EBM-SKLU

Intel® 6th Generation ULT Processor 5.25" Mini Module

User's Manual

2nd Ed –28 April 2016

Part No. E2047582701R

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.

Copyright Notice

Trademark Acknowledgement

Brand and product names are trademarks or registered trademarks of their respective owners.

Disclaimer

Avalue Technology Inc. reserves the right to make changes, without notice, to any product, including circuits and/or software described or contained in this manual in order to improve design and/or performance. Avalue Technology assumes no responsibility or liability for the use of the described product(s), conveys no license or title under any patent, copyright, or masks work rights to these products, and makes no representations or warranties that

these products are free from patent, copyright, or mask work right infringement, unless otherwise specified. Applications that are described in this manual are for illustration purposes only. Avalue Technology Inc. makes no representation or warranty that such application will be suitable for the specified use without further testing or modification.

Life Support Policy

Avalue Technology's PRODUCTS ARE NOT FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE PRIOR WRITTEN APPROVAL OF Avalue Technology Inc.

As used herein:

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

    2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

A Message to the Customer

Avalue Customer Services

Each and every Avalue's product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Avalue device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Avalue has come to be known.

Your satisfaction is our primary concern. Here is a guide to Avalue's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. So please consult the user's manual first.

To receive the latest version of the user's manual; please visit our Web site at:
http://www.avalue.com.tw/

Product Warranty

Avalue warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

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

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

Content

1. Getting Started

1.1 Safety Precautions

Warning!

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

Caution!

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

1.2 Packing List

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

- 1 x EBM-SKLU Intel® 6th Generation ULT Processor 5.25" Mini Module
- 1 x Driver/Utility DVD-ROM

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

1.3 Document Amendment History

Revision	Date	By	Comment
1st	January 2016	Avalue	Initial Release
2nd	April 2016	Avalue	Update Setting Jumpers & Connectors

1.4 Manual Objectives

This manual describes in details Avalue Technology EBM-SKLU 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 EBM-SKLU 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 6th generation Intel® Skylake i7/i5/i3 2+2e SoC ULT Processor (15W)
BIOS	AMI uEFI BIOS,128 Mbit SPI Flash ROM iAMTsupported
I/O Chip	EC(IT8528E)
System Memory	Two 260-pin DDR4 SODIMM (non ECC) support up to 32GB
SSD	mSATA from MiniPCIe
Watchdog Timer	H/W Reset, 1sec. ~ 65535sec. and 1sec./step
H/W Status Monitor	Monitoring System Temperature, Voltage and FAN Status with Auto Throttling Control
Expansion	1 x Mini PCIe connector (for PCIe &USB2.0 &SIM Card) 1 x Mini PCIe connector (for MSATA)
Built-in Touch screen (optional)	EETI ETP-CP-MER4485XRU 1 x 5-pin 2.54mm Pin Header (0 Degree Right Angle Pin Header)
I/O	
MIO	1 x SATA III (1 x 1x2 pin wafer w/2.0mm pitch for SATA Power) 2 x DB-9 male connector for COM1/2 (RS-232/422/485 selected by jumper w/ Auto Flow), 4 x RS-232 (Pin Header) LPC x 1, SPI x 1
USB	4 x USB3.0 (dual deck USB connector for 2 USB3.0 port), 4 x USB 2.0 (Wafer)
GPIO	16bit GPIO (2 x 10 pin wafer w/2.0mm pitch) 8 x In, 8 x Out
	*1 x SIM socket *Backlight 1. 1 x 2 x 3 pin w/2.0mm pitch (VR voltage adjustment)-- 1/3/5 pin connected to EC 2. 1 x 1 x 5 pin wafer w/2.0mm pitch-- Please check Backlight sheet 3. 1 x 1 x 3 pin header w/2.0mm pitch(DC/PWM)-- 1pin for PWM,3pin for DC *1 x 6pin DIP Switch for COM1 & COM2 (RS232/422/485 selection),AT/ATX, Touch on/off
Display	
Chipset	Intel® Skylake U Processor integrated Graphics
Resolution	LVDS: 1920 x 1080@60Hz HDMI: 3840 x 2160@24Hz
Multiple Display	Dual display
HDMI	HDMI 1.4b
LCD Interface	Dual channel 24-bit LVDS (CH7511B) 2 x 20 pin Hirose Connector for (Optional BOM for 1 x internal eDP or 1 x CH7511B LVDS for 2 x 24-bit.)

Audio	
AC97 Codec	Realtek ALC233 HD Supports 2.1-CH Audio
Audio Amp	2W Per Channel Line-Out and Amp.
Ethernet	
LAN Chip	1 x Intel I210AT GbE controller 1 x Intel I219LM Gigabit Ethernet PHY
Ethernet Interface	10/100/1000 Base-Tx compatible
Internal I/O Connectors	
Fan	1 x 4 pin header w/2.54mm pitch
Buzzer	Onboard
CMOS Battery	CR2032
Audio	2 x 1 x 2 wafer w/2.0mm pitch for AMP (if use 2.1 Audio Codec)
COM	4 x RS232
Rear I/O Connectors	
USB	4 x USB3.0
LAN	RJ-45 connectors for two GbE ports (Default one RJ-45)
HDMI	1 x HDMI (HDMI type A connector)
LED	1 x dual deck LED: Green indicator: power-on Yellow indicator: HDD active
Others	1 x Reset button
Mechanical & Environmental	
Power Requirement	+11.4V ~ 26V
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 board level
Storage Temp.	-20°C ~ 70°C (-4°F ~ 140°F)
Operating Humidity	0% ~ 90% relative humidity, non-condensing
Size (L x W)	8" x 5.75" (203mm x 146mm)
Weight	0.55lb (0.25kg)

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 EBM-SKLU.
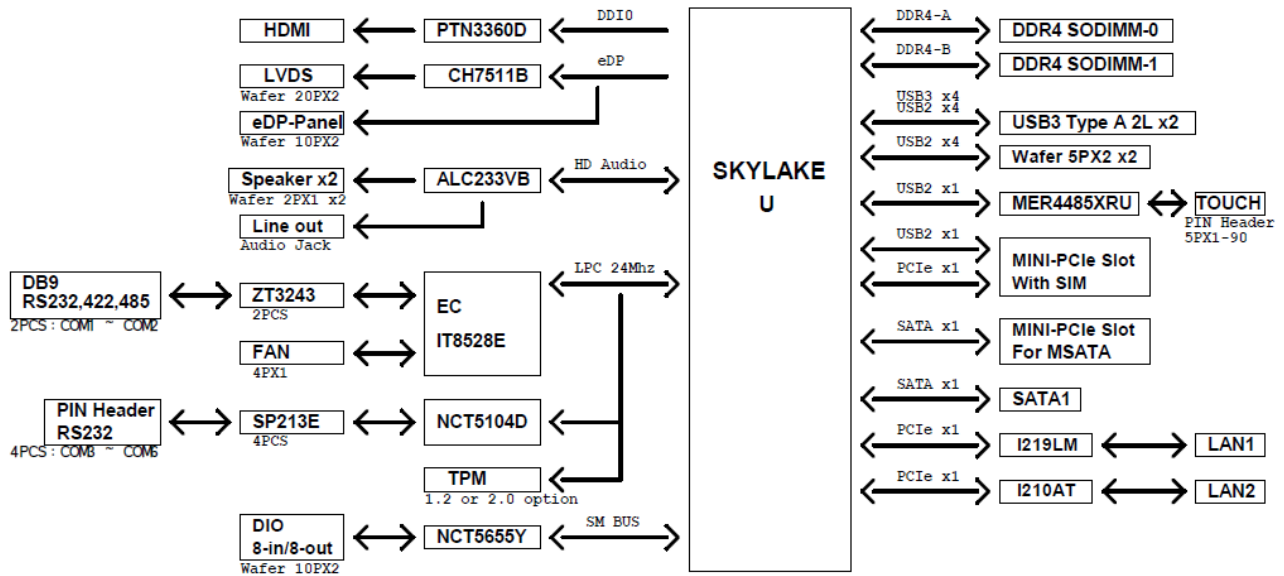
2. Hardware Configuration

2.1 Product Overview
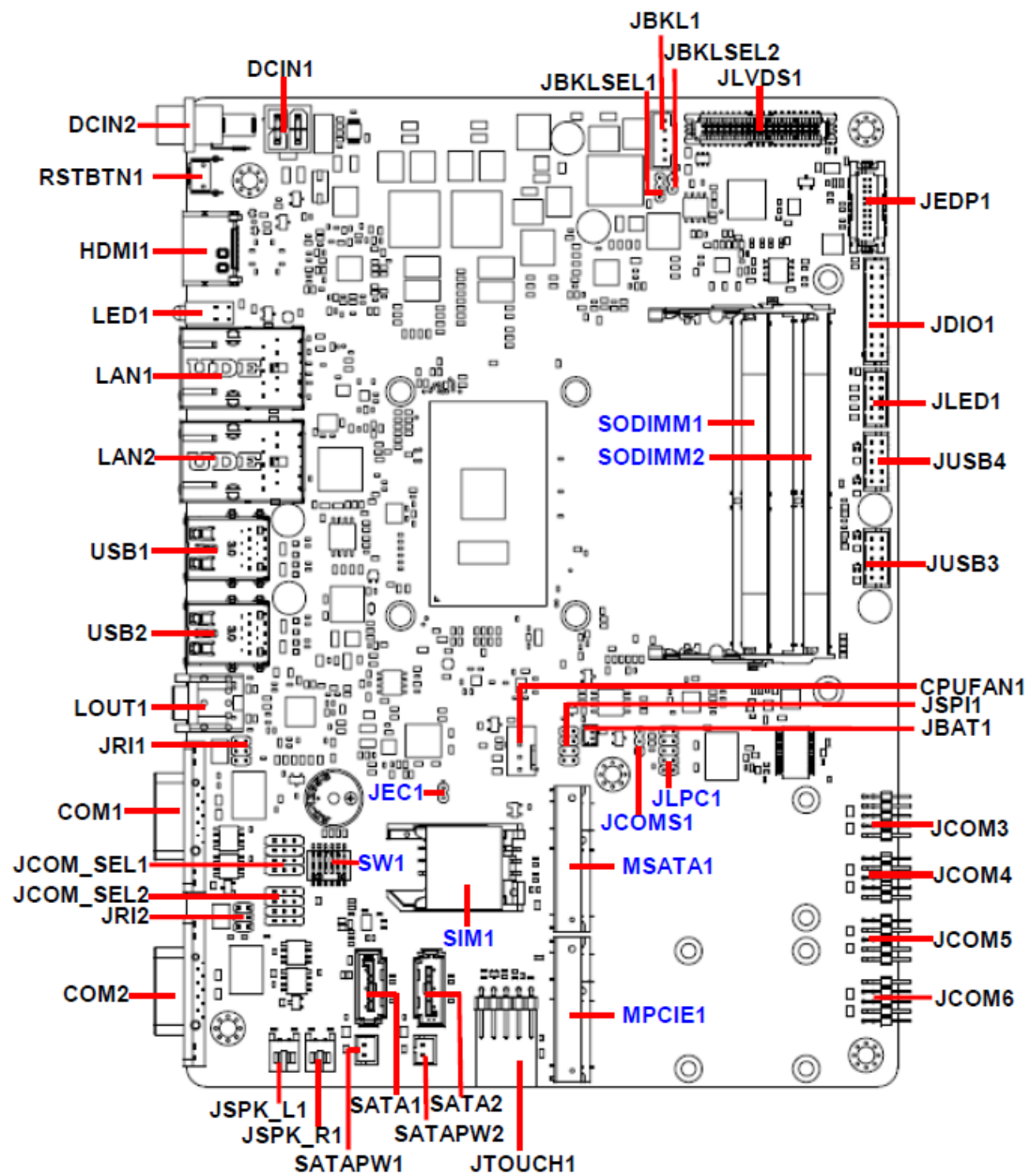
2.2 Jumper and Connector List

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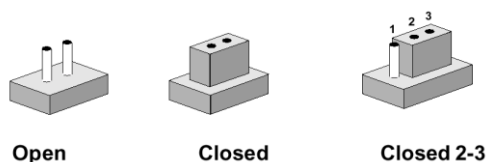
The jumper settings are schematically depicted in this manual as follows:

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
JRI1/2	Serial port 1/2 pin9 signal select	3 x 2 header, pitch 2.00mm
JCOM_SEL1	Serial port 1 – RS232/422/485 mode select	4 x 3 header, pitch 2.00mm
JCOM_SEL2	Serial port 2 – RS232/422/485 mode select	4 x 3 header, pitch 2.00mm
JBKLSEL1	LCD brightness DC/PWM mode select 1	3 x 1 header, pitch 2.00mm
SW1	Multi-function select	DIP switch 6pin
JCOMS1	Clear CMOS	3 x 1 header, pitch 2.00mm

Connectors

Label	Function	Note
JBKLSEL2	LCD brightness DC/PWM mode select 2	2 x 1 header, pitch 2.00mm
JBKL1	LCD Inverter connector	5 x 1 wafer, pitch 2.00mm

CPUFAN1	CPU fan connector	4 x 1 wafer, pitch 2.54mm
COM1/2	Serial Port 1/2 connector	D-sub 9 pin, male
JCOM3/4/5/6	Serial Port 3/4/5/6 connector	5 x 2 header, pitch 2.00mm
JDIO1	General purpose I/O connector	10 x 2 wafer, pitch 2.00mm
JLED1	Front Panel connector	5 x 2 wafer, pitch 2.00mm
LED1	HDD/Power LED indicator	
JLVDS1	LVDS connector	DIN 40-pin wafer, pitch 1.25mm
JTOUCH1	Touch panel connector	5 x 1 header, pitch 2.54mm
USB1/2	4 x USB3.0 connector	
JUSB3	USB connector	5 x 2 wafer, pitch 2.00mm
JUSB4	USB connector	5 x 2 wafer, pitch 2.00mm
LAN1/2	RJ-45 Ethernet 1/2	
JBAT1	Battery connector	2 x 1 wafer, pitch 1.25mm
SODIMM1/2	DDR4 SODIMM socket	
JSPK_L1	Amplifier connector	2 x 1 wafer, pitch 2.00mm
JSPK_R1	Amplifier connector	2 x 1 wafer, pitch 2.00mm
MSATA1	Full size mPCIe Slot	
MPCIE1	Mini-PCIe_connector	
JLPC1	LPC connector	5 x 2 header, pitch 2.00mm
DCIN1	Power connector	2 x 2 wafer, pitch 4.20mm
DCIN2	Power connector	
RSTBTN1	Reset button	
JSPI1	SPI connector	4 x 2 header, pitch 2.00mm
JEC1	EC Debug connector	2 x 1 header, pitch 2.00 mm
SATAPW1/2	SATA Power connector 1/2	2 x 1 wafer, pitch 2.00mm
SATA1/2	Serial ATA connector 1/2	
SIM1	SIM card slot	
HDMI1	HDMI connector	
LOUT1	Audio line-out connector	
JEDP1	eDP_Panel connector	10 x 2 wafer, pitch 1.25mm

2.3 Setting Jumpers & Connectors

2.3.1   Multi-function select (SW1)
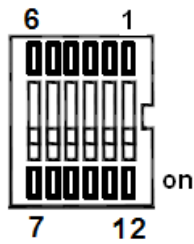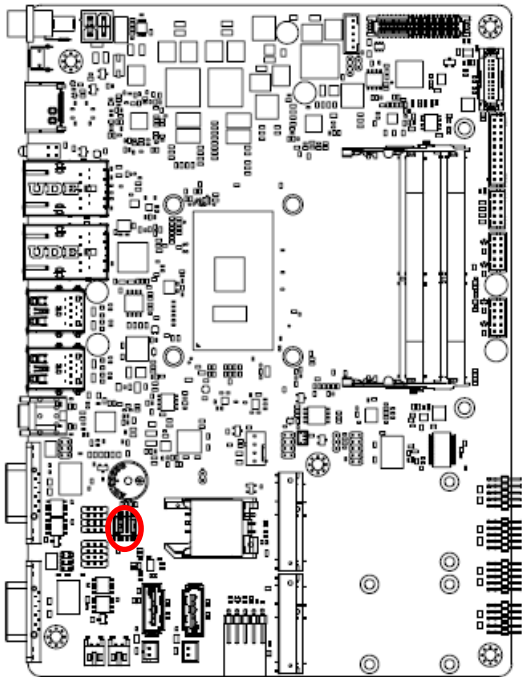
In Serial Port 1 mode

	RS-232	RS-422	RS-485
1	OFF	ON	ON
2	ON	OFF	ON

In Serial Port 2 mode

	RS-232	RS-422	RS-485
3	OFF	ON	ON
4	ON	OFF	ON

	ON	OFF
5	AT SEL	ATX SEL
6	Touch off	Touch on

2.3.2   Serial port 1/2 RS-232/422/485 mode select (JCOM_SEL1/2)
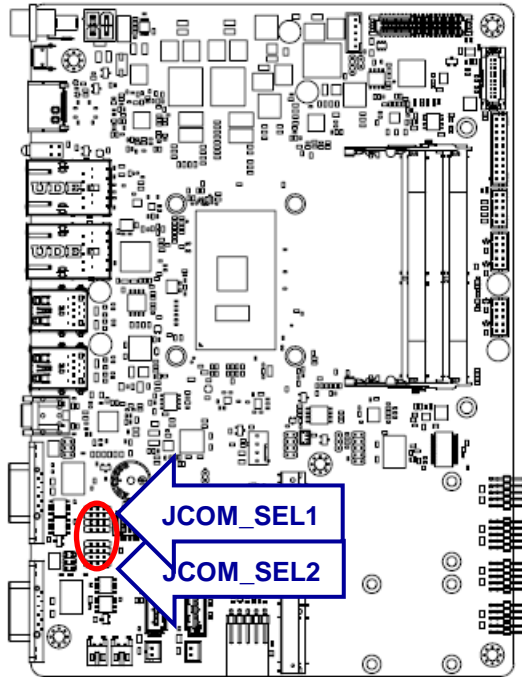
RS-232*
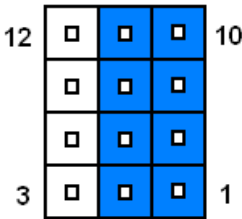
RS-422/ 485
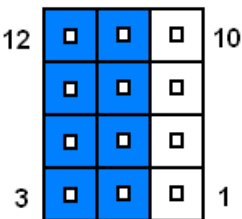
* Defaul

