

EZX-EHLP

Intel® Elkhart Lake 1.8" SBC

User's Manual

1st Ed –16 August 2022

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.
- (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE 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.

Notice

This guide is designed for experienced users to setup the system within the shortest time. For detailed information, please always refer to the electronic user's manual.

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2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information available.
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4. Carefully pack the defective product, a complete Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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1. Getting Started

1.1 Safety Precautions

Warning!



Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!



Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

1.2 Packing List

Before you begin installing your single board, please make sure that the following materials have been shipped:

- 1 x EZX-EHLP motherboard
- 1 x DC jack power cable
- 1 x M.2 42 to 52 bracket with screws



If any of the above items is damaged or missing, contact your retailer.

1.3 Document Amendment History

Revision	Date	By	Comment
1 st	August 2022	Avalue	Initial Release

1.4 Manual Objectives

This manual describes in details Avalue Technology EZX-EHLP Single Board.

We have tried to include as much information as possible but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of this board.

We strongly recommend that you study this manual carefully before attempting to set up EZX-EHLP or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

Please be aware that it is possible to create configurations within the CMOS RAM that make booting impossible. If this should happen, clear the CMOS settings, (see the description of the Jumper Settings for details).

If you have any suggestions or find any errors regarding this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

1.5 System Specifications

EZX-EHLP	
Product Features	Intel® Atom® x6000E Series and Intel® Pentium® and Celeron® J Series processors with CPU Bottom Mounted
	Onboard Single channel LPDDR4 4GB memory down (8GB for BOM option)
	Onboard eMMC 5.1 64GB
	1 x Intel® I210AT Gigabit Ethernet
	1 x Mini DP(DP++), eDP 1.3
	4 x USB 2.0 by pin header
	1 x Dual deck USB3.1 gen2 Type A for 2 x USB 3.1 Gen2 at I/O
	1 x RS-232/422/485
	1 x M.2 Type B 3042/2242 bridge bracket to 3052 (with PCI-e x2 (via OEM BIOS request) or default (PCI-e x1+USB2.0/USB3.0), or (SATAIII+ USB2.0/USB3.0), SIM Slot for SSD/LTE/IO Cards)
	*Default is PCI-e x1/SATAIII+USB2.0/USB3.0 support WWAN+GNSS or NVMe SSD *1 x 10 Pin FPC connector for Micro SIM card adapter *Micro SIM card to SIM card adapter by optional GPIO 8bit DC in +12V
System	
CPU	Intel® Atom® x6000E Series and Intel® Pentium® and Celeron® J Series processors with CPU Bottom Mounted
BIOS	AMI uEFI BIOS, 256Mbit SPI Flash ROM
I/O Chip	EC ITE IT5571
System Memory	Onboard Single channel LPDDR4 4GB memory down (8GB for BOM option)
Watchdog Timer	H/W Reset, 1sec. – 65535sec./min.1sec. or 1min. step
H/W Status Monitor	CPU temperature monitoring Voltages monitoring
Storage	
M.2	1 x M.2 Type B 3042/2242 bridge bracket to 3052 (with PCI-e x2 (via OEM BIOS request) or default (PCI-e x1+USB2.0/USB3), or (SATAIII + USB2.0/USB3), SIM Slot for SSD/LTE/IO Cards) 1 x 10 Pin FPC connector for Micro SIM card adapter
eMMC	Onboard eMMC 5.1 64GB
Edge I/O	
LAN	1 x Intel® I210AT Gigabit Ethernet

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USB 3.1	1 x Dual deck USB3.1 gen2 Type A for 2 x USB 3.1 Gen2 at I/O
DP	1 x Mini DP(DP++)
Onboard I/O	
COM	1 x 2 x 5 pin, pitch 1.27mm connector for RS-232/422/485
USB 2.0	1 x 2 x 6 pin, pitch 1.27mm connector for 4 USB 2.0
GPIO	1 x 2 x 6 pin, pitch 1.27mm connector for GPIO: 8bits
Front Panel	1 x 2 x 5 pin, pitch 1.27mm connector for front panel
RTC Battery	1 x horizontal type battery connector (Battery cable 170mm length)
AT/ATX Selector	1 x 2 x 2 pin, pitch 1.27mm switch for AT/ATX mode (SW1(OO))
Clear CMOS	SW1 switch clear CMOS, need about 15s.
eDP	1 x 2 x 10 pin, pitch 1.25mm connector for eDP
BIOS SPI	1 x 1 x 10 pin, pitch 1.00mm connector for BIOS SPI
EC Debug/ eSPI	1 x 2 x 6 pin, pitch 1.27mm connector for BIOS SPI/EC (80 port)
Activity Indicator LED	Onboard by LED (Boot LED)
Power input connector	1 x 2 pin, phoenix connector for power input connector (right angle) *Note: For system product, please use certified power adapter/power supply.
Display	
Graphic Chipset	Intel® UHD Graphics for 10th Gen Intel® Processors
Spec. & Resolution	1 x Mini DP: 4096 x 2160@60 Hz 1 x eDP: 4096 x 2160@60 Hz Note: This is Intel resolution. DQV actual test resolution as below: Mini DP to DP: 3840x2160(60Hz) Mini DP(DP++) to DP + DP to HDMI: 1920x1080(60Hz) Mini DP(DP++) to HDMI: 1920x1080(60Hz)
Multiple Display	Dual Display (Mini DP+eDP)
Ethernet	
LAN Chipset	1 x Intel® I210AT Gigabit Ethernet
LAN Spec.	10/100/1000 Base-Tx GbE compatible
Mechanical & Environmental	
Power Requirement	DC in +12V 1 x 2 pin, phoenix connector for power input connector (right angle) *Note: For system product, please use certified CE & FCC power adapter/power supply.
ACPI	Single power ATX Support S0, S3, S4, S5 ACPI 5.1 Compliant
Power Mode	AT / ATX mode Switchable Through Jumper
Operating Temp.	0~60°C, w/HDD/SSD, ambient with 0.5 m/s Air flow Elkhart Lake N/J Series CPU SKU

	-20~60°C, w/HDD/SSD, ambient with 0.5 m/s Air flow Elkhart Lake Atom x6000E Series CPU SKU
Storage Temp.	-40~ +75°C
Operating Humidity	40°C @ 95% Relative Humidity, Non-condensing
Size (L x W)	1.8" SBC Form Factor 84mm (3.31") x 65mm (2.55")
Weight	0.30kg
OS Information	Win10 64bit, Linux



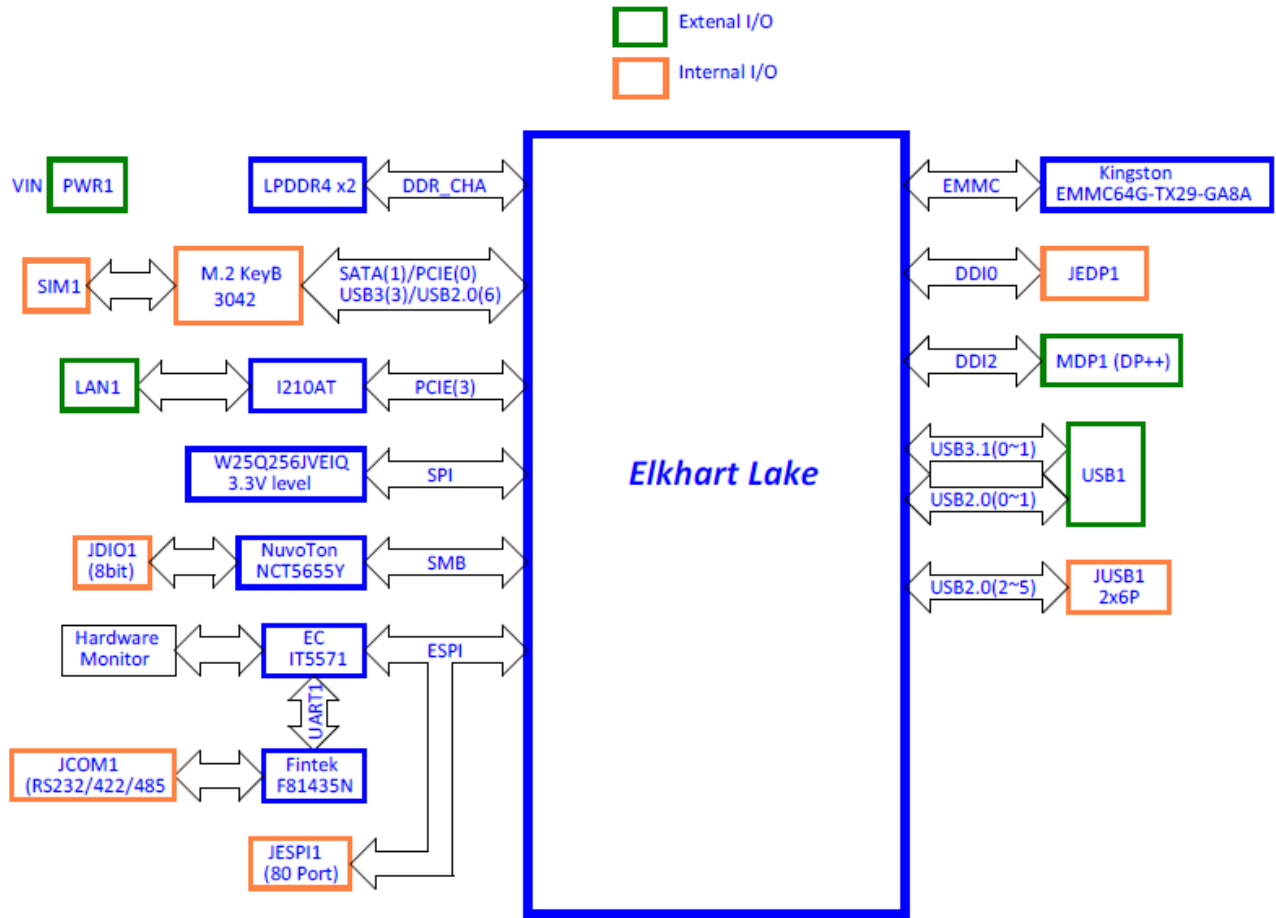
Note: Specifications are subject to change without notice.

User condition suggestion:

- Q: When use M.2 NVMe PCI-e SSD, device Manager will show Unknow USB Device (Port Reset Failed).
Also, each time enters OS, will show warning message "USB device not recognized".
A: Standard BIOS follow specification setting default as PCI-ex1 + USB3. Therefore, customer sees these when use PCI-e x2 M.2 PCI-e SSD, it will requires for OEM BIOS for PCI-e x2 setting.
- Q: Why Clear CMOS needs approximately 45sec to complete the whole process?
A: Usually clear CMOS is designed with 2.0mm pitch pin header with jumper. But due to EZX-EHLP PCB size is small, its unable to use pin header with jumper, therefore, it has used dip switch as design, but due to unable use 3rd pin on pin header and design 1K to ground to discharge, therefore, EZX-EHLP will requires CPU internal loss after power off for clear CMOS.

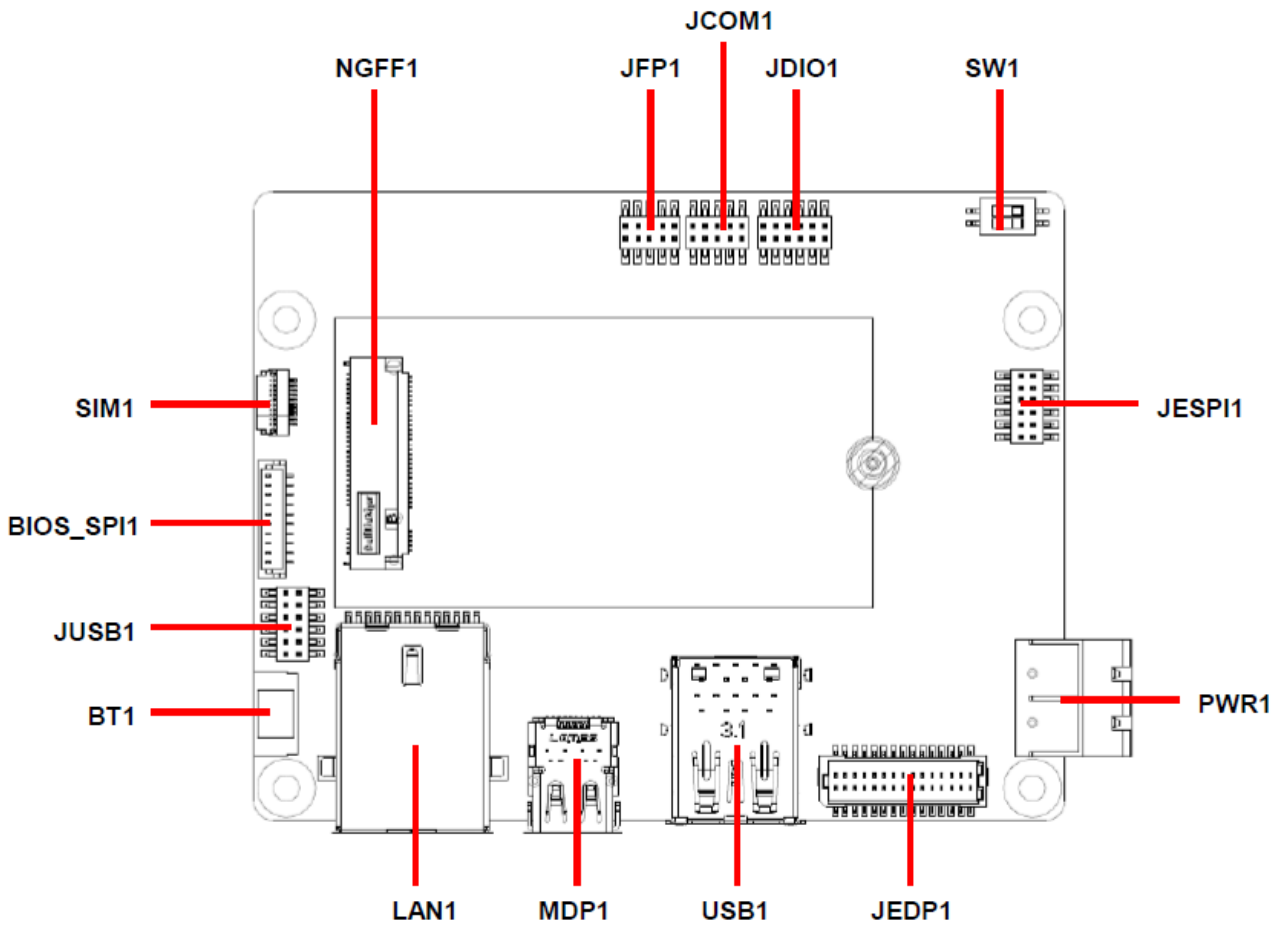
1.6 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of EZX-EHLP



2. Hardware Configuration

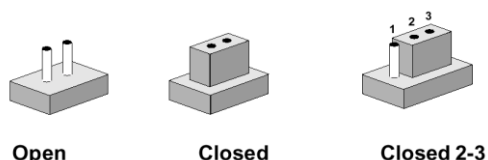
2.1 Product Overview



2.2 Jumper and Connector List

You can configure your board to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch.

It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip. To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case, you would connect either two pins.



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



A pair of needle-nose pliers may be helpful when working with jumpers.

Connectors on the board are linked to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

The following tables list the function of each of the board's jumpers and connectors.

