto] [Disabled] [Enabled]

VccDLL Bypass Training*
Configuration options: [Auto] [Disabled] [Enabled]

CMD/CTL Drive Strength Up/Dn 2D
Configuration options: [Auto] [Disabled] [Enabled]

DIMM CA ODT Training
Configuration options: [Auto] [Disabled] [Enabled]

PanicVttDnLp Training*
Configuration options: [Auto] [Disabled] [Enabled]

Read Vref Decap Traning*
Configuration options: [Auto] [Disabled] [Enabled]

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

Duty Cycle Correction Training
Configuration options: [Auto] [Disabled] [Enabled]

Rank Margin Tool Per Bit
Configuration options: [Auto] [Disabled] [Enabled]

DIMM DFE Training
Configuration options: [Auto] [Disabled] [Enabled]

Tx Dqs Dcc Training
Configuration options: [Auto] [Disabled] [Enabled]

Rank Margin Tool
Configuration options: [Auto] [Disabled] [Enabled]

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

DIMM SPD Alias Test
Configuration options: [Auto] [Disabled] [Enabled]

Receive Enable Centering 1D
Configuration options: [Auto] [Disabled] [Enabled]

Retrain Margin Check
Configuration options: [Auto] [Disabled] [Enabled]

Write Drive Strength Up/Dn independently
Configuration options: [Auto] [Disabled] [Enabled]

Margin Check Limit
Checks Margin to Limit to see if next boot memory needs to be retrained.
Configuration options: [Disabled] [L1] [L2] [Both]

The following item appears only when **Margin Check Limit** is set to **[L2]** or **[Both]**.

Margin Limit Check L2
L2 check threshold is scale of L1 check.
Configuration options: [1] - [300]

Third Timings

tRDRD_sg_Training
Configuration options: [Auto] [0] - [127]

tRDRD_sg_Runtime
Configuration options: [Auto] [0] - [127]

tRDRD_dg_Training
Configuration options: [Auto] [0] - [127]

tRDRD_dg_Runtime
Configuration options: [Auto] [0] - [127]

tRDWR_sg
Configuration options: [Auto] [0] - [255]

tRDWR_dg
Configuration options: [Auto] [0] - [255]

tWRWR_sg
Configuration options: [Auto] [0] - [127]

tWRWR_dg
Configuration options: [Auto] [0] - [127]

tWRRD_sg
Configuration options: [Auto] [0] - [511]

tWRRD_dg
Configuration options: [Auto] [0] - [511]

tRDRD_dr
Configuration options: [Auto] [0] - [255]

tRDRD_dd
Configuration options: [Auto] [0] - [255]

tRDWR_dr
Configuration options: [Auto] [0] - [255]

tRDWR_dd
Configuration options: [Auto] [0] - [255]

tWRWR_dr
Configuration options: [Auto] [0] - [127]

tWRWR_dd
Configuration options: [Auto] [0] - [255]

tWRRD_dr
Configuration options: [Auto] [0] - [127]

tWRRD_dd
Configuration options: [Auto] [0] - [127]

tRPRE
Configuration options: [Auto] [0] - [4]

tWPRE
Configuration options: [Auto] [0] - [4]

tWRPRE
Configuration options: [Auto] [0] - [1023]

tPRPDEN
Configuration options: [Auto] [0] - [31]

tRDPDEN
Configuration options: [Auto] [0] - [255]

tWRPDEN
Configuration options: [Auto] [0] - [1023]

tCPDED
Configuration options: [Auto] [0] - [31]

tREFIX9
Configuration options: [Auto] [0] - [255]

Ref Interval
Configuration options: [Auto] [0] - [8191]

tXPDLL
Configuration options: [Auto] [0] - [127]

tXP
Configuration options: [Auto] [0] - [127]

tPPD
Configuration options: [Auto] [0] - [15]

tCCD_L_tDLLK
Configuration options: [Auto] [0] - [15]

Misc.

MRC Fast Boot
Allows you to enable or disable the MRC fast boot.
Configuration options: [Disabled] [Enabled]

MCH Full Check
Enable this item to enhance the system stability. Setting this item to [Disabled] may enhance the DRAM overclocking capability.
Configuration options: [Auto] [Enabled] [Disabled]

Mem Over Clock Fail Count
Configuration options: [Auto] [1] - [255]

Training Profile
Allows you to select the DIMM training profile.
Configuration options: [Auto] [Standard Profile] [ASUS User Profile]

RxDfe
Allows you to set the DFE on SOC Rx.
Configuration options: [Auto] [Enabled] [Disabled]

Mrc Training Loop Count
Allows you to set the exponential number of loops to run the test.
Configuration options: [Auto] [0] - [32]

DRAM CLK Period
Allows you to set the DRAM clock period.
Configuration options: [Auto] [0] - [161]

Dll_bwsel
Can try a range of 22+ for OC.
Configuration options: [Auto] [0] - [63]

Controller 0, Channel 0 Control
Allows you to enable or disable Controller 0, Channel 0.
Configuration options: [Enabled] [Disabled]

Controller 0, Channel 1 Control
Allows you to enable or disable Controller 0, Channel 1.
Configuration options: [Enabled] [Disabled]

Controller 1, Channel 0 Control
Allows you to enable or disable Controller 1, Channel 0.
Configuration options: [Enabled] [Disabled]

Controller 1, Channel 1 Control
Allows you to enable or disable Controller 1, Channel 1.
Configuration options: [Enabled] [Disabled]

MC_Vref0-2
Configuration options: [Auto] [0] - [65533]

Configure Memory Dynamic Frequency Switching

The following item appears only when R**ealtime Memory Frequency** is set to **[Disabled]**.

Dynamic Memory Boost

Allows you to enable or disable Dynamic Memory Boost Feature. Allows automatic switching between default SPD Profile frequency and selected XMP profile frequency. Only valid if an XMP Profile is selected.
Configuration options: [Disabled] [Enabled]

The following item appears only when **Dynamic Memory Boost** is set to **[Disabled]**.

Realtime Memory Frequency

Allows you to enable or disable Memory Frequency feature. Allows manual switching in runtime between default SPD Profile frequency and selected XMP profile frequency. Only valid if an XMP Profile is selected.
Configuration options: [Disabled] [Enabled]

SA GV

System Agent Geyserville. Can disable, fix to a specific point, or enable frequency switching. If enabled, we recommend you to leave options at parked values for best compatibility. Enabling this feature requires a longer boot time.
Configuration options: [Disabled] [Enabled] [Fixed to 1st Point] [Fixed to 2nd Point] [Fixed to 3rd Point] [Fixed to 4th Point]

The following items appear only when **SA GV** is set to **[Enabled]**, **[Fixed to 1st Point]**, **[Fixed to 2nd Point]**, **[Fixed to 3rd Point]**, or **[Fixed to 4th Point]**.

First Point Frequency

Allows you to specify the frequency for the given point. 0-MRC auto, else a specific frequency as an integer: 2000Mhz.
Configuration options: [0] - [65535]

First Point Gear

Allows you to set the gear ratio for this SAGV point. 0-Auto, 1-G1, 2-G2, 4-G4.
Configuration options: [0] - [4]

Second Point Frequency

Allows you to specify the frequency for the given point. 0-MRC auto, else a specific frequency as an integer: 2000Mhz.
Configuration options: [0] - [65535]

Second Point Gear

Allows you to set the gear ratio for this SAGV point. 0-Auto, 1-G1, 2-G2, 4-G4.
Configuration options: [0] - [4]

Third Point Frequency

Allows you to specify the frequency for the given point. 0-MRC auto, else a specific frequency as an integer: 2000Mhz.
Configuration options: [0] - [65535]

Third Point Gear
Allows you to set the gear ratio for this SAGV point. 0-Auto, 1-G1, 2-G2, 4-G4.
Configuration options: [0] - [4]

The Fourth Point Gear will always be the settings you set in the main menu, so configure the Fourth Point Gear there.

Digi+ VRM

VRM Initialization Check
When any error occurs during VRM initialization, the system will hang at POST code 76/77 if this function is enabled.
Configuration options: [Disabled] [Enabled]

CPU Input Voltage Load-line Calibration
Configuration options [Auto] [Level 1] [Level 2] [Level 3]

CPU Load-line Calibration
The load-line is defined by the Intel VRM specification and affects the level of voltage supplied to the processor. Higher load-line calibration settings result in reduced VDroop at the expense of voltage overshoot and will increase CPU temperatures due to higher voltage under load. Select from level 1 to 7 to adjust the load-line slope. Level 1 = greater VDroop, Level 7 = minimum VDroop.
Configuration options [Auto] [Level 1] [Level 2] [Level 3] [Level 4:Recommended for OC] [Level 5] [Level 6] [Level 7]

The actual performance boost may vary depending on your CPU specification.

DO NOT remove the thermal module. The thermal conditions should be monitored.

Synch ACDC Loadline with VRM Loadline
Enable this item to allow the VRM Loadline to be adjusted automatically to match the AC/DC Loadline.
Configuration options: [Disabled] [Enabled

CPU Current Capability
Allows you to set the shut-off current limit for external voltage regulator. A higher setting will allow the voltage regulator to supply more current while a lower setting will cause the voltage regulator to shut off the system when the supplied current is higher than the set value.
Configuration options: [Auto] [100%] - [120%]

Configure higher values when overclocking or under a high loading for extra power support.

CPU VRM Switching Frequency

This item affects the VRM transient response speed and the component thermal production. Select [Manual] to configure a higher frequency for a quicker transient response speed. Setting a higher switching frequency will result in better transient response at the expense of higher VRM temperatures. Active cooling of the VRM heatsink is recommended when running high CPU voltage and high load-line calibration values.

Configuration options: [Auto] [Manual]

DO NOT remove the thermal module. The thermal conditions should be monitored.

The following item appears only when **CPU VRM Switching Frequency** is set to **[Manual]**.

Fixed CPU VRM Switching Frequency(KHz)

Allows you to set a higher frequency for a quicker transient response speed. The values range from 250 KHz to 500 KHz with an interval of 50 KHz.

The following item appears only when **CPU VRM Switching Frequency** is set to **[Auto]**.

VRM Spread Spectrum

Allows you to reduce the magnitude of peak noise from the VRM. Enable this item to reduce peak noise. Disable this settings when overclocking.

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

CPU Power Duty Control

CPU power duty control adjusts the duty cycle of each VRM phase based upon current and/or temperature.

[Auto]	Automatically selects the power duty control.
[T. Probe]	Sets the buck controller to balance VRM FET temperatures
[Extreme]	Select to set the VRM current balance mode.

DO NOT remove the thermal module when setting this item to **[Extreme]**. The thermal conditions should be monitored.

CPU Power Phase Control

Allows you to set the power phase control of the CPU.

[Auto]	Automatically selects the power phase control.
[Standard]	The number of active phases is controlled by the CPU.
[Extreme]	Sets full phase mode.

DO NOT remove the thermal module when setting this item to **[Extreme]**. The thermal conditions should be monitored.

The following items appear only when using the onboard graphics.

CPU Graphics Load-line Calibration
The load-line is defined by the Intel VRM specification and affects the CPU Graphics power voltage. The CPU Graphics working voltage will decrease proportionally depending on the CPU Graphics loading. Higher levels of the load-line calibration can get a higher voltage and a better overclocking performance but increase the CPU Graphics and VRM thermal production. Select from level 1 to 8 to adjust the CPU Graphics power voltage from 100% to 0%.
Configuration options [Auto] [Level 1] [Level 2] [Level 3] [Level 4:Recommended for OC] [Level 5] [Level 6] [Level 7]

Boosted performance may vary depending on the CPU Graphics specification. DO NOT remove the thermal module.

CPU Graphics VRM Switching Frequency
The switching frequency will affect the CPU Graphics transient response spreed and the component thermal production. Select manual mode to configure a higher frequency to get a quicker transient response speed.
Configuration options: [Auto] [Manual]

DO NOT remove the thermal module when setting this item to **[Manual]**. The thermal conditions should be monitored.

The following item appears only when **CPU Graphics VRM Switching Frequency** is set to **[Manual]**.

Fixed CPU Graphics Switching Frequency(KHz)
The switching frequency will affect the CPU Graphics transient response spreed and the component thermal production. Use the <+> or <-> to adjust the value. The values range from 250 KHz to 500 KHz with an interval of 50 KHz.

Boot Voltages

CPU Core/Cache Boot Voltage
Allows you to set the CPU voltage at initial boot up. Use the <+> or <-> to adjust the value. The values range from 0.600V to 1.700V with an interval of 0.005V.
Configuration options: [Auto] [0.60000] - [1.70000]

CPU Input Boot Voltage
Allows you to set the CPU Input Voltage at initial boot up. Use the <+> or <-> to adjust the value. The values range from 1.500V to 1.700V with an interval of 0.010V.
Configuration options: [Auto] [1.50000] - [2.10000]

PLL Termination Boot Voltage
Allows you to set the PLL Termination voltage at initial boot up. Use the <+> or <-> to adjust the value. The values range from 0.800V to 1.800V with an interval of 0.010V.
Configuration options: [Auto] [0.80000] - [1.80000]

CPU Standby Boot Voltage
Allows you to set the CPU Standby voltage at initial bootup. Use the <+> or <-> to adjust the value. The values range from 0.800V to 1.800V with an interval of 0.010V.
Configuration options: [Auto] [0.80000] - [1.80000]

Memory Controller Boot Voltage
Allows you to set the Memory Controller voltage at initial bootup. Use the <+> or <-> to adjust the value. The values range from 1.000V to 2.000V with an interval of 0.00625V.
Configuration options: [Auto] [1.00000] - [2.00000]

Auto Voltage Caps

CPU Core Auto Voltage Cap
Setting this to a specific value will set a ceiling for CPU Core Auto Voltage. When not in manual mode, it's effectiveness is subject to other factors such as AC/DC Loadline values and CPU's native VID. Use the <+> or <-> to adjust the value. The values range from 0.600V to 1.700V with an interval of 0.005V.
Configuration options: [Auto] [0.60000] - [1.70000]

CPU Input Auto Voltage Cap
Setting this to a specific value will set a ceiling for CPU Input Auto Voltage. Use the <+> or <-> to adjust the value. The values range from 1.500V to 2.100V with an interval of 0.010V.
Configuration options: [Auto] [1.50000] - [2.10000]

Memory Controller Auto Voltage Cap
Setting this to a specific value will set a ceiling for Memory Controller Auto Voltage. Use the <+> or <-> to adjust the value. The values range from 1.000V to 2.000V with an interval of 0.00625V.
Configuration options: [Auto] [1.00000] - [2.00000]

Internal CPU Power Management

The items in this submenu allow you to set the CPU ratio and features.

IVR Transmitter VDDQ ICCMAX
Configuration options: [Auto] [0] - [15]

CPU Core/Cache Current Limit Max.
Allows you to configure a current limit for frequency or power throttling when overclocking. Can be set to maximum value (511.75) to prevent throttling when overclocking. Use the <+> or <-> to adjust the value. The values range from 0.00 to 511.75 with an interval of 0.25.
Configuration options: [Auto] [0.00] - [511.75]

CPU Graphics Current Limit
Allows you to configure a high current limit to prevent frequency or power throttling when overclocking. Use the <+> or <-> to adjust the value. The values range from 0.00 to 511.75 with an interval of 0.25.
Configuration options: [Auto] [0.00] - [511.75]

Long Duration Package Power Limit
An Intel parameter known as [power limit 1] and specified in Watts. The default value is defined by TDP of the processor. Increasing the value will allow the Turbo ratio to be maintained for a longer duration under higher current loads.
Configuration options: [Auto] [1] - [4095]

Package Power Time Window
An Intel parameter of [power limit 1] and specified in seconds. The applied value indicates how long the Turbo ratio can be active when TDP is exceeded.
Configuration options: [Auto] [1] [2] [3] [4] [5] [6] [7] [8] [10] [12] [14] [16] [20] [24] [28] [32] [40] [48] [56] [64] [80] [96] [112] [128] [160] [192] [224] [256] [320] [384] [448]

Short Duration Package Power Limit
An Intel parameter known as [power limit 2] and specified in Watts. It is the second Intel power limit which provides protection when package power exceeds power limit 1. The default setting is 1.25 times power limit 1. According to Intel, the platform must support this value for up to 10msec when power consumption exceeds power limit 2. ASUS motherboards are engineered to support this duration for a longer time as required to facilitate overclocking.
Configuration options: [Auto] [1] - [4095]

IA AC Load Line
Allows you to set the AC loadline defined in mOhms. Use the <+> and <-> keys to adjust the value.
Configuration options: [Auto] [0.01] - [62.49]

IA DC Load Line
Allows you to set the DC loadline defined in mOhms. Use the <+> and <-> keys to adjust the value.
Configuration options: [Auto] [0.01] - [62.49]

IA CEP Enable
Allows you to enable or disable IA CEP (Current Excursion Protection) Support. Uses pCode Mailbox Command 0x37, Sub-command 0x1. Set Databit2 to 1.
Configuration options: [Auto] [Disabled] [Enabled]

GT CEP Enable
Allows you to enable or disable GT CEP (Current Excursion Protection) Support. Uses pCode Mailbox Command 0x37, Sub-command 0x1. Set Databit3 to 1.
Configuration options: [Auto] [Disabled] [Enabled]

SA CEP Enable
Allows you to enable or disable SA CEP (Current Excursion Protection) Support. Uses pCode Mailbox Command 0x37, Sub-command 0x1. Set Databit3 to 1.
Configuration options: [Auto] [Disabled] [Enabled]

IA SoC Iccmax Reactive Protector
Configuration options: [Auto] [Disabled] [Enabled]

Inverse Temperature Dependency Throttle
Configuration options: [Auto] [Disabled] [Enabled]

IA VR Voltage Limit
Voltage Limit (VMAX). This value represents the Maximum instantaneous voltage allowed at any given time. Range is 0 - 7999mV. Uses BIOS VR mailbox command 0x8.
Configuration options: [Auto] [0] - [7999]

Tweaker's Paradise

Realtime Memory Timing
Allows you to enable or disable realtime memory timing. When set to **[Enabled]**, the system will allow performing realtime memory timing changes after MRC_DONE.
Configuration options: [Disabled] [Enabled]

SPD Write Disable
Allows you to enable or disable setting SPD Write Disable. For security recommendations, SPD write disable bit must be set.
Configuration options: [TRUE] [FALSE]

PVD Ratio Threshold
For the Core Domain PLL, the threshold to switch to lower post divider is 15 by default. You can set a value lower than 15 when pushing high BCLK so that Digitally Controlled Oscillator (DCO) remains at reasonable frequency.
Configuration options: [Auto] [1] - [40]

SA PLL Frequency Override
Allows you to configure Sa PLL Frequency.
Configuration options: [Auto] [3200 MHz] [1600 MHz]

BCLK TSC HW Fixup
Allows you to enable or disable BCLK TSC HW Fixup disable during TSC copy from PMA to APIC.
Configuration options: [Enabled] [Disabled]

Core Ratio Extension Mode
Allows you to enable or disable Core Ratio Above 85 Extension Mode.

[Disabled]	Max Overclocking Ratio Limit as specified by OCMB 0x1 command is 85.
[Enabled]	Max Overclocking Ratio Limit as specified by OCMB 0x1 command is 120.

FLL OC mode
Configuration options: [Auto] [Disabled] [Normal] [Elevated] [Extreme Elevated]

Core PLL Voltage
Allows you to configure the offset for the Core PLL VCC Trim. Use the <+> and <-> keys to adjust the value. The values range from 0.900V to 1.845V with an interval of 0.015V.
Configuration options: [Auto] [0.90000] - [1.84500]

GT PLL Voltage
Allows you to configure the offset for the GT PLL VCC Trim. Use the <+> and <-> keys to adjust the value. The values range from 0.900V to 1.845V with an interval of 0.015V.
Configuration options: [Auto] [0.90000] - [1.84500]

Ring PLL Voltage
Allows you to configure the offset for the Ring PLL VCC Trim. Use the <+> and <-> keys to adjust the value. The values range from 0.900V to 1.845V with an interval of 0.015V.
Configuration options: [Auto] [0.90000] - [1.84500]

System Agent PLL Voltage
Allows you to configure the offset for the System Agent PLL VCC Trim. Use the <+> and <-> keys to adjust the value. The values range from 0.900V to 1.845V with an interval of 0.015V.
Configuration options: [Auto] [0.90000] - [1.84500]

Memory Controller PLL Voltage
Allows you to configure the offset for the Memory Controller PLL VCC Trim. Use the <+> and <-> keys to adjust the value. The values range from 0.900V to 1.845V with an interval of 0.015V.
Configuration options: [Auto] [0.90000] - [1.84500]

CPU 1.8V Small Rail
Allows you to configure the voltage for the CPU 1.8V Small Rail. Use the <+> and <-> keys to adjust the value. The values range from 1.500V to 2.300V with an interval of 0.010V.
Configuration options: [Auto] [1.50000] - [2.30000]

PLL Termination Voltage
Allows you to configure the voltage for the PLL Termination. Use the <+> and <-> keys to adjust the value. The values range from 0.800V to 1.800V with an interval of 0.010V.
Configuration options: [Auto] [0.80000V] - [1.80000V]

CPU Standby Voltage
Allows you to configure the voltage for the CPU Standby. Use the <+> and <-> keys to adjust the value. The values range from 0.800V to 1.800V with an interval of 0.010V.
Configuration options: [Auto] [0.80000] - [1.80000]

PCH 1.05V Voltage
Allows you to configure the voltage for the PCH 1.05V. Use the <+> and <-> keys to adjust the value. The values range from 0.800V to 1.600V with an interval of 0.010V.
Configuration options: [Auto] [0.80000] - [1.60000]

PCH 0.82V Voltage
Allows you to configure the voltage for the PCH 0.82V. Use the <+> and <-> keys to adjust the value. The values range from 0.700V to 1.300V with an interval of 0.010V.
Configuration options: [Auto] [0.70000] - [1.30000]

CPU Input Voltage Reset Voltage
Allows you to configure the voltage for the CPU Input when reset. Use the <+> and <-> keys to adjust the value. The values range from 1.500V to 2.100V with an interval of 0.010V.
Configuration options: [Auto] [1.50000] - [2.10000]

Min. CPU Cache Ratio

Allows you to set the minimum possible CPU cache ratio. Use the <+> and <-> keys to adjust the value.
Configuration options: [Auto] [8] - [51]

Max. CPU Cache Ratio

Allows you to set the maximum possible CPU cache ratio. Use the <+> and <-> keys to adjust the value.
Configuration options: [Auto] [8] - [51]

Max. CPU Graphics Ratio

Allows you to configure the CPU graphics ratio. The ratio may vary depending on the system loading. Use the <+> and <-> keys to adjust the value.
Configuration options: [Auto] [1] - [31]

Extreme Over-voltage

This item can only be enabled when the onboard CPU_OV jumper is switched on. Setting this item to **[Enabled]** allows you to configure higher voltages for overclocking, but the CPU lifetime will not be guaranteed.
Configuration options: [Disabled] [Enabled]

CPU Core/Cache Voltage

Configures the mode of Voltage fed to the CPU cores. Manual mode allows user-defined values. Offset mode modifies values by SVID.
Configuration options: [Auto] [Manual Mode] [Offset Mode]

The following item appears only when **CPU Core/Cache Voltage** is set to **[Manual Mode]**.

