

EBM-QM87U

Intel® 4th Generation ULT Processor 5.25" Mini Module

User's Manual



2nd Ed – 09 August 2016

FCC Statement



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

- (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.
- (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.

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

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

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

Notice

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

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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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1. Getting Started

1.1 Safety Precautions

Warning!



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

Caution!



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

1.2 Packing List

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

- 1 x EBM-QM87U Intel® 4th Generation ULT Processor 5.25" Mini Module
- 1 x DVD-ROM or CD-ROM contains the followings:
 - User's Manual (this manual in PDF file)
 - Ethernet driver and utilities
 - VGA drivers and utilities
 - Audio drivers and utilities



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

1.3 Document Amendment History

Revision	Date	By	Comment
1 st	May 2014	Avalue	Initial Release
2 nd	August 2016	Avalue	Update Specifications

1.4 Manual Objectives

This manual describes in details Avalue Technology EBM-QM87U 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-QM87U 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

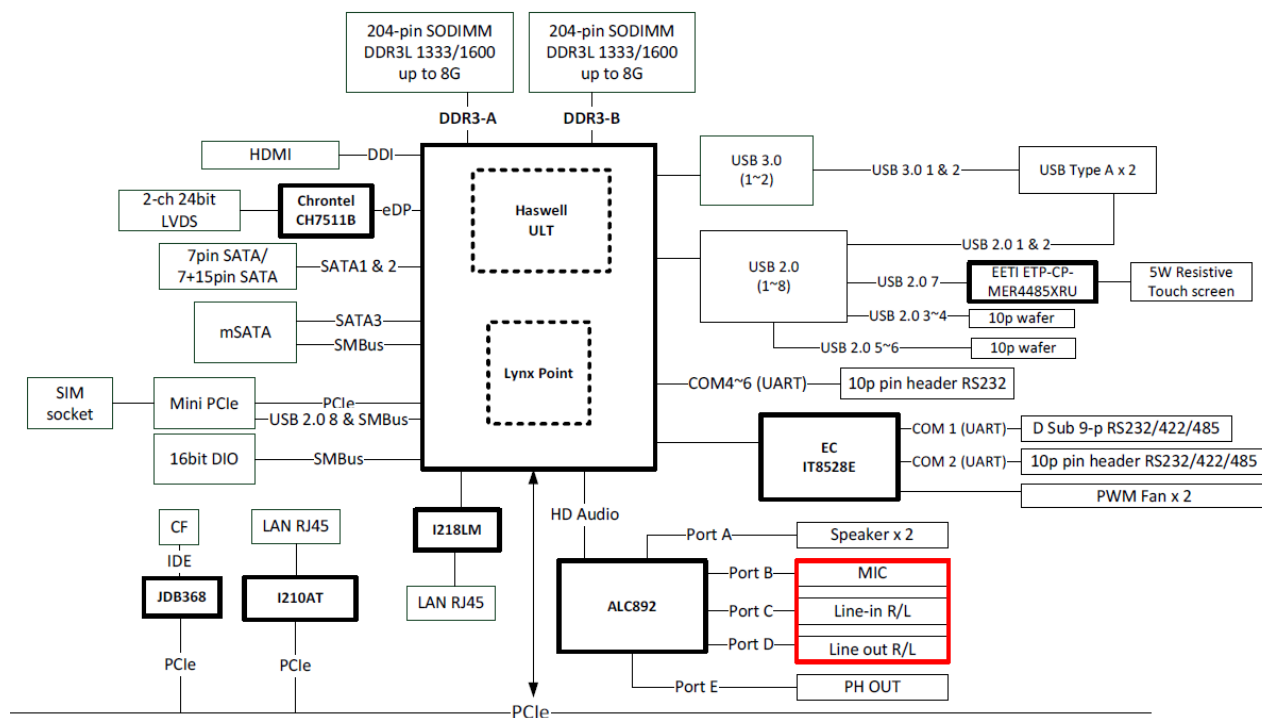
System	
CPU	Intel® 4th Generation ULT 2 Cores BGA w/Integrated Lynx Point PCH (2 Die MCP) (Co-layout w/Core i7/i5/i3)
BIOS	AMI uEFI BIOS, 128 Mbit SPI Flash ROM iAMT 9.5 Supported
System Chipset	Intel® Lynx Point (2 Die MCP; Integrated in Processor)
I/O Chip	E/C IT8528E
System Memory	2 x 204-pin DDR3L SODIMM Up to 8GB Per DIMM
SSD	One CompactFlash Type I/II Socket
Watchdog Timer	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 Only
I/O	
MIO	1 x HDMI, 1 x CF (via JMB368), 1 x Lockable DC Jack 2 x LAN, 2 x USB 3.0, 2 x COM (RS-232/422/485 Selected by BIOS; additional setting for RS485 mode by SW2), 1 x Line-out
USB	2 x USB 3.0 Type A (Including 2 x USB 2.0) 2 x USB 2.0 10-pin Box Wafer
DIO	16-bit General Purpose I/O for DI and DO
Touch Interface	1 x USB 2.0 (EETI ETP-CP-MER4485XRU Support 5 wire)
Display	
Chipset	Intel® Lynx Poing Integrated w/CPU
Resolution	HDMI: 4000 x 2000 @ 24Hz (Single Display) LVDS: 1920 x 1200 @ 60Hz
Multiple Display	Dual-display Supported: HDMI + LVDS
LCD Interface	1 x eDP via CH7511 Supports 24-bit Dual Channel LVDS
Touch Screen Interface	
Chipset	EETI ETP-CP-S458XRU Support 5-wire
Touch Interface	1 x 5-pin 2.0mm Pin Header
Audio	
HD Codec	Realtek ALC892 Supports 5.1-CH Audio
Audio Interface	Mic-in, Line-in, Line-out, Speaker-out

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Ethernet	
LAN Chip	1 x Intel® I210AT Gigabit Ethernet controller 1 x Intel® I218LM Gigabit Ethernet PHY
Ethernet Interface	10/100/1000 Base-Tx Gigabit Ethernet Compatible
Mechanical & Environmental	
Power Requirement	+12V ~ +26V
Power Type	AT or ATX Mode
Operating Temp.	0~60°C (32~140°F)
Storage Temp.	-40 ~ 75°C (-40 ~ 167°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)

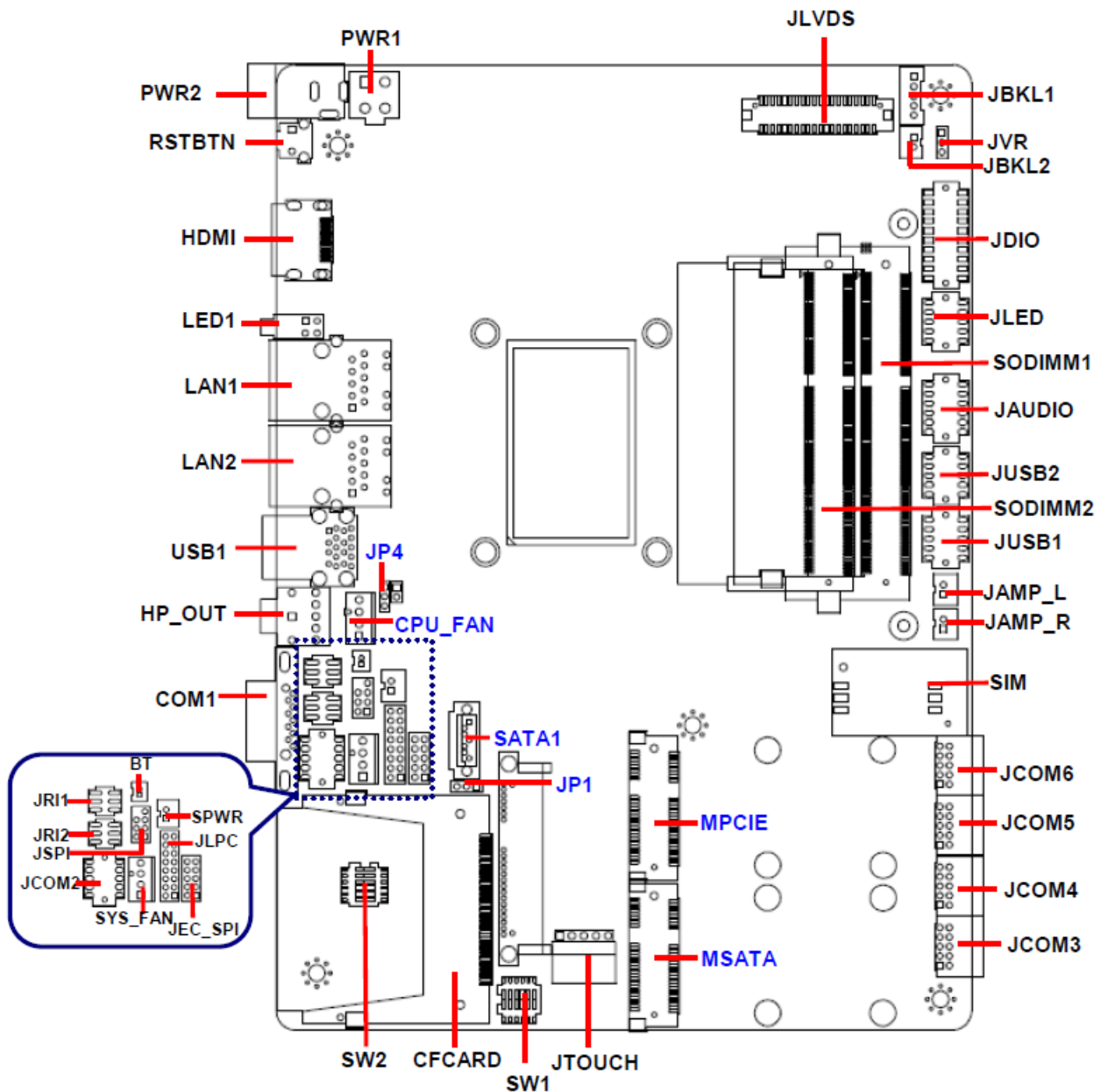
1.6 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of EBM-QM87U.



2. Hardware Configuration

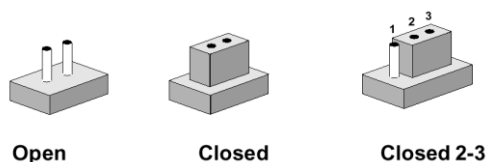
2.1 Product Overview



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
JP1	SATA Power select (SATA1- Serial ATA connector)	3 x 1 header, pitch 2.00mm
JP4	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
JVR	LCD backlight brightness adjustment	3 x 1 header, pitch 2.00mm
SW1	Multi-function select	DIP switch 6pin
SW2	Serial port 1/ 2 – RS485 mode select	DIP switch 6pin

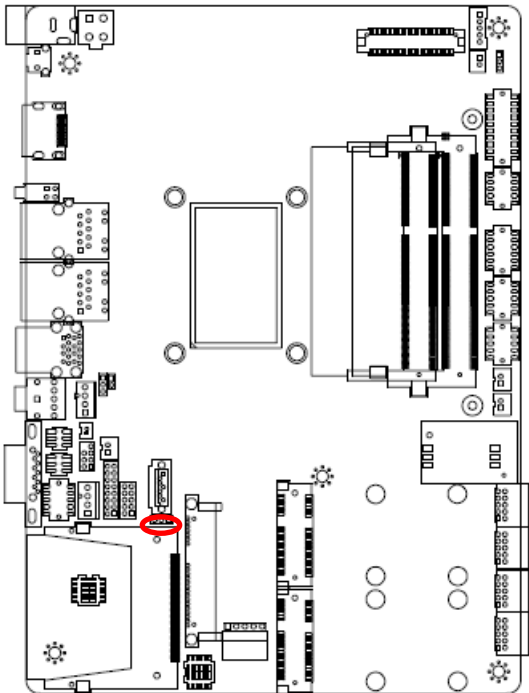
Connectors

Label	Function	Note
CFCARD	Compact Flash card connector	
COM1	Serial Port 1 connector	D-sub 9 pin, male

CPU_FAN	CPU fan connector	4 x 1 wafer, pitch 2.54mm
SYS_FAN	System fan connector	4 x 1 wafer, pitch 2.54mm
SODIMM1/2	204-pin DDR3 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
JCOM2	Serial Port 2 connector	5 x 2 wafer, pitch 2.00mm
JCOM3	Serial Port 3 connector	5 x 2 header, pitch 2.00mm
JCOM4	Serial Port 4 connector	5 x 2 header, pitch 2.00mm
JCOM5	Serial Port 5 connector	5 x 2 header, pitch 2.00mm
JCOM6	Serial Port 6 connector	5 x 2 header, pitch 2.00mm
JDIO	General purpose I/O connector	10 x 2 wafer, pitch 2.00mm
JLED	LED indicator connector	5 x 2 wafer, pitch 2.00mm
LED1	HDD/Power LED indicator	
JLVDS	LVDS Connector	DIN 40-pin wafer, pitch 1.25mm
JTOUCH	Touch panel connector	5 x 1 header, pitch 2.54mm
USB1	USB connector	
JUSB1	USB connector 1	5 x 2 wafer, pitch 2.00mm
JUSB2	USB connector 2	5 x 2 wafer, pitch 2.00mm
LAN1	RJ-45 Ethernet 1	
LAN2	RJ-45 Ethernet 2	
BT	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
MPCIE	Mini-PCI connector	
MSATA	SMBUS & SATA connector	
JLPC	LPC connector	8 x 2 header, pitch 2.00mm
PWR1	Power connector	2 x 2 wafer, pitch 4.20mm
PWR2	Power connector	
RSTBTN	Reset button	
JSPI	SPI connector	4 x 2 header, pitch 2.00mm
JEC_SPI	EC_Program	4 x 2 header, pitch 2.00mm
SPWR	SATA Power connector	2 x 1 wafer, pitch 2.00mm
SATA1	Serial ATA connector	
SIM	SIM card slot	
HDMI	HDMI connector	
HP_OUT	Audio line-out connector	

2.3 Setting Jumpers & Connectors

2.3.1 SATA Power select (JP1)

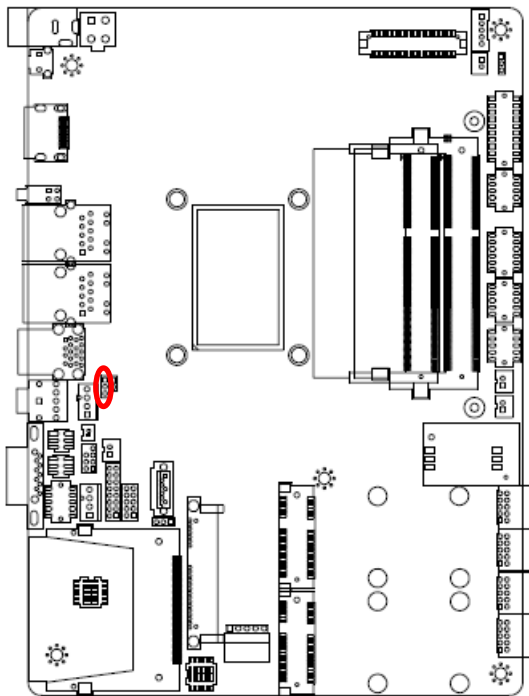


* Default

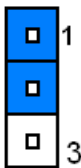


Signal	PIN
+5V	1
SATA1 P7	2
GND	3

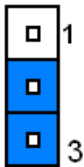
2.3.2 Clear CMOS (JP4)



Protect*

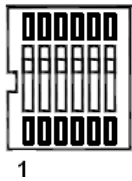
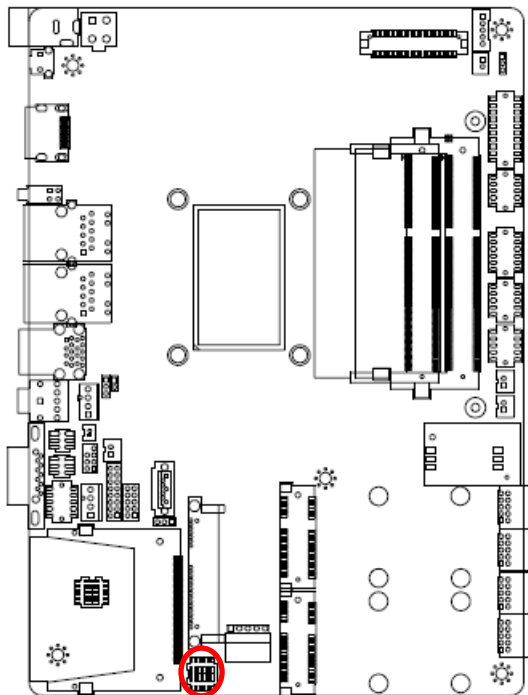


Clear CMOS



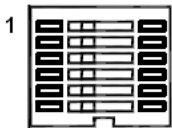
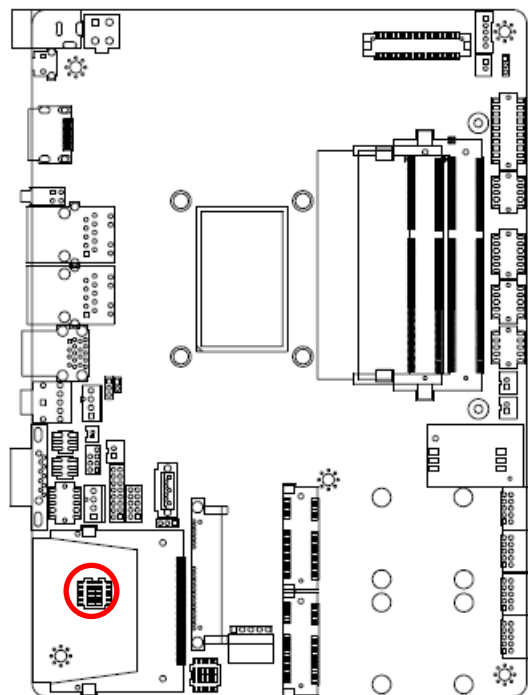
* Default

2.3.3 Multi-function select (SW1)



	ON	OFF
1	AT SEL	ATX SEL
2	CF Slave	CF Master
3	Touch off	Touch on
4	NC	NC
5	BKLT Negative	BKLT Positive
6	GPIO56:L	GPIO56:H