Connectors

Label	Function	Note
PWR1	Power connector	2 x 1 wafer, pitch 5.08mm
JESPI1	JESPI connector	6 x 2 header, pitch 1.27mm
JDIO1	General purpose I/O connector	6 x 2 header, pitch 1.27mm
JCOM1	Serial Port 1 connector	5 x 2 header, pitch 1.27mm
JFP1	Front Panel connector	5 x 2 header, pitch 1.27mm
NGFF1	M.2 KEY-B 2242/3042 connector	
SIM1	SIM card slot	
BIOS_SPI1	BIOS SPI connector	10 x 1 wafer, pitch 1.00mm
JUSB1	USB2.0 connector	6 x 2 header, pitch 1.27mm
BT1	Battery connector	2 x 1 wafer, pitch 1.25mm
LAN1	1 x RJ-45 Ethernet	
USB1	2 x USB3.1 connector	

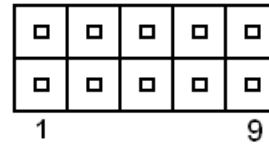
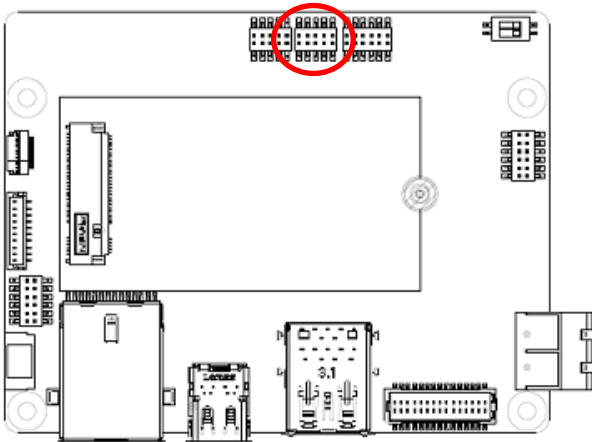
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JEDP1	eDP connector	15 x 2 wafer, pitch 1.00mm
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MDP1	Mini DP connector (DP++)
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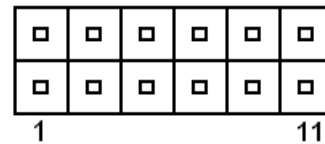
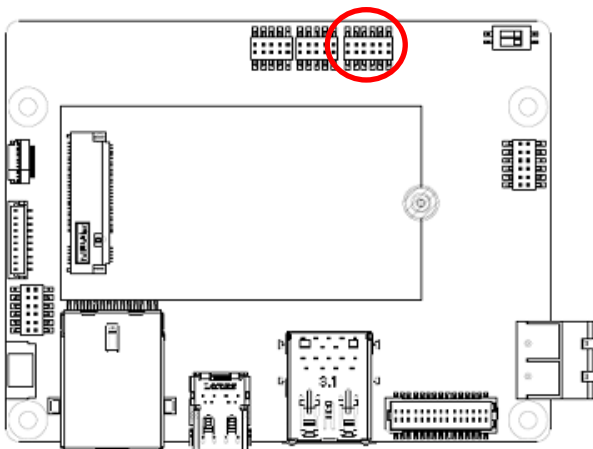
2.3 Setting Jumpers & Connectors

2.3.1 Serial port 2 connector (JCOM1)



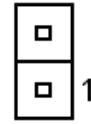
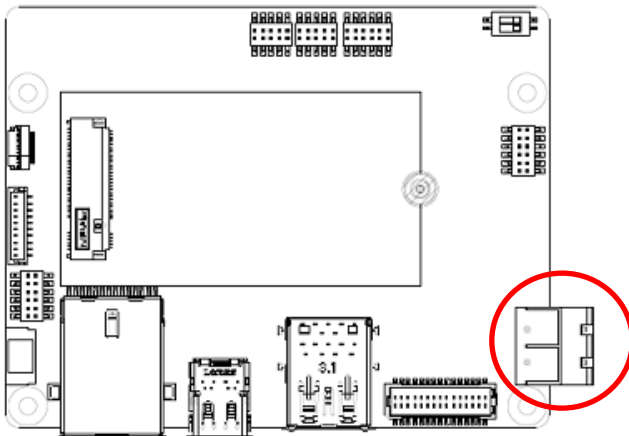
Signal	PIN	PIN	Signal
COM_DCD#_TXN_1	1	2	COM_RXD_TXP_1
COM_TXD_RXP_1	3	4	COM_DTR#_RXN_1
GND	5	6	COM_DSR#_1
COM_RTS#_1	7	8	COM_CTS#_1
COM_RI#_1	9	10	NC

2.3.2 General purpose I/O connector (JDIO1)



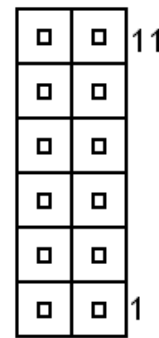
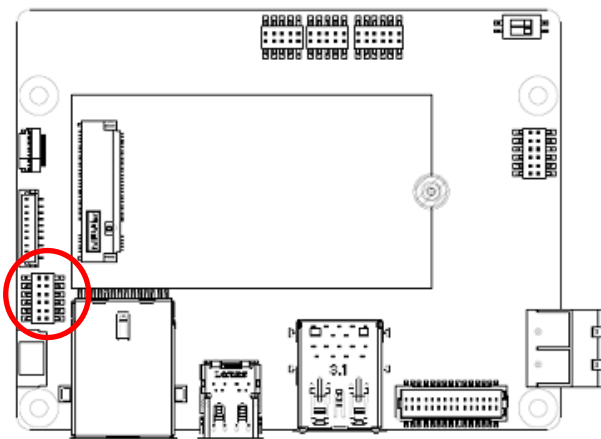
Signal	PIN	PIN	Signal
DIO_GP20	1	2	DIO_GP10
DIO_GP21	3	4	DIO_GP11
DIO_GP22	5	6	DIO_GP12
DIO_GP23	7	8	DIO_GP13
SMB_SCL_S0	9	10	SMB_SDA_S0
GND	11	12	+5V

2.3.3 Power connector (PWR1)



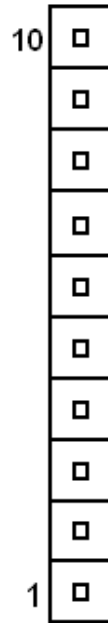
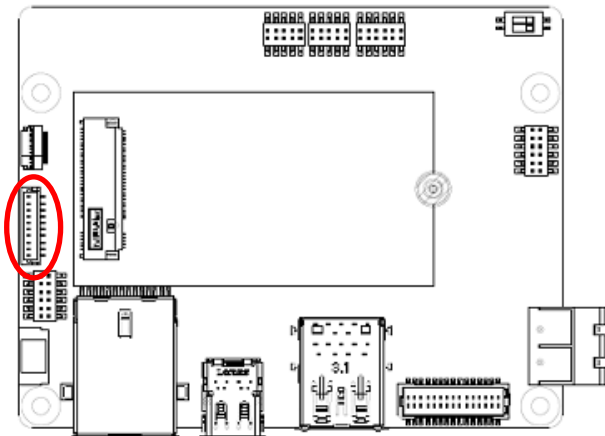
Signal	PIN
+12V	2
GND	1

2.3.4 USB2.0 connector (JUSB1)



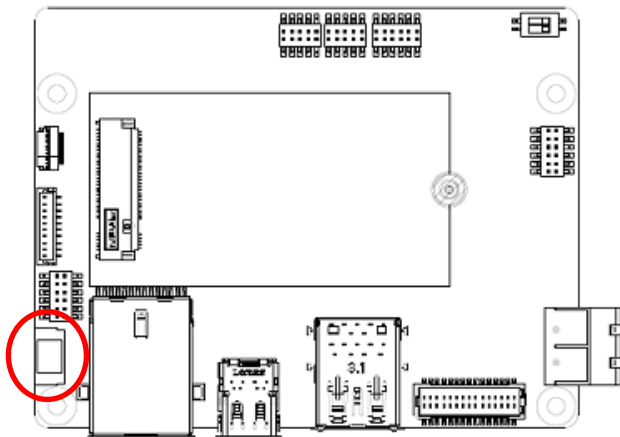
Signal	PIN	PIN	Signal
+V5A_USB_PH	12	11	GND
USB_R_DP5	10	9	USB_R_DP4
USB_R_DN5	8	7	USB_R_DN4
USB_R_DP3	6	5	USB_R_DP2
USB_R_DN3	4	3	USB_R_DN2
+V5A_USB34	2	1	GND

2.3.5 BIOS SPI connector (BIOS_SPI1)



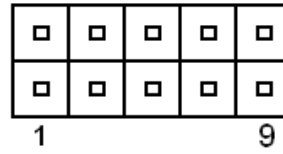
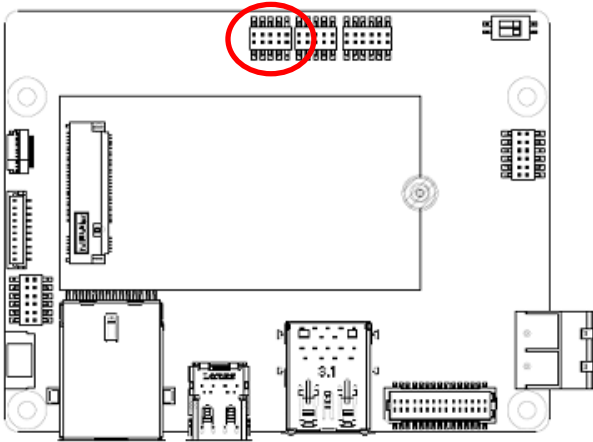
Signal	PIN
+V3.3A_SPI	10
GND	9
SPI_CS#0	8
SPI_CLK	7
SPI_MISO	6
SPI_MOSI	5
SPI_HOLD#	4
SPI_WP#	3
EC_SMDAT_DBG	2
EC_SMCLK_DBG	1

2.3.6 Battery connector (BT1)



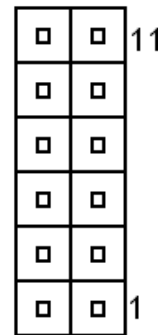
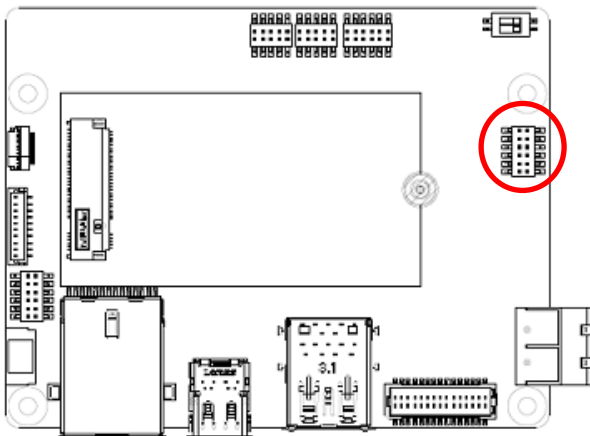
Signal	PIN
+RTCBATT	1
GND	2

2.3.7 Front Panel connector (JFP1)



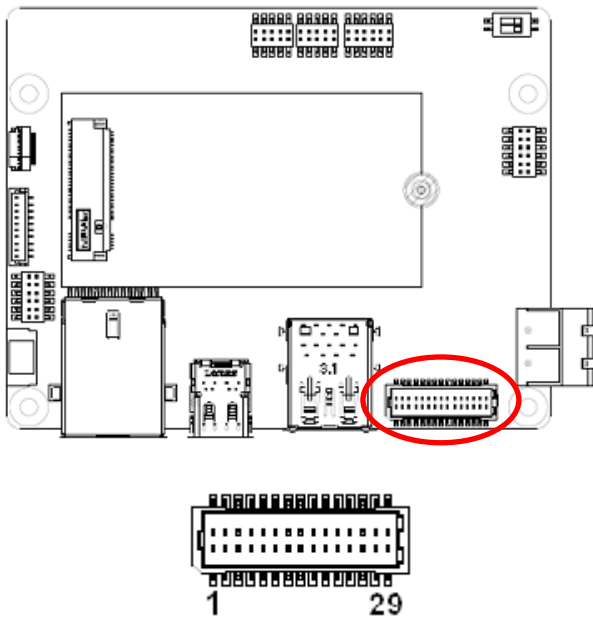
Signal	PIN	PIN	Signal
FP_HDD_LED+	1	2	FP_PWR_LED+
HDD_LED#	3	4	PWR_LED#
PMC_RSTBTN#	5	6	PWR_BTN_IN_EC#
GND	7	8	GND
NC	9	10	NC

2.3.8 JESPI connector (JESPI1)



Signal	PIN	PIN	Signal
ESPI_ALERT#2	12	11	ESPI_RST#
GND	10	9	NC
CN_ESPI_CLK	8	7	CN_ESPI_IO3
ESPI_CS#	6	5	CN_ESPI_IO2
PLT_RST_BUF#	4	3	CN_ESPI_IO1
+V3.3_ESPI	2	1	CN_ESPI_IO0

2.3.9 eDP connector (JEDP1)



Signal	PIN	PIN	Signal
GND	1	2	GND
EDP_Panel_TXN0	3	4	EDP_Panel_TXN3
EDP_Panel_TXP0	5	6	EDP_Panel_TXP3
GND	7	8	GND
EDP_Panel_TXN1	9	10	GND
EDP_Panel_TXP1	11	12	EDP_Panel_AUXN
GND	13	14	EDP_Panel_AUXP
EDP_Panel_TXN2	15	16	GND
EDP_Panel_TXP2	17	18	SOC_DDI0_HPDP
+V3.3S_eDP	19	20	+V3.3S_eDP
GND	21	22	GND
PWM_VBRIGHT	23	24	BKLEN
GND	25	26	GND
+5V	27	28	+V12S_INV
+5V	29	30	+V12S_INV



Note: Mainboard Connector: Aces 50238-03071-003 or Equivalent
 User Side Connector: WELL-LIN 1010-H-2X15P or Equivalent

3. BIOS Setup

3.1 Introduction

The BIOS setup program allows users to modify the basic system configuration. In this following chapter will describe how to access the BIOS setup program and the configuration options that may be changed.

3.2 Starting Setup

AMI BIOS™ is immediately activated when you first power on the computer. The BIOS reads the system information contained in the NVRAM and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

By pressing <ESC> or immediately after switching the system on, or

By pressing the <ESC> or key when the following message appears briefly at the left-top of the screen during the POST (Power On Self Test).

Press <ESC> or to enter SETUP

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

3.3 Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the PageUp and PageDown keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

Button	Description
↑	Move to previous item
↓	Move to next item
←	Move to the item in the left hand
→	Move to the item in the right hand
Esc key	Main Menu -- Quit and not save changes into NVRAM Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Previous Values
F3 key	Optimized defaults
F4 key	Save & Exit Setup

- **Navigating Through The Menu Bar**

Use the left and right arrow keys to choose the menu you want to be in.



Note: Some of the navigation keys differ from one screen to another.

- **To Display a Sub Menu**

Use the arrow keys to move the cursor to the sub menu you want. Then press <Enter>. A “➤” pointer marks all sub menus.

3.4 Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> or the <Enter> key again.

3.5 In Case of Problems

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the AMI BIOS supports an override to the NVRAM settings which resets your system to its defaults.

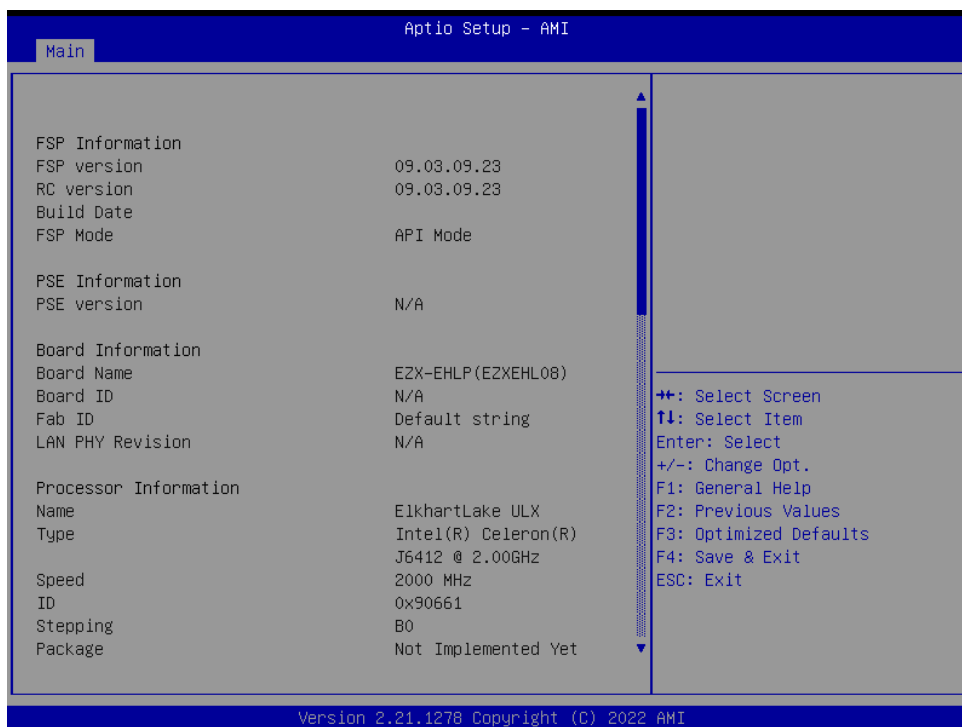
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance and reliability. Even a seemingly small change to the chipset setup has the potential for causing you to use the override.

3.6 BIOS setup

Once you enter the Aptio Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

3.6.1 Main Menu

This section allows you to record some basic hardware configurations in your computer and set the system clock.



3.6.1.1 System Language

This option allows choosing the system default language.

3.6.1.2 System Date

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

3.6.1.3 System Time

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



Note: The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.

Visit the Avalue website (www.avalue.com.tw) to download the latest product and BIOS information.

