

# ESM-KBLA

7th Gen Intel® Xeon™ Processors E3-15XX v6 Series Type 6  
COMe Basic Module with Intel®CM238 Chipset

## User's Manual

1<sup>st</sup> Ed – 05 September 2017

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Part No. E2047289200R

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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.

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## Notice

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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 ESM-KBLA COMe Module
- 1 x Driver/Utility DVD-ROM
- 5 x Screws
- 1 x Desiccant



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

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1.3 Document Amendment History

| Revision        | Date           | By     | Comment         |
|-----------------|----------------|--------|-----------------|
| 1 <sup>st</sup> | September 2017 | Avalue | Initial Release |

## 1.4 Manual Objectives

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

Please be aware that it is possible to create configurations within the 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             |                                                                                                                                                                                                                                                                          |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CPU                | IOTG 7th Generation Intel® Xeon® Processor E3-1505M v6 / E3-1505L v6                                                                                                                                                                                                     |
| BIOS               | AMI uEFI BIOS, 128 Mbit SPI Flash ROM<br>iAMT (Optional)                                                                                                                                                                                                                 |
| System Chipset     | Intel CM238                                                                                                                                                                                                                                                              |
| I/O Chip           | EC (IT8528E)                                                                                                                                                                                                                                                             |
| System Memory      | Two 260-pin SODIMM DDR4 2400 / 2133 SDRAM with ECC support                                                                                                                                                                                                               |
| Watchdog Timer     | H/W Reset, 1sec. ~ 65535sec. and 1sec./step                                                                                                                                                                                                                              |
| H/W Status Monitor | Monitoring System Temperature, Voltage and FAN Status with Auto Throttling Control                                                                                                                                                                                       |
| Expansion          | 8 x PCIe * 1                                                                                                                                                                                                                                                             |
| I/O                |                                                                                                                                                                                                                                                                          |
| MIO                | 4 x SATAIII (Support RAID0, 1, 5, 10), LPC, I2C, SPI, SMBus, 2 x UART (2-wire), SDIO (optional)                                                                                                                                                                          |
| USB                | 8 x USB 2.0, 4 x USB 3.0                                                                                                                                                                                                                                                 |
| GPIO               | 8bit GPIO                                                                                                                                                                                                                                                                |
| Display            |                                                                                                                                                                                                                                                                          |
| Chipset            | Intel® Kaby Lake Processor integrated Graphics                                                                                                                                                                                                                           |
| Resolution         | HDMI 1.4: 4096 x 2160 @24Hz (only one display output)<br>DP 1.2: 4096 x 2304 @60Hz (only one display output)<br>eDP 1.4 (optional): 4096 x 2304 @60Hz (only one display output)<br>LVDS ( via eDP-to-LVDS): 1920 x 1080 @60Hz<br>VGA ( via DP-to-VGA): 1920 x 1080 @60Hz |
| Multiple Display   | Active 3 Display Combinations : IBL#567387 rev 1.1 page 74                                                                                                                                                                                                               |
|                    |                                                                                                                                                                                                                                                                          |
|                    |                                                                                                                                                                                                                                                                          |
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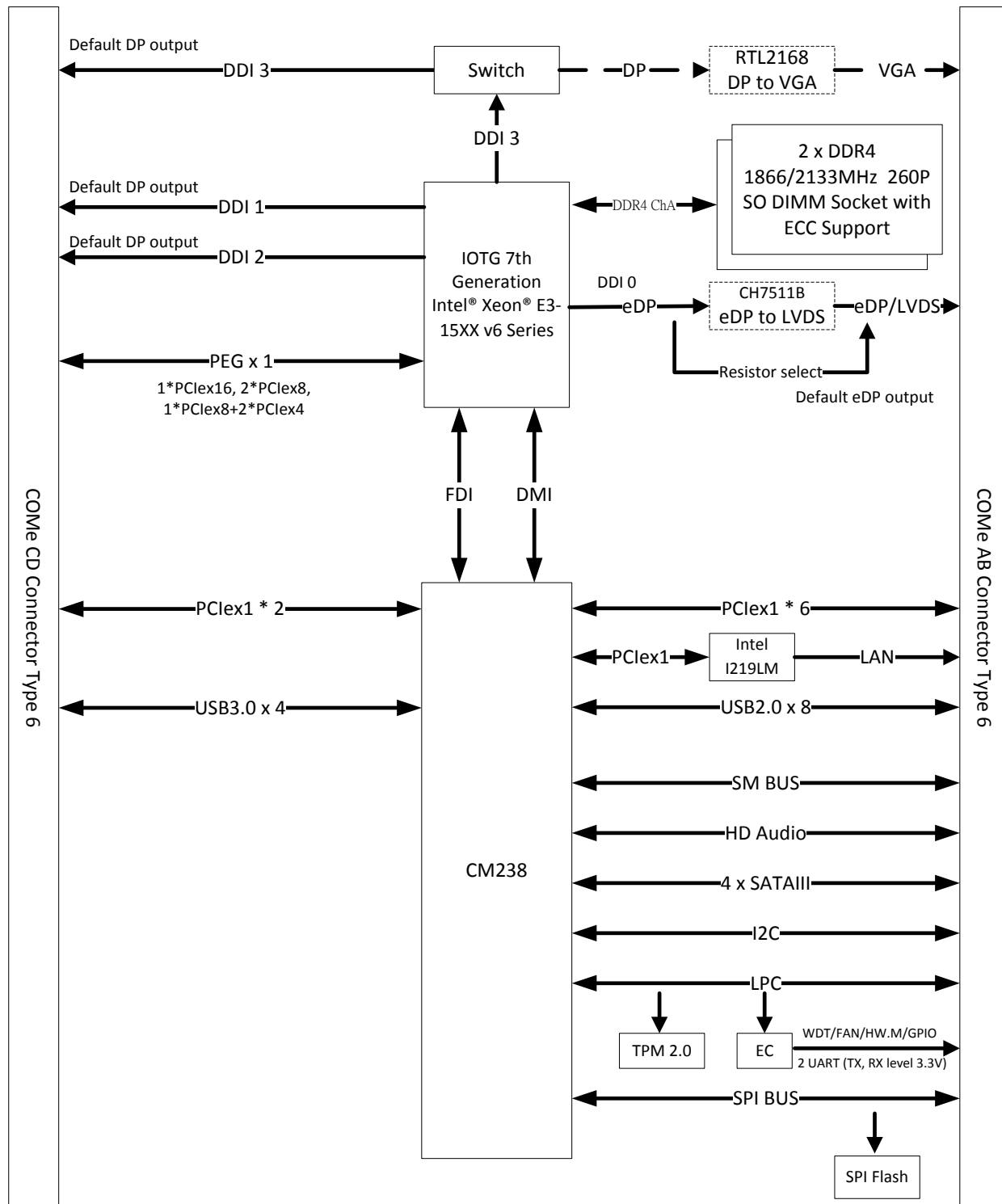
|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|-----|----|----|-----|----|------|-----|------|----|-----|------|------|-----|------|-----|-----|-----|------|-----|-----|----|-----|----|-----|
|                                      | Note:<br>*For VGA, a DP to VGA converter is required.                                                                                                                                                                                                                                                                                                                                                                                               |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
|                                      | <table><tr><td>Display1</td><td>Display2</td><td>Display3</td></tr><tr><td>eDP</td><td>DP</td><td>DP</td></tr><tr><td>eDP</td><td>DP</td><td>HDMI</td></tr><tr><td>eDP</td><td>HDMI</td><td>DP</td></tr><tr><td>eDP</td><td>HDMI</td><td>HDMI</td></tr><tr><td>eDP</td><td>HDMI</td><td>DVI</td></tr><tr><td>eDP</td><td>DVI</td><td>HDMI</td></tr><tr><td>eDP</td><td>DVI</td><td>DP</td></tr><tr><td>eDP</td><td>DP</td><td>DVI</td></tr></table> | Display1 | Display2 | Display3 | eDP | DP | DP | eDP | DP | HDMI | eDP | HDMI | DP | eDP | HDMI | HDMI | eDP | HDMI | DVI | eDP | DVI | HDMI | eDP | DVI | DP | eDP | DP | DVI |
|                                      | Display1                                                                                                                                                                                                                                                                                                                                                                                                                                            | Display2 | Display3 |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
|                                      | eDP                                                                                                                                                                                                                                                                                                                                                                                                                                                 | DP       | DP       |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
|                                      | eDP                                                                                                                                                                                                                                                                                                                                                                                                                                                 | DP       | HDMI     |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
|                                      | eDP                                                                                                                                                                                                                                                                                                                                                                                                                                                 | HDMI     | DP       |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
|                                      | eDP                                                                                                                                                                                                                                                                                                                                                                                                                                                 | HDMI     | HDMI     |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
|                                      | eDP                                                                                                                                                                                                                                                                                                                                                                                                                                                 | HDMI     | DVI      |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
|                                      | eDP                                                                                                                                                                                                                                                                                                                                                                                                                                                 | DVI      | HDMI     |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
|                                      | eDP                                                                                                                                                                                                                                                                                                                                                                                                                                                 | DVI      | DP       |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| eDP                                  | DP                                                                                                                                                                                                                                                                                                                                                                                                                                                  | DVI      |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Note: Depends on vary carrier board. |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| HDMI                                 | HDMI 1.4                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| LCD Interface                        | LVDS via CH7511B<br>VGA via RTL2168 (DP to VGA)                                                                                                                                                                                                                                                                                                                                                                                                     |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Audio                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Audio Amp                            | intel HD audio I/F                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Ethernet                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Ethernet Interface                   | Intel I219LM Gigabit Ethernet PHY                                                                                                                                                                                                                                                                                                                                                                                                                   |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Mechanical & Environmental           |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Power Requirement                    | +9 ~ +19V                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| ACPI                                 | Single power ATX Support S0, S3, S4, S5<br>ACPI 5.0 Compliant                                                                                                                                                                                                                                                                                                                                                                                       |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Power Type                           | AT/ATX                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Operating Temp.                      | Standard: 0 to 60°C                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Storage Temp.                        | -40°C to 75°C                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Operating Humidity                   | 0% ~ 90% relative humidity, non-condensing                                                                                                                                                                                                                                                                                                                                                                                                          |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Size (L x W)                         | 125 mm x 95 mm                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |
| Weight                               | 0.44lbs(0.2kg)                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |          |          |     |    |    |     |    |      |     |      |    |     |      |      |     |      |     |     |     |      |     |     |    |     |    |     |



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

## 1.6 Architecture Overview—Block Diagram

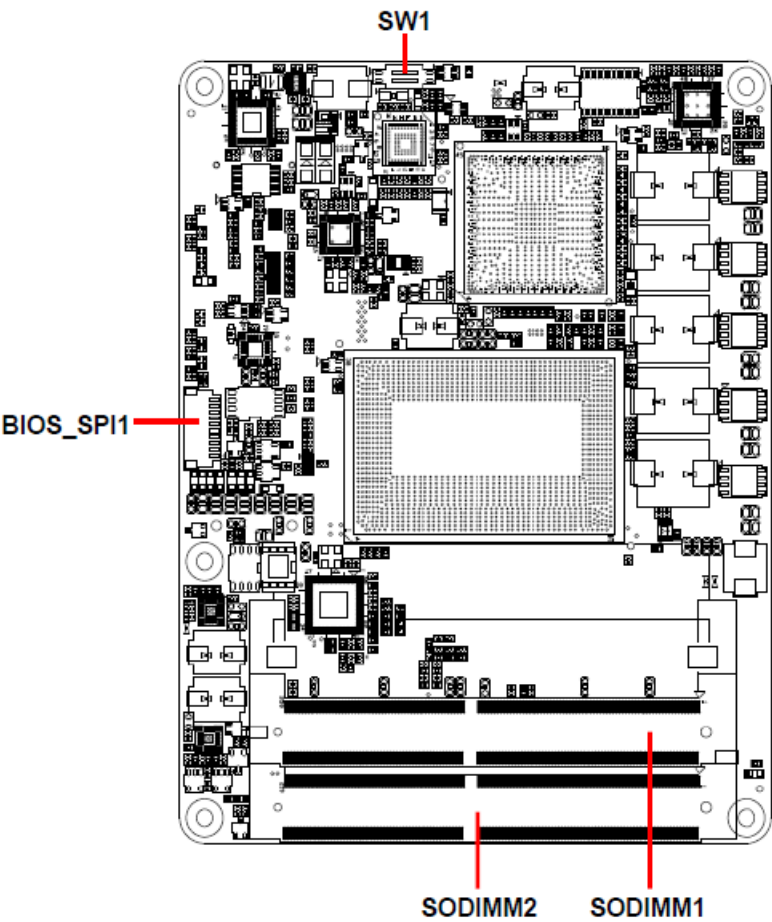
The following block diagram shows the architecture and main components of ESM-KBLA.

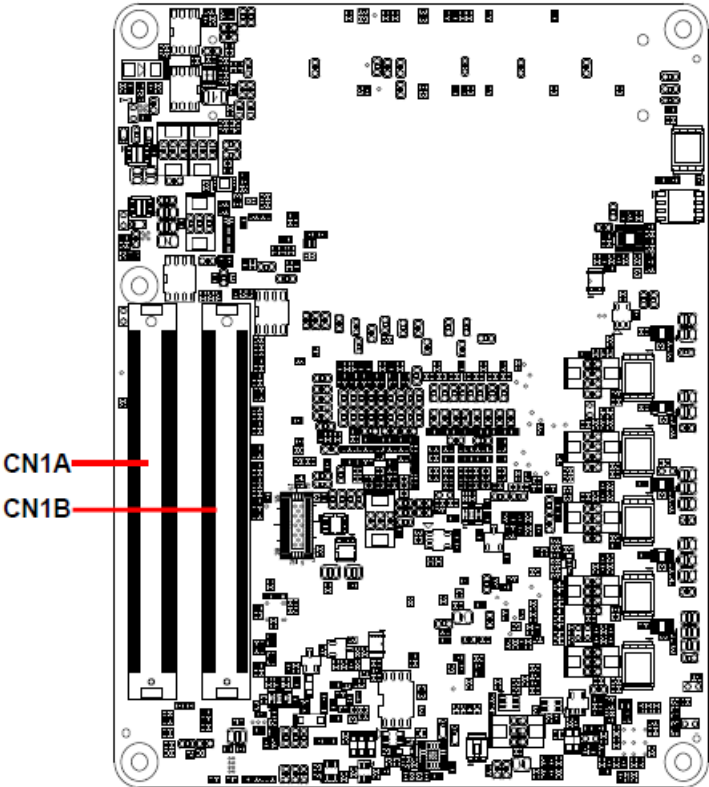


## 2. Hardware Configuration

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2.1 Product Overview





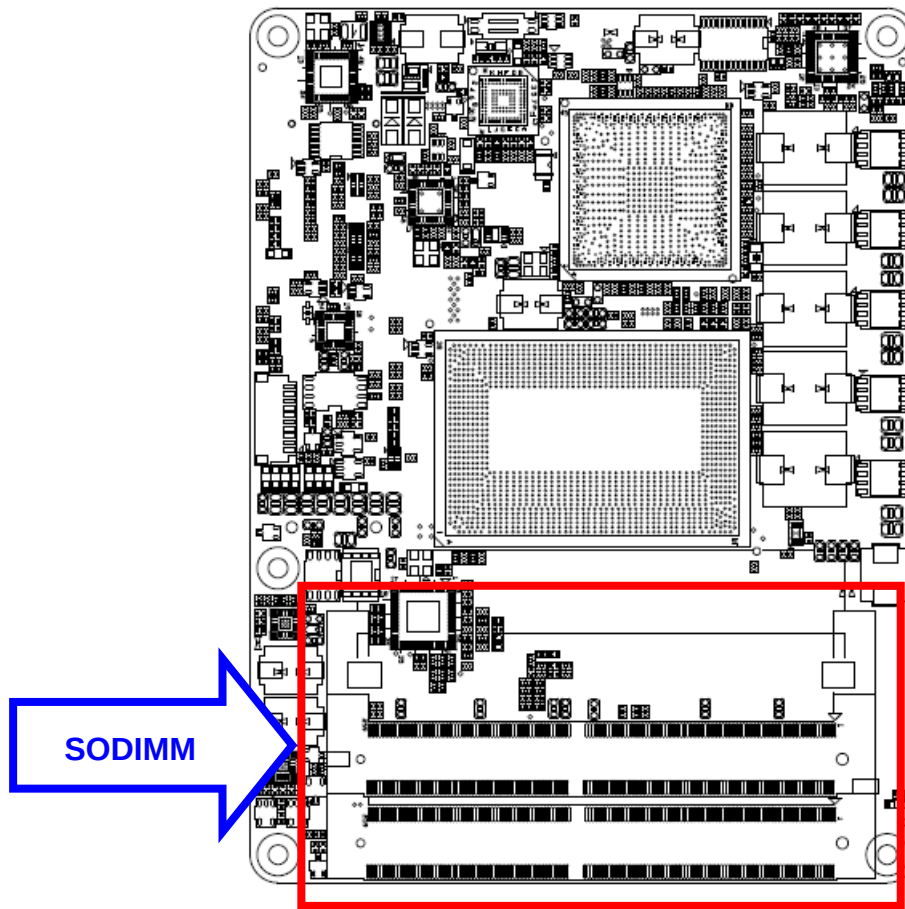
## **2.2 Installation Procedure**

This chapter explains you the instructions of how to setup your system.

1. Turn off the power supply.
2. Insert the DIMM module (be careful with the orientation).
3. Insert all external cables for hard disk, keyboard, mouse, USB etc. except for flat panel. A CRT monitor must be connected in order to change NVRAM settings to support flat panel.
4. Connect power supply to the board via the ATXPWR.
5. Turn on the power.
6. Enter the BIOS setup by pressing the delete key during boot up. Use the "Save & Exit \ Restore Defaults" feature.
7. If TFT panel display is to be utilized, make sure the panel voltage is correctly set before connecting the display cable and turning on the power.

### 2.2.1 Main Memory

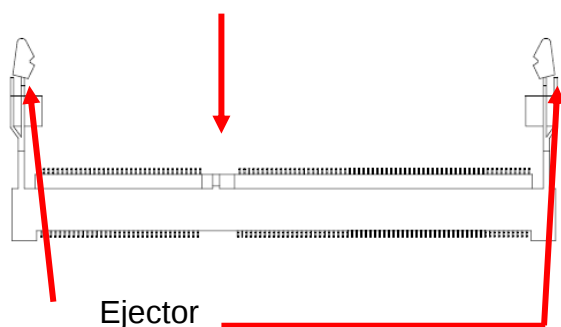
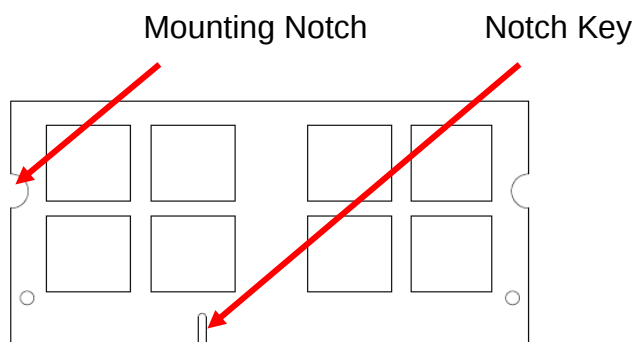
ESM-KBLA provides two 260-pin SODIMM socket, supports up to 32GB DDR4 2400/2133 SDRAM



Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to board and components.

## ESM-KBLA User's Manual

- Locate the SODIMM socket on the board.
- Carefully hold two edges of the SODIMM module. avoid touching its connectors.
- Align the notch key on the module with the rib on the slot.
- Firmly press the modules into the socket which automatically snaps into the mounting notch. Do not force the SODIMM module in with extra force as the SODIMM module only fits in one direction.



**260-pin DDR4 SODIMM**

- To remove SODIMM modules, simultaneously push the two ejector tabs outward, then pull out the SODIMM module.



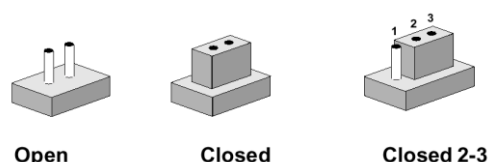
### **Note:**

- (1) Please do not change any DDR4 SDRAM parameter in BIOS setup to increase your system's performance without acquiring technical information in advance.
- (2) Static electricity can damage the electronic components of the computer or optional boards. Before proceeding, ensure that you are discharged of static electricity by briefly touching a grounded metal object.

## 2.3 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.

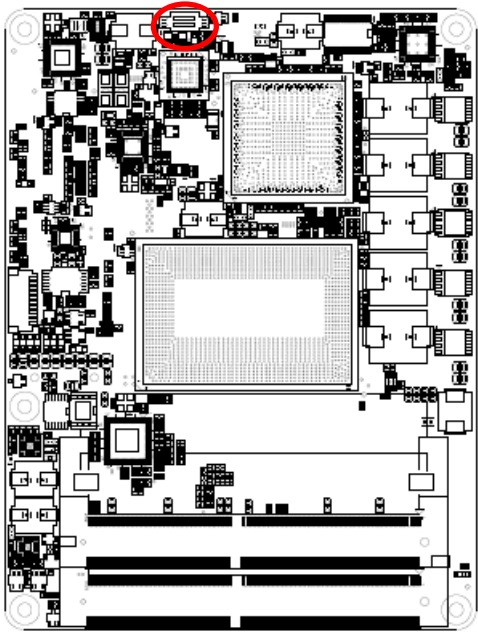
The following tables list the function of each of the board's jumpers and connectors.

### Connectors

| Label            | Function                        | Note                       |
|------------------|---------------------------------|----------------------------|
| <b>BIOS_SPI1</b> | (Reserved for BIOS programming) | 5 x 2 header, pitch 2.00mm |
| <b>CN1A</b>      | COM Express connector 1         |                            |
| <b>CN1B</b>      | COM Express connector 2         |                            |
| <b>SODIMM1</b>   | 260-pin DDR4 SDRAM DIMM socket  |                            |
| <b>SODIMM2</b>   | 260-pin DDR4 SDRAM DIMM socket  |                            |
| <b>SW1</b>       | AT/ATX mode selector            |                            |

2.4 Setting Jumpers & Connectors

2.4.1 AT/ATX mode selector (SW1)



AT/ATX mode



AT mode\*

|     |   |  |   |    |
|-----|---|--|---|----|
| OFF | 1 |  | ⇒ | ON |
|     | 2 |  |   |    |

ATX mode

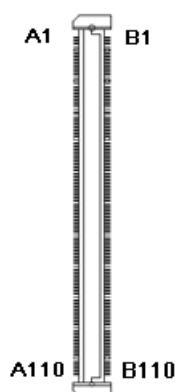
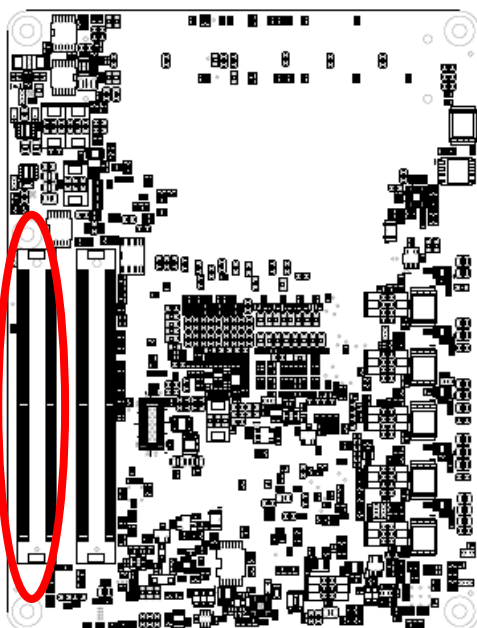
|     |   |   |  |    |
|-----|---|---|--|----|
| OFF | 1 | ⇐ |  | ON |
|     | 2 |   |  |    |

\*Default

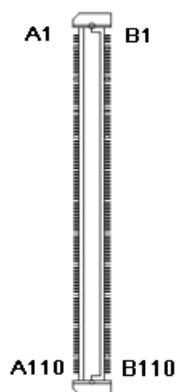
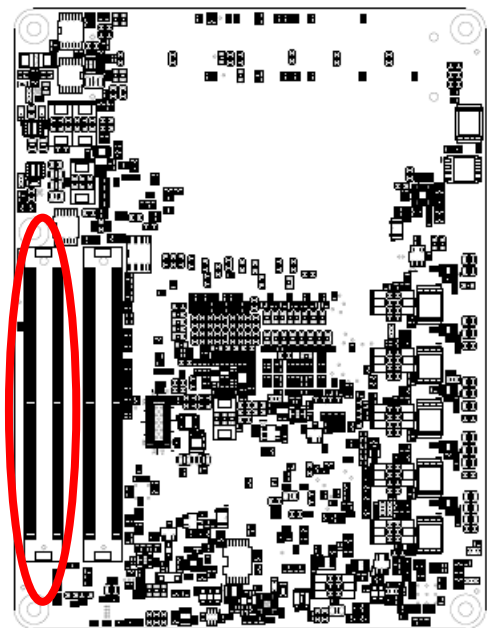
2.4.1.1 Signal Description –AT/ATX mode selection

| AT/ATX mode     | Description                                                         |
|-----------------|---------------------------------------------------------------------|
| <p>AT mode</p>  | Auto-power on, no need to press Power button to enable power on/off |
| <p>ATX mode</p> | Press the power button to enable power on/off                       |

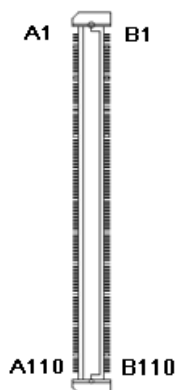
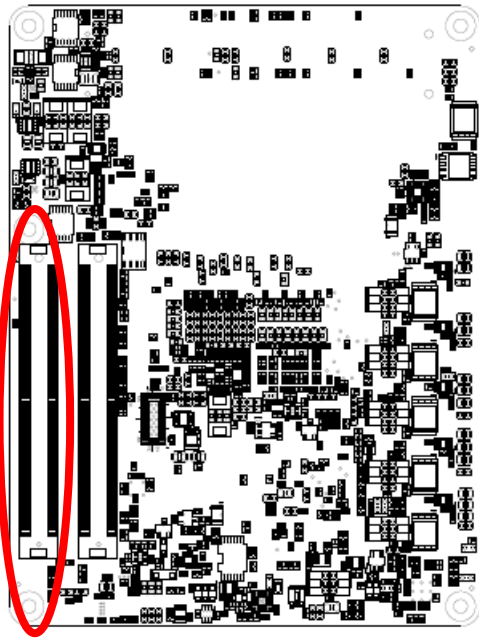
## 2.4.2 COM Express Connector 1 (CN1A)



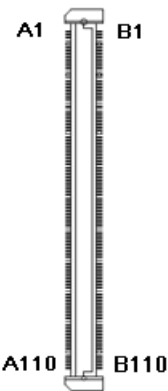
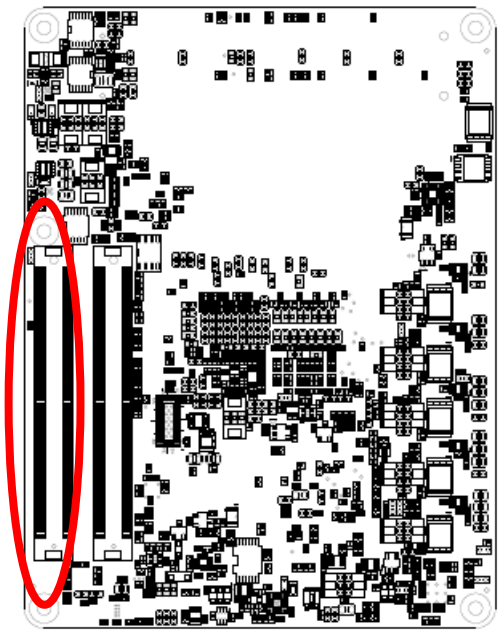
| Signal         | PIN | PIN | Signal      |
|----------------|-----|-----|-------------|
| GND            | A1  | B1  | GND         |
| GBE0_MDI3-     | A2  | B2  | GBE0_ACT#   |
| GBE0_MDI3+     | A3  | B3  | LPC_LFRAME# |
| GBE0_LINK100#  | A4  | B4  | LPC_AD0     |
| GBE0_LINK1000# | A5  | B5  | LPC_AD1     |
| GBE0_MDI2-     | A6  | B6  | LPC_AD2     |
| GBE0_MDI2+     | A7  | B7  | LPC_AD3     |
| GBE0_LINK#     | A8  | B8  | NC          |
| GBE0_MDI1-     | A9  | B9  | NC          |
| GBE0_MDI1+     | A10 | B10 | CLK_24M_CB  |
| GND            | A11 | B11 | GND         |
| GBE0_MDI0-     | A12 | B12 | PWRBTN#     |
| GBE0_MDI0+     | A13 | B13 | SMB_CK_A    |
| GBE0_CTREF     | A14 | B14 | SMB_DAT_A   |
| SUS_S3#        | A15 | B15 | SMB_ALERT#  |
| SATA0_TX+      | A16 | B16 | SATA1_TX+   |
| SATA0_TX-      | A17 | B17 | SATA1_TX-   |
| SUS_S4#        | A18 | B18 | SUS_STAT#   |
| SATA0_RX+      | A19 | B19 | SATA1_RX+   |
| SATA0_RX-      | A20 | B20 | SATA1_RX-   |
| GND            | A21 | B21 | GND         |
| SATA2_TX+      | A22 | B22 | SATA3_TX+   |
| SATA2_TX-      | A23 | B23 | SATA3_TX-   |
| SUS_S5#        | A24 | B24 | PWR_OK      |
| SATA2_RX+      | A25 | B25 | SATA3_RX+   |
| SATA2_RX-      | A26 | B26 | SATA3_RX-   |
| BATLOW#        | A27 | B27 | WDT         |
| SATA_ACT#      | A28 | B28 | NC          |
| HDA_SYNC       | A29 | B29 | HDA_SDI1    |
| HDA_RST#       | A30 | B30 | HDA_SDI0    |



| Signal       | PIN | PIN | Signal       |
|--------------|-----|-----|--------------|
| GND          | A31 | B31 | GND          |
| HDA_BITCLK   | A32 | B32 | SPKR         |
| HDA_SDOUT    | A33 | B33 | I2C_CLK      |
| BIOS_DIS0#   | A34 | B34 | I2C_DATA     |
| THRMTRIP     | A35 | B35 | THRM#        |
| USB6-        | A36 | B36 | USB7-        |
| USB6+        | A37 | B37 | USB7+        |
| USB_6_7_OC#  | A38 | B38 | USB_4_5_OC#  |
| USB4-        | A39 | B39 | USB5-        |
| USB4+        | A40 | B40 | USB5+        |
| GND          | A41 | B41 | GND          |
| USB2-        | A42 | B42 | USB3-        |
| USB2+        | A43 | B43 | USB3+        |
| USB_2_3_OC#  | A44 | B44 | USB_0_1_OC#  |
| USB0-        | A45 | B45 | USB1-        |
| USB0+        | A46 | B46 | USB1+        |
| VCC_RTC      | A47 | B47 | EXCD1_PERST# |
| EXCD0_PERST# | A48 | B48 | EXCD1_CPPE#  |
| EXCD0_CPPE#  | A49 | B49 | SYS_RESET#   |
| SERIRQ       | A50 | B50 | CB_RESET#    |
| GND          | A51 | B51 | GND          |
| PCIE_TX5+    | A52 | B52 | PCIE_RX5+    |
| PCIE_TX5-    | A53 | B53 | PCIE_RX5-    |
| GPI0         | A54 | B54 | GPO1         |
| PCIE_TX4+    | A55 | B55 | PCIE_RX4+    |
| PCIE_TX4-    | A56 | B56 | PCIE_RX4-    |
| GND          | A57 | B57 | GPO2         |
| PCIE_TX3+    | A58 | B58 | PCIE_RX3+    |
| PCIE_TX3-    | A59 | B59 | PCIE_RX3-    |
| GND          | A60 | B60 | GND          |



| Signal                 | PIN | PIN | Signal         |
|------------------------|-----|-----|----------------|
| PCIE_TX2+              | A61 | B61 | PCIE_RX2+      |
| PCIE_TX2-              | A62 | B62 | PCIE_RX2-      |
| GPI1                   | A63 | B63 | GPO3           |
| PCIE_TX1+              | A64 | B64 | PCIE_RX1+      |
| PCIE_TX1-              | A65 | B65 | PCIE_RX1-      |
| GND                    | A66 | B66 | PCIE_WAKE#     |
| GPI2                   | A67 | B67 | WAKE1#         |
| PCIE_TX0+              | A68 | B68 | PCIE_RX0+      |
| PCIE_TX0-              | A69 | B69 | PCIE_RX0-      |
| GND                    | A70 | B70 | GND            |
| LVDS_A0+/EDP_TX2+      | A71 | B71 | LVDS_B0+       |
| LVDS_A0-/EDP_TX2-      | A72 | B72 | LVDS_B0-       |
| LVDS_A1+/EDP_TX1+      | A73 | B73 | LVDS_B1+       |
| LVDS_A1-/EDP_TX1-      | A74 | B74 | LVDS_B1-       |
| LVDS_A2+/EDP_TX0+      | A75 | B75 | LVDS_B2+       |
| LVDS_A2-/EDP_TX0-      | A76 | B76 | LVDS_B2-       |
| LVDS_VDD_EN/EDP_VDD_EN | A77 | B77 | LVDS_B3+       |
| LVDS_A3+               | A78 | B78 | LVDS_B3-       |
| LVDS_A3-               | A79 | B79 | LVDS_BKLT_EN   |
| GND                    | A80 | B80 | GND            |
| LVDS_A_CK+/EDP_TX3+    | A81 | B81 | LVDS_B_CK+     |
| LVDS_A_CK-/EDP_TX3-    | A82 | B82 | LVDS_B_CK-     |
| LVDS_I2C_CK/EDP_AUX+   | A83 | B83 | LVDS_BKLT_CTRL |
| LVDS_I2C_DAT/EDP_AUX-  | A84 | B84 | +ATX5VSB       |
| GPI3                   | A85 | B85 | +ATX5VSB       |
| KBRST#                 | A86 | B86 | +ATX5VSB       |
| CB_EDP_HDP             | A87 | B87 | +ATX5VSB       |
| PCIE_CLK_REF+          | A88 | B88 | BIOS_DIS1#     |
| PCIE_CLK_REF-          | A89 | B89 | VGA_RED        |
| GND                    | A90 | B90 | GND            |



| Signal      | PIN  | PIN  | Signal      |
|-------------|------|------|-------------|
| SPI_POWER   | A91  | B91  | VGA_GRN     |
| SPI_MISO    | A92  | B92  | VGA_BLU     |
| GPO0        | A93  | B93  | VGA_HSYNC   |
| SPI_CLK     | A94  | B94  | VGA_VSYNC   |
| SPI_MOSI    | A95  | B95  | VGA_I2C_CK  |
| PP_TPM      | A96  | B96  | VGA_I2C_DAT |
| NC          | A97  | B97  | SPI_CS#     |
| SER0_TX     | A98  | B98  | NC          |
| SER0_RX     | A99  | B99  | NC          |
| GND         | A100 | B100 | GND         |
| SER1_TX     | A101 | B101 | FAN_PWMOUT  |
| SER1_RX     | A102 | B102 | FAN_TACHIN  |
| LID#        | A103 | B103 | SLEEP#      |
| +VIN_9V_19V | A104 | B104 | +VIN_9V_19V |
| +VIN_9V_19V | A105 | B105 | +VIN_9V_19V |
| +VIN_9V_19V | A106 | B106 | +VIN_9V_19V |
| +VIN_9V_19V | A107 | B107 | +VIN_9V_19V |
| +VIN_9V_19V | A108 | B108 | +VIN_9V_19V |
| +VIN_9V_19V | A109 | B109 | +VIN_9V_19V |
| GND         | A110 | B110 | GND         |

