EBM-BYT

Intel® Atom™ SoC Processor 5.25” Mini Module

User’s Manual

7th Ed – 08 May 2019

Part No. E2047582306R

FCC Statement

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

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

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

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

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

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

Notice

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

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A Message to the Customer

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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-BYT Intel® Atom™ SoC Processor 5.25" Mini Module

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

1.3 Document Amendment History

Revision	Date	By	Comment
1st	May 2014	Avalue	Initial Release
2nd	September 2014	Avalue	Update BIOS Setup
3rd	October 2014	Avalue	Update System Specifications
4th	May 2015	Avalue	Update System Specifications
5th	July 2016	Avalue	Update Jumper and Connector List
6th	February 2019	Avalue	Update System Specifications
7th	May 2019	Avalue	Update Product Overview

1.4 Manual Objectives

This manual describes in details Avalue Technology EBM-BYT 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-BYT series or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

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

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

1.5 System Specifications

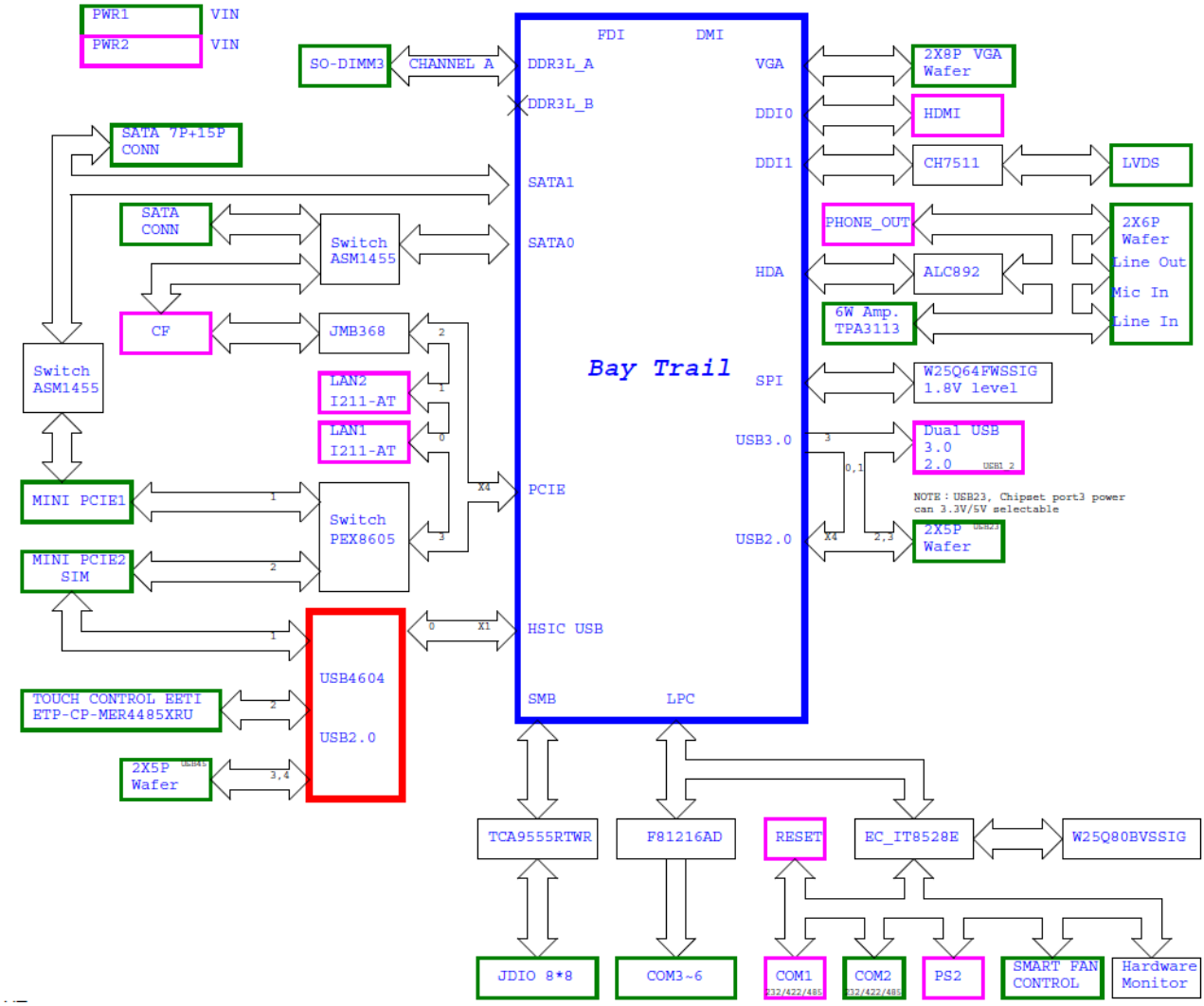
System	
CPU	Onboard Intel Bay Trail-M/D/I SoC
BIOS	AMI uEFI BIOS, 64/128Mbit SPI Flash ROM
System Chipset	Valleyview SoC Integrated
I/O Chip	EC (IT8528E)
System Memory	One 204-pin DDR3 SODIMM Socket, Supports Up to 8GB DDR3L 1333MHz SDRAM
SSD	One CompactFlash Type I/II Socket
Watchdog Timer	H/W Reset, 1sec. ~ 65535sec. and 1sec step
H/W Status Monitor	Monitoring System Temperature, Voltage, and Cooling Fan Status with Auto Throttling Control
Expansion	1 x mPCIe with SIM Slot 1 x mPCIe Supports mSATA
I/O	
MIO	1 x SATA II 2 x Mini PCIe, 1 x SIM 2 x RS-232/422/485 (COM1 selected by BIOS, COM2 selected by switch) 4 x RS-232 (option) 1 x CF 1 x Mic/Line-in/Line-out 2 x LAN (1 x optional K/B & Mouse)
USB	1 USB 3.0, 5 USB 2.0
DIO	16-bit General Purpose I/O for DI and DO
Display	
Chipset	Valleyview SoC Integrated Graphics
Resolution	VGA: Max. resolution 2560 x 1080@ 60Hz HDMI: Max. resolution 1920 x 1200@ 60Hz LVDS: Max. resolution 1920 x 1080@ 60Hz
Multiple Display	CRT + LVDS, HDMI + LVDS, CRT + HDMI
HDMI	HDMI 1.4a
LCD Interface	LVDS
Touch Screen Interface	
Chipset	EETI support 5-wire resistive touch
Touch Interface	USB

Audio	
HD Codec	Realtek ALC892 Supports 5.1-CH Audio
Audio Interface	Mic-in, Line-in, Line-out
Audio Amplifier	5W Amplifier
Ethernet	
LAN Chip	Bay Trail-I: 2 x Intel® I210IT Gigabit Ethernet Controller Bay Trail-M/D: 2 x Intel® I211AT Gigabit Ethernet Controller
Ethernet Interface	10/100/1000 Base-Tx Gigabit Ethernet Compatible
Mechanical & Environmental	
Power Requirement	＋12V ～ ＋26V
Power Type	AT/ATX
Operating Temp.	0°C ~ 60°C (BayTrail-D/M) -40°C ~ 85°C (BayTrail-I)
Storage Temp.	-40 ~ 85°C (-40 ~ 185°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.

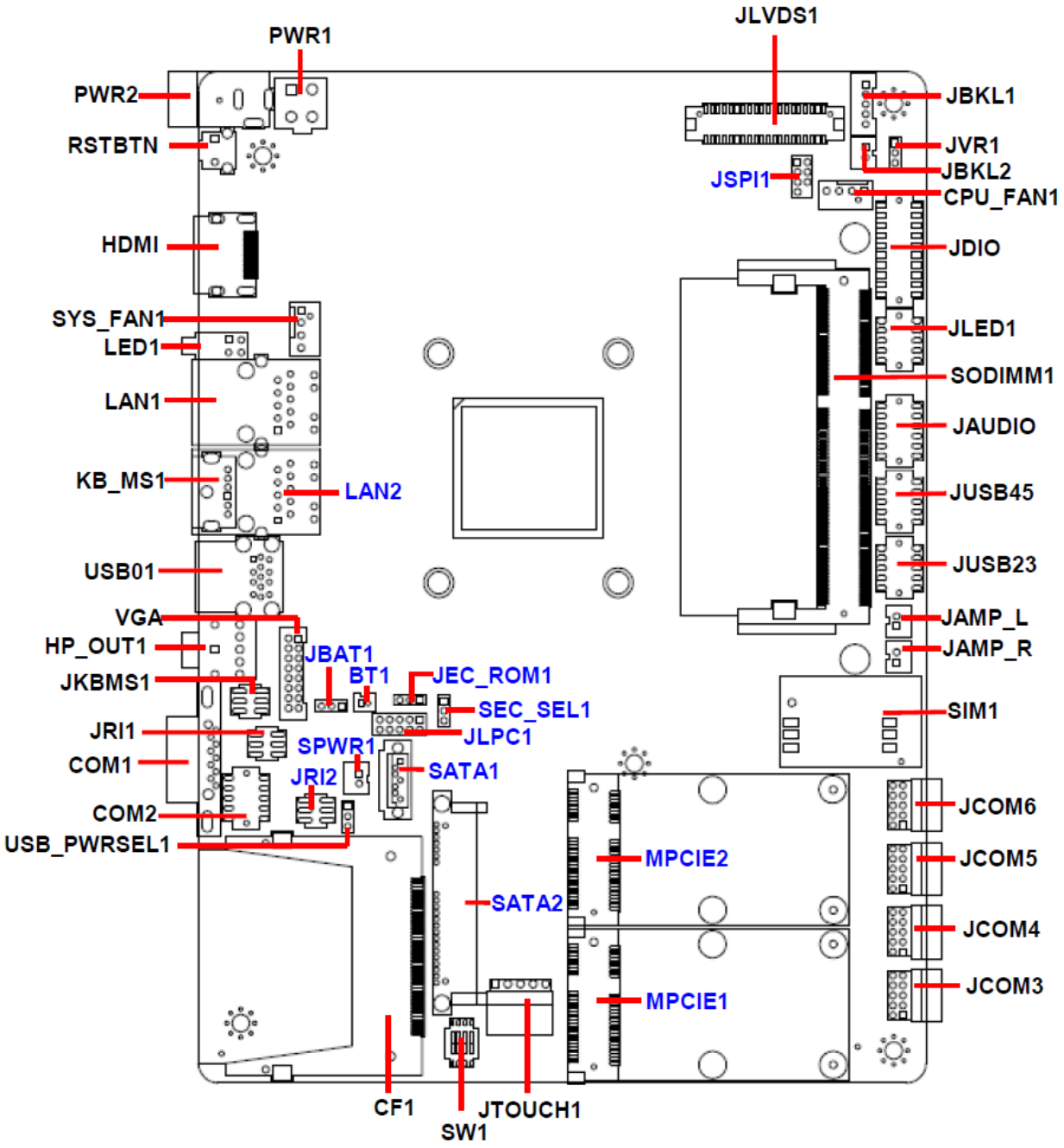
1.6 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of EBM-BYT.



2. Hardware Configuration

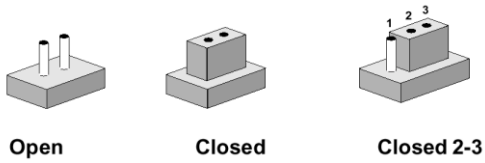
2.1 Product Overview



2.2 Jumper and Connector List

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

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



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

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

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

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

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

Jumpers

Label	Function	Note
JBAT1	Clear CMOS	3 x 1 header, pitch 2.00mm
JRI1	Serial port 1 pin9 signal select	3 x 2 header, pitch 2.00mm
JRI2	Serial port 2 pin9 signal select	3 x 2 header, pitch 2.00mm
JVR1	LCD backlight brightness adjustment	3 x 1 header, pitch 2.00mm
SW1	Multi-function select	DIP switch 4pin

Connectors

Label	Function	Note
CPU_FAN1	CPU fan connector	4 x 1 wafer, pitch 2.54mm
SYS_FAN1	System fan connector	4 x 1 wafer, pitch 2.54mm
SODIMM1	204-pin DDR3L SODIMM socket	

JAUDIO	Audio connector	6 x 2 wafer, pitch 2.00mm
JBKL1	LCD Inverter connector	5 x 1 wafer, pitch 2.00mm
JBKL2	LCD Inverter connector	2 x 1 wafer, pitch 2.00mm
COM1	Serial Port 1 connector	D-sub 9 pin, male
COM2	Serial Port 2 connector	5 x 2 wafer, pitch 2.00mm
JCOM3	Serial Port 3 connector	5 x 2 wafer, pitch 2.00mm
JCOM4	Serial Port 4 connector	5 x 2 wafer, pitch 2.00mm
JCOM5	Serial Port 5 connector	5 x 2 wafer, pitch 2.00mm
JCOM6	Serial Port 6 connector	5 x 2 wafer, pitch 2.00mm
JDIO	General purpose I/O connector	10 x 2 wafer, pitch 2.00mm
JLED1	LED indicator 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
USB01	USB connector 1 & 2	
JUSB23	USB connector 3 & 4	5 x 2 wafer, pitch 2.00mm
JUSB45	USB connector 5 & 6	5 x 2 wafer, pitch 2.00mm
LAN1	RJ-45 Ethernet 1	
LAN2	RJ-45 Ethernet 2	
KB_MS1	PS/2 keyboard & mouse connector	
JKBMS1	PS/2 keyboard & mouse connector	3 x 2 header, pitch 2.00 mm
BT1	Battery connector	2 x 1 wafer, pitch 1.25mm
JAMP_R	AMPLIFIER_R	2 x 1 wafer, pitch 2.00mm
JAMP_L	AMPLIFIER_L	2 x 1 wafer, pitch 2.00mm
MPCIE1	Mini-PCI connector 1	Supports mSATA (w/o USB signals)
MPCIE2	Mini-PCI connector 2	Supports WiFi/3G w/ SIM (Standard MPCIe w/ USB signals)
JLPC1	LPC connector	5 x 2 header, pitch 2.00mm
PWR1	Power connector	2 x 2 wafer, pitch 4.20mm
PWR2	Power connector	
RSTBTN	Reset button	
JSPI1	SPI connector	4 x 2 header, pitch 2.00mm
JEC_ROM1	EC Debug connector	3 x 1 header, pitch 2.00 mm
SPWR1	SATA Power connector	2 x 1 wafer, pitch 2.00mm

CF1	Compact Flash card connector	SATA1 & CF are not co-working
SATA1	Serial ATA connector 1	
SATA2	Serial ATA connector 2 (Option)	7+15pin SATA connector
SIM1	SIM card slot	
HDMI	HDMI connector	
HP_OUT1	Audio line-out connector	
USB_PWRSEL1	USB Power select	3 x 1 header, pitch 2.00mm
VGA	VGA connector	8 x 2 wafer, pitch 2.00 mm

※ SATA connector noted:

SATA2 connector(option) and the mSATA from mPCIe1 slot can't be used at the same time because of the following reason.

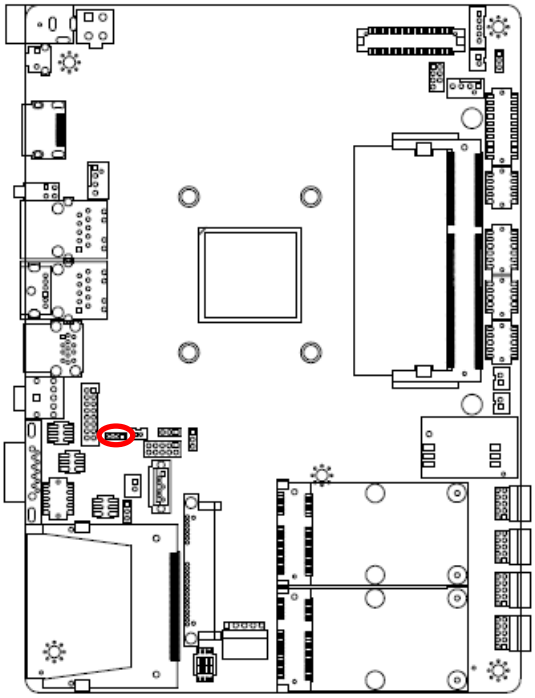
When we use the SATA1 connector, the mPCIe1 is available to use mSATA because they are from the different SATA signal source.

When we use the SATA2 connector(the SATA2 connector has not been mounted by default unless the customer needs it), the SATA signal source will be occupied by SATA2 connector, so that the mPCIe1 slot can't use the same SATA signal source to work at the same time.

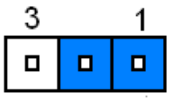
Therefore, when we use SATA2 connector, the mSATA from mPCIe1 slot will be unavailable at the same time.

2.3 Setting Jumpers & Connectors

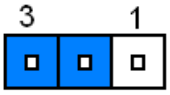
2.3.1 Clear CMOS (JBAT1)



Protect*

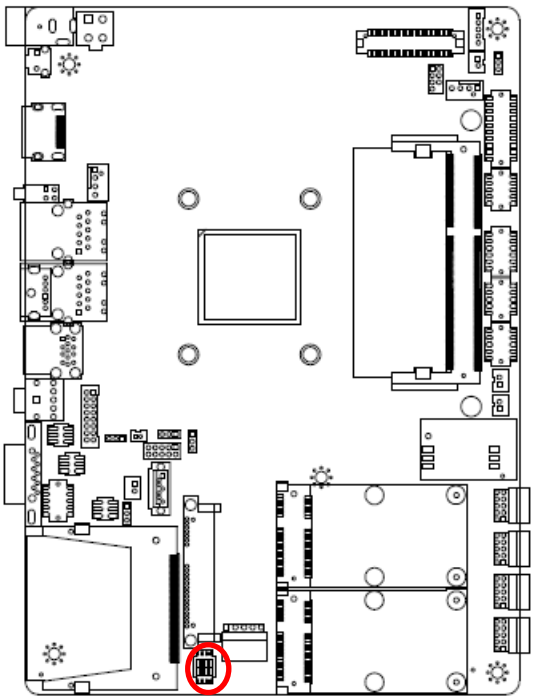


Clear CMOS



*** Default**

2.3.2 Multi-function select (SW1)

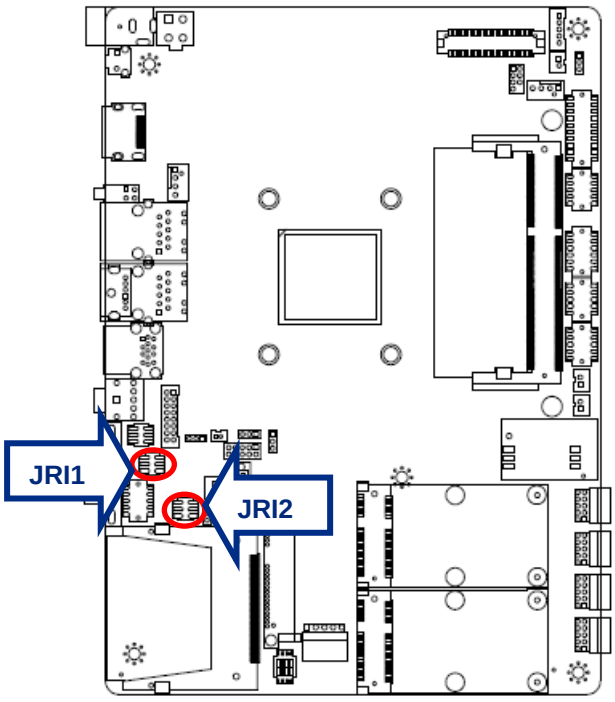


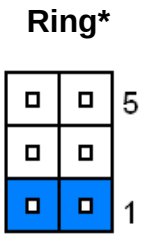
	ON	OFF
1	AT SEL	ATX SEL
2	Touch off	Touch on

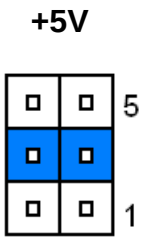
In Serial Port 2 mode

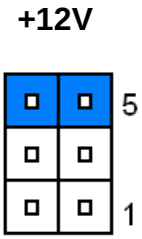
	RS-232	RS-422	RS-485
3	OFF	ON	OFF
4	OFF	OFF	ON

