

## Embedded Computing

Embedded Computing Platforms for Industrial and Commercial Applications

## LEC-2137 User Manual

Version: 1.2

Date of Release: 2018-08-27

## Icon Descriptions

The icons are used in the manual to serve as an indication of interest topics or important messages. Below is a description of these icons:



**Note:** This check mark indicates that there is a note of interest and is something that you should pay special attention to while using the product.



**Warning:** This exclamation point indicates that there is a caution or warning and it is something that could damage your property or product.

## Online Resources

The listed websites are links to the on-line product information and technical support.

| Resources        | URL                                                                                             |
|------------------|-------------------------------------------------------------------------------------------------|
| Lanner           | <a href="http://www.lannerinc.com">http://www.lannerinc.com</a>                                 |
| Product Resource | <a href="http://www.lannerinc.com/download-center">http://www.lannerinc.com/download-center</a> |
| RMA              | <a href="http://eRMA.lannerinc.com">http://eRMA.lannerinc.com</a>                               |

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# Compliances and Certification

## CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

## FCC Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. The operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## EMC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. The operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.

## Safety Guidelines

Follow these guidelines to ensure general safety:

- ▶ Keep the chassis area clear and dust-free during and after installation.
- ▶ Do not wear loose clothing or jewelry that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- ▶ Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- ▶ Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- ▶ Disconnect all power by turning off the power and unplugging the power cord before installing or removing a chassis or working near power supplies
- ▶ Do not work alone if potentially hazardous conditions exist.
- ▶ Never assume that power is disconnected from a circuit; always check the circuit.

### **Lithium Battery Caution:**

- ▶ Risk of Explosion if Battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.
- ▶ Installation only by a trained electrician or only by an electrically trained person who knows all English Installation and Device Specifications which are to be applied.
- ▶ Do not carry the handle of power supplies when moving to another place.
- ▶ The machine can only be used in a fixed location such as labs or computer facilities.

### **Operating Safety**

- ▶ Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
- ▶ Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
- ▶ Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.
- ▶ Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- ▶ Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

### **Mounting Installation Precaution**

#### **Environment:**

- ▶ Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- ▶ If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T<sub>ma</sub>) specified by the manufacturer.
- ▶ Installation of the equipment (especially in a rack) should consider the ventilation of the system's intake (for taking chilled air) and exhaust (for emitting hot air) openings so that the amount of air flow required for safe operation of the equipment is not compromised.
- ▶ To avoid a hazardous load condition, be sure the mechanical loading is even when mounting.
- ▶ Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

- ▶ Reliable earthing should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).
- ▶ Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the unit or use of inappropriate installation components.

#### **Installation & Operation:**

- ▶ The installation of this product must be performed by trained specialists; otherwise, a non-specialist might create the risk of the system's falling to the ground or other damages.
- ▶ Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the system or use of inappropriate installation components.

## **Consignes de sécurité**

Suivez ces consignes pour assurer la sécurité générale :

- ▶ Laissez la zone du châssis propre et sans poussière pendant et après l'installation.
- ▶ Ne portez pas de vêtements amples ou de bijoux qui pourraient être pris dans le châssis. Attachez votre cravate ou écharpe et remontez vos manches.
- ▶ Portez des lunettes de sécurité pour protéger vos yeux.
- ▶ N'effectuez aucune action qui pourrait créer un danger pour d'autres ou rendre l'équipement dangereux.
- ▶ Coupez complètement l'alimentation en éteignant l'alimentation et en débranchant le cordon d'alimentation avant d'installer ou de retirer un châssis ou de travailler à proximité de sources d'alimentation.
- ▶ Ne travaillez pas seul si des conditions dangereuses sont présentes.
- ▶ Ne considérez jamais que l'alimentation est coupée d'un circuit, vérifiez toujours le circuit. Cet appareil génère, utilise et émet une énergie radiofréquence et, s'il n'est pas installé et utilisé conformément aux instructions des fournisseurs de composants sans fil, il risque de provoquer des interférences dans les communications radio.

## **Avertissement concernant la pile au lithium**

- ▶ Risque d'explosion si la pile est remplacée par une autre d'un mauvais type.
- ▶ Jetez les piles usagées conformément aux instructions.
- ▶ L'installation doit être effectuée par un électricien formé ou une personne formée à l'électricité connaissant toutes les spécifications d'installation et d'appareil du produit.
- ▶ Ne transportez pas l'unité en la tenant par le câble d'alimentation lorsque vous déplacez l'appareil.
- ▶ La machine ne peut être utilisée qu'à un lieu fixe comme en laboratoire, salle d'ordinateurs ou salle de classe.

## Sécurité de fonctionnement

L'équipement électrique génère de la chaleur. La température ambiante peut ne pas être adéquate pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.

- ▶ Vérifiez que le couvercle du châssis est bien fixé. La conception du châssis permet à l'air de refroidissement de bien circuler. Un châssis ouvert laisse l'air s'échapper, ce qui peut interrompre et rediriger le flux d'air frais destiné aux composants internes.
- ▶ Les décharges électrostatiques (ESD) peuvent endommager l'équipement et gêner les circuits électriques. Des dégâts d'ESD surviennent lorsque des composants électroniques sont mal manipulés et peuvent causer des pannes totales ou intermittentes. Suivez les procédures de prévention d'ESD lors du retrait et du remplacement de composants.
- ▶ Portez un bracelet anti-ESD et veillez à ce qu'il soit bien au contact de la peau. Si aucun bracelet n'est disponible, reliez votre corps à la terre en touchant la partie métallique du châssis.
- ▶ Vérifiez régulièrement la valeur de résistance du bracelet antistatique, qui doit être comprise entre 1 et 10 mégohms (Mohms).

## Consignes de sécurité électrique

- ▶ Avant d'allumer l'appareil, reliez le câble de mise à la terre de l'équipement à la terre.
- ▶ Une bonne mise à la terre (connexion à la terre) est très importante pour protéger l'équipement contre les effets néfastes du bruit externe et réduire les risques d'électrocution en cas de foudre.
- ▶ Pour désinstaller l'équipement, débranchez le câble de mise à la terre après avoir éteint l'appareil.
- ▶ Un câble de mise à la terre est requis et la zone reliant les sections du conducteur doit faire plus de 4 mm<sup>2</sup> ou 10 AWG.

## Revision History

| Version | Date       | Descriptions                        |
|---------|------------|-------------------------------------|
| 1.0     | 2018/04/03 | 1 <sup>st</sup> Official Release    |
| 1.1     | 2018/08/27 | Modified R6 Reset Button definition |

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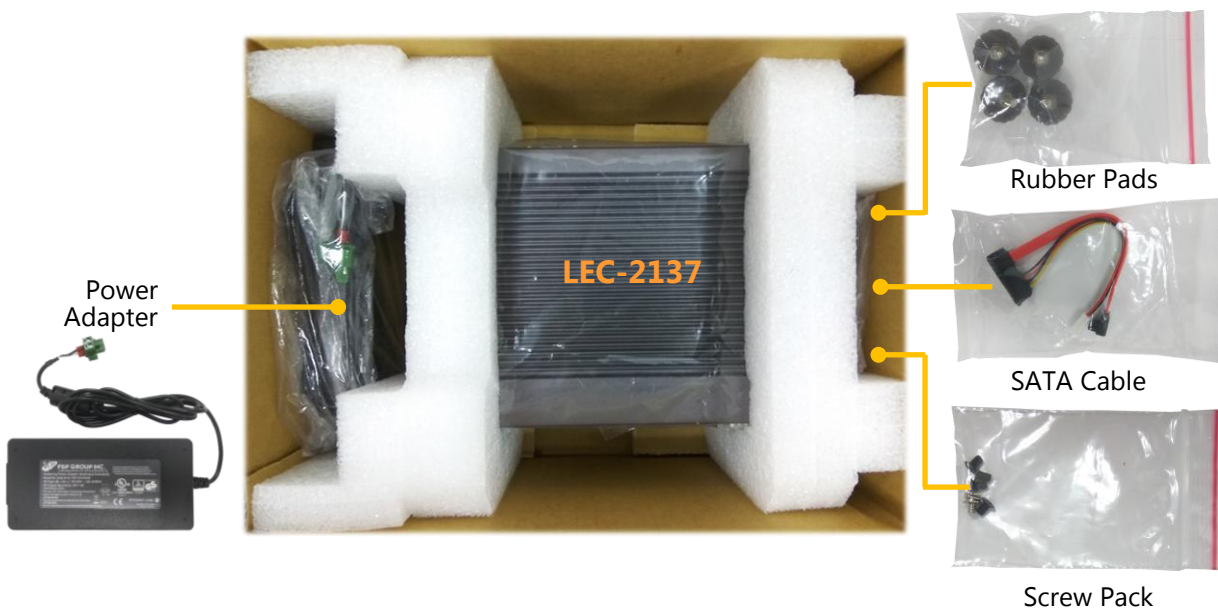
# CHAPTER 1: PRODUCT OVERVIEW

The LEC-2137 is a fanless and robust embedded box PC system utilizing the Intel Apollo Lake CPU with improved graphical and media performance, including support USB 3.0, Low-powered DDR3/L and VGA/HDMI display. The system is ideal for efficient imaging workflows, digital signage with secure content delivery, visually appealing interactive clients (interactive kiosks, intelligent vending, ATM and point-of-sale (POS) terminals) and industrial control systems.