### 2.4.2.1 Signal Description – COM Express Connector 1 (CN1A)

#### 2.4.2.1.1 Audio Signals

| Signal       | Signal Description      |
|--------------|-------------------------|
| HDA_SYNC     | HD Audio Sync           |
| HDA_RST#     | HD Audio Reset          |
| HDA_SDI[0:1] | Audio CODEC Serial Data |
| HDA_BITCLK   | HD Audio Clock          |
| HDA_SDOUT    | HD Audio Data           |

#### 2.4.2.1.2 Gigabit Ethernet Signals

| Signal           | Signal Description                                                                                                                                                                                     |          |        |       |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------|-------|
| GBE0_MD[0:3] +/- | Gigabit Ethernet Controller 0: Media Dependent Interface Differential Pairs 0,1,2,3. The MDI can operate in 1000, 100 and 10 Mbit / sec modes. Some pairs are unused in some modes, per the following: |          |        |       |
|                  |                                                                                                                                                                                                        | 1000B-T  | 100B-T | 10B-T |
|                  | MDI[0]+/-                                                                                                                                                                                              | B1_DA+/- | TX+/-  | TX+/- |
|                  | MDI[1]+/                                                                                                                                                                                               | B1_DB+/- | RX+/-  | RX+/- |
|                  | MDI[2]+/                                                                                                                                                                                               | B1_DC+/- | X      | X     |
|                  | MDI[3]+/                                                                                                                                                                                               | B1_DD+/- | X      | X     |
| GBE0_ACT#        | Gigabit Ethernet Controller 0 activity indicator, active low.                                                                                                                                          |          |        |       |
| GBE0_Link#       | Gigabit Ethernet Controller 0 link indicator, active low.                                                                                                                                              |          |        |       |
| GBE0_Link100#    | Gigabit Ethernet Controller 0 100 Mbit / sec link indicator, active low.                                                                                                                               |          |        |       |
| GBE0_Lin1000#    | Gigabit Ethernet Controller 0 1000 Mbit / sec link indicator, active low.                                                                                                                              |          |        |       |

#### 2.4.2.1.3 PCI Express Signals

| Signal           | Signal Description                                                                       |
|------------------|------------------------------------------------------------------------------------------|
| PCIE_TX[0:6] +/- | PCI Express Differential Transmit Pair 0-6                                               |
| PCIE_RX[0:6] +/- | PCI Express Differential Receive Pair 0-6                                                |
| PCIE0_CK_REF+/-  | Reference clock output for PCI Express lanes 0-6 and for PCI Express Graphics lanes 0-15 |

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### 2.4.2.1.4 Flat Panel LVDS Signals

| Signal                           | Signal Description                     |
|----------------------------------|----------------------------------------|
| LVDS_BKLT_CTRL/<br>EDP_BKLT_CTRL | Controls panel digital power.          |
| ENBKL#                           | Controls backlight power enable.       |
| LVDS_I2C_CK                      | I2C clock output for LVDS display use. |
| LVDS_I2C_DAT                     | I2C data line for LVDS display use.    |
| LVDS_A/EDP_TX [0:3] +/-          | LVDS Channel A differential pairs.     |
| LVDS_B[0:3] +/-                  | LVDS Channel B differential pairs.     |
| LVDS_VDD_EN/EDP_VDD_EN           | LVDS panel power enables.              |
| LVDS_A_CK/EDP_TX3 +/-            | LVDS Channel A differential clock.     |
| LVDS_B_CK +/-                    | LVDS Channel A differential clock.     |

### 2.4.2.1.5 LPC Signals

| Signal        | Signal Description                            |
|---------------|-----------------------------------------------|
| LPC_LFRAME#   | LPC frame indicates the start of an LPC cycle |
| LPC_AD[0:3]   | LPC multiplexed address, command and data bus |
| LPC_DRQ[0:1]# | LPC serial DMA request                        |
| LPC_CLK       | LPC clock output - 33MHz nominal              |
| SERIRQ        | LPC serial interrupt                          |

### 2.4.2.1.6 Miscellaneous Signals

| Signal                   | Signal Description                                           |            |                                    |                                    |                    |                   |                |             |
|--------------------------|--------------------------------------------------------------|------------|------------------------------------|------------------------------------|--------------------|-------------------|----------------|-------------|
| SPKR                     | Output for audio enunciator - the "speaker" in PC-AT systems |            |                                    |                                    |                    |                   |                |             |
| BIOS_DIS0#<br>BIOS_DIS1# | Selection straps to determine the BIOS boot device           |            |                                    |                                    |                    |                   |                |             |
|                          | BIOS_DIS1#                                                   | BIOS_DIS0# | Chipset<br>SPI CS1#<br>Destination | Chipset<br>SPI CS0#<br>Destination | Carrier<br>SPI_CS# | SPI<br>Descriptor | Bios Entry     | Ref<br>Line |
|                          | 1                                                            | 1          | Module                             | Module                             | High               | Module            | SPI0/SPI1      | 0           |
|                          | 1                                                            | 0          | Module                             | Module                             | High               | Module            | Carrier<br>FWH | 1           |
|                          | 0                                                            | 1          | Module                             | Carrier                            | SPI0               | Carrier           | SPI0/SPI1      | 2           |
|                          | 0                                                            | 0          | Carrier                            | Module                             | SPI1               | Module            | SPI0/SPI1      | 3           |

### 2.4.2.1.7 GPIO Signals

| Signal   | Signal Description           |
|----------|------------------------------|
| GPI[0:4] | General purpose input pins.  |
| GPO[0:4] | General purpose output pins. |

## 2.4.2.1.8 Power Signals

| Signal   | Signal Description                                                                                                                                                                                                                                                                                         |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| +ATX5VSB | Standby power input: +5.0V nominal. See Electrical Specifications for allowable input range. If VCC5_SBY is used, all available +ATX5VSB pins on the connector(s) must be used. Only used for standby and suspend functions. May be left unconnected if these functions are not used in the system design. |
| VCC_RTC  | Real-time clock circuit-power input. Nominally +3.0V.                                                                                                                                                                                                                                                      |

## 2.4.2.1.9 Power &amp; System Management Signals

| Signal     | Signal Description                                                                                                       |
|------------|--------------------------------------------------------------------------------------------------------------------------|
| SUS_S3#    | Indicates system is in Suspend to RAM state. Active low output.                                                          |
| SUS_S4#    | Indicates system is in Suspend to Disk state. Active low output.                                                         |
| SUS_S5#    | Indicates system is in Soft Off state.                                                                                   |
| BATLOW#    | Indicates that external battery is low                                                                                   |
| PWRBTN#    | Power button to bring system out of S5 (soft off), active on rising edge.                                                |
| SMB_CK     | System Management Bus bidirectional clock line.                                                                          |
| SMB_DTA    | System Management Bus bidirectional data line.                                                                           |
| SMB_ALERT# | System Management Bus Alert - input can be used to generate an SMI# (System Management Interrupt) or to wake the system. |
| SUS_STAT#  | Indicates imminent suspend operation.                                                                                    |
| PWR_OK     | Power OK from main power supply                                                                                          |
| SYS_RESET# | Reset button input. Active low input.                                                                                    |
| WAKE0#     | PCI Express wake up signal.                                                                                              |
| WAKE1#     | General purpose wake up signal.                                                                                          |

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### 2.4.2.1.10 SATA Signals

| Signal           | Signal Description                                        |
|------------------|-----------------------------------------------------------|
| SATA[0:3]_TX +/- | Serial ATA Channel 0-3 transmit differential pair.        |
| SATA[0:3]_RX +/- | Serial ATA Channel 0-3 receive differential pair.         |
| ATA_ACT#         | ATA (parallel and serial) activity indicator, active low. |

### 2.4.2.1.11 VGA Signals

| Signal                   | Signal Description                                                       |
|--------------------------|--------------------------------------------------------------------------|
| VGA_RED                  | Red for monitor. Analog DAC output.                                      |
| VGA_GRN                  | Green for monitor. Analog DAC output.                                    |
| VGA_BLU                  | Blue for monitor. Analog DAC output.                                     |
| VGA_HSYNC                | Horizontal sync output to VGA monitor                                    |
| VGA_VSYNC                | Vertical sync output to VGA monitor                                      |
| VGA_I <sup>2</sup> C_CLK | DDC clock line (I2C port dedicated to identify VGA monitor capabilities) |
| VGA_I <sup>2</sup> C_DAT | DDC data line.                                                           |

### 2.4.2.1.12 USB Signals

| Signal       | Signal Description                           |
|--------------|----------------------------------------------|
| USB[0:7] +/- | USB differential pairs, channels 0 through 7 |
| USB_0_1_OC#  | USB over-current sense, USB channels 0 and 1 |
| USB_2_3_OC#  | USB over-current sense, USB channels 2 and 3 |
| USB_4_5_OC#  | USB over-current sense, USB channels 4 and 5 |
| USB_6_7_OC#  | USB over-current sense, USB channels 6 and 7 |

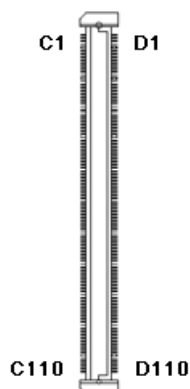
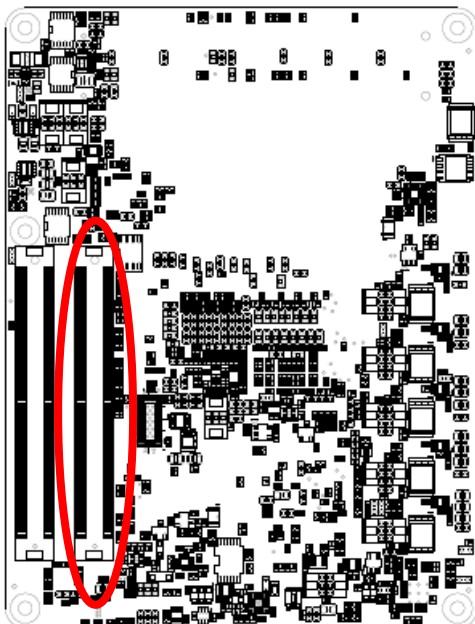
### 2.4.2.1.13 I2C Signals

| Signal   | Signal Description                      |
|----------|-----------------------------------------|
| I2C_CLK  | General purpose I2C port clock output.  |
| I2C_DATA | General purpose I2C port data I/O line. |

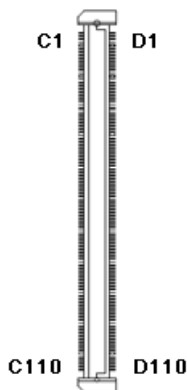
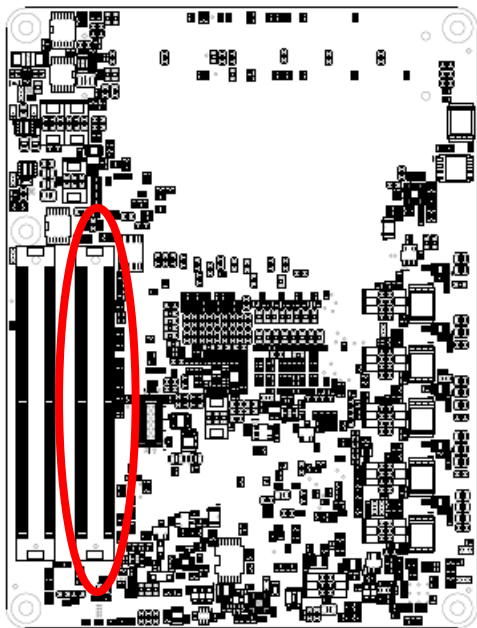
### 2.4.2.1.14 COM.0 Pins Signals

| Signal    | Signal Description                 |
|-----------|------------------------------------|
| SER0/1_TX | TTL level outputs from the Module. |
| SER0/1_RX | TTL level inputs from the Module.  |

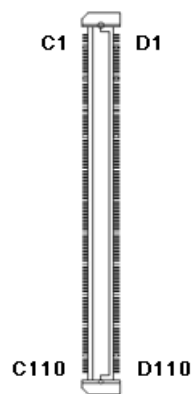
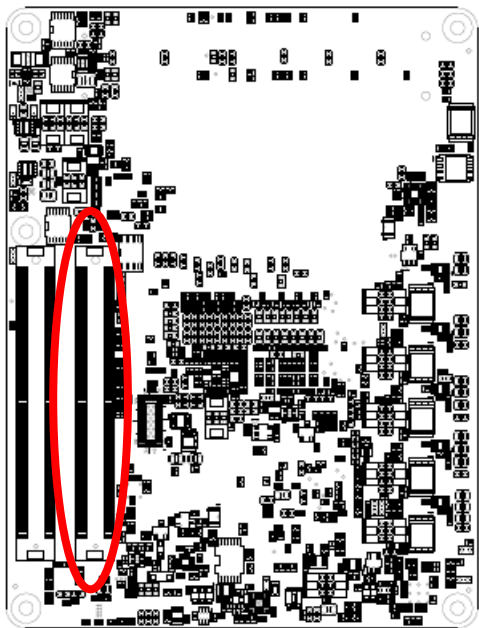
### 2.4.3 COM Express Connector 2 (CN1B)



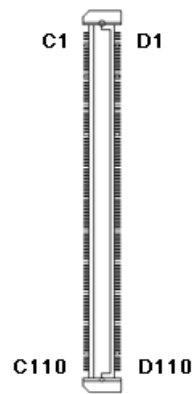
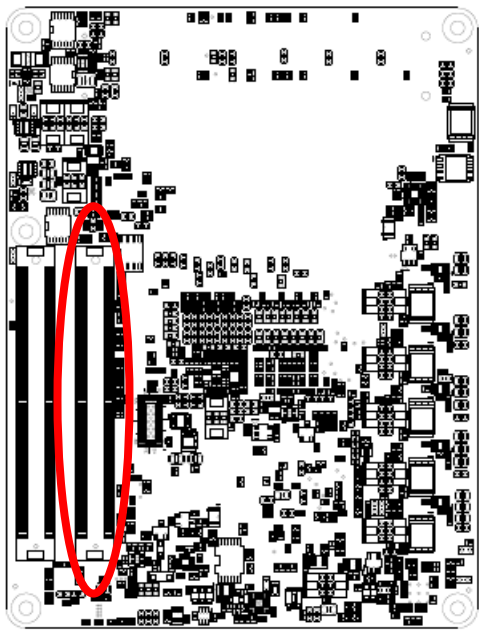
| Signal          | PIN | PIN | Signal            |
|-----------------|-----|-----|-------------------|
| GND             | C1  | D1  | GND               |
| GND             | C2  | D2  | GND               |
| USB_SSRX0-      | C3  | D3  | USB_SSTX0-        |
| USB_SSRX0+      | C4  | D4  | USB_SSTX0+        |
| GND             | C5  | D5  | GND               |
| USB_SSRX1-      | C6  | D6  | USB_SSTX1-        |
| USB_SSRX1+      | C7  | D7  | USB_SSTX1+        |
| GND             | C8  | D8  | GND               |
| USB_SSRX2-      | C9  | D9  | USB_SSTX2-        |
| USB_SSRX2+      | C10 | D10 | USB_SSTX2+        |
| GND             | C11 | D11 | GND               |
| USB_SSRX3-      | C12 | D12 | USB_SSTX3-        |
| USB_SSRX3+      | C13 | D13 | USB_SSTX3+        |
| GND             | C14 | D14 | GND               |
| NC              | C15 | D15 | DDI1_CTRLCLK_AUX+ |
| NC              | C16 | D16 | DDI1_CTRLCLK_AUX- |
| LVDS_BLUP       | C17 | D17 | NC                |
| LVDS_BLDN       | C18 | D18 | NC                |
| PCIE_RX6+       | C19 | D19 | PCIE_TX6+         |
| PCIE_RX6-       | C20 | D20 | PCIE_TX6-         |
| GND             | C21 | D21 | GND               |
| PCIE_RX7+       | C22 | D22 | PCIE_TX7+         |
| PCIE_RX7-       | C23 | D23 | PCIE_TX7-         |
| DDI1_HPD        | C24 | D24 | NC                |
| NC              | C25 | D25 | NC                |
| NC              | C26 | D26 | DDI1_PAIR0+       |
| PEG_GEN3_RESTE# | C27 | D27 | DDI1_PAIR0-       |
| NC              | C28 | D28 | NC                |
| NC              | C29 | D29 | DDI1_PAIR1+       |
| NC              | C30 | D30 | DDI1_PAIR1-       |



| Signal             | PIN | PIN | Signal           |
|--------------------|-----|-----|------------------|
| GND                | C31 | D31 | GND              |
| DDI2_CTRLCLK_AUX+  | C32 | D32 | DDI1_PAIR2+      |
| DDI2_CTRLDATA_AUX- | C33 | D33 | DDI1_PAIR2-      |
| DDI2_DDC_AUX_SEL   | C34 | D34 | DDI1_DDC_AUX_SEL |
| NC                 | C35 | D35 | NC               |
| DDI3_CTRLCLK_AUX+  | C36 | D36 | DDI1_PAIR3+      |
| DDI3_CTRLDATA_AUX- | C37 | D37 | DDI1_PAIR3-      |
| DDI3_DDC_AUX_SEL   | C38 | D38 | NC               |
| DDI3_PAIR0+        | C39 | D39 | DDI2_PAIR0+      |
| DDI3_PAIR0-        | C40 | D40 | DDI2_PAIR0-      |
| GND                | C41 | D41 | GND              |
| DDI3_PAIR1+        | C42 | D42 | DDI2_PAIR1+      |
| DDI3_PAIR1-        | C43 | D43 | DDI2_PAIR1-      |
| DDI3_HPD           | C44 | D44 | DDI2_HPD         |
| NC                 | C45 | D45 | NC               |
| DDI3_PAIR2+        | C46 | D46 | DDI2_PAIR2+      |
| DDI3_PAIR2-        | C47 | D47 | DDI2_PAIR2-      |
| NC                 | C48 | D48 | NC               |
| DDI3_PAIR3+        | C49 | D49 | DDI2_PAIR3+      |
| DDI3_PAIR3-        | C50 | D50 | DDI2_PAIR3-      |
| GND                | C51 | D51 | GND              |
| PEG_RX0+           | C52 | D52 | PEG_TX0+         |
| PEG_RX0-           | C53 | D53 | PEG_TX0-         |
| TYPE0#             | C54 | D54 | PEG_LAN_RV#      |
| PEG_RX1+           | C55 | D55 | PEG_TX1+         |
| PEG_RX1-           | C56 | D56 | PEG_TX1-         |
| TYPE1#             | C57 | D57 | TYPE2#           |
| PEG_RX2+           | C58 | D58 | PEG_TX2+         |
| PEG_RX2-           | C59 | D59 | PEG_TX2-         |
| GND                | C60 | D60 | GND              |



| Signal    | PIN | PIN | Signal    |
|-----------|-----|-----|-----------|
| PEG_RX3+  | C61 | D61 | PEG_TX3+  |
| PEG_RX3-  | C62 | D62 | PEG_TX3-  |
| NC        | C63 | D63 | NC        |
| NC        | C64 | D64 | NC-       |
| PEG_RX4+  | C65 | D65 | PEG_TX4+  |
| PEG_RX4-  | C66 | D66 | PEG_TX4-  |
| NC        | C67 | D67 | GND       |
| PEG_RX5+  | C68 | D68 | PEG_TX5+  |
| PEG_RX5-  | C69 | D69 | PEG_TX5-  |
| GND       | C70 | D70 | GND       |
| PEG_RX6+  | C71 | D71 | PEG_TX6+  |
| PEG_RX6-  | C72 | D72 | PEG_TX6-  |
| GND       | C73 | D73 | GND       |
| PEG_RX7+  | C74 | D74 | PEG_TX7+  |
| PEG_RX7-  | C75 | D75 | PEG_TX7-  |
| GND       | C76 | D76 | GND       |
| NC        | C77 | D77 | NC        |
| PEG_RX8+  | C78 | D78 | PEG_TX8+  |
| PEG_RX8-  | C79 | D79 | PEG_TX8-  |
| GND       | C80 | D80 | GND       |
| PEG_RX9+  | C81 | D81 | PEG_TX9+  |
| PEG_RX9-  | C82 | D82 | PEG_TX9-  |
| NC        | C83 | D83 | NC        |
| GND       | C84 | D84 | GND       |
| PEG_RX10+ | C85 | D85 | PEG_TX10+ |
| PEG_RX10- | C86 | D86 | PEG_TX10- |
| GND       | C87 | D87 | GND       |
| PEG_RX11+ | C88 | D88 | PEG_TX11+ |
| PEG_RX11- | C89 | D89 | PEG_TX11- |
| GND       | C90 | D90 | GND       |



| Signal      | PIN  | PIN  | Signal      |
|-------------|------|------|-------------|
| PEG_RX12+   | C91  | D91  | PEG_TX12+   |
| PEG_RX12-   | C92  | D92  | PEG_TX12-   |
| GND         | C93  | D93  | GND         |
| PEG_RX13+   | C94  | D94  | PEG_TX13+   |
| PEG_RX13-   | C95  | D95  | PEG_TX13-   |
| GND         | C96  | D96  | GND         |
| NC          | C97  | D97  | NC          |
| PEG_RX14+   | C98  | D98  | PEG_TX14+   |
| PEG_RX14-   | C99  | D99  | PEG_TX14-   |
| GND         | C100 | D100 | GND         |
| PEG_RX15+   | C101 | D101 | PEG_TX15+   |
| PEG_RX15-   | C102 | D102 | PEG_TX15-   |
| GND         | C103 | D103 | GND         |
| +VIN_9V_19V | C104 | D104 | +VIN_9V_19V |
| +VIN_9V_19V | C105 | D105 | +VIN_9V_19V |
| +VIN_9V_19V | C106 | D106 | +VIN_9V_19V |
| +VIN_9V_19V | C107 | D107 | +VIN_9V_19V |
| +VIN_9V_19V | C108 | D108 | +VIN_9V_19V |
| +VIN_9V_19V | C109 | D109 | +VIN_9V_19V |
| GND         | C110 | D110 | GND         |

### 2.4.3.1 Signal Description – COM Express Connector 2 (CN1B)

#### 2.4.3.1.1 USB3.0 Signals

| Signal                           | Signal Description                                                              |
|----------------------------------|---------------------------------------------------------------------------------|
| USB_SSTX[0:3]+<br>USB_SSTX[0:3]- | Additional transmit signal differential pairs for the SuperSpeed USB data path. |
| USB_SSRX[0:3]+<br>USB_SSRX[0:3]- | Additional receive signal differential pairs for the SuperSpeed USB data path.  |

#### 2.4.3.1.2 PEG Signals

| Signal                           | Signal Description                                                                                   |
|----------------------------------|------------------------------------------------------------------------------------------------------|
| PEG_TX[ 0:15]+<br>PEG_TX[ 0:15]- | PCI Express Graphics transmit differential paris.                                                    |
| PEG_RX[ 0:15]+<br>PEG_RX[ 0:15]- | PCI Express Graphics recevie differential paris.                                                     |
| PEG_LAN_RV#                      | PCI Express Graphics lane reversal input strap. Pull low on the Carrier board to reverse lane order. |

#### 2.4.3.1.3 DDI Signals

| Signal                                      | Signal Description                                                                                                                                                                                                        |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DDI[1:3]_PAIR[0:3]+<br>DDI[1:3]_PAIR [0:3]- | Digital Display Interface 1 to 3 Pair[0:3] differential pairs                                                                                                                                                             |
| DDI[1:3]_DDC_AUX_SEL                        | Selects the function of DDI[1:3]_CTRLCLK_AUX+ and DDI[1:3]_CTRLDATA_AUX-. If this input is floating the AUX pair is used for the DP AUX+/- signals. If pulled-high the AUX pair contains the CRTCLK and CTRLDATA signals. |
| DDI[1:3]_CTRLCLK_AUX+                       | DP AUX+function if DDI[1:3]_DDC_AUX_SEL is no connect<br>HDMI/DVI 12C CTRLCLK if DDI[1:3]_DDC_AUX_SEL is pulled high                                                                                                      |
| DDI[1:3]_CTRLDATA_AUX-                      | DP AUX-function if DDI[1:3]_DDC_AUX_SEL is no connect<br>HDMI/DVI 12C CTRLDATA if DDI[1:3]_DDC_AUX_SEL is pulled high                                                                                                     |
| DDI[1:3]_HPD                                | Digital Display Interface Hot-Plug Detect                                                                                                                                                                                 |

## 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<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 BIOS supports an override to the NVRAM settings which resets your system to its defaults.

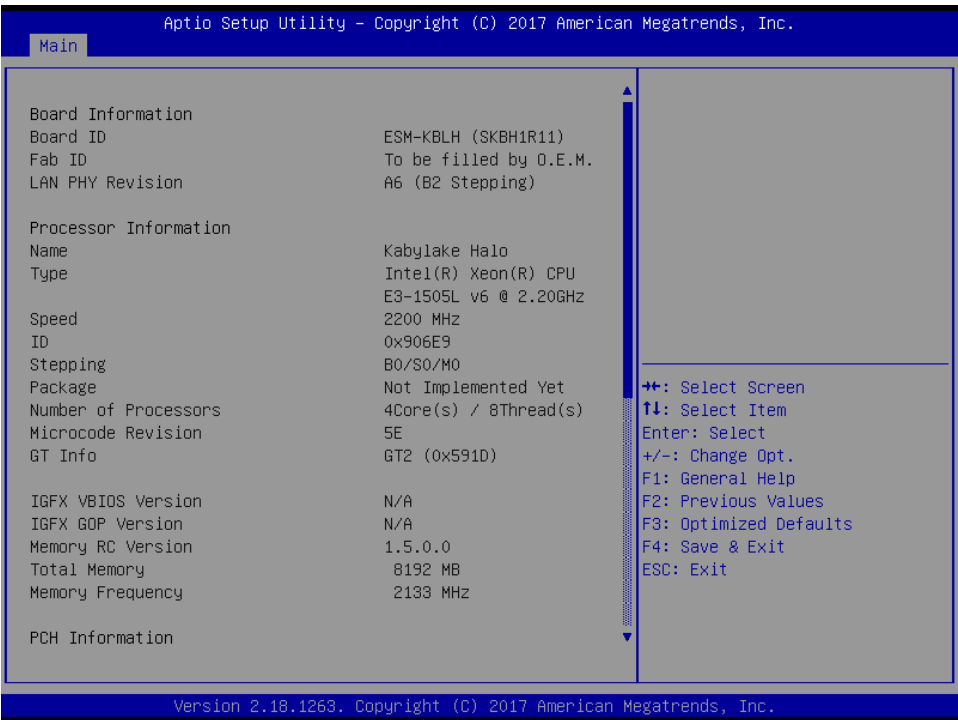
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both your systems manufacturer to provide the absolute maximum performance and reliability.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

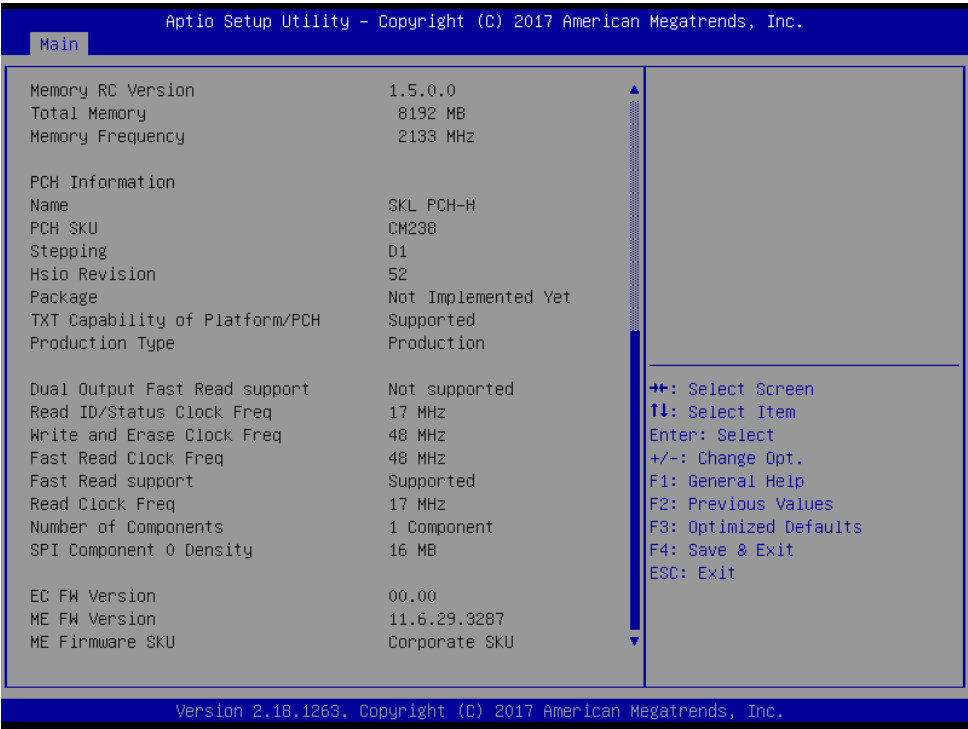
3.6 BIOS setup

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

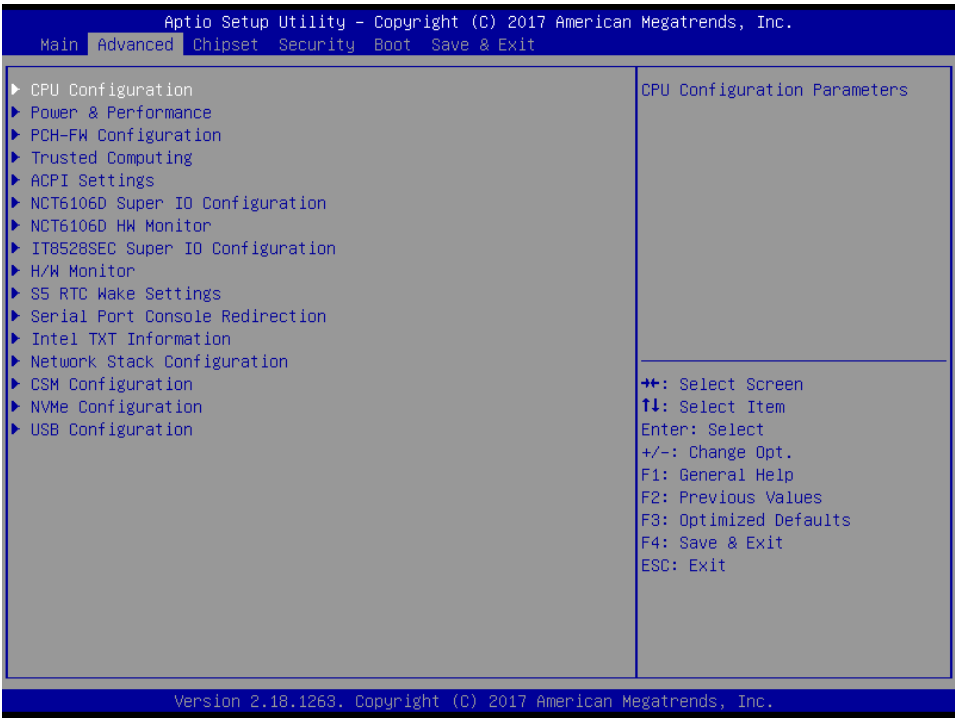
Use the system time option to set the system time. Manually enter the hours, minutes and seconds.



