SLP-WHG

1 x SLP-WHG Onboard 8th Gen Intel® Core™ SoC i7/i5/i3 & Celeron® BGA Processor

Quick Reference Guide

1st Ed –12 May 2021

Part No. E2017SLWHA0R

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 SLP-WHG Onboard 8th Gen Intel® Core™ SoC i7/i5/i3 & Celeron® BGA Processor
- Other major components include the following:
  - Screw kit
  - Wall Mount Kit
  - Accessory box

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

1.3 System Specifications

Component	
Mother Board	EMX-WHLGP
CPU	Onboard 8th Gen Intel® Core™ SoC i7/i5/i3 & Celeron® BGA Processor (Whiskeylake-U Series)
CPU Cooler (Type)	Fanless
Memory	2 x 260-pin DDR4 2133 MHz SO-DIMM socket, supports up to 32GB Max (non ECC only)
Adapter	24V/7.5A AC/DC 180W adapter (Phoenix connector), Optional
System Fan	FANLESS
Operating System	Win10, Linux
Storage	
Hard Disk Drive	1 x 2.5” HDD/SSD
Solid State Drive	Supported
Other Storage Device	1 x M.2 3042/2242/2260/2280 Key B support SSD
External I/O	
PS/2 KB & Mouse	Yes
Serial Port	Standard: 4 x COM (RS232)
USB Port	3 x USB3.1 Gen1 1 x USB Type C w/o ALT mode
Video Port	3 x HDMI (HDMI1 does not support hot plug)
LAN Port	3 x RJ45 with Intel I219LM and I210IT
Wireless LAN Antenna	Optional: 2 x Wireless LAN Antenna
Switch	1 x Power-on Switch 1 x Power on SW (Phoenix Connector)
Indicator Light	1 x HDD LED 1 x Power LED
Expansion Slots	1 x PCIe*4 1 x PCIe*1
Mechanical	
Power Type	AT/ATX Mode (Default: ATX mode)
Power Connector Type	Phoenix Connector Type or Mini Din Type DC in
Dimension	217 (H)/ 115 (W) / 220(D) (mm)
Weight	3.4kgs (unpacked)
Color	Black

Fanless	Yes
OS Support	Win10, Linux
Reliability	
EMI Test	CE/FCC : Class B (Nice to have)
Safety	Avalue Standard
Dust and Rain Test	Avalue Standard
Vibration Test	Random Vibration Operation: 1. PSD: 0.03622G²/Hz , 1.5 Grms 2. operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 minutes per each axis 6. IEC 60068-2-64 Test:Fh 7. Storage : SSD Sine Vibration test (Non-operation) 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 :10 min. each axis 6 System condition : Non-Operating mode 7. Reference IEC 60068-2-6 Testing procedures Package vibration test 1. PSD: 0.026G²/Hz , 2.16 Grms 2. Non-operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 min. per each axis 6. IEC 60068-2-64 Test:Fh
Mechanical Shock Test	1. Wave form：Half Sine wave 2. Acceleration Rate：10g for operation mode 3. Duration Time：11ms 4. No. of Shock：Z axis 300 times 5. Test Axis: Z axis 6. Operation mode 7. Reference IEC 60068-2-29 Testing procedures Test Eb : Bump Test
Drop Test	Package drop test

	1 One corner , three edges, six faces 2 ISTA 2A, IEC-60068-2-32 Test:Ed
Operating Temperature	-20~50°C (-4˚F ~ 122˚F) w/Industrial SSD and memory, ambient w/ 0.5m/s air flow
Operating Humidity	40°C @ 95% Relative Humidity, Non-condensing
Storage Temperature	-40°C ~ 75°C (-40 ~ 167°F)

Note: Specifications are subject to change without notice.

User condition suggestion:

Onboard LAN1/2/3(219/210/210 hardware numbering is the same as PCB numbering)

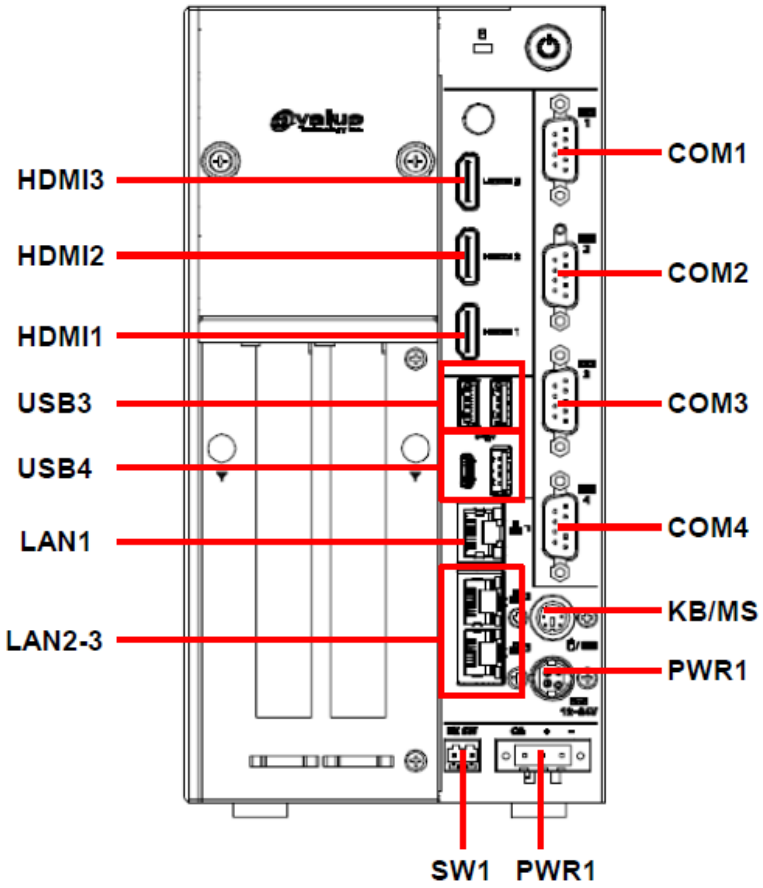
If install WinOS with WiFi card may cause the numbering of onboard LAN shift backwards.

In case the condition, there are two solution,

1. Remove WiFi card, then install WinOS and connect WiFi card.
2. Disable WiFi PCIe port in BIOS, then install WinOS and enable PCIe Root Port of WiFi card in BIOS.

1.4 System Overview

1.4.1 SLP-WHG Rear View

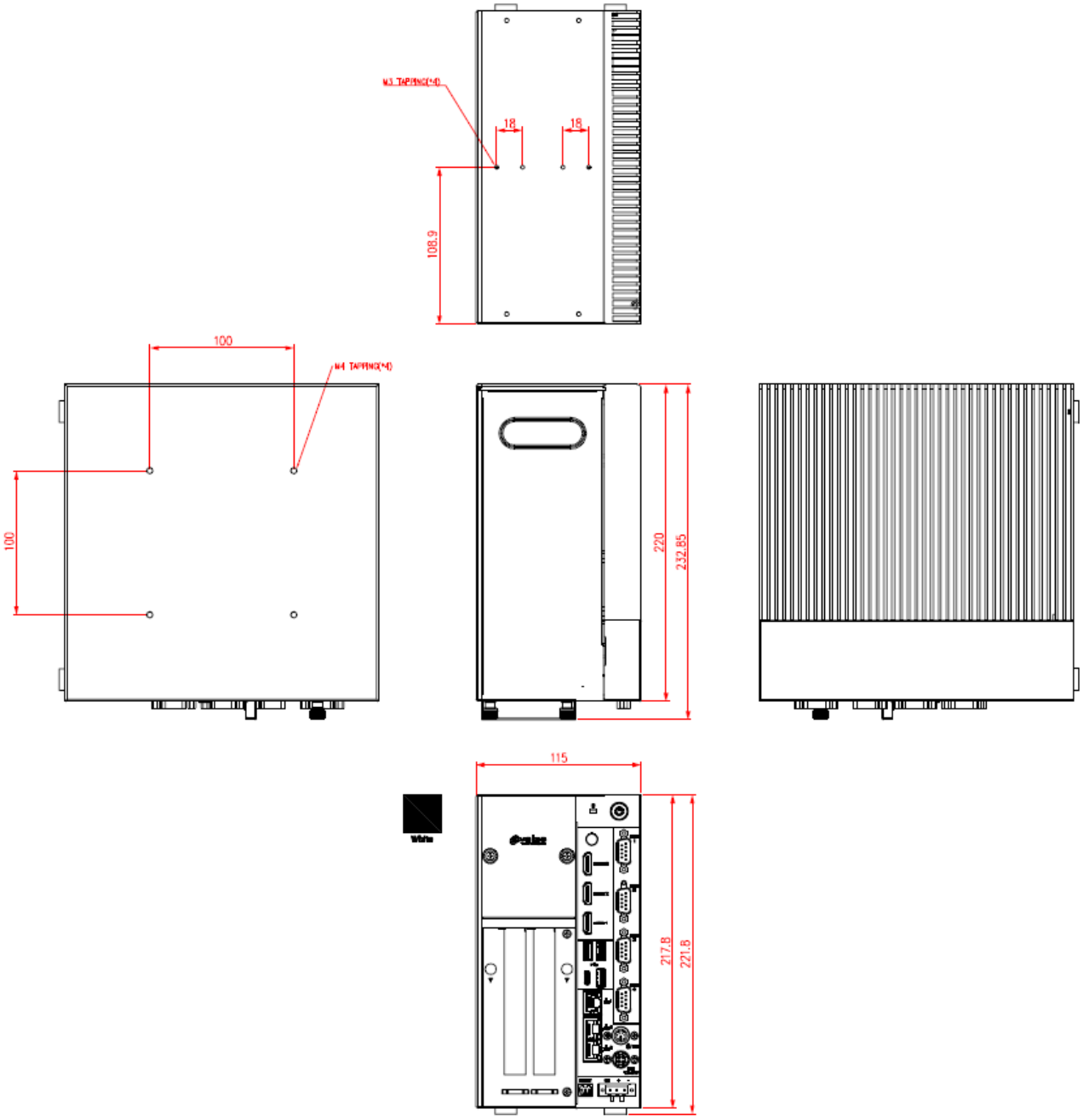


Connectors

Label	Function	Note
HDMI1/2/3	HDMI connector 1/2/3	
USB3/4	USB connector 3/4	
LAN1/2-3	RJ-45 Ethernet 1/2-3	
COM1/2	Serial Port 1 connector	5 x 2 header, pitch 2.00mm
COM3/4	Serial Port 3-6 connector	5 x 2 header, pitch 2.00mm
KB&MS	PS/2 keyboard & mouse header	4 x 2 header, pitch 2.00mm
PWR1	Power connector	2 x 2 wafer, pitch 4.20mm
PWR1	DC Input connector	3 x 1 wafer, pitch 5.08mm
SW1	Power Button connector	

1.5 System Dimensions

1.5.1 SLP-WHG Front & Top view



(Unit: mm)

2. Hardware Configuration

Jumper and Connector Setting

For advanced information, please refer to:

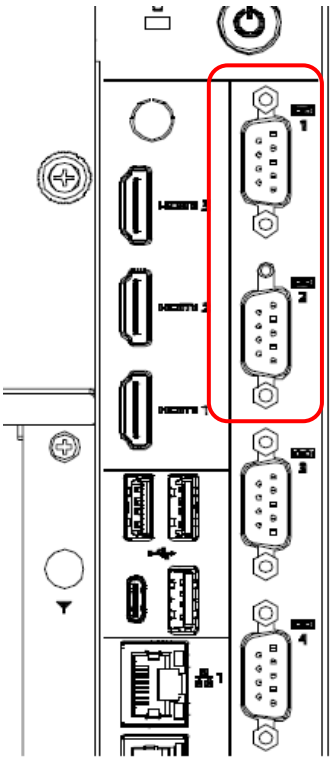
1- EMX-WHLGP User's Manual

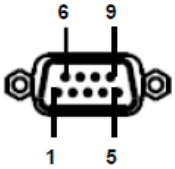
Note: If you need more information, please visit our website:

http://www.avalue.com.tw

2.1 SLP-WHG connector mapping

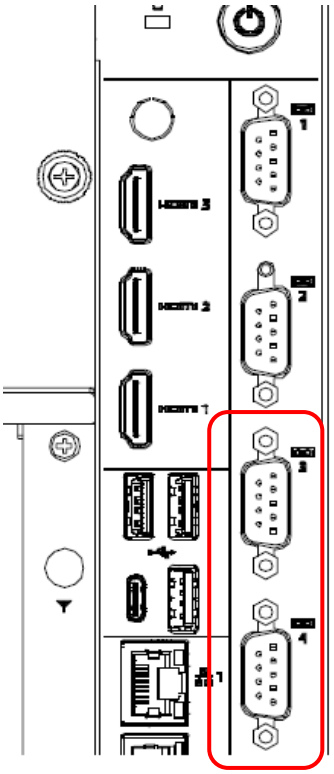
2.1.1 Serial Port 1/2 connector (COM1/2)

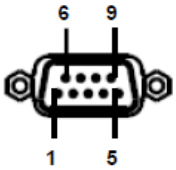




Pin	RS-232	RS-422	RS-485
1	DCD#	TXD422-	485DATA-
2	RXD	TXD422+	485DATA+
3	TXD	RXD422+	
4	DTR#	RXD422-	
5	GND		
6	DSR#		
7	RTS#		
8	CTS#		
9	RI#		

2.1.2 Serial Port 3/4 connector (COM3/4)

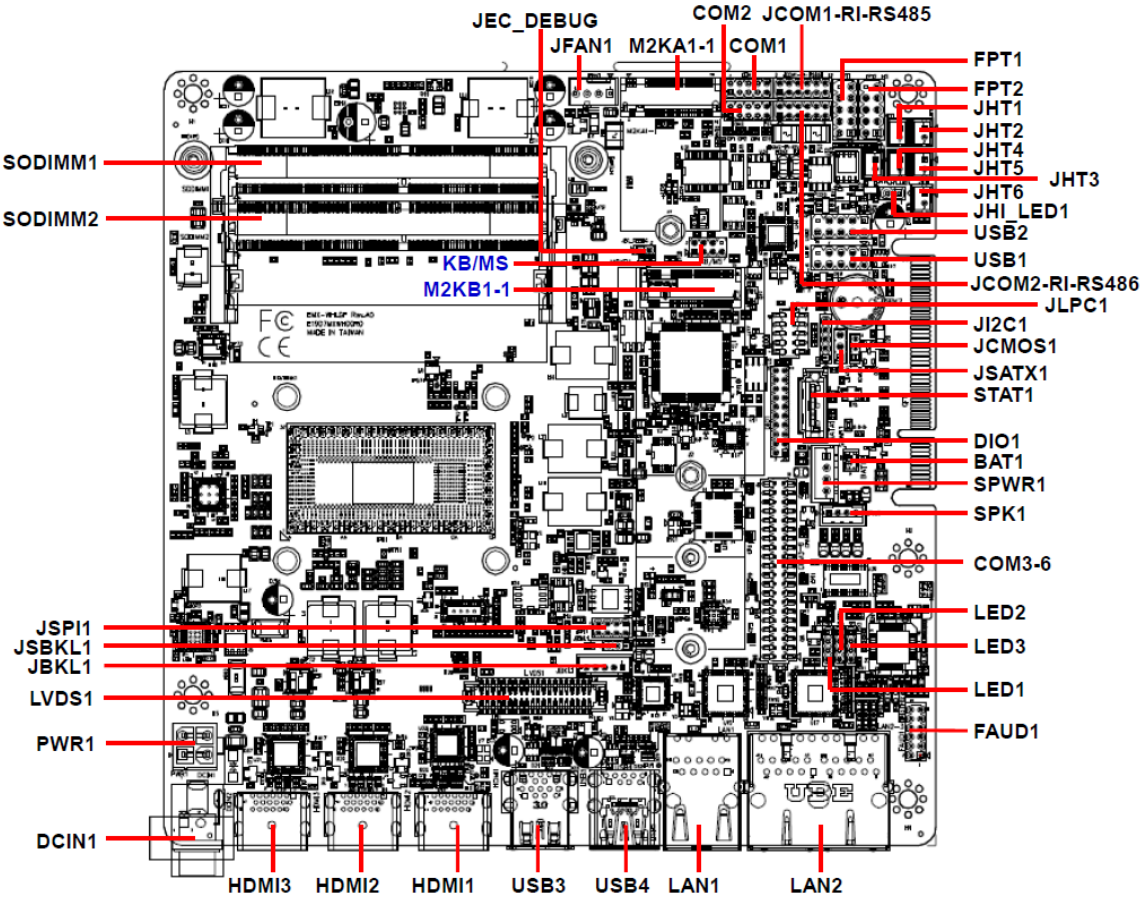


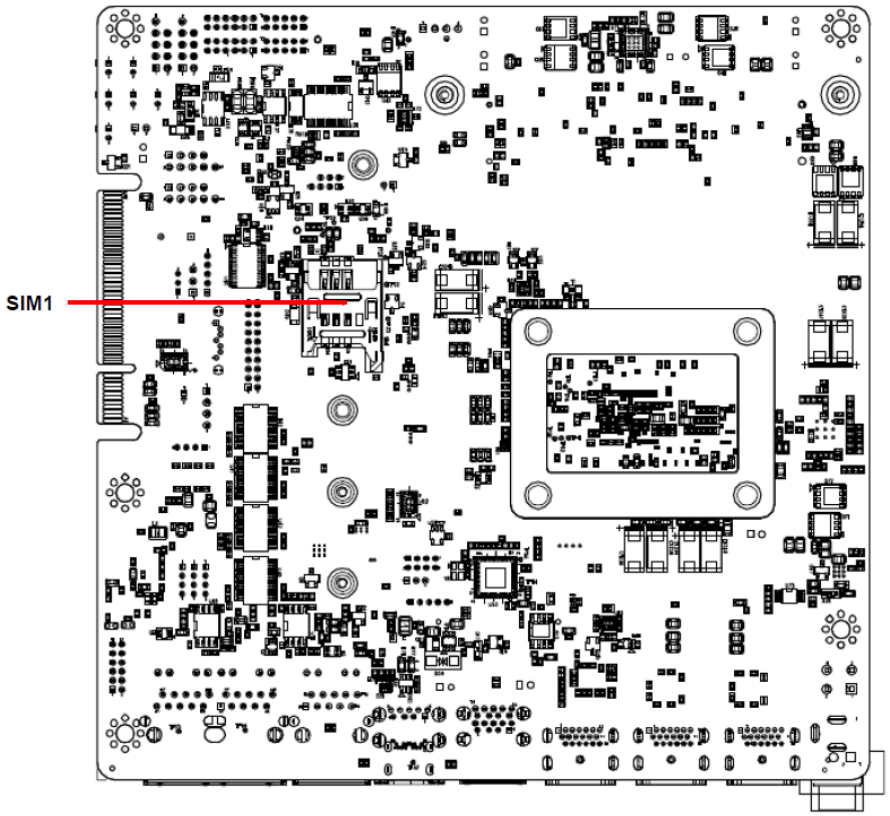


Signal	PIN	PIN	Signal
		9	NRI#
NCTS#	8	7	NRTS#
NDSR#	6	5	GND
NDTR#	4	3	NTXD
NRXD	2	1	NDCD#

2.2 EMX-WHLGP Overviews

2.2.1 EMX-WHLGP





2.3 EMX-WHLGP Jumper & Connector list

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

Jumpers

Label	Function	Note
JSBKL1	LVDS Back Light power selection	3 x 1 header, pitch 2.00mm
JSATX1	AT/ATX Power Mode Select	3 x 1 header, pitch 2.54mm
JCOMS1	Clear CMOS	3 x 1 header, pitch 2.00mm
JCOM1-RI-RS485	Serial port 1/2 pin9 signal select	6 x 2 header, pitch 2.00mm
JCOM2-RI-RS486	Serial port 1/2 pin9 signal select	6 x 2 header, pitch 2.00mm

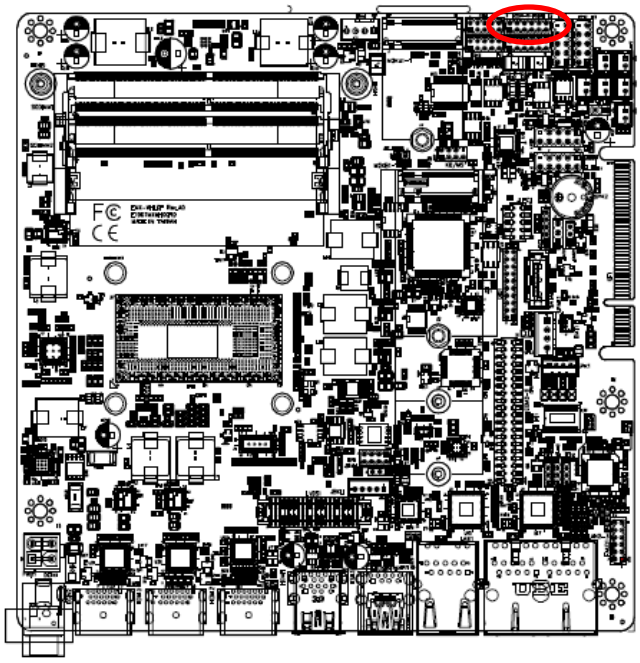
Connectors

Label	Function	Note
FPT1/2	Miscellaneous setting connector 1/2	5 x 2 header, pitch 2.54mm
SODIMM1/2	206-pin DDR4 SO-DIMM socket	
FAUD1	Front Audio connector	6 x 2 header, pitch 2.00mm
JBKL1	LCD Inverter connector	5 x 1 wafer, pitch 2.00mm
JSPI1	SPI connector	4 x 2 header, pitch 2.00mm
JEC_DEBUG	EC Debug	2 x 1 header, pitch 2.00mm
COM1/2	Serial Port 1/2 connector	5 x 2 header, pitch 2.00mm
COM3-6	Serial Port 3-6 connector	20 x 2 header, pitch 2.00mm
DIO1	General purpose I/O connector	10 x 2 header, pitch 2.00mm
SPK1	Speaker connector	4 x 1 wafer, pitch 2.00mm
LVDS1	LVDS Connector	20 x 2 wafer, pitch 1.25mm
USB1/2	USB connector 1/2	5 x 2 header, pitch 2.54mm
USB3/4	USB connector 3/4	
LAN1/2	RJ-45 Ethernet 1/2	
LED1/2/3	LED indicator connector 1/2/3	4 x 1 header, pitch 2.00mm
M2KA1-1	M.2 2230 Key A slot	
M2KB1-1	M.2 3042/2242/2260/2280 Key B Slot	
JLPC	LPC connector	5 x 2 header, pitch 2.00mm
DCIN1	DC Power-in connector	
PWR1	Power connector	2 x 2 wafer, pitch 4.20mm
SATA1	Serial ATA connector	SATA1 is not functioning in EMX-SKLGP-3855 SKU

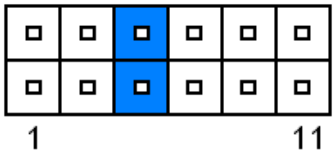
SPWR1	SATA Power connector	4 x 1 wafer, pitch 2.54mm
JI2C1	JI2C connector	5 x 1 header, pitch 2.00mm
HDMI1/2/3	HDMI connector 1/2/3	
JFAN1	CPU Fan connector	1 x 4 wafer, pitch 2.54 mm
SIM1	SIM card slot	
KB/MS	PS/2 keyboard & mouse header	4 x 2 header, pitch 2.00mm
BAT1	Battery connector	2 x 1 wafer, pitch 1.25mm
JHT_LED	LED Indicator for Heater	2 x 1 header, pitch 2.54mm
JHT1/23/4/5/6	CPU Heatsink Heater Connector	2 x 1 header, pitch 2.00mm
GF	Gold Finger	

2.4 EMX-WHLGP Setting Jumpers & Connectors

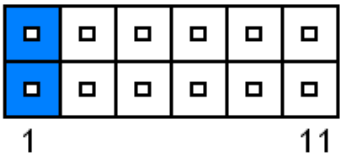
1.4.1 Serial port 1/2 pin9 signal select (JCOM1-RI-RS485)



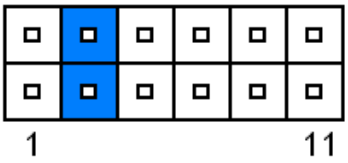
Ring*



+5V

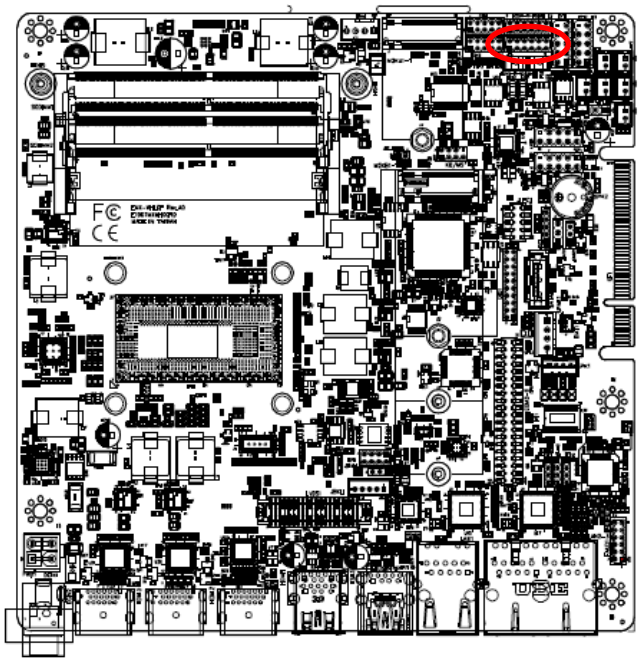


+12V

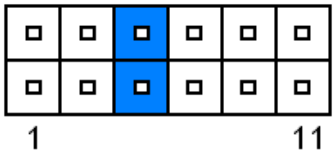


*** Default**

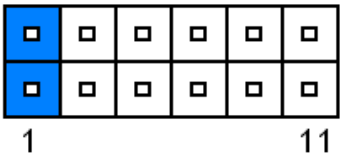
1.4.2 Serial port 1/2 pin9 signal select (JCOM2-RI-RS485)