2.3.4 Serial port 1/ 2 – RS485 mode select (SW2)



In Serial Port 1 mode

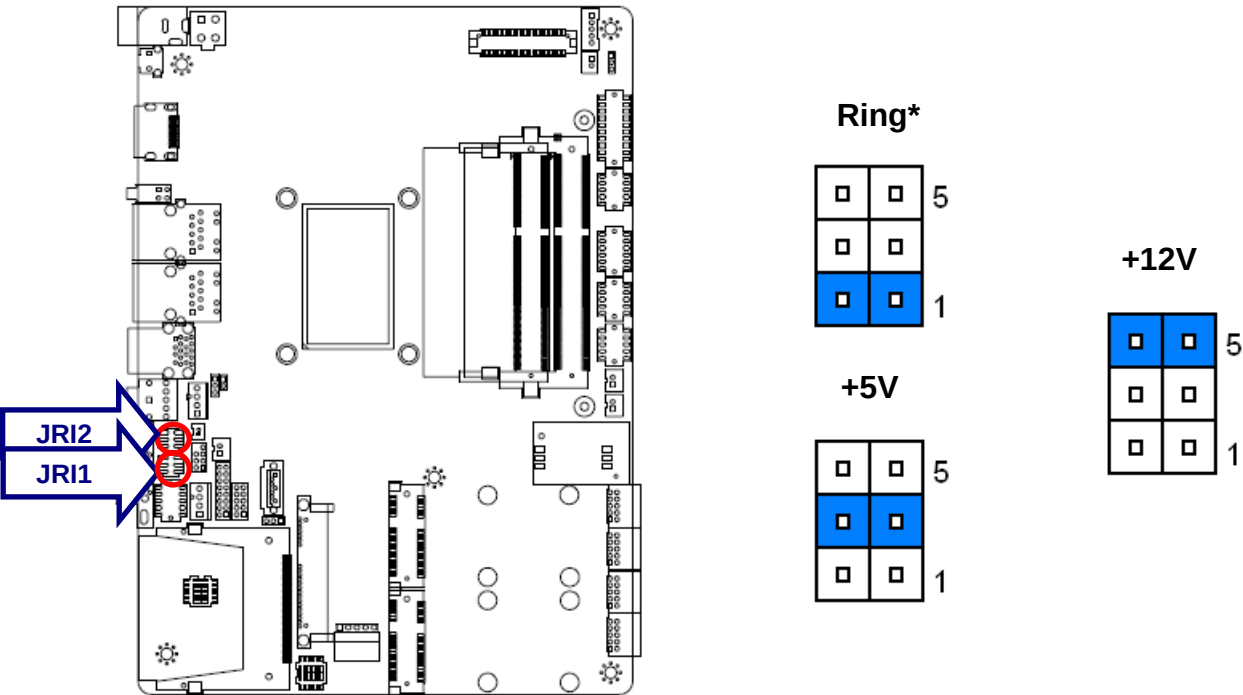
	ON	OFF
1	Auto Direction*	RTS# Control
2	485TXP external biasing resistor	OPEN*
3	485TXN external biasing resistor	OPEN*

In Serial Port 2 mode

	ON	OFF
4	Auto Direction*	RTS# Control
5	485TXP external biasing resistor	OPEN*
6	485TXN external biasing resistor	OPEN*

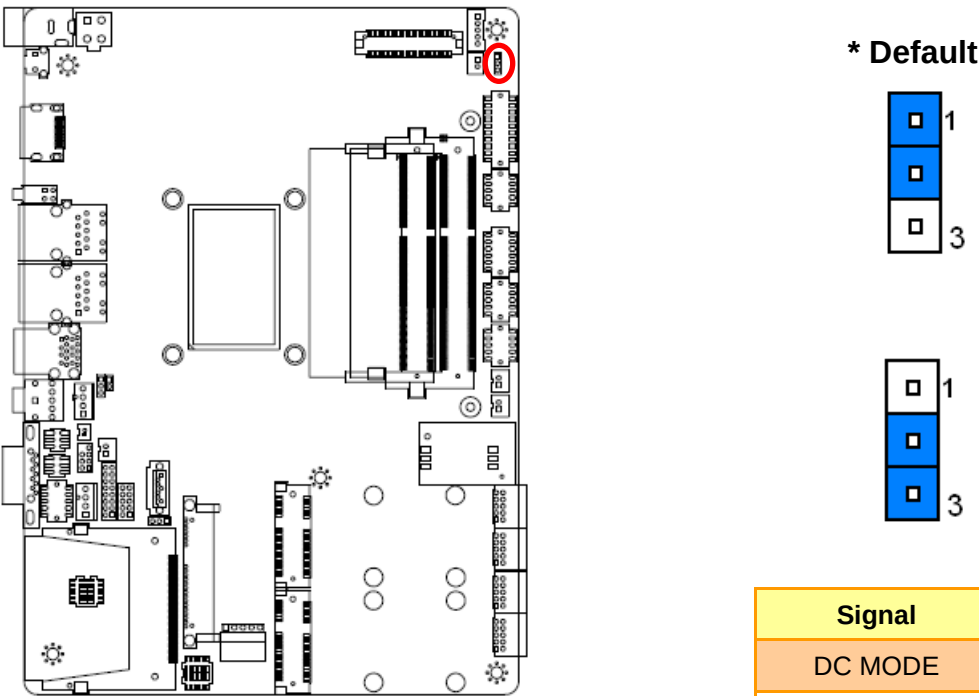
* Default

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



* Default

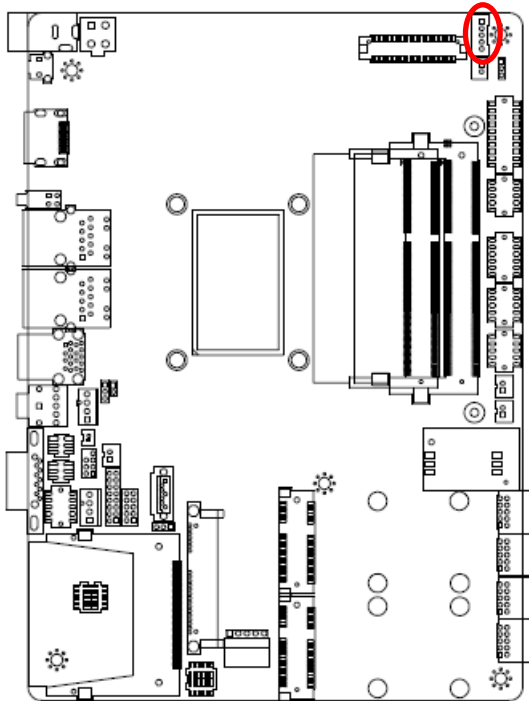
2.3.6 LCD backlight brightness adjustment (JVR)



* Default

Signal	PIN
DC MODE	1
VBRIGHT	2
PWM MODE	3

2.3.7 LCD Inverter connector (JBKL1)

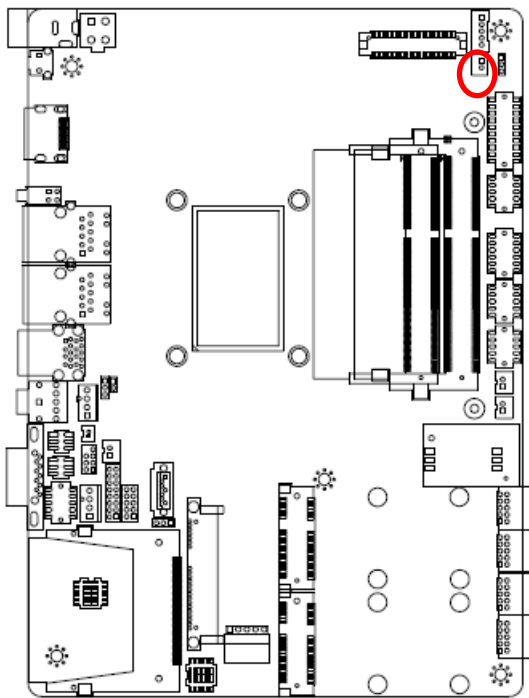


Signal	PIN
+12V	1
GND	2
BKLEN	3
VBRIGHT	4
+5V	5



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.

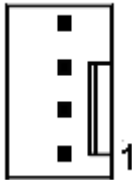
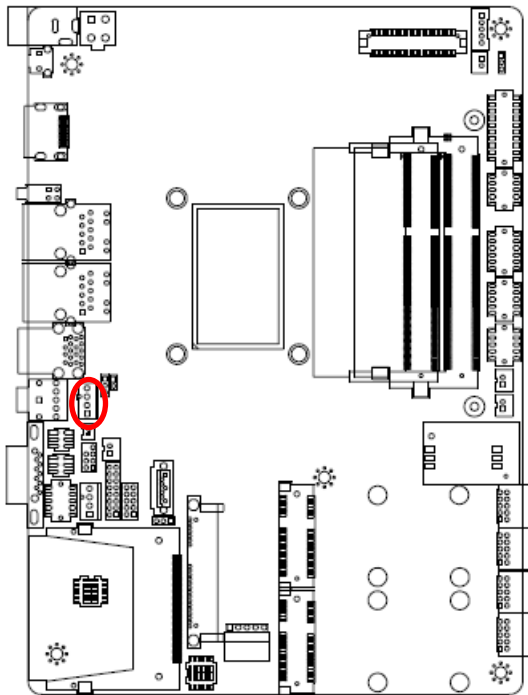
2.3.8 LCD Inverter connector (JBKL2)



Signal	PIN
+12V	1
GND	2

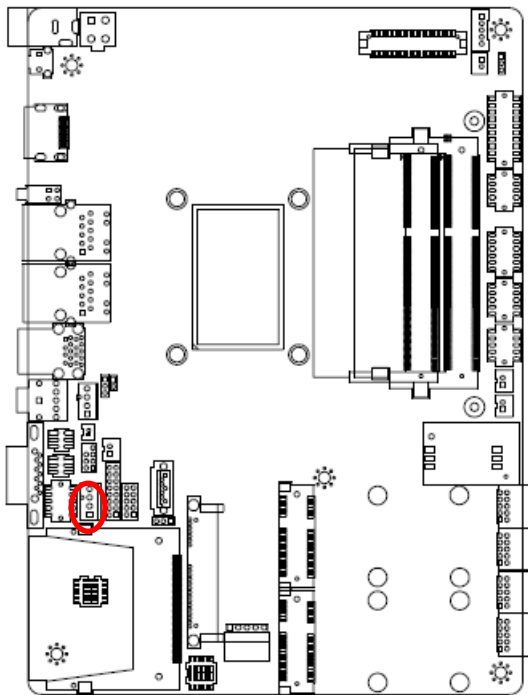
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2.3.9 CPU fan connector (CPU_FAN)



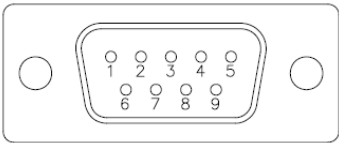
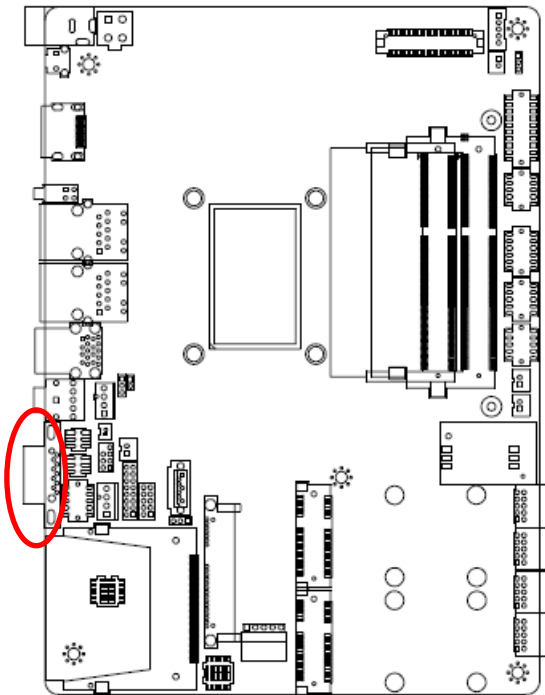
Signal	PIN
FAN_PWM0	4
EC_TACH0	3
+12V	2
GND	1

2.3.10 System fan connector (SYS_FAN)



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

2.3.11 Serial port 1 connector (COM1)



RS-232 Mode

Signal	PIN	PIN	Signal
NRXDA	2	1	NDCDA#
NDTRA#	4	3	NTXDA
NDSRA#	6	5	GND
NCTSA#	8	7	NRTSA#
		9	NR1A#

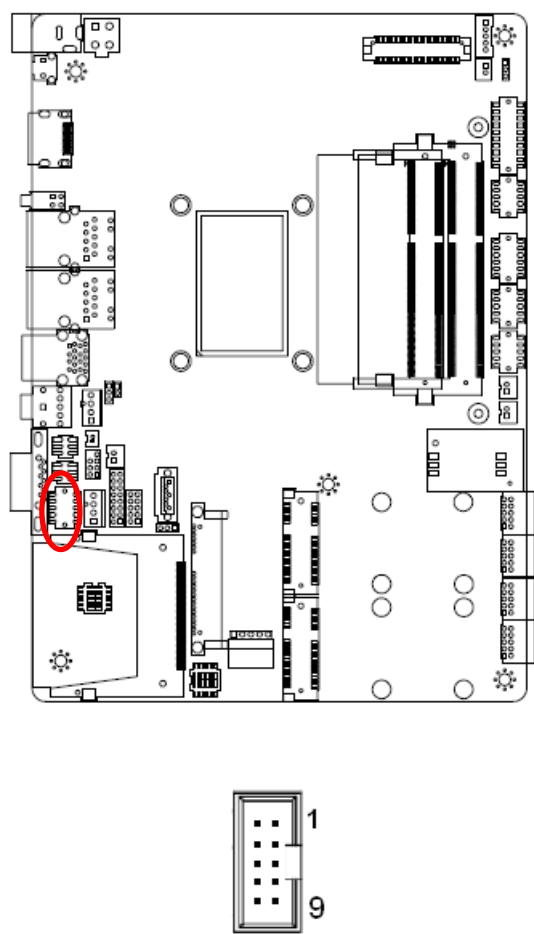
RS-422 Mode

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

2.3.12 Serial port 2 connector (JCOM2)



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#

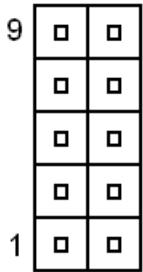
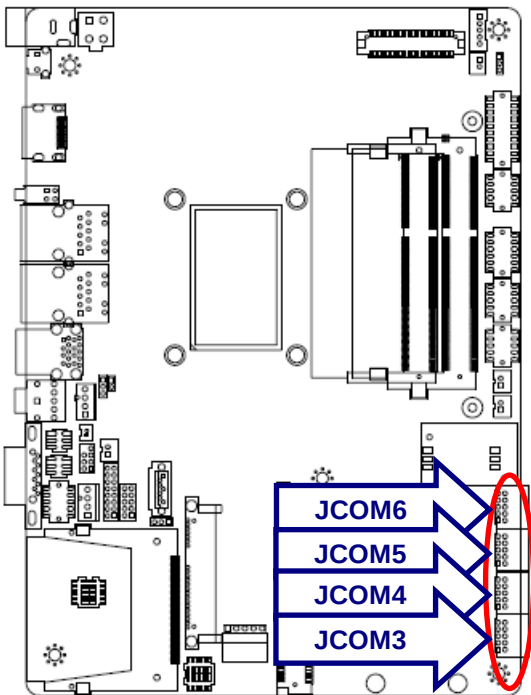
RS-422 Mode

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

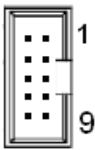
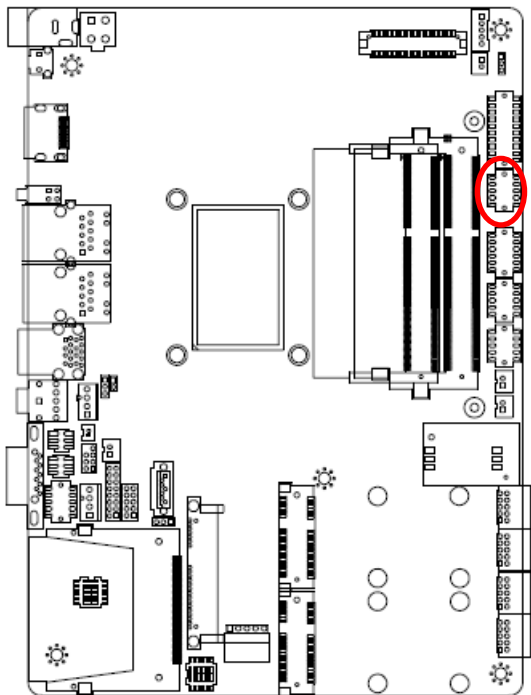
Signal	PIN	PIN	Signal
485TXP	2	1	485TXN
NC	4	3	NC
NC	6	5	GND
NC	8	7	NC
NC	10	9	NC

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



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

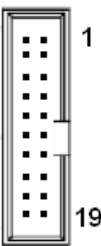
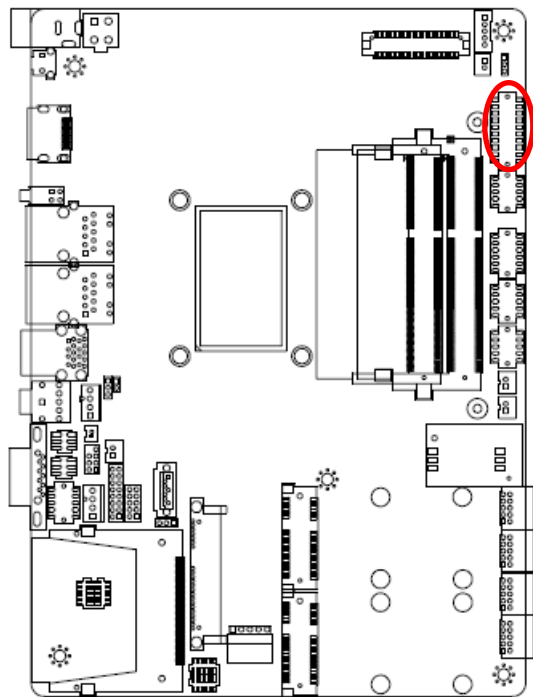
2.3.14 LED indicator connector (JLED)



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

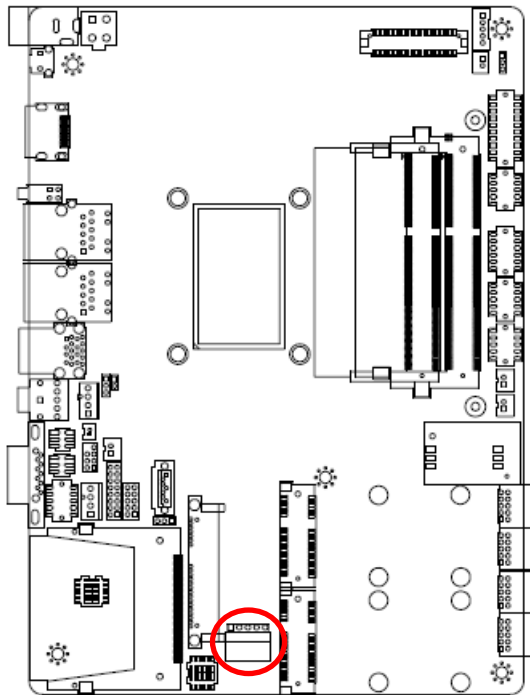
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2.3.15 General purpose I/O connector (JDIO)



