EMX-H310C

Intel® 8/9th Gen. Core™
i7/i5/i3/Pentium®/Celeron®/Processor Mini ITX Motherboard
With Intel® H310 Chipset, 2 LAN

User's Manual

3rd Ed – 25 May 2022

Part No. E2047M31C02R

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 INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

Notice

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

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1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into body, or (b) support or sustain life and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

A Message to the Customer

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To receive the latest version of the user's manual; please visit our Web site at:
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Avalue warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Avalue, or which have been subject to misuse, abuse, accident or improper installation. Avalue assumes no liability under the terms of this warranty as a consequence of such events. Because of Avalue's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If any of Avalue's products is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details. If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU type and speed, Avalue's products model name, hardware & BIOS revision number, other hardware and software used, etc.) Note anything abnormal and list any on-screen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information available.
3. If your product is diagnosed as defective, obtain an RMA (return material authorization) number from your dealer. This allows us to process your good return more quickly.
4. Carefully pack the defective product, a complete Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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

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

- 1 x EMX-H310C Motherboard
- 2 x SATA Cable
- 1 x I/O Shield

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

1.3 Document Amendment History

Revision	Date	By	Comment
1st	November 2021	Avalue	Initial Release
2nd	April 2022	Avalue	Update BIOS setup
3rd	May 2022	Avalue	Setting Jumpers & Connectors

1.4 Manual Objectives

This manual describes in details Avalue Technology EMX-H310C Single Board.

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

We strongly recommend that you study this manual carefully before attempting to set up EMX-H310C or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

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

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

1.5 System Specifications

System	
CPU	Intel® LGA1151 Socket Supports 8/9th Generation Core™ Pentium® /Celeron /i7/ i5/ i3 Processors (Max. TDP at 65W)
BIOS	AMI uEFI BIOS, 128Mbit SPI Flash ROM
System Chipset	Intel® H310 Express Chipset
I/O Chip	ITE8786E
System Memory	Two 260-pin DDR4 2400/2666MHz SO-DIMM socket, supports up to 64GB Max
Watchdog Timer	H/W Reset, 5~255 seconds/5~255 minutes
H/W Status Monitor	Monitoring CPU & System Temperature and Voltage
Expansion Slot	
mPCIe	1 x Full Size Mini PCI-e supports USB 2.0 signal with SIM card slot
M.2	1 x M.2 (2230) A-Key, support WiFi module (1 x PCI-e x 1 and USB 2.0 Signal)
PCIe	1 x PCI-e x 1
Storage	
mSATA	1 x mSATA slot
SATA	2 x SATA III
Edge I/O	
LAN	2 x Realtek RTL8111H Gigabit Ethernet
USB 2.0	8 x USB 2.0
USB 3.1	4 x USB 3.1 Gen 1
HDMI	1 x HDMI 1.4b
VGA	1 x VGA (By Realtek RTD2168 IC)
Audio	1 x Line out, 1 x Mic in , 1 x Line in
PS2	PS2 KB/MS
I/O Interface (SOM)	
COM	COM 2: Support RS232/422/485 selected by Jumper selection 1 x 2 x 3 pin, pitch 2.00mm connector for COM 2 support RS422/485 connector(location : J485E1) 1 x 2 x 3 pin, pitch 2.00mm connector for COM 2 support RS232/RS422/485 Jumper selection (location : COM2_SET) 1 x 2 x 3 pin, pitch 2.00mm connector for COM 1 support RS232 with Pin 9,+5V/+12V/RI by jumper (location : JC1) 1 x 2 x 3 pin, pitch 2.00mm connector for COM 2 support RS232 with Pin 9,+5V/+12V/RI by jumper (location : JC2) 1 x 2 x 20 pin, pitch 2.00mm connector for COM 1~4 support RS-232 connector

USB 2.0	1 x 2 x 5 pin, pitch 2.54mm connector for 2 x USB 2.0
GPIO	1 x 2 x 5 pin, pitch 2.00mm connector for 8bits GPIO
CPU/System FAN	1 x 1 x 4 pin, pitch 2.54mm CPU fan connector with smart fan function supported 1 x 1 x 4 pin, pitch 2.54mm System fan connector with smart fan function supported
Buzzer	1 x Onboard buzzer
Front Panel	1 x 2 x 5 pin, pitch 2.54mm connector for front panel
RTC Battery	1 x 2 Pin Pitch 1.25mm Vertical type battery connector
AT/ATX Selector	1 x 1 x 3 pin pitch 2.54mm connector for AT/ATX jumper 1 x 2 x 10 pin ATX power connector 1 x 2 x 2 pin ATX 12V power connector
Clear CMOS	1 x 1 x 3pin, pitch 2.00mm connector for COMS Clear
LVDS	LVDS: Dual channel 18/24-bits LVDS (Chrontel CH7511B eDP to LVDS) default 1024x768 24/1 F/W 1 x 2 x 20 pin, pitch 1.25mm connector for LVDS (must be using WF40H6-7GAA178 connector)
eDP	1 x 1 x 30 pin, FPC connector for eDP
LCD Inverter	1 x 1 x 5 pin, pitch 2.00mm Wafer connector for LCD inverter backlight connector (5V/12V)
ME	1 x 1 x 3pin, pitch 2.00mm connector for ME setting
Audio	1 x 2 x 5 pin, pitch 2.54mm connector for front Audio
Amp Connector	1 x 4 pin, pitch wafer 2.00mm connector for 3W x 2 Speaker
Display	
Graphic Chipset	Intel® 8/9th Generation CPU integrated
Spec. & Resolution	VGA: 2048 x1536 @ 50 Hz HDMI 1.4b: 4096x2160@30Hz LVDS : 1024x768@60Hz default, colay eDP 2 lanes 1920 x 1080@60Hz by BOM optional *default no LVDS, no eDP
Multiple Display	Dual Display
Audio	
Audio Codec	Realtek ALC897 colay ALC662 HD Audio Decoding Controller
Amplifier	NS4258 3W Amplifier per channel Amplifier
Ethernet	
LAN Chipset	2 x Realtek RTL8111H Gigabit Ethernet
LAN Spec.	10/100/1000 Base-Tx GbE compatible
Mechanical & Environmental Specification	
Power Requirement	+12V / +5V / 5VSB /+3.3V / -12V
ACPI	Single power ATX Support S0, S3, S4, S5
Power Mode	AT/ATX mode

Operating Temp.	0°C ~ 60°C
Storage Temp.	40°C ~ 85°C (-40°F ~ 185°F)
Operating Humidity	40°C @ 95% Relative Humidity, Non-condensing
Size (L x W)	6.7" x 6.7" (170mm x 170mm)
Weight	0.40kg
Vibration Test	Operation mode, IEC60068-2-64, 1.5 Grms, 5-500Hz, 30 minutes per each axis Non Operation mode, IEC60068-2-64, 3.0 Grms, 5-500Hz, 30 minutes per each axis
Shock Test	10G, IEC 60068-2-27, Half Sine, 11ms, Z Axis
Drop Test	ISTA 2A, IEC-60068-2-32 Test : Ed, Test Ea, 1 Corner, 3 Edges, 6 Faces
OS Information	Win10 64bit. Linux

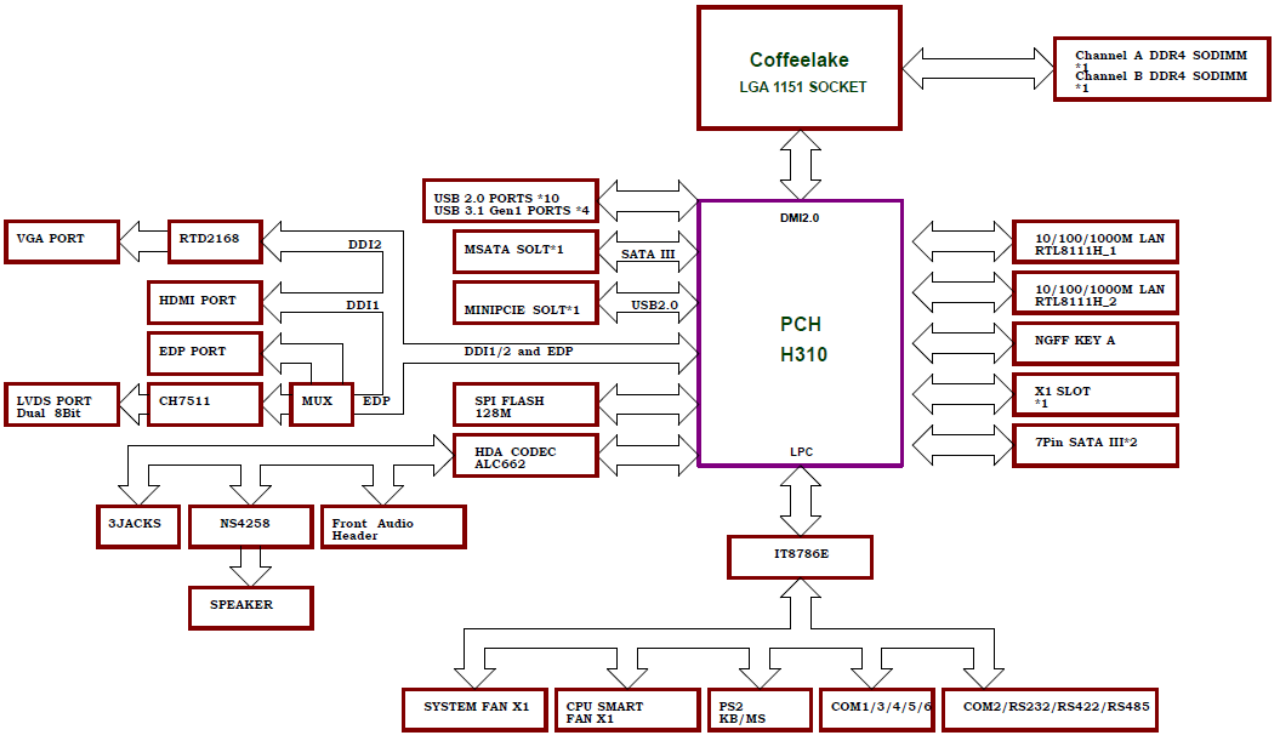
Note: Specifications are subject to change without notice.

User condition suggestion:

1. EMX-H310C Model standard version no LVDS, no eDP. For OEM version with LVDS or eDP by MOQ production, please contact Avalue sales.
2. LVDS default resolution only 1024x768@60Hz, if customer may need other resolution, please contact Avalue AE for OEM BIOS request.

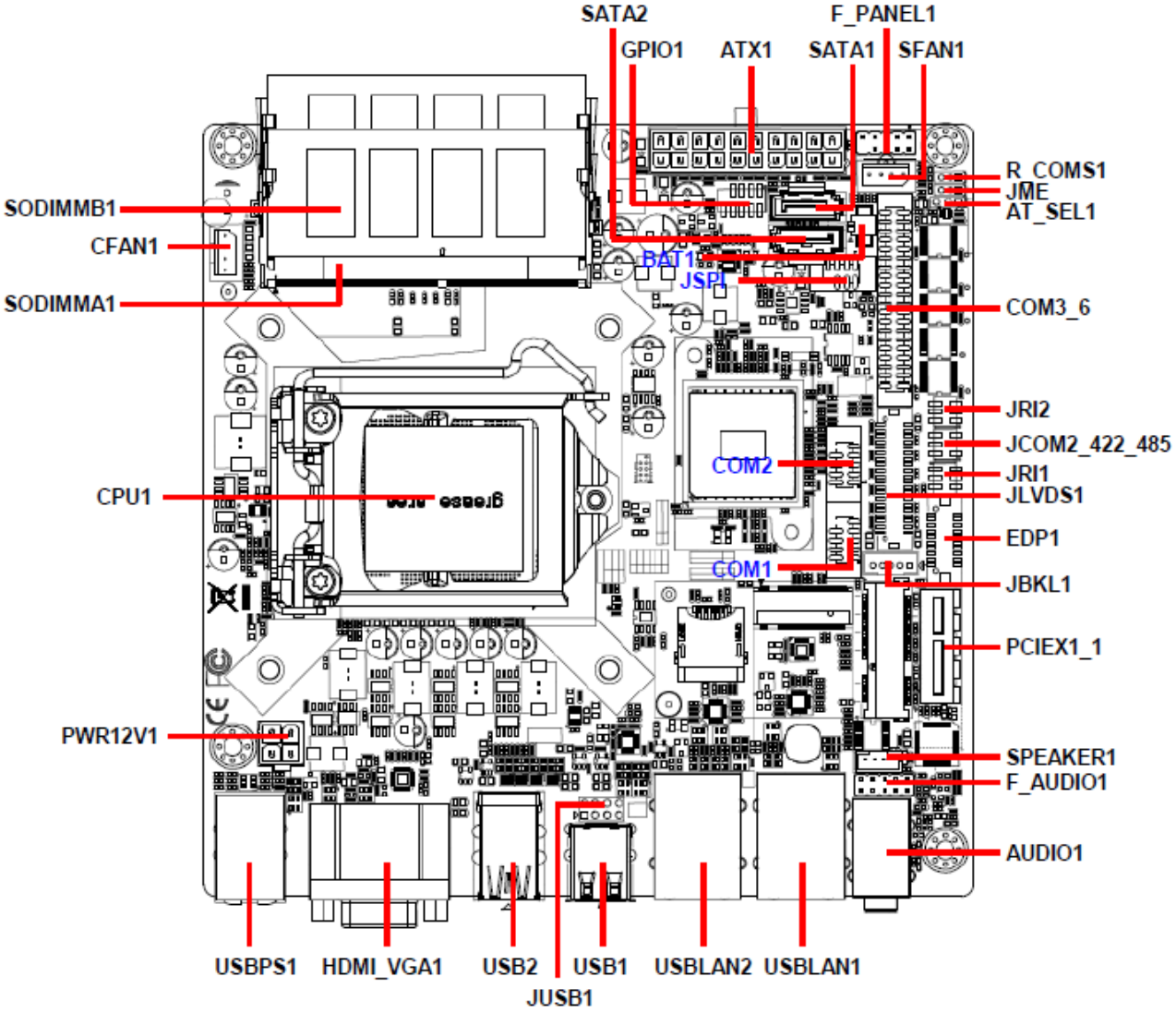
1.6 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of EMX-H310C.



2. Hardware Configuration

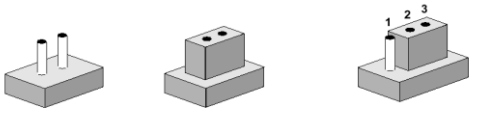
2.1 Product Overview



2.2 Jumper and Connector List

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

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



Open Closed Closed 2-3

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

Open Closed Closed 2-3

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

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

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

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

Jumpers

Label	Function	Note
JRI1/2	Serial port 1/2 pin9 signal select	3 x 2 header, pitch 2.00mm
R_COMS1	Clear CMOS	3 x 1 header, pitch 2.00mm
JME	BIOS ME function configuration (JME1)	3 x 1 header, pitch 2.00mm
AT_SEL1	AT/ATX Power Mode Select	3 x 1 header, pitch 2.54mm

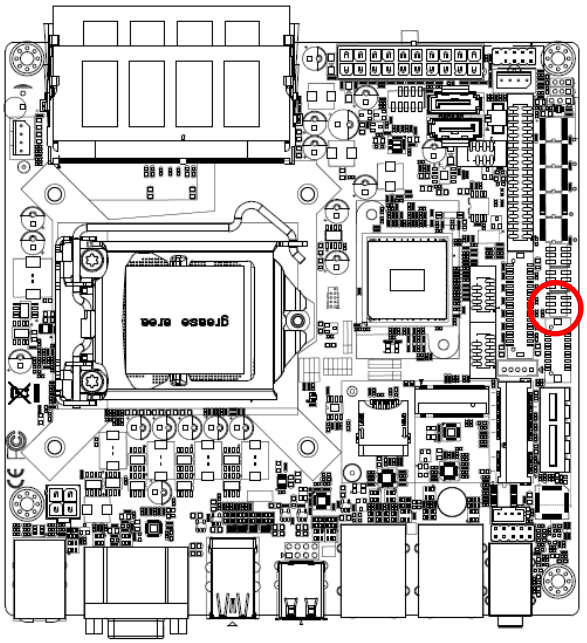
Connectors

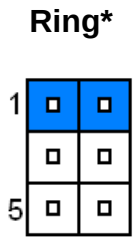
Label	Function	Note
SFAN1	System fan connector 1 (with smart fan function supported)	4 x 1 wafer, pitch 2.54mm
CFAN1	CPU fan connector	4 x 1 wafer, pitch 2.54mm
JSPI1	Miscellaneous setting connector	4 x 2 header, pitch 2.00mm
COM1/2	Serial Port1/2 connector	5 x 2 header, pitch 2.00 mm
F_AUDIO1	Front Audio connector	5 x 2 header, pitch 2.54mm

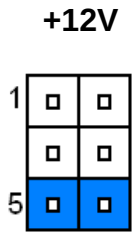
GPIO1	General purpose I/O connector	5 x 2 header, pitch 2.00mm
JBKL1	LCD Inverter connector	5 x 1 wafer, pitch 2.00 mm
F_PANEL	Front panel setting connector	5 x 2 header, pitch 2.54mm
COM3_6	Serial Port 3~6 connector	20 x 2 header, pitch 2.00mm
JUSB1	USB connector	4 x 2 wafer, pitch 2.00mm
EDP1	eDP-Panel connector	10 x 2 wafer, pitch 1.25mm
JLVDS1	LVDS connector	20 x 2 wafer, pitch 1.25mm
BAT1	Battery connector	2 x 1 wafer, pitch 1.25mm
PWR12V1	Power connector	2 x 2 wafer, pitch 4.20mm
HDMI_VGA1	HDMI+VGA connector	
SATA1/2	Serial ATA connector	
SODIMMA1	260-pin DIMM slot 1	
SODIMMB1	260-pin DIMM slot 2	
PCIEX1_1	PCI-e x16 slot	
CPU	CPU connector	
AUDIO1	AUDIO1 connector	
USB1/2	USB connector 1/2	
USBPS	DP connector	
USBPS1	USB+PS2 connector	
USBLAN1/2	USB+LAN connector 1/2	

