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Industry Standard, Flexible Architecture

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Robust Design, Quality Parts

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Server/Workstation
Motherboard

Z890D4U
W880D4U

User Manual

English

Version 1.60
Published Apr. 2026

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If swallowed, a button battery can cause serious injury or death.
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Licensee's specific rights may vary from country to country.

CALIFORNIA, USA ONLY

The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.

"Perchlorate Material-special handling may apply, see www.dtsc.ca.gov/hazardouswaste/perchlorate"

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HIGH-DEFINITION MULTIMEDIA INTERFACE

The terms HDMI® and HDMI High-Definition Multimedia Interface, and the HDMI logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.

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 reason able 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.

ASRock Rack INC. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of related UKCA Directives. Full text of UKCA declaration of conformity is available at: http://www.asrockrack.com

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

Please refer to https://www.asrockrack.com/general/about.asp?cat=Responsibility for information disclosure based on regulation requirements ASRock Rack is complied with.

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.

Contents

Chapter 1 Introduction

Thank you for purchasing ASRock Rack ***Z890D4U / W880D4U*** motherboard, a reliable motherboard produced under ASRock Rack's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock Rack's commitment to quality and endurance.

Because the motherboard specifications and the BIOS software might be updated, the content of this manual will be subject to change without notice. In case any modifications of this manual occur, the updated version will be available on ASRock Rack website without further notice. Find the latest memory and CPU support lists on ASRock Rack website as well. ASRock Rack's Website: www.ASRockRack.com

Please visit the website for specific information and technical support: https://www.asrockrack.com/support/

1.1 Package Contents

- ASRock Rack Z890D4U / W880D4U motherboard (Micro-ATX form factor: 244 mm x 244 mm)
- Quick installation guide
- 1 SATA3 cable (60cm)
- 1 ATX 4P to 24P power cable (8 cm)
- 1 SATA PWR 6 pin cable
- 1 Mini SAS HD to 4* SATA cable (60 cm)
- 1 I/O shield
- 2 Screws for M.2 sockets

If any items are missing or appear damaged, contact the authorized dealer.

English

1.2 Specifications

Z890D4U/W880D4U	
MB Physical Status	
Form Factor	Micro-ATX
Dimension	9.6 in x 9.6 in (244 mm x 244 mm)
Processor System	
CPU	Supports Intel® Core™ Ultra desktop processors (Series 2)
Socket	Single Socket LGA 1851
Thermal Design Power	125W
Chipset	**Z890D4U:** Intel® Z890 **W880D4U:** Intel® W880
System Memory	
Supported DIMM Quantity	4 DIMM slots (2DPC)
Supported Type	**Z890D4U:** DDR5 288-pin non-ECC UDIMM, CUDIMM **W880D4U:** DDR5 288-pin ECC/non-ECC UDIMM, CUDIMM
Max. Capacity per DIMM	64 GB
Max. DIMM Frequency	UDIMM: 5600 MT/s (2SPC 0R2R) 4800 MT/s (2SPC 1R1R) 4400 MT/s (2SPC 2R2R) CUDIMM: 6400 MT/s (1SPC) 5600 MT/s (2SPC 0R2R) 4800 MT/s (2SPC 1R1R) 4400 MT/s (2SPC 2R2R)
Voltage	1.1V
Note: Memory support is to be validated.	
PCIe Expansion Slots	
PCIe x16	SLOT6: PCIe 5.0 x16 [CPU]* **MCIO1 shared lanes x8 with SLOT6. To enable MCIO1, BIOS settings are required.*
PCIe x4	SLOT4: PCIe 5.0 x4 [CPU]
Other PCIe Expansion Connectors	
M.2	1 M-key (PCIe 4.0 x4), supports 2280 form factor [CPU] 1 M-key (PCIe 4.0 x4), supports 2280 form factor [PCH]
MCIO	MCIO1 (PCIe 5.0 x8 or 2 PCIe 5.0 x4)* [CPU] MCIO2 (2 PCIe 4.0 x4) [PCH] **MCIO1 shared lanes x8 with SLOT6. To enable MCIO1, BIOS settings are required.*

SATA/SAS Storage	
PCH Built-in Storage	Intel® Z890 / W880 (8 SATA 6Gb/s; RAID 0/1/5/10): 4 SATA 7-pin, 1 Mini-SAS HD
Ethernet	
Additional GbE Controller	2 RJ45 (1 GbE) by Intel® i210
Server Management	
BMC Controller	ASPEED AST2600: IPMI 2.0 with iKVM and vMedia support
Dedicated IPMI LAN	1 RJ45 dedicated IPMI LAN port by Realtek RTL8211F
Graphics	
Controller	ASPEED AST2600: 1 DB15 (VGA) Intel® integrated processor graphics: 1 HDMI, 1 DisplayPort
Rear I/O	
UID Button/ LED	1 UID button, 1UID LED
Video Port	1 DB15 (VGA), 1 HDMI, 1 Display Port
Serial Port	1 DB9 (COM)
USB Port	2 Type A (USB 3.2 Gen1)
LAN Port	2 RJ45 (1 GbE), 1 dedicated IPMI
Internal Connectors/Headers	
Power Connector	1 Micro-fit (4-pin, ATX PSU signal) w/ ATX 24-pin adapter cable, 3 (8-pin, ATX 12V) support 12V DC-in
Other Power Connectors	1 (6-pin) for HDD power when using 12V DC-in power source
Auxiliary Panel Header	1 (9-pin): chassis intrusion, system fault LED, LAN activity LEDs, locate
System Panel	1 (9-pin): power switch, reset switch, system power LED, HDD activity LED
NMI Header	1
VGA Header	1 (15-pin)
Speaker Header	1 (4-pin)
Fan Header	7 (4-pin)
Thermal Sensor Header	1
TPM Header	1 (13-pin, SPI)
SGPIO Header	1
SMBus Header	1
PMBus Header	1
IPMB Header	1

USB Header	1 (19-pin, 2 USB 3.2 Gen1) 1 (9-pin, 2 USB 2.0)
Clear CMOS	1 (contact pads)
LED Indicators	
Standby Power LED	1 (5VSB)
80 Debug Port LED	1
Fan Fail LED	7
BMC Heartbeat LED	1
System BIOS	
Type	AMI 256Mb SPI Flash ROM
Features	Plug and Play (PnP), ACPI 6.4 (and above) compliance wake-up events, SMBIOS 3.6.0 and above, ASRock Rack Instant Flash
Hardware Monitor	
Temperature	CPU, PCH, MB, card side, TR, VR, M.2 temperature sensing
Fan	Fan tachometer CPU quiet fan (allow chassis fan speed auto-adjust by CPU temperature) Fan multi-speed control
Voltage	VCORE, GT, VCCSA, VNNAON, VCCIO, 1.8V_CPU, VDD2, 0.82V_PCH, 1.8VSB, 3V, 5V, 12V, BAT, 3VSB, 5VSB
Support OS	
OS	Microsoft® Windows® - Windows 10 (64 bit) - Windows 11 (64 bit)* ** The installation procedure for the ASPEED VGA driver on Windows 11 24H2/25H2 is as below:* *1. First install the Intel Onboard VGA Driver (HDMI). Even if a reboot prompt appears after installation, do not restart immediately. Proceed to install the ASPEED VGA Driver.* *2. After installing the ASPEED VGA Driver, then restart the system.* *3. END.* Linux® - RedHat Enterprise Linux Server 10.0 (64 bit) - SUSE SLES 15.6 (64 bit) - UBuntu 24.04.2 (64 bit)

NOTE: 1. Supports UEFI BOOT only.
2. Please refer to the website for the latest OS support list.

Environment	
Temperature	Operating temperature: 10°C ~ 35°C Non-operating temperature: -40°C ~ 70°C
Humidity	Non-operating humidity: 20% ~ 90% (non-condensing)

NOTE: Please refer to the website for the latest specifications.

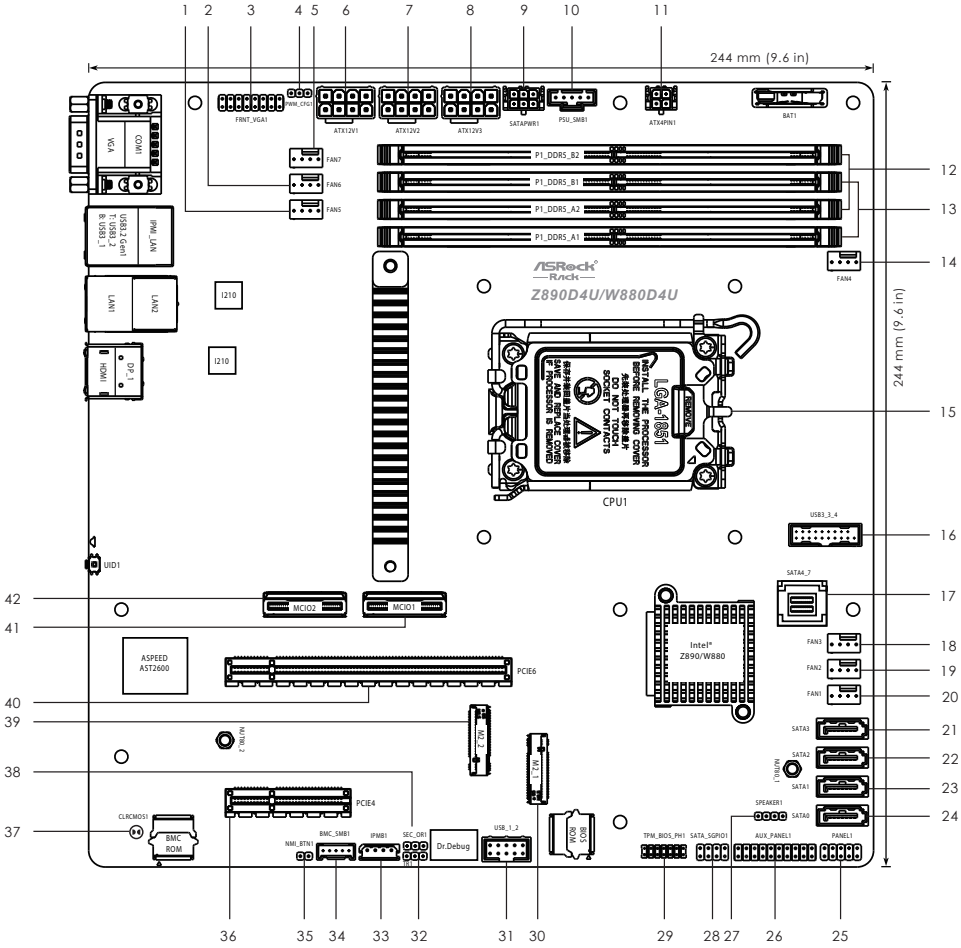
This motherboard supports Wake from on Board LAN. To use this function, please make sure that the "Wake on Magic Packet from power off state" is enabled in Device Manager > Intel® Ethernet Connection > Power Management. And the "PCI Devices Power On" is enabled in UEFI SETUP UTILITY > Advanced > ACPI Configuration. After that, onboard LAN1&2 can wake up S5 under OS.

If installing Intel® LAN utility or Marvell SATA utility, this motherboard may fail Windows® Hardware Quality Lab (WHQL) certification tests. If installing the drivers only, it will pass the WHQL tests.

1.3 Unique Features

ASRock Rack Instant Flash is a BIOS flash utility embedded in Flash ROM. This convenient BIOS update tool allows user to update system BIOS without entering operating systems first like MS-DOS or Windows®. With this utility, press the <F6> key during the POST or the <F2> key to enter into the BIOS setup menu to access ASRock Rack Instant Flash. Just launch this tool and save the new BIOS file to the USB flash drive, floppy disk or hard drive, then update the BIOS only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system.

1.4 Motherboard Layout

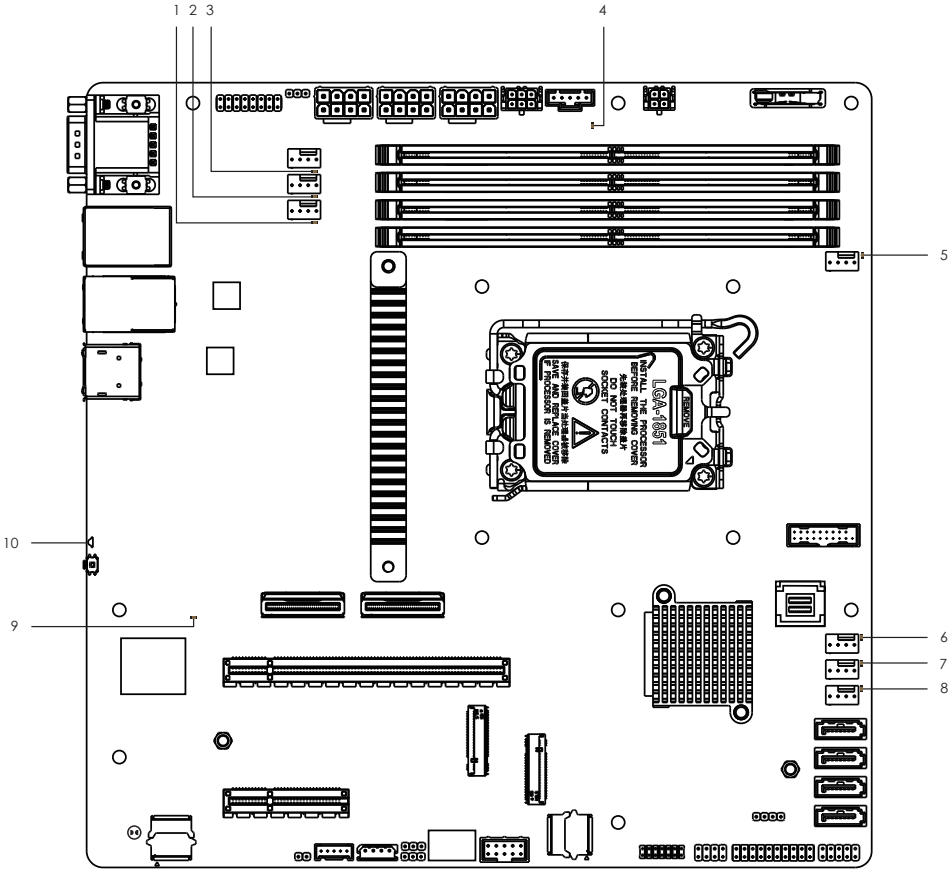


No.	Description
1	System Fan Header (FAN5)
2	System Fan Header (FAN6)
3	Front VGA Header (FRNT_VGA1)
4	PWM Configuration Header (PWM_CFG1)
5	System Fan Header (FAN7)
6	ATX 12V Power Connector (ATX12V1)
7	ATX 12V Power Connector (ATX12V2)
8	ATX 12V Power Connector (ATX12V3)
9	SATA Power Connector (SATAPWR1)
10	PSU SMBus Header (PSU_SMB1)
11	Micro-Fit Power Connector (ATX4PIN1)
12	2 x 288-pin DDR5 DIMM Slots (P1_DDR5_B2, P1_DDR5_A2)*
13	2 x 288-pin DDR5 DIMM Slots (P1_DDR5_B1, P1_DDR5_A1)*
14	System Fan Header (FAN4)
15	LGA1851 CPU Socket (CPU1)
16	USB 3.2 Gen1 Header (USB3_3_4)
17	MiniSAS HD Connector (SATA4_7)
18	System Fan Header (FAN3)
19	System Fan Header (FAN2)
20	System Fan Header (FAN1)
21	SATA Connector (SATA3)
22	SATA Connector (SATA2)
23	SATA Connector (SATA1)
24	SATA Connector (SATA0)
25	System Panel Header (PANEL1)
26	Auxiliary Panel Header (AUX_PANEL1)
27	Speaker Header (SPEAKER1)
28	Serial General Purpose Input/Output Header (SATA_SGPIO1)
29	SPI TPM Header (TPM_BIOS_PH1)
30	M.2 Socket (M2_1) (Type 2280)
31	USB 2.0 Header (USB_1_2)
32	Thermal Sensor Header (TR1)
33	Intelligent Platform Management Bus Header (IPMB1)
34	Baseboard Management Controller SMBus Header (BMC_SMB1)

No.	Description
35	Non Maskable Interrupt Button (NMI_BTN1)
36	PCI Express 5.0 x4 Slot (PCIE4)
37	Clear CMOS Pad (CLRCMOS1)
38	Security Override Jumper (SEC_OR1)
39	M.2 Socket (M2_2) (Type 2280)
40	PCI Express 5.0 x16 Slot (PCIE6)
41	Mini Cool Edge IO Connector (MCIO1)
42	Mini Cool Edge IO Connector (MCIO2)

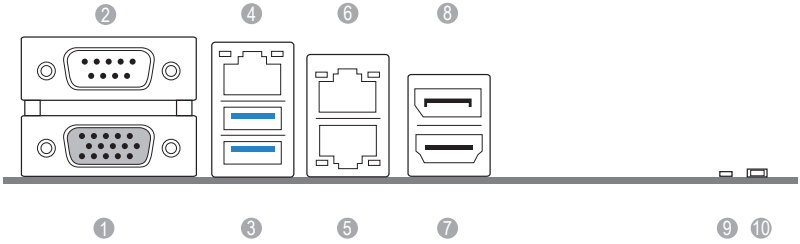
**For DIMM installation and configuration instructions, please see p.19 (Installing the Memory Modules (DIMM)) for more details.*

1.5 Onboard LED Indicators



No.	Item	Status	Description
1	LED_FAN5	Red	FAN5 failed
2	LED_FAN6	Red	FAN6 failed
3	LED_FAN7	Red	FAN7 failed
4	SB_PWR1	Green	STB PWR ready
5	LED_FAN4	Red	FAN4 failed
6	LED_FAN3	Red	FAN3 failed
7	LED_FAN2	Red	FAN2 failed
8	LED_FAN1	Red	FAN1 failed
9	BMC_LED1	Green	BMC heartbeat LED
10	UID_LED	Blue	BMC UID LED

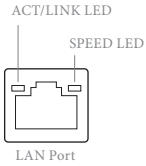
1.6 I/O Panel



No.	Description	No.	Description
1	VGA Port (VGA)	6	1G LAN RJ-45 Port (LAN2)**
2	Serial Port (COM1)	7	HDMI Port (HDMI)
3	USB 3.2 Gen1 Ports (USB3_1_2)	8	Display Port (DP_1)
4	LAN RJ-45 Port (IPMI_LAN)*	9	UID LED (UID_LED)
5	1G LAN RJ-45 Port (LAN1, shared NIC)**	10	UID Switch (UID1)

LAN Port LED Indications

*There are two LEDs on the IPMI LAN port specified for link activity and speed. Please refer to the table below for the LAN port LED indications.

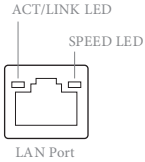


IPMI LAN Port LED Indications

Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No link	Off	10 Mbps connection or no link
Blinking Yellow	Data activity	Orange	100 Mbps connection
On	Link	Green	1 Gbps connection

English

**There are two LEDs on the 1G LAN port specified for link activity and speed. Please refer to the table below for the LAN port LED indications.

