AV1000-10L-60A

14/13/12th Gen. Intel® Raptor Lake-S Refresh/ Raptor Lake-S /Alder Lake-S, Core™ i9/i7/i5/i3 Liquid Cooled GPU Server User's Manual

User's Manual

Revision Date: Jul. 03. 2025

Safety Information

Electrical safety

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

Operation safety

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

Statement

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AV1000-10L-60A User's Manual

Revision Date: Jul. 03. 2025

Revision History

Revision	Date (yyyy/mm/dd)	Changes
Version 1.0	2025/07/03	Initial release
Version 1.1	2025/9/04	Update I/O pin define

Packing list

□ AV1000-10L-60A Liquid cooled GPU server System

□ CD (Driver + Quick Installation Guide)

If any of the above items is damaged or missing, please contact your local distributor.

Ordering Information

Model Number	Description
AV1000_10L-60A	Rugged military Liquid cooled GPU server with Intel® Raptor Lake-S i7-13700TE processor, Nvidia Quadro RTX 6000 Ada, 12~60V DC-IN,

Table of contents

Chapter 1: Product Introduction

1-1 Key Features

System

CPU	14th Gen Intel® Raptor Lake-S Refresh i9/i7/i5/i3 Pentium®/ Celeron® IOTG Series Processor, TDP 35W~125W 13th Gen Intel® Raptor Lake-S i9/i7/i5/i3 Pentium®/ Celeron® IOTG Series Processor, TDP 35W~125W 12th Gen Intel® Alder Lake-S i9/i7/i5/i3 Pentium®/ Celeron® IOTG Series Processor, TDP 35W~125W
Memory type	4 x DDR5 UDIMM slots (288-pin, vertical), - Up to 4400 MT/s, - Up to 128GB
Chipset	Intel® R680
Ethernet	4x Intel® I226-LM 2.5GbE RJ45 LAN
TPM	TPM 2.0 (on Board)
Watchdog	256-level Watchdog Timer
Smart Fan Control	1 x 4-pin PWM CPU fan connector 3 x 4-pin PWM system fan connector

Expansion Slot

M.2	1 x M.2 2280/22110 B+M-key (PCIe 4.0 x4 NVMe; Signal from CPU), 1 x M.2 2242/2280 B+M-key (PCIe 4.0 x4 & SATA3.0 Signal from PCH) 1 x M.0 2242/2280 B+M-key (PCIe 3.0 x4 signal from PCH)
PCIe Slot	1 x PCIe 5.0 X16 slot + 2 x PCIe 4.0 X4 + 1 x PCIe 3.0 x4 slots.

Graphic

GPU	1x NVIDIA ® RTX 6000 Ada, 48GB, 18,176 CUDA, Max. 300W
Display Port	Up to 4K (4096 x 2304) @120 Hz/60 Hz
	4 x DP 1.4a (4096 x 2160 @60 Hz)

GMSL2

GMSL	8 x GMSL2, 1920 x 1080P@60/45/30 fps

Ethernet

Chipset	4 x Intel® I226-LM 2.5Giga LAN
	8 x Intel® I350 1.0 GbE LAN

Audio

Codec	Realtek® ALC897 Audio Codec

Front I/O

X1~X4	4 x 2.5GbE LAN with M12 connector
X5~X10	6 x 1.0GbE LAN with M12 connector
X11~X14	4 x USB3.2 Gen 2 Type-A with M20 connector
X15	1 x CAN bus with M12 connector
X16	1 x DP port with M24 connector
X17~X22	6 x GMSL2 with FAKRA Z-code connector
X23	1 x 8GPI +8GPO with D38999 connector
X24	1 x DC-IN with M12 connector
HDD LED	1 x LED Indicator for SSD
Power Button	1 x Button with LED inside indicator
RES	1 x Remote switch with M8 connector

Rear I/O

GND	1x GND screw
Water in	2x LQ4 with 1/4" G-thread/BSPP, Blue color
Water out	2x LQ4 with 1/4" G-thread/BSPP, Red color

Internal I/O

SATAIII	4 x SATA3.0 6Gb/s ports Support RAID 0/1/5/10, AHCI mode
USB	1 x USB3.2 Gen 1 connector 1 x USB2.0 connector 2 x USB2.0 Type-A connectors
Audio	1 x Front Audio connector
Panel	1 x Front Panel connector
	1 x Front LAN LED connector
	1 x Front Audio connector (Lin-out & Mic-in)
Display	1 x eDP connector
Serial	6 x COM ports connectors
GPIO	2 x GPIO connectors(5V, 16-bit 8x GPU/GPO)
Fan	1 x 4-pin PWM CPU Fan connector 3 x 4-pin PWM system Fan connectors

Power	1 x 8-pin ATX 12V power connector
	1 x 24-pin ATX power connector
Others	1 x CMOS battery header
	1 x Parallel port(LPT) header
	1 x JCASE Chassis intrusion header
	1 x S/PDIF connector
	1 x JKBMS PS/2 keyboard & Mouse connector
	1 x PMBus connector (3.3V)
	1 x SMBus connector (5V)
	1 x I2C connector
	1 x FIO header / 1 x SPI TPM header
Jumpers	6 x COM voltage select jumpers
	1 x Clear CMOS jumper
	1 x ME jumper (for iAMT BIOS flash)
	1 x AT/ ATX mode select jumper
	1 x eDP Power Select Jumper

Thermal

Liquid Cooled	Liquid Cooled Plate by Liquid-to-Liquid thermal exchange

Mechanical and Environmental

Form Factor	19", 2.25U Rack mount Liquid cooled platform
Power Type	12V~63V DC-IN
Dimension	450 x 500 x 100mm (W x D x H)
Operating Temperature	ET : 0℃ ~ 60℃ UT : -20℃ ~ 70℃
Storage Temperature	-40℃ ~ 85℃
Relative humidity	10% to 95%, non-condensing

Standard Compliance

Design to meet	CE/FCC Class B, BSMI

OS

OS Support	Windows 10 IoT Enterprise 2021 LTSC (64-bit)
	Windows 11 IoT Enterprise LTSC 24H2 (64-bit)
	Linux Kernel 5.xx, Ubuntu 22.04 LTS Pre-scan

Specifications are subject to change without notice

1.2 Mechanical Dimensions
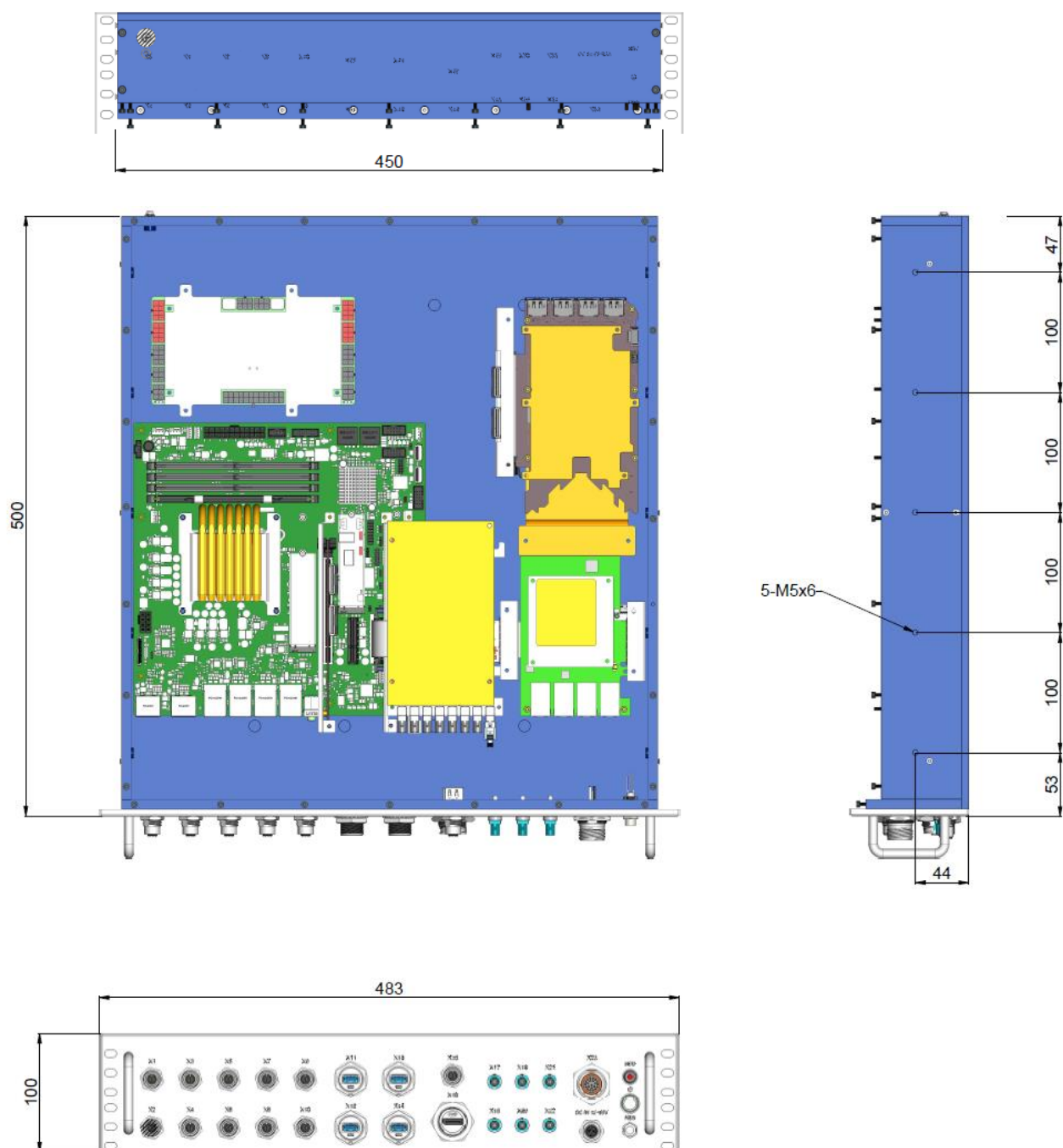
1.3 Front I/O
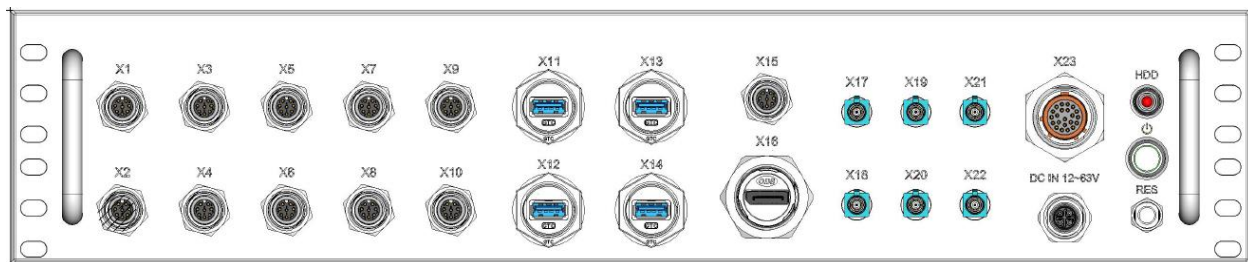
X1 ~ X10	1 x GbE LAN M12 connector
X11 ~ X14	1 x USB3.0 with M20 connector
X15	1 x CAN bus with M12 connector
X16	1 x DP with M24 connector
X17 ~ X22	1 x FAKRA connector Z-code
X23	1 x 8GPI +8GPO with D38999 connector
X24	1 x DC-IN with M12 connector
HDD LED	1 x LED Indicator for SSD
Power Button	1 x Button with LED inside indicator
RES	1 x Remote switch with M8 connector

Chapter 2: Jumpers and Connectors Locations

2.1 Front Bezel Connector Pin Definitions

X1~X4 & X5~X10: 4 x 2.5GbE LAN & 6 x 1.0GbE LAN with M12 [MSAS-08PFFS-SF8001] connector (CN1)

Pin define	CON1	CON2	Color
D1+	1	1	WHITE/ORANGE
D1-	2	2	ORANGE
D2+	3	3	WHITE/GREEN
D2-	4	4	BLUE
D3+	5	5	WHITE/BLUE
D3-	6	6	GREEN
D4+	7	7	WHITE/BROWN
D4-	8	8	BROWN
	shell	shell	
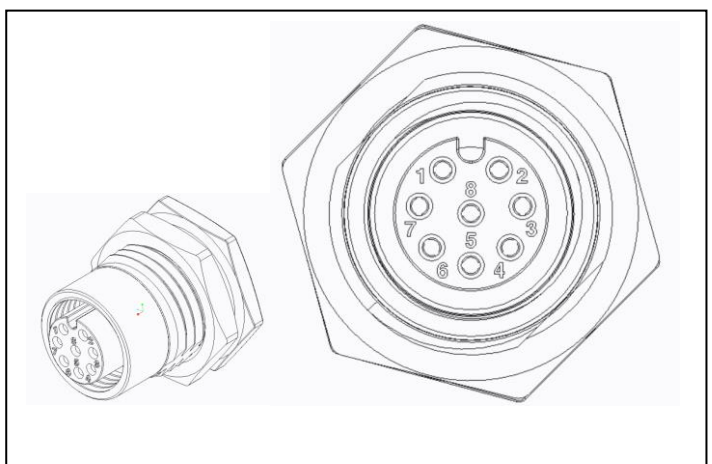
Inner RJ45 plug pin define as CN2.

