MIX-Q870A1

Industrial Motherboard

HIGH-DEFINITION MULTIMEDIA INTERFACE

May 2026

Copyright Notice

Acknowledgments

Contents

Chapter 1

Product Overview

1.1 Package contents

Check your industrial motherboard package for the following items:

- ☑ 1 x Industrial Motherboard
- ☑ 1 x SATA 6Gb/s Cable
- ☑ 1 x I/O Shield

If any of the above items is damaged or missing, contact your distributor or sales representative immediately

1.2 Features

- ☑ Intel® Core™ Ultra Processors (Series 2) (formerly Arrow Lake-S), LGA1851 Socket, 65W
- ☑ Dual-Channel DDR5 6400MHz CSO-DIMM/SODIMM x 2, up to 96GB
- ☑ PCIe Gen 5 [x16] x 1 with jumper-selectable bifurcation
- ☑ Multi-display outputs: HDMI 2.0, DP 1.2, 18/24-bit LVDS (co-layout eDP)
- ☑ Realtek® ALC897 Audio
- ☑ Intel® Q870 Chipset

1.3 Specifications

System	
Processor	Intel® Core™ Ultra Processors (Series 2) (formerly Arrow Lake-S), LGA1851 Socket, 65W
Chipset	Intel® Q870 Chipset
Memory	Dual-Channel DDR5 6400MHz CSO-DIMM/SODIMM x 2, up to 96GB
Graphics	Intel® Graphics
I/O Chipset	Nuvoton NCT5525D
Ethernet	Intel® Ethernet Connection I219-LM, GbE x 1 (vPro) Intel® Ethernet Controller I226-V 2.5GbE x 1
Audio	Realtek® ALC897 (with audio AMP)
TPM	TPM 2.0
Expansion Slot	PCIe Gen 5 [x16] x 1 with jumper-selectable bifurcation (1×16 / 2×8 / 1×8 + 2×4) M.2 2230 E-Key x 1 (PCIe [x1]/NVMe)
BIOS	256Mbit Flash ROM, AMI BIOS
H/W Monitor	Temperature Monitor on CPU/System, Voltage Monitor on Vcore/5V/3.3V/12V, Fan Monitor on Chassis
Watchdog Timer	1~255 steps by software program
Smart Fan Control	CPU Fan/Chassis Fan
Wake on LAN/PXE	Yes (WOL/PXE)
Power State	S3, S4, S5
Graphics	
Graphics Chipset	Intel® Graphics
Graphics Multi Display	Quad Independent Display
VGA	—
DVI	—
HDMI	HDMI 2.0, up to 4096 x 2160/2560 x 1600 @60Hz, with Digital Audio
Display Port	DP 1.2, up to 4096 x 2160 @60Hz (HBR2)
LVDS	Up to 1920 x 1080 @60Hz, Dual-Channel 18/24-bit LVDS, co-layout eDP (default: LVDS)
eDP	up to 1920 x 1080 @60Hz
Backlight Control	PWM
Environmental	
Battery	Lithium Battery
Power Requirement	ATX
Operating Temperature	32°F ~ 140°F (0 ~ 60°C)
Storage Temperature	-40°F ~ 185°F (-40°C ~ 85°C)
Operating Humidity	60°C @90% RH, Non-Condensing

Certification	CE & FCC (Class A)
Form Factor	Mini-ITX: 6.7" x 6.7" (170mm x 170mm)
Weight	1.1 lb (0.5 kg)
MTBF (Hours)	—
Rear I/O Ports	
USB	USB 3.2 Gen 2 x 8
Display I/O	HDMI 2.0 x 2 DP 1.2 x 2
Audio I/O	Line-out x 1, Mic-in x 1
LAN I/O	RJ-45 LAN x 2
Serial Port	—
PS/2 Port	—
Others	—
Internal I/O Connectors	
Storage	SATA 6Gb/s x 2 M.2 2280 M-Key x 1 (PCIe [x4]/NVMe) M.2 2242 M-Key x 1 (SATA), bottom side
USB	USB 3.0 Pin Header x 1 (USB 3.2 Gen 1 x 2)
Display I/O	40-pin LVDS/eDP Connector x 1 with Inverter (Default: LVDS)
Audio I/O	AAFP Header x 1 (ASUS pin-out)
Serial Port	—
PS/2 Port	—
Parallel Port	—
DIO	8-bit Programmable x 1 (4-in/4-out)
Fan	4-pin Chassis Fan Connector x 1 4-pin CPU Fan Connector x 1
Power	ATX
Others	Clear CMOS Jumper x 1 Front Panel Connector x 1 ATX/AT Mode Select x 1 ME Disable x 2 (CPU/PCH) eDP/LVDS Tcon IC Voltage Select x 1 Backlight Voltage Select x 1
OS	
OS Support	Windows® 10/11 64-bit Linux Ubuntu 24.04

Rear I/O Placement	
	HDMI x 2 (Stack) DP x 2 (Stack) USB 3.2 Gen 2 x 2 + RJ-45 x 1 USB 3.2 Gen 2 x 2 + RJ-45 x 1 USB 3.2 Gen 2 x 4 Audio Jack for Mic-in + Line-out x 1

Specifications are subject to change without notice

Chapter 2

Motherboard Information

2.1 Before you Proceed

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

CAUTION!

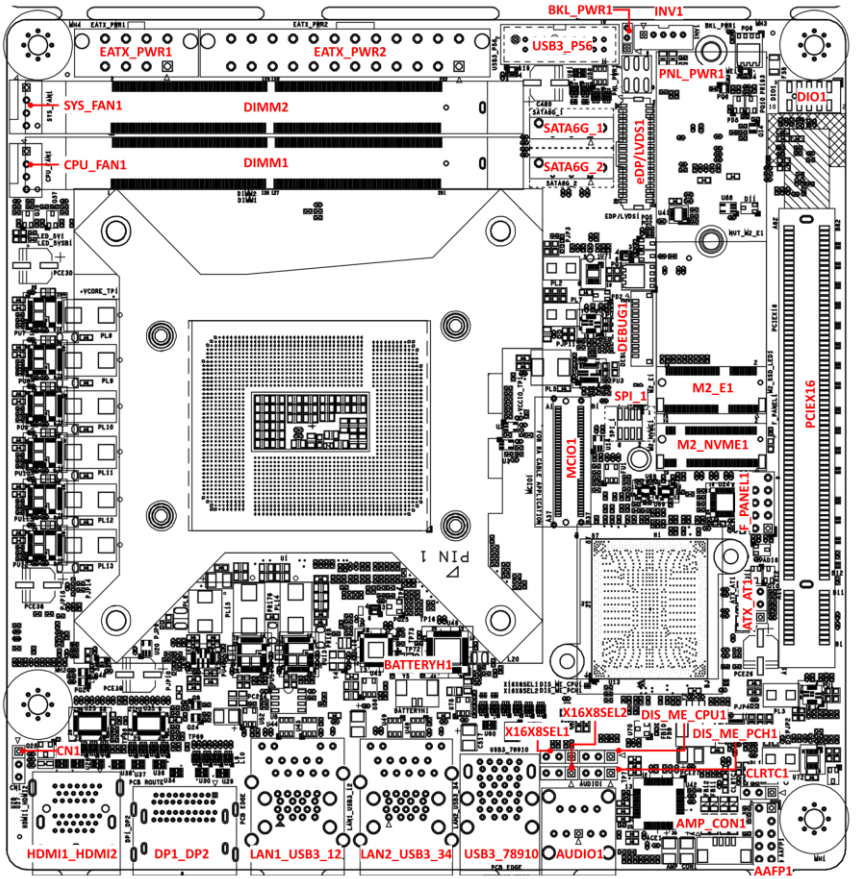
- Unplug the power cord from the wall socket before touching any component.
- Before handling components, use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, to avoid damaging them due to static electricity.
- Hold components by the edges to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

2.2 Motherboard Layout

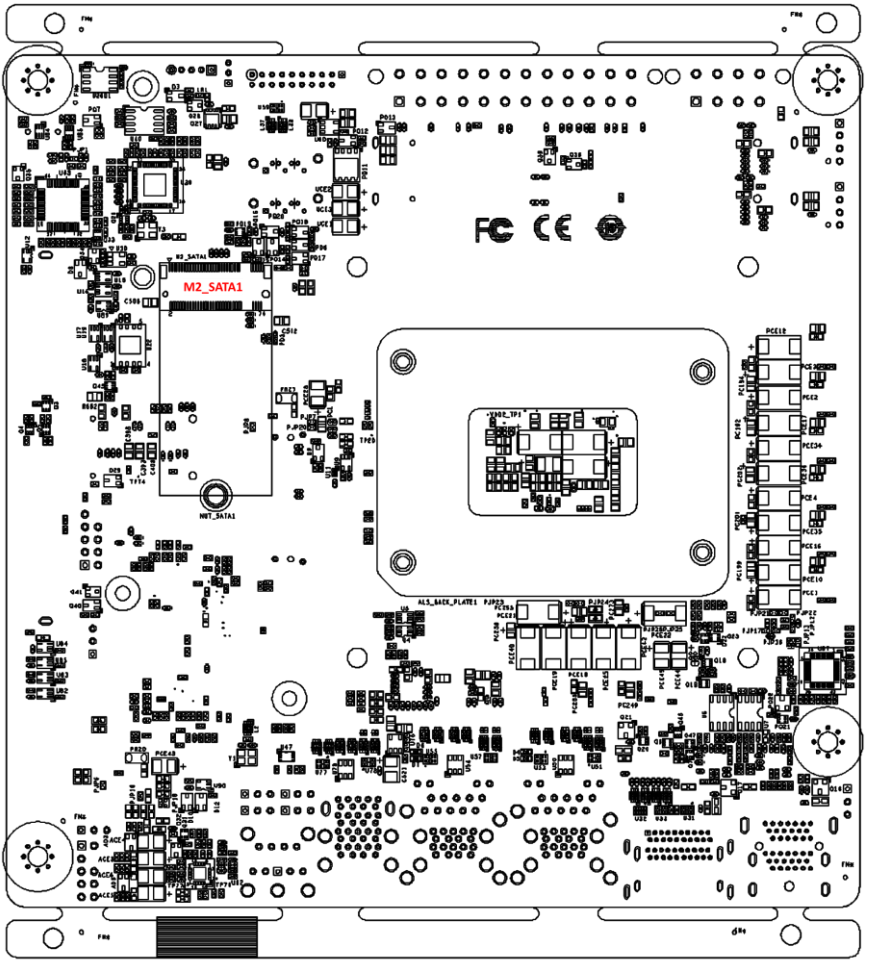
Place four screws into the holes indicated by circles to secure the motherboard to the chassis

Do not overtighten the screws! Doing so can damage the motherboard

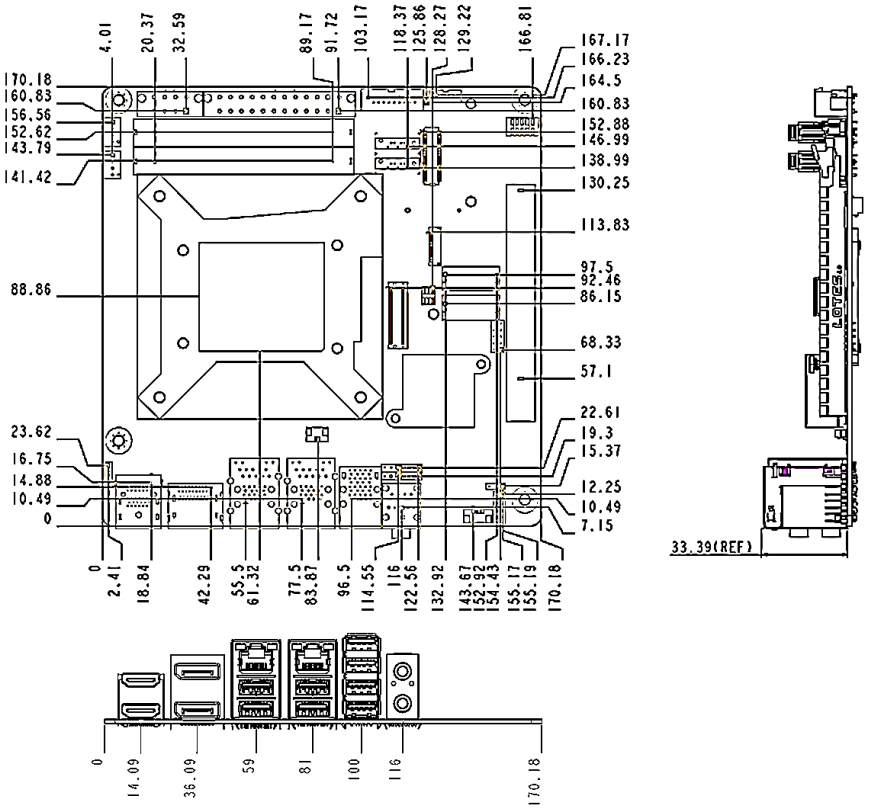
Component Side



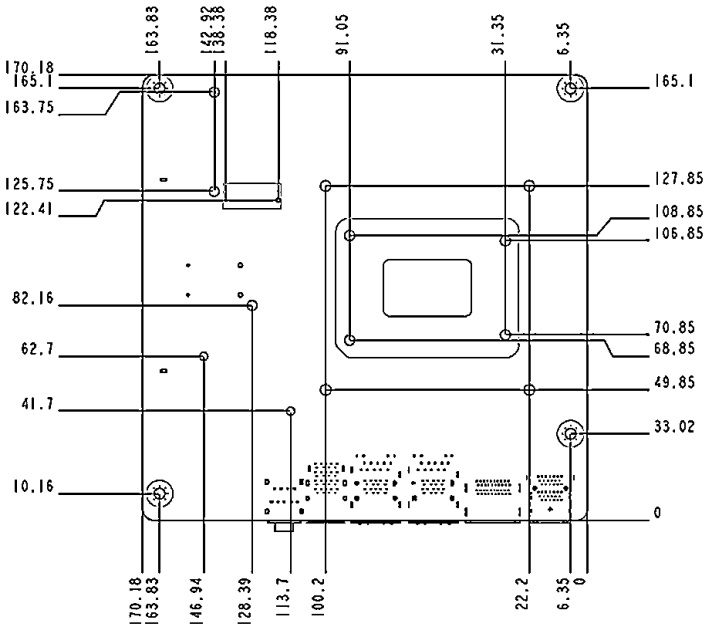
Solder Side



Screw Size: Component Side

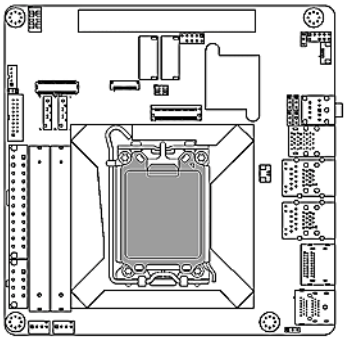


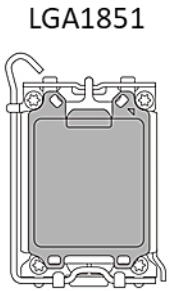
Screw Size: Solder Side



2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1851 socket designed for Intel® Core™ Ultra Processors (Series 2) (formerly Arrow Lake-S).





IMPORTANT: Unplug all power cables before installing the CPU.

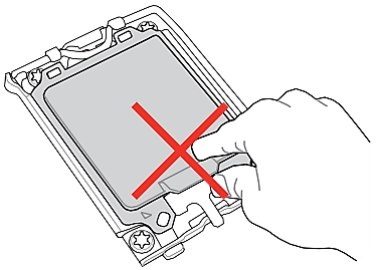
CAUTION!

- Ensure that you install the correct CPU designed for LGA1851 socket only. DO NOT install a CPU designed for other sockets on the LGA1851 socket.
- The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU.
- Ensure that all power cables are unplugged before installing the CPU.
- Ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1851 socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/ incorrect removal of the PnP cap.

2.3.1 Installing the CPU

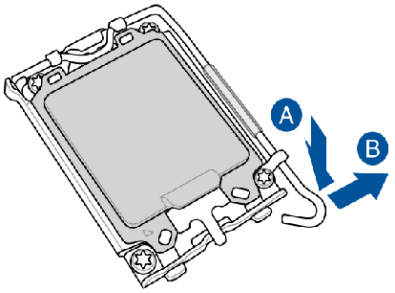
CAUTION!

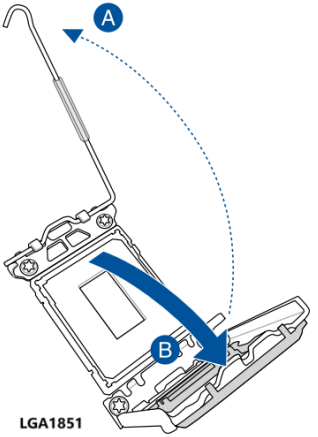
- Ensure that you install the correct CPU designed for LGA1851 socket only. DO NOT install a CPU designed for other sockets on the LGA1851 socket.
- ASUS will not cover damages resulting from incorrect CPU installation/ removal, incorrect CPU orientation/placement, or other damages resulting from negligence by the user.

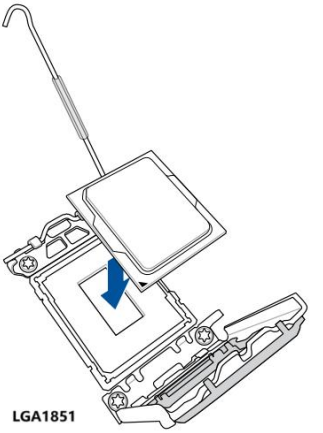


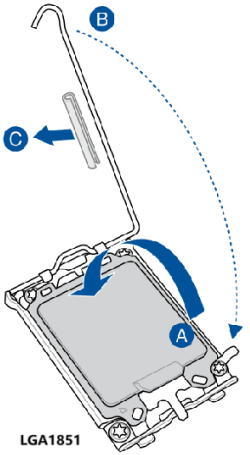
CAUTION!

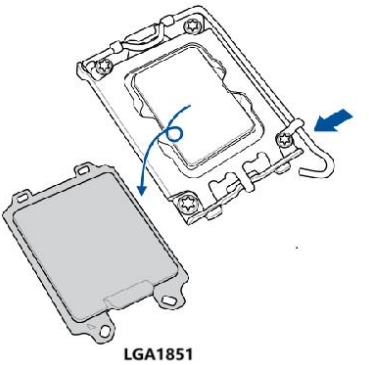
Take caution when lifting the load lever, ensure to hold onto the load lever when releasing the load lever. Letting go of the load lever immediately after releasing it may cause the load lever to spring back and cause damage to your motherboard.



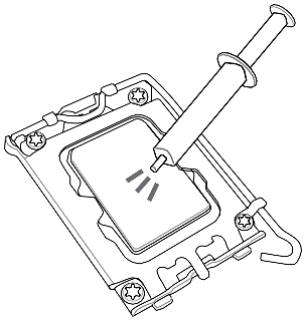

A
B
LGA1851


LGA1851


B
C
A
LGA1851


LGA1851

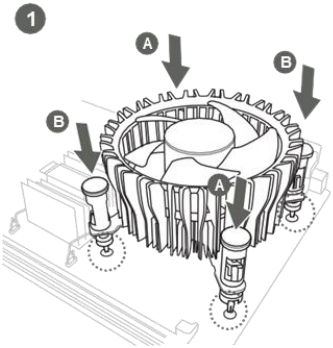
2.3.2 CPU Heatsink and Fan Assembly Installation

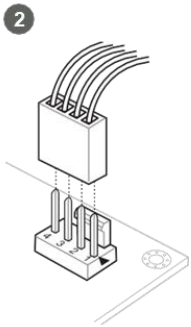


IMPORTANT: Apply Thermal Interface Material to the CPU cooling system and CPU before you install the cooling system, if necessary

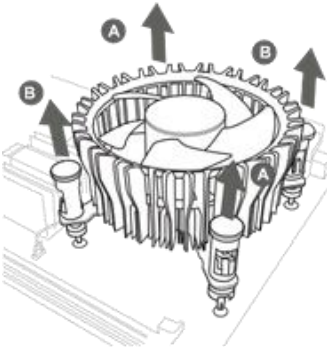
CAUTION! Ensure to remove the CPU Socket lever protector on the lever latch before installing the cooling system, failure to do so may cause damages to your system.

Installing CPU Heatsink and Fan:





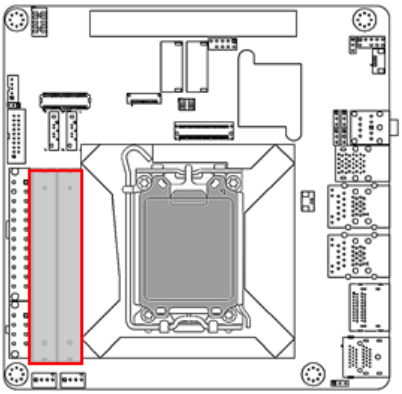
Uninstalling the CPU Heatsink and Fan:

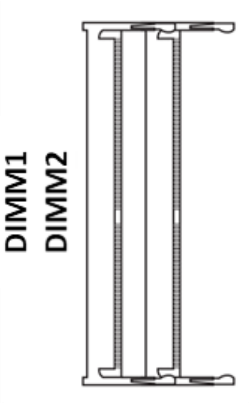


2.3.3 System Memory

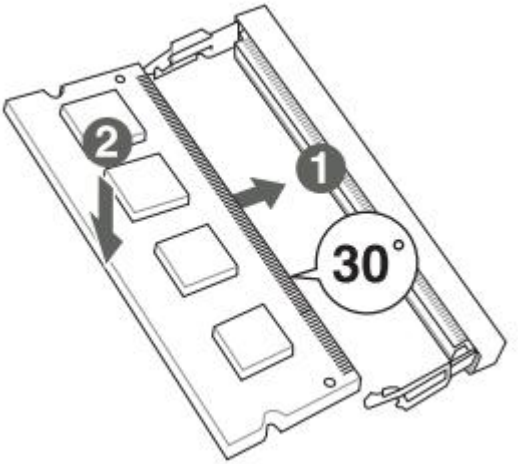
The motherboard comes with Small Outline Dual Inline Memory Modules (SODIMM) slots designed for DDR5 (Double Data Rate 5) memory modules.