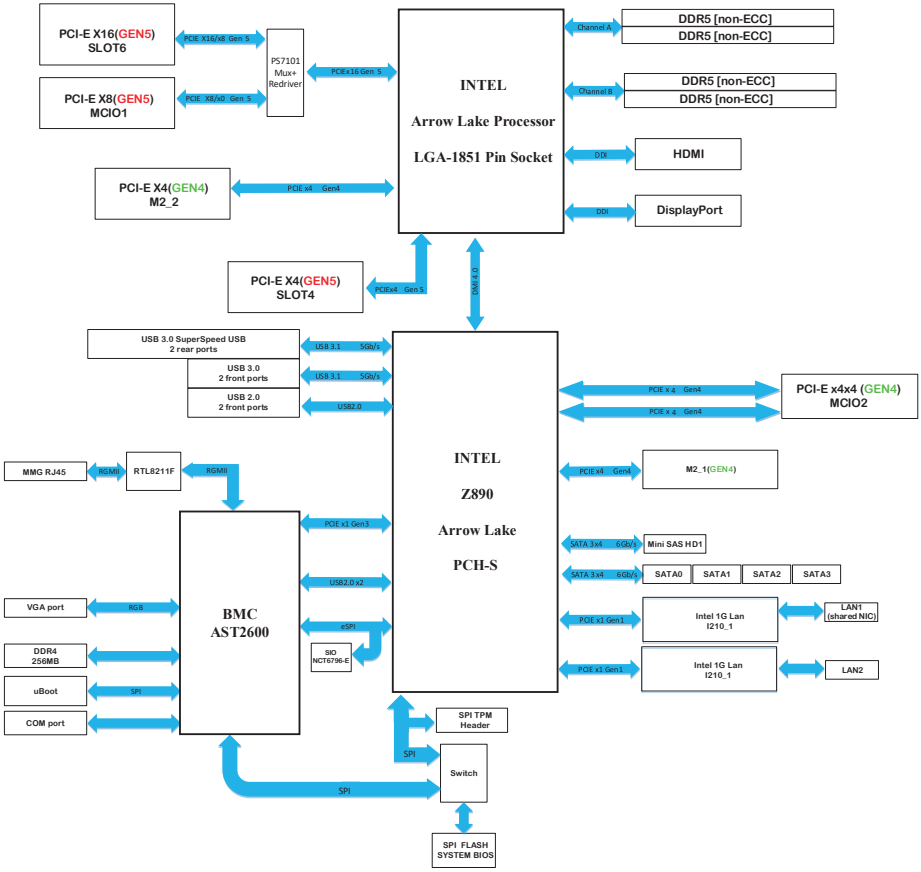


1G LAN Port LED Indications

Activity / Link LED		Speed LED	
Status	**Description**	**Status**	**Description**
Off	No link	Off	10 Mbps connection or no link
Blinking Yellow	Data activity	Orange	100 Mbps connection
On	Link	Green	1 Gbps connection

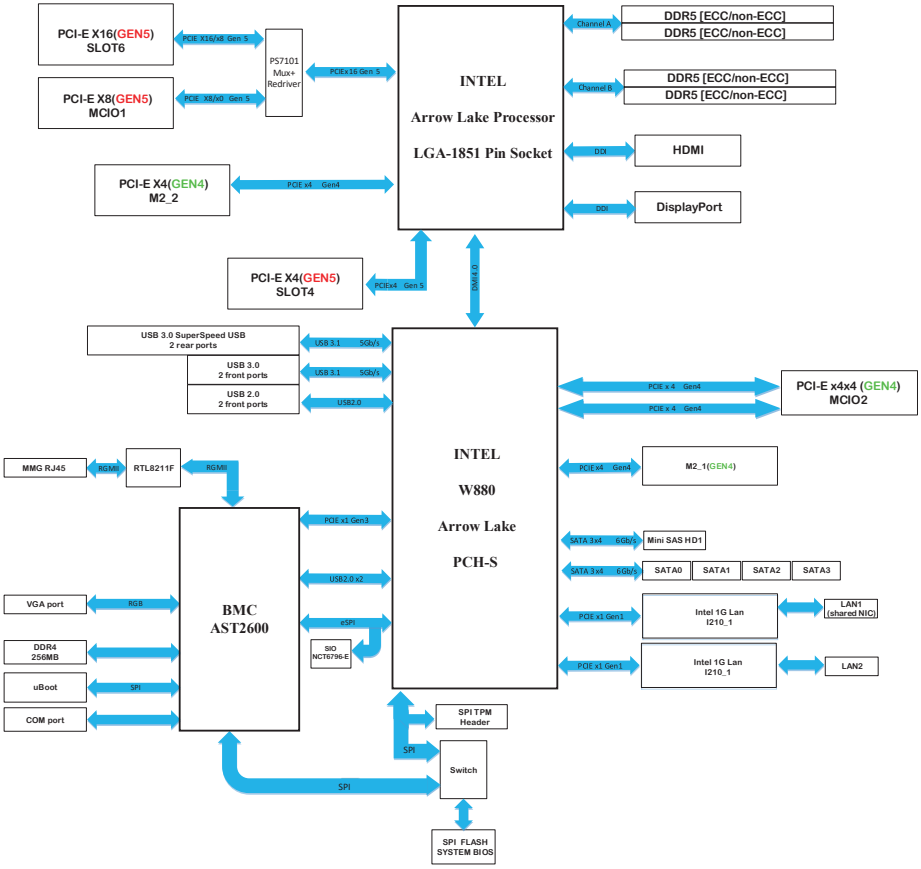
1.7 Block Diagram

Z890D4U:



English

W880D4U:


PCI-E X16(GEN5)
SLOT6
PCIE X16/x8 Gen 5
PS7101
Mux+
Redriver
PCIEx16 Gen 5
PCI-E X8(GEN5)
MCIO1
PCIE X8/x0 Gen 5
INTEL
Arrow Lake Processor
LGA-1851 Pin Socket
Channel A
DDR5 [ECC/non-ECC]
DDR5 [ECC/non-ECC]
Channel B
DDR5 [ECC/non-ECC]
DDR5 [ECC/non-ECC]
DDI
HDMI
DDI
DisplayPort
PCI-E X4(GEN4)
M2_2
PCIE x4 Gen4
PCI-E X4(GEN5)
SLOT4
PCIEx4 Gen 5
DMI4.0
USB 3.0 SuperSpeed USB
2 rear ports
USB 3.1 5Gb/s
USB 3.0
2 front ports
USB 3.1 5Gb/s
USB 2.0
2 front ports
USB2.0
INTEL
W880
Arrow Lake
PCH-S
PCIE x 4 Gen4
PCIE x 4 Gen4
PCI-E x4x4 (GEN4)
MCIO2
PCIE x4 Gen4
M2_1(GEN4)
MMG RJ45
RGMII
RTL8211F
RGMII
PCIE x1 Gen3
SATA 3x4 6Gb/s
Mini SAS HD1
SATA 3x4 6Gb/s
SATA0
SATA1
SATA2
SATA3
USB2.0 x2
VGA port
RGB
BMC
AST2600
eSPI
PCIE x1 Gen1
Intel 1G Lan
I210_1
LAN1
(shared NIC)
DDR4
256MB
SIO
NCT6796-E
uBoot
SPI
PCIE x1 Gen1
Intel 1G Lan
I210_1
LAN2
COM port
SPI TPM
Header
SPI
Switch
SPI
SPI FLASH
SYSTEM BIOS

Chapter 2 Installation

This is a Micro-ATX form factor (244 mm x 244 mm) motherboard. Before installing the motherboard, study the configuration of the chassis to ensure that the motherboard fits into it.

1. *Ensure the motherboard battery is installed before unplugging the power cord or install ing/removing the motherboard.*
2. *Before installing or removing any component, ensure that the power is off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.*

2.1 Screw Holes

Place screws into the holes indicated by circles to secure the motherboard to the chassis.

Do not over-tighten the screws! Doing so may damage the motherboard.

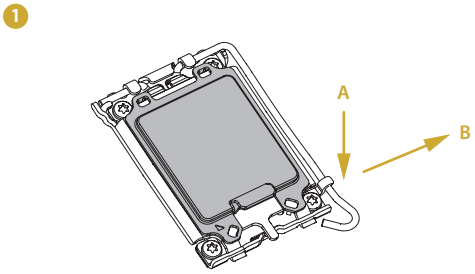
2.2 Pre-installation Precautions

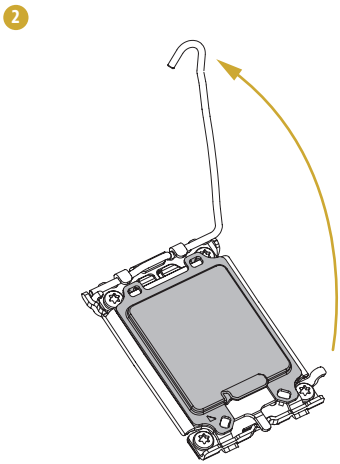
Take note of the following precautions before installing motherboard components or change any motherboard settings.

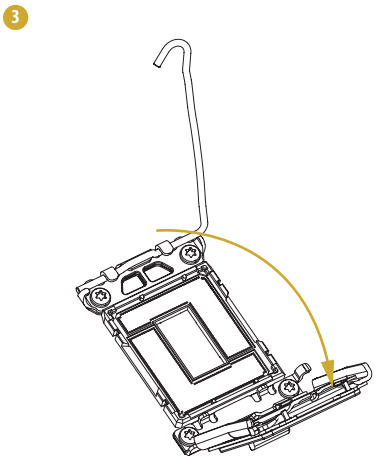
1. Unplug the power cord from the wall socket before touching any components.
2. To avoid damaging the motherboard's components due to static electricity, NEVER place the motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before handling the components.
3. Hold components by the edges and do not touch the ICs.
4. Whenever uninstall any component, place it on a grounded anti-static pad or in the bag that comes with the component.
5. When placing screws into the screw holes to secure the motherboard to the chassis, please do not over-tighten the screws! Doing so may damage the motherboard.

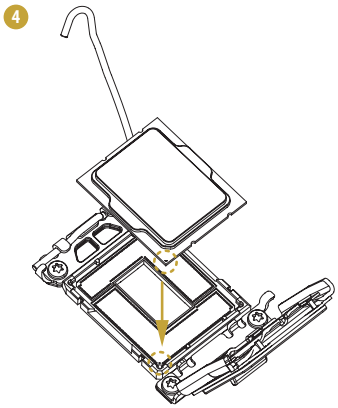
2.3 Installing the CPU

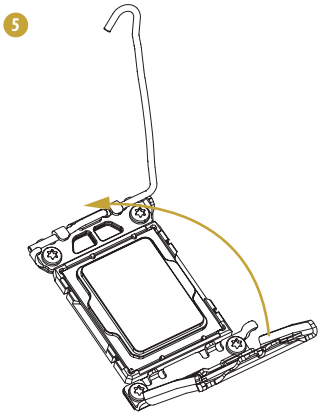
1. *Before inserting the CPU into the socket, please check if the **PnP cap** is on the socket, if the CPU surface is unclean, or if there are any **bent pins** in the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.*
2. *Unplug all power cables before installing the CPU.*

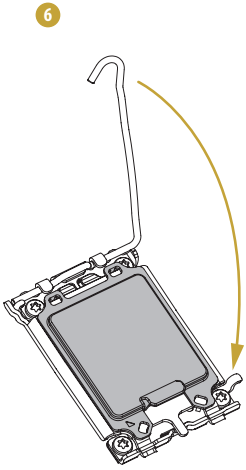


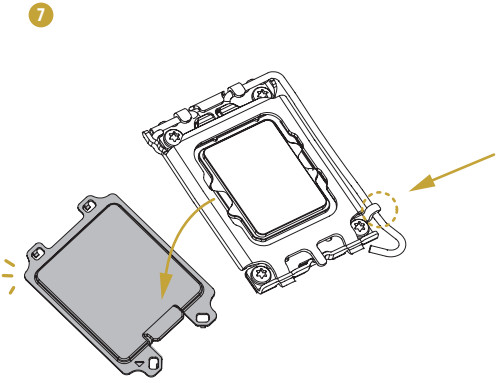








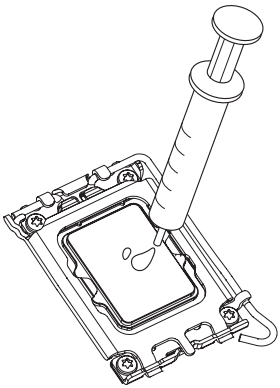


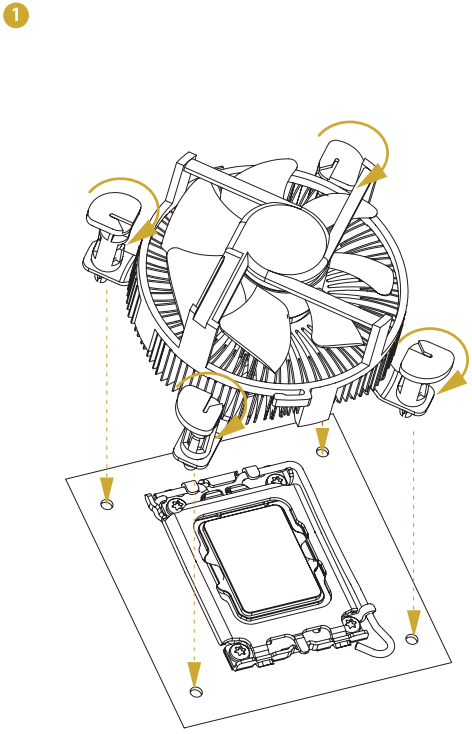


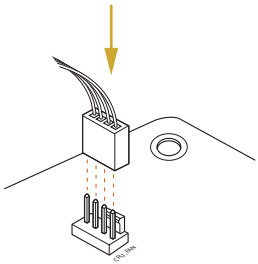
Please save and replace the cover if the processor is removed. The cover must be placed if wishing to return the motherboard for after service.

2.4 Installing the CPU Fan and Heatsink

Please avoid using push-pin type CPU coolers, as the PCB thickness may prevent proper installation. A screw-based mounting system is recommended for a secure and reliable fit.







2.5 Installing the Memory Modules (DIMM)

This motherboard provides four 288-pin DDR5 (Double Data Rate 5) DIMM slots, and supports Dual Channel Memory Technology.

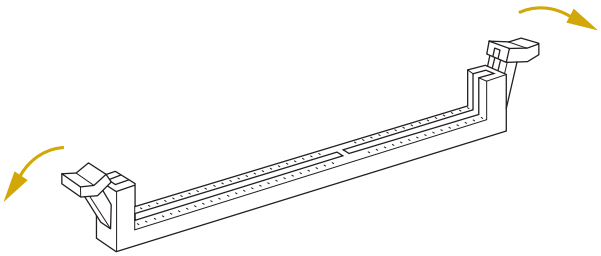
1. *For dual channel configuration, it always need to install identical (the same brand, speed, size and chip-type) DDR5 DIMM pairs.*
2. *It is unable to activate Dual Channel Memory Technology with only one or three memory module installed.*
3. *It is not allowed to install a DDR, DDR2, DDR3 or DDR4 memory module into a DDR5 slot; otherwise, this motherboard and DIMM may be damaged.*

Dual Channel Memory Configuration

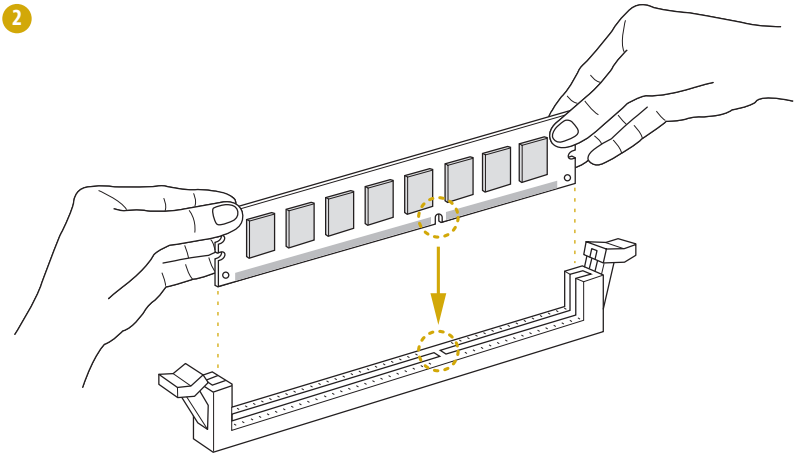
Priority	P1_DDR5_A1	P1_DDR5_A2	P1_DDR5_B1	P1_DDR5_B2
1		V		V
2	V	V	V	V

The symbol V indicates the slot is populated.

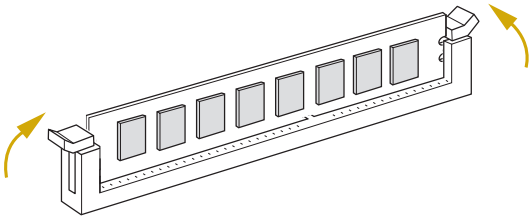
1



2



3



The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if forcing the DIMM into the slot at incorrect orientation.

2.6 Expansion Slots (PCI Express Slots)

There are 2 PCI Express slots on this motherboard.

PCIE slots:

PCIE4 (PCIe 5.0 x4 slot) is used for PCI Express x4 lane width cards.
PCIE6 (PCIe 5.0 x16 slot) is used for PCI Express x16 lane width cards.

Slot	Generation	Mechanical	Electrical	Source
PCIE 4	5.0	x4	x4	CPU
PCIE 6	5.0	x16	x16	CPU

**MCIO1 shared lanes x8 with SLOT6. To enable MCIO1, BIOS settings are required.*

Installing an expansion card

Step 1. Before installing an expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before starting the installation.

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

Step 3. Remove the bracket facing the slot that intending to use. Keep the screws for later use.

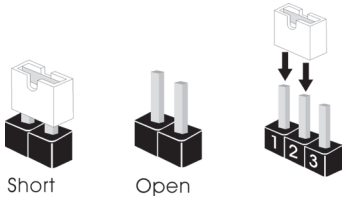
Step 4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.

Step 5. Fasten the card to the chassis with screws.

Step 6. Replace the system cover.

2.7 Jumper Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on the pins, the jumper is “Short”. If no jumper cap is placed on the pins, the jumper is “Open”. The illustration shows a 3-pin jumper whose pin1 and pin2 are “Short” when a jumper cap is placed on these 2 pins.

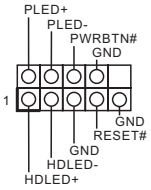


Security Override Jumper (3-pin SEC_OR1) (see p.6, No. 38)	1_2 	2_3 
	Flash Descriptor Security Override	Not override (Default)

2.8 Onboard Headers and Connectors

Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard.

System Panel Header
(9-pin PANEL1)
(see p.6, No. 25)



Connect the power switch, reset switch and system status indicator on the chassis to this header according to the pin assignments. Particularly note the positive and negative pins before connecting the cables.

PWRBTN (Power Switch):
Connect to the power switch on the chassis front panel. Configure the way to turn off the system using the power switch.

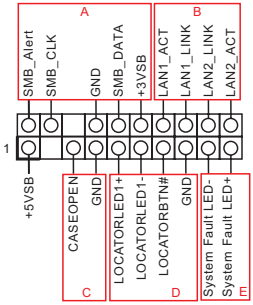
RESET (Reset Switch):
Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

PLED (System Power LED):
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED is off when the system is in S4 sleep state or powered off (S5).

HDLED (Hard Drive Activity LED):
Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting the chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

Auxiliary Panel Header
(18-pin AUX_PANEL1)
(see p.6, No. 26)



This header supports multiple functions on the front panel, including the front panel SMB, internet status indicator and chassis intrusion pin.

A. Front panel SMBus connecting pin (6-1 pin FPSMB)
This header allows user to connect SMBus (System Management Bus) equipment. It can be used for communication between peripheral equipment in the system, which has slower transmission rates, and power management equipment.

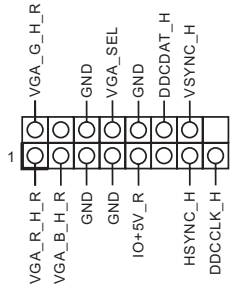
B. Internet status indicator (2-pin LAN1_ACT / LINK LAN2_ACT / LINK)
These two 2-pin headers allow user to use the Gigabit internet indicator cable to connect to the LAN status indicator. When this indicator flickers, it means that the internet is properly connected.

C. Chassis intrusion pin (2-pin CHASSIS)
This header is provided for host computer chassis with chassis intrusion detection designs. In addition, it must also work with external detection equipment, such as a chassis intrusion detection sensor or a microswitch. When this function is activated, if any chassis component movement occurs, the sensor will immediately detect it and send a signal to this header, and the system will then record this chassis intrusion event. The default setting is set to the CASEOPEN and GND pin; this function is off.

