

# ECM-SKLH

Intel® Skylake H Processor 3.5" Micro Module

## User's Manual

1<sup>st</sup> Ed – 18 January 2016

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## FCC Statement



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

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

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

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

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

## Notice

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

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2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information available.
3. If your product is diagnosed as defective, obtain an RMA (return material authorization) number from your dealer. This allows us to process your good return more quickly.
4. Carefully pack the defective product, a complete Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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# 1. Getting Started

## 1.1 Safety Precautions

### Warning!



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

### Caution!



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

## 1.2 Packing List

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

- 1 x 3.5" ECM-SKLH Micro Module
- 1 x DVD-ROM contains the followings:
  - User's Manual (this manual in PDF file)
  - Ethernet driver and utilities
  - VGA drivers and utilities
  - Audio drivers and utilities
- 1 x Cable set contains the followings:
  - 1 x Audio cable (12pin, 2.0 pitch)
  - 1 x USB 2.0 cable (10P/2.0mm-10P/2.0mm)
  - 1 x Serial ATA cable (7-pin, standard)
  - 1 x Wire SATA power cable (15-pin, 4P/2.5mm)
  - 1 x Flat Cable 9P(M)-PHD (10P/2.0mm)
- 3M foam (VHB-4622 10mm\*20mm\*1.1mm)



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



### 1.3 Document Amendment History

Revision	Date	By	Comment
1 <sup>st</sup>	January 2016	Avalue	Initial Release

### 1.4 Manual Objectives

This manual describes in details Avalue Technology ECM-SKLH Single Board.

We have tried to include as much information as possible but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of this board.

We strongly recommend that you study this manual carefully before attempting to set up ECM-SKLH 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 NVRAM that make booting impossible. If this should happen, clear the NVRAM 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	
<b>CPU</b>	Onboard 6th generation Intel® Skylake H Processor 45W/35W/25W (CPU GT4 not support)
<b>BIOS</b>	AMI uEFI BIOS, 128 Mbit SPI Flash ROM iAMT supported
<b>System Chipset</b>	Intel® Skylake PCH-H QM170 Corp
<b>I/O Chip</b>	EC(IT8528E)
<b>System Memory</b>	1 x 260-Pin DDR4 2133MTs SO-DIMM (support non-ECC only)
<b>SSD</b>	1 x M.2( 2242) SSD (B key support SATA or PCIe x1 & USB3 only & USB2) mSATA from MiniPCIe
<b>Watchdog Timer</b>	H/W Reset, 1sec. – 65535sec.
<b>H/W Status Monitor</b>	Monitoring System Temperature, Voltage and FAN Status with Auto Throttling Control
<b>Expansion</b>	1 x Full-Size Mini PCI Express Mini Card with mSATA supported
I/O	
<b>MIO</b>	2 x SATA III, 1 x RS232 (COM1) 1 x RS232/422/485 COM2, LPC, SPI
<b>USB</b>	4 x USB3.0 (dual deck USB connector for 2 USB3.0 port), 2 x USB 2.0 (Wafer)
<b>GPIO</b>	8-bit GPIO
Display	
<b>Chipset</b>	Intel® Skylake Processor integrated Graphics
<b>Resolution</b>	LVDS: 1920 x 1080@60Hz 2 x HDMI: 3840 x 2160@24Hz
<b>Multiple Display</b>	Triple display
<b>HDMI</b>	HDMI 1.4b
<b>LCD Interface</b>	Dual channel 18/24-bit LVDS (via 7511B)
Audio	
<b>AC97 Codec</b>	Realtek ALC233 HD codec Supports 2.1-CH Audio
<b>Audio Amp</b>	Internal AMP, Class-D amplifier has 2 Watt (rms)/4Ω per channel output Line in, Line-Out, Mic in
Ethernet	
<b>LAN Chip</b>	1 x Intel I210AT GbE controller 1 x Intel I219LM Gigabit Ethernet PHY

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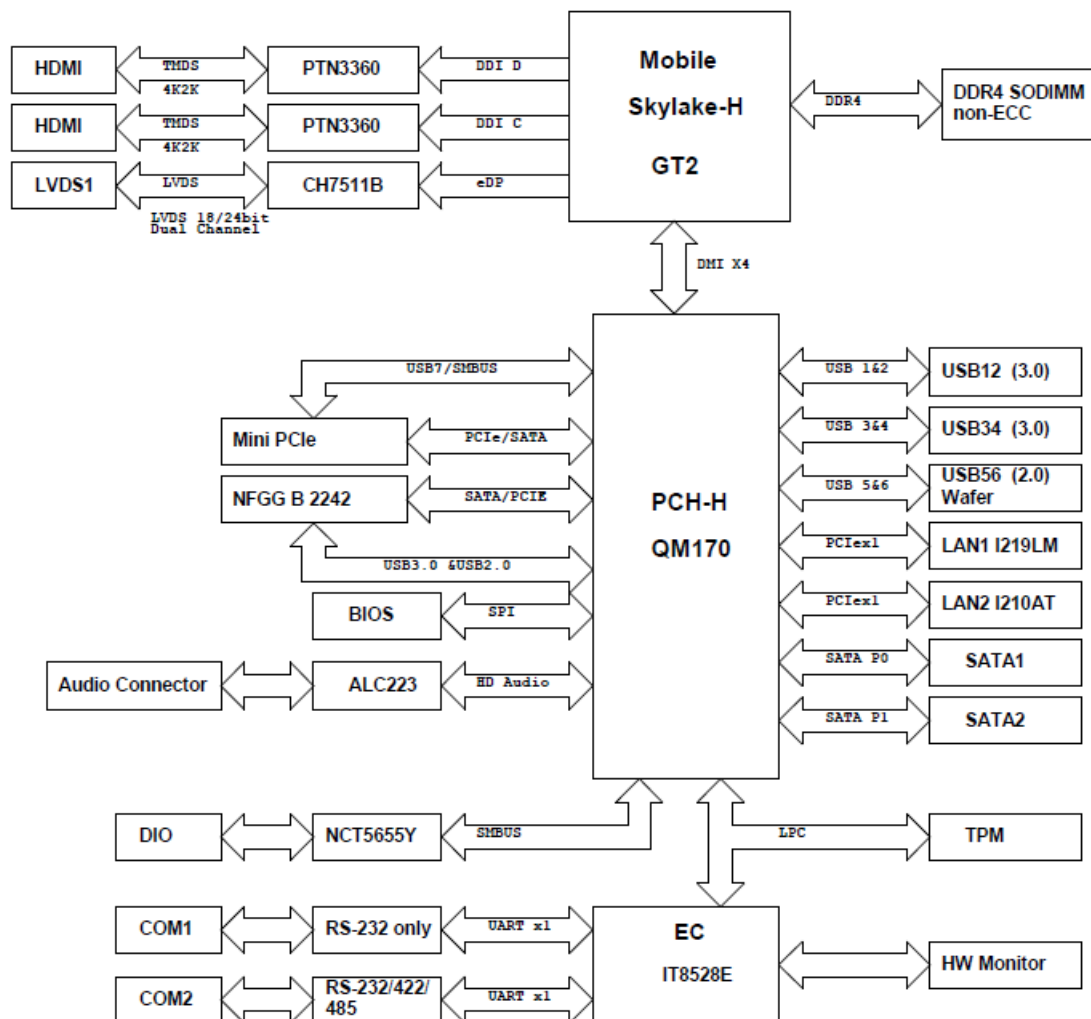
<b>Ethernet Interface</b>	10/100/1000 Base-Tx compatible
<b>Internal I/O Connectors</b>	
<b>Fan</b>	2 x Fan 4P-Wafer
<b>Buzzer</b>	On board Buzzer
<b>CMOS Battery</b>	Wire CR2032
<b>Power On</b>	2 x 4-pin header
<b>Audio</b>	2 x 8-pin header
<b>COM</b>	1 x RS232/422/485 (COM2)
<b>USB</b>	2 x 5-pin header
<b>Rear I/O Connectors</b>	
<b>USB</b>	4 x USB3.0
<b>LAN</b>	2 x Ethernet
<b>HDMI</b>	2 x HDMI
<b>LED</b>	Front Panel LED Connector (for system use)
<b>COM</b>	1 x RS232
<b>Mechanical &amp; Environmental</b>	
<b>Power Requirement</b>	+12V
<b>ACPI</b>	Single power ATX Support S0, S3, S4, S5 ACPI 5.0 Compliant
<b>Power Type</b>	AT / ATX
<b>Operating Temp.</b>	0°C ~ 60°C
<b>Storage Temp.</b>	-40°C ~ 75°C
<b>Operating Humidity</b>	0% ~ 90% relative humidity, non-condensing
<b>Size (L x W)</b>	5.7" x 4" (146mm x 101mm)
<b>Weight</b>	0.44lbs (0.2kg)



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

## 1.6 Architecture Overview—Block Diagram

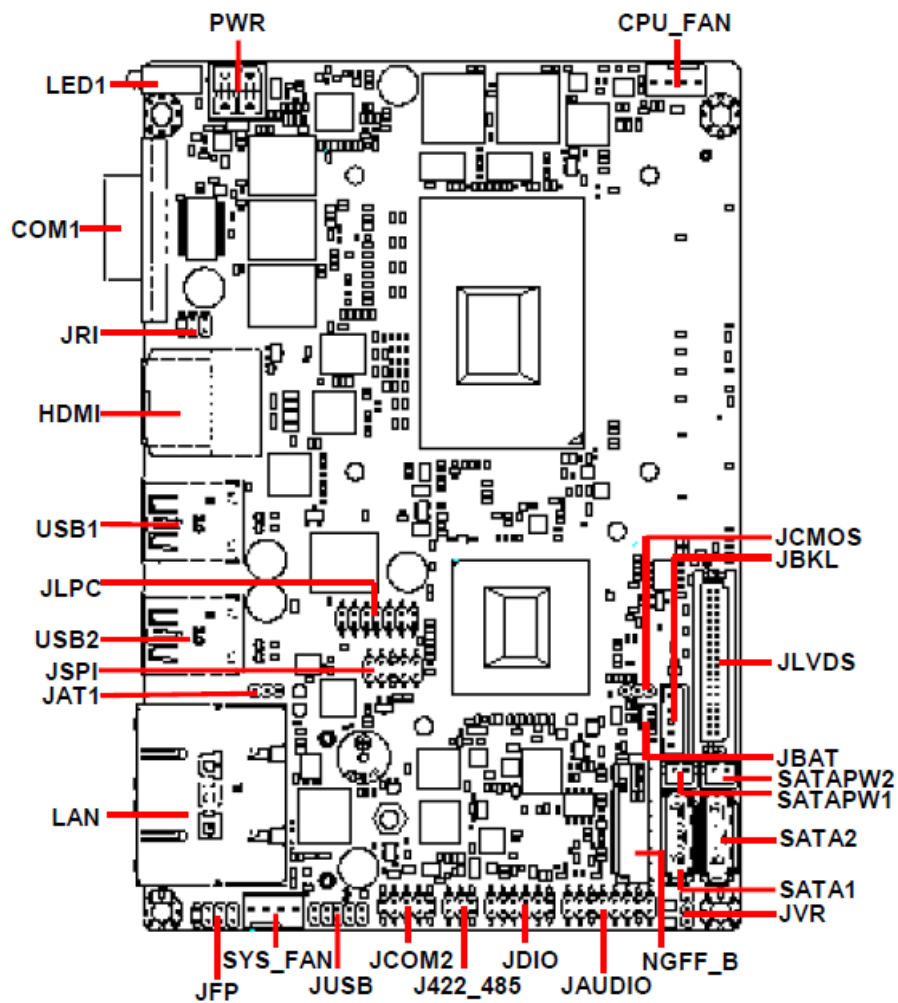
The following block diagram shows the architecture and main components of ECM-SKLH.

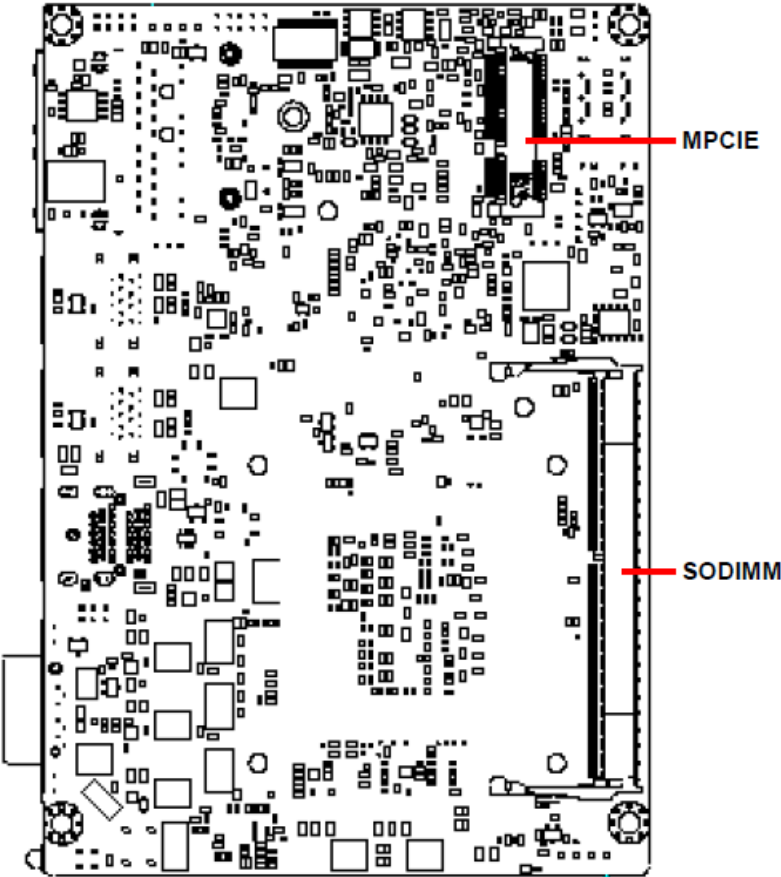


## 2. Hardware Configuration

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## 2.1 Product Overview



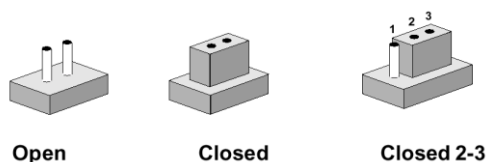




## 2.2 Jumper and Connector List

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

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



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



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

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

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

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

### Jumpers

Label	Function	Note
JCMOS	Clear CMOS	3 x 1 header, pitch 2.00 mm
JRI	Serial port 1 pin9 signal select	3 x 2 header, pitch 2.00 mm
JAT1	AT/ ATX Input power select	3 x 1 header, pitch 2.00 mm
JVR	LCD backlight brightness adjustment	3 x 1 header, pitch 2.00 mm

### Connectors

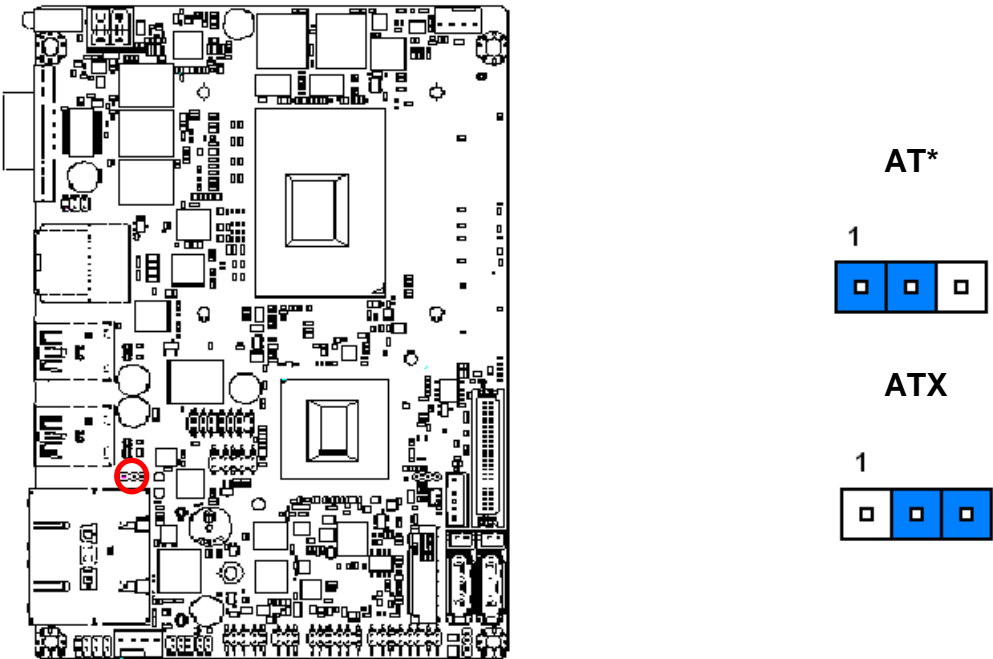
Label	Function	Note
JBAT	Battery connector	2 x 1 wafer, pitch 1.25 mm
CPU_FAN	CPU fan connector	4 x 1 wafer, pitch 2.54 mm
SYS_FAN	System fan connector	4 x 1 wafer, pitch 2.54mm
JAUDIO	Audio connector	8 x 2 header, pitch 2.00 mm

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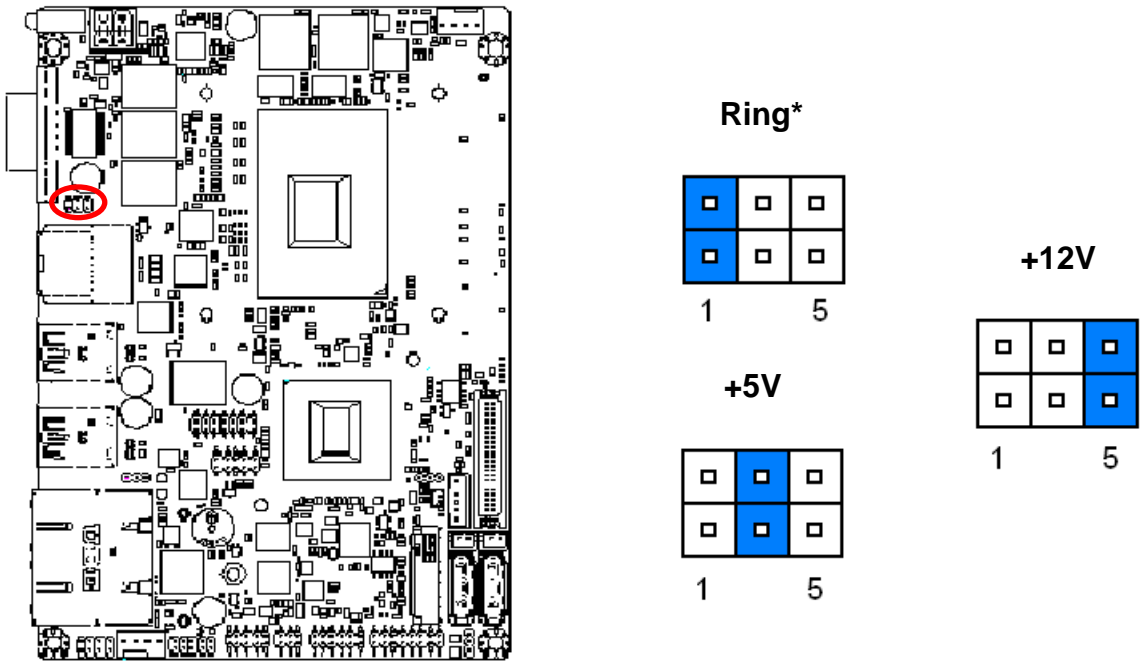
<b>JBKL</b>	LCD inverter connector	5 x 1 wafer, pitch 2.00 mm
<b>J422_485</b>	Serial port 2 in RS-422/485 mode	3 x 2 header, pitch 2.00 mm
<b>COM1</b>	Serial port 1 connector	D-sub 9-pin, male
<b>JCOM2</b>	Serial port 2 connector	5 x 2 header, pitch 2.00 mm
<b>JDIO</b>	General purpose I/O connector	6 x 2 header, pitch 2.00 mm
<b>JFP</b>	Miscellaneous setting connector	4 x 2 header, pitch 2.00 mm
<b>JLPC</b>	Low pin count interface	7 x 2 header, pitch 2.00 mm
<b>JLVDS</b>	LVDS connector	20 x 2 header, pitch 1.25 mm
<b>JSPI</b>	SPI connector	5 x 2 header, pitch 2.00mm
<b>USB1/2</b>	On-board connector for USB3.0 x 4	
<b>JUSB</b>	On-board header for USB2.0	5 x 2 header, pitch 2.00 mm
<b>HDMI1</b>	DUAL HDMI connector	
<b>LAN</b>	RJ-45 Ethernet connector x 2	
<b>LED1</b>	HDD/Power LED indicator	
<b>PWR</b>	Power connector	2 x 2 wafer, pitch 4.20 mm
<b>SATAPW1/2</b>	SATA power header 1/2	2 x 1 wafer, pitch 2.00 mm
<b>SATA1/2</b>	Serial ATA connector 1/2	
<b>NGFF_B</b>	M.2 KEY-B 2242 connector	
<b>MPCIE</b>	Full size Mini-PCI-e connector	
<b>SODIMM</b>	DDR4 SODIMM socket	