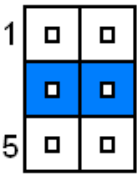
2.3 Setting Jumpers & Connectors

2.3.1 Serial port 1 pin9 signal select (JRI1)



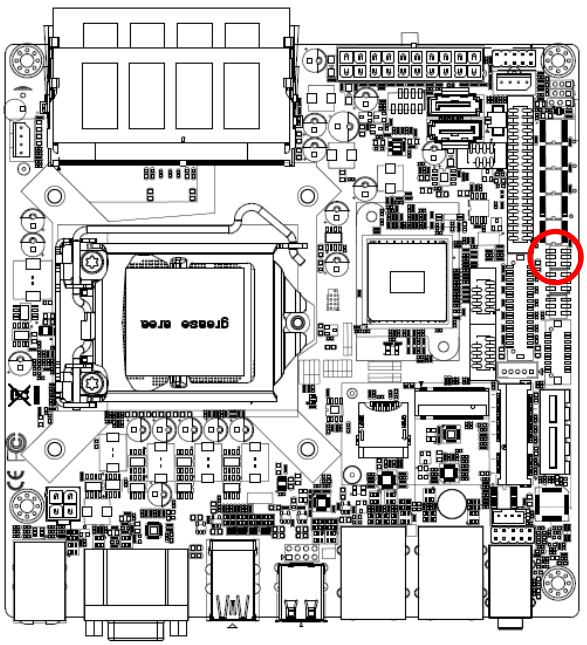


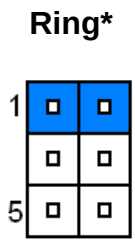


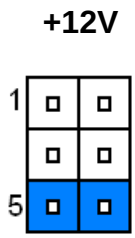


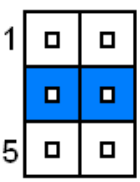
*** Default**

2.3.2 Serial port 2 pin9 signal select (JRI2)



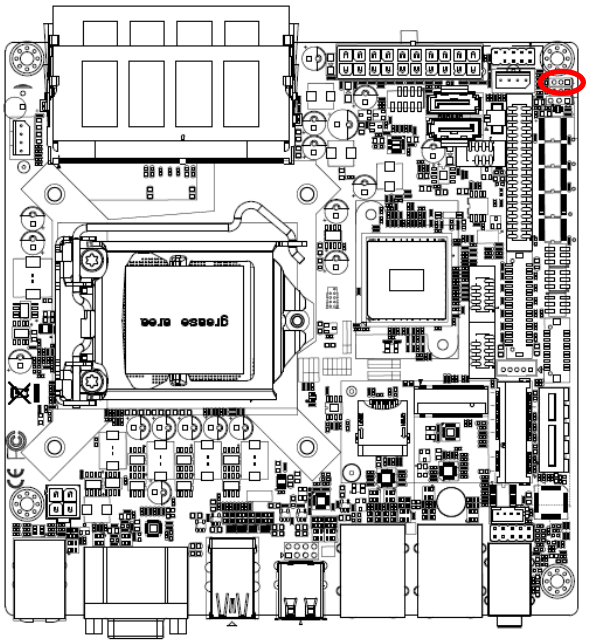




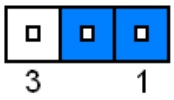


*** Default**

2.3.3 Clear CMOS (R_COMS1)



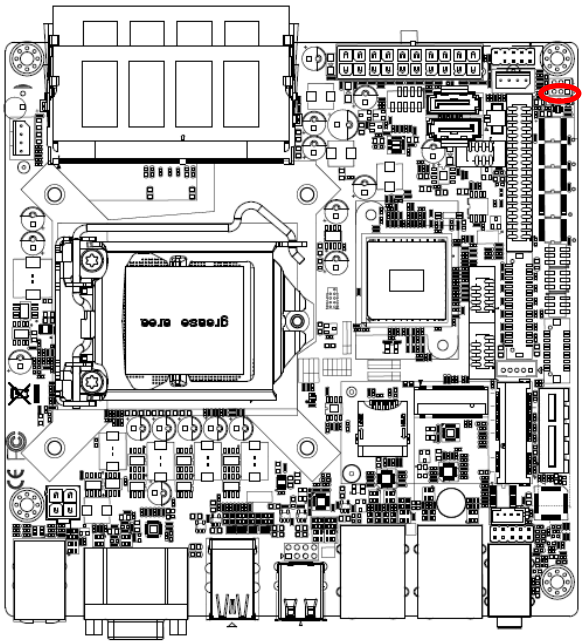
Protect*



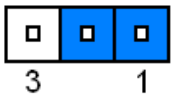
Clear CMOS

*** Default**

2.3.4 BIOS ME function configuration (JME1)



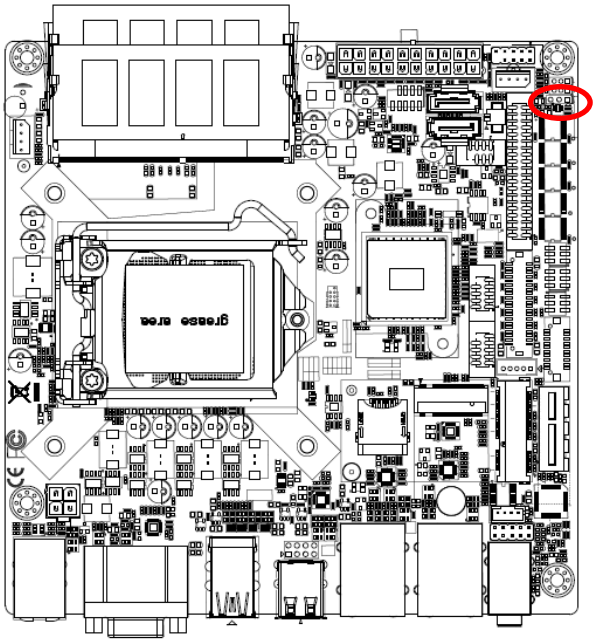
Enable ME *



Disable ME

*** Default**

2.3.5 AT/ATX Power Mode Select (AT_SEL1)

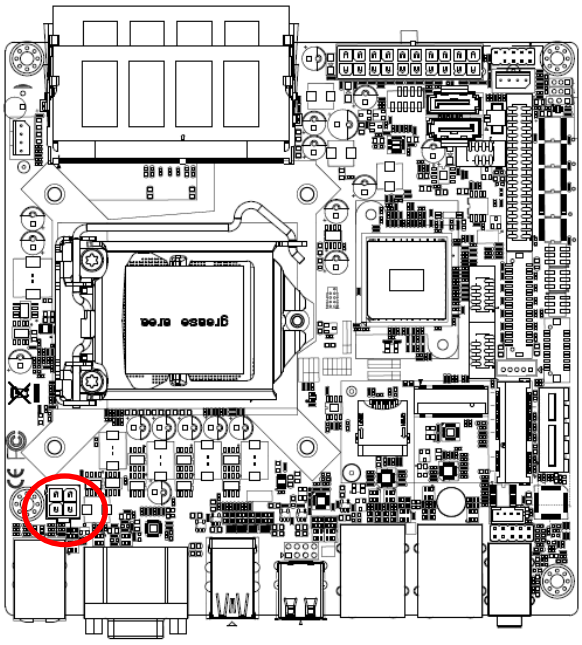


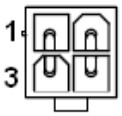
AT

ATX*

*** Default**

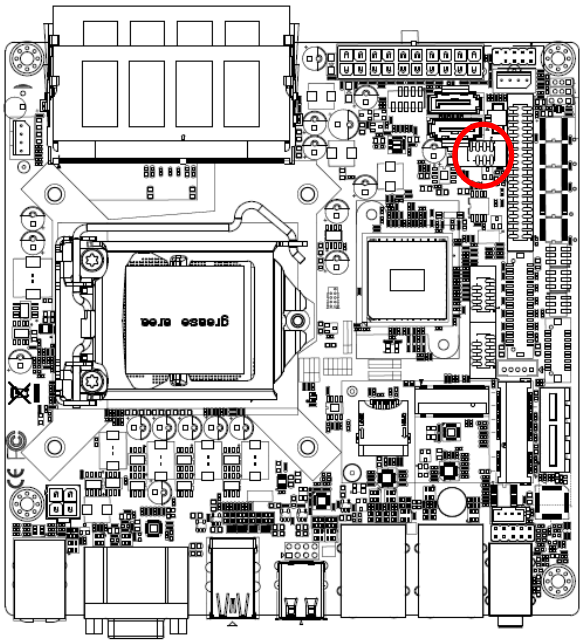
2.3.6 Power connector (PWR12V1)

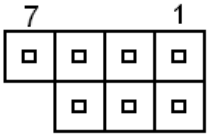




Signal	PIN	PIN	Signal
GND	1	2	GND
12VIN	3	4	12VIN

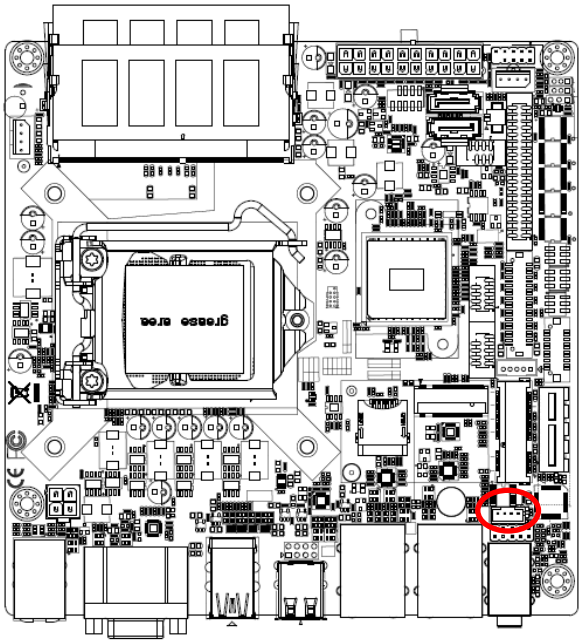
2.3.7 Miscellaneous setting connector (JSPI1)

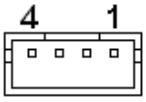




Signal	PIN	PIN	Signal
V_3P3_EPW	1	2	GND
SPI_CS0_N	3	4	SPI_CLK
SPI_MISO	5	6	SPI_MOSI
SPI_HD	7		

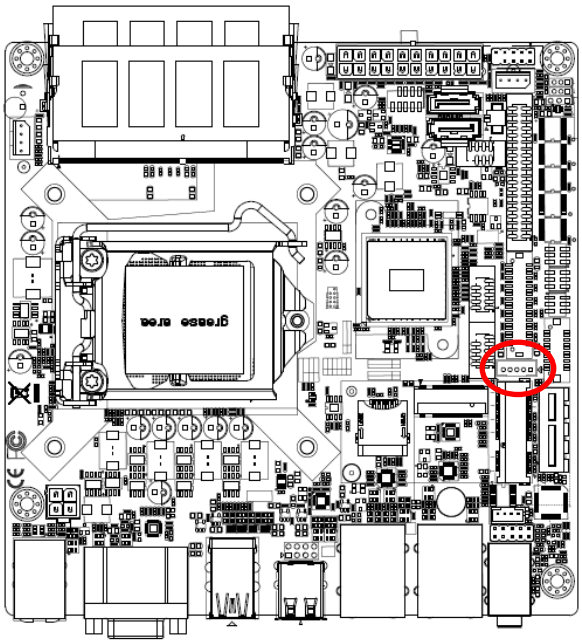
2.3.8 Speaker connector (SPEAKER1)

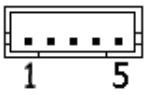




Signal	PIN
AMP_OUT_RP	1
AMP_OUT_RN	2
AMP_OUT_LN	3
AMP_OUT_LP	4

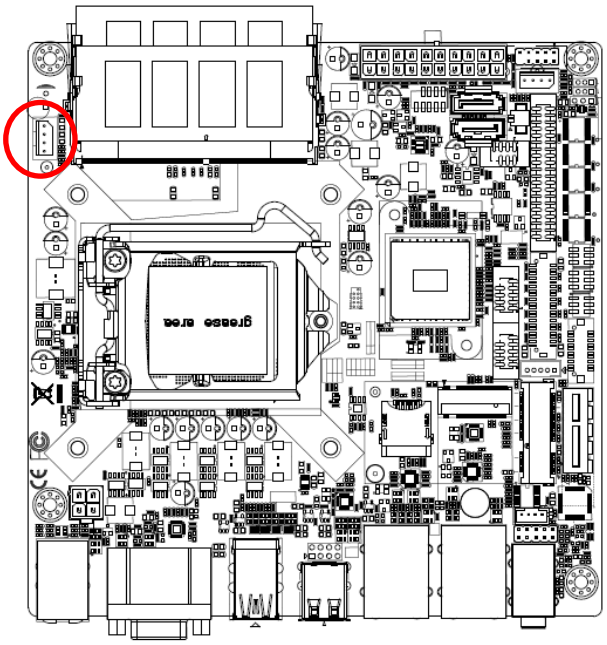
2.3.9 LCD Inverter connector (JBKL1)

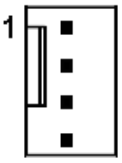




Signal	PIN
VCC12	1
GND	2
LVDS_BKLEN	3
LVDS_BKLTADJ	4
VCC5	5

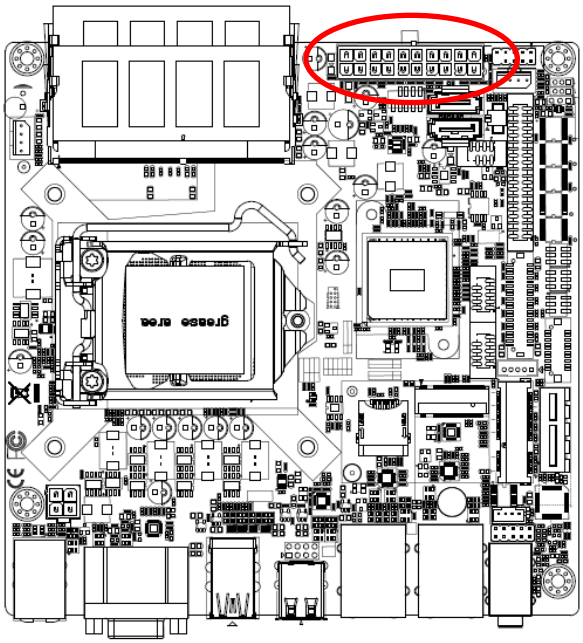
2.3.10 CPU fan connector (CFAN1)

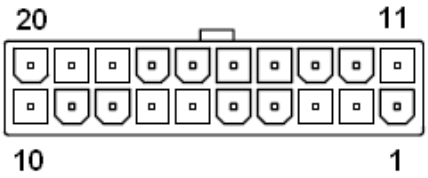




PIN	Signal
1	GND
2	VCC12
3	FAN_CTL1
4	FAN_TAC1

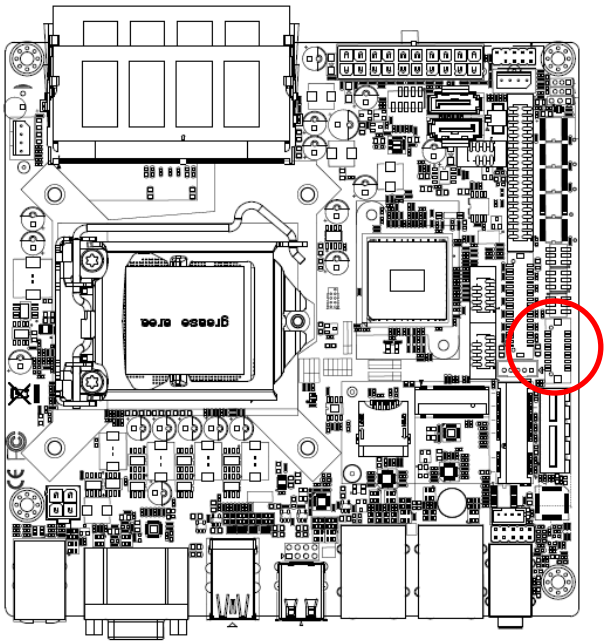
2.3.11 ATX Power connector (ATX1)

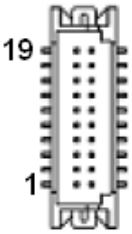




Signal	PIN	PIN	Signal
+3.3V	11	1	+3.3V
-12V	12	2	+3.3V
GND	13	3	GND
PSCN	14	4	+5V
GND	15	5	GND
GND	16	6	+5V
GND	17	7	GND
-5V	18	8	POK
+5V	19	9	+5VSB
+5V	20	10	+12V

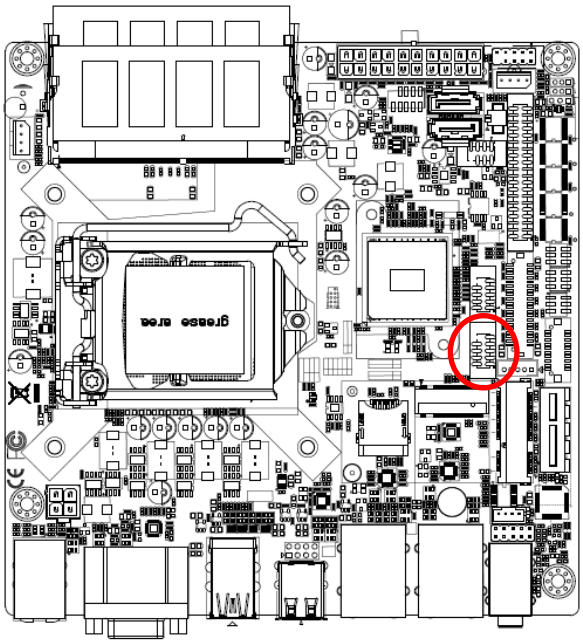
2.3.12 eDP-Panel connector (EDP 1)

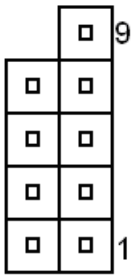




Signal	PIN	PIN	Signal
VCC1	19	20	VCC2
TXP2	17	18	HPD
TXN2	15	16	GND6
GND5	13	14	AUXP
TXP1	11	12	AUXN
TXN1	9	10	GND4
GND3	7	8	NC1
TXP0	5	6	TXP3
TXN0	3	4	TXN3
GND	1	2	GND

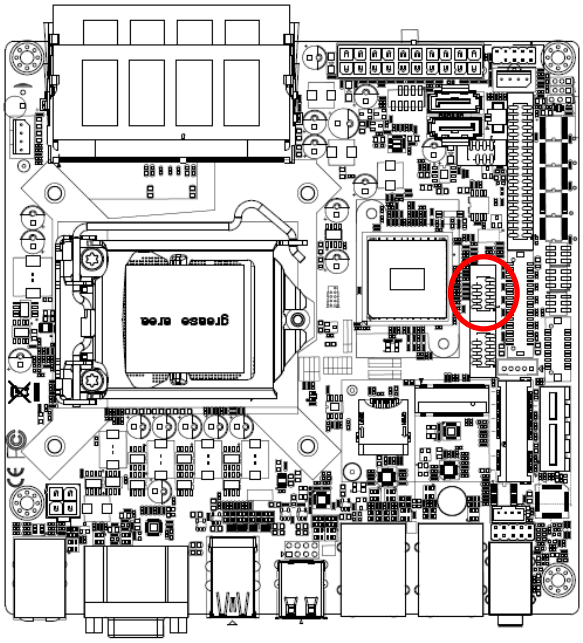
2.3.13 Serial port connector (COM1)

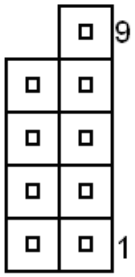




Signal	PIN	PIN	Signal
		9	NRI1
NCTS1	8	7	NRTS1
NDSR1	6	5	GND
NDTR1	4	3	NSOUT1
NSIN1	2	1	NDCD1

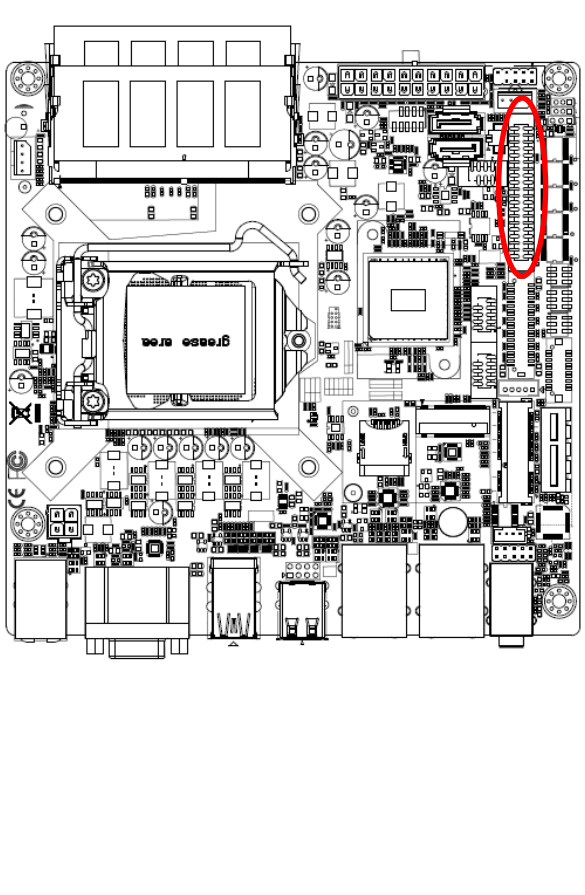
2.3.14 Serial port connector (COM2)