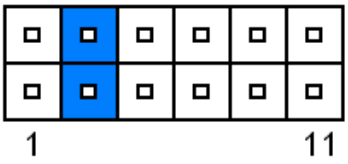
Ring*



+5V

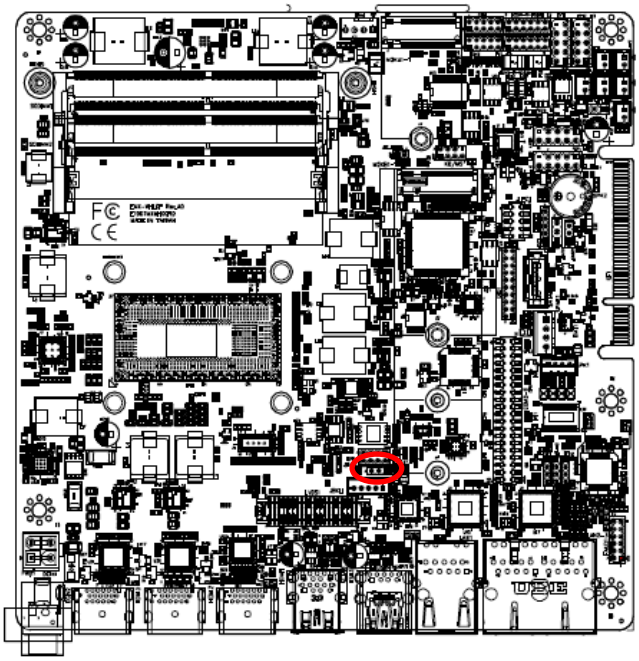


+12V



*** Default**

1.4.3 LVDS Back Light power selection (JSBKL1)

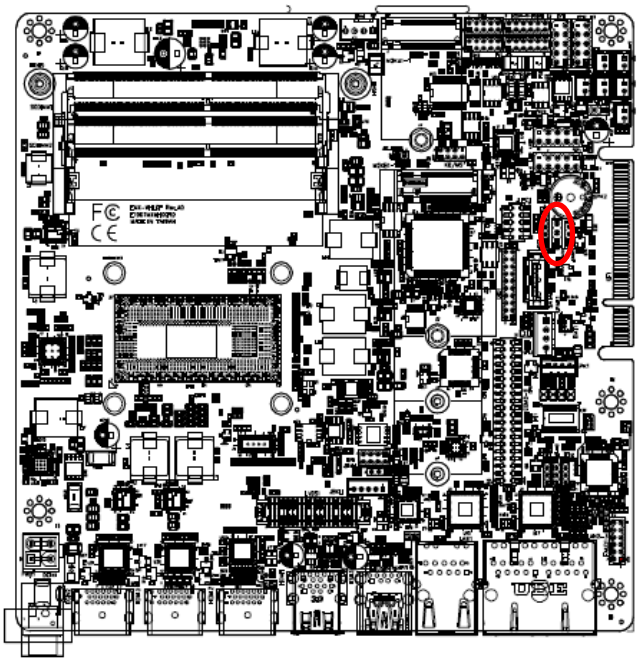


PWM Mode*

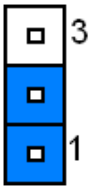
DC Mode

*** Default**

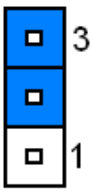
1.4.4 AT/ATX Power Mode Select (JSATX1)



ATX*

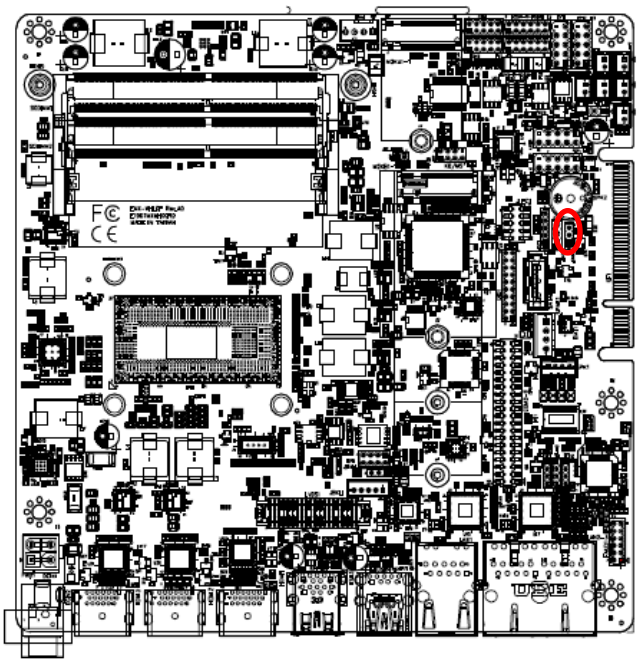


AT

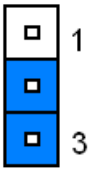


*** Default**

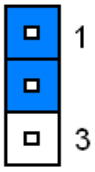
1.4.5 Clear CMOS (JCMOS1)



Protect*

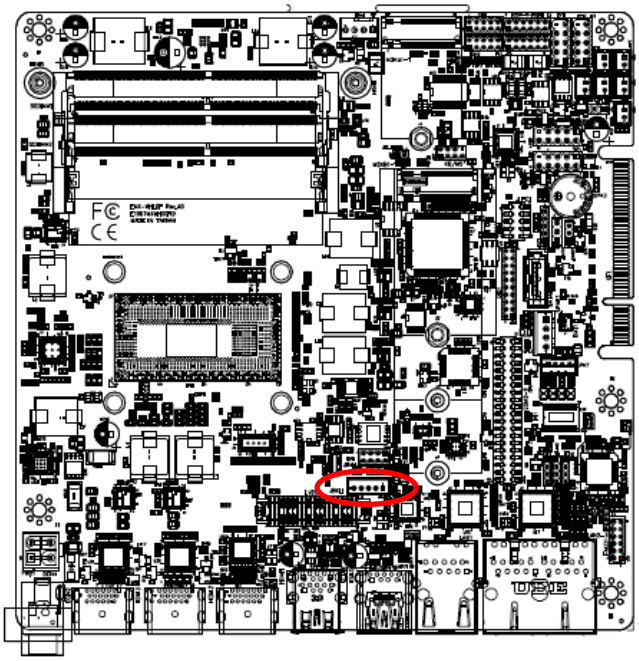


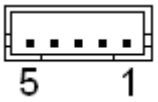
Clear CMOS



*** Default**

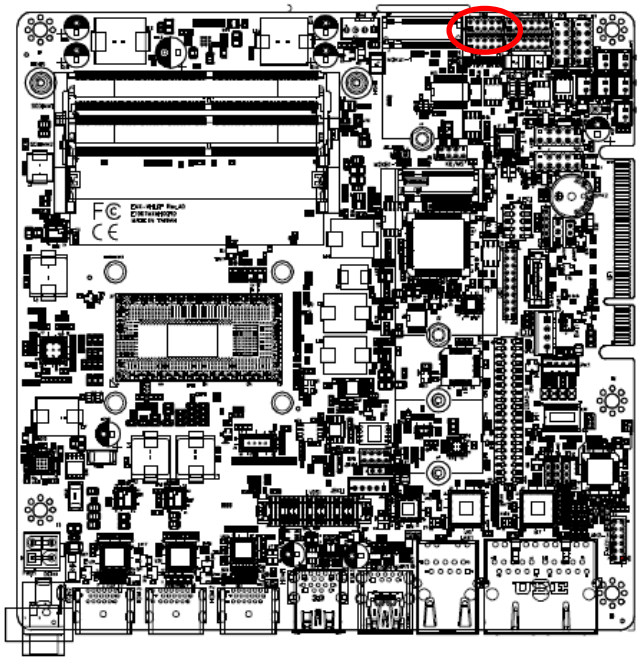
1.4.6 LCD Inverter connector (JBKL1)

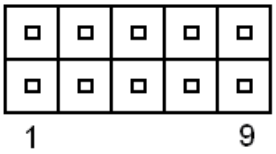




PIN	Signal
1	+12V
2	GND
3	LVDS_BKLT_EN
4	LVDS_BKLTCTL
5	+5V

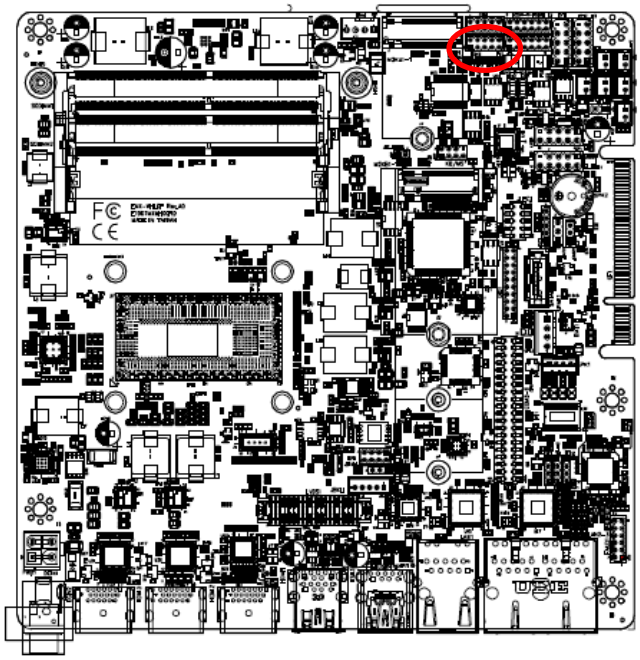
1.4.7 Serial port 1 connector (COM1)

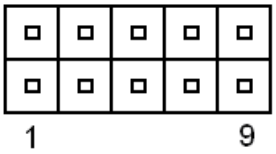




Signal	PIN	PIN	Signal
COM_DCD#_1	1	2	COM_RXD_1
COM_TXD_1	3	4	COM_DTR#_1
GND	5	6	COM_DSR#_1
COM_RTS#_1	7	8	COM_CTS#_1
COM_R#_1_R	9	10	NC

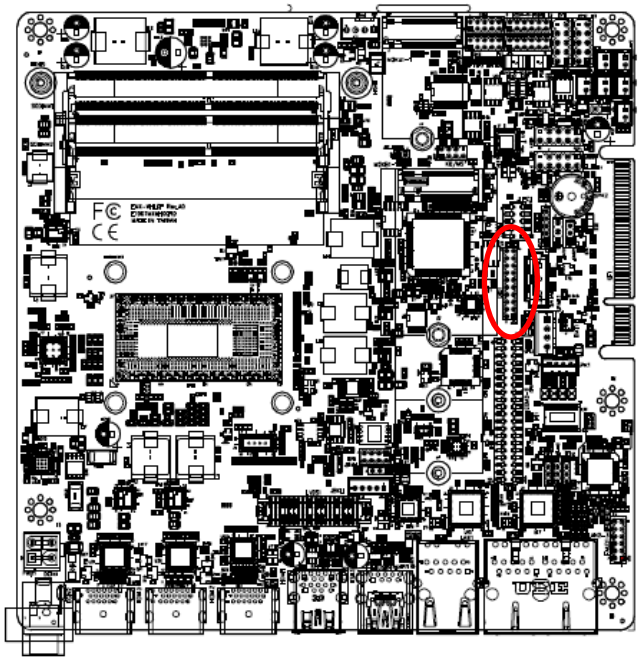
1.4.8 Serial port 2 connector (COM2)

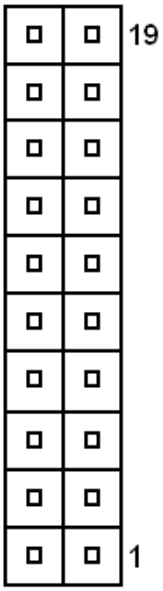




Signal	PIN	PIN	Signal
COM_DCD#_2	1	2	COM_RXD_2
COM_TXD_2	3	4	COM_DTR#_2
GND	5	6	COM_DSR#_2
COM_RTS#_2	7	8	COM_CTS#_2
COM_R#_2_R	9	10	NC

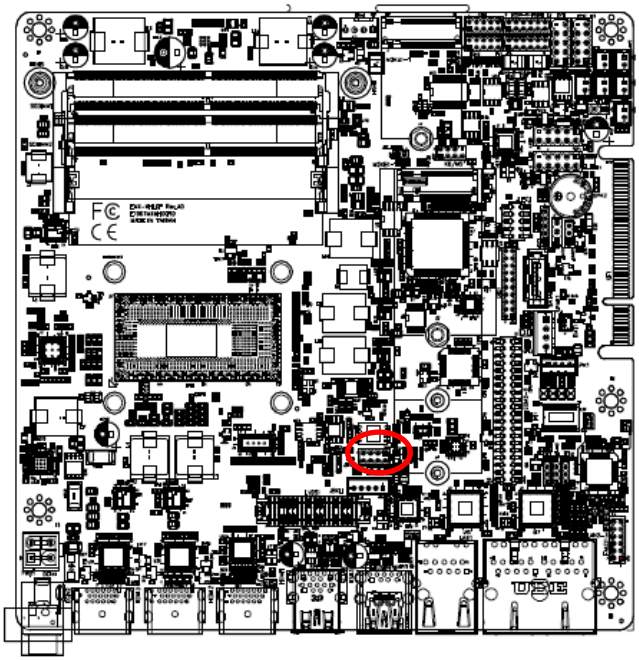
1.4.9 General purpose I/O connector (DIO1)

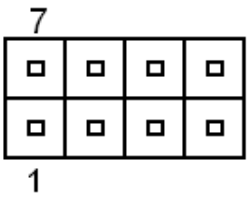




Signal	PIN	PIN	Signal
DI0	1	2	DO0
DI1	3	4	DO1
DI2	5	6	DO2
DI3	7	8	DO3
DI4	9	10	DO4
DI5	11	12	DO5
DI6	13	14	DO6
DI7	15	16	DO7
SMB_CLK_S	17	18	SMB_DATA_S
GND	19	20	+5V

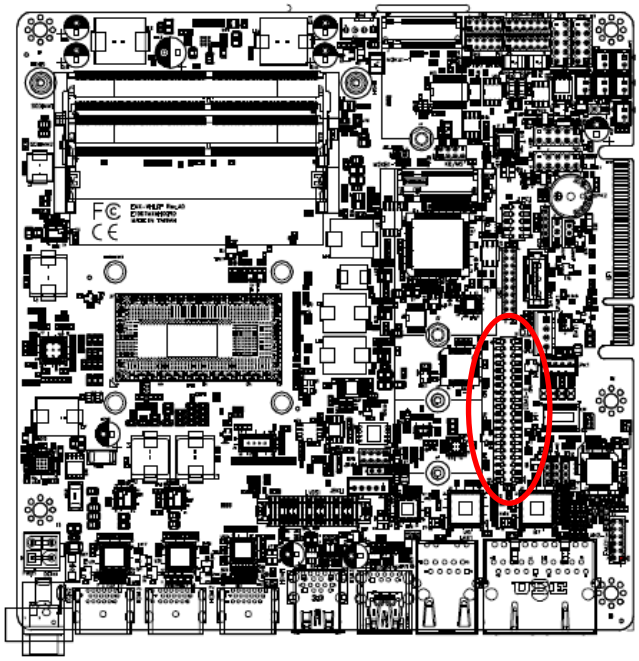
1.4.10 SPI connector (JSPI1)

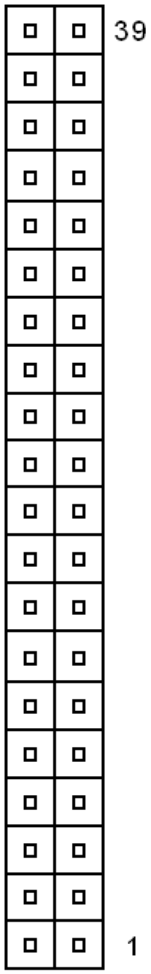




Signal	PIN	PIN	Signal
+3.3A_SPI	1	2	GND
SPI0_CS0#	3	4	SPI_CLK
SPI_SO	5	6	SPI_SI
HOLD#	7	8	SPI_WP#

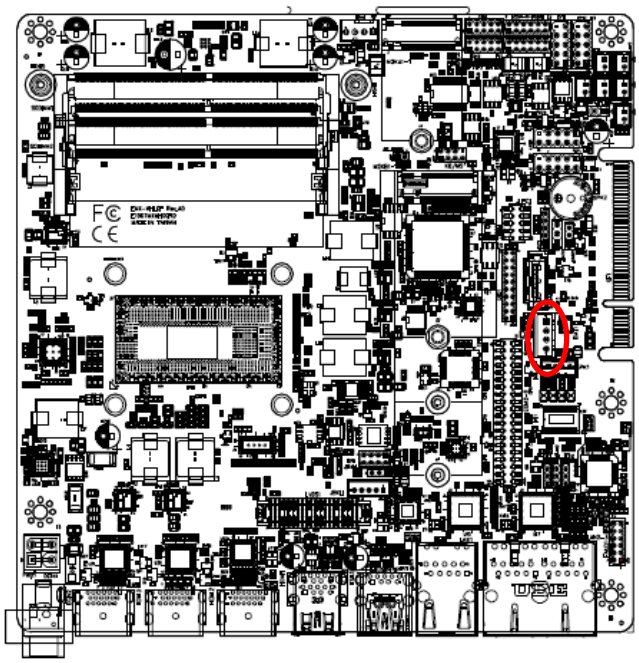
1.4.11 Serial port 3-6 connector (COM3-6)





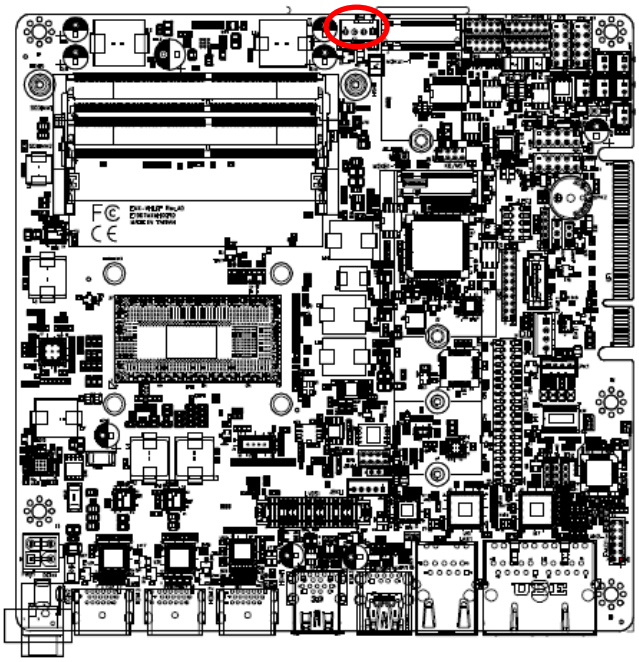
Signal	PIN	PIN	Signal
NC	40	39	COM_R#_6
COM_CTS#_6	38	37	COM_RTS#_6
COM_DSR#_6	36	35	GND
COM_DTR#_6	34	33	COM_TXD_6
COM_RXD_6	32	31	COM_DCD#_6
NC	30	29	COM_R#_5
COM_CTS#_5	28	27	COM_RTS#_5
COM_DSR#_5	26	25	GND
COM_DTR#_5	24	23	COM_TXD_5
COM_RXD_5	22	21	COM_DCD#_5
NC	20	19	COM_R#_4
COM_CTS#_4	18	17	COM_RTS#_4
COM_DSR#_4	16	15	GND
COM_DTR#_4	14	13	COM_TXD_4
COM_RXD_4	12	11	COM_DCD#_4
NC	10	9	COM_R#_3
COM_CTS#_3	8	7	COM_RTS#_3
COM_DSR#_3	6	5	GND
COM_DTR#_3	4	3	COM_TXD_3
COM_RXD_3	2	1	COM_DCD#_3

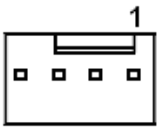
1.4.12 SATA Power connector (SPWR1)



PIN	Signal
1	+V5S_SATA1
2	GND
3	GND
4	+V12S_SATA1

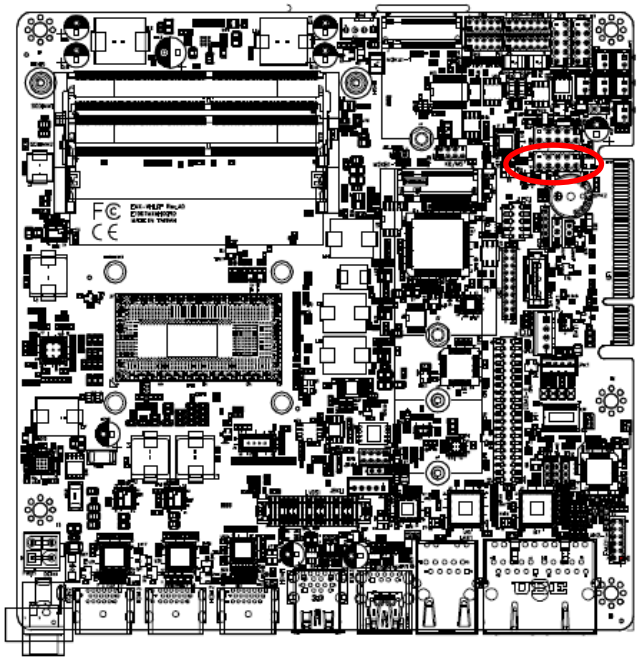
1.4.13 CPU Fan connector (JFAN1)

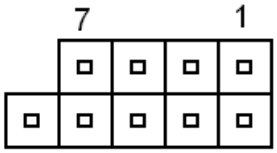




PIN	Signal
1	GND
2	+12V_FAN1
3	CPUFANIN
4	FAN_PWM0

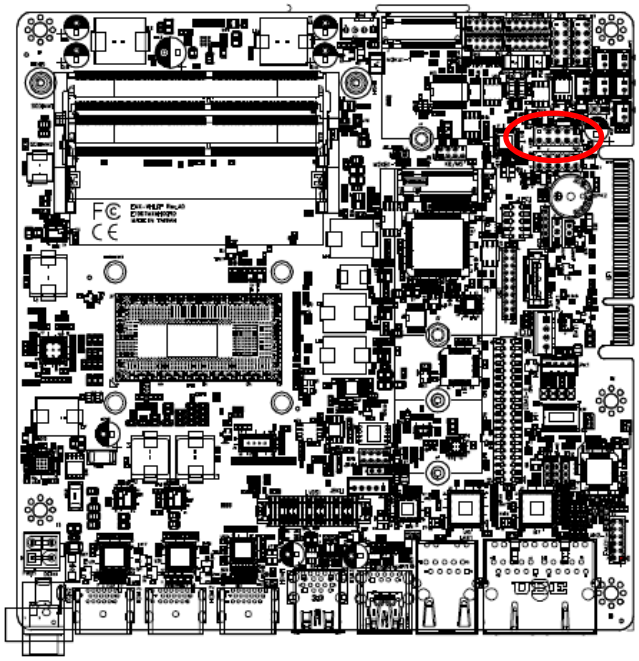
1.4.14 USB connector 1(USB1)

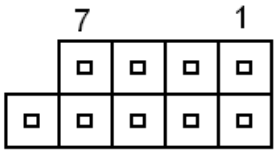




Signal	PIN	PIN	Signal
+V5A_HUB1-4	1	2	+V5A_HUB1-4
UHUB_DM1_R	3	4	UHUB_DM2_R
UHUB_DP1_R	5	6	UHUB_DP2_R
GND	7	8	GND
		10	NC

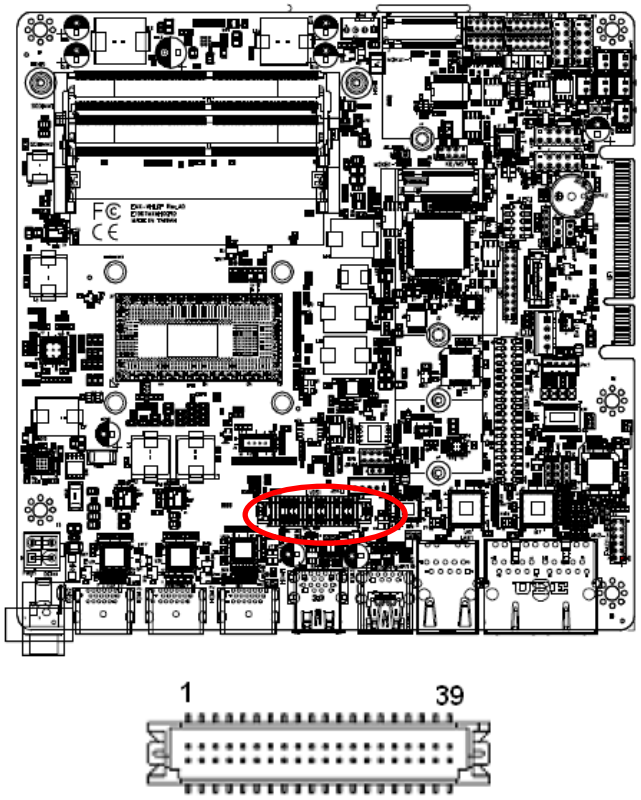
1.4.15 USB connector 2(USB2)





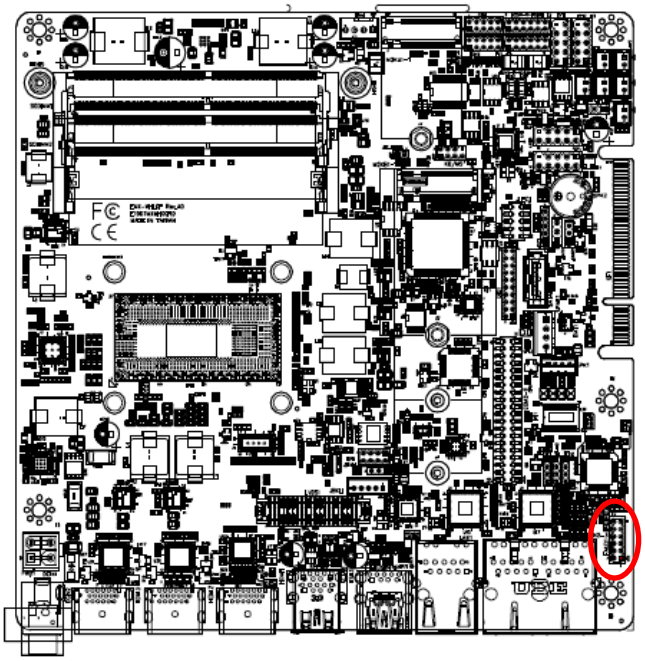
Signal	PIN	PIN	Signal
+V5A_HUB1-4	1	2	+V5A_HUB1-4
UHUB_DM3_R	3	4	UHUB_DM4_R
UHUB_DP3_R	5	6	UHUB_DP4_R
GND	7	8	GND
		10	NC

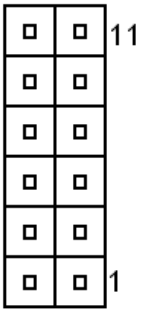
1.4.16 LVDS connector (LVDS1)



Signal	PIN	PIN	Signal
+5V_LVDS	2	1	+3.3V_LVDS
+5V_LVDS	4	3	+3.3V_LVDS
NC	6	5	NC
GND	8	7	GND
LVDS_DATA0_P	10	9	LVDS_DATA1_P
LVDS_DATA0_N	12	11	LVDS_DATA1_N
GND	14	13	GND
LVDS_DATA2_P	16	15	LVDS_DATA3_P
LVDS_DATA2_N	18	17	LVDS_DATA3_N
GND	20	19	GND
LVDS_DATA4_P	22	21	LVDS_DATA5_P
LVDS_DATA4_N	24	23	LVDS_DATA5_N
GND	26	25	GND
LVDS_DATA6_P	28	27	LVDS_DATA7_P
LVDS_DATA6_N	30	29	LVDS_DATA7_N
GND	32	31	GND
LVDS_CLK1_P	34	33	LVDS_CLK2_P
LVDS_ CLK1_N	36	35	LVDS_ CLK2_N
GND	38	37	GND
+12V	40	39	+12V

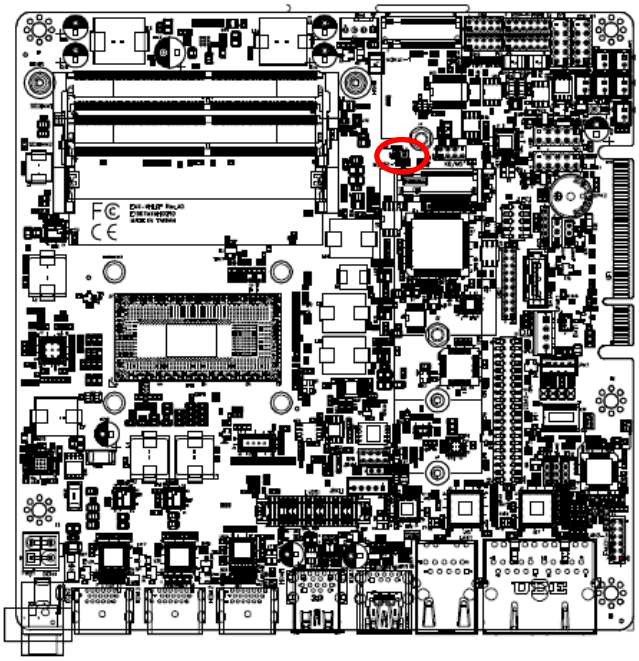
1.4.17 Front Audio connector (FAUD1)