2.3 Setting Jumpers & Connectors

2.3.1 AT/ ATX Input power select (JAT1)

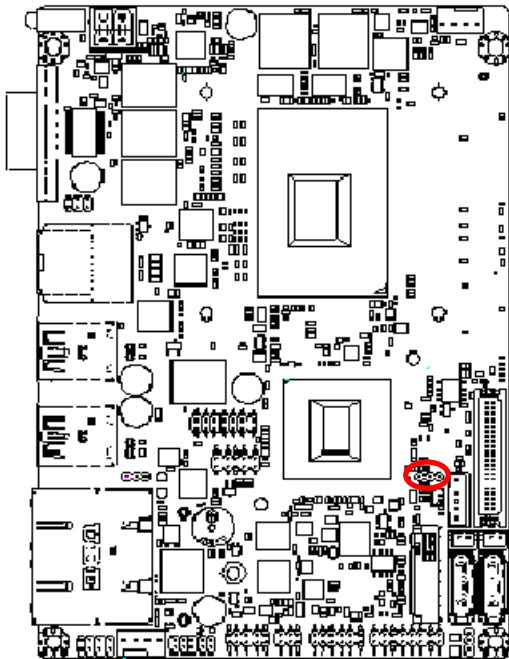


2.3.2 Serial port 1 pin9 signal select (JRI)

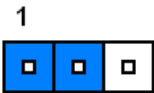


\* Default

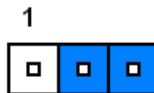
2.3.3 Clear CMOS (JCMOS)



Protect\*

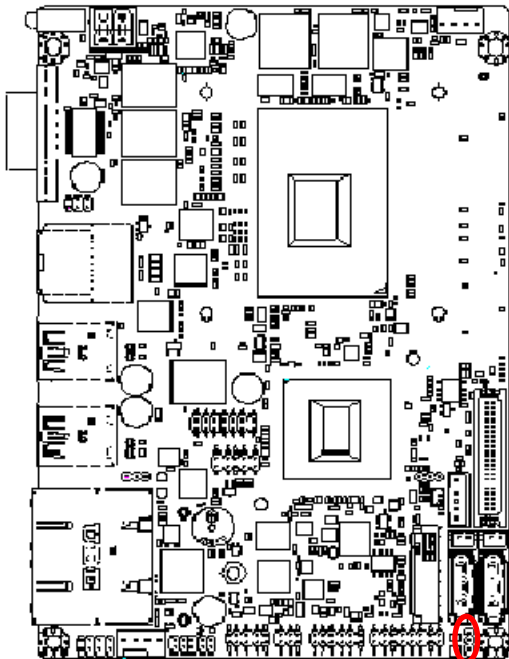


Clear CMOS

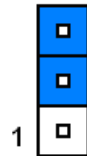


\* Default

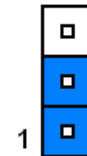
2.3.4 LCD backlight brightness adjustment (JVR)



DC Mode\*

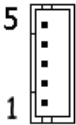
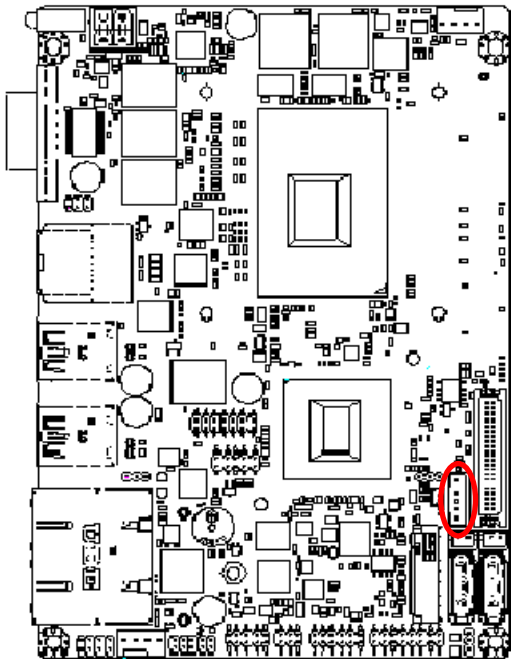


PWM Mode



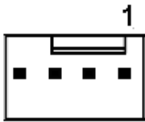
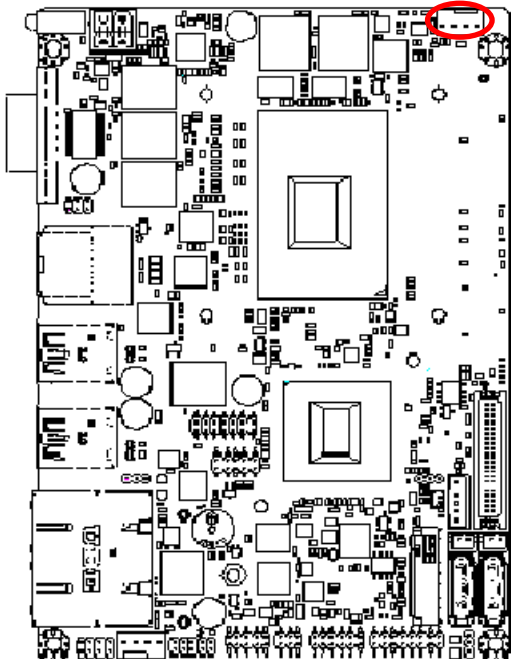
\* Default

2.3.5 LCD Inverter connector (JBKL)



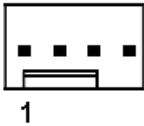
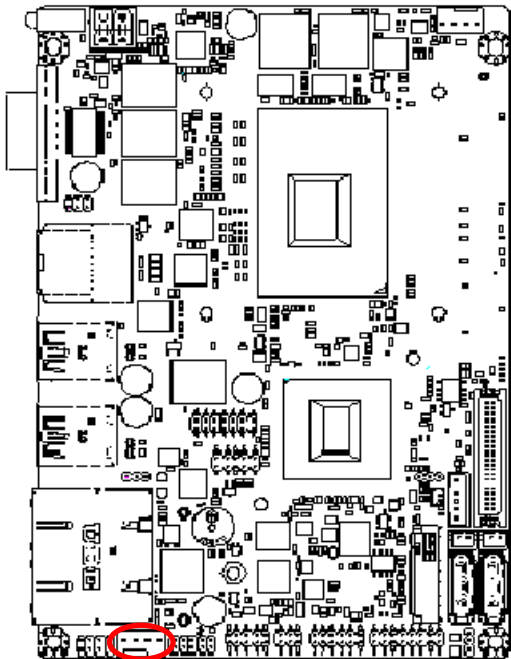
Signal	PIN
+5V	5
VBRIGHT	4
BKLEN	3
GND	2
+12V	1

2.3.6 CPU fan connector (CPU\_FAN)



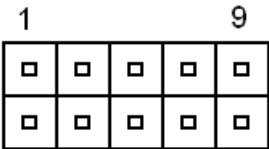
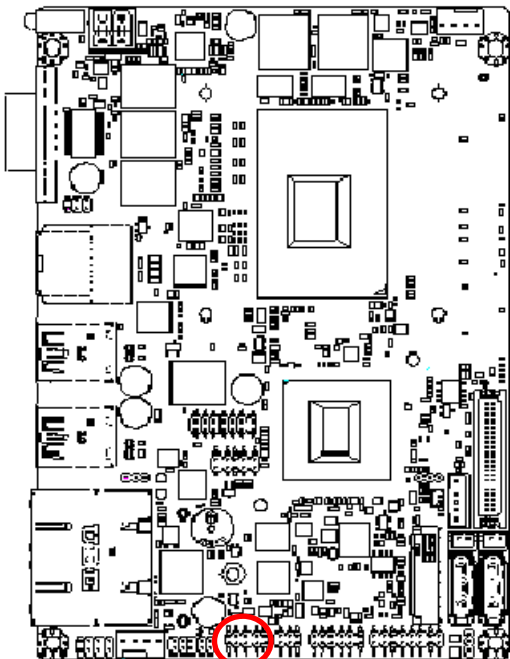
Signal	PIN
GND	1
+12V	2
EC_TACH0	3
FAN_PWM0	4

2.3.7 System fan connector (SYS\_FAN)



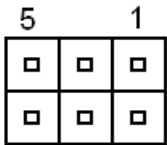
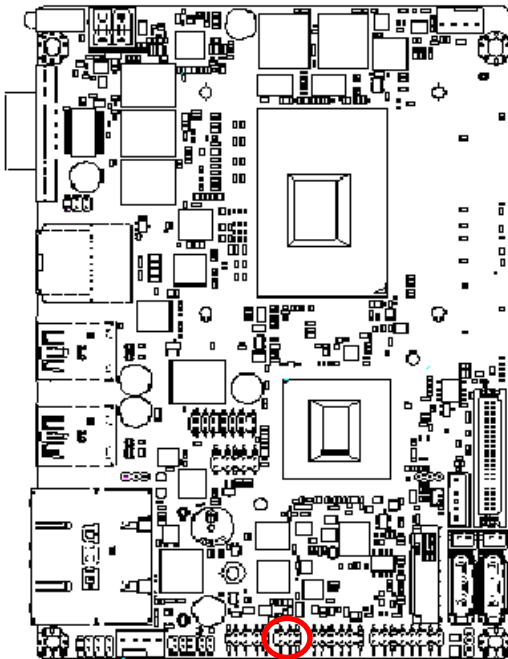
Signal	PIN
GND	1
+12V	2
EC_TACH1	3
FAN_PWM1	4

2.3.8 Serial port 2 connector (JCOM2)



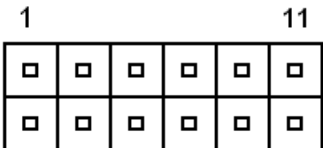
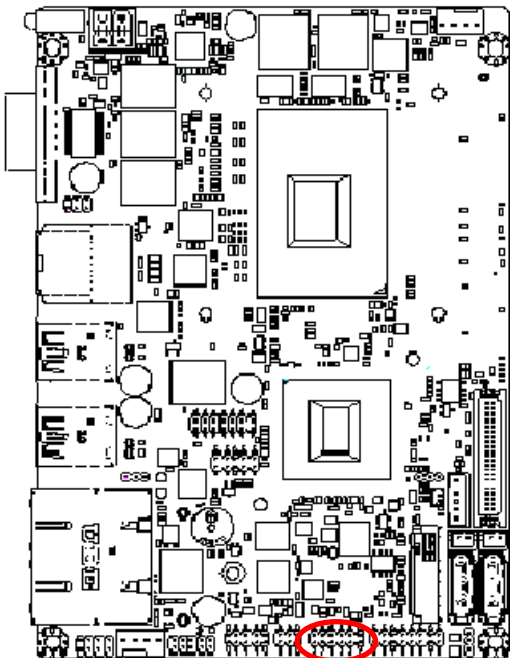
Signal	PIN	PIN	Signal
COM_DCD#	1	2	COM_RXD#
COM_TXD	3	4	COM_DTR#
GND	5	6	COM_DSR#
COM_RTS#	7	8	COM_CTS#
COM_RI#	9	10	NC

2.3.9 Serial port 2 in RS-422/485 mode (J422\_485)



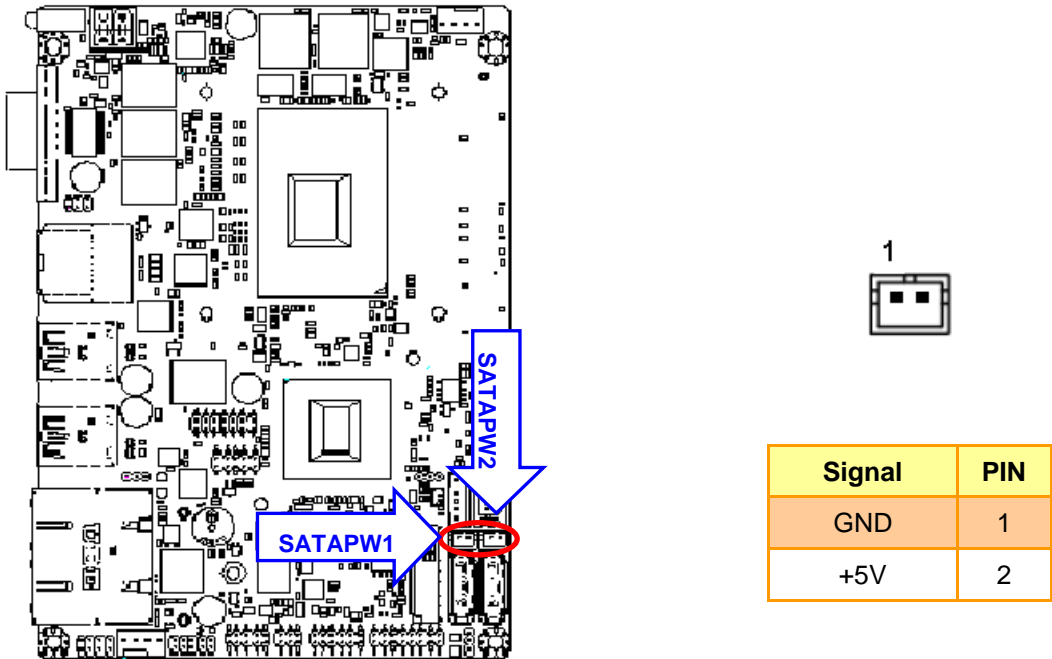
Signal	PIN	PIN	Signal
485-422_TXDN	1	2	422_RXDN
485-422_TXDP	3	4	422_RXDP
+5V	5	6	GND

2.3.10 General purpose I/O connector (JDIO)

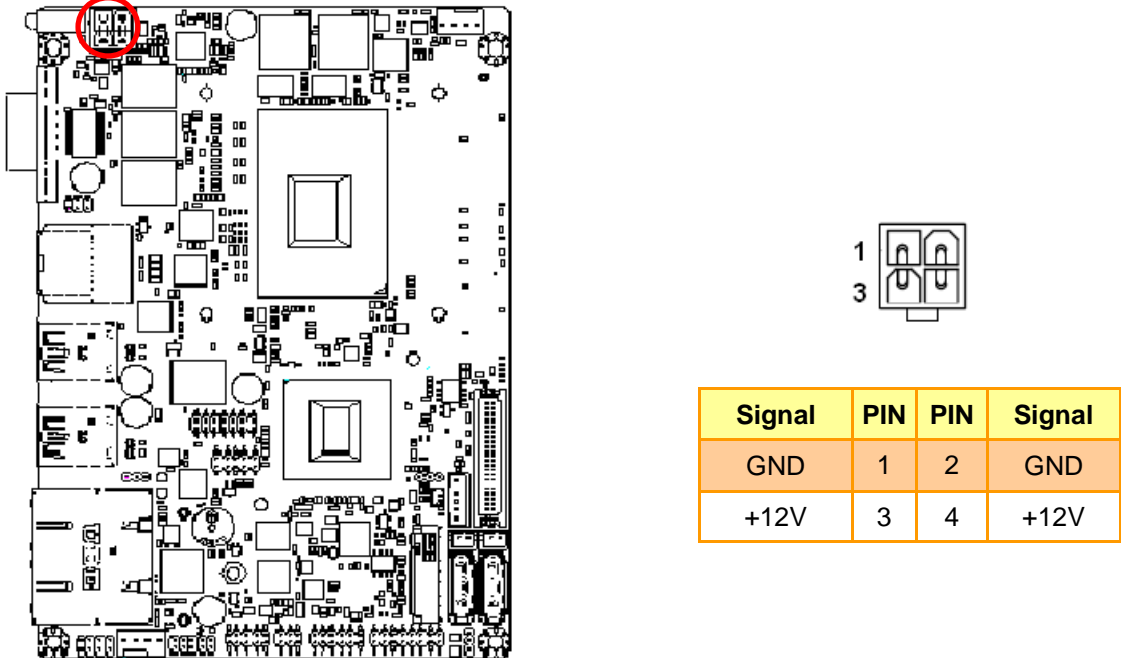


Signal	PIN	PIN	Signal
DIO_GP10	1	2	DIO_GP20
DIO_GP11	3	4	DIO_GP21
DIO_GP12	5	6	DIO_GP22
DIO_GP13	7	8	DIO_GP23
SMB_CLK_VCC	9	10	SMB_DATA_VCC
GND	11	12	+5V

2.3.11 SATA Power header 1/2 (SATAPW1/2)

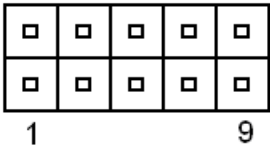
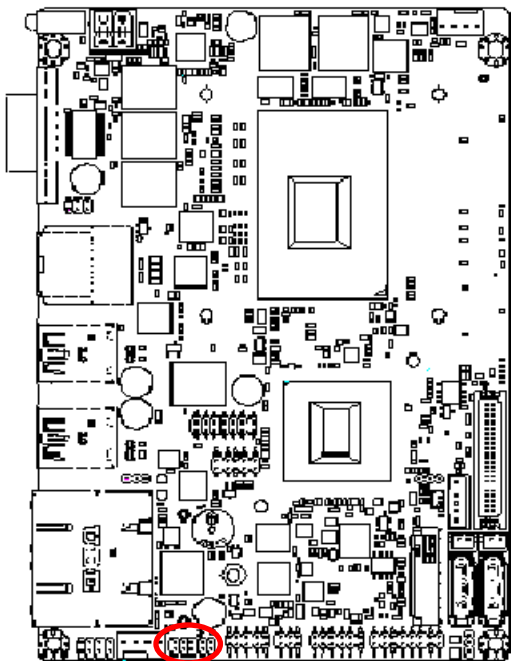


2.3.12 Power connector (PWR)



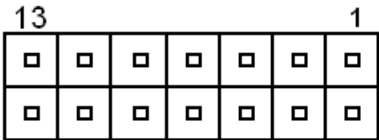
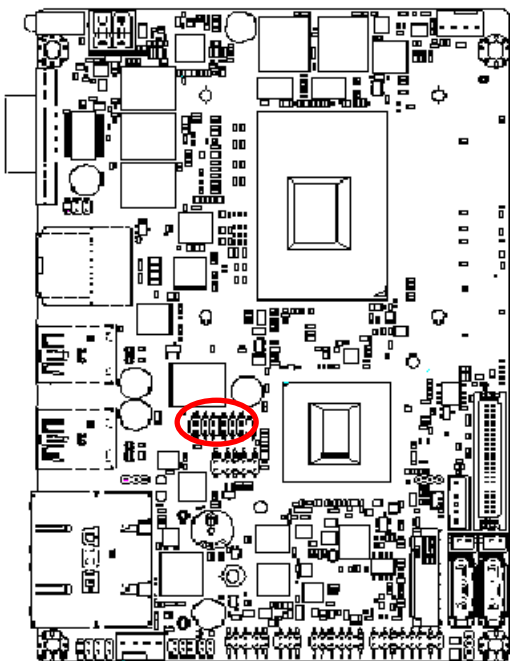


2.3.13 On-board header for USB2.0 (JUSB)



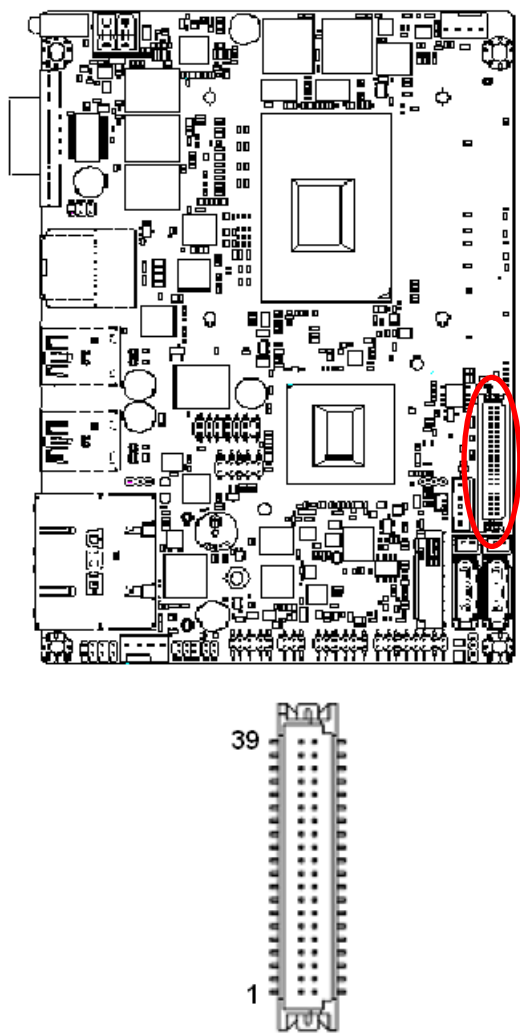
Signal	PIN	PIN	Signal
+5VSB	1	2	GND
USB_DN4	3	4	GND
USB_DP4	5	6	USB_DP5
GND	7	8	USB_DN5
GND	9	10	+5VSB