## Package Content

Your package contains the following items:

- ▶ 1x LEC-2137 Embedded Compact PC
- ▶ 1x pack of Rubber Pads
- ▶ 1x Pack of Screws
- ▶ 1x Power Adapter
- ▶ 1x SATA Cable



**Note:** If you should find any components missing or damaged, please contact your dealer immediately for assistance.

## Ordering Information

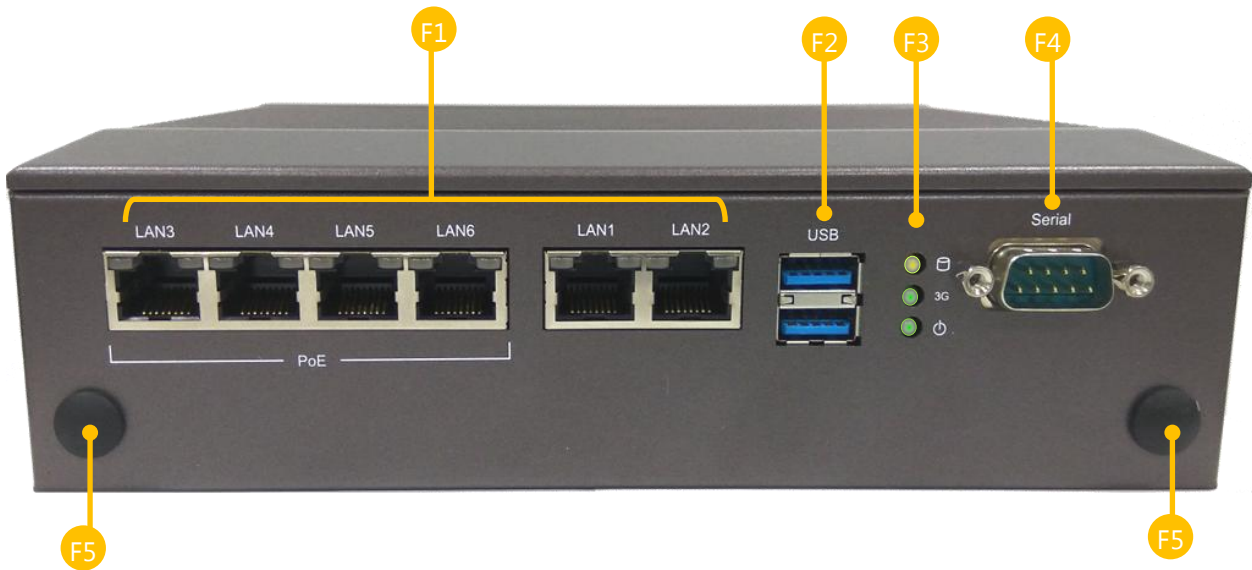
| SKU No.           |                                    |
|-------------------|------------------------------------|
| LEC-2137 <b>A</b> | Intel E3950 4 Cores+6x GbE         |
| LEC-2137 <b>B</b> | Intel E3950 4 Cores+2x GbE+ 4x PoE |
| LEC-2137 <b>C</b> | Intel N3350 2 Cores+6x GbE         |
| LEC-2137 <b>D</b> | Intel N3350 2 Cores+2x GbE+ 4x PoE |

## System Specifications

|                            |                        |                                                                                        |
|----------------------------|------------------------|----------------------------------------------------------------------------------------|
| <b>Processor System</b>    | CPU                    | Intel® Atom™ x7-E3950 or Celeron® N3350                                                |
|                            | Frequency              | Base frequency 1.6 GHz/1.1 GHz<br>Burst frequency 2.0 GHz/2.4 GHz                      |
|                            | Core Number            | 4C/2C                                                                                  |
|                            | Chipset                | SOC                                                                                    |
| <b>Fanless</b>             |                        | Yes                                                                                    |
| <b>Memory</b>              | Technology             | DDR3L 1333/1600 MHz                                                                    |
|                            | Max. Capacity          | 8GB                                                                                    |
|                            | Socket                 | 1x 204-pin SODIMM                                                                      |
| <b>Graphic</b>             | Controller             | Intel® HD Graphics                                                                     |
|                            | VGA                    | 1x VGA, 1600 x 1200                                                                    |
|                            | DVI                    | -                                                                                      |
|                            | HDMI                   | 1x HDMI, 3840 x 2160@30Hz                                                              |
| <b>Audio</b>               | Codec                  | -                                                                                      |
|                            | Interface              | -                                                                                      |
| <b>Ethernet</b>            | Controller             | Intel® i210                                                                            |
|                            | Speed                  | 10/100/1000 Mbps                                                                       |
|                            | Interface              | 6x RJ45 (Including 4x PoE Option)                                                      |
| <b>Storage</b>             | Type                   | SATA III                                                                               |
|                            | Installation           | 1x mSATA Socket (Half Size)                                                            |
|                            | Type                   | SATA III                                                                               |
|                            | Installation           | 1x 2.5" HDD/SSD Drive Bay                                                              |
| <b>I/O</b>                 | Serial Port            | 1x RS-232/422/485, DB9 Male                                                            |
|                            | Digital I/O            | -                                                                                      |
|                            | USB 2.0                | 2x Type A                                                                              |
|                            | USB 3.0                | 2x Type A                                                                              |
|                            | Power-On/ Reset Button | 1x Power On/Off, 1x Reset                                                              |
|                            | Remote                 | -                                                                                      |
|                            | LED                    | Power/HDD/3G                                                                           |
| <b>Expansion Interface</b> | Antenna Hole           | 2x SMA Antenna Hole                                                                    |
|                            | Mini-PCIe              | 1x Full-sized Socket with SIM Card Reader, Socket with USB 2.0 signals (only USB 2.0 ) |
| <b>Watchdog Timer</b>      |                        | Watchdog Timer 1~255 Level Time Interval<br>System Reset, Software Programmable        |
| <b>Power</b>               | Power Type             | ATX                                                                                    |
|                            | Power Supply Voltage   | +12VDC ~ +30VDC                                                                        |
|                            | Connector              | 2-pin Terminal Block                                                                   |

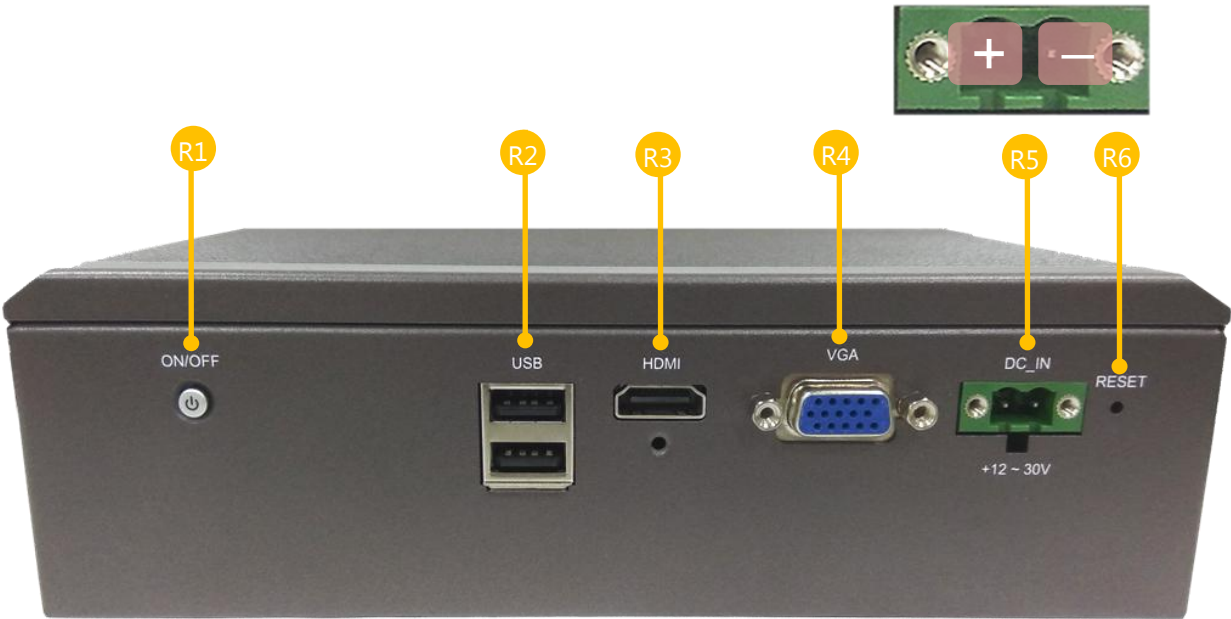
|                       |                                                                         |                                                                        |
|-----------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>Power</b>          | Power Consumption (Idle)                                                | 10.266W                                                                |
|                       | Power Consumption (Full Load)                                           | 21.424W                                                                |
|                       | Power consumption (with all PoE ports supplying power to 4x IP cameras) | 54.405W                                                                |
|                       | Power Adaptor                                                           | AC to DC, AC 90 to 240 VAC Input<br>DC 24VDC/2.5A 60W /120W            |
| <b>Environment</b>    | Operating Temperature                                                   | LEC-2137A/LEC-2137B: -20°C to 55°C<br>LEC-2137C/LEC-2137D: 0°C to 50°C |
|                       | Storage Temperature                                                     | -20°C to 70°C                                                          |
|                       | Relative Humidity                                                       | 5% to 95%, non-condensing                                              |
|                       | Vibration                                                               | IEC 60068-2-64, 0.5Grms,<br>Random 5 to 500Hz, 40 Mins/Axis            |
| <b>Mechanical</b>     | Dimension (W x H x D)                                                   | 198 x 57 x 143.8 mm                                                    |
|                       | Construction                                                            | Aluminum + SGCC                                                        |
|                       | Weight                                                                  | With POE Board: 2.2 kg<br>Without PoE Board: 2.1 kg                    |
|                       | Mounting                                                                | Rack, VESA, Wallmount, DIN-rail                                        |
| <b>Driver Support</b> | Microsoft Windows                                                       | Win 7/Win 10 Full                                                      |
| <b>Certification</b>  | EMC                                                                     | CE,FCC Class A                                                         |

