NUC-EHL

Intel® Elkhart Lake Fanless Ultra Slim System

Quick Reference Guide

1st Ed – 27 December 2022

Part No. E2017JAQ0A0R

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 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 INSTATLLED 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.

A Message to the Customer

Avalue Customer Services

Each and every Avalue's product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Avalue device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Avalue has come to be known.

Your satisfaction is our primary concern. Here is a guide to Avalue's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. So please consult the user's manual first.

To receive the latest version of the user's manual; please visit our Web site at:

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

Content

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

- 1 x NUC-EHL Intel® Celeron® Processor Ultra Slim System
- 1 x AC to DC Adapter
- 1 x Table Stand
- 1 x Din Rail
- 1 x VESA
- 4 x Rubber Foot
- 1 x Screw Kit
- 2 x Thermal Pad (for M.2 card)

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

1.3 System Specifications

System Information	
Processor	Intel® Celeron® Processor J6412 (1.5M Cache, up to 2.60 GHz)
System Memory	1 x 260-Pin SO-DIMM Socket, Max. Up to 32GB DDR4 3200MHz
I/O Chipset	ITE IT5571VG
BIOS Information	AMI uEFI BIOS, 256Mbit SPI Flash ROM
Watchdog Timer	H/W Reset, 1sec. – 65535sec./min.1sec. or 1min. step
H/W Status Monitor	Monitoring System Temperature and Voltage with Auto Throttling Control
TPM	TPM 2.0 (NuvoTon NPCT754AADYX co-lay with Infineon SLB9670VQ2.0) Default is NuvoTon
SBC	NCM-EHL
Expansion	
M.2 (Key-X, Size, Signal)	1 x M.2 Key-B 2242/3042 (SATAIII, PCIex1, USB 2.0, with Internal SIM Slot) 1 x M.2 Key-B 2242 (PCIe), share with M.2 Key B 2242/3042 expansion Slot) 1 x M.2 Key-E 2230 (PCIex1, USB 2.0)
Storage	
M.2 (Key-X, Size, Signal)	1 x M.2 Key-B 2242 (SATAIII)
Edge I/O (Front)	
USB Port	2 x USB 2.0
Audio	1 x Line-Out, 1 x Mic-In
Power Button	1 x Power On/Off w/ LED
COM Port	1 x RS232/422/485 (BIOS)
Power Button	1 x Power On/Off w/ LED
Edge I/O (Rear)	
USB Port	4 x USB 3.1 Gen.2
COM Port	1 x RS232/422/485 (BIOS)
HDMI	2 x HDMI 2.0b
RJ-45	2 x RJ45
DC Jack	1 x Lockable DC Jack
LED Indicator	1 x Data Access 1 x Power
Kensington Lock	1 x Kensington Lock
Edge I/O (Right)	
Antenna	2 x Antenna Mounting with Dust Protection Cover
Micro SD Slot	1 x Micro SD Slot
Edge I/O (Left)	
Antenna	2 x Antenna Mounting with Dust Protection Cover

<table>
<tr><th colspan="2">Display</th></tr>
<tr><td>Graphic Chipset</td><td>Intel® UHD Graphics for 10th Gen Intel® Processors</td></tr>
<tr><td>Resolution</td><td>2 x HDMI 2.0b.: 4096x2160@60Hz</td></tr>
<tr><th colspan="2">Audio</th></tr>
<tr><td>Audio Codec</td><td>RealTek ALC888S-VD2-GR (Co-Layout RealTek ALC897-VA2-CG)</td></tr>
<tr><td>Interface</td><td>Mic-In, Line-Out</td></tr>
<tr><th colspan="2">Ethernet</th></tr>
<tr><td>LAN Chipset</td><td>Intel® Ethernet Controller I225-LM</td></tr>
<tr><td>Specification</td><td>2 x 10/100/1000/2.5 Base-Tx GbE compatible</td></tr>
<tr><td>LED Indicator</td><td>Max. 2.5G LAN Port
<table>
<tr><th colspan="2">ACT/LINK</th><th>SPEED</th></tr>
<tr><th>Definition</th><th>LED</th><th>Definition</th></tr>
<tr><td>No Link</td><td>Solid Orange</td><td>2.5G</td></tr>
<tr><td>Connection</td><td>Solid Green</td><td>1G/100M</td></tr>
<tr><td>Activity</td><td>Light Off</td><td>10M</td></tr>
</table></td></tr>
<tr><th colspan="2">Power Requirement</th></tr>
<tr><td>DC Input</td><td>+12V</td></tr>
<tr><td>DC Input Connector</td><td>Lockable DC Jack</td></tr>
<tr><td>ACPI</td><td>Single power ATX Support S0, S3, S4, S5
ACPI 5.0 Compliant</td></tr>
<tr><td>Power Mode</td><td>AT/ATX (ATX is default setting)</td></tr>
<tr><td>Adapter</td><td>AC to DC Adapter, 12V/5A</td></tr>
<tr><th colspan="2">Mechanical & Environment</th></tr>
<tr><td>Operating Temp.</td><td>0°C ~ 50°C (14°F ~ 122°F) with 0.2m/s air flow
0°C ~ 60°C (14°F ~ 140°F) with 0.5m/s air flow</td></tr>
<tr><td>Storage Temp.</td><td>-30°C ~ 70°C (-22°F ~ 158°F)</td></tr>
<tr><td>Operating Humidity</td><td>40°C @ 95% Relative Humidity, Non-condensing</td></tr>
<tr><td>Dimension (W*L*H)</td><td>170 x 125 x 36 mm</td></tr>
<tr><td>Weight</td><td>0.95Kg</td></tr>
<tr><td>Vibration Test</td><td>Random Vibration Operation
1 Test PSD : 0.00505G²/Hz , 5 Grms
2 System condition : operation mode
3 Test frequency : 5~500 Hz
4 Test axis : X,Y and Z axis
5 Test time : 30 minutes per each axis
6 IEC60068-2-64 Test Fh
6 Storage : SSD

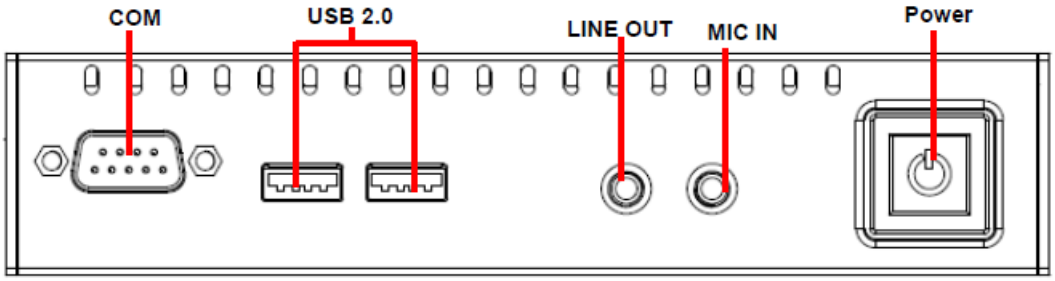
Sine Vibration test (Non-operation)</td></tr>
</table>

	1 Test Acceleration : 2G 2 Test frequency : 5~500 Hz 3 Sweep：1 Oct/ per one minute. (logarithmic) 4 Test Axis : X,Y and Z axis 5 Test time :30 min. each axis 6 System condition : Non-Operating mode 7. Reference IEC 60068-2-6 Testing procedures Package Vibration Test: 1 Test PSD : 0.026G²/Hz , 2.16 Grms 2 Test frequency : 5~500 Hz 3 Test axis : X,Y and Z axis 4 Test time : 30 minutes per each axis 5 IEC 60068-2-64 Test Fh
Shock Test	1 Wave from : Half Sine wave 2 Acceleration Rate : 55G 3 Duration Time : 11ms 4 No. of shock : 3 times 5 Test Axis : +/- X, +/-Y, +/-Z axis, six faces 6 operation mode 7 Reference IEC 60068-2-27 testing procedures Test Eb : SSD Shock Test
Drop Test	Package drop test Reference ISTA 2A, Method : IEC-60068-2-32 Test:Ed Test Ea : Drop Test 1 Test phase : One corner, three edges, six faces 2 Test high : 96.5cm 3 Package weight : 5Kg 4 Test drawing
IP Rating	IP40
Mounting Kit	Table Stand/VESA/Din Rail
Software Support	
OS Information	Win10, Win11, Linux
Certification	
Certification Information	CE, FCC Class B

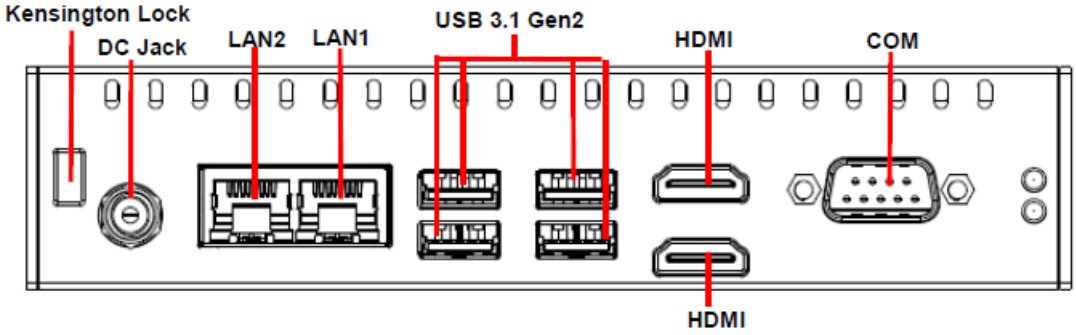
Note: Specifications are subject to change without notice.

1.4 System Overview

1.4.1 Front View



1.4.2 Rear View



1.4.3 Left View

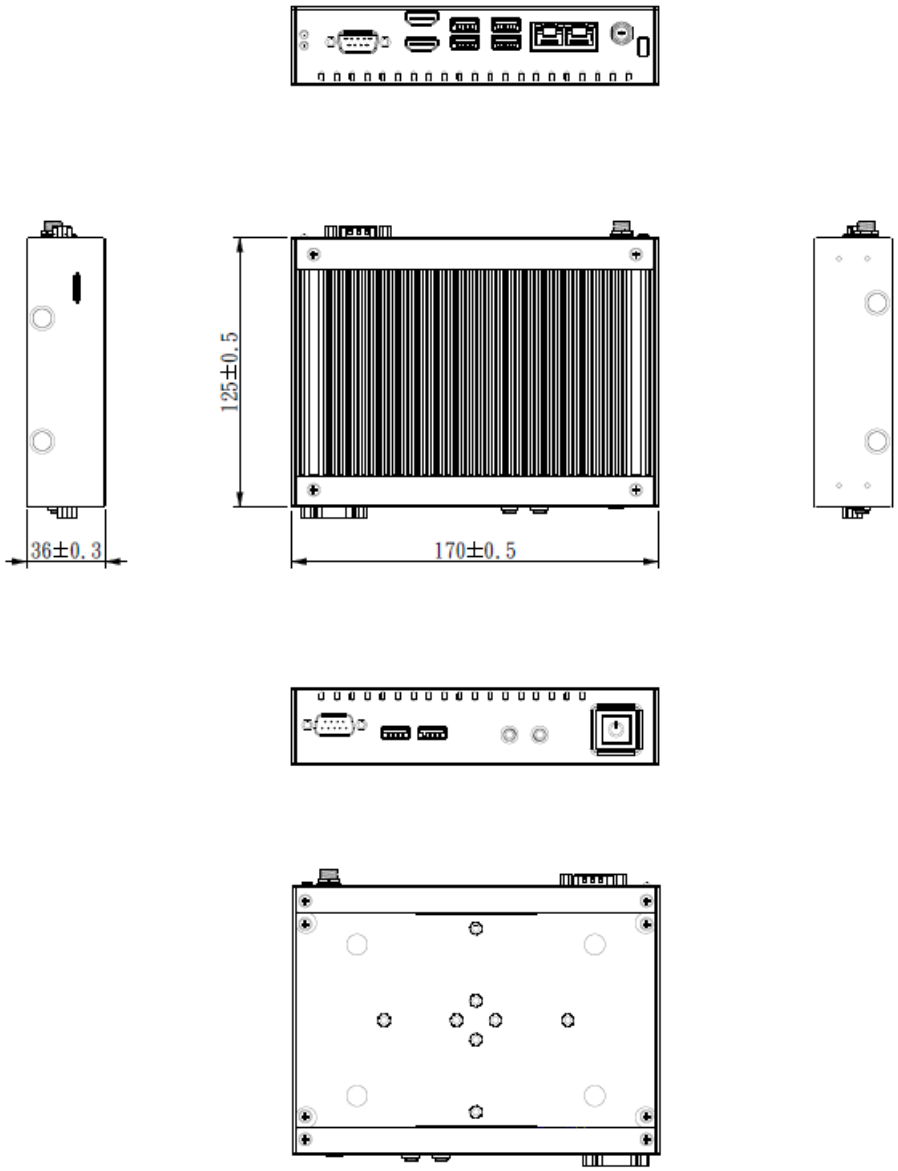
Connectors

Label	Function	Note
Power	Power on button	
USB 2.0	2 x USB2.0 connector	
COM	2 x Serial port connector	
LINE OUT	Line-out audio jack	
MIC IN	Mic-in audio jack	
LAN1/2	RJ-45 Ethernet 1/2	
USB 3.1 Gen2	4 x USB 3.1 Gen2 connector	
DC Jack	Lockable DC Jack *Note 1	
HDMI	2 x HDMI connector	
Kensington Lock	Kensington Lock	

Micro SD	Micro SD card

*Note 1: Do not unplug the adapter and Jack arbitrarily after booting. It will cause system abnormalities.

1.5 System Dimensions



(Unit: mm)

2. Hardware Configuration

Jumper and Connector Setting, Driver and BIOS Installing

For advanced information, please refer to:

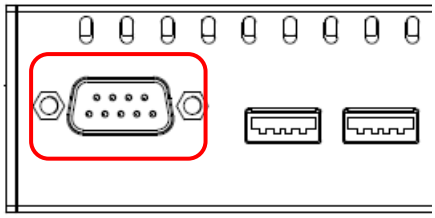
1- NCM-EHL included in this manual.

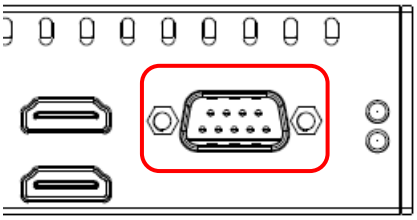
Note: If you need more information, please visit our website:

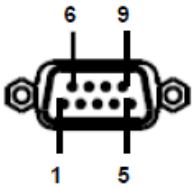
http://www.avalue.com.tw

2.1 NUC-EHL connector mapping

2.1.1 Serial Port 1/2 connector (COM1/2)







In RS-232 Mode

Signal	PIN	PIN	Signal
NDCD#	1	6	NDSR#
NRXD	2	7	NRTS#
NTXD	3	8	NCTS#
NDTR#	4	9	NRI#
GND	5		

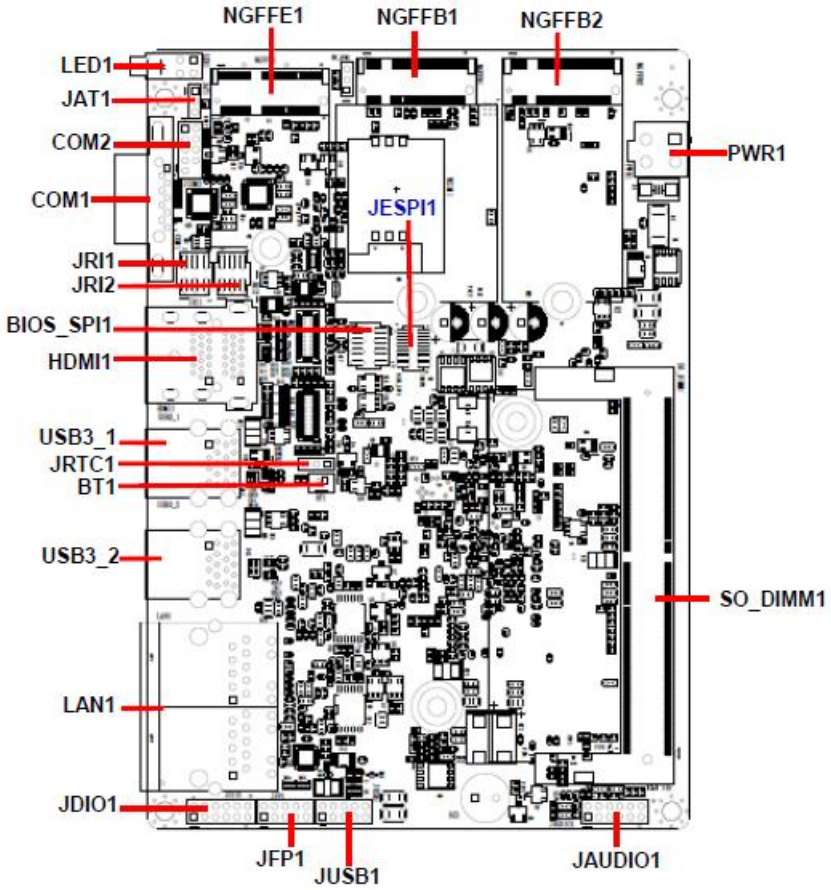
In RS-422 Mode

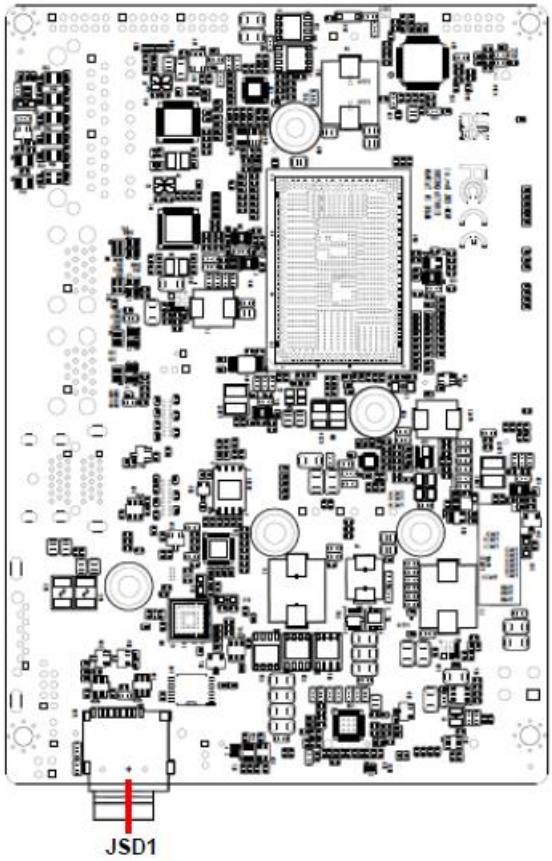
Signal	PIN	PIN	Signal
TxD1-	1	6	NC
TxD1+	2	7	NC
RxD1+	3	8	NC
RxD1-	4	9	NC
GND	5		

