ECM-APL2-B1

Intel Apollo Lake processor 3.5 Micro Module

User's Manual

3rd 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 UNDESIRED OPERATION.

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

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

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

Notice

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

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1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into body, or (b) support or sustain life and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

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

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

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

Content

ECM-APL2-B1 User's Manual

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-APL2-B1 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 (depend on operating temperature & CPU SKU)

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

1.3 Document Amendment History

Revision	Date	By	Comment
1st	March 2020	Avalue	Initial Release
2nd	April 2020	Avalue	Update System Specifications
3rd	July 2020	Avalue	Update Packing List

1.4 Manual Objectives

This manual describes in details Avalue Technology ECM-APL2-B1 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-APL2-B1 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	Onboard Intel® Pentium®/Celeron®/Atom™ SoC BGA Processor (Apollo Lake Platform F-1 Stepping)- (with CPU Bottom Mounted)
BIOS	AMI BIOS, 128 Mbit SPI Flash ROM
Chipset	Apollo SoC integrated
I/O Chip	EC(IT8528VG)
Memory	One 204-pin DDR3L SODIMM Socket, Supports 4G/8G & Up to 8GB DDR3L 1866MTs SDRAM (Non-ECC)
Watchdog Timer	H/W Reset, 1sec. ~ 65535sec and 1sec. or 1min./step
H/W Status Monitor	CPU & system temperature monitoring Voltages monitoring
TPM	2.0
Other	mSATA supported from MiniPCIe
Expansion Slot	
mPCIe	1 x Full-Size Mini PCI Express Mini Card with mSATA supported 1 x Half-Size Mini PCI Express Mini Card
Storage	
mSATA	1 x mSATA support from Mini PCIe
SATA Interface	1 x SATA III
SATA Power	1 x 2P w/2.0mm 5V Power
External I/O	
COM	1 x DB-9 male connector for COM1 RS232(pin9 5V or 12V)
USB	4 x USB3.0
Others	2 x LAN 2 x HDMI Stack LED indicator for power / HDD
Internal I/O	
COM	5 pin x 2 w/2.0mm pitch for RS232 and 3pin x 2 w/2.0mm pitch for RS422/485 switch with GPIO
USB	5 pin x 2 w/ 2.0mm for USB2.0 (pin header)
GPIO	1 x 8-bit GPIO
Audio	6 x 2 pin header w/2.0mm pitch
FAN	CPU_FAN1 4pin 2.5mm wafer
Buzzer	With pin header
Others	1 x LPC (Low Pin Count)

	1 x SPI 1 x CMOS Battery CR2032 with wire(BT1) (co-lay Maxell "CR17335A WK11 with wire)(BT2)
Display	
Processor Graphic	Intel® Apollo Lake SoC Processor integrated Gen9 LP graphics
Interface w/ Resolution	2 x HDMI: Max resolution 3840x2160@30Hz 1 x LVDS dual channel18/24 bit: Max resolution 1920x1080@60Hz (via 7511B)
Multiple Display	Triple display
Other	HDMI 1.4b
Audio	
AC97 Codec	Realtek ALC892 support 5.1 channel
Interface	Mic-In, Line-In, Line-Out
Ethernet	
LAN Chip	2 x Intel I211AT(for N&J series) 2 x Intel I210IT(for E series Wide Temp.)
Ethernet Spec.	10/100/1000 Base-Tx compatible
Mechanical & Environmental	
Power Requirement	+12V ~ +26V
Power Connector	Input PWR 2Px2 W/OP 4.2 180D(M)
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) for N & J series -40°C ~ 85°C (-40°F ~ 185°F) for E-series CPU (Optional)
Storage Temp.	-40°C ~ 75°C (-40°F ~ 167°F)
Operating Humidity	40°C @ 95% Relative Humidity, Non-condensing
Size (L x W) (Please consult product engineers for the production feasibility if the size is larger than 410x360mm or smaller than 80x70mm)	5.7" x 4" (146mm x 101mm)
Weight	0.44lbs (0.2kg)
OS	Win 10, Linux

(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-APL2-B1.
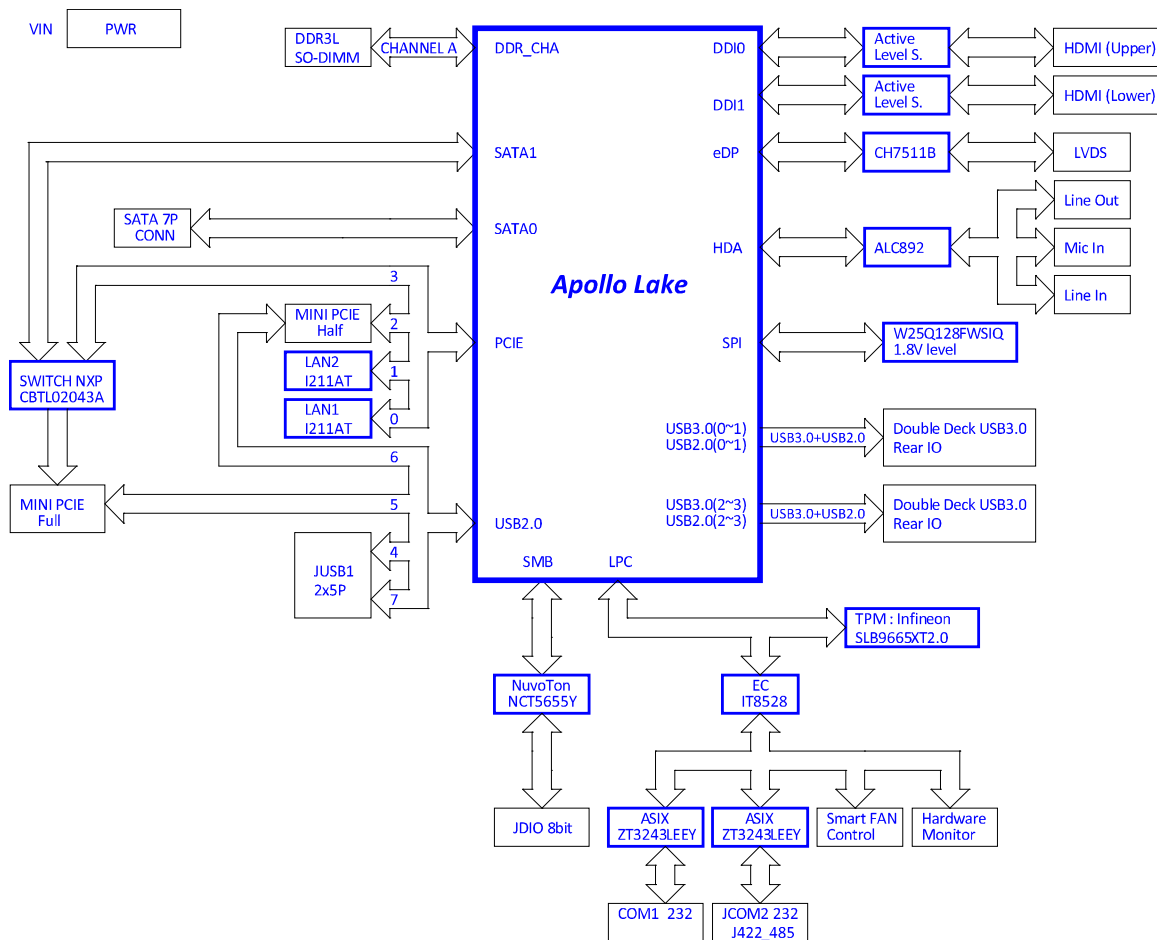
2. Hardware Configuration

2.1 Product Overview
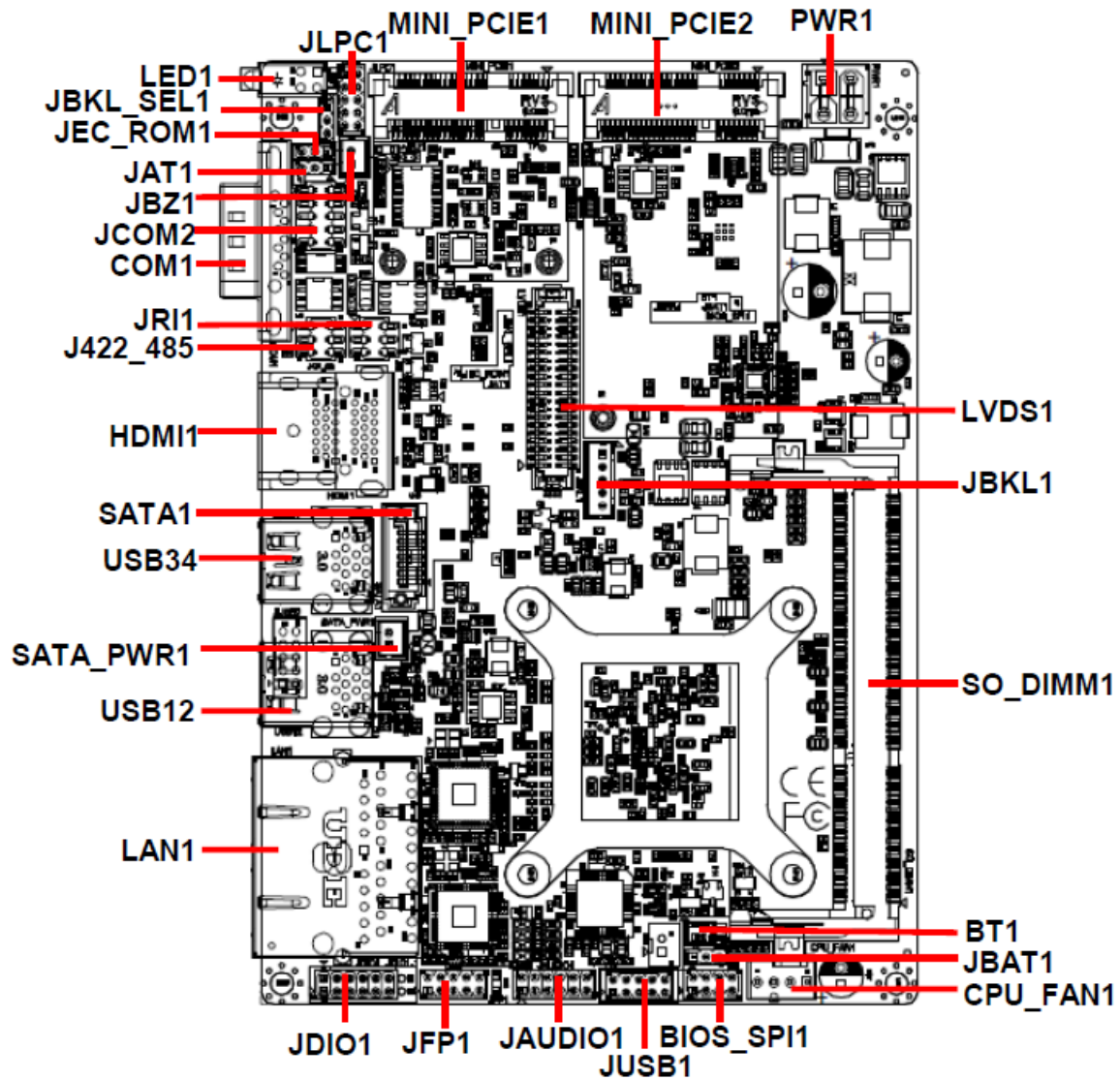
2.2 Jumper and Connector List

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

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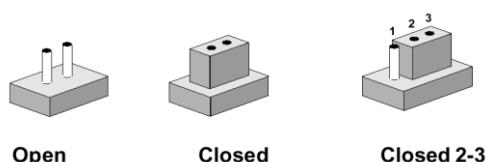
The jumper settings are schematically depicted in this manual as follows:

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
JBKL_SEL1	LCD backlight brightness adjustment	3 x 1 header, pitch 2.00 mm
JAT1	AT/ATX Input power select	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
J422_485	Serial port 2 in RS-422/485 mode	3 x 2 header, pitch 2.00 mm
COM1	Serial port 1 connector	D-sub 9-pin, male
JCOM2	Serial port 2 connector	5 x 2 header, pitch 2.00 mm **Note**：JCOM2 support RS422/485 by BIOS setting
JDIO1	General purpose I/O connector	6 x 2 header, pitch 2.00 mm
JFP1	Miscellaneous setting connector	5 x 2 header, pitch 2.00 mm
JLPC1	Low pin count interface	5 x 2 header, pitch 2.00 mm
USB12/34	4 x USB3.0 connector	
JUSB1	USB connector 1	5 x 2 header, pitch 2.00 mm
JEC_ROM1	EC Debug connector	3 x 1 header, pitch 2.00 mm
LAN1	2 x RJ-45 Ethernet connector	
LED1	HDD/Power LED indicator	
PWR1	Power connector	2 x 2 wafer, pitch 4.20 mm
JBZ1	PC Buzzer connector	2 x 1 wafer, pitch 2.00 mm
SATA_PWR1	SATA Power header	2 x 1 wafer, pitch 2.00 mm
SATA1	Serial ATA connector 1	
HDMI1	HDMI connector	
BIOS_SPI1	BIOS SPI header	4 x 2 header, pitch 2.00 mm
MINI_PCIE1/2	Mini-PCI connector 1/2	
SO_DIMM1	DDR3 SODIMM connector	
LVDS1	LVDS connector	20 x 2 wafer, pitch 1.25 mm Matching Connector: Hirose DF13-40DS-1.25C

2.3 Setting Jumpers & Connectors

2.3.1　AT/ATX Input power select (JAT1)
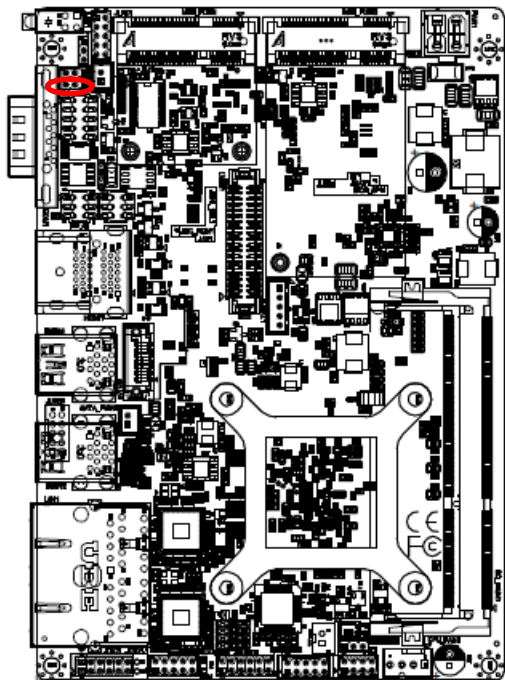
AT*
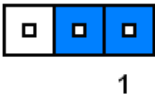
ATX
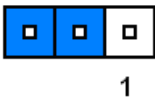
 * Default