2.3.14 LPC connector (JLPC)



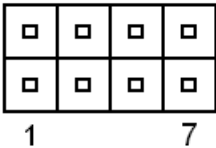
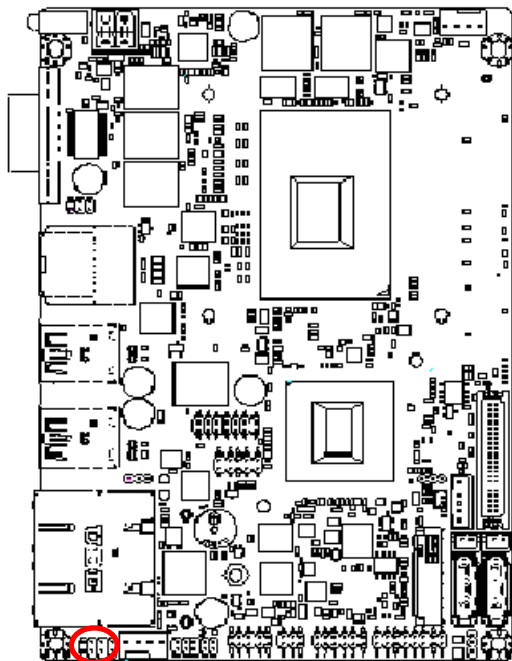
Signal	PIN	PIN	Signal
LPC_AD0	1	2	+3.3V
LPC_AD1	3	4	PLTRST#
LPC_AD	5	6	LPC_LFRAME#
LPC_AD03	7	8	CLK_PCI_JLPC
SERIRQ	9	10	GND
+5V	11	12	GND
+5VSB	13	14	GND

2.3.15 LVDS connector (JLVDS)



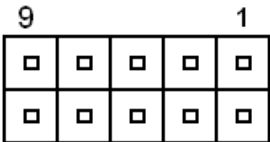
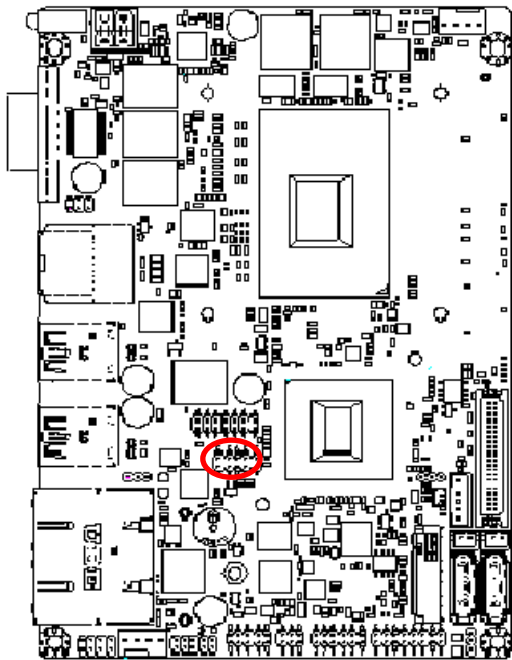
Signal	PIN	PIN	Signal
+12V	39	40	+12V
GND	37	38	GND
LVDS_CLK2_N	35	36	LVDS_CLK1_N
LVDS_CLK2_P	33	34	LVDS_CLK1_P
GND	31	32	GND
LVDS_DATA7_N	29	30	LVDS_DATA6_N
LVDS_DATA7_P	27	28	LVDS_DATA6_P
GND	25	26	GND
LVDS_DATA5_N	23	24	LVDS_DATA4_N
LVDS_DATA5_P	21	22	LVDS_DATA4_P
GND	19	20	GND
LVDS_DATA3_N	17	18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

2.3.16 Miscellaneous setting connector (JFP)



Signal	PIN	PIN	Signal
PWR_BTN_IN_EC#	1	2	GND
RESET_BT	3	4	GND
+5VSB	5	6	PWR_LED-
HDD_LED#	7	8	+5V

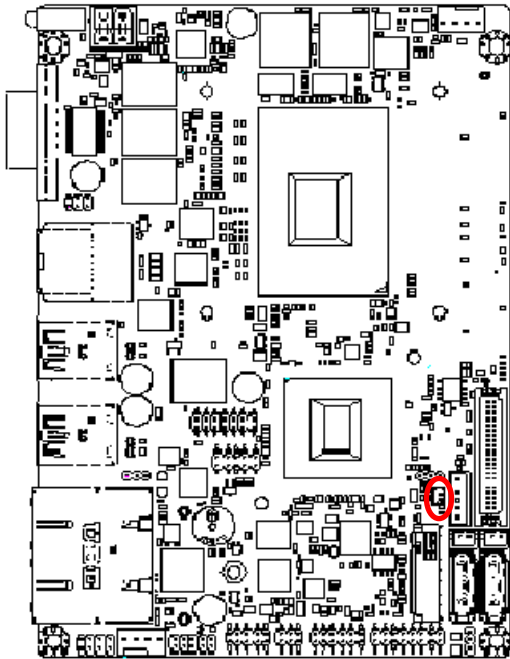
2.3.17 SPI header (JSPI)



Signal	PIN	PIN	Signal
+3.3VSB	1	2	GND
SPI_CS0#	3	4	SPI_CLK
SPI_SO	5	6	SPI_SI
HOLD#	7	8	NC
EC_SMCLK_DEBUG	9	10	EC_SMDAT_DEBUG

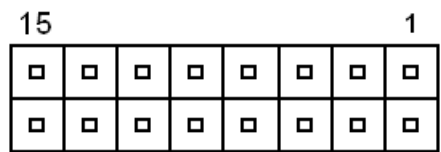
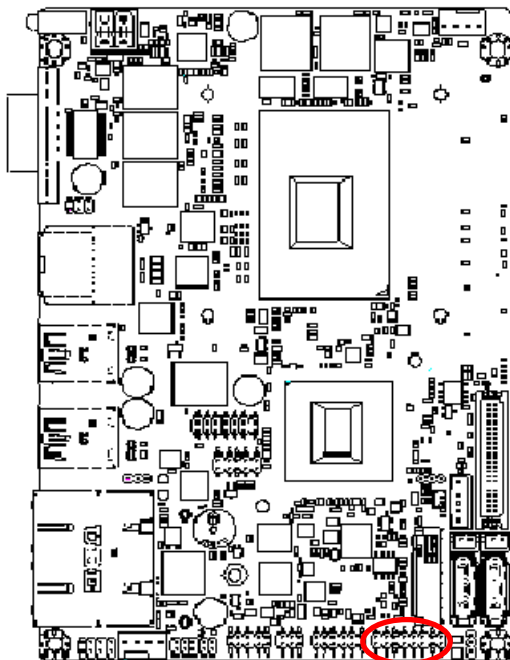
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2.3.18 Battery connector (JBAT)



Signal	PIN
GND	2
+3.3V	1

2.3.19 Audio connector (JAUDIO)



Signal	PIN	PIN	Signal
FRONT-R-OUT	1	2	FRONT-L-OUT
HD_AGND	3	4	HD_AGND
LINE1-R-IN	5	6	LIN1-L-IN
MIC1-R-IN	7	8	MIC1-L-IN
FRONT-JD	9	10	LINE1-JD
MIC1-JD	11	12	HD_AGND
SPK_L+	13	14	SPK_R+
SPK_L-	15	16	SPK_R-

2.3.19.1 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

## 3.BIOS Setup

---

### 3.1 Introduction

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

### 3.2 Starting Setup

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

While the BIOS is in control, the Setup program can be activated in one of two ways:

By pressing <F2> or <Del> immediately after switching the system on, or

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

**Press <F2> or <Del> to enter SETUP**

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

### 3.3 Using Setup

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

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

- **Navigating Through The Menu Bar**

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



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

- **To Display a Sub Menu**

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

### 3.4 Getting Help

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

### 3.5 In Case of Problems

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the Insyde 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 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.

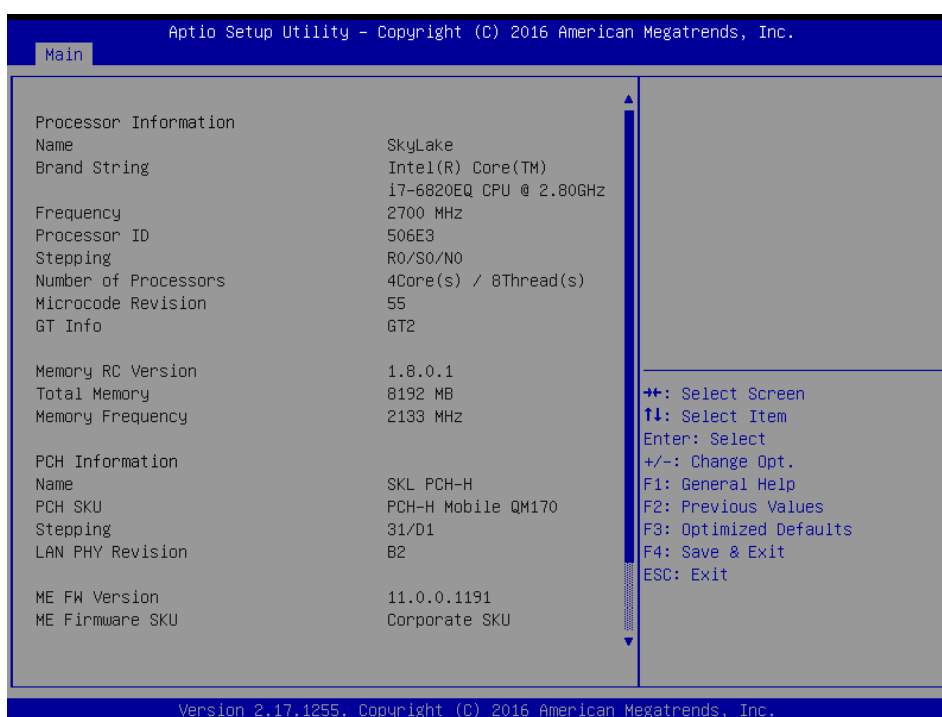
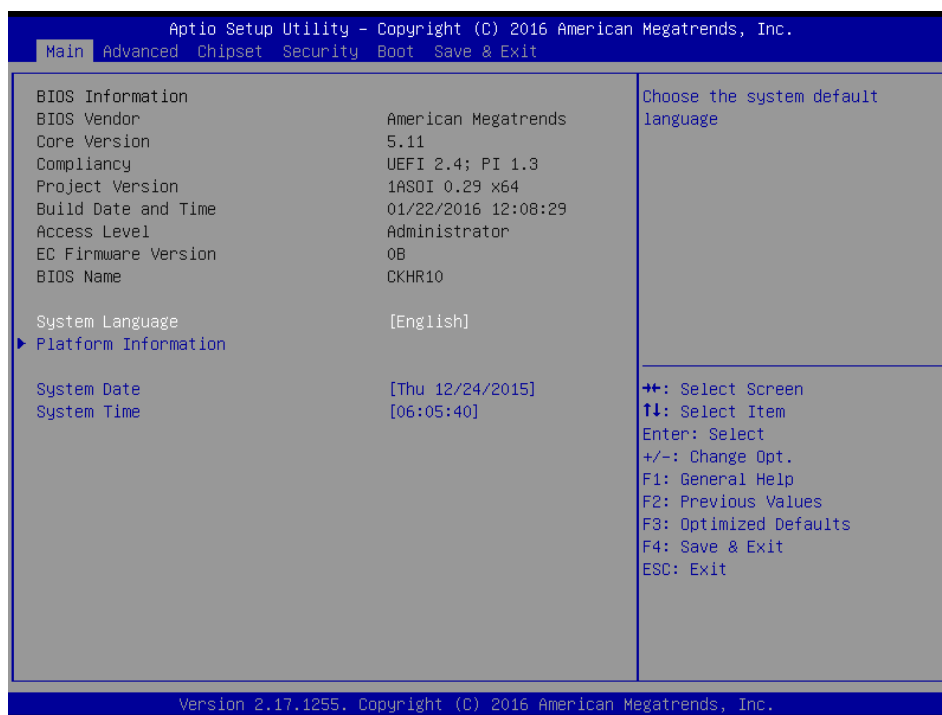


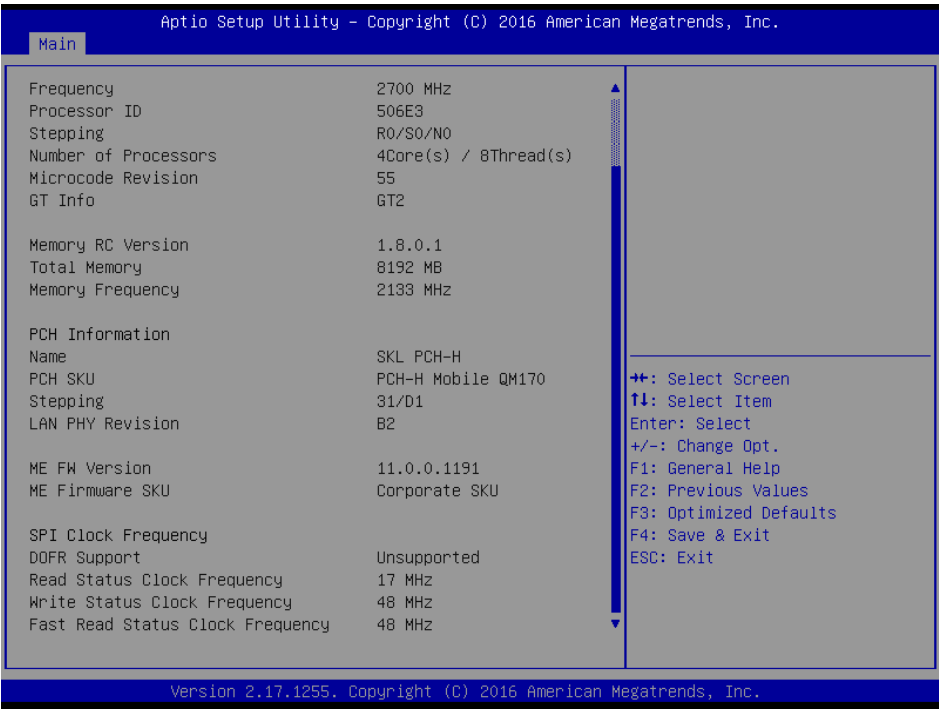
## 3.6 BIOS setup

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

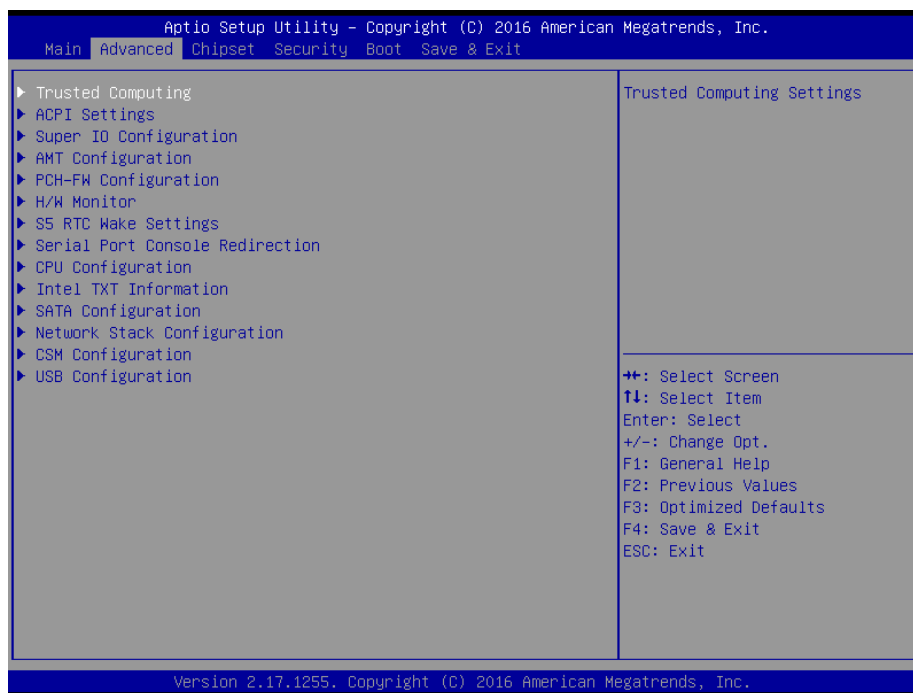
Use the system time option to set the system time. Manually enter the hours, minutes and seconds.



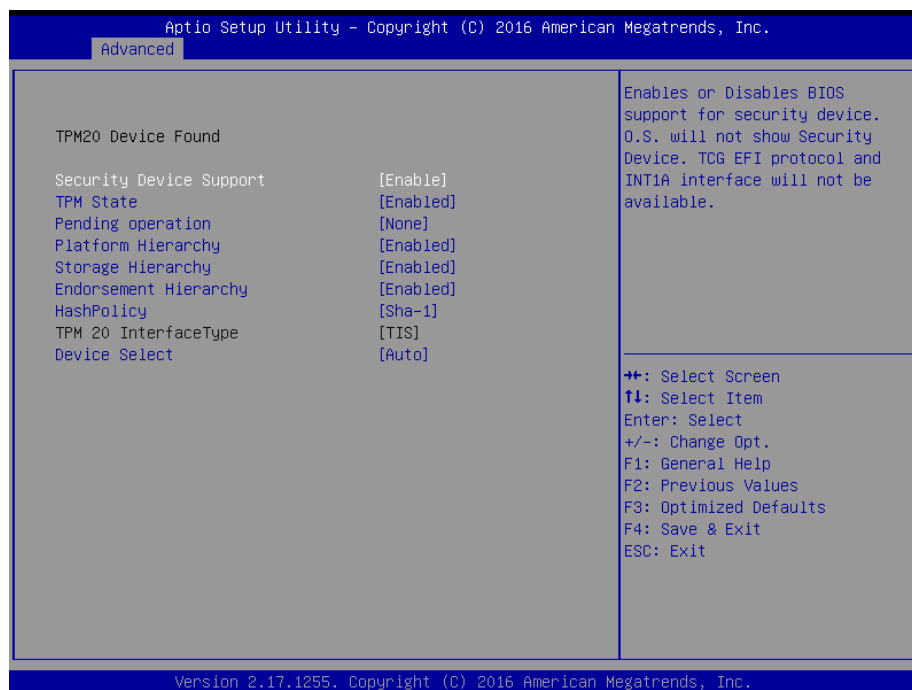
**Note:** The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen. Visit the Avalue website ([www.avalue.com.tw](http://www.avalue.com.tw)) to download the latest product and BIOS information.

