

# ECM-APL

Intel® Apollo lake processor 3.5 Micro Module

## User's Manual

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5<sup>th</sup> Ed – 30 July 2020

## FCC Statement



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

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

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

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

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

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

## Notice

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

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2. 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.

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1. Collect all the information about the problem encountered. (For example, CPU type and speed, 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.

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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 3.5" ECM-APL Micro Module
- 1 x Cable set contains the followings:
  - 1 x Serial ATA cable (7-pin, standard)
  - 1 x Wire SATA power cable (15-pin, 2P/2.0mm)
  - 1 x Flat Cable 9P(M)-PHD (10P/2.0mm)
- 3M foam (VHB-4622 10mm\*20mm\*1.1mm)
- 1 x CPU Heatsink or Cooler(depend on operating temperature & CPU SKU)



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

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### 1.3 Document Amendment History

Revision	Date	By	Comment
1 <sup>st</sup>	December 2016		Initial Release
2 <sup>nd</sup>	March 2017		Add JLVDS1 and JBKL1 matching connector
3 <sup>rd</sup>	September 2019		Update System Specifications
4 <sup>th</sup>	December 2019		Update System Specifications
5 <sup>th</sup>	July 2020		Update Packing List

### 1.4 Manual Objectives

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-APL 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

<b>System</b>	
<b>CPU</b>	Onboard Intel® Pentium®/Celeron®/Atom™ SoC BGA Processor (Apollo Lake Platform)
<b>BIOS</b>	AMI BIOS, 128 Mbit SPI Flash ROM
<b>System Chipset</b>	Apollo SoC integrated
<b>I/O Chip</b>	EC (ITE IT8528VG), E3900 Series CPU use EC (ITE IT8528VG I) for WT
<b>System Memory</b>	One 204-pin DDR3L SODIMM Socket, Supports 4G/8G & Up to 8GB DDR3L 1866MTs SDRAM (Non-ECC)
<b>Storage</b>	1 x M.2 B key (2242 support SATA/USB interface & with Micro SIM card connector) for SSD/3G/4G
<b>Watchdog Timer</b>	H/W Reset, 1sec. ~ 65535sec and 1sec. or 1min./step
<b>H/W Status Monitor</b>	CPU & system temperature monitoring Voltages monitoring
<b>Expansion</b>	1 x Full-Size Mini PCI Express Mini Card (for PCIe & USB2.0)
<b>Built-in Touch screen (optional)</b>	EETI ETP-CP-MER4485XRU With 5-pin 2.0mm Box Header (Can be Selected to Support 4/ 5Wire Touch Screen)
<b>I/O</b>	
<b>MIO</b>	1 x SATA III 1 x DB-9 male connector for COM1 supports RS232/422/485 (selectable by BIOS, w/ Auto Flow)
<b>USB</b>	4 x USB3.0 (Edge connectors), 1 x USB 2.0 (Pin header)
<b>GPIO</b>	8-bit
<b>Others</b>	LPC, SPI
<b>Display</b>	
<b>Chipset</b>	Intel® Apollo Lake SoC Processor integrated Gen9 LP graphics
<b>Resolution</b>	LVDS: 1920 x 1080@60Hz Dual HDMI: 3840 x 2160@30Hz
<b>Multiple Display</b>	Dual HDMI+LVDS
<b>HDMI</b>	HDMI x 1.4b
<b>LCD Interface</b>	Dual channel 18/24-bit LVDS (via 7511B)
<b>Audio</b>	
<b>AC97 Codec</b>	Realtek ALC892
<b>Audio Amp</b>	Mic-In, Line-In and Line-Out
<b>Ethernet</b>	

## ECM-APL User's Manual

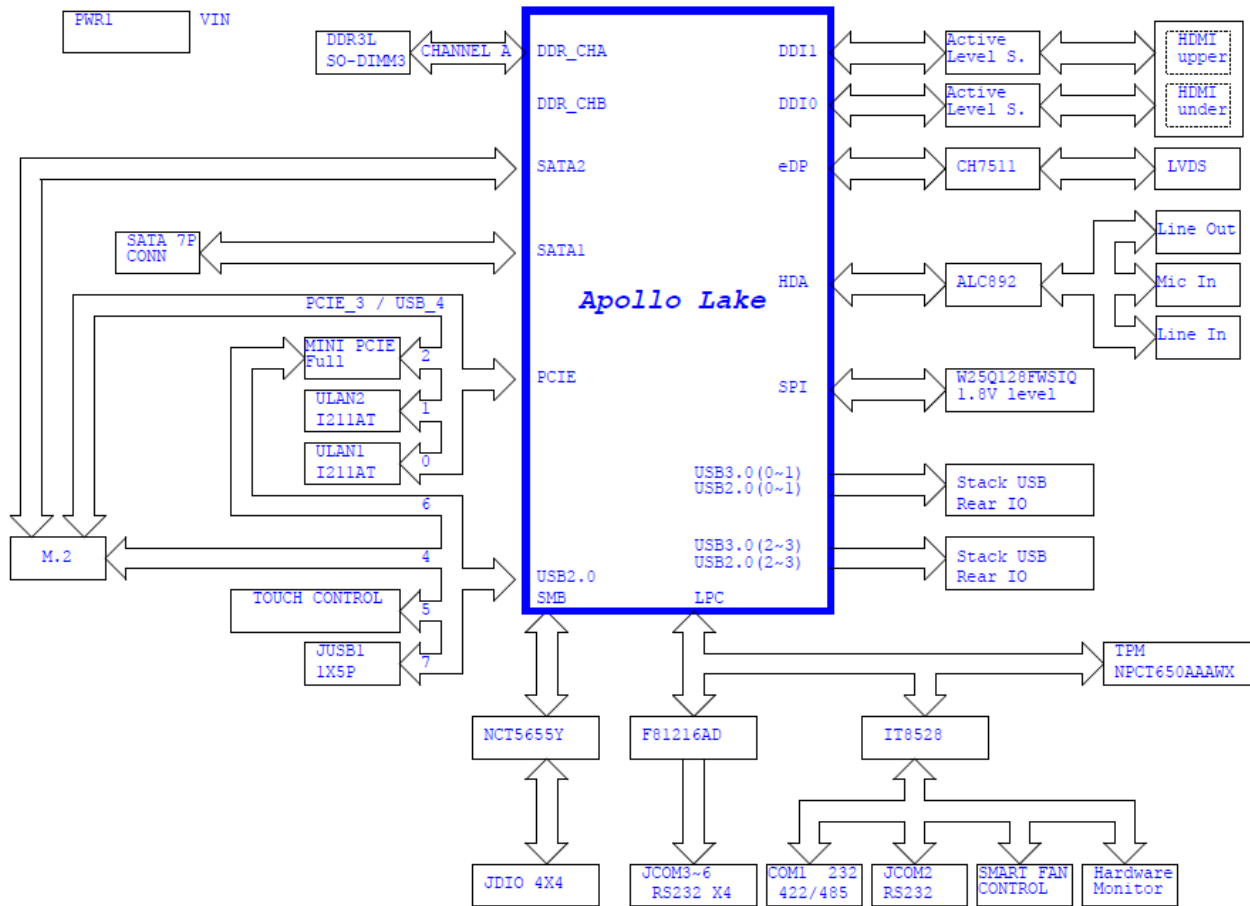
<b>LAN Chip</b>	2 x Intel I211AT GbE controller (E3900 Series CPU use Intel I210IT for WT)
<b>Ethernet Interface</b>	10/100/1000 Base-Tx compatible
<b>Internal I/O Connectors</b>	
<b>Fan</b>	CPU_FAN1 4pin 2.5mm wafer header
<b>Buzzer</b>	With Pin header
<b>CMOS Battery</b>	CR2032
<b>Power On</b>	AX/ATX selectable by jumper
<b>COM</b>	5 x RS232 for COM2/3/4/5/6
<b>Rear I/O Connectors</b>	
<b>USB</b>	4 x USB3.0
<b>LAN</b>	2 x RJ-45
<b>HDMI</b>	HDMI x 2 38P 90D(F) w/Flange BLK
<b>LED</b>	Stack LED indicator for power/HDD
<b>Mechanical &amp; Environmental</b>	
<b>Power Requirement</b>	+12V ~ +26V
<b>ACPI</b>	Single power ATX Support S0, S3, S4, S5 ACPI 5.0 Compliant
<b>Power Type</b>	AT / ATX
<b>Operating Temp.</b>	0°C ~ 60°C (32°F ~ 140°F) -40°C ~ 85°C (-40°F ~ 185°F) for I-series CPU
<b>Storage Temp.</b>	-40°C ~ 85°C (-40°F ~ 167°F)
<b>Operating Humidity</b>	0% ~ 90% relative humidity, non-condensing
<b>Size (L x W)</b>	5.7" x 4" (146mm x 101mm)
<b>Weight</b>	0.44lbs (0.2kg)
<b>OS support</b>	OS information: Win10 (64) /Linux/Android (listed in accordance with Intel document)



**Note:** Specifications are subject to change without notice.

## 1.6 Architecture Overview—Block Diagram

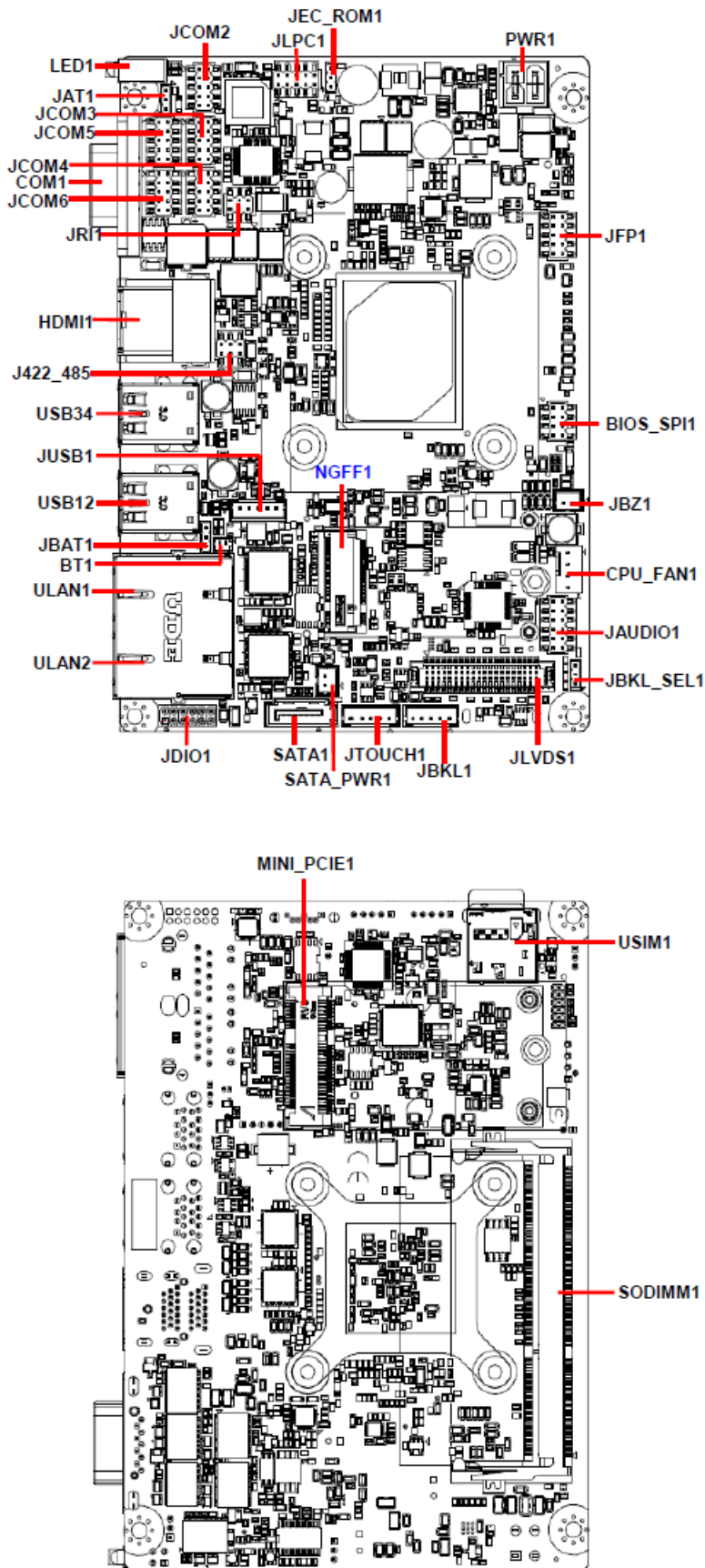
The following block diagram shows the architecture and main components of ECM-APL.



# 2. Hardware Configuration

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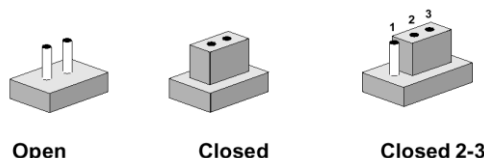
## 2.1 Product Overview



## 2.2 Jumper and Connector List

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

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



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



A pair of needle-nose pliers may be helpful when working with jumpers. Connectors on the board are linked to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.

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

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

### 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

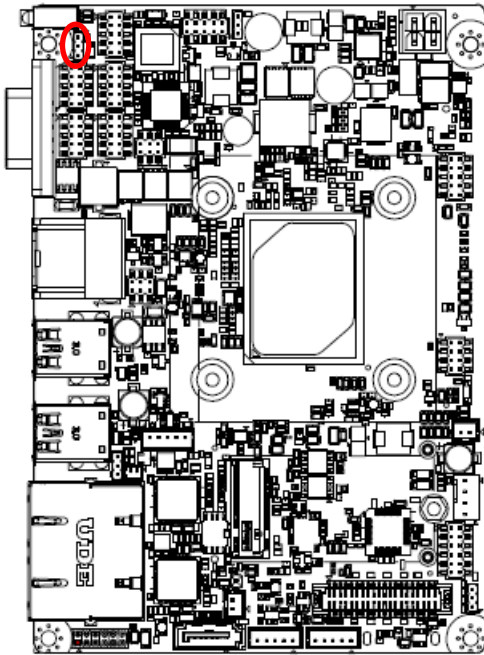
Label	Function	Note
BT1	Battery connector	2 x 1 wafer, pitch 1.25 mm
CPU_FAN1	CPU fan connector	4 x 1 wafer, pitch 2.54 mm
JAUDIO1	Audio connector	6 x 2 header, pitch 2.00 mm
JBKL1	LCD inverter connector	5 x 1 wafer, pitch 2.00 mm



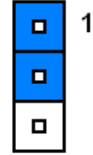
		Matching Connector: JST PHR-5
<b>J422_485</b>	Serial port 1 in RS-422/485 mode	3 x 2 header, pitch 2.00 mm
<b>COM1</b>	Serial port 1 connector	D-sub 9-pin, male <b>Note</b> : COM1 support RS422/485 by BIOS setting
<b>JCOM2/3/4/5/6</b>	Serial port 2/3/4/5/6 connector	5 x 2 header, pitch 2.00 mm
<b>JDIO1</b>	General purpose I/O connector	6 x 2 header, pitch 2.00 mm
<b>JFP1</b>	Miscellaneous setting connector	5 x 2 header, pitch 2.00 mm
<b>JLPC1</b>	Low pin count interface	5 x 2 header, pitch 2.00 mm
<b>JLVDS1</b>	LVDS connector	20 x 2 wafer, pitch 1.25 mm Matching Connector: Hirose DF13-40DS-1.25C
<b>JTOUCH1</b>	Touch Panel connector	5 x 1 wafer, pitch 2.00 mm
<b>USB12/34</b>	On-board connector for USB3.0 x 4	
<b>JUSB1</b>	On-board header for USB2.0	5 x 1 wafer, pitch 2.00 mm
<b>JEC_ROM1</b>	EC Debug connector	3 x 1 header, pitch 2.00 mm
<b>ULAN1/2</b>	RJ-45 Ethernet connector 1/2	
<b>LED1</b>	HDD/Power LED indicator	
<b>PWR1</b>	Power connector	2 x 2 wafer, pitch 4.20 mm
<b>JBZ1</b>	PC Buzzer header	2 x 1 wafer, pitch 2.00 mm
<b>SATA_PWR1</b>	SATA power header	2 x 1 wafer, pitch 2.00 mm
<b>SATA1</b>	Serial ATA connector 1	
<b>HDMI1</b>	HDMI connector	
<b>BIOS_SPI1</b>	BIOS SPI header	4 x 2 header, pitch 2.00 mm
<b>NGFF1</b>	M.2 B key slot	
<b>MINI_PCIE1</b>	Mini-PCI connector	
<b>SO_DIMM1</b>	DDR3 SODIMM connector	
<b>USIM1</b>	Sim card slot	

## 2.3 Setting Jumpers & Connectors

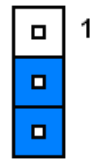
### 2.3.1 AT/ ATX Input power select (JAT1)



AT\*

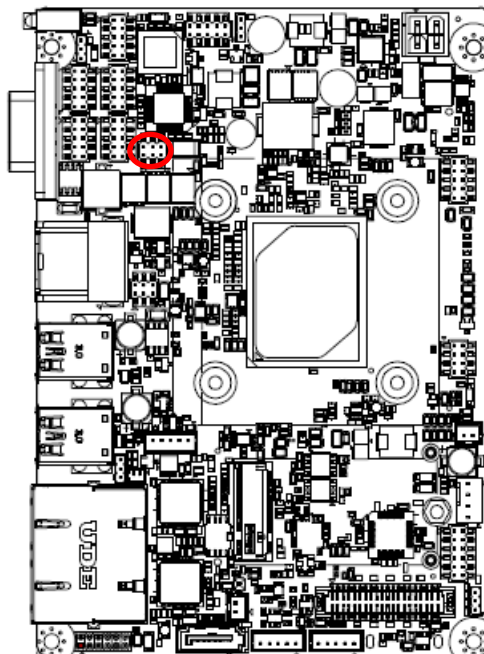


ATX

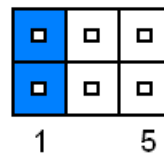


\* Default

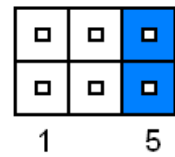
### 2.3.2 Serial port 1 pin9 signal select (JRI1)



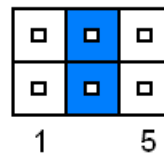
Ring\*



+12V

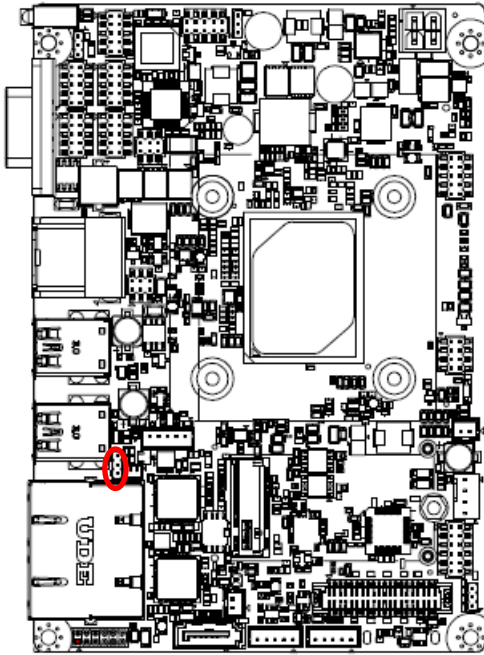


+5V

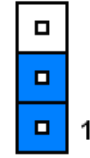


\* Default

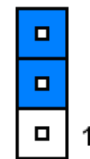
### 2.3.3 Clear CMOS (JBAT1)



Protect\*

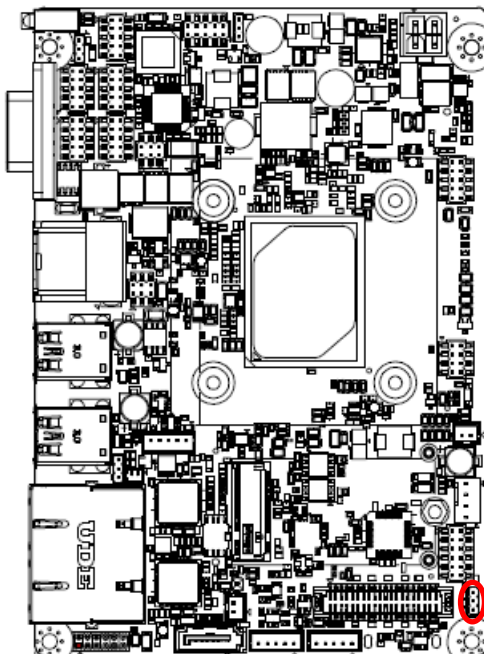


Clear CMOS

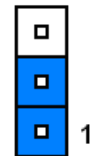


\* Default

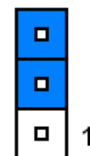
### 2.3.4 LCD backlight brightness adjustment (JBKL\_SEL1)



