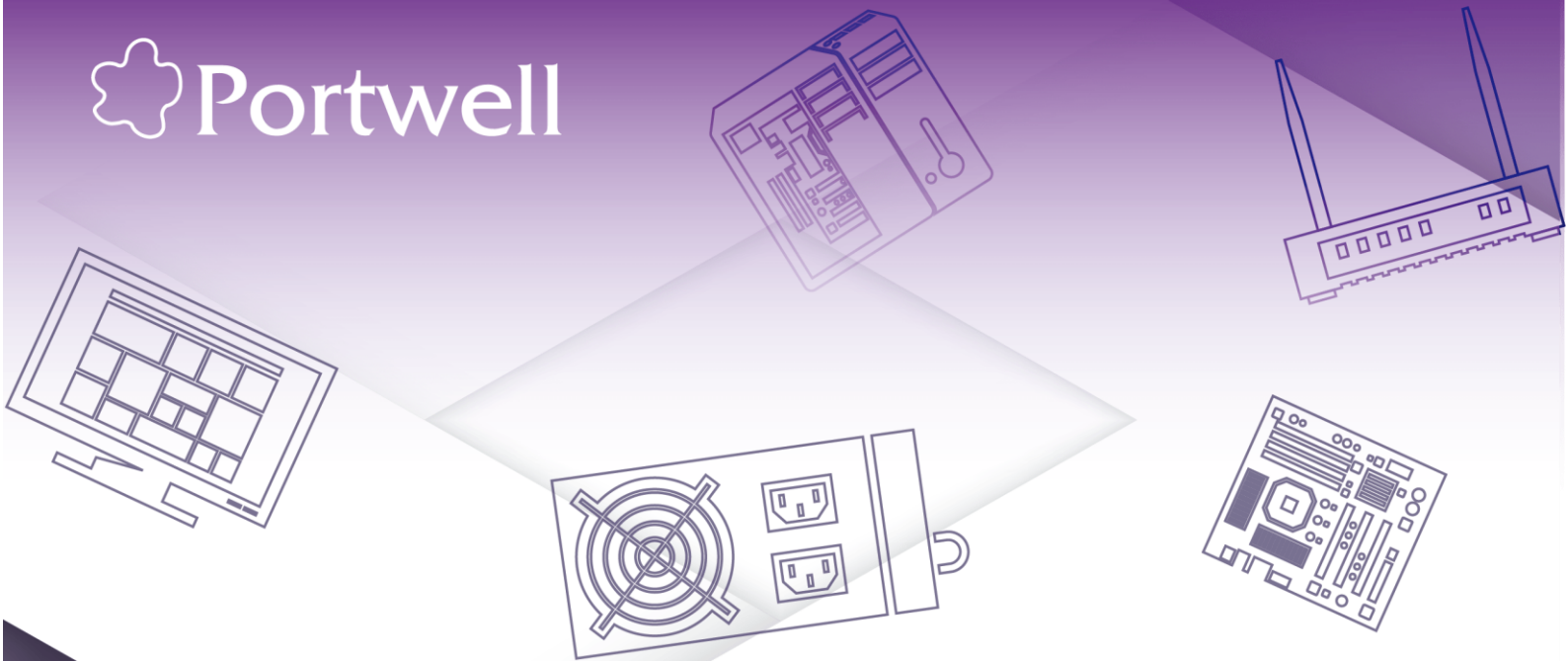
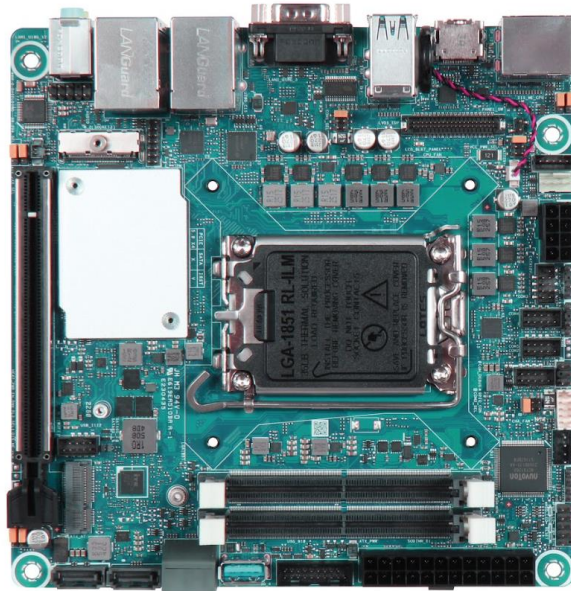




WADE-8214-Q870

MINI-ITX Embedded Board

User Manual

Version R1.2

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Revision History

R1.0	Official Released Rev. 1.0
R1.1	Update Power consumption
R1.2	Update Block Diagram

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Chapter 1

Overview

1 Introduction

1. Introduction

WADE-8214-Q870 is based on the Intel® Core™ Ultra Processors (Series 2) which offers newest performance with Hybrid technology. WADE-8214-Q870 supports dual channels DDR5 SO-DIMM up to 96GB.

Desktop solution is still popular in the market of DVR and Factory Automation which can fulfill most of these applications; therefore, with high performance and high-end specifications, WADE-8214-Q870 is our first-generation Arrow Lake chip architecture on mini-ITX line.

Chapter 2

Overview

- 2 Specifications
- 2.1 Supported Operating Systems
- 2.2 Mechanical Dimension
- 2.3 Power Consumption

2. Specifications

Main Processor	Intel® Core™ Ultra Processors Series 2 (up to 65W)
System BIOS	AMI UEFI BIOS
Main Memory	2x non-ECC DDR5 6400MT/s SO-DIMM up to 96GB 1DPC, 2-channel
Graphics	Intel® Graphics with Xe LPG Architecture up to 4Xe Graphics Engines HDMI: 1x HDMI port on rear I/O (HDMI 2.1, 4096x2304 @ 60Hz) DP: 2x DP port on rear I/O (DP 1.4, 4096x2304 @ 60Hz) USC-C : 1x DPOC eDP/LVDS: 1x eDP/LVDS on board connector
Expansion Interface	1x PCIe Gen5 x16 slot (16X; 8X+8X; 8X+4X+4X). 1x M.2 E key 2230 with PCIe and CNVi modes for WiFi/BT devices 1x M.2 M Key 2280 with NVMe support
Storage Interface	4x SATA III port (SATA 6Gb/s)
Input/Output	Serial Port: 1x RS-232/422/485 port on rear I/O 1x RS-232/422/485 on-board pin header 3x RS-232 on-board pin-header USB Port: 1x USB 3.2 Gen2 x 2 (Type C) on rear I/O 3x USB 3.2 Gen2 on rear I/O 4x USB 3.2 Gen1 on rear I/O 2x USB3.2 Gen1 on-board pin-header 1x USB3.2 Gen1 on-board stick socket 2x USB2.0 on-board pin header Audio Interface: Audio jack on rear I/O (Line-out, Line-in)
Ethernet	1x Intel® 2.5GbE Controller, 1 Intel® 1GbE Controller 2x RJ45 connectors on rear I/O
High Drive GPIO	1x pin-header for GPIO(8bit)
Mechanical and environmental specifications	Board size: 170mm x 170 mm (6.7" x 6.7") Operating temperature: 0 ~ 60° C Storage temperature: -40 ~ 85° C Humidity: 5 ~ 95% non-condensing Power requirement: ATX mode
Certification	CE/FCC

2.1 Supported Operating Systems

The WADE-8214-Q870 supports the following operating systems.

Windows 10 IoT Enterprise LTSC 2021

Windows 11 IoT Enterprise LTSC 2024

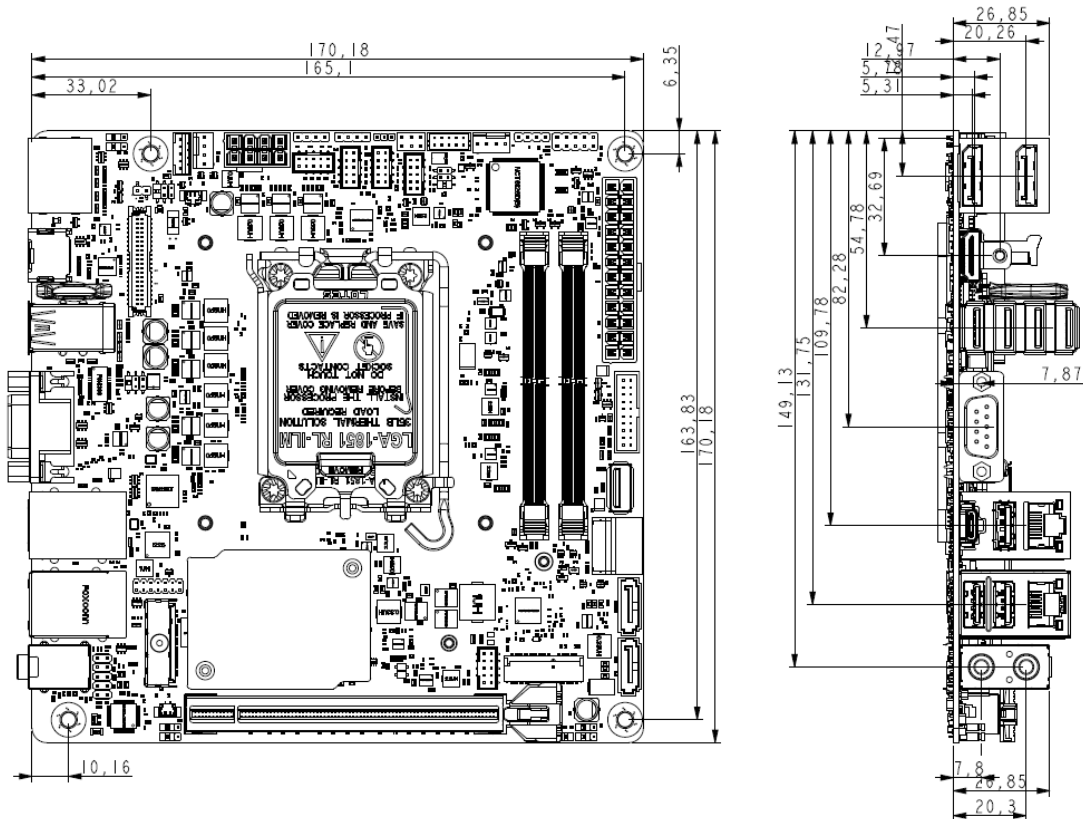
Ubuntu

RedHat Enterprise

Fedora Workstation

OpenSUSE

2.2 Mechanical Dimensions



2.3 Power Consumption

Testing Configuration			
Mother Board	WADE-8214-Q870	DIMM1	SAMSING UDIMM DDR5 6400 32GB 0040
CPU	Intel® core™ Ultra7 265 65W	DIMM2	SAMSING UDIMM DDR5 6400 32GB 0041
HDD1	Sandisk SSD Plus 240GB	Graphic Card	N/A
HDD2	Sandisk SSD Plus 240GB	M.2 Card	SAMSUNG SSD 970 EVO PLUS 250GB
HDD3	Seagate HDD 160GB	Audio Card	32.0.101.6737
HDD4	ADATA ISSS31C-128G	CPU Cooler	Bizzard T400K-RR-17PA-R1
USB 1/2/3/4	Fixture Unloading: 0.9 mA	PSU	MPX-7503-AFAG-750W
LAN1 Driver Rev	1.1.4.43	LAN2 Driver Rev	12.18.11.1
Power On : The requirement is to confirm the power consumption during startup without any loading (Idle status) when all KPs are fully installed			
Idle status	230V/50HZ		54.02W
	115V/60HZ		54.74W
Full Loading : The requirement is to confirm the power consumption when all KPs, rear I/O ports are fully connected, and the motherboard is running at full loading via concurrent program execution			
Furmark + Prime95 status	230V/50HZ		129.28W
	115V/60HZ		129.02W

2.4 Environmental Specifications

Storage Temperature: -40~85° C

Operation Temperature: 0~60° C

Storage Humidity: 5~95%, non-condensing

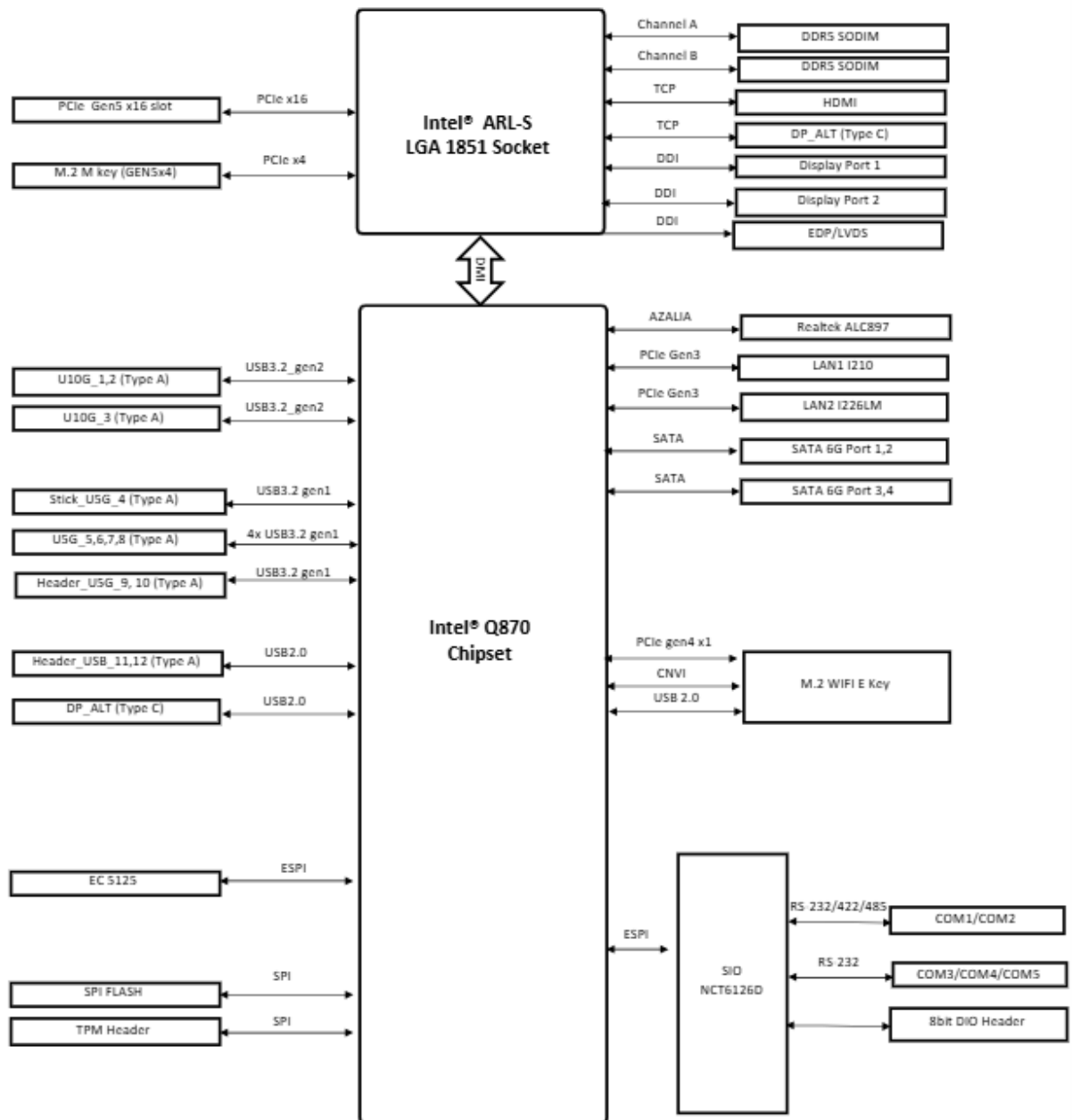
Operation Humidity: 5~95%, non-condensing

Chapter 3

Overview

3 Block Diagram

3 Block Diagram



Chapter 4

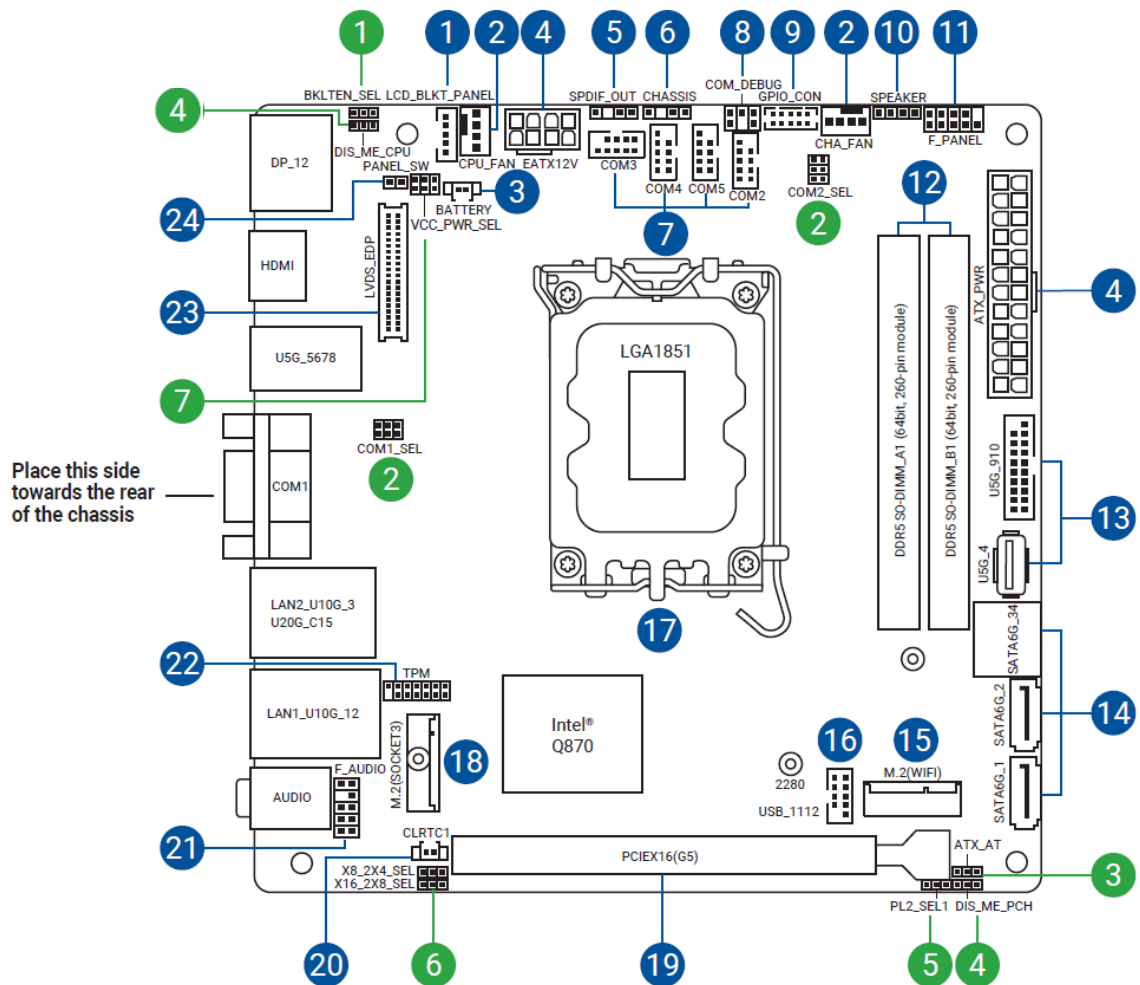
Overview

- 4 Hardware Configuration
- 4.1 Jumpers and Connectors
- 4.2 Jumper Settings

4 Hardware Configuration

4.1 Jumpers and Connectors

This chapter indicates the location of jumpers', headers and connectors' locations. Users may find useful information related to hardware settings in this chapter.



4.2 Jumper Settings and Connector

For users to customize WADE-8214-Q870 features. In the following sections, Short means covering a jumper cap over jumper pins; Open or N/C (Not Connected) means removing a jumper cap from jumper pins. Users can refer to Figure 1 for the Jumper allocations.

Jumper Table

The jumper settings are schematically depicted in this manual as follows:

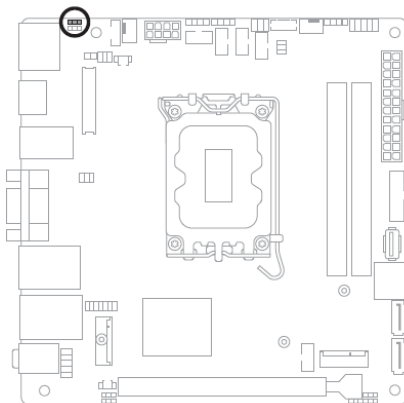
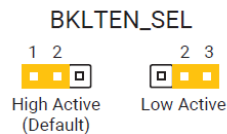
Jump Function List:

Connectors/Slots	
1.	LVDS/eDP Backlight panel connector (5-pin LCD_BLKT_PANEL)
2.	CPU and Chassis Fan headers (4-pin CPU_FAN, 4-pin CHA_FAN)
3.	RTC Battery header (2-pin BATTERY)
4.	ATX Power connectors (24-pin EATXPWR, 8-pin EATX12V)
5.	Digital Audio header (4-1 pin SPDIF_OUT)
6.	Chassis Intrude header (4-1 pin CHASSIS)
7.	Serial Port headers (10-1 pin COM2, COM3, COM4, COM5)
8.	COM Debug connector (6-1 pin COM_DEBUG)
9.	General purpose input/output connector (10-pin GPIO_CON)
10.	Speaker header (4-pin SPEAKER)
11.	System Panel header (10-1 pin F_PANEL)
12.	DDR5 SO-DIMM slots
13.	USB 3.2 Gen 1 connectors (U5G_4 / U5G_910)
14.	SATA 6.0Gb/s ports (7-pin SATA6G_1-4)
15.	M.2 Wi-Fi
16.	USB 2.0 header (10-1 pin USB_1112)
17.	Intel® LGA1851 CPU socket
18.	M.2 socket 3
19.	PCI Express 5.0 x16 slot
20.	Clear CMOS header (2-pin CLRTC)
21.	Front Panel Audio header (10-1 pin F_AUDIO)

22.	SPI TPM header (14-1 pin SPI_TPM)
23.	LVDS/eDP Signal connector (LVDS_eDP)
24.	LCD Panel Monitor Switch header (2-pin PANEL_SW)
Jumpers	
1.	LVDS/eDP Panel Enable Signal Selection header (3-pin BKLTEN_SEL)
2.	COM1/2 Ring/+5V/+12V selection jumpers (6-pin COM1_SEL, COM2_SEL)
3..	AT/ATX Mode selection jumper (3-pin AT_ATX)
4.	Disable ME jumper (3-pin DIS_ME_CPU, DIS_ME_PCH)
5.	Power Limit selection jumper (3-pin PL2_SEL1)
6.	Expansion slot bandwidth selection jumpers (3-pinX16_2X8_SEL, X8_2X4_SEL)
7.	Display panel VCC power selection (6-pin VCC_PWR_SEL)

● Jumper

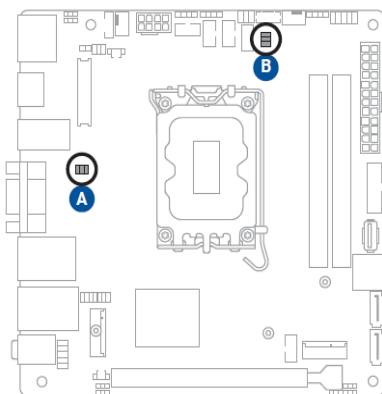
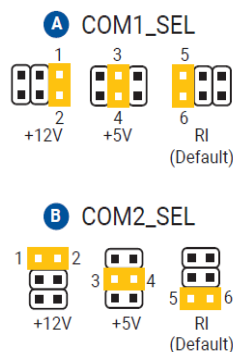
1 : LVDS/EDP Panel Enable Signal Selection header (BKLTEN_SEL)



PIN No.	Signal Description
1-2 Short	High Active (Default)
2-3 Short	Low Active

*Connector Type:
Header 1x3P, 2.00mm pitch, S/T

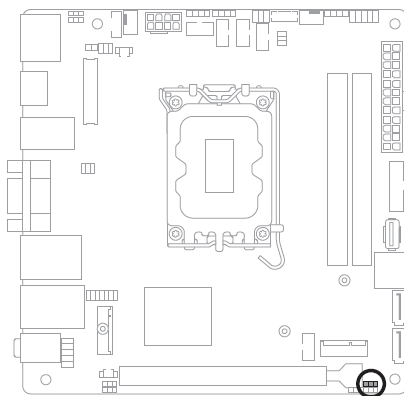
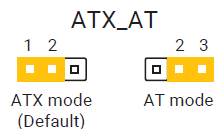
2 : COM1/2 Ring/+5V/+12V selection (6-pin COM1_SEL, COM2_SEL)



PIN No.	Signal Description
1-2 Short	+12V
2-3 Short	+5V
5-6 Short	Ring (Default)

*Connector Type:
Header 2x3p, 2.00mm pitch, S/T

3 : AT/ATX mode selection jumper (3-pin AT_AT)

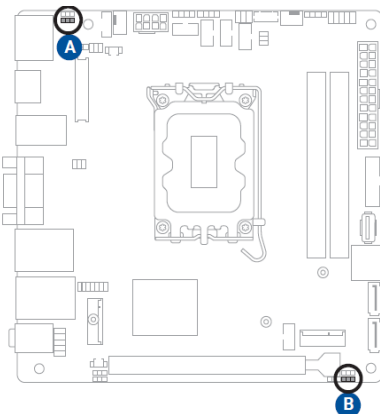
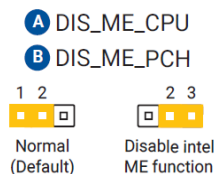


PIN No.	Signal Description
1-2 Short	ATX mode (Default)
2-3 Short	AT mode

*Connector Type:
Header 1x3p, 2.00mm pitch, S/T

4 : Disable ME jumper (3-pin DIS_ME_CPU, DIS_ME_PCH)

This jumper allows you to enable or disable the Intel® ME function. Set this jumper to pins 1-2 to enable (default) the Intel® ME function and to pins 2-3 to disable it.