### 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 Trusted Computing

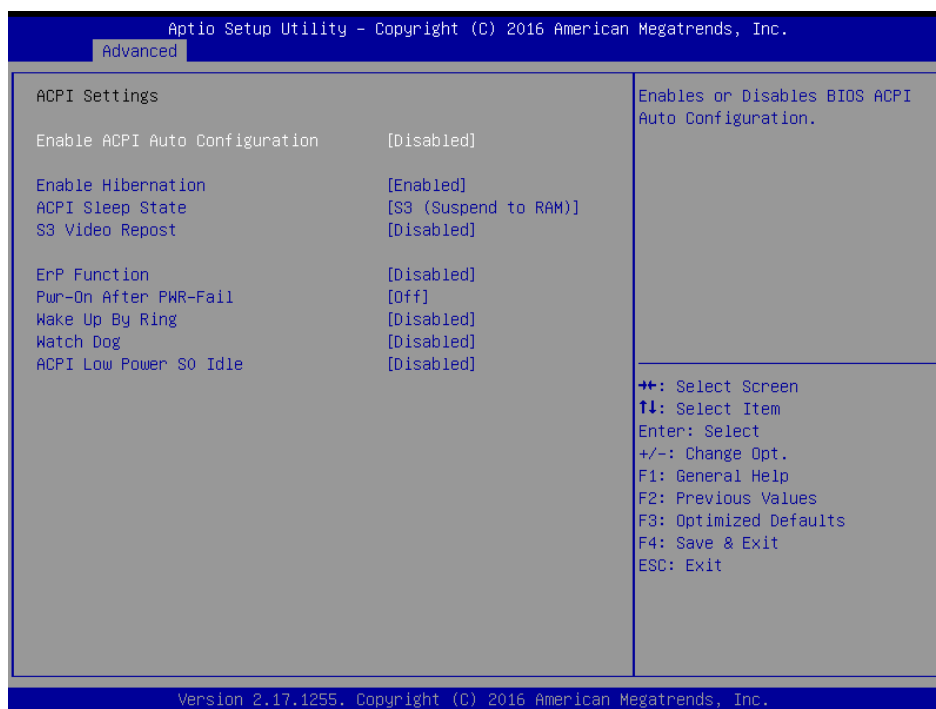


Item	Options	Description
Security Device Support	Disable, Enable[Default]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be

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		available.
<b>TPM State</b>	Disabled Enabled[ <b>Default</b> ],	Enable/Disable Security Device. NOTE: Your Computer will reboot during restart in order to change State of the Device.
<b>Pending operation</b>	None[ <b>Default</b> ], TPM Clear	Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
<b>Platform Hierarchy</b>	Disabled Enabled[ <b>Default</b> ],	Enable or Disable Platform Hierarchy.
<b>Storage Hierarchy</b>	Disabled Enabled[ <b>Default</b> ],	Enable or Disable Storage Hierarchy.
<b>Endorsement Hierarchy</b>	Disabled Enabled[ <b>Default</b> ],	Enable or Disable Endorsement Hierarchy.
<b>Device Select</b>	Auto[ <b>Default</b> ],	TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.

### 3.6.2.2 APCI Settings



Item	Options	Description
<b>Enable ACPI Auto Configuration</b>	Disabled[ <b>Default</b> ], Enabled	Enables or Disables BIOS ACPI Auto Configuration.
<b>Enable Hibernation</b>	Disabled Enabled[ <b>Default</b> ],	Enables or Disables System ability to Hibernation (OS/S4 Sleep State). This option may be not effective with some OS.

<b>ACPI Sleep State</b>	Suspend Disabled, S3 (Suspend to RAM) <b>[Default]</b>	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
<b>S3 Video Repost</b>	Disabled <b>[Default]</b> , Enabled	Enable or Disable S3 Video Repost.
<b>ErP Function</b>	Disabled <b>[Default]</b> , Enabled	ErP Function (Deep S5).
<b>Pwr-On After PWR-Fail</b>	Off <b>[Default]</b> On Last state	Select the power station after power failure.
<b>Wake Up By Ring</b>	Disabled <b>[Default]</b> , Enabled	System wake up by ring (from S3~S5).
<b>Watch Dog</b>	Disabled <b>[Default]</b> , 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select Watch Dog Timer (WDT) Mode.
<b>ACPI Low Power S0 Idle</b>	Disabled <b>[Default]</b> , Enabled	Enable or Disable ACPI Low Power S0 Idle Support.

### 3.6.2.3 IT8528 Super IO Configuration

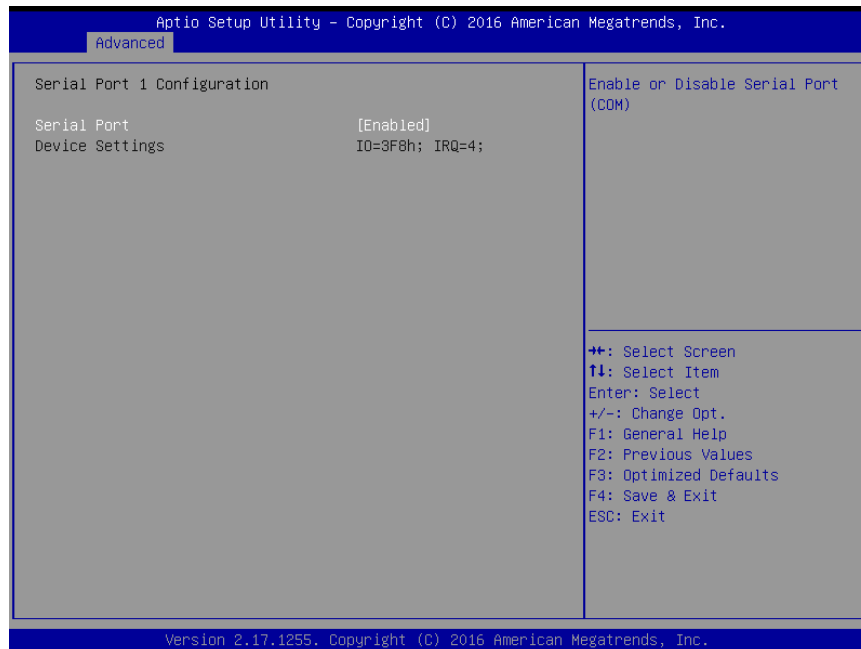
You can use this item to set up or change the IT8528 Super IO configuration for serial ports. Please refer to 3.6.2.3.1~ 3.6.2.3.2 for more information.



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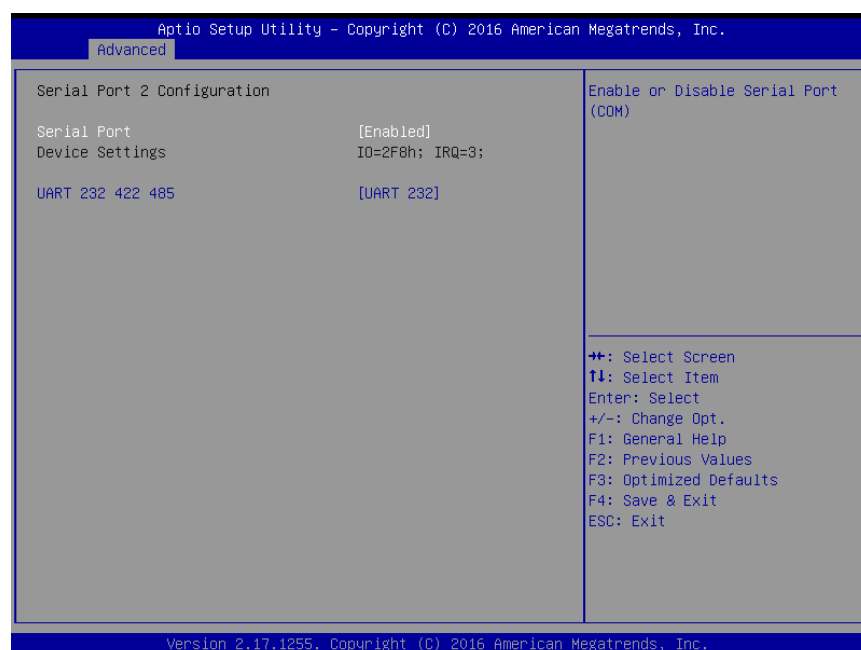
Item	Description
<b>Serial Port 1 Configuration</b>	Set Parameters of Serial Port 1 (COMA).
<b>Serial Port 2 Configuration</b>	Set Parameters of Serial Port 2 (COMB).

### 3.6.2.3.1 Serial Port 1 Configuration



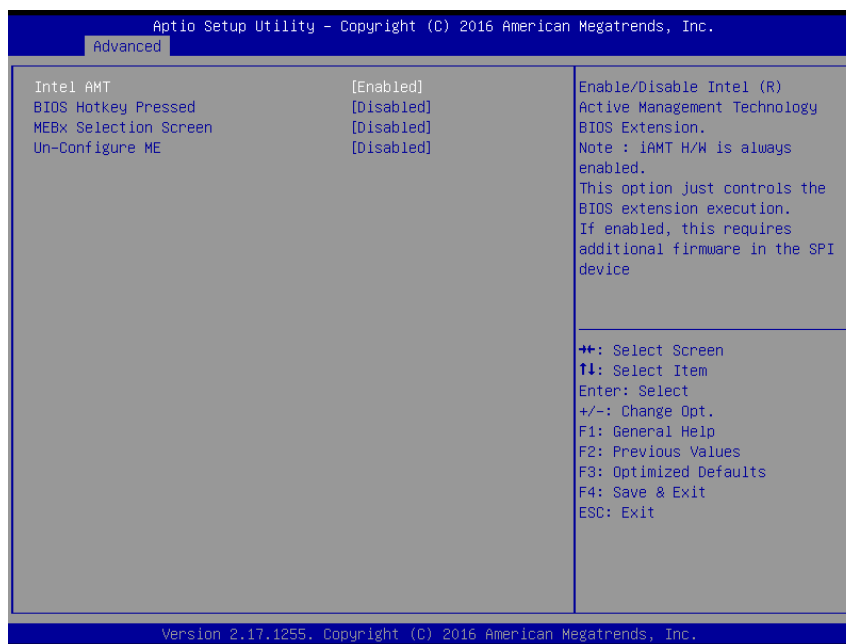
Item	Option	Description
<b>Serial Port</b>	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).

### 3.6.2.3.2 Serial Port 2 Configuration



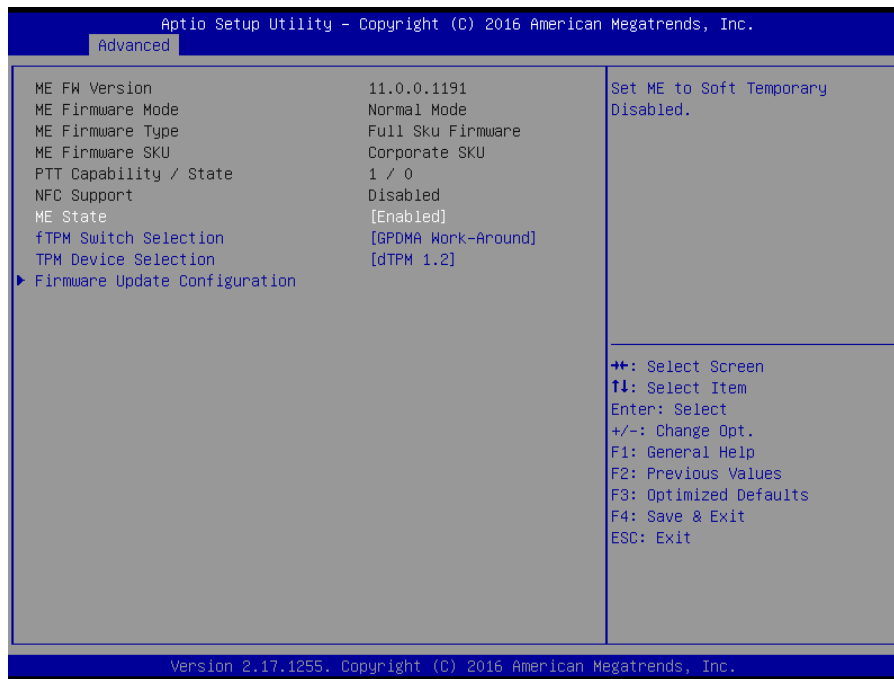
Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232[Default] UART 422 UART 485	Change the Serial Port as RS232/422/485.

### 3.6.2.4 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.
BIOS Hotkey Pressed	Disabled[Default] Enabled,	OEMFLag Bit 1: Enable/Disable BIOS hotkey press.
MEBx Selection Screen	Disabled[Default] Enabled,	OEMFLag Bit 2: Enable/Disable MEBx selection screen.
Un-Configure ME	Disabled[Default] Enabled,	OEMFLag Bit 15: Un-Configure ME without password.

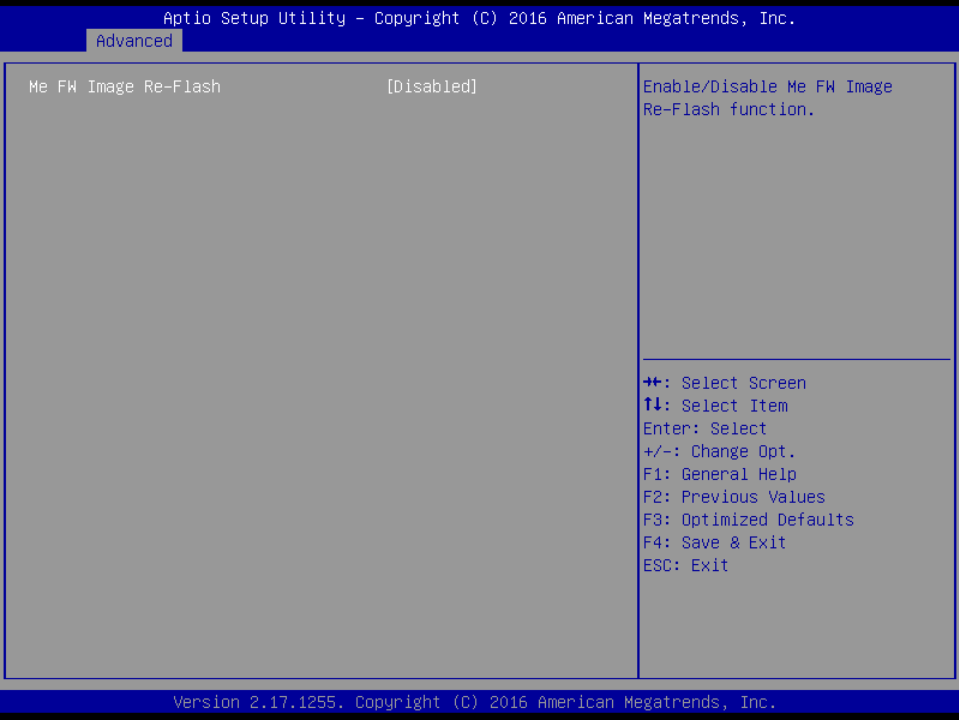
## 3.6.2.5 PCH-FW Configuration



Item	Options	Description
ME State	Disabled Enabled[Default],	Set ME to Soft Temporary Disabled.
fTPM Switch Selection	GPDMA Work-Around[Default], MSFT QFE Solution	Select the desired fTPM solution to be used.
TPM Device Selection	dTPM 1.2[Default], PTT	Selects TPM device: PTT or dTPM. PTT – Enables PTT in SkuMgr dTPM 1.2 – Disables PTT in SkuMgr Warning! PTT/dTPM will be disabled and all data saved on it will be lost.

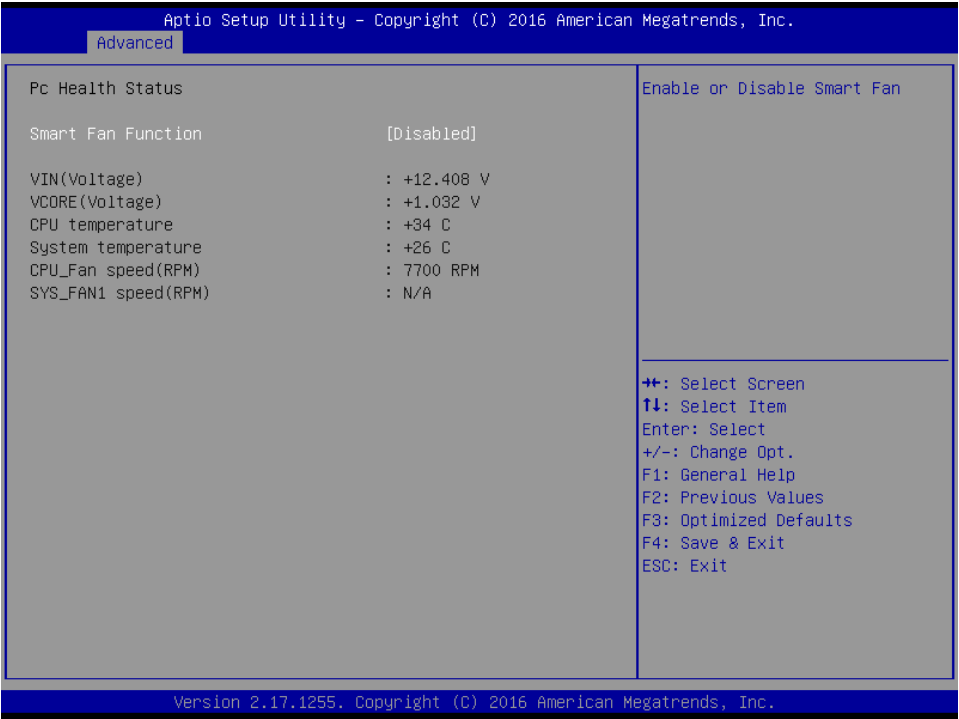


3.6.2.5.1 Firmware Update Configuration

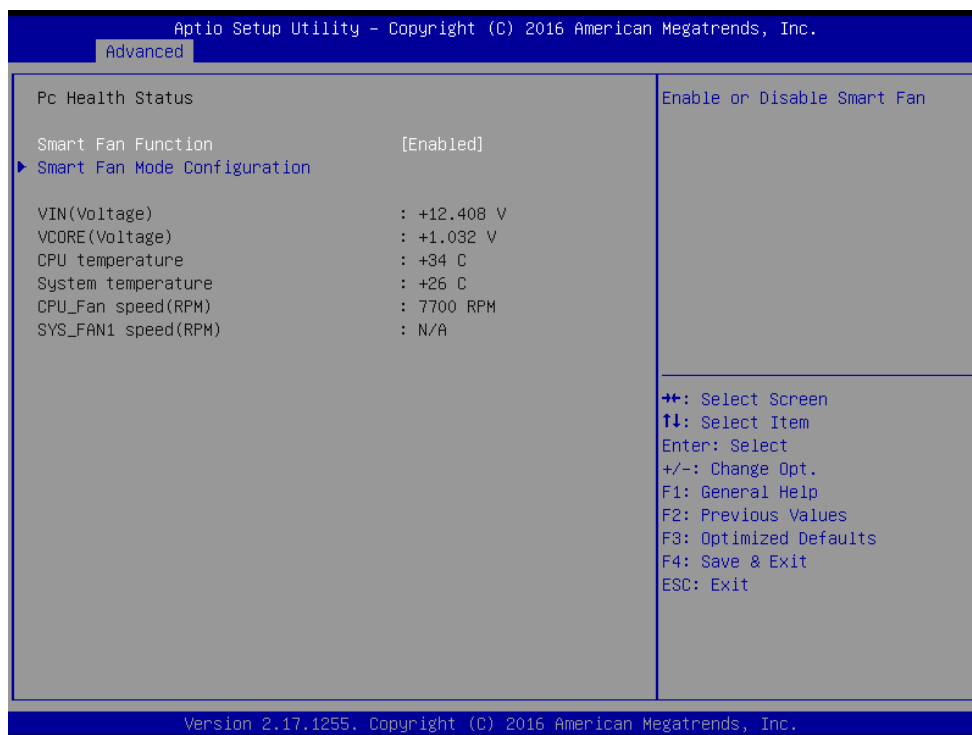


Item	Option	Description
ME FW Image Re-Flash	Disabled [Default], Enabled	Enable/Disable Me FW Image Re-Flash function.

3.6.2.6 H/W Monitor

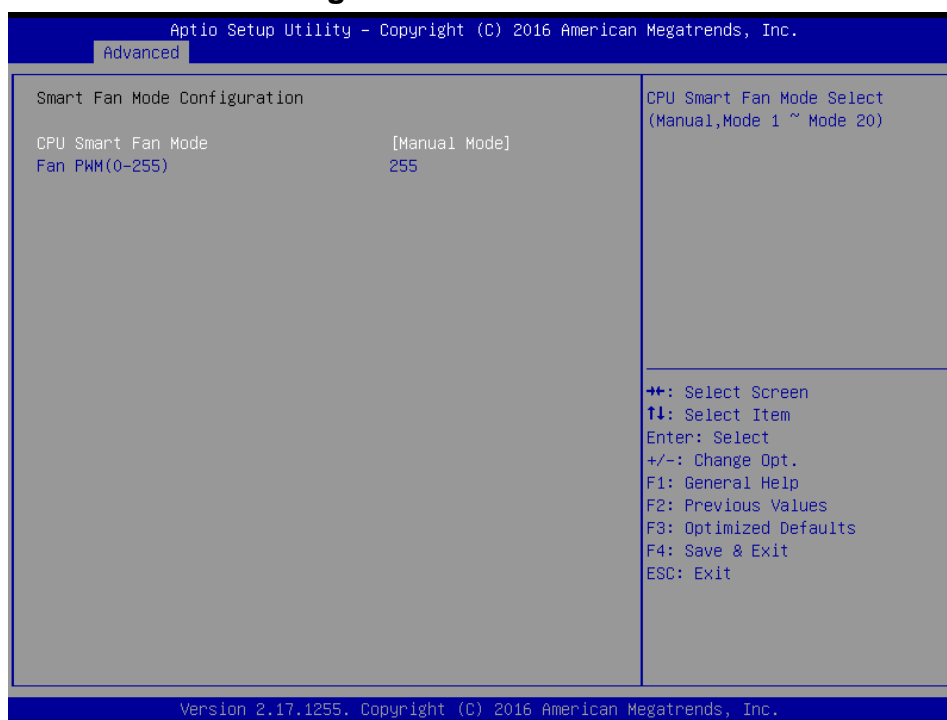


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Item	Options	Description
Smart Fan Function	Enabled, Disabled[Default]	Enables or Disables Smart Fan.