PWM Mode\*

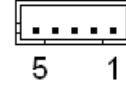
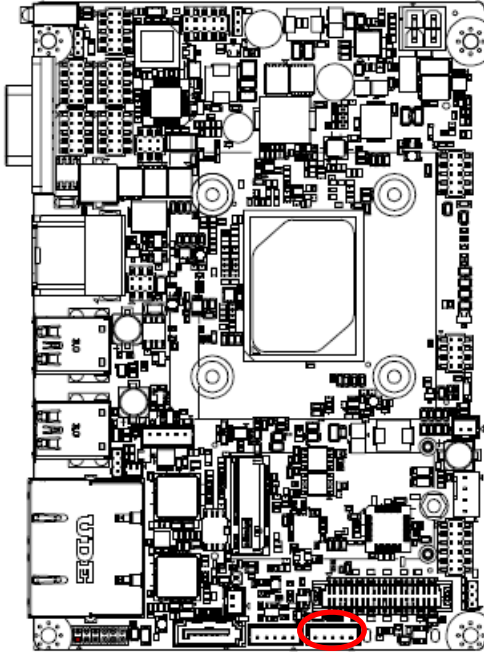


DC Mode



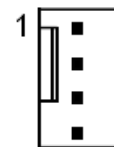
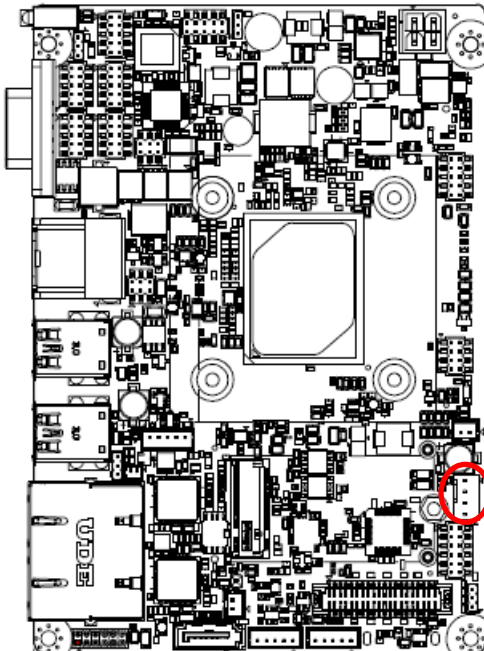
\* Default

2.3.5 LCD Inverter connector (JBKL1)



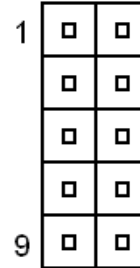
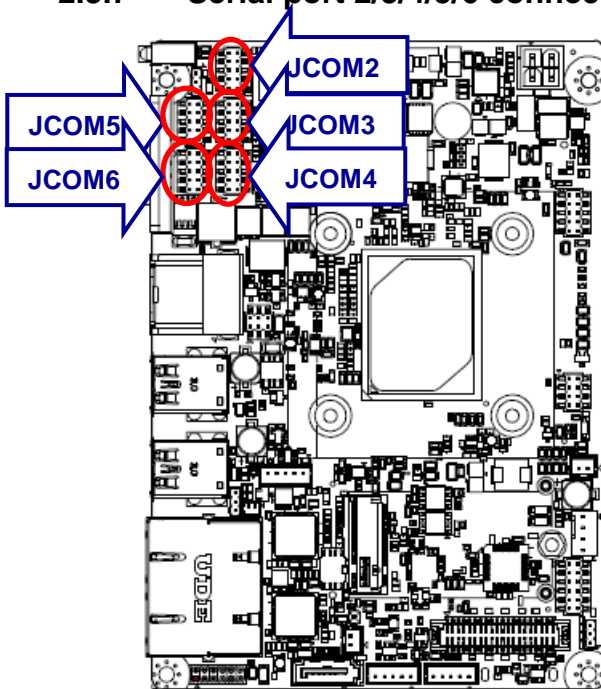
Signal	PIN
+12V	1
GND	2
BKLEN	3
VBRIGHT	4
+5V	5

2.3.6 CPU fan connector (CPU\_FAN1)



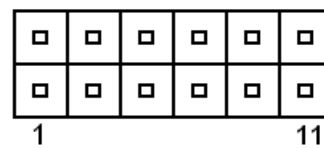
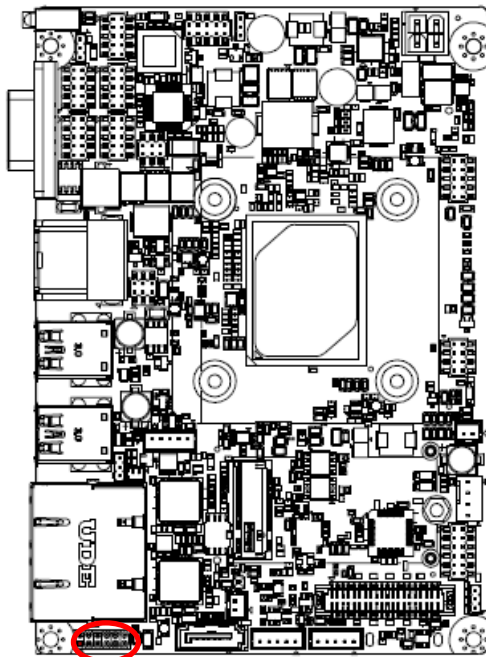
Signal	PIN
GND	1
+12V	2
EC_TACH0	3
FAN_PWM0	4

### 2.3.7 Serial port 2/3/4/5/6 connector (JCOM2/3/4/5/6)



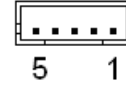
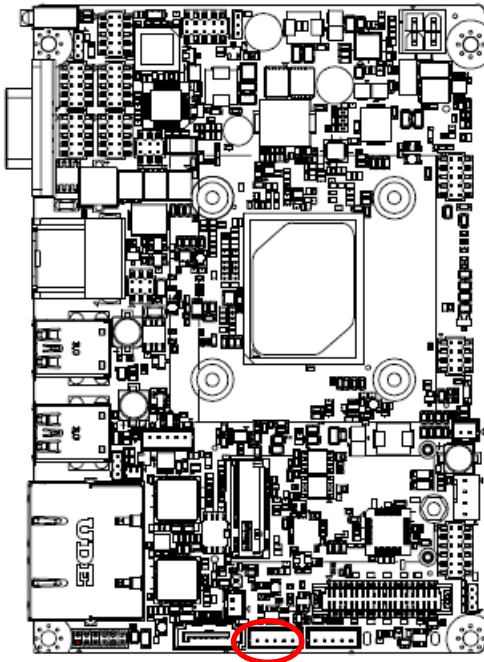
Signal	PIN	PIN	Signal
COM_DCD#	1	2	COM_RXD
COM_TXD	3	4	COM_DTR#
GND	5	6	COM_DSR#
COM_RTS#	7	8	COM_CTS#
COM_RI#	9	10	NC

### 2.3.8 General purpose I/O connector (JDIO1)



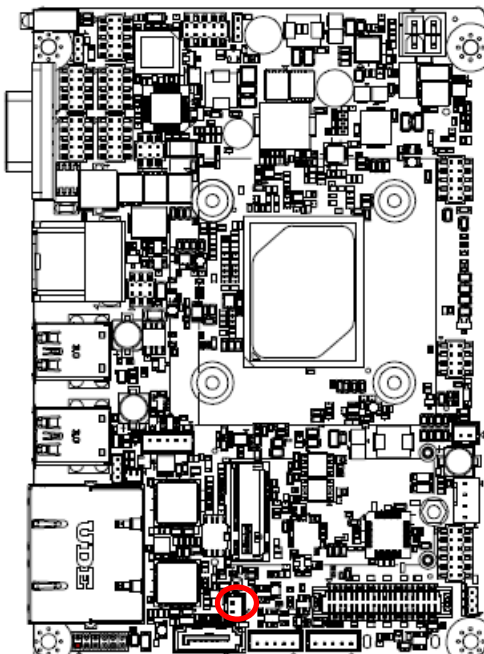
Signal	PIN	PIN	Signal
DIO_GP20	1	2	DIO_GP10
DIO_GP21	3	4	DIO_GP11
DIO_GP22	5	6	DIO_GP12
DIO_GP23	7	8	DIO_GP13
SMB_SCL_S0	9	10	SMB_SDA_S0
GND	11	12	+5V

2.3.9 Touch Panel connector (JTOUCH1)



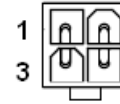
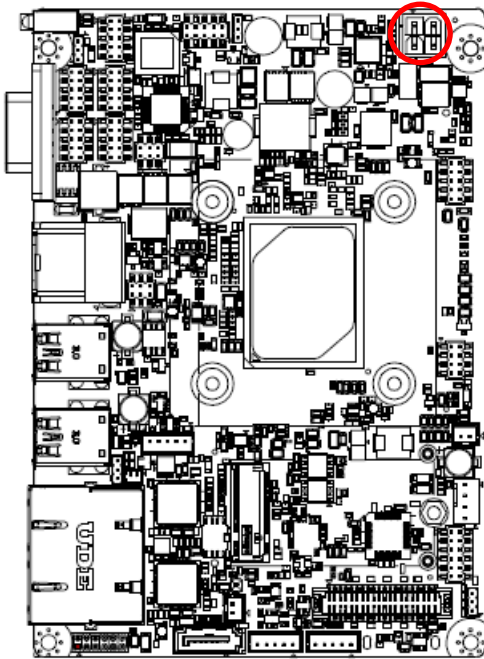
Signal	PIN
THX+	1
THX-	2
THPROBE_R	3
THY+	4
THY-	5

2.3.10 SATA Power header (SATA\_PWR1)



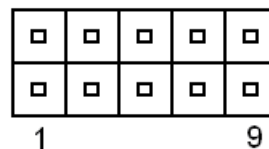
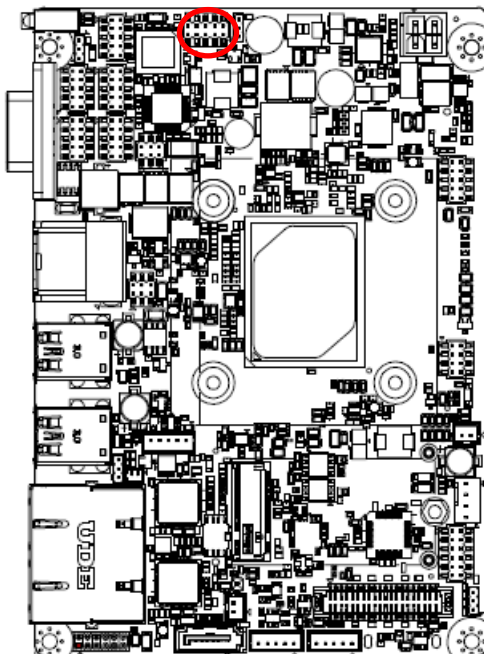
Signal	PIN
+5V	2
GND	1

### 2.3.11 Power connector (PWR1)



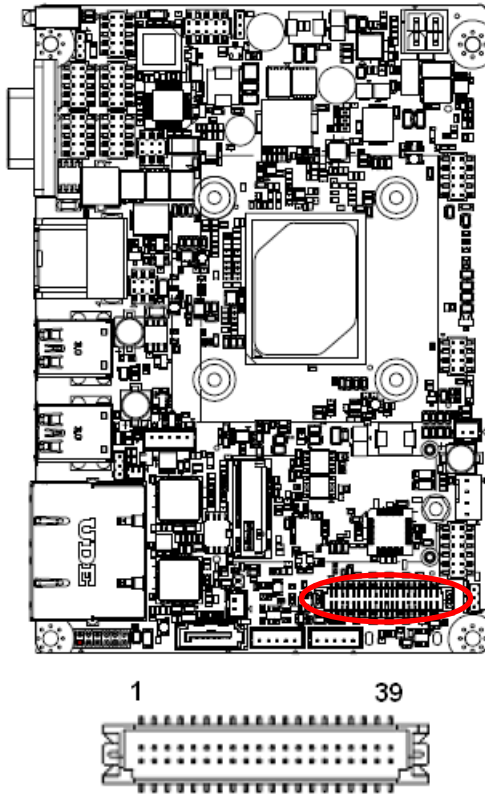
Signal	PIN	PIN	Signal
GND	1	2	GND
+26V_VIN_VIN	3	4	+26V_VIN_VIN

### 2.3.12 Low pin count interface (JLPC1)



Signal	PIN	PIN	Signal
LPC_AD0	1	2	+3.3V
LPC_AD1	3	4	PLT_RST_BUF#
LPC_AD2	5	6	LPC_FRAME#
LPC_AD3	7	8	LPC_PORT80_CLK
LPC_SERIRQ	9	10	GND

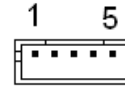
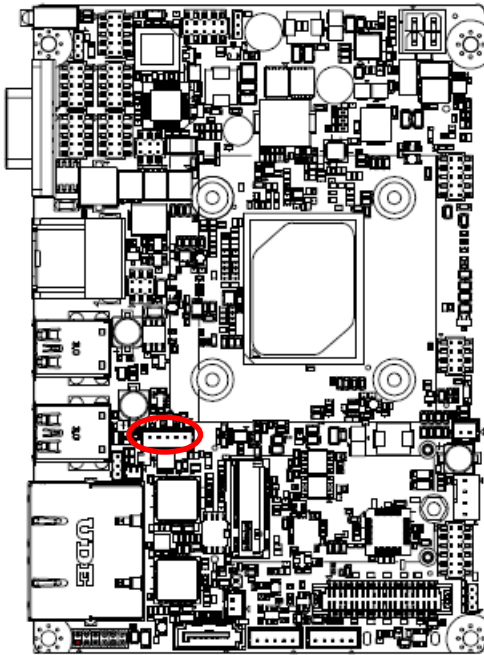
2.3.13 LVDS connector (JLVDS1)



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

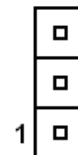
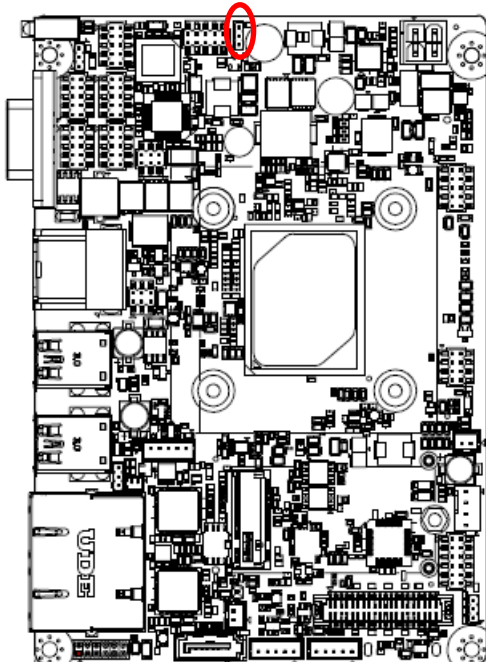


### 2.3.14 On-board header for USB2.0 (JUSB1)



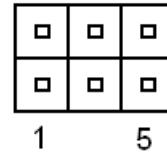
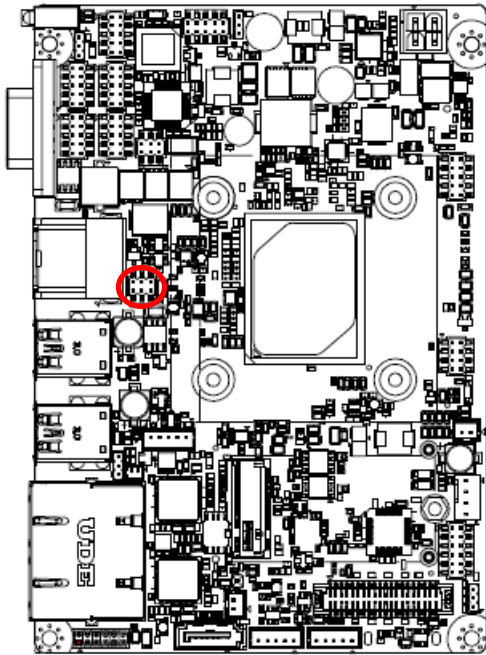
Signal	PIN
+5VSB	1
USB_R_DN7	2
USB_R_DP7	3
GND	4
GND	5

### 2.3.15 EC Debug connector (JEC\_ROM1)



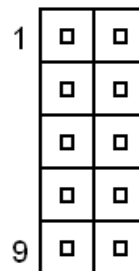
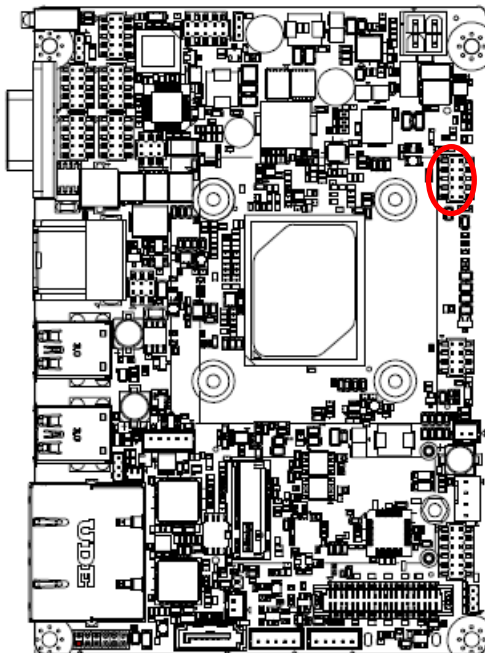
Signal	PIN
GND	3
EC_SMDAT_DEBUG	2
EC_SMCLK_DEBUG	1

2.3.16 Serial port 1 in RS-422/485 mode (J422\_485)



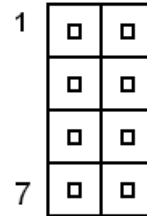
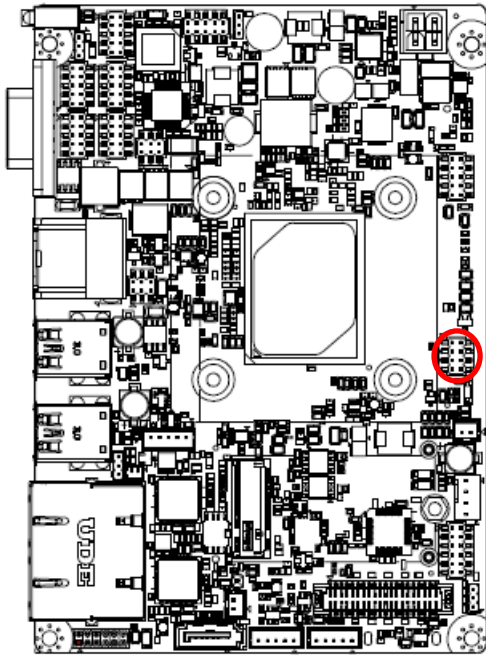
Signal	PIN	PIN	Signal
485TX2-	1	2	485TX2+
485RX2+	3	4	485RX2-
+5V	5	6	GND

2.3.17 Miscellaneous setting connector (JFP1)



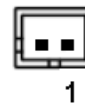
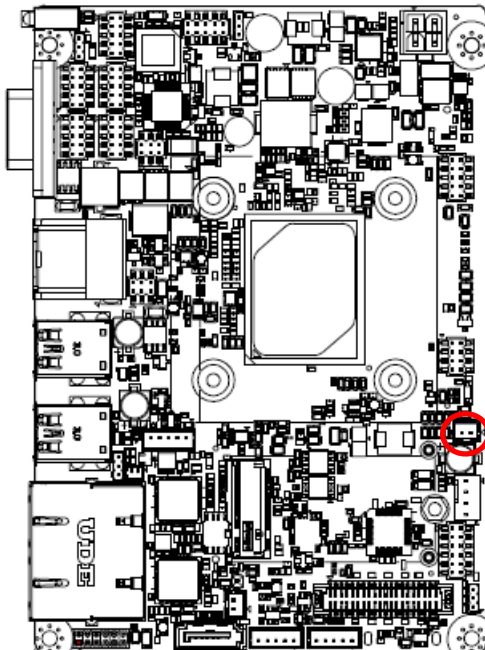
Signal	PIN	PIN	Signal
PWR_BTN_IN_EC#	1	2	GND
PMU_RSTBTN#	3	4	GND
FP_PWR_LED+	5	6	PWR_LED#
HDD_LED#	7	8	+5V
CASE_OPEN#	9	10	GND

### 2.3.18 BIOS SPI header (BIOS\_SPI1)



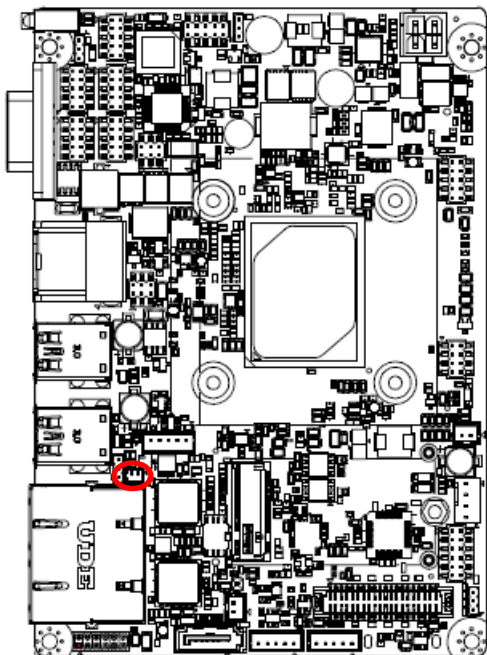
Signal	PIN	PIN	Signal
+1.8VSB	1	2	GND
SPI_CS#0	3	4	CPI_CLK
SPI_MISO	5	6	SPI_MOSI
SPI_HOLD#	7	8	SPI_WP#

