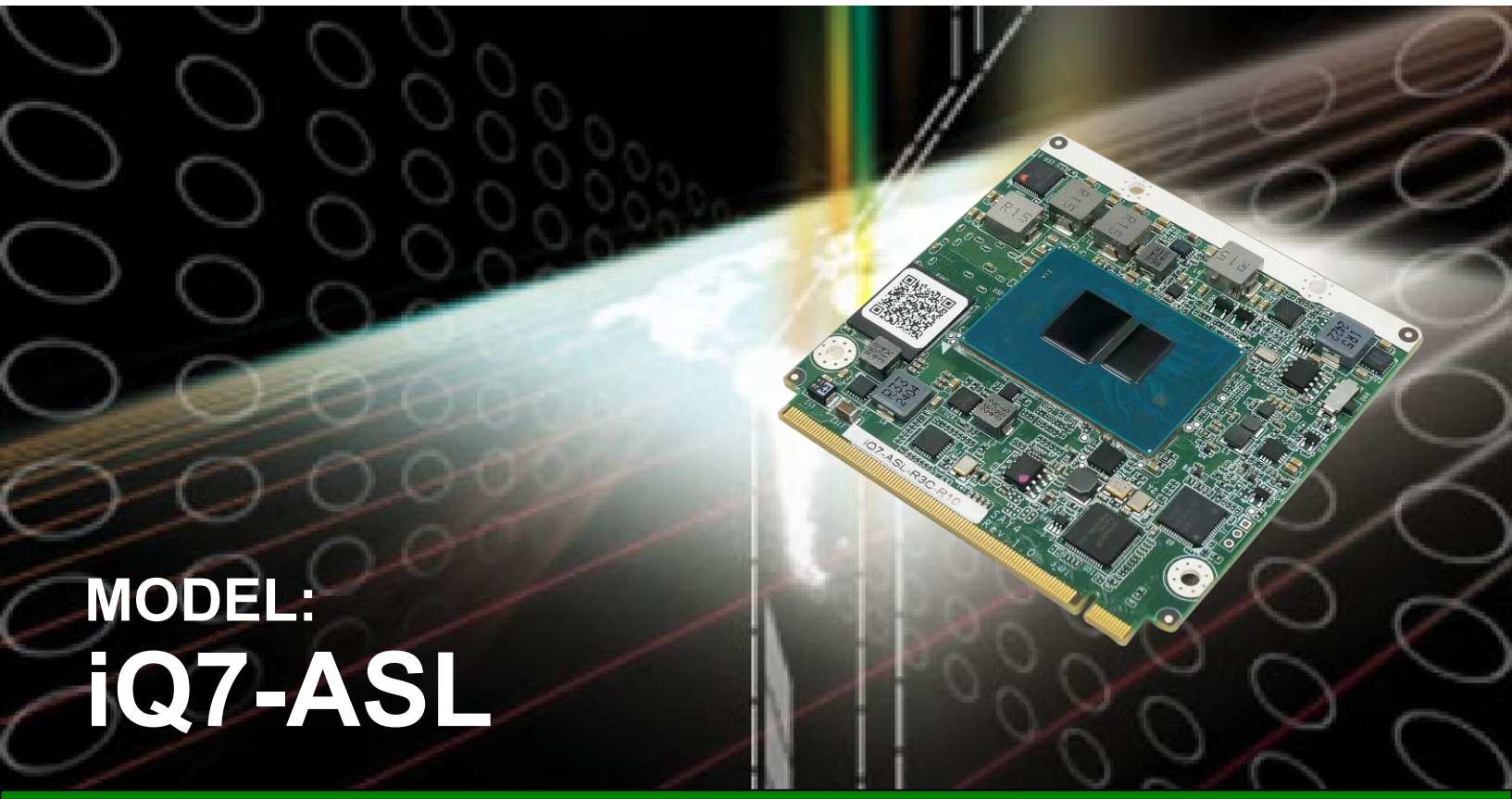
IEI Integration Corp.



MODEL:

iQ7-ASL

Qseven® Rev. 2.1 module with Intel® Amston Lake & Alder Lake-N, with 8GB LPDDR5 memory on board default, Support DP,LVDS,2.5GbE,SATA 6Gb/s,USB 3.2,Audio and RoHS

User Manual

Rev. 1.00 – February 21, 2025

RoHS Lead Free

Revision

Date	Version	Changes
February 21, 2025	1.00	Initial release

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BIOS Menus

Chapter

1

Introduction

1.1 Introduction

Figure 1-1: iQ7-ASL

The iQ7-ASL Qseven® module provides the main processing chips and is connected to a compatible Qseven® baseboard. The iQ7-ASL is preinstalled with Intel® Amston Lake & Alder Lake-N Atom® or Celeron® processor. The Qseven® standard allows the Qseven® baseboard to be designed, while leaving the choice of processor till the later stages of design. The iQ7-ASL provides a low power option with the full range of modern I/O options. The iQ7-ASL embedded module is designed for flexible integration by system developers into customized platform devices.

1.2 Features

Some of the iQ7-ASL Qseven module features are listed below:

- Complies with Qseven® Rev. 2.1 form factor
- Supports Intel 7 Intel® Amston Lake & Alder Lake-N processor
- LPDDR5-5500 8G pre-installed soldered memory (system max.16G)
- Optional 8 GB – 256 GB soldered eMMC
- Supports dual independent display via LVDS or eDP, HDMI
- Supports USB 3.2 Gen 2 (10Gb/s), SATA 6Gb/s and 2.5GbE
- Supports operating temperature (-10ºC ~ 60ºC)
- RoHS compliant

1.3 Model Variations

There are several models of the iQ7-ASL series. The model variations are listed in **Table 1-1**.

Model	On-board SoC	Operating Temp.
Standard		
iQ7-ASL-R3C	Intel® Amston Lake 7433RE SoC Processor (up to 2.7GHz, quad-core, TDP=9W)	-10ºC ~ 60ºC
iQ7-ASL-N2C	Intel® Alder Lake-N N97 SoC Processor (up to 2.9GHz, quad-core, TDP=12W)	-10ºC ~ 60ºC
iQ7-ASL-E1C	Intel® Alder Lake-N x7211E SoC Processor (up to 2.9GHz, dual-core, TDP=6W)	-10ºC ~ 60ºC

Table 1-1: Model Variations

1.4 Board Overview

The on-board components and connector of the iQ7-ASL are shown in the figures below.

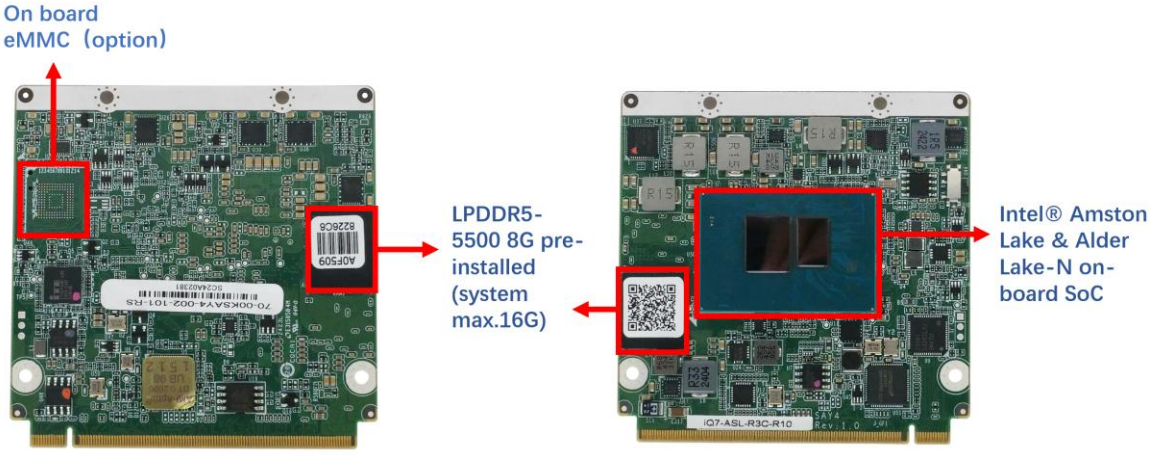


Figure 1-2: On-board Components and Connectors

1.5 Dimensions

The main dimensions of the iQ7-ASL are shown in the diagram below.

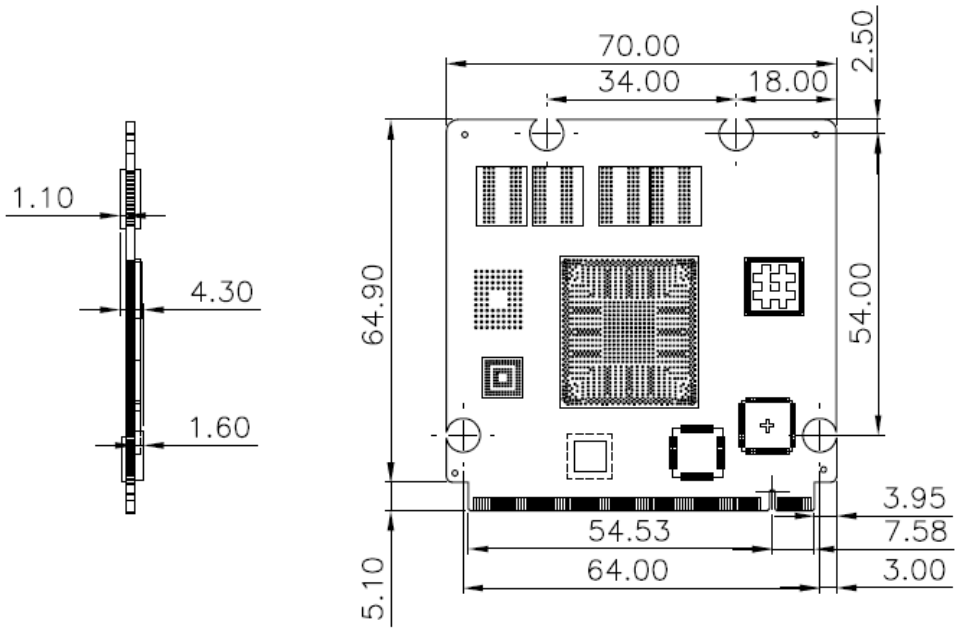


Figure 1-3: iQ7-ASL Dimensions (mm)

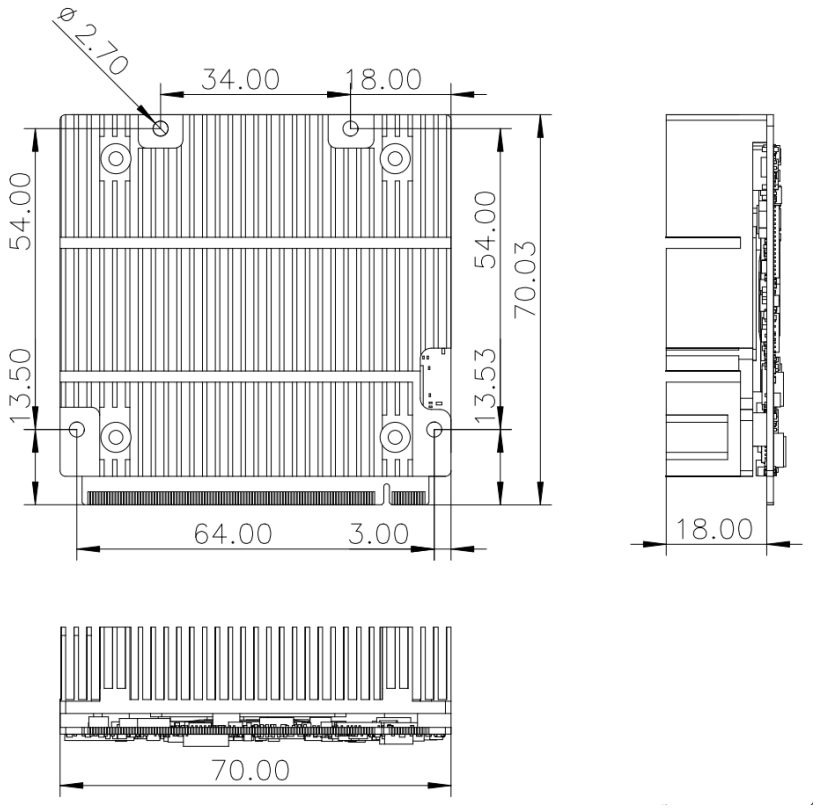


Figure 1-4: iQ7-ASL Dimensions with Heatsink (mm)

1.6 Data Flow

Figure 1-5 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

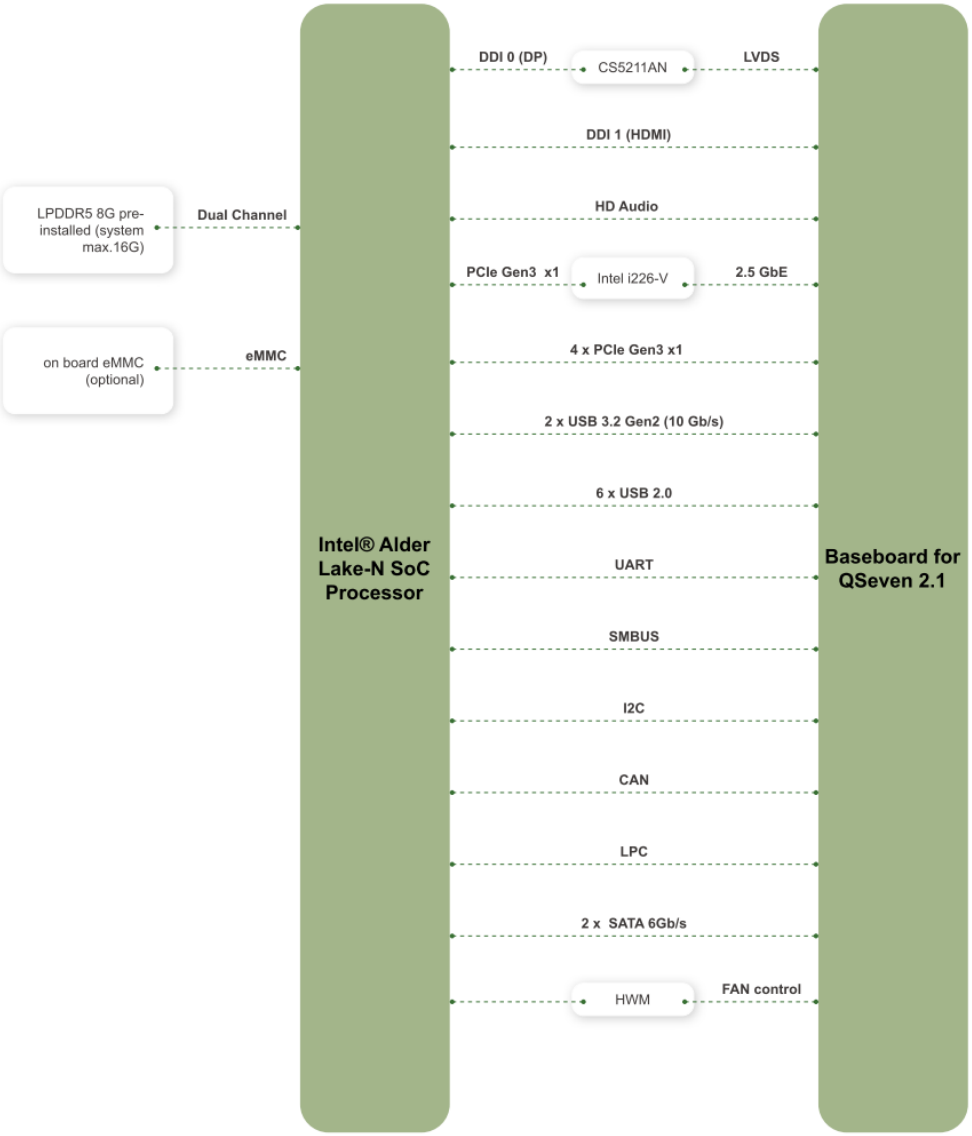


Figure 1-5: Data Flow Diagram

1.7 Technical Specifications

The iQ7-ASL technical specifications are listed below.

	iQ7-ASL
Form Factor	Qseven® Rev. 2.0
On-board SoC	▪ **Standard** ○ Intel® Alder Lake-N N97 SoC Processor (up to 2.9GHz, quad-core, TDP=12W) ○ Intel® Amston Lake 7433RE SoC Processor (up to 2.7GHz, quad-core, TDP=9W) ○ Intel® Alder Lake-N x7211E SoC Processor (up to 2.9GHz, dual-core, TDP=6W)
Memory	On board LPDDR5-5500 8G pre-installed (system max.16G)
Graphics Engine	Intel® UHD Graphics
Ethernet	1 x PCIe 2.5 GbE with Intel i226-V signal to baseboard
BIOS	UEFI BIOS
Embedded Controller	ITE IT8528E/FX
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Storage	2 x SATA 6Gb/s signal to baseboard on board eMMC (optional)
Display (signal to baseboard)	Double independent diplay signal to baseboard 1 x HDMI 1.4a: up to 4096 x 2160@30Hz 1 x LVDS: 1920 x 1200 @ 60Hz or eDP: 4096 x 2160 @ 60Hz
Expansions (signal to baseboard)	4 x PCIe Gen3 x1 signal to baseboard

	iQ7-ASL
I/O Interfaces **(signal to baseboard)**	2 x USB 3.2 Gen2(10 Gb/s) 6 x USB 2.0 1 x UART HD Audio SDIO SMBus I^2C LPC SPI
Power Supply	5V DC
Operating Temperature	-10ºC ~ 60ºC
Storage Temperature	-30ºC ~ 70ºC
Operating Humidity	5% ~ 95% (non-condensing)
Dimensions	70 mm x 70 mm
Weight (GW/NW)	300 g/150 g

Table 1-2: iQ7-ASL Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions

WARNING!