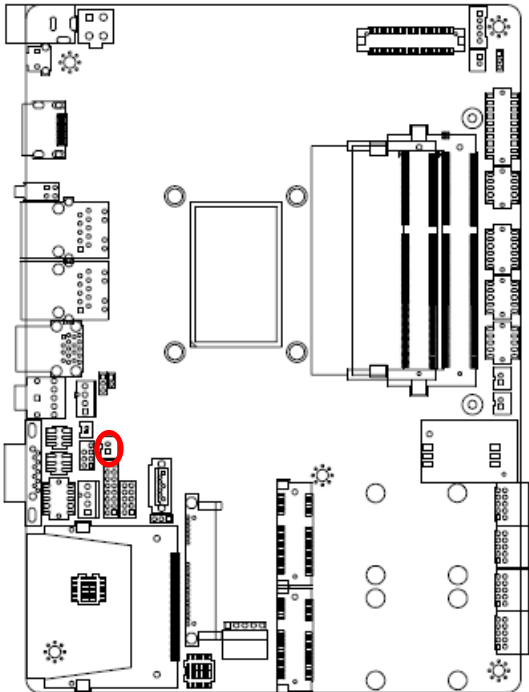
Signal	PIN	PIN	Signal
DI0	2	1	DO0
DI1	4	3	DO1
DI2	6	5	DO2
DI3	8	7	DO3
DI4	10	9	DO4
DI5	12	11	DO5
DI6	14	13	DO6
DI7	16	15	DO7
SMB_CLK_VCC	18	17	SMB_DATA_VCC
GND	20	19	+5V

2.3.16 Touch panel connector (JTOUCH)



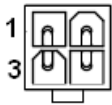
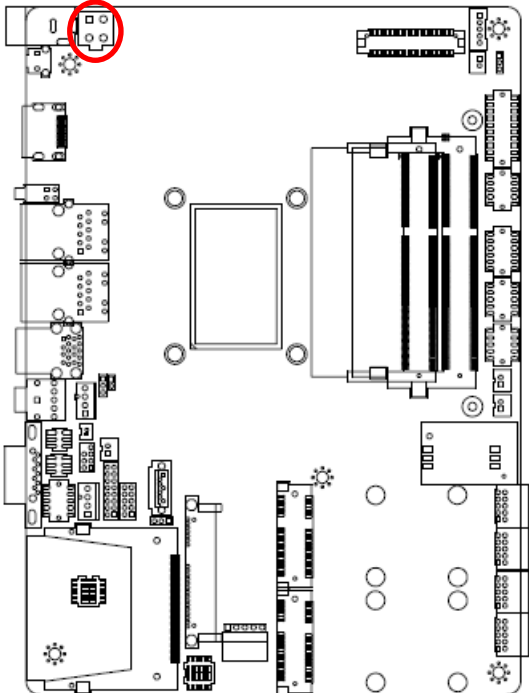
Signal	PIN
THX-	1
THX+	2
THPROBE_R	3
THY+	4
THY-	5

2.3.17 SATA Power connector (SPWR)



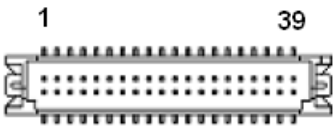
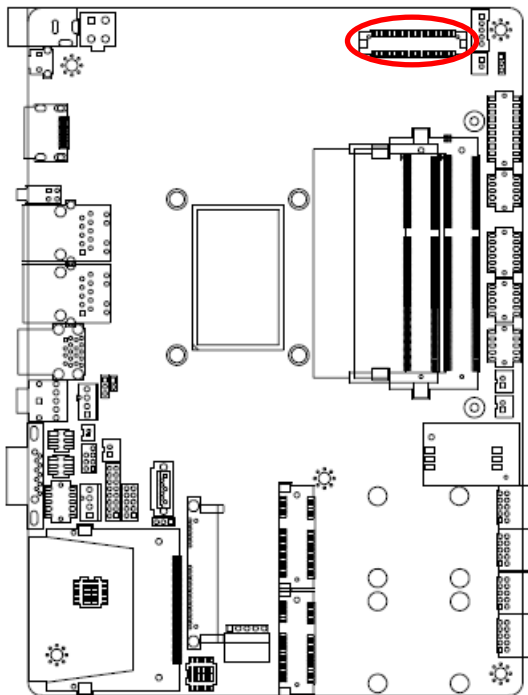
Signal	PIN
+5V	2
GND	1

2.3.18 Power connector (PWR1)



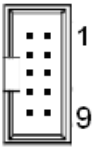
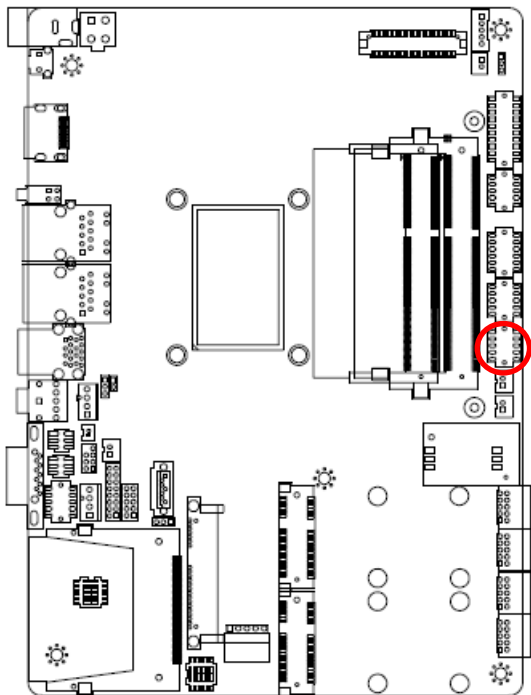
Signal	PIN	PIN	Signal
GND	1	2	GND
+V_DCIN	3	4	+V_DCIN

2.3.19 LVDS connector (JLVDS)



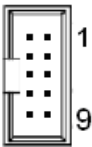
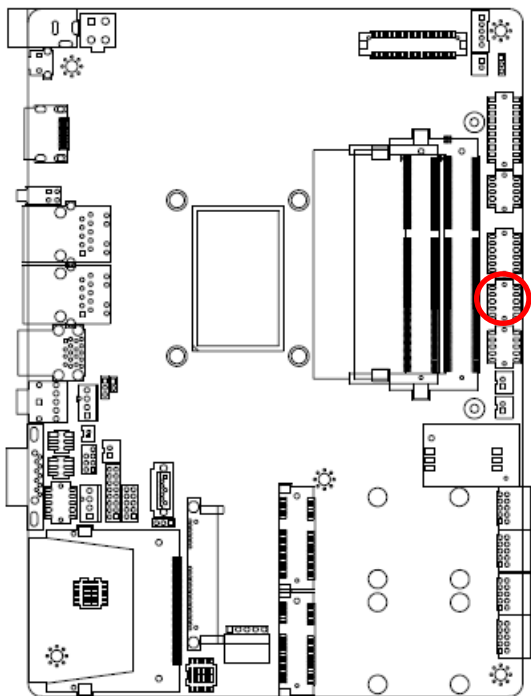
Signal	PIN	PIN	Signal
+3V	1	2	+5V
+3V	3	4	+5V
LVDS_DDC_CLK	5	6	LVDS_DDC_DATA
GND	7	8	GND
LVDS_DATA1_P	9	10	LVDS_DATA0_P
LVDS_DATA1_N	11	12	LVDS_DATA0_N
GND	13	14	GND
LVDS_DATA3_P	15	16	LVDS_DATA2_P
LVDS_DATA3_N	17	18	LVDS_DATA2_N
GND	19	20	GND
LVDS_DATA5_P	21	22	LVDS_DATA4_P
LVDS_DATA5_N	23	24	LVDS_DATA4_N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

2.3.20 USB connector 1 (JUSB1)



Signal	PIN	PIN	Signal
+VCC_USB23	2	1	+VCC_USB23
USB_DN2	4	3	USB_DN3
USB_DP2	6	5	USB_DP3
GND	8	7	GND
GND	10	9	GND

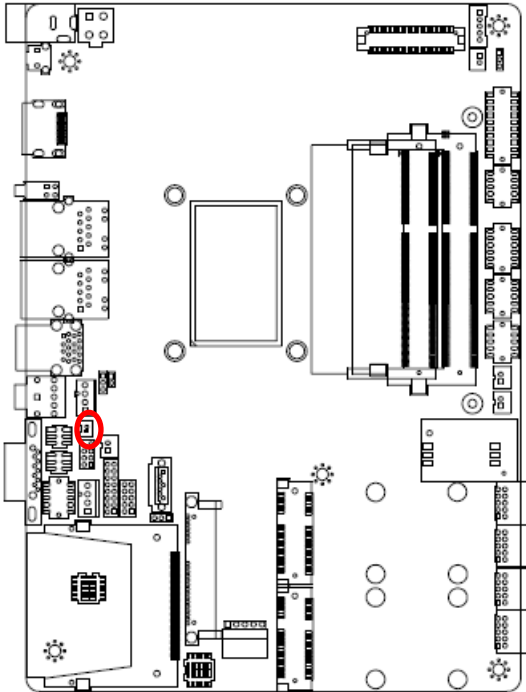
2.3.21 USB connector 2 (JUSB2)



Signal	PIN	PIN	Signal
+VCC_USB45	2	1	+VCC_USB45
USB_DN4	4	3	USB_DN5
USB_DP4	6	5	USB_DP5
GND	8	7	GND
GND	10	9	GND

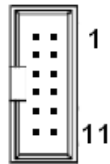
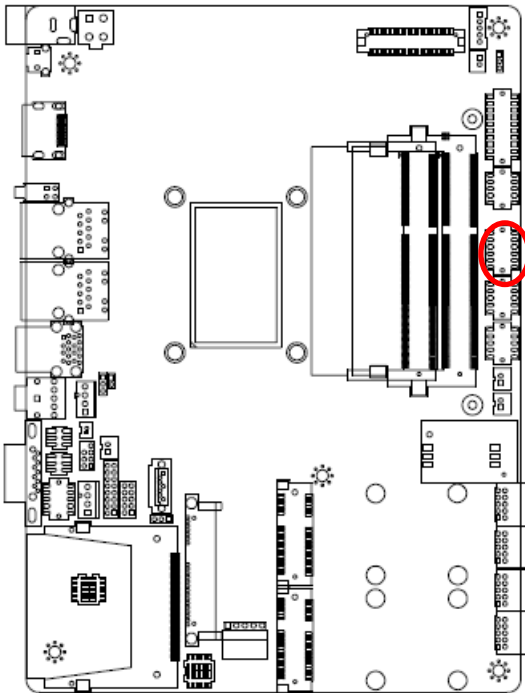
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2.3.22 Battery connector (BT1)



Signal	PIN
GND	2
+VBAT	1

2.3.23 Audio connector (JAUDIO)

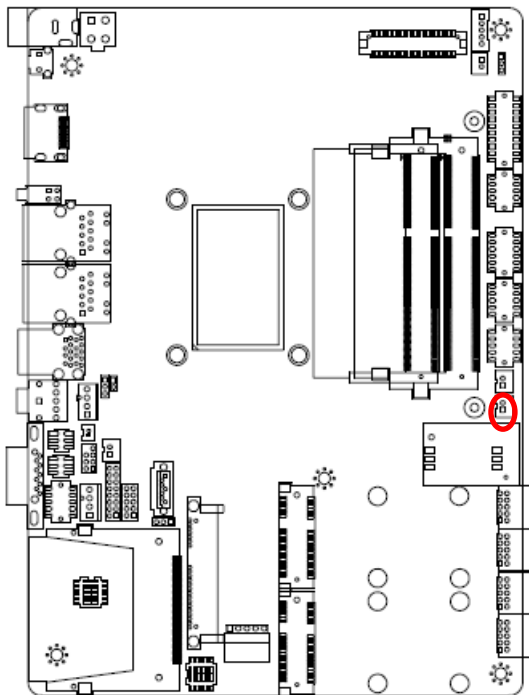


Signal	PIN	PIN	Signal
LINEOUT_R	2	1	LINEOUT_L
GND	4	3	GND
LINE1_RIN	6	5	LINE1_LIN
MIC_RIN	8	7	MIC_LIN
FRONT_JD	10	9	LINE1_JD
MIC1_JD	12	11	GND

2.3.23.1 Signal Description – Audio connector (JAUDIO)

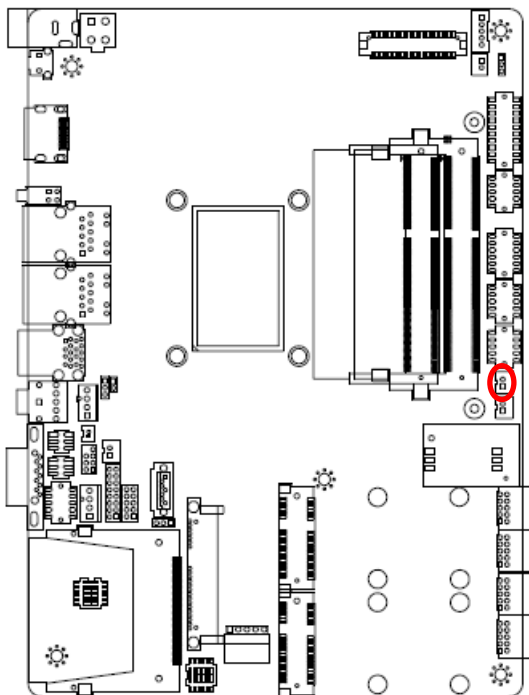
Signal	Signal Description
LINE1_JD	AUDIO IN (LINE_RIN/LIN)sense pin
FRONT_JD	AUDIO Out(ROUT/LOUT) sense pin
MIC1_JD	MIC IN (MIC_RIN/LIN) sense pin

2.3.24 AMPLIFIER_R (JAMP_R)



Signal	PIN
AMP_ROUT-	2
AMP_ROUT+	1

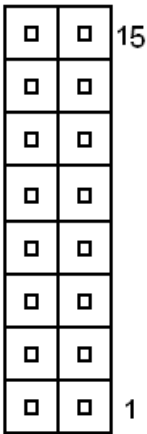
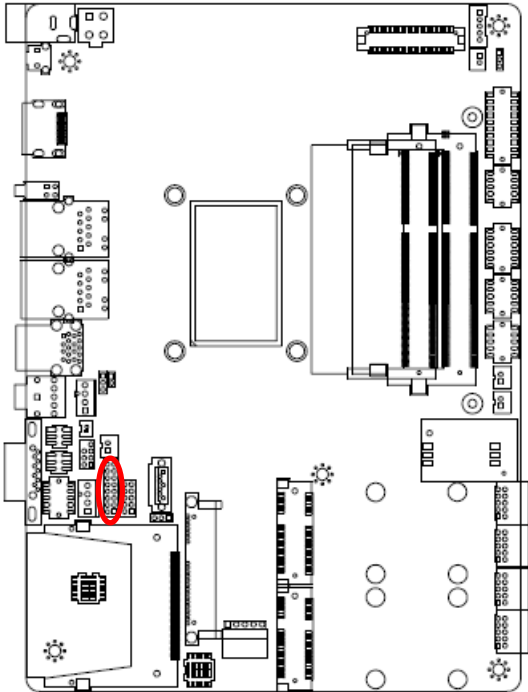
2.3.25 AMPLIFIER_L (AMP_L)



Signal	PIN
AMP_LOUT-	2
AMP_LOUT+	1

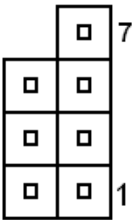
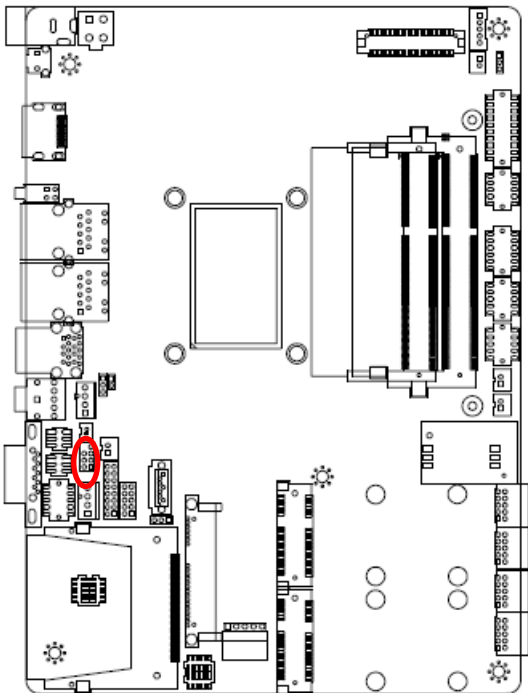
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2.3.26 LPC connector (JLPC)



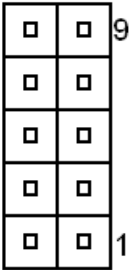
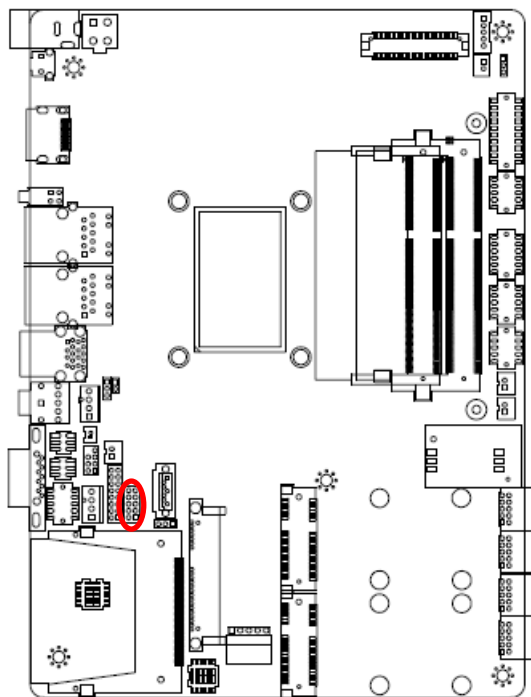
Signal	PIN	PIN	Signal
L80LLAT	16	15	L80HLAT
GND	14	13	+5VSB
GND	12	11	+5V
GND	10	9	SERIRQ
CLK_PCI_JLPC	8	7	LPC_AD3
LPC_LFRAME#	6	5	LPC_AD2
PLTRST#	4	3	LPC_AD1
+V3P3S	2	1	LPC_AD0

2.3.27 SPI connector (JSPI)



Signal	PIN	PIN	Signal
		7	HOLD#
SPI_SI	6	5	SPI_SO
SPI_CLK	4	3	SPI_CS0#
GND	2	1	+V3P3A_SPI

2.3.28 EC_Program (JEC_SPI)



Signal	PIN	PIN	Signal
EC_SMDAT_DEBUG	10	9	EC_SMCLK_DEBUG
NC	8	7	EC_HOLD#
EC_FMOSI	6	5	EC_FMISO
EC_FSCK	4	3	EC_FSCE#
GND	2	1	+VSPI_EC

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

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

Press 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.