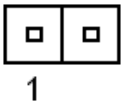




Signal	PIN	PIN	Signal
GND_AUD	12	11	MIC1_JD
NC	10	9	LINEOUT1_JD
MIC1_LIN	8	7	MIC1_RIN
NC	6	5	NC
GND_AUD	4	3	GND_AUD
LINEOUT_L	2	1	LINEOUT_R

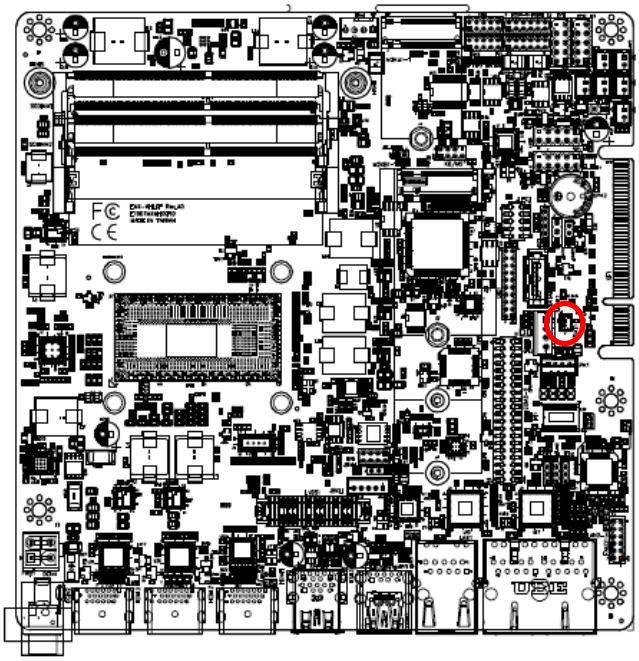
1.4.18 EC Debug (JEC_DEBUG)

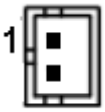




PIN	Signal
1	EC_SMCLK
2	EC_SMDAT

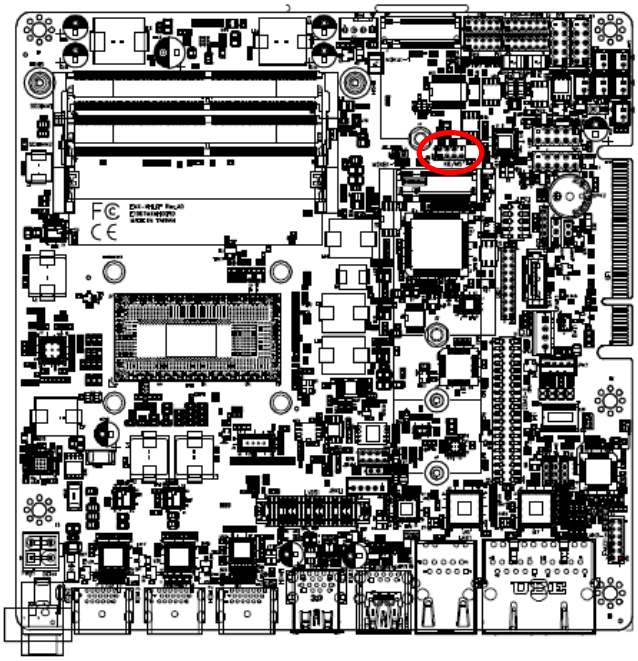
1.4.19 Battery connector (BAT1)

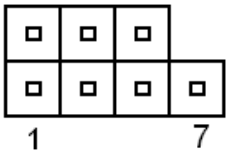




PIN	Signal
1	+VRTCBAT
2	GND

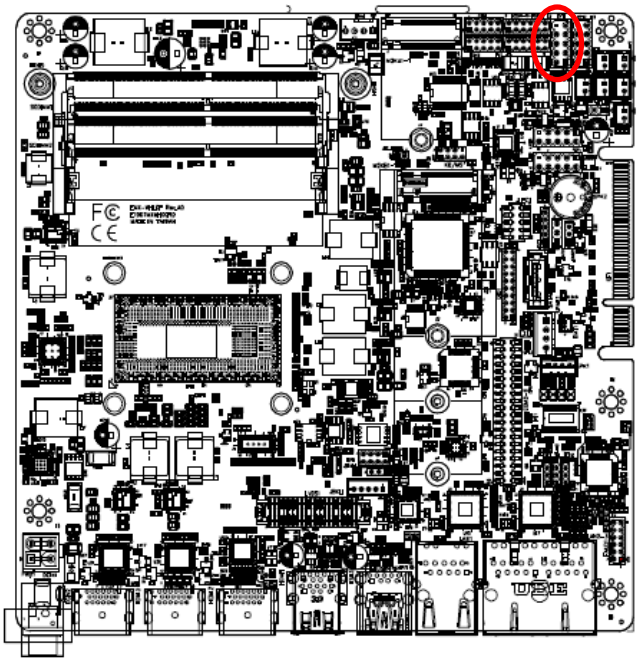
1.4.20 PS/2 keyboard & mouse header (KB/MS)

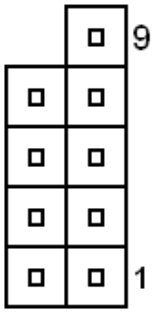




Signal	PIN	PIN	Signal
KBDAT	1	2	KBCLK
GND	3	4	5V
MSDAT	5	6	MSCLK
NC	7		

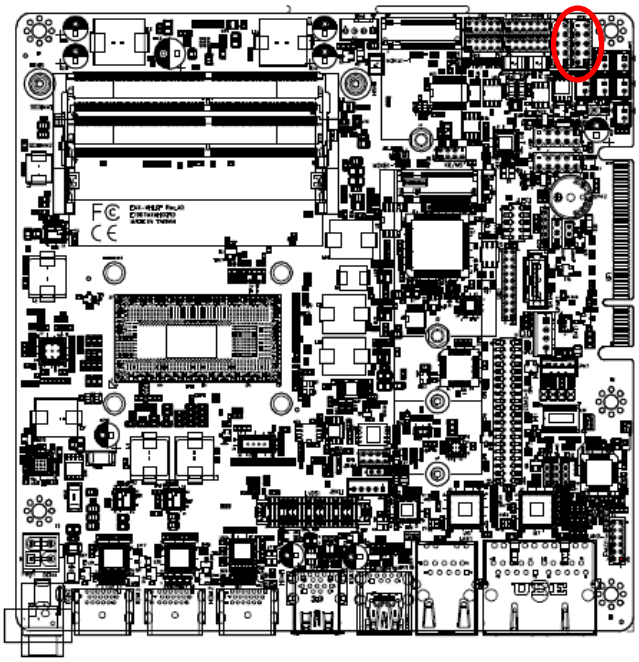
1.4.21 Miscellaneous setting connector 1 (FPT1)

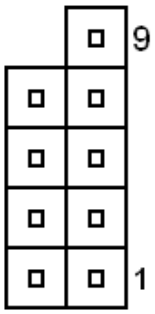




Signal	PIN	PIN	Signal
		9	NC
-PWR _BTN	8	7	-Reset
+PWR _BTN	6	5	+Reset
-PWR_LED	4	3	-HD_LED
+PWR_LED	2	1	+HD_LED

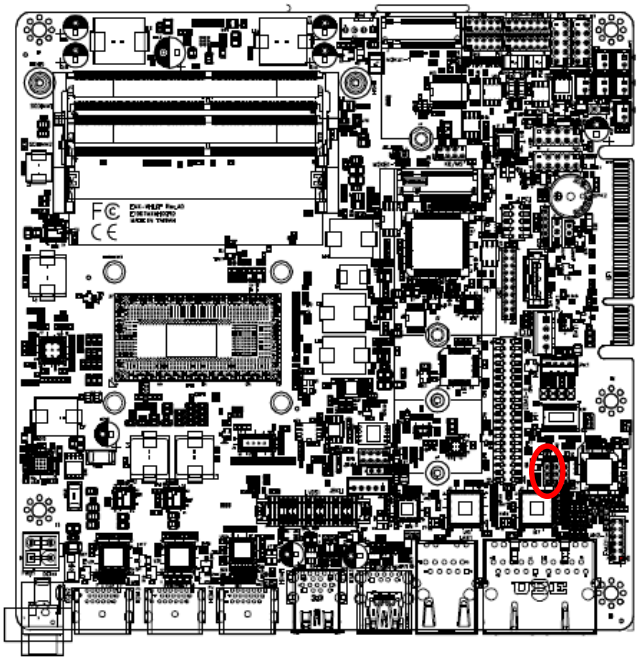
1.4.22 Miscellaneous setting connector 2 (FPT2)





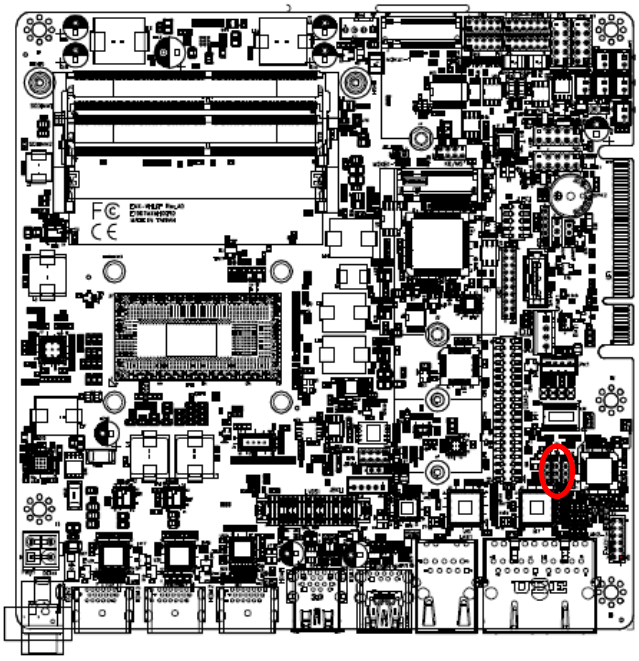
Signal	PIN	PIN	Signal
Speaker+	1	2	BLK_VR(10K)
NC	3	4	BLK_UP
NC	5	6	BLK_DN
Speaker-	7	8	GND
NC	9	10	

1.4.23 LED indicator connector 1 (LED1)



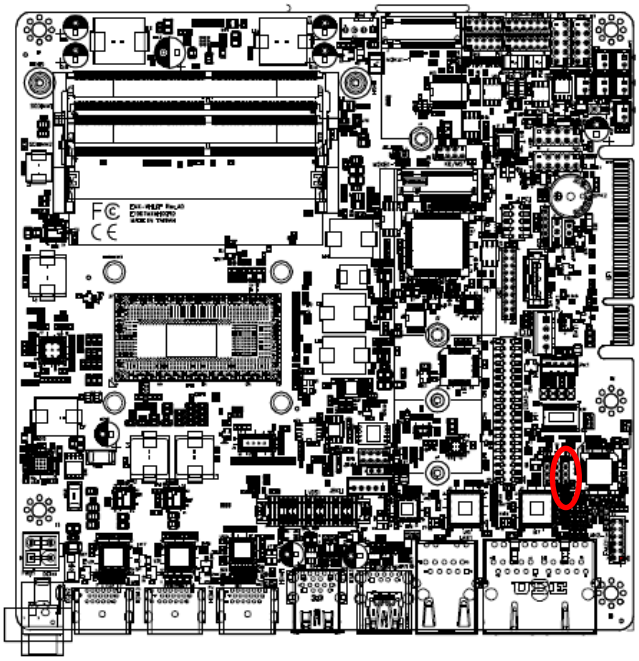
PIN	Signal
1	LAN1_ACT_P
2	LAN1_ACT_N
3	LAN1_100#_LED
4	LAN1_1000#_LED

1.4.24 LED indicator connector 2 (LED2)



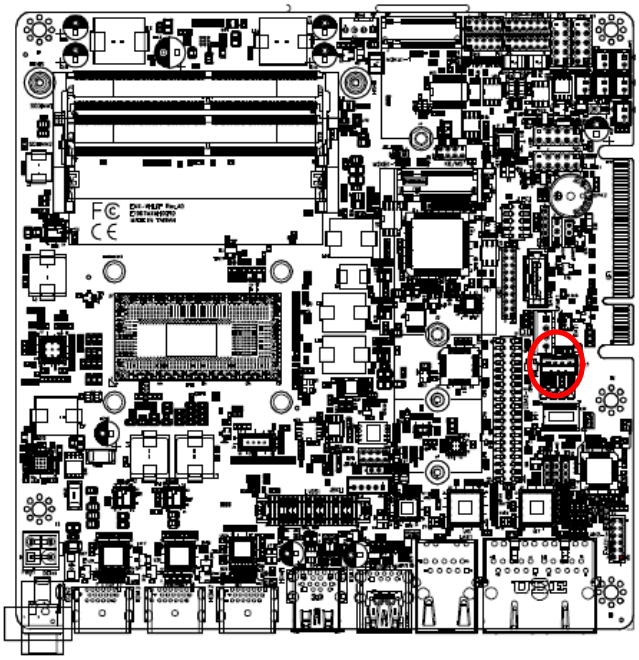
PIN	Signal
1	LAN2_ACT_P
2	LAN2_ACT_N
3	LAN2_100#_LED
4	LAN2_1000#_LED

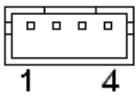
1.4.25 LED indicator connector 3 (LED3)



PIN	Signal
1	LAN3_ACT_P
2	LAN3_ACT_N
3	LAN3_100#_LED
4	LAN3_1000#_LED

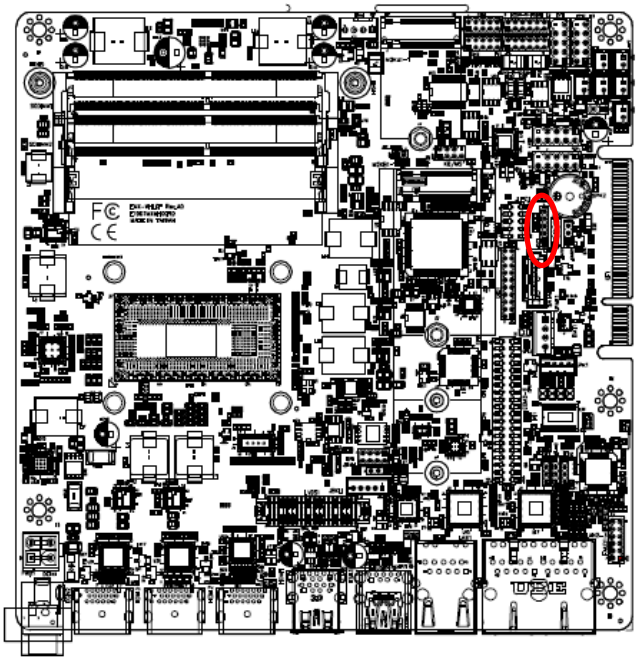
1.4.26 Speaker connector (SPK1)

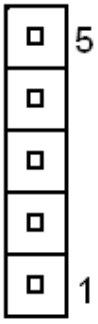




PIN	Signal
1	SPK_L+
2	SPK_L-
3	SPK_R+
4	SPK_R-

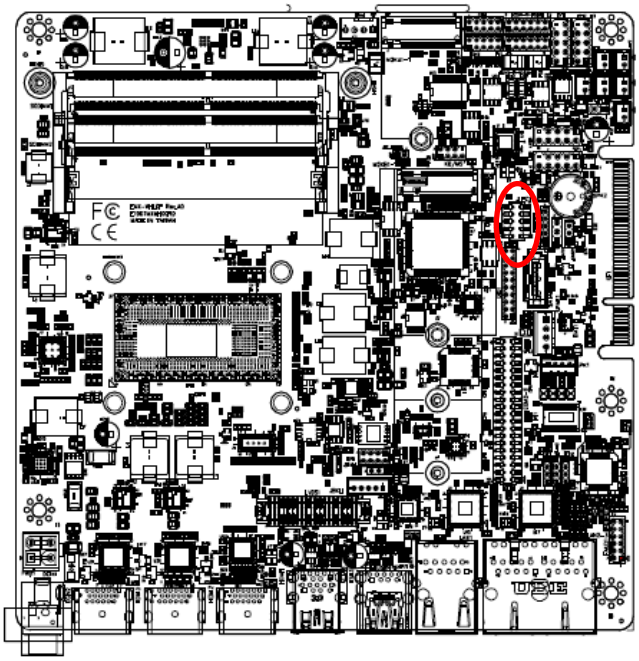
1.4.27 JI2C connector (JI2C1)

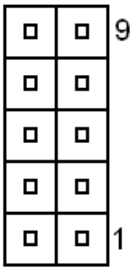




PIN	Signal
1	+3.3V
2	INT_I2C0#
3	I2C0_CLK
4	I2C0_DATA
5	GND

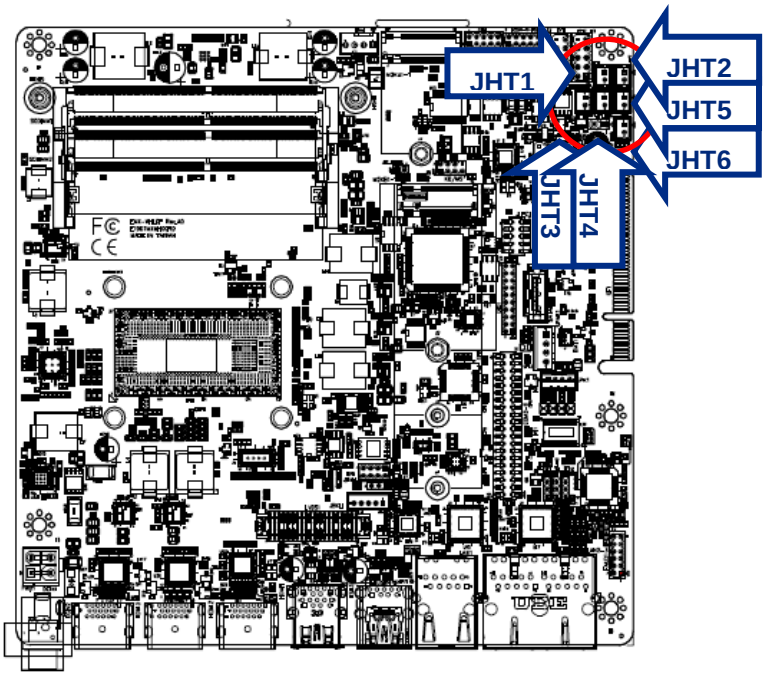
1.4.28 LPC connector (JLPC1)





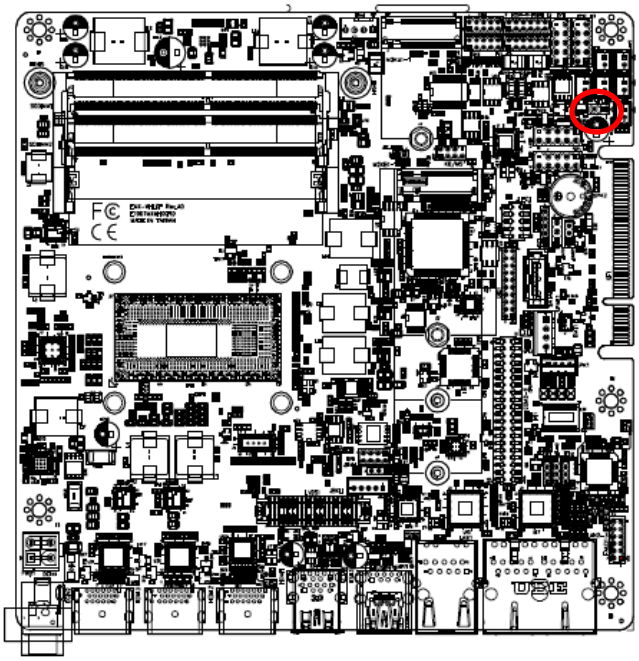
Signal	PIN	PIN	Signal
GND	10	9	LPC_SERIRQ
LPC_CLK	8	7	LPC_AD3
LPC_FRAME#	6	5	LPC_AD2
PCH_PLTRST#	4	3	LPC_AD1
+3.3V	2	1	LPC_AD0

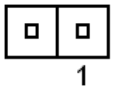
1.4.29 CPU Heatsink Heater Connector (JHT1/2/3/4/5/6)



PIN	Signal
1	+12V
2	GND

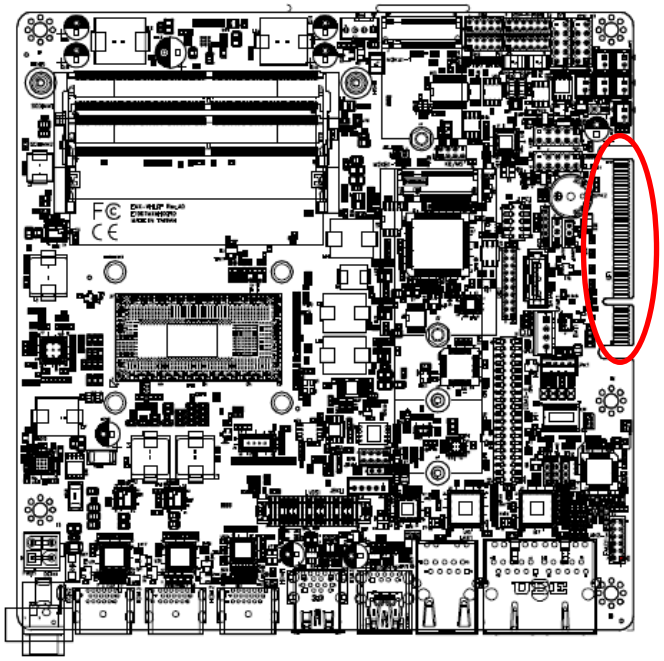
1.4.30 LED Indicator for Heater (JHT_LED1)

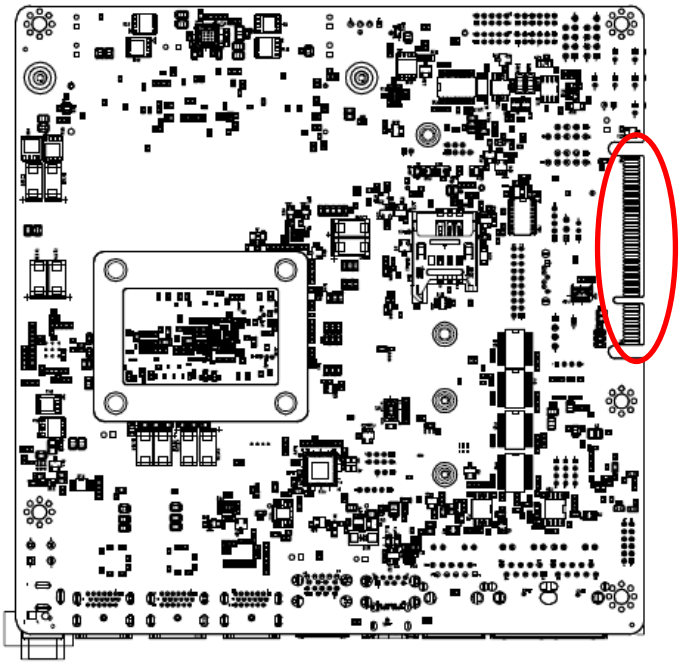


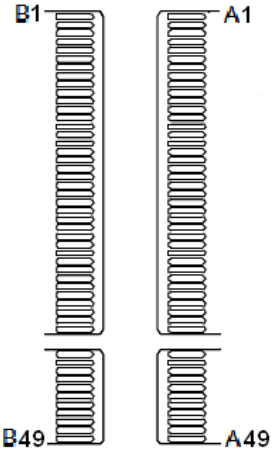


PIN	Signal
1	+12V
2	GND

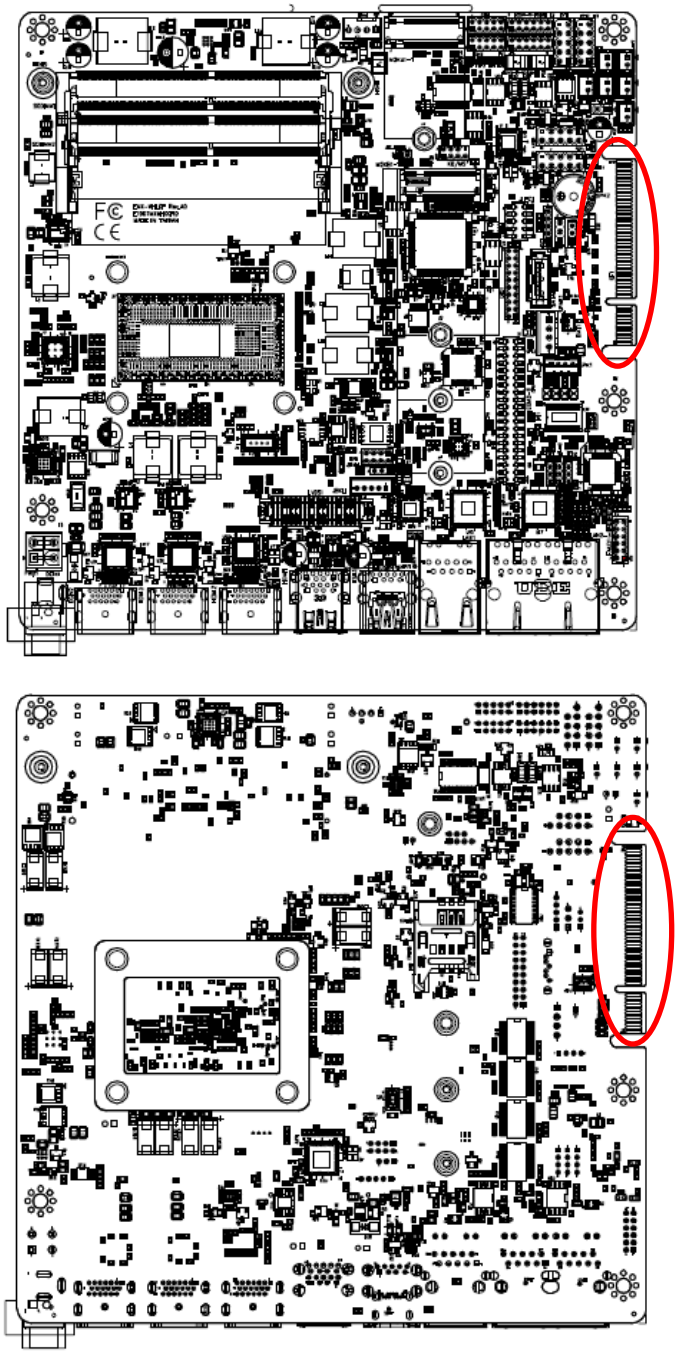
1.4.31 Gold Finger (GF)

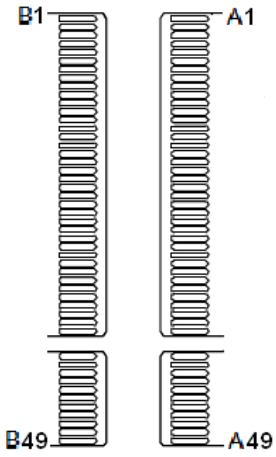






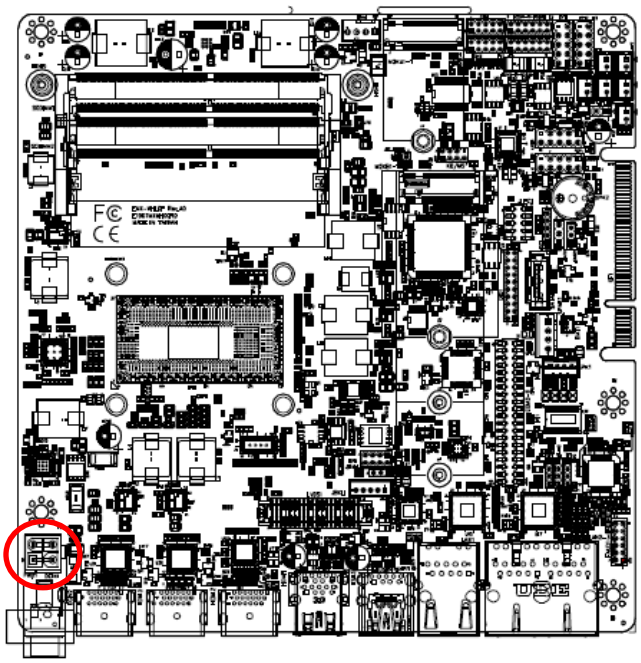
Signal	PIN	PIN	Signal
+12V	B1	A1	+12V
+12V	B2	A2	+12V
+12V	B3	A3	+12V
GND	B4	A4	GND
SMB_CLK_S	B5	A5	EN_V5S-V3.3S
SMB_DATA_S	B6	A6	GF_PWR_OK
GND	B7	A7	GF_CKL_REQ#
NC	B8	A8	GF_SATA1_DEVSLP
GF_PWR_BTN_EC#	B9	A9	+5V
+3.3V	B10	A10	+5V
GF_PWAKE#	B11	A11	RST_GF#
	KEY		
USB_PWR_EN_GF	B12	A12	GND
GND	B13	A13	CLK_GF_P5
PCIE_TXP13	B14	A14	CLK_GF_N5
PCIE_TXN13	B15	A15	GND
GND	B16	A16	PCIE_RXP13
NC	B17	A17	PCIE_RXN13
GND	B18	A18	GND
PCIE_TXP14	B19	A19	NC
PCIE_TXN14	B20	A20	GND
GND	B21	A21	PCIE_RXP14
GND	B22	A22	PCIE_RXN14
PCIE_TXP15	B23	A23	GND
PCIE_TXN15	B24	A24	GND
GND	B25	A25	PCIE_RXP15

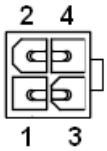




Signal	PIN	PIN	Signal
GND	B26	A26	PCIE_RXN15
PCIE_TXP16	B27	A27	GND
PCIE_TXN16	B28	A28	GND
GND	B29	A29	PCIE_RXP16
NC	B30	A30	PCIE_RXN16
NC	B31	A31	GND
GND	B32	A32	NC
USB_PP7	B33	A33	GF_USB_OC#
USB_PN7	B34	A34	GND
GND	B35	A35	NC
GND	B36	A36	NC
SATA_TXP_1_GF_L	B37	A37	GND
SATA_TXN_1_GF_L	B38	A38	GND
GND	B39	A39	SATA_RXN_1_GF_L
GND	B40	A40	SATA_RXP_1_GF_L
PCIE_GF_TXP9	B41	A41	GND
PCIE_GF_TXN9	B42	A42	GND
GND	B43	A43	PCIE_GF_RXP9
GND	B44	A44	PCIE_GF_RXN9
NC	B45	A45	GND
NC	B46	A46	GND
GND	B47	A47	NC
NC	B48	A48	NC
GND	B49	A49	GND

1.4.32 Power connector (PWR1)





Signal	PIN	PIN	Signal
GND	2	4	+VIN
GND	1	3	+VIN

Note: VIN = 12~24V

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

The 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 <Del> or <F2> immediately after switching the system on, or
By pressing the <Del> or <F2> key when the following message appears briefly at the left-top of the screen during the POST (Power On Self Test).