2.3.3   Serial port 1/ 2 pin9 signal select (JRI1/ JRI2)

Ring*

+5V

+12V
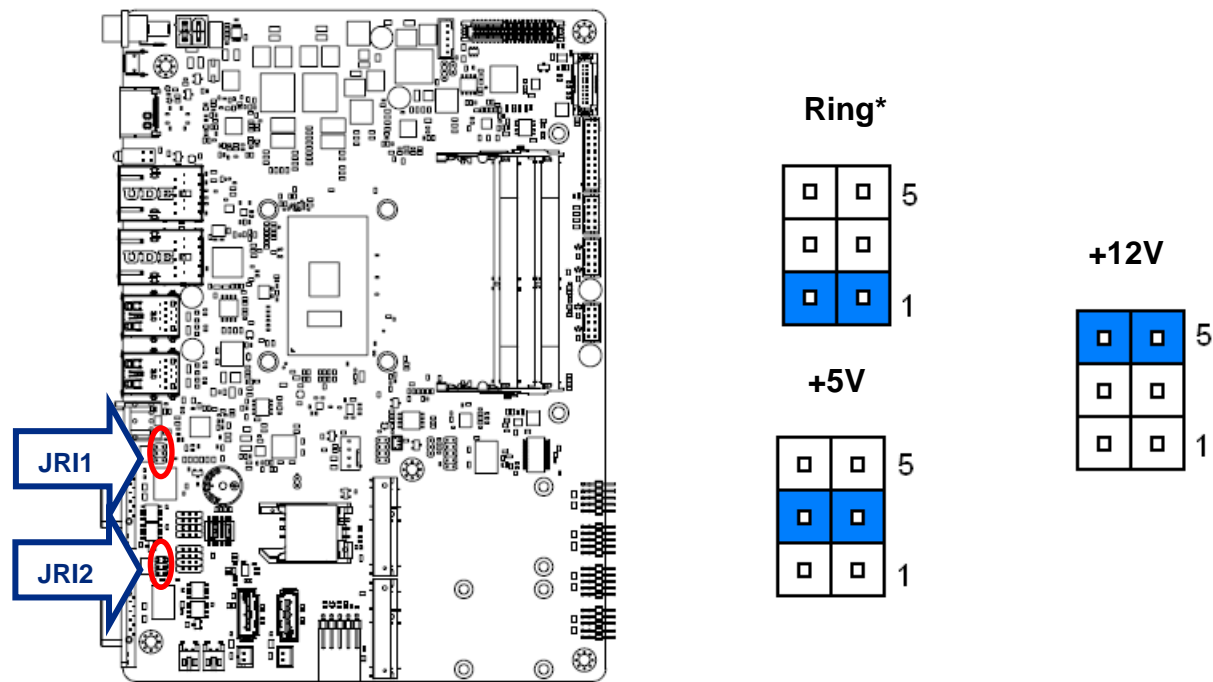
* Default

2.3.4   Clear CMOS (JCOMS1)

Normal*

Clear CMOS
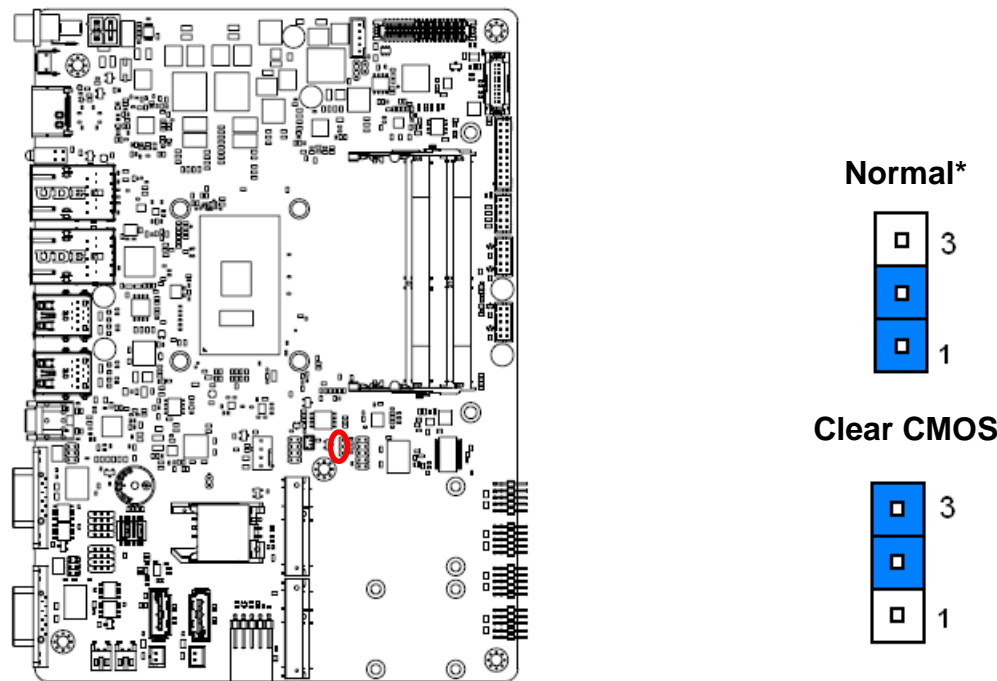
* Default

2.3.5 LCD brightness DC/PWM mode select 1/2 (JBKLSEL1/2)
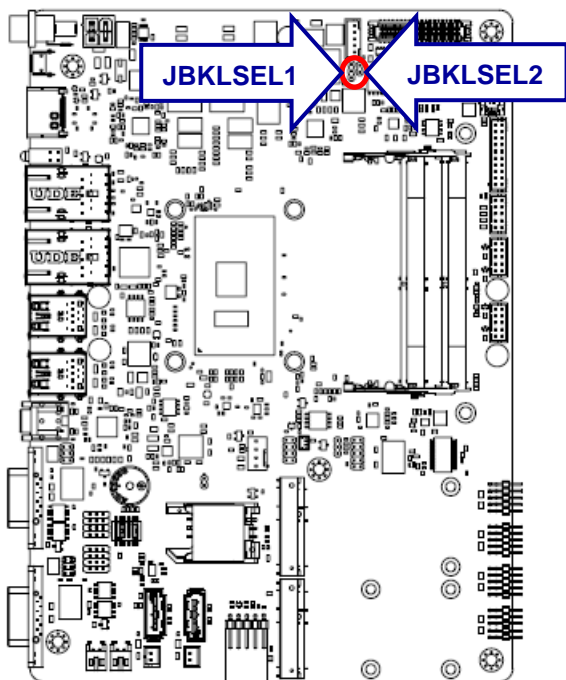
PWM Mode*
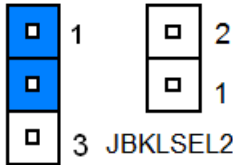
DC Mode
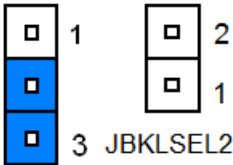
OS Driver
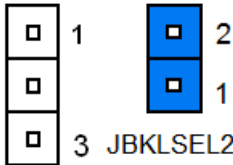
* Default

Note:

JBKLSEL1/2 can't be used simultaneously.

2.3.6 LCD Inverter connector (JBKL1)
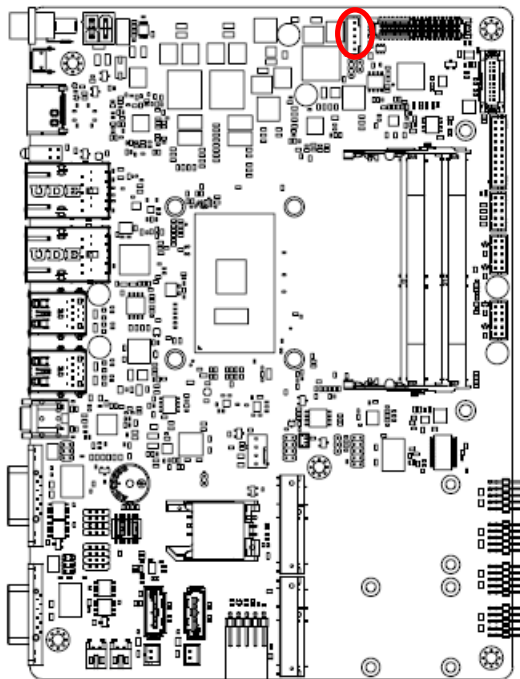
Signal	PIN
+12V	1
GND	2
LVDS_BKLT_EN	3
LVDS_BKLTCTL	4
+5V	5

2.3.7 CPU fan connector (CPUFAN1)
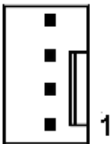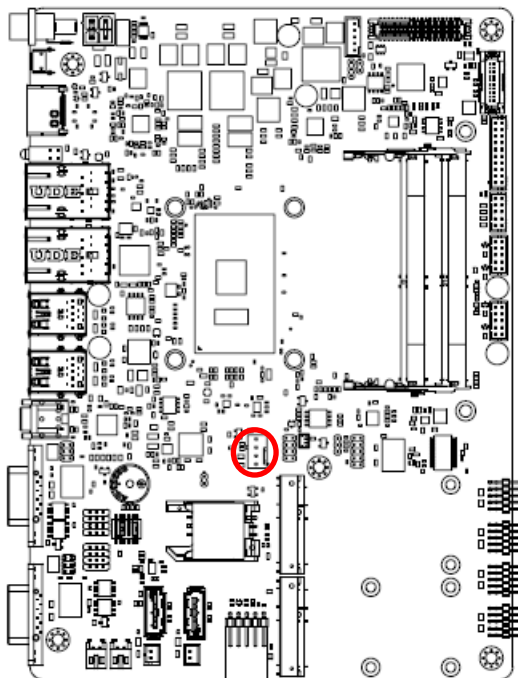
Signal	PIN
+5V	4
EC_TACH0	3
+12V	2
GND	1

2.3.8 Serial port 3/4/5/6 connector (JCOM3/JCOM4/JCOM5/JCOM6)
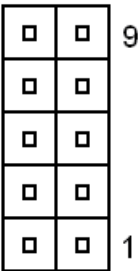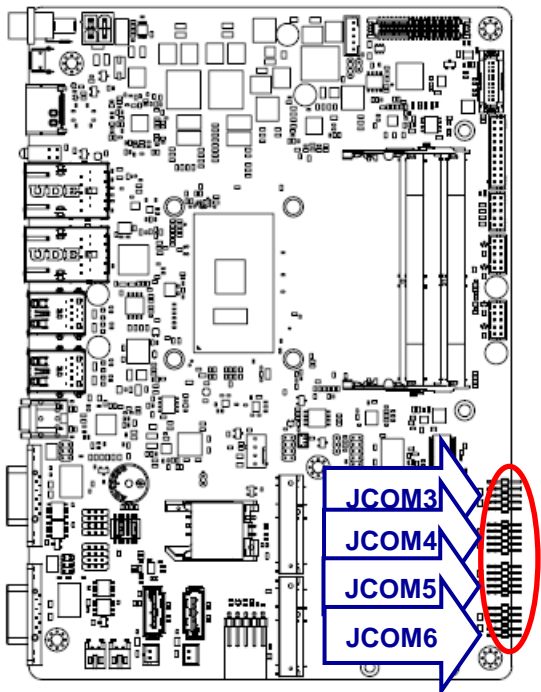
Signal	PIN	PIN	Signal
NC	10	9	COM_RI#
COM_CTS#	8	7	COM_RTS#
COM_DSR#	6	5	GND
COM_DTR#	4	3	COM_TXD
COM_RXD	2	1	COM_DCD#

2.3.9   eDP_Panel connector (JEDP1)
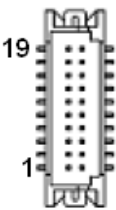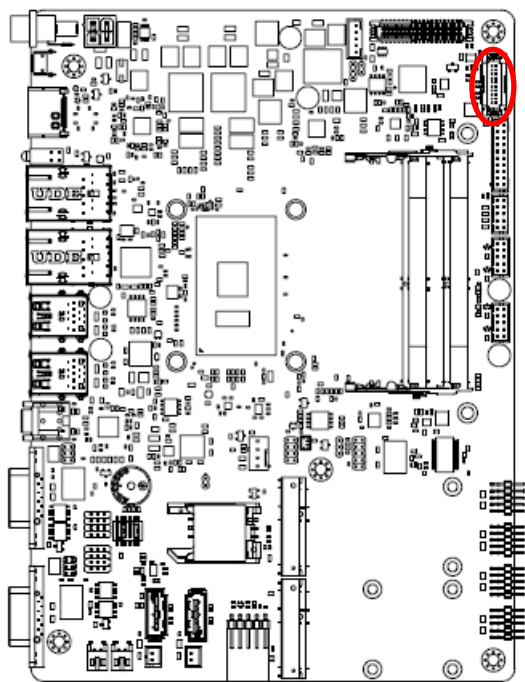
Signal	PIN	PIN	Signal
+V3512_EDP	19	20	+V3512_EDP
EDP_Panel_TXP2	17	18	EDP_Panel_HPD
EDP_Panel_TXN2	15	16	GND
GND	13	14	EDP_Panel_AUXP
EDP_Panel_TXP1	11	12	EDP_Panel_AUXN
EDP_Panel_TXN1	9	10	GND
GND	7	8	NC
EDP_Panel_TXP0	5	6	EDP_Panel_TXP3
EDP_Panel_TXN0	3	4	EDP_Panel_TXN3
GND	1	2	GND

2.3.10   Front Panel connector (JLED1)
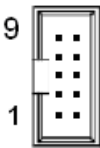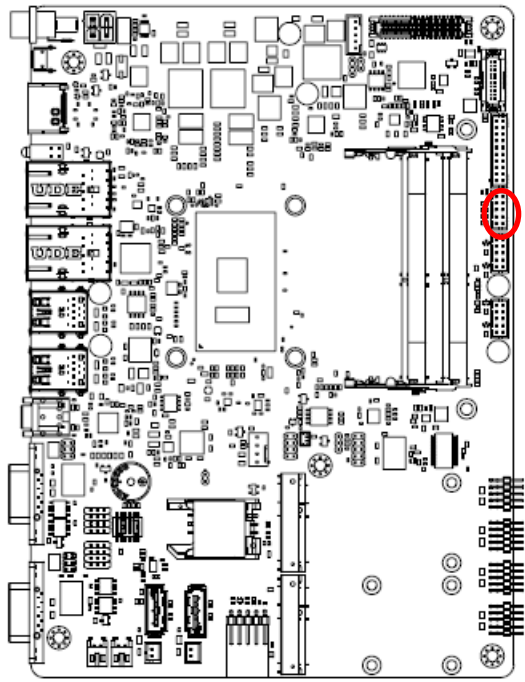
Signal	PIN	PIN	Signal
GND	9	10	PWRBTN#
+5VSB	7	8	LAN2_ACT#_LED
+5VSB	5	6	LAN1_ACT#_LED
+5V	3	4	HDD_LED#
+5VSB	1	2	PWR_LED-

2.3.11   General purpose I/O connector (JDIO1)
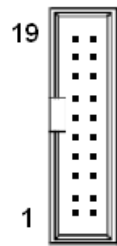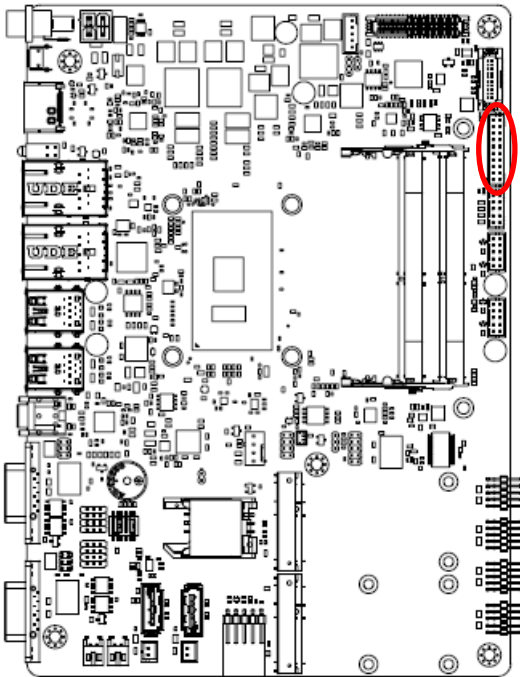
Signal	PIN	PIN	Signal
+5V	19	20	GND
SMB_DATA_5655	17	18	SMB_CLK_5655
DIO_GP27	15	16	DIO_GP17
DIO_GP26	13	14	DIO_GP16
DIO_GP25	11	12	DIO_GP15
DIO_GP24	9	10	DIO_GP14
DIO_GP23	7	8	DIO_GP13
DIO_GP22	5	6	DIO_GP12
DIO_GP21	3	4	DIO_GP11
DIO_GP20	1	2	DIO_GP10

2.3.12   Touch panel connector (JTOUCH1)
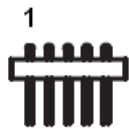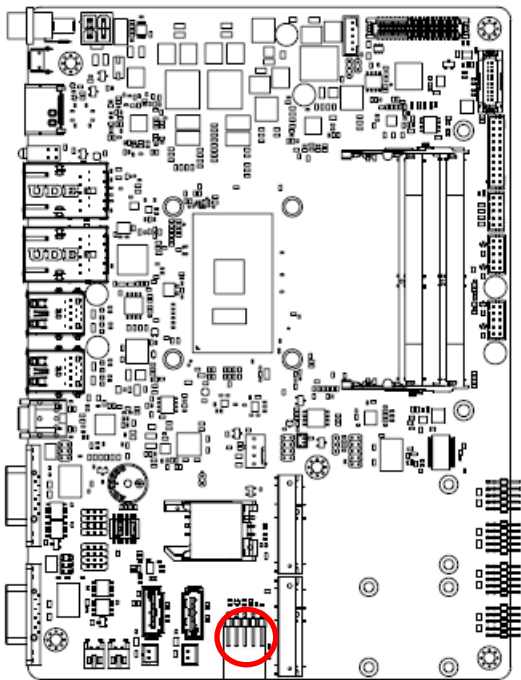
Signal	PIN
THX+	1
THX-	2
THPROBE_R	3
THY+	4
THY-	5

2.3.13 SATA Power connector 1/2 (SATAPW1/2)
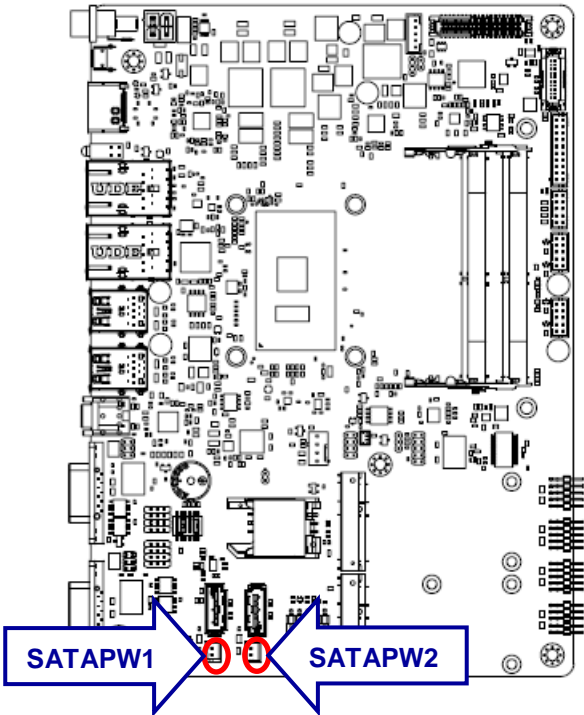
Signal	PIN
+5V	2
GND	1

2.3.14 Power connector (DCIN1)
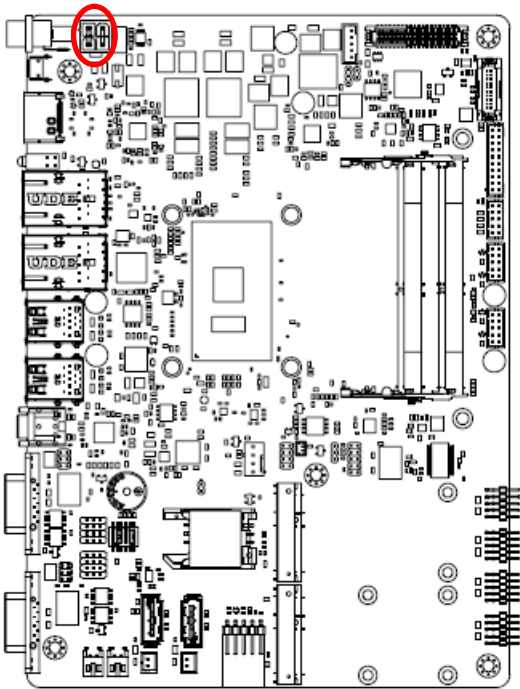
Signal	PIN	PIN	Signal
+VIN_26V	1	2	+VIN_26V
GND	3	4	GND