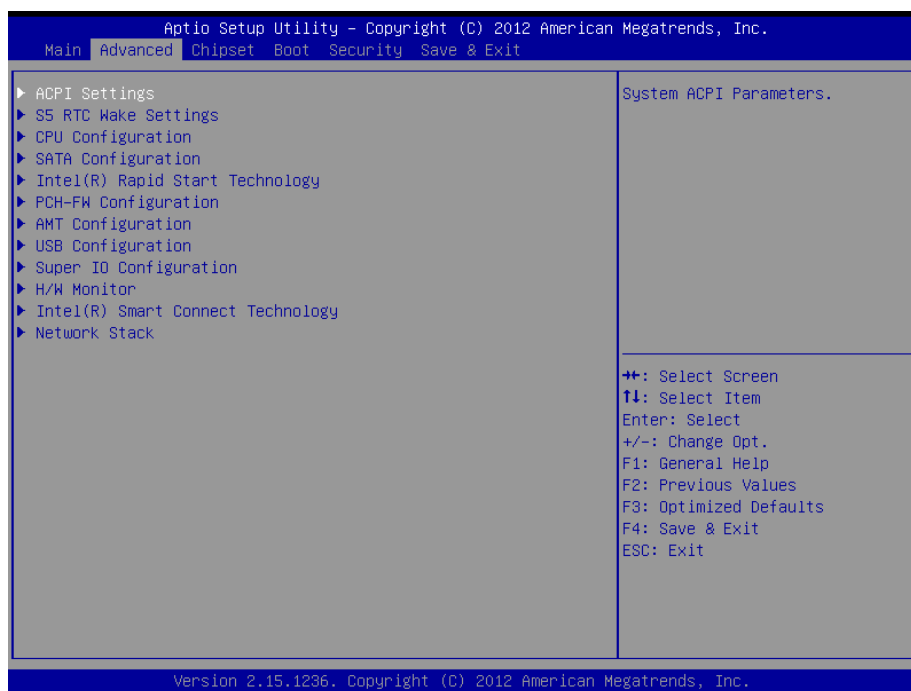


Note: The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.

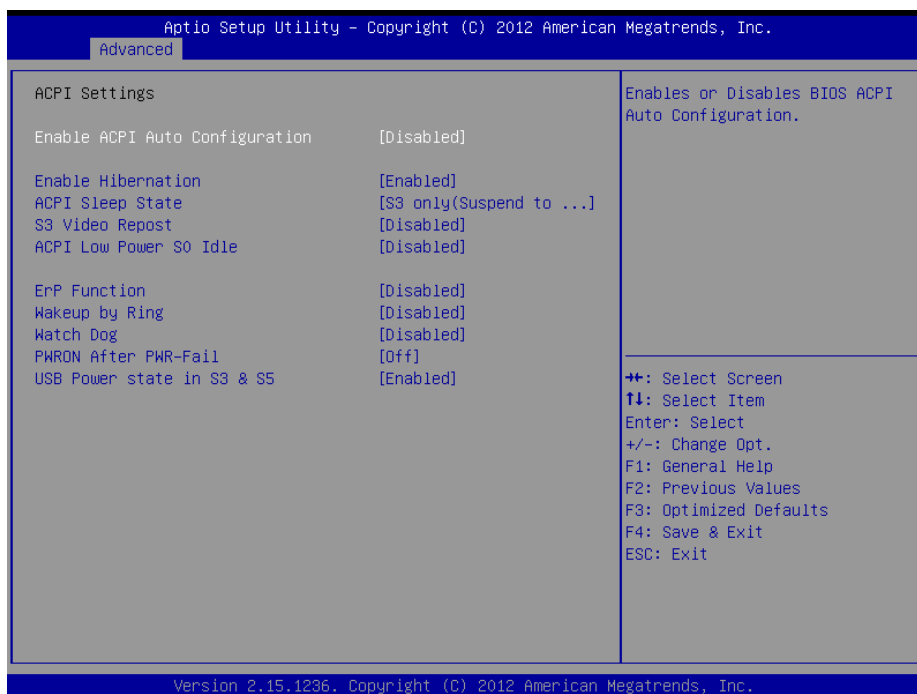
Visit the Avalue website (www.avalue.com.tw) to download the latest product and BIOS information.

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 ACPI Settings



Item	Options	Description
Enable ACPI Auto Configuration	Disabled[Default], Enabled	Enables or Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled	Enables or Disables System ability to

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	Enabled[Default],	Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Suspend Disabled, S3 only (Suspend to RAM)[Default]	Select ACPI sleep state the system will enter when the SUSPEND button is pressed.
S3 Video Repost	Disabled[Default], Enabled	Enable or Disable S3 Video Repost.
ACPI Low Power SO Id1e	Disabled[Default], Enabled	Enable or Disable ACPI Low Power S0 Id1e Support.
ErP Function	Disabled[Default], Enabled	Enable or Disable ErP.
Wakeup by Ring	Disabled[Default], Enabled	Wakeup by Ring from S1~S5.
Watch Dog	Disabled[Default], 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select WatchDog.
PWR-On After PWR-Fail	Off[Default] On Former-Sts	Select PWRON After PWR-Fail.
USB Power state in S3 & S5	Disabled Enabled[Default],	Enable or Disable USB Power state in S3, S5.

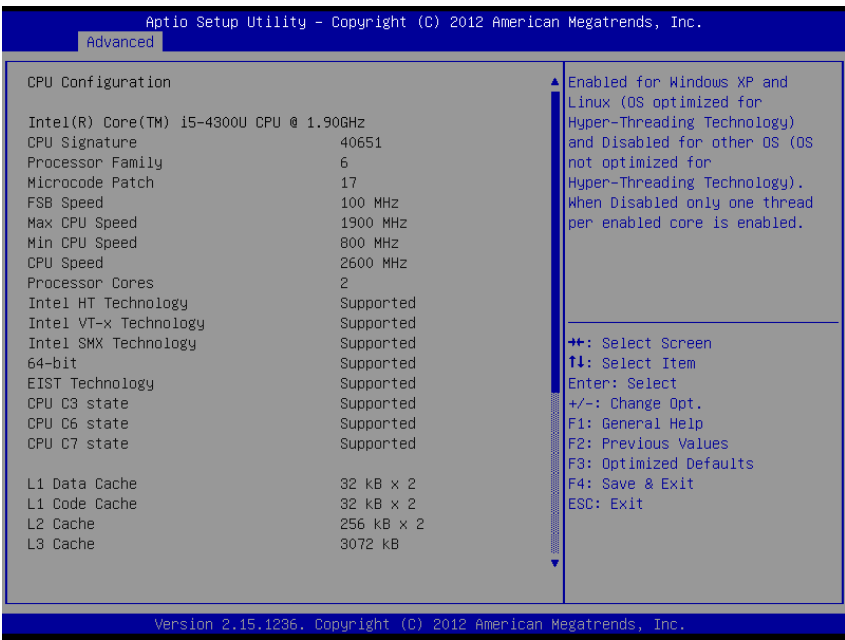
3.6.2.2 S5 RTC Wake Settings



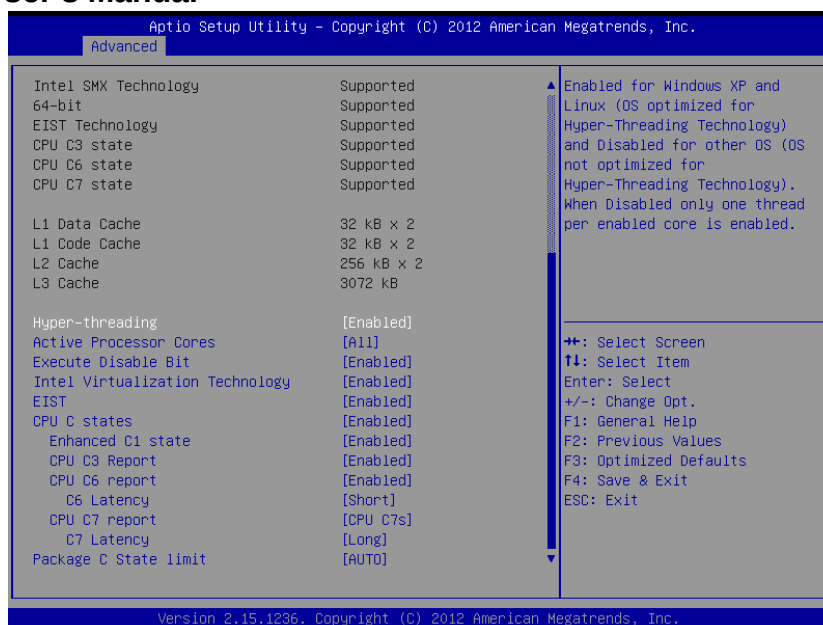
Item	Options	Description
Wake system from S5	Disabled[Default], Fixed Time Dynamic Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr:min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).

3.6.2.3 CPU Configuration

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

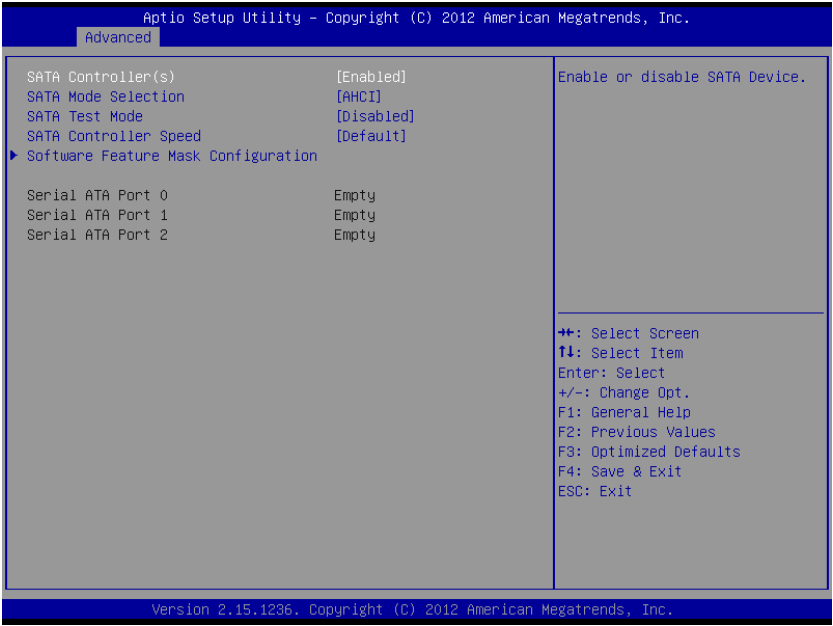


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Item	Options	Description
Hyper-threading	Disabled Enabled[Default]	Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled.
Active Processor Cores	All[Default] 1/2/3	Number of cores to enable in each processor package
Intel Virtualization Technology	Disabled Enabled[Default]	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
EIST	Disabled Enabled[Default]	Enable/Disable Intel SpeedStep.
CPU C states	Disabled Enabled[Default]	Enable or disable CPU C states.
Enhanced C1 state	Disabled Enabled[Default]	Enhanced C1 state.
CPU C3/6 Report	Disabled Enabled[Default]	Enable/Disable CPU C3/6 report to OS.
C6 Latency	Short[Default] Long	Configure Short/Long latency for C6.
CPU C7 Report	Disabled CPU C7 CPU C7s[Default]	Enable/Disable CPU C7 report to OS.
C7 Latency	Short Long[Default]	Configure Short/Long latency for C7.
Package C State limit	C0/C1 C2 C3 C6 C7 C7s AUTO[Default]	Package C State limit.

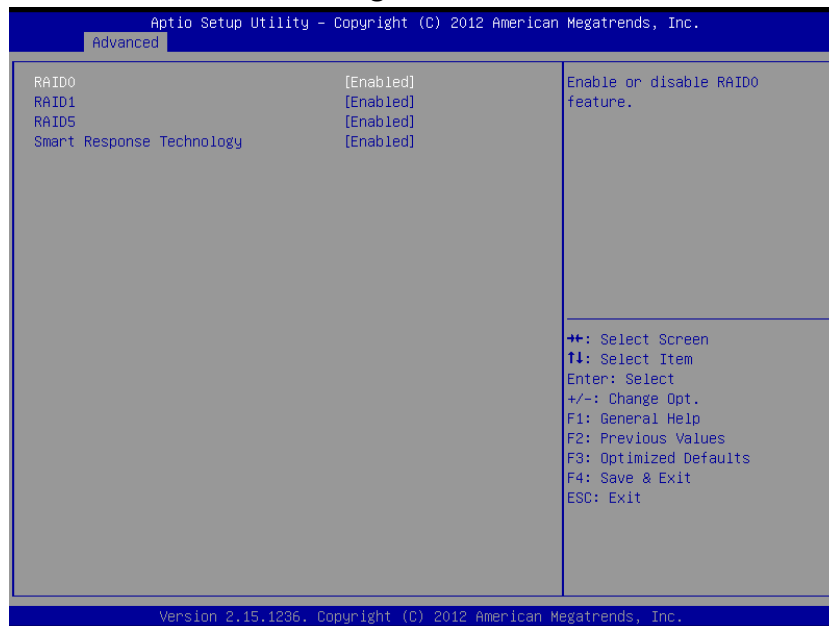
3.6.2.4 SATA Configuration



Item	Options	Description
SATA Controller(s)	Disabled, Enabled [Default]	Enable or disable SATA Device.
SATA Mode Selection	IDE AHCI [Default] , RAID	Determines how SATA controller(s) operate.
SATA Test Mode	Disabled [Default] , Enabled	Enable or disable Test Mode.
SATA Controller Speed	Default Gen1 Gen2 Gen3	Indicates the maximum speed the SATA controller can support.

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3.6.2.4.1 Software Feature Mask Configuration



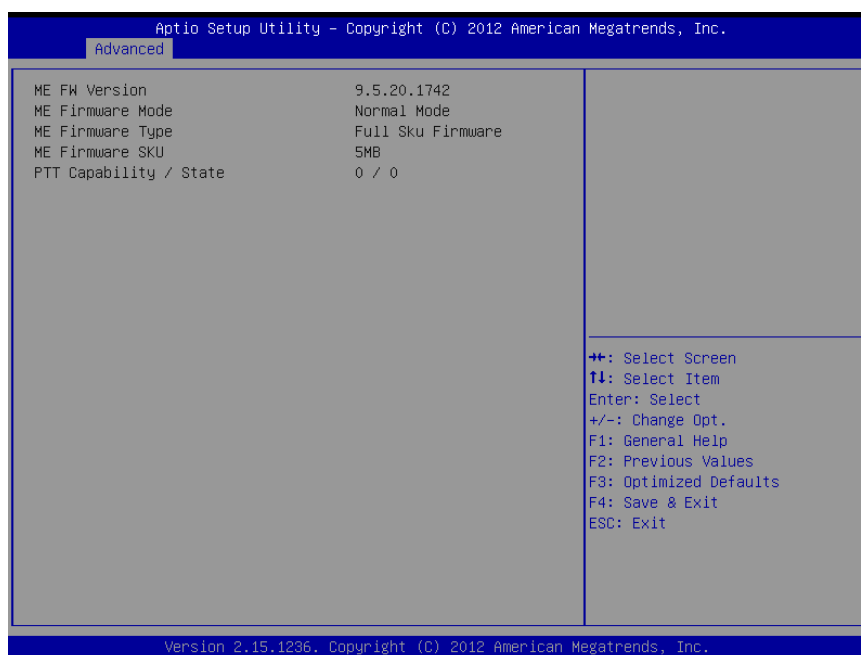
Item	Option	Description
RAID0/1/5	Enabled[Default], Disabled	Enable or disable RAID0/1/5 feature.
Smart Response Technology	Enabled[Default], Disabled	Enable or disable Smart Response Technology.

3.6.2.5 Intel® Rapid Start Technology

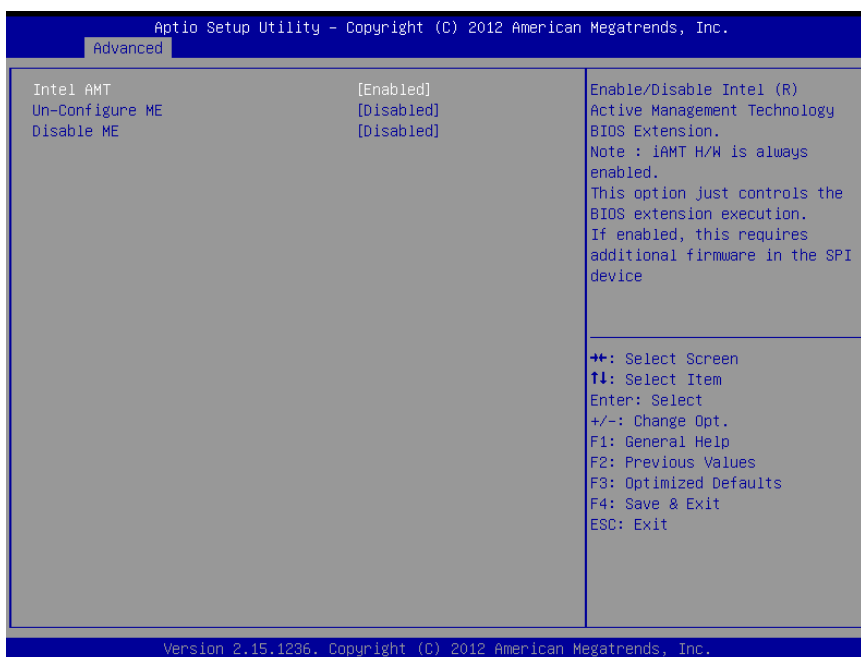


Item	Options	Description
Intel® Rapid Start Technology	Disabled[Default], Enabled	Enable or disable Intel® Rapid Start Technology.