**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.

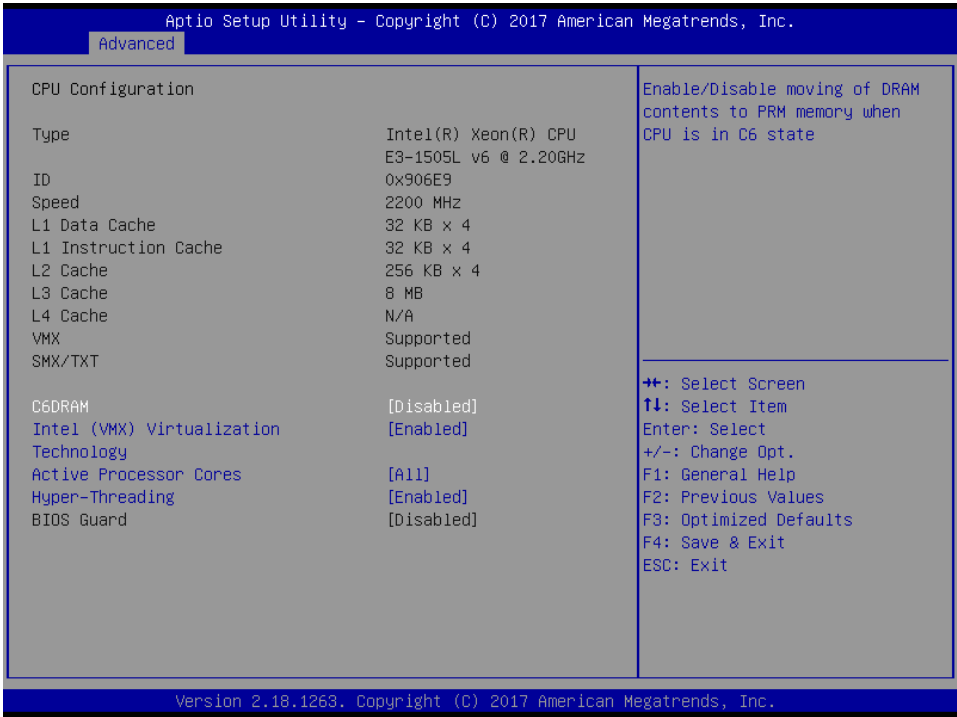
3.6.2 Advanced Menu

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



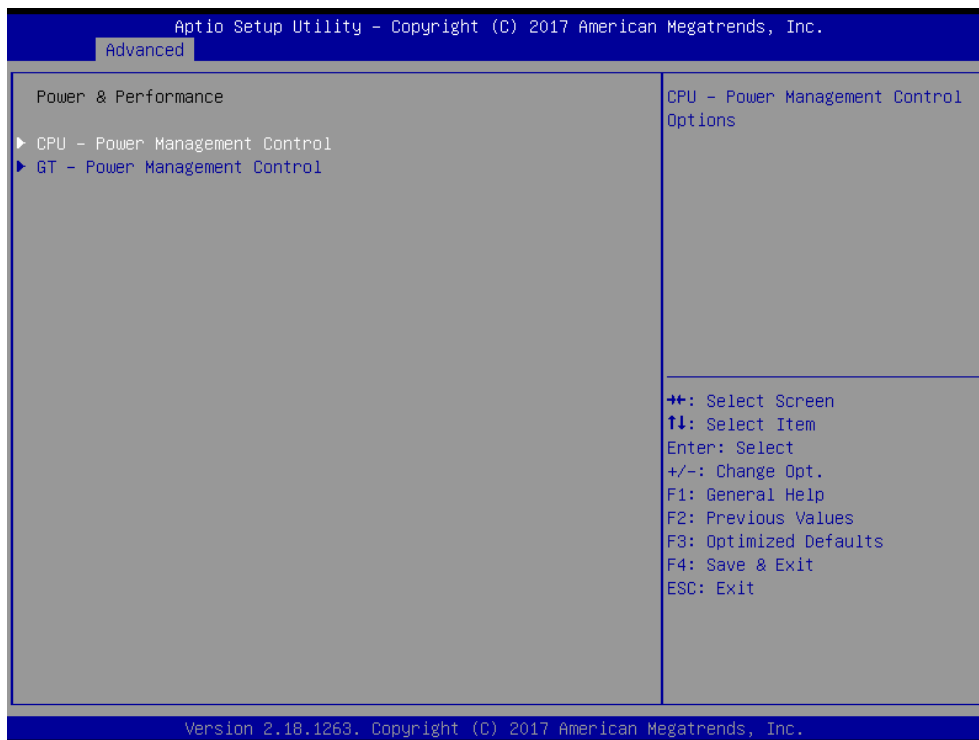
3.6.2.1 CPU Configuration

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

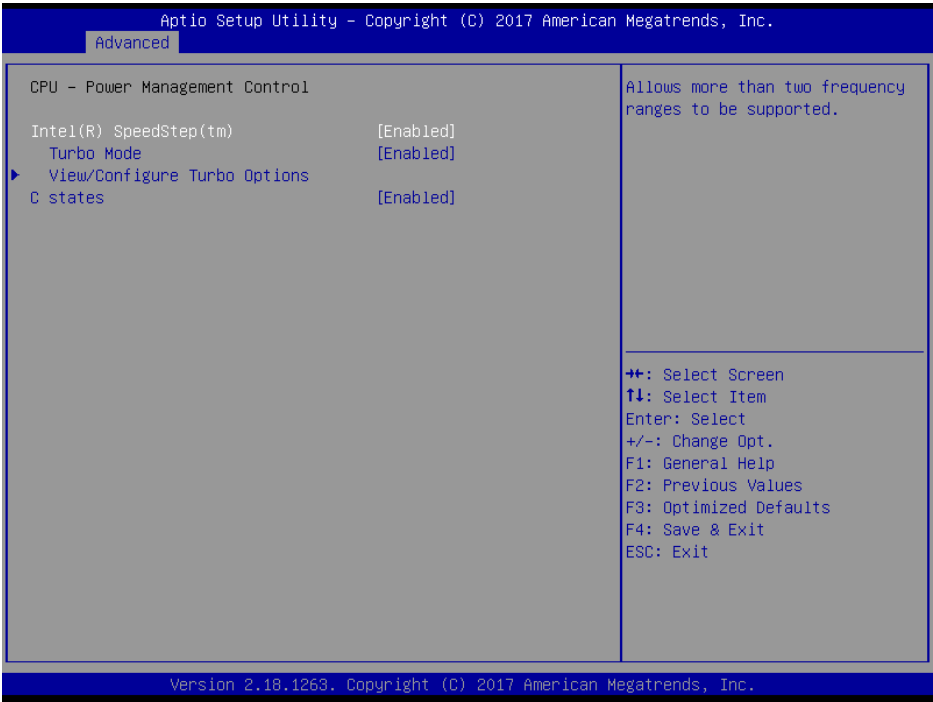


| Item                                         | Options                       | Description                                                                                                                                                   |
|----------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>C6DRAM</b>                                | Disabled[Default]<br>Enabled  | Enable/Disable moving of DRAM contents to PRM memory when CPU is in C6 state.                                                                                 |
| <b>Intel (VMX) Virtualization Technology</b> | Disabled<br>Enabled[Default]  | When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.                                                       |
| <b>Active Processor Cores</b>                | All[Default]<br>1<br>2<br>3   | Number of cores to enable in each processor package.                                                                                                          |
| <b>Hyper-Threading</b>                       | 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). |

### 3.6.2.2 Power & Performance

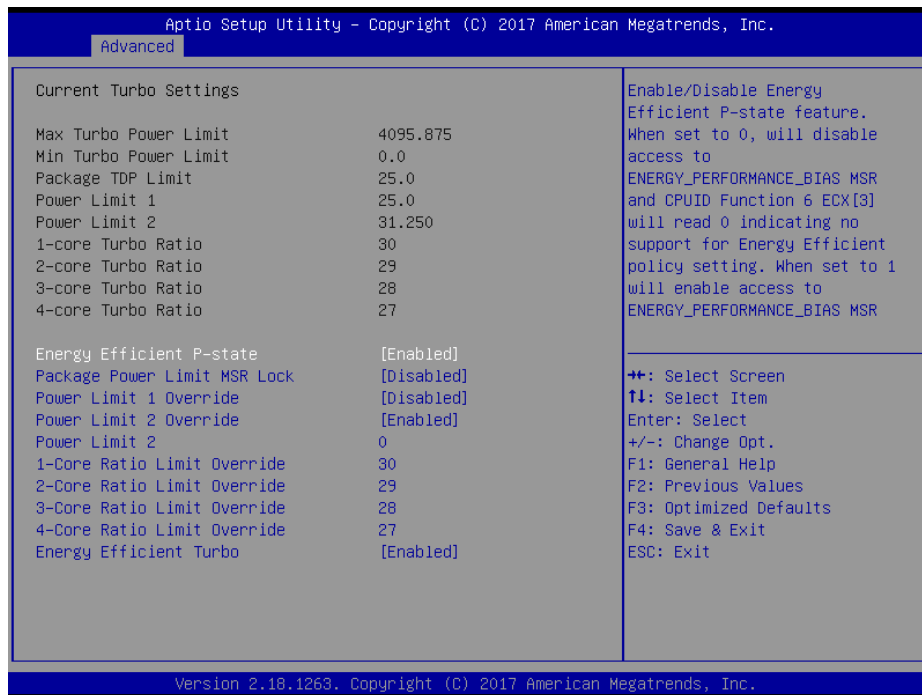


3.6.2.2.1 CPU – Power Management Control



| Item              | Option                     | Description                                                                                                                                  |
|-------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Intel® SpeedStep™ | Enabled[Default], Disabled | Allows more than two frequency ranges to be supported.                                                                                       |
| Turbo Mode        | Enabled[Default], Disabled | 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          | Enabled[Default], Disabled | Enable/Disable CPU Power Management. Allows CPU to go to C states when it’s not 100291697032tilized.                                         |

## 3.6.2.2.1.1 View/Configure Turbo Options

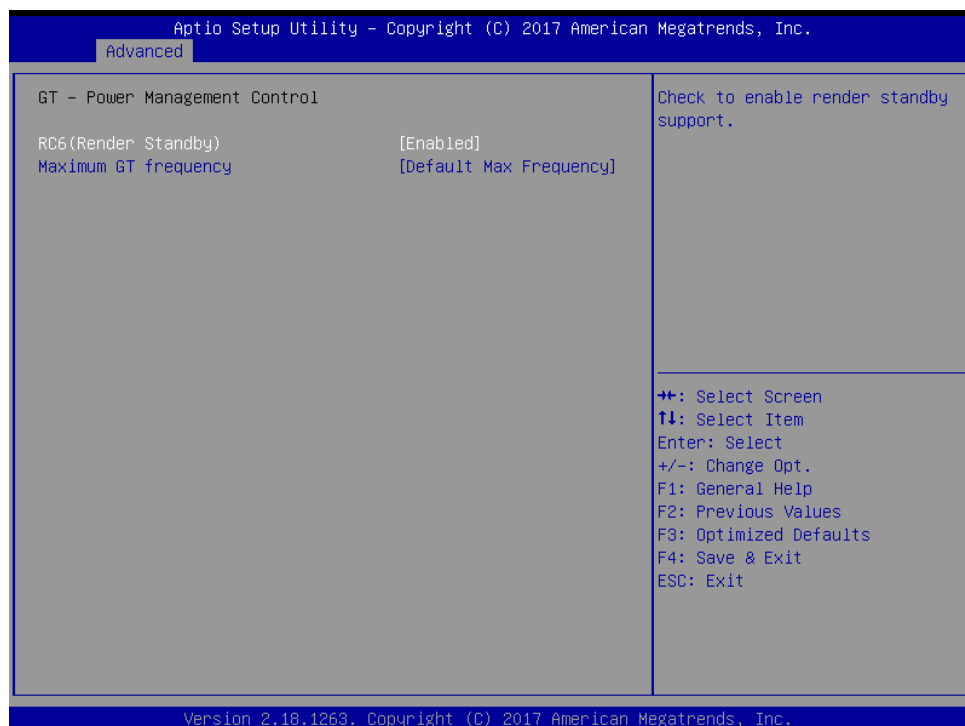


| Item                                | Option                        | Description                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Energy Efficient P-state</b>     | Enabled[Default],<br>Disabled | Enable/Disable Energy Efficient P-state feature. When set to 0, will disable access to ENERGY_PERFORMANCE_BIAS MSR and CPUID Function 6 ECX[3] will read 0 indicating no support for Energy Efficient policy setting. When set to 1 will enable access to ENERGY_PERFORMANCE_BIAS MSR 1B0h and CPUID Function 6 ECX[3] will read 1 indicating Energy Efficient policy setting is. |
| <b>Package Power Limit MSR Lock</b> | Disabled[Default]<br>Enabled  | Enable/Disable locking of Package Power Limit settings. When enabled, PACKAGE_POWER_LIMIT MSR will be locked and a reset will be required to unlock the register.                                                                                                                                                                                                                 |
| <b>Power Limit 1 Override</b>       | Disabled[Default]<br>Enabled  | Enable/Disable Power Limit 1 override. If this option is disabled, BIOS will program the default values for Power Limit 1 and Power Limit 1 Time Window.                                                                                                                                                                                                                          |
| <b>Power Limit 2 Override</b>       | Disabled<br>Enabled[Default]  | Enable/Disable Power Limit 2 override. If this option is disabled, BIOS will program the default values for Power Limit 2.                                                                                                                                                                                                                                                        |
| <b>Power Limit 2</b>                | 0                             | Power Limit 2 value in Milli Watts. BIOS will round to the nearest 1/8W when programming. If the value is 0, BIOS will program this value as 1.25*TDP. For                                                                                                                                                                                                                        |

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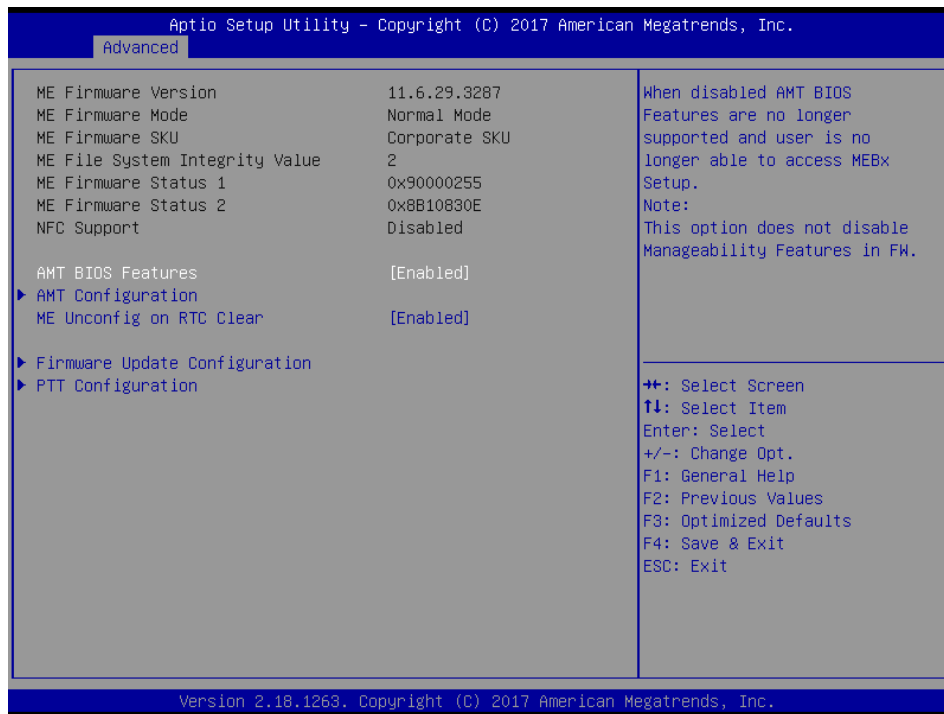
|                                    |                            |                                                                                                                                                                                                                                                                   |
|------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                    |                            | 12.50W, enter 12500. Processor applies control policies such that the package power does not exceed this limit.                                                                                                                                                   |
| <b>1-Core Ratio Limit Override</b> | 0-83                       | 1-Core Ratio Limit with range 0 to 83. The Minimum range may vary between Processors. This 1-Core Ratio Limit Must be greater than or equal to 2-Core ratio Limit, 3-Core Ratio Limit, 4-Core Ratio Limit.                                                        |
| <b>2-Core Ratio Limit Override</b> | 0-83                       | 2-Core Ratio Limit with range 0 to 83. The Minimum range may vary between Processors. This 2-Core Ratio Limit Must be Less than or equal to 1-Core Ratio Limit.                                                                                                   |
| <b>3-Core Ratio Limit Override</b> | 0-83                       | 4-Core Ratio Limit with range 0 to 83. The Minimum range may vary between Processors. This 4-Core Ratio Limit Must be Less than or equal to 1-Core Ratio Limit.                                                                                                   |
| <b>4-Core Ratio Limit Override</b> | 0-83                       | 1-Core Ratio Limit with range 0 to 83. The Minimum range may vary between Processors. This 1-Core Ratio Limit Must be greater than or equal to 2-Core ratio Limit, 3-Core Ratio Limit, 4-Core Ratio Limit.                                                        |
| <b>Energy Efficient Turbo</b>      | Disabled, Enabled[Default] | Enable/Disable Energy Efficient Turbo Feature. This feature will opportunistically lower the turbo frequency to increase efficiency. Recommended only to disable in overclocking situations where turbo frequency must remain constant. Otherwise, leave enabled. |

### 3.6.2.2.2 GT – Power Management Control



| Item                        | Option                                                                                                                                                                                                                           | Description                             |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>RC6(Render Standby)</b>  | Enabled[ <b>Default</b> ],<br>Disabled                                                                                                                                                                                           | Check to enable render standby support. |
| <b>Maximum GT frequency</b> | Default Max Frequency[ <b>Default</b> ]<br>100Mhz/150Mhz/200Mhz/250Mhz/300Mhz<br>/350Mhz/400Mhz/450Mhz/500Mhz/550Mhz<br>/600Mhz/650Mhz/700Mhz/750Mhz/800Mhz<br>/850Mhz/900Mhz/950Mhz/1000Mhz/1050Mhz<br>/1100Mhz/1150Mhz/1200Mhz | Auto Updated.                           |

### 3.6.2.3 PCH-FW Configuration



| Item                            | Options                                | Description                                                                                                                                                               |
|---------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AMT BIOS Features</b>        | Disabled,<br>Enabled[ <b>Default</b> ] | When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEXb Setup. Note: This option does not disable Manageability Features in FW. |
| <b>ME Unconfig on RTC Clear</b> | Disabled,<br>Enabled[ <b>Default</b> ] | When Disabled ME will not be unconfigured on RTC Clear.                                                                                                                   |

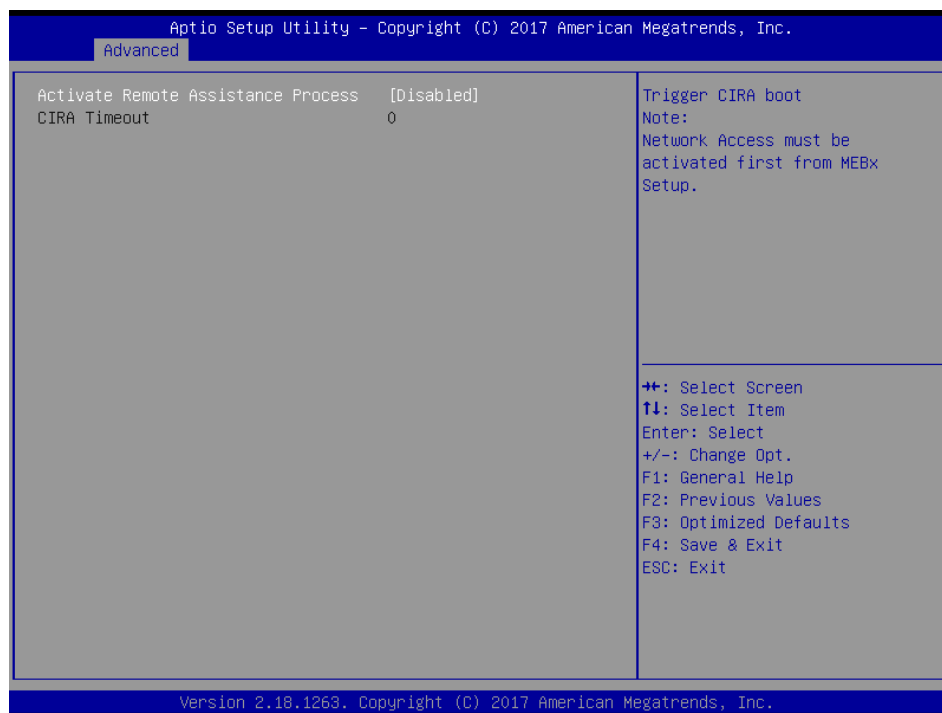
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### 3.6.2.3.1 AMT Configuration



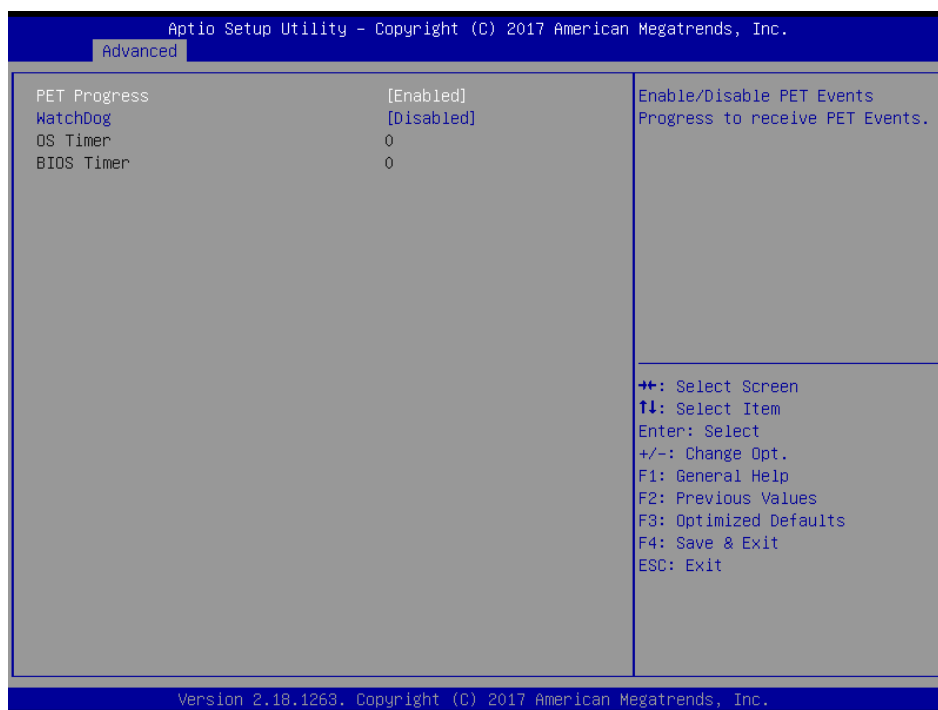
| Item                    | Option                        | Description                                   |
|-------------------------|-------------------------------|-----------------------------------------------|
| ASF support             | Disabled,<br>Enabled[Default] | Enable/Disable Alert Standard Format support. |
| USB Provisioning of AMT | Disabled[Default],<br>Enabled | Enable/Disable of AMT USB Provisioning.       |

#### 3.6.2.3.1.1 CIRA Configuration



| Item                                      | Description                                                                      |
|-------------------------------------------|----------------------------------------------------------------------------------|
| <b>Activate Remote Assistance Process</b> | Trigger CIRA boot. Note: Network Access must be activated first from MEBx Setup. |

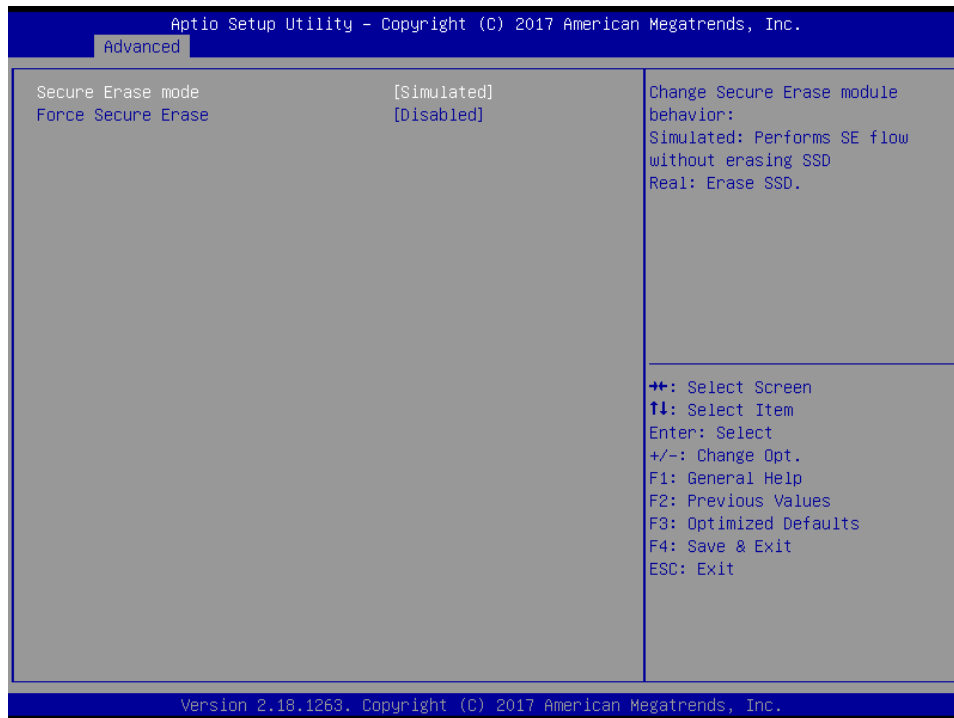
### 3.6.2.3.1.2 ASF Configuration



| Item                | Option                                 | Description                                               |
|---------------------|----------------------------------------|-----------------------------------------------------------|
| <b>PET Progress</b> | Disabled,<br>Enabled <b>[Default]</b>  | Enable/Disable PET Events Progress to receive PET Events. |
| <b>WatchDog</b>     | Disabled <b>[Default]</b> ,<br>Enabled | Enable/Disable WatchDog Timer.                            |

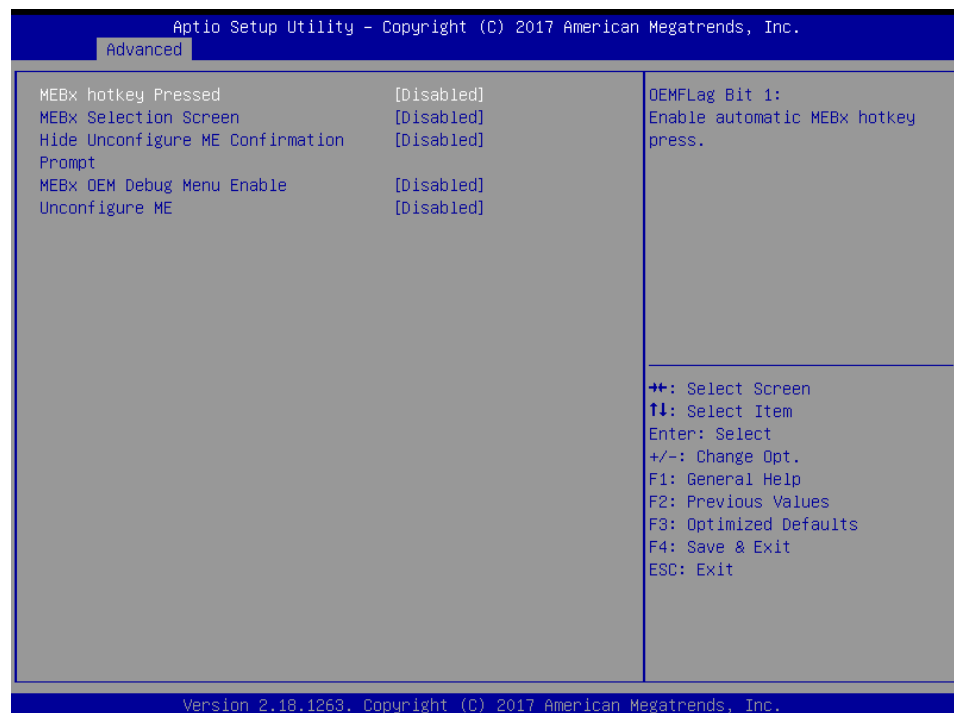
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### 3.6.2.3.1.3 Secure Erase Configuration



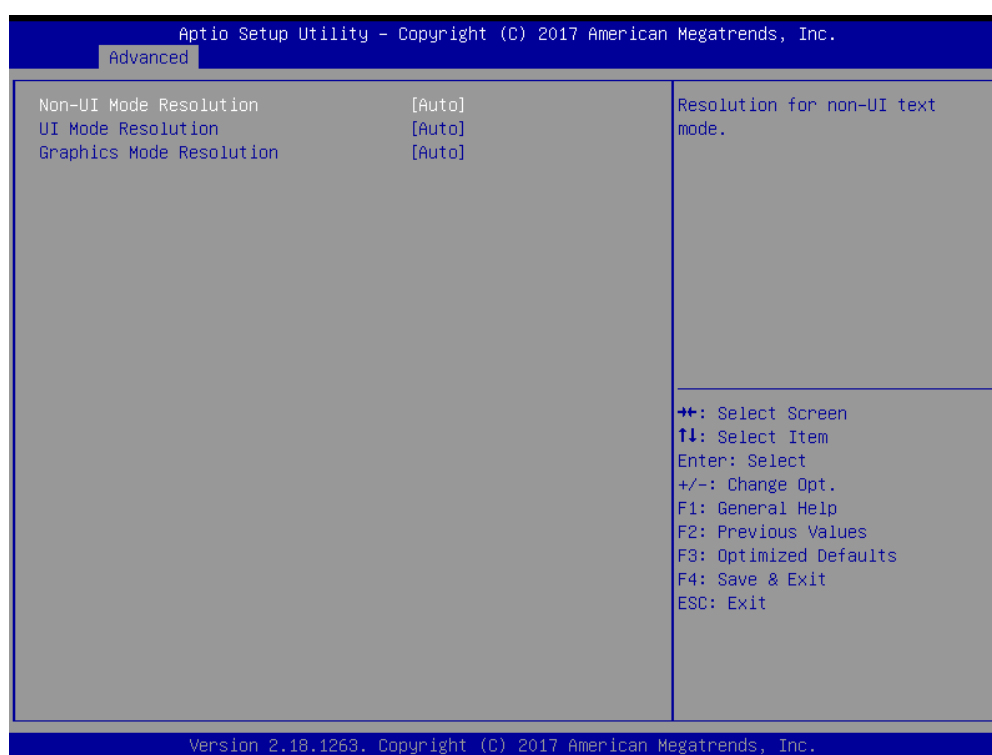
| Item               | Option                        | Description                                                                                                 |
|--------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------|
| Secure Erase mode  | Simulated[Default]<br>Real    | Change Secure Erase module behavior:<br>Simulated: Performs SE flow without erasing SSD<br>Real: Erase SSD. |
| Force Secure Erase | Disabled[Default],<br>Enabled | Force Secure Erase on next boot.                                                                            |

### 3.6.2.3.1.4 OEM Flags Settings



| Item                             |                               | Description                                                                                                                                                                                                                              |
|----------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MEBx hotkey Pressed              | Disabled[Default],<br>Enabled | OEMFlag Bit 1: Enable automatic MEBx hotkey press.                                                                                                                                                                                       |
| MEBx Selection Screen            | Disabled[Default],<br>Enabled | OEMFlag Bit 2: Enable MEBx selection screen with 2 options: Press 1 to enter ME Configuration Screens Press 2 to initiate a remote connection<br>Note: Network Access must be activated from MEBx Setup for this screen to be displayed. |
| Hide Unconfigure ME Confirmation | Disabled[Default],<br>Enabled | OEMFlag Bit 6: Hide Unconfigure ME confirmation prompt when attempting ME unconfiguration.                                                                                                                                               |
| MEBx OED Debug Menu Enable       | Disabled[Default],<br>Enabled | OEMFlag Bit 14: Enable OEM debug menu in MEBx.                                                                                                                                                                                           |
| Unconfigure ME                   | Disabled[Default],<br>Enabled | OEMFlag Bit 15: Unconfigure ME with resetting MEBx password to default.                                                                                                                                                                  |

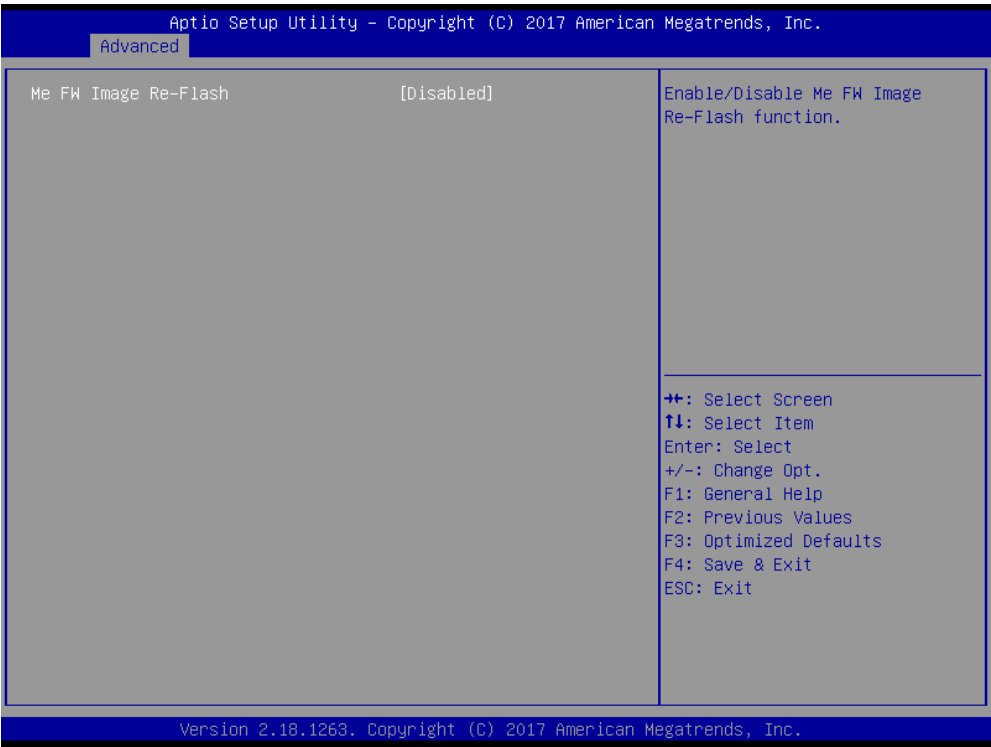
### 3.6.2.3.1.5 MEBx Resolution Settings



| Item                     |                                   | Description                      |
|--------------------------|-----------------------------------|----------------------------------|
| Non-UI Mode Resolution   | Auto[Default],<br>80x25<br>100x31 | Resolution for non-UI text mode. |
| UI Mode Resolution       | Auto[Default],<br>80x25<br>100x31 | Resolution for UI text mode.     |
| Graphics Mode Resolution | Auto[Default],<br>640x480         | Resolution for graphics mode.    |