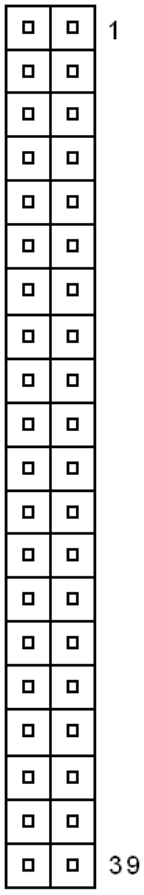




Signal	PIN	PIN	Signal
		9	NRI2
NCTS2	8	7	NRTS2
NDSR2	6	5	GND
NDTR2	4	3	NSOUT2
NSIN2	2	1	NDCD2

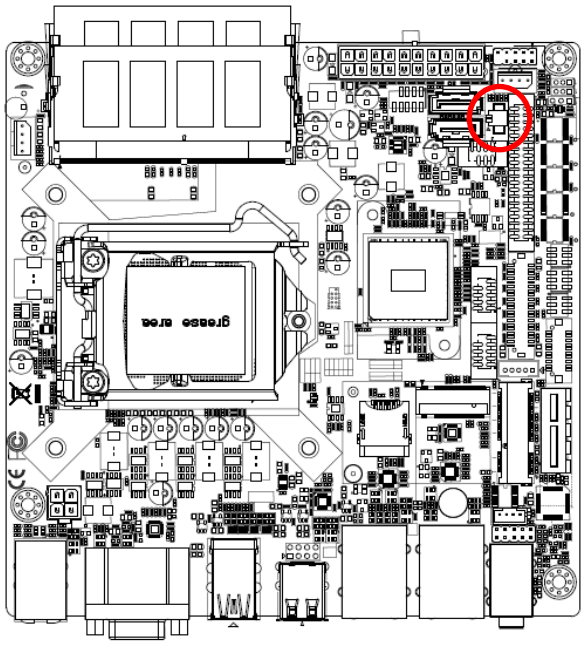
2.3.15 Serial Port 3~6 connector (COM3_6)

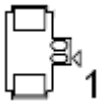




Signal	PIN	PIN	Signal
NDCD3	1	2	NSIN3
NSOUT3	3	4	NDTR3
GND	5	6	NDSR3
NRTS3	7	8	NCTS3
NRI3	9	10	NC
NDCD4	11	12	NSIN4
NSOUT4	13	14	NDTR4
GND	15	16	NDSR4
NRTS4	17	18	NCTS4
NRI4	19	20	NC
NDCD5	21	22	NSIN5
NSOUT5	23	24	NDTR5
GND	25	26	NDSR5
NRTS5	27	28	NCT5
NRI5	29	30	NC
NDCD6	31	32	NSIN6
NSOUT6	33	34	NDTR6
GND	35	36	NDSR6
NRTS6	37	38	NCTS6
NRI6	39	40	NC

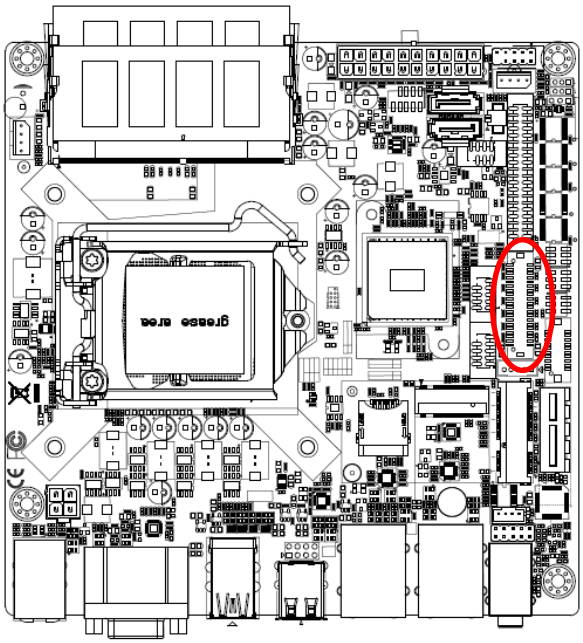
2.3.16 Battery connector (BAT1)

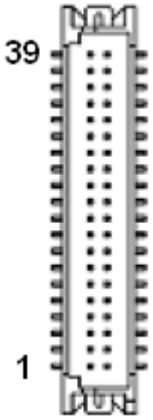




Signal	PIN
+3.3V	2
GND	1

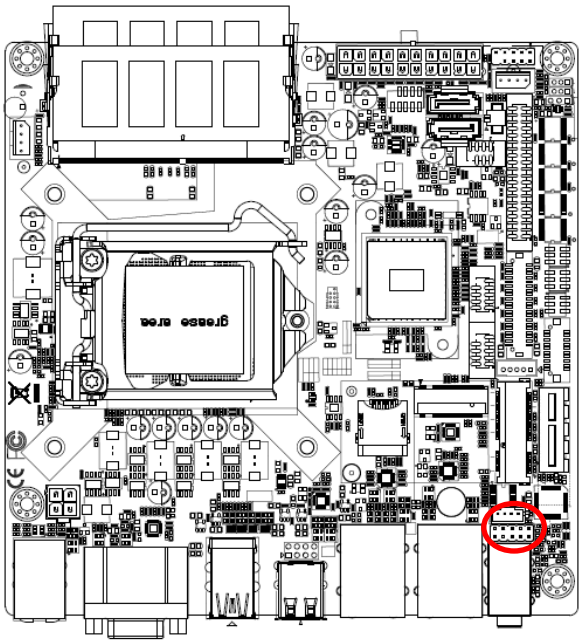
2.3.17 LVDS connector (JLVDS1)

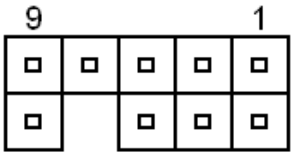




Signal	PIN	PIN	Signal
VCC12_1	39	40	VCC12_2
GND11	37	38	GND12
CLK2_N	35	36	CLK1_N
CLK2_P	33	34	CLK1_P
GND9	31	32	GND10
LVDS7N	29	30	LVDS6N
LVDS7P	27	28	LVDS6P
GND7	25	26	GND8
LVDS5N	23	24	LVDS4N
LVDS5P	21	22	LVDS4P
GND5	19	20	GND6
LVDS3N	17	18	LVDS2N
LVDS3P	15	16	LVDS2P
GND3	13	14	GND4
LVDS1N	11	12	LVDS0N
LVDS1P	9	10	LVDS0P
GND1	7	8	GND2
NC1	5	6	NC2
VCC3_2	3	4	VCC5_2
VCC3_1	1	2	VCC5_1

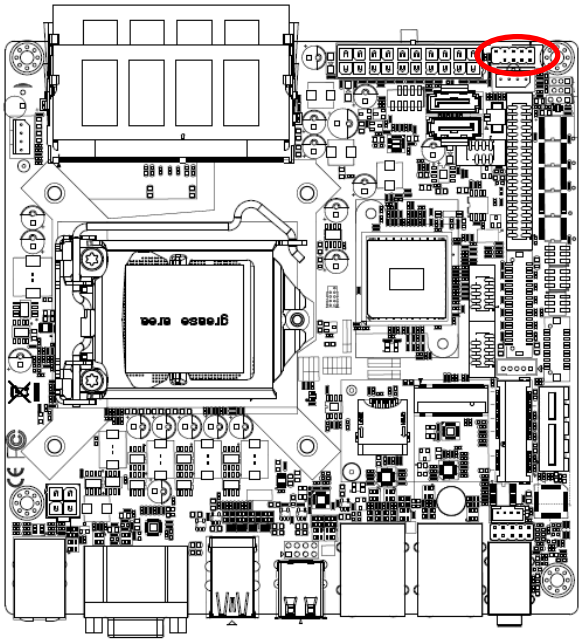
2.3.18 Front Audio connector (F_AUDIO1)

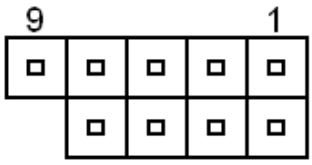




Signal	PIN	PIN	Signal
MIC2_L	1	2	GND
MIC2_R	3	4	VCC
LINE2_R	5	6	MIC2-JD
GND	7		
LINE2_L	9	10	LINE2-JD

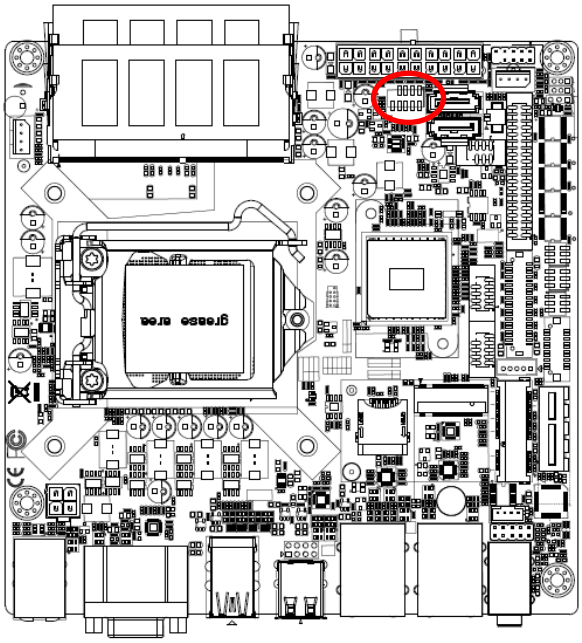
2.3.19 Front panel setting connector (F_PANEL)

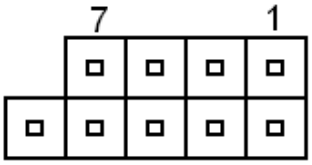




Signal	PIN	PIN	Signal
HDLED+	1	2	POWER_LED+
SATA_ACT#	3	4	POWER_LED-
BT_RST#	5	6	PBTNJ_SIO
GND	7	8	GND
NC	9		

2.3.20 General purpose I/O connector (GPIO1)

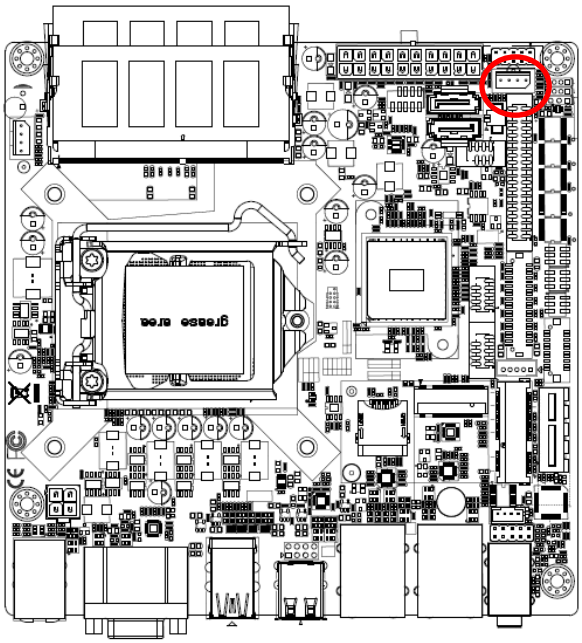


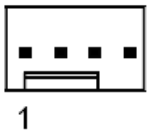


Signal	PIN	PIN	Signal
GPP_K6	1	2	GPP_F15
GPP_K7	3	4	GPP_K11
GPP_K10	5	6	GPP_F17
GPP_E12	7	8	GPP_F18
		10	GND

Note: Pin2 is connected to the OC# Pin on the side of the USB power IC through 0 ohms.
If the definition of Pin2 is to be GPIO_F15, it is recommended to disconnect the OC end

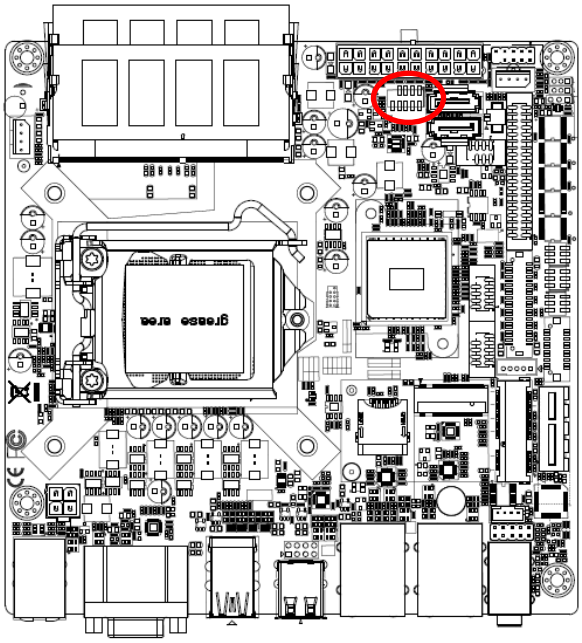
2.3.21 System fan connector (SFAN1)

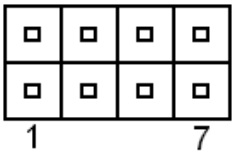




Signal	PIN
FAN_CTL2	4
FAN_TAC2	3
VCC12	2
GND	1

2.3.22 USB connector (JUSB1)





Signal	PIN	PIN	Signal
POWER_JUSB6	1	2	POWER_JUSB6
USB_TN2	3	4	USB_TN4
USB_TP2	5	6	USB_TP4
GND	7	8	GND

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 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 F1 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.

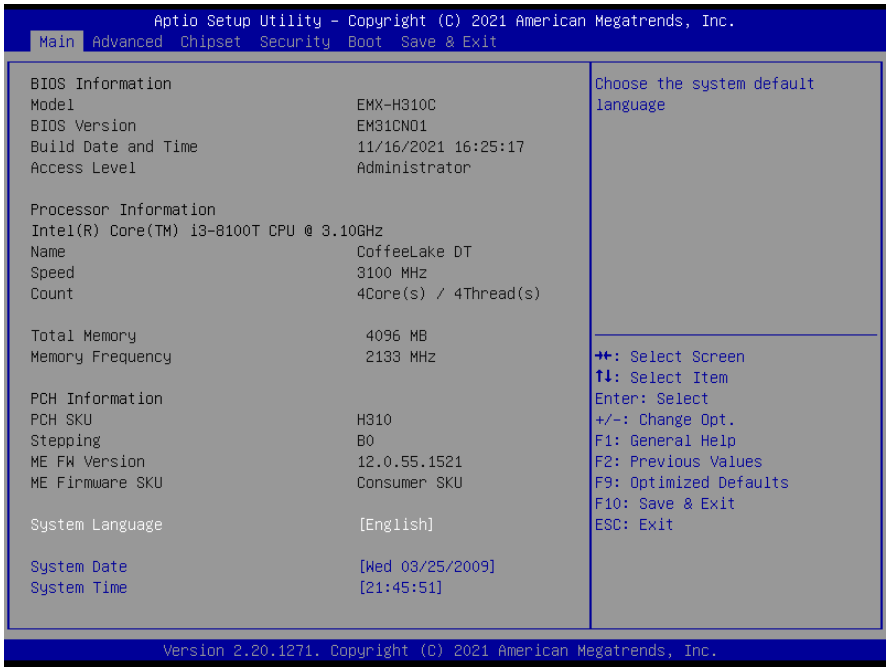
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance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

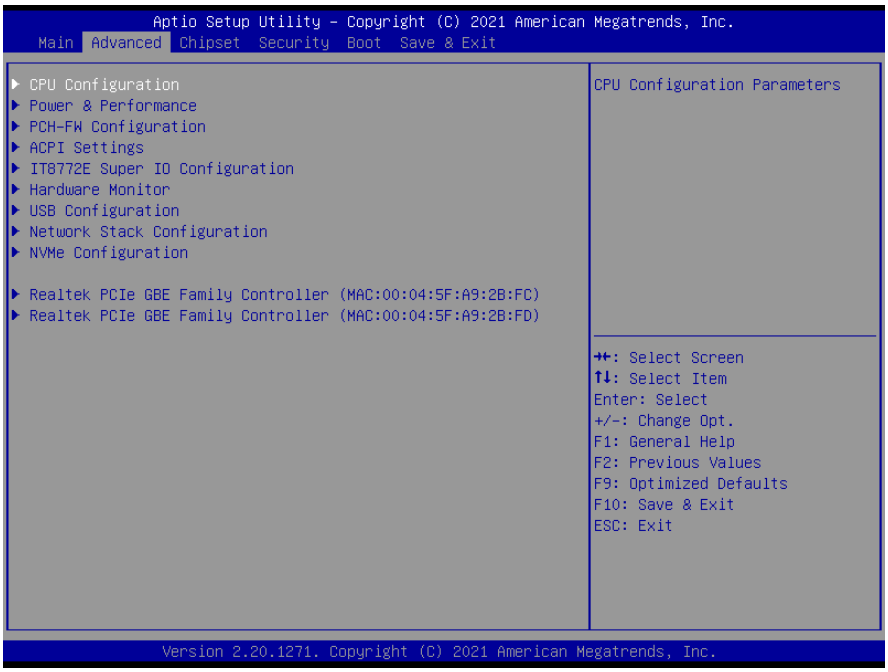
3.6.1.3 System Time

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

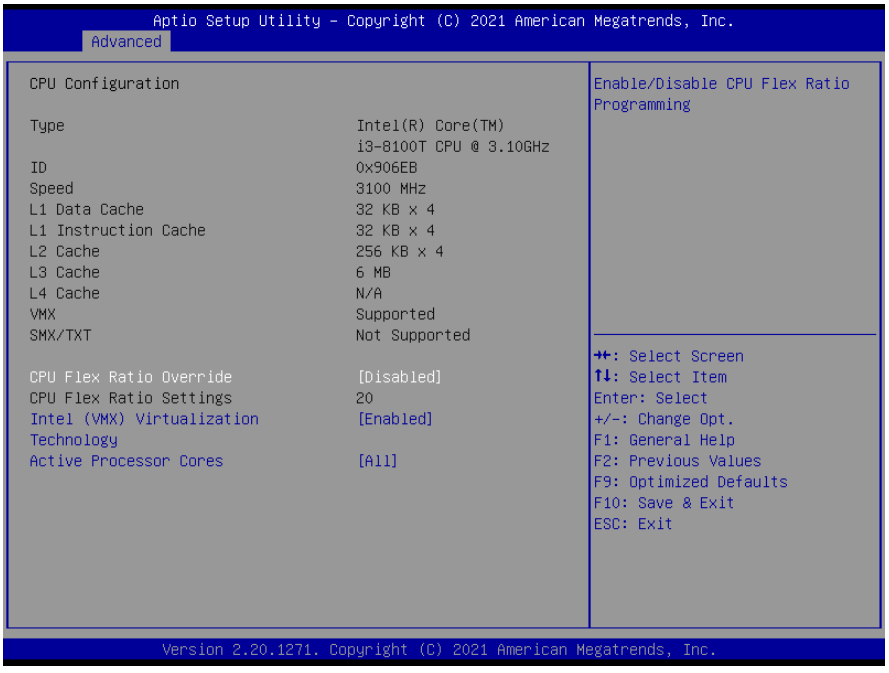
Note: The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.
Visit the Avalue website (www.avalue.com.tw) to download the latest product and BIOS information.

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.