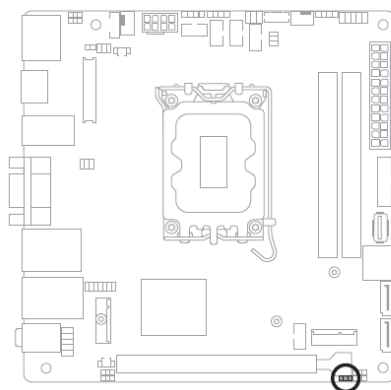


PIN No.	Signal Description
1-2 Short	Normal (Default)
2-3 Short	Disable

*Connector Type:
Header 1x3p, 2.00mm pitch, S/T

5 : Power Limit selection jumper (3-pin PL2_SEL1)

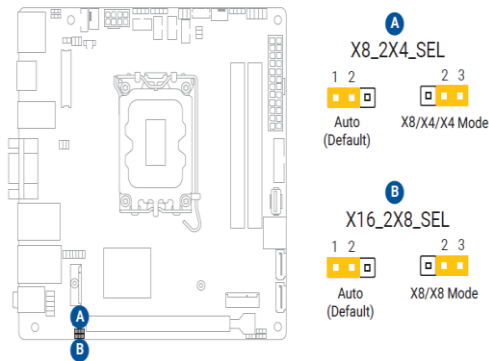
These jumpers allow you to configure the power limit settings



PIN No.	Signal Description
1-2 Short	65W
2-3 Short	Unlock (Default)

*Connector Type:
Header 1x3p, 2.00mm pitch, S/T

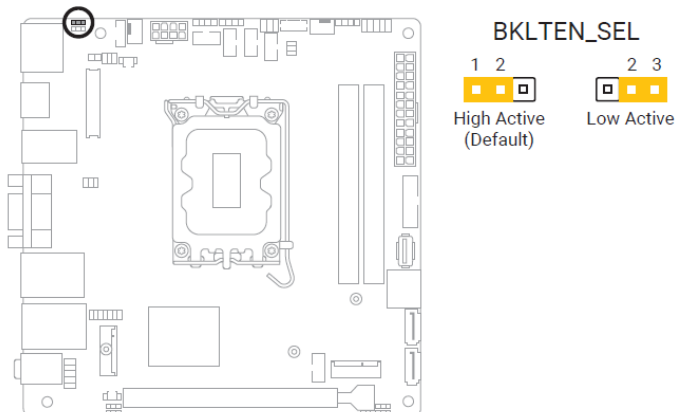
6 : Expansion slot bandwidth selection jumpers (3-pin X16_2X8_SEL, X8_2X4_SEL)



PIN No.	PCIEX16(G5)_1	PCIEX16(G5)_2
A: 1-2 B: 1-2 (Default)	x16 (if PCIEX16(G5)_2 is empty) x8 (if PCIEX16(G5)_2 is used)	X8
A: 2-3 B: 1-2	X8	X8
A: 2-3 B: 2-3	X8	X4/x4

*Connector Type:
Header 1x3p, 2.00mm pitch, S/T

7 : Display panel VCC power selection (6-pin VCC_PWR_SEL)



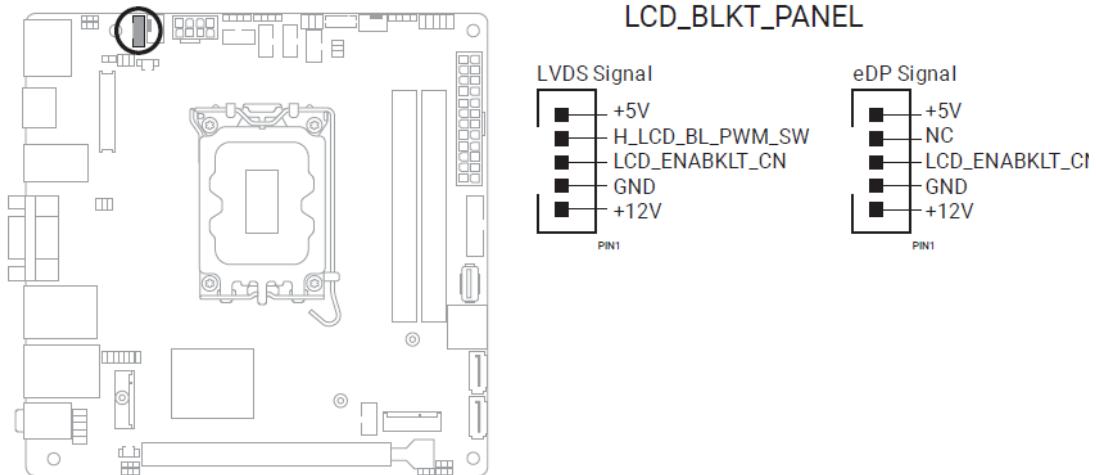
PIN No.	Signal Description
1-2	High Active (Default)
2-3	Low Active

*Connector Type:
Header 1x3p, 2.00mm pitch, S/T

● Connectors/Slots

1 : LVDS/eDP Backlight panel connector (5-pin LCD_BLK_PANEL)

This connector is for the LVDS/eDP panel backlight voltage selection.

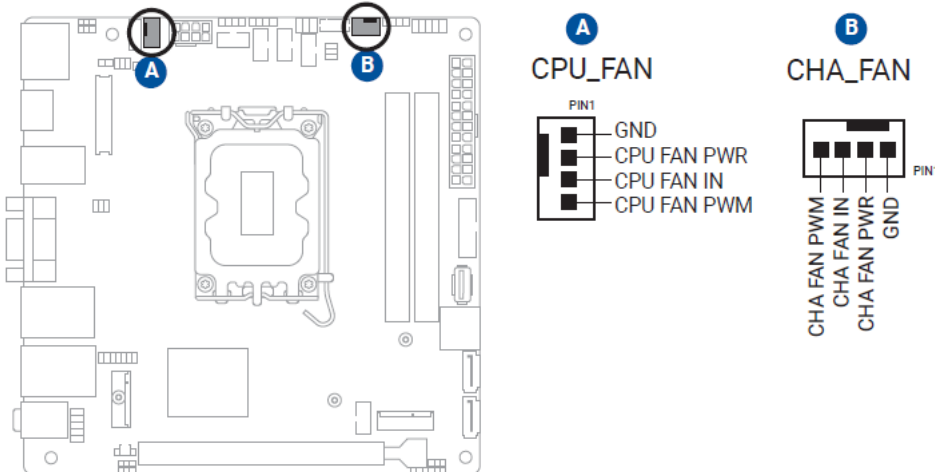


*Connector Type:

Wafer 6p, 2.0mm pitch

2: CPU and Chassis Fan headers (4-pin CPU_FAN, 4-pin CHA_FAN)

Connect the fan cables to the fan headers on the motherboard, ensuring that the black wire of each cable matches the ground pin of the header.



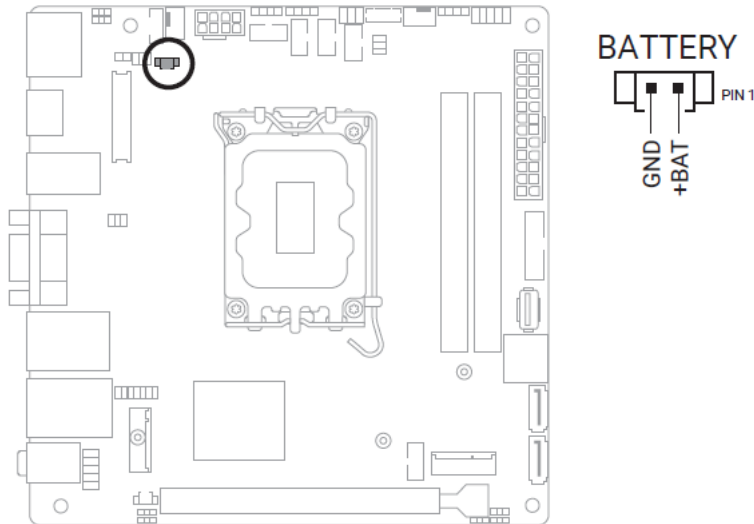
*Connector Type:

Wafer HD 4p, 2.54mm pitch, S/T

Note : Do not forget to connect the fan cables to the fan headers. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan headers!

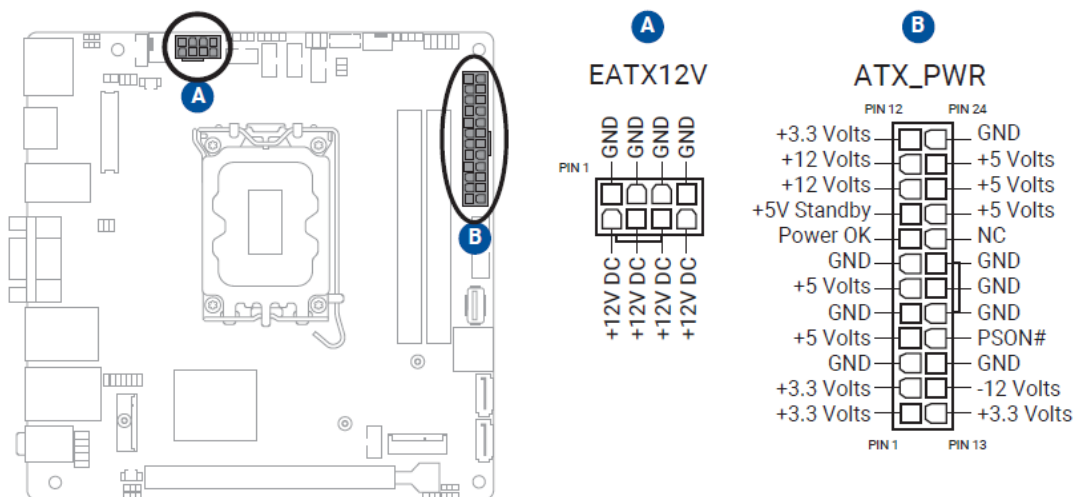
3: RTC Battery header (2-pin BATTERY)

This connector is for the lithium CMOS battery



4: ATX Power connectors (24-pin EATXPWR, 8-pin EATX12V)

Correctly orient the ATX power supply plugs into these connectors and push down firmly until the connectors completely fit.



DC Mode EATXPWR

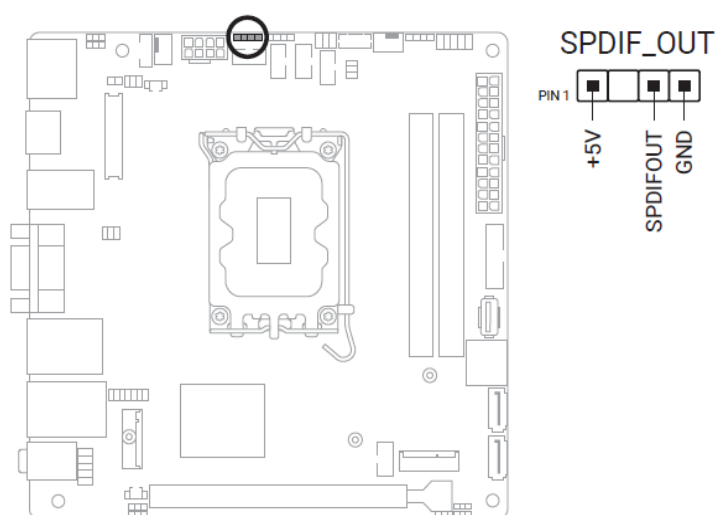
PIN No.	Signal Description	PIN No.	Signal Description
1	+3.3V out	13	+3.3V out
2	+3.3V out	14	NC

3	GND	15	GND
4	+5V out	16	PSON#
5	GND	17	GND
6	+5V out	18	GND
7	GND	19	GND
8	NC	20	+12V out
9	NC	21	+5V out
10	+12V in	22	+5V out
11	+12V in	23	+5V out
12	+3.3V out	24	GND

DC Mode EATX12V

PIN No.	Signal Description	PIN No.	Signal Description
1	GND	5	+12V in
2	GND	6	+12V in
3	GND	7	+12V in
4	GND	8	+12V in

5: Digital Audio header (4-1 pin SPDIF_OUT)

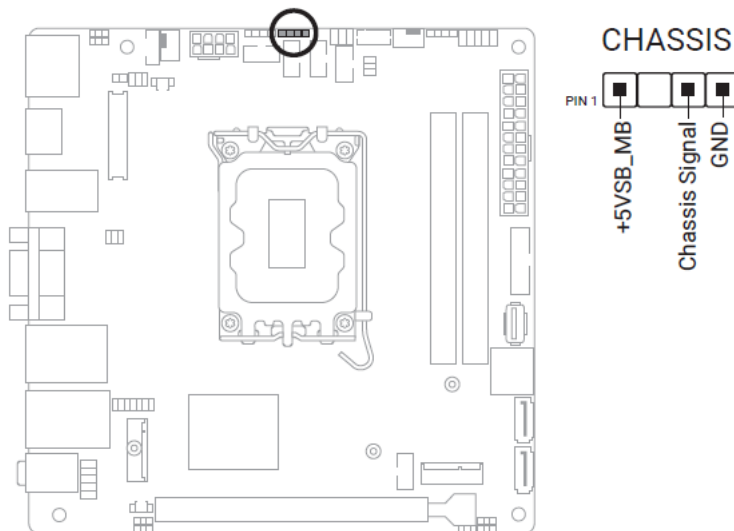


*Connector Type:
Header 1x4p, K2, 2.54mm pitch

6 : Chassis Intrude header (4-1 pin CHASSIS)

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

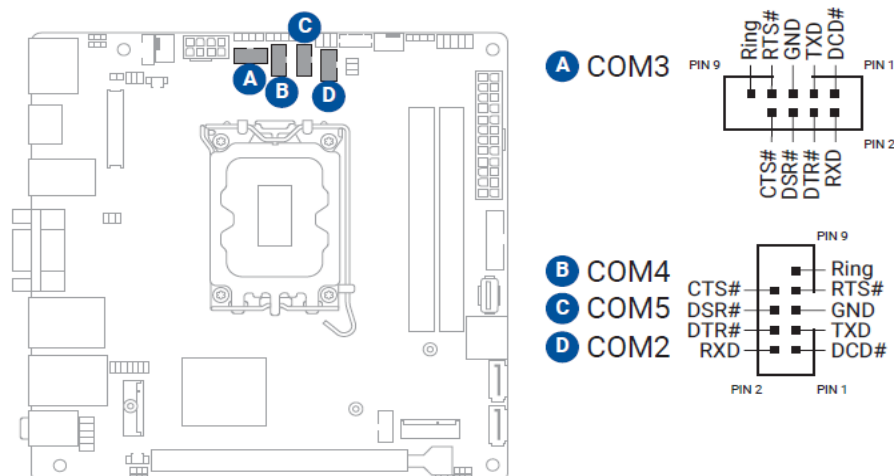
By default, the pin labeled “Chassis Signal” and “Ground” are shorted with jumper caps. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.



*Connector Type:

Header 4p, K2, 2.54mm pitch

7 : Serial Port headers (10-1 pin COM2, COM3, COM4, COM5)

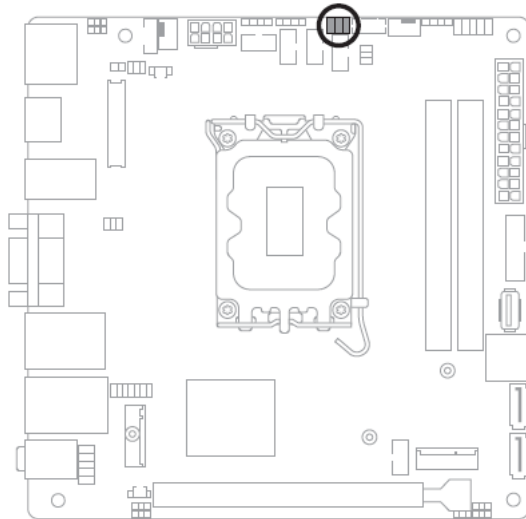
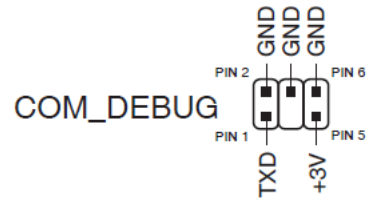


*Connector Type:

BOX header 2x5p, K10, 2.0mm pitch

8 : COM Debug connector (6-1 pin COM_DEBUG)

The COM Debug connector allows you to connect to a COM debug card.

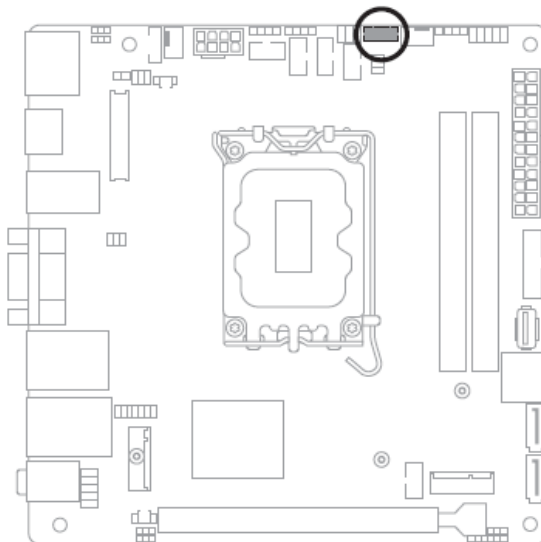
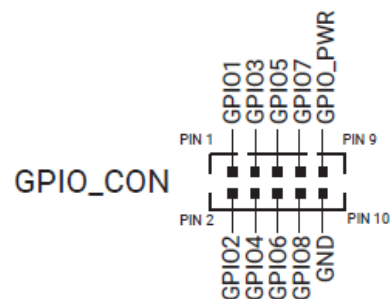


*Connector Type:

Header 2x3p, 2.54mm pitch

9 : General purpose input/output connector (10-pin GPIO_CON)

This connector is for a general purpose input/output module which allows you to customize the digital signal input/output.

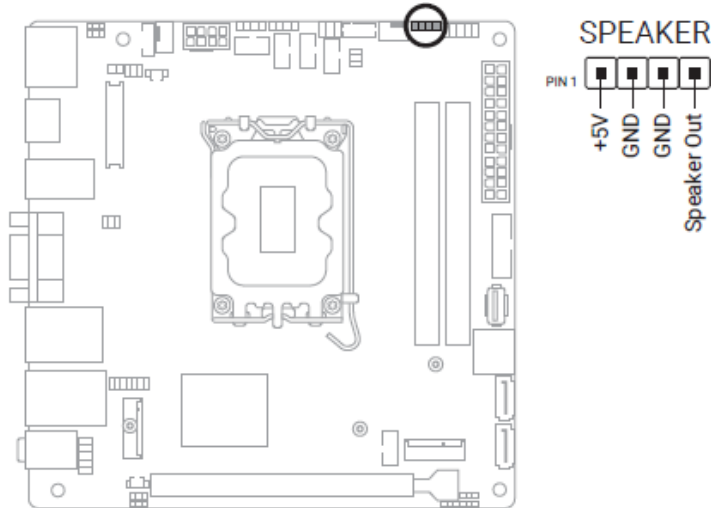


*Connector Type:

Wafer HD 2x5p, 2.0mm pitch, S/T

10 : Speaker header (4-pin SPEAKER)

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

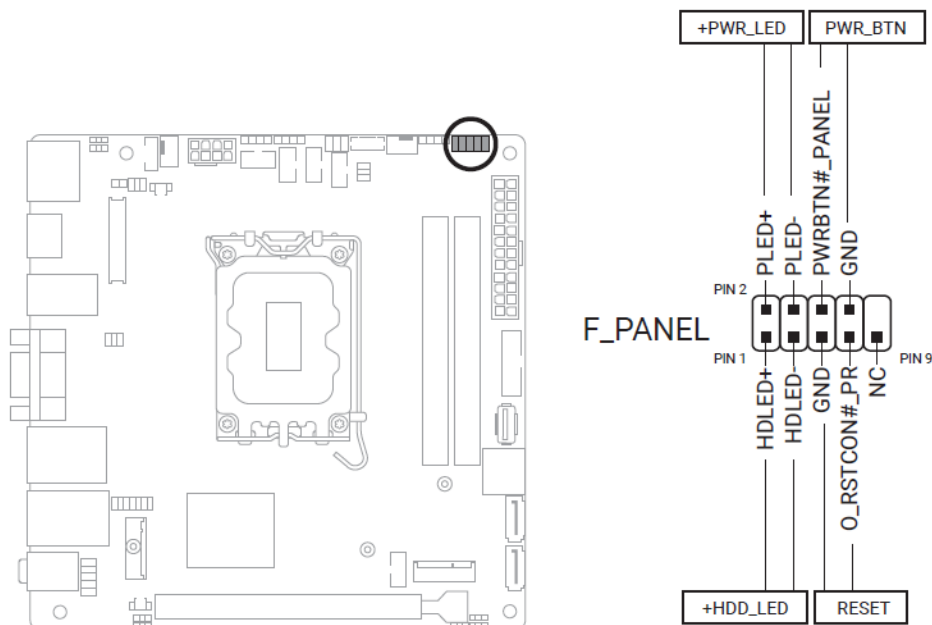


*Connector Type:

Header 1x4p, 2.54mm pitch, S/T

11 : System Panel header (10-1 pin F_PANEL)

This header supports several chassis-mounted functions.



*Connector Type:

Header 1x4p, 2.54mm pitch, S/T

- **System power LED (2-pin +PWR_LED)**

This 2-pin header is for the system power LED. Connect the chassis power LED cable to this header. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

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

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

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

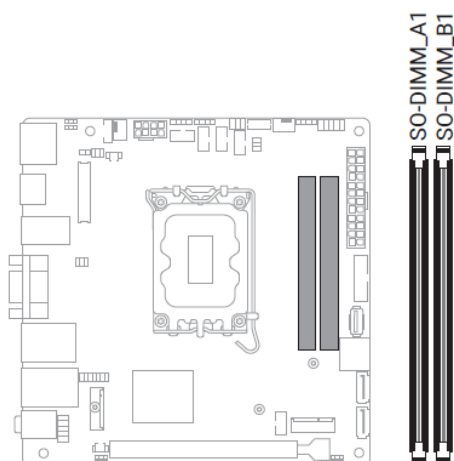
This 2-pin header is for the system power button.

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

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

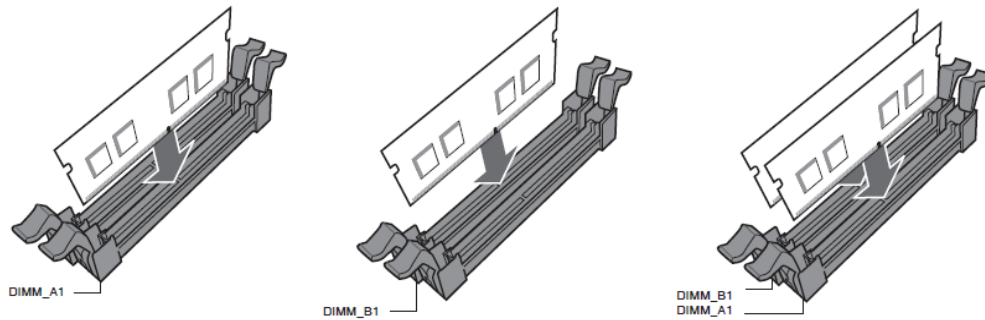
12 : DDR5 SO-DIMM slots

This motherboard comes with two Double Data Rate 5 (DDR5) Small Outline Dual Inline Memory Module (SO-DIMM) sockets. The figure below illustrates the location of the DDR5 SO-DIMM sockets:

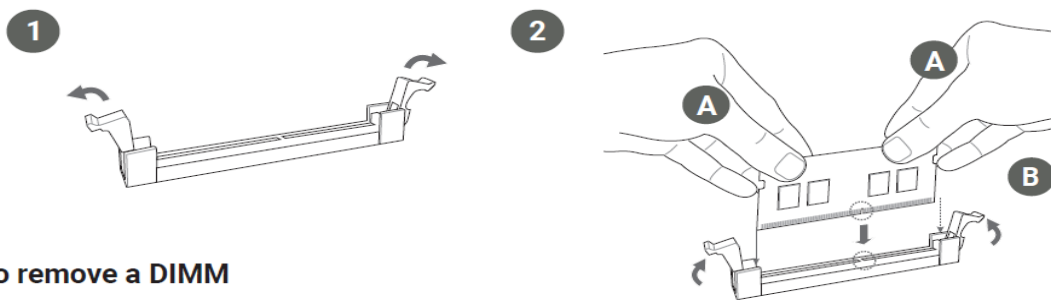


Channel	Sockets
Channel A	SO-DIMM_B1
Channel B	SO-DIMM_A1

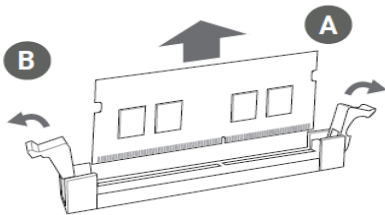
Recommended memory configuration



Installing a DIMM

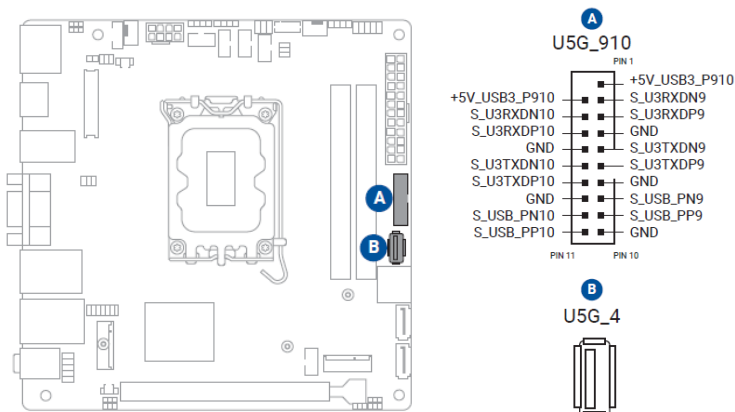


To remove a DIMM



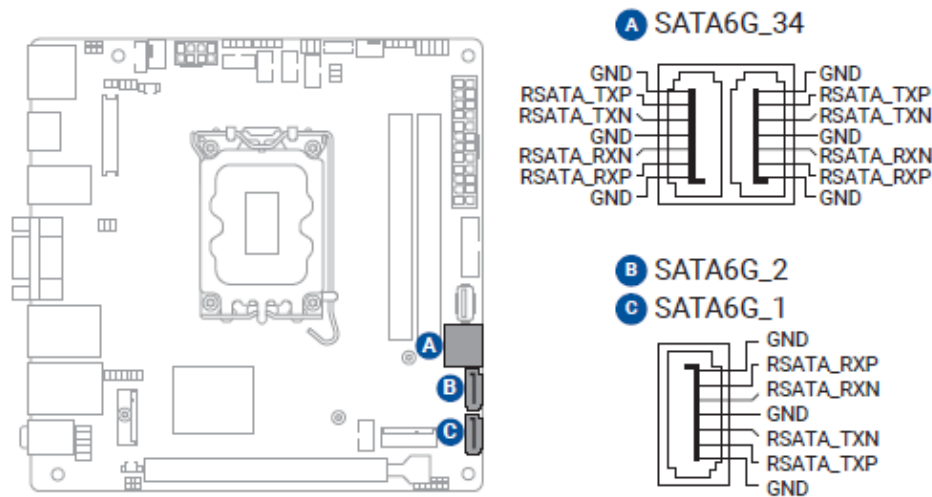
13 : USB 3.2 Gen 1 connectors (U5G_4 / U5G_910)

Connect a USB 3.2 Gen 1 module to any of these connectors for additional USB 3.2 Gen 1 front or rear panel ports. These connectors comply with USB 3.2 Gen 1 specifications and provide faster data transfer speeds of up to 5 Gbps, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.



14 : SATA 6.0Gb/s ports (7-pin SATA6G_1-4)

These ports connect to Serial ATA 6.0 Gb/s hard disk drives or an optical drive via Serial ATA 6.0 Gb/s signal cables.