D. Locator LED (4-pin LOCATOR)
This header is for the locator switch and LED on the front panel.

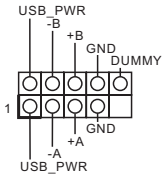
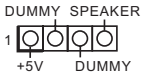
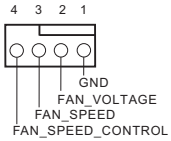
E. System Fault LED (2-pin SYSTEM STATUS)
This header is for the Fault LED on the system.

Front VGA Header
(15-pin FRNT_VGA1)
(see p.6, No. 3)

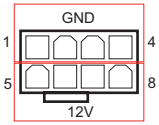


Please connect either end of VGA_2X8 cable to VGA header.

English

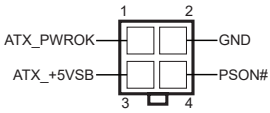
SATAConnectors (SATA0) (see p.6, No. 24) (SATA1) (see p.6, No. 23) (SATA2) (see p.6, No. 22) (SATA3) (see p.6, No. 21)		These SATA connectors support SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate.
USB 2.0 Header (9-pin USB_1_2) (see p.6, No. 31)		There is one USB 2.0 header on this motherboard. Each USB 2.0 header can support two ports.
Chassis Speaker Header (4-pin SPEAKER1) (see p.6, No. 27)		Please connect the chassis speaker to this header.
System Fan Headers (4-pin FAN1) (see p.6, No. 20) (4-pin FAN2) (see p.6, No. 19) (4-pin FAN3) (see p.6, No. 18) (4-pin FAN4) (see p.6, No. 14) (4-pin FAN5) (see p.6, No. 1) (4-pin FAN6) (see p.6, No. 2) (4-pin FAN7) (see p.6, No. 5)		Please connect fan cables to the fan headers and match the black wire to the ground pin. All fans support Fan Control. The fan max. current is 4A and the max. power is 48 Watts.

ATX 12V Power Connectors
(8-pin ATX12V1)
(see p.6, No. 6)
(8-pin ATX12V2)
(see p.6, No. 7)
(8-pin ATX12V3)
(see p.6, No. 8)



This motherboard provides three 8-pin ATX 12V power connectors.

Micro-Fit Power Connector
(4-pin ATX4PIN1)
(ATX 24pin-to-4pin))
(see p.6, No. 11)

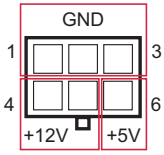


The motherboard provides one 4-pin power/signal connector which is a required input for ATX power source.

When using ATX power, it is necessary to use a 24pin-to-4pin power cable to connect between the 24pin power connector of PSU and the ATX4PIN connector on the motherboard for power supply and signal communication.

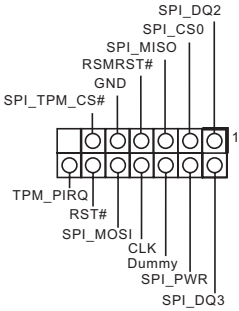
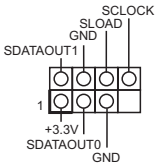
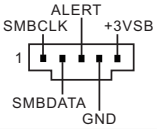
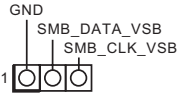
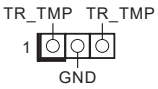
For DC-IN 12V application, it is not necessary to use this ATX 4PIN power connector.

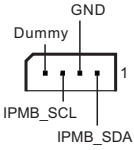
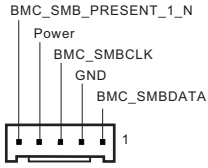
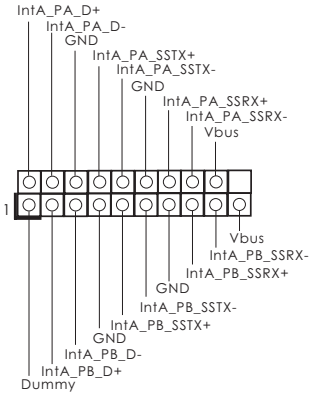
SATA Power Connector
(DC-IN Mode)
(6-pin SATAPWR1)
(see p.6, No. 9)



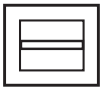
When using DC-IN mode without SATA power, please use a SATA power cable to connect this SATA power connector and the SATA hard drive to provide power from the motherboard.

English

SPI TPM Header (13-pin TPM_BIOS_PH1) (see p.6, No. 29)		This connector supports SPI Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.
Serial General Purpose Input/Output Header (7-pin SATA_SGPIO1) (see p.6, No. 28)		The header supports Serial Link interface for onboard SATA connections.
PSU SMBus Header (PSU_SMB1) (see p6, No. 10)		PSU SMBus monitors the status of the power supply, fan and system temperature.
Non Maskable Interrupt Button Header (NMI_BTN1) (see p.6, No. 35)		Please connect a NMI device to this header.
PWM Configuration Header (3-pin PWM_CFG1) (see p.6, No. 4)		This header is used for PWM configurations.
Thermal Sensor Header (3-pin TR1) (see p.6, No. 32)		Please connect the thermal sensor cable to either pin 1-2 or pin 2-3 and the other end to the device to monitor its temperature.

Intelligent Platform Management Bus Header (4-pin IPMB1) (see p.6, No. 33)		This 4-pin connector is used to provide a cabled base-board or front panel connection for value added features and 3rd-party add-in cards, such as Emergency Management cards, that provide management features using the IPMB.
Baseboard Management Controller SMBus Header (5-pin BMC_SMB1) (see p.6, No. 34)		The header is used for the SM BUS devices.
USB 3.2 Gen1 Header (19-pin USB3_3_4) (see p.6, No. 16)		Besides two default USB 3.2 Gen1 ports on the I/O panel, there is one USB 3.2 Gen1 header on this motherboard. This USB 3.2 Gen1 header can support two USB 3.2 Gen1 ports.
Clear CMOS Pad (CLRCMOS1) (see p.6, No. 37)		CLRMOS1 allows user to clear the data in CMOS. To clear CMOS, take out the CMOS battery and short the Clear CMOS Pad.

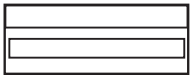
MiniSAS HD Connector
(SATA4_7)
(see p.6, No. 17)



This connector supports MiniSAS-to-SATA data cables for internal storage devices with up to 6.0 Gb/s data transfer rate.

Pin	Defeinition	Pin	Defeinition
A1	DUMMY	C1	DATA0_R
A2	CLOCK	C2	DUMMY
A3	GND	C3	GND
A4	SATA1_C_RXP	C4	SATA1_C_TXP
A5	SATA1_C_RXN	C5	SATA1_C_TXN
A6	GND	C6	GND
A7	SATA3_C_RXP	C7	SATA3_C_TXP
A8	SATA3_C_RXN	C8	SATA3_C_TXN
A9	GND	C9	GND
B1	DUMMY	D1	DATA1_R
B2	LOAD_R	D2	DUMMY
B3	GND	D3	GND
B4	SATA0_C_RXP	D4	SATA0_C_TXP
B5	SATA0_C_RXN	D5	SATA0_C_TXN
B6	GND	D6	GND
B7	SATA2_C_RXP	D7	SATA2_C_TXP
B8	SATA2_C_RXN	D8	SATA2_C_TXN
B9	GND	D9	GND
		2	NP_NC2
1	NP_NC1	3	NP_NC3

Mini Cool Edge IO Connectors
(MCIO1)
(see p.6, No. 41)
(MCIO2)
(see p.6, No. 42)



This motherboard supports two Mini Cool Edge IO Connectors. Please connect these connectors to the HDD backplane board.

**MCIO1 shared lanes x8 with SLOT6. To enable MCIO1, BIOS settings are required.*

English

MCIO1 Pin Definition

Pin	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	MCIO1_RXP0	B2	MCIO1_TXP0
A3	MCIO1_RXN0	B3	MCIO1_TXN0
A4	GND	B4	GND
A5	MCIO1_RXP1	B5	MCIO1_TXP1
A6	MCIO1_RXN1	B6	MCIO1_TXN1
A7	GND	B7	GND
A8	SPARE_A1	B8	SCL1
A9	WAKE#	B9	SDA1
A10	GND	B10	GND
A11	DP	B11	PCIE_RST_R
A12	DN	B12	PRSNT0_R_N
A13	GND	B13	GND
A14	MCIO1_RXP2	B14	MCIO1_TXP2
A15	MCIO1_RXN2	B15	MCIO1_TXN2
A16	GND	B16	GND
A17	MCIO1_RXP3	B17	MCIO1_TXP3
A18	MCIO1_RXN3	B18	MCIO1_TXN3
A19	GND	B19	GND
A20	MCIO1_RXP4	B20	MCIO1_TXP4
A21	MCIO1_RXN4	B21	MCIO1_TXN4
A22	GND	B22	GND
A23	MCIO1_RXP5	B23	MCIO1_TXP5
A24	MCIO1_RXN5	B24	MCIO1_TXN5
A25	GND	B25	GND
A26	SPARE_A2	B26	SCL2
A27	WAKE#	B27	SDA2
A28	GND	B28	GND
A29	DP	B29	PCIE_RST_R
A30	DN	B30	PRSNT1_R_N
A31	GND	B31	GND
A32	MCIO1_RXP6	B32	MCIO1_TXP6
A33	MCIO1_RXN6	B33	MCIO1_TXN6
A34	GND	B34	GND
A35	MCIO1_RXP7	B35	MCIO1_TXP7
A36	MCIO1_RXN7	B36	MCIO1_TXN7
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

MCIO2 Pin Definition

Pin	Defeinition	Pin	Defeinition
A1	GND	B1	GND
A2	MCIO2_1_RXP3	B2	MCIO2_1_TXP3
A3	MCIO2_1_RXN3	B3	MCIO2_1_TXN3
A4	GND	B4	GND
A5	MCIO2_1_RXP2	B5	MCIO2_1_TXP2
A6	MCIO2_1_RXN2	B6	MCIO2_1_TXN2
A7	GND	B7	GND
A8	SPARE_A4	B8	SCL1
A9	WAKE#	B9	SDA1
A10	GND	B10	GND
A11	MCIO2_1_DP	B11	SIO_RST2#
A12	MCIO2_1_DN	B12	PRSNT0_N
A13	GND	B13	GND
A14	MCIO2_1_RXP1	B14	MCIO2_1_TXP1
A15	MCIO2_1_RXN1	B15	MCIO2_1_TXN1
A16	GND	B16	GND
A17	MCIO2_1_RXP0	B17	MCIO2_1_TXP0
A18	MCIO2_1_RXN0	B18	MCIO2_1_TXN0
A19	GND	B19	GND
A20	MCIO2_2_RXP3	B20	MCIO2_2_TXP3
A21	MCIO2_2_RXN3	B21	MCIO2_2_TXN3
A22	GND	B22	GND
A23	MCIO2_2_RXP2	B23	MCIO2_2_TXP2
A24	MCIO2_2_RXN2	B24	MCIO2_2_TXN2
A25	GND	B25	GND
A26	SPARE_A3	B26	SCL2
A27	WAKE#	B27	SDA2
A28	GND	B28	GND
A29	MCIO2_2_DP	B29	SIO_RST2#
A30	MCIO2_2_DN	B30	PRSNT1_N
A31	GND	B31	GND
A32	MCIO2_2_RXP1	B32	MCIO2_2_TXP1
A33	MCIO2_2_RXN1	B33	MCIO2_2_TXN1
A34	GND	B34	GND
A35	MCIO2_2_RXP0	B35	MCIO2_2_TXP0
A36	MCIO2_2_RXN0	B36	MCIO2_2_TXN0
A37	GND	B37	GND
75	NP_NC_1	76	NP_NC_2
77	PGND_1	78	PGND_3
79	PGND_2	80	PGND_4

2.9 Dr. Debug

Dr. Debug is used to provide code information, which makes troubleshooting even easier. Please see the diagrams below for reading the Dr. Debug codes.

Code	Description
0x10	PEI_CORE_STARTED
0x11	PEI_CAR_CPU_INIT
0x15	PEI_CAR_NB_INIT
0x19	PEI_CAR_SB_INIT
0x31	PEI_MEMORY_INSTALLED
0x32	PEI_CPU_INIT
0x33	PEI_CPU_CACHE_INIT
0x34	PEI_CPU_AP_INIT
0x35	PEI_CPU_BSP_SELECT
0x36	PEI_CPU_SMM_INIT
0x37	PEI_MEM_NB_INIT
0x3B	PEI_MEM_SB_INIT
0x4F	PEI_DXE_IPL_STARTED
0x60	DXE_CORE_STARTED
0x61	DXE_NVRAM_INIT
0x62	DXE_SBRUN_INIT

0x63	DXE_CPU_INIT
0x68	DXE_NB_HB_INIT
0x69	DXE_NB_INIT
0x6A	DXE_NB_SMM_INIT
0x70	DXE_SB_INIT
0x71	DXE_SB_SMM_INIT
0x72	DXE_SB_DEVICES_INIT
0x78	DXE_ACPI_INIT
0x79	DXE_CSM_INIT
0x90	DXE_BDS_STARTED
0x91	DXE_BDS_CONNECT_DRIVERS
0x92	DXE_PCI_BUS_BEGIN
0x93	DXE_PCI_BUS_HPC_INIT
0x94	DXE_PCI_BUS_ENUM
0x95	DXE_PCI_BUS_REQUEST_RESOURCES
0x96	DXE_PCI_BUS_ASSIGN_RESOURCES
0x97	DXE_CON_OUT_CONNECT
0x98	DXE_CON_IN_CONNECT

0x99	DXE_SIO_INIT
0x9A	DXE_USB_BEGIN
0x9B	DXE_USB_RESET
0x9C	DXE_USB_DETECT
0x9D	DXE_USB_ENABLE
0xA0	DXE_IDE_BEGIN
0xA1	DXE_IDE_RESET
0xA2	DXE_IDE_DETECT
0xA3	DXE_IDE_ENABLE
0xA4	DXE_SCSI_BEGIN
0xA5	DXE_SCSI_RESET
0xA6	DXE_SCSI_DETECT
0xA7	DXE_SCSI_ENABLE
0xA8	DXE_SETUP_VERIFYING_PASSWORD
0xA9	DXE_SETUP_START
0xAB	DXE_SETUP_INPUT_WAIT
0xAD	DXE_READY_TO_BOOT
0xAE	DXE_LEGACY_BOOT

0xAF	DXE_EXIT_BOOT_SERVICES
0xB0	RT_SET_VIRTUAL_ADDRESS_MAP_BEGIN
0xB1	RT_SET_VIRTUAL_ADDRESS_MAP_END
0xB2	DXE_LEGACY_OPROM_INIT
0xB3	DXE_RESET_SYSTEM
0xB4	DXE_USB_HOTPLUG
0xB5	DXE_PCI_BUS_HOTPLUG
0xB6	DXE_NVRAM_CLEANUP
0xB7	DXE_CONFIGURATION_RESET
0xF0	PEI_RECOVERY_AUTO
0xF1	PEI_RECOVERY_USER
0xF2	PEI_RECOVERY_STARTED
0xF3	PEI_RECOVERY_CAPSULE_FOUND
0xF4	PEI_RECOVERY_CAPSULE_LOADED
0xE0	PEI_S3_STARTED
0xE1	PEI_S3_BOOT_SCRIPT
0xE2	PEI_S3_VIDEO_REPOST

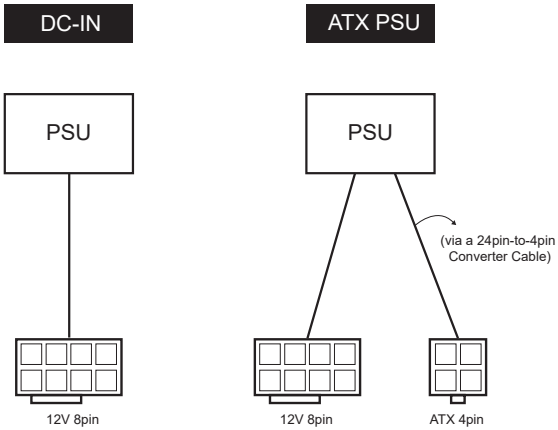
0xE3	PEI_S3_OS_WAKE
0x50	PEI_MEMORY_INVALID_TYPE
0x53	PEI_MEMORY_NOT_DETECTED
0x55	PEI_MEMORY_NOT_INSTALLED
0x57	PEI_CPU_MISMATCH
0x58	PEI_CPU_SELF_TEST_FAILED
0x59	PEI_CPU_NO_MICROCODE
0x5A	PEI_CPU_ERROR
0x5B	PEI_RESET_NOT_AVAILABLE
0xD0	DXE_CPU_ERROR
0xD1	DXE_NB_ERROR
0xD2	DXE_SB_ERROR
0xD3	DXE_ARCH_PROTOCOL_NOT_AVAILABLE
0xD4	DXE_PCI_BUS_OUT_OF_RESOURCES
0xD5	DXE_LEGACY_OPROM_NO_SPACE
0xD6	DXE_NO_CON_OUT
0xD7	DXE_NO_CON_IN

0xD8	DXE_INVALID_PASSWORD
0xD9	DXE_BOOT_OPTION_LOAD_ERROR
0xDA	DXE_BOOT_OPTION_FAILED
0xDB	DXE_FLASH_UPDATE_FAILED
0xDC	DXE_RESET_NOT_AVAILABLE
0xE8	PEI_MEMORY_S3_RESUME_FAILED
0xE9	PEI_S3_RESUME_PPI_NOT_FOUND
0xEA	PEI_S3_BOOT_SCRIPT_ERROR
0xEB	PEI_S3_OS_WAKE_ERROR

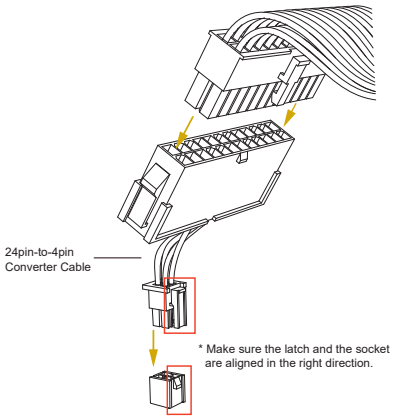
2.10 ATX PSU / DC-IN Power Connections

This motherboard supports both +12V DC and ATX power input. Please refer to the table below for the required connections between the motherboard and the power supply.

Connector	DC-IN	ATX PSU
12V 8pin	O	O
ATX 4pin	X	O *(with the bundled ATX 24pin-to-4pin converter cable)*



The following diagram illustrates how to connect the bundled ATX 24pin-to-4pin converter cable.



2.11 Unit Identification purpose LED / Switch

Use the UID button to locate the server working on behind a rack of servers.

Unit Identification purpose LED (UID_LED) / Switch (UID1)		When the UID button on the front or rear panel is pressed, the front/rear UID blue LED indicator will be turned on. Press the UID button again to turn off the indicator.

1. Press and hold the UID button for 4 seconds, BMC will trigger an external reset.
2. Press and hold the UID button for 10 seconds, BMC will reset and load default values.

2.12 Dual LAN and Teaming Operation Guide

Dual LAN with Teaming enabled on this motherboard allows two single connections to act as one single connection(s) for twice the transmission bandwidth, making data transmission more effective and improving the quality of transmission of distant images. Fault tolerance on the dual LAN network prevents network downtime by transferring the workload from a failed port to a working port.

The speed of transmission is subject to the actual network environment or status even with Teaming enabled.

Before setting up Teaming, please make sure whether the Switch (or Router) supports Teaming (IEEE 802.3ad Link Aggregation). Specify a preferred adapter in Intel PROSet. Under normal conditions, the Primary adapter handles all non-TCP/IP traffic. The Secondary adapter will receive fallback traffic if the primary fails. If the Preferred Primary adapter fails, but is later restored to an active status, control is automatically switched back to the Preferred Primary adapter.

Step 1

From **Device Manager**, open the properties of a team.

Step 2

Click the **Settings** tab.

Step 3

Click the **Modify Team** button.

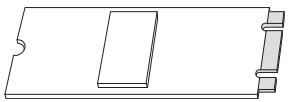
Step 4

Select the adapter that wants to be the primary adapter and click the **Set Primary** button.

If do not specify a preferred primary adapter, the software will choose an adapter of the highest capability (model and speed) to act as the default primary. If a failover occurs, another adapter becomes the primary. The adapter will, however, rejoin the team as a non-primary.