In RS-485 Mode

Signal	PIN	PIN	Signal
DATA1-	1	6	NC
DATA1+	2	7	NC
NC	3	8	NC
NC	4	9	NC
GND	5		

2.2 NCM-EHL Overviews





2.3 NCM-EHL Jumper & Connector list

Jumpers

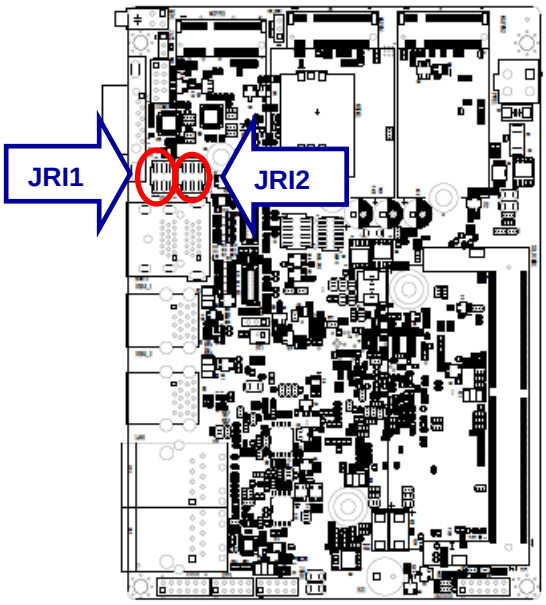
Label	Function	Note
JRI1/2	Serial port 1/2 pin9 signal select	3 x 2 header, pitch 2.00mm
JAT1	AT/ATX Input power select	3 x 1 header, pitch 2.00mm
JRTC1	Clear CMOS	3 x 1 header, pitch 2.00mm

Connectors

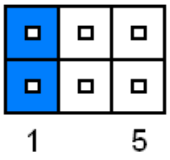
Label	Function	Note
COM1	Serial port 1 connector	
COM2	Serial port 2 connector	5 x 2 header, pitch 2.00mm
JDIO1	General purpose I/O connector	6 x 2 header, pitch 2.00mm
NGFFB1	M.2 KEY-B 2242/3042 connector	
NGFFB2	M.2 KEY-B 2242/3042 connector	
NGFFE1	M.2 KEY-E 2230 connector	
LED1	HDD/Power LED indicator	
JFP1	Front Panel connector	5 x 2 header, pitch 2.00mm
USB3_1/3_2	4 x USB3.1 Gen2 connector	
JUSB1	USB2.0 connector	5 x 2 header, pitch 2.00mm
LAN1	RJ-45 Ethernet 1/2	
BT1	Battery connector	2 x 1 wafer, pitch 1.25mm
BIOS_SPI1	BIOS SPI connector	4 x 2 header, pitch 2.00mm
PWR1	Power connector	2 x 2 wafer, pitch 4.20mm
JAUDIO1	Audio connector	6 x 2 header, pitch 2.00mm
SO_DIMM1	DDR4 SODIMM socket	
JESPI1	ESPI connector	6 x 2 header, pitch 1.27mm
JSD1	SD card slot	

2.4 NCM-EHL Jumpers & Connectors settings

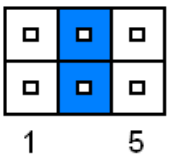
2.4.1 Serial port 1/2 pin9 signal select (JRI1/2)



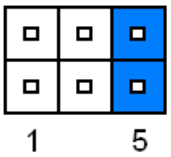
Ring*



+5V

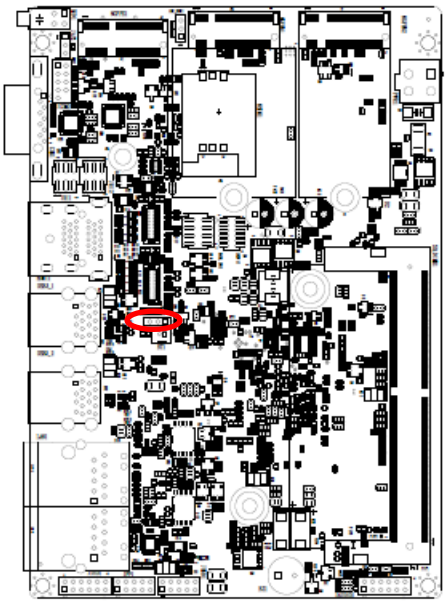


+12V

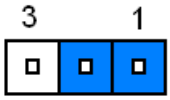


*** Default**

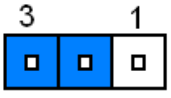
2.4.2 Clear CMOS (JRTC1)



Normal*

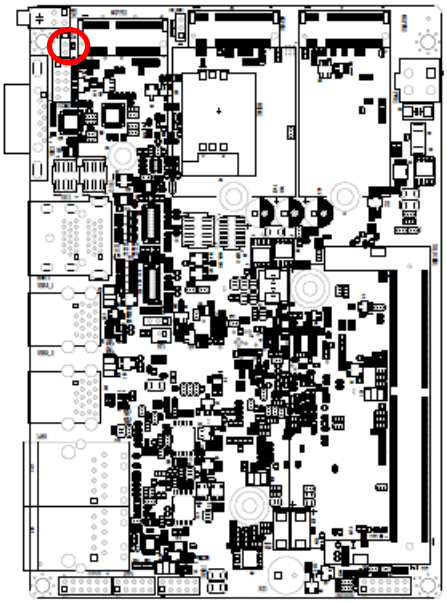


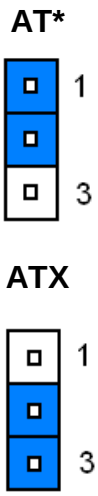
Clear CMOS



*** Default**

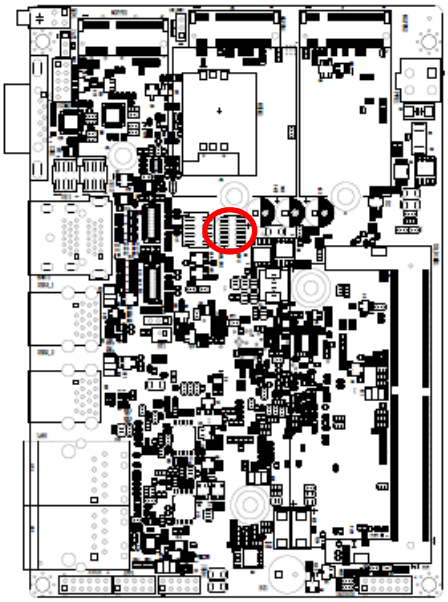
2.4.3 AT/ATX Input power select (JAT1)

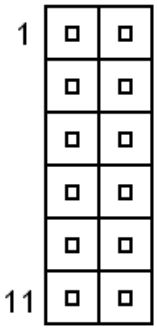




*** Default**

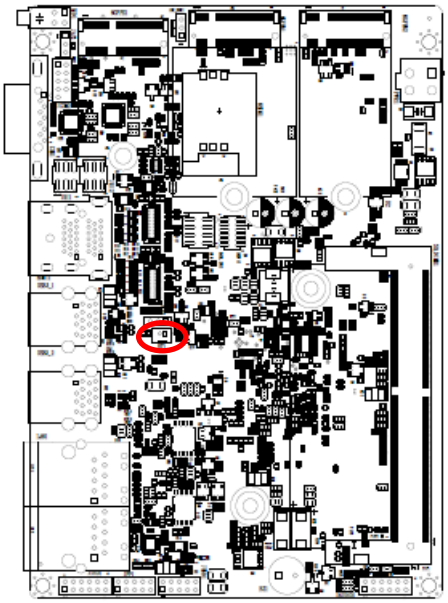
2.4.4 ESPI connector (JESPI1)





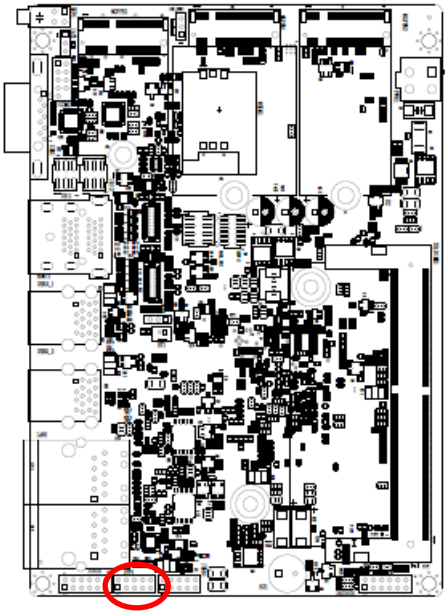
Signal	PIN	PIN	Signal
CN_ESPI_IO0	1	2	+V3.3_ESPI
CN_ESPI_IO1	3	4	PLT_RST_BUF#
CN_ESPI_IO2	5	6	ESPI_CS#
CN_ESPI_IO3	7	8	CN_ESPI_CLK
NC	9	10	GND
ESPI_RST	11	12	ESPI_ALERT#1

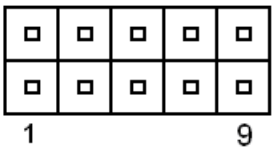
2.4.5 Battery connector (BT1)



Signal	PIN
+RTCBAT	1
GND	2

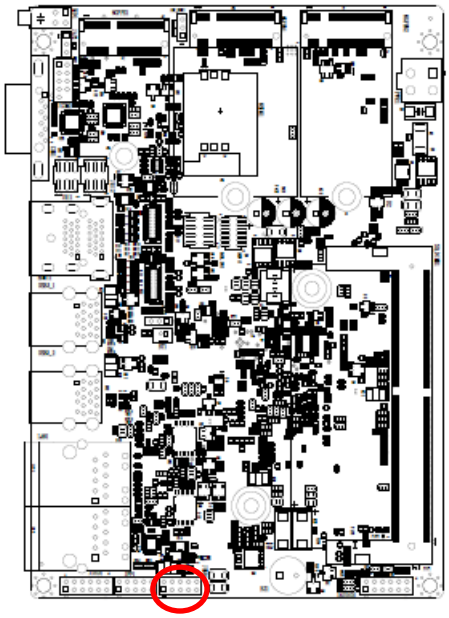
2.4.6 Front Panel connector (JFP1)

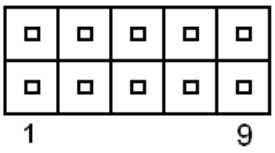




Signal	PIN	PIN	Signal
FP_HDD_LED+	1	2	FP_PWR_LED+
HDD_LED#	3	4	PWR_LED#
FP_RST	5	6	FP_PWRBTN
GND	7	8	GND
NC	9	10	GND

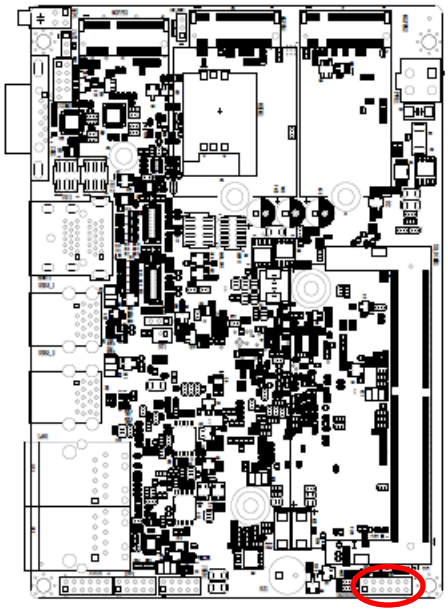
2.4.7 USB2.0 connector (JUSB1)

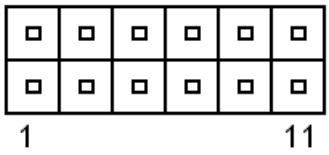




Signal	PIN	PIN	Signal
+V5A_USB2	1	2	GND
USB_R_DN4	3	4	GND
USB_R_DP4	5	6	USB_R_DP5
GND	7	8	USB_R_DN5
GND	9	10	+V5A_USB2

2.4.8 Audio connector (JAUDIO1)



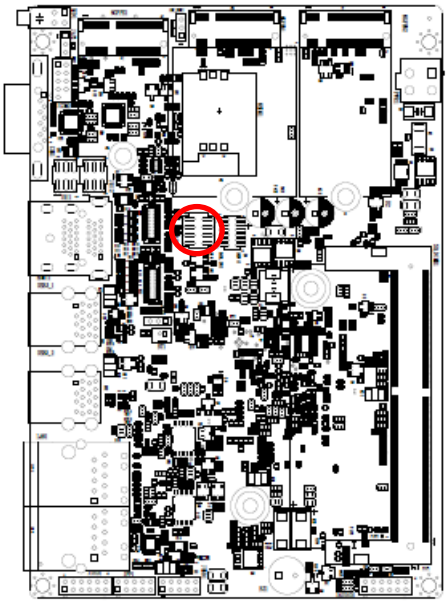


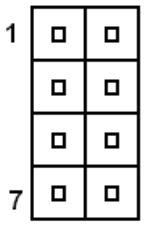
Signal	PIN	PIN	Signal
FRONT-R-OUT	1	2	FRONT-L-OUT
HD_AGND	3	4	HD_AGND
LINE1-R-IN	5	6	LINE1-L-IN
MIC1-R-IN	7	8	MIC1-L-IN
FRONT-JD	9	10	LINE1-JD
MIC1-JD	11	12	HD_AGND

2.4.8.1 Signal Description – Audio connector (JAUDIO1)

Signal	Signal Description
LINE1-JD	AUDIO IN (LINE_RIN/LIN)sense pin
FRONT-JD	AUDIO Out(ROUT/LOUT) sense pin
MIC1-JD	MIC IN (MIC_RIN/LIN) sense pin

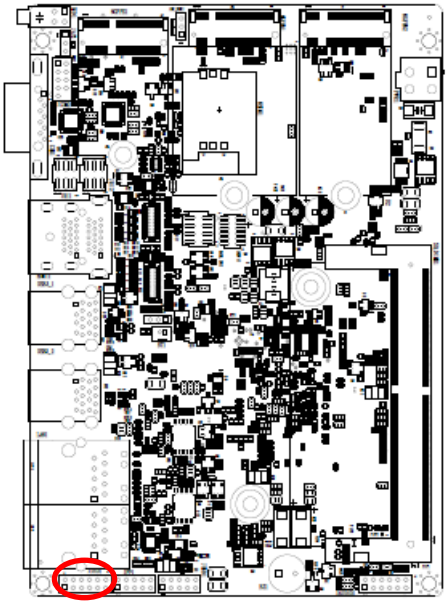
2.4.9 BIOS SPI connector (BIOS_SPI1)

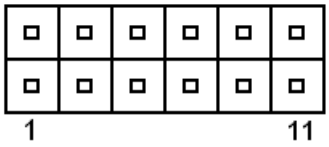




Signal	PIN	PIN	Signal
+V3.3A_SPI	1	2	GND
SPI_CS0#	3	4	SPI_CLK
SPI_MISO	5	6	SPI_MOSI
BIOS_HOLD#	7	8	BIOS_WP#

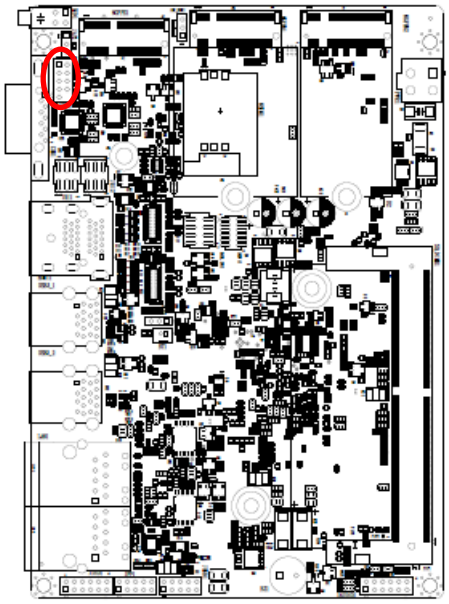
2.4.10 General purpose I/O connector (JDIO1)

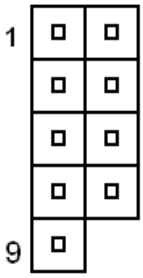




Signal	PIN	PIN	Signal
DIO_GP20_TGPI4	1	2	DIO_GP10_TGPI0
DIO_GP21_TGPI5	3	4	DIO_GP11_TGPI1
DIO_GP22_TGPI6	5	6	DIO_GP12_TGPI2
DIO_GP23_TGPI7	7	8	DIO_GP13_TGPI3
SMB_SCL_S0	9	10	SMB_SDA_S0
GND	11	12	+V5S_DIO