Press <Del> or <F2> 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. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to.

Press F1 to Continue, DEL to enter SETUP

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
Enter	Select
+/-	Value
Esc	Exit
F1	General Help
F2	Previous Values
F3	Optimized Defaults
F4	Save & Exit Setup
<K>	Scroll help area upwards
<M>	Scroll help area downwards

- **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 <Enter> key.

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.

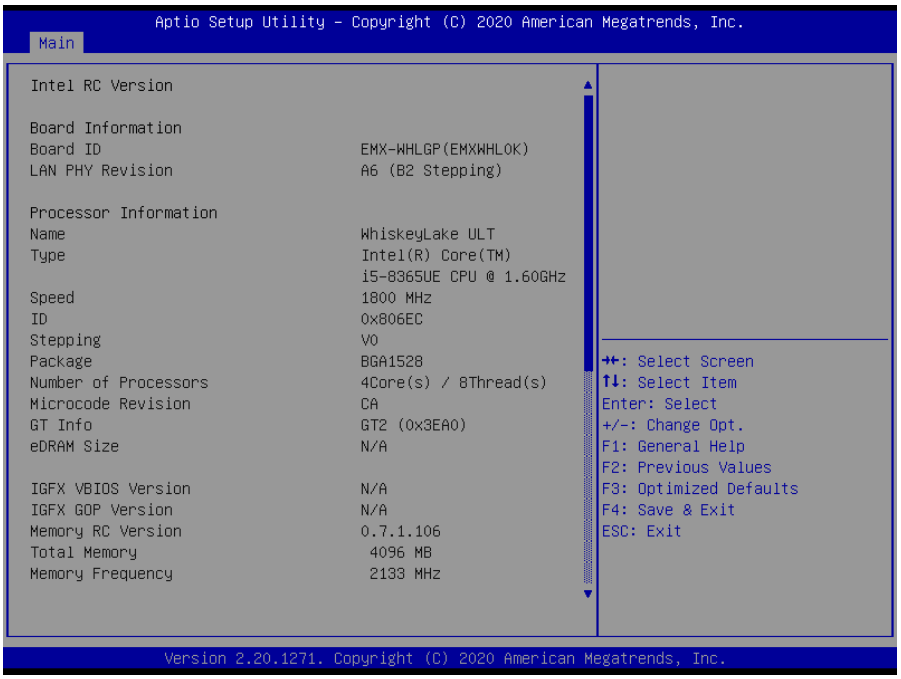
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance 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.

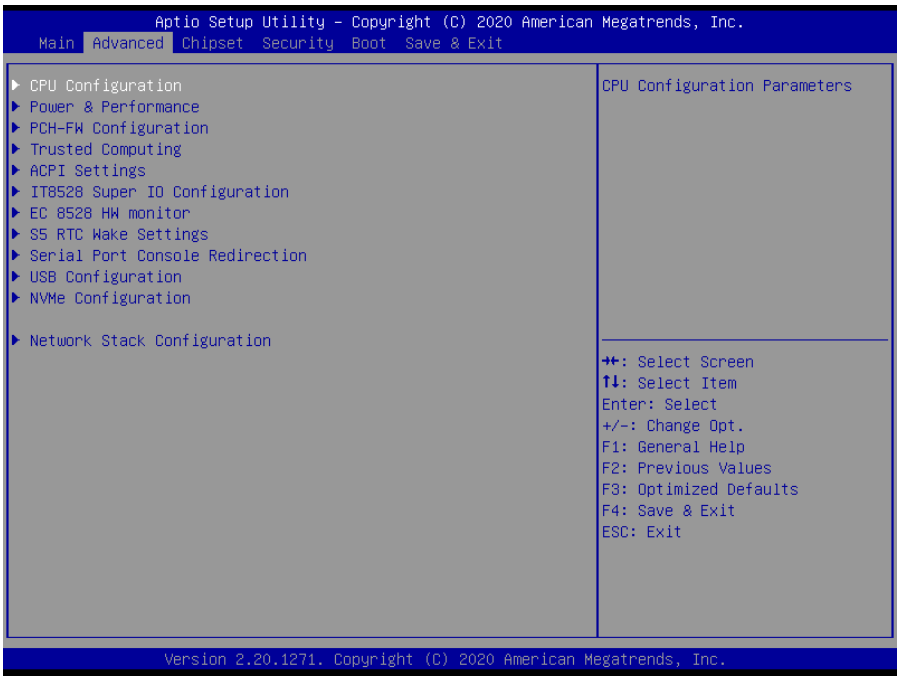
3.6.1.3 System Time

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.

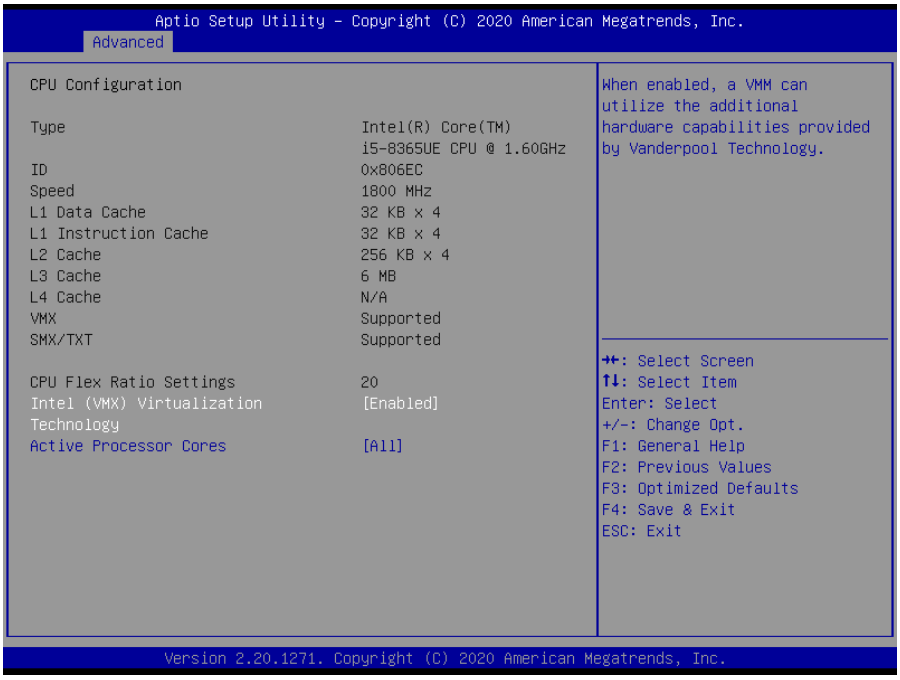
3.6.2 Advanced Menu

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



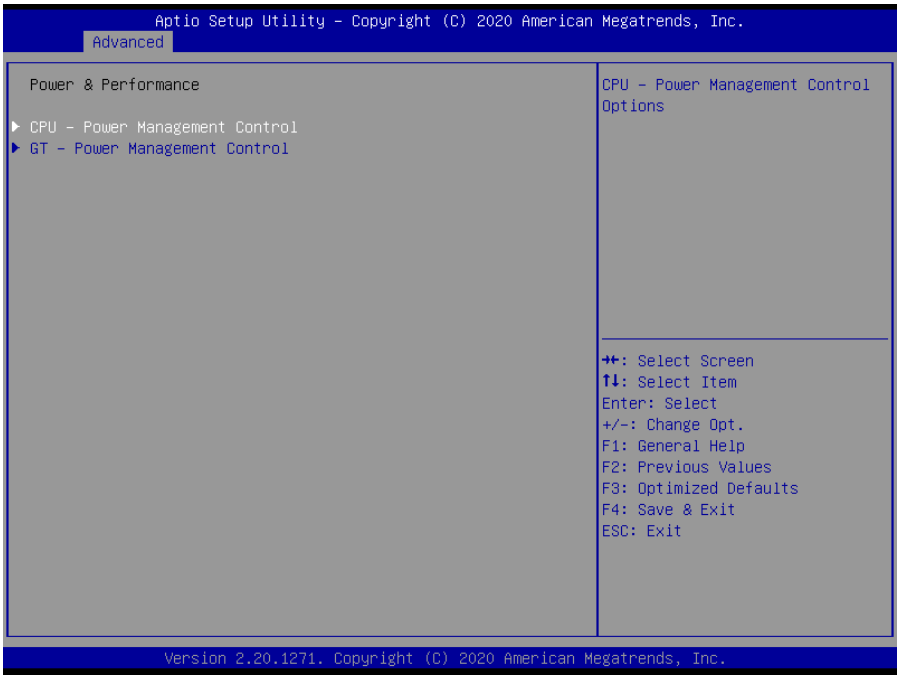
3.6.2.1 CPU Configuration

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

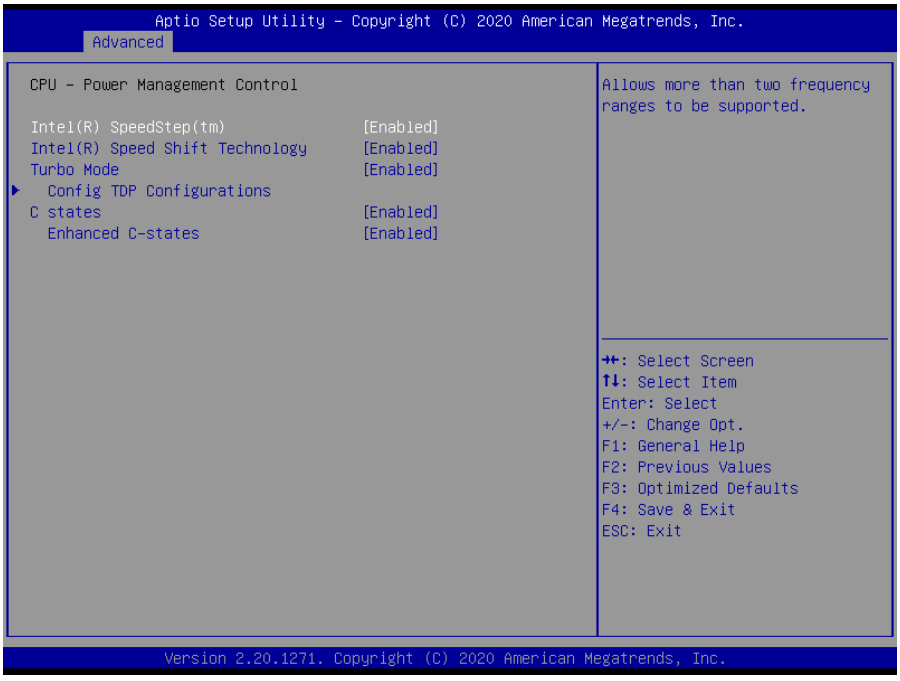


Item	Options	Description
Intel (VMX) Virtualization Technology	Disabled, Enabled**[Default]**	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	All**[Default]** 1 2 3 4	Number of cores to enable in each processor package.

3.6.2.2 Power & Performance



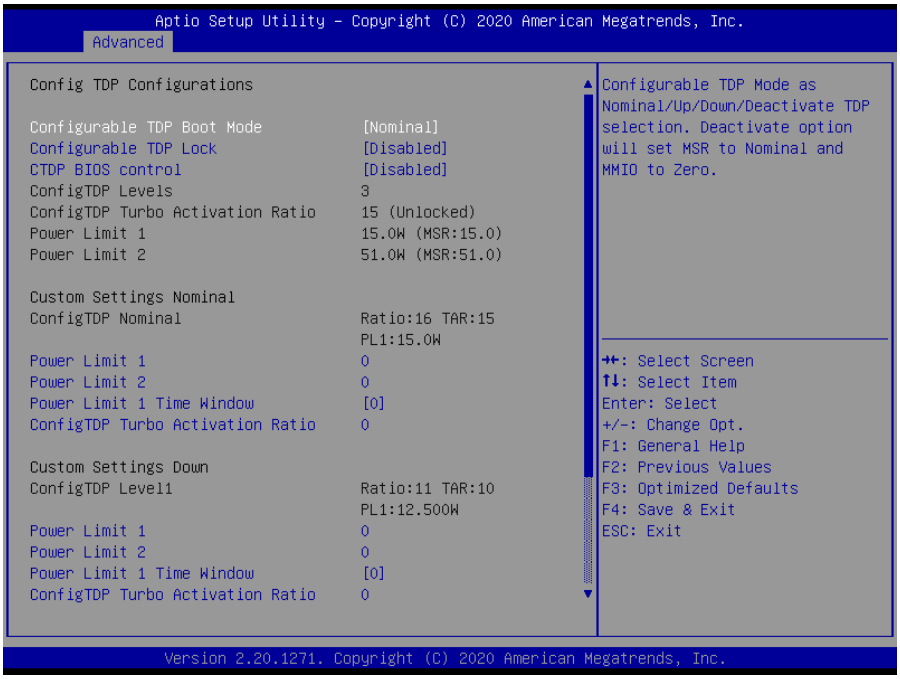
3.6.2.2.1 CPU - Power Management Control



Item	Options	Description
Intel(R) SpeedStep(tm)	Disabled, Enabled**[Default]**	Allows more than two frequency ranges to be supported.
Intel(R) Speed Shift Technology	Disabled, Enabled**[Default]**	Enable/Disable Intel(R) 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 Intel Speed Step or Intel Speed Shift to be available and enabled).
C states	Disabled, Enabled**[Default]**	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Enhanced C-states	Disabled, Enabled**[Default]**	Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.

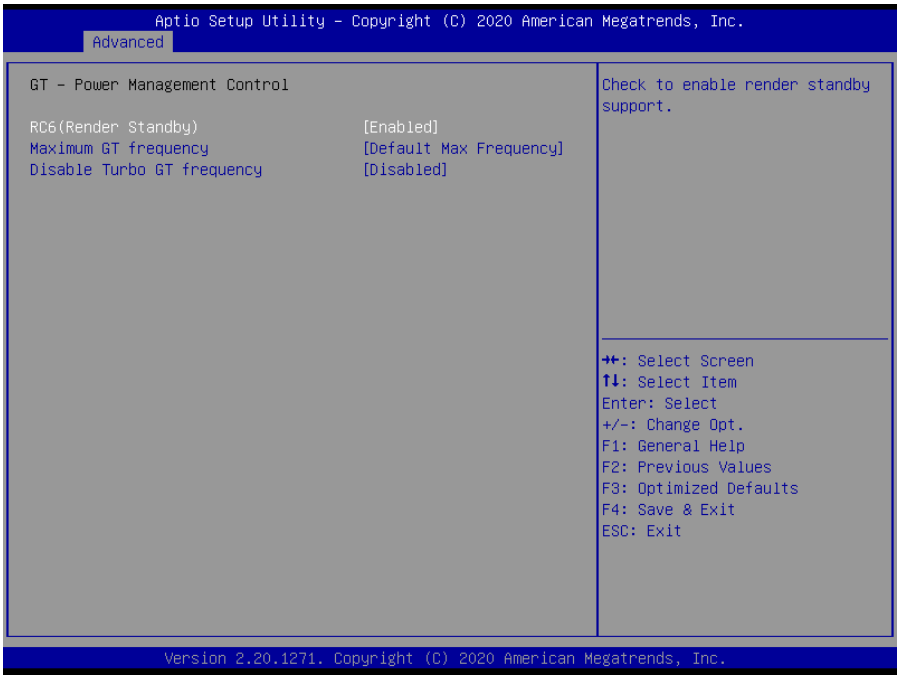
3.6.2.2.1.1 Config TDP Configurations



Item	Options	Description
Configurable TDP Boot Mode	Nominal**[Default]** Up Down Deactivate	Configurable TDP Mode as Nominal/Up/Down/Deactivate TDP selection. Deactivate option will set MSR to Nominal and MMIO to Zero.
Configurable TDP Lock	Enabled, Disabled**[Default]**	Configurable TDP Mode Lock sets the Lock bits on TURBO ACTIVATION_RATIO and CONFIG_TDP_CONTROL. Note: When CTDP Lock is enabled Custom ConfigTDP Count will be forced to 1 and Custom ConfigTDP Boot Index will be forced to 0.
CTDP BIOS control	Enabled, Disabled**[Default]**	Enables CTDP control via runtime ACPI BIOS methods. This "BIOS only" feature does not require EC or driver support.
Power Limit 1	0	Power Limit 1 in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500. Overclocking

		SKU: Value must be between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). Other SKUs: This value must be between Min Power
Power Limit 2	0	Power Limit 2 value in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500. Processor applies control policies such that the package power does not exceed this limit.
Power Limit 1 Time Window	0**[Default]** 1 2 3 4 5 6 7 8 10 12 14 16 20 24 28 32 40 48 56 64 80 96 112 128	Power Limit 1 Time Window value in seconds. The value may vary from 0 to 128. 0 = use default value (28 sec). Defines time window which TDP value should be maintained.
ConfigTDP Turbo Activation Ratio	0	Custom value for Turbo Activation Ratio. Needs to be configured with valid values from LFM to Max Turbo. 0 means don't use custom value.

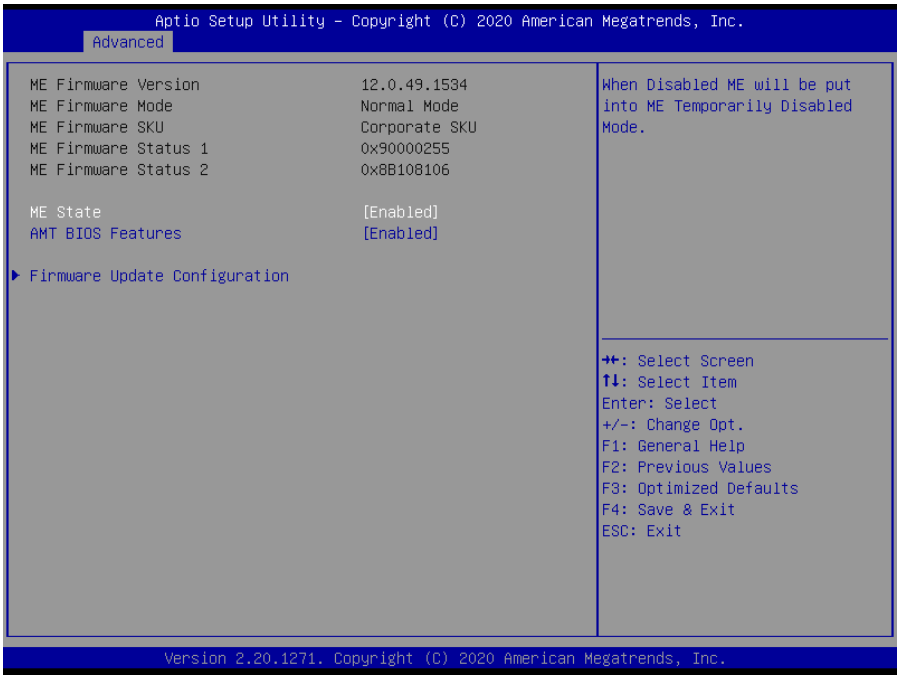
3.6.2.2.2 GT - Power Management Control



Item	Options	Description
RC6(Render Standby)	Disabled, Enabled**[Default]**	Check to enable render standby support.
Maximum GT frequency	Default Max Frequency**[Default]** 100Mhz 150Mhz 200Mhz 250Mhz 300Mhz 350Mhz 400Mhz 450Mhz 500Mhz 550Mhz 600Mhz 650Mhz 700Mhz 750Mhz 800Mhz 850Mhz 900Mhz 950Mhz 1000Mhz 1050Mhz 1100Mhz 1150Mhz 1200Mhz	Auto Updated

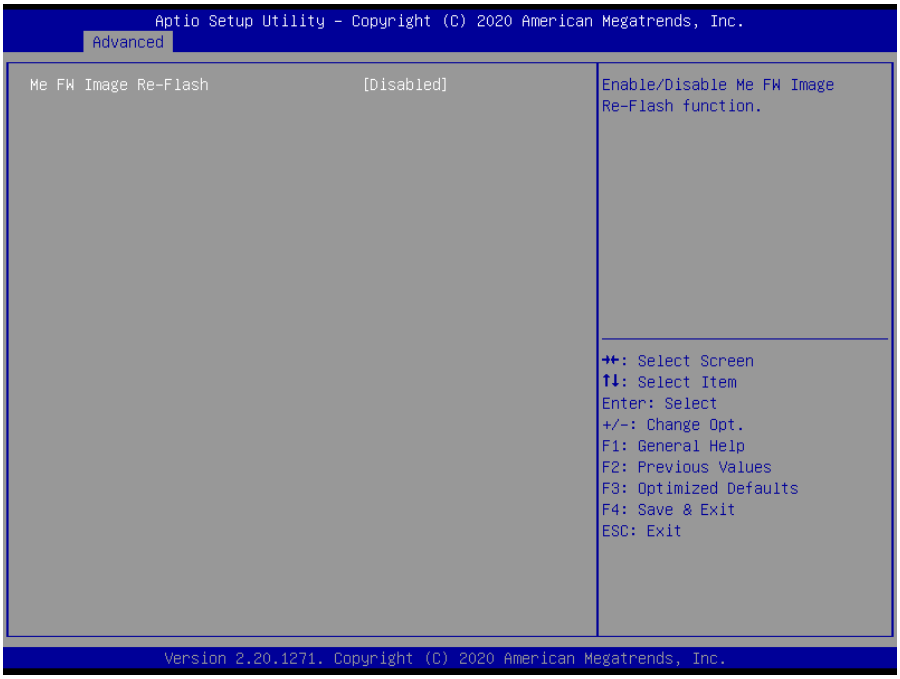
Disable Turbo GT frequency	Enabled, Disabled**[Default]**	Enabled: Disables Turbo GT frequency. Disabled GT frequency is not limited

3.6.2.3 PCH-FW Configuration



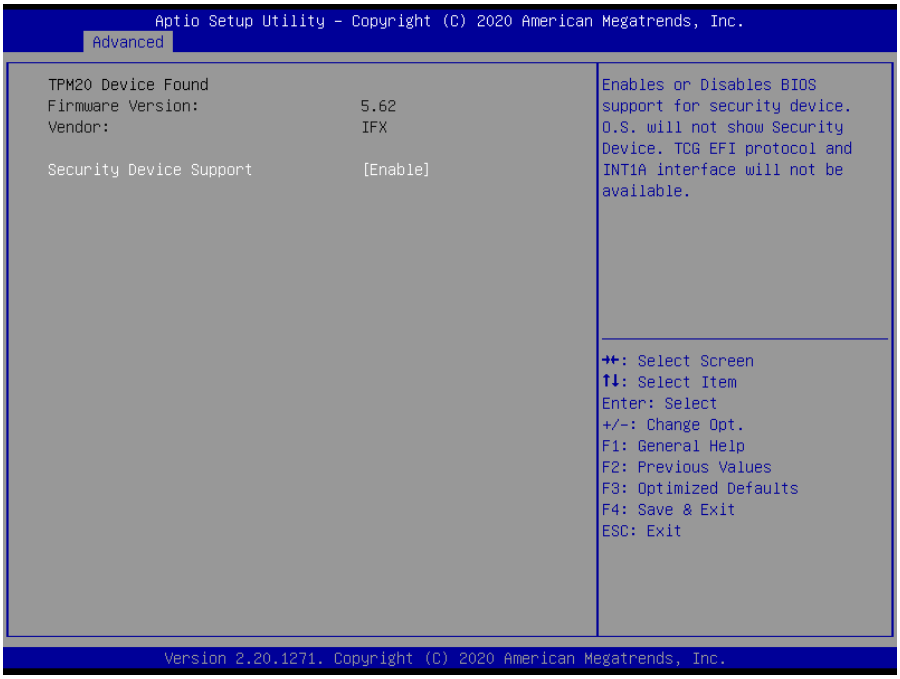
Item	Options	Description
ME State	Disabled, Enabled**[Default]**	When Disabled ME will be put into ME Temporarily Disabled Mode.
AMT BIOS Features	Disabled, Enabled**[Default]**	When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup. Note: This option does not disable Manageability Features in FW.