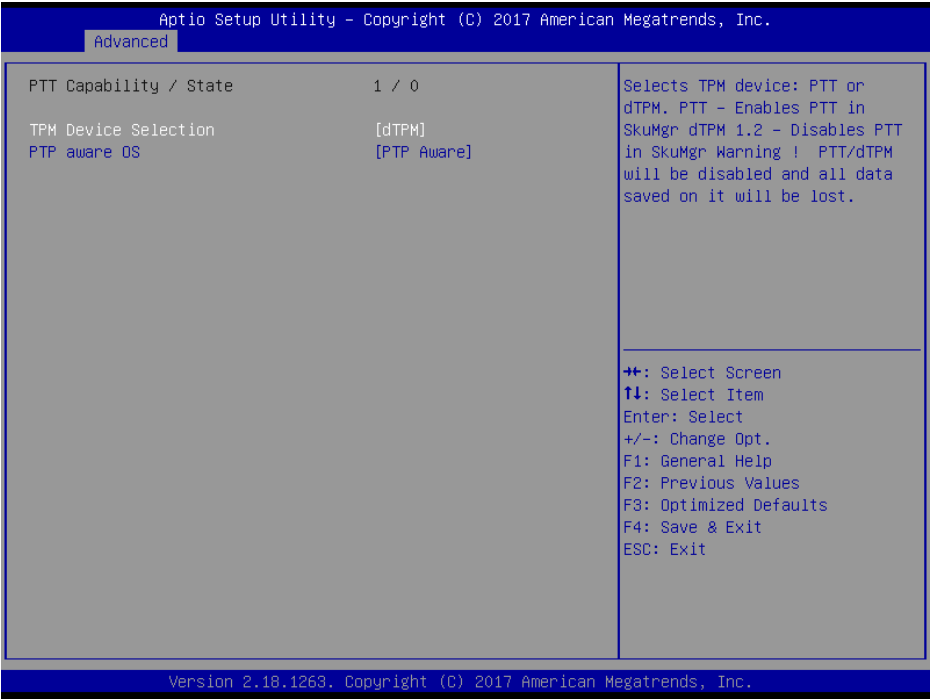
|  |                     |  |
|--|---------------------|--|
|  | 800x600<br>1024x768 |  |
|--|---------------------|--|

3.6.2.3.2 Firmware Update Configuration



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

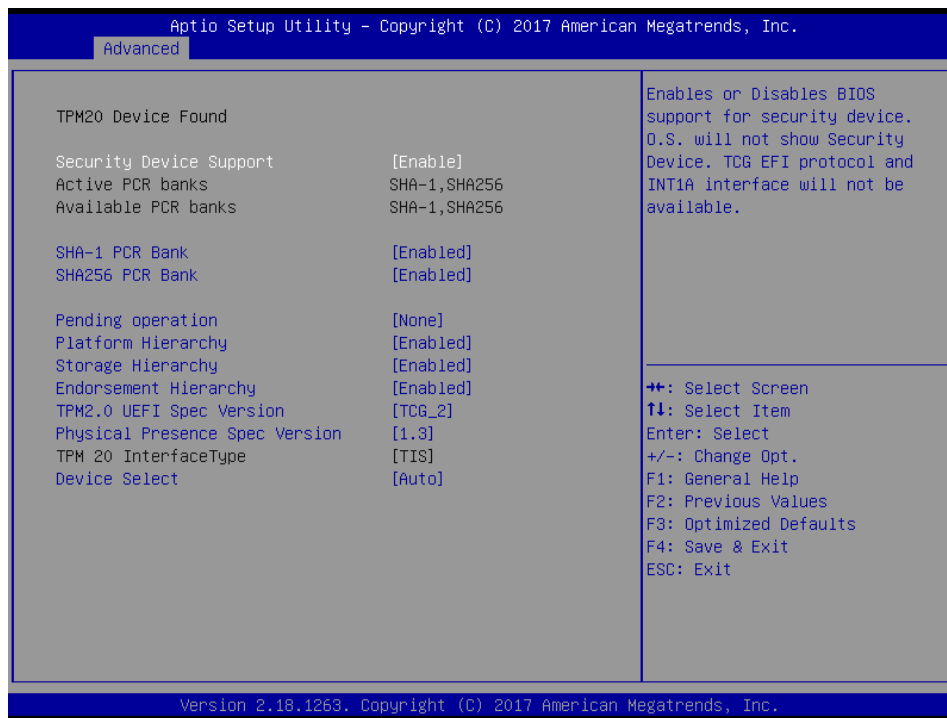
3.6.2.3.3 PTT Configuration



| Item                 | Option                              | Description                                                                                                                                                              |
|----------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TPM Device Selection | dTPM[Default],<br>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. |
| PTP aware OS         | PTP Aware[Default]<br>Not PTP Aware | Select whether or not the OS you will boot to will be PTP aware.                                                                                                         |

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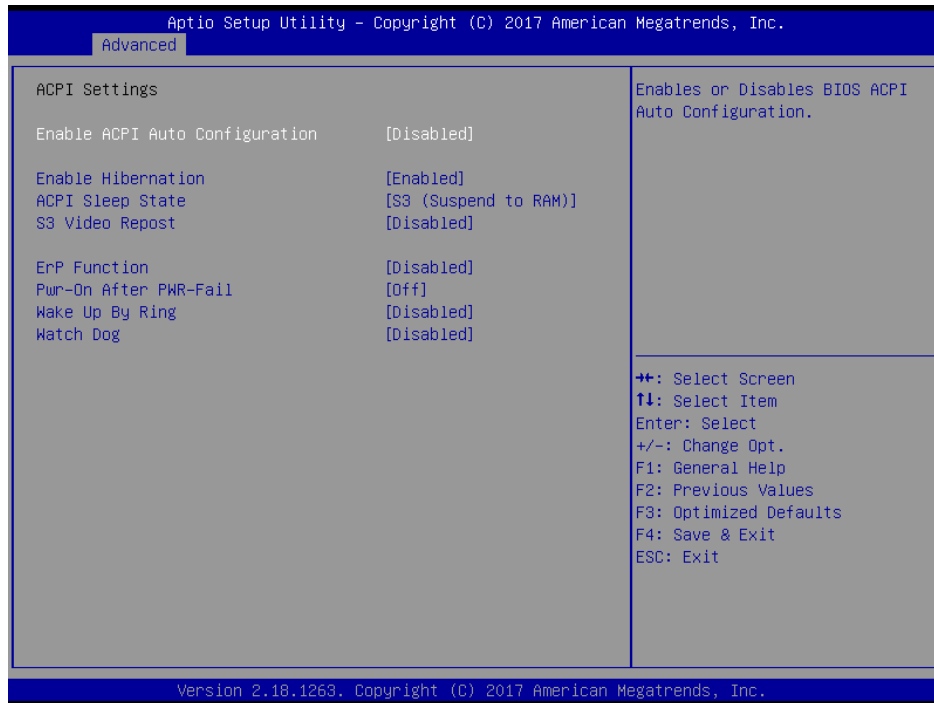
### 3.6.2.4 Trusted Computing



| Item                                  | Options                       | Description                                                                                                                                              |
|---------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Security Device Support</b>        | Disable,<br>Enable[Default]   | Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.    |
| <b>SHA-1 PCR Bank</b>                 | Disabled<br>Enabled[Default], | Enable or Disable SHA-1 PCR Bank.                                                                                                                        |
| <b>SHA256 PCR Bank</b>                | Disabled<br>Enabled[Default], | Enable or Disable SHA256 PCR Bank.                                                                                                                       |
| <b>Pending operation</b>              | None[Default],<br>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<br>Enabled[Default], | Enable or Disable Platform Hierarchy.                                                                                                                    |
| <b>Storage Hierarchy</b>              | Disabled<br>Enabled[Default], | Enable or Disable Storage Hierarchy.                                                                                                                     |
| <b>Endorsement Hierarchy</b>          | Disabled<br>Enabled[Default], | Enable or Disable Endorsement Hierarchy.                                                                                                                 |
| <b>TPM2.0 UEFI Spec Version</b>       | TCG_1_2<br>TCG_2[Default],    | Select the TCG2 Spec Version Support, TCG_1_2: the Compatible mode for Win8/Win10, TCG_2: Support new TCG2 protocol and event format for Win10 or later. |
| <b>Physical Presence Spec Version</b> | 1.2<br>1.3[Default],          | Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.                                                   |

|                      |                                               |                                                                                                                                                                                                                      |
|----------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Device Select</b> | TPM 1.2<br>TPM 2.0<br>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. |
|----------------------|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 3.6.2.5 ACPI Settings



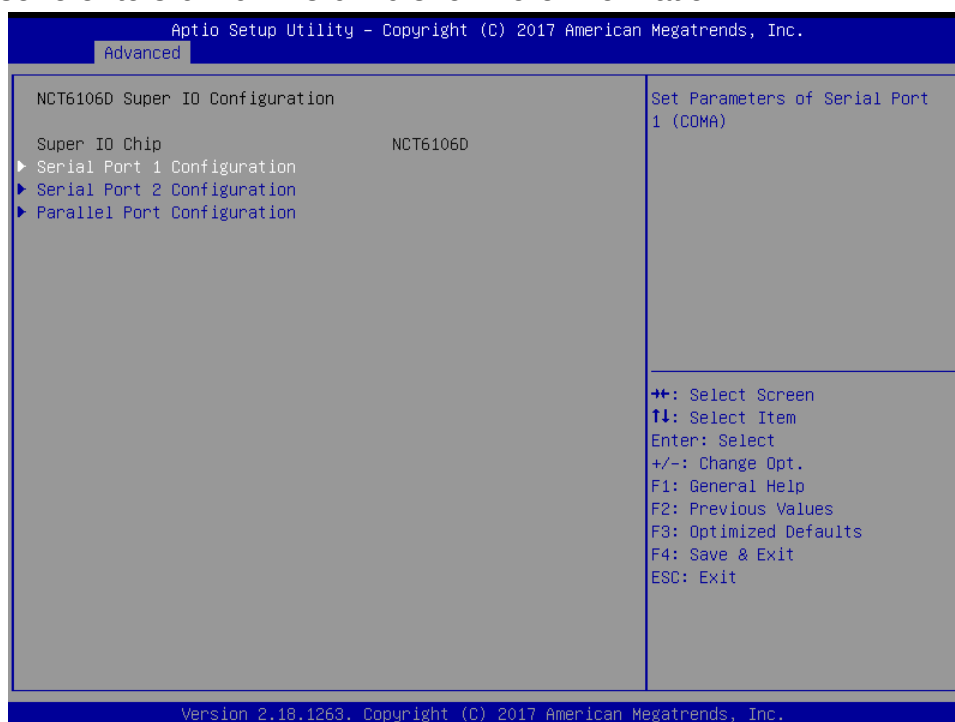
| Item                                  | Options                                                     | Description                                                                                                         |
|---------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Enable ACPI Auto Configuration</b> | Disabled[ <b>Default</b> ],<br>Enabled                      | Enables or Disables BIOS ACPI Auto Configuration.                                                                   |
| <b>Enable Hibernation</b>             | Disabled<br>Enabled[ <b>Default</b> ],                      | Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some OS. |
| <b>ACPI Sleep State</b>               | Suspend Disabled,<br>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> ],<br>Enabled                      | Enable or Disable S3 Video Repost.                                                                                  |
| <b>ErP Function</b>                   | Disabled[ <b>Default</b> ],<br>Enabled                      | ErP Function (Deep S5).                                                                                             |
| <b>Pwr-On After PWR-Fail</b>          | Off[ <b>Default</b> ]<br>On<br>Last state                   | Select the power station after power failure.                                                                       |
| <b>Wake Up By Ring</b>                | Disabled[ <b>Default</b> ],<br>Enabled                      | System wake up by ring (from S3~S5).                                                                                |

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|                         |                                                                                                      |                                           |
|-------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <p><b>Watch Dog</b></p> | <p>Disabled[Default],<br/>30 sec<br/>40 sec<br/>50 sec<br/>1 min<br/>2 min<br/>10 min<br/>30 min</p> | <p>Select Watch Dog Timer (WDT) Mode.</p> |
|-------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------|

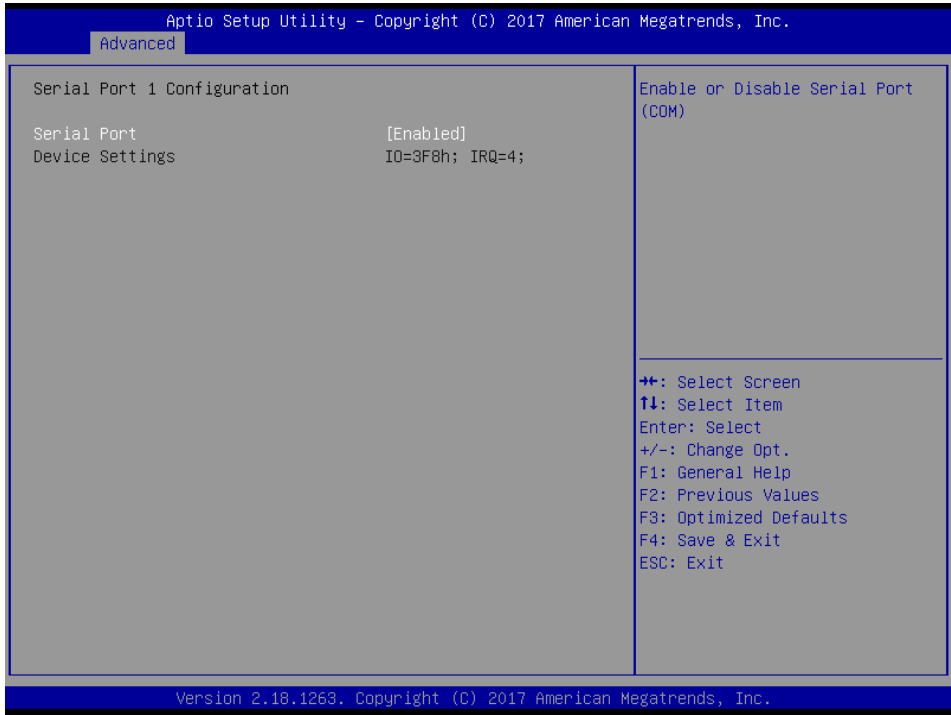
### 3.6.2.6 NCT6106D Super IO Configuration

You can use this item to set up or change the NCT6106D Super IO configuration for serial ports. Please refer to 3.6.2.6.1~ 3.6.2.6.3 for more information.



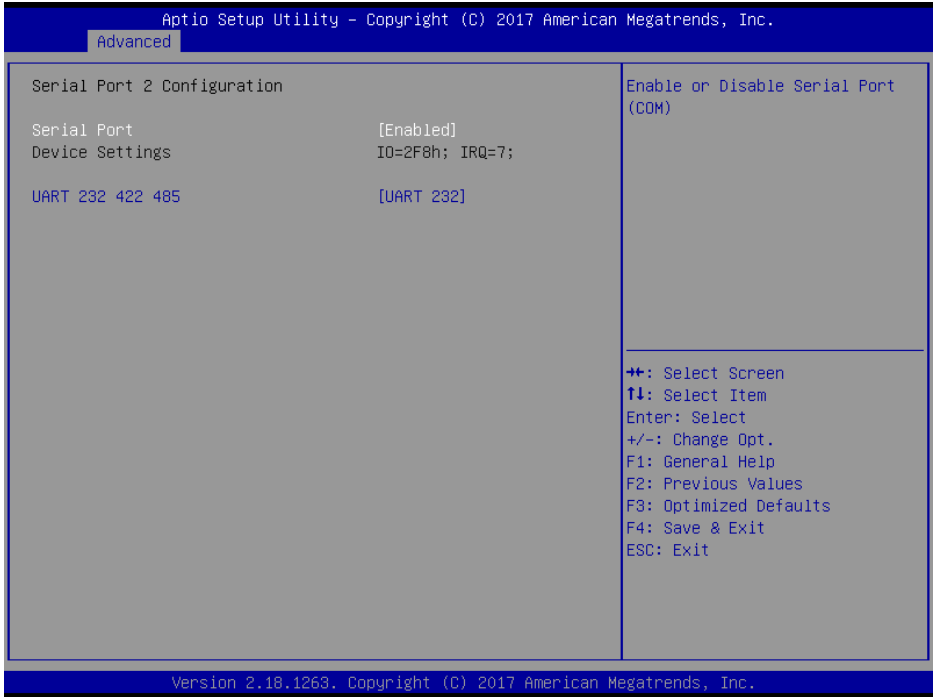
| Item                               | Description                                 |
|------------------------------------|---------------------------------------------|
| <b>Serial Port 1 Configuration</b> | Set Parameters of Serial Port 1 (COMA).     |
| <b>Serial Port 2 Configuration</b> | Set Parameters of Serial Port 2 (COMB).     |
| <b>Parallel Port Configuration</b> | Set Parameters of Parallel Port (LPT/LPTE). |

3.6.2.6.1 Serial Port 1 Configuration



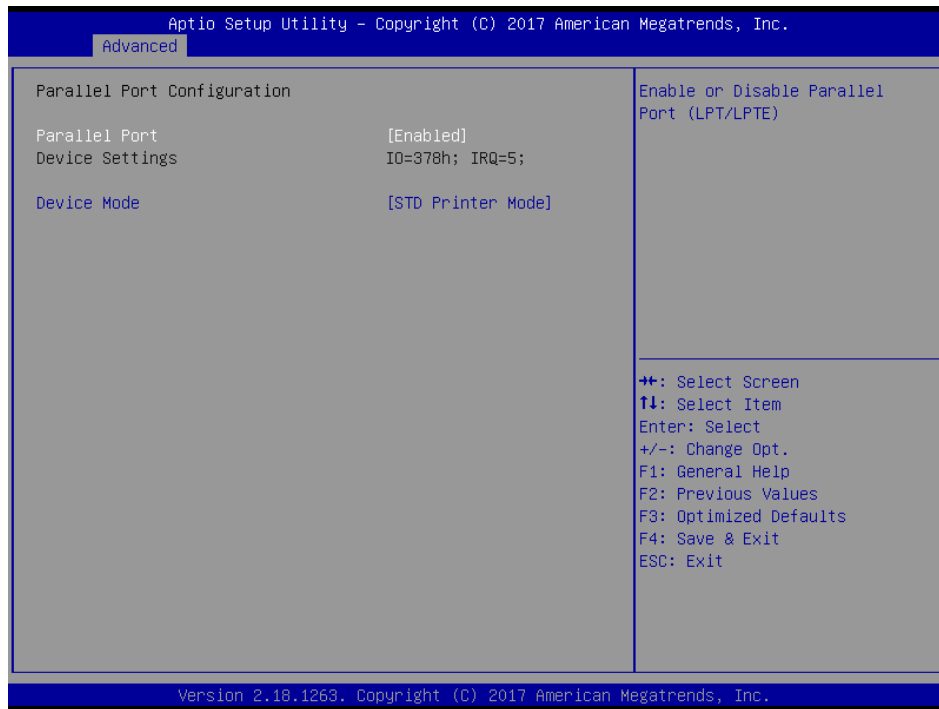
| Item        | Option                     | Description                          |
|-------------|----------------------------|--------------------------------------|
| Serial Port | Enabled[Default], Disabled | Enable or Disable Serial Port (COM). |

3.6.2.6.2 Serial Port 2 Configuration



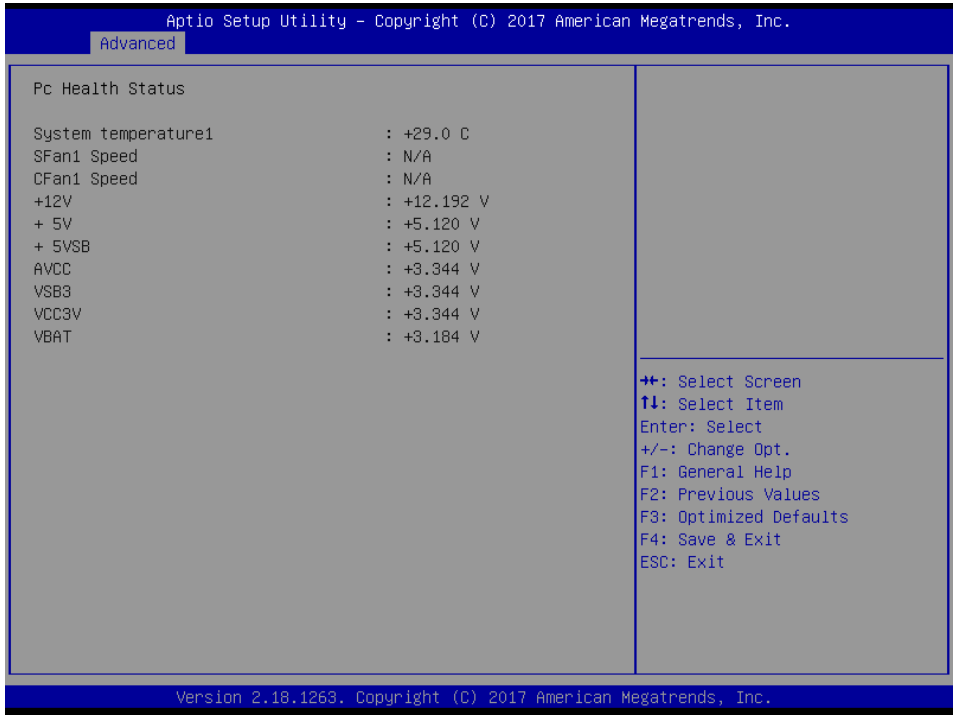
| Item             | Option                                    | Description                              |
|------------------|-------------------------------------------|------------------------------------------|
| Serial Port      | Enabled[Default],<br>Disabled             | Enable or Disable Serial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

### 3.6.2.6.3 Parallel Port Configuration



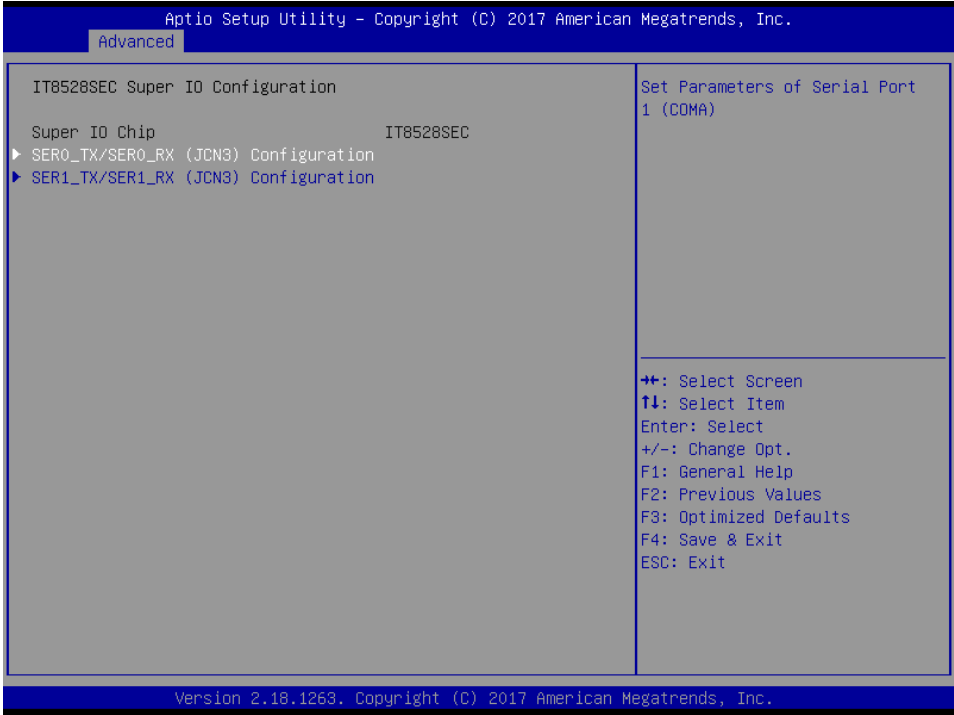
| Item          | Option                                                                                                                                | Description                                 |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| Parallel Port | Enabled[Default],<br>Disabled                                                                                                         | Enable or Disable Parallel Port (LPT/LPTE). |
| Device Mode   | STD Printer Mode[Default]<br>EPP-1.9 and SPP Mode<br>EPP-1.7 and SPP Mode<br>ECP Mode<br>ECP and EPP 1.9 Mode<br>ECP and EPP 1.7 Mode | Change the Printer Port mode.               |

3.6.2.7 NCT6106D HW Monitor

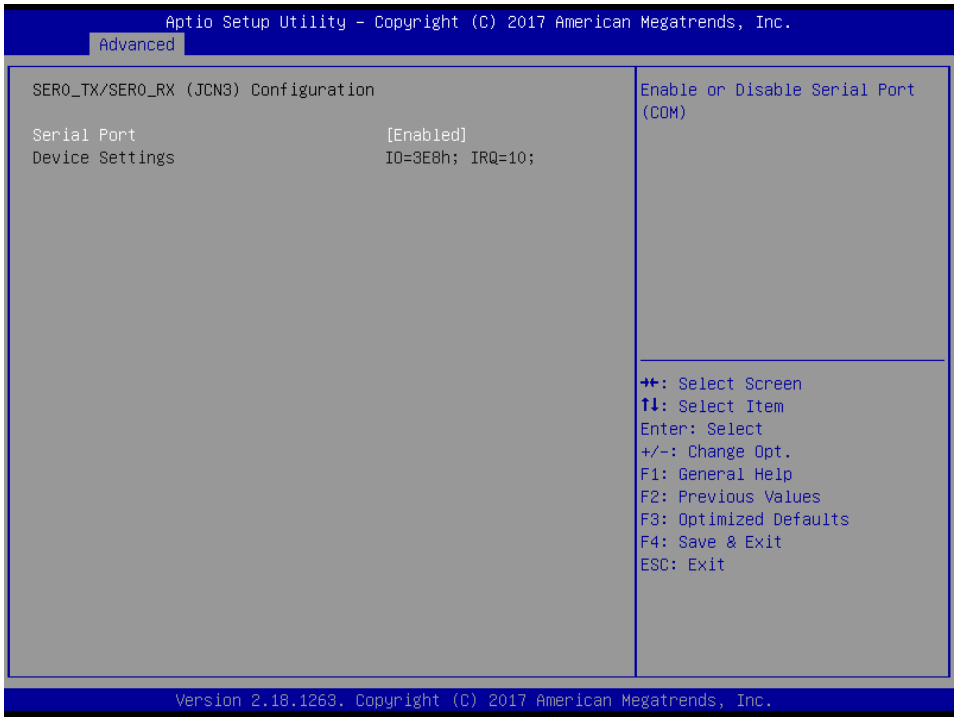


3.6.2.8 IT8528SEC Super IO Configuration

You can use this item to set up or change the IT8528SEC Super IO configuration for serial ports. Please refer to 3.6.2.8.1~ 3.6.2.8.2 for more information.

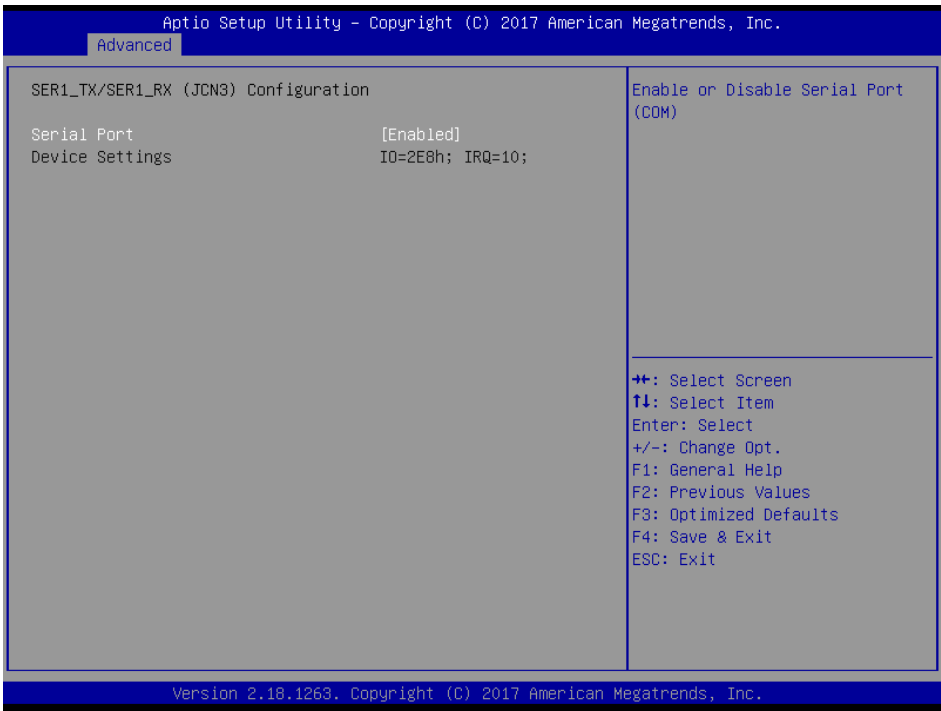


3.6.2.8.1 SER0\_TX/SER0\_RX (JCN3) Configuration



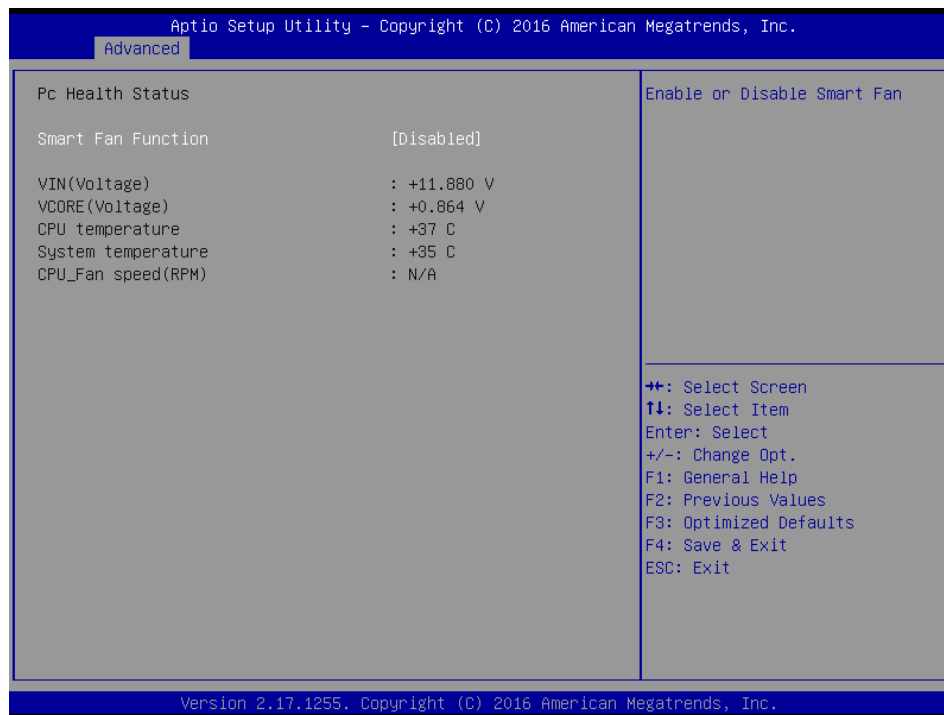
| Item        | Option                     | Description                          |
|-------------|----------------------------|--------------------------------------|
| Serial Port | Enabled[Default], Disabled | Enable or Disable Serial Port (COM). |

3.6.2.8.2 SER1\_TX/SER1\_RX (JCN3) Configuration

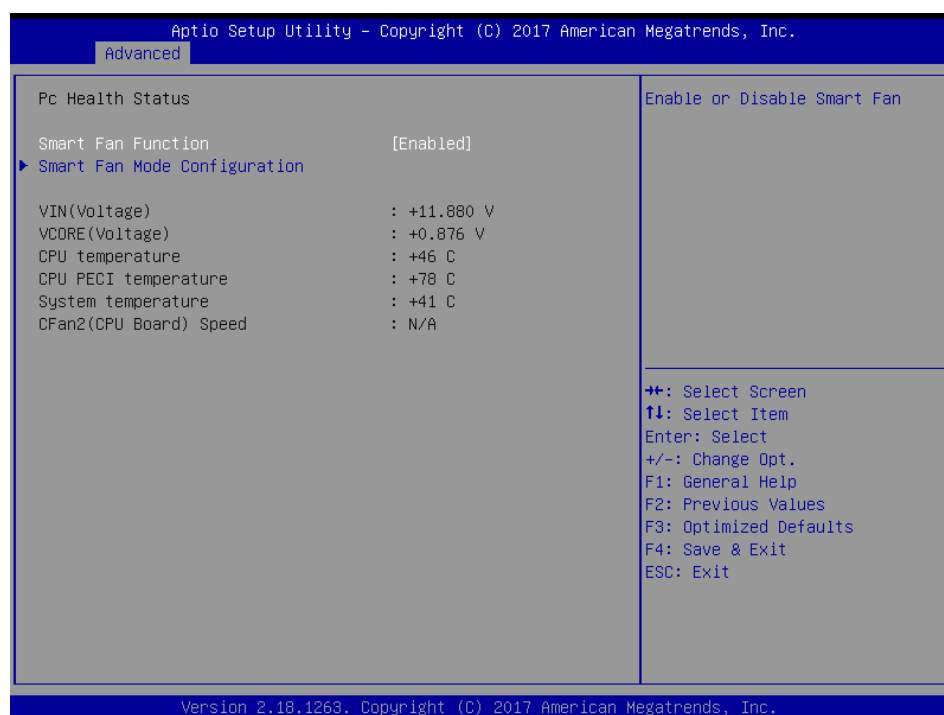


| Item        | Option                        | Description                          |
|-------------|-------------------------------|--------------------------------------|
| Serial Port | Enabled[Default],<br>Disabled | Enable or Disable Serial Port (COM). |