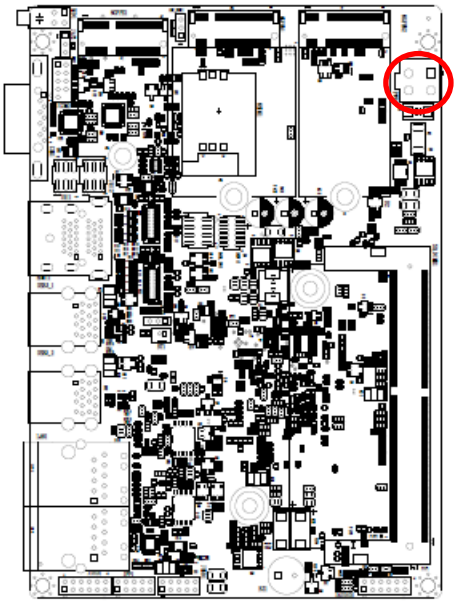
2.4.11 Serial port 2 connector (COM2)

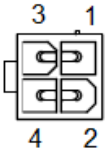




Signal	PIN	PIN	Signal
COM_DCD#_TXN_2	1	2	COM_RXD_TXP_2
COM_TXD_RXP_2	3	4	COM_DTR#_RXN_2
GND	5	6	COM_DSR#_2
COM_RTS#_2	7	8	COM_CTS#_2
+V_COM_RI#_2	9		

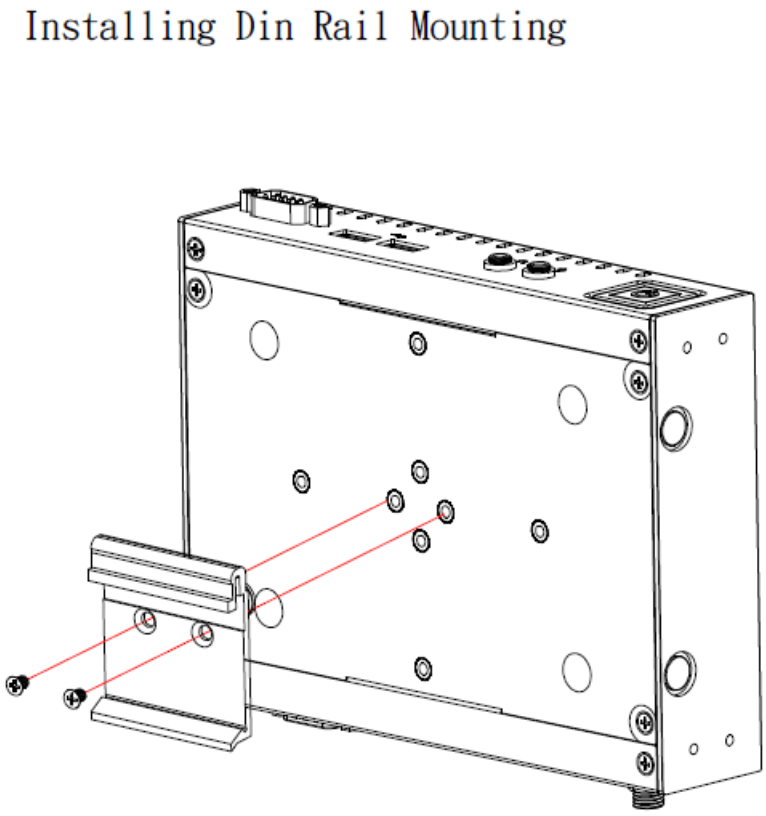
2.4.12 Power connector (PWR1)





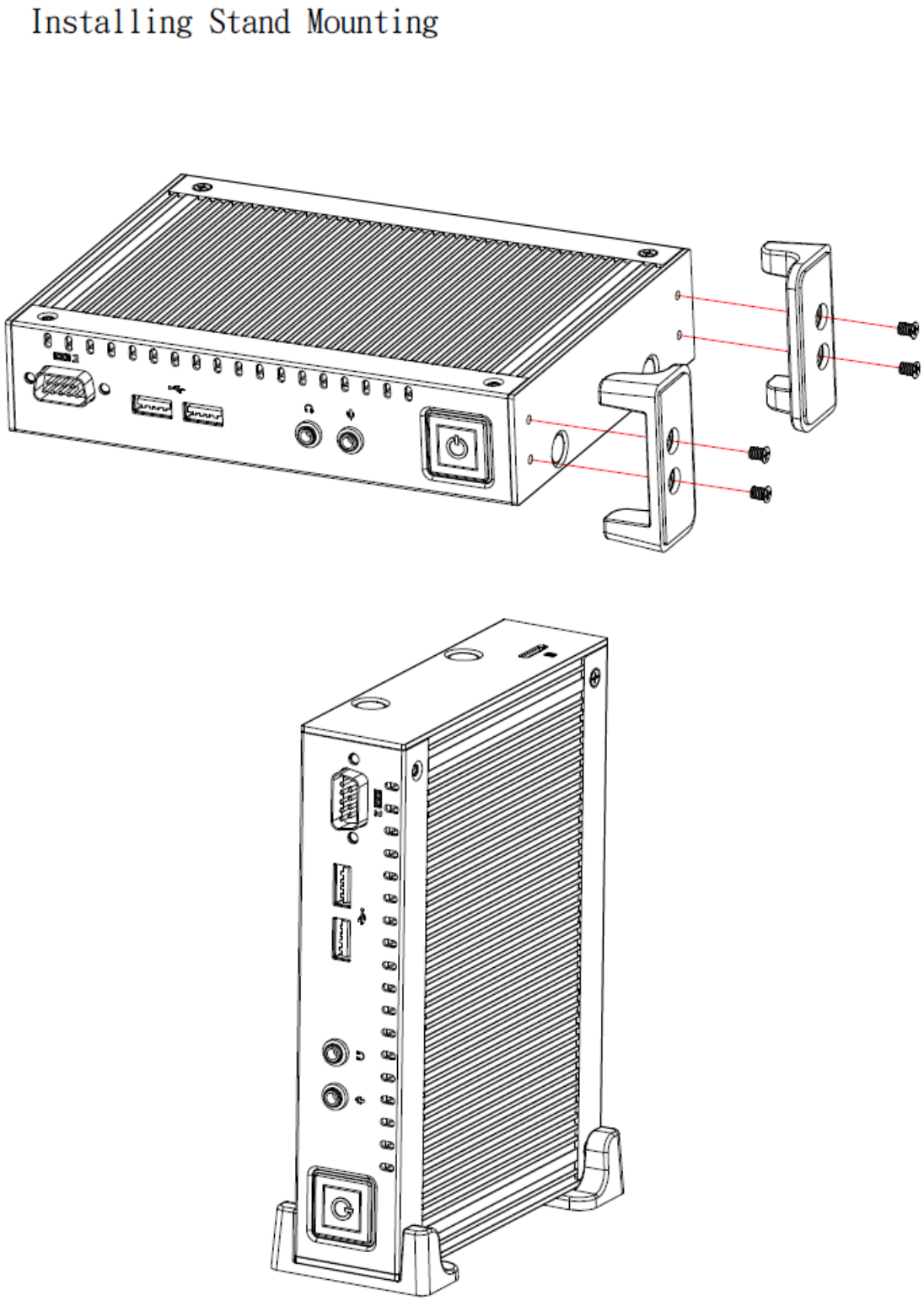
Signal	PIN	PIN	Signal
+24V_VIN	3	1	GND
+24V_VIN	4	2	GND

2.5 Installing Din Rail Mounting (NUC-EHL)



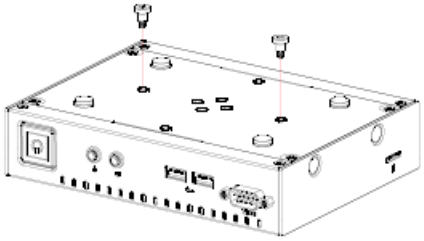
Step1. Fix with two M3*4 screws on the system.

2.6 Installing Stand Mounting (NUC-EHL)

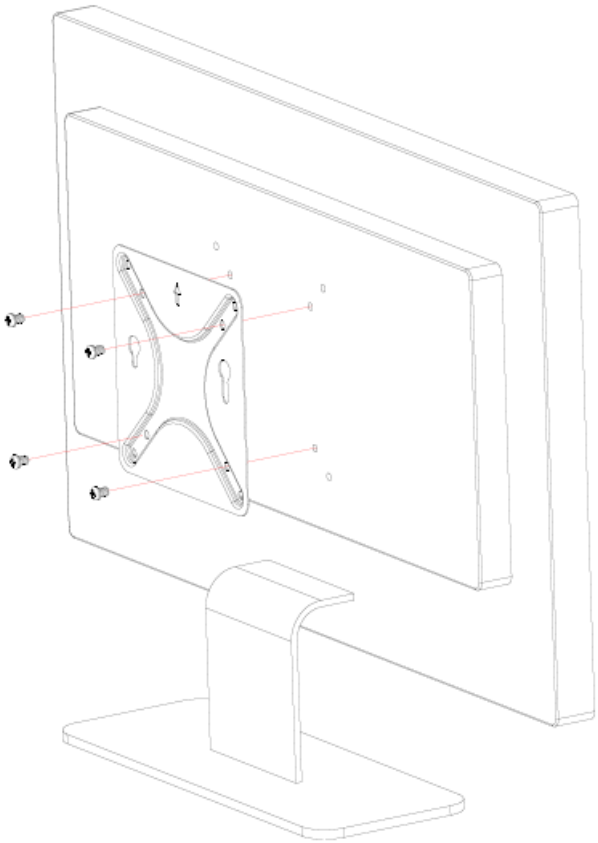


Step1. Fix with four 6#32*5 screws on the system.

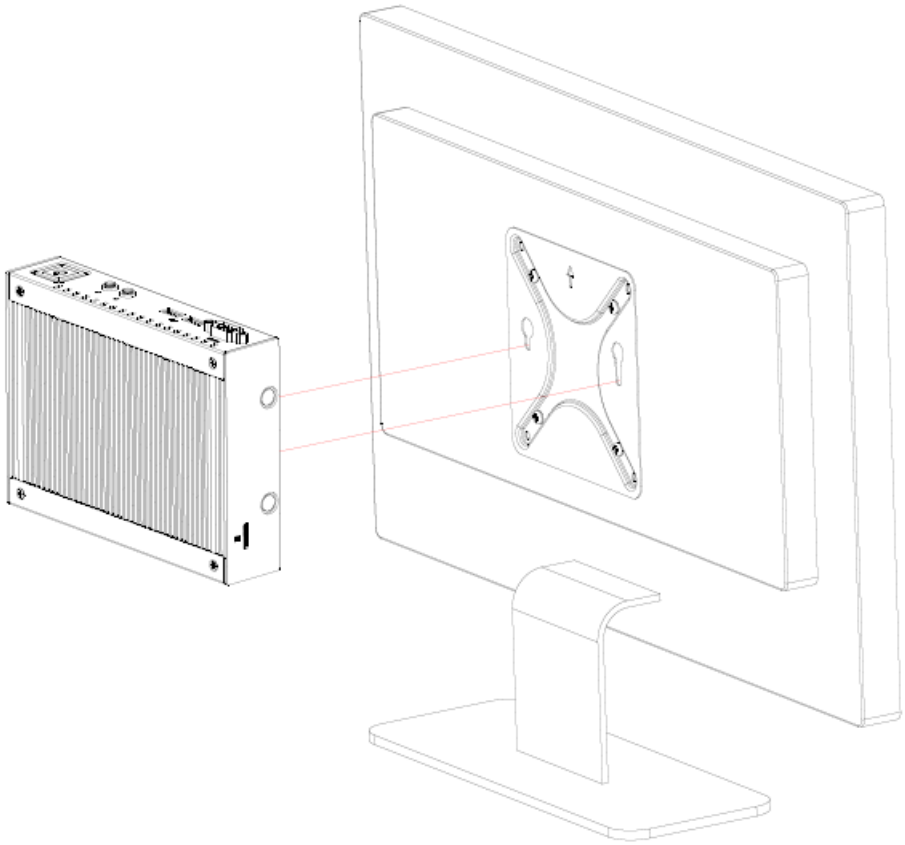
2.7 Installing VESA Mounting (NUC-EHL)



Step1. Insert and fasten two M3*L11.1 screw on the bottom.

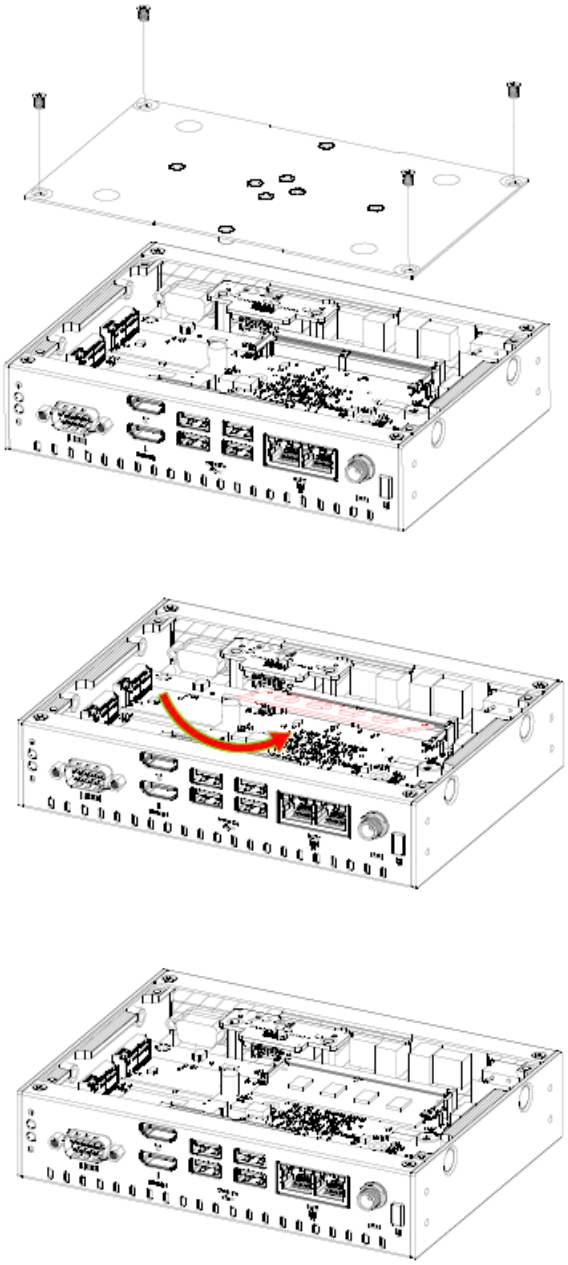


Step2. Fix with four M4*6mm screws on the monitor (or wall).



Step3. Slide the system onto the VESA mount bracket.

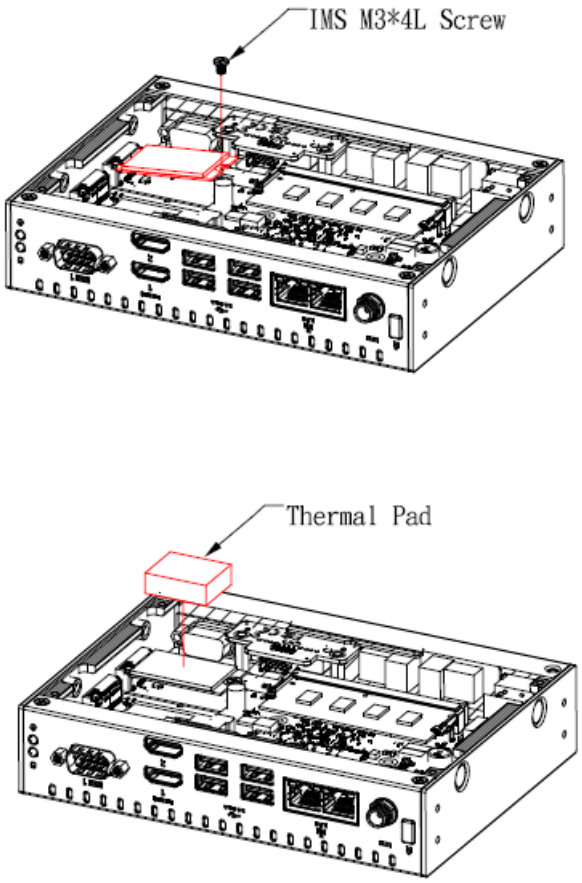
2.8 Installing Memory & M.2 card (NUC-EHL)



Step 1. Remove 4 screws from the bottom of your system and take it off.

Step 2. Slide the DDR4 SODIMM into the memory socket and press it down until properly seated.

Installing M.2 Key B (2242) card



Step 3. Insert M.2 B-Key (2242) card into designated locations and fasten with screw.

Step 4. Paste the Thermal Pad to complete installation.

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

Press <ESC> or <Del> 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.

