

ECM-CFS

3.5" Coffee Lake-S Micro Module

User's Manual

7th Ed – 19 July 2023

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Part No. E2047394206R

FCC Statement



THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

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

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

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

A Message to the Customer

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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.

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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:

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1. Getting Started

1.1 Safety Precautions

Warning!



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

Caution!



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

1.2 Packing List

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

- 1 x ECM-CFS 3.5" Micro Module
- 1 x AUX-032 daughter board
- 1 x Cable set contains the followings:
 - 1 x Audio cable (12P/2.0mm-12P/ 2.0mm)
 - 1 x USB 2.0 cable (10P/2.0mm-10P/2.0mm)
 - 1 x Serial ATA cable (7P/1.27mm, standard)
 - 1 x Wire SATA power cable (15P/1.27mm-2P/2.0mm)
 - 1 x Flat Cable 9P(M)-PHD (10P/2.0mm)
- 3M foam (VHB-4622 10mm*20mm*1.1mm)



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

1.3 Document Amendment History

Revision	Date	By	Comment
1 st	August 2018	Avalue	Initial Release
2 nd	July 2019	Avalue	Update 2.3 Setting Jumpers & Connectors
3 rd	August 2019	Avalue	Update 1.5 System Specifications
4 th	October 2019	Avalue	Remove CEC1 connector
5 th	November 2019	Avalue	Update 1.5 System Specifications
6 th	September 2022	Avalue	Update 2.3.14 LVDS connector (JLVDS1)
7 th	July 2023	Avalue	Update 1.5 System Specifications

1.4 Manual Objectives

This manual describes in details Avalue Technology ECM-CFS 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 ECM-CFS 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	8 th /9 th generation Intel® Coffee lake-S (LGA 1151) 6+2,4+2 Processor (35W)
BIOS	AMI uEFO BIOS,256 Mbit SPI Flash ROM iAMT supported
System Chipset	Intel® CNL PCH-H Q370/H310 Corp
I/O Chip	EC(IT8528E)
System Memory	1 x 260-Pin DDR4 2400/2666MTs SO-DIMM up to 32GB
SSD	mSATA from MiniPCIe
Watchdog Timer	H/W Reset, 1sec. – 65535sec./min. 1sec. or 1min. step
H/W Status Monitor	Monitoring System Temperature, Voltage and FAN Status with Auto Throttling Control
Expansion	1 x Full-Size Mini PCI Express Mini Card with mSATA supported
I/O	
MIO	2 x SATA III (with 2 x (1 x 2)pin wafer w/2.0mm pitch for SATA Power) 1 x RS232 (COM1) 1x RS232 for COM2 LPC,SPI 1 x Full-Size Mini PCI Express with mSATA supported (Q370 w/PCIe/SATA/USB 2.0) (H310 w/SATA/USB2.0)
USB	4 x USB3.1 Gen2(dual deck USB connector for 2 USB3.1 port 10Gbps) (H310 support USB3.1 Gen1,Q370 support USB3.1 Gen2), 2 x USB 2.0(by 2 x 5 pin header)
GPIO	8-bit GPIO
Others	LPC
Display	
Chipset	Intel® Coffee Lake Processor integrated Graphics
Resolution	LVDS: 1920 x 1200@60Hz 2 x HDMI: 4096 x 2304@30Hz (cost reduce)
Multiple Display	Q370 support Triple Display H310 only support Dual Display:LVDS+HDMI1(default LVDS enable)or HDMI1+HDMI2(LVDS disabled)
HDMI	HDMI 1.4
LCD Interface	Dual channel 18/24-bit LVDS (via 7511B)
Audio	

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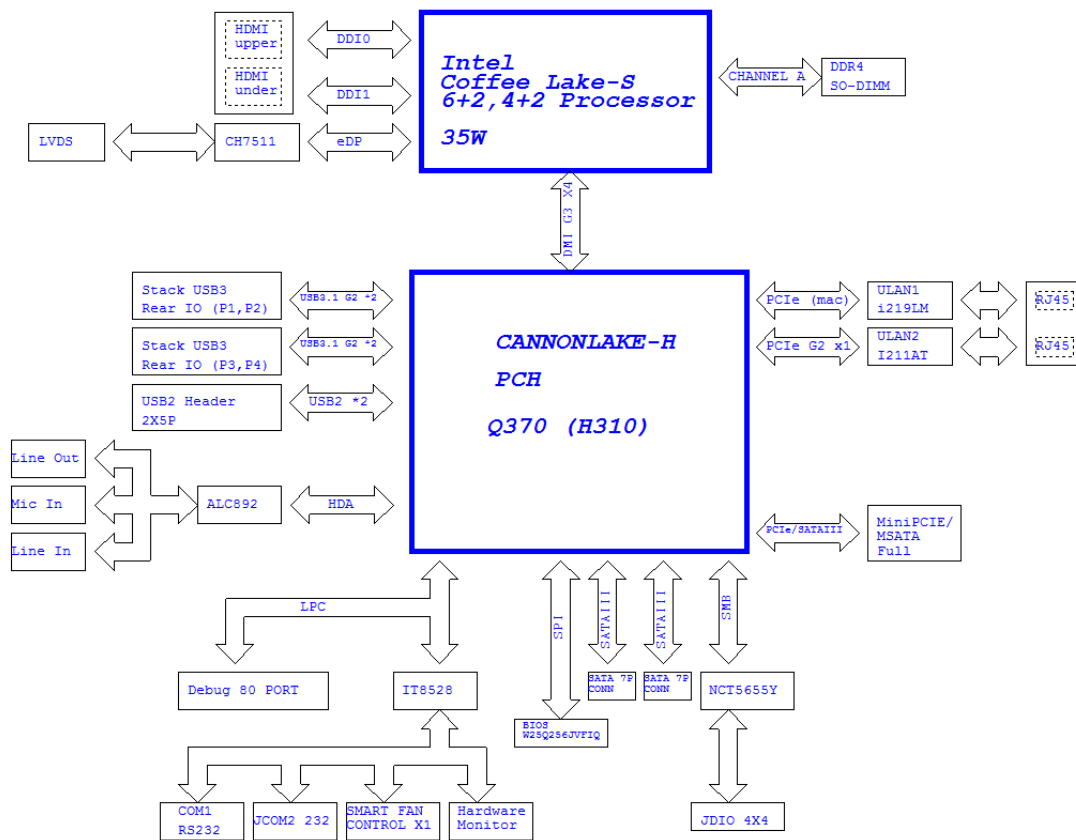
AC97 Codec	Realtek ALC892 HD codec Supports 5.1-CH Audio
Audio Interface	Line in ,Line-Out, Mic in
Ethernet	
LAN Chip	1 x Intel I211AT GbE controller 1 x Intel I219LM Gigabit Ethernet PHY
Ethernet Interface	10/100/1000 Base-Tx compatible
Internal I/O Connectors	
Fan	CPU_FAN1 4pin 2.5mm wafer header (smart FAN)
Buzzer	With Pin header
CMOS Battery	CR2032
Power ON	AX / ATX selectable by jumper
Audio	6 x 2 pin header w/2.0mm pitch
COM	1 x JCOM2 (RS232)
SATA power	2 x (1 x 2)pin wafer for SATA power
Rear I/O Connectors	
USB	4 x USB3.1 (10Gbps) type-A
LAN	2 x Ethernet
HDMI	2 x HDMI
COM	1 x DB-9 male connector for COM1(RS-232)(support RI,5V,12V)
LED	Stack LED for PWR and HDD LED
Mechanical & Environmental	
Power Requirement	+12V
ACPI	Single power ATX Support S0, S3, S4, S5 ACPI 5.0 Compliant
Power Type	AT/ATX
Operating Temp.	0°C ~60°C(32°F ~ 140°F)
Storage Temp.	-40°C ~75°C (-40°F ~ 167°F)
Operating Humidity	0% ~ 90% relative humidity, non-condensing
Size (L x W)	5.7" x 4" (146mm x 101mm)
Weight	0.44 lbs (0.2 Kg)
OS Support	Win 10 / Linux



Note: Specifications are subject to change without notice.

1.6 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of ECM-CFS.



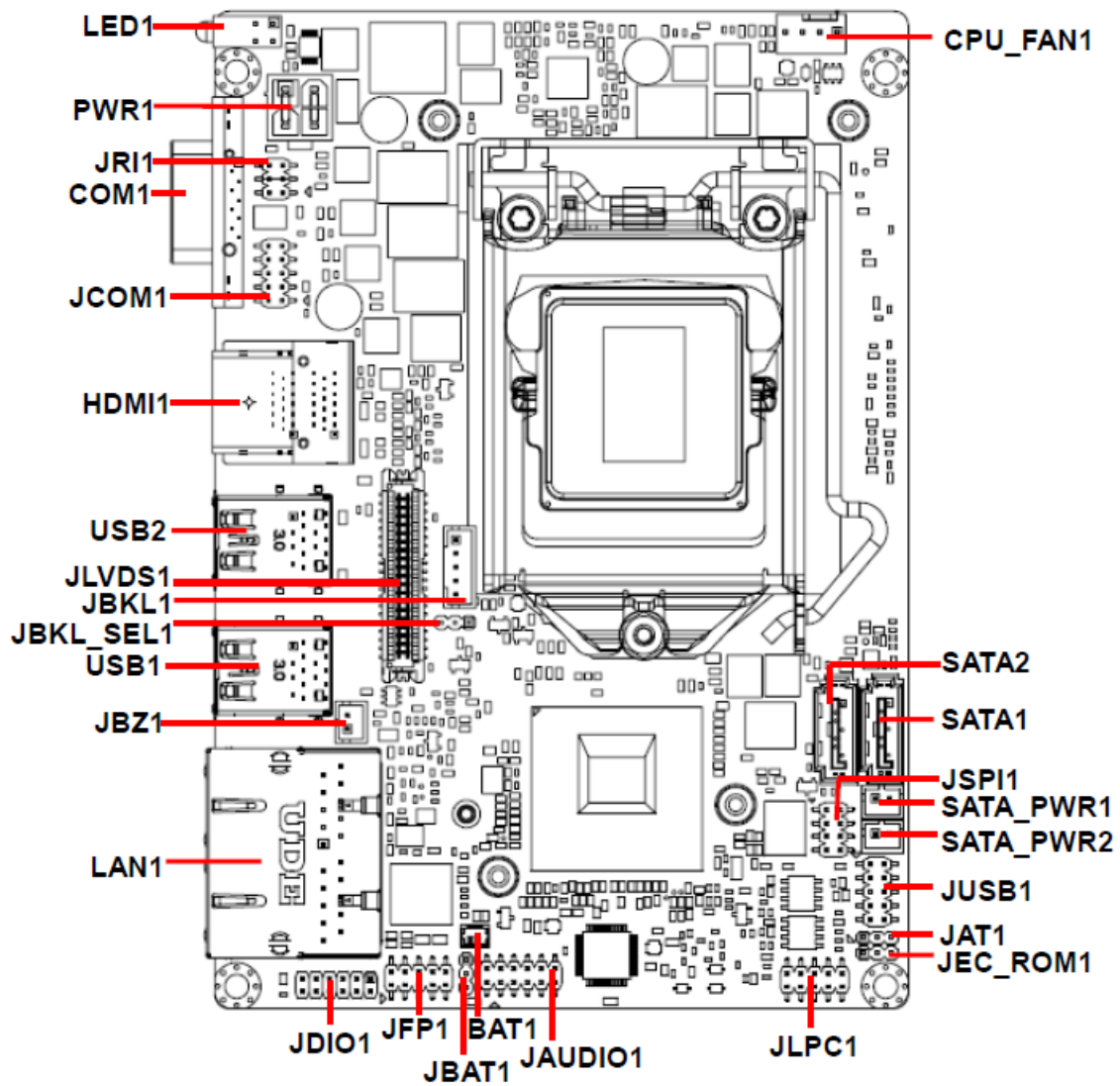
2. Hardware Configuration

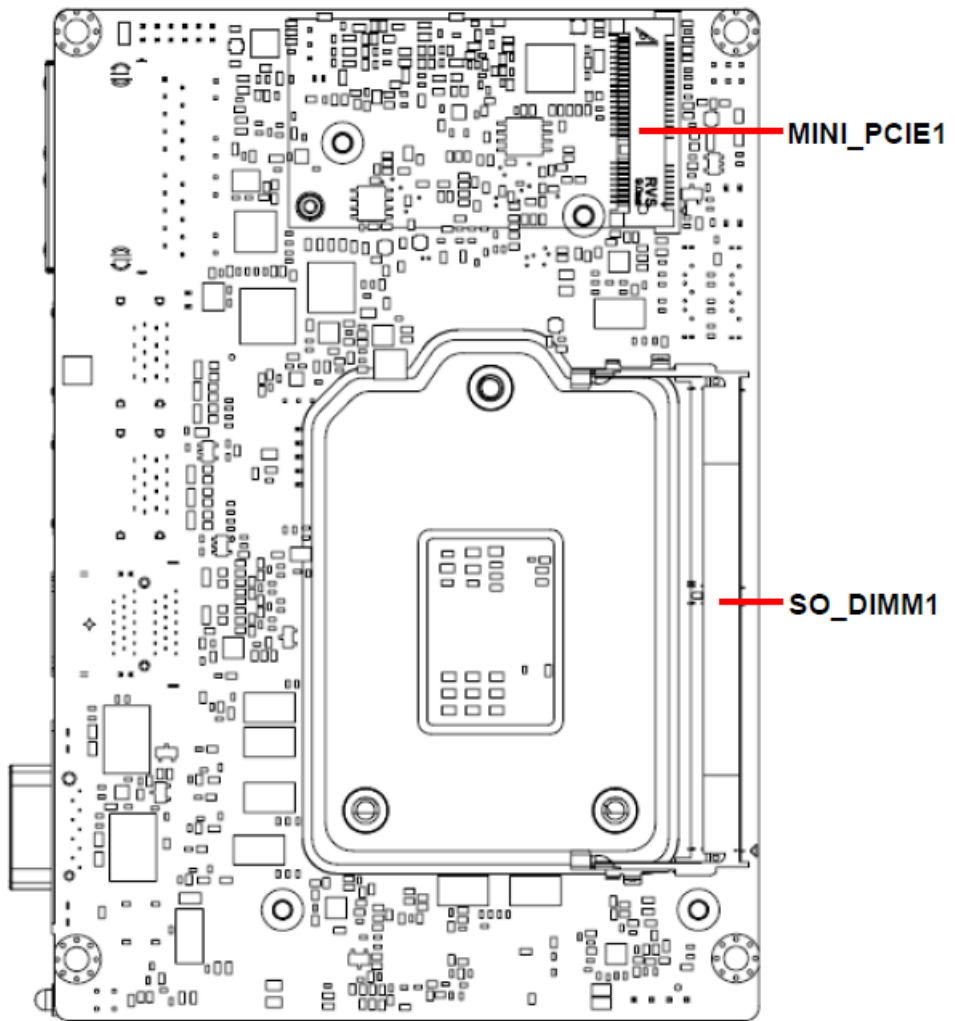


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2.1 Product Overviews





2.2 Jumper & Connector list

Jumpers

Label	Function	Note
JBAT1	Clear CMOS	3 x 1 header, pitch 2.00 mm
JRI1	Serial port 1 pin9 signal select	3 x 2 header, pitch 2.00 mm
JAT1	AT/ATX Input power select	3 x 1 header, pitch 2.00 mm
JBKL_SEL1	LCD backlight brightness adjustment	3 x 1 header, pitch 2.00 mm

Connectors

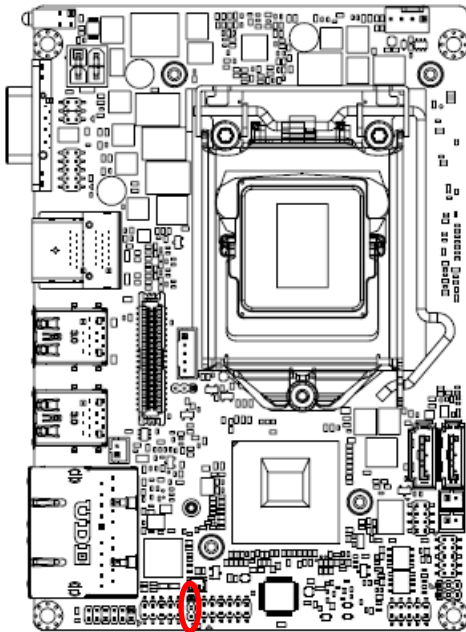
Label	Function	Note
BAT1	Battery connector	2 x 1 wafer, pitch 1.25 mm
CPU_FAN1	CPU fan connector	4 x 1 wafer, pitch 2.54 mm
JAUDIO1	Audio connector	6 x 2 header, pitch 2.00 mm
JBKL1	LCD inverter connector	5 x 1 wafer, pitch 2.00 mm Matching Connector: JST PHR-5
COM1	Serial port 1 connector	D-sub 9-pin, male
JCOM1	Serial port 2 connector	5 x 2 header, pitch 2.00 mm
JDIO1	General purpose I/O connector	6 x 2 header, pitch 2.00 mm
JFP1	Front Panel connector	5 x 2 header, pitch 2.00 mm
JLPC1	LPC connector	5 x 2 header, pitch 2.00 mm
JLVDS1	LVDS connector	20 x 2 header, pitch 1.25 mm Matching Connector: Hirose DF13-40DS-1.25C
JSPI1	SPI connector	4 x 2 header, pitch 2.00 mm
USB1/2	H310 support USB3.1 Gen1 Q370 support USB3.1 Gen2	
JUSB1	On-board header for USB2.0	5 x 2 header, pitch 2.00 mm
HDMI1	DUAL HDMI connector	
LAN1	RJ-45 Ethernet x 2	
LED1	HDD/Power LED indicator	
PWR1	Power connector	2 x 2 wafer, pitch 4.20 mm
SATA_PWR1	SATA power connector 1	2 x 1 wafer, pitch 2.00 mm
SATA_PWR2	SATA power connector 2	2 x 1 wafer, pitch 2.00 mm
SATA1/2	Serial ATA connector 1/2	

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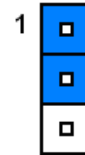
JBZ1	PC Buzzer header	2 x 1 wafer, pitch 2.00 mm
JEC_ROM1	EC Debug connector	3 x 1 header, pitch 2.00 mm
MINI_PCIE1	Full size Mini-PCI-e connector	
SO_DIMM1	DDR4 SODIMM socket	

2.3 Setting Jumpers & Connectors

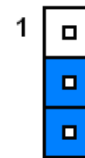
2.3.1 Clear CMOS (JBAT1)



Protect*

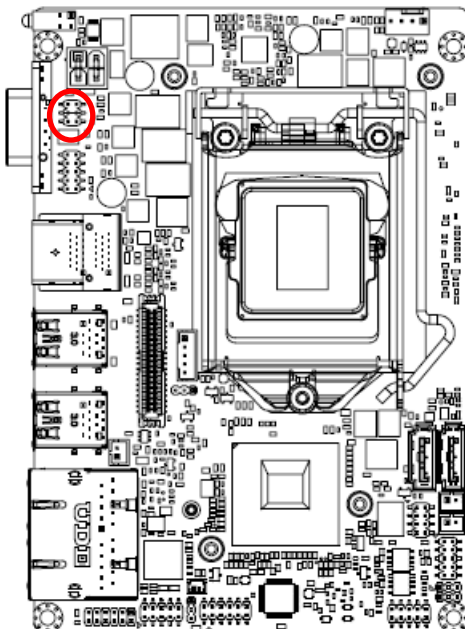


Clear CMOS

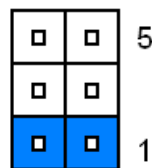


* Default

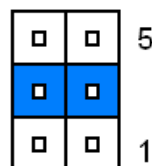
2.3.2 Serial port 1 pin9 signal select (JR1)