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



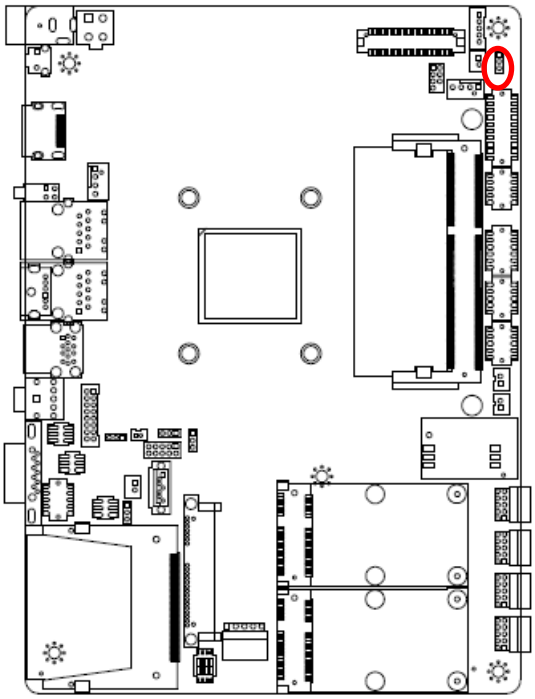


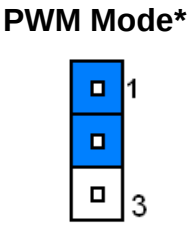


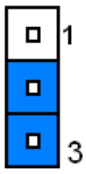


*** Default**

2.3.4 LCD backlight brightness adjustment (JVR1)

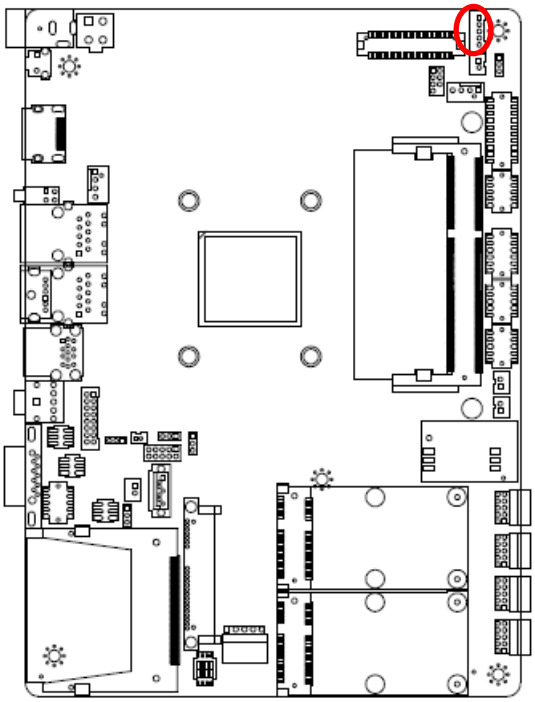






*** Default**

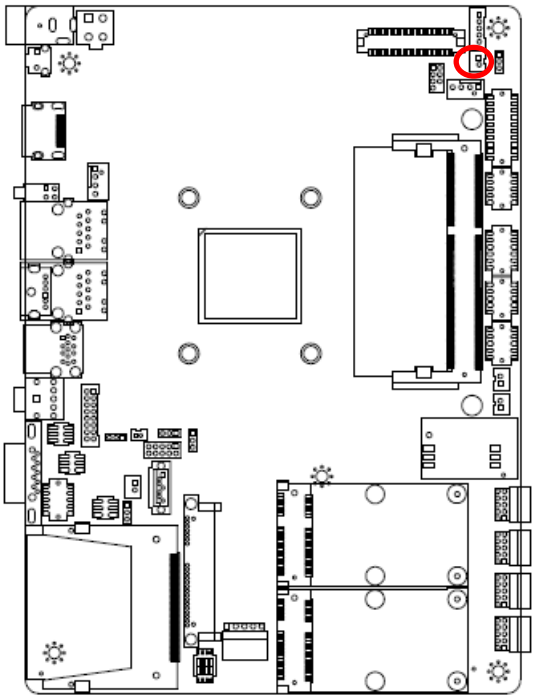
2.3.5 LCD Inverter connector (JBKL1)



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

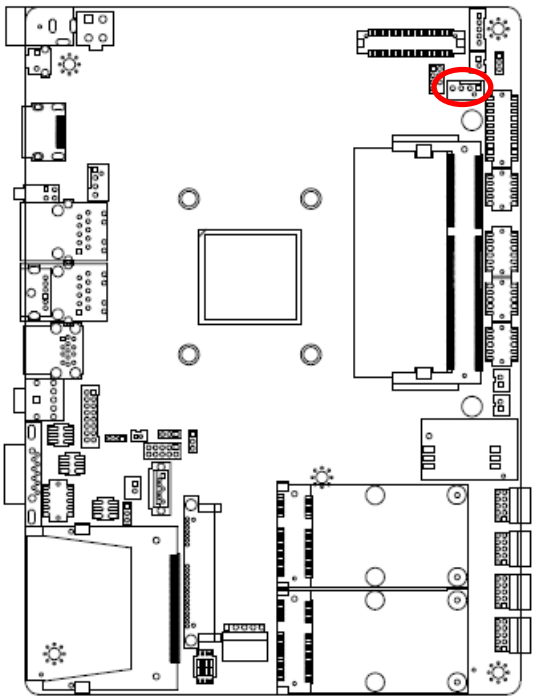
Note:
For inverters with adjustable Backlight function, it is possible to control the LCD brightness through the VR signal controlled by **JVR**. Please see the **JVR** section for detailed circuitry information.

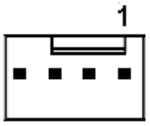
2.3.6 LCD Inverter connector (JBKL2)



Signal	PIN
+12V	1
GND	2

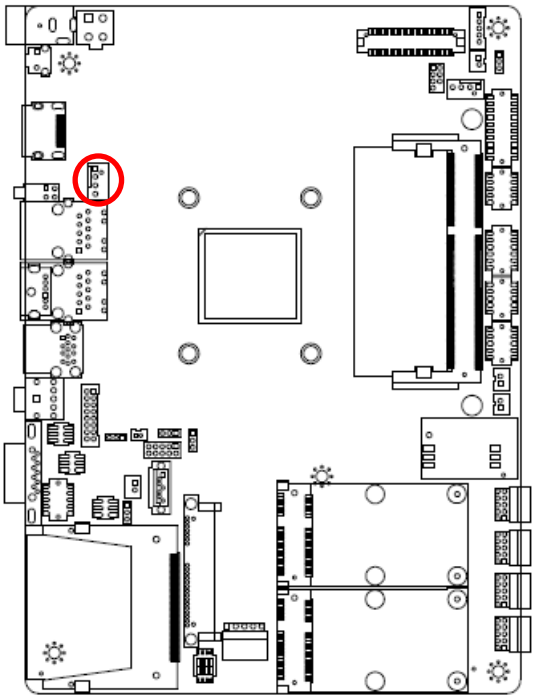
2.3.7 CPU fan connector (CPU_FAN1)

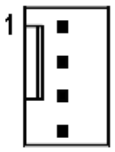




Signal	PIN
GND	1
+12V	2
EC_TACH0	3
FAN_PWM0	4

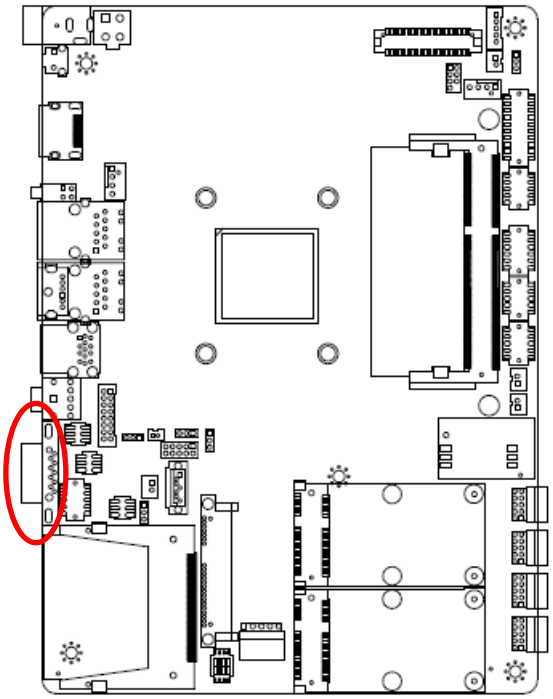
2.3.8 System fan connector (SYS_FAN1)

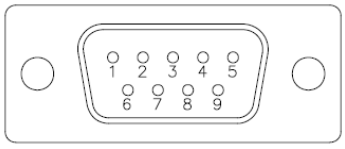




Signal	PIN
GND	1
+12V	2
EC_TACH1	3
FAN_PWM1	4

2.3.9 Serial port 1 connector (COM1)





RS-232 Mode

Signal	PIN	PIN	Signal
NDCDA#_485TXN	1	6	NDSRA#
NRXDA_485TXP	2	7	NRTSA#
NTXDA_485RXP	3	8	NCTSA#
NDTRA#_485RXN	4	9	NRIA#
GND	5		

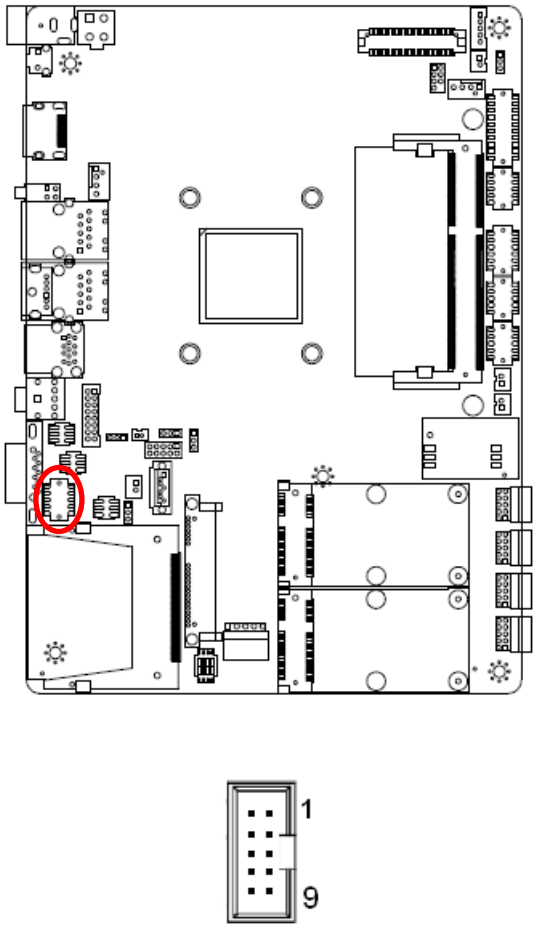
RS-422 Mode

Signal	PIN	PIN	Signal
485TXN	1	6	NC
485TXP	2	7	NC
485RXP	3	8	NC
485RXN	4	9	NC
GND	5		

RS-485 Mode

Signal	PIN	PIN	Signal
485TXN	1	6	NC
485TXP	2	7	NC
NC	3	8	NC
NC	4	9	NC
GND	5		

2.3.10 Serial port 2 connector (COM2)



RS-232 Mode

Signal	PIN	PIN	Signal
NRXDB#	2	1	NDCDB
NDTRB#	4	3	NTXDB
NDSRB#	6	5	GND
NCTSB#	8	7	NRTSB#
NC	10	9	NRIB#

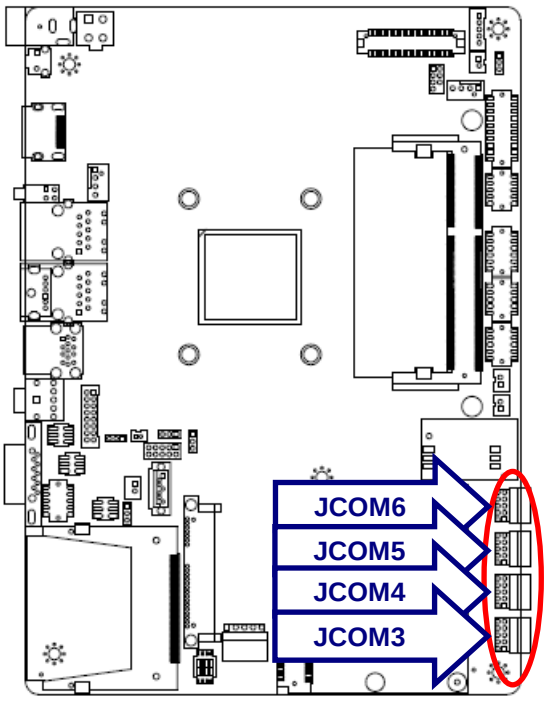
RS-422 Mode

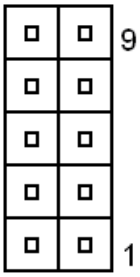
Signal	PIN	PIN	Signal
485TXP	2	1	485TXN
485RXN	4	3	485RXP
NC	6	5	GND
NC	8	7	NC
NC	10	9	NC

RS-485 Mode

Signal	PIN	PIN	Signal
485TXP	2	1	485TXN
NC	4	3	NC
NC	6	5	GND
NC	8	7	NC
NC	10	9	NC

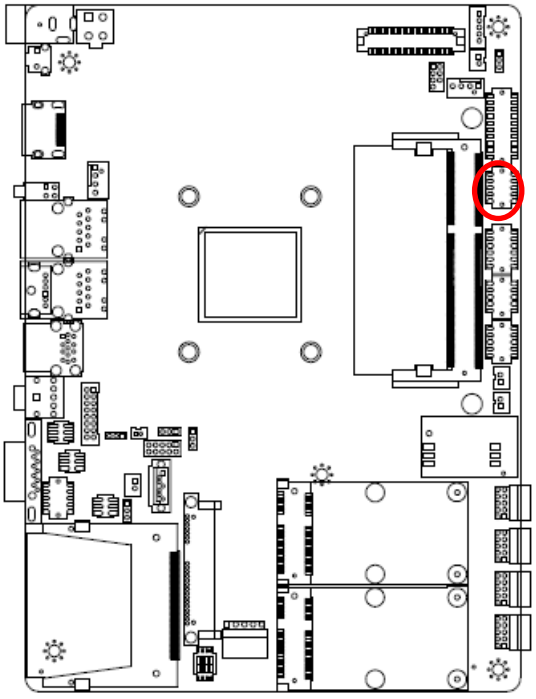
2.3.11 Serial port 3/ 4/ 5/ 6 connector (COM3/ COM4/ COM5/ COM6)

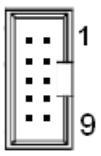




Signal	PIN	PIN	Signal
COM_RI#	10	9	NC
COM_RTS#	8	7	COM_CTS#
GND	6	5	COM_DSR#
COM_TXD	4	3	COM_DTR#
COM_DCD#	2	1	COM_RXD

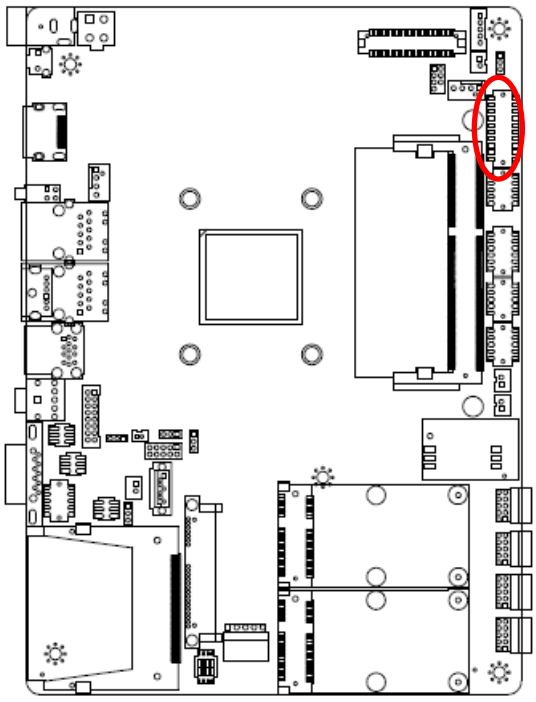
2.3.12 LED indicator connector (JLED1)

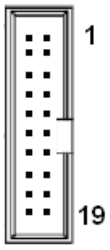




Signal	PIN	PIN	Signal
PWR_LED#	2	1	+5VSB
HDD_LED#	4	3	+5V
LAN1_ACT#	6	5	+V3P3M
LAN2_ACT#	8	7	+V3P3A
PWR_BTN	10	9	GND

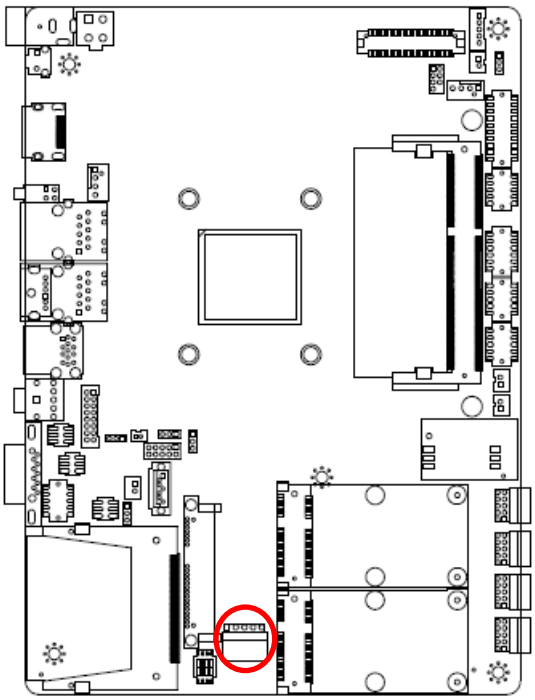
2.3.13 General purpose I/O connector (JDIO)





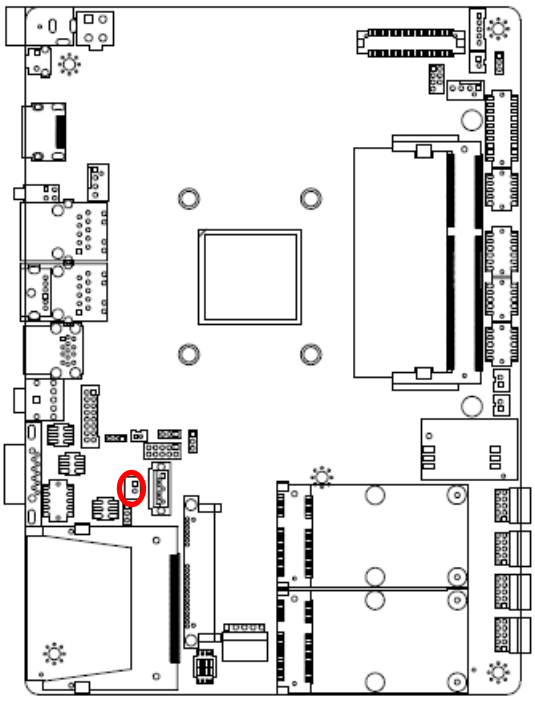
Signal	PIN	PIN	Signal
DIO_GP10	2	1	DIO_GP20
DIO_GP11	4	3	DIO_GP21
DIO_GP12	6	5	DIO_GP22
DIO_GP13	8	7	DIO_GP23
DIO_GP14	10	9	DIO_GP24
DIO_GP15	12	11	DIO_GP25
DIO_GP16	14	13	DIO_GP26
DIO_GP17	16	15	DIO_GP27
SMB_CLK_9555	18	17	SMB_DATA_9555
GND	20	19	+5V

2.3.14 Touch panel connector (JTOUCH1)



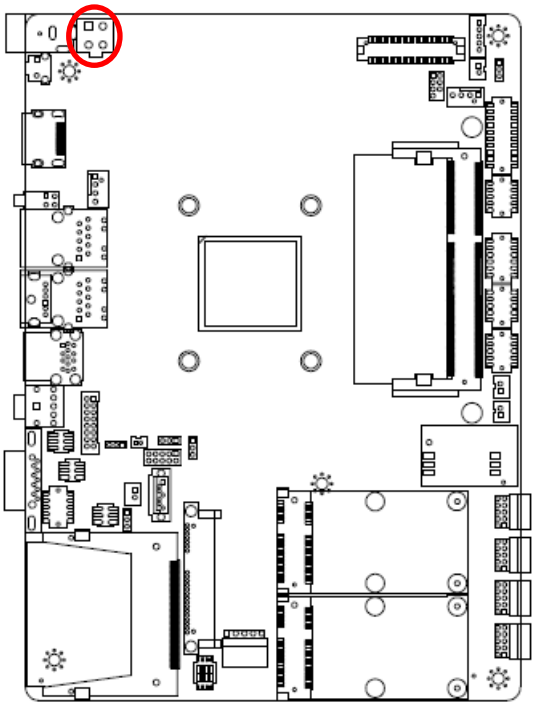
Signal	PIN
THX+	1
THX-	2
THPROBE_R	3
THY+	4
THY-	5

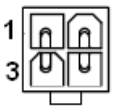
2.3.15 SATA Power connector (SPWR1)



Signal	PIN
GND	1
+5V	2

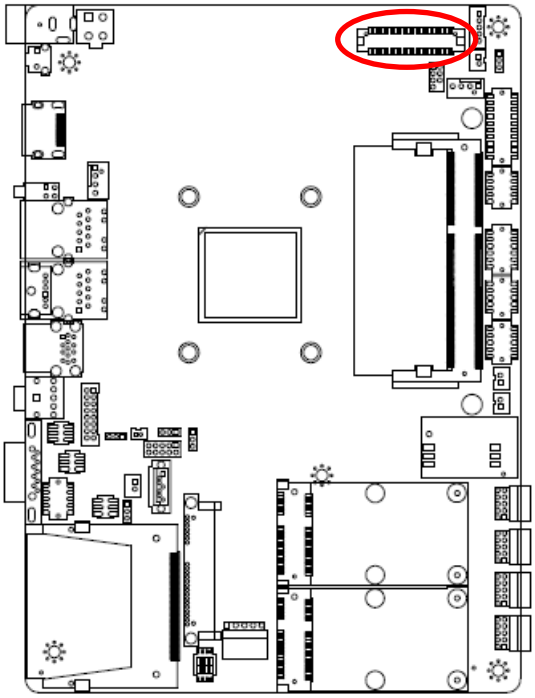
2.3.16 Power connector (PWR1)

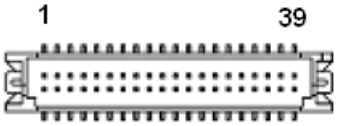




Signal	PIN	PIN	Signal
GND	1	2	GND
VIN_IN	3	4	VIN_IN

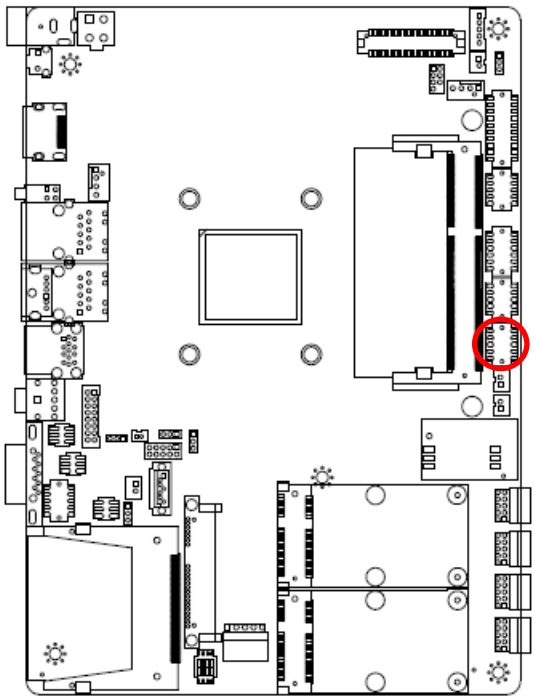
2.3.17 LVDS connector (JLVDS1)