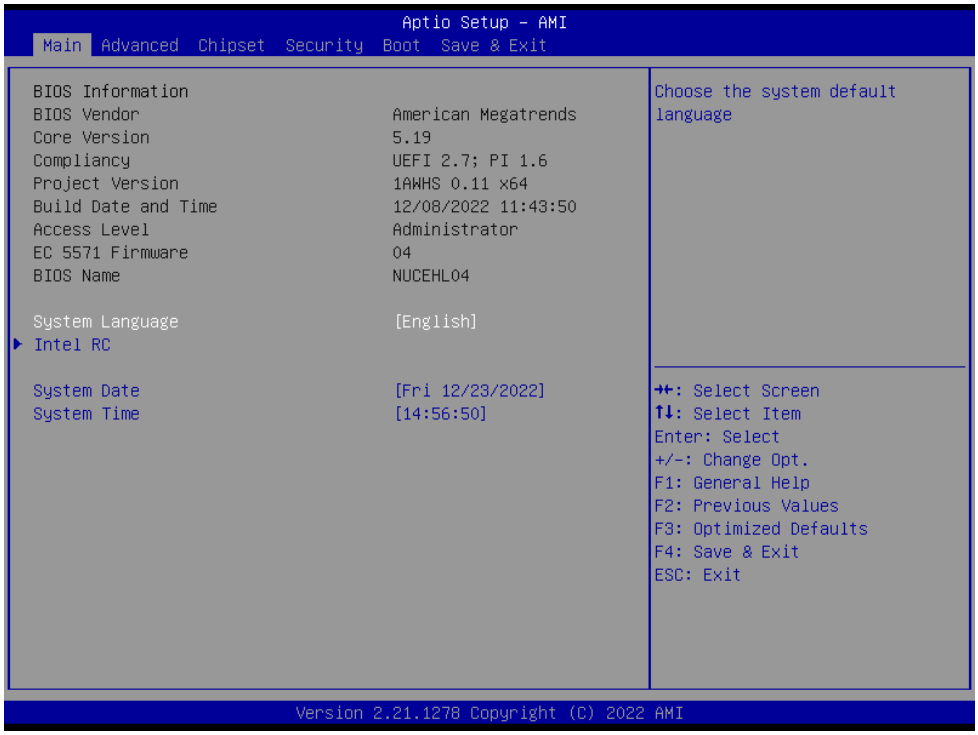
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance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

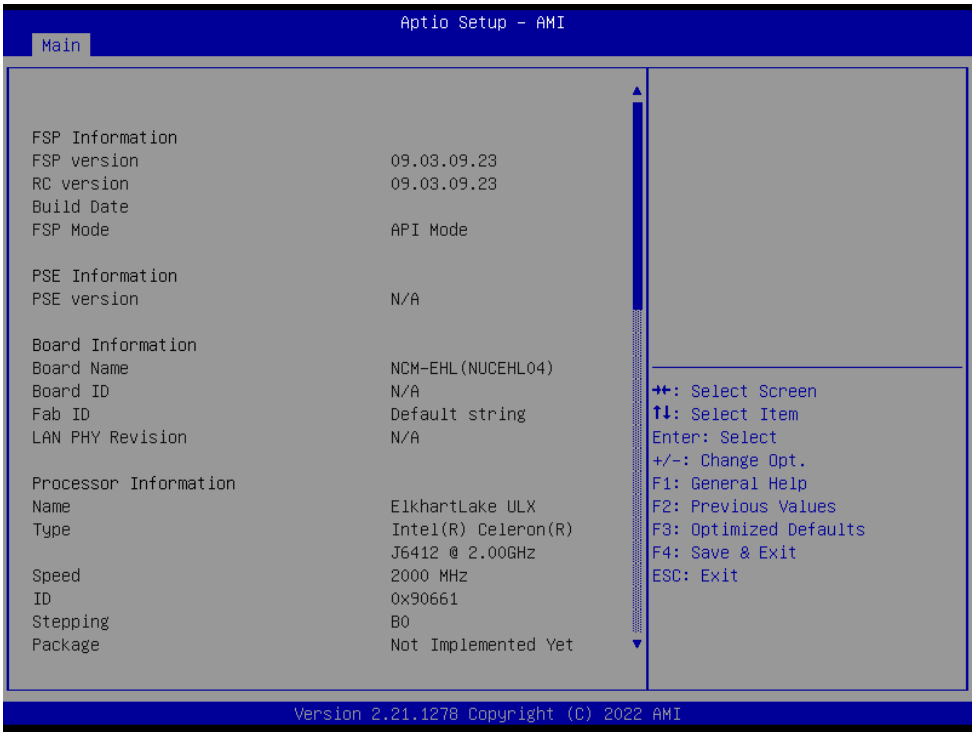
3.6 BIOS setup

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.

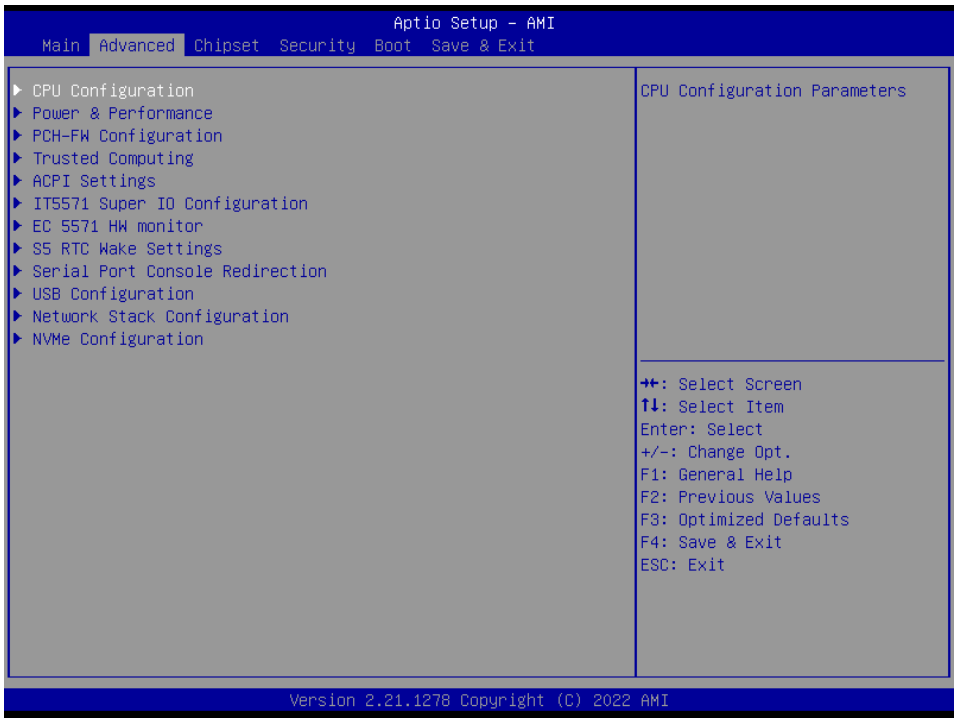
3.6.1.3 System Time

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.

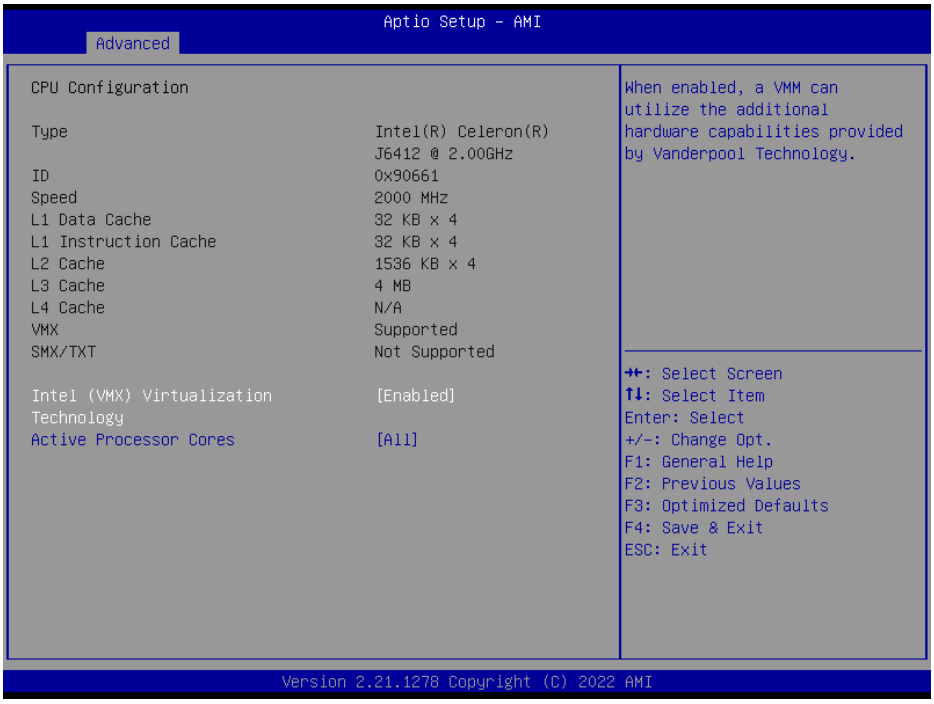
3.6.2 Advanced Menu

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

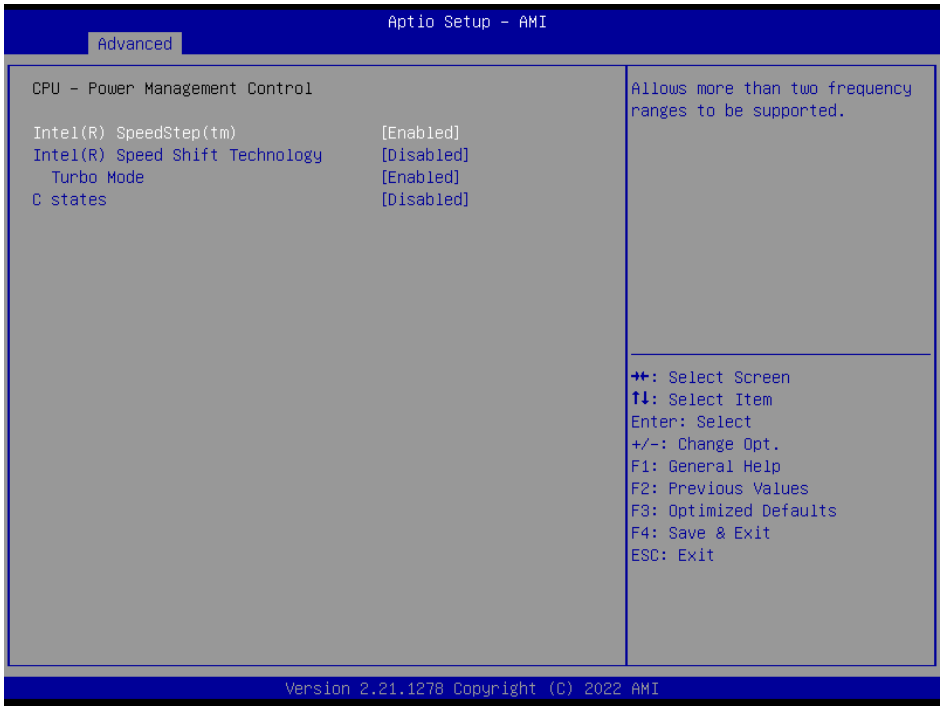
Use the CPU configuration menu to view detailed CPU specification and configure the CPU.



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

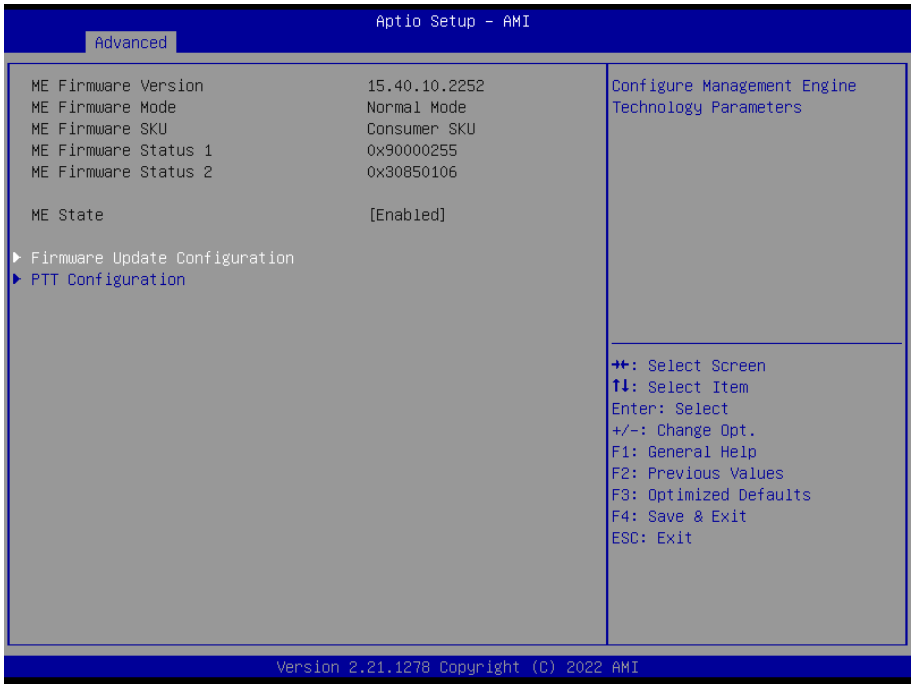
3.6.2.2.1 CPU – Power Management Control



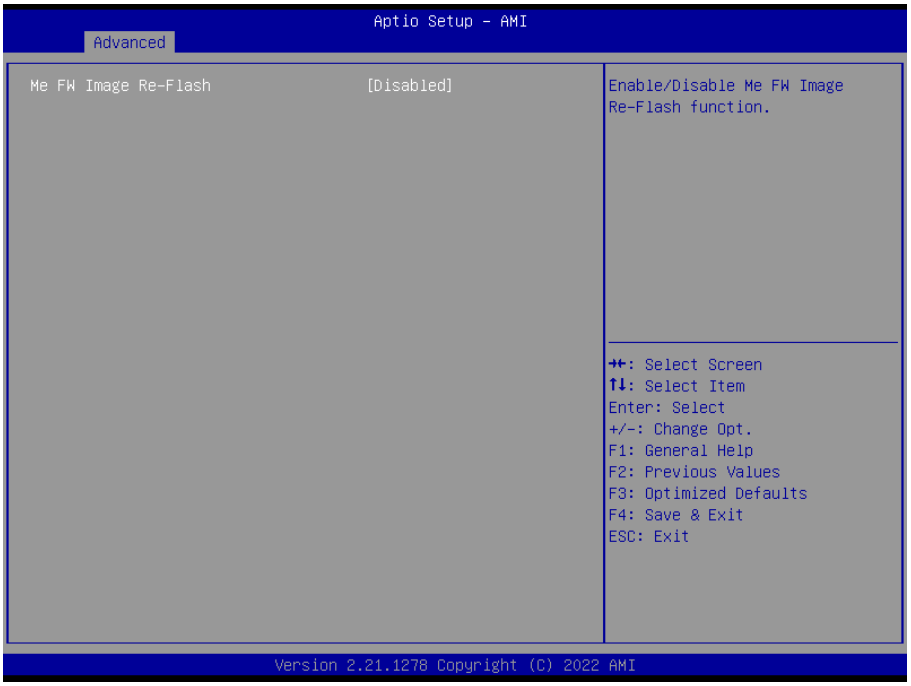
Item	Option	Description
Intel® SpeedStep™	Enabled**[Default]**, Disabled	Allows more than two frequency ranges to be supported.
Intel® Speed Shift Technology	Enabled, Disabled**[Default]**	Eanble/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.

Turbo Mode	Enabled**[Default]**, Disabled	Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.
C States	Enabled Disabled**[Default]**,	Enable/Disable CPU Power Management. Allows CPU to go to C state when it's not 100% utilized.

3.6.2.3 PCH-FW Configuration

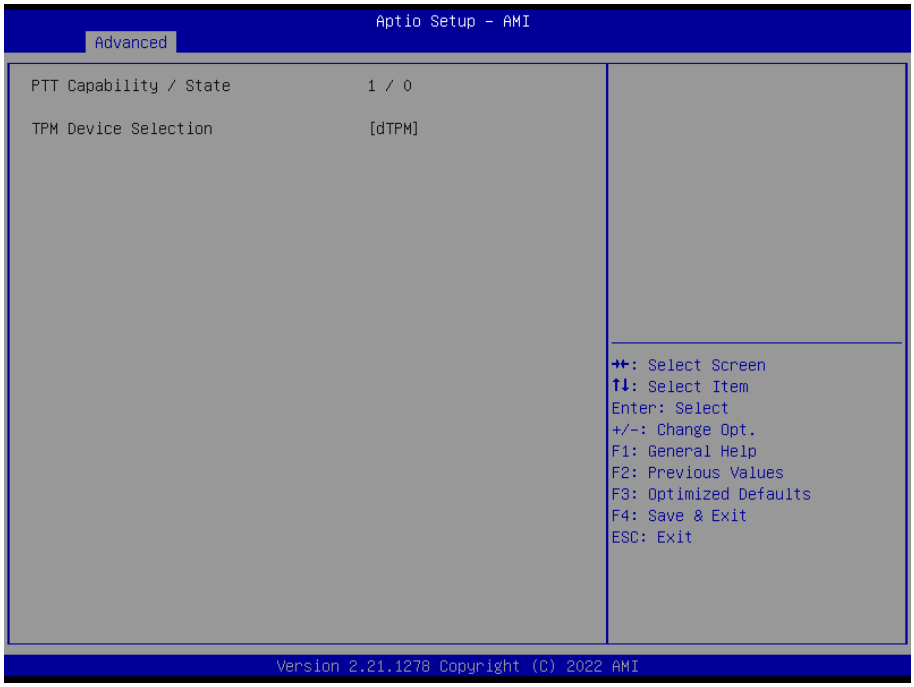


3.6.2.3.1 Firmware Update Configuration

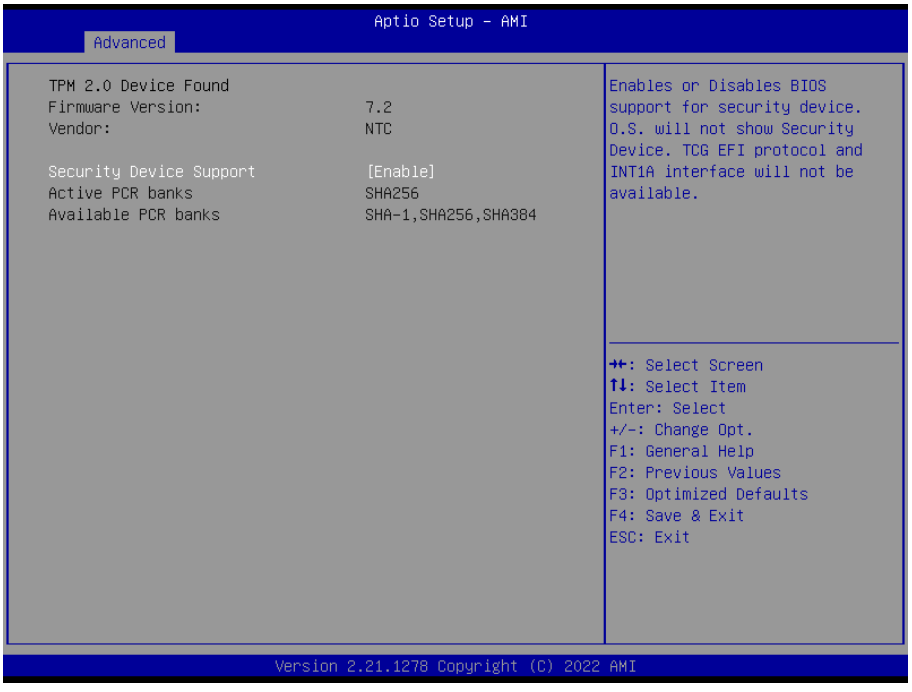


Item	Option	Description
ME FW Image Re-Flash	Disabled**[Default]**, Enabled	Enable/Disable Me FW Image Re-Flash function.