Front Panel



| No. |                 | Description                                                                                                                                                                                                                                                               |
|-----|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F1  | GbE & PoE Ports | 6 x 100/1000Mbps Ethernet ports or<br>4x 100/1000Mbps PoE ports + 2x 100/1000Mbps Ethernet ports (by SKU)                                                                                                                                                                 |
| F2  | USB Port        | 2x USB 3.0 port                                                                                                                                                                                                                                                           |
| F3  | LED Indicators  | <div><div>HDD Activity</div><div>WWAN Connection</div><div>Status System Power</div><div></div></div> <p>Please refer to <a href="#">Appendix A: LED Indicator Explanations</a> for description of the LED Indicators (including those on GbE Ports and Power Button)</p> |
| F4  | Serial Port     | 1x DB9 Male connector, RS-232/422/485                                                                                                                                                                                                                                     |
| F5  | Antenna Port    | 2x Antenna Hole with dust plug                                                                                                                                                                                                                                            |

# Rear Panel



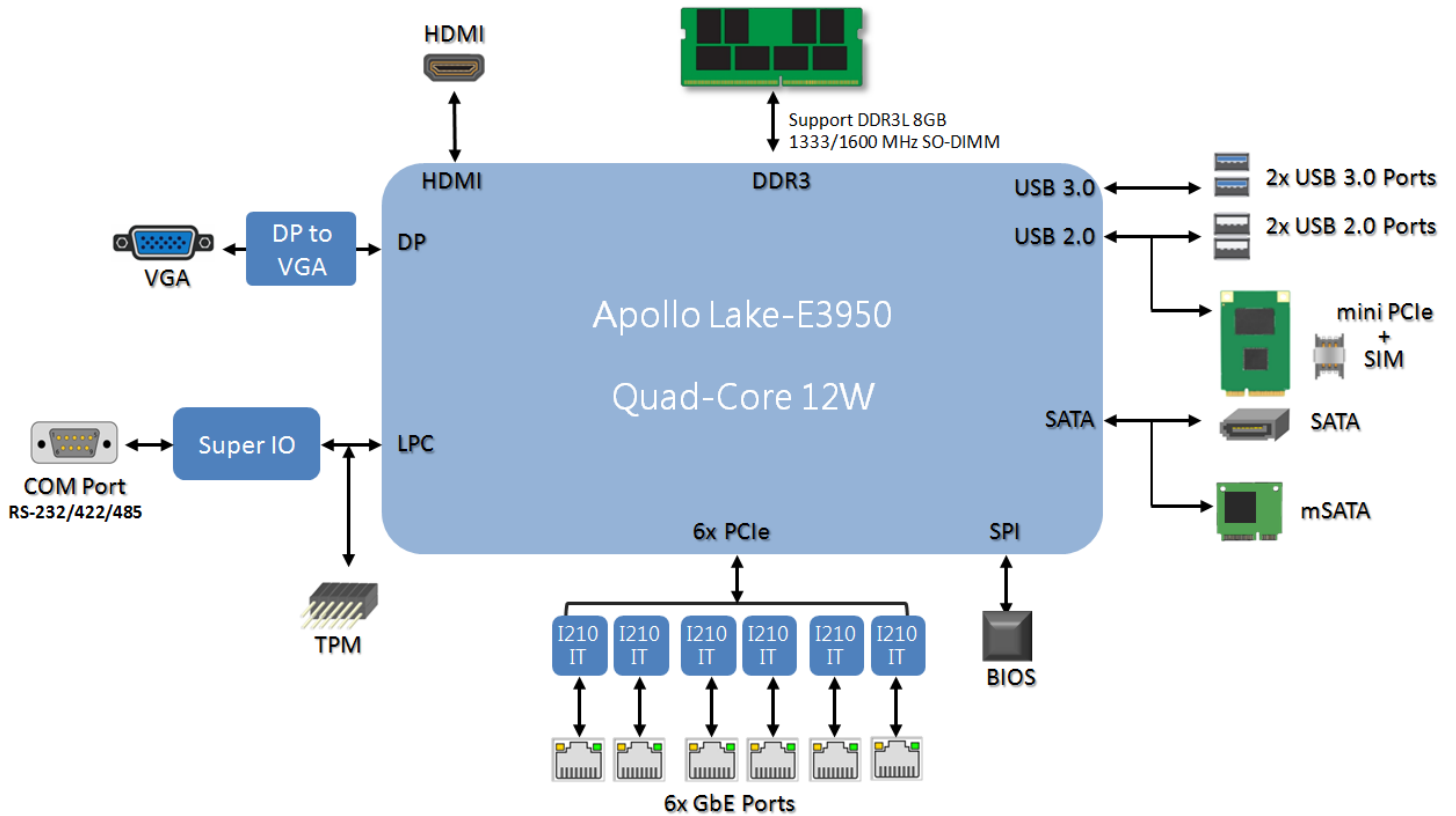
| No. | Description  |                                               |
|-----|--------------|-----------------------------------------------|
| R1  | Power Button | 1x Power button with LED                      |
| R2  | USB Port     | 2x USB 2.0 port                               |
| R3  | HDMI Port    | 1x HDMI with screw                            |
| R4  | Serial Port  | 1x DB9 Male connector, RS-232/422/485         |
| R5  | Power Supply | DC 24VDC, 2.5A 60W/120W, 2-pin terminal block |
| R6  | Reset Button | Hardware reset                                |

## CHAPTER 2: MOTHERBOARD INFORMATION

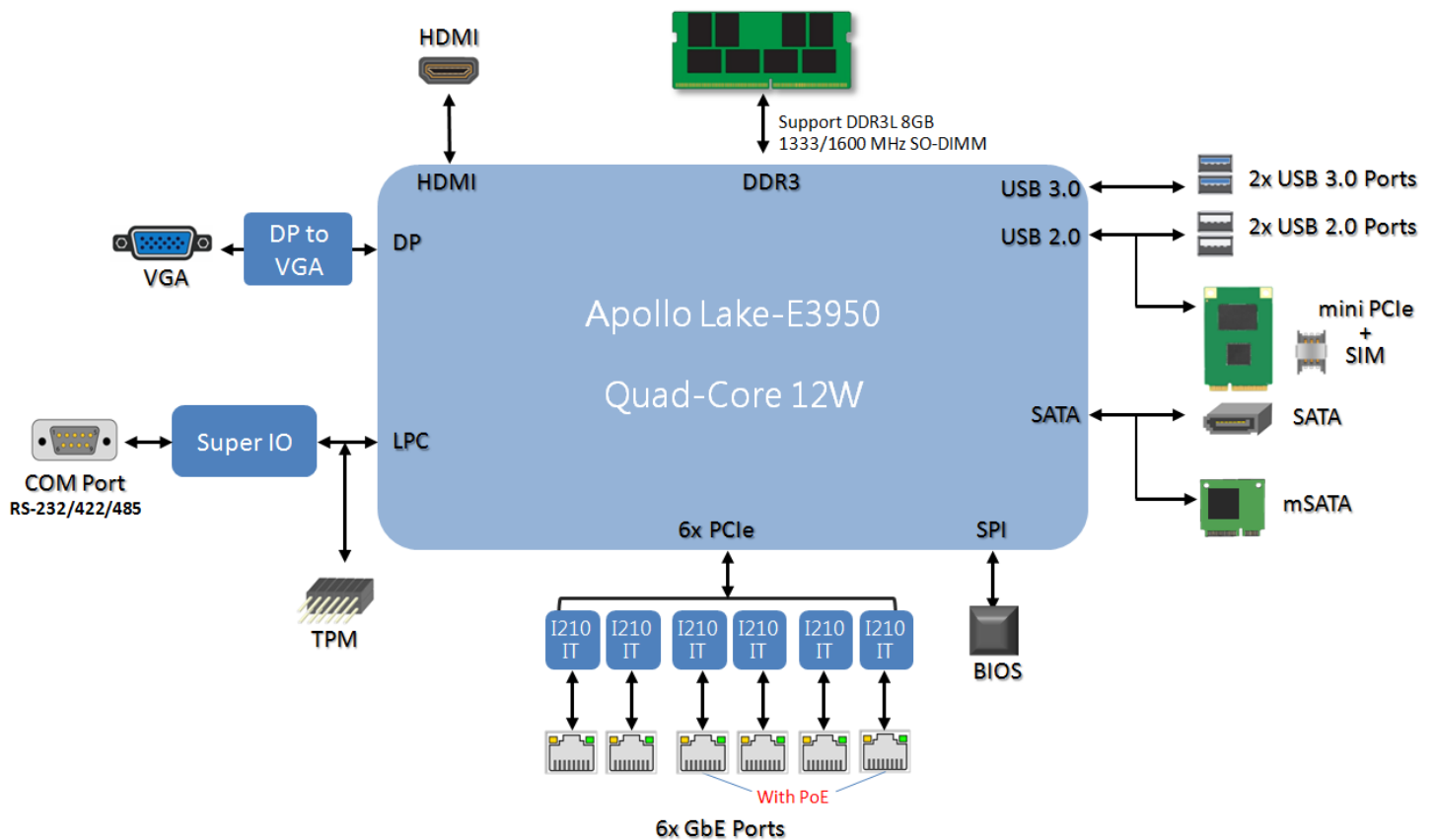
### Block Diagram

The block diagram indicates how data flows among components on the motherboard. Please refer to the following figure for your motherboard's layout design.