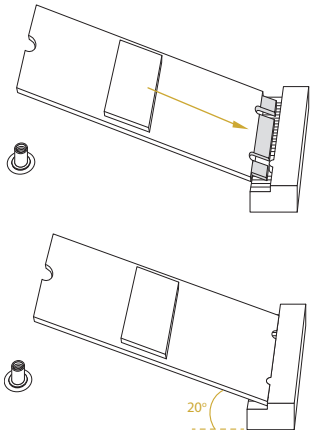
2.13 M.2 SSD Module Installation Guide

The M.2 Socket (M2_1/M2_2, Key M) supports type 2280 M.2 PCI Express module up to Gen4 x4.



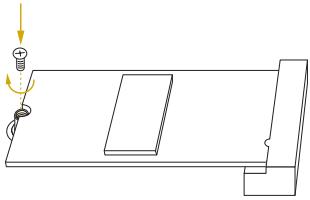
Step 1

Prepare a M.2 SSD module and the screw.



Step 2

Gently insert the M.2 SSD module into the M.2 slot. Please be aware that the M.2 SSD module only fits in one orientation.



Step 3

Tighten the screw with a screwdriver to secure the module into place. Please do not overtighten the screw as this might damage the module.

Chapter 3 UEFI Setup Utility

3.1 Introduction

This section explains how to use the UEFI SETUP UTILITY to configure the system. The UEFI chip on the motherboard stores the UEFI SETUP UTILITY. Run the UEFI SETUP UTILITY when starting up the computer. Please press <F2> or <Del> during the Power-On-Self-Test (POST) to enter the UEFI SETUP UTILITY; otherwise, POST will continue with its test routines.

Restart the system by pressing <Ctrl> + <Alt> + <Delete> to enter the UEFI SETUP UTILITY after POST, or by pressing the reset button on the system chassis. This allows user to restart by turning the system off and then back on.

Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions are for reference purpose only, and they may not exactly match what seeing on the screen.

3.1.1 UEFI Menu Bar

The top of the screen has a menu bar with the following selections:

Item	Description
Main	To set up the system time/date information
OC Tweaker	For overclocking confi gurations
Advanced	To set up the advanced UEFI features
Security	To set up the security features
Server Mgmt	To manage the server
Event Logs	For event log configuration
Boot	To set up the default system device to locate and load the Operating System
Exit	To exit the current screen or the UEFI SETUP UTILITY

Use < ← > key or < → > key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen.

English

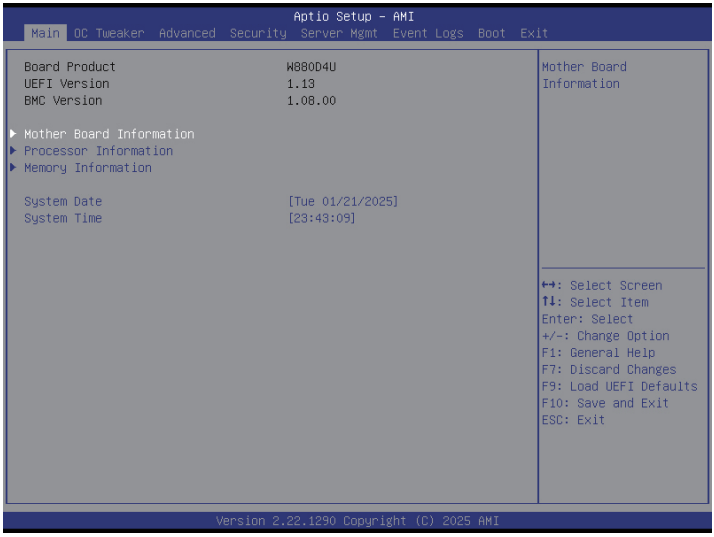
3.1.2 Navigation Keys

Please check the following table for the function description of each navigation key.

Navigation Key(s)	Function Description
←/ →	Moves cursor left or right to select Screens
↑ / ↓	Moves cursor up or down to select items
+ / -	To change option for the selected items
<Tab>	Switch to next function
<Enter>	To bring up the selected screen
<PGUP>	Go to the previous page
<PGDN>	Go to the next page
<HOME>	Go to the top of the screen
<END>	Go to the bottom of the screen
<F1>	To display the General Help Screen
<F7>	Discard changes and exit the UEFI SETUP UTILITY
<F9>	Load optimal default values for all the settings
<F10>	Save changes and exit the UEFI SETUP UTILITY
<F12>	Print screen
<ESC>	Jump to the Exit Screen or exit the current screen

3.2 Main Screen

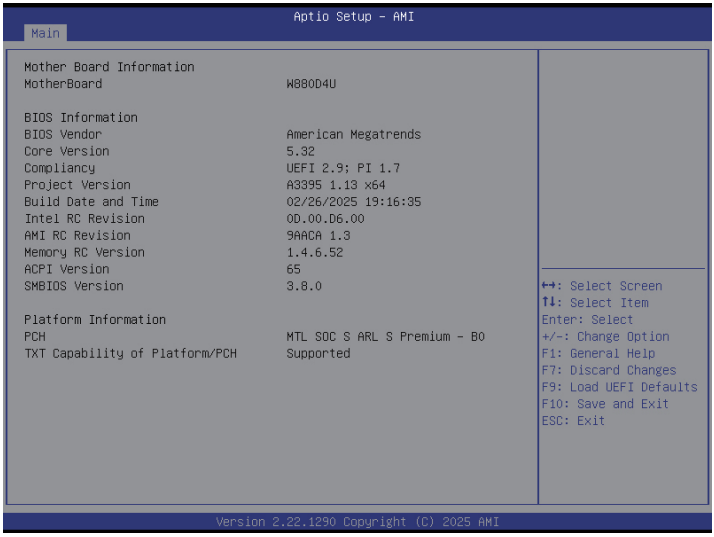
Enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview. The Main screen provides system overview information and allows user to set the system time and date.



The screenshots in this user manual are examples and for references only. The actual images may slightly vary depending on the model and the version used.

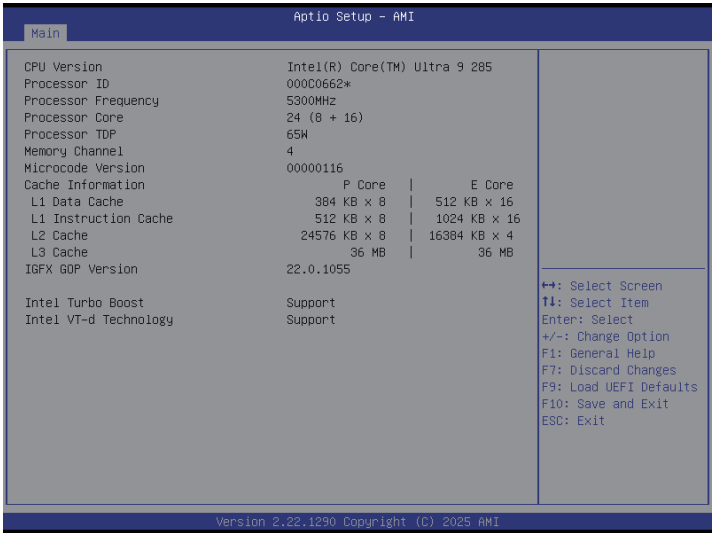
3.2.1 Motherboard Information

Press [Enter] to view the information of the motheboard.



3.2.2 Processor Information

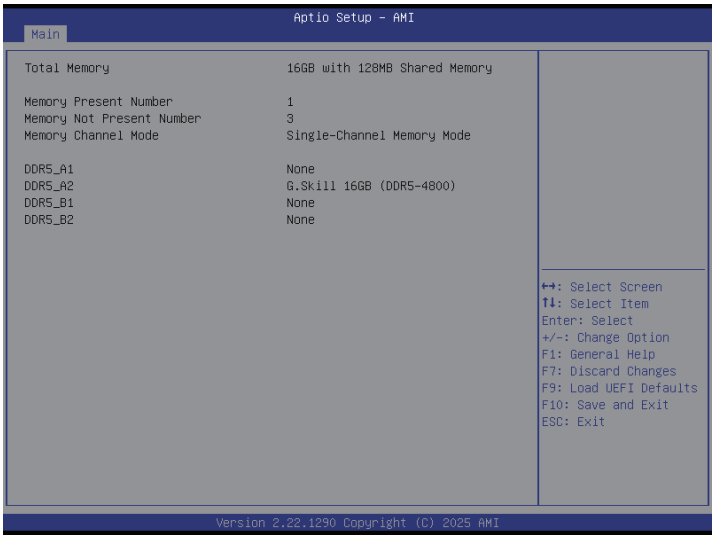
Press [Enter] to view the information of the processor.



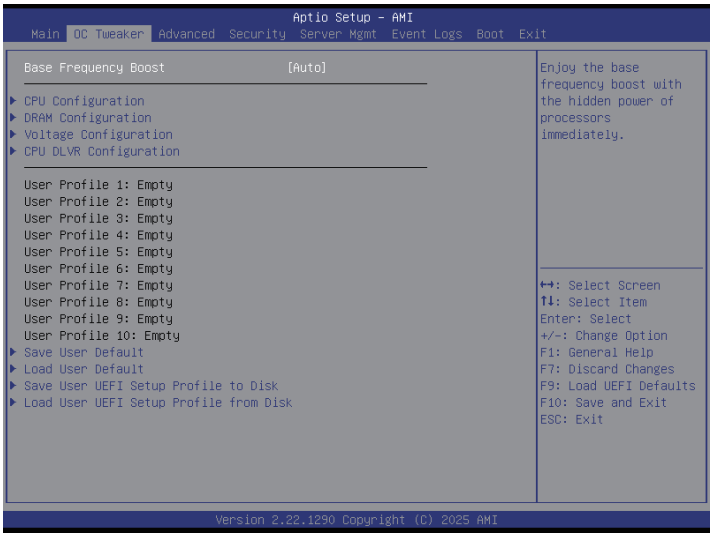
English

3.2.3 Memory Information

Press [Enter] to view the information of the memory.



3.3 OC Tweaker



Base Frequency Boost

Enjoy the base frequency boost with the hidden power of processors immediately.

CPU Configuration

Configue CPU options.

DRAM Configuration

Configue DRAM Timing.

Voltage Configuration

Configue Voltage options.

CPU DLVR Configuration

Configue CPU DLVR options.

Save User Default

Type a profile name and press enter to save the settings as user default.

Load User Default

Load previously saved user defaults.

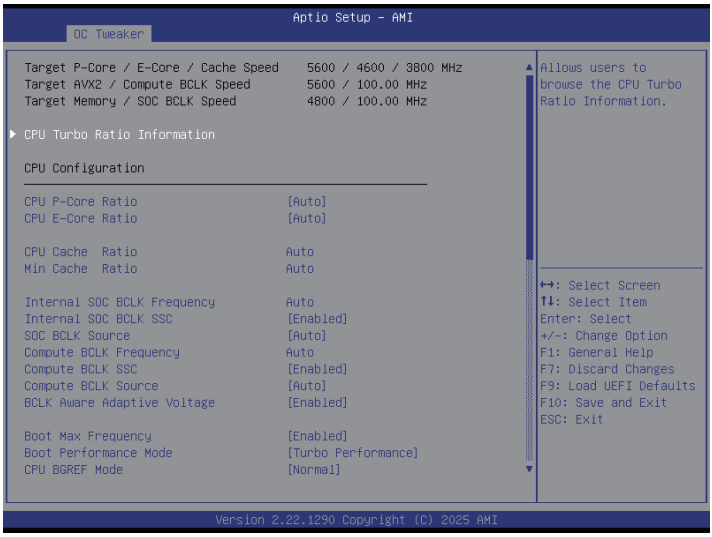
Save User UEFI Setup Profile to Disk

It helps user to save current UEFI settings as an user profile to disk.

Load User UEFI Setup Profile from Disk

Load previous saved profile from the disk.

3.3.1 CPU Configuration



CPU Turbo Ratio Information

The CPU speed is determined by the CPU P-Core Ratio multiplied with the BCLK. Increasing the CPU P-Core Ratio will increase the internal CPU clock speed without affeceting the clock speed of other components.

CPU P-Core Ratio

The CPU speed is determined by the CPU P-Core Ratio multiplied with the BCLK. Increasing the CPU P-Core Ratio will increase the internal CPU clock speed without affecting the clock speed of other components.

CPU E-Core Ratio

The E-Core speed is determined by the E-Core Ratio multiplied with the BCLK. Increasing the E-Core Ratio will increase the internal E-Core clock speed without affecting the clock speed of other components.

CPU Cache Ratio

The CPU Internal Bus Speed Ratio. The maximum should be the same as the CPU Ratio.

Min Cache Ratio Limit

The CPU Internal Bus Speed minimum ratio.

CPU Flex Ratio Override

Enable or disable CPU Flex Ratio Programming. Flex Ratio can lower maximum non-turbo, especially for CPU wihout turbo function.

Internal SOC BCLK Frequency

Configure SOC-die internal BCLK frequency.

Internal SOC BCLK SSC

Configure SOC-die spread spectrum clocking.

SOC BCLK Source

Configure source for SOC BCLK. The BCLK affect memory, iGPU, NPU, D2D Fabric, SAF/NOC Fabric.

Compute BLCK Frequency

Configure compute-die internal BCLK frequency.

Compute BLCK SSC

Configure compute-die spread spectrum clocking.

Compute BLCK Source

Configure source for compute BCLK. To control the compute BCLK independently, please select Compute-Die Internal BCLK. The BCLK affect P-Core, E-Core and Cache.

BCLK Aware Adaptive Voltage

BCLK Aware Adaptive Voltage enable/disable. When enabled, pcode will be aware of the BCLK frequency when calculating the CPU V/F curves. This is ideal for BCLK OC to avoid high voltage overrides.

Boot Max Frequency

Select this to enable or disable Boot Maximum Frequency in CPU strap.

Boot Performance Mode

Select the performance state that the BIOS will set before OS handoff. Max Battery mode will set CPU ratio as xB till OS handoff. This option is suggested for BCLK overclocking.

CPU BGREF Mode

Select CPU Bandgap Reference Mode between Normal and Bandgap Bypassed.
CPU Bandgap Reference Mode - the default voltage is Normal.

VCCIA Boot Voltage

Select VCCIA boot voltage between Nominal and High Voltage. VCCIA boot Voltage - The default voltage is Nominal, to support the high voltage, BIOS can program VCCIA boot voltage higher than 1.65v (max 2.01v).

VCCSA Boot Voltage

Select VCCSA boot voltage between Nominal and High Voltage (up to 1.2/1.3V). VCCSA boot Voltage - The default voltage is Nominal,.

Ring to Core Ratio Offset

Disable Ring to Core Ratio Offset so the ring and core can run at the same frequency.

FLL Overclocking Mode

Nominal is good for normal core ratio overclocking. Elevated and Extremely Elevated are good for high BCLK OC.

SA PLL Frequency Override

Configure SA PLL Frequency.

BCLK TSC HW Fixup

BCLK TSC HW Fixup disable during TSC copy from PMA to APIC.

Intel SpeedStep Technology

Intel SpeedStep technology allows processors to switch between multiple frequencies and voltage points for better power saving and heat dissipation. CPU turbo ratio can be fixed when Intel SpeedStep Technology set Disabled and Intel Turbo Boost Technology set Enabled.

Intel Turbo Boost Technology

Intel Turbo Boost Technology enables the processor to run above its base operating frequency when the operating system requests the highest performance state.

Intel Speed Shift Technology

Enable/Disable Intel Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-sates.

To Get best support for Intel Turbo Boost Max Technology 3.0 (ITBMT 3.0), it needs to enable Intel Speed Shift Technology. If the CPU does not support ITBMT 3.0, option will still grayed out.

Intel Turbo Boost Max Technology 3.0

Select this to enable or disable Intel Turbo Boost Technology 3.0 (ITBMT 3.0) support. Disabling will report the maximum ratio of the slowest core in _CPC object. Processors supportinh the ITBMT 3.0 feature contain at least on processor core whose maximum ratio is higher than the others.

Intel Dynamic Tuning Technology

Select this to enable or disable Intel Dynamic Platform Thermal Framwork.

Long Duration Power Limit

Configure Package Power Limit 1 in watts. When the limit is exceeded, the CPU ratio will be lowered after a period of time. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

Long Duration Maintained

Configure the period of time until the CPU ratio is lowered when the Long Duration Power Limit is exceeded.

Short Duration Power Limit

Configure Package Power Limit 2 in watts. When the limit is exceeded, the CPU ratio will be lowered immediately. A lower limit can protect the CPU and save power, while a higher limit may improve performance.

CPU Core Unlimited Current Limit

To unlock voltage regulator current limit completely, set this option to Enabled.

CPU Core Current Limit

Configure the Voltage Regulator Current Limit. This value represents the Maximum instaneous current allowed at any given time.

GT Unlimited Current Limit

To unlock voltage regulator current limit completely, set this option to Enabled.

GT Current Limit

Configure the Voltage Regulator Current Limit. This value represents the Maximum instaneous current allowed at any given time.

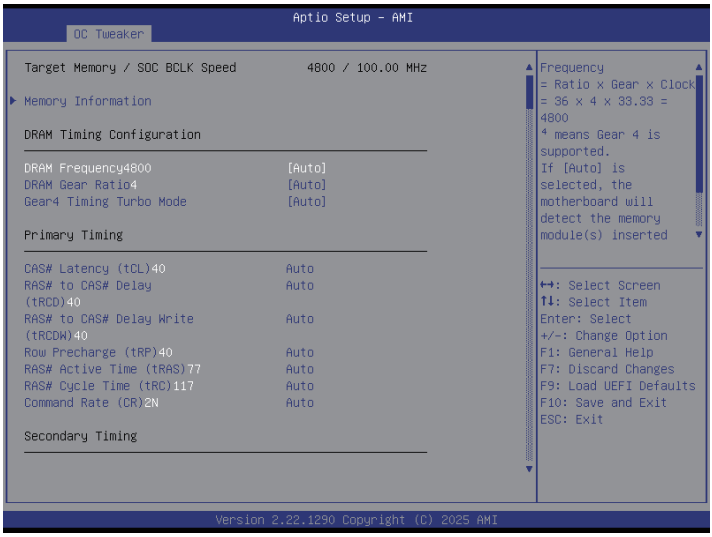
GT CEP Enable

Select this to enable or disable GT CEP (Current Excursion Protection) Support.

IA CEP Enable

Select this to enable or disable IA CEP (Current Excursion Protection) Support.

3.3.2 DRAM Configuration



Memory Information

Allows users to browse the serial presence detect (SPD) and Intel extreme memory profile (XMP) for DDR modules.

DRAM Timing Configuration

DRAM Frequency

If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assign the appropriate frequency automatically.

DRAM Gear Ratio

High gear is good for high frequency.

Gear4 Timing Turbo Ratio

The default value is [Auto] for Gear4 Timing Turbo Mode.

Primary Timing

CAS# Latency (tCL)

The time between sending a column address to the memory and the beginning of the data in response.

RAS# to CAS# Delay (tRCD)

The number of clock cycles required between the opening of a row of memory and accessing columns within it.

RAS# to CAS# Delay Write (tRCDW)

The number of clock cycles required between the opening of a row of memory and accessing columns within it.

Row Precharge Time (tRP)

The number of clock cycles required between the issuing of the precharge command and opening the next row.

RAS# Active Time (tRAS)

The number of clock cycles required between a bank active command and issuing the precharge command.

RAS# Cycle Time (tRC)

Configure the minimum active to active/Refresh Time.

Command Rate (CR)

The delay between when a memory chip is selected and when the first active command can be issued.

Secondary Timing

Write Recovery Time (tWR)

The amount of delay that must elapse after the completion of a valid write operation, before an active bank can be precharged.

Refresh Cycle Time2 (tRFC2)

The number of clocks from a Refresh command until the first Activate command to the same rank.

Refresh Cycle Time per Bank (tRFCpb)

The number of clocks that a per back Refresh command takes to complete.

CAS to CAS CMD Delay (tCCD_L)

Internal Write to Read Command Delay Time.