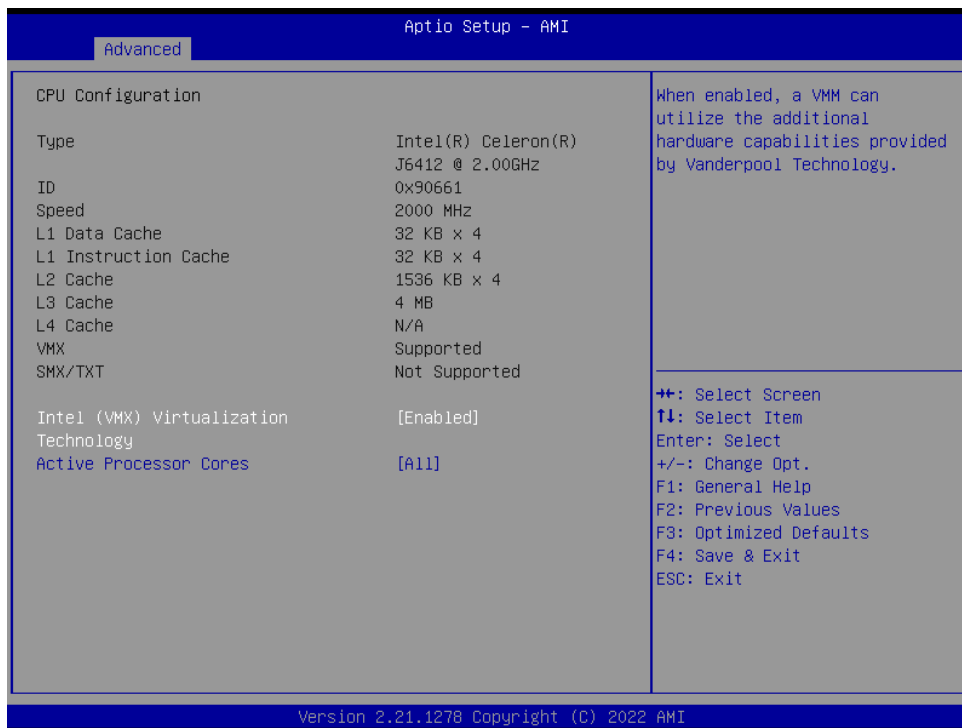
3.6.2 Advanced Menu

This section allows you to configure your CPU and other system devices for basic operation through the following sub-menus.



3.6.2.1 CPU Configuration

Use the CPU configuration menu to view detailed CPU specification and configure the CPU.

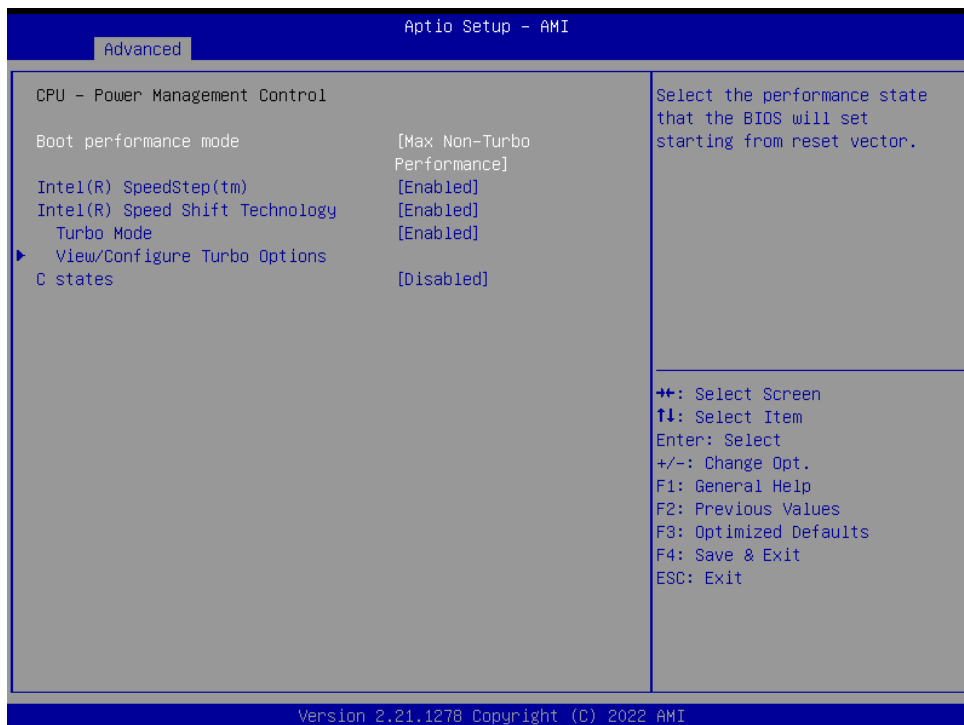


Item	Options	Description
Intel (VMX) Virtualization Technology	Disabled Enabled[Default]	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	All[Default] 1 2 3	Number of cores to enable in each processor package.

3.6.2.2 Power & Performance



3.6.2.2.1 CPU – Power Management Control

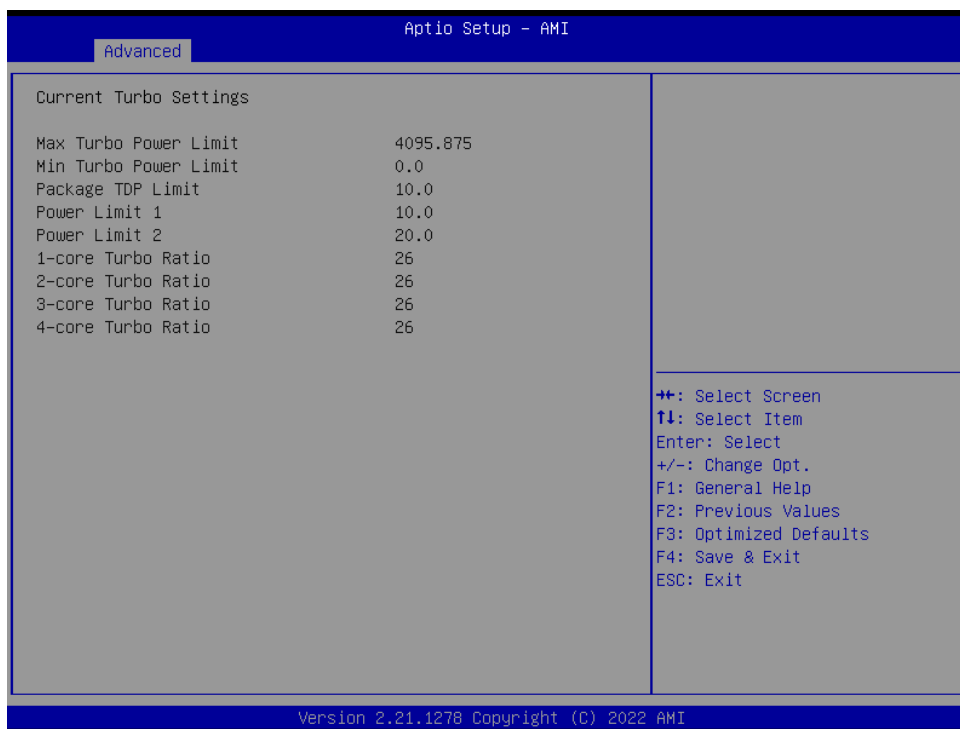


Item	Option	Description
Boot performance mode	Max Non-Turbo Performance [Default] , Turbo Performance	Select the performance state that the BIOS will set starting from reset vector.

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Intel® SpeedStep™	Disabled Enabled[Default],	Allows more than two frequency ranges to be supported.
Intel® Speed Shift Technology	Disabled Enabled[Default],	Enable/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Disabled Enabled[Default],	Enable/Disable processor Turbo Mode (requires EMTTM enabled too).AUTO means enabled.
C States	Disabled[Default], Enabled	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

3.6.2.2.1.1 View/Configure Turbo Options

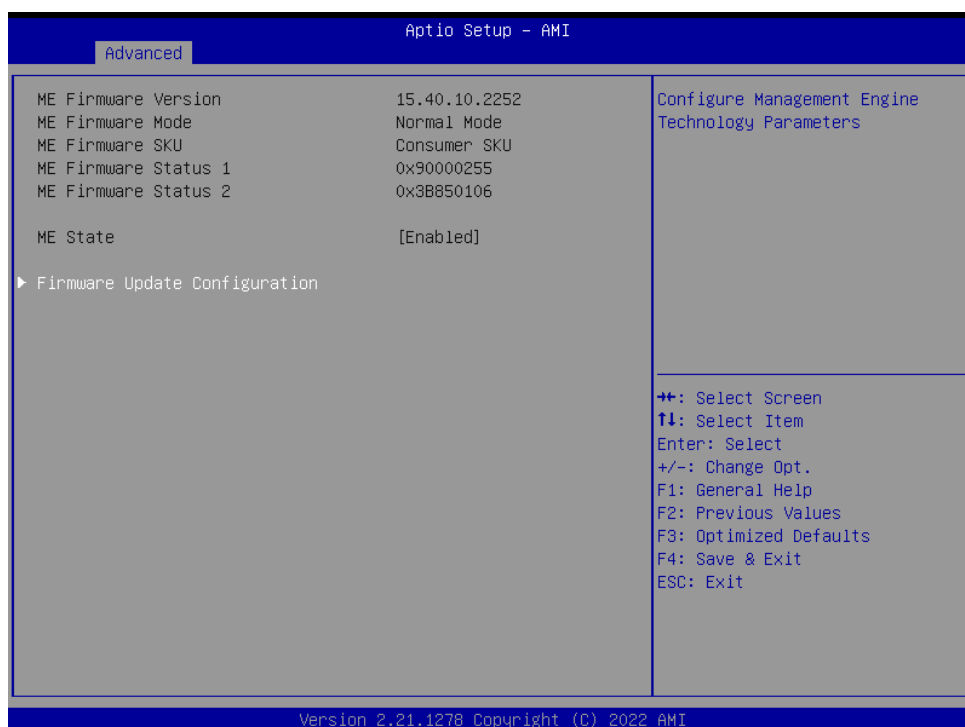


3.6.2.2.2 GT – Power Management Control



Item	Option	Description
RC6(Render Standby)	Disabled Enabled[Default],	Check to enable render standby support.
Disable Turbo GT frequency	Enabled Disabled[Default]	Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited.

3.6.2.3 PCH-FW Configuration



3.6.2.3.1 Firmware Update Configuration



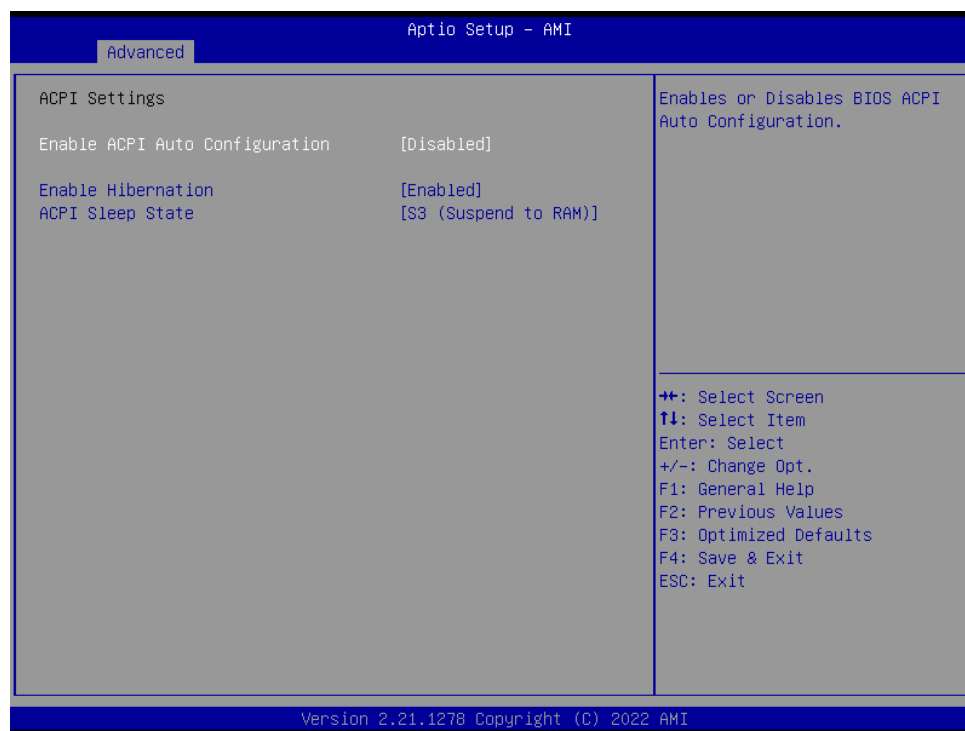
Item	Option	Description
ME FW Image Re-Flash	Disabled [Default], Enabled	Enable/Disable Me FW Image Re-Flash function.

3.6.2.4 Trusted Computing



Item	Options	Description
Security Device Support	Disable, Enable[Default]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

3.6.2.5 ACPI Settings

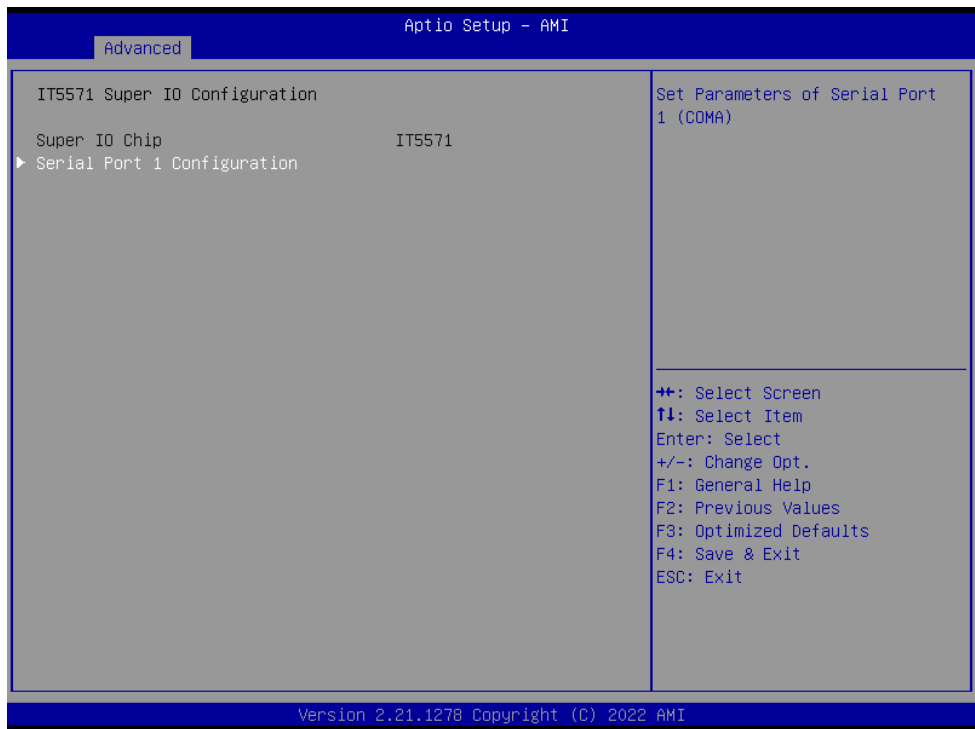


Item	Options	Description
Enable ACPI Auto Configuration	Disabled[Default], Enabled	Enables or Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled Enabled[Default],	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some Operating systems.
ACPI Sleep State	Suspend Disabled, S3 (Suspend to RAM)[Default]	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

3.6.2.6 IT5571 Super IO Configuration

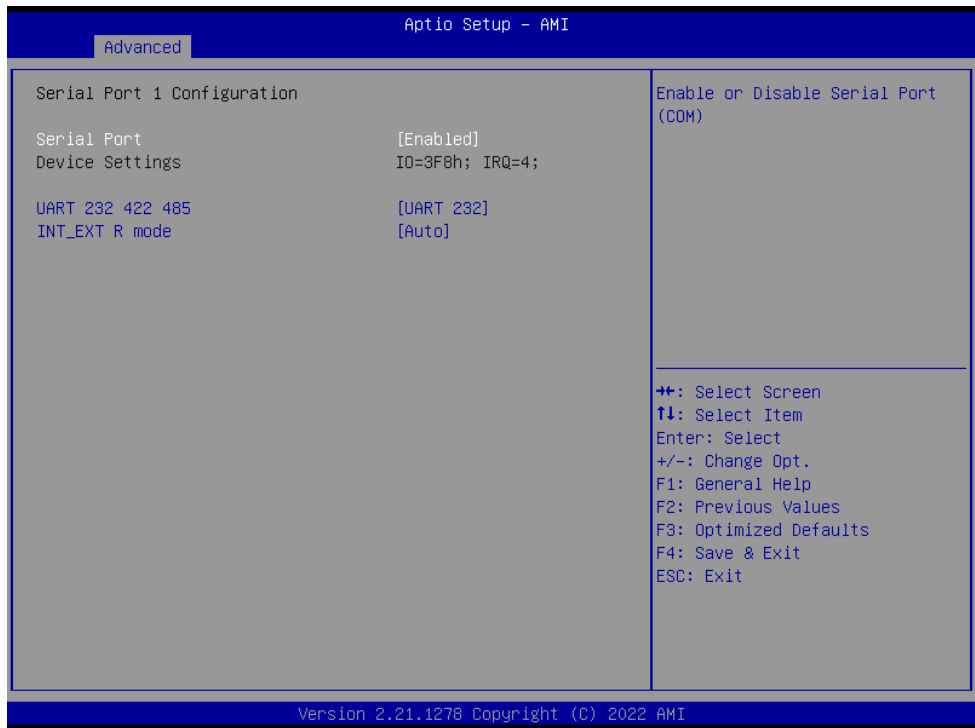
You can use this item to set up or change the IT5571 Super IO configuration for serial ports. Please refer to 3.6.2.6.1 for more information.