3.6.2.6 PCH-FW Configuration



3.6.2.7 AMT Configuration



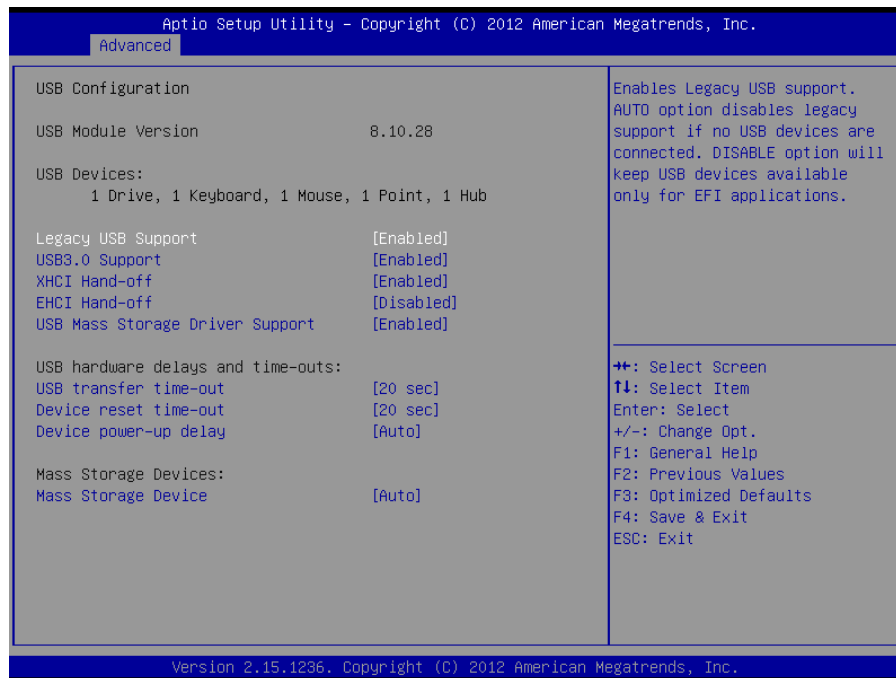
Item	Options	Description
Intel AMT	Disabled, Enabled[Default]	Enable/Disable Intel® Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.

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Un-Configure ME	OEMFlag Bit 15: Un-Configure ME without password.	
Disable ME	Disabled[Default], Enabled	Set Me to Soft Temporary Disabled.

3.6.2.8 USB Configuration

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

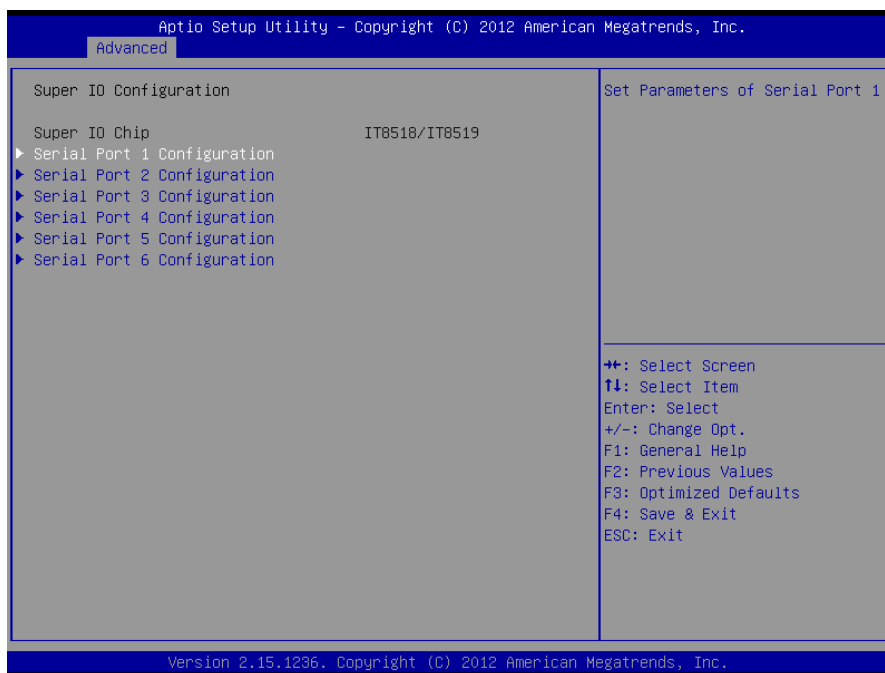


Item	Options	Description
Legacy USB Support	Enabled[Default] Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
USB3.0 Support	Enabled[Default] Disabled	Enable/Disable USB3.0 (XHCI) Controller support.
XHCI Hand-off	Enabled[Default] Disabled	This is a workaround for OSes 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	USB mass storage device Start Unit command time-out.

	40 sec	
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 from Hub descriptor.

3.6.2.9 Super IO Configuration

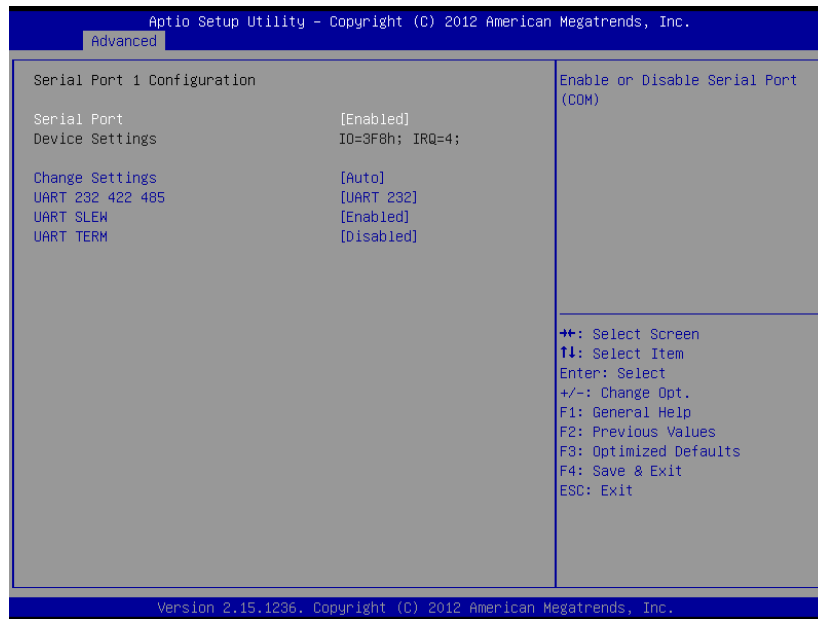
You can use this item to set up or change the Super IO configuration for serial ports. Please refer to 3.6.2.9.1~3.6.2.9.6 for more information.



Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1.
Serial Port 2 Configuration	Set Parameters of Serial Port 2.
Serial Port 3 Configuration	Set Parameters of Serial Port 3.
Serial Port 4 Configuration	Set Parameters of Serial Port 4.
Serial Port 5 Configuration	Set Parameters of Serial Port 5.
Serial Port 6 Configuration	Set Parameters of Serial Port 6.

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3.6.2.9.1 Serial Port 1 Configuration



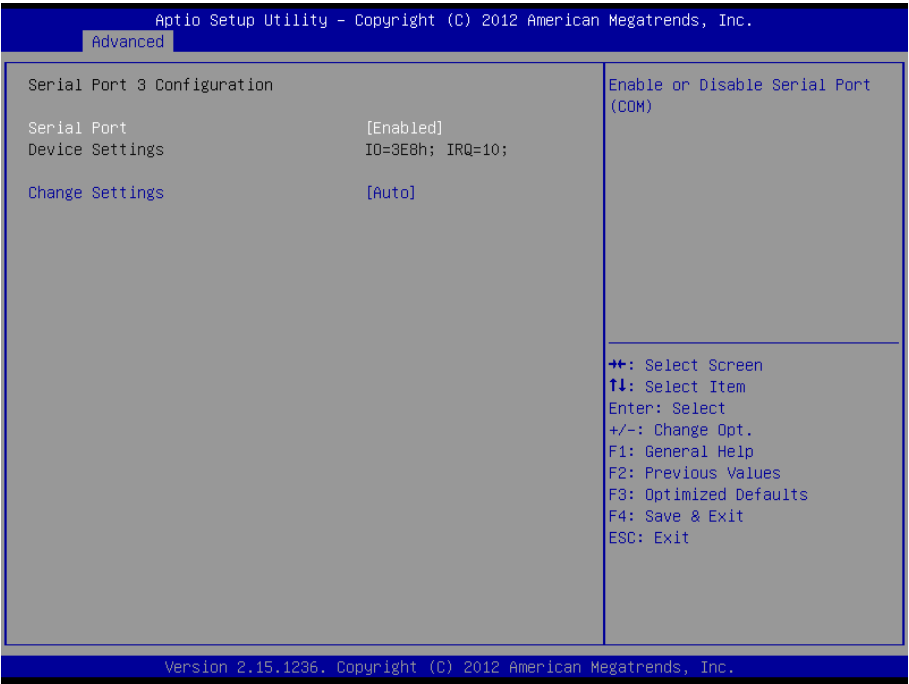
Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default] IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=33,4,5,6,7,9,10,11,12;	Select an optimal setting for Super IO device.
UART 232 422 485	UART 232[Default], UART 485, UART 422	Change the Serial Port as RS232/ 422/ 485
UART SLEW	Enabled[Default], Disabled	Enable or Disable 250kbps slew limiting.
UART TERM	Enabled, Disabled[Default]	Enable or Disable RS-485/422 receiver termination.

3.6.2.9.2 Serial Port 2 Configuration



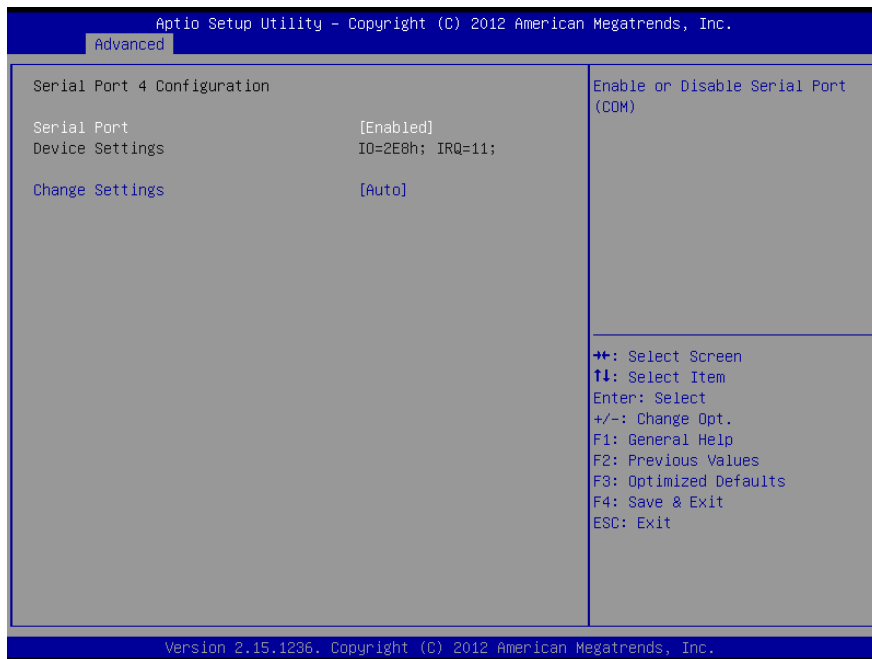
Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default] IO=2F8h; IRQ=3; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal setting for super IO device.
UART 232 422 485	UART 232[Default], UART 485, UART 422	Change the Serial Port as RS232/ 422/ 485
UART SLEW	Enabled[Default], Disabled	Enable or Disable 250kbps slew limiting.
UART TERM	Enabled, Disabled[Default]	Enable or Disable RS-485/422 receiver termination.

3.6.2.9.3 Serial Port 3 Configuration



Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default] IO=3F8h; IRQ=3; 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.

3.6.2.9.4 Serial Port 4 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=3,4,5,6,7,9,10,11,12; 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.

3.6.2.9.5 Serial Port 5 Configuration



Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default] IO=3E8h; IRQ=3; 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; IO=200h; IRQ=3,4,5,6,7,9,10,11,12; IO=208h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal setting for super IO device.

3.6.2.9.6 Serial Port 6 Configuration



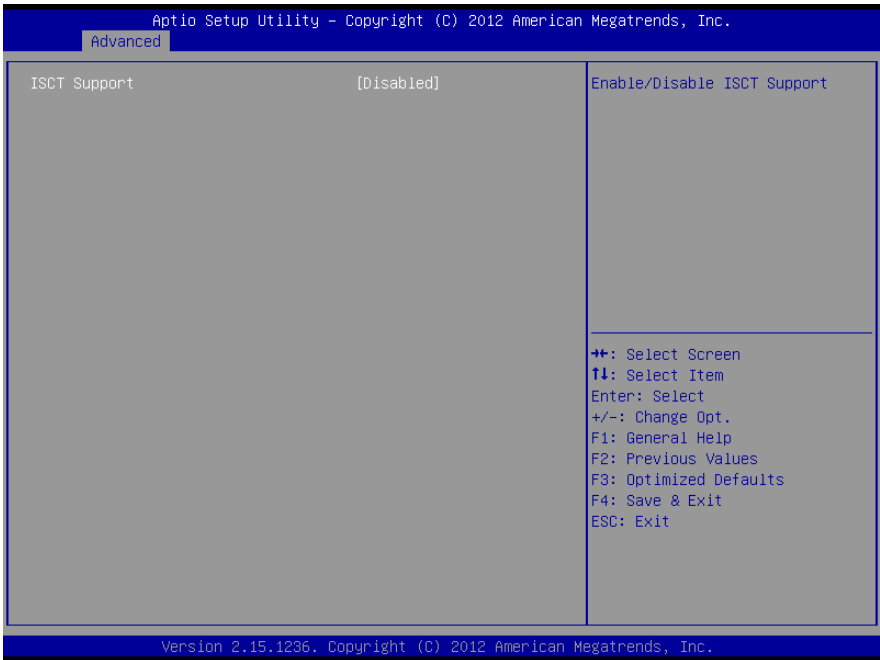
Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).
Change Settings	Auto[Default] IO=2E8h; IRQ=3; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=200h; IRQ=3,4,5,6,7,9,10,11,12; IO=208h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal setting for super IO device.

3.6.2.10 H/W Monitor



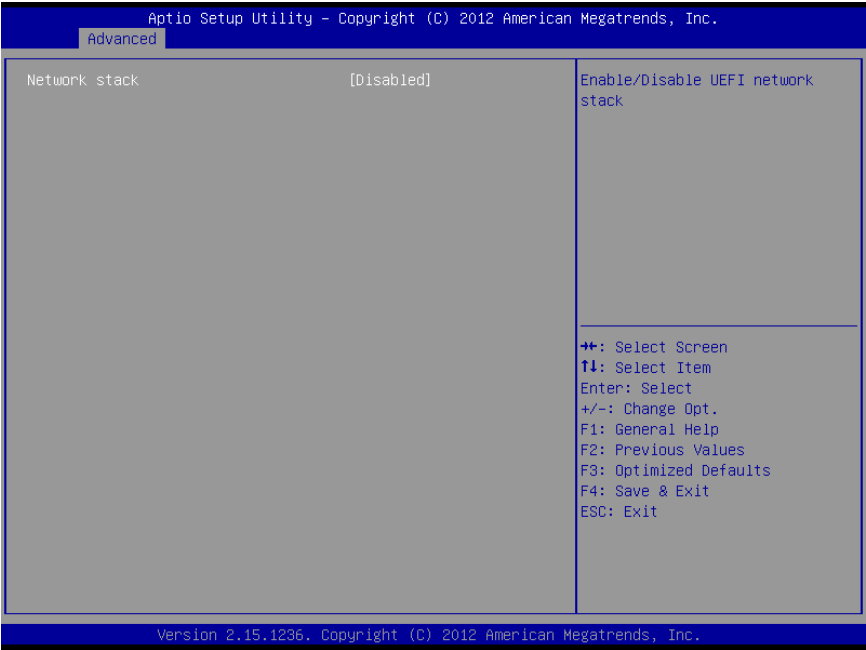
Item	Options	Description
Smart Fan Function	Enabled, Disabled[Default]	Enables or Disables Smart Fan.

3.6.2.11 Intel® Smart Connect Technology



Item	Options	Description
ISCT Support	Enabled, Disabled[Default]	Enables/Disables ISCT Support.

3.6.2.12 Network Stack

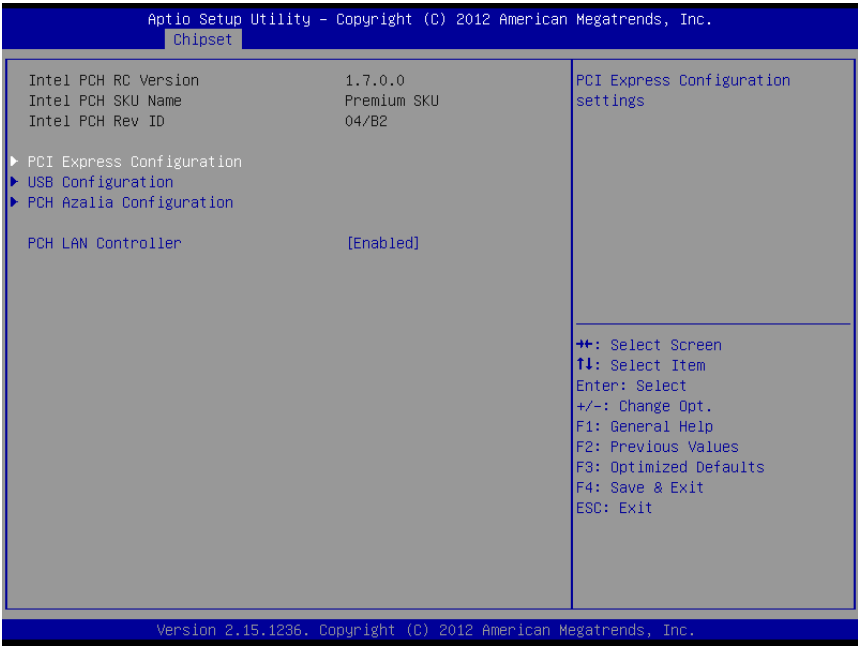


Item	Options	Description
Network stack	Enabled, Disabled [Default]	Enables/Disables UEFI network stack.