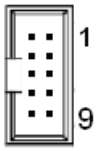




Signal	PIN	PIN	Signal
+3.3V	1	2	+5V
+3.3V	3	4	+5V
NC	5	6	NC
GND	7	8	GND
LVDS_DATA1_P	9	10	LVDS_DATA0_P
LVDS_DATA1_N	11	12	LVDS_DATA0_N
GND	13	14	GND
LVDS_DATA3_P	15	16	LVDS_DATA2_P
LVDS_DATA3_N	17	18	LVDS_DATA2_N
GND	19	20	GND
LVDS_DATA5_P	21	22	LVDS_DATA4_P
LVDS_DATA5_N	23	24	LVDS_DATA4_N
GND	25	26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

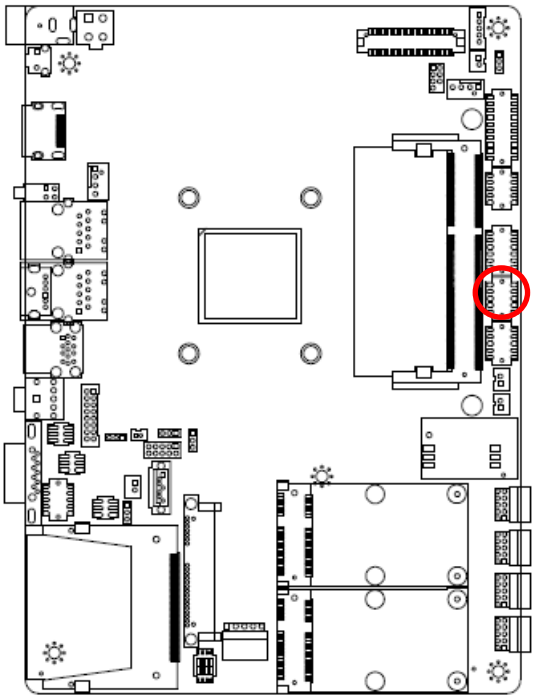
2.3.18 USB connector 3 & 4 (JUSB23)

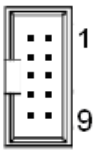




Signal	PIN	PIN	Signal
USBVCC3	2	1	USBVCC2
USB_HUB1_R_DN	4	3	USB_DN_R_2
USB_HUB1_R_DP	6	5	USB_DP_R_2
GND	8	7	GND
GND	10	9	GND

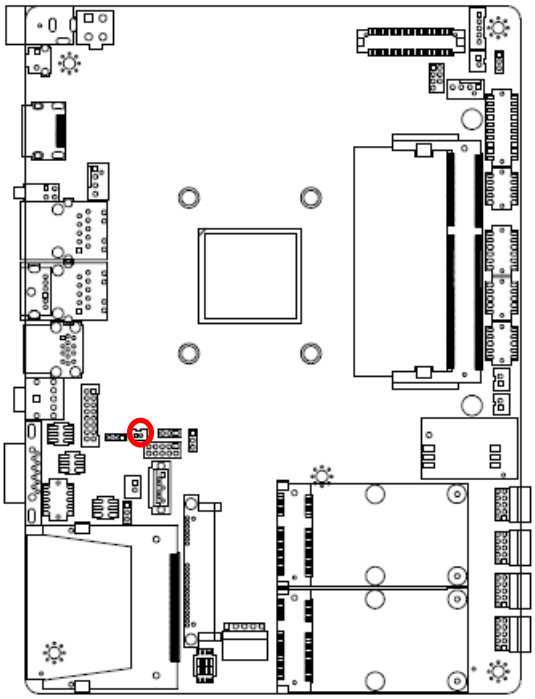
2.3.19 USB connector 5 & 6 (JUSB45)

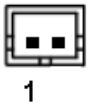




Signal	PIN	PIN	Signal
USBVCC45	2	1	USBVCC45
HSICUSB1B_DN_R	4	3	HSICUSB1A_DN_R
HSICUSB1B_DP_R	6	5	HSICUSB1A_DP_R
GND	8	7	GND
GND	10	9	GND

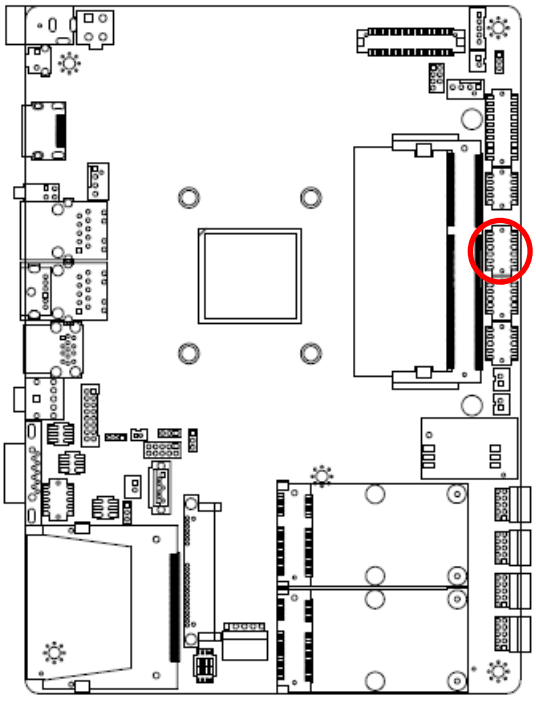
2.3.20 Battery connector (BT1)

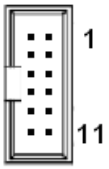




Signal	PIN
+3.3VSB	1
GND	2

2.3.21 Audio connector (JAUDIO)



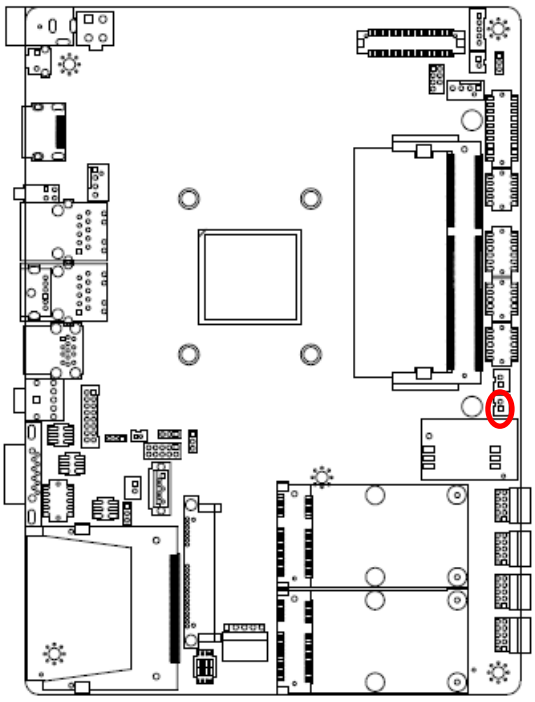


Signal	PIN	PIN	Signal
LINEOUT_R	2	1	LINEOUT_L
GND	4	3	GND
LINE1_RIN	6	5	LINE1_LIN
MIC_RIN	8	7	MIC_LIN
FRONT_JD	10	9	LINE1_JD
MIC1_JD	12	11	GND

2.3.21.1 Signal Description – Audio connector (JAUDIO)

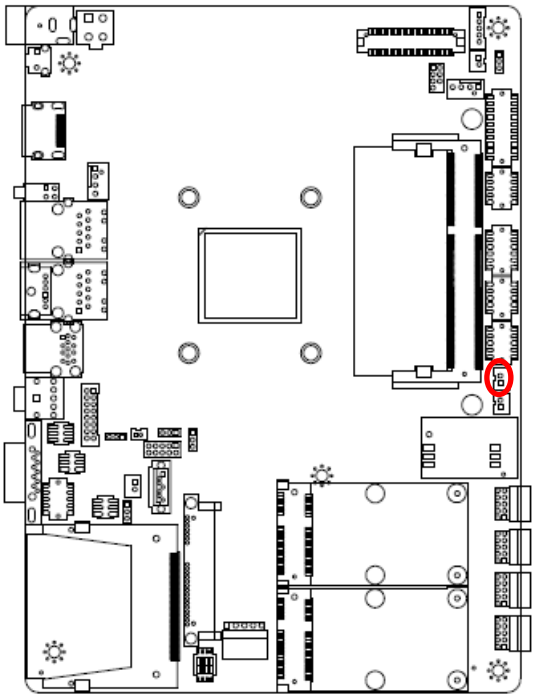
Signal	Signal Description
LINE1_JD	AUDIO IN (LINE_RIN/LIN)sense pin
FRONT_JD	AUDIO Out(ROUT/LOUT) sense pin
MIC1_JD	MIC IN (MIC_RIN/LIN) sense pin

2.3.22 AMPLIFIER_R (JAMP_R)



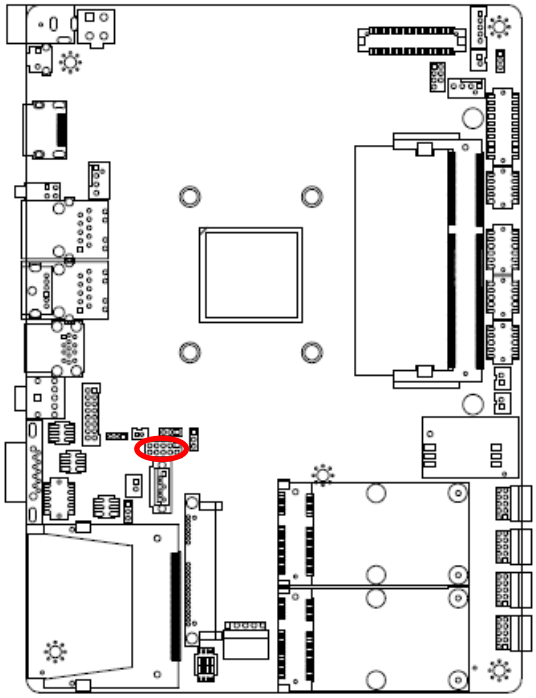
Signal	PIN
SPK_R-	2
SPK_R+	1

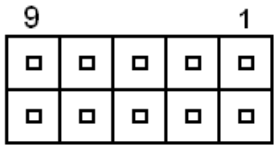
2.3.23 AMPLIFIER_L (AMP_L)



Signal	PIN
SPK_L-	2
SPK_L+	1

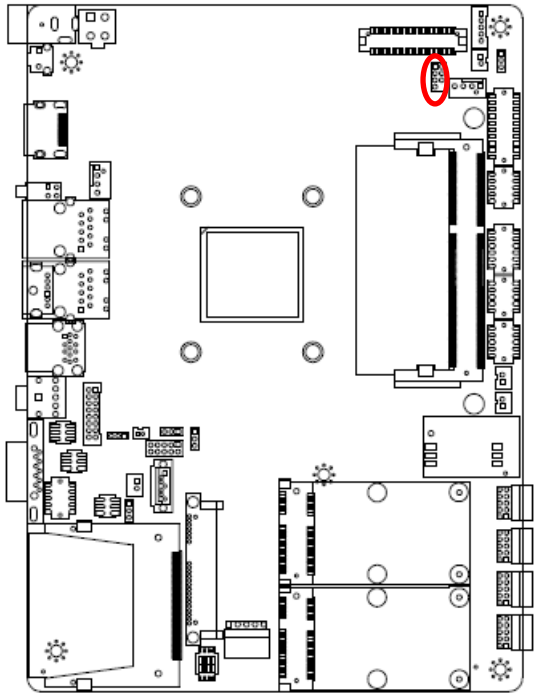
2.3.24 LPC connector (JLPC1)

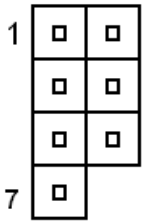




Signal	PIN	PIN	Signal
LPC_AD0	1	2	+3.3V
LPC_AD1	3	4	LPC_PORT80_RST#
LPC_AD2	5	6	LPC_FRAME#
LPC_AD3	7	8	LPC_PORT80_CLK
LPC_SERIRQ	9	10	GND

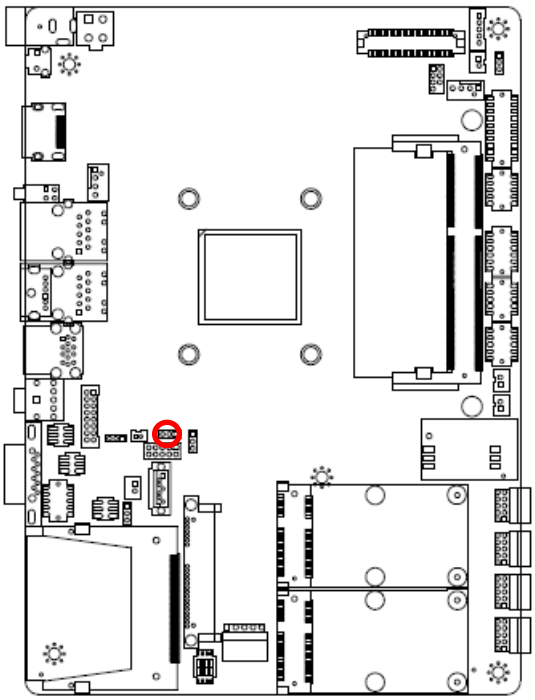
2.3.25 SPI connector (JSPI1)

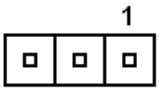




Signal	PIN	PIN	Signal
+VSPI_BIOS	1	2	GND
SPI_ROM_CS#	3	4	SPI_ROM_CLK
SPI_ROM_MISO_R	5	6	SPI_ROM_MOSI
SPI_HOLD#	7		

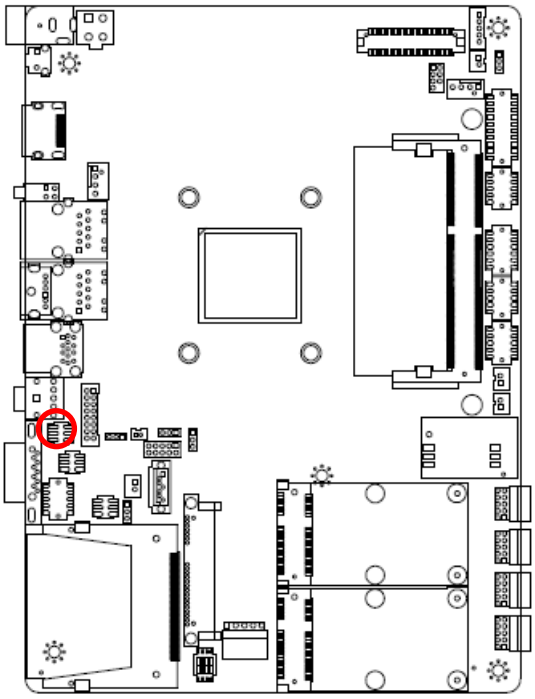
2.3.26 EC_Program (JEC_ROM1)

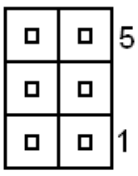




Signal	PIN
EC_SMCLK_DEBUG	1
EC_SMDAT_DEBUG	2
GND	3

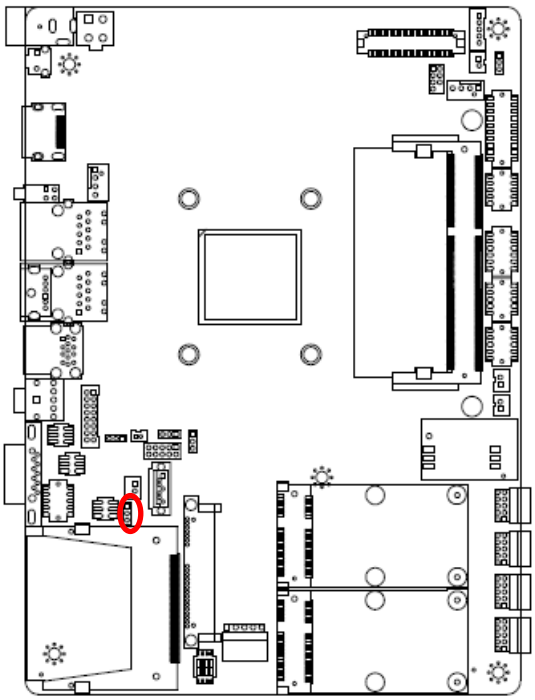
2.3.27 PS/2 keyboard & mouse connector (JKBMS1)

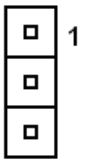




Signal	PIN	PIN	Signal
MSCK	6	5	MSDT
KBVCC	4	3	GND
KBCK	2	1	KBDT

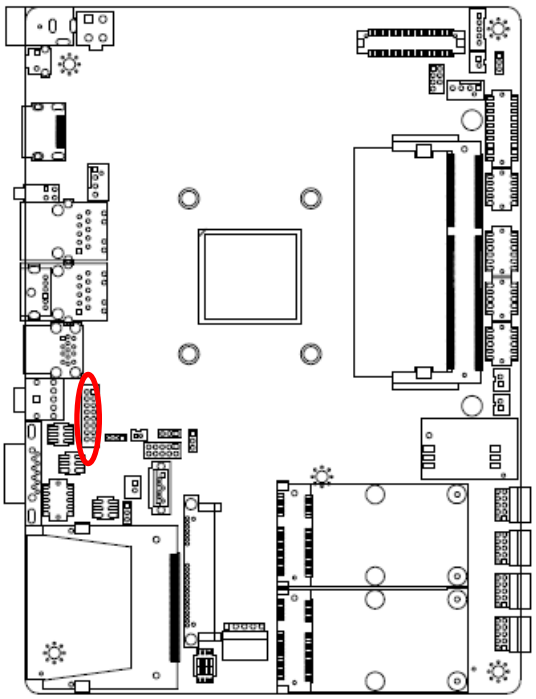
2.3.28 USB Power select (USB_PWRSEL1)

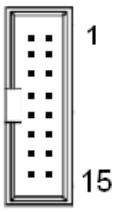




Signal	PIN
+5VSB	1
USB_PWR_SEL	2
+5V	3

2.3.29 VGA connector (VGA)





Signal	PIN	PIN	Signal
VGA_RED	2	1	+V5_CRT_HDMI
VGA_GREEN	4	3	GND
VGA_BLUE	6	5	NC
NC	8	7	VGA_DDCDAT
GND	10	9	VGA_HSYNC
GND	12	11	VGA_VSYNC
GND	14	13	VGA_DDCCLK
GND	16	15	GND

3.BIOS Setup

3.1 Introduction

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

3.2 Starting Setup

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

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

Press <Del> or <F2> to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to.

Press F1 to Continue, DEL to enter SETUP

3.3 Using Setup

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

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

- **Navigating Through The Menu Bar**

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

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

- **To Display a Sub Menu**

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

3.4 Getting Help

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

3.5 In Case of Problems

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

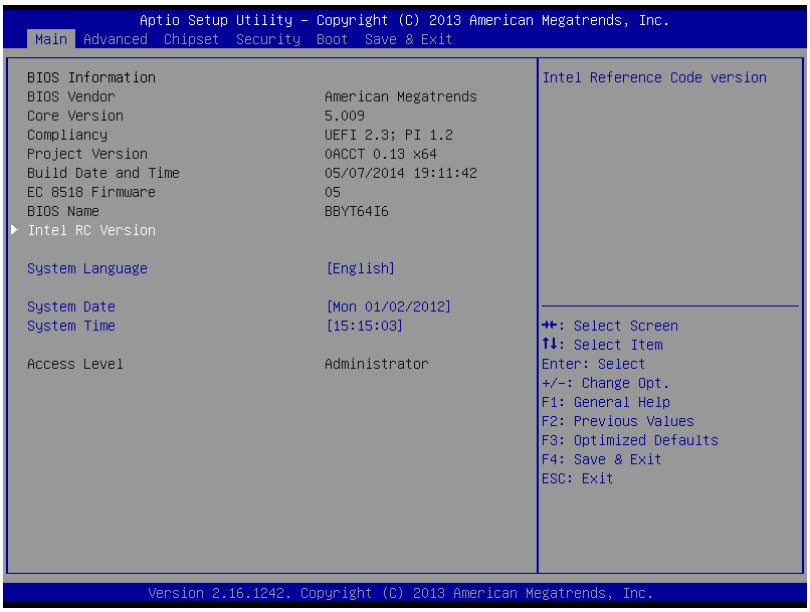
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance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

3.6 BIOS setup

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

3.6.1 Main Menu

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



3.6.1.1 System Language

This option allows choosing the system default language.

3.6.1.2 System Date

Use the system date option to set the system date. Manually enter the day, month and year.