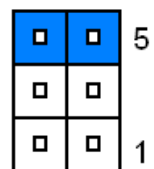
Ring*



+5V

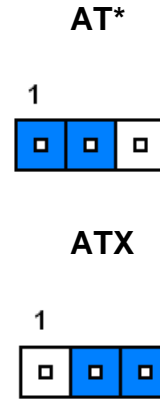
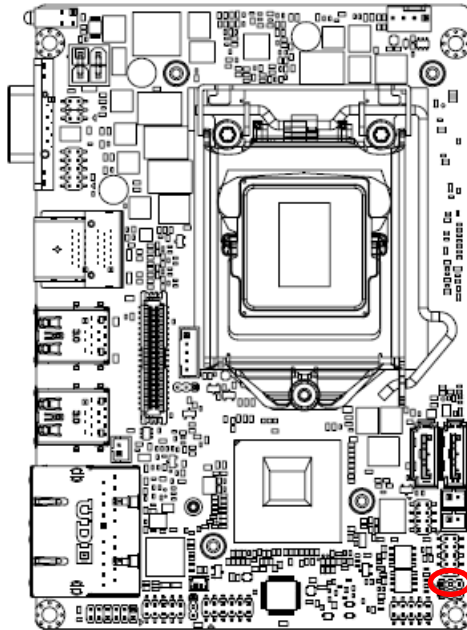


+12V

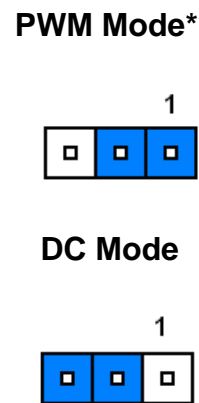
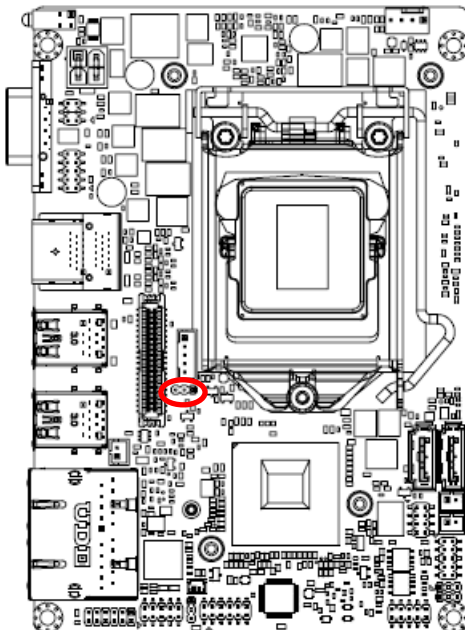


* Default

2.3.3 AT/ATX Input power select (JAT1)

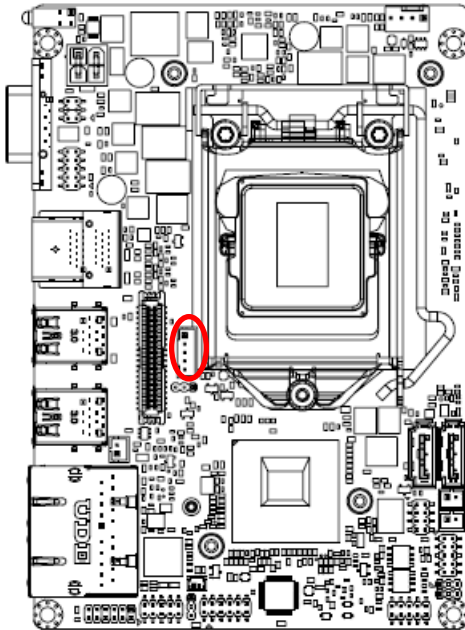


2.3.4 LCD backlight brightness adjustment (JBKL_SEL1)



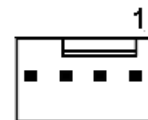
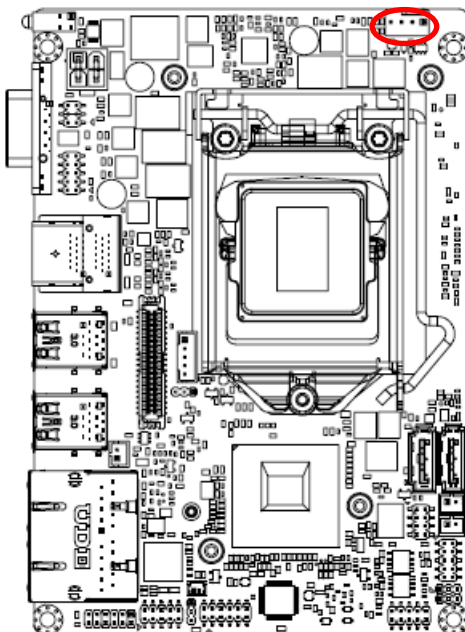
* Default

2.3.5 LCD Inverter connector (JBKL1)



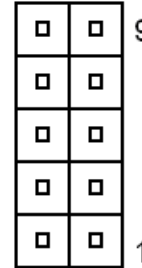
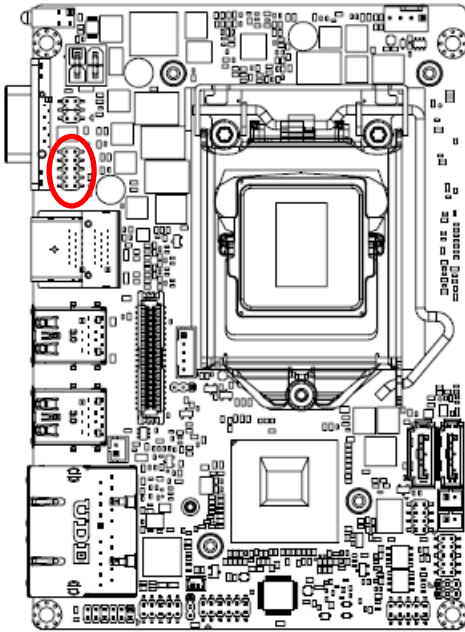
Signal	PIN
+12V	1
GND	2
BKLEN	3
VBRIGHT	4
+5V	5

2.3.6 CPU fan connector (CPU_FAN1)



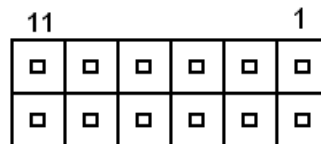
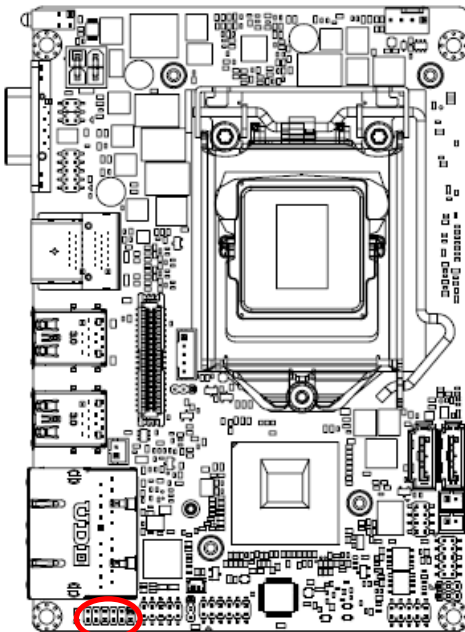
Signal	PIN
GND	1
+12V	2
CFAN_IN	3
CFAN_OUT	4

2.3.7 Serial port 2 connector (JCOM1)



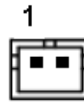
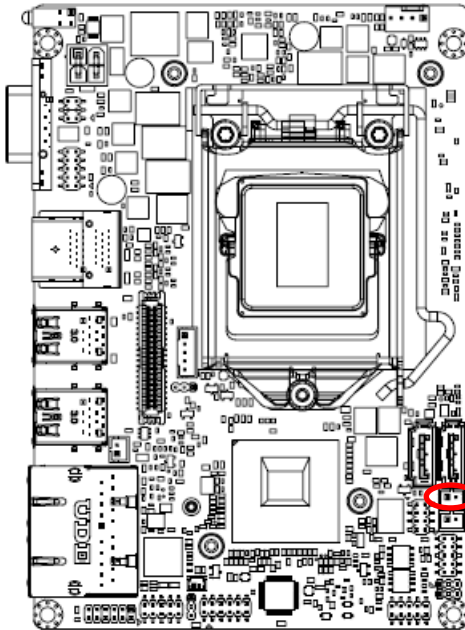
Signal	PIN	PIN	Signal
NC	10	9	COM_RI#_2
COM_CTS#_2	8	7	COM_RTS#_2
COM_DSR#_2	6	5	GND
COM_DTR#_2	4	3	COM_TXD_2
COM_RXD_2	2	1	COM_DCD#_2

2.3.8 General purpose I/O connector (JDIO1)



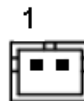
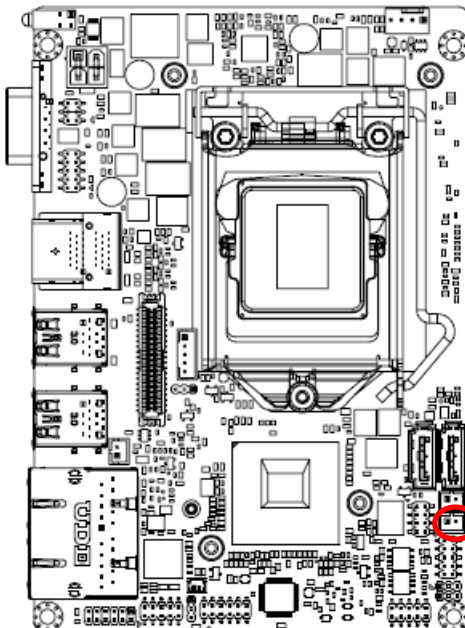
Signal	PIN	PIN	Signal
DIO_GP20	1	2	DIO_GP10
DIO_GP21	3	4	DIO_GP11
DIO_GP22	5	6	DIO_GP12
DIO_GP23	7	8	DIO_GP13
SMB_SCL_S0	9	10	SMB_SDA_S0
GND	11	12	+5V

2.3.9 SATA power connector 1 (SATA_PWR1)



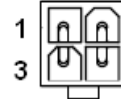
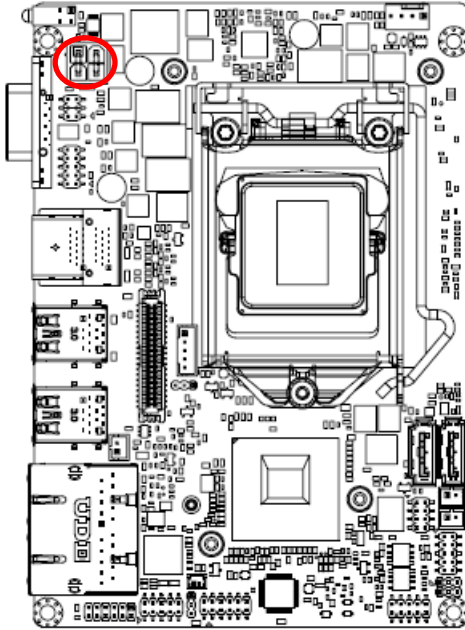
Signal	PIN
GND	1
SATA_PWR1	2

2.3.10 SATA power connector 2 (SATA_PWR2)



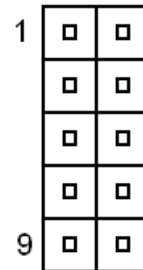
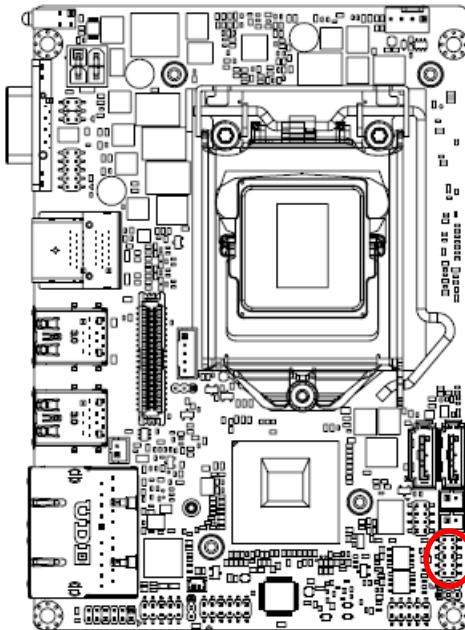
Signal	PIN
GND	1
SATA_PWR2	2

2.3.11 Power connector (PWR1)



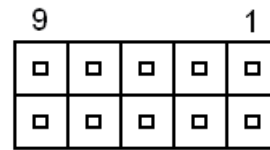
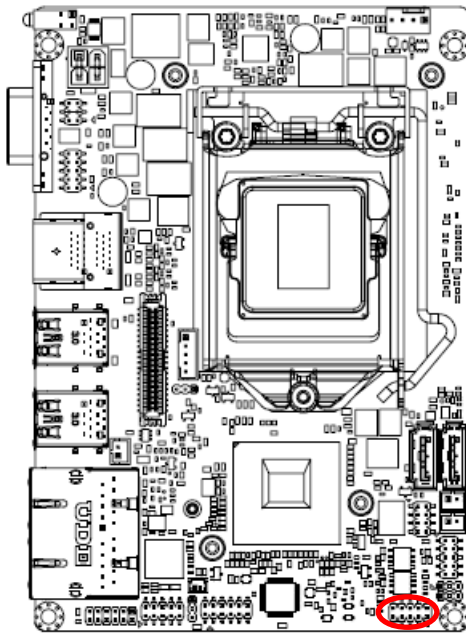
Signal	PIN	PIN	Signal
GND	1	2	GND
+12V	3	4	+12V

2.3.12 On-board header for USB2.0 (JUSB1)



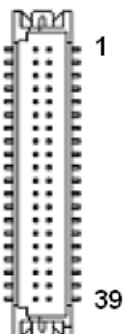
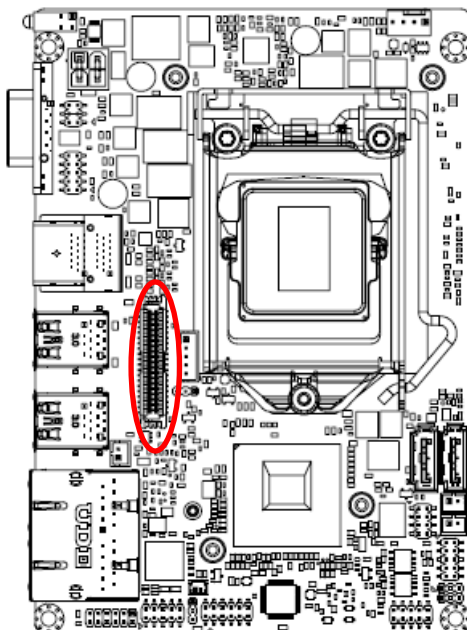
Signal	PIN	PIN	Signal
+5VSB	1	2	GND
USB_R_DN5	3	4	GND
USB_R_DP5	5	6	USB_R_DP6
GND	7	8	USB_R_DN6
GND	9	10	+5VSB

2.3.13 LPC connector (JLPC1)



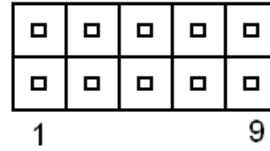
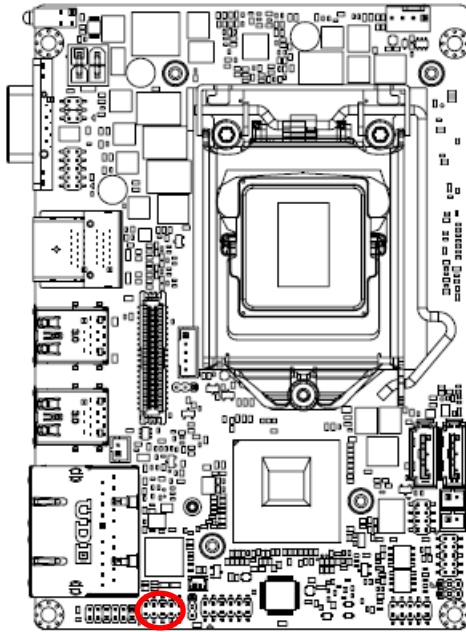
Signal	PIN	PIN	Signal
LPC_AD0	1	2	+3.3V
LPC_AD1	3	4	RST_TPM#
LPC_AD2	5	6	LPC_LFRAME#
LPC_AD3	7	8	CLK1_LPC_DEBUG
LPC_SERIRQ	9	10	GND

2.3.14 LVDS connector (JLVDS1)



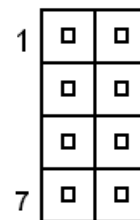
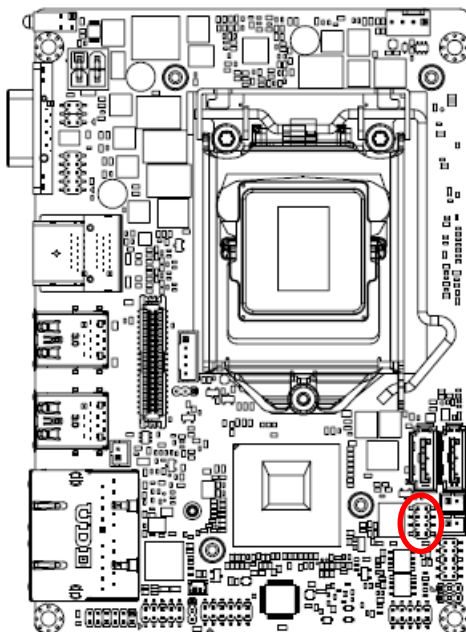
Signal	PIN	PIN	Signal
+5V	2	1	+3.3V
+5V	4	3	+3.3V
NC	6	5	NC
GND	8	7	GND
LVDS_DATA0_P	10	9	LVDS_DATA1_P
LVDS_DATA0_N	12	11	LVDS_DATA1_N
GND	14	13	GND
LVDS_DATA2_P	16	15	LVDS_DATA3_P
LVDS_DATA2_N	18	17	LVDS_DATA3_N
GND	20	19	GND
LVDS_DATA4_P	22	21	LVDS_DATA5_P
LVDS_DATA4_N	24	23	LVDS_DATA5_N
GND	26	25	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

2.3.15 Front Panel connector (JFP1)



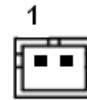
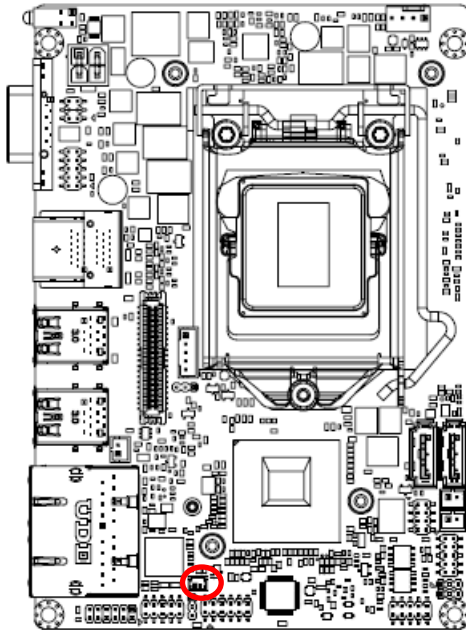
Signal	PIN	PIN	Signal
PWRBTN_IN#	1	2	GND
PM_SYSRST#	3	4	GND
FP_PWR_LED+	5	6	PWR_LED#
HDD_LED#	7	8	+5V
CASE_OPEN#	9	10	GND

2.3.16 SPI connector (JSPI1)



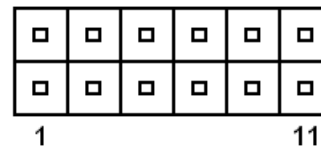
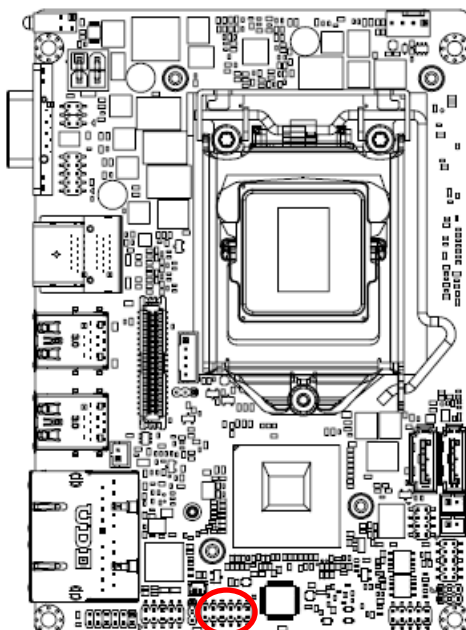
Signal	PIN	PIN	Signal
+3.3VSB	1	2	GND
SPI_CS0#	3	4	SPI_CLK
SPI_MISO	5	6	SPI_MOSI
BIOS_HOLD#	7	8	BIOS_WP#