Write CAS to CAS CMD Delay (tCCD_L_WR)

Internal Write to Write Command Delay Time.

Write to Read Delay (tWTR_L)

The number of clocks between the last valid write operation and the next read command to the same internal bank.

Write to Read Delay (tWTR_S)

The number of clocks between the last valid write operation and the next read command to the same internal bank.

RAS to RAS Delay (tRRD_L)

The number of clocks between two rows activated in different banks of the same rank.

RAS to RAS Delay (tRRD_S)

The number of clocks between two rows activated in different banks of the same rank.

Read to Precharge (tRTP)

The number of clocks that are inserted between a read command to a row pre-charge command to the same rank.

Four Activate Window (tFAW)

The time window in which four activates are allowed the same rank.

CAS Write Latency (tCWL)

Configure CAS Write Latency.

Refresh Delay Same Bank (tREFSBRD)

Configure tREFSBRD, Same Bank Refresh to ACT delay.

Refresh Interval x9 (tREFIx9)

Configure tREFIx9 for max time between refreshes per rank.

Refresh Interval (tREFI)

Configure refresh cycles at an average periodic interval.

Power Down Timing

tCKE

Configure the period of time the DDR5 initiates a minimum of one refresh command internally once it enters Self-Refresh mode.

tXP

Configure the CKE low exit time before a new command can be sent after CKE comes up.

tCPDED

Configure CPDED.

tRDPDEN

Configure CASrd to CKE low time.

tWRPDEN

Configure CASwr to CKE low time.

tCKCKEH

Configure CKCKEH.

tCSH

Configure tCSH.

tCSL

Configure tCSL

tCA2CS

Configure tCA2CS.

tPRPDEN

Configure tPRPDEN. tPRPDEN, tACTPDEN, tREFPDEN will use this single value.

tOSCO

Configure tOSCO.

tMRR

Configure tMRR.

tMRD

Configure DDR tMRD timing parameter. MRS to MRS minimum delay in number of DCLK.

Turn Around Timing

TAT Pre Training

tRDRD_sg

Configure between module read to read delay.

tRDRD_dg

Configure between module read to read delay.

tRDRD_dr

Configure between module read to read delay.

tRDRD_dd

Configure between module read to read delay.

tRDWR_sg

Configure between module read to write delay.

tRDWR_dg

Configure between module read to write delay.

tRDWR_dr

Configure between module read to write delay.

tRDWR_dd

Configure between module read to write delay.

tWRRD_sg

Configure between module write to read delay.

tWRRD_dg

Configure between module write to read delay.

tWRRD_dr

Configure between module write to read delay.

tWRRD_dd

Configure between module write to read delay.

tWRWR_sg

Configure between module write to write delay.

tWRWR_dg

Configure between module write to write delay.

tWRWR_dr

Configure between module write to write delay.

tWRWR_dd

Configure between module write to write delay.

TAT Post Training

tRDRD_sg

Configure between module write to read delay.

tRDRD_dg

Configure between module write to read delay.

tRDRD_dr

Configure between module write to read delay.

tRDRD_dd

Configure between module write to read delay.

tRDWR_sg

Configure between module write to read delay.

tRDWR_dg

Configure between module write to read delay.

tRDWR_dr

Configure between module write to read delay.

tRDWR_dd

Configure between module write to read delay.

tWRRD_sg

Configure between module write to read delay.

tWRRD_dg

Configure between module write to read delay.

tWRRD_dr

Configure between module write to read delay.

tWRRD_dd

Configure between module write to read delay.

tWRWR_sg

Configure between module write to write delay.

tWRWR_dg

Configure between module write to write delay.

tWRWR_dr

Configure between module write to write delay.

tWRWR_dd

Configure between module write to write delay.

Round Trip Timing

RTL IO Delay Offset

Configure round trip latency IO delay initial offset.

RTL Offset (MC0 A1/A2)

Configure round trip latency Offset value.

RTL Offset (MC1 A1/A2)

Configure round trip latency Offset value.

RTL Offset (MC0 B1/B2)

Configure round trip latency Offset value.

RTL Offset (MC1 B1/B2)

Configure round trip latency Offset value.

ODT Setting

RTT WR (A1)

Configure the memory on die termination resistors RTT WR.

RTT NOM RD (A1)

Configure the memory on die termination resistors RTT NOM RD.

RTT NOM WR (A1)

Configure the memory on die termination resistors RTT NOM WR.

RTT PARK (A1)

Configure the memory on die termination resistors RTT PARK.

RTT PARK DQS (A1)

Configure the memory on die termination resistors RTT PARK DQS.

RTT CA Gruop A (A1)

Configure the memory on die termination resistors RTT CA Group A.

RTT CS Gruop A (A1)

Configure the memory on die termination resistors RTT CS Group A.

RTT CK Gruop A (A1)

Configure the memory on die termination resistors RTT CK Group A.

RTT CA Gruop B (A1)

Configure the memory on die termination resistors RTT CA Group B.

RTT CS Gruop B (A1)

Configure the memory on die termination resistors RTT CS Group B.

RTT CK Gruop B (A1)

Configure the memory on die termination resistors RTT CK Group B.

RTT WR (A2)

Configure the memory on die termination resistors RTT WR.

RTT NOM RD (A2)

Configure the memory on die termination resistors RTT NOM RD.

RTT NOM WR (A2)

Configure the memory on die termination resistors RTT NOM WR.

RTT PARK (A2)

Configure the memory on die termination resistors RTT PARK.

RTT PARK DQS (A2)

Configure the memory on die termination resistors RTT PARK DQS.

RTT CA Gruop A (A2)

Configure the memory on die termination resistors RTT CA Group A.

RTT CS Gruop A (A2)

Configure the memory on die termination resistors RTT CS Group A.

RTT CK Gruop A (A2)

Configure the memory on die termination resistors RTT CK Group A.

RTT CA Gruop B (A2)

Configure the memory on die termination resistors RTT CA Group B.

RTT CS Gruop B (A2)

Configure the memory on die termination resistors RTT CS Group B.

RTT CK Gruop B (A2)

Configure the memory on die termination resistors RTT CK Group B.

RTT WR (B1)

Configure the memory on die termination resistors RTT WR.

RTT NOM RD (B1)

Configure the memory on die termination resistors RTT NOM RD.

RTT NOM WR (B1)

Configure the memory on die termination resistors RTT NOM WR.

RTT PARK (B1)

Configure the memory on die termination resistors RTT PARK.

RTT PARK DQS (B1)

Configure the memory on die termination resistors RTT PARK DQS.

RTT CA Gruop A (B1)

Configure the memory on die termination resistors RTT CA Group A.

RTT CS Gruop A (B1)

Configure the memory on die termination resistors RTT CS Group A.

RTT CK Gruop A (B1)

Configure the memory on die termination resistors RTT CK Group A.

RTT CA Gruop B (B1)

Configure the memory on die termination resistors RTT CA Group B.

RTT CS Gruop B (B1)

Configure the memory on die termination resistors RTT CS Group B.

RTT CK Gruop B (B1)

Configure the memory on die termination resistors RTT CK Group B.

RTT WR (B2)

Configure the memory on die termination resistors RTT WR.

RTT NOM RD (B2)

Configure the memory on die termination resistors RTT NOM RD.

RTT NOM WR (B2)

Configure the memory on die termination resistors RTT NOM WR.

RTT PARK (B2)

Configure the memory on die termination resistors RTT PARK.

RTT PARK DQS (B2)

Configure the memory on die termination resistors RTT PARK DQS.

RTT CA Gruop A (B2)

Configure the memory on die termination resistors RTT CA Group A.

RTT CS Gruop A (B2)

Configure the memory on die termination resistors RTT CS Group A.

RTT CK Gruop A (B2)

Configure the memory on die termination resistors RTT CK Group A.

RTT CA Gruop B (B2)

Configure the memory on die termination resistors RTT CA Group B.

RTT CS Gruop B (B2)

Configure the memory on die termination resistors RTT CS Group B.

RTT CK Gruop B (B2)

Configure the memory on die termination resistors RTT CK Group B.

MRS Setting

Pull Up Output Driver Impedance MC0

Configure the Pull Up Output Driver Impedance for DRAM A1 A2 MRS MR5 OP [2:1}.

Pull Up Output Driver Impedance MC1

Configure the Pull Up Output Driver Impedance for DRAM B1 B2 MRS MR5 OP [2:1}.

Pull Down Output Driver Impedance MC0

Configure the Pull Down Output Driver Impedance for DRAM A1 A2 MRS MR5 OP [7:6}.

Pull Down Output Driver Impedance MC1

Configure the Pull Down Output Driver Impedance for DRAM B1 B2 MRS MR5 OP [7:6}.

Read Preamble

Configure the Read Preamble for DRAM MRS MR8 OP[2:0].

Write Preamble

Configure the Write Preamble for DRAM MRS MR8 OP[4:3].

Read Postamble

Configure the Read Postamble for DRAM MRS MR8 OP[6].

Write Postamble

Configure the Write Postamble for DRAM MRS MR8 OP[7].

tCCD_L/tDLLK

Configure the tCCD_L/tCCD_L_WR/tCCD_L_WR2/tDLLK for DRAM MRS MR13 OP[3:0].

Training Setting

Memory Training Algorithms

Select this to enable or disable Memory Training Algorithms.

Advanced Setting

Realtime Memory Timing

Configure the realtime memory timings.
[Enabled] The system will allow performing realtime memory timing changes after MRC_DONE.

Force Reset Type

Force Reset Type after F10 Save Changes and Exit.

Retrain on Fast Fail

Restart MRC in Cold mode if SW MemTest fails during Fast flow. The defaul value is [Enabled].

Retrain to Working Channel

Restart MRC in Cold mode after disabling failing channel. The defaul value is [Disabled].

Exit On Failure (MRC)

Exit On Failure for MRC training steps.

Force ColdReset

Force ColdReset OR Choose MrcColdBoot mode, when Coldboot is required during MRC execution. Note: If ME 5.0MB is present, ForceColdReset is required!

Reset for MRC Failed

Reset system after MRC training is failed.

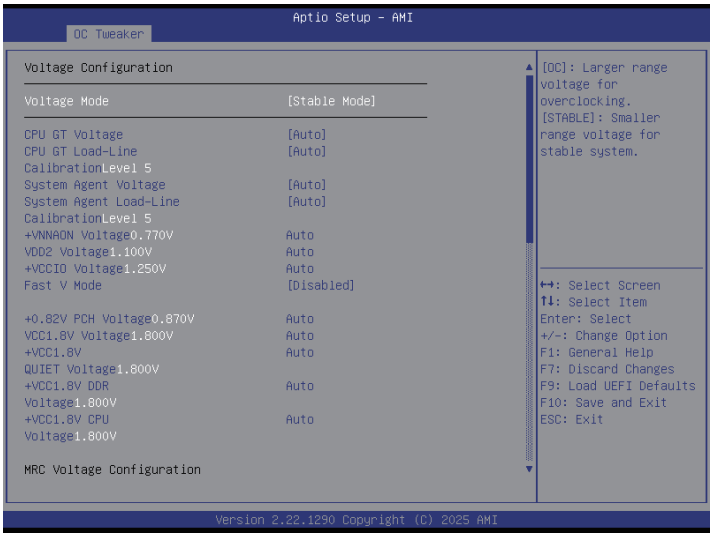
MRC Training on Warm Boot

When enabled, memory training will be excuted when warm boot.

MRC Fast Boot

When enabled, portions of memory reference code will be skipped when possibe to increase boot speed.

3.3.3 Voltage Configuration



Voltage Mode

[OC] - Larger range voltage for overclocking.
[Stable] - Smaller range voltage for stable system.

CPU GT Voltage

Input voltage for the processor by the external voltage regulator.

CPU GT Load-Line Calibration

CPU GT Load-Line Calibration helps prevent GT voltage droop when the system is under heavy loading.

System Agent Voltage

Input voltage for the processor by the external voltage regulator.

System Agent Load-Line Calibration

System Agent Load-Line Calibration helps prevent System Agent voltage droop when the system is under heavy load.

+VNNAON Voltage

Configure the voltage for the +VNNAON.

VDD2 Voltage

Configure the voltage for the VDD2.

+VCCIO Voltage

Configure the voltage for the +VCCIO.

Fast V Mode

The default for this item is [Disabled].

+0.82V PCH Voltage

Configure the voltage for the +0.82V PCH.

VCC1.8V Voltage

Configure the voltage for the VCC1.8V.

+VCC1.8V QUIET Voltage

Configure the voltage for the +VCC1.8V QUIET.

+VCC1.8V DDR Voltage

Configure the voltage for the +VCC1.8V DDR.

+VCC1.8V CPU Voltage

Configure the voltage for the +VCC1.8V CPU.

MRC Voltage Configuration

Vdd2Mv Voltage

The VR Rail tied to the DRAM. Usually, it equals to or lower than VDD2 voltage.

Vddq Voltage

Configure the CPU FIVR TX Vddq.

Vcclog Voltage

Configure the CPU FIVR VCC IOG.

VccClk Voltage

Configure the CPU FIVR VCC CLK.

DDR5 PMIC Configuration

PMIC Voltage Option

Choose separate to individually adjust DIMM PMIC.

VDD Voltage

Configure the VDD Voltage supported by PMIC at DRAM side.

VDD Voltage Range

JEDEC Standard is ranges from 0.800V to 1.435V. OC Demand is ranges from 0.800V to 2.070V. OC Demand may not be applied if PMIC OC CAP is JEDEC PMIC, user can check it via Memory Information tool.

VDDQ Voltage

Configure the VDDQ Voltage supported by PMIC at DRAM side.

VDDQ Voltage Range

JEDEC Standard is ranges from 0.800V to 1.435V. OC Demand is ranges from 0.800V to 2.070V. OC Demand may not be applied if PMIC OC CAP is JEDEC PMIC, user can check it via Memory Information tool.

VPP Voltage

Configure the memory VPP Voltage supported by PMIC at DRAM side.

PMIC Protection Unlock

Configure the PMIC Protection Unclock setting.

Current Limiter VDD

Output current limiter warning threshold setting.

Current Limiter VDDQ

Output current limiter warning threshold setting.

Current Limiter VPP

Output current limiter warning threshold setting.

AVX Configuration

AVX2 Voltage Guardband Scale Factor

AVX2 Voltage Guardband Scale Factor controls the voltage guardband applied to AVX2 workloads. A value > 1.00 will increase the voltage guardband, and < 1.00 will decrease the voltage guardband.

VR Configuration

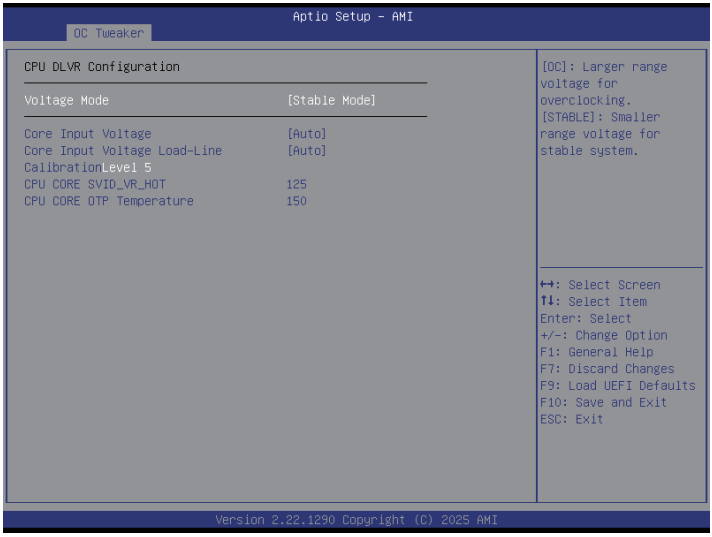
IA AC Loadline

The nominal CPU VID voltage may be adjusted by AC Load Line. Higher AC loadline get higher VID, especially for high frequency or heavy loading.

IA DC Loadline

The power calculations done by the CPU may be adjusted by DC Load Line. DC Loadline in m0hms. Range is 0-20.00. 0=AUTO/HW default.

3.3.4 CPU DLVR Configuration



Voltage Mode

[OC] - Larger range voltage for overclocking.
[Stable] - Smaller range voltage for stable system.

Core Input Voltage

Input voltage for the processor by the external voltage regulator.

Core Input Voltage Load-Line Calibration

CPU Load-Line Calibration helps prevent CPU voltage droop when the system is under heavy loading.

CPU CORE SVID_VR_HOT

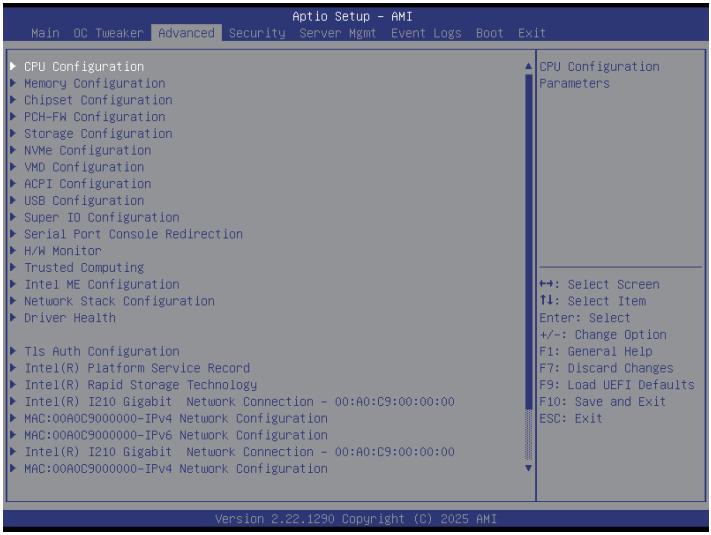
Configure CPU CORE SVID_VR_HOT.

CPU CORE OTP Temperature

Configure CPU CORE OTP Temperature.

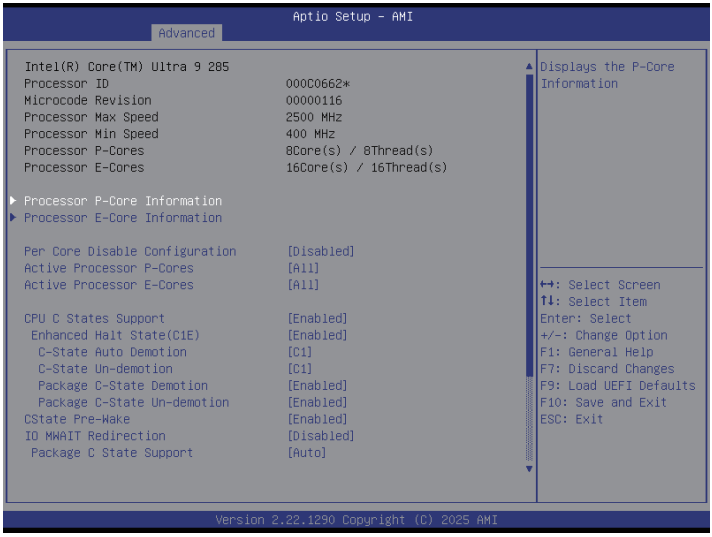
3.4 Advanced Screen

In this section, set the configurations for the following items: CPU Configuration, Memory Configuration, Chipset Configuration, PCH-FW Configuration, Storage Configuration, NVMe Configuration, VMD Configuration, ACPI Configuration, USB Configuration, Super IO Configuration, Serial Port Console Redirection, H/W Monitor, Trusted Computing, Intel ME Configuration, Network Stack Configuration, Driver Health and Tls Auth Configuration, Intel(R) Platform Service Record, Intel(R) Rapid Storage Technology, Intel(R) Network Connection and Insant Flash.



Setting wrong values in this section may cause the system to malfunction.

3.4.1 CPU Configuration



Processor P-Core Information

This item displays the P-Core Information.

Processor E-Core Information

This item displays the E-Core Information.

Pre Core Disable Configuration

Select this item to enable or disable Per Core Disable. When Per Core Disable Configuration is enabled, the Active Cores and Active Efficient-cores options will be disabled.

Active Processor P-Cores

Select the number of cores to enable in each processor package.