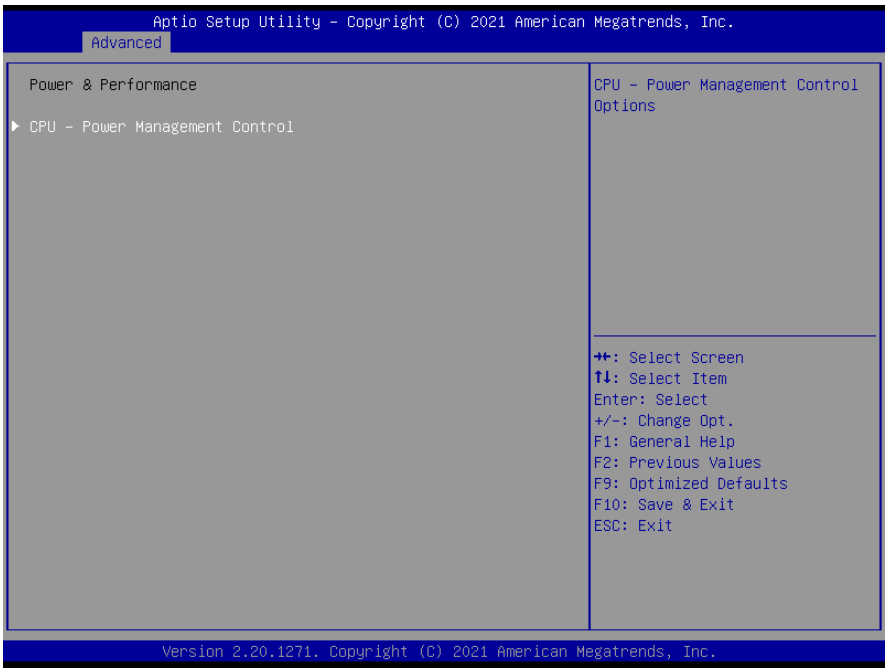
3.6.2.1 CPU Configuration



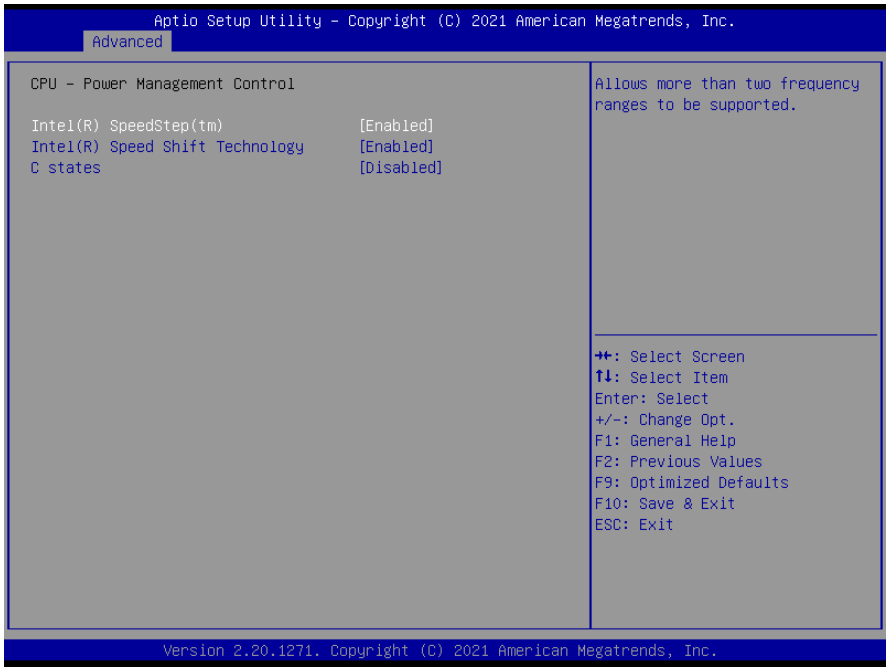
Item	Options	Description
CPU Flex Ratio Override	Disabled**[Default]**, Enabled	Enable/Disable CPU Flex Ratio Programming

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 5 6 7 8	Number of cores to enable in each processor package.

3.6.2.2 CPU - Power Management Control

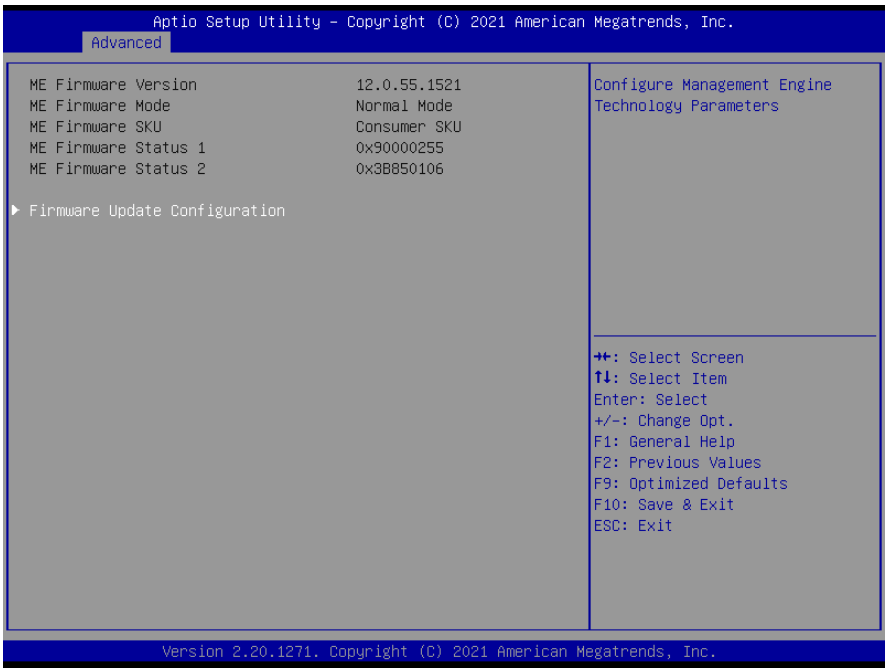


3.6.2.2.1 CPU - Power Management Control

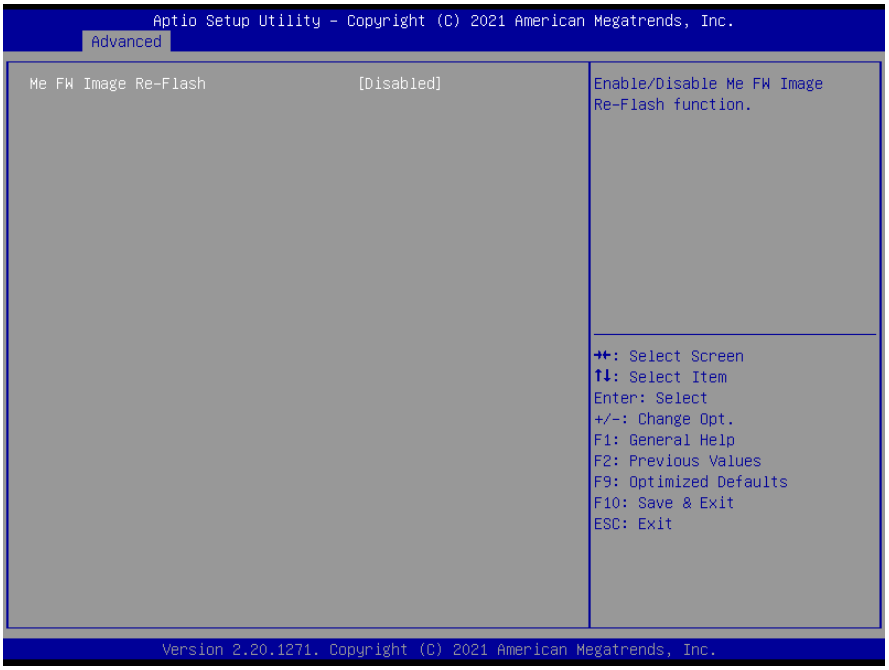


Item	Options	Description
Intel(R) SpeedStep(tm)	Disabled Enabled**[Default]**,	Allows more than two frequency ranges to be supported.
Intel(R) Speed Shift Technology	Disabled Enabled**[Default]**,	Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
C states	Disabled**[Default]**, Enabled	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized

3.6.2.3 PCH-FW Configuration

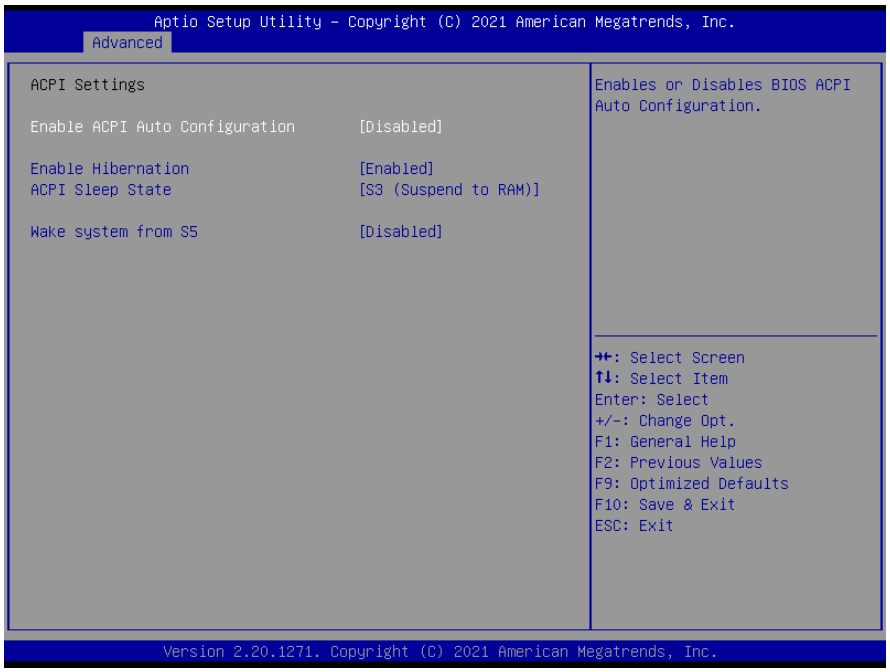


3.6.2.3.1 Firmware Update Configuration



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

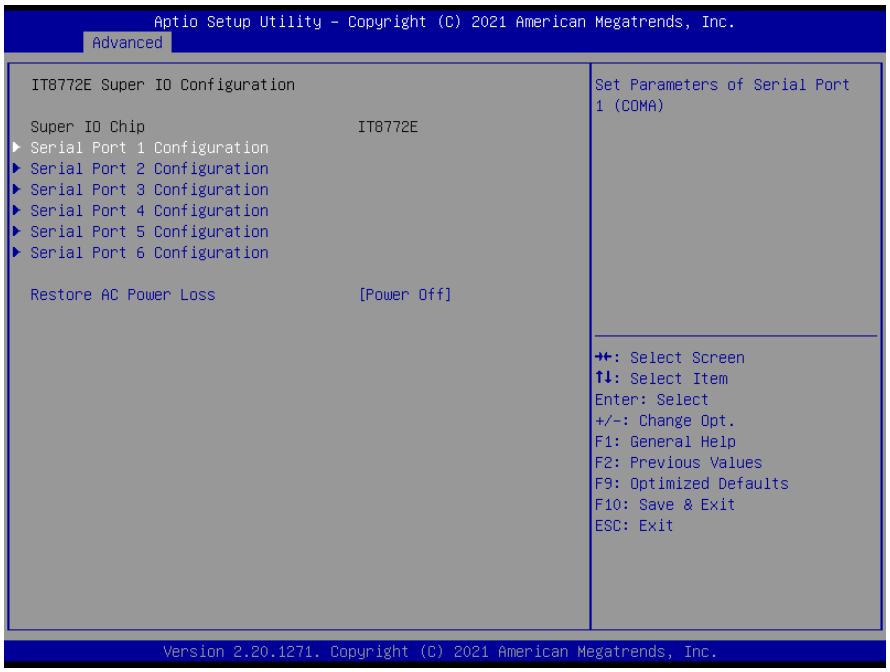
3.6.2.4 ACPI Settings



Item	Options	Description
Enable ACPI Auto Configuration	Disabled**[Default]**, Enabled	Enables or Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled Enabled**[Default]**,	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.
ACPI Sleep State	Suspend Disabled, S3 (Suspend to RAM)**[Default]**	Select the highest ACPI sleep state the system will enter when the SUSPEDN button is pressed.
Wake system from S5	Disabled**[Default]**, Enabled	Enable or disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified

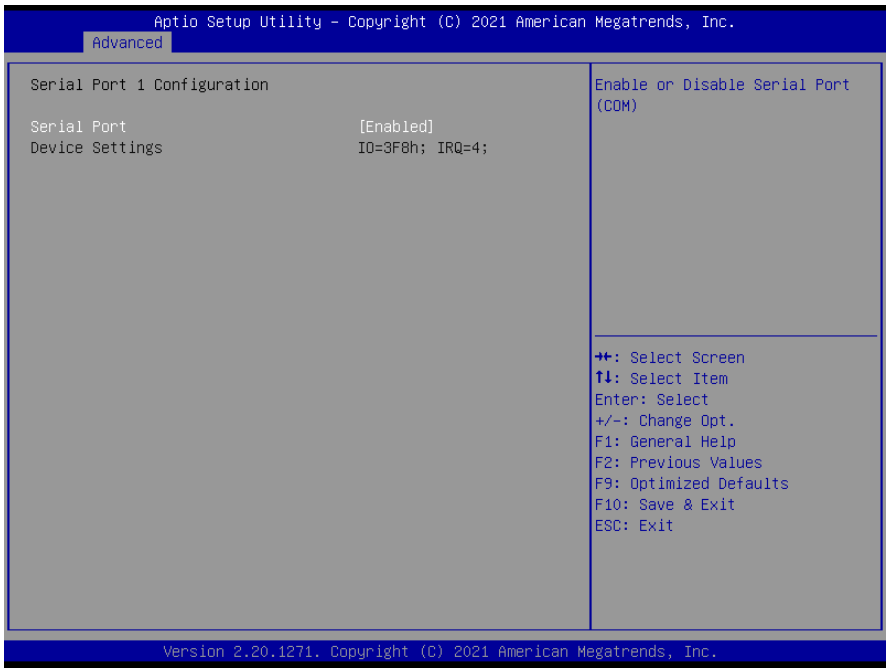
3.6.2.5 Super IO Configuration

You can use this item to set up or change the Super IO configuration for serial ports. Please refer to 3.6.2.5.1~ 3.6.2.5.6 for more information.



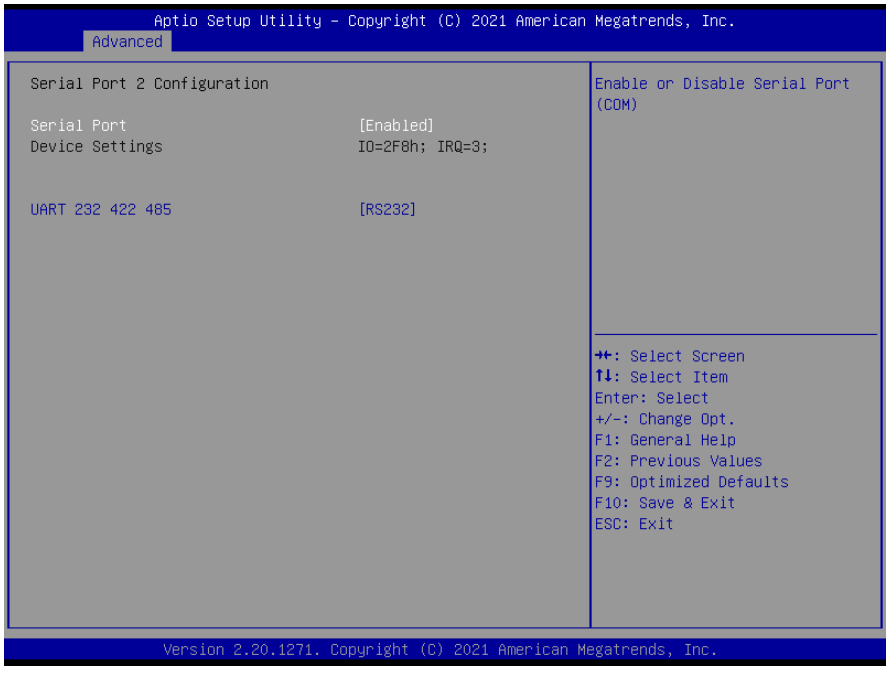
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration	Set Parameters of Serial Port 3 (COMC).
Serial Port 4 Configuration	Set Parameters of Serial Port 4 (COMD).
Serial Port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

3.6.2.5.1 Serial Port 1 Configuration



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

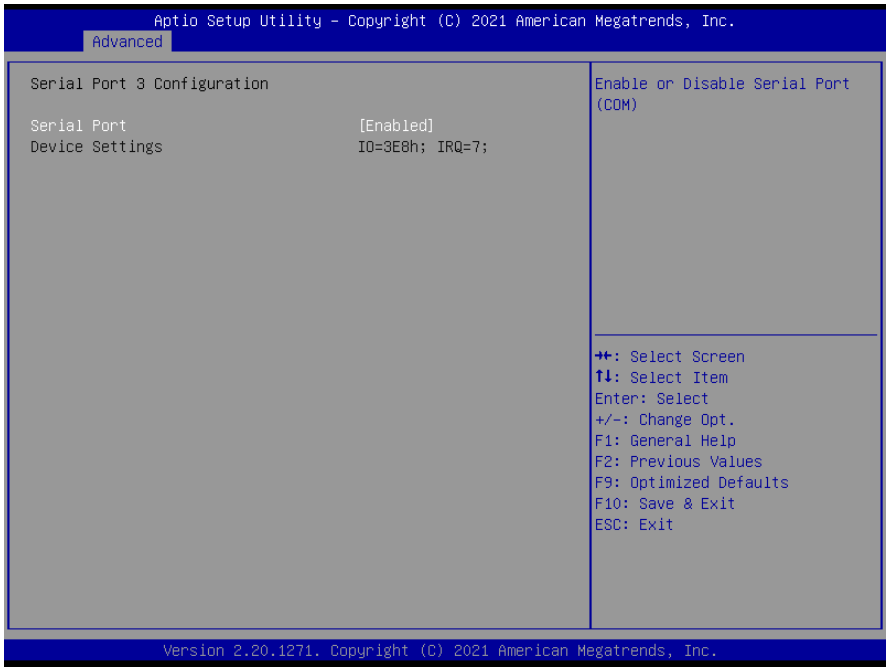
3.6.2.5.2 Serial Port 2 Configuration



Item	Option	Description
Serial Port	Disabled Enabled**[Default]**,	Enable or Disable Serial Port (COM).
UART 232 422 485	RS232**[Default]**, RS422	Set COM Port as RS232, RS422 or RS485 mode.

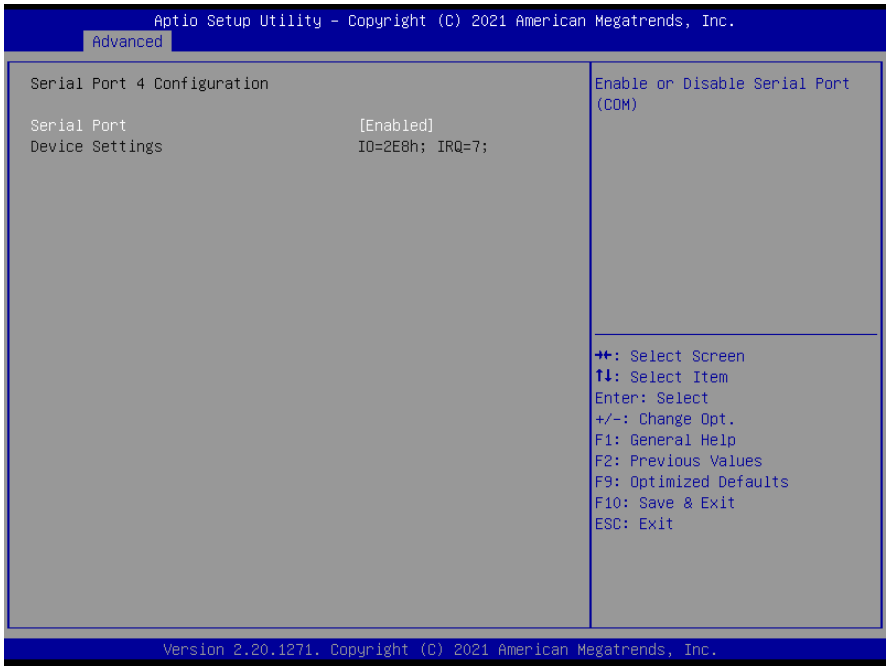
	RS485	

3.6.2.5.3 Serial Port 3 Configuration



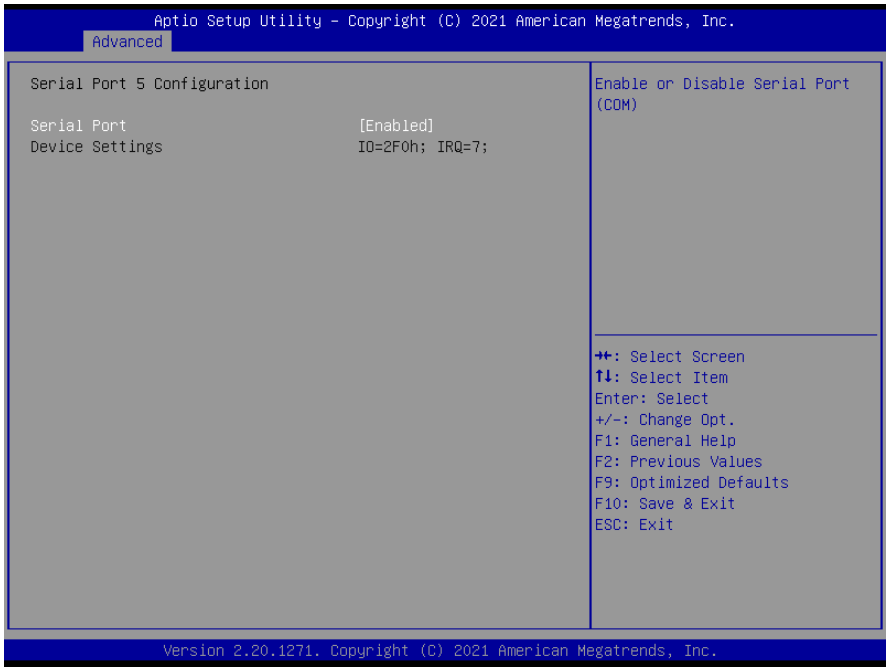
Item	Option	Description
Serial Port	Disabled Enabled**[Default]**,	Enable or Disable Serial Port (COM).