2.3.15　LVDS connector (JLVDS1)
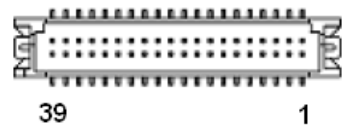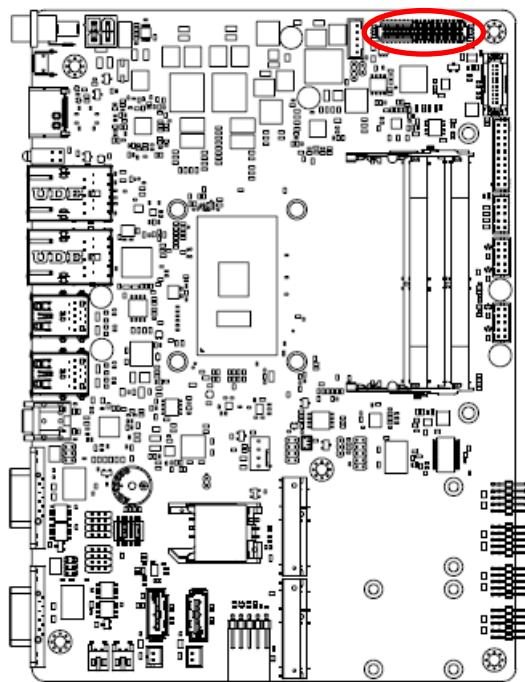
Signal	PIN	PIN	Signal
+3.3V	1	2	+5V
+3.3V	3	4	+5V
NC	5	6	NC
GND	7	8	GND
LVDS_DATA1_P	9	10	LVDS_DATA0_P
LVDS_DATA1_N	11	12	LVDS_DATA0_N
GND	13	14	GND
LVDS_DATA3_P	15	16	LVDS_DATA2_P
LVDS_DATA3_N	17	18	LVDS_DATA2_N
GND	19	20	GND
LVDS_DATA5_P	21	22	LVDS_DATA4_P
LVDS_DATA5_N	23	24	LVDS_DATA4_N
GND	25	26	GND
LVDS_DATA7_P	27	28	LVDS_DATA6_P
LVDS_DATA7_N	29	30	LVDS_DATA6_N
GND	31	32	GND
LVDS_CLK2_P	33	34	LVDS_CLK1_P
LVDS_CLK2_N	35	36	LVDS_CLK1_N
GND	37	38	GND
+12V	39	40	+12V

2.3.16   USB connector (JUSB3)
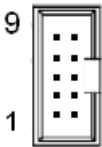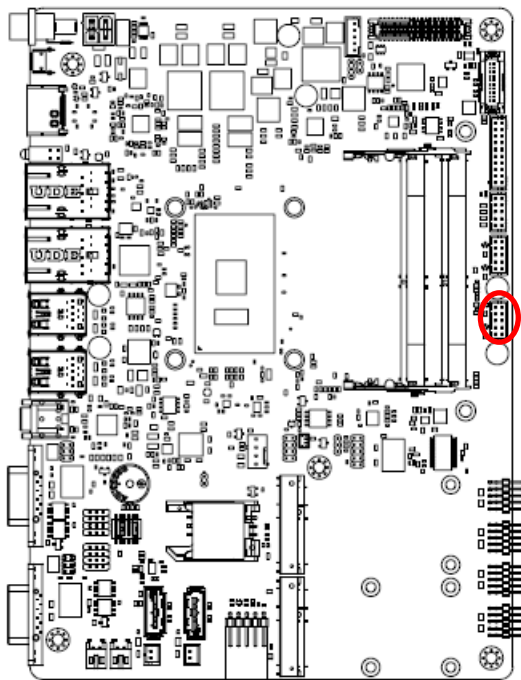
Signal	PIN	PIN	Signal
GND	9	10	GND
GND	7	8	GND
USB_Z_PP5	5	6	USB_Z_PP6
USB_Z_PN5	3	4	USB_Z_PN6
+5VSB	1	2	+5VSB

2.3.17   USB connector (JUSB4)
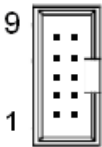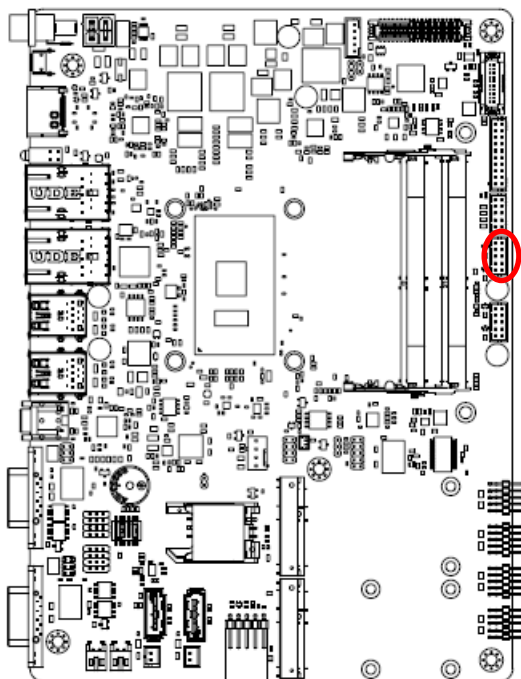
Signal	PIN	PIN	Signal
GND	9	10	GND
GND	7	8	GND
USB_Z_PP7	5	6	USB_Z_PP8
USB_Z_PN7	3	4	USB_Z_PN8
+5VSB	1	2	+5VSB

2.3.18 Amplifier connector (JSPK_R1)
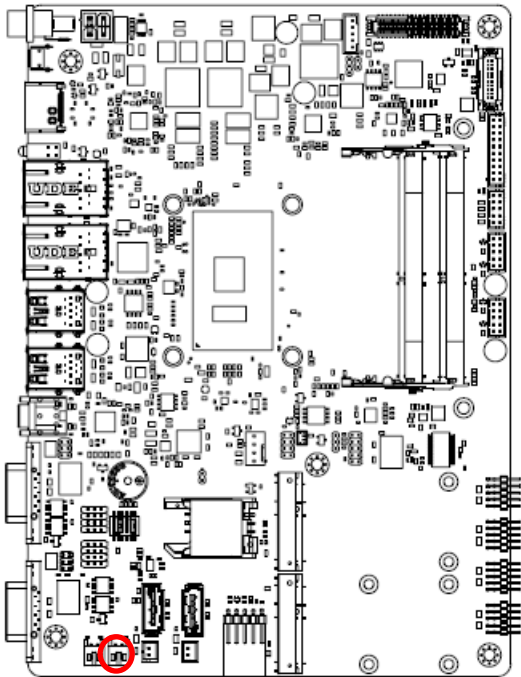
Signal	PIN
SPK_R+	1
SPK_R-	2

2.3.19 Amplifier connector (JSPK_L1)
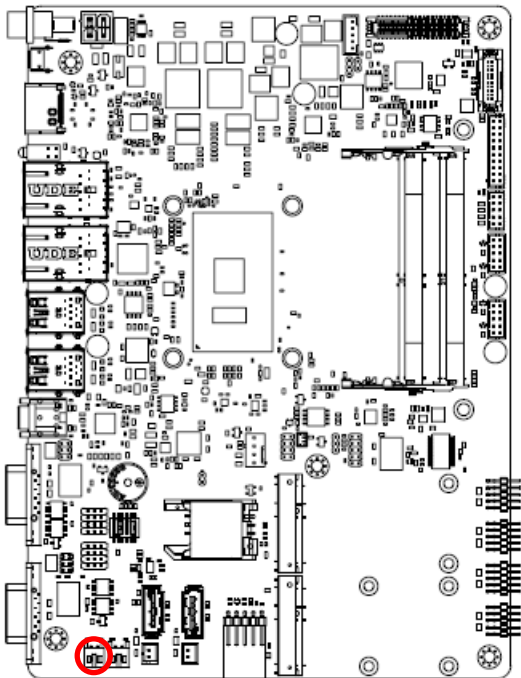
Signal	PIN
SPK_L+	1
SPK_L-	2

2.3.20 SPI connector (JSPI1)
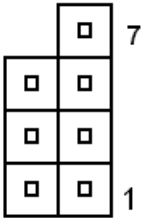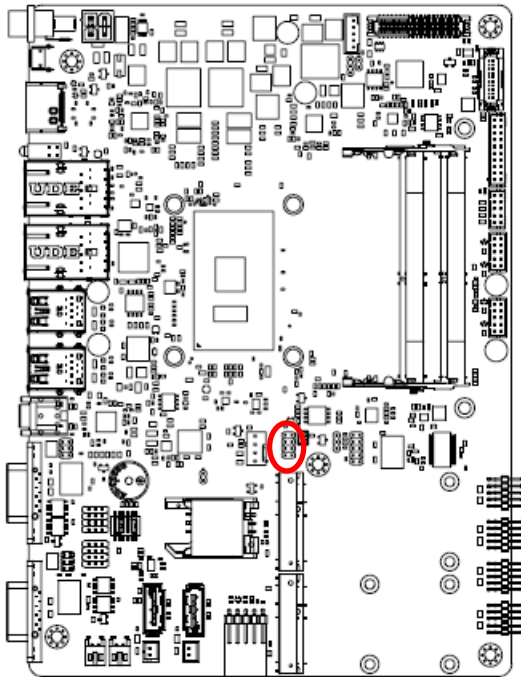
Signal	PIN	PIN	Signal
		7	HOLD#
SPI_SI	6	5	SPI_SO
SPI_CLK	4	3	SPI0_CS0#
GND	2	1	+3.3VSB

2.3.21 EC Debug connector (JEC1)
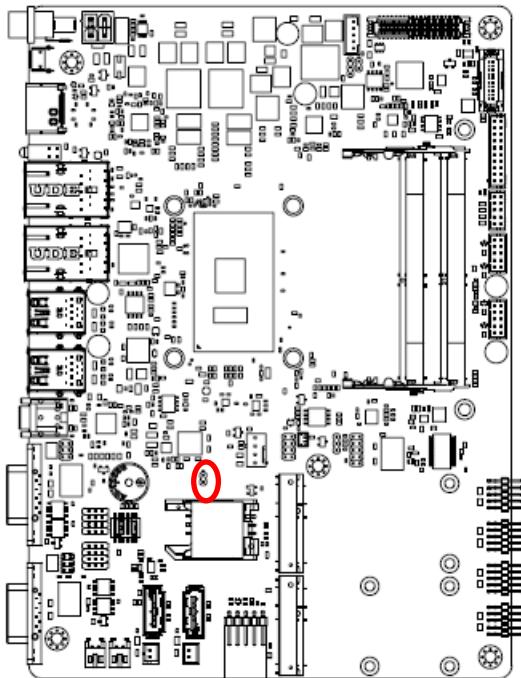
Signal	PIN
EC_SMDAT_DEBUG	2
EC_SMCLK_DEBUG	1

2.3.22 Battery connector (JBAT1)
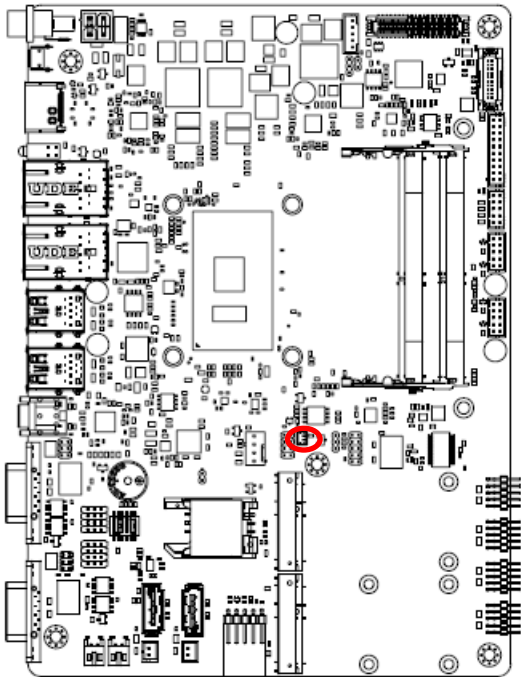
Signal	PIN
GND	2
+RTCBAT	1

2.3.23 LPC connector (JLPC1)
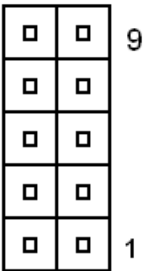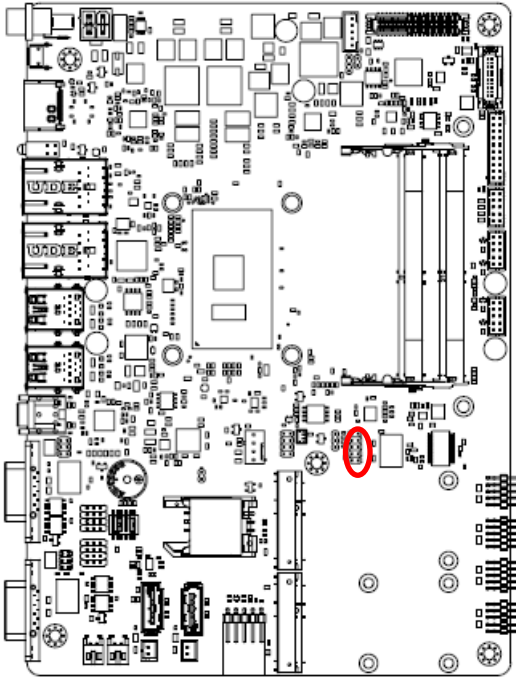
Signal	PIN	PIN	Signal
GND	10	9	LPC_SERIRQ
CLK2_LPC_PORT80	8	7	LPC_AD3
LPC_LFRAME#	6	5	LPC_AD2
RST_PORT80#	4	3	LPC_AD1
+3.3VSB	2	1	LPC_AD0

3.BIOS Setup

3.1 Introduction

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

3.2 Starting Setup

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

While the BIOS is in control, the Setup program can be activated in one of two ways:
By pressing <F2> or <Del> immediately after switching the system on, or
By pressing the <F2> or <Del> key when the following message appears briefly at the left-top of the screen during the POST (Power On Self Test).

Press <F2> or <Del> to enter SETUP

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

3.3 Using Setup

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

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

- **Navigating Through The Menu Bar**

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

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

- **To Display a Sub Menu**

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

3.4 Getting Help

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

3.5 In Case of Problems

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the 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) 2016 American Megatrends, Inc.
  Main  Advanced  Chipset  Security  Boot  Save & Exit

  BIOS Information                                    Choose the system default
  BIOS Vendor                 American Megatrends     language
  Core Version                5.11
  Compliancy                  UEFI 2.4; PI 1.3
  Project Version             1ASOI 0.30 x64
  Build Date and Time         01/15/2016 16:43:14
  Access Level                Administrator
  EC 8528 Firmware            05
  BIOS Name                   BSKLU-OM

  System Language             [English]
▶ Platform Information

  System Date                 [Tue 01/19/2016]       ↦↤: Select Screen
  System Time                 [11:10:45]             ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit

            Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

```
            Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
  Main

  Processor Information
  Name                        SkyLake
  Brand String                Intel(R) Core(TM)
                              i7-6600U CPU @ 2.60GHz
  Frequency                   2500 MHz
  Processor ID                406E3
  Stepping                    D0/K0
  Number of Processors        2Core(s) / 4Thread(s)
  Microcode Revision          5E
  GT Info                     GT2

  Memory RC Version           1.8.0.1
  Total Memory                16384 MB                ↦↤: Select Screen
  Memory Frequency            2133 MHz                ↑↓: Select Item
                                                      Enter: Select
  PCH Information                                      +/-: Change Opt.
  Name                        SKL PCH-LP              F1: General Help
  PCH SKU                     PCH-LP Mobile (U)       F2: Previous Values
                              Premium SKU             F3: Optimized Defaults
  Stepping                    21/C1                   F4: Save & Exit
  LAN PHY Revision            B2                      ESC: Exit

  ME FW Version               11.0.0.1194
  ME Firmware SKU             Corporate SKU

            Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

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) 2016 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  Save & Exit

  ▶ Trusted Computing                              Trusted Computing Settings
  ▶ ACPI Settings
  ▶ AMT Configuration
  ▶ PCH-FW Configuration
  ▶ IT8528 Super IO Configuration
  ▶ EC 8528 HW monitor
  ▶ S5 RTC Wake Settings
  ▶ Serial Port Console Redirection
  ▶ CPU Configuration
  ▶ Intel TXT Information
  ▶ SATA Configuration
  ▶ Network Stack Configuration
  ▶ CSM Configuration
  ▶ USB Configuration
                                                 →←: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit


            Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

3.6.2.1 Trusted Computing

```
                      Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
           Advanced

           TPM20 Device Found                                          Enables or Disables BIOS
                                                                       support for security device.
           Security Device Support          [Enable]                  O.S. will not show Security
           Active PCR banks                 SHA-1                      Device. TCG EFI protocol and
           Available PCR banks              SHA-1,SHA256               INT1A interface will not be
                                                                       available.
           SHA-1 PCR Bank                   [Enabled]
           SHA256 PCR Bank                  [Disabled]

           Pending operation               [None]
           Platform Hierarchy              [Enabled]
           Storage Hierarchy               [Enabled]
           Endorsement Hierarchy           [Enabled]                   ↔: Select Screen
           TPM2.0 UEFI Spec Version         [1.0]                      ↑↓: Select Item
           TPM 20 InterfaceType            [TIS]                       Enter: Select
                                                                       +/-: Change Opt.
                                                                       F1: General Help
                                                                       F2: Previous Values
                                                                       F3: Optimized Defaults
                                                                       F4: Save & Exit
                                                                       ESC: Exit




                      Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

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.
SHA-1 PCR Bank	Disabled Enabled**[Default]**,	Enables or Disables SHA-1 PCR Bank.
SHA256 PCR Bank	Disabled**[Default]** Enabled,	Enables or Disables SHA256 PCR Bank.
Pending operation	None**[Default]**, TPM Clear	Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Disabled Enabled**[Default]**,	Enable or Disable Platform Hierarchy.
Storage Hierarchy	Disabled Enabled**[Default]**,	Enable or Disable Storage Hierarchy.
Endorsement Hierarchy	Disabled Enabled**[Default]**,	Enable or Disable Endorsement Hierarchy.
TPM2.0 UEFI Spec Version	1.0**[Default]**, 1.x	Select the TCG2 Spec Version Support. 1.0: the Compatible mode for Win8/Win10, 1.x: For TCG2 newer spec for Win10.

3.6.2.2 APCI Settings

```
          Aptio Setup Utility - Copyright (C) 2016 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)]
  ACPI Low Power S0 Idle        [Disabled]

  ErP Function                  [Disabled]
  PWR-On After PWR-Fail         [Off]
  Watch Dog                     [Disabled]



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



          Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

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.
ACPI Low Power S0 Id1e	Disabled**[Default]**, Enabled	Enable or Disable ACPI Low Power S0 Id1e Support.
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.

3.6.2.3 AMT Configuration

```
                    Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
       Advanced

    Intel AMT                          [Enabled]            Enable/Disable Intel (R)
    Un-Configure ME                    [Disabled]           Active Management Technology
                                                            BIOS Extension.
                                                            Note : iAMT H/W is always
                                                            enabled.
                                                            This option just controls the
                                                            BIOS extension execution.
                                                            If enabled, this requires
                                                            additional firmware in the SPI
                                                            device.