Active Processor E-Cores

Select the number of E-Cores to enable in each processor package.

CPU C States Support

Enable CPU C States Support for power saving. It is recommended to keep C6 and C7 enabled for better power saving.

Enhanced Halt State (C1E)

Enable Enhanced Halt State (C1E) for lower power consumption.

C-State Auto Demotion

Configure C-State Auto Demotion.

C-State Un-demotion

Configure C-State Un-demotion.

Package C-State Demotion

Select this item to enable or disable Package C-State Demotion.

Package C-State Un-Demotion

Select this item to enable or disable Package C-State Un-demotion.

CState Pre-Wake

Disable - to 1 to disable the Cstate Pre-Wake.

IO MWAIT Redirection

Set this to map IO_read instructions set to IO registers PMG_IO_BASE_ADDRBASE+offset to MWAIT (offset).

Package C State Support

Enable CPU, PCIe, Memory, Graphics C State Support for power saving.

DC6 Latency WA

Select this to enable or disable DC6 Latency WA.

CPU Thermal Throttling

Enable CPU internal thermal control mechanisms to keep the CPU from overheating.

Intel AVX/AVX2

Enable/Disable the Intel AVX and AVX2 Instructions. This is applicable for Big Core only.

Intel Virtualization Technology

Intel Virtualization Technology allows a platform to run multiple operating systems and applications in independent partitions, so that one computer system can function as multiple virtual systems.

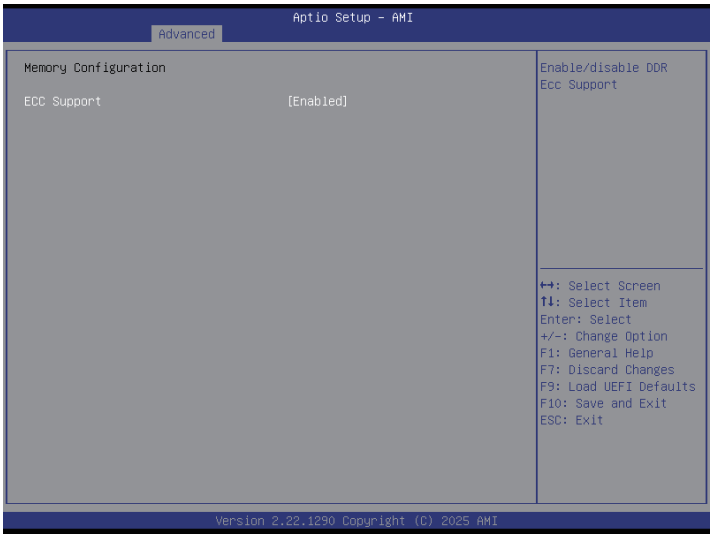
X2APIC Enable

Selec this to enable or disable X2APIC Operating Mode. When this option is configured as 'Enabled', 'VT-d' option must be 'Enabled' and 'X2APIC Opt Out' option must be 'Disabled' as well.

Legacy Game Compatibility Mode

When 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.

3.4.2 Memory Configuration

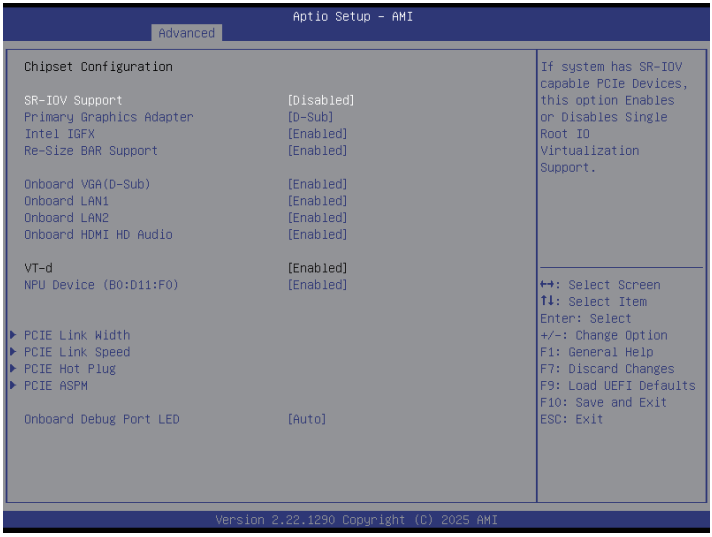


ECC Support

Use this item to enable or disable DDR ECC Support.

**Z890D4U dose not support ECC.*

3.4.3 Chipset Configuration



SR-IOV Support

If system has SR-IOV capable PCIe Devices, this option Enables or Disables Single Root IO Virtualization Support. Only for PCH PCIE Devices.

Primary Graphics Adapter

If PCI Express graphics card is installed on the motherboard, use this option to select PCI Express or Onboard VGA as the primary graphics adapter.

**If no PCI Express graphics card is installed, [Onboard VGA] is the default graphics adapter. There is no screen on monitor even if a HDMI display is connected. Select [Onboard Hdmi] instead to use HDMI as output source.*

Intel IGFX

Select disable to disable the integrated graphics when an external graphics card is installed. Or select enable to keep the integrated graphics enabled at all times.

Re-Sized BAR Support

If system has Resizable BAR capable PCIe Devices, this option Enables or Disables Resizable BAR Support (Only if System Supports 64 bit PCI Decoding).

Onboard VGA (D-Sub)

Use this item to enable or disable the Onboard VGA function.

Onboard LAN

Use this to enable or disable the Onboard LAN function.

Onboard HDMI HD Audio

Enable audio for the onboard digital outputs.

VT-d

Intel® Virtualization Technology for Directed I/O helps the virtual machine monitor better utilize hardware by improving application compatibility and reliability, and providing additional levels of manageability, security, isolation, and I/O performance.

NPU Device (B0:D11:F0)

Use this to enable or disable NPU (Neural Processing Unit) Device.

PCIE Link Width

Select this item to configue PCIE Link Width.

PCIE6/MCIO1 Line Width
Use this item to select PCIE6/MCIO1 Link Width including x16, x8x8, x8x4x4 options.

PCIE Link Speed

Select this item to configure PCIE Link Speed.

PCIE4/PCIE6 Link Speed
Select Link Speed for PCIE4/PCIE6, the default value is [Auto]. Auto mode is optimizing for overclocking

M2_1/M2_2 Link Speed
Select Link Speed for M.2, the default value is [Auto]. Auto mode is optimizing for overclocking

MCIO2_1/MCIO2_2 Link Speed
Select Link Speed for MCIO, the default value is [Auto]. Auto mode is optimizing for overclocking

PCIE Hot Plug

Select this item to configure PCIE Hot Plug globally.

PCIE4/PCIE6 Hot Plug
Enable or disable PCIE Hot Plug.

MCIO2-1/MCIO2-2 Hot Plug
Enable or disable MCIO Hot Plug.

PCIE ASPM

Selec this item to configure the PCIE ASPM.

PCI-E ASPM Support (Global)
Select this item to disable ASPM Support in all PCIe root ports.

PCIE4/PCIE6 ASPM Support
Enables or disables the ASPM support for PCIE.

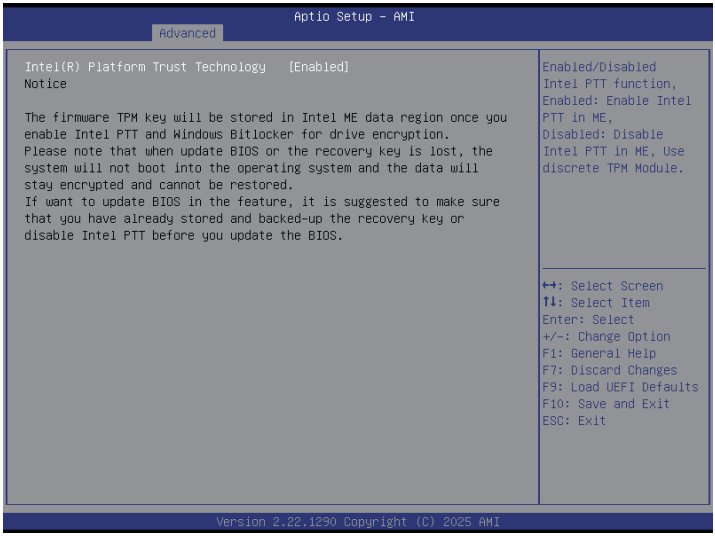
M2_1/M2_2 ASPM Support
Enables or disables the ASPM support for M.2.

MCIO2_1/MCIO2_2 ASPM Support
Enables or disables the ASPM support for MCIO.

Onboard Debug Port LED

Enable or disable the onboard Dr. Debug LED.

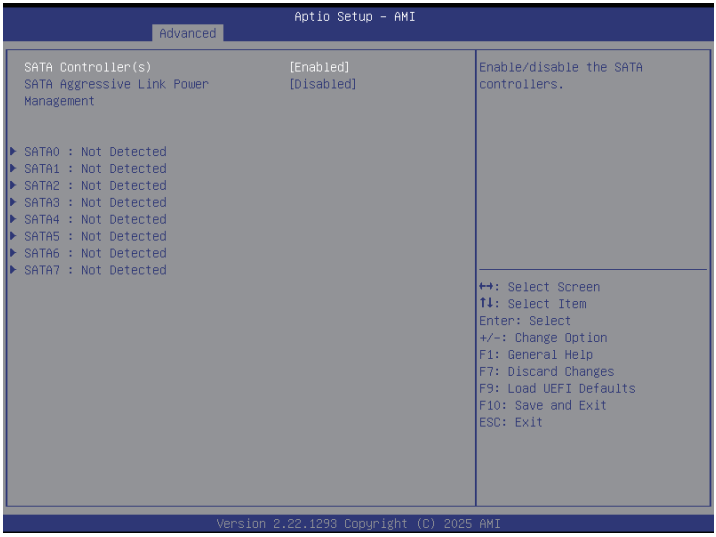
3.4.4 PCH-FW Configuration



Intel(R) Platform Trust Technology

Use this item to configure Intel PTT funciton. Select Enabled to use Intel PTT in ME. Disable this option to use discrete TPM Module.

3.4.5 Storage Configuration



SATA Controller(s)

Enable/disable the SATA controllers.

SATA Aggressive Link Power Management

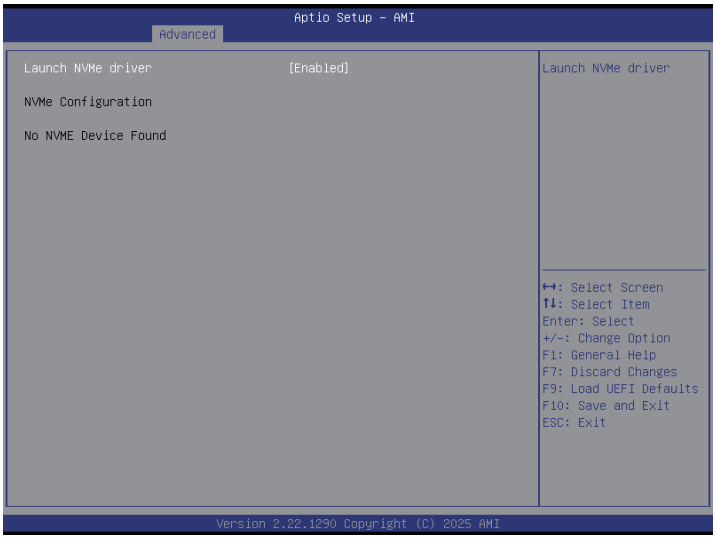
SATA Aggressive Link Power Management allows SATA devices to enter a low power state during periods of inactivity to save power. It is only supported by AHCI mode.

SATA0/1/2/3/4/5/6/7

Select this item to configure the SATA, External SATA, Hot Plug and SATA Device Type.

SATA Connector	Physical Mapping
SATA0	4
SATA1	5
SATA2	6
SATA3	7
SATA4	0
SATA5	1
SATA6	2
SATA7	3

3.4.6 NVME Configuration

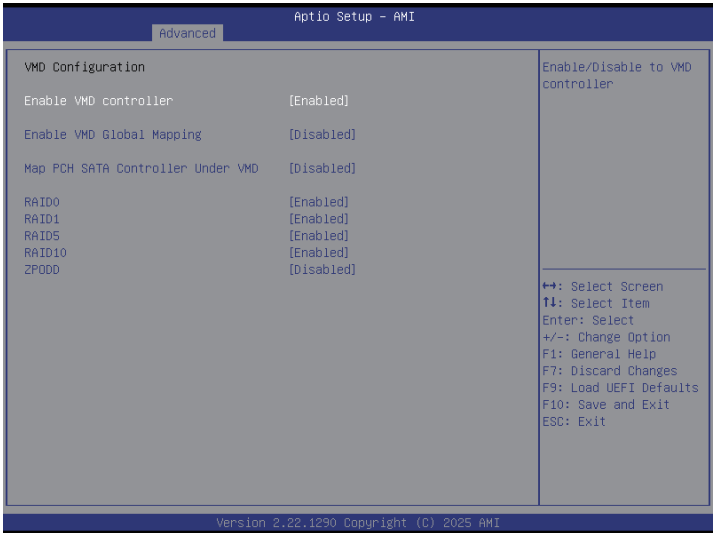


The NVMe Configuration displays the NVMe controller and Drive information.

Launch NVMe driver

Select this item to enable or disable launch NVMe driver.

3.4.7 VMD Configuration



Enable VMD Controller

Use this item to enable or disable VMD Controller. When enabled, the options below appear.

Enable VMD Global Mapping

Use this item to enable or disable VMD Global Mapping.

Map this Root Port under VMD

Use this item to map or unmap Root Port to VMD.

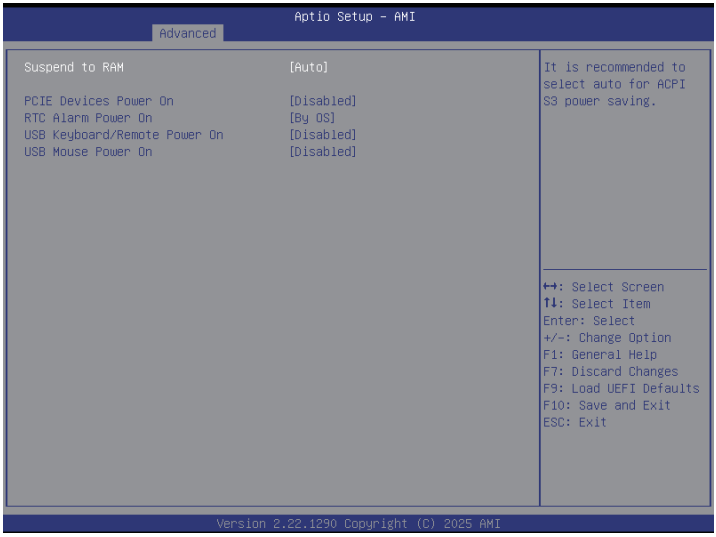
RAID0/1/5/10

Use this item to enable or disable RAID0/1/5/10 support.

ZP0DD

Use this item to enable or disable ZP0DD. The option is only needed to be enabled when ZPODD is connected in VMD mode.

3.4.8 ACPI Configuration



Suspend to RAM

Select disable for ACPI suspend type S1. It is recommended to select auto for ACPI S3 power saving.

PCIE Devices Power On

Allow the system to be waked up by a PCIE device and enable wake on LAN.

RTC Alarm Power On

Allow the system to be waked up by the real time clock alarm. Set it to By OS to let it be handled by the operating system.

RTC Alarm Date
Use this item to set Date of RTC power on feature.

RTC Alarm Hour
Use this item to set Hour of RTC power on feature.

RTC Alarm Minute
Use this item to set Minute of RTC power on feature.

RTC Alarm Second
Use this item to set Second of RTC power on feature.

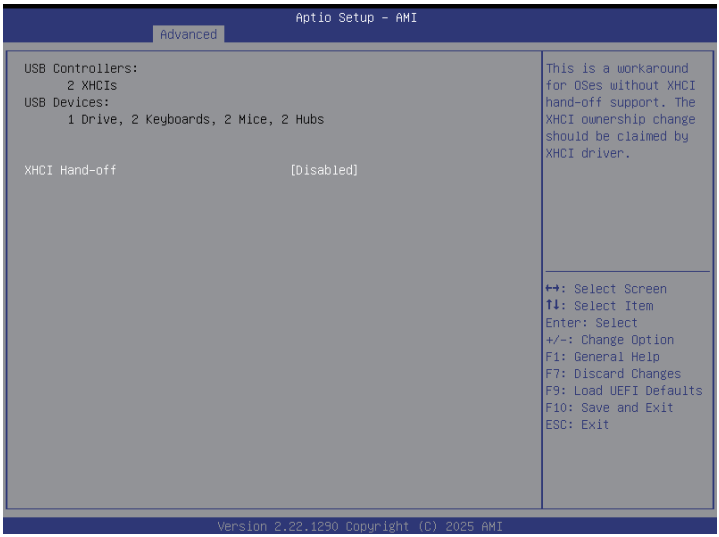
USB Keyboard/Remote Power On

Allow the system to be waked up by an USB keyboard or remote controller.

USB Mouse Power On

Allow the system to be waked up by an USB mouse.

3.4.9 USB Configuration

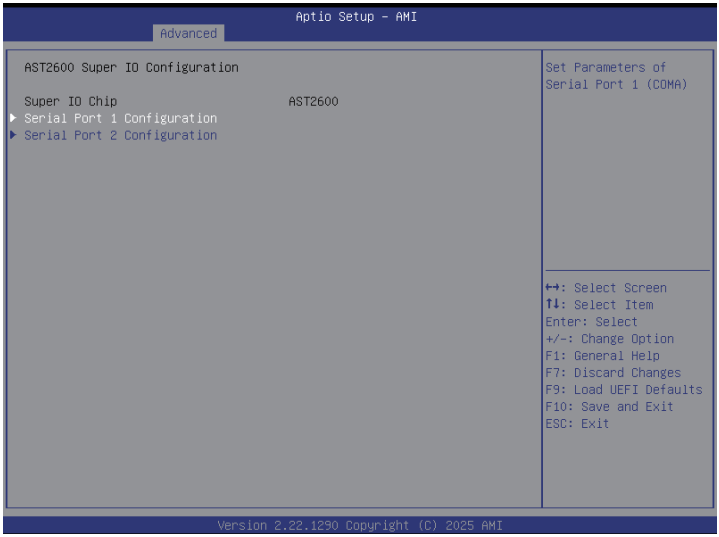


This page displays the information of the USB controllers and USB devices.

XHCI Hand-off

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

3.4.10 Super IO Configuration



Serial Port 1 Configuration / Serial Port 2 Configuration

Use this item to set parameters of Serial Port1 (COMA).

Serial Port

Use this item to enable or disable the serial port (COM).

Change Settings

Use this item to select an optimal setting for Super IO device.

Serieal Port2 Configuration

Use this item to set parameters of Serial Port2 (COMB).

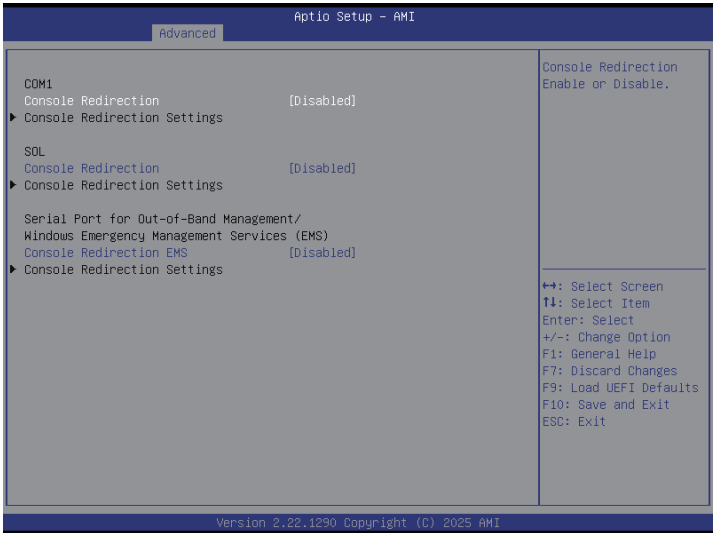
Serial Port

Use this item to enable or disable the SOL port.