Static electricity can destroy certain electronics. Make sure to follow the ESD precautions to prevent damage to the product, and injury to the user.

Make sure to adhere to the following guidelines:

- ***Wear an anti-static wristband***: Wearing an anti-static wristband can prevent electrostatic discharge.
- ***Self-grounding***: Touch a grounded conductor every few minutes to discharge any excess static buildup.
- ***Use an anti-static pad***: When configuring any circuit board, place it on an anti-static mat.
- ***Only handle the edges of the PCB***: Don't touch the surface of the motherboard. Hold the motherboard by the edges when handling.

2.2 Unpacking Precautions

When the iQ7-ASL is unpacked, please do the following:

- Follow the antistatic guidelines above.
- Make sure the packing box is facing upwards when opening.
- Make sure all the packing list items are present.

2.3 Packing List

NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the iQ7-ASL was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The iQ7-ASL is shipped with the following components:

Quantity	Item and Part Number	Image
1	iQ7-ASL Qseven Module	
1	Heatsink	
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Baseboard for Qseven modules (**P/N**: iQ7-CB)	

Table 2-2: Optional Items

Chapter

3

Installation

3.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the iQ7-ASL may result in permanent damage to the iQ7-ASL and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the iQ7-ASL. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the iQ7-ASL or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***: Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the iQ7-ASL, place it on an antic-static pad. This reduces the possibility of ESD damaging the iQ7-ASL.
- ***Only handle the edges of the PCB***: When handling the PCB, hold the PCB by the edges.

3.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before installation. All installation notices must be strictly adhered to. Failing to adhere to these precautions may lead to severe damage and injury to the person performing the installation.

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - The user manual provides a complete description of the iQ7-ASL installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the iQ7-ASL on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the iQ7-ASL off:
  - When working with the iQ7-ASL, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the iQ7-ASL **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

3.3 Qseven Connector Pinouts

CN Label: **J_GF1**

CN Type: 230-pin Qseven connector

CN Location: See **Figure 3-1**

CN Pinouts: See **Table 3-1**

The standard Qseven connector location and pinouts are shown below.

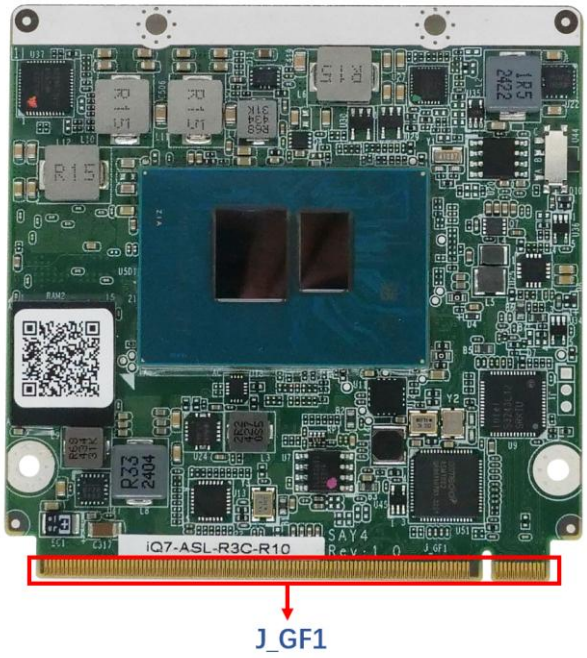


Figure 3-1: Qseven Connector Location

Pin No.	Description	Pin No.	Description
1	GND	2	GND
3	GBE_MDI3-	4	GBE_MDI2-
5	GBE_MDI3+	6	GBE_MDI2+
7	GBE_LINK 1000#	8	GBE_LINK 2500#
9	GBE_MDI1-	10	GBE_MDI0-
11	GBE_MDI1+	12	GBE_MDI0+

Pin No.	Description	Pin No.	Description
13	reserved	14	GBE_ACT#
15	reserved	16	SUS_S5#
17	WAKE#	18	SUS_S3#
19	SUS_STAT#	20	PWRBTN#
21	SLP_BTN#	22	LID#
23	GND	24	GND
25	GND	26	PWGIN
27	BATLOW#	28	RSTBTN#
29	SATA0_TX+	30	SATA1_TX+
31	SATA0_TX-	32	SATA1_TX-
33	SATA_ACT#	34	GND
35	SATA0_RX+	36	SATA1_RX+
37	SATA0_RX-	38	SATA1_RX-
39	GND	40	GND
41	BIOS_DISABLE	42	reserved
43	reserved	44	reserved
45	reserved	46	reserved
47	reserved	48	reserved
49	reserved	50	reserved
51	reserved	52	reserved
53	reserved	54	reserved
55	reserved	56	USB_OTG_ PEN
57	GND	58	GND
59	HDA_SYNC	60	SMB_CLK
61	HDA_RST	62	SMB_DAT
63	HDA_BITCLK	64	SMB_ALERT#
65	HDA_SDI	66	GP0_I2C_CLK
67	HDA_SDO	68	GP0_I2C_DAT
69	THRM#	70	WDTRIG#
71	THRMTRIP#	72	WDTRST#
73	GND	74	GND

Pin No.	Description	Pin No.	Description
75	USB3_TX0-	76	USB3_RX0-
77	USB3_TX0+	78	USB3_RX0+
79	USB2_OC#	80	USB_4_5_OC#
81	USB_P5-	82	USB_P4-
83	USB_P5+	84	USB_P4+
85	USB_2_3_OC#	86	USB_0_1_OC#
87	USB_P3-	88	USB_P2-
89	USB_P3+	90	USB_P2+
91	N/C	92	reserved
93	USB_P1-	94	USB_P0-
95	USB_P1+	96	USB_P0+
97	GND	98	GND
99	LVDS_A0+	100	LVDS_B0+
101	LVDS_A0-	102	LVDS_B0-
103	LVDS_A1+	104	LVDS_B1+
105	LVDS_A1-	106	LVDS_B1-
107	LVDS_A2+	108	LVDS_B2+
109	LVDS_A2-	110	LVDS_B2-
111	LVDS_PPEN	112	LVDS_BLEN
113	LVDS_A3+	114	LVDS_B3+
115	LVDS_A3-	116	LVDS_B3-
117	GND	118	GND
119	LVDS_A_CLK+	120	LVDS_B_CLK+
121	LVDS_A_CLK-	122	LVDS_B_CLK-
123	LVDS_BLT_ CTRL	124	reserved
125	LVDS_DID_ DAT	126	LVDS_BLC_DAT
127	LVDS_DID_ CLK	128	reserved
129	CAN0_TX	130	CAN0_RX
131	DP_LANE3+ / TMDS_CLK+	132	USB3_TX1-

Pin No.	Description	Pin No.	Description
133	DP_LANE3- / TMDS_CLK-	134	USB3_TX1+
135	GND	136	GND
137	DP_LANE1+/ TMDS_LANE1+	138	DP_AUX+
139	DP_LANE1-/ TMDS_LANE1-	140	DP_AUX-
141	GND	142	GND
143	DP_LANE2+/ TMDS_LANE0+	144	USB3_RX1-
145	DP_LANE2-/ TMDS_LANE0-	146	USB3_RX1+
147	GND	148	GND
149	DP_LANE0+ / TMDS_LANE2+	150	HDMI_CTRL_DAT
151	DP_LANE0- / TMDS_LANE2-	152	HDMI_CTRL_CLK
153	HDMI_HPD#	154	DP_HPD#
155	PCIE_CLK_REF+	156	PCIE_WAKE#
157	PCIE_CLK_REF-	158	PCIE_RST#
159	GND	160	GND
161	PCIE3_TX+	162	PCIE3_RX+
163	PCIE3_TX-	164	PCIE3_RX-
165	GND	166	GND
167	PCIE2_TX+	168	PCIE2_RX+
169	PCIE2_TX-	170	PCIE2_RX-
171	UART0_TX	172	UART0_RTS#
173	PCIE1_TX+	174	PCIE1_RX+
175	PCIE1_TX-	176	PCIE1_RX-
177	UART0_RX	178	UART0_CTS#
179	PCIE0_TX+	180	PCIE0_RX+
181	PCIE0_TX-	182	PCIE0_RX-
183	GND	184	GND

Pin No.	Description	Pin No.	Description
185	LPC_AD0	186	LPC_AD1
187	LPC_AD2	188	LPC_AD3
189	LPC_CLK	190	LPC_FRAME#
191	SERIRQ	192	LPC_LDRQ#
193	VCC_RTC	194	SPKR
195	FANIO_EC	196	FANOUT_EC
197	GND	198	GND
199	SPI_MOSI	200	SPI_CS0#
201	SPI_MISO	202	SPI_CS1#
203	SPI_SCK	204	reserved
205	VCC_5V_SB	206	VCC_5V_SB
207	reserved	208	reserved
209	reserved	210	reserved
211	NC	212	NC
213	NC	214	NC
215	NC	216	NC
217	NC	218	NC
219	VCC	220	VCC
221	VCC	222	VCC
223	VCC	224	VCC
225	VCC	226	VCC
227	VCC	228	VCC
229	VCC	230	VCC

Table 3-1: Qseven Connector Pin Definitions

3.4 Mounting iQ7-ASL to Baseboard

NOTE:

Baseboard can be designed by the end user, customized by IEI, or purchased from IEI. For more information visit the IEI website (www.ieiworld.com) or contact an IEI sales representative.

WARNING:

Never run the Qseven module without the heatsink and a thermal pad. The thermal pad acts as a thermal interface between the module and the heatsink. The heatsink must be installed on the iQ7-ASL to maintain proper operating temperatures. Make sure to maintain the heatsink temperature under 60°C (or 85°C for W2 models) in operation.

NOTE:

The **TXE** BIOS option (refer to **Section** 错误!未找到引用源。) must be disabled when the user needs to flash BIOS in the following situations:

1. Flash the BIOS of the baseboard (IQ7-DB-MATX).
2. Flash the BIOS of the newly installed iQ7-ASL module.

Follow the steps below to install the iQ7-ASL to the optional baseboard.

Step 1: Align the Qseven connector on the edge of the iQ7-ASL with the corresponding socket on the baseboard. Slide the iQ7-ASL into the socket at an angle of about 20º. (Figure 3-2).

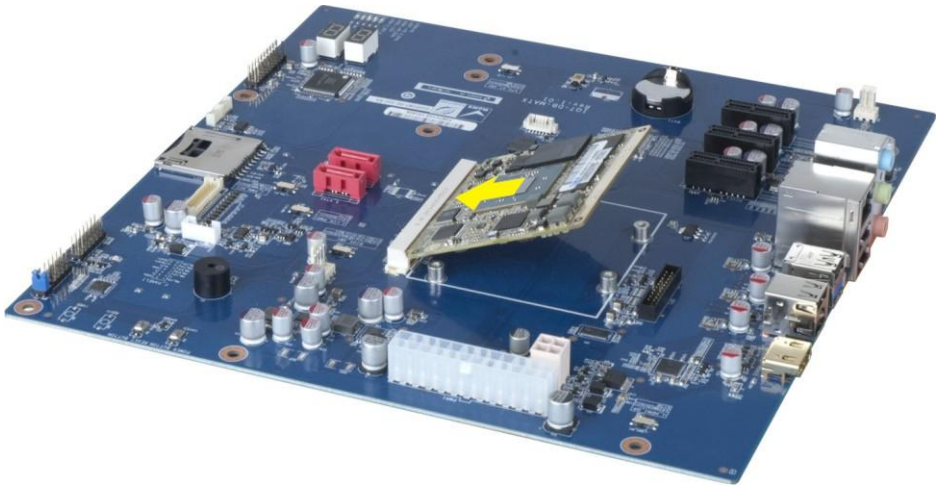


Figure 3-2: Connect the Qseven Connectors

Step 2: Ensure a thermal pad is placed on the CPU of the iQ7-ASL.

Step 3: Place the heatsink on the iQ7-ASL, aligning the retention screw holes and gently pushing the heatsink down.

Step 4: Secure the heatsink to the iQ7-ASL and the baseboard with the supplied retention screws (Figure 3-3).

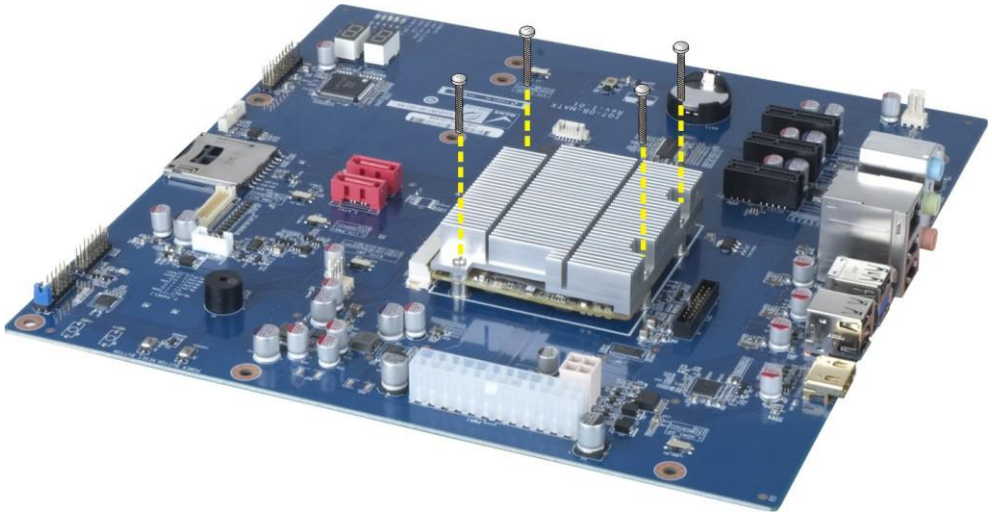


Figure 3-3: Secure the Heatsink

3.5 Available Drivers

All the drivers for the iQ7-ASL are available on IEI Resource Download Center (https://download.ieiworld.com). Type iQ7-ASL and press Enter to find all the relevant software, utilities, and documentation.