### 3.6.2.9 H/W Monitor

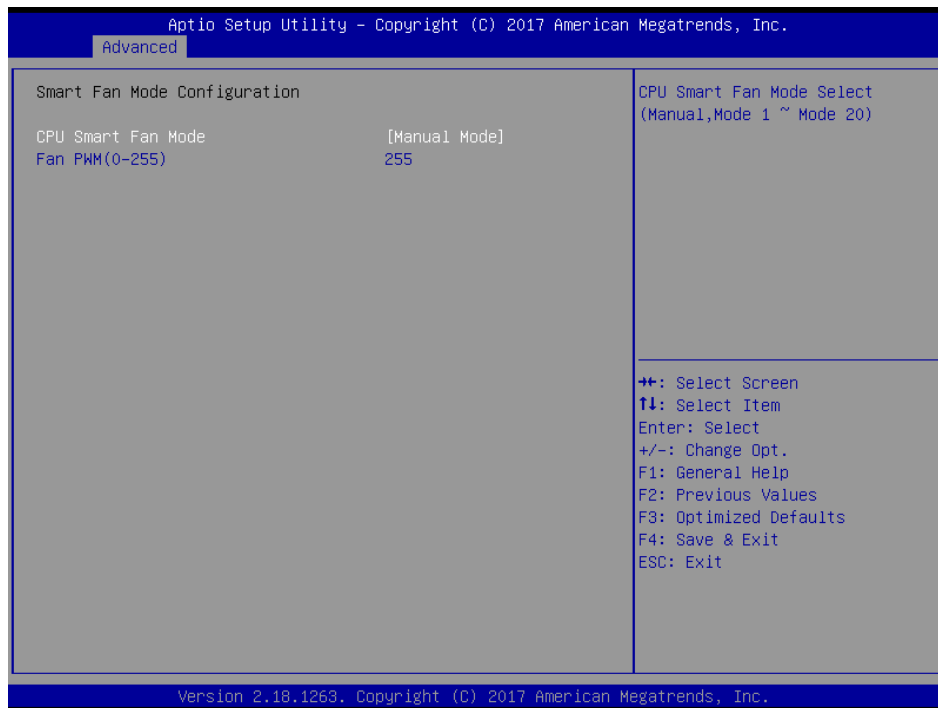


| Item               | Options                       | Description                    |
|--------------------|-------------------------------|--------------------------------|
| Smart Fan Function | Enabled,<br>Disabled[Default] | Enables or Disables Smart Fan. |



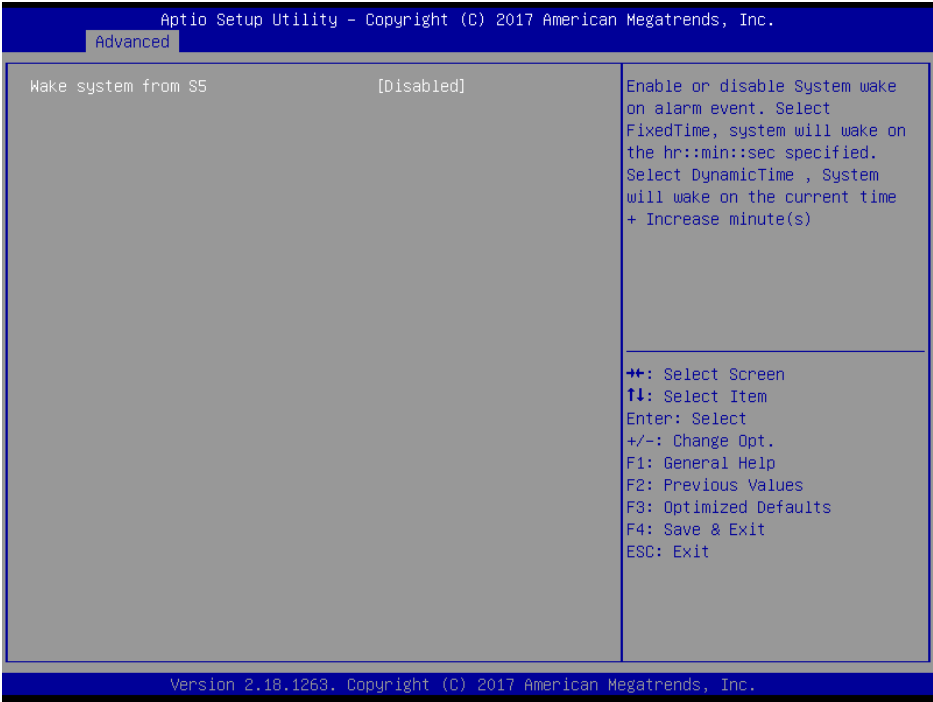
| Item               | Options                       | Description                    |
|--------------------|-------------------------------|--------------------------------|
| Smart Fan Function | Enabled[Default],<br>Disabled | Enables or Disables Smart Fan. |

## 3.6.2.9.1 Smart Fan Mode Configuration

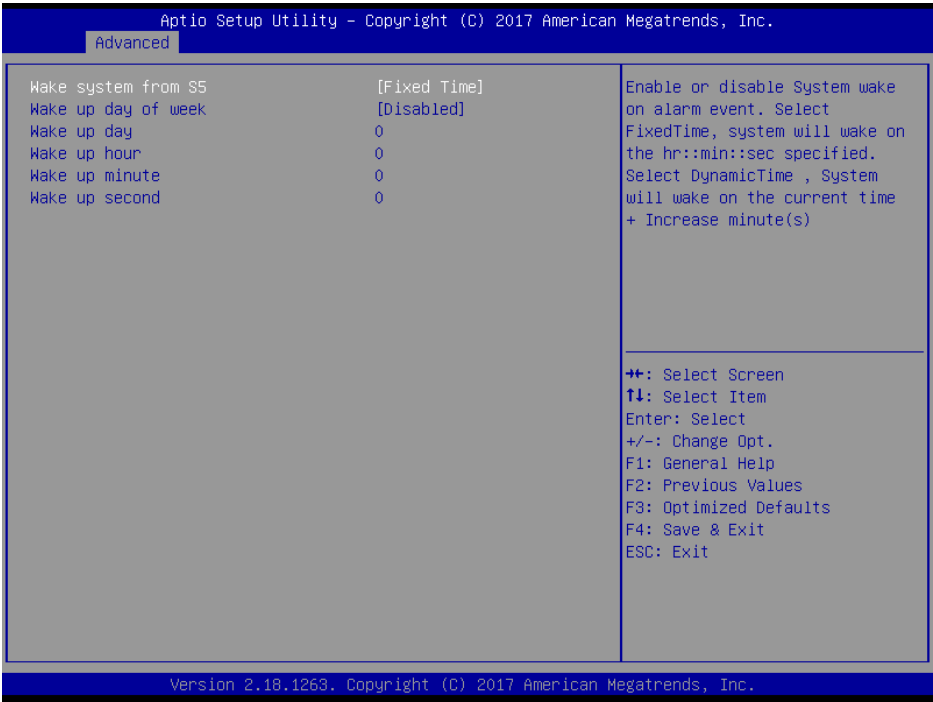


| Item               | Option                                                                                                 | Description                                         |
|--------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| CPU Smart Fan Mode | Manual Mode[Default]/,<br>Mode 01/02/03/04/05<br>/06/07/08/09/10<br>/11/12/13/14/15<br>/16/17/18/19/20 | CPU Smart Fan Mode Select (Manual, Mode 1~Mode 20). |
| Fan PWM (0-255)    | 0-255[Default]                                                                                         | Fan PWM duty (0-255).                               |

3.6.2.10 S5 RTC Wake Settings

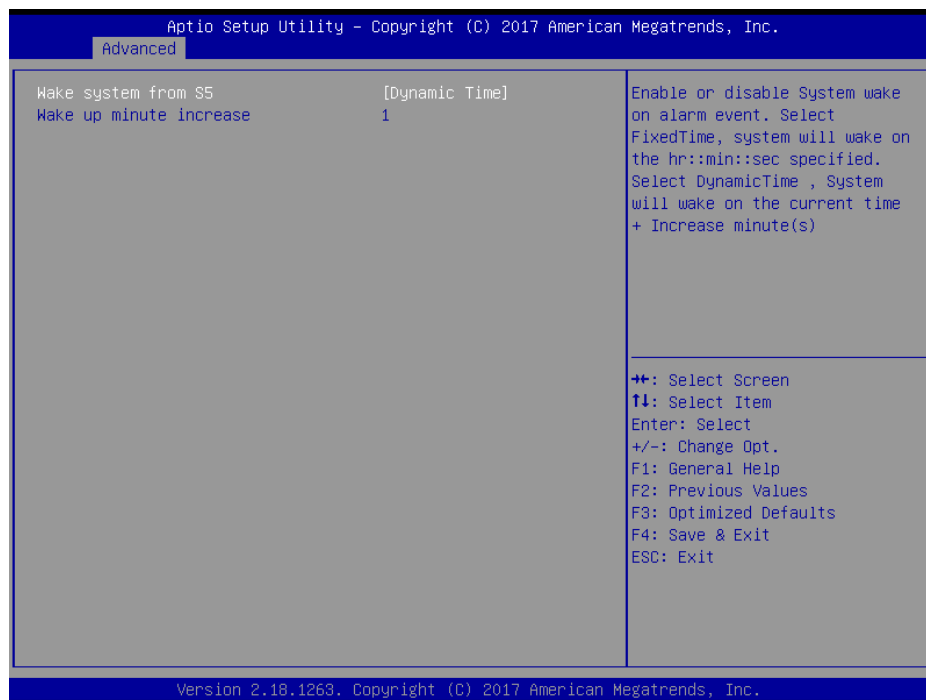


| Item                | Options                                          | Description                                                                                                                                                                                      |
|---------------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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). |



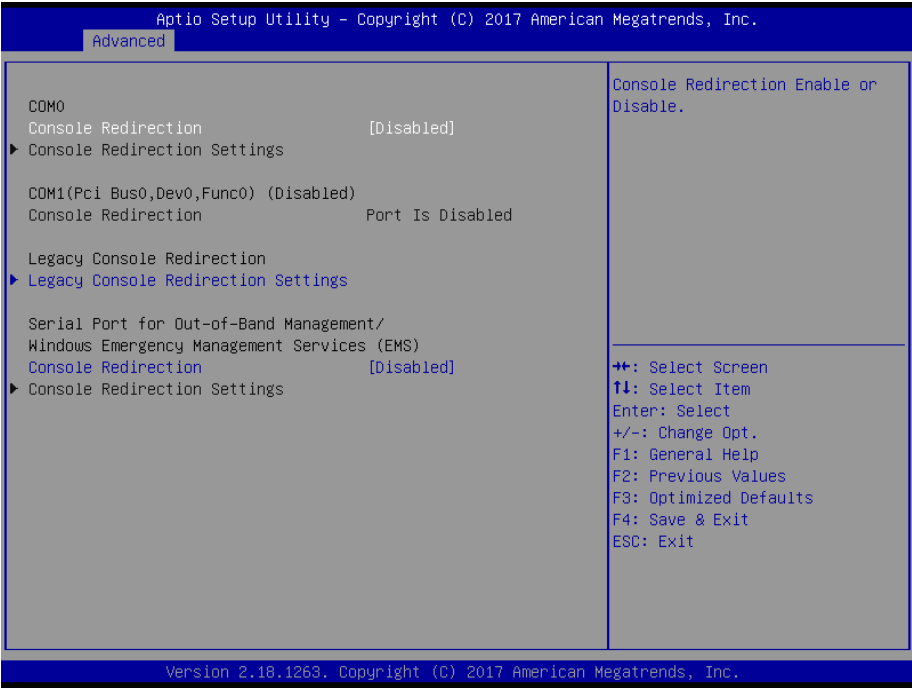
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| Item                | Options                                               | Description                                                                                                                                                                                      |
|---------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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[Default]<br>Monday-Friday<br>Monday-Saturday | Wake up day of week. (Monday-Friday) or (Monday-Saturday).                                                                                                                                       |
| Wake up day         | 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.                                                                                     |
| Wake up hour        | 0-23                                                  | Select 0-23 For example enter 3 for 3am and 15 for 3pm.                                                                                                                                          |
| Wake up minute      | 0-23                                                  | Select 0-23 For example enter 3 for 3am and 15 for 3pm.                                                                                                                                          |
| Wake up second      | 0-23                                                  | Select 0-23 For example enter 3 for 3am and 15 for 3pm.                                                                                                                                          |



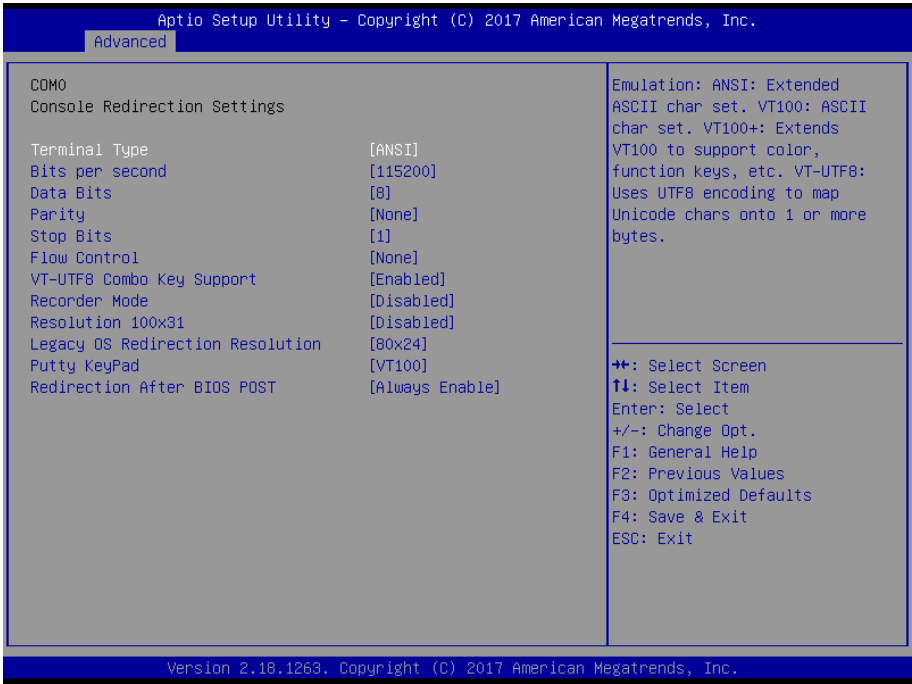
| Item                    | Options                                          | Description                                                                                                                                                                                      |
|-------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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.                                                                                                                                                                                             |

3.6.2.11 Serial Port Console Redirection



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

3.6.2.11.1 Smart Fan Mode Configuration

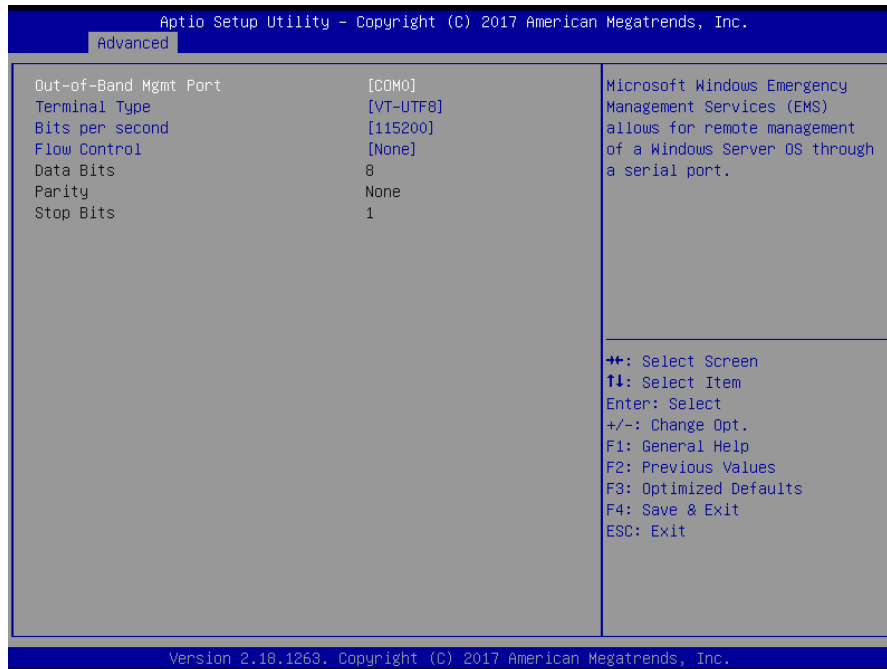


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| Item                             | Option                                                    | Description                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Terminal Type                    | VT100<br>VT100+<br>VT-UTF8<br>ANSI[Default]/              | 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]        | Select 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                      | 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-UTF8 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[Default]<br>Enabled                              | 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>XTERM6<br>SCO<br>ESCN<br>VT400 | Select FunctionKey and KeyPad on Putty.                                                                                                                                                                                                                                                                                                                                        |

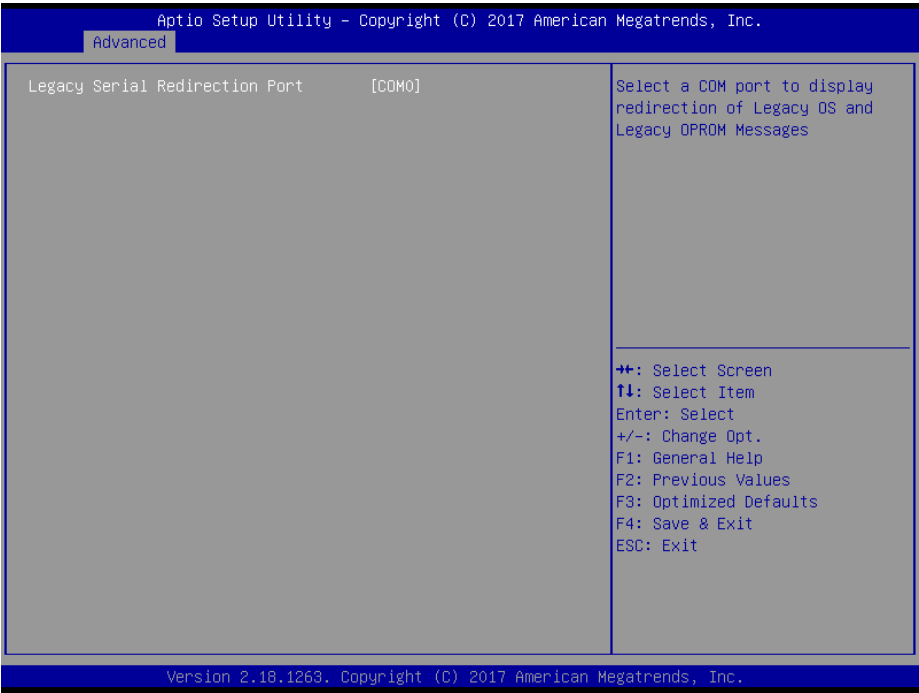
|                                    |                                      |                                                                                                                                                                                                                         |
|------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Redirection After BIOS POST</b> | 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 Legacy console Redirection is enabled for Legacy OS. |
|------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 3.6.2.11.2 Console Redirection Settings



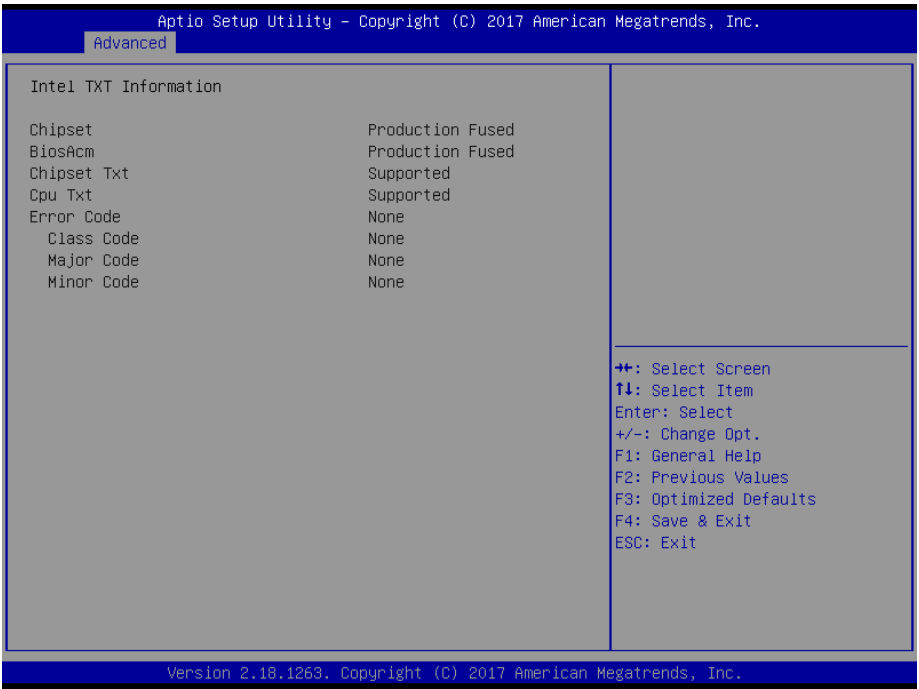
| Item                         | Option                                                 | Description                                                                                                                                                                                                                                                                                                       |
|------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Out-of-Band Mgmt Port</b> | COM0[Default]                                          | Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.                                                                                                                                                                                  |
| <b>Terminal Type</b>         | VT100<br>VT100+<br>VT-UTF8[Default]<br>ANSI            | VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.                                                                                                    |
| <b>Bits per second</b>       | 9600<br>19200<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.                                                                                                                                                                                |
| <b>Flow Control</b>          | None[Default]<br>Hardware RTS/CTS<br>Software Xon/Xoff | 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. |

3.6.2.11.3 Console Redirection Settings



| Item                           | Option        | Description                                                                     |
|--------------------------------|---------------|---------------------------------------------------------------------------------|
| Legacy Serial Redirection Port | COM0[Default] | Select a COM port to display redirection of Legacy OS and Legacy OPRM Messages. |

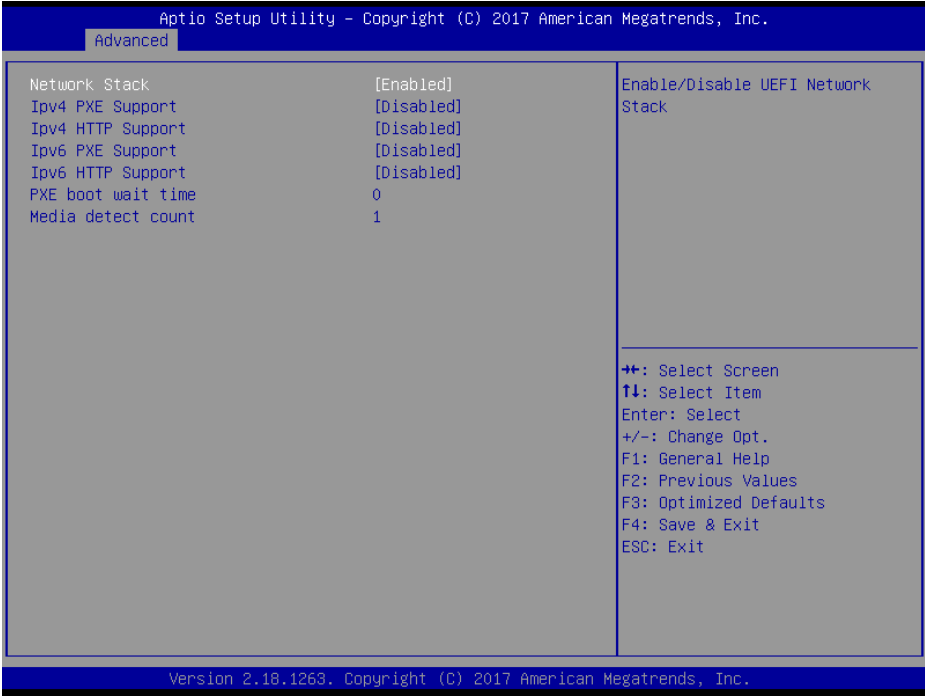
3.6.2.12 Intel TXT Configuration



3.6.2.13 Network Stack Configuration



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



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

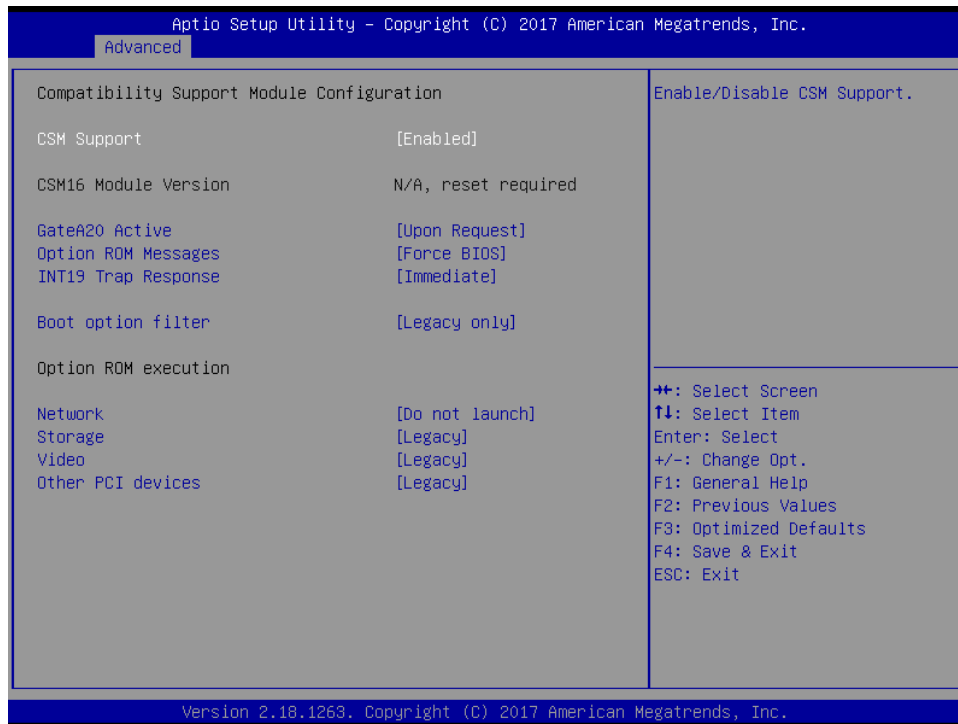
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|                           |                              |                                                                                       |
|---------------------------|------------------------------|---------------------------------------------------------------------------------------|
| <b>Ipv4 HTTP Support</b>  | Enabled<br>Disabled[Default] | Enable Ipv4 HTTP Boot Support. If disabled IPV4 HTTP boot option will not be created. |
| <b>Ipv6 PXE Support</b>   | Enabled<br>Disabled[Default] | Enable Ipv6 PXE Boot Support. If disabled IPV6 PXE boot option will not be created.   |
| <b>Ipv6 HTTP Support</b>  | Enabled<br>Disabled[Default] | Enable Ipv6 HTTP Boot Support. If disabled IPV6 HTTP 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.                                    |

### 3.6.2.14 CSM Configuration

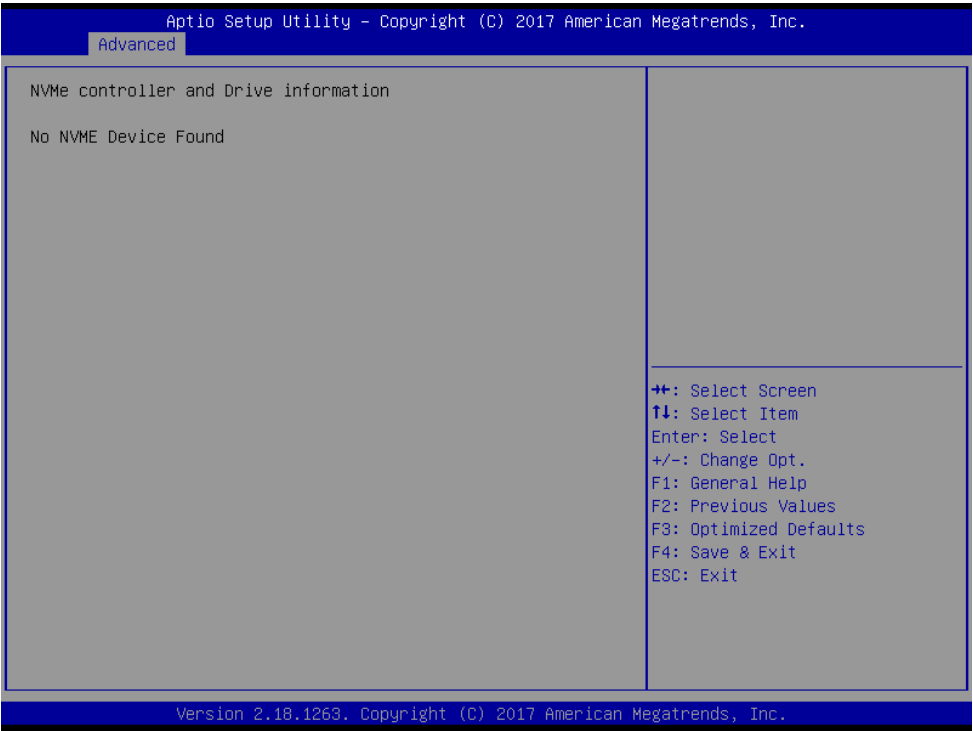


| Item               | Options                      | Description                 |
|--------------------|------------------------------|-----------------------------|
| <b>CSM Support</b> | Enabled<br>Disabled[Default] | Enable/Disable CSM Support. |



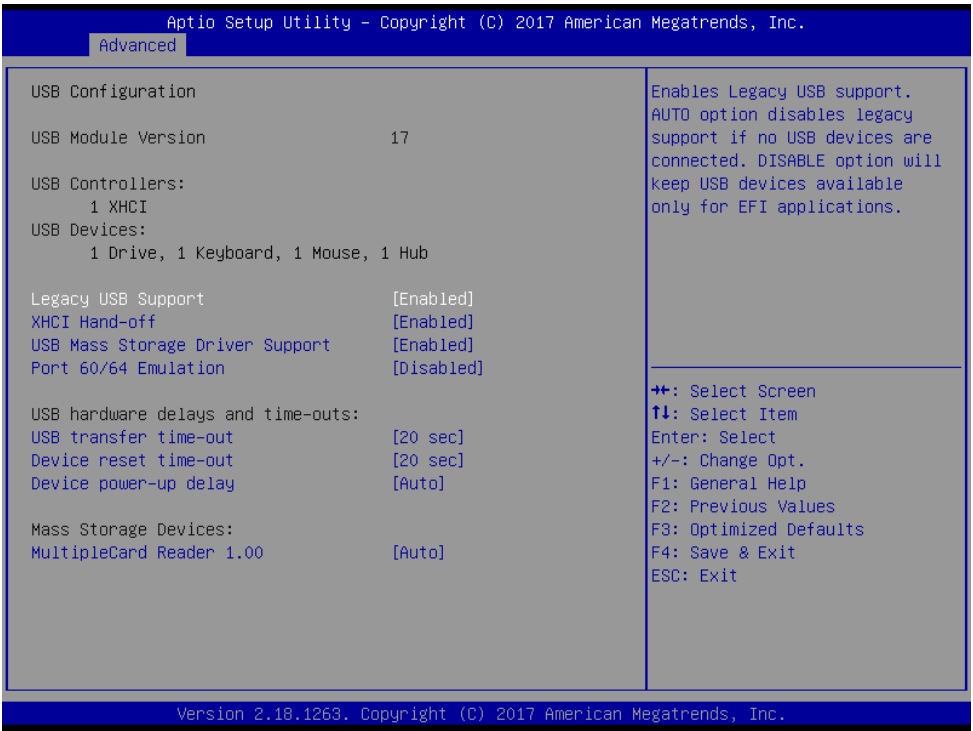
| Item                       | Options                                              | Description                                                                                                                                                 |
|----------------------------|------------------------------------------------------|-----------------------------------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