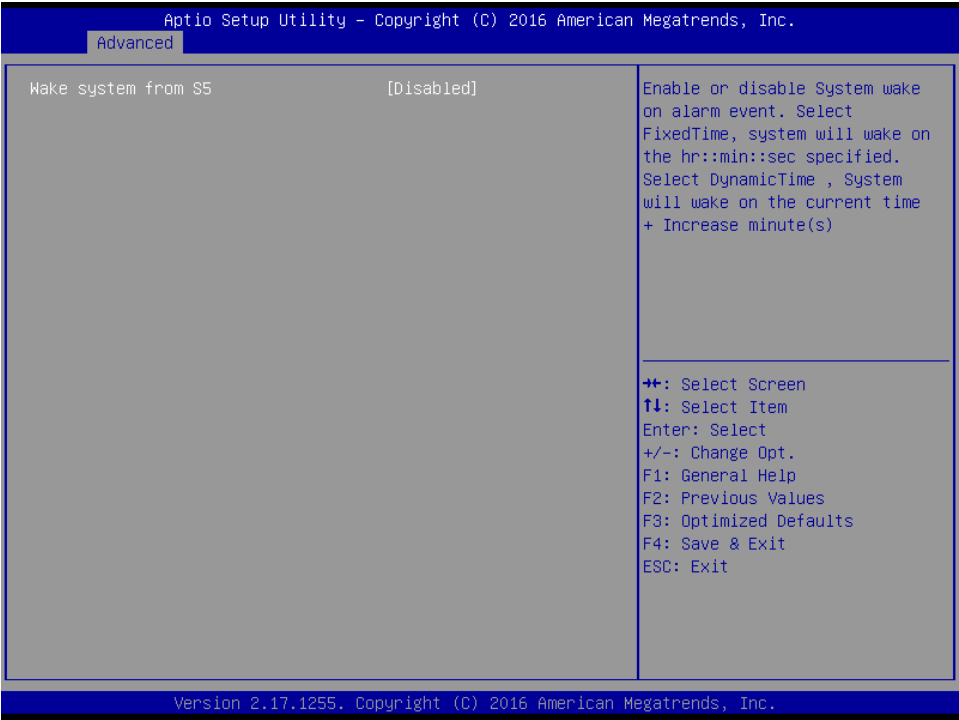
### 3.6.2.6.1 Smart Fan Mode Configuration



Item	Option	Description
CPU Smart Fan Mode	Manual Mode[Default]/, Mode 01/02/03/04/05	CPU Smart Fan Mode Select (Manual, Mode 1~Mode 20).

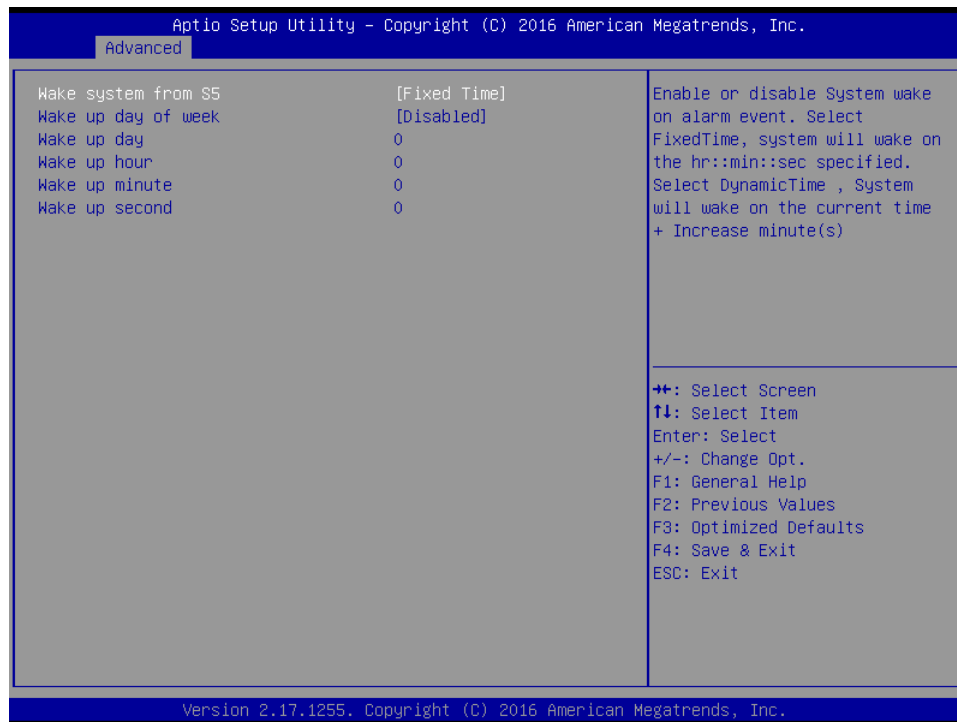
	/06/07/08/09/10 /11/12/13/14/15 /16/17/18/19/20	
Fan PWM (0-255)	0-255[Default]	Fan PWM duty (0-255).

3.6.2.7 S5 RTC Wake Settings

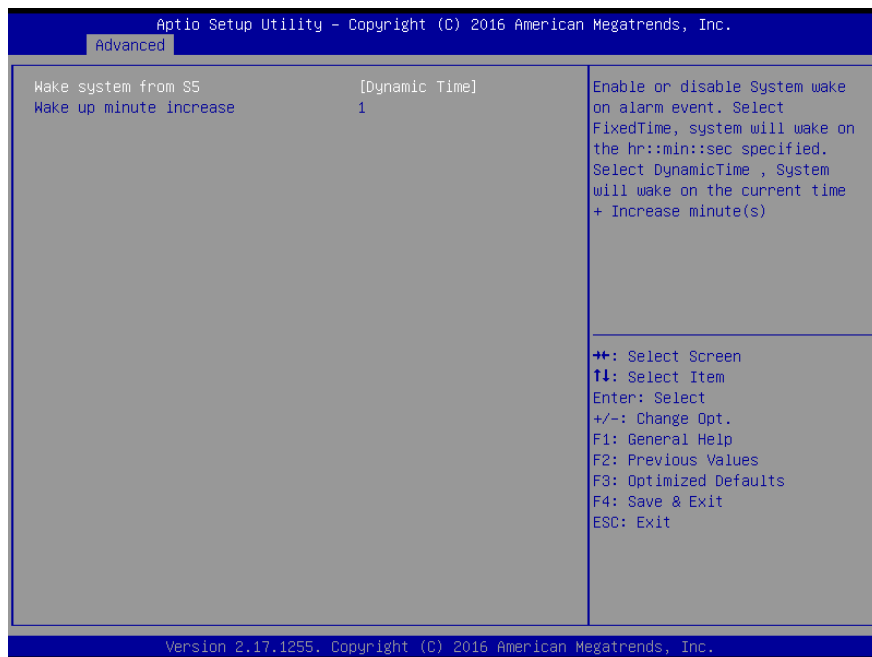


Item	Options	Description
Wake system from S5	Disabled[Default], Fixed Time Dynamic Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).

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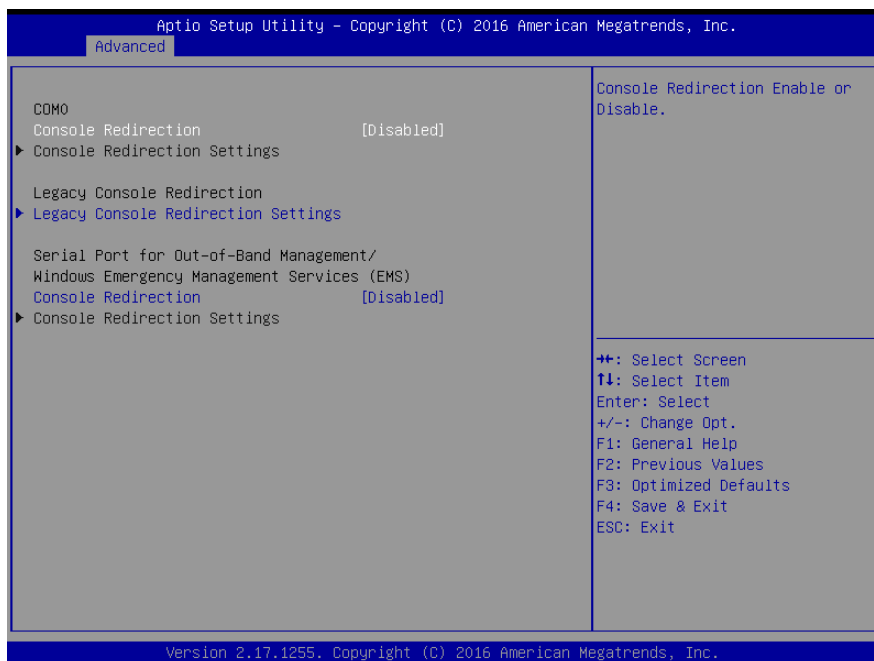


Item	Options	Description
<b>Wake system from S5</b>	Disabled, Fixed Time[Default] Dynamic Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).
<b>Wake up day of week</b>	Disabled[Default] Monday-Friday Monday-Saturday	Wake up day of week. (Monday-Friday) or (Monday-Saturday).
<b>Wake up day</b>	1-31	Select 0 for daily system wake up 1-31 for which day of the month that you would like the system to wake up.
<b>Wake up hour</b>	0-23	Select 0-23 For example enter 3 for 3am and 15 for 3pm.
<b>Wake up minute</b>	0-23	Select 0-23 For example enter 3 for 3am and 15 for 3pm.
<b>Wake up second</b>	0-23	Select 0-23 For example enter 3 for 3am and 15 for 3pm.



Item	Options	Description
Wake system from S5	Disabled, Fixed Time Dynamic Time[Default]	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).
Wake up minute increase	1-5	1-5.

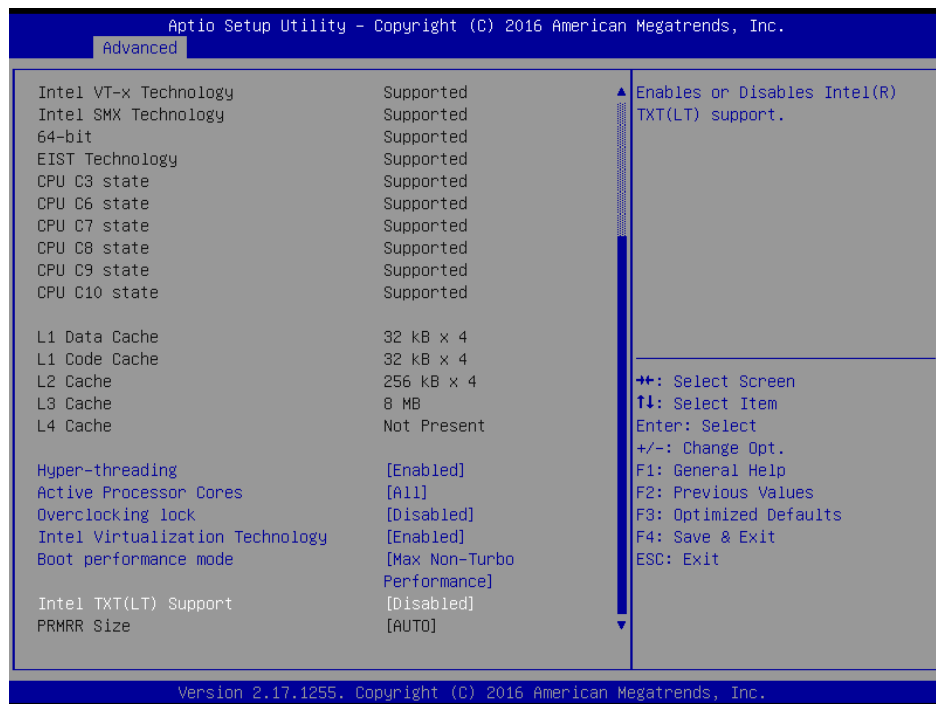
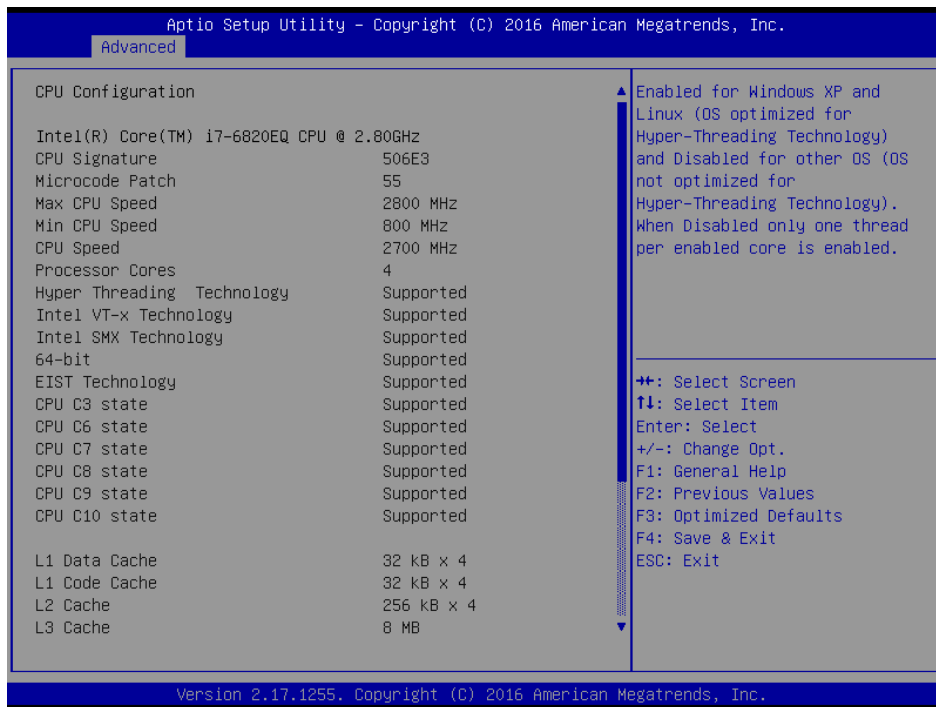
### 3.6.2.8 Serial Port Console Redirection



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

## 3.6.2.9 CPU Configuration

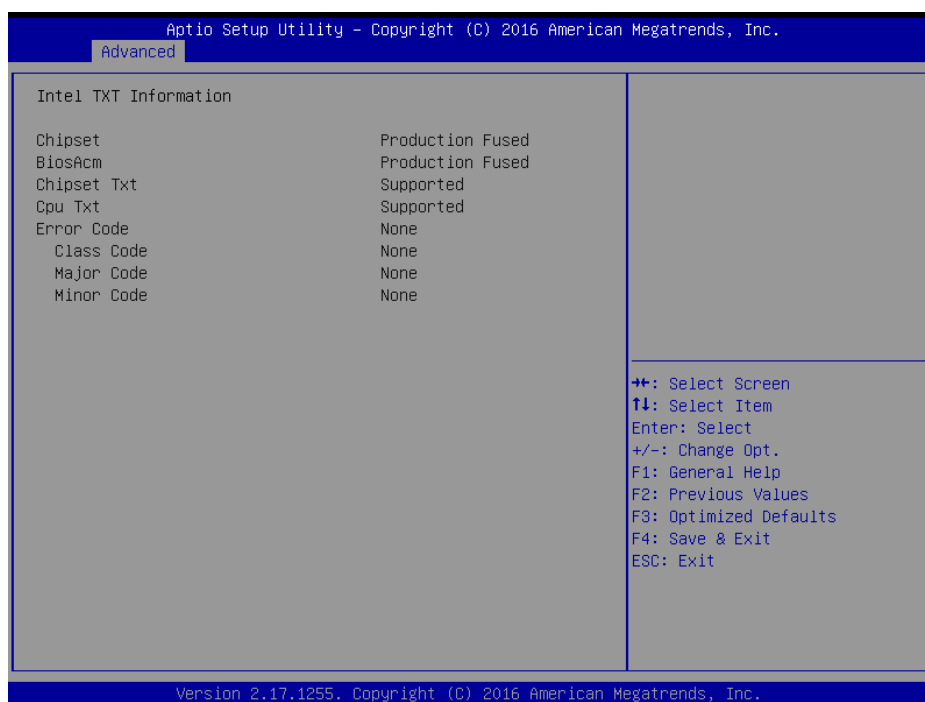
Use the CPU configuration menu to view detailed CPU specification and configure the CPU.



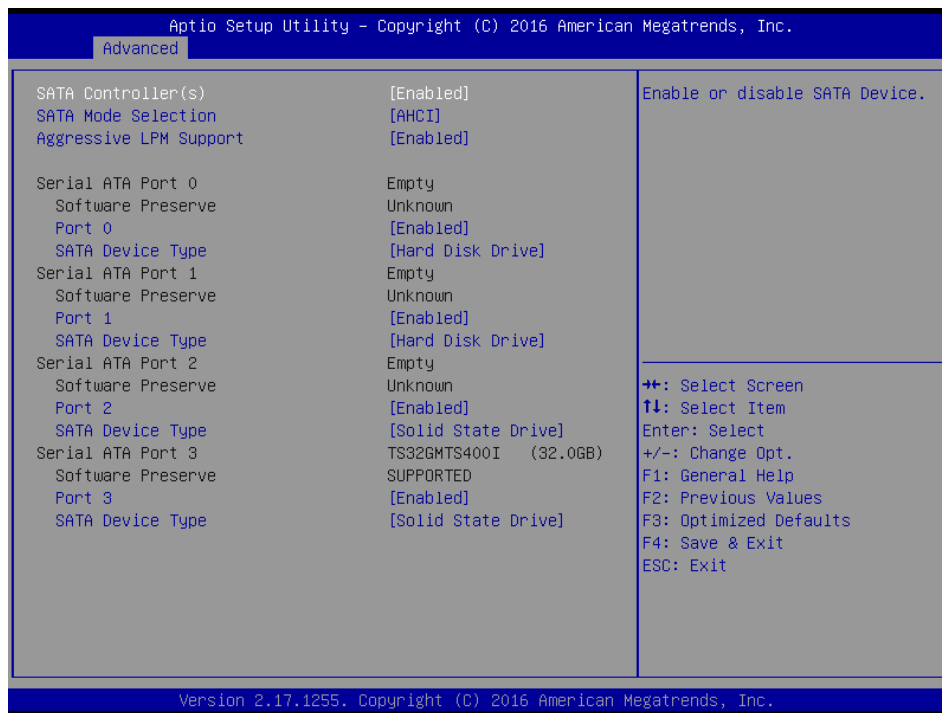
Item	Options	Description
Hyper-threading	Disabled, Enabled[Default]	Enabled for Windows XP and Linux (OS optimized for Hyper- Threading Technology) and Disabled for other OS (OS not optimized for Hyper- Threading

		Technology). When Disabled only one thread per enabled core is enabled.
<b>Active Processor Cores</b>	All[Default] 1 2 3	Number of cores to enable in each processor package.
<b>Overclocking lock</b>	Disabled[Default], Enabled	FLEX_RATIO (194) MSR.
<b>Intel Virtualization Technology</b>	Disabled Enabled[Default]	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
<b>Boot performance mode</b>	Max Battery Max Non-Turbo Performance[Default] Turbo Performance	Select the performance state that the BIOS will set before OS handoff.
<b>Intel TXT(LT) Support</b>	Disabled[Default], Enabled	Enables or Disables Intel® TXT(LT) support.