X11 ~ X14: 1 x USB3.0 Type-A with M20 connector
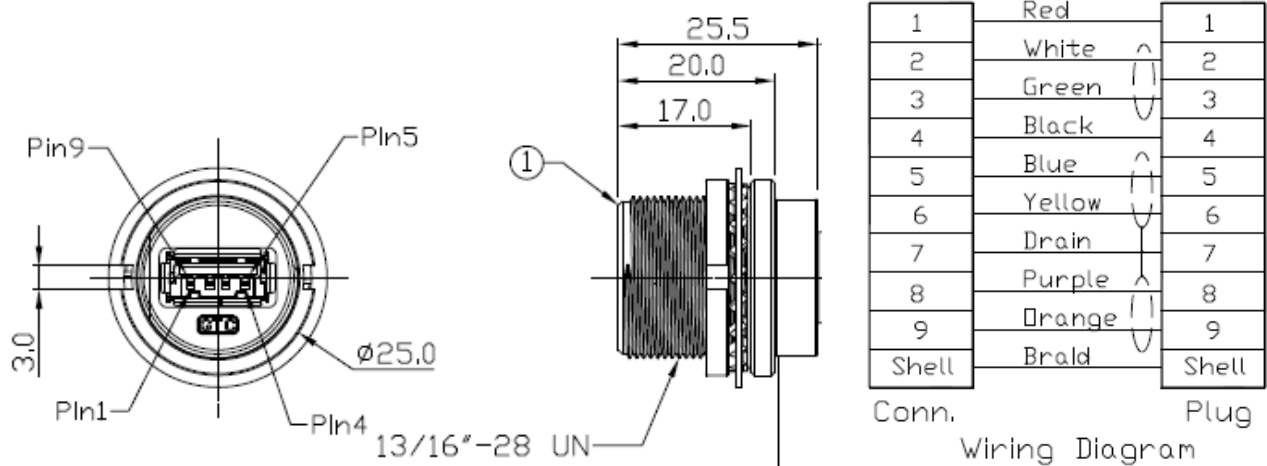
X15: 1 x CAN bus with M12 [MSAS-08PFFS-SF8001] connector

Inner Con2: m125ah-03; 1.25 Pitch 1x3P

3Pin CAN connector Pin Define		
	CON1	CON2
CAN-L	1	1
CAN-H	2	2
GND	3	3
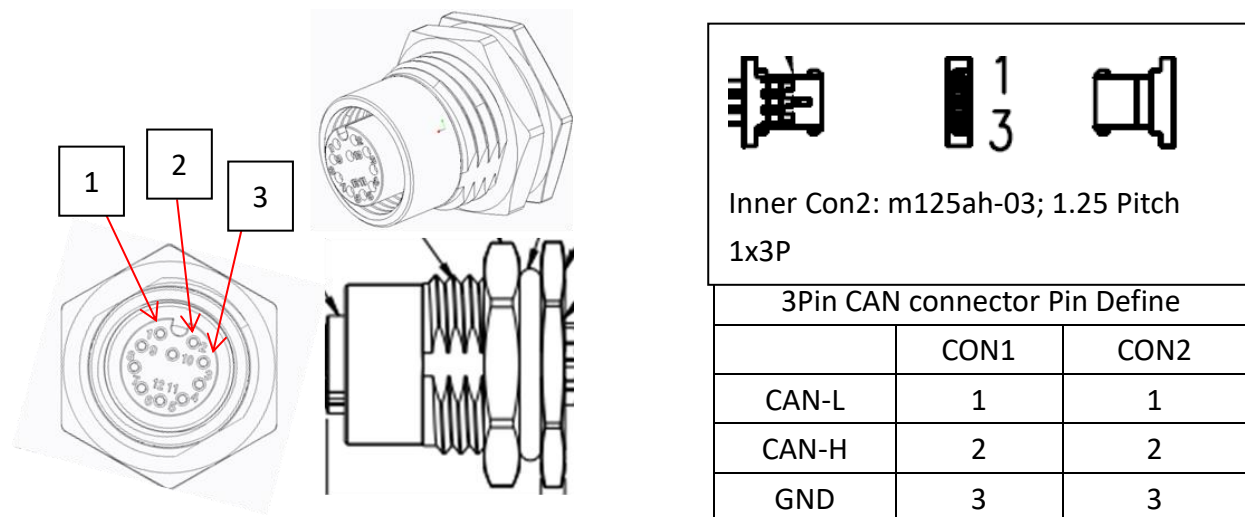
CON1: Amphenol LTW M12A-12PFFS-SF8001

X16: 1 x DP with M24 connector
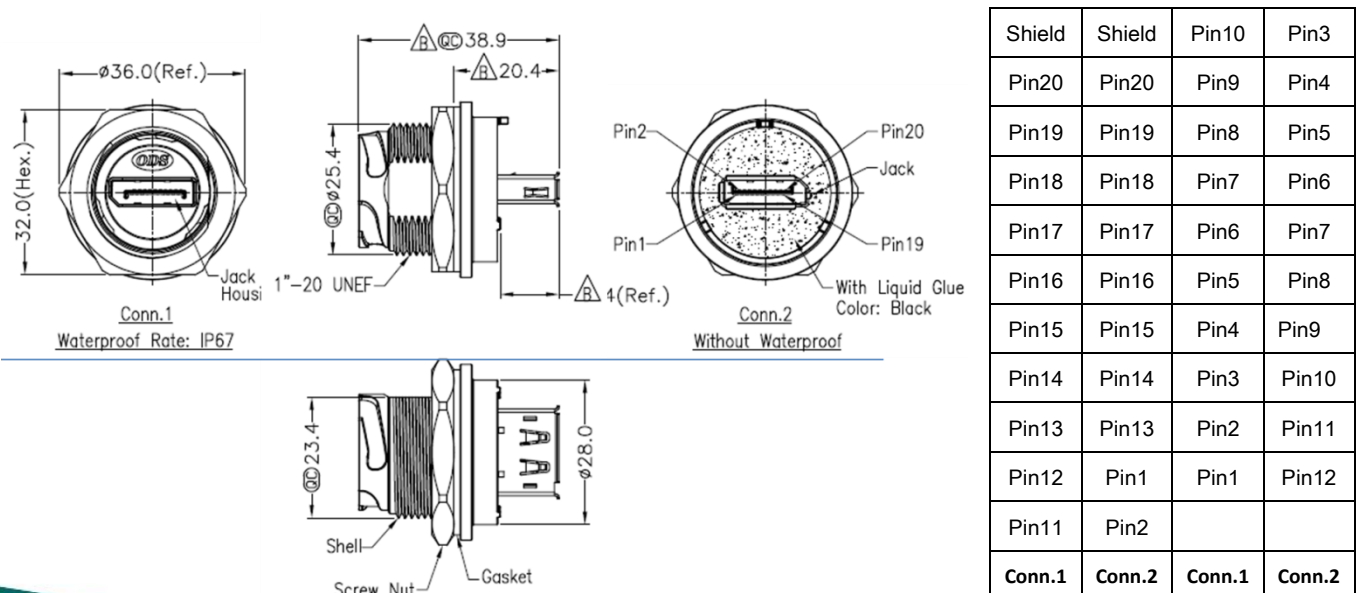
Shield	Shield	Pin10	Pin3
Pin20	Pin20	Pin9	Pin4
Pin19	Pin19	Pin8	Pin5
Pin18	Pin18	Pin7	Pin6
Pin17	Pin17	Pin6	Pin7
Pin16	Pin16	Pin5	Pin8
Pin15	Pin15	Pin4	Pin9
Pin14	Pin14	Pin3	Pin10
Pin13	Pin13	Pin2	Pin11
Pin12	Pin1	Pin1	Pin12
Pin11	Pin2		
Conn.1	Conn.2	Conn.1	Conn.2
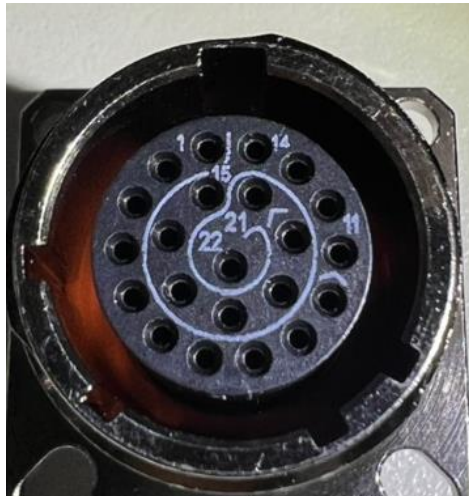
X17 ~ X22: 6 x GMSL2 with FAKRA Z-code connector
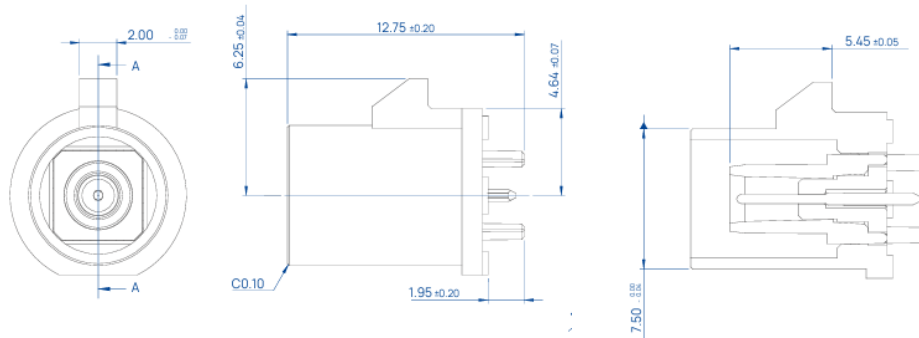
Coding Standard	Z
Pre/Suffix	1-xxxxxxx-X
Color	Water Blue
USCAR Application	Neutral (Fits all)

X23: 1 x 8GPI +8GPO with D38999 connector

PIN DEFINE				AMPHENOL 20FC35SN
CONN	GPO	CONN	GPI	
1	GND	11	GND	
2	N_GPIO_VCC (VCC5)	12	N_GPIO_VCC (VCC5)	
3	N_GPO0	13	N_GPI0	
4	N_GPO1	14	N_GPI1	
5	N_GPO2	15	N_GPI2	
6	N_GPO3	16	N_GPI3	
7	N_GPO4	17	N_GPI4	
8	N_GPO5	18	N_GPI5	
9	N_GPO6	19	N_GPI6	
10	N_GPO7	20	N_GPI7	

X24: 1 x DC-IN with Amphenol M12S-04PMMS-SF8B25
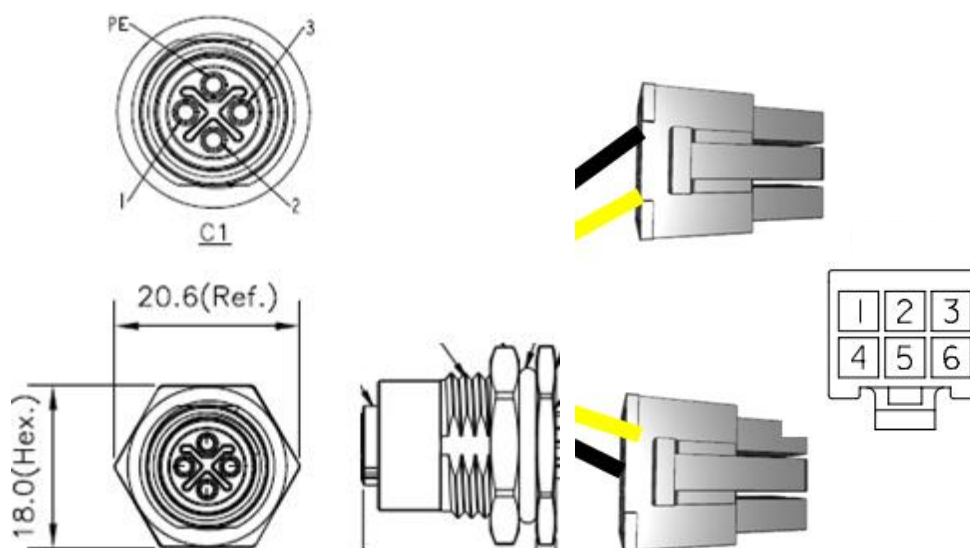
Color	CON1	CON2	CON3
Black	PE	1,2	
Black	3		1,2
Yellow	2	4,5	
Yellow	1		4,5

CON1: Amphenol M12S-04PMMS-SF8B25   CON2,3: Molex 46992-0610 pitch=4.2
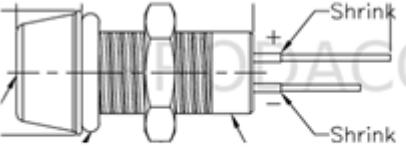
2.2 Power Button, LED & HDD LED
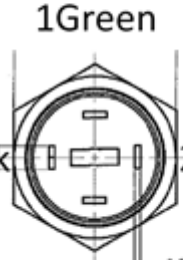
The Power Button connection is located on pins 6 and 8 of JFP1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS - see Chapter 4). To turn off the power when the system is in suspend mode, press the button for 4 seconds or longer. Refer to the table below for pin definitions.