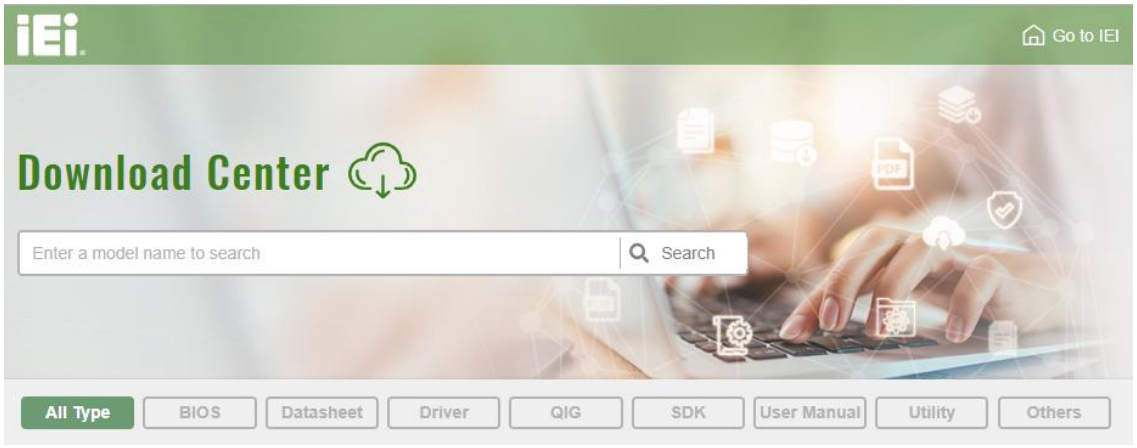
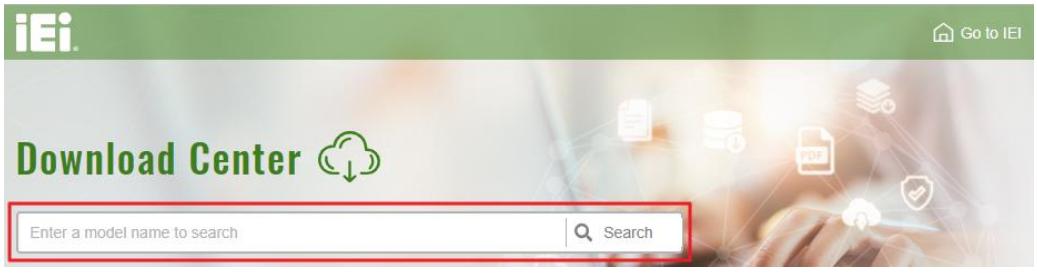


Figure 3-4: IEI Resource Download Center

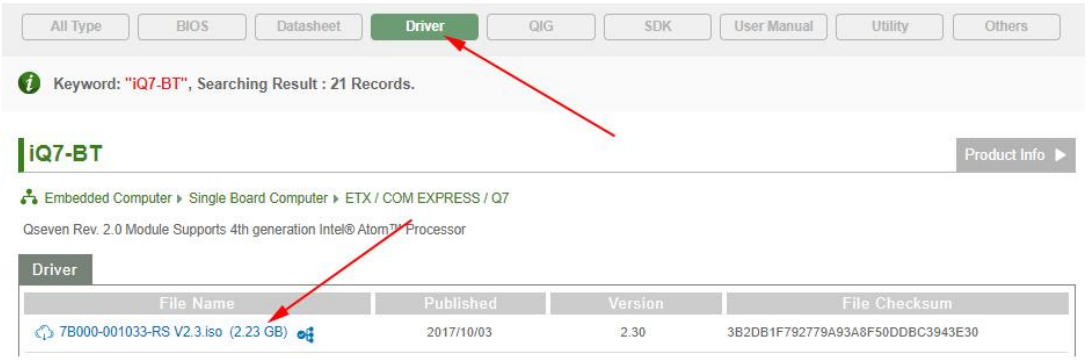
3.5.1 Driver Download

To download drivers from IEI Resource Download Center, follow the steps below.

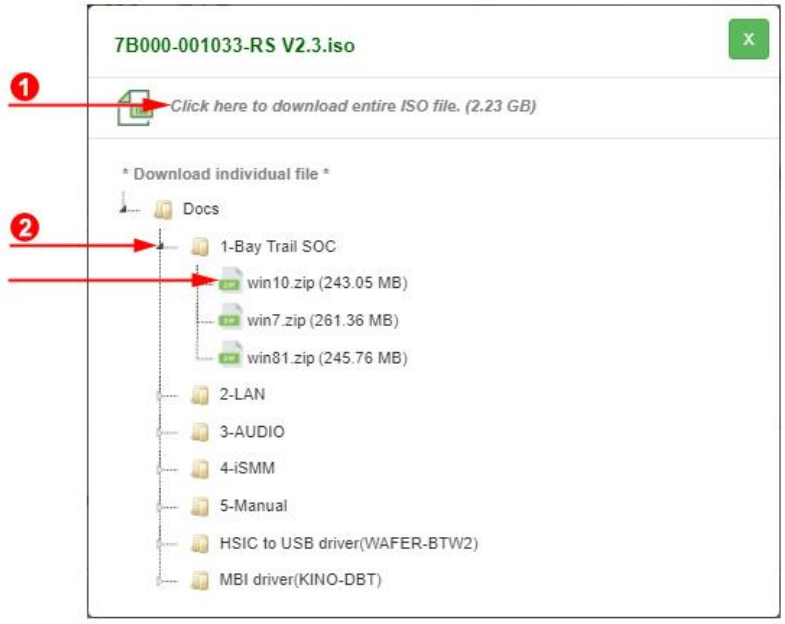
Step 1: Go to https://download.ieiworld.com. Type iQ7-ASL and press Enter.



Step 2: All product-related software, utilities, and documentation will be listed. You can choose **Driver** to filter the result.



Step 3: Click the driver file name on the page and you will be prompted with the following window. You can download the entire ISO file (❶), or double click an individual item to find its driver file and click the file name to download (❷).



NOTE:

To install software from the downloaded ISO image file in Windows 8, 8.1 or 10, double-click the ISO file to mount it as a virtual drive to view its content. On Windows 7 system, an additional tool (such as Virtual CD-ROM Control Panel from Microsoft) is needed to mount the file.

Chapter

4

BIOS

4.1 Introduction

The BIOS is programmed onto the BIOS chip. The BIOS setup program allows changes to certain system settings. This chapter outlines the options that can be changed.

NOTE:

Some of the BIOS options may vary throughout the life cycle of the product and are subject to change without prior notice.

4.1.1 Starting Setup

The UEFI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. **Using the keyboard**: Press the **DEL** or **F2** as soon as the system is turned on.
2. **Using touchscreen**: Press the **Setup** button on the upper right corner of the BIOS Starting Menu.

If the message disappears before the **DEL or F2** key is pressed, restart the computer and try again, then the BIOS Starting Menu will appear. Select "Setup" and press Enter to get into the BIOS Setup.

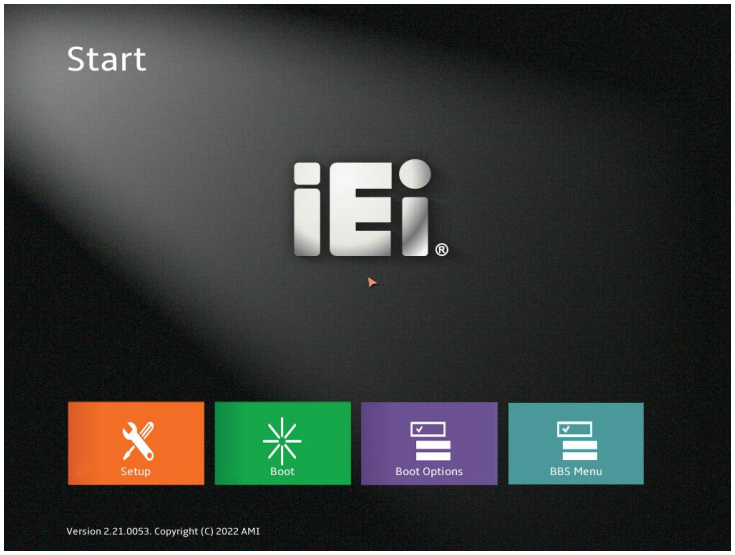


Figure 4-1: BIOS Starting Menu

4.1.2 Using Setup

The BIOS Setup menu can be navigated by using a keyboard or a touchscreen.

4.1.2.1 Keyboard Navigation

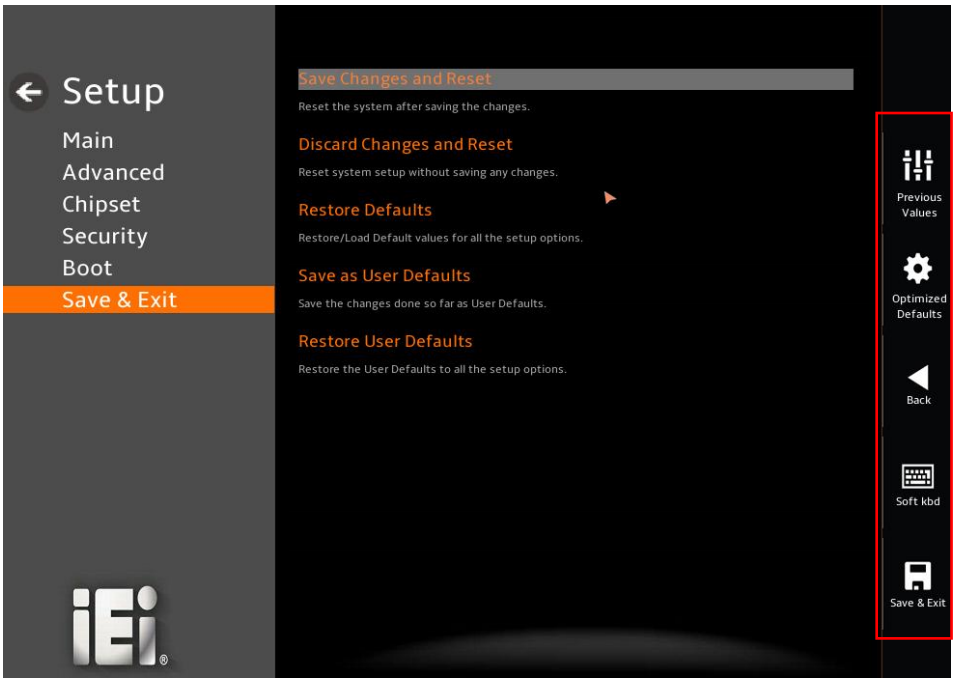
For keyboard navigation, use the navigation keys shown in 错误!未找到引用源。.

Key	Function
Up arrow	Move to the previous item
Down arrow	Move to the next item
Left arrow	Move to the item on the left-hand side
Right arrow	Move to the item on the right-hand side
+	Increase the numeric value or make changes
-	Decrease the numeric value or make changes
Page Up	Move to the previous page
Page Dn	Move to the next page
Esc	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit the current page and return to Main Menu
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2	Load previous values
F3	Load optimized defaults
F4	Save changes and Exit BIOS
<K>	Scroll the help area upwards
<M>	Scroll the help area downwards

Table 4-1: BIOS Navigation Keys

4.1.2.2 Touch Navigation

For touchscreen navigation, use the on-screen navigation keys shown below.



On-screen Button	Function
Previous Values	Load the last value you set.
Optimized Defaults	Load the factory default values to achieve the best performance.
Back	Return to the previous menu.
Soft kbd	Display the on-screen keyboard.
Save & Exit	Save the changes made to the BIOS options and reset the system.

Table 4-2: BIOS On-screen Navigation Keys

4.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window, press the **Esc** key.

4.1.4 Unable to Reboot after Configuration Changes

If the computer cannot boot after changes to the system configuration are made, CMOS resets to default settings. Use the clear CMOS button described in **Section** 错误!未找到引用源。.

4.1.5 BIOS Menu Bar

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

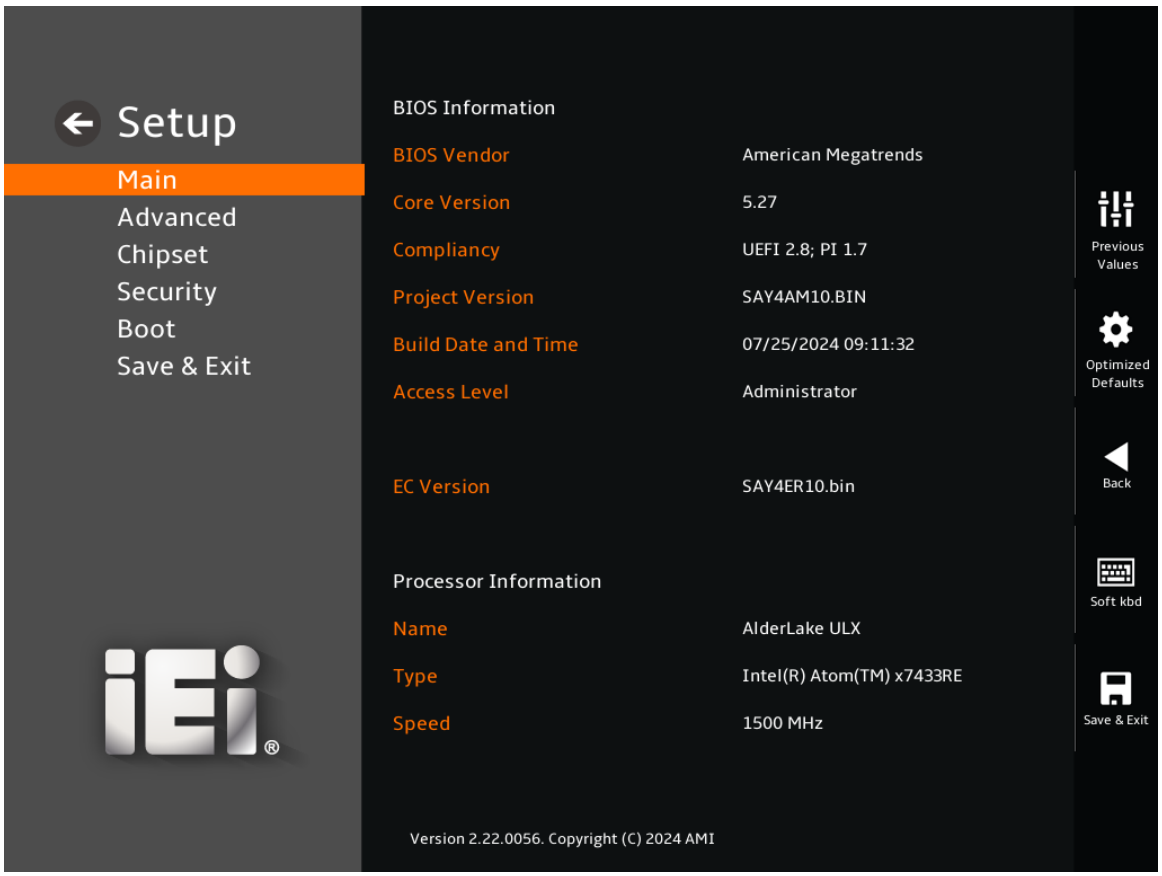
- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Security – Sets User and Supervisor Passwords.
- Boot – Changes the system boot configuration.
- Save & Exit – Selects exit options and loads default settings.