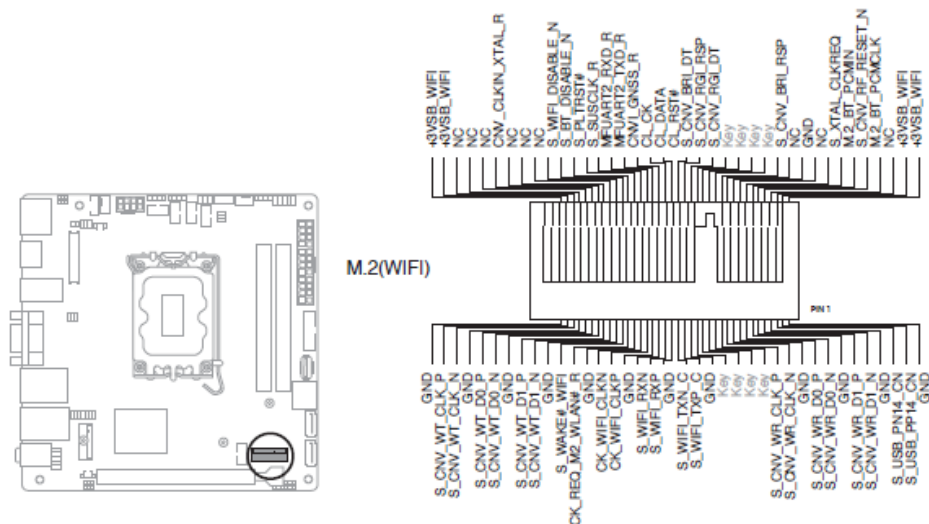


*Connector Type:

Wafer HD 7p, 1.27mm pitch

15 : M.2 Wi-Fi

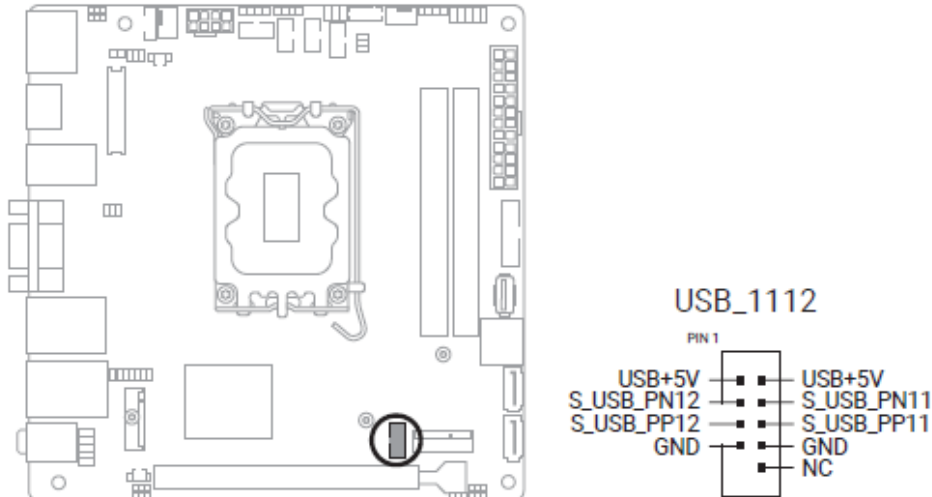
This socket connects to an M.2 Wi-Fi device.



Note: We recommend using a PH1 screwdriver with a torque of 2.0 +/- 0.2 kgf.cm when tightening the screw.

16 : USB 2.0 header (10-1 pin USB_1112)

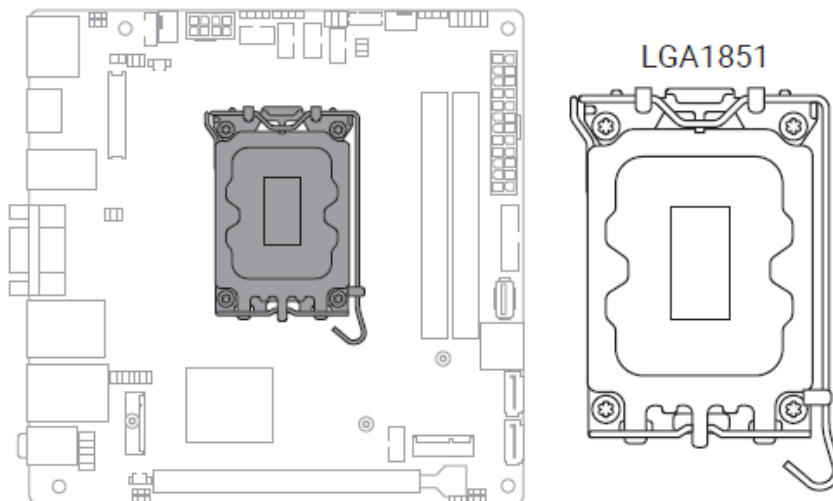
This header is for an USB 2.0 port. Connect the USB cable to this header. This USB header complies with USB 2.0 specification that supports up to 480 Mbps connection speed.



*Connector Type:
Header 2x5p, K9, 2.0mm pitch

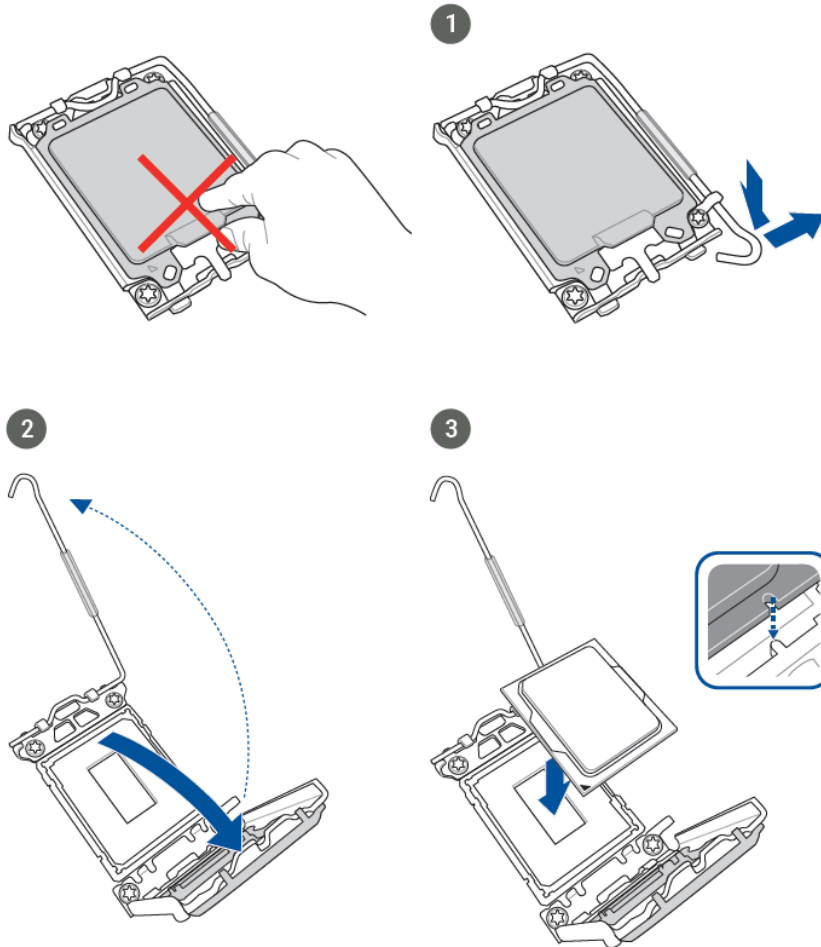
17 : Intel® LGA1851 CPU socket

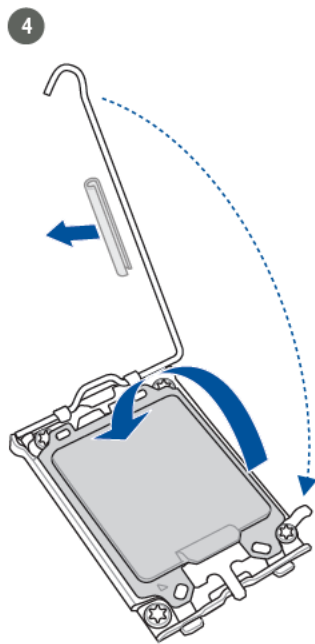
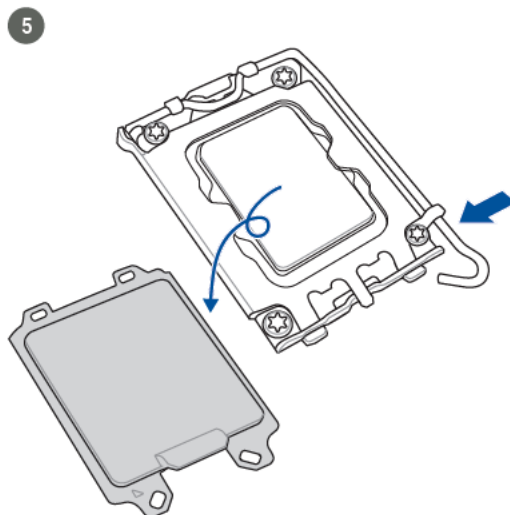
The motherboard comes with a surface mount LGA1851 socket designed for ARL-S Core™ Ultra Processors (Series 2).



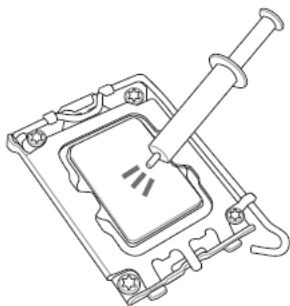
Note: Unplug all power cables before installing the CPU.

- CPU installation



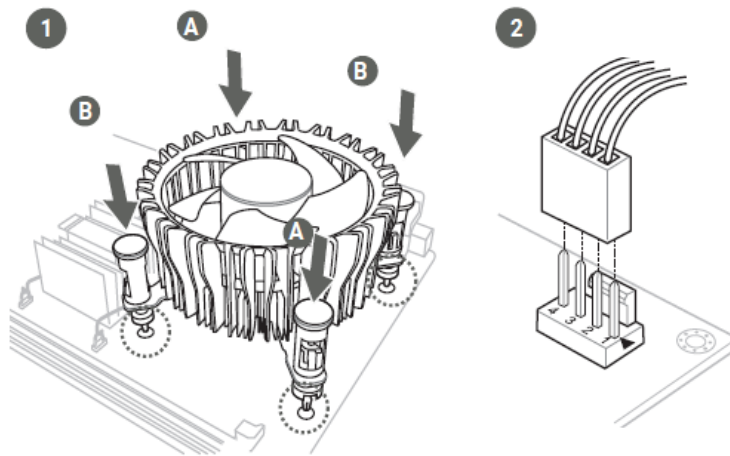


- **CPU heatsink and fan assembly installation**



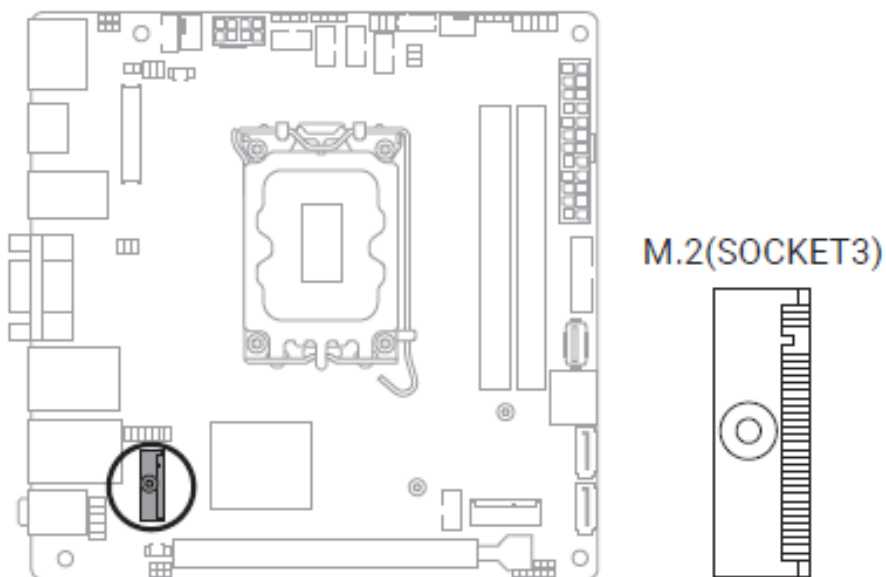
Note: Apply Thermal Interface Material to the CPU cooling system and CPU before you install the cooling system, if necessary.

To install the CPU heatsink and fan assembly



18 : M.2 socket 3

This socket allows you to install an M.2 SSD module.

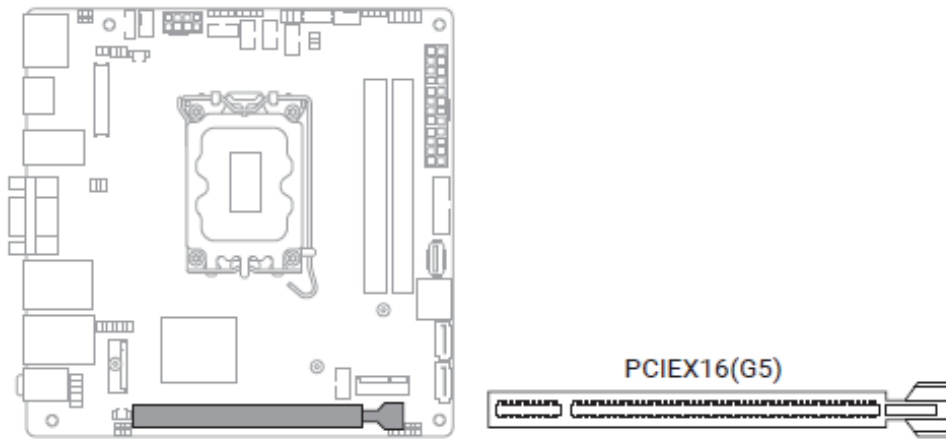


Note: *This socket supports M Key and 2280 storage devices.

*We recommend using a PH1 screwdriver
with a torque of 2.0 +/- 0.2 kgf.cm when tightening the screw.

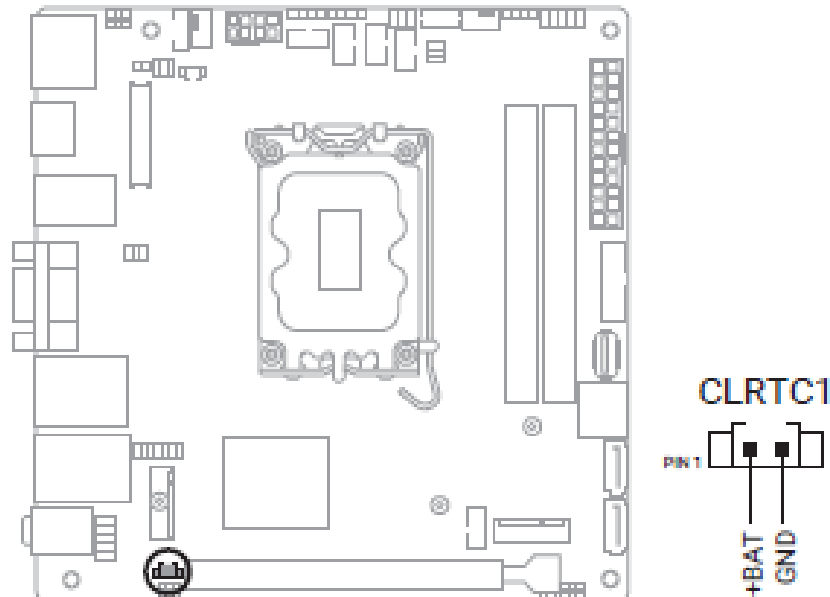
19 : PCI Express 5.0 x16 slot

This slot supports a PCIe 5.0 x16 graphics card that complies with the PCI Express specification.



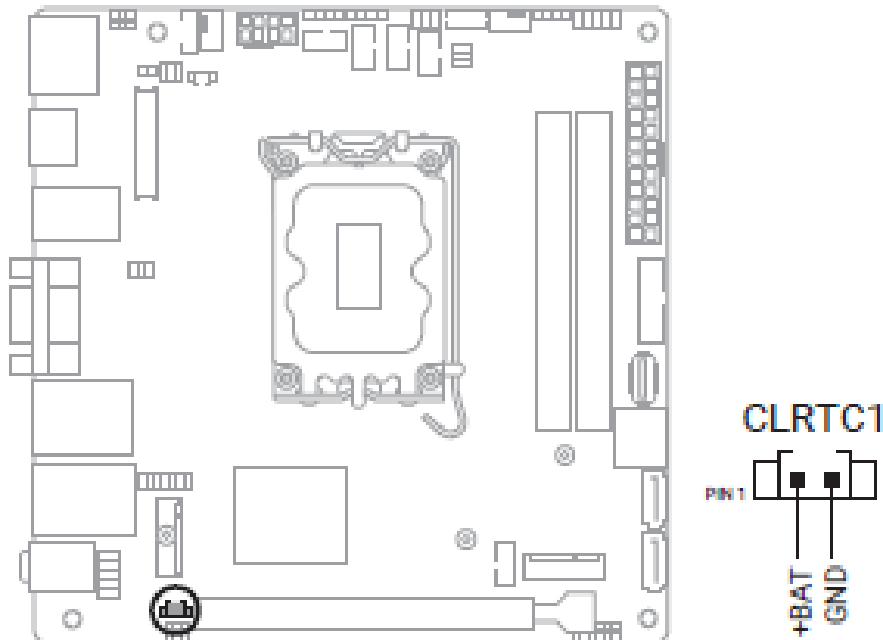
20 : Clear CMOS header (2-pin CLRTC)

This header allows you to clear the CMOS RTC RAM data of the system setup information such as date, time, and system passwords.



21 : Front Panel Audio header (10-1 pin F_AUDIO)

This header allows you to clear the CMOS RTC RAM data of the system setup information such as date, time, and system passwords.



*Connector Type:

Header 1x2p, 1.25mm pitch, S/T

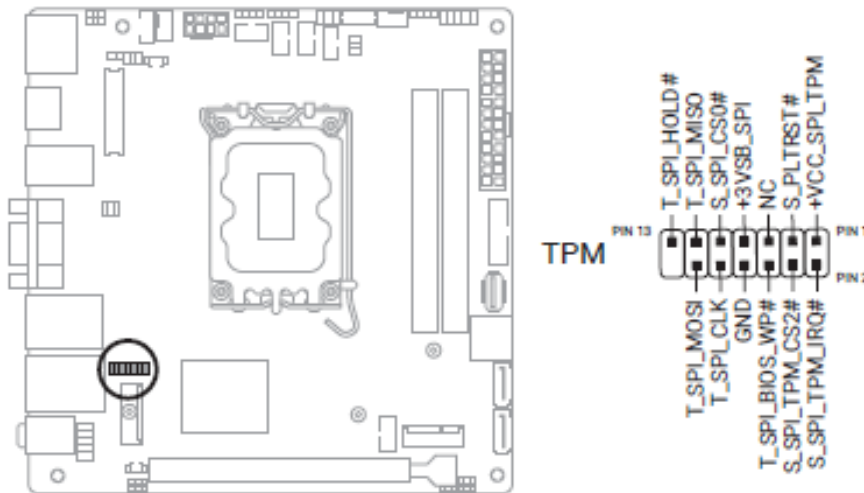
● To erase the RTC RAM:

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

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

22 : SPI TPM header (14-1 pin SPI_TPM)

This header supports a Trusted Platform Module (TPM) system with a Serial Peripheral Interface (SPI), allowing you to securely store keys, digital certificates, passwords and data. A TPM system also enhances network security, protects digital identities, and ensures platform integrity.

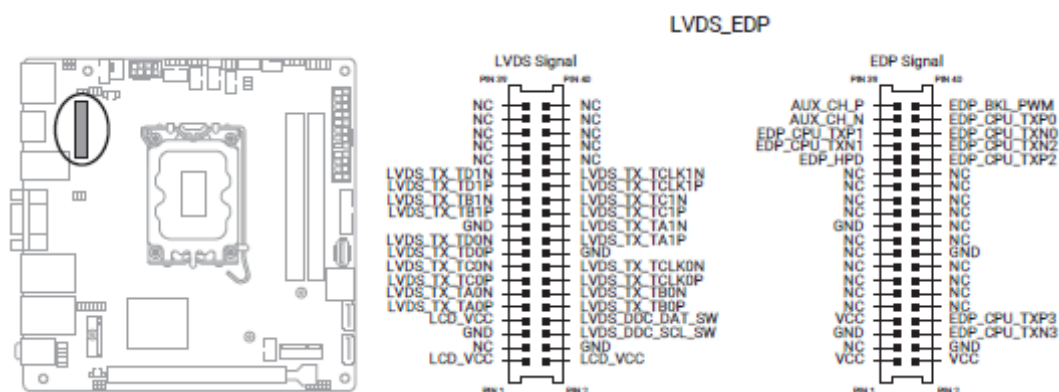


*Connector Type:

Header 2x7p, K14, 2.0mm pitch

23 : LVDS/eDP Signal connector (LVDS_eDP)

This header is for an LCD monitor that supports Low Voltage Differential Signaling (LVDS) interface or an internal embedded DisplayPort (eDP) connection.

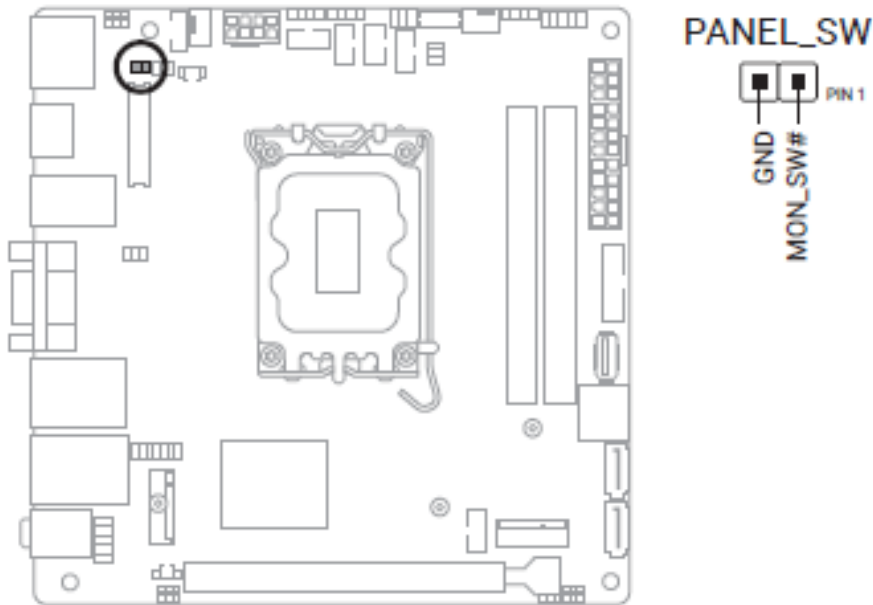


*Connector Type:

Wafer HD 2x20p, 1.25mm pitch

24 : LCD Panel Monitor Switch header (2-pin PANEL_SW)

This 2-pin header is for connecting a monitor switch that can turn off the LCD panel display backlight.



Chapter 5

Overview

- 5 Sample Code
- 5.1 Watch Dog Timer
- 5.2 Signal GPIO Signal

5 Sample Code

5.1 Watch Dog Timer

IO 0x25D 0xA2

IO 0x25C LSB

IO 0x25C MSB

Example:設定 WDT = 5s

```
rw /command="o 0x25d 0xA2 ;
```

```
rw /command="o 0x25c 0x05 ;
```

```
rw /command="o 0x25c 0x00 ;
```

- Watchdog Command

The command format is shown as below:

Watchdog Command Format		
Register	Byte	Data Field
Command	1	Command code, A2h
Data	1	Timeout in seconds, LSB.
	2	Timeout in seconds, MSB.

Write 0 to disable watchdog(WDT), otherwise, non-zero value to start/reset WDT. The host shall stop or restart the WDT before timeout, or EC will asserts reset signal to reboot system.

5.2 Signal GPIO Signal

```
#define NCT6126D_CONFIG_INDEX 0x2e
```

```
#define NCT6126D_CONFIG_DATA 0x2f
```

```
#define NCT6126D_LDN_SEL_REGISTER 0x7
```

```
#define NCT6126D_LDN_WDT 0x8
```

```
#define NCT6126D_LDN_WDT2 0xd
```

```

VOID SIOBasicIORead(
    IN UINT8 nLDN,
    IN UINT8 nOffset,
    OUT UINT8* nValue )
{
    IoWrite8(NCT6126D_CONFIG_INDEX, 0x87);
//NCT6126D_CONFIG_INDEX
    IoWrite8(NCT6126D_CONFIG_INDEX, 0x87);

    IoWrite8(NCT6126D_CONFIG_INDEX,
NCT6126D_LDN_SEL_REGISTER);
    IoWrite8(NCT6126D_CONFIG_DATA, nLDN); //Select device
    IoWrite8(NCT6126D_CONFIG_INDEX, nOffset);
    *nValue=IoRead8(NCT6126D_CONFIG_DATA); //read register
value

    IoWrite8(NCT6126D_CONFIG_INDEX, 0xAA);
}
VOID SIOBasicIOWrite(IN UINT8 nLDN,
    IN UINT8 nOffset,
    IN UINT8 nValue )
{
    IoWrite8(NCT6126D_CONFIG_INDEX, 0x87);
    IoWrite8(NCT6126D_CONFIG_INDEX, 0x87);

    IoWrite8(NCT6126D_CONFIG_INDEX,
NCT6126D_LDN_SEL_REGISTER);
    IoWrite8(NCT6126D_CONFIG_DATA, nLDN); // Select device
    IoWrite8(NCT6126D_CONFIG_INDEX, nOffset);
    IoWrite8(NCT6126D_CONFIG_DATA, nValue); //write register
value

```

```

        IoWrite8(NCT6126D_CONFIG_INDEX, 0xAA);
    }
    VOID IOSetBit(IN UINT8 nLDN,
                  IN UINT8 nOffset,
                  IN UINT8 nData )
    {
        IoWrite8(NCT6126D_CONFIG_INDEX, 0x87);
        IoWrite8(NCT6126D_CONFIG_INDEX, 0x87);

        IoWrite8(NCT6126D_CONFIG_INDEX,
NCT6126D_LDN_SEL_REGISTER);
        IoWrite8(NCT6126D_CONFIG_DATA, nLDN);           // Select device
        IoWrite8(NCT6126D_CONFIG_INDEX, nOffset);
        IoWrite8(NCT6126D_CONFIG_DATA,
IoRead8(NCT6126D_CONFIG_DATA)|nData);    //write register value

        IoWrite8(NCT6126D_CONFIG_INDEX, 0xAA);
    }

    VOID IOResetBit(IN UINT8 nLDN,
                    IN UINT8 nOffset,
                    IN UINT8 nData )
    {

        IoWrite8(NCT6126D_CONFIG_INDEX, 0x87);
        IoWrite8(NCT6126D_CONFIG_INDEX, 0x87);

        IoWrite8(NCT6126D_CONFIG_INDEX,
NCT6126D_LDN_SEL_REGISTER);
        IoWrite8(NCT6126D_CONFIG_DATA, nLDN);           // Select device
        IoWrite8(NCT6126D_CONFIG_INDEX, nOffset);
        IoWrite8(NCT6126D_CONFIG_DATA,
IoRead8(NCT6126D_CONFIG_DATA)&~nData);    //write register value

```

```
        IoWrite8(NCT6126D_CONFIG_INDEX, 0xAA);
    }
    VOID DisableWatchDogTimer1(){
        UINT8 Data8;

        // Enter mode
        IoWrite8(NCT6126D_CONFIG_INDEX, 0x87);
        IoWrite8(NCT6126D_CONFIG_INDEX, 0x87);

        //
        //Select LDN8 WDT1
        //
        IoWrite8(NCT6126D_CONFIG_INDEX,
NCT6126D_LDN_SEL_REGISTER);
        IoWrite8(NCT6126D_CONFIG_DATA, NCT6126D_LDN_WDT); //LDN8

        //Set 0x0 to CRF1h, stop Watchdog Timer 1 counting
        IoWrite8(NCT6126D_CONFIG_INDEX, 0xF1);
        Data8 = 0;
        IoWrite8(NCT6126D_CONFIG_DATA, Data8);

        /// Exit mode
        IoWrite8(NCT6126D_CONFIG_INDEX, 0xAA);
    }
    VOID DisableWatchDogTimer2(){
        UINT8 Data8;
        //
        // clear WDT2
        //
        // Enter mode
        IoWrite8(NCT6126D_CONFIG_INDEX, 0x87);
        IoWrite8(NCT6126D_CONFIG_INDEX, 0x87);
```

```
//  
//Select LDN WDT2  
//  
IoWrite8(NCT6126D_CONFIG_INDEX,  
NCT6126D_LDN_SEL_REGISTER);  
IoWrite8(NCT6126D_CONFIG_DATA, NCT6126D_LDN_WDT2);  
  
//  
//disable WDT2  
//  
IoWrite8(NCT6126D_CONFIG_INDEX, 0xE3);  
Data8=IoRead8(NCT6126D_CONFIG_DATA);  
Data8= Data8 & ~BIT0;  
IoWrite8(NCT6126D_CONFIG_DATA, Data8);  
/// Exit mode  
IoWrite8(NCT6126D_CONFIG_INDEX, 0xAA);  
}  
  
//sample code  
//CRF0:  
//CR F0h. GPIO4 I/O Register  
//Location: Address F0h  
//Size: 8 bits  
//7-0  
//GPIO4 I/O register  
//0: The respective GPIO4 PIN is programmed as an output port  
//1: The respective GPIO4 PIN is programmed as an input port.  
  
//CRF1:  
//CR F1h. GPIO4 Data Register  
//Location: Address F1h  
//Size: 8 bits
```

//GPIO4 Data register

//For output ports, the respective bits can be read/written and produced to pins.