The HDD LED connection is located on pins 1 and 3 of JFP1.
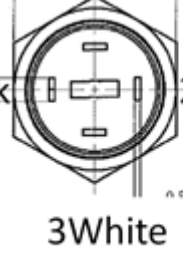
The Power LED connection is located on pins 2 and 4 of JFP1.
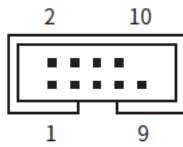
Wire color	LED	CON2	
Orange	+	1	LED
Grey	-	2	GND

	CON1	CON2	CON3	
Green	1		1	LED+
White	3		2	GND
Red	2	1		PWRBTN
Black	4	2		GND

1	HDD LED+	2	POWER LED
3	HDD LED-	4	POWER LED
5	RESET SWITCH-	6	POWER SWITCH+
7	RESET SWITCH+	8	POWER SWITCH-
9	N/C	10	No pin

Chapter 3 UEFI BIOS

3-1 BIOS Setup

This chapter provides information on the BIOS Setup program and allows users to configure the system for optimal use.

Users may need to run the Setup program when:

o   An error message appears on the screen at system startup and requests users to run SETUP.

o   Users want to change the default settings for customized features.

⚠️ *Important*

o   *Please note that BIOS update assumes technician-level experience.*

o   *As the system BIOS is under continuous update for better system performance, the illustrations in this chapter should be held for reference only.*

Entering 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 <DEL> or <F2> key to enter Setup, <F11> key to Boot Menu, <F12> key to PXE Boot .

Press <DEL> or <F2> to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

⚠️ *Important*

The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.

Control Keys

← →	Select Screen
↑ ↓	Select Item
Enter	Select
+ -	Change Value
Esc	Exit
F1	General Help
F7	Previous Values
F9	Optimized Defaults
F10	Save & Reset*
F12	Screenshot capture
<K>	Scroll help area upwards
<M>	Scroll help area downwards

When you press <F10>, a confirmation window appears and it provides the modification information. Select between Yes or No to confirm your choice.

Getting Help

Upon entering setup, you will see the Main Menu.

Main Menu

The main menu lists the setup functions you can make changes to. You can use the **arrow keys** (↑ ↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Sub-Menu

If you find a right pointer symbol appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use **arrow keys** (↑ ↓) to highlight the field and press **<Enter>** to call up the sub-menu. Then you can use the **control keys** to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press the **<Esc>.**

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing **<F1>.** The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

3-2 The Manu Bar

```
                           Aptio Setup - AMI
  Main  Advanced  Boot  Security  Chipset  Power  Save & Exit

  System Date                    [Sat 02/17/2024]      Set the Date. Use Tab to
  System Time                    [00:01:26]            switch between Date elements.
                                                       Default Ranges:
  SATA_1                         Not Present           Year: 2000-2099
  SATA_2                         Not Present           Months: 1-12
  SATA_3                         Not Present           Days: Dependent on month
  SATA_4                         Not Present           Range of Years may vary.
  SATA_5                         Not Present
  M.2_1                          Not Present
  M.2_2                          Not Present
  M.2_3                          Not Present

  SATA Mode                      AHCI
  Enable VMD controller          [Disabled]            ++: Select Screen
▶ VMD setup menu                                       ↑↓: Select Item
                                                       Enter: Select
  USB Devices:                                         +/-: Change Opt.
        1 Drive, 1 Keyboard, 1 Mouse                   ESC: Exit
                                                       F1: General Help
  BIOS Version                   ECF09IMS.800          F7: Previous Values
                                                       F9: Optimized Defaults
  13th Gen Intel(R) Core(TM) i9-13900E @1800 MHz       F10: Save & Reset Setup
  Processor ID                   0xB0671               F12: Screenshot capture
  Build Type                     64                    <k>: Scroll help area upwards
  Total Memory                   32768 MB(DDR5)        <m>: Scroll help area downwards

                    Version 2.22.1290 Copyright (C) 2024 AMI
```

► **Main**

Use this menu for basic system configurations, such as time, date, etc.

► **Advanced**

Use this menu to set up the items of special enhanced features.

► **Boot**

Use this menu to specify the priority of boot devices.

► **Security**

Use this menu to set supervisor and user passwords.

► **Chipset**

This menu controls the advanced features of the on-board chipsets.

► **Power**

Use this menu to specify your settings for power management.

► **Save & Exit**

This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.

3-2.1 Main
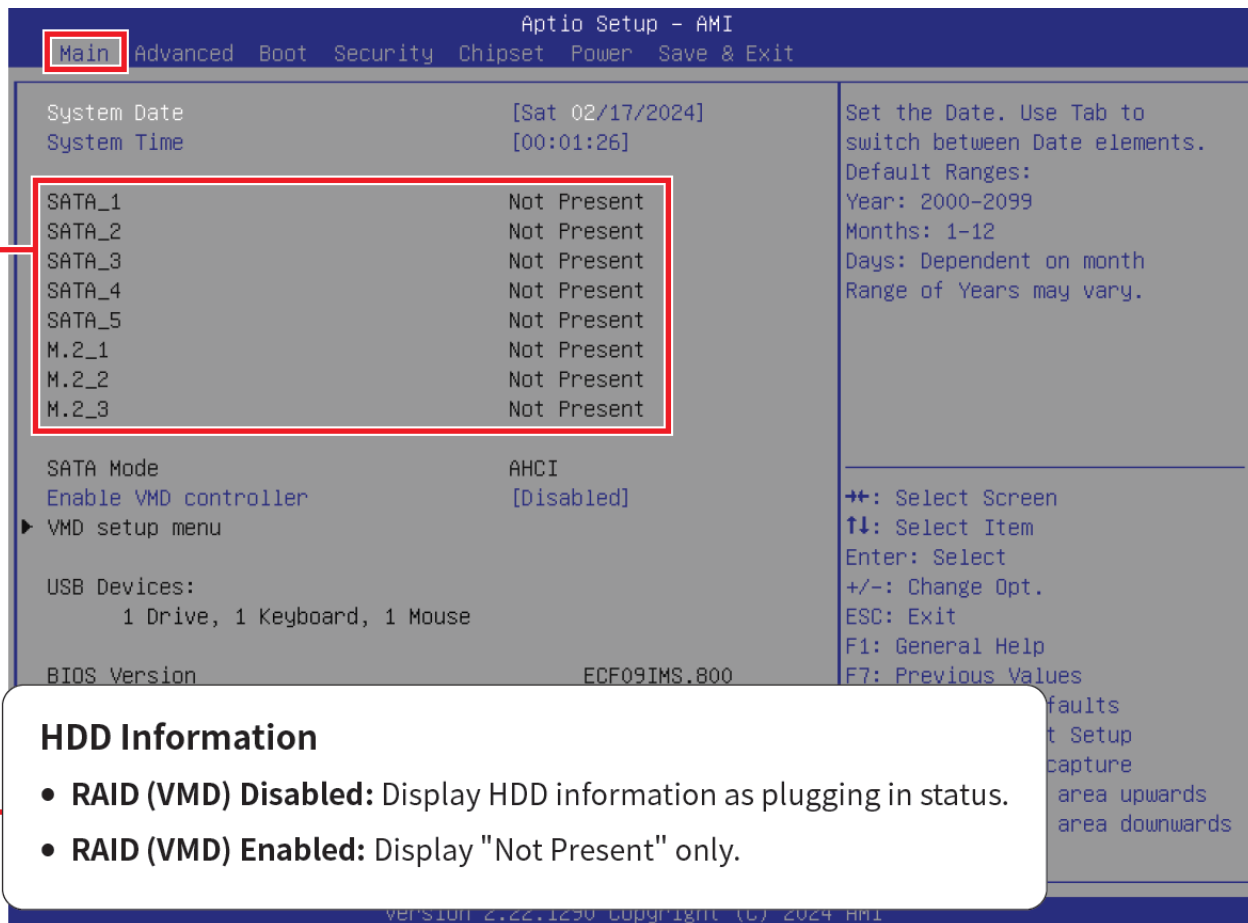
► **System Date**

This setting allows you to set the system date. Format: <Day> <Month> <Date> <Year>.

► **System Time**

This setting allows you to set the system time. Format: <Hour> <Minute> <Second>.

► **SATA Mode Selection**

This setting specifies SATA controller mode.

[AHCI]

AHCI (Advanced Host Controller Interface), is a technical standard for an interface that allows the software to communicate with Serial ATA (SATA) devices. It offers advanced SATA features such as Native Command Queuing (NCQ) and hot-plugging.

[RAID]

RAID (Redundant Array of Independent Disks) is a virtual disk storage technology that combines multiple physical disks into one unit for data redundancy, performance improvement, or both.

► **Enable VMD controller**

Enables or disables VMD (RAID) controller.

3-2.2 Advanced

```
                              Aptio Setup - AMI
     Main  Advanced  Boot  Security  Chipset  Power  Save & Exit

  Full Screen Logo Display              [Disabled]        Enables or disables Full
  Bootup NumLock State                  [On]              Screen Logo Display option
▶ CPU Configuration
▶ Super IO Configuration
▶ H/W Monitor
▶ Smart Fan Configuration
▶ PCI/PCIE Device Configuration
▶ Network Stack Configuration
▶ GPIO Group Configuration
▶ PCIE ASPM Settings
                                                         ➔←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         ESC: Exit
                                                         F1: General Help
                                                         F7: Previous Values
                                                         F9: Optimized Defaults
                                                         F10: Save & Reset Setup
                                                         F12: Screenshot capture
                                                         <k>: Scroll help area upwards
                                                         <m>: Scroll help area downwards

                   Version 2.22.1290 Copyright (C) 2024 AMI
```

► Full Screen Logo Display

This BIOS feature determines if the BIOS should hide the normal POST messages with the motherboard or system manufacturer's full-screen logo.

[Enabled]

BIOS will display the full-screen logo during the boot-up sequence, hiding normal POST messages.

[Disabled]

BIOS will display the normal POST messages, instead of the full screen logo.

Please note that enabling this BIOS feature often adds 2-3 seconds to the booting sequence. This delay ensures that the logo is displayed for a sufficient amount of time. Therefore, it is recommended to disable this BIOS feature for faster boot-up.

► Bootup NumLock State

This setting is to set the state of the Num Lock key on the keyboard when the system is powered on.

[On]　　　　Turn on the Num Lock key when the system is powered on.

[Off]　　　　Allow users to use the arrow keys on the numeric keypad.

► CPU Configuration

```
                          Advanced

CPU Configuration                                    When enabled, a VMM can
                                                     utilize the additional
13th Gen Intel(R) Core(TM) i9-13900E                 hardware capabilities provided
Processor ID                    0xB0671              by Vanderpool Technology.
Processor Speed                 1800 MHz

P-core Information
L1 Data Cache                   48 KB x 8
L1 Instruction Cache            32 KB x 8
L2 Cache                        2048 KB x 8
L3 Cache                        36 MB

E-core Information
L1 Data Cache                   32 KB x 16
L1 Instruction Cache            64 KB x 16           →←: Select Screen
L2 Cache                        4096 KB x 4          ↑↓: Select Item
L3 Cache                        36 MB                Enter: Select
                                                     +/-: Change Opt.
Intel Virtualization Technology [Enabled]            ESC: Exit
Hyper-Threading                 [Enabled]            F1: General Help
Active Performance-cores        [All]                F7: Previous Values
Active Efficient-cores          [All]                F9: Optimized Defaults
Intel(R) SpeedStep(tm)          [Enabled]            F10: Save & Reset Setup
Intel(R) Speed Shift Technology [Enabled]            F12: Screenshot capture
C states                        [Enabled]            <k>: Scroll help area upwards
                                                     <m>: Scroll help area downwards
```

►Intel Virtualization Technology

Enables or disables Intel Virtualization technology.

[Enabled]

Enables Intel Virtualization technology and allows a platform to run multiple operating systems in independent partitions. The system can function as multiple systems virtually.

[Disabled]

Disables this function.

► Hyper-Threading (HT Function)

Enables or disables Intel Hyper-Threading technology.

The processor uses Hyper-Threading technology to improve utilization of the CPU resources and potentially increasing overall performance by allowing it to handle multiple threads simultaneously. If you disable the function, it will restricts the CPU to operate as a single-threaded processor, with only one logical core per physical core. Please disable this item if your operating system does not support HT Function or unreliability and instability may occur.

► Active Performance-cores

Select the number of active Performance-cores (P-cores).

► Active Efficient-cores

Select the number of active Efficient-cores (E-cores).

► Intel(R) SpeedStep(TM)

Enhanced Intel SpeedStep® Technology enables the OS to control and activate performance states (P-States) of the processor.

[Enabled]

When enabled, Intel SpeedStep® technology is activated. This technology allows the processor to manage its power consumption via performance state (P-State) transitions.