### 2.3.19 PC Buzzer header (JBZ1)



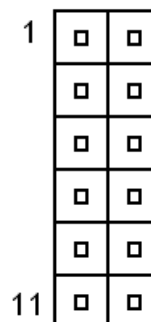
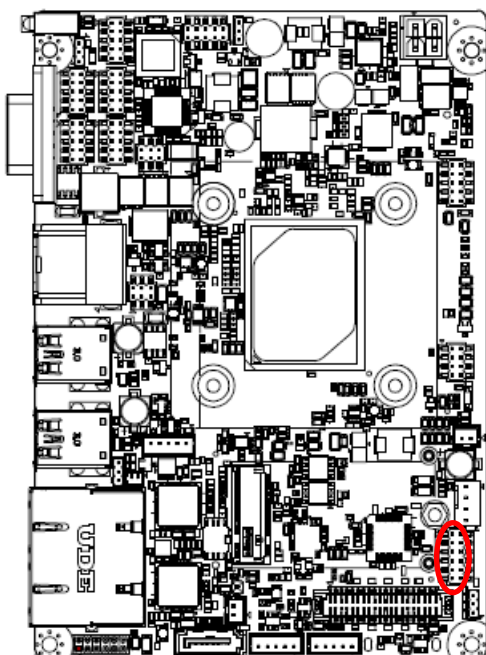
Signal	PIN
SOC_SPKR_R	1
+5V	2

2.3.20 Battery connector (BT1)



Signal	PIN
+RTCBATT	1
GND	2

2.3.21 Audio connector (JAUDIO1)



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

2.3.21.1 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

# 3. BIOS Setup

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### 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 <DEL> or <ESC> immediately after switching the system on, or

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

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

- **Navigating Through The Menu Bar**

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



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

- **To Display a Sub Menu**

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

### 3.4 Getting Help

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

### 3.5 In Case of Problems

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

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

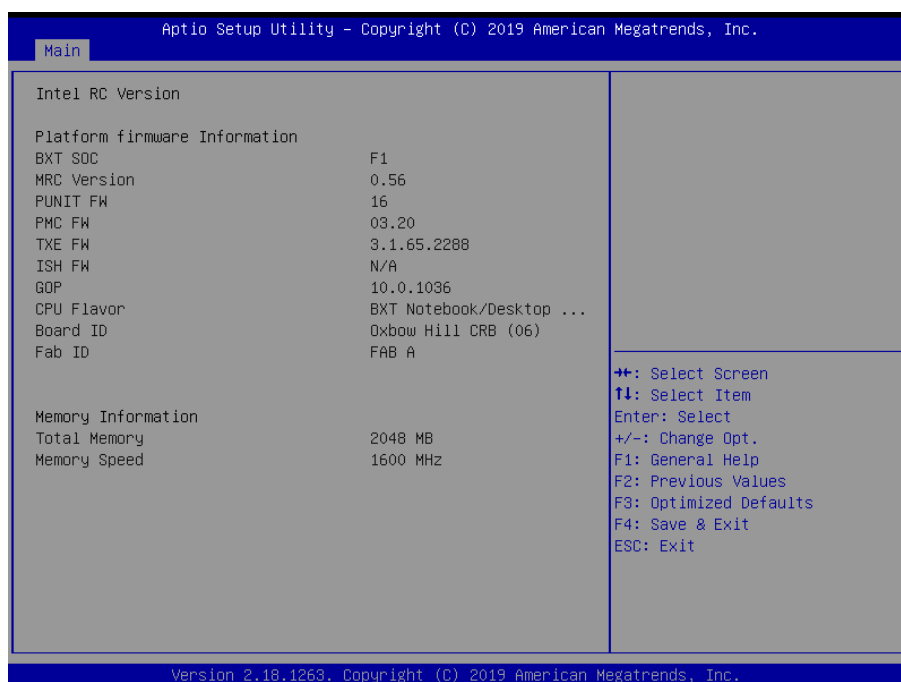


### 3.6 BIOS setup

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

#### 3.6.1 Main Menu

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



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### 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

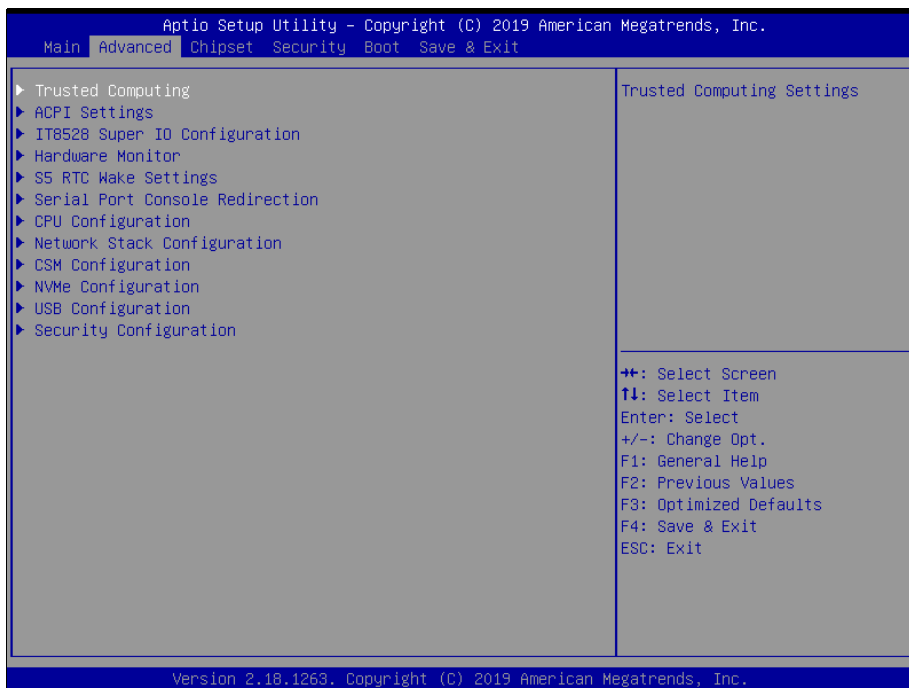
Use the system time option to set the system time. Manually enter the hours, minutes and seconds.



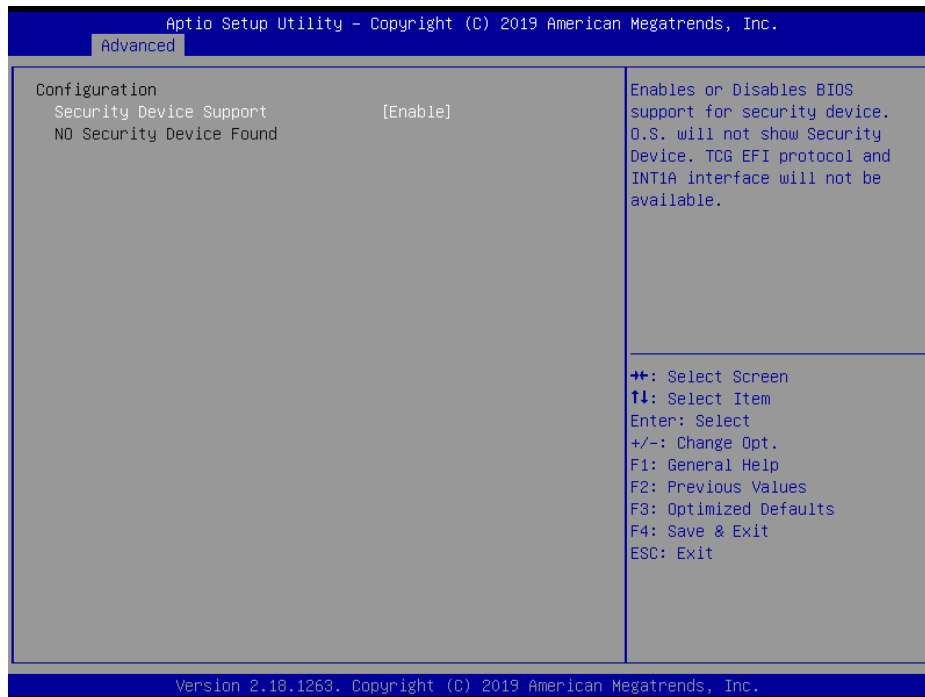
**Note:** The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.

## 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.

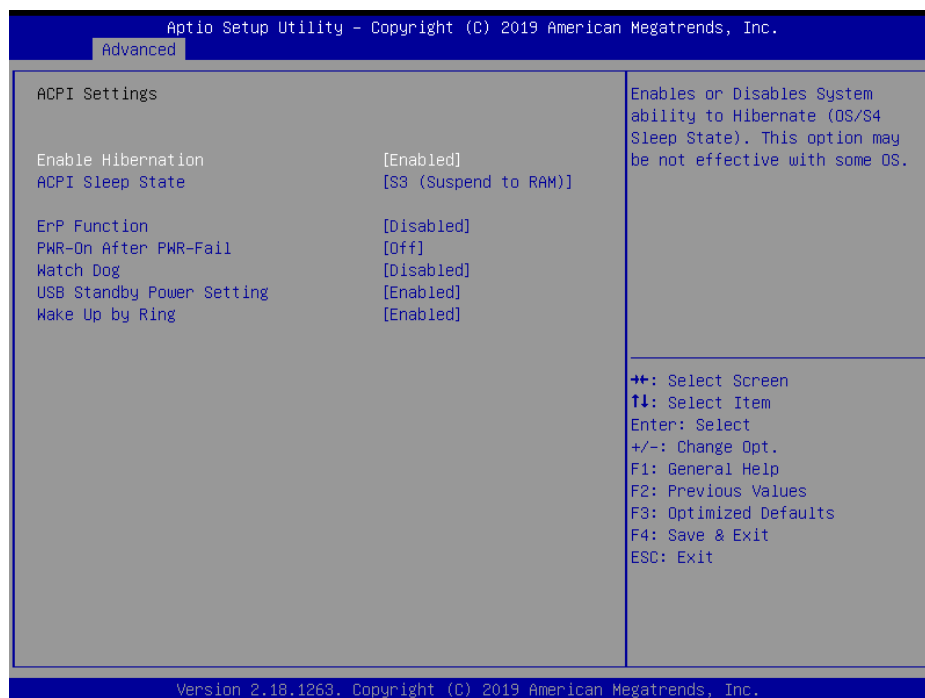


### 3.6.2.1 Trusted Computing



Item	Options	Description
<b>Security Device Support</b>	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.

### 3.6.2.2 APCI Settings

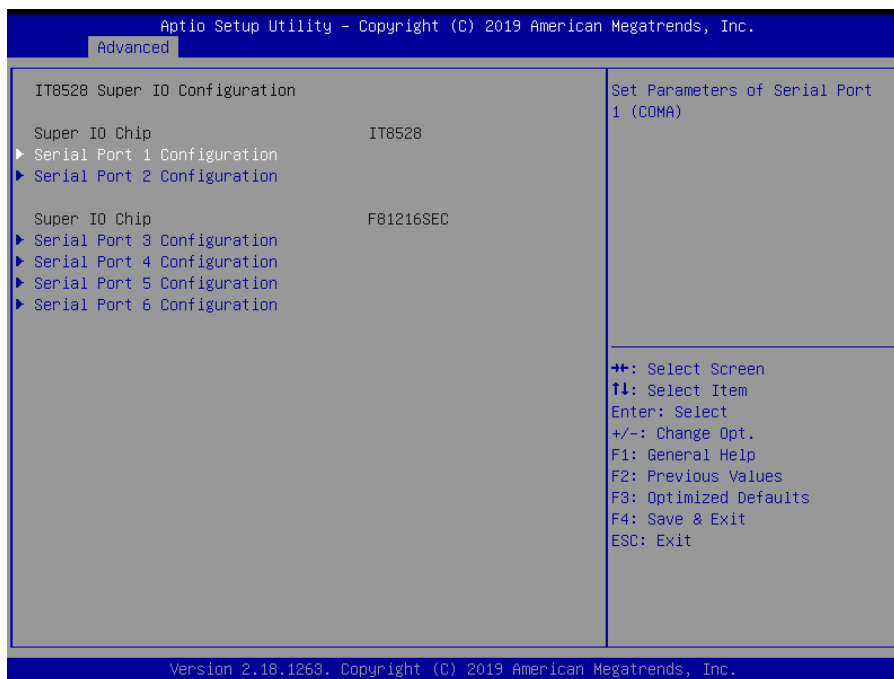


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Item	Options	Description
<b>Enable Hibernation</b>	Disabled Enabled[ <b>Default</b> ]	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
<b>ACPI Sleep State</b>	Suspend Disabled, S3 (Suspend to RAM)[ <b>Default</b> ]	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
<b>ErP Function</b>	Disabled[ <b>Default</b> ], Enabled	ErP Function (Deep S5).
<b>Pwr-On After PWR-Fail</b>	Off[ <b>Default</b> ] On Last state	AC loss resume.
<b>Watch Dog</b>	Disabled[ <b>Default</b> ], 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select WatchDog.
<b>USB Standby Power Setting</b>	Disabled Enabled[ <b>Default</b> ]	Enabled/Disabled USB Standby Power during S3/S4/S5.
<b>Wake Up By Ring</b>	Disabled Enabled[ <b>Default</b> ]	Wake Up by Ring from S3/S4/S5.

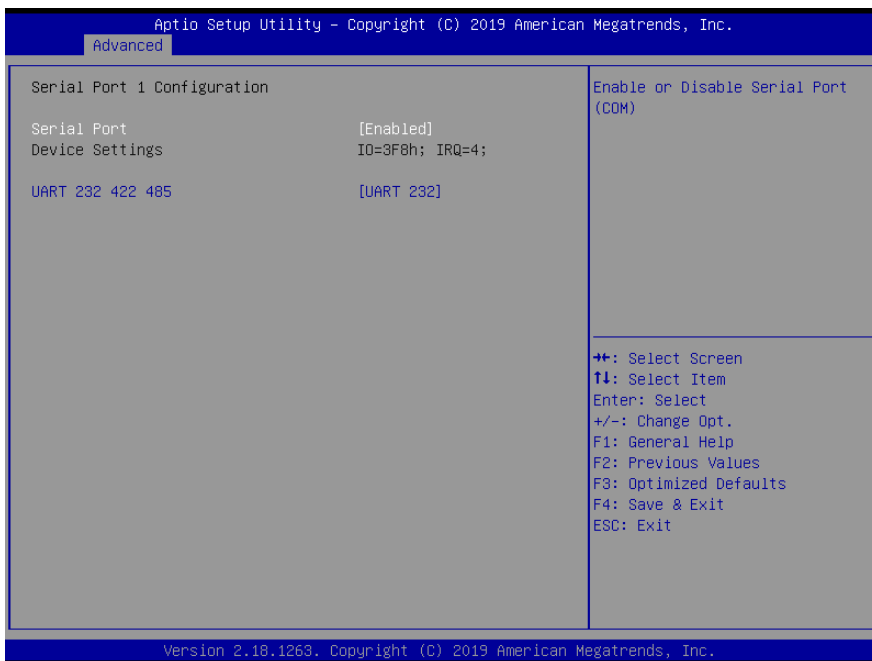
### 3.6.2.3 IT8528 Super IO Configuration

You can use this item to set up or change the IT8528 Super IO configuration for serial ports. Please refer to 3.6.2.3.1~ 3.6.2.3.6 for more information.



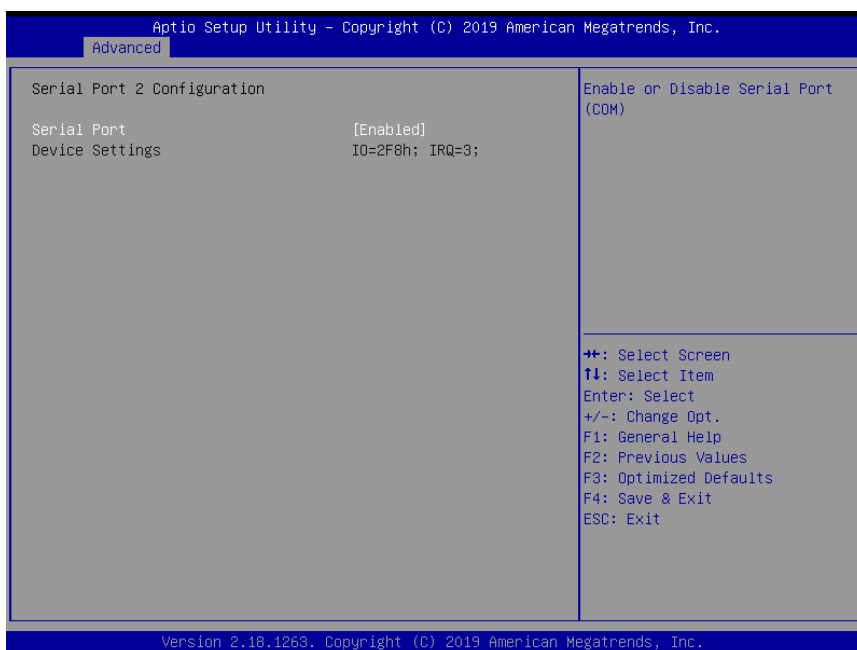
Item	Description
<b>Serial Port 1 Configuration</b>	Set Parameters of Serial Port 1 (COMA).
<b>Serial Port 2 Configuration</b>	Set Parameters of Serial Port 2 (COMB).
<b>Serial Port 3 Configuration</b>	Set Parameters of Serial Port 3 (COMC).
<b>Serial Port 4 Configuration</b>	Set Parameters of Serial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

3.6.2.3.1 Serial Port 1 Configuration



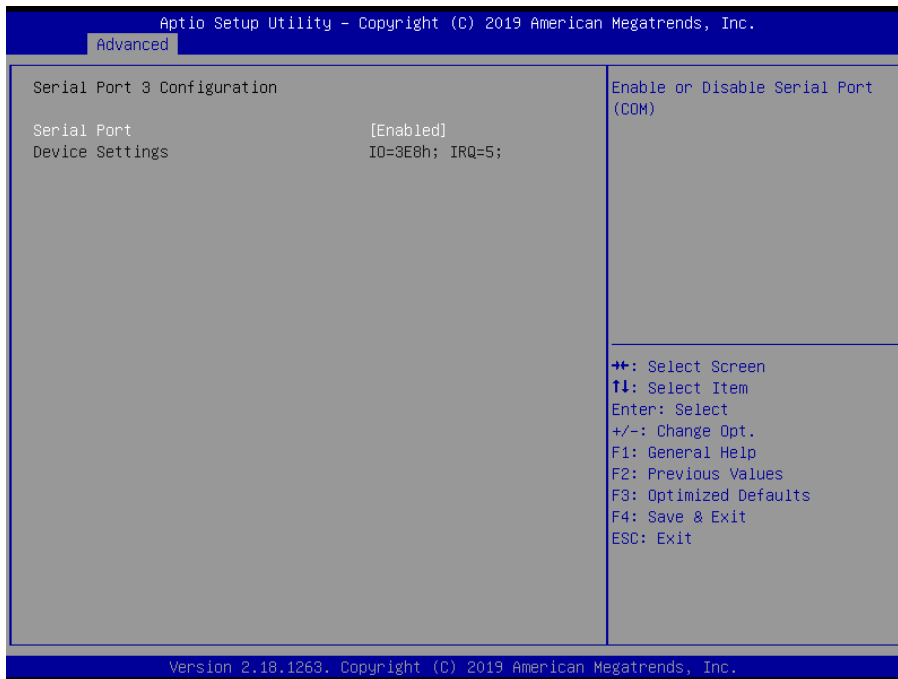
Item	Option	Description
Serial Port	Disabled Enabled[Default]	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232[Default] UART 422 UART 485	Change the Serial Port as RS232/422/485.