3.6.3 Chipset

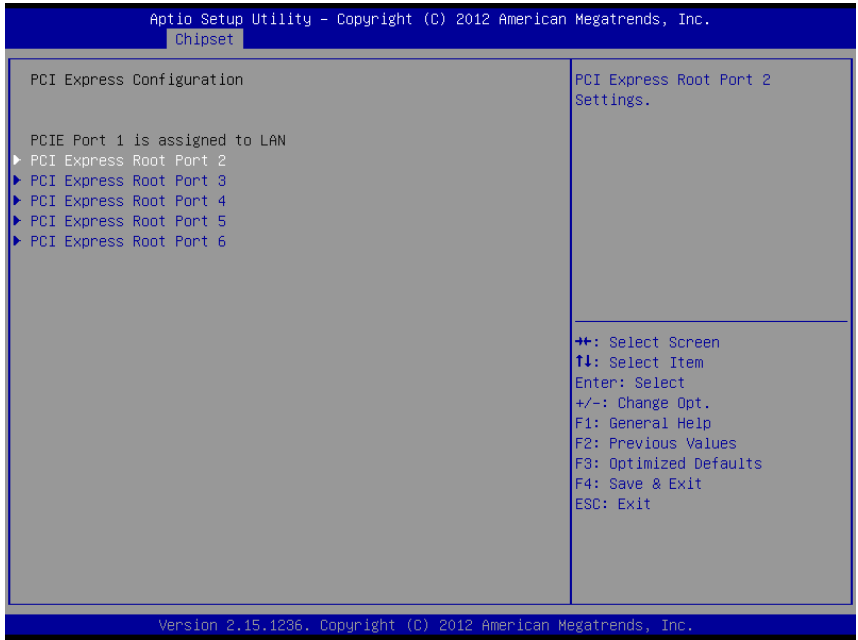


3.6.3.1 PCH-IO Configuration



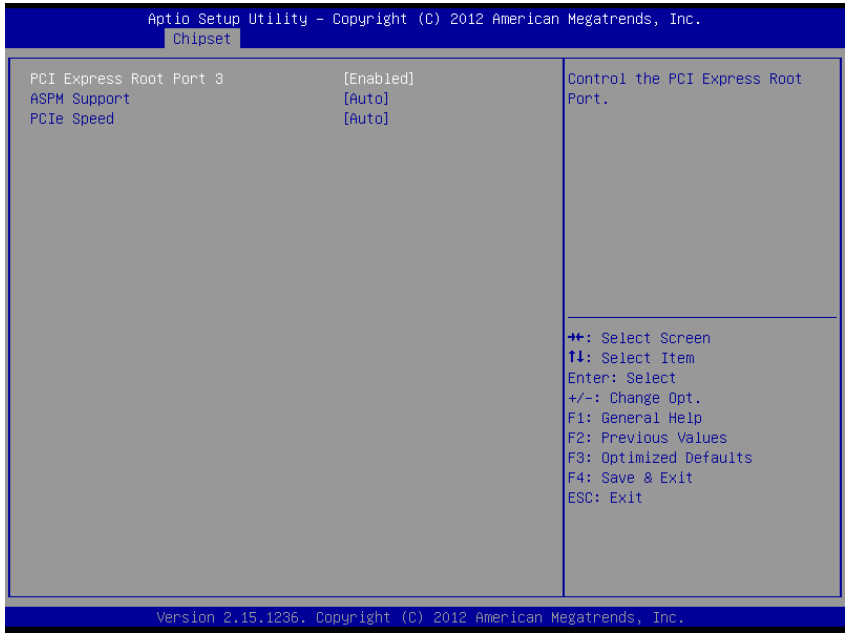
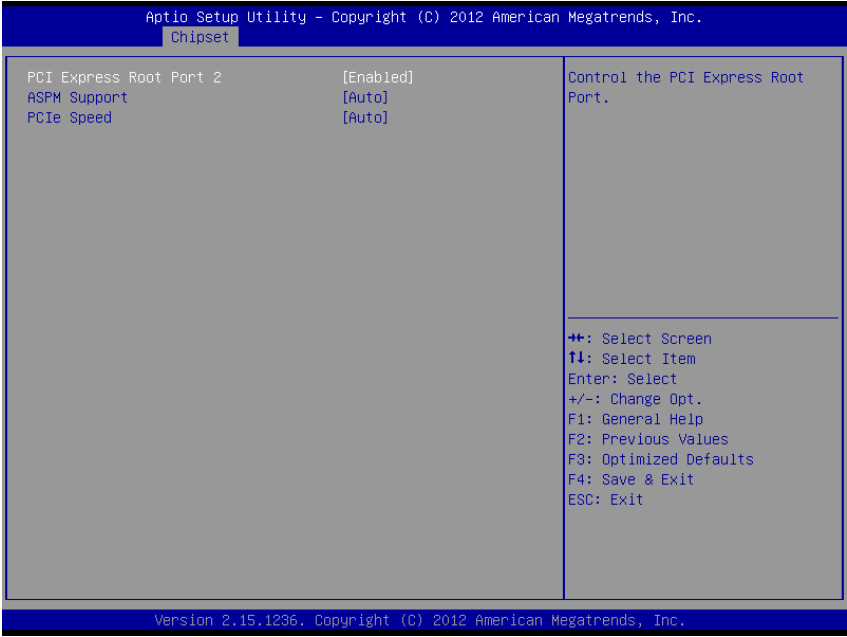
Item	Option	Description
PCH LAN Controller	Enabled[Default], Disabled	Enable or disable onboard NIC.

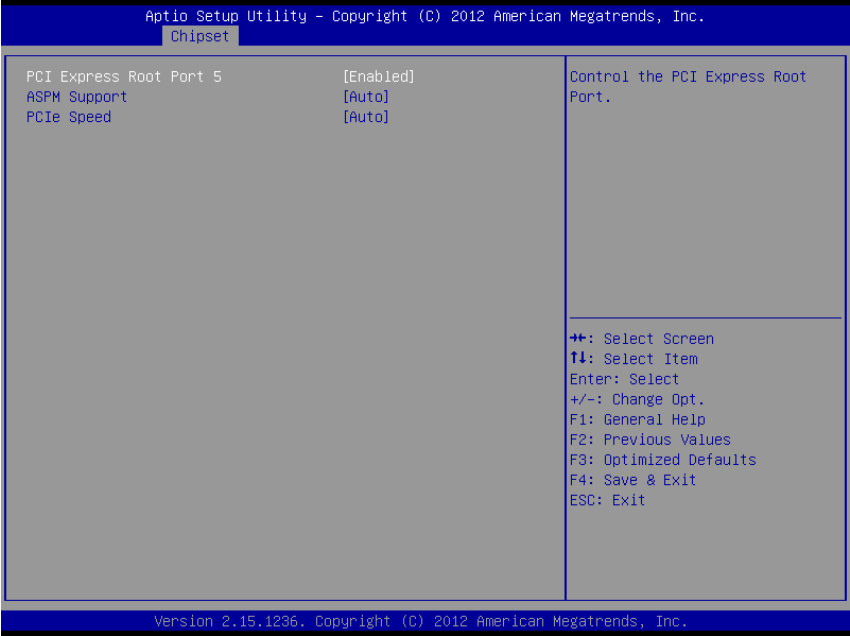
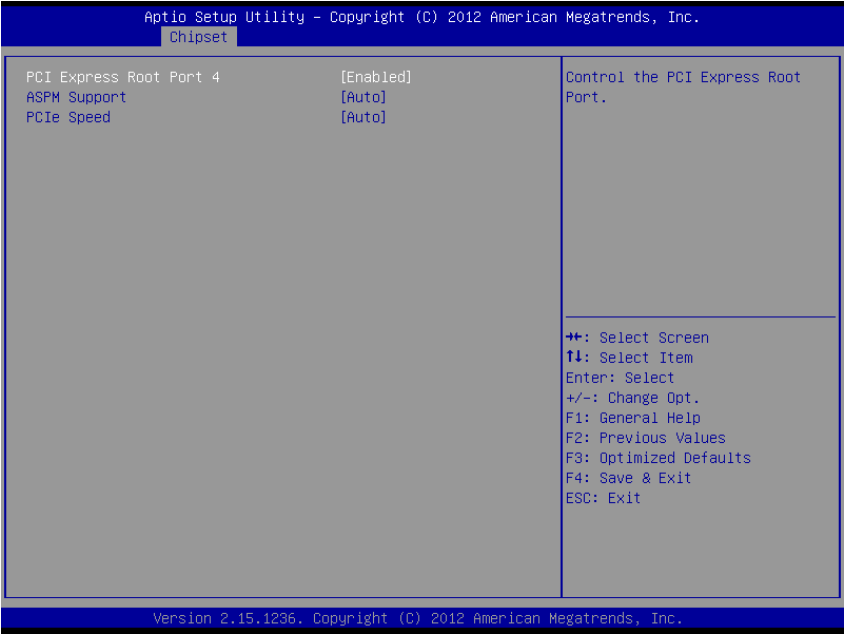
3.6.3.1.1 PCI Express Configuration



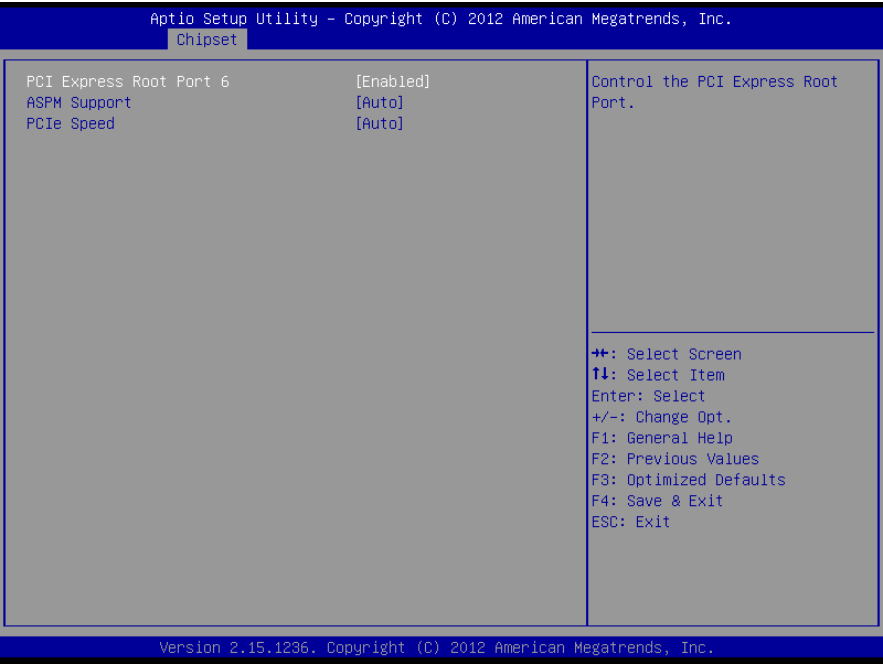
EBM-QM87U User’s Manual

3.6.3.1.1.1 PCI Express Root Port 2



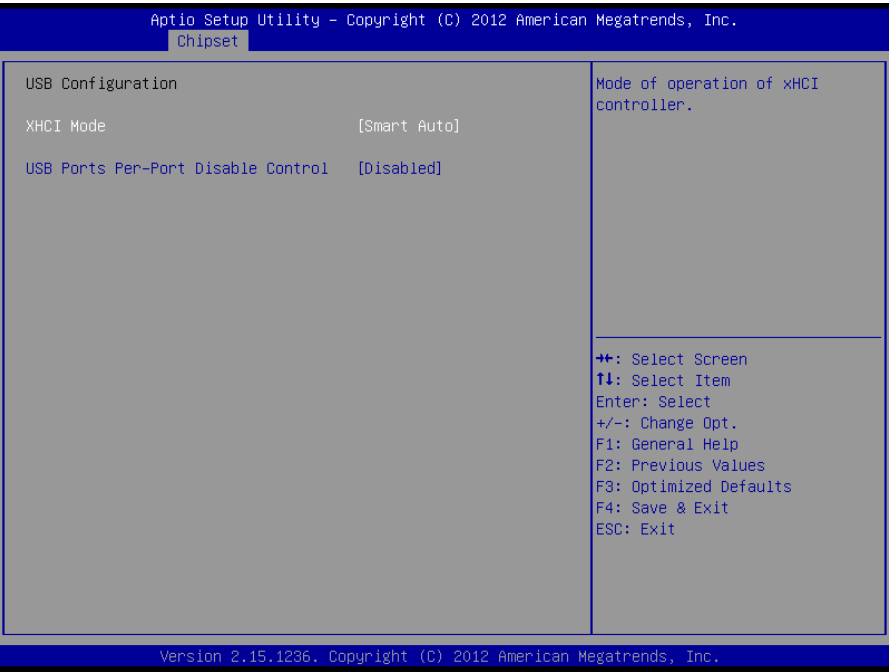


EBM-QM87U User’s Manual



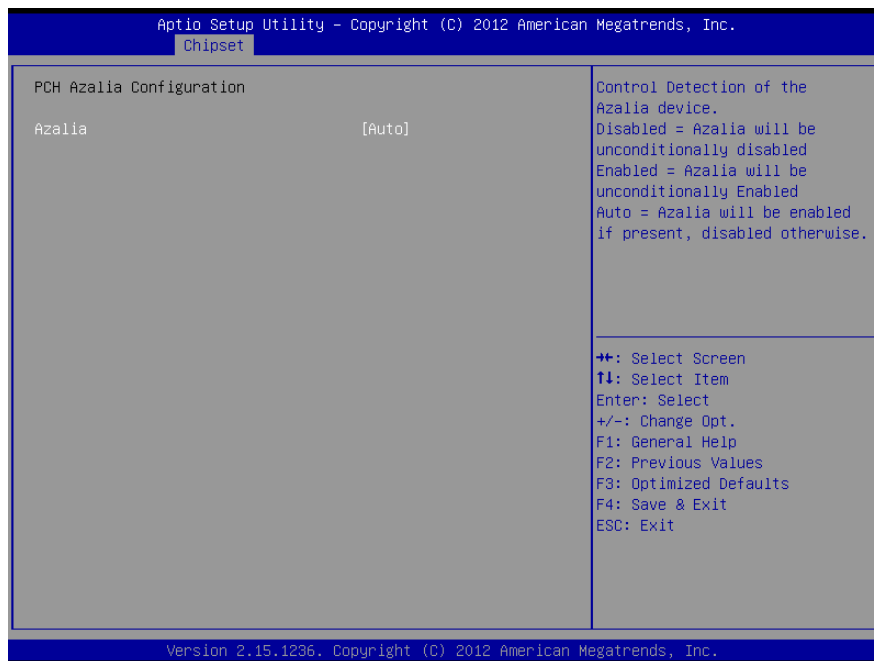
Item	Option	Description
PCI Express Root Port 2/3/4/5/6	Enabled[Default], Disabled	Control the PCI Express Root Port.
ASPM Support	Disabled L0s L1 L0sL1 Auto[Default]	Set the ASPM Level: Force L0s State: AUTO – BIOS auto configure: DISABLE – Disables ASPM.
PCIe Speed	Auto[Default] Gen1 Gen2	Select PCI Express port speed.

3.6.3.1.2 USB Configuration



Item	Option	Description
XHCI Mode	Smart Auto[Default] Disabled	Mode of operation of xHCI controller.
USB Ports Per-Port Disable Control	Enabled Disabled[Default]	Control each of the USB ports (0~13) disabling.

3.6.3.1.3 PCH Azalia Configuration



Item	Option	Description
Azalia	Disabled[Default] Enabled Auto	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.

EBM-QM87U User's Manual

3.6.3.2 System Agent (SA) Configuration



Item	Option	Description
VT-d	Disabled Enabled [Default]	Check to enable VT-d function on MCH.

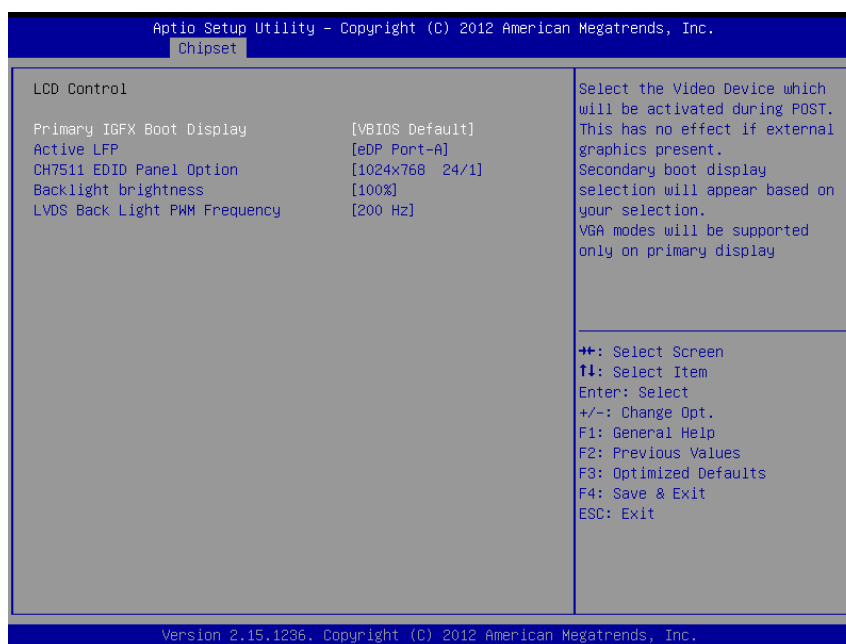
3.6.3.2.1 Graphics Configuration



Item	Option	Description
Primary Display	Auto [Default] , IGFX PEG PCIE SG	Select which of IGFX/PEG/PCI Graphics device should be Primary Display.

Primary PCIE	Auto[Default], PCIE1 PCIE2 PCIE3 PCIE4 PCIE5 PCIE6 PCIE7	Select PCIE0/PCIE1/PCIE2/PCIE3/PCIE4 /PCIE5/PCIE6/PCIE7 Graphics device should be Primary PCIE.
Internal Graphics	Auto[Default] Enabled, Disabled	Keep IGD enabled based on the setup options.
Aperture Size	128MB 256MB[Default] 512Mb	Select the Aperture Size.
DVMT Pre-Allocated	32M[Default]/64M/96M/128M/160M/ 192M/224M/256M/288M/320M/352M/ 384M/416M/448M/480M/512M/1024M	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
DVMT Total Gfx Mem	128M 256M[Default] MAX	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.

3.6.3.2.1.1 LCD Control

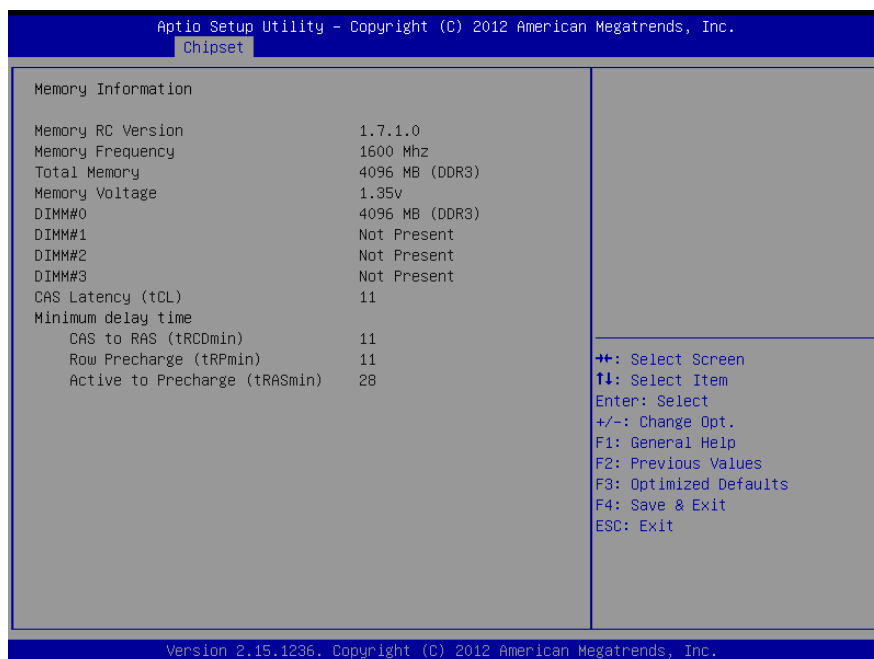


Item	Option	Description
Primary IGFX Boot Display	VBIOS Default[Default] HDMI LVDS	Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.
Active LFP	No LVDS eDP Port-A[Default],	Select the Active LFP Configuration. No LVDS: VBIOS does not enable LVDS.