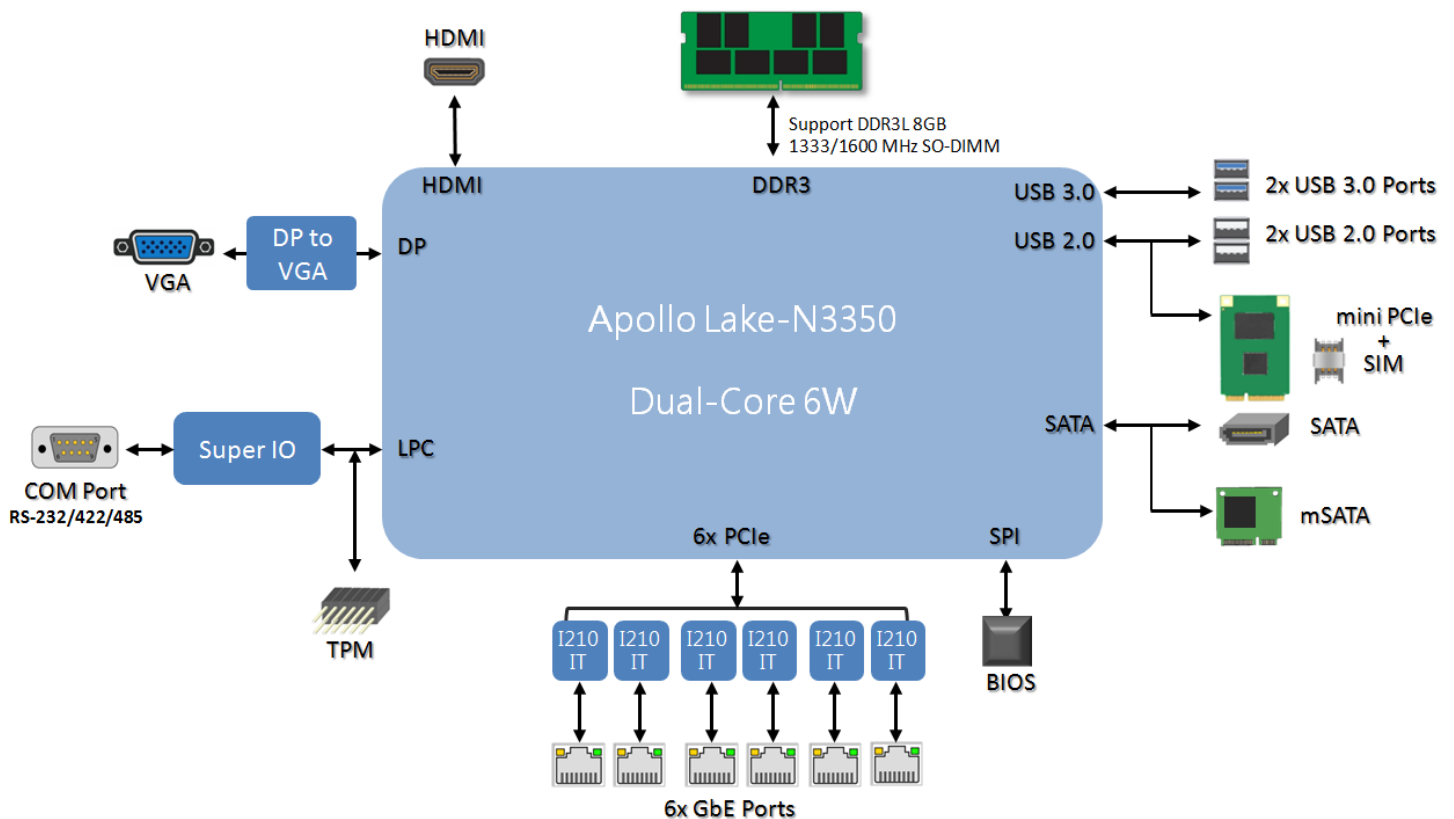
LEC-2137A

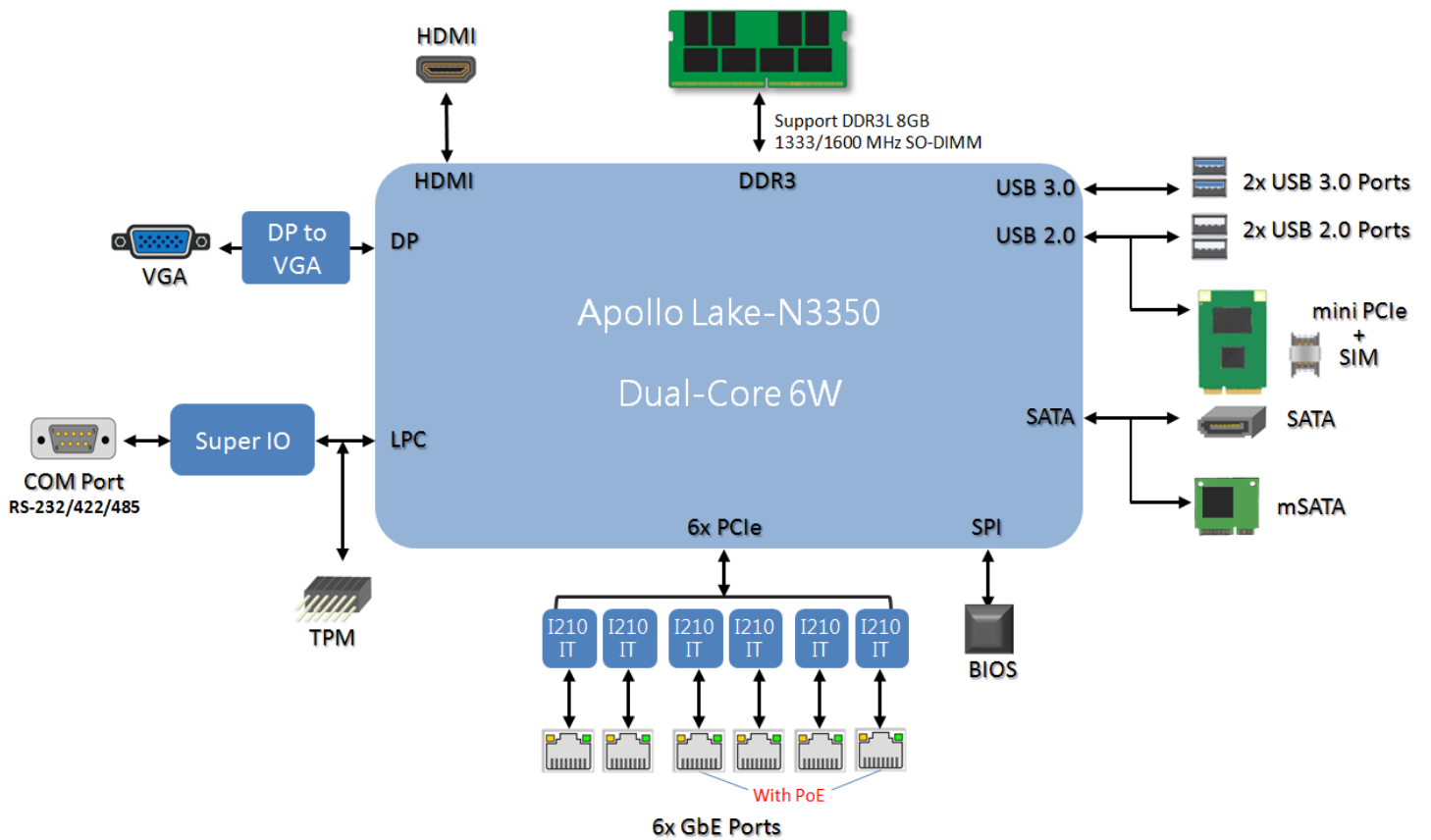


## LEC-2137B



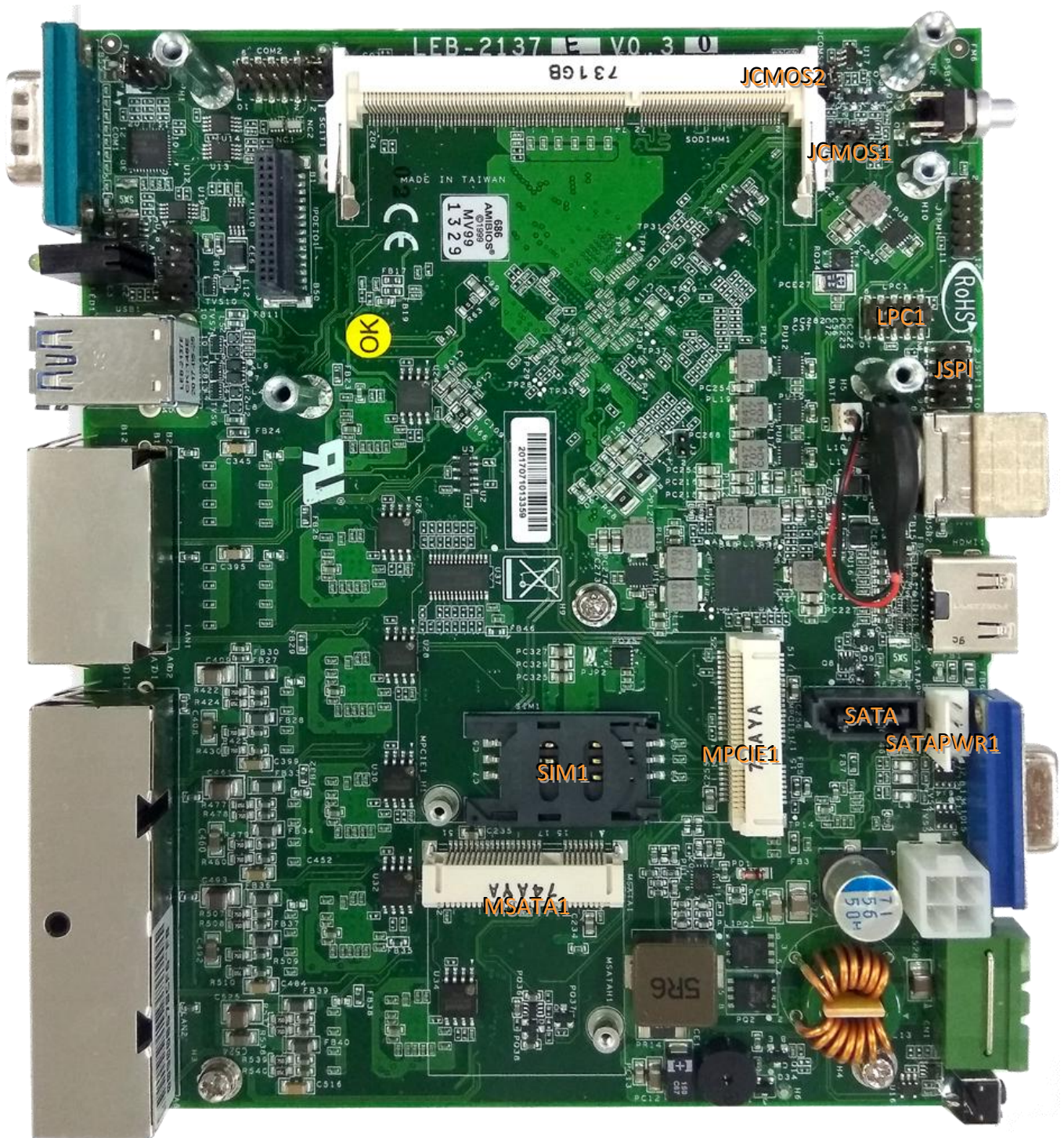
## LEC-2137C





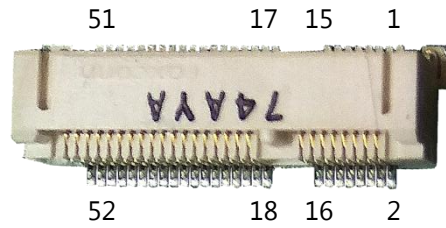
## Motherboard Layout

The motherboard layout shows the connectors and jumpers on the board. Refer to the following picture as a reference of the pin assignments and the internal connectors.



## Internal Jumper & Connectors

### MSATA1



| Pin | Description | Pin | Description | Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|-----|-------------|-----|-------------|
| 1   | WAKE#       | 2   | +3.3Vaux    | 3   | COEX1       | 4   | GND         |
| 5   | COEX2       | 6   | +1.5V       | 7   | CLKREQ#     | 8   | UIM_PWR     |
| 9   | GND         | 10  | UIM_DATA    | 11  | REFCLK+     | 12  | UIM_CLK     |
| 13  | REFCLK-     | 14  | UIM_RESET   | 15  | GND         | 16  | UIM_VPP     |
| 17  | Reserve     | 18  | GND         | 19  | Reserve     | 20  | W_DISABLE#  |
| 21  | GND         | 22  | PERST#      | 23  | PERn0       | 24  | +3.3Vaux    |
| 25  | PERp0       | 26  | GND         | 27  | GND         | 28  | +1.5V       |
| 29  | GND         | 30  | SMB_CLK     | 31  | PETn0       | 32  | SMB_DATA    |
| 33  | PETp0       | 34  | GND         | 35  | GND         | 36  | USB_D-      |
| 37  | GND         | 38  | USB_D+      | 39  | +3.3Vaux    | 40  | GND         |
| 41  | +3.3Vaux    | 42  | LED_WWAN#   | 43  | GND         | 44  | LED_WLAN#   |
| 45  | Reserve     | 46  | LED_WPAN#   | 47  | Reserve     | 48  | +1.5V       |
| 49  | Reserve     | 50  | GND         | 51  | Reserve     | 52  | +3.3Vaux    |

### SATA1

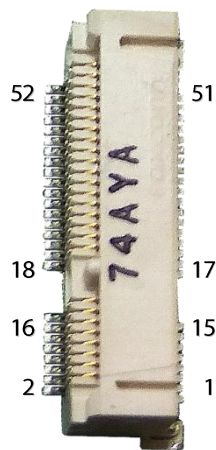
| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | GND         | 2   | TXP         |
| 3   | TXN         | 4   | GND         |
| 5   | RXN         | 6   | RXP         |
| 7   | GND         |     |             |



### SATAPWR1

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | +12V        | 2   | GND         |
| 3   | GND         | 4   | +5V         |



**MPCIE1:** Mini-PCIe socket with SIM card reader

| Pin       | Description | Pin       | Description | Pin       | Description | Pin       | Description |
|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|
| <b>1</b>  | WAKE#       | <b>2</b>  | +3.3Vaux    | <b>3</b>  | COEX1       | <b>4</b>  | GND         |
| <b>5</b>  | COEX2       | <b>6</b>  | +1.5V       | <b>7</b>  | CLKREQ#     | <b>8</b>  | UIM_PWR     |
| <b>9</b>  | GND         | <b>10</b> | UIM_DATA    | <b>11</b> | Reserve     | <b>12</b> | UIM_CLK     |
| <b>13</b> | Reserve     | <b>14</b> | UIM_RESET   | <b>15</b> | GND         | <b>16</b> | UIM_VPP     |