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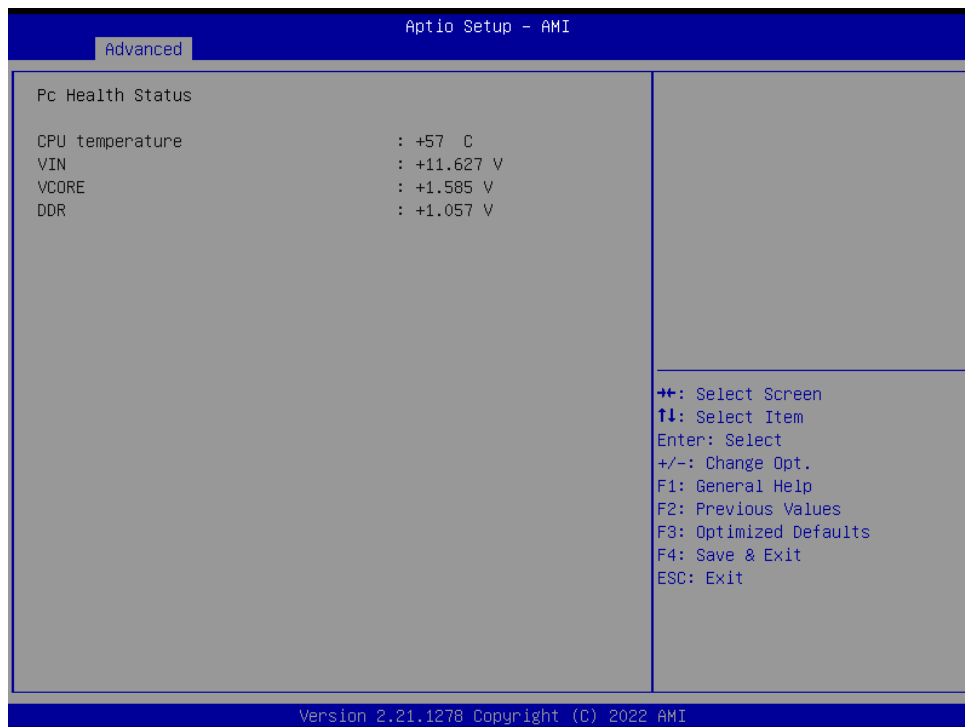
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).

3.6.2.6.1 Serial Port 1 Configuration



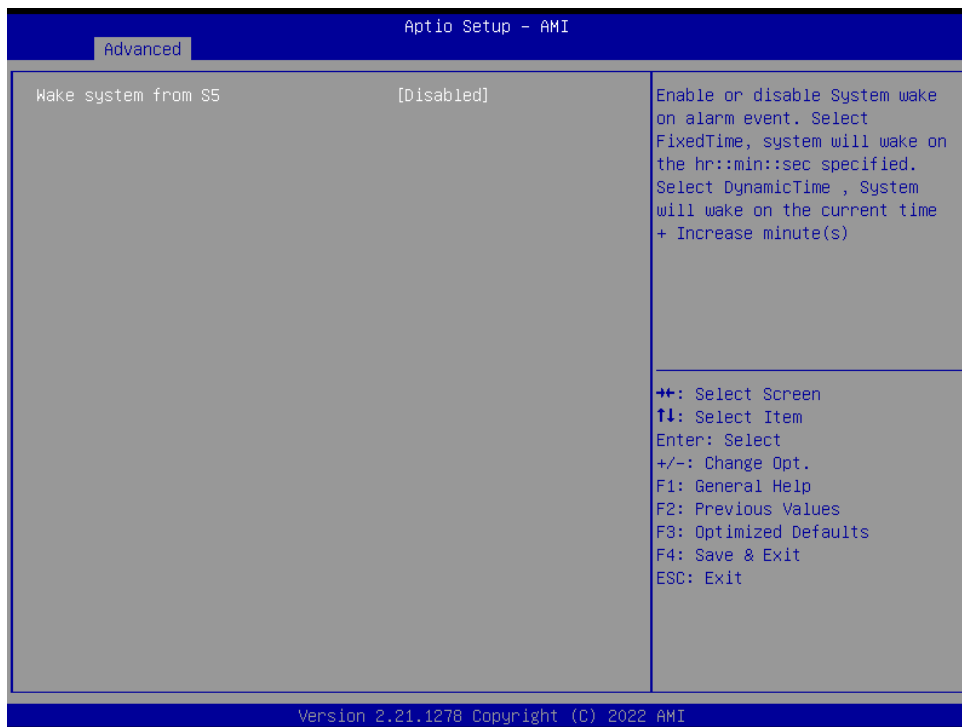
Item	Option	Description
Serial Port	Disabled Enabled[Default],	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232[Default], UART 422 UART 485	Change the Serial Port as RS232/422/485.
INT_EXT R mode	Auto[Default], Non INT+EXT R EXT R INT R INT+EXT R	Enable switches for internal and external resistors

3.6.2.7 EC 5571 HW monitor



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3.6.2.8 S5 RTC Wake Settings



Item	Options	Description
Wake system from S5	Disabled[Default], Fixed Time Dynamic Time	Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).

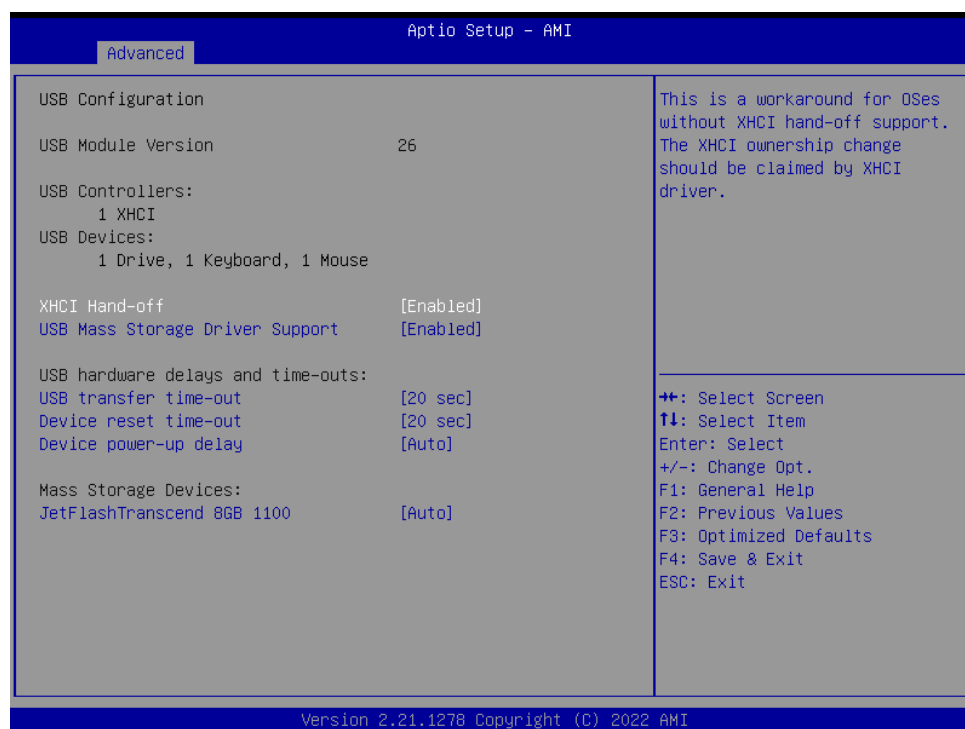
3.6.2.9 Serial Port Console Redirection



Item	Options	Description
Console Redirection	Disabled[Default], Enabled	Console Redirection Enable or Disable.
Console Redirection EMS	Disabled[Default], Enabled	Console Redirection Enable or Disable.

3.6.2.10 USB Configuration

The USB Configuration menu helps read USB information and configures USB settings.



Item	Options	Description
XHCI Hand-off	Enabled[Default], Disabled	This is a workaround for OSeS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Disabled Enabled[Default],	Enable/Disable USB Mass Storage Driver Support.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec[Default]	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec[Default] 30 sec 40 sec	USB mass storage device Start Unit command time-out.

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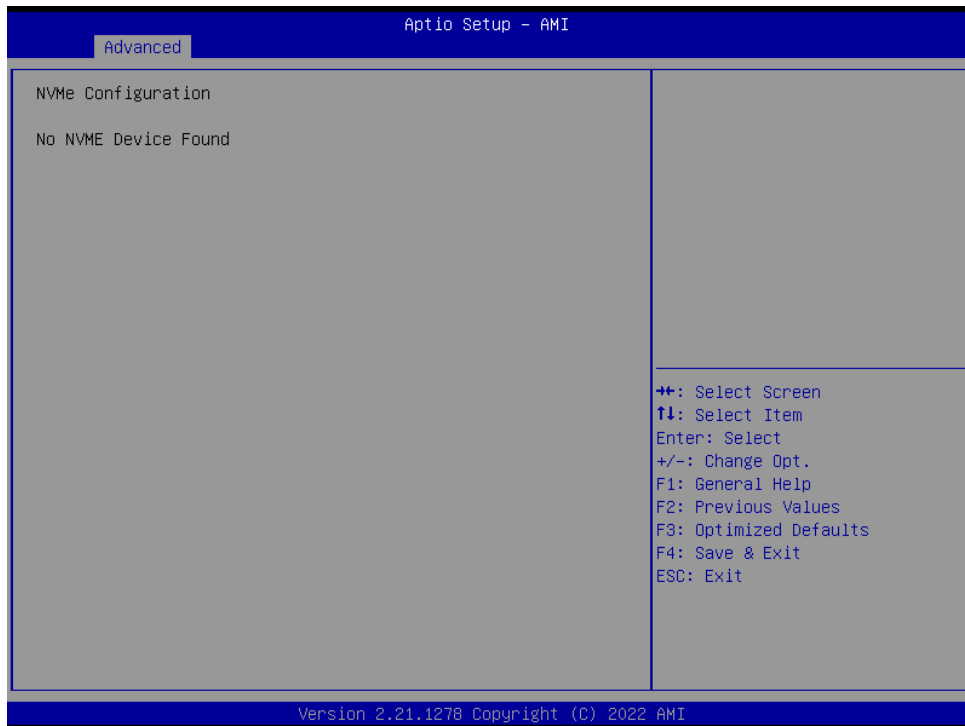
Device power-up delay	Auto[Default] Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken form Hub descriptor.
Mass Storage Devices	Auto[Default] Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

3.6.2.11 Network Stack Configuration



Item	Options	Description
Network Stack	Enabled Disabled[Default]	Enable/Disable UEFI Network Stack.

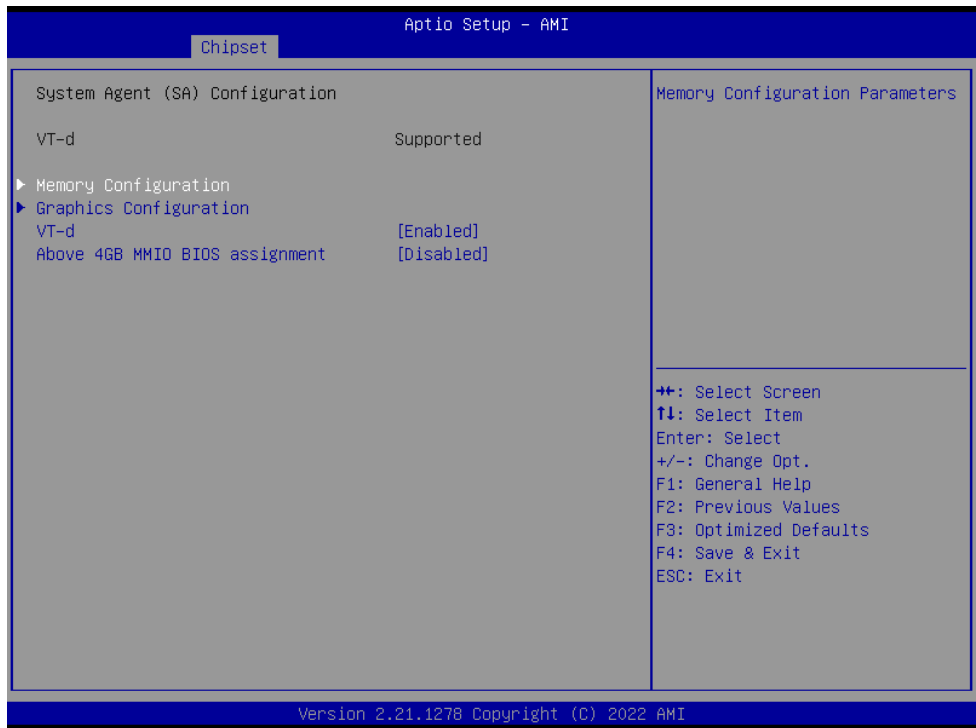
3.6.2.12 NVMe Configuration



3.6.3 Chipset

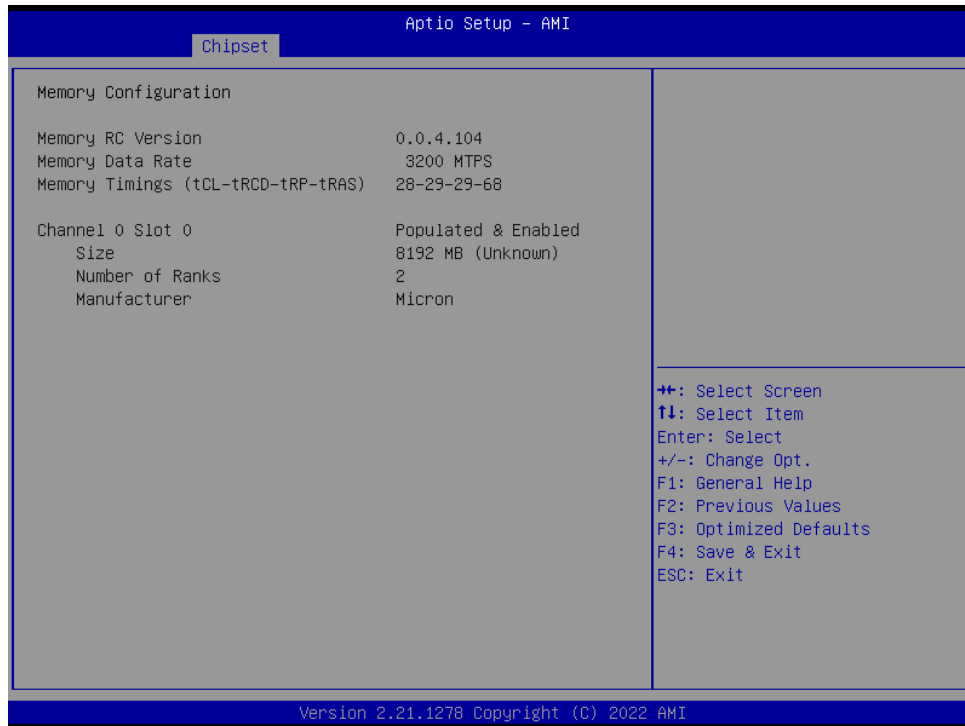


3.6.3.1 System Agent (SA) Configuration

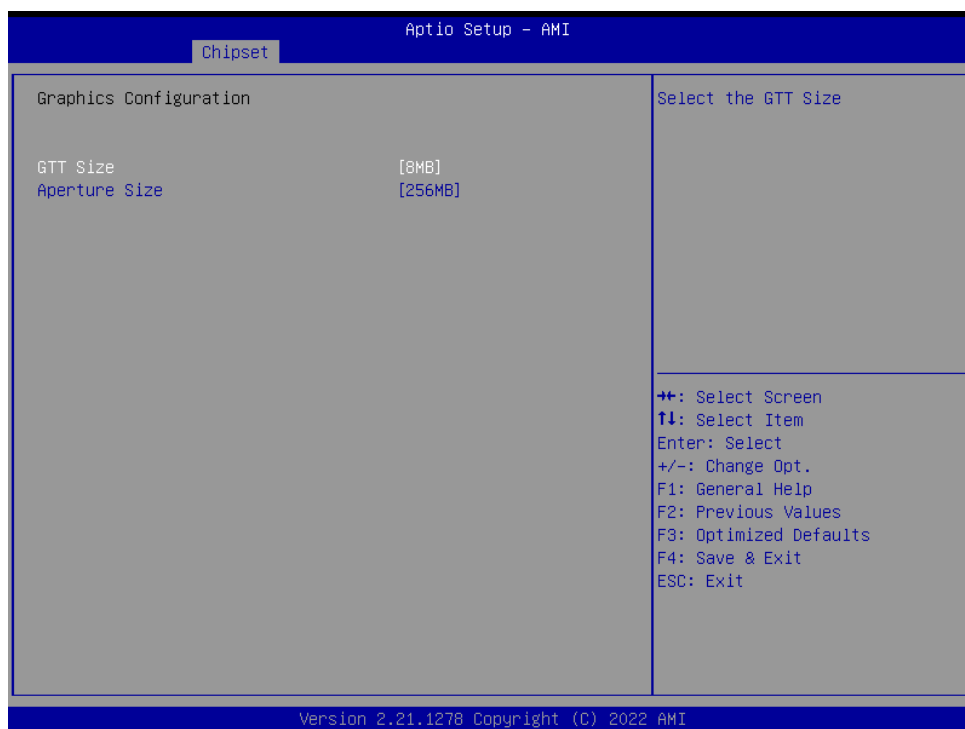


Item	Option	Description
VT-d	Disabled Enabled[Default]	VT-d capability.
Above 4GB MMIO BIOS assignment	Enabled Disabled[Default]	Enable/Disable above 4GB MemoryMappedIO BIOS assignment. This is enabled automatically when Aperture Size is set to 2048MB.