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

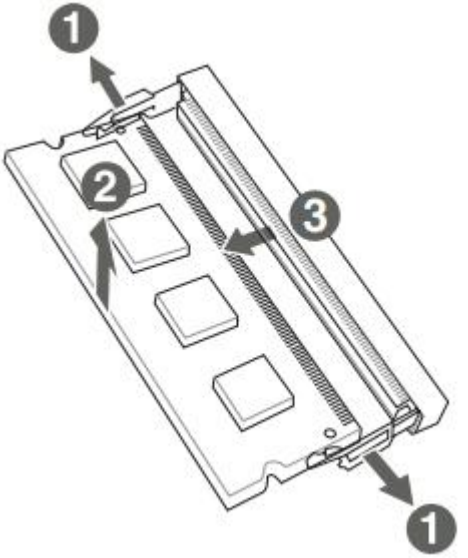




2.3.4 DIMM Installation



DIMM Removal:

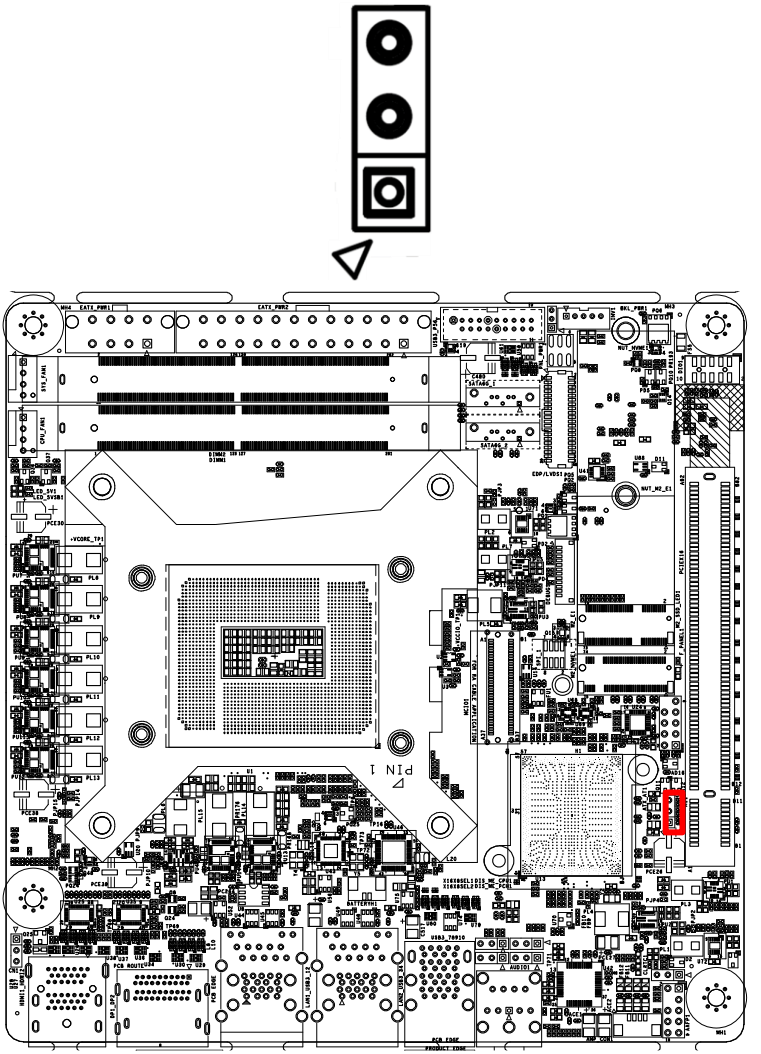


2.4 Jumpers

Please refer to the table below for all of the board's jumpers that you can configure for your application

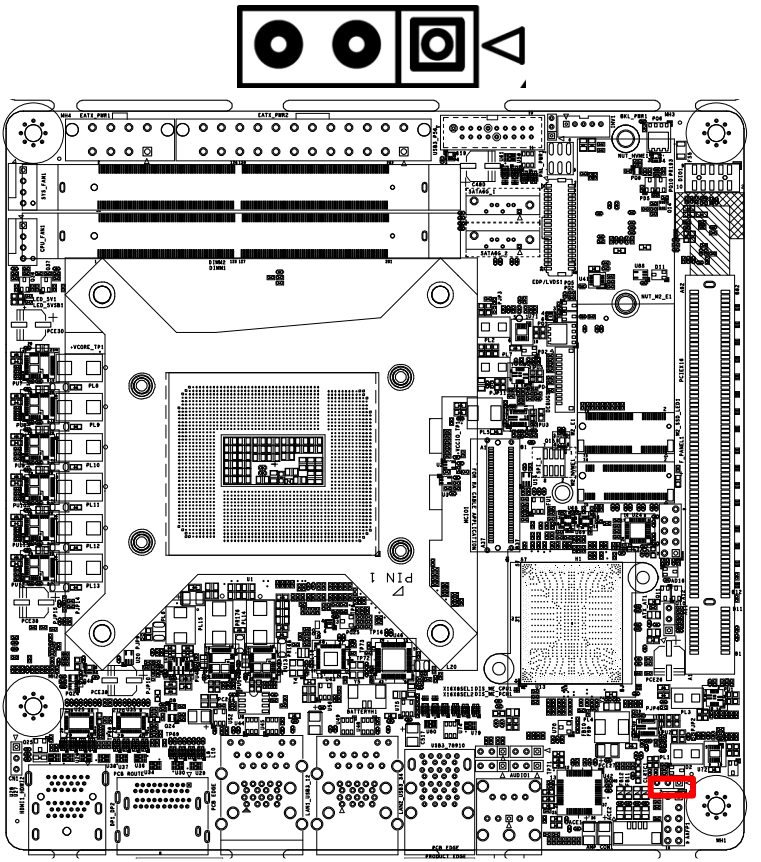
Label	Function
ATX_AT1	AT / ATX Power Mode Selection
CLRTC1	Clear CMOS Jumper
PNL_PWR1	LCD Panel Voltage Selection (+5V / +3.3V)
BKL_PWR1	Inverter Voltage Selection (+5V / +12V)
X16X8SEL1 / X16X8SEL2	PCIe Lane Configuration (x16 / x8 + x8 / x8 + x4 + x4)
DIS_ME_CPU1	CPU ME Disable Jumper
DIS_ME_PCH1	PCH ME Disable Jumper

2.4.1 AT / ATX Power Mode Selection (ATX_AT1)



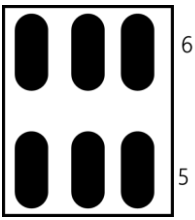
Setting	Pin Configuration
ATX Mode	1-2 (Default)
AT Mode	2-3

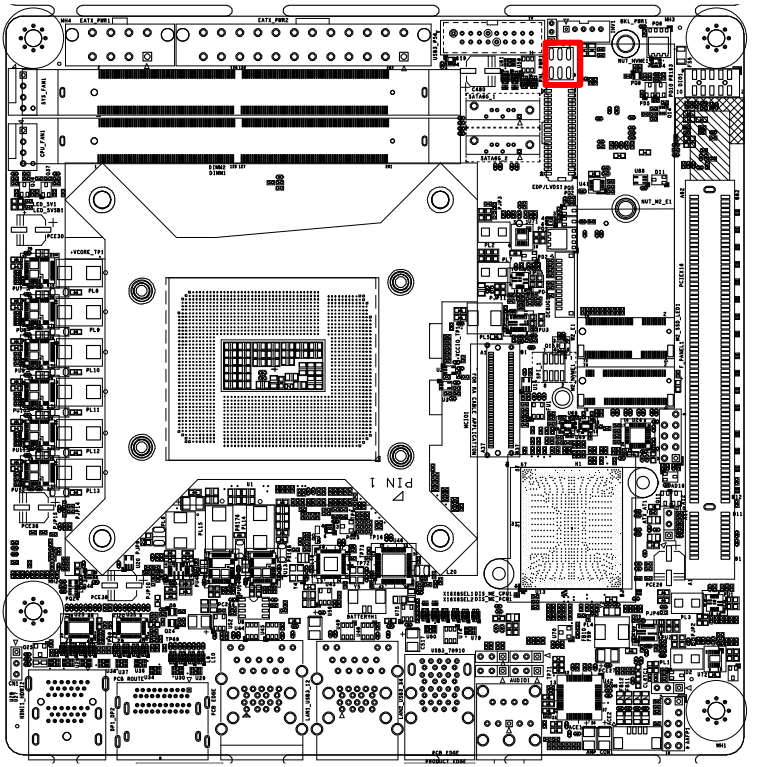
2.4.2 Clear CMOS Jumper (CLRTC1)



Setting	Pin Configuration
Normal	1-2 (Default)
Clear	2-3

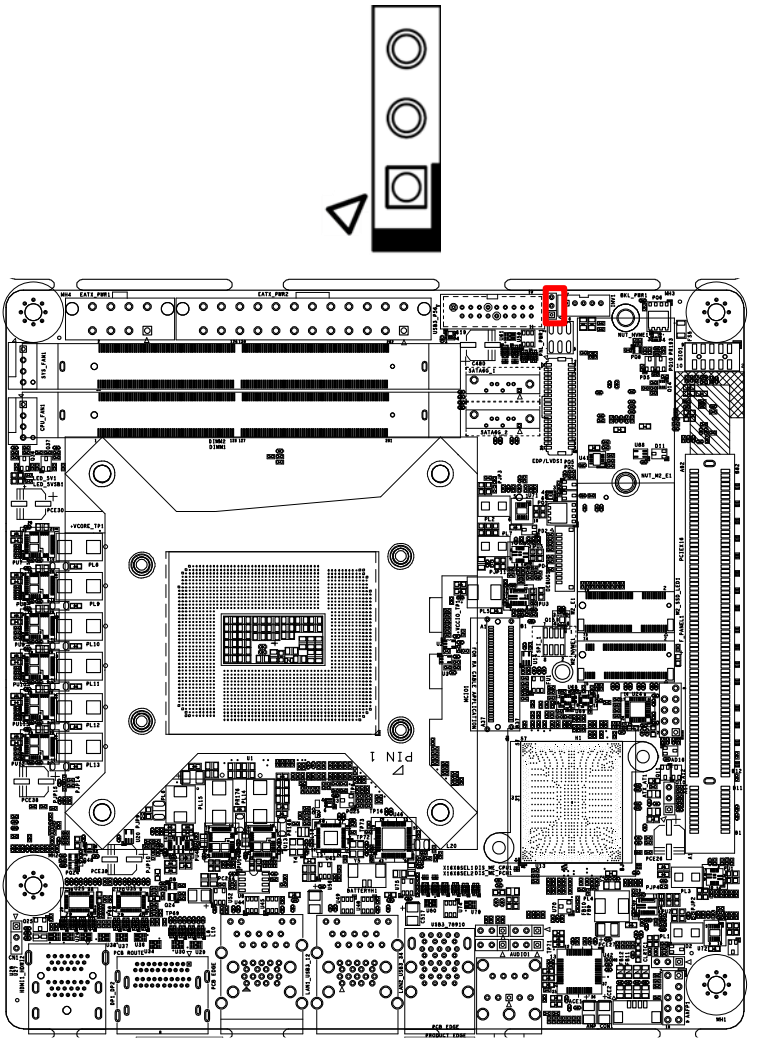
2.4.3 LCD Panel Voltage Selection (PNL_PWR1)





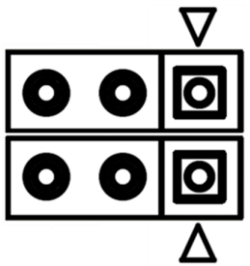
Setting	Pin Configuration
+3V	1-2(Default)
+12V	3-4
+5V	5-6

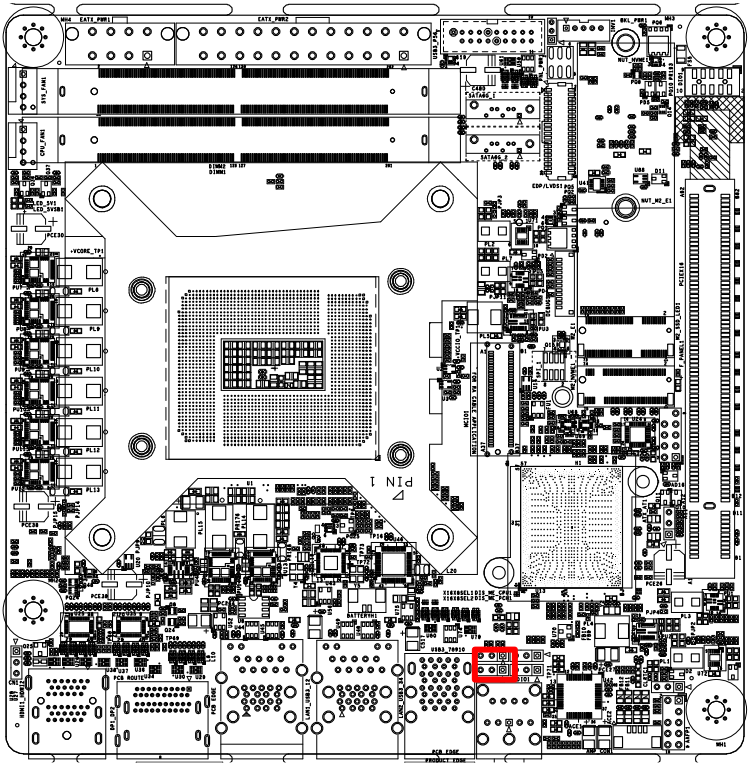
2.4.4 Inverter Voltage Selection (BKL_PWR)



Setting	Pin Configuration
+12	1-2
+5V	2-3 (Default)

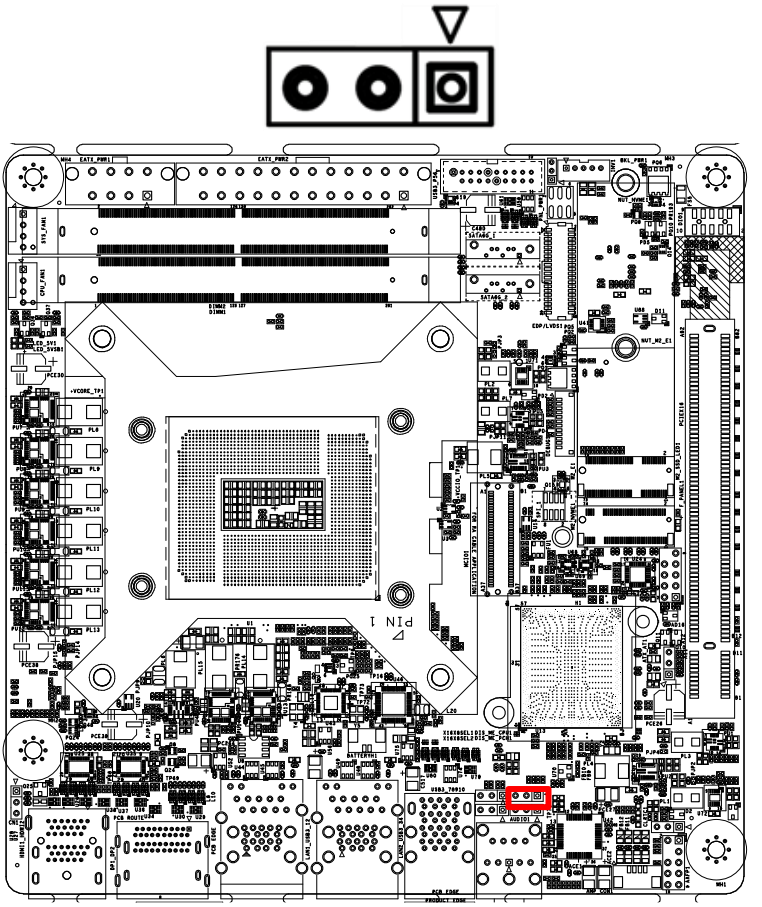
2.4.5 PCIe Lane Configuration (X16X8SEL1 / X16X8SEL2)





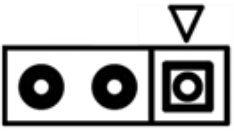
Pin	PCIE x16 (Default)	2*PCIE x8	x8, x4, x4	
X16X8SEL1	1-2 (L)	2-3 (H)	2-3 (H)	(GPP_SA16)
X16X8SEL2	1-2 (L)	1-2 (L)	2-3 (H)	(GPP_SA15)

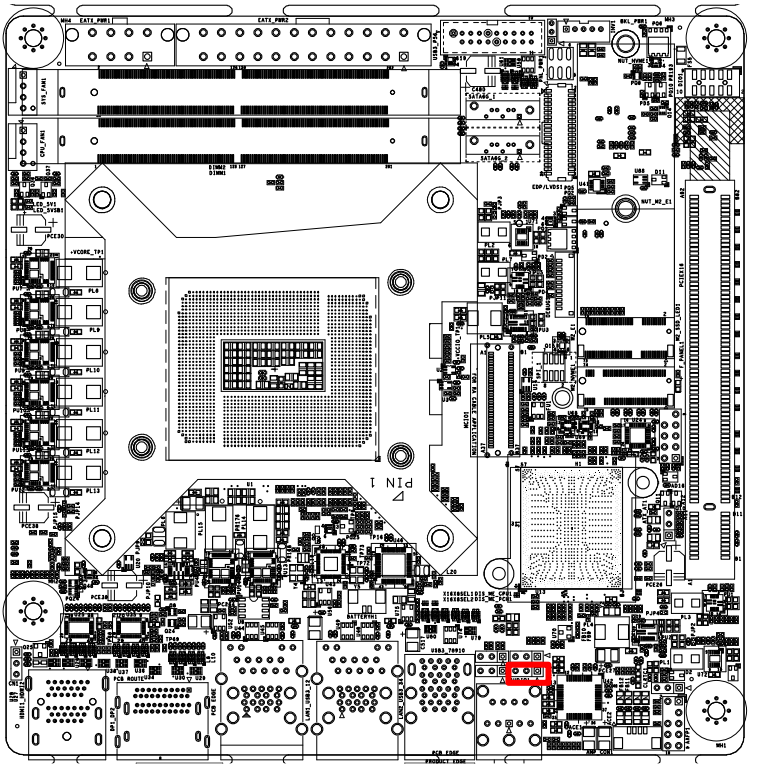
2.4.6 CPU ME Disable Jumper (DIS_ME_CPU1)



Setting	Pin Configuration
Normal	1-2
Disable ME	2-3

2.4.7 PCH ME Disable Jumper (DIS_ME_PCH1)



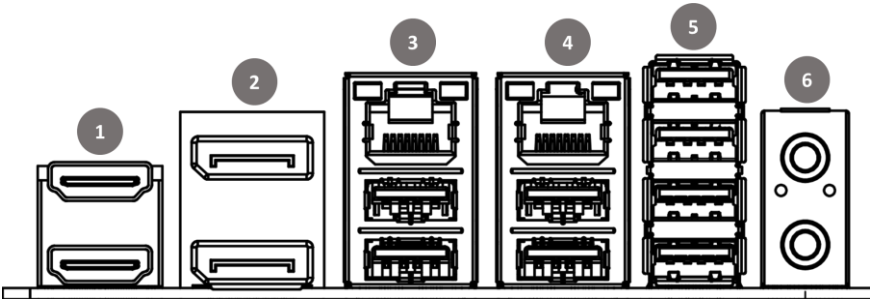


Setting	Pin Configuration
Normal	1-2
Disable ME	2-3

2.5 Internal Connectors

Please refer to the table below for all of the board's connectors that you can configure for your application.

Rear I/O Ports

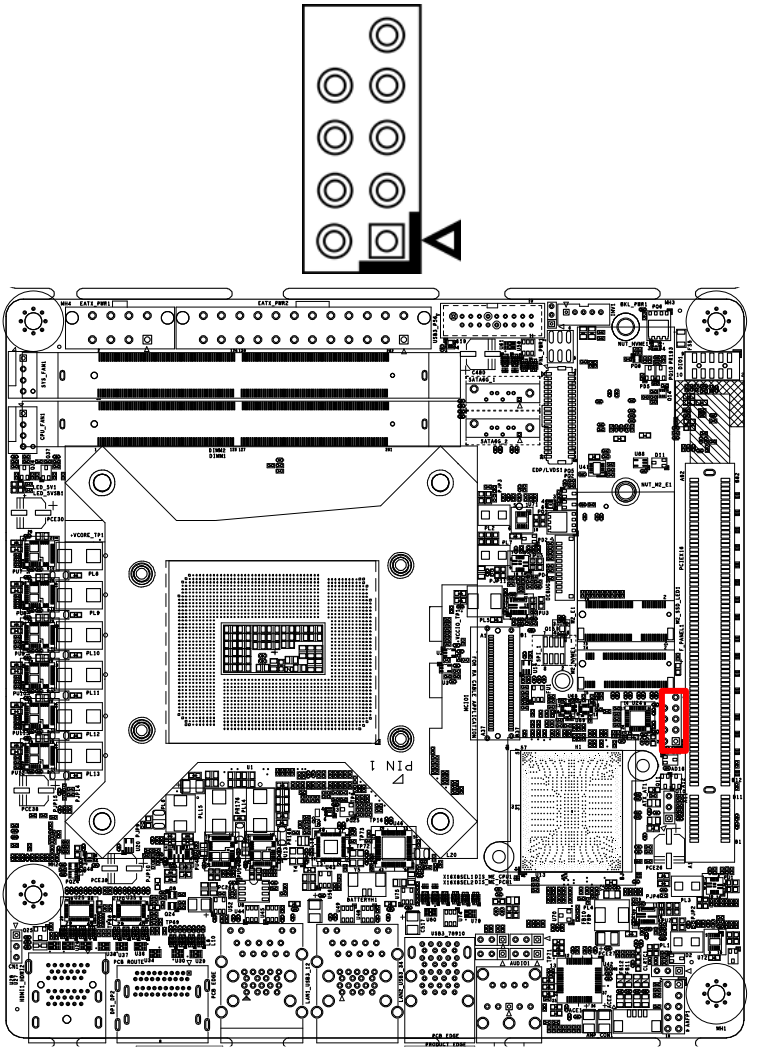


Label	Function
1	HDMI x 2 (Stack)
2	DP x 2 (Stack)
3	USB 3.2 Gen 2 x 2 + RJ-45 x 1
4	USB 3.2 Gen 2 x 2 + RJ-45 x 1
5	USB 3.2 Gen 2 x 4
6	Audio Jack for Mic-in + Line-out x 1

Internal Connectors

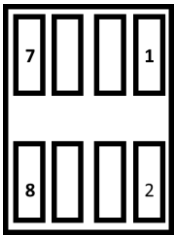
Label	Function
F_PANEL1	Front Panel Header
SPI_1	SPI Flash Programming Header
USB3_P56	Internal USB 3.0 (5 Gbps) Header
CPU_FAN1 / SYS_FAN1	Fan Headers
DEBUG1	Debug Port Header
DIO	Digital I/O Header
AMP_CON	Amplifier Connector
AAFP	Front Audio Header
INV1	Inverter Connector
BATTERYH1	CMOS Battery Holder
eDP/LVDS1	LVDS / eDP Connector

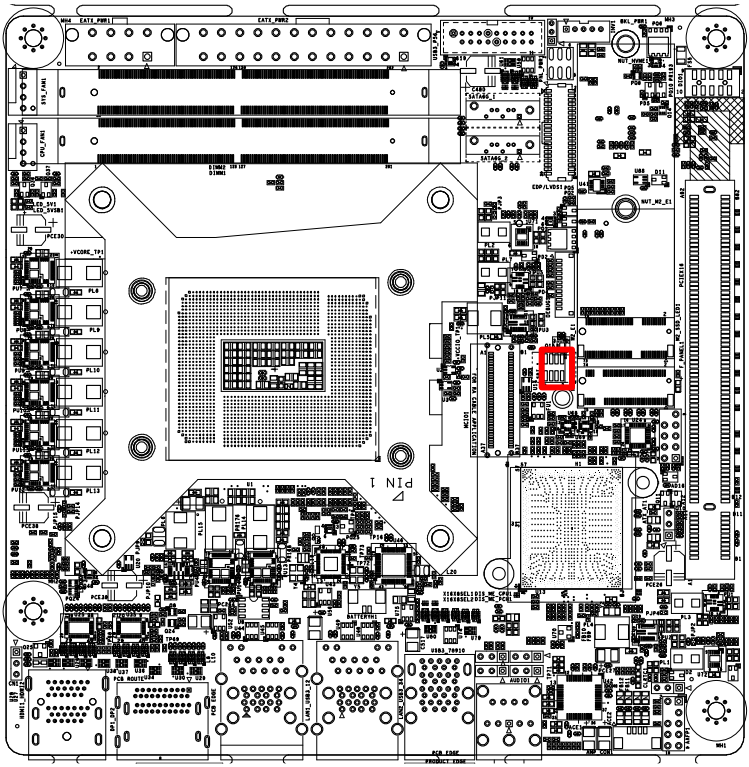
2.5.1 Front Panel Connector (F_PANEL1)