2.3.17 Battery connector (BAT1)



Signal	PIN
+RTCBAT	1
GND	2

2.3.18 Audio connector (JAUDIO1)

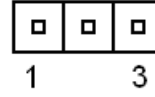
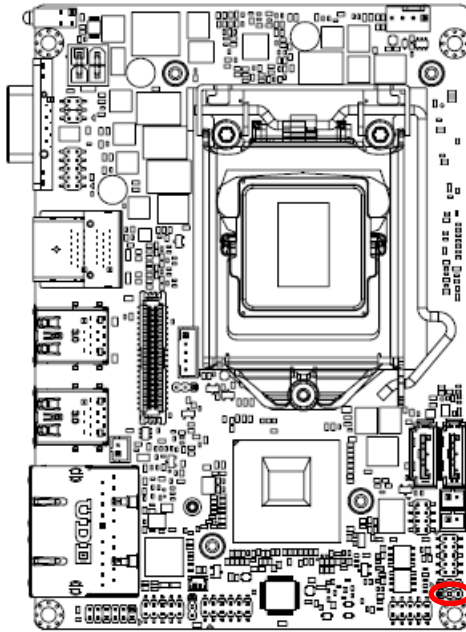


Signal	PIN	PIN	Signal
FRONT-R-OUT	1	2	FRONT-L-OUT
HD_AGND	3	4	HD_AGND
LINE1-R-IN	5	6	LIN1-L-IN
MIC1-R-IN	7	8	MIC1-L-IN
FRONT-JD	9	10	LINE1-JD
MIC1-JD	11	12	HD_AGND

2.3.18.1 Signal Description – Audio connector (JAUDIO1)

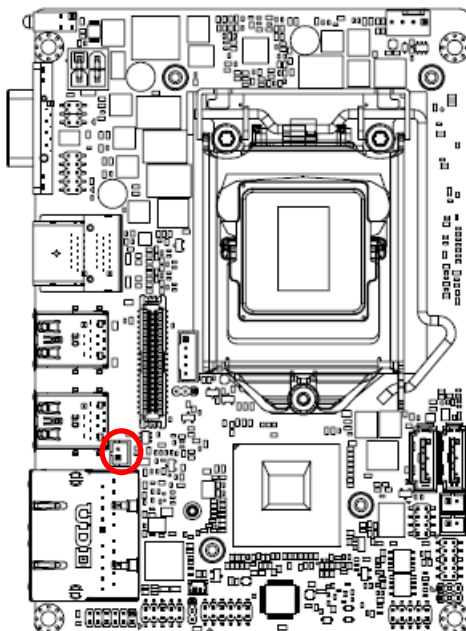
Signal	Signal Description
LINE1-JD	AUDIO IN (LINE_RIN/LIN)sense pin
FRONT-JD	AUDIO Out(ROUT/LOUT) sense pin
MIC1-JD	MIC IN (MIC_RIN/LIN) sense pin

2.3.19 EC Debug connector (JEC_ROM1)



Signal	PIN
EC_SMCLK_DBG	1
EC_SMDAT_DBG	2
GND	3

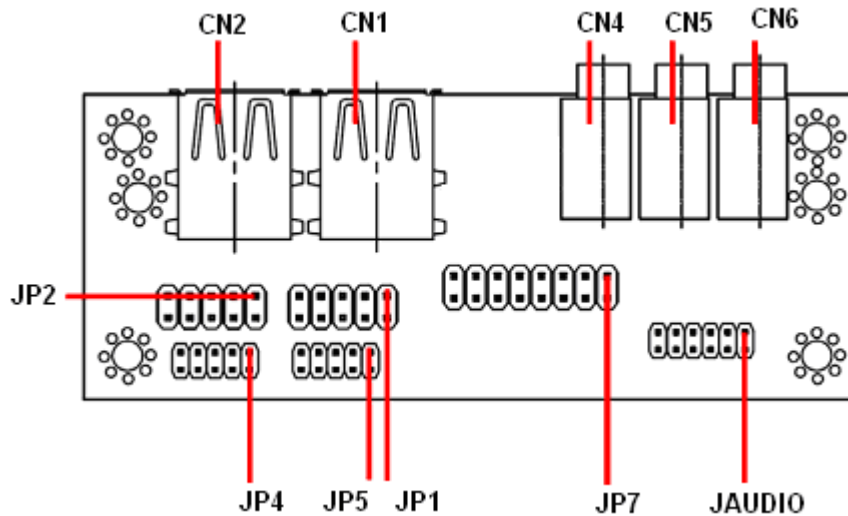
2.3.20 PC Buzzer header (JBZ1)



Signal	PIN
SPKR	1
+5V	2

2.4 Audio/USB Daughter Board User's Guide

2.4.1 Jumper and Connector Layout



2.4.2 Jumper and Connector List

Connectors

Label	Function	Note
CN1, CN2	USB connector	
CN4	Line out connector	Phone Jack
CN5	Line in connector	Phone Jack
CN6	Mic in connector	Phone Jack
JAUDIO	Audio connector	6 x 2 header, pitch 2.0mm
JP1	2.54mm USB connector	5 x 2 header, pitch 2.54mm
JP2	2.54mm USB connector	5 x 2 header, pitch 2.54mm
JP4	2.0mm USB connector	5 x 2 header, pitch 2.0mm
JP5	2.0mm USB connector	5 x 2 header, pitch 2.0mm
JP7	TV / Audio connector	8 x 2 header, pitch 2.54mm

2.4.3 Setting Jumper and Connector

Audio Connector (JAUDIO)

Signal	PIN	PIN	Signal
OUTR	1	2	OUTL
GND	3	4	GND
INR1	5	6	INL1
MICIN1	7	8	AREF
FRONT-JD1	9	10	LINE1-JD1
MIC1-JD1	11	12	GND

2.54mm USB Connector (JP1)

Signal	PIN	PIN	Signal
+5V	1	2	GND
D1-	3	4	GND
D1+	5	6	D2+
GND	7	8	D2-
GND	9	10	+5V



Note: Wrong USB cable configuration with your USB devices might damage your USB devices.

2.54mm USB Connector (JP2)

Signal	PIN	PIN	Signal
+5V	1	2	GND
D3-	3	4	GND
D3+	5	6	D4+
GND	7	8	D4-
GND	9	10	+5V

TV / Audio Connector (JP7)

Signal	PIN	PIN	Signal
Mic In	1	2	Mic Bais
GND	3	4	GND
Line out L	5	6	Line out R
SPK L	7	8	SPK R
Line in L	9	10	Line in R
GND	11	12	NC
TVGND	13	14	NC
TVGND	15	16	COMP

2.0mm USB Connector (JP4)

Signal	PIN	PIN	Signal
+5V	1	2	GND
D3-	3	4	GND
D3+	5	6	D4+
GND	7	8	D4-
GND	9	10	+5V

2.0mm USB Connector (JP5)

Signal	PIN	PIN	Signal
+5V	1	2	GND
D1-	3	4	GND
D1+	5	6	D2+
GND	7	8	D2-
GND	9	10	+5V

3. BIOS Setup

3.1 Introduction

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

3.2 Starting Setup

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

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

By pressing <F2> or immediately after switching the system on, or

By pressing the <F2> or key when the following message appears briefly at the left-top of the screen during the POST (Power On Self Test).

Press <F2> or to enter SETUP

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

3.3 Using Setup

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

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

- **Navigating Through The Menu Bar**

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



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

- **To Display a Sub Menu**

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

3.4 Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> or the 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 BIOS supports an override to the NVRAM settings which resets your system to its defaults.

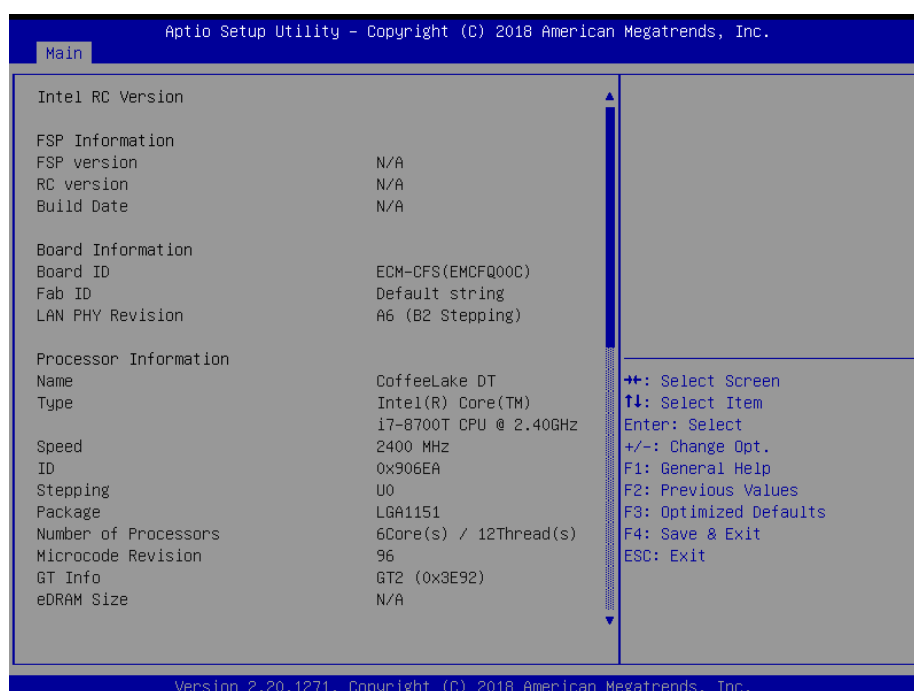
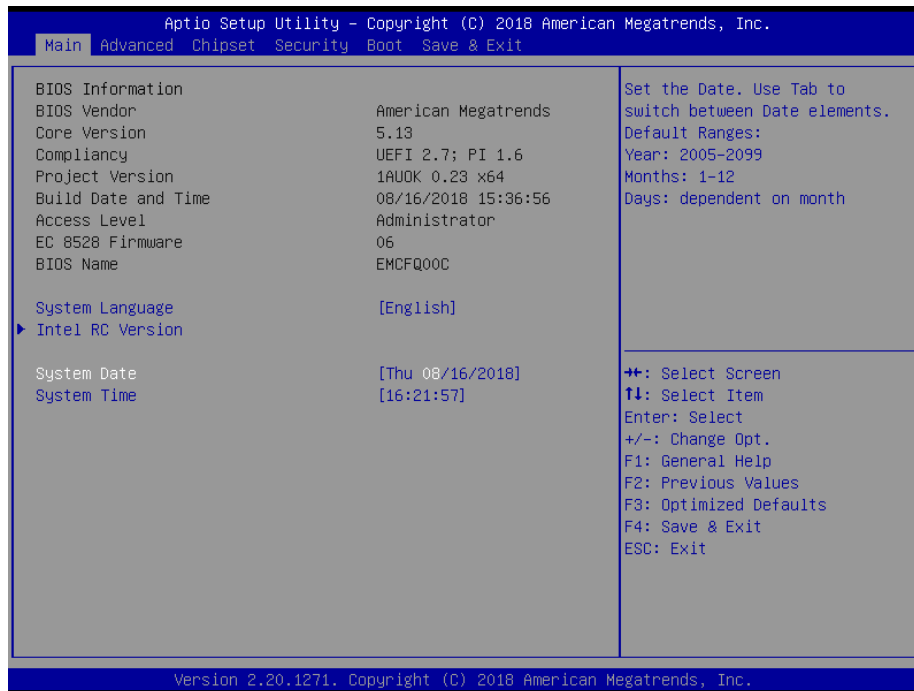
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both your systems manufacturer to provide the absolute maximum performance and reliability.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

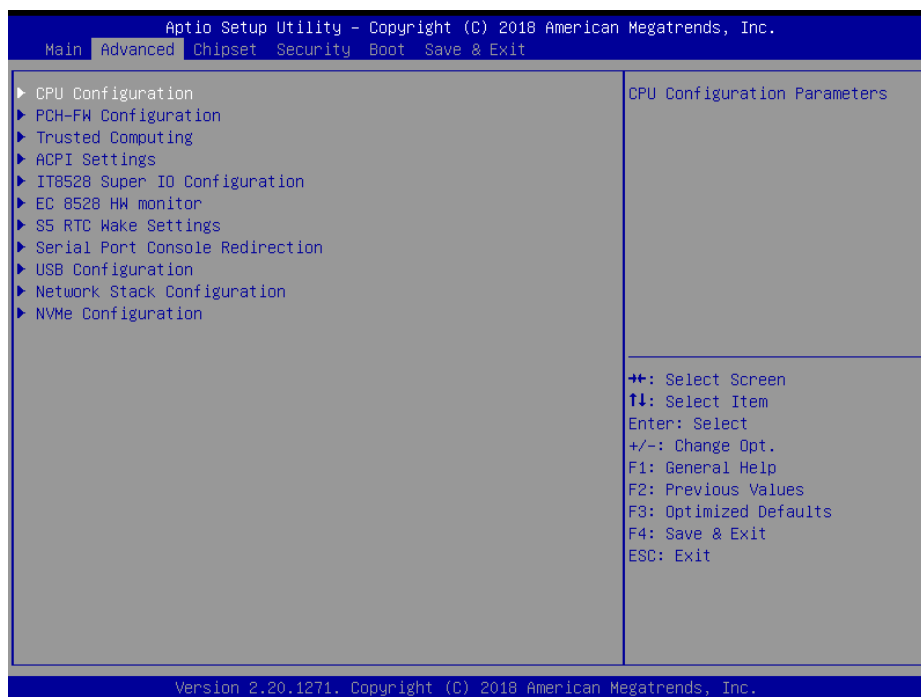
Use the system time option to set the system time. Manually enter the hours, minutes and seconds.



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.



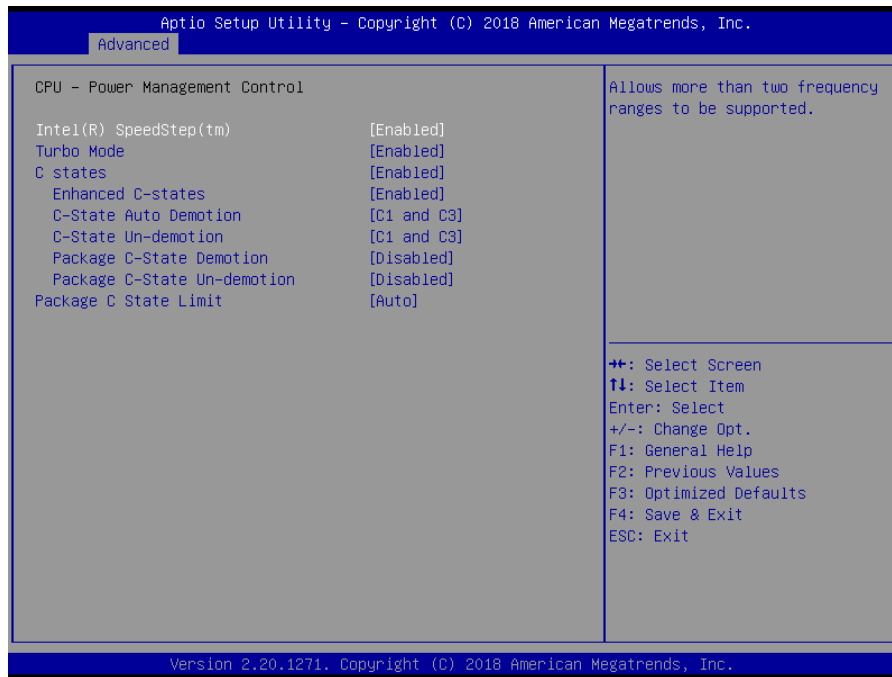
3.6.2.1 CPU Configuration

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

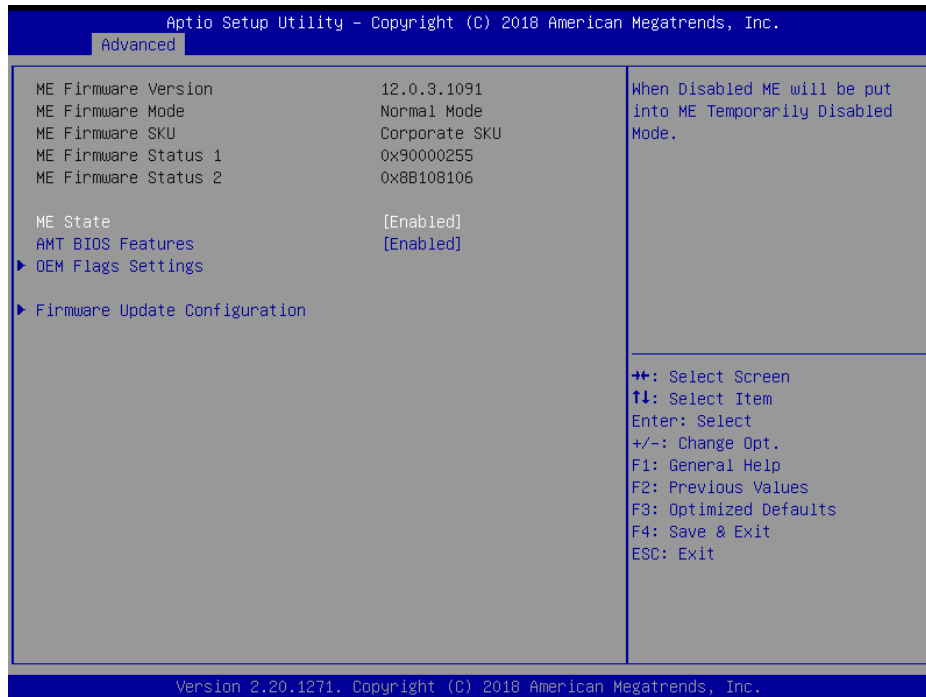
3.6.2.1.1 CPU – Power Management Control



Item	Option	Description
Intel® SpeedStep™	Enabled[Default], Disabled	Allows more than two frequency ranges to be supported.
Turbo Mode	Enabled[Default], Disabled	Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).
C States	Enabled[Default], Disabled	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Enhanced C-states	Enabled[Default], Disabled	Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.
C-State Auto Demotion	Disabled, C1 C3 C1 and C3[Default]	Configure C-State Auto Demotion.
C-State Un-demotion	Disabled, C1 C3 C1 and C3[Default]	Configure C-State Un-demotion.
Package C-State Demotion	Enabled Disabled[Default]	Package C-State Demotion.
Package C-State Un-demotion	Enabled Disabled[Default]	Package C-State Un-demotion.
Package C State Limit	C0/C1 C2 C3 C6 C7	Maximum Package C State Limit Setting. CPU Default: Leaves to Factory default value. Auto: Initializes to deepest available Package C State Limit.

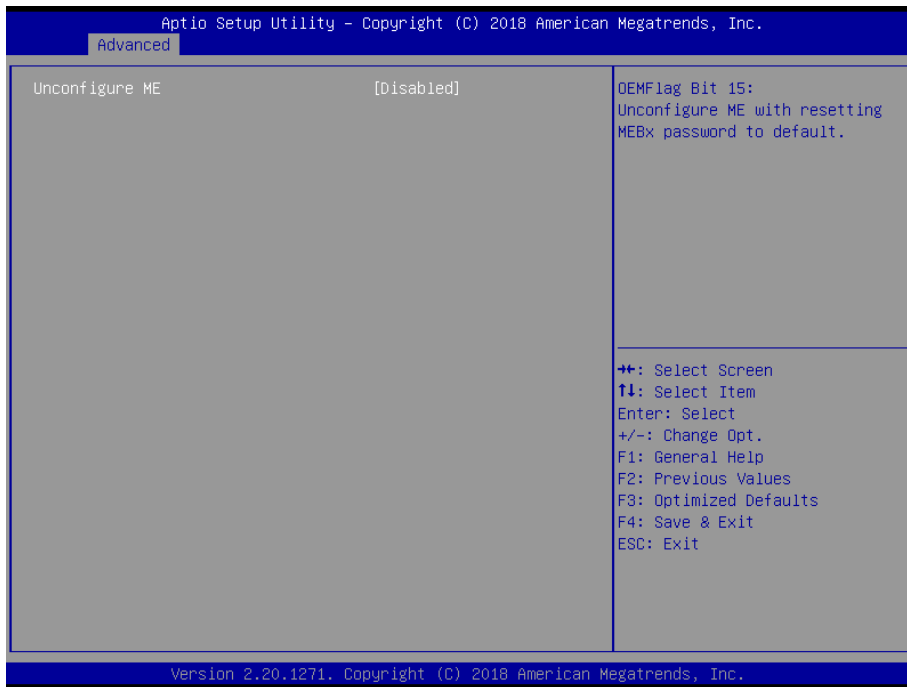
	C7S C8 C9 C10 CPU Default Auto[Default]	
--	--	--

3.6.2.2 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 disable 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.