3.6.1.3 System Time

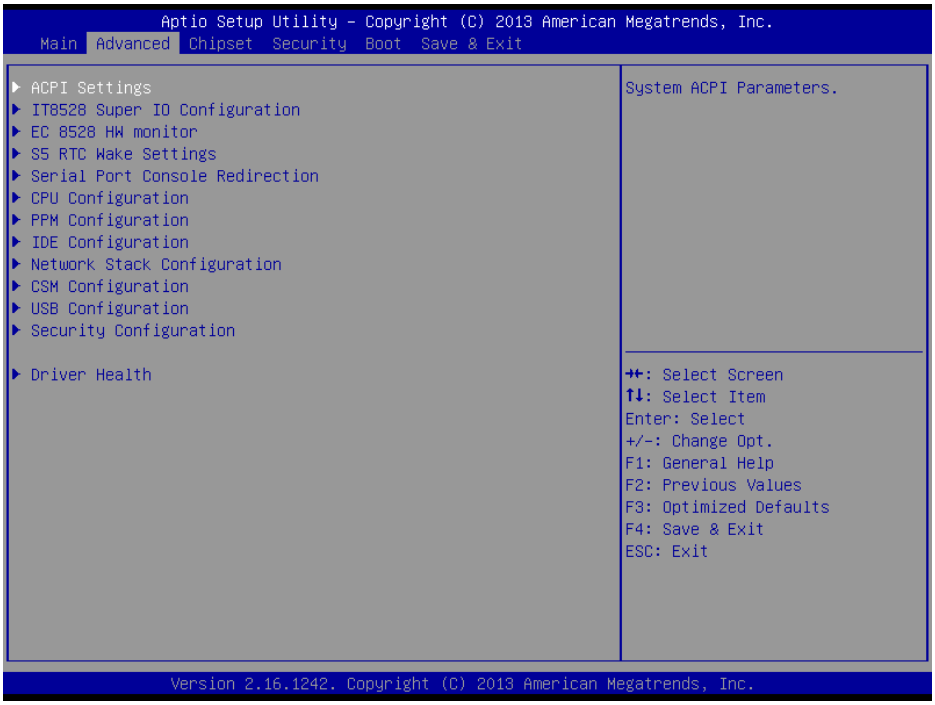
Use the system time option to set the system time. Manually enter the hours, minutes and seconds.

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

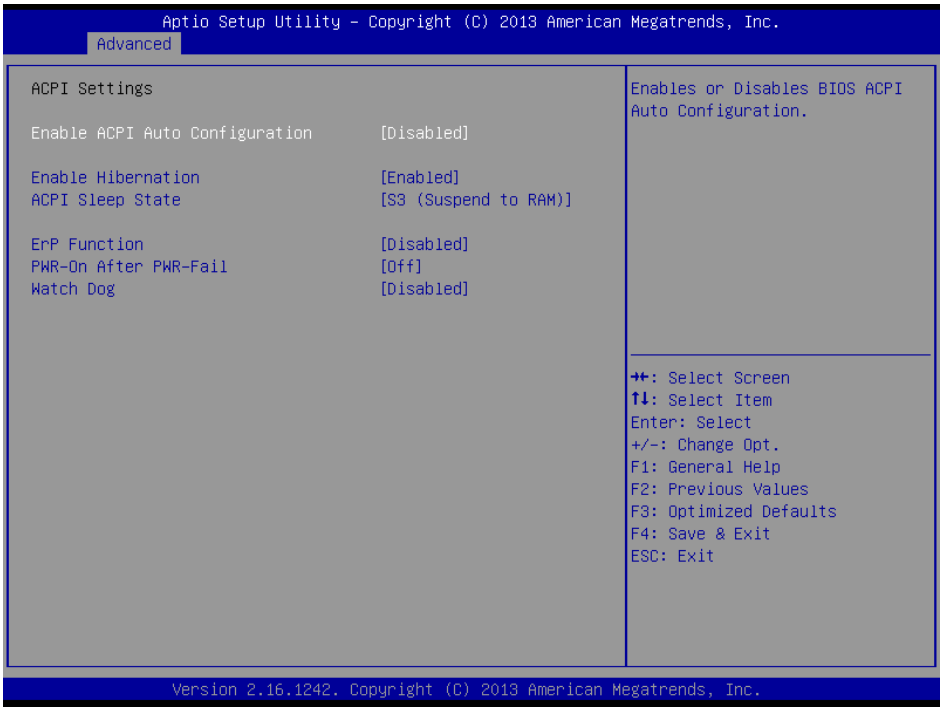
Visit the Avalue website (www.avalue.com.tw) to download the latest product and BIOS information.

3.6.2 Advanced Menu

This section allows you to configure your CPU and other system devices for basic operation through the following sub-menus.



3.6.2.1 APCI Settings

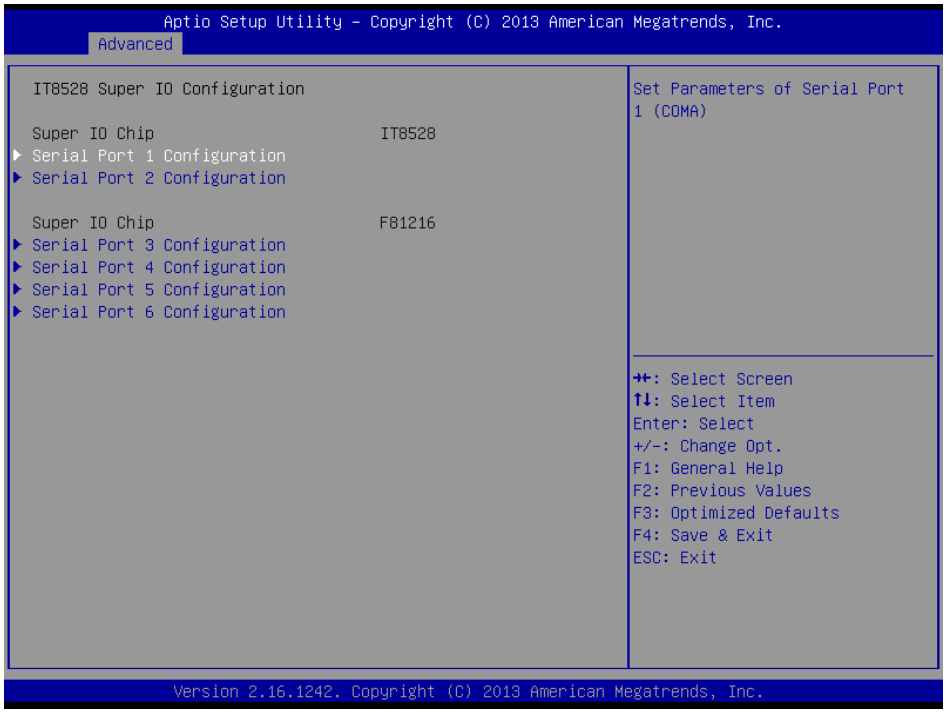


Item	Options	Description
Enable ACPI Auto Configuration	Disabled**[Default]**, Enabled	Enables or Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled Enabled**[Default]**,	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This

		option may be not effective with some OS.
ACPI Sleep State	Suspend Disabled, S3 (Suspend to RAM) **[Default]**	Enables or Disables System ability to Sleep (OS/S3 Sleep State).
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.

3.6.2.2 IT8528 Super IO Configuration

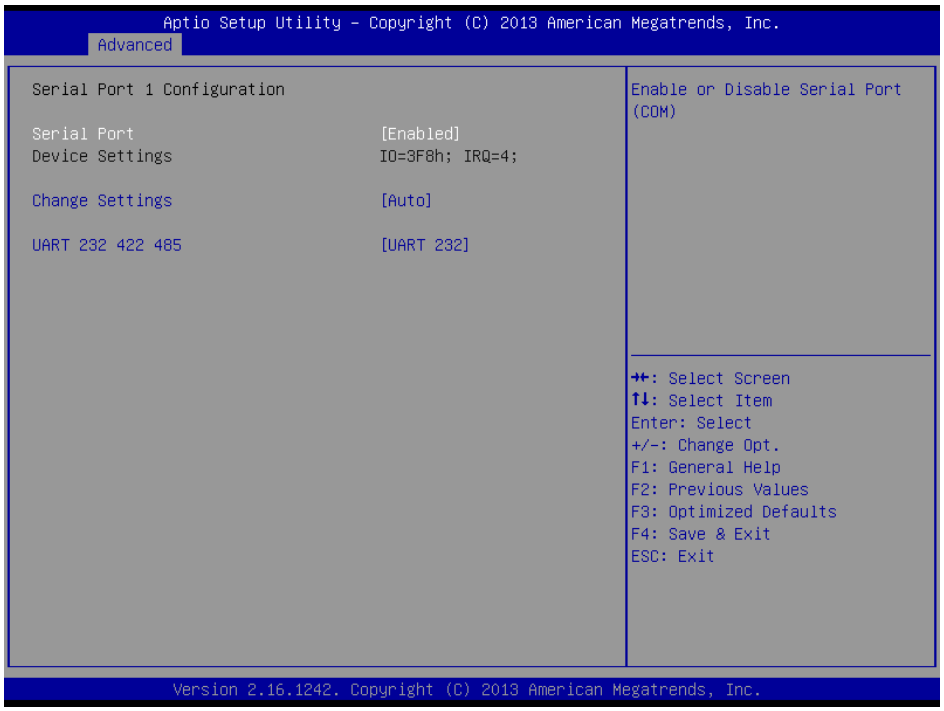
You can use this item to set up or change the IT8528 Super IO configuration for serial ports. Please refer to 3.6.2.2.1~ 3.6.2.2.6 for more information.



Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration	Set Parameters of Serial Port 3 (COMC).

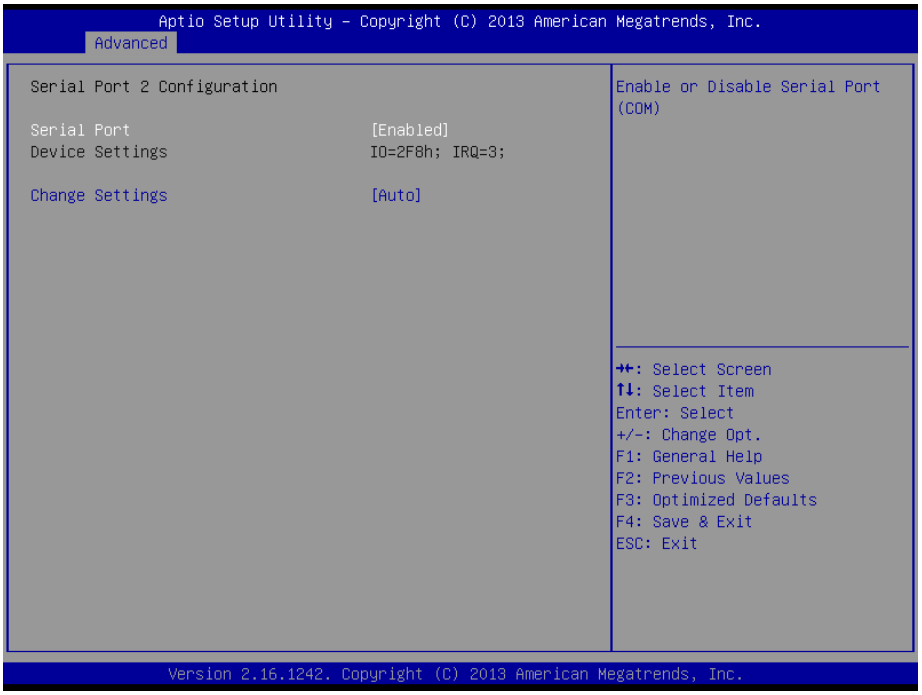
Serial Port 4 Configuration	Set Parameters of Serial Port 4 (COMD).
Serial Port 5 Configuration	Set Parameters of Serial Port 5 (COME).
Serial Port 6 Configuration	Set Parameters of Serial Port 6 (COMF).

3.6.2.2.1 Serial Port 1 Configuration



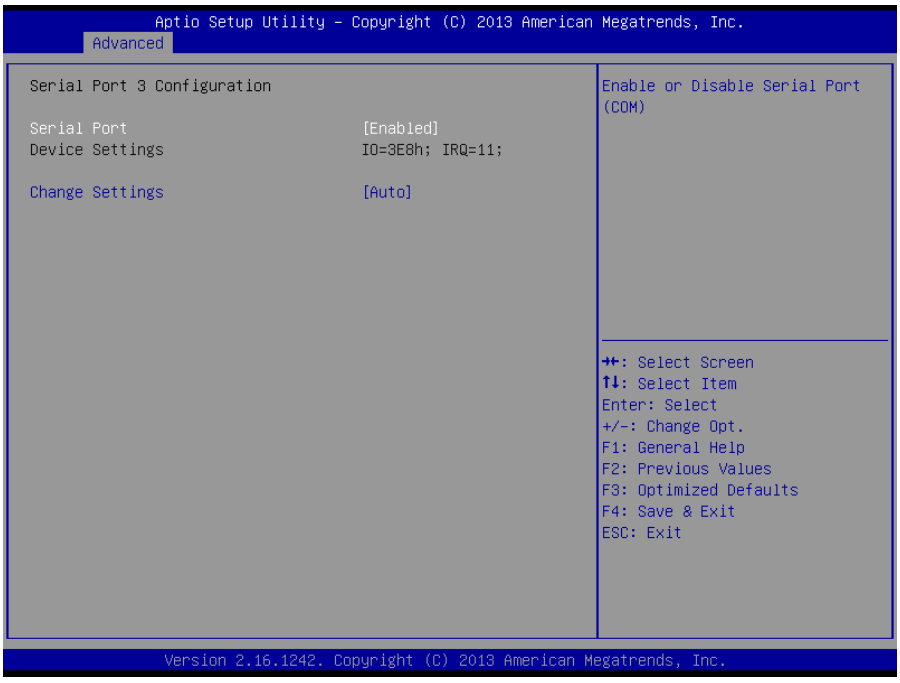
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto**[Default]** IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal setting for Super IO device.
UART 232 422 485	UART 232**[Default]**, UART 485, UART 422	Change the Serial Port as RS232/ 422/ 485

3.6.2.2.2 Serial Port 2 Configuration



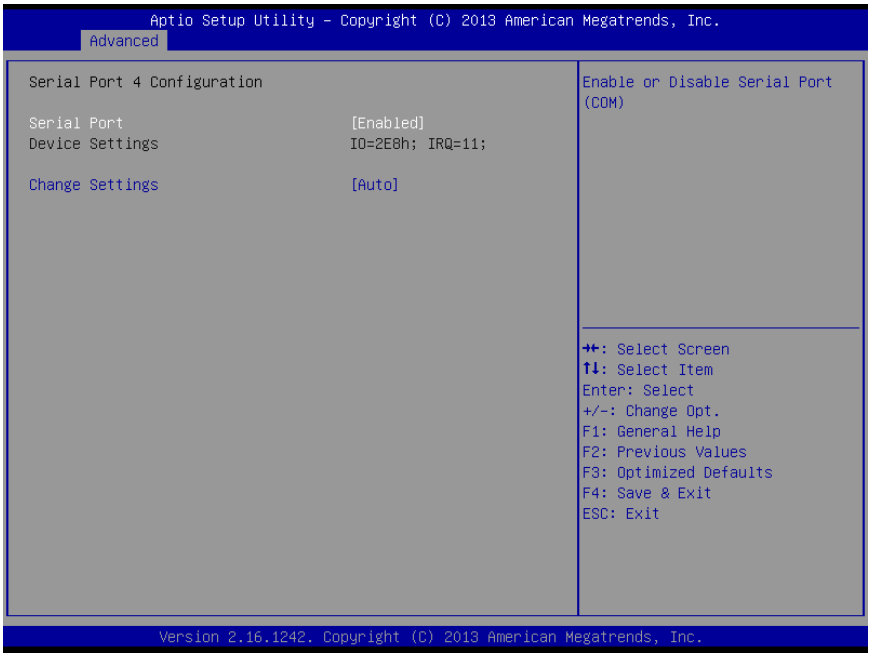
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto**[Default]** IO=2F8h; IRQ=3; IO=3F8h; IRQ=3,4,5,6,7,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,10,11,12;	Select an optimal setting for super IO device.

3.6.2.2.3 Serial Port 3 Configuration



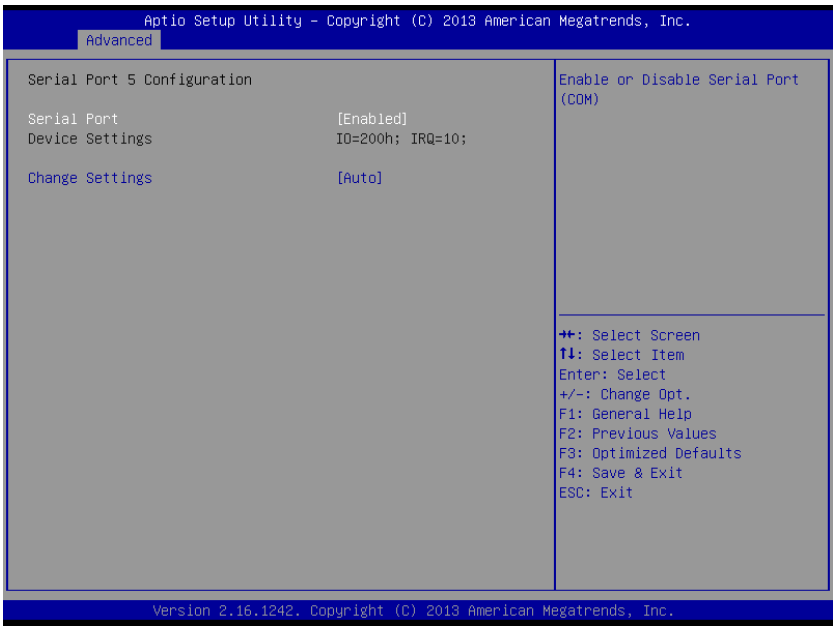
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto**[Default]** IO=3E8h; IRQ=11; IO=3F8h; IRQ=10,11; IO=2F8h; IRQ=10,11; IO=3E8h; IRQ=10,11; IO=2E8h; IRQ=10,11;	Select an optimal setting for super IO device.

3.6.2.2.4 Serial Port 4 Configuration



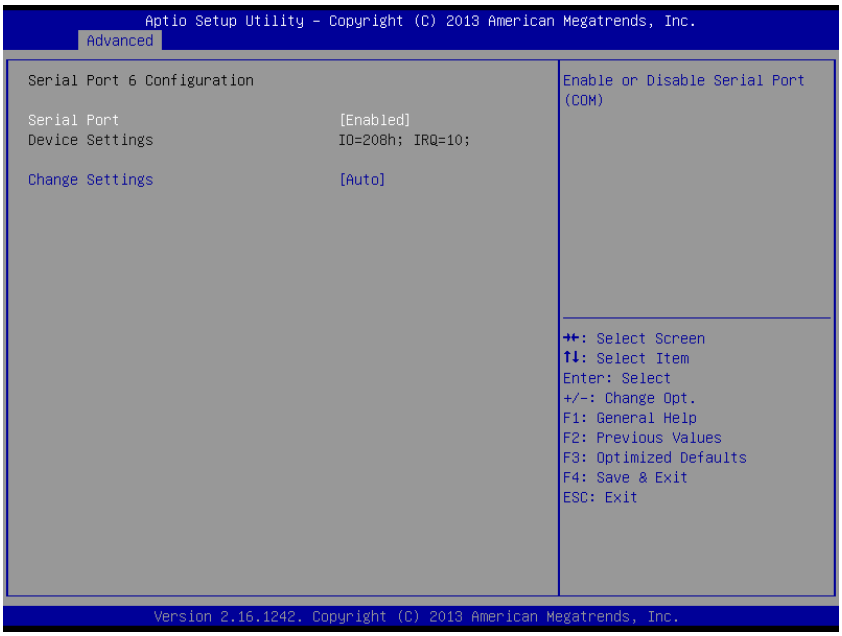
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto**[Default]** IO=2E8h; IRQ=11; IO=3F8h; IRQ=10,11; IO=2F8h; IRQ=10,11; IO=3E8h; IRQ=10,11; IO=2E8h; IRQ=10,11;	Select an optimal setting for super IO device.

3.6.2.2.5 Serial Port 5 Configuration



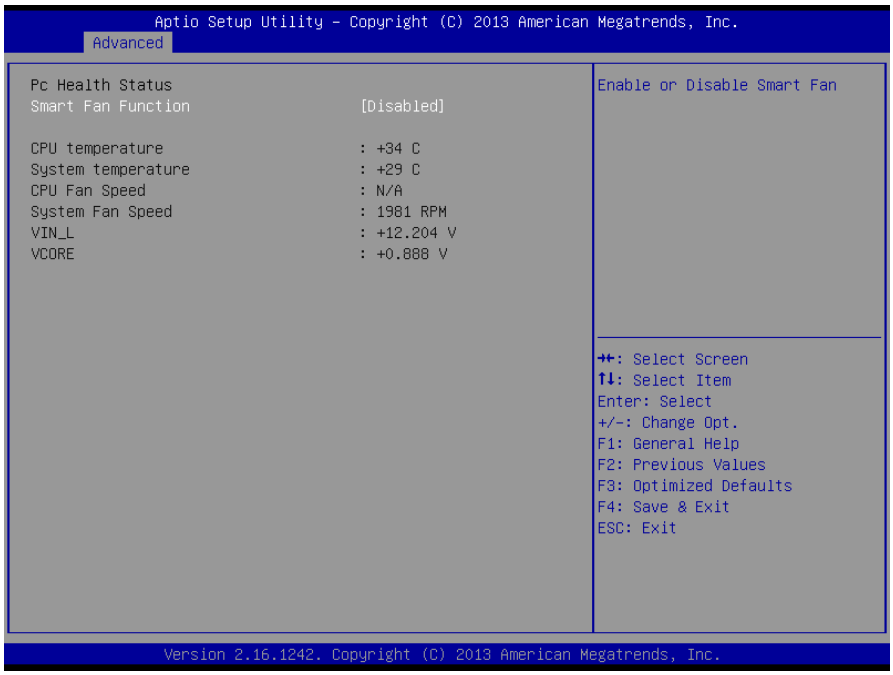
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto**[Default]** IO=200h; IRQ=10; IO=200h; IRQ=10,11; IO=208h; IRQ=10,11; IO=210h; IRQ=10,11; IO=218h; IRQ=10,11;	Select an optimal setting for super IO device.