3.6.2.3.2 PTT Configuration

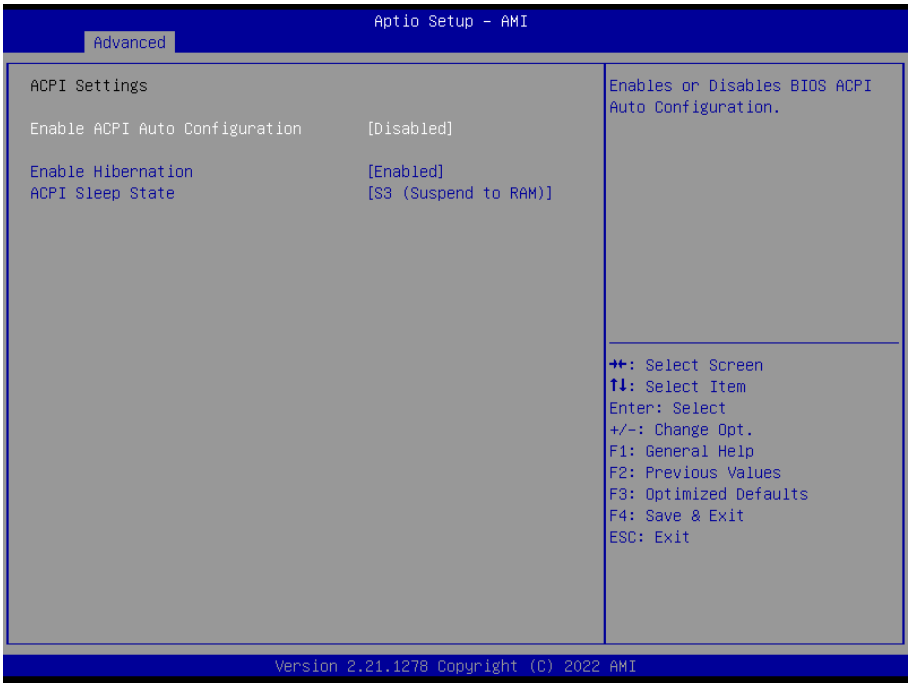


3.6.2.4 Trusted Computing



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.

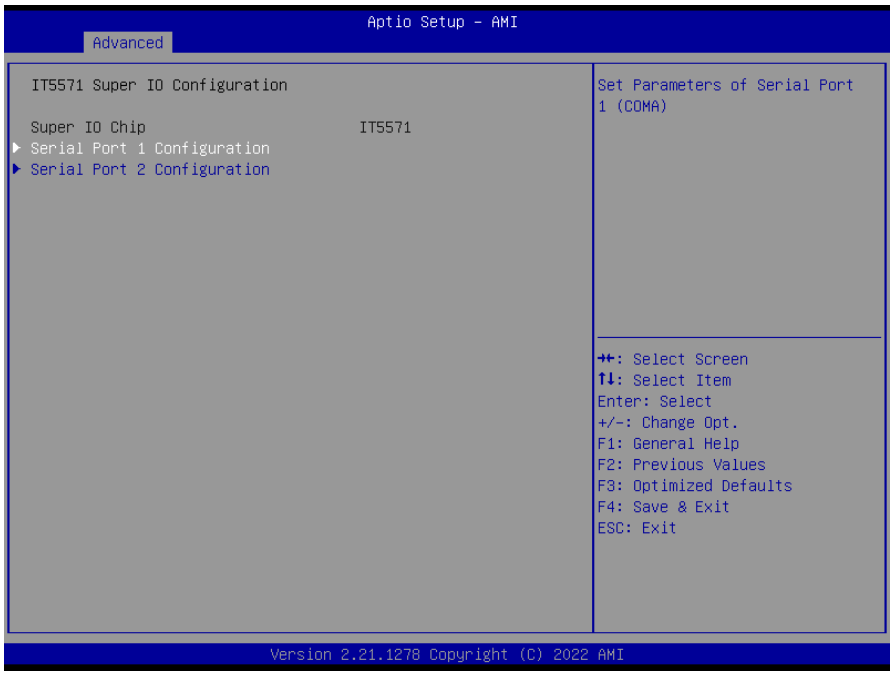
3.6.2.5 APCI Settings



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 OS.
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.

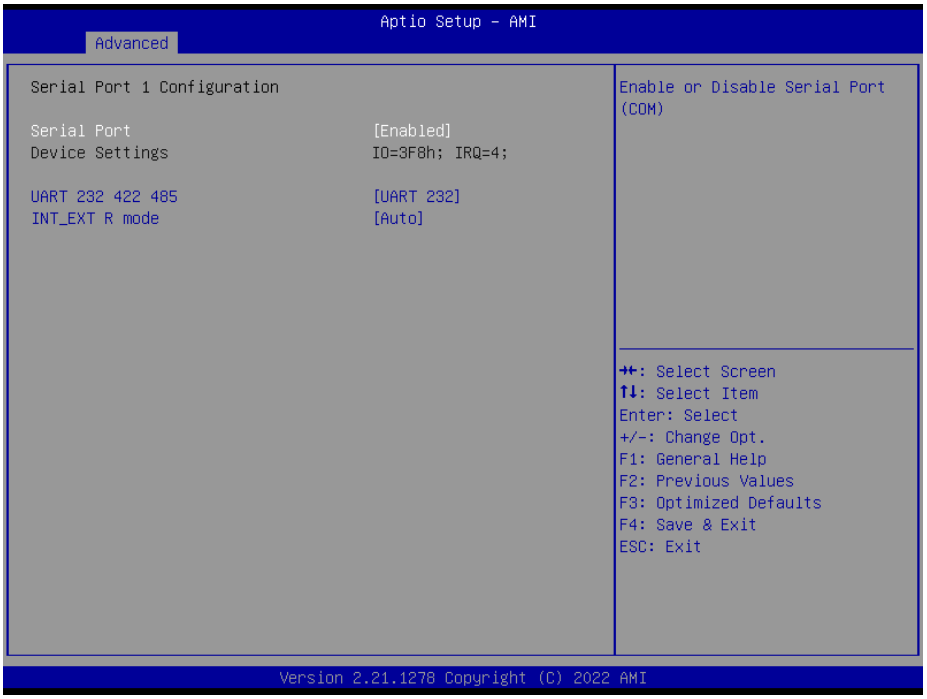
3.6.2.6 IT5571 Super IO Configuration

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 ~ 3.6.2.6.2 for more information.



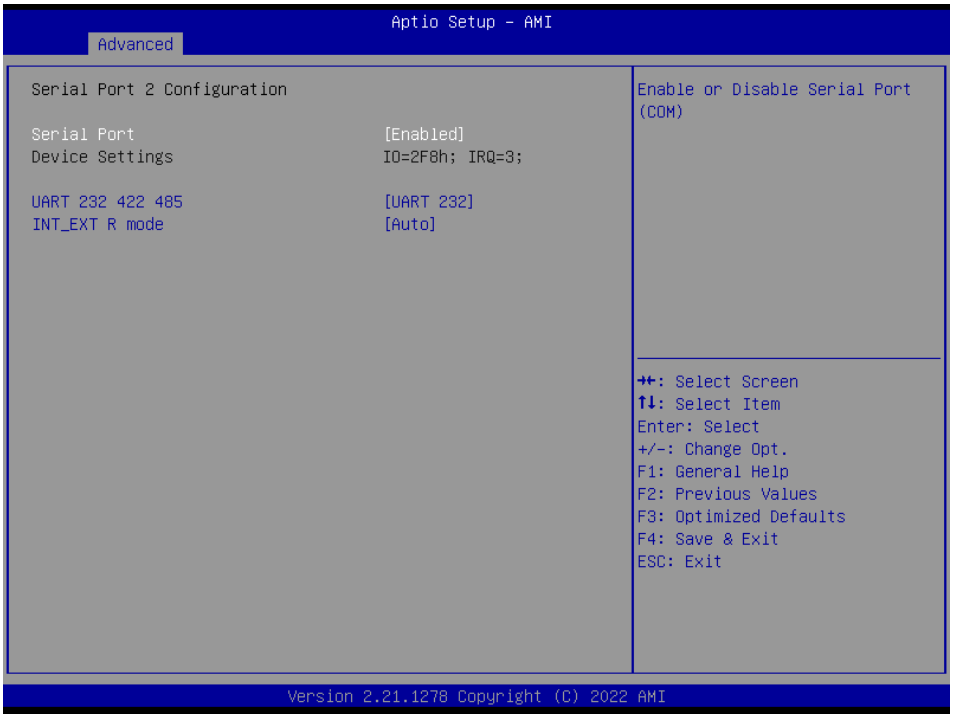
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).

3.6.2.6.1 Serial Port 1 Configuration



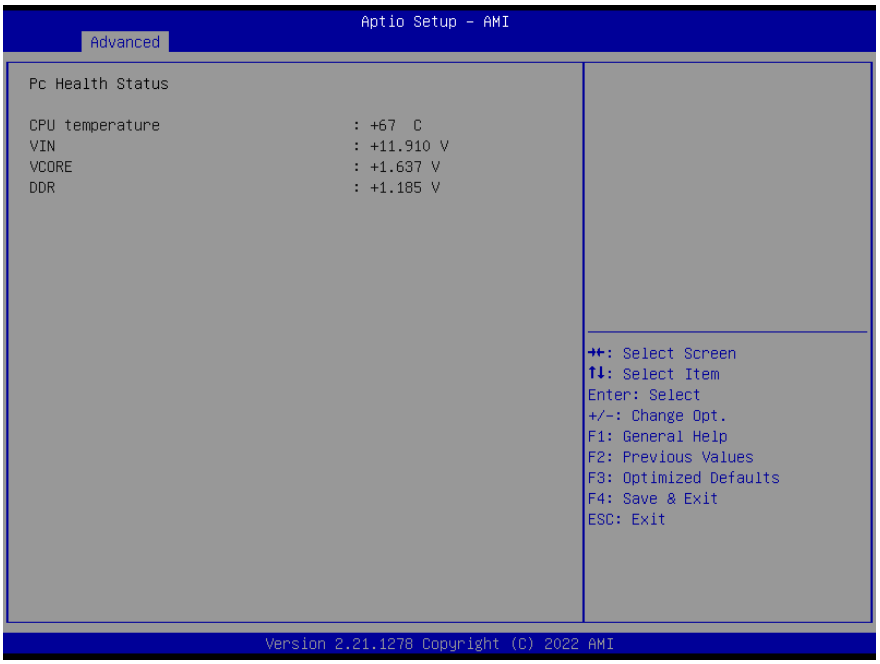
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232**[Default]** UART 422 UART 485	Change the Serial Port as RS232/422/485.
INT_EXT R mode	Auto**[Default]**, Non INT+EXT R EXT R INT R INT+EXT R	Enable switches for internal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

3.6.2.6.2 Serial Port 2 Configuration

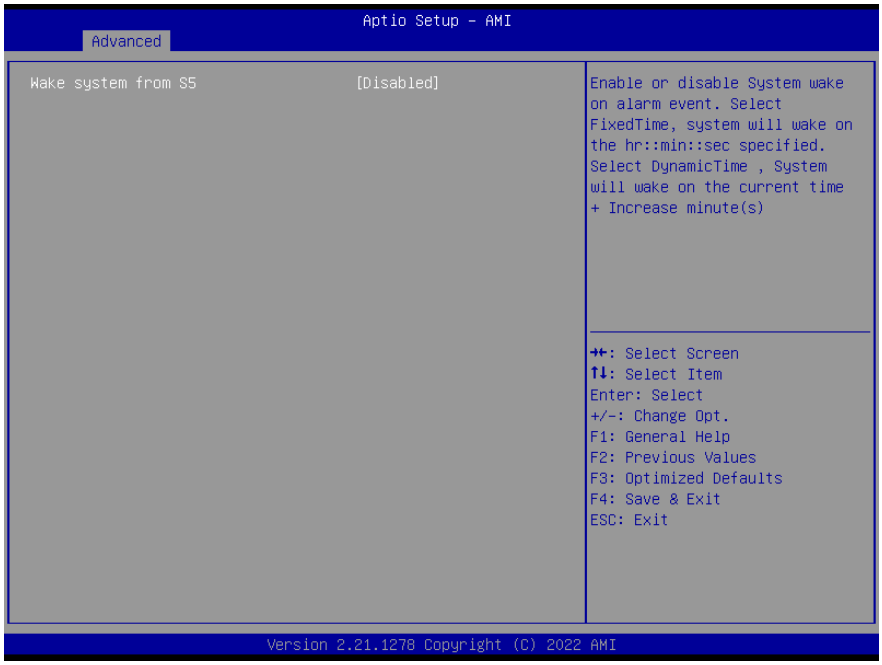


Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232**[Default]** UART 422 UART 485	Change the Serial Port as RS232/422/485.
INT_EXT R mode	Auto**[Default]**, Non INT+EXT R EXT R INT R INT+EXT R	Enable switches for internal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

3.6.2.7 HW Monitor

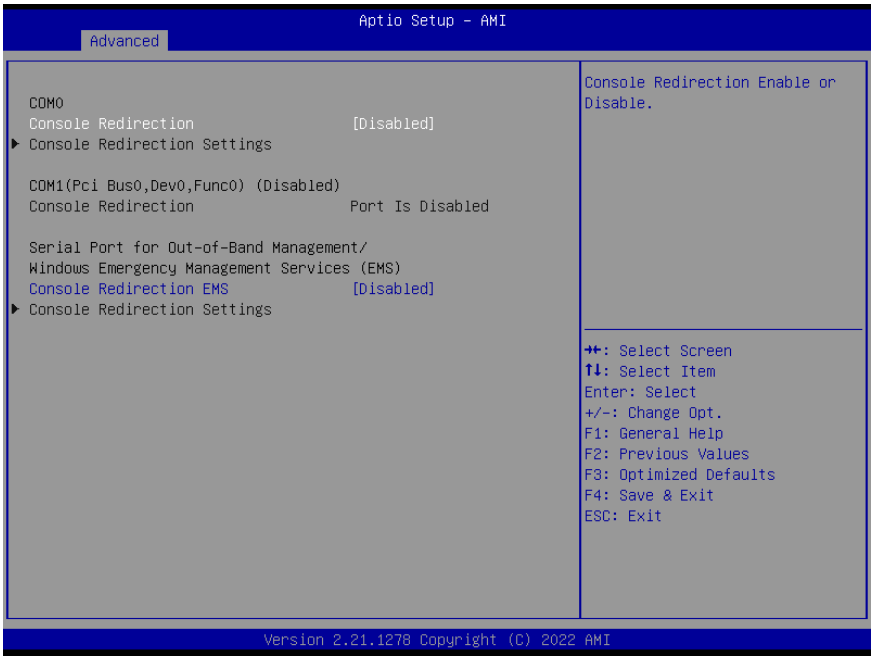


3.6.2.8 S5 RTC Wake Settings



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

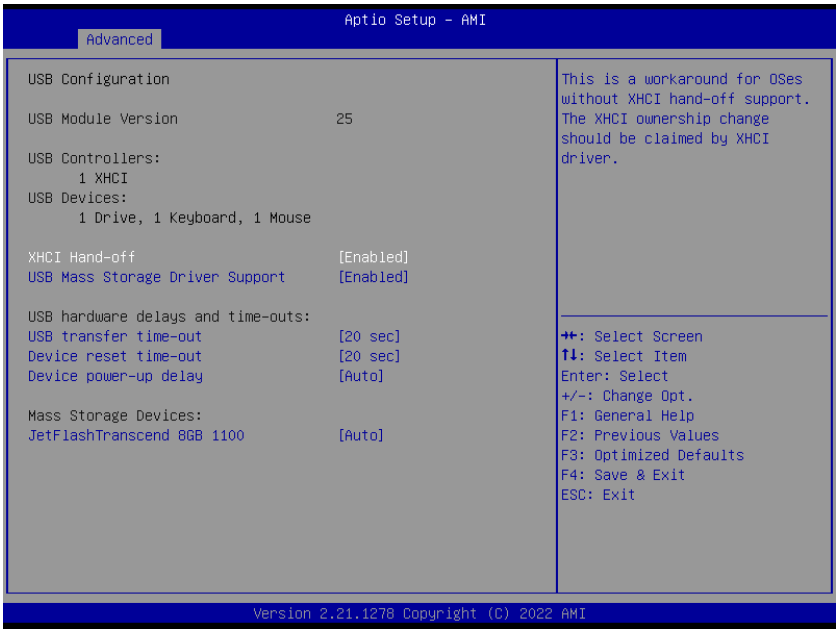
3.6.2.9 Serial Port Console Redirection



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

3.6.2.10 USB Configuration

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



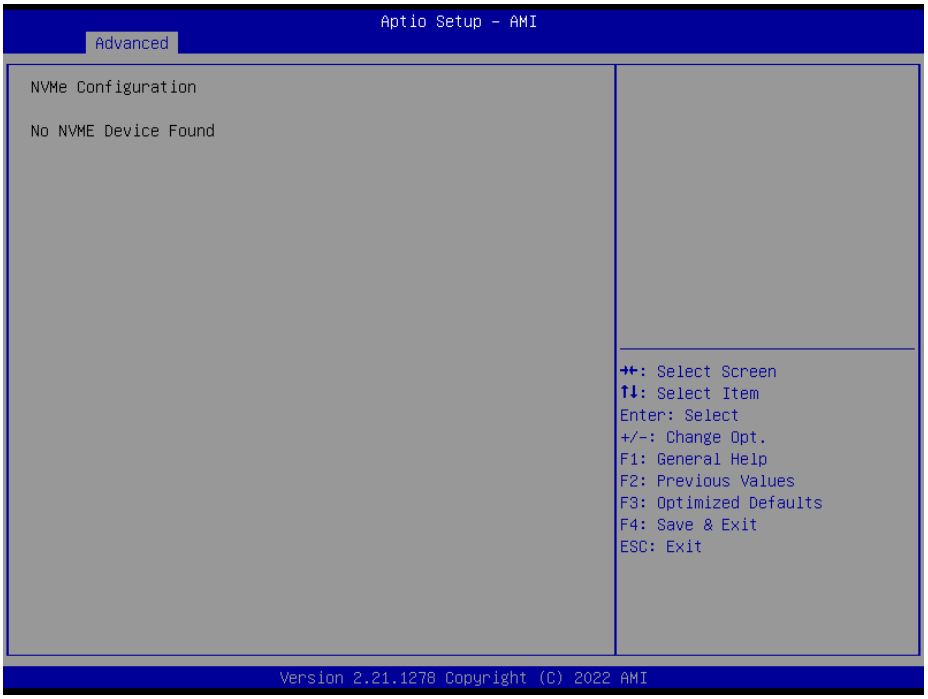
Item	Options	Description
XHCI Hand-off	Enabled**[Default]**, Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