3.6.2.2.1 OEM Flags Settings



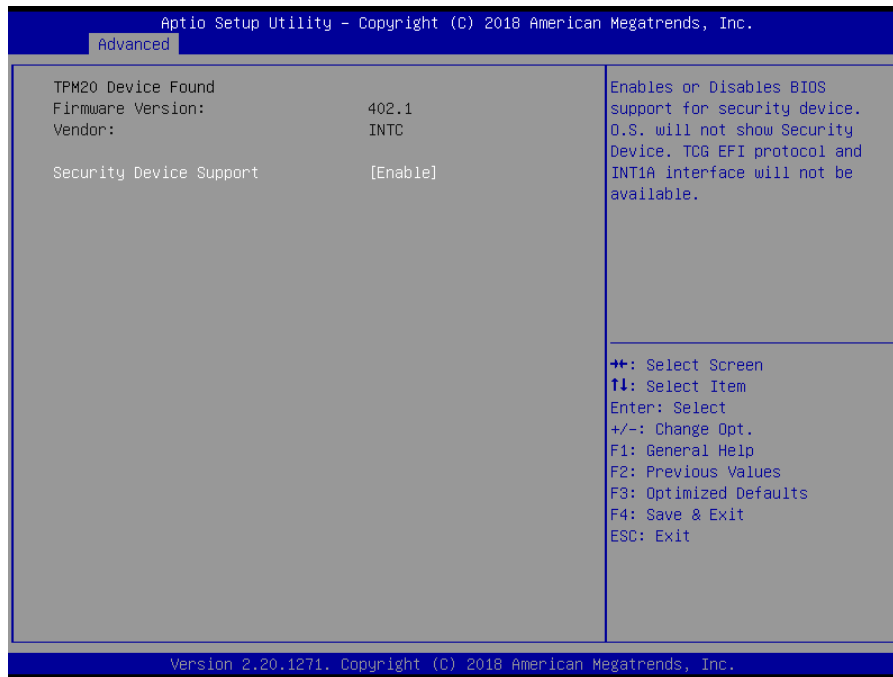
Item	Option	Description
Unconfigure ME	Disabled[Default], Enabled	OEMFlag Bit 15: Unconfigure ME with resetting MEBx password to default.

3.6.2.2.2 Firmware Update Configuration



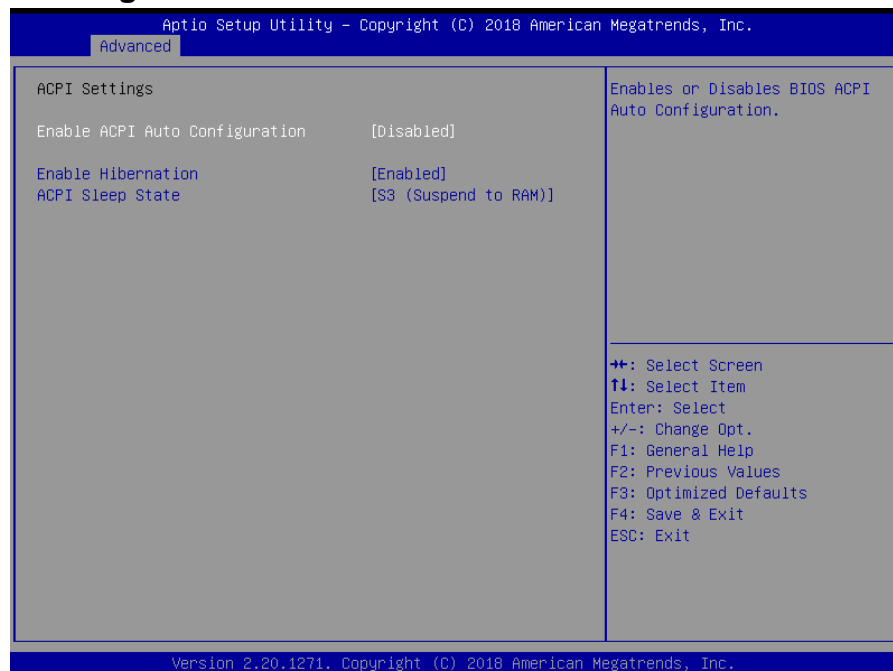
Item	Option	Description
Unconfigure ME	Disabled[Default], Enabled	OEMFlag Bit 15: Unconfigure ME with resetting MEBx password to default.

3.6.2.3 Trusted Computing



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

3.6.2.4 APCI Settings



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

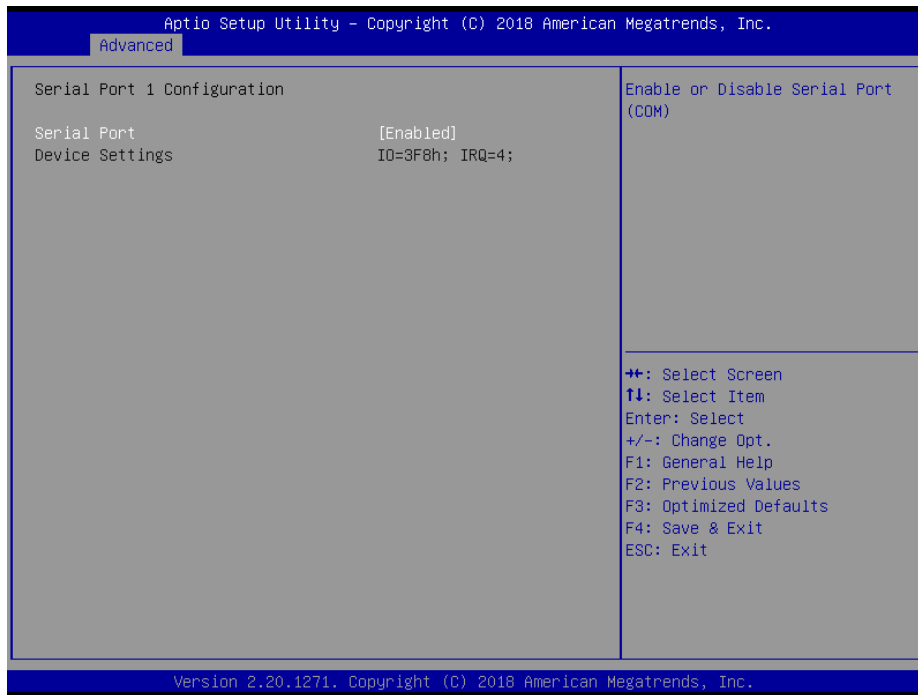
3.6.2.5 IT8528 Super IO Configuration

You can use this item to set up or change the IT8528 Super IO configuration for serial ports. Please refer to 3.6.2.5.1~ 3.6.2.5.2 for more information.



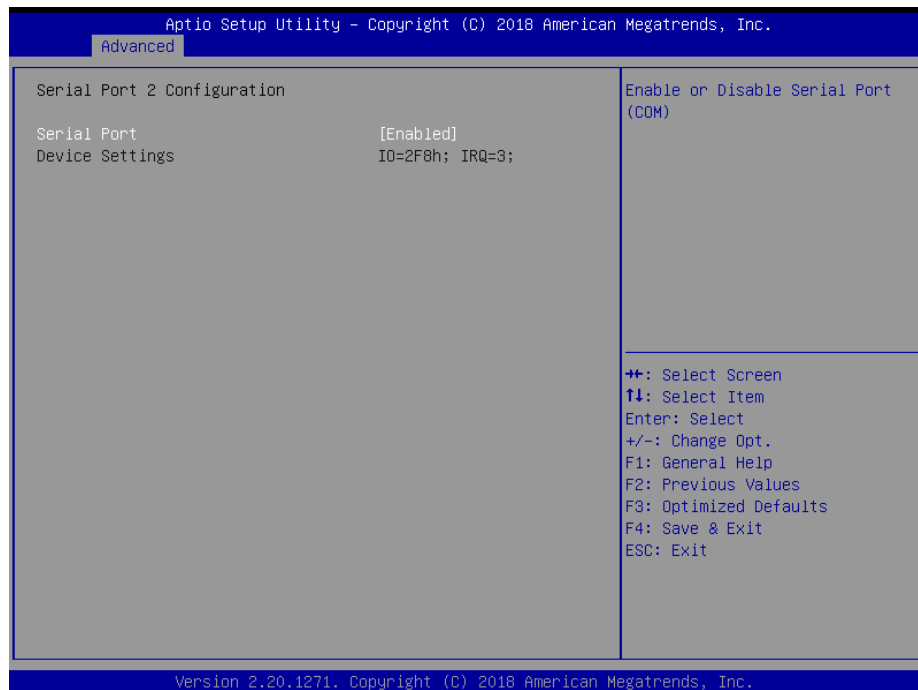
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).

3.6.2.5.1 Serial Port 1 Configuration



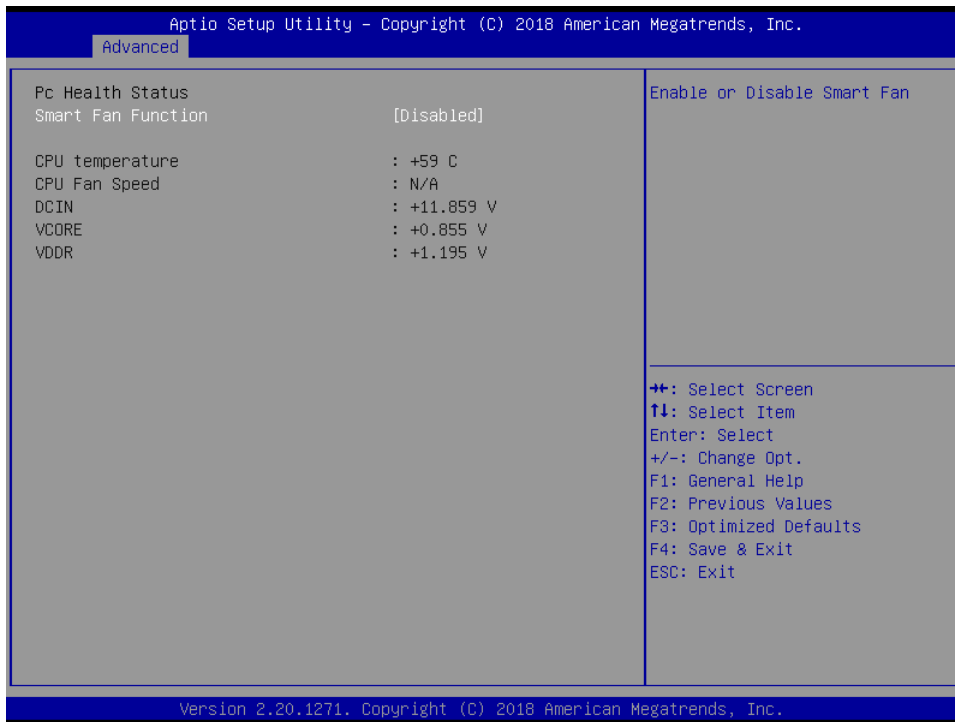
Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).

3.6.2.5.2 Serial Port 2 Configuration



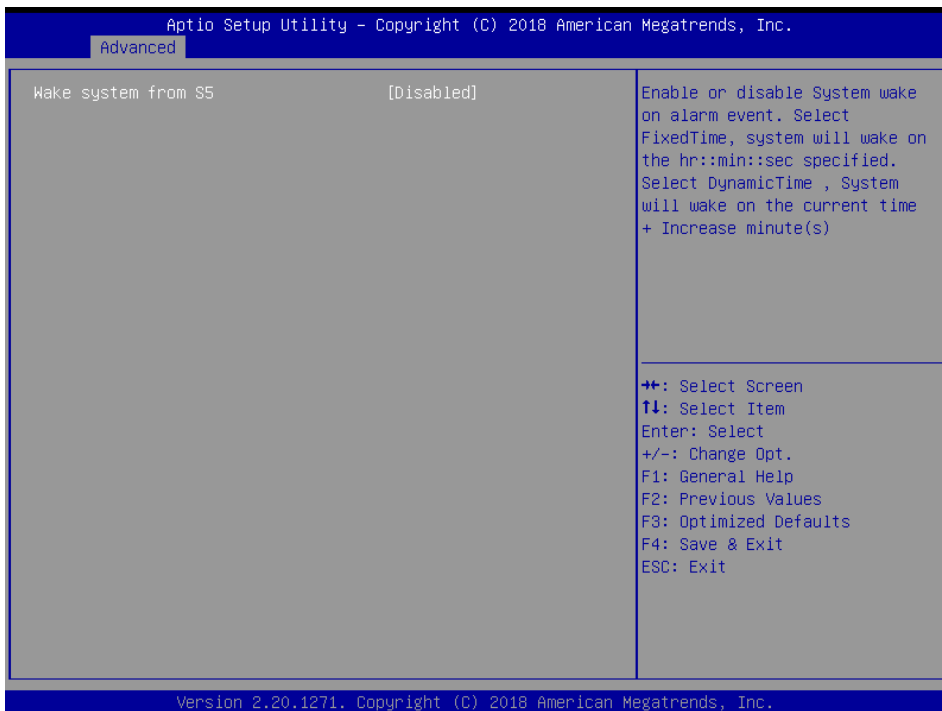
Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).

3.6.2.6 EC 8528 HW Monitor



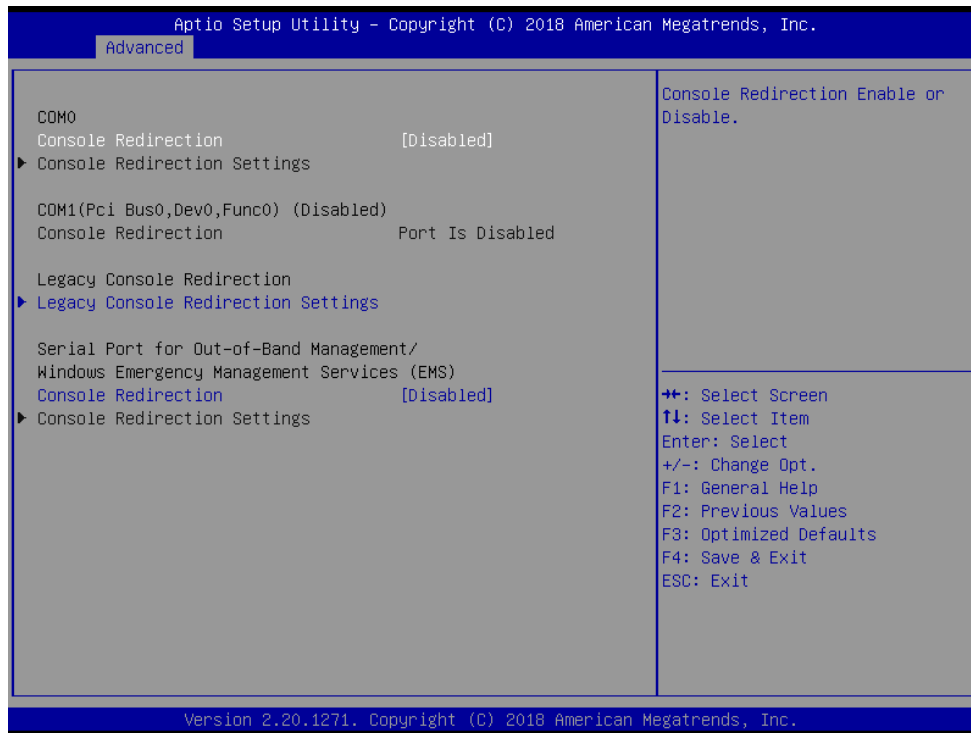
Item	Options	Description
Smart Fan Function	Enabled, Disabled[Default]	Enables or Disables Smart Fan.

3.6.2.7 S5 RTC Wake Settings



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

3.6.2.8 Serial Port Console Redirection



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

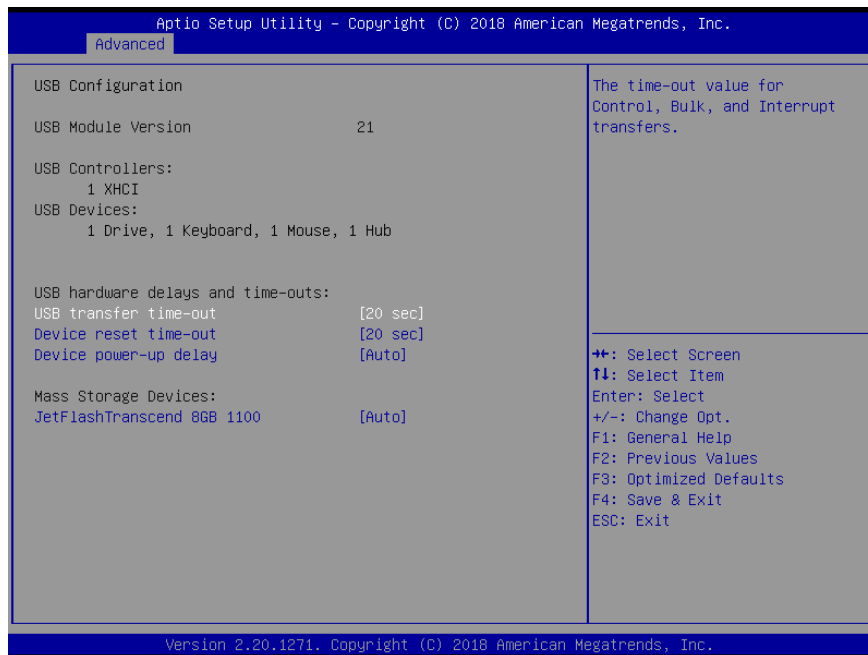
3.6.2.8.1 Legacy Console Redirection Settings



Item	Option	Description
Redirection COM Port	COM0[Default]	Select a COM port to display redirection of Legacy OS and Legacy OPRM 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.