2.3.2　Clear CMOS (JBAT1)
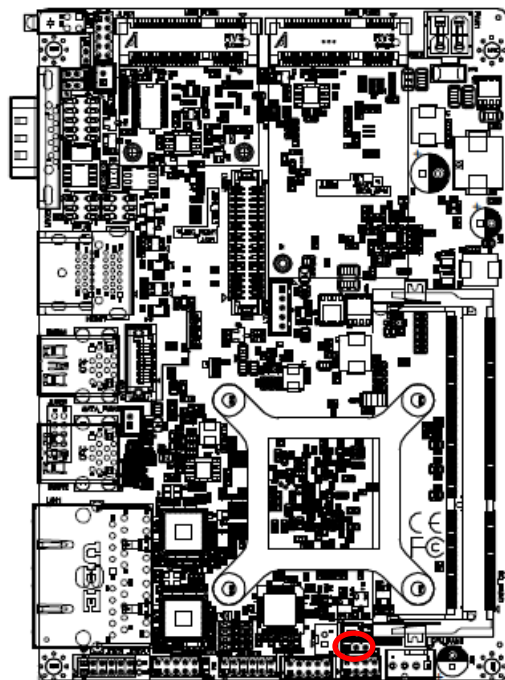
Protect*
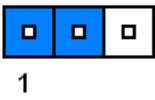
Clear CMOS
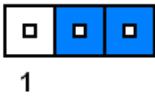
 * Default

2.3.3 Serial port 1 pin9 signal select (JRI1)

Ring*

+5V

+12V
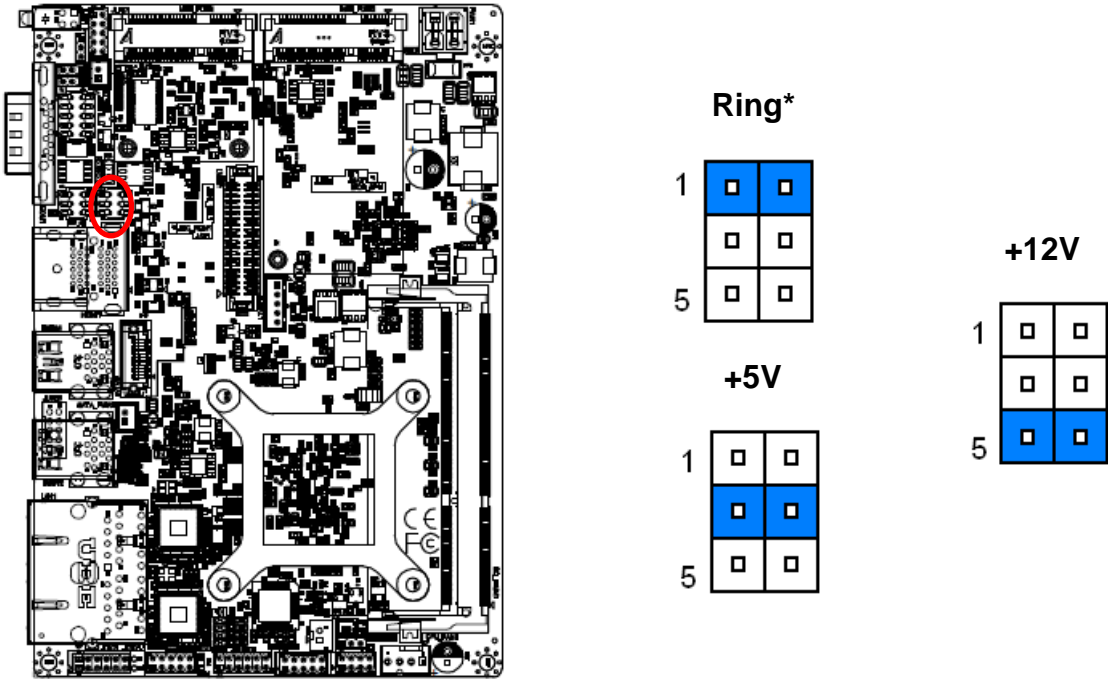
 * Default

2.3.4 LCD backlight brightness adjustment (JBKL_SEL1)

PWM Mode*

DC Mode
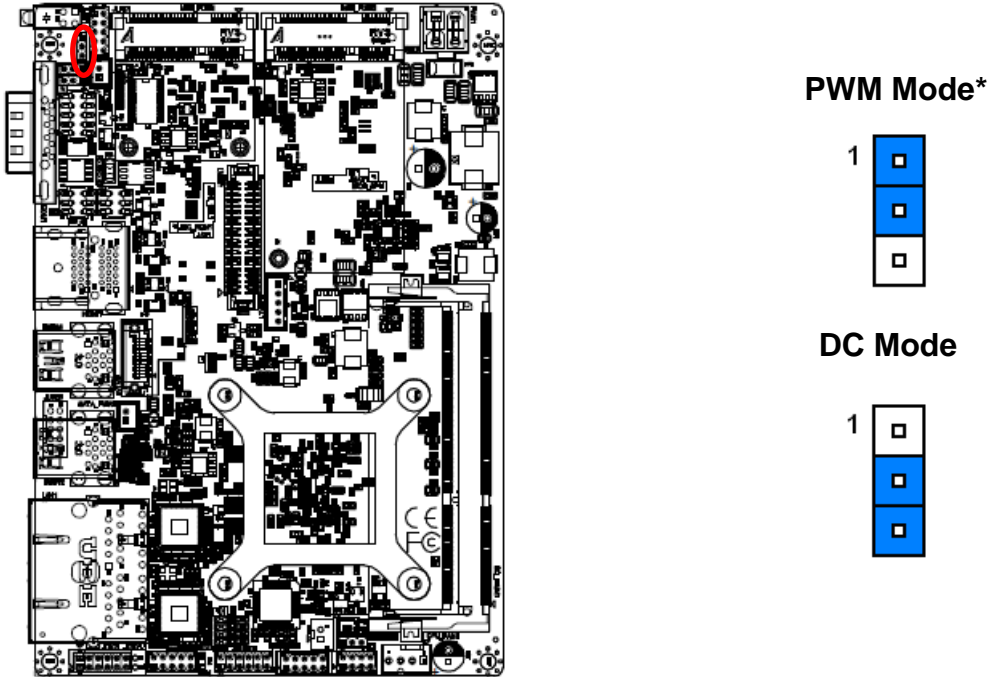
 * Default

2.3.5   LCD Inverter connector (JBKL1)
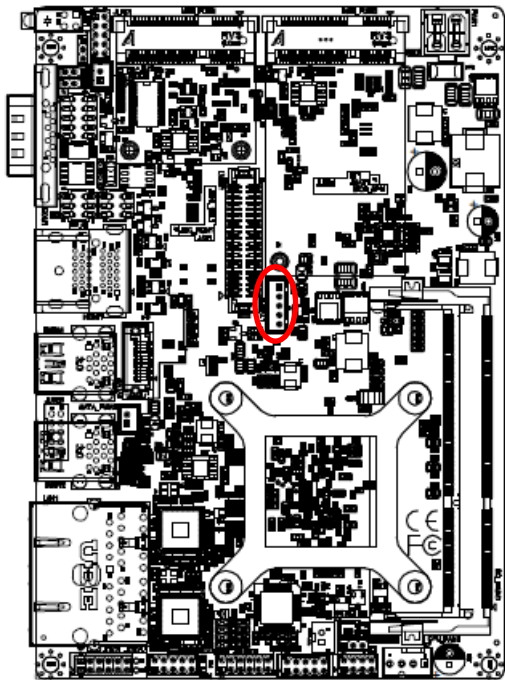
Signal	PIN
+12V	1
GND	2
BKLEN	3
VBRIGHT	4
+5V	5

2.3.6   CPU fan connector (CPU_FAN1)
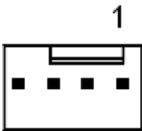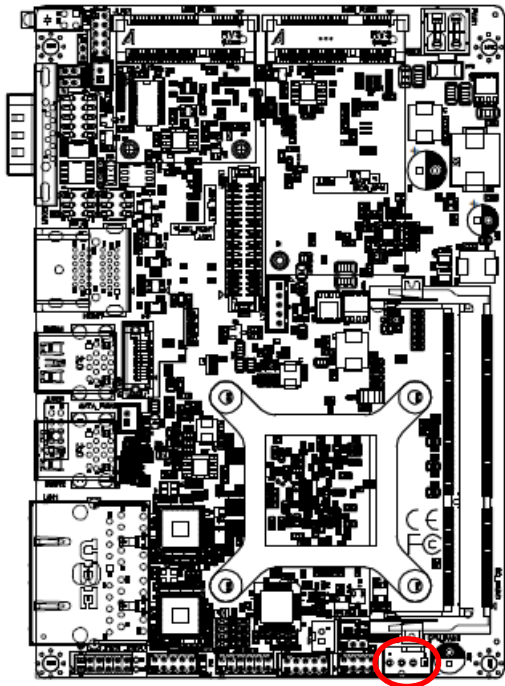
Signal	PIN
GND	1
+12V	2
EC_TACH0	3
FAN_PWM0	4

2.3.7   Serial port 2 in RS-422/485 mode (J422_485)
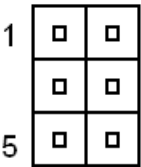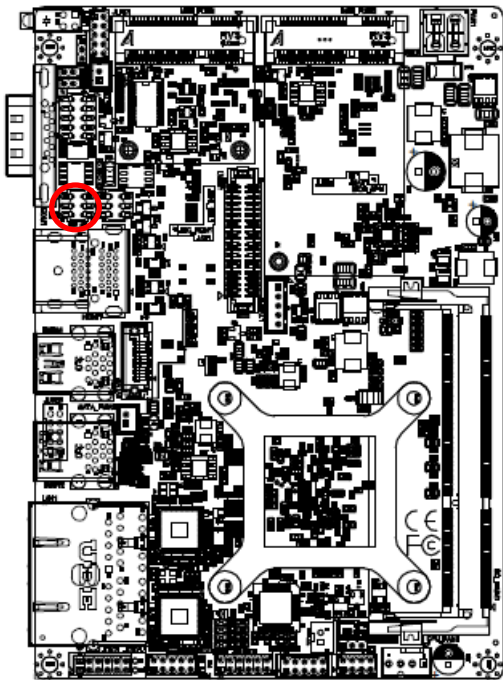
Signal	PIN	PIN	Signal
485TX2-	1	2	485TX2+
485RX2+	3	4	485RX2-
+5V	5	6	GND

2.3.8   Serial port 2 connector (JCOM2)
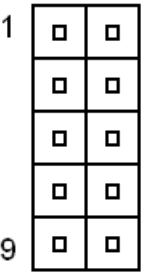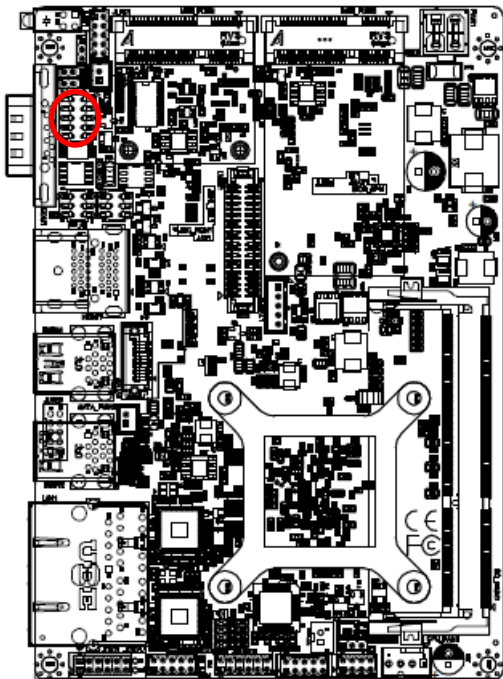
Signal	PIN	PIN	Signal
COM_DCD#_2	1	2	COM_RXD_2
COM_TXD_2	3	4	COM_DTR#_2
GND	5	6	COM_DSR#_2
COM_RTS#_2	7	8	COM_CTS#_2
COM_RI#_2	9	10	NC

2.3.9 General purpose I/O connector (JDIO1)
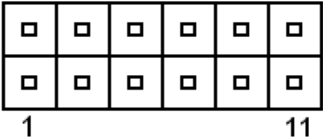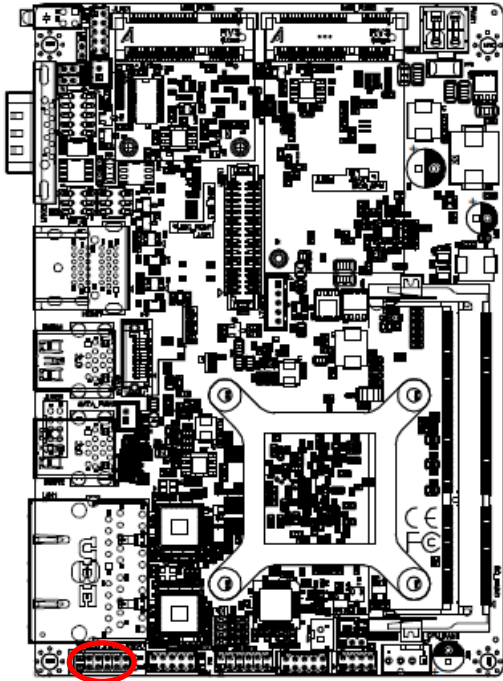
Signal	PIN	PIN	Signal
DIO_GP20	1	2	DIO_GP10
DIO_GP21	3	4	DIO_GP11
DIO_GP22	5	6	DIO_GP12
DIO_GP23	7	8	DIO_GP13
SMB_SCL_S0	9	10	SMB_SDA_S0
GND	11	12	+5V

