# EMX-H110KP

**Intel® Core™ Processors with Intel® H110 Mini ITX Motherboard**

# User's Manual

**2nd Ed –15 January 2019**

Part No. E2047M11K01R

## FCC Statement

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

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

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

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

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

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

## Notice

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

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

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

# Content

# 1. Getting Started

## 1.1 Safety Precautions

**Warning!**

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

**Caution!**

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

## 1.2 Packing List

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

- 1 x EMX-H110KP motherboard
- 2 x SATA cable
- 1 x I/O Shield

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

## 1.3 Document Amendment History

| Revision | Date | By | Comment |
|---|---|---|---|
| 1st | August 2017 | Avalue | Initial Release |
| 2nd | January 2019 | Avalue | Update Setting Jumpers & Connectors |

## 1.4 Manual Objectives

This manual describes in details Avalue Technology EMX-H110KP 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 EMX-H110KP 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® LGA1151 Socket Supports 6/7th Generation Core™ i7/ i5/ i3 Processors (Max. TDP at 95W) |
| **BIOS** | AMI uEFI BIOS, 128Mbit SPI Flash ROM |
| **System Chipset** | Intel® H110 Express Chipset |
| **I/O Chip** | Nuvoton® NCT6106D |
| **System Memory** | Two 260-pin DDR4 2400MHz SO-DIMM socket, supports up to 32GB Max |
| **Watchdog Timer** | H/W Reset, 5~255 seconds/5~255 minutes |
| **H/W Status Monitor** | CPU temperature monitoring<br>Voltages monitoring<br>CPU fan speed control |
| **Expansion** | 1 x PCI-e x 16<br>1 x Full Size Mini-PCI-e with mSATA Support (SATA III)<br>1 x Half Size Mini PCI-e |
| **S3/S4** | Yes (S0/S3/S4/S5) |
| **Display** | |
| **Chipset** | Intel® 6th Generation CPU integrated |
| **Resolution** | VGA: 2048 x 1536@50 Hz<br>HDMI: 4096 x 2160@24 Hz, 2560 x 1600@60 Hz<br>DP: 4096 x 2304@60Hz |
| **Multiple Display** | Dual Display |
| **Audio** | |
| **Audio Codec** | Realtek ALC892 HD Audio Decoding Controller |
| **Ethernet** | |
| **LAN Chip** | 1 x Intel® I219LM Gigabit Ethernet PHY<br>1 x Intel® I211AT PCI-e Gigabit Ethernet |
| **Internal I/O Connectors** | |
| **Internal I/O Connector** | Storage:<br>- 1 x SATA III or 1 x full size Mini PCI-e support mSATA by BIOS selection<br>- 3 SATAIII<br>1 x Half Size Mini PCI-e<br>COM 1 Pin9 power selection:<br>- 1 x 2 x 3 pin, pitch 2.00mm connector for COM 1 support RS232 with Pin 9, +5V/+12V/RI<br>COM 2: |

| | |
|---|---|
| | - 1 x 2 x 3 pin, pitch 2.00mm connector for COM 2 support RS232 with Pin 9, +5V/+12V/RI<br>- 1 x 2 x 3 pin, pitch 2.00mm connector for COM 2 support RS422/485 connector, Pin 5 with +5V<br>COM 2: 1 x 2 x 5 pin, pitch 2.00mm connector for COM2 support RS-232 connector<br>COM 3 ~ 6.<br>- 4 x 2 x 5 pin, pitch 2.00mm connector for COM 3 ~ 6: support RS-232 connector<br>1 x 2 x 5 pin, pitch 2.54mm connector for 2 USB 2.0<br>1 x 2 x 20 pin, pitch 1.25mm connector for LVDS<br>1 x 1 x 5 pin, pitch 2.00mm Wafer connector for LCD inverter backlight connector (5V/12V)<br>1 x 1 x 4 pin, pitch 2.54mm CPU fan connector with smart fan function supported<br>1 x 1 x 4 pin, pitch 2.54mm System fan connector with smart fan function supported<br>1 x 2 x 5 pin, pitch 2.54mm connector for front panel<br>2 x 1 x 2 pin, pitch 2.00mm connector for LAN1 & LAN2 Activity Indicator LED<br>1 x 2 x 5 pin, pitch 2.54mm connector for front Audio<br>1 x 4 pin, pitch wafer 2.00mm connector for 6W x 2 Speaker<br>1 x 1 x 3 pin, pitch 2.54mm connector for COMS Clear<br>1 x 2 pin Pitch 1.25mm Vertical type battery connector<br>1 x 2 x 6 pin, pitch 2.00mm connector for 8 bits GPIO<br>1 x 2 x 3 pin, pitch 2.00mm connector for SGPIO (Only support C236 PCH platform)<br>1 x 2 x 4 pin, pitch 2.00mm connector for BIOS SPI<br>1 x 2 x 5 pin, pitch 2.0mm connector for LPC<br>Onboard buzzer<br>1 x 1 x 3 pin pitch 2.00mm connector for AT/ATX jumper<br>1 x 2 x 10 pin ATX power connector<br>1 x 2 x 2 pin ATX 12V power connector |
| **Rear I/O Connectors** | |
| **Rear Side External I/O Connector** | 2 x RJ-45 with Dual deck USB 3.0 connector<br>1 x VGA<br>1 x DP<br>1 x HDMI<br>COM1 support RS-232 DB9 connector, Pin 9 with / +5V/+12V/RI Supported<br>1 x Line-out,1 x Mic-In,1 x Line-in<br>1 x PS/2 Keyboard or PS/2 Mouse with Dual deck USB 2.0 |
| **Mechanical & Environmental** | |
| **Power Requirement** | +12V / +5V / 5VSB /+3.3V/ -12V |

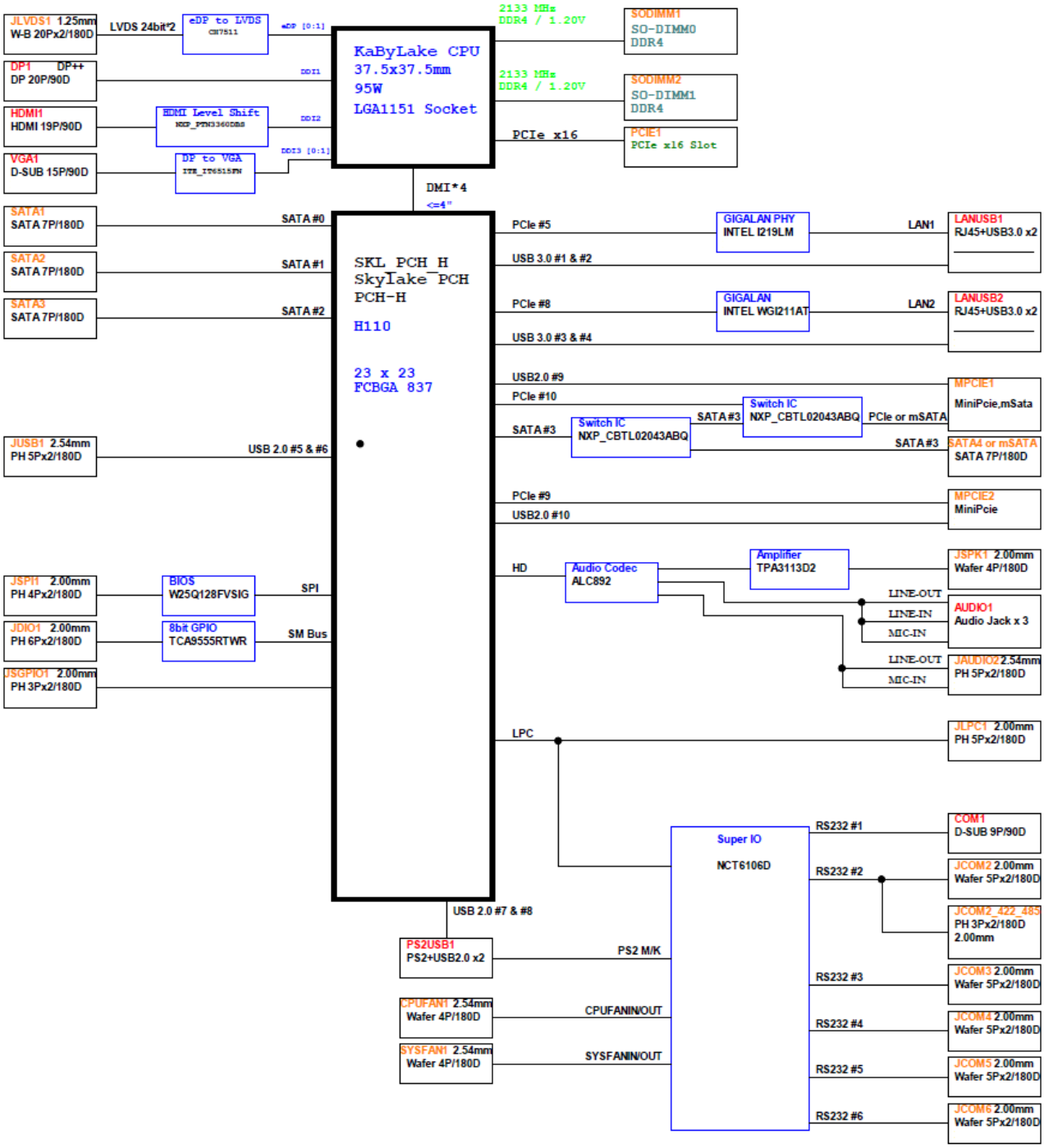
| | |
|---|---|
| **ACPI** | Single power ATX Support S0, S3, S4, S5 |
| **Power Type** | AT / ATX mode Switchable Through Jumper |
| **Operating Temp.** | 0 ~ 60°C (32~140°F) |
| **Storage Temp.** | -40 ~ 75°C |
| **Operating Humidity** | 0% ~ 90% relative humidity, non-condensing |
| **Size (L x W)** | 6.7" x 6.7" (170mm x 170mm) |
| **Weight** | 0.40 kg |

**Note:**

1. The Windows 7 & Windows 8 must be Setup USB 3.0 driver.
2. Specifications are subject to change without notice.

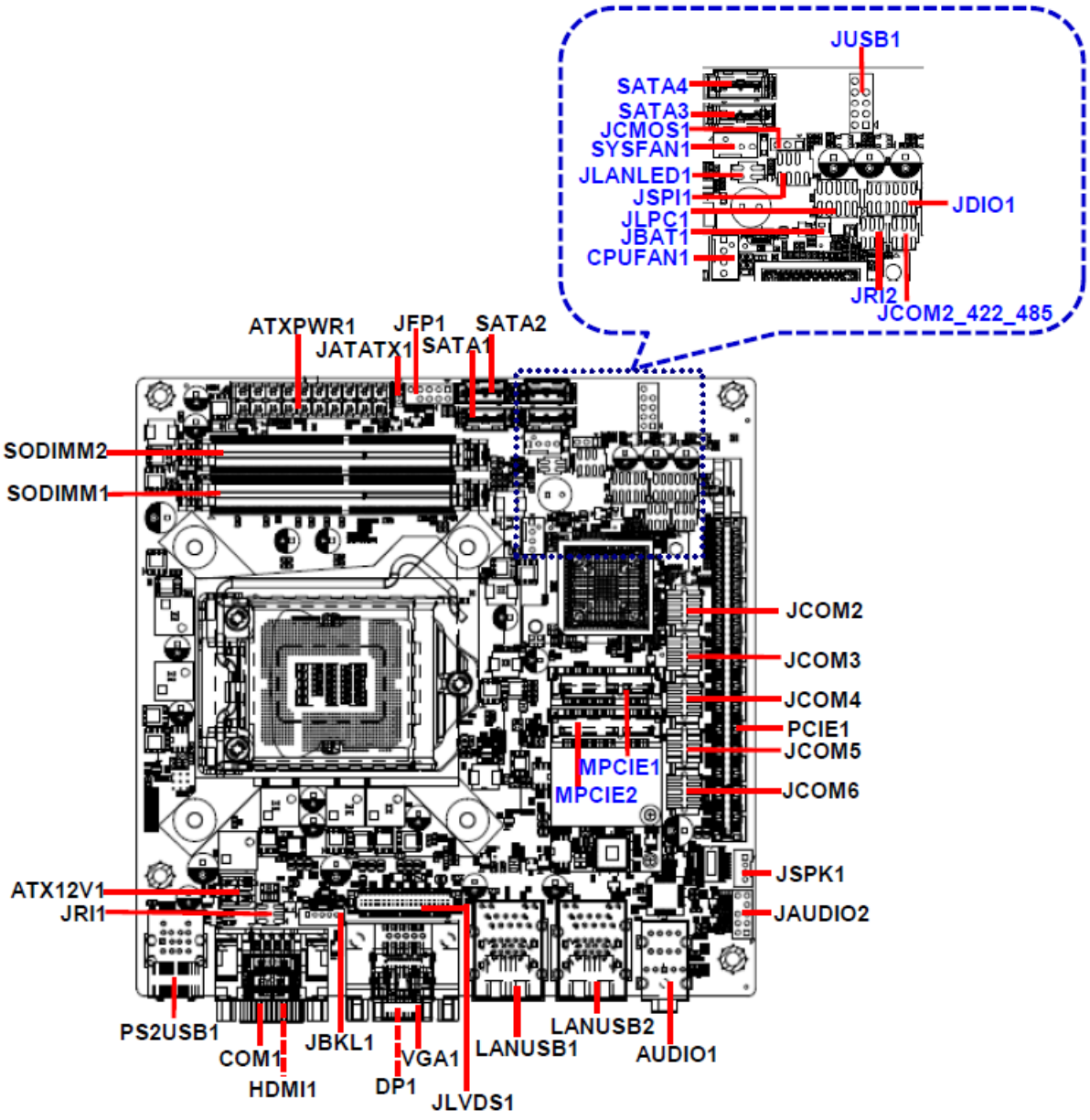
## 1.6 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of EMX-H110KP.



# 2. Hardware Configuration

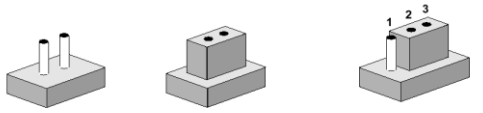
## 2.1 Product Overview



## 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.




Open Closed Closed 2-3

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


Open Closed Closed 2-3

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

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

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

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

### Jumpers

| Label | Function | Note |
|---|---|---|
| **JRI1/2** | Serial port 1/2 pin9 signal select | 3 x 2 header, pitch 2.00mm |
| **JATATX1** | AT/ATX Power Mode Select | 3 x 1 header, pitch 2.00mm |
| **JCMOS1** | Clear CMOS | 3 x 1 header, pitch 2.54mm |

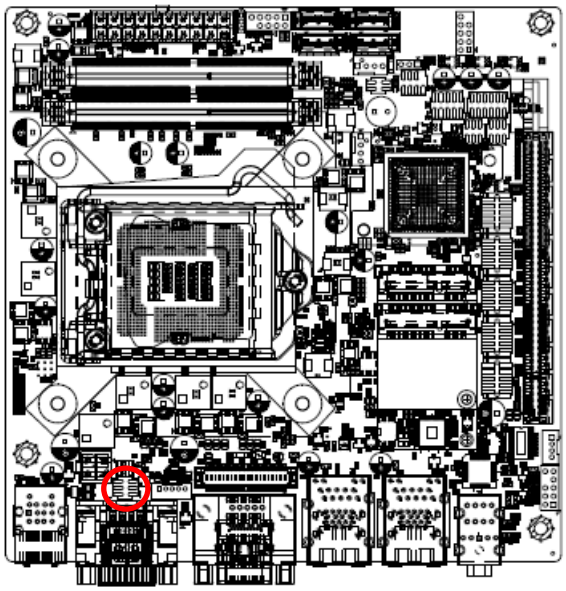
### Connectors

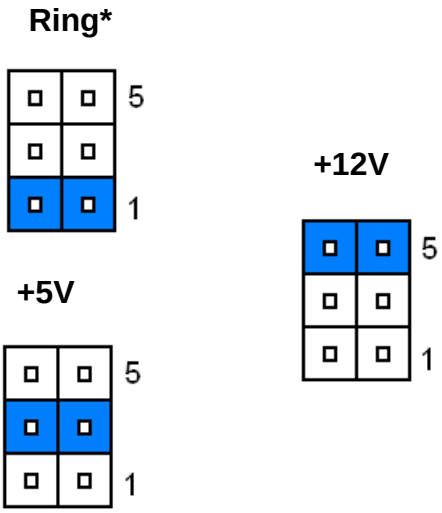
| Label | Function | Note |
|---|---|---|
| **CPUFAN1** | CPU fan connector | 4 x 1 wafer, pitch 2.54mm |
| **SYSFAN1** | System fan connector | 4 x 1 wafer, pitch 2.54mm |
| **JFP1** | Front panel setting connector | 5 x 2 header, pitch 2.54 mm |
| **SODIMM1/2** | 260-pin DDR4 DIMM socket | |
| **AUDIO1** | Line out, Mic in, Line out | |
| **JAUDIO2** | Front Audio connector | 5 x 2 header, pitch 2.54 mm |

| | | |
|---|---|---|
| **JBKL1** | LCD Inverter connector | 5 x 1 wafer, pitch 2.00mm |
| **JSPI1** | SPI connector | 4 x 2 header, pitch 2.00mm |
| **COM1** | Serial Port 1 connector | D-sub 9 pin, male |
| **JCOM2/3/4/5/6** | Serial Port 2/3/4/5/6 connector | 5 x 2 wafer, pitch 2.00mm |
| **JCOM2_422_485** | COM2 RS485/422 connector | 3 x 2 header, pitch 2.00 mm |
| **JDIO1** | General purpose I/O connector | 6 x 2 header, pitch 2.00mm |
| **JSPK1** | Amplifier connector | 4 x 1 wafer, pitch 2.00 mm |
| **JLVDS1** | LVDS Connector | DIN 40-pin wafer, pitch 1.25mm |
| **PS2USB1** | PS/2 keyboard or mouse connector<br>2 x USB 2.0 connector | |
| **LANUSB1/2** | 2 x RJ-45 with Dual deck USB 3.0 connector | |
| **JUSB1** | USB 2.0 connector 1 | 5 x 2 header, pitch 2.54mm |
| **JLPC1** | LPC connector | 5 x 2 header, pitch 2.00mm |
| **PCIE1** | PCI-e x 16 connector | |
| **JLANLED1** | LAN1& LAN 2 active LED connector | 2 x 2 header, pitch 2.00 mm |
| **JBAT1** | Battery connector | 2 x 1 wafer, pitch 1.25mm |
| **MPCIE1/2** | Full size Mini-PCI-e connector 1<br>Half size Mini-PCI-e connector 2 | |
| **ATXPWR1** | ATX Power connector | 10 x 2 wafer, pitch 4.20mm |
| **ATX12V1** | ATX 12V power connector | 2 x 2 wafer, pitch 4.20mm |
| **SATA1~4** | Serial ATA III connector 1~4 | |
| **HDMI1** | HDMI connector | |
| **DP1** | DP connector | |
| **VGA1** | VGA connector | |

## 2.3 Setting Jumpers & Connectors

### 2.3.1 Serial port 1 pin9 signal select (JRI1)



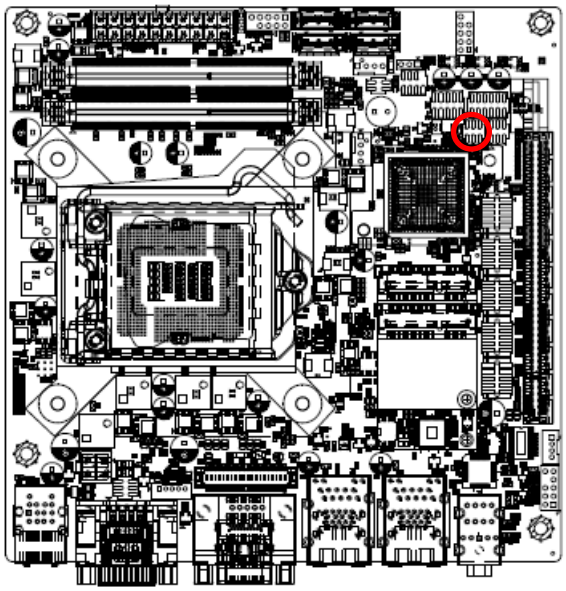


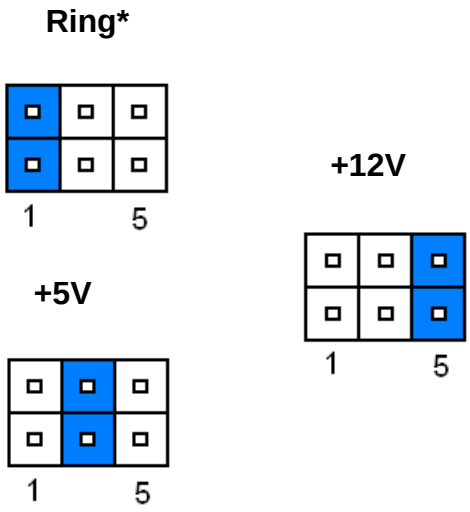

*** Default**

**Note:**

Max Current 1A.

### 2.3.2 Serial port 2 pin9 signal select (JRI2)



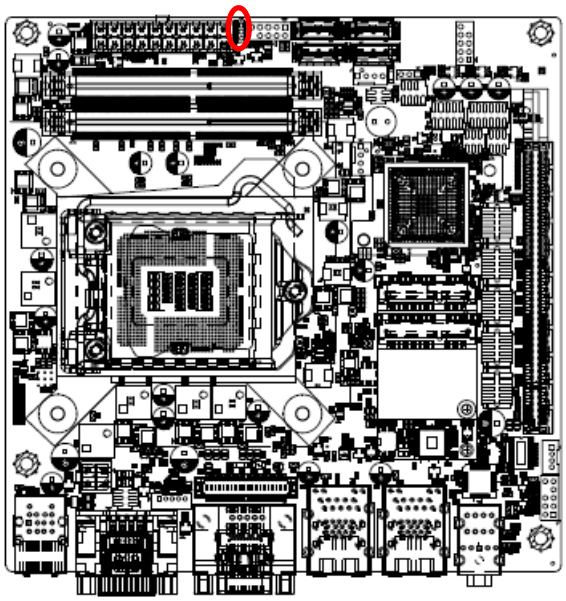



*** Default**

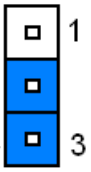
**Note:**

Max Current 1A.

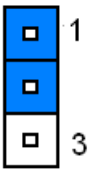
### 2.3.3 AT/ATX Power Mode Select (JATATX1)



**ATX***

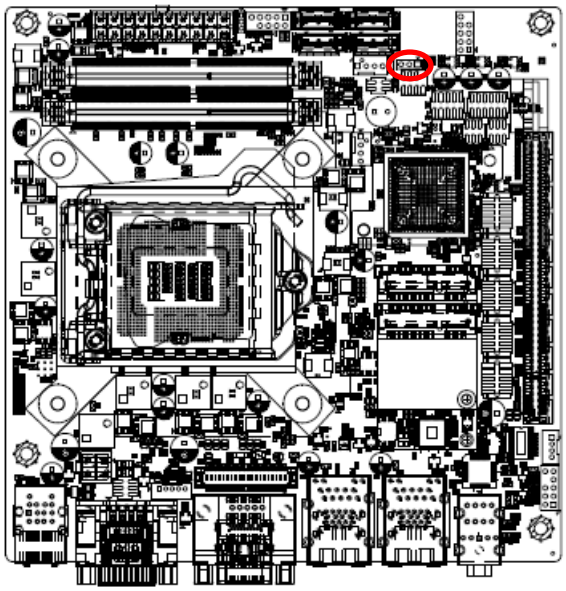



**AT**

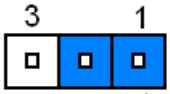



*** Default**

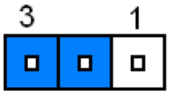
### 2.3.4 Clear CMOS (JCMOS1)



**Protect***

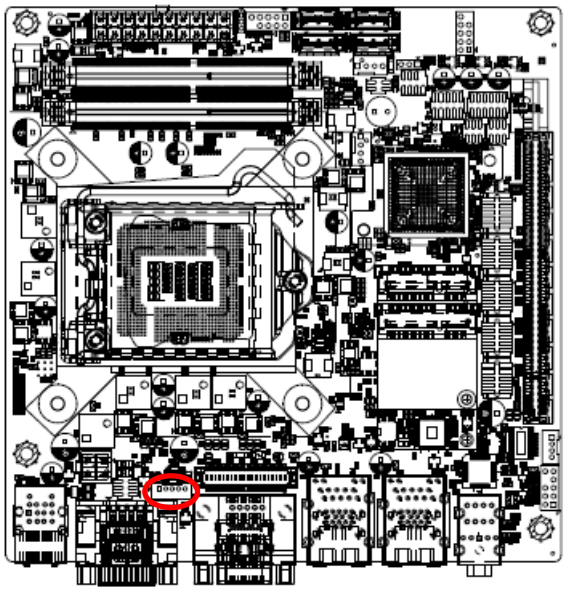


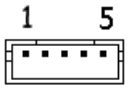

**Clear CMOS**




*** Default**

### 2.3.5 LCD Inverter connector (JBKL1)



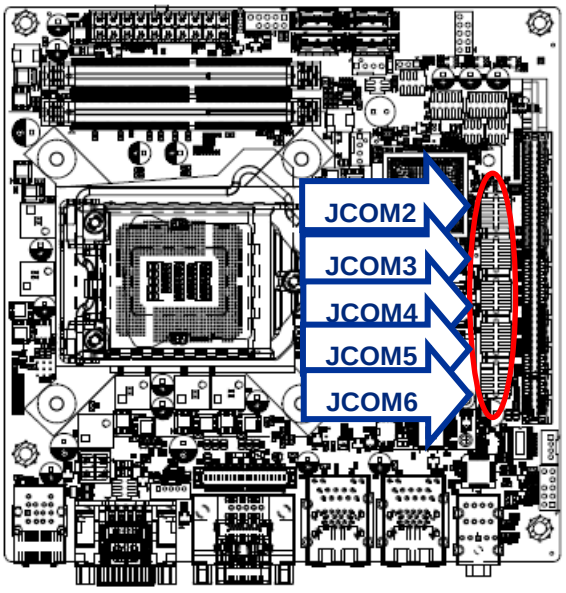


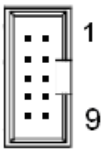

| PIN | Signal | Max current |
|---|---|---|
| 1 | +12V | 2A |
| 2 | GND | |
| 3 | BKLEN | |
| 4 | VBRIGHT | |
| 5 | +5V | 2A |

**Note:**

Mapping connector PHR5.