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

4.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.

The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main(1/3)

BIOS Menu 2: Main(2/3)

BIOS Menu 3: Main(3/3)

➔ **BIOS Information**

The **BIOS Information** lists a summary of the BIOS. The fields in **BIOS Information** cannot be changed. The items shown in the system overview include:

BIOS Vendor: installed BIOS vendor
Core Version: current BIOS version
Compliancy: current UEFI & PI version
Project Version: the board version
Build Date and Time: the date the current BIOS version was made
EC Version: current EC version

➔ **Processor Information**

The **Processor Information** lists a summary of the Processor. The fields in **Processor Information** cannot be changed. The items shown in the system overview include:

Name: displays the processor's details
Type: displays the processor's type
Speed: displays the processor's speed
ID: displays the processor's ID

➔ **PCH Information**

The **PCH Information** lists a brief summary of the PCH. The fields in **PCH Information** cannot be changed. The items shown in the system overview include:

Name: displays the PCH's name
PCH SKU: displays the PCH's SKU
Stepping: displays the PCH's stepping
TXT Capability of Platform/PCH: displays the TXT capability
Production Type: displays the production type
ME FW Version: displays the ME firmware version
ME Firmware SKU: displays the ME firmware SKU
PMC FW Version: displays the PMC firmware version

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

➔ **System Time [xx:xx:xx]**

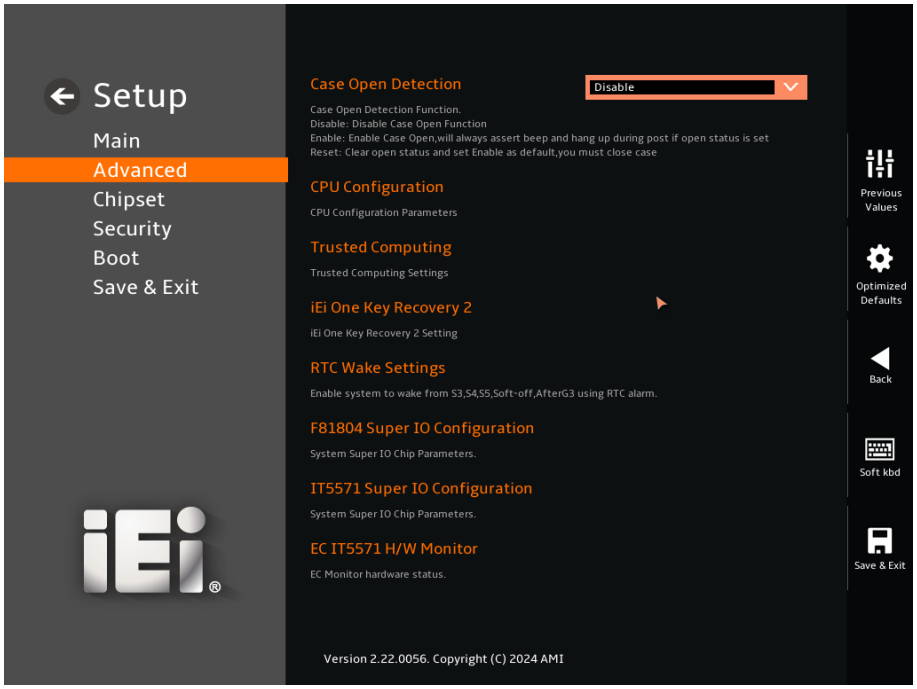
Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

4.3 Advanced

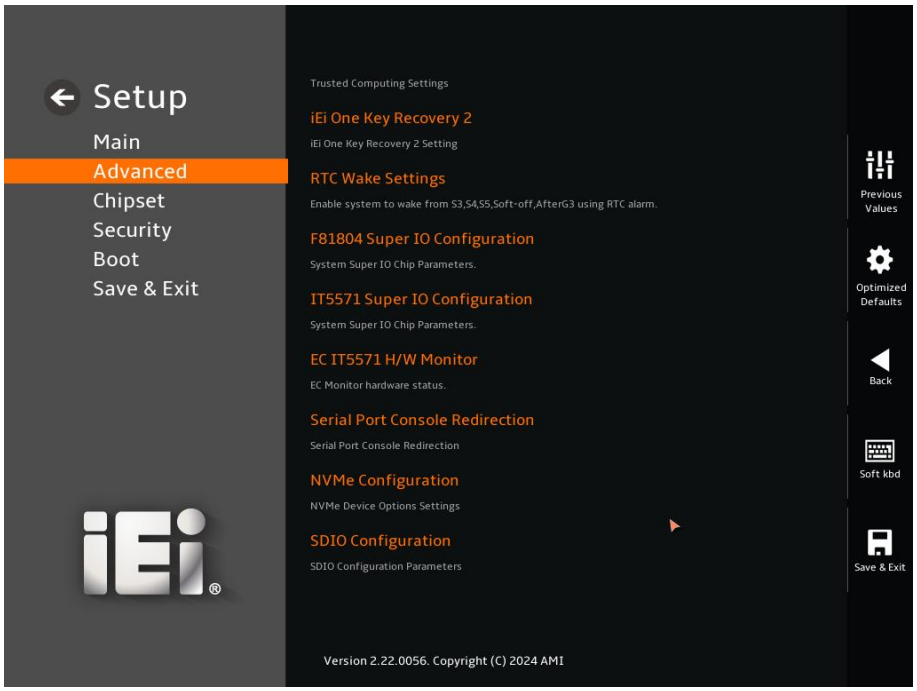
Use the **Advanced** menu (**BIOS Menu 4**) to configure the CPU and peripheral devices through the following sub-menus:

WARNING!

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings are compatible with the hardware.



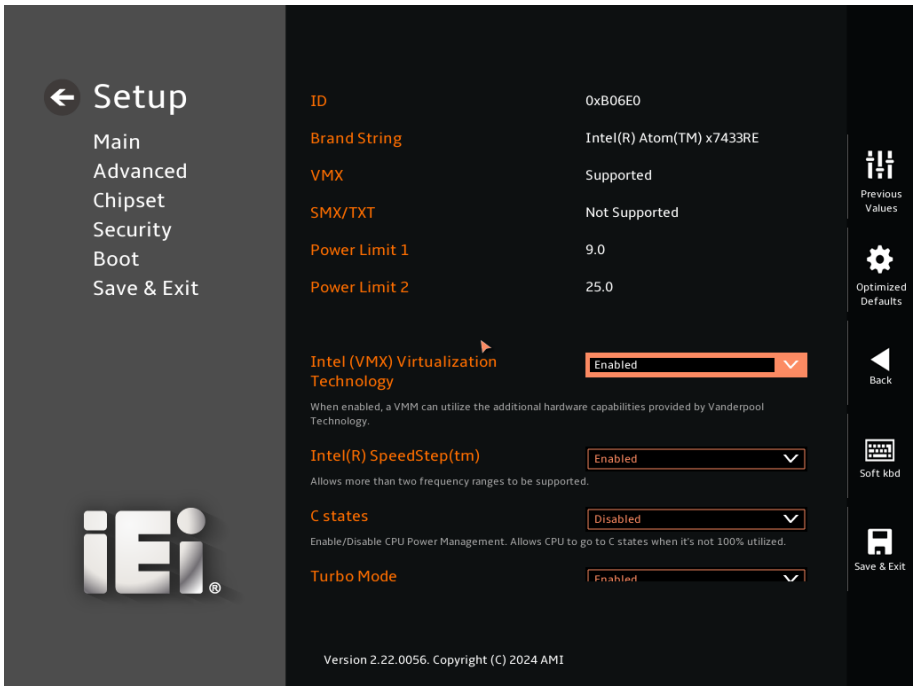
BIOS Menu 4: Advanced (1/2)



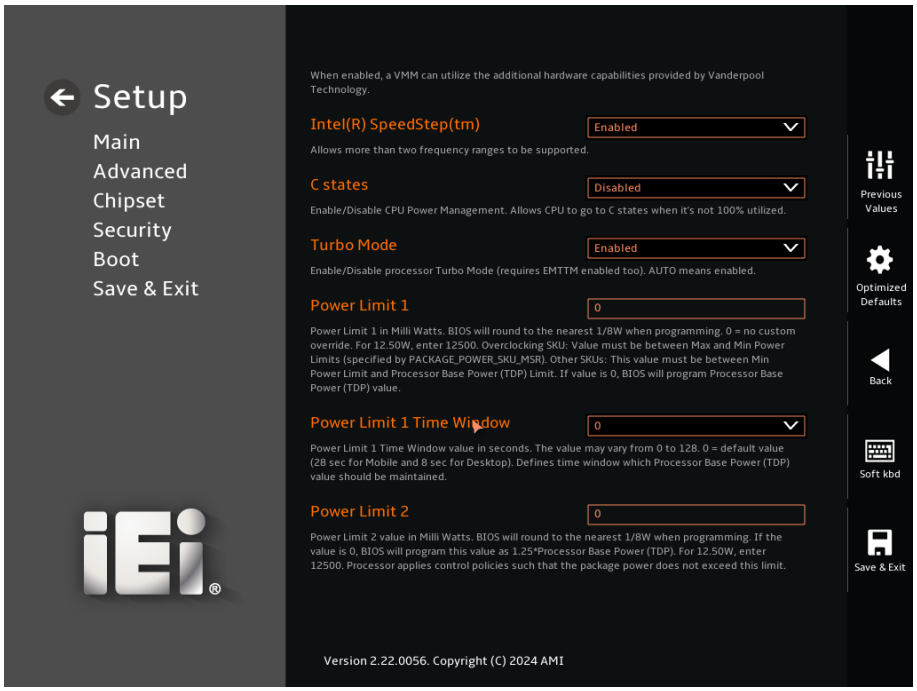
BIOS Menu 5: Advanced (2/2)

4.3.1 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 6**) to view detailed CPU specifications or enable the Intel Virtualization Technology.



BIOS Menu 6: CPU Configuration (1/2)



BIOS Menu 7: CPU Configuration (2/2)

➔ **Intel (VMX) Virtualization Technology [Enabled]**

Use the **Intel (VMX) Virtualization Technology** option to enable or disable virtualization on the system. When combined with third party software, Intel® Virtualization technology allows several OSs to run on the same system at the same time.

➔	**Disabled**		Disables Intel Virtualization Technology.
➔	**Enabled**	**DEFAULT**	Enables Intel Virtualization Technology.

➔ **Active Performance Cores [All]**

Use the **Active Performance Cores** BIOS option to enable numbers of P-cores in the processor package.

➔	**All**	**DEFAULT**	Enable all P-cores in the processor package.
➔	**1**		Enable one P-core in the processor package.

➔ **Active Efficient Cores [All]**

Use the **Active Efficient Cores** BIOS option to enable the number of E-cores in the processor package.

➔	**All**	**DEFAULT**	Enable all E-cores in the processor package.
➔	**0**		Enable zero E-core in the processor package.
➔	**1**		Enable one E-cores in the processor package.
➔	**2**		Enable two E-cores in the processor package.
➔	**3**		Enable three E-cores in the processor package.
➔	**4**		Enable four E-cores in the processor package.
➔	**5**		Enable five E-cores in the processor package.
➔	**6**		Enable six E-cores in the processor package.
➔	**7**		Enable seven E-cores in the processor package.

➔ **Hyper-Threading [Enabled]**

Use the **Hyper-Threading** option to enable or disable the **Hyper-Threading** Technology.

➔	**Disabled**		Disables Hyper-Threading Technology
➔	**Enabled**	**DEFAULT**	Enables Hyper-Threading Technology

➔ **Intel(R) SpeedStep(tm) [Enabled]**

Use the **Intel(R) SpeedStep(tm)** option to enable or disable the Intel® SpeedStep Technology which allows more than two frequency ranges to be supported.

➔	**Disabled**		Disables Intel® SpeedStep Technology
➔	**Enabled**	**DEFAULT**	Enables Intel® SpeedStep Technology

➔ **Turbo Mode [Enabled]**

Use the **Turbo Mode** option to enable or disable Turbo Mode which requires Intel Speed Step or Intel Speed Shift to be available and enabled.

➔	**Disabled**		Disables Turbo Mode Technology
➔	**Enabled**	**DEFAULT**	Enables Turbo Mode Technology

➔ **C states [Disabled]**

Use the **C states** option to enable or disable CPU power management which allows CPU to go to C states when it is not 100% utilized.

➔	**Disabled**	**DEFAULT**	Disables CPU power management
➔	**Enabled**		Enables CPU power management

➔ **Power Limit 1 [0]**

Use the + or – key to change the **Power Limit 1** value. BIOS will program the default values for Limit 1 and Power Limit 1 Time Window. For 12.50W, enter 12500.

➔ **Power Limit 1 Time Window [0]**

Use the **Power Limit 1 Time Window** option to select the PL1 time duration. The value may vary from 0 to 128. For 0 is the default value

➔ **Power Limit 2 [0]**

Use the + or – key to change the **Power Limit 2** value. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500.

4.3.1.1 Efficient-core Information

Use the **Efficient-core Information** menu (**BIOS Menu 8**) to display the E-core information.

BIOS Menu 8: Efficient-core Information

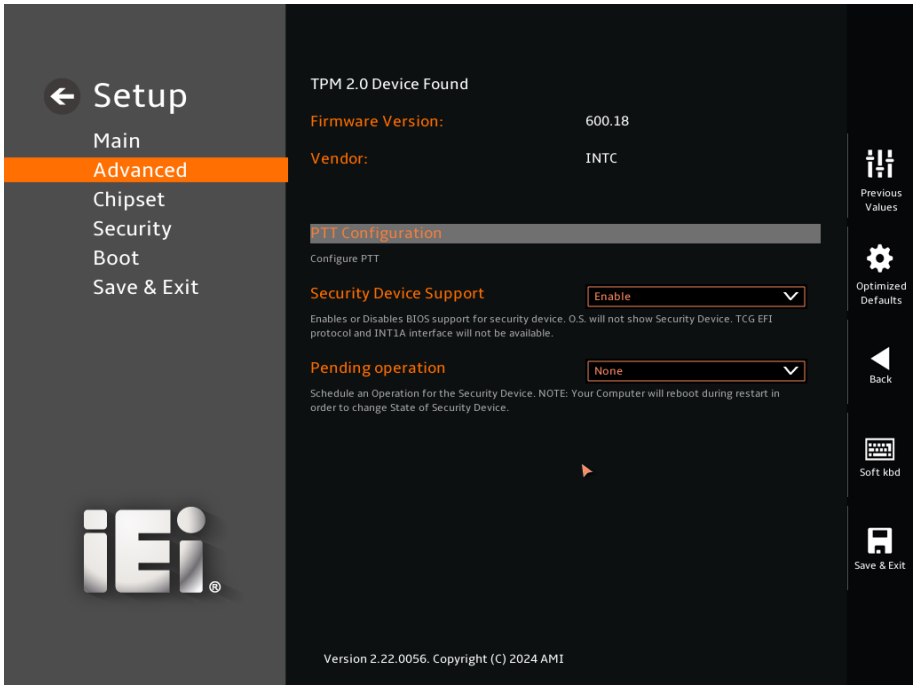
4.3.1.2 Performance-core Information

Use the **Performance-core Information** menu (**BIOS Menu 9**) to display the P-core information.