3.6.2.15 NVMe Configuration



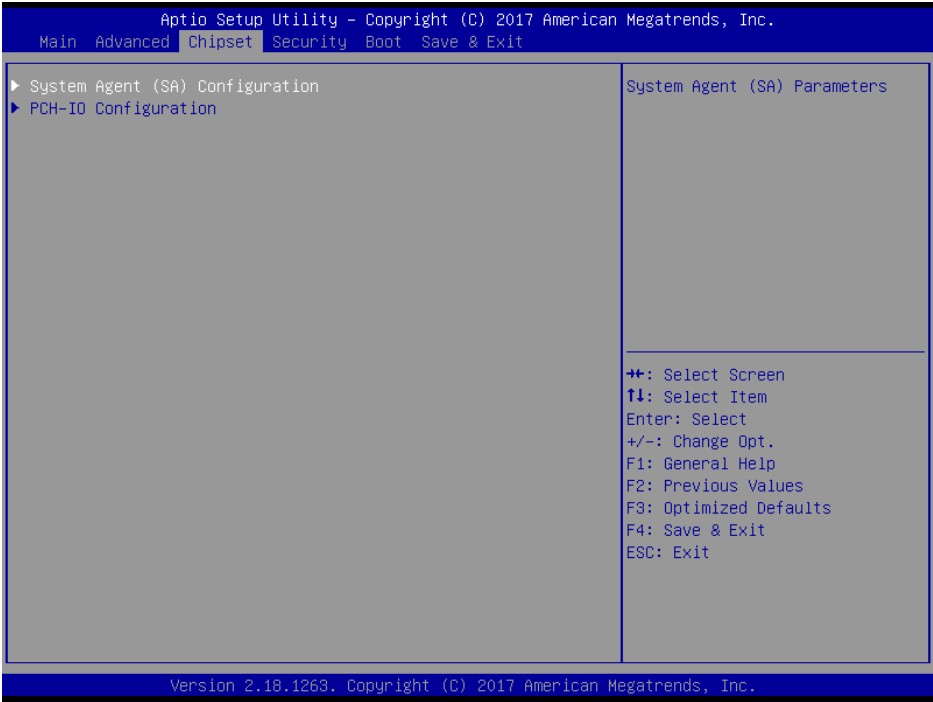
3.6.2.16 USB Configuration

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



| Item                                   | Options                                                      | Description                                                                                                                                                                                                |
|----------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Legacy USB Support</b>              | Enabled[Default]<br>Disabled<br>Auto                         | Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep SUB devices available only for EFI applications.                                 |
| <b>XHCI Hand-off</b>                   | Enabled[Default]<br>Disabled                                 | This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.                                                                                   |
| <b>USB Mass Storage Driver Support</b> | Enabled[Default]<br>Disabled                                 | Enable/Disable USB Mass Storage Driver Support.                                                                                                                                                            |
| <b>Port 60/64 Emulation</b>            | Enabled<br>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<br>5 sec<br>10 sec<br>20 sec[Default]                  | The time-out value for Control, Bulk, and Interrupt transfers.                                                                                                                                             |
| <b>Device reset time-out</b>           | 10 sec<br>20 sec[Default]<br>30 sec<br>40 sec                | USB mass storage device Start Unit command time-out.                                                                                                                                                       |
| <b>Device power-up delay</b>           | 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 from Hub descriptor. |
| <b>Mass Storage Devices</b>            | 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

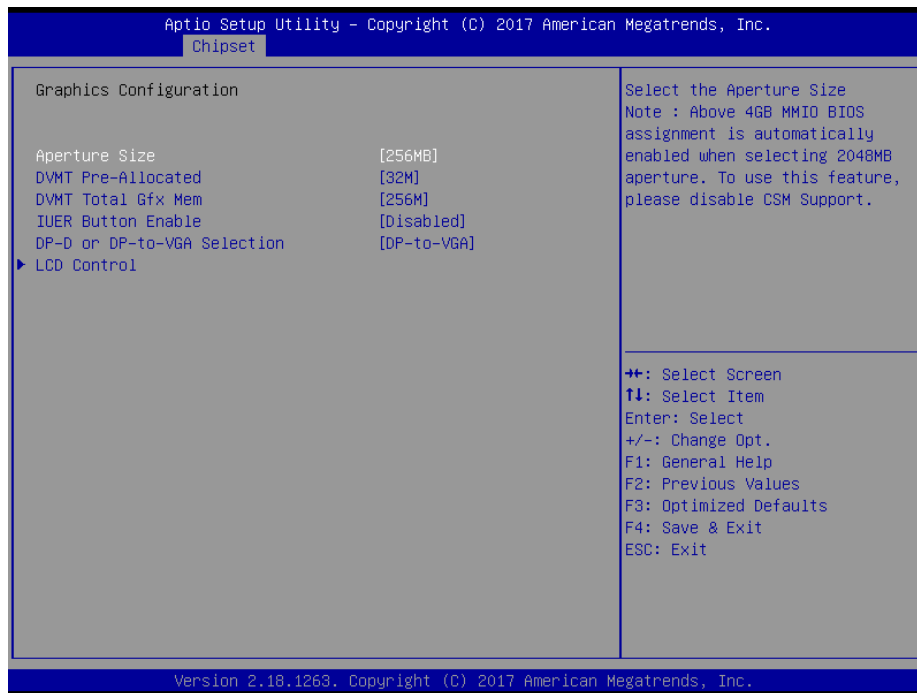


3.6.3.1 System Agent (SA) Configuration



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

### 3.6.3.1.1 Graphics Configuration

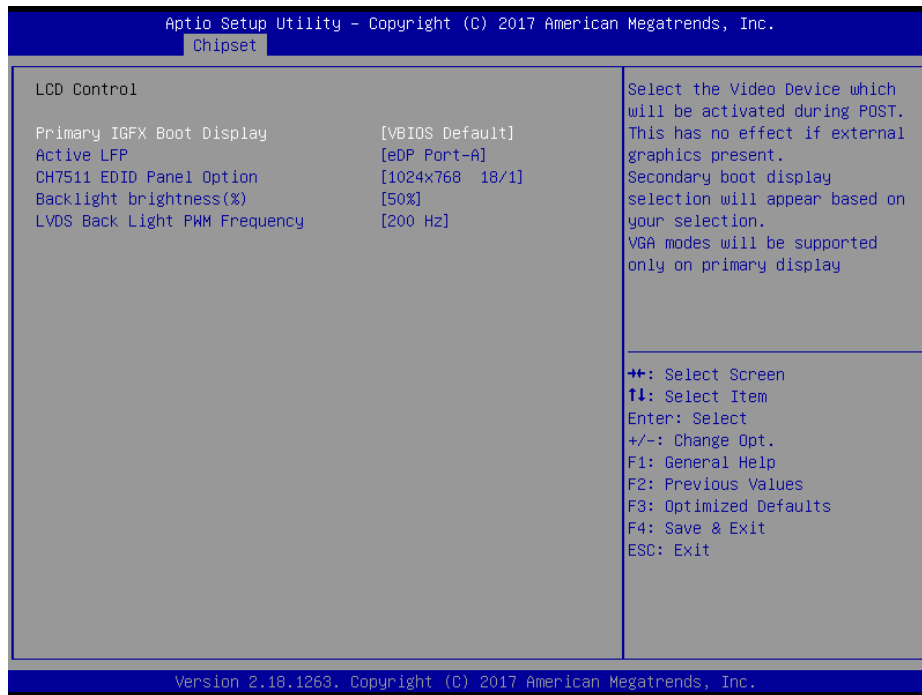


| Item               | Option                                                                                                                              | Description                                                                                                                                                              |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aperture Size      | 128MB<br>256MB<br>512MB<br>1024MB<br>2048MB[Default]                                                                                | Select the Aperture Size. Note: Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support. |
| DVMT Pre-Allocated | 0M<br>32M<br>64M<br>4M<br>8M<br>12M<br>16M<br>20M<br>24M<br>28M<br>32M/F7[Default]<br>36M<br>40M<br>44M<br>48M<br>52M<br>56M<br>60M | Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.                                                                         |
| DVMT Total Gfx Mem | 256M[Default]<br>128M<br>MAX                                                                                                        | Select DVMT 5.0 Total Graphics Memory size used by the Internal Graphics Device.                                                                                         |

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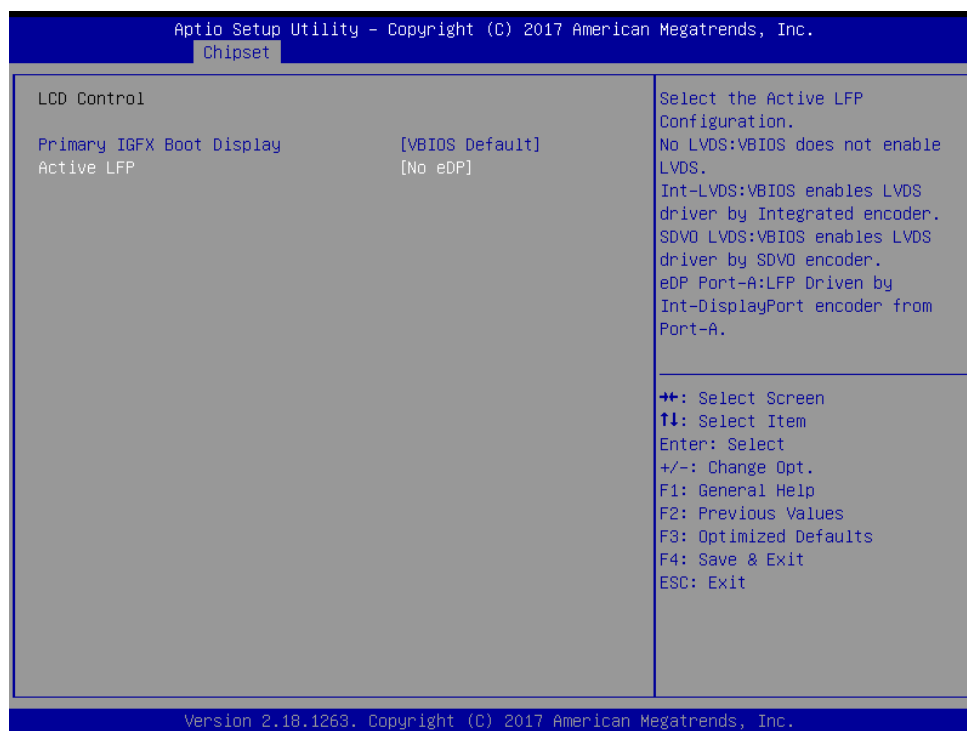
|                             |                              |                                           |
|-----------------------------|------------------------------|-------------------------------------------|
| IUER Button Enable          | Disabled[Default]<br>Enabled | Enable/Disable IUER Button Functionality. |
| DP-D or DP-to-VGA Selection | DP-D<br>DP-to-VGA[Default]   | Selection of DP Port-D output.            |

### 3.6.3.1.1.1 LCD Control



| Item                      | Option                                                                                                      | Description                                                                                                                                                                                                                                                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Primary IGFX Boot Display | VBIOs Default[Default],<br>EFP<br>LFP<br>EFP3<br>EFP2<br>EFP4                                               | Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.                                                                                        |
| Active LFP                | No eDP<br>eDP Port-A[Default],                                                                              | Select the Active LFP Configuration. No LVDS:VBIOs does not enable LVDS. Int-LVDS:VBIOs enable LVDS driver by Integrated encoder. SDVO LVDS:VBIOs enables LVDS driver by SDVO encoder. eDP Port-A:LFP Driven by Int-DisplayPort encoder from Port-A. eDP Port-D:LFP Driven by Int-DisplayPort encoder from Port-D(through PCH). |
| CH7511 EDID Panel Option  | 1024x768 18/1[Default]<br>1366x768 18/1<br>1024x600 18/1<br>1280x800 18/1<br>1920x1200 24/2<br>640x480 18/1 | Port1-EDP to LVDS (Chrotel 7511) Panel EDID Option.                                                                                                                                                                                                                                                                             |

|                                      |                                                                                                                                          |                                       |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
|                                      | 800x480 18/1<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 |                                       |
| <b>Backlight brightness (%)</b>      | 00%<br>25%<br>50% <b>[Default]</b><br>75%<br>100%                                                                                        | Select LVDS back light PWM duty.      |
| <b>LVDS Back Light PWM Frequency</b> | 200 Hz <b>[Default]</b><br>300 Hz<br>400 Hz<br>500 Hz<br>700 Hz<br>1kHz<br>2kHz<br>3kHz<br>5kHz<br>10kHz<br>20kHz                        | Select LVDS back light PWM Frequency. |

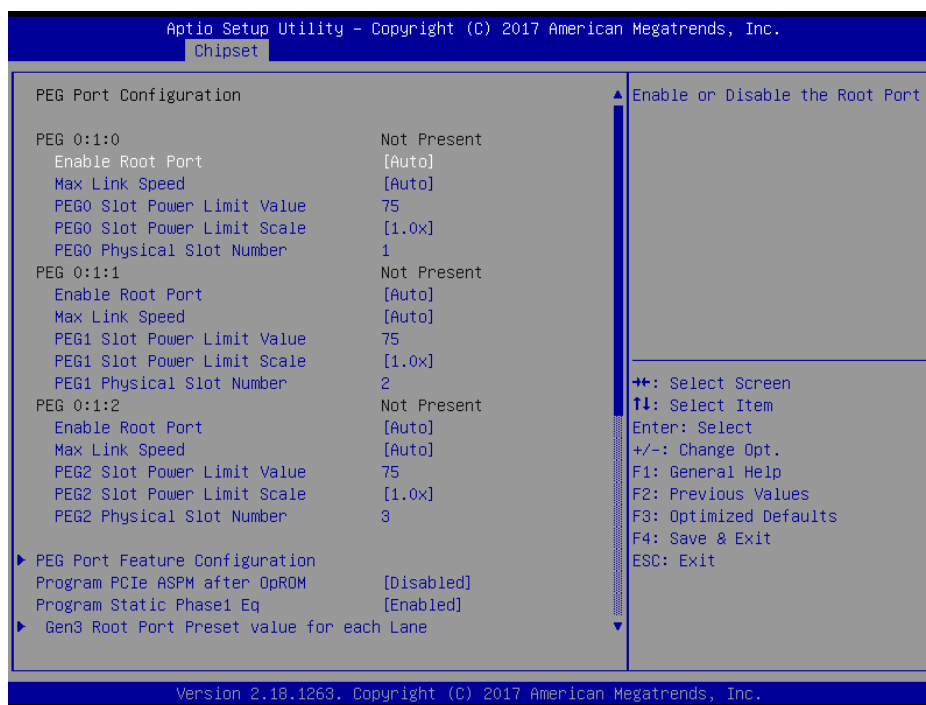


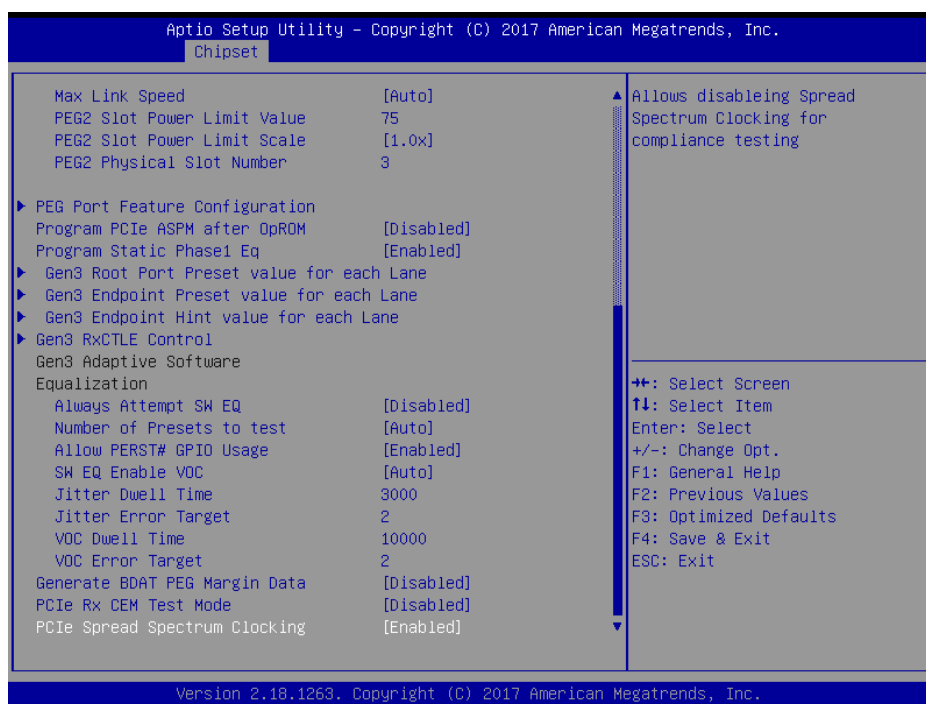
| Item                             | Option                                         | Description                                                                                                                  |
|----------------------------------|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>Primary IGFX Boot Display</b> | VBIOS Default <b>[Default]</b> ,<br>EFP<br>LFP | Select the Video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot |

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|                   |                                |                                                                                                                                                                                                                                                                                                                                 |
|-------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   | EFP3<br>EFP2<br>EFP4           | display selection will appear based on your selection. VGA modes will be supported only on primary display.                                                                                                                                                                                                                     |
| <b>Active LFP</b> | No eDP[Default],<br>eDP Port-A | Select the Active LFP Configuration. No LVDS:VBIOS does not enable LVDS. Int-LVDS:VBIOS enable LVDS driver by Integrated encoder. SDVO LVDS:VBIOS enables LVDS driver by SDVO encoder. eDP Port-A:LFP Driven by Int-DisplayPort encoder from Port-A. eDP Port-D:LFP Driven by Int-DisplayPort encoder from Port-D(through PCH). |

### 3.6.3.1.2 PEG Port Configuration





## PEG 0:1:0

| 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<br>Gen2<br>Gen3    | Configure PEG 0:1:0 Max Speed.                                                                                                                              |
| PEG0 Slot Power Limit Value | 0-255<br>75[Default]                     | Sets the upper limit on power supplied by slot, Power limit (in Watts) is calculated by multiplying this value by the Slot Power Limit Scale. Values 0-255. |
| PEG0 Slot Power Limit Scale | 1.0x[Default]<br>0.1x<br>0.01x<br>0.001x | Select the scale used for the Slot Power Limit Value.                                                                                                       |
| PEG0 Physical Slot Number   | 0-8191<br>1[Default]                     | Set the physical slot number attached to this Port. The number has to be globally unique within the chassis. Values 0-8191.                                 |

## PEG 0:1:1

| 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<br>Gen2        | Configure PEG 0:1:1 Max Speed.   |

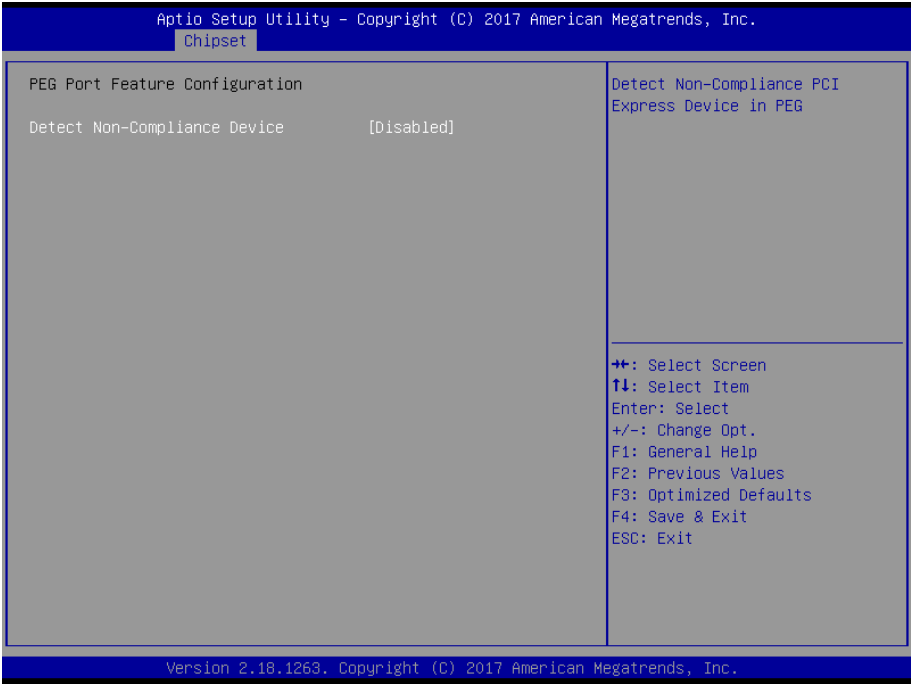
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|                                    |                                          |                                                                                                                                                             |
|------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                    | Gen3                                     |                                                                                                                                                             |
| <b>PEG1 Slot Power Limit Value</b> | 0-255<br>75[Default]                     | Sets the upper limit on power supplied by slot, Power limit (in Watts) is calculated by multiplying this value by the Slot Power Limit Scale. Values 0-255. |
| <b>PEG1 Slot Power Limit Scale</b> | 1.0x[Default]<br>0.1x<br>0.01x<br>0.001x | Select the scale used for the Slot Power Limit Value.                                                                                                       |
| <b>PEG1 Physical Slot Number</b>   | 0-8191<br>2[Default]                     | Set the physical slot number attached to this Port. The number has to be globally unique within the chassis. Values 0-8191.                                 |

## PEG 0:1:2

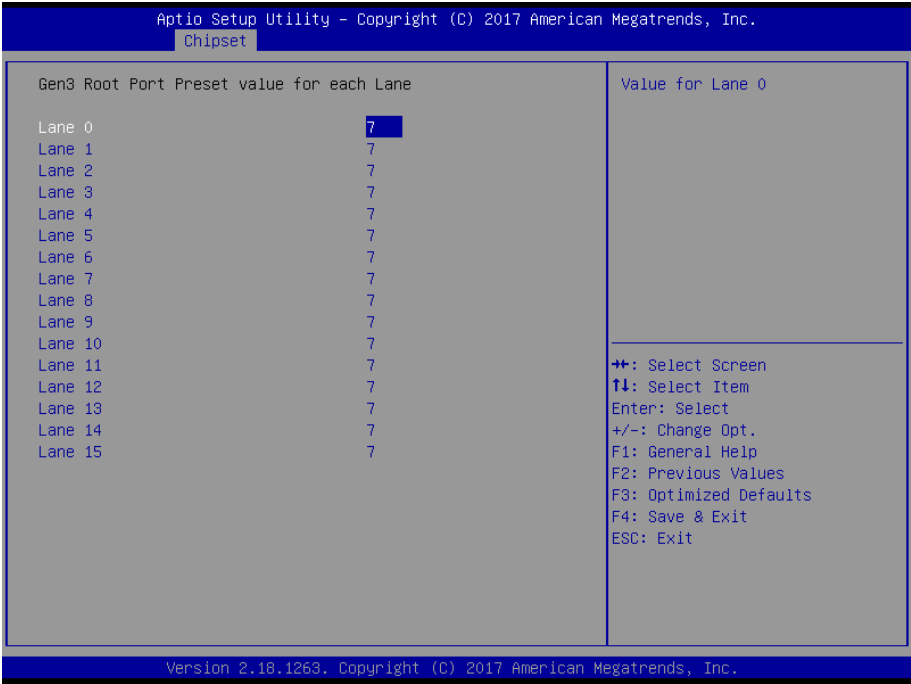
| Item                                 | Option                                   | Description                                                                                                                                                 |
|--------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Enable Root Port</b>              | Disabled<br>Enabled<br>Auto[Default]     | Enable or Disable the Root Port.                                                                                                                            |
| <b>Max Link Speed</b>                | Auto[Default]<br>Gen1<br>Gen2<br>Gen3    | Configure PEG 0:1:2 Max Speed.                                                                                                                              |
| <b>PEG2 Slot Power Limit Value</b>   | 0-255<br>75[Default]                     | Sets the upper limit on power supplied by slot, Power limit (in Watts) is calculated by multiplying this value by the Slot Power Limit Scale. Values 0-255. |
| <b>PEG2 Slot Power Limit Scale</b>   | 1.0x[Default]<br>0.1x<br>0.01x<br>0.001x | Select the scale used for the Slot Power Limit Value.                                                                                                       |
| <b>PEG2 Physical Slot Number</b>     | 0-8191<br>3[Default]                     | Set the physical slot number attached to this Port. The number has to be globally unique within the chassis. Values 0-8191.                                 |
| <b>Program PCIe ASPM after OpROM</b> | Disabled[Default]<br>Enabled             | Enabled: PCIe ASPM will be programmed after OpROM. Disabled: PCIe ASPM will be programmed before OpROM.                                                     |
| <b>Program Static Phase1 Eq</b>      | Disabled<br>Enabled[Default]             | Program Phase1 Presets/CTLEp.                                                                                                                               |

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. |

3.6.3.1.3.2 Gen3 Root Port Preset value for each Lane



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| Item                                             | Option | Description                                          |
|--------------------------------------------------|--------|------------------------------------------------------|
| <b>Lane0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15</b> | 0-7    | Value of Lane 0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15. |

### 3.6.3.1.3.3 Gen3 Endpoint Preset value for each Lane

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Chipset

| Gen3 Endpoint Preset value for each Lane |   | Value for Lane 0                                                                                                                                                               |
|------------------------------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lane 0                                   | 7 | ++: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>ESC: Exit |
| Lane 1                                   | 7 |                                                                                                                                                                                |
| Lane 2                                   | 7 |                                                                                                                                                                                |
| Lane 3                                   | 7 |                                                                                                                                                                                |
| Lane 4                                   | 7 |                                                                                                                                                                                |
| Lane 5                                   | 7 |                                                                                                                                                                                |
| Lane 6                                   | 7 |                                                                                                                                                                                |
| Lane 7                                   | 7 |                                                                                                                                                                                |
| Lane 8                                   | 7 |                                                                                                                                                                                |
| Lane 9                                   | 7 |                                                                                                                                                                                |
| Lane 10                                  | 7 |                                                                                                                                                                                |
| Lane 11                                  | 7 |                                                                                                                                                                                |
| Lane 12                                  | 7 |                                                                                                                                                                                |
| Lane 13                                  | 7 |                                                                                                                                                                                |
| Lane 14                                  | 7 |                                                                                                                                                                                |
| Lane 15                                  | 7 |                                                                                                                                                                                |

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| Item                                             | Option | Description                                          |
|--------------------------------------------------|--------|------------------------------------------------------|
| <b>Lane0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15</b> | 0-7    | Value of Lane 0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15. |

### 3.6.3.1.3.4 Gen3 Endpoint Hint value for each Lane

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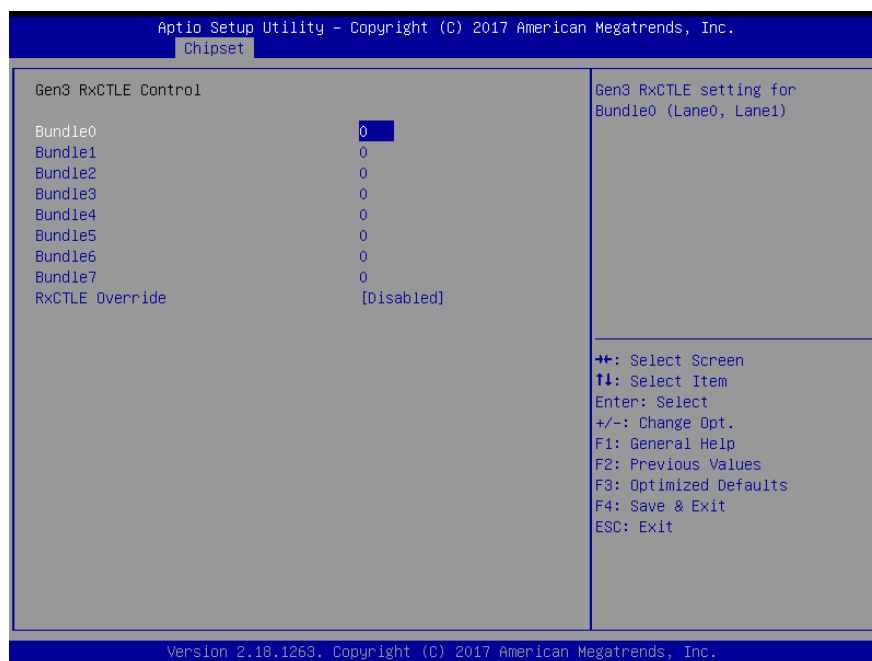
Chipset

| Gen3 Endpoint Hint value for each Lane |   | Value for Lane 0                                                                                                                                                               |
|----------------------------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lane 0                                 | 2 | ++: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>ESC: Exit |
| Lane 1                                 | 2 |                                                                                                                                                                                |
| Lane 2                                 | 2 |                                                                                                                                                                                |
| Lane 3                                 | 2 |                                                                                                                                                                                |
| Lane 4                                 | 2 |                                                                                                                                                                                |
| Lane 5                                 | 2 |                                                                                                                                                                                |
| Lane 6                                 | 2 |                                                                                                                                                                                |
| Lane 7                                 | 2 |                                                                                                                                                                                |
| Lane 8                                 | 2 |                                                                                                                                                                                |
| Lane 9                                 | 2 |                                                                                                                                                                                |
| Lane 10                                | 2 |                                                                                                                                                                                |
| Lane 11                                | 2 |                                                                                                                                                                                |
| Lane 12                                | 2 |                                                                                                                                                                                |
| Lane 13                                | 2 |                                                                                                                                                                                |
| Lane 14                                | 2 |                                                                                                                                                                                |
| Lane 15                                | 2 |                                                                                                                                                                                |

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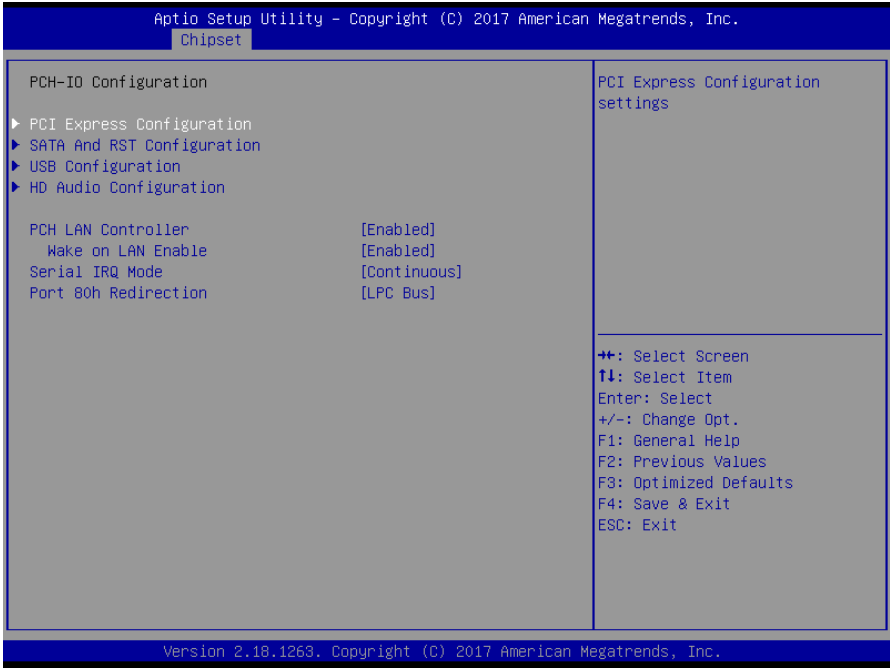
| Item                                             | Option | Description                                          |
|--------------------------------------------------|--------|------------------------------------------------------|
| <b>Lane0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15</b> | 0-2    | Value of Lane 0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15. |

### 3.6.3.1.3.5 Gen3 RxCTLE Control



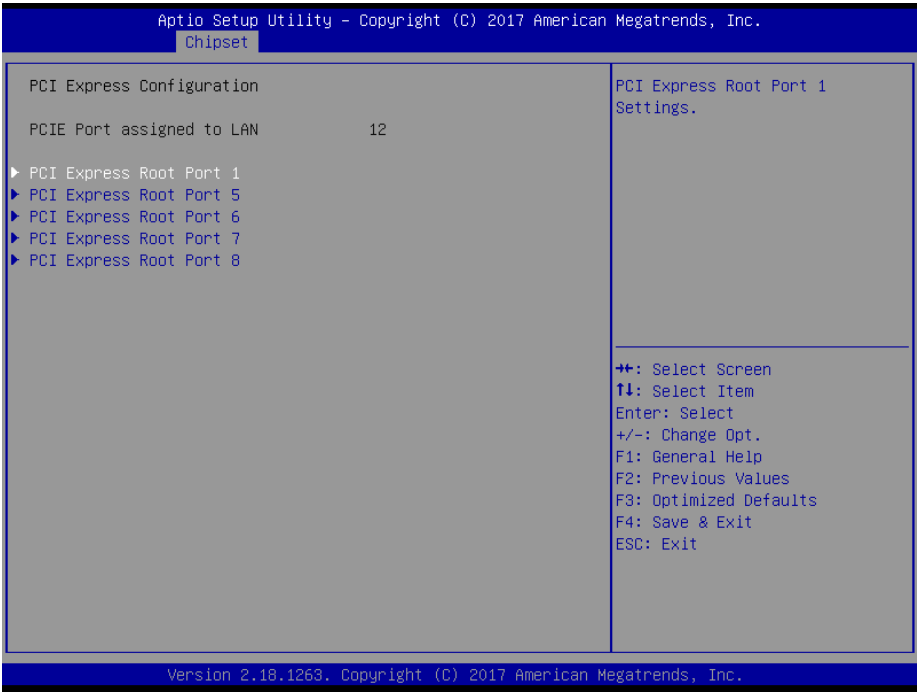
| Item                   | Option                        | Description                                                 |
|------------------------|-------------------------------|-------------------------------------------------------------|
| <b>Bundle0</b>         | 0                             | Gen3 RxCTLE setting for Bundle0 (Lane0, Lane1).             |
| <b>Bundle1</b>         | 0                             | Gen3 RxCTLE setting for Bundle1 (Lane2, Lane3).             |
| <b>Bundle2</b>         | 0                             | Gen3 RxCTLE setting for Bundle2 (Lane4, Lane5).             |
| <b>Bundle3</b>         | 0                             | Gen3 RxCTLE setting for Bundle3 (Lane6, Lane7).             |
| <b>Bundle4</b>         | 0                             | Gen3 RxCTLE setting for Bundle4 (Lane8, Lane9).             |
| <b>Bundle5</b>         | 0                             | Gen3 RxCTLE setting for Bundle5 (Lane10, Lane11).           |
| <b>Bundle6</b>         | 0                             | Gen3 RxCTLE setting for Bundle6 (Lane12, Lane13).           |
| <b>Bundle7</b>         | 0                             | Gen3 RxCTLE setting for Bundle7 (Lane14, Lane15).           |
| <b>RxCTLE Override</b> | Disabled[Default],<br>Enabled | When Enabled, it overrides PEG's RxCTLE adaptive behaviour. |