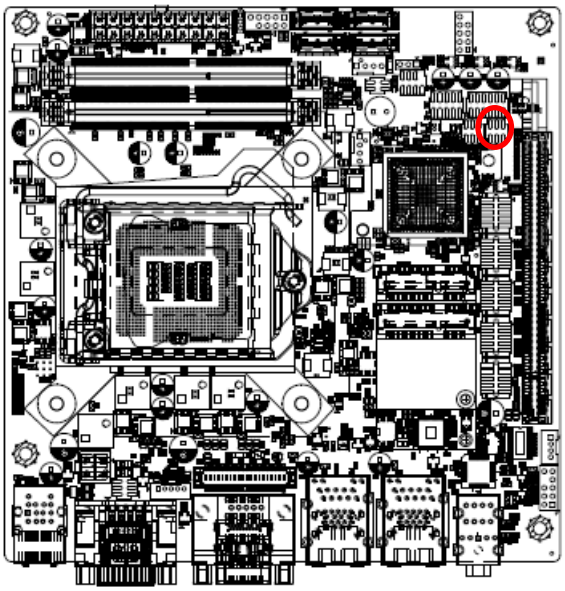
### 2.3.6 Serial port 2/3/4/5/6 connector (JCOM2/3/4/5/6)

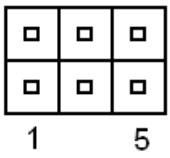



| Signal | PIN | PIN | Signal |
|---|---|---|---|
| NRXD | 2 | 1 | NDCD# |
| NDTR# | 4 | 3 | NTXD |
| NDSR# | 6 | 5 | GND |
| NCTS# | 8 | 7 | NRTS# |
| NC | 10 | 9 | NRI# |

### 2.3.7 COM2 RS485/422 connector (JCOM2_422_485)






**RS-422**

| Signal | PIN | PIN | Signal |
|---|---|---|---|
| 422TX- | 1 | 2 | 422RX- |
| 422TX+ | 3 | 4 | 422RX+ |
| +5V | 5 | 6 | GND |

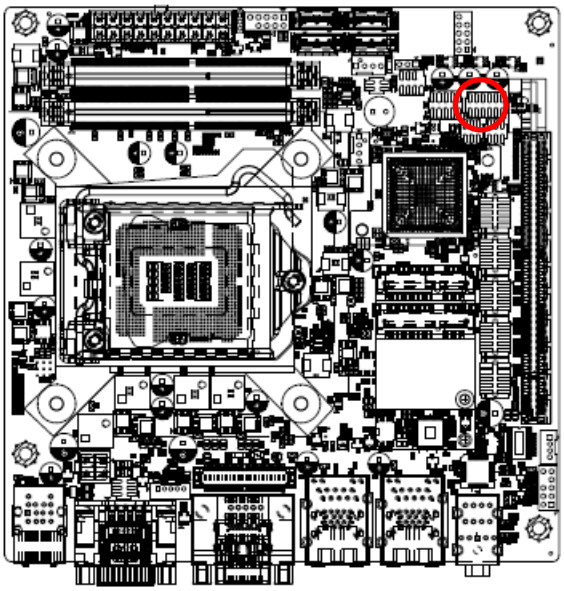
**RS-485**

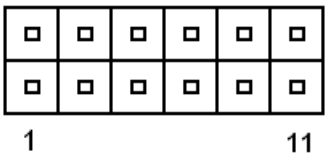
| Signal | PIN | PIN | Signal |
|---|---|---|---|
| DATA- | 1 | 2 | NC |
| DATA+ | 3 | 4 | NC |
| +5V | 5 | 6 | GND |

**Note:**

Max Current 1A.

### 2.3.8 General purpose I/O connector (JDIO1)



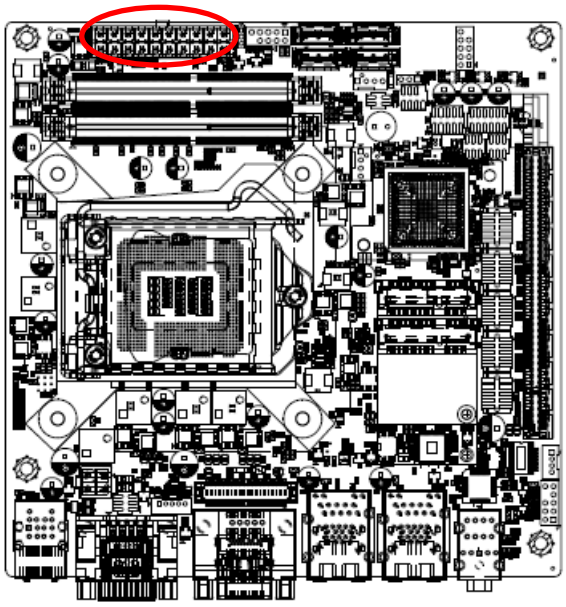


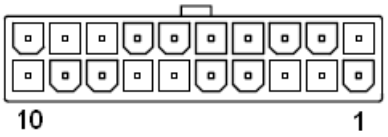

| Signal | PIN | PIN | Signal |
|---|---|---|---|
| DI0 | 1 | 2 | DO0 |
| DI1 | 3 | 4 | DO1 |
| DI2 | 5 | 6 | DO2 |
| DI3 | 7 | 8 | DO3 |
| SMB_CLK_9555 | 9 | 10 | SMB_DATA_9555 |
| GND | 11 | 12 | +5V |

**Note:**

Max Current 1A.

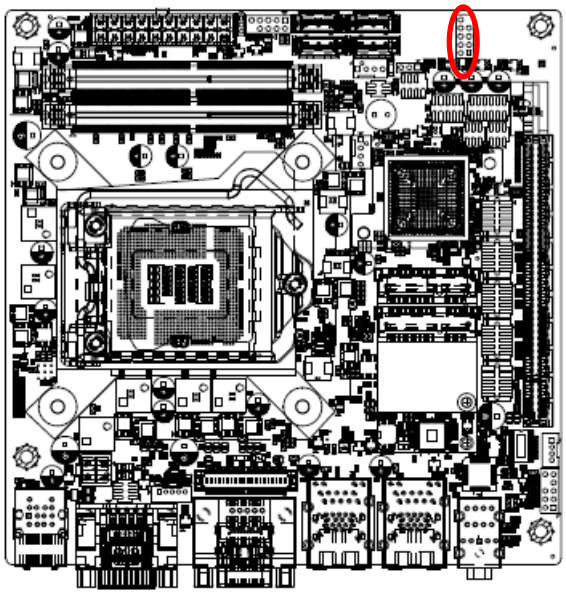
### 2.3.9 ATX Power connector (ATXPWR1)

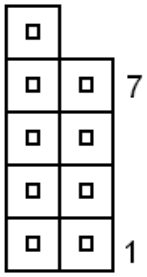





| Signal | PIN | PIN | Signal |
|---|---|---|---|
| +3.3V | 1 | 11 | +3.3V |
| +3.3V | 2 | 12 | -12V |
| GND | 3 | 13 | GND |
| +5V | 4 | 14 | PSON# |
| GND | 5 | 15 | GND |
| +5V | 6 | 16 | GND |
| GND | 7 | 17 | GND |
| PG_ATX | 8 | 18 | -5V |
| +V5SB_DP | 9 | 19 | +5V |
| +12V | 10 | 20 | +5V |

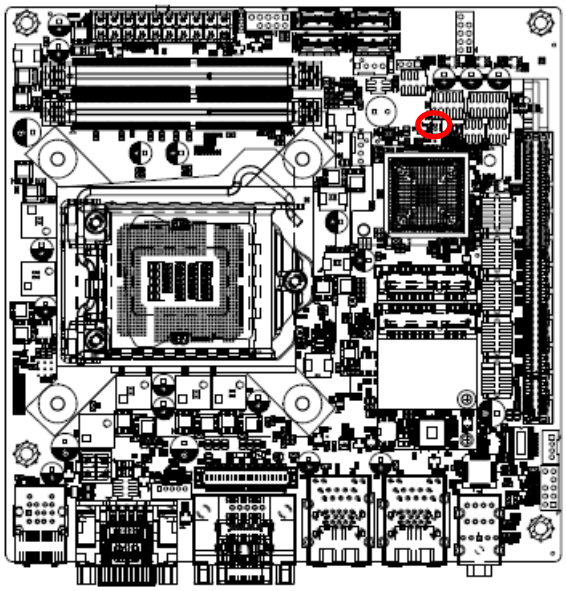
### 2.3.10 USB 2.0 connector 1 (JUSB1)





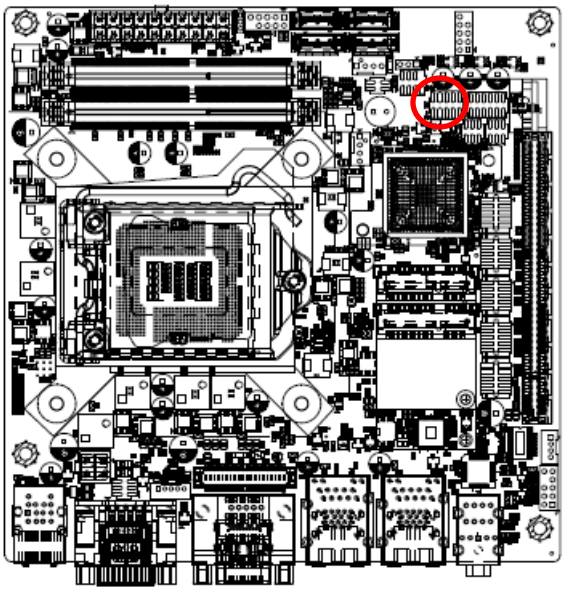

| Signal | PIN | PIN | Signal |
|---|---|---|---|
| NC | 10 | | |
| GND | 8 | 7 | GND |
| USB_R_DP6 | 6 | 5 | USB_R_DP5 |
| USB_R_DN6 | 4 | 3 | USB_R_DN5 |
| +5V | 2 | 1 | +5V |

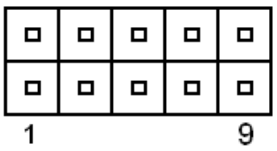
### 2.3.11 Battery connector (JBAT1)




| Signal | PIN |
|---|---|
| RTC_VBAT_1 | 1 |
| GND | 2 |

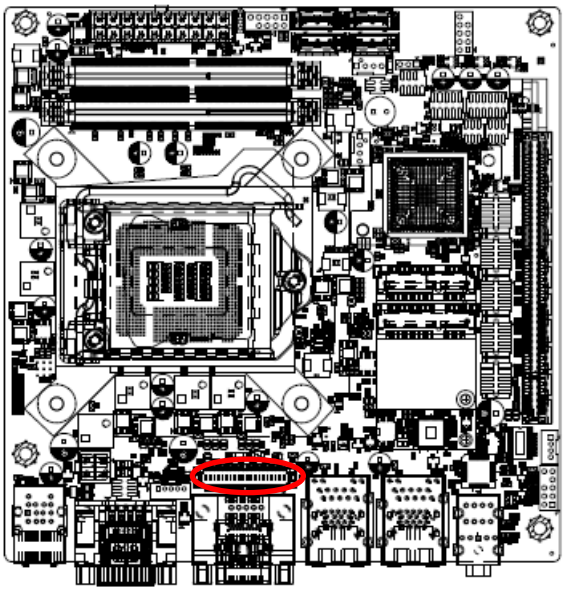
### 2.3.12 LPC connector (JLPC1)

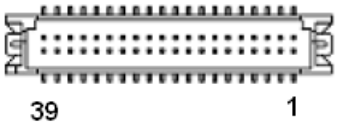





| Signal | PIN | PIN | Signal |
|---|---|---|---|
| LPC_AD0 | 1 | 2 | +3.3V |
| LPC_AD1 | 3 | 4 | BUF_PLT_RST# |
| LPC_AD2 | 5 | 6 | LPC_FRAME# |
| LPC_AD3 | 7 | 8 | LPC_CLK |
| LPC_SERIRQ | 9 | 10 | GND |

### 2.3.13 LVDS connector (JLVDS1)



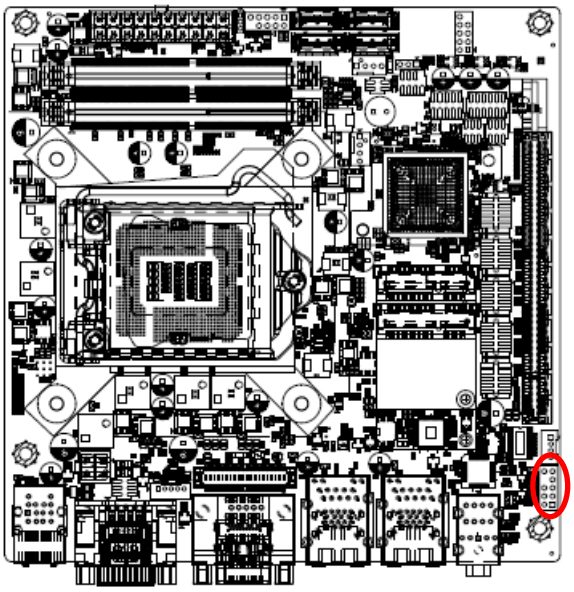


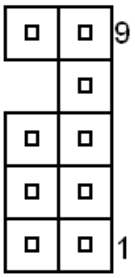

**Note:**

Mapping connector DF13-40DS-1.25C (1.0mm).

| Signal | PIN | PIN | Signal |
|---|---|---|---|
| +5V | 2 | 1 | +3.3V |
| +5V | 4 | 3 | +3.3V |
| NC | 6 | 5 | NC |
| GND | 8 | 7 | GND |
| LVDS_DATA0_P | 10 | 9 | LVDS_DATA1_P |
| LVDS_DATA0_N | 12 | 11 | LVDS_DATA1_N |
| GND | 14 | 13 | GND |
| LVDS_DATA2_P | 16 | 15 | LVDS_DATA3_P |
| LVDS_DATA2_N | 18 | 17 | LVDS_DATA3_N |
| GND | 20 | 19 | GND |
| LVDS_DATA4_P | 22 | 21 | LVDS_DATA5_P |
| LVDS_DATA4_N | 24 | 23 | LVDS_DATA5_N |
| GND | 26 | 25 | GND |
| LVDS_DATA6_P | 28 | 27 | LVDS_DATA7_P |
| LVDS_DATA6_N | 30 | 29 | LVDS_DATA7_N |
| GND | 32 | 31 | GND |
| LVDS_CLK1_P | 34 | 33 | LVDS_CLK2_P |
| LVDS_ CLK1_N | 36 | 35 | LVDS_ CLK2_N |
| GND | 38 | 37 | GND |
| +12V | 40 | 39 | +12V |

## 2.3.14 Front Audio connector (JAUDIO2)



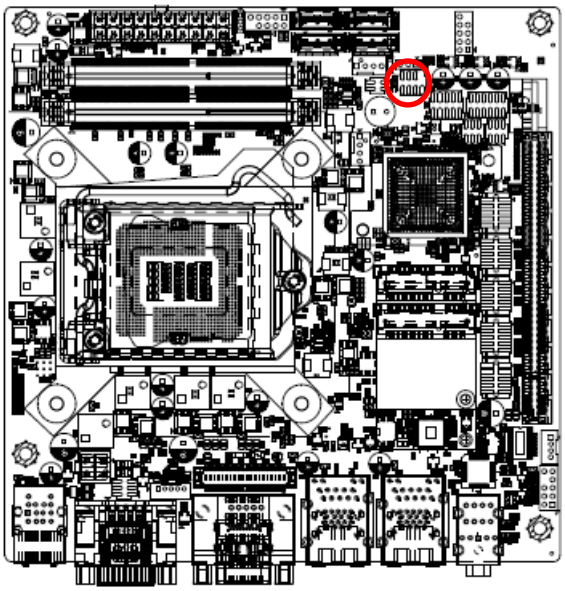


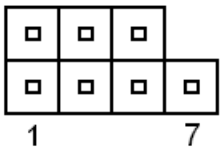

| Signal | PIN | PIN | Signal |
|---|---|---|---|
| LINE2_JD | 10 | 9 | LINE2_LIN |
| | | 7 | GND |
| MIC2_JD | 6 | 5 | LINE2_RIN |
| ACZ_DET#_R | 4 | 3 | MIC2_RIN |
| GND | 2 | 1 | MIC2_LIN |

### *2.3.14.1 Signal Description –Audio connector 2 (JAUDIO2)*

| Signal | Signal Description |
|---|---|
| LINE2_JD | AUDIO IN (LINE_RIN/LIN)sense pin |
| MIC2_JD | MIC IN (MIC_RIN/LIN) sense pin |

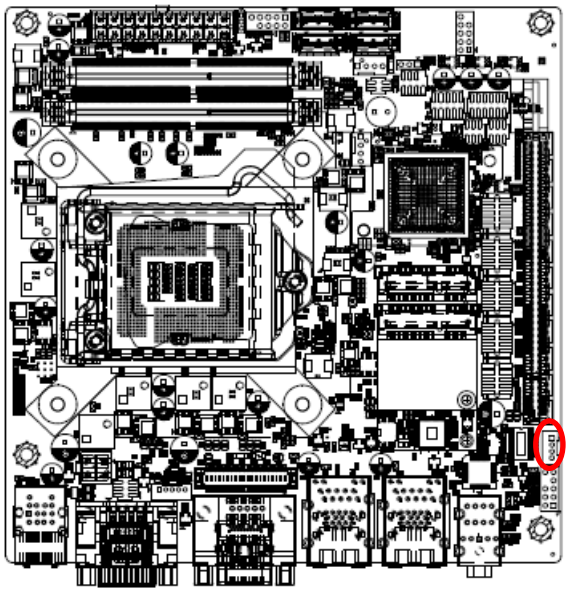
### 2.3.15 SPI connector (JSPI1)






| Signal | PIN | PIN | Signal |
|---|---|---|---|
| +3.3V | 1 | 2 | GND |
| SSPI_CS0#_R | 3 | 4 | SSPI_SCLK_R |
| SSPI_SO_R | 5 | 6 | SSPI_SI_R |
| SSPI_HOLD#0 | 7 | | |

### 2.3.16 Amplifier connector (JSPK1)

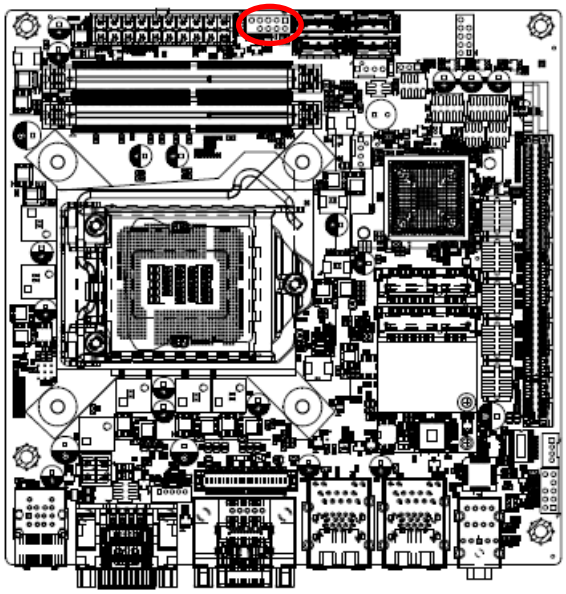


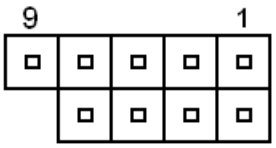

| Signal | PIN |
|---|---|
| SPK_L+ | 1 |
| SPK_L- | 2 |
| SPK_R+ | 3 |
| SPK_R- | 4 |

**Note:**

Support 6W x 2 speakers. Mapping Connector PHR-4.

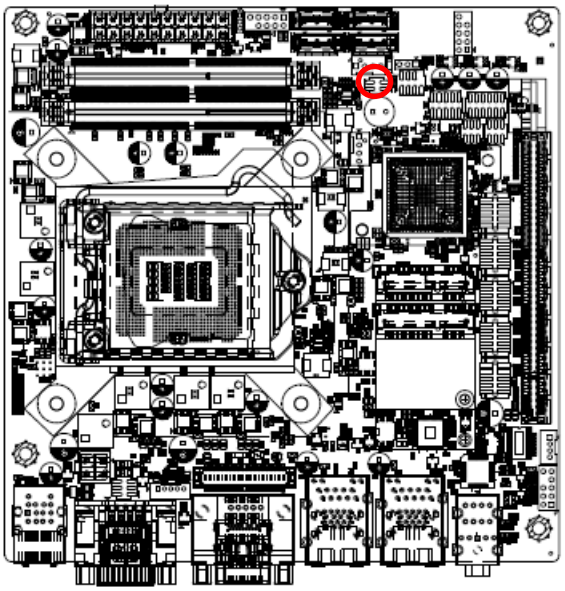
### 2.3.17 Front panel setting connector (JFP1)

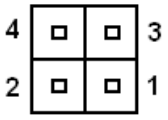





| Signal | PIN | PIN | Signal |
|---|---|---|---|
| +HD_LED | 1 | 2 | +PWR_LED |
| -HD_LED | 3 | 4 | -PWE_LED |
| +Reset | 5 | 6 | +PWR_BNT |
| -Reset | 7 | 8 | -PWR_BNT |
| NC | 9 | | |

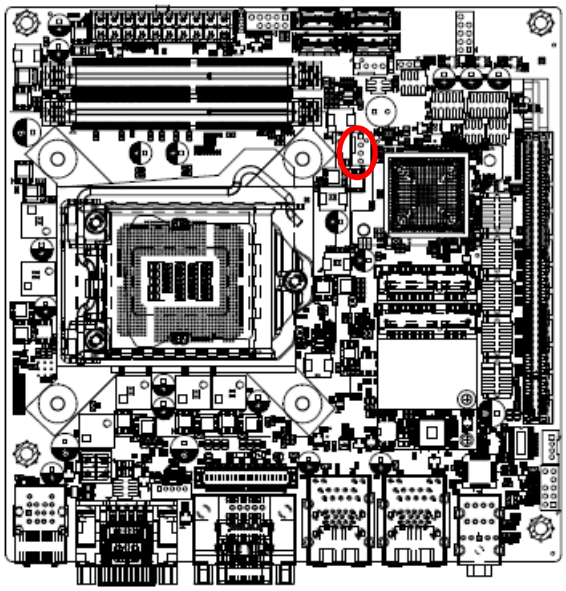
### 2.3.18 LAN1& LAN 2 active LED connector (JLANLED1)

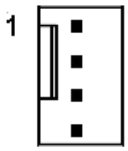





| Signal | PIN | PIN | Signal |
|---|---|---|---|
| LAN2_ACT# | 4 | 3 | LAN1_ACT# |
| FRONT_LAN2_ACT | 2 | 1 | FRONT_LAN1_ACT |

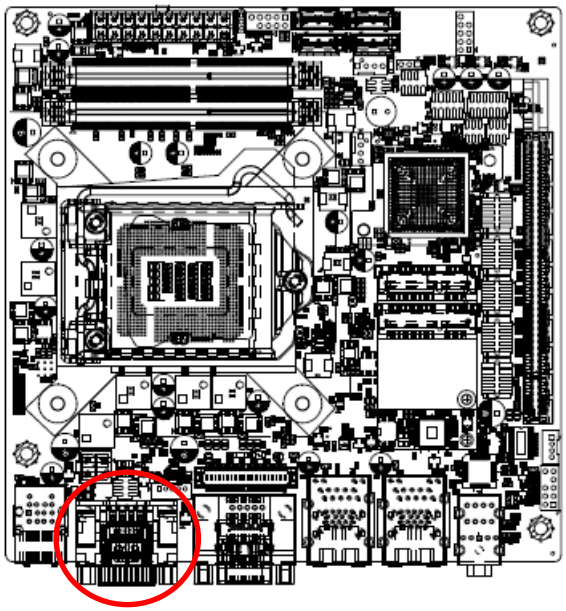
### 2.3.19 CPU fan connector (CPUFAN1)

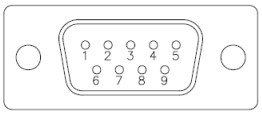





| Signal | PIN |
|---|---|
| GND | 1 |
| +12V | 2 |
| CPUFANIN | 3 |
| CPUFANOUT | 4 |

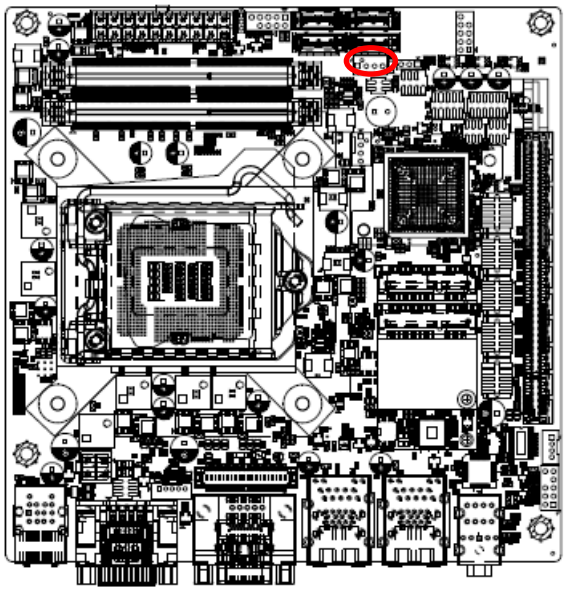
### 2.3.20 Serial port 1 connector (COM1)