CPU Core Voltage Override

Allows you to configure the input voltage for the CPU by the external voltage regulator. Use the <+> and <-> keys to adjust the value. The values range from 0.600V to 1.700V with an interval of 0.005V.
Configuration options: [Auto] [0.60000] - [1.70000]

The following items appear only when **CPU Core/Cache Voltage** is set to **[Offset Mode]**.

Offset Mode Sign

[+] To offset the CPU core voltage by a positive value.

[–] To offset the CPU core voltage by a negative value.

CPU Core Voltage Offset

Allows you to configure the input voltage for the CPU by the external voltage regulator. Use the <+> or <-> to adjust the value. The values range from 0.005V to 0.635V with an interval of 0.005V.
Configuration options: [Auto] [0.00500] - [0.63500]

CPU Graphics Voltage

Allows you to configure the mode of voltage fed to the CPU Graphics. Manual mode allows user-defined values. Offset mode modified values by SVID.
Configuration options: [Auto] [Manual Mode] [Offset Mode]

The following item appears only when **CPU Graphics Voltage** is set to **[Manual Mode]**.

CPU Graphics Voltage Override

Allows you to configure the voltage for the CPU Graphics. Use the <+> or <-> to adjust the value. The values range from 0.600V to 1.700V with an interval of 0.005V.
Configuration options: [Auto] [0.60000] - [1.70000]

The following items appear only when **CPU Graphics Voltage** is set to **[Offset Mode]**.

Offset Mode Sign

[+] To offset the voltage by a positive value.

[–] To offset the voltage by a negative value.

CPU Graphics Voltage Offset

Allows you to configure the CPU graphics voltage offset value. Use the <+> or <-> to adjust the value. The values range from 0.005V to 0.635V with an interval of 0.005V.
Configuration options: [Auto] [0.00500] - [0.63500]

You need to save the changes and reset the system for the changes to take effect.

CPU L2 Voltage

Allows you to configure the voltage for the CPU L2. This may help for sustaining high clock speeds.
Configuration options: [Auto] [Manual Mode]

The following item appears only when **CPU L2 Voltage** is set to **[Manual Mode]**.

CPU L2 Voltage Override

Allows you to configure the voltage for the CPU L2. Use the <+> or <-> to adjust the value. The values range from 0.700V to 1.800V with an interval of 0.001V.
Configuration options: [Auto] [0.70000] - [1.80000]

CPU System Agent Voltage

Allows you to configure the voltage for the CPU System Agent.
Configuration options: [Auto] [Manual Mode] [Offset Mode]

The following item appears only when **CPU System Agent Voltage** is set to **[Manual Mode]**.

CPU System Agent Voltage Override

Allows you to configure the input voltage for the CPU by the external voltage regulator. Use the <+> and <-> keys to adjust the value. The values range from 0.700V to 1.800V with an interval of 0.001V.
Configuration options: [Auto] [0.70000] - [1.80000]

The following item appears only when **CPU System Agent Voltage** is set to **[Offset Mode]**.

CPU System Agent Voltage Offset

Allows you to configure the CPU System Agent Voltage offset value. Use the <+> or <-> to adjust the value. The values range from 0.001V to 0.999V with an interval of 0.001V.
Configuration options: [Auto] [0.00100] - [0.99900]

You need to save the changes and reset the system for the changes to take effect.

CPU Input Voltage

Allows you to configure the voltage for the CPU Input. Use the <+> or <-> to adjust the value. The values range from 1.500V to 2.100V with an interval of 0.010V.
Configuration options: [Auto] [1.50000] - [2.10000]

High DRAM Voltage Mode

If this item is set to **[Disabled]**, the upper range for DRAM Voltage will be 1.435V. If this item is set to **[Enabled]**, the upper range will be 2.070V. If enabled on non-supported DRAM, the voltage will be lower than requested.
Configuration options: [Auto] [Disabled] [Enabled]

DRAM VDD Voltage

Power for the DRAM ICs' VDD portion. Use the <+> or <-> to adjust the value. The values range from 0.800V to 1.435V with an interval of 0.005V.
Configuration options: [Auto] [0.80000] - [1.43500]

DRAM VDDQ Voltage

Power for the DRAM ICs' VDD Data portion. Use the <+> or <-> to adjust the value. The values range from 0.800V to 1.435V with an interval of 0.005V.
Configuration options: [Auto] [0.80000] - [1.43500]

Advanced Memory Voltages

IVR Transmitter VDDQ Voltage

Allows you to set the voltage for the internal transmitter voltage for the Memory Controller. Use the <+> or <-> to adjust the value. The values range from 0.700V to 2.200V with an interval of 0.005V.
Configuration options: [Auto] [0.70000] - [2.20000]

Memory Controller Voltage

Allows you to set the voltage for the Memory Controller. Use the <+> or <-> to adjust the value. The values range from 1.000V to 2.000V with an interval of 0.00625V.
Configuration options: [Auto] [1.00000] - [2.00000]

MC Voltage Calculation Voltage Base

Allows you to set the base MC voltage used for calculations. Use the <+> or <-> to adjust the value. The values range from 0.700V to 2.200V with an interval of 0.005V.
Configuration options: [Auto] [0.70000] - [2.20000]

VDD Calculation Voltage Base
Allows you to set the base VDD voltage used for calculations. Use the <+> or <-> to adjust the value. The values range from 0.700V to 2.200V with an interval of 0.005V.
Configuration options: [Auto] [0.70000] - [2.20000]

PMIC Voltages
Configuration options: [Auto] [Sync All PMICs] [By per PMIC]

The following items appear only when **PMIC Voltages** is set to **[Sync All PMICs]**.

SPD HUB VLDO (1.8V)
Allows you to set the main power for the SPD Hub Logic. Default set to 1.8V. Use the <+> or <-> to adjust the value. The values range from 1.700V to 2.000V with an interval of 0.100V.
Configuration options: [Auto] [1.70000] - [2.00000]

SPD HUB VDDIO (1.0V)
Allows you to set the main power for the SPD Hub side-band interface. Default set to 1.0V. Use the <+> or <-> to adjust the value. The values range from 0.900V to 1.200V with an interval of 0.100V.
Configuration options: [Auto] [0.90000] - [1.20000]

DRAM VDD Voltage
Allows you to set the power for the DRAM IC's VDD portion. Use the <+> or <-> to adjust the value. The values range from 0.800V to 1.435V with an interval of 0.005V.
Configuration options: [Auto] [0.80000] - [1.43500]

DRAM VDDQ Voltage
Allows you to set the power for the DRAM IC's Data portion. Use the <+> or <-> to adjust the value. The values range from 0.800V to 1.435V with an interval of 0.005V.
Configuration options: [Auto] [0.80000] - [1.43500]

DRAM VPP Voltage
Allows you to set the power for the DRAM Activating Power Supply. Use the <+> or <-> to adjust the value. The values range from 1.500V to 2.135V with an interval of 0.005V.
Configuration options: [Auto] [1.50000] - [2.13500]

DRAM VDD Switching Frequency
Allows you to set the switching frequency of DRAM VDD regulator in MHz. Use the <+> or <-> to adjust the value. The values range from 0.750MHz to 1.500MHz with an interval of 0.250MHz.
Configuration options: [Auto] [0.75000] - [1.50000]

DRAM VDDQ Switching Frequency
Allows you to set the switching frequency of DRAM VDDQ regulator in MHz. Use the <+> or <-> to adjust the value. The values range from 0.750MHz to 1.500MHz with an interval of 0.250MHz.
Configuration options: [Auto] [0.75000] - [1.50000]

DRAM VPP Switching Frequency
Allows you to set the switching frequency of DRAM VPP regulator in MHz. Use the <+> or <-> to adjust the value. The values range from 0.750MHz to 1.500MHz with an interval of 0.250MHz.
Configuration options: [Auto] [0.75000] - [1.50000]

DRAM Current Capability
Allows you to set the current capability for the switching regulators in Amps. Use the <+> or <-> to adjust the value. The values range from 0.125A to 7.875A with an interval of 0.125A.
Configuration options: [Auto] [0.12500] - [7.87500]

The following items appear only when **PMIC Voltages** is set to **[By per PMIC]**.

PMIC0-3 SPD HUB VLDO (1.8V)
Allows you to set the main power for the SPD Hub Logic. Default set to 1.8V. Use the <+> or <-> to adjust the value. The values range from 1.700V to 2.000V with an interval of 0.100V.
Configuration options: [Auto] [1.70000] - [2.00000]

PMIC0-3 SPD HUB VDDIO (1.0V)
Allows you to set the main power for the SPD Hub side-band interface. Default set to 1.0V. Use the <+> or <-> to adjust the value. The values range from 0.900V to 1.200V with an interval of 0.100V.
Configuration options: [Auto] [0.90000] - [1.20000]

PMIC0-3 DRAM VDD Voltage
Allows you to set the power for the DRAM IC's VDD portion. Use the <+> or <-> to adjust the value. The values range from 0.800V to 1.435V with an interval of 0.005V.
Configuration options: [Auto] [0.80000] - [1.43500]

PMIC0-3 DRAM VDDQ Voltage
Allows you to set the power for the DRAM IC's Data portion. Use the <+> or <-> to adjust the value. The values range from 0.800V to 1.435V with an interval of 0.005V.
Configuration options: [Auto] [0.80000] - [1.43500]

PMIC0-3 DRAM VPP Voltage
Allows you to set the power for the DRAM Activating Power Supply. Use the <+> or <-> to adjust the value. The values range from 1.500V to 2.135V with an interval of 0.005V.
Configuration options: [Auto] [1.50000] - [2.13500]

PMIC0-3 DRAM VDD Switching Frequency
Allows you to set the switching frequency of memory VDD regulator in MHz. Use the <+> or <-> to adjust the value. The values range from 0.750MHz to 1.500MHz with an interval of 0.250MHz.
Configuration options: [Auto] [0.75000] - [1.50000]

PMIC0-3 DRAM VDDQ Switching Frequency
Allows you to set the switching frequency of memory VDDQ regulator in MHz. Use the <+> or <-> to adjust the value. The values range from 0.750MHz to 1.500MHz with an interval of 0.250MHz.
Configuration options: [Auto] [0.75000] - [1.50000]

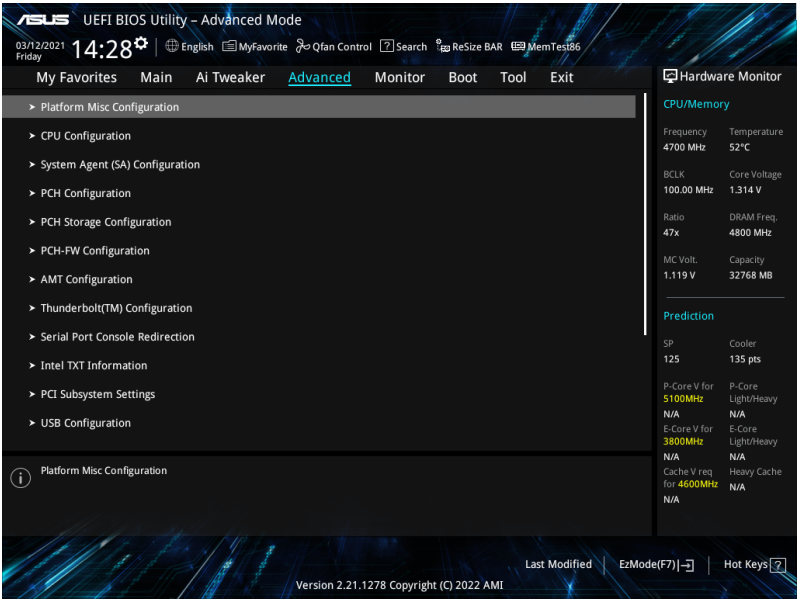
PMIC0-3 DRAM VPP Switching Frequency
Allows you to set the switching frequency of memory VPP regulator in MHz. Use the <+> or <-> to adjust the value. The values range from 0.750MHz to 1.500MHz with an interval of 0.250MHz.
Configuration options: [Auto] [0.75000] - [1.50000]

PMIC0-3 DRAM Current Capability
Allows you to set the current capability for the switching regulators in Amps. Use the <+> or <-> to adjust the value. The values range from 0.125A to 7.875A with an interval of 0.125A.
Configuration options: [Auto] [0.12500] - [7.87500]

4.6 Advanced menu

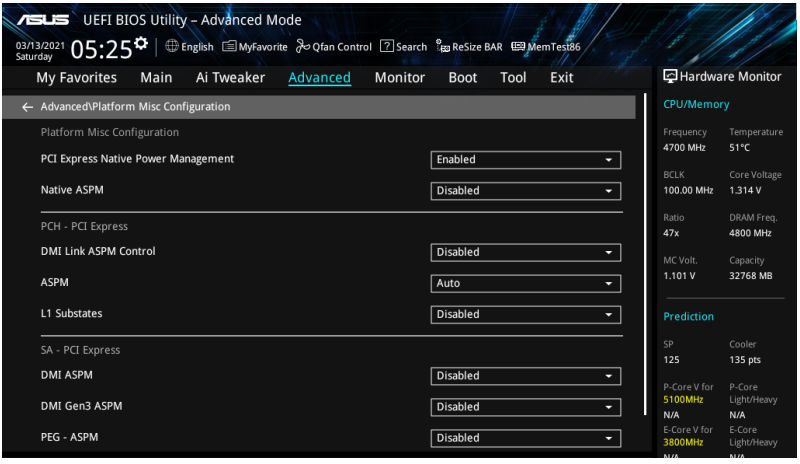
The Advanced menu items allow you to change the settings for the CPU and other system devices.

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



4.6.1 Platform Misc Configuration

The items in this menu allow you to configure the platform-related features.



PCI Express Native Power Management

Allows you to enhance the power saving feature of PCI Express and perform Active State Power Management (ASPM) operations in the operating system when set to **[Enabled]**.
Configuration options: [Disabled] [Enabled]

The following item appears only when **PCI Express Native Power Management** is set to **[Enabled]**.

Native ASPM

Set this item to **[Enabled]** for OS Controlled ASPM, or set this item to **[Disabled]** for BIOS controlled ASPM.
Configuration options: [Auto] [Enabled] [Disabled]

PCH - PCI Express

DMI Link ASPM Control

Allows you to control the Active State Power Management of the DMI Link.
Configuration options: [Disabled] [L1] [Auto]

ASPM

Allows you to select the ASPM state for energy-saving conditions.
Configuration options: [Disabled] [L1] [Auto]

L1 Substates

Allows you to select the PCI Express L1 Substates settings.
Configuration options: [Disabled] [L1.1] [L1.1 & L1.2]

SA - PCI Express

DMI ASPM Control

Allows you to set the DMI ASPM Support.
Configuration options: [Disabled] [Auto] [ASPM L1]

DMI Gen3 ASPM

Allows you to set the DMI Gen3 ASPM Support.
Configuration options: [Disabled] [Auto] [ASPM L1]

PEG - ASPM

Allows you to control the ASPM support for the PEG 0. This has no effect if PEG is not the currently active device.
Configuration options: [Disabled] [L0s] [L1] [L0sL1]

PCI Express Clock Gating

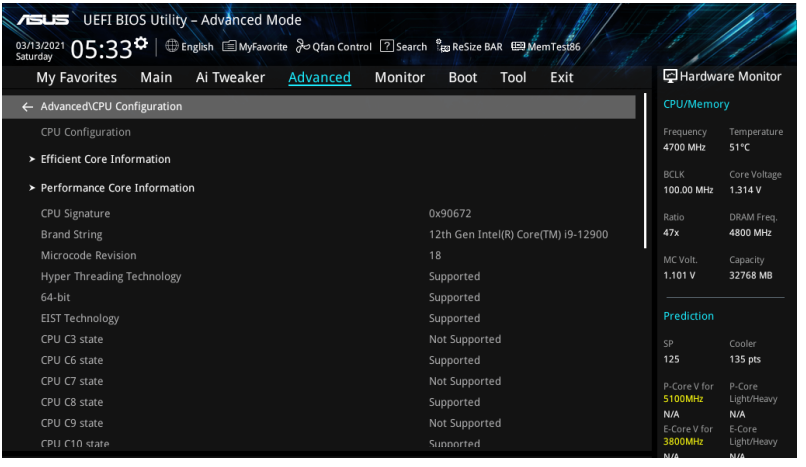
Allows you to enable or disable PCI Express Clock Gating for each root port.

Configuration options: [Disabled] [Enabled]

4.6.2 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects. Scroll down to display other BIOS items.

The items in this menu may vary based on the CPU installed.



Efficient Core Information

This submenu displays the Efficient Core Information.

Performance Core Information

This submenu displays the Performance Core Information.

Hardware Prefetcher

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

Adjacent Cache Line Prefetch

Allows you to prefetch adjacent cache lines, reducing the DRAM loading time and improving the system performance.
Configuration options: [Disabled] [Enabled]

Intel (VMX) Virtualization Technology

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

The following items appear only when **Intel Trusted Execution Technology** is set to **[Disabled]**.

Active Performance Cores

Allows you to select the number of CPU cores to activate in each processor package.
Configuration options: [All] [1] - [7]

Active Efficient Cores

Allows you to select the number of Efficient cores to activate in each processor package.
Configuration options: [All] [0] - [7]

Number of Cores and Efficient Cores are looked at together. When both are {0,0}, Pcode will enable all cores.

Hyper-Threading

Allows a hyper-threading processor to appear as two logical processors, allowing the operating system to schedule two threads or processes simultaneously.

[Enabled] For two threads per activated core.

[Disabled] For only one thread per activated core.

The following item appears only when **Intel (VMX) Virtualization Technology** is set to **[Enabled]**.

Intel Trusted Execution Technology

Allows you to enable utilization of additional hardware capabilities provided by Intel(R) Trusted Execution Technology.
Configuration options: [Disabled] [Enabled]

Changes require a full power cycle to take effect.

The following items appear only when **Intel Trusted Execution Technology** is set to **[Enabled]**.

Alias Check Request

Enables Txt Alias Checking capability.
Configuration options: [Disabled] [Enabled]

- Changes require full Txt capability before it will take effect.
- This is a one time only change, and will be reset on the next reboot.

DPR Memory Size (MB)

Reserve DPR memory size (0-255) MB.
Configuration options: [0] - [255]

Reset AUX Content

Reset TPM Aux Content. Txt may not be functional after AUX content gets reset.

Total Memory Encryption

Allows you to configure the Total Memory Encryption (TME) to protect DRAM data from physical attacks.
Configuration options: [Disabled] [Enabled]

Legacy Game Compatibility Mode

When set to [Enabled], pressing the scroll lock key will toggle the Efficient-cores between being parked when Scroll Lock LED is on and un-parked when LED is off.
Configuration options: [Disabled] [Enabled]

CPU - Power Management Control

The items in this submenu allow you to manage and configure the CPU's power.

Boot performance mode
Allows you to select the performance state that the BIOS will set starting from the reset vector.
Configuration options: [Max Battery] [Max Non-Turbo Performance] [Turbo Performance] [Auto]

Intel(R) SpeedStep(tm)
Allows more than two frequency to be supported.
Configuration options: [Disabled] [Enabled]

Intel(R) Speed Shift Technology
Allows you to disable or enable Intel(R) Speed Shift Technology support. When enabled, CPPC v2 interface allows hardware controlled P-states.
Configuration options: [Disabled] [Enabled]

Intel(R) Turbo Boost Max Technology 3.0
Allows you to disable or enable Intel(R) Turbo Boost Max Technology 3.0 support. Disabling will report the maximum ratio of the slowest core in _CPC object.
Configuration options: [Disabled] [Enabled]

Turbo Mode
Allows you to automatically set the CPU cores to run faster than the base operating frequency when it is below the operating power, current and temperature specification limit.
Configuration options: [Disabled] [Enabled]

Acoustic Noise Settings
The items in this submenu allow you to configure Acoustic Noise Settings for IA, GT, and SA domains.

Acoustic Noise Settings

Acoustic Noise Mitigation
Enabling this option will help mitigate acoustic noise on certain SKUs when the CPU is in deeper C state.
Configuration options: [Disabled] [Enabled]

The following items appear only when Acoustic Noise Mitigation is set to **[Enabled]**.

Pre Wake Time
Allows you to set the maximum Pre Wake randomization time in micro ticks. This is for acoustic noise mitigation Dynamic Periodicity Alteration (DPA) tuning. Use the <+> or <-> to adjust the value.
Configuration options: [0] - [255]

Ramp Up Time
Allows you to set the maximum Ramp Up randomization time in micro ticks. This is for acoustic noise mitigation Dynamic Periodicity Alteration (DPA) tuning. Use the <+> or <-> to adjust the value.
Configuration options: [0] - [255]

Ramp Down Time
Allows you to set the maximum Ramp Down randomization time in micro ticks. This is for acoustic noise mitigation Dynamic Periodicity Alteration (DPA) tuning. Use the <+> or <-> to adjust the value.
Configuration options: [0] - [255]

IA VR Domain

Disable Fast PKG C State Ramp for IA Domain
This option needs to be configured to reduce acoustic noise during deeper C states.

[FALSE] Don't disable Fast ramp during deeper C states.