//For input ports, the respective bits can be read only from pins. Write accesses will be ignored.

```
void main()
```

```
{
```

```
    UINT8 Data = 0;
```

```
    UINT8 currentValue;
```

```
    // Disable Watchdog Timer 1
```

```
    SIOBasicIOWrite(NCT6126D_LDN_WDT, 0xF1, Data);
```

```
    // GPI (Input Mode) configuration:
```

```
    // 1. Activate GPIO4 pin - CR30h[4] = 1
```

```
    // 2. Set GPIO0 as input mode - CRE0h[0] = 1
```

```
    SIOBasicIOWrite(0x7, 0x30, &currentValue);
```

```
    SIOBasicIOWrite(0x7, 0x30, currentValue | BIT4); // Activate GPIO4
```

```
    SIOBasicIOWrite(0x7, 0xF0, &currentValue);
```

```
    SIOBasicIOWrite(0x7, 0xF0, currentValue | BIT0); // Set GP40 as input mode
```

```
    // GPO high (Output High) configuration:
```

```
    // 1. Activate GPIO4 pin - CR30h[4] = 1
```

```
    // 2. Set GPIO1 as output mode - CRE0h[1] = 0
```

```
    // 3. Set GPIO1 output high - CRE1h[1] = 1
```

```
    SIOBasicIOWrite(0x7, 0x30, &currentValue);
```

```
    SIOBasicIOWrite(0x7, 0x30, currentValue | BIT4); // Activate GPIO4
```

```
    SIOBasicIOWrite(0x7, 0xF0, &currentValue);
```

```
    SIOBasicIOWrite(0x7, 0xF0, currentValue & ~BIT1); // Set GP41 as
```

output mode

```
SIOBasicIORead(0x7, 0xF1, &currentValue);  
SIOBasicIOWrite(0x7, 0xF1, currentValue | BIT1); // Output high level
```

```
// GPO low (Output Low) configuration:  
// 1. Activate GPIO4 pin - CR30h[4] = 1  
// 2. Set GPIO2 as output mode - CRE0h[2] = 0  
// 3. Set GPIO2 output low - CRE1h[2] = 0  
SIOBasicIORead(0x7, 0x30, &currentValue);  
SIOBasicIOWrite(0x7, 0x30, currentValue | BIT4); // Activate GPIO4
```

```
SIOBasicIORead(0x7, 0xF0, &currentValue);  
SIOBasicIOWrite(0x7, 0xF0, currentValue & ~BIT2); // Set GP42 as
```

output mode

```
SIOBasicIORead(0x7, 0xF1, &currentValue);  
SIOBasicIOWrite(0x7, 0xF1, currentValue & ~BIT2); // Output low  
level  
}
```

Chapter 6

Overview

- 6 BIOS Setup Items
- 6.1 Entering Setup -- Launch System Setup
- 6.2 Main
- 6.3 Configuration

6 BIOS Setup Items

WADE-8214-Q870 is equipped with the AMI BIOS stored in Flash ROM. These BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in SPI Flash so that it is retained during power-off periods. When the system is turned on, WADE-8214-Q870 communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start up.

6.1 Entering Setup - Launch System Setup

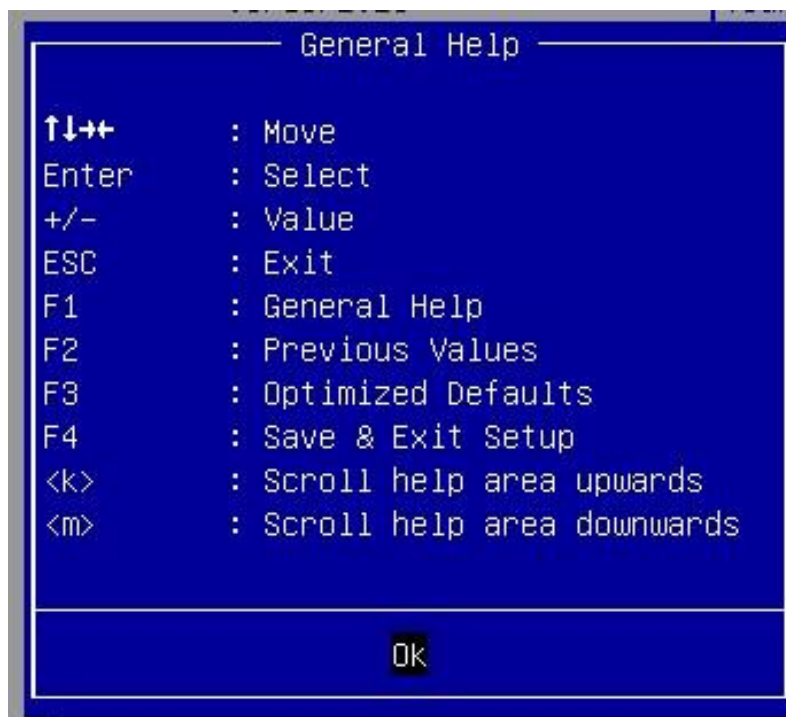
Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press key will enter BIOS setup screen.

Press to enter SETUP

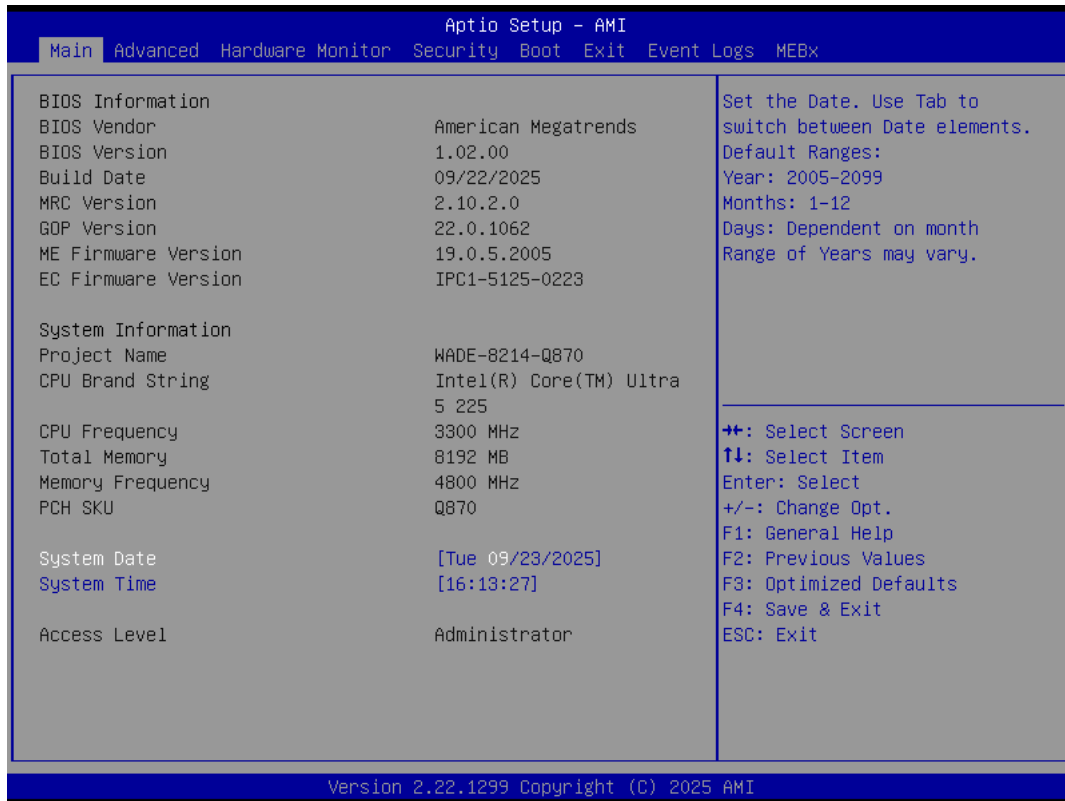
If the message disappears before responding and still wish to enter Setup, please restart the system by turning it OFF and On or pressing the RESET button. It can be also restarted by pressing <Ctrl>, <Alt>, and <Delete> keys on keyboard simultaneously.

Press <F1> to Run General Help or Resume

The BIOS setup program provides a General Help screen. The menu can be easily called up from any menu by pressing <F1>. The Help screen lists all the possible keys to use and the selections for the highlighted item. Press <Esc> to exit the Help screen.

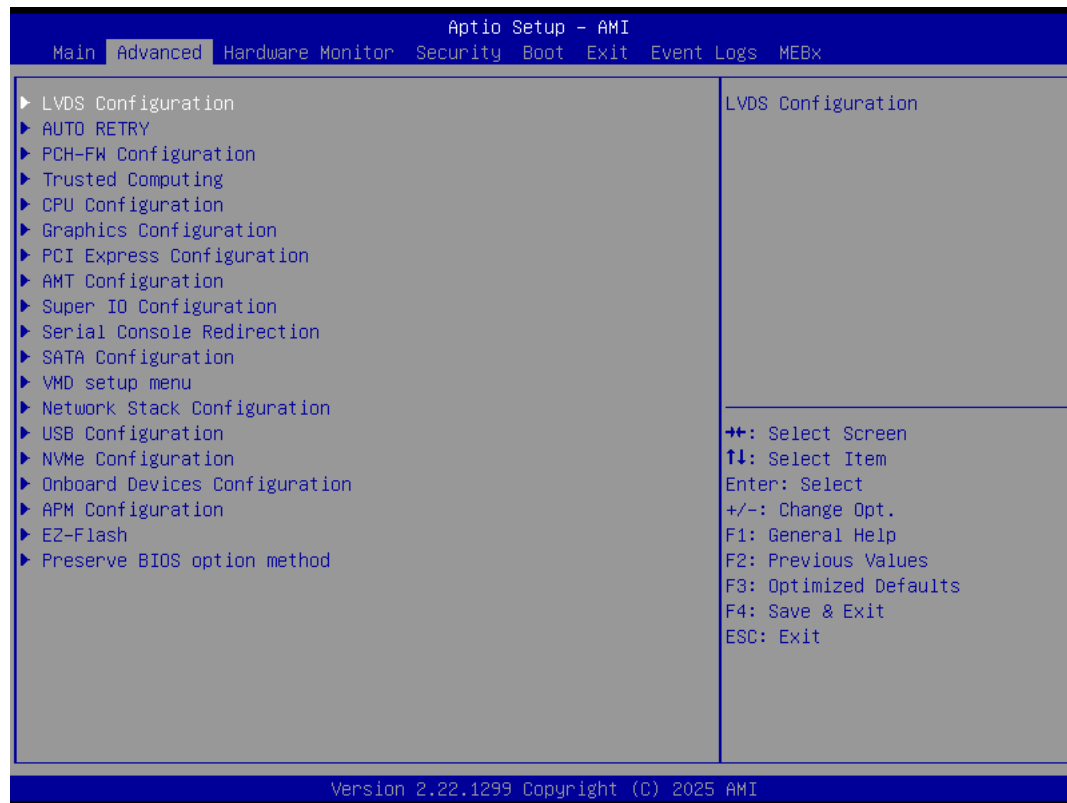


6.2 Main

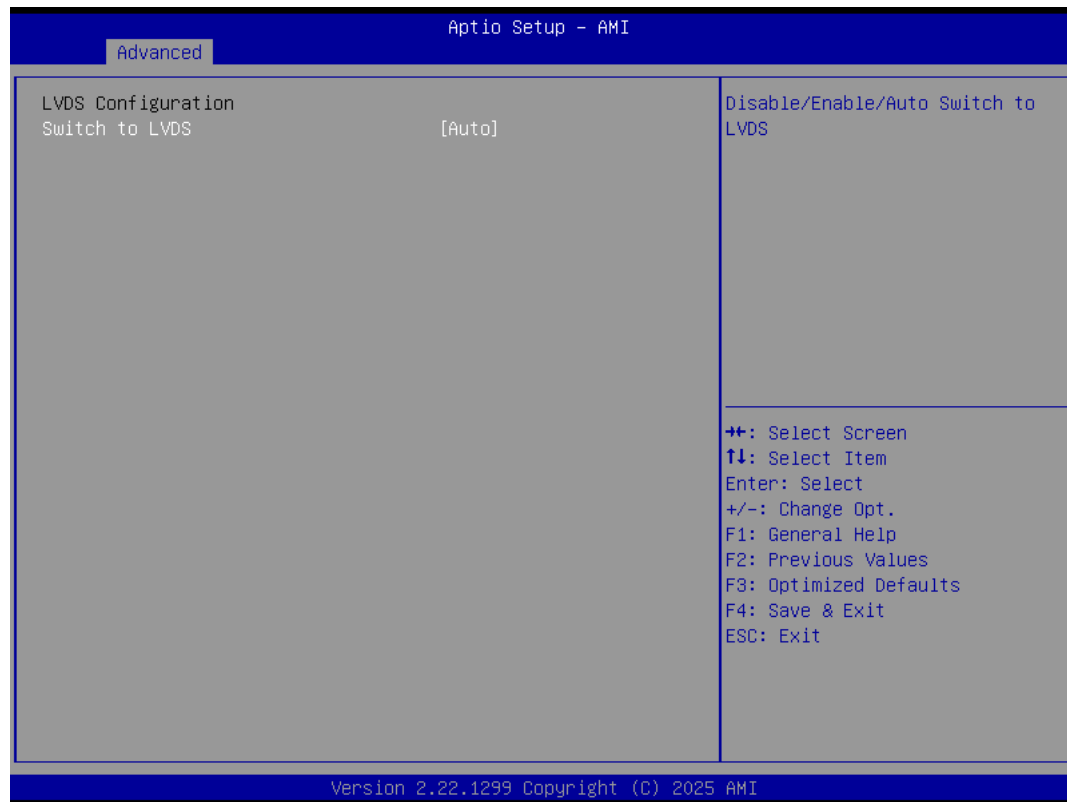


Feature	Description	Options
System Date	Set the Date. Use Tab to switch between Date elements. Default Ranges: Year: 2005 – 2099 Months: 1 – 12 Days: Dependent on month Range of Years may vary.	
System Time	Set the Time. Use Tab to switch between Time elements.	

6.3 Advanced

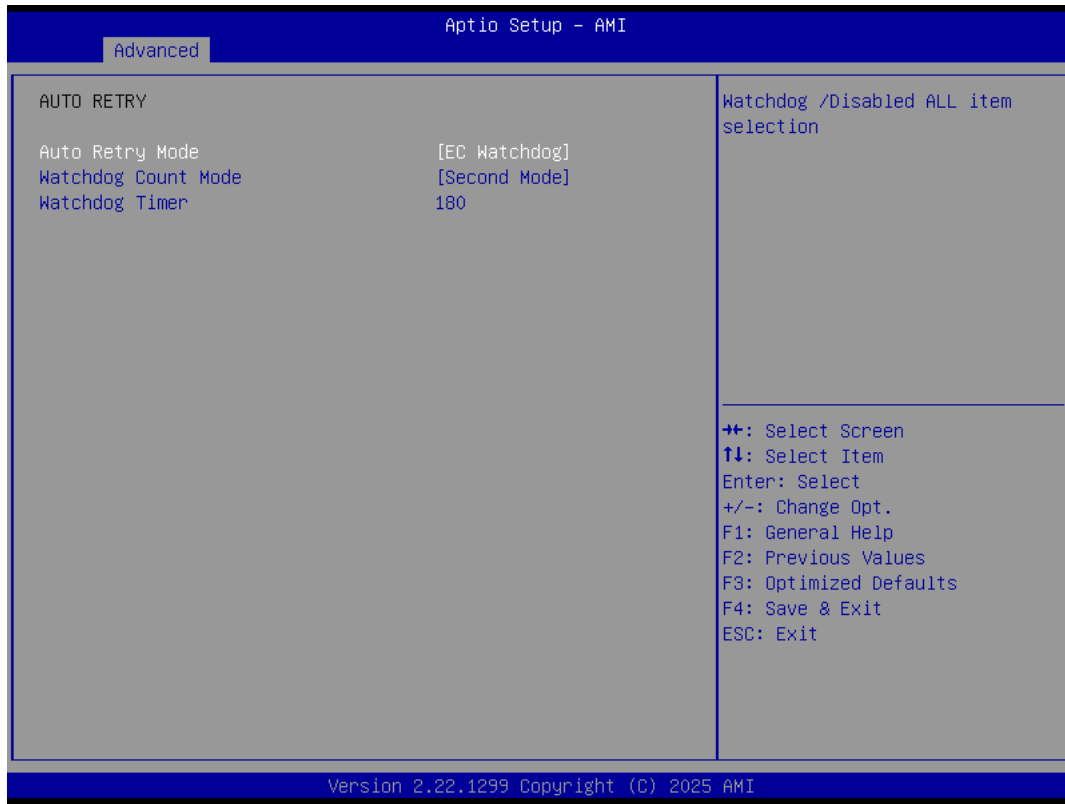


6.3.1 LVDS Configuration



Feature	Description	Options
Switch to LVDS	Disable/Enable/Auto Switch to LVDS.	★Auto, Disabled, Enabled

6.3.2 AUTO RETRY



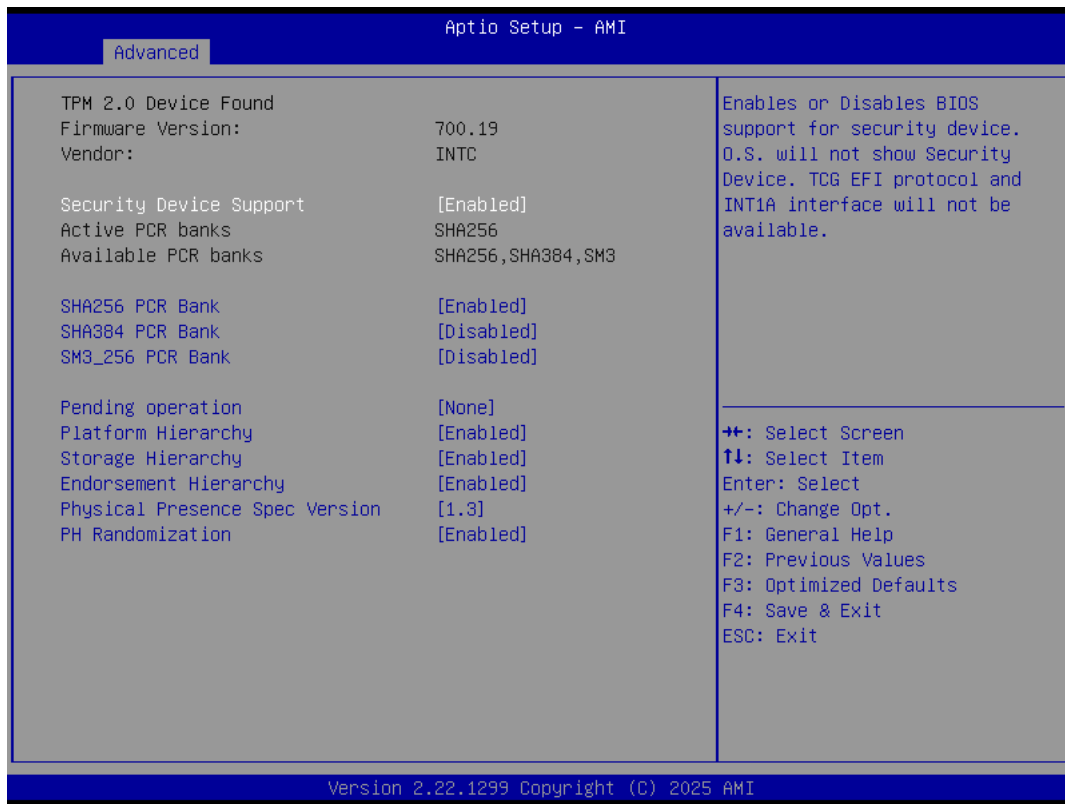
Feature	Description	Options
Auto Retry	Watchdog /Disabled ALL item selection	★EC Watchdog, Disabled
Watchdog Count Mode	Select Watchdog Timer count mode	★Second Mode, Minute Mode
Watchdog Timer	Watchdog Timer time-out value. Range: 30 ~ 255	★180

6.3.3 PCH-FW Configuration



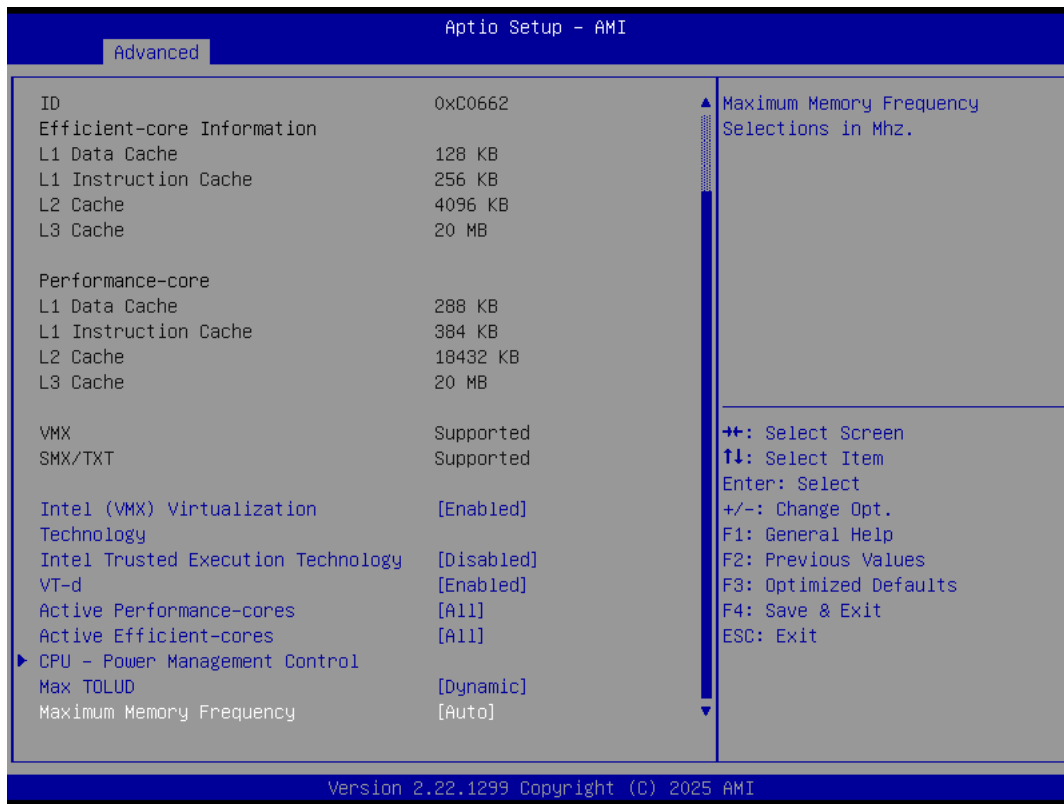
Feature	Description	Options
TPM Device Selection	Selects TPM device: PTT or dTPM. PTT - Enables PTT in SkuMgr dTPM 1.2 - Disables PTT in SkuMgr Warning ! PTT/ dTPM will be disabled and all data saved on it will be lost.	★PTT, dTPM

6.3.4 Trusted Computing



Feature	Description	Options
Security Device Support	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.	★Enabled, Disabled
SHA256 PCR Bank	Enables or Disables SHA256 PCR Bank.	★Enabled, Disabled
SHA384 PCR Bank	Enables or Disables SHA384 PCR Bank.	Enabled, ★Disabled
SM3_256 PCR Bank	Enables or Disables SM3_256 PCR Bank	Enabled, ★Disabled
Pending operation	Schedule an Operation for the Security Device. Note: Your Computer will reboot during restart in order to change State of Security Device.	★None, TPM Clear
Platform Hierarchy	Enables or Disables Platform Hierarchy.	★Enabled, Disabled
Storage Hierarchy	Enables or Disables Storage Hierarchy.	★Enabled, Disabled
Endorsement Hierarchy	Enables or Disables Endorsement Hierarchy.	★Enabled, Disabled
Physical Presence Spec Version	Select to Tell O.S. to Support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.	1.2, ★1.3
PH Randomization	Enables or Disables Platform Hierarchy randomization	★Enabled, Disabled

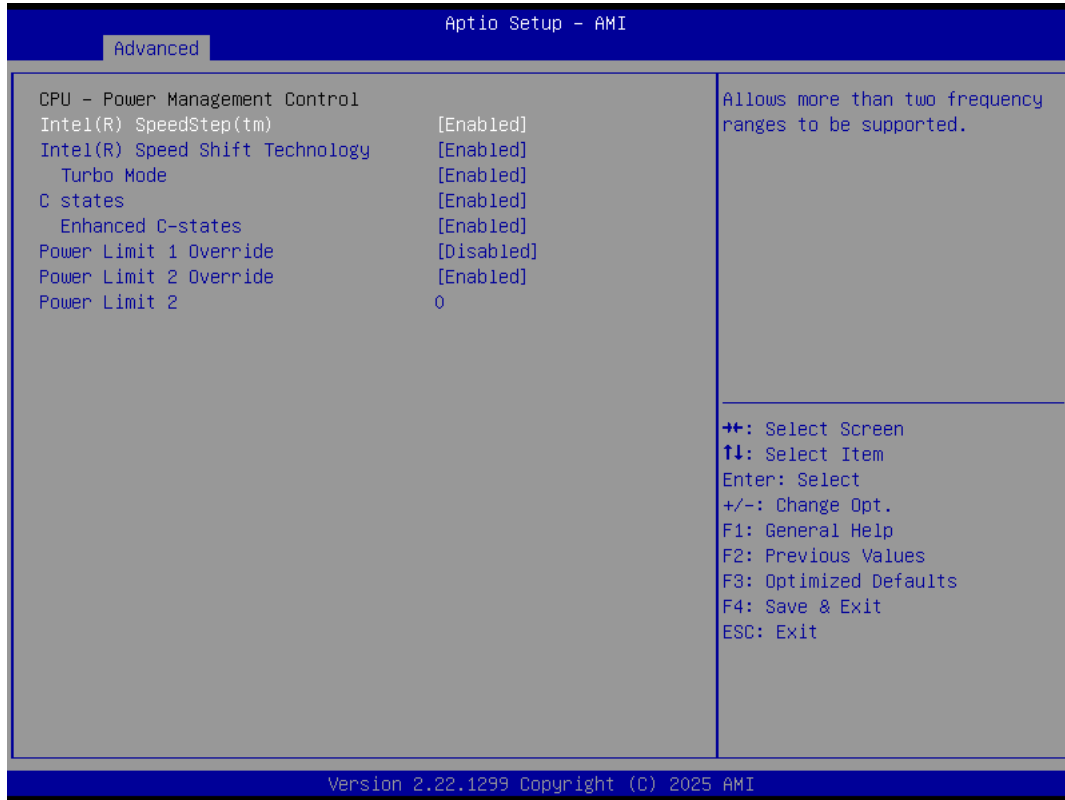
6.3.5 CPU Configuration



Feature	Description	Options
Intel (VMX)Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.	★Enabled, Disabled
Intel Trusted Execution Technology	Enables utilization of additional hardware capabilities provided by Intel(R) Trusted Execution Technology. Changes require a full power cycle to take effect.	Enabled, ★Disabled
VT-d	VT-d capability	★Enabled, Disabled
Active Performance-cores	Number of P-cores to enable in each processor package. Note: Number of Cores and E-Cores are looked at together. When both are {0,0}, Pcode will enable all cores.	★All, 5, 4, 3, 2, 1
Active Efficient-cores	Number of E-cores to enable in each processor package. Note: Number of Cores and E-Cores are looked at together. When both are {0,0}, Pcode will enable all cores.	★All, 3, 2, 1, 0
Max TOLUD	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller	★Dynamic, 0.75 GB, 1 GB, 1.25 GB, 1.5 GB, 1.75 GB, 2 GB, 2.25 GB, 2.5 GB