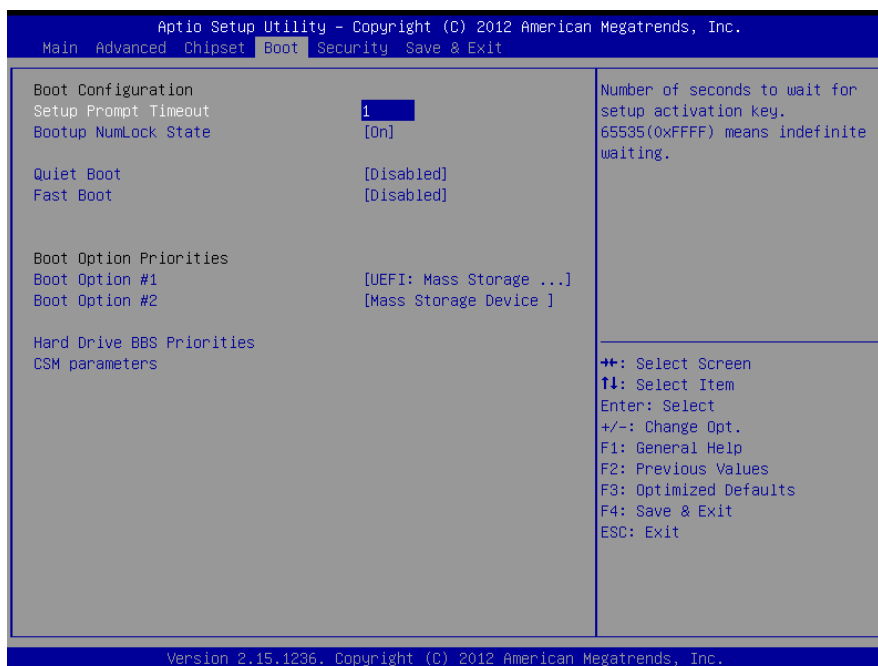
EBM-QM87U User's Manual

		Int-LVDS: VBIOS enables LVDS driver by Integrated encoder. SDVO LVDS: VBIOS enables by SDVO encoder. eDP Port-A: LFP Driven by Int-DisplayPort encoder from Port-A. eDP Port-D: LFP Driven by Int-DisplayPort encoder from Port-D (through PCH).
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 640x840 18/1 800x480 18/1 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.
Backlight brightness	100% [Default] 75% 50% 25% 0%	Select LVDS back light PWM duty.
LVDS Back Light PWM Frequency	200 Hz [Default] 300 Hz 400 Hz 500 Hz 700 Hz 1KHz 2KHz 3KHz 5KHz	Select LVDS back light PWM Frequency.

3.6.3.2.2 Memory Configuration



3.6.4 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.

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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.	
CSM Parameters	OpROM execution, boot options filter, etc.	

3.6.5 Security



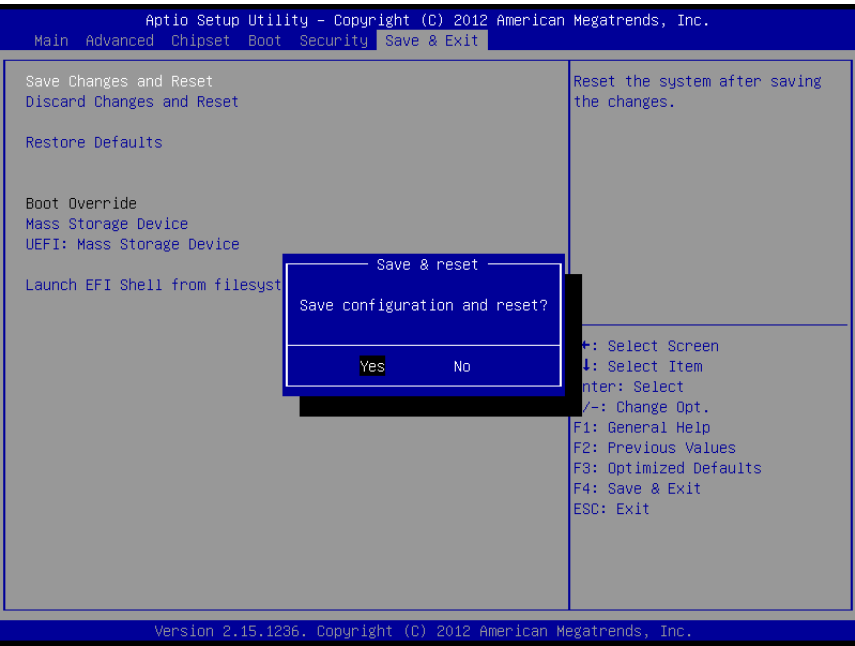
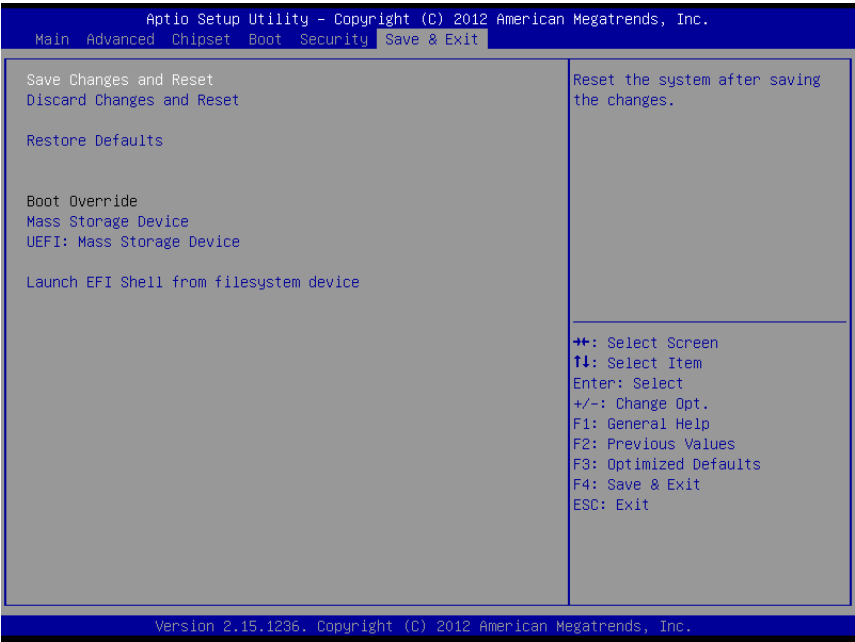
- **Administrator Password**

Set setup Administrator Password

- **User Password**

Set User Password

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

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

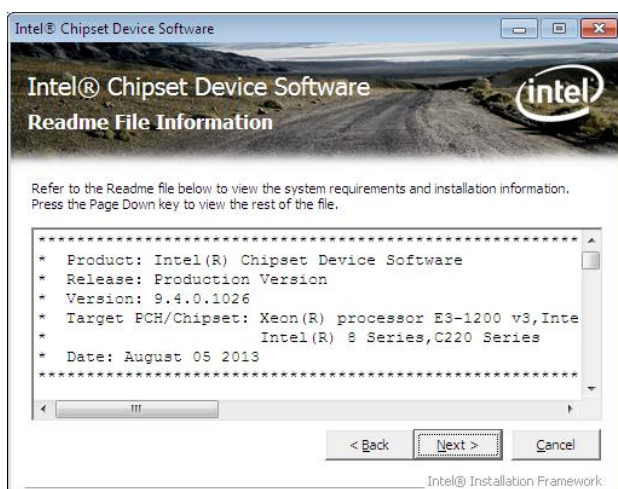
\\Driver_Chipset\\Intel\\EBM-QM87U.



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.



Step 2. Click Next.



Step 3. Click Next.



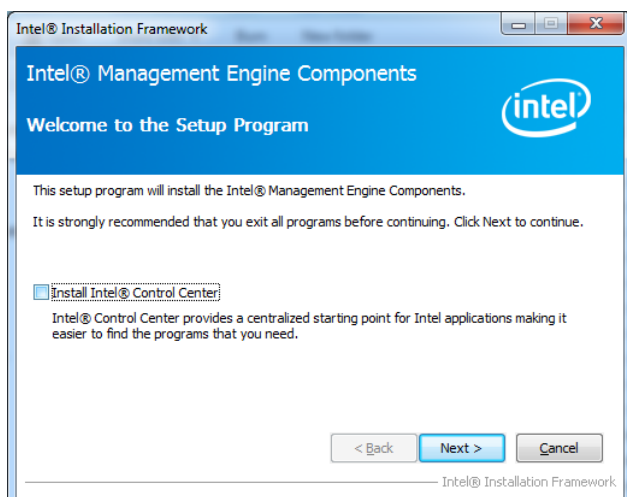
Step 4. Click Finish to complete setup.

4.2 Install ME Driver

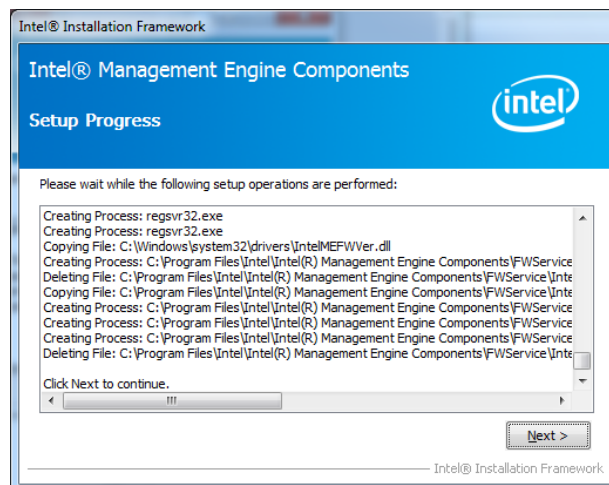
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **Utility\EBM-QM87U_ME**.



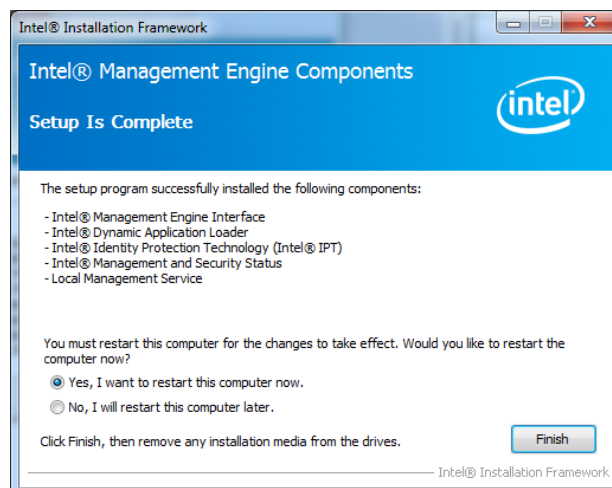
Note: The installation procedures and screen shots in this section are based on Windows 8.1 operation system. If the warning message appears while the installation process, click Continue to go on.



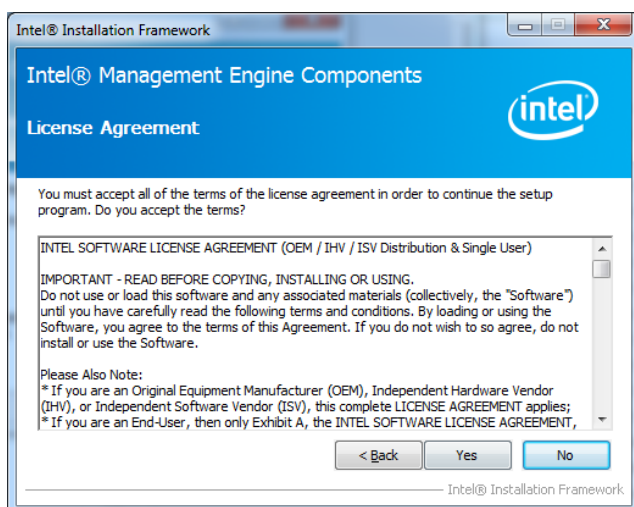
Step1. Click **Next** to start installation.



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



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



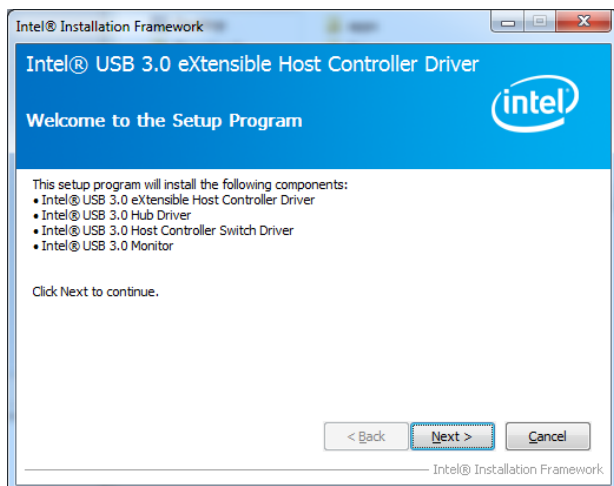
Step 2. Click **Yes** to accept license agreement.

4.3 Install USB3.0 Driver

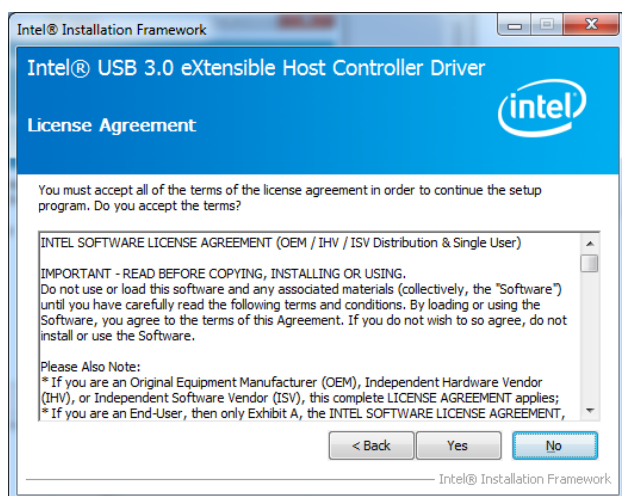
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to \Utility\EBM-QM87U_USB3.0.



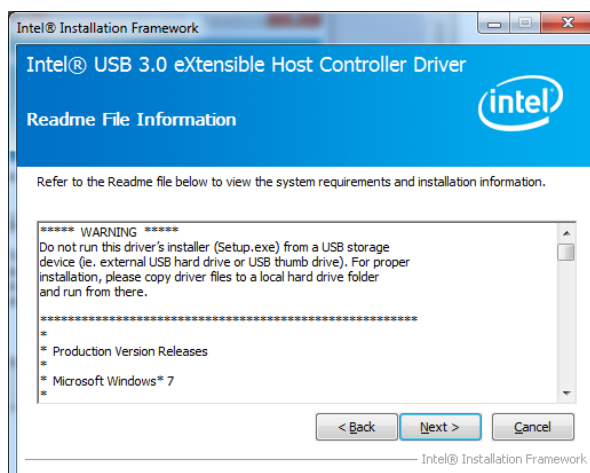
Note: The installation procedures and screen shots in this section are based on Windows 8.1 operation system. If the warning message appears while the installation process, click Continue to go on.



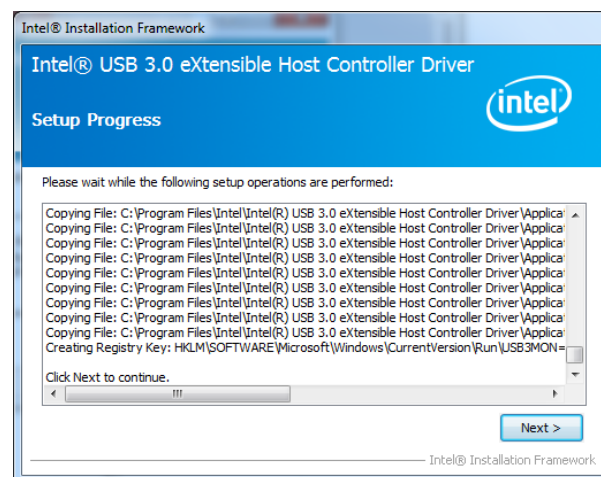
Step1. Click **Next** to start installation.



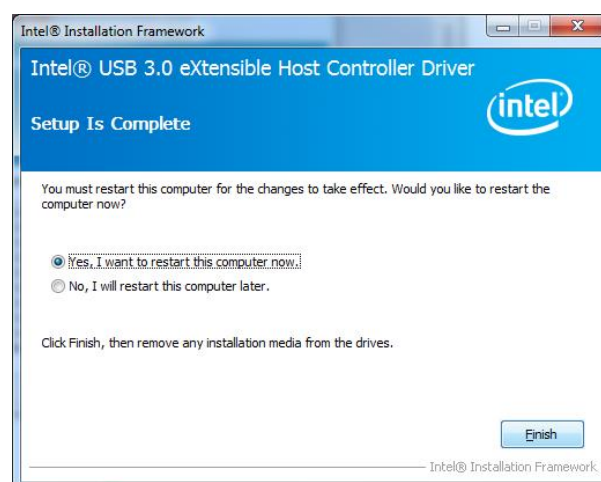
Step 2. Click **Yes**.



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



Step 4. Click **Next**.



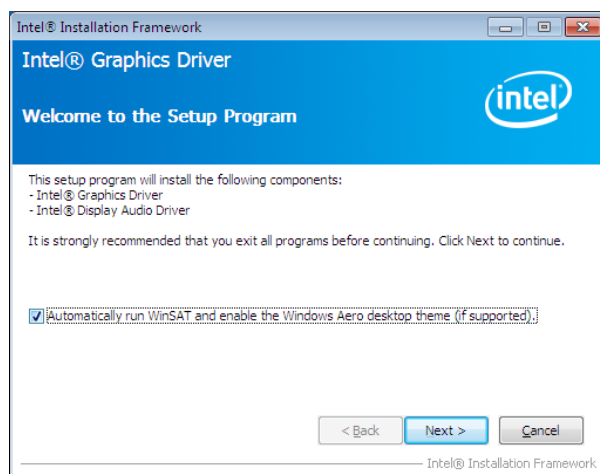
Step 5. Click **Finish** to complete setup.