Pin	Signal	Pin	Signal
1	HDLED+	2	PLED+
3	HDLED_D-	4	PLED-
5	GND	6	F_PWRBTN#
7	RSTCON#_PANEL	8	GND
9	(NC)	10	(kill pin)

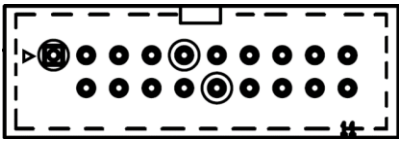
2.5.2 SPI Flash Programming Header (SPI_1)

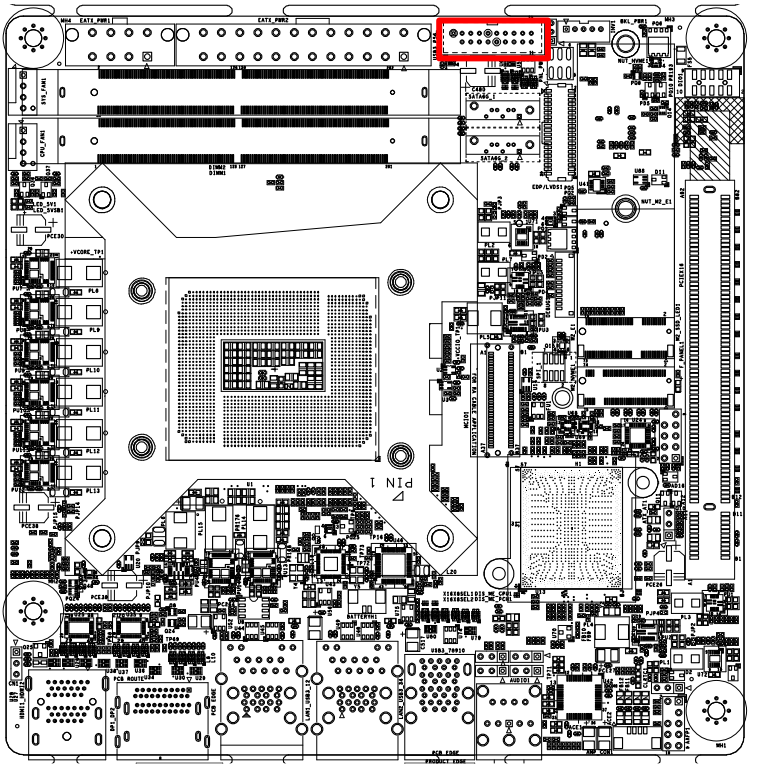




Pin	Signal	Pin	Signal
1	+3V_SPI	2	GND
3	BIOS_SPI_CS#	4	BIOS_SPI_CLK
5	BIOS_SPI_MISO	6	BIOS_SPI_MOSI
7	(NC)	8	(NC)

2.5.3 Internal USB 3.0 (5 Gbps) Header (USB3_P56)

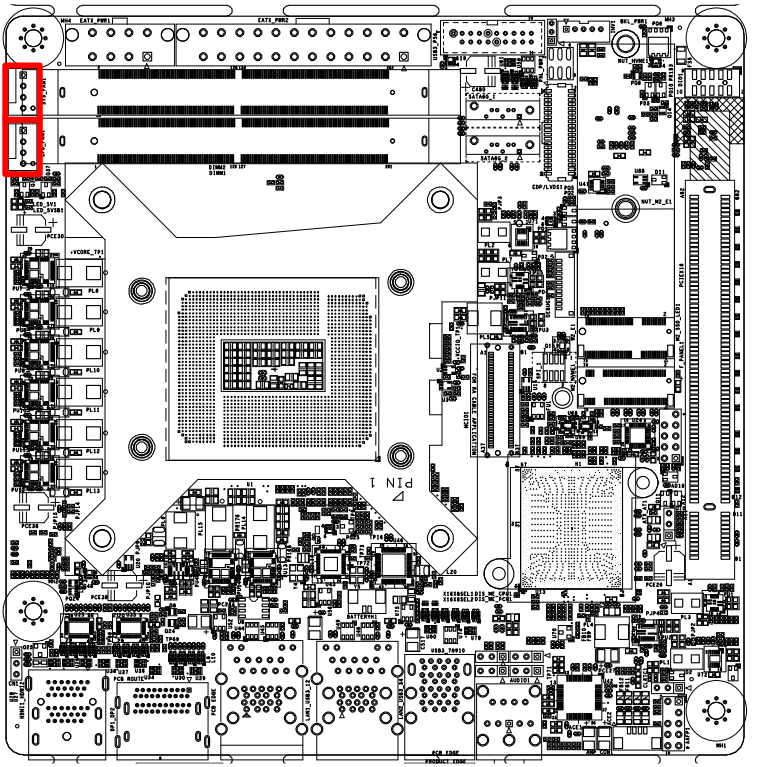




Pin	Signal	Pin	Signal
20	(kill pin)	1	+5V_USB3_P56
19	+5V_USB3_P56	2	S_U3RXDN5
18	S_U3RXDN6	3	S_U3RXDP5
17	S_U3RXDP6	4	GND
16	GND	5	S_U3TXDN5
15	S_U3TXDN6	6	S_U3TXDP5
14	S_U3TXDP6	7	GND
13	GND	8	S_USB_PN5
12	S_USB_PN6	9	S_USB_PP5

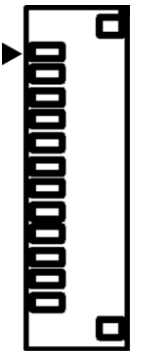
Pin	Signal	Pin	Signal
11	S_USB_PP6	10	GND

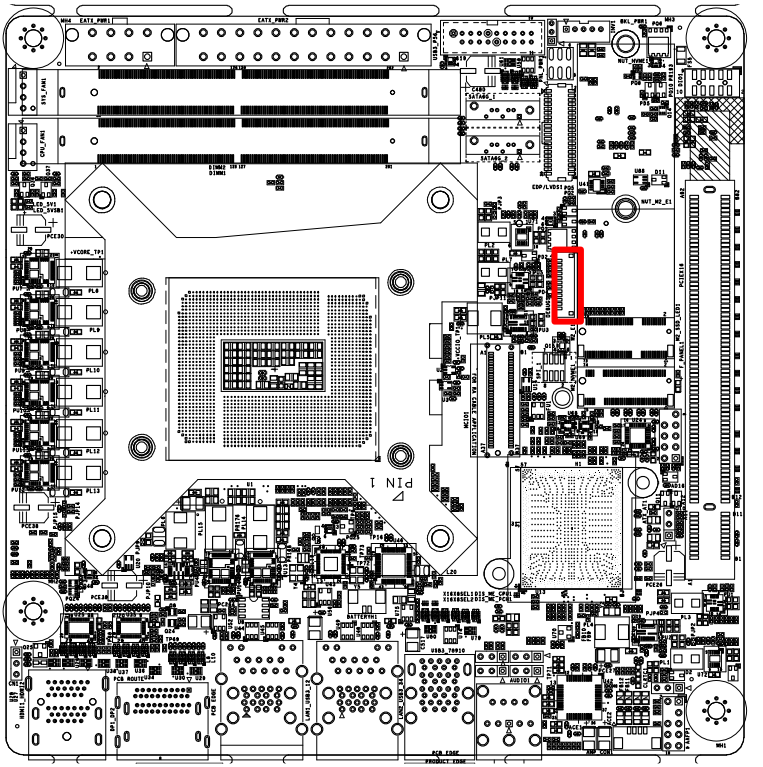
2.5.4 Fan Headers (CPU_FAN1 / SYS_FAN1)



Pin	Signal	Pin	Signal
1	GND	5	+12VSUS
2	+12V	6	+12VSUS
3	SENSE	7	+12VSUS
4	PWM	8	+12VSUS

2.5.5 Debug Port Header (DEBUG1)

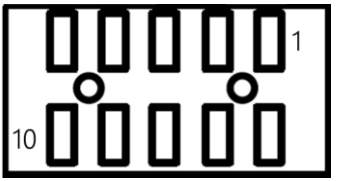


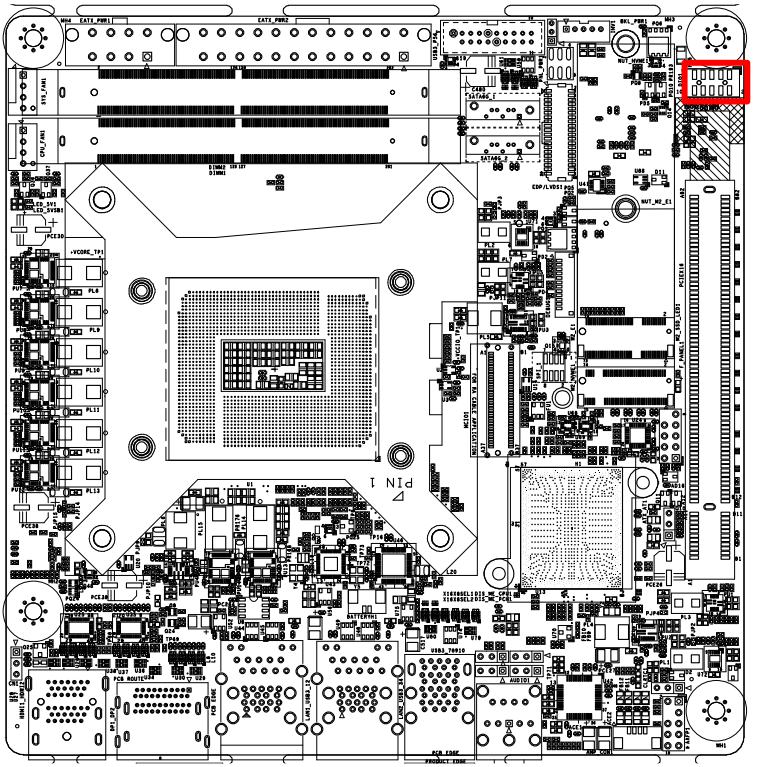


Pin	Signal
1	ESPI_IO0_DB
2	ESPI_IO1_DB

Pin	Signal
3	ESPI_IO2_DB
4	ESPI_IO3_DB
5	+3V
6	ESPI_CS0#_DB
7	ESPI_RESET#_DB
8	GND
9	ESPI_CLK_DB
10	+3VSUS
11	GND
12	NC

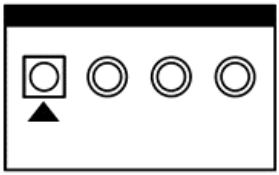
2.5.6 Digital I/O Connector (DIO)

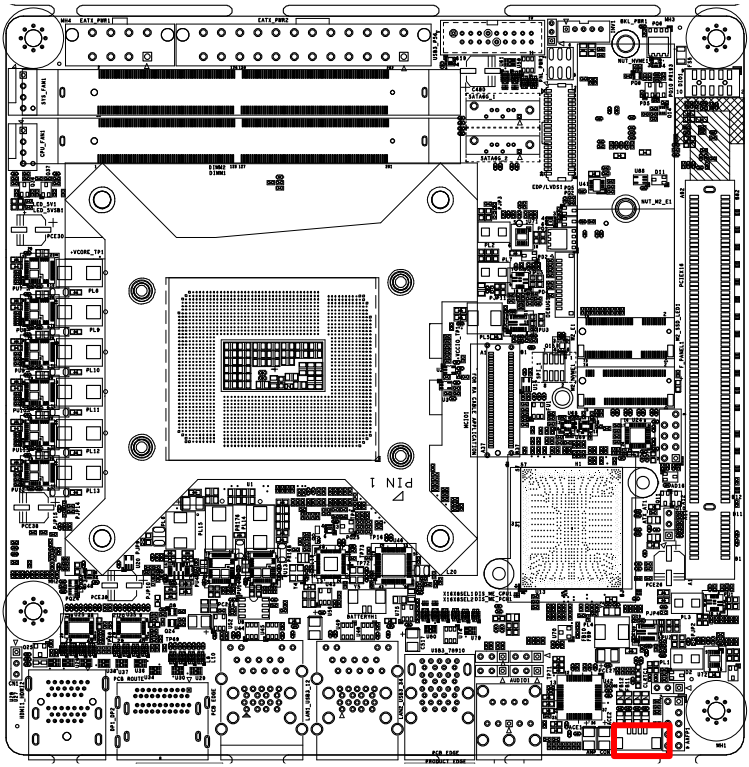




Pin	Signal	Pin	Signal
1	DIO_I#1	2	DIO_I#2
3	DIO_I#3	4	DIO_I#4
5	DIO_O#1	6	DIO_O#2
7	DIO_O#3	8	DIO_O#4
9	+5V	10	GND

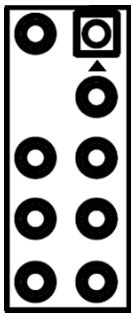
2.5.7 Amplifier Connector (AMP_CON)

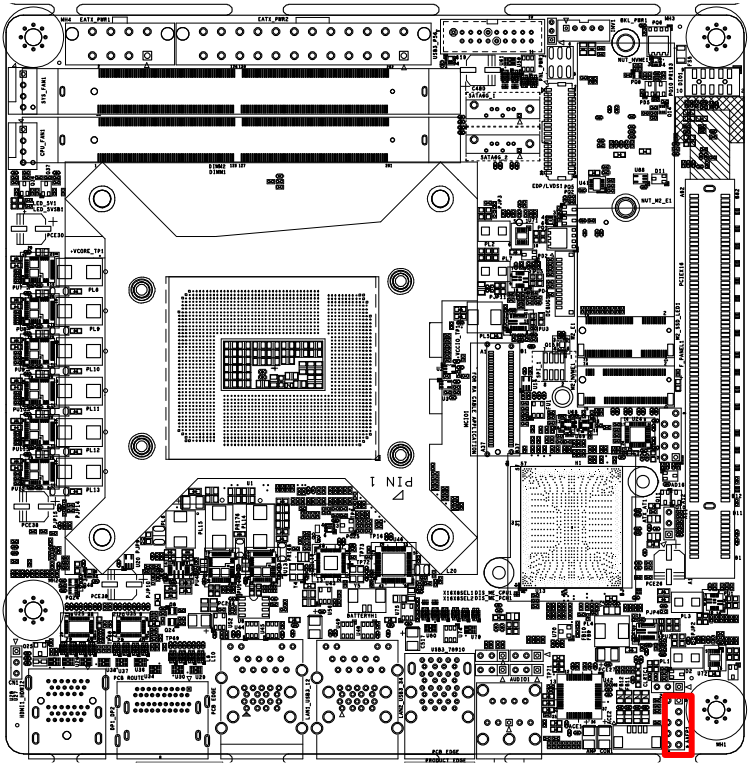




Pin	Signal
1	ROUTP
2	ROUTN
3	LOUTN
4	LOUTP

2.5.8 Front Audio Header (AAFP)

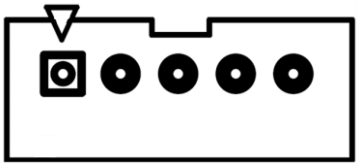


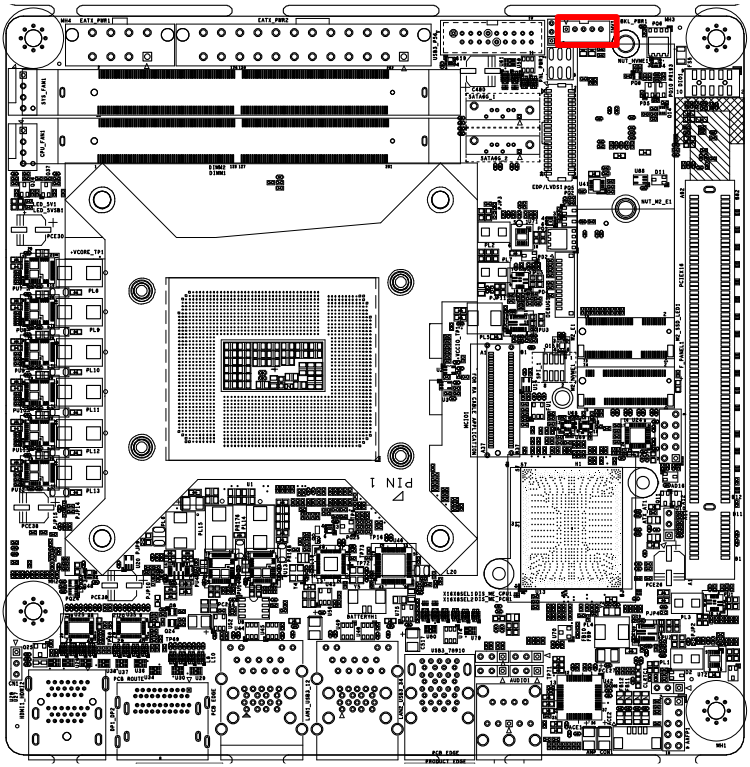


Pin	Signal	Pin	Signal
1	A_LINE2_L	2	LINE2-JD
3	A_JD_FRONT	4	(kill pin)
5	A_LINE2_R	6	MIC2-JD
7	A_MIC2_R	8	NC

Pin	Signal	Pin	Signal
9	GND	10	A_MIC2_L

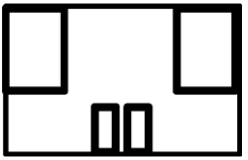
2.5.9 Inverter (INV1)

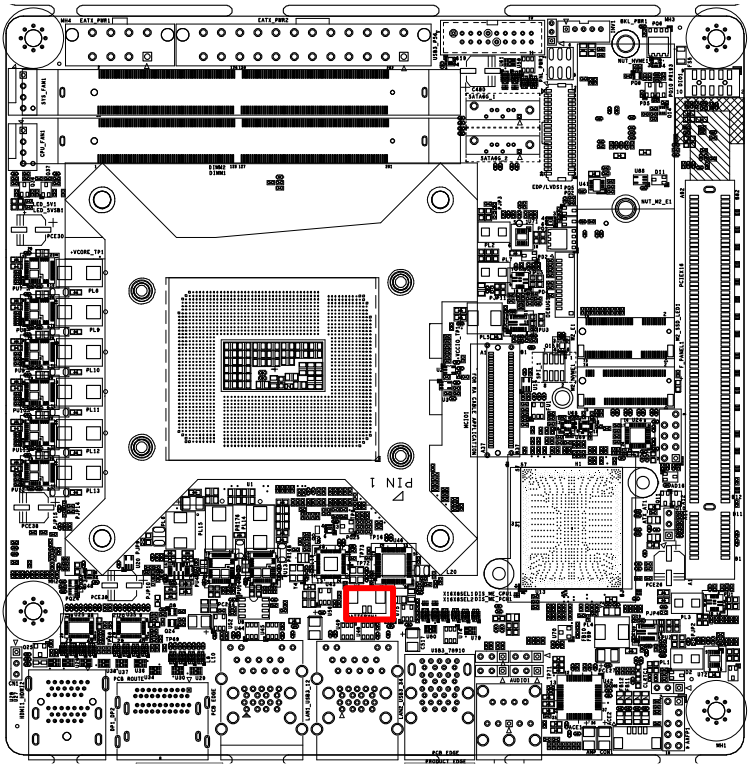




Pin	Signal
1	+BLVCC
2	PWM_OUT
3	GND
4	GND
5	ENABKL

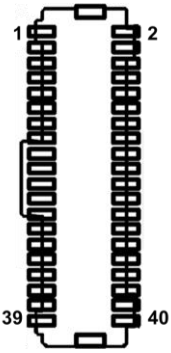
2.5.10 Battery Holder (BATTERYH1)

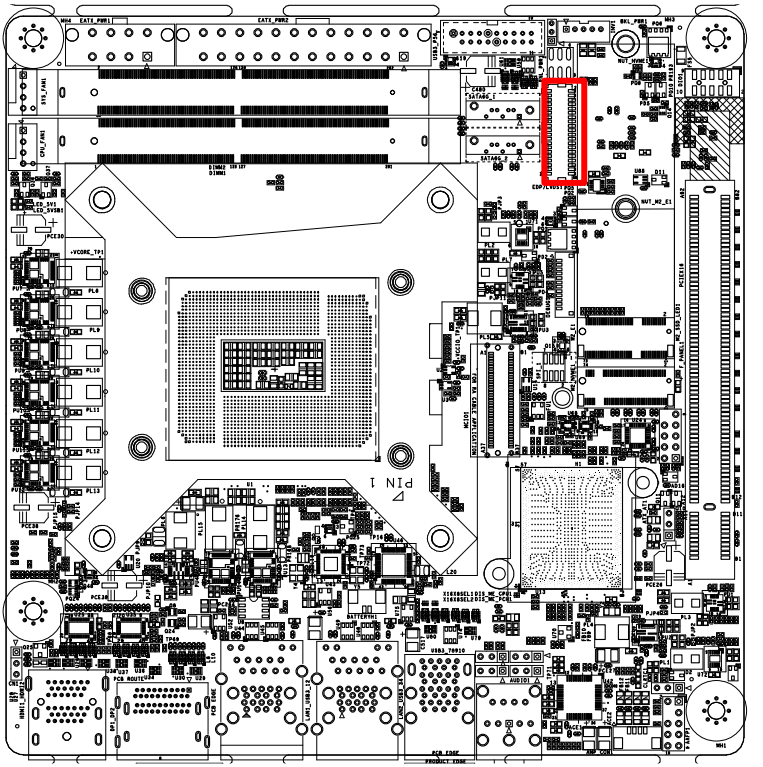




Pin	Signal
1	+BAT
2	GND

2.5.11 LVDS / eDP Connector (eDP/LVDS1)





Pin	Signal	Pin	Signal
1	+V_PANEL	2	+V_PANEL
3	ENABKL	4	PWM_OUT

Pin	Signal	Pin	Signal
5	+BLVCC	6	GND
7	+BLVCC	8	+BLVCC
9	GND	10	GND
11	LVDS0_D0-	12	LVDS1_D0-
13	LVDS0_D0+	14	LVDS1_D0+
15	GND	16	GND
17	LVDS0_D1-	18	LVDS1_D1-
19	LVDS0_D1+	20	LVDS1_D1+
21	GND	22	GND
23	LVDS0_D2-	24	LVDS1_D2-
25	LVDS0_D2+	26	LVDS1_D2+
27	GND	28	GND
29	LVDS0_CLK-	30	LVDS1_CLK-
31	LVDS0_CLK+	32	LVDS1_CLK+
33	GND	34	GND
35	LVDS0_D3-	36	LVDS1_D3-
37	LVDS0_D3+	38	LVDS1_D3+
39	SPC1	40	SPD1

CN	LVDS	eDP
31	LVDS0_CLK+	eDP_AUXP
29	LVDS0_CLK–	eDP_AUXN
25	LVDS0_D2+	eDP_TX0P
23	LVDS0_D2–	eDP_TX0N
19	LVDS0_D1+	eDP_TX1P
17	LVDS0_D1–	eDP_TX1N
13	LVDS0_D0+	eDP_HPD

Chapter 3

BIOS Setup

3.1 BIOS Setup Program

Use the BIOS Setup program to configure its parameters. The BIOS screens include navigation keys and brief online help to guide you in using the BIOS Setup program.

Entering BIOS Setup at startup
To enter BIOS Setup at startup:

Press <Del> during the Power-On Self Test (POST). If you do not press <Delete>, POST continues with its routine.