3.6.3.2 PCH-IO Configuration

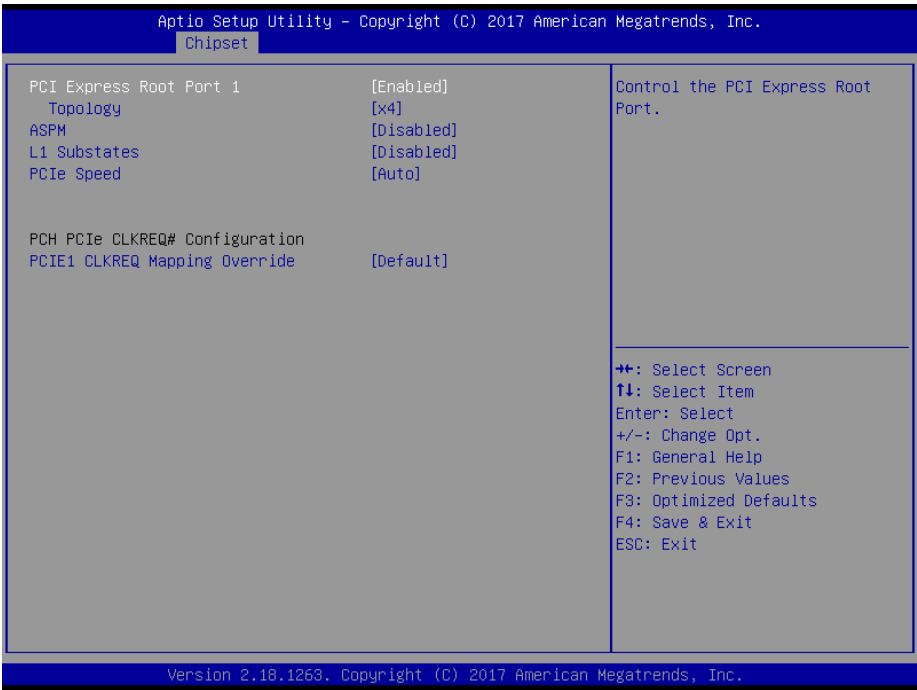


| Item                 | Option                               | Description                                          |
|----------------------|--------------------------------------|------------------------------------------------------|
| PCH LAN Controller   | Disabled<br>Enabled <b>[Default]</b> | Enable or disable onboard NIC.                       |
| Wake on LAN Enable   | Disabled<br>Enabled <b>[Default]</b> | Enable or disable integrated LAN to wake the system. |
| Serial IRQ Mode      | Quiet<br>Continuous <b>[Default]</b> | Configure Serial IRQ Mode.                           |
| Port 80h Redirection | LPC Bus <b>[Default]</b><br>PCIE Bus | Control where the Port 80h cycles are sent.          |

3.6.3.2.1 PCI Express Configuration



3.6.3.2.1.1 PCI Express Root Port1

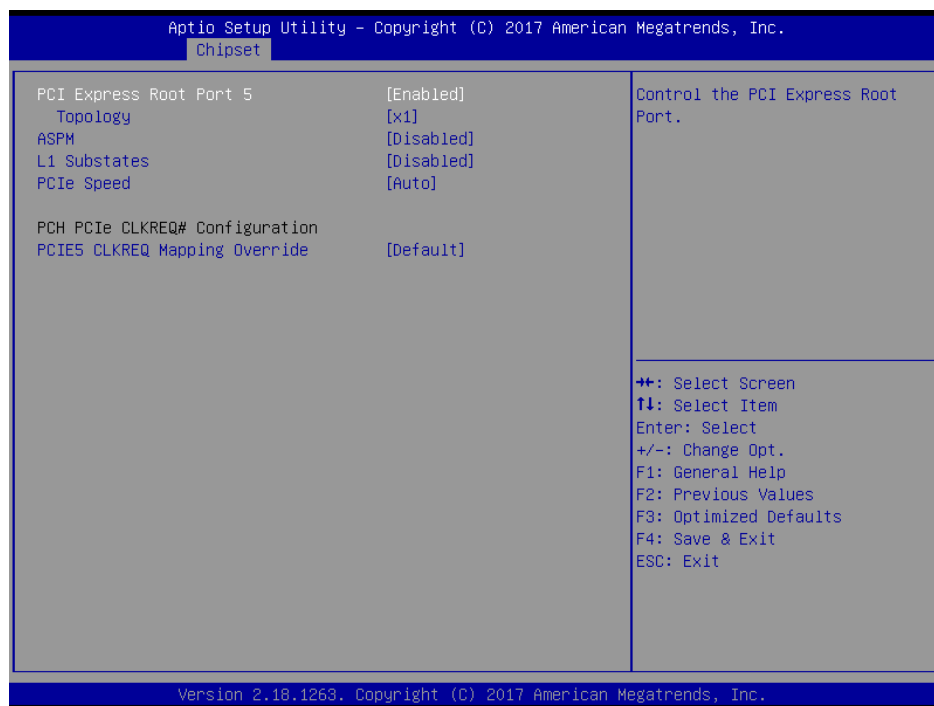


| Item                    | Option                                              | Description                                                                          |
|-------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------|
| PCI Express Root Port 1 | Enabled[Default], Disabled                          | Control the PCI Express Root Port.                                                   |
| Topology                | Unknown<br>x1,<br>x4[Default]<br>Sata Express<br>M2 | Identify the SATA Topology if it is Default or ISATA or Flex or DirectConnect or M2. |

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|                                      |                                                            |                                                                                                                  |
|--------------------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>ASPM</b>                          | Auto<br>L0sL1<br>L1<br>L0s<br>Disabled <b>[Default]</b> ,  | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |
| <b>L1 Substates</b>                  | Disabled <b>[Default]</b> ,<br>L1.1<br>L1.2<br>L1.1 & L1.2 | PCI Express L1 Substates settings.                                                                               |
| <b>PCIe Speed</b>                    | Auto <b>[Default]</b><br>Gen1<br>Gen2<br>Gen3              | Configure PCIe Speed.                                                                                            |
| <b>PCIE1 CLKREQ Mapping Override</b> | Default <b>[Default]</b><br>No CLKREQ<br>Custom number     | PCIE CLKREQ Qverride for default platform mapping.                                                               |

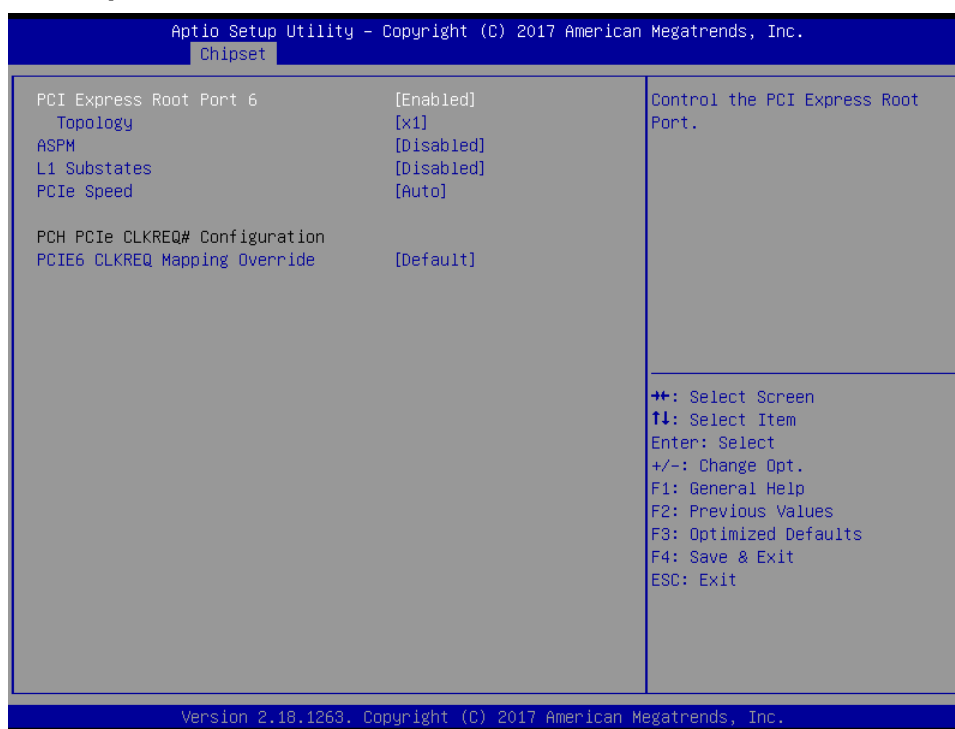
### 3.6.3.2.1.2 PCI Express Root Port5



| Item                           | Option                                                       | Description                                                                          |
|--------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>PCI Express Root Port 5</b> | Enabled <b>[Default]</b> ,<br>Disabled                       | Control the PCI Express Root Port.                                                   |
| <b>Topology</b>                | Unknown<br>x1 <b>[Default]</b> ,<br>x4<br>Sata Express<br>M2 | Identify the SATA Topology if it is Default or ISATA or Flex or DirectConnect or M2. |
| <b>ASPM</b>                    | Auto,<br>L0sL1                                               | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto        |

|                                      |                                                   |                                                    |
|--------------------------------------|---------------------------------------------------|----------------------------------------------------|
|                                      | L1<br>L0s<br>Disabled[Default]                    | configure DISABLE – Disables ASPM.                 |
| <b>L1 Substates</b>                  | Disabled[Default],<br>L1.1<br>L1.2<br>L1.1 & L1.2 | PCI Express L1 Substates settings.                 |
| <b>PCIe Speed</b>                    | Auto[Default]<br>Gen1<br>Gen2<br>Gen3             | Configure PCIe Speed.                              |
| <b>PCIE5 CLKREQ Mapping Override</b> | Default[Default]<br>No CLKREQ<br>Custom number    | PCIE CLKREQ Qverride for default platform mapping. |

### 3.6.3.2.1.3 PCI Express Root Port6

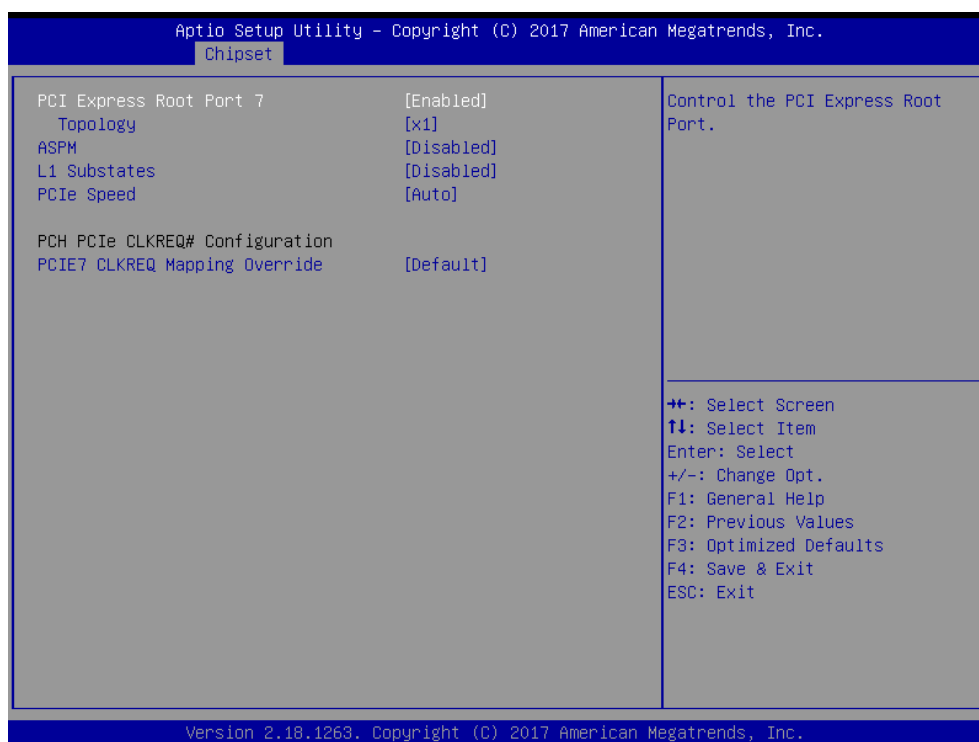


| Item                           | Option                                              | Description                                                                                                      |
|--------------------------------|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>PCI Express Root Port 6</b> | Enabled[Default],<br>Disabled                       | Control the PCI Express Root Port.                                                                               |
| <b>Topology</b>                | Unknown<br>x1[Default],<br>x4<br>Sata Express<br>M2 | Identify the SATA Topology if it is Default or ISATA or Flex or DirectConnect or M2.                             |
| <b>ASPM</b>                    | Auto,<br>L0sL1<br>L1<br>L0s<br>Disabled[Default]    | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |

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|                                      |                                                            |                                                    |
|--------------------------------------|------------------------------------------------------------|----------------------------------------------------|
| <b>L1 Substates</b>                  | Disabled[ <b>Default</b> ],<br>L1.1<br>L1.2<br>L1.1 & L1.2 | PCI Express L1 Substates settings.                 |
| <b>PCIe Speed</b>                    | Auto[ <b>Default</b> ]<br>Gen1<br>Gen2<br>Gen3             | Configure PCIe Speed.                              |
| <b>PCIE6 CLKREQ Mapping Override</b> | Default[ <b>Default</b> ]<br>No CLKREQ<br>Custom number    | PCIE CLKREQ Qverride for default platform mapping. |

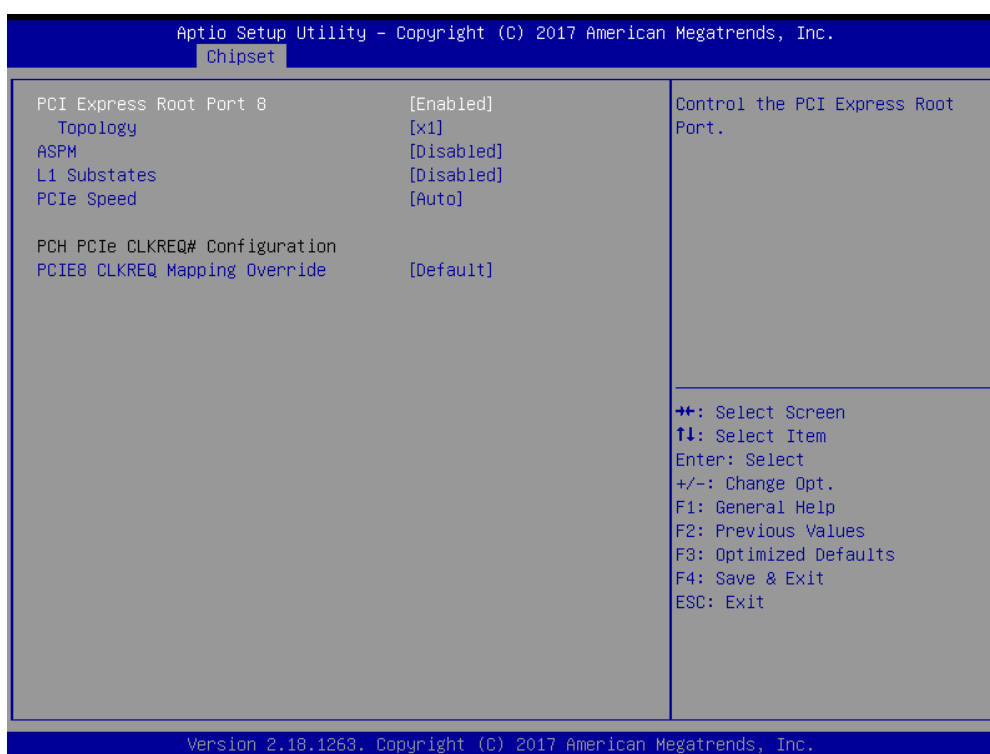
### 3.6.3.2.1.4 PCI Express Root Port7



| Item                           | Option                                                       | Description                                                                                                      |
|--------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>PCI Express Root Port 7</b> | Enabled[ <b>Default</b> ],<br>Disabled                       | Control the PCI Express Root Port.                                                                               |
| <b>Topology</b>                | Unknown<br>x1[ <b>Default</b> ],<br>x4<br>Sata Express<br>M2 | Identify the SATA Topology if it is Default or ISATA or Flex or DirectConnect or M2.                             |
| <b>ASPM</b>                    | Auto,<br>L0sL1<br>L1<br>L0s<br>Disabled[ <b>Default</b> ]    | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |

|                                      |                                                            |                                                    |
|--------------------------------------|------------------------------------------------------------|----------------------------------------------------|
| <b>L1 Substates</b>                  | Disabled[ <b>Default</b> ],<br>L1.1<br>L1.2<br>L1.1 & L1.2 | PCI Express L1 Substates settings.                 |
| <b>PCIe Speed</b>                    | Auto[ <b>Default</b> ]<br>Gen1<br>Gen2<br>Gen3             | Configure PCIe Speed.                              |
| <b>PCIE7 CLKREQ Mapping Override</b> | Default[ <b>Default</b> ]<br>No CLKREQ<br>Custom number    | PCIE CLKREQ Qverride for default platform mapping. |

### 3.6.3.2.1.5 PCI Express Root Port8

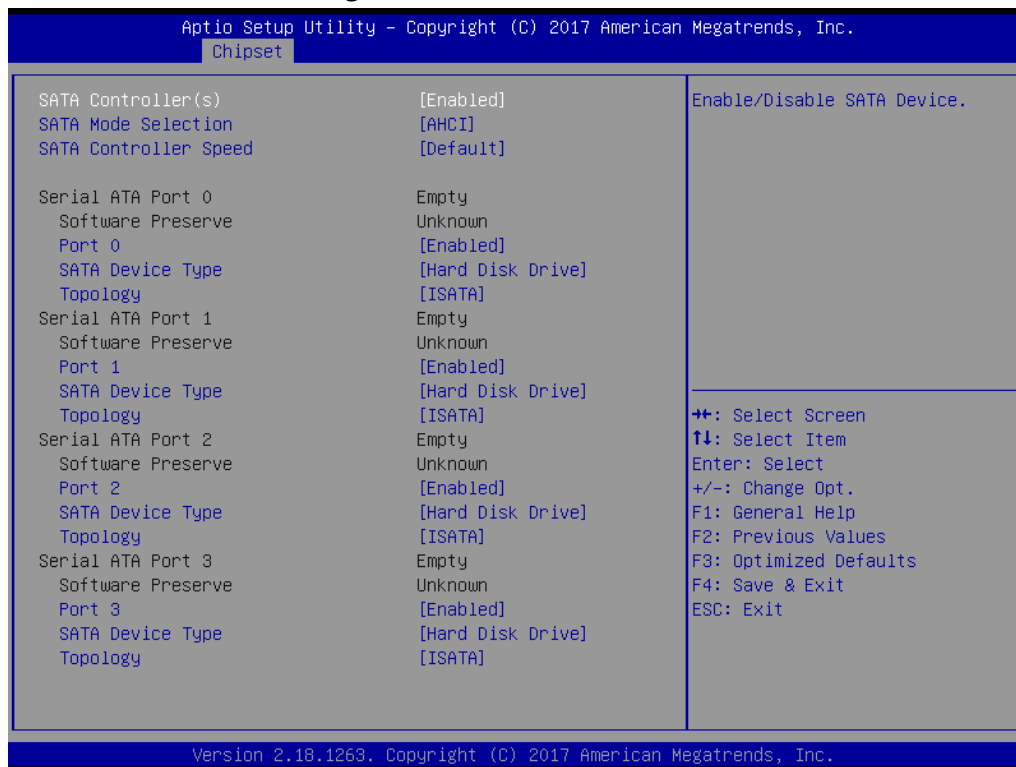


| Item                           | Option                                                       | Description                                                                                                      |
|--------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>PCI Express Root Port 8</b> | Enabled[ <b>Default</b> ],<br>Disabled                       | Control the PCI Express Root Port.                                                                               |
| <b>Topology</b>                | Unknown<br>x1[ <b>Default</b> ],<br>x4<br>Sata Express<br>M2 | Identify the SATA Topology if it is Default or ISATA or Flex or DirectConnect or M2.                             |
| <b>ASPM</b>                    | Auto,<br>L0sL1<br>L1<br>L0s<br>Disabled[ <b>Default</b> ]    | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |
| <b>L1 Substates</b>            | Disabled[ <b>Default</b> ],<br>L1.1                          | PCI Express L1 Substates settings.                                                                               |

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|                                      |                                                |                                                    |
|--------------------------------------|------------------------------------------------|----------------------------------------------------|
|                                      | L1.2<br>L1.1 & L1.2                            |                                                    |
| <b>PCIe Speed</b>                    | Auto[Default]<br>Gen1<br>Gen2<br>Gen3          | Configure PCIe Speed.                              |
| <b>PCIe8 CLKREQ Mapping Override</b> | Default[Default]<br>No CLKREQ<br>Custom number | PCIe CLKREQ Qverride for default platform mapping. |

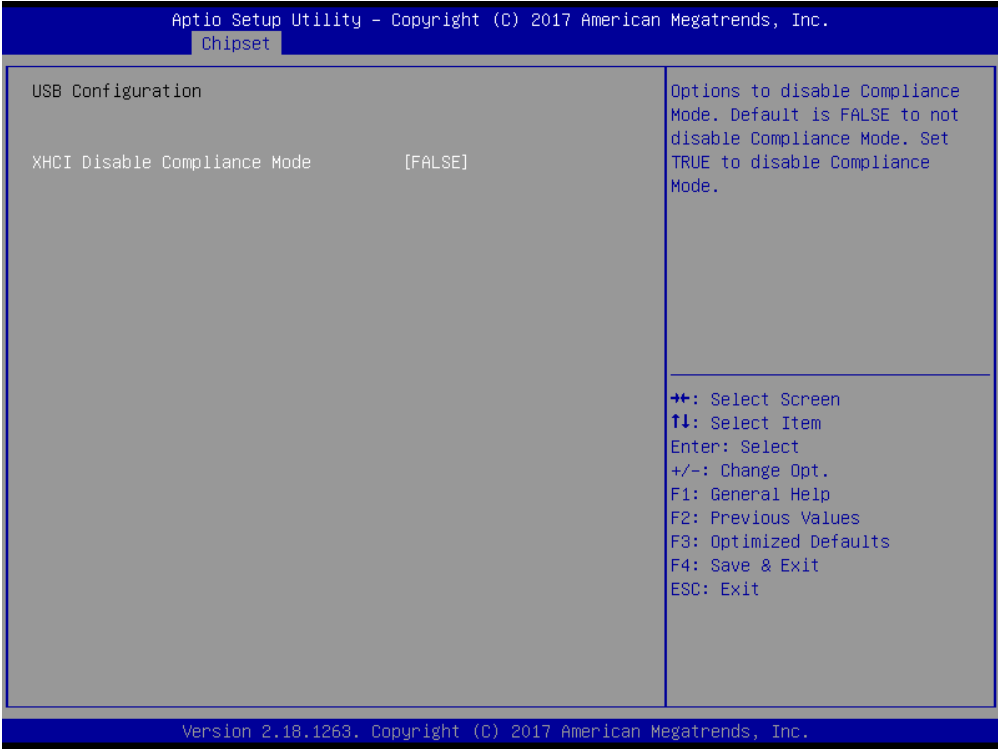
### 3.6.3.2.2 SATA And RST Configuration



| Item                         | Options                                       | Description                                                                  |
|------------------------------|-----------------------------------------------|------------------------------------------------------------------------------|
| <b>SATA Controller(s)</b>    | Enabled[Default]<br>Disabled,                 | Enable/Disable SATA Device.                                                  |
| <b>SATA Mode Selection</b>   | AHCI[Default],<br>RAID                        | Determines how SATA controller(s) operate.                                   |
| <b>SATA Controller Speed</b> | Default[Default]<br>Gen1<br>Gen2<br>Gen3      | Indicates the maximum speed the SATA controller can support.                 |
| <b>Port 0/1/2/3</b>          | Enabled[Default]<br>Disabled                  | Enable or Disable SATA Port.                                                 |
| <b>SATA Device Type</b>      | Hard Disk Drive[Default]<br>Solid State Drive | Identify the SATA port is connected to Solid State Drive or Hard Disk Drive. |

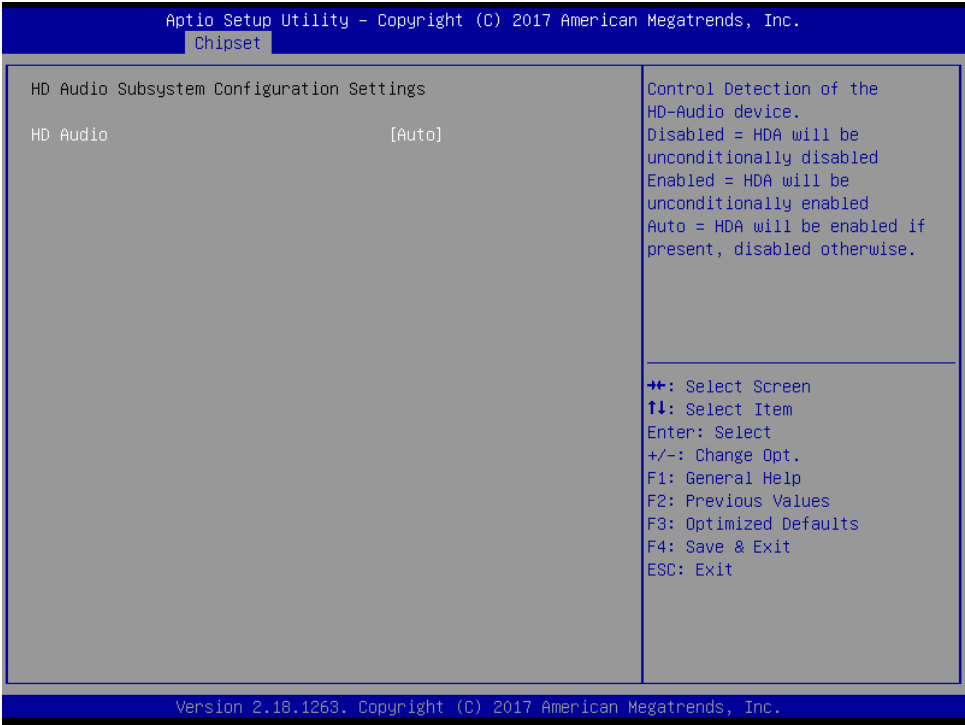
|            |                                                           |                                                                                      |
|------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------|
| Technology | Unknown<br>ISATA[Default]<br>Direct Connect<br>Flex<br>M2 | Identify the SATA Topology if it is Default or ISATA or Flex or DirectConnect or M2. |
|------------|-----------------------------------------------------------|--------------------------------------------------------------------------------------|

3.6.3.2.3 USB Configuration



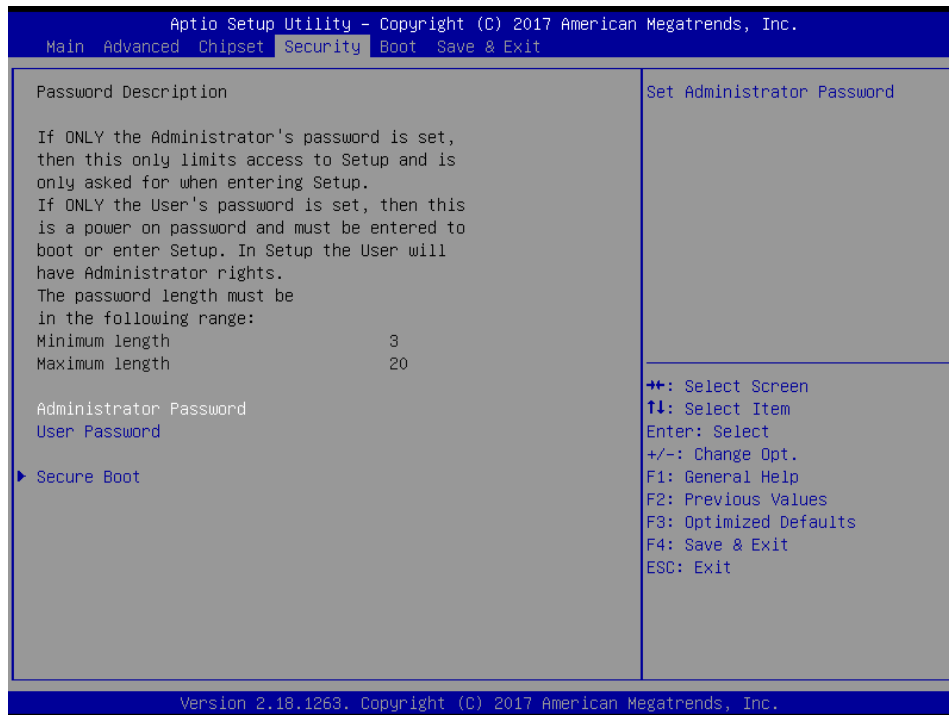
| Item                         | Option                  | Description                                                                                                              |
|------------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------|
| XHCI Disable Compliance Mode | FALSE[Default],<br>TRUE | Option to disable Compliance Mode. Default is FALSE to not disable Compliance Mode. Set TRUE to disable Compliance Mode. |

3.6.3.2.4 HD Audio Configuration



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

### 3.6.4 Security



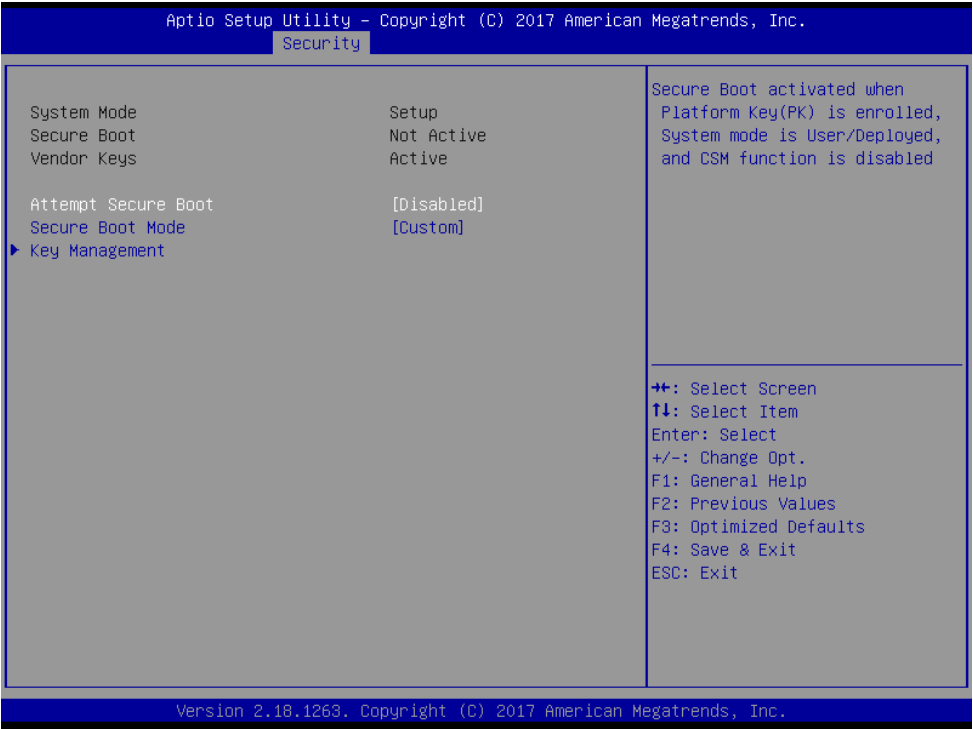
- **Administrator Password**

## Set setup Administrator Password

- **User Password**

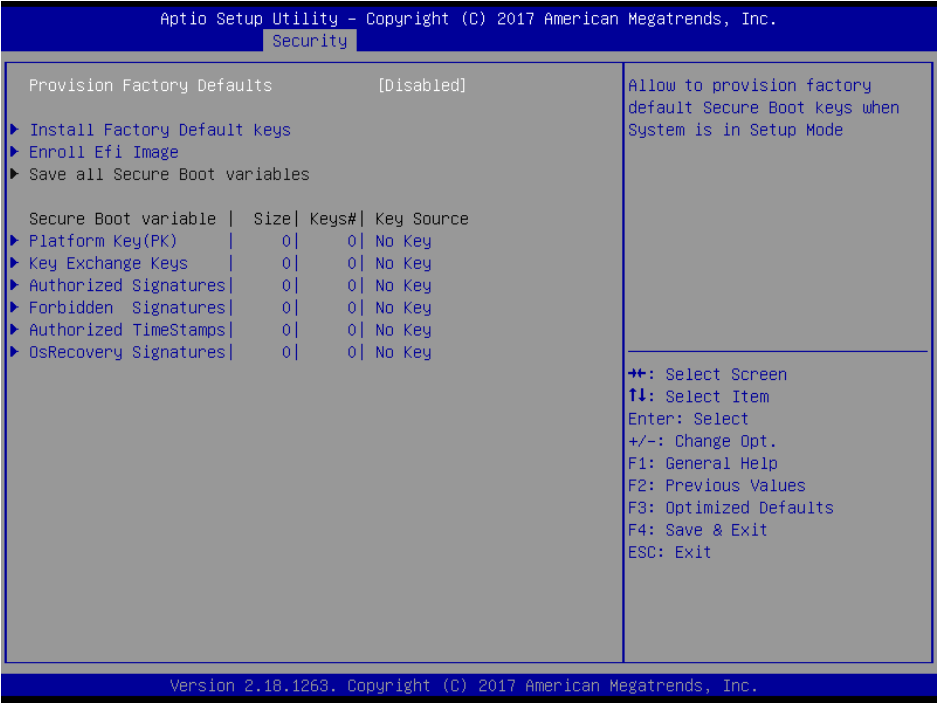
## Set User Password

3.6.4.1 Secure Boot



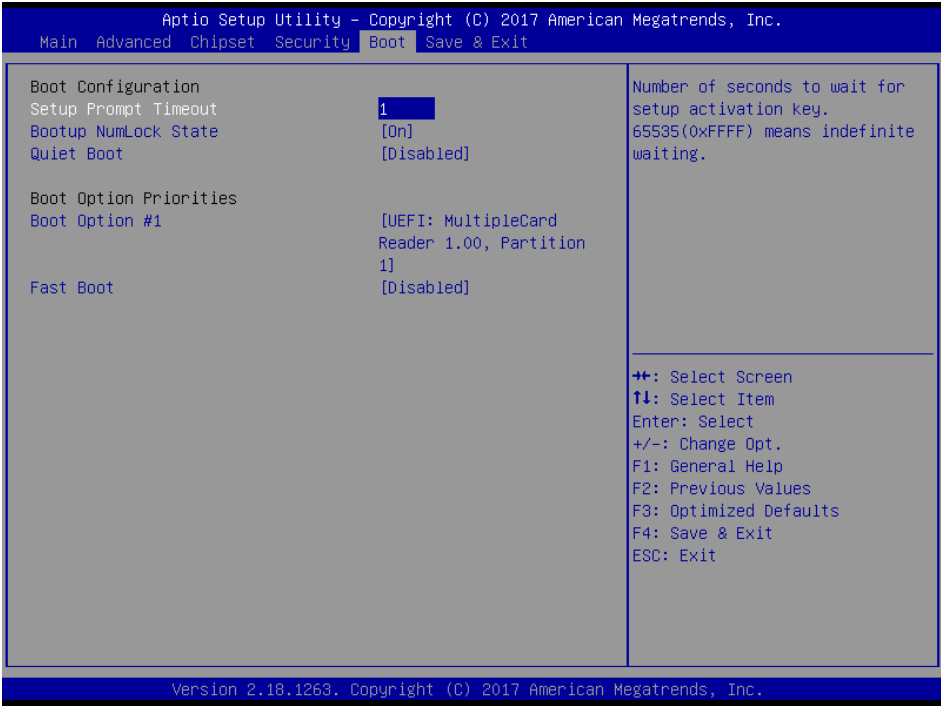
| Item                | Option                       | Description                                                                                                                |
|---------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 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: Standard/Custom. In Custom mode Secure Boot Variables can be configured without authentication. |