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


                    Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

Item	Options	Description
Intel AMT	Disabled Enabled**[Default]**,	Enable/Disable Intel® Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.
Un-Configure ME	Disabled**[Default]** Enabled,	OEMFlag Bit 15: Un-Configure ME without password.

3.6.2.4   PCH-FW Configuration

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
       Advanced

   ME FW Version                    11.0.0.1194              Selects the desired fTPM
   ME Firmware Mode                 Normal Mode              solution to be used.
   ME Firmware Type                 Full Sku Firmware
   ME Firmware SKU                  Corporate SKU
   PTT Capability / State           1 / 0
   NFC Support                      Disabled
   ME Unconfig on RTC Clear State   [Enabled]
   ME State                         [Enabled]
   fTPM Switch Selection            [GPDMA Work-Around]
 ▶ Firmware Update Configuration

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

              Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

Item	Options	Description
fTPM Switch Selection	GPDMA Work-Around**[Default]**, MSFT QFE Solution	Select the desired fTPM solution to be used.

3.6.2.4.1   Firmware Update Configuration

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
       Advanced

   Me FW Image Re-Flash             [Disabled]              Enable/Disable Me FW Image
                                                            Re-Flash function.

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

              Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

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

3.6.2.5 IT8528 Super IO Configuration

You can use this item to set up or change the IT8528 Super IO configuration for serial ports. Please refer to 3.6.2.5.1~ 3.6.2.5.6 for more information.

```
           Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
     Advanced

    IT8528 Super IO Configuration                          Set Parameters of Serial Port
                                                           1 (COMA)
    Super IO Chip                       IT8528
  ▶ Serial Port 1 Configuration
  ▶ Serial Port 2 Configuration

    Super IO Chip                       NCT5104DSEC
  ▶ Serial Port 3 Configuration
  ▶ Serial Port 4 Configuration
  ▶ Serial Port 5 Configuration
  ▶ Serial Port 6 Configuration

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



            Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

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

3.6.2.5.1 Serial Port 1 Configuration
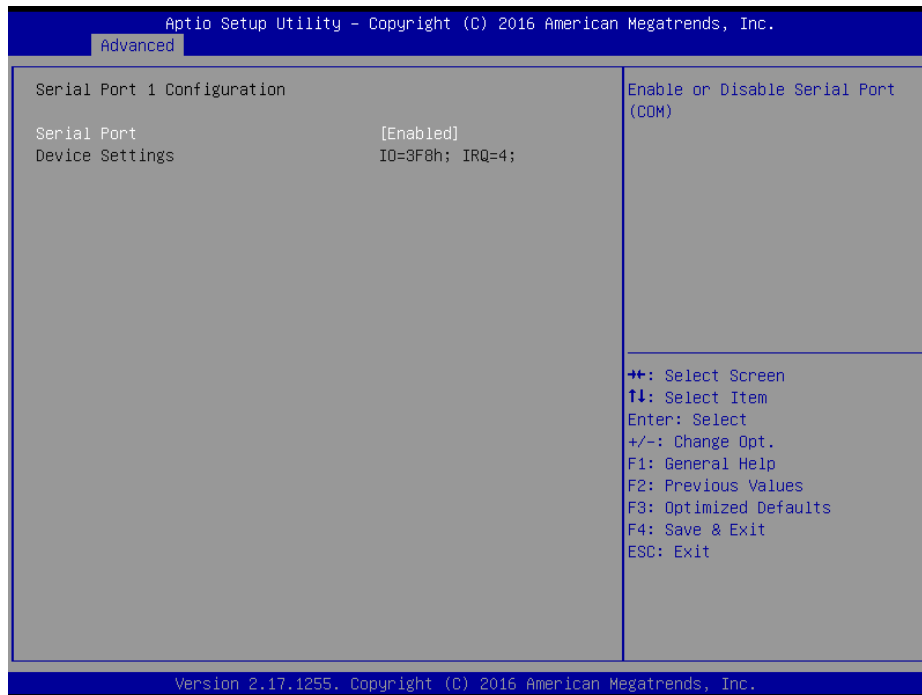
```
                Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
        Advanced

    Serial Port 1 Configuration                           Enable or Disable Serial Port
                                                          (COM)
    Serial Port                      [Enabled]
    Device Settings                  IO=3F8h; IRQ=4;








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



                Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

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

3.6.2.5.2 Serial Port 2 Configuration
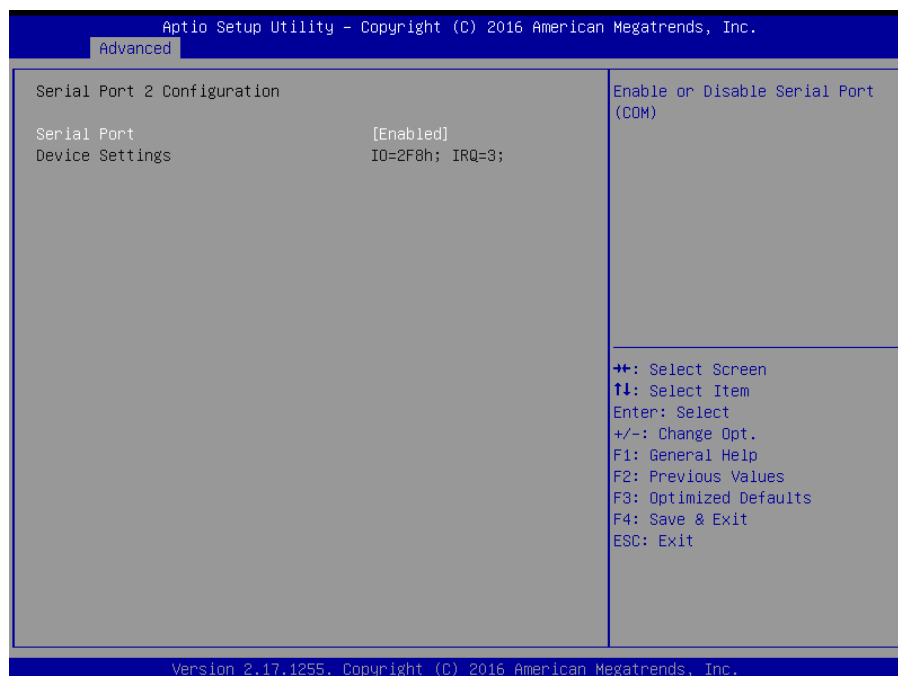
```
                Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
        Advanced

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








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



                Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

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

3.6.2.5.3 Serial Port 3 Configuration

```
              Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
        Advanced

    Serial Port 3 Configuration                              Enable or Disable Serial Port
                                                             (COM)
    Serial Port                        [Enabled]
    Device Settings                    IO=3E8h; IRQ=5;




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



              Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

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

3.6.2.5.4 Serial Port 4 Configuration
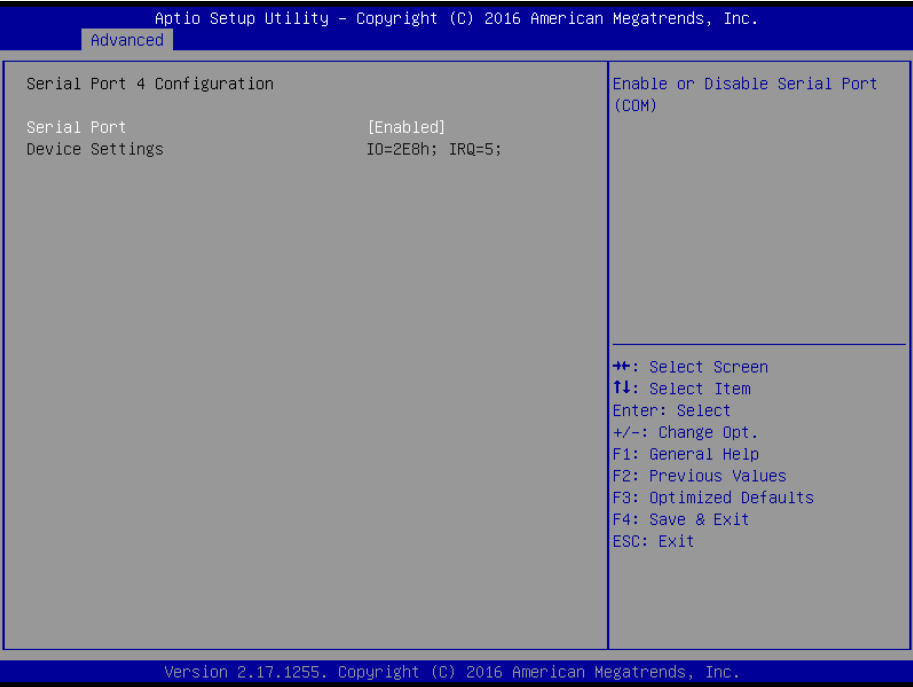
```
              Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
        Advanced

    Serial Port 4 Configuration                              Enable or Disable Serial Port
                                                             (COM)
    Serial Port                        [Enabled]
    Device Settings                    IO=2E8h; IRQ=5;




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



              Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

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

3.6.2.5.5 Serial Port 5 Configuration
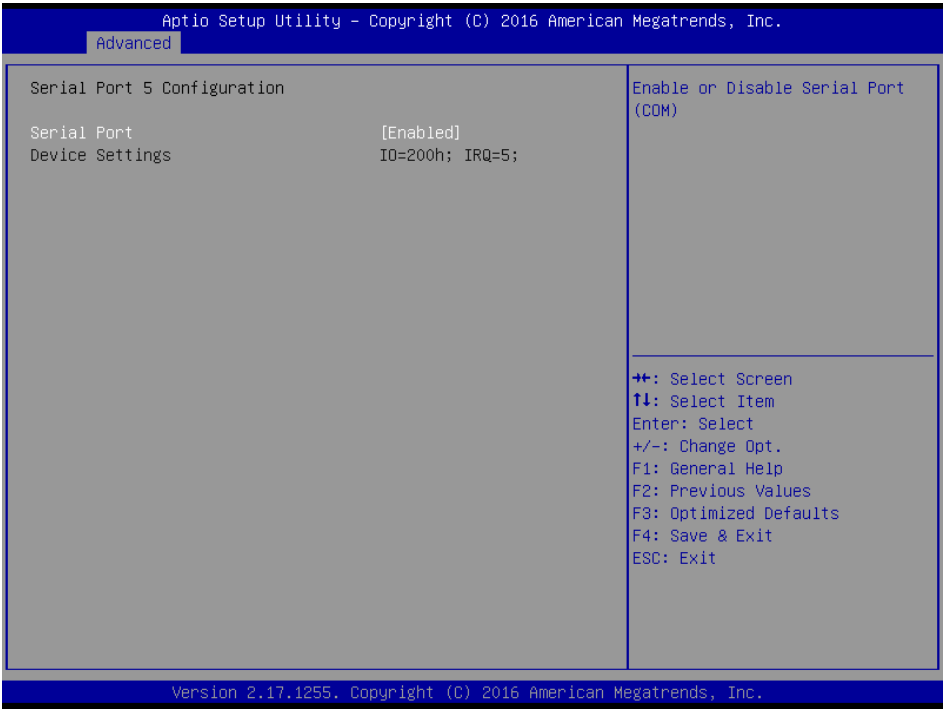
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.5.6 Serial Port 6 Configuration
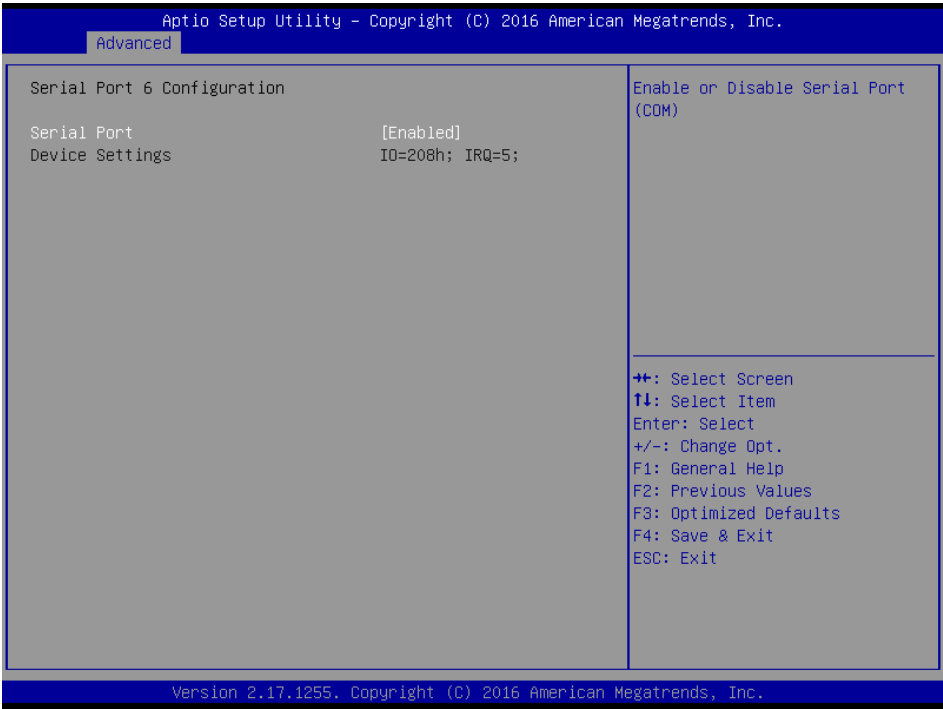
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.6   H/W Monitor

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
           Advanced

    Pc Health Status                                     Enable or Disable Smart Fan
    Smart Fan Function              [Disabled]

    CPU temperature                 : +24 C
    System temperature              : +24 C
    Fan1 Speed                      : 6125 RPM
    +V5S                            : +5.062 V
    VIN_L                           : +12.117 V
    VCORE                           : +0.914 V



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



              Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

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

3.6.2.7   S5 RTC Wake Settings

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
           Advanced

    Wake system from S5            [Disabled]           Enable or disable System wake
                                                        on alarm event. Select
                                                        FixedTime, system will wake on
                                                        the hr::min::sec specified.
                                                        Select DynamicTime , System
                                                        will wake on the current time
                                                        + Increase minute(s)



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



              Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

Item	Options	Description
Wake system from S5	Disabled**[Default]**,	Enable or disable System wake on alarm

	Fixed Time	event. Select Fixed Time, system will wake on
	Dynamic Time	the hr::min::sec specified. Select Dynamic
		Time, System will wake on the current time +
		Increase minute(s).

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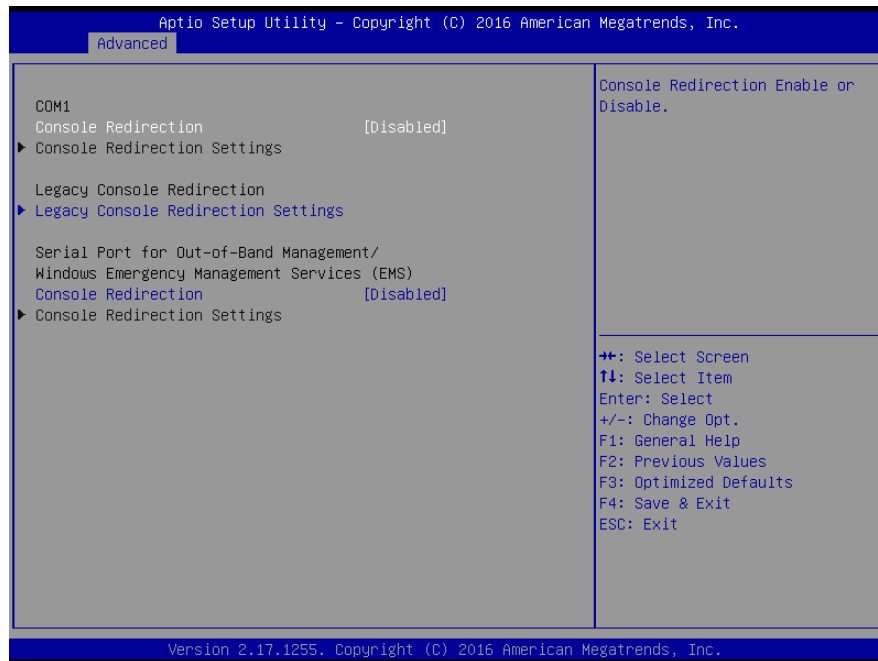
Item	Options	Description
Console Redirection	Disabled**[Default]**, Enabled	Console Redirection Enable or Disable.

3.6.2.8.1 Legacy Console Redirection Settings
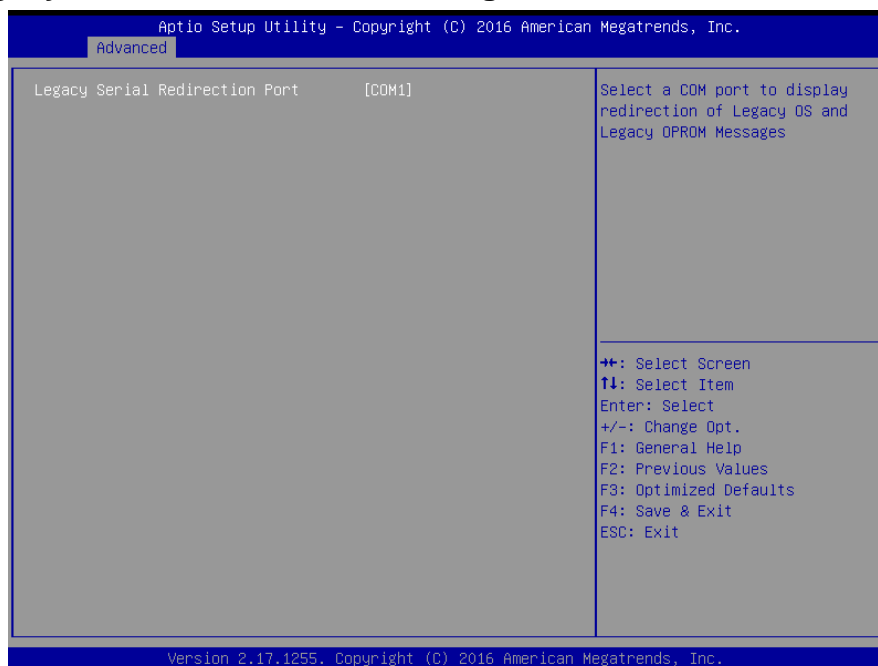
Item	Option	Description
Legacy Serial Redirection	COM1**[Default]**,	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

3.6.2.9 CPU Configuration

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

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
    Advanced

 CPU Configuration                                         ▲  Enabled for Windows XP and
                                                              Linux (OS optimized for
 Intel(R) Core(TM) i7-6600U CPU @ 2.60GHz                     Hyper-Threading Technology)
 CPU Signature                      406E3                     and Disabled for other OS (OS
 Microcode Patch                    5E                        not optimized for
 Max CPU Speed                      2600 MHz                  Hyper-Threading Technology).
 Min CPU Speed                      400 MHz                   When Disabled only one thread
 CPU Speed                          2500 MHz                  per enabled core is enabled.
 Processor Cores                    2
 Hyper Threading  Technology        Supported
 Intel VT-x Technology              Supported
 Intel SMX Technology               Supported
 64-bit                             Supported
 EIST Technology                    Supported              ▸◂: Select Screen
 CPU C3 state                       Supported              ↑↓: Select Item
 CPU C6 state                       Supported              Enter: Select
 CPU C7 state                       Supported              +/-: Change Opt.
 CPU C8 state                       Supported              F1: General Help
 CPU C9 state                       Supported              F2: Previous Values
 CPU C10 state                      Supported              F3: Optimized Defaults
                                                           F4: Save & Exit
 L1 Data Cache                      32 kB x 2              ESC: Exit
 L1 Code Cache                      32 kB x 2
 L2 Cache                           256 kB x 2
 L3 Cache                           4 MB
 L4 Cache                           Not Present

 Hyper-threading                    [Enabled]
 Active Processor Cores             [All]
 Overclocking lock                  [Disabled]
 Intel Virtualization Technology    [Enabled]
   Turbo Mode                       [Enabled]
 CPU C states                       [Enabled]
 Package C State limit              [AUTO]                 ▼

              Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

Item	Options	Description
Hyper-threading	Disabled, Enabled**[Default]**	When Hyper-threading is enabled, 2 logical CPUS per core is present.
Active Processor Cores	All**[Default]** 1 2 3	Number of cores to enable in each processor package.
Overclocking lock	Disabled**[Default]**, Enabled	FLEX_RATIO (194) MSR.
Intel Virtualization Technology	Disabled Enabled**[Default]**	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Turbo Mode	Disabled Enabled**[Default]**	Turbo Mode.
CPU C states	Disabled Enabled**[Default]**	Enable or disable CPU C state.

	C0/C1	
	C2	
	C3	
	C6	
Package C State limit	C7	Package C State limit.
	C7s	
	C8	
	C9	
	C10	
	Auto**[Default]**	

3.6.2.10 Intel TXT Configuration