[TRUE] Disable Fast ramp during deeper C state.

Slow Slew Rate for IA Domain
Set VR IA Slow Slew Rate for Deep Package C State ramp time; Slow slew rate equals to Fast divided by number, the number is 2, 4, 8 to slow down the slew rate to help minimize acoustic noise.
Configuration options: [Fast/2] [Fast/4] [Fast/8]

GT VR Domain

Disable Fast PKG C State Ramp for GT Domain
This option needs to be configured to reduce acoustic noise during deeper C states.

[FALSE] Don't disable Fast ramp during deeper C states.

[TRUE] Disable Fast ramp during deeper C state.

Slow Slew Rate for GT Domain
Set VR GT Slow Slew Rate for Deep Package C State ramp time; Slow slew rate equals to Fast divided by number, the number is 2, 4, 8 to slow down the slew rate to help minimize acoustic noise.
Configuration options: [Fast/2] [Fast/4] [Fast/8]

CPU C-states
Allows you to enable or disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Configuration options: [Auto] [Disabled] [Enabled]

The following items appear only when CPU C-states is set to **[Enabled]**.

Enhanced C-States
Allows you to enable or disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.
Configuration options: [Enabled] [Disabled]

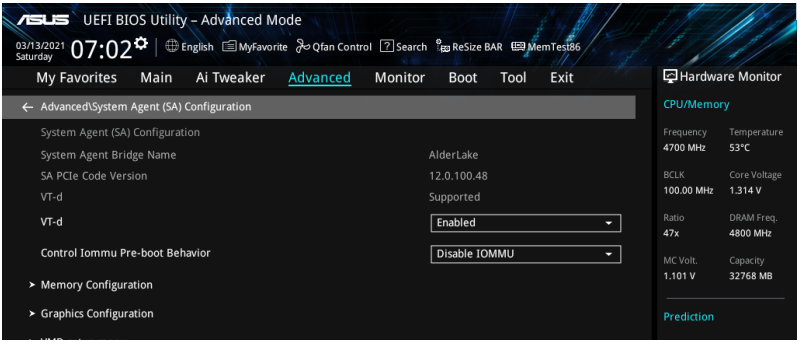
Package C State Limit
Allows you to set the C-state limit for the CPU package. Setting to [CPU Default] will leave it as the Factory default value. Setting to [Auto] will initialize the deepest available Package C State Limit.
Configuration options: [C0/C1] [C2] [C3] [C6] [C7] [C7s] [C8] [C9] [C10] [CPU Default] [Auto]

Thermal Monitor
Allows you to enable or disable the Thermal Monitor.
Configuration options: [Disabled] [Enabled]

Dual Tau Boost
Allows you to enable Dual Tau Boost feature. This is only applicable for Desktop 35W/65W/125W sku. When DPTF is enabled this feature is ignored.
Configuration options: [Disabled] [Enabled]

4.6.3 System Agent (SA) Configuration

The items in this menu allow you to change the System Agent (SA) parameters.



VT-d

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

The following item appears only when VT-d is set to **[Enabled]**.

Control Iommu Pre-boot Behavior

Allows you to enable IOMMU in Pre-boot environment (if DMAR table is installed in DXE and if VTD_INFO_PPI is installed in PEI).
Configuration options: [Disable IOMMU] [Enable IOMMU during boot]

Memory Configuration

The items in this submenu allow you to set memory configuration parameters.

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

Graphics Configuration

The items in this submenu allow you to select a primary display from CPU Graphics, PEG Graphics devices, or PCIe Graphics devices.

Primary Display
Allows you to select the primary display from CPU Graphics / PEG Graphics / PCIe Graphics device.
Configuration options: [Auto] [CPU Graphics] [PEG Slot] [PCIE]

iGPU Multi-Monitor
Set this item to **[Enabled]** to empower both integrated and discrete graphics for multi-monitor output. iGPU shared system memory size will be fixed at 64M.
Configuration options: [Disabled] [Enabled]

DVMT Pre-Allocated
Allows you to select the DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
Configuration options: [32M] [64M] [96M] [128M] [160M] [192M] [224M] [256M] [288M] [320M] [352M] [384M] [416M] [448M] [480M] [512M]

RC6(Render Standby)
Allows you to enable render standby support.
Configuration options: [Disabled] [Enabled]

VMD setup menu

The items in this submenu allow you to set the VMD configuration settings.

Enable VMD controller
Allows you to enable or disable the VMD controller.
Configuration options: [Disabled] [Enabled]

Setting **Enable VMD controller** to **[Disabled]** may result in data loss.

The following items appear only when Enable VMD controller is set to **[Enabled]**.

Map PCIE Storage under VMD
Allows you to map or unmap PCIE Storage to VMD.
Configuration options: [Disabled] [Enabled]

Ensure to set **Map SATA Controller under VMD** to **[Disabled]** if you set **Map PCIE Storage under VMD** to **[Enabled]**.

Map SATA Controller under VMD
Allows you to map or unmap this Root Port to VMD.
Configuration options: [Disabled] [Enabled]

Ensure to set **Map PCIE Storage under VMD** to **[Disabled]** if you set **Map SATA Controller under VMD** to **[Enabled]**.

PCI Express Configuration

The items in this submenu allow you to configure the PCIe Speeds for the different onboard slots.

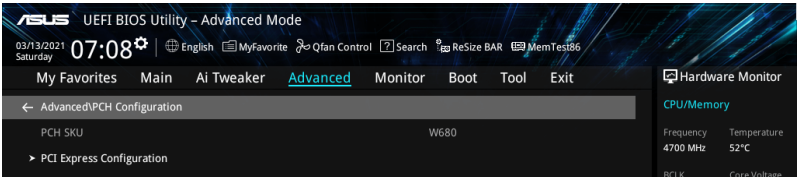
M.2_1 Link Speed
Allows you to configure the PCIe speed for M.2_1 slot.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3] [Gen4]

PCIEX16(G5) Link Speed
Allows you to configure the PCIe speed for PCIEX16(G5) slot.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3] [Gen4] [Gen5]

PCIEX16_2 Link Speed
Allows you to configure the PCIe speed for PCIEX16_2 slot.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3] [Gen4] [Gen5]

4.6.4 PCH Configuration

The items in this menu allow you to change the PCIe configurations for slots supported by the PCH.



PCI Express Configuration

The items in this submenu allow you to configure the PCIe Speeds for the different onboard slots supported by the PCH.

PCIEX16(G3)_2 Link Speed
Allows you to configure the PCIe speed for PCIEX16(G3)_2 slot.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

M.2_2 Link Speed
Allows you to configure the PCIe speed for M.2_2 slot.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

PCIEX16(G4)_4 Link Speed
Allows you to configure the PCIe speed for PCIEX16(G4)_4 slot.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

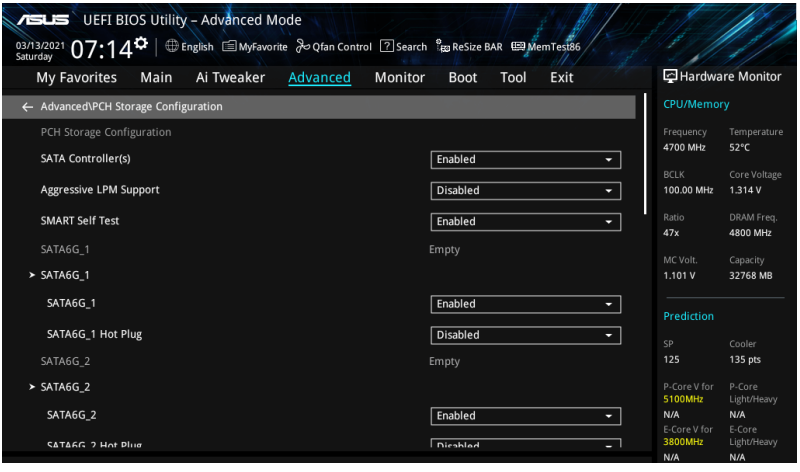
PCIEX16(G4)_3 Link Speed
Allows you to configure the PCIe speed for PCIEX16(G4)_3 slot.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3] [Gen4]

M.2_3 Link Speed
Allows you to configure the PCIe speed for M.2_2 slot.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3] [Gen4]

4.6.5 PCH Storage Configuration

While entering Setup, the BIOS automatically detects the presence of SATA devices. The SATA Port items show Empty if no SATA device is installed to the corresponding SATA port.

Scroll down to display the other BIOS items.



SATA Controller(s)

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

The following items appear only when **SATA Controller(s)** is set to **[Enabled]**.

Aggressive LPM support

Allows PCH to aggressively enter link power state.
Configuration options: [Disabled] [Enabled]

SMART Self Test

S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) is a monitoring system that shows a warning message during POST (Power-on Self Test) when an error occurs in the hard disks.
Configuration options: [Disabled] [Enabled]

SATA6G_1 - SATA6G_8

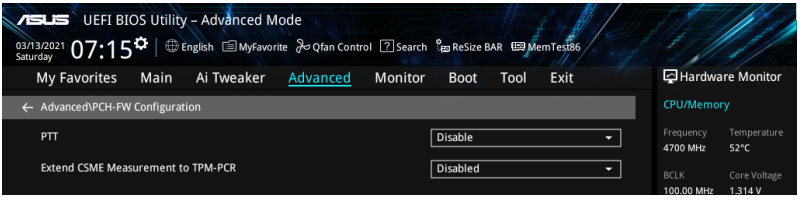
Allows you to enable or disable the selected SATA port.
Configuration options: [Disabled] [Enabled]

SATA6G_1 - SATA6G_8 Hot Plug

Designates this port as Hot Pluggable.
Configuration options: [Disabled] [Enabled]

4.6.6 PCH-FW Configuration

The items in this menu allows you to configure the firmware TPM.



PTT

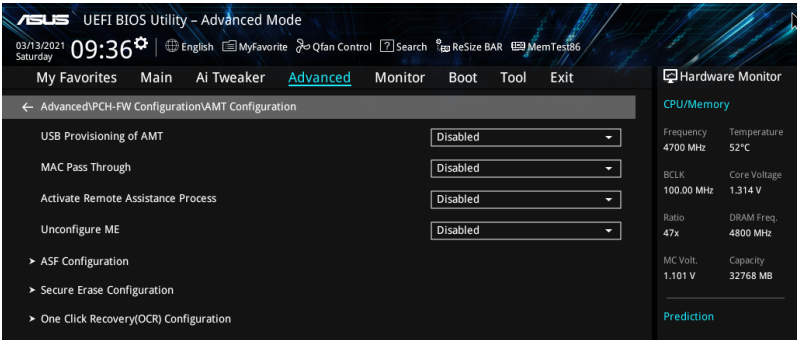
Allows you to enable or disable PTT in SkuMgr.
Configuration options: [Disable] [Enable]

Extend CSME Measurement to TPM-PCR

Allows you to enable or disable Extend CSME Measurements to TPM-PCR[0] and AMR Config to TPM-PCR[1].
Configuration options: [Disabled] [Enabled]

4.6.7 AMT Configuration

The items in this menu allow you to configure Intel(R) Active Management Technology parameters.



USB Provisioning of AMT

Allows you to enable or disable AMT USB provisioning.
Configuration options: [Disabled] [Enabled]

MAC Pass Through

Allows you to enable or disable MAC Pass Through function.
Configuration options: [Disabled] [Enabled]

Activate Remote Assistance Process

Allows you to trigger CIRA boot.
Configuration options: [Disabled] [Enabled]

Network Access must be activated first from MEBx Setup.

Unconfigure ME

Unconfigure ME with resetting MEBx password to default on next boot.
Configuration options: [Disabled] [Enabled]

ASF Configuration

The items in this submenu allow you to configure Alert Standard Format parameters.

PET Progress
Allows you to enable or disable PET Events Progress to receive PET Events.
Configuration options: [Disabled] [Enabled]

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

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

OS Timer
Allows you to set OS watchdog timer.
Configuration options: [0] - [65535]

BIOS Timer
Allows you to set BIOS watchdog timer.
Configuration options: [0] - [65535]

ASF Sensors Table
Adds ASF Sensor Table into ASF! ACPI Table.
Configuration options: [Disabled] [Enabled]

Secure Erase Configuration

The items in this submenu allow you to configure secure erase.

Secure Erase mode
Change the Secure Erase module behavior.
[Simulated] Performs SE flow without erasing SSD.
[Real] Erase SSD.

Force Secure Erase
Allows you to force Secure Erase on next boot.
Configuration options: [Disabled] [Enabled]

One Click Recovery (OCR) Configuration

The items in this submenu allow you to configure settings for One Click Recovery. This will allow access for AMT to boot a recovery OS application.

OCR Https Boot
Allows you to enable or disable One Click Recovery Https Boot.
Configuration options: [Disabled] [Enabled]

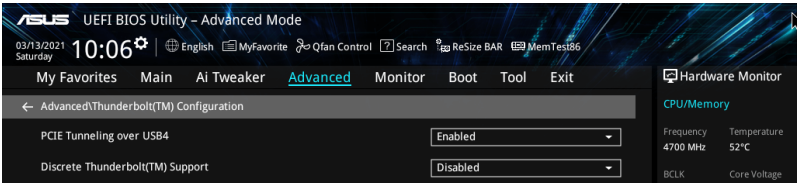
OCR PBA Boot
Allows you to enable or disable One Click Recovery PBA Boot.
Configuration options: [Disabled] [Enabled]

OCR Windows Recovery Boot
Allows you to enable or disable One Click Recovery Windows Recovery Boot.
Configuration options: [Disabled] [Enabled]

OCR Disable Secure Boot
Allows CSME to request Secure Boot to be disabled for One Click Recovery.
Configuration options: [Disabled] [Enabled]

4.6.8 Thunderbolt(TM) Configuration

The items in this menu allow you to configure Thunderbolt settings.



PCIE Tunneling over USB4

Allows you to enable or disable PCIE Tunneling over USB4.
Configuration options: [Disabled] [Enabled]

Discrete Thunderbolt(TM) Support

Allows you to enable or disable Discrete Thunderbolt(TM) Support.
Configuration options: [Disabled] [Enabled]

- Please set **Control Iommu Pre-boot Behavior** in the **System Agent(SA) Configuration** page to **[Enabled]** to support DMA Protection Feature.
- The following items appear only when **Discrete Thunderbolt(TM) Support** is set to **[Enabled]**.

Wake From Thunderbolt(TM) Devices

Allows you to enable or disable system wake from Thunderbolt(TM) devices.
Configuration options: [Disabled] [Enabled]

Discrete Thunderbolt(TM) Configuration

The items in this submenu allow you to configure Discrete Thunderbolt(TM) related configurations.

DTBT Go2Sx Command
Allows you to enable the command to put DTBT into Sx state while system is going into Sx.
Configuration options: [Disabled] [Enabled]

Windows 10 Thunderbolt Support
Allows you to specify Windows 10 Thunderbolt support level.
[Enable + RTD3] OS Native support plus RTD3.
[Disabled] No OS native support.

DTBT Controller 0 Configuration

DTBT Contorller 0
Configuration options: [Disabled] [Enabled]

TBT Host Router
Allows you to enable host router based on ports available.
Configuration options: [One Port] [Two Port]

Extra Bus Reserved
Allows you to select the TBT Root Port Type.

[56] One port Host.

[106] Two port Host.

Reserved Memory
Allows you to set the Reserved Memory for this Root Bridge. Use the <+> and <-> keys to adjust the value.
Configuration options: [1] - [4096]

Memory alignment
Allows you to set the memory alignment bits. Use the <+> and <-> keys to adjust the value.
Configuration options: [0] - [31]

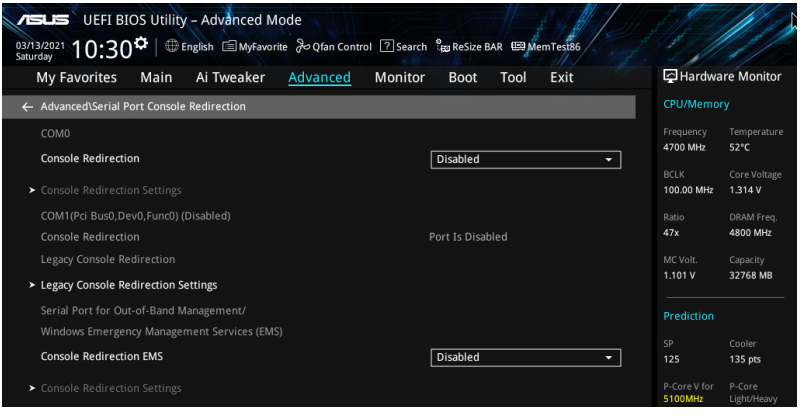
Reserved PMemory
Allows you to set the Reserved Prefetchable Memory for this Root Bridge. Use the <+> and <-> keys to adjust the value.
Configuration options: [1] - [4096]

PMemory alignment
Allows you to set the PMemory alignment bits. Use the <+> and <-> keys to adjust the value.
Configuration options: [0] - [31]

Reserved I/O
Use the <+> and <-> keys to adjust the value. Use the <+> and <-> keys to adjust the value. The values range from 0 to 60 with an interval of 4.
Configuration options: [0] - [60]

4.6.9 Serial Port Console Redirection

The items in this menu allow you to configure serial port console redirection settings.



COM0 / COM1

Console Redirection

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

The following item appears only when **Console Redirection** for **COM0** or **COM1** is set to **[Enabled]**.

Console Redirection Settings

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

Terminal Type

Allows you to set the terminal type.

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

Bits per second

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

Configuration options: [7] [8]

Parity

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. They can be used as an additional data bit.

[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

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

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

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

Resolution 100x31
This allows you enable or disable extended terminal solution.
Configuration options: [Disabled] [Enabled]

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

Legacy Console Redirection Settings

Redirection COM Port
Allows you to select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.
Configuration options: [COM0] [COM1]

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

Redirection After POST
The default setting for this option is set to [Always Enable].

[Always Enable]	Legacy Console Redirection is enabled for legacy OS.
[Bootloader]	The legacy Console Redirection is disabled before booting to legacy OS.

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

Console Redirection EMS

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

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

Console Redirection Settings

Out-of-Band Mgmt Port
Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.
Configuration options: [COM0] [COM1]

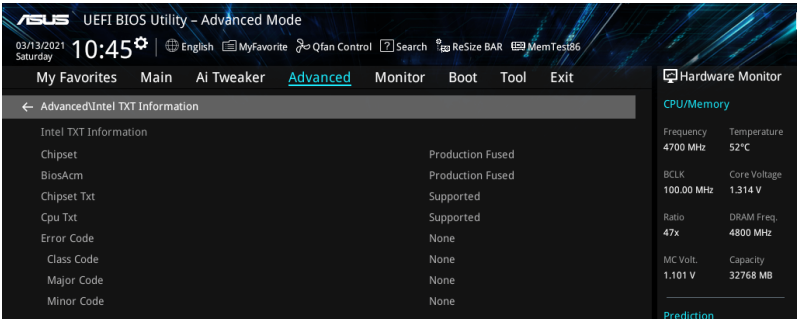
Terminal Type EMS
VT-UTF8 is the preferred terminal type for out0of-band management. The next best choice is VT100+, and then VT100. See above, in Console Redirection Settings page for more help with Terminal Type/Emulation.
Configuration options: [VT100] [VT100+] [VT-UTF8] [ANSI]

Bits per second EMS
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] [57600] [115200]

Flow Control EMS
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] [Software Xon/Xoff]

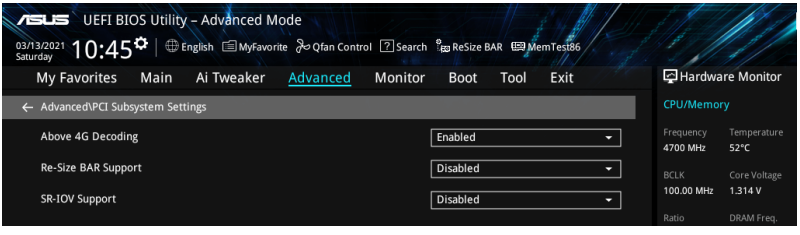
4.6.10 Intel TXT Information

You may view the Intel TXT information in this menu.



4.6.11 PCI Subsystem Settings

The items in this menu allows you to configure PCI, PCI-X, and PCI Express Settings.



Above 4G Decoding

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

Only enabled under 64bit operating system.

The following item appears only when **Above 4G Decoding** is set to **[Enabled]**.

Re-Size BAR Support

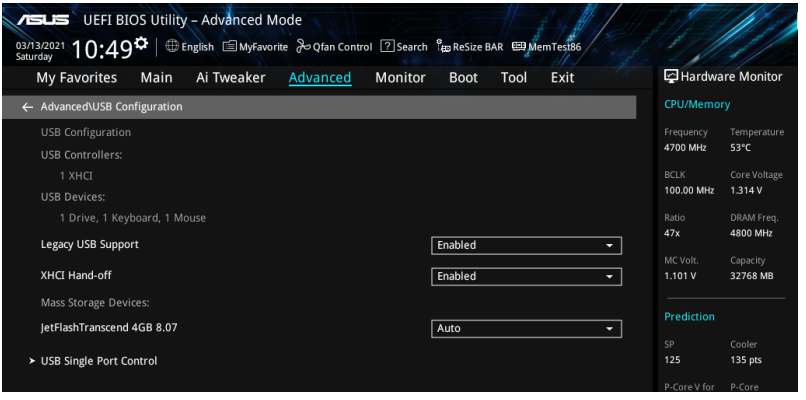
If system has Resizable BAR capable PCIe Devices, this option enables or disables Resizable BAR Support.
Configuration options: [Disabled] [Enabled]

SR-IOV Support

Allows you to enable or disable Single Root IO Virtualization Support if the system has SR-IOV capable PCIe devices.
Configuration options: [Disabled] [Enabled]

4.6.12 USB Configuration

The items in this menu allow you to change the USB-related features.



The **Mass Storage Devices** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

Legacy USB Support

[Enabled] Enabled the Legacy USB support.

[Disabled] USB devices are available only for EFI applications.

[Auto] Automatically disabled the Legacy USB support if no USB devices are connected.