Entering BIOS Setup after POST
To enter BIOS Setup after POST:

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

CAUTION! Using the power button, reset button, or the <Ctrl>+<Alt>+<Del> keys to reboot a running operating system can cause damage to your data or system. Always shut down the system properly from the operating system.

IMPORTANT:

- The default BIOS settings for this motherboard apply to most working conditions and ensures optimal performance. If the system becomes unstable after changing any BIOS settings, load the default settings to regain system stability. Select the option **Restore Defaults** under the Save & Exit Menu. See section **3.7 Save & Exit**.
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.

3.2 BIOS Menu Screen

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

Main - For changing the basic system configuration.

Advanced - For changing the advanced system settings.

Chipset - For viewing and changing chipset settings.

Security - For setting up BIOS security settings.

Boot - For changing the system boot configuration.

Save & Exit - For selecting the exit options and loading default settings.

MEBx - For viewing and changing MEBx settings.

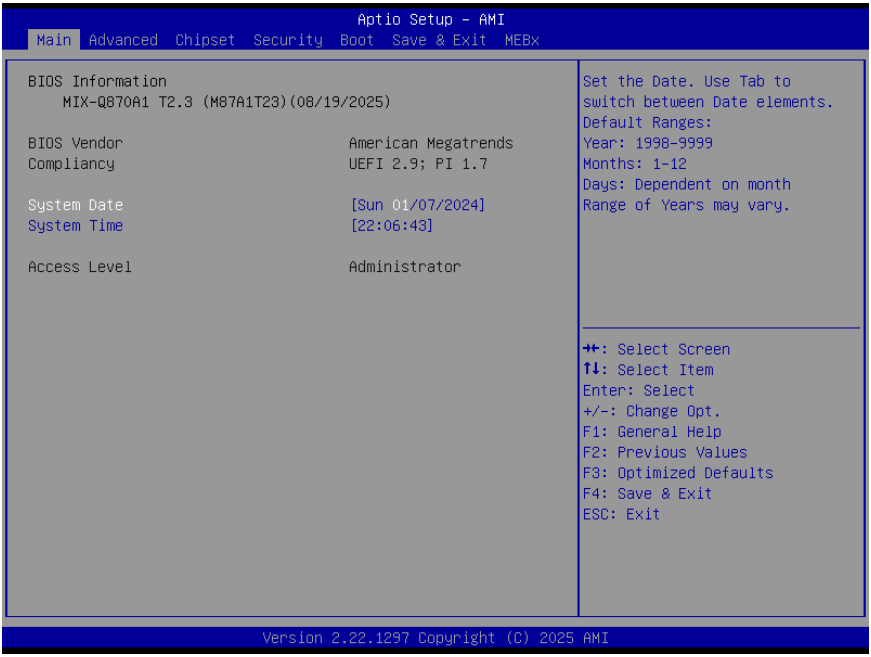
To select an item on the menu bar, press the right or left arrow key on the keyboard until the desired item is highlighted.

The Main menu provides you an overview of the basic system information, and allows you to set the system date, time, language, and security settings.

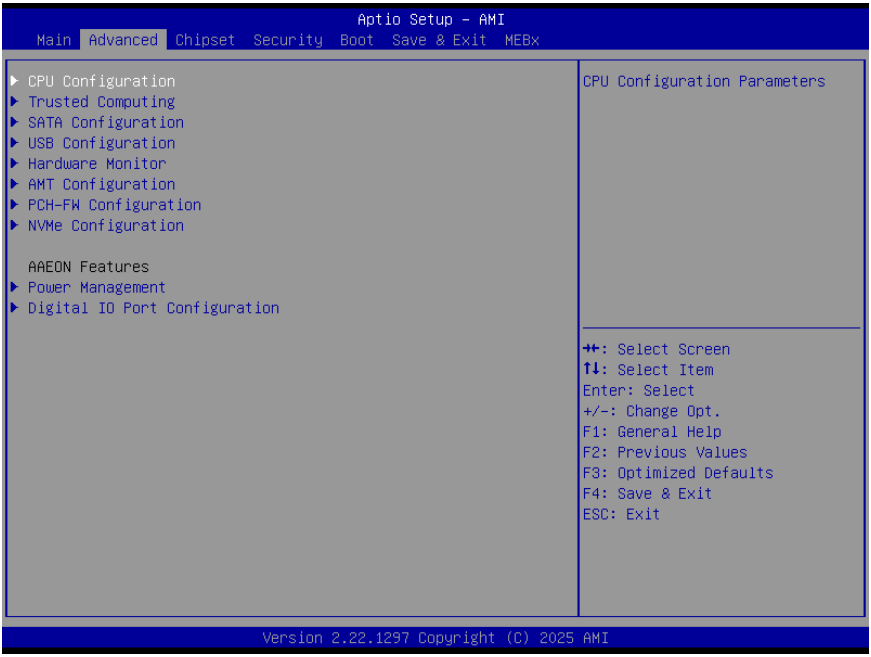
System Date [Day MM/DD/YYYY]: Allows you to set the system date.

System Time [HH:MM:SS]: Allows you to set the system time.

3.3 Setup Submenu: Main Menu



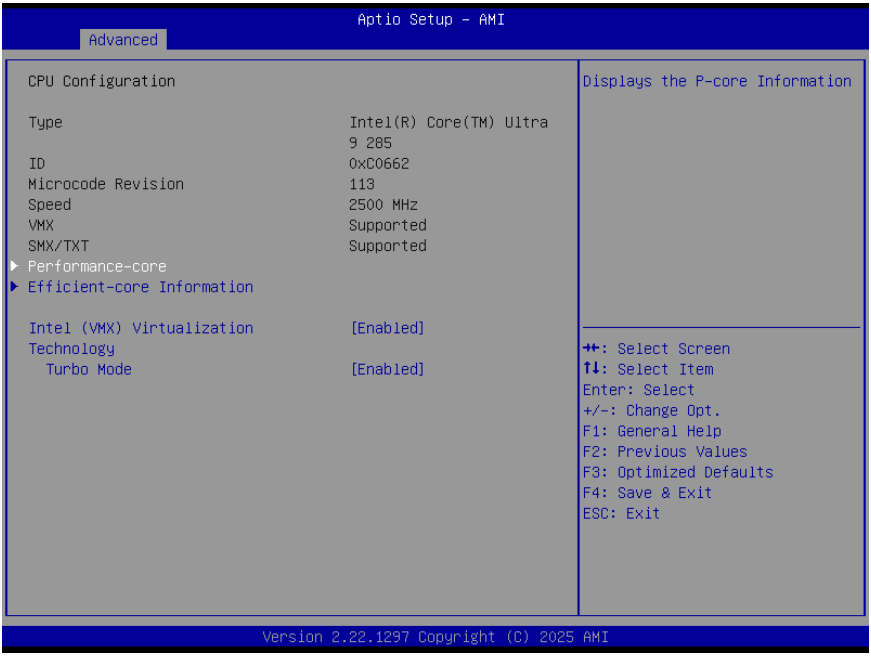
3.4 Setup Submenu: Advanced



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

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

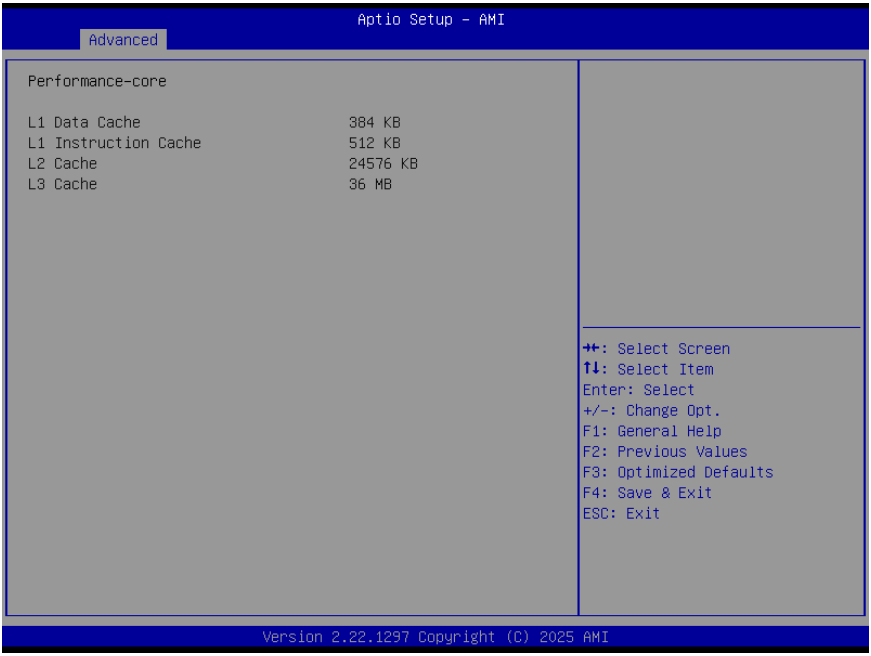
3.4.1 CPU Configuration



The items in this menu show CPU-related information the BIOS automatically detects.

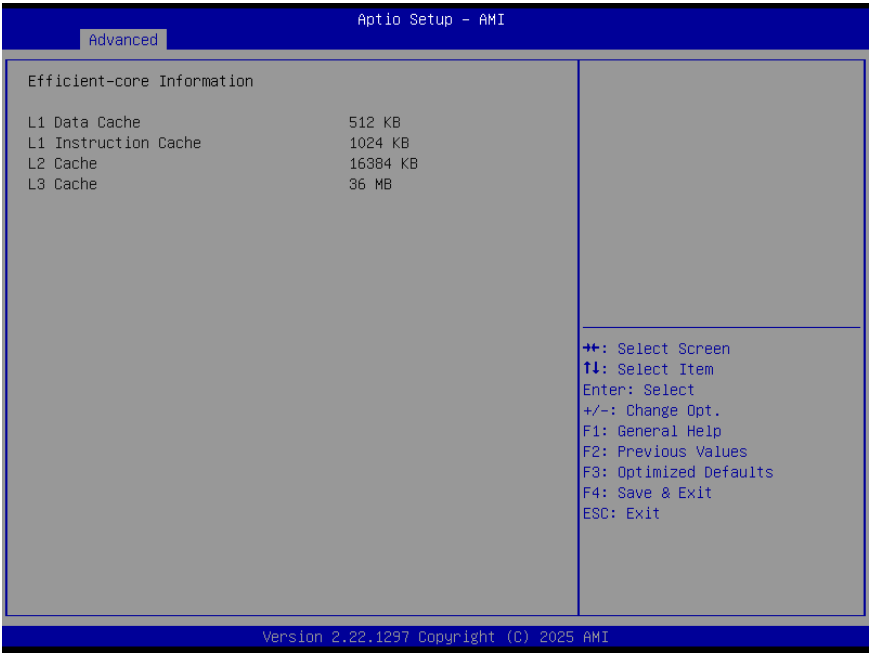
Important: The items shown in the submenu may be different depending on the type of CPU installed.

Performance-core Information

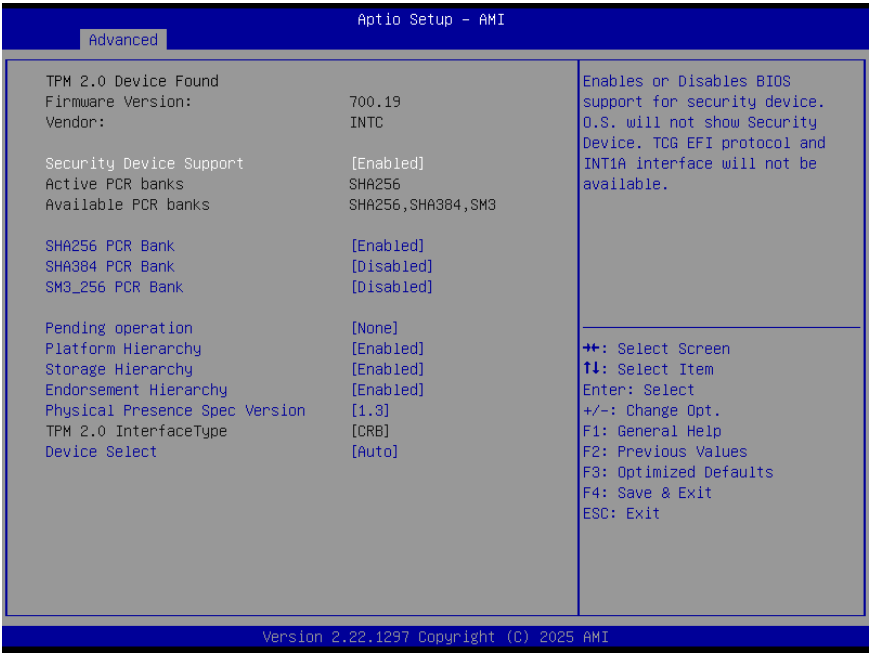


Options Summary	
Intel (VMX) Virtualization Technology	Enabled
	Disabled
Allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.	
Turbo Mode	Enabled
	Disabled
This item allows you to automatically set the CPU cores to run faster than the base operating frequency when it is below the operating power, current and temperature specification limit. Note: Turbo Mode is only available on selected CPU models.	

Efficient-core Information



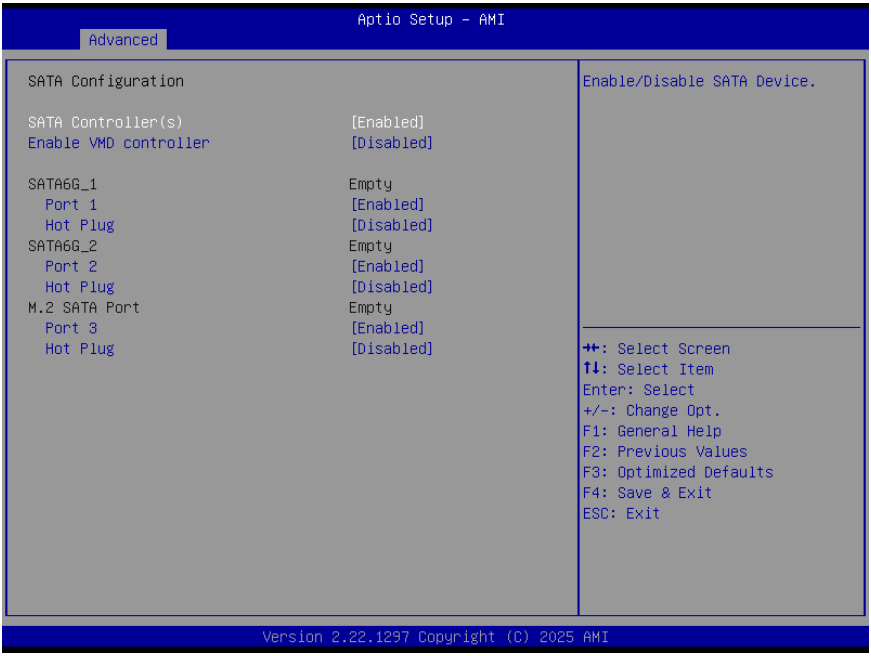
3.4.2 Trusted Computing



Options Summary	
Security Device Support	**Enabled**
	Disabled
Allows you to enable or disable BIOS support for security devices.	
SHA256 PCR Bank	**Enabled**
	Disabled
Enables or disables the SHA256 PCR bank.	
SHA384 PCR Bank	Enabled
	Disabled
Allows you to enable or disable SHA384 PCR Bank.	
SM3_256 PCR Bank	Enabled
	Disabled
Allows you to enable or disable SM3_256 PCR Bank.	
Pending operation	**None**
	TPM Clear
Schedule an Operation for the Security Device. **Note**: Your Computer will reboot during restart in order to change State of Security Device.	

Options Summary	
Platform Hierarchy	Enabled
	Disabled
Enables or disables the Platform Hierarchy in the TPM.	
Storage Hierarchy	Enabled
	Disabled
Allows you to enable or disable Storage Hierarchy	
Endorsement Hierarchy	Enabled
	Disabled
Allows you to enable or disable Endorsement Hierarchy	
Physical Presence Spec Version	1.3
	1.2
Select to tell operating system to support PPI Spec Version 1.2 or 1.3. Some HCK tests might not support 1.3.	
Device Select	Auto
	TPM1.2
	TPM2.0
Allows you to select the TPM device.	

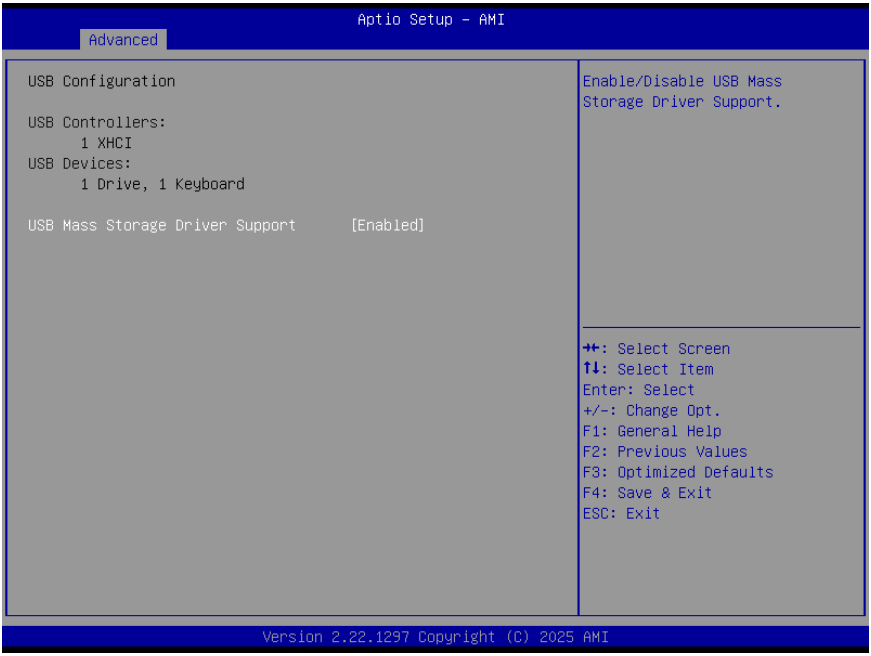
3.4.3 SATA Configuration



Options Summary	
SATA Controller(s)	**Enabled**
	Disabled
Enables or disables the SATA controller. Disabling this option will turn off all SATA ports.	
SATA6G_1 (Port 1)	**Enabled**
	Disabled
Allows you to enable or disable SATA Port 1.	
SATA6G_1 Hot Plug	Enabled
	Disabled
Allows you to enable or disable hot-plug support for SATA Port 1.	
SATA6G_2 (Port 2	**Enabled**
	Disabled
Allows you to enable or disable SATA Port 1.	
SATA6G_2 Hot Plug	Enabled
	Disabled
Allows you to enable or disable hot-plug support for SATA Port 2.	
M.2 SATA Port (Port 3)	Enabled
	Disabled

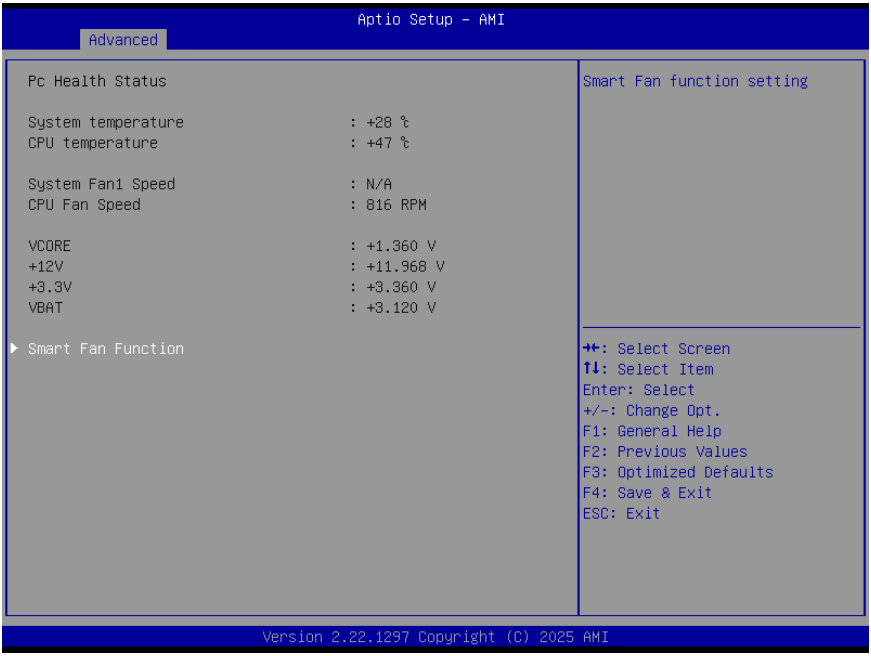
Options Summary	
Allows you to enable or disable SATA Port 3.	
M.2 SATA Port Hot Plug	Enabled
	Disabled
Allows you to enable or disable hot-plug support for SATA Port 3.	

3.4.4 USB Configuration



Options Summary	
USB Mass Storage Driver Support	**Enabled**
	Disabled
Allows you to enable or disable support for USB mass storage devices.	

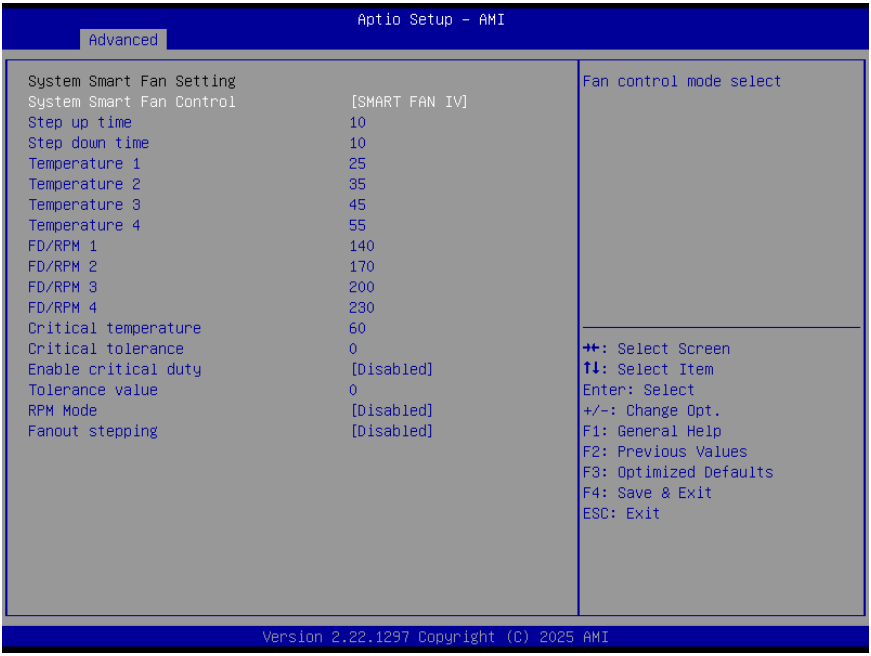
3.4.5 H/W Monitor



3.4.5.1 H/W Monitor: Smart Fan

The items in this menu allow you to configure the smart fan.