2.3.10 SATA Power header (SATA_PWR1)
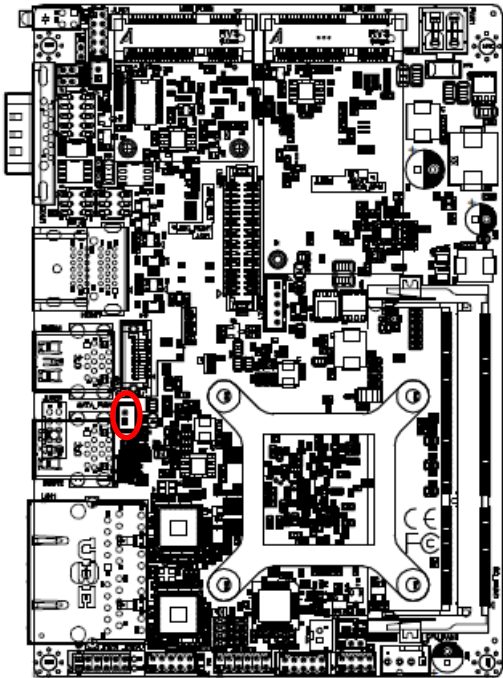
Signal	PIN
+5V	2
GND	1

2.3.11   Power connector (PWR1)
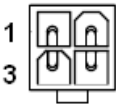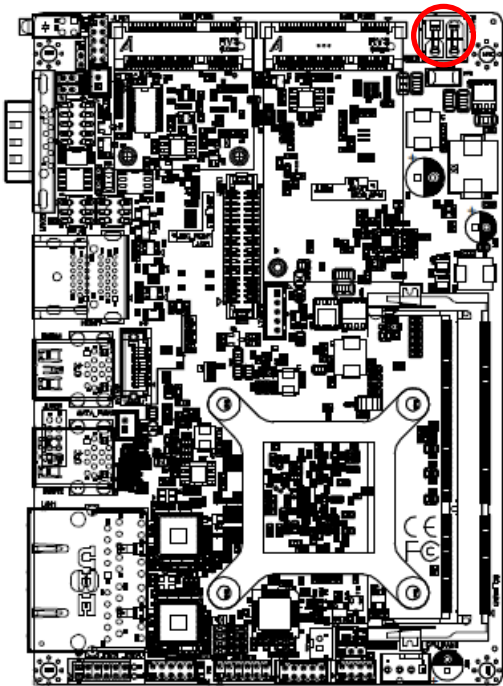
Signal	PIN	PIN	Signal
GND	1	2	GND
+26V_VIN_VIN	3	4	+26V_VIN_VIN

2.3.12   Low pin count interface (JLPC1)
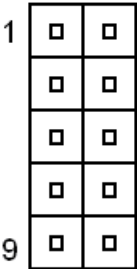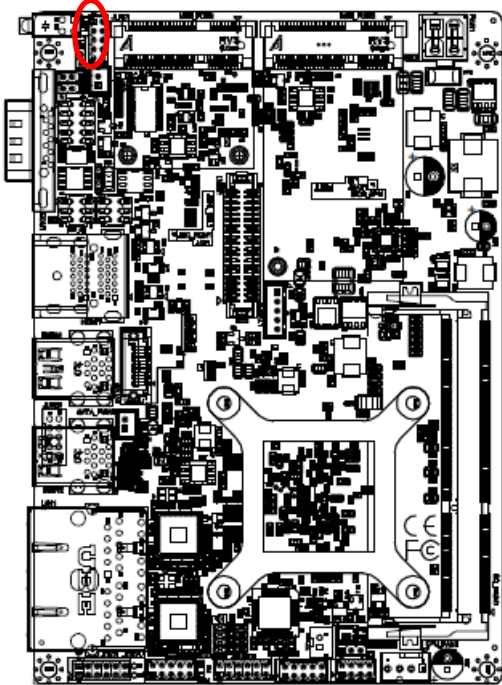
Signal	PIN	PIN	Signal
LPC_AD0	1	2	+3.3V
LPC_AD1	3	4	PLT_RST_BUF#
LPC_AD2	5	6	LPC_FRAME#
LPC_AD3	7	8	LPC_PORT80_CLK
LPC_SERIRQ	9	10	GND

2.3.13 USB connector 1 (JUSB1)
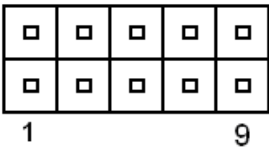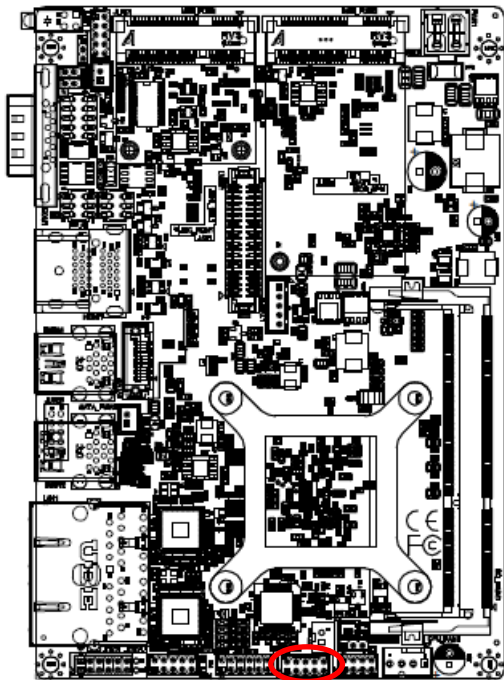
Signal	PIN	PIN	Signal
+5VSB	1	2	GND
USB_R_DN4	3	4	GND
USB_R_DP4	5	6	USB_R_DP7
GND	7	8	USB_R_DN7
GND	9	10	+5VSB

2.3.14 EC Debug connector (JEC_ROM1)
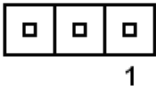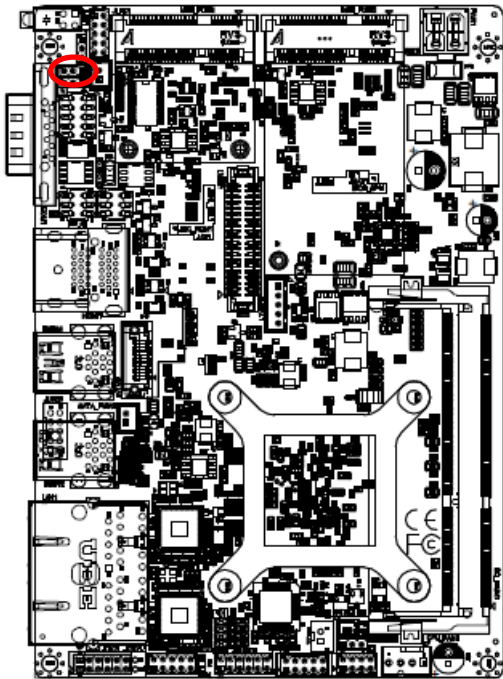
Signal	PIN
EC_SMCLK_DEBUG	1
EC_SMDAT_DEBUG	2
GND	3

2.3.15　Miscellaneous setting connector (JFP1)
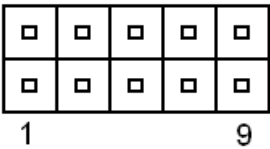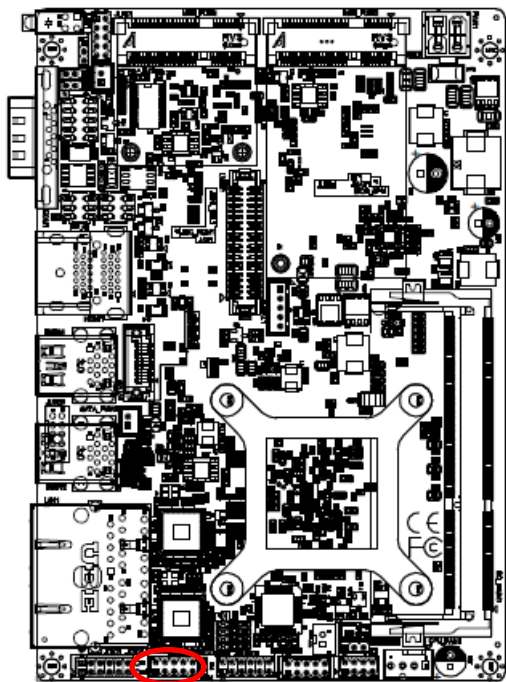
Signal	PIN	PIN	Signal
PWR_BTN_IN_EC#	1	2	GND
PMU_RSTBTN#	3	4	GND
FP_PWR_LED+	5	6	PWR_LED#
HDD_LED#	7	8	+5V
CASE_OPEN#	9	10	GND

2.3.16　BIOS SPI header (BIOS_SPI1)
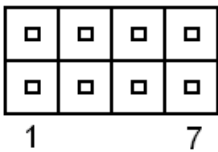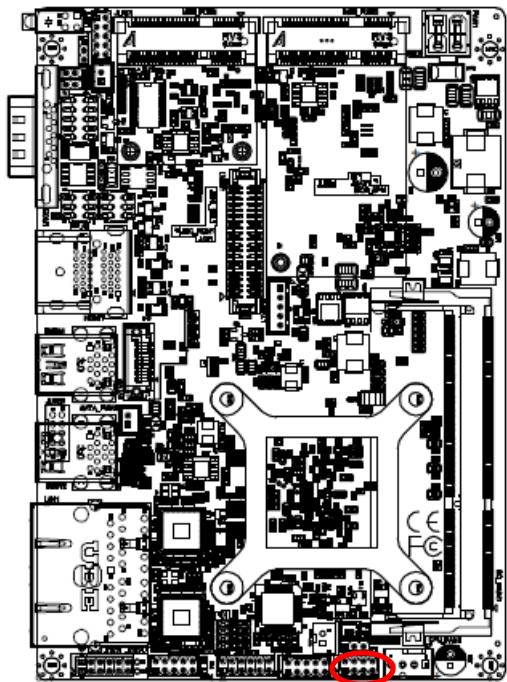
Signal	PIN	PIN	Signal
+1.8VSB	1	2	GND
SPI_CS#0	3	4	SPI_CLK
SPI_MISO	5	6	SPI_MOSI
SPI_HOLD#	7	8	SPI_WP#

2.3.17 PC Buzzer connector (JBZ1)
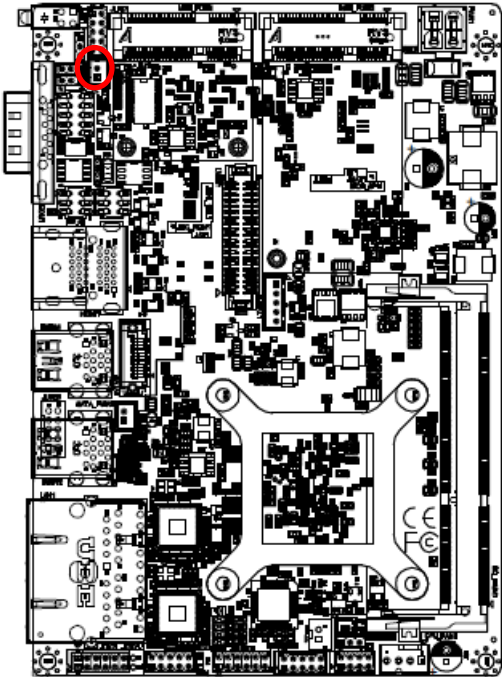
Signal	PIN
+5v	2
SOC_SPKR_R	1

2.3.18 Battery connector (BT1)
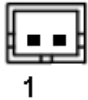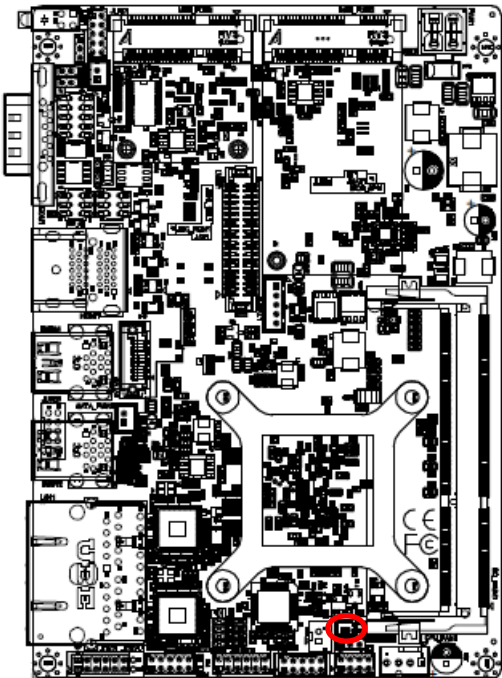
Signal	PIN
+RTCBATT	1
GND	2

2.3.19   Audio connector (JAUDIO1)
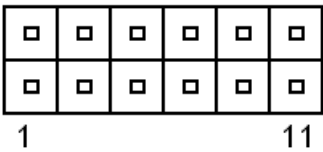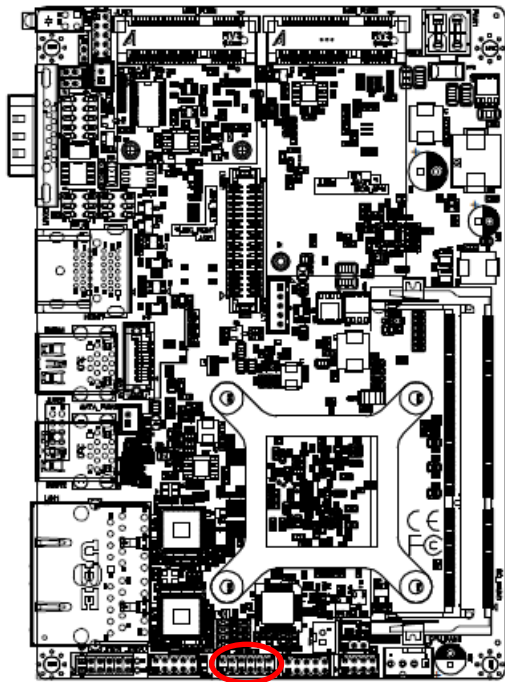
Signal	PIN	PIN	Signal
FRONT-R-OUT	1	2	FRONT-L-OUT
HD_AGND	3	4	HD_AGND
LINE1-R-IN	5	6	LINE1-L-IN
MIC1-R-IN	7	8	MIC1-L-IN
FRONT-JD	9	10	LINE1-JD
MIC1-JD	11	12	HD_AGND

2.3.19.1 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

2.3.20   LVDS connector (LVDS1)
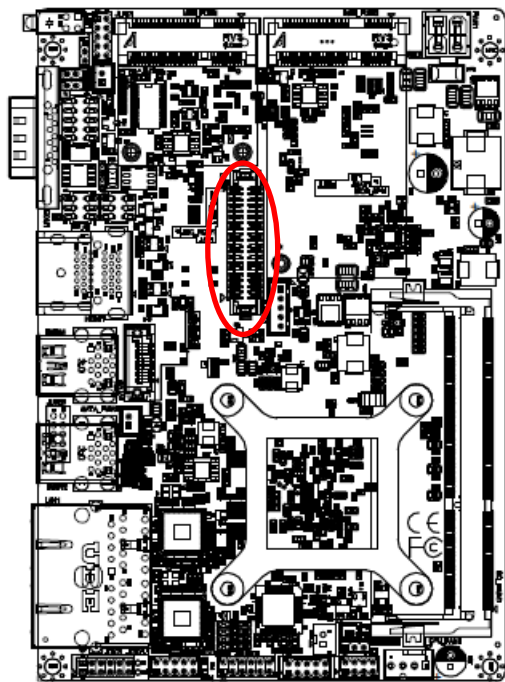
Signal	PIN	PIN	Signal
+12V	39	40	+12V
GND	37	38	GND
LVDS_CLK2_N	35	36	LVDS_CLK1_N
LVDS_CLK2_P	33	34	LVDS_CLK1_P
GND	31	32	GND
LVDS_DATA7_N	29	30	LVDS_DATA6_N
LVDS_DATA7_P	27	28	LVDS_DATA6_P
GND	25	26	GND
LVDS_DATA5_N	23	24	LVDS_DATA4_N
LVDS_DATA5_P	21	22	LVDS_DATA4_P
GND	19	20	GND
LVDS_DATA3_N	17	18	LVDS_DATA2_N
LVDS_DATA3_P	15	16	LVDS_DATA2_P
GND	13	14	GND
LVDS_DATA1_N	11	12	LVDS_DATA0_N
LVDS_DATA1_P	9	10	LVDS_DATA0_P
GND	7	8	GND
NC	5	6	NC
+3.3V	3	4	+5V
+3.3V	1	2	+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 <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.

```
Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
 Main  Advanced  Chipset  Security  Boot  Save & Exit

BIOS Information                                            Choose the system default
BIOS Vendor               American Megatrends               language
Core Version              5.12
Compliancy                UEFI 2.5; PI 1.4
Project Version           1ATJS 0.54 x64
Build Date and Time       01/17/2020 14:18:46
Access Level              Administrator
EC 8528 Firmware          B3
BIOS Name                 CAPL2B03

System Language           [English]
▶ Intel RC Version

System Date               [Mon 02/10/2020]            →←: Select Screen
System Time               [13:43:10]                  ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit

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```

```
Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
 Main

Intel RC Version

Platform firmware Information
BXT SOC                   F1
MRC Version               0.56
PUNIT FW                  1A
PMC FW                    03.20
TXE FW                    3.1.65.2288
ISH FW                    N/A
GOP                       10.0.1036
CPU Flavor                BXT Notebook/Desktop ...
Board ID                  Oxbow Hill CRB (06)
Fab ID                    FAB A
                                                      →←: Select Screen
                                                      ↑↓: Select Item
Memory Information                                    Enter: Select
Total Memory              4096 MB                     +/-: Change Opt.
Memory Speed              1600 MHz                    F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit

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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.