XHCI Hand-off

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

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

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

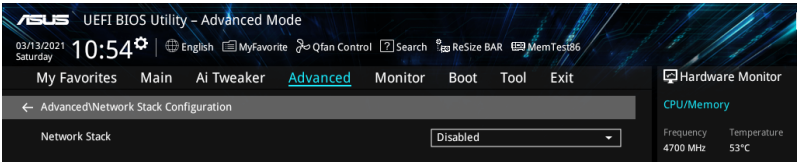
USB Single Port Control

Allows you to enable or disable the individual USB ports.

Refer to section **Rear panel features** in your motherboard's user manual for the location of the USB ports.

4.6.13 Network Stack Configuration

The items in this menu allow you to change the Network Stack Configuration.



Network stack

Allows you to disable or enable the UEFI network stack.
Configuration options: [Disable] [Enable]

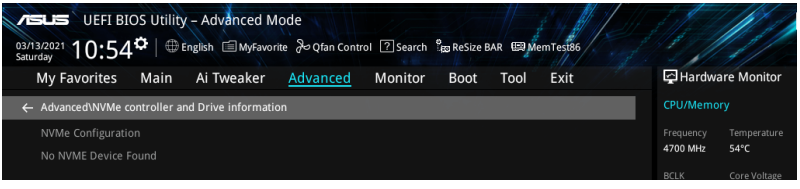
The following items appear only when **Network Stack** is set to **[Enabled]**.

Ipv4/Ipv6 PXE Support

Allows you to enable or disable the Ipv4/Ipv6 PXE wake event.
Configuration options: [Disabled] [Enabled]

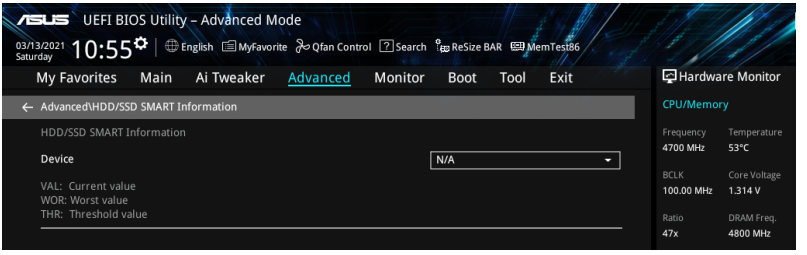
4.6.14 NVMe Configuration

This menu displays the NVMe controller and Drive information of the connected devices. You may press <Enter> on a connected NVMe device which appears in this menu to view more information on the NVMe device.



4.6.15 HDD/SSD SMART Information

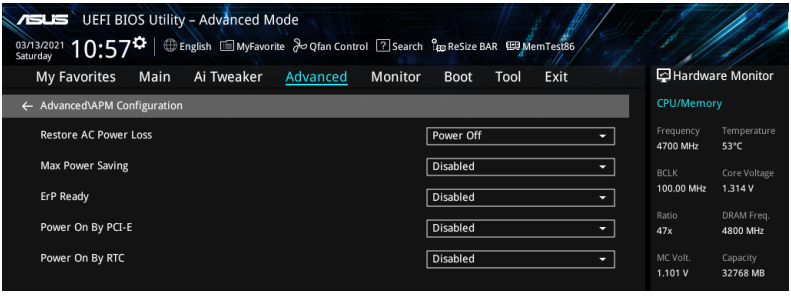
The items in this menu allow you to view the SMART information for connected storage devices.



NVM Express devices do not support SMART information.

4.6.16 APM Configuration

The items in this menu allow you to change the advanced power management settings.



Restore AC Power Loss

Allows your system to go to ON state, OFF state, or both states after an AC power loss. When setting your system to **[Last State]**, it goes to the previous state before the AC power loss.
Configuration options: [Power Off] [Power On] [Last State]

Max Power Saving

Configuration options: [Disabled] [Enabled]

ErP Ready

Allows you to switch off some power at S4+S5 or S5 to get the system ready for ErP requirement. When set to **[Enabled]**, all other PME options are switched off. RGB LEDs and RGB/Addressable RGB Headers will also be disabled.
Configuration options: [Disabled] [Enabled (S4+S5)] [Enabled (S5)]

Power On By PCI-E

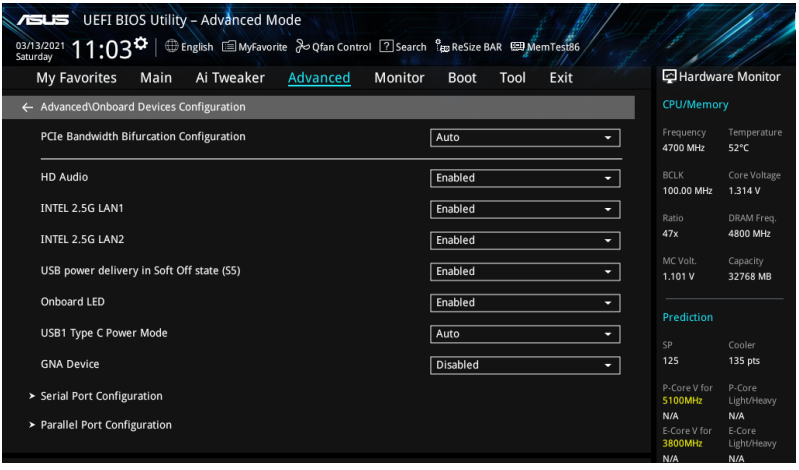
Allows you to enable or disable the Wake-on-LAN function of the onboard LAN controller or other installed PCI-E LAN cards.
Configuration options: [Disabled] [Enabled]

Power On By RTC

Allows you to enable or disable the RTC (Real-Time Clock) to generate a wake event and configure the RTC alarm date. When enabled, you can set the days, hours, minutes, or seconds to schedule an RTC alarm date.
Configuration options: [Disabled] [Enabled]

4.6.17 Onboard Devices Configuration

The items in this menu allow you to change the onboard devices settings. Scroll down to view the other BIOS items.



PCIe Bandwidth Bifurcation Configuration

[Auto] Run full PCIe X16 mode.

[X8/X8] Split up PCIEX16_1 that runs at X16 into X8/X8.

HD Audio

Controls the detection of the HD-Audio device.

[Disabled] HDA will be unconditionally disabled.

[Enabled] HDA will be unconditionally enabled.

Intel 2.5G LAN1/2

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

USB power delivery in Soft Off state (S5)

Allows you to enable or disable USB power when your PC is in the S5 state.
Configuration options: [Disabled] [Enabled]

Onboard LED

Allows you to turn on or off the HDD and PLED LEDs.
Configuration options: [Disabled] [Enabled]

USB1 Type C Power Mode

[Auto] Power will be provided to USB 3.2 Gen 2 Type-C ports automatically when a device is detected.

[Enabled] Power will always be on for USB 3.2 Gen 2 Type-C ports.

Improper connection may damage the system permanently.

GNA Device

Allows you to enable or disable SA GNA Device.
Configuration options: [Enabled] [Disabled]

Serial Port Configuration

This submenu allows you to set parameters for Serial Port.

This item will only function if there is a serial port (COM) connector on your motherboard.

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

The following item appears only when Serial Port is set to **[Enabled]**.

Change settings
Allows you to select an optimal setting for super IO device.
Configuration options: [IO=3F8h; IRQ=4] [IO=2F8h; IRQ=3] [IO=3E8h; IRQ=4] [IO=2E8h; IRQ=3]

Parallel Port Configuration

This submenu allows you to set parameters for Parallel Port (LPT/LPTE).

Parallel Port
Allows you to enable or disable Parallel Port (LPT/LPTE).
Configuration options: [Disabled] [Enabled]

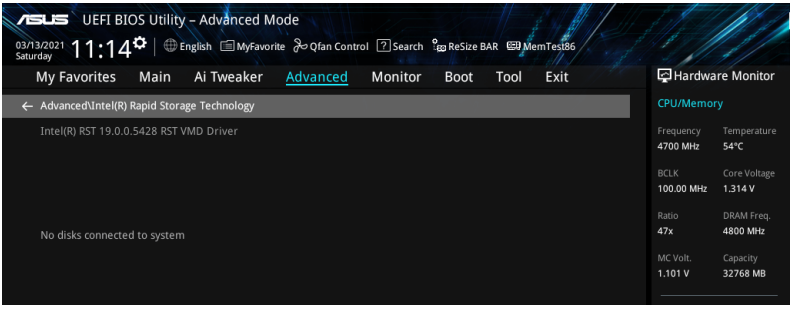
Change settings
Allows you to select an optimal setting for super IO device.
Configuration options: [IO=378h; IRQ=5] [IO=378h; IRQ=5,6,7,9,10,11,12] [IO=278h; IRQ=5,6,7,9,10,11,12]

Device Mode
Allows you to change the Printer Port mode.
Configuration options: [STD Printer Mode] [SPP Mode] [EPP-1.9 and SPP Mode] [EPP-1.7 and SPP Mode] [ECP Mode] [ECP and EPP-1.9 Mode] [ECP and EPP-1.7 Mode]

4.6.18 Intel(R) Rapid Storage Technology

The items in this menu allow you manage RAID volumes on the Intel(R) RAID Controller.

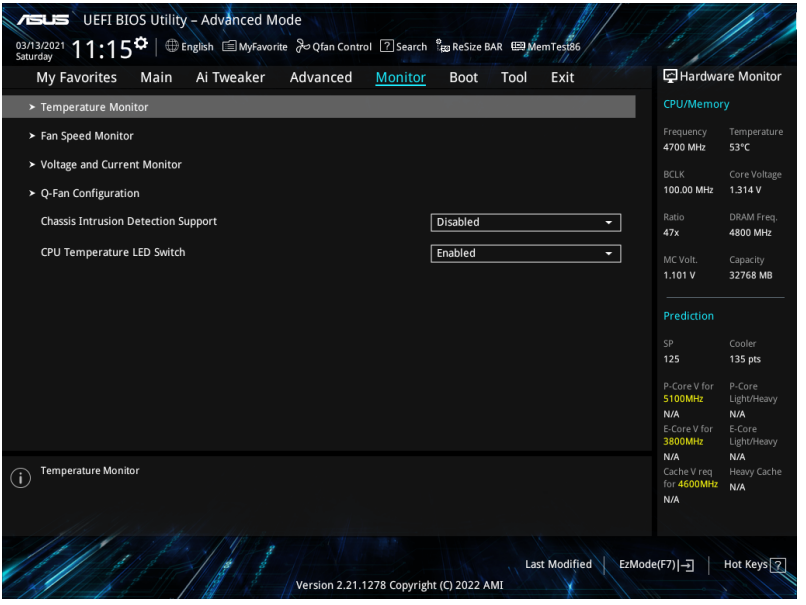
- The settings and options of this menu may vary depending on the storage devices connected. Please refer to the BIOS of your motherboard for the actual settings and options.
- Ensure to set the VMD configuration settings before using Intel(R) Rapid Storage Technology to create a RAID set.



4.7 Monitor menu

The Monitor menu displays the system temperature/power status, and allows you to change the fan settings. Scroll down to display the other BIOS items.

The settings and options of this menu may vary depending on your motherboard. Please refer to the BIOS of your motherboard for the actual settings and options.



Temperature Monitor

CPU Temperature, CPU Package Temperature, MotherBoard Temperature, VRM Thermistor Temperature, Chipset Temperature, T_Sensor Temperature, DIMM A1-2 Temperature, DIMM B1-2 Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the temperatures for the different components. Select **[Ignore]** if you do not wish to display the detected temperatures.

Fan Speed Monitor

CPU Fan Speed, CPU Optional Fan Speed, Chassis Fan 1-3 Speed, AIO PUMP Speed [xxxx RPM]

The onboard hardware monitor automatically detects and displays the fan speeds in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows N/A. Select **[Ignore]** if you do not wish to display the detected speed.

Voltage and Current Monitor

CPU Core Voltage, 12V Voltage, 5V Voltage, 3.3V Voltage, Memory Controller Voltage [x.xxx V]
The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Select **[Ignore]** if you do not want to detect this item.

CPU Core Current [xx A]
The onboard hardware monitor automatically detects the current output. Select **[Ignore]** if you do not want to detect this item.

Q-Fan Configuration

AI Cooling
ASUS AI Cooling will automatically manage and control all motherboard fans, ensuring the most efficient settings are set depending on the current system load and temperature. When you enable this function, AI Cooling function will try to lower fan speed to decrease fan noise without compromising current performance. You can keep track of fan performance via the ASUS Fan Xpert software with a blue dot in the Fan curve chart.
Configuration options: [Enabled] [Disabled]

Q-Fan Tuning
Click this item to automatically detect the lowest speed and configure the minimum duty cycle for each fan.

The process may take 2 to 5 minutes. DO NOT shut down or reset your system during the tuning process.

CPU Q-Fan Control
Allows you to set the CPU Q-Fan operating mode.

[Auto Detect]	Detects the type of installed fan/pump and automatically switches the control modes.
[DC Mode]	Enables the Q-Fan Control feature in DC mode for 3-pin fan/pump.
[PWM Mode]	Enables the Q-Fan Control feature in PWM mode for 4-pin fan/pump.

CPU Fan Profile
Allows you to set the appropriate performance level of the assigned fan/pump. When selecting [Manual], we suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty.
Configuration options: [Standard] [Silent] [Turbo] [Full Speed] [Manual]

The following items appear only when CPU Fan Profile is set to **[Standard]**, **[Silent]**, **[Turbo]**, or **[Manual]**.

CPU Fan Step Up
Step up allows you to adjust how quickly the fan rotation speed changes, with level 0 being an instantaneous change in speed. The higher the level, the slower the change in speed, and may also result in less noise, but this will also cause slower heat dissipation.
Configuration options: [Level 0] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]

CPU Fan Step Down
Step down allows you to adjust how quickly the fan rotation speed changes, with level 0 being an instantaneous change in speed. The higher the level, the slower the change in speed, and may also result in less noise, but this will also cause slower heat dissipation.
Configuration options: [Level 0] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]

CPU Fan Speed Low Limit
Allows you to set the lower speed limit for assigned fan/pump. A warning message will appear when the limit is reached; the warning message will not appear if [Ignore] is selected.
Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

The following items appear only when **CPU Fan Profile** is set to **[Manual]**.

CPU Fan Upper Temperature
Configure the fan/pump upper temperature to make assigned fan/pump operate at the max. duty cycle when the source temperature reaches the limit. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the upper temperature.

The fan/pump upper temperature cannot be lower than the fan/pump lower temperature.

CPU Fan Max. Duty Cycle (%)
Set the maximum fan/pump duty cycle of the assigned fan/pump for when the source temp. reaches the upper limit. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the fan/pump maximum duty cycle.

CPU Fan Middle Temperature
Configure the fan/pump middle temperature to make assigned fan/pump operate at the mid. duty cycle when the source temperature is higher than the limit. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the middle temperature.

CPU Fan Middle. Duty Cycle (%)
Set the middle fan/pump duty cycle of the assigned fan/pump for when the source temp. exceeds the middle temperature. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the fan/pump middle duty cycle.

CPU Fan Lower Temperature
Configure the fan/pump lower temperature to make assigned fan/pump operate at the min. duty cycle when the source temperature is lower than the limit. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the lower temperature.

CPU Fan Min. Duty Cycle(%)
Set the middle fan/pump duty cycle of the assigned fan/pump for when the source temp. is lower than the lower temperature. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the fan/pump minimum duty cycle.

Chassis Fan(s) Configuration

Chassis Fan 1-3 Q-Fan Control
Allows you to set the Chassis Fan 1-3 operating mode.

[Auto Detect]	Detects the type of installed fan/pump and automatically switches the control modes.
[DC Mode]	Enables the Q-Fan Control feature in DC mode for 3-pin fan/pump.
[PWM Mode]	Enables the Q-Fan Control feature in PWM mode for 4-pin fan/pump.

Chassis Fan 1-3 Profile
Allows you to set the appropriate performance level of the assigned fan/pump. When selecting **[Manual]**, we suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty.
Configuration options: [Standard] [Silent] [Turbo] [Full Speed] [Manual]

The following items appear only when **CPU Fan 1-3 Profil**e is set to **[Standard]**, **[Silent]**, **[Turbo]**, or **[Manual]**.

Chassis Fan 1-3 Q-Fan Source
The assigned fan/pump will be controlled according to the selected temperature source.
Configuration options: [CPU] [MotherBoard] [VRM Thermistor] [Chipset] [T_Sensor] [Multiple Sources]

For Multiple Sources, select up to three temperature sources and the fan will automatically change based on the highest temperature.

Chassis Fan 1-3 Step Up

Step up allows you to adjust how quickly the fan rotation speed changes, with level 0 being an instantaneous change in speed. The higher the level, the slower the change in speed, and may also result in less noise, but this will also cause slower heat dissipation.

Configuration options: [Level 0] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]

Chassis Fan 1-3 Step Down

Step down allows you to adjust how quickly the fan rotation speed changes, with level 0 being an instantaneous change in speed. The higher the level, the slower the change in speed, and may also result in less noise, but this will also cause slower heat dissipation.

Configuration options: [Level 0] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]

Chassis Fan 1-3 Speed Low Limit

Allows you to set the lower speed limit for assigned fan/pump. A warning message will appear when the limit is reached; the warning message will not appear if [Ignore] is selected.

Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

The following items appear only when **Chassis Fan 1-3 Profile** is set to **[Manual]**.

Chassis Fan 1-3 Upper Temperature

Configure the fan/pump upper temperature to make assigned fan/pump operate at the max. duty cycle when the source temperature reaches the limit. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the upper temperature.

The fan/pump upper temperature cannot be lower than the fan/pump lower temperature.

Chassis Fan 1-3 Max. Duty Cycle (%)

Set the maximum fan/pump duty cycle of the assigned fan/pump for when the source temp. reaches the upper limit. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the fan/pump maximum duty cycle.

Chassis Fan 1-3 Middle Temperature

Configure the fan/pump middle temperature to make assigned fan/pump operate at the mid. duty cycle when the source temperature is higher than the limit. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the middle temperature.

Chassis Fan 1-3 Middle. Duty Cycle (%)
Set the middle fan/pump duty cycle of the assigned fan/pump for when the source temp. exceeds the middle temperature. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the fan/pump middle duty cycle.

Chassis Fan 1-3 Lower Temperature
Configure the fan/pump lower temperature to make assigned fan/pump operate at the min. duty cycle when the source temperature is lower than the limit. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the lower temperature.

Chassis Fan 1-3 Min. Duty Cycle(%)
Set the middle fan/pump duty cycle of the assigned fan/pump for when the source temp. is lower than the lower temperature. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the fan/pump minimum duty cycle.

AIO Pump Q-Fan Control
Allows you to set the AIO Pump operating mode.

[Auto Detect]	Detects the type of installed fan/pump and automatically switches the control modes.
[DC Mode]	Enables the Q-Fan Control feature in DC mode for 3-pin fan/pump.
[PWM Mode]	Enables the Q-Fan Control feature in PWM mode for 4-pin fan/pump.

AIO Pump Profile
Allows you to set the appropriate performance level of the assigned fan/pump. When selecting [Manual], we suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty.
Configuration options: [Standard] [Silent] [Turbo] [Full Speed] [Manual]

The following items appear only when **AIO Pump Profile** is set to **[Standard]**, **[Silent]**, **[Turbo]**, or **[Manual]**.

AIO Pump Q-Fan Source
The assigned fan/pump will be controlled according to the selected temperature source.
Configuration options: [CPU] [MotherBoard] [VRM Thermistor] [Chipset] [T_Sensor] [Multiple Sources]

AIO Pump Step Up
Step up allows you to adjust how quickly the fan rotation speed changes, with level 0 being an instantaneous change in speed. The higher the level, the slower the change in speed, and may also result in less noise, but this will also cause slower heat dissipation.
Configuration options: [Level 0] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]

AIO Pump Step Down
Step down allows you to adjust how quickly the fan rotation speed changes, with level 0 being an instantaneous change in speed. The higher the level, the slower the change in speed, and may also result in less noise, but this will also cause slower heat dissipation.
Configuration options: [Level 0] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5]

AIO Pump Speed Low Limit
Allows you to set the lower speed limit for assigned fan/pump. A warning message will appear when the limit is reached; the warning message will not appear if [Ignore] is selected.
Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

The following items appear only when **AIO Pump Profile** is set to **[Manual]**.

AIO Pump Upper Temperature
Configure the fan/pump upper temperature to make assigned fan/pump operate at the max. duty cycle when the source temperature reaches the limit. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the upper temperature.

The fan/pump upper temperature cannot be lower than the fan/pump lower temperature.

AIO Pump Max. Duty Cycle (%)
Set the maximum fan/pump duty cycle of the assigned fan/pump for when the source temp. reaches the upper limit. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the fan/pump maximum duty cycle.

AIO Pump Middle Temperature
Configure the fan/pump middle temperature to make assigned fan/pump operate at the mid. duty cycle when the source temperature is higher than the limit. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the middle temperature.

AIO Pump Middle. Duty Cycle (%)
Set the middle fan/pump duty cycle of the assigned fan/pump for when the source temp. exceeds the middle temperature. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the fan/pump middle duty cycle.

AIO Pump Lower Temperature
Configure the fan/pump lower temperature to make assigned fan/pump operate at the min. duty cycle when the source temperature is lower than the limit. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the lower temperature.

AIO Pump Min. Duty Cycle(%)
Set the middle fan/pump duty cycle of the assigned fan/pump for when the source temp. is lower than the lower temperature. We suggest raising your fan/pump duty to 100% if your CPU temperature exceeds 75°C. Please be noted CPU performance will throttle due to overheating with inefficient fan/pump duty. Use the <+> or <-> keys to adjust the fan/pump minimum duty cycle.