3.6.2.9 USB Configuration

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



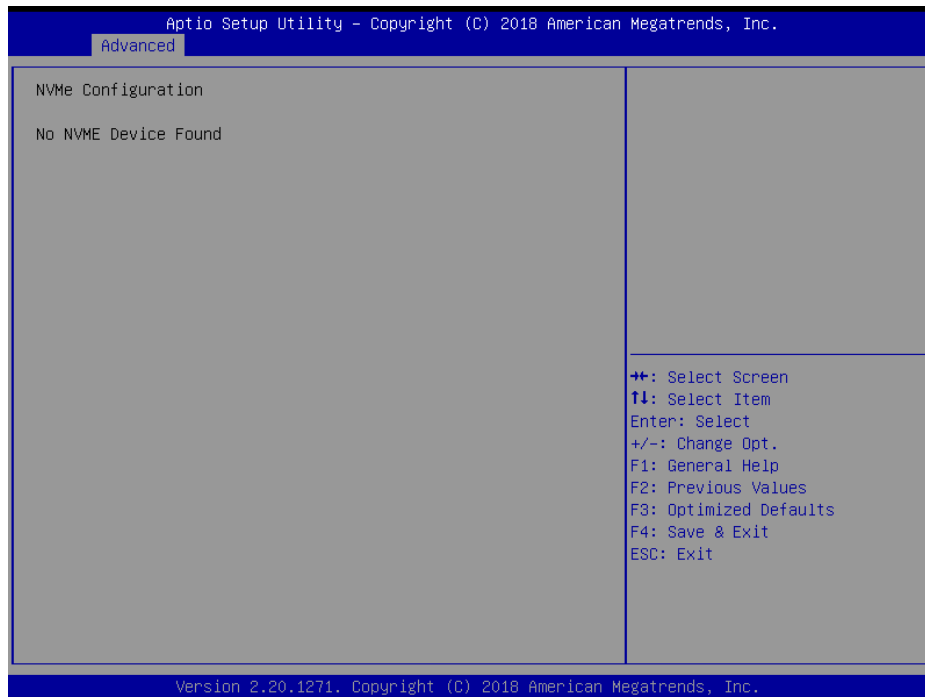
Item	Options	Description
USB transfer time-out	1 sec 5 sec 10 sec 20 sec [Default]	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec [Default] 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto [Default] Manual	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.
Mass Storage Devices	Auto [Default] Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

3.6.2.10 Network Stack Configuration

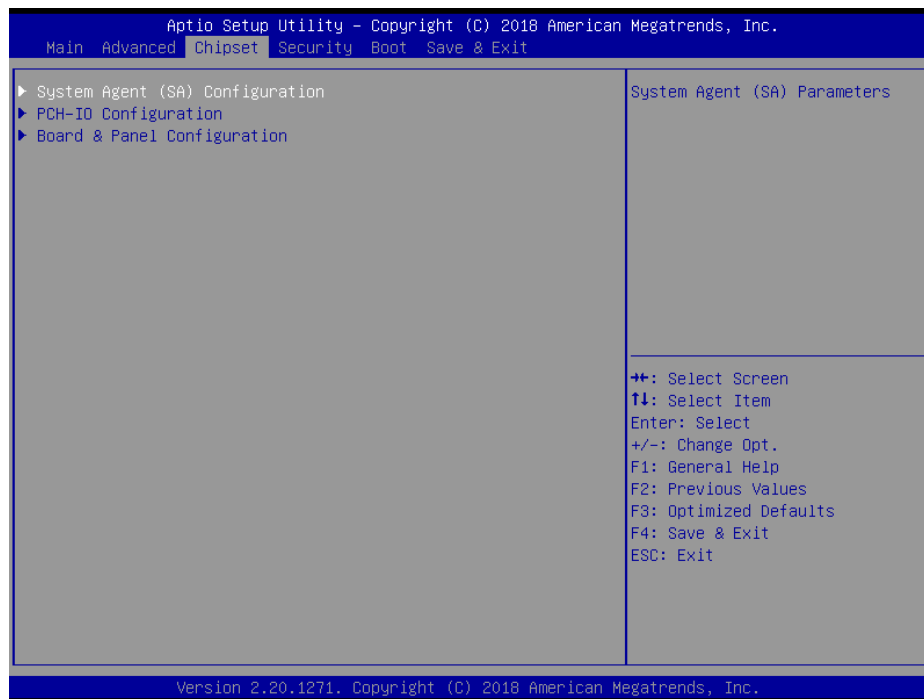


Item	Options	Description
Network Stack	Enabled Disabled[Default]	Enable/Disable UEFI Network Stack.

3.6.2.11 NVMe Configuration



3.6.3 Chipset

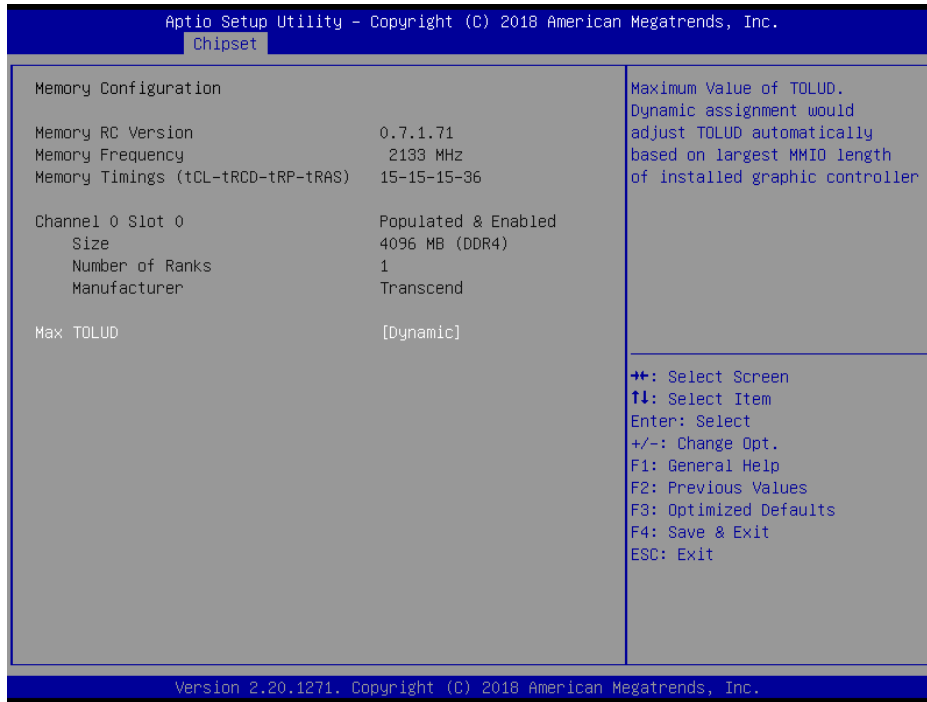


3.6.3.1 System Agent (SA) Configuration



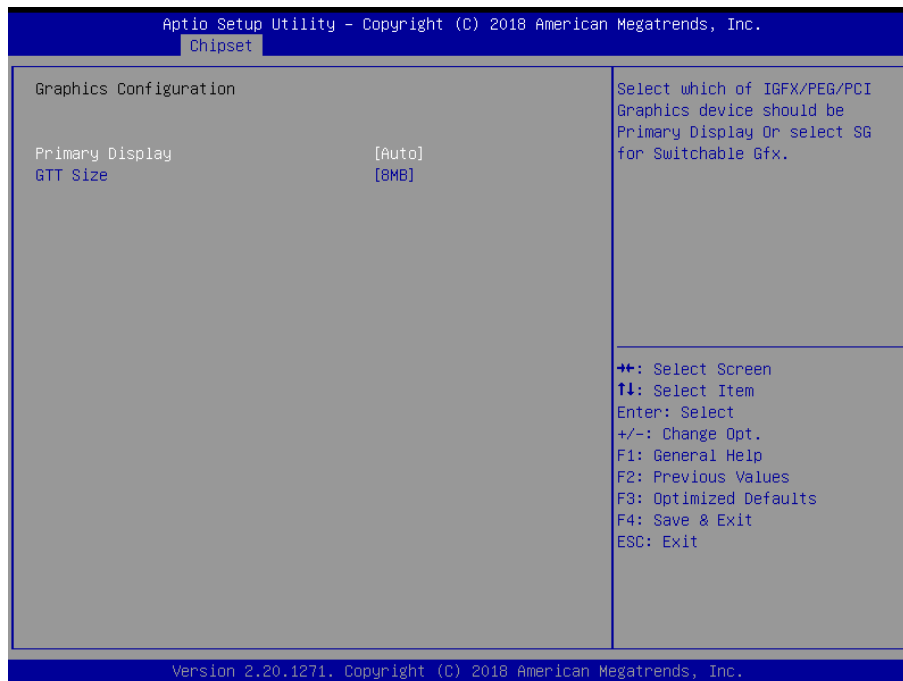
Item	Option	Description
VT-d	Enabled[Default] Disabled	VT-d capability.

3.6.3.1.1 Memory Configuration



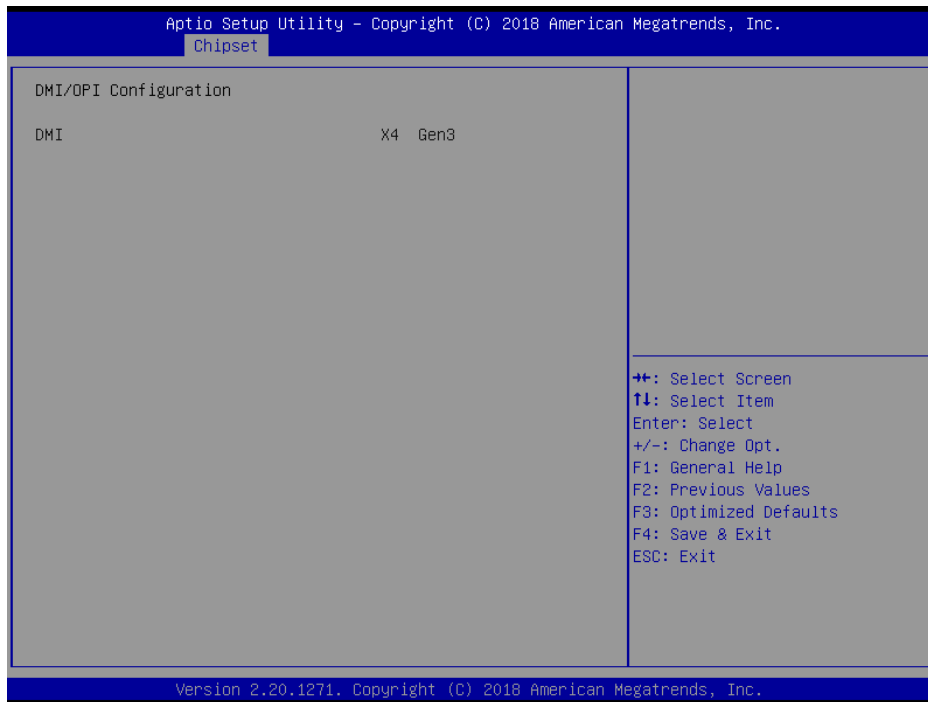
Item	Option	Description
Max TOLUD	Dynamic[Default]	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.
	1 GB	
	1.25 GB	
	1.5 GB	
	1.75 GB	
	2 GB	
	2.25 GB	
	2.5 GB	
	2.75 GB	
3 GB		

3.6.3.1.2 Graphics Configuration

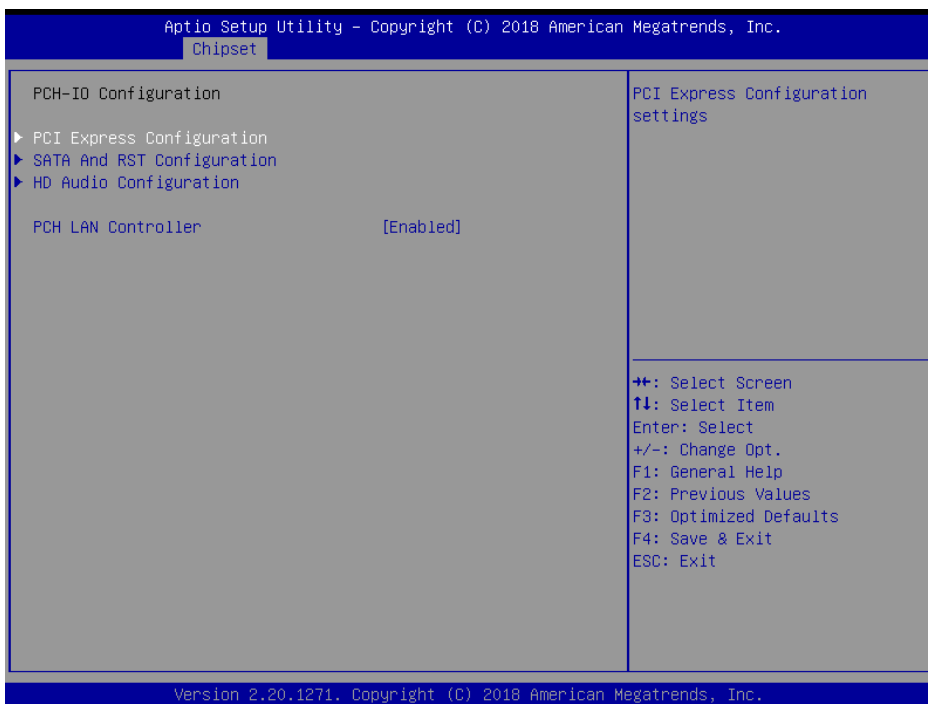


Item	Option	Description
Primary Display	Auto[Default] IGFX	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
GTT Size	2MB 4MB 8MB[Default]	Select the GTT Size.

3.6.3.1.3 DMI/OPI Configuration

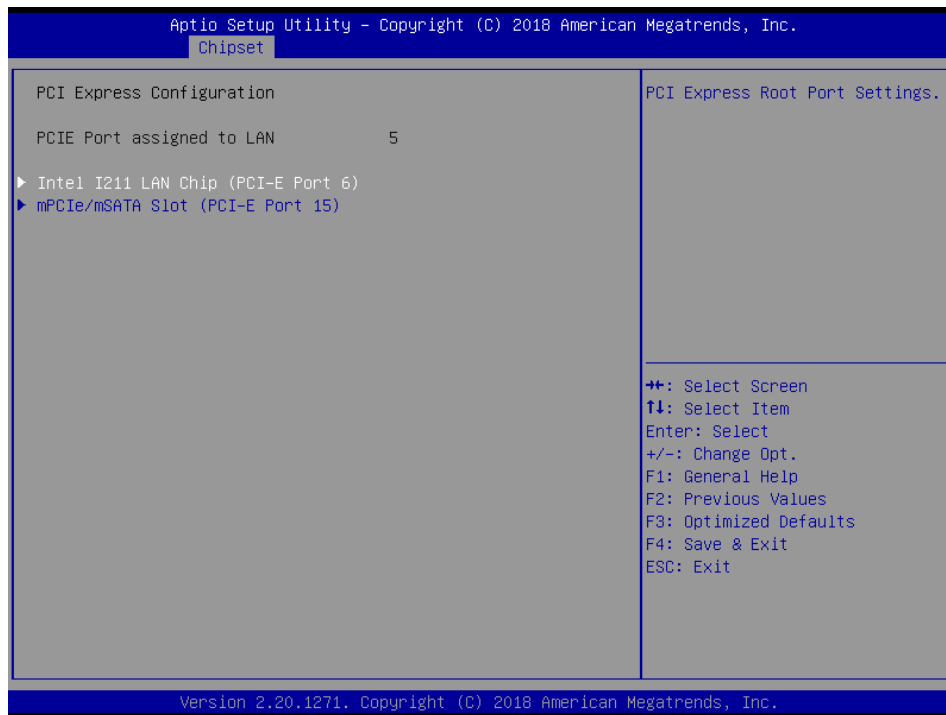


3.6.3.2 PCH-IO Configuration

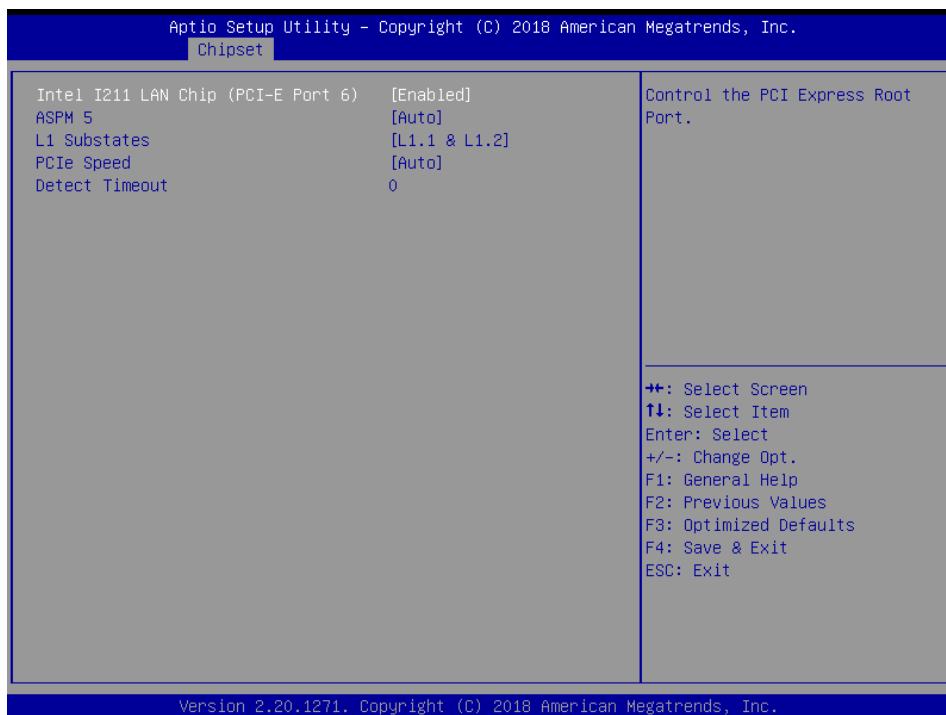


Item	Option	Description
PCH LAN Controller	Disabled Enabled[Default]	Enable/Disable onboard NIC.

3.6.3.2.1 PCI Express Configuration



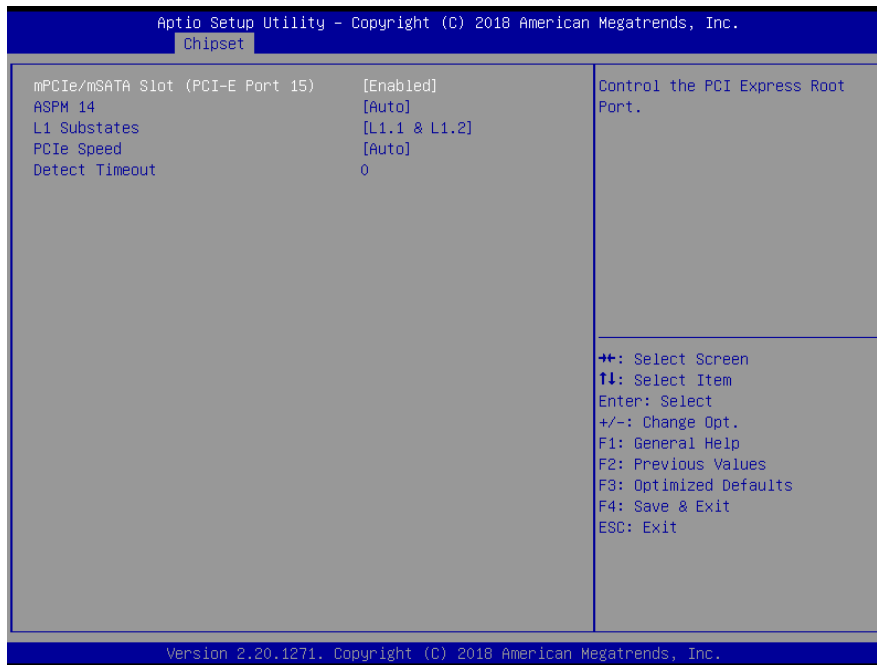
3.6.3.2.1.1 Intel I211 LAN Chip (PCI-E Port 6)



Item	Option	Description
Intel I211 LAN Chip (PCI-E Port 6)	Enabled[Default], Disabled	Control the PCI Express Root Port.
ASPM 5	Disabled, L0s	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto

	L1 L0sL1 Auto[Default]	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.

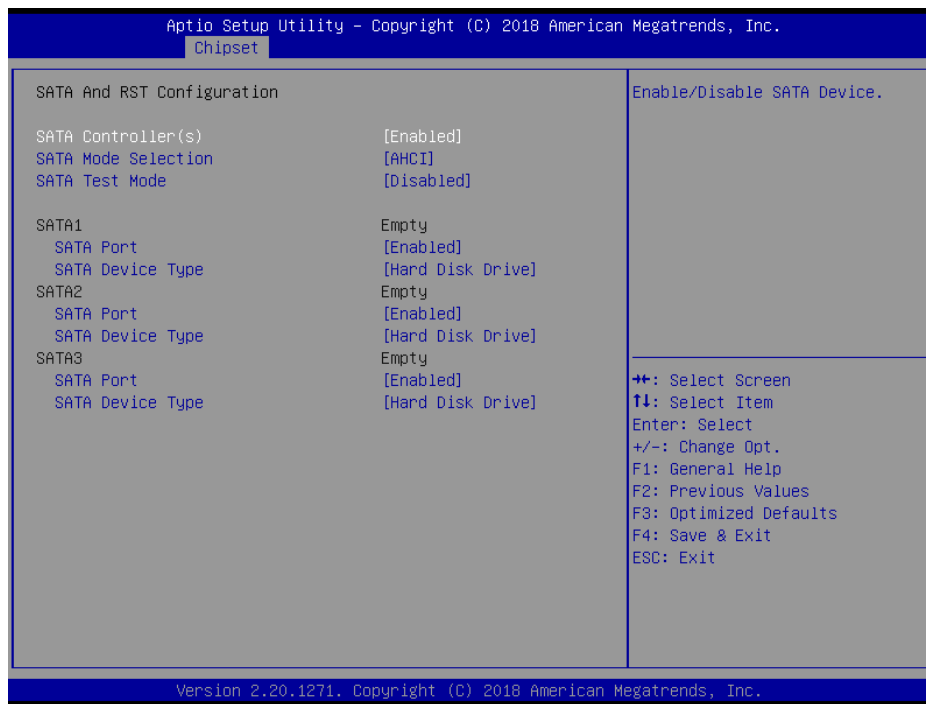
3.6.3.2.1.2 mPCIe/mSATA Slot (PEI-E Port 15)



Item	Option	Description
mPCIe/mSATA Slot (PEI-E Port 15)	Enabled[Default], Disabled	Control the PCI Express Root Port.
ASPM 14	Disabled, L0s L1 L0sL1 Auto[Default]	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	Configure PCIe Speed.