3.6.2.3.2 Serial Port 2 Configuration



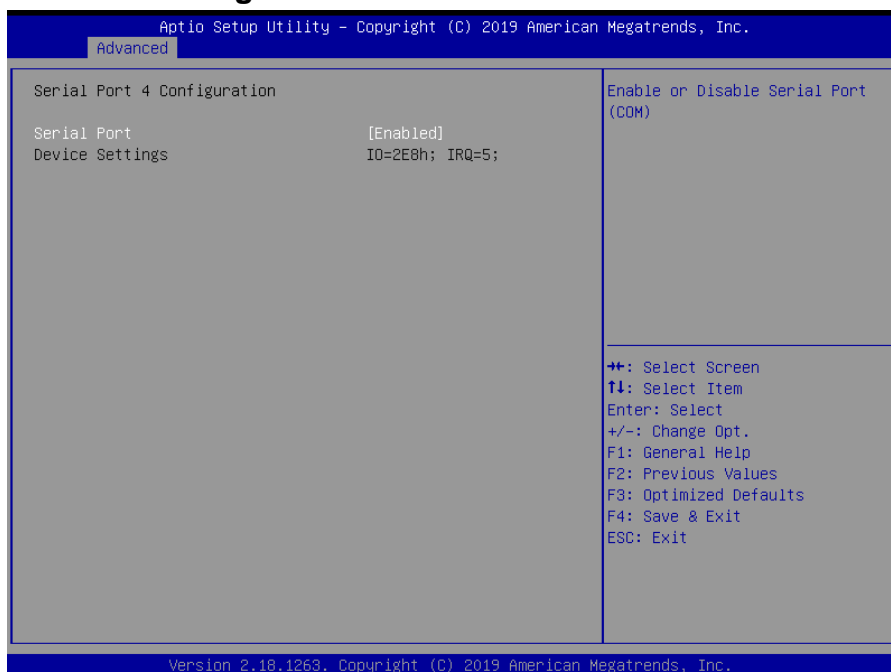
Item	Option	Description
Serial Port	Disabled Enabled[Default]	Enable or Disable Serial Port (COM).

### 3.6.2.3.3 Serial Port 3 Configuration



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

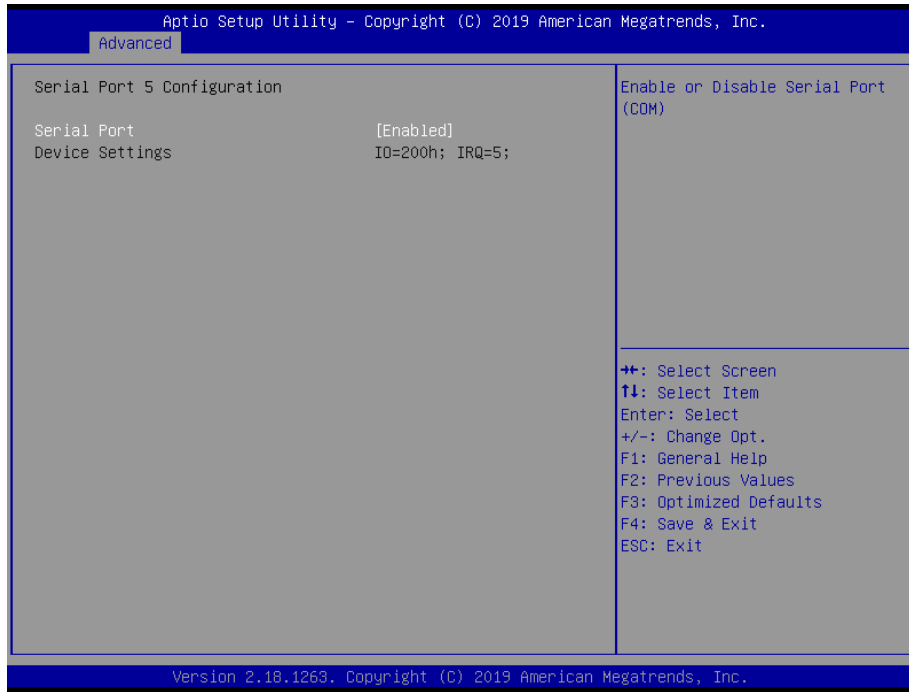
### 3.6.2.3.4 Serial Port 4 Configuration



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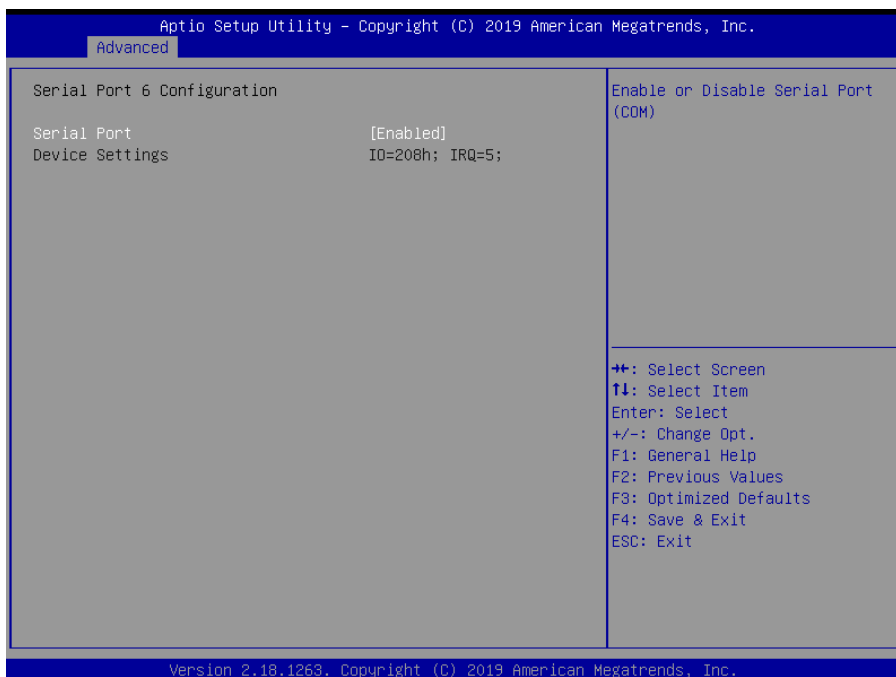
Item	Option	Description
Serial Port	Disabled Enabled[Default]	Enable or Disable Serial Port (COM).

## 3.6.2.3.5 Serial Port 5 Configuration



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

## 3.6.2.3.6 Serial Port 6 Configuration





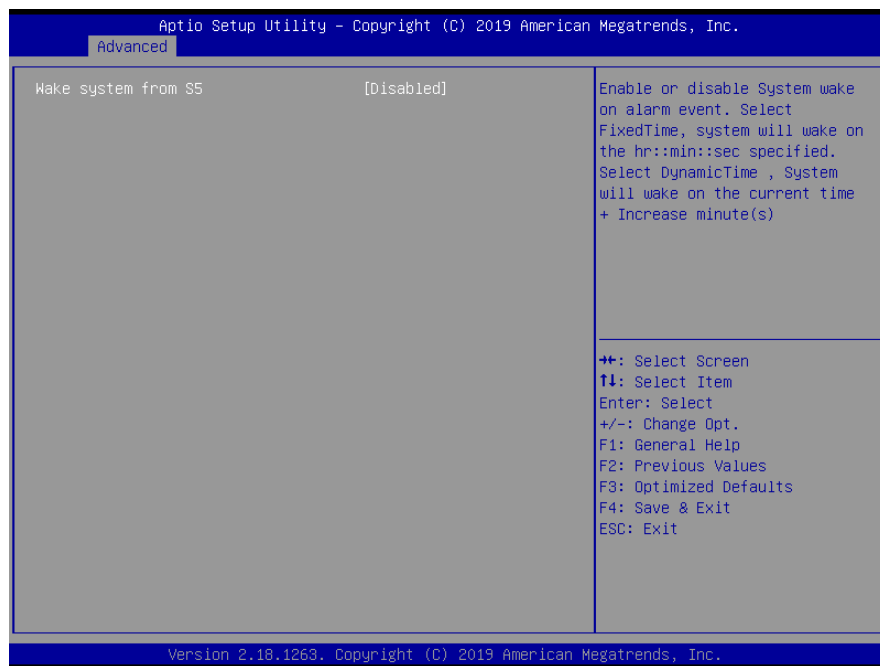
Item	Option	Description
Serial Port	Disabled Enabled[Default]	Enable or Disable Serial Port (COM).

### 3.6.2.4 H/W Monitor



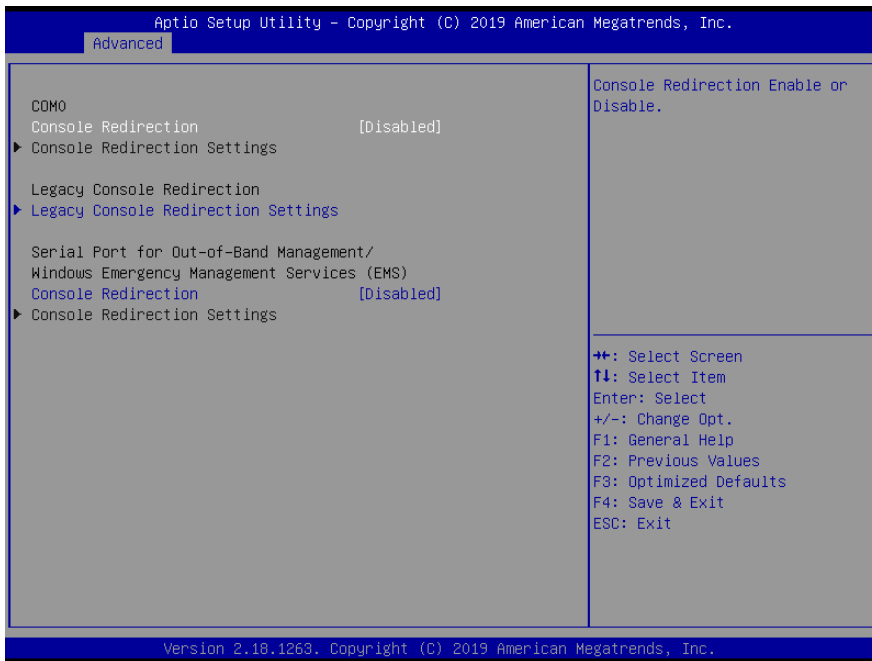
Item	Options	Description
Smart Fan Function	Enabled, Disabled[Default]	Enables or Disables Smart Fan.

### 3.6.2.5 S5 RTC Wake Settings



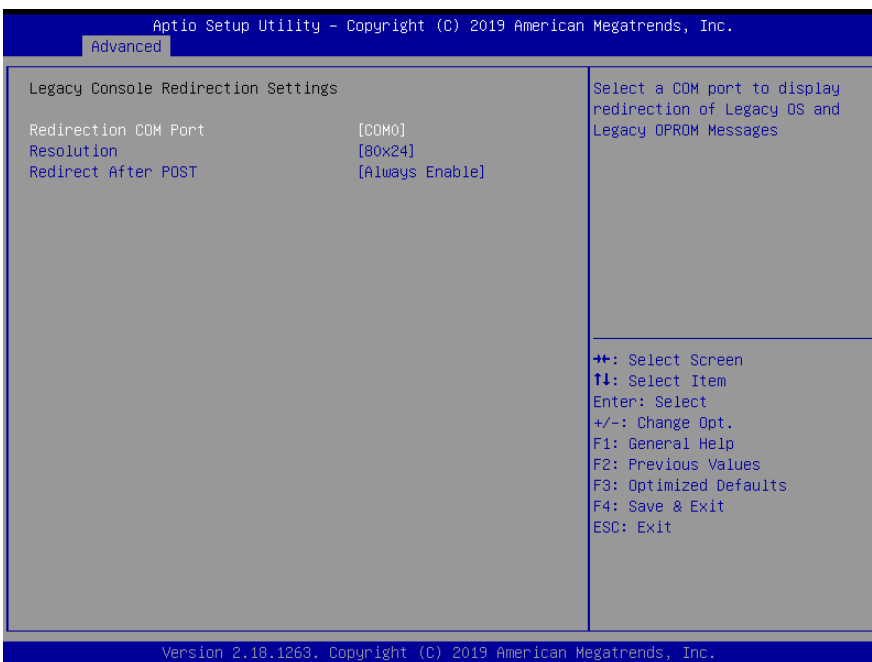
Item	Options	Description
Wake system from S5	Disabled[Default], Fixed Time Dynamic Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).

### 3.6.2.6 Serial Port Console Redirection



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

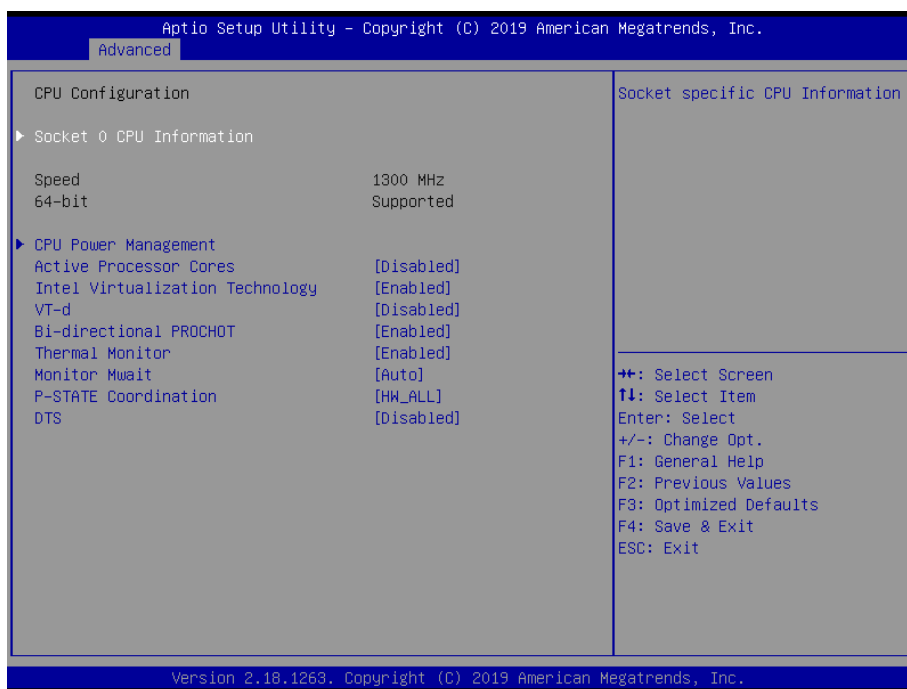
#### 3.6.2.6.1 Legacy Console Redirection Settings



Item	Option	Description
<b>Redirection COM Port</b>	COM0[Default]	Select a COM port to display redirection of Legacy OS and Legacy OPRM Messages.
<b>Resolution</b>	80x24[Default] 80x25	On Legacy OS, the Number of Rows and Columns supported redirection.
<b>Redirect After POST</b>	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.

### 3.6.2.7 CPU Configuration

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

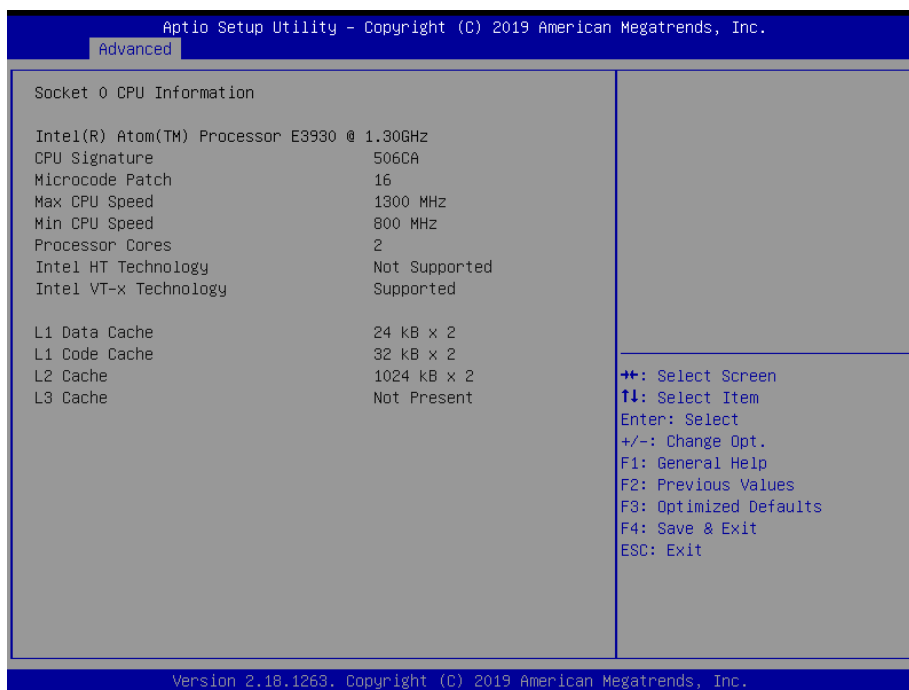


Item	Options	Description
<b>Active Processor Cores</b>	Disabled[Default] Enabled	Number of cores to enable in each processor package.
<b>Intel Virtualization Technology</b>	Disabled Enabled[Default]	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
<b>VT-d</b>	Disabled[Default] Enabled	Enable/Disable CPU VT-d.
<b>Bi-directional PROCHOT</b>	Disabled Enabled[Default]	When a processor thermal sensor trips (either core), the PROCHOT# will be driven. If bi-direction is enabled, external agents can drive PROCHOT# to throttle the processor.

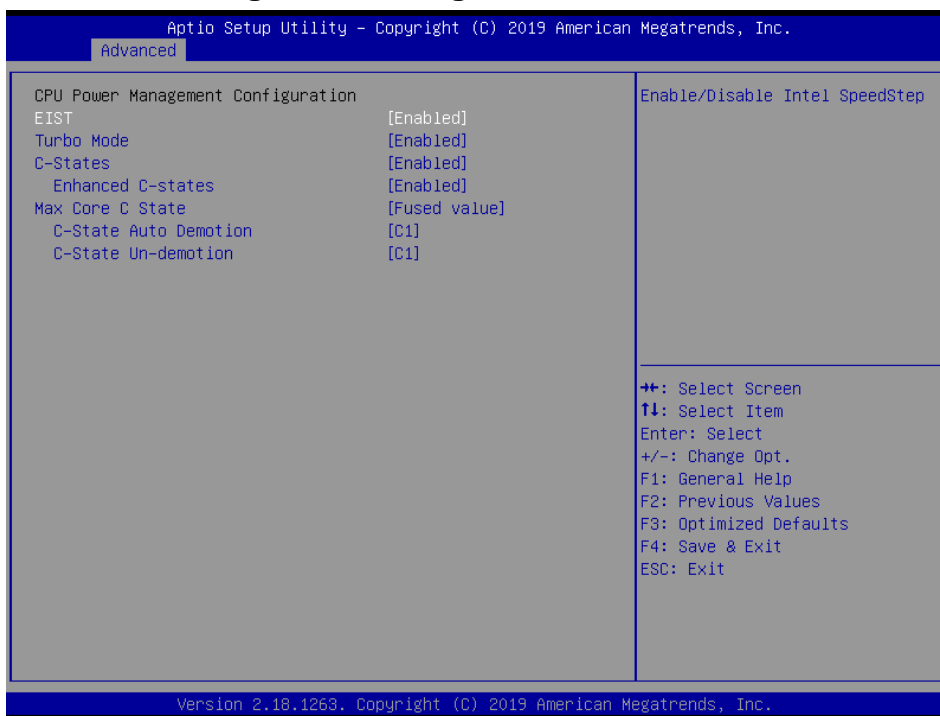
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<b>Thermal Monitor</b>	Disabled Enabled[ <b>Default</b> ]	Enable/Disable Thermal Monitor.
<b>Monitor Mwait</b>	Disabled Enabled Auto[ <b>Default</b> ]	Enable/Disable Monitor Mwait.
<b>P-STATE Coordination</b>	HW_ALL[ <b>Default</b> ] SW_ALL SW_ANY	Change P-STATE Coordination type.
<b>DTS</b>	Disabled[ <b>Default</b> ] Enabled	Enable/Disable Digital Thermal Sensor.