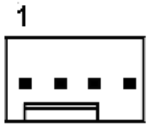





| Signal | PIN | PIN | Signal |
|---|---|---|---|
| NDCDA# | 1 | 6 | NDSRA# |
| NRXDA | 2 | 7 | NRTSA# |
| NTXDA | 3 | 8 | NCTSA# |
| NDTRA# | 4 | 9 | NRIA# |
| GND | 5 | | |

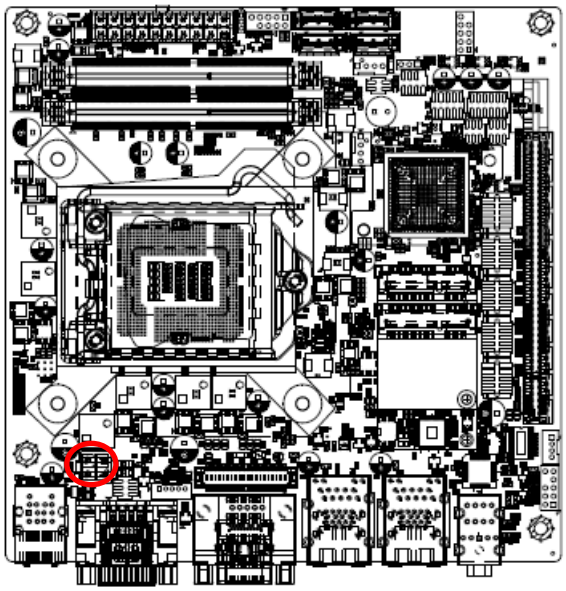
### 2.3.21 System fan connector (SYSFAN1)

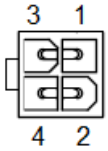





| Signal | PIN |
|---|---|
| GND | 1 |
| +12V | 2 |
| SYSFANIN | 3 |
| SYSFANOUT | 4 |

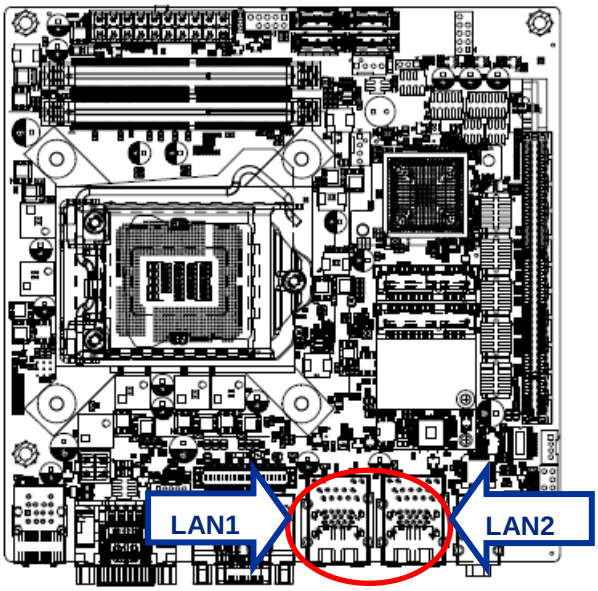
### 2.3.22 ATX 12V power connector (ATX12V1)

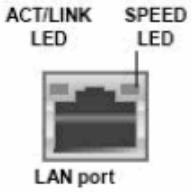





| Signal | PIN | PIN | Signal |
|---|---|---|---|
| +12V | 3 | 1 | GND |
| +12V | 4 | 2 | GND |

### 2.3.23 Gigabit LAN (RJ-45) connector (LAN1/2)




**Note:**

This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

| ACT/LINK LED | | SPEED LED | |
|---|---|---|---|
| **Status** | **Description** | **Status** | **Description** |
| OFF | No Light | OFF | 10Mbps connection |
| Orange | Linked | Green | 100Mbps connection |
| Blinking | Data activity | Orange | 1Gbps connection |

# 3.BIOS Setup

## 3.1 Introduction

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

## 3.2 Starting Setup

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

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

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

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

**Press F1 to Continue, DEL to enter SETUP**

## 3.3 Using Setup

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

| Button | Description |
|---|---|
| ↑ | Move to previous item |
| ↓ | Move to next item |
| ← | Move to the item in the left hand |
| → | Move to the item in the right hand |
| Esc key | Main Menu -- Quit and not save changes into NVRAM<br>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.

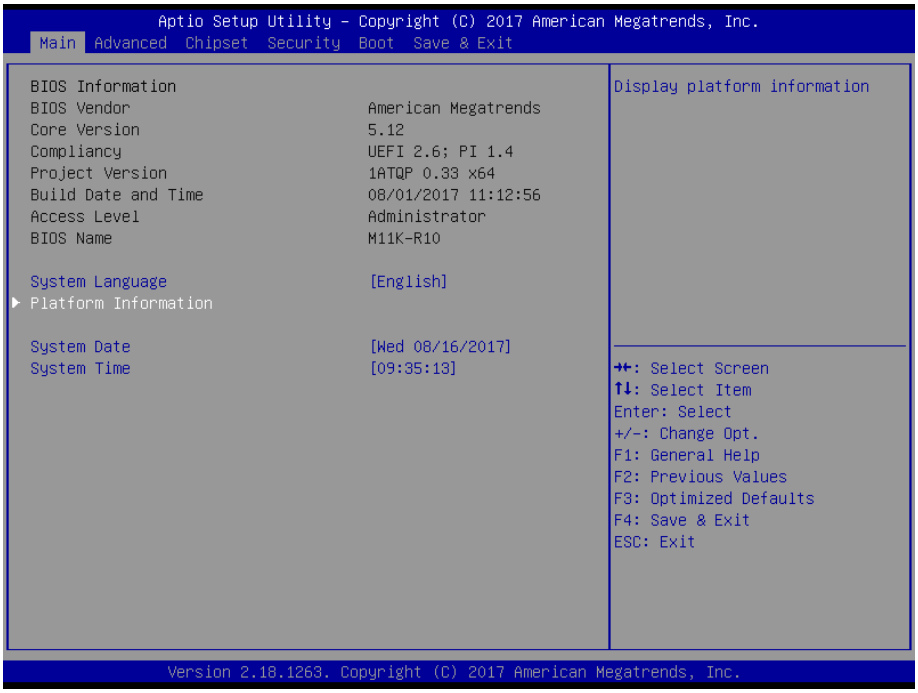
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance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

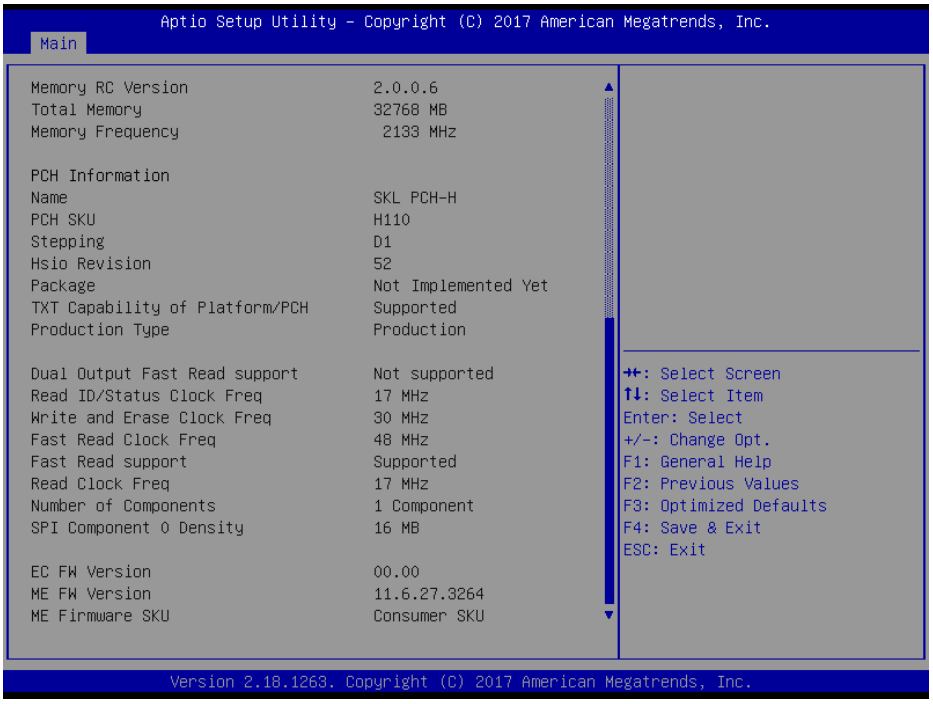
## 3.6 BIOS setup

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.

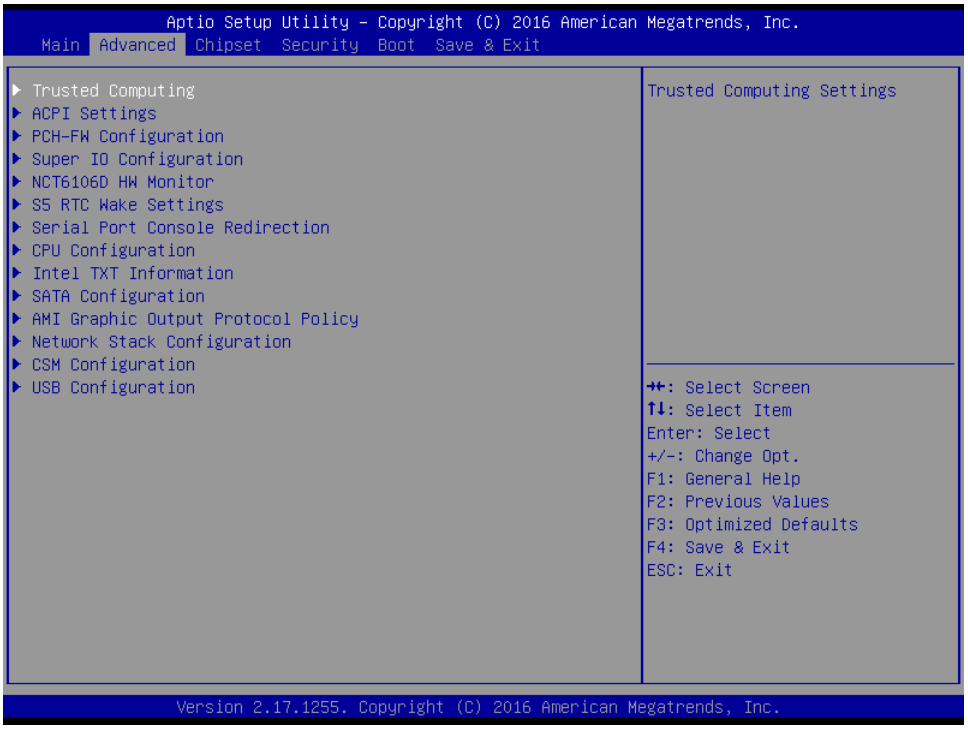
#### 3.6.1.3 System Time

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.

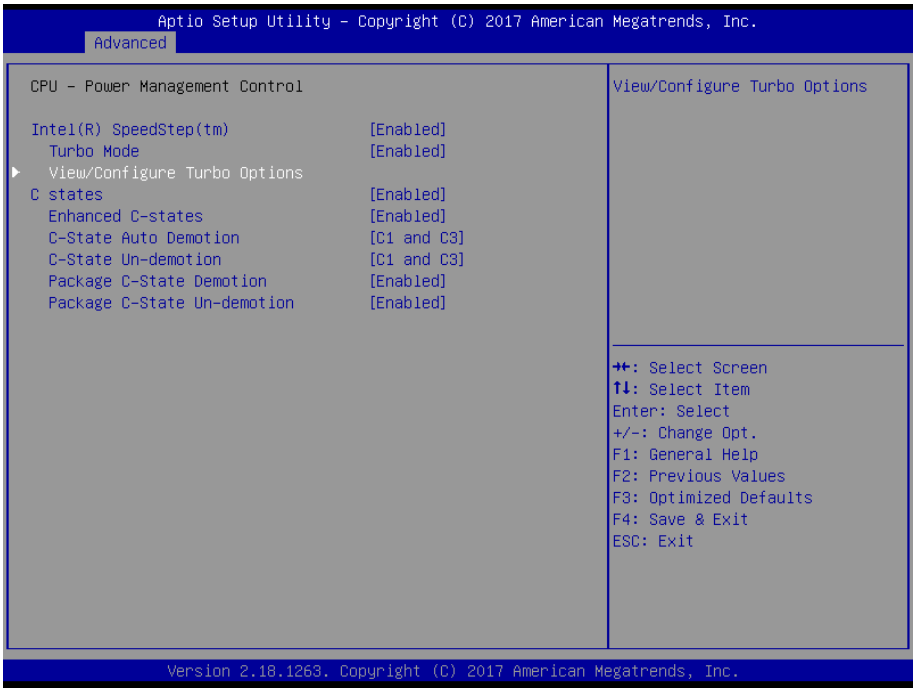



#### 3.6.2.1 CPU Configuration

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

| Item | Options | Description |
|---|---|---|
| **Intel (VMX) Virtualization Technology** | Disabled<br>Enabled**[Default]** | When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. |
| **Active Processor Cores** | All**[Default]**,<br>1<br>2<br>3 | Number of cores to enable in each processor package. |
| **Hyper-Threading** | Disabled<br>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). |

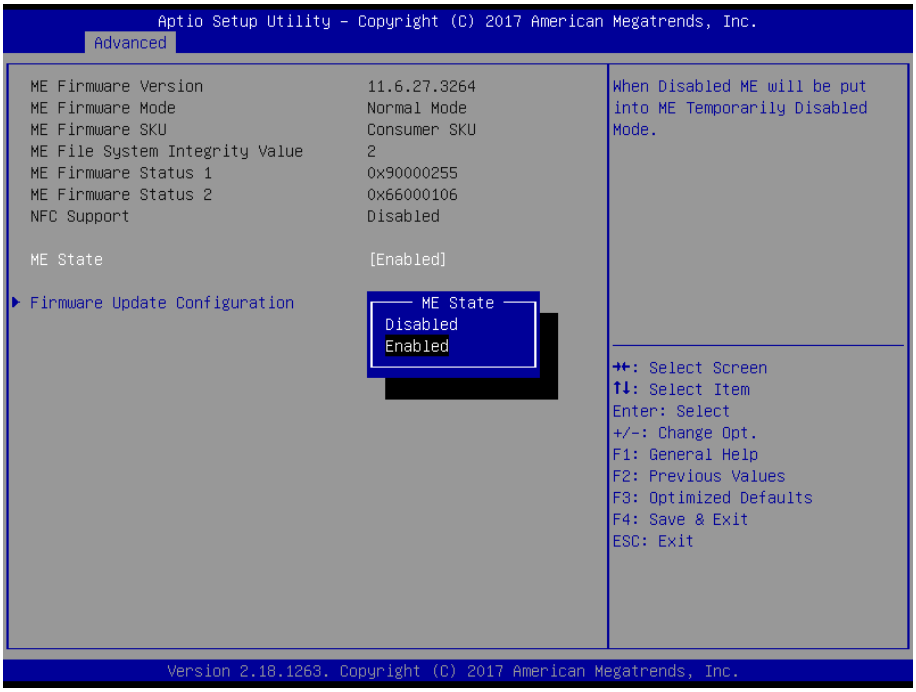
### 3.6.2.1.1 CPU – Power Management Control




| Item | Option | Description |
|---|---|---|
| **Intel® SpeedStep™** | Disabled,<br>Enabled**[Default]** | Allows more than two frequency ranges to be supported. |
| **Turbo Mode** | Disabled,<br>Enabled**[Default]** | Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled, unless max turbo ratio is bigger than 16 – SKL A0 W/A. |
| **C states** | Disabled,<br>Enabled**[Default]** | Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100284789272tilized. |
| **Enhanced C-states** | Disabled,<br>Enabled**[Default]** | Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State. |
| **C-State Auto Demotion** | Disabled,<br>C1 | Configure C-State Auto Demotion. |

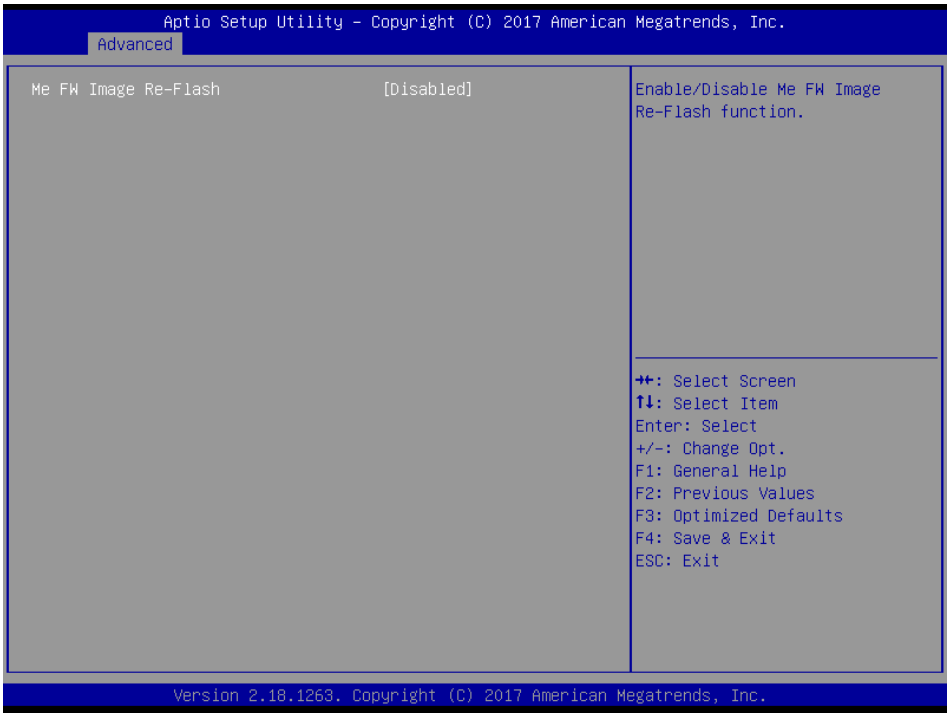
| | | |
|---|---|---|
| | C3<br>C1 and C3**[Default]** | |
| **C-State Un-demotion** | Disabled,<br>C1<br>C3<br>C1 and C3**[Default]** | Configure C-State Un-demotion. |
| **Package C-State Demotion** | Disabled,<br>Enabled<br>Auto**[Default]** | Enable or Disable Package C-State Demotion. 0: Disable; 1: Enable; 2: Auto (Auto: Enabled for Skylake; Disabled for Kabylake). |
| **Package C-State Un-demotion** | Disabled,<br>Enabled<br>Auto**[Default]** | Enable or Disable Package C-State UnDemotion. 0: Disable; 1: Enable; 2: Auto (Auto: Enabled for Skylake; Disabled for Kabylake). |

### 3.6.2.2 PCH-FW Configuration



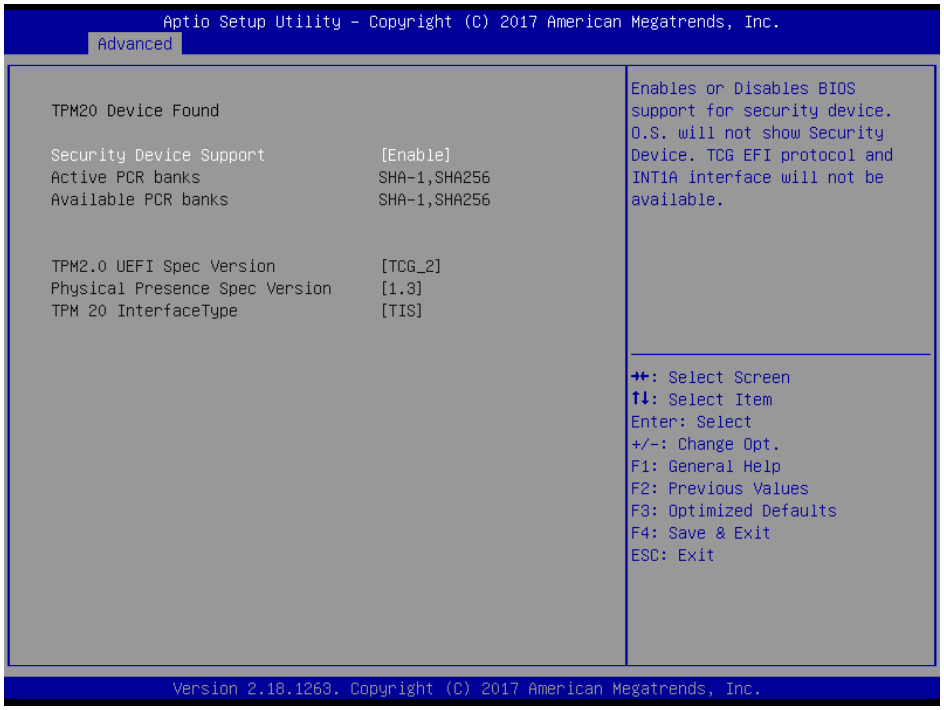

| Item | Options | Description |
|---|---|---|
| **ME State** | Disabled,<br>Enabled**[Default]** | When Disabled ME will be put into ME Temporarily Disabled Mode. |

#### 3.6.2.2.1 Firmware Update Configuration



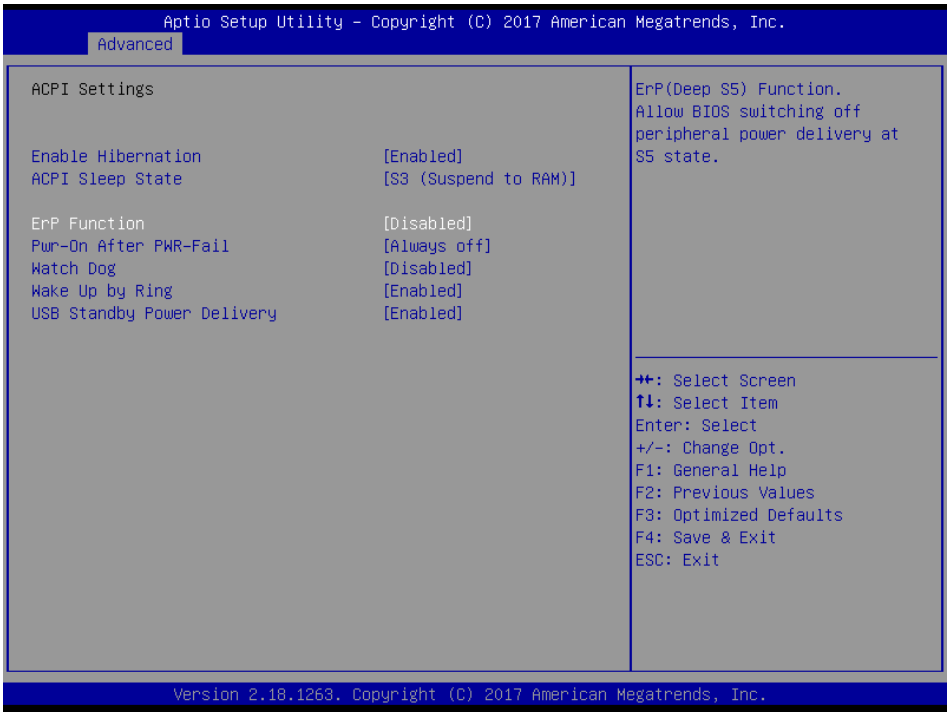

| Item | Option | Description |
|---|---|---|
| **ME FW Image Re-Flash** | Disabled**[Default]**, Enabled | Enable/Disable Me FW Image Re-Flash function. |

### 3.6.2.3 Trusted Computing



| Item | Options | Description |
|---|---|---|
| **Security Device Support** | Disable,<br>Enable**[Default]** | Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1Ainterface will not be available. |