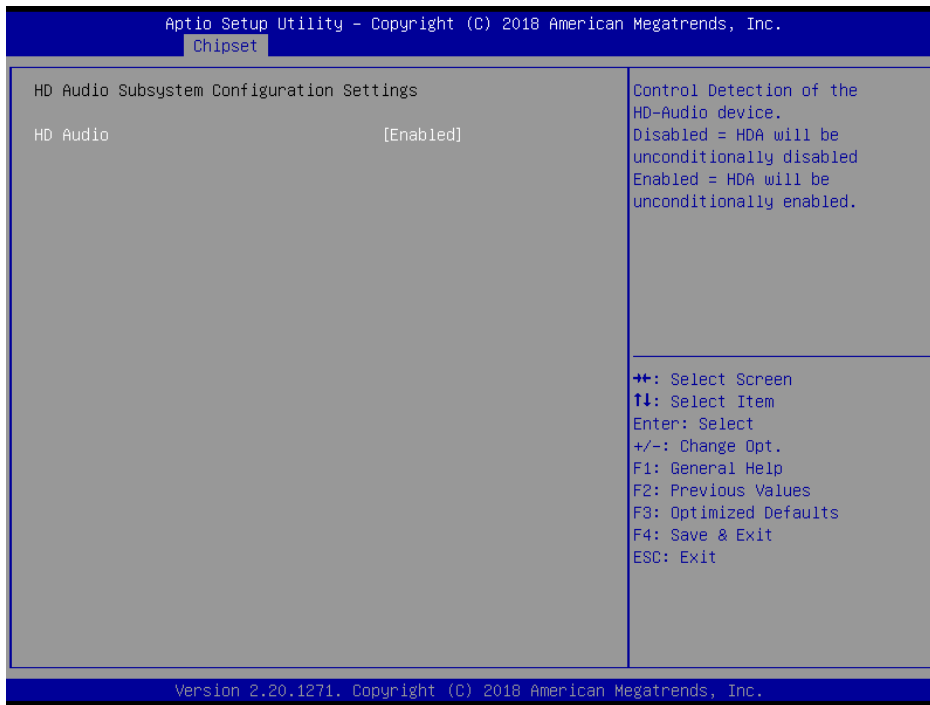
	Gen3	
Detect Timeout	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.

3.6.3.2.2 SATA And RST Configuration



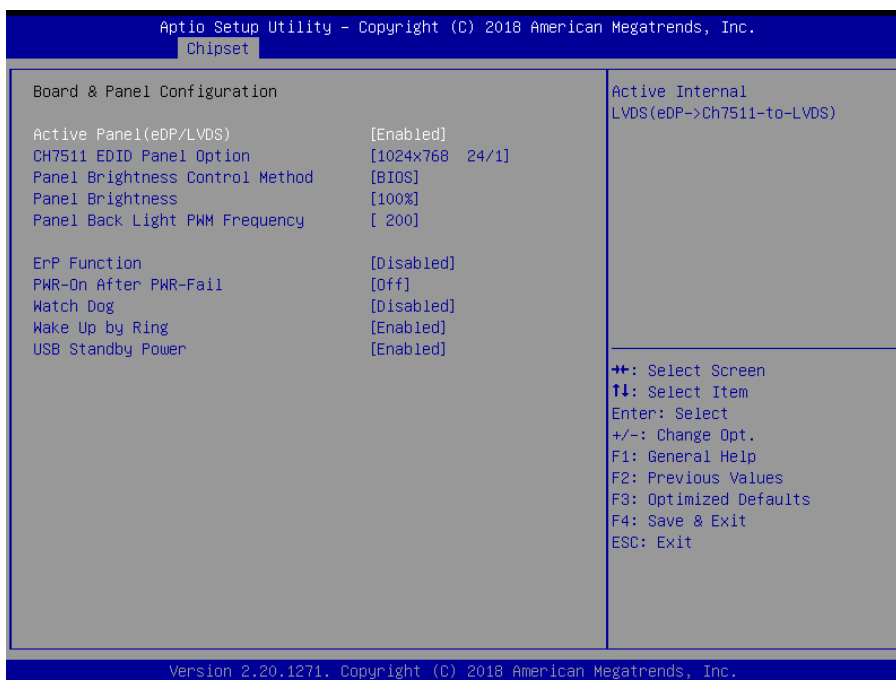
Item	Options	Description
SATA Controller(s)	Enabled[Default] Disabled,	Enable/Disable SATA Device.
SATA Mode Selection	AHCI[Default], RAID	Determines how SATA controller(s) operate.
SATA Test Mode	Enabled Disabled[Default]	The Mode Enable/Disable (Loop Back).
SATA Port	Enabled[Default] Disabled	Enable 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.

3.6.3.2.3 HD Audio Configuration



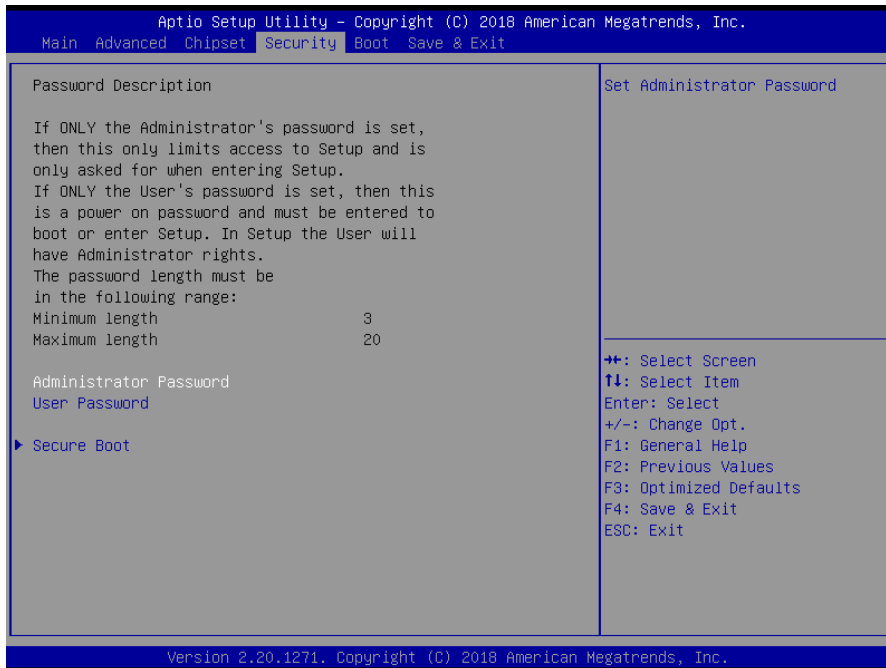
Item	Option	Description
HD Audio	Disabled Enabled[Default]	Control Detection of the HD-Audio device. Disable = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled

3.6.3.3 Board & Panel Configuration



Item	Option	Description
Active Panel (eDP/LVDS)	Disabled Enabled[Default]	Active Internal LVDS(eDP->Cg7511-to-LVDS).
CH7511 EDID Panel Option	1024x768 24/1[Default] 800x600 18/1 1024x768 18/1 1366x768 18/1 1024x600 18/1 1280x800 18/1 1920x1200 24/2 1920x1080 18/2 1280x1024 24/2 1366x768 24/1 1920x1080 24/2 1680x1050 24/2	Port-EDP to LVDS(Chrotel 7511) Panel EDID Option.
Panel Brightness Control Method	BIOS[Default] 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 30 min	Select WatchDog.
Wake Up by Ring	Disabled Enabled[Default]	Wake Up by Ring from S3/S4/S5.
USB Standby Power	Disabled Enabled[Default]	Enable/Disabled USB Standby Power during S3/S4/S5.

3.6.4 Security



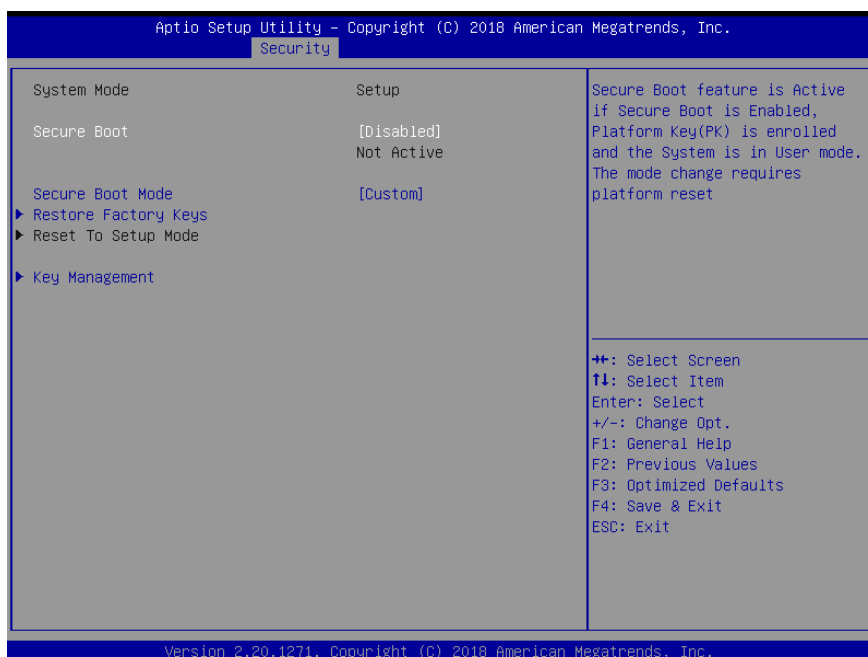
- **Administrator Password**

Set setup Administrator Password

- **User Password**

Set User Password

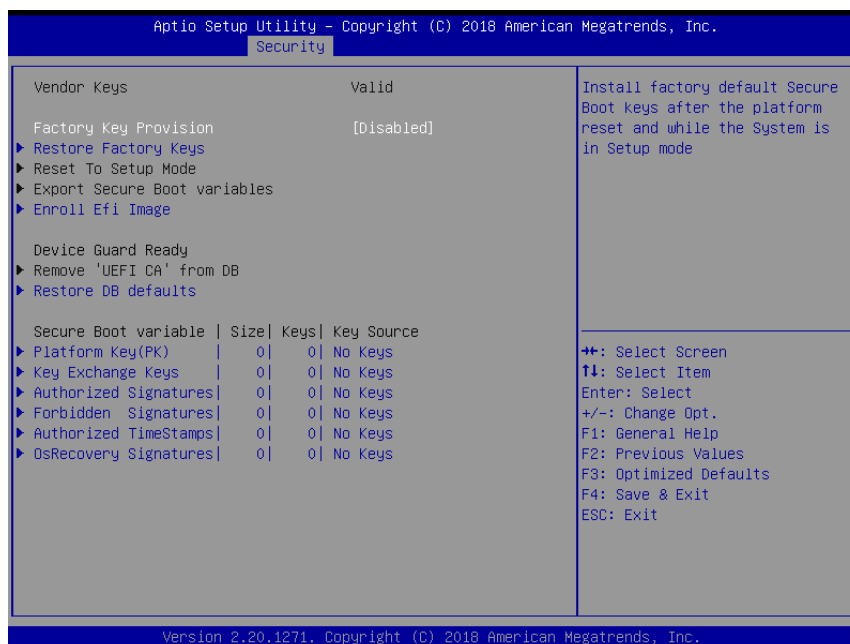
3.6.4.1 Secure Boot

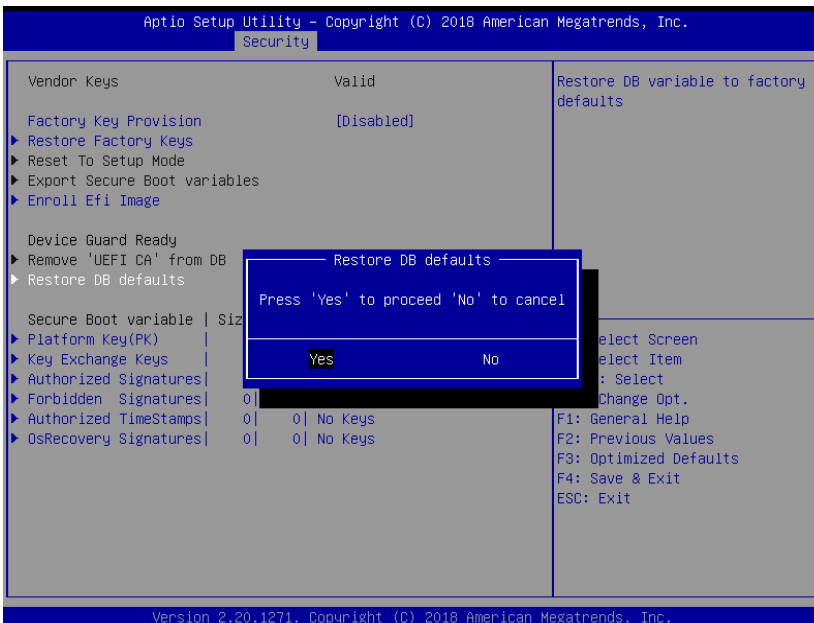
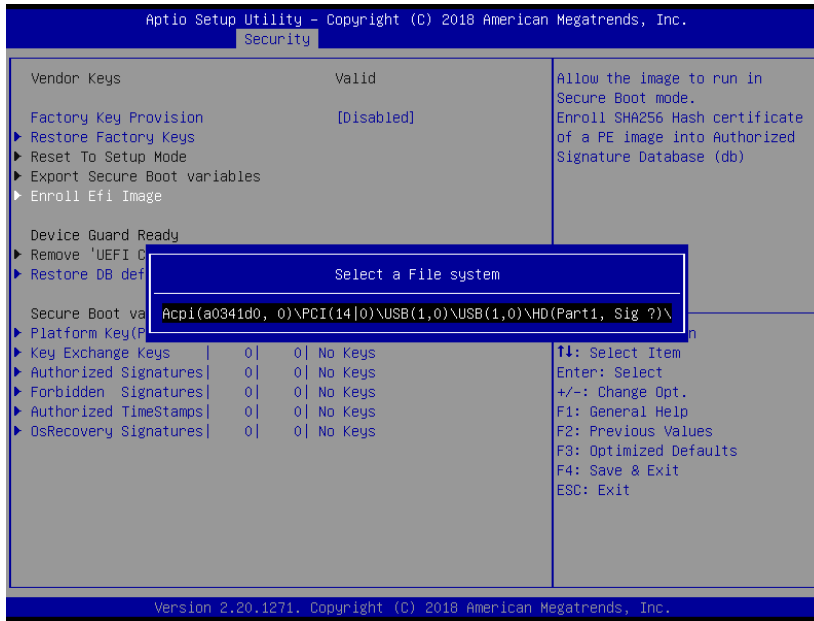
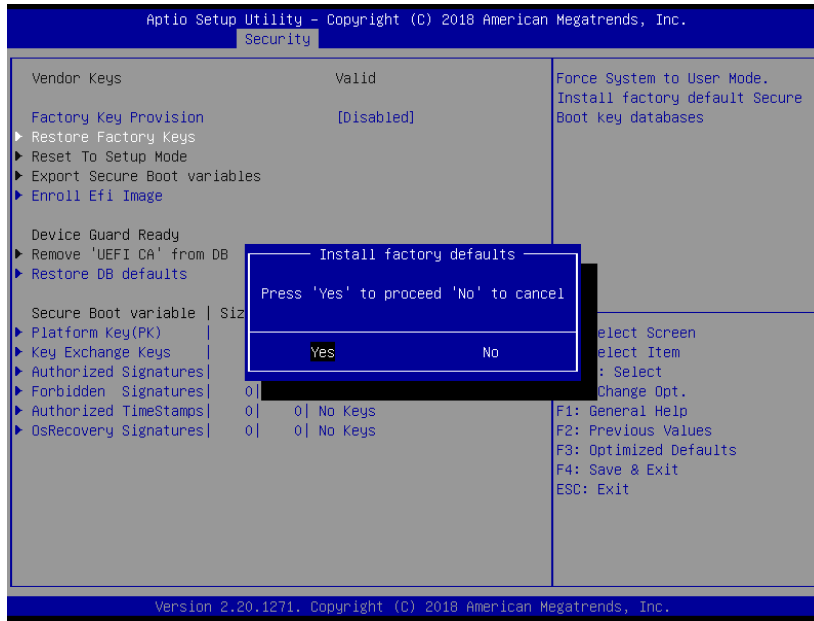




Item	Option	Description
Secure Boot	Disabled[Default] Enabled	Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset.
Secure Boot Mode	Standard Custom[Default]	Secure Boot mode selector: Standard/Custom.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

3.6.4.1.1 Key Management





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Security

Vendor Keys Valid

Factory Key Provision [Disabled]

- ▶ Restore Factory Keys
- ▶ Reset To Setup Mode
- ▶ Export Secure Boot variables
- ▶ Enroll Efi Image

Device Guard Ready

- ▶ Remove 'UEFI CA' from DB
- ▶ Restore DB defaults

Secure Boot variable | Size | Ke

▶ Platform Key(PK)	0		
▶ Key Exchange Keys	0	0	No Keys
▶ Authorized Signatures	0	0	No Keys
▶ Forbidden Signatures	0	0	No Keys
▶ Authorized TimeStamps	0	0	No Keys
▶ OsRecovery Signatures	0	0	No Keys

Platform Key(PK)

Update

Enroll Factory Defaults or load certificates from a file:

- Public Key Certificate:
 - EFI_SIGNATURE_LIST
 - EFI_CERT_X509 (DER)
 - EFI_CERT_RSA2048 (bin)
 - EFI_CERT_SHAXXX
- Authenticated UEFI Variable
- EFI PE/COFF Image(SHA256)

Key Source: Factory,External,Mixed

++: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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Security

Vendor Keys Valid

Factory Key Provision [Disabled]

- ▶ Restore Factory Keys
- ▶ Reset To Setup Mode
- ▶ Export Secure Boot variables
- ▶ Enroll Efi Image

Device Guard Ready

- ▶ Remove 'UEFI CA' from DB
- ▶ Restore DB defaults

Secure Boot variable | Size | Ke

▶ Platform Key(PK)	0		
▶ Key Exchange Keys	0	0	No Keys
▶ Authorized Signatures	0	0	No Keys
▶ Forbidden Signatures	0	0	No Keys
▶ Authorized TimeStamps	0	0	No Keys
▶ OsRecovery Signatures	0	0	No Keys

Key Exchange Keys

Update

Append

Enroll Factory Defaults or load certificates from a file:

- Public Key Certificate:
 - EFI_SIGNATURE_LIST
 - EFI_CERT_X509 (DER)
 - EFI_CERT_RSA2048 (bin)
 - EFI_CERT_SHAXXX
- Authenticated UEFI Variable
- EFI PE/COFF Image(SHA256)

Key Source: Factory,External,Mixed

++: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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Security

Vendor Keys Valid

Factory Key Provision [Disabled]

- ▶ Restore Factory Keys
- ▶ Reset To Setup Mode
- ▶ Export Secure Boot variables
- ▶ Enroll Efi Image

Device Guard Ready

- ▶ Remove 'UEFI CA' from DB
- ▶ Restore DB defaults

Secure Boot variable | Size | Ke

▶ Platform Key(PK)	0		
▶ Key Exchange Keys	0	0	No Keys
▶ Authorized Signatures	0	0	No Keys
▶ Forbidden Signatures	0	0	No Keys
▶ Authorized TimeStamps	0	0	No Keys
▶ OsRecovery Signatures	0	0	No Keys

Authorized Signatures

Update

Append

Enroll Factory Defaults or load certificates from a file:

- Public Key Certificate:
 - EFI_SIGNATURE_LIST
 - EFI_CERT_X509 (DER)
 - EFI_CERT_RSA2048 (bin)
 - EFI_CERT_SHAXXX
- Authenticated UEFI Variable
- EFI PE/COFF Image(SHA256)

Key Source: Factory,External,Mixed

++: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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Security