USB Mass Storage Driver Support	Disabled**[Default]**, Enabled	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.
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

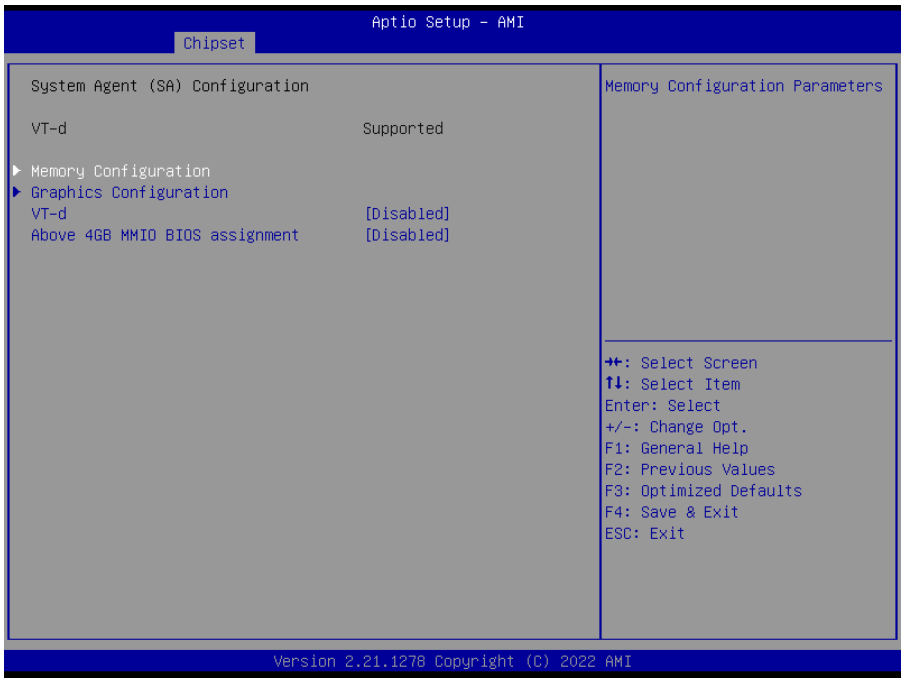
Item	Options	Description
Network Stack	Enabled Disabled**[Default]**	Enable/Disable UEFI Network Stack.

3.6.2.12 NVMe Configuration



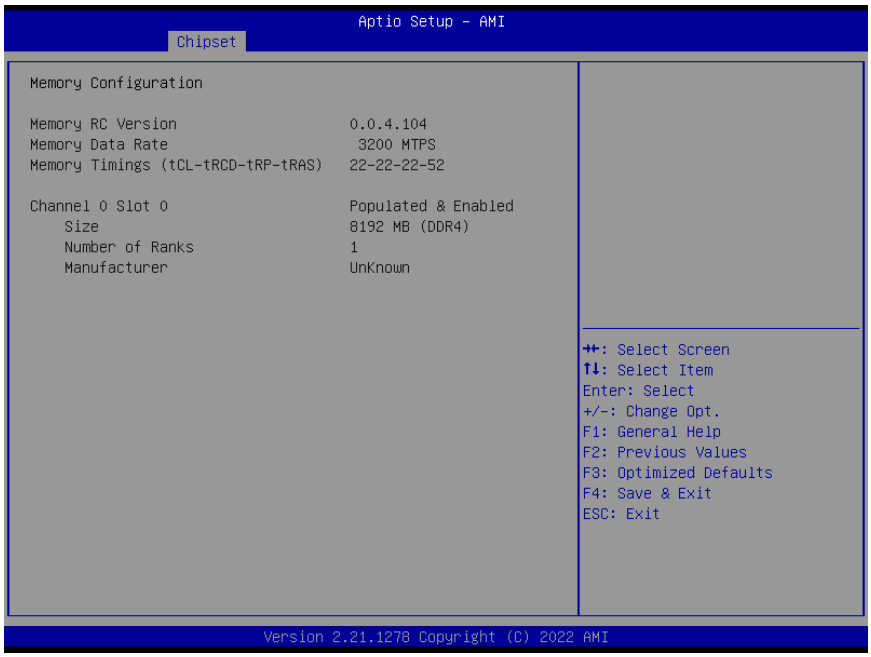
3.6.3 Chipset

3.6.3.1 System Agent (SA) Configuration

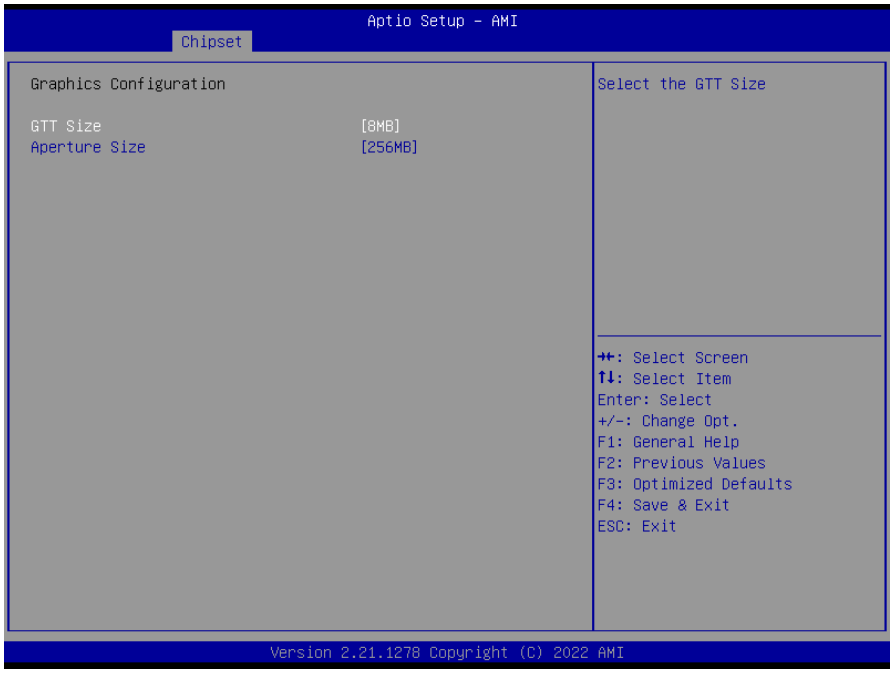


Item	Option	Description
VT-d	Disabled**[Default]** Enabled	VT-d capability.
Above 4GB MMIO BIOS assignment	Enabled Disabled**[Default]**	Enable/Disable above 4GB MemoryMappedIO BIOS assignment. This is enabled automatically when Aperture Size is set to 2048MB.

3.6.3.1.1 Memory Configuration

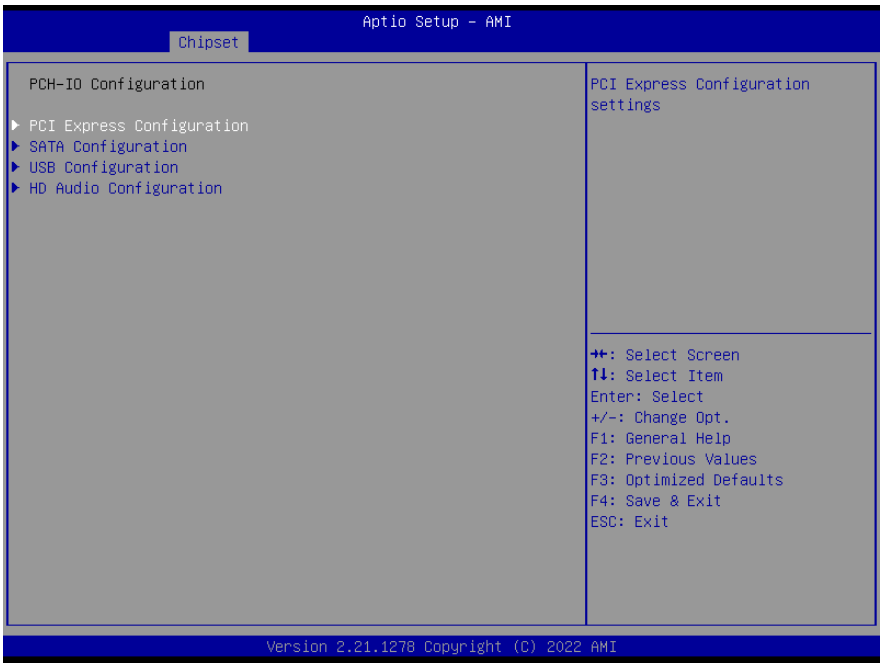


3.6.3.1.2 Graphics Configuration

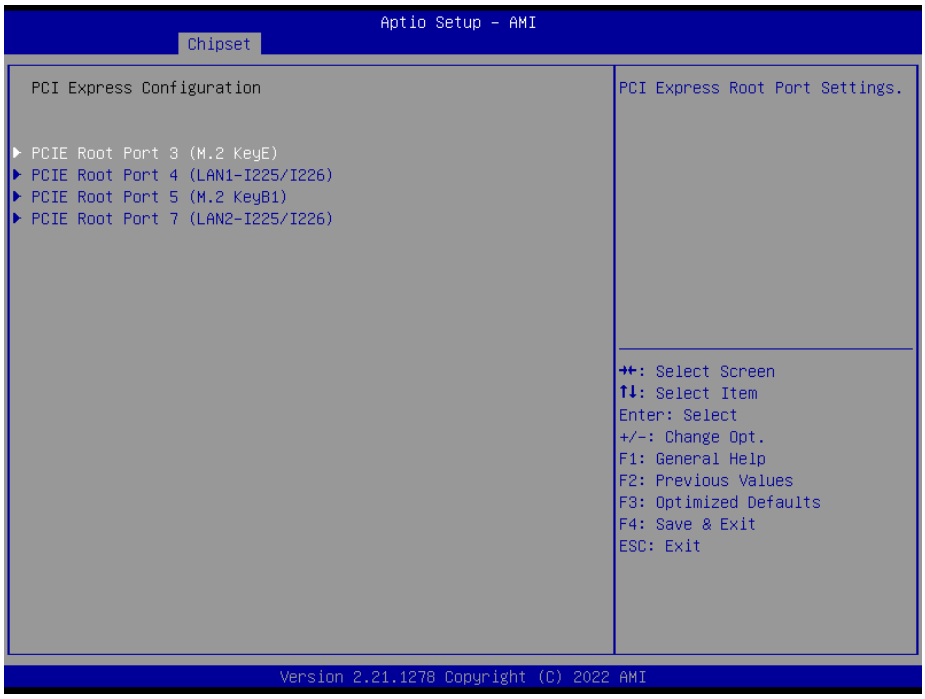


Item	Option	Description
GTT Size	2MB 4MB 8MB**[Default]**	Select the GTT Size.
Aperture Size	128MB 256MB**[Default]** 512MB 1024MB	Select the Aperture Size. Note: Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.

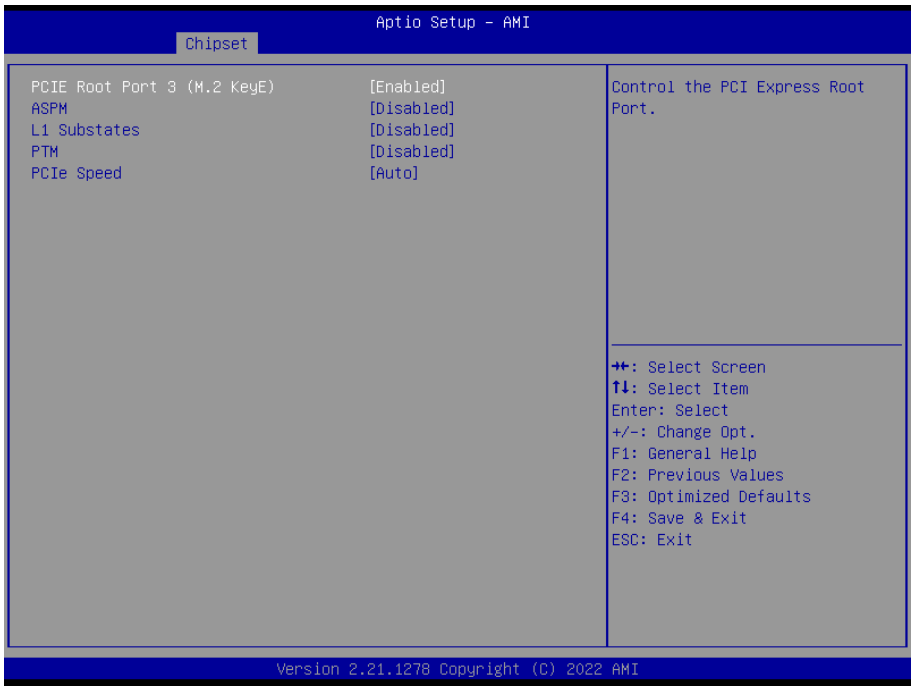
3.6.3.2 PCH-IO Configuration



3.6.3.2.1 PCI Express Configuration



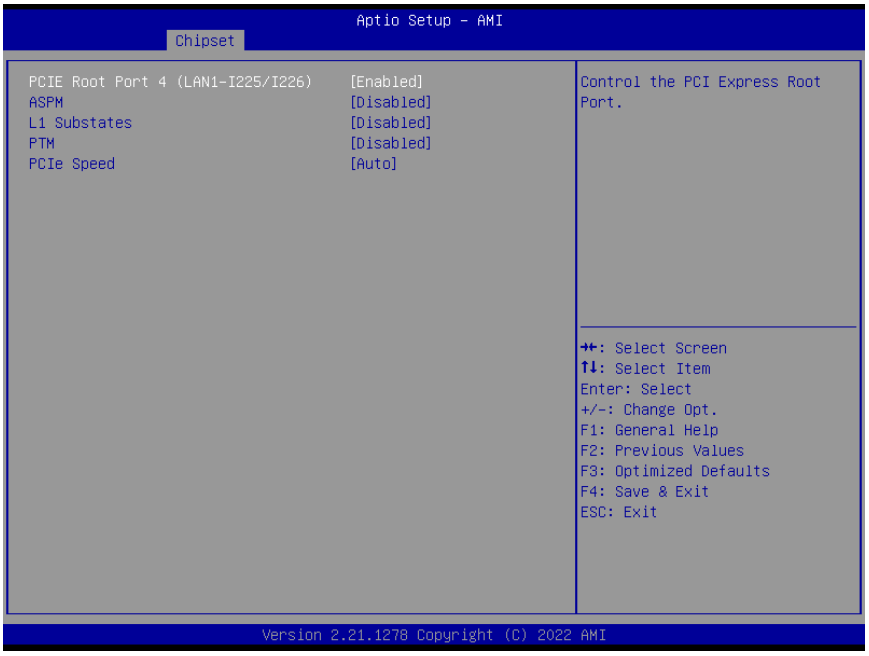
3.6.3.2.1.1 PCIE Root Port 3(M.2 KeyE)



Item	Option	Description
PCIE Root Port 3(M.2 KeyE)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L0s	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto

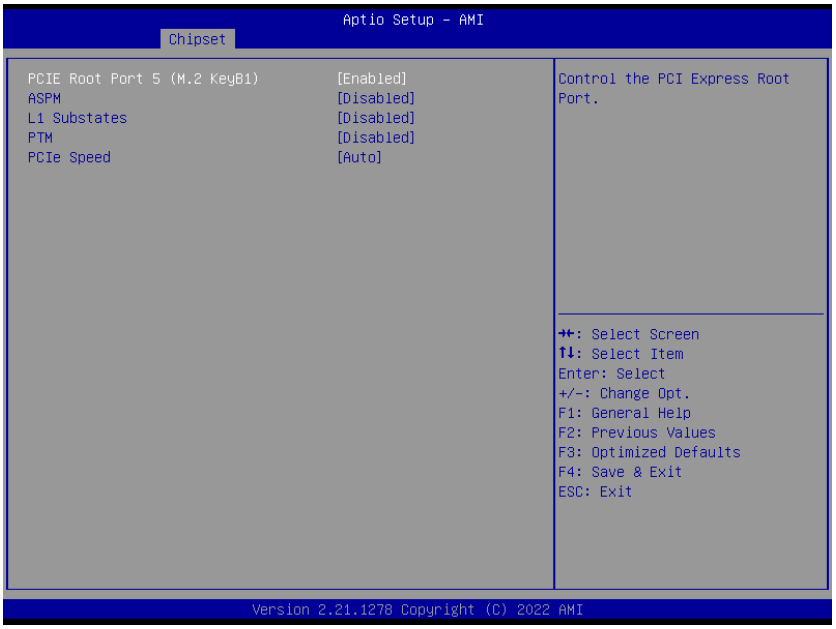
	L1 L0sL1 Auto	configure DISABLE – Disables ASPM.
L1 Substates	Disabled**[Default]** L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
PTM	Disabled**[Default]**, Enabled	Enable/Disable Precision Time Measurement.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.1.2 PCIE Root Port 4(LAN1-I225/I226)



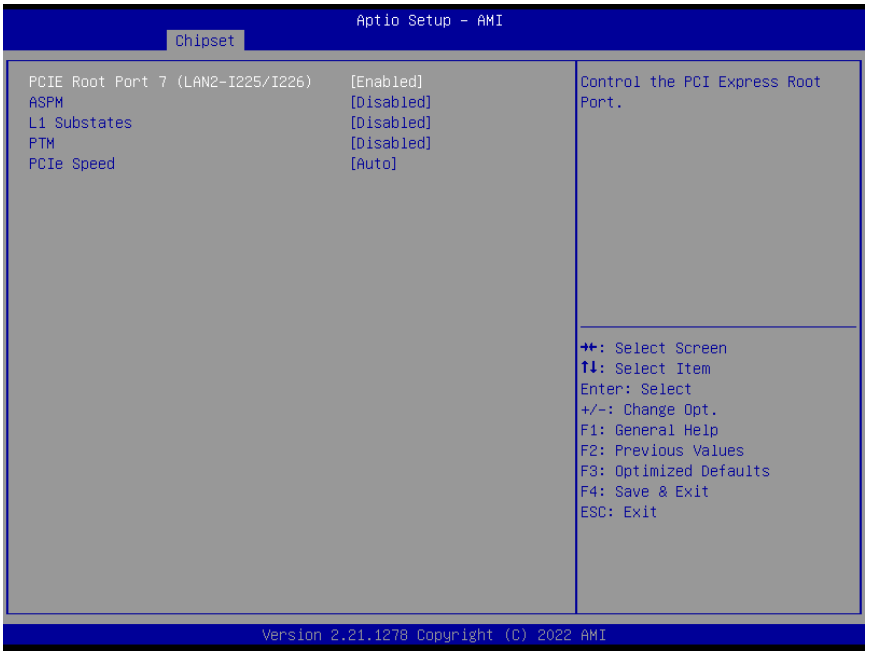
Item	Option	Description
PCIE Root Port 4(LAN1-I225/I226)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled**[Default]** L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
PTM	Disabled**[Default]**, Enabled	Enable/Disable Precision Time Measurement.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.1.3 PCIE Root Port 5(M.2 KeyB1)



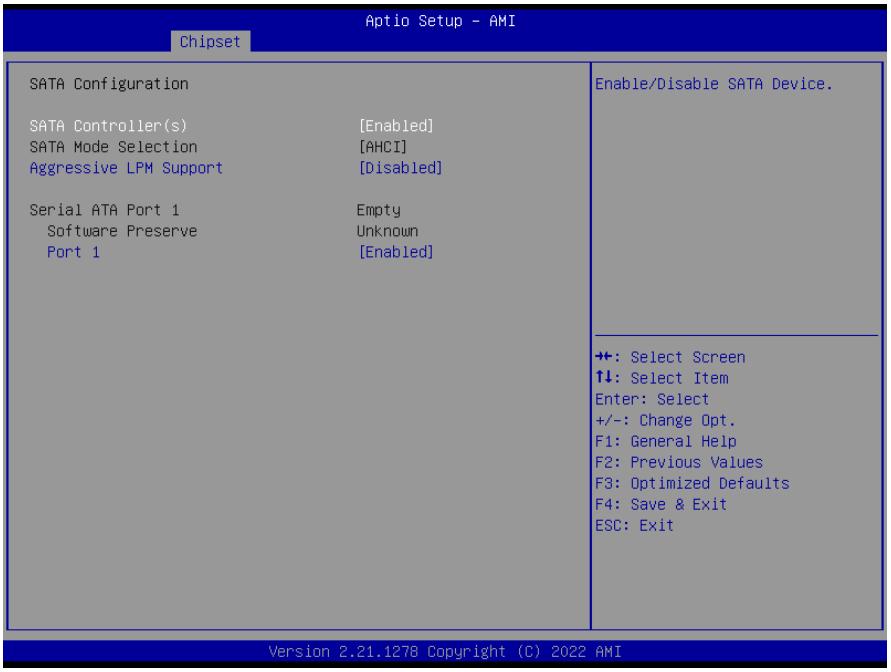
Item	Option	Description
PCIE Root Port 5(M.2 KeyB1)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled**[Default]** L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
PTM	Disabled**[Default]**, Enabled	Enable/Disable Precision Time Measurement.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.1.4 PCIE Root Port 7(LAN2-I225/I226)



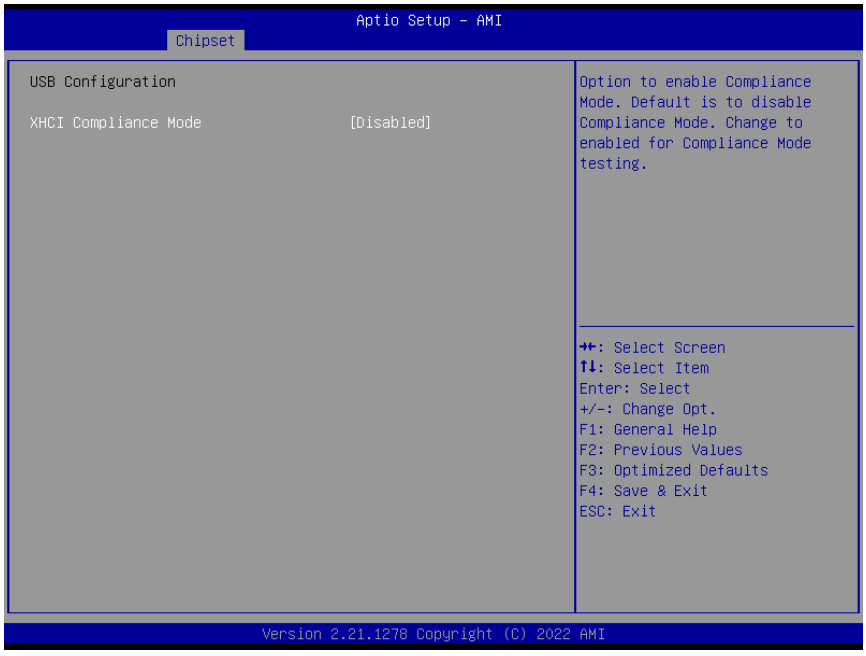
Item	Option	Description
PCIE Root Port 7(LAN2-I225/I226)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled**[Default]** L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
PTM	Disabled**[Default]**, Enabled	Enable/Disable Precision Time Measurement.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.2 SATA Configuration



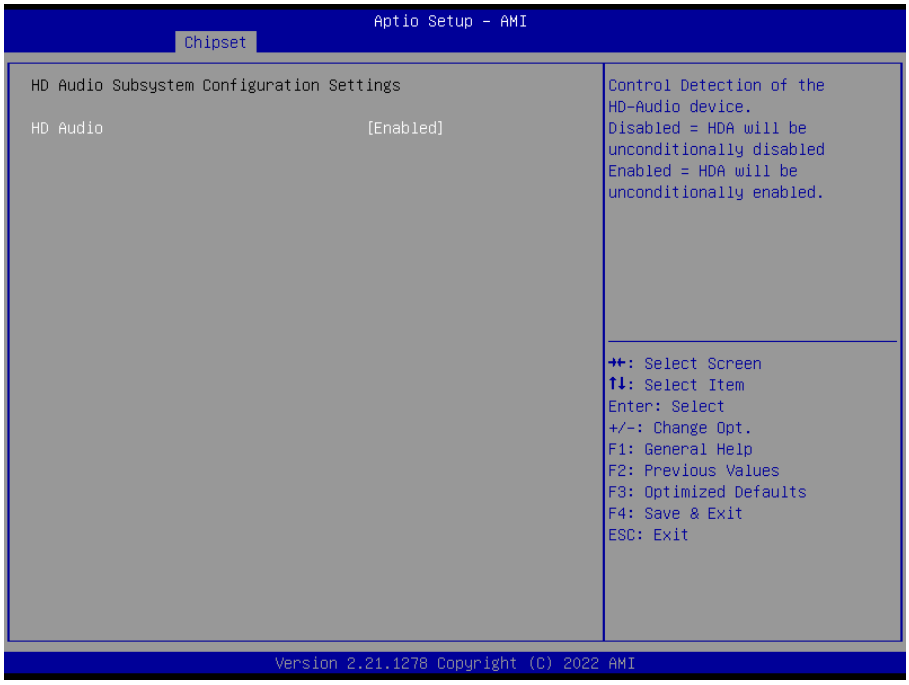
Item	Options	Description
SATA Controller(s)	Enabled**[Default]** Disabled,	Enable/Disable SATA Device.
Aggressive LPM Support	Disabled**[Default]** Enabled	Enable PCH to aggressively enter link power state.
Port 1	Enabled**[Default]** Disabled	Enable or Disable SATA Port.

3.6.3.2.3 USB Configuration



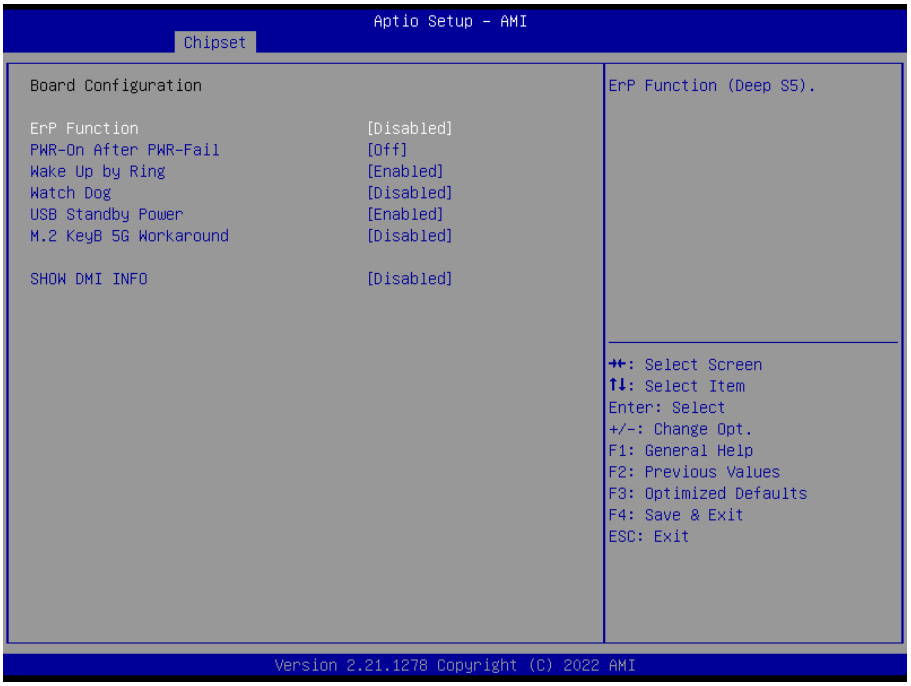
Item	Option	Description
XHCI Compliance Mode	Disabled**[Default]** Enabled	Option to enable Compliance Mode. Default is to disable Compliance Mode. Change to enabled for Compliance Mode testing.

3.6.3.2.4 HD Audio Configuration



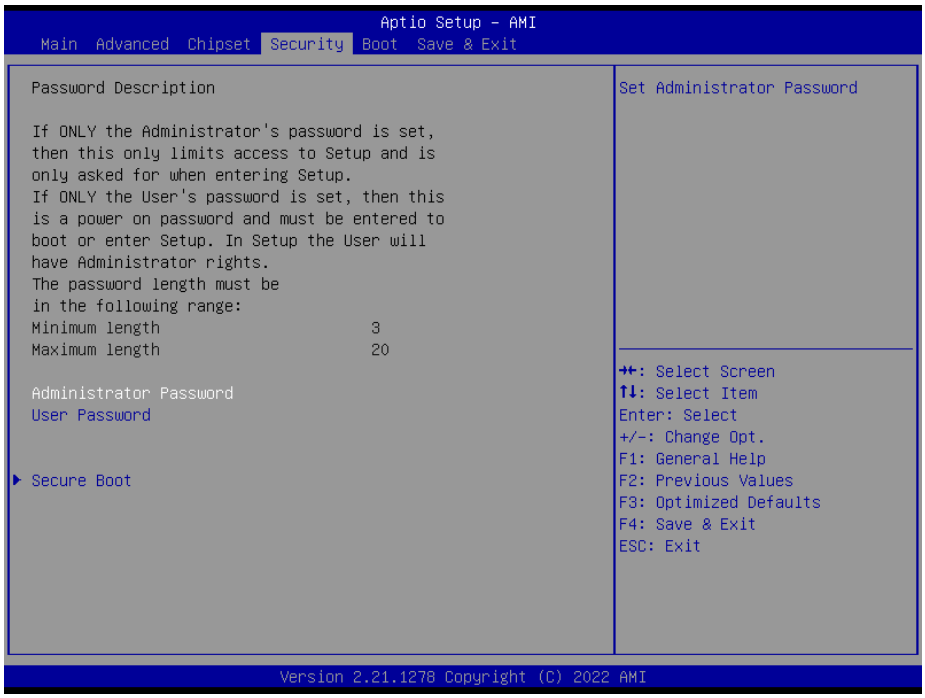
Item	Option	Description
HD Audio	Disabled Enabled**[Default]**	Control Detection of the HD-Audio device. Disable = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled.

3.6.3.3 Board & Panel Configuration



Item	Option	Description
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.
M.2 KeyB 5G Workaround	Disabled**[Default]** Enabled	Enable/Disabled M.2 KeyB 5G Card Workaround.
SHOW DMI IFO	Disabled**[Default]** Enabled	SHOW DMI IFO.