| <b>17</b> | Reserve     | <b>18</b> | GND         | <b>19</b> | Reserve     | <b>20</b> | W_DISABLE#  |
| <b>21</b> | GND         | <b>22</b> | PERST#      | <b>23</b> | Reserve     | <b>24</b> | +3.3Vaux    |
| <b>25</b> | Reserve     | <b>26</b> | GND         | <b>27</b> | GND         | <b>28</b> | +1.5V       |
| <b>29</b> | GND         | <b>30</b> | Reserve     | <b>31</b> | Reserve     | <b>32</b> | Reserve     |
| <b>33</b> | Reserve     | <b>34</b> | GND         | <b>35</b> | GND         | <b>36</b> | USB_D-      |
| <b>37</b> | GND         | <b>38</b> | USB_D+      | <b>39</b> | +3.3Vaux    | <b>40</b> | GND         |
| <b>41</b> | +3.3Vaux    | <b>42</b> | LED_WWAN#   | <b>43</b> | GND         | <b>44</b> | LED_WLAN#   |
| <b>45</b> | Reserve     | <b>46</b> | LED_WPAN#   | <b>47</b> | Reserve     | <b>48</b> | +1.5V       |
| <b>49</b> | Reserve     | <b>50</b> | GND         | <b>51</b> | Reserve     | <b>52</b> | +3.3Vaux    |

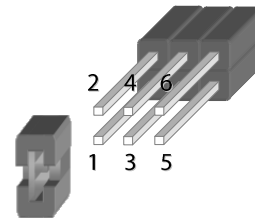
**SIM1**

| Pin       | Description | Pin       | Description |
|-----------|-------------|-----------|-------------|
| <b>C1</b> | UIM_PWR     | <b>C5</b> | GND         |
| <b>C2</b> | UIM_RST#    | <b>C6</b> | UIM_VPP     |
| <b>C3</b> | UIM_CLK     | <b>C7</b> | UIM_DATA    |

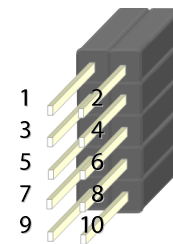


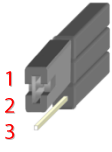
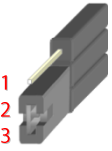
**JRI1 (Pin Header)**

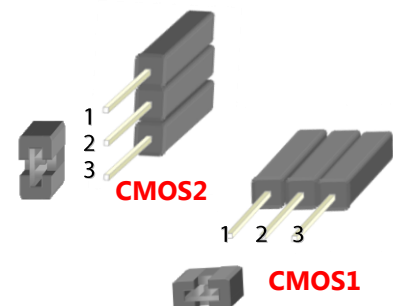
| Setting                                                                           | Description        |
|-----------------------------------------------------------------------------------|--------------------|
|  | 1-2 (Default): RI# |
|  | 3-4: +5V           |
|  | 5-6: +12V          |

**JSPI1 (Pin Header)**

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | HOLD#       | 2   | NC          |
| 3   | CS#         | 4   | +1.8V       |
| 5   | MISO        | 6   | NC          |
| 7   | NC          | 8   | CLK         |
| 9   | GND         | 10  | MOSI        |

**JCMOS1 & 2: (Pin Header)**

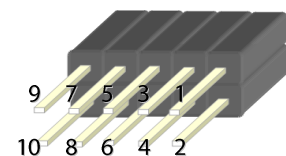
| Setting                                                                             | Description              | Setting                                                                             | Description        |
|-------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------|--------------------|
|  | 1-2:<br>Normal (Default) |  | 2-3:<br>Clear CMOS |



**Note:** For your selection of CMOS function to work (Normal or Clear CMOS), please make sure you have configured both the settings on both CMOS1 and CMOS2.