Vendor Keys	Valid	Enroll Factory Defaults or load certificates from a file:
Factory Key Provision	[Disabled]	1.Public Key Certificate:
▶ Restore Factory Keys		a)EFI_SIGNATURE_LIST
▶ Reset To Setup Mode		b)EFI_CERT_X509 (DER)
▶ Export Secure Boot variables		c)EFI_CERT_RSA2048 (bin)
▶ Enroll Efi Image		d)EFI_CERT_SHAXXX
Device Guard Ready		2.Authenticated UEFI Variable
▶ Remove 'UEFI CA' from DB		3.EFI PE/COFF Image(SHA256)
▶ Restore DB defaults		Key Source:
		Factory,External,Mixed
Secure Boot variable	Size Ke	
▶ Platform Key(PK)	0	
▶ Key Exchange Keys	0 0 No Keys	
▶ Authorized Signatures	0 0 No Keys	
▶ Forbidden Signatures	0 0 No Keys	
▶ Authorized TimeStamps	0 0 No Keys	
▶ OsRecovery Signatures	0 0 No Keys	

Forbidden Signatures

Update

Append

++: Select Screen
 T4: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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Security

Vendor Keys	Valid	Enroll Factory Defaults or load certificates from a file:
Factory Key Provision	[Disabled]	1.Public Key Certificate:
▶ Restore Factory Keys		a)EFI_SIGNATURE_LIST
▶ Reset To Setup Mode		b)EFI_CERT_X509 (DER)
▶ Export Secure Boot variables		c)EFI_CERT_RSA2048 (bin)
▶ Enroll Efi Image		d)EFI_CERT_SHAXXX
Device Guard Ready		2.Authenticated UEFI Variable
▶ Remove 'UEFI CA' from DB		3.EFI PE/COFF Image(SHA256)
▶ Restore DB defaults		Key Source:
		Factory,External,Mixed
Secure Boot variable	Size Ke	
▶ Platform Key(PK)	0	
▶ Key Exchange Keys	0 0 No Keys	
▶ Authorized Signatures	0 0 No Keys	
▶ Forbidden Signatures	0 0 No Keys	
▶ Authorized TimeStamps	0 0 No Keys	
▶ OsRecovery Signatures	0 0 No Keys	

Authorized TimeStamps

Update

Append

++: Select Screen
 T4: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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Security

Vendor Keys	Valid	Enroll Factory Defaults or load certificates from a file:
Factory Key Provision	[Disabled]	1.Public Key Certificate:
▶ Restore Factory Keys		a)EFI_SIGNATURE_LIST
▶ Reset To Setup Mode		b)EFI_CERT_X509 (DER)
▶ Export Secure Boot variables		c)EFI_CERT_RSA2048 (bin)
▶ Enroll Efi Image		d)EFI_CERT_SHAXXX
Device Guard Ready		2.Authenticated UEFI Variable
▶ Remove 'UEFI CA' from DB		3.EFI PE/COFF Image(SHA256)
▶ Restore DB defaults		Key Source:
		Factory,External,Mixed
Secure Boot variable	Size Ke	
▶ Platform Key(PK)	0	
▶ Key Exchange Keys	0 0 No Keys	
▶ Authorized Signatures	0 0 No Keys	
▶ Forbidden Signatures	0 0 No Keys	
▶ Authorized TimeStamps	0 0 No Keys	
▶ OsRecovery Signatures	0 0 No Keys	

OsRecovery Signatures

Update

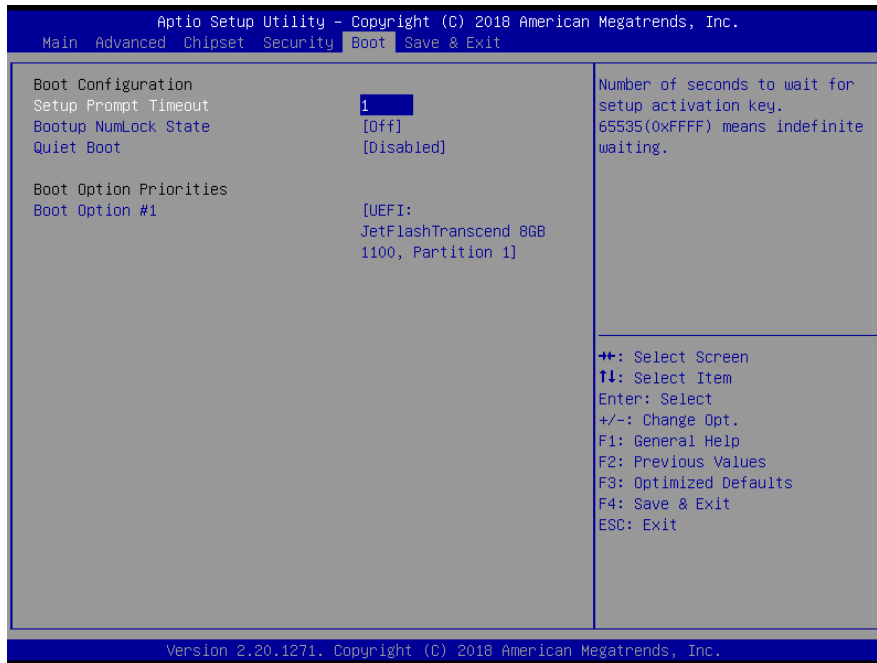
Append

++: Select Screen
 T4: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

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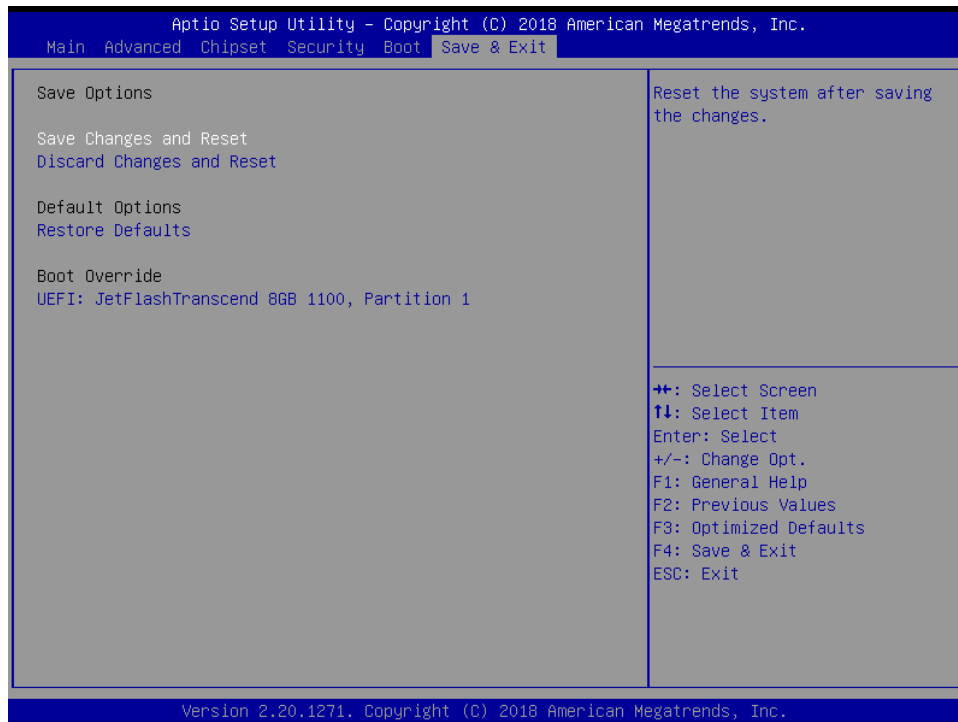
Item	Option	Description
Factory Key Provision	Disabled[Default] Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.

3.6.5 Boot



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

3.6.6 Save and exit



3.6.6.1 Save Changes and Reset

Reset the system after saving the changes.

3.6.6.2 Discard Changes and Reset

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

3.6.6.3 Restore Defaults

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

3.6.6.4 Launch EFI Shell from filesystem device

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

4. Drivers Installation



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

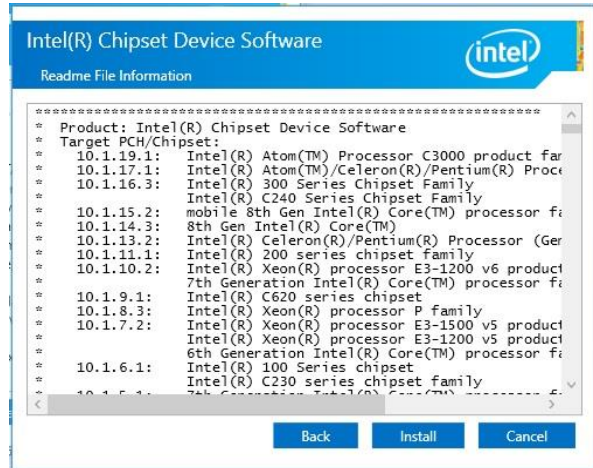
4.1 Install Chipset Driver

All drivers can be found on the Avalue Official Website:

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



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



Step 3. Click Install.



Step1. Click Next.



Step 4. Complete setup.



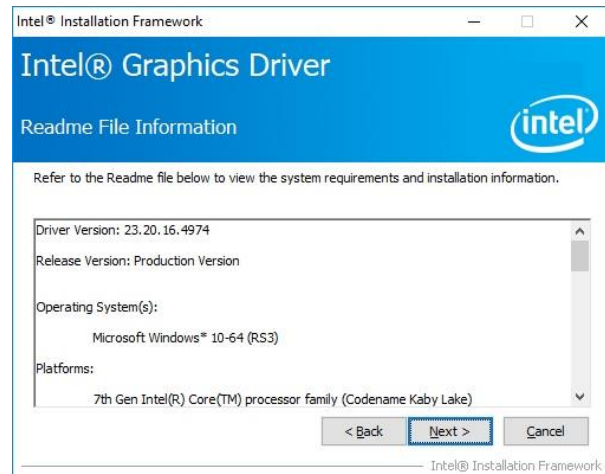
Step 2. Click Accept.

4.2 Install Display Driver

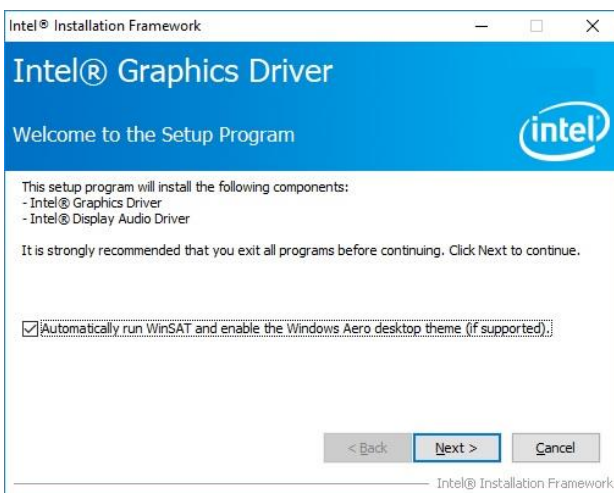
All drivers can be found on the Avalue Official Website:
<http://www.avalue.com.tw>.



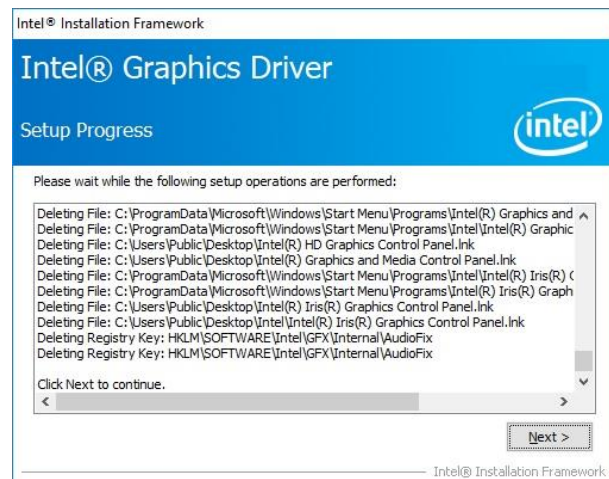
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



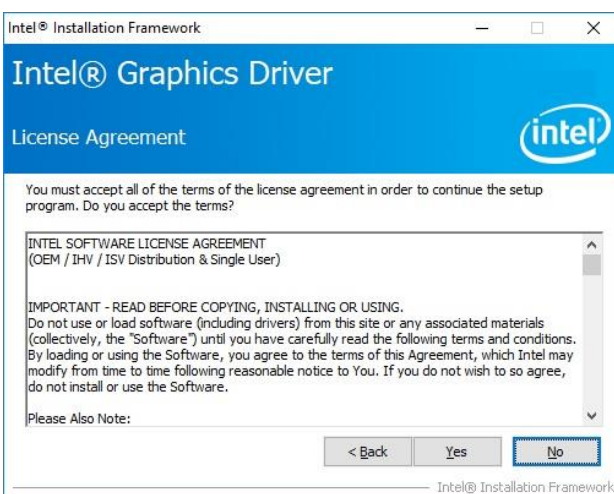
Step 3. Click Next.



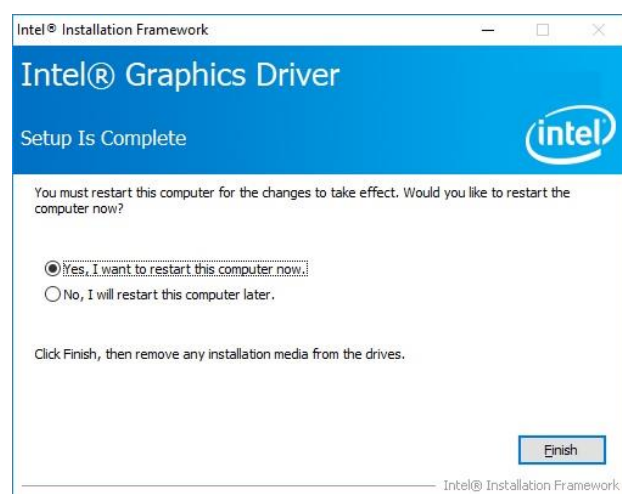
Step 1. Click Next to continue installation.



Step 4. Click Next.



Step 2. Click Yes to accept license agreement.



Step 5. Click Finish to complete setup.

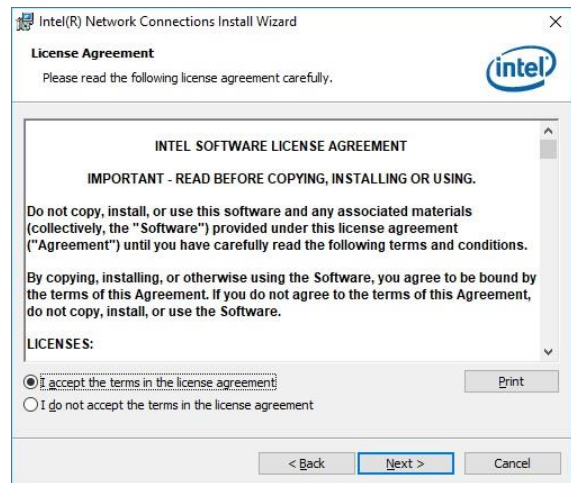
4.3 Install LAN Driver

All drivers can be found on the Avalue Official Website:

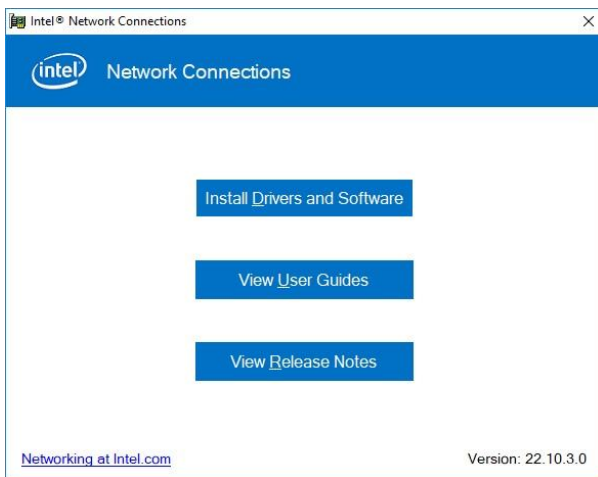
<http://www.avalue.com.tw>.



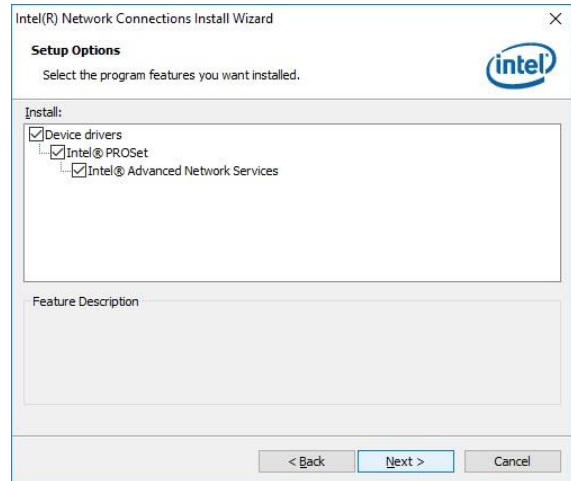
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



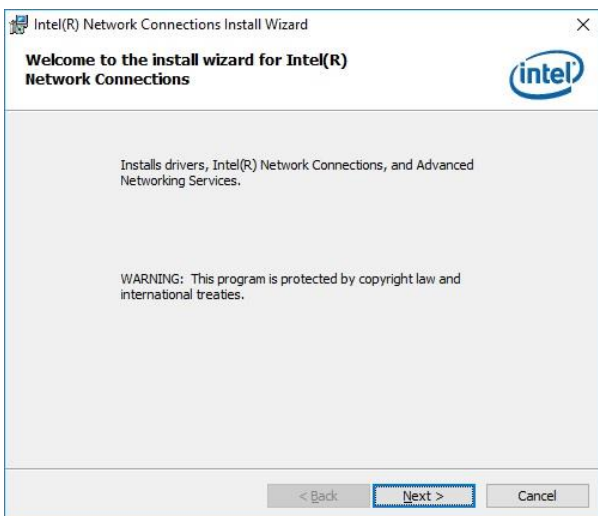
Step 3. Click Next.



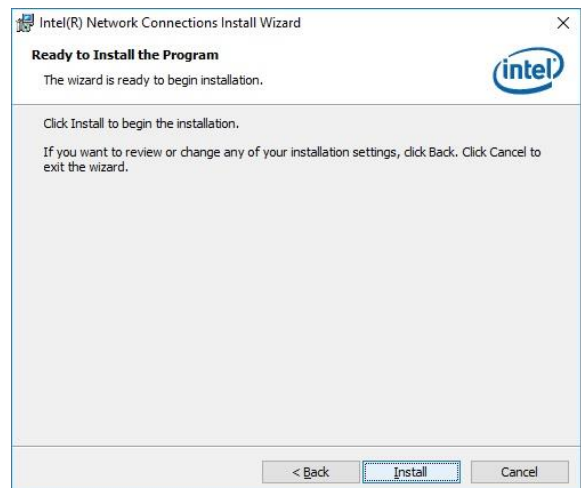
Step 1. Click Install Drivers and Software.



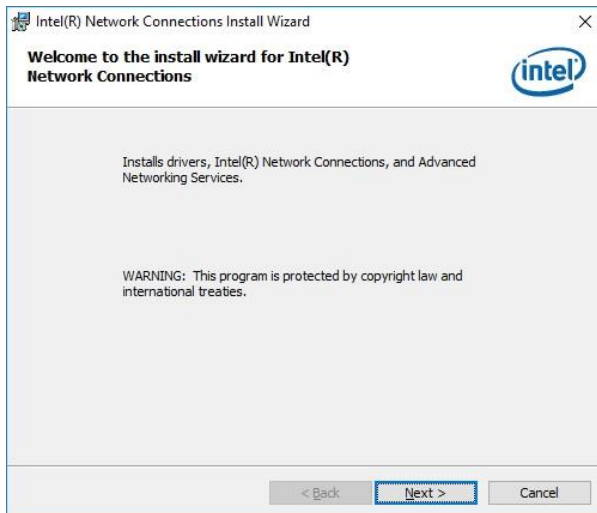
Step 4. Click Next.



Step 2. Click Next.



Step 5. Click Install.