### 3.6.2.10 Intel TXT Configuration



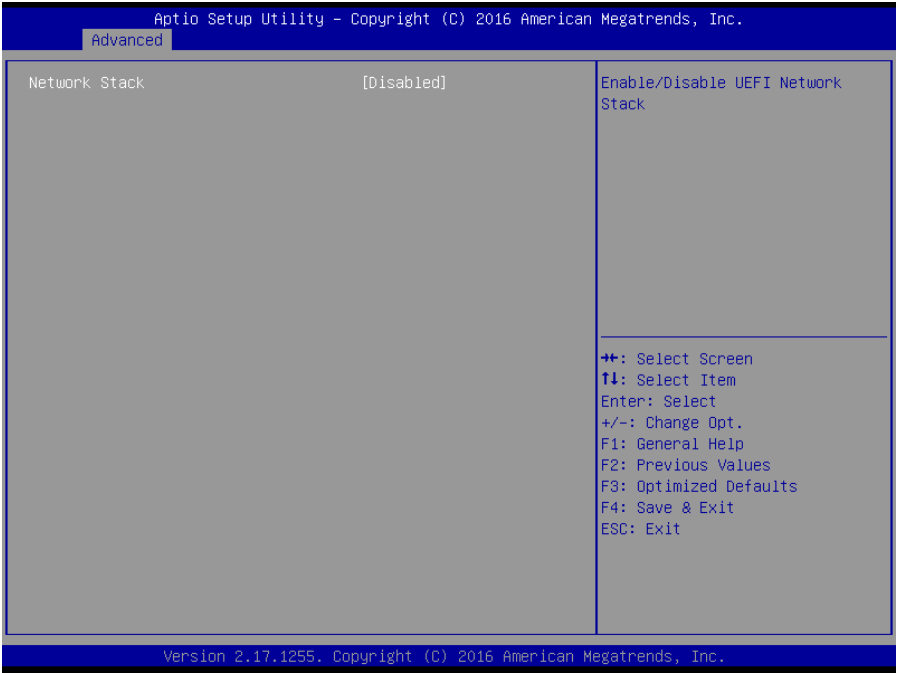
## 3.6.2.11 SATA Configuration



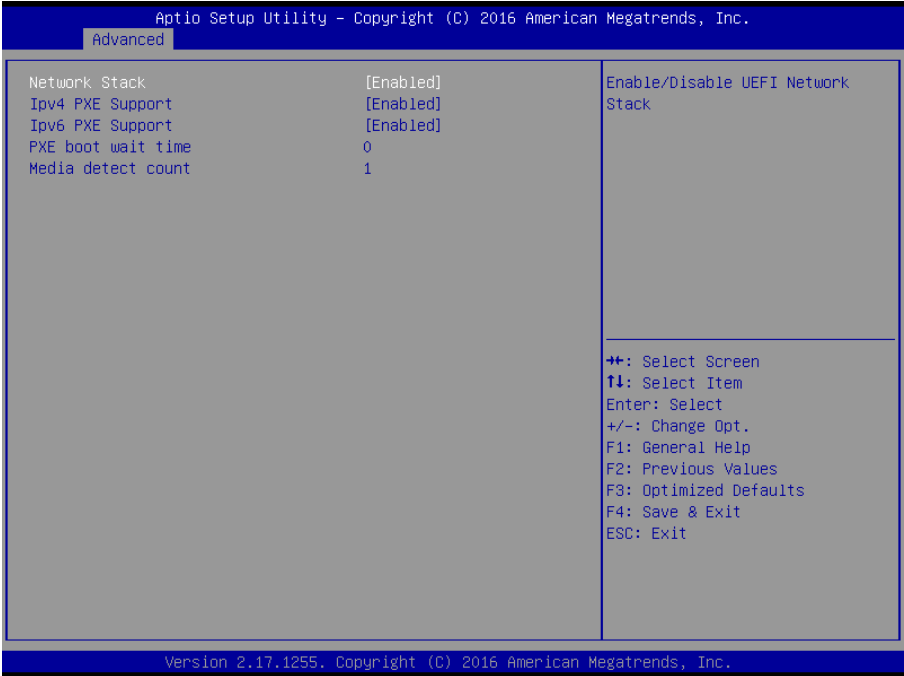
Item	Options	Description
<b>SATA Controller(s)</b>	Enabled[ <b>Default</b> ] Disabled,	Enable or disable SATA Device.
<b>SATA Mode Selection</b>	AHCI[ <b>Default</b> ], RAID	Determines how SATA controller(s) operate.
<b>Aggressive LPM Support</b>	Enabled[ <b>Default</b> ] Disabled	Enable PCH to aggressively enter link power state.
<b>Port 0/1/2/3</b>	Enabled[ <b>Default</b> ] Disabled,	Enable or Disable SATA Port.
<b>SATA Device Type</b>	Hard Disk Drive [ <b>Default</b> ] Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.



3.6.2.12 Network Stack Configuration



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



Item	Options	Description
Network Stack	Enabled <b>[Default]</b> Disabled	Enable/Disable UEFI Network Stack.
Ipv4 PXE Support	Enabled <b>[Default]</b> Disabled	Enable Ipv4 PXE Boot Support. If disabled IPV4 PXE boot option will not be created.

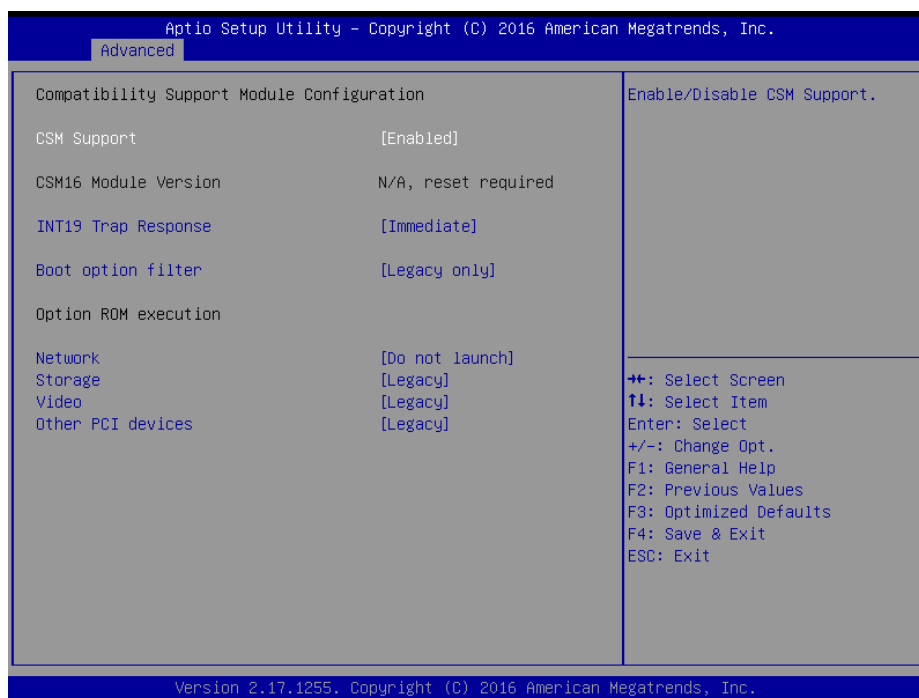
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<b>Ipv6 PXE Support</b>	Enabled[ <b>Default</b> ] Disabled	Enable Ipv6 PXE Boot Support. If disabled IPV6 PXE boot option will not be created.
<b>PXE boot wait time</b>	0	Wait time to press ESC key to abort the PXE boot.
<b>Media detect count</b>	1	Number of times presence of media will be checked.

### 3.6.2.13 CSM Configuration



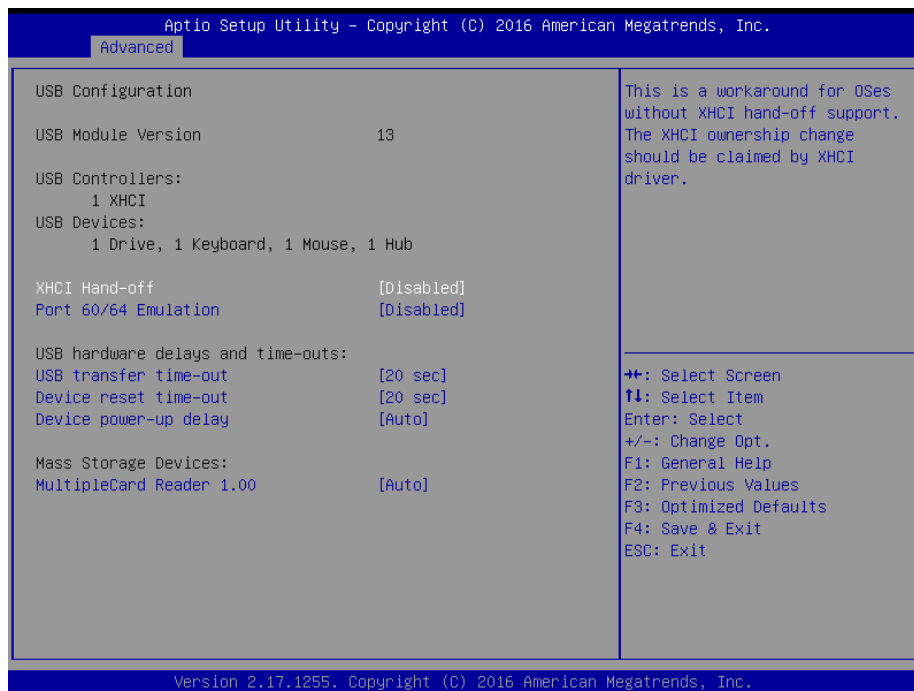
Item	Options	Description
<b>CSM Support</b>	Enabled Disabled[ <b>Default</b> ]	Enable/Disable CSM Support.



Item	Options	Description
<b>CSM Support</b>	Enabled[Default] Disabled	Enable/Disable CSM Support.
<b>INT19 Trap Response</b>	Immediate[Default] Postponed	BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE – execute the trap right away; POSTPONED – execute the trap during legacy boot.
<b>Boot Option filter</b>	UEFI and Legacy Legacy only[Default] UEFI only	This option controls Legacy/UEFI ROMs priority.
<b>Network</b>	Do not launch[Default] UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM.
<b>Storage</b>	Do not launch UEFI Legacy[Default]	Controls the execution of UEFI and Legacy Storage OpROM.
<b>Video</b>	Do not launch UEFI Legacy[Default]	Controls the execution of UEFI and Legacy Video OpROM.
<b>Other PCI devices</b>	Do not launch UEFI Legacy[Default]	Determines OpROM execution policy for devices other than Network, Storage, or Vide.

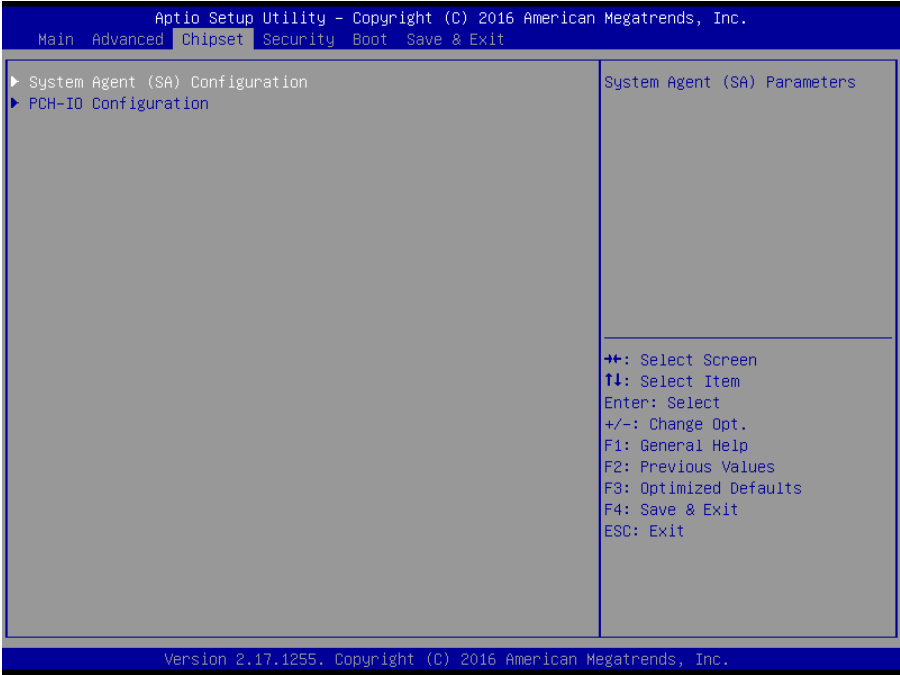
### 3.6.2.14 USB Configuration

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



Item	Options	Description
<b>XHCI Hand-off</b>	Enabled Disabled[Default]	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
<b>Port 60/64 Emulation</b>	Enabled Disabled[Default]	Enable I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
<b>USB transfer time-out</b>	1 sec 5 sec 10 sec 20 sec[Default]	The time-out value for Control, Bulk, and Interrupt transfers.
<b>Device reset time-out</b>	10 sec 20 sec[Default] 30 sec 40 sec	USB mass storage device Start Unit command time-out.
<b>Device power-up delay</b>	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.
<b>Mass Storage Devices</b>	Auto[Default] Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

3.6.3 Chipset

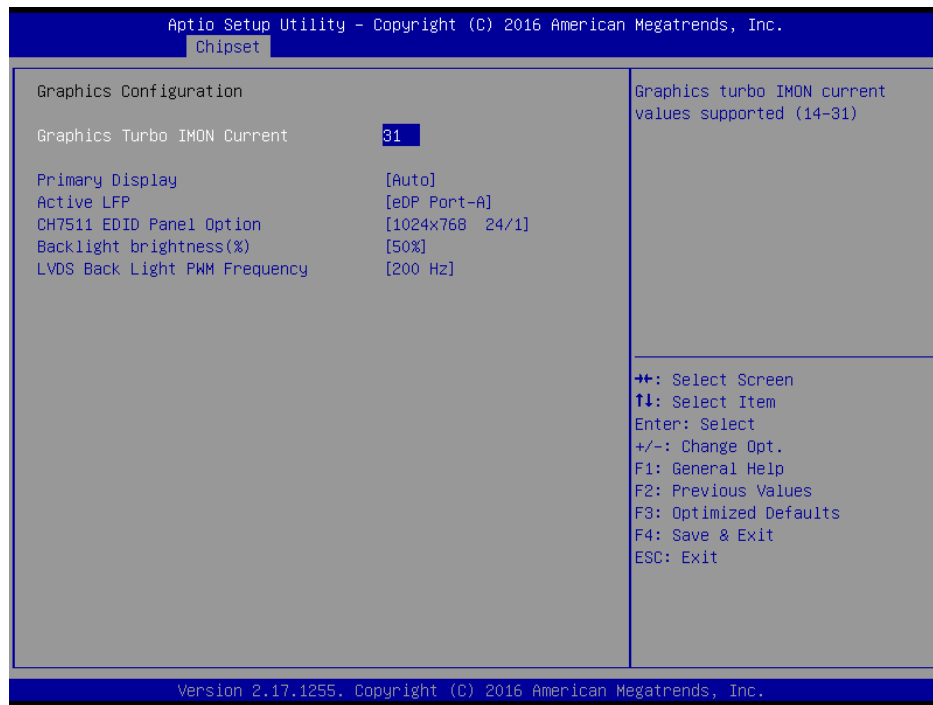


3.6.3.1 System Agent (SA) Configuration



Item	Option	Description
VT-d	Enabled[Default] Disabled	VT-d capability.
GMM Device (B0:D8:F0)	Enabled[Default] Disabled	Enable/Disable SA GMM Device.

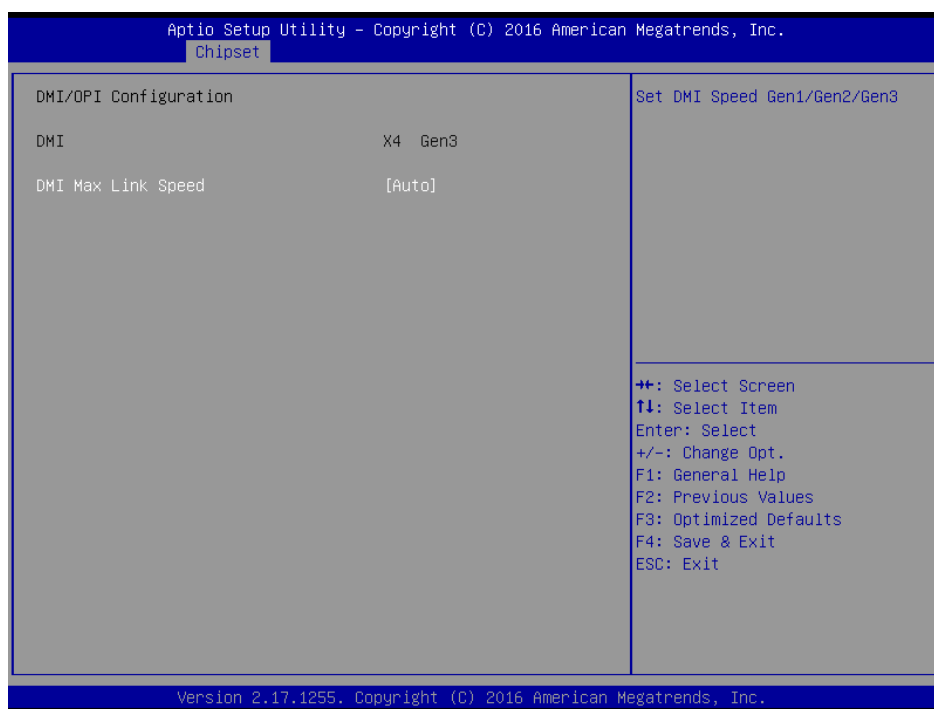
## 3.6.3.1.1 Graphics Configuration



Item	Option	Description
<b>Graphics Turbo IMON Current</b>	14-31	Graphics turbo IMON current values supported (14-31).
<b>Primary Display</b>	Auto <b>[Default]</b> IGFX PCIE	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
<b>Active LFP</b>	No LVDS eDP Port-A <b>[Default]</b>	Configuring LFP usage.
<b>CH7511 EDID Panel Option</b>	1024x768 24/1 <b>[Default]</b> 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 1680x1050 24/2	Port1-EDP to LVDS (Chrotel 7511) Panel EDID Option.
<b>Backlight brightness (%)</b>	00% 25% 50% <b>[Default]</b>	Select LVDS back light PWM duty.

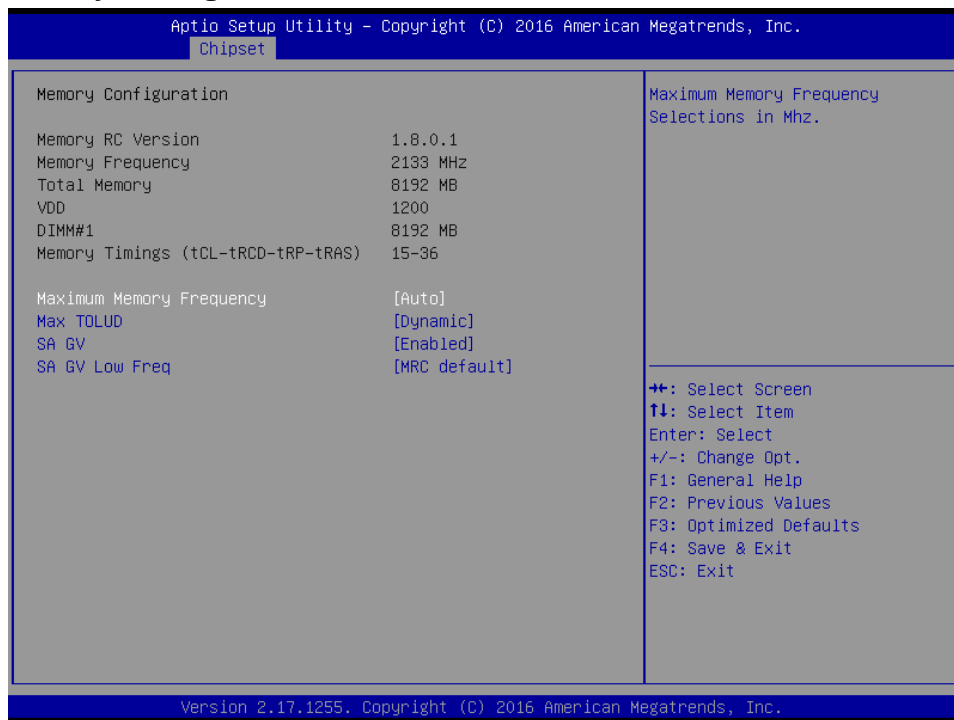
	75% 100%	
<b>LVDS Back Light PWM Frequency</b>	200 Hz[Default] 300 Hz 400 Hz 500 Hz 700 Hz 1k 2k 3k 5k 10k 20k	Select LVDS back light PWM Frequency.