Feature	Description	Options
Maximum Memory Frequency	Maximum Memory Frequency Selections in Mhz.	★Auto, 1067, 1333, 1600, 1867, 2133, 2400, 2667, 2933, 3200, 3467, 3600, 3733, 4000, 4200, 4267, 4400, 4600, 4800, 5000, 5200, 5400, 5600, 5800, 6000, 6200, 6400, 6600, 6800, 7000, 7200, 7400, 7600, 7800, 8000, 8200, 8400, 8600, 8800, 9000, 9200, 9400, 9600, 9800, 10000, 10200, 10400, 10600, 10800, 11000, 11200, 11400, 11600, 11800, 12000, 12200, 12400, 12600, 12800

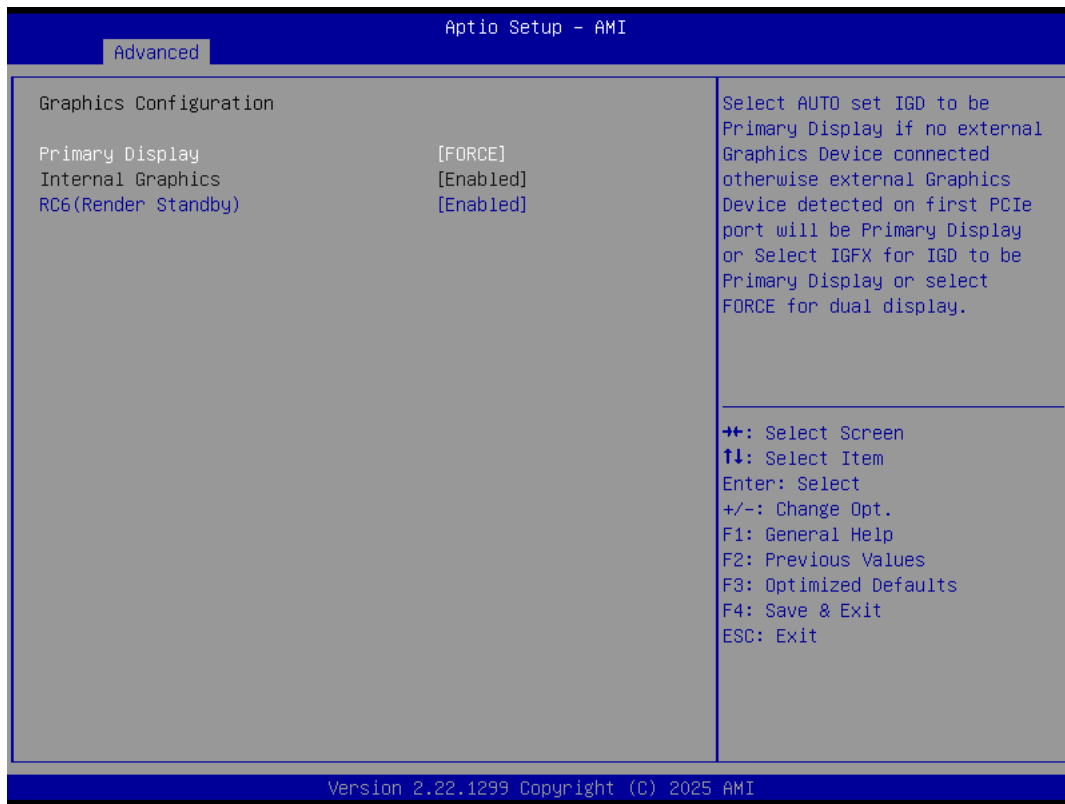
CPU – Power Management Control



Feature	Description	Options
Intel(R) SpeedStep(tm)	Allows more than two frequency ranges to be supported.	★Enabled, Disabled
Intel(R) Speed Shift Technology	Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.	★Enabled, Disabled
Turbo Mode	Enable/Disable processor Turbo Mode.	★Enabled, Disabled
C states	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.	★Enabled, Disabled
Enhanced C-states	Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.	★Enabled, Disabled
Power Limit 1 Override	Enable/Disable Power Limit 1 override. If this option is disabled, BIOS will program the default values for power Limit 1 and Power Limit 1 Time Window.	Enabled, ★Disabled

Feature	Description	Options
Power Limit 1 Override [Enabled]		
Power Limit 1	Power Limit 1 in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0=no custom override. For 12.50W, enter 12500. Overclocking SKU: Value must be between Max and Min Power Limits. Other SKUs: This value must be between Min Power Limit and Processor Base Power (TDP) Limit.	
Power Limit 2 Override	Enable/Disable Power Limit 2 override. If this option is disabled, BIOS will program the default values for Power Limit 2.	★Enabled, Disabled
Power Limit 2	Power Limit 2 value in Milli Watts. BIOS will round to the nearest 1/8W when programming. If the value is 0, BIOS will program this value as 1.25*Processor Base Power (TDP). For 12.50w, enter 12500. Processor applies control policies such that the package power does not exceed this limit.	

6.3.6 Graphics Configuration



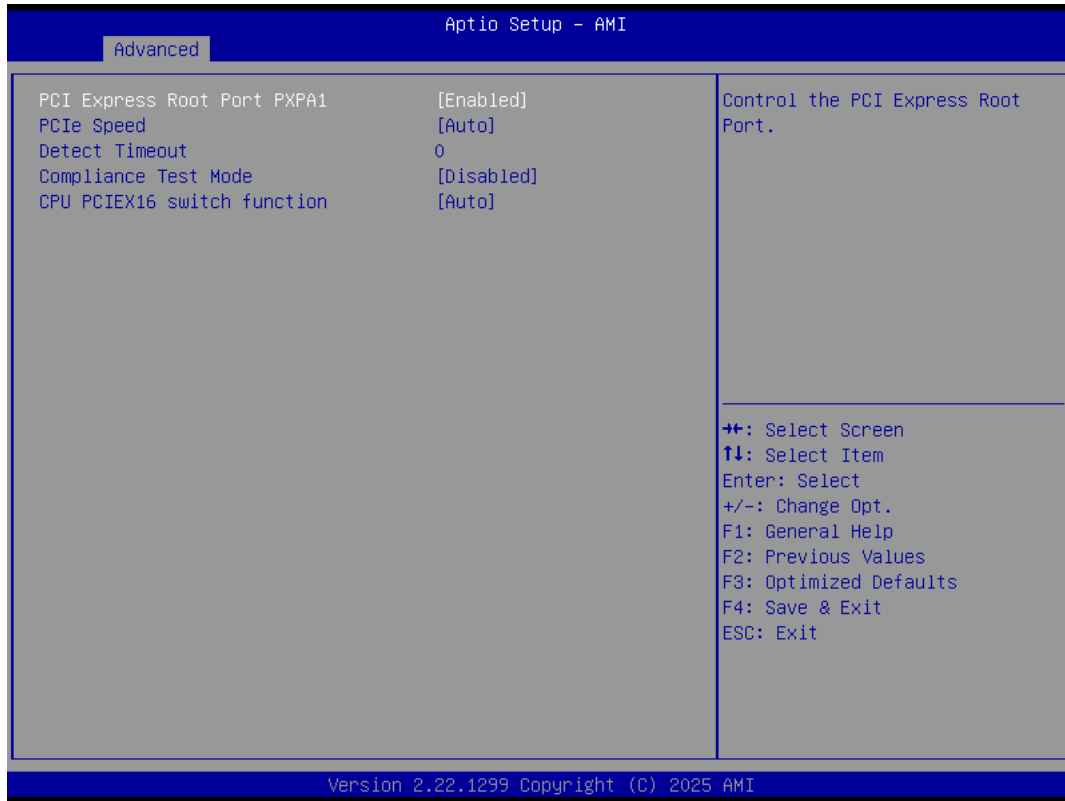
Feature	Description	Options
Primary Display	Select AUTO set IGD to be Primary Display if no external Graphics Device connected otherwise external Graphics Device detected on first PCIe port will be Primary Display or Select IGFX for IGD to be Primary Display or select FORCE for dual display.	★FORCE, Auto, IGFX
Internal Graphics	Keep IGFX enabled based on the setup options.	★Enabled, Disabled
RC6(Render Standby)	Check to enable render standby support.	★Enabled, Disabled

6.3.7 PCI Express Configuration



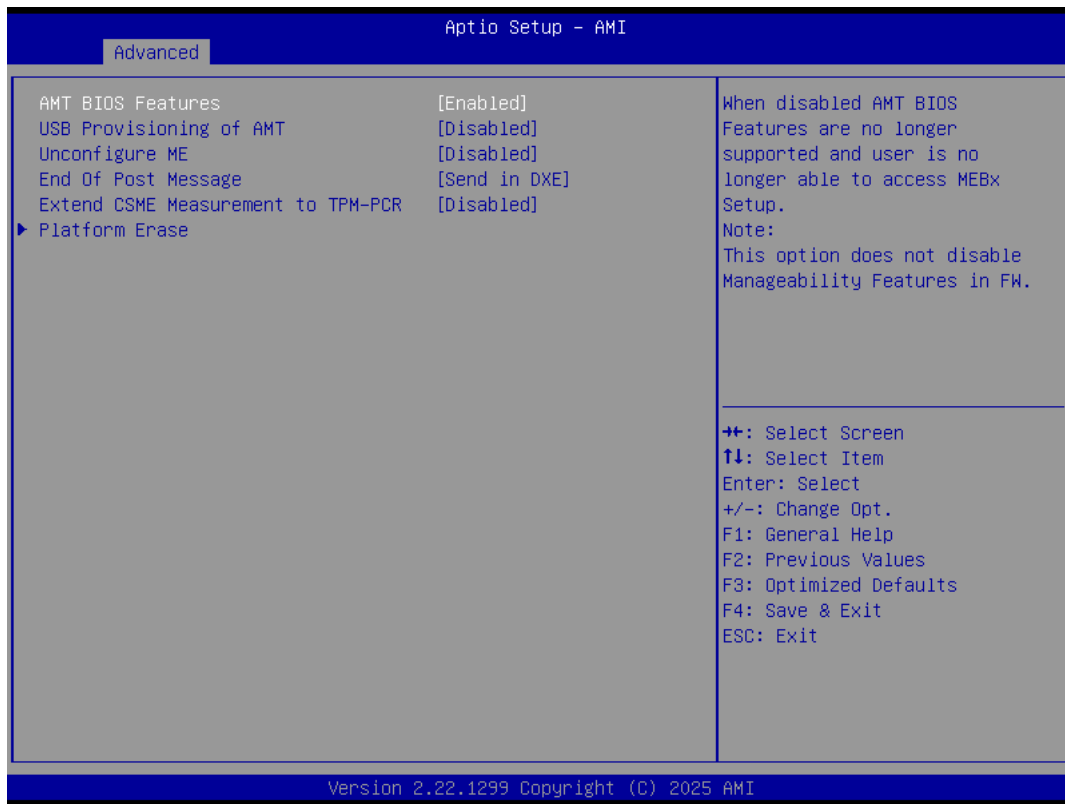
Feature	Description	Options
PCIEx16(G5) 1 Slot	Enable/Disable PCIEx16(G5) Slot	
PCIE Devices Patch	PCIE Devices Patch	
PCH PCIE Clock Gating	PCH PCI Express Clock Gating Enable/Disable for all port	★Enabled, Disabled
PCH PCIE Power Gating	PCH PCI Express Power Gating Enable/Disable for all port	★Enabled, Disabled
Re-Size BAR Support	If system has Resizable BAR capable PCIe Devices, this option Enables or Disables Resizable BAR Support.	★Enabled, Disabled

PCIEx16(G5) 1 Slot



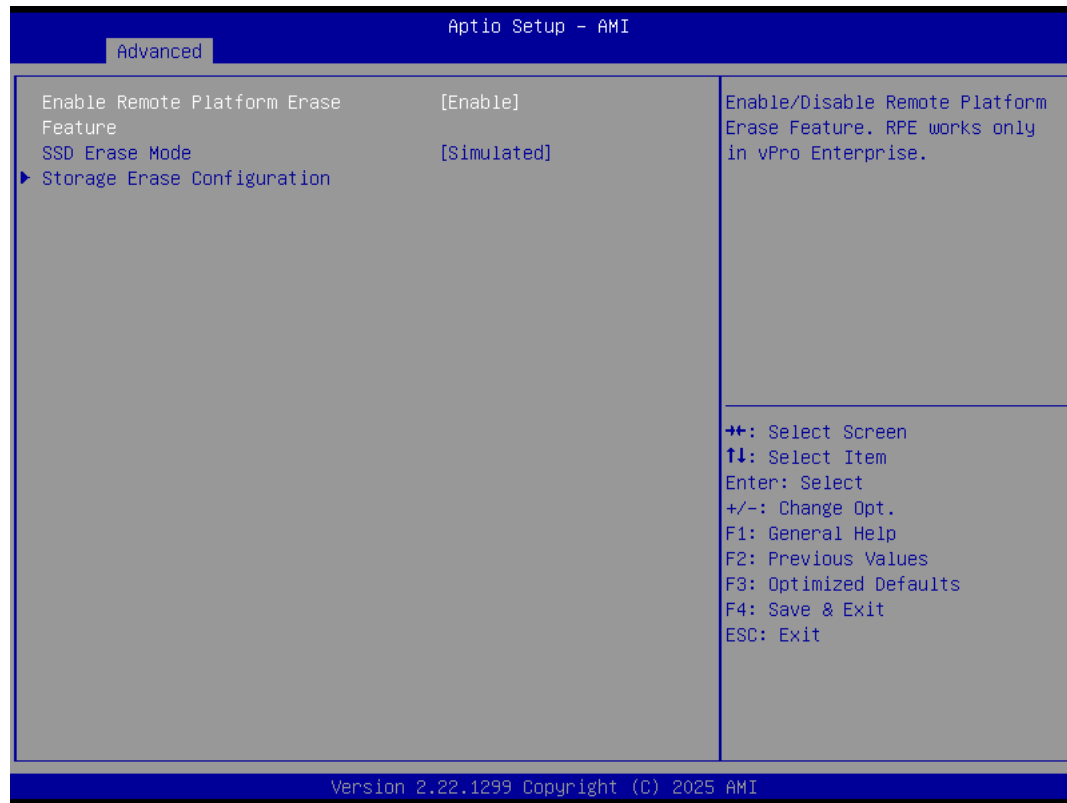
Feature	Description	Options
PCI Express Root Port PXPA1	Control the PCI Express Root Port.	★Enabled, Disabled
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3, Gen4, Gen5
Detect Timeout	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.	★0
Compliance Test Mode	Enable when using Compliance Load Board	Enabled, ★Disabled
CPU PCIEX16 switch function	CPU PCIEX16 switch function Auto/2x8/1x8+2x4	★Auto, 2x8, 1x8+2x4

6.3.8 AMT Configuration



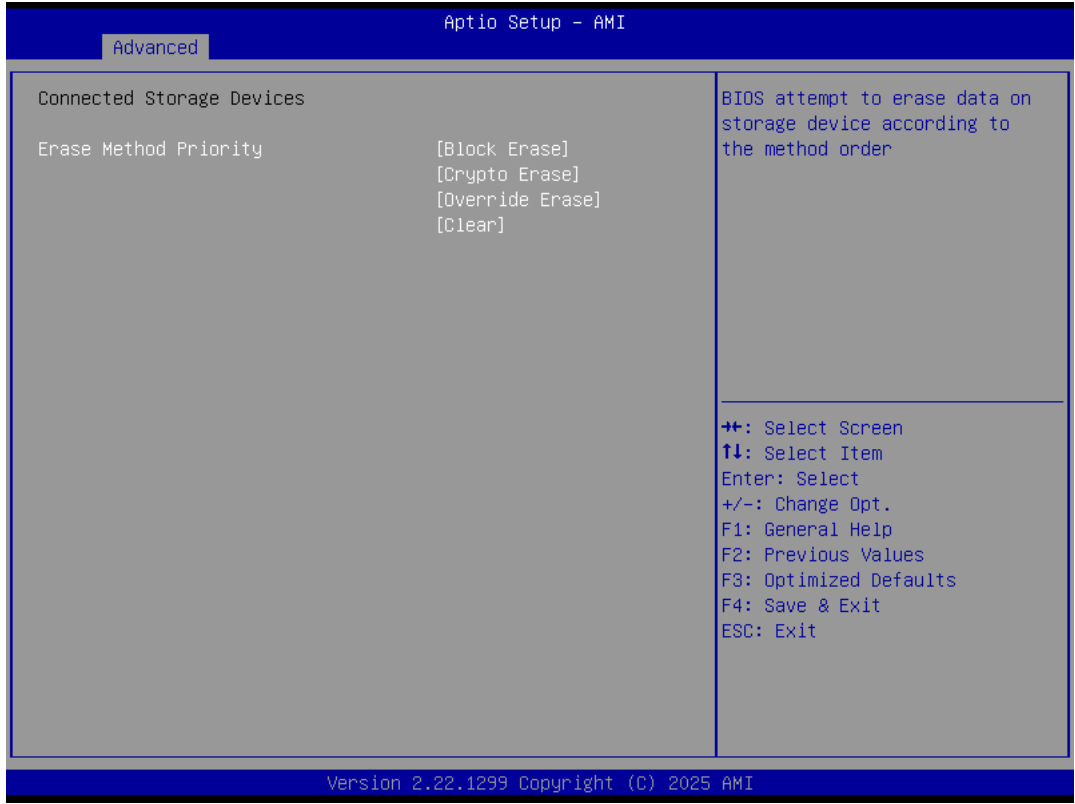
Feature	Description	Options
AMT BIOS Features	When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup. Note: This option does not disable Manageability Features in FW.	★Enabled, Disabled
USB Provisioning of AMT	Enable/Disable of AMT USB Provisioning.	Enabled, ★Disabled
Unconfigure ME	Unconfigure ME with resetting MEBx password to default on next boot.	Enabled, ★Disabled
End Of Post Message	Enable/Disable End of Post message sent to ME	★Send in DXE, Disabled
Extend CSME Measurement to TPM-PCR	Enable/Disable Extend CSME Measurement to TPM-PCR[0] and AMT Config to TPM-PCR[1]	Enabled, ★Disabled
Platform Erase	Platform Erase settings	

Platform Erase



Feature	Description	Options
Enable Remote Platform Erase Feature	Enable/Disable Remote Platform Erase Feature. RPE works only in vPro Enterprise.	★ Enable, Disable
SSD Erase Mode	Change RPE SSD Erase Action behavior: Simulated: Performs RPE SSD Erase flow without erasing SSD Real: Erase SSD.	★ Simulated, Real
Storage Erase Configuration	Storage Erase Configuration menu	

Storage Erase Configuration



Feature	Description	Options
Erase Method Priority	BIOS attempt to erase data on storage device according to the method order	Block Erase Crypto Erase Override Erase Clear

6.3.9 Super IO Configuration



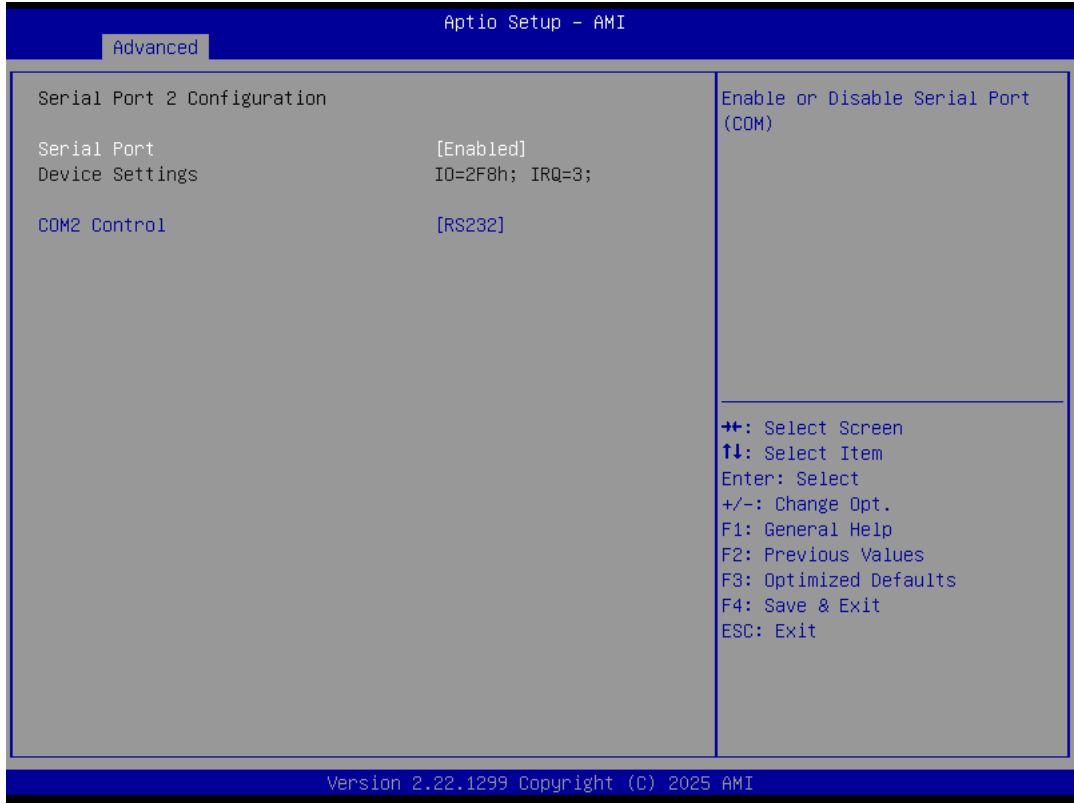
Feature	Description	Options
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA)	
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB)	
Serial Port 3 Configuration	Set Parameters of Serial Port 3 (COMC)	
Serial Port 4 Configuration	Set Parameters of Serial Port 4 (COMD)	
Serial Port 5 Configuration	Set Parameters of Serial Port 5 (COME)	

Serial Port 1 Configuration



Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	★Enabled, Disabled
COM1 Control	Select COM1 mode. RS232, RS422 or RS485	★RS232, RS422, RS485

Serial Port 2 Configuration



Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	★Enabled, Disabled
COM2 Control	Select COM2 mode. RS232, RS422 or RS485	★RS232, RS422, RS485

Serial Port 3 Configuration



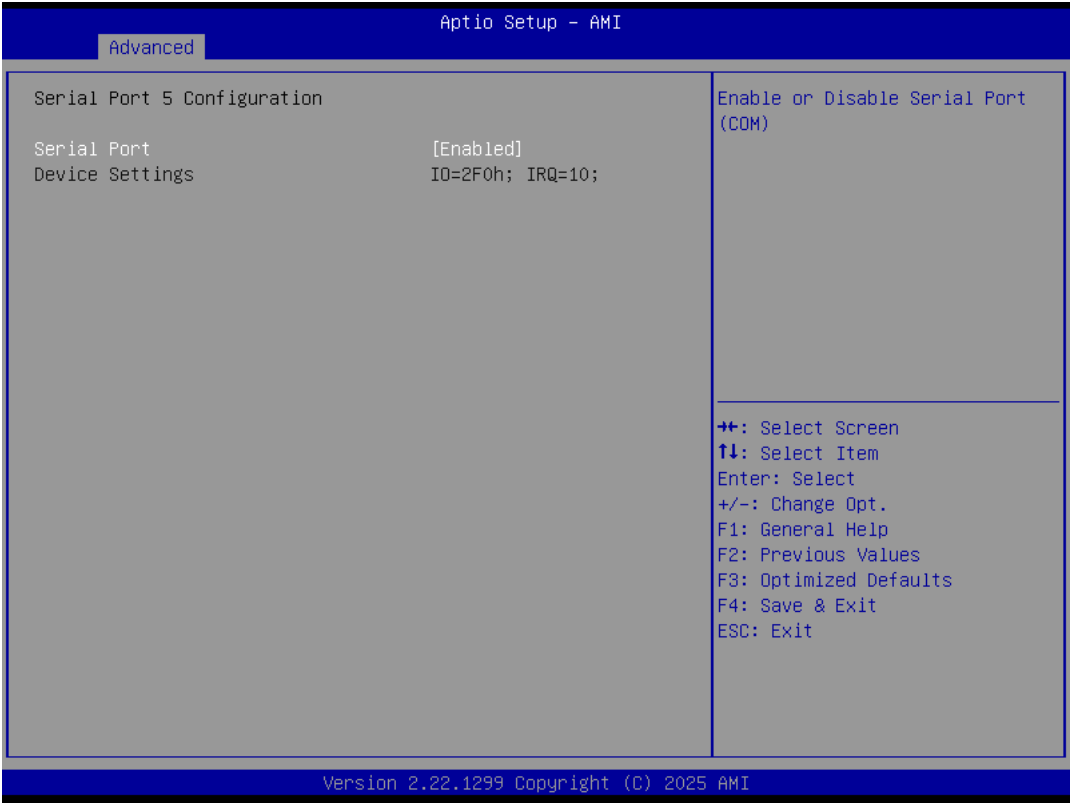
Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	★Enabled, Disabled

Serial Port 4 Configuration



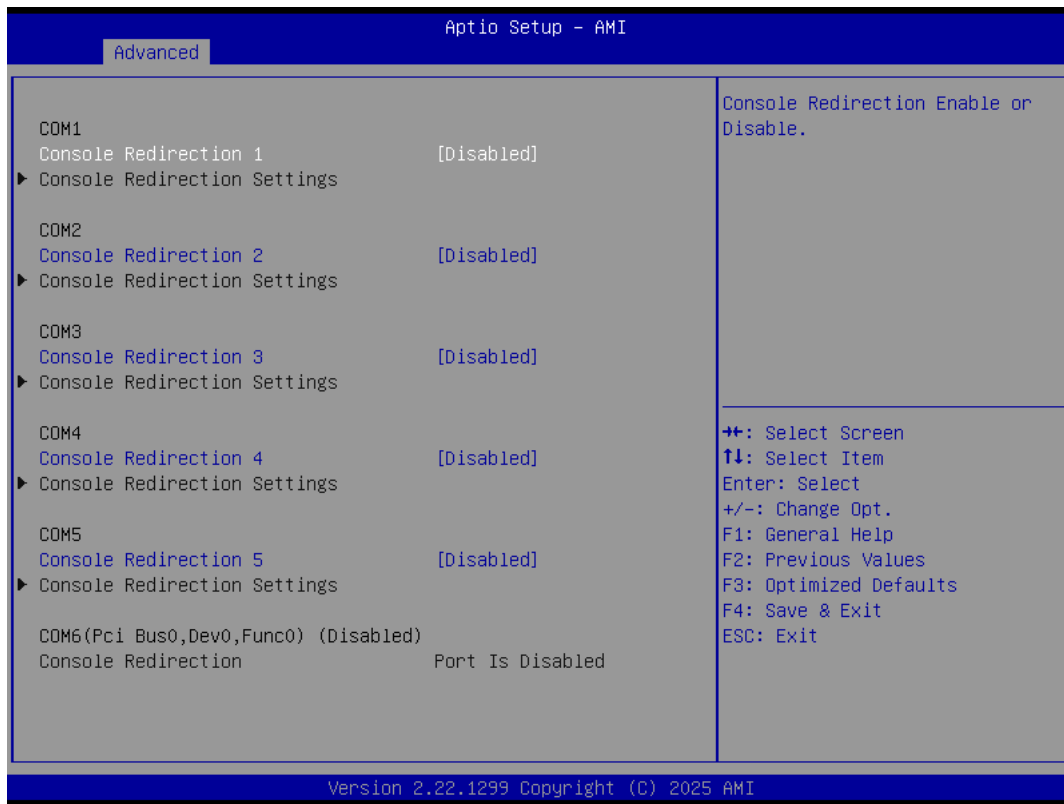
Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	★Enabled, Disabled