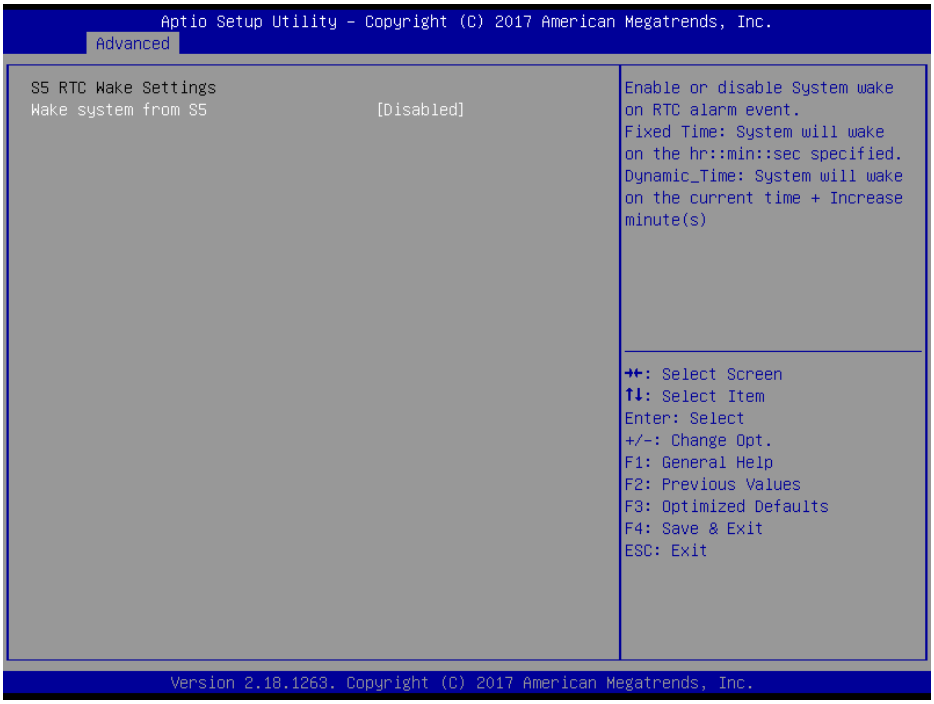
### 3.6.2.4 APCI Settings



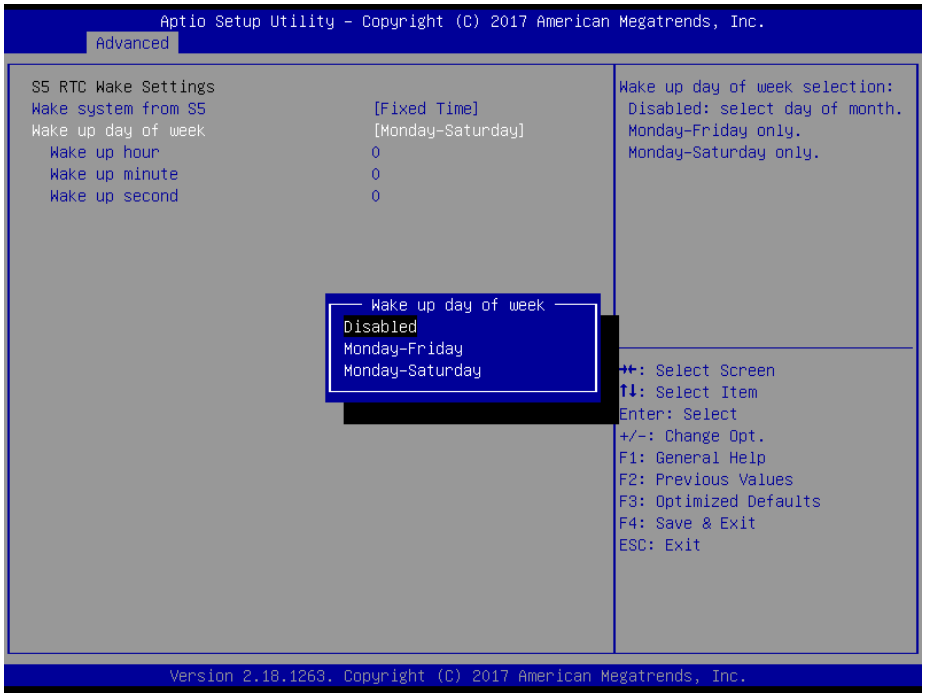

| Item | Options | Description |
|---|---|---|
| **Enable Hibernation** | Disabled<br>Enabled**[Default]**, | Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some OS. |
| **ACPI Sleep State** | Suspend Disabled,<br>S3 (Suspend to RAM)**[Default]** | Select the highest ACPI sleep state the system will enter when the SUSPEDN button is pressed. |
| **ErP Function** | Disabled**[Default]**,<br>Enabled | ErP (Deep S5) Function. Allow BIOS switching off peripheral power delivery at S5 state. |
| **Pwr-On After PWR-Fail** | Always Off**[Default]**<br>Always On<br>Keep Last state | Specify what state to go to when power is re-applied after a power failure (G3 state). |
| **Watch Dog** | Disabled**[Default]**,<br>30 sec<br>40 sec<br>50 sec<br>1 min<br>2 min<br>10 min<br>30 min | Select Watch Dog Timer (WDT) Mode. |

| | | |
|---|---|---|
| **Wake Up by Ring** | Disabled<br>Enabled**[Default]**, | Enable/Disable system waked up by Ring signal from S3(Sleep), S4(Hibernate) and S5(Soft Off) states. |
| **USB Standby Power Delivery** | Disabled<br>Enabled**[Default]**, | Enable/Disable USB Power delivery in S3 (Sleep), S4 (Hibernate) and S5 (Soft Off) States. |

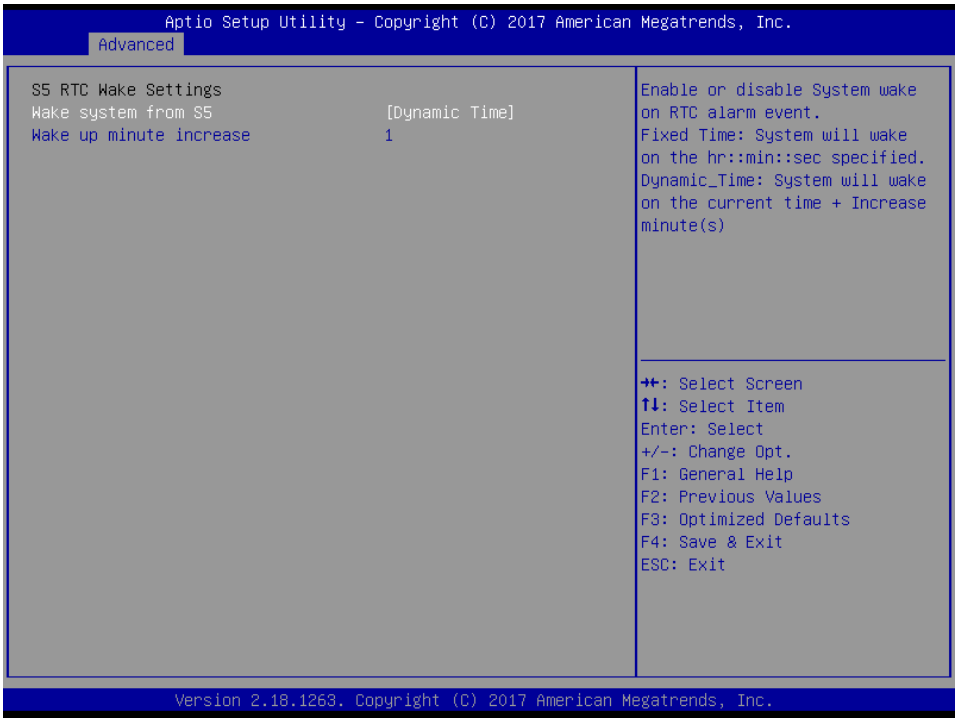
### 3.6.2.5 S5 RTC Wake Settings




| Item | Options | Description |
|---|---|---|
| **Wake system from S5** | Disabled**[Default]**,<br>Fixed Time<br>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). |



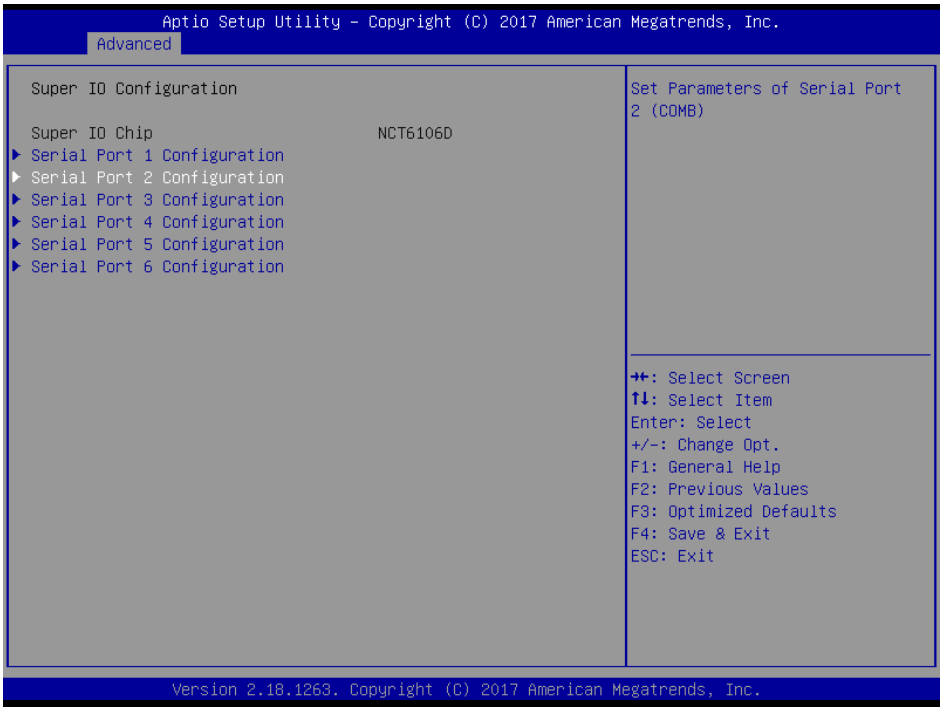

| Item | Options | Description |
|---|---|---|
| **Wake system from S5** | Disabled,<br>Fixed Time**[Default]**<br>Dynamic Time | Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s). |
| **Wake up day of week** | Disabled,<br>Monday-Friday<br>Monday-Saturday**[Default]** | Wake up day of week selection: Disabled: select day of month. Monday-Friday only. Monday-Saturday only. |
| **Wake up hour** | 0-23 | Select 0-23 For example enter 3 for 3am and 15 for 3pm. |
| **Wake up minute** | 0-59 | 0-59. |
| **Wake up second** | 0-59 | 0-59. |




| Item | Options | Description |
|---|---|---|
| **Wake system from S5** | Disabled,<br>Fixed Time<br>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. |

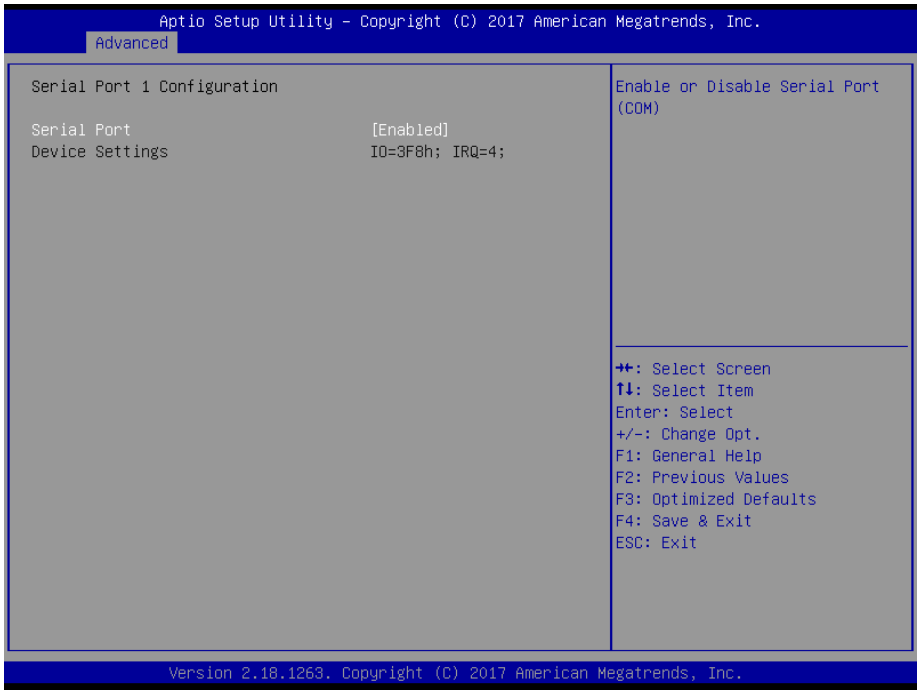
### 3.6.2.6 Super IO Configuration

You can use this item to set up or change the Super IO configuration for serial ports. Please refer to 3.6.2.6.1~ 3.6.2.6.6 for more information.



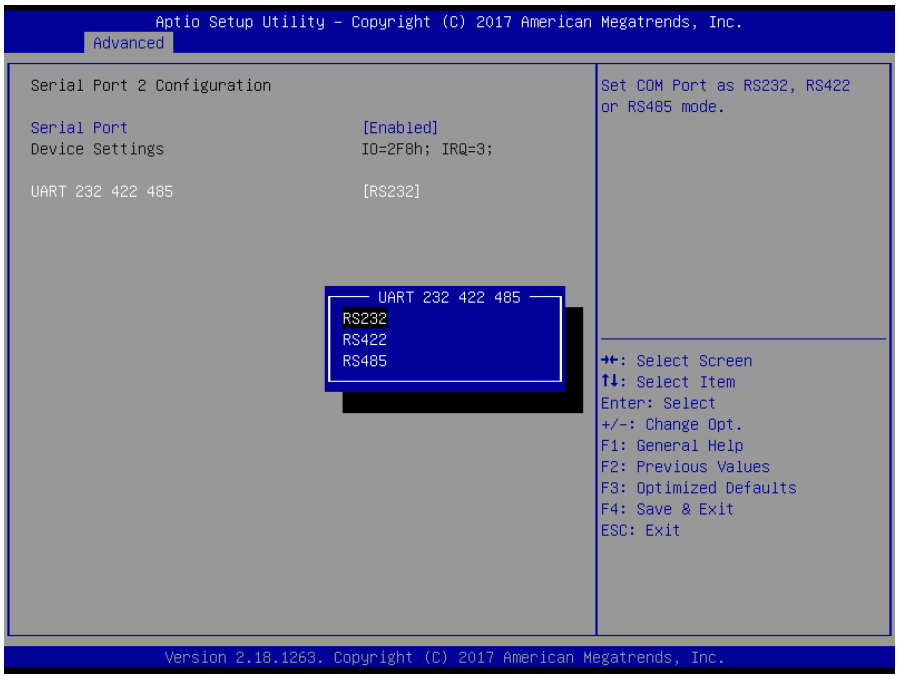
| Item | Description |
|---|---|
| **Serial Port 1 Configuration** | Set Parameters of Serial Port 1 (COMA). |
| **Serial Port 2 Configuration** | Set Parameters of Serial Port 2 (COMB). |
| **Serial Port 3 Configuration** | Set Parameters of Serial Port 3 (COMC). |
| **Serial Port 4 Configuration**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

### 3.6.2.6.1 Serial Port 1 Configuration



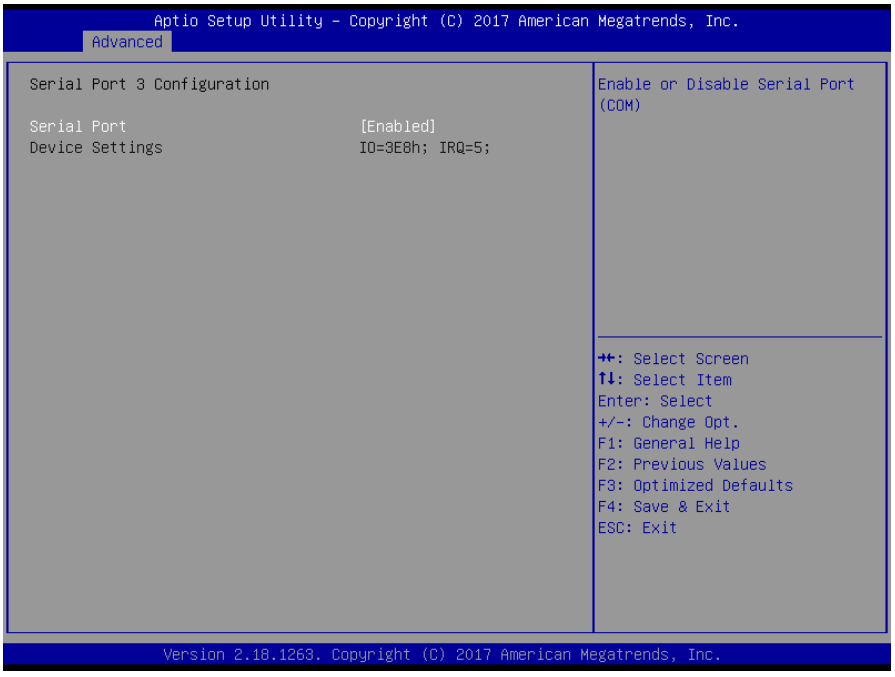

| Item | Option | Description |
|---|---|---|
| **Serial Port** | Disabled<br>Enabled**[Default]**, | Enable or Disable Serial Port (COM). |

### 3.6.2.6.2 Serial Port 2 Configuration



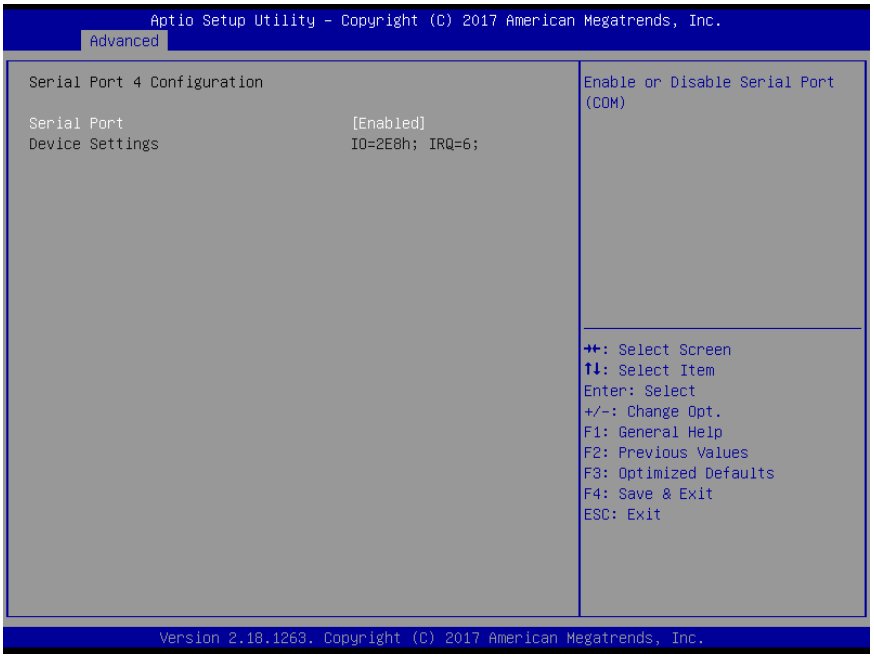

| Item | Option | Description |
|---|---|---|
| **Serial Port** | Disabled<br>Enabled**[Default]**, | Enable or Disable Serial Port (COM). |
| **UART 232 422 485** | RS232**[Default]**<br>RS422<br>RS485 | Set COM Port as RS232, RS422 or RS485 mode. |

### 3.6.2.6.3 Serial Port 3 Configuration



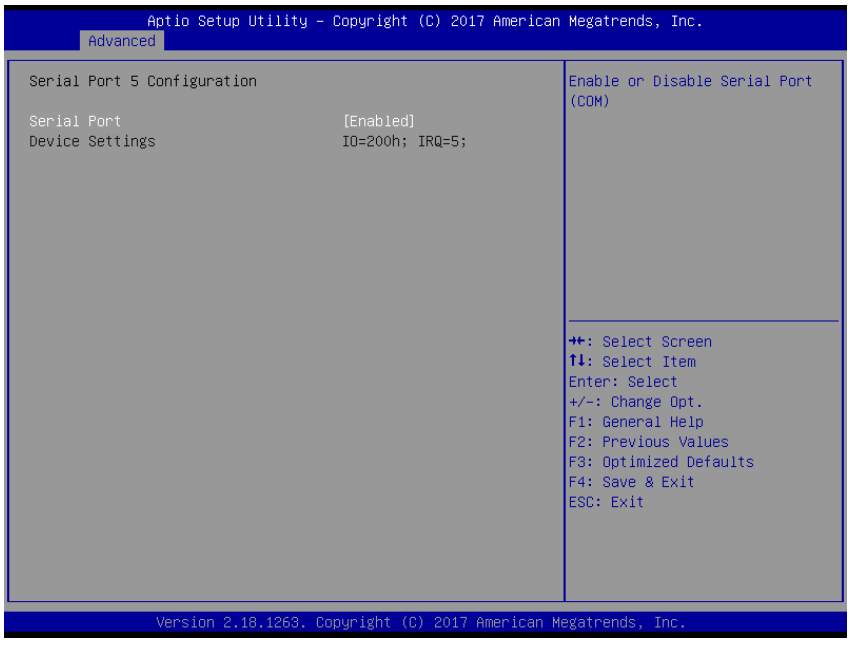
| Item | Option | Description |
|---|---|---|
| **Serial Port** | Disabled<br>Enabled**[Default]**, | Enable or Disable Serial Port (COM). |

### 3.6.2.6.4 Serial Port 4 Configuration



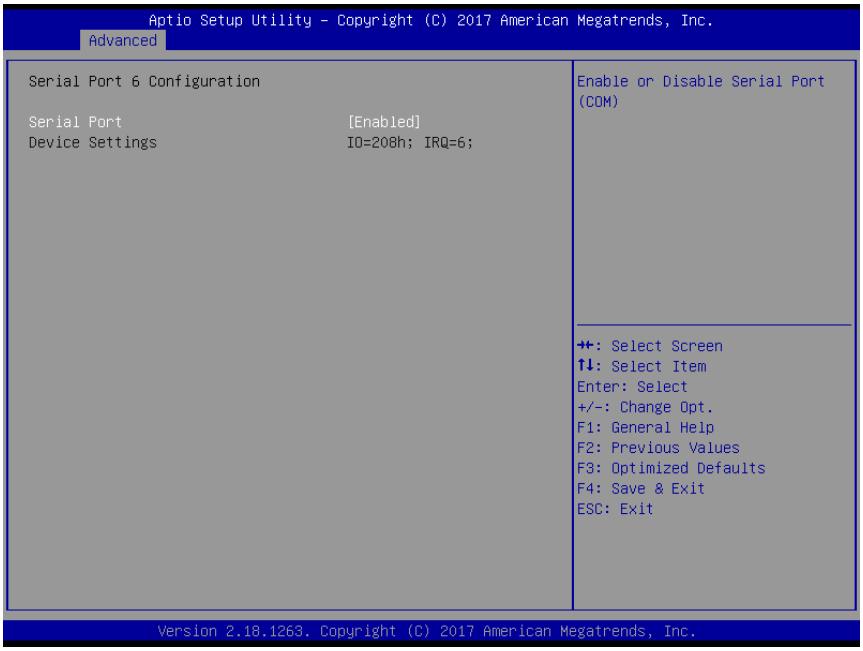

| Item | Option | Description |
|---|---|---|
| **Serial Port** | Disabled<br>Enabled**[Default]**, | Enable or Disable Serial Port (COM). |

### 3.6.2.6.5 Serial Port 5 Configuration



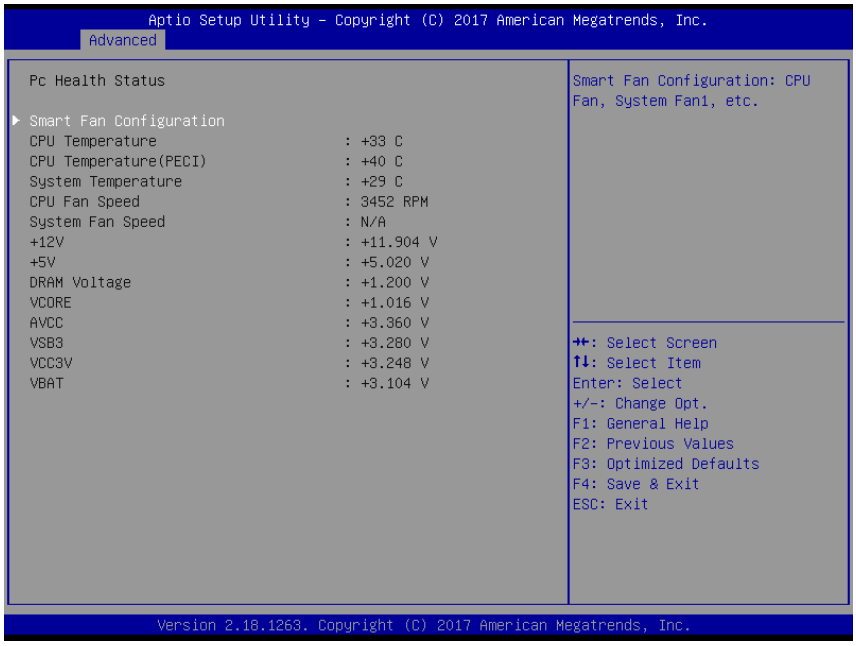
| Item | Option | Description |
|---|---|---|
| **Serial Port** | Disabled<br>Enabled**[Default]**, | Enable or Disable Serial Port (COM). |

### 3.6.2.6.6 Serial Port 6 Configuration

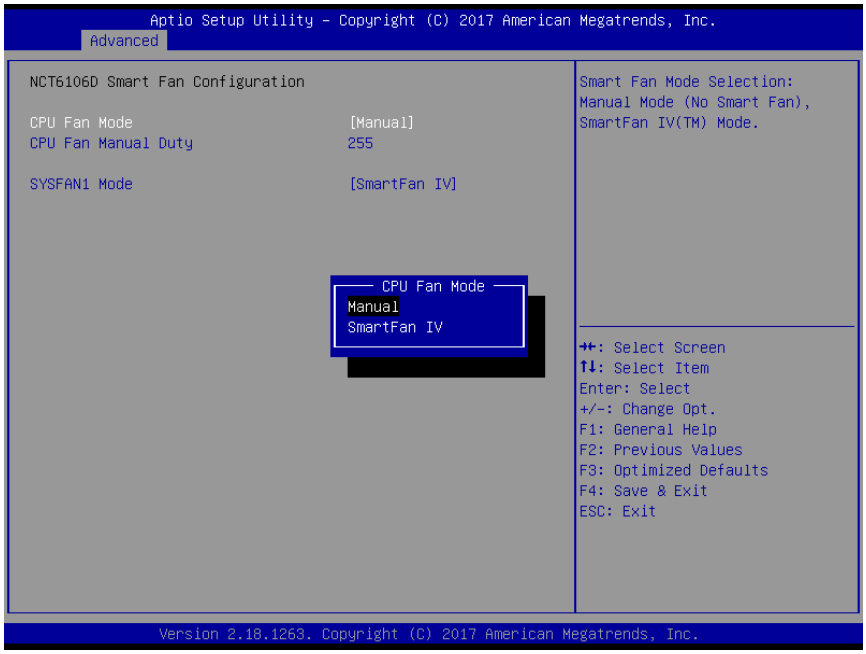



| Item | Option | Description |
|---|---|---|
| **Serial Port** | Disabled<br>Enabled**[Default]**, | Enable or Disable Serial Port (COM). |