BIOS Menu 9: Performance-core Information

4.3.2 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 10**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 10: Trusted Computing

➔ **Security Device Support [Enable]**

Use the **Security Device Support** option to select the TPM device.

➔ **Disable**		TPM support is disabled.
➔ **Enable**	**DEFAULT**	TPM support is enabled.

➔ **Pending Operation [None]**

Use the **Pending Operation** option to schedule an operation for the security device.

➔ **None**	**DEFAULT**	TPM information remains unchanged as the previous
➔ **TPM Clear**		TPM information is cleared

4.3.2.1 PTT Configuration

➔ **TPM Device Selection [PTT]**

Use the **TPM Device Selection** option to enable or disable BIOS support for security devices.

➔ **dTPM** dTPM support is enabled.

➔ **PTT** **DEFAULT** PTT support is enabled.

4.3.3 iEi One Key Recovery 2

The **iEi One Key Recovery 2** menu (**BIOS Menu 11**) configures iEi One Key Recovery 2.

BIOS Menu 11: iEi One Key Recovery 2 Settings

➔ **Auto Recovery Function [Disabled]**

Use the **Auto Recovery Function** option to enable or disable the watchdog function, when OS crashes, it will automatically recover the system.

➔ **Disable** TPM support is disabled.

➔ **Enable** **DEFAULT** TPM support is enabled.

4.3.4 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 12**) configures the RTC wake event.

BIOS Menu 12: RTC Wake Settings

➔ **Wake system with Fixed Time [Enabled]**

Use the **Wake system with the Fixed Time** option to enable or disable the system wake on alarm event.

➔ **Disabled** The real-time clock (RTC) cannot generate a wake event.

➔ **Enabled** **DEFAULT** If selected, the **Wake up every day** option appears, allowing you to enable the system to wake up every day at the specified time. Besides, the following options appear with values that can be selected:

Wake up date

Wake up hour

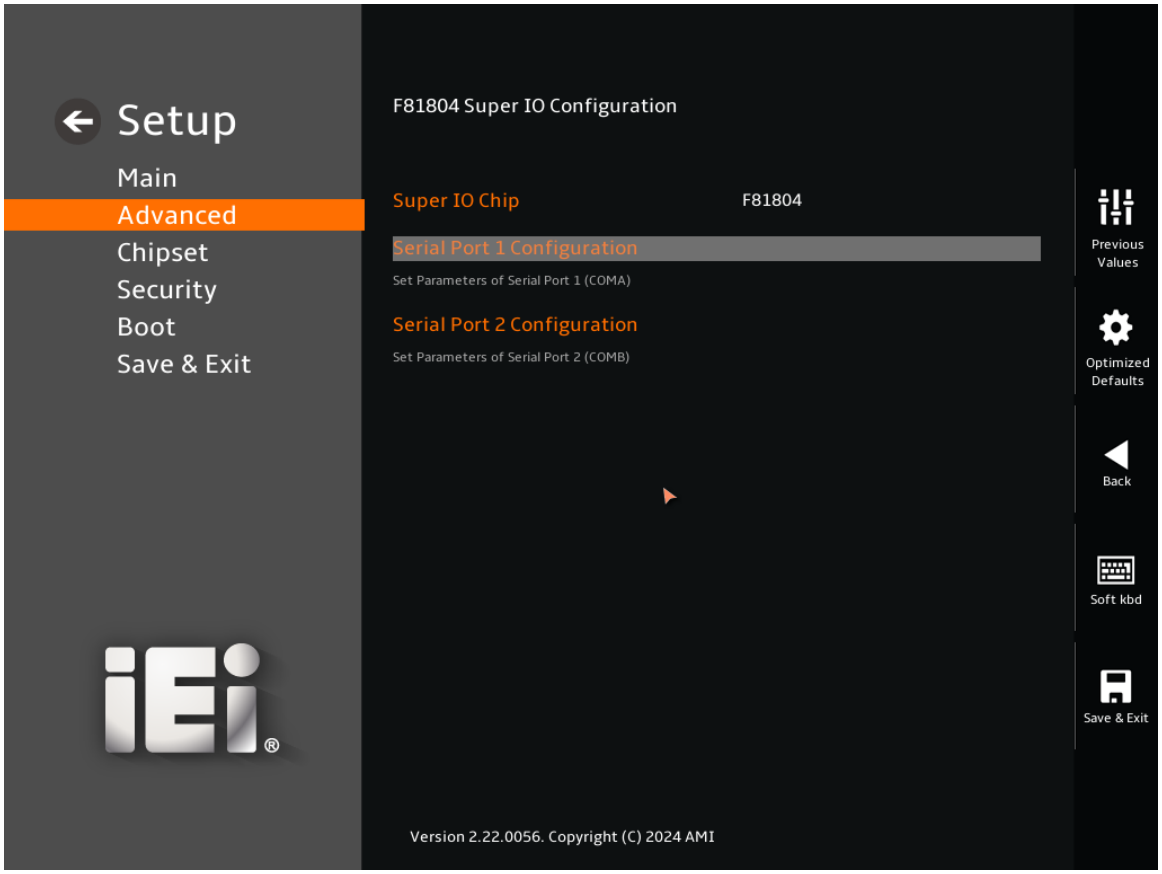
Wake up minute

Wake up second

After setting the alarm, the computer turns itself on from a suspended state when the alarm goes off.

4.3.5 F81804 Super IO Configuration

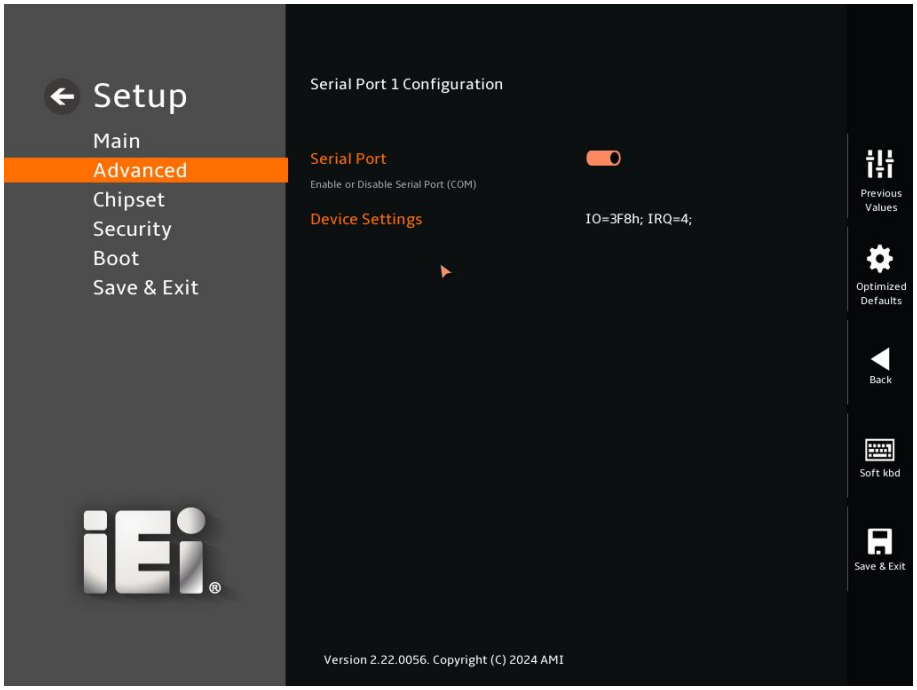
Use the **F81804 Super IO Configuration** menu (**BIOS Menu 13**) to set or change the configurations for serial ports.



BIOS Menu 13: F81804 Super I/O Configuration

4.3.5.1 Serial Port 1 Configuration

Use the **Serial Port 1 Configuration** menu (**BIOS Menu 14**) to configure the serial port n.



BIOS Menu 14: Serial Port 1 Configuration Menu

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**		Disable the serial port
➔ **Enabled**	**DEFAULT**	Enable the serial port

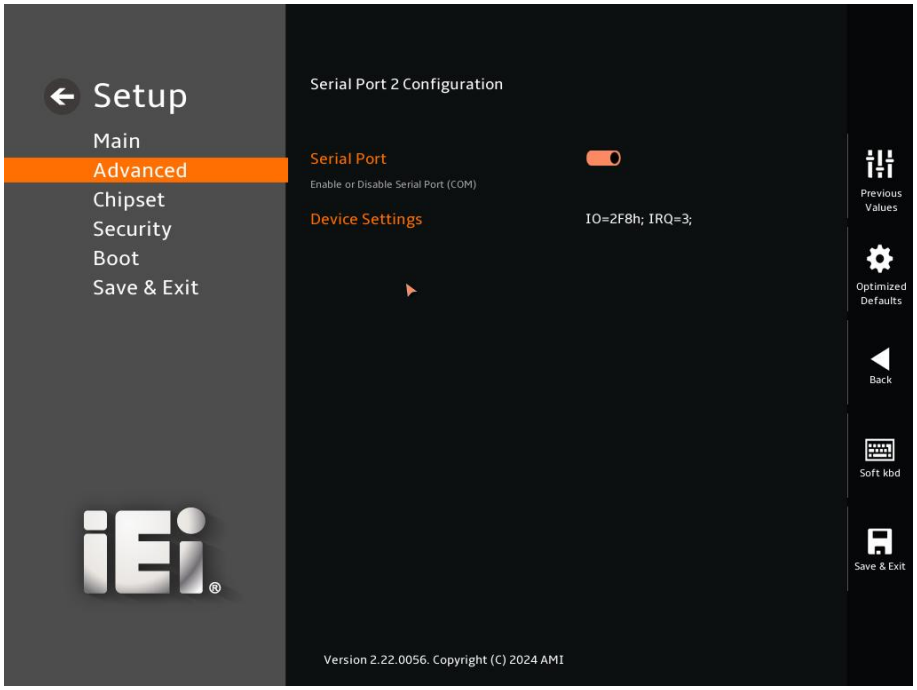
➔ **Device Settings**

The **Device Settings** option shows the serial I/O port address and interrupt address.

➔ **IO=3F8h; IRQ=4**	The serial Port I/O port address is 3F8h and the interrupt address is IRQ4

4.3.5.2 Serial Port 2 Configuration

Use the **Serial Port 2 Configuration** menu (**BIOS Menu 15**) to configure the serial port n.



BIOS Menu 15: Serial Port 2 Configuration Menu

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**		Disable the serial port
➔ **Enabled**	**DEFAULT**	Enable the serial port

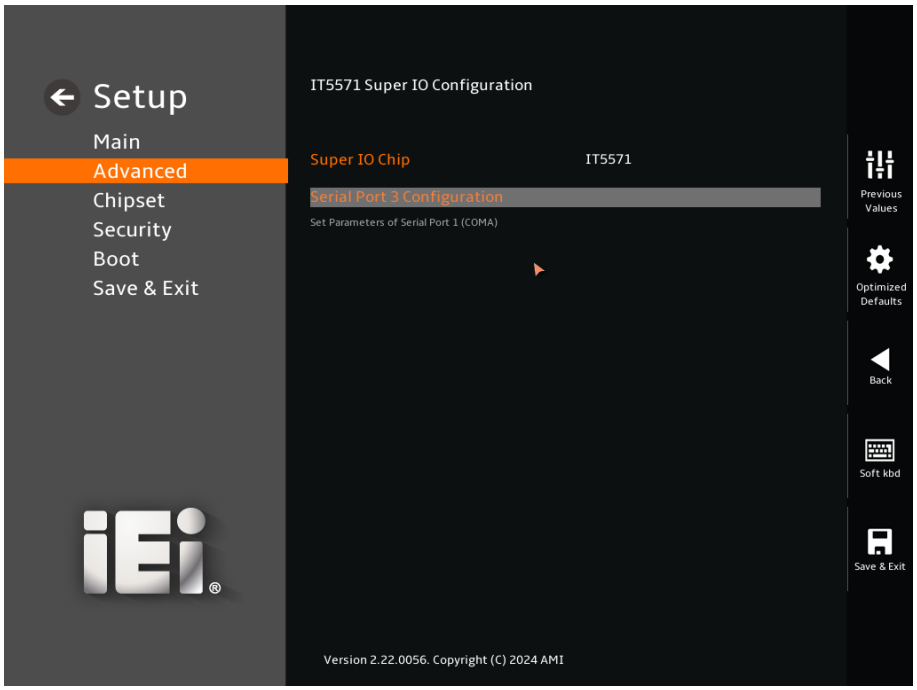
➔ **Device Settings**

The **Device Settings** option shows the serial port I/O port address and interrupt address.

➔ **IO=2F8h; IRQ=3**	The serial I/O port address is 2F8h and the interrupt address is IRQ3

4.3.6 IT5571 Super IO Configuration

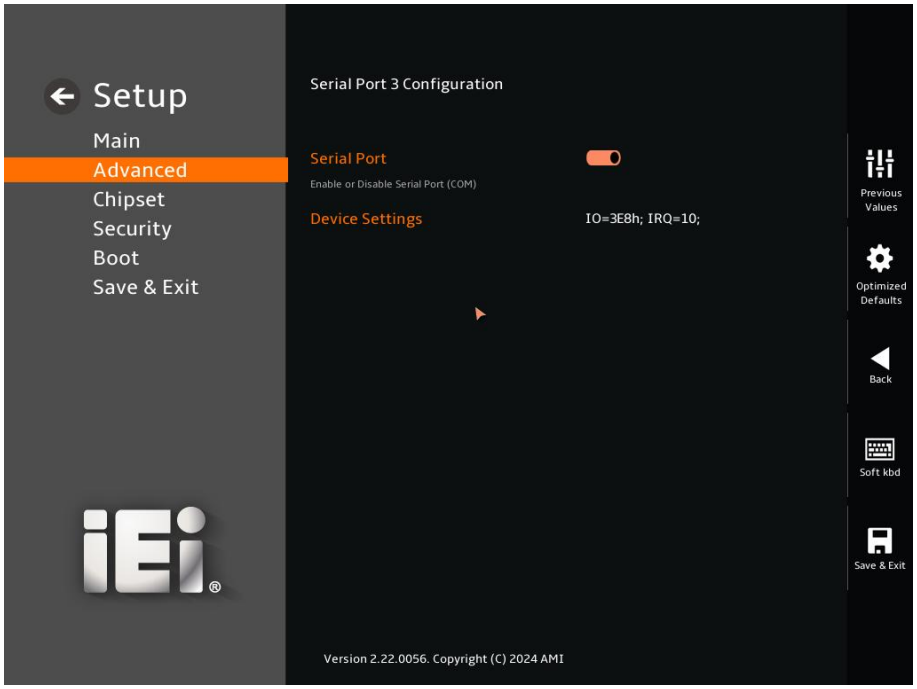
Use the **IT5571 Super IO Configuration** menu (**BIOS Menu 13**) to set or change the configurations for serial ports.



BIOS Menu 16: IT5571 Super I/O Configuration

4.3.6.1 Serial Port 3 Configuration

Use the **Serial Port 3 Configuration** menu (**BIOS Menu 14**) to configure the serial port n.



BIOS Menu 17: Serial Port 3 Configuration Menu

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**		Disable the serial port
➔ **Enabled**	**DEFAULT**	Enable the serial port

➔ **Device Settings**

The **Device Settings** option shows the serial I/O port address and interrupt address.

➔ **IO=3F8h; IRQ=10** The serial Port I/O port address is 3F8h and the interrupt address is IRQ10

4.3.7 EC IT5571 H/W Monitor

The **EC IT5571 H/W Monitor** menu (**BIOS Menu 18**) contains the smart fan mode configuration submenu and shows the state of H/W real-time operating temperature, fan speeds and system voltages.