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.

```
          Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
      Main  Advanced  Chipset  Security  Boot  Save & Exit

   ▶ Trusted Computing                                    Trusted Computing Settings
   ▶ ACPI Settings
   ▶ IT8528 Super IO Configuration
   ▶ Hardware Monitor
   ▶ S5 RTC Wake Settings
   ▶ Serial Port Console Redirection
   ▶ CPU Configuration
   ▶ Network Stack Configuration
   ▶ USB Configuration
   ▶ Security Configuration

                                                          ↔: 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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```

3.6.2.1 Trusted Computing

```
          Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
    Advanced

    TPM20 Device Found                                  Enables or Disables BIOS
    Firmware Version:            1.3                     support for security device.
    Vendor:                      NTC                     O.S. will not show Security
                                                         Device. TCG EFI protocol and
    Security Device Support      [Enable]                INT1A interface will not be
                                                         available.




                                                         →←: 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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```

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.

3.6.2.2 APCI Settings

```
          Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
    Advanced

    ACPI Settings                                       Enables or Disables System
                                                        ability to Hibernate (OS/S4
                                                        Sleep State). This option may
    Enable Hibernation           [Enabled]              be not effective with some OS.
    ACPI Sleep State             [S3 (Suspend to RAM)]

    ErP Function                 [Disabled]
    PWR-On After PWR-Fail        [Off]
    Watch Dog                    [Disabled]
    USB Standby Power Setting    [Enabled]
    Wake Up by Ring              [Enabled]




                                                         →←: 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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```

Item	Options	Description
Enable Hibernation	Disabled Enabled**[Default]**	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some 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.
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.
USB Standby Power Setting	Disabled Enabled**[Default]**	Enabled/Disabled USB Standby Power during S3/S4/S5.
Wake Up By Ring	Disabled Enabled**[Default]**	Wake Up by Ring from S3/S4/S5.

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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~ 3.6.2.3.2 for more information.
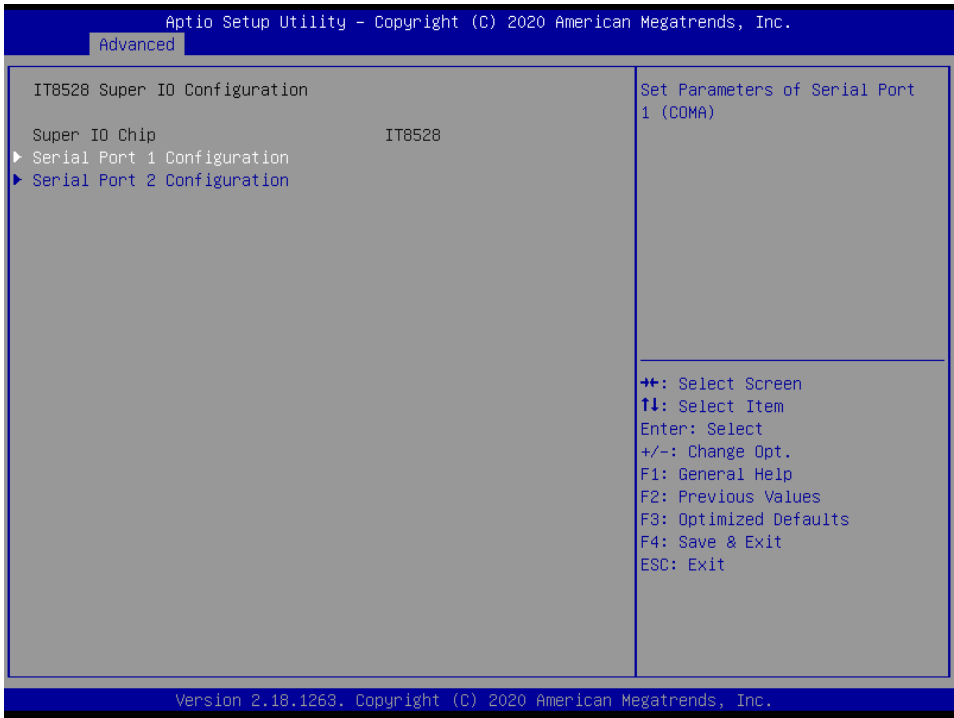
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).

3.6.2.3.1　Serial Port 1 Configuration

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

3.6.2.3.2 Serial Port 2 Configuration
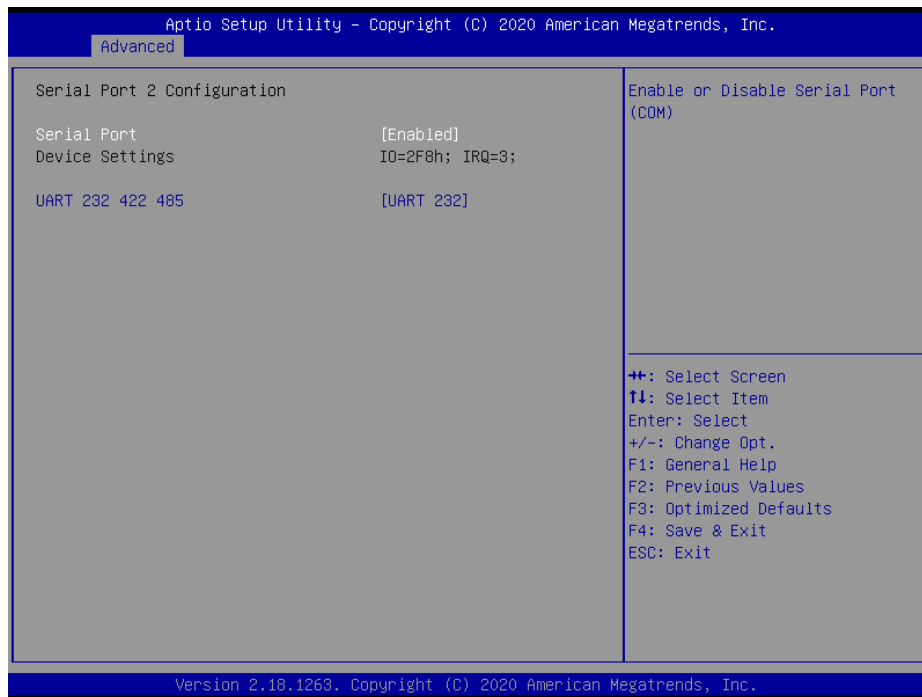
```
              Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
     Advanced

    Serial Port 2 Configuration                                    Enable or Disable Serial Port
                                                                   (COM)
    Serial Port                         [Enabled]
    Device Settings                     IO=2F8h; IRQ=3;

    UART 232 422 485                    [UART 232]




                                                                   →←: 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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```

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.

3.6.2.4 H/W Monitor
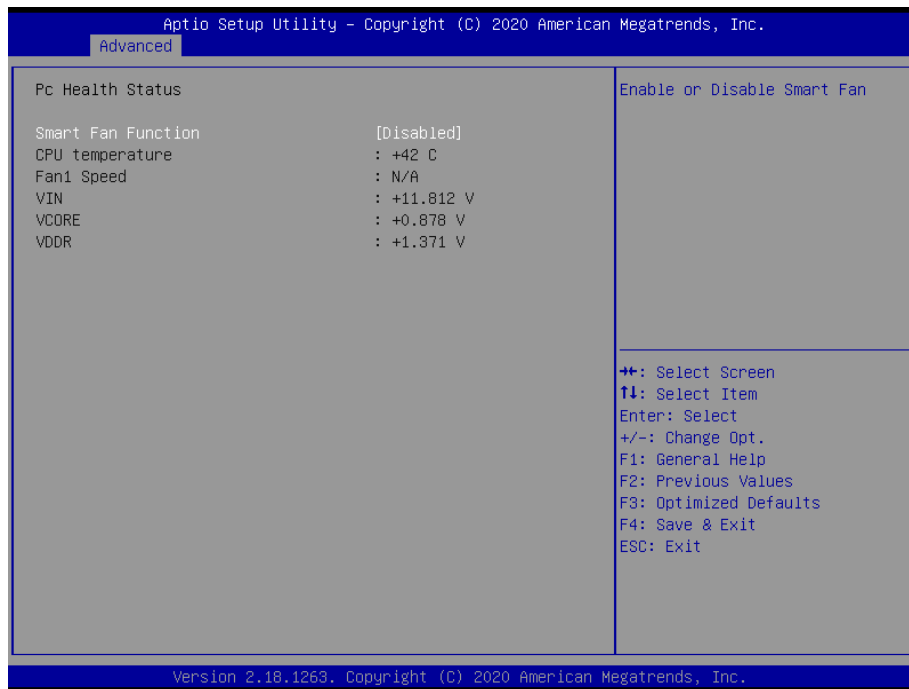
Item	Options	Description
Smart Fan Function	Enabled, Disabled**[Default]**	Enables or Disables Smart Fan.

3.6.2.5 S5 RTC Wake Settings

Item	Options	Description
Wake system from S5	Disabled**[Default]**, Fixed Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified.

	Dynamic Time	Select Dynamic Time, System will wake on the current time + Increase minute(s).

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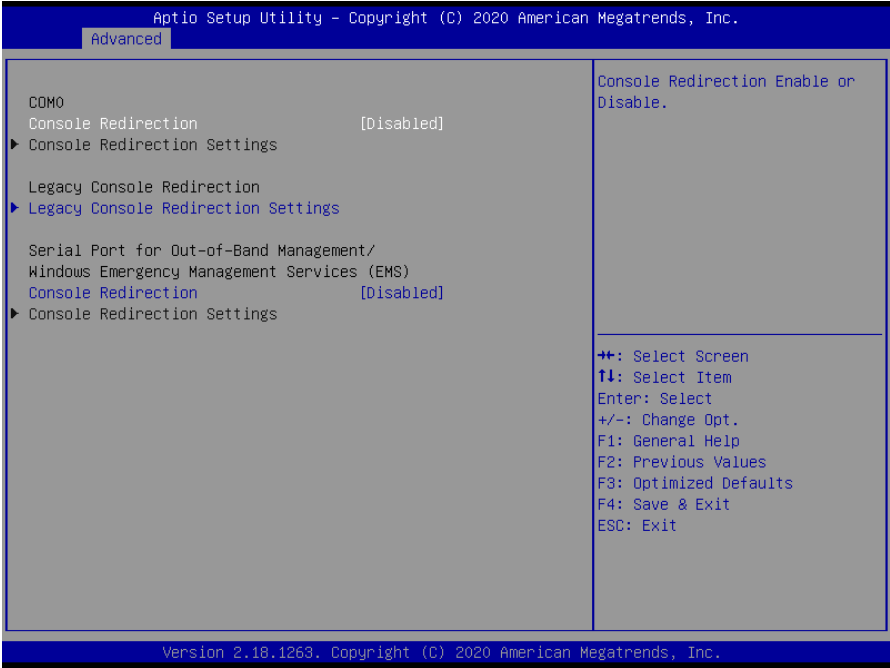
Item	Options	Description
Console Redirection	Disabled**[Default]**, Enabled	Console Redirection Enable or Disable.

3.6.2.6.1 Legacy Console Redirection Settings
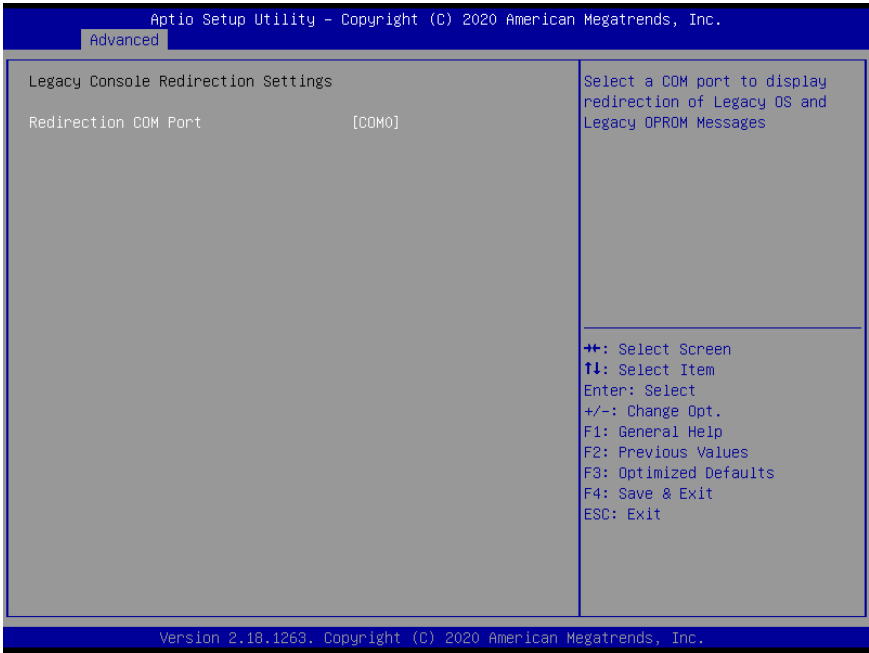
Item	Option	Description
Redirection COM Port	COM0**[Default]**	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

3.6.2.7 CPU Configuration

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

Item	Options	Description
Intel Virtualization Technology	Disabled Enabled**[Default]**	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
VT-d	Disabled**[Default]** Enabled	Enable/Disable CPU VT-d.