Change Settings

Use this item to select an optimal setting for Super IO device.

3.4.11 Serial Port Console Redirection



COM1 / SOL

Console Redirection

Use this option to enable or disable Console Redirection. If this item is set to Enabled, select a COM Port to be used for Console Redirection.

Console Redirection Settings

Use this option to configure Console Redirection Settings, and specify how the computer and the host computer to exchange information.

Terminal Type

Use this item to select the preferred terminal emulation type for out-of-band management. It is recommended to select [VT-UTF8].

Option	Description
VT100	ASCII character set
VT100+	Extended VT100 that supports color and function keys
VT-UTF8	UTF8 encoding is used to map Unicode chars onto 1 or more bytes
ANSI	Extended ASCII character set

Bits Per Second

Use this item to select the serial port transmission speed. The speed used in the host computer and the client computer must be the same. Long or noisy lines may require lower transmission speed. The options include [9600], [19200], [38400], [57600] and [115200].

Data Bits

Use this item to set the data transmission size. The options include [7] and [8] (Bits).

Parity

Use this item to select the parity bit. The options include [None], [Even], [Odd], [Mark] and [Space]. 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.

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

The item indicates the end of a serial data packet. The standard setting is [1] Stop Bit. Select [2] Stop Bits for slower devices.

Flow Control

Use this item to set the flow control to 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 restart the flow. Hardware flow uses two wires to send start/stop signals. The options include [None] and [Hardware RTS/CTS].

VT-UTF8 Combo Key Support

Use this item to enable or disable the VT-UTF8 Combo Key Support for ANSI/VT100 terminals.

Recorder Mode

Use this item to enable or disable Recorder Mode to capture terminal data and send it as text messages.

Resolution 100x31

Use this item to enable or disable extended terminal resolution support.

Putty Keypad

Use this item to select Function Key and Keypad on Putty.

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

Console Redirection EMS

Use this option to enable or disable Console Redirection. If this item is set to Enabled, select a COM Port to be used for Console Redirection.

Console Redirection Settings

Use this option to configure Console Redirection Settings, and specify how the computer and the host computer to exchange information.

Out-of-Band Mgmt Port

Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.

Terminal Type EMS

Use this item to select the preferred terminal emulation type for out-of-band management. It is recommended to select [VT-UTF8].

Option	Description
VT100	ASCII character set
VT100+	Extended VT100 that supports color and function keys
VT-UTF8	UTF8 encoding is used to map Unicode chars onto 1 or more bytes
ANSI	Extended ASCII character set

Bits Per Second EMS

Use this item to select the serial port transmission speed. The speed used in the host computer and the client computer must be the same. Long or noisy lines may require lower transmission speed. The options include [9600], [19200], [57600] and [115200].

Flow Control EMS

Use this item to set the flow control to 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 restart the flow. Hardware flow uses two wires to send start/stop signals. The options include [None], [Hardware RTS/CTS], and [Software Xon/Xoff].

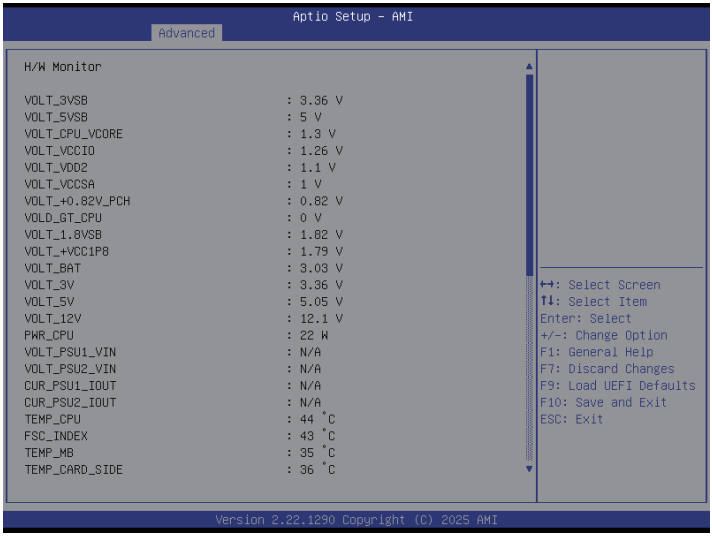
Data Bits EMS

Parity EMS

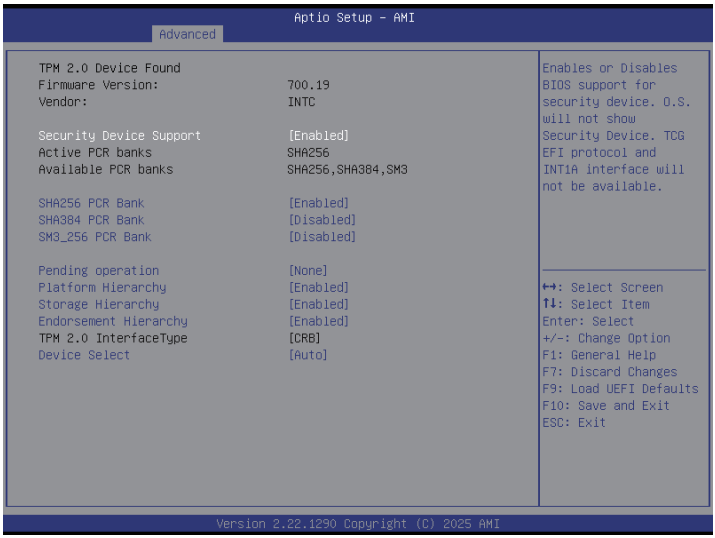
Stop Bits EMS

3.4.12 H/W Monitor

In this section, it allows user to monitor the status of the hardware on the system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.



3.4.13 Trusted Computing



NOTE: Options vary depending on the version of the connected TPM module.

Security Device Support

Enable to activate Trusted Platform Module (TPM) security for the hard diskdrives.

Active PCR banks

This item displays active PCR Banks.

Available PCR Banks

This item displays available PCR Banks.

SHA256 PCR Bank

Use this item to enable or disable SHA256 PCR Bank

SHA384 PCR Bank

Use this item to enable or disable SHA384 PCR Bank.

SM3_256 PCR Bank

Use this item to enable or disable SM3_256 PCR Bank.

Pending Operation

Schedule an Operation for the Security Device.
NOTE: The computer will reboot during restart in order to change State of the Device.

Platform Hierarchy

Use this item to enable or disable Platform Hierarchy.

Storage Hierarchy

Use this item to enable or disable Storage Hierarchy.

Endorsement Hierarchy

Use this item to enable or disable Endorsement Hierarchy.

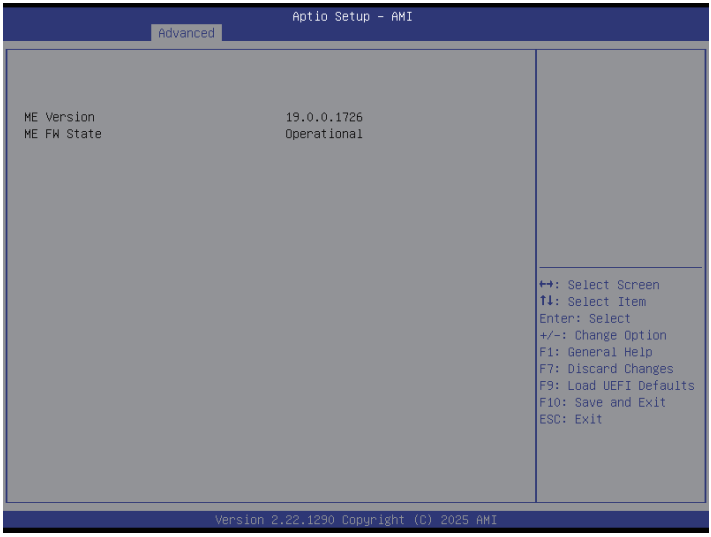
TPM 2.0 InterfaceType (CRB)

Select the Communication Interface to TPM 2.0 Device

Device Select

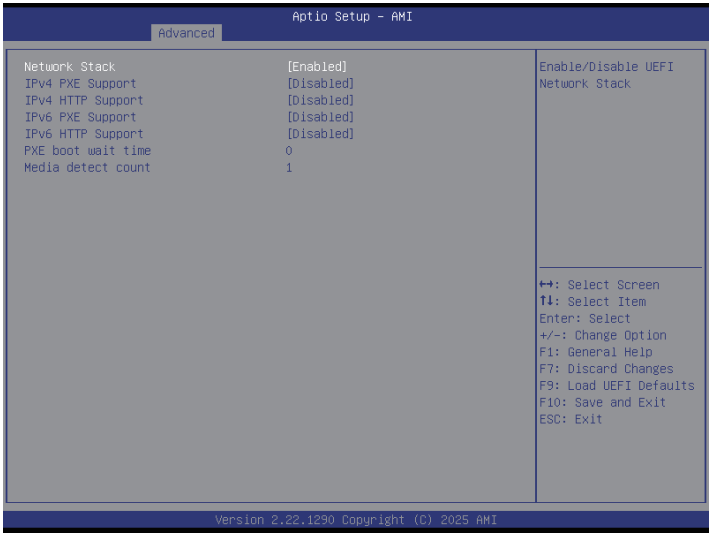
Use this item to select the TPM device to be supported. TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both with the default set to TPM 2.0 devices. If TPM 2.0 devices are not found, TPM 1.2 devices will be enumerated.

3.4.14 Intel ME Configuration



ME Subsystem screen displays the Intel ME Subsystem Configuration information, such as ME Version and ME FW State.

3.4.15 Network Stack Configuration



Network Stack

Use this item to enable or disable UEFI Network Stack.

Ipv4 PXE Support

Use this item to enable or disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

Ipv4 HTTP Support

Use this item to enable or disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.

Ipv6 PXE Support

Use this item to enable or disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

Ipv6 HTTP Support

Use this item to enable or disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.

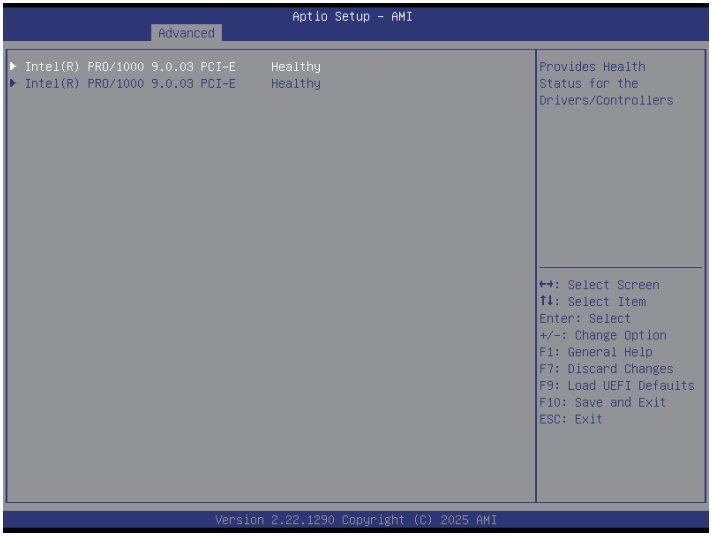
PXE Boot Wait Time

Specifies the wait time and press the ESC key to abort the PXE boot.

Media Detect Count

Specifies the number of times the presence of physical storage device are verified on a system reset or power cycle.

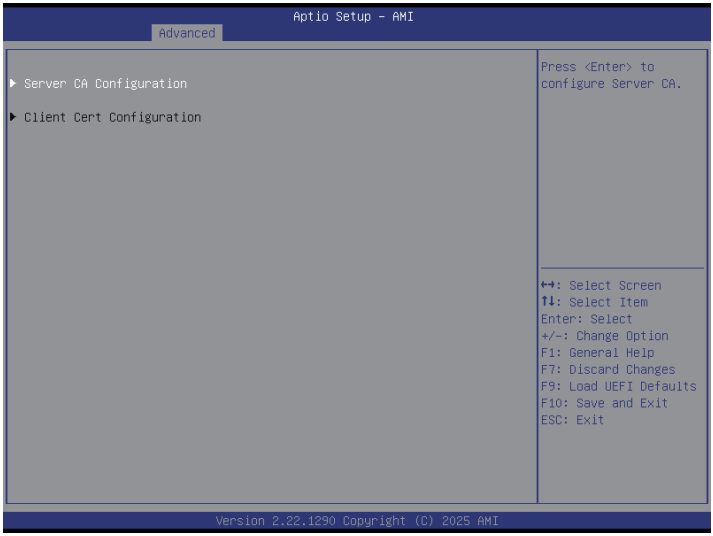
3.4.16 Driver Health



This page provides health status for the drivers/controllers.

Note: The screenshot here is for for references only. The items on this page vary depending on models and devices used.

3.4.17 Tls Auth Configuration



Server CA Configuration

Press <Enter> to configure Server CA.

Client Cert Configuration

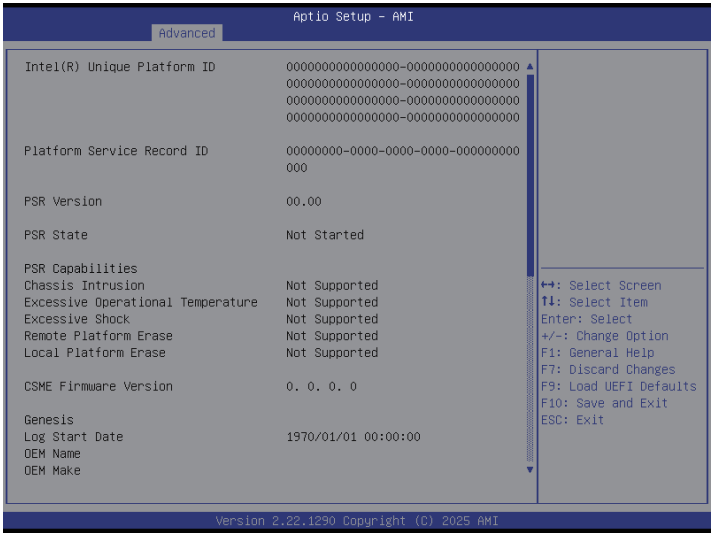
Enroll Cert

Press <Enter> to enroll cert.

Delete Cert

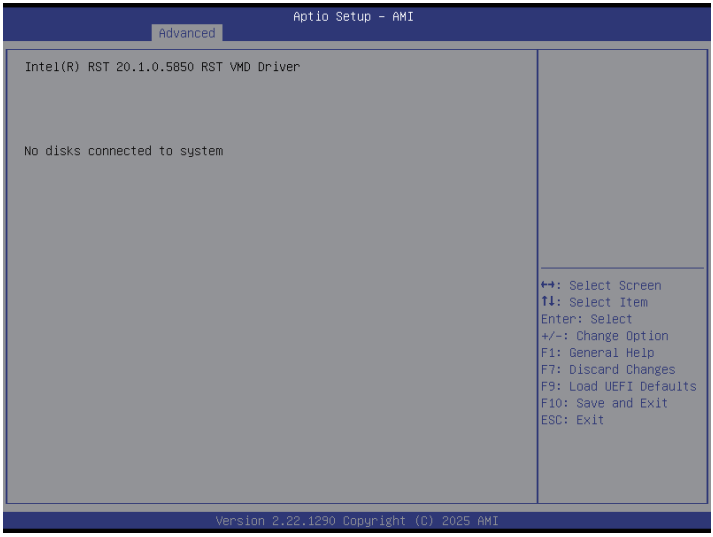
Press <Enter> to delete cert.

3.4.18 Intel(R) Platform Service Record



This formset contains forms for displaying platform service record Zero values means either not started or failed to receive PSR data from CSME.

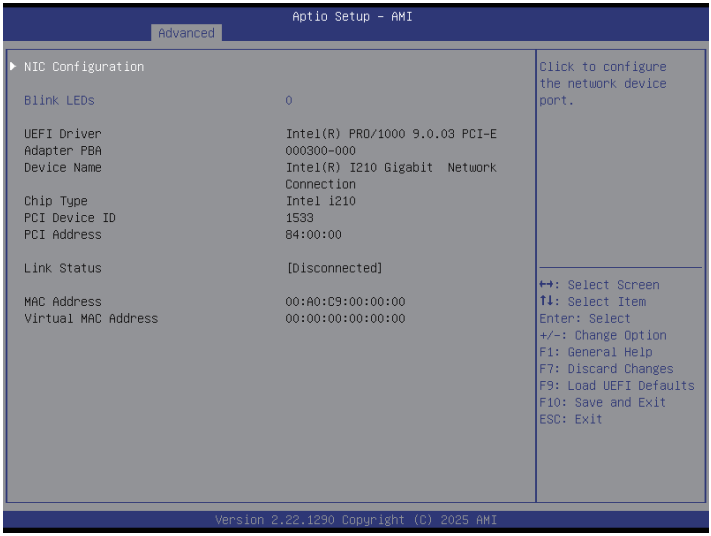
3.4.19 Intel(R) Rapid Storage Technology



This formset allows the user to manage RAID volumes on the Intel(R) RAID Controller.

3.4.20 Intel(R) Network Connection

Configure Gigabit Ethernet device parameters.



NIC Configuration

Click this item to configure the network device port.

Link Speed
Specifies the port speed used for the selected boot protocol.

Wake On LAN
Use this item to enable power on of the system via LAN. Note that configuring Wake on LAN in the operating system does not change the value of this setting, but does override the behavior of Wake on LAN in OS controlled power states.

Blink LEDs

Identify the physical network port by blinking the associated LED.

Port Configuration Information

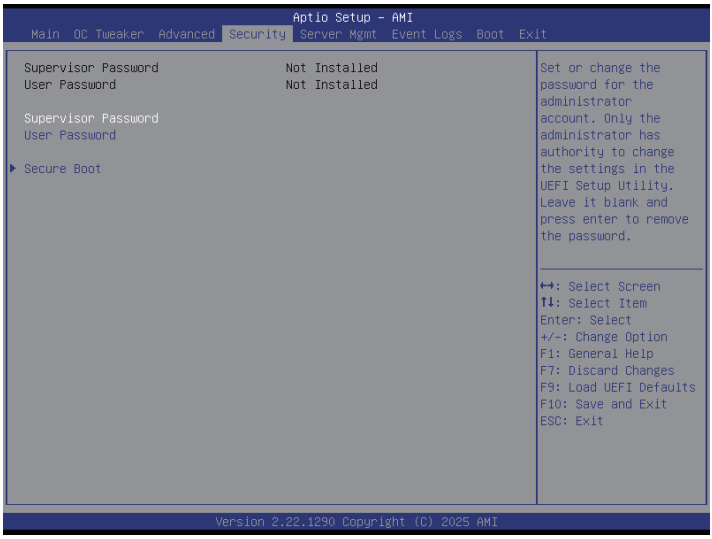
Displays port configuration information including UEFI Driver, Adapter PBA, Device Name, Chip Type, PCI Device ID, PCI Address, Link Status, MAC Address and Virtual MAC Address.

3.4.21 Instant Flash

Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows user to update system UEFI without entering operating systems first like MS-DOS or Windows®. Just save the new UEFI file to the USB flash drive, floppy disk or hard drive and launch this tool, then update the UEFI only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system. If executing Instant Flash utility, the utility will show the UEFI files and their respective information. Select the proper UEFI file to update the UEFI, and reboot the system after the UEFI update process is completed.

3.5 Security Screen

In this section, set or change the supervisor/user password for the system. It also allows user to clear the user password.



Supervisor Password

Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

User Password

Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

Secure Boot

Use this item to enable or disable support for Secure Boot.

Secure Boot Mode

Enable to support Windows 8 or later versions Secure Boot.

3.5.1 Expert Key Management

In this section, expert users can modify Secure Boot Policy variables without full authentication.

Factory Key Provision

Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.

Install Default Secure Boot Keys

Please install default secure boot keys if it's the first time to use secure boot.

Clear Secure Boot keys

Force System to Setup Mode - clear all Secure Boot Variables. Change takes effect after reboot.

Enroll Efi Image

Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).

Export Secure Boot variables

Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device.