### 3.6.3.1.2 DMI/OPI Configuration



Item	Option	Description
<b>DMI Max Link Speed</b>	Auto[Default] Gen1 Gen2 Gen3	Set DMI Speed Gen1/Gen2/Gen3.

## 3.6.3.1.3 Memory Configuration



Item	Option	Description
<b>Maximum Memory Frequency</b>	Auto[Default] /1067/1200/1333/1400/1600 /1800/1867/2000/2133/2200 /2400/2600/2667/2800/2933 /3000/3200	Maximum Memory Frequency Selections in Mhz.
<b>Max TOLUD</b>	Dynamic[Default] /1GB/1.25GB/1.5GB/1.75GB /2GB/2.25GB/2.5GB/2.75GB /3GB/3.25GB/3.5GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.
<b>SA GV</b>	Disabled Fixed Low Fixed High Enabled[Default]	System Agent Geyserville. Fixed Low/High: SA GV disabled, MR only runs tasks from Low or High point.
<b>SA GV Low Freq</b>	MRC default[Default] /1067/1200/1333/1400/1600 /1800/1867	System Agent Geyserville. Set frequency for low point. Default 1067 for LPDDR3/DDR3, 1333 for DDR4.

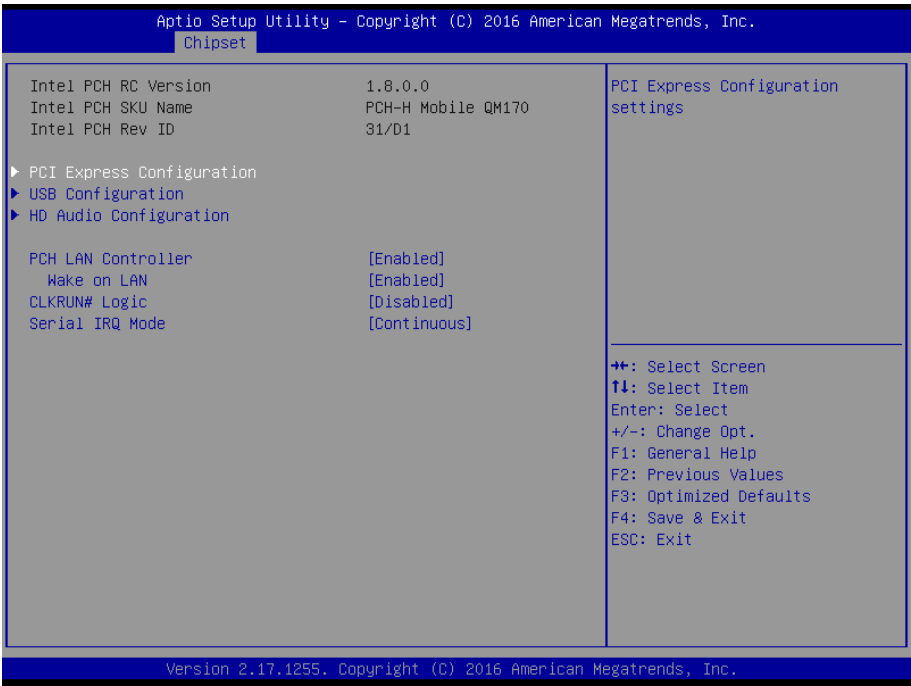


3.6.3.1.4 GT- Power Management Control



Item	Option	Description
RC6 (Render Standby)	Enabled[Default] Disabled	Check to enable render standby support.

3.6.3.2 PCH-IO Configuration



Item	Option	Description
<b>PCH LAN Controller</b>	Disabled Enabled[ <b>Default</b> ]	Enable or disable onboard NIC.
<b>Wake on LAN</b>	Disabled Enabled[ <b>Default</b> ]	Enable or disable integrated LAN to wake the system.
<b>CLKRUN# Logic</b>	Disabled[ <b>Default</b> ] Enabled	Enable the CLKRUN# logic to stop the PCI clocks.
<b>Serial IRQ Mode</b>	Quiet Continuous[ <b>Default</b> ]	Configure Serial IRQ Mode.

### 3.6.3.2.1 PCI Express Configuration



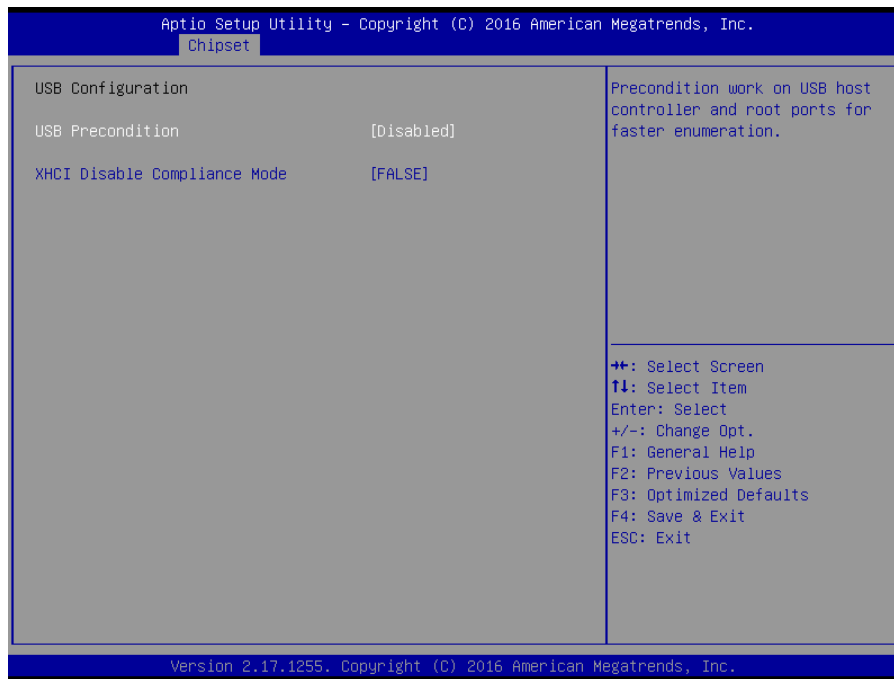
Item	Option	Description
<b>DMI Link ASPM Control</b>	Disabled Enabled[ <b>Default</b> ]	Enable/Disable the control of Active State Power Management on SA side of the DMI Link.

### 3.6.3.2.1.1 PCI Express Root Port6 (Lan-i210)



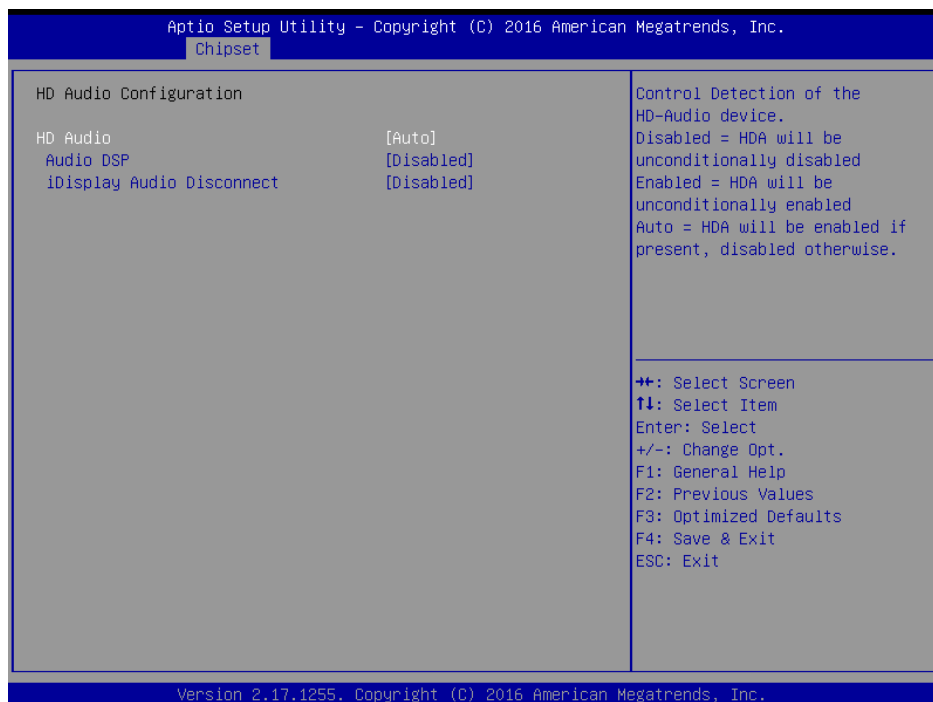
Item	Option	Description
<b>PCI Express Root Port 6</b>	Enabled[Default], Disabled	Control the PCI Express Root Port.
<b>Topology</b>	Unknown x1[Default], x4 Sata Express M2	Identify the SATA Topology if it is Default or ISATA or Flex or DirectConnect or M2.
<b>ASPM Support</b>	Disabled L0s L1 L0sL1 Auto[Default],	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
<b>L1 Substates</b>	Disabled L1.1 L1.2 L1.1 & L1.2[Default],	PCI Express L1 Substates settings.
<b>PCIe Speed</b>	Auto[Default] Gen1 Gen2 Gen3	Select PCI Express port speed.
<b>Detect Non-Compliance Device</b>	Disabled[Default], Enabled	Detect Non-Compliance PCI Express Device. If enable, it will take more time at POST time.

## 3.6.3.2.2 USB Configuration



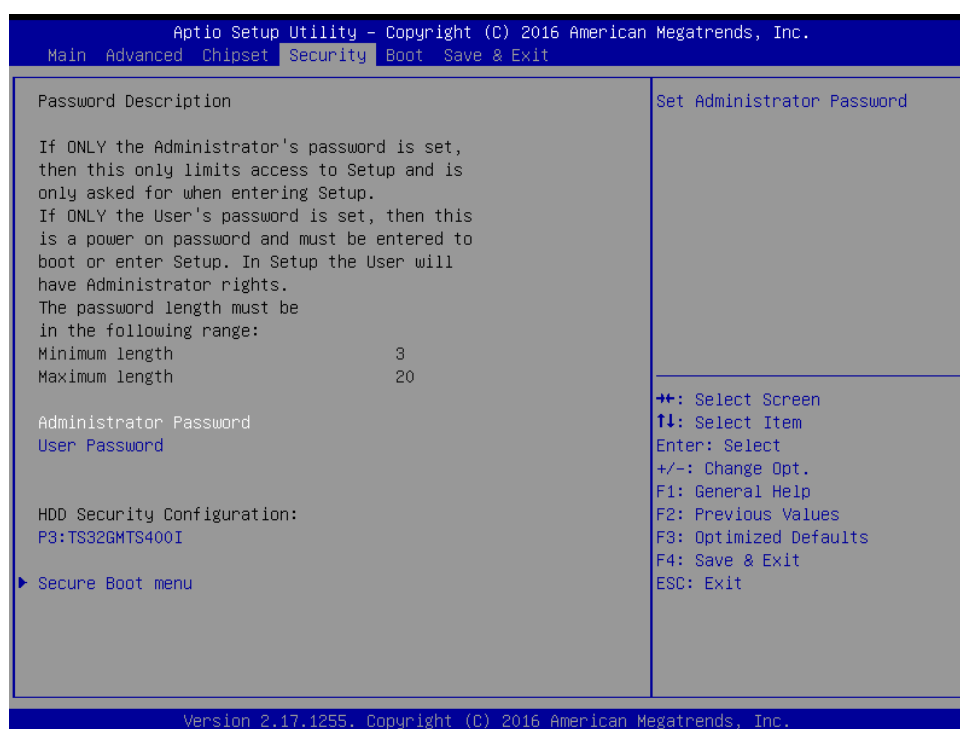
Item	Option	Description
<b>USB Precondition</b>	Enabled Disabled <b>[Default]</b> ,	Precondition work on USB host controller and root ports for faster enumeration.
<b>XHCI Disable Compliance Mode</b>	FALSE <b>[Default]</b> , TRUE	Option to disable Compliance Mode. Default is FALSE to not disable Compliance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

## 3.6.3.2.3 HD Audio Configuration



Item	Option	Description
HD Audio	Disabled Enabled Auto[Default],	Control Detection of the HD-Audio device. Disable = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled Auto = HDA will be enabled if present, disabled otherwise.
Audio DSP	Disabled[Default] Enabled	Enable/Disable Audio DSP.
iDisplay Audio Disconnect	Disabled[Default] Enabled	Disconnects SDI2 signal to hide/disable iDisplay Audio Code.

### 3.6.4 Security



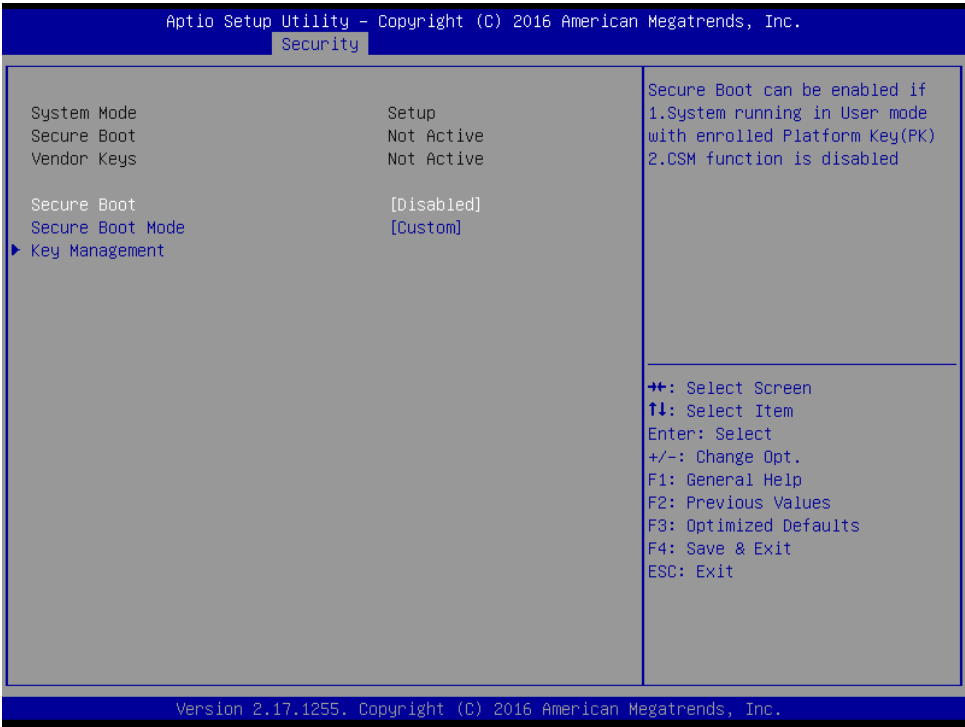
- **Administrator Password**

Set setup Administrator Password

- **User Password**

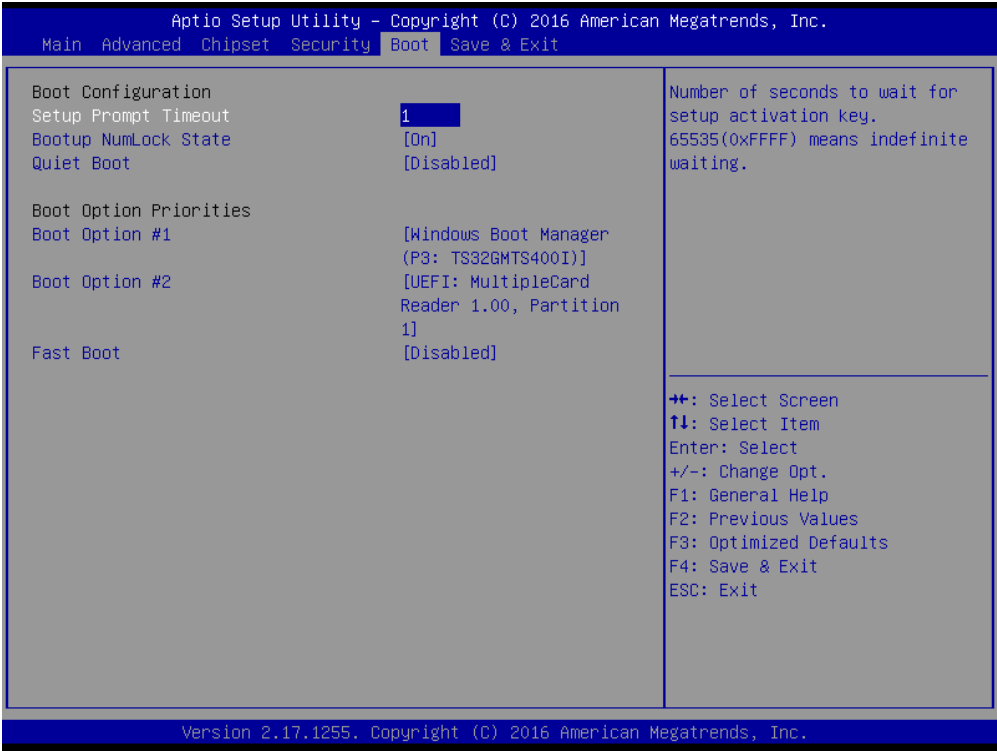
Set User Password

3.6.4.1 Secure Boot menu



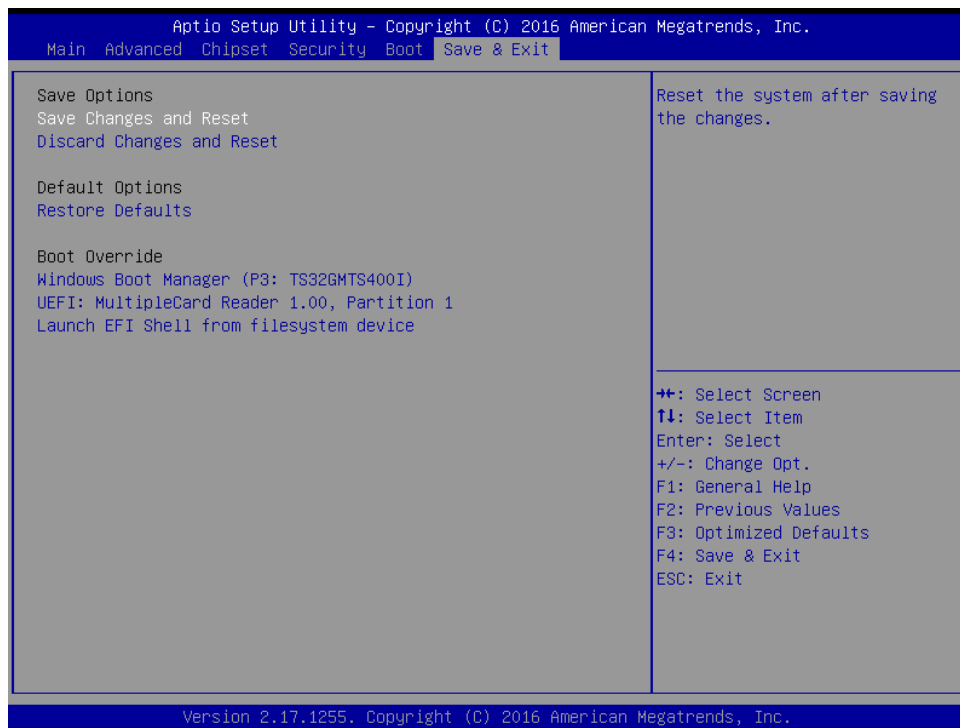
Item	Option	Description
Secure Boot	Disabled[Default] Enabled	Secure Boot can be enabled if 1.System running in User mode with enrolled Platform Key(PK) 2.CSM function is disabled.
Secure Boot Mode	Standard Custom[Default]	Secure Boot mode selector. 'Custom' Mode enables users to change Image Execution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

3.6.5 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

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\\ECM-SKLH`.