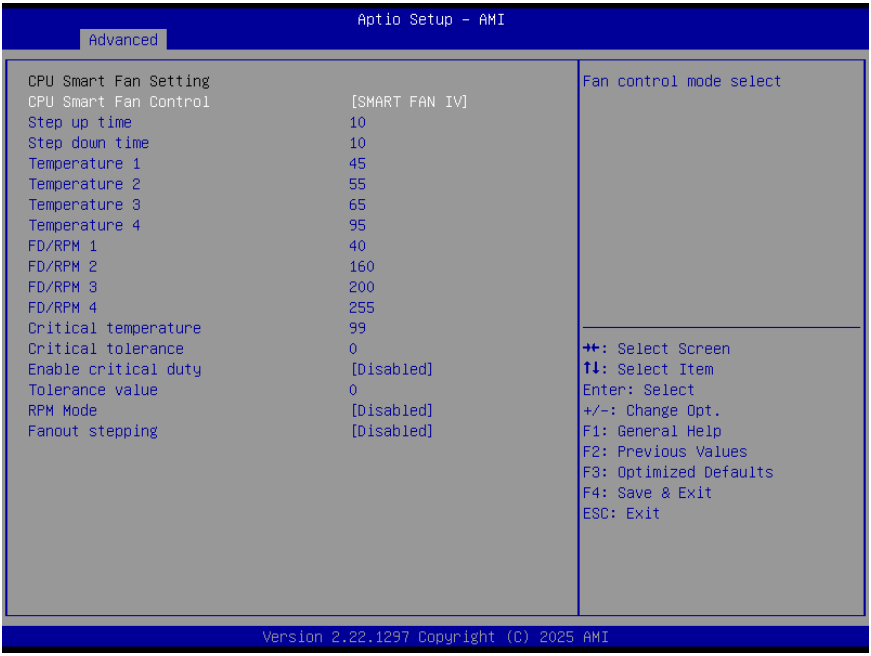
3.4.5.2 H/W Monitor: System Smart Fan



Options Summary	
System Smart Fan Control	SMART FAN IV
Select the fan control mode.	
Step Up Time	10
Step Down Time	10
Temperature 1	25°C FD/RPM 1 140 RPM
Temperature 2	35°C FD/RPM 2 170 RPM
Temperature 3	45°C FD/RPM 3 200 RPM
Temperature 4	55°C FD/RPM 4 230 RPM
Auto fan speed control. Fan speed will follow different temperatures according to the corresponding FD/RPM values.	
Critical Temperature	60°C
Auto fan speed control. Fan speed will follow different temperatures according to the corresponding FD/RPM values.	
Critical Tolerance	0°C
Defines tolerance for critical temperature detection.	

Options Summary	
Enable Critical Duty	Disabled
	Enabled
Enable or disable fan critical duty control.	
Tolerance Value	0
Fan speed tolerance.	
RPM Mode	Disabled
	Enabled
Enable or disable manual RPM mode.	
Fanout Stepping	Disabled
	Enabled
Defines incremental steps for fan speed adjustments.	

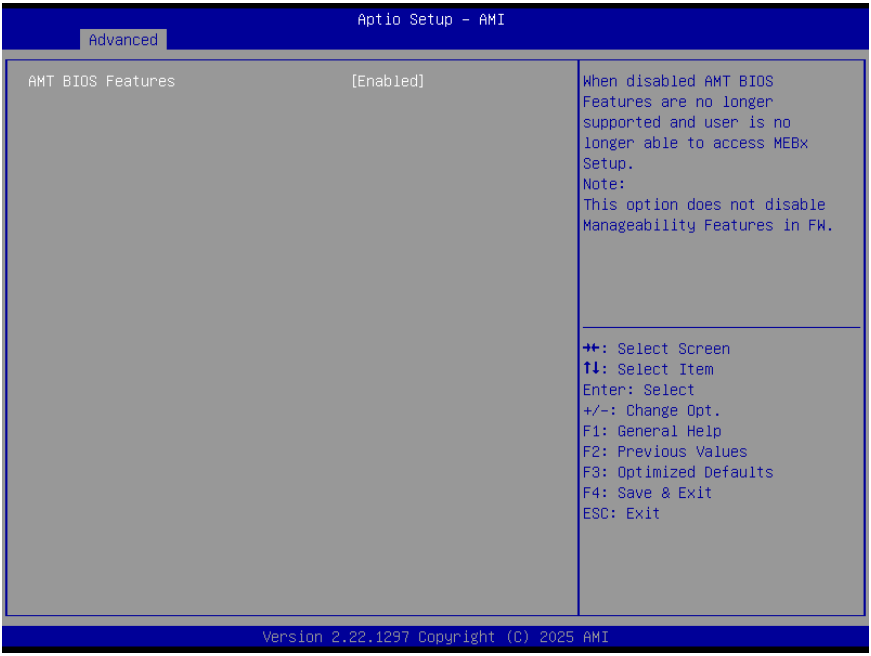
3.4.5.3 H/W Monitor: CPU Smart Fan 1



Options Summary	
CPU Smart Fan Control	SMART FAN IV
Select the fan control mode.	
Step Up Time	10
Step Down Time	10
Temperature 1	45°C FD/RPM 1 40 RPM
Temperature 2	55°C FD/RPM 2 160 RPM
Temperature 3	65°C FD/RPM 3 200 RPM
Temperature 4	95°C FD/RPM 4 255 RPM
Auto fan speed control. Fan speed will follow different temperatures according to the corresponding FD/RPM values.	
Critical Temperature	99°C
Auto fan speed control. Fan speed will follow different temperatures according to the corresponding FD/RPM values.	
Critical Tolerance	0°C
Defines tolerance for critical temperature detection.	
Enable Critical Duty	Disabled
	Enabled

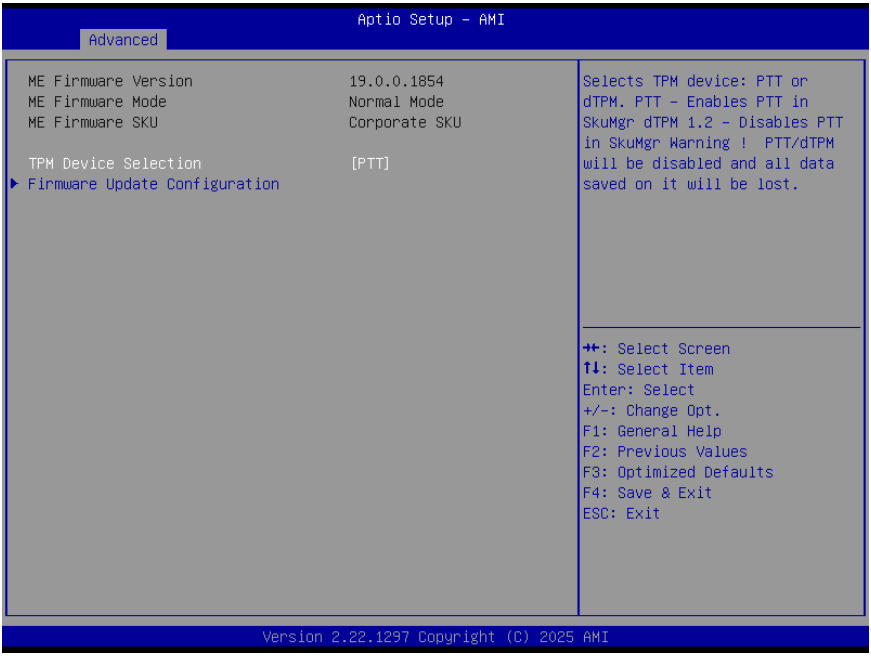
Options Summary	
Enable or disable fan critical duty control.	
Tolerance Value	0
Fan speed tolerance.	
RPM Mode	Disabled
	Enabled
Enable or disable manual RPM mode.	
Fanout Stepping	Disabled
	Enabled
Defines incremental steps for fan speed adjustments.	

3.4.6 AMT BIOS Features



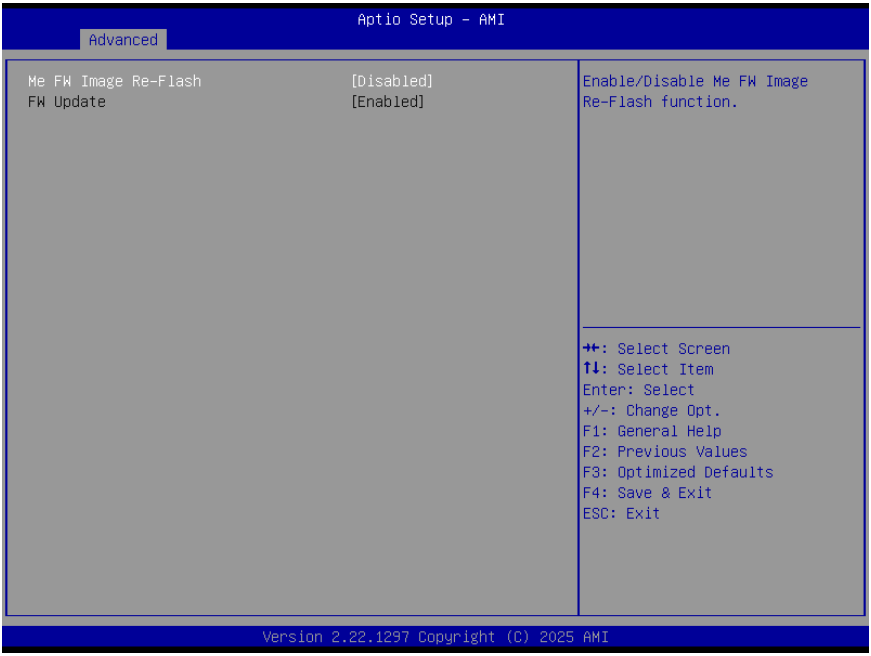
Options Summary	
AMT BIOS Features	Enabled
	Disabled
Allows you to enable or disable Intel Active Management Technology (AMT) features in the BIOS.	

3.4.7 PCH-FW Configuration



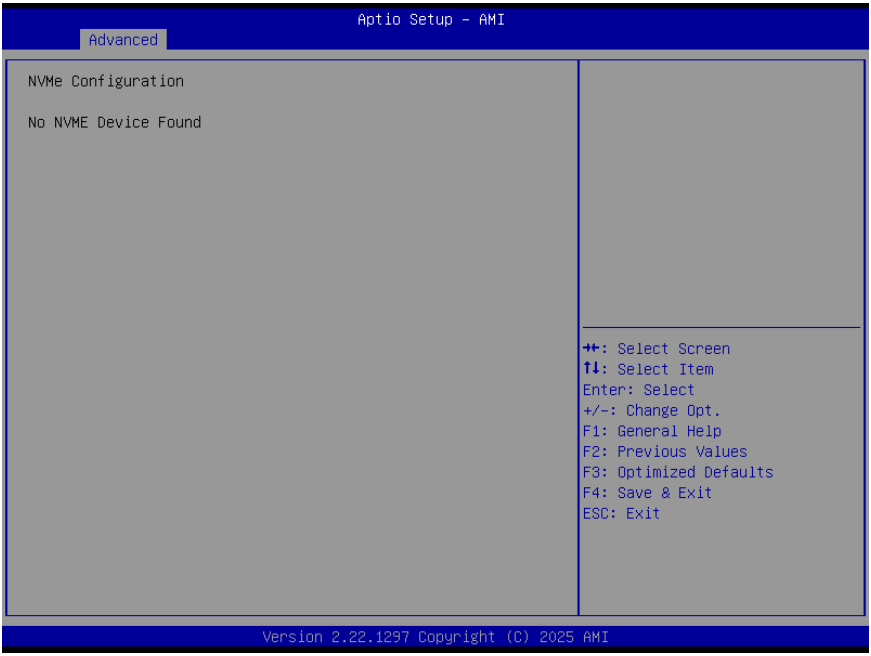
Options Summary	
TPM Device Selection	PTT
	dTPM
[PTT]: Enables PTT in SkuMgr., [dTPM]: Disables PTT in SkuMgr.	

3.4.7.1 Firmware Update Configuration

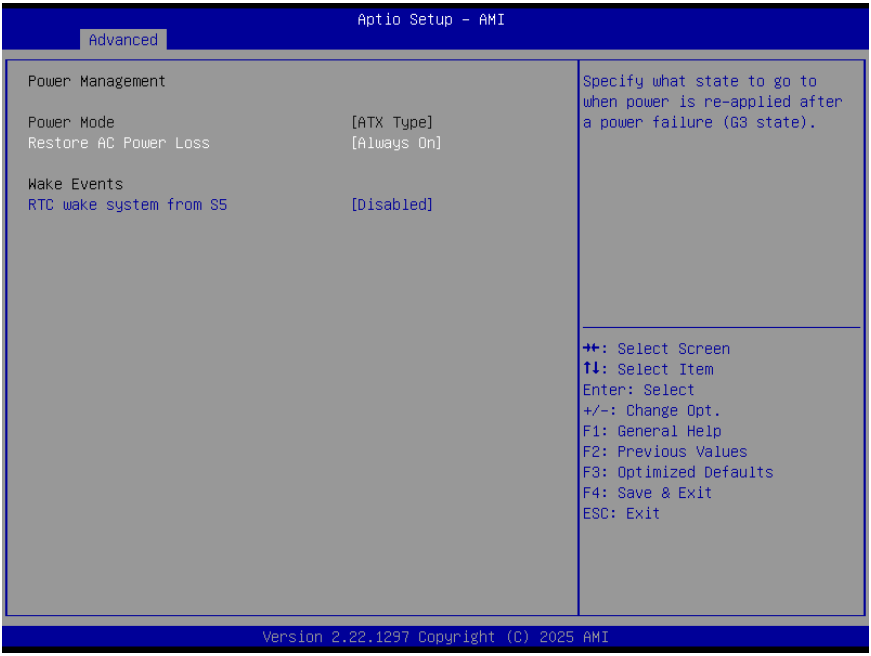


Options Summary	
Me FW Image Re-Flash	Enabled
	Disabled
Enable/Disable Me FW Image Re-Flash function.	
FW Update	Disabled
	Enabled
Enable/Disable ME FW Update function.	

3.4.8 NVMe Configuration

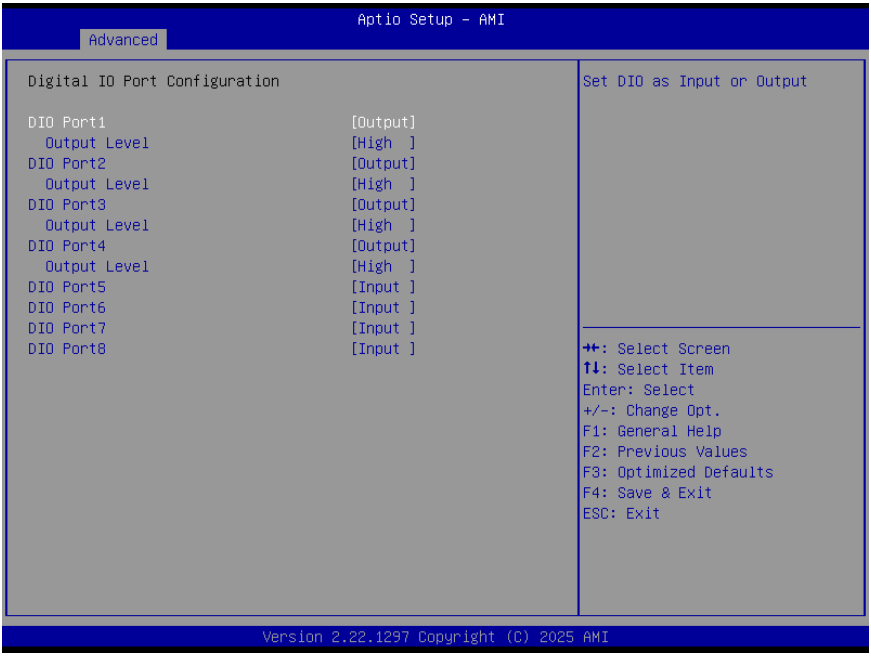


3.4.9 Power Management



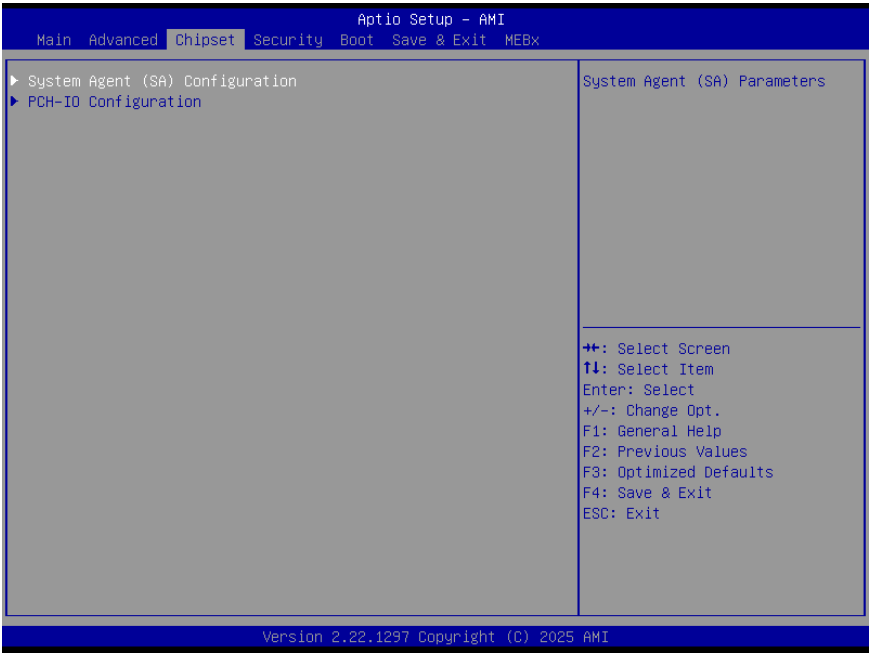
Options Summary	
Power Mode	**ATX Type**
	AT Type
Select system power mode.	
Restore AC Power Loss	Last State
	Always On
	Always Off
Select power state when power is re-applied after a power failure.	
RTC Wake System from S5	Enabled
	Disabled
Allows the system to wake from the real-time clock while in S5 (soft off) state.	

3.4.10 Digital IO Port Configuration



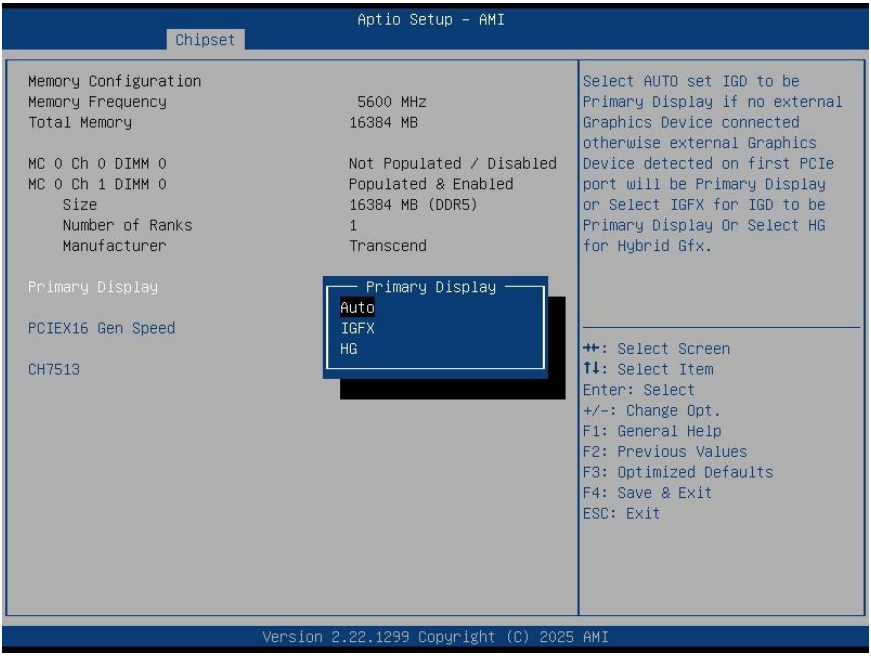
Options Summary	
DIO Port*	Output
	Input
Set DIO as Input or Output	
Output Level	High
	Low
Set output level when DIO pin is output	

3.5 Setup Submenu: Chipset



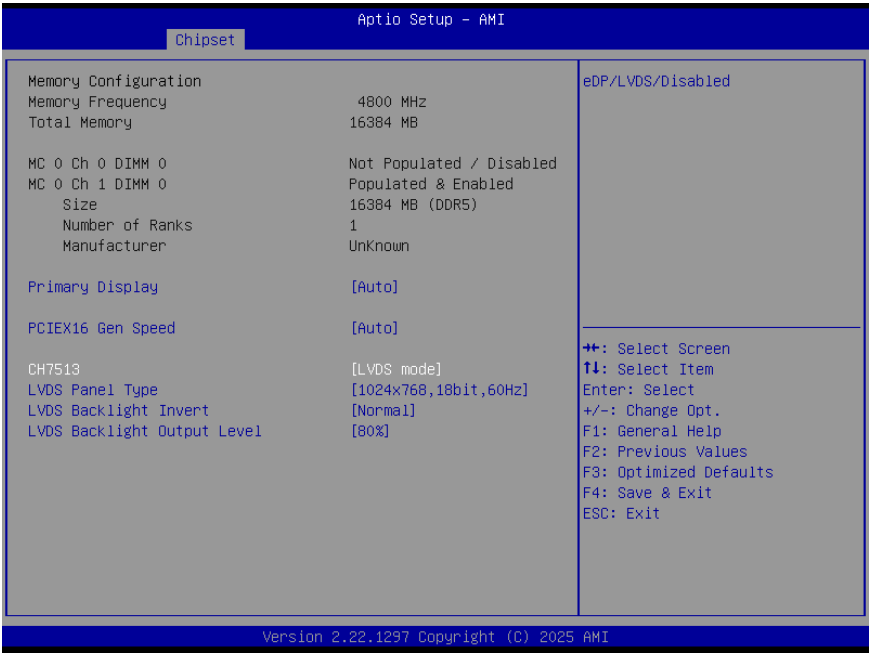
The Chipset menu items allow you to change the settings for the chipset.

3.5.1 System Agent (SA) Configuration



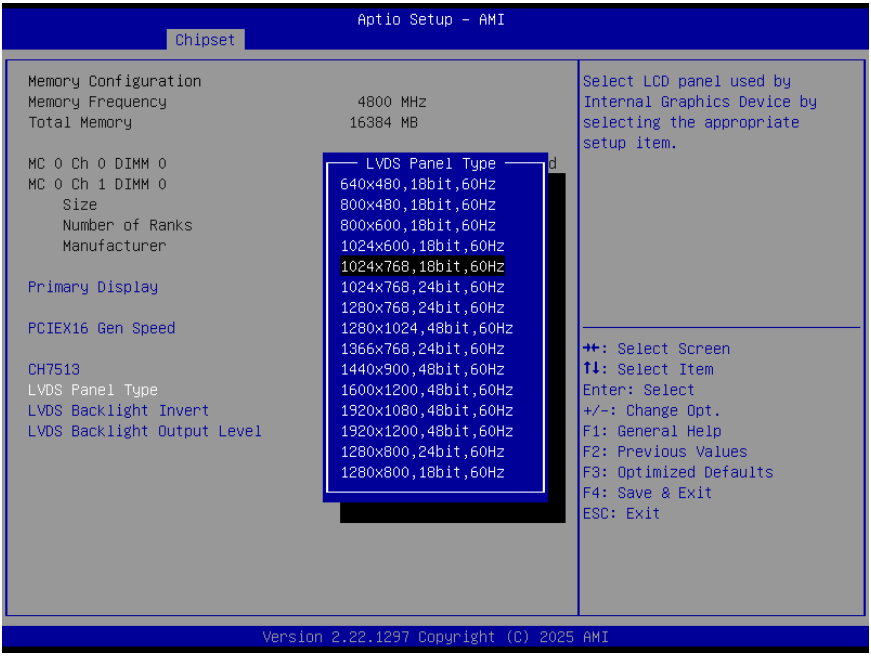
Options Summary	
Primary Display	Auto
	IGFX
	HG
Allows selection of the primary display device.	