```
            Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
        Advanced

   Intel TXT Information

   Chipset                     Production Fused
   BiosAcm                     Production Fused
   Chipset Txt                 Supported
   Cpu Txt                     Supported
   Error Code                  None
     Class Code                None
     Major Code                None
     Minor Code                None




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




            Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

3.6.2.11 SATA Configuration

Item	Options	Description
SATA Controller(s)	Enabled**[Default]** Disabled,	Enable or disable SATA Device.
SATA Test Mode	Enabled Disabled**[Default]**,	Test Mode Enable/Disable (Loop Back).
Aggressive LPM Support	Enabled**[Default]** Disabled	Enable PCH to aggressively enter link power state.
Port 0/1/2	Enabled**[Default]** Disabled,	Enable or Disable SATA Port.
SATA Device Type	Hard Disk Drive **[Default]** Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

3.6.2.12 Network Stack Configuration

```
          Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
        Advanced

 Network Stack                    [Disabled]                  Enable/Disable UEFI Network
                                                              Stack




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




          Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```
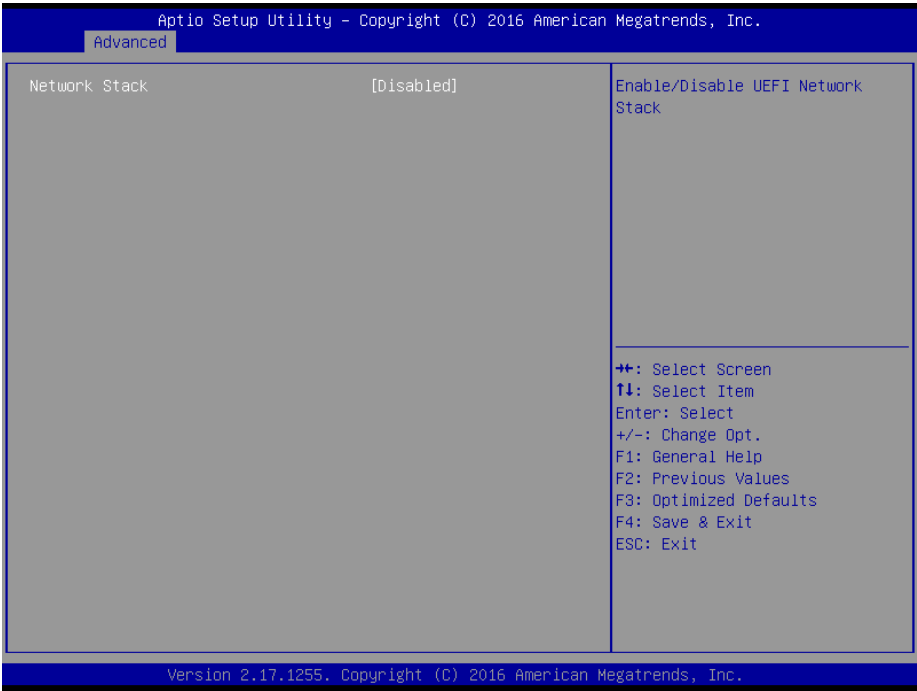
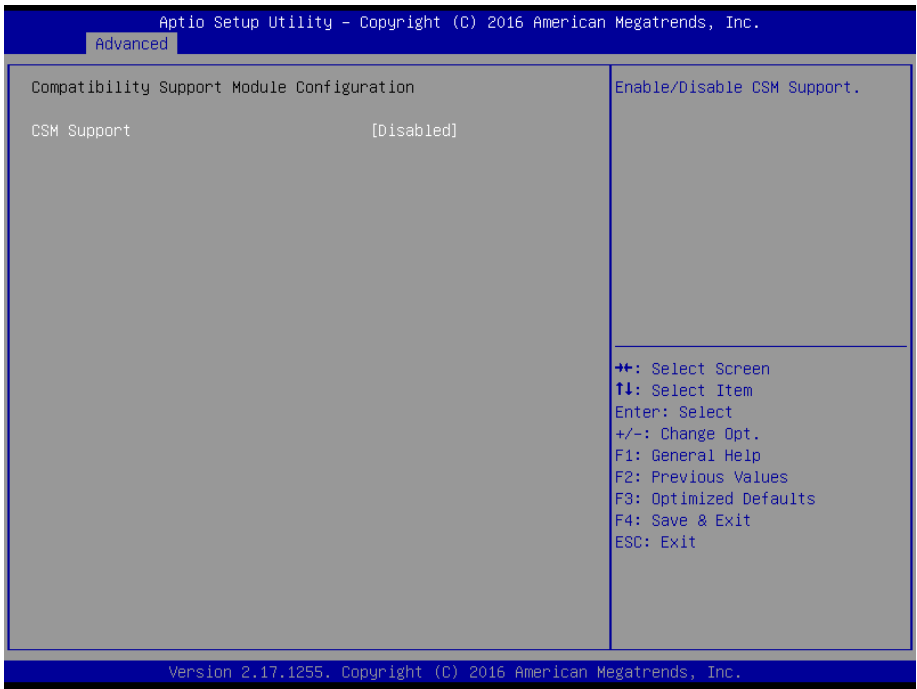| Item	Options	Description
Network Stack	Enabled Disabled**[Default]**	Enable/Disable UEFI Network Stack.

3.6.2.13 CSM Configuration

```
          Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
        Advanced

 Compatibility Support Module Configuration                   Enable/Disable CSM Support.

 CSM Support                      [Disabled]




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




          Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

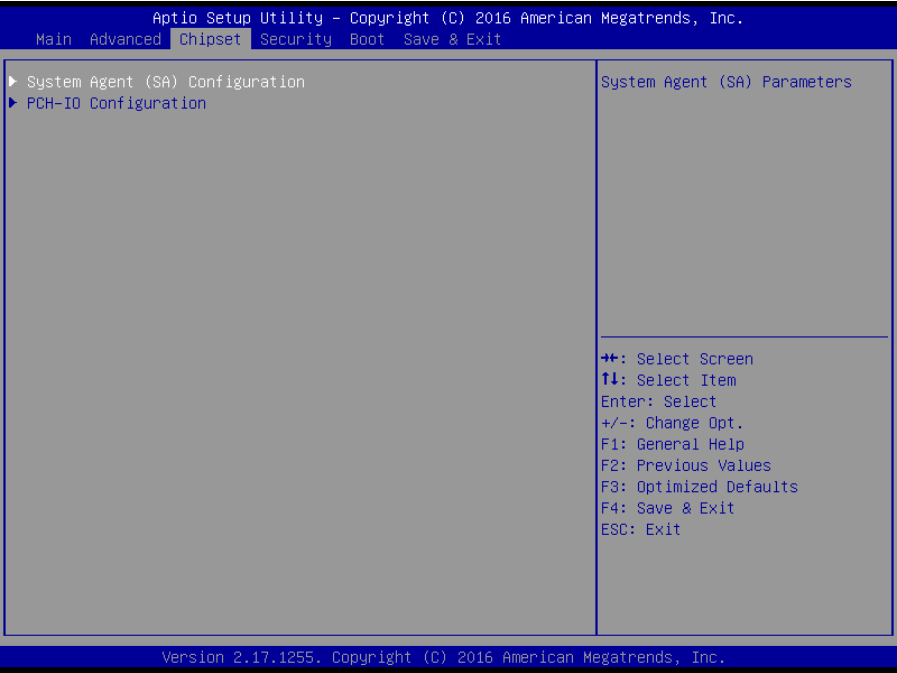| Item	Options	Description
CSM Support	Enabled Disabled**[Default]**	Enable/Disable CSM Support.

3.6.2.14 USB Configuration

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

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
        Advanced

    USB Configuration                                    Enables Legacy USB support.
                                                         AUTO option disables legacy
    USB Module Version              13                   support if no USB devices are
                                                         connected. DISABLE option will
    USB Controllers:                                     keep USB devices available
        1 XHCI                                           only for EFI applications.
    USB Devices:
        1 Drive, 1 Keyboard

    Legacy USB Support              [Enabled]
    XHCI Hand-off                   [Enabled]
    USB Mass Storage Driver Support [Enabled]
    Port 60/64 Emulation            [Disabled]
                                                         ➔➔: Select Screen
    USB hardware delays and time-outs:                   ↑↓: Select Item
    USB transfer time-out           [20 sec]             Enter: Select
    Device reset time-out           [20 sec]             +/-: Change Opt.
    Device power-up delay           [Auto]               F1: General Help
                                                         F2: Previous Values
    Mass Storage Devices:                                F3: Optimized Defaults
    hp v220w 1100                   [Auto]               F4: Save & Exit
                                                         ESC: Exit



              Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

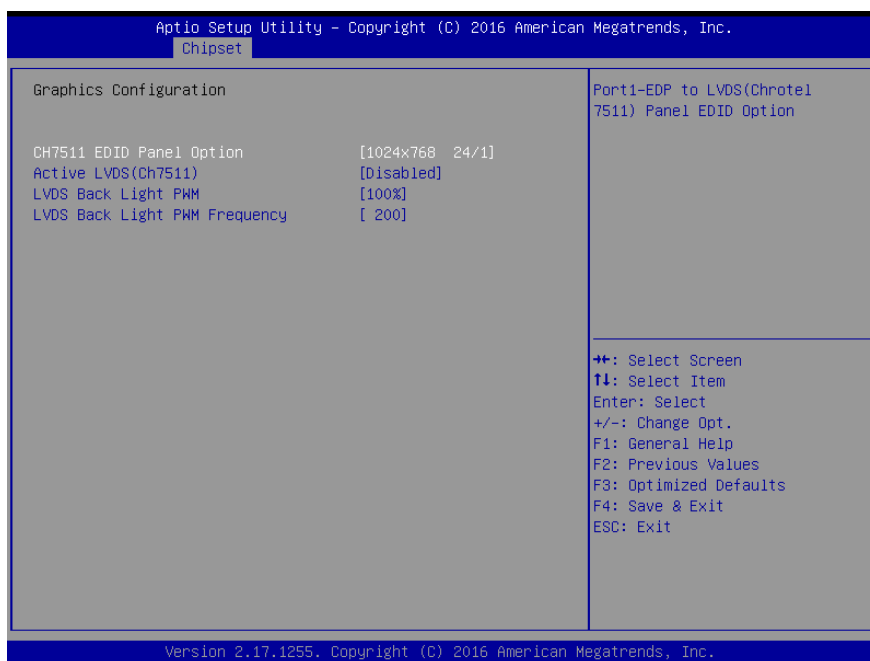| Item	Options	Description
Legacy USB Support	Enabled**[Default]** Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled**[Default]** Disabled	This is a workaround for OSew without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enabled**[Default]** Disabled	Enable/Disable USB Mass Storage Driver Support.
Port 60/64 Emulation	Enabled Disabled**[Default]**	Enable I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
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.

3.6.3　　Chipset

3.6.3.1　　System Agent (SA) Configuration
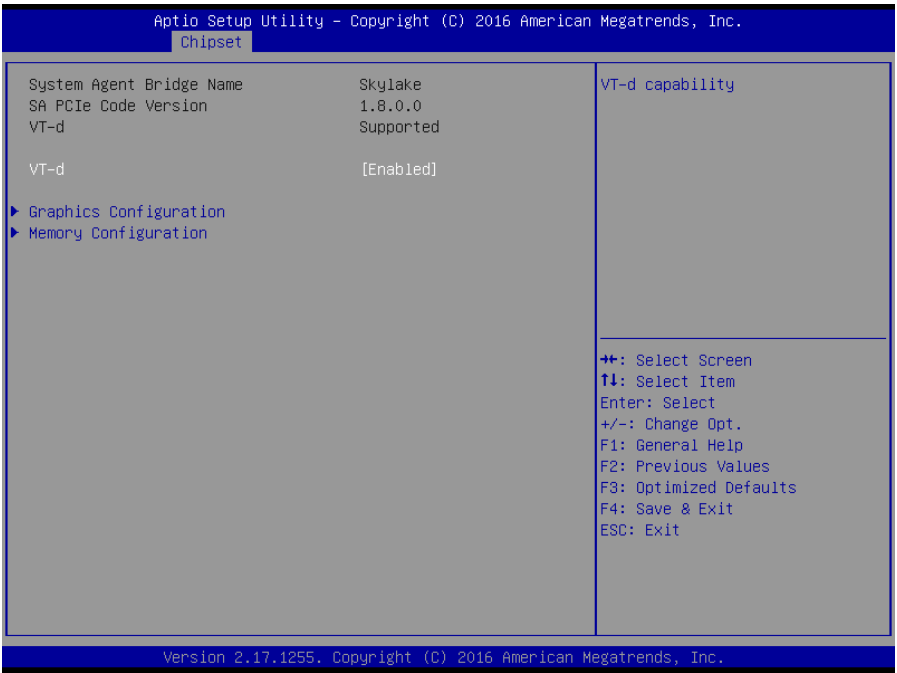
Item	Option	Description
VT-d	Enabled**[Default]** Disabled	VT-d capability.

3.6.3.1.1 Graphics Configuration

```
                    Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
                    Chipset

    Graphics Configuration                                    Port1-EDP to LVDS(Chrotel
                                                              7511) Panel EDID Option

    CH7511 EDID Panel Option              [1024x768  24/1]
    Active LVDS(Ch7511)                   [Disabled]
    LVDS Back Light PWM                   [100%]
    LVDS Back Light PWM Frequency         [ 200]




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




                    Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

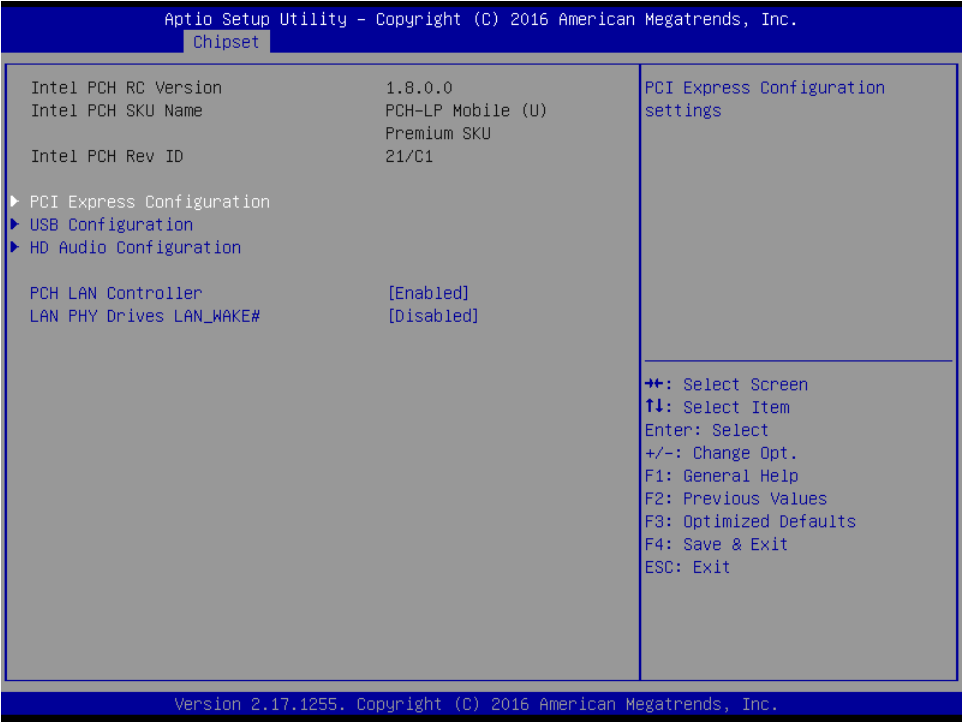| Item	Option	Description
CH7511 EDID Panel Option	1024x768 24/1**[Default]** 800x600 18/1 1024x768 18/1 1366x768 18/1 1024x600 18/1 1280x800 18/1 1920x1200 24/2 1920x1080 18/2 1280x1024 24/2 1440x900 18/2 1600x1200 24/2 1366x768 24/1 1920x1080 24/2 1680x1050 24/2	Port1-EDP to LVDS (Chrotel 7511) Panel EDID Option.
Active LVDS (CH7511)	Enabled**[Default]** Disabled	Active Internal LVDS (eDP->Ch7511-to-LVDS).
LVDS Back Light PWM	00% 25% 50% 75% 100%**[Default]**	Select LVDS back light PWM duty.
LVDS Back Light PWM Frequency	200**[Default]** 300 400 500 700 1k 2k	Select LVDS back light PWM Frequency.

	3k	
	5k	
	10k	
	20k	

3.6.3.1.2 Memory Configuration

```
                 Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
                  Chipset

   Memory Configuration                                      Maximum Memory Frequency
                                                             Selections in Mhz.
   Memory RC Version              1.8.0.1
   Memory Frequency              2133 MHz
   Total Memory                  16384 MB
   VDD                           1200
   DIMM#0                        Not Present
   DIMM#2                        16384 MB
   Memory Timings (tCL-tRCD-tRP-tRAS)   15-36

   Maximum Memory Frequency      [Auto]
   Max TOLUD                     [Dynamic]

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

                 Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

Item	Option	Description
Maximum Memory Frequency	Auto**[Default]** 1067/1200/1333/1400/1600 /1800/1867/2000/2133/2200 /2400/2600/2667/2800/2933 /3000/3200	Maximum Memory Frequency Selections in Mhz.
Max TOLUD	Dynamic**[Default]** 1GB/1.25GB/1.5GB/1.75GB /2GB/2.25GB/2.5GB/2.75GB /3GB/3.25GB/3.5GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.