3.6.2.2.6 Serial Port 6 Configuration



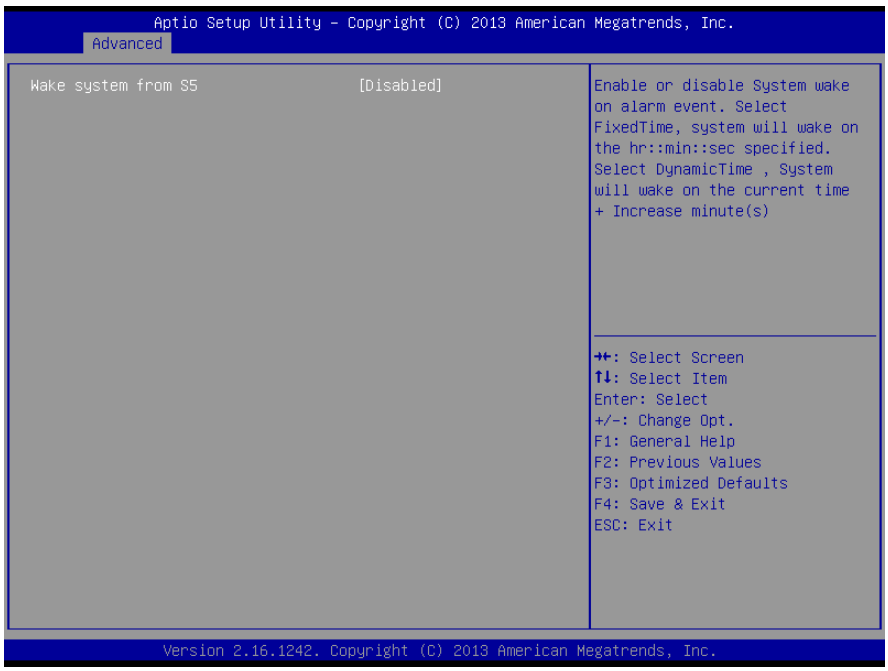
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto**[Default]** IO=208h; IRQ=10; IO=200h; IRQ=10,11; IO=200h; IRQ=10,11; IO=200h; IRQ=10,11; IO=200h; IRQ=10,11;	Select an optimal setting for super IO device.

3.6.2.3 H/W Monitor



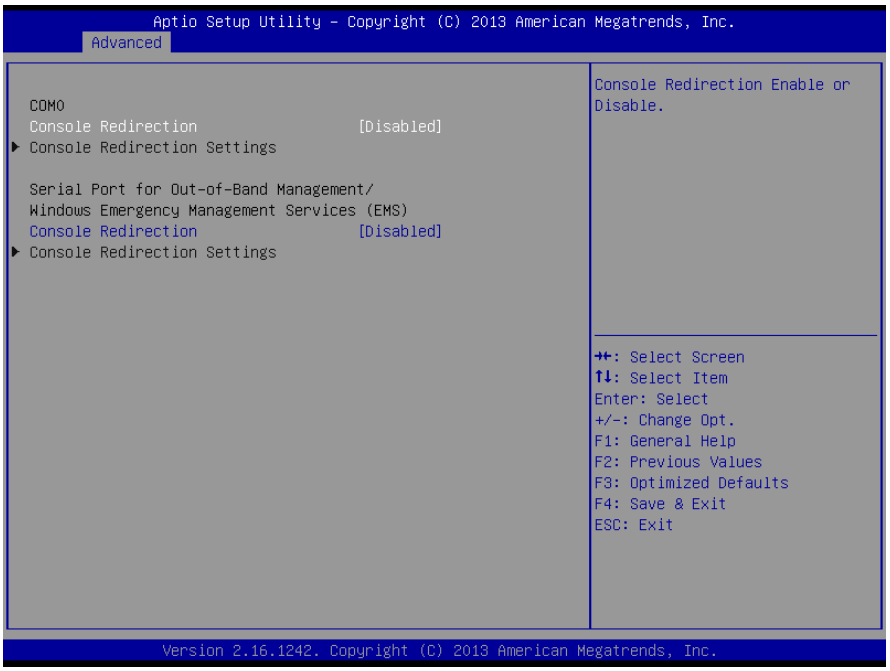
Item	Options	Description
Smart Fan Function	Enabled, Disabled**[Default]**	Enables or Disables Smart Fan.

3.6.2.4 S5 RTC Wake Settings



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

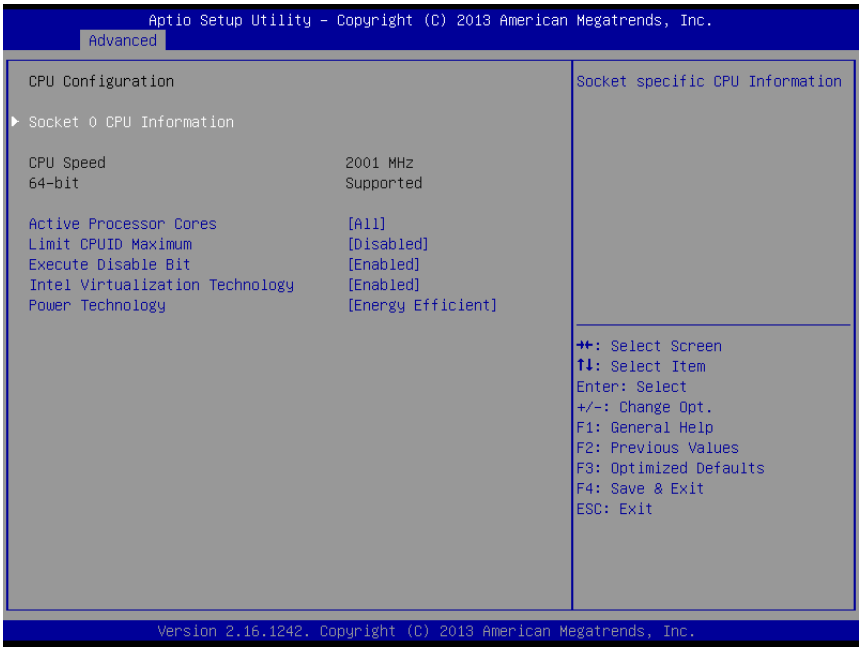
3.6.2.5 Serial Port Console Redirection



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

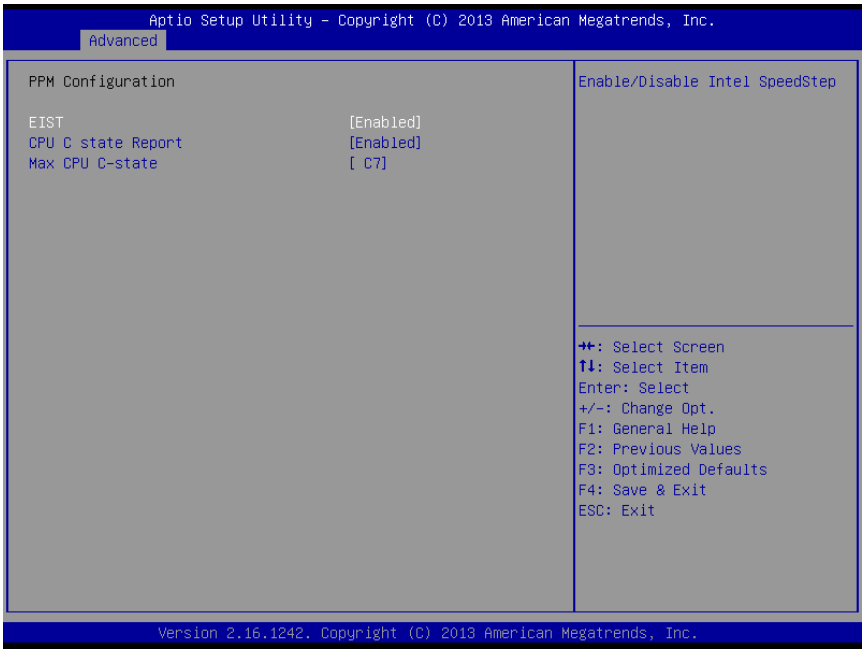
3.6.2.6 CPU Configuration

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



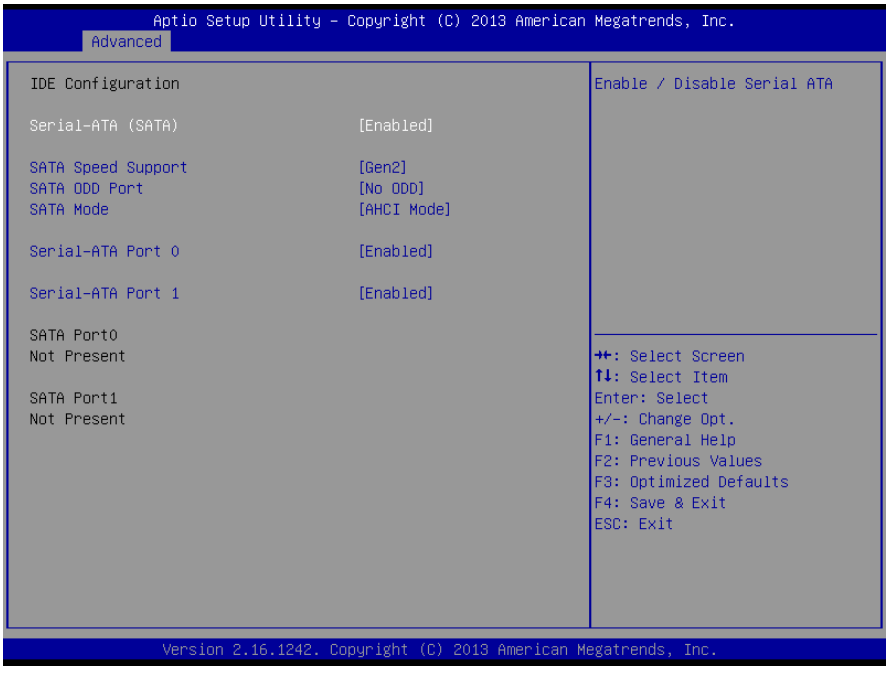
Item	Options	Description
Active Processor Cores	All**[Default]**, 1	Number of cores to enable in each processor package.
Limit CPUID Maximum	Disabled**[Default]**, Enabled	Disabled for Windows XP.
Execute Disable Bit	Disabled, Enabled**[Default]**	XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.)
Intel Virtualization Technology	Disabled, Enabled**[Default]**	When enabled, a VMM can utilize the additional hardware capabilities provided by Virtualization Technology.
Power Technology	Disabled, Energy Efficient**[Default]** Custom	Enable the power management features.

3.6.2.7 PPM Configuration



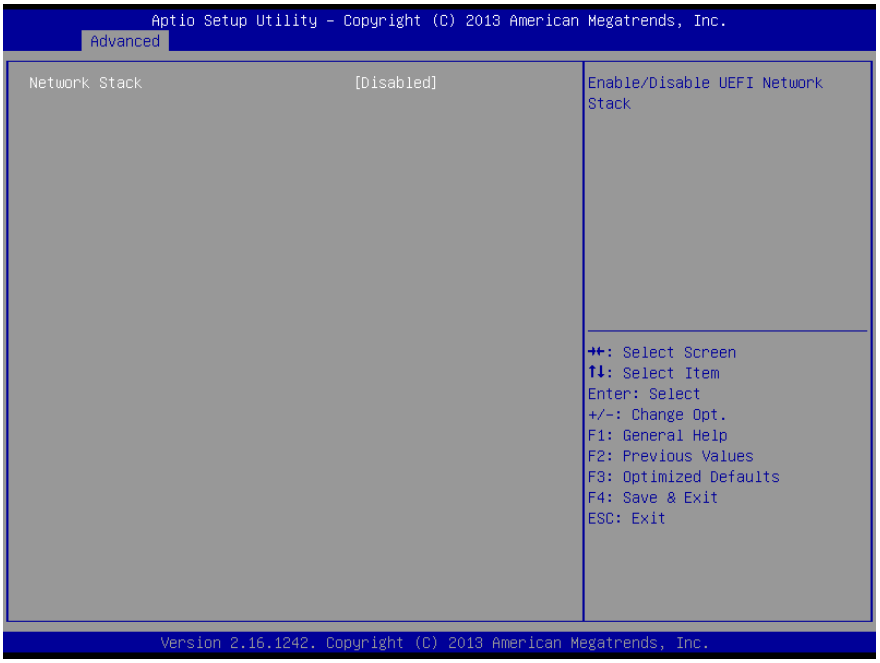
Item	Options	Description
EIST	Disabled, Enabled**[Default]**	Enable/Disable Intel SpeedStep.
CPU C state Report	Disabled, Enabled**[Default]**	Enable/Disable CPU C state report to OS.
Max CPU C-state	C1/C6/C7**[Default]**	This option controls Max C state that the processor will support.

3.6.2.8 IDE Configuration



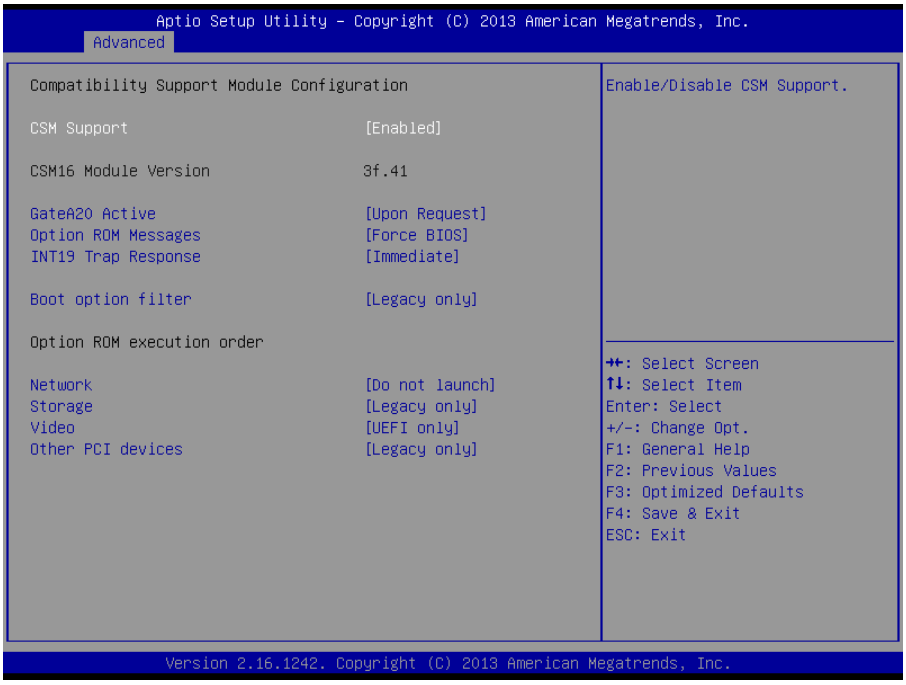
Item	Options	Description
Serial-ATA (SATA)	Enabled**[Default]** Disabled,	Enable/Disable Serial ATA.
SATA Speed Support	Gen1 Gen2**[Default]**	SATA Speed Support.
SATA ODD Port	Port0 ODD Port1 ODD No ODD**[Default]**	SATA ODD is Port0 or Port1.
SATA Mode	IDE Mode AHCI Mode**[Default]**	Select IDE/AHCI.
Serial-ATA Port 0/1	Enabled**[Default]** Disabled,	Enable/Disable Serial ATA Port0/1.

3.6.2.9 Network Stack Configuration



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

3.6.2.10 CSM Configuration



Item	Options	Description
CSM Support	Enabled**[Default]** Disabled,	Enable/Disable CSM Support.
GateA20 Active	Upon Request**[Default]** Always	UPON REQUEST – GA20 can be disabled using BIOS services. ALWAYS – go not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
Option ROM Messages	Force BIOS**[Default]** Keep Current	Set display mode for Option ROM.
INT19 Trap Response	Immediate**[Default]** Postponed	BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE – execute the trap right away; POSTPONED – execute the traps during legacy boot.
Boot option filter	UEFI and Legacy Legacy only**[Default]** UEFI only	This option controls Legacy/UEFI ROMs priority.
Network	Do not launch**[Default]** UEFI only Legacy only	Controls the execution of UEFI and Legacy PXE OpROM.
Storage	Do not launch UEFI only Legacy only**[Default]**	Controls the execution of UEFI and Legacy Storage OpROM.
Video	Do not launch UEFI only Legacy only**[Default]**	Controls the execution of UEFI and Legacy Video OpROM.

Other PCI devices	UEFI only Legacy only**[Default]**,	Determines OpROM execution policy for devices other than Network, Storage, or Video.

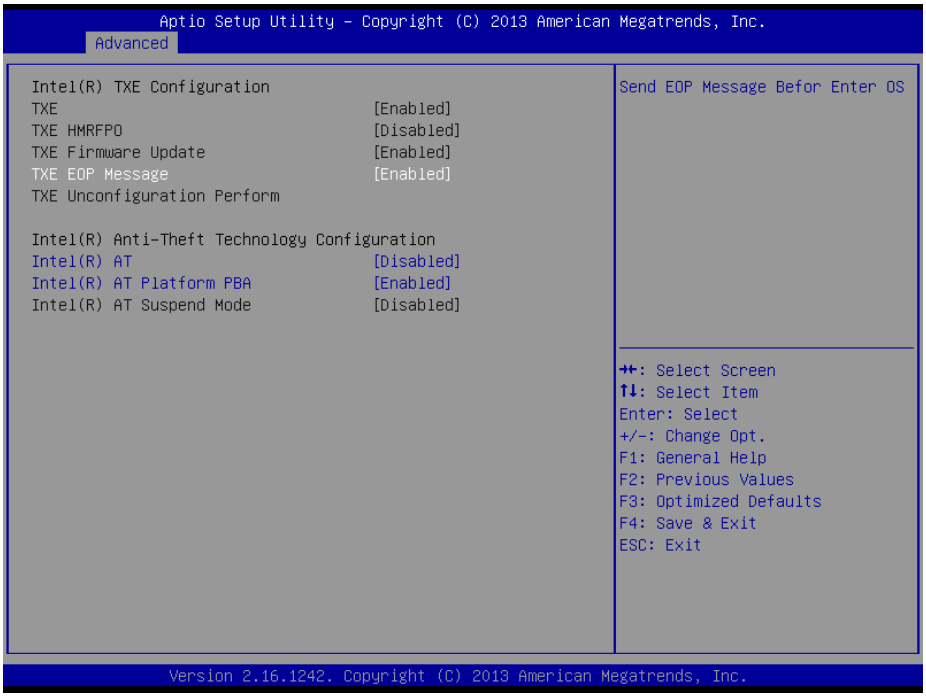
3.6.2.11 USB Configuration

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

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.
EHCI Hand-off	Enabled Disabled**[Default]**	This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.
USB Mass Storage Driver Support	Enabled**[Default]** Disabled	Enable/Disable USB Mass Storage Driver Support.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec**[Default]**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec**[Default]** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto**[Default]** Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is

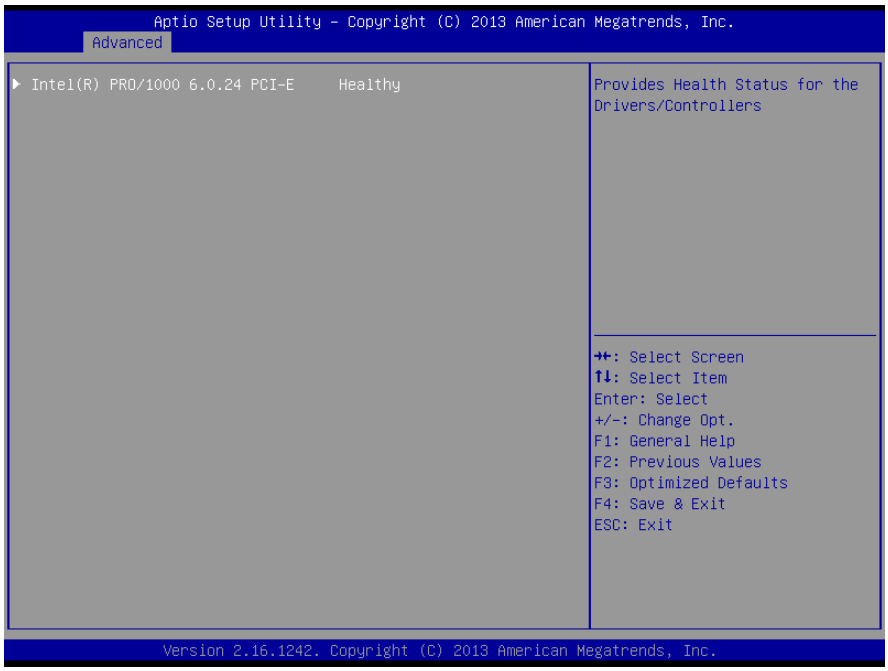
		100ms, for a Hub port the delay is taken form Hub descriptor.