Platform Key (PK)

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Facory, Modified, Mixed

Key Exchange Keys (KEK)

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Facory, Modified, Mixed

Authorized Signatures (db)

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Facory, Modified, Mixed

Forbidden Signatures (dbx)

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Facory, Modified, Mixed

Authorized TimeStamps (dbt)

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Facory, Modified, Mixed

OsRecovery Signatures (dbr)

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

a) EFI_SIGNATURE_LIST

b) EFI_CERT_X509 (DER)

c) EFI_CERT_RSA2048 (bin)

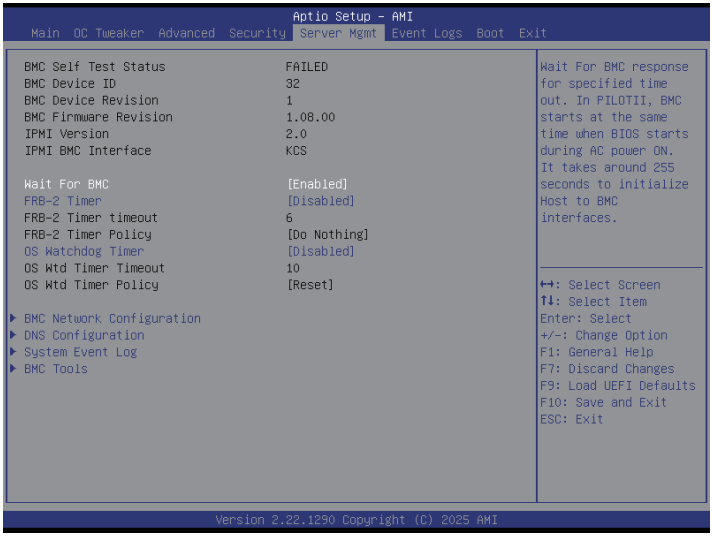
d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3. EFI PE/COFF Image(SHA256)

Key Source: Facory, Modified, Mixed

3.6 Server Mgmt



Wait For BMC

Wait For BMC response for specified time out. In PILOTII, BMC starts at the same time when BIOS starts during AC power ON. It takes around 90 seconds to initialize Host to BMC interfaces.

FRB-2 Timer

Use this item to enable or disable FRB-2 timer (POST timer).

FRB-2 Timer Timeout

Enter value between 1 to 30 min for FRB-2 Timer Expiration.

FRB-2 Timer Policy

Use this item to configure how the system should respond if the FRB-2 Timer expires. Not available if FRB-2 Timer is disabled.

OS Watchdog Timer

If enabled, starts a BIOS timer which can only be shut off by Management Software after the OS loads. Helps determine that the OS successfully loaded or follows the OS Boot Watchdog Timer policy.

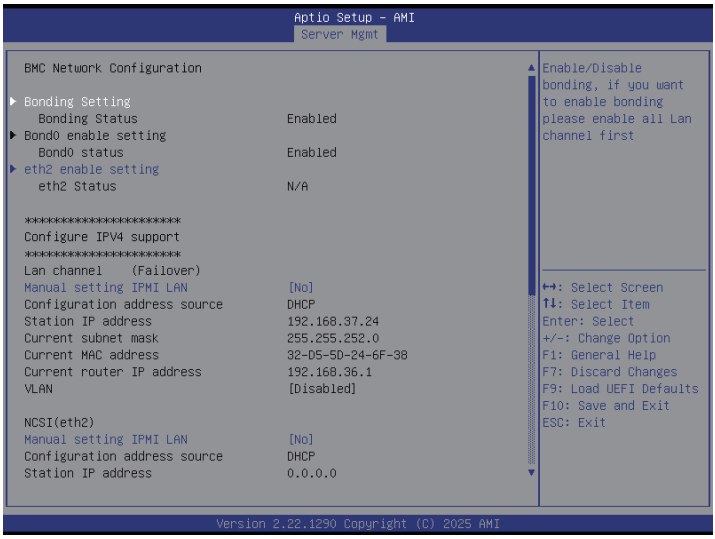
OS Wtd Timer Timeout

Enter the value between 1 to 30 min for OS Boot Watchdog Timer Expiration. This item is not available if OS Boot Watchdog Timer is disabled.

OS Wtd Timer Policy

Configure how the system should respond if the OS Boot Watchdog Timer expires. This item is not available if OS Boot Watchdog Timer is disabled.

3.6.1 BMC Network Configuration



Bonding Setting

Use this item to enable or disable bonding. Please enable all Lan channel first before enabling bonding.

Bond0 Enable Setting

Show the Bond0 status is enabled or disabled.

Lan Channel (Failover)

Manual Setting IPMI LAN

If [No] is selected, the IP address is assigned by DHCP. If using a static IP address, toggle to [Yes], and the changes take effect after the system reboots. The default value is [No].

Configuration Address Source

Select to configure BMC network parameters statically or dynamically(by BIOS or BMC). Configuration options: [Static] and [DHCP].

When [DHCP] or [Static] is selected, do NOT modify the BMC network settings on the IPMI web page.

Static: Manually enter the IP Address, Subnet Mask and Gateway Address in the BIOS for BMC LAN channel configuration.
DHCP: IP address, Subnet Mask and Gateway Address are automatically assigned by the network's DHCP server.

The default login information for the IPMI web interface is:
Username: admin
Password: admin

For more instructions on how to set up remote control environment and use the IPMI management platform, please refer to the IPMI Configuration User Guide or go to the Support website at: http://www.asrockrack.com/support/faq.asp

VLAN

Enabled/Disabled Virtual Local Area Network.

If [Enabled] is selected, configure the items below.
VLAN ID: Select this item to configure the VLAN ID setting, the Maximum value is 4094 and the Minimum value is 1.
VLAN Priority: Select this item to configure the VLAN Priotity setting. the Maximum value is 7 and the Minimum value is 0.

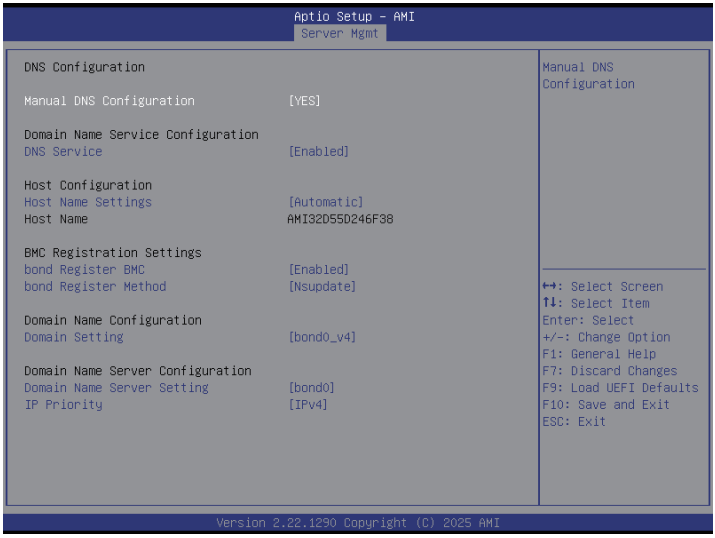
IPV6 Support

Enabled/Disable LAN1 IPV6 Support.

Manual Setting IPMI LAN(IPV6)

Select to configure LAN channel parameters statically or dynamically(by BIOS or BMC). Unspecified option will not modify any BMC network parameters during BIOS phase.

3.6.2 DNS Configuration



Manual DNS Configuration

Select this item to manual configure DNS.

If [YES] is selected, configure the items below.

DNS Service

Use this item to enable or disable DNS Service Configuration.

Host Name Settings

Use this item to automatic or manual Host Name Settings.

Bond Register BMC

Use this item to enable or disable Bond Register BMC.

Bond Register Method

Use this item to configure Bond Register Method with Nsupdate or DHCP client FQDN/ Hostname..

Domain Setting

This item supports Manual, Bond0_v4 and Bond0_v6 Domain Settings.

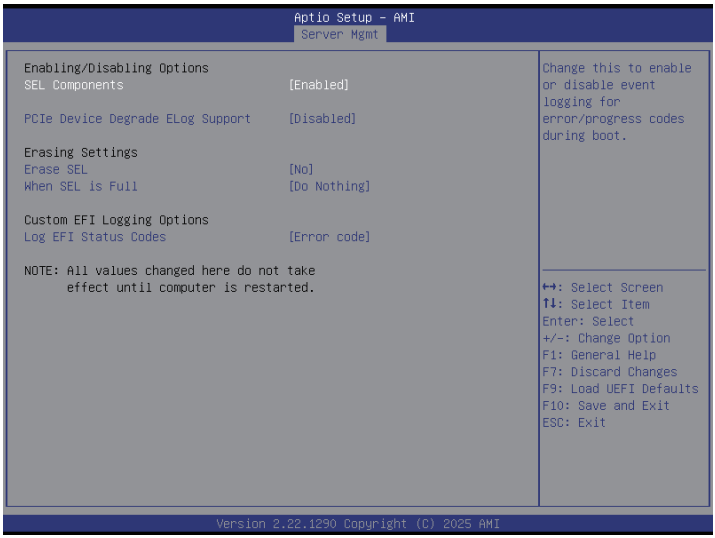
Domain Name Server Setting

This item supports Manual and Bond0 DNS Server Settings.

IP Priority

This item supports IPV4 and IPV6 IP Priority.

3.6.3 System Event Log



SEL Components

Change this to enable ro disable all features of System Event Logging during boot.

PCIe Device Degrade ELog Support

Use this item to enable or disable PCIe Device Degrade Error Logging Support.

Erase SEL

Use this to choose options for earsing SEL.

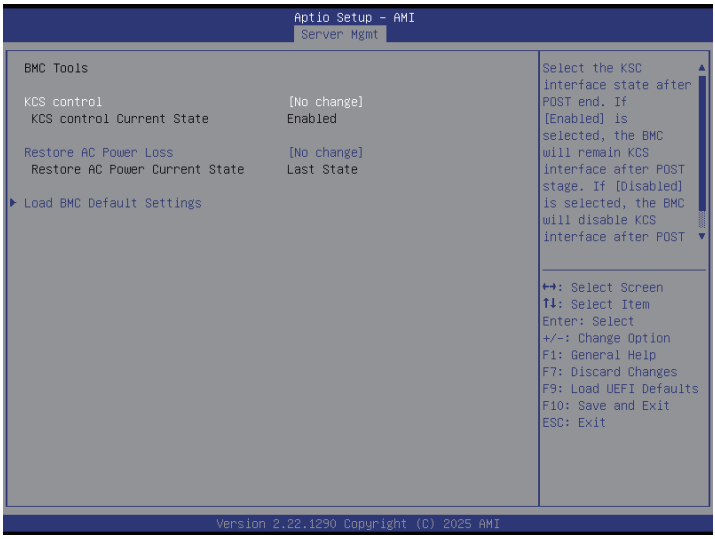
When SEL is Full

Use this to choose options for reactions to a full SEL.

Log EFI Status Codes

Use this item to disable the logging of EFI Status Codes or log only error code or only progress or both.

3.6.4 BMC Tools



KCS Control

Select this KCS interface state after POST end. If [Enabled] us selected, the BMC will remain KCS interface after POST stage. If [Disabled] is selected, the BMC will disable KCS interface after POST stage

Restore AC Power Loss

This allows user to set the power state after an unexpected AC/power loss. If [Power Off] is selected, the AC/power remains off when the power recovers. If [Power On] is selected, the AC/power resumes and the system starts to boot up when the power recovers. If [Last State] is selected, it will recover to the state before AC/power loss.

Load BMC Default Settings

Use this item to Load BMC Default Settings

3.7 Event Logs

Change Smbios Event Log Settings

This allows user to configure the Smbios Event Log Settings.

When entering the item, the sub-item will be displayed as below:

Smbios Event Log
Use this item to enable or disable all features of the SMBIOS Event Logging during system boot.

Erase Event Log
The options include [No], [Yes, Next reset] and [Yes, Every reset]. If Yes is selected, all logged events will be erased.

When Log is Full
Use this item to choose options for reactions to a full Smbios Event Log. The options include [Do Nothing] and [Erase Immediately].

Log System Boot Event
Choose option to enable/disable logging of System boot event.

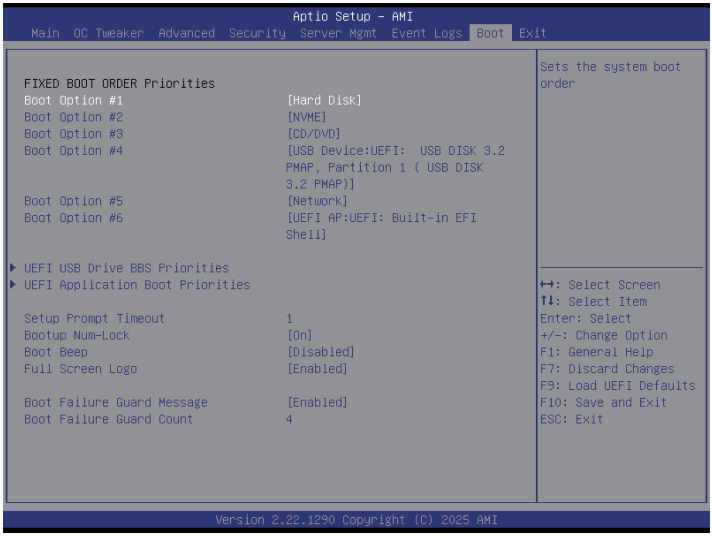
View Smbios Event Log

Press <Enter> to view the Smbios Event Log records.

All values changed here do not take effect until computer is restarted.

3.8 Boot Screen

In this section, it will display the available devices on the system for user to configure the boot settings and the boot priority.



Boot Option #1~#6

Use this item to set the system boot order.

UEFI USB Drive BBS Priorities

Specifies the Boot Device Priority sequence from available UEFI USB Drives.

UEFI Application Boot Priorities

Specifies the Boot Device Priority sequence from available UEFI Application.

Setup Prompt Timeout

Configure the number of seconds to wait for the UEFI setup utility.

Bootup Num-Lock

If this item is set to [On], it will automatically activate the Numeric Lock function after boot-up.

Boot Beep

Select whether the Boot Beep should be turned on or off when the system boots up. Please note that a buzzer is needed.

Full Screen Logo

Use this item to enable or disable OEM Logo. The default value is [Enabled].

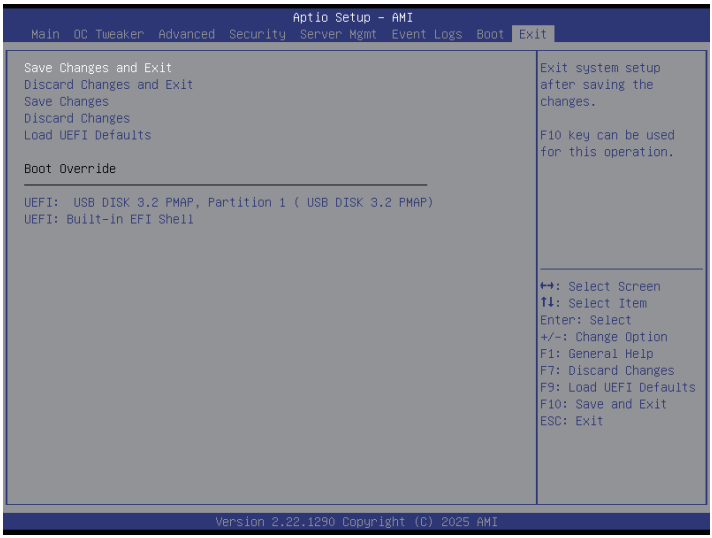
Boot Failure Guard Message

If the computer fails to boot for a number of times the system automatically restores the default settings.

Boot Failure Guard Count

Use this item to configure Boot Failure Guard Count.

3.9 Exit Screen



Save Changes and Exit

When selecting this option, the following message “Save configuration changes and exit setup?” will pop-out. Press <F10> key or select [Yes] to save the changes and exit the UEFI SETUP UTILITY.

Discard Changes and Exit

When selecting this option, the following message “Discard changes and exit setup?” will pop-out. Press <ESC> key or select [Yes] to exit the UEFI SETUP UTILITY without saving any changes.

Save Changes

When selecting this option, the following message “Save changes?” will pop-out. Select [Yes] to save all changes.

Discard Changes

When selecting this option, the following message “Discard changes?” will pop-out. Press <F7> key or select [Yes] to discard all changes.

Load UEFI Defaults

Load UEFI default values for all the setup questions. F9 key can be used for this operation.

Chapter 4 Software Support

After all the hardware has been installed, it suggests to the offical website at http://www.ASRockRack.com and make sure if there are any new updates of the BIOS / BMC firmware for the motherboard.

4.1 Download and Install Operating System

This motherboard supports various Microsoft® Windows® Server / Linux compliant operating systems. Please download the operating system from the OS manufacturer. Please refer to the OS documentation for more instructions.

**Please download the Intel® Rapid Storage Technology driver from the ASRock Rack's website (www.asrockrack.com) to the USB drive while installing OS in SATA RAID mode.*

4.2 Download and Install Software Drivers

This motherboard supports various Microsoft® Windows® compliant drivers. Please download the required drivers from the website at http://www.ASRockRack.com.

To download necessary drivers, go to the product page, click on the "Download" tab, choose the operating system, and select the driver to donwload.

Chapter 5 Troubleshooting

5.1 Troubleshooting Procedures

Follow the procedures below to troubleshoot the system.

Always unplug the power cord before adding, removing or changing any hardware components. Failure to do so may cause physical injuries and motherboard damages.

1. Disconnect the power cable and check whether the PWR LED is off.
2. Unplug all cables, connectors and remove all add-on cards from the motherboard. Make sure that the jumpers are set to default settings.
3. Confirm that there are no short circuits between the motherboard and the chassis.
4. Install a CPU and fan on the motherboard, then connect the chassis speaker and power LED.

If there is no power...

1. Confirm that there are no short circuits between the motherboard and the chassis.
2. Make sure that the jumpers are set to default settings.
3. Check the settings of the 115V/230V switch on the power supply.
4. Verify if the battery on the motherboard provides ~3VDC. Install a new battery if it does not.

If there is no video...

1. Try replugging the monitor cables and power cord.
2. Check for memory errors.

If there are memory errors...

1. Verify that the DIMM modules are properly seated in the slots.
2. Use recommended DDR5 ECC (for W880D4U only) /non-ECC UDIMM, CUDIMM.
3. If having installed more than one DIMM modules, they should be identical with the same brand, speed, size and chip-type.
4. Try inserting different DIMM modules into different slots to identify faulty ones.
5. Check the settings of the 115V/230V switch on the power supply.

Unable to save system setup configurations...

1. Verify if the battery on the motherboard provides ~3VDC. Install a new battery if it does not.
2. Confirm whether the power supply provides adaquate and stable power.

Other problems...

1. Try searching keywords related to the problem on ASRock Rack's FAQ page: http://www.asrockrack.com/support

5.2 Technical Support Procedures

If having tried the troubleshooting procedures mentioned above and the problems are still unsolved, please contact ASRock Rack's technical support with the following information:

1. Contact information
2. Model name, BIOS version and problem type.
3. System configuration.
4. Problem description.

Contact ASRock Rack's technical support at:
http://www.asrockrack.com/support/tsd.asp

5.3 Returning Merchandise for Service

For warranty service, the receipt or a copy of the invoice marked with the date of purchase is required. By calling the vendor or going to the RMA website (http://event. asrockrack. com/tsd.asp) to obtain a Returned Merchandise Authorization (RMA) number.

The RMA number should be displayed on the outside of the shipping carton which is mailed prepaid or hand-carried when returning the motherboard to the manufacturer. Shipping and handling charges will be applied for all orders that must be mailed when service is complete.

This warranty does not cover damages incurred in shipping or from failure due to alteration, misuse, abuse or improper maintenance of products.

Contact the distributor first for any product related problems during the warranty period.

Contact Information

Contact ASRock Rack or want to know more about ASRock Rack, you're welcome to visit ASRock Rack's website at http://www.asrockrack.com; or contact the dealer for further information. For technical questions, please submit a support request form at https://event.asrockrack.com/tsd.asp

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