3.6.2.5.4 Serial Port 4 Configuration



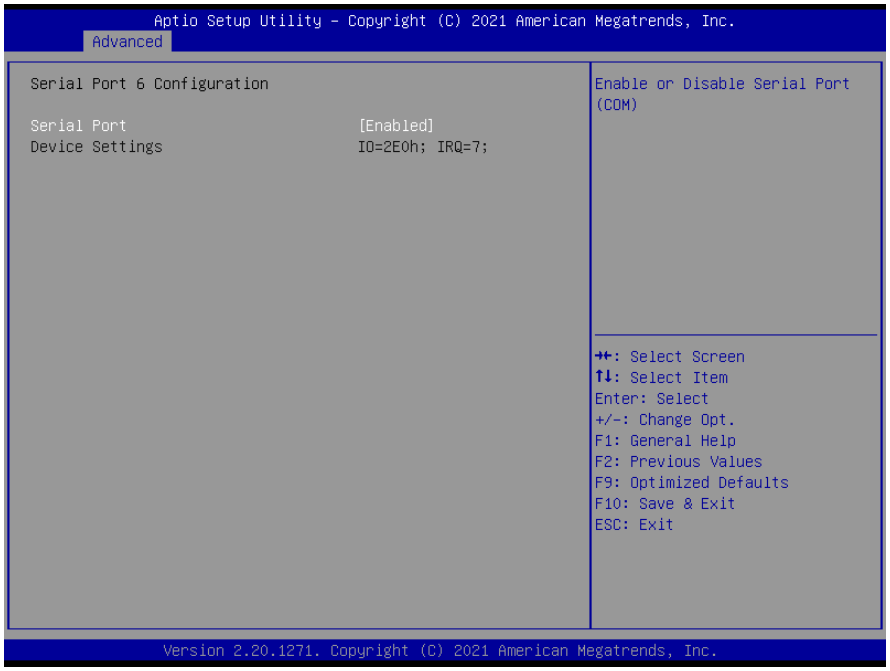
Item	Option	Description
Serial Port	Disabled Enabled**[Default]**,	Enable or Disable Serial Port (COM).

3.6.2.5.5 Serial Port 5 Configuration



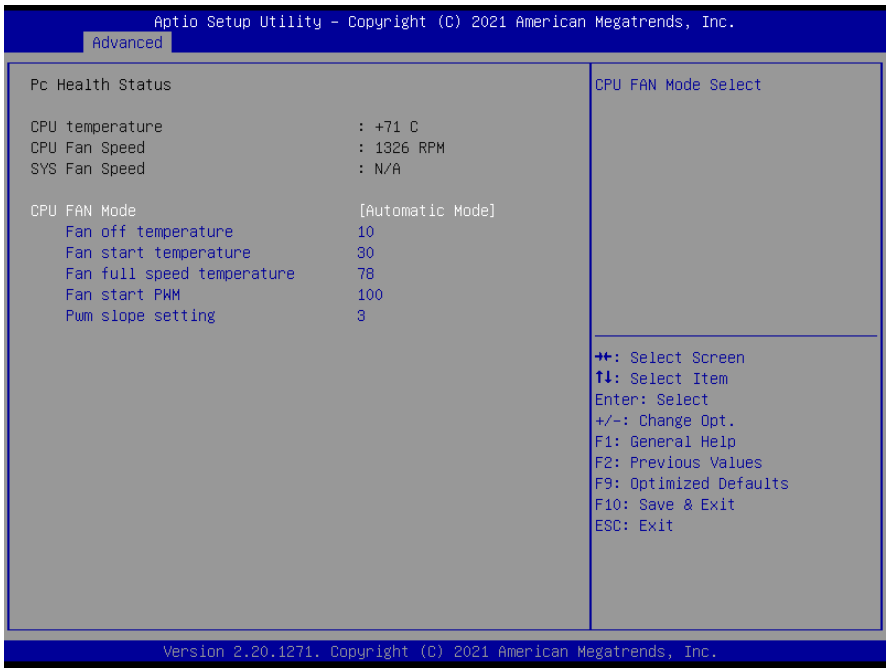
Item	Option	Description
Serial Port	Disabled Enabled**[Default]**,	Enable or Disable Serial Port (COM).

3.6.2.5.6 Serial Port 6 Configuration



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

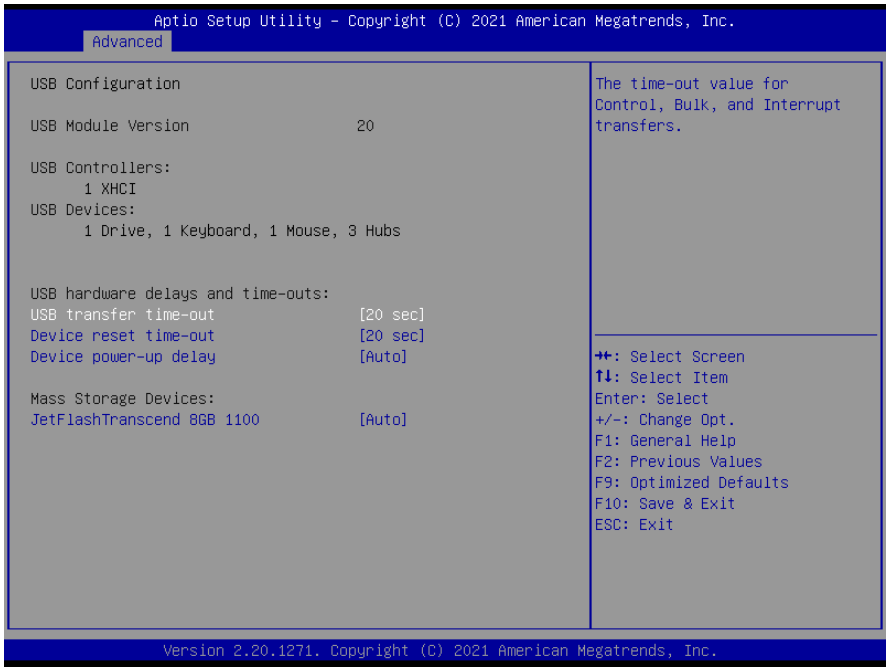
3.6.2.6 ITE8786E H/W Monitor



Item	Option	Description
CPU Fan Mode	Full on Mode Automatic Mode**[Default]**, Manual Mode	Avalue Smart Fan Mode Select: Mode 01 to Mode 20 Or Manual (No Smart Fan)
Fan off temperature	10	Fan will off when temperature lower than this value
Fan start temperature	30	Smart Fan will work when temperature higher than this value
Fan full speed temperature	78	Fan will full speed when temperature higher than this value
Fan start PWM	100	Fan will stat with this PWM value
Pwm slope setting	3	PWM SLOPE Selection,0~16

3.6.2.7 USB Configuration

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



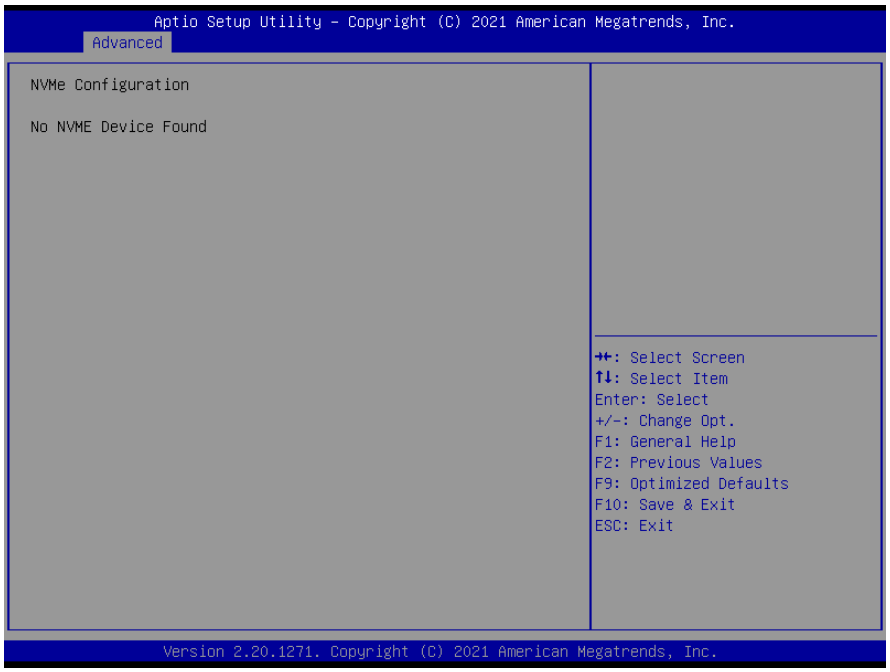
Item	Options	Description
USB transfer time-out	1 sec 5 sec 10 sec 20 sec**[Default]**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec**[Default]** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto**[Default]**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

3.6.2.8 Network Stack Configuration

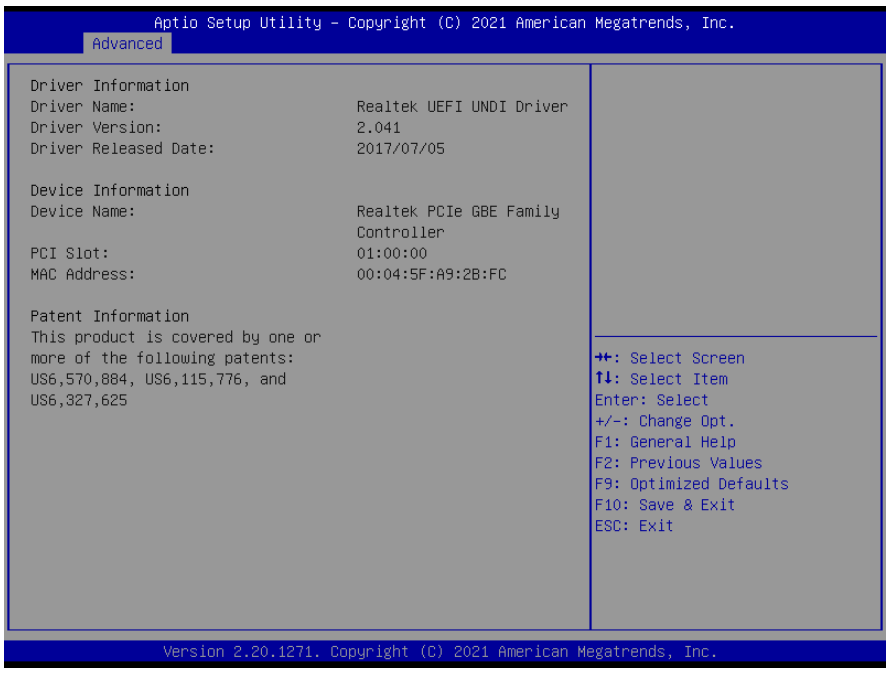
Item	Options	Description
Network Stack	Disabled**[Default]**, Enabled	Enable/Disable UEFI Network Stack.

Note: Motherboard designed with quad Gigabit LAN consumes longer startup time when Network Stack setting at "Enable", this is a normal phenomenon.

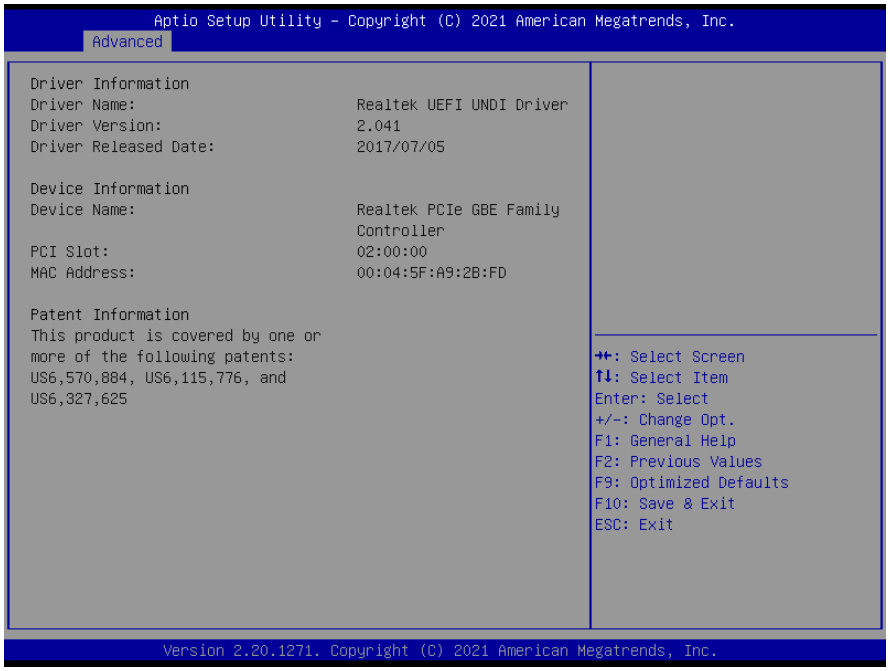
3.6.2.9 NVMe Configuration



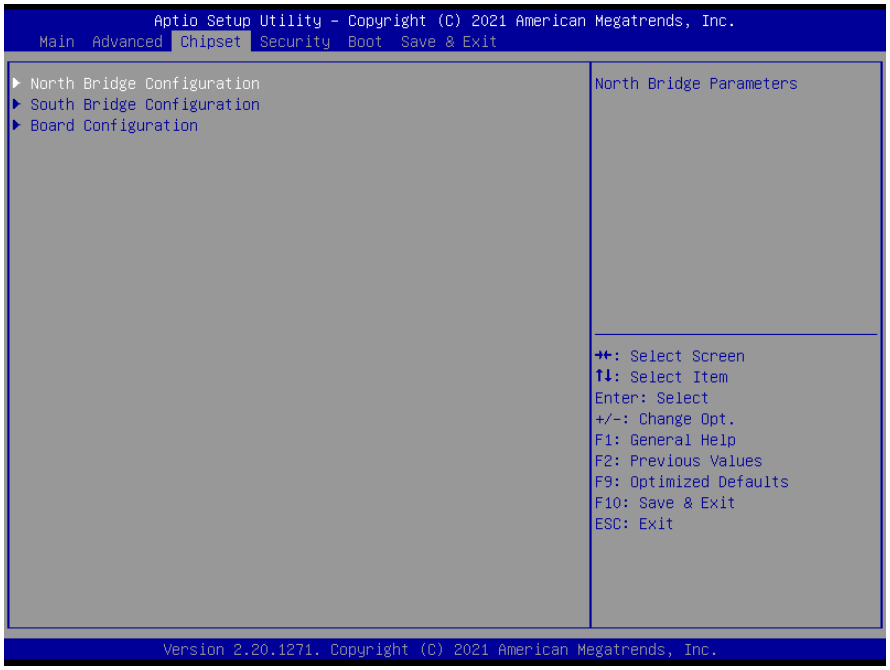
3.6.2.10 Realtek PCIe GBE Family Controller (MAC:00:04:5F:A9:2B:FC)



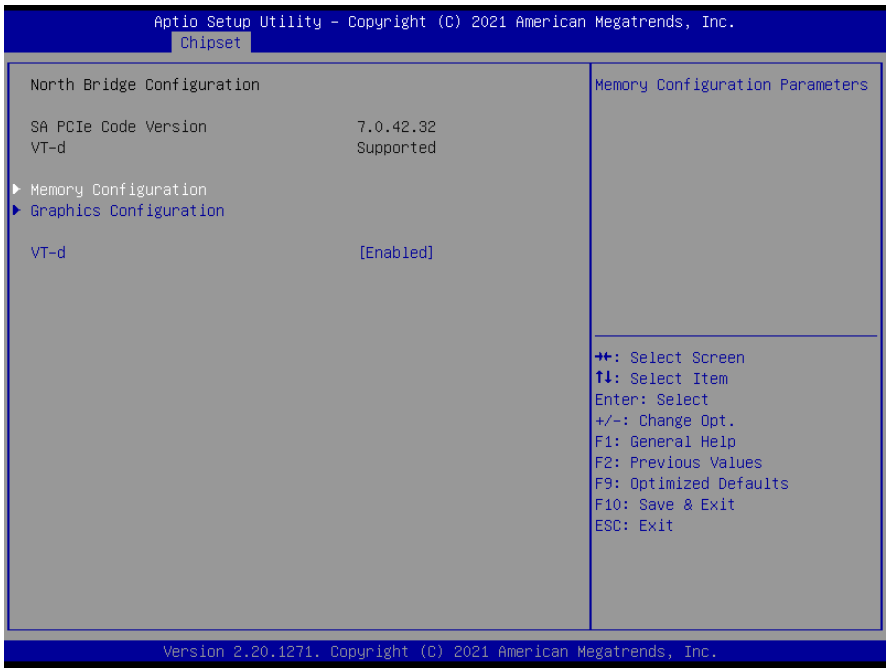
3.6.2.11 Realtek PCIe GBE Family Controller (MAC:00:04:5F:A9:2B:FD)



3.6.3 Chipset

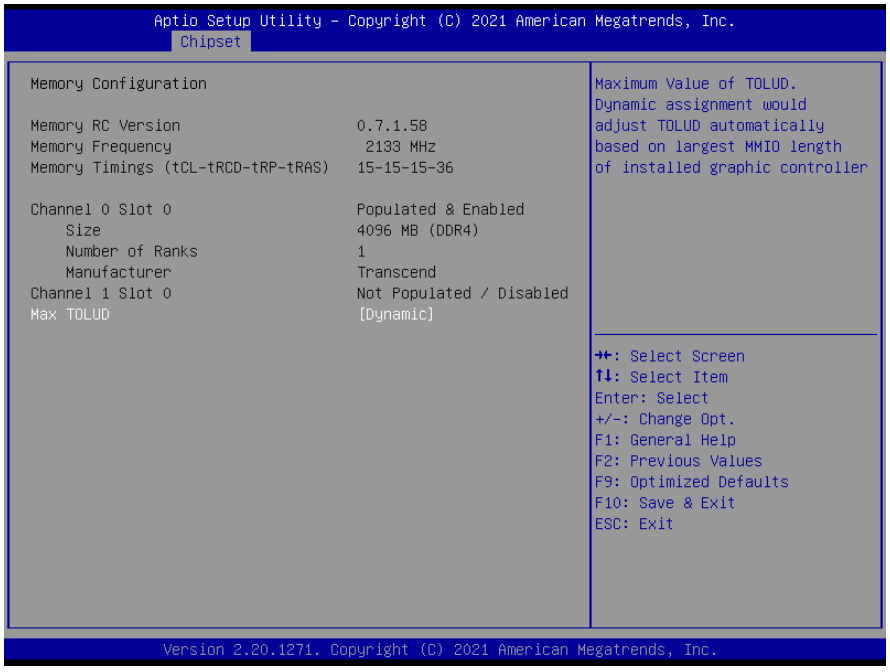


3.6.3.1 North Bridge Configuration



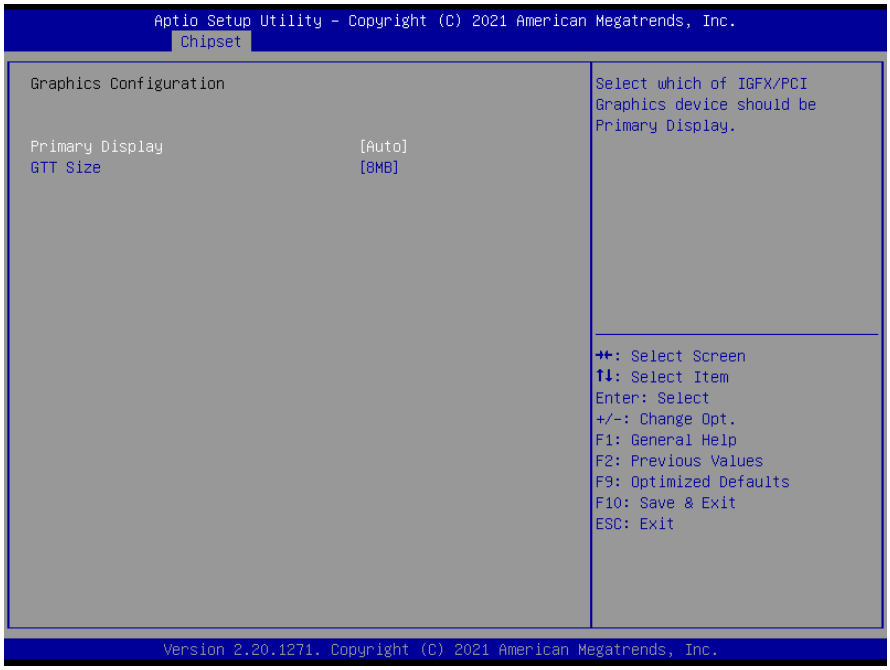
Item	Option	Description
VT-d	Disabled Enabled**[Default]**	VT-d capability.