3.6.3.1.1 Memory Configuration



3.6.3.1.2 Graphics Configuration

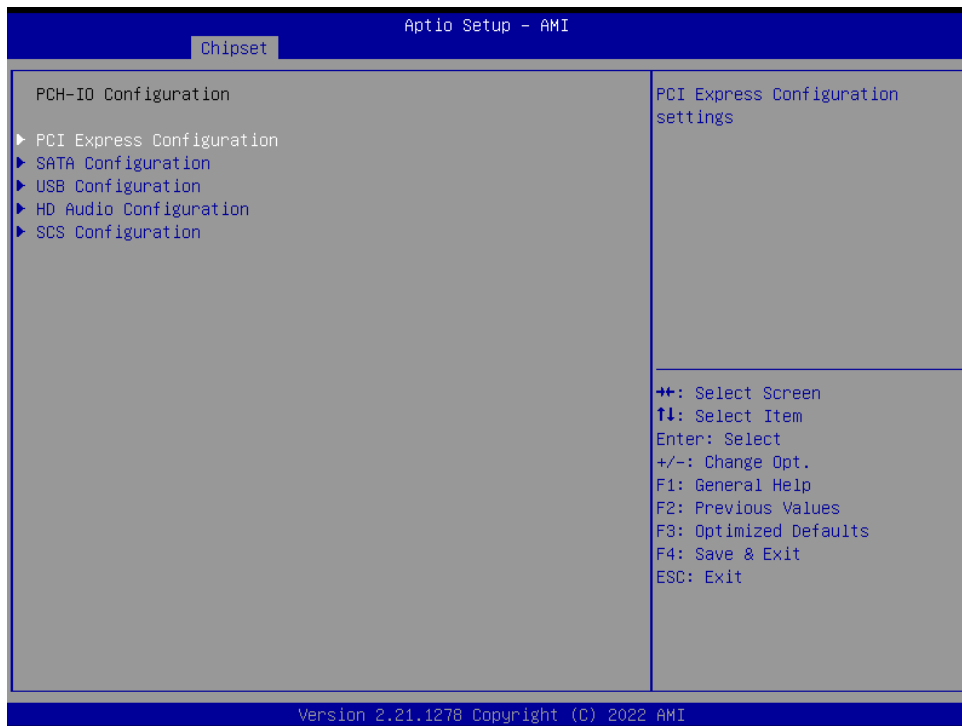


Item	Option	Description
GTT Size	2MB 4MB 8MB[Default]	Select the GTT Size.

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Aperture Size	128MB 256MB [Default] 512MB 1024MB	Select the Aperture Size. Note: Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.
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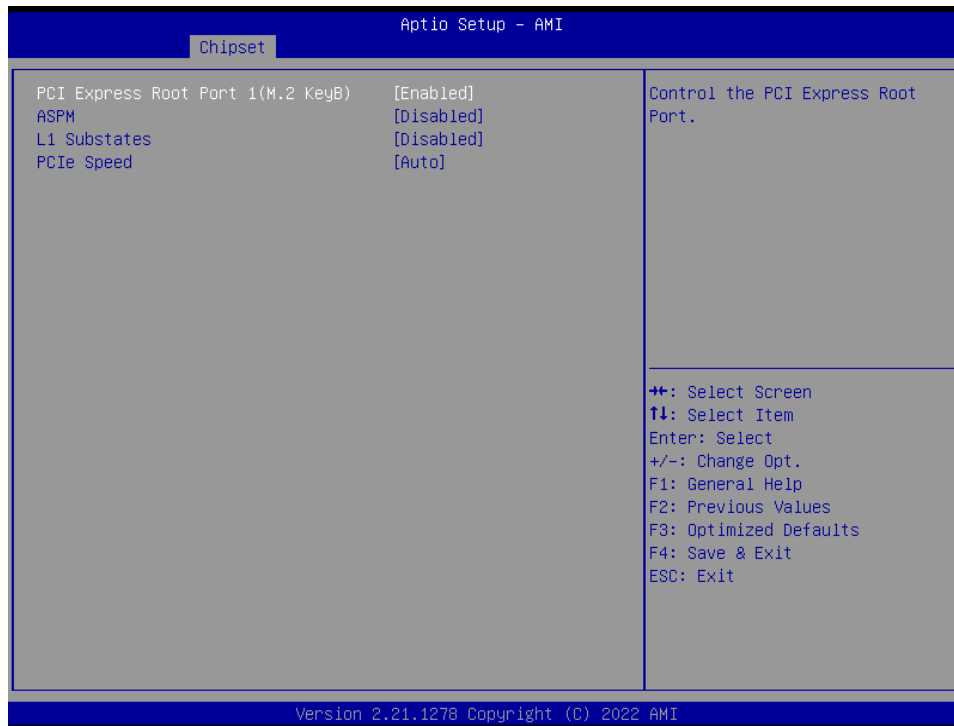
3.6.3.2 PCH-IO Configuration



3.6.3.2.1 PCI Express Configuration

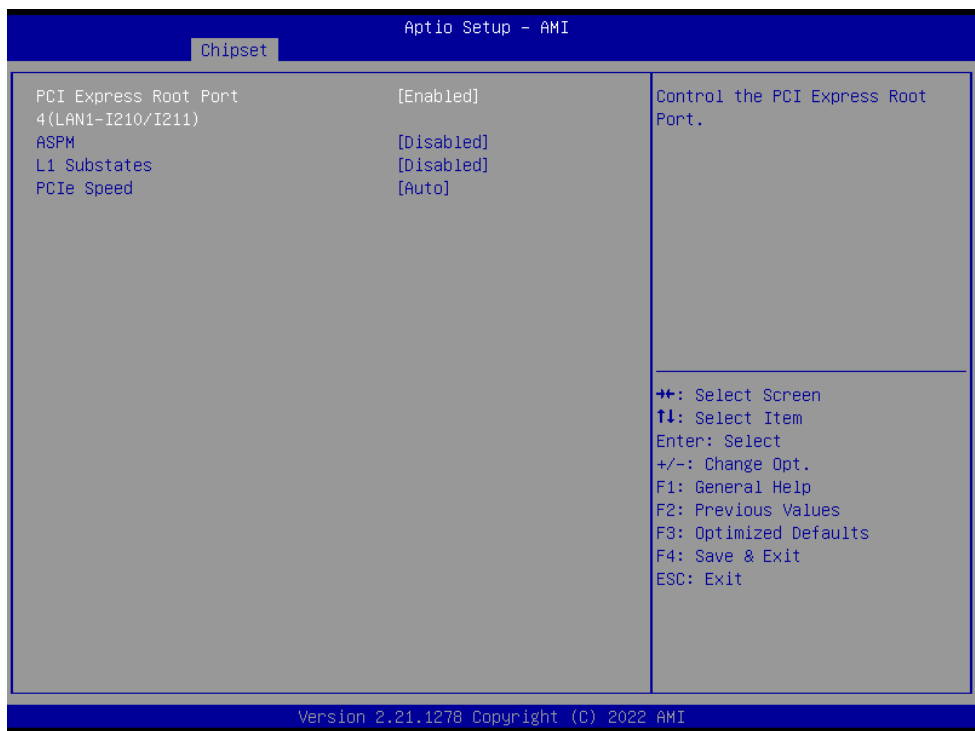


3.6.3.2.1.1 PCI Express Root Port 1(M.2 KeyB)



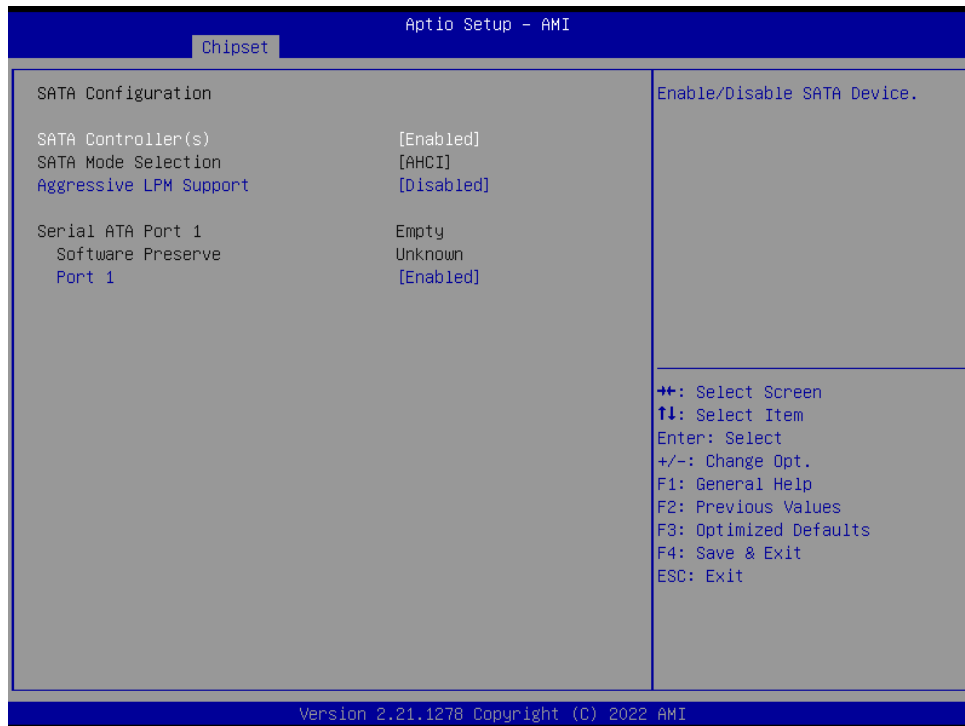
Item	Option	Description
PCI Express Root Port 1 (M.2 KeyB)	Disabled Enabled [Default] ,	Control the PCI Express Root Port.
ASPM	Disabled [Default] , L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled [Default] L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
PCIe Speed	Auto [Default] Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.1.2 PCI Express Root Port 4(LAN1-I210/I211)



Item	Option	Description
PCI Express Root Port 4 (LAN1-I210/I211)	Disabled Enabled [Default] ,	Control the PCI Express Root Port.
ASPM	Disabled [Default] , L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled [Default] L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
PCIe Speed	Auto [Default] Gen1 Gen2 Gen3	Configure PCIe Speed.

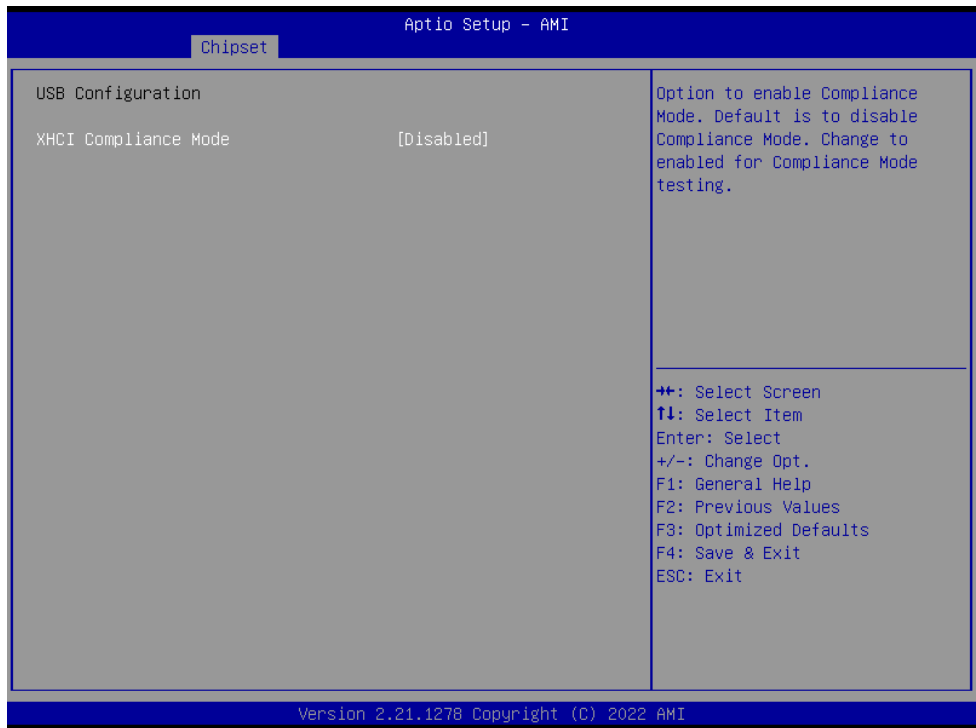
3.6.3.2.2 SATA Configuration



Item	Options	Description
SATA Controller(s)	Disabled, Enabled[Default]	Enable/Disable SATA Device.
Aggressive LPM Support	Disabled [Default], Enabled	Enable PCH to aggressively enter link power state.
Port 1	Disabled, Enabled[Default]	Enable or Disable SATA Port.

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3.6.3.2.3 USB Configuration



Item	Options	Description
XHCI Compliance Mode	Disabled[Default] Enabled	Option to enable Compliance Mode. Default is to disable Compliance Mode. Change to enabled for Compliance Mode testing.

3.6.3.2.4 HD Audio Configuration



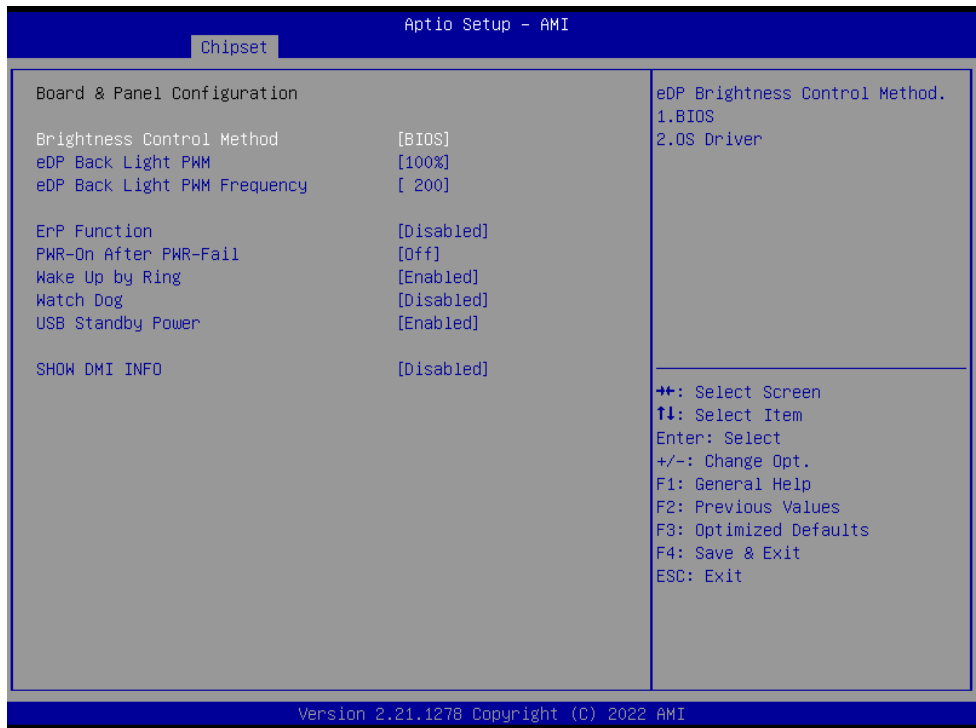
Item	Option	Description
HD Audio	Disabled Enabled[Default]	Control Detection of the HD-Audio device. Disable = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled.