### 3.6.2.7.1 Socket 0 CPU Information

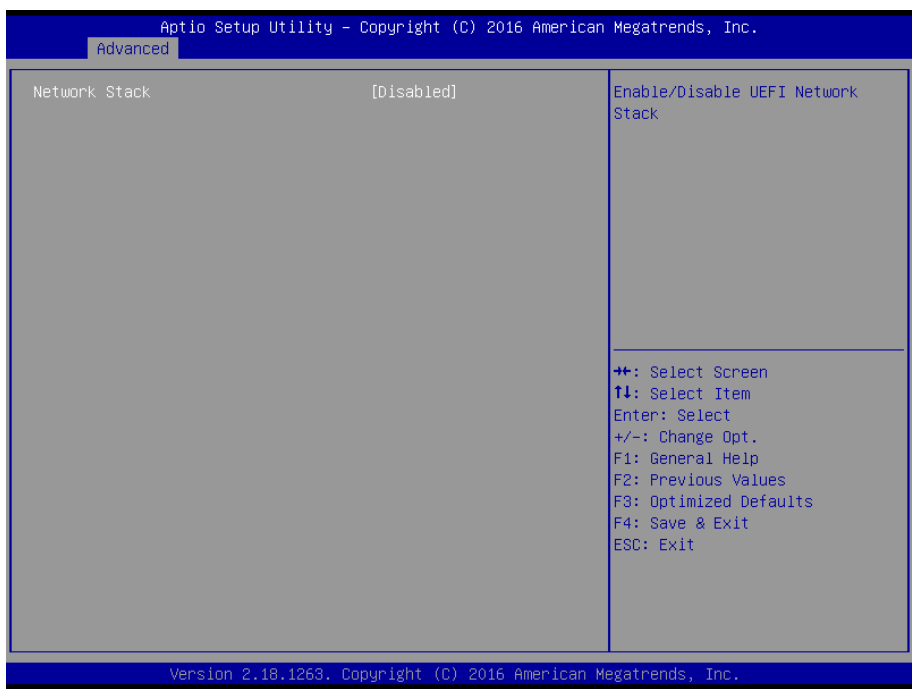


### 3.6.2.7.2 CPU Power Management Configuration



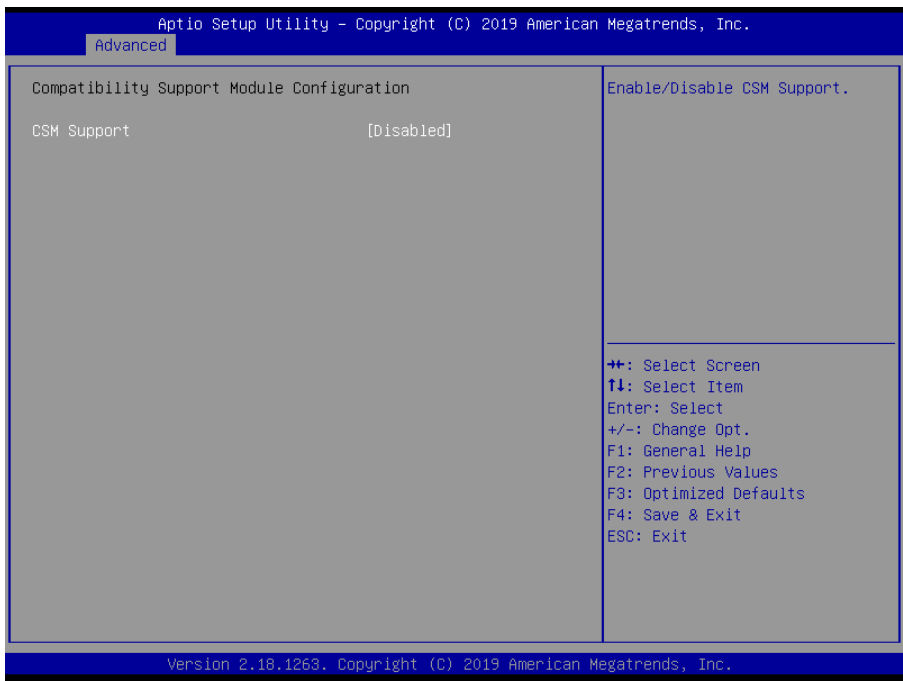
Item	Option	Description
<b>EIST</b>	Disabled Enabled[ <b>Default</b> ]	Enable/Disable Intel SpeedStep.
<b>Turbo Mode</b>	Disabled Enabled[ <b>Default</b> ]	Turbo Mode.
<b>C-States</b>	Disabled Enabled[ <b>Default</b> ]	Enable/Disable C-States.
<b>Enhanced C-states</b>	Disabled Enabled[ <b>Default</b> ]	Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.
<b>Max Core C State</b>	Fused value[ <b>Default</b> ] Core C10 Core C9 Core C8 Core C7 Core C6 Core C1 Unlimited	This option controls the Max Core C State that cores will support.
<b>C-State Auto Demotion</b>	Disabled C1[ <b>Default</b> ]	Configure C-State Auto Demotion.
<b>C-State Un-demotion</b>	Disabled C1[ <b>Default</b> ]	Configure C-State Un-demotion.

### 3.6.2.8 Network Stack Configuration



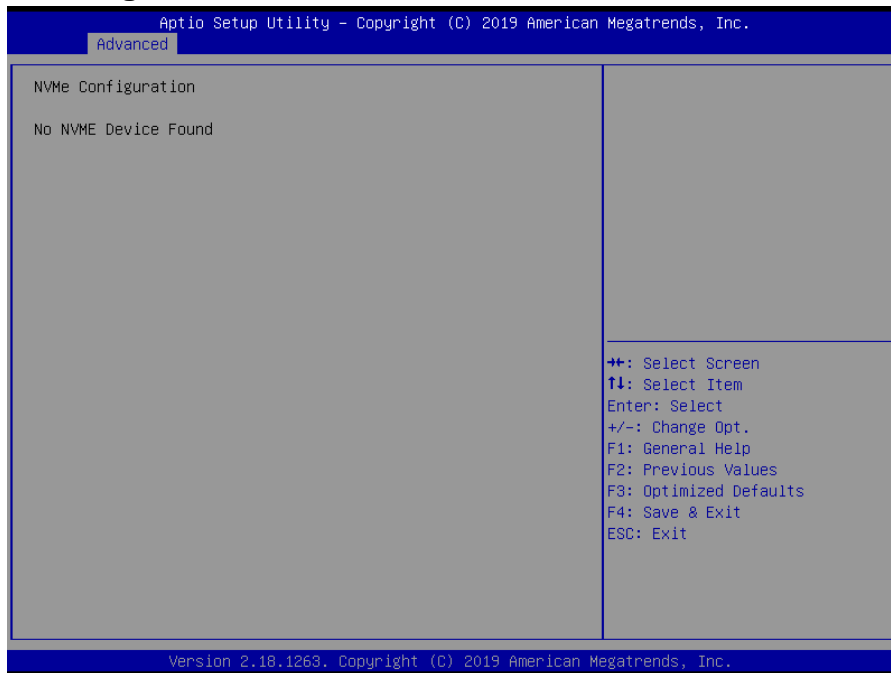
Item	Options	Description
Network Stack	Disabled[Default] Enabled	Enable/Disable UEFI Network Stack.

### 3.6.2.9 CSM Configuration



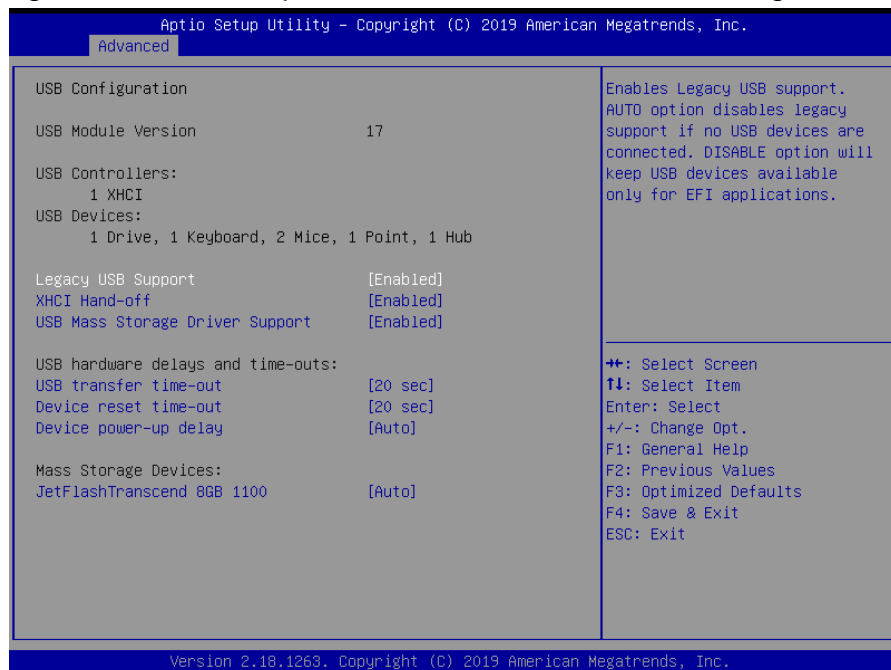
Item	Options	Description
CSM Support	Disabled[Default] Enabled	Enable/Disable CSM Support.

### 3.6.2.10 NVMe Configuration



### 3.6.2.11 USB Configuration

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

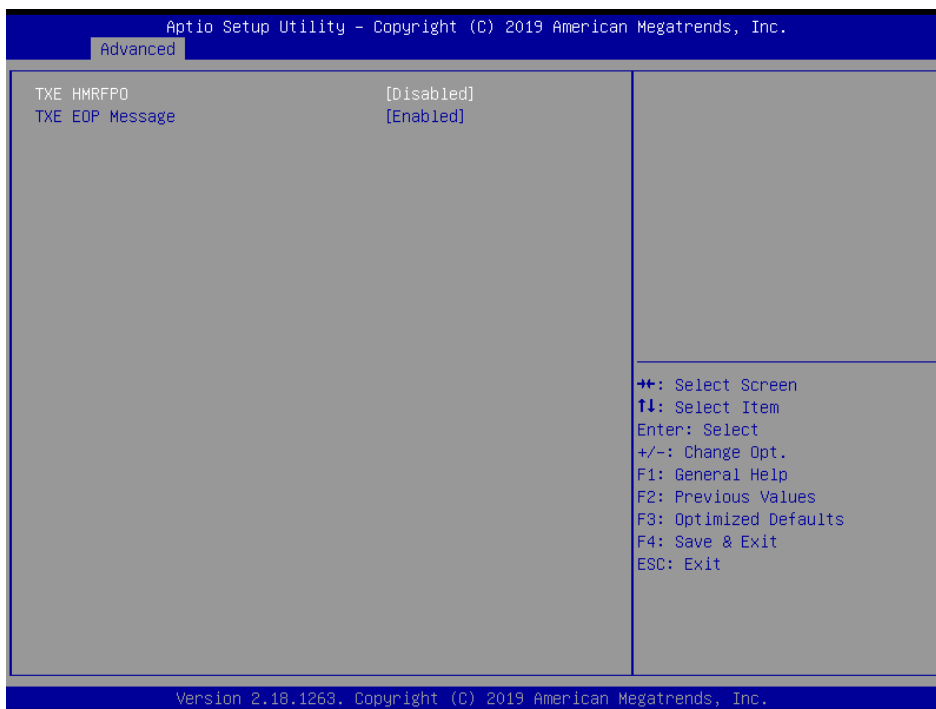


Item	Options	Description
<b>Legacy USB Support</b>	Enabled[Default] Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
<b>XHCI Hand-off</b>	Disabled Enabled[Default]	This is a workaround for OSeS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

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<b>USB Mass Storage Driver Support</b>	Disabled Enabled[ <b>Default</b> ]	Enable/Disable USB Mass Storage Driver Support.
<b>USB transfer time-out</b>	1 sec 5 sec 10 sec 20 sec[ <b>Default</b> ]	The time-out value for Control, Bulk, and Interrupt transfers.
<b>Device reset time-out</b>	10 sec 20 sec[ <b>Default</b> ] 30 sec 40 sec	USB mass storage device Start Unit command time-out.
<b>Device power-up delay</b>	Auto[ <b>Default</b> ] 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.
<b>Mass Storage Devices</b>	Auto[ <b>Default</b> ] 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.

### 3.6.2.12 Security Configuration



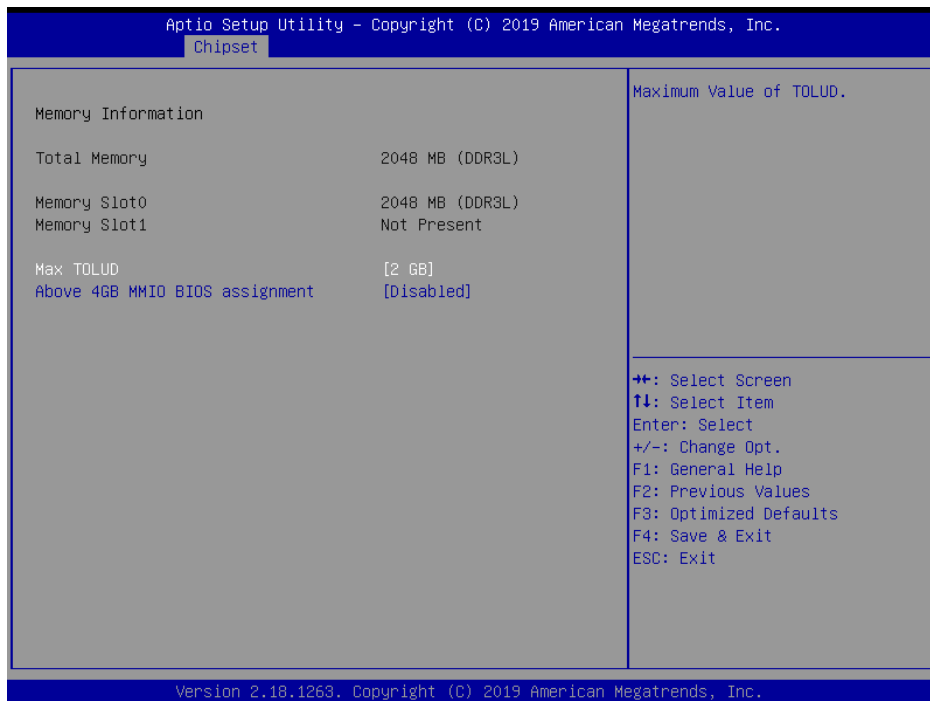
Item	Options	Description
<b>TXE HMRFP0</b>	Enabled Disabled[ <b>Default</b> ]	TXE HMRFP0.
<b>TXE EOP Message</b>	Enabled[ <b>Default</b> ] Disabled	Send EOP Message Before Enter OS.



### 3.6.3 Chipset



#### 3.6.3.1 North Bridge

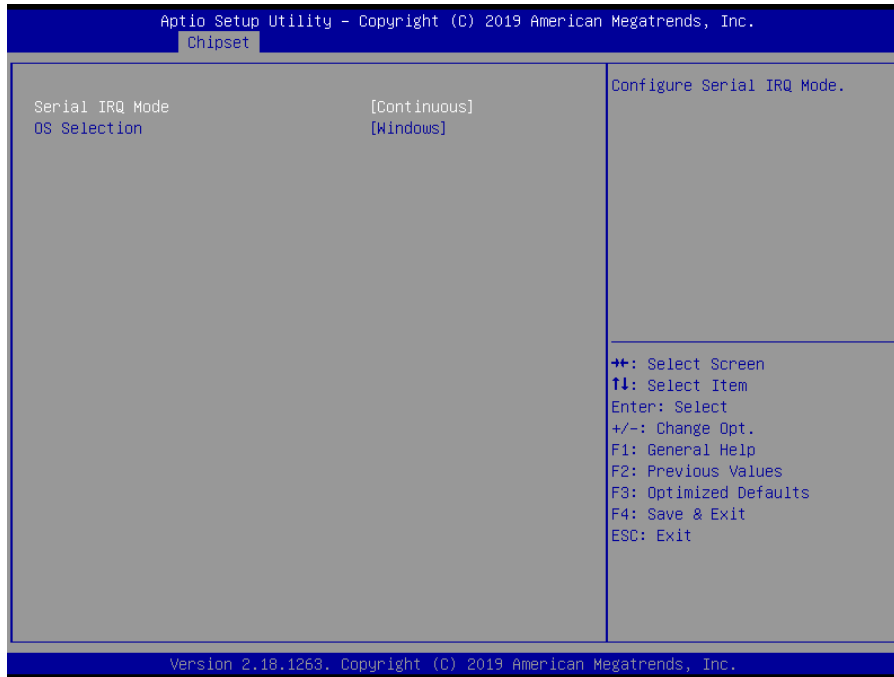


Item	Option	Description
<b>Max TOLUD</b>	<b>2 GB[Default]</b>	Maximum Value of TOLUD.
	2.25 GB	
	2.5 GB	
	2.75 GB	

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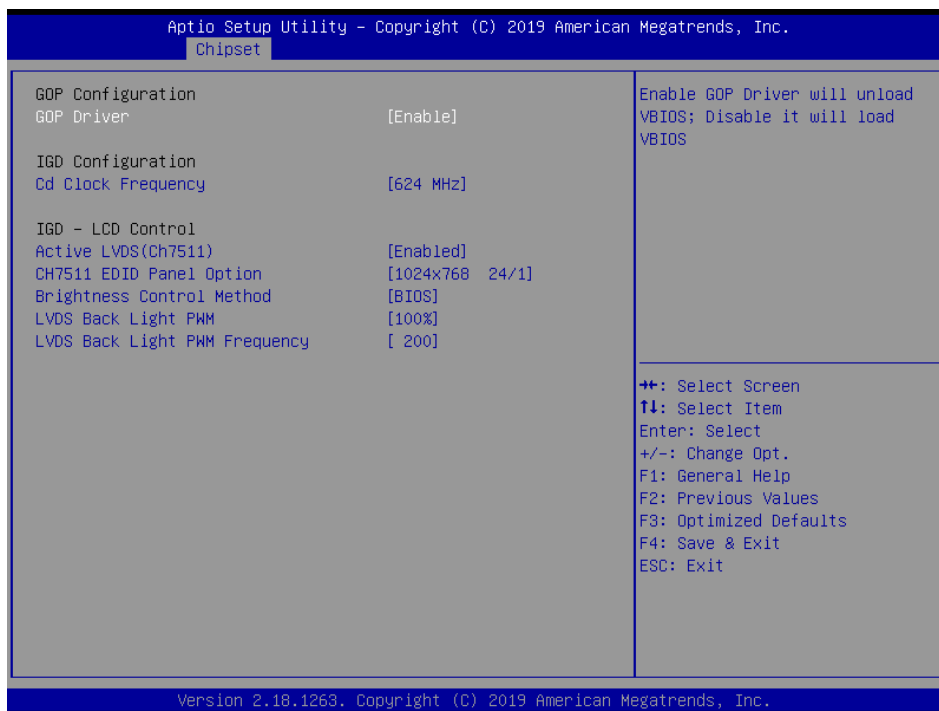
<b>Above 4GB MMIO BIOS assignment</b>	<p>Enabled Disabled[<b>Default</b>]</p>	<p>Enable/Disable above 4GB MemoryMappedIO BIOS assignment. This is disabled automatically when Aperture Size is set to 2048MB.</p>
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### 3.6.3.2 South Bridge



Item	Option	Description
<b>Serial IRQ Mode</b>	<p>Quiet Continuous[<b>Default</b>]</p>	Configure Serial IRQ Mode.
<b>OS Selection</b>	<p>Windows[<b>Default</b>] Android Intel Linux</p>	Select the target OS.

### 3.6.3.3 Uncore Configuration

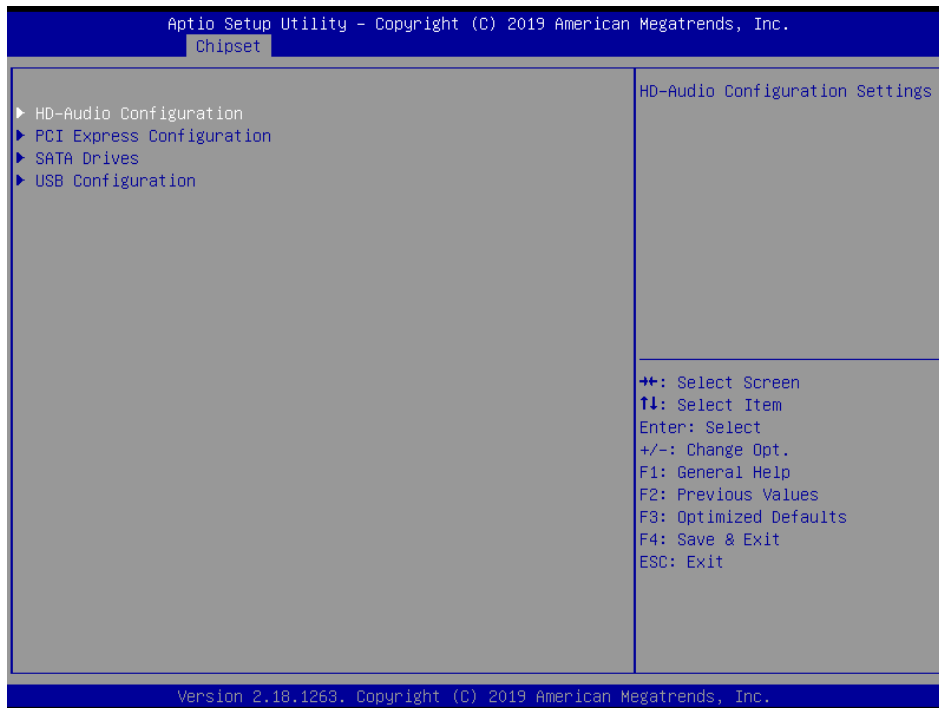


Item	Option	Description
<b>GOP Driver</b>	Enable[Default] Disable	Enable GOP Driver will unload VBIOS ; Disable it will load VBIOS.
<b>Cd Clock Frequency</b>	144 MHz 288 MHz 384 MHz 576 MHz 624 MHz[Default]	Select the highest Cd Clock frequency supported by the platform.
<b>Active LVDS (CH7511)</b>	Disabled Enabled[Default]	Active Internal LVDS(eDP->Ch7511-to-LVDS).
<b>CH7511 EDID Panel Option</b>	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 1440x900 18/2 1600x1200 24/2 1366x768 24/1 1920x1080 24/2 1680x1050 24/2	Port1-EDP to LVDS (Chrotel 7511) Panel EDID Option.
<b>Brightness Control Method</b>	BIOS[Default] OS Driver	LVDS Brightness Control Method. 1.BIOS 2.Brightness Button 3.Variable Resistor 4.OS Driver.