Serial Port 5 Configuration



Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	★Enabled, Disabled

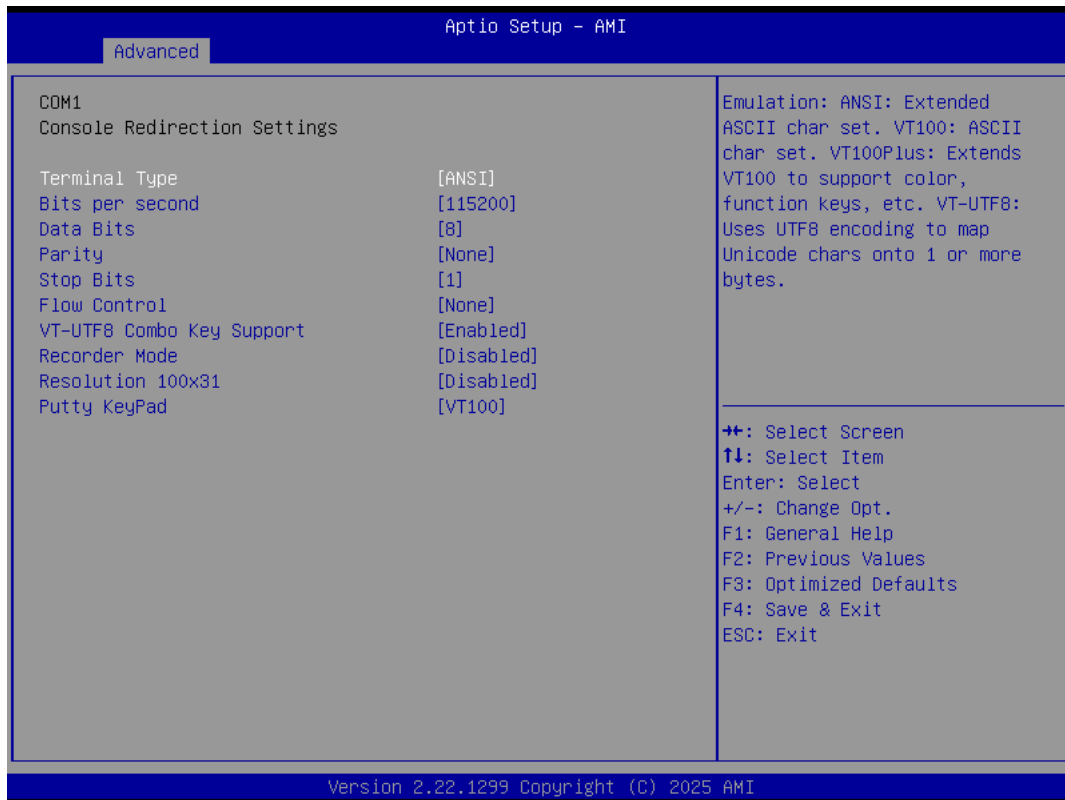
6.3.10 Serial Console Redirection



Feature	Description	Options
Console Redirection 1	Console Redirection Enable or Disable.	Enabled, ★Disabled
Console Redirection 2	Console Redirection Enable or Disable.	Enabled, ★Disabled
Console Redirection 3	Console Redirection Enable or Disable.	Enabled, ★Disabled
Console Redirection 4	Console Redirection Enable or Disable.	Enabled, ★Disabled
Console Redirection 5	Console Redirection Enable or Disable.	Enabled, ★Disabled
Console Redirection 1 ~ 5 [Enabled]		
Console Redirection Settings	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.	

COM1 ~ COM5 Console Redirection Settings

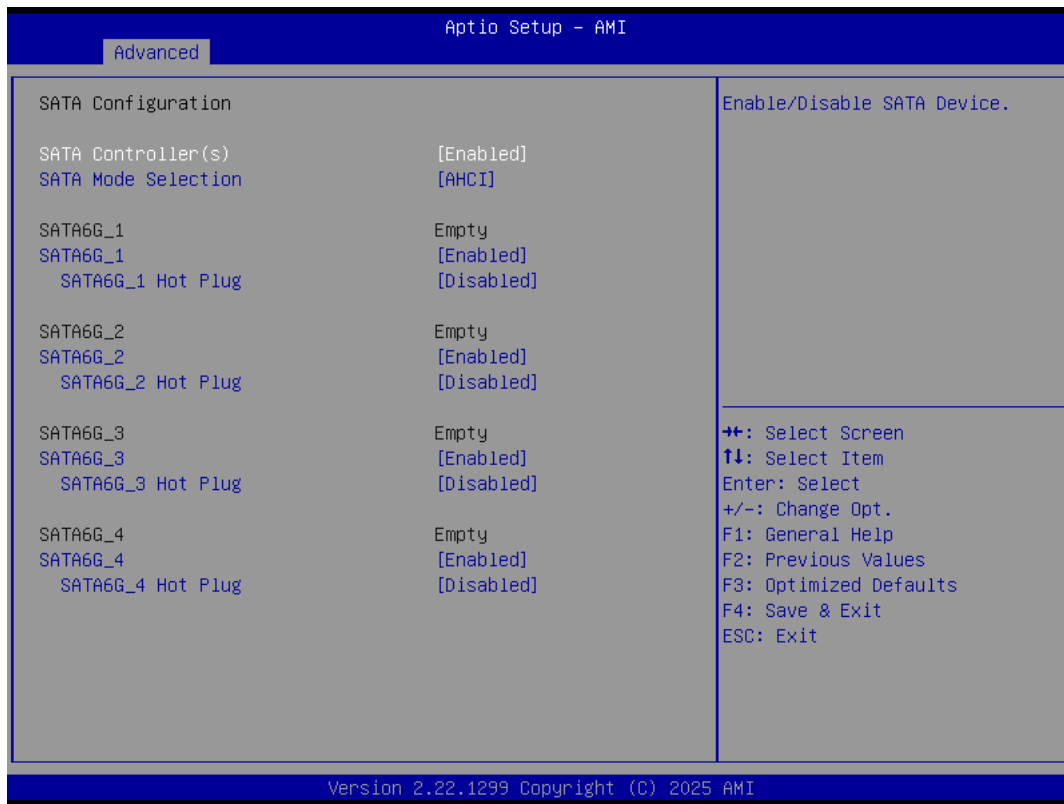
The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.



Feature	Description	Options
Terminal Type	Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.	★ANSI, VT100, VT100Plus, VT-UTF8
Bits per second	Selects Serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.	★115200, 9600, 19200, 38400, 57600, 230400, 460800, 921600
Data bits	Data bits	★8, 7

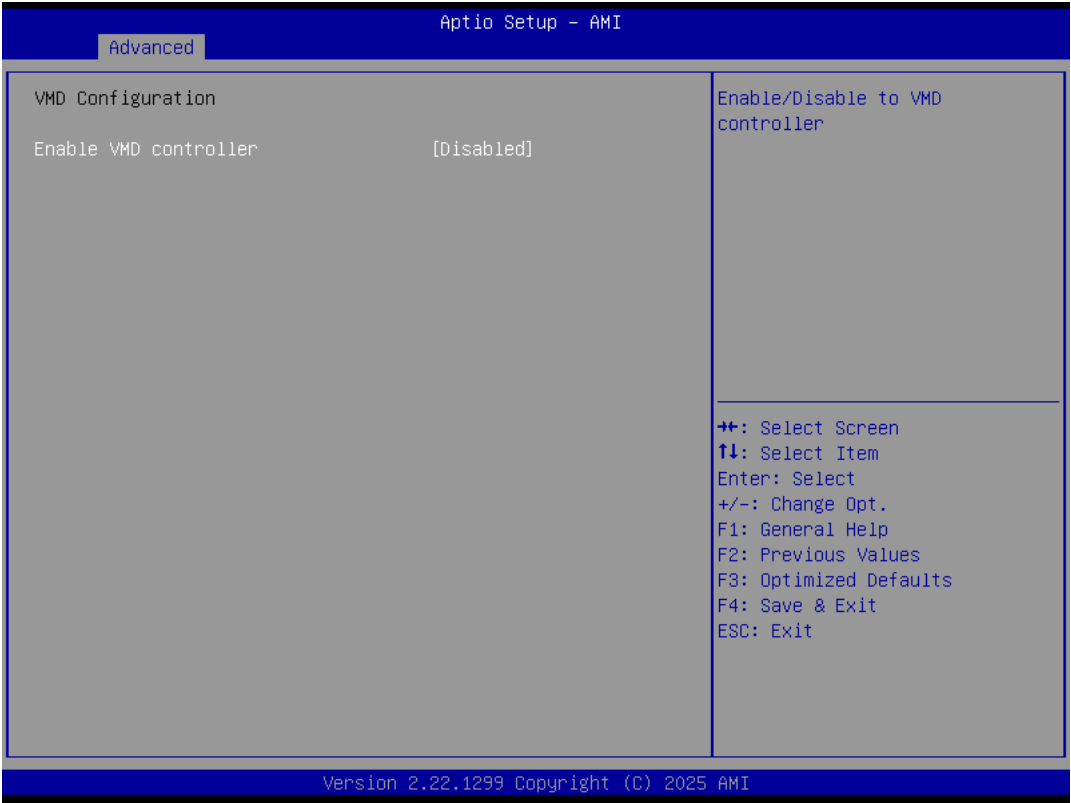
Feature	Description	Options
Parity	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.	★None, Even, Odd, Mark, Space
Stop Bits	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.	★1, 2
Flow Control	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.	★None, Hardware RTS/CTS
VT-UTF8 Combo Key Support	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals	★Enabled, Disabled
Recorder Mode	With this mode enabled only text will be sent. This is to capture Terminal data.	Enabled, ★Disabled
Resolution 100x31	Enables or disables extended terminal resolution	Enabled, ★Disabled
Putty KeyPad	Select FunctionKey and KeyPad on Putty.	★VT100, LINUX, XTERMR6, SCO, ESCN, VT400

6.3.11 SATA Configuration



Feature	Description	Options
SATA Controller(s)	Enable/Disable SATA Device.	★Enabled, Disabled
SATA Mode Selection	Determines how SATA controller(s) operate.	★AHCI
SATA6G_1	Enable or Disable SATA Port	★Enabled, Disabled
SATA6G_1 Hot Plug	Designates this port as Hot Pluggable.	Enabled, ★Disabled
SATA6G_2	Enable or Disable SATA Port	★Enabled, Disabled
SATA6G_2 Hot Plug	Designates this port as Hot Pluggable.	Enabled, ★Disabled
SATA6G_3	Enable or Disable SATA Port	★Enabled, Disabled
SATA6G_3 Hot Plug	Designates this port as Hot Pluggable.	Enabled, ★Disabled
SATA6G_4	Enable or Disable SATA Port	★Enabled, Disabled
SATA6G_4 Hot Plug	Designates this port as Hot Pluggable.	Enabled, ★Disabled

6.3.12 VMD setup menu



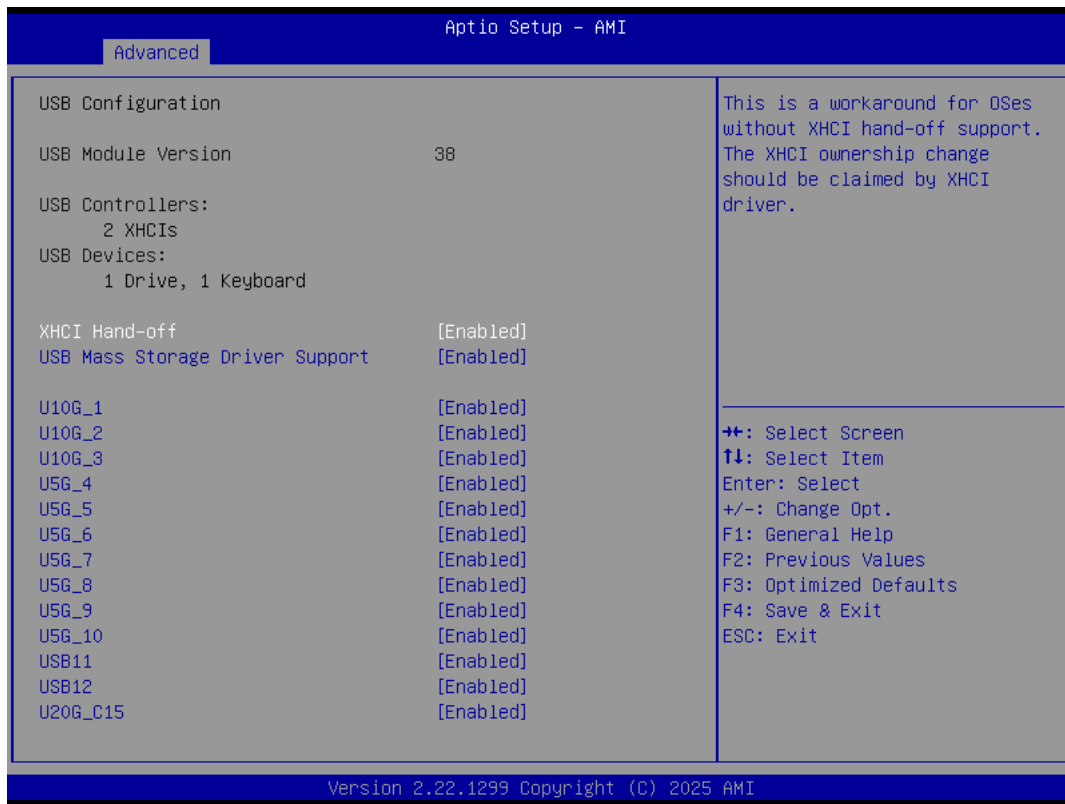
Feature	Description	Options
Enable VMD controller	Enable/Disable to VMD controller	★Disabled, Enabled
Enable VMD controller [Enabled]		
Map PCH SATA Controller Under VMD		★Disabled

6.3.13 Network Stack Configuration



Feature	Description	Options
Network Stack	Enable/Disable UEFI Network Stack	★Disabled, Enabled
Network Stack [Enabled]		
IPv4 PXE Support	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.	★Disabled, Enabled
IPv6 PXE Support	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.	★Disabled, Enabled

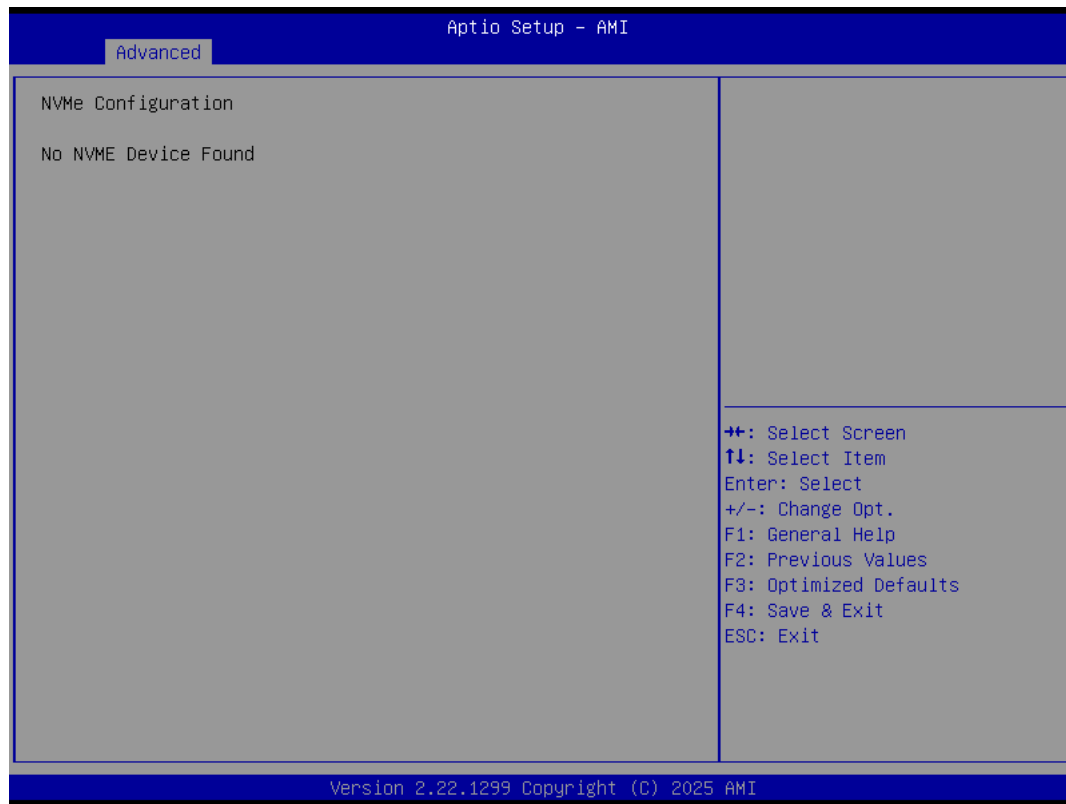
6.3.14 USB Configuration



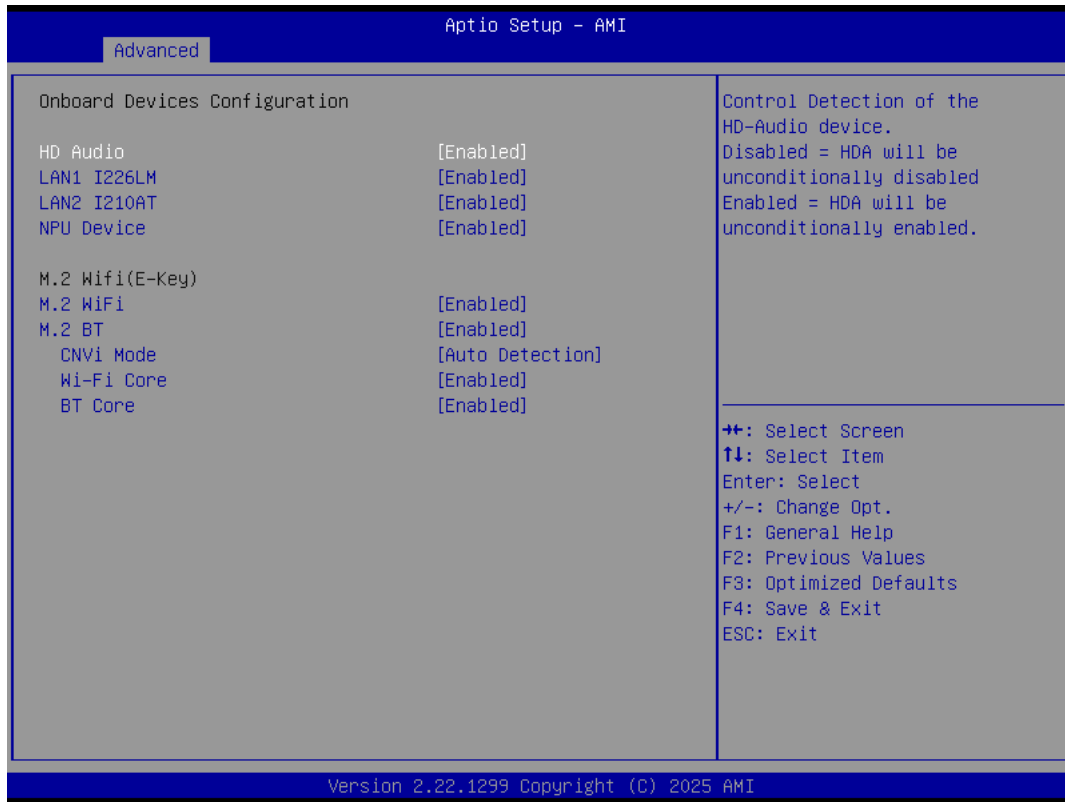
Feature	Description	Options
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.	★Enabled, Disabled
USB Mass Storage Driver Support	Enable/Disable USB Mass Storage Driver Support.	★Enabled, Disabled
U10G_1	Enable/Disable U10G_1	★Enabled, Disabled
U10G_2	Enable/Disable U10G_2	★Enabled, Disabled
U10G_3	Enable/Disable U10G_3	★Enabled, Disabled
U5G_4	Enable/Disable U5G_4	★Enabled, Disabled
U5G_5	Enable/Disable U5G_5	★Enabled, Disabled
U5G_6	Enable/Disable U5G_6	★Enabled, Disabled

Feature	Description	Options
U10G_7	Enable/Disable U10G_7	★Enabled, Disabled
U10G_8	Enable/Disable U10G_8	★Enabled, Disabled
U5G_9	Enable/Disable U5G_9	★Enabled, Disabled
U5G_10	Enable/Disable U5G_10	★Enabled, Disabled
USB11	Enable/Disable USB11	★Enabled, Disabled
USB12	Enable/Disable USB12	★Enabled, Disabled
U20G_C15	Enable/Disable U20G_C15	★Enabled, Disabled

6.3.15 NVMe Configuration

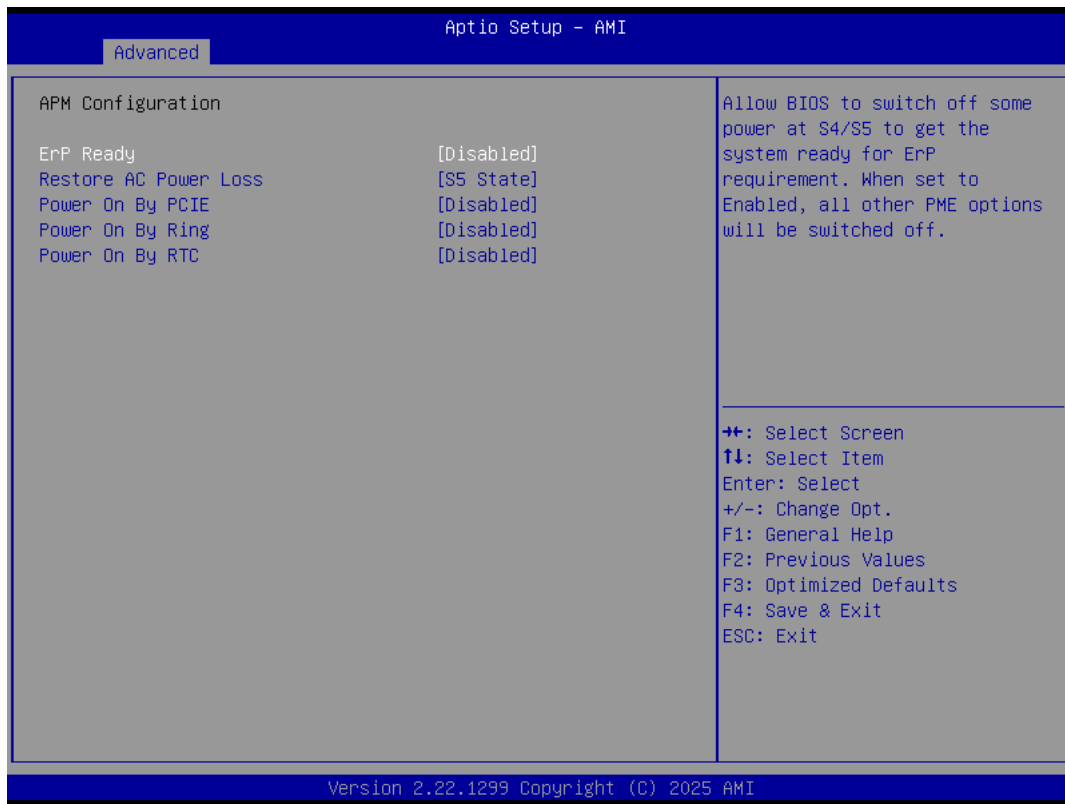


6.3.16 Onboard Device Configuration



Feature	Description	Options
HD Audio	Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled. Enabled = HDA will be unconditionally enabled.	★Enabled, Disabled
LAN1 I226LM	Enable/Disable LAN1 I226LM	★Enabled, Disabled
LAN2 I210AT	Enable/Disable LAN2 I210AT	★Enabled, Disabled
NPU Device	Enable/Disable NPU (Neural Processing Unit) Device.	★Enabled, Disabled
M.2 WiFi	Enable/Disable M.2 WiFi	★Enabled, Disabled
M.2 BT	Enable/Disable M.2 BT	★Enabled, Disabled
CNVi Mode	This option configures Connectivity. [Auto Detection] means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; [Disable Integrated] disables Integrated Solution. NOTE: When CNVi is present, the GPIO pins that are used for radio interface cannot be assigned to the other native function.	★Auto Detection, Disable Integrated
Wi-Fi Core	This is an option intended to Enable/Disable Wi-Fi Core in CNVi	★Enabled, Disabled
BT Core	This is an option intended to Enable/Disable BT Core in CNVi	★Enabled, Disabled

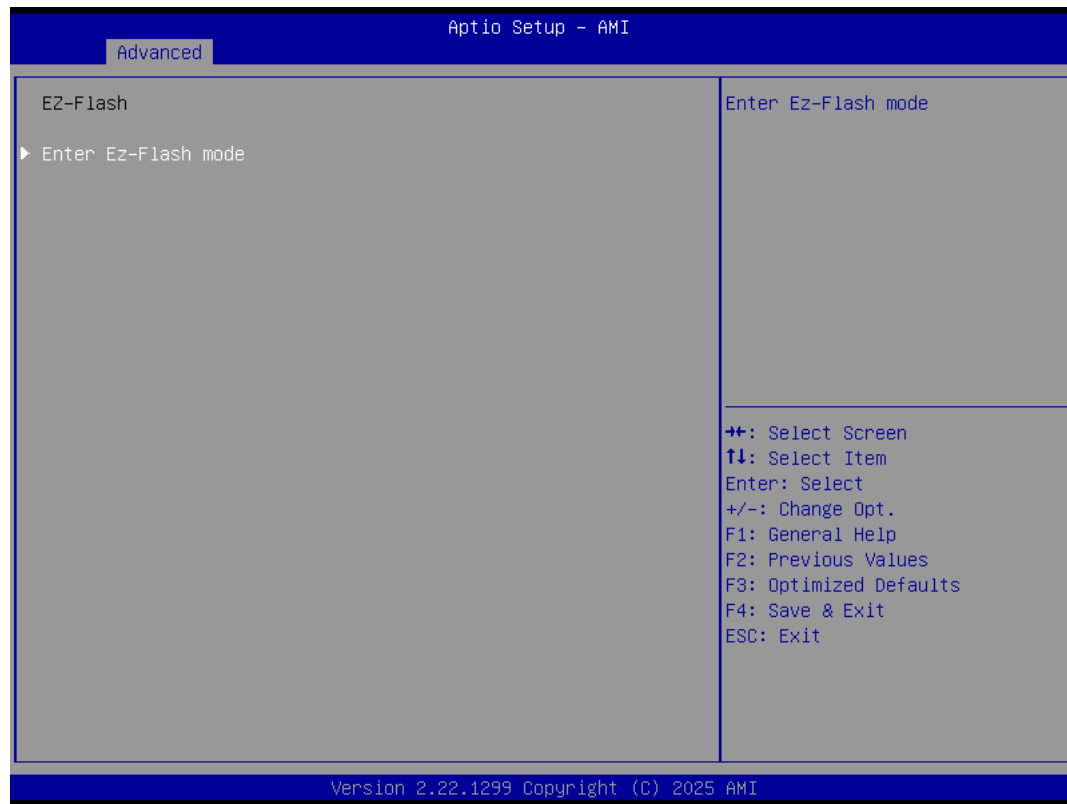
6.3.17 APM Configuration



Feature	Description	Options
ErP Ready	Allow BIOS to switch off some power at S4/S5 to get the system ready for ErP requirement. When set to Enabled, all other PME options will be switched off.	★Disabled, Enabled
Restore AC Power Loss	Select AC power state when power is re-applied after a power failure.	★S5 State, S0 State
Power On By PCIE	Enable or disable the Wake-on-LAN function of the onboard LAN controller or other installed PCIE LAN devices.	★Disabled, Enabled
Power On By Ring	Power On By Ring	★Disabled, Enabled
Power On By RTC	Select whether to enable Wake Up on Alarm, to turn on your system on a special day of the month, special day of the week or daily. NOTE: Values in these fields may be overwritten by the operating system.	★Disabled, Single event, Daily event, Weekly event, Monthly event