### 3.6.2.7 NCT6106D H/W Monitor

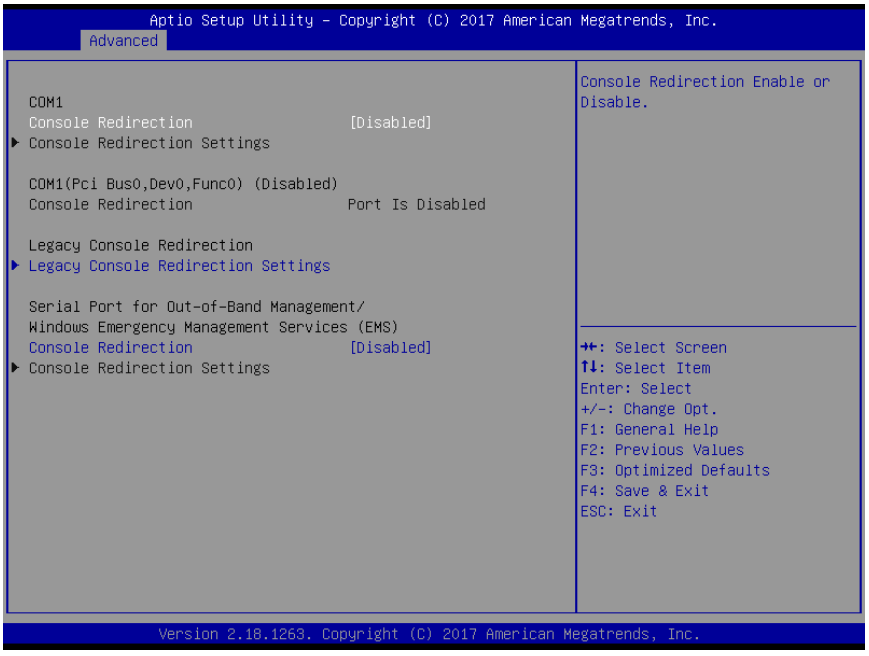


### 3.6.2.7.1 Smart Fan Configuration



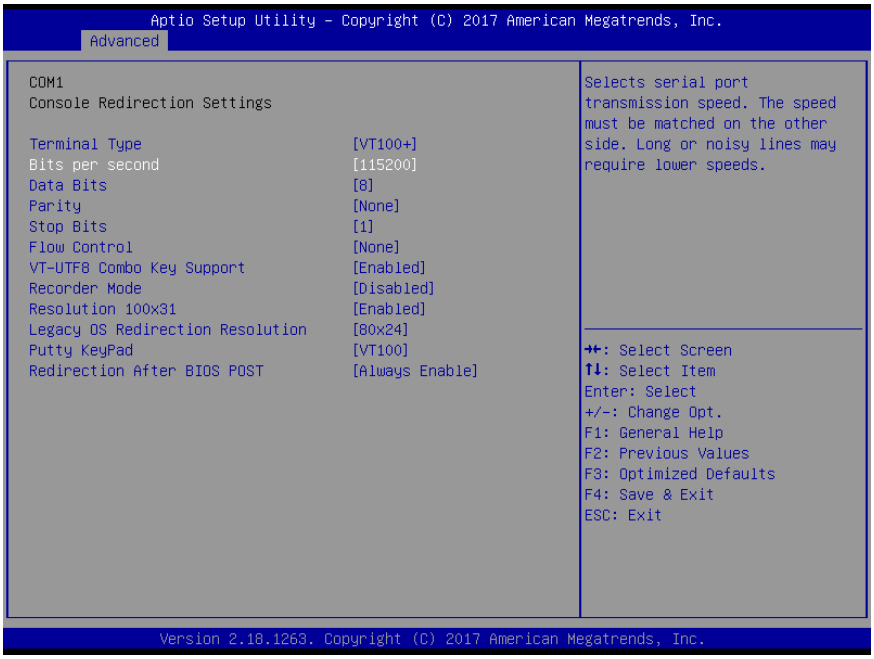

| Item | Option | Description |
|---|---|---|
| **CPU Fan Mode** | Manual**[Default]**, SmartFan IV | Smart Fan Mode Selection: Manual Mode (No Smart Fan), SmartFan IV™ Mode. |
| **CPU Fan Manual Duty** | 0-255**[Default]** | CPU Fan manual output duty: 0 to 255. |
| **SYSFAN1 Mode** | Manual SmartFan IV**[Default]**, | Smart Fan Mode Selection: Manual Mode (No Smart Fan), SmartFan IV™ Mode. |

### 3.6.2.8 Serial Port Console Redirection



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

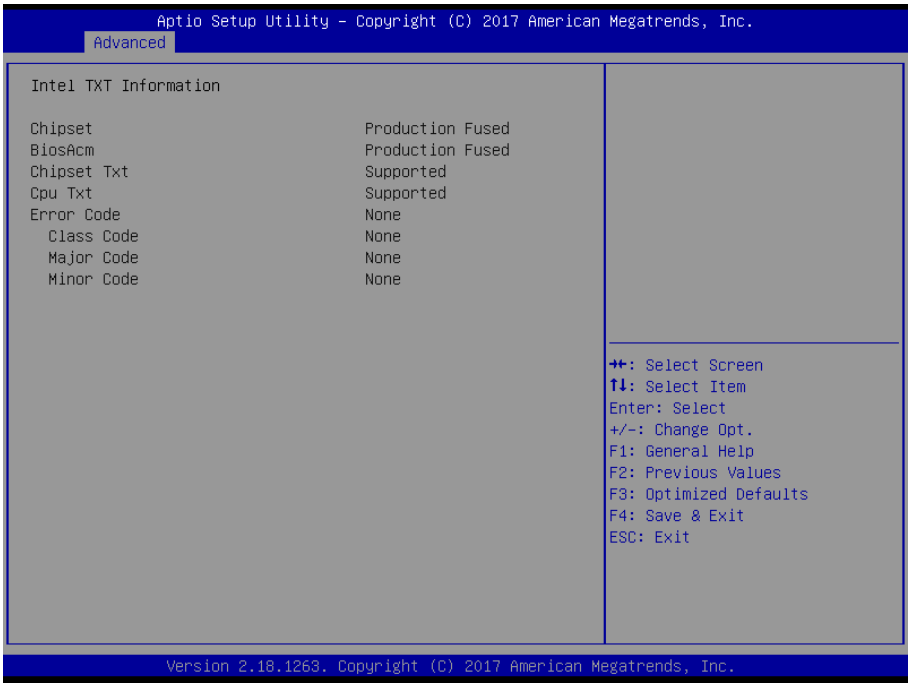
### 3.6.2.8.1 COM1



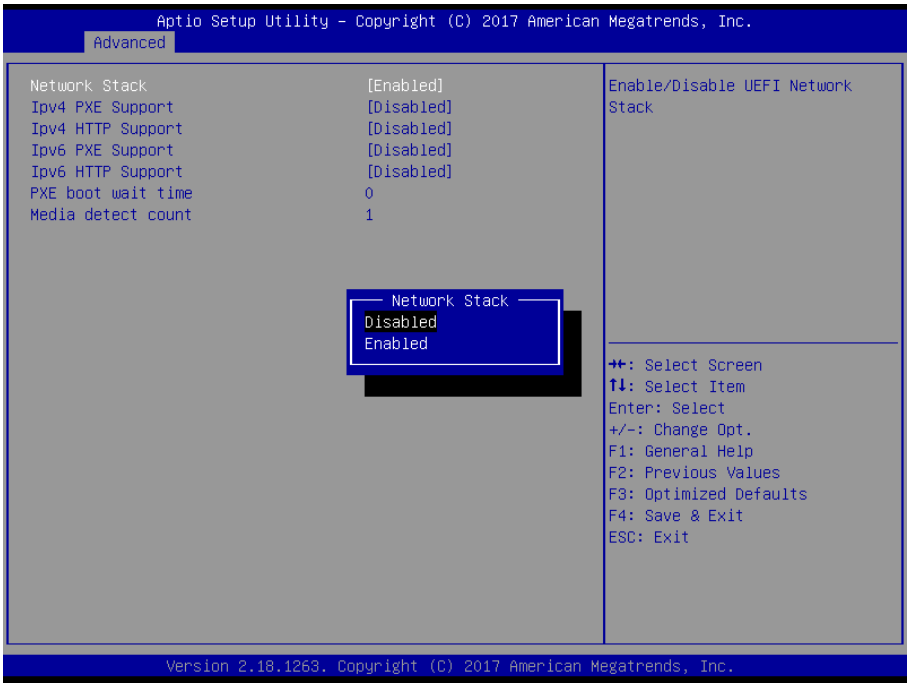

| Item | Option | Description |
|---|---|---|
| **Terminal Type** | VT100<br>VT100+**[Default]**<br>VT-UTF8<br>ABSI | Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes. |
| **Bits per second** | 9600<br>19200<br>38400<br>57600<br>115200**[Default]** | Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds. |
| **Data Bits** | 7<br>8**[Default]** | Data Bits. |
| **Parity** | None**[Default]**<br>Even<br>Odd<br>Mark<br>Space | A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always. 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit. |
| **Stop Bits** | 1**[Default]**<br>2 | Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may |

| | | |
|---|---|---|
| | | require more than 1 stop bit. |
| **Flow Control** | None**[Default]**<br>Hardware RTS/CTS | Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals. |
| **VT-UTFB Combo Key Support** | Disabled<br>Enabled**[Default]** | Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals. |
| **Recorder Mode** | Disabled**[Default]**<br>Enabled | With this mode enabled only text will be sent. This is to capture Terminal data. |
| **Resolution 100x31** | Disabled<br>Enabled**[Default]** | Enables or disables extended terminal resolution. |
| **Legacy OS Redirection Resolution** | 80x24**[Default]**<br>80x25 | On Legacy OS, the Number of Rows and Columns supported redirection. |
| **Putty KeyPad** | VT100**[Default]**<br>LINUX<br>XTERMR6<br>SCO<br>ESCN<br>VT400 | Select FunctionKey and KeyPad on Putty. |
| **Redirection After BIOS POST** | Always Enable**[Default]**<br>BootLoader | The Settings specify if BootLoader is selected then Legacy console redirection is disabled before booting to Legacy OS. Default value is Always Enable which means Legaacy console Redirection is enabled for Legacy OS. |

### 3.6.2.9 Intel TXT Configuration



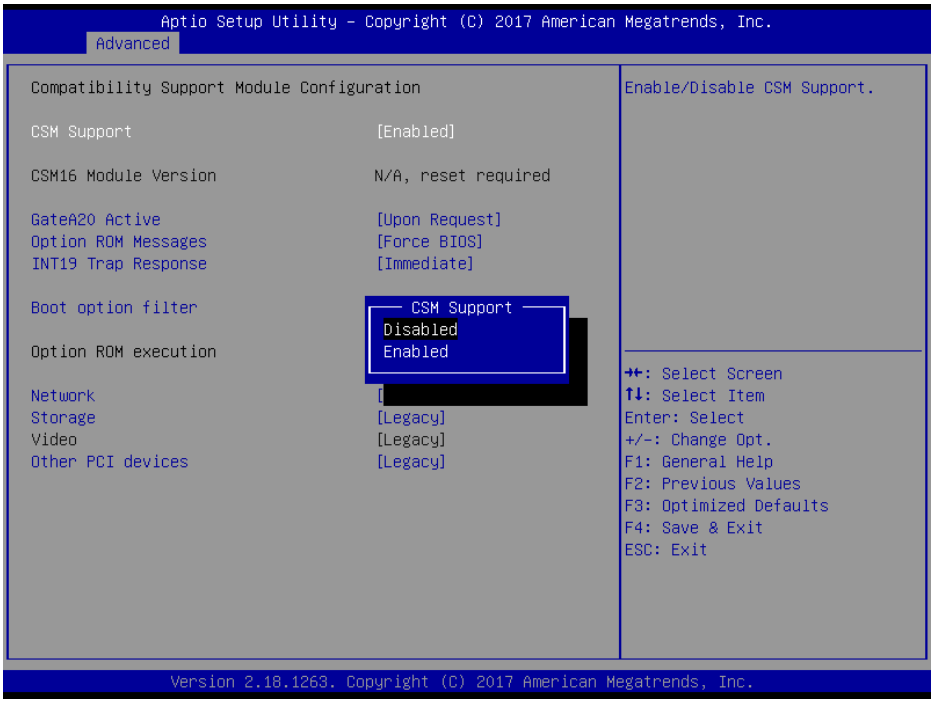
### 3.6.2.10 Network Stack Configuration




| Item | Options | Description |
|---|---|---|
| **Network Stack** | Disabled**[Default]**<br>Enabled | Enable/Disable UEFI Network Stack. |
| **Ipv4 PXE Support** | Disabled**[Default]**<br>Enabled | Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available. |
| **Ipv4 HTTP Support** | Disabled**[Default]**<br>Enabled | Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available. |
| **Ipv6 PXE Support** | Disabled**[Default]**<br>Enabled | Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available. |
| **Ipv6 HTTP Support** | Disabled**[Default]**<br>Enabled | Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available. |
| **PXE boot wait time** | 0 | Wait time to press ESC key to abort the PXE boot. |
| **Media detect count** | 1 | Number of times presence of media will be checked. |

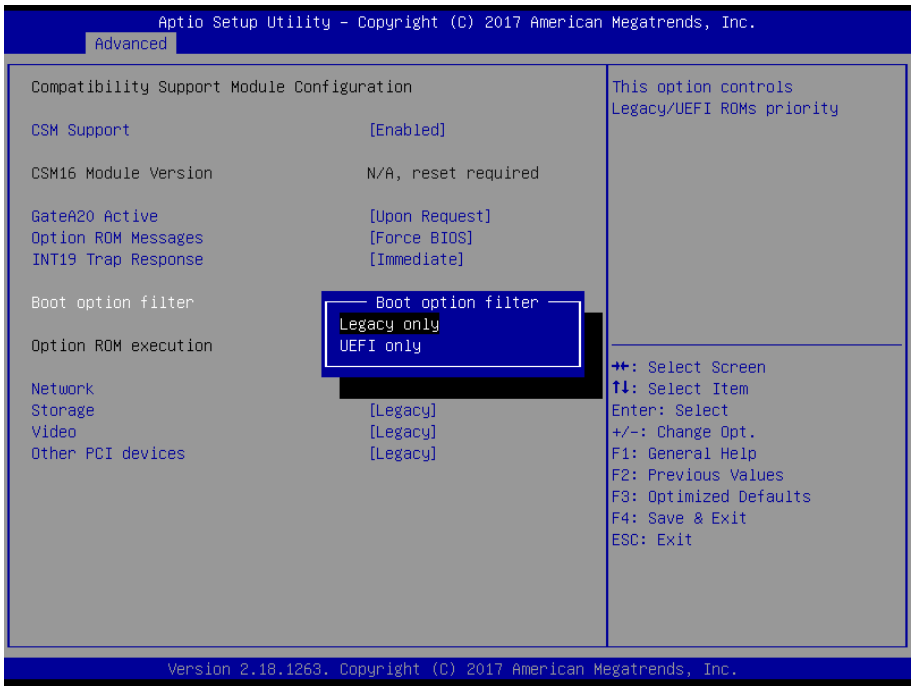
### 3.6.2.11 CSM Configuration

**BIOS Default:**




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

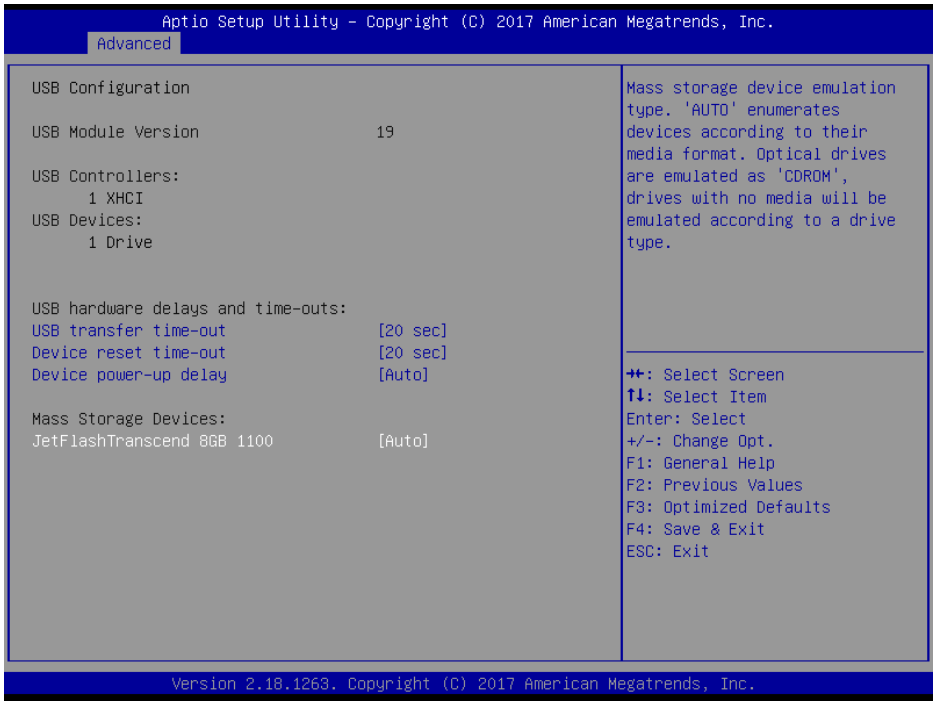
## If enable CSM Support:




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

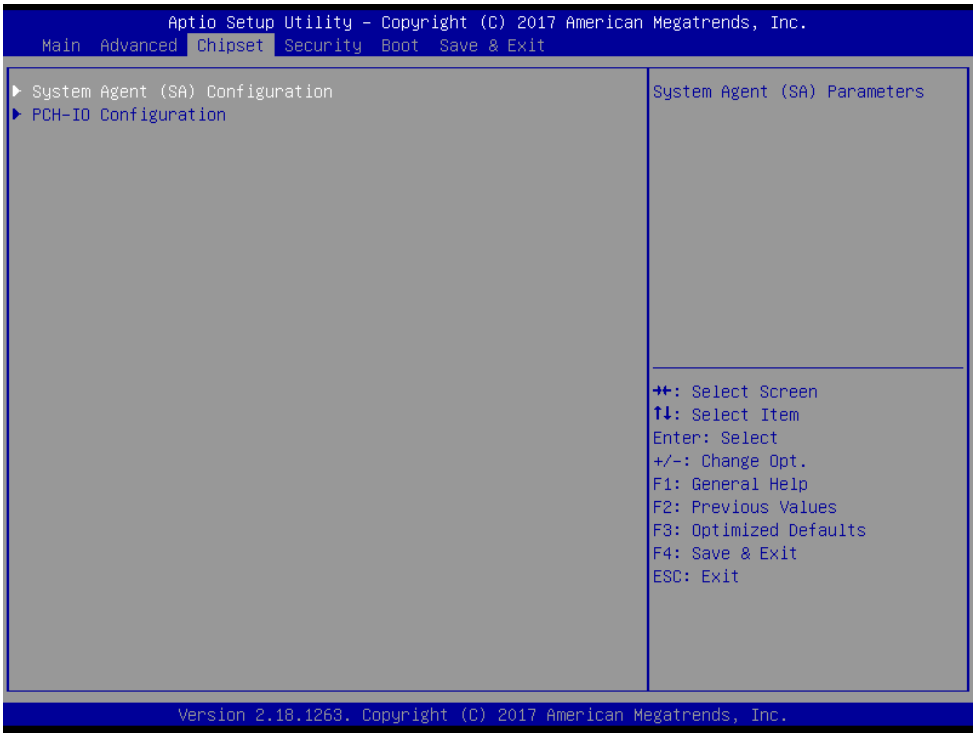
### 3.6.2.12 USB Configuration

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

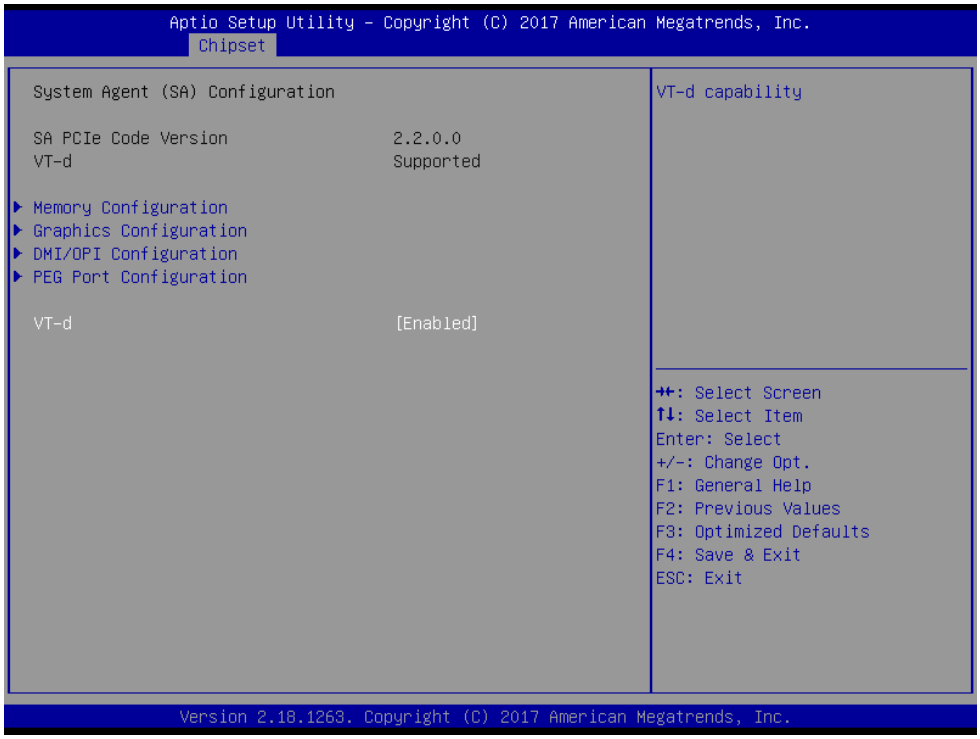



| Item | Options | Description |
|---|---|---|
| **USB transfer time-out** | 1 sec<br>5 sec<br>10 sec<br>20 sec**[Default]** | The time-out value for Control, Bulk, and Interrupt transfers. |
| **Device reset time-out** | 10 sec<br>20 sec**[Default]**<br>30 sec<br>40 sec | USB mass storage device Start Unit command time-out. |
| **Device power-up delay** | Auto**[Default]**<br>Manual | Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken form Hub descriptor. |
| **Mass Storage Devices** | Auto**[Default]**<br>Floppy<br>Forced FDD<br>Hard Disk<br>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

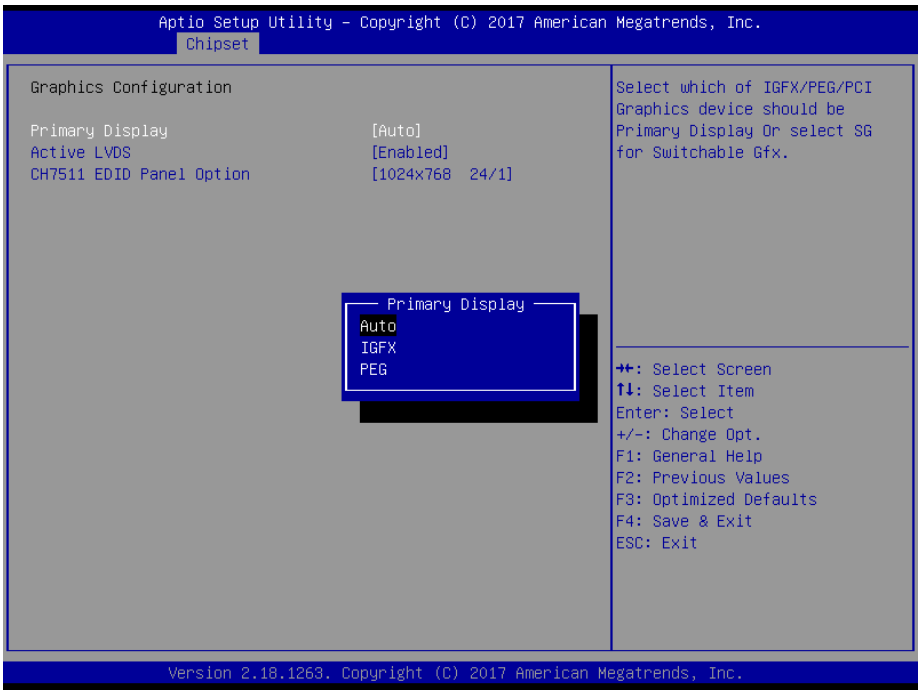



#### 3.6.3.1 System Agent (SA) Configuration



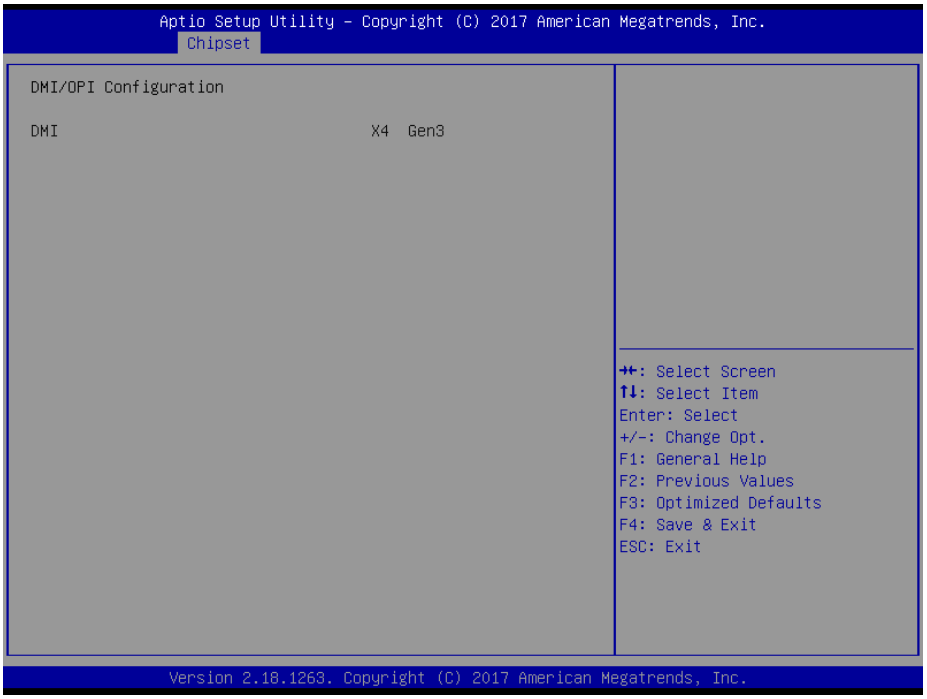
| Item | Option | Description |
|---|---|---|
| **VT-d** | Enabled**[Default]**<br>Disabled | VT-d capability. |