3.5.1.1 CH7513



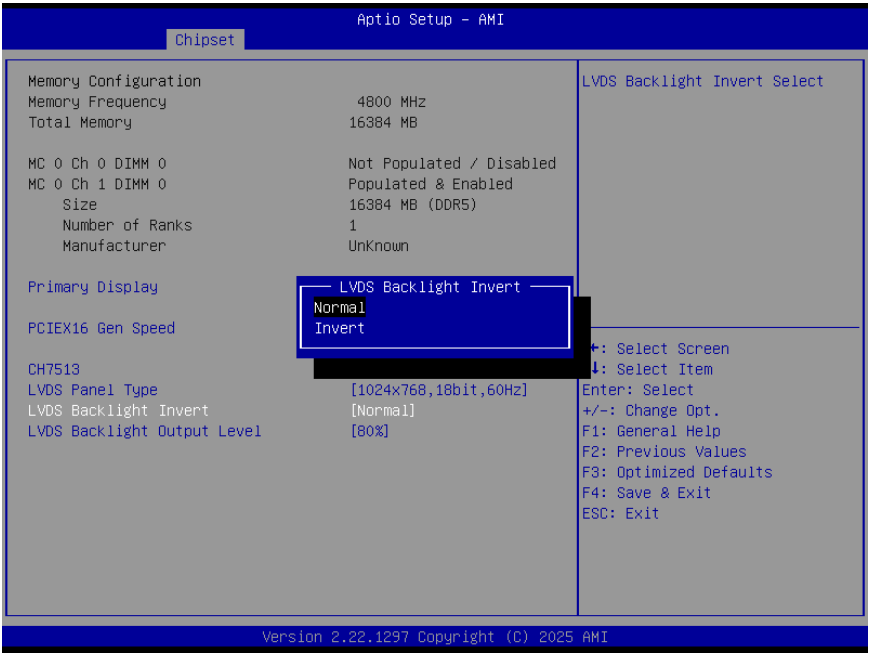
Options Summary	
CH7513	Disabled
	eDP mode
	LVDS mode
Allows enabling or disabling the CH7513 display controller.	

3.5.1.2 LVDS Panel Type



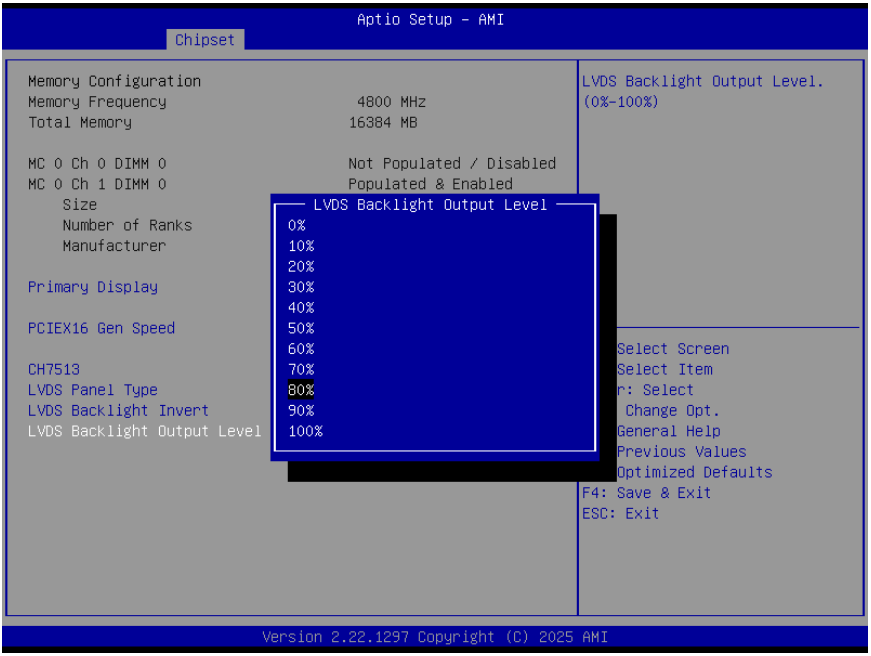
Options Summary	
LVDS Panel Type	640 × 480, 18-bit, 60Hz
	800 × 480, 18-bit, 60Hz
	800 × 600, 18-bit, 60Hz
	1024 × 600, 18-bit, 60Hz
	1024 × 768, 18-bit, 60Hz
	1024 × 768, 24-bit, 60Hz
	1280 × 768, 24-bit, 60Hz
	1280 × 1024, 48-bit, 60Hz
	1366 × 768, 24-bit, 60Hz
	1440 × 900, 48-bit, 60Hz
	1600 × 1200, 48-bit, 60Hz
	1920 × 1080, 48-bit, 60Hz
	1920 × 1200, 48-bit, 60Hz
	1280 × 800, 24-bit, 60Hz
	1280 × 800, 18-bit, 60Hz
Sets the output level for the LVDS backlight control.	

3.5.1.3 LVDS Backlight Invert



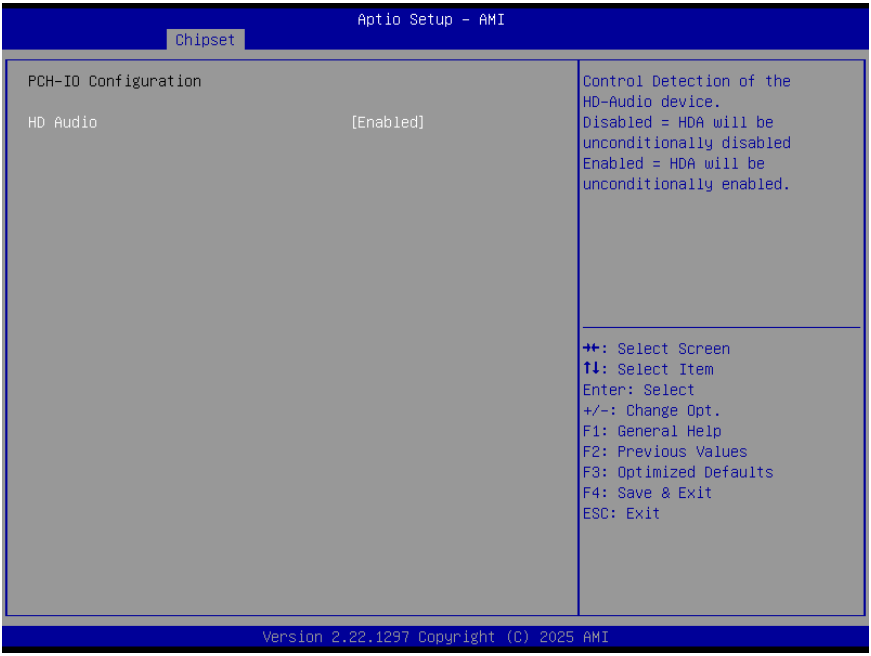
Options Summary	
LVDS Backlight Invert	Normal
	Invert
Select backlight control signal type.	

3.5.1.4 LVDS Backlight Output Level



Options Summary	
LVDS Backlight Output Level	0%
	10%
	20%
	30%
	40%
	50%
	60%
	70%
	80%
	90%
	100%
Select backlight control level	

3.5.2 PCH-IO Configuration



Options Summary	
HD Audio	Disabled
	Enabled
Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled. Enabled = HDA will be unconditionally enabled.	

3.6 Setup Submenu: Security

Administrator Password

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

To set an administrator password:

1 Select the **Administrator Password** item and press <**Enter**>.

2 From the **Create New Password** box, key in a password, then press <**Enter**>.

3. Confirm the password when prompted.

To change an administrator password:

1 Select the **Administrator Password** item and press <**Enter**>.

2 From the **Enter Current Password** box, key in the current password, then press <**Enter**>.

3 From the **Create New Password** box, key in a new password, then press <**Enter**>

4 Confirm the password when prompted.

To clear the administrator password, follow the same steps as in changing an administrator password, but press <**Enter**> when prompted to create/confirm the password. After you clear the password, the **Administrator Pas**sword item on top of the screen shows **Not Installed.**

User Password

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

To set a user password:

1 Select the **User Password** item and press <**Enter**>.

2 From the **Create New Password** box, key in a password, then press <**Enter**>.

3. Confirm the password when prompted.

To change a user password:

1 Select the **User Password** item and press <**Enter**>.

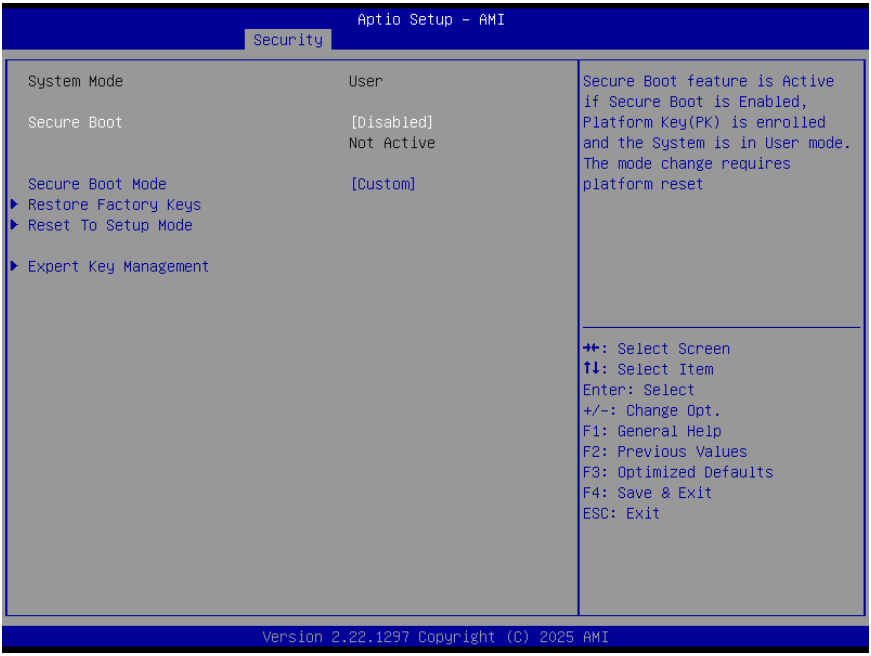
2 From the **Enter Current Password** box, key in the current password, then press <**Enter**>.

3 From the **Create New Password** box, key in a new password, then press <**Enter**>

4 Confirm the password when prompted.

To clear the user password, follow the same steps as in changing a user password, but press <**Enter**> when prompted to create/confirm the password. After you clear the password, the **User Password** item on top of the screen shows **Not Installed.**

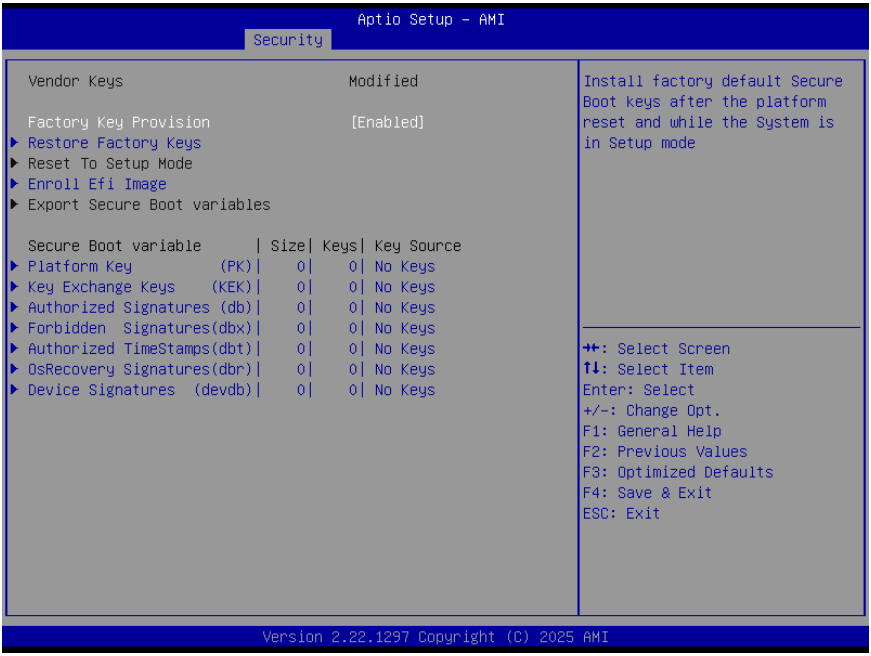
3.6.1 Secure Boot



Options Summary	
Secure Boot	Disabled
	Enabled
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	
Secure Boot Status	Not Active
	Active
Displays the current Secure Boot state.	
Secure Boot Mode	Custom
	Standard
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	
Install Factory Defaults	Yes
	No
Force System to User Mode. Install factory default Secure Boot key databases	
Reset to Setup Mode	Yes
	No

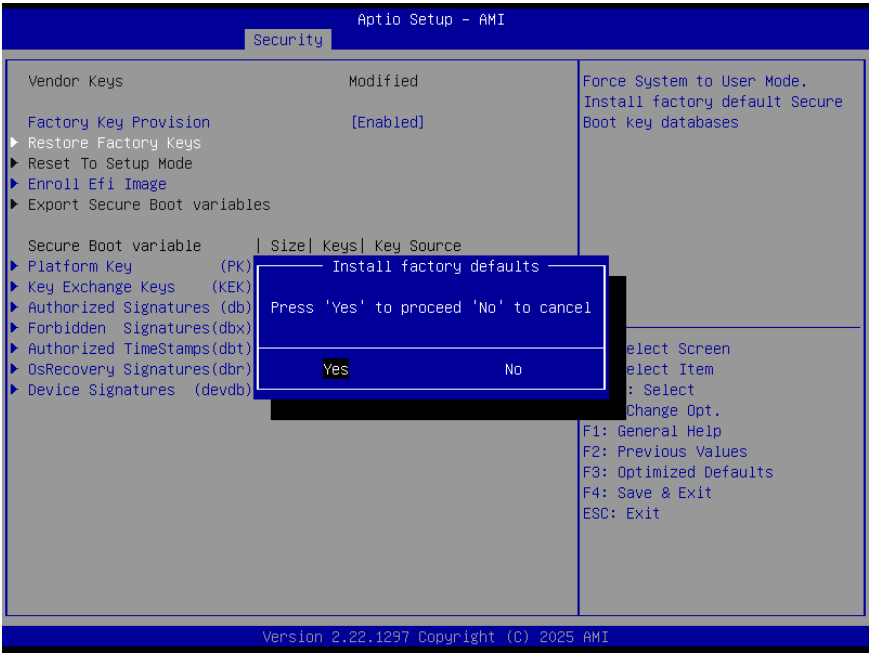
Options Summary
Delete all Secure Boot key databases from NVRAM

3.6.2 Key Management



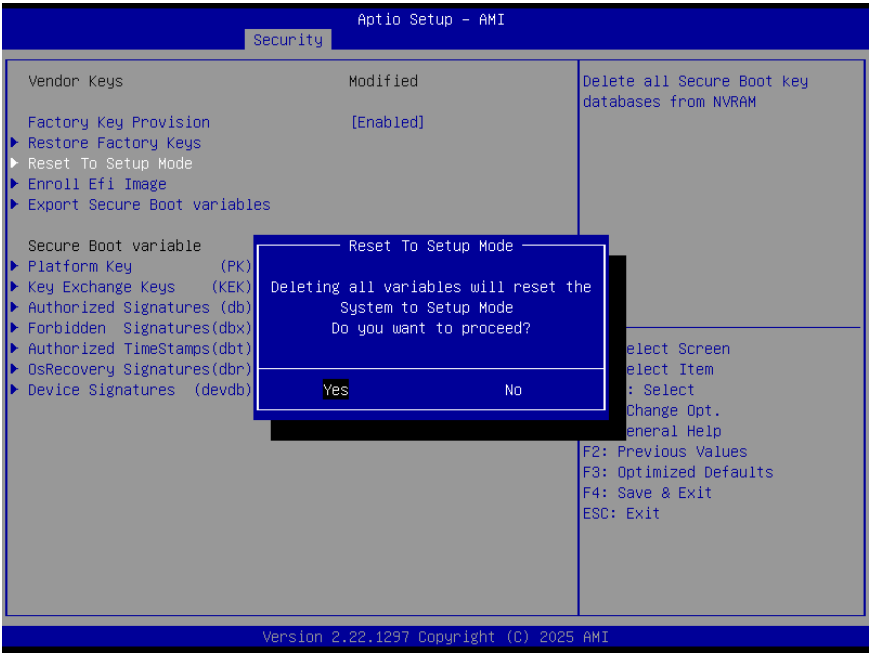
Options Summary	
Factory Key Provision	Enabled
	Disabled
Allows you to enable or disable factory key provisioning for Secure Boot.	

3.6.3 Restore Factory Keys



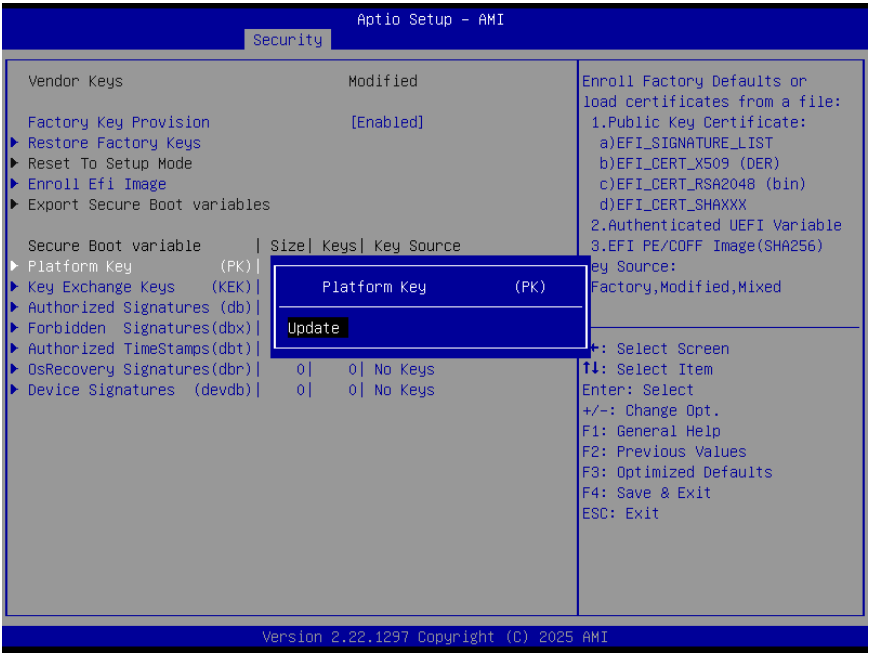
Options Summary	
Install factory defaults	Yes
	No
Force System to User Mode. Install factory default Secure Boot key databases.	

3.6.4 Reset To Setup Mode



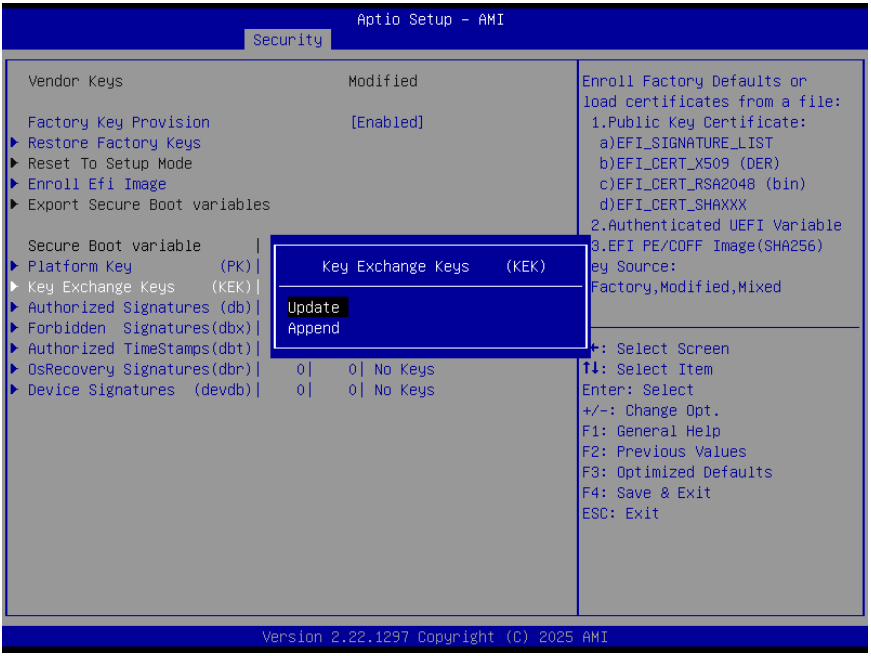
Options Summary	
Install factory defaults	Yes
	No
Delete all Secure Boot key databases from NVRAM.	
Enroll EFI Image	
Allow Efi image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db)	
Export Secure Boot Variables	
Save NVRAM content of Secure Boot variable to a file.	