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

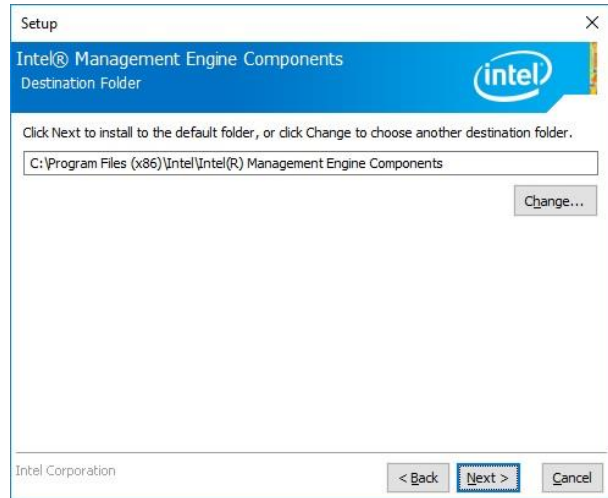
4.4 Install ME Driver

All drivers can be found on the Avalue Official Website:

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



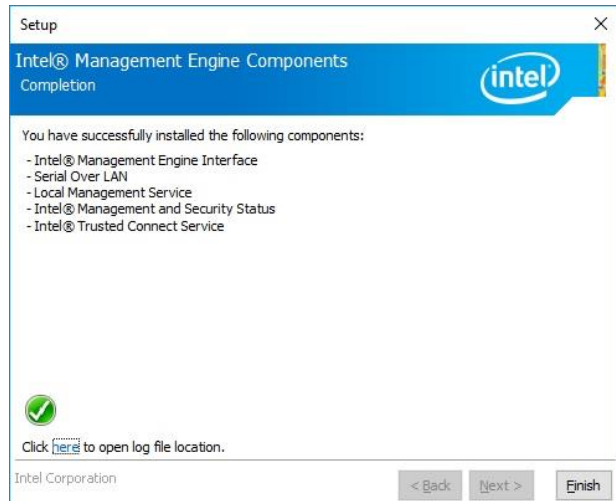
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



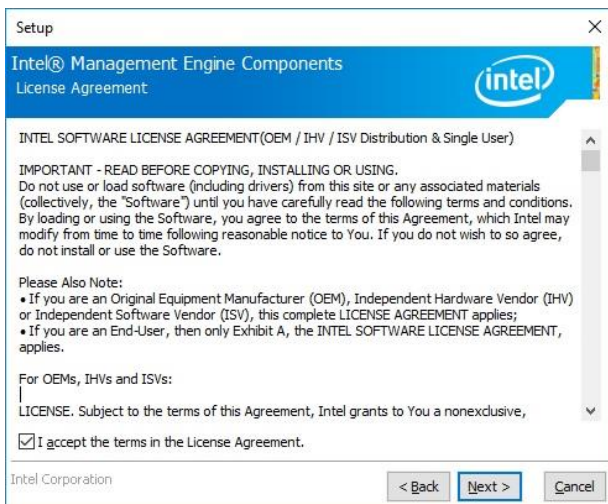
Step 3. Click Next.



Step1. Click Next to start installation.



Step 4. Click Finish to complete setup.



Step 2. Click Next.

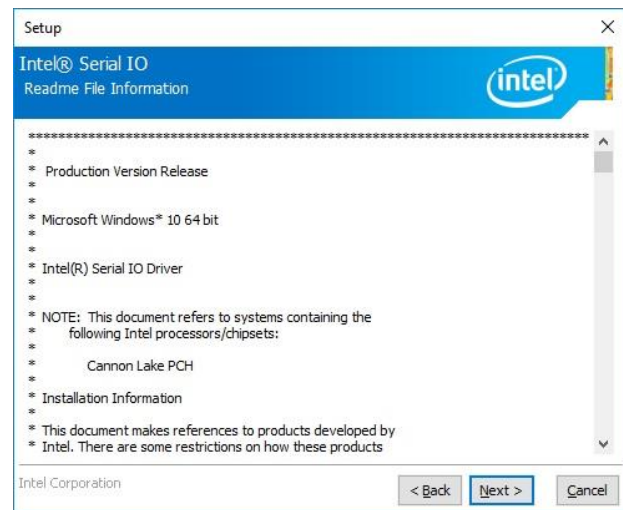
4.5 Install Serial IO Driver

All drivers can be found on the Avalue Official Website:

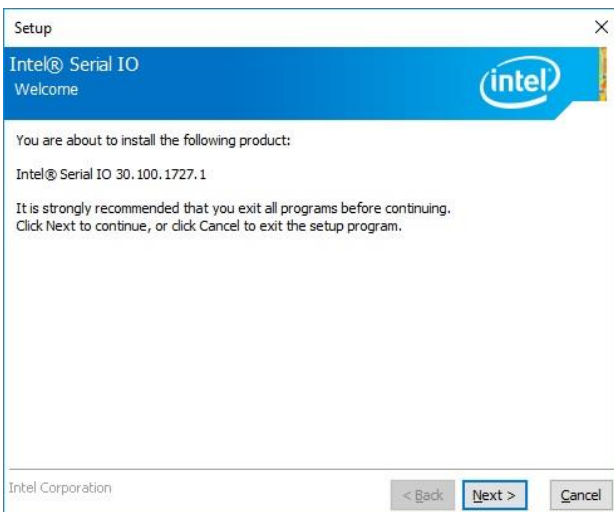
<http://www.avalue.com.tw>.



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



Step 3. Click Next.



Step 1. Click Next to continue installation.



Step 4. Click Next.



Step 2. Click Next.



Step 5. Complete setup.

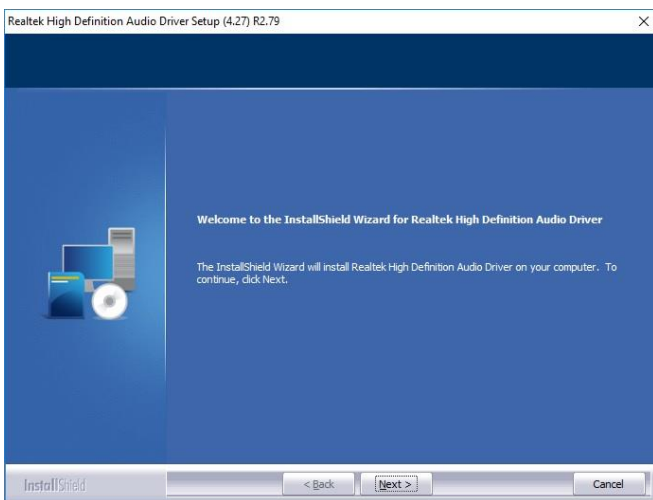
4.6 Install Audio Driver (For Realtek ALC892)

All drivers can be found on the Avalue Official Website:

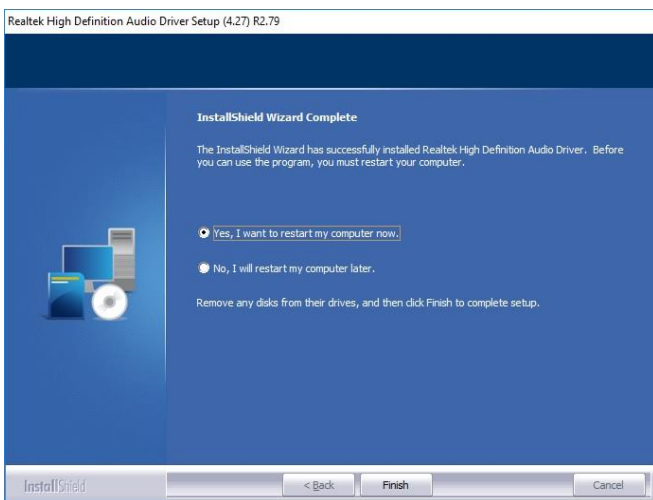
<http://www.avalu.com.tw>.



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



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



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

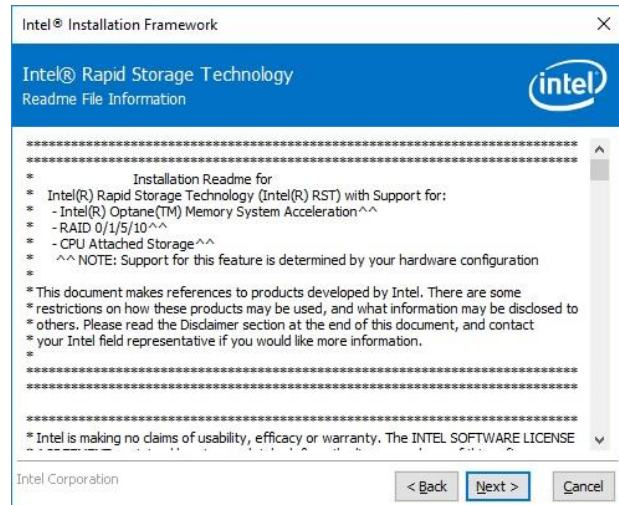
4.7 Install IRST Driver

All drivers can be found on the Avalue Official Website:

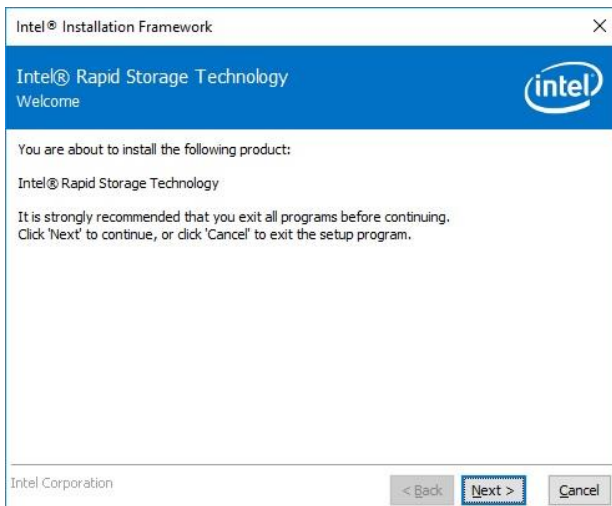
<http://www.avalu.com.tw>.



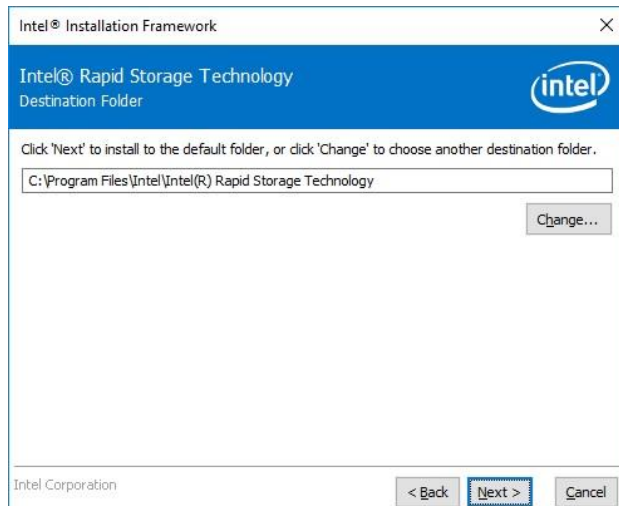
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



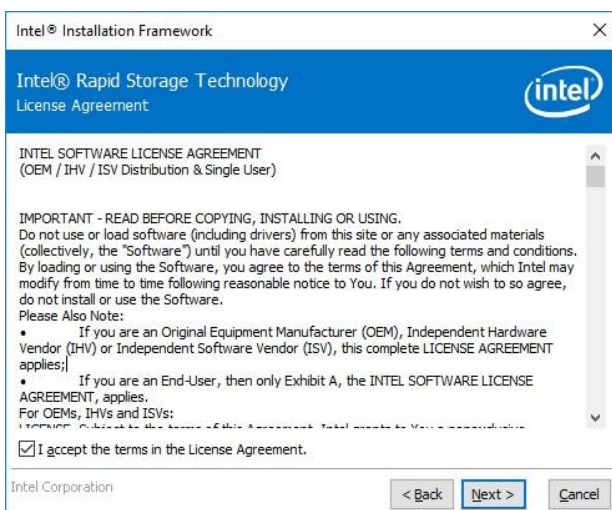
Step 3. Click Next.



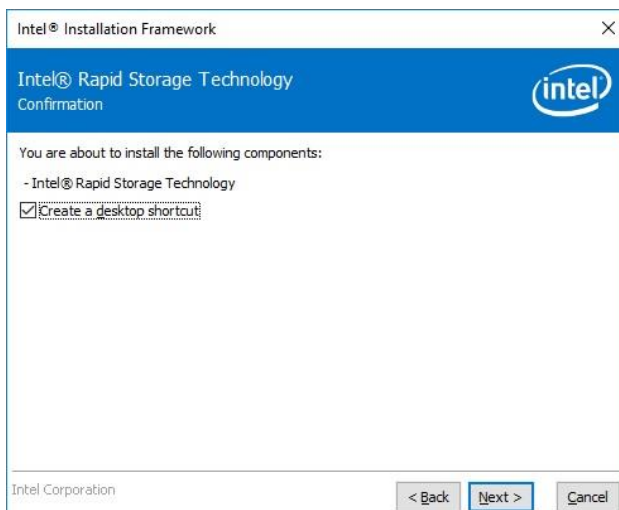
Step 1. Click Next to continue installation.



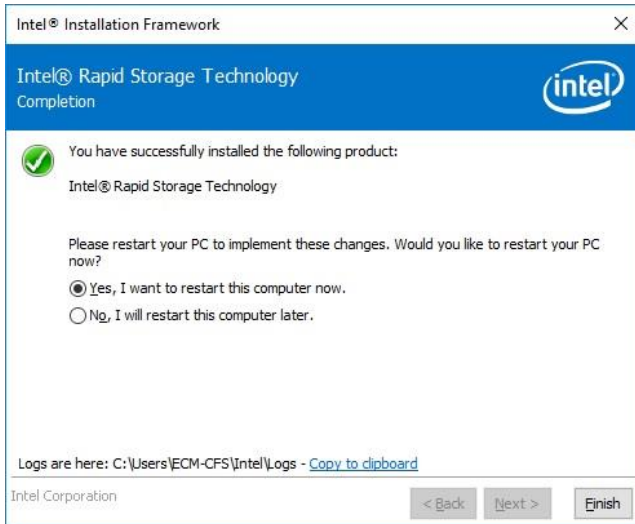
Step 4. Click Next.



Step 2. Click Next.

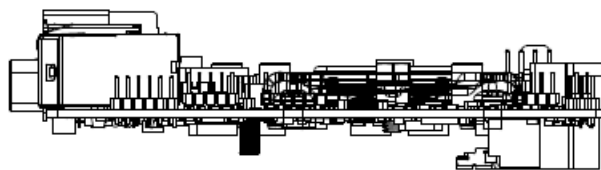
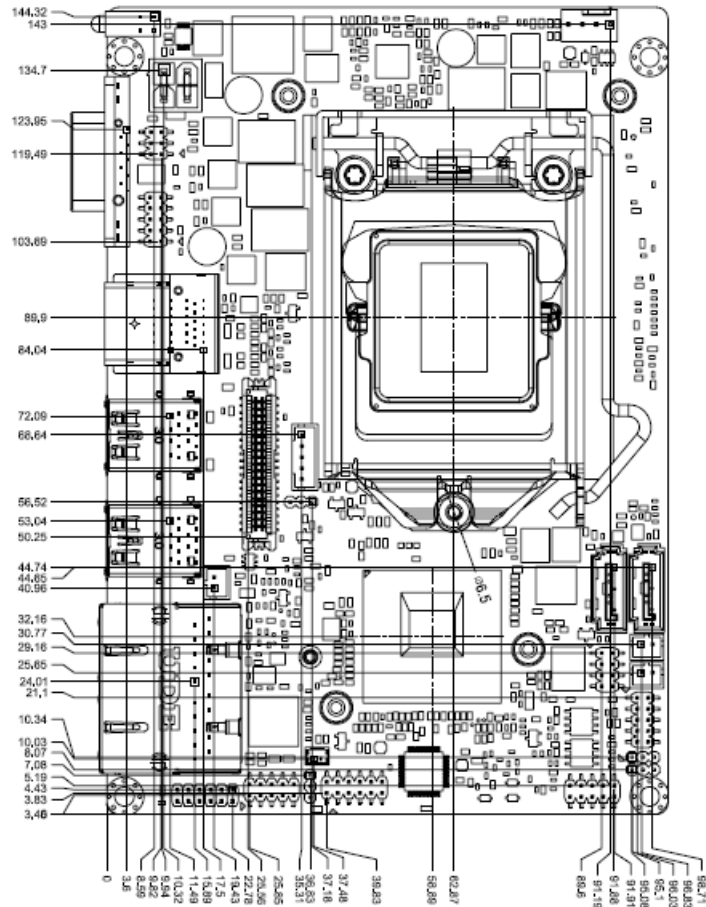
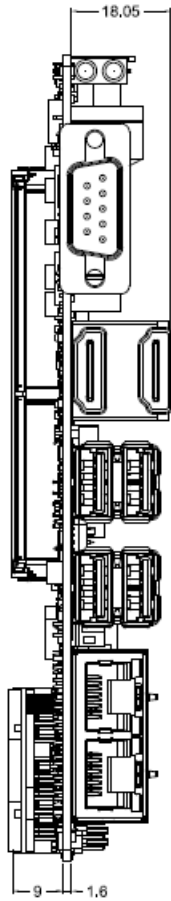


Step 5. Complete setup.

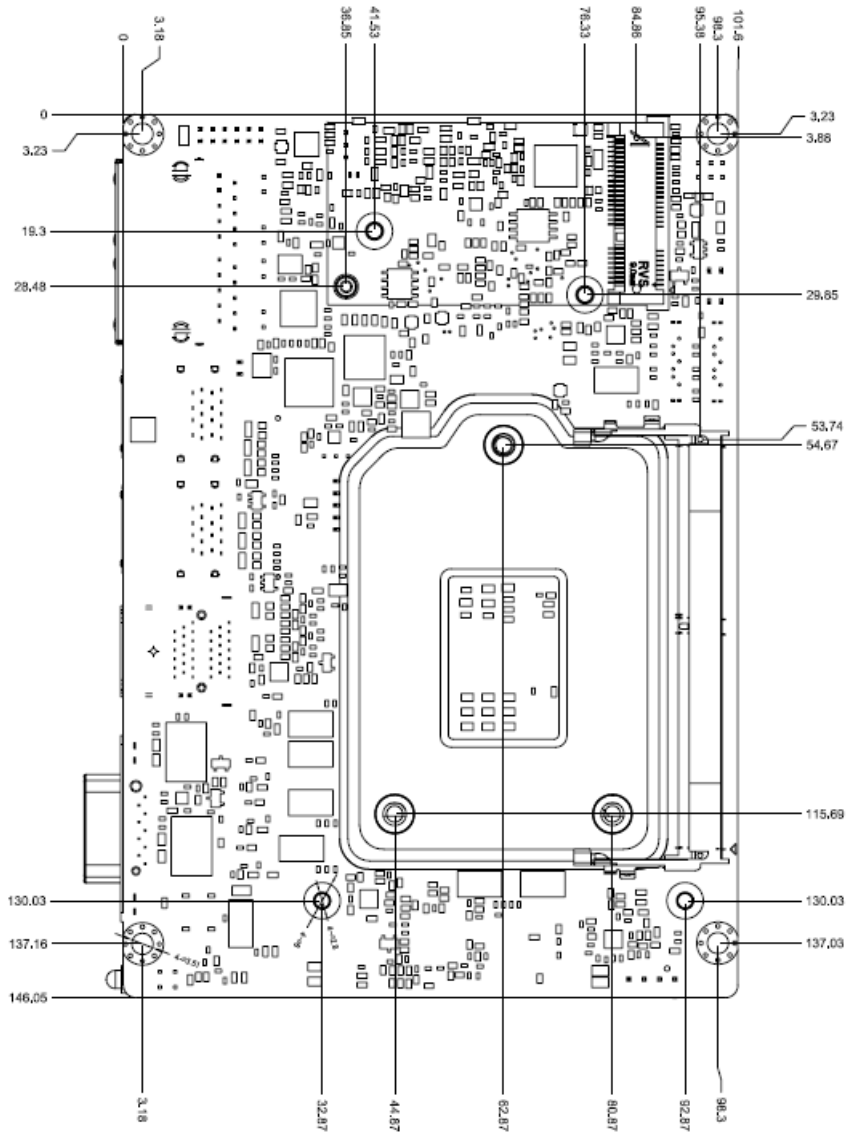


Step 6. Click **Finish** to complete setup.

5. Mechanical Drawing



Unit: mm



Unit: mm