BIOS Menu 18: EC IT5571 H/W Monitor

BIOS Menu 19: EC KB9068 H/W Monitor (2/2)

➔ PC Health Status

The following system parameters and values are shown. The system parameters that are monitored are:

System Temperatures:

- CPU Temperature

Fan Speeds:

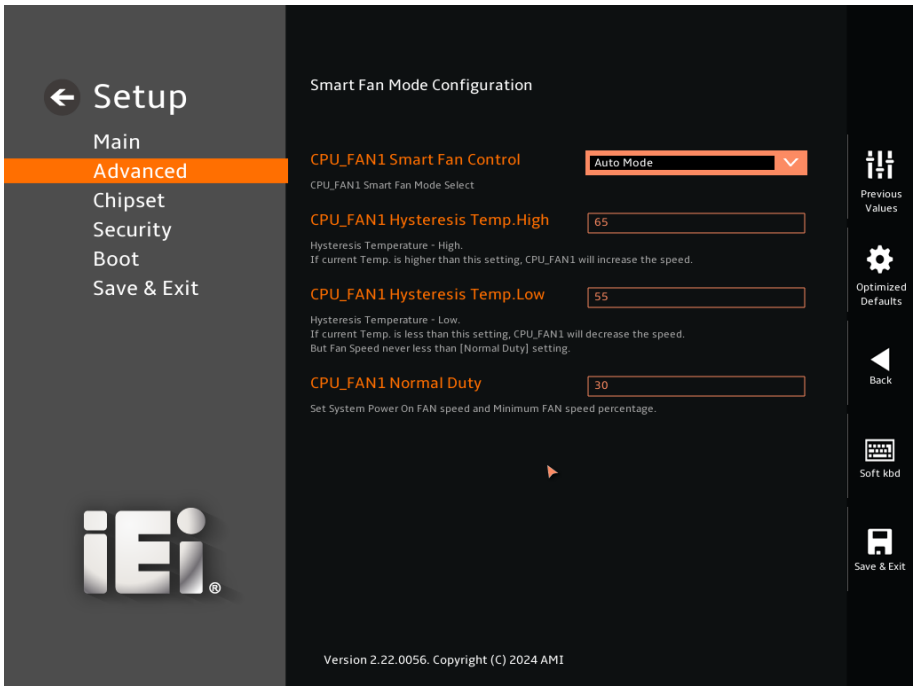
- Fan1 Speed

Voltages:

- +5VS

4.3.7.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 20**) to configure the CPU/system fan start/off temperature and control mode.



BIOS Menu 20: Smart Fan Mode Configuration

➔ **CPU_FAN1 Smart Fan Control [Auto Mode]**

Use the **CPU_FAN1 Smart Fan Control** option to configure the CPU Smart Fan.

➔ **Manual Mode**		The fan spins at the speed set in Manual Mode settings.
➔ **Auto Mode**	**DEFAULT**	The fan adjusts its speed using Auto Mode settings.

➔ **CPU_FAN1 Hysteresis Temp.High [65]**

If the current CPU temperature is higher than this setting, CPU_FAN1 will increase the speed.

➔ **CPU_FAN1 Hysteresis Temp.Low [55]**

If the current CPU temperature is lower than this setting, CPU_FAN1 will decrease the speed. But the fan speed is never less than the [Normal Duty] setting.

➔ **CPU_FAN1 Normal Duty [30]**

Use the **CPU_FAN1 Start PWM** option to set the system power on fan speed and minimum fan speed percentage. Use the + or – key to change the value or enter a decimal number.

4.3.8 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 21**) allows the console redirection options to be configured. Console Redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.

BIOS Menu 21: Serial Port Console Redirection (1/2)

BIOS Menu 22: Serial Port Console Redirection (2/2)

➔ **Console Redirection [Disabled]**

Use the **Console Redirection** option to enable or disable the console redirection function.

➔	**Disabled**	**DEFAULT**	Disabled the console redirection function
➔	**Enabled**		Enabled the console redirection function

The **Console Redirection Settings** submenu will be available when the **Console Redirection** option is enabled.

4.3.8.1 Console Redirection Settings

The following options are available in the **Console Redirection Settings** submenu (**BIOS Menu 23**) when the **COM Console Redirection** (for COM1 to COM3) option is enabled.

BIOS Menu 23: COM Console Redirection Settings

➔ **Terminal Type [ANSI]**

Use the **Terminal Type** option to specify the remote terminal type.

➔ **VT100**		The target terminal type is VT100
➔ **VT100+**		The target terminal type is VT100+
➔ **VT-UTF8**		The target terminal type is VT-UTF8
➔ **ANSI**	**DEFAULT**	The target terminal type is ANSI

➔ **Bits per second [115200]**

Use the **Bits per second** option to specify the serial port transmission speed. The speed must match on the other side. Long or noisy lines may require lower speeds.

➔ **9600**	Sets the serial port transmission speed at 9600.
➔ **19200**	Sets the serial port transmission speed at 19200.
➔ **38400**	Sets the serial port transmission speed at 38400.

➔	**57600**		Sets the serial port transmission speed at 57600.
➔	**115200**	**DEFAULT**	Sets the serial port transmission speed at 115200.

➔ **Data Bits [8]**

Use the **Data Bits** option to specify the number of data bits.

➔	**7**		Sets the data bits at 7.
➔	**8**	**DEFAULT**	Sets the data bits at 8.

➔ **Parity [None]**

Use the **Parity** option to specify the parity bit that can be sent with the data bits for detecting transmission errors.

➔	**None**	**DEFAULT**	No parity bit is sent with the data bits.
➔	**Even**		The parity bit is 0 if the number of ones in the data bits is even.
➔	**Odd**		The parity bit is 0 if the number of ones in the data bits is odd.
➔	**Mark**		The parity bit is always 1. This option does not allow for error detection.
➔	**Space**		The parity bit is always 0. T This option does not allow for error detection.

➔ **Stop Bits [1]**

Use the **Stop Bits** option to specify the number of stop bits used to indicate the end of a serial data packet. Communication with slow devices may require more than 1 stop bit.

➔	**1**	**DEFAULT**	Sets the number of stop bits at 1.
➔	**2**		Sets the number of stop bits at 2.

4.3.9 NVMe Configuration

Use the **NVMe Configuration** (

BIOS Menu 24) menu to display the NVMe controller and device information.

BIOS Menu 24: NVMe Configuration

4.3.10 SDIO Configuration

Use the **SDIO Configuration** (

BIOS Menu 24) menu to display the SDIO controller and device information.

BIOS Menu 25: SDIO Configuration

➔ **SDIO Access Mode [Auto]**

Use the **SDIO Access Mode** to specify the communication type.

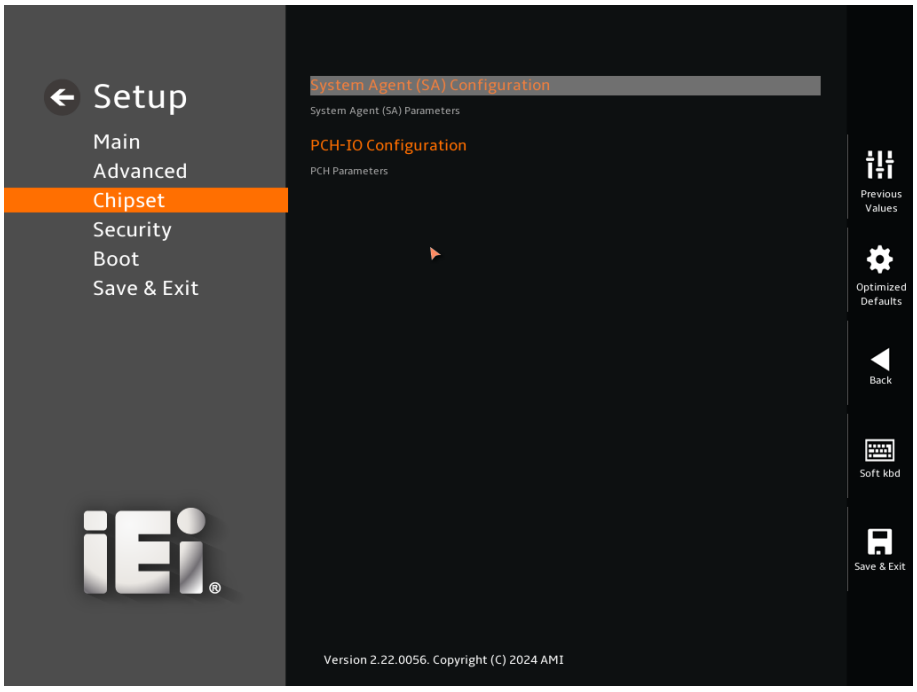
➔	**Auto**	**DEFAULT**	The communication type is Auto
➔	**ADMA**		The communication type is ADMA
➔	**SDMA**		The communication type is SDMA
➔	**PIO**		The communication type is PIO

4.4 Chipset

Use the **Chipset** menu (**BIOS Menu 26**) to access the PCH IO and System Agent (SA) configuration menus.

WARNING!

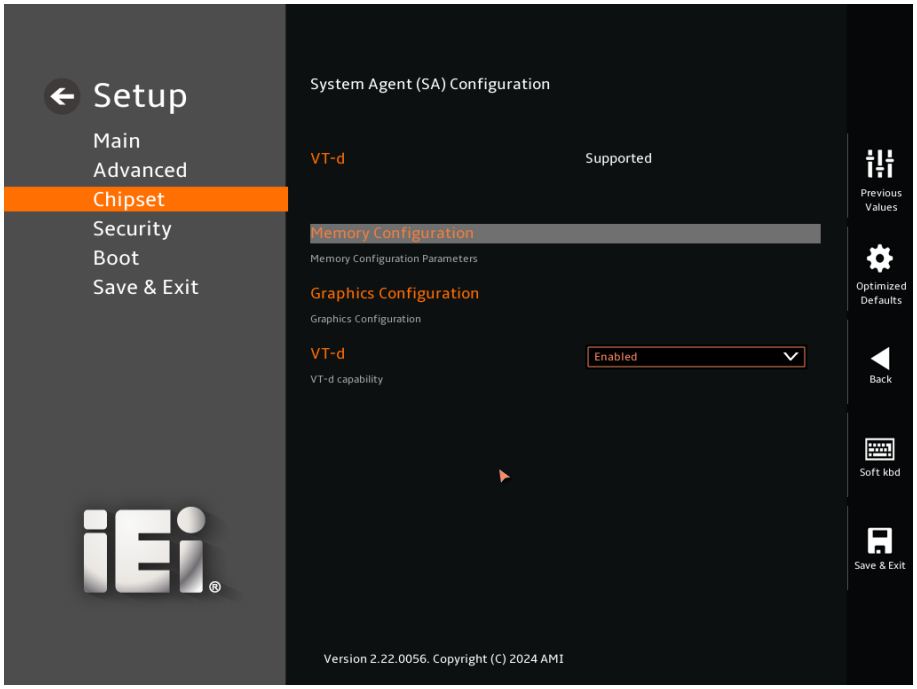
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 26: Chipset

4.4.1 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 27**) to configure the System Agent (SA) parameters.



BIOS Menu 27: System Agent (SA) Configuration

➔ **VT-d [Enabled]**

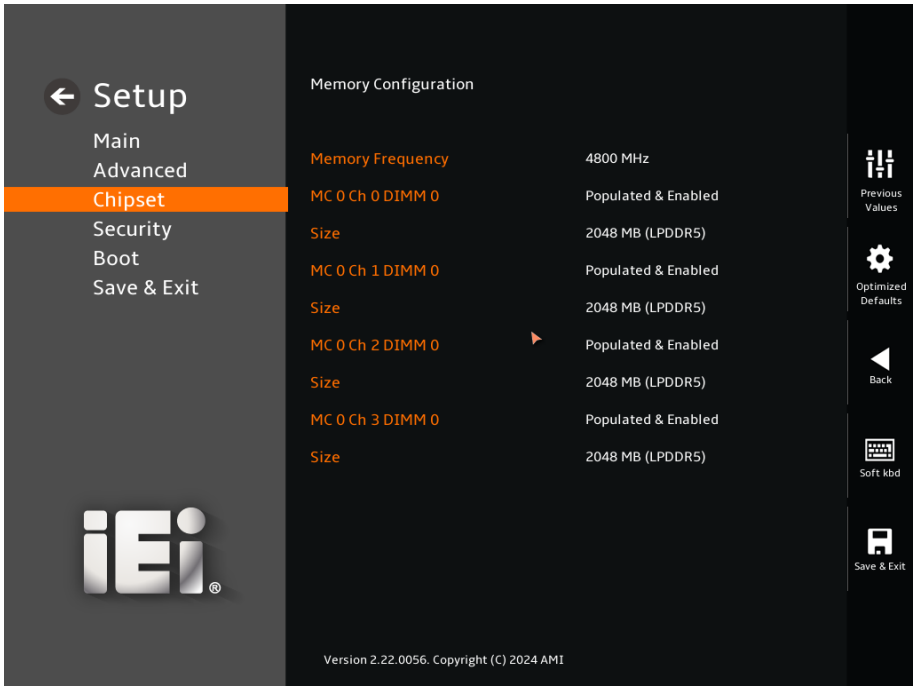
Use the **VT-d** option to enable or disable the VT-d capability.

➔ **Disabled** Disable the VT-d capability

➔ **Enabled** **DEFAULT** Enable the VT-d capability

4.4.1.1 Memory Configuration

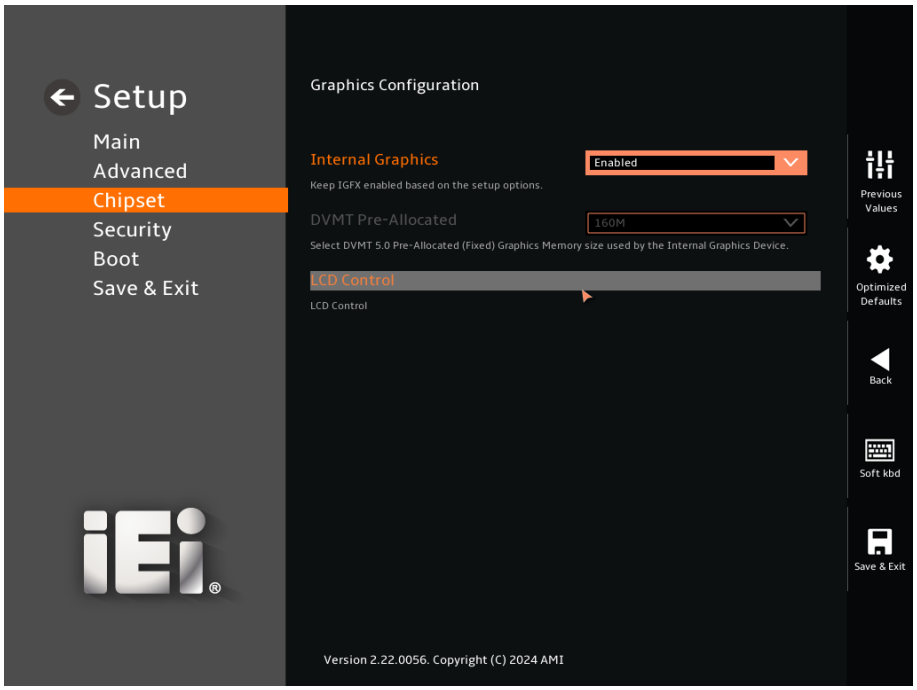
Use the **Memory Configuration** submenu (**BIOS Menu 28**) to view memory information.



BIOS Menu 28: Memory Configuration

4.4.1.2 Graphics Configuration

Use the **Graphics Configuration** (**BIOS Menu 29**) menu to configure the video device connected to the system.