3.6.5 Platform Key (PK)



Options Summary	
Platform Key (PK)	Update
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	

3.6.6 Key Exchange Keys



Options Summary	
Key Exchange Keys (KEK)	Update
	Append

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

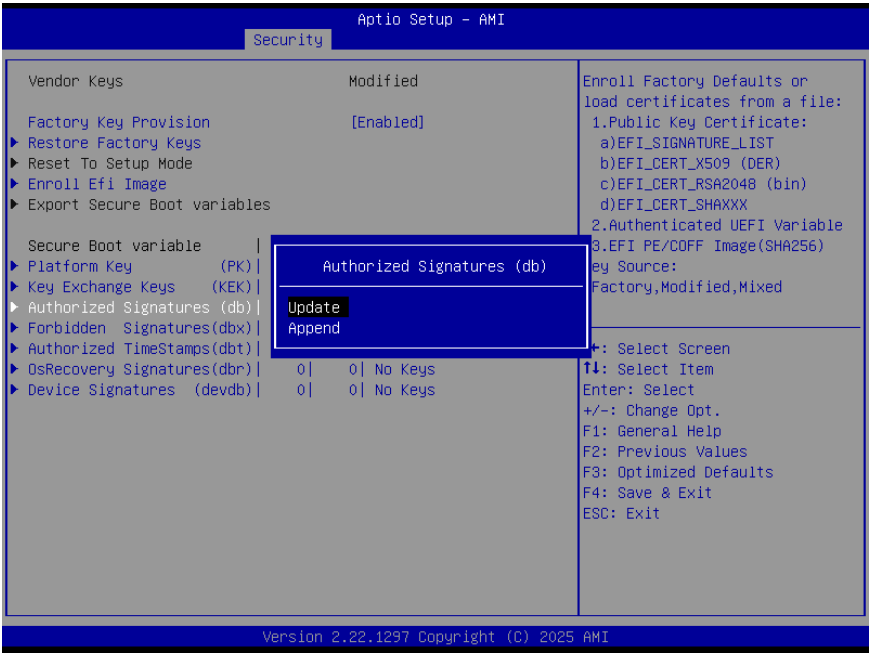
a) EFI_SIGNATURE_LIST
b) EFI_CERT_X509 (DER)
c) EFI_CERT_RSA2048 (bin)
d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3.EFI PE/COFF Image (SHA256)

Key Source: Factory, Modified, Mixed

3.6.7 Authorized Signatures



Options Summary	
Authorized Signatures (db)	Update
	Append

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

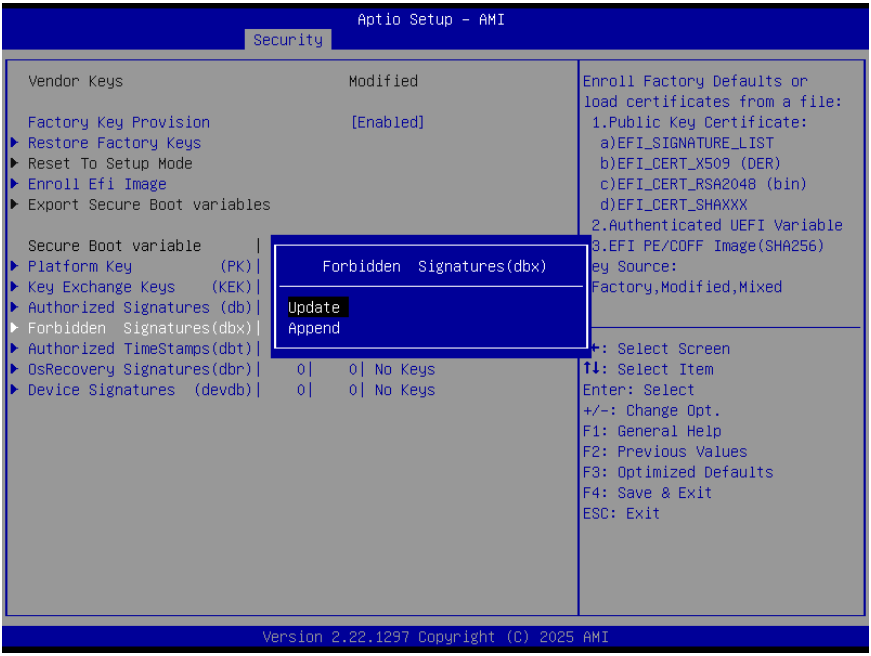
a) EFI_SIGNATURE_LIST
b) EFI_CERT_X509 (DER)
c) EFI_CERT_RSA2048 (bin)
d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3.EFI PE/COFF Image (SHA256)

Key Source: Factory, Modified, Mixed

3.6.8 Forbidden Signatures



Options Summary	
Forbidden Signatures (dbx)	Update
	Append

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

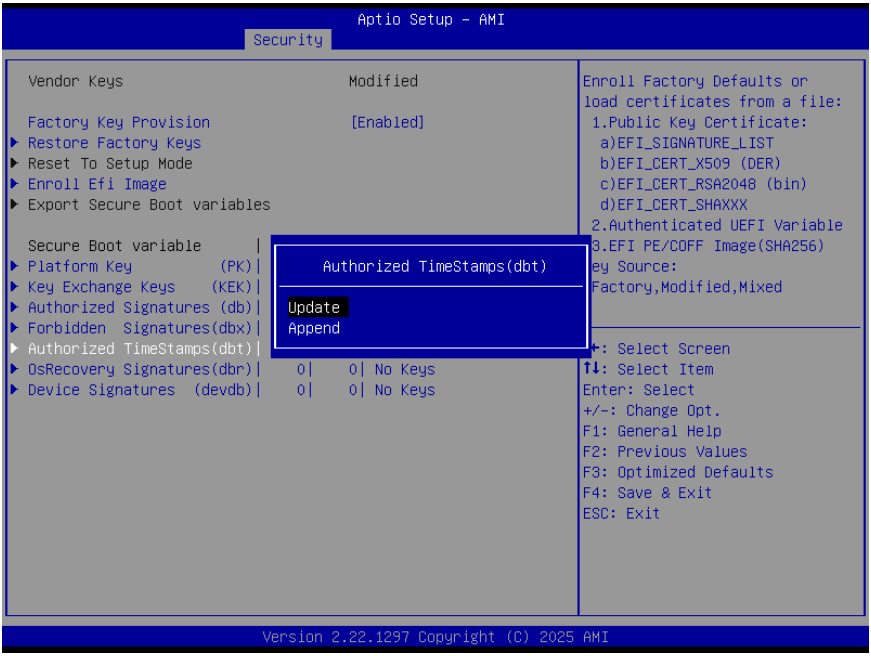
a) EFI_SIGNATURE_LIST
b) EFI_CERT_X509 (DER)
c) EFI_CERT_RSA2048 (bin)
d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3.EFI PE/COFF Image (SHA256)

Key Source: Factory, Modified, Mixed

3.6.9 Authorized TimeStamps



Options Summary	
Authorized TimeStamps (dbt)	Update
	Append

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

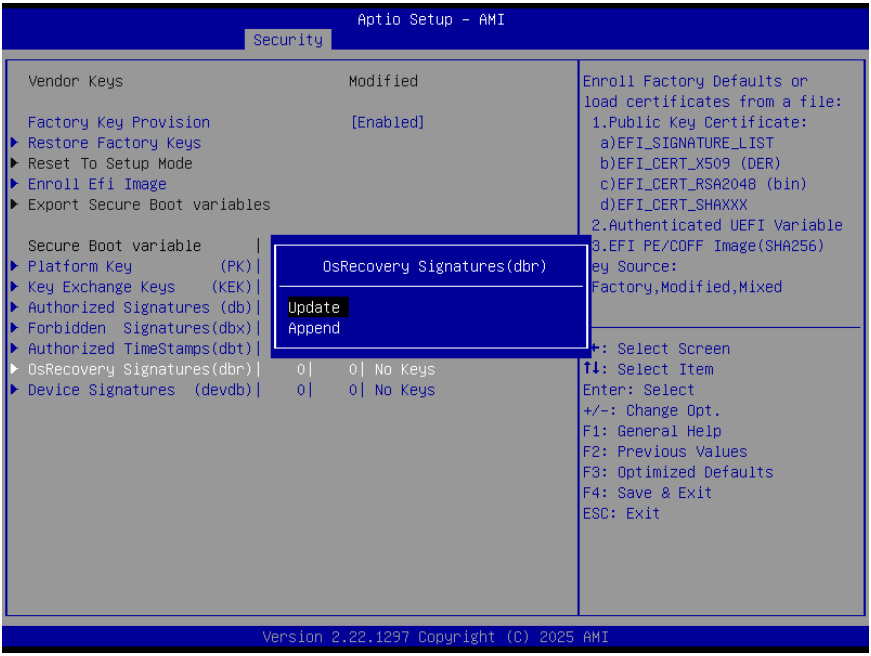
a) EFI_SIGNATURE_LIST
b) EFI_CERT_X509 (DER)
c) EFI_CERT_RSA2048 (bin)
d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3.EFI PE/COFF Image (SHA256)

Key Source: Factory, Modified, Mixed

3.6.10 OsRecovery Signatures



Options Summary	
OsRecovery Signatures (dbr)	Update
	Append

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

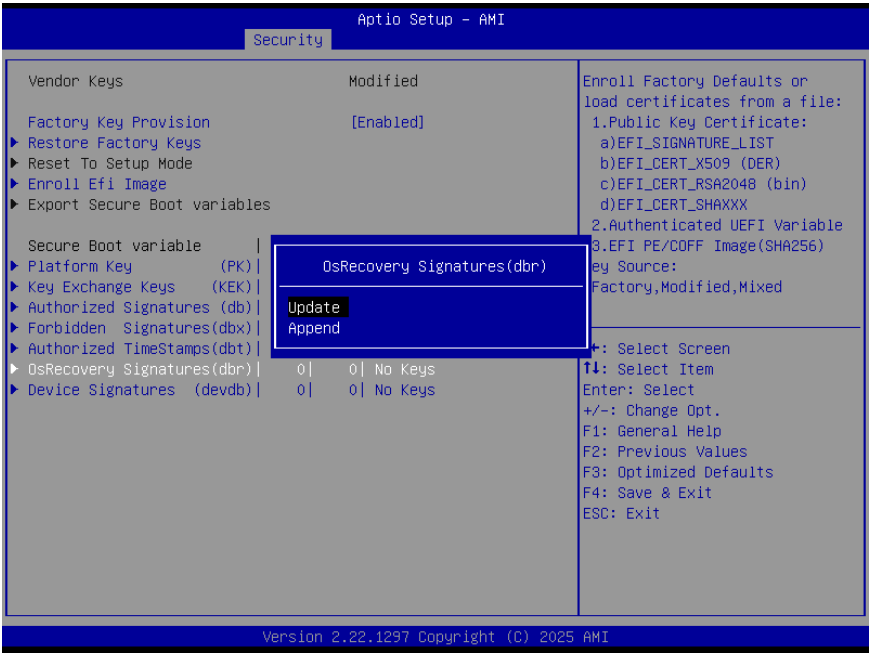
a) EFI_SIGNATURE_LIST
b) EFI_CERT_X509 (DER)
c) EFI_CERT_RSA2048 (bin)
d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3.EFI PE/COFF Image (SHA256)

Key Source: Factory, Modified, Mixed

3.6.11 Device Signatures



Options Summary	
Device Signatures (devdb)	Update
	Append

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

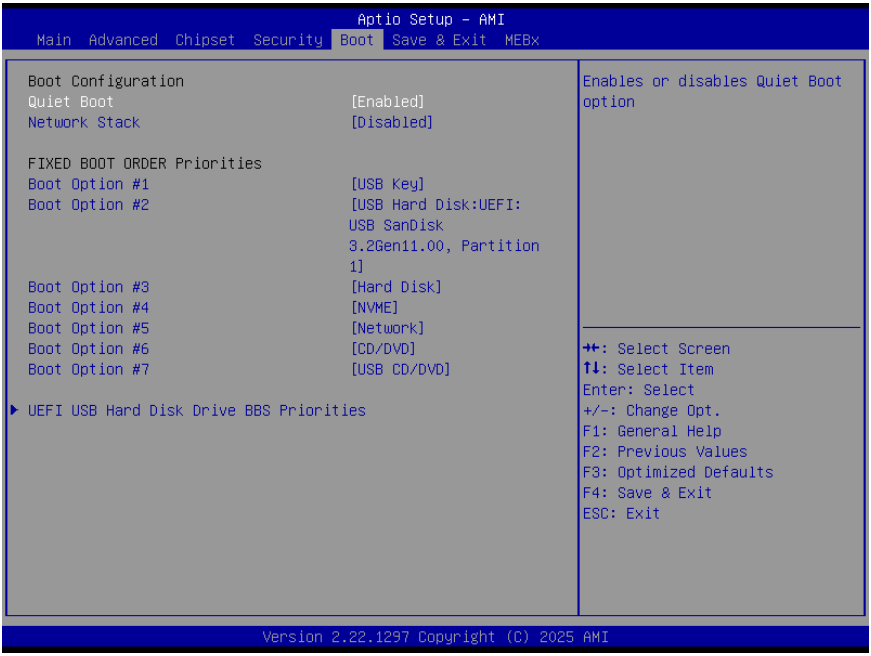
a) EFI_SIGNATURE_LIST
b) EFI_CERT_X509 (DER)
c) EFI_CERT_RSA2048 (bin)
d) EFI_CERT_SHAXXX

2. Authenticated UEFI Variable

3.EFI PE/COFF Image (SHA256)

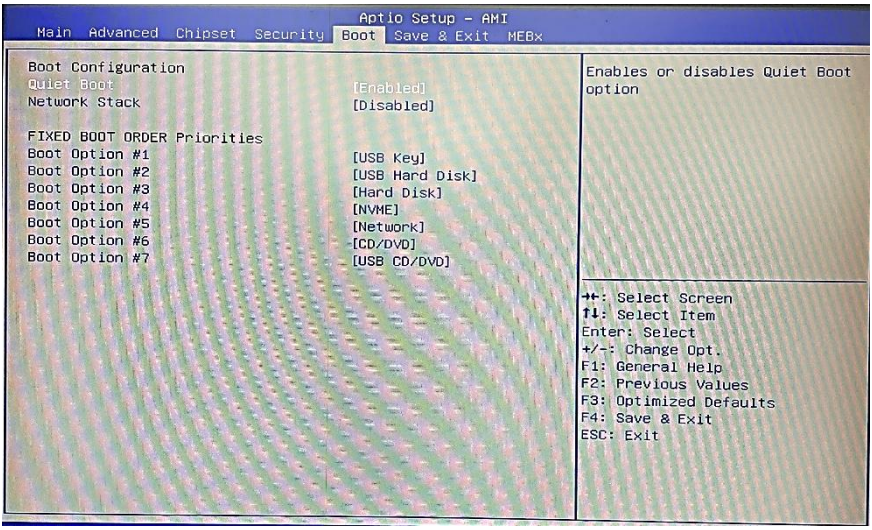
Key Source: Factory, Modified, Mixed

3.7 Setup Submenu: Boot

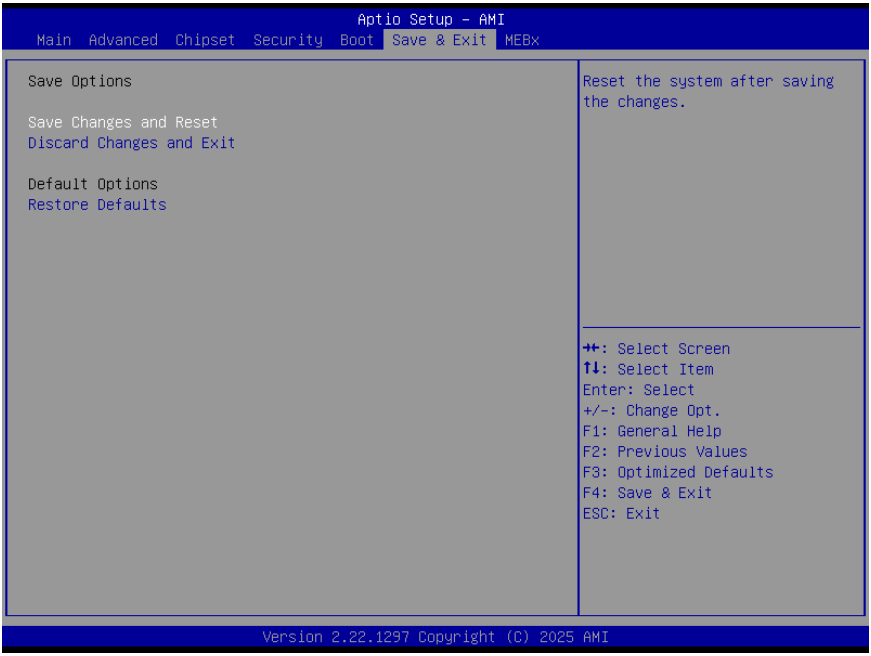


Options Summary	
Quiet Boot	Disabled
	Enabled
Enable or Disable Quiet Boot option.	
Network Stack	**Disabled**
	Enabled
Enable/Disable UEFI Network Stack.	
FIXED BOOT ORDER Priorities	
Sets the system boot order.	

3.7.1 BBS Priorities



3.8 Setup Submenu: Save & Exit



Once you are finished making your selections, choose this option from the **Save & Exit** menu to ensure the values you selected are saved. When you select this option, a confirmation window appears. Select **Yes** to save changes and reset.

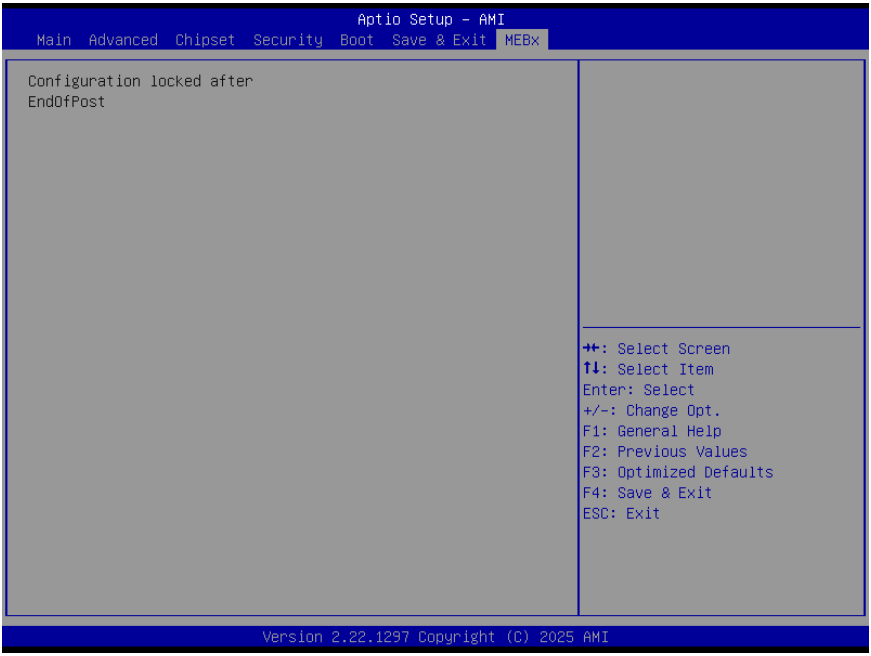
Discard Changes and Exit

This option allows you to exit the Setup program without saving your changes. When you select this option or if you press <**Esc**>, a confirmation window appears. Select **Yes** to discard changes and exit.

Restore Defaults

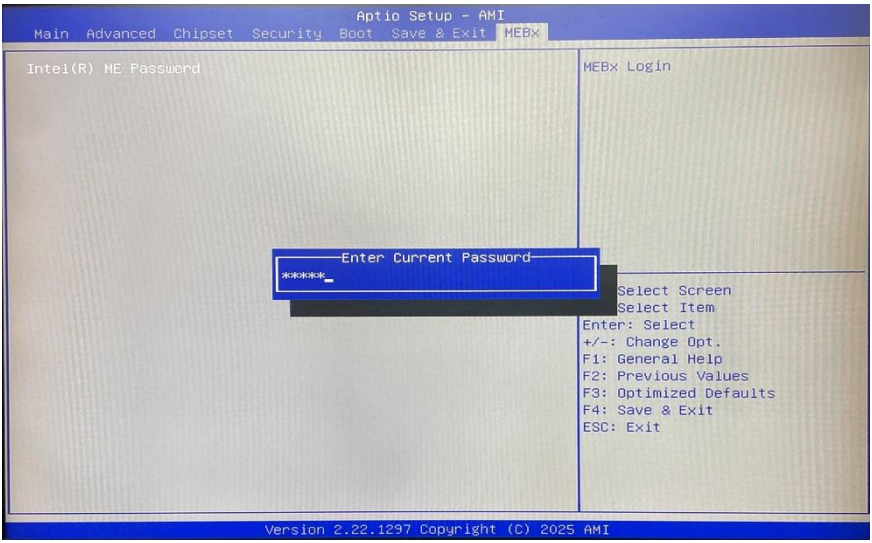
Save or restore User Defaults to all setup options.

3.9 Setup Submenu: MEBx



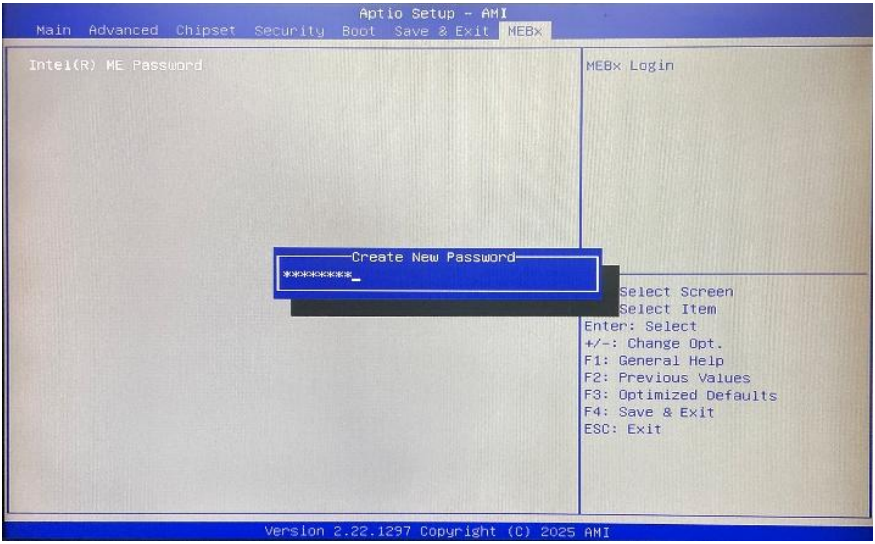
The MEBx menu items allow you to view and change MEBx configurations.

3.9.1 Intel(R) ME Password



The default password is **admin**. The IT administrator must change the default password when entering the Intel® MEBx configuration menu for the first time so that any feature can be used.

3.9.2 Create New Password



Press **<Enter>** to change the default password (**admin**).

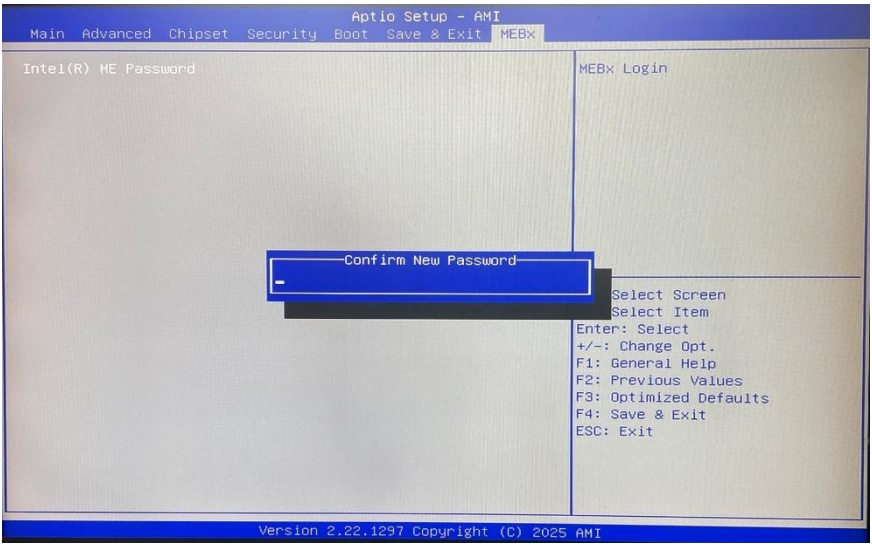
Password Requirements:

- Length: 8–32 characters
- Must include:
  - At least one digit (0–9)
  - At least one special character (e.g., !, $, ;) — except :, ,, "
  - At least one uppercase (A–Z) and one lowercase (a–z) letter
- Valid but not counted toward complexity: underscore _ and whitespace
- Limitations may occur with non-US keyboard layouts, which can affect remote connectivity.

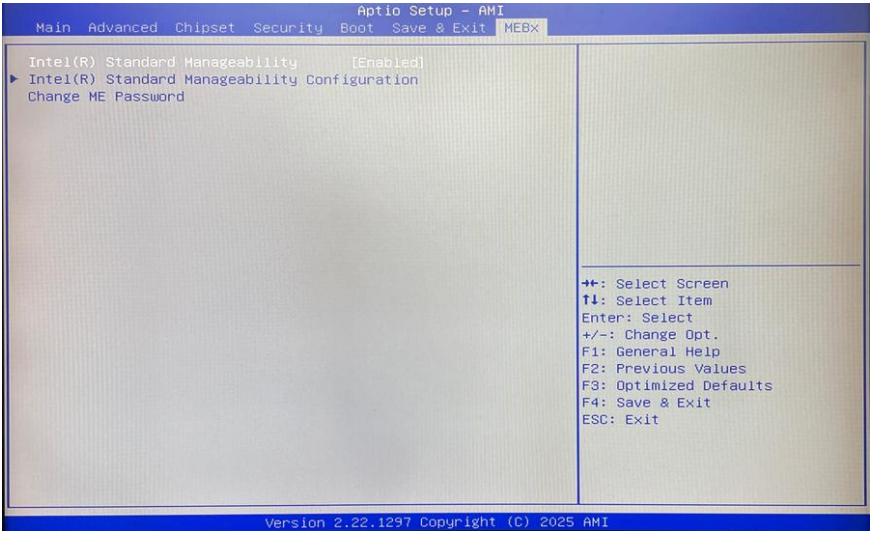
Notes:

- The MEBx UI accepts a maximum of 32 characters; the last character entered replaces the 32nd character.
- To reset the password to the default (**admin**), shut down the system, disconnect AC and DC power, and perform an RTC reset.