[Disabled]

Disables this function

► Intel(R) Speed Shift Technology

Intel® Speed Shift Technology is an energy-efficient method that allows frequency control by hardware rather than the OS.

[Enabled]

When enabled, Intel® Speed Shift Technology is activated. The technology enables the management of processor power consumption via hardware performance state (P-State) transitions.

[Disabled]

Disable this function.

► C States

This setting controls the C-States (CPU Power states).

[Enabled]

Detects the idle state of system and reduce CPU power consumption accordingly.

[Disabled]

Disable this function.

► **Super IO Configuration**

```
 Advanced

 Super IO Configuration                               ▲  Enable or Disable Serial Port
                                                         (COM)
 Serial Port 1              [Enabled]
 Device Settings            IO=3F8h; IRQ=4;
 Change Settings            [Auto]
 Mode Select                [RS232]
 Serial Port 2              [Enabled]
 Device Settings            IO=2F8h; IRQ=3;
 Change Settings            [Auto]
 Mode Select                [RS232]
 Serial Port 3              [Enabled]
 Device Settings            IO=3E8h; IRQ=7;
 Change Settings            [Auto]                  _____
 Mode Select                [RS232]                 ⇥⇤: Select Screen
 Serial Port 4              [Enabled]               ↑↓: Select Item
 Device Settings            IO=2E8h; IRQ=7;         Enter: Select
 Change Settings            [Auto]                  +/-: Change Opt.
 Mode Select                [RS232]                 ESC: Exit
 Serial Port 5              [Enabled]               F1: General Help
 Device Settings            IO=2F0h; IRQ=7;         F7: Previous Values
 Change Settings            [Auto]                  F9: Optimized Defaults
 Mode Select                [RS232]                 F10: Save & Reset Setup
 Serial Port 6              [Enabled]               F12: Screenshot capture
 Device Settings            IO=2E0h; IRQ=7;         <k>: Scroll help area upwards
 Change Settings            [Auto]               ▼  <m>: Scroll help area downwards
```

► **Serial Port 1/ 2/ 3/ 4/ 5/ 6, Parallel Port**

This setting enables or disables the specified serial port or parallel port.

» **Device Settings**

This setting shows the address & IRQ of the specified serial port or parallel port.

» **Change Settings**

This setting is used to change the address & IRQ settings of the specified serial port or parallel port.

» **Mode Select**

Select an operation mode for Serial Port 1/ 2/ 3/ 4/ 5/ 6, Parallel Port.

► **FIFO Mode**

This setting controls the FIFO (First In First Out) data transfer mode.

► **Shared IRQ Mode**

This setting provides the system with the ability to share interrupts among its serial ports.

► **Watch Dog Timer**

You can enable the system watchdog timer, a hardware timer that generates a reset when the software that it monitors does not respond as expected each time the watchdog polls it.

►H/W Monitor (PC Health Status)

These items display the current status of all monitored hardware devices/components such as voltages, temperatures and all fans' speeds.

```
Advanced

PC Health Status

CPU temperature                      : +34 C
System temperature1                  : +26 C
System temperature2                  : +25 C
System temperature3                  : +25 C

CPUFAN                               : 2572 RPM
SYSFAN1                              : N/A
SYSFAN2                              : N/A
SYSFAN3                              : N/A

VCC_CORE                             : +0.792 V
VCC3                                 : +3.384 V        →←: Select Screen
VCC5                                 : +5.129 V        ↑↓: Select Item
+12V                                 : +12.496 V       Enter: Select
VCC3V                                : +3.376 V        +/-: Change Opt.
VSB3V                                : +3.376 V        ESC: Exit
VSB5V                                : +4.944 V        F1: General Help
VBAT                                 : +3.136 V        F7: Previous Values
                                                       F9: Optimized Defaults
                                                       F10: Save & Reset Setup
                                                       F12: Screenshot capture
                                                       <k>: Scroll help area upwards
                                                       <m>: Scroll help area downwards
```

►Smart Fan Configuration

```
Advanced

Configuration Smart FAN                               Disabled/Enabled Smart FAN
                                                      Function
CPUFAN                          [Disabled]
SYSFAN1                         [Disabled]
SYSFAN2                         [Disabled]
SYSFAN3                         [Disabled]
```

► CPUFAN/ SYSFAN1~3

This setting enables or disables the Smart Fan function. Smart Fan is an excellent feature which will adjust the CPU/system fan speed automatically depending on the current CPU/system temperature, avoiding the overheating to damage your system. The following item will display when CPUFAN/ SYSFAN1~3 is enabled.

» **Min. Speed (%)**

The beginning speed of the System fan.

► **PCI/PCIE Device Configuration**

```
 Advanced

 Audio Controller                [Enabled]      Control Detection of the Audio
                                                Controller.
                                                Disabled = Audio Controller
                                                will be unconditionally
                                                disabled.
                                                Enabled = Audio Controller
                                                will be unconditionally
                                                Enabled.
```

► Audio Controller

This setting enables or disables the detection of the onboard audio controller.

► **Network Stack Configuration**

This menu provides Network Stack settings for users to enable network boot (PXE) from BIOS.

```
 Advanced

 Network Stack                   [Disabled]     Enable/Disable UEFI Network
                                                Stack
```

► Network Stack

This menu provides Network Stack settings for users to enable network boot (PXE) from BIOS. The following items will display when Network Stak is enabled.

» IPV4 PXE Support

Enables or disables IPv4 PXE boot support.

» IPV4 HTTP Support

Enables or disables Ipv4 HTTP Support.

» IPV6 PXE Support

Enables or disables Ipv6 PXE Support.

» IPV6 HTTP Support

Enables or disables Ipv6 HTTP Support.

» PXE boot wait time

Use this option to specify the wait time to press the ESC key to abort the PXE boot. Press "+" or" -" on your keyboard to change the value. The default setting is 0.

» Media detect count

Use this option to specify the number of times media will be checked. Press" +" or" -" on your keyboard to change the value. The default setting is 1.

► **GPIO Group Configuration**

```
 Advanced

 GPO0                              [Low]            Set GPOO to output High/Low
 GPO1                              [Low]
 GPO2                              [Low]
 GPO3                              [Low]
 GPO4                              [Low]
 GPO5                              [Low]
 GPO6                              [Low]
 GPO7                              [Low]
```

► GPO0 ~ GPO7

These settings control the operation mode of the specified GPIO.

►PCIE ASPM settings

This menu provide settings for PCIe ASPM (Active State Power Management) level for different installed devices.

```
 Advanced

 M2_M1                             [Disabled]       PCI Express Active State Power
 M2_M2                             [Disabled]       Management settings.
 M2_M3                             [Disabled]
 PCIE1                             [Disabled]
 PCIE2                             [Disabled]
 PCIE3                             [Disabled]
 PCIE4                             [Disabled]
```

► M2_M1~3, PCIE1~4

Sets PCI Express ASPM (Active State Power Management) state for power saving.

[L0s]

Initiate an automatic shutdown of the system to protect from potential damage due to overheating.

[L1]

Higher latency, lower power" standby" state (optional).

[L0sL1]

Activate both L0s and L1 support.

[Disabled]

Disable this function.

⚠️ *Important*

Expansion slots availability varies by SKU. Please refer to the Specifications and Expansion Slots sections for information.

3-2.3   Boot

```
                              Aptio Setup - AMI
      Main  Advanced  Boot  Security  Chipset  Power  Save & Exit

   Boot Option Priorities                                  Sets the system boot order
   Boot Option #1                  [UEFI:
                                   JetFlashTranscend 16GB
                                   1100, Partition 1
                                   (JetFlashTranscend
                                   16GB 1100)]
   Boot Option #2                  [UEFI: Built-in EFI
                                   Shell]

   Driver Option Priorities


                                                     →←: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     ESC: Exit
                                                     F1: General Help
                                                     F7: Previous Values
                                                     F9: Optimized Defaults
                                                     F10: Save & Reset Setup
                                                     F12: Screenshot capture
                                                     <k>: Scroll help area upwards
                                                     <m>: Scroll help area downwards

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```

►Boot Option #1-2

This setting allows users to set the sequence of boot devices where BIOS attempts to load the disk operating system.

3-2.4 Security

```
                              Aptio Setup - AMI
     Main  Advanced  Boot  Security  Chipset  Power  Save & Exit

    Administrator Password                              Set Administrator Password
    User Password
    Chassis Intrusion                  [Disabled]
    Intel Trusted Execution Technology [Disabled]

  ▶ PCH-FW Configuration
  ▶ AMT Configuration
  ▶ Trusted Computing
  ▶ Serial Port Console Redirection
  ▶ Secure Boot

                                                     ←→: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     ESC: Exit
                                                     F1: General Help
                                                     F7: Previous Values
                                                     F9: Optimized Defaults
                                                     F10: Save & Reset Setup
                                                     F12: Screenshot capture
                                                     <k>: Scroll help area upwards
                                                     <m>: Scroll help area downwards

                    Version 2.22.1290 Copyright (C) 2024 AMI
```
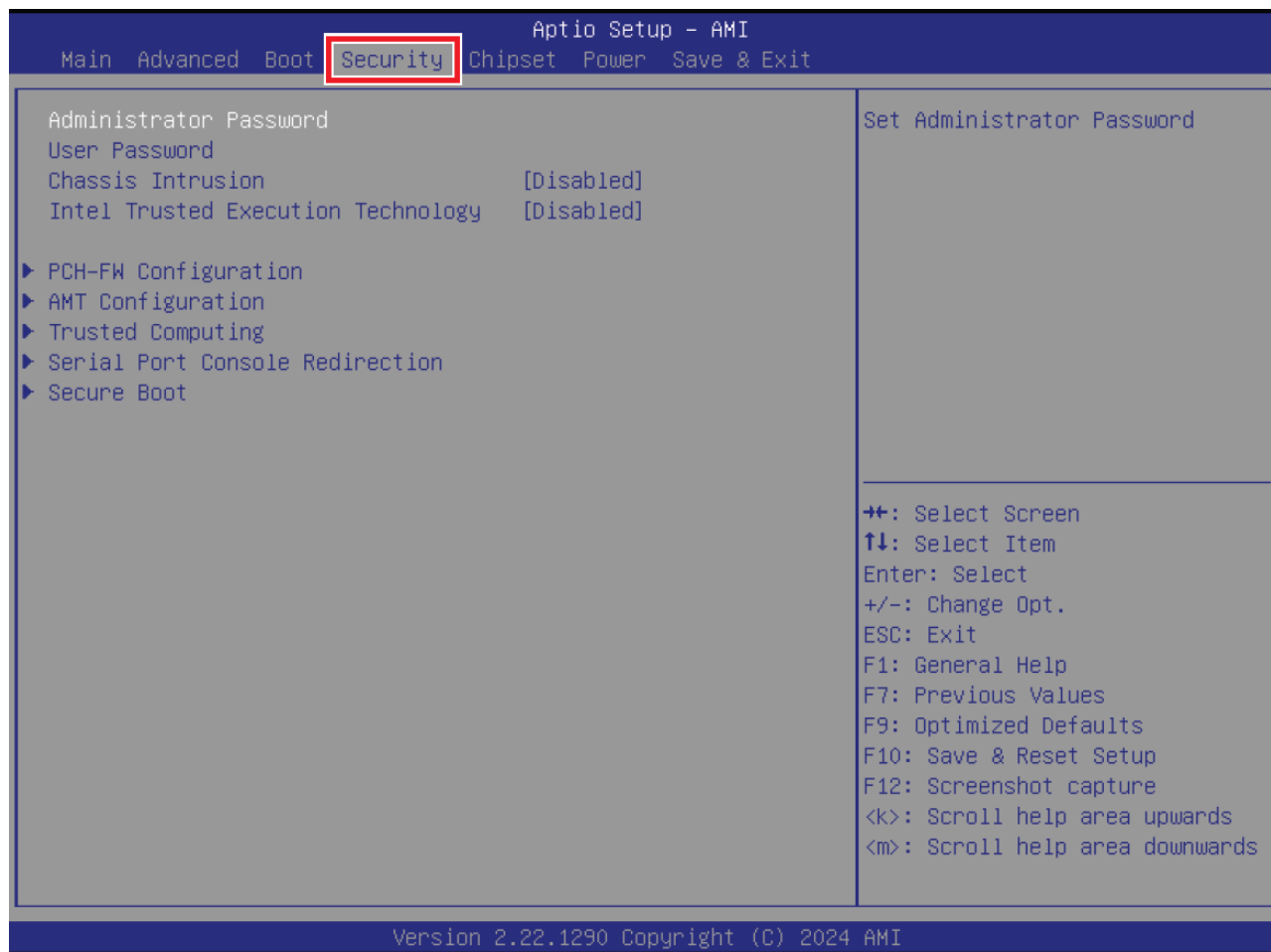
► Administrator Password

Administrator Password controls access to the BIOS Setup utility.

► User Password

User Password controls access to the system at boot and to the BIOS Setup utility.

► Chassis Intrusion

Enables or disables recording messages while the chassis is opened. This function is ready for the chassis equips a chassis intrusion jumper (switch).

[Enabled]

Once the chassis is opened, the system will record and issue a warning message. A beep sound will be emitted before this function is reset.

[Disabled]

Once the chassis is closed, the system will record and issue a warning message.

[Reset]

Clear the warning message. After clearing the message, please return to Enabled or Disabled.

► Intel Trusted Execution Technology

Enables or disables the Intel Trusted Execution Technology. Intel® Trusted Execution Technology (Intel® TXT) is a security feature that provides hardware-based security to protect the system and maintain the confidentiality and integrity of data stored or created on the system.
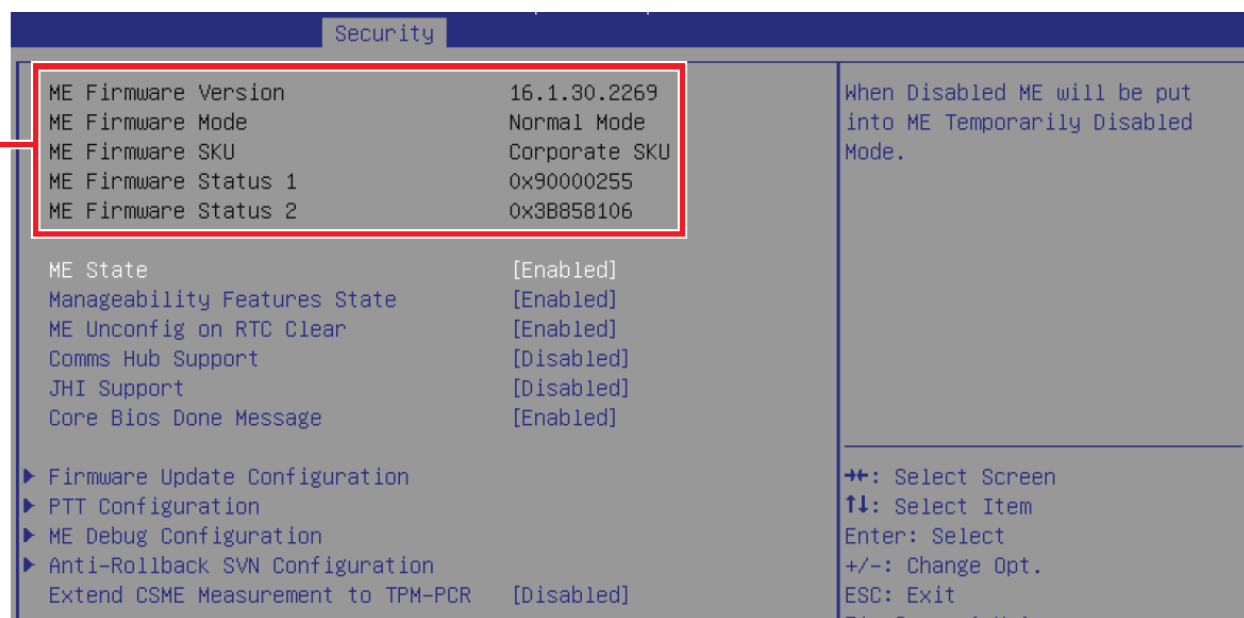
⚠️ *Important*

SKU3/4 (Intel® H610E) does not support" Intel Trusted Execution Technology" and "AMT Configuration".

►PCH-FW Configuration

This menu allows you to configure settings related to the PCH firmware.