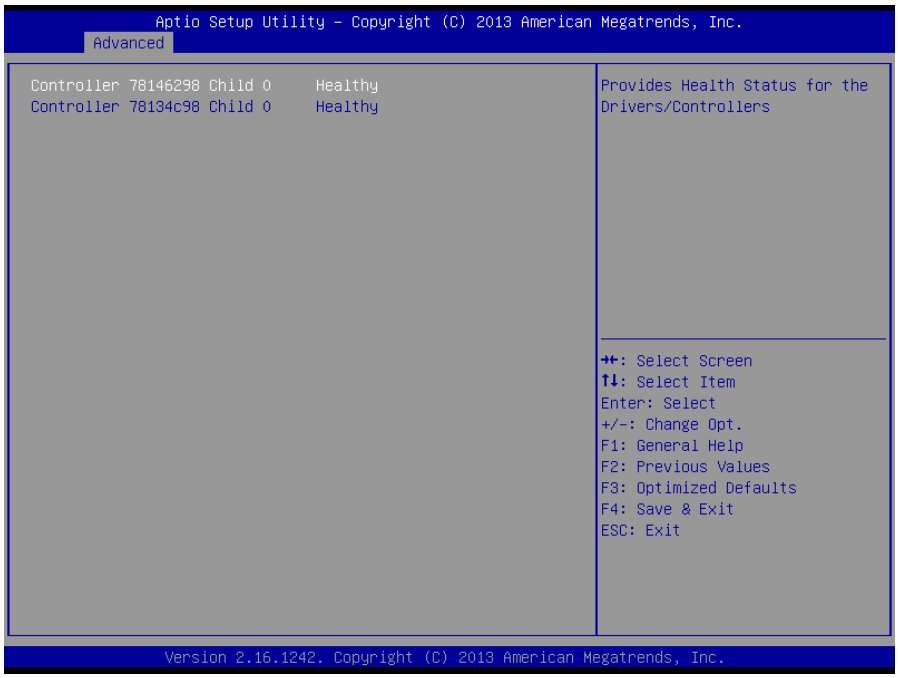
3.6.2.12 Security Configuration



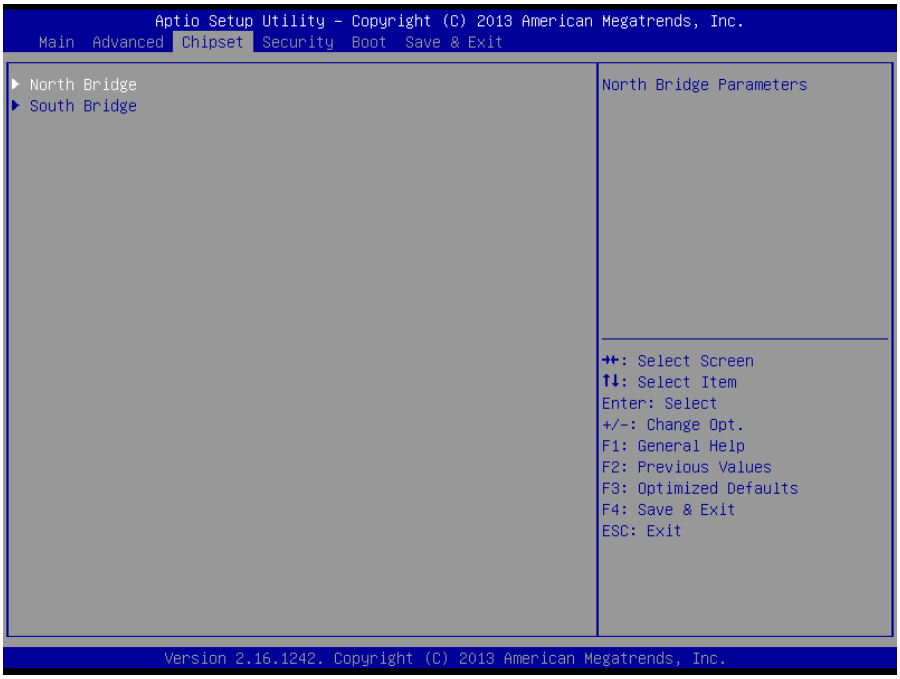
Item	Options	Description
TXE EOP Message	Disabled Enabled**[Default]**,	Send EOP Message Before Enter OS.
Intel® AT	Disabled**[Default]** Enabled,	Enable/Disable BIOS AT Code from Running.
Inter® AT Platform PBA	Disabled, Enabled**[Default]**	Enable/Disable BIOS AT Code from Running.

3.6.2.13 Lan driver report status

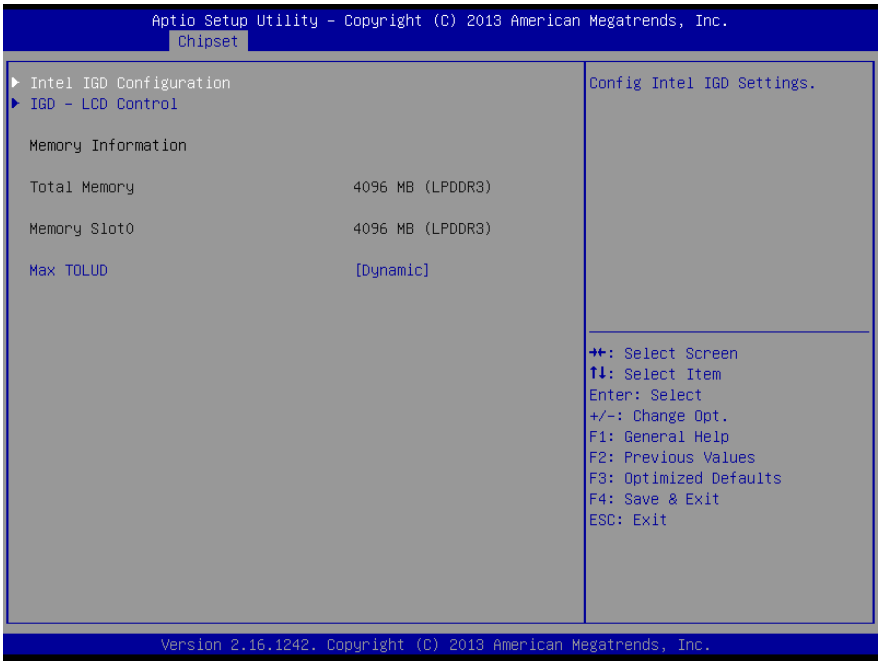




3.6.3 Chipset

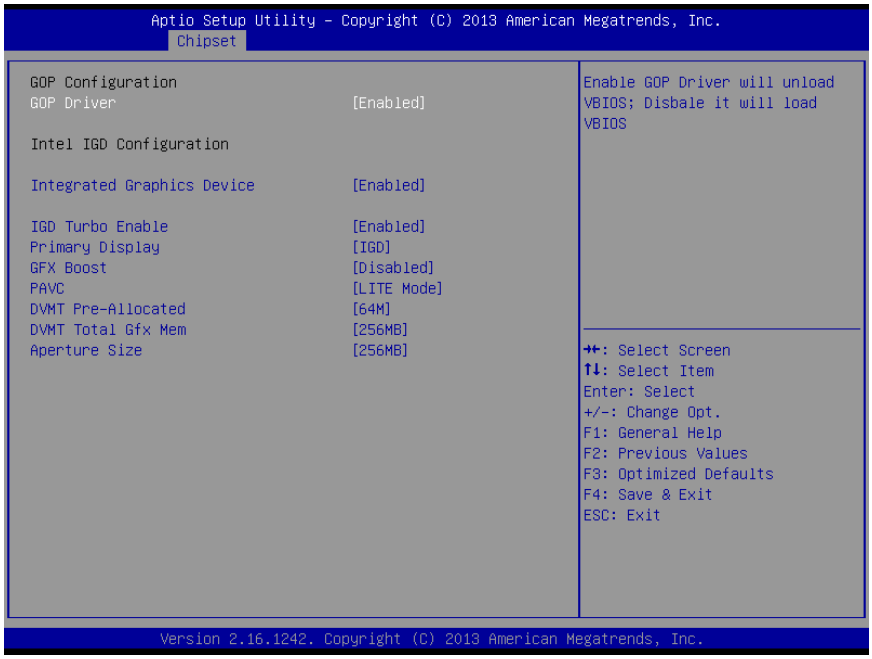


3.6.3.1 North Bridge



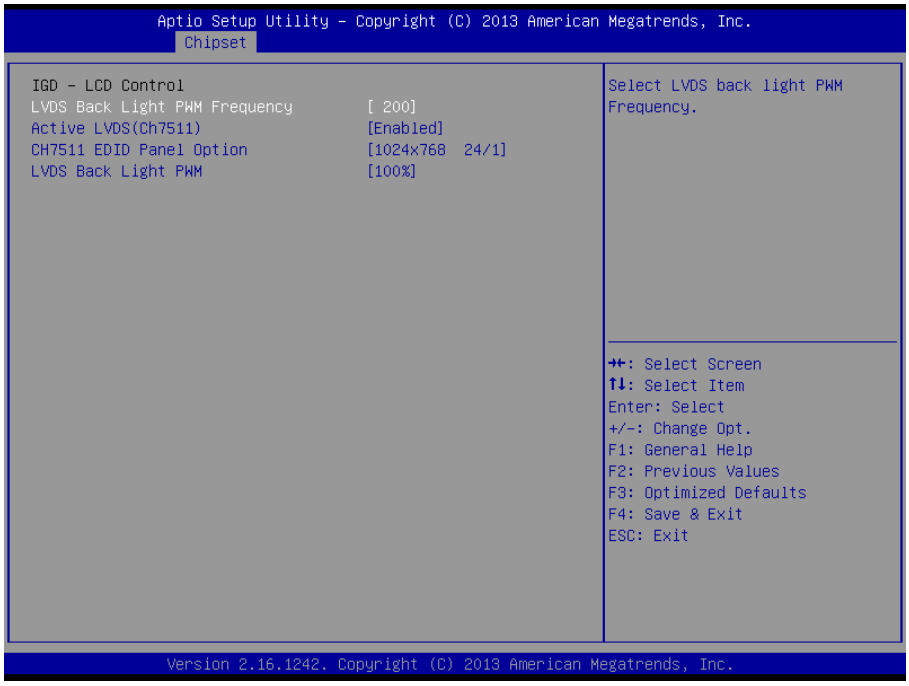
Item	Option	Description
Max TOLUD	Dynamic**[Default]** 2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB	Maximum Value of TOLUD.

3.6.3.1.1 Intel IGD Configuration



Item	Option	Description
GOP Driver	Enabled**[Default]**, Disabled	Enable GOP Driver will unload VBIOS; Disable it will load VBIOS.
Integrated Graphics Device	Enabled**[Default]**, Disabled	Enable: Enable Integrated Graphics Device (IGD) when selected as the Primary Video Adaptor. Disable: Always disable IGD.
IGD Turbo Enable	Enabled**[Default]**, Disabled	Enable: Enable IGD Turbo Enable. Disable: IGD Turbo Disable.
Primary Display	Auto IGD**[Default]** PCIe	Select which of IGD/PCI Graphics device should be Primary Display.
GFX Boost	Enabled, Disabled**[Default]**	Enable/Disable GFX Boost.
PAVC	Disabled LITE Mode**[Default]** SERPENT Mode	Enable/Disable Protected Audio Video Control.
DVMT Pre-Allocated	64M**[Default]**/96M128M/160M/192M/ 224M/256M/288M/320M/352M/ 384M/416M/448M/ 480M/512M	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
DVMT Total Gfx Mem	128MB 256MB**[Default]** Max	Select DVMT 5.0 Total Graphics Memory size used by the Internal Graphics Device.
Aperture Size	128MB 256MB**[Default]**	Select the Aperture Size.

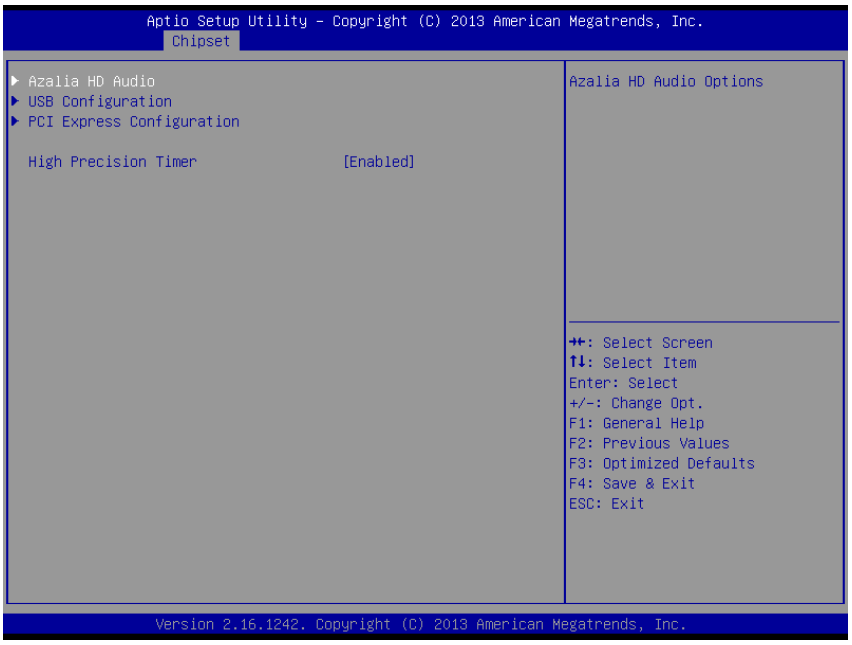
3.6.3.1.2 IGD - LCD Control



Item	Option	Description
LVDS Back Light PWM Frequency	200**[Default]** 300 400 500 700 1k 2k 3k 5k 10k 20k	Select LVDS back light PWM Frequency.
Active LVDS (Ch7511)	Enabled**[Default]** Disabled	Active Internal LVDS(eDP->Ch7511-to –LVDS).
CH7511 EDID Panel Option	1024x768 24/1**[Default]** 800x600 18/1 1024x768 18/1 1366x768 18/1 1024x600 18/1 1280x800 18/1 1920x1200 24/2 640x480 18/1 800x480 18/1 1920x1080 18/2 1280x1024 24/2 1440x900 18/2 1600x1200 24/2 1366x768 24/1 1920x1080 24/2	Port1-EDP to LVDS (Chrotel 7511) Panel EDID Option.

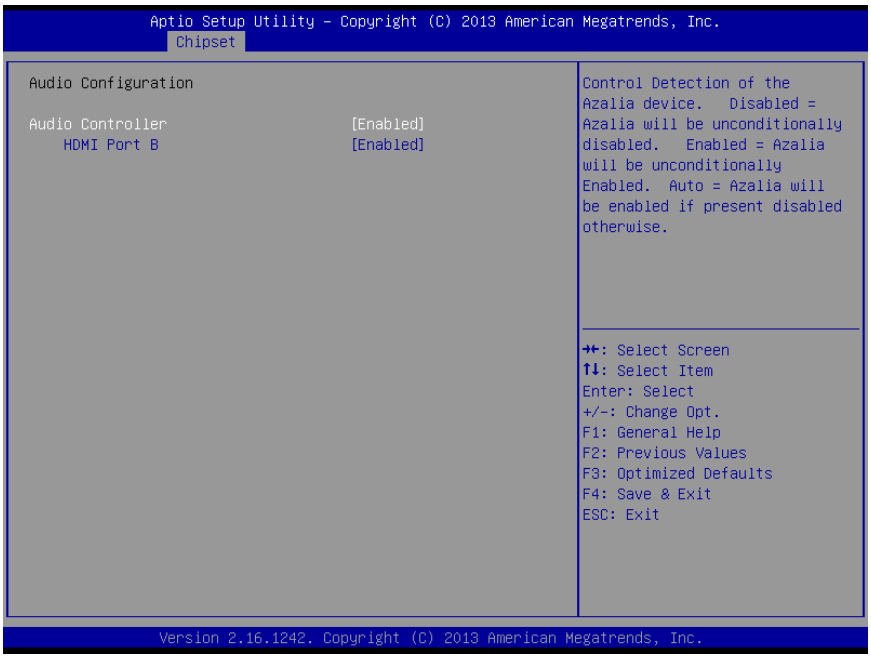
	1680x1050 24/2	
LVDS Back Light PWM	00% 25% 50% 75% 100%**[Default]**	Select LVDS back light PWM duty.

3.6.3.2 South Bridge



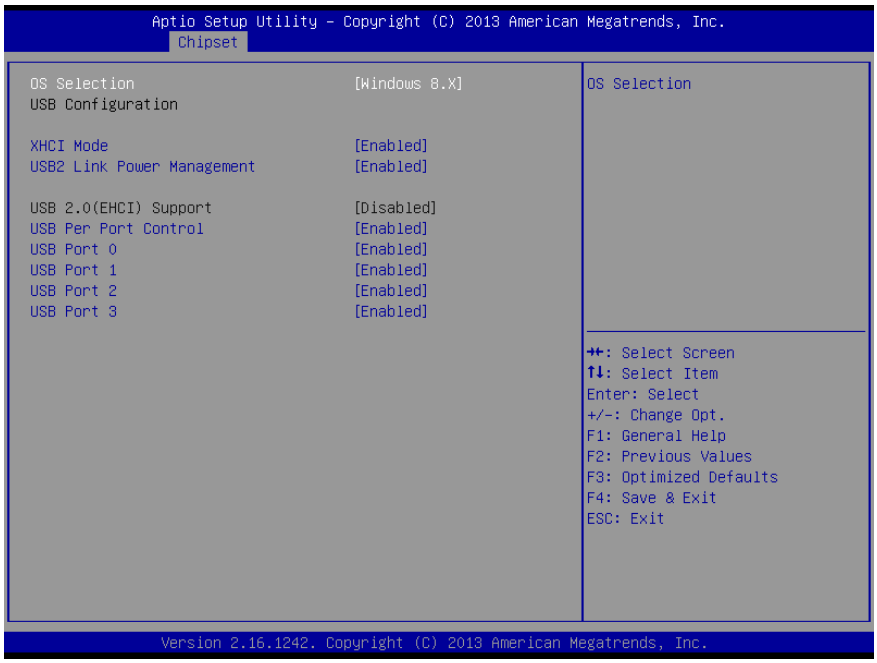
Item	Option	Description
High Precision Timer	Disabled Enabled**[Default]**	Enable or Disable the High Precision Event Timer.

3.6.3.2.1 Azalia HD Audio



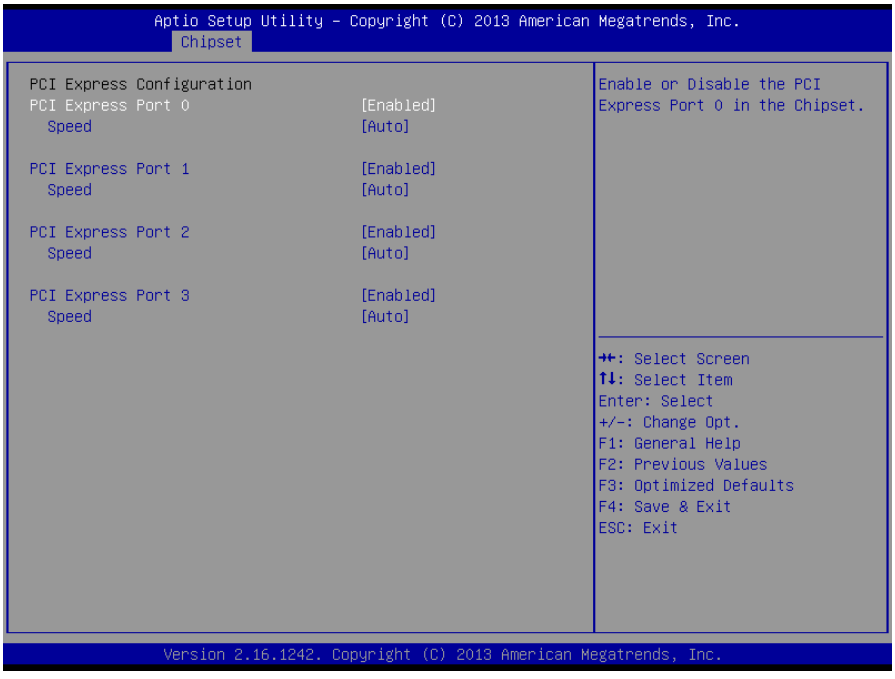
Item	Option	Description
Audio Controller	Enabled**[Default]**, Disabled	Control Detection of the Azalia device. Disabled = Azalia will be unconditionally disabled. Enabled = Azalia will be unconditionally Enabled. Auto = Azalia will be enabled if present disabled otherwise.
HDMI Port B	Enabled**[Default]**, Disabled	Enable/Disable HDMI Port B.

3.6.3.2.2 USB Configuration



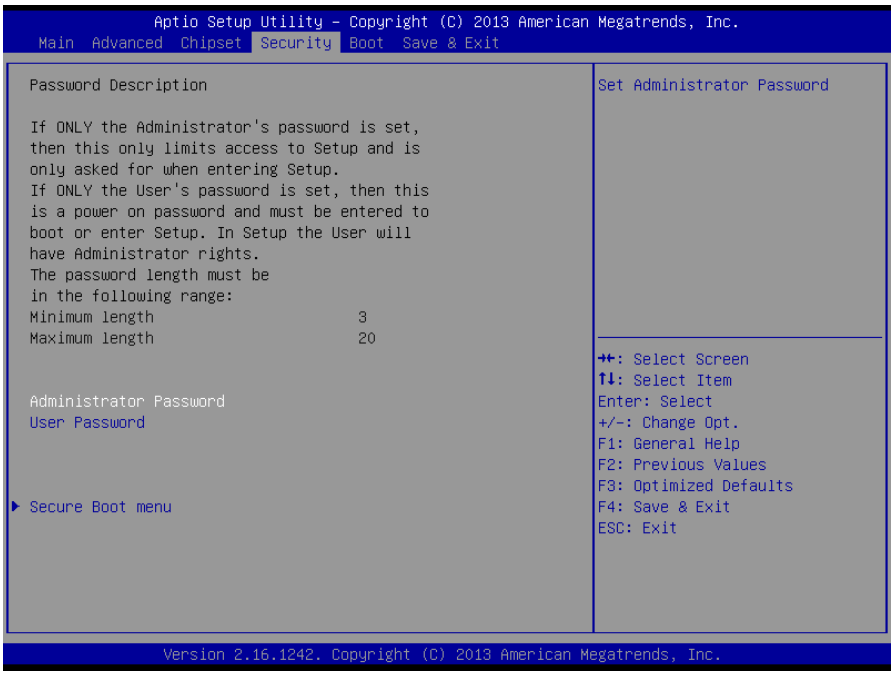
Item	Option	Description
OS Selection	Windows 8.X**[Default]** Android Windows 7	Please select the corresponding type of Windows for OS installation. Please change the item of OS selection to Windows 7 if you intend to install Windows 7 OS; Please change the item of OS selection to Windows 8.X if you intend to install Windows 8 OS.
XHCI Mode	Enabled**[Default]**, Disabled Auto Smart Auto	Mode of operation of xHCI controller.
USB2 Link Power Management	Enabled**[Default]**, Disabled	Enable/Disable USB2 Link Power Management.
USB 2.0 (EHCI) Support	Enabled, Disabled**[Default]**	Control the USB EHCI (USB2.0) functions. One EHCI controller must always be enabled.
USB Per Port Control	Enabled**[Default]**, Disabled	Control each of the USB ports (0~3). Enable: Enable USB per port; Disable: Use USB port X settings.
USB Port 0/1/2/3	Enabled**[Default]**, Disabled	Enable/Disable USB Port 0/1/2/3

3.6.3.2.3 PCI Express Configuration



Item	Option	Description
PCI Express Port 0/1/2/3	Enabled**[Default]**, Disabled	Enable or Disable the PCI Express Port 0/1/2/3 in the Chipset.
Speed	Auto**[Default]** Gen 2 Gen 1	Configure PCIe Port Speed.