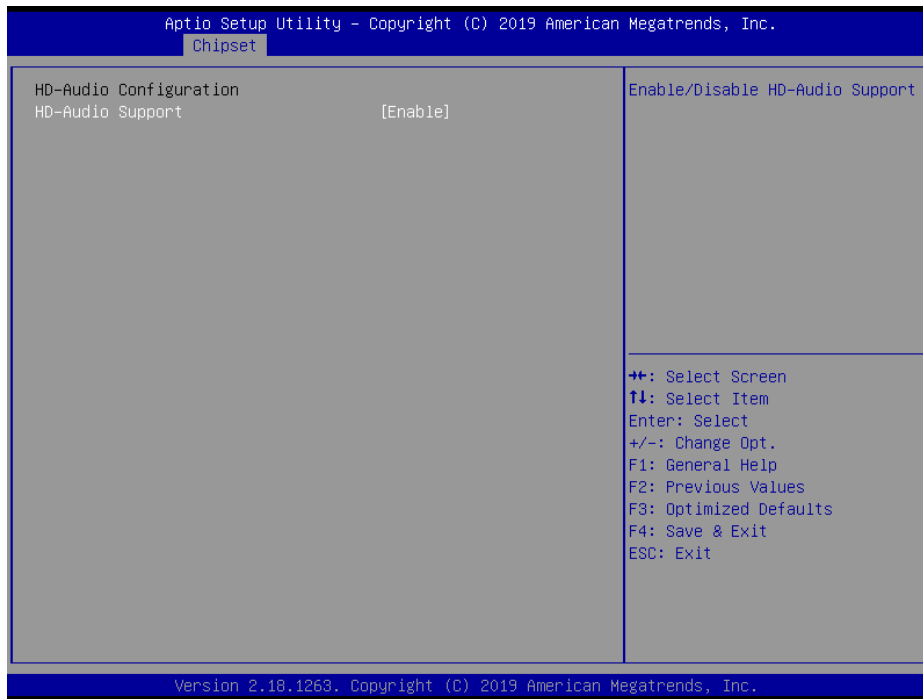
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<p><b>LVDS Back Light PWM</b></p>	<p>00% 25% 50% 75% 100%<b>[Default]</b></p>	<p>Select LVDS back light PWM duty.</p>
<p><b>LVDS Back Light PWM Frequency</b></p>	<p>200<b>[Default]</b> 300 400 500 700 1k 2k 3k 5k 10k 20k</p>	<p>Select LVDS back light PWM Frequency.</p>

### 3.6.3.4 South Cluster Configuration

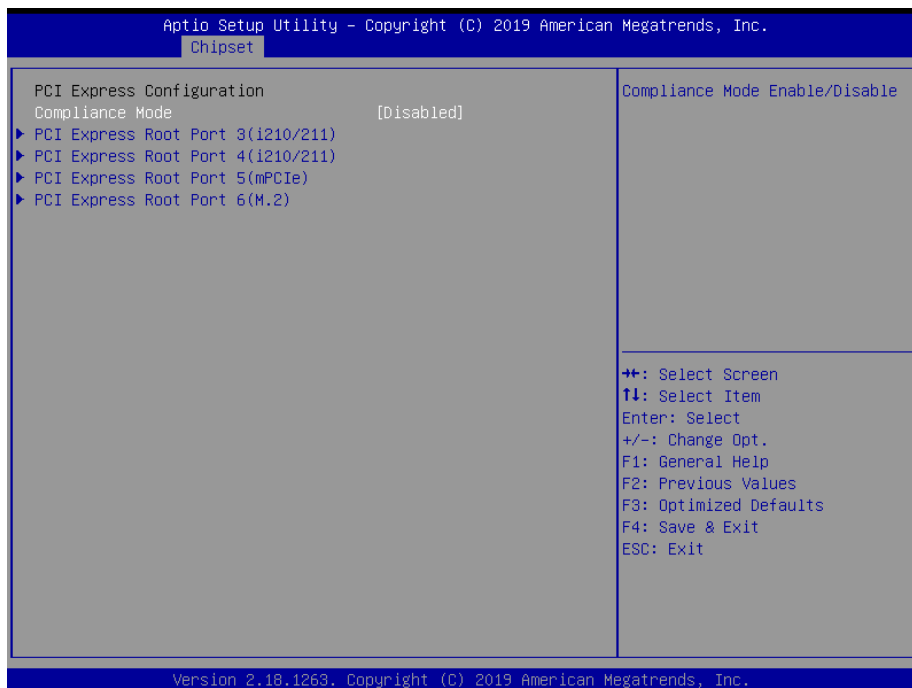


### 3.6.3.4.1 HD-Audio Configuration



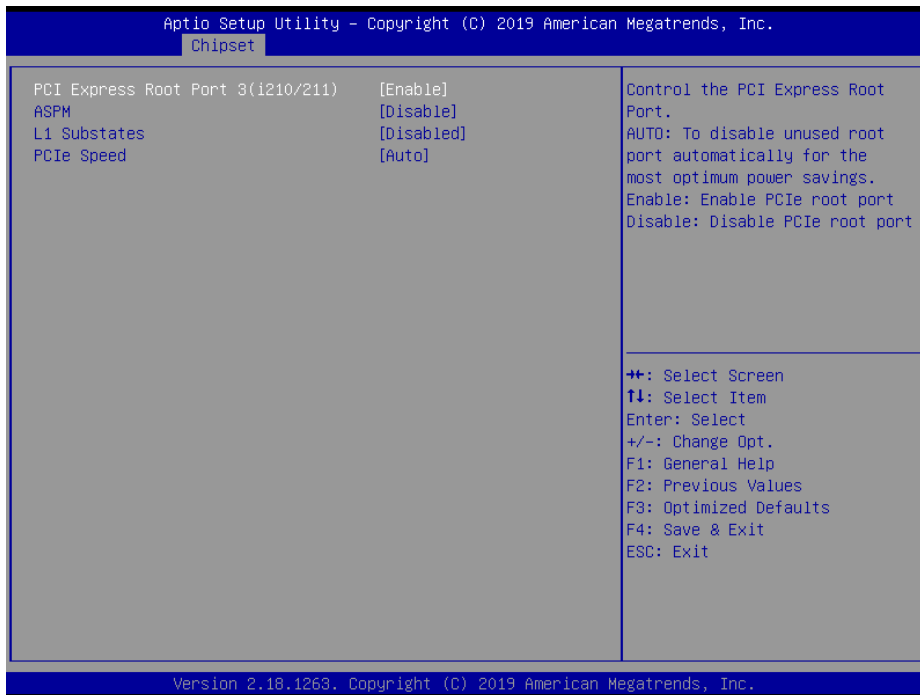
Item	Option	Description
HD-Audio Support	Disable Enable[Default]	Enable/Disable HD-Audio Support.

### 3.6.3.4.2 PCI Express Configuration



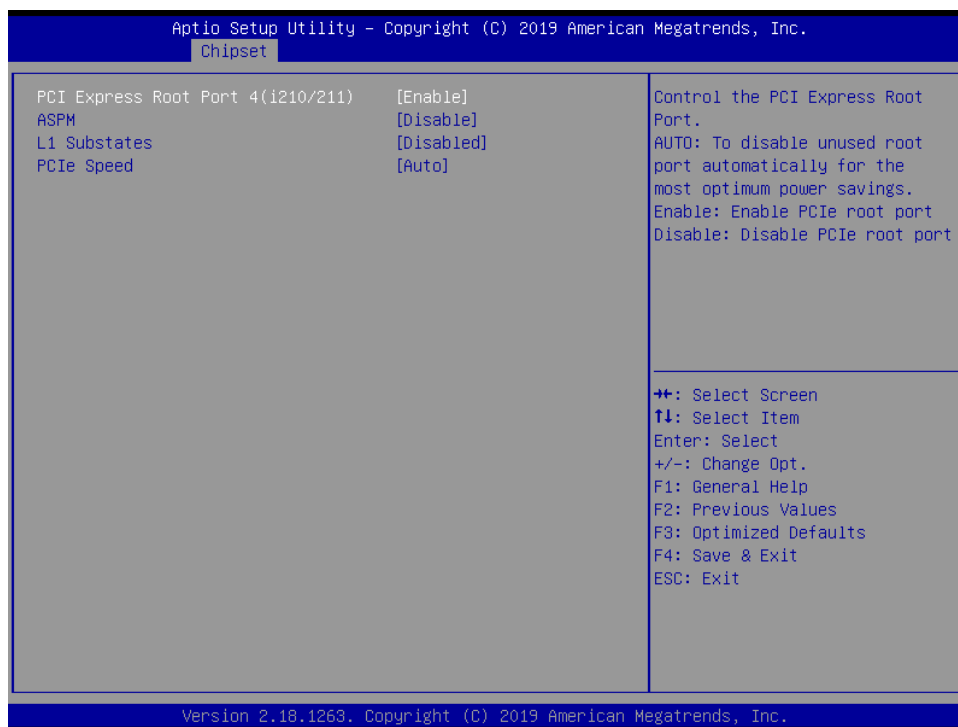
Item	Option	Description
Compliance Mode	Disabled[Default] Enabled	Compliance Mode Enable/Disable.

3.6.3.4.2.1 PCI Express Root Port 3(i210/211)



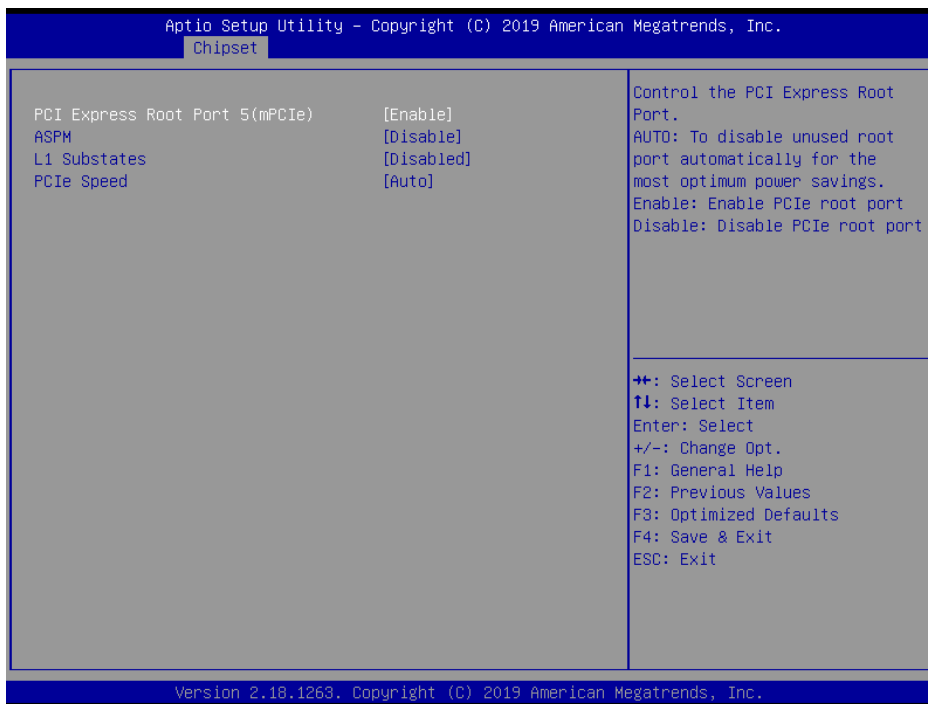
Item	Option	Description
PCI Express Root Port 3(i210/211)	Enabled[Default], Disabled	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disable: Disable PCIe root port.
ASPM	Disable[Default] L0s L1 L0sL1 Auto	PCI Express Active State Power Management settings.
L1 Substates	Disabled[Default] L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
PCIe Speed	Auto[Default] Gen1 Gen2	Configure PCIe Speed.

### 3.6.3.4.2.2 PCI Express Root Port 4(i210/211)



Item	Option	Description
<b>PCI Express Root Port 4(i210/211)</b>	Enabled[Default], Disabled	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disable: Disable PCIe root port.
<b>ASPM</b>	Disable[Default] L0s L1 L0sL1 Auto	PCI Express Active State Power Management settings.
<b>L1 Substates</b>	Disabled[Default] L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
<b>PCIe Speed</b>	Auto[Default] Gen1 Gen2	Configure PCIe Speed.

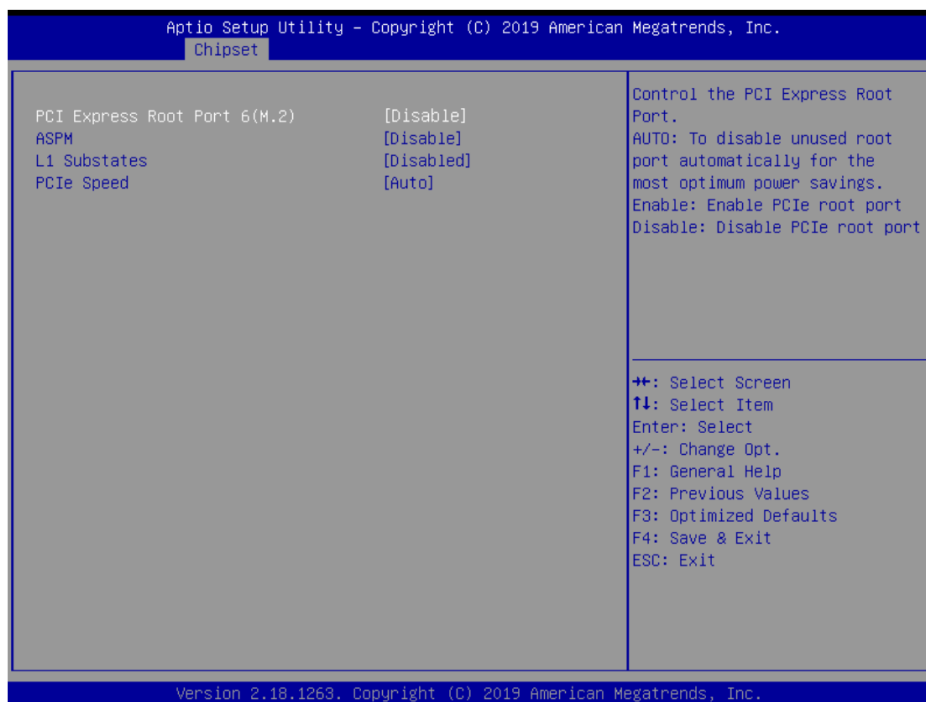
3.6.3.4.2.3 PCI Express Root Port 5(mPCIe)



Item	Option	Description
<b>PCI Express Root Port 5(mPCIe)</b>	Enabled <b>[Default]</b> , Disabled	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disable: Disable PCIe root port.
<b>ASPM</b>	Disable <b>[Default]</b> L0s L1 L0sL1 Auto	PCI Express Active State Power Management settings.
<b>L1 Substates</b>	Disabled <b>[Default]</b> L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
<b>PCIe Speed</b>	Auto <b>[Default]</b> Gen1 Gen2	Configure PCIe Speed.

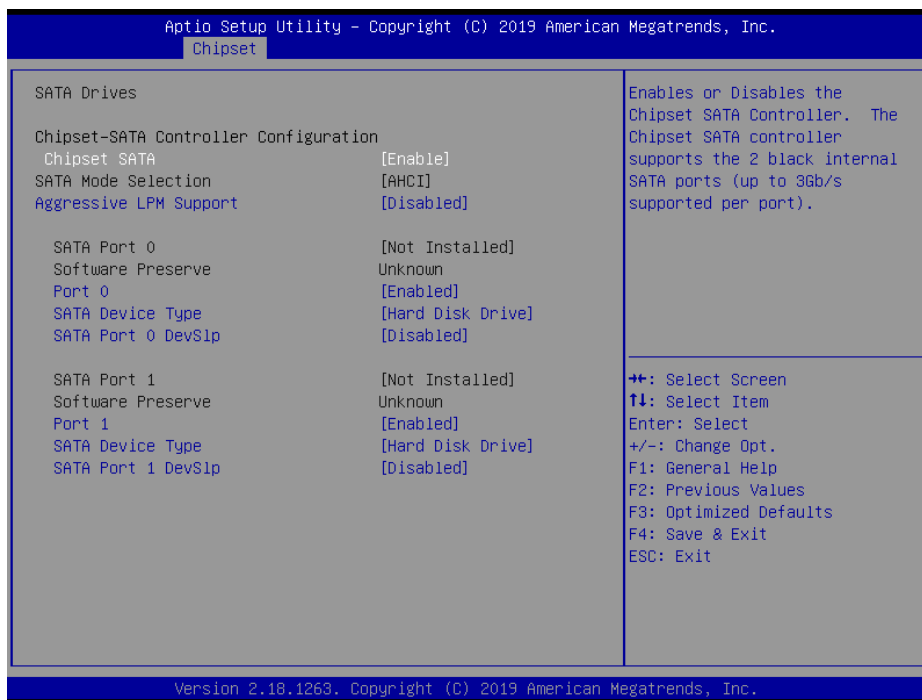


### 3.6.3.4.2.4 PCI Express Root Port 6(M.2)



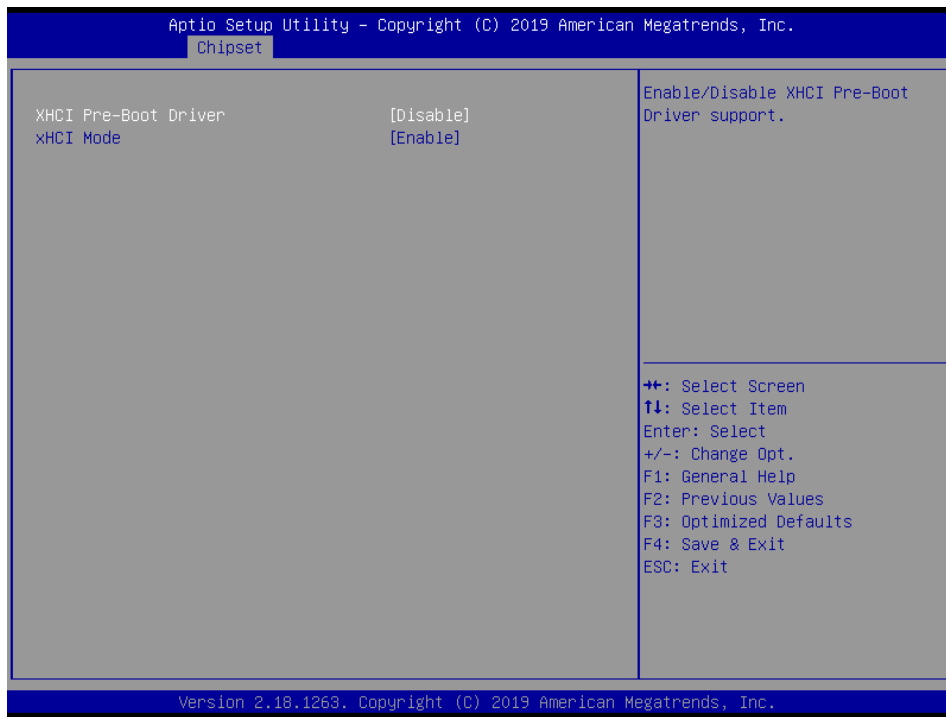
Item	Option	Description
<b>PCI Express Root Port 6(M.2)</b>	Enabled Disabled[Default],	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disable: Disable PCIe root port.
<b>ASPM</b>	Disable[Default] L0s L1 L0sL1 Auto	PCI Express Active State Power Management settings.
<b>L1 Substates</b>	Disabled[Default] L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substates settings.
<b>PCIe Speed</b>	Auto[Default] Gen1 Gen2	Configure PCIe Speed.

3.6.3.4.3 SATA Drivers



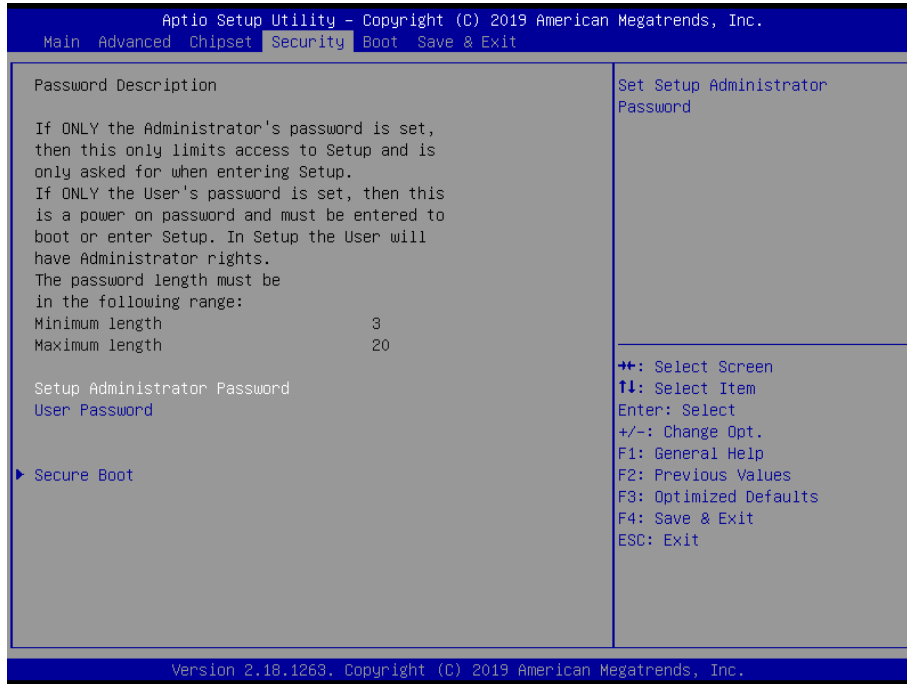
Item	Option	Description
<b>Chipset SATA</b>	Enable[Default] Disable	Enables or Disables the Chipset SATA Controller. The Chipset SATA controller supports the 2 black internal SATA ports (up to 3Gb/s supported per port).
<b>Aggressive LPM Support</b>	Disabled[Default] Enabled	Enable PCH to aggressively enter link power state.
<b>Port 0/1</b>	Disabled Enabled[Default]	Enable or Disable SATA Port.
<b>SATA Device Type</b>	Hard Disk Drive[Default] Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.
<b>SATA Port 0/1 DevSlp</b>	Disabled[Default] Enabled	Enable/Disable SATA Port 0/1 DevSlp. Board rework for LP needed before enable.