```
                              Security

  ME Firmware Version        16.1.30.2269      When Disabled ME will be put
  ME Firmware Mode           Normal Mode       into ME Temporarily Disabled
  ME Firmware SKU            Corporate SKU     Mode.
  ME Firmware Status 1       0x90000255
  ME Firmware Status 2       0x3B858106

  ME State                   [Enabled]
  Manageability Features State   [Enabled]
  ME Unconfig on RTC Clear   [Enabled]
  Comms Hub Support          [Disabled]
  JHI Support                [Disabled]
  Core Bios Done Message     [Enabled]

▶ Firmware Update Configuration              ↔: Select Screen
▶ PTT Configuration                          ↑↓: Select Item
▶ ME Debug Configuration                     Enter: Select
▶ Anti-Rollback SVN Configuration            +/-: Change Opt.
  Extend CSME Measurement to TPM-PCR  [Disabled]  ESC: Exit
```

Firmware Information

ME Firmware Version	ME Firmware SKU
ME Firmware Mode	ME Firmware Status 1-2

These settings show the firmware information of the Intel ME (Management Engine).

▶ ME State

This menu controls the Intel® Management Engine State (ME state) parameters, which provides various management and security capabilities. The following items will display when ME State is enabled.

» Manageability Feature State

Enables or disables Manageability Feature State. Enabling this item for remote management capabilities.

» ME Un-config on RTC Clear

Enables or disables ME Unconfig on RTC Clear. Enabling this item resets the ME configuration to its default state, removing any customizations or settings applied.

» Comms Hub Support

Enables or disables the communications hub support.

» JHI Support

Enables or disables JHI Support. JHI stands for Intel® Dynamic Application Loader Host Interface Service (Intel® DAL HIS) and is the engineering name for this feature. Enabling JHI Support in the BIOS settings allows the system to utilize this interface for communication between trusted applications and host-based applications.

» Core BIOS Done Message

Enables or disables Core BIOS Done Message sent to ME.

▶ Firmware Update Configuration

```
┌─────────────────────Security─────────────────────────────────────────────┐
│                                                                           │
│  Me FW Image Re-Flash            [Disabled]       Enable/Disable Me FW Image │
│  FW Update                       [Enabled]        Re-Flash function.        │
│                                                                           │
└───────────────────────────────────────────────────────────────────────────┘
```

» ME FW Image Re-Flash

Enables or disables the ME Firmware Image Re-flashing.

» Local FW Update

Enables or disables the capability to perform a firmware update of the ME locally.

▶ PTT Configuration

Intel® Platform Trust Technology (PTT) is a platform functionality for credential storage and key management used by Microsoft Windows.

```
┌─────────────────────Security─────────────────────────────────────────────┐
│                                                                           │
│  PTT Capability / State           1 / 0           Selects TPM device: PTT or │
│                                                   dTPM. PTT - Enables PTT in │
│  TPM Device Selection            [dTPM]           SkuMgr dTPM 1.2 - Disables PTT │
│                                                   in SkuMgr Warning !  PTT/dTPM │
│                                                   will be disabled and all data │
│                                                   saved on it will be lost.    │
│                                                                           │
└───────────────────────────────────────────────────────────────────────────┘
```

» TPM Device Selection

Select TPM (Trusted Platform Module) devices from PTT or dTPM (Discrete TPM).

[PTT]

Enables PTT in SkuMgr.

[dTPM]

Disables PTT in SkuMgr. Warning! PTT/ dTPM will be disabled and all data saved on it will be lost.

▶ ME Debug Configuration

This menu allows you to configure debug-related options for the Intel®
Management Engine (ME).

```
                        Security

  HECI Timeouts                    [Enabled]           Enable/Disable HECI
                                                       Send/Receive Timeouts.
  Force ME DID Init Status         [Disabled]
  CPU Replaced Polling Disable     [Disabled]
  HECI Message check Disable       [Disabled]
  MBP HOB Skip                     [Disabled]
  HECI2 Interface Communication    [Disabled]
  KT Device                        [Enabled]
  End Of Post Message              [Send in DXE]
  DOI3 Setting for HECI Disable    [Disabled]
  MCTP Broadcast Cycle             [Disabled]
```

» HECI Timeouts

This setting enables/ disables the HECI (Host Embedded Controller Interface) send/receive
timeouts.

» Force ME DID Init Status

Forces the ME Device ID (DID) initialization status value.

» CPU Replaced Polling Disable

Setting this option disables the CPU replacement polling loop.

» HECI Message Check Disable

This setting disables message check for BIOS boot path when sending messages.

» MBP HOB Skip

Setting this option will skip ME's Memory-Based Protection (MBP) H0B region.

» HECI2 Interface Communication

This setting Adds/ Removes HECI2 device from PCI space.

» KT Device

Enables or disables Key Transfer (KT) Device.

» End of Post Message

Enables or disables End of Post Message sent to ME.

» DOI3 Setting for HECI Disable

Setting this option disables setting DOI3 bit for all HECI devices.

» MCTP Broadcast Cycle

Enables or disables Management Component Transport Protocol (MCTP) Broadcast Cycle.

▶ Anti-Rollback SVN Configuration

» Automatic HW-Enforced Anti-Rollback SVN

Setting this item enables will automatically activate the hardware-enforced anti-rollback
protection based on the Secure Version Number (SVN). Once enabled, the hardware will
enforce that only firmware updates with an SVN equal to or higher than the current SVN can

be installed.

» Set HW-Enforced Anti-Rollback for Current SVN

Enable HW ERB mechanism for current ARB SVN value. FW with lower ARB-SVN will be blocked from execution. The value will be restored to disable after the command is sent. This item will display when Automatic HW-Enforced Anti-Rollback SVN is enabled.

► AMT Configuration

Intel® Active Management Technology (Intel® AMT) is hardware-based technology for remotely managing and securing PCs out-of-band (OOB).

```
                              Aptio Setup – AMI
            Security

   USB Provisioning of AMT          [Disabled]        Enable/Disable of AMT USB
   MAC Pass Through                 [Disabled]        Provisioning.
   Activate Remote Assistance Process  [Disabled]
   Unconfigure ME                   [Disabled]
 ▶ ASF Configuration
 ▶ Secure Erase Configuration
 ▶ MEBx
 ▶ One Click Recovery(OCR) Configuration
 ▶ Remote Platform Erase Configuration



                                                     ➜←: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     ESC: Exit
                                                     F1: General Help
                                                     F7: Previous Values
                                                     F9: Optimized Defaults
                                                     F10: Save & Reset Setup
                                                     F12: Screenshot capture
                                                     <k>: Scroll help area upwards
                                                     <m>: Scroll help area downwards

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```

▶ USB Provisioning of AMT

Enables or disables the ability to provision AMT using a USB device.

▶ Mac PASS Through

Enables or disables the ability of AMT to pass through network traffic without altering the original MAC (Media Access Control) addresses of the network interface. Enabling Mac PASS Through ensures that the network traffic appears to originate from the original MAC address of the system.

▶ Activate Remote Assistance Process

Enables or disables remote assistance sessions to be initiated on systems with AMT support.

▶ Un-configure ME

Enables or disables the Un-configure ME.

⚠ *Important*

SKU3/4 (Intel® H610E) does not support "AMT Configuration".

▶ ASF Configuration

```
                      Security
PET Progress                [Enabled]        Enable/Disable PET Events
WatchDog                    [Disabled]       Progress to receive PET Events.
OS Timer                    0
BIOS Timer                  0
ASF Sensors Table           [Disabled]
```

» PET Progress

Enables or disable the this item to receive PET Events.

» WatchDog

Enables or disable the watchdog timer.

» OS Timer

This item displays OS Timer.

» BIOS Timer

This item displays BIOS Timer.

» ASF Sensor Table

Enables or disable the Alert Standard Format (ASF) Sensor Table.

▶ Secure Erase Configuration

```
                      Security
Secure Erase mode           [Simulated]      Change Secure Erase module
Force Secure Erase          [Disabled]       behavior:
                                             Simulated: Performs SE flow
                                             without erasing SSD
                                             Real: Erase SSD.
                                             *** If SATA device is used,
                                             OEM could use
                                             SECURE_ERASE_HOOK_PROTOCOL to
                                             remove SATA power to skip G3
                                             cycle. ***
```

» Secure Erase Mode

This setting change Secure Erase module behavior.

[Simulated]

Performs SE flow without erasing SSD.

[Real]

Erase SSD.

» Force Secure Erase

Enables or disables to force Secure Erase on next boot.

▶ **MEBx (Management Engine BIOS Extension)**

```
                         Security
 Intel(R) ME Password                              MEBx Login
```

▶ **Trusted Computing**

```
                         Security

 TPM 2.0 Device Found                          Enables or Disables BIOS
 Firmware Version:          15.22              support for security device.
 Vendor:                    IFX                O.S. will not show Security
                                               Device. TCG EFI protocol and
 Security Device Support    [Enable]           INT1A interface will not be
 Active PCR banks           SHA256             available.
 Available PCR banks        SHA256,SHA384

 SHA256 PCR Bank            [Enabled]
 SHA384 PCR Bank            [Disabled]

 Pending operation          [None]
 Platform Hierarchy         [Enabled]          ─────────────────────────────
 Storage Hierarchy          [Enabled]          ↔: Select Screen
 Endorsement Hierarchy      [Enabled]          ↑↓: Select Item
 Physical Presence Spec Version [1.3]          Enter: Select
 TPM 2.0 InterfaceType      [TIS]              +/-: Change Opt.
 PH Randomization           [Enabled]          ESC: Exit
 Device Select              [TPM 2.0]          F1: General Help
                                               F7: Previous Values
                                               F9: Optimized Defaults
                                               F10: Save & Reset Setup
                                               F12: Screenshot capture
                                               <k>: Scroll help area upwards
                                               <m>: Scroll help area downwards
```

▶ **Security Device Support**

This item enables or disables BIOS support for security device. When set to [Disable], the OS will not show security device.