### 3.6.3.1.1 Graphics Configuration




| Item | Option | Description |
|---|---|---|
| **Primary Display** | Auto**[Default]**<br>IGFX<br>PEG | Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx. |
| **Active LVDS** | Disabled<br>Enabled**[Default]** | Active on-board eDP to LVDS Converter. |
| **CH7511 EDID Panel Option** | 1024x768 24/1**[Default]**<br>800x600 18/1<br>1024x768 18/1<br>1366x768 18/1<br>1024x600 18/1<br>1280x800 18/1<br>1920x1200 24/2<br>1920x1080 18/2<br>1280x1024 24/2<br>1440x900 18/2<br>1600x1200 24/2<br>1366x768 24/1<br>1920x1080 24/2<br>1680x1050 24/2 | Set which panel resolution EDID reported by CH7511. |

### 3.6.3.1.2 DMI/OPI Configuration

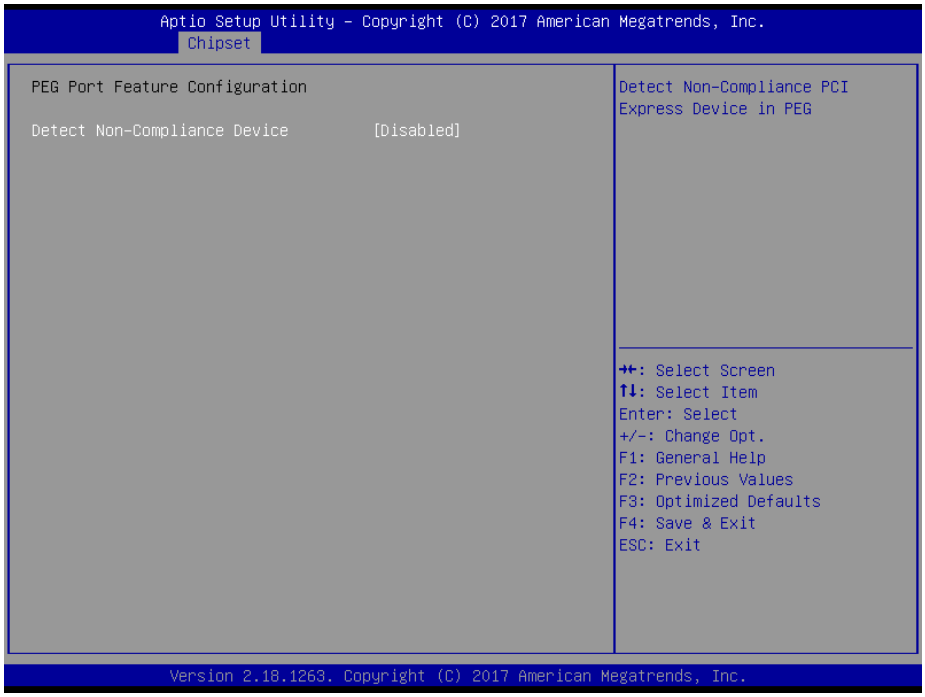



### 3.6.3.1.3 PEG Port Configuration


| Item | Option | Description |
|---|---|---|
| **Enable Root Port** | Disabled<br>Enabled<br>Auto**[Default]** | Enable or Disable the Root Port. |
| **Max Link Speed** | Auto**[Default]**<br>Gen1 | Configure PEG 0:1:0 Max Speed. |

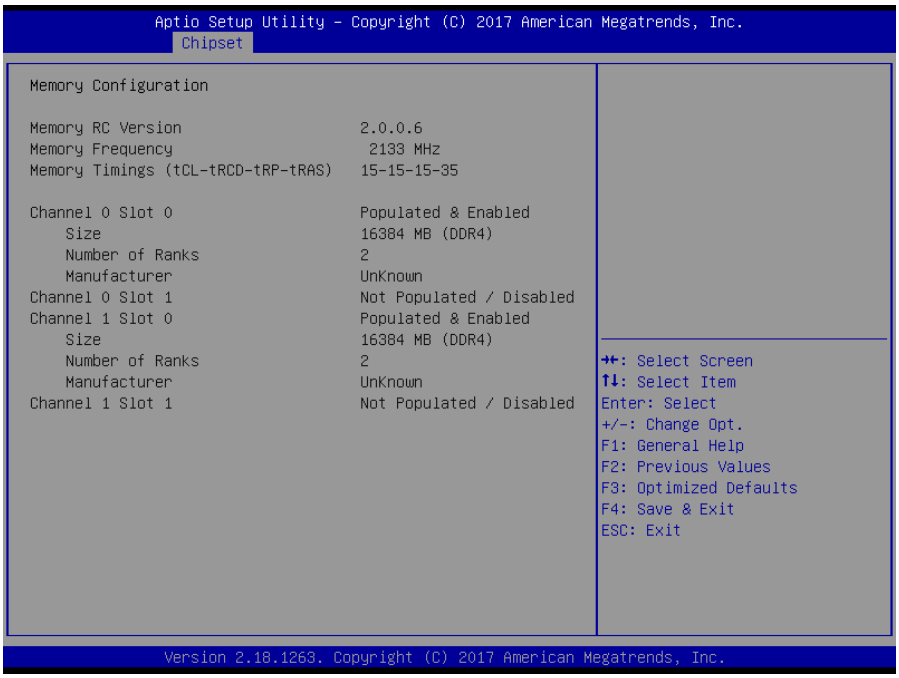
| | | |
|---|---|---|
| | Gen2<br>Gen3 | |
| **Program PCIe ASPM after OpROM** | Disabled**[Default]**<br>Enabled | Enabled: PCIe ASPM will be programmed after OpROM. Disabled: PCIe ASPM will be programmed before OpROM. |

### 3.6.3.1.3.1 PEG Port Feature Configuration

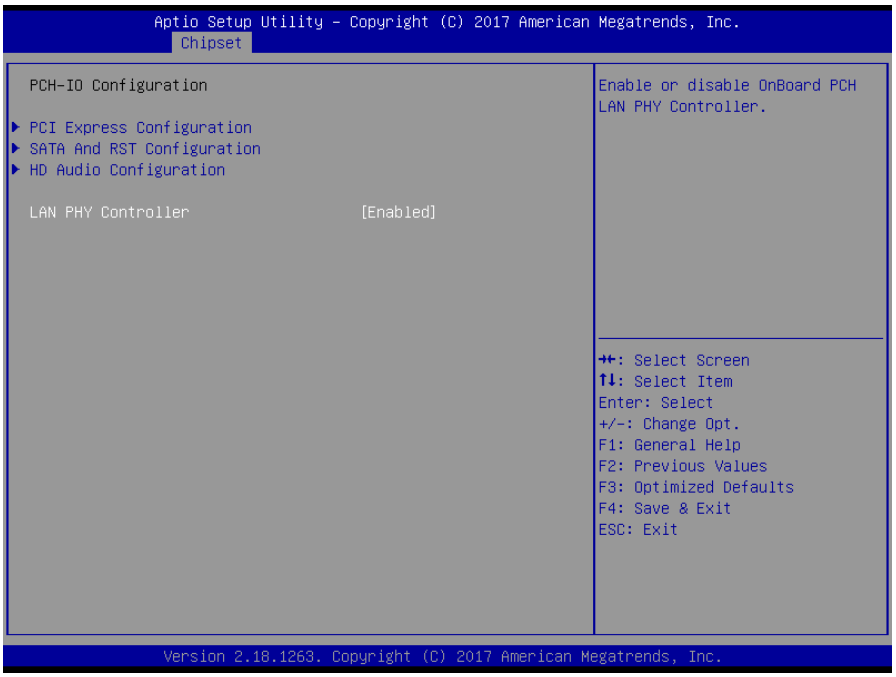



| Item | Option | Description |
|---|---|---|
| **Detect Non-Compliance Device** | Disabled**[Default]**<br>Enabled, | Detect Non-Compliance PCI Express Device in PEG. |

#### 3.6.3.1.4 Memory Configuration

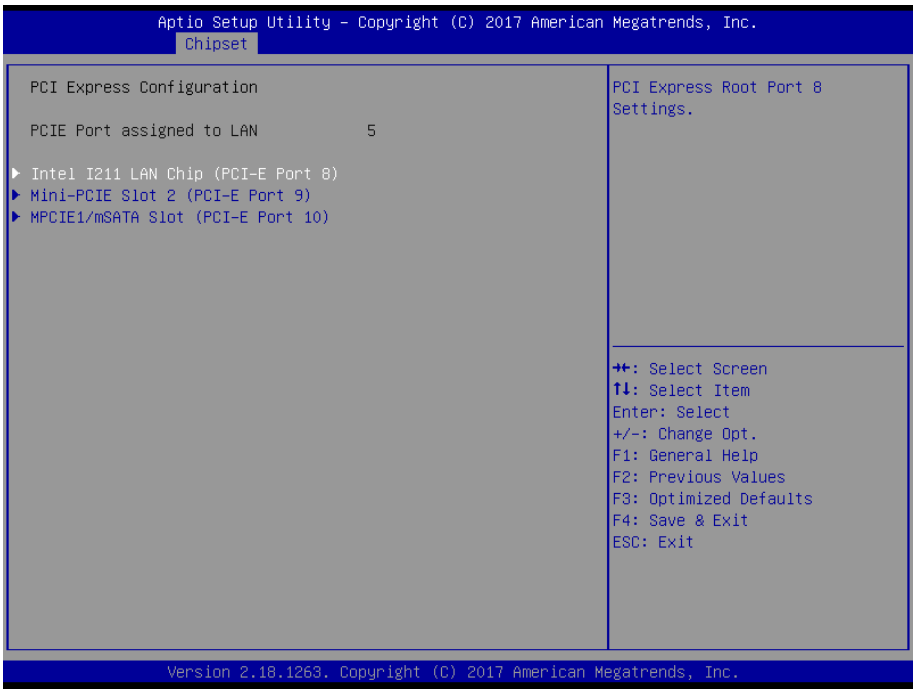



### 3.6.3.2 PCH-IO Configuration

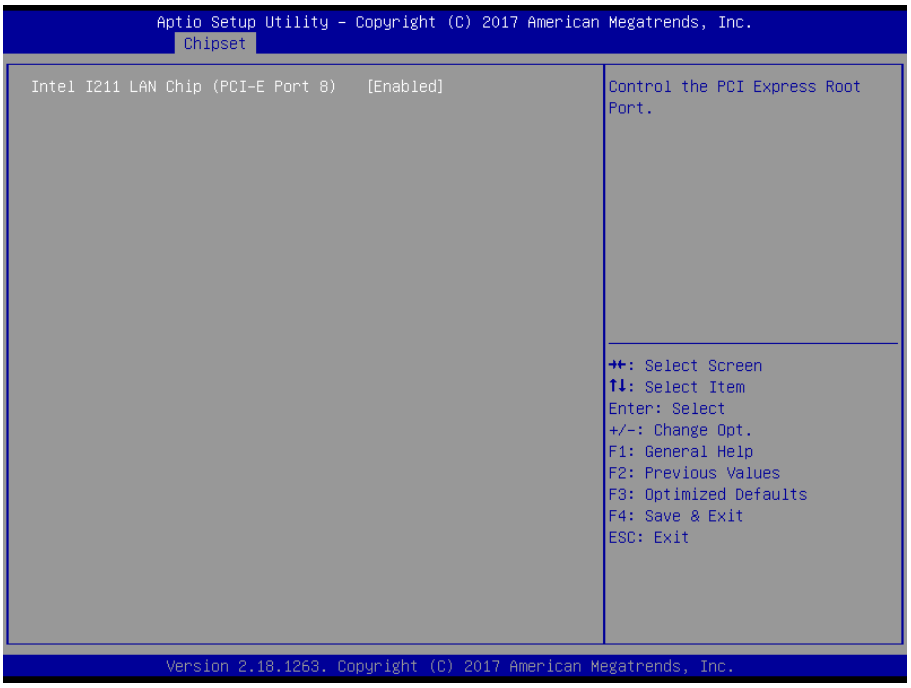



| Item | Option | Description |
|---|---|---|
| **LAN PHY Controller** | Disabled<br>Enabled**[Default]** | Enable or disable OnBoard PCH LAN PHY Controller. |

### 3.6.3.2.1 PCI Express Configuration

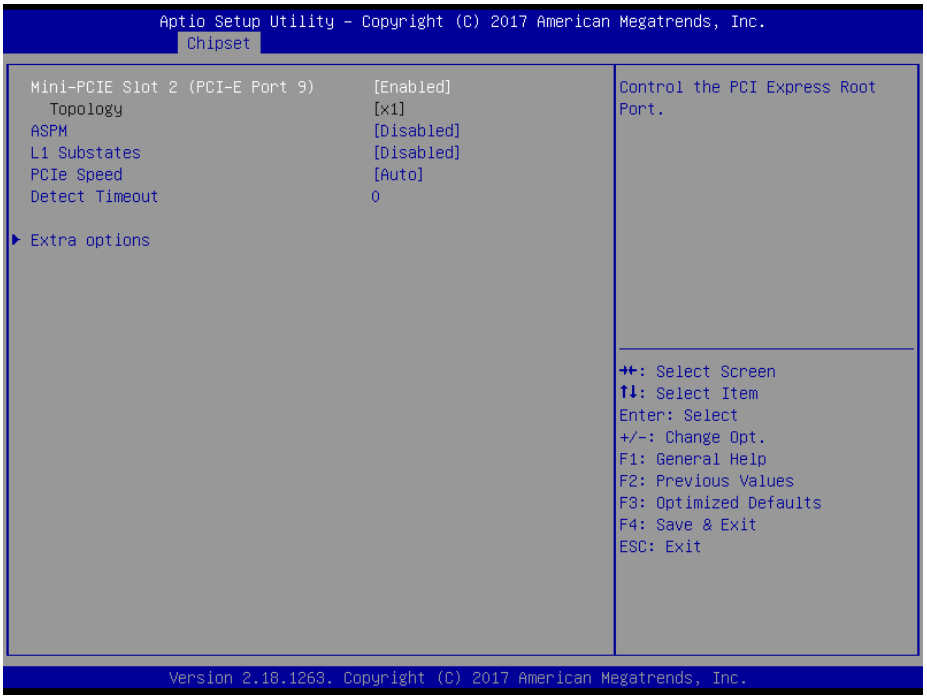



#### 3.6.3.2.1.1 Intel I211 LAN Chip (PCI-E Port 8)



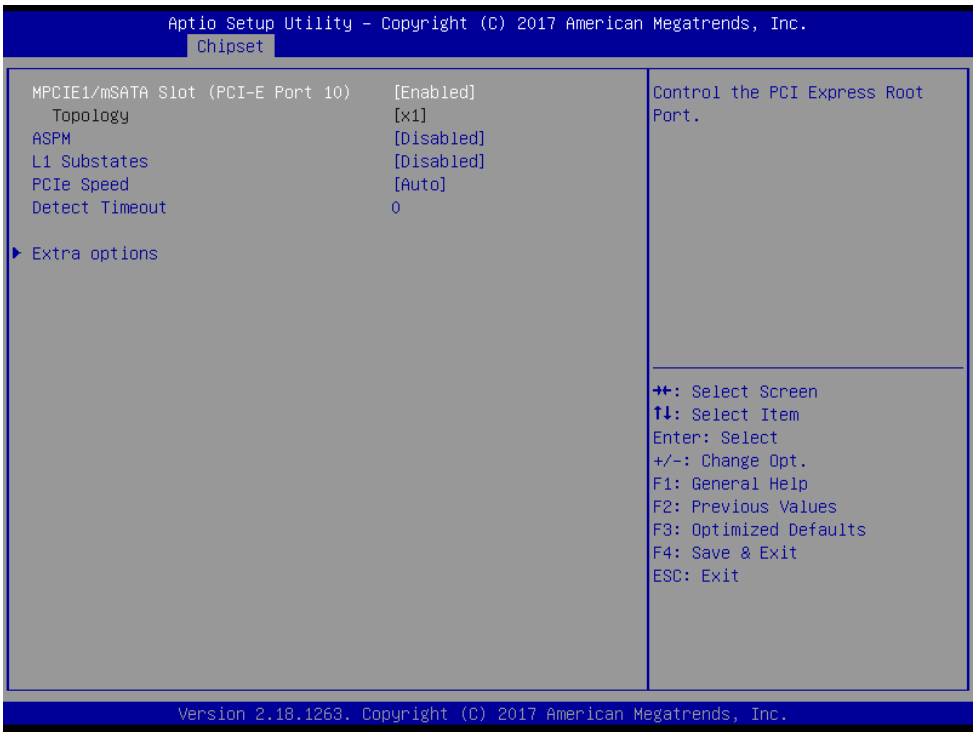

| Item | Option | Description |
|---|---|---|
| **Intel I211 LAN Chip (PCI-E Port 8)** | Disabled<br>Enabled**[Default]**, | Enable or Disable the Root Port. |

### 3.6.3.2.1.2 Mini-PCIE Slot 2 (PCI-E Port 9)



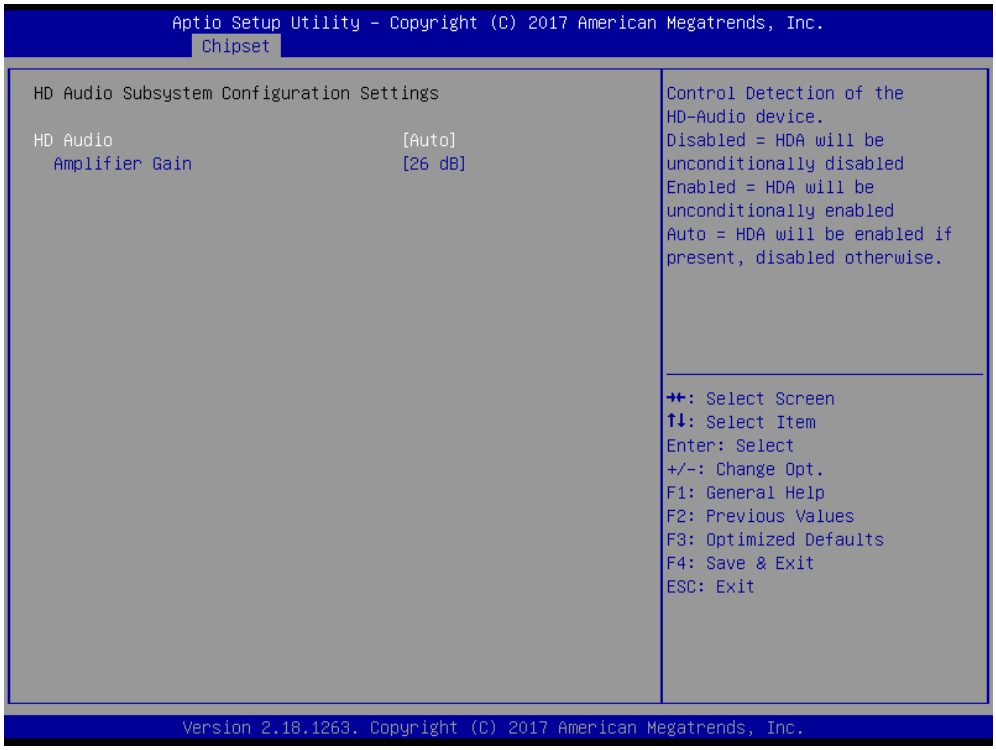

| Item | Option | Description |
|---|---|---|
| **Mini-PCIE Slot 2 (PCI-E Port 9)** | Disabled<br>Enabled**[Default]**, | Enable or Disable the Root Port. |
| **ASPM** | Disabled**[Default]**,<br>L0s<br>L1<br>L0sL1<br>Auto | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |
| **L1 Substates** | Disabled**[Default]**,<br>L1.1<br>L1.2<br>L1.1 & L1.2 | PCI Express L1 Substates settings. |
| **PCIe Speed** | Auto**[Default]**<br>Gen1<br>Gen2 | Select PCIe speed. |
| **Detect Timeout** | 0 | The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port. |

### 3.6.3.2.1.3 MPCIE/mSATA Slot (PCI-E Port 10)



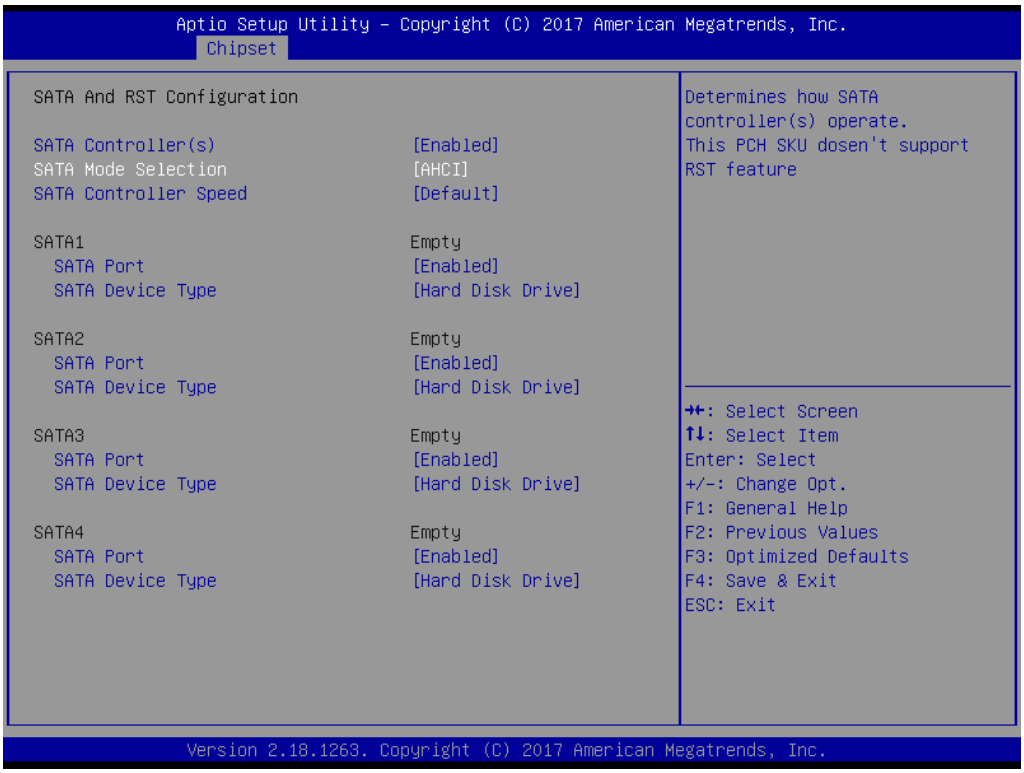

| Item | Option | Description |
|---|---|---|
| **MPCIE1/mSATA Slot (PCI-E Port 10)** | Enabled**[Default]**, Disabled | Enable or Disable the Root Port. |
| **ASPM** | Disabled**[Default]**, L0s L1 L0sL1 Auto | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |
| **L1 Substates** | Disabled**[Default]**, L1.1 L1.2 L1.1 & L1.2 | PCI Express L1 Substates settings. |
| **PCIe Speed** | Auto**[Default]** Gen1 Gen2 | Select PCIe speed. |
| **Detect Timeout** | 0 | The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port. |