### 3.6.3.4.4 USB Configuration



Item	Option	Description
<b>XHCI Pre-Boot Driver</b>	Enable Disable <b>[Default]</b>	Enable/Disable XHCI Pre-Boot Driver support.
<b>xHCI Mode</b>	Enable <b>[Default]</b> Disable	Once disabled, XHCI controller would be function disabled, none of the USB devices are detectable and usable during boot and in OS. Do not disable it unless for debug purpose.

## 3.6.4 Security



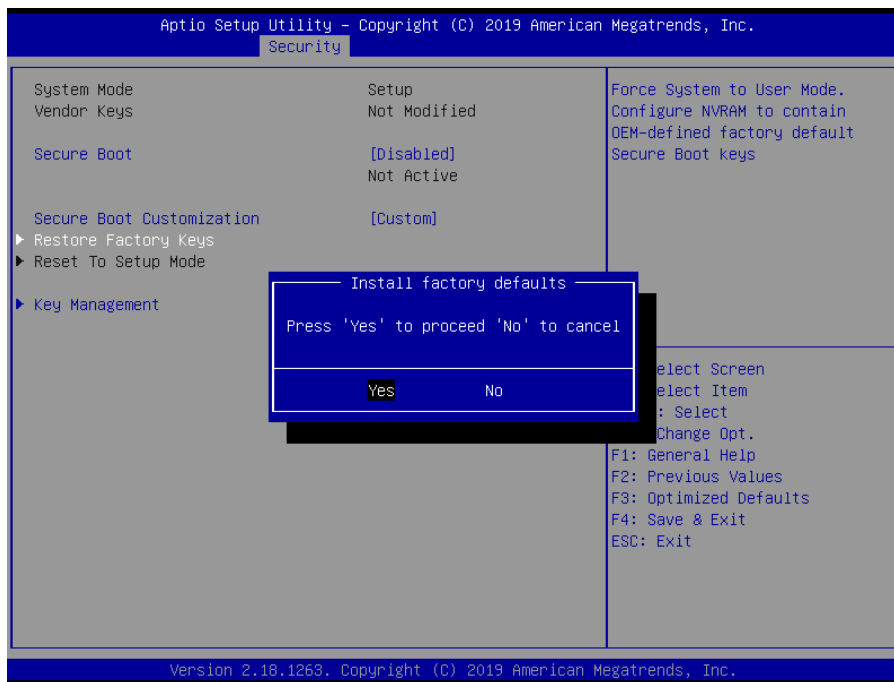
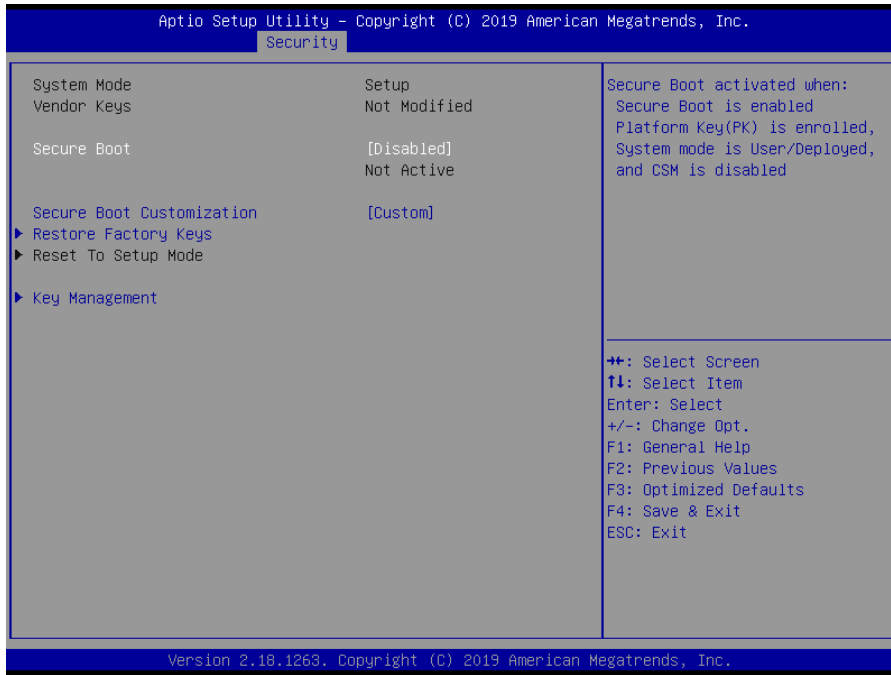
- **Setup Administrator Password**

Set setup Administrator Password

- **User Password**

Set User Password

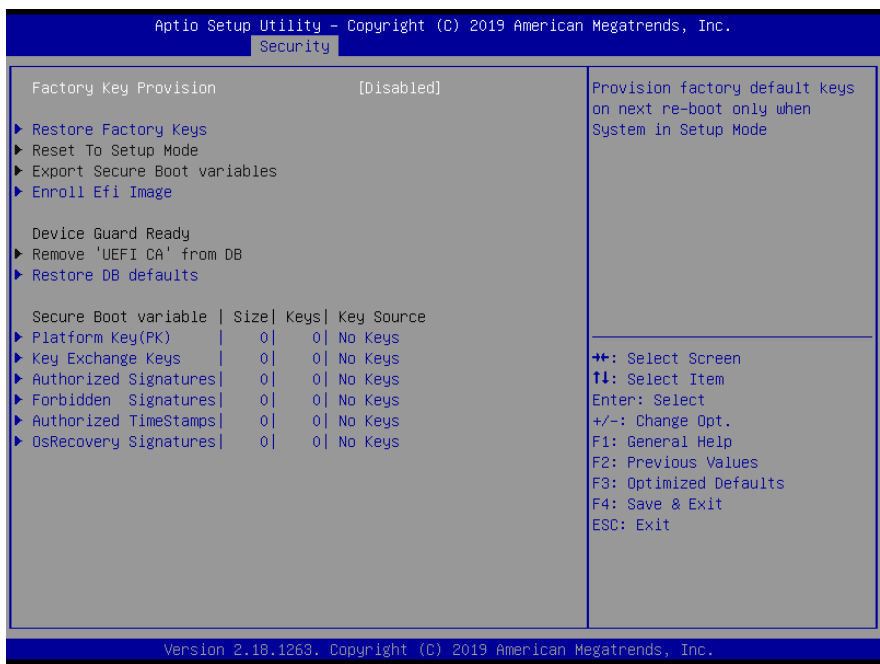
3.6.4.1 Secure Boot



Item	Option	Description
Secure Boot	Disabled[Default] Enabled	Secure Boot activated when: Secure Boot is enabled. Platform Key(PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.
Secure Boot Customization	Standard Customized[Default]	Secure Boot Mode – Custom_Standard, Set UEFI Secure Boot Mode to STANDARD mode or CUSTOM mode, this change is effect after save. And after reset, the mode will return to STANDARD mode.

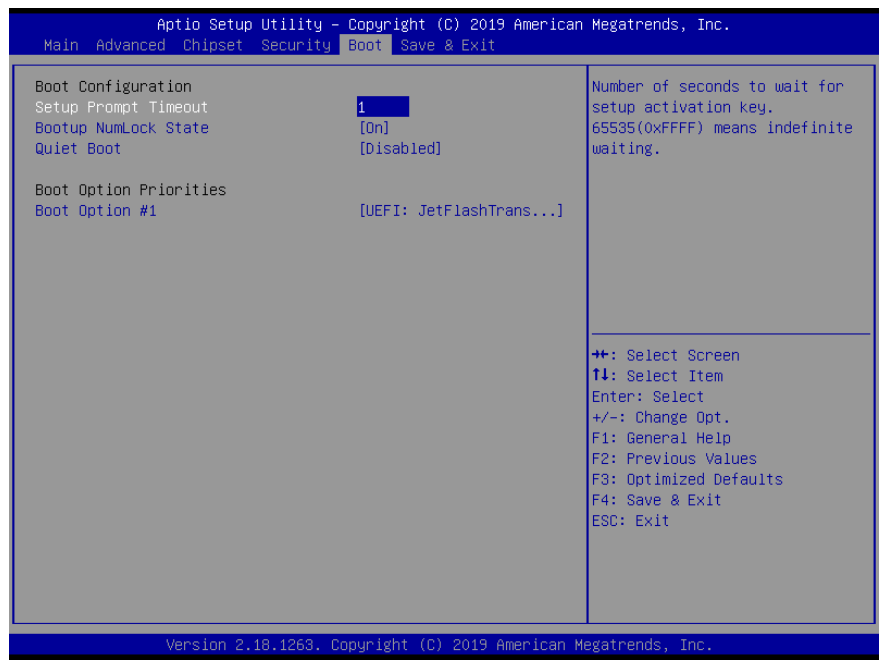
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## 3.6.4.1.1 Key Management



Item	Option	Description
Provision Factory Defaults	Disabled[Default] Enabled	Provision factory default keys on next re-boot when System is in Setup Mode.

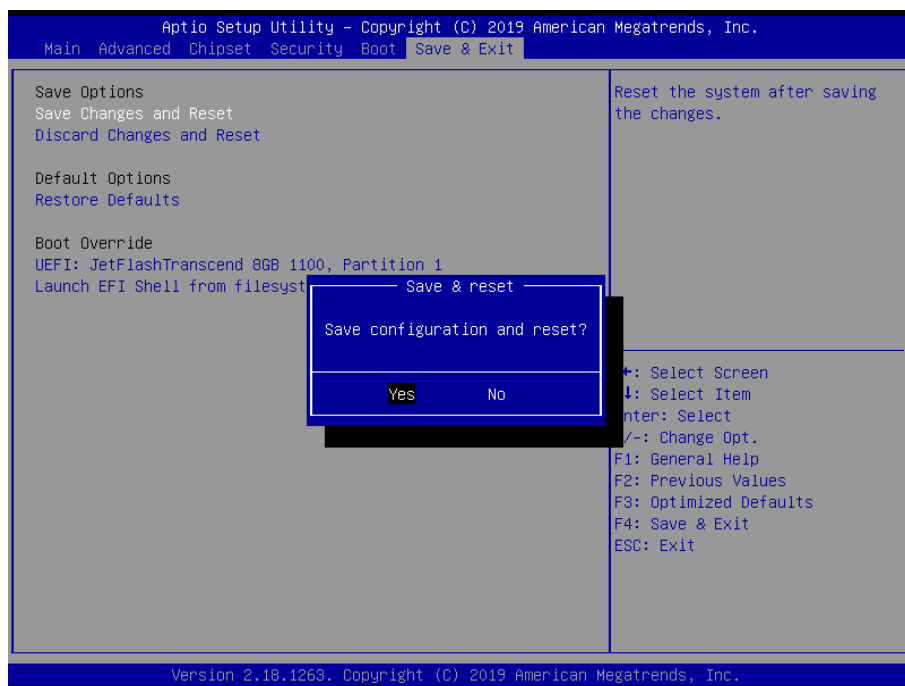
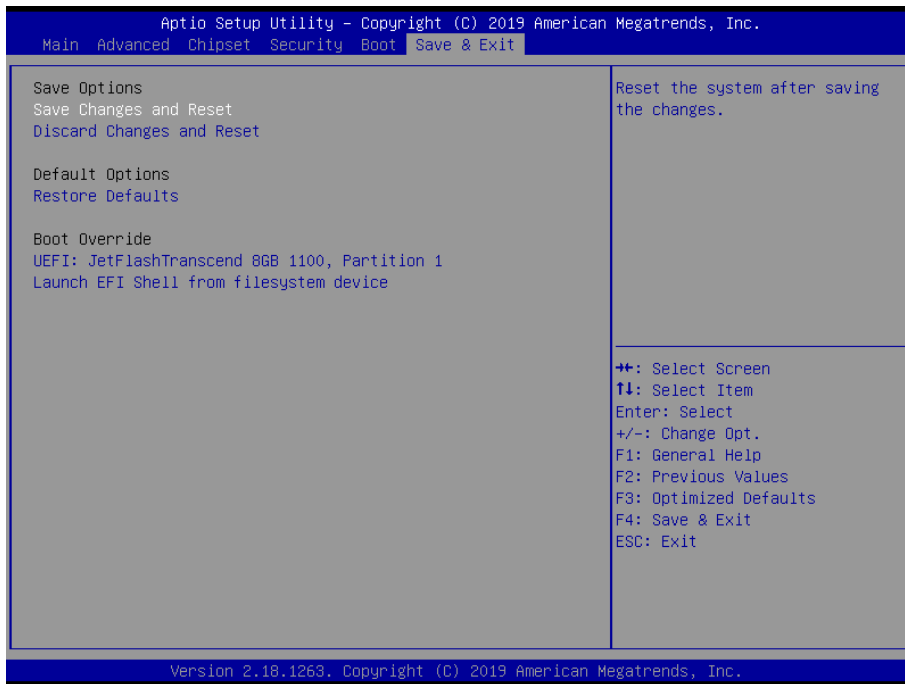
## 3.6.5 Boot



Item	Option	Description
Setup Prompt Timeout	1~ 65535	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

<b>Bootup NumLock State</b>	On[ <b>Default</b> ] Off	Select the Keyboard NumLock state
<b>Quiet Boot</b>	Disabled[ <b>Default</b> ] Enabled	Enables or disables Quiet Boot option
<b>Boot Option #1</b>	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

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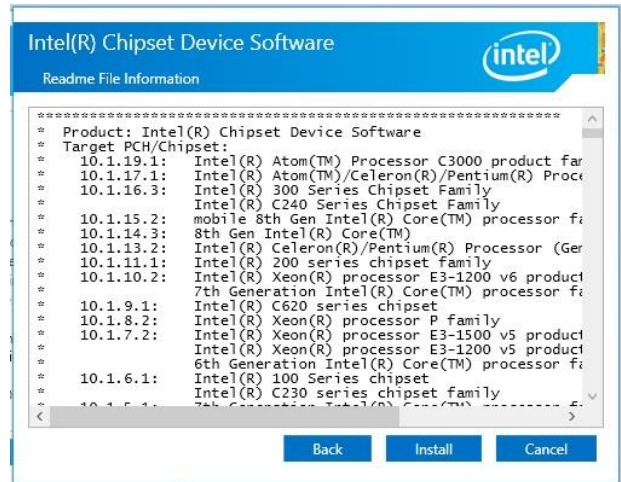
**Note:** Installation procedures and screen shots in this section are for your reference and may not be exactly the same as shown on your screen.

## 4.1 Install Chipset Driver

Please contact us for drivers.



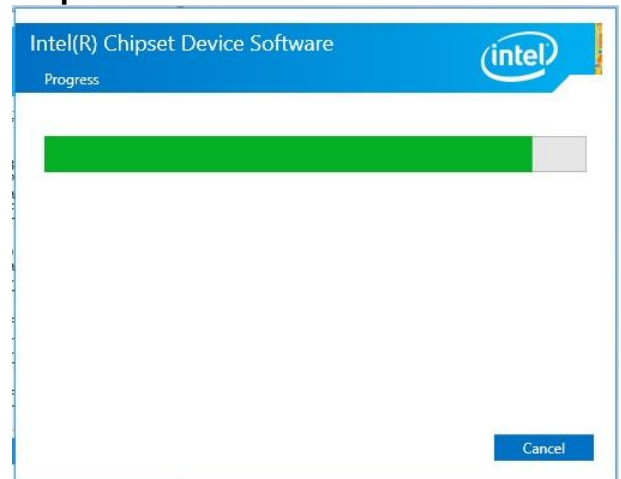
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



### Step 3. Click Install.



### Step 1. Click Next.



### Step 4. Installing.



### Step 2. Click Accept.



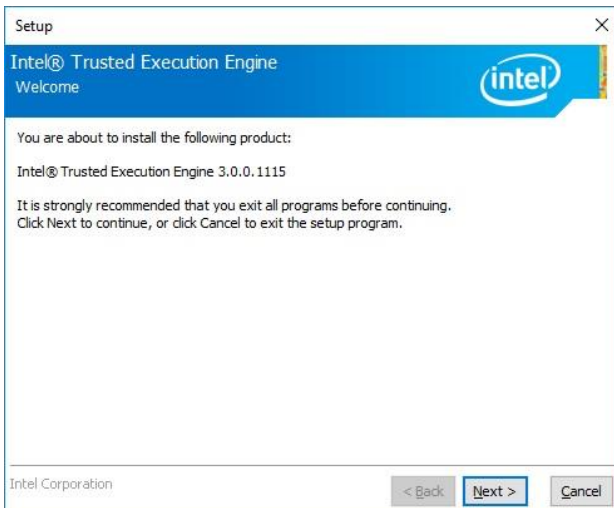
### Step 5. Complete setup.

## 4.2 Install TXE Driver

Please contact us for drivers.



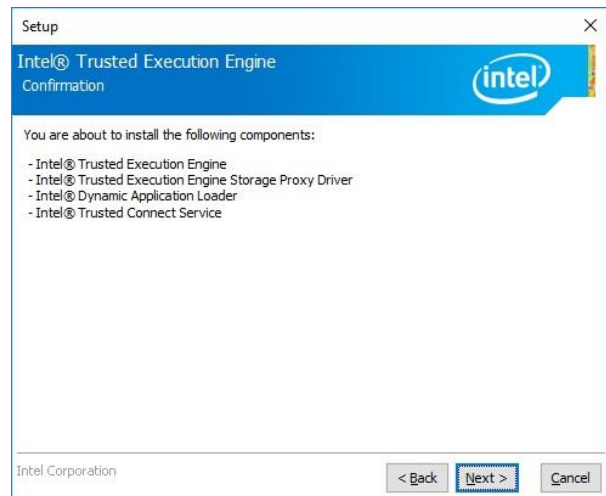
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



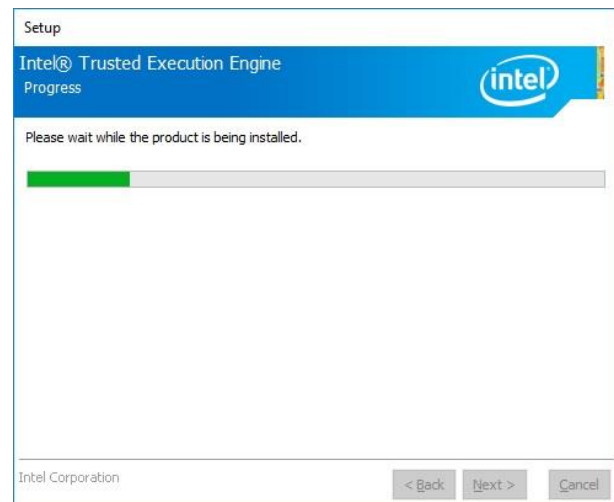
**Step1.** Click **Next** to start installation.



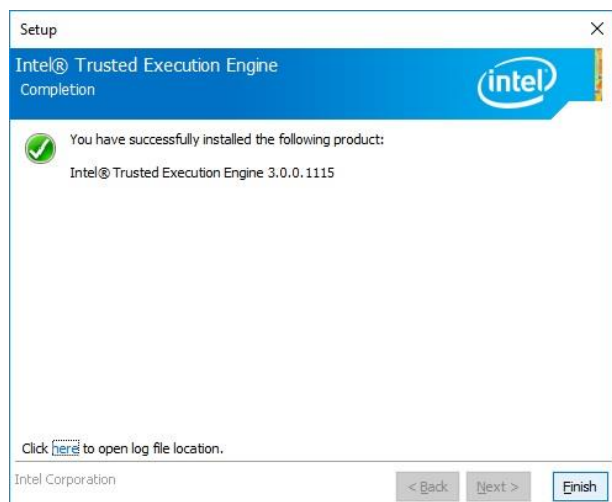
**Step 2.** Click **Next**.