BIOS Menu 29: Graphics Configuration

➔ **Internal Graphics [Enabled]**

Use the **Internal Graphics** option to configure whether to keep IGFX enabled. If a user wants to support dual display by internal graphics and external graphics, this Internal Graphics option should be set to Enabled and the above Primary Display option should be set to IGFX.

➔ **Auto**		Auto mode
➔ **Disabled**		Disables IGFX.
➔ **Enabled**	**Default**	Enables IGFX.

➔ **DVMT Pre-Allocated [160M]**

Use the **DVMT Pre-Allocated** option to set the amount of system memory allocated to the integrated graphics processor when the system boots. The system memory allocated can then only be used as graphics memory and is no longer available to applications or the operating system. Configuration options are listed below:

80M
160M **Default**

➔ **DVMT Total Gfx Mem [MAX]**

Use the **DVMT Total Gfx Mem** option to select the total DVMT5.0 graphic memory size used by the internal graphic device. The following options are available:

128M
256M
MAX **Default**

4.4.1.2.1 LCD Control

Use the **LCD Control** menu (**BIOS Menu 10**) to configure settings of onboard LVDS.

BIOS Menu 30: LCD Control

➔ **On board LVDS [Disable]**

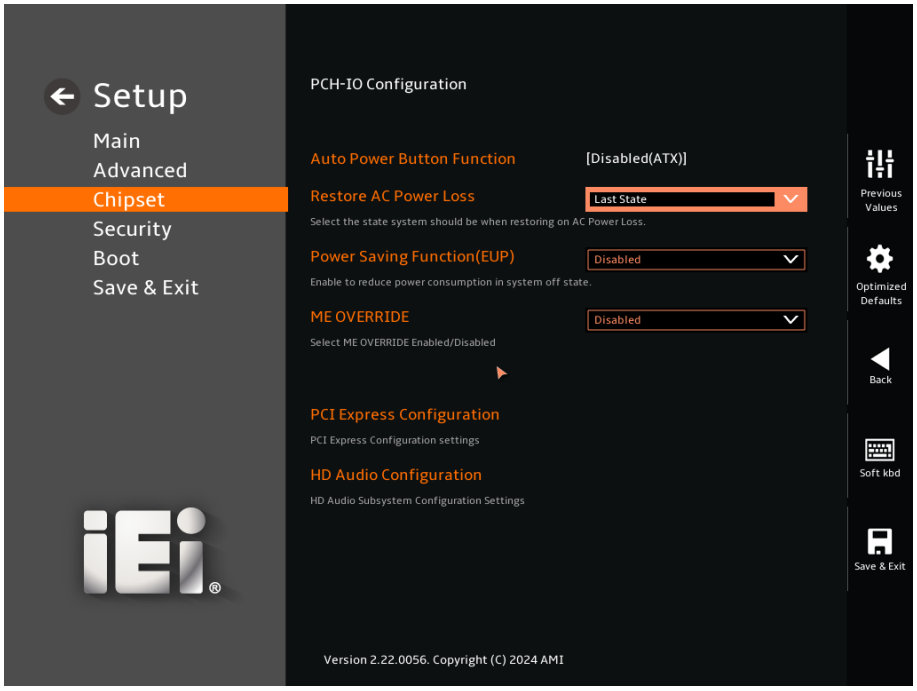
Use the **On board LVDS** option to configure support for the LVDS.

➔ **Disable** **DEFAULT** LVDS support is disabled.

➔ **Enable** LVDS support is enabled.

4.4.2 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 31**) to configure the PCH parameters.



BIOS Menu 31: PCH-IO Configuration

➔ **Auto Power Button Function [Disabled (ATX)]**

Use the **Auto Power Button Function** BIOS option to show the power mode state. Use the **J_ATX_AT1** to switch the AT/ATX power mode.

➔ **Enabled (AT)** The system power mode is AT.

➔ **Disabled (ATX)** The system power mode is ATX.

➔ **Restore AC Power Loss [Last State]**

Use the **Restore AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system when the power mode is ATX.

- ➔ **Power Off** The system remains turned off
- ➔ **Power On** The system turns on
- ➔ **Last State** **DEFAULT** The system returns to its previous state. If it is on, it turns itself on. If it was off, it remains off.

➔ **Power Saving Function (EUP) [Disabled]**

Use the **Power Saving Function (EUP)** BIOS option to enable or disable the power saving function.

- ➔ **Disabled** **DEFAULT** The power-saving function is disabled.
- ➔ **Enabled** The power-saving function is enabled. It will reduce power consumption when the system is off.

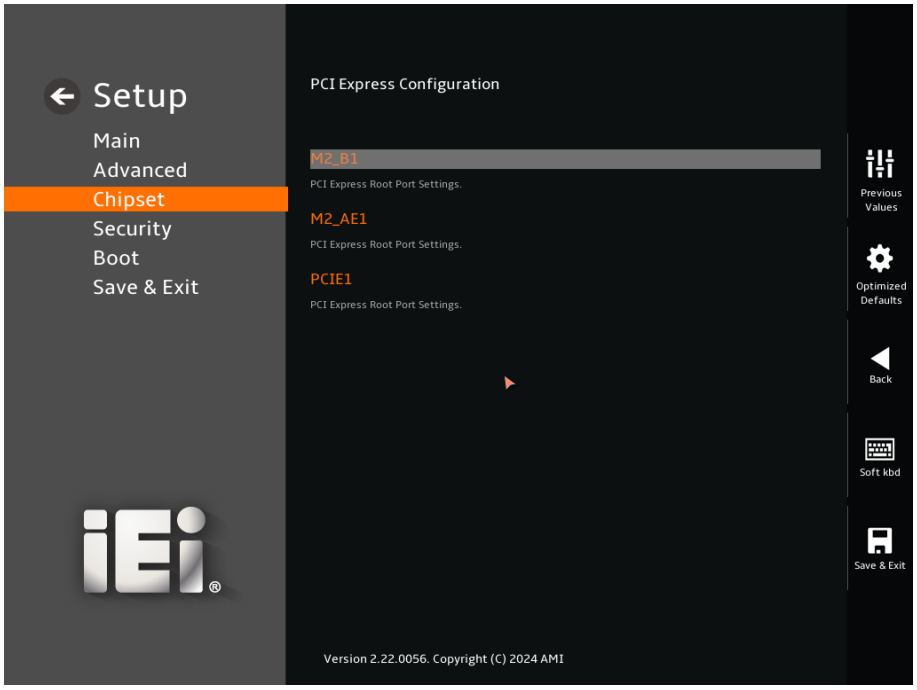
➔ **ME Override [Disable]**

Use the **ME Override** to enable or disable the ME Override.

- ➔ **Disabled** **DEFAULT** ME Override is disabled.
- ➔ **Enabled** ME Override is enabled.

4.4.2.1 PCI Express Configuration

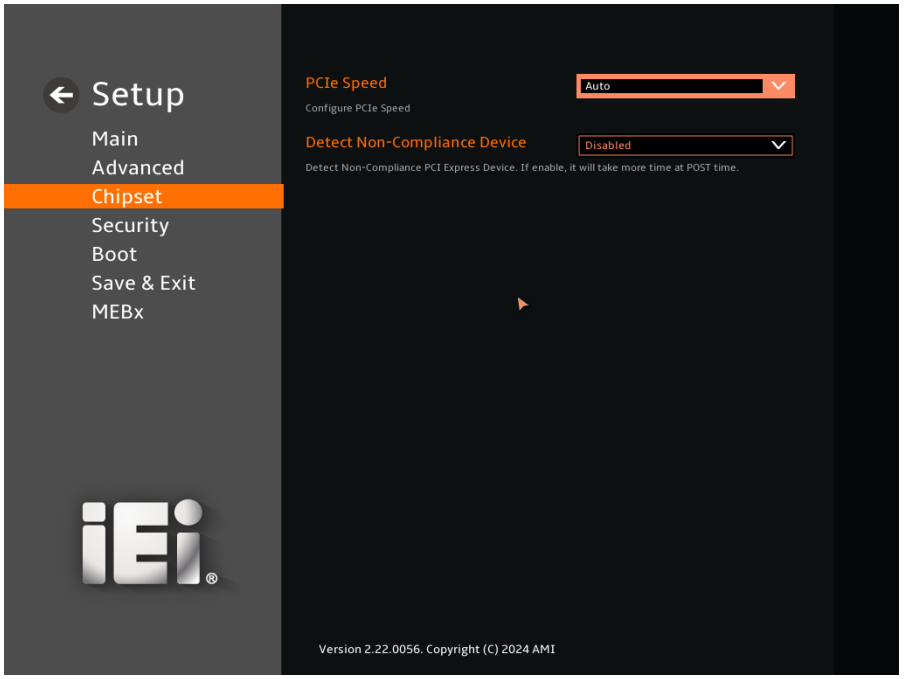
Use the **PCI Express Configuration** submenu (**BIOS Menu 32**) to configure the PCI Express slots.



BIOS Menu 32: PCI Express Configuration

4.4.2.1.1 M2_B1 Slot

Use the **M2_B1** submenu (**BIOS Menu 33**) to configure the M.2 B key slot.



BIOS Menu 33: M2_B1

➔ **PCIe Speed [Auto]**

Use the **PCIe Speed** option to specify the PCI Express port speed. Configuration options are listed below.

➔ **Auto**	**DEFAULT**	Auto mode.
➔ **Gen1**		Configure PCIe Speed to Gen1.
➔ **Gen2**		Configure PCIe Speed to Gen2.
➔ **Gen3**		Configure PCIe Speed to Gen3.

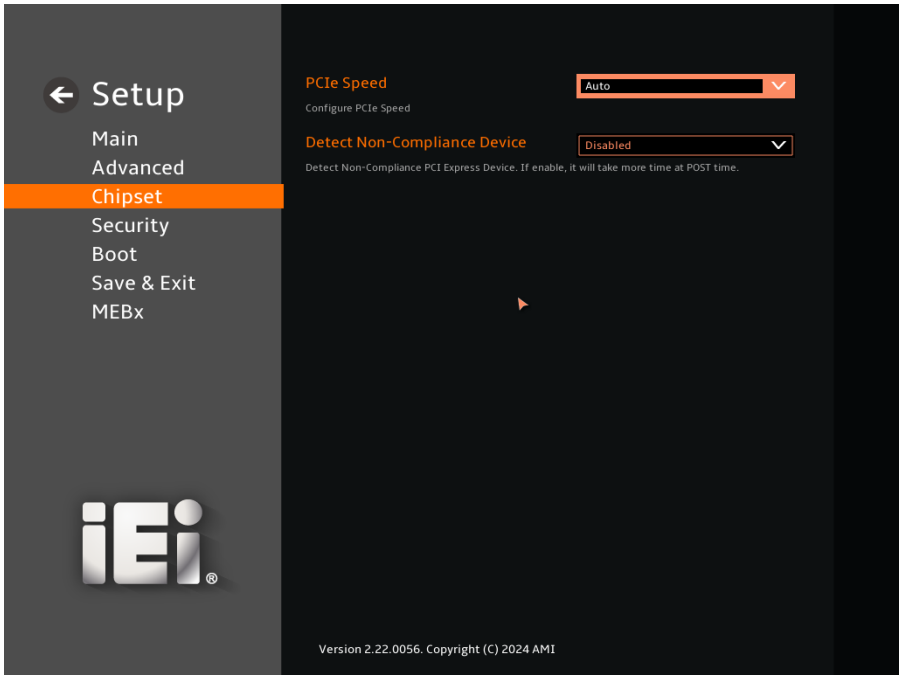
➔ **Detect Non-Compliance Device [Disabled]**

Use the **Detect Non-Compliance Device** option to configure whether to detect if a non-compliance PCI Express device is connected to the PCI Express port.

➔ **Disabled**	**DEFAULT**	Do not detect if a non-compliant PCI Express device is connected to the PCI Express port.
➔ **Enabled**		Detect if a non-compliant PCI Express device is connected to the PCI Express port.

4.4.2.1.2 M2_AE1 Slot

Use the **M2_AE1** submenu (**BIOS Menu 33**) to configure the M.2 B key slot.



BIOS Menu 34: M2_AE1

➔ **PCIe Speed [Auto]**

Use the **PCIe Speed** option to specify the PCI Express port speed. Configuration options are listed below.

➔ **Auto**	**DEFAULT**	Auto mode.
➔ **Gen1**		Configure PCIe Speed to Gen1.
➔ **Gen2**		Configure PCIe Speed to Gen2.
➔ **Gen3**		Configure PCIe Speed to Gen3.

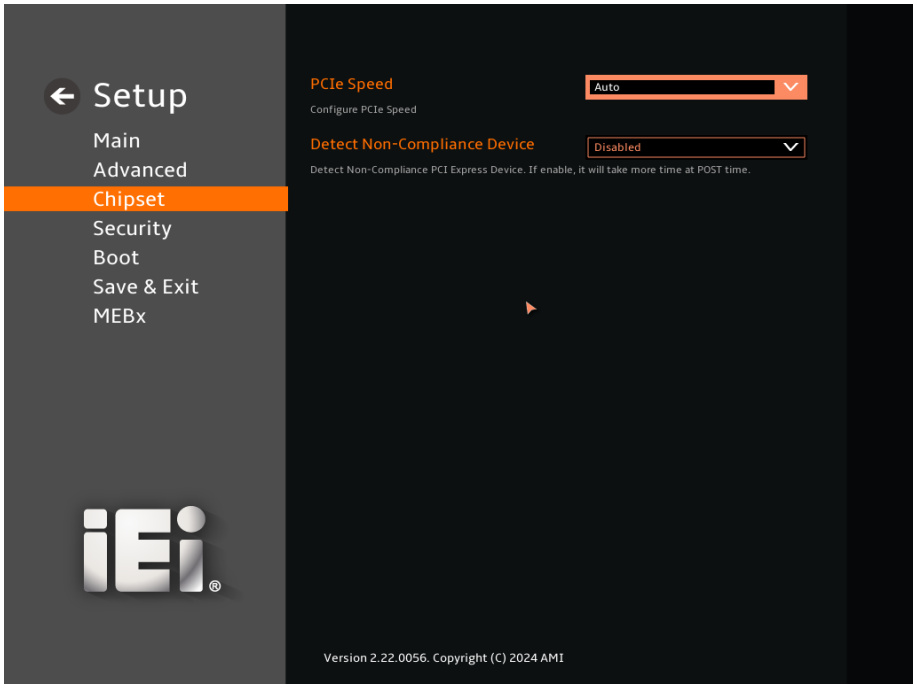
➔ **Detect Non-Compliance Device [Disabled]**

Use the **Detect Non-Compliance Device** option to configure whether to detect if a non-compliance PCI Express device is connected to the PCI Express port.

➔ **Disabled**	**DEFAULT**	Do not detect if a non-compliant PCI Express device is connected to the PCI Express port.
➔ **Enabled**		Detect if a non-compliant PCI Express device is connected to the PCI Express port.

4.4.2.1.3 PCIE1

Use the **PCIE1** submenu (**BIOS Menu 33**) to configure the PCIE slot.



BIOS Menu 35: PCIE1

➔ **PCIe Speed [Auto]**

Use the **PCIe Speed** option to specify the PCI Express port speed. Configuration options are listed below.

➔ **Auto**	**DEFAULT**	Auto mode.

➔ **Gen1**		Configure PCIe Speed to Gen1.
➔ **Gen2**		Configure PCIe Speed to Gen2.
➔ **Gen3**		Configure PCIe Speed to Gen3.