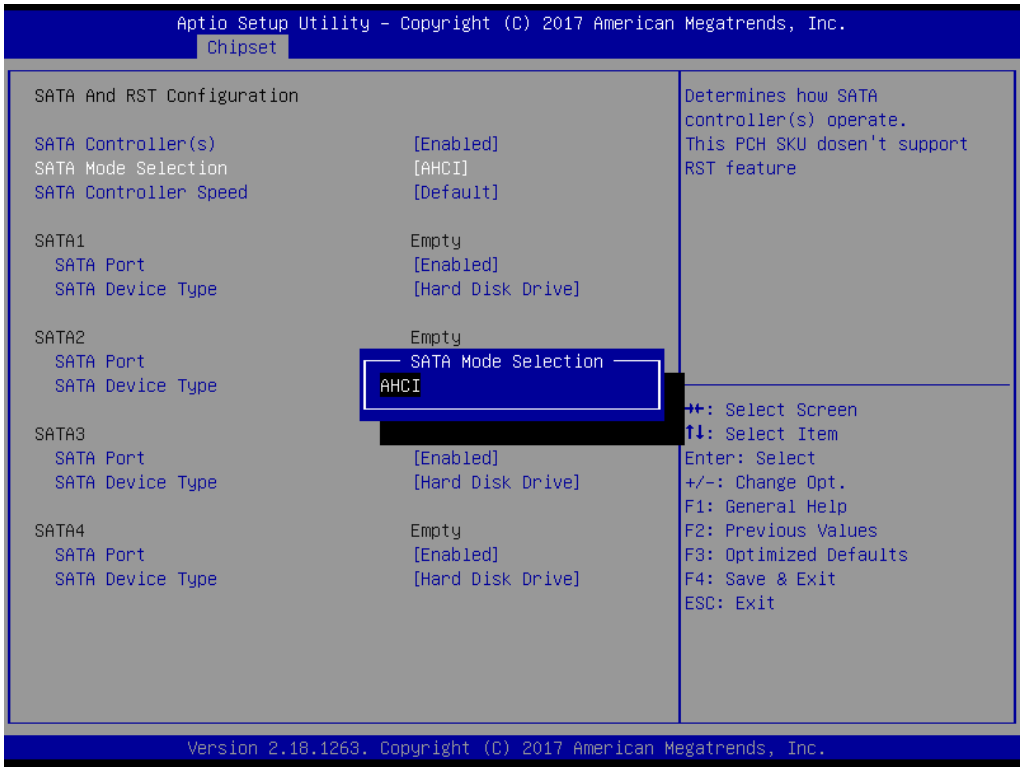
### 3.6.3.2.2 HD Audio Configuration




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

### 3.6.3.2.3 SATA And RST Configuration

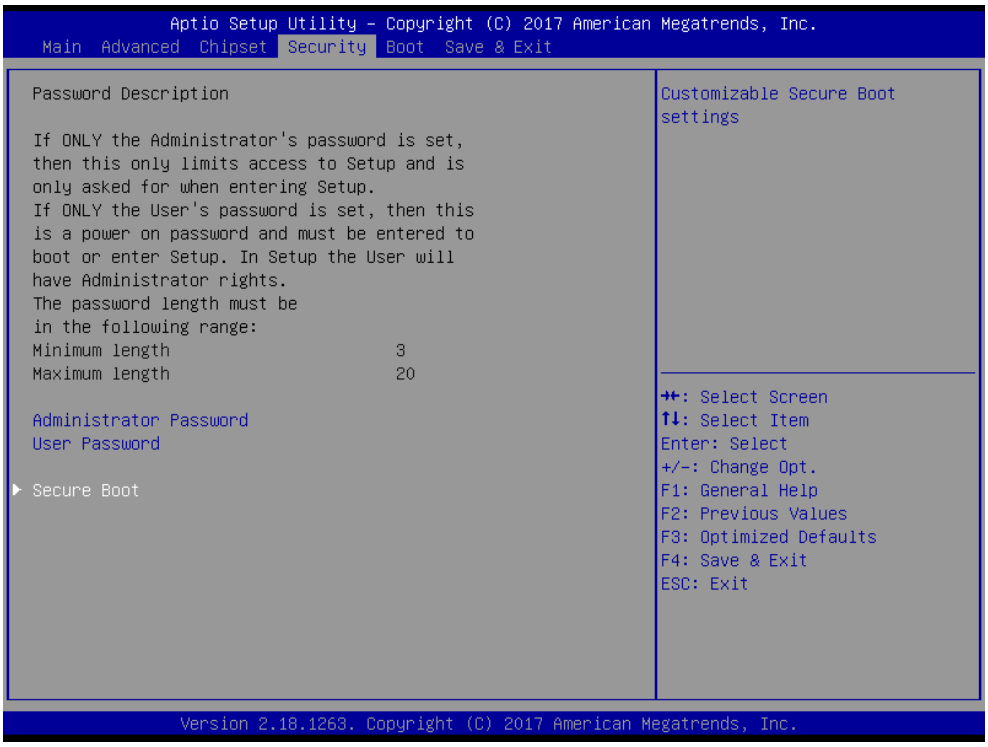



| Item | Option | Description |
|---|---|---|
| **SATA Controller(s)** | Enabled**[Default]**, Disabled | Enable/Disable SATA Device. |
| **SATA Mode Selection** | AHCI<br>RAID**[Default]** | Determines how SATA controller(s) operate. |

| | | |
|---|---|---|
| **SATA Controller Speed** | Default**[Default]**<br>Gen1<br>Gen2<br>Gen3 | Indicates the maximum speed the SATA controller can support. |
| **SATA Port** | Enabled**[Default]**,<br>Disabled | Enable or Disable SATA Port. |
| **SATA Device Type** | Hard Disk Drive**[Default]**,<br>Solid State Drive | Identify the SATA port is connected to Solid State Drive or Hard Disk Drive. |

### 3.6.4 Security



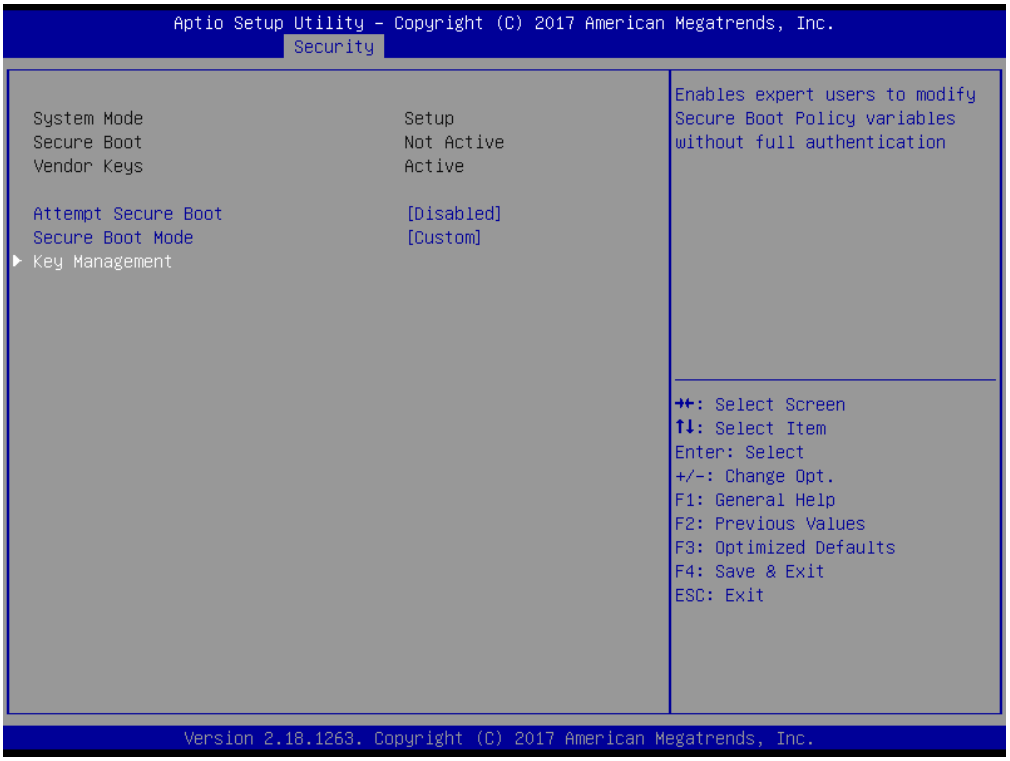

- **Administrator Password**

Set setup Administrator Password

- **User Password**

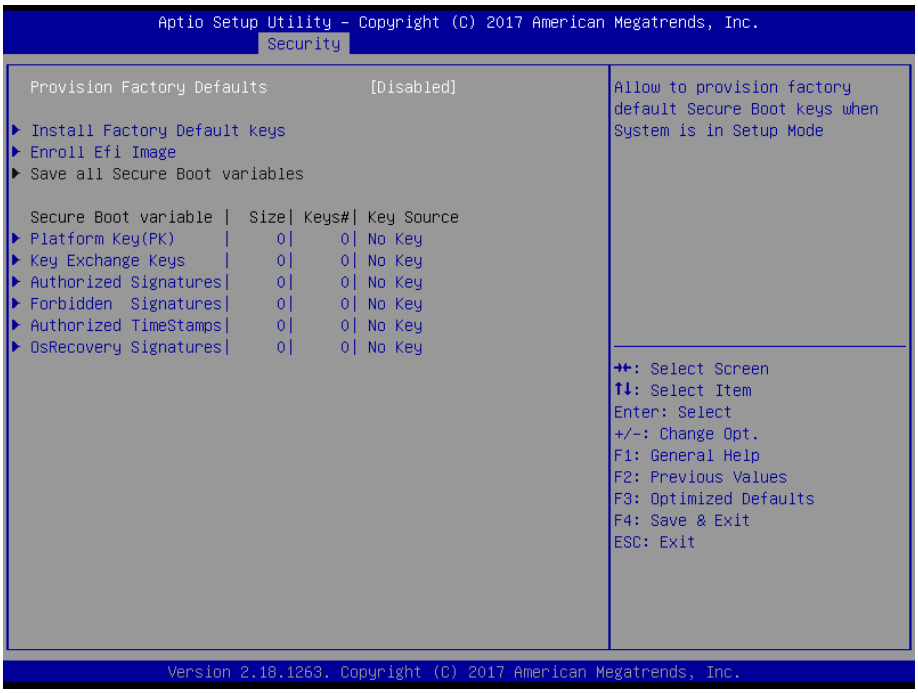
Set User Password

### 3.6.4.1 Secure Boot menu



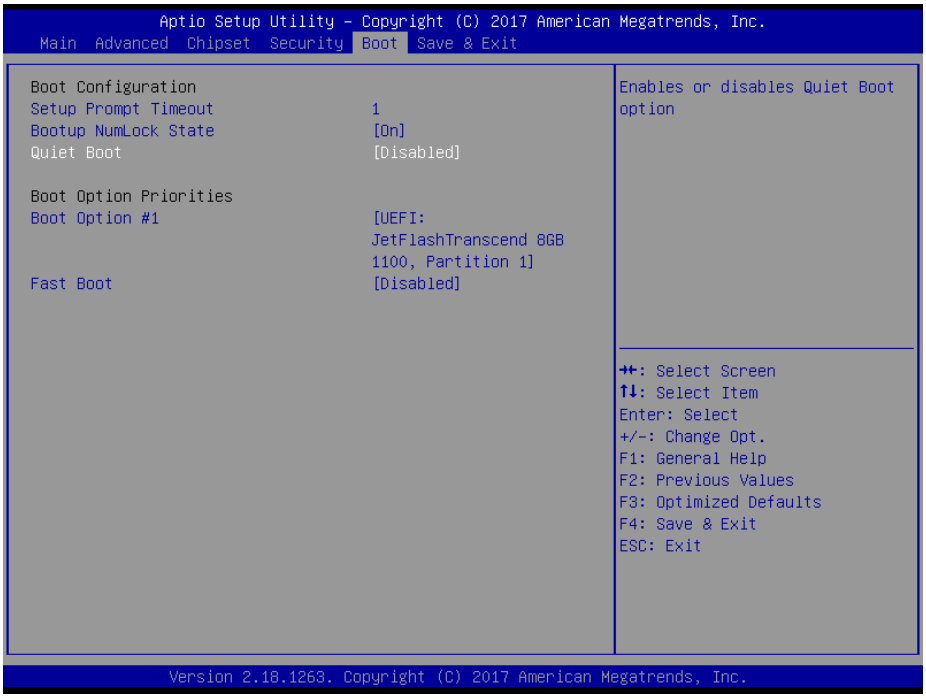

| Item | Option | Description |
|---|---|---|
| **Attempt Secure Boot** | Disabled**[Default]**<br>Enabled | Secure Boot can be enabled if 1.System running in User mode with enrolled Platform Key(PK) 2.CSM function is disabled. |
| **Secure Boot Mode** | Standard<br>Custom**[Default]** | Secure Boot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

#### 3.6.4.1.1 Key Management



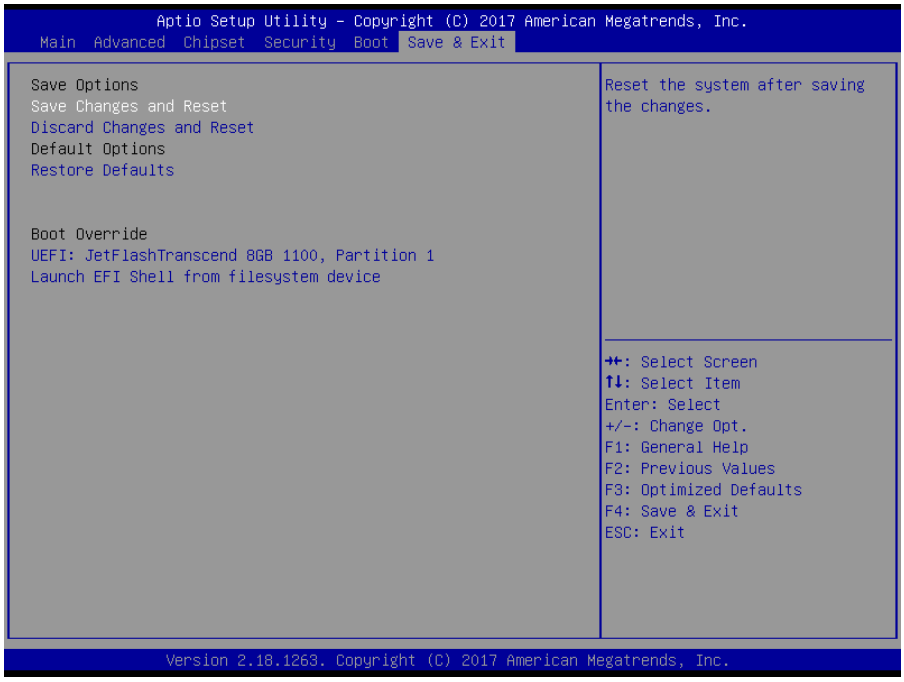

| Item | Option | Description |
|---|---|---|
| **Provision Factory Default** | Enabled,<br>Disabled**[Default]** | Allow to provision factory default Secure Boot keys when System is in Setup Mode. |

### 3.6.5 Boot



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

### 3.6.6 Save and exit




#### *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.

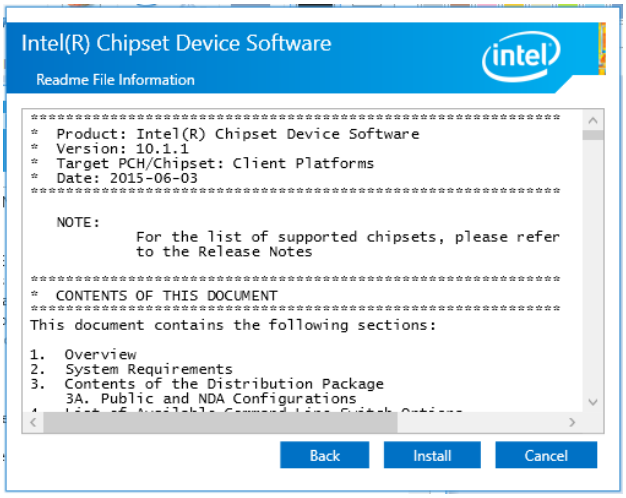
# 4. Drivers Installation

**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.

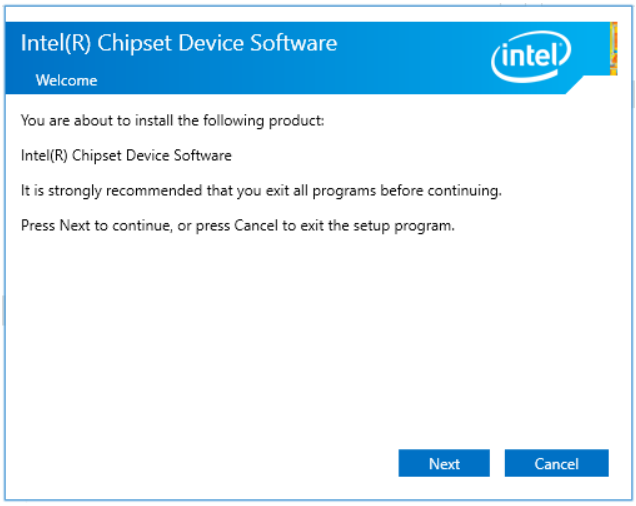
## 4.1 Install Chipset Driver

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.

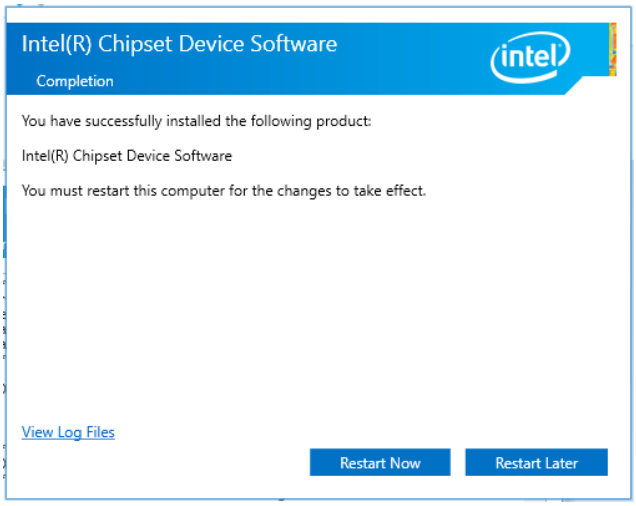
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



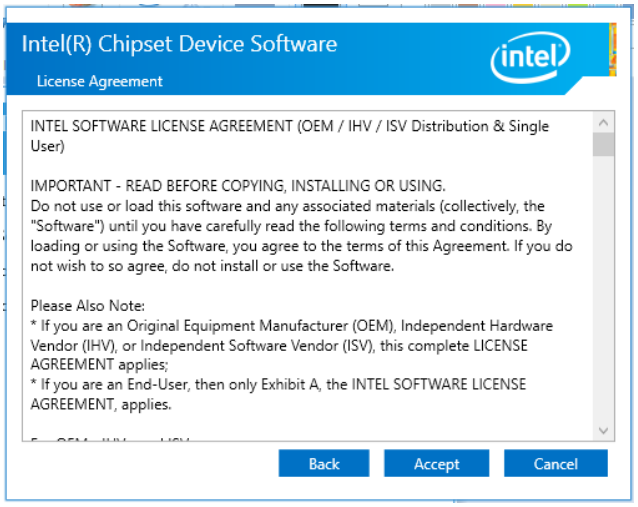

**Step 3.** Click **Install**.




**Step1.** Click **Next**.




**Step 4.** Complete setup.

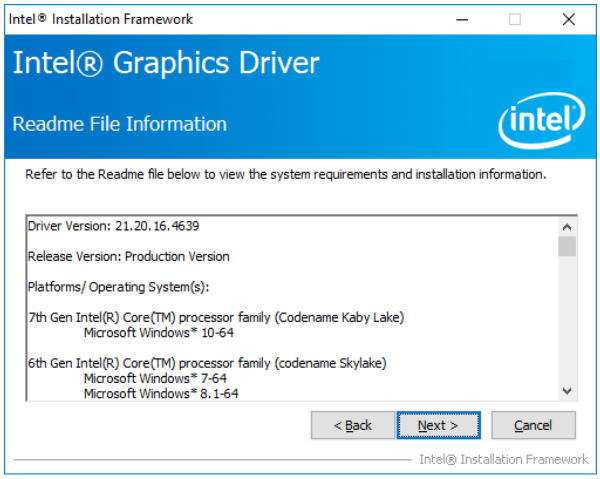



**Step 2.** Click **Accept**.

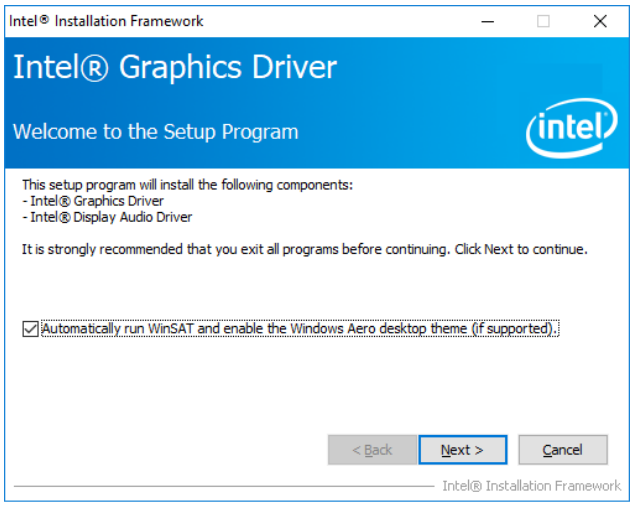
## 4.2 Install VGA Driver

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.

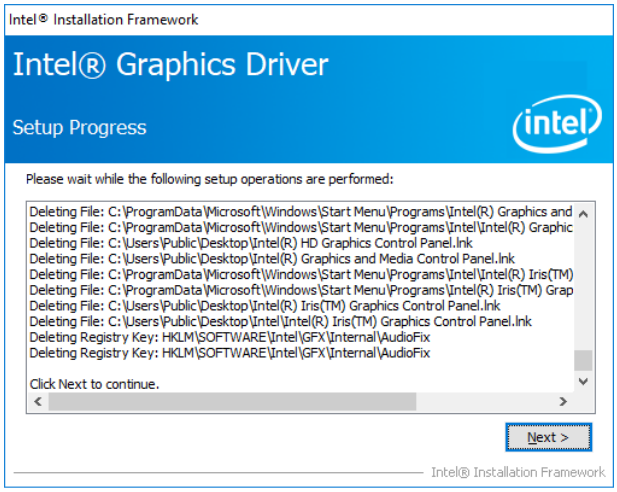
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system.



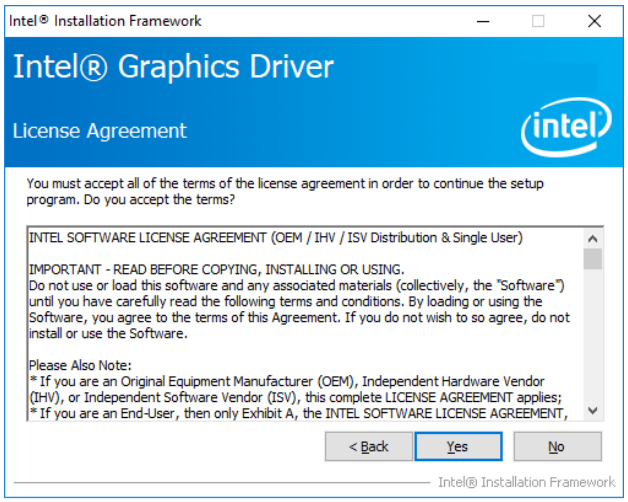

**Step 3.** Click **Next.**




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

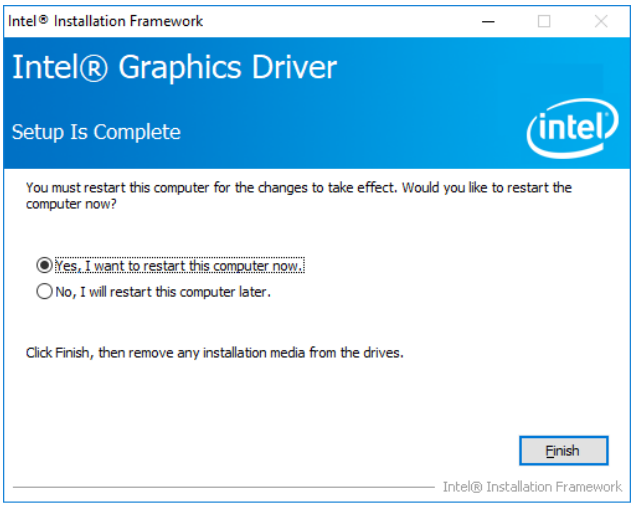



**Step 4.** Click **Next**.




**Step 2.**

Click **Yes** to accept license agreement.