3.6.3.2.5 SCS Configuration



Item	Option	Description
eMMC 5.1 Controller	Disabled Enabled[Default]	Enable or Disable SCS eMMC 5.1 Controller

3.6.3.3 Board & Panel Configuration



Item	Option	Description
Brightness Control Method	BIOS[Default] OS Driver	eDP Brightness Control Method. 1.BIOS 2.OS Driver.
eDP Back Light PWM	00% 25% 50% 75% 100%[Default]	Select eDP back light PWM duty.
eDP Back Light PWM Frequency	200[Default] 300 400 500 700 1k 2k 3k 5k 10k 20k	Select eDP back light PWM Frequency.
ErP Function	Disabled[Default] Enabled	ErP Function (Deep S5).
PWR-On After PWR-Fail	Off[Default] On Last state	AC loss resume.

Wake Up by Ring	Disabled Enabled[Default]	Wake Up by Ring from S3/S4/S5.
Watch Dog	Disabled[Default] 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select WatchDog.
USB Standby Power	Disabled Enabled[Default]	Enable/Disabled USB Standby Power during S3/S4/S5.
SHOW DMI INFO	Disabled[Default] Enabled	SHOW DMI INFO.

3.6.4 Security



- **Administrator Password**

Set setup Administrator Password

- **User Password**

Set User Password

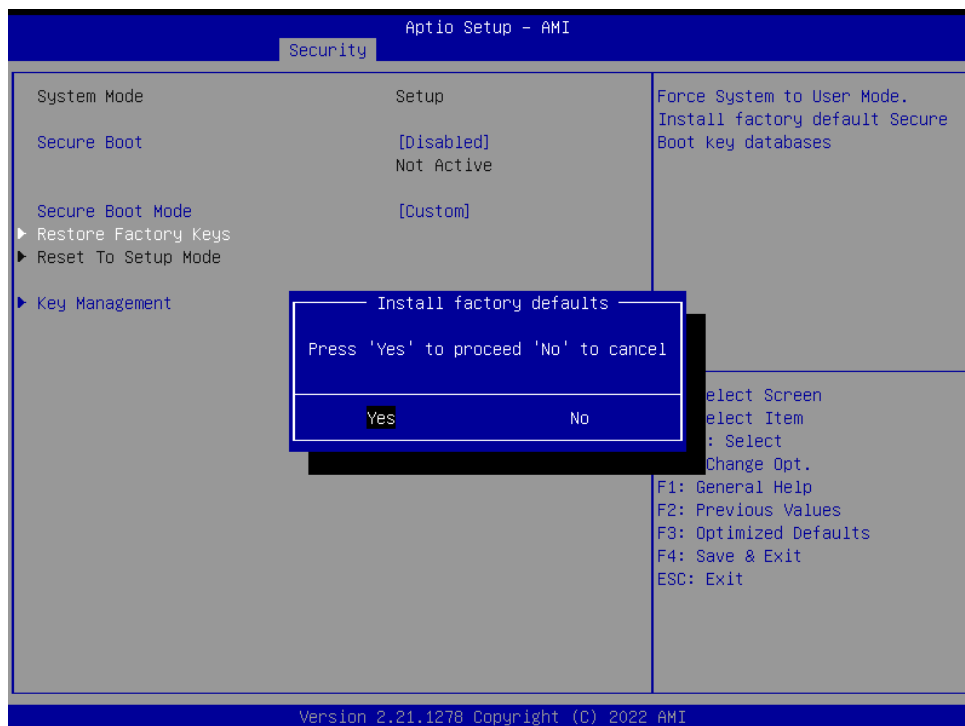
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3.6.4.1 Secure Boot

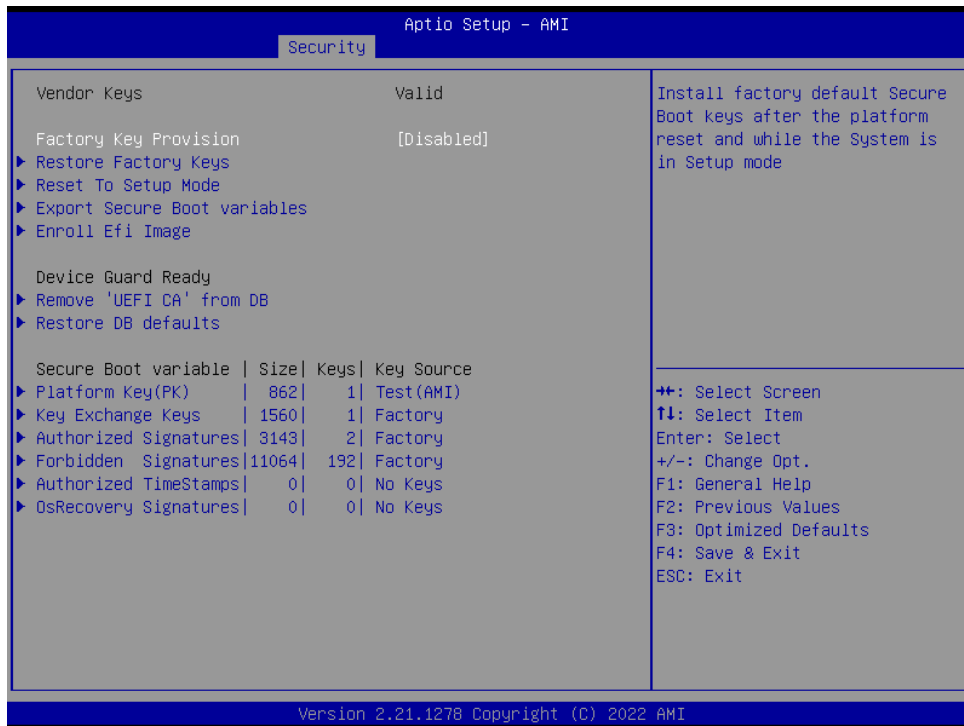


Item	Option	Description
Secure Boot	Disabled[Default] Enabled	Secure Boot feature is Active if Secure Boot is Enable, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset.
Secure Boot Mode	Standard Custom[Default]	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication

3.6.4.1.1 Restore Factory Keys

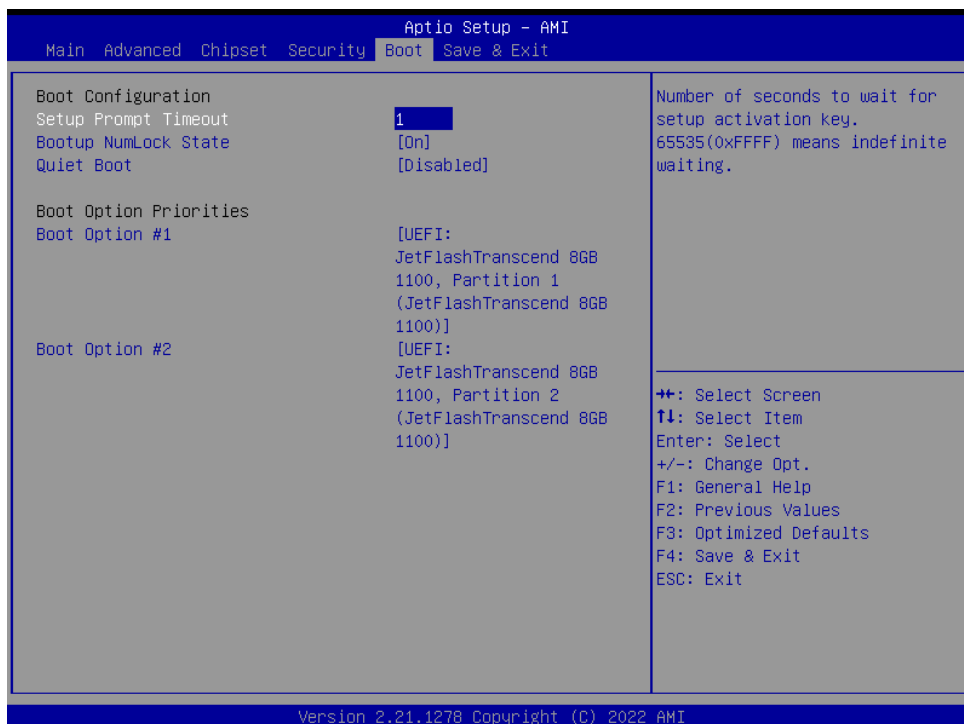


3.6.4.1.2 Key Management



Item	Option	Description
Factory Key Provision	Disabled[Default] Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.

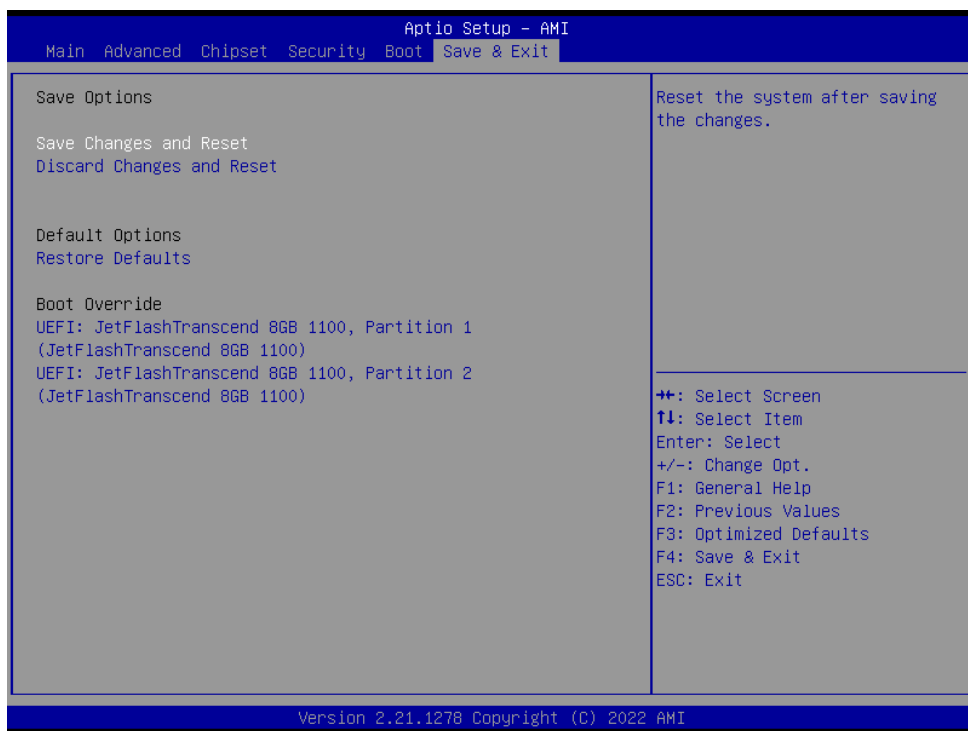
3.6.5 Boot

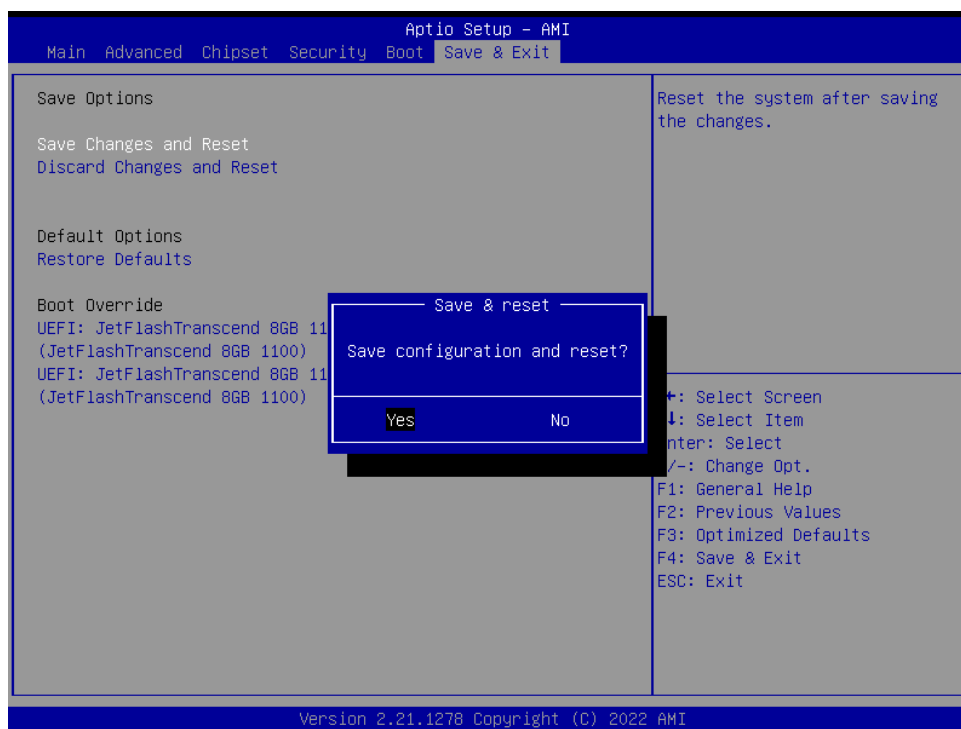


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Item	Option	Description
Setup Prompt Timeout	1	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On[Default] Off	Select the keyboard NumLock state
Quiet Boot	Disabled[Default] Enabled	Enables or disables Quiet Boot option
Boot Option #1/#2	Set the system boot order.	

3.6.6 Save and exit





3.6.6.1 **Save Changes and Exit**

Use the save changes and reset option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

3.6.6.2 **Discard Changes and Exit**

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

3.6.6.3 **Save Changes and Reset**

Reset the system after saving the changes.

3.6.6.4 **Discard Changes and Reset**

Any changes made to BIOS settings during this session of the BIOS setup program are discarded. The setup program then exits and reboots the controller.

3.6.6.5 **Save Changes**

Changes made to BIOS settings during this session are committed to NVRAM. The setup program remains active, allowing further changes.

3.6.6.6 *Discard Changes*

Any changes made to BIOS settings during this session of the BIOS setup program are discarded. The BIOS setup continues to be active.

3.6.6.7 *Restore Defaults*

This option restores all BIOS settings to the factory default. This option is useful if the controller exhibits unpredictable behavior due to an incorrect or inappropriate BIOS setting.

3.6.6.8 *Save as User Defaults*

This option saves a copy of the current BIOS settings as the User Defaults. This option is useful for preserving custom BIOS setup configurations.

3.6.6.9 *Restore User Defaults*

This option restores all BIOS settings to the user defaults. This option is useful for restoring previously preserved custom BIOS setup configurations.

4. Drivers Installation



Note: Installation procedures and screen shots in this section are for your reference and may not be exactly the same as shown on your screen.

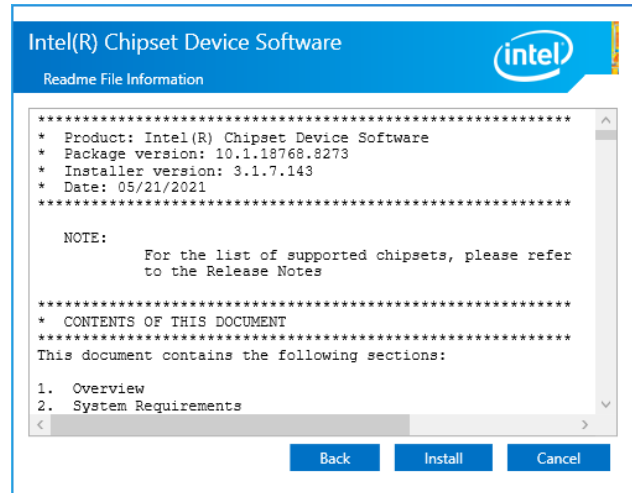
4.1 Install Chipset Driver

All drivers can be found on the Avalue Official Website:

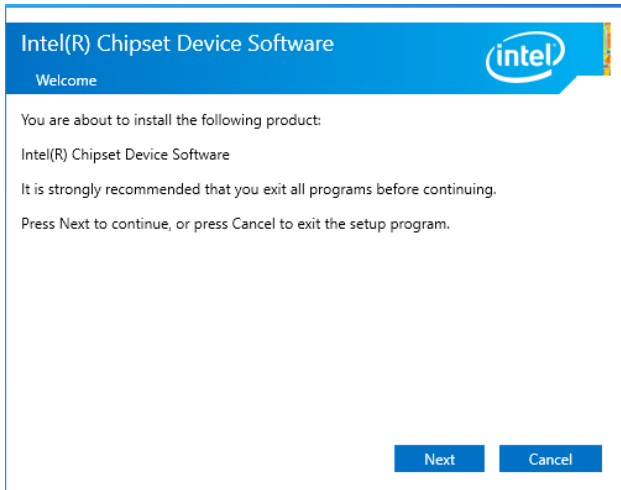
<http://www.avalue.com.tw>.



Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



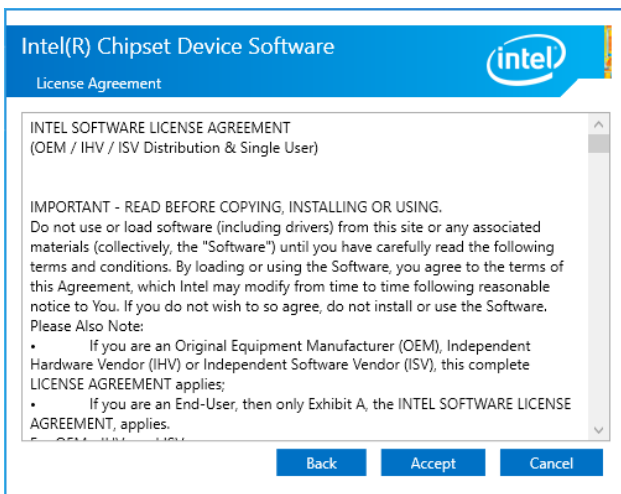
Step 3. Click Install.



Step1. Click Next.



Step 4. Setup completed.



Step 2. Click Accept.

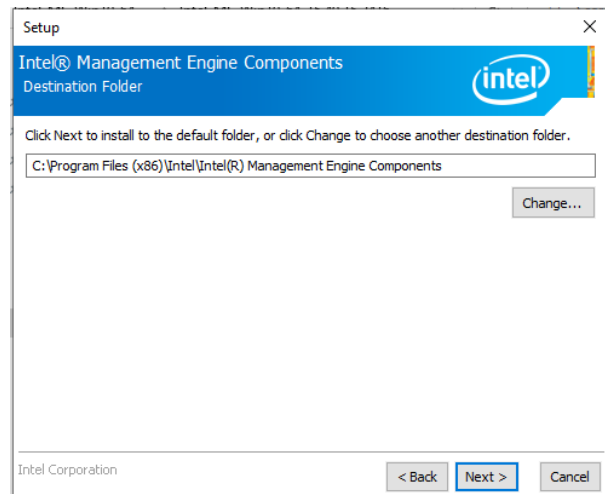
4.2 Install ME Driver

All drivers can be found on the Avalue Official Website:

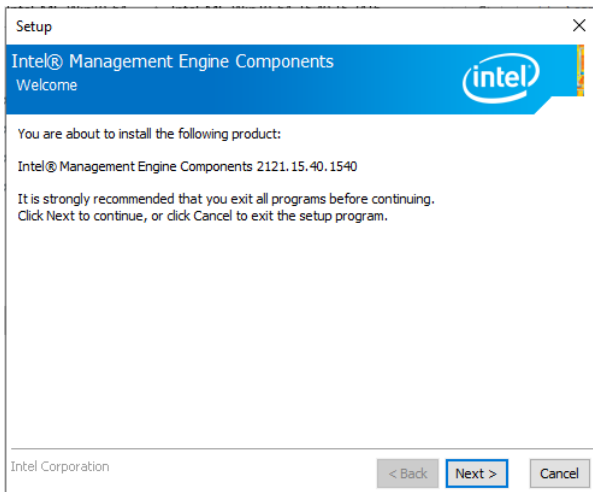
<http://www.avalu.com.tw>.



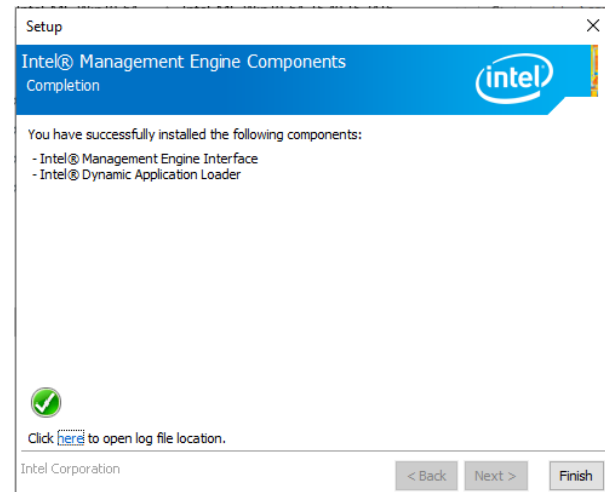
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



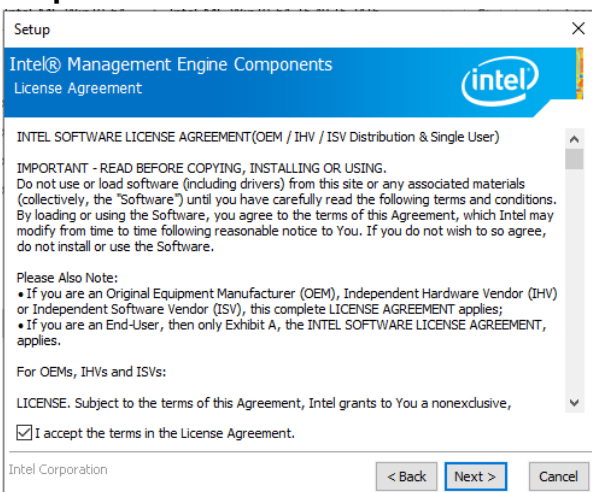
Step 3. Click **Next** to continue installation.



Step1. Click **Next** to start installation.



Step 4. Click **Finish** to complete setup.



Step 2. Click **Next**.

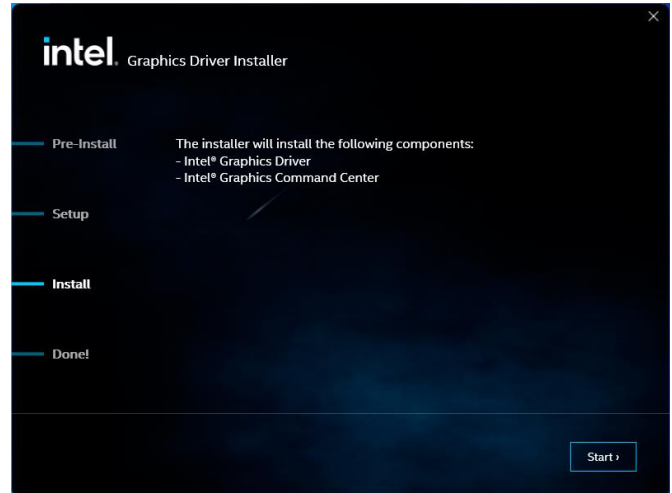
4.3 Install VGA Driver

All drivers can be found on the Avalue Official Website:

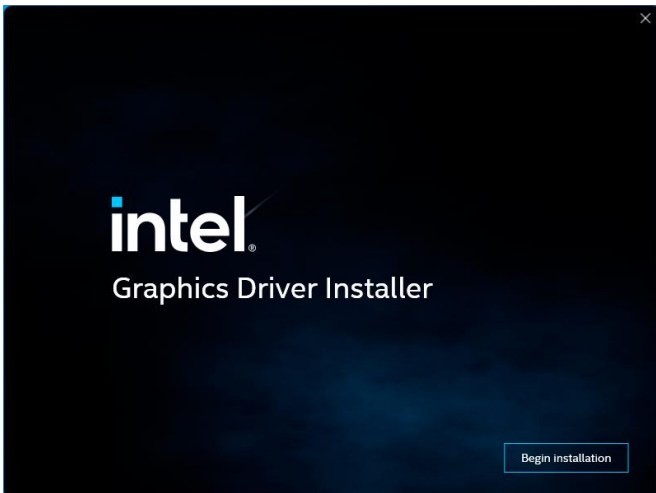
<http://www.avalue.com.tw>.



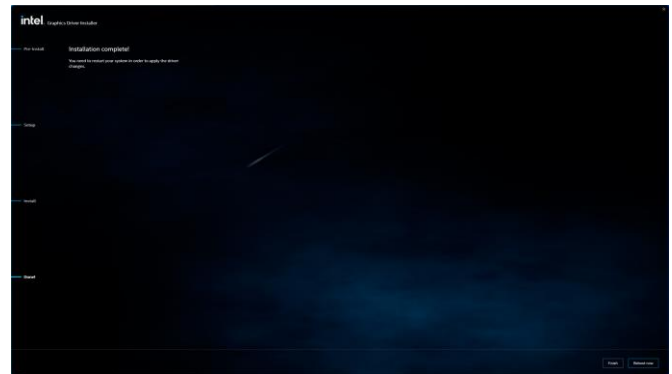
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



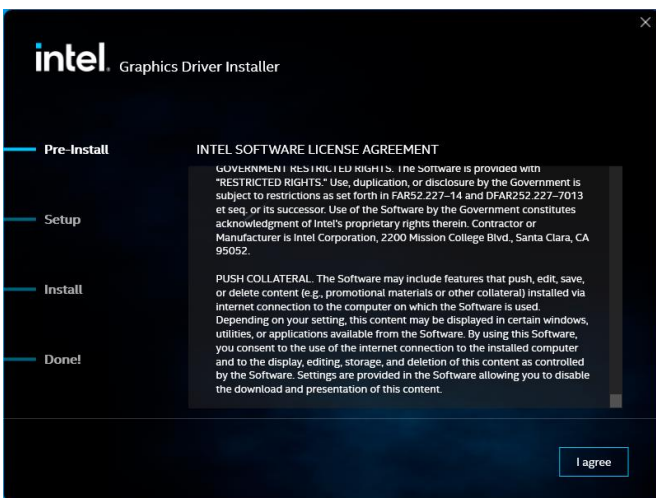
Step 3. Click Start.



Step 1. Click Begin installation.



Step 4. Click Finish to complete setup.



Step 2. Click Next.

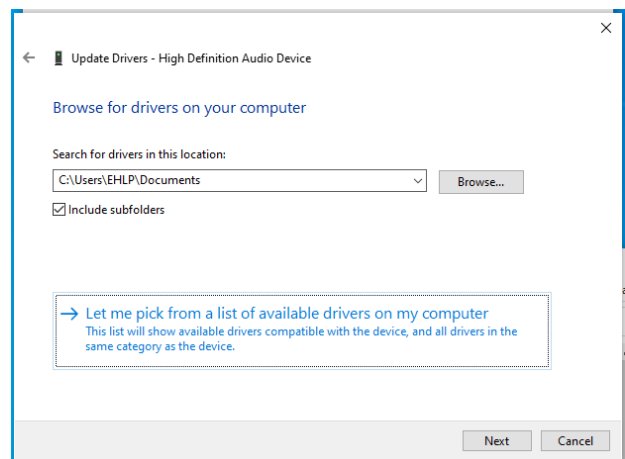
4.4 Install Display Audio Driver

All drivers can be found on the Avalue Official Website:

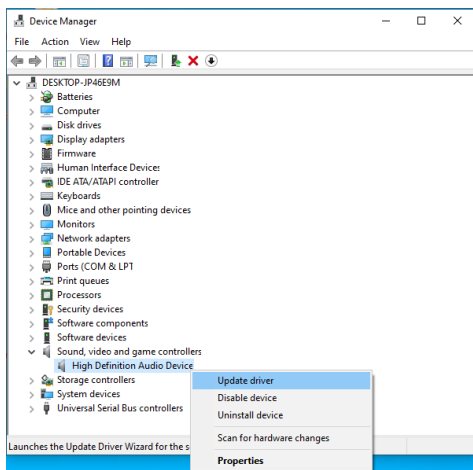
<http://www.avalue.com.tw>.



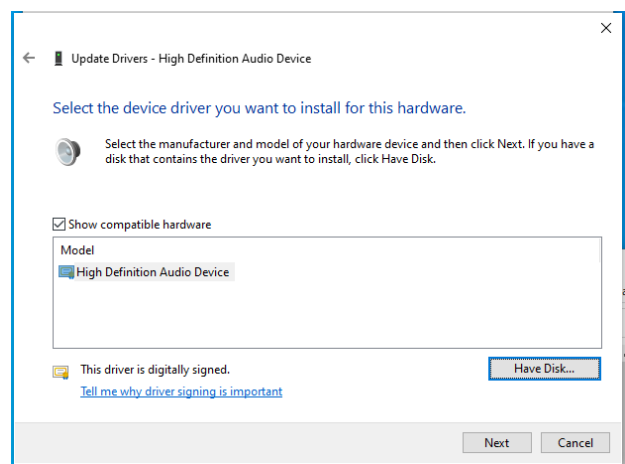
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



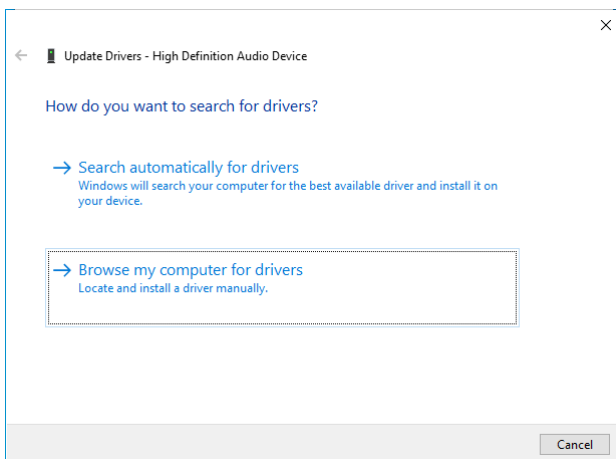
Step 3. Click Next.



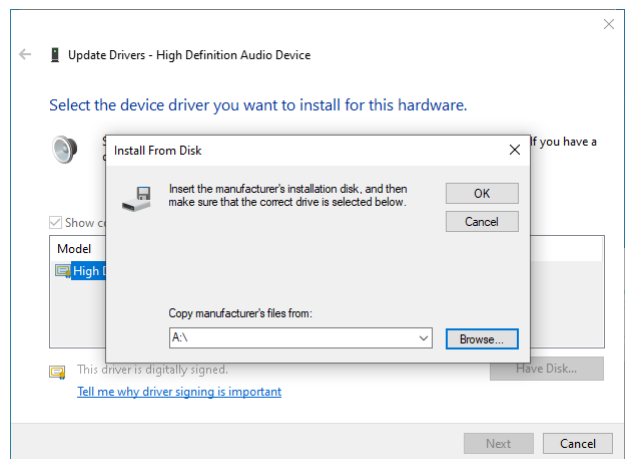
Step 1. Click Update Drivers.



Step 4. Click Next.

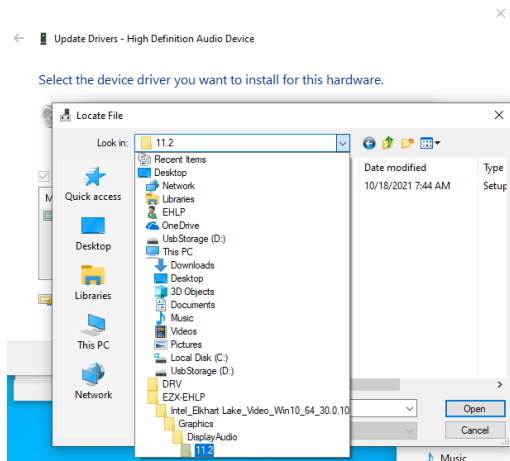


Step 2. Click Browse my computer for drivers.

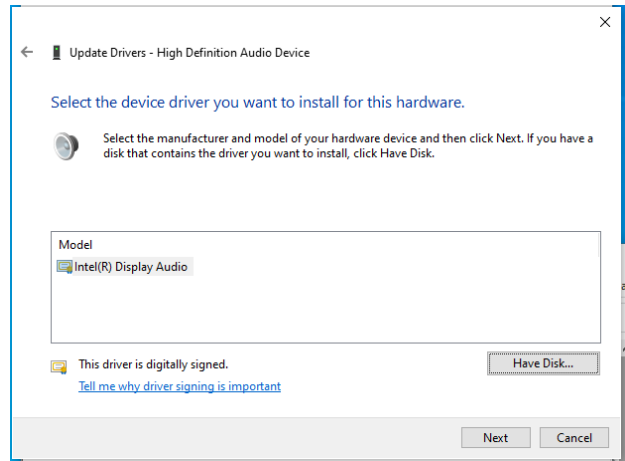


Step 5. Click OK.