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



**Step 4.** Installing.



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

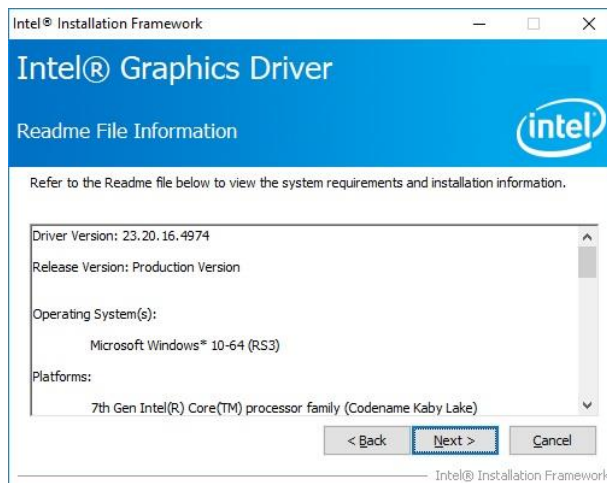
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## 4.3 Install VGA Driver

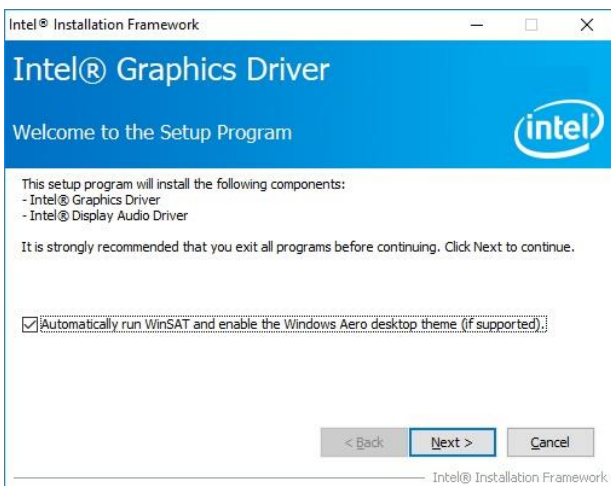
Please contact us for drivers.



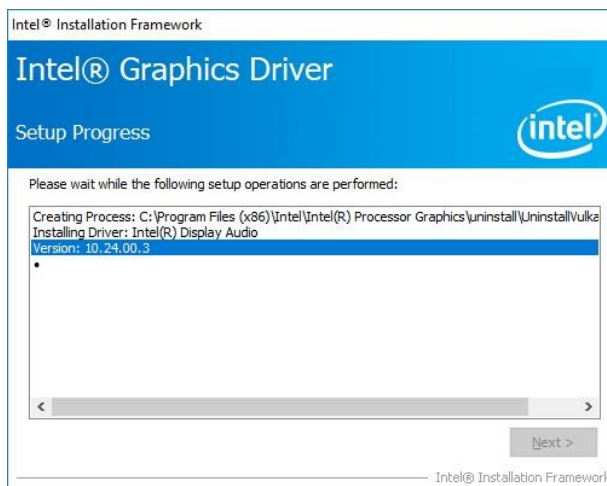
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system.



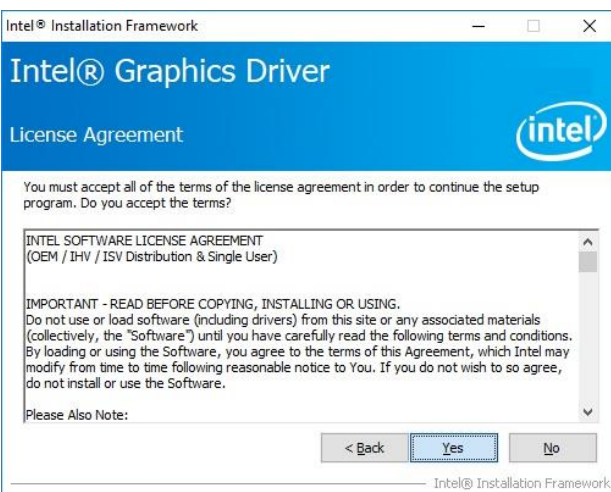
**Step 3. Click Next.**



**Step 1. Click Next.**

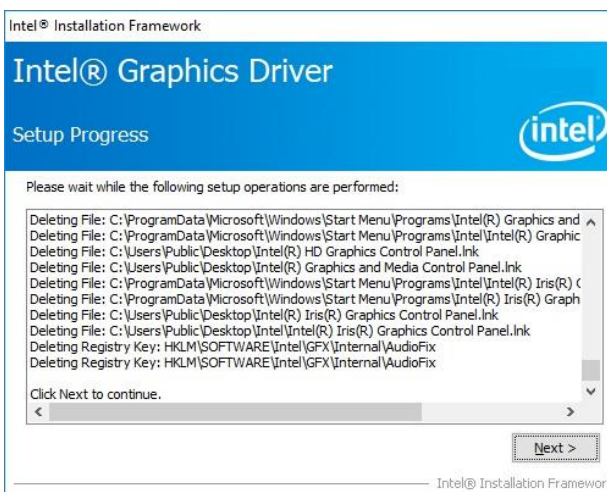


**Step 4. Click Next.**

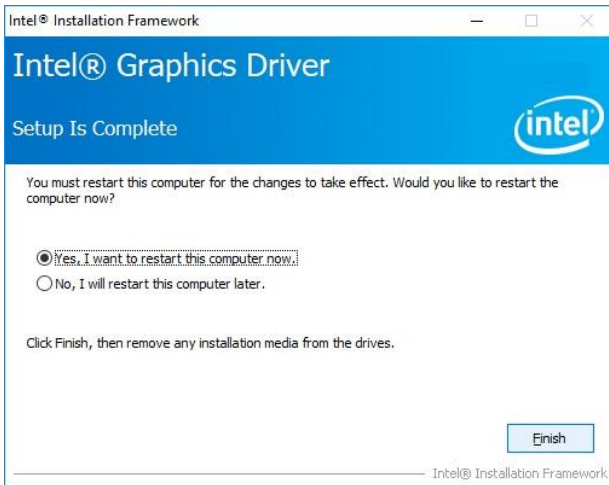


**Step 2.**

Click **Yes** to accept license agreement.



**Step 5. Click Next.**



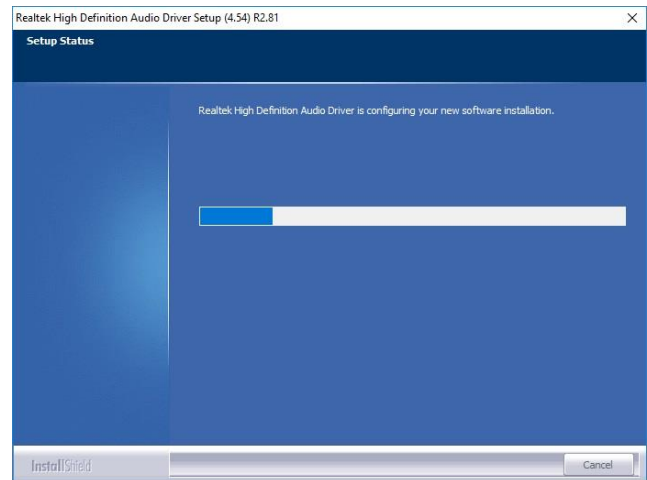
**Step 6.** Click **Finish** to complete setup.

## 4.4 Install Audio Driver (For Realtek ALC892)

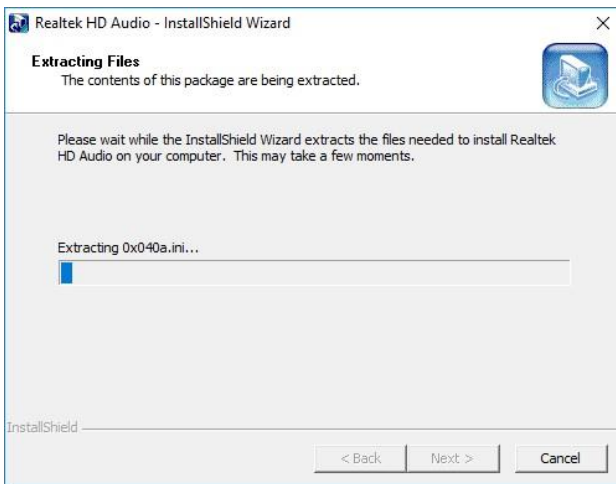
Please contact us for drivers.



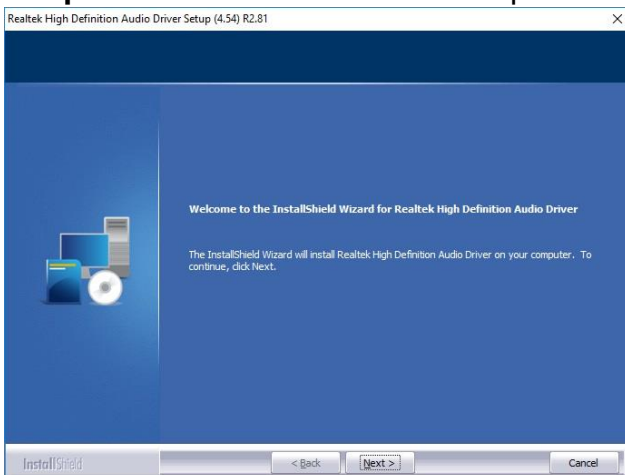
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system.



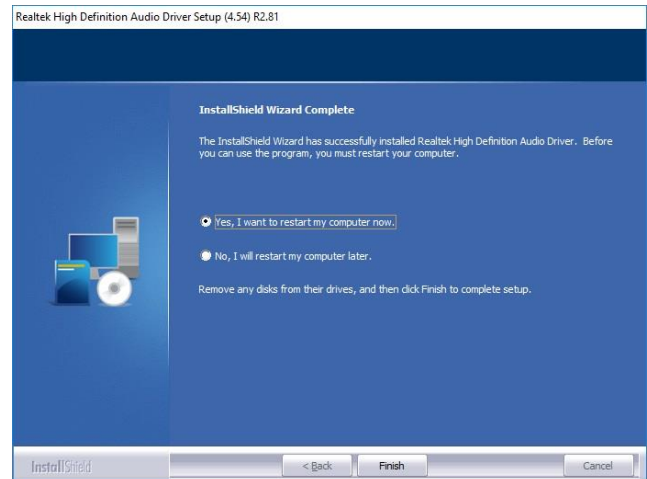
**Step 3. Installing.**



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



**Step 2. Click Next.**



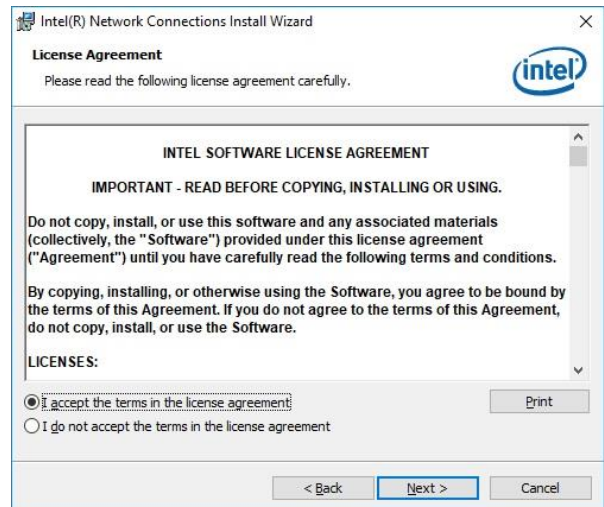
**Step 4. Click Finish** to complete the setup.

## 4.5 Install Ethernet Driver

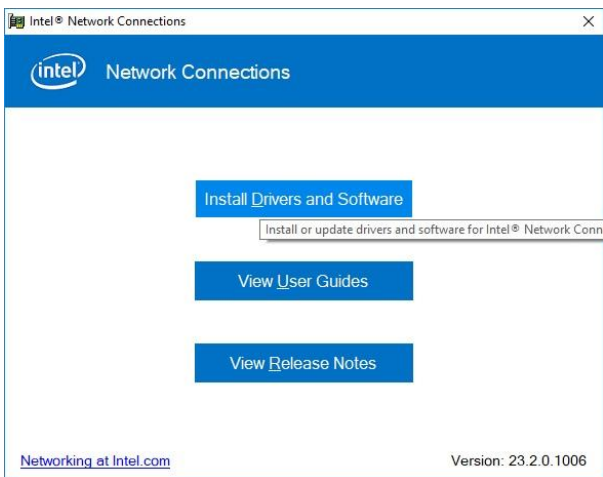
Please contact us for drivers.



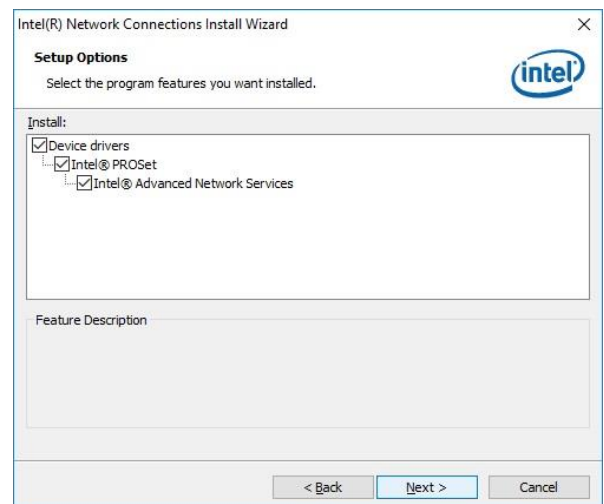
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system.



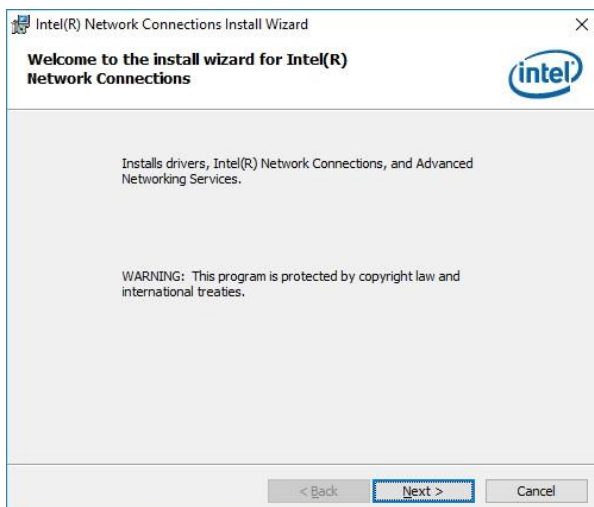
**Step 3. Click Next.**



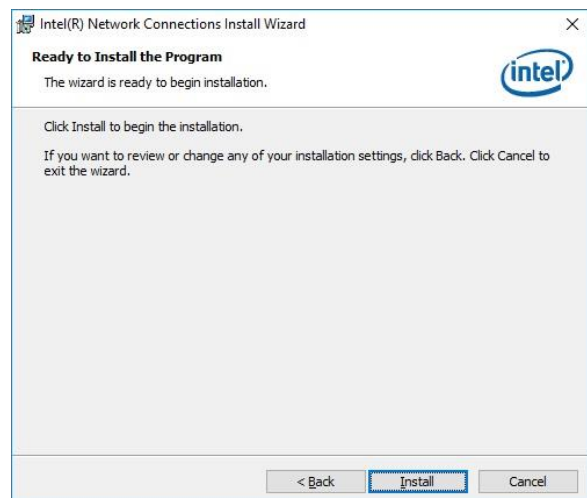
**Step 1. Click Install Drivers and Software.**



**Step 4. Click Next.**

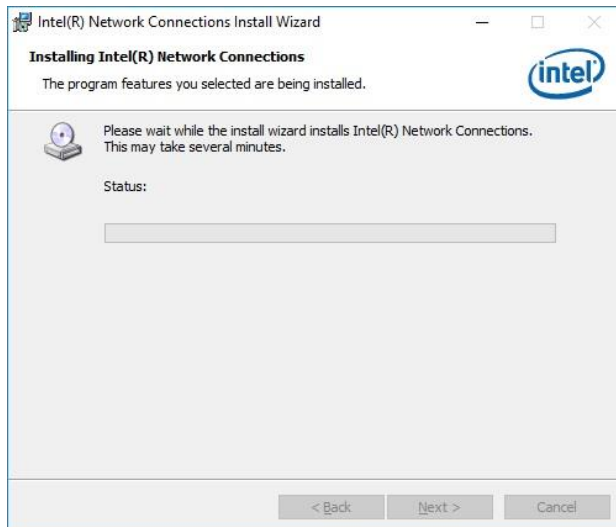


**Step 2. Click Next to proceed.**

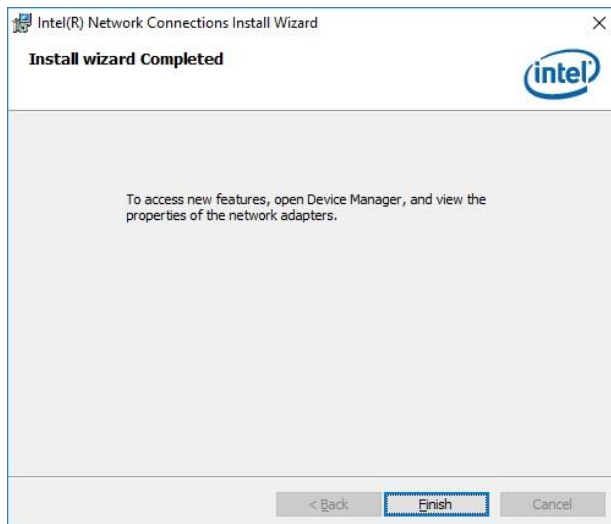


**Step 5. Click Install.**

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**Step 6. Click Next.**



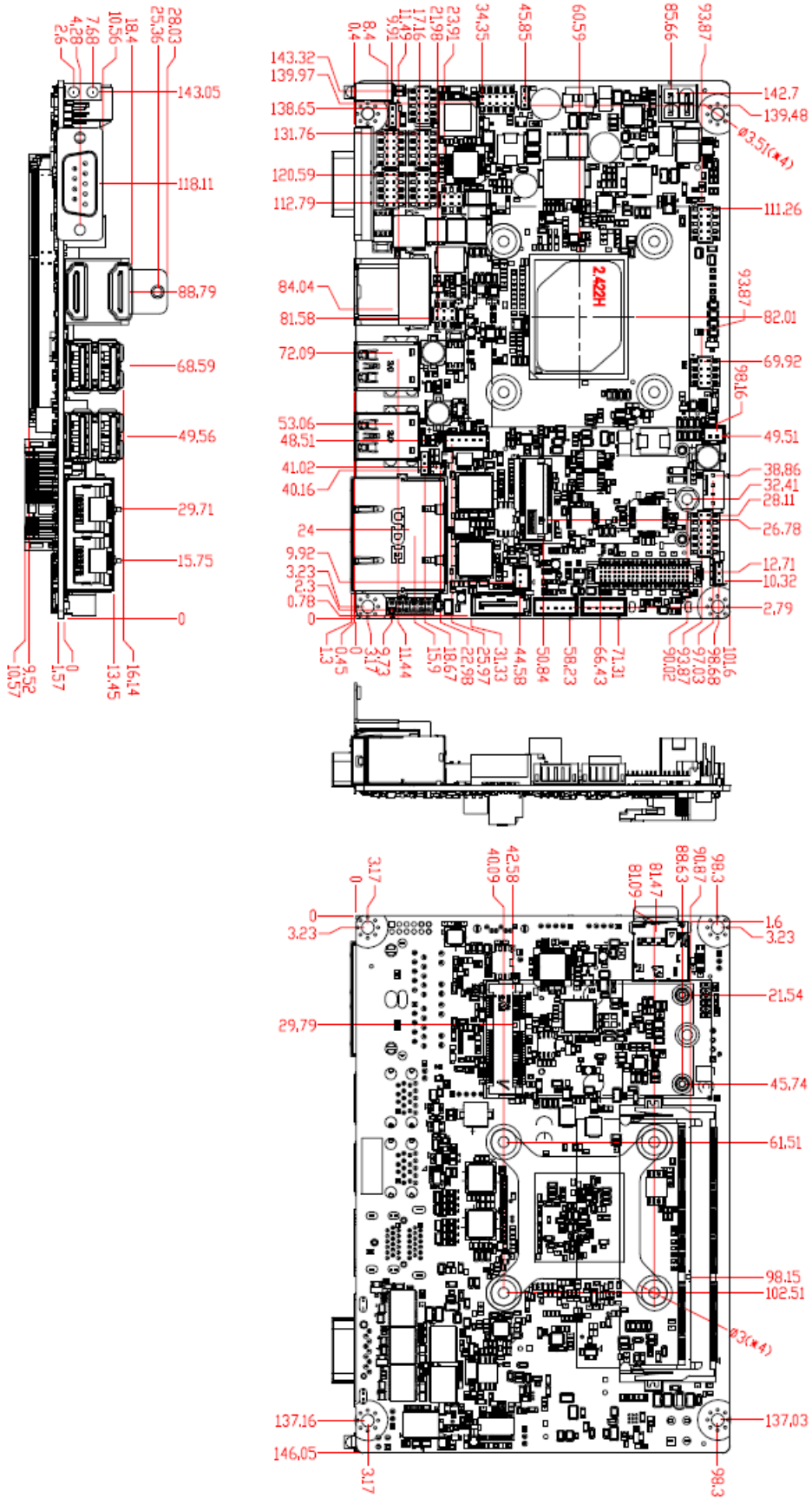
**Step 7. Click Finish to complete the setup.**



# 5. Mechanical Drawing

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Unit: mm