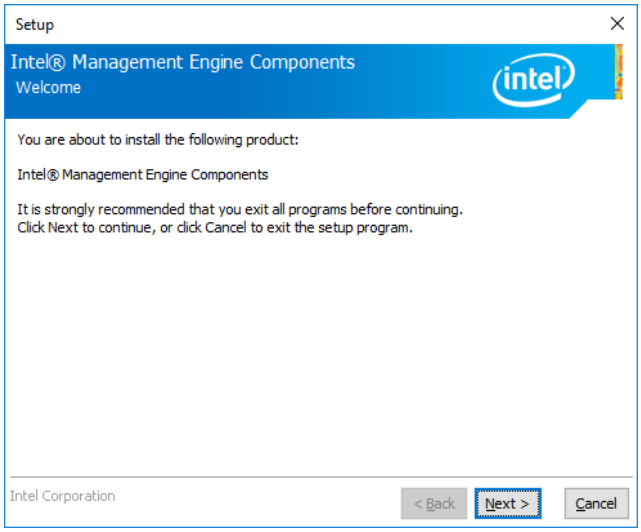



**Step 5.** Click **Finish** to complete setup.

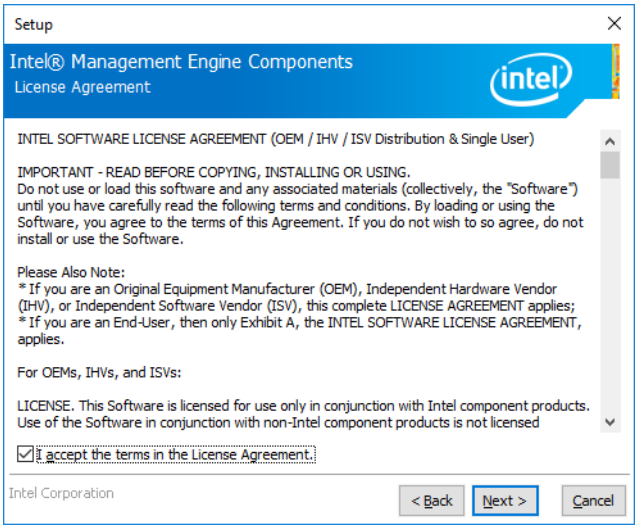
## 4.3 Install ME Driver

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

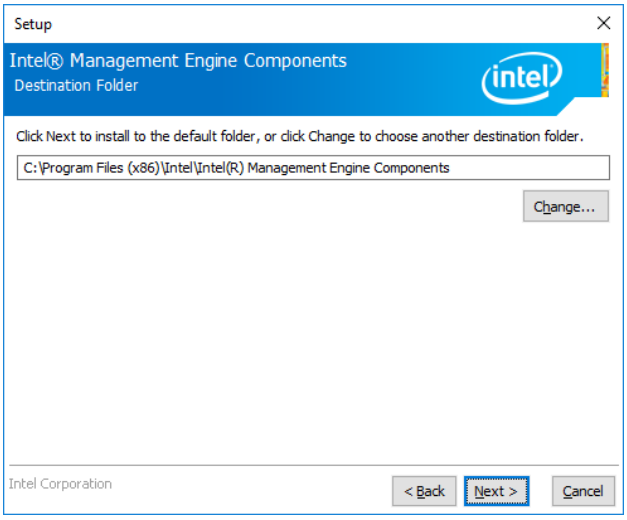
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system.



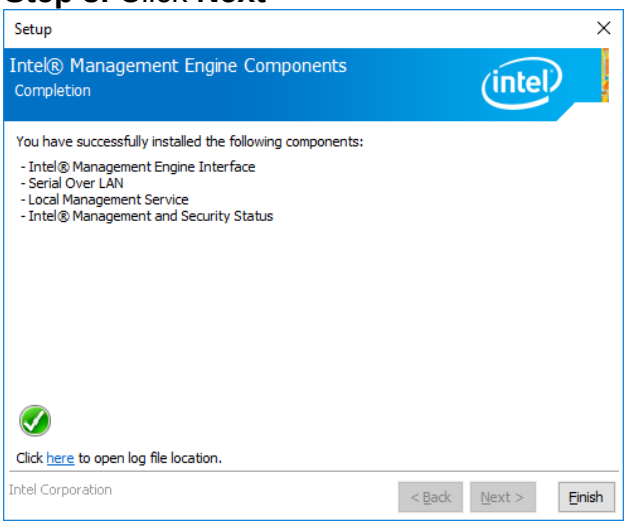

**Step 1.** Click **Next** to continue setup.




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




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

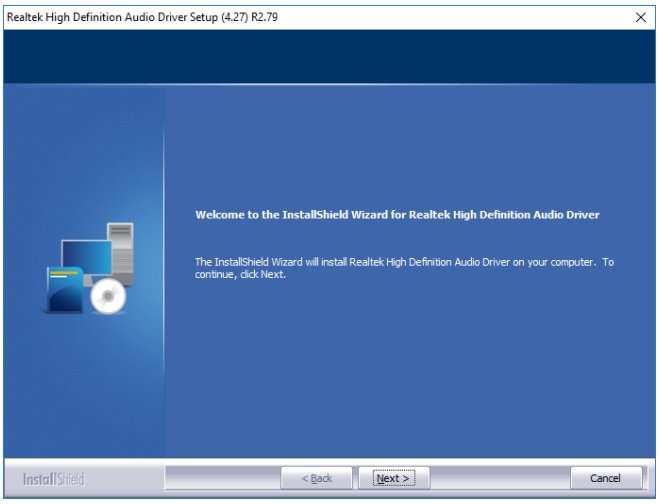



**Step 4.** Click **Finish** to complete the setup

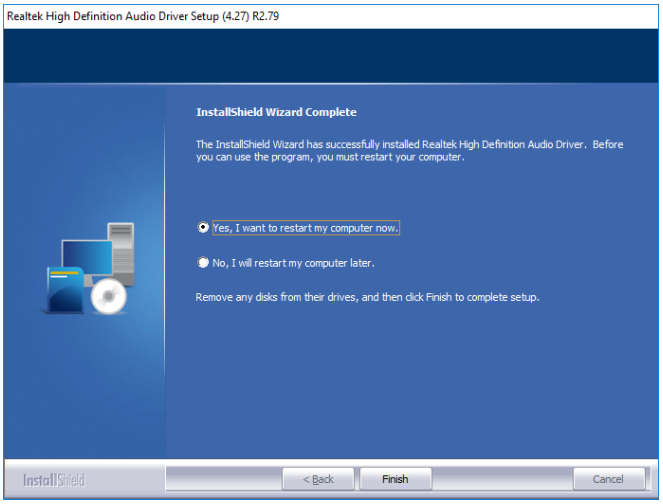
## 4.4 Install Audio Driver (For Realtek ALC892 HD Audio)

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.

**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 Install.

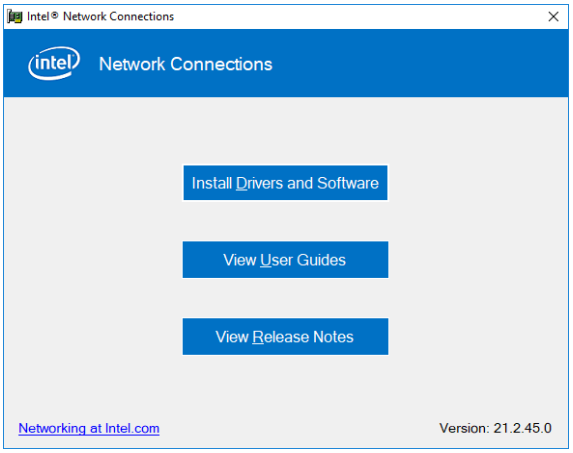



**Step 2.** Select **Finish** to complete Installation.

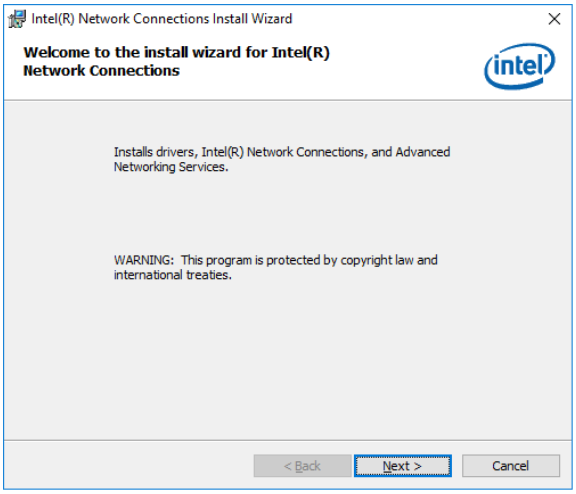
## 4.5 Install LAN Driver

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.

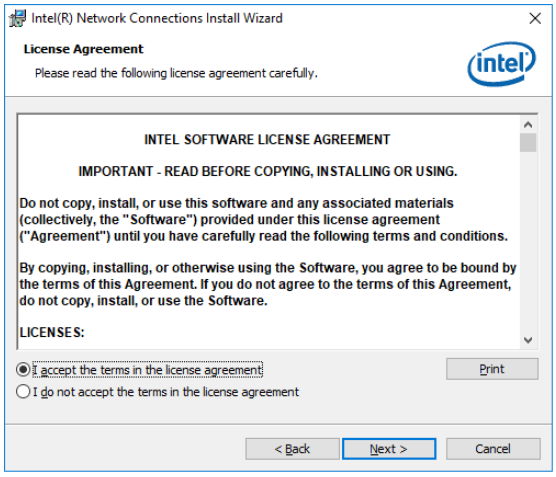
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system.



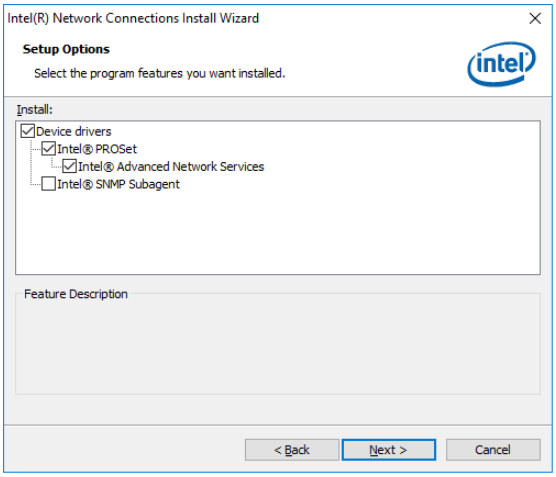

**Step 1.** Click **Install Drivers and Software**.



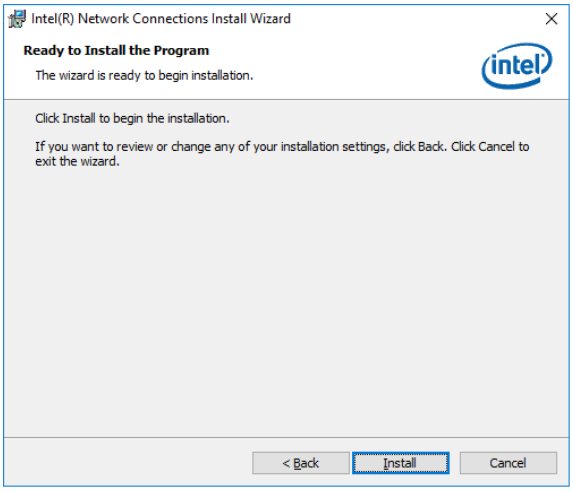

**Step 2.** Click **Next**.



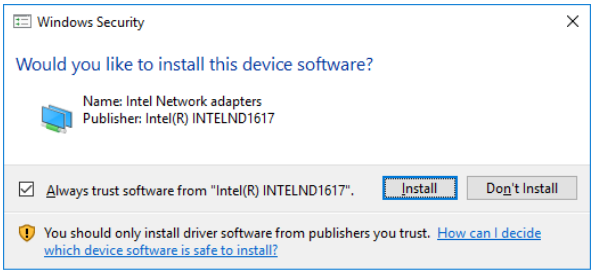

**Step 3.** Click **Next**.



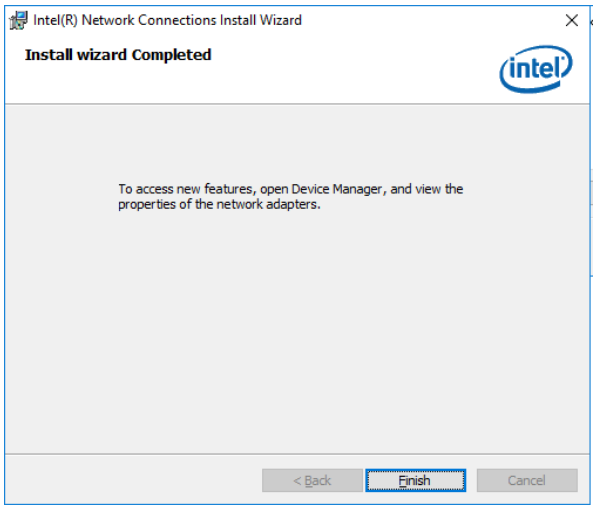

**Step 4.** Click **Next**.




**Step 5.** Click **Install**.




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

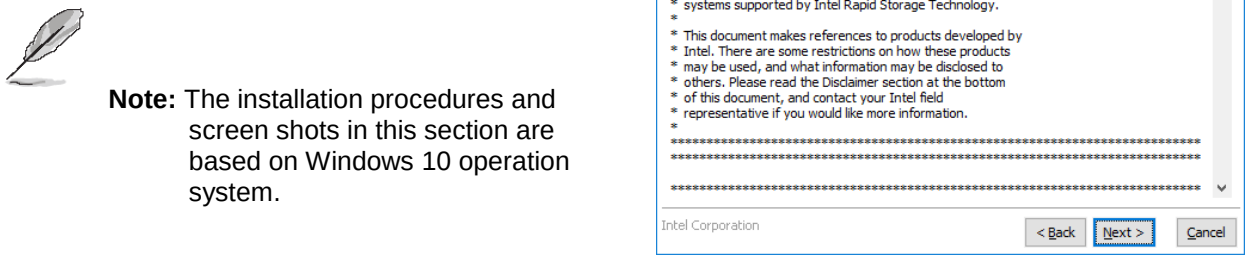



**Step 7.** Click **Finish** to complete setup.

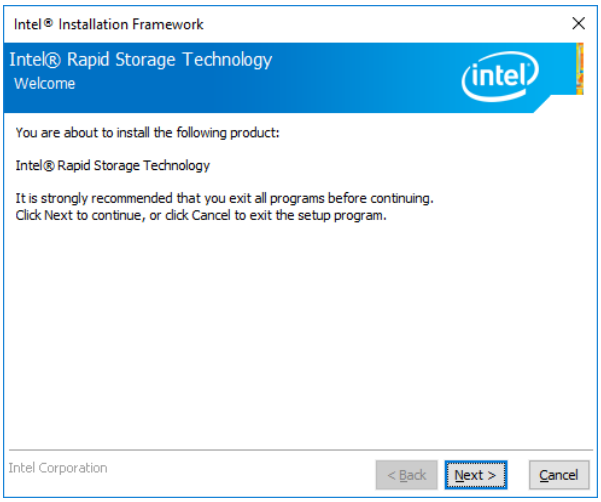
## 4.6 Install RST Driver

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.

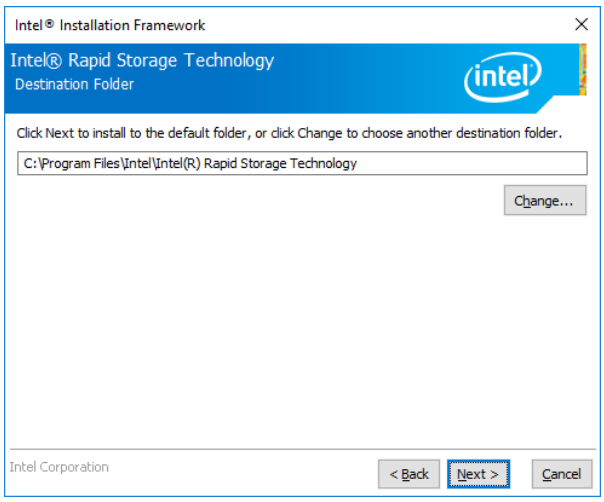
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system.



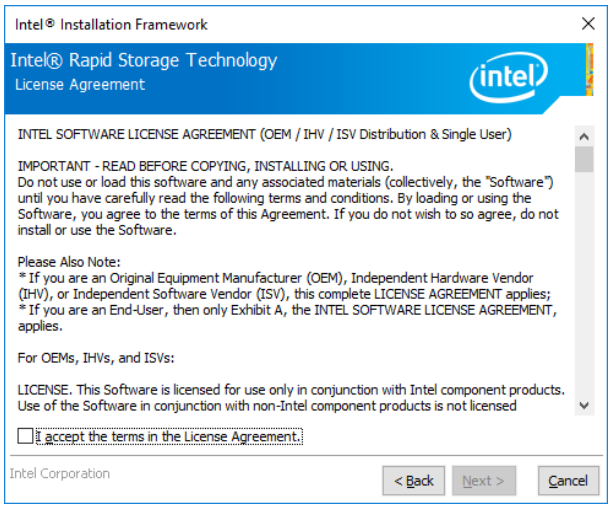

**Step 3.** Click **Next.**



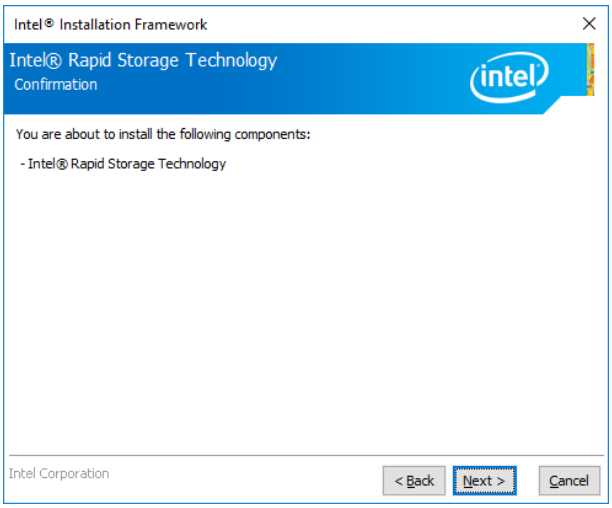

**Step 1.** Click **Next** to continue installation.



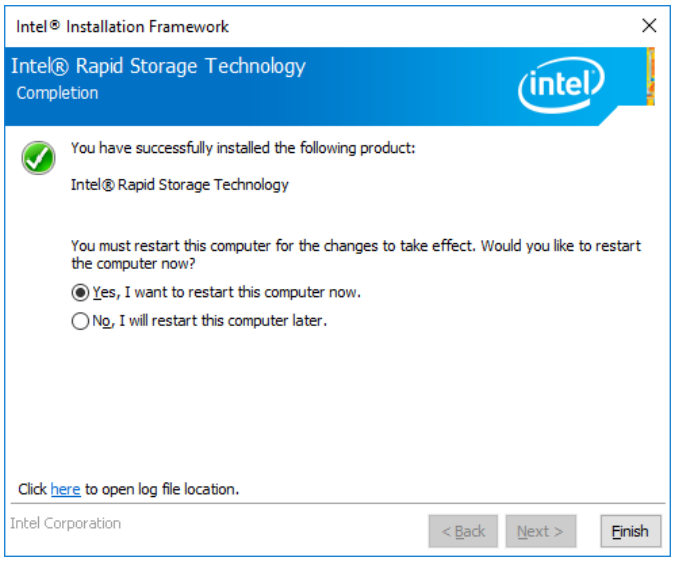

**Step 4.** Click **Next**.




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

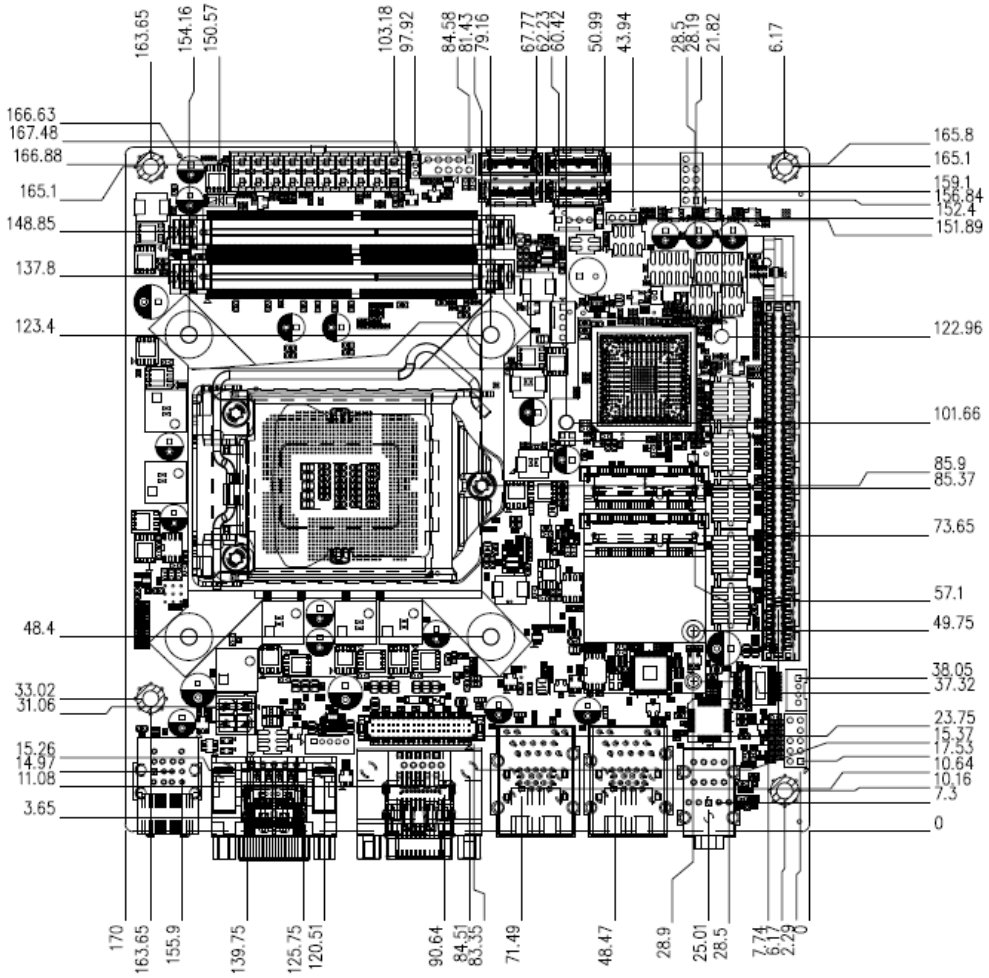


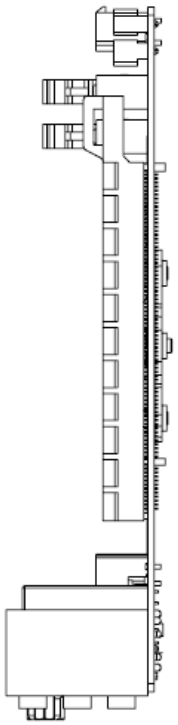

**Step 5.** Click **Next**.

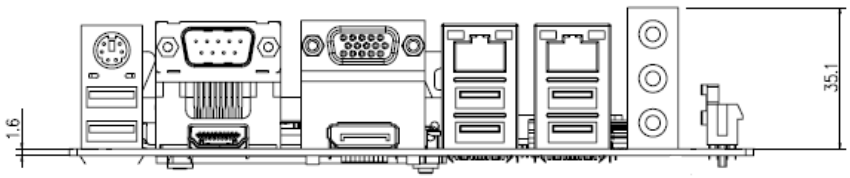



**Step 6.** Click **Finish** to complete setup.

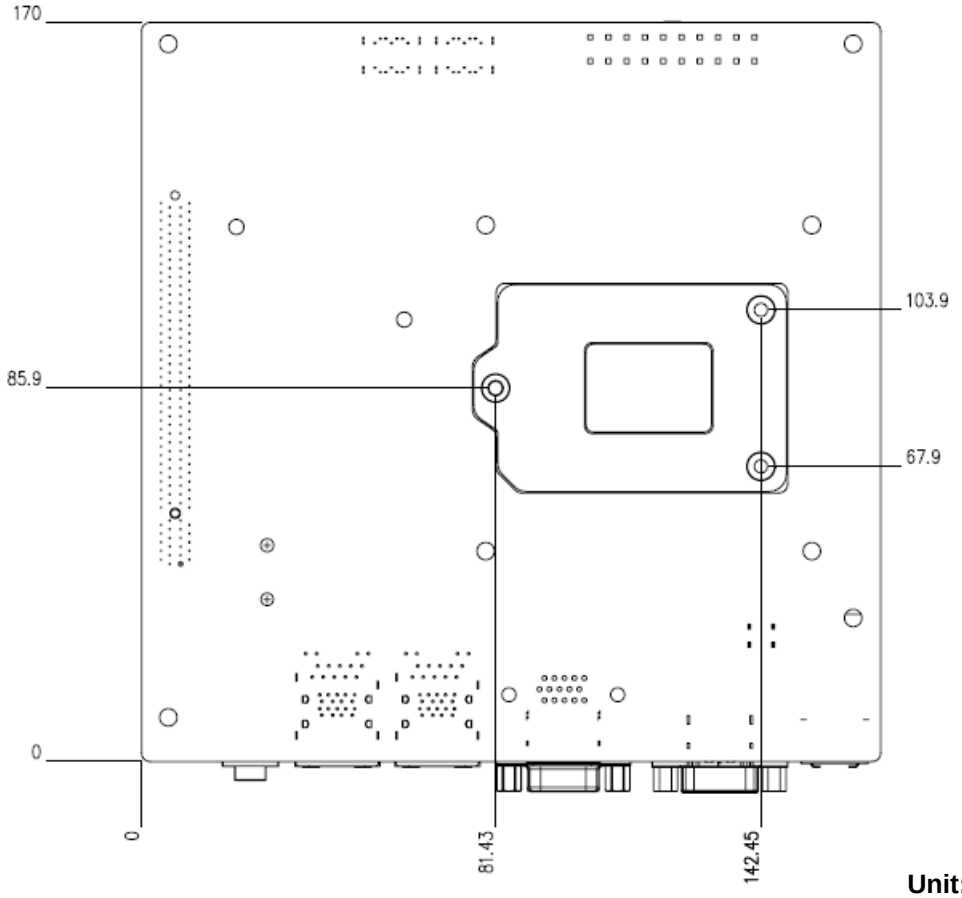
# 5. Mechanical Drawing


163.65
154.16
150.57
103.18
97.92
84.58
81.43
79.16
67.77
62.23
60.42
50.99
43.94
28.5
28.19
21.82
6.17
166.63
167.48
166.88
165.1
148.85
137.8
123.4
48.4
33.02
31.06
15.26
14.97
11.08
3.65
165.8
165.1
159.1
156.84
152.4
151.89
122.96
101.66
85.9
85.37
73.65
57.1
49.75
38.05
37.32
23.75
19.37
17.53
10.64
10.16
7.3
0
170
163.65
155.9
139.75
125.75
120.51
90.64
84.51
83.35
71.49
48.47
28.9
25.01
28.5
7.74
6.17
2.29
0




1.6
35.1

**Unit: mm**




**Unit: mm**