Chassis Intrusion Detection Support

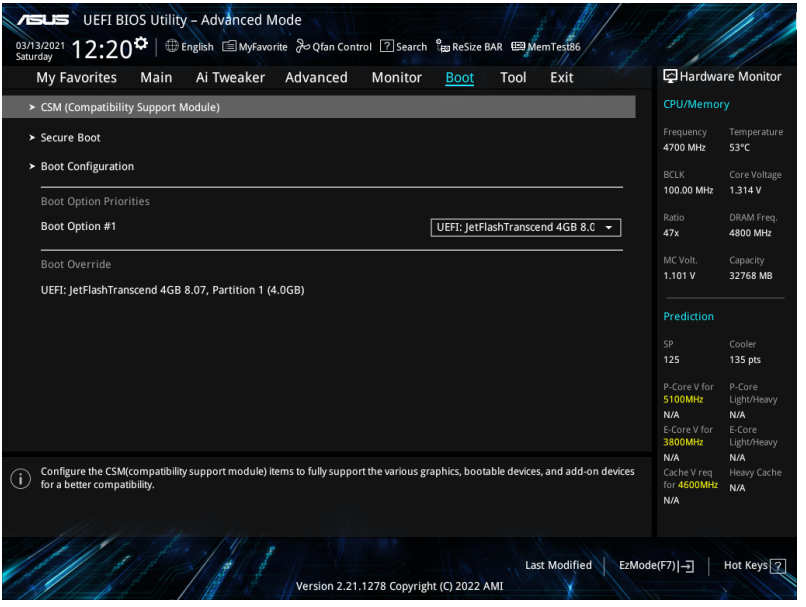
Set this item to **[Enabled]** to enable the chassis intrusion detection function.
Configuration options: [Enabled] [Disabled]

CPU Temperature LED Switch

The CPU_LED will light up to indicate high CPU temperature.
Configuration options: [Disabled] [Enabled]

4.8 Boot menu

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



CSM (Compatibility Support Module)

Allows you to configure the CSM (Compatibility Support Module) items to fully support the various VGA, bootable devices and add-on devices for better compatibility.

Launch CSM will be set to **[Disabled]** and cannot be configured when using the integrated graphics.

Launch CSM

[Enabled] For better compatibility, enable the CSM to fully support the non-UEFI driver add-on devices or the Windows® UEFI mode.

[Disabled] Disable the CSM to fully support the non-UEFI driver add-on devices or the Windows® UEFI mode.

The following items appear only when **Launch CSM** is set to **[Enabled]**.

Boot Device Control

Allows you to select the type of devices that you want to boot.
Configuration options: [UEFI and Legacy OPROM] [Legacy OPROM only] [UEFI only]

Boot from Network Devices

Allows you to select the type of network devices that you want to launch.
Configuration options: [Ignore] [Legacy only] [UEFI only]

Boot from Storage Devices
Allows you to select the type of storage devices that you want to launch.
Configuration options: [Ignore] [Legacy only] [UEFI only]

Boot from PCI-E/PCI Expansion Devices
Allows you to select the type of PCI-E/PCI expansion devices that you want to launch.
Configuration options: [Ignore] [Legacy only] [UEFI only]

Secure Boot

Allows you to configure the Windows® Secure Boot settings and manage its keys to protect the system from unauthorized access and malwares during POST.

OS Type

[Other OS]	Get the optimized function when booting on Windows® non-UEFI mode. Microsoft® Secure Boot only supports Windows® UEFI mode.
[Windows UEFI Mode]	This item allows you to select your installed operating system. Execute the Microsoft® Secure Boot check. Only select this option when booting on Windows® UEFI mode or other Microsoft® Secure Boot compliant OS.

The Microsoft secure boot can only function properly on Windows UEFI mode.

Secure Boot Mode
This option allows you to select the Secure Boot mode from between Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.
Configuration options: [Standard] [Custom]

The following item appears only when **Secure Boot Mode** is set to **[Custom]**.

Key Management

Install Default Secure Boot keys
Allows you to immediately load the default Security Boot keys, Platform key (PK), Key-exchange Key (KEK), Signature database (db), and Revoked Signatures (dbx). When the default Secure boot keys are loaded, the PK state will change from Unloaded mode to loaded mode.

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

Save all Secure Boot variables
Allows you to save all secure boot keys to a USB storage device.

PK Management
The Platform Key (PK) locks and secures the firmware from any permissible changes. The system verifies the PK before your system enters the OS.

Save To File
Allows you to save the PK to a USB storage device.

Set New key
Allows you to load the downloaded PK from a USB storage device.

Delete key
Allows you to delete the PK from your system. Once the PK is deleted, all the system's Secure Boot keys will not be active.
Configuration options: [Yes] [No]

The PK file must be formatted as a UEFI variable structure with time-based authenticated variable.

KEK Management
The KEK (Key-exchange Key or Key Enrollment Key) manages the Signature database (db) and Revoked Signature database (dbx).

Key-exchange Key (KEK) refers to Microsoft® Secure Boot Key-Enrollment Key (KEK).

Save to file
Allows you to save the KEK to a USB storage device.

Set New key
Allows you to load the downloaded KEK from a USB storage device.

Append Key
Allows you to load the additional KEK from a storage device for an additional db and dbx loaded management.

Delete key
Allows you to delete the KEK from your system.
Configuration options: [Yes] [No]

The KEK file must be formatted as a UEFI variable structure with time-based authenticated variable.

DB Management
The db (Authorized Signature database) lists the signers or images of UEFI applications, operating system loaders, and UEFI drivers that you can load on the single computer.

Save to file
Allows you to save the db to a USB storage device.

Set New key
Allows you to load the downloaded db from a USB storage device.

Append Key
Allows you to load the additional db from a storage device for an additional db and dbx loaded management.

Delete key
Allows you to delete the db file from your system.
Configuration options: [Yes] [No]

The db file must be formatted as a UEFI variable structure with time-based authenticated variable.

DBX Management

The dbx (Revoked Signature database) lists the forbidden images of db items that are no longer trusted and cannot be loaded.

Save to file

Allows you to save the dbx to a USB storage device.

Set New key

Allows you to load the downloaded dbx from a USB storage device.

Append Key

Allows you to load the additional dbx from a storage device for an additional db and dbx loaded management.

Delete key

Allows you to delete the dbx file from your system.
Configuration options: [Yes] [No]

The dbx file must be formatted as a UEFI variable structure with time-based authenticated variable.

Boot Configuration

Fast Boot

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

The following item appears only when **Fast Boot** is set to **[Enabled]**.

Next Boot after AC Power Loss

[Normal Boot]	Returns to normal boot on the next boot after an AC power loss.
[Fast Boot]	Accelerates the boot speed on the next boot after an AC power loss.

Boot Logo Display

[Auto]	Automatically adjust the boot logo size for Windows requirements.
[Full Screen]	Maximize the boot logo size.
[Disabled]	Hide the logo during POST.

The following item appears only when **Boot Logo Display** is set to **[Auto] or [Full Screen]**.

Post Delay Time

Allows you to select a desired additional POST waiting time to easily enter the BIOS Setup. You can only execute the POST delay time during normal boot.
Configuration options: [0 sec] - [10 sec]

This feature only works when set under normal boot.

The following item appears only when **Boot Logo Display** is set to **[Disabled]**.

Post Report
Allows you to select a desired POST report waiting time or until ESC is pressed.
Configuration options: [1 sec] - [10 sec] [Until Press ESC]

Boot up NumLock State
Allows you to select the keyboard NumLock state.
Configuration options: [On] [Off]

Wait For 'F1' If Error
Allows your system to wait for the <F1> key to be pressed when error occurs.
Configuration options: [Disabled] [Enabled]

Option ROM Messages

[Force BIOS]	The Option ROM Messages will be shown during the POST.
[Keep Current]	Only the ASUS logo will be shown during the POST.

Interrupt 19 Capture
Enable this item to allow the option ROMs to trap the interrupt 19.
Configuration options: [Enabled] [Disabled]

AMI Native NVMe Driver Support
Allows you to enable or disable AMI Native NVMe driver.
Configuration options: [Disabled] [Enabled]

Setup Mode

[Advanced Mode]	This item allows you to go to Advanced Mode of the BIOS after POST.
[EZ Mode]	This item allows you to go to EZ Mode of the BIOS after POST.

Boot Sector (MBR/GPT) Recovery Policy
Allows you to set the Boot Sector Policy.

[Auto Recovery]	Follow UEFI Rule.
[Local User Control]	You can enter setup page and select Boot Sector (MBR/GPT) Recovery Policy to recovery MBR/GPT on the next boot time.

The following item appears only when **Boot Sector (MBR/GPT) Recovery Policy** is set to **[Local User Control]**.

Next Boot Recovery Action
Choose the (MBR/GPT) recovery action on the next boot.
Configuration options: [Skip] [Recovery]

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.

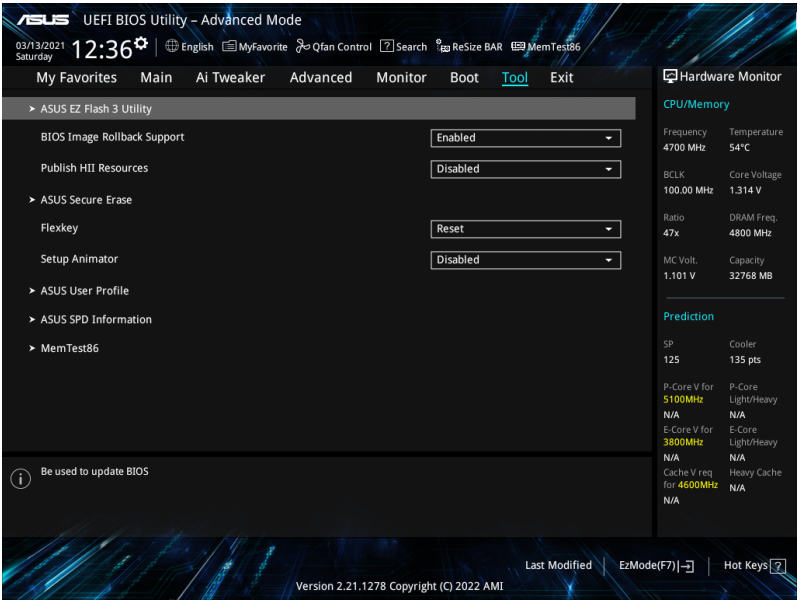
- To access Windows® OS in Safe Mode, press <F8 > after POST (Windows® 8 not supported).
- To select the boot device during system startup, press <F8> when ASUS Logo appears.

Boot Override

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

4.9 Tool menu

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



BIOS Image Rollback Support

[Enabled] Support roll back your BIOS to a previous version, but this setting violates the NIST SP 800-147 requirement.

[Disabled] Only support updating your BIOS to a newer version, and this setting meets the NIST SP 800-147 requirement.

Publish HII Resources

Configuration options: [Disabled] [Enabled]

Flexkey

[Reset] Reboots the system.

[DirectKey] Boot directly into the BIOS.

Setup Animator

Allows you to enable or disable the Setup animator.
Configuration options: [Disabled] [Enabled]

4.9.1 ASUS EZ Flash 3 Utility

Allows you to run ASUS EZ Flash 3. When you press <Enter>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <Enter> to confirm your choice.

For more details, refer to section **ASUS EZ Flash 3**.

4.9.2 Secure Erase

SSD speeds may lower over time as with any storage medium due to data processing. Secure Erase completely and safely cleans your SSD, restoring it to factory performance levels.

To launch Secure Erase, click **Tool > Secure Erase** on the Advanced mode menu.

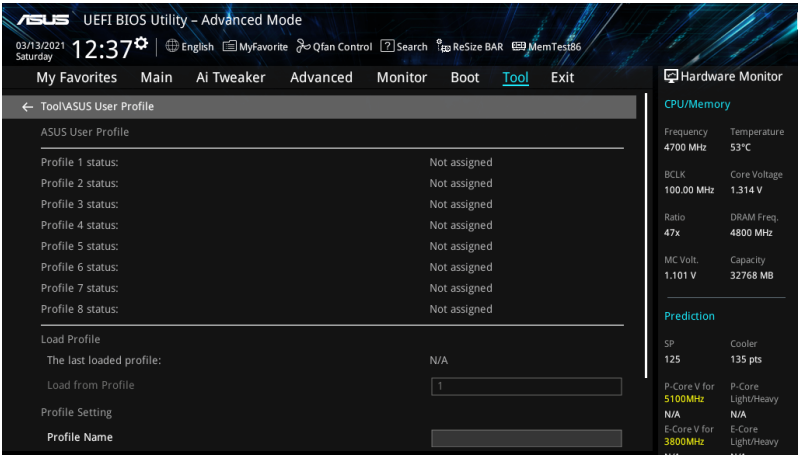
- The time to erase the contents of your SSD may take a while depending on its size. Do not turn off the system during the process.
- Secure Erase is only supported on Intel SATA port. For more information about Intel SATA ports, refer to section **Motherboard layout** in your user manual.

Status definition:

- **Frozen.** The frozen state is the result of a BIOS protective measure. The BIOS guards drives that do not have password protection by freezing them prior to booting. If the drive is frozen, a power off or hard reset of your PC must be performed to proceed with the Secure Erase.
- **Locked.** SSDs might be locked if the Secure Erase process is either incomplete or was stopped. This may be due to a third party software that uses a different password defined by ASUS. You have to unlock the SSD in the software before proceeding with Secure Erase.

4.9.3 ASUS User Profile

Allows you to store or load multiple BIOS settings.



Load from Profile

Allows you to load the previous BIOS settings saved in the BIOS Flash. Key in the profile number that saved your BIOS settings, press <Enter>, and then select **Yes**.

- DO NOT shut down or reset the system while updating the BIOS to prevent the system boot failure!
- We recommend that you update the BIOS file only coming from the same memory/ CPU configuration and BIOS version.

Profile Name

Allows you to key in a profile name.

Save to Profile

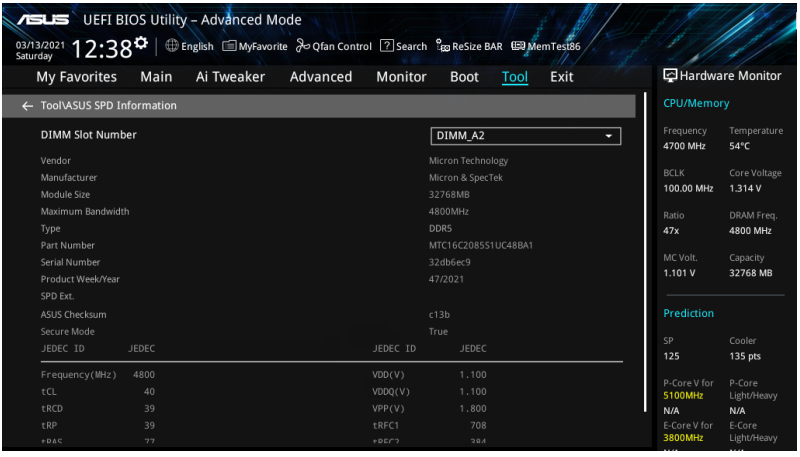
Allows you to save the current BIOS settings to the BIOS Flash, and create a profile. Key in a profile number from one to eight, press <Enter>, and then select **Yes**.

Load/Save Profile from/to USB Drive

Allows you to load or save profile from your USB drive, load and save profile to your USB drive.

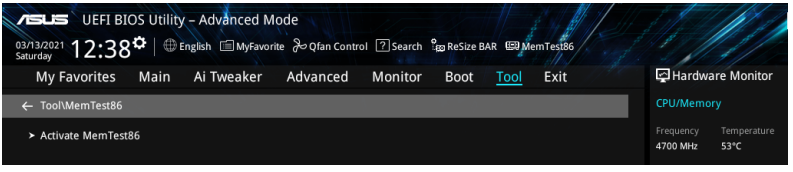
4.9.4 ASUS SPD Information

This item allows you to view the DRAM SPD information.



4.9.5 MemTest86

This item allows you to obtain a memory diagnosis.



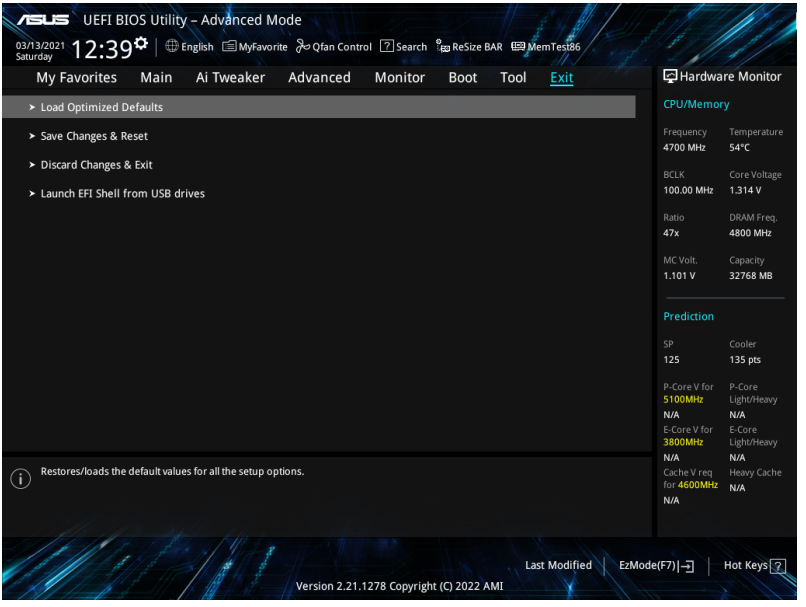
Activate MemTest86

Press <Enter> to open MemTest86 to perform and check testing results.

- Please save all changes made before using MemTest86.
- There will be a few seconds of loading time after pressing <Enter> on this option.

4.10 Exit menu

The Exit menu items allow you to load the optimal default values for the BIOS items, and save or discard your changes to the BIOS items. You can access the EZ Mode from the Exit menu.



Load Optimized Defaults

Allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select **OK** to load the default values.

Save Changes & Reset

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved. When you select this option or if you press <F10>, a confirmation window appears. Select **OK** to save changes and exit.

Discard Changes & Exit

Allows you to exit the Setup program without saving your changes. When you select this option or if you press <Esc>, a confirmation window appears. Select **Yes** to discard changes and exit.

Launch EFI Shell from USB drives

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

4.11 Updating BIOS

The ASUS website publishes the latest BIOS versions to provide enhancements on system stability, compatibility,and performance. However, BIOS updating is potentially risky. If there is no problem using the current version of BIOS, DO NOT manually update the BIOS. Inappropriate BIOS updating may result to system's failure to boot. Carefully follow the instructions in this chapter to update your BIOS when necessary.

Visit http://www.asus.com to download the latest BIOS file for this motherboard.

The following utilities allow you to manage and update the motherboard BIOS setup program.

1. EZ Update: Updates the BIOS in Windows® environment.
2. ASUS EZ Flash 3: Updates the BIOS using a USB flash drive.
3. ASUS CrashFree BIOS 3: Restores the BIOS using the motherboard support DVD or a USB flash drive when the BIOS file fails or gets corrupted.

4.11.1 EZ Update

The EZ Update is a utility that allows you to update the motherboard BIOS in Windows® environment.

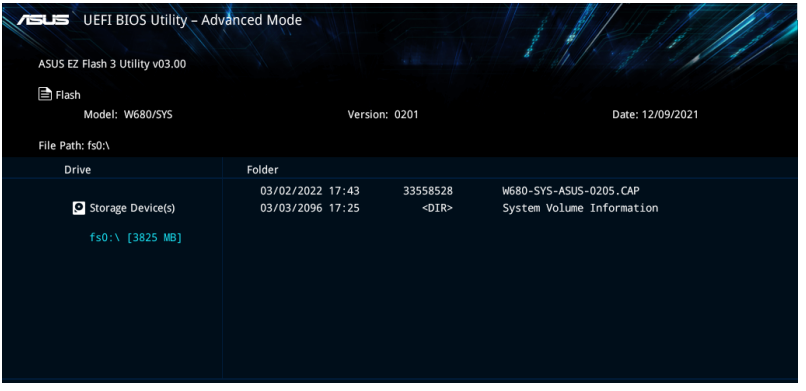
- EZ Update requires an Internet connection either through a network or an ISP (Internet Service Provider).
- This utility is available in the support DVD that comes with the motherboard package.

4.11.2 ASUS EZ Flash 3

ASUS EZ Flash 3 allows you to download and update to the latest BIOS using a USB drive.

To update the BIOS:

1. Insert the USB flash drive that contains the latest BIOS file to a USB port.
2. Enter the Advanced Mode of the BIOS setup program. Go to the **Tool** menu to select **ASUS EZ Flash 3 Utility** and press <Enter>.
3. Press Left arrow key to switch to the Drive field.
4. Press the Up/Down arrow keys to find the USB flash drive that contains the latest BIOS, and then press <Enter>.
5. Press Right arrow key to switch to the Folder Info field.
6. Press the Up/Down arrow keys to find the BIOS file, and then press <Enter> to perform the BIOS update process. Reboot the system when the update process is done.



4.11.3 ASUS CrashFree BIOS 3

The ASUS CrashFree BIOS 3 utility 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 restore a corrupted BIOS file using the motherboard support DVD or a USB flash drive that contains the BIOS file.

The BIOS file in the motherboard support DVD may be older than the BIOS file published on the ASUS official website. If you want to use the newer BIOS file, download the file at https://www.asus.com/support/ and save it to a USB flash drive.

Recovering the BIOS

To recover the BIOS:

1. Turn on the system.
2. Insert the motherboard support DVD to the optical drive, or the USB flash drive containing the BIOS file to the USB port.
3. The utility automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and enters ASUS EZ Flash 3 automatically.
4. The system requires you to enter BIOS Setup to recover the BIOS setting. To ensure system compatibility and stability, we recommend that you press <F5> to load default BIOS values.

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

5 RAID Configuration

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

5.1 RAID configurations

The motherboard supports Intel® Rapid Storage Technology enterprise Option ROM Utility with RAID 0, RAID 1, RAID 10, and RAID 5 support.

If you want to install a Windows® operating system to a hard disk drive included in a RAID set, you have to create a RAID driver disk and load the RAID driver during OS installation. Refer to section **Creating a RAID driver disk** for details.

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 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.

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.

5.1.2 Installing storage devices

The motherboard supports Serial ATA hard disk drives, PCIE SSD storage devices, and M.2 modules. For optimal performance, install identical drives or modules of the same model and capacity when creating a disk array.