3.6.3.2　PCH-IO Configuration

```
            Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
                 Chipset

    Intel PCH RC Version             1.8.0.0              PCI Express Configuration
    Intel PCH SKU Name               PCH-LP Mobile (U)    settings
                                     Premium SKU
    Intel PCH Rev ID                 21/C1

  ▶ PCI Express Configuration
  ▶ USB Configuration
  ▶ HD Audio Configuration

    PCH LAN Controller               [Enabled]
    LAN PHY Drives LAN_WAKE#         [Disabled]


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




            Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

Item	Option	Description
PCH LAN Controller	Disabled Enabled**[Default]**	Enable or disable onboard NIC.
LAN PHY Drives LAN_WAKE#	Disabled**[Default]** Enabled	Enable/Disable LAN Phy driving LAN_WAKE# else platform drives LAN_WAKE#.

3.6.3.2.1　PCI Express Configuration

```
            Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
                 Chipset

    PCI Express Configuration                            PCI Express Root Port 5
                                                         Settings.

    PCIE Port 4 is assigned to LAN
  ▶ PCI Express Root Port 5(Lan i210)
  ▶ PCI Express Root Port 6(mPCIe)






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


            Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

3.6.3.2.1.1 PCI Express Root Port5 (Lan i210)

```
                    Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
                 Chipset

    PCI Express Root Port 5          [Enabled]            Control the PCI Express Root
    ASPM Support                     [Disabled]           Port.
    L1 Substates                     [L1.1 & L1.2]
    PCIe Speed                       [Auto]




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




                    Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```
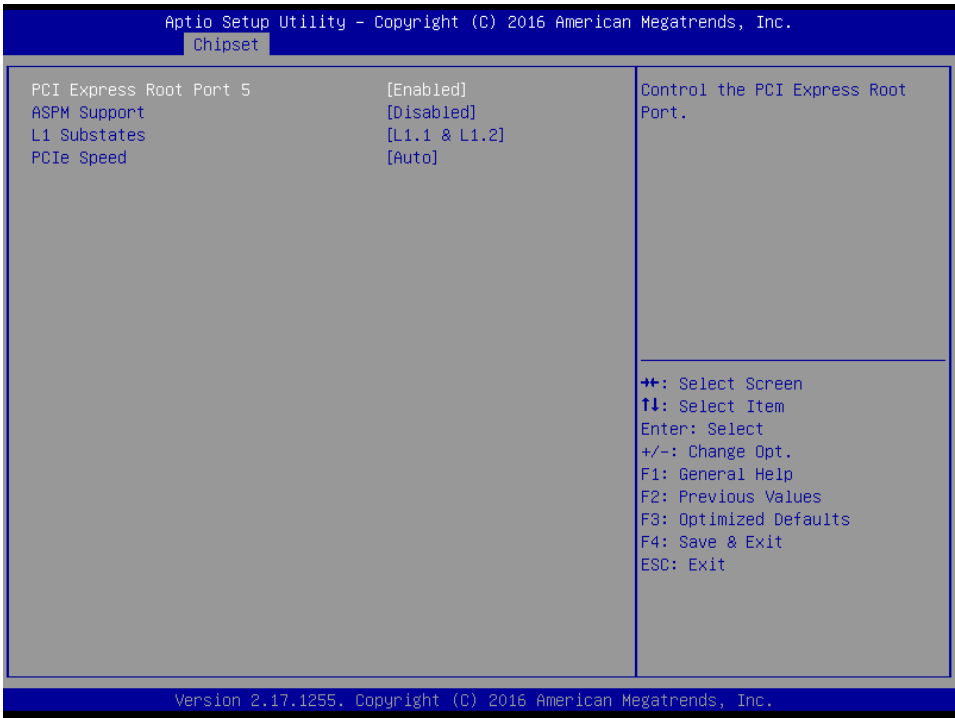
Item	Option	Description
PCI Express Root Port 5	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM Support	Disabled **[Default]**, L0s, L1, L0sL1, Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled, L1.1, L1.2, L1.1 & L1.2**[Default]**,	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]**, Gen1, Gen2, Gen3	Select PCI Express port speed.

3.6.3.2.1.2 PCI Express Root Port6 (mPCIe)

```
                Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
                 Chipset

          PCI Express Root Port 6           [Enabled]              Control the PCI Express Root
          ASPM Support                      [Disabled]             Port.
          L1 Substates                      [L1.1 & L1.2]
          PCIe Speed                        [Auto]




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




                Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```
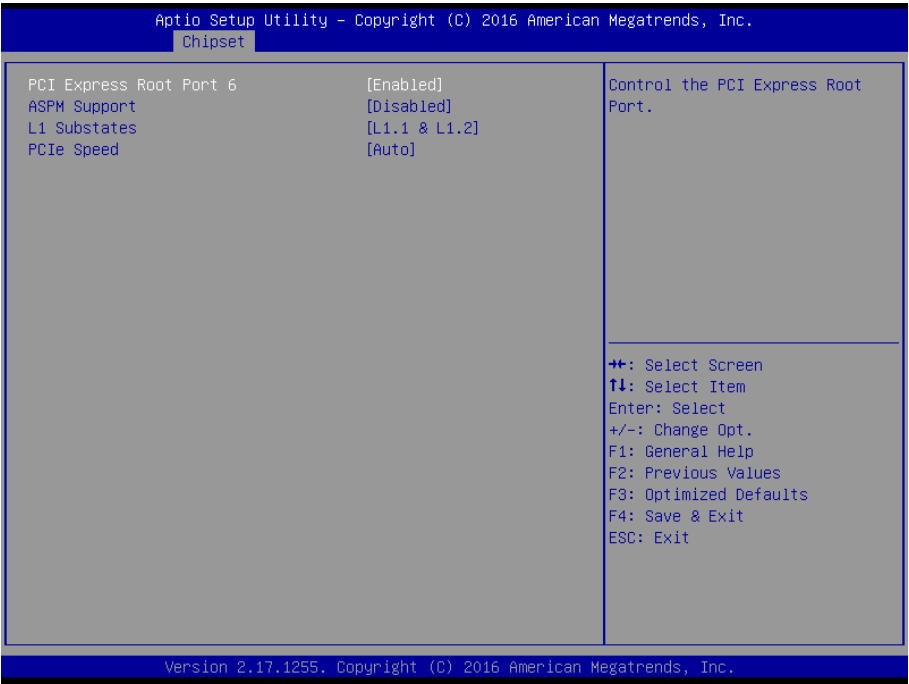
Item	Option	Description
PCI Express Root Port 6	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM Support	Disabled **[Default]**, L0s, L1, L0sL1, Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled, L1.1, L1.2, L1.1 & L1.2**[Default]**,	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]**, Gen1, Gen2, Gen3	Select PCI Express port speed.

3.6.3.2.2 USB Configuration

```
                Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
               Chipset

  USB Configuration                                        Precondition work on USB host
                                                           controller and root ports for
  USB Precondition              [Disabled]                 faster enumeration.

  XHCI Disable Compliance Mode  [FALSE]




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




                Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

Item	Option	Description
USB Precondition	Enabled Disabled**[Default]**,	Precondition work on USB host controller and root ports for faster enumeration.
XHCI Disable Compliance Mode	FALSE**[Default]**, TRUE	Option to disable Compliance Mode. Default is FALSE to not disable Compliance Mode. Set TRUE to disable Compliance Mode.

3.6.3.2.3 HD Audio Configuration

```
                Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
               Chipset

  HD Audio Configuration                                   Control Detection of the
                                                           HD-Audio device.
  HD Audio                      [Auto]                     Disabled = HDA will be
                                                           unconditionally disabled
                                                           Enabled = HDA will be
                                                           unconditionally enabled
                                                           Auto = HDA will be enabled if
                                                           present, disabled otherwise.




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




                Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

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

3.6.4 Security

```
              Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
        Main  Advanced  Chipset  Security  Boot  Save & Exit

       Password Description                                    Set Administrator Password

       If ONLY the Administrator's password is set,
       then this only limits access to Setup and is
       only asked for when entering Setup.
       If ONLY the User's password is set, then this
       is a power on password and must be entered to
       boot or enter Setup. In Setup the User will
       have Administrator rights.
       The password length must be
       in the following range:
       Minimum length               3
       Maximum length               20
                                                          →←: Select Screen
                                                          ↑↓: Select Item
       Administrator Password                             Enter: Select
       User Password                                      +/-: Change Opt.
                                                          F1: General Help
     ▶ Secure Boot menu                                   F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit



              Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

● **Administrator Password**

Set setup Administrator Password

● **User Password**

Set User Password

3.6.4.1　Secure Boot menu
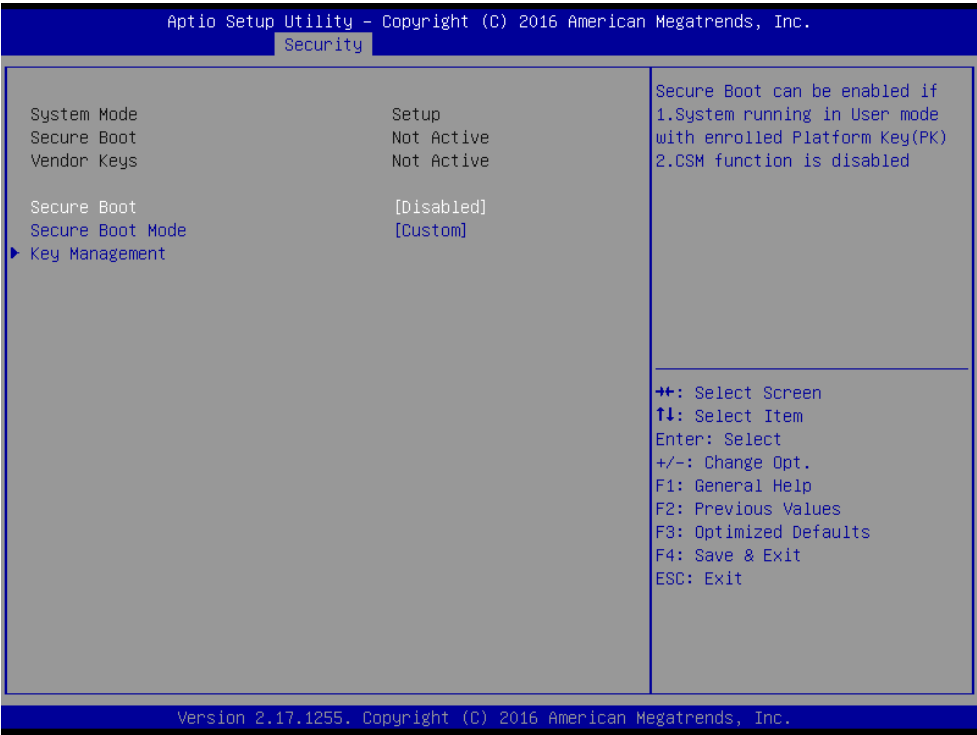
Item	Option	Description
Secure Boot	Disabled**[Default]** Enabled	Secure Boot can be enabled if 1.System running in User mode with enrolled Platform Key(PK) 2.CSM function is disabled.
Secure Boot Mode	Standard Custom**[Default]**	Secure Boot mode selector. 'Custom' Mode enables users to change Image Execution policy and manage Secure Boot Keys.

3.6.4.1.1 Key Management
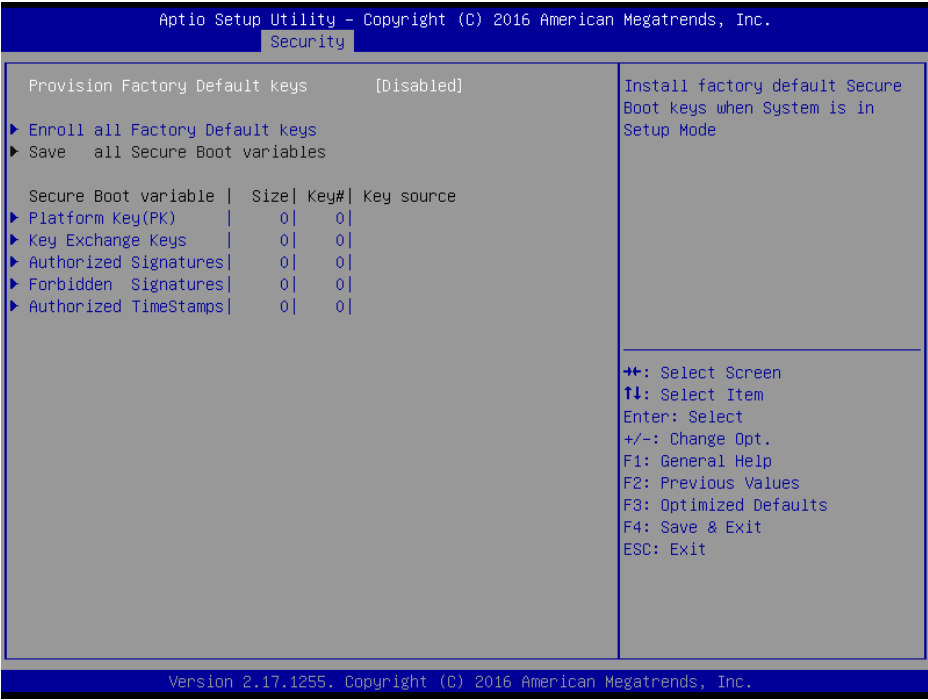
Item	Option	Description
Provision Factory Default keys	Enabled, Disabled**[Default]**	Install Factory default Secure Boot Keys when System is in Setup Mode.

3.6.5   Boot
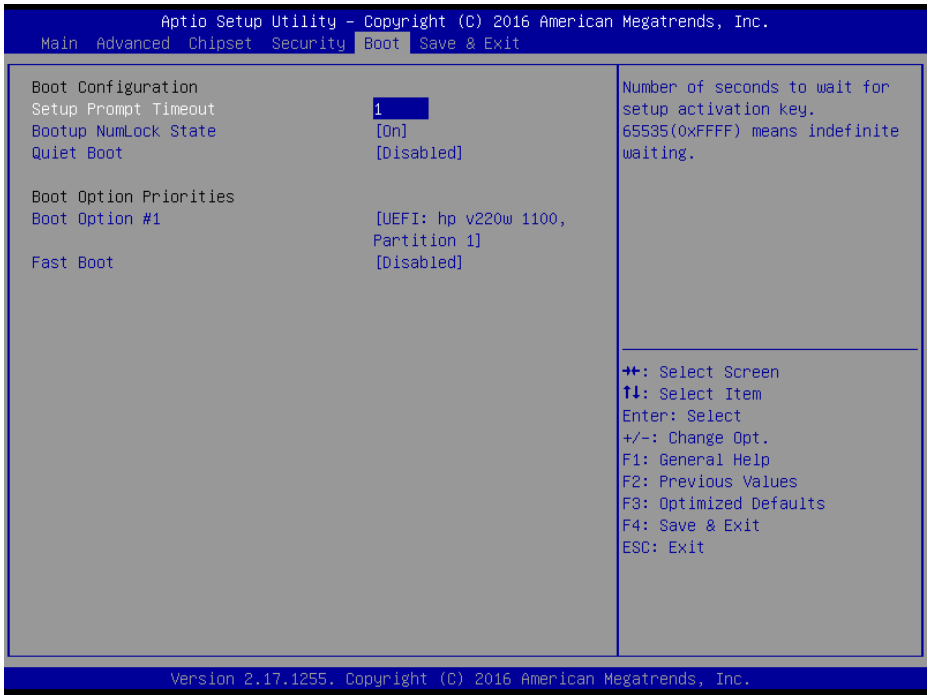
Item	Option	Description
Setup Prompt Timeout	1~ 65535	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On**[Default]** Off	Select the Keyboard NumLock state
Quiet Boot	Disabled**[Default]** Enabled	Enables or disables Quiet Boot option
Fast Boot	Disabled**[Default]** Enabled	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
Boot Option #1	Set the system boot order.	

3.6.6   Save and exit

```
          Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
      Main  Advanced  Chipset  Security  Boot  Save & Exit

    Save Options                                    Reset the system after saving
    Save Changes and Reset                          the changes.
    Discard Changes and Reset

    Default Options
    Restore Defaults



    Boot Override
    UEFI: hp v220w 1100, Partition 1
    Launch EFI Shell from filesystem device

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



          Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

```
          Aptio Setup Utility - Copyright (C) 2016 American Megatrends, Inc.
       Main  Advanced  Chipset  Security  Boot  Save & Exit

     Save Options                                        Reset the system after saving
     Save Changes and Reset                              the changes.
     Discard Changes and Reset

     Default Options
     Restore Defaults


     Boot Override                ┌──── Save & reset ────┐
     UEFI: hp v220w 1100, Partition│ Save configuration and reset?
     Launch EFI Shell from filesyst│                      │
                                   │                      │  →: Select Screen
                                   │                      │  ↓: Select Item
                                   │    Yes        No     │ nter: Select
                                   └──────────────────────┘ /-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit



          Version 2.17.1255. Copyright (C) 2016 American Megatrends, Inc.
```

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.
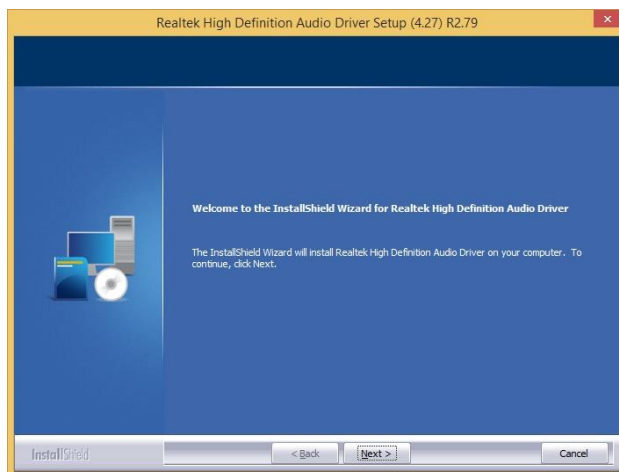
4.1 Install Chipset Driver

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\Driver_Chipset\Intel\EBM-SKLU**.
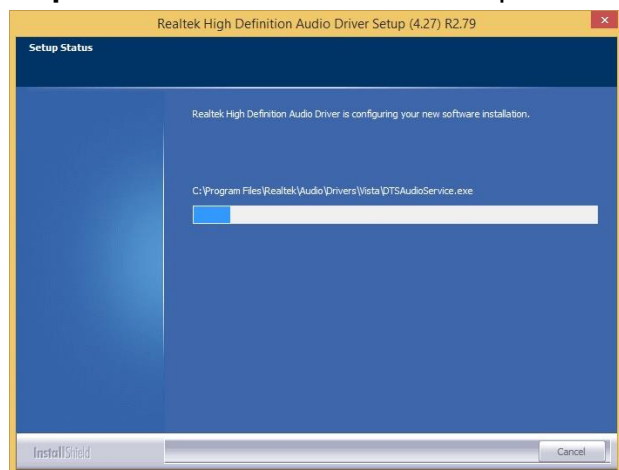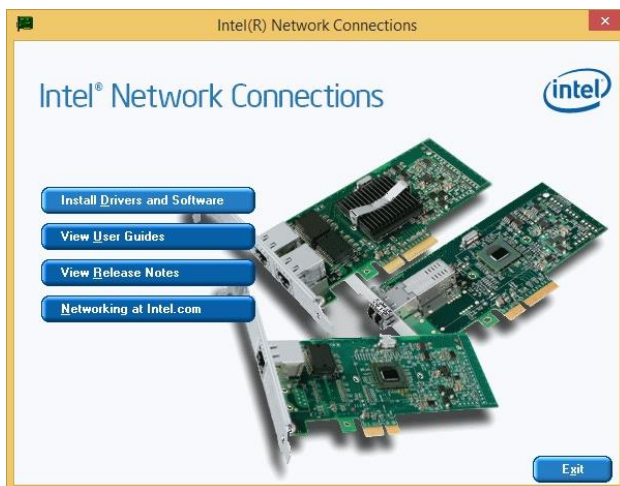
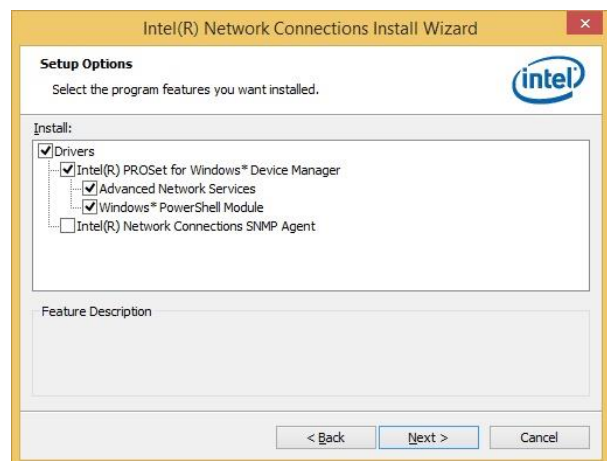> **Note:** The installation procedures and screen shots in this section are based on Windows 8.1 operation system. If the warning message appears while the installation process, click Continue to go on.