3.6.4 Security



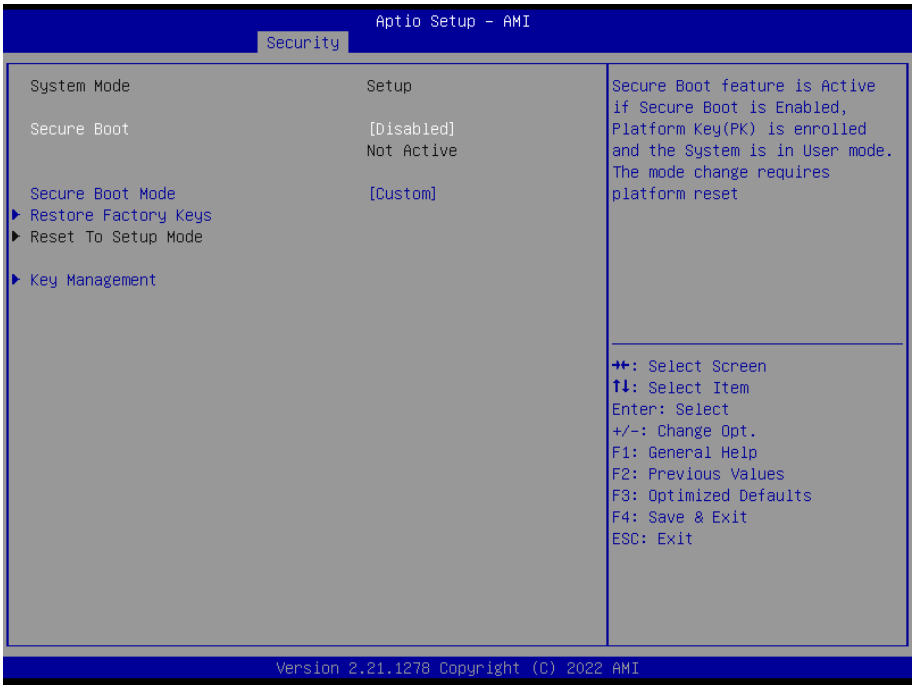
- **Administrator Password**

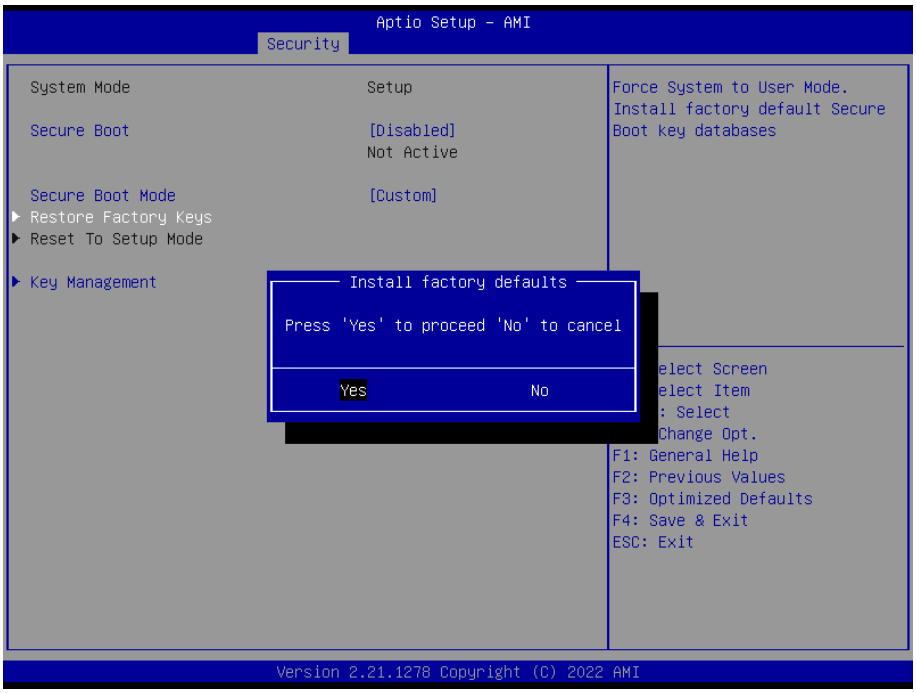
Set setup Administrator Password

- **User Password**

Set User Password

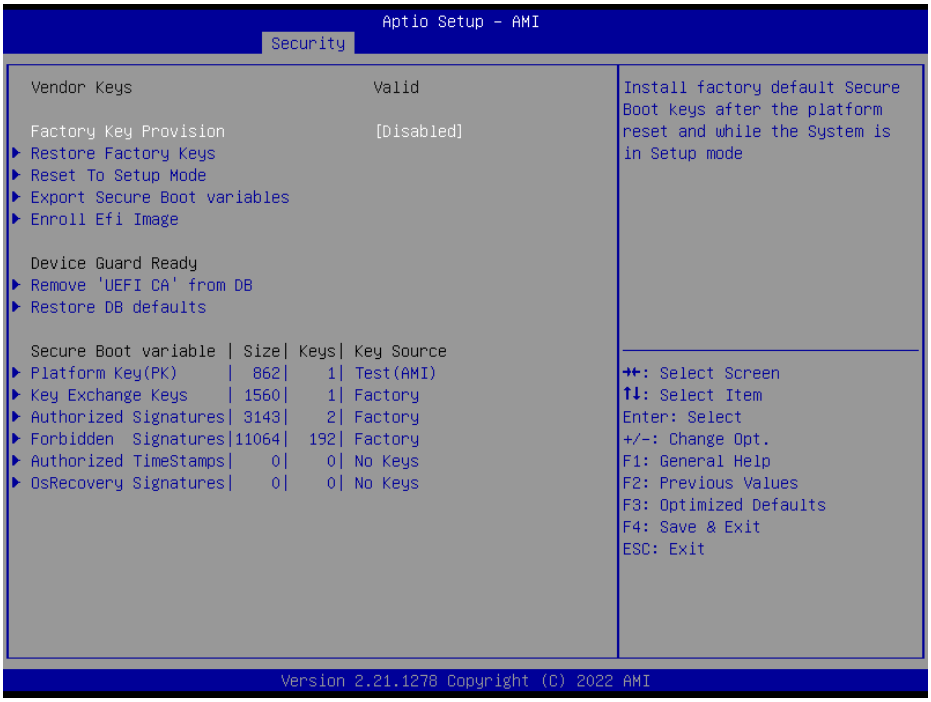
3.6.4.1 Secure Boot





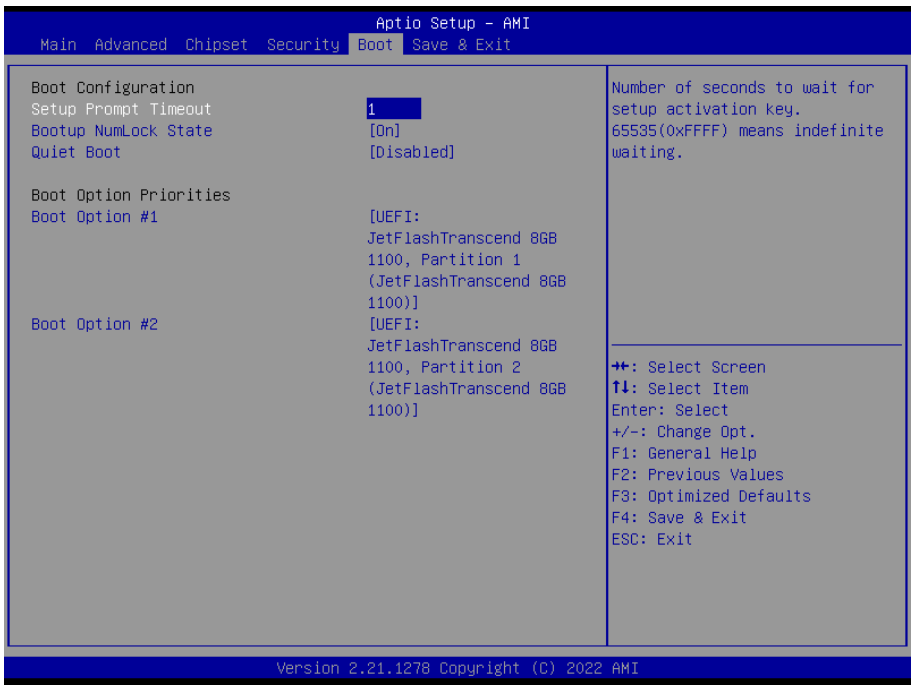
Item	Option	Description
Secure Boot	Disabled**[Default]** Enabled	Secure Boot feature is Active if Secure Boot is Enable, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset.
Secure Boot Mode	Standard Custom**[Default]**	Secure Boot mode selector: Standard/Custom. In Custom mode Secure Boot Variables can be configured without authentication.

3.6.4.1.1 Key Management



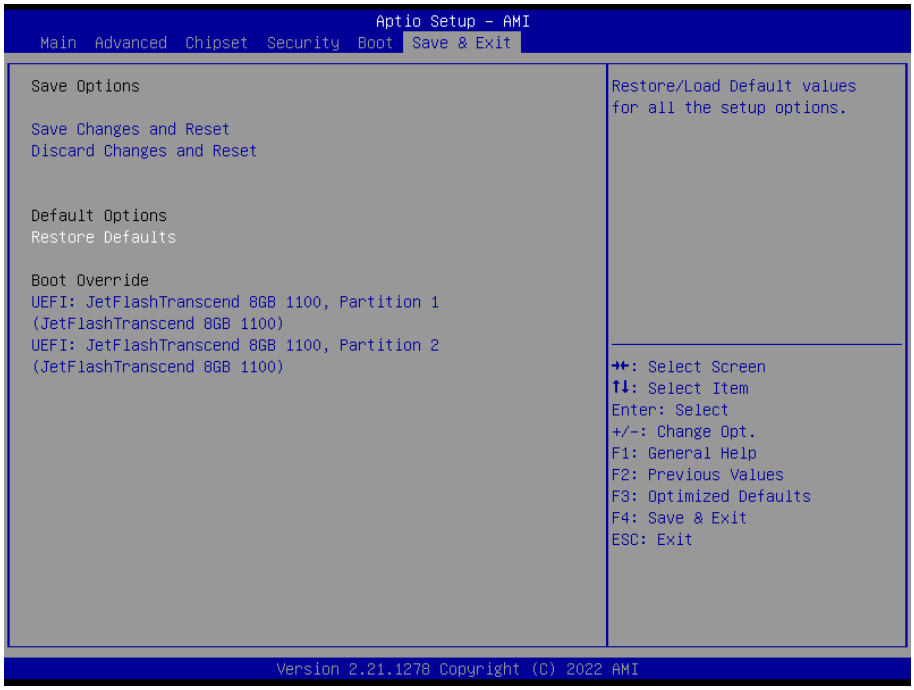
Item	Option	Description
Factory Key Provision	Disabled**[Default]** Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.

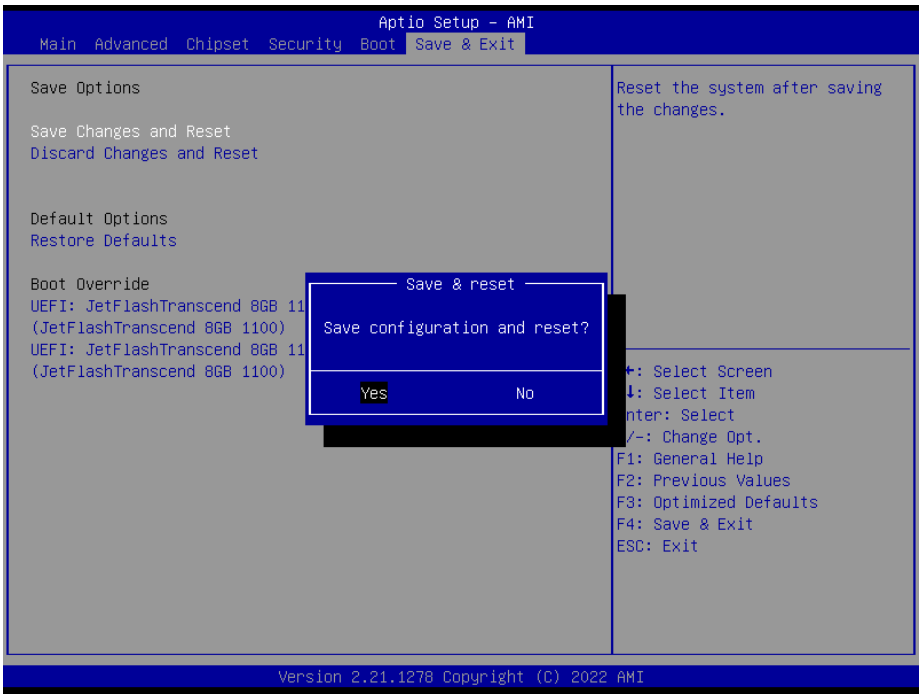
3.6.5 Boot



Item	Option	Description
Setup Prompt Timeout	1~ 65535	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 Reset

Reset the system after saving the changes.

3.6.6.2 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.

3.6.6.3 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.

3.6.6.4 Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

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. Click **Finish** to complete setup.

Step 2. Click **Accept**.

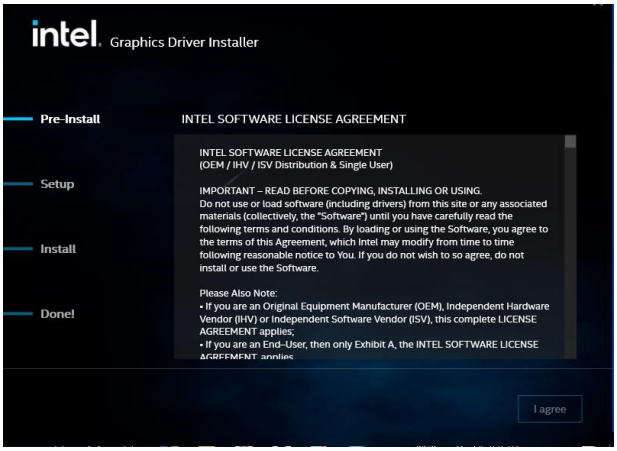
4.2 Install VGA Driver

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 **Finish** to complete setup.

Step 1. Click **Begin installation**.



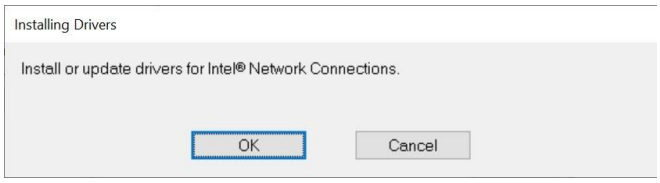
Step 2.

Click **I agree** to accept license agreement.

4.3 Install LAN 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.



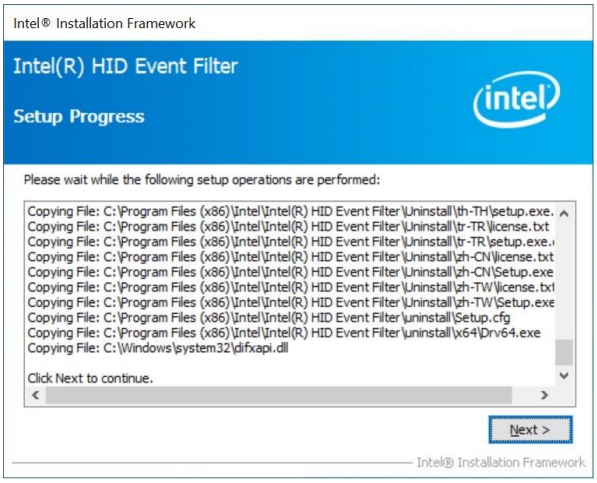
Step1. Click **OK** to Install.

Step 2. Setup completed.

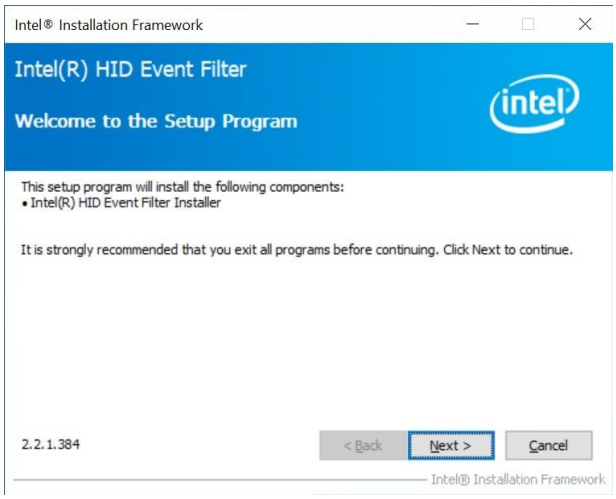
4.4 Install HID Event filter Driver

All drivers can be found on the Avalue Official Website: http://www.avalue.com.tw.

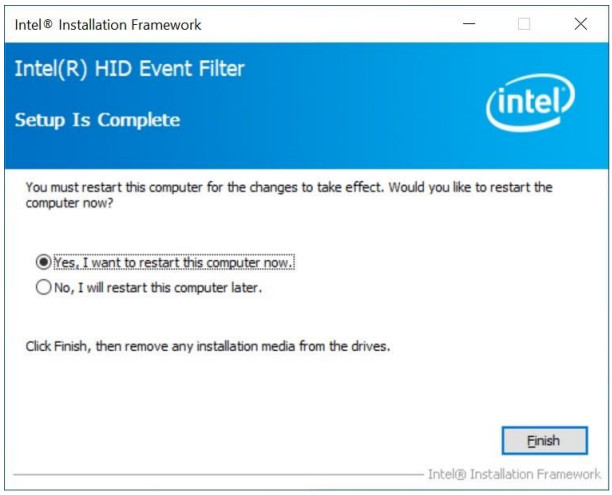
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



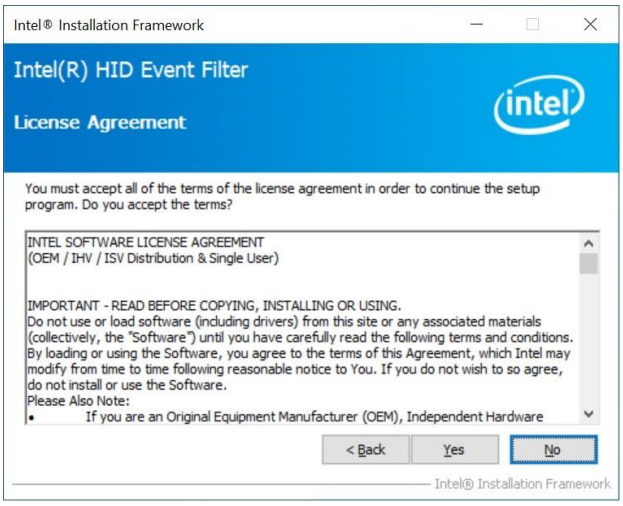
Step 3. Click **Next**.



Step 1. Click **Next** to continue installation.



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

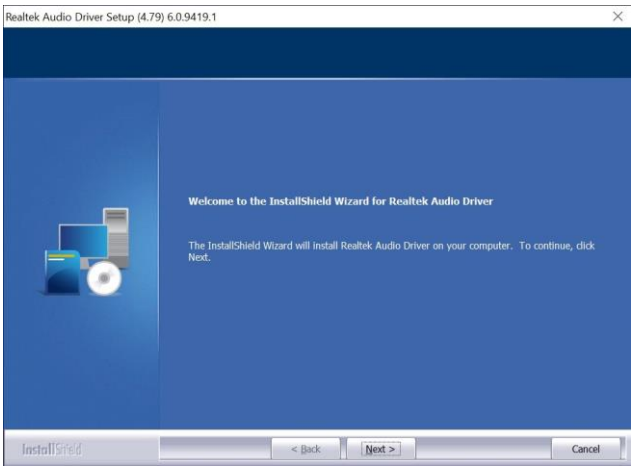


Step 2. Click **Yes**.

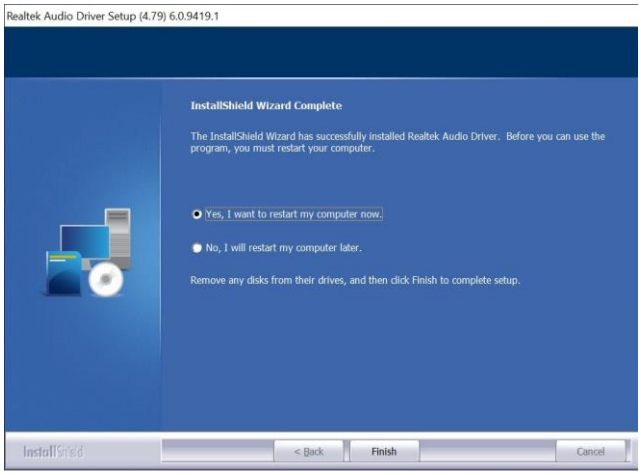
4.5 Install Audio Driver

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 1. Step1. Click **Next** to Install.



Step 2. Click **Finish** to complete setup.