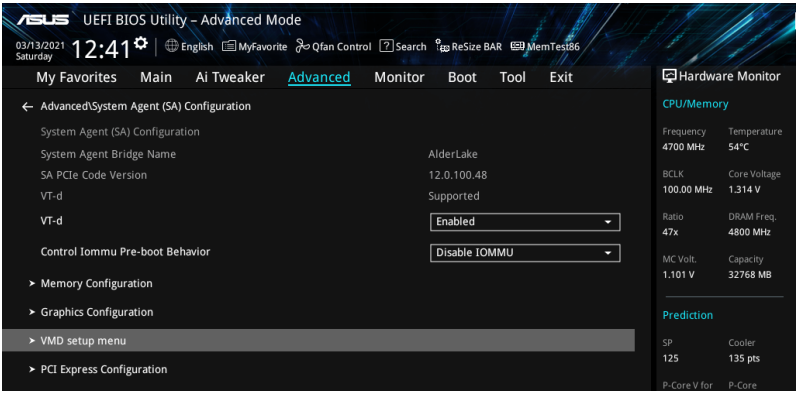
Refer to Chapter 2 for details on installing storage devices to your motherboard.

5.1.3 Creating a SATA RAID set in UEFI BIOS

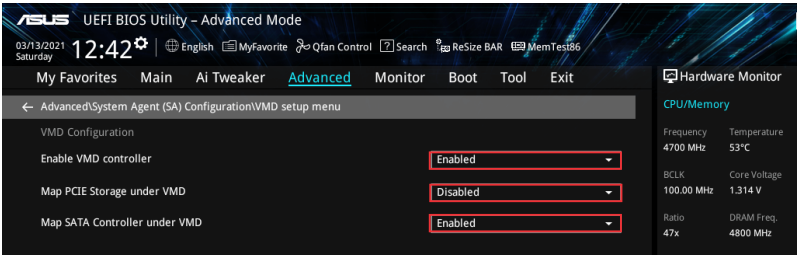
1. Enter the BIOS Setup during POST.

Refer to Chapter 4 in your motherboard's user manual for details on entering and navigating through the BIOS Setup.

2. Go to **Advanced** > **System Agent (SA) Configuration** > **VMD Setup Menu**.



3. In the VMD setup menu, set **Enable VMD controller** and **Map SATA Controller under VMD** to **[Enabled]**, and set **Map PCIE Storage under VMD** to **[Disabled]**.

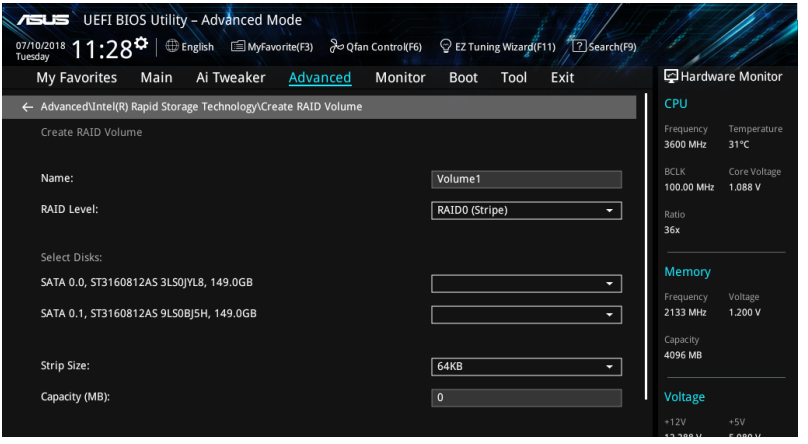


4. Save your changes and exit the BIOS Setup, then enter the BIOS Setup again.

5. Go to **Advanced > Intel(R) Rapid Storage Technology** to display the Intel® Rapid Storage Technology menu.

Creating a RAID set

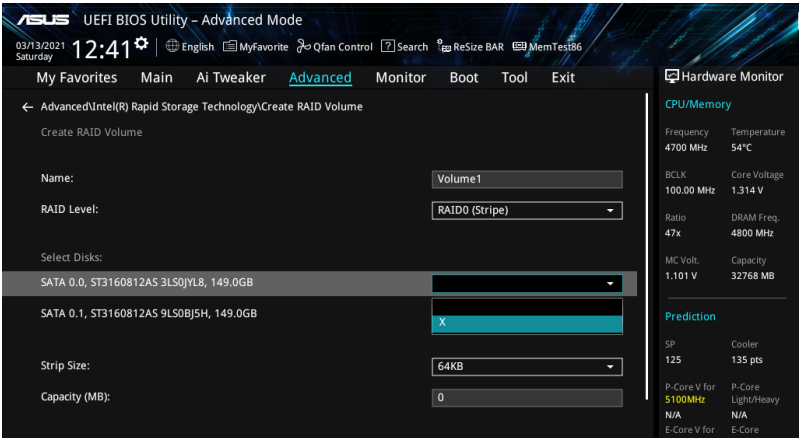
1. From the Intel® Rapid Storage Technology menu, select **Create RAID Volume** and press <Enter>. The following screen appears:



2. When the **Name** item is selected, enter a name for the RAID set and press <Enter>.

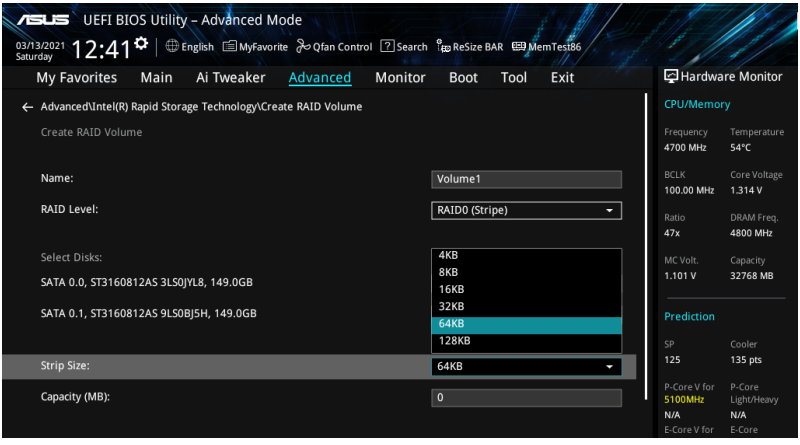
3. When the **RAID Level** item is selected, press <Enter> to select the RAID level to create, and then press <Enter>.

4. Under **Select Disks**, press <Enter> and select **X** for the disks you want to include in the RAID set.



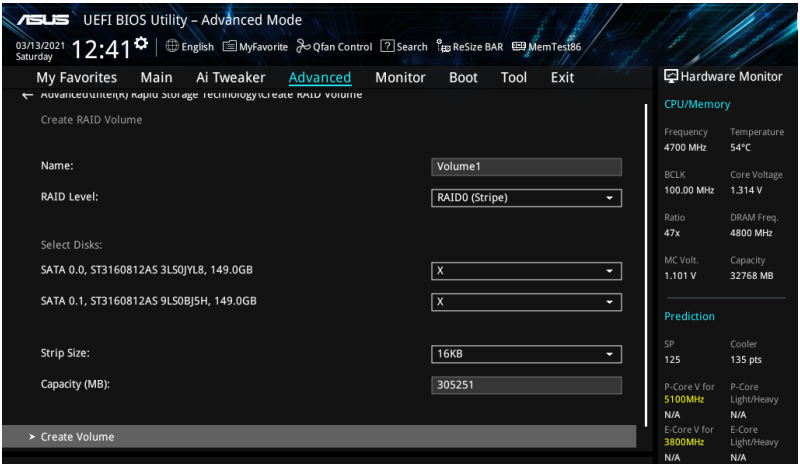
5. When the **Strip Size** item is selected, press <Enter> to select strip size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available strip size values range from 4 KB to 128 KB. The following are typical values:
   - RAID 0: 128 KB
   - RAID 10: 64 KB
   - RAID 5: 64 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 (MB)** 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.



8. Save your changes and exit the BIOS Setup, then enter the BIOS Setup again.

9. The RAID volume should appear in the **Intel(R) Rapid Storage Technology** menu, And also appear in the **EZ Mode** menu under **Storage Information**.

To delete a RAID set, please refer to section **Deleting a RAID set**.

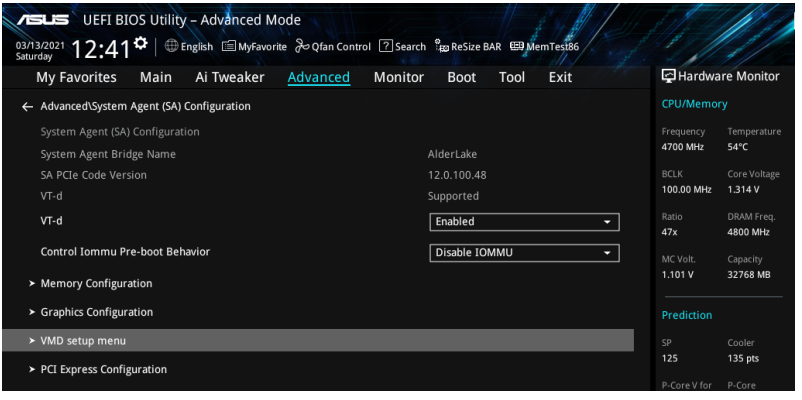
5.1.4 Creating an NVMe RAID set with onboard M.2 modules in UEFI BIOS

- You can create a RAID set with the following setups:
  - NVMe SSDs from the CPU.
  - NVMe SSDs from the PCH.
  - NVMe SSDs from the CPU and PCH.
  - Third-party storage devices.
- You can only create PCIe RAID 0/1/5 on W680/Z690/Q670/H670 Series

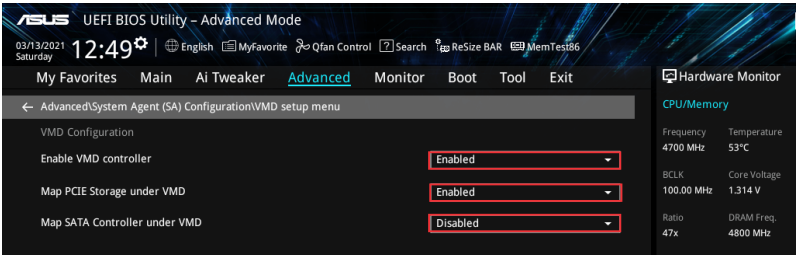
1. Enter the BIOS Setup during POST.

Refer to Chapter 4 in your motherboard's user manual for details on entering and navigating through the BIOS Setup.

2. Go to **Advanced** > **System Agent (SA) Configuration** > **VMD Setup Menu**.



3. In the VMD setup menu, set **Enable VMD controller** and **Map PCIE Storage under VMD** to **[Enabled]**, and set **Map SATA Controller under VMD** to **[Disabled]**.

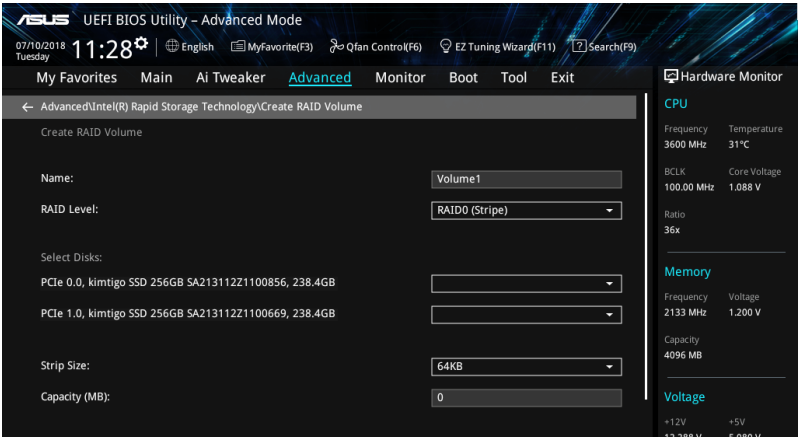


4. Save your changes and exit the BIOS Setup, then enter the BIOS Setup again.

5. Go to **Advanced > Intel(R) Rapid Storage Technology** to display the Intel® Rapid Storage Technology menu.

Creating a RAID set

1. From the Intel® Rapid Storage Technology menu, select **Create RAID Volume** and press <Enter>. The following screen appears:

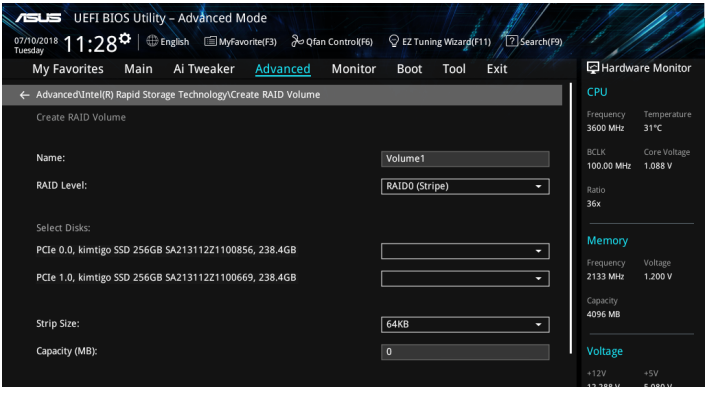


2. When the **Name** item is selected, enter a name for the RAID set and press <Enter>.

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.

Only full SATA or full NVMe RAID is supported, different interfaces of RAID cannot be created, such as half NVMe and half RAID.



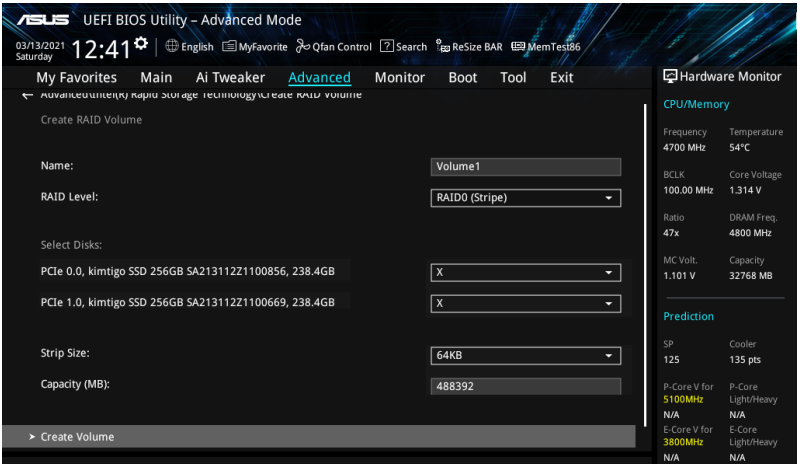
5. When the **Strip Size** item is selected, press <Enter> to select strip size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available strip size values range from 4 KB to 128 KB. The following are typical values:

   - 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 (MB)** 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.



8. Save your changes and exit the BIOS Setup, then enter the BIOS Setup again.

9. The RAID volume should appear in the **Intel(R) Rapid Storage Technology** menu, And also appear in the **EZ Mode** menu under **Storage Information**.

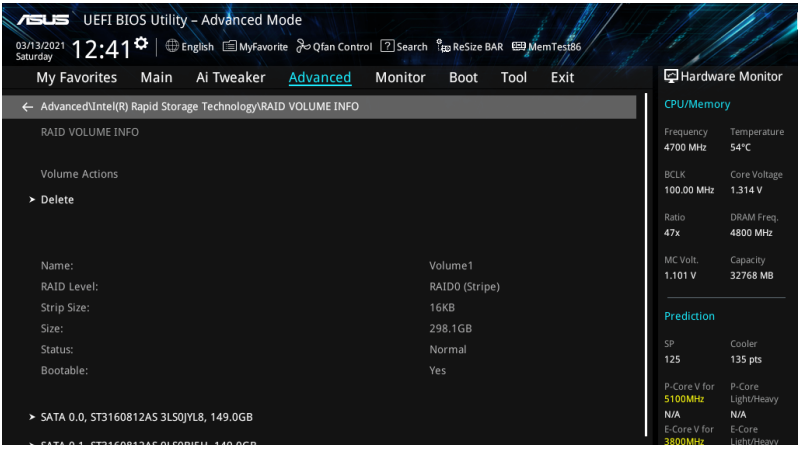
To delete a RAID set, please refer to section **Deleting a RAID set**.

5.1.5 Deleting a RAID set

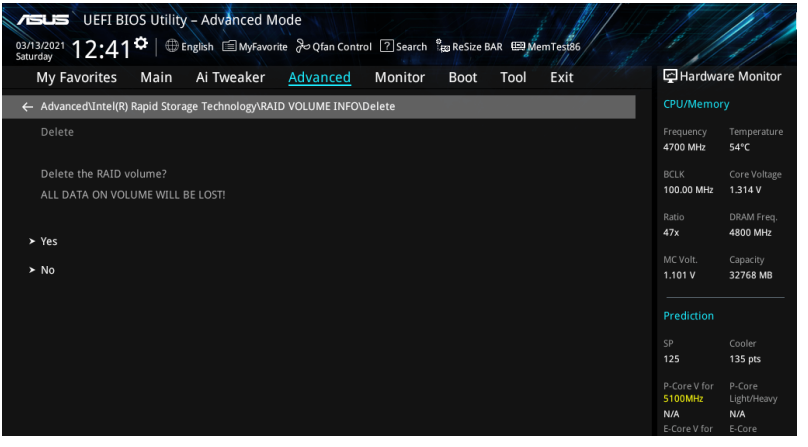
Be cautious when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the Intel® Rapid Storage Technology 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® Rapid Storage Technology menu, or select **No** to cancel.



5.2 Installing the RAID controller driver during Windows® 10 or Windows® 11 OS installation

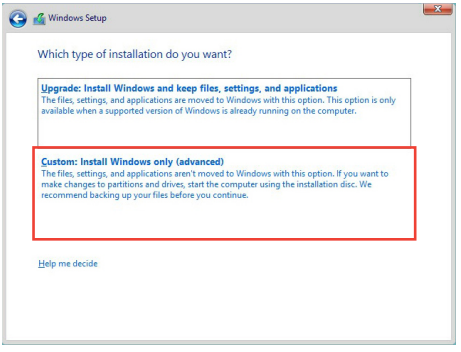
After creating the RAID sets, you are now ready to install an operating system to the independent drives or bootable array. This part provides the instructions on how to install the RAID controller drivers during OS installation.

The steps and screenshots are for reference only and may change with newer Windows updates.

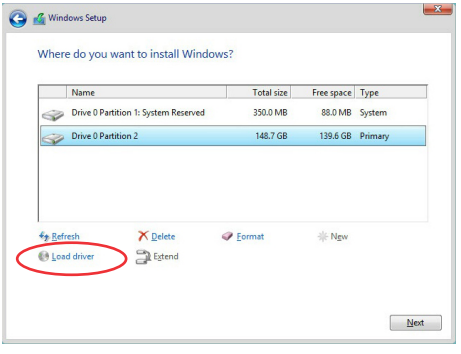
If you created a SATA RAID set, you will not be able to use the optical drive connected to a SATA port before the RAID driver is loaded.

To install the RAID controller driver when installing Windows® 10 or Windows® 11 OS:

1. Boot the computer using the Windows® 10 OS or Windows® 11 installation disc. Follow the screen instructions to start installing Windows®.
2. When prompted to choose a type of installation, click **Custom: Install Windows only (advanced)**.

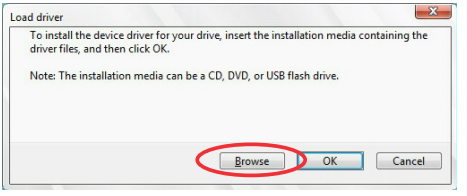


3. Click **Load Driver**.



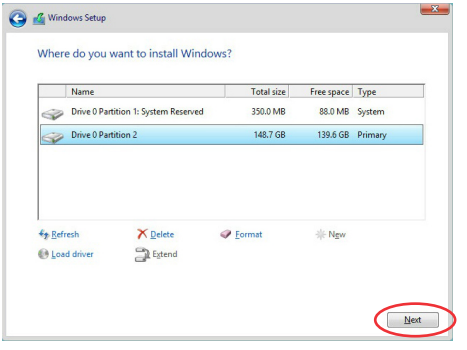
4. A message appears, reminding you to insert the installation media containing the driver of the RAID controller driver. Click **Browse** to continue.

- If you have only one optical drive installed in your system, eject the Windows OS installation disc and replace it with the motherboard Support DVD.
- If you created a SATA RAID set and cannot use the optical drive, or if you do not have an optical drive, you can use another computer with an optical drive to copy the RAID driver from the support DVD to a USB flash drive.



5. Locate the driver in the corresponding folder of the Support DVD or the USB flash drive with RAID driver, 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, select the drive to install Windows and click **Next**.

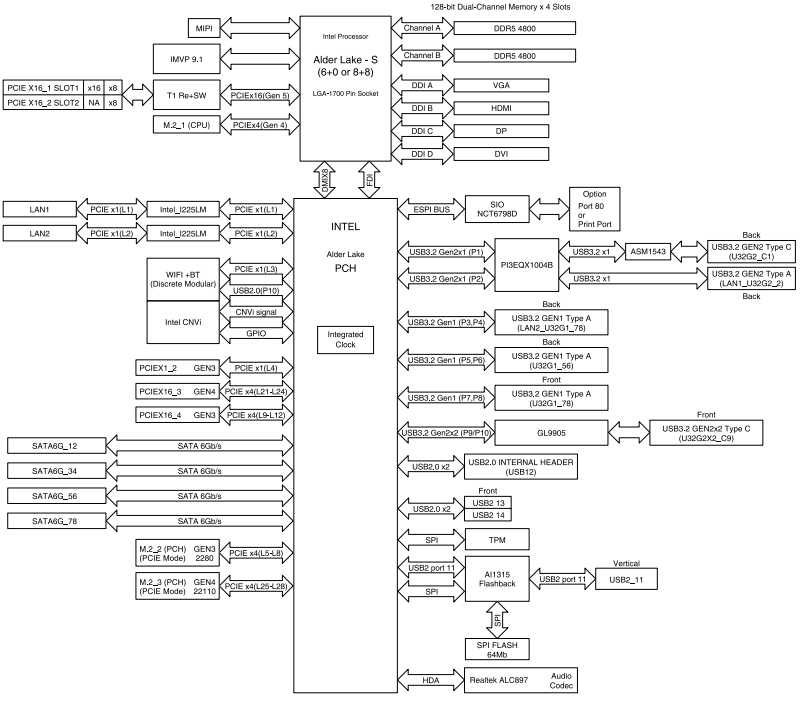
If you have ejected the Windows OS installation disc in a previous step, ensure to replace the motherboard Support DVD with the Windows OS installation disc.