3.6.3.1.1 Memory Configuration



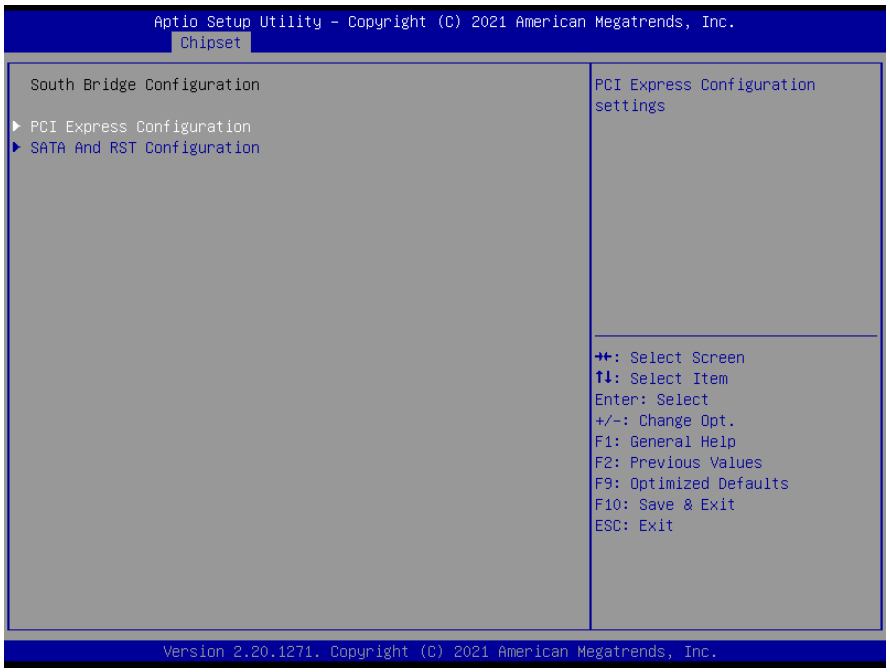
Item	Option	Description
Max TOLUD	Dynamic**[Default]** 1GB 1.25 GB 1.5 GB 1.75 GB 2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller

3.6.3.1.2 Graphics Configuration

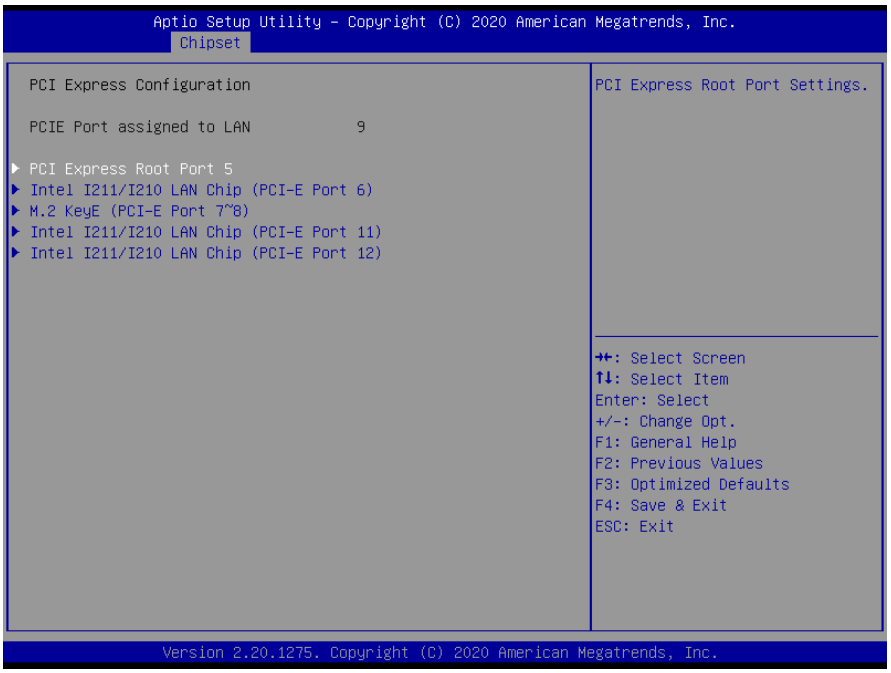


Item	Option	Description
Primary Display	Auto**[Default]** IGFX PCI	Select which of IGFX/PEG Graphics device should be Primary Display.
GTT Size	2MB 4MB 8MB**[Default]**	Select the GTT Size

3.6.3.2 South Bridge Configuration



3.6.3.2.1 PCI Express Configuration



3.6.3.2.1.1 PCI Express Root Port 5

Item	Option	Description
NGFFA1 (PCI-E Port 5)	Disabled Enabled**[Default]**,	Control the PCI Express Root Port.
ASPM 4	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
Detect Timeout	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.

3.6.3.2.1.2 RTL8111H LAN1 (PCI-E Port 6)

Item	Option	Description
RTL8111H LAN1 (PCI-E Port 6)	Disabled Enabled**[Default]**,	Control the PCI Express Root Port.
ASPM 5	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
Detect Timeout	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.

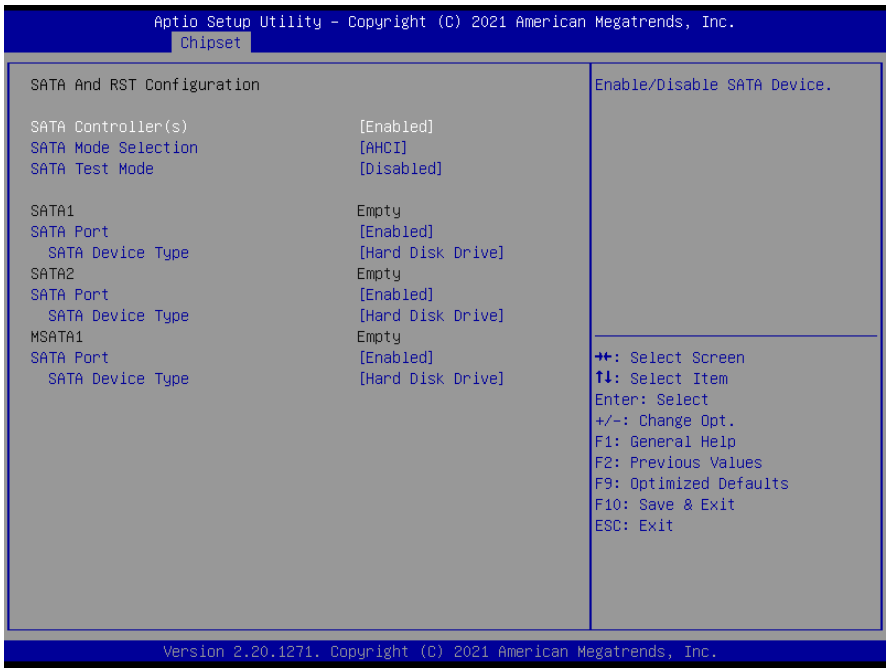
3.6.3.2.1.3 RTL8111H LAN2 (PCI-E Port 7)

Item	Option	Description
RTL8111H LAN2 (PCI-E Port 7)	Disabled Enabled**[Default]**,	Control the PCI Express Root Port.
ASPM 6	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
Detect Timeout	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.

3.6.3.2.1.4 PCIEX1 (PCI-E Port 8)

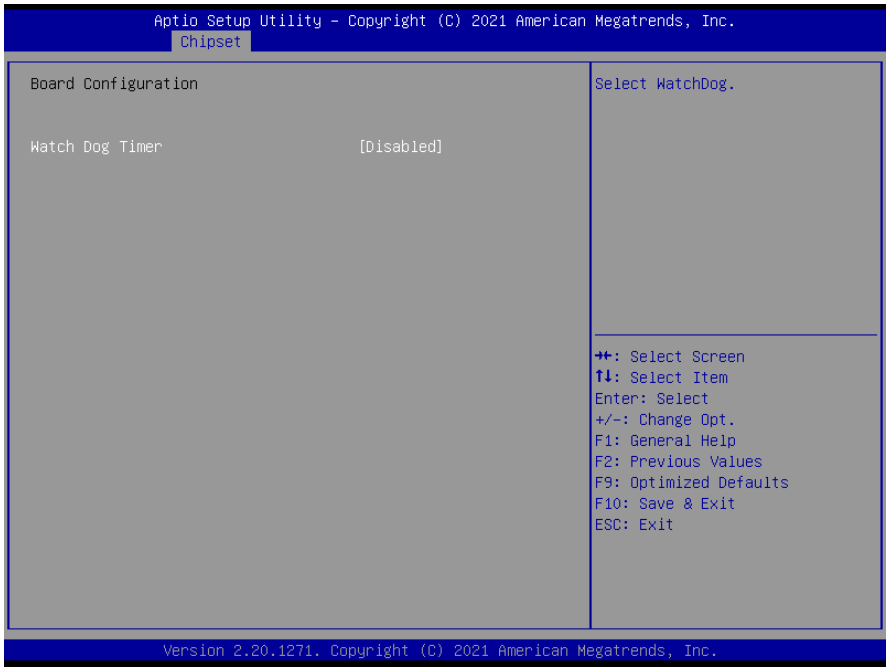
Item	Option	Description
PCIEX1 (PCI-E Port 8)	Disabled Enabled**[Default]**,	Control the PCI Express Root Port.
ASPM 7	Disabled**[Default]** L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s - Force all links to L0s State AUTO - BIOS auto configure DISABLE - Disables ASPM.
L1 Substates	Disabled L1.1 L1.1 & L1.2**[Default]**	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed
Detect Timeout	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.

3.6.3.2.2 SATA And RST Configuration



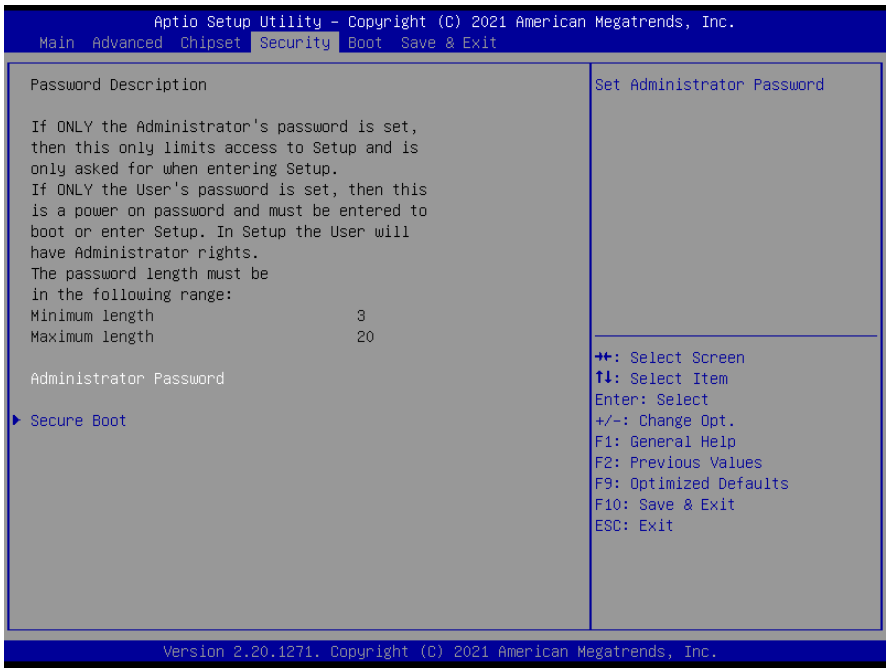
Item	Options	Description
SATA Configuration(S)	Enabled**[Default]**, Disabled	Enable/Disable SATA Device.
SATA Mode Selection	AHCI**[Default]**, RAID	Determines how SATA controller(s) operate.
SATA Test Mode	Enabled Disabled**[Default]**,	Test Mode Enable/Disable (Loop Back).
SATA Port	Disabled Enabled**[Default]**,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

3.6.3.3 Board Configuration



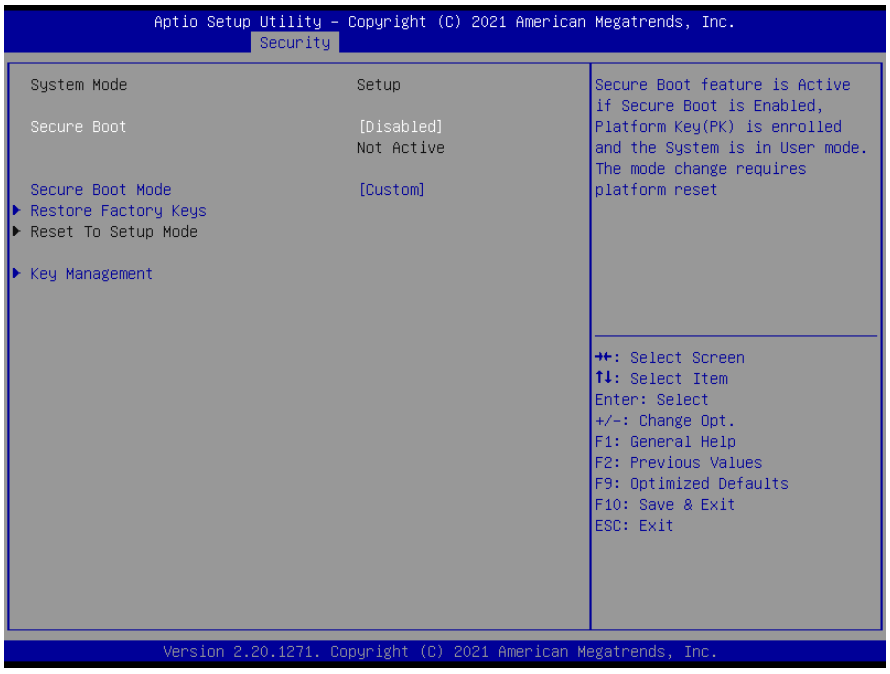
Item	Option	Description
Watch Dog Timer	Disabled**[Default]**, 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select WatchDog.

3.6.4 Security



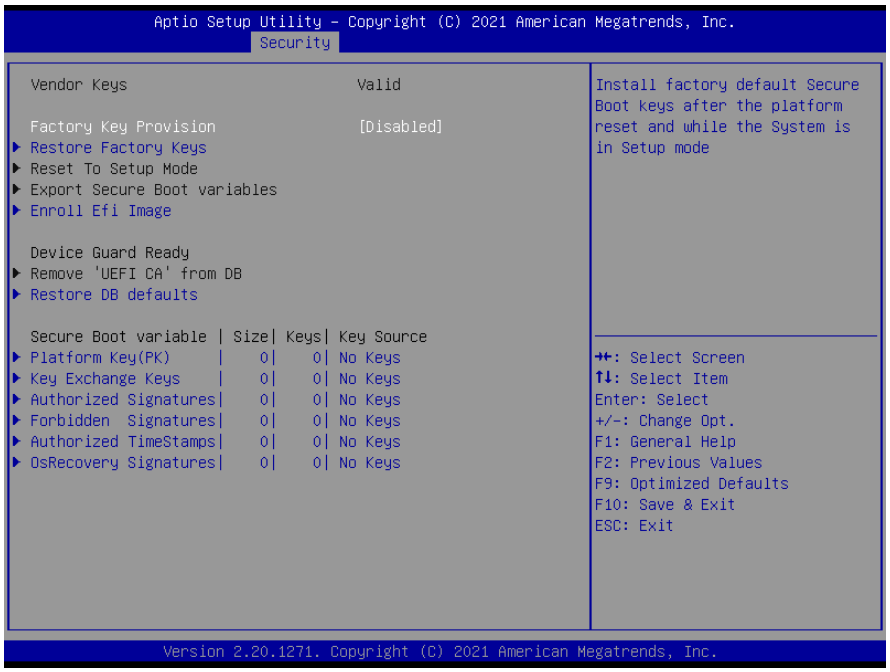
Item	Description
Administrator Password	Set Administrator Password
User Password	Set User Password

3.6.4.1 Secure Boot

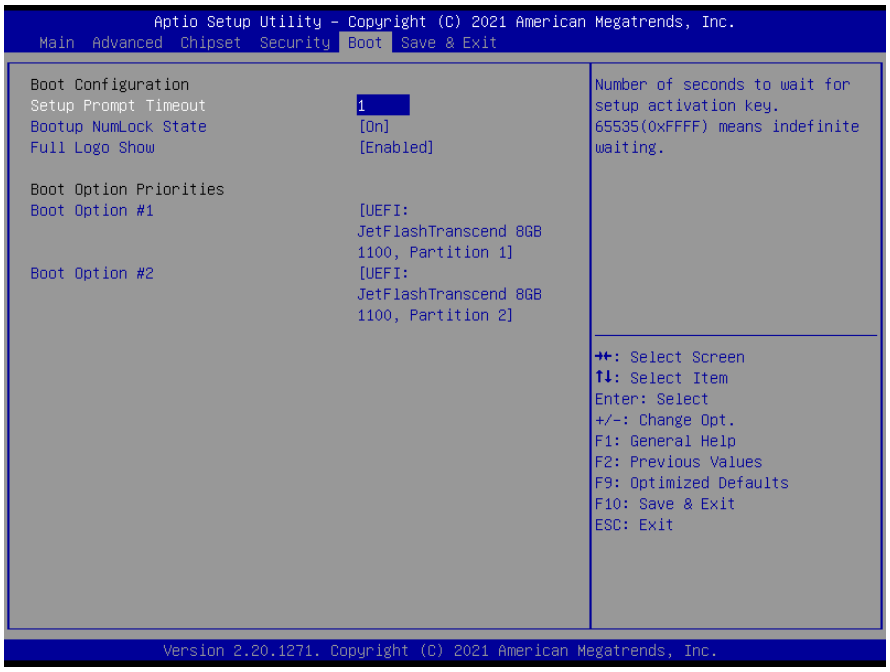


Item	Option	Description
Secure Boot	Disabled**[Default]**, Enabled	Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset
Secure Boot Mode	Standard Custom**[Default]**,	Secure Boot mode options: Standard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