**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.**



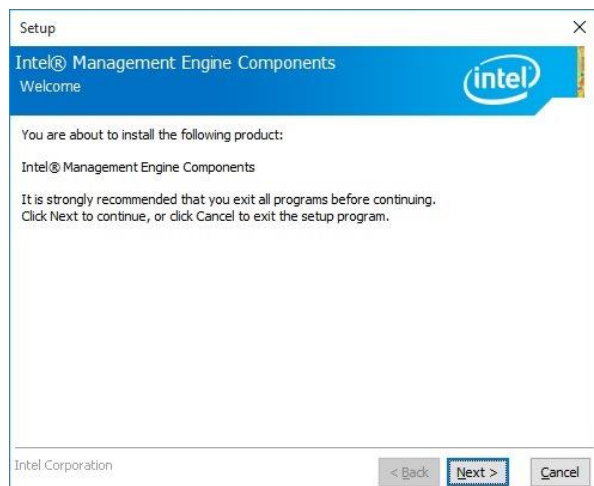
**Step 4. Setup completed.**

## 4.2 Install ME Driver

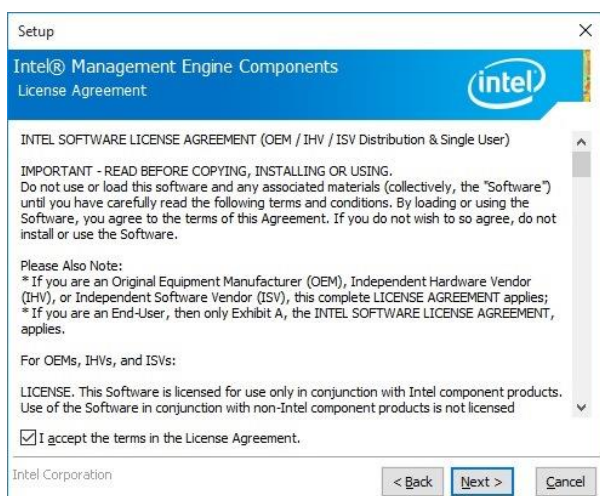
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to `\\Utility\ECM-SKLH_ME`.



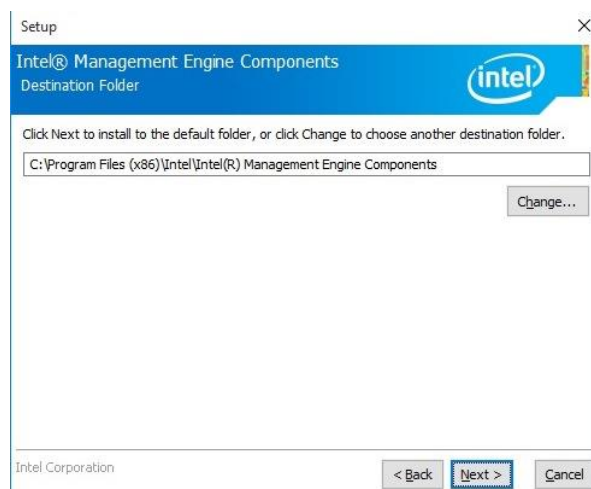
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



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



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



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



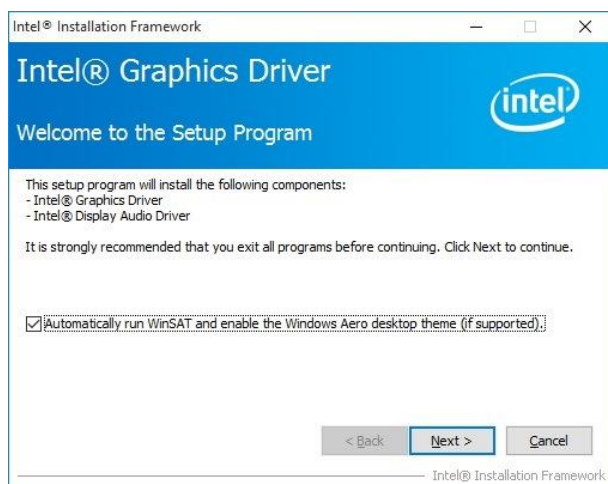
**Step 4.** Click **Finish** to complete setup.

## 4.3 Install VGA Driver

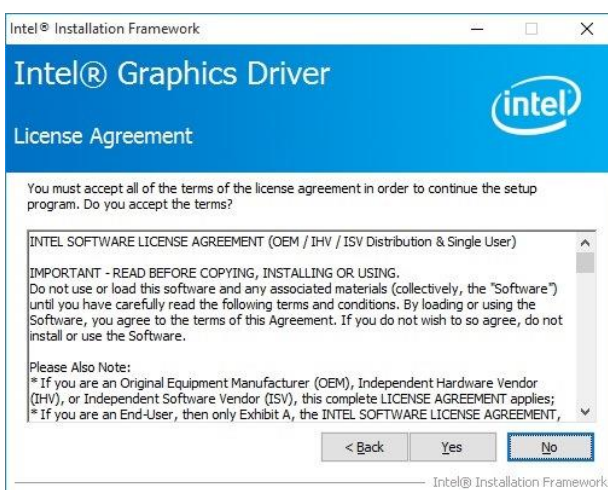
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **VGA\ECM-SKLH**.



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

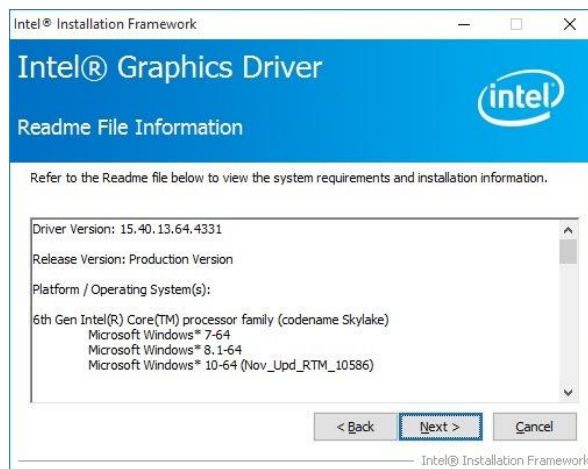


**Step 1.** Click **Next** to continue installation.

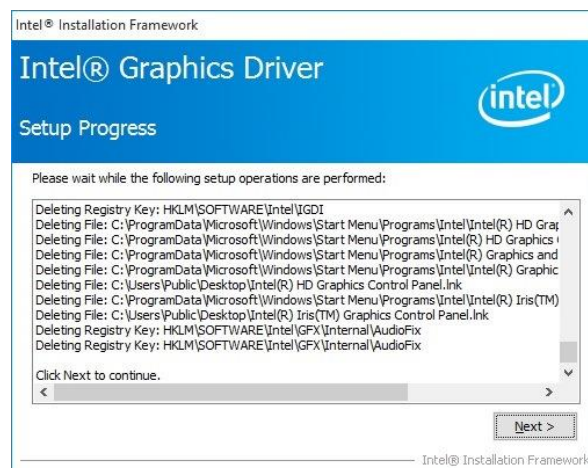


**Step 2.**

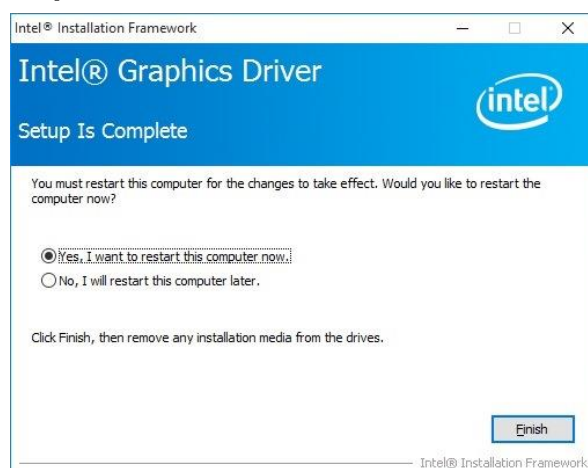
Click **Yes** to accept license agreement.



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



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



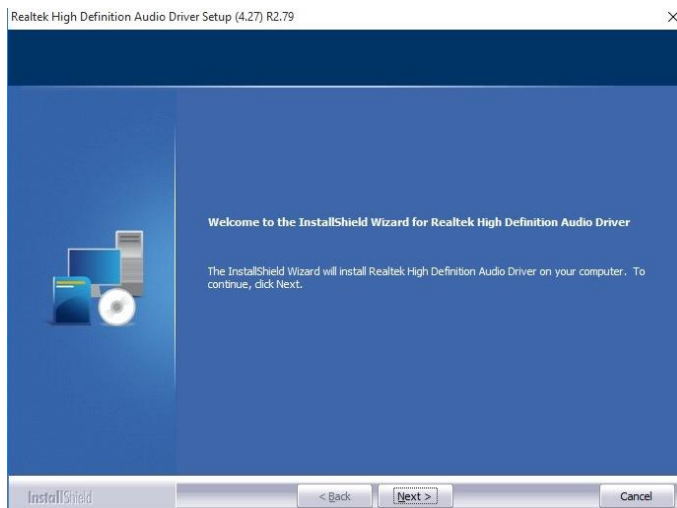
**Step 5.** Click **Finish** to complete setup.

## 4.4 Install Audio Driver (For Realtek ALC233)

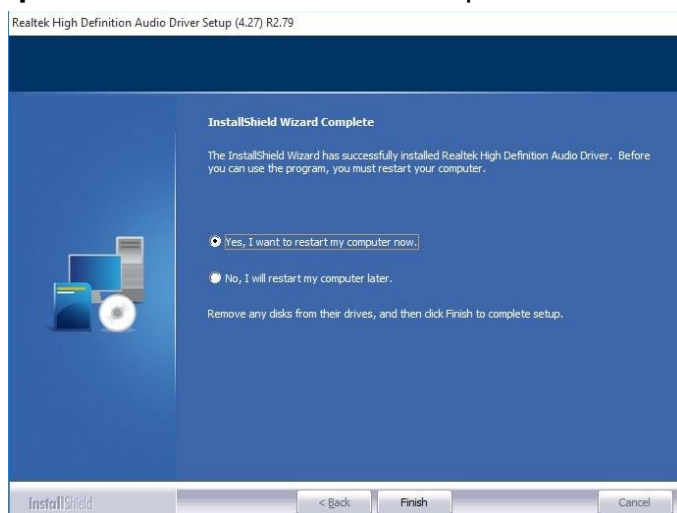
Insert the Supporting CD-ROM to CD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to **\\Driver\_Audio\\Realtek\\ALC233\\ECM-SKLH\_Audio**.



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



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



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

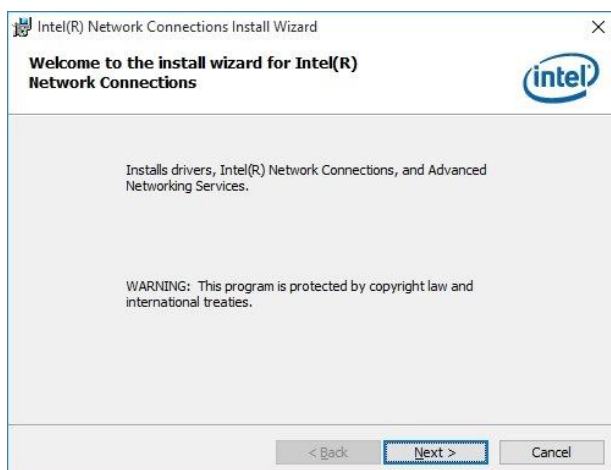


## 4.5 Install Ethernet Driver

Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to  
**\\Driver\_Gigabit\\Intel\\I210AT\_I219LM\\ECM-SKLH\_LAN.**



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



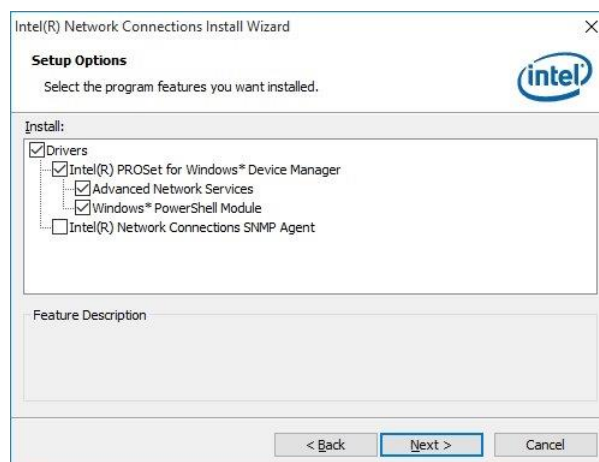
**Step 1. Click Next.**



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



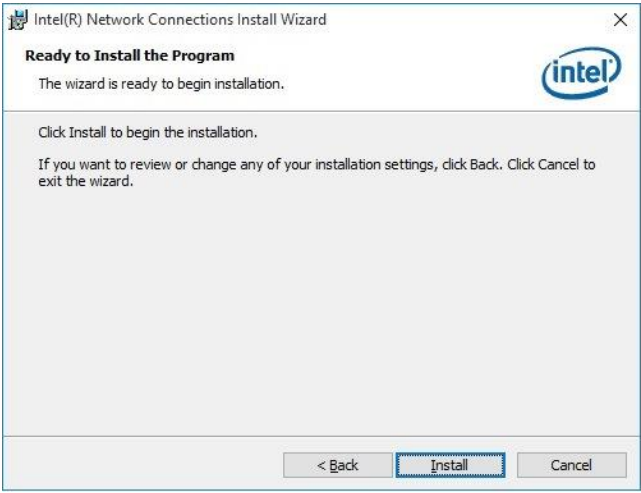
**Step 3. Click Next.**



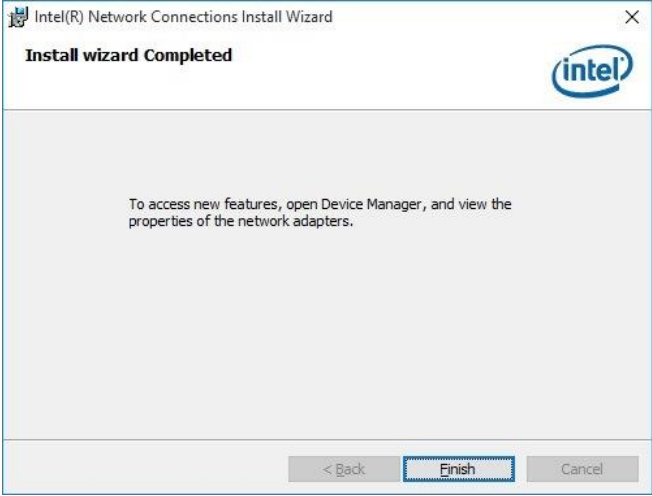
**Step 4. Click Next.**



**Step 5. Click Yes.**



Step 6. Click **Install**.



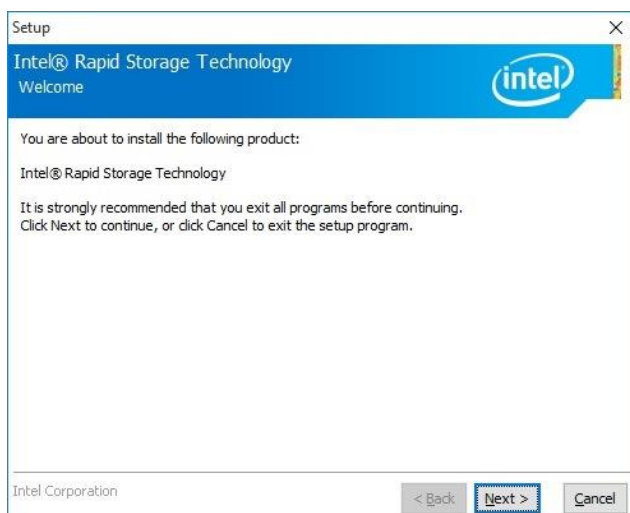
Step 7. Click **Finish** to complete the setup.

## 4.6 Install RST 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\ECM-SKLH\_RST.



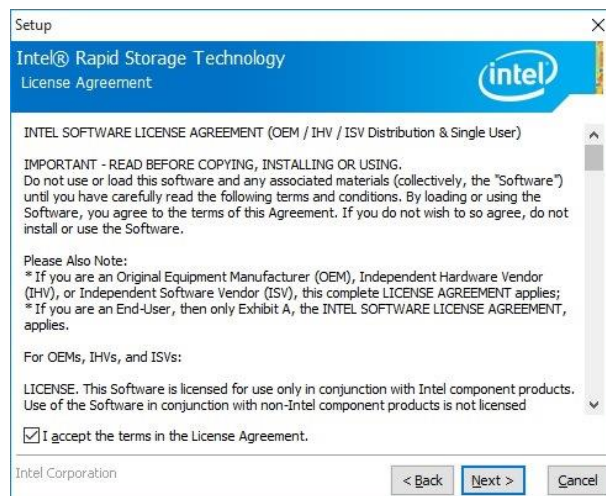
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system.



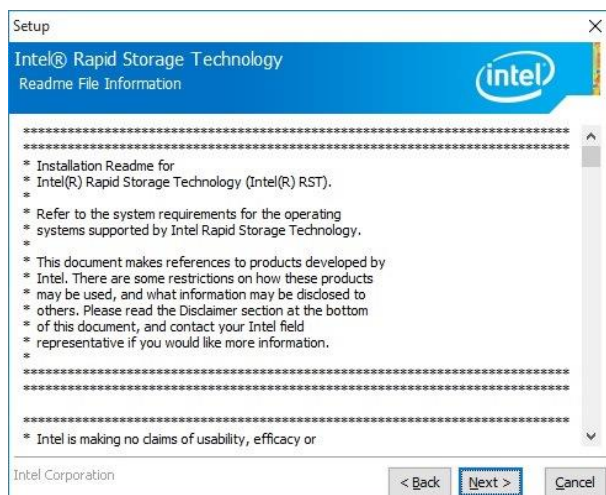
**Step 1. Click Next** to continue installation.



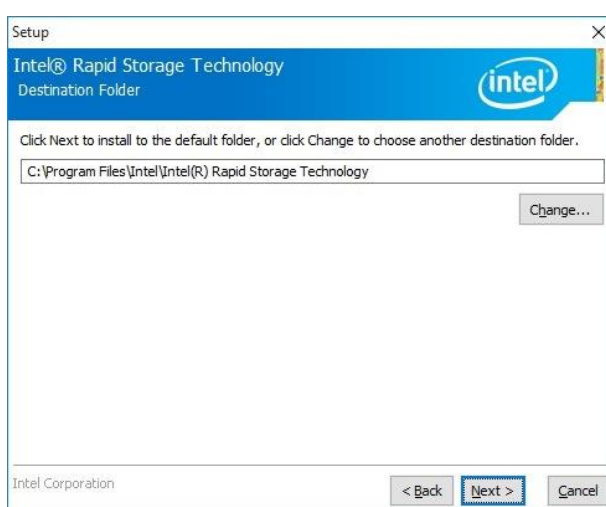
**Step 2. Click Next.**



**Step 3. Click Next.**



**Step 4. Click Next.**



**Step 5. Click Next.**





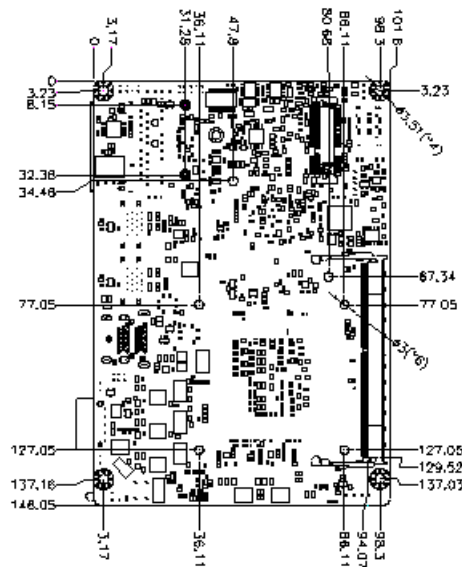
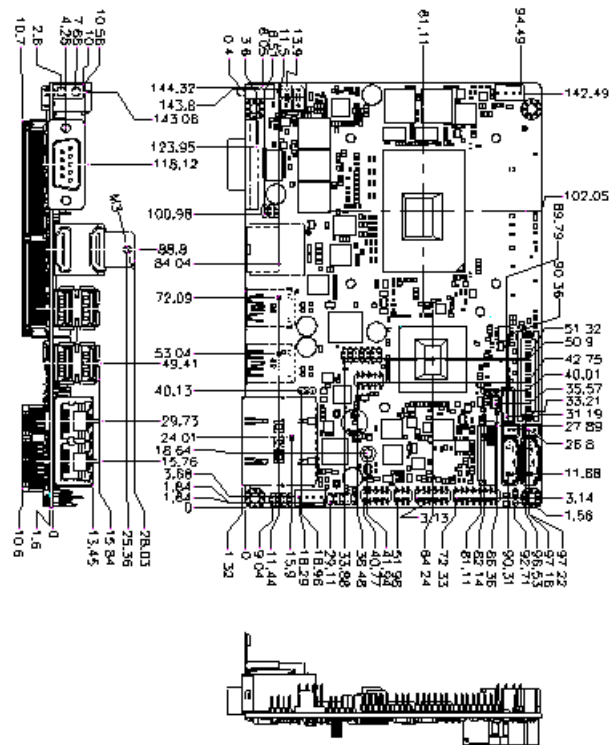
**Step 6.** Click **Next**.



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

# 5. Mechanical Drawing





Unit: mm



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