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

Appendix A

W680/SYS block diagram



Q-Code table

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

(continued on the next page)

Code	Description
F4	Recovery firmware image is loaded
F5 – F7	Reserved for future AMI progress codes
F8	Recovery PPI is not available
F9	Recovery capsule is not found
FB – FF	Reserved for future AMI error codes
60	DXE Core is started
61	NVRAM initialization
62	Installation of the PCH Runtime Services
63 – 67	CPU DXE initialization is started
68	PCI host bridge initialization
69	System Agent DXE initialization is started
6A	System Agent DXE SMM initialization is started
6B – 6F	System Agent DXE initialization (System Agent module specific)
70	PCH DXE initialization is started
71	PCH DXE SMM initialization is started
72	PCH devices initialization
73 – 77	PCH DXE Initialization (PCH module specific)
78	ACPI module initialization
79	CSM initialization
7A – 7F	Reserved for future AMI DXE codes
90	Boot Device Selection (BDS) phase is started
91	Driver connecting is started
92	PCI Bus initialization is started
93	PCI Bus Hot Plug Controller Initialization
94	PCI Bus Enumeration
95	PCI Bus Request Resources
96	PCI Bus Assign Resources
97	Console Output devices connect
98	Console input devices connect
99	Super IO Initialization
9A	USB initialization is started
9B	USB Reset
9C	USB Detect
9D	USB Enable
9E – 9F	Reserved for future AMI codes
A0	IDE initialization is started
A1	IDE Reset
A2	IDE Detect
A3	IDE Enable
A4	SCSI initialization is started

(continued on the next page)

Code	Description
A5	SCSI Reset
A6	SCSI Detect
A7	SCSI Enable
A8	Setup Verifying Password
A9	Start of Setup
AA	Reserved for ASL (see ASL Status Codes section below)
AB	Setup Input Wait
AC	Reserved for ASL (see ASL Status Codes section below)
AD	Ready To Boot event
AE	Legacy Boot event
AF	Exit Boot Services event
B0	Runtime Set Virtual Address MAP Begin
B1	Runtime Set Virtual Address MAP End
B2	Legacy Option ROM Initialization
B3	System Reset
B4	USB hot plug
B5	PCI bus hot plug
B6	Clean-up of NVRAM
B7	Configuration Reset (reset of NVRAM settings)
B8– BF	Reserved for future AMI codes
D0	CPU initialization error
D1	System Agent initialization error
D2	PCH initialization error
D3	Some of the Architectural Protocols are not available
D4	PCI resource allocation error. Out of Resources
D5	No Space for Legacy Option ROM
D6	No Console Output Devices are found
D7	No Console Input Devices are found
D8	Invalid password
D9	Error loading Boot Option (LoadImage returned error)
DA	Boot Option is failed (StartImage returned error)
DB	Flash update is failed
DC	Reset protocol is not available

ACPI/ASL Checkpoints (under OS)

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

Notices

FCC Compliance Information

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

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.

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

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

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: PD9AX210NG" and "Contains IC: 1000M-AX210NG".

This radio transmitter FCCID: PD9AX210NG has been approved by FCC to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna List:

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Inpaq	DAM-I3-H1-M2-800-10-66	Dipole antenna	2.73dBi for 2.4GHz 1.79dBi for 5GHz

NOTE: The antenna connector is Reverse SMA type.

RF exposure warning

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

HDMI Trademark Notice

The terms HDMI, HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing Administrator, Inc.

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.

Operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

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.

La bande 5150 – 5250 MHz est réservée uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

CAN ICES-003(B)/NMB-003(B)

UNII

Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

Devraient également être informés les utilisateurs que les radars à haute puissance sont désignés comme utilisateurs principaux (c.-à-utilisateurs prioritaires) des bandes 5250-5350 MHz et 5650-5850 MHz et que ces radars pourraient provoquer des interférences et / ou endommager les appareils LE-LAN.

Radio Frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Innovation, Science and Economic Development Canada (ISED) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has also been evaluated and shown compliant with the ISED RF Exposure limits under mobile exposure conditions. (antennas are greater than 20cm from a person's body).

Informations concernant l'exposition aux frйquences radio (RF)

La puissance de sortie rayonnée du dispositif sans fil est inférieure aux limites d'exposition aux radiofréquences d'Innovation, Sciences et Développement économique Canada (ISED). Le dispositif sans fil doit être utilisé de manière à minimiser le potentiel de contact humain pendant le fonctionnement normal.

Cet appareil a également été évalué et montré conforme aux limites d'exposition RF ISED dans des conditions d'exposition mobiles. (Les antennes sont à plus de 20 cm du corps d'une personne).

Radio transmitter

This radio transmitter IC: 1000M-AX210NG has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Cet émetteur radio IC: 1000M-AX210NG a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antennes énumérés ci-dessous avec le gain maximal admissible et impédance d'antenne requise pour chaque type d'antenne indiqué. Types d'antennes n'est pas inclus dans cette liste, ayant un gain supérieur au gain maximal indiqué pour ce type, sont strictement interdits pour une utilisation avec cet appareil.

Antenna List:

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Inpaq	DAM-I3-H1-M2-800-10-66	Dipole antenna	2.73dBi for 2.4GHz 1.79dBi for 5GHz

NOTE: The antenna connector is Reverse SMA type.

VCCI: Japan Compliance Statement

Class B ITE

この装置は、クラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

ＶＣＣＩ－Ｂ

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.

Japan JATE

本製品は電気通信事業者（移動通信会社、固定通信会社、インターネットプロバイダ等）の通信回線（公衆無線LANを含む）に直接接続することができません。本製品をインターネットに接続する場合は、必ずルータ等を経由し接続してください。

Safety Precautions

Accessories that came with this product have been designed and verified for the use in connection with this product. Never use accessories for other products to prevent the risk of electric shock or fire.

安全上のご注意

付属品は当該専用品です。他の機器には使用しないでください。機器の破損もしくは、火災や感電の原因となることがあります。

KC: Korea Warning Statement

B급 기기 (가정용 방송통신기자재)
이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

*당해 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다.

NCC: Taiwan Wireless Statement

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應 立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

應避免影響附近雷達系統之操作。

Japan RF Equipment Statement

屋外での使用について

本製品は、5GHz帯域での通信に対応しています。電波法の定めにより5.2GHz、5.3GHz帯域の電波は屋外で使用が禁じられています。

法律および規制遵守

本製品は電波法及びこれに基づく命令の定めるところに従い使用してください。日本国外では、その国の法律または規制により、本製品の使用ができないことがあります。このような国では、本製品を運用した結果、罰せられることがありますが、当社は一切責任を負いかねますのでご了承ください。

Google™ License Terms

Précautions d’emploi de l’appareil :

a. Soyez particulièrement vigilant quant à votre sécurité lors de l’utilisation de cet appareil dans certains lieux (les avions, les aéroports, les hôpitaux, les stations-service et les garages professionnels).

b. Évitez d’utiliser cet appareil à proximité de dispositifs médicaux implantés. Si vous portez un implant électronique (stimulateurs cardiaques, pompes à insuline, neurostimulateurs…), veuillez impérativement respecter une distance minimale de 15 centimètres entre cet appareil et l’implant pour réduire les risques d’interférence.

c. Utilisez cet appareil dans de bonnes conditions de réception pour minimiser le niveau de rayonnement. Ce n’est pas toujours le cas dans certaines zones ou situations, notamment dans les parkings souterrains, dans les ascenseurs, en train ou en voiture ou tout simplement dans un secteur mal couvert par le réseau.

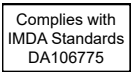
d. Tenez cet appareil à distance du ventre des femmes enceintes et du bas-ventre des adolescents.

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/.

Regional notice for Singapore



This ASUS product complies with IMDA Standards.

Declaration of compliance for product environmental regulation

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

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

EU REACH and Article 33

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

EU RoHS

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

Japan JIS-C-0950 Material Declarations

Information on Japan RoHS (JIS-C-0950) chemical disclosures is available on http://csr.asus.com/english/article.aspx?id=19

India RoHS

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

Vietnam RoHS

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

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

Turkey RoHS

AEEE Yönetmeliğine Uygundur

ASUS Recycling/Takeback Services

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

Ecodesign Directive

European Union announced a framework for the setting of ecodesign requirements for energy-related products (2009/125/EC). Specific Implementing Measures are aimed at improving environmental performance of specific products or across multiple product types. ASUS provides product information on the CSR website. The further information could be found at https://csr.asus.com/english/article.aspx?id=1555.

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.

ENERGY STAR Qualified Product

ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy helping us all save money and protect the environment through energy efficient products and practices.

All ASUS products with the ENERGY STAR logo comply with the ENERGY STAR standard, and the power management feature is enabled by default. The monitor is automatically set to sleep within 10 minutes of user inactivity; the computer is automatically set to sleep within 30 minutes of user inactivity. To wake your computer, click the mouse, press any key on the keyboard, or press the power button.

Please visit http://www.energystar.gov/powermanagement for detail information on power management and its benefits to the environment. In addition, please visit http://www.energystar.gov for detail information on the ENERGY STAR joint program.

Energy Star is NOT supported on FreeDOS and Linux-based operating systems.

Simplified UKCA Declaration of Conformity

ASUSTek Computer Inc. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of The Radio Equipment Regulations 2017 (S.I. 2017/1206). Full text of UKCA declaration of conformity is available at https://www.asus.com/support/.

The WiFi operating in the band 5150-5350MHz shall be restricted to indoor use for the country listed below:

UK

UKCA RF Output table (The Radio Equipment Regulations 2017)

Intel® Wi-Fi 6E AX210 (Model: AX210NGW):

Function	Frequency	Maximum Output Power (EIRP)
WiFi	2412 - 2472 MHz	20 dBm
	5150 - 5350 MHz	20 dBm
	5470 - 5725 MHz	19 dBm
	5725 - 5850 MHz	11 dBm
Bluetooth	2402 - 2480 MHz	13 dBm

* Receiver category 1

UKCA RF Output table (The Radio Equipment Regulations 2017)

Intel® Wi-Fi 6E AX211 (Model: AX212NGW):

Function	Frequency	Maximum Output Power (EIRP)
WiFi	2412 - 2472 MHz	20 dBm
	5150 - 5350 MHz	20 dBm
	5470 - 5725 MHz	19 dBm
	5725 - 5850 MHz	11 dBm
Bluetooth	2402 - 2480 MHz	13 dBm

* Receiver category 1

Simplified EU Declaration of Conformity

ASUSTek Computer Inc. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. Full text of EU declaration of conformity is available at https://www.asus.com/support/

The WiFi operating in the band 5150-5350MHz shall be restricted to indoor use for countries listed in the table below:

Déclaration simplifiée de conformité de l'UE

ASUSTek Computer Inc. déclare par la présente que cet appareil est conforme aux critères essentiels et autres clauses pertinentes de la directive 2014/53/EU. La déclaration de conformité de l'UE peut être téléchargée à partir du site internet suivant : https://www.asus.com/support/

Dans la plage de fréquence 5150-5350 MHz, le Wi-Fi est restreint à une utilisation en intérieur dans les pays listés dans le tableau ci-dessous:

Vereinfachte EU-Konformitätserklärung

ASUSTek COMPUTER INC erklärt hiermit, dass dieses Gerät mit den grundlegenden Anforderungen und anderen relevanten Bestimmungen der Richtlinie 2014/53/EU übereinstimmt. Der gesamte Text der EU-Konformitätserklärung ist verfügbar unter: https://www.asus.com/support/

Der WLAN-Betrieb im Band von 5150-5350 MHz ist für die in der unteren Tabelle aufgeführten Länder auf den Innenbereich beschränkt:

Dichiarazione di conformità UE semplificata

ASUSTek Computer Inc. con la presente dichiara che questo dispositivo è conforme ai requisiti essenziali e alle altre disposizioni pertinenti con la direttiva 2014/53/EU. Il testo completo della dichiarazione di conformità UE è disponibile all'indirizzo: https://www.asus.com/support/

L'utilizzo della rete Wi-Fi con frequenza compresa nell'intervallo 5150-5350MHz deve essere limitato all'interno degli edifici per i paesi presenti nella seguente tabella:

Упрощенное заявление о соответствии европейской директиве

ASUSTek Computer Inc. заявляет, что устройство соответствует основным требованиям и другим соответствующим условиям директивы 2014/53/EU. Полный текст декларации соответствия ЕС доступен на https://www.asus.com/support/

Работа WiFi в диапазоне частот 5150-5350 должна быть ограничена использованием в помещениях для стран, перечисленных в таблице ниже:

إعلان التوافق المبسط الصادر عن الاتحاد الأوروبي

تقر شركة ASUSTek Computer أن هذا الجهاز يتوافق مع المتطلبات الأساسية والأحكام الأخرى ذات الصلة الخاصة بتوجيه 2014/53/EU. يتوفر النص الكامل لإعلان التوافق الصادر عن الاتحاد الأوروبي على:
https://www.asus.com/support/

يجب حصر استخدام WiFi العاملة بـ 5150-5350 ميجا هرتز على الاستخدام المنزلي للبلدان المدرجة بالجدول.

Опростена декларация за съответствие на ЕС

С настоящото ASUSTek Computer Inc. декларира, че това устройство е в съответствие със съществените изисквания и другите приложими постановления на свързаната Директива 2014/53/ЕС. Пълният текст на ЕС декларация за съвместимост е достъпен на адрес https://www.asus.com/support/

WiFi, работеща в диапазон 5150-5350MHz, трябва да се ограничи до употреба на закрито за страните, посочени в таблицата по-долу:

Declaração de Conformidade UE Simplificada

ASUSTek Computer Inc. declara que este dispositivo está em conformidade com os requisitos essenciais e outras disposições relevantes relacionadas às diretivas 2014/53/UE. O texto completo da declaração de conformidade CE está disponível em https://www.asus.com/support/

O WiFi operando na banda 5150-5350MHz deve ser restrito para uso interno para os países listados na tabela abaixo:

Pojednostavljena EU Izjava o sukladnosti

ASUSTeK Computer Inc. ovim izjavljuje da je ovaj uređaj sukladan s bitnim zahtjevima i ostalim odgovarajućim odredbama direktive 2014/53/EU. Cijeli tekst EU izjave o sukladnosti dostupan je na https://www.asus.com/support/

WiFi koji radi na opsegu frekvencija 5150-5350 MHz bit će ograničen na upotrebu u zatvorenom prostoru u zemljama na donjem popisu:

Zjednodušené prohlášení o shodě EU

Společnost ASUSTek Computer Inc. tímto prohlašuje, že toto zařízení splňuje základní požadavky a další příslušná ustanovení směrnice 2014/53/ EU. Plné znění prohlášení o shodě EU je k dispozici na adrese https://www.asus.com/support/

V zemích uvedených v tabulce je provoz sítě Wi-Fi ve frekvenčním rozsahu 5 150 - 5 350 MHz povolen pouze ve vnitřních prostorech:

Forenklet EU-overensstemmelseserklæring

ASUSTeK Computer Inc. erklærer hermed at denne enhed er i overensstemmelse med hovedkravene og øvrige relevante bestemmelser i direktivet 2014/53/EU. Hele EU-overensstemmelseserklæringen kan findes på https://www.asus.com/support/

Wi-Fi, der bruger 5150-5350 MHz skal begrænses til indendørs brug i lande, der er anført i tabellen:

Vereenvoudigd EU-conformiteitsverklaring

ASUSTeK Computer Inc. verklaart hierbij dat dit apparaat voldoet aan de essentiële vereisten en andere relevante bepalingen van Richtlijn 2014/53/EU. De volledige tekst van de EU-conformiteitsverklaring is beschikbaar op https://www.asus.com/support/

De WiFi op 5150-5350MHz zal beperkt zijn tot binnengebruik voor in de tabel vermelde landen:

Lihtsustatud EÜ vastavusdeklaratsioon

Käesolevaga kinnitab ASUSTek Computer Inc, et seade vastab direktiivi 2014/53/EÜ olulistele nõuetele ja teistele asjakohastele sätetele. EL vastavusdeklaratsiooni täistekst on saadaval veebisaidil https://www.asus.com/support/

Sagedusvahemikus 5150-5350 MHz töötava WiFi kasutamine on järgmistes riikides lubatud ainult siseruumides:

Eurooppa - EY:n vaatimustenmukaisuusvakuutus

ASUSTek Computer Inc. ilmoittaa täten, että tämä laite on direktiivin 2014/53/EU olennaisten vaatimusten ja muiden asiaankuuluvien lisäysten mukainen. Koko EY:n vaatimustenmukaisuusvakuutuksen teksti on luettavissa osoitteessa https://www.asus.com/support/

5 150 - 5 350 MHzin taajuudella toimiva WiFi on rajoitettu sisäkäyttöön taulukossa luetelluissa maissa:

تبعیت از نسخه ساده شده بیانیه اتحادیه اروپا

ASUSTek Computer Inc در اینجا اعلام می کند که این دستگاه با نیازهای اساسی و سایر مقررات مربوط به بیانیه 2014/53/EU. مطابقت دارد. متن کامل پیروی از این بیانیه اتحادیه اروپا در این آدرس موجود است:
https://www.asus.com/support/.

عملکرد 5150-5350 مگاهرتز برای WiFi باید برای استفاده در فضای داخل ساختمان برای کشورهای فهرست شده در جدول، محدود شود.

Απλοποιημένη Δήλωση Συμμόρφωσης ΕΕ

Διά του παρόντος η ASUSTek Computer Inc. δηλώνει ότι αυτή η συσκευή είναι σύμμορφη με τις βασικές προϋποθέσεις και άλλες σχετικές διατάξεις της Οδηγίας 2014/53/ΕΕ. Το πλήρες κείμενο της δήλωσης συμμόρφωσης της ΕΕ είναι διαθέσιμο στη διεύθυνση https://www.asus.com/support/

Το WiFi που λειτουργεί στη ζώνη 5150-5350MHz περιορίζεται για χρήση σε εσωτερικούς χώρους για τις χώρες που αναφέρονται στον παρακάτω πίνακα:

הצהרת תאימות רגולטורית מקוצרת עבור האיחוד אירופי

ASUSTek Computer Inc. מצהירה בזאת כי מכשיר זה תואם לדרישות החיוניות ולשאר הסעיפים הרלוונטיים של הקבה 2014/53/EU. ניתן לקרוא את הנוסח המלא של הצהרת התאימות הרגולטורית עבור האיחוד האירופי בכתובת:
https://www.asus.com/support/

יש להגביל רשתות Wi-Fi הפועלות ברצועת התדרים 5150-5350MHz לשימוש בתוך מבנים סגורים בארצות המפורטות ברשימה הבאה:

Egyszerűsített EU megfelelőségi nyilatkozat

Az ASUSTek Computer Inc. ezennel kijelenti, hogy ez az eszköz megfelel az 2014/53/EU sz. irányelv alapvető követelményeinek és egyéb vonatkozó rendelkezéseinek. Az EU megfelelőségi nyilatkozat teljes szövegét a következő weboldalon tekintheti meg: https://www.asus.com/support/

Az 5150-5350 MHz-es sávban működő Wi-Fi-t beltéri használatra kell korlátozni az alábbi táblázatban felsorolt országokban:

Pernyataan Kesesuaian UE yang Disederhanakan

ASUSTeK Computer Inc. dengan ini menyatakan bahwa perangkat ini memenuhi persyaratan utama dan ketentuan relevan lainnya yang terdapat pada Petunjuk 2014/53/EU. Teks lengkap pernyataan kesesuaian EU tersedia di: https://www.asus.com/support/

WiFi yang Beroperasi pada 5150-5350 MHz akan terbatas untuk penggunaan dalam ruangan di negara yang tercantum dalam tabel

Vienkāršota ES atbilstības paziņojums

ASUSTeK Computer Inc. ar šo paziņo, ka šī ierīce atbilst Direktīvas 2014/53/ES būtiskajām prasībām un citiem citiem saistošajiem nosacījumiem. Pilns ES atbilstības paziņojuma teksts pieejams šeit:
https://www.asus.com/support/

Wi-Fi darbība 5150–5350 MHz ir jāierobežo lietošanai telpās valstīs, kuras norāditas tālāk.