**LPC1: (Pin Header)**

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | CLK         | 2   | AD1         |
| 3   | RESET#      | 4   | AD0         |
| 5   | FRAME#      | 6   | +3.3V       |
| 7   | AD3         | 8   | GND         |
| 9   | AD2         | 10  | GND         |



## CHAPTER 3: HARDWARE SETUP

To reduce the risk of personal injury, electric shock, or damage to the unit, please remove all power connections to completely shut down the device. Also, please wear ESD protection gloves when conducting the steps in this chapter.

### Opening the Chassis

1. Flip over the system and unscrew the four screws indicated in the picture.



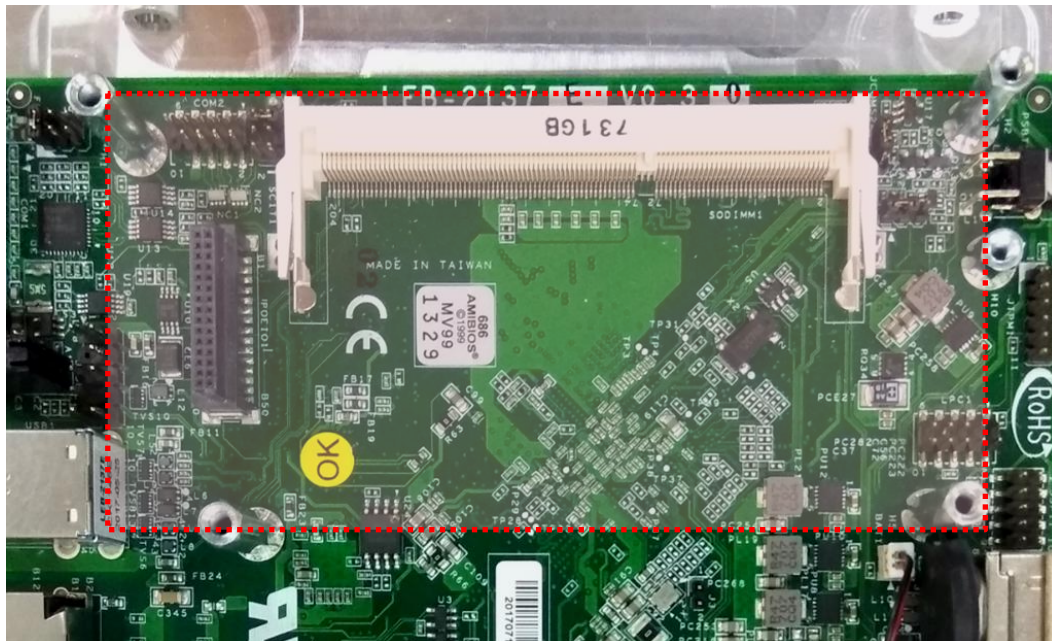
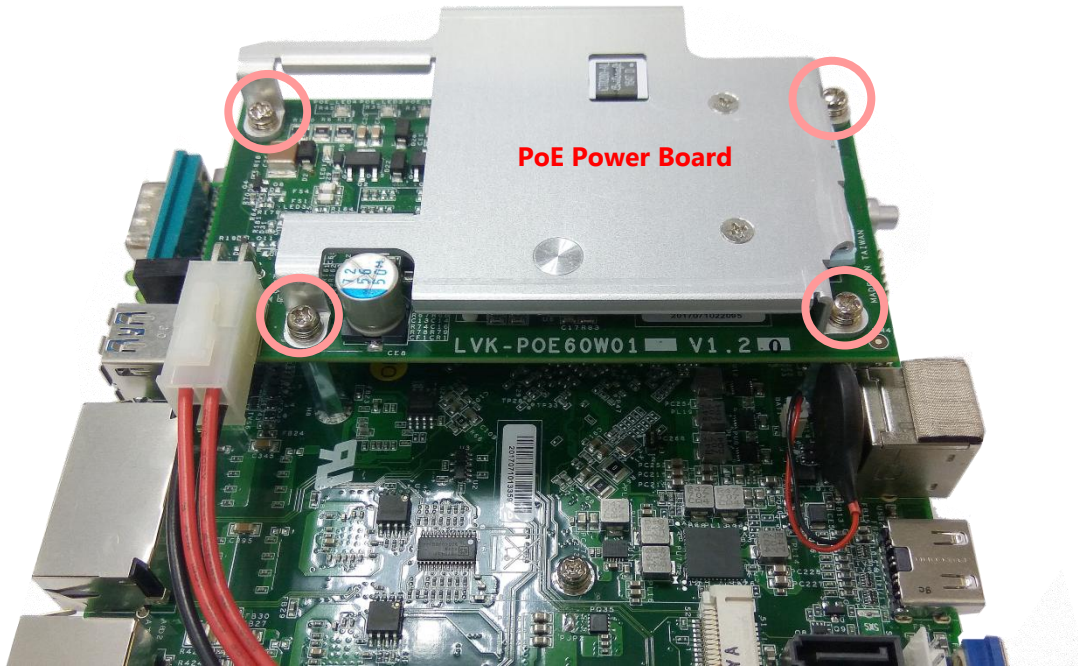
2. Insert your fingers into both grooves on the bottom panel and lift the panel up to remove it.



## Remove the PoE Power Board

As certain components and connectors such as the SODIMM slot are topped by the PoE Power board, you will have to remove this board in order to reach these components.

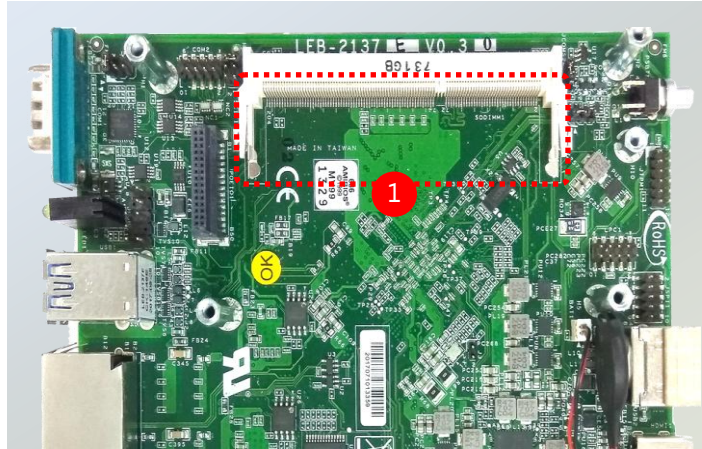
Simply remove the four screws that lock the board to the motherboard to reveal the covered components.



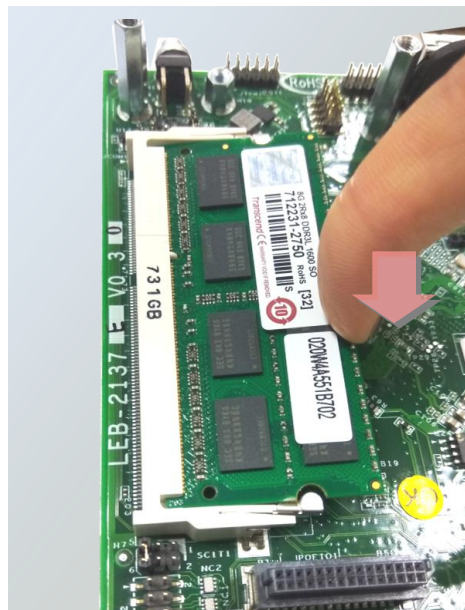
## Installing the System Memory

The motherboard supports SODIMM memory. Please follow the steps below to install the SODIMM memory modules.

1. Follow the instructions in Remove the PoE Power Board to reveal the SODIMM slot.



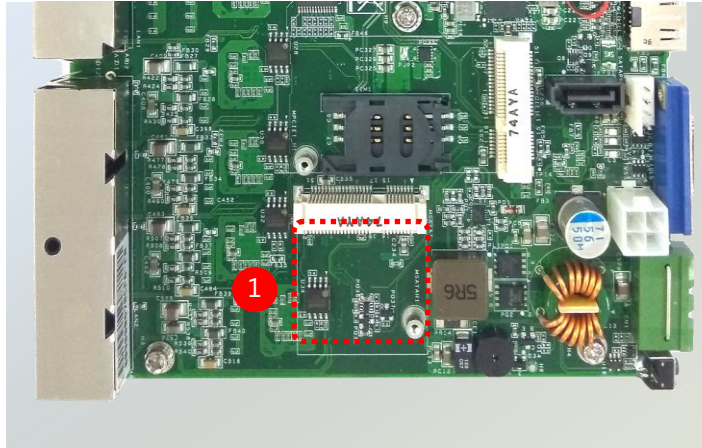
2. Align the notch of the module with the socket key in the slot.
3. Press on the card to push it down vertically until it clicks into place.



## Installing the mSATA

The motherboard provides one mSATA slot. Follow the procedures below for installing an mSATA card.

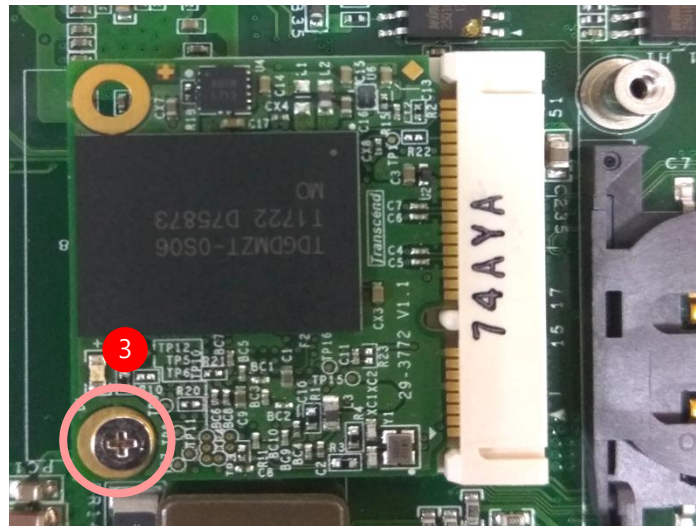
1. Locate the mSATA slot.