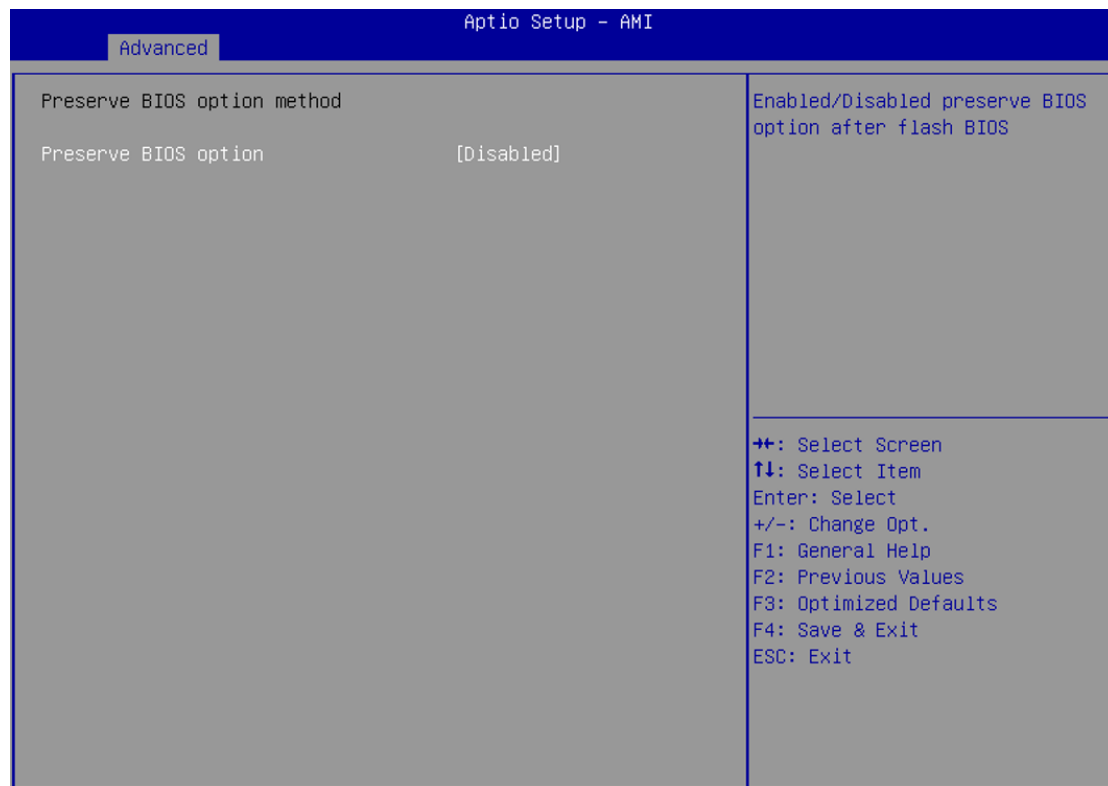
Feature	Description	Options
Power On By RTC [Single event]		
Wake up hour	Select 0-23 For example enter 3 for 3am and 15 for 3pm	
Wake up minute	Select 0-59 for Minute	
Wake up second	Select 0-59 for Second	
Power On By RTC [Daily event]		
Wake up hour	Select 0-23 For example enter 3 for 3am and 15 for 3pm	
Wake up minute	Select 0-59 for Minute	
Wake up second	Select 0-59 for Second	
Power On By RTC [Weekly event]		
Alarm day of Week	Select the day of the week when the system is to wake up.	★Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday
Wake up hour	Select 0-23 For example enter 3 for 3am and 15 for 3pm	
Wake up minute	Select 0-59 for Minute	
Wake up second	Select 0-59 for Second	
Power On By RTC [Monthly event]		
Day of the Month	RTC Alarm Date (Days)	★15
Wake up hour	Select 0-23 For example enter 3 for 3am and 15 for 3pm	
Wake up minute	Select 0-59 for Minute	
Wake up second	Select 0-59 for Second	

6.3.18 EZ-Flash



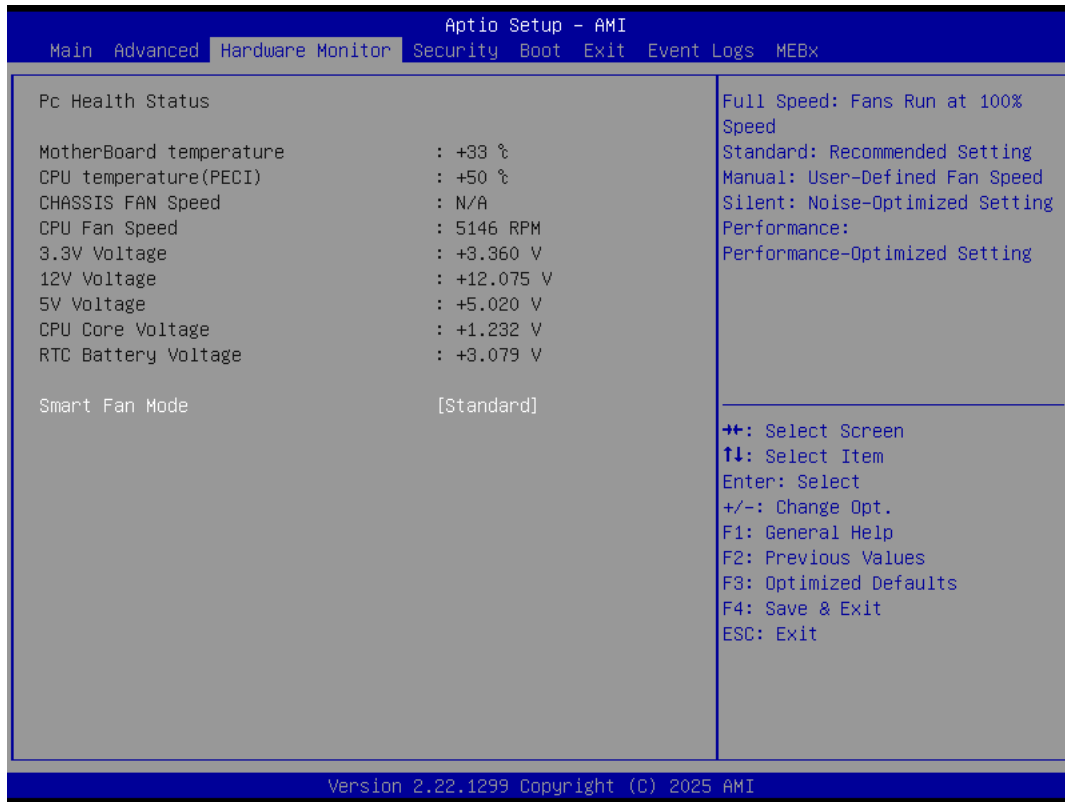
Feature	Description	Options
Enter Ez-Flash mode	In this mode, select a BIOS update file from your drive to update	

6.3.19 Preserve BIOS option method



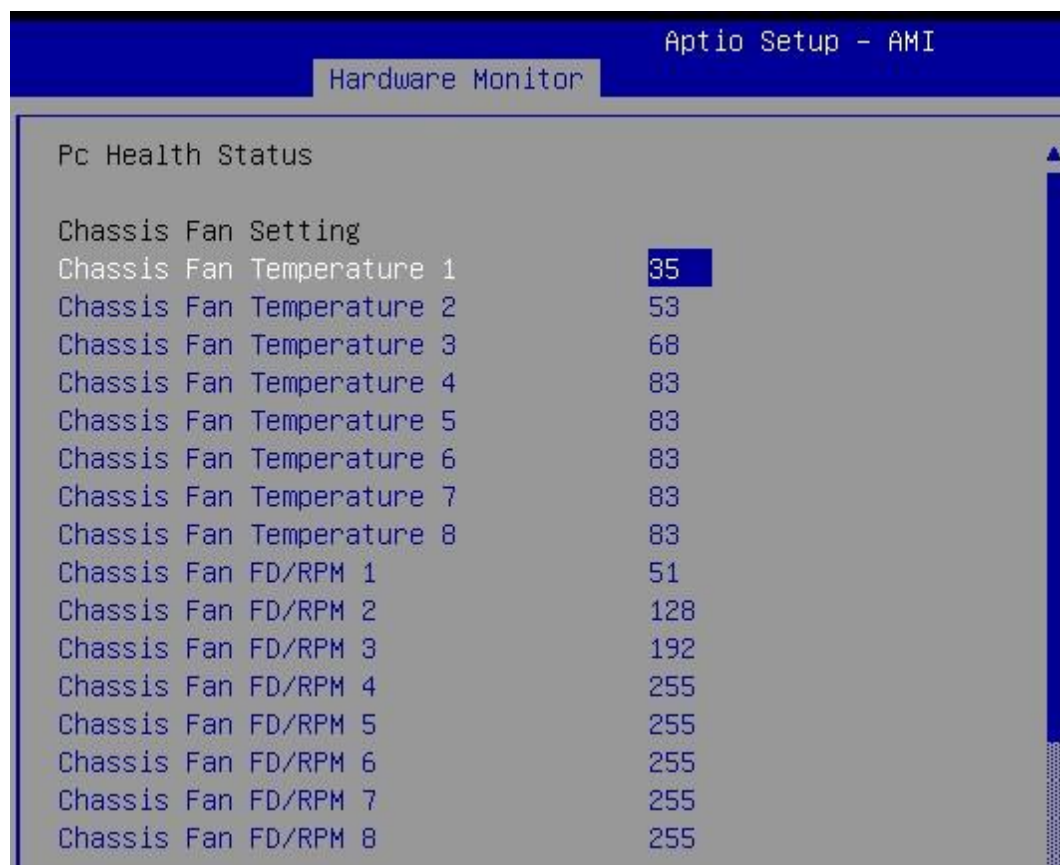
Feature	Description	Options
Preserve BIOS option	Enabled/Disabled preserve BIOS option after flash BIOS	★Disabled, Enabled

6.4 Hardware Monitor



Feature	Description	Options
Smart Fan Mode	Full Speed: Fans Run at 100% Speed Standard: Recommended Setting Manual: User-Defined Fan Speed Silent: Noise-Optimized Setting Performance: Performance-Optimized Setting	★Standard, Full Speed, Manual, Silent, Performance
Smart Fan Mode [Manual]		
Smart Fan Function	Smart Fan Function Setting	

Chassis Fan Setting



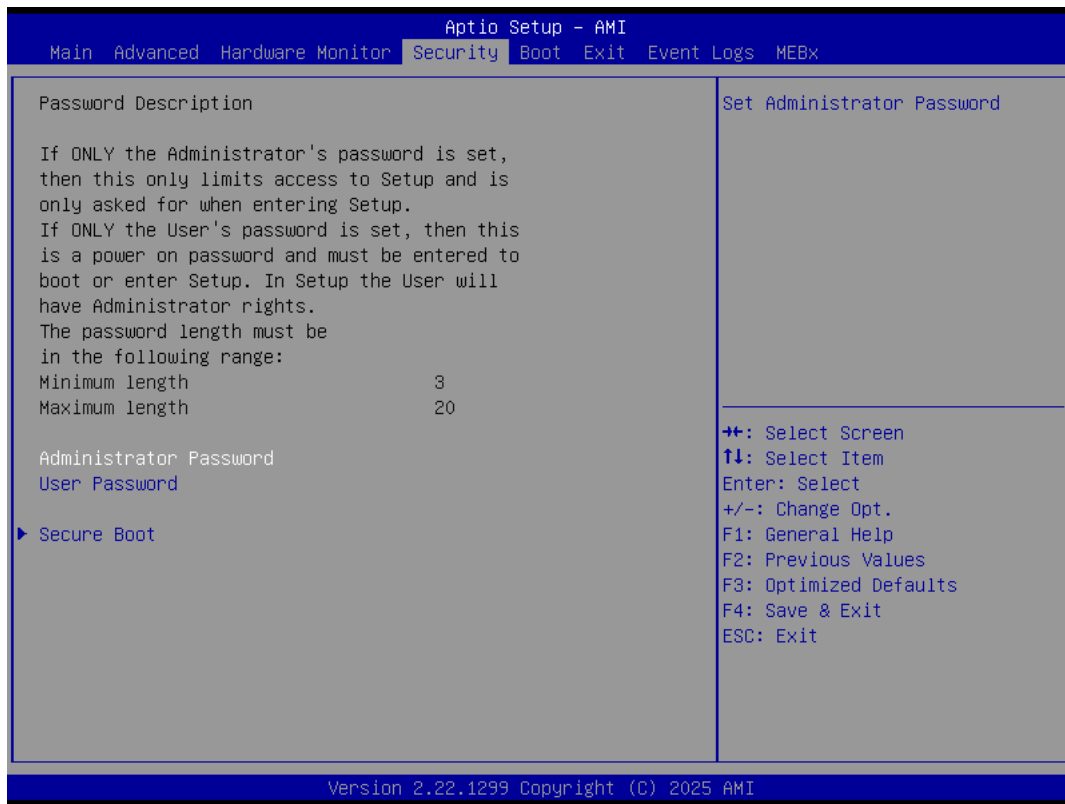
Feature	Description	Options
Chassis Fan Temperature 1~8	The value of temperature1~8.	
Chassis Fan FD/RPM 1~8	The value of Fan Duty/RPM when temperature is T1~T8	

CPU Fan Setting

CPU Fan Setting	
CPU Fan Temperature 1	40
CPU Fan Temperature 2	58
CPU Fan Temperature 3	73
CPU Fan Temperature 4	88
CPU Fan Temperature 5	88
CPU Fan Temperature 6	88
CPU Fan Temperature 7	88
CPU Fan Temperature 8	88
CPU Fan FD/RPM 1	51
CPU Fan FD/RPM 2	128
CPU Fan FD/RPM 3	192
CPU Fan FD/RPM 4	255
CPU Fan FD/RPM 5	255
CPU Fan FD/RPM 6	255
CPU Fan FD/RPM 7	255
CPU Fan FD/RPM 8	255

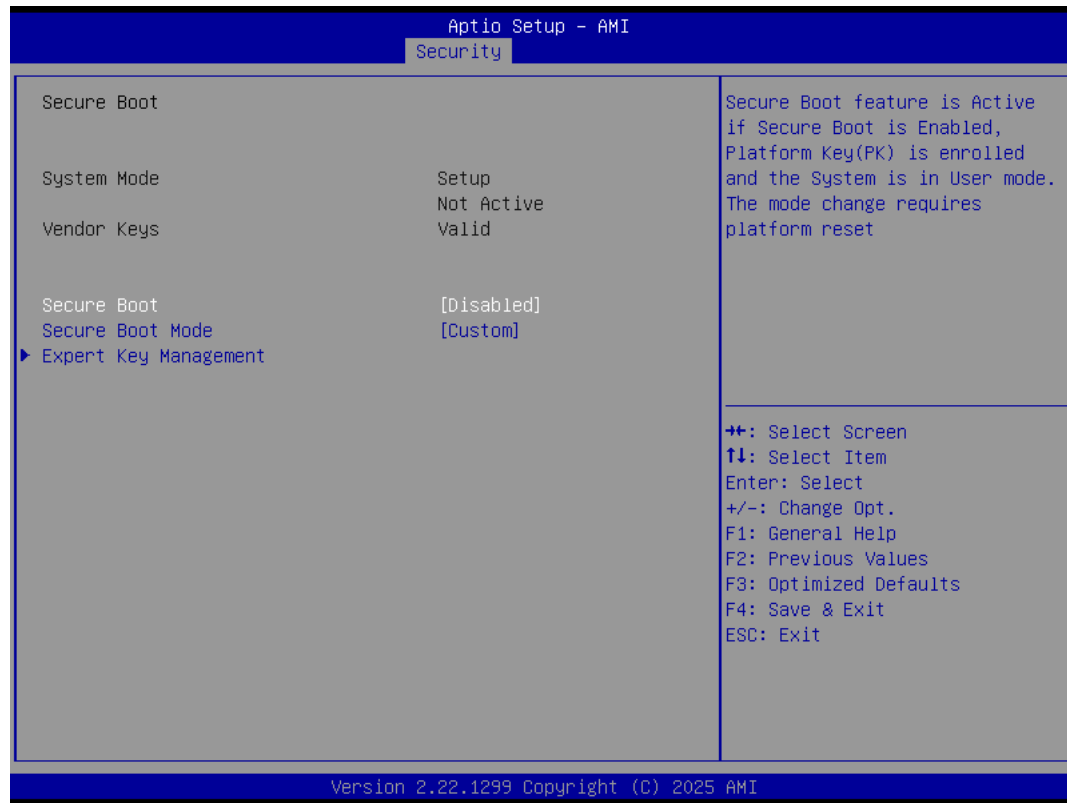
Feature	Description	Options
CPU Fan Temperature 1~8	The value of temperature1~8.	
CPU Fan FD/RPM 1~8	The value of Fan Duty/RPM when temperature is T1~T8	

6.5 Security



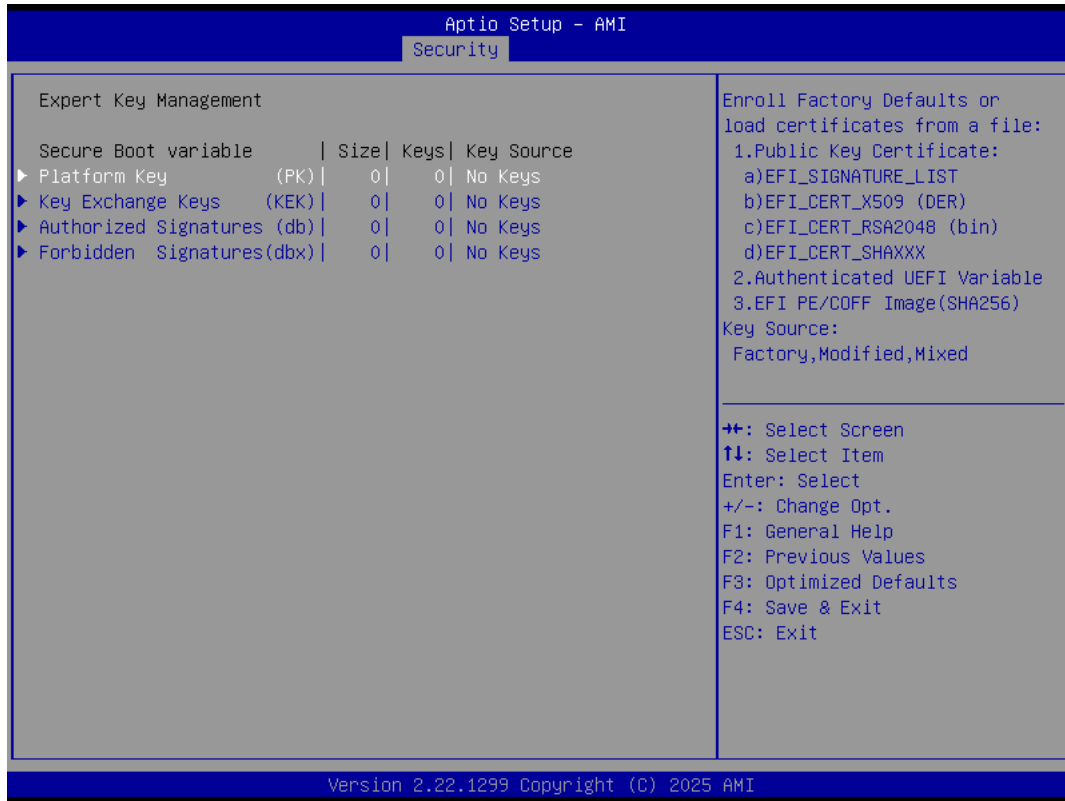
Feature	Description	Options
Administrator Password	Set Administrator password	
User Password	Set User Password	

Secure Boot



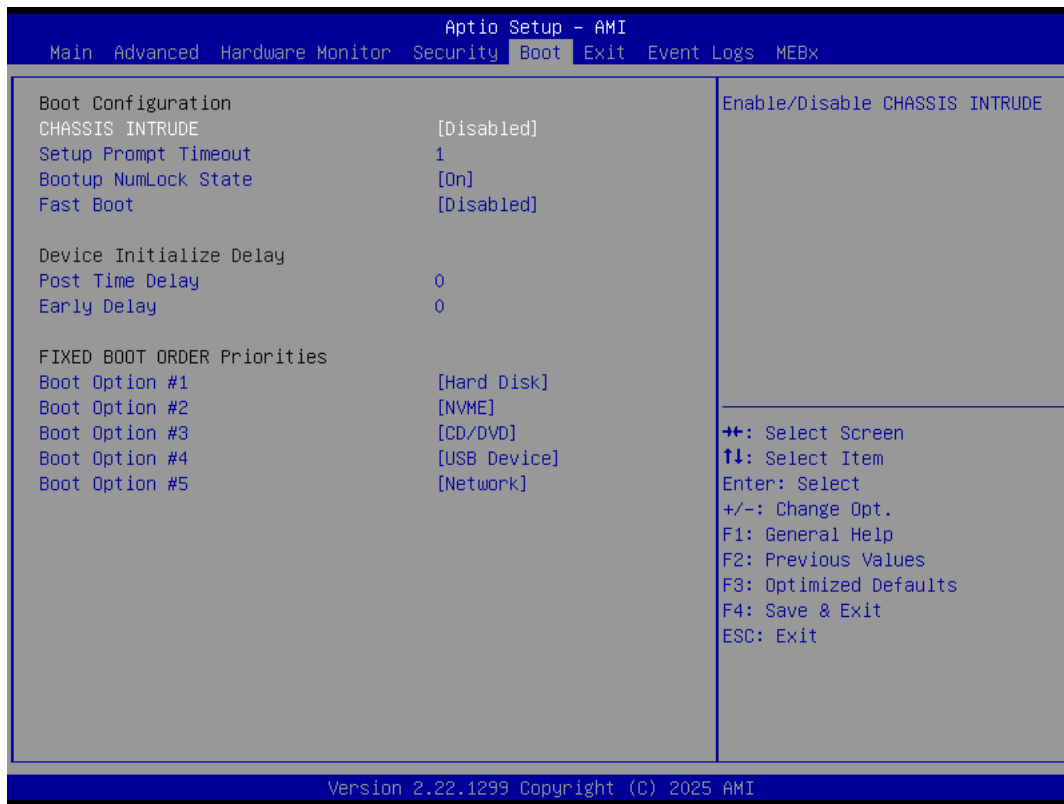
Feature	Description	Options
Secure Boot	Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset	★Disabled, Enabled
Secure Boot Mode	Secure Boot Mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication	Standard, ★Custom
Expert Key Management	Enables expert users to modify Secure Boot Policy variables without variable authentication	

Expert Key Management



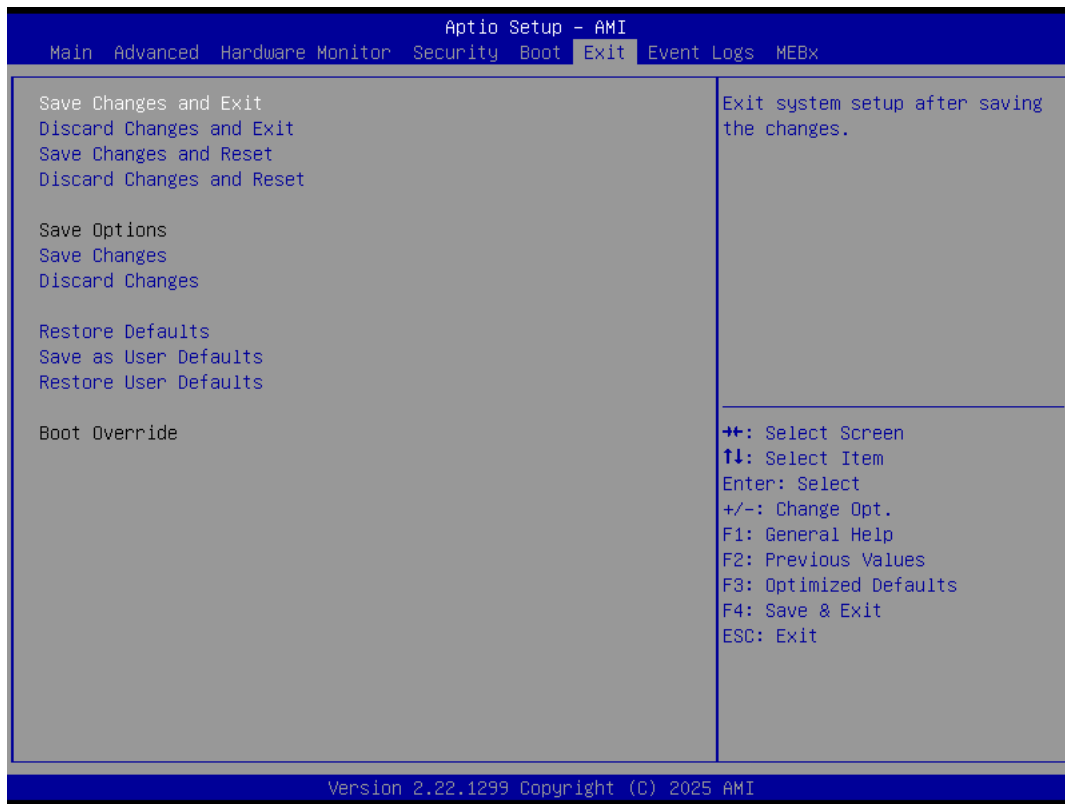
Feature	Description	Options
Platform Key(PK)	Enroll Factory Defaults or load certificates from a file: 1.Public Key Certificate: a)EFI_SIGNATURE_LIST b) EFI_CERT_X509 (DER) c) EFI_CERT_RSA2048 (bin) d)EFI_CERT_SHAXXX 2.Authenticated UEFI Variable 3.EFI PE/COFF Image(SHA256) Key Source: Factory, Modified, Mixed	Update,
Key Exchange Keys(KEK)		Update, Append,
Authorized Signatures(db)		Update, Append,
Forbidden Signatures(dbx)		Update, Append,