Supaprastinta ES atitikties deklaracija

Šiame dokumente bendrovė „ASUSTek Computer Inc." pareiškia, kad šis prietaisas atitinka pagrindinius reikalavimus ir kitas susijusias Direktyvos 2014/53/ES nuostatas. Visas ES atitikties deklaracijos tekstas pateikiamas čia: https://www.asus.com/support/

Toliau nurodytose šalyse „WiFi" ryšiu, veikiančiu 5 150–5 350 MHz dažnio juostoje, galima naudotis tik patalpose:

Forenklet EU-samsvarserklæring

ASUSTek Computer Inc. erklærer herved at denne enheten er i samsvar med hovedsaklige krav og andre relevante forskrifter i direktivet 2014/53/EU. Fullstendig tekst for EU-samsvarserklæringen finnes på: https://www.asus.com/support/

Wi-Fi-området 5150–5350 MHz skal begrenses til innendørs bruk for landene som er oppført i tabellen:

Uproszczona deklaracja zgodności UE

Firma ASUSTek Computer Inc. niniejszym oświadcza, że urządzenie to jest zgodne z zasadniczymi wymogami i innymi właściwymi postanowieniami dyrektywy 2014/53/EU. Pełny tekst deklaracji zgodności UE jest dostępny pod adresem https://www.asus.com/support/

W krajach wymienionych w tabeli działanie sieci Wi-Fi w paśmie 5150–5350 MHz powinno być ograniczone wyłącznie do pomieszczeń:

Declaração de Conformidade Simplificada da UE

A ASUSTek Computer Inc. declara que este dispositivo está em conformidade com os requisitos essenciais e outras disposições relevantes da Diretiva 2014/53/UE. O texto integral da declaração de conformidade da UE está disponível em https://www.asus.com/support/

A utilização das frequências WiFi de 5150 a 5350MHz está restrita a ambientes interiores nos países apresentados na tabela:

Declarație de conformitate UE, versiune simplificată

Prin prezenta, ASUSTek Computer Inc. declară că acest dispozitiv este în conformitate cu reglementările esențiale și cu celelalte prevederi relevante ale Directivei 2014/53/UE. Textul complet al declarației de conformitate UE este disponibil la adresa https://www.asus.com/support/

Pentru țările listate în tabelul de mai jos, rețelele WiFi care funcționează în banda de frecvență de 5.150-5.350 MHz trebuie utilizate doar în interior:

Pojednostavljena Deklaracija o usaglašenosti EU

ASUSTek Computer Inc. ovim izjavljuje da je ovaj uređaj usaglašen sa osnovnim zahtevima i drugim relevantnim odredbama Direktive 2014/53/EU. Ceo tekst Deklaracije o usaglašenosti EU dostupan je na lokaciji https://www.asus.com/support/

WiFi koji radi u frekventnom opsegu od 5150 MHz do 5350 MHz ograničen je isključivo na upotrebu u zatvorenom prostoru za zemlje navedene u tabeli ispod:

Zjednodušené vyhlásenie o zhode platné pre EÚ

Spoločnosť ASUSTek Computer Inc. týmto vyhlasuje, že toto zariadenie je v súlade so základnými požiadavkami a ďalšími príslušnými ustanoveniami smernice č. 2014/53/EÚ. Plné znenie vyhlásenia o zhode pre EÚ je k dispozícii na lokalite https://www.asus.com/support/

Činnosť WiFi v pásme 5150 - 5350 MHz bude obmedzená na použitie vo vnútornom prostredí pre krajiny uvedené v tabuľke nižšie:

Poenostavljena izjava EU o skladnosti

ASUSTek Computer Inc. tukaj izjavlja, da je ta naprava skladna s temeljnimi zahtevami in drugimi relevantnimii določili Direktive 2014/53/EU. Polno besedilo izjave EU o skladnosti je na voljo na https://www.asus.com/support/

WiFi, ki deluje v pasovnem območju 5150–5350 MHz, mora biti v državah, navedenih v spodnjem seznamu, omejen na notranjo uporabo:

Declaración de conformidad simplificada para la UE

Por la presente, ASUSTek Computer Inc. declara que este dispositivo cumple los requisitos básicos y otras disposiciones pertinentes de la directiva 2014/53/EU. En https://www.asus.com/support/ está disponible el texto completo de la declaración de conformidad para la UE.

La conexión WiFi con una frecuencia de funcionamiento de 5150-5350 MHz se restringirá al uso en interiores para los países enumerados en la tabla:

Förenklad EU-försäkran om överensstämmelse

ASUSTek Computer Inc. deklarerar härmed att denna enhet överensstämmer med de grundläggande kraven och andra relevanta bestämmelser i direktiv 2014/53/EU. Fullständig text av EU-försäkran om överensstämmelse finns på https://www.asus.com/support/

WiFi som använder 5150-5350 MHz kommer att begränsas för användning inomhus i de länder som anges i tabellen:

ประกาศเกี่ยวกับความสอดคล้องของสหภาพยุโรปแบบย่อ

ASUSTek Computer Inc. ขอประกาศในที่นี้ว่าอุปกรณ์นี้มีความสอดคล้องกับความ
ต้องการที่จำเป็นและเงื่อนไขที่เกี่ยวข้องอื่น ๆ ของบทบัญญัติข้อกำหนด 2014/53/EU เนื้อหาที่สมบูรณ์ของประกาศความสอดคล้องกับ EU มีอยู่ที่ https://www.asus.com/support/

การทำงานของ WiFi ที่ 5150-5350MHz ถูกจำกัดให้ใช้ในอาคารสำหรับประเทศที่แสดงในตาราง

Basitleştirilmiş AB Uyumluluk Bildirimi

ASUSTek Computer Inc., bu aygıtın 2014/53/EU Yönergesinin temel gereksinimlerine ve diğer ilgili hükümlerine uygun olduğunu bildirir. AB uygunluk bildiriminin tam metni şu adreste bulunabilir: https://www.asus.com/support/

5150-5350 MHz arasındaki WiFi çalışması, tabloda listelenen ülkeler için iç mekân kullanımıyla kısıtlanacaktır.

Спрощена декларація про відповідність нормам ЄС

ASUSTek Computer Inc. заявляє, що цей пристрій відповідає основним вимогам та іншим відповідним вимогам Директиви 2014 / 53 / ЕU. Повний текст декларації відповідності нормам ЄС доступний на https://www.asus.com/support/

Робота Wi-Fi на частоті 5150-5350 МГц обмежується використанням у приміщенні для країн, поданих у таблиці нижче:

CE

AT	BE	BG	CZ	DK	EE	FR
DE	IS	IE	IT	EL	ES	CY
LV	LI	LT	LU	HU	MT	NL
NO	PL	PT	RO	SI	SK	TR
FI	SE	CH	HR	UK(NI)		

CE RED RF Output table (Directive 2014/53/EU)

Intel® Wi-Fi 6E AX210 (Model: AX210NGW):

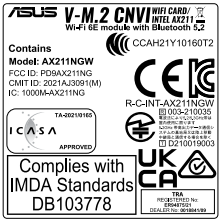
Function	Frequency	Maximum Output Power (EIRP)
WiFi	2412 - 2472 MHz	20 dBm
	5150 - 5350 MHz	20 dBm
	5470 - 5725 MHz	19 dBm
	5725 - 5850 MHz	11 dBm
Bluetooth	2402 - 2480 MHz	13 dBm

* Receiver category 1

CE RED RF Output table (Directive 2014/53/EU)
Intel® Wi-Fi 6E AX211 (Model: AX212NGW):

Function	Frequency	Maximum Output Power (EIRP)
WiFi	2412 - 2472 MHz	20 dBm
	5150 - 5350 MHz	20 dBm
	5470 - 5725 MHz	19 dBm
	5725 - 5850 MHz	11 dBm
Bluetooth	2402 - 2480 MHz	13 dBm

* Receiver category 1



Warranty

EN: ASUS Guarantee Information

- ASUS offers a voluntary manufacturer's Commercial Guarantee.
- ASUS reserves the right to interpret the provisions of the ASUS Commercial Guarantee.
- This ASUS Commercial Guarantee is provided independently and in addition to the statutory Legal Guarantee and in no way affects or limits the rights under the Legal Guarantee.

For all the guarantee information, please visit https://www.asus.com/support.

F: Garantie ASUS

- ASUS fournit une garantie commerciale en tant que garantie volontaire du fabricant.
- ASUS se réserve le droit d'interpréter et de clarifier les informations relatives à la garantie commerciale ASUS.
- Cette garantie commerciale ASUS est fournie indépendamment et parallèlement à la garantie légale, elle n'affecte ou ne limite d'aucune façon les droits acquis par la garantie légale.

Pour plus d'informations sur la garantie, consultez le site https://www.asus.com/fr/support/.

G: ASUS Garantieinformationen

- ASUS bietet eine freiwillige Warengarantie des Herstellers an.
- ASUS behält sich das Recht zur Auslegung der Bestimmungen in der ASUS Warengarantie vor.
- Diese ASUS Warengarantie wird unabhängig und zusätzlich zur rechtmäßigen gesetzlichen Garantie gewährt und beeinträchtigt oder beschränkt in keiner Weise die Rechte aus der gesetzlichen Garantie.

Die vollständigen Garantieinformationen finden Sie unter https://www.asus.com/de/support/.

I: Informativa sulla Garanzia ASUS

- ASUS offre una Garanzia Commerciale volontaria del produttore.
- ASUS si riserva il diritto di interpretare le disposizioni della Garanzia Commerciale ASUS.
- La presente Garanzia Commerciale ASUS viene fornita in modo indipendente e in aggiunta alla Garanzia Legale prevista per legge e non pregiudica o limita in alcun modo i diritti previsti dalla Garanzia Legale.

Per tutte le informazioni sulla garanzia, visitare https://www.asus.com/it/support.

R: Информация о гарантии ASUS

- ASUS предлагает добровольную гарантию от производителя.
- ASUS оставляет за собой право интерпретирование положений гарантии ASUS.
- Настоящая гарантия ASUS никоим образом не ограничивает Ваши права, предусмотренные локальным законодательством.

Для получения полной информации о гарантии посетите https://www.asus.com/ru/support/.

DA: ASUS garantioplysninger

- ASUS tilbyder en valgfri handelsmæssig garanti.
- ASUS forbeholder sig retten til at fortolke bestemmelserne i ASUS' handelsmæssige garanti.
- Denne handelsmæssige garanti fra ASUS tilbydes uafhængigt, som en tilføjelse til den lovbestemte juridiske garanti og den påvirker eller begrænser på ingen måde rettighederne i den juridiske garanti.

Alle garantioplysningerne kan findes på https://www.asus.com/dk/support/.

BG: Информация за гаранцията от ASUS

- ASUS предлага доброволна търговска гаранция от производителя.
- ASUS си запазва правото да тълкува условията на търговската гаранция на ASUS.
- Тази търговска гаранция на ASUS се предлага независимо от и в допълнение на законовата гаранция. Тя по никакъв начин не оказва влияние върху правата на потребителя в законовата гаранция и по никакъв начин не ги ограничава.

За цялостна информация относно гаранцията, моля, посетете https://www.asus.com/support.

CZ: Informace o záruce společnosti ASUS

- Společnost ASUS nabízí dobrovolnou komerční záruku výrobce.
- Společnost ASUS si vyhrazuje právo vykládat ustanovení komerční záruky společnosti ASUS.
- Tato komerční záruka společnosti ASUS je poskytována nezávisle a jako doplněk zákonné záruky a žádným způsobem neovlivňuje ani neomezuje práva vyplývající ze zákonné záruky.

Všechny informace o záruce najdete na adrese https://www.asus.com/cz/support/.

CR: Informacije o ASUS jamstvu

- ASUS dragovoljno nudi komercijalno proizvođačko jamstvo.
- ASUS zadržava prava na tumačenje odredbi ASUS komercijalnog jamstva.
- Ovo ASUS komercijalno jamstvo daje se neovisno i kao dodatak zakonskom jamstvu i ni na koji način ne ograničuje prava iz okvira zakonskog jamstva.

Sve informacije o jamstvu potražite na https://www.asus.com/support.

DU: ASUS-garantie-informatie

- SUS biedt een vrijwillige commerciële garantie van de fabrikant.
- ASUS behoudt zich het recht voor om de bepalingen van de commerciële garantie van ASUS uit te leggen.
- Deze commerciële garantie van ASUS wordt onafhankelijk en als aanvulling op de statutaire Wettelijke garantie geboden en beïnvloedt of beperkt in geen geval de rechten onder de wettelijke garantie.

Voor alle informatie over de garantie, gaat u naar https://www.asus.com/nl/support/.

EE: Teave ASUS-e garantii kohta

- ASUS pakub vabatahtlikku tasulist tootjagarantiid.
- ASUS jätab endale õiguse tõlgendada ASUS-e tasulise garantii tingimusi.
- See ASUS-e tasuline garantii on sõltumatu lisagarantii seadusega kehtestatud garantiile ega mõjuta mingil määral seadusega kehtestatud garantiid ning seadusega kehtestatud garantii piiranguid.

Vaadake garantiiga seotud teavet veebisaidilt https://www.asus.com/ee/.

GK: Πληροφορίες εγγύησης ASUS

- Η ASUS προσφέρει μια εθελοντική Εμπορική εγγύηση κατασκευαστή.
- Η ASUS διατηρεί το δικαίωμα ερμηνείας των διατάξεων της Εμπορικής εγγύησης ASUS.
- Αυτή η Εμπορική εγγύηση ASUS παρέχεται ανεξάρτητα και επιπροσθέτως της θεσμικής Νομικής εγγύησης και σε καμία περίπτωση δεν επηρεάζει ή περιορίζει τα δικαιώματα βάσει της Νομικής εγγύησης.

Για όλες τις πληροφορίες εγγύησης, επισκεφθείτε τη διεύθυνση https://www.asus.com/gr-el/.

HUG: ASUS garanciális információk

- Az ASUS önkéntes gyártói kereskedelmi garanciát kínál.
- Az ASUS fenntartja magának a jogot, hogy értelmezze az ASUS kereskedelmi garanciára vonatkozó rendelkezéseket.
- Ezt a kereskedelmi garanciát az ASUS függetlenül és a törvényes garancia mellett nyújtja és semmilyen módon nem befolyásolja, vagy korlátozza a jogi garancia nyújtotta jogokat.

A garanciára vonatkozó teljes körű információkért látogasson el a https://www.asus.com/hu/support/ oldalra.

LV: ASUS garantijas informācija

- ASUS piedāvā brīvprātīgu ražotāja komerciālo garantiju.
- ASUS patur tiesības interpretēt ASUS komerciālās garantijas noteikumus.
- Šī ASUS komerciālā garantija tiek piedāvāta neatkarīgi un papildus likumā noteiktajai juridiskajai garantijai, un tā nekādi neietekmē vai neierobežo juridiskajā garantijā noteiktās tiesības.

Lai iegūtu informāciju par garantiju, apmeklējiet vietni https://www.asus.com/lv/.

LT: Informacija apie ASUS garantiją

- ASUS siūlo savanorišką komercinę gamintojo garantiją.
- ASUS pasilieka teisę savo nuožiūra aiškinti šios komercinės ASUS garantijos nuostatas.
- Ši komercinė ASUS garantija suteikiama nepriklausoma, be įstatyminės teisinės garantijos, ir jokiu būdu nepaveikia ar neapriboja teisinės garantijos suteikiamų teisių.

Norėdami gauti visą informaciją apie garantiją, apsilankykite https://www.asus.com/lt/.

PL: Informacje o gwarancji firmy ASUS

- Firma ASUS oferuje dobrowolną gwarancję handlową producenta.
- Firma ASUS zastrzega sobie prawo do interpretacji warunków gwarancji handlowej firmy ASUS.
- Niniejsza gwarancja handlowa firmy ASUS jest udzielana niezależnie, jako dodatek do wymaganej ustawowo gwarancji prawnej i w żaden sposób nie wpływa na prawa przysługujące na mocy gwarancji prawnej ani ich nie ogranicza.

Wszelkie informacje na temat gwarancji można znaleźć na stronie https://www.asus.com/pl/support.

PG: Informações de Garantia ASUS

- A ASUS oferece uma Garantia Comercial voluntária do fabricante.
- A ASUS reserva o direito de interpretar as disposições da Garantia Comercial da ASUS.
- Esta Garantia Comercial da ASUS é fornecida de forma independente além da Garantia Legal estatutária e não afeta nem limita de qualquer forma os direitos estabelecidos na Garantia Legal.

Para consultar todas as informações sobre a garantia, visite https://www.asus.com/pt/support/.

RO: Informații despre garanția ASUS

- ASUS oferă o garanție comercială voluntară a producătorului.
- ASUS își rezervă dreptul de a interpreta prevederile garanției comerciale ASUS.
- Această garanție comercială ASUS este oferită independent și în plus față de garanția obligatorie legal și nu afectează sau limitează în niciun fel drepturile acordate conform garanției legale.

Pentru toate informațiile legate de garanție, vizitați https://www.asus.com/ro/support.

SL: Informacije o garanciji ASUS

- ASUS ponuja prostovoljno tržno garancijo proizvajalca.
- ASUS si pridržuje pravico do razlage določb tržne garancije družbe ASUS.
- Ta tržna garancija družbe ASUS je na voljo neodvisno in kot dodatek zakonsko predpisani pravni garanciji ter na noben način ne vpliva na pravice, ki jih zagotavlja pravna garancija, oziroma jih omejuje.

Vse informacije o garanciji najdete na spletnem mestu https://www.asus.com/support.

SK: Informácie o záruke ASUS

- ASUS ponúka dobrovoľnú obchodnú záruku výrobcu.
- ASUS si vyhradzuje právo interpretovať ustanovenia obchodnej záruky ASUS.
- Táto obchodná záruka ASUS je poskytnutá nezávisle a navyše k zákonnej záruke a v žiadnom prípade neovplyvňuje ani neobmedzuje tieto práva podľa tejto zákonnej záruky.

Všetky ďalšie informácie o záruke nájdete na https://www.asus.com/sk/support.

ES: Información de garantía de ASUS

- ASUS ofrece una garantía comercial voluntaria del fabricante.
- ASUS se reserva el derecho de interpretar las disposiciones de esta garantía comercial de ASUS.
- Esta garantía comercial de ASUS se proporciona de forma independiente y adicional a la garantía estatutaria y de ninguna manera afecta a los derechos bajo la garantía legal ni los limita.

Para obtener toda la información sobre la garantía, visite https://www.asus.com/ES/support/.

TR: ASUS Garanti Bilgileri

- ASUS, gönüllü olarak üretici Ticari Garantisi sunar.
- ASUS, ASUS Ticari Garantisinin hükümlerini yorumlama hakkını saklı tutar.
- Bu ASUS Ticari Garantisi, bağımsız olarak ve hukuki Yasal Garanti'ye ek olarak sağlanır ve hiçbir şekilde Yasal Garanti kapsamındaki hakları etkilemez veya sınırlandırmaz.

Tüm garanti bilgileri için lütfen https://www.asus.com/tr/support adresini ziyaret edin.

FI: ASUS-takuutiedot

- ASUS tarjoaa vapaaehtoisen valmistajan kaupallisen takuun.
- ASUS pidättää oikeuden tulkita ASUS-kaupallisen takuun ehdot.
- Tämä ASUS-kaupallinen takuu tarjotaan itsenäisesti lakisääteisen oikeudellisen takuun lisäksi eikä se vaikuta millään tavoin laillisen takuun oikeuksiin tai rajoita niitä.

Saadaksesi kaikki takuutiedot, siirry osoitteeseen https://www.asus.com/fi/support.

NW: Informasjon om ASUS-garanti

- ASUS tilbyr som produsent en frivillig kommersiell garanti.
- ASUS forbeholder seg retten til å tolke bestemmelsene i ASUS sin kommersielle garanti.
- ASUS sin kommersielle garanti gis uavhengig og i tillegg til den lovbestemte juridiske garantien, og verken påvirker eller begrenser rettighetene under den juridiske garantien på noen måte.

Du finner fullstendig informasjon om garanti på https://www.asus.com/no/support/.

SB: Informacije o ASUS garanciji

- ASUS nudi dobrovoljnu proizvođačku komercijalnu garanciju.
- ASUS zadržava pravo da tumači odredbe svoje ASUS komercijalne garancije.
- Ova ASUS komercijalna garancija daje se nezavisno, kao dodatak zakonskoj pravnoj garanciji, i ni ka koji način ne utiče na i ne ograničava prava data pravnom garancijom.

Za sve informacije o garanciji, posetite https://www.asus.com/support/.

SW: ASUS garantiinformation

- ASUS erbjuder en frivillig kommersiell tillverkningsgaranti.
- ASUS förbehåller sig rätten att tolka bestämmelserna i ASUS kommersiella garanti.
- Denna kommersiella garanti från ASUS tillhandahålles separat och som tillägg till den lagstadgade garantin, och påverkar eller begränsar på intet sätts rättigheterna under den lagstadgade garantin.

För all garantiinformation, besök https://www.asus.com/se/support/.

UA: Інформація про Гарантію ASUS

- ASUS пропонує добровільну Комерційну Гарантію виробника.
- ASUS застерігає за собою право тлумачити положення Комерційної Гарантії ASUS
- Цю Комерційну Гарантію надано незалежно і на додаток до обов'язкової Законної Гарантії; вона жодним чином не впливає на права за Законною Гарантією і не обмежує їх.

Всю інформацію про гарантію подано тут: https://www.asus.com/ua/support.

MX: Garantía y Soporte

Esta Garantía aplica en el país de compra. Usted acepta que en esta garantía:

- Los procedimientos de servicio pueden variar en función del país.
- Algunos servicios y/o piezas de reemplazo pudieran no estar disponibles en todos los países.
- Algunos países pueden tener tarifas y restricciones que se apliquen en el momento de realizar el servicio, visite el sitio de soporte de ASUS en https://www.asus.com/mx/support/ para ver más detalles.
- Si tiene alguna queja o necesidad de un centro de reparación local o el periodo de garantía del producto ASUS, por favor visite el sitio de Soporte de ASUS en https://www.asus.com/mx/support/ para mayores detalles.

Información de contacto ASUS
Esta garantía está respaldada por:
ASUSTeK Computer Inc.
Centro de Atención ASUS +52 (55) 1946-3663

BP: Informações de garantia ASUS

Esta garantia aplica-se ao período definido pela garantia legal (90 dias) mais o período de garantia comercial oferecido pela ASUS. Por exemplo: 12M significa 12 meses de garantia no total (3 meses de garantia legal mais 9 meses de garantia contratual), 24 meses significa 24 meses de garantia no total (3 meses de garantia legal mais 21 meses de garantia contratual) e 36 meses significa 36 meses de garantia no total (3 meses de garantia legal e 33 de garantia contratual) a contar da data da garantia declarada (Data de Início da Garantia).

Para todas as informações de garantia, visite https://www.asus.com/br/support/.

ID: Informasi Garansi ASUS

Garansi ini berlaku di negara tempat pembelian.

Periode Garansi tertera pada kemasan/kotak dari Produk dan Masa Garansi dimulai sejak tanggal pembelian Produk ASUS dengan kondisi baru.

Silahkan pindai Kode QR di bagian bawah halaman terakhir untuk Kartu Garansi versi Web dalam format PDF untuk lebih informasi jelas mengenai jaminan garansi Produk ASUS.

- Informasi Dukungan ASUS, silakan kunjungi https://www.asus.com/id/support.
- Informasi Lokasi Layanan, silakan kunjungi https://www.asus.com/id/support/Service-Center/Indonesia.
- Layanan Call Center: 1500128

VI: Thông tin đảm bảo của ASUS

- ASUS cung cấp Bảo hành thương mại tự nguyện của nhà sản xuất.
- ASUS bảo lưu quyền giải thích các điều khoản của Bảo hành thương mại của ASUS.
- Bảo hành thương mại này của ASUS được cung cấp độc lập và ngoài Bảo đảm pháp lý theo luật định và không có cách nào ảnh hưởng đến hoặc giới hạn các quyền theo Bảo lãnh pháp lý. Để biết tất cả các thông tin bảo hành, vui lòng truy cập

https://www.asus.com/vn/support

Service and Support

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