▶ **SHA256 PCR Bank, SHA384 PCR Bank**

These settings enables or disables the SHA256 PCR Bank and SHA384 PCR Bank.

▶ **Pending Operation**

When Security Device Support is set to [Enable], Pending Operation will appear. It is advised that users should routinely back up their TPM secured data.

  [TPM Clear]

  Clear all data secured by TPM.

  [None]

  Discard the se lection.

▶ **Platform Hierarchy, Storage Hierarchy, Endorsement Hierarchy**

These settings enables or disables the Platform Hierarchy, Storage Hierarchy and Endorsement Hierarchy.

▶ **Physical Presence Spec Version**

This settings show the Physical Presence Spec Version.

▶ **PH Randomization**

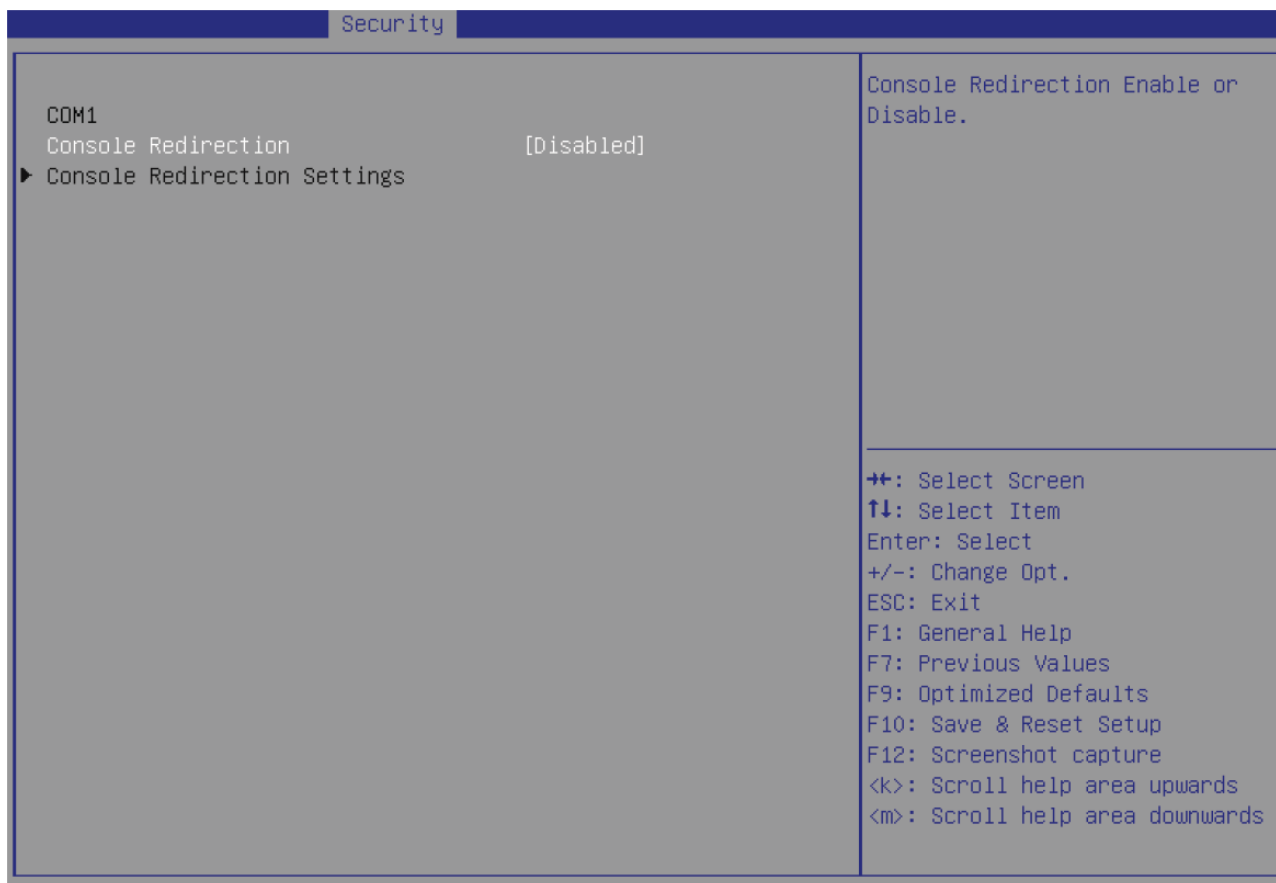Enables or disables Platform Hierarchy (PH) Randomization.

▶ **TPM 2.0 Interface Type**

This setting shows the TPM 2.0 Interface Type.

▶ **Device Select**

Select your TPM device through this setting.

▶ **Serial Port Console Redirection**

▶ **Console Redirection**

Console Redirection operates in host systems that do not have a monitor and keyboard attached. This setting enables or disables the operation of console redirection. When set to [Enabled], BIOS redirects and sends all contents that should be displayed on the screen to the serial COM port for display on the terminal screen. Besides, all data received from the serial port is interpreted as keystrokes from a local keyboard.

▶ **Console Redirection Settings**

This option appears when Console Redirection is enabled.

» **Terminal Type**

To operate the system's console redirection, you need a terminal supporting ANSI terminal protocol and a RS-232 null modem cable connected between the host system and terminal(s). You can select emulation for the terminal from this setting.

[ANSI]

Extended ASCII character set.

[VT100]

ASCII character set.

[VT100Plus]

Extends VT100 to support color, function keys, etc.

[VT-UTF8]

Uses UTF8 encoding to map Unicode characters onto one or more bytes.

» **Bits per second, Data Bits, Parity, Stop Bits**

These setting specifies the transfer rate (bits per second, data bits, parity, stop bits) of Console Redirection.

» **Flow Control**

Flow control is the process of managing the rate of data transmission between two nodes. It's the process of adjusting the flow of data from one device to another to ensure that the receiving device can handle all of the incoming data. This is particularly important where the sending device is capable of sending data much faster than the receiving device can receive it.

» **VT-UTF8 Combo Key Support**

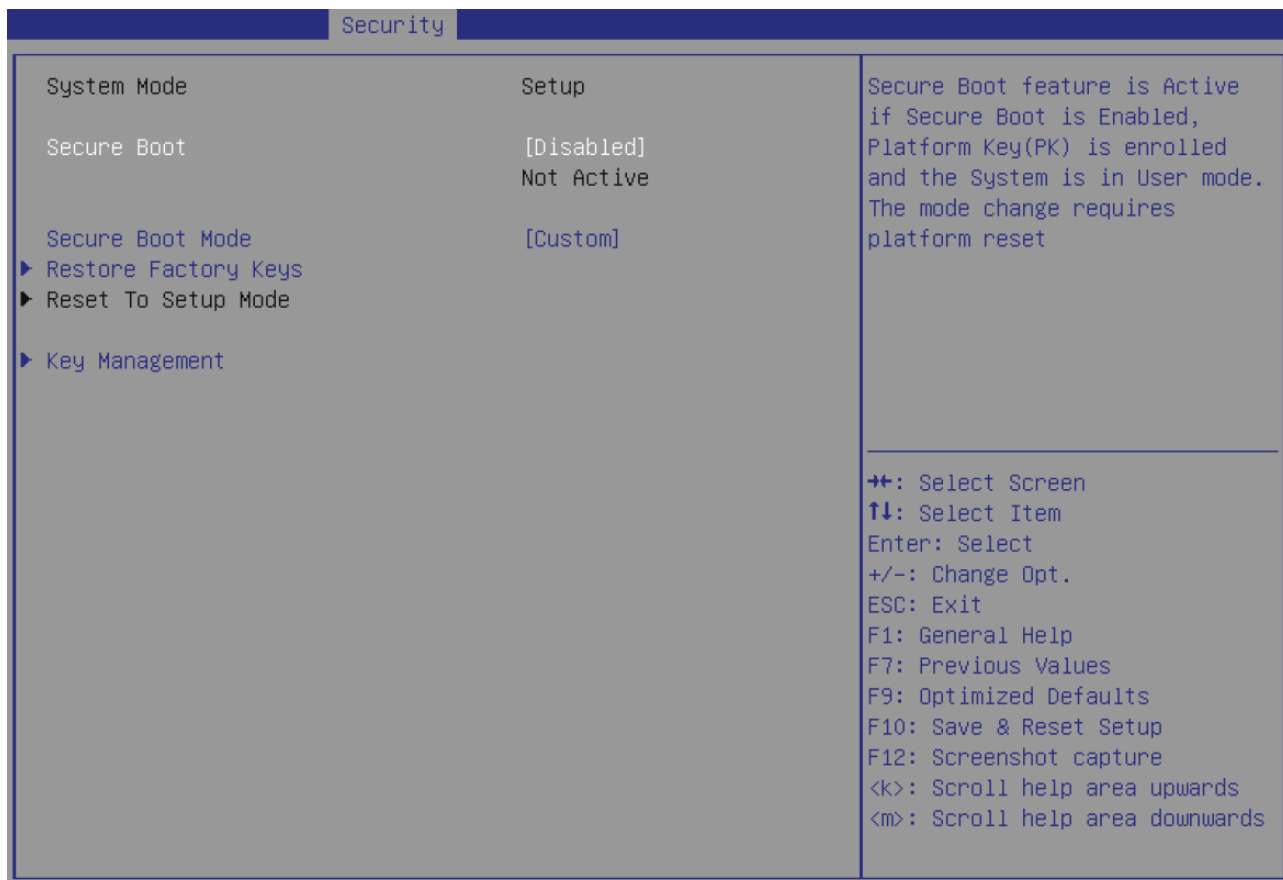This setting enables or disables the VT-UTF8 combination key support for ANSI/VT100 terminals.

» **Recorder Mode, Resolution 100x31**

These settings enables or disables the recorder mode and the resolution 100x31.

» **Putty KeyPad**

PuTTY is a terminal emulator for Windows. This setting controls the numeric keypad for use in PuTTY.

► **Secure Boot**

```
                          Security

   System Mode                  Setup             Secure Boot feature is Active
                                                  if Secure Boot is Enabled,
   Secure Boot              [Disabled]            Platform Key(PK) is enrolled
                            Not Active            and the System is in User mode.
                                                  The mode change requires
   Secure Boot Mode         [Custom]             platform reset
 ▶ Restore Factory Keys
 ▶ Reset To Setup Mode

 ▶ Key Management
                                                 ─────────────────────────────
                                                 �**: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 ESC: Exit
                                                 F1: General Help
                                                 F7: Previous Values
                                                 F9: Optimized Defaults
                                                 F10: Save & Reset Setup
                                                 F12: Screenshot capture
                                                 <k>: Scroll help area upwards
                                                 <m>: Scroll help area downwards
```

▶ **Secure Boot**

Secure Boot function can be enabled only when the Platform Key (PK) is enrolled and running accordingly.

▶ **Secure Boot Mode**

Selects the secure boot mode. This item appears when Secure Boot is enabled.

[Standard]

The system will automatically load the secure keys from BIOS.

[Custom]

Allows user to configure the secure boot settings and manually load the secure keys.

▶ **Restore Factory Keys**

Allows you to restore all factory default keys. The settings will be applied after reboot or at the next reboot. This item appears when "Secure Boot Mode" sets to [Custom].

▶ **Reset to setup Mode**

Allows you to delete all the Secure Boot keys (PK,KEK,db,dbt,dbx). The settings will be applied after reboot or at the next reboot. This item appears when" Secure Boot Mode" sets to [Custom].

▶ **Key Management**

Press Enter key to enter the sub-menu. Manage the secure boot keys. This item appears when" Secure Boot Mode" sets to [Custom].

```
                          Security

  Vendor Keys                      Valid            Install factory default Secure
                                                    Boot keys after the platform
  Factory Key Provision            [Disabled]       reset and while the System is
▶ Restore Factory Keys                              in Setup mode
▶ Reset To Setup Mode
▶ Enroll Efi Image
▶ Export Secure Boot variables

  Secure Boot variable     | Size| Keys| Key Source
▶ Platform Key       (PK)|    0|    0| No Keys
▶ Key Exchange Keys  (KEK)|    0|    0| No Keys
▶ Authorized Signatures (db)|  0|    0| No Keys
▶ Forbidden  Signatures(dbx)|  0|    0| No Keys     ↔: Select Screen
▶ Authorized TimeStamps(dbt)|  0|    0| No Keys     ↑↓: Select Item
▶ OsRecovery Signatures(dbr)|  0|    0| No Keys     Enter: Select
                                                    +/-: Change Opt.
                                                    ESC: Exit
                                                    F1: General Help
                                                    F7: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Reset Setup
                                                    F12: Screenshot capture
                                                    <k>: Scroll help area upwards
                                                    <m>: Scroll help area downwards
```

» Platform Key (PK):

The Platform Key (PK) can protect the firmware from any un-authenticated changes. The system will verify the PK before your system enters the OS. Platform Key (PK) is used for updating KEK.

» Set New Key

Sets a new PK to your system.

» Delete Key

Deletes the PK from your system.

» Key Exchange Keys (KEK):

Key Exchange Key (KEK) is used for updating DB or DBX.

» Set New Key

Sets a new KEK to your system.

» Append Key

Loads an additional KEK from storage devices to your system.