3.6.4 Security



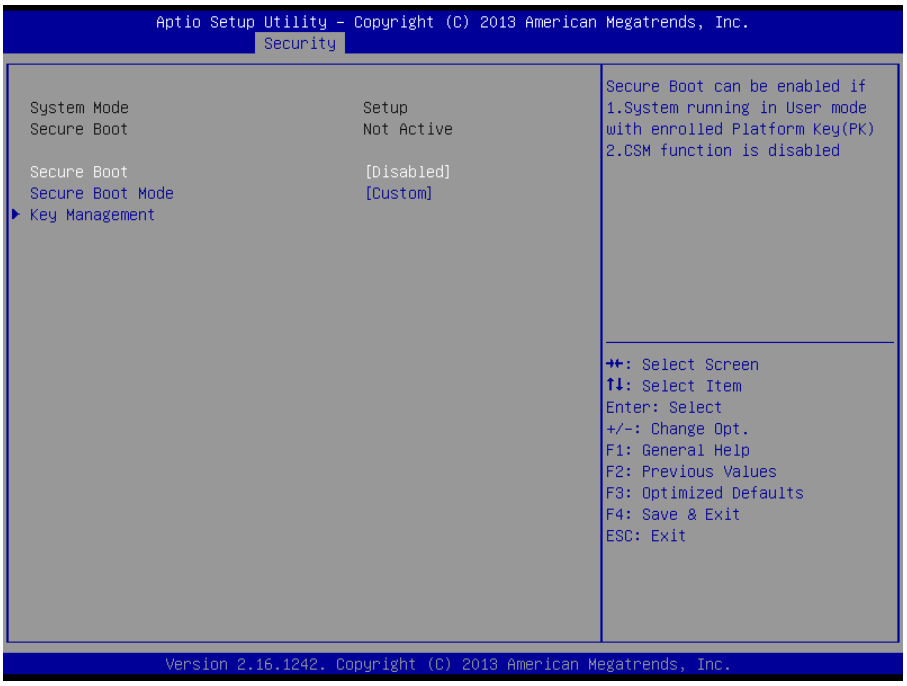
- **Administrator Password**

Set setup Administrator Password

- **User Password**

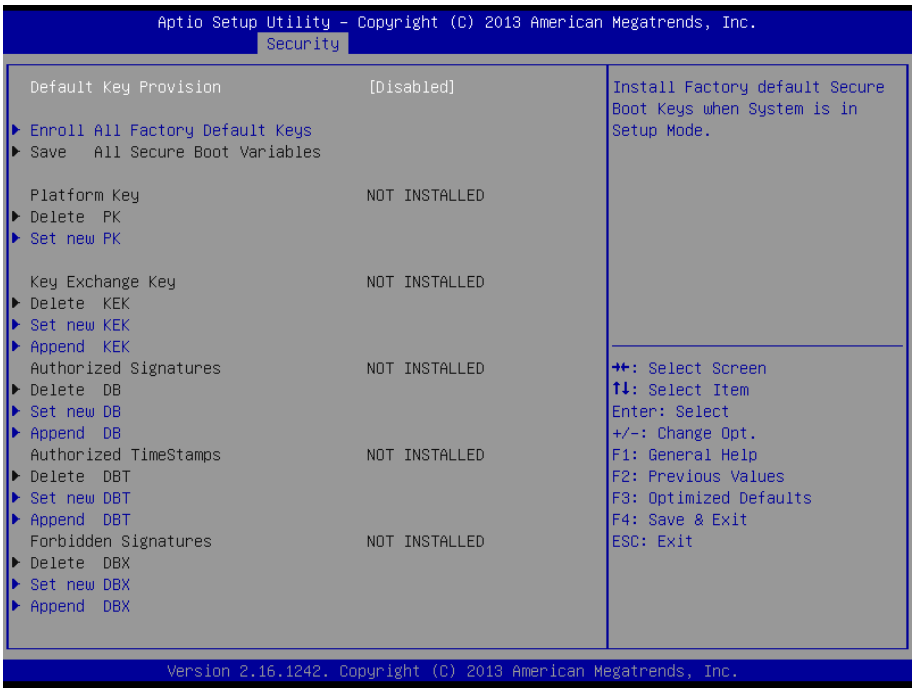
Set User Password

3.6.4.1 Secure Boot menu



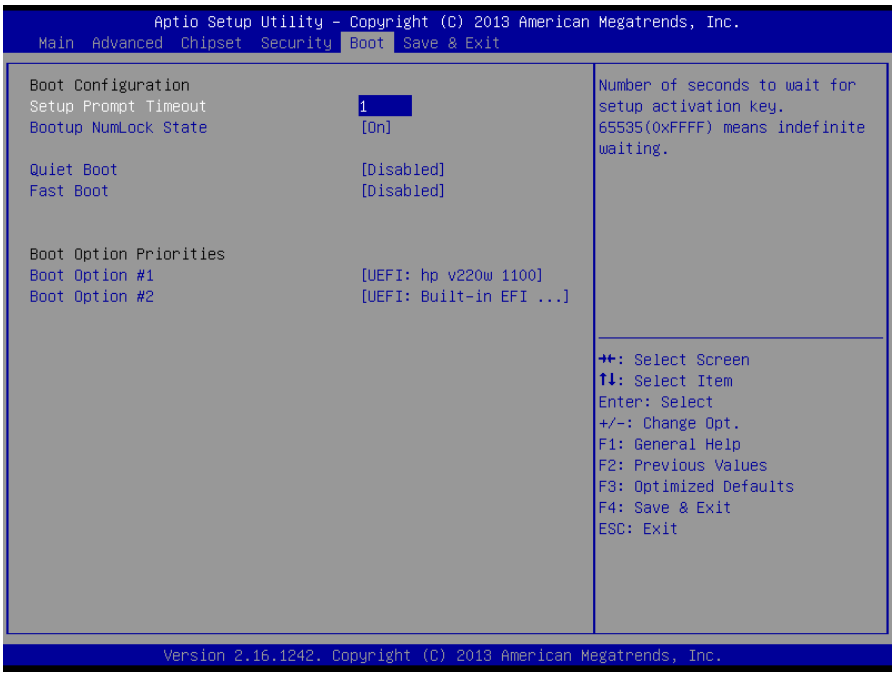
Item	Option	Description
Secure Boot	Disabled**[Default]** Enabled	Secure Boot can be enabled if 1.System running in User mode with enrolled Platform Key(PK) 2.CSM function is disabled.
Secure Boot Mode	Standard Custom**[Default]**	Secure Boot mode selector. 'Custom' Mode enables users to change Image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

3.6.4.1.1 Key Management



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

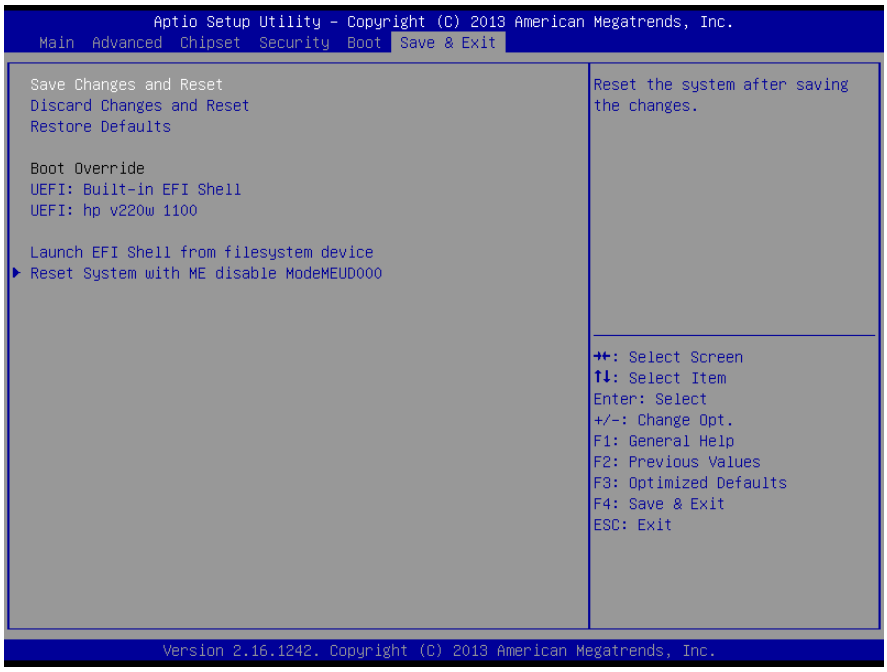
3.6.5 Boot

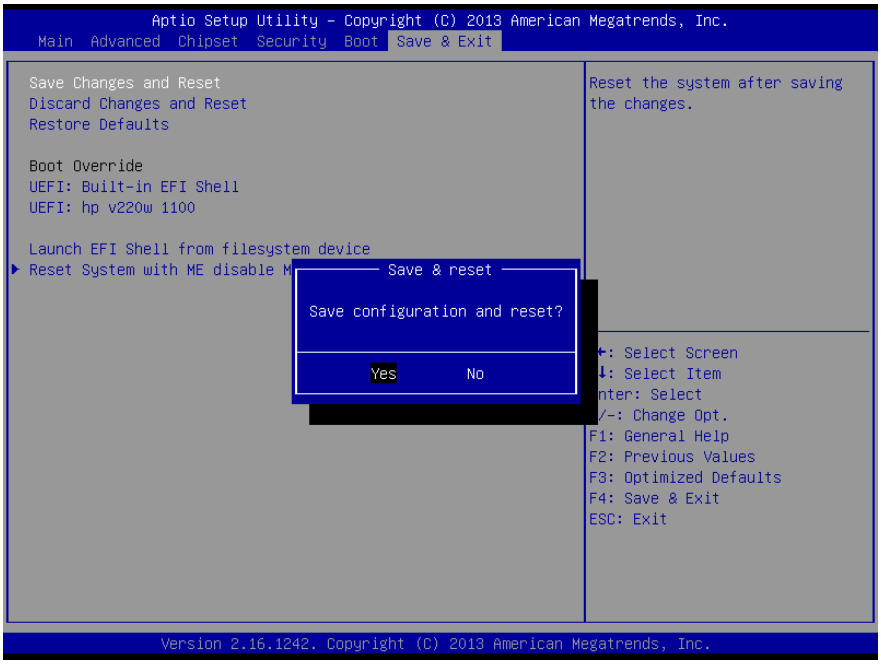


Item	Option	Description
Setup Prompt Timeout	1~ 65535	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

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 #1/2	Set the system boot order.	

3.6.6 Save and exit





3.6.6.1 Save Changes and Reset

Reset the system after saving the changes.

3.6.6.2 Discard Changes and Reset

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

3.6.6.3 Restore Defaults

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

3.6.6.4 Launch EFI Shell from filesystem device

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

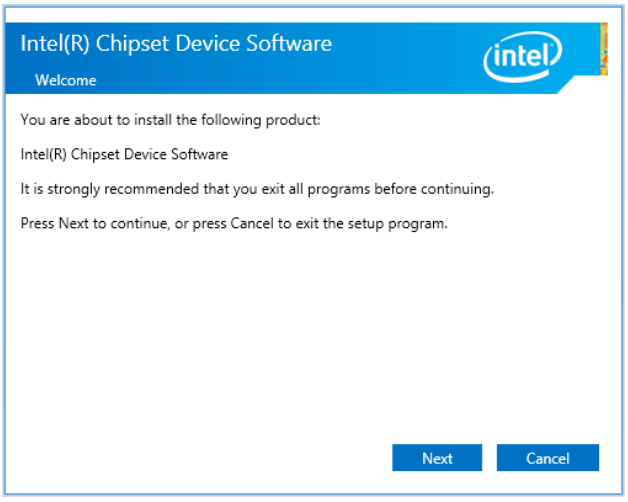
4. Drivers Installation

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

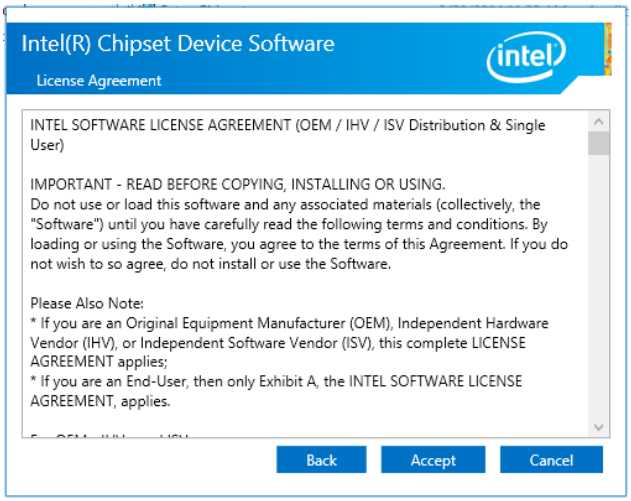
4.1 Install Chipset Driver

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

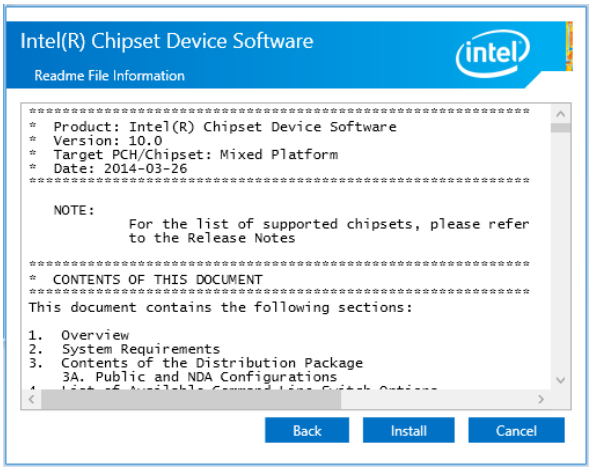
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



Step1. Click **Next**.



Step 2. Click **Accept**.



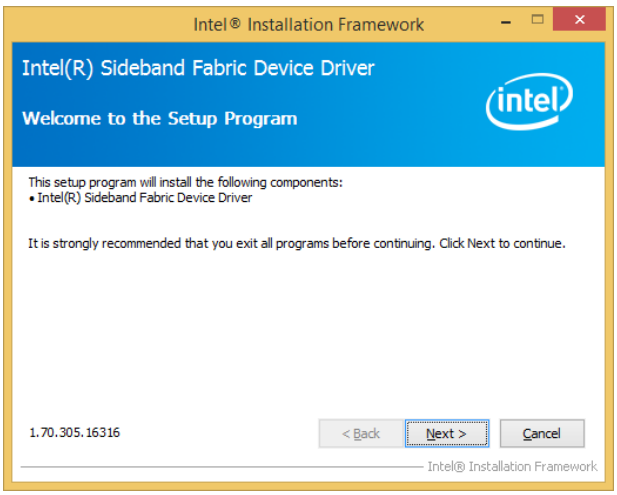
Step 3. Click **Install**.

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

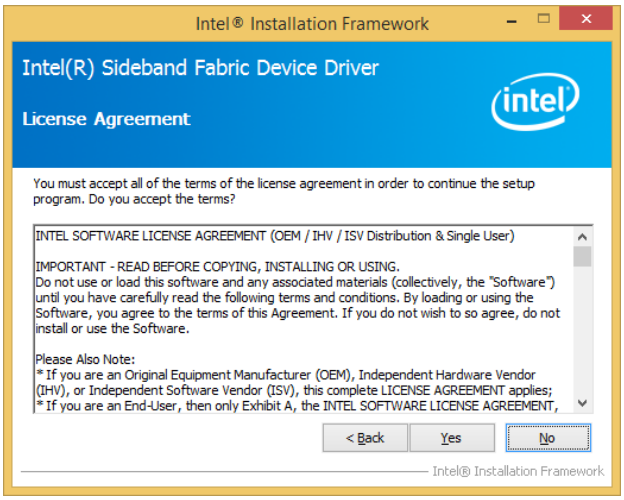
4.2 Install MBI Driver

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

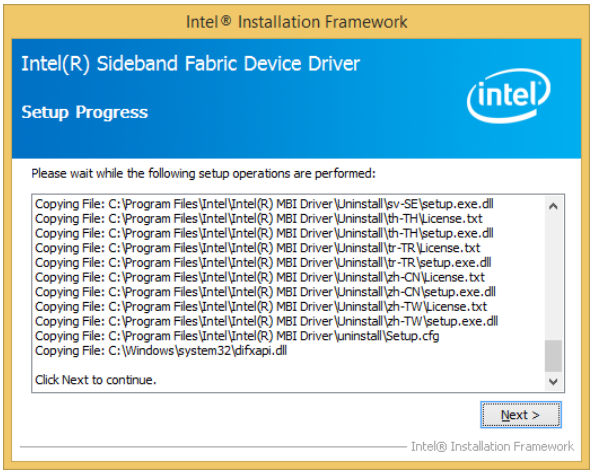
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



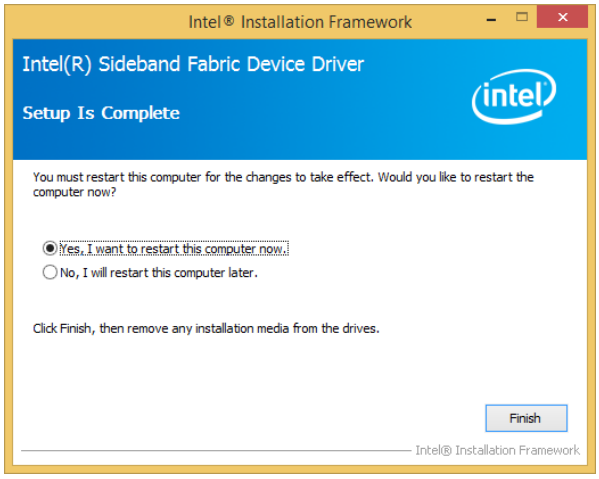
Step1. Click **Next** to start installation.



Step 2. Click **Yes** to accept license agreement.



Step 3. Click **Next** to proceed setup.

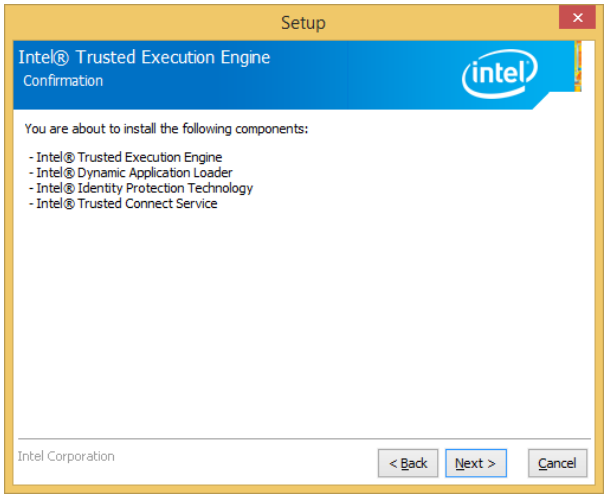


Step 4. Click **Finish** to complete setup.

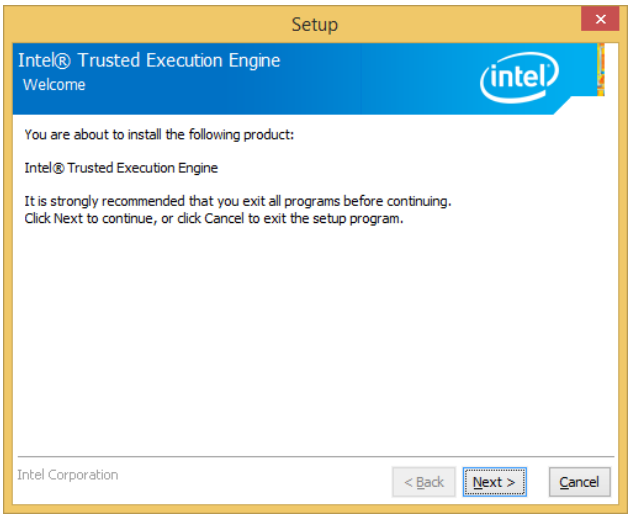
4.3 Install TXE Driver

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

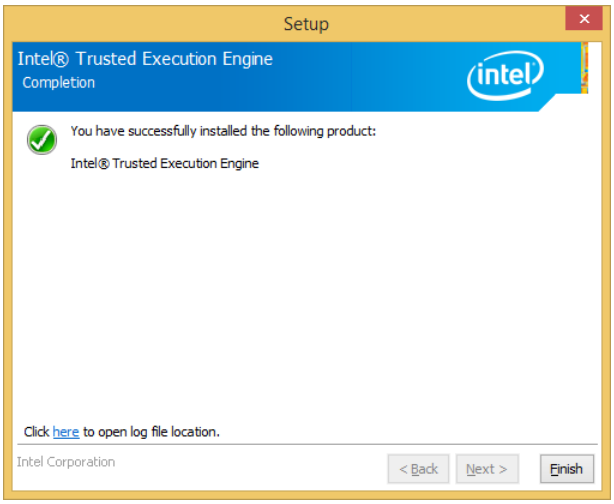
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



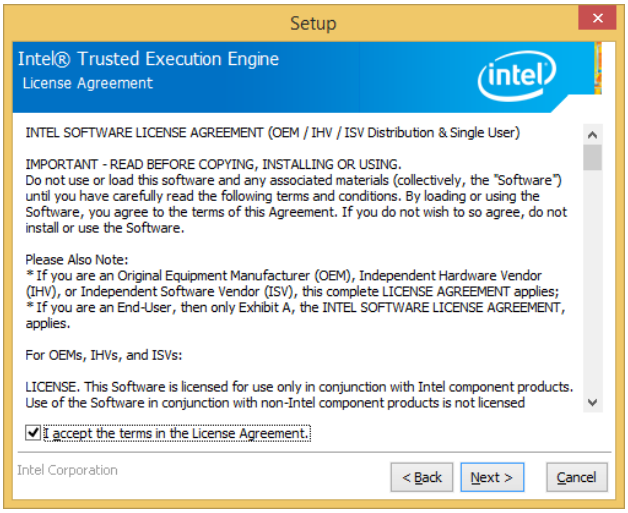
Step 3. Click **Next** to continue installation.