3.6.2.3.1 Firmware Update Configuration



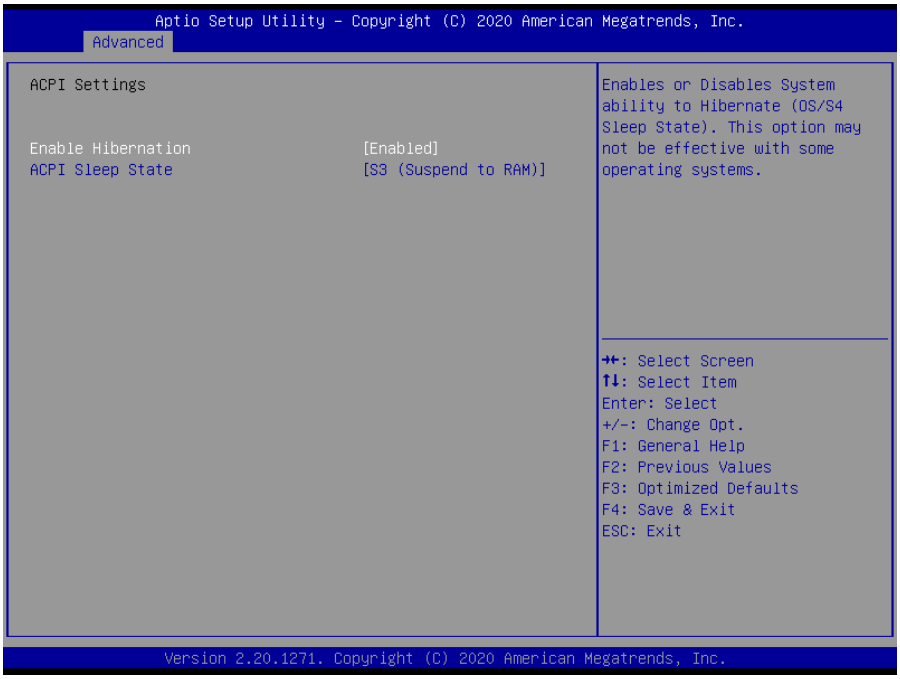
Item	Options	Description
Me FW Image Re-Flash	Disabled**[Default]**, Enabled	Enable/Disable Me FW Image Re-Flash function.

3.6.2.4 Trusted Computing



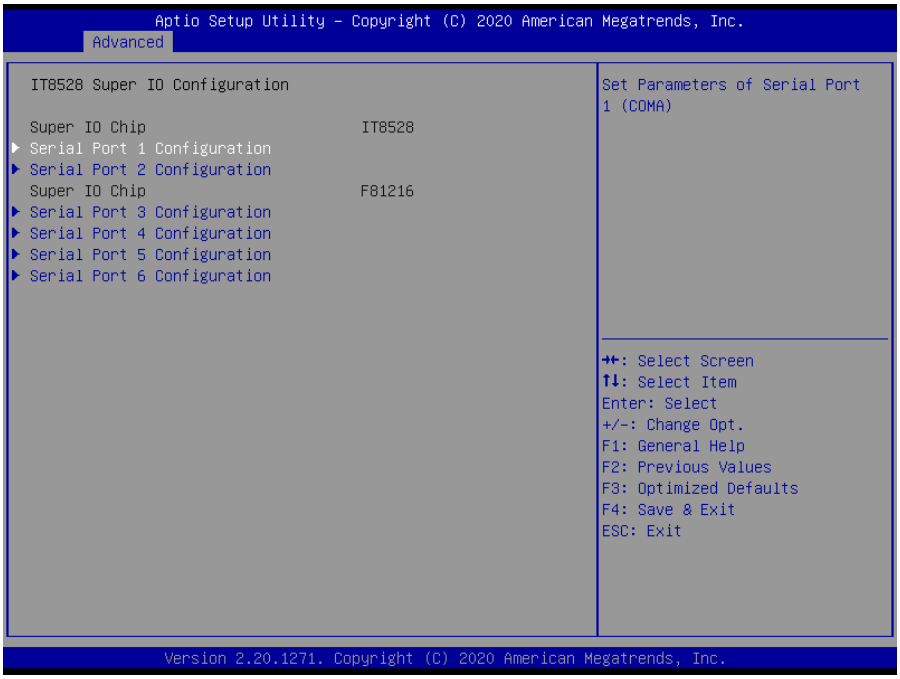
Item	Options	Description
Security Device Support	Disabled, Enabled**[Default]**	Enable or Disable BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

3.6.2.5 ACPI Settings



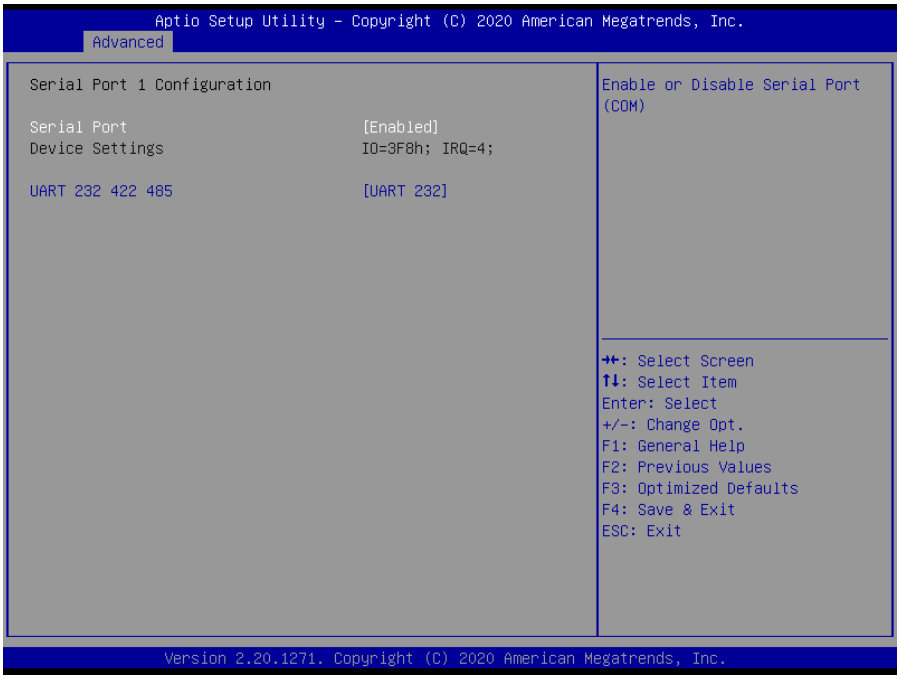
Item	Options	Description
Enable Hibernation	Disabled Enabled**[Default]**,	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some operating systems.
ACPI Sleep State	Suspend Disabled, S3 (Suspend to RAM)**[Default]**	Select the highest ACPI sleep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

3.6.2.6 IT8528 Super IO Configuration



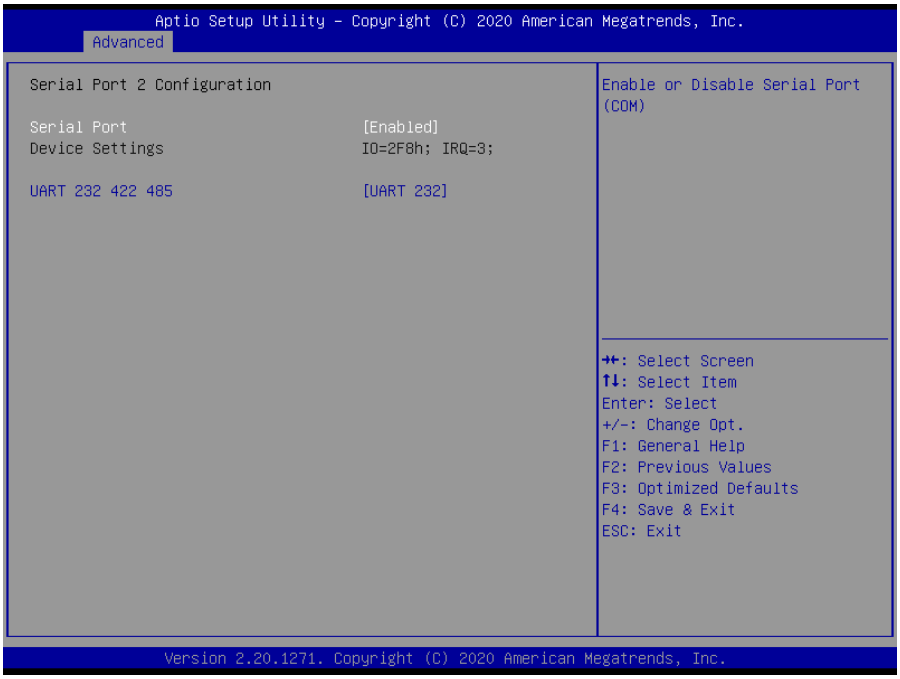
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration	Set Parameters of Serial Port 3 (COMC).
Serial Port 4 Configuration	Set Parameters of Serial Port 4 (COMD).
Serial Port 5 Configuration	Set Parameters of Serial Port 5 (COME).
Serial Port 6 Configuration	Set Parameters of Serial Port 6 (COMF).

3.6.2.6.1 Serial Port 1 Configuration



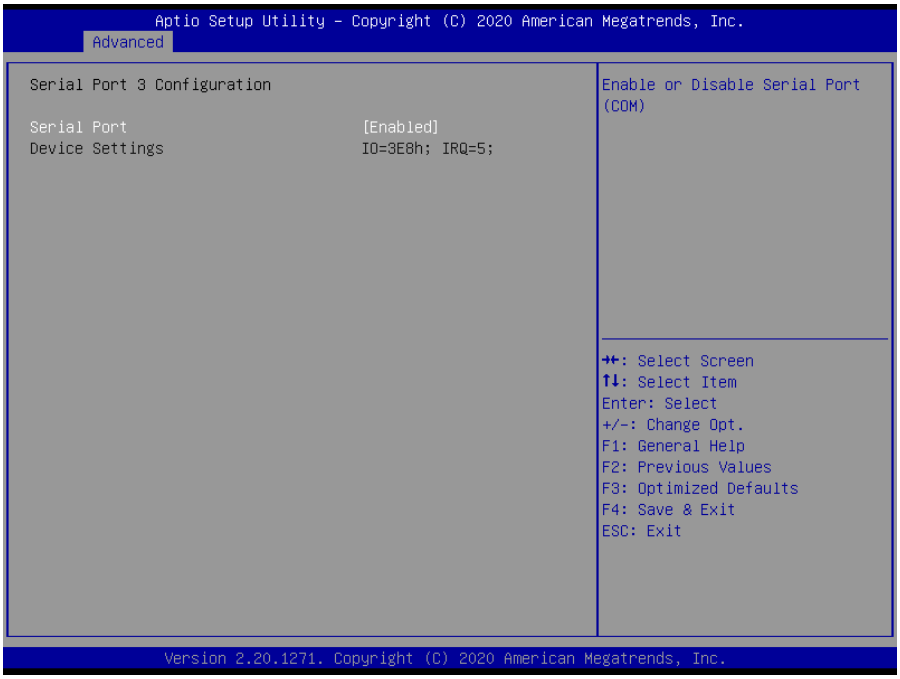
Item	Option	Description
Serial Port	Disabled Enabled**[Default]**,	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232**[Default]**, UART 422, UART 485	Change the Serial Port as RS232/422/485.

3.6.2.6.2 Serial Port 2 Configuration



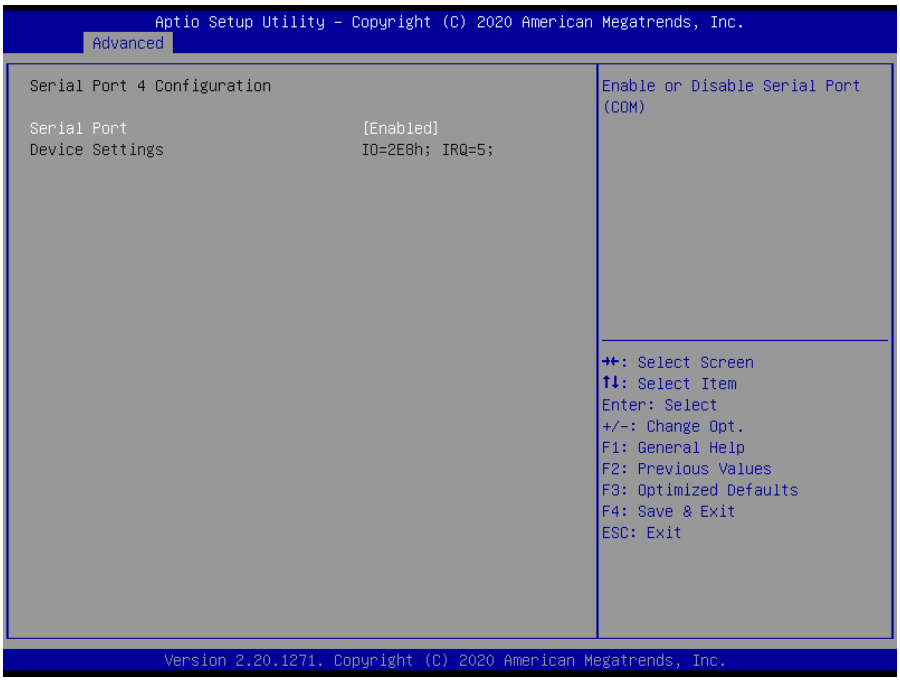
Item	Option	Description
Serial Port	Disabled Enabled**[Default]**,	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232**[Default]**, UART 422, UART 485	Change the Serial Port as RS232/422/485.

3.6.2.6.3 Serial Port 3 Configuration



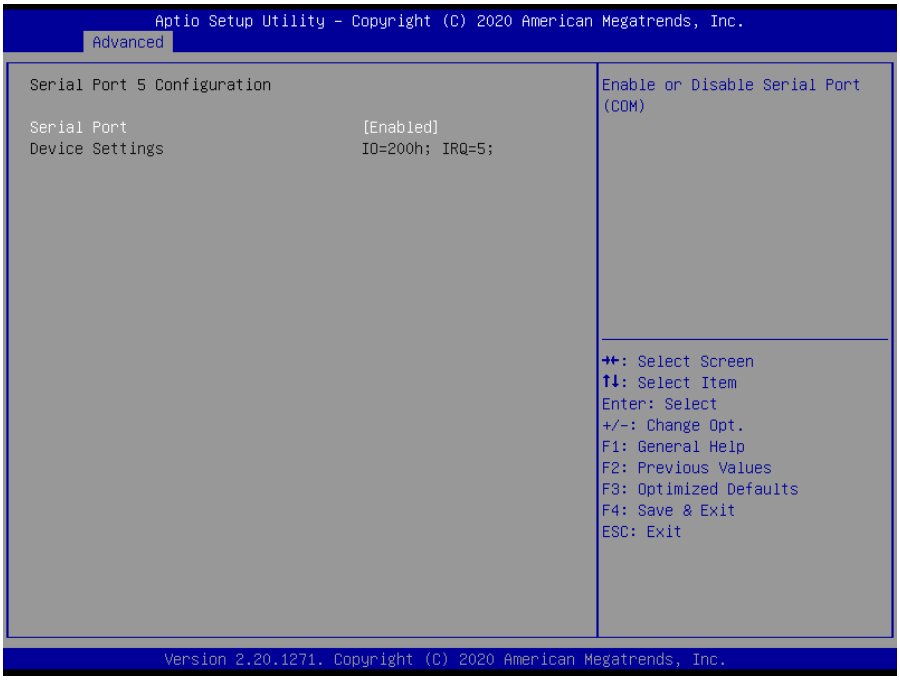
Item	Option	Description
Serial Port	Disabled Enabled**[Default]**,	Enable or Disable Serial Port (COM).

3.6.2.6.4 Serial Port 4 Configuration



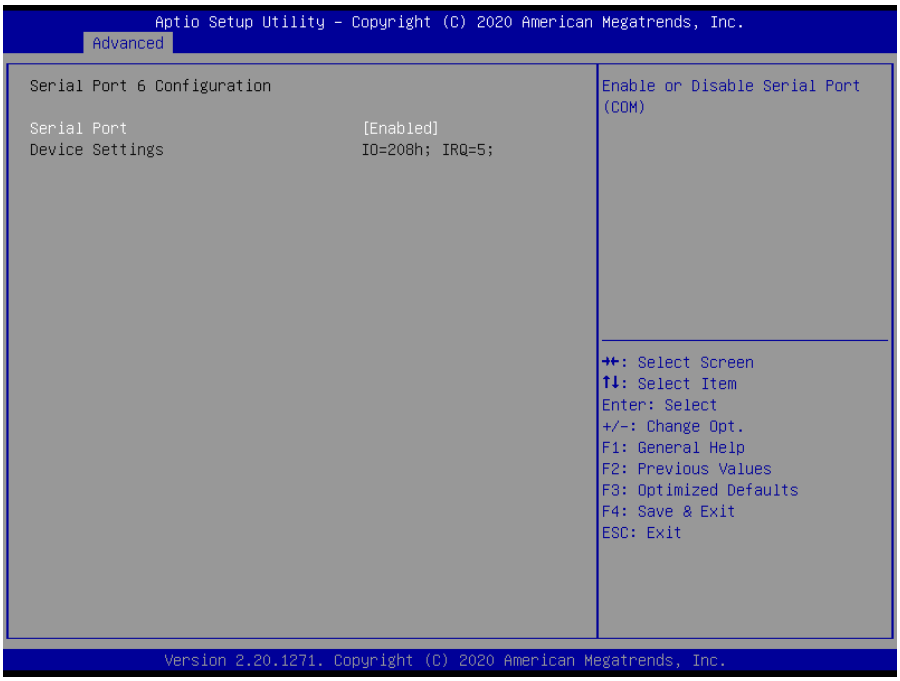
Item	Option	Description
Serial Port	Disabled Enabled**[Default]**,	Enable or Disable Serial Port (COM).

3.6.2.6.5 Serial Port 5 Configuration



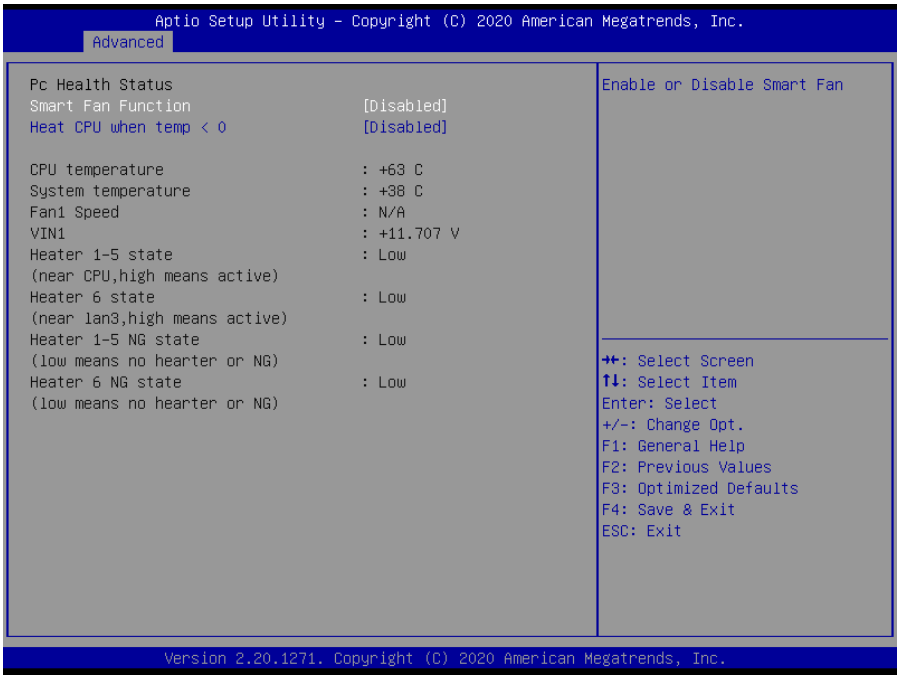
Item	Option	Description
Serial Port	Disabled Enabled**[Default]**,	Enable or Disable Serial Port (COM).

3.6.2.6.6 Serial Port 6 Configuration



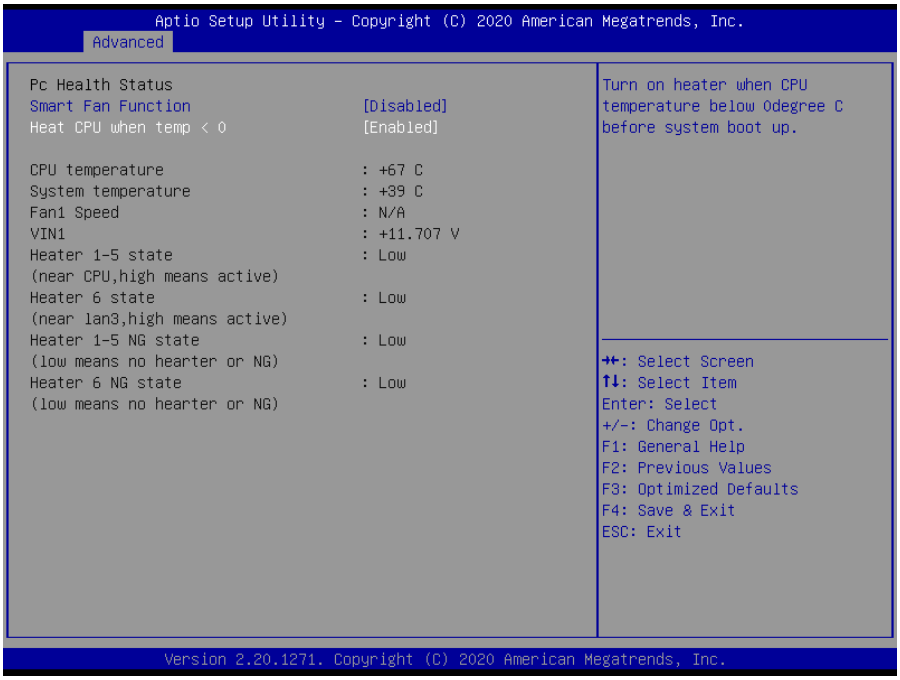
Item	Option	Description
Serial Port	Disabled Enabled**[Default]**,	Enable or Disable Serial Port (COM).

3.6.2.7 EC 8528 HW monitor



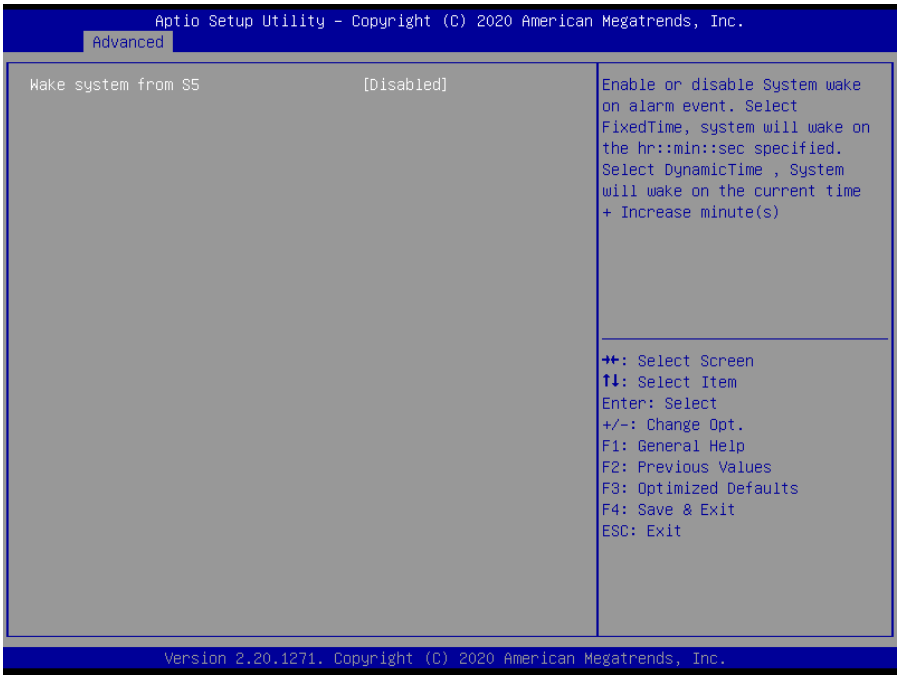
Item	Options	Description
Smart Fan Function	Disabled**[Default]**, Enabled	Enabled or Disable Smart Fan
Heat CPU when temp < 0	Disabled**[Default]**, Enabled	Turn on heater when CPU temperature below 0degree C before system boot up.

3.6.2.7.1 EC 8528 HW monitor-note



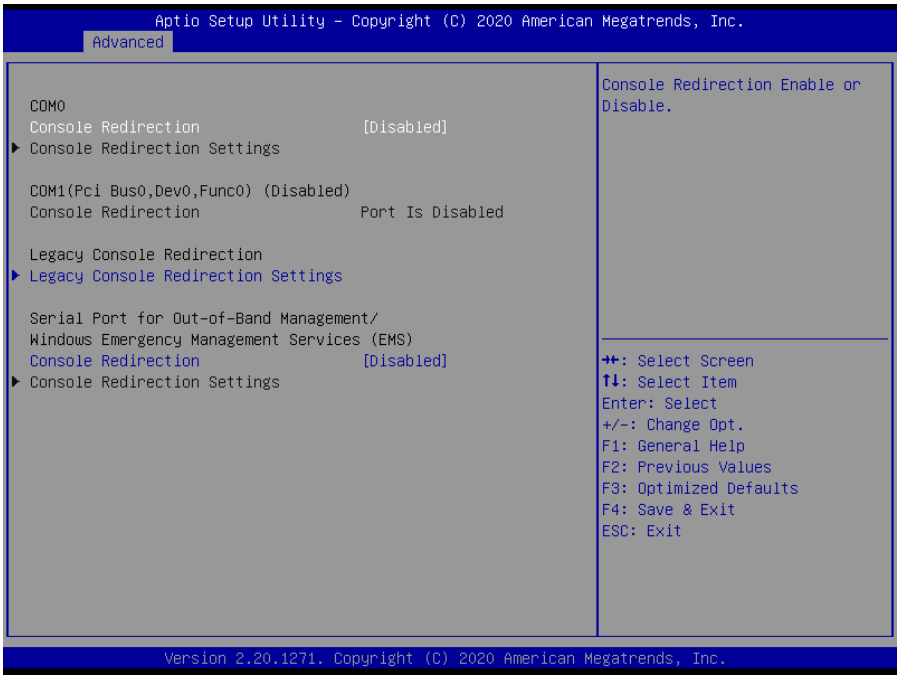
Item	Options	Description
Smart Fan Function	Disabled**[Default]**, Enabled	Enabled or Disable Smart Fan
Heat CPU when temp < 0	For finished product package with heatsink and heater attached, item Heat CPU when temp < 0 would be enabled as default.	