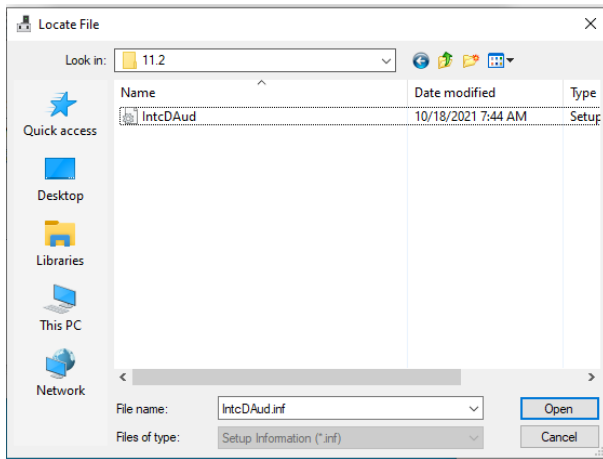
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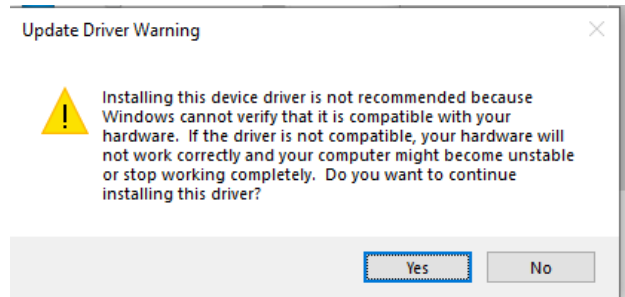
Step 6. Click Open.



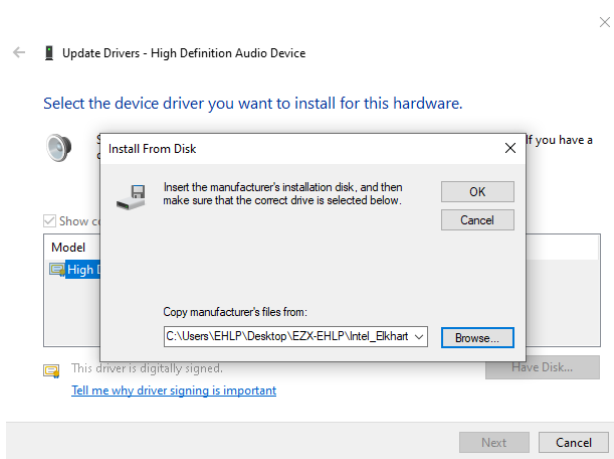
Step 9. Click Next.



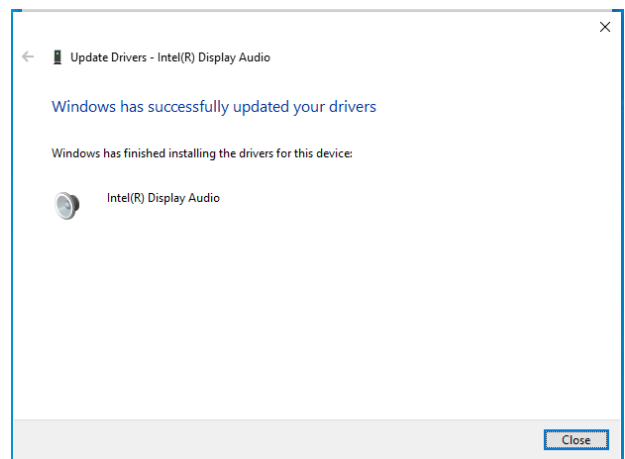
Step 7. Click Open.



Step 10. Click Yes.



Step 8. Click OK.



Step 11. Click Close.

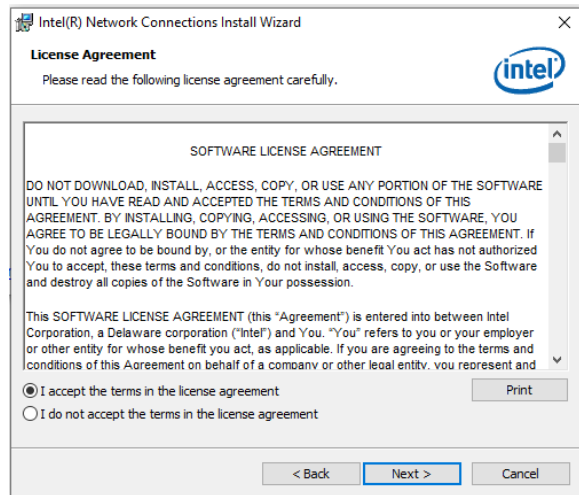
4.5 Install Ethernet Driver

All drivers can be found on the Avalue Official Website:

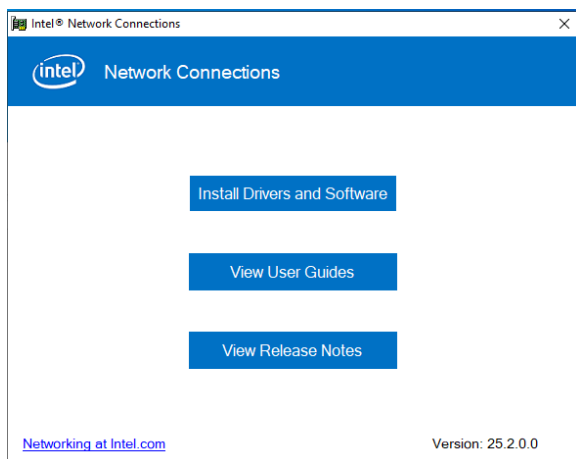
<http://www.avalue.com.tw>.



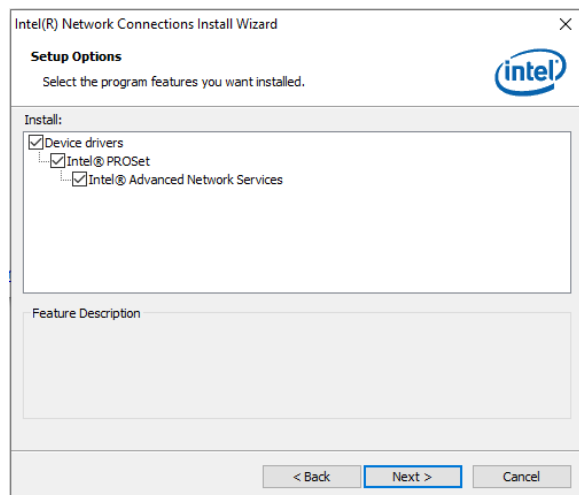
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



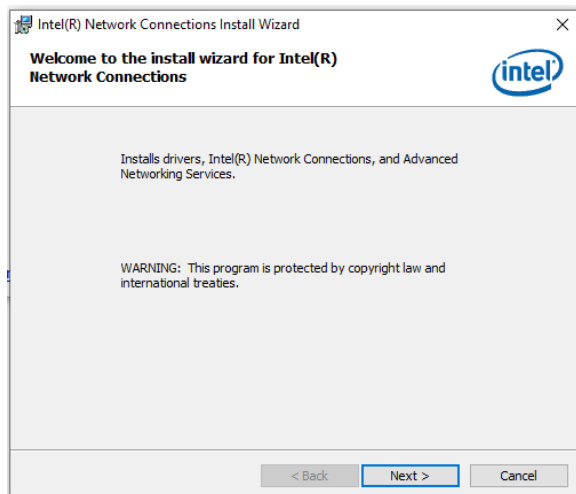
Step 3. Click Next.



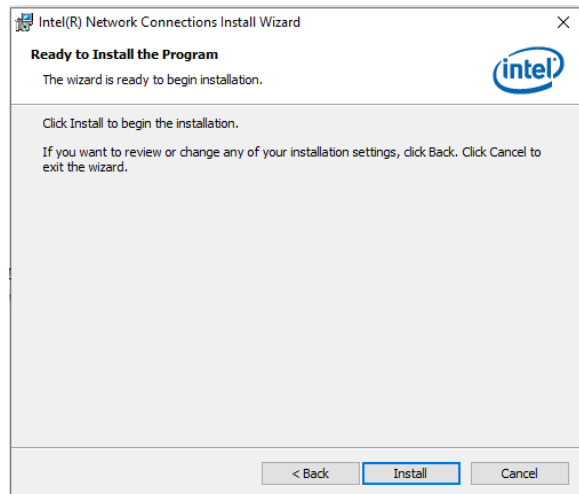
Step 1. Click Install Drivers and Software to continue installation.



Step 4. Click Next.

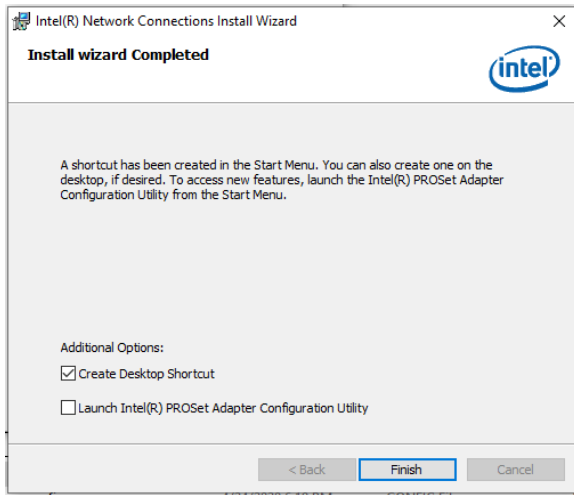


Step 2. Click Next.



Step 5. Click Install.

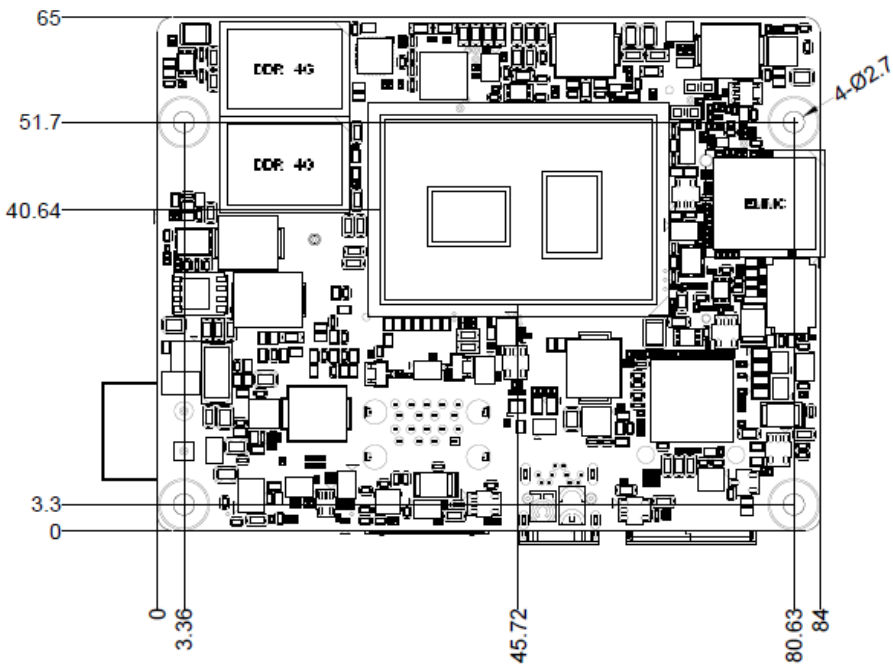
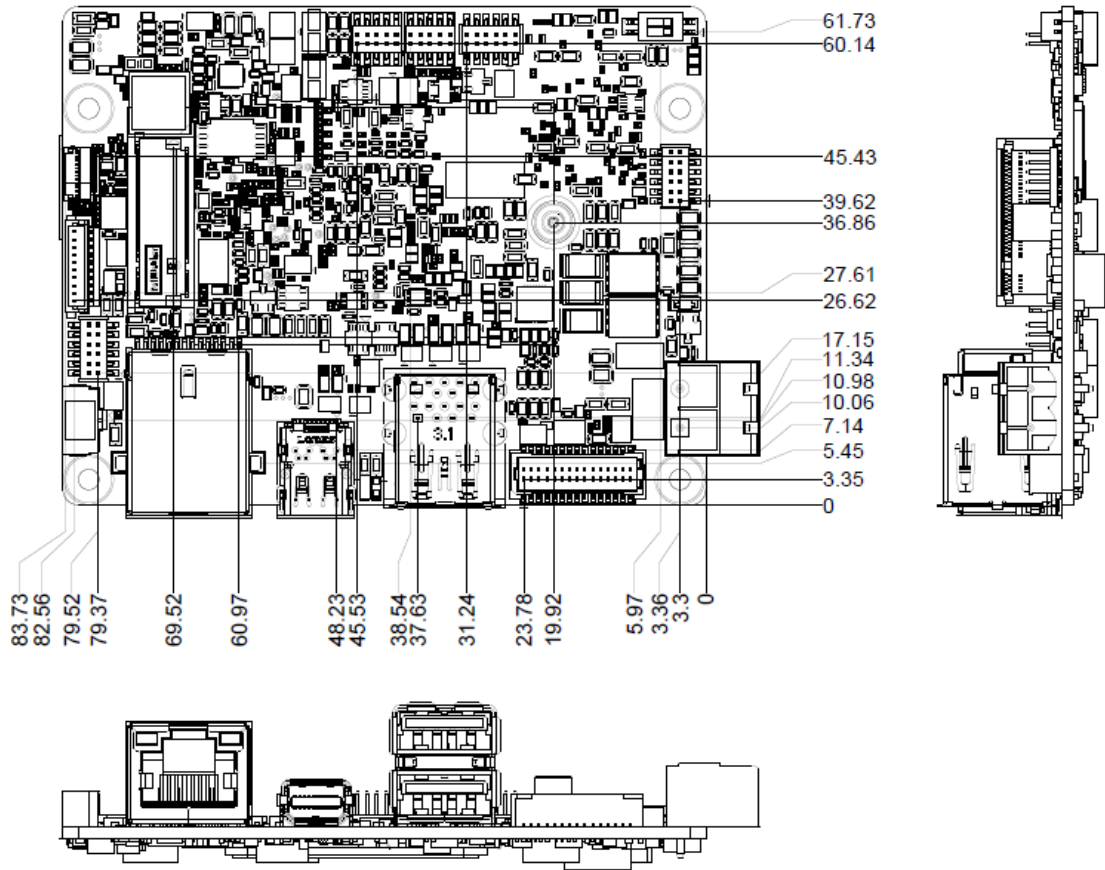
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Step 6. Click **Finish** to complete setup.

5. Mechanical Drawing

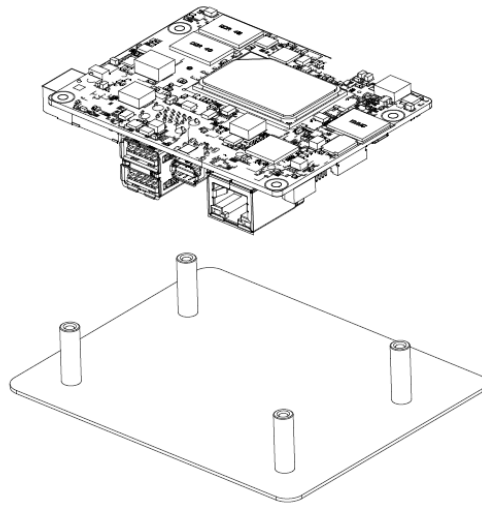
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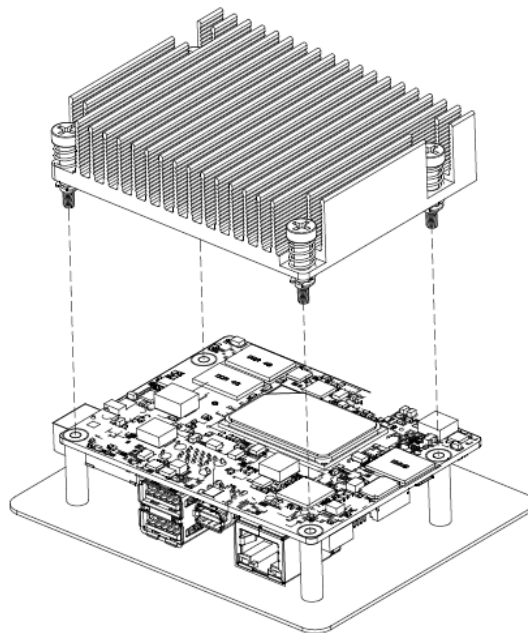
Unit: mm

For thermal solutions:

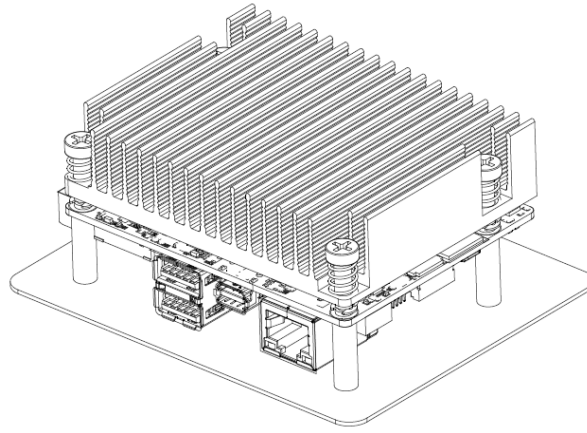
- Heatsink assembly



1.Pre-fix the mainboard on chassis.



2.Remove heatsink thermal pad cover and assemble with chassis.



3.Heatsink assembled.

- M.2 module assembly