3.6.4.1.1 Key Management



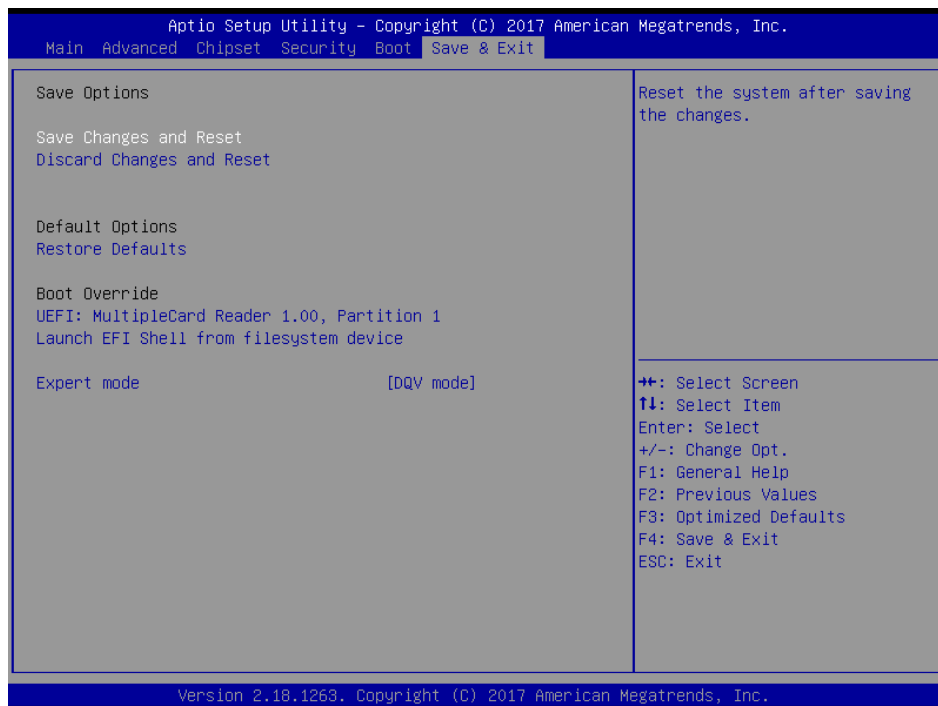
| Item                       | Option                               | Description                                                                       |
|----------------------------|--------------------------------------|-----------------------------------------------------------------------------------|
| Provision Factory Defaults | Disabled <b>[Default]</b><br>Enabled | 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, or link to **/Driver\_Chipset/Intel/ESM-KBLH\_KBLA.**



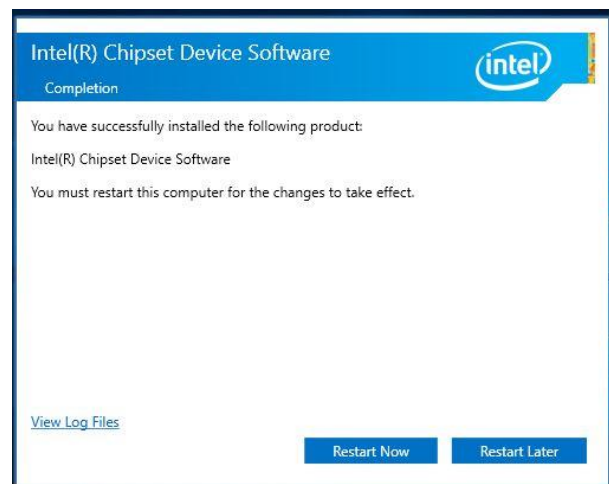
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



**Step 3. Click Install.**



**Step1. Click Next.**



**Step 4. Complete setup.**



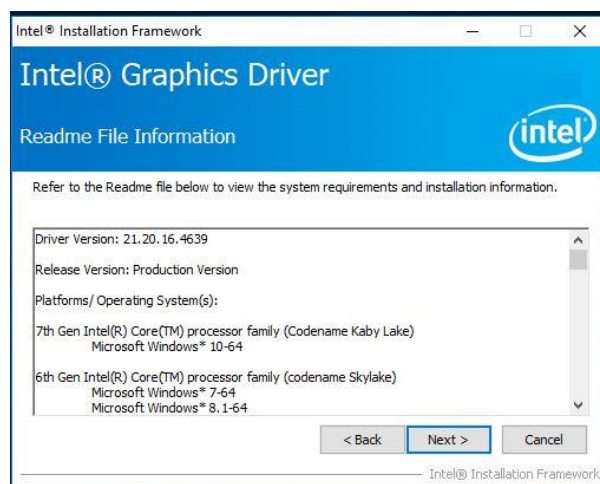
**Step 2. Click Accept.**

## 4.2 Install Display Driver

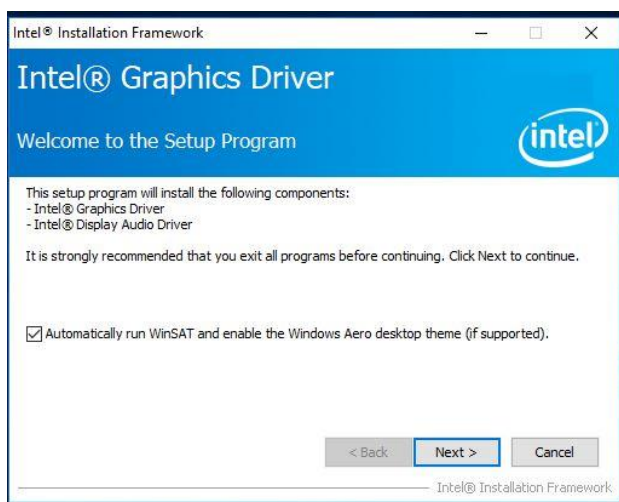
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to [/VGA/ESM-KBLH\\_KBLA](#).



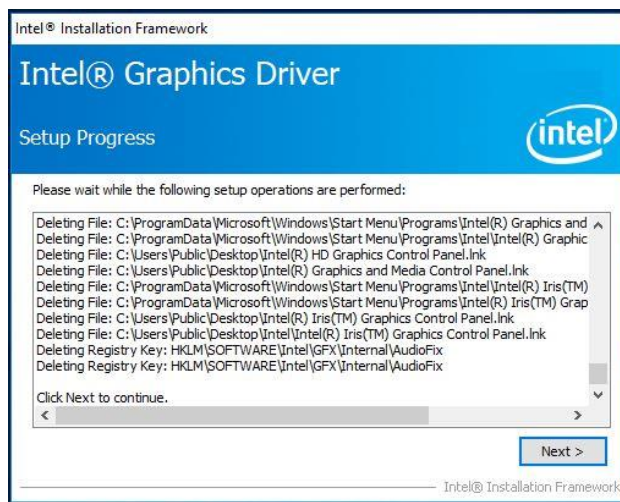
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system.



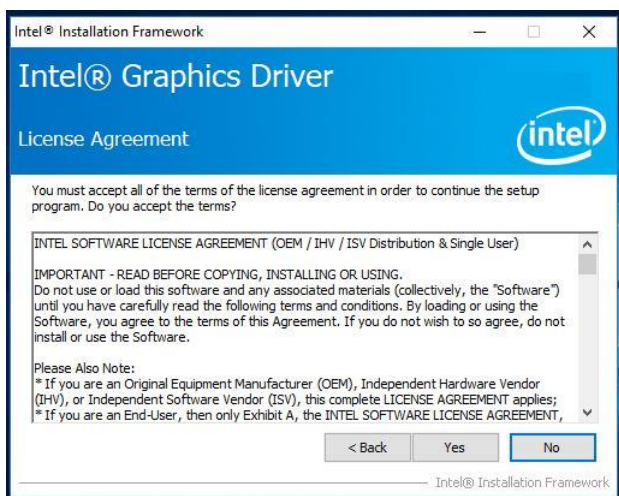
**Step 3. Click Next.**



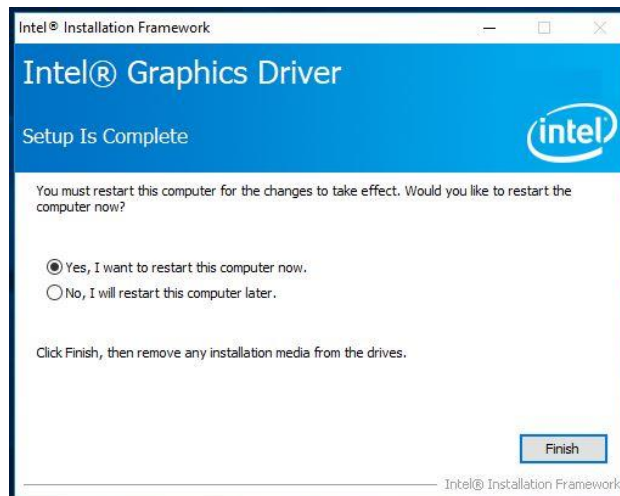
**Step 1. Click Next** to continue installation.



**Step 4. Click Next.**



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



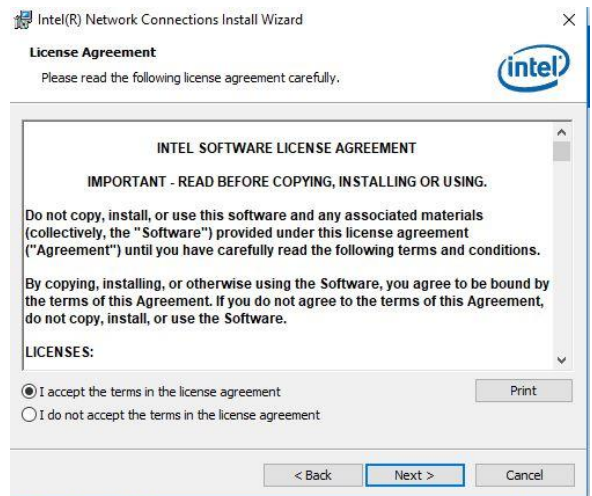
**Step 5. Click Finish** to complete setup.

## 4.3 Install LAN Driver (For Intel I219LM)

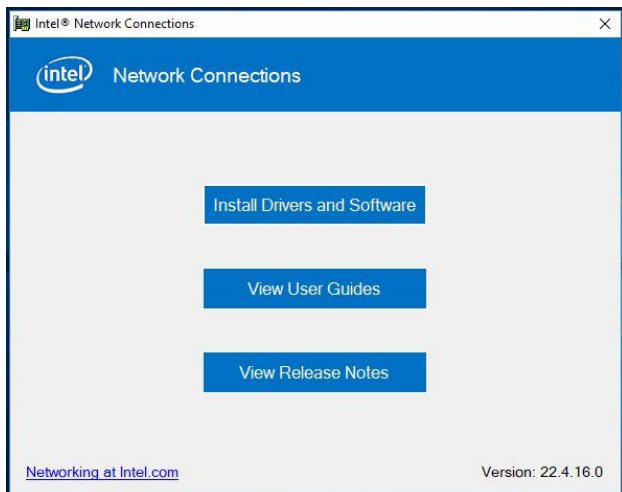
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to [/Driver\\_Gigabit/Intel//I219LM/ESM-KBLH\\_KBLA\\_LAN](#).



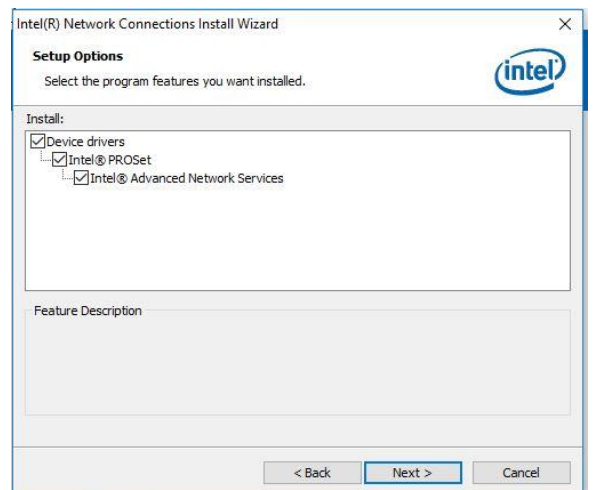
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system.



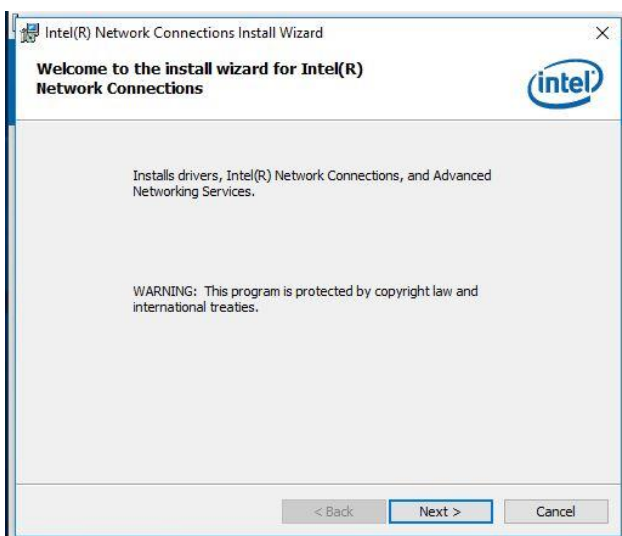
**Step 3. Click Next.**



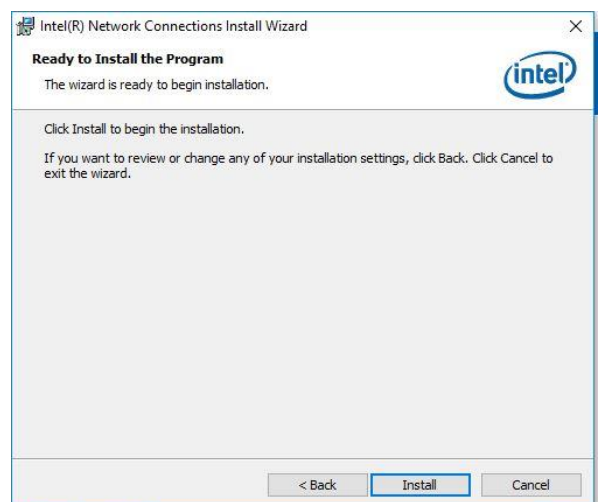
**Step 1. Click Install Drivers and Software.**



**Step 4. Click Next.**

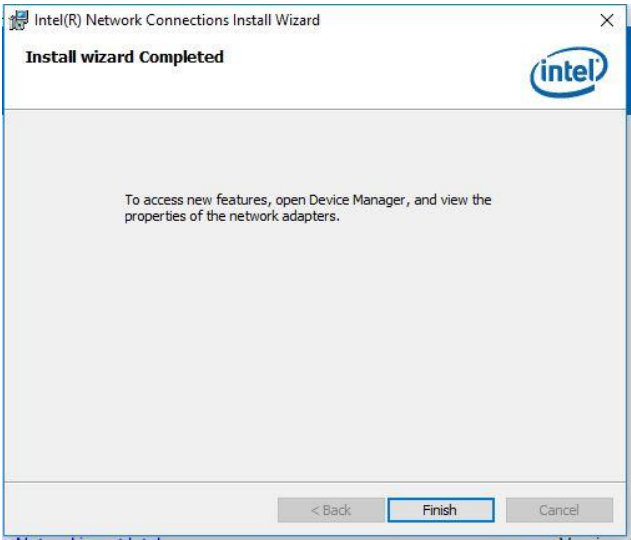


**Step 2. Click Next** to complete setup.



**Step 5. Click Install.**

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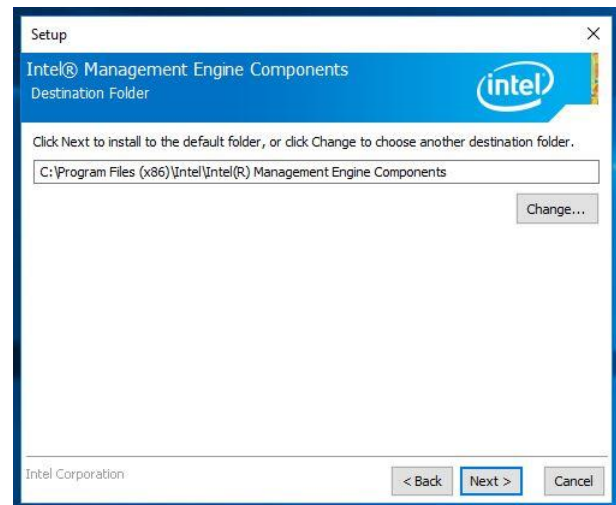
**Step 6.** Click **Finish** to complete setup.

## 4.4 Install ME Driver

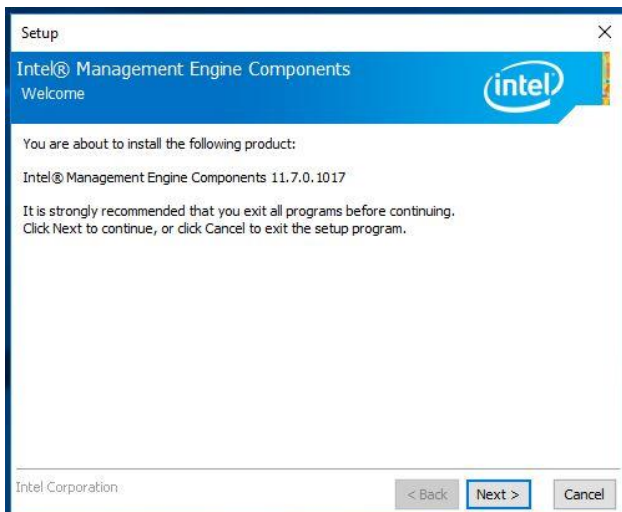
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to [/Utility/ESM-KBLH\\_KBLA\\_ME](#).



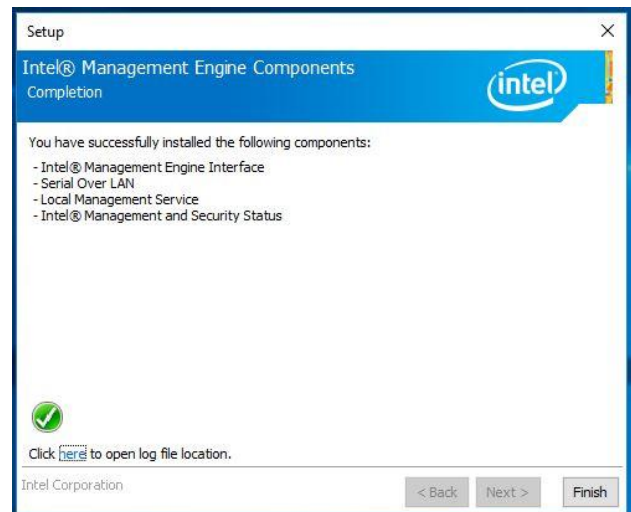
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system. If the warning message appears while the installation process, click Continue to go on.



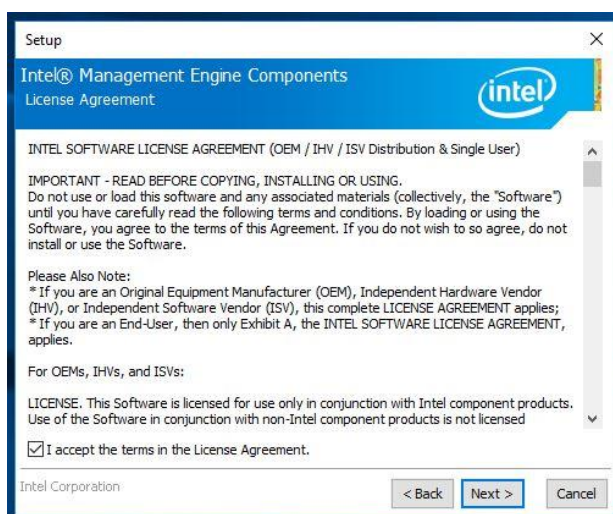
**Step 3.** Click **Next**.



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



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



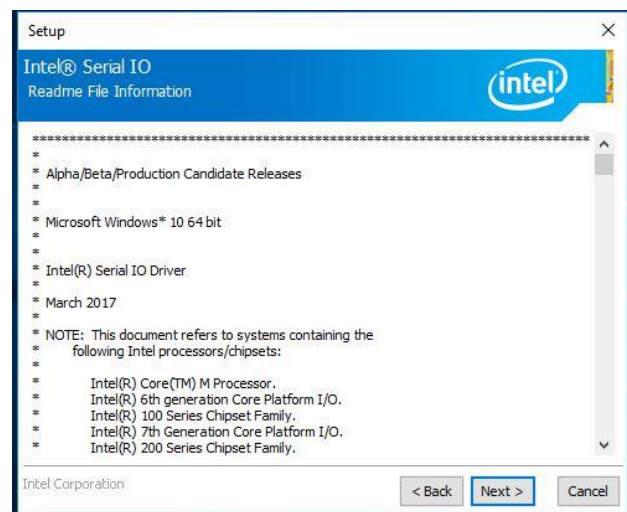
**Step 2.** Click **Next**.

## 4.5 Install Serial IO Driver

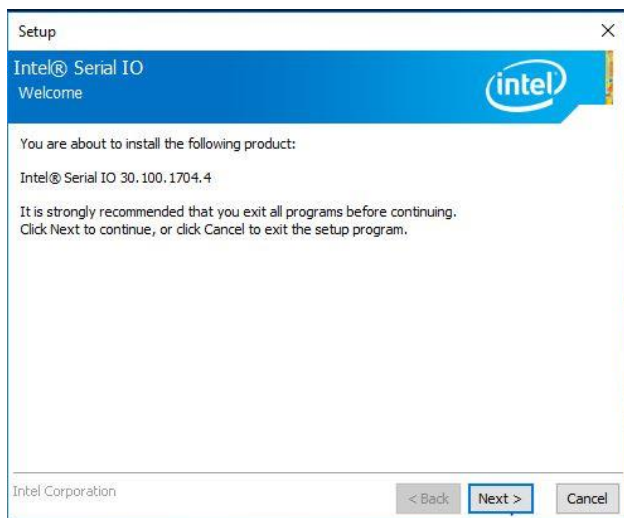
Insert the Supporting DVD-ROM to DVD-ROM drive, and it should show the index page of Avalue's products automatically. If not, locate Index.htm and choose the product from the menu left, or link to [/Utility/ESM-KBLH\\_KBLA\\_SerialIO](#).



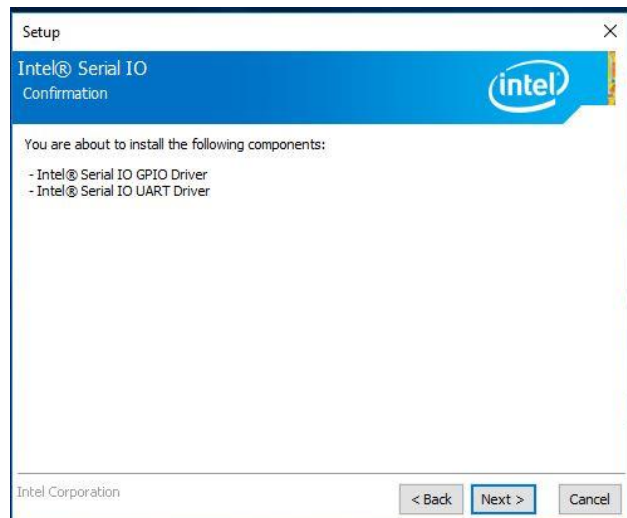
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system.



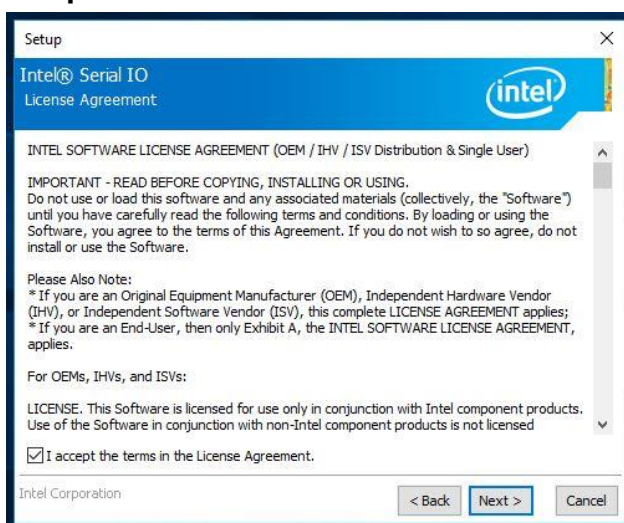
**Step 3. Click Next.**



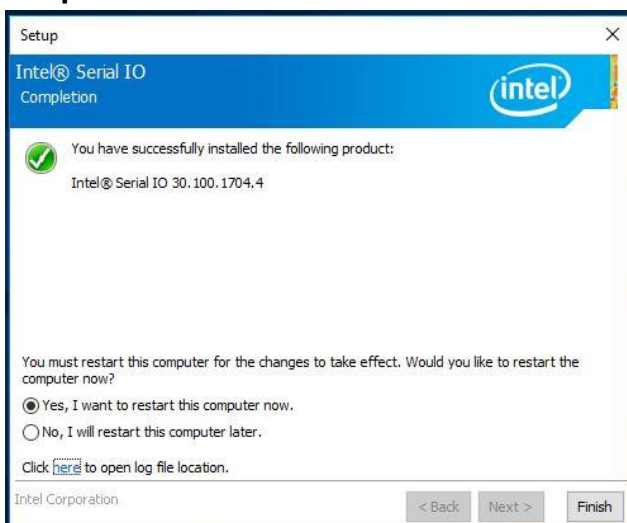
**Step 1. Click Next** to continue installation.



**Step 4. Click Next.**



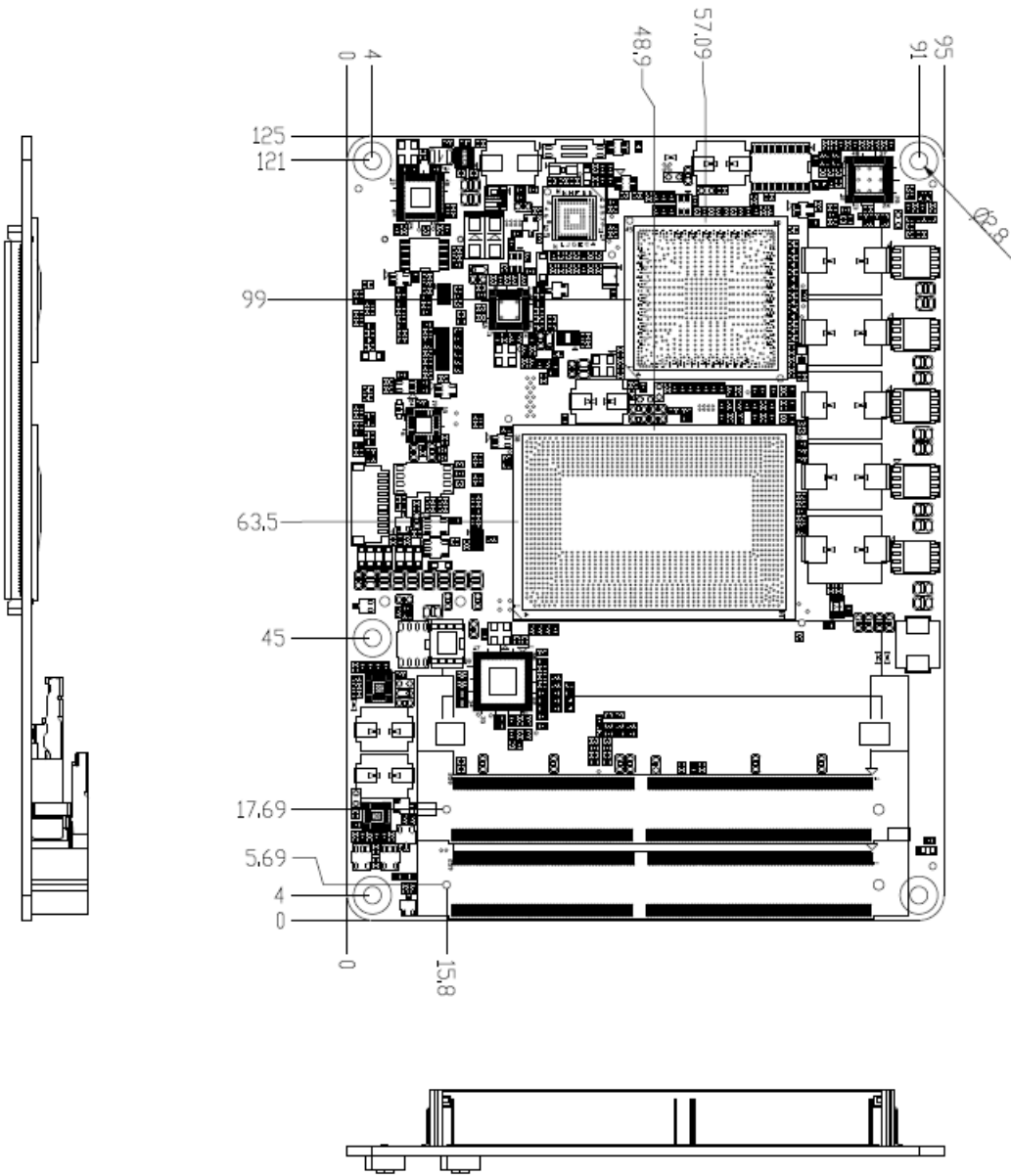
**Step 2. Click Next.**



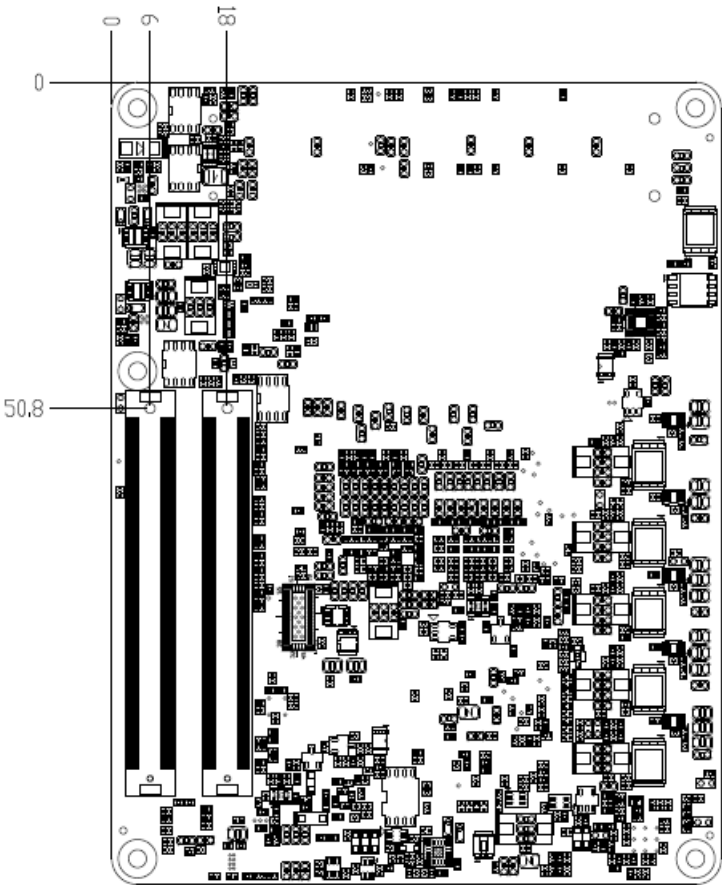
**Step 5. Click Finish** to complete setup.

# 5. Mechanical Drawing

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Unit: mm



Unit: mm