3.6.2.8 S5 RTC Wake Settings



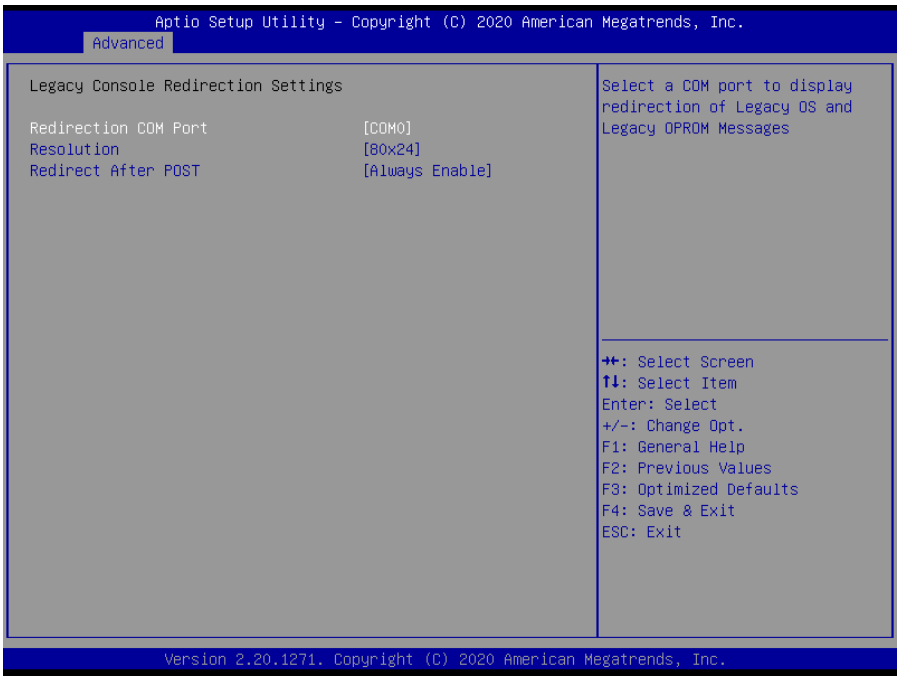
Item	Options	Description
Wake system from S5	Disabled**[Default]**, Fixed Time Dynamic Time	Enabled or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s)

3.6.2.9 Serial Port Console Redirection



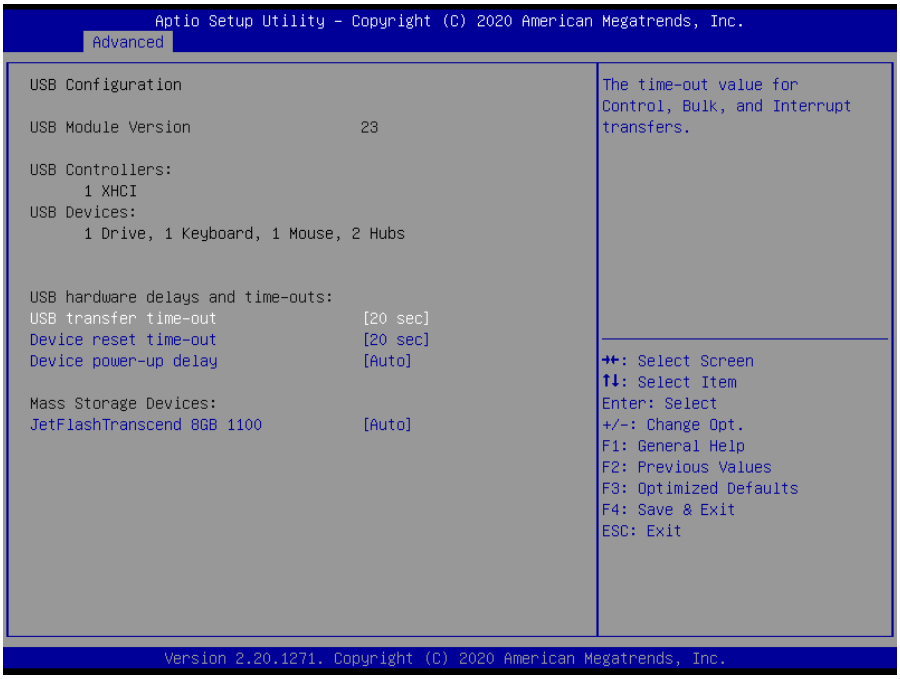
Item	Option	Description
Console Redirection	Disabled**[Default]**, Enabled	Console Redirection Enabled or Disable.

3.6.2.9.1 Legacy Serial Redirection Port



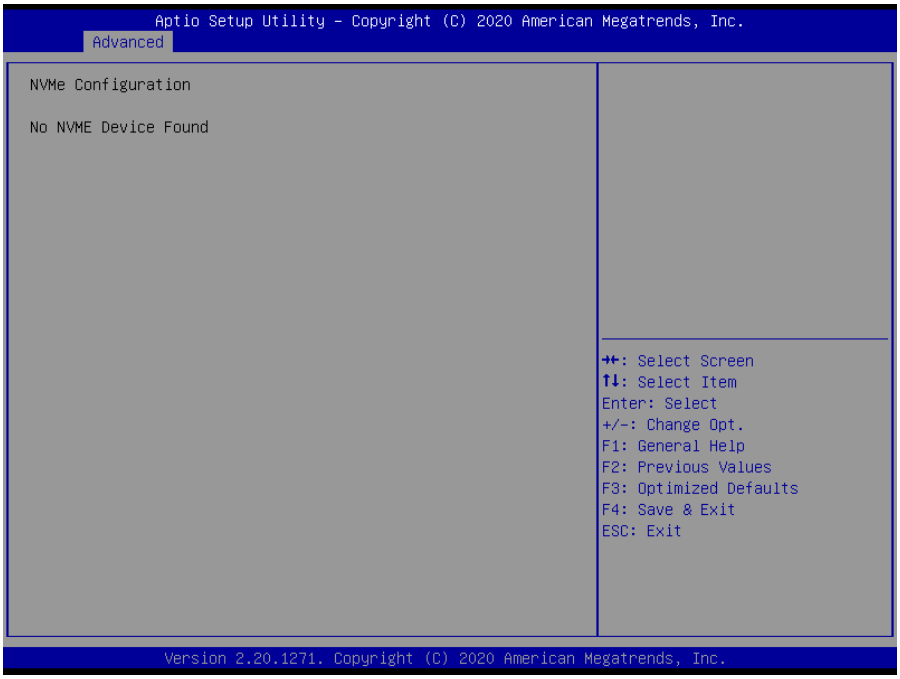
Item	Option	Description
Redirection COM Port	COM0	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages
Resolution	80x24**[Default]**, 80x25	On Legacy Os, the Number of Rows and Columns supported redirection
Redirect After POST	Always Enable**[Default]**, BootLoader	When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

3.6.2.10 USB Configuration

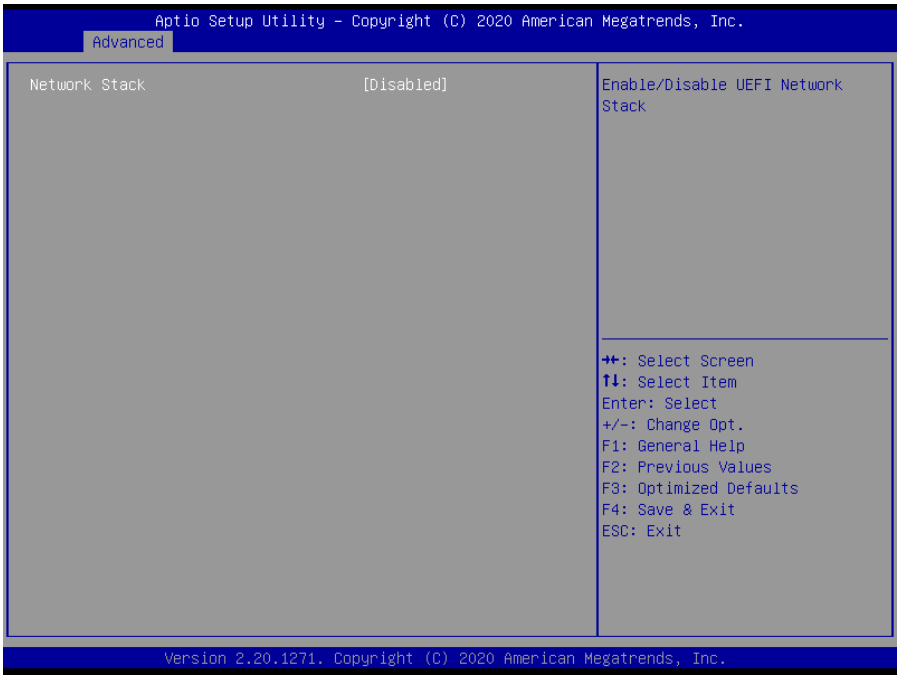


Item	Options	Description
USB transfer time-out	1 sec 5 sec 10 sec 20 sec**[Default]**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec**[Default]** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto**[Default]** 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.
JetFlashTranscend 8GB 1100	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’, drive with no media will be emulated according to a drive type.

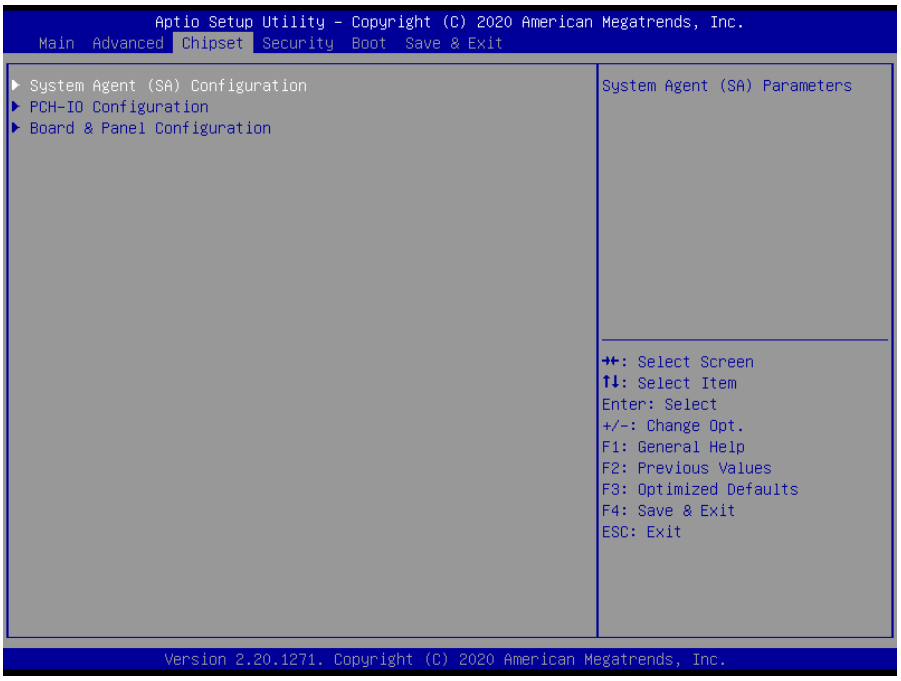
3.6.2.11 NVMe controller and Drive information



3.6.2.12 Network Stack Configuration



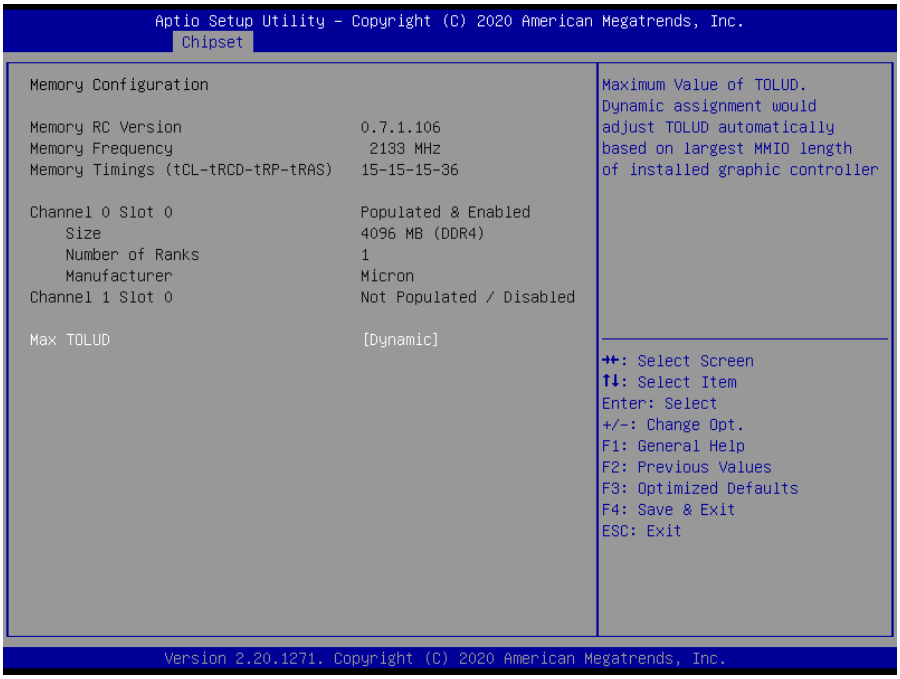
3.6.3 Chipset



3.6.3.1 System Agent (SA) Configuration

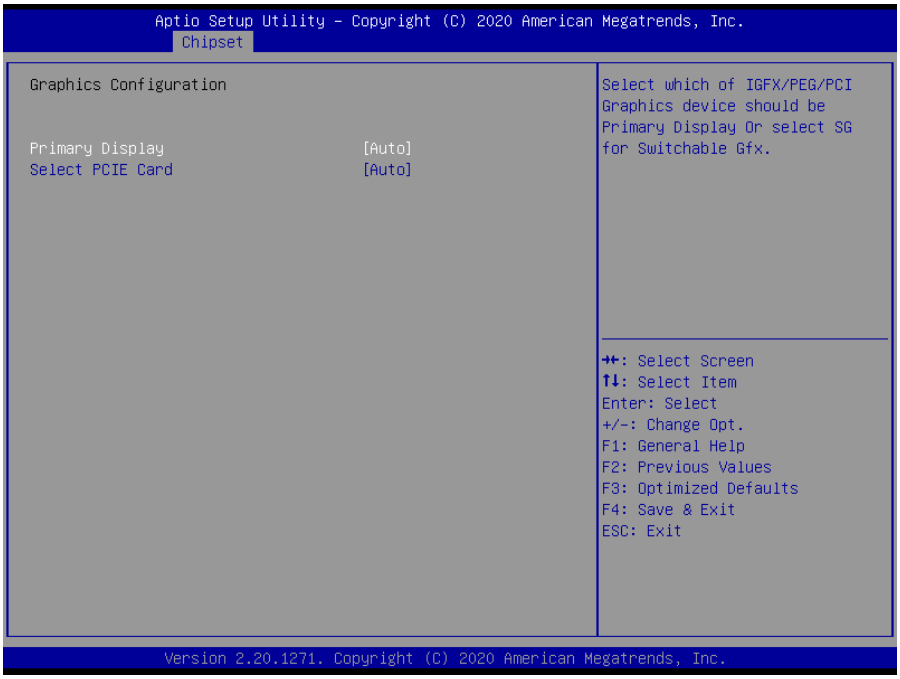
Item	Option	Description
VT-d	Disabled Enabled**[Default]**	VT-d capability.

3.6.3.1.1 Memory Configuration



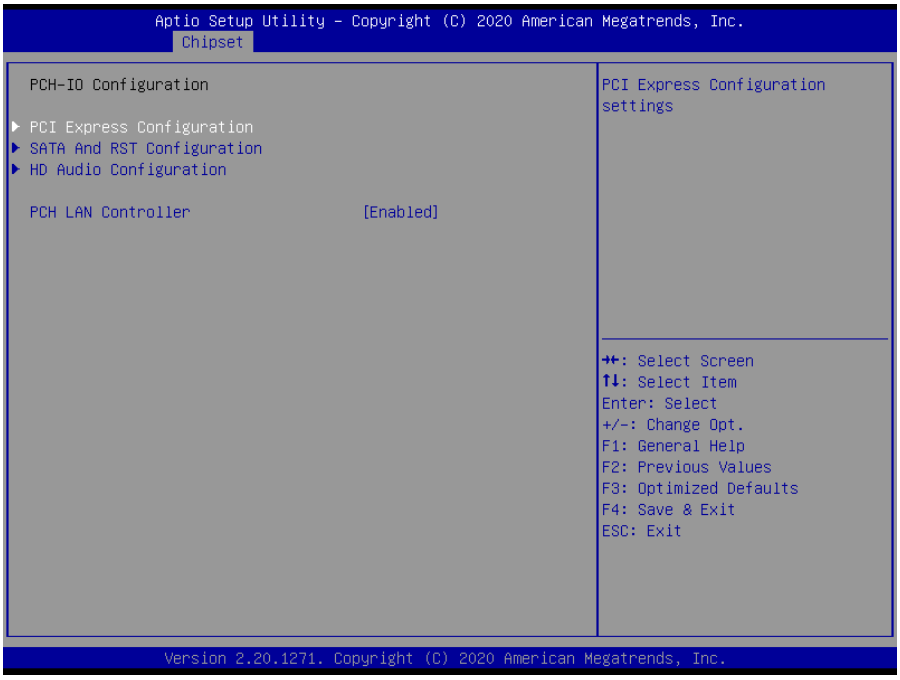
Item	Option	Description
Max TOLUD	Dynamic 1GB**[Default]** 1GB 1.25GB 1.5GB 1.75 GB 2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller

3.6.3.1.2 Graphics Configuration



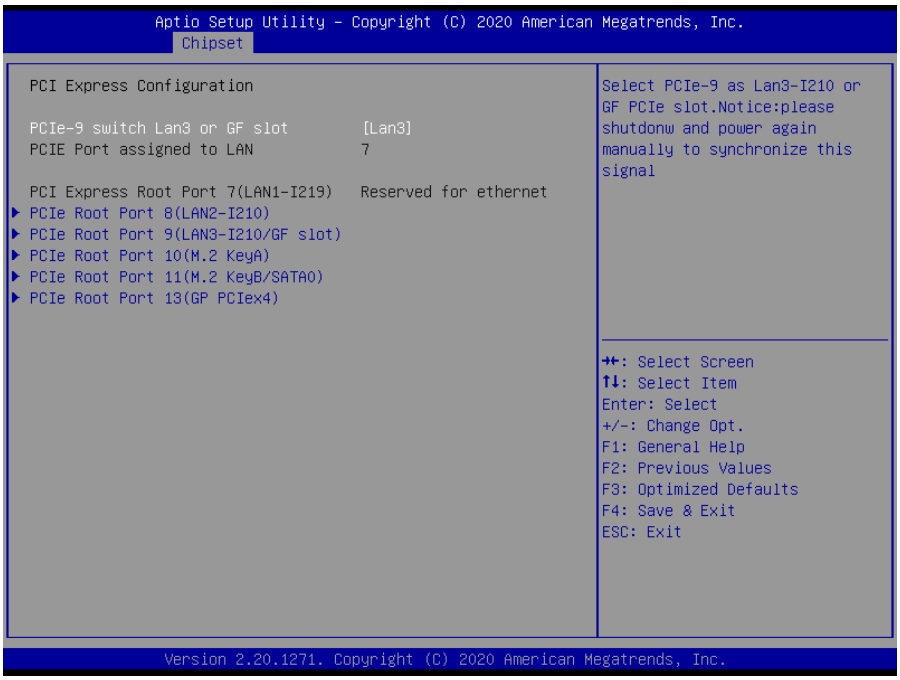
Item	Option	Description
Primary Display	Auto**[Default]** IGFX PEG PCI SG	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
Select PCIE Card	Auto**[Default]** Elk Creek 4 PEG Eval	Select the card used on the platform Auto : Skip GPIO based Power Enable to dGPU Elk Creek 4: DGPU Power Enable = ActiveLow PEG Eval : DGPU Power Enable = ActiveHigh

3.6.3.2 PCH-IO Configuration



Item	Option	Description
PCH LAN(I219) Controller	Enabled**[Default]** Disabled	Enable/Disable onboard NIC.

3.6.3.2.1 PCI Express Configuration



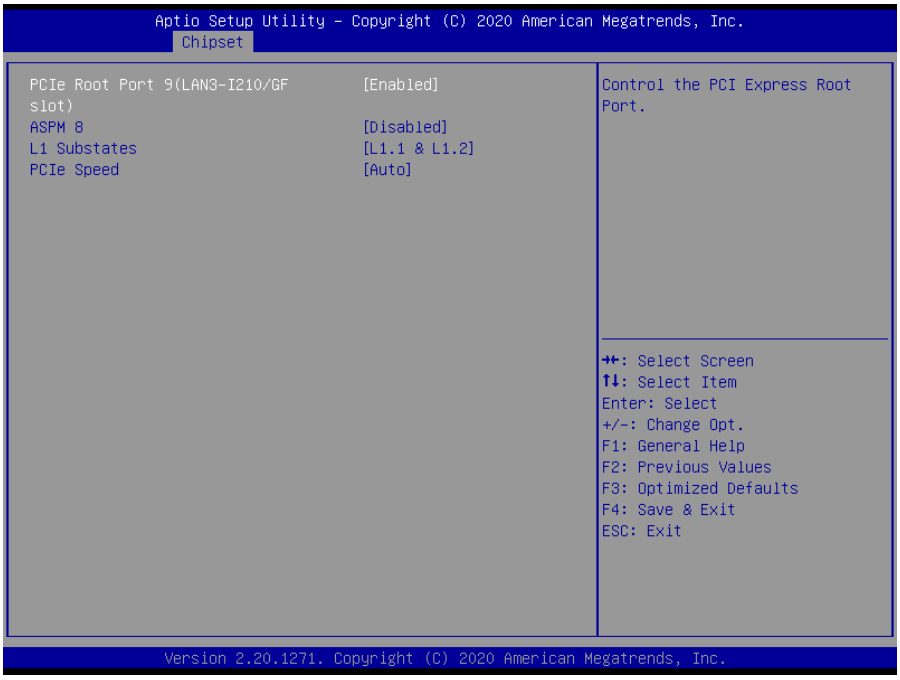
Item	Option	Description
PCIe-9 switch Lan3 or GF slot	Lan3 **[Default]**	Select PCIe-9 as Lan3-1210 or GF PCIe

	GF slot	slot Notice:please shutdown and power again manually to synchronize this signal

3.6.3.2.1.1 PCIe Root Port 8(LAN2-I210)

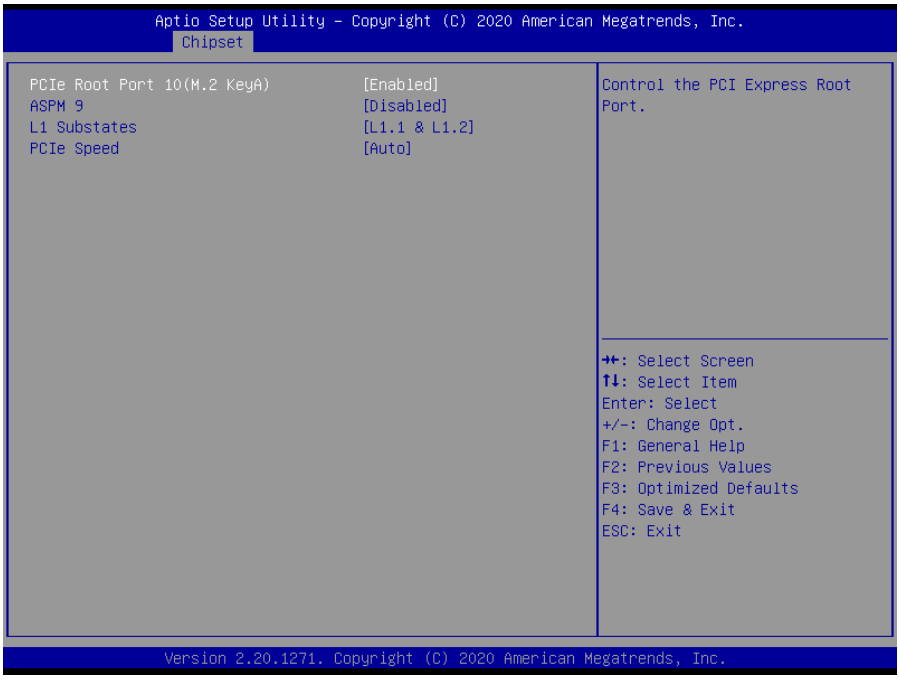
Item	Option	Description
PCIe Root Port 8(LAN2-I210)	Disabled Enabled**[Default]**,	Control the PCI Express Root Port.
ASPM 7	Disabled**[Default]** L0s L1 L0sL1 Auto,	Set the ASPM Level: Force L0s - Force all links to L0s State AUTO - BIOS auto configure DISABLE - Disables ASPM.
L1 Substates	Disabled L1.1 L1.1 & L1.2**[Default]**,	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe speed.

3.6.3.2.1.2 PCIe Root Port 9(LAN3-I210/GF slot)



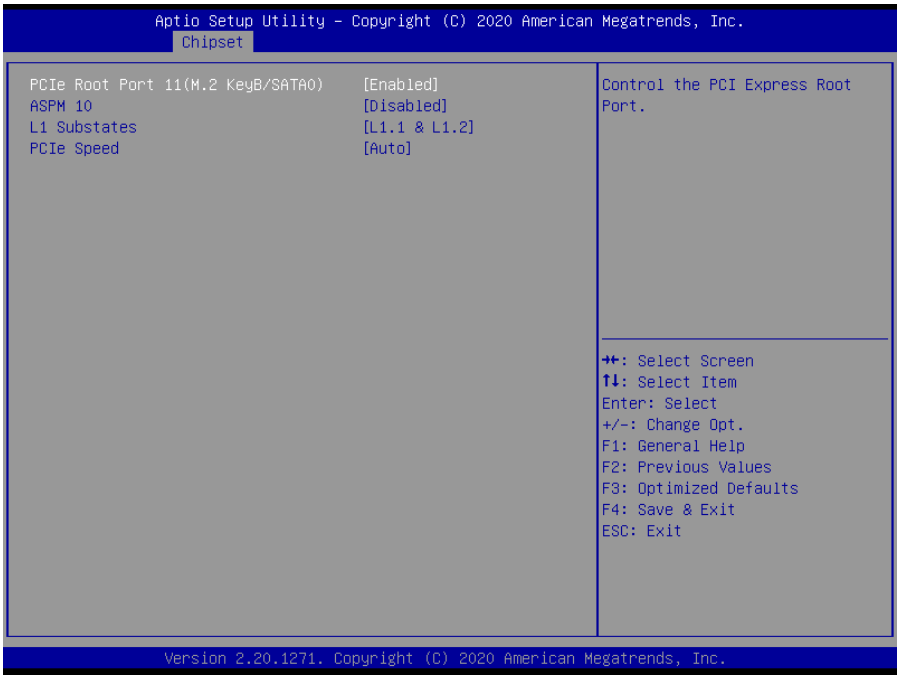
Item	Option	Description
PCIe Root Port 9 (LAN3-I210/GF slot)	Disabled Enabled**[Default]**,	Control the PCI Express Root Port.
ASPM 8	Disabled**[Default]** L0s L1 L0sL1 Auto,	Set the ASPM Level: Force L0s - Force all links to L0s State AUTO - BIOS auto configure DISABLE - Disables ASPM.
L1 Substates	Disabled L1.1 L1.1 & L1.2**[Default]**,	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe speed.