3.6.2.7.1 Socket 0 CPU Information

```
                    Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
    Advanced

  Socket 0 CPU Information

  Intel(R) Atom(TM) Processor E3950 @ 1.60GHz
  CPU Signature                     506CA
  Microcode Patch                   1A
  Max CPU Speed                     1600 MHz
  Min CPU Speed                     800 MHz
  Processor Cores                   4
  Intel HT Technology               Not Supported
  Intel VT-x Technology             Supported

  L1 Data Cache                     24 kB x 4
  L1 Code Cache                     32 kB x 4                    ↔: Select Screen
  L2 Cache                          1024 kB x 2                  ↑↓: Select Item
  L3 Cache                          Not Present                  Enter: Select
                                                                 +/-: Change Opt.
                                                                 F1: General Help
                                                                 F2: Previous Values
                                                                 F3: Optimized Defaults
                                                                 F4: Save & Exit
                                                                 ESC: Exit


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```

3.6.2.7.2 CPU Power Management Configuration

```
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    Advanced

  CPU Power Management Configuration              Enable/Disable Intel SpeedStep
  EIST                              [Enabled]
  Turbo Mode                        [Enabled]













                                                                 ↔: 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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```

Item	Option	Description
EIST	Disabled Enabled**[Default]**	Enable/Disable Intel SpeedStep.
Turbo Mode	Disabled Enabled**[Default]**	Turbo Mode.

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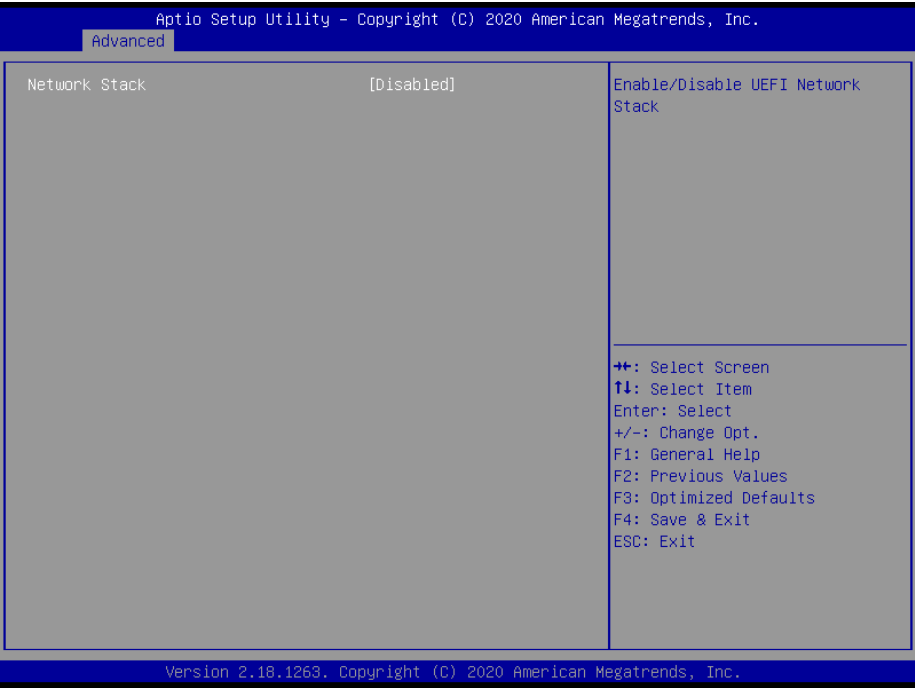
Item	Options	Description
Network Stack	Disabled**[Default]** Enabled	Enable/Disable UEFI Network Stack.

3.6.2.9 USB Configuration

The USB Configuration menu helps read USB information and configures USB settings.
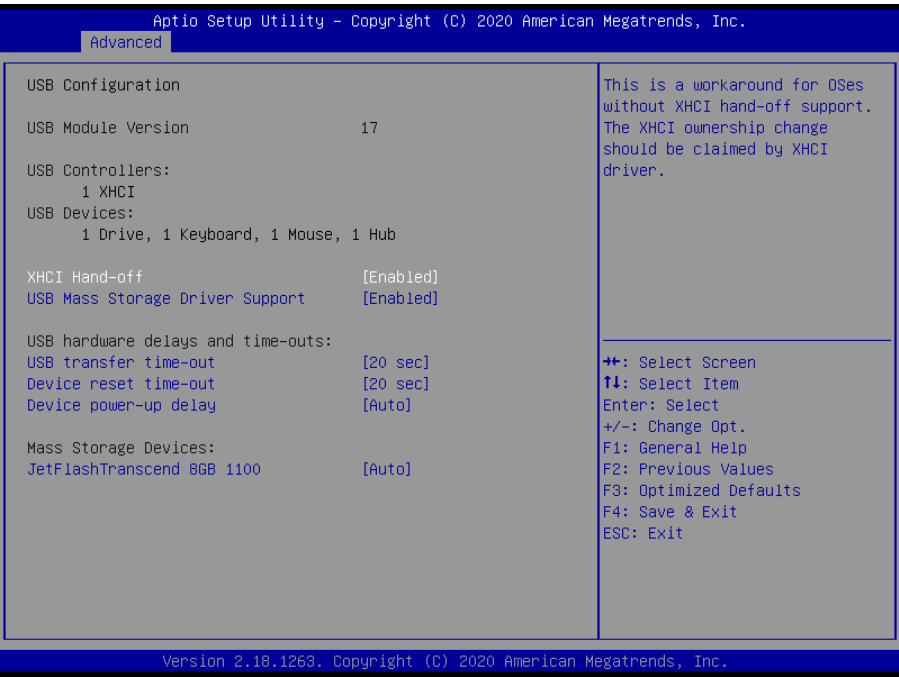
Item	Options	Description
XHCI Hand-off	Disabled Enabled**[Default]**	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Disabled Enabled**[Default]**	Enable/Disable USB Mass Storage Driver Support.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec**[Default]**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec**[Default]** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto**[Default]** Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken form Hub descriptor.
Mass Storage Devices	Auto**[Default]** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

3.6.2.10 Security Configuration
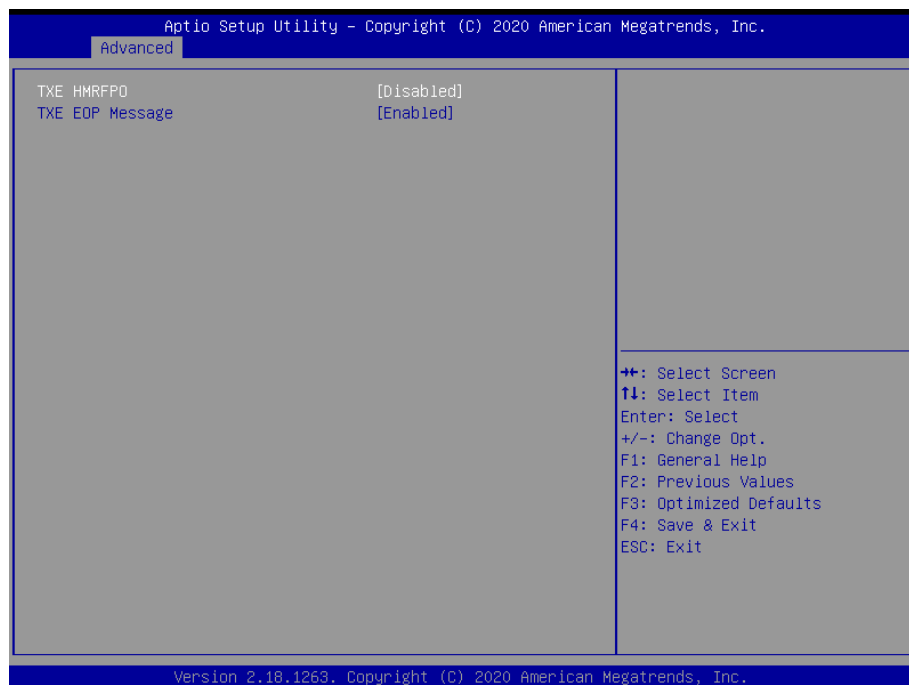
Item	Options	Description
TXE HMRFPO	Enabled Disabled**[Default]**	TXE HMRFPO.

TXE EOP Message	Enabled**[Default]** Disabled	Send EOP Message Before Enter OS.

3.6.3   Chipset

```
                Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
           Main  Advanced  Chipset  Security  Boot  Save & Exit

    ▶ North Bridge                                          North Bridge Parameters
    ▶ South Bridge
    ▶ Uncore Configuration
    ▶ South Cluster Configuration






                                                        ↦↤: 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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```

3.6.3.1   North Bridge

```
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                     Chipset

    Memory Information

    Total Memory                     4096 MB (DDR3L)

    Memory Slot0                     4096 MB (DDR3L)







                                                        ↦↤: 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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```

3.6.3.2 South Bridge

```
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              Chipset

  OS Selection                          [Windows]                    Select the target OS.




                                                              →←: 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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```

Item	Option	Description
OS Selection	Windows**[Default]** Intel Linux	Select the target OS.

3.6.3.3   Uncore Configuration

Item	Option	Description
Active LVDS(Ch7511)	Enabled**[Default]** Disabled	Active Internal LVDS(eDP->Ch7511-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 1440x900 18/2 1600x1200 24/2 1366x768 24/1 1920x1080 24/2 1680x1050 24/2	Port1-EDP to LVDS(Chrotel 7511) Panel EDID Option.
Brightness Control Method	BIOS**[Default]** OS Driver	LVDS Brightness Control Method. 1.BIOS 2.OS Driver
LVDS Back Light PWM	0% 25% 50% 75%	Select LVDS back light PWM duty.

	100%**[Default]**	
LVDS Back Light PWM Frequency	200**[Default]** 300 400 500 700 1 k 2 k 3 k 5 k 10 k 20 k	Select LVDS back light PWM Frequency.

3.6.3.4   South Cluster Configuration

3.6.3.4.1 HD-Audio Configuration

```
                    Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
                        Chipset

     HD-Audio Configuration                              Enable/Disable HD-Audio Support
     HD-Audio Support                    [Enable]




                                                         →←: 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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```
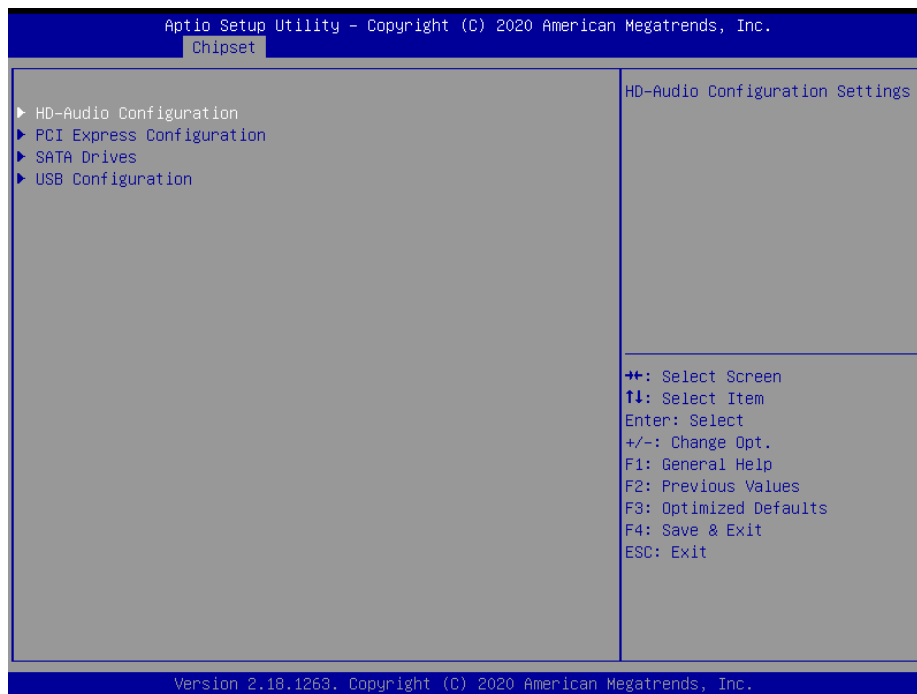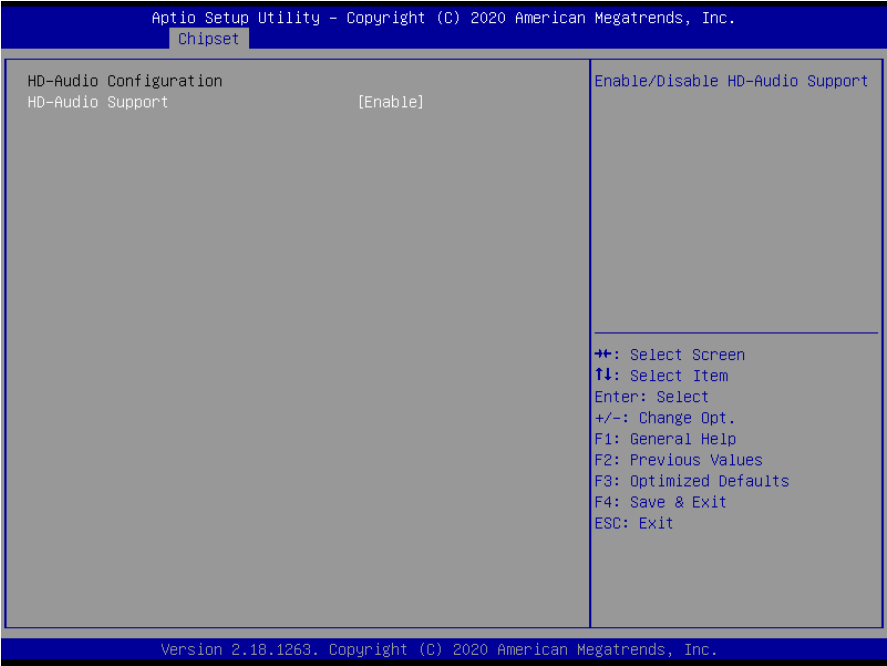
Item	Option	Description
HD-Audio Support	Disable Enable**[Default]**	Enable/Disable HD-Audio Support.