3.6.4.1.1 Key Management

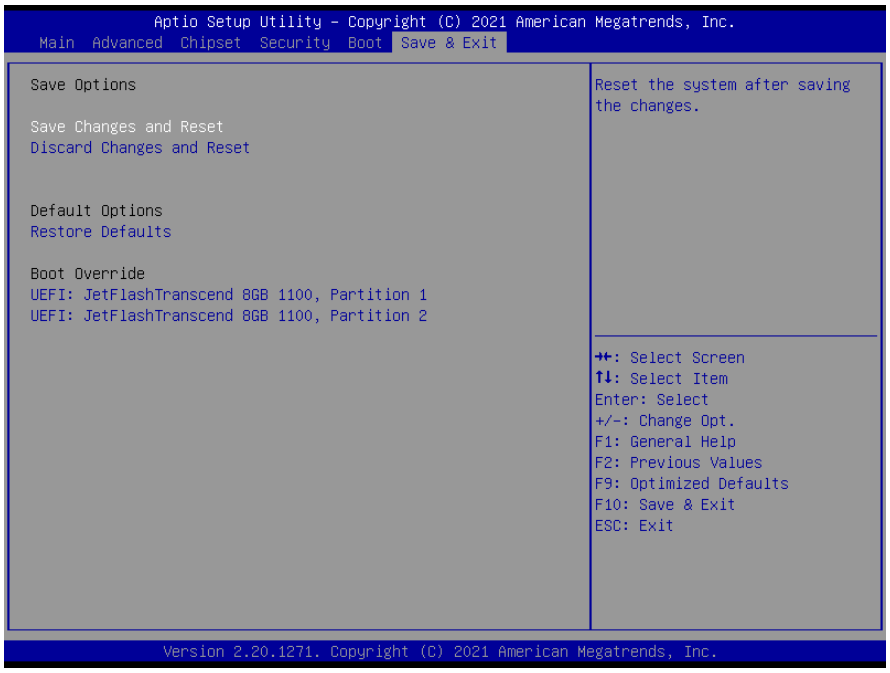


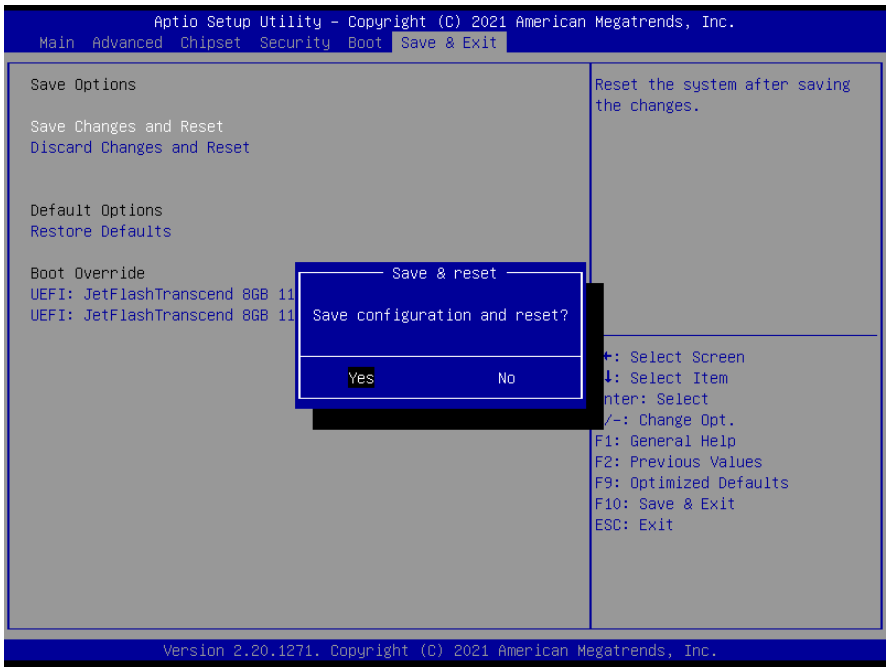
3.6.5 Boot



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**[Default]** Off	Select the keyboard NumLock state.
Quiet Boot	Disabled**[Default]** Enabled	Enable or disable Quiet Boot option.
Boot Option #1	Sets the system boot order	

3.6.6 Save & 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.

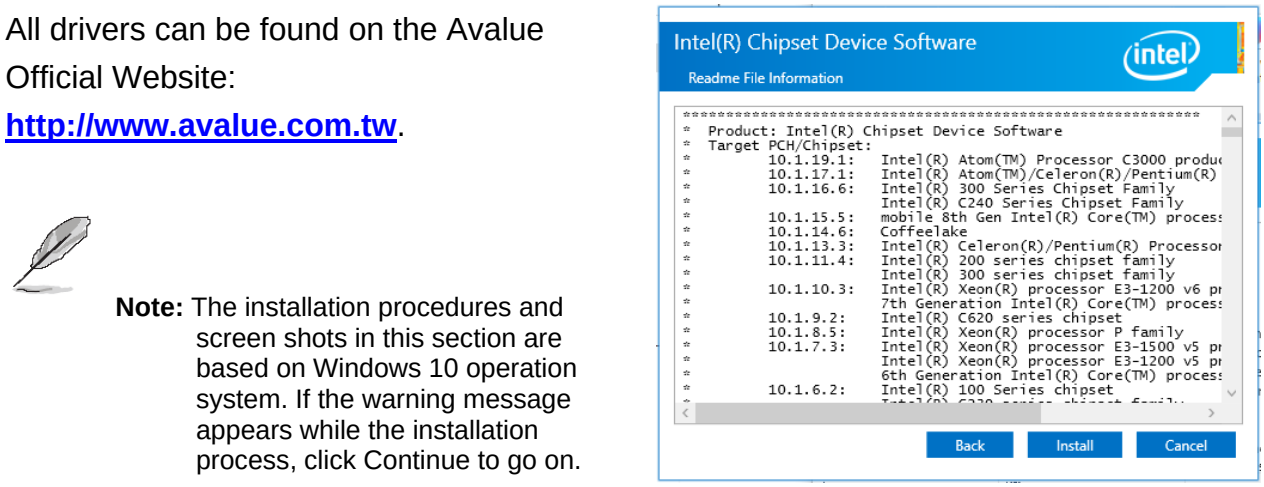
4. Drivers Installation

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.

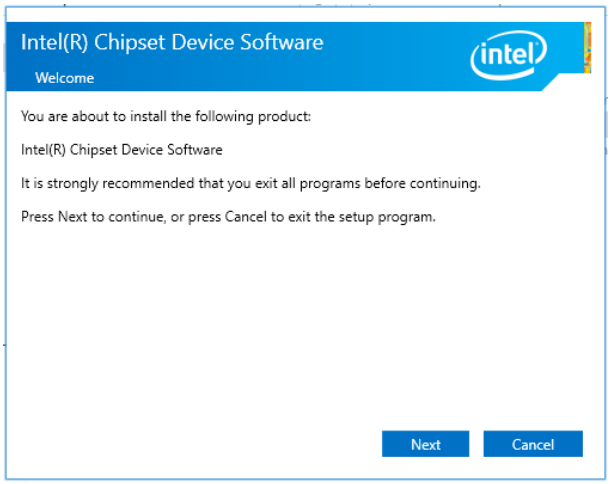
4.1 Install Chipset Driver

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.

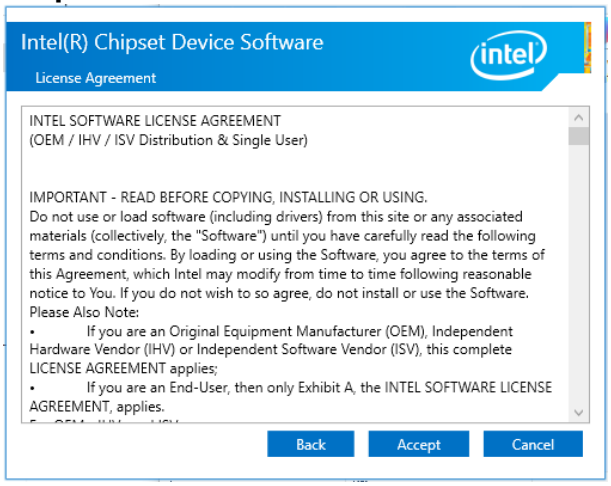


Step 3. Click **Install**.



Step1. Click **Next**.

Step 4. Complete setup.

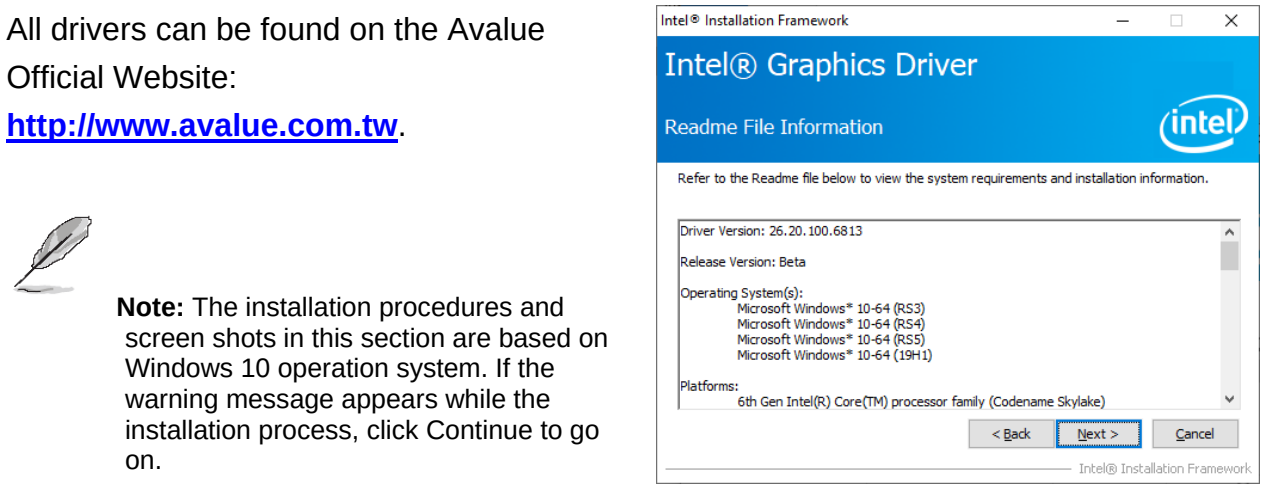


Step 2. Click **Accept**.

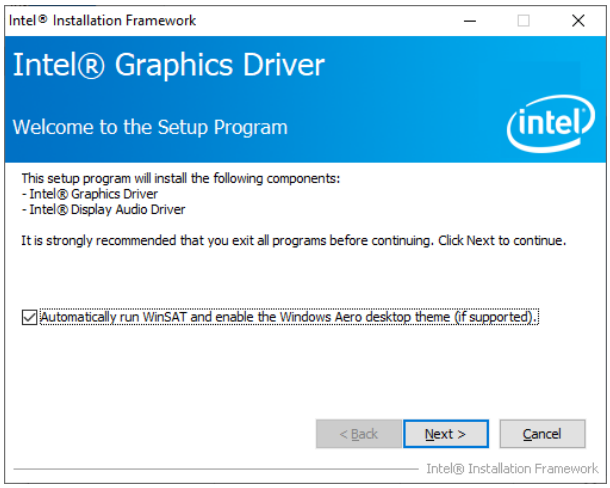
4.2 Install VGA Driver

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

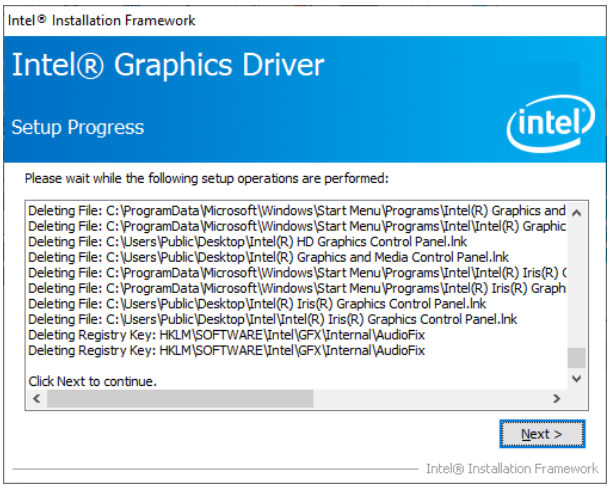
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



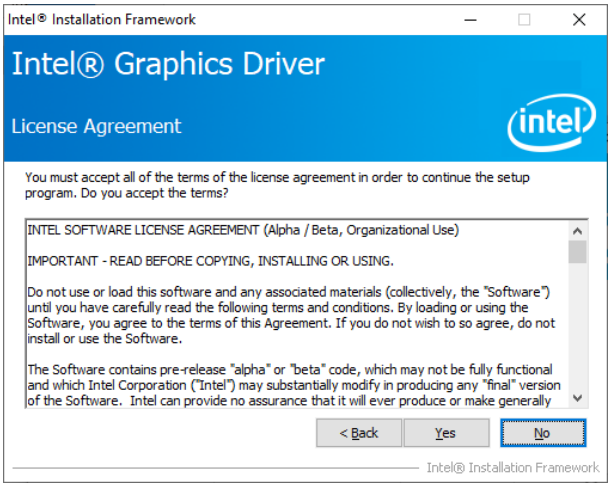
Step 3. Click **Next.**



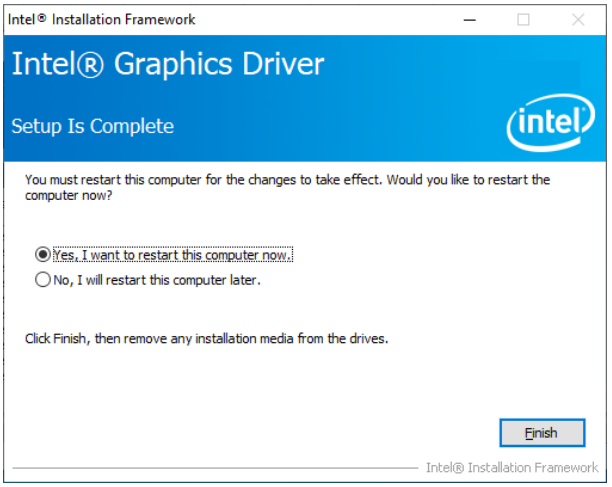
Step 1. Click **Next** to continue installation.



Step 4. Click **Next**.



Step 2. Click **Yes**.



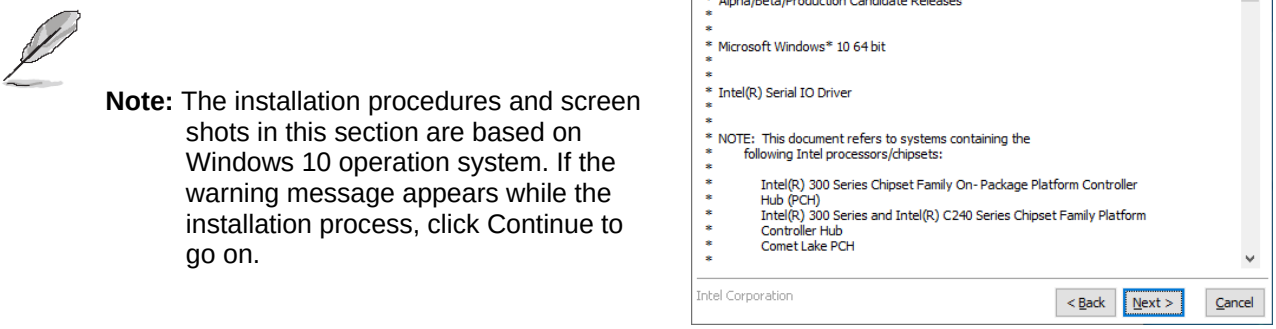
Step 5. Click **Finish** to complete setup.

4.3 Install Serial IO Driver

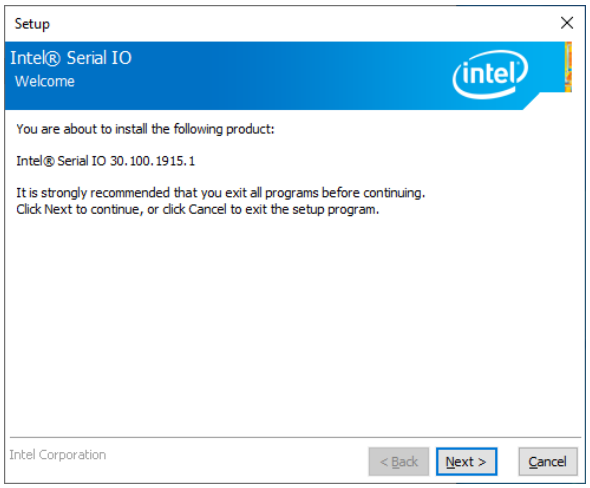
All drivers can be found on the Avalue Official Website:

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

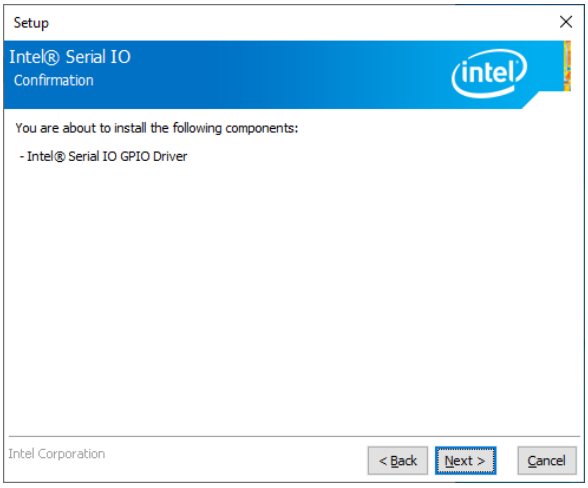
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



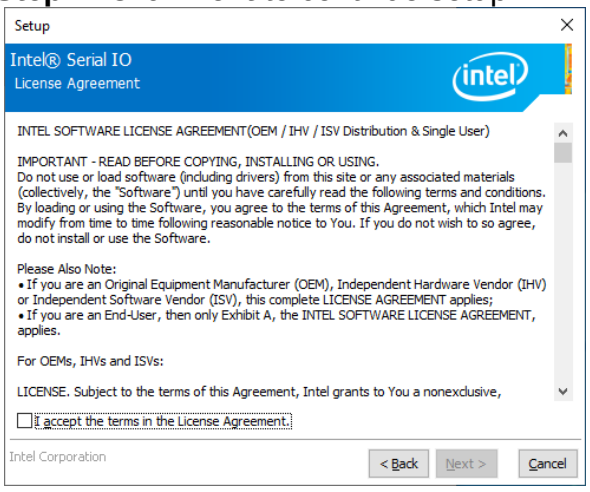
Step 3. Click **Next**.



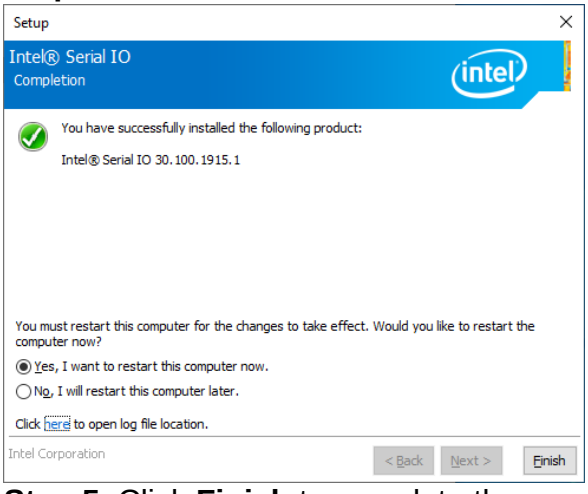
Step 1. Click **Next** to continue setup.



Step 4. Click **Next**.



Step 2. Click **Next**.