3.6.3.2.1.3 PCIe Root Port 10(M.2 KeyA)



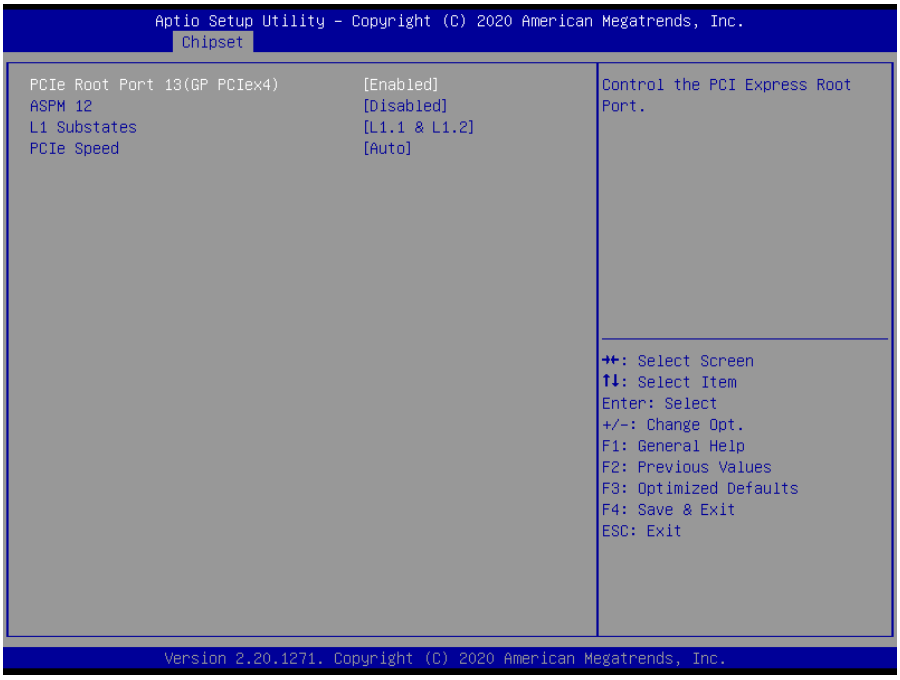
Item	Option	Description
PCIe Root Port 10(M.2 KeyA)	Disabled Enabled**[Default]**,	Control the PCI Express Root Port.
ASPM 9	Disabled**[Default]** L0s L1 L0sL1 Auto,	Set the ASPM Level: Force L0s - Force all links to L0s State AUTO - BIOS auto configure DISABLE - Disables ASPM.
L1 Substates	Disabled L1.1 L1.1 & L1.2**[Default]**,	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe speed.

3.6.3.2.1.4 PCIe Root Port 11(M.2 KeyB/SATA0)



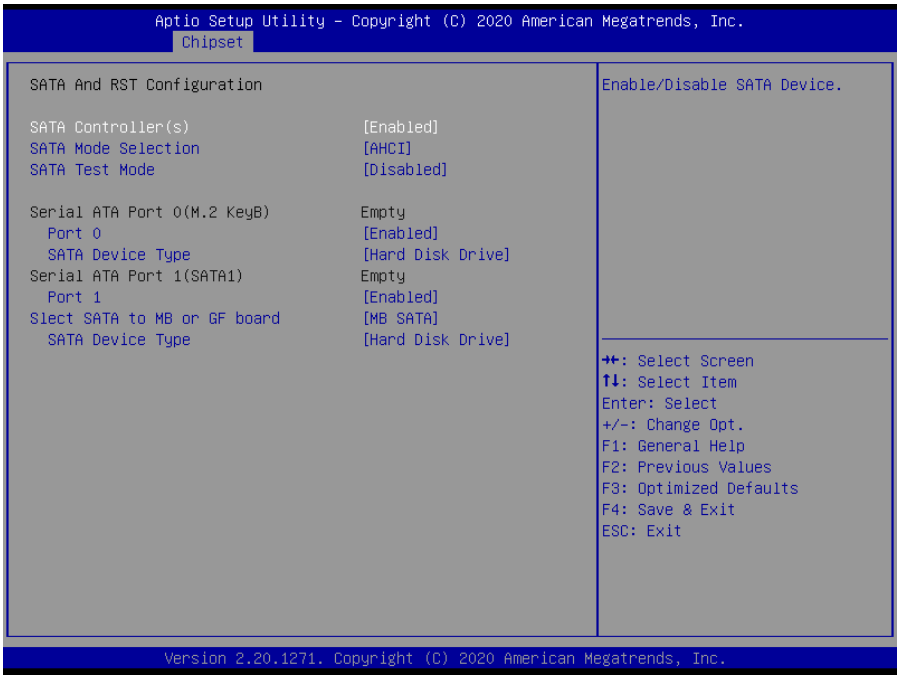
Item	Option	Description
PCIe Root Port 11 (M.2 KeyB/SATA0)	Disabled Enabled**[Default]**,	Control the PCI Express Root Port.
ASPM 10	Disabled**[Default]** L0s L1 L0sL1 Auto,	Set the ASPM Level: Force L0s - Force all links to L0s State AUTO - BIOS auto configure DISABLE - Disables ASPM.
L1 Substates	Disabled L1.1 L1.1 & L1.2**[Default]**,	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe speed.

3.6.3.2.1.5 PCIe Root Port 13(GP PCIex4)



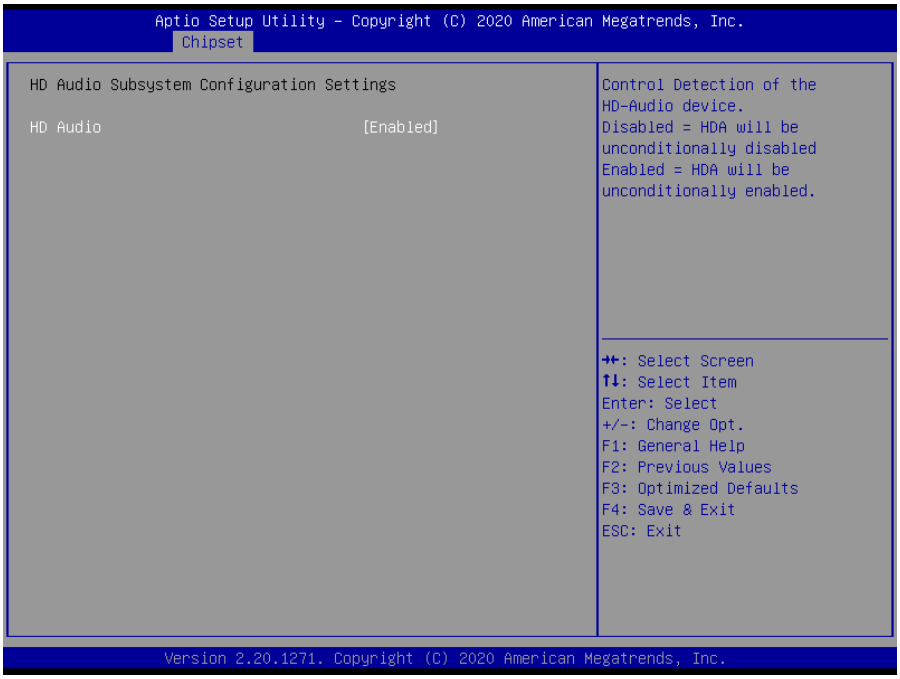
Item	Option	Description
PCIe Root Port 13(GP PCIex4)	Disabled Enabled**[Default]**,	Control the PCI Express Root Port.
ASPM 12	Disabled**[Default]** L0s L1 L0sL1 Auto,	Set the ASPM Level: Force L0s - Force all links to L0s State AUTO - BIOS auto configure DISABLE - Disables ASPM.
L1 Substates	Disabled L1.1 L1.1 & L1.2**[Default]**,	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe speed.

3.6.3.2.2 SATA And RST Configuration



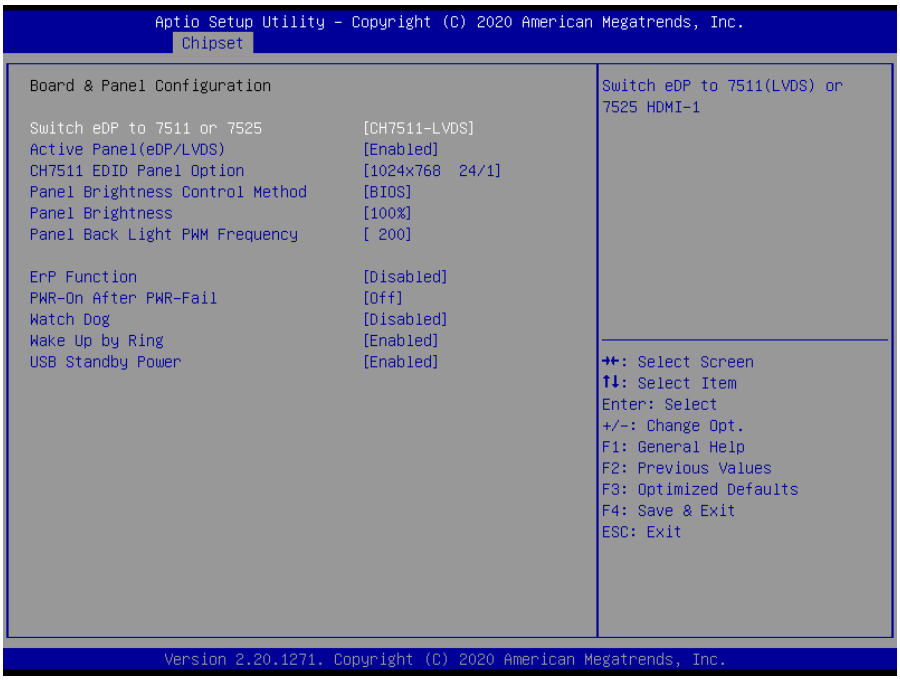
Item	Options	Description
SATA Controller(s)	Enabled**[Default]** Disabled,	Enable/Disable SATA Device.
SATA Mode Selection	AHCI**[Default]** RAID	Determines how SATA controller(s) operate.
SATA Test Mode	Enabled**[Default]** Disabled,	Test Mode Enable/Disable (Loop Back).
Port0	Disabled, Enabled**[Default]**	Enable or Disable SATA Port.
SATA Device Type	Hard Disk Drive Solid State Drive**[Default]**	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.
Port1	Disabled, Enabled**[Default]**	Enable or Disable SATA Port.
Slect SATA to MB or GF board	GF board SATA**[Default]** MB SATA	Slect SATA to MB or GF board
SATA Device Type	Hard Disk Drive**[Default]** Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

3.6.3.2.3 HD Audio Configuration



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

3.6.3.3 Board & Panel Configuration

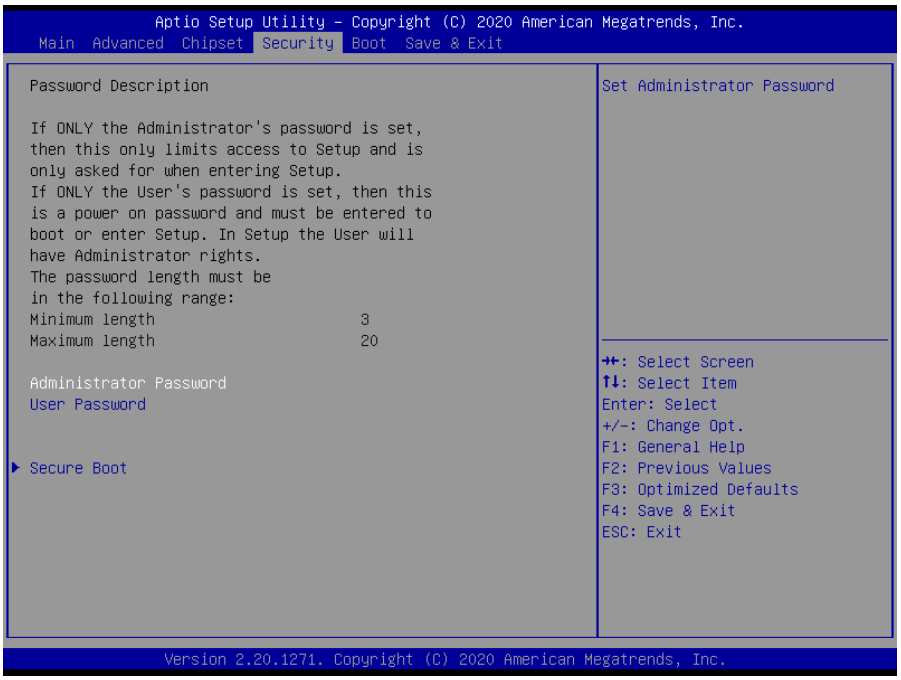


SLP-WHG

Item	Option	Description
Switch eDP to 7511 or 7525	CH7511-LVDS CH7525-HDMI1**[Default]**	Switch eDP to 7511(LVDS) or 7525 HDMI-1
Active Panel(eDP/LVDS)	Disabled**[Default]**, Enabled	Active Internal LVDS(eDP->Ch7511 -to-LVDS)
CH7511 EDID Panel Option	1024 x 768 24/1**[Default]** 800 x 600 18/1 1024 x 768 18/1 1366 x 768 18/1 1024 x 600 18/1 1280 x 800 18/1 1920 x 200 24/2 1920 x 1080 18/2 1280 x 1024 24/2 1440 x 900 18/2 1600 x1200 24/2 1366 x768 24/1 1920 x1080 24/2 1680 x1050 24/2	Port1-EDP to LVDS(Chrotel 7511)Panel EDID Option
Panel Brightness Control Method	BIOS**[Default]** BR Button VR OS Driver	Panel Brightness Control Method. 1.BIOS 2.OS Driver
Panel Brightness	00% 25% 50% 75% 100%**[Default]**	Select Panel(eDP/LVDS) back light PWM duty.
Panel Back Light PWM Frequency	200**[Default]** 300 400 500 700 1k 2k 3k 5k 10k 20k	Select Panel(eDP/LVDS) 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.
Watch Dog	Disabled**[Default]**, 30 sec 40 sec 50 sec 1 min 2 min 10 min	Select WatchDog

	30 min	
Wake Up by Ring	Disabled Enabled**[Default]**,	Wake Up by Ring from S3/S4/S5
USB Standby Power	Disabled Enabled**[Default]**,	Enabled/Disabled USB Standby Power during S3/S4/S5

3.6.4 Security



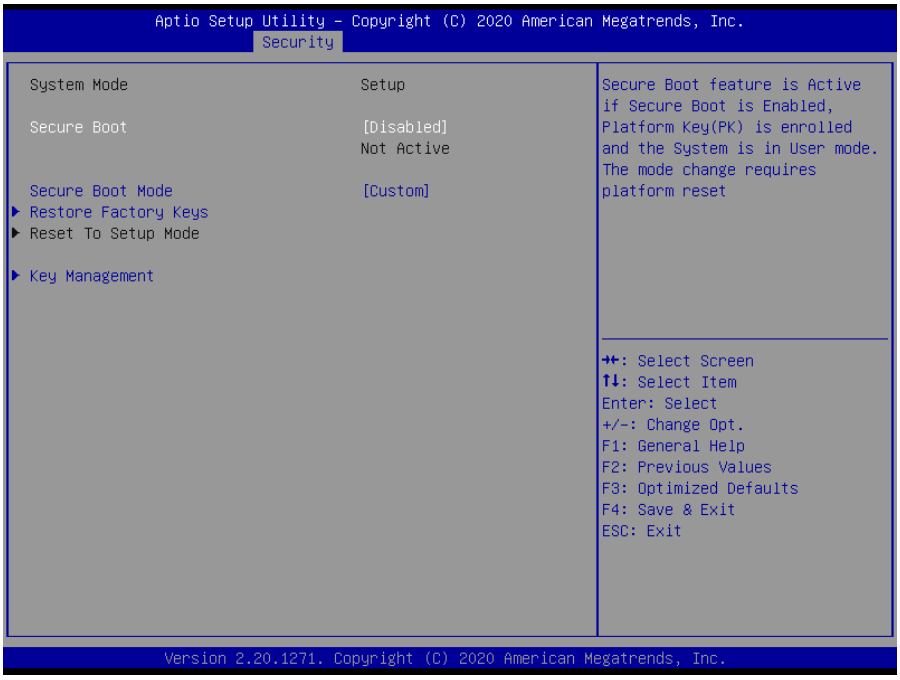
- **Administrator Password**

Set Administrator Password

- **User Password**

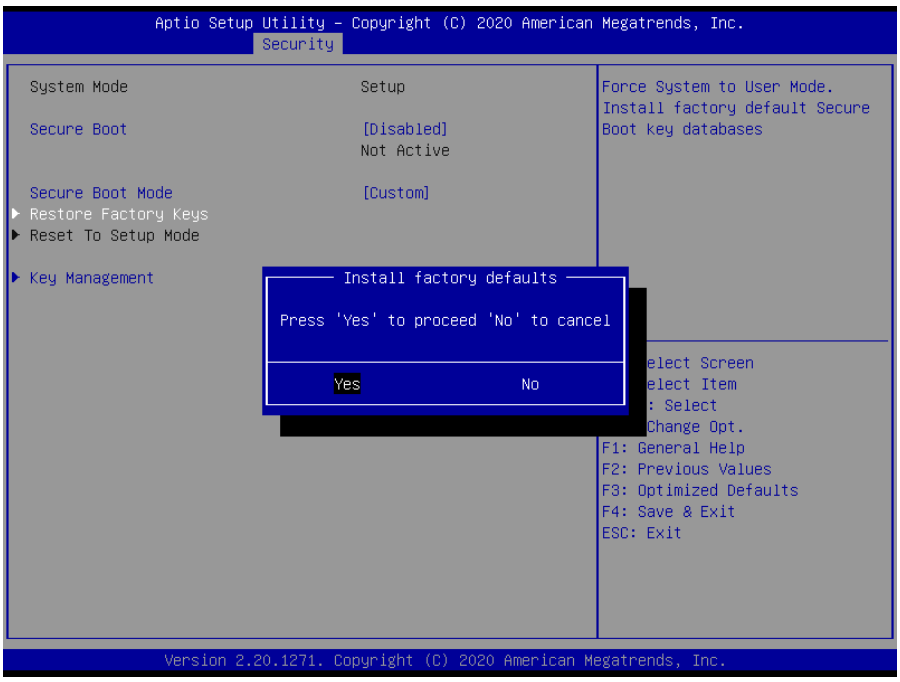
Set User Password

3.6.4.1 Secure Boot

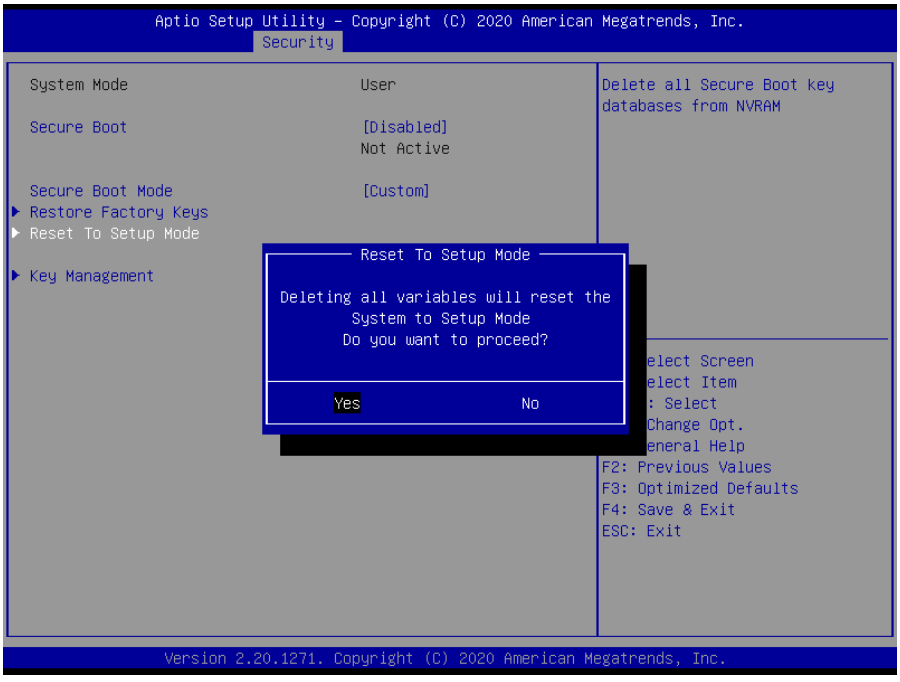


Item		Description
Secure Boot	Disabled Enabled**[Default]**,	Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset
Secure Boot Mode	Standard Custom**[Default]**,	Secure Boot mode options: Standard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

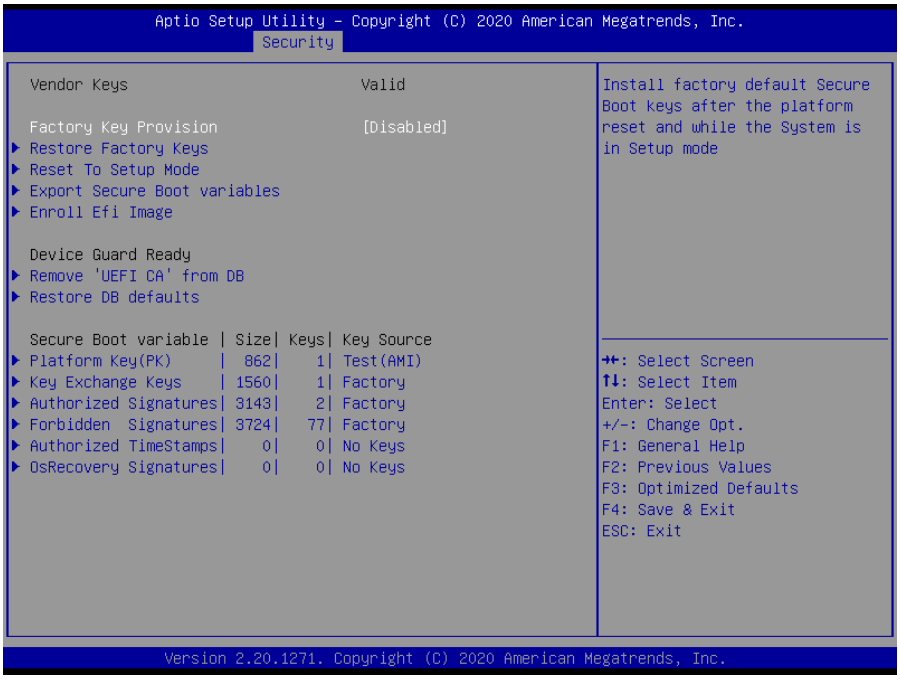
4.6.4.1.1 Restore Factory Keys



4.6.4.1.2 Reset To Setup Mode

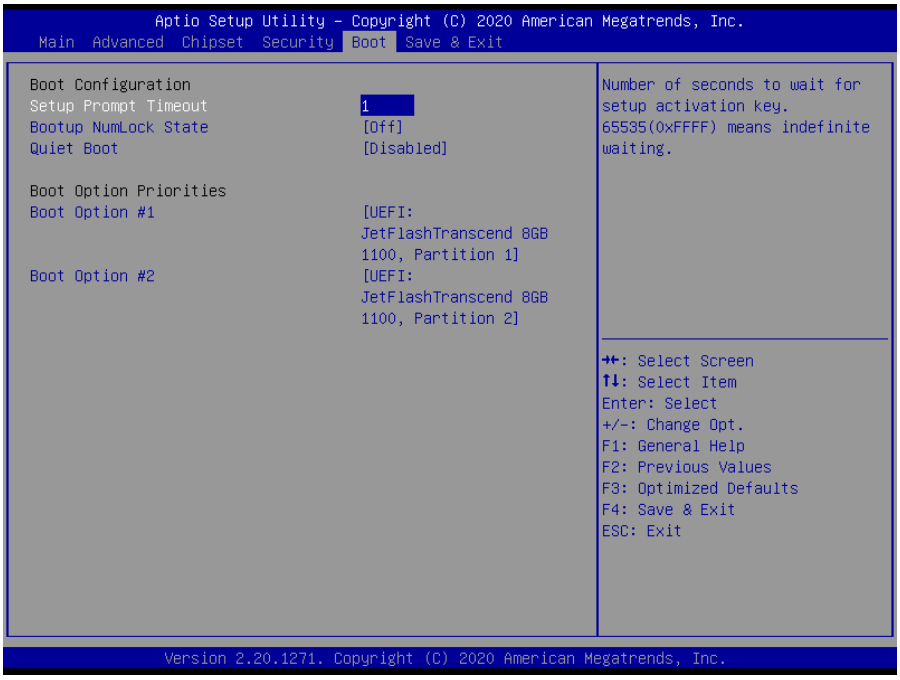


4.6.4.1.3 Key Management



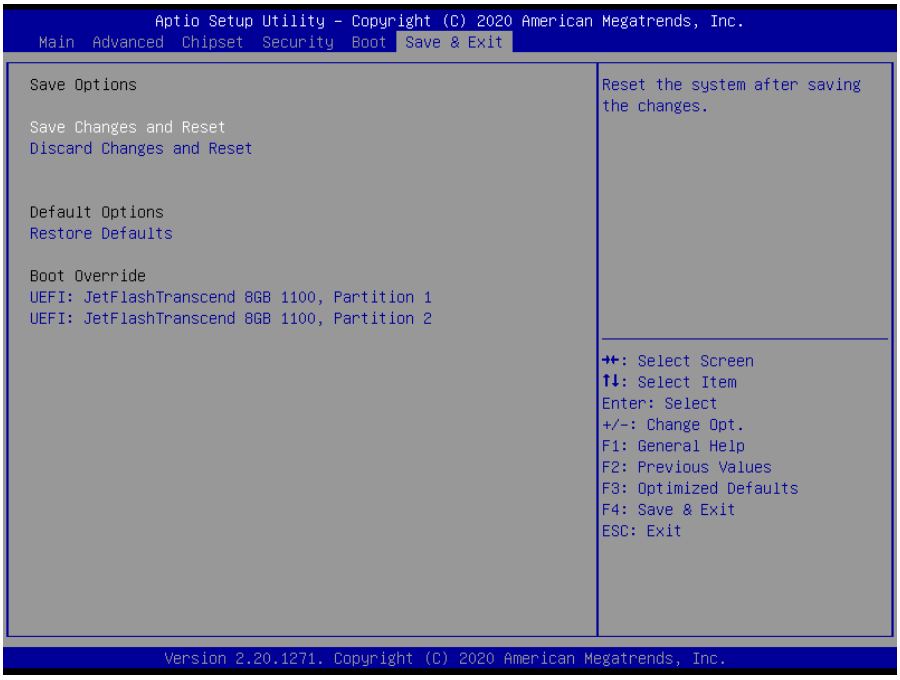
Item	Option	Description
Factory Key Provision	Disabled**[Default]** Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode
Restore Factory Keys	Force System to User Mode. Install factory default Secure Boot key databases	
Reset To Setup Mode	Delete all Secure Boot key databases from NVRAM	
Export Secure Boot variables	Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device	
Enroll Efi Image	Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db)	
Remove 'UEFI CA' from DB	Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized Signature database (db)	
Restore DB defaults	Restore DB variable to factory defaults	

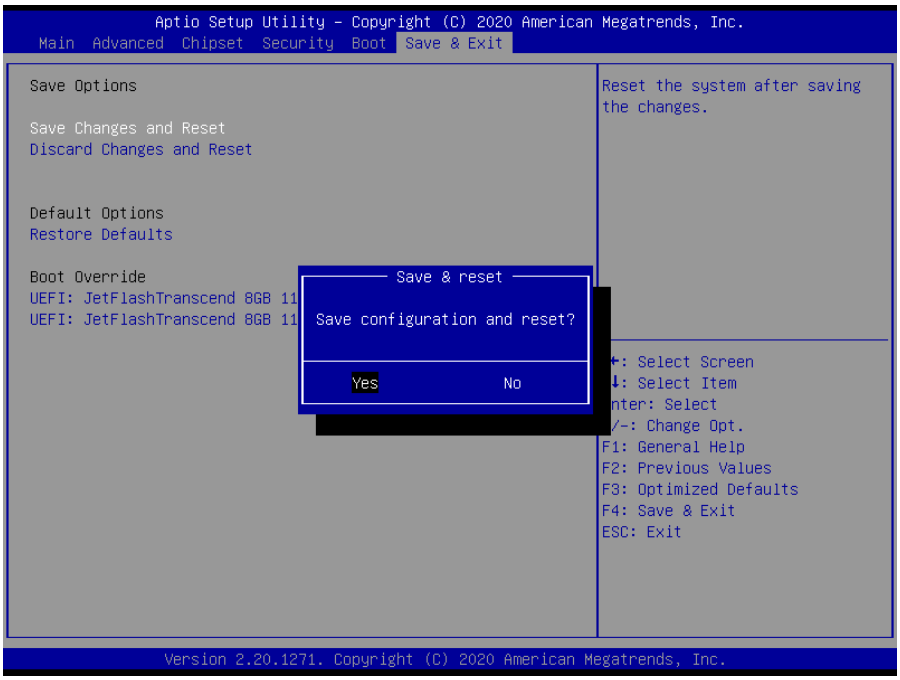
3.6.5 Boot



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 Off**[Default]**	Select the Keyboard NumLock state
Quiet Boot	Disabled**[Default]** Enabled	Enables or disables Quiet Boot option
Boot Option #1	Sets the system boot order.	
Boot Option #2	Sets 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

Reset system setup without saving any changes.