Once new password has been set, you will be required to confirm it by inputting again:

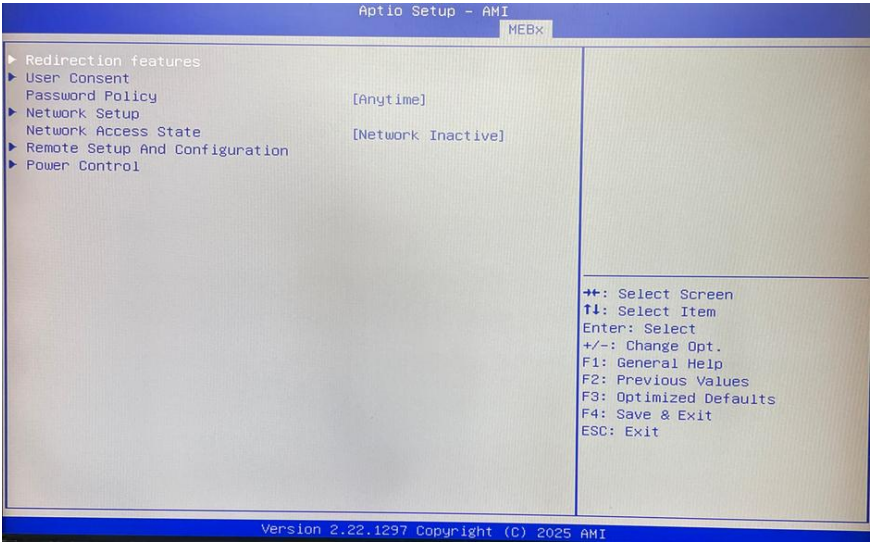


3.9.3 Intel® Standard Manageability



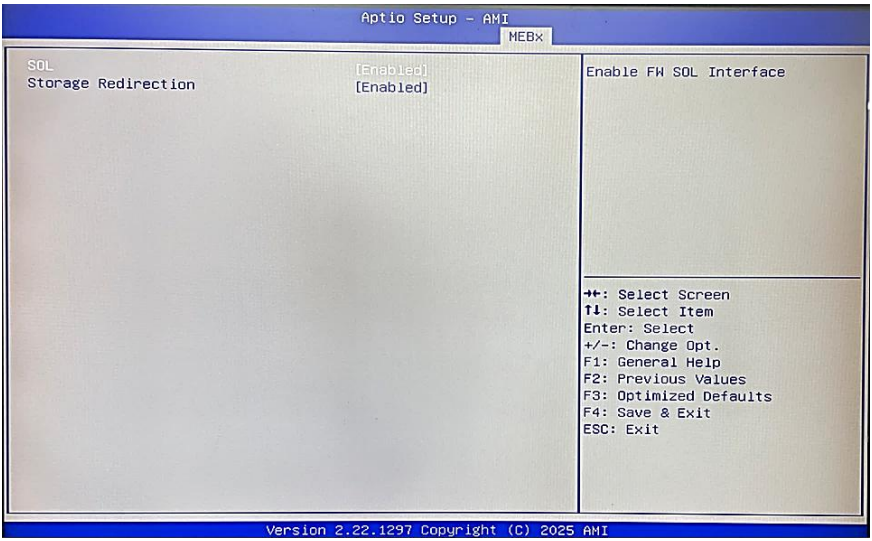
Options Summary	
Intel® Standard Manageability	Enabled
	Disabled
Enables or disables Intel® Standard Manageability (ISM) features, which provides access to ISM configuration options.	

3.9.4 Redirection Features



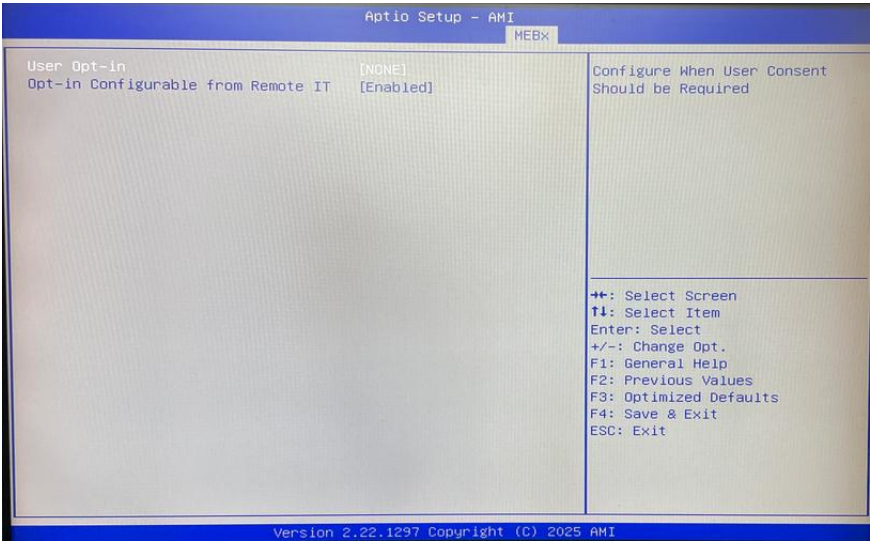
Options Summary	
User Consent Password Policy	Anytime
Specifies when user consent is required for remote management operations.	
Network Access State	Network Inactive
Indicates the current state of network access for Intel® Management Engine (ME).	

3.9.5 SOL and Storage Redirection



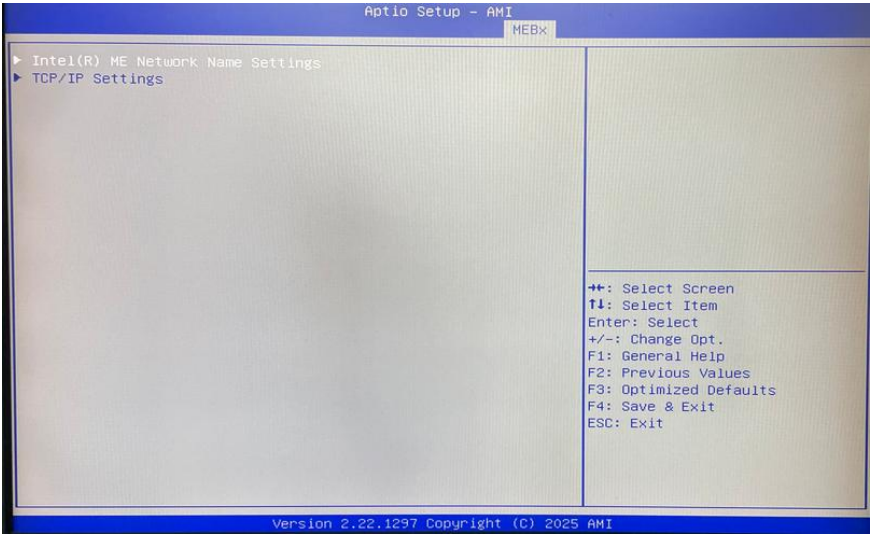
Options Summary	
Serial-over-LAN (SOL)	Disabled
	Enabled
Allows the system's serial console to be redirected over the network. When Enabled, administrators can access the system's BIOS and OS console remotely through Intel® AMT, even if the system is powered off (if ME power is active).	
Storage Redirection	Disabled
	Enabled
Allows remote access to the system's storage devices over the network. When Enabled, administrators can remotely mount disk images or boot media as if physically attached to the system.	

3.9.6 User Opt-in



Options Summary	
User Opt-in	None
	Enabled
None – No opt-in is required (default). Enabled – Requires user consent before remote management operations can occur.	
Opt-in Configurable from Remote IT	Disabled
	Enabled
Allows IT administrators to configure when user consent is required for remote sessions. This ensures that remote access actions comply with organizational policies.	

3.9.7 Intel® ME Network Settings



Intel® ME Network Name Settings

Allows configuration of the Management Engine (ME) network identity, including the hostname and other identifying parameters used for remote management.

TCP/IP Settings

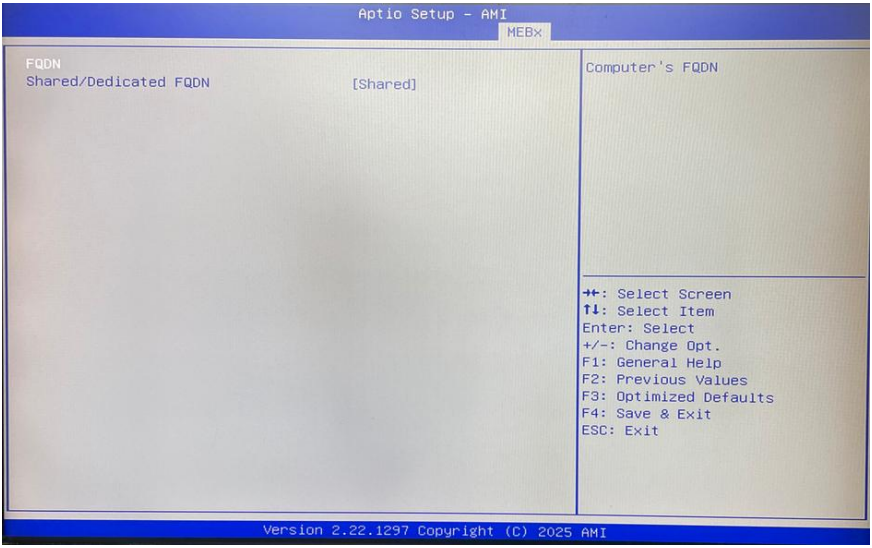
Configures network connectivity for Intel® ME. Settings typically include:

- **IP Address** – Static or DHCP-assigned IP for ME network interface.
- **Subnet Mask** – Defines the network segment for the ME interface.
- **Gateway** – Default gateway used by the ME for network communication.
- **DNS Servers** – Optional, for resolving network names.

Description:

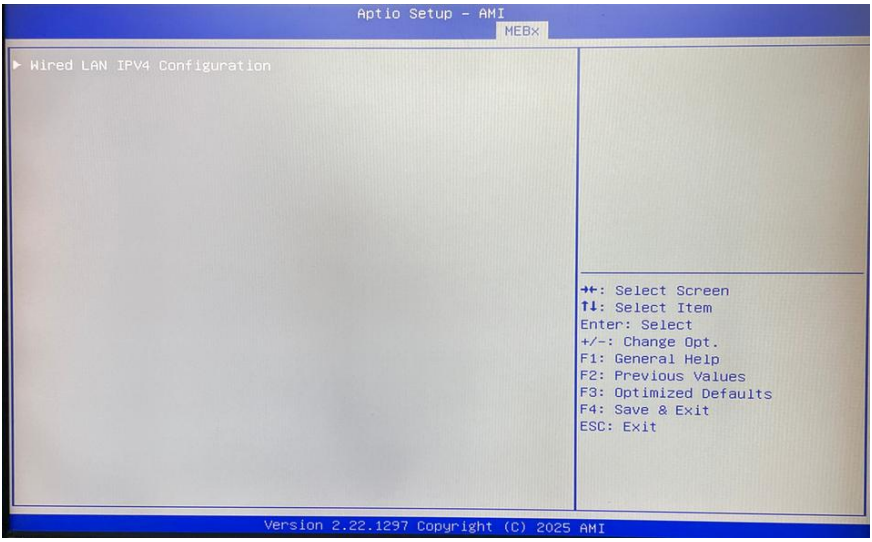
These settings enable the ME to communicate over the network for **remote management, firmware updates, and system monitoring**. Proper configuration ensures that the ME is reachable and compliant with your IT network policies.

3.9.7.1 FQDN Settings



Options Summary	
FQDN	Shared
	Dedicated
Shared – Uses the same FQDN as the host system (default). Dedicated – Assigns a unique FQDN to the ME, independent of the host system name.	

3.9.7.2 Wired LAN IPv4 Configuration

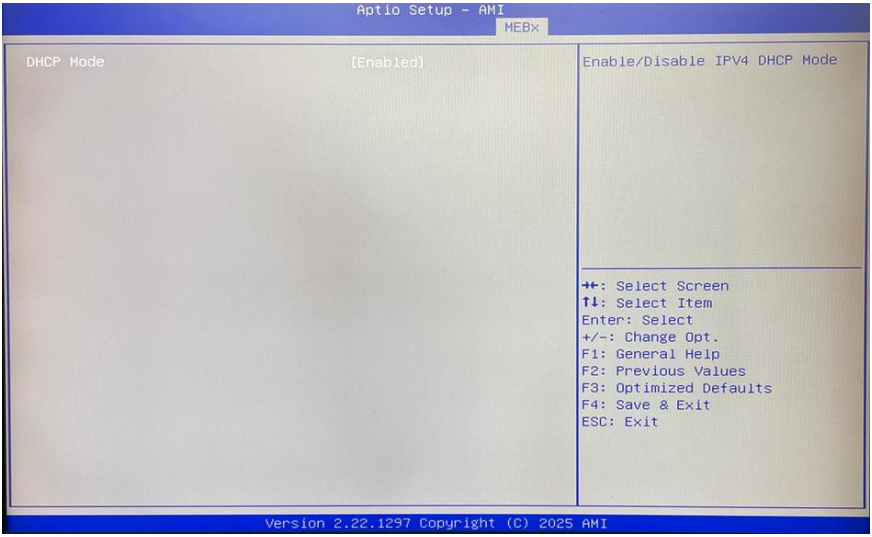


Wired LAN IPv4 Configuration
Configures the IPv4 settings for the Intel® Management Engine (ME) network interface over a wired LAN connection.
Typical Settings Include:

- IP Address – Assign a static IPv4 address or use DHCP to automatically obtain one.
- Subnet Mask – Defines the network segment for the ME interface.
- Default Gateway – Specifies the gateway used by the ME to communicate outside the local network.
- Primary/Secondary DNS – Optional settings for name resolution.

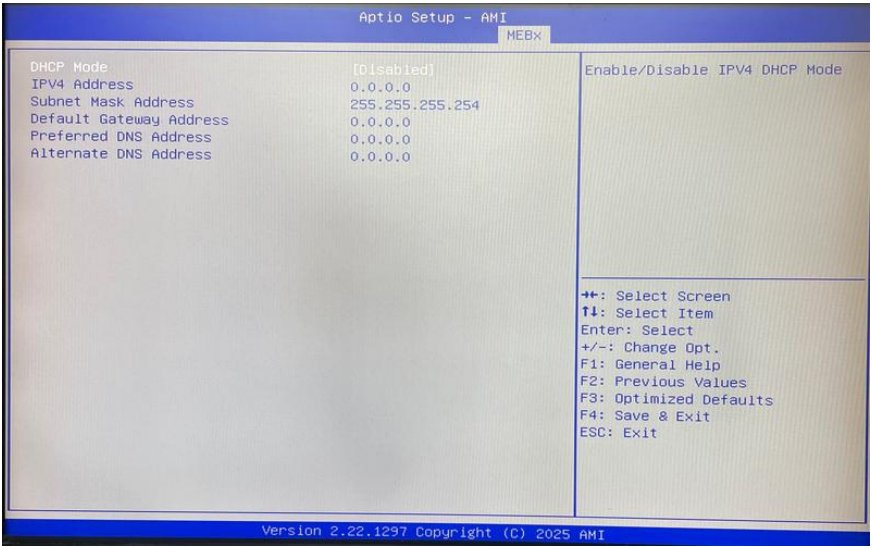
Description:
Proper configuration of the wired LAN IPv4 settings ensures that the Intel® ME interface can communicate over the network for remote management, firmware updates, and monitoring, in compliance with IT policies.

3.9.7.3 DHCP Mode



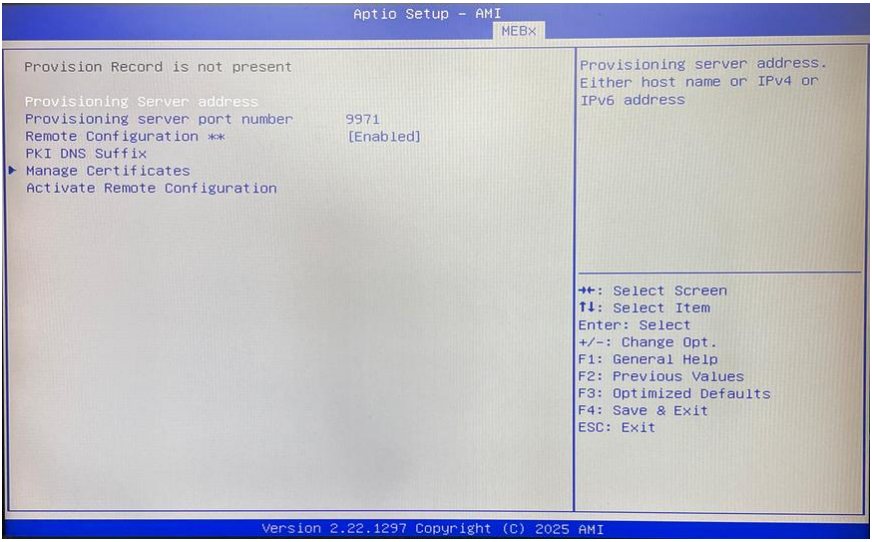
Options Summary	
DHCP Mode	Enabled
	Disabled
Enabled - ME obtains an IP address and network settings automatically from a DHCP server. Disabled – Requires manual configuration of IPv4 network parameters.	

3.9.7.4 IPv4 Configuration



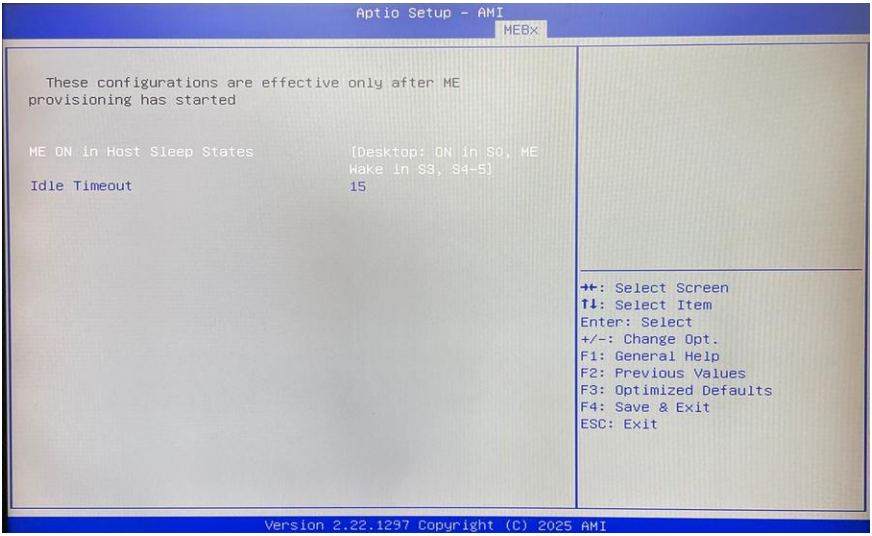
Options Summary	
DHCP Mode	Enabled
	Disabled
Enabled - ME obtains an IP address and network settings automatically from a DHCP server. Disabled – Requires manual configuration of IPv4 network parameters.	
IP Address	
Specifies the static IPv4 address assigned to the ME interface when DHCP is disabled.	
Subnet Mask Address	
Specifies the subnet mask for the ME interface, defining the local network segment.	
Default Gateway Address	
Specifies the gateway used by the ME to communicate with external networks.	
Preferred DNS Address	
Specifies the primary DNS server for name resolution.	
Alternate DNS Address	
Specifies the secondary DNS server for redundancy.	

3.9.7.5 Provisioning & Remote Configuration



Options Summary	
Provision Record	
Indicates whether the system has been provisioned for Intel® AMT/ME remote management.	
Provisioning Server Address	
Specifies the network address of the provisioning server used for Intel® ME remote configuration.	
Provisioning Server Port Number	
Specifies the port number used to connect to the provisioning server.	
Remote Configuration	Enabled
	Disabled
Allows remote configuration of Intel® ME via the provisioning server.	
PKI DNS Suffix	
Specifies the DNS suffix used for Public Key Infrastructure (PKI) certificates.	
Manage Certificates	
Provides access to view, import, or remove ME-related certificates used for secure communication with the provisioning server.	
Activate Remote Configuration	
Initiates the provisioning process to enable remote configuration on the system.	

3.9.7.6 Provisioning & Power Settings



Provisioning Requirement

- These configurations take effect only after ME provisioning has started.

ME ON in Host Sleep States

- Desktop: ON in S0, ME Wake in S3, S4–S5
  Specifies when the Intel® Management Engine (ME) remains active relative to system power states:
  - S0 – System fully on.
  - S3 – Sleep (suspend to RAM).
  - S4 – Hibernate (suspend to disk).
  - S5 – Soft off (system powered down, but AC power present).
- This setting enables remote management even when the system is in low-power states.

Idle Timeout

- Example: 15 minutes
  Specifies the time ME remains idle before entering a low-power or inactive state.

Description:

These settings ensure that Intel® ME can perform remote management, monitoring, and provisioning efficiently while respecting the system's power states. Proper configuration is required for continuous manageability during sleep or off states.

Appendix

Notices

FCC Statement

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

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Attention:

Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte.
Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur. Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage.

China RoHS Requirements (CN)

产品中有毒有害物质或元素名称及含量

AAEON **主板/子板/背板** QO4-381 Rev.A2

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板及其电子组件	×	○	○	○	○	○
外部信号连接器及线材	×	○	○	○	○	○

本表格依据 SJ/T 11364 的规定编制。

○：表示该有毒有害物质在该部件所有均质材料中的含量均在GB/T 26572标准规定的限量要求以下。

×：表示该有害物质的某一均质材料超出了GB/T 26572的限量要求，然而该部件仍符合欧盟指令2011/65/EU 的规范。

环保使用期限(EFUP (Environmental Friendly Use Period)) : 10年

备注：此产品所标示之环保使用期限，系指在一般正常使用状况下。

China RoHS Requirements (EN)

Name and content of hazardous substances in product

AAEON Main Board/Daughter Board/Backplane QO4-381 Rev.A2

Part Name	Hazardous Substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚(PBDE)
PCB Assemblies	×	○	○	○	○	○
Connector and Cable	×	○	○	○	○	○

The table is prepared in accordance with the provisions of SJ/T 11364.

○：Indicates that said hazardous substance contained in all of the homogenous materials for this product is below the limit requirement of GB/T 26572.

×：Indicates that said hazardous substance contained in at least one of the homogenous materials used for this part is above the limit requirement of GB/T 26572. But this product still be compliance with 2011/65/EU Directive (allowed with 2011/65/EU Annex III of RoHS exemption with number 6(c),7(a),7(c)-1).

EFUP (Environment Friendly Use Period) value: 10 years

Notes: This product defined period of use is under normal condition.