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



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

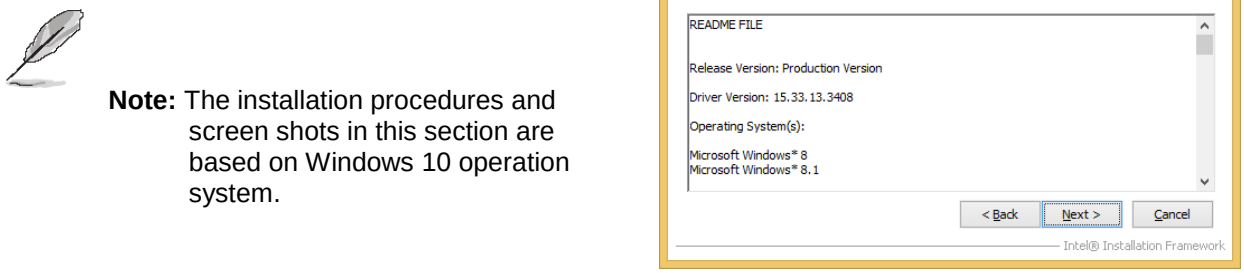


Step 2. Click **Next**.

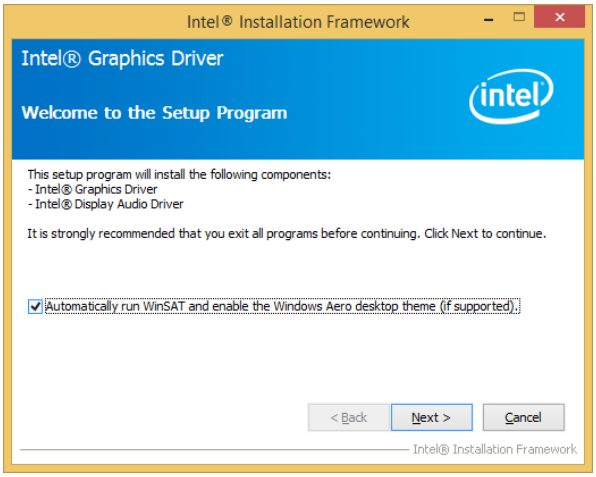
4.4 Install VGA Driver

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

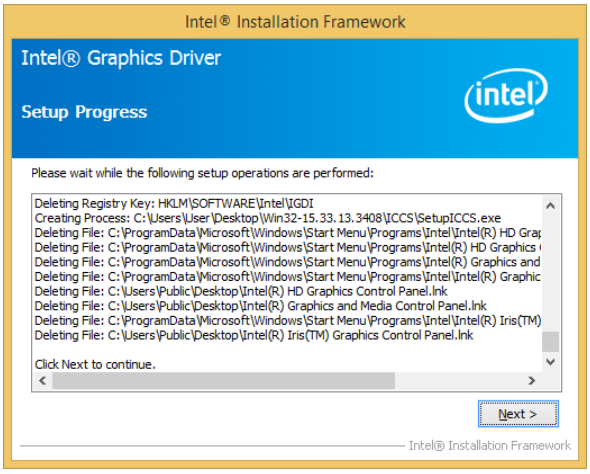
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



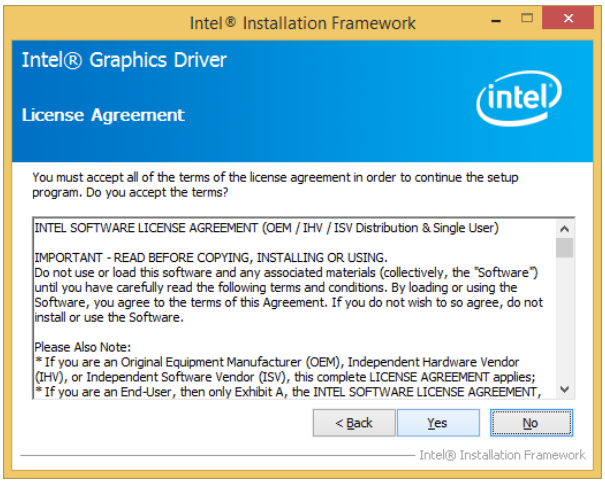
Step 3. Click **Next.**



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

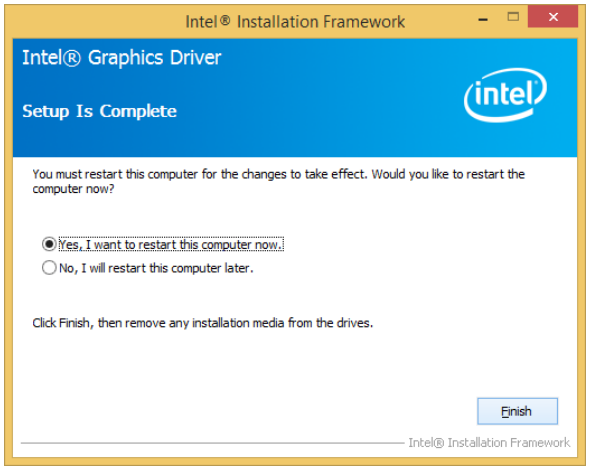


Step 4. Click **Next**.



Step 2.

Click **Yes** to accept license agreement.



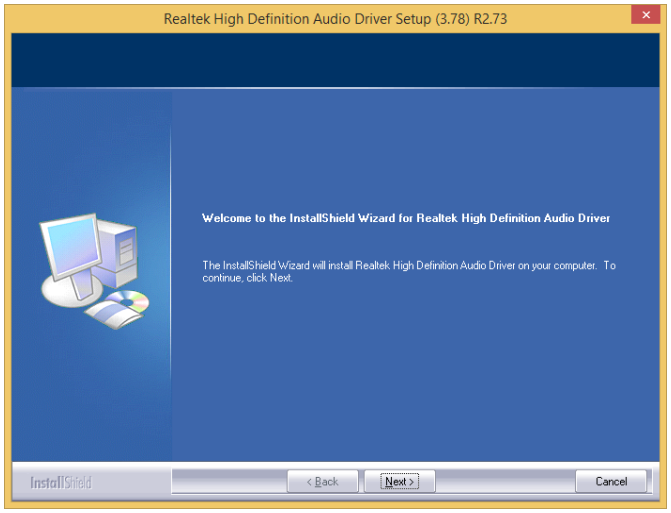
Step 5. Click **Finish** to complete setup.

4.5 Install Audio Driver (For Realtek ALC892)

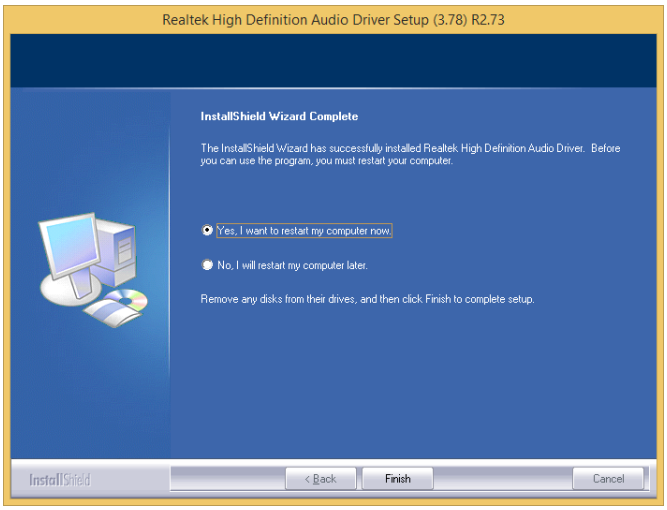
All drivers can be found on the Avalue Official Website:

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

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



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

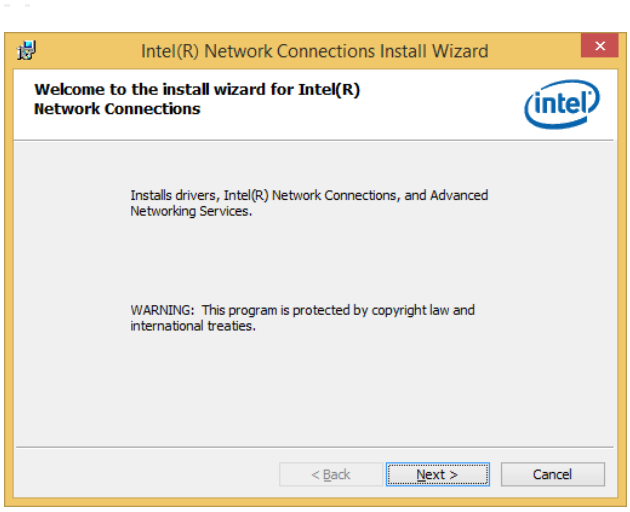


Step 2. Click **Finish** to complete the setup.

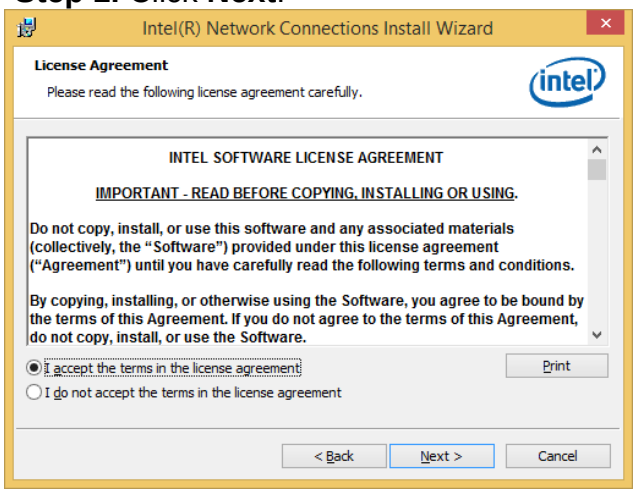
4.6 Install Ethernet Driver

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

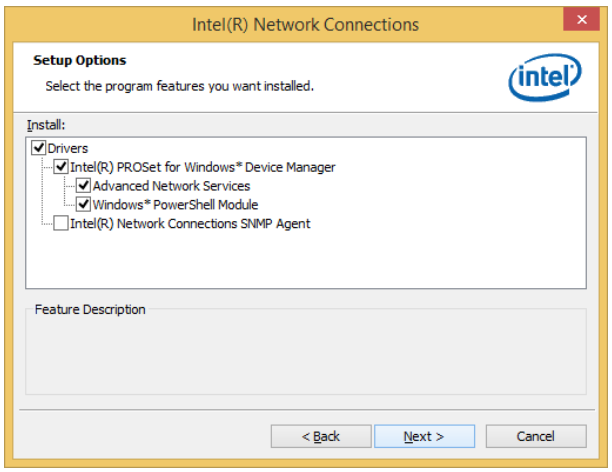
Note: The installation procedures and screen shots in this section are based on Windows 10 operation system.



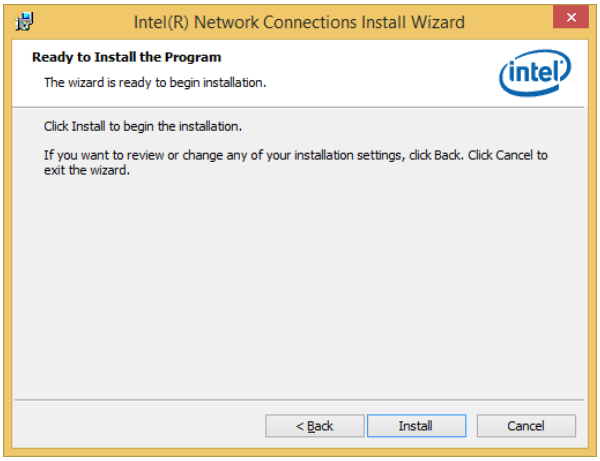
Step 1. Click **Next**.



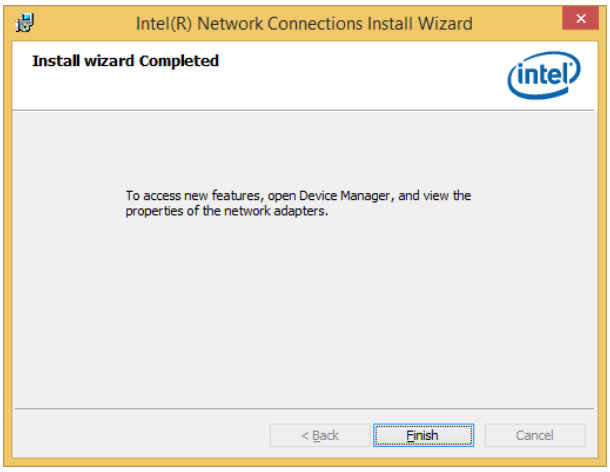
Step 2. Click **Next** to accept license agreement.



Step 3. Click **Next**.

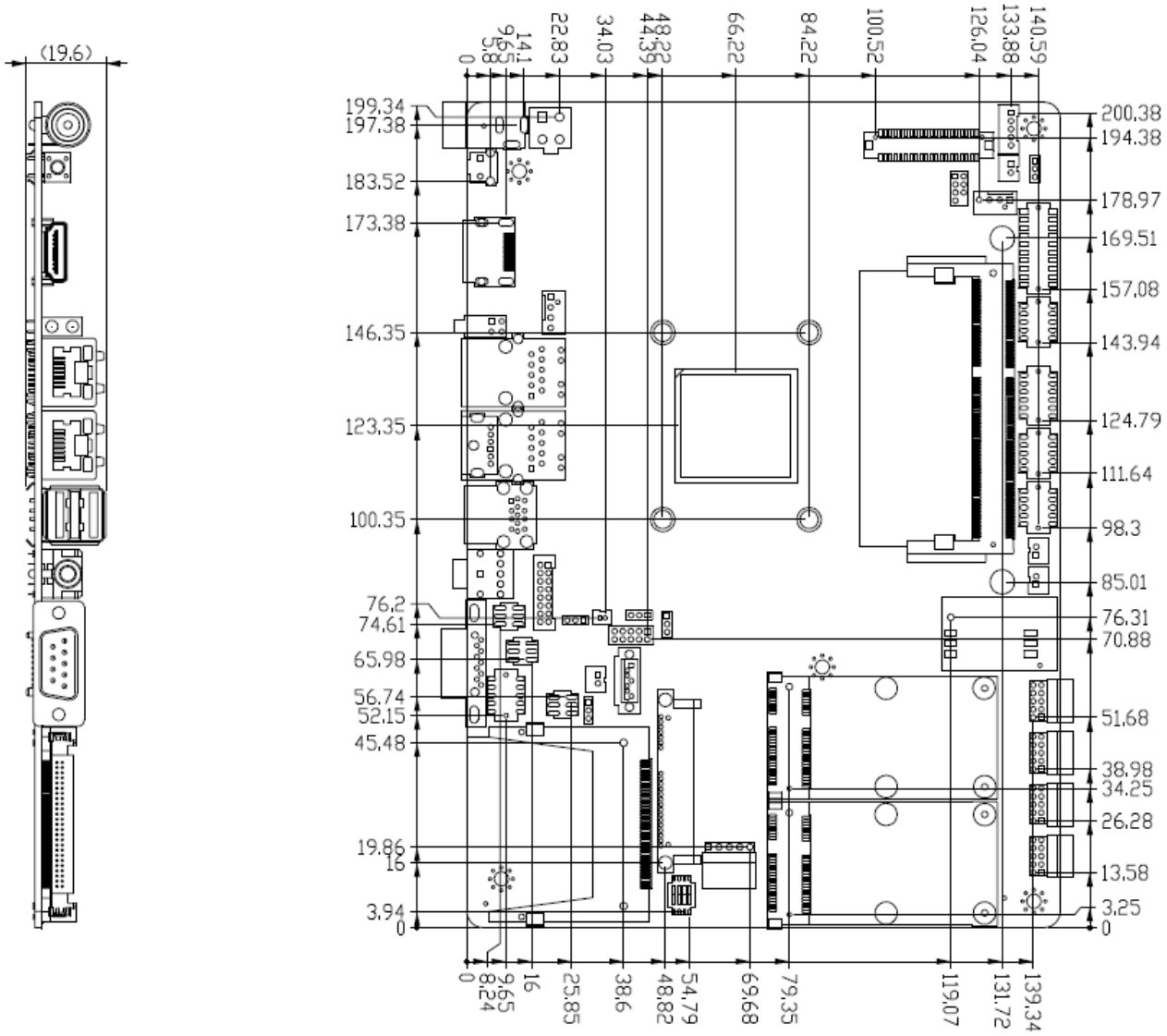


Step 4. Click **Install** to proceed.

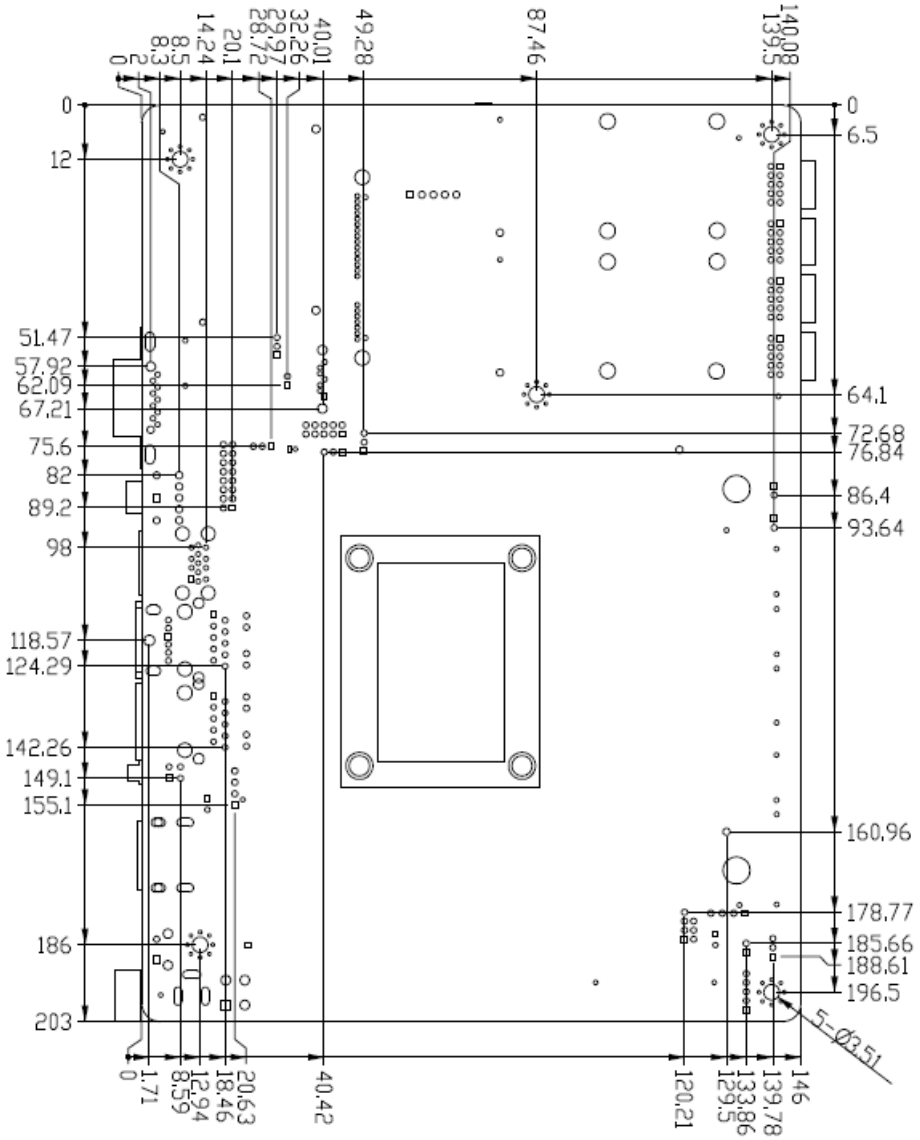


Step 5. Click **Finish** to complete the setup

5. Mechanical Drawing


(19.6)
0
5.8
9.65
14.1
22.83
34.03
44.55
48.22
66.22
84.22
100.52
126.04
133.88
140.59
199.34
197.38
183.52
173.38
146.35
123.35
100.35
76.2
74.61
65.98
56.74
52.15
45.48
19.86
16
3.94
0
200.38
194.38
178.97
169.51
157.08
143.94
124.79
111.64
98.3
85.01
76.31
70.88
51.68
38.98
34.25
26.28
13.58
3.25
0
0
8.24
9.65
16
25.85
38.6
48.82
54.79
69.68
79.35
119.07
131.72
139.34

Unit: mm


0
2
8.3
8.5
14.24
20.1
28.72
32.26
40.01
49.28
87.46
139.5
140.08
0
6.5
12
51.47
57.92
62.09
67.21
75.6
82
89.2
98
64.1
72.68
76.84
86.4
93.64
118.57
124.29
142.26
149.1
155.1
160.96
178.77
185.66
188.61
196.5
186
203
5-Ø3.51
0
1.71
8.59
12.94
18.46
20.63
40.42
120.21
129.5
133.86
139.78
146

Unit: mm