3.6.3.4.2 PCI Express Configuration

```
                    Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
                        Chipset

     PCI Express Configuration                           Control the PCI Express Root
   ▶ PCI Express Root Port 3(i210/211)                   Port.
   ▶ PCI Express Root Port 4(i210/211)                   AUTO: To disable unused root
   ▶ PCI Express Root Port 5(mPCIe)                      port automatically for the
   ▶ PCI Express Root Port 6(mPCIe half)                 most optimum power savings.
                                                         Enable: Enable PCIe root port
                                                         Disable: Disable PCIe root port



                                                         →←: 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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```

3.6.3.4.2.1 PCI Express Root Port 3(i210/211)
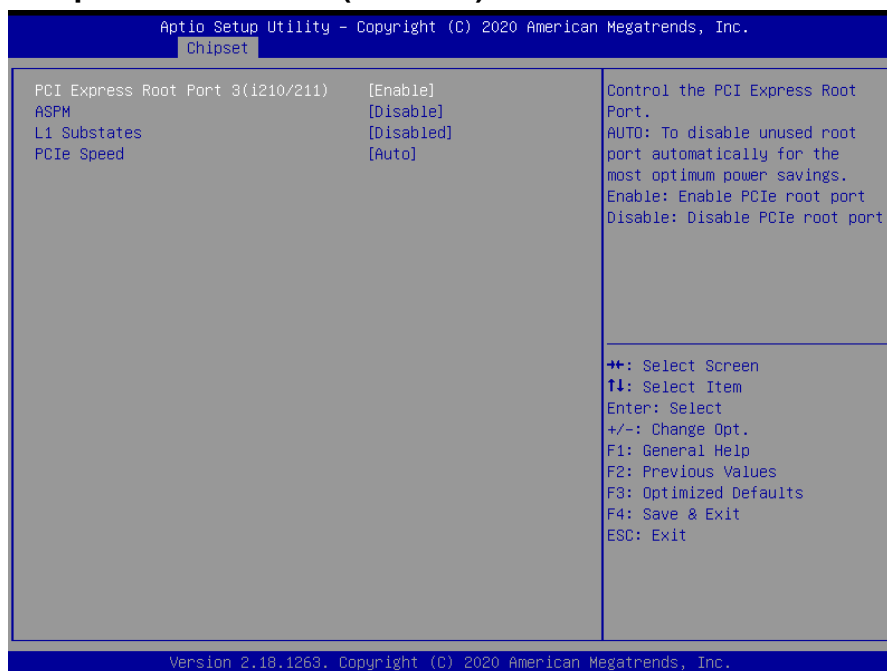
Item	Option	Description
PCI Express Root Port 3(i210/211)	Disable Enable**[Default]**	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disable: Disable PCIe root port.
ASPM	Disable**[Default]** L0s L1 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)

```
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 Chipset

 PCI Express Root Port 4(i210/211)    [Enable]              Control the PCI Express Root
 ASPM                                 [Disable]             Port.
 L1 Substates                         [Disabled]            AUTO: To disable unused root
 PCIe Speed                           [Auto]                port automatically for the
                                                            most optimum power savings.
                                                            Enable: Enable PCIe root port
                                                            Disable: Disable PCIe root port



                                                            ↔: 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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```

Item	Option	Description
PCI Express Root Port 4(i210/211)	Disable Enable**[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.
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.

3.6.3.4.2.3 PCI Express Root Port 5(mPCIe)

```
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                      Chipset

      PCI Express Root Port 5(mPCIe)        [Enable]              Control the PCI Express Root
      ASPM                                  [Disable]             Port.
      L1 Substates                          [Disabled]            AUTO: To disable unused root
      PCIe Speed                            [Auto]                port automatically for the
                                                                  most optimum power savings.
                                                                  Enable: Enable PCIe root port
                                                                  Disable: Disable PCIe root port



                                                                  →←: 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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```

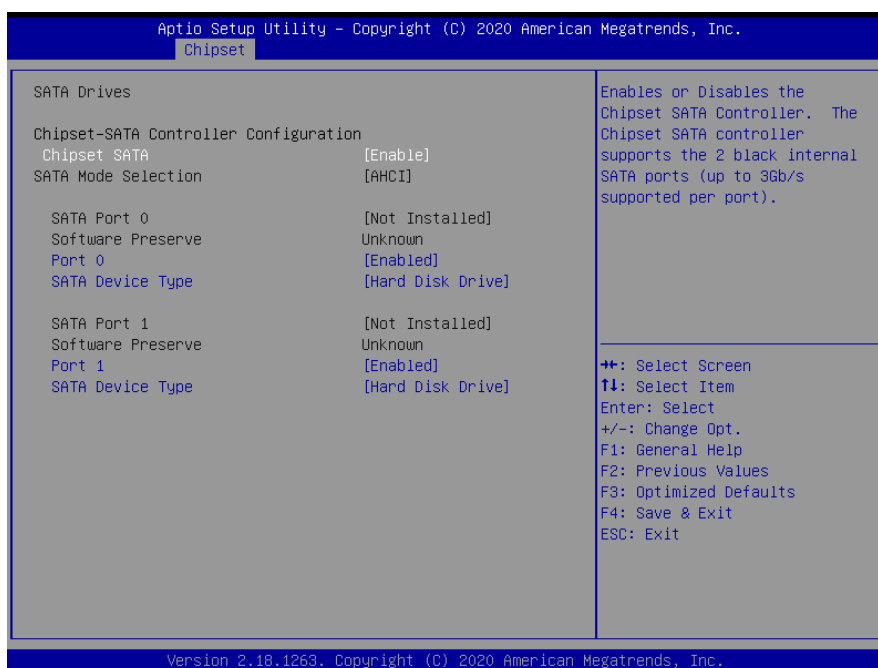| Item	Option	Description
PCI Express Root Port 5(mPCIe)	Disable Enable**[Default]**	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disable: Disable PCIe root port.
ASPM	Disable**[Default]** L0s L1 L0sL1 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.

3.6.3.4.2.4 PCI Express Root Port 6(mPCIe half)
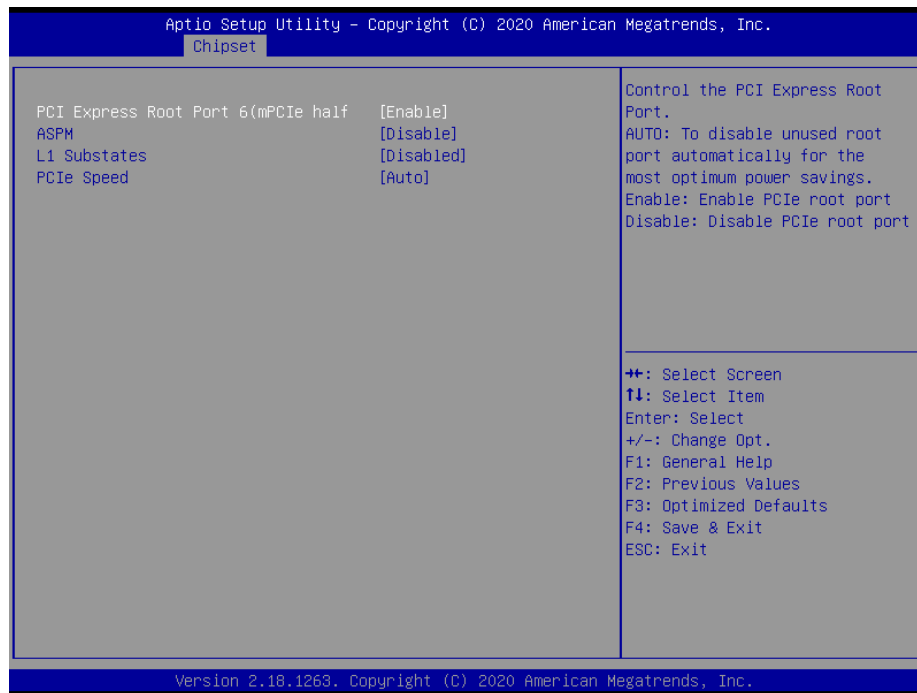
Item	Option	Description
PCI Express Root Port 6(mPCIe half)	Disable Enable**[Default]**	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disable: Disable PCIe root port.
ASPM	Disable**[Default]** L0s L1 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.

3.6.3.4.3 SATA Drives

```
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                  Chipset

     SATA Drives                                              Enables or Disables the
                                                             Chipset SATA Controller.  The
     Chipset-SATA Controller Configuration                   Chipset SATA controller
      Chipset SATA                    [Enable]               supports the 2 black internal
     SATA Mode Selection              [AHCI]                 SATA ports (up to 3Gb/s
                                                             supported per port).
       SATA Port 0                    [Not Installed]
       Software Preserve              Unknown
       Port 0                         [Enabled]
       SATA Device Type               [Hard Disk Drive]

       SATA Port 1                    [Not Installed]
       Software Preserve              Unknown
       Port 1                         [Enabled]              →←: Select Screen
       SATA Device Type               [Hard Disk Drive]      ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit

                Version 2.18.1263. Copyright (C) 2020 American Megatrends, Inc.
```

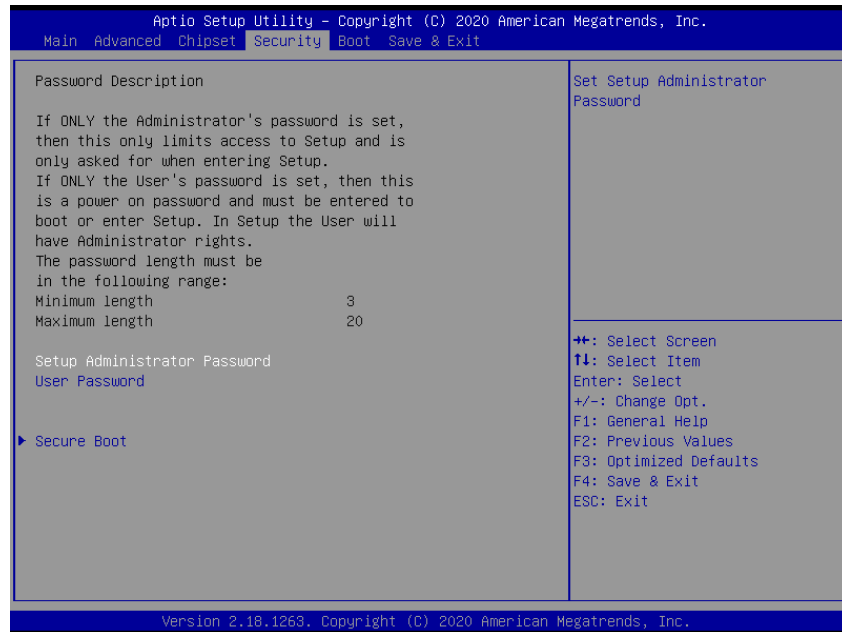| Item	Option	Description
Chipset SATA	Enable**[Default]** Disable	Enables or Disables the Chipset SATA Controller. The Chipset SATA controller supports the 2 black internal SATA ports (up to 3Gb/s supported per port).
Port 0/1	Disabled Enabled**[Default]**	Enable or Disable SATA Port.
SATA Device Type	Hard Disk Drive**[Default]** Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

3.6.3.4.4 USB Configuration

```
                Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
                  Chipset

       XHCI Pre-Boot Driver            [Disable]             Enable/Disable XHCI Pre-Boot
                                                             Driver support.

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

                Version 2.18.1263. Copyright (C) 2020 American Megatrends, Inc.
```

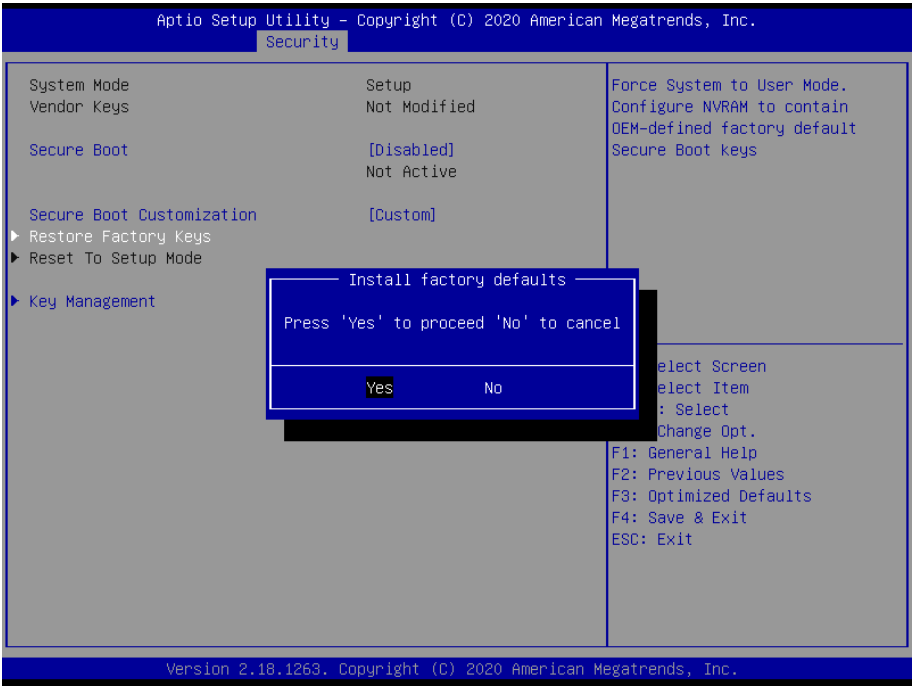| Item	Option	Description
XHCI Pre-Boot Driver	Enable Disable**[Default]**	Enable/Disable XHCI Pre-Boot Driver support.

3.6.4 Security

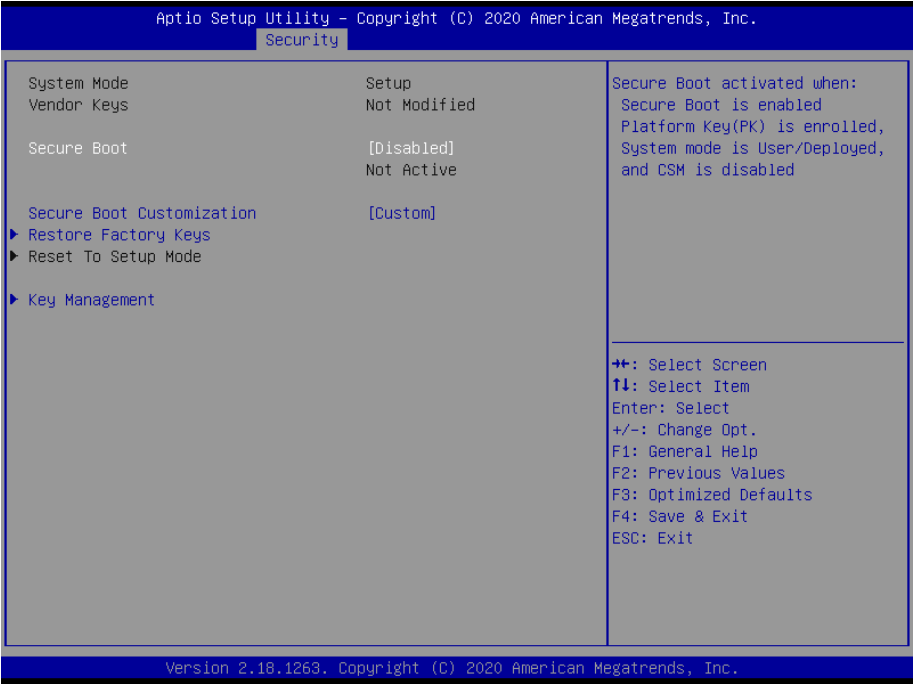

- ● **Setup Administrator Password**

Set setup Administrator Password

- ● **User Password**

Set User Password

3.6.4.1   Secure Boot