6.6 Boot



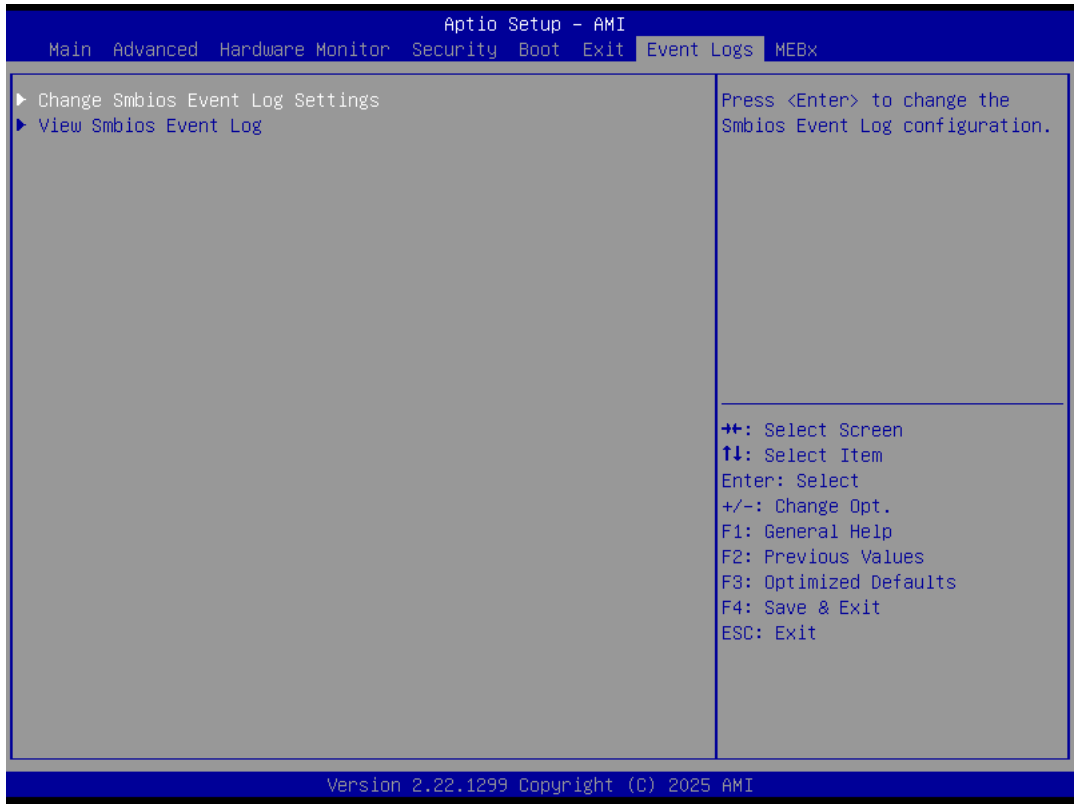
Feature	Description	Options
CHASSIS INTRUDE	Enable/Disable CHASSIS INTRUDE	★Disabled, Enabled
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.	★1
Bootup NumLock State	Select the keyboard NumLock state	★On, Off
Fast Boot	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.	★Disabled, Enabled
Post Time Delay	Add a delay of 0 ~ 6000ms after Device initialization to increase the compatibility. The unit is 500ms.	★0
Early Delay	Add a delay of 0 ~ 6000ms before Device initialization to increase the compatibility. The unit is 100ms.	★0
Boot Option #1 ~ #5	Sets the system boot order	★Hard Disk, NVME, CD/DVD, Network USB Device, Disabled

6.7 Exit



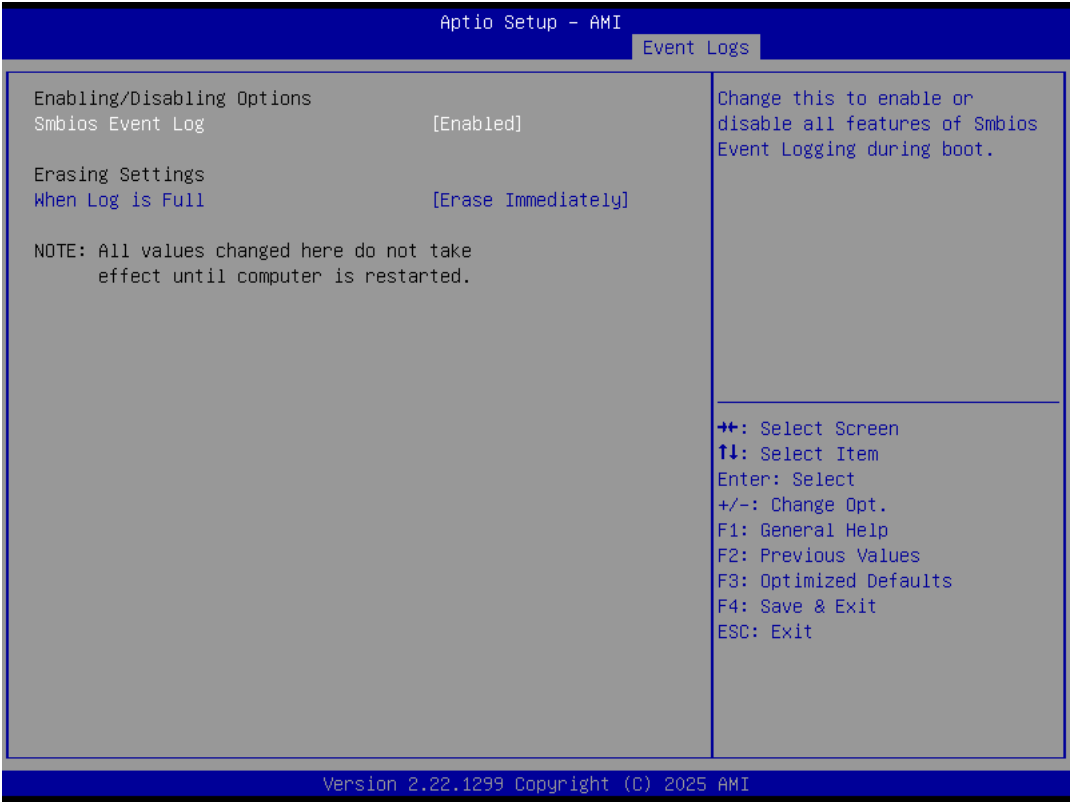
Feature	Description	Options
Save Changes and Exit	Exit system setup after saving the changes.	
Discard Changes and Exit	Exit system setup without saving any changes.	
Save Changes and Reset	Reset the system after saving the changes.	
Discard Changes and Reset	Rest system setup without saving any changes.	
Save Changes	Save Changes done so far to any of the setup options.	
Discard Changes	Discard Changes done so far to any of the setup options.	
Restore Defaults	Restore/Load Default values for all the setup options.	
Save as User Defaults	Save the changes done so far as User Defaults.	
Restore User Defaults	Restore the User Defaults to all the setup options.	

6.8 Event Logs



Feature	Description	Options
Change Smbios Event Log Settings	Press <Enter> to change the Smbios Event Log configuration.	
View Smbios Event Log	Press <Enter> to view the Smbios Event Log records.	

Change Smbios Event Log Settings



Feature	Description	Options
Smbios Event Log	Change this to enable or disable all features of Smbios Event Logging during boot.	★Enabled, Disabled
When Log is Full	Choose options for reactions to a full Smbios Event Log.	★Erase Immediately, Do Nothing

View Smbios Event Log

Aptio Setup - AMI			
			Event Logs
DATE	TIME	ERROR CODE	DESCRIPTION
01/01/25	00:00:00	Smbios 0x16	Log Area Reset and Count is applicable only for Multi-Events
01/01/25	00:00:02	Smbios 0xE6	
09/09/25	15:12:25	Smbios 0xE8	
09/09/25	15:18:43	Smbios 0xE8	
09/11/25	14:36:44	Smbios 0xE8	
09/15/25	10:52:58	Smbios 0xE8	
			⇄: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.22.1299 Copyright (C) 2025 AMI			

6.9 MEBx



7 System Resources

7.1 Intel® Arrow Lake S

Model	WADE-8214-Q870			
Vendor	CPU Name	Frequency	Code Name	TDP
Intel	ULTRA 5-235	3.4GHz	Arrow Lake	65W
Intel	ULTRA 5-225	3.3GHz	Arrow Lake	65W
Intel	ULTRA 5-225F	3.3GHz	Arrow Lake	65W
Intel	ULTRA 5-245	3.5GHz	Arrow Lake	65W
Intel	ULTRA 5-225	3.3GHz	Arrow Lake	64W
Intel	ULTRA 5-225F	3.3GHz	Arrow Lake	64W
Intel	ULTRA 5-230F	3.4GHz	Arrow Lake	64W
Intel	ULTRA 5-245T	2.2GHz	Arrow Lake	35W
Intel	ULTRA 5-235T	2.2GHz	Arrow Lake	35W
Intel	ULTRA 5-225T	2.5GHz	Arrow Lake	35W
Intel	ULTRA 7-265F	2.4GHz	Arrow Lake	65W
Intel	ULTRA 7-265	2.4GHz	Arrow Lake	65W
Intel	ULTRA 7-265T	1.5GHz	Arrow Lake	35W
Intel	ULTRA 9-285	2.5GHz	Arrow Lake	65W
Intel	ULTRA 9-285T	1.4GHz	Arrow Lake	35W

7.2 Main Memory

WADE-8214-Q870 provides 2 x 260-pin SO-DIMM sockets which supports DDR5 non-ECC memory. The maximum memory can be up to 96GB. Memory clock and related settings can be detected by BIOS via SPD interface.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedures to install memory module into memory socket. Before locking, make sure that all modules have been fully inserted into the card slots.

7.3 Installing the Single Board Computer

To install your WADE-8214-Q870 into standard chassis or proprietary environment, please perform the following:

Step 1 : Check all jumpers setting on proper position

Step 2 : Install and configure memory module on right position

Step 3 : Place WADE-8214-Q870 into the dedicated position in the system

Step 4 : Attach cables to existing peripheral devices and secure it

WARNING

Please ensure that motherboard is properly inserted and fixed by mechanism.

Chapter 8

Overview

- 8 Troubleshooting
- 8.1 Hardware Quick Installation
- 8.2 BIOS Setting
- 8.3 FAQ

8 Troubleshooting

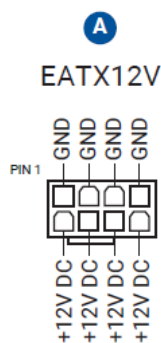
This chapter provides a few useful tips to quickly get WADE-8214-Q870 running with success. As basic hardware installation has been addressed in Chapter 2, this chapter will focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

8.1 Hardware Quick Installation

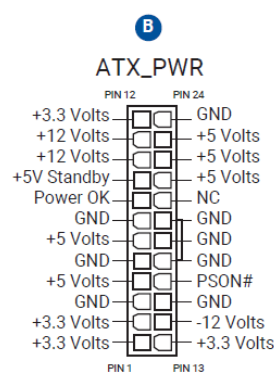
ATX Power Setting

Correctly orient the ATX power supply plugs into these connectors and push down firmly until the connectors completely fit.

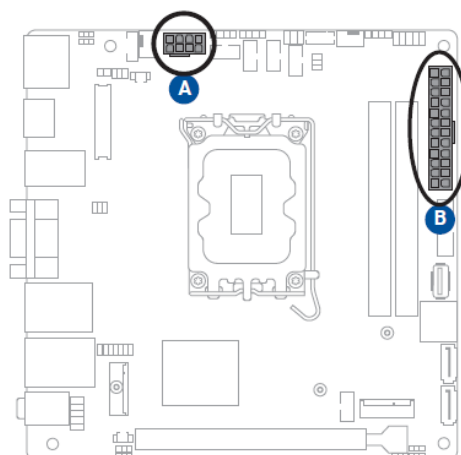
A: EATX 8 Pin



B: ATX_PWR 24 Pin

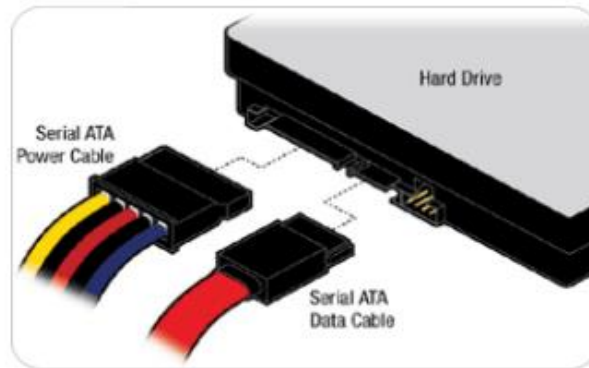
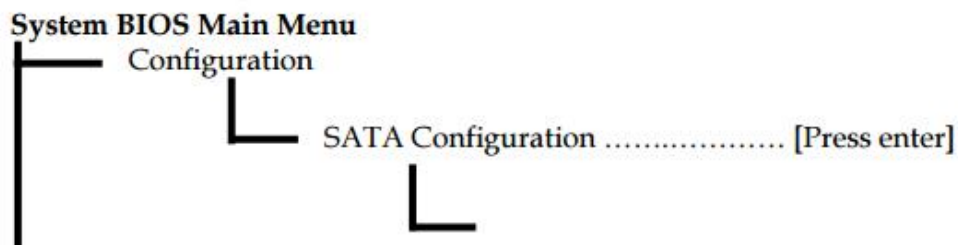


Connector



Serial ATA

Serial ATA Hard Disk Setting for SATA Speed Selection



SATA Speed Selection [Auto, Gen1, Gen2, Gen3]

8.2 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on ATX power.

260-pin DDR5 6400MT/s SO-DIMM Memory, keyboard, mouse, SATA hard disk, VGA connector, device power cables, ATX accessories are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with WADE-8214-Q870, it is recommended, when going with the boot-up sequence, to hit “DEL” and “ESC” key and enter the BIOS

setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to **“Restore Defaults”**, press **“Enter”** and select **“Yes”** to load default optimal BIOS setup. This will force your BIOS setting back to the initial factory configurations. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting at any time when system appears to be unstable in boot up sequence.

8.3 FAQ

Information & Support

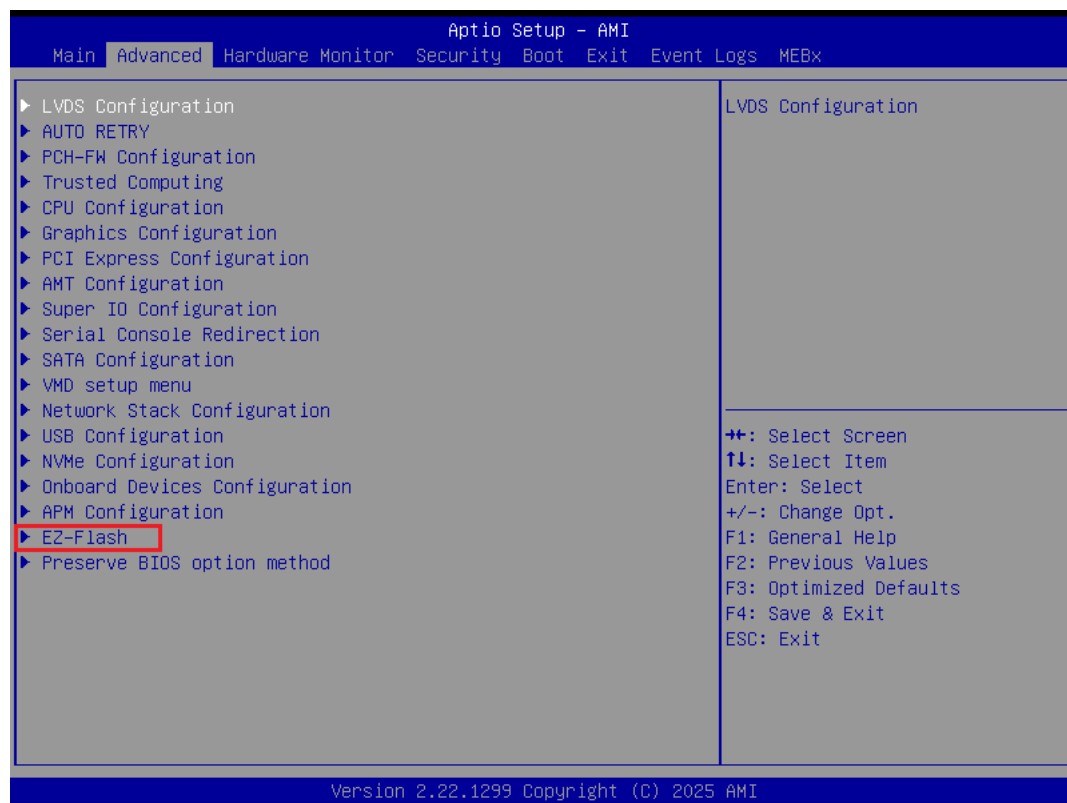
Question: I forgot my password for system BIOS, what am I supposed to do?

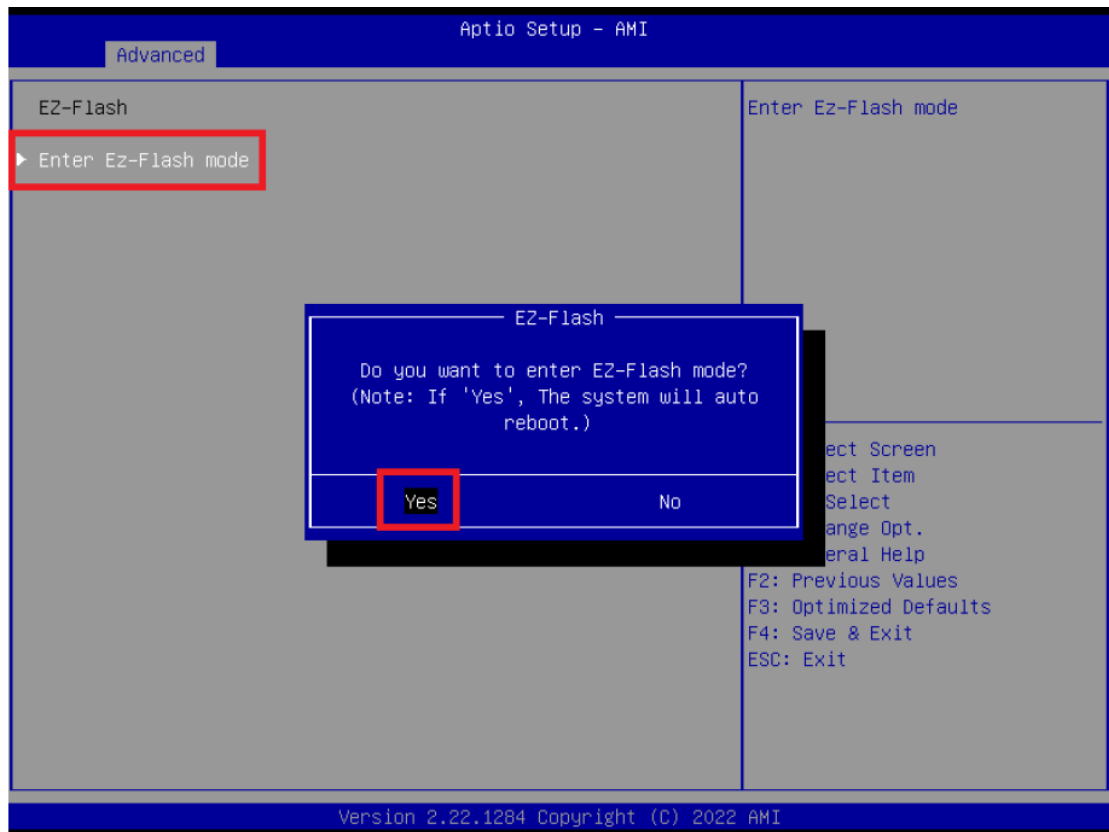
Answer: You can switch off your power supply then find the RTC battery on the WADE-8214-Q870. Then remove the RTC battery and wait 5 seconds to clean your password then to switch on your power supply.

Question: How to update the BIOS file of WADE-8214-Q870?

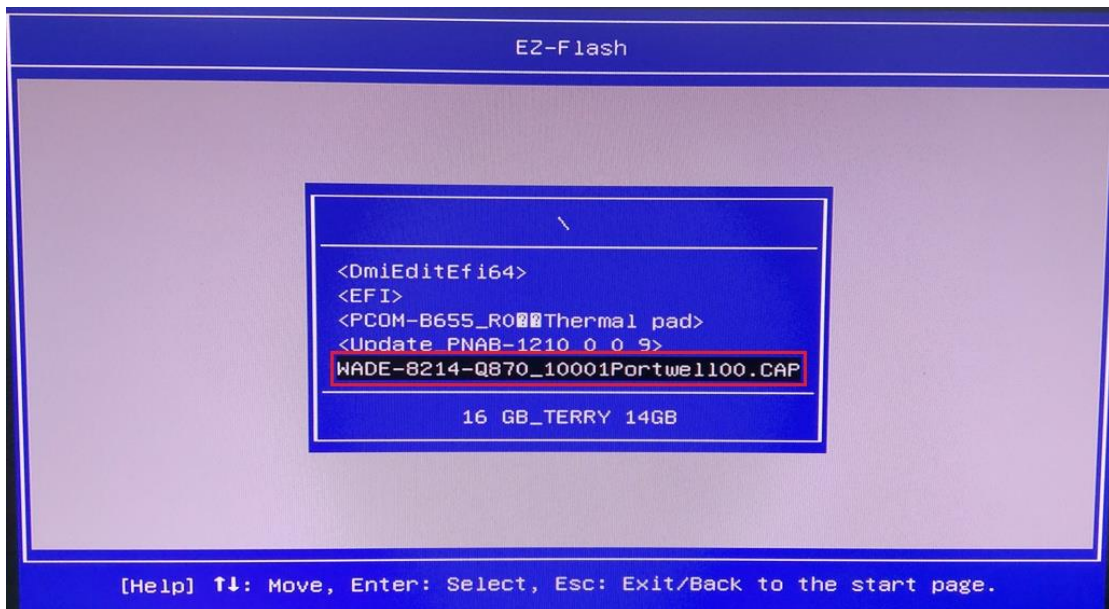
Answer:

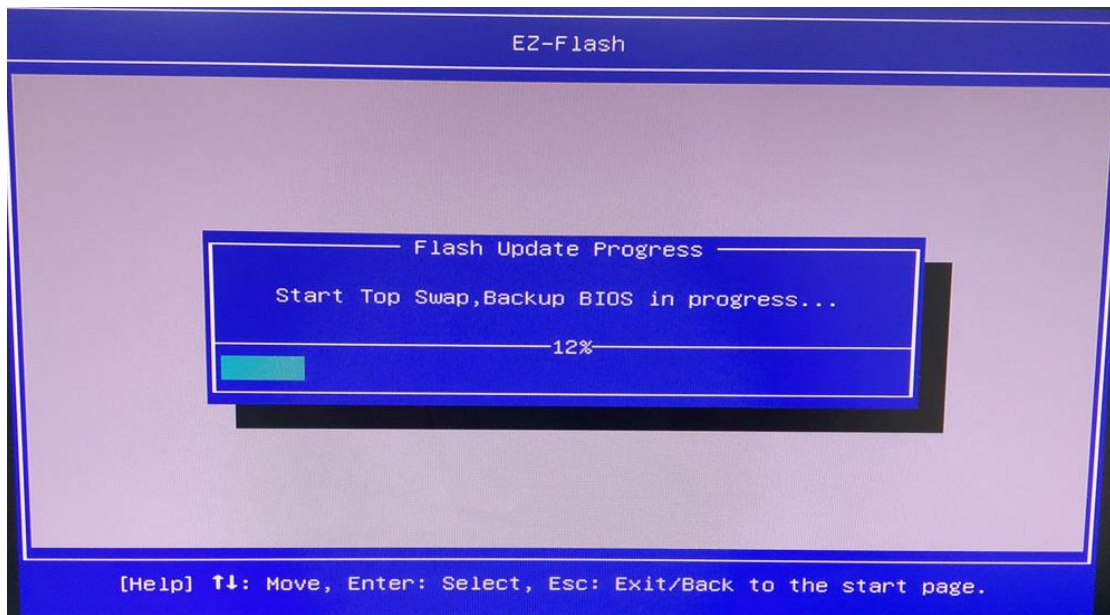
1. Please visit web site of Portwell download center as below hyperlink
<https://www.portwell.com.tw/support-center/download-center/>
2. Select “Search download” and type the keyword “WADE-8214-Q870”.
3. Find the “BIOS” page and download the ROM file and unzip file to USB flash drive (FAT 32 formats).
4. Boot into BIOS and switch to “Advanced” page then select “EZ-Flash”.





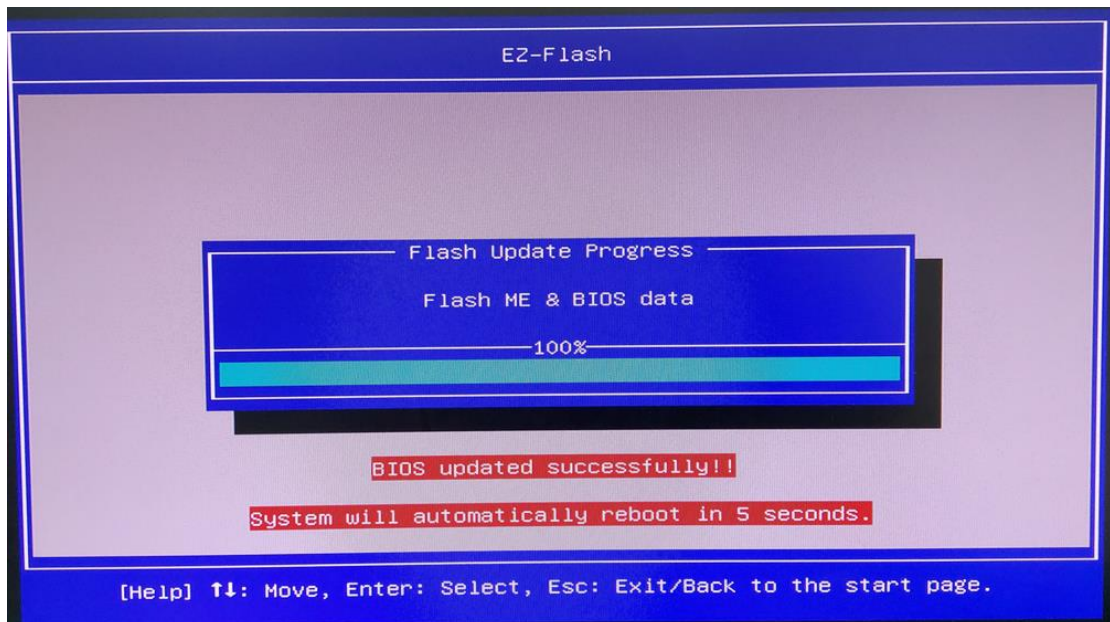
5. Enter EZ-Flash mode, Select the USB Drive and Click the BIOS file then start updating BIOS.





6. When you see the “**BIOS updated successfully**” message, which means the BIOS update processes finished.

Please cut the AC power off and **wait for 10 seconds** before powering on.



Chapter 9

Overview

9 Portwell Software Service

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Portwell Evaluation Tool (PET)

The Portwell Evaluation Tool (PET) is an API which Portwell's customers can access the GPIO, I2C, SMBus, etc under Windows and Linux OS. For more information, please contact Portwell.

Portwell BIOS web Tool (PBT)

The Portwell BIOS web Tool (PBT) is a brand-new on-line utility which innovated by Portwell. PBT now is available for Portwell's premiere customers who are able to add customized BIOS logo and change BIOS default settings on American Megatrends (AMI) BIOS. Please contact Portwell for more information.

Portwell EC Auto Test Tool (PECAT)

The Portwell EC Auto Test Tool (PECAT) is a brand-new utility which innovated by Portwell. PECAT now is available for Portwell's premiere customers, who are able to Test Embedded Controller Function in UEFI Mode. Please contact Portwell for more information.



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