3.6.6.3 Restore Defaults

Restore/Load Default values for all the setup options.

3.6.6.4 Launch EFI Shell from filesystem device

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

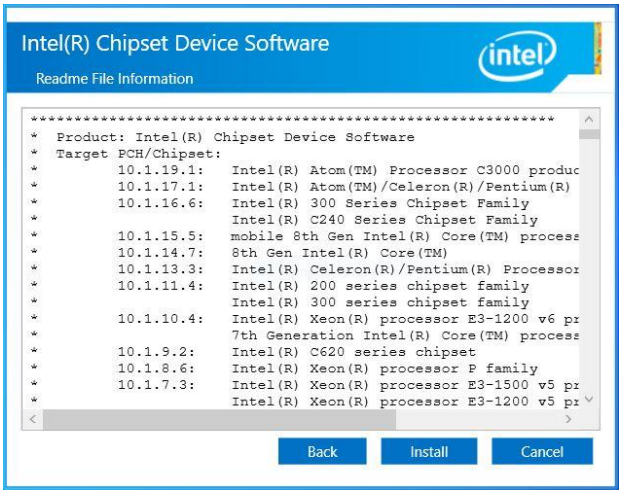
4. Drivers Installation

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.



Step 3. Click **Install**.

Step1. Click **Next**.

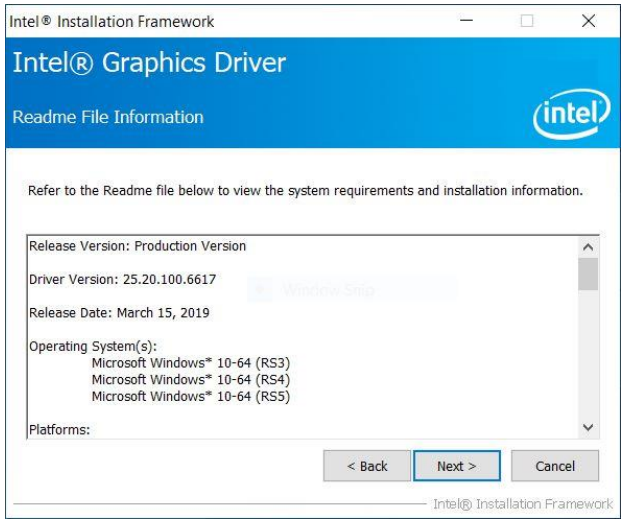
Step 4. Complete setup.

Step 2. Click **Accept**.

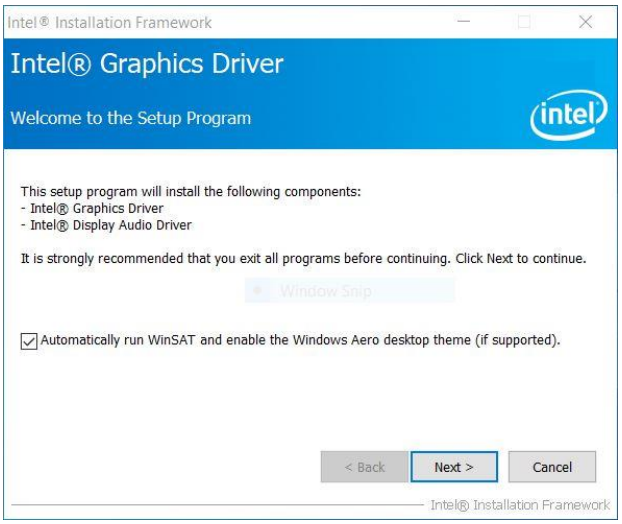
4.2 Install VGA Driver

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

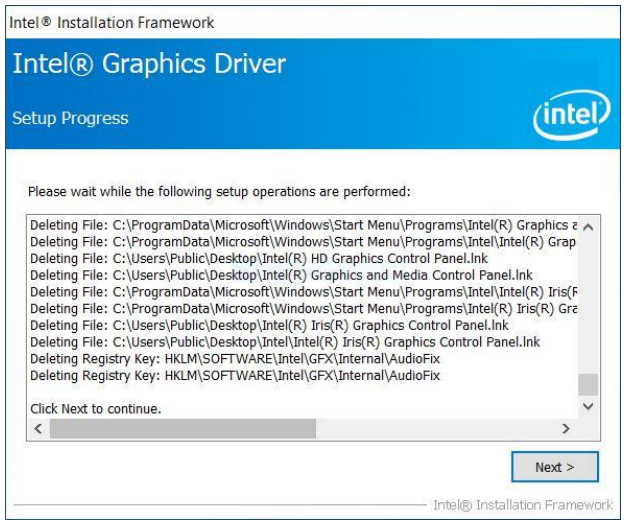
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



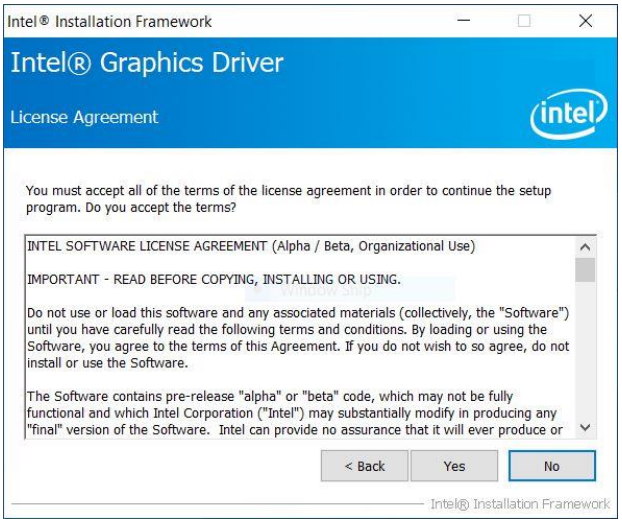
Step 3. Click **Install.**



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

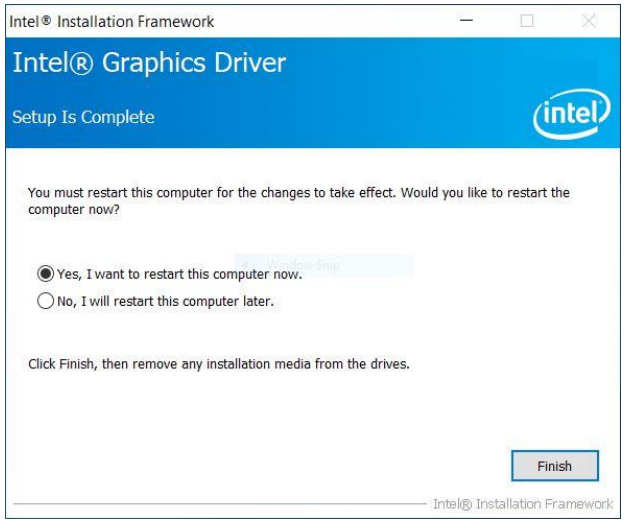


Step 4. Click **Next**



Step 2.

Click **Yes** to accept license agreement.

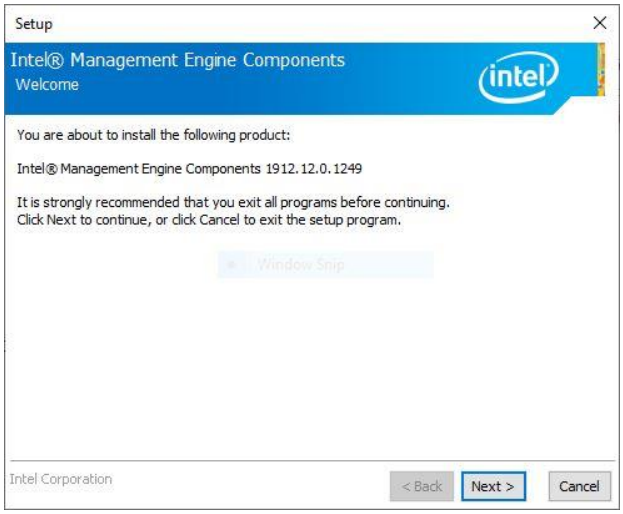


Step 5. Click **Finish** to complete setup.

4.3 Install ME Driver

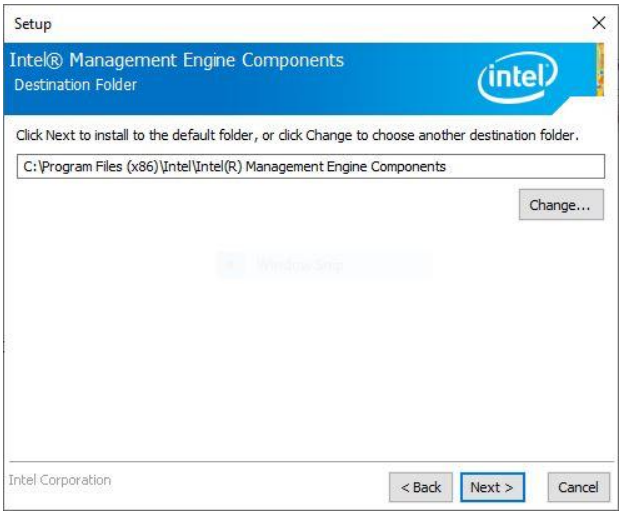
All drivers can be found on the Avalue Official Website: http://www.avalue.com.tw.

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

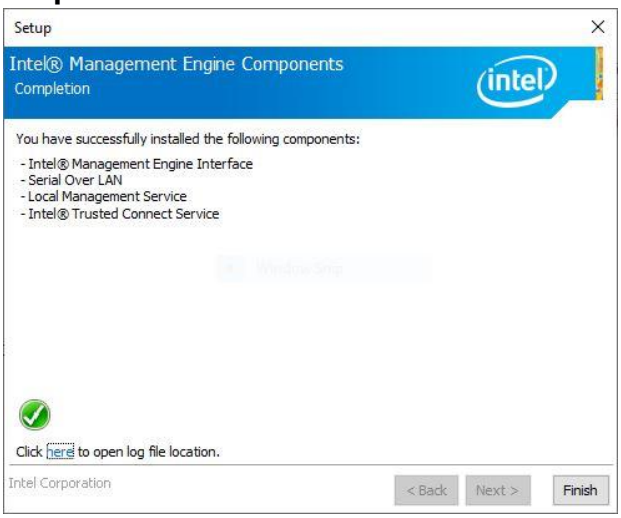


Step 1. Click **Next** to continue setup.

Step 2. Click **Next**.



Step 3. Click **Next**.

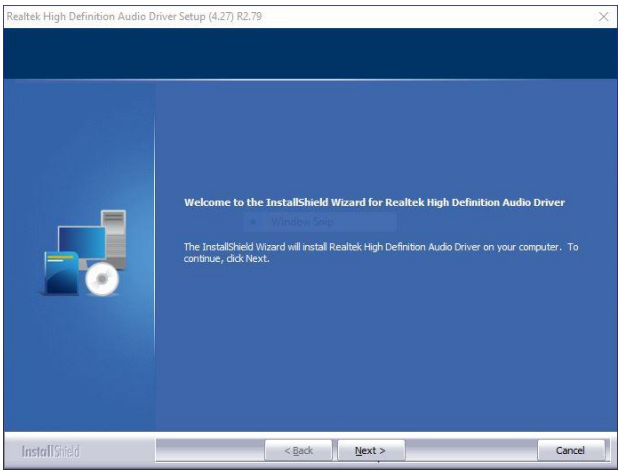


Step 4. Click **Finish** to complete setup.

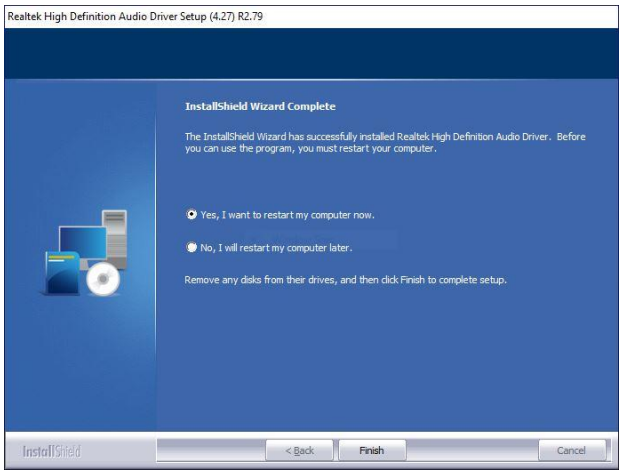
4.4 Install Audio Driver (For Realtek ALC888S HD Audio)

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.



Step1. Click **Next** to Install.

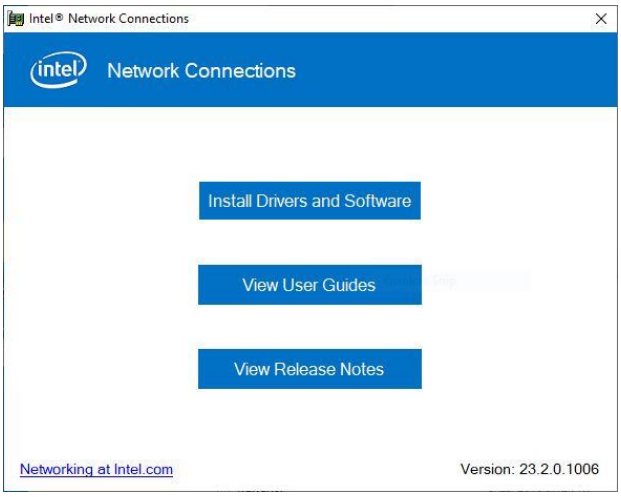


Step 2. Click **Finish** to complete setup.

4.5 Install LAN Driver

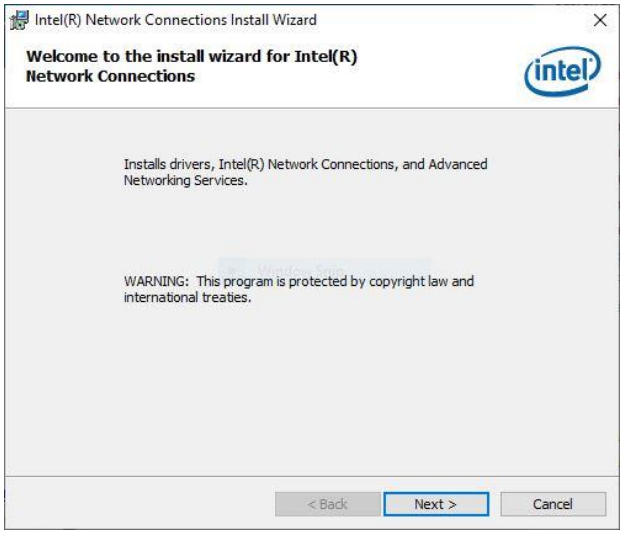
All drivers can be found on the Avalue Official Website:
http://www.avalue.com.tw.

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

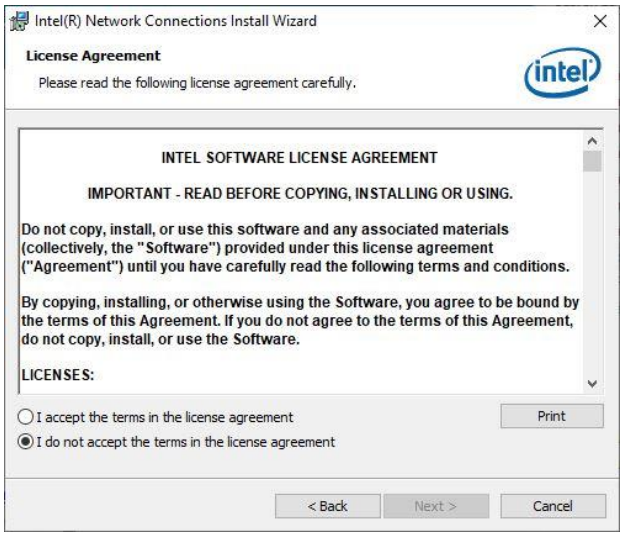


Step 1.

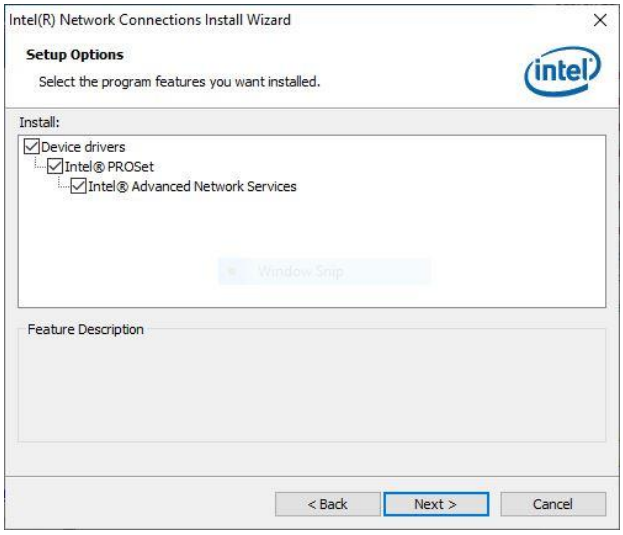
Click **Install Drivers and Software**.



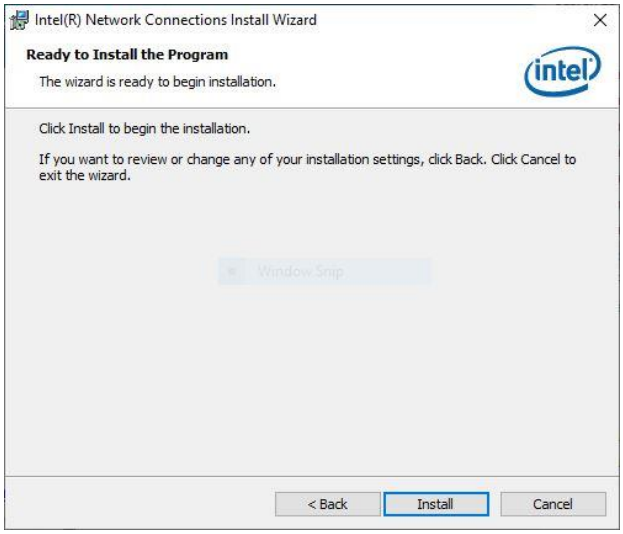
Step 2. Click **Next**.



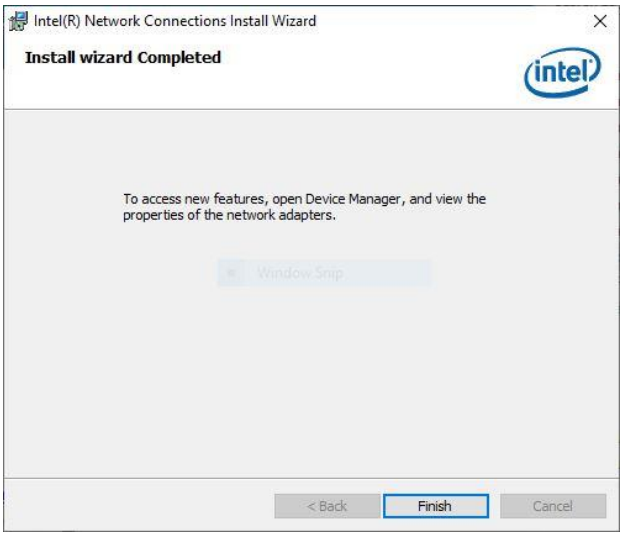
Step 3. Click **Next**.



Step 4. Click **Next**.



Step 5. Click **Install**.

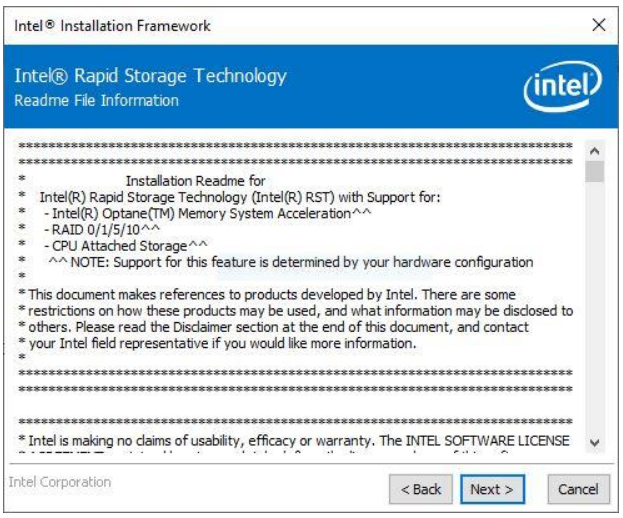


Step 6. Click **Finish** to complete setup.

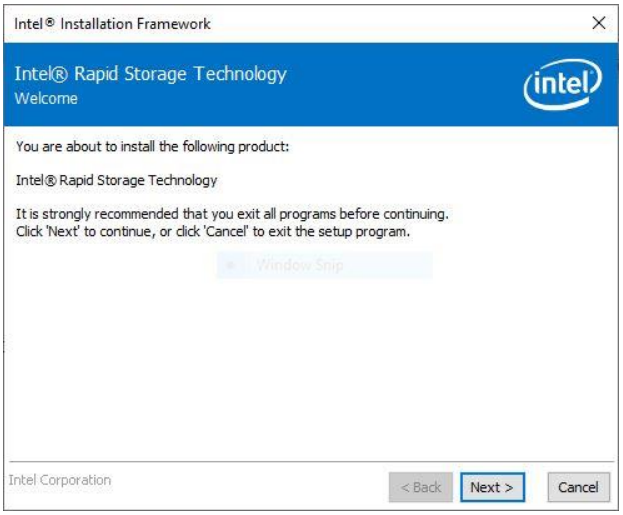
4.6 Install RST Driver

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

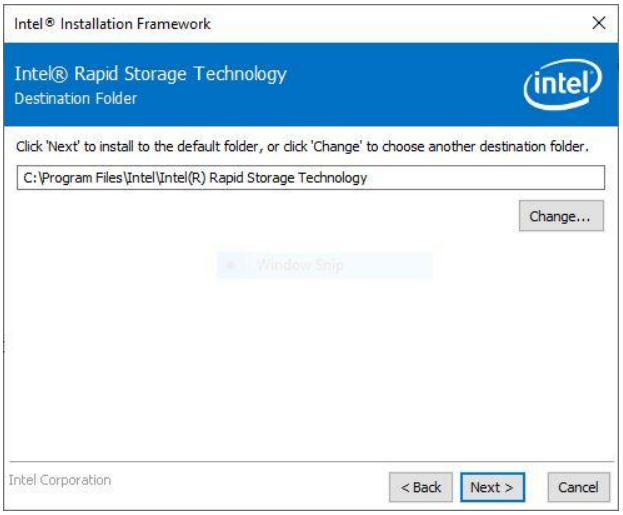
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



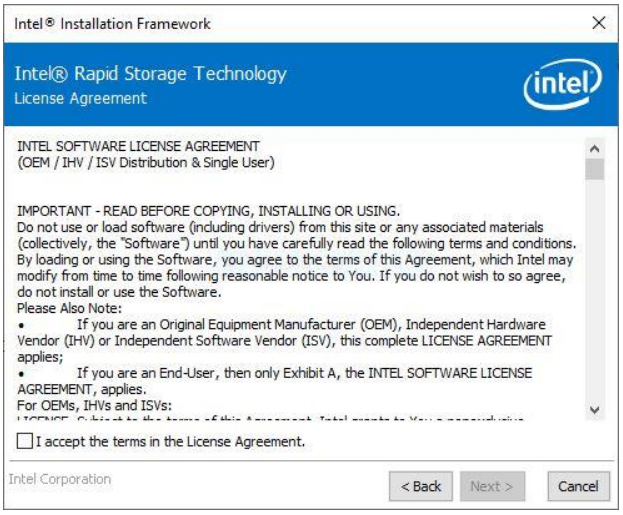
Step 3. Click **Next**.



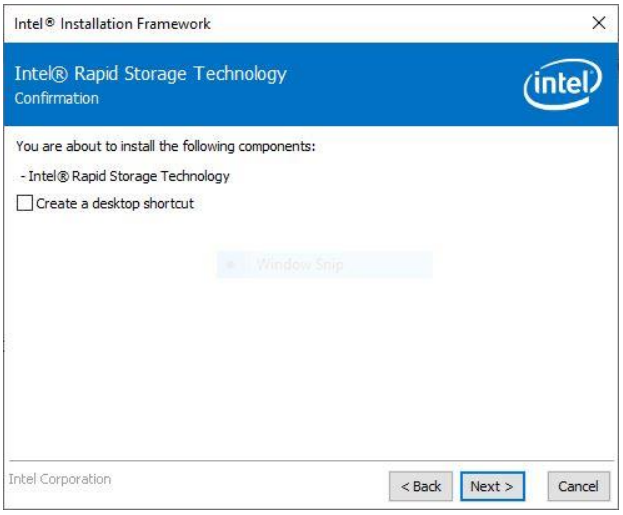
Step 1. Click **Next** to continue installation.



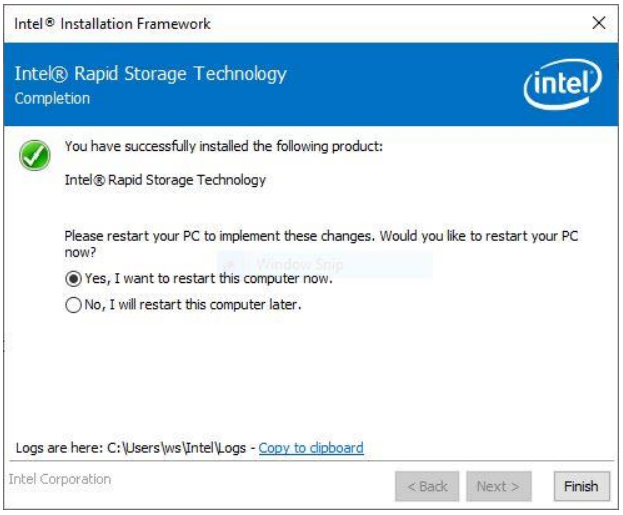
Step 4. Click **Next**.



Step 2. Click **Next**.



Step 5. Click **Next**.



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