2. Align the notch of the mSATA module with the socket key in the slot, and insert it at 30 degrees into the socket until it is fully seated in the connector.

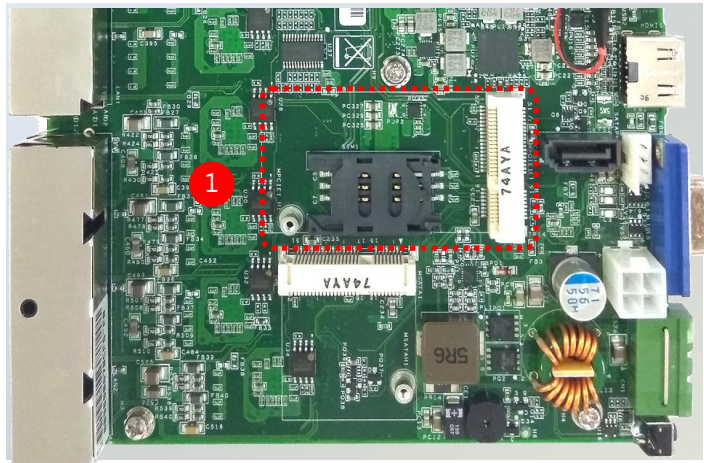


3. Push down on the module and secure it with the screw that comes with it.



## Installing 3G Supported Module

1. Locate MPCIE1 slot.

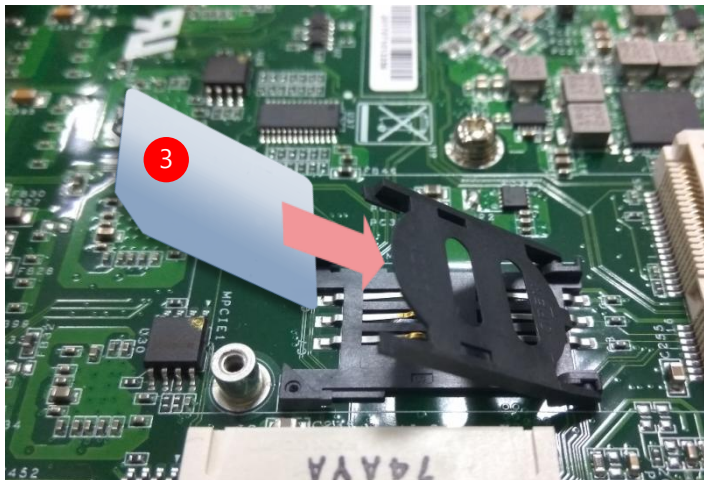


To install the SIM card:

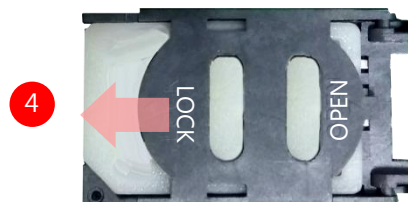
2. Slide open the socket cover and lift the cover on its hinges.



3. Insert the SIM card into the slot in the cover with the gold contacts facing down, and the angled corner of the card is positioned correctly as shown in the picture.

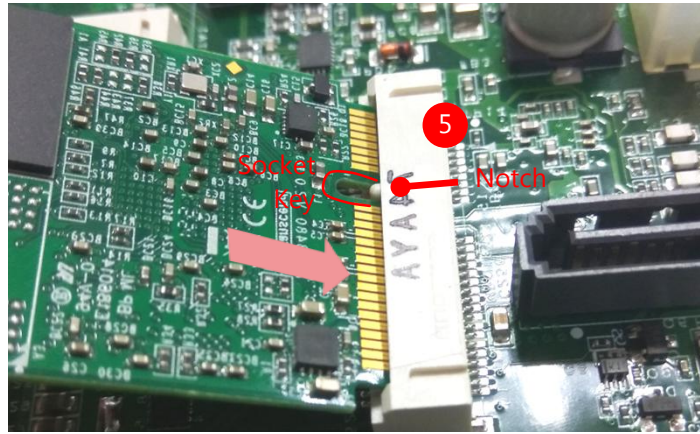


4. Push down the cover to close, and the SIM card will come in contact with the metal contacts in the socket. Finally, Slide the socket cover to the Lock position.

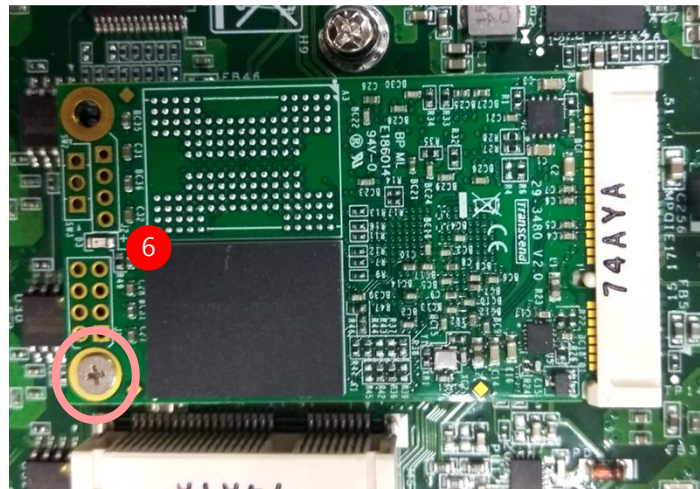


To install the 3G module

5. Align the notch of the module with the socket key in the slot, and insert it at 30 degrees into the socket until it is fully seated in the connector.

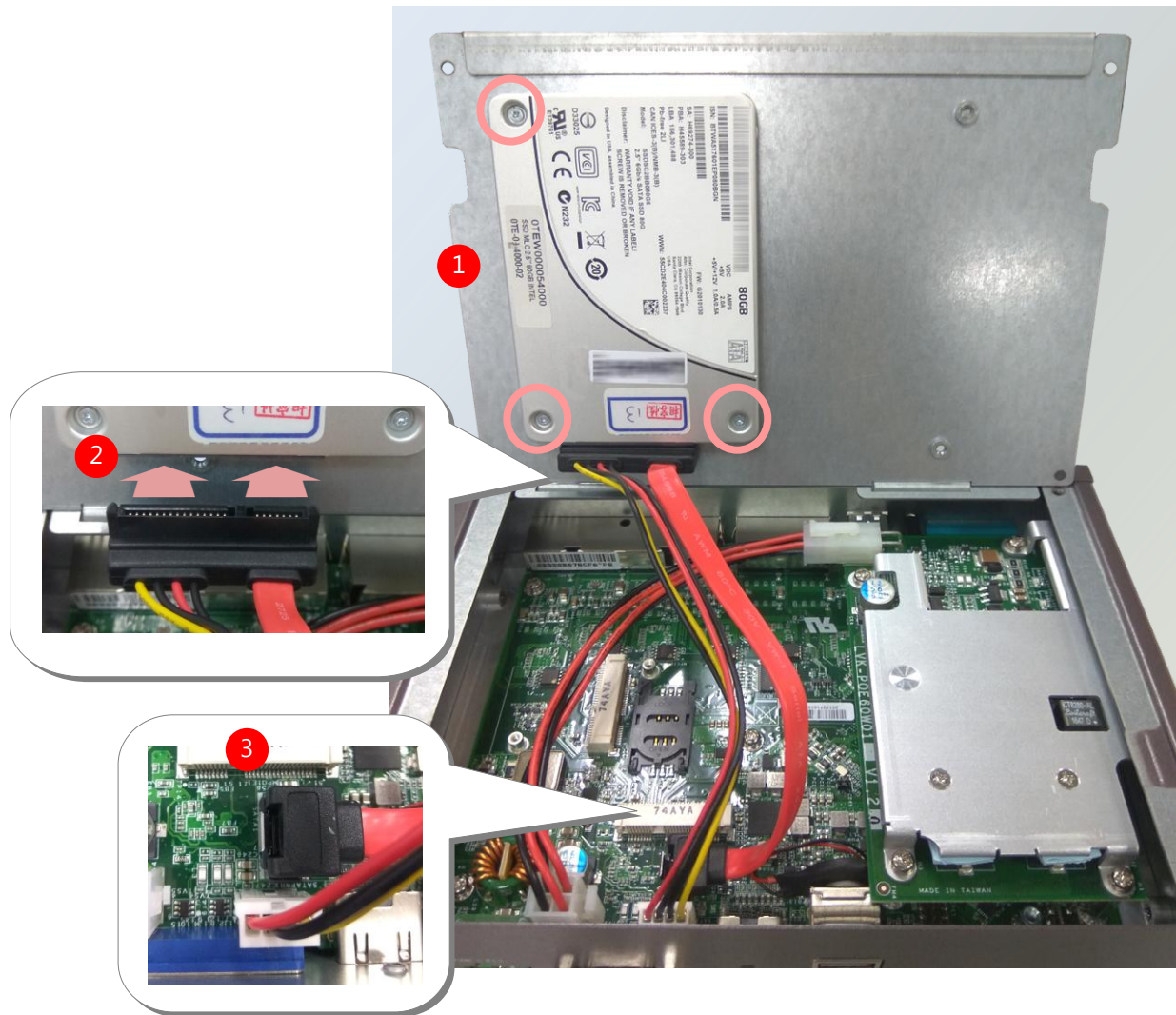


6. Push down on the module and secure it with the screw that comes with it.



## Installing the Disk Drive

1. Fix the hard disk onto the inner side of the bottom panel with provided disk screws.
2. Insert the end of the SATA cable to the SATA contacts on the disk.
3. Insert the other end of the SATA data cable to the SATA port on the motherboard and the end of the SATA power cable to the SATA Power port.