» Delete Key

Deletes the KEK from your system.

» Authorized Signatures (db) :

Authorized Signatures (db) lists the signatures that can be loaded.

» Set New Key

Sets a new db to your system.

» Append Key

Loads an additional db from storage devices to your system.

» Delete Key

Deletes the db from your system.

» Forbidden Signatures (dbx):

Forbidden Signatures (dbx) lists the forbidden signatures that are not trusted and cannot be loaded.

» Set New Key

Sets a new dbx to your system.

» Append Key

Loads an additional dbx from storage devices to your system.

» Delete Key

Deletes the dbx from your system.

» Authorized TimeStamps (dbt):

Authorized TimeStamps (dbt) lists the authentication signatures with authorization time stamps.

» Set New Key

Sets a new DBT to your system.

» Append Key

Loads an additional DBT from storage devices to your system.

» OsRecovery Singnatures (dbr):

Lists the available signatures for OS recovery.

3-2.5   Chipset

```
                          Aptio Setup - AMI
     Main  Advanced  Boot  Security  Chipset  Power  Save & Exit

  Primary Display                 [IGFX]              Select which of IGFX/PEG/PCI
  Internal Graphics               [Enabled]           Graphics device should be
  DVMT Total Gfx Mem              [256M]               Primary Display Or select HG
  DVMT Pre-Allocated              [64M]                for Hybrid Gfx.




                                                     →←: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     ESC: Exit
                                                     F1: General Help
                                                     F7: Previous Values
                                                     F9: Optimized Defaults
                                                     F10: Save & Reset Setup
                                                     F12: Screenshot capture
                                                     <k>: Scroll help area upwards
                                                     <m>: Scroll help area downwards

```

► Primary Display

Use the field to select the primary display of the system.

► Internal Graphics

This setting enables or disables the internal graphics function.

Available settings are:

[Auto]

The internal graphics will be automatically enabled or disabled.

[Enabled]

Enables the internal graphics.

[Disabled]

Disables the internal graphics.

► DVMT Total Gfx Mem

This setting specifies the total graphics memory size for Dynamic Video Memory Technology (DVMT).

► DVMT Pre-Allocated

This setting defines the DVMT pre-allocated memory. Pre-allocated memory is the small amount of system memory made available at boot time by the system BIOS for video. Pre-allocated memory is also known as locked memory. This is because it is" locked" for video use only and as such, is invisible and unable to be used by the operating system.

3-2.6 Power
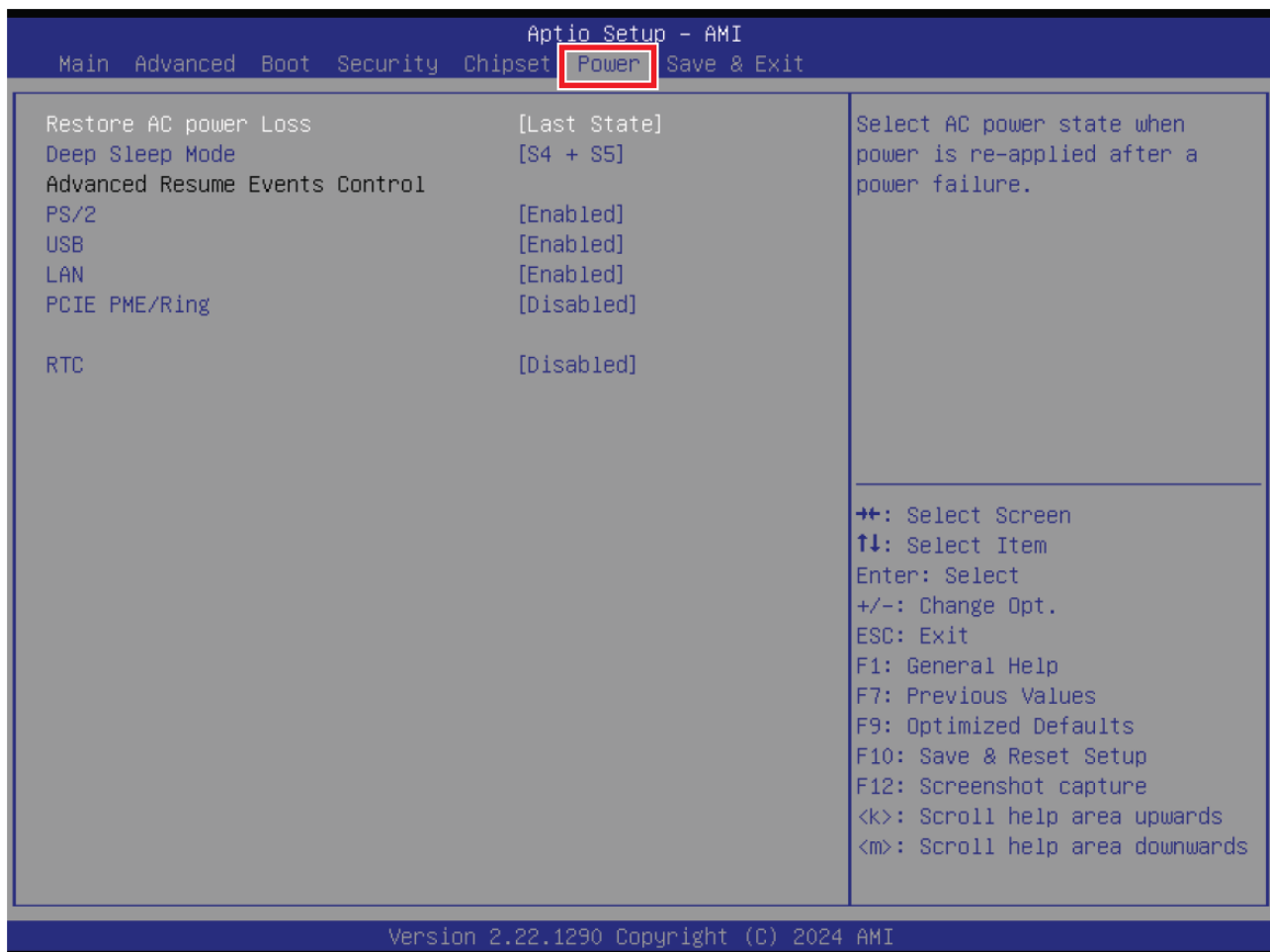
► Restore AC Power Loss

This setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

[Power Off]

Leaves the computer in the power off state.

[Power On]

Leaves the computer in the power on state.

[Last State]

Restores the system to the previous status before power failure or interrupt occurred.

► Deep Sleep Mode

The setting enables or disables the Deep S5 power saving mode. S5 is almost the same as G3 Mechanical Off, except that the PSU still supplies power, at a minimum, to the power button to allow return to S0. A full reboot is required. No previous content is retained. Other components may remain powered so the computer can" wake" on input from the keyboard, clock, modem, LAN, or USB device.

► PS/2, USB, LAN, PCIE PME

The setting allows the activity of the specified device to wake up the system from power saving modes.

► RTC

When [Enabled], your can set the date and time at which the RTC (real-time clock) alarm awakens the system from power saving modes.

3-2.7 Save & Exit
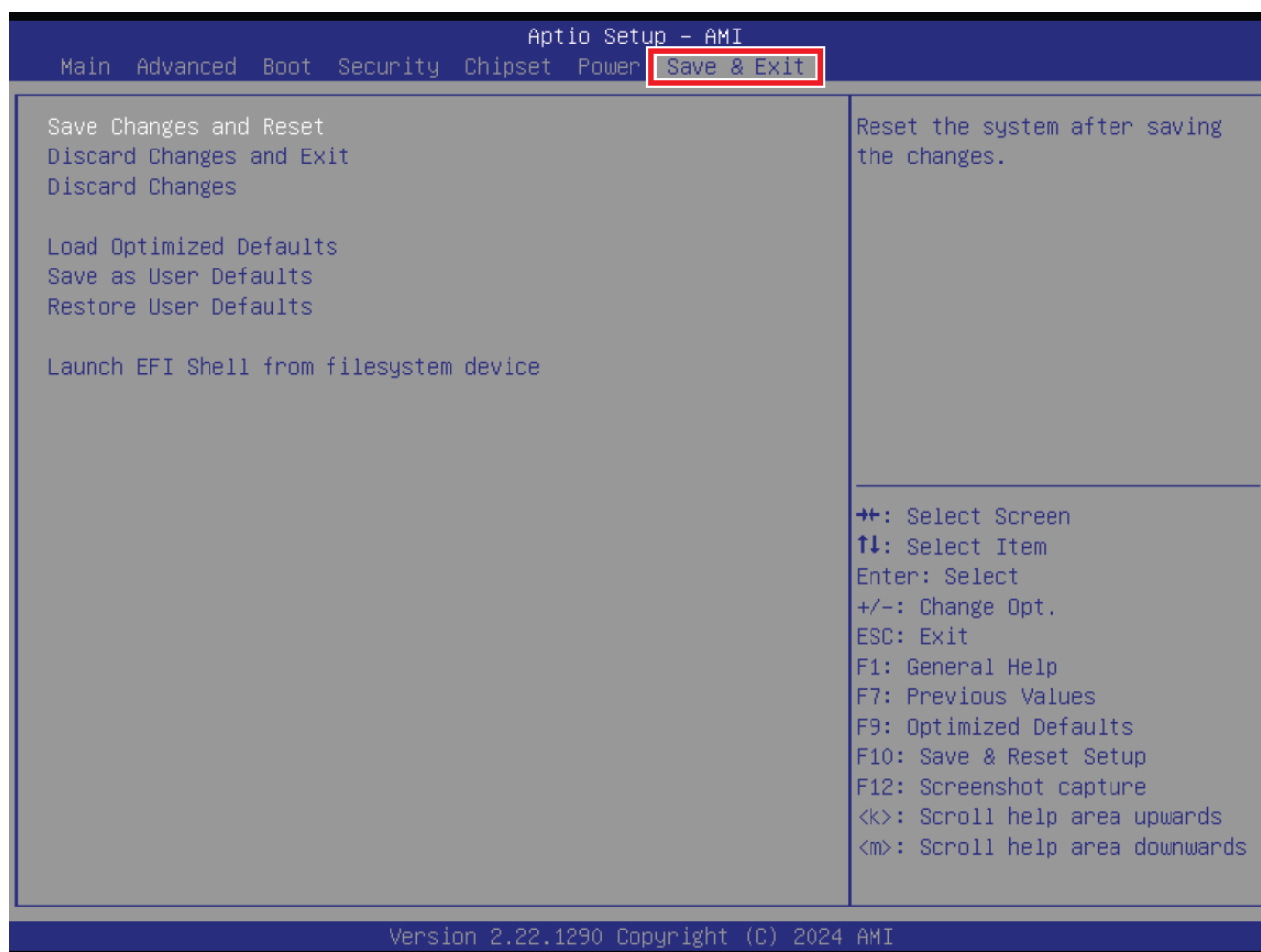
► Save Changes and Reset

Save changes to CMOS and reset the system.

► Discard Changes and Exit

Abandon all changes and exit the Setup Utility.

► Discard Changes

Abandon all changes.

► Load Optimized Defaults

Use this menu to load the default values set by the motherboard manufacturer specifically for optimal performance of the motherboard.

► Save as User Defaults

Save changes as the user's default profile.

► Restore User Defaults

Restore the user's default profile.

► Launch EFI Shell from filesystem device

This setting helps to launch the EFI Shell application from one of the available file system devices.

3-3 GPIO WDT SMBus Programming

This chapter provides WDT (Watch Dog Timer), GPIO (General Purpose Input/ Output) and SMBus Access programming guide.

Abstract

In this section, code examples based on C programming language provided for customer interest. Inportb, Outportb, Inportl and Outportl are basic functions used for access IO ports and defined as following.

Inportb:

Read a single 8-bit I/O port.

Outportb:

Write a single byte to an 8-bit port.

Inportl:

Reads a single 32-bit I/O port.

Outportl:

Write a single long to a 32-bit port.

3-3.1   General Purposed IO – GPIO/DIO

The GPIO port configuration addresses are listed in the following table:

Name	IO Port	IO address	Name	IO Port	IO address
N_GPI0	0x12	Bit 0	N_GPO0	0x21	Bit 0
N_GPI1	0x12	Bit 1	N_GPO1	0x21	Bit 1
N_GPI2	0x12	Bit 2	N_GPO2	0x21	Bit 2
N_GPI3	0x42	Bit 3	N_GPO3	0x21	Bit 3
N_GPI4	0x12	Bit 4	N_GPO4	0x21	Bit 4
N_GPI5	0x12	Bit 5	N_GPO5	0x21	Bit 5
N_GPI6	0x12	Bit 6	N_GPO6	0x21	Bit 6
N_GPI7	0x12	Bit 7	N_GPO7	0x21	Bit 7

Note: GPIO should be accessed through controller device 0x6E on SMBus.

The associated access method in examples (SMBus_ReadByte, SMBus_WriteByte) are provided in part 3.

►**Set output value of GPO**

1. Read the value from GPO port.

2. Set the value of GPO address.

3. Write the value back to GPO port.

Example: Set N_GPO0 output "high"

val =SMBus_ReadByte (0x6E, 0x21);

// Read value from N_GPO0 port through SMBus.

val = val | (1<<0);

// Set N_GPO0address (bit 0) to 1 (output "high").