```
            Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
                            Security

    System Mode                     Setup                Secure Boot activated when:
    Vendor Keys                     Not Modified          Secure Boot is enabled
                                                          Platform Key(PK) is enrolled,
    Secure Boot                     [Disabled]            System mode is User/Deployed,
                                    Not Active            and CSM is disabled

    Secure Boot Customization       [Custom]
  ▶ Restore Factory Keys
  ▶ Reset To Setup Mode

  ▶ Key Management

                                                         ↔: 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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```

```
            Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
                            Security

    System Mode                     Setup                Force System to User Mode.
    Vendor Keys                     Not Modified          Configure NVRAM to contain
                                                          OEM-defined factory default
    Secure Boot                     [Disabled]            Secure Boot keys
                                    Not Active

    Secure Boot Customization       [Custom]
  ▶ Restore Factory Keys
  ▶ Reset To Setup Mode

  ▶ Key Management
                    ┌──── Install factory defaults ────┐
                    │  Press 'Yes' to proceed 'No' to cancel  │
                    │                                   │      elect Screen
                    │           Yes          No         │      elect Item
                    └───────────────────────────────────┘    : Select
                                                              Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit



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```

Item	Option	Description
Secure Boot	Disabled**[Default]** Enabled	Secure Boot activated when Platform Key(PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.
Secure Boot Customization	Standard Custom**[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.

3.6.4.1.1   Key Management
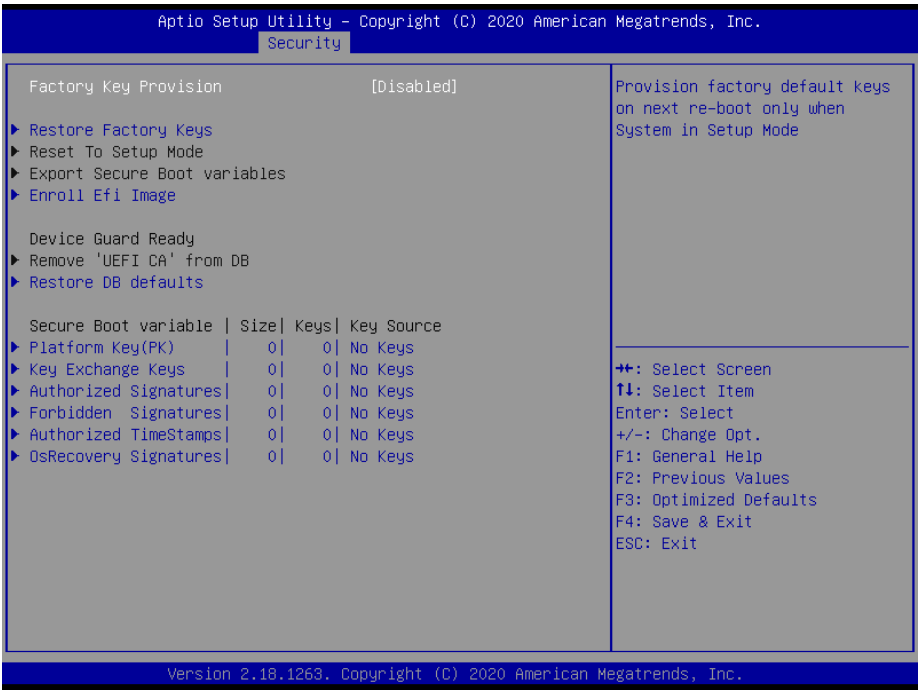
Item	Options	Description
Factory Key Provision	Disabled**[Default]** Enabled	Provision factory default keys on next re-boot only when System in Setup Mode.