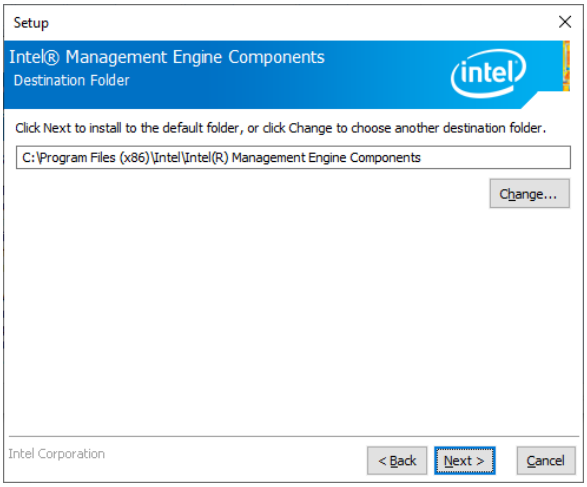


Step 5. Click **Finish** to complete the setup.

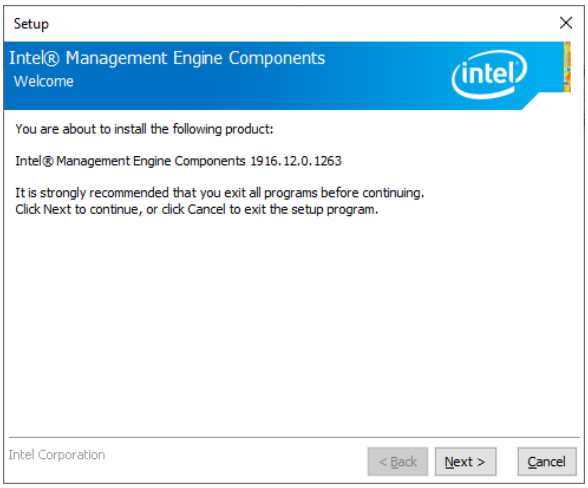
4.4 Install ME Driver

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

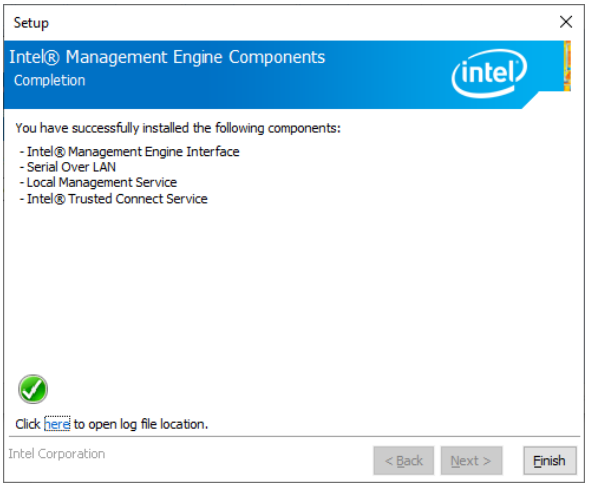
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



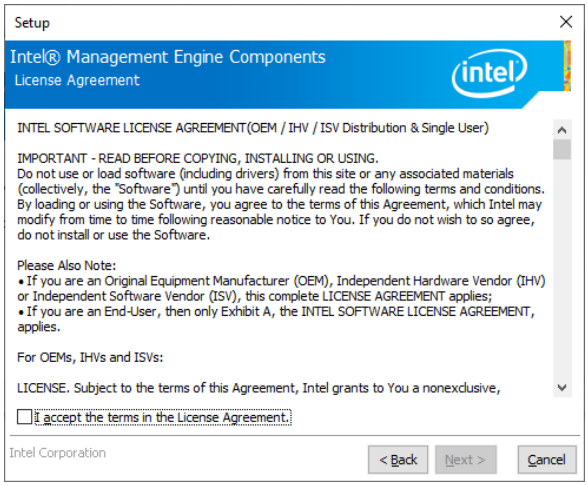
Step 3. Click **Next**



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



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

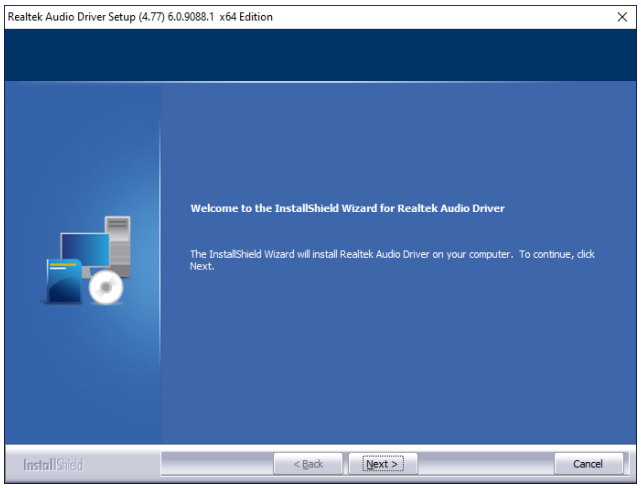


Step 2. Click **Next**.

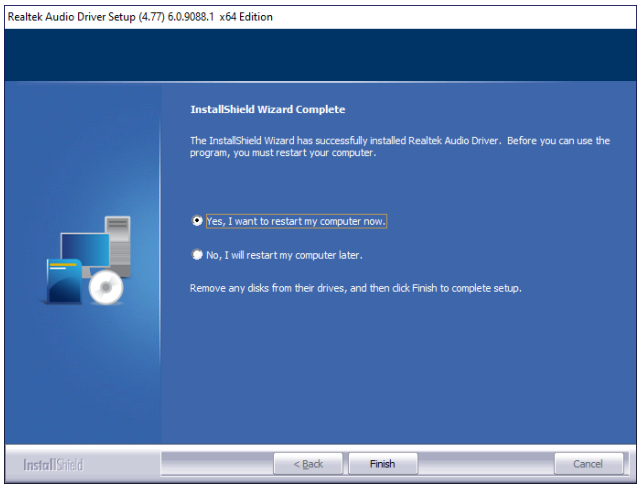
4.5 Install Audio Driver

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.



Step1. Click **Next** to Install.

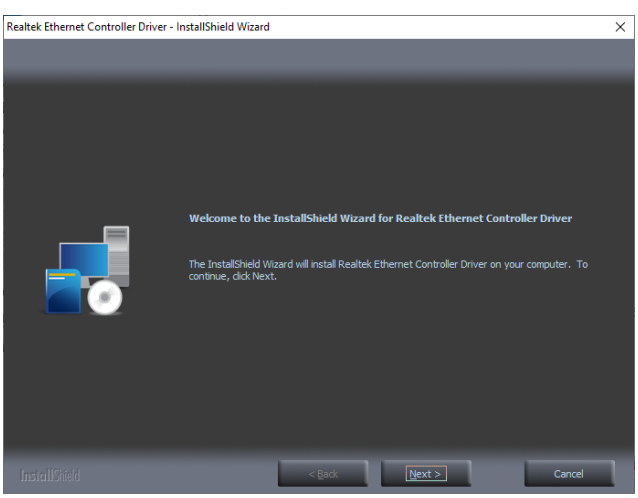


Step 2. Select **Finish** to complete Installation.

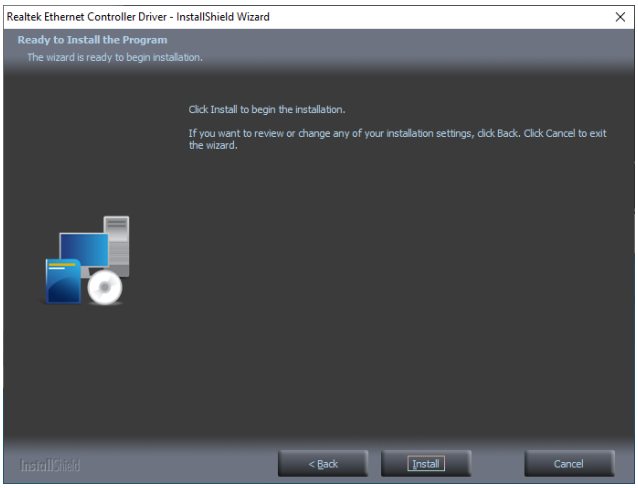
4.6 Install LAN Driver

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

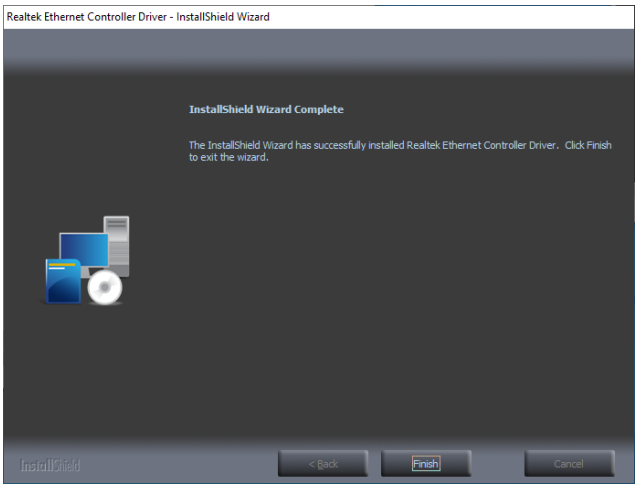
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



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



Step 2. Click **Install**.

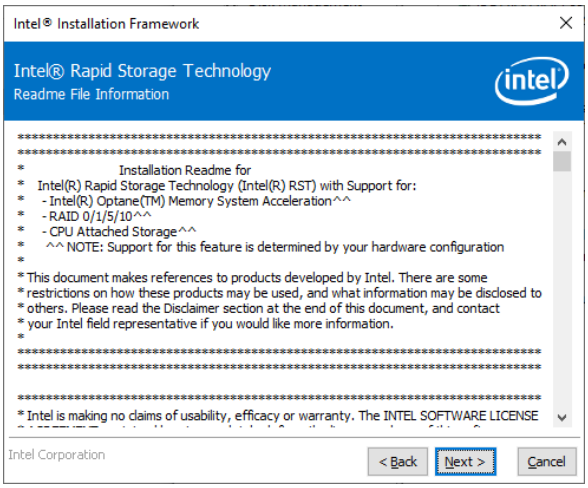


Step 3. Select **Finish** to complete Installation.

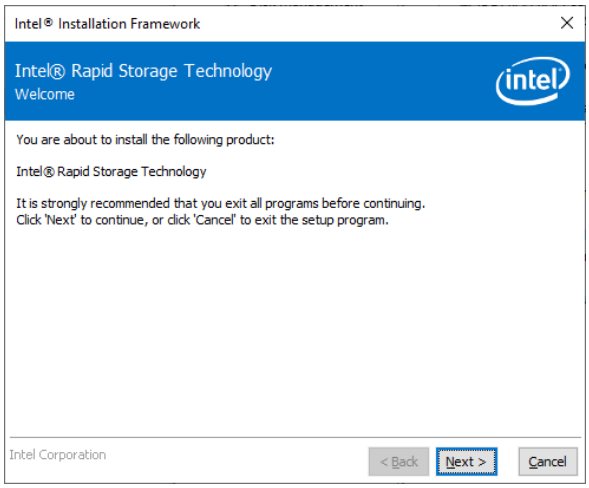
4.7 Install RST Driver

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

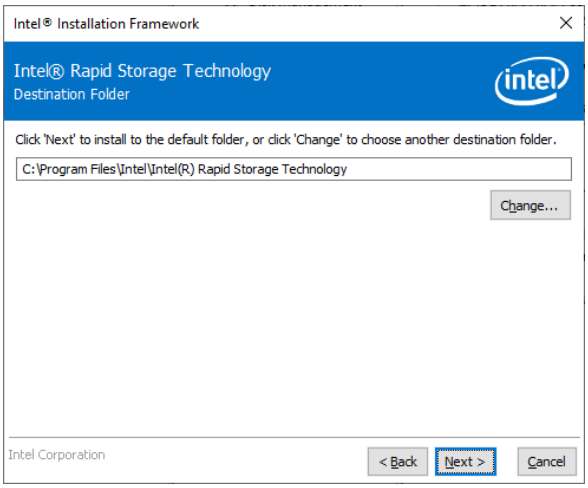
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



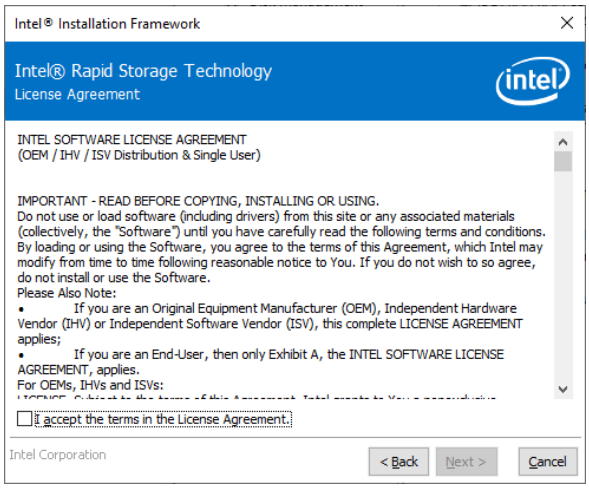
Step 3. Click **Next.**



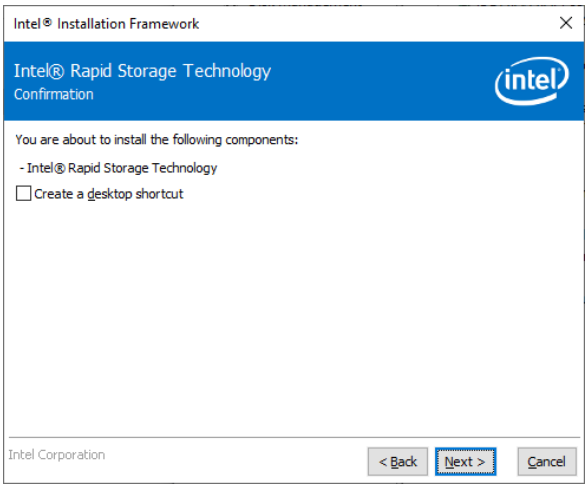
Step 1. Click **Next** to continue installation.



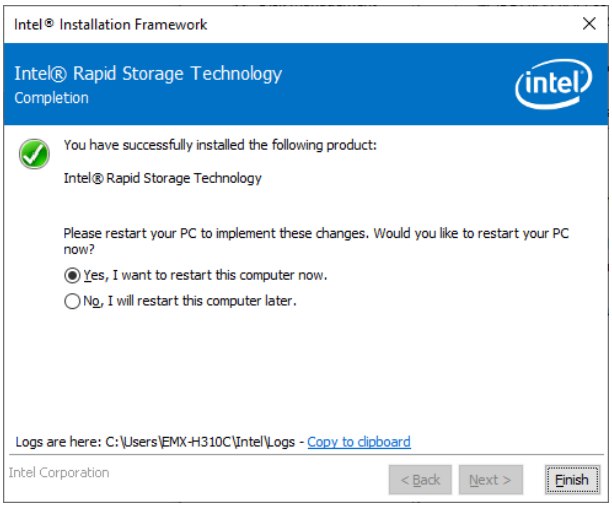
Step 4. Click **Next**.



Step 2. Click **Next**.

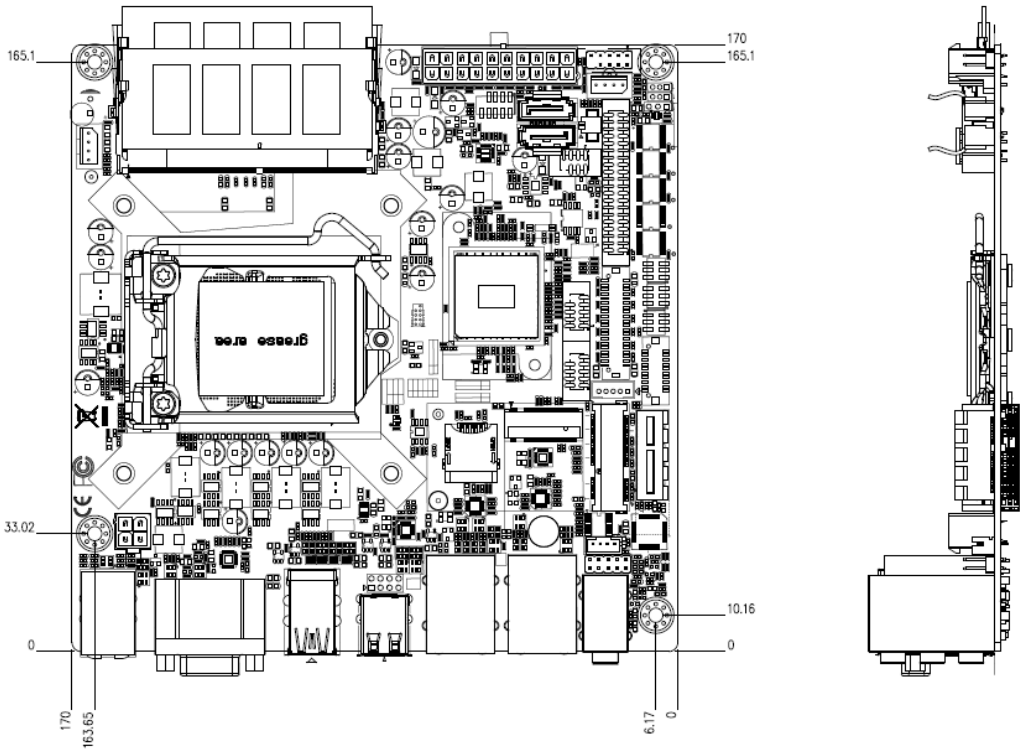


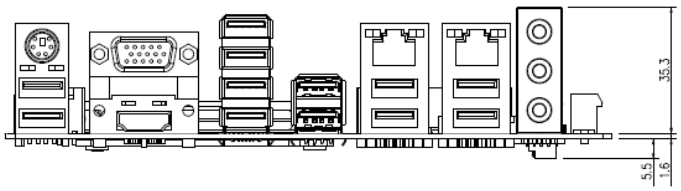
Step 5. Click **Finish** to complete setup.



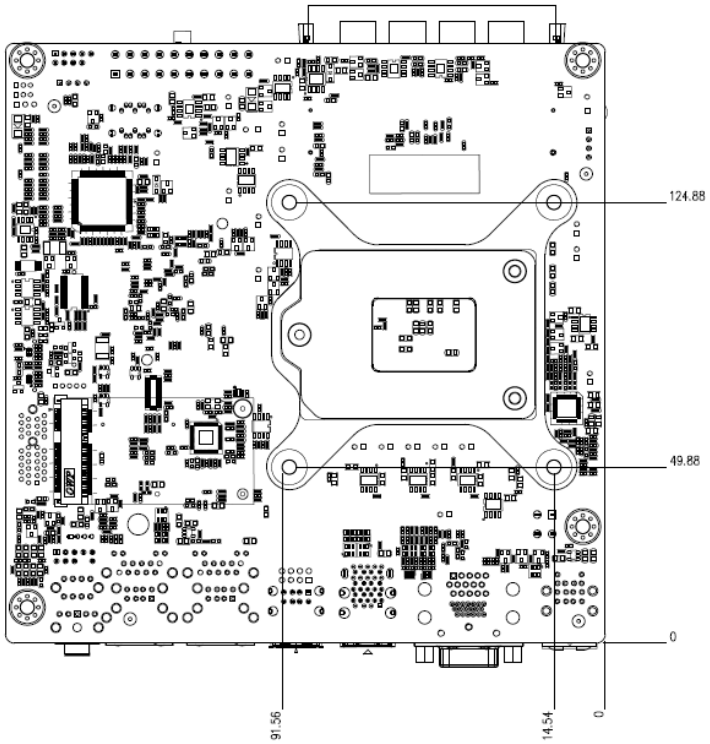
Step 6. Click **Finish** to complete setup.

5. Mechanical Drawing





Unit: mm



Unit: mm

6. Appendix

Board Configuration_Panel Interface LVDS

1. EMX-H310C Model standard version no LVDS, no eDP. For OEM version with LVDS or eDP by MOQ production, please contact Avalue sales.
2. LVDS default resolution only 1024x768@60Hz, if customer may need other resolution, please contact Avalue AE for OEM BIOS request.