4.4 Install VGA Driver

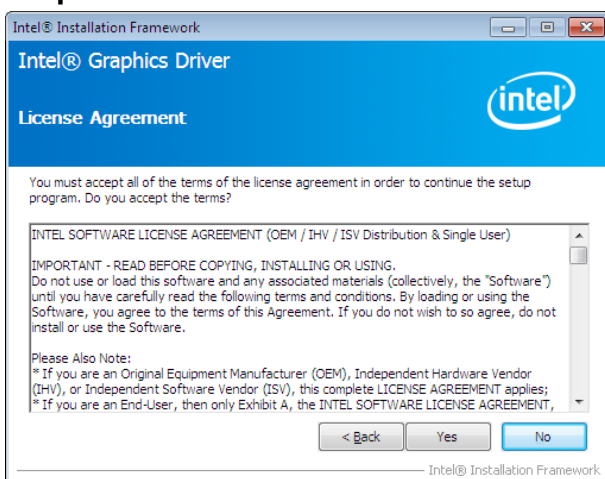
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\\VGA\EBM-QM87U**.



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

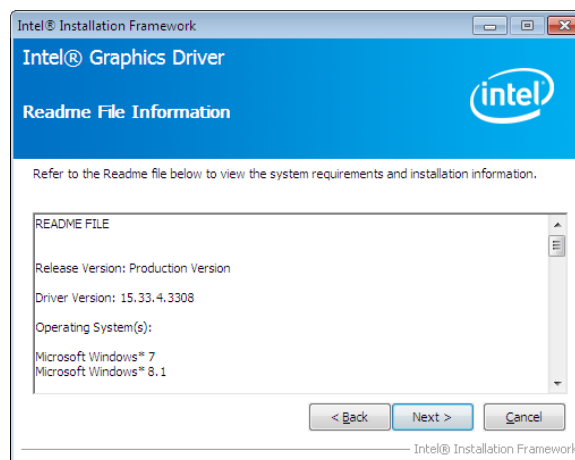


Step 1. Click **Next** to continue installation.

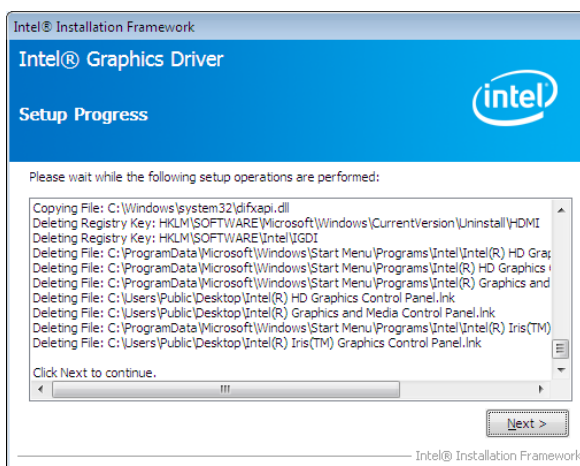


Step 2.

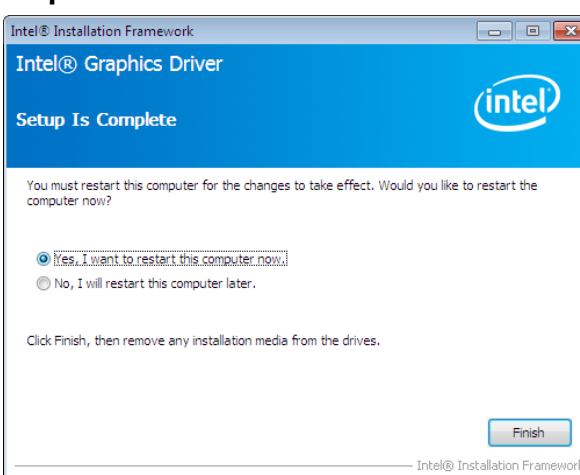
Click **Yes** to accept license agreement.



Step 3. Click **Next**.



Step 4. Click **Next**.



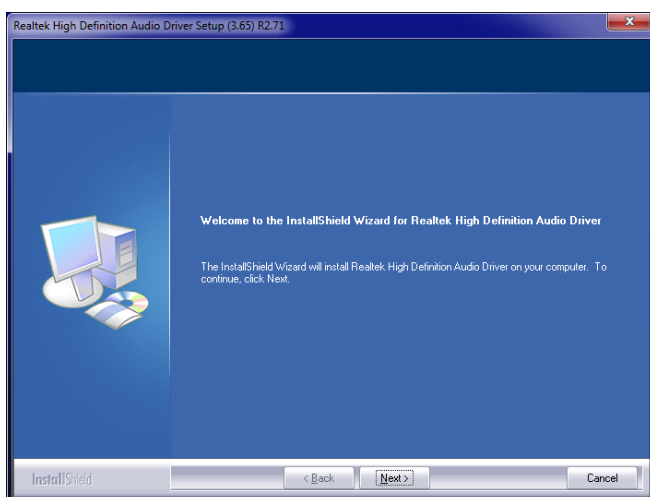
Step 5. Click **Finish** to complete setup.

4.5 Install Audio Driver (For Realtek ALC892)

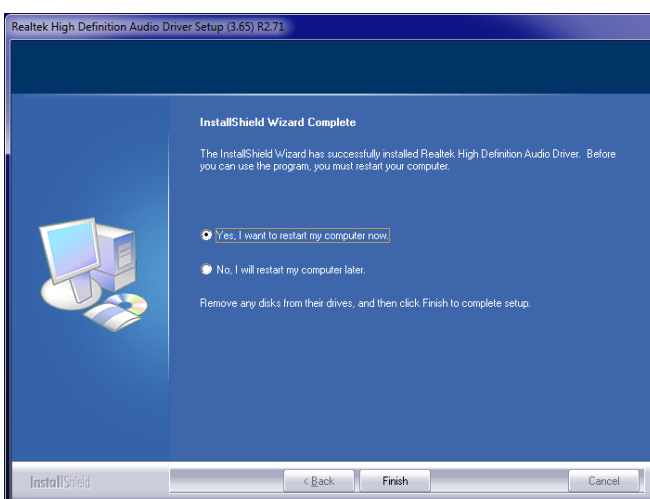
Insert the Supporting CD-ROM to CD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\\Driver_Audio\\Realtek\\ALC892\\EBM-QM87U_Audio**.



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



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



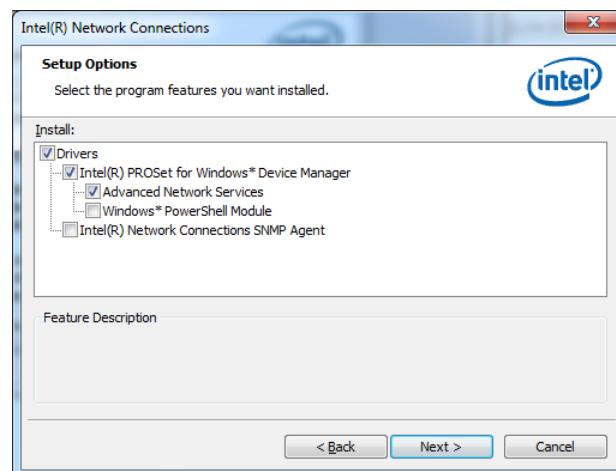
Step 2. Click **Finish** to complete the setup.

4.6 Install Ethernet Driver

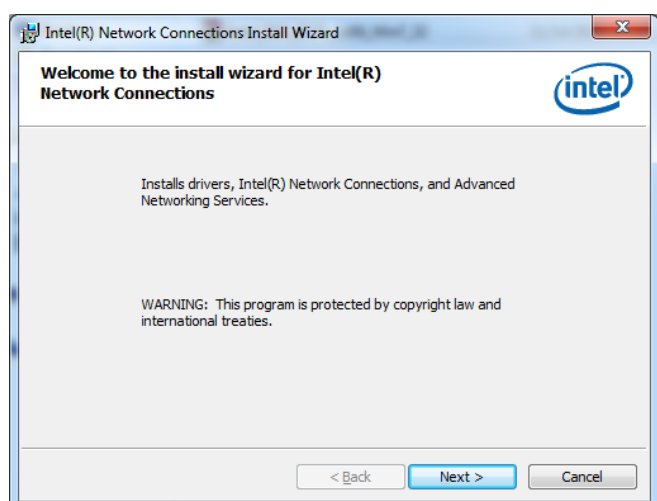
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to
\\Driver_Gigabit\\Intel\\I210\\EBM-QM87U_LAN.



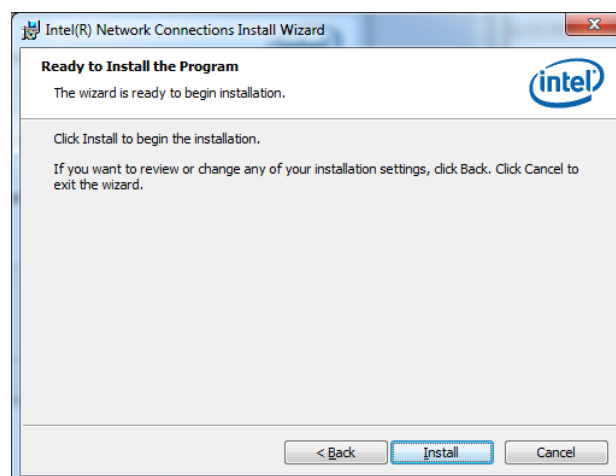
Note: The installation procedures and screen shots in this section are based on Windows 8.1 operation system.



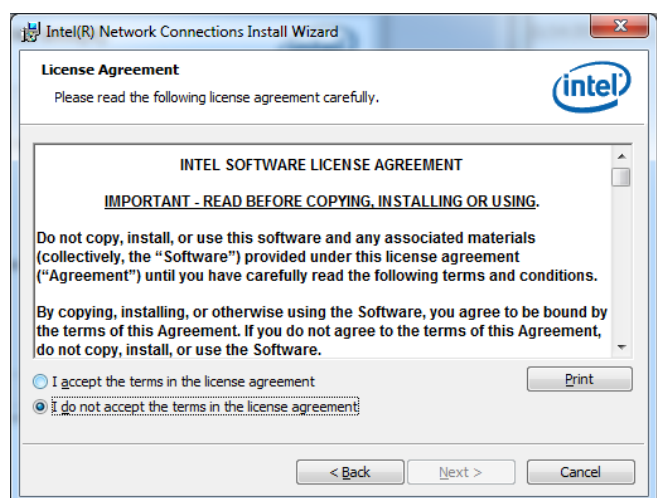
Step 3. Click **Next**.



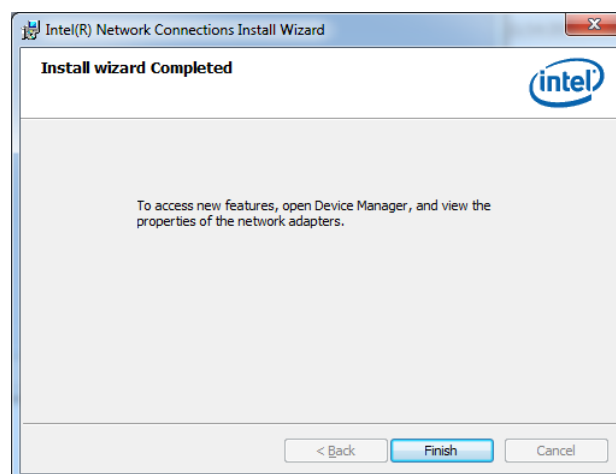
Step 1. Click **Next**.



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

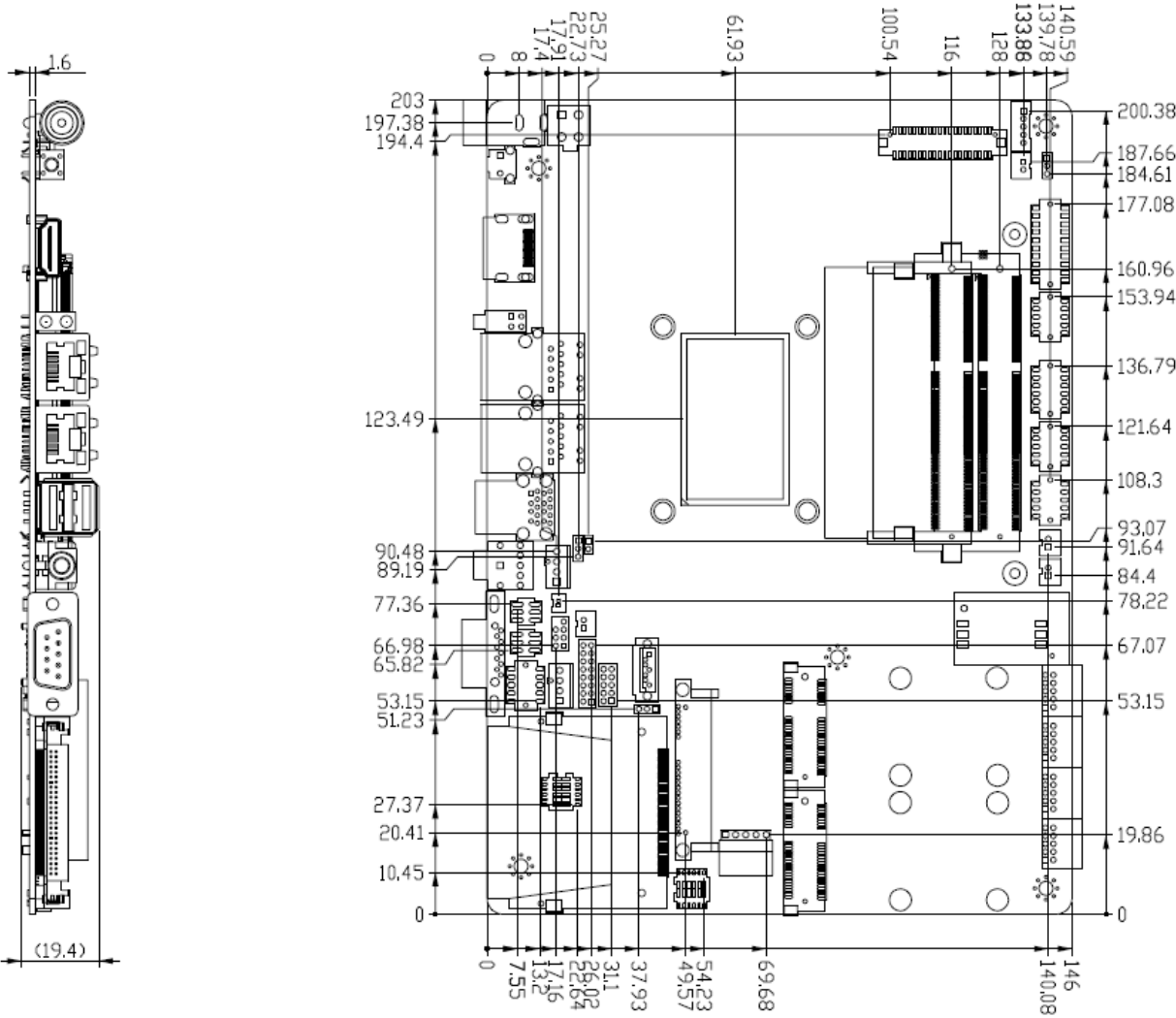


Step 2. Click **Next** to accept license agreement.

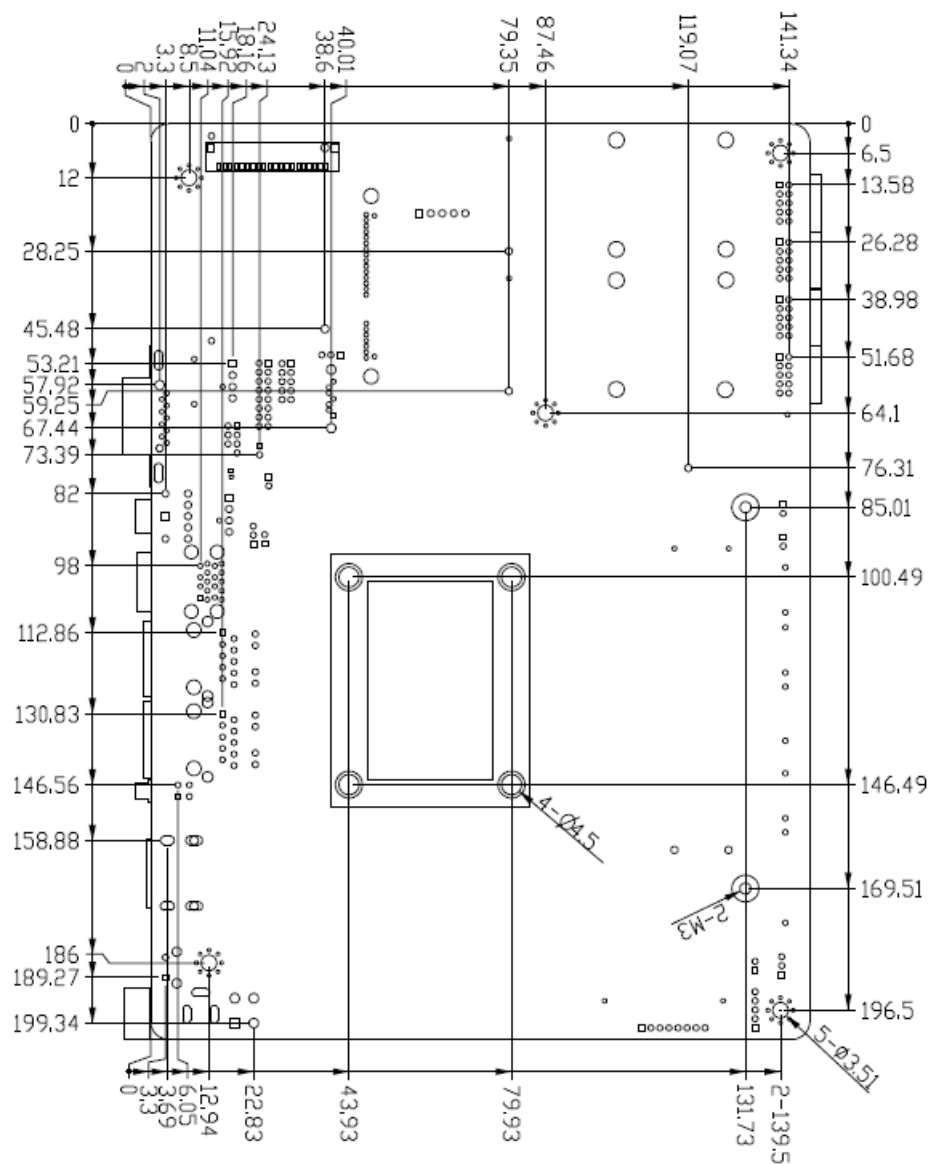


Step 5. Click **Finish** to complete the setup

5. Mechanical Drawing



Unit: mm



Unit: mm