SMBus_WriteByte (0x6E, 0x21, val);

// Write back to N_GPO0 port through SMBus.

Example: Set N_GPO1 output "low"

val = SMBus_ReadByte (0x6E, 0x21);

// Read value from N_GPO1 port through SMBus..

val = val & (~(1<<1));

// Set N_GPO1 address (bit 1) to 0 (output "low").

SMBus_WriteByte (0x6E, 0x21, val);

// Write back to N_GPO1 port through SMBus.

►Read input value from GPI:

1. Read the value from GPI port.

2. Get the value of GPI address.

Example: Get N_GPI2 input value.

val = SMBus_ReadByte (0x6E, 0x12);

// Read value from N_GPI2 port through SMBus.

val = val & (1<<2);

// Read N_GPI2 address (bit 2).

if (val)

printf ("Input of N_GPI2 is High");

else

printf ("Input of N_GPI2 is Low");

Example: Get N_GPI3 input value.

val = SMBus_ReadByte (0x6E, 0x42);

// Read value from N_GPI3 port through SMBus.

val = val & (1<<3);

// Read N_GPI3 address (bit 3).

if (val)

printf ("Input of N_GPI3 is High");

else

printf ("Input of N_GPI3 is Low");

3-4 Watchdog Timer– WDT

The base address (WDT_BASE) of WDT configuration registers is 0xA10.

3-4.1   Set WDT Time Unit

```
val = Inportb (WDT_BASE + 0x05); // Read current WDT setting
val = val | 0x08; // minute mode. val = val & 0xF7 if second mode
Outportb (WDT_BASE + 0x05, val); // Write back WDT setting
```

3-4.2   Set WDT Time

```
Outportb (WDT_BASE + 0x06, Time); // Write WDT time, value 1 to 255.
```

3-4.3   Enable WDT

```
val = Inportb (WDT_BASE + 0x0A); // Read current WDT_PME setting
val = val | 0x01; // Enable WDT OUT: WDOUT_EN (bit 0) set to 1.
Outportb (WDT_BASE + 0x0A, val); // Write back WDT setting.
val = Inportb (WDT_BASE + 0x05); // Read current WDT setting
val = val | 0x20; // Enable WDT by set WD_EN (bit 5) to 1.
Outportb (WDT_BASE + 0x05, val); // Write back WDT setting.
```

3-4.4   Disable WDT

```
val = Inportb (WDT_BASE + 0x05); // Read current WDT setting
val = val & 0xDF; // Disable WDT by set WD_EN (bit 5) to 0.
Outportb (WDT_BASE + 0x05, val); // Write back WDT setting.
```

3-4.5   Check WDT Reset Flag

```
If the system has been reset by WDT function, this flag will set to 1.
val = Inportb (WDT_BASE + 0x05); // Read current WDT setting.
val = val & 0x40; // Check WDTMOUT_STS (bit 6).
if (val) printf ("timeout event occurred");
else printf ("timeout event not occurred");
```

3-4.6   Clear WDT Reset Flag

```
val = Inportb (WDT_BASE + 0x05); // Read current WDT setting
val = val | 0x40; // Set 1 to WDTMOUT_STS (bit 6);
Outportb (WDT_BASE + 0x05, val); // Write back WDT setting
```
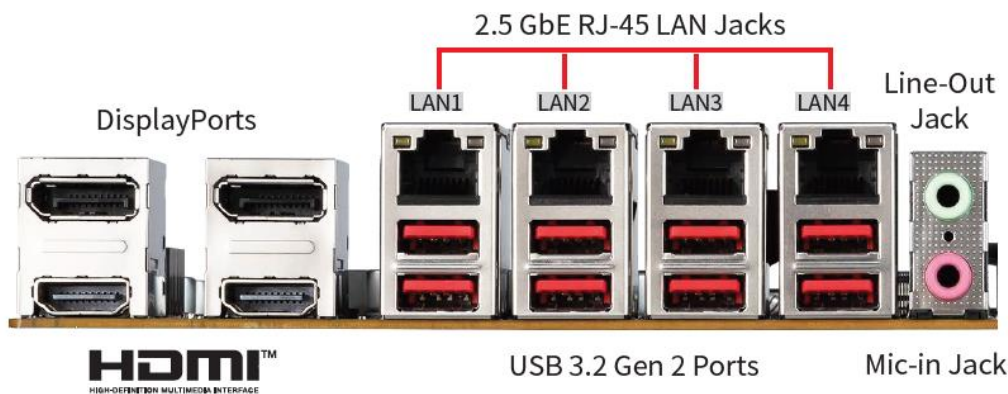
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4-1 Motherboard Overview
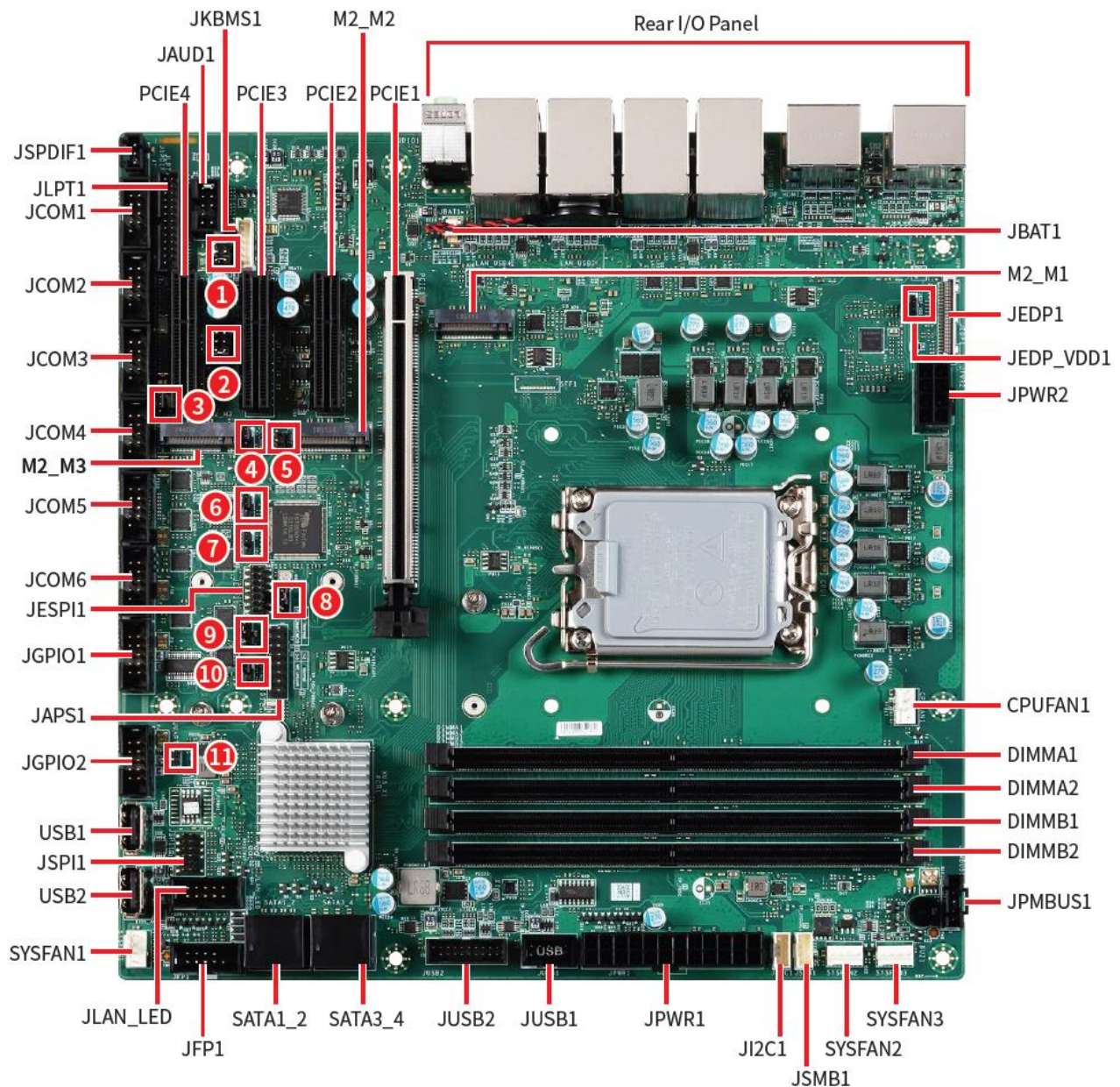
❶ JCOMP1   ❻ JCOMP5   ⑪ JUART1

❷ JCOMP2   ❼ JCOMP6

❸ JCOMP3   ❽ JATX1

❹ JCOMP4   ❾ JCMOS1

❺ JCASE1   ❿ JME_DIS1

DisplayPort

DisplayPort is a digital display interface standard. This connector is used to connect a monitor with DisplayPort inputs.

HDMI™ Connector

HDMI™ is an all-digital interface for uncompressed audio/video streams, supporting standard, enhanced, or high-definition video, and multi-channel digital audio on a single cable.

2.5 GbE RJ-45 LAN Jack

The standard single RJ45 LAN jack is provided for connection to the Local Area Network (LAN). You can connect a network cable to it.

Link/ Activity LED			Speed LED	
Status	**Description**		**Status**	**Description**
⚪ Off	No link		⚪ Off	10/100 Mbps
🟡 Yellow	Linked		🟢 Green	1000 Mbps
🌓 Blinking	Data activity		🟠 Orange	2.5 Gbps

USB 3.2 Gen 2 Port

USB 3.2 Gen 2, the SuperSpeed USB 10Gbps, delivers high-speed data transfer for various devices, such as storage devices, hard drives, video cameras, etc.

⚠️ *Important*

High-speed devices are recommended for USB 3.2 ports whereas low-speed devices, such as mouse or keyboard, are suggested to be plugged into the USB 2.0 ports.

Line-Out Jack

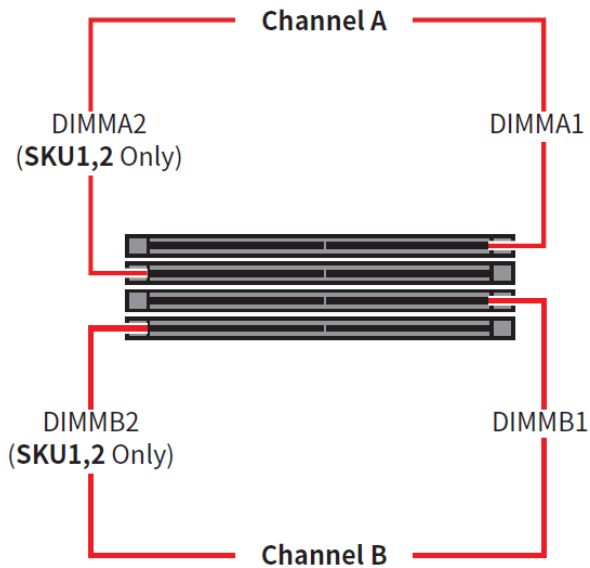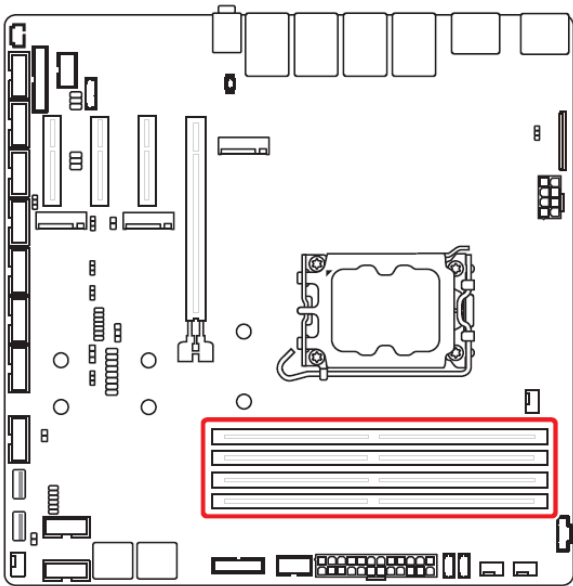This connector is provided for headphones or speakers.

Mic-In Jack

This connector is provided for microphones.

4-2 Memory

DIMM1~2: DDR5 DIMM Slots

The SO-DIMM slots is intended for memory modules.

Recommended Memory Population

Quantity of DIMMs		1	2			3		4
Channel A	DIMMA1				V		V	V
	DIMMA2	V	V		V	V	V	V
Channel B	DIMMB1			V		V		V
	DIMMB2		V	V		V	V	V

**"V" indicates a populated DIMM slot. **

⚠️ *Important*

- *Only support UDIMM.*
- *There should be at least 1 DDR5 DIMM populated.*
- *Paired memory installation for Max performance.*
- *If only 1 DIMM is populated in a channel, then populate it in the DIMMA2 slot.*
- *Populate the same DIMM type in each channel, specifically: 1. Use the same DIMM size; 2. Use the same number of ranks per DIMM.*
- *We don't suggest other memory installation.*