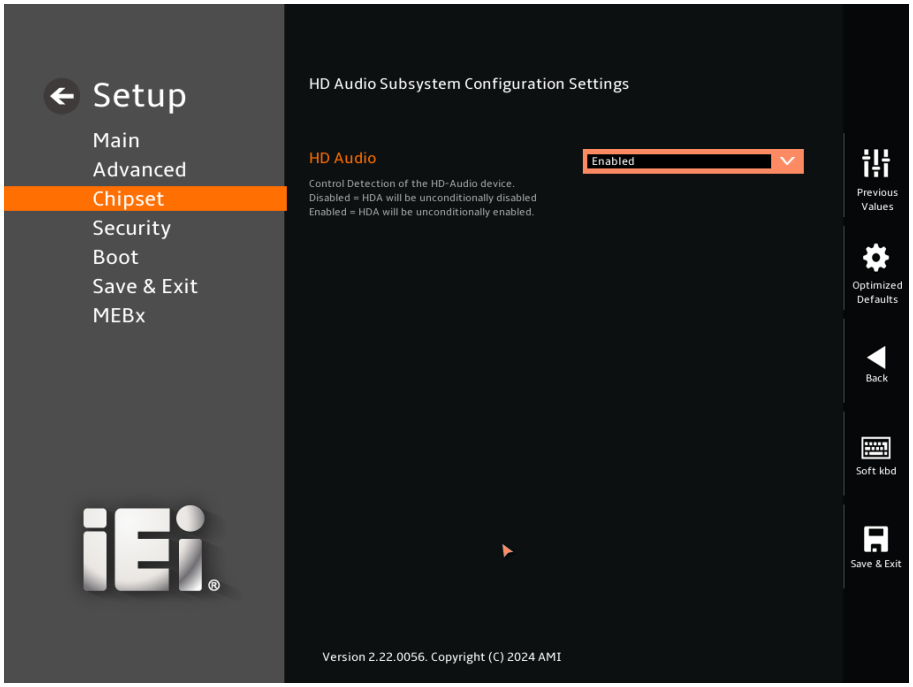
➔ **Detect Non-Compliance Device [Disabled]**

Use the **Detect Non-Compliance Device** option to configure whether to detect if a non-compliance PCI Express device is connected to the PCI Express port.

➔ **Disabled**	**DEFAULT**	Do not detect if a non-compliant PCI Express device is connected to the PCI Express port.
➔ **Enabled**		Detect if a non-compliant PCI Express device is connected to the PCI Express port.

4.4.2.2 HD Audio Configuration

Use the **HD Audio Configuration** menu (**BIOS Menu 36**) to configure the PCH Azalia settings.



BIOS Menu 36: HD Audio Configuration

➔ **HD Audio [Enabled]**

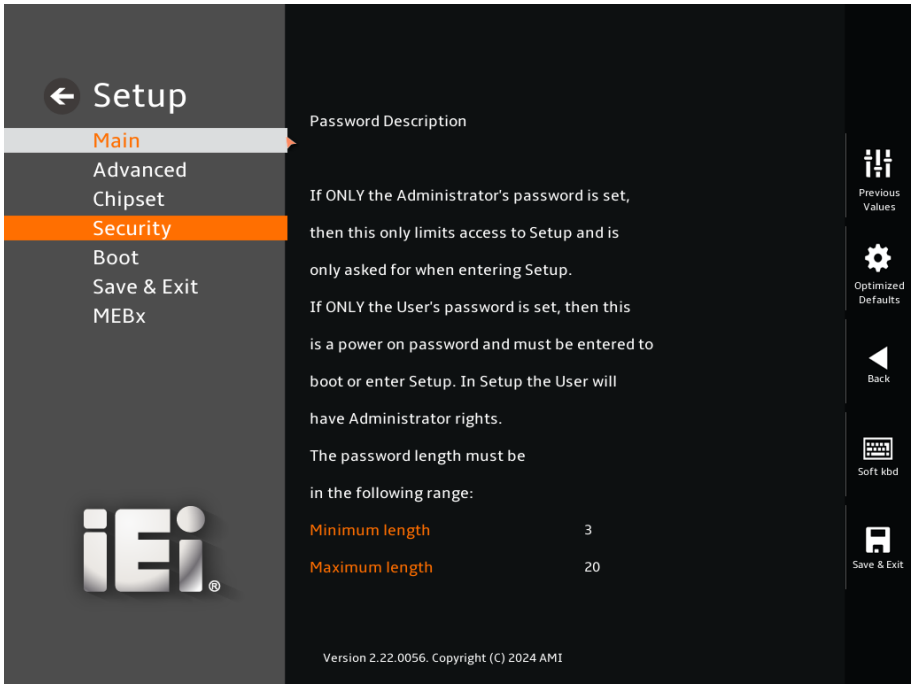
Use the **HD Audio** option to enable or disable the High Definition Audio controller.

➔ **Disabled** The onboard High Definition Audio controller is disabled.

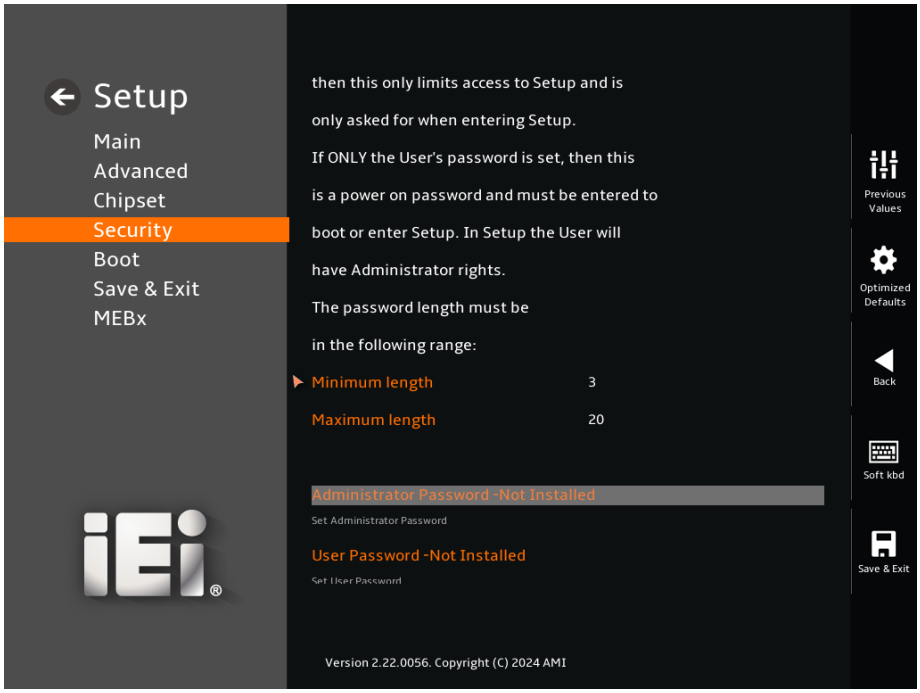
➔ **Enabled** **DEFAULT** The onboard High Definition Audio controller is enabled.

4.5 Security

Use the **Security** menu (**BIOS Menu 37**) to set system and user passwords.



BIOS Menu 37: Security (1/2)



BIOS Menu 38: Security (2/2)

➔ **Administrator Password**

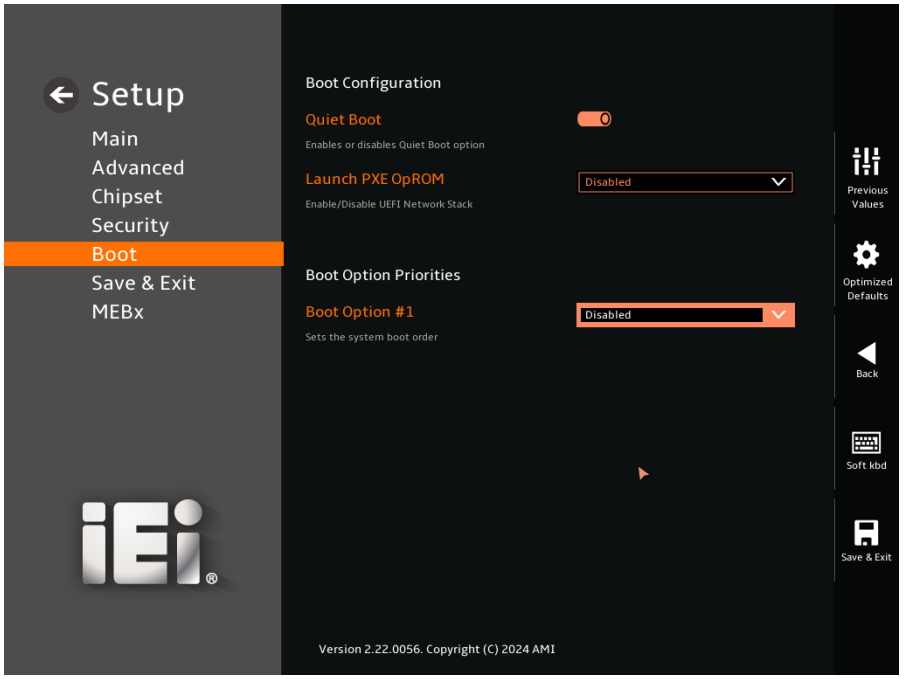
Use the **Administrator Password** to set or change an administrator password.

➔ **User Password**

Use the **User Password** to set or change a user password.

4.6 Boot

Use the **Boot** menu (**BIOS Menu 39**) to configure system boot options.



BIOS Menu 39: Boot

4.6.1 Boot Configuration

➔ **Quiet Boot [Enabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔ **Disabled** Normal POST messages displayed

➔ **Enabled** **DEFAULT** OEM Logo displayed instead of POST messages

➔ **Launch PXE OpROM [Disabled]**

Use the **Launch PXE OpROM** option to enable or disable the boot option for legacy network devices.

➔ **Disabled** **DEFAULT** Ignore all PXE Option ROMs

➔ **Enabled** Load PXE Option ROMs.

4.6.2 Boot Option Priorities

Use the Boot Option # N to choose the system boots from the peripherals you selected. The following Boot Options are listed as an example.

➔ **Boot Option #1**

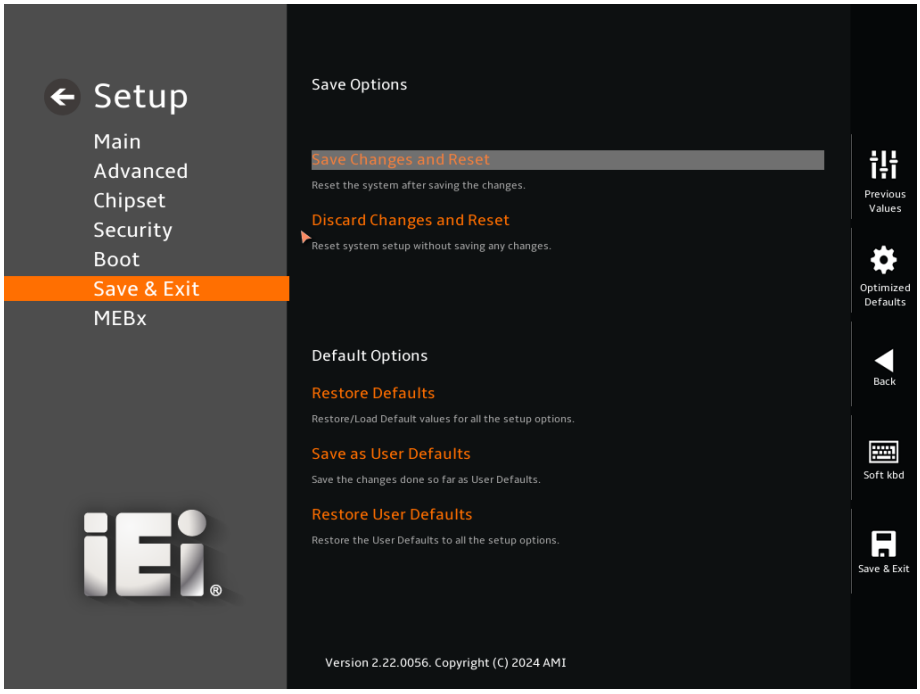
Sets the system boot order **ADATA SP580** as the first priority.

➔ **Windows Boot Manager (P1: ADATA SSD SP580 240GB)**

➔ **Disabled**

4.7 Save & Exit

Use the **Save & Exit** menu (**BIOS Menu 40**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 40: Save & Exit

➔ Save Changes and Reset

Use the **Save Changes and Reset** option to save the changes made to the BIOS options and reset the system.

➔ Discard Changes and Reset

Use the **Discard Changes and Reset** option to exit the system without saving the changes made to the BIOS configuration setup program.

➔ Restore Defaults

Use the **Restore Defaults** option to load the optimal default values for each of the parameters on the Setup menus. The **F3 key can be used for this operation.**

➔ **Save as User Defaults**

Use the **Save as User Defaults** option to save the changes done so far as user defaults.

➔ **Restore User Defaults**

Use the **Restore User Defaults** option to restore the user defaults to all the setup options.

Appendix

A

Regulatory Compliance

DECLARATION OF CONFORMITY

This equipment has been tested and found to comply with specifications for CE marking. If the user modifies and/or installs other devices in the equipment, the CE conformity declaration may no longer apply.

FCC WARNING

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Appendix

B

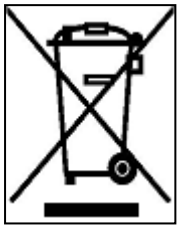
Product Disposal

CAUTION:

Risk of explosion if battery is replaced by an incorrect type. Only certified engineers should replace the on-board battery.

Dispose of used batteries according to instructions and local regulations.

- Outside the European Union – If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union – The device that produces less waste and is easier to recycle is classified as electronic device in terms of the European Directive 2012/19/EU (WEEE), and must not be disposed of as domestic garbage.



EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your device, please follow the guidance of your local authority, or ask the shop where you purchased the product. The mark on electrical and electronic products only applies to the current European Union Member States.

Please follow the national guidelines for electrical and electronic product disposal.

Appendix

C

BIOS Options

Below is a list of BIOS configuration options in the BIOS chapter.

Appendix

D

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. Contact IEI support or visit the IEI website for specific drivers for other operating systems.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMIs or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer.

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table D-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. When the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

EXAMPLE PROGRAM:

```
; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT     15H

;
; ADD THE APPLICATION PROGRAM HERE
;

        CMP     EXIT_AP, 1      ;is the application over?
        JNE     W_LOOP          ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT     15H

;
; EXIT ;
```

Appendix

E

Hazardous Materials Disclosure

E.1 RoHS Directive (2015/863/EU)

The details provided in this appendix are to ensure that the product is compliant with the RoHS Directive (2015/863/EU). The table below acknowledges the presences of small quantities of certain substances in the product, and is applicable to RoHS Directive (2015/863/EU).

Please refer to the following table.

Part Name	Toxic or Hazardous Substances and Elements									
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)	Bis(2-ethylhexyl) phthalate (DEHP)	Butyl benzyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)
Housing	O	O	O	O	O	O	O	O	O	O
Display	O	O	O	O	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O	O	O	O	O
Battery	O	O	O	O	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in Directive (EU) 2015/863.

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in Directive (EU) 2015/863.

E.2 China RoHS

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

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)
壳体	O	O	O	O	O	O
显示	O	O	O	O	O	O
印刷电路板	O	O	O	O	O	O
金属螺帽	O	O	O	O	O	O
电缆组装	O	O	O	O	O	O
风扇组装	O	O	O	O	O	O
电力供应组装	O	O	O	O	O	O
电池	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11364-2014 與 GB/T26572-2011 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11364-2014 與 GB/T26572-2011 标准规定的限量要求。