Step 3. Click **Install**.

Step1. Click **Next**.

Step 4. Setup completed.

Step 2. Click **Accept**.

4.2 Install Touch Driver

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\Utility\EBM-SKLU_Touch**.

Note: The installation procedures and screen shots in this section are based on Windows 8.1 operation system. If the warning message appears while the installation process, click Continue to go on.
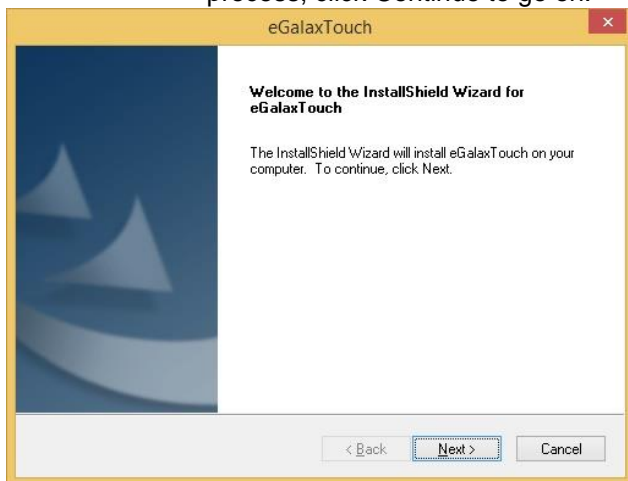
Step1. Click **Next** to start installation.
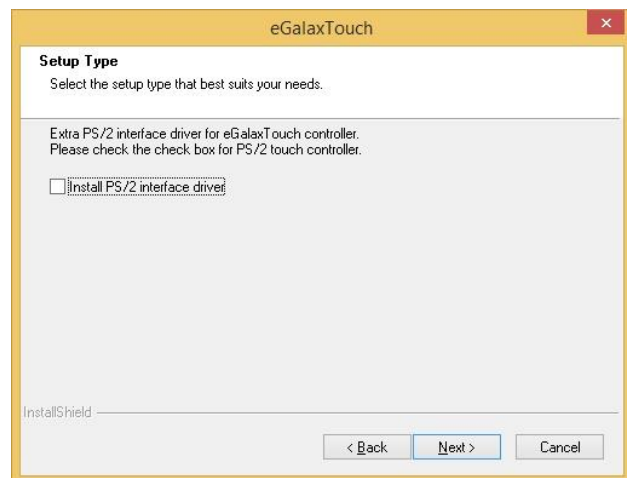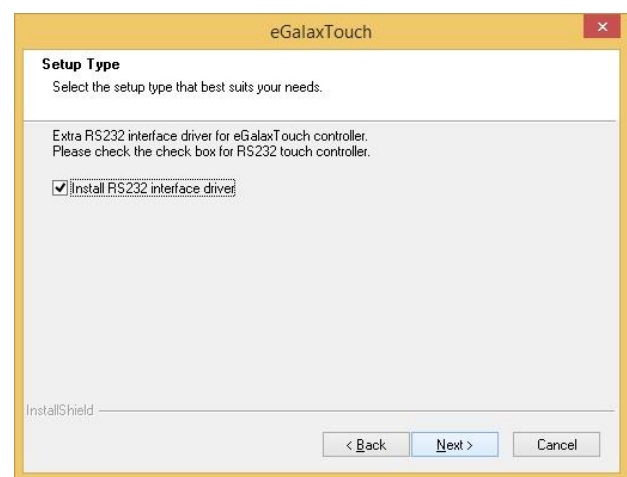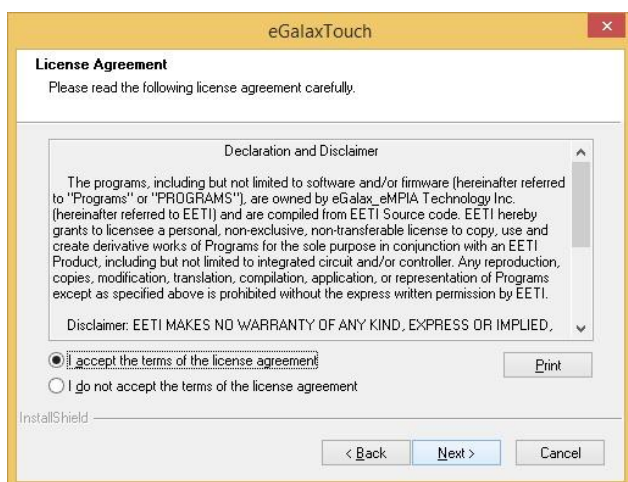
Step 2. Click **Next** to proceed setup.

Step 3. Click **Next**.
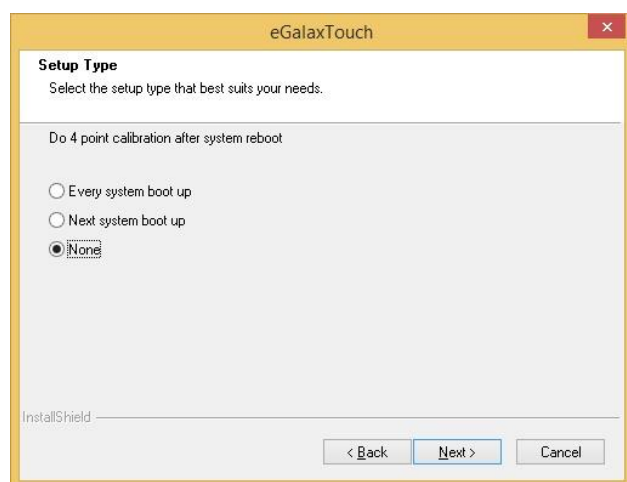
Step 4. Click **Next**.

Step 5. Click **Next**.

Step 6. Click **OK**.
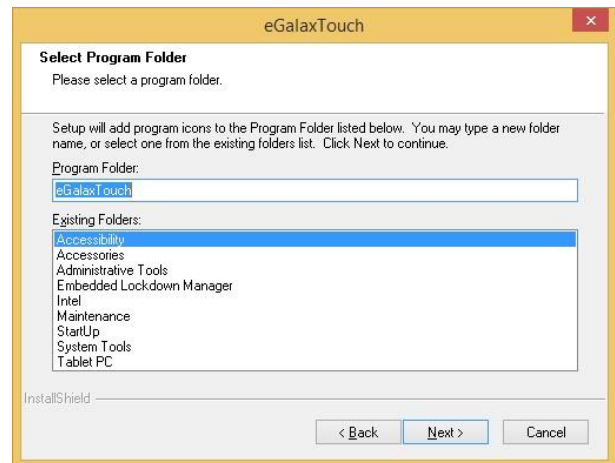
Step 9. Click **Next**.
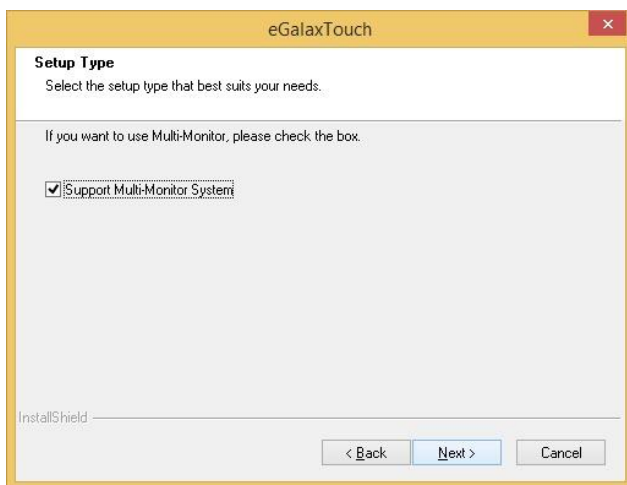
Step7. Click **Next**.
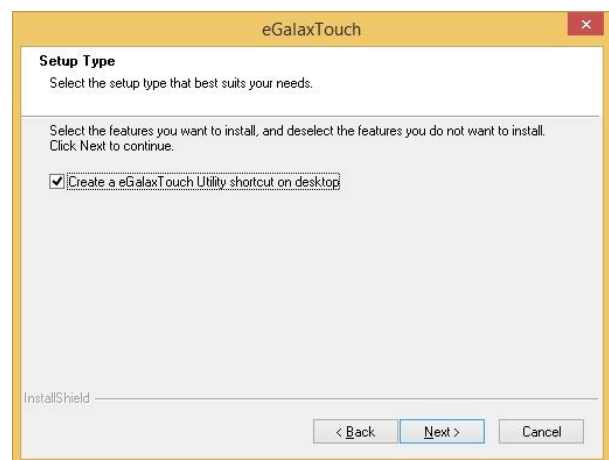
Step 10. Click **Next**.
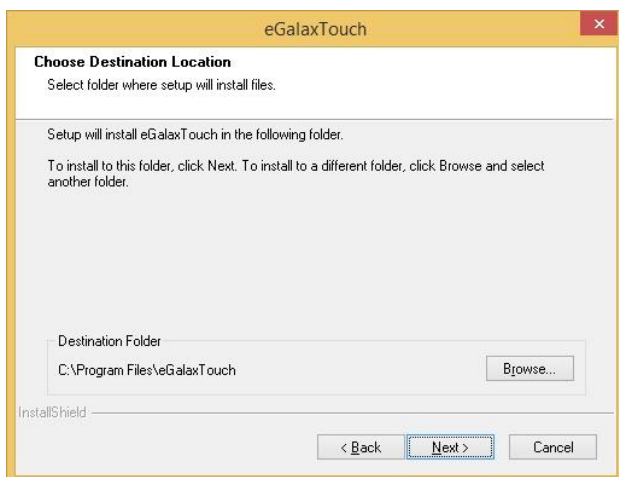
Step 8. Click **Next** to proceed setup.
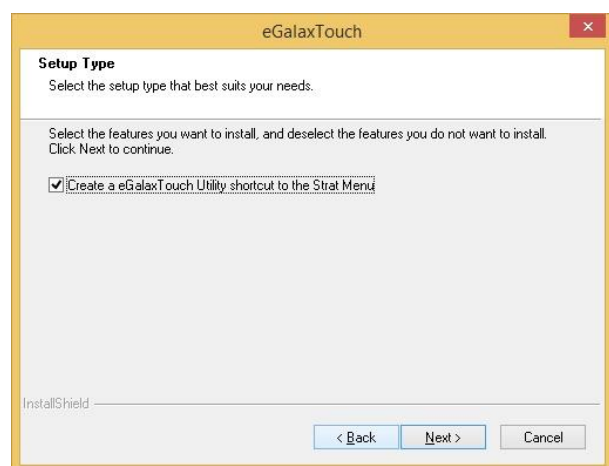
Step 11. Click **Next**.
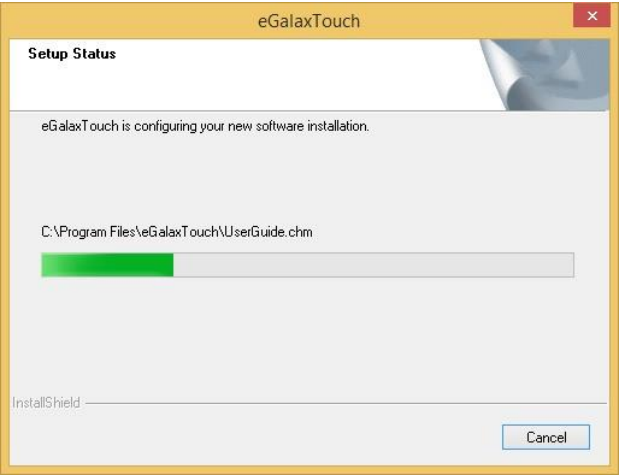
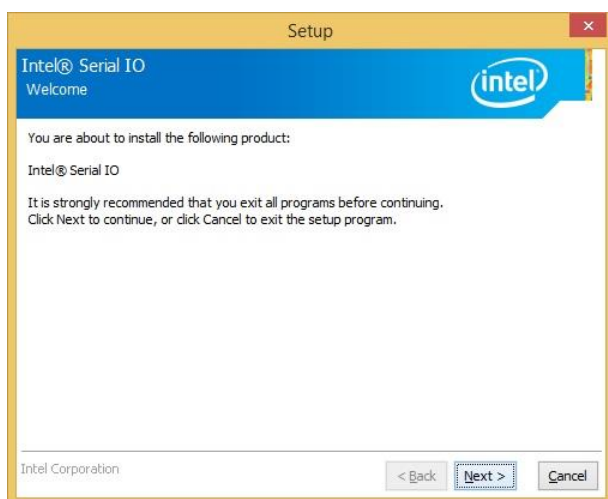**Step 12.** Setup completed

4.3 Install ME Driver

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\Utility\EBM-SKLU_ME**.

Note: The installation procedures and screen shots in this section are based on Windows 8.1 operation system. If the warning message appears while the installation process, click Continue to go on.
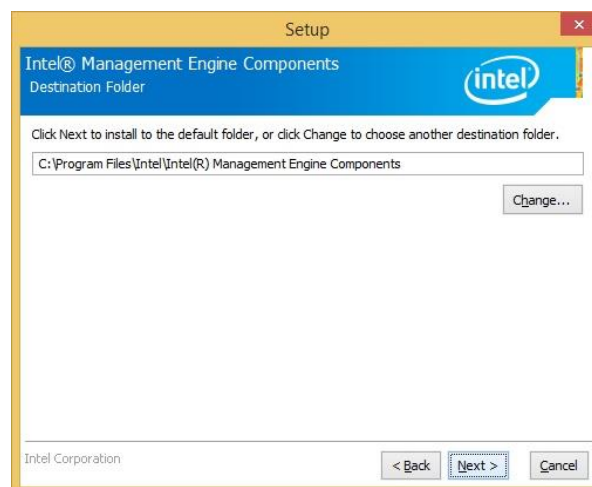
Step 3. Click **Next** to continue installation.
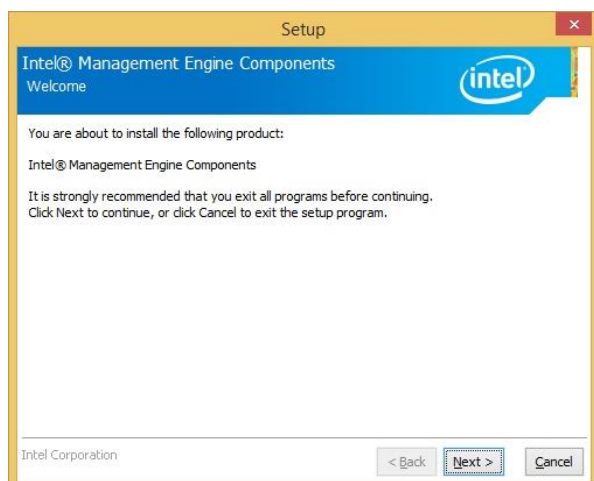
Step1. Click **Next** to start installation.
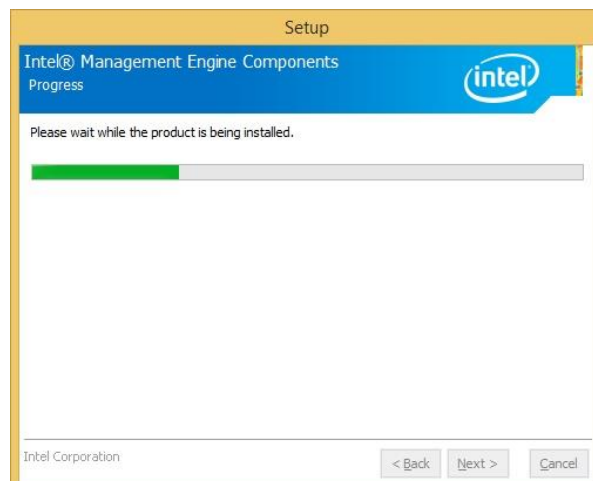
Step 4. Installing.
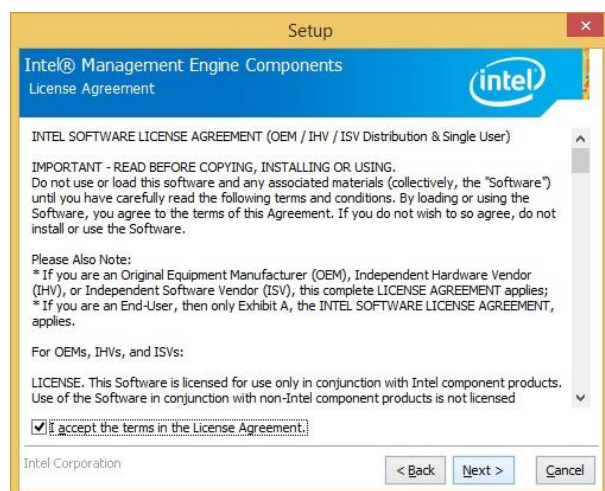
Step 2. Click **Next**.

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

4.4 Install VGA Driver

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\VGA\EBM-SKLU**.

Note: The installation procedures and screen shots in this section are based on Windows 8.1 operation system.
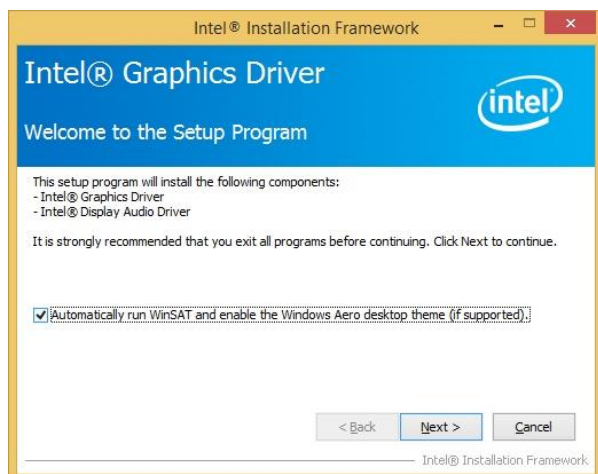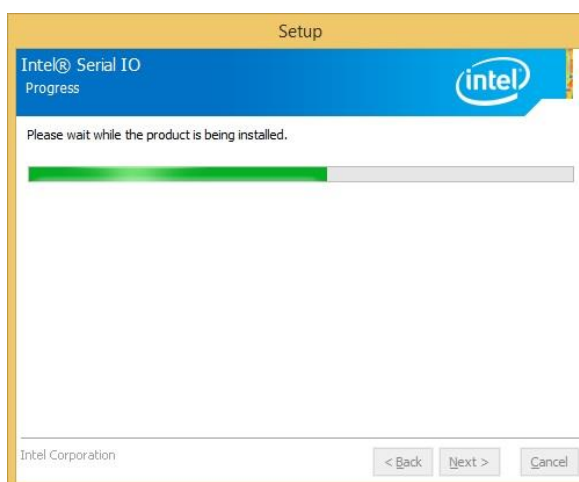
Step 3. Click **Next.**

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

Step 2.