3.6.5   Boot
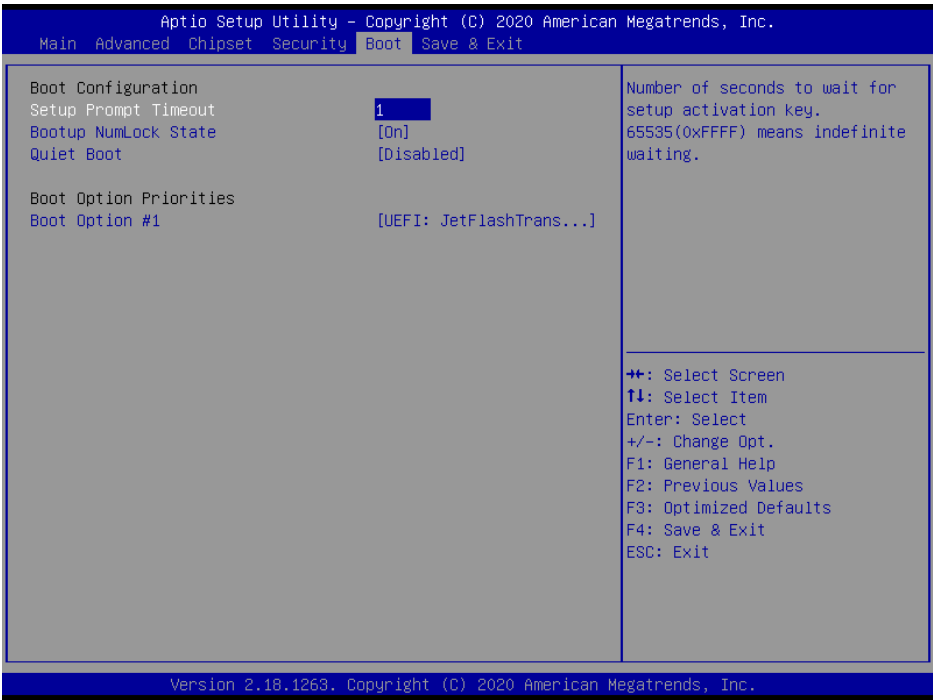
Item	Option	Description
Setup Prompt Timeout	1~ 65535	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On**[Default]** Off	Select the Keyboard NumLock state
Quiet Boot	Disabled**[Default]** Enabled	Enables or disables Quiet Boot option
Boot Option #1	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.
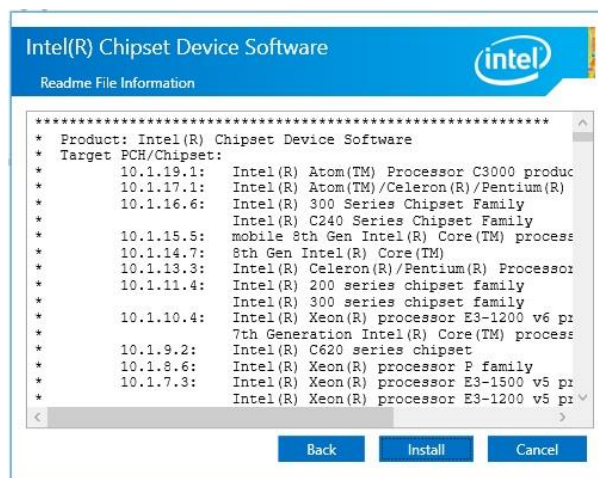
Step 3. Click **Install**.

Step1. Click **Next**.

Step 4. Complete setup.

Step 2. Click **Accept**.

4.2 Install TXE 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.
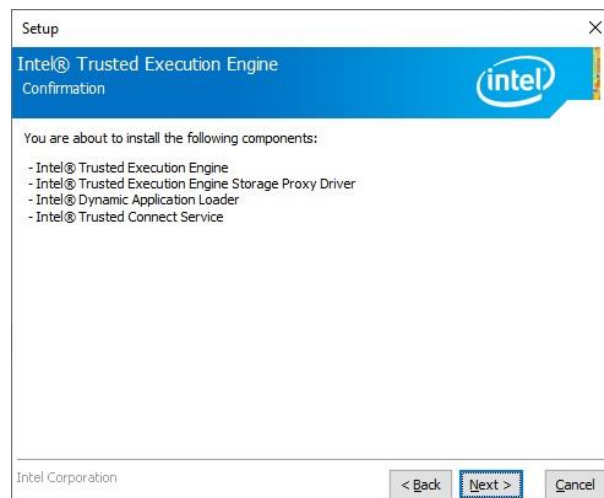
Step 3. Click **Next** to continue installation.
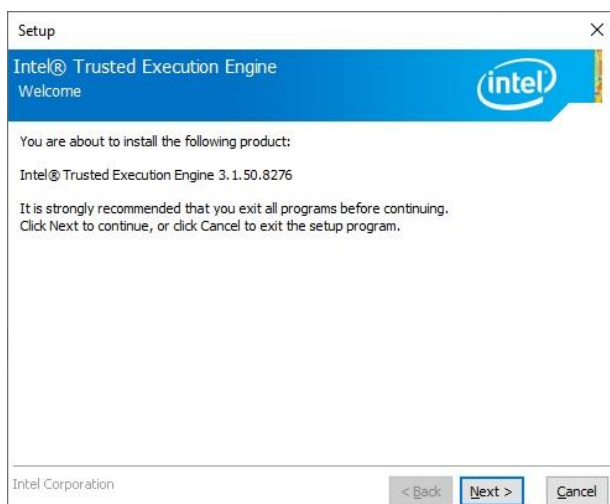
Step1. Click **Next** to start installation.
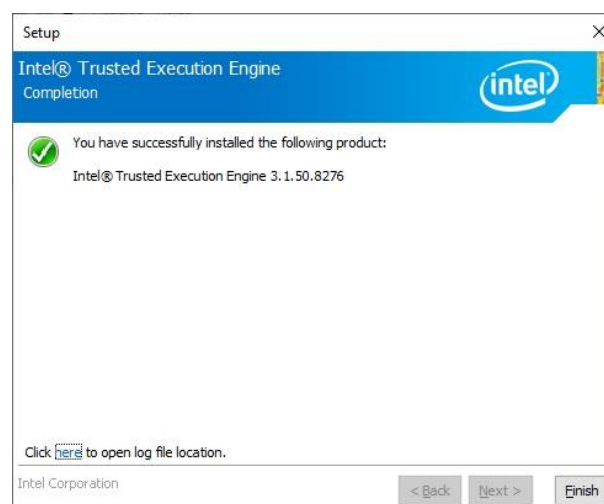
Step 4. Click **Finish** to complete setup.
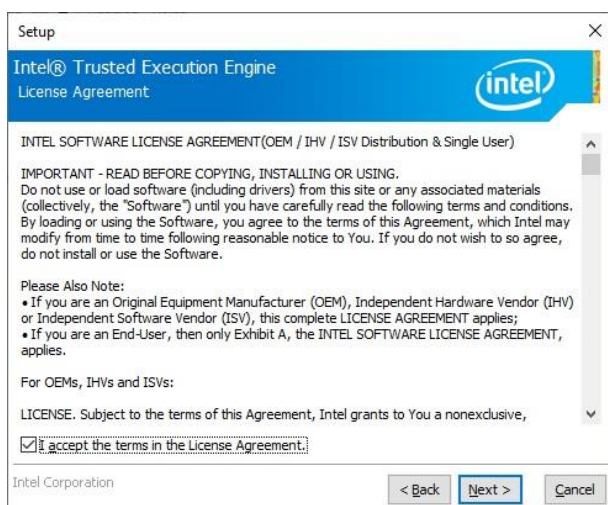
Step 2. Click **Next**.

4.3 Install VGA Driver

All drivers can be found on the Avalue Official Website:

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

Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.
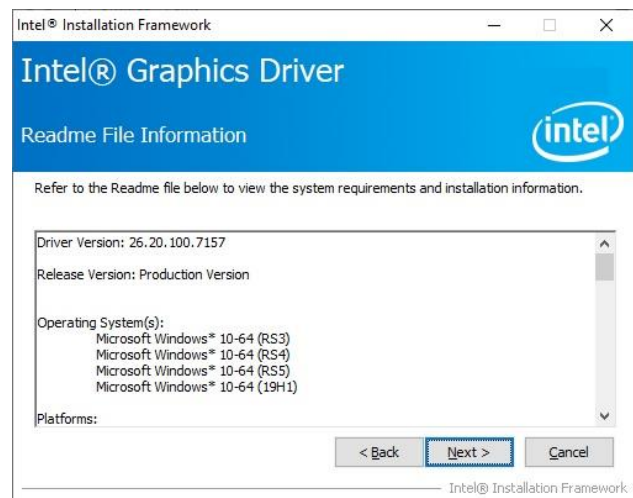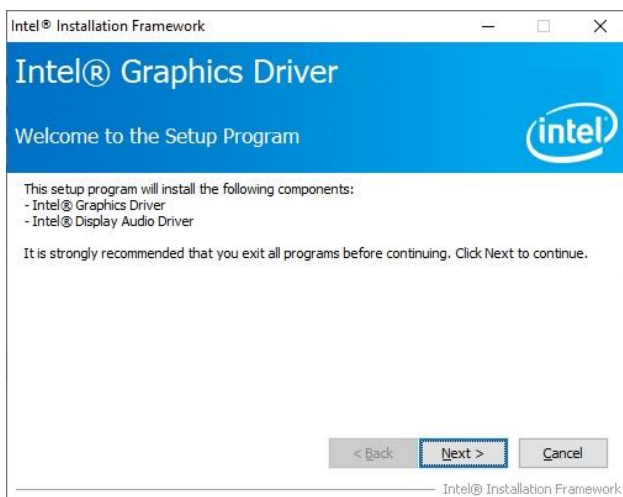
Step 3. Click **Next.**
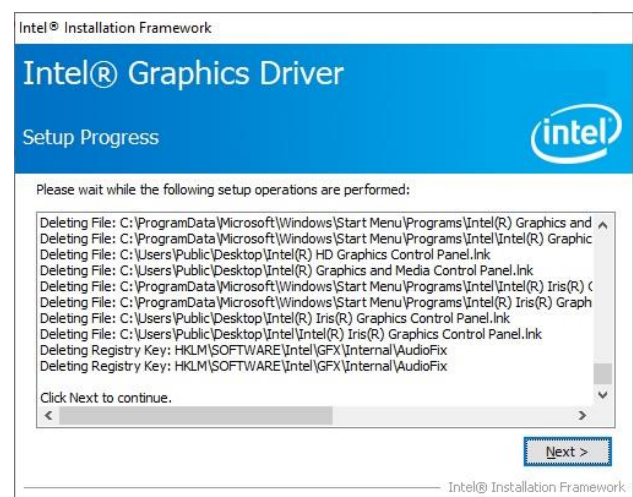
Step 1. Click **Next**.

Step 4. Click **Next**.
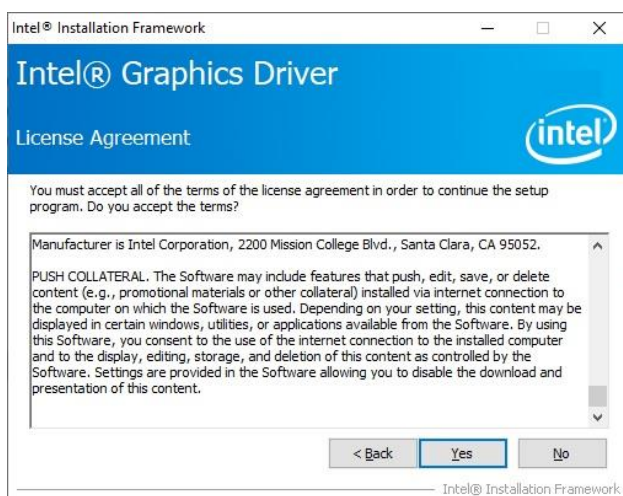
Step 2.
Click **Yes** to accept license agreement.
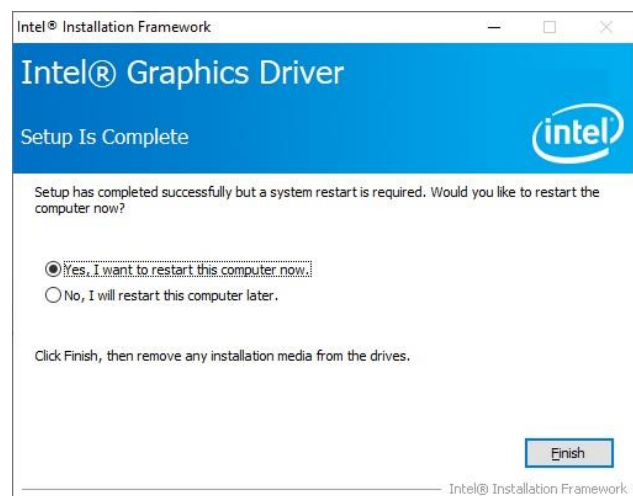
Step 5. Click **Finish** to complete setup.

4.4 Install Audio Driver (For Realtek ALC892)

All drivers can be found on the Avalue Official Website:

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

Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.
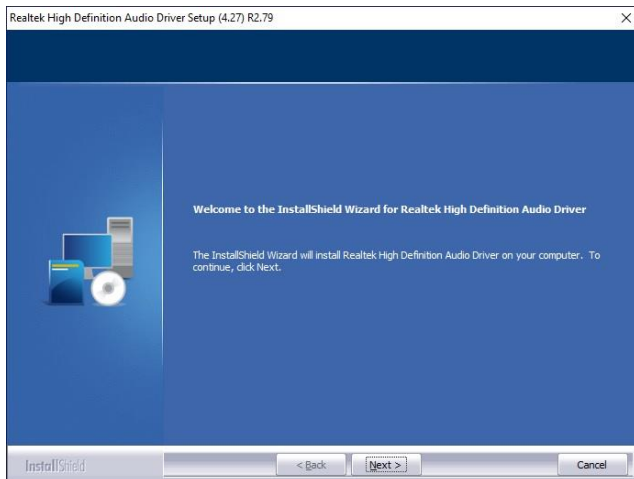
Step 1. Click **Next** to continue setup.
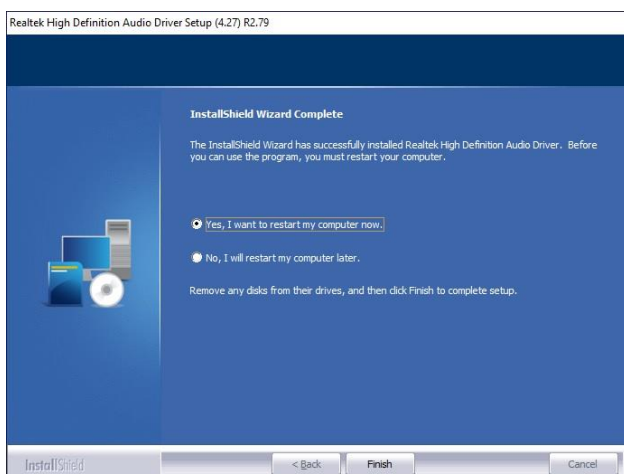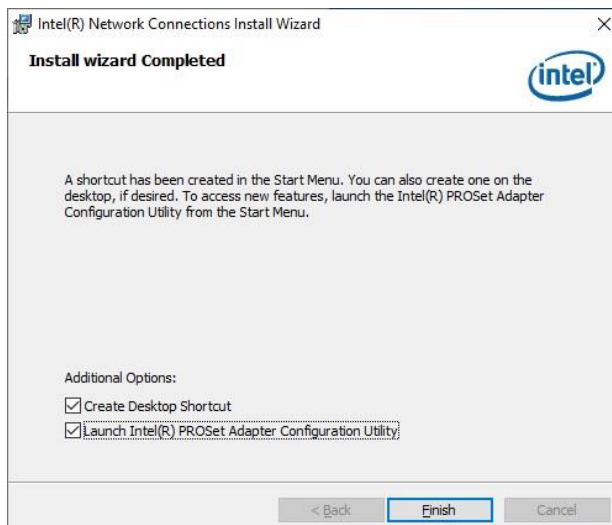

Step 2. Click **Finish** to complete the setup.

4.5 Install Ethernet 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.
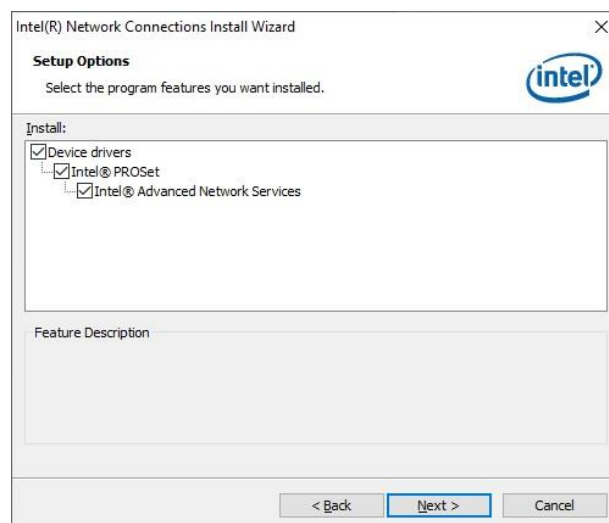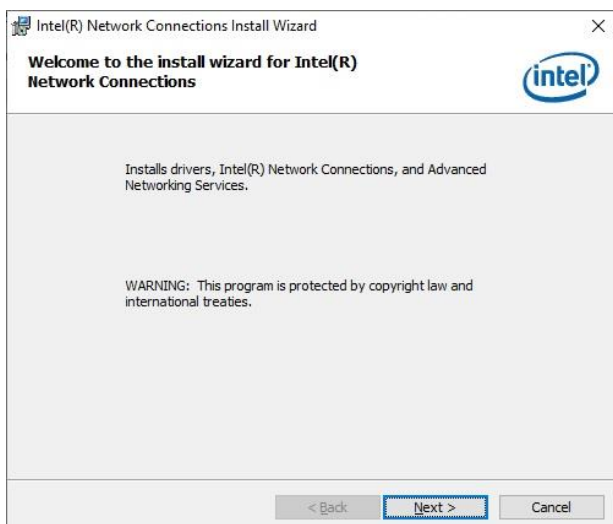
Step 3. Click **Next**.

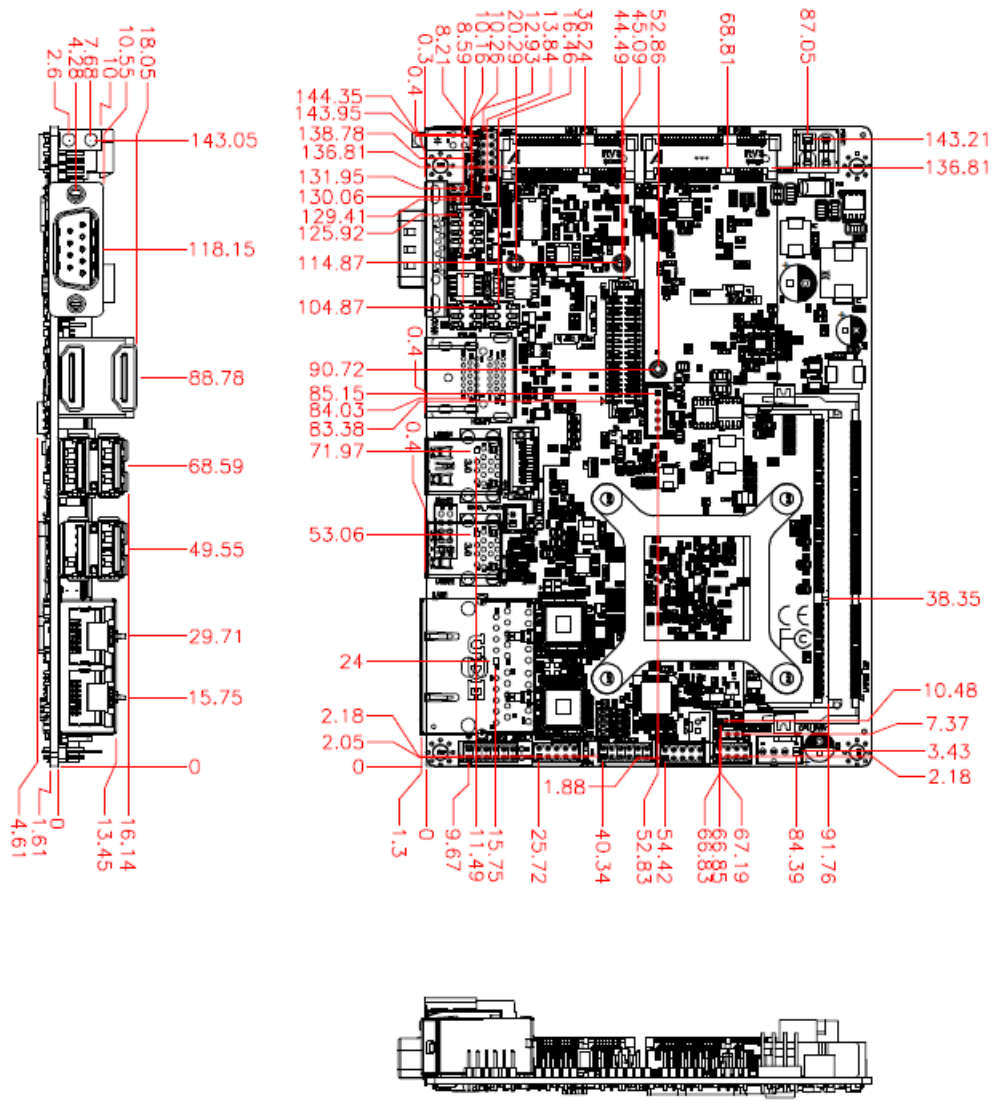**Step 1.** Click **Next** to proceed.
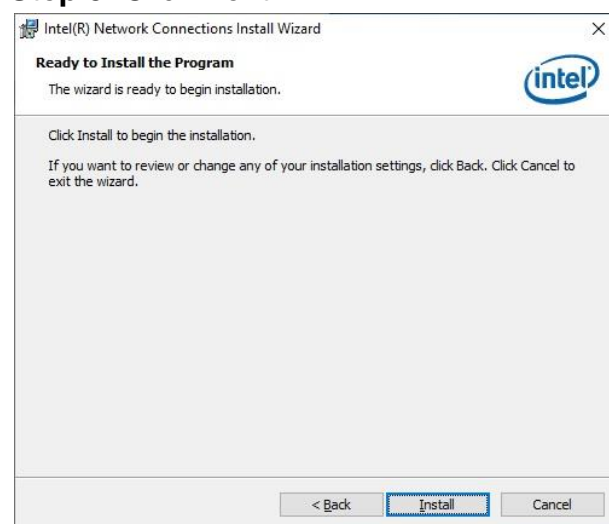
Step 4. Click **Install**.
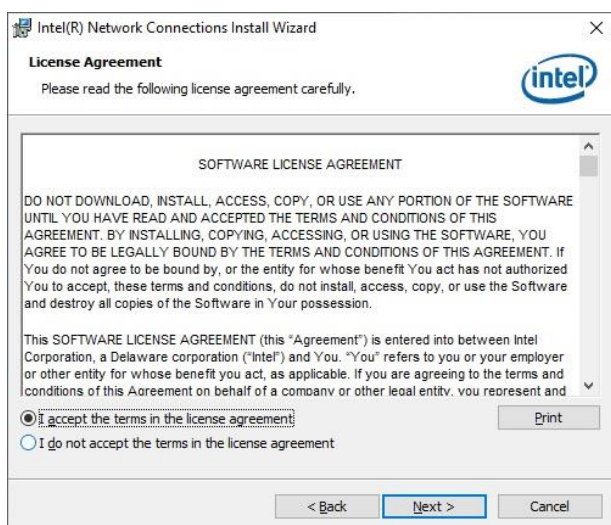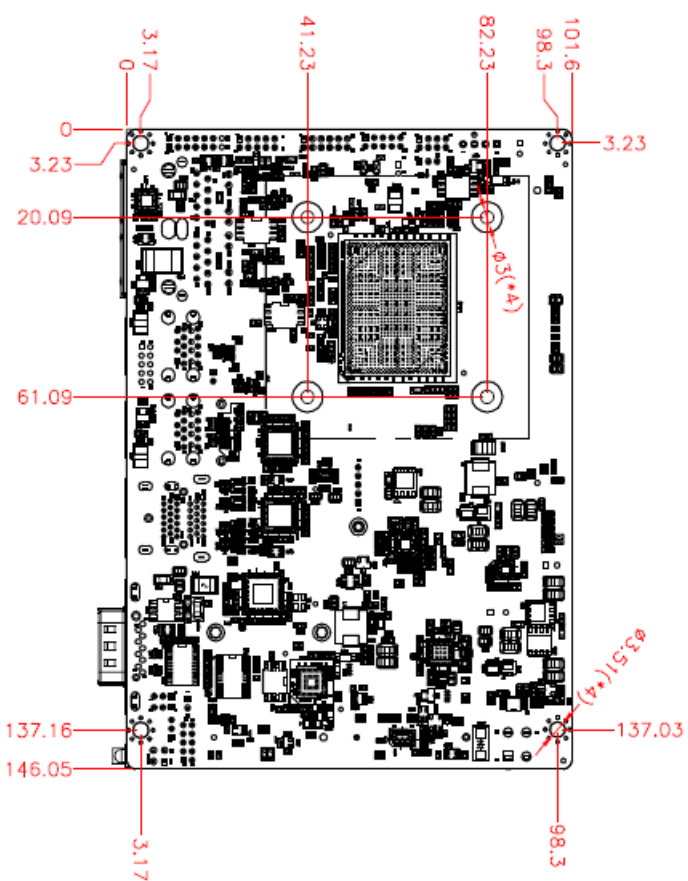
Step 2. Click **Next**.

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

5. Mechanical Drawing

Unit: mm

Unit: mm