Click **Yes** to accept license agreement.
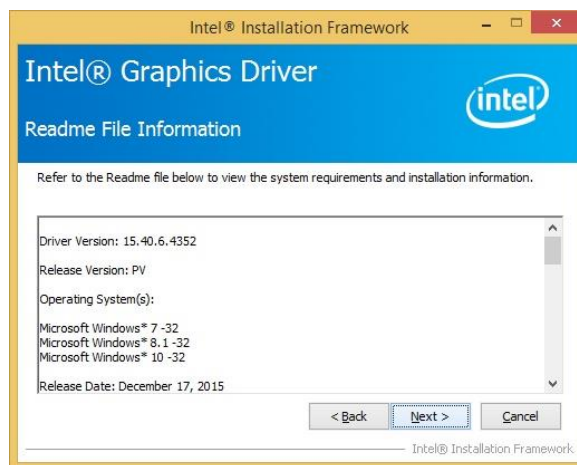
Step 4. Click **Next**.
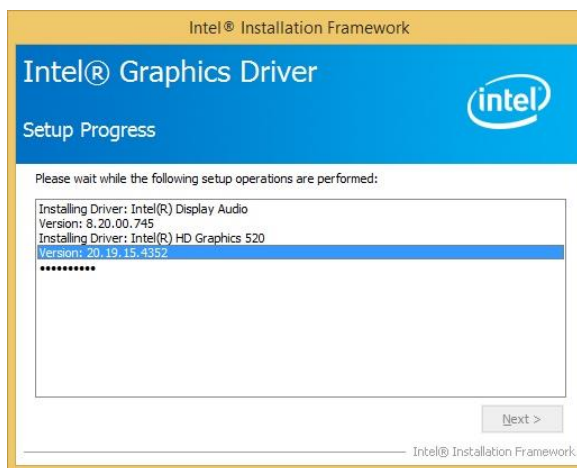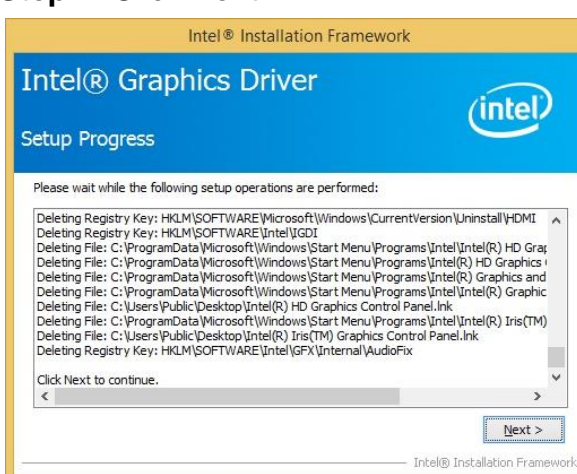
Step 5. Click **Next**.
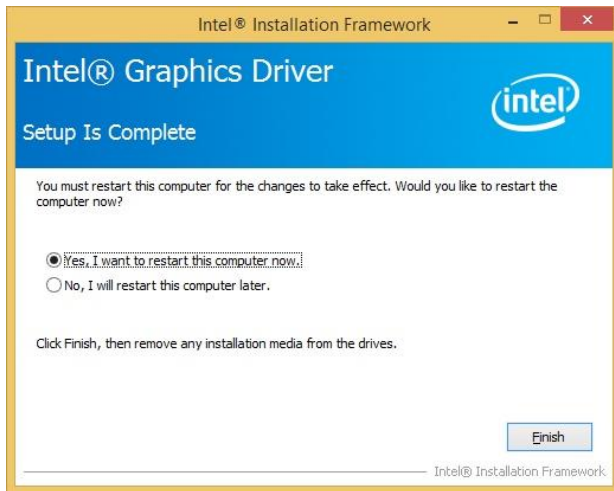
Step 6. Click **Finish** to complete setup.

4.5 Install Audio Driver (For Realtek ALC233)

Insert the Supporting CD-ROM to CD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\Driver_Audio\Realtek\ALC233\EBM-SKLU_Audio**.
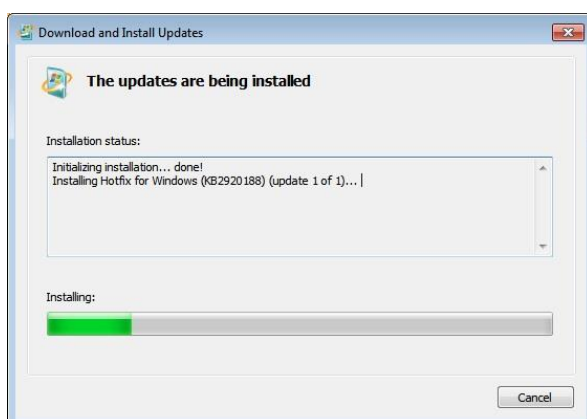
Note: The installation procedures and screen shots in this section are based on Windows 8.1 operation system.
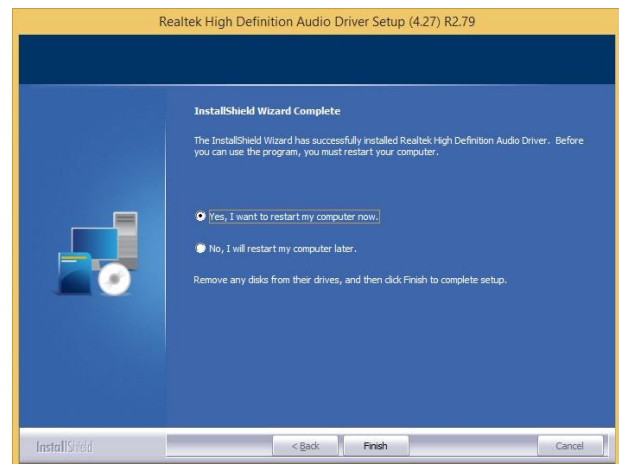
Step 3. Click **Finish** to complete the setup.

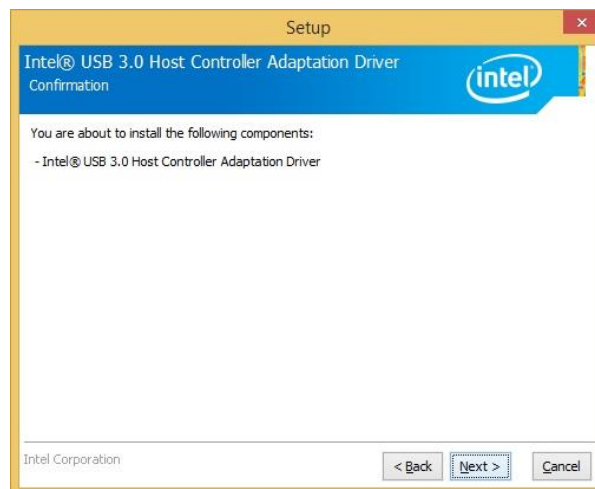**Step 1.** Click **Next** to continue setup.

Step 2. Installing.

4.6 Install Ethernet Driver

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to

\Driver_Gigabit\Intel\I210AT_I219LM\EBM-SKLU_LAN.

Note: The installation procedures and screen shots in this section are based on Windows 8.1 operation system.

Step 3. Click **Next.**

Step 4. Click **Next** to continue.

Step 1. Click **Install Drivers and Software** to continue installation.

Step 2. Click **Next**.
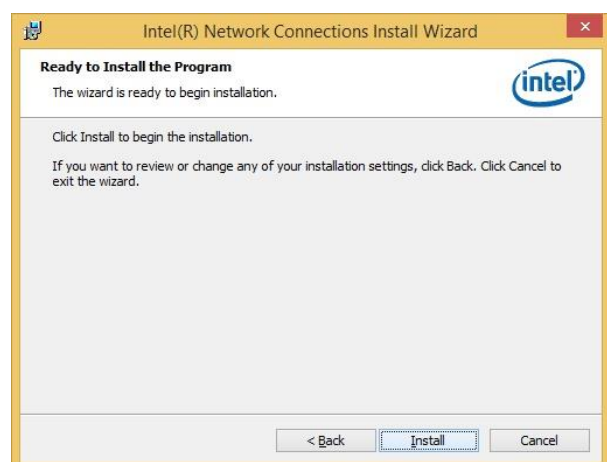
Step 5. Click **Install**.

Step 6. Installing.

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

4.7 Install Serial IO Driver

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\Utility\EBM-SKLU_Serial_IO**.

Note: The installation procedures and screen shots in this section are based on Windows 8.1 operation system.

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

Step 2. Click **Next**.

Step 3. Click **Next.**

Step 4. Click **Next**.

Step 5. Installing.

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

4.8 Install TPM2.0 Driver

Insert the Supporting CD-ROM to CD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\Utility\EBM-SKLU_TPM2.0**.

Note: The installation procedures and screen shots in this section are based on Windows 7 operation system.

Step 3. Setup completed.
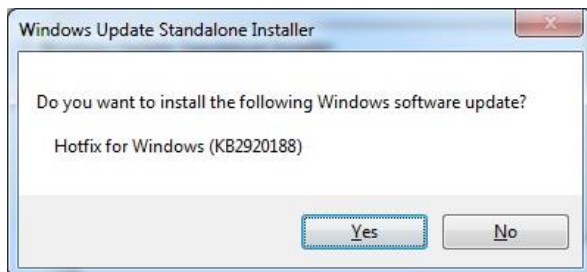
Step 1. Click **Yes** to continue setup.

Step 2. Installing.

4.9 Install USB3.0 Driver

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\Utility\EBM-SKLU_USB3.0**.

> **Note:** The installation procedures and screen shots in this section are based on Windows 8.1 operation system. If the warning message appears while the installation process, click Continue to go on.
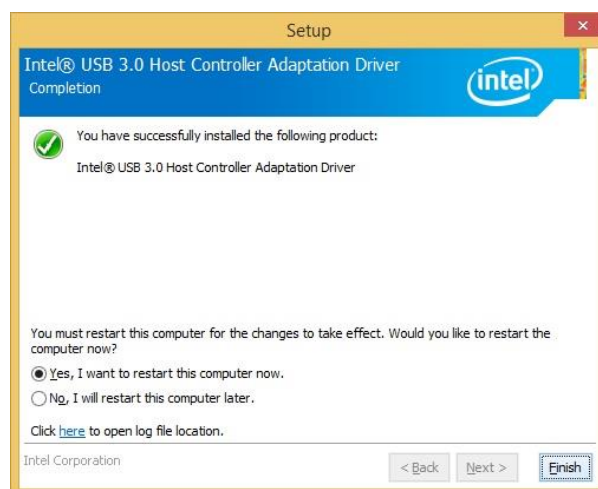

Step 3. Click **Next** to continue installation.
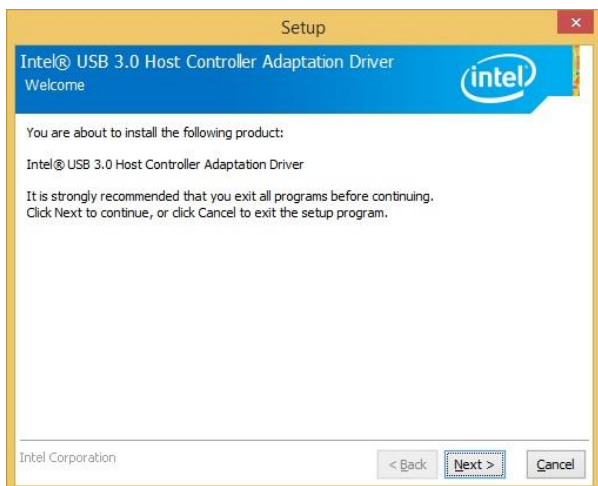
Step1. Click **Next** to start installation.
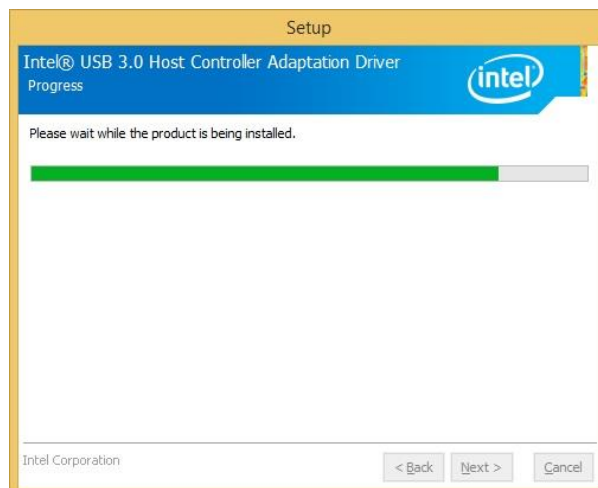
Step 4. Installing.

Step 2. Click **Next**.

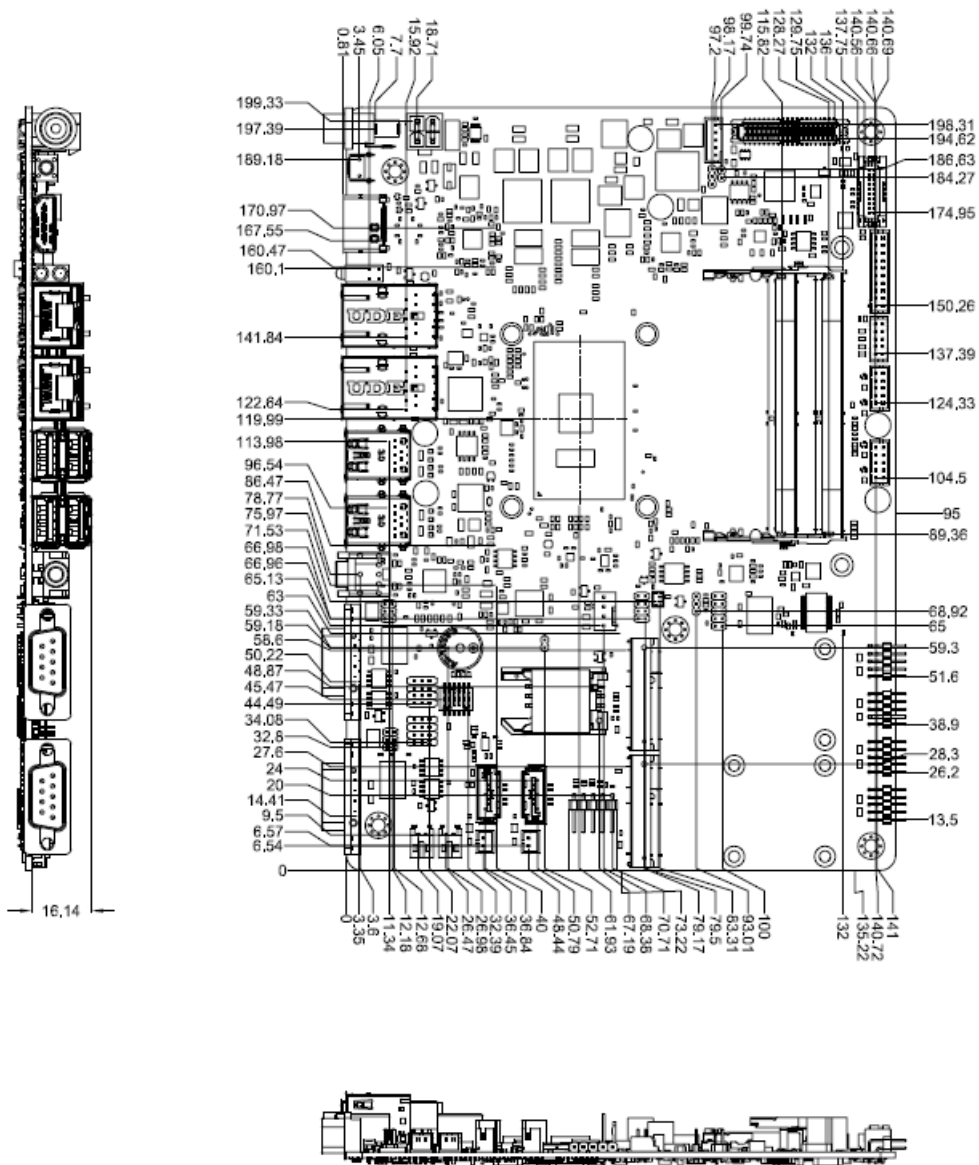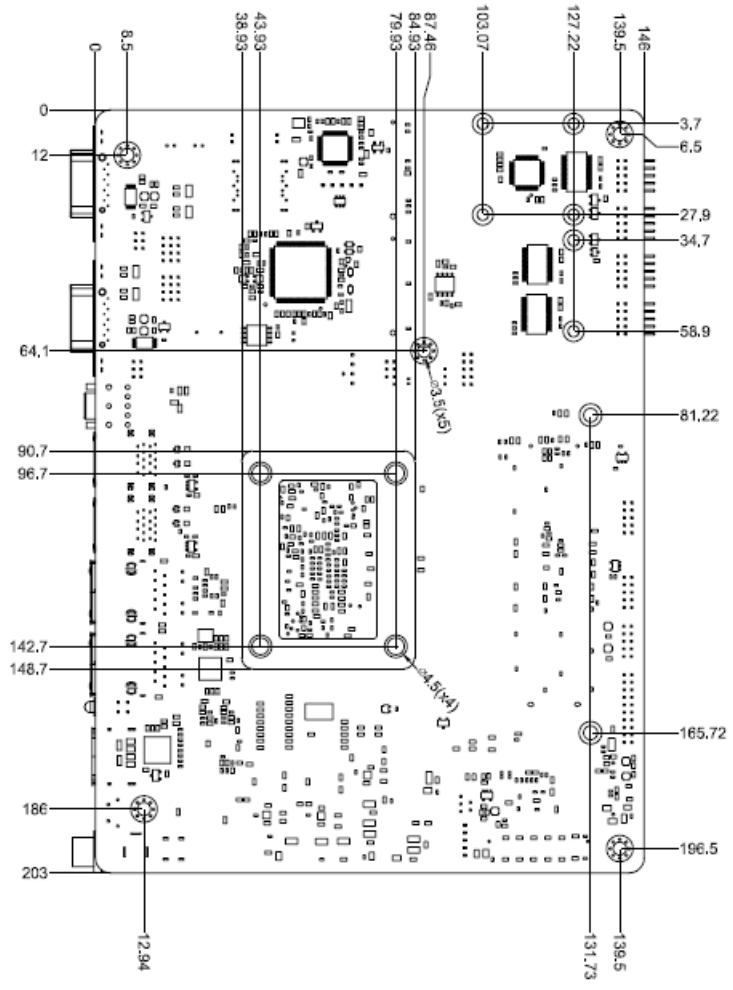**Step 5.** Click **Finish** to complete setup.

5. Mechanical Drawing

Unit: mm

Unit: mm