## CHAPTER 4: BIOS SETUP

### Enter BIOS Setup

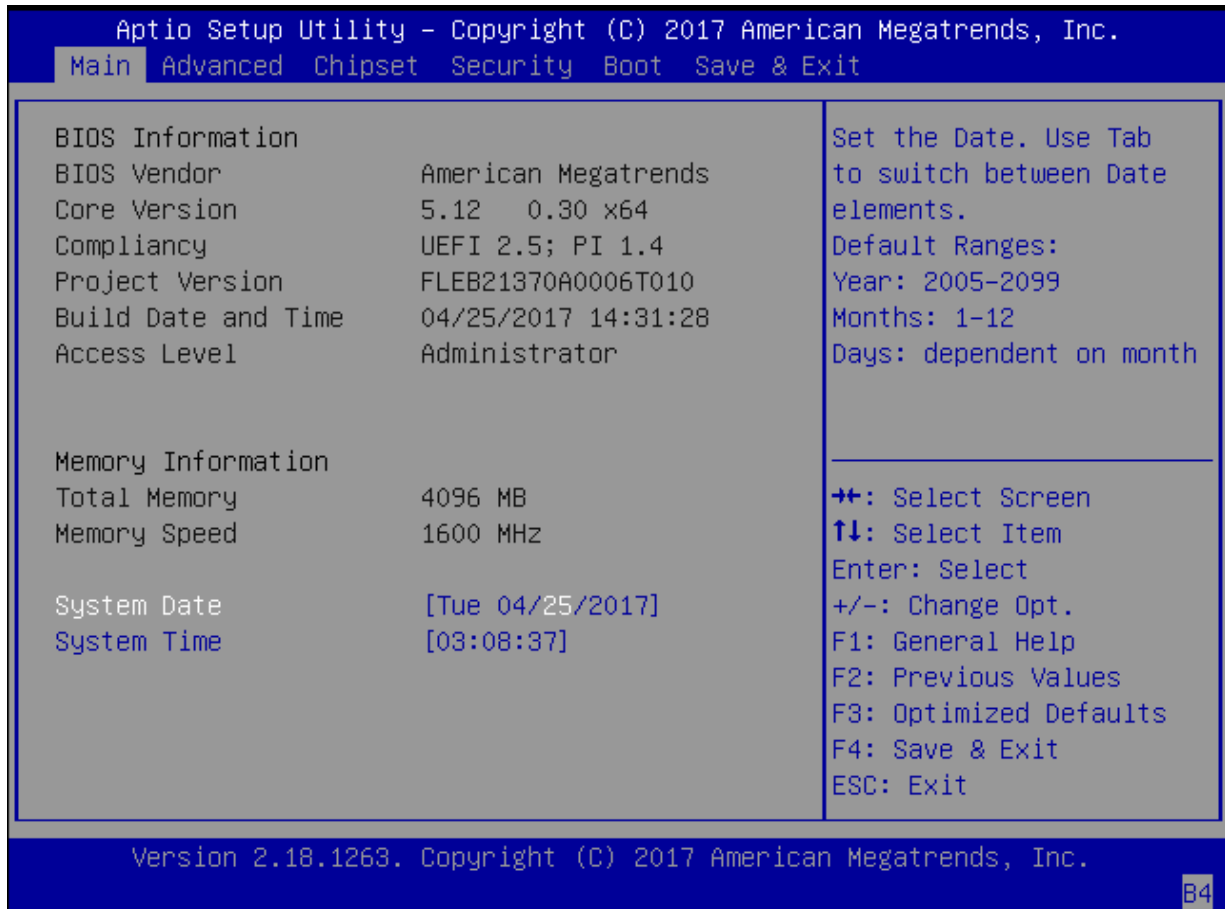
To enter the BIOS setup utility, simply follow the steps below:

1. Boot up the system.
2. Pressing the **<Tab>** or **<Del>** key immediately allows you to enter the Setup utility, then you will be directed to the BIOS main screen.
3. Instructions of BIOS navigations:

| Control Keys         | Description                                                                                        |
|----------------------|----------------------------------------------------------------------------------------------------|
| <b>→←</b>            | select a setup screen, for instance, [Main], [IntelRCSetup], [Security], [Boot], and [Save & Exit] |
| <b>↑↓</b>            | select an item/option on a setup screen                                                            |
| <b>&lt;Enter&gt;</b> | select an item/option or enter a sub-menu                                                          |
| <b>+/-</b>           | to adjust values for the selected setup item/option                                                |
| <b>F1</b>            | to display General Help screen                                                                     |
| <b>F2</b>            | to retrieve previous values, such as the parameters configured the last time you had entered BIOS. |
| <b>F3</b>            | to load optimized default values                                                                   |
| <b>F4</b>            | to save configurations and exit BIOS                                                               |
| <b>&lt;Esc&gt;</b>   | exit the current screen                                                                            |

## Main

Setup main page displays a description of BIOS information and project version information. You can also set up the System Time and System Date here.

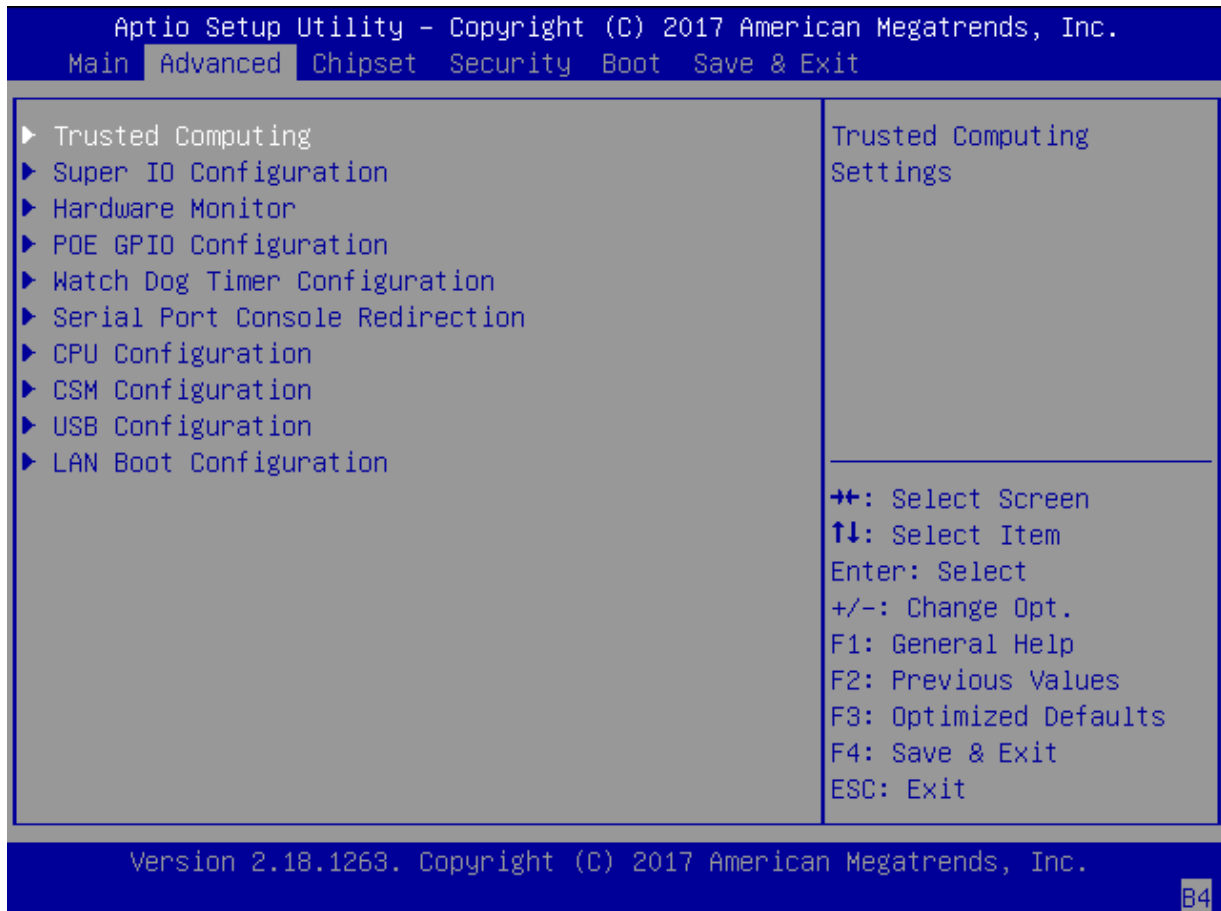


(The screenshots presented in section are for reference only)

| Item        | Description                                                                                                                                            |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| System Date | The option allows the user to set the date on the system RTC.<br>Simply navigate to the month, day, or year and type in the correct numeric value.     |
| System Time | The option allows the user to set the Time on the system RTC.<br>Simply navigate to the hour, minute, or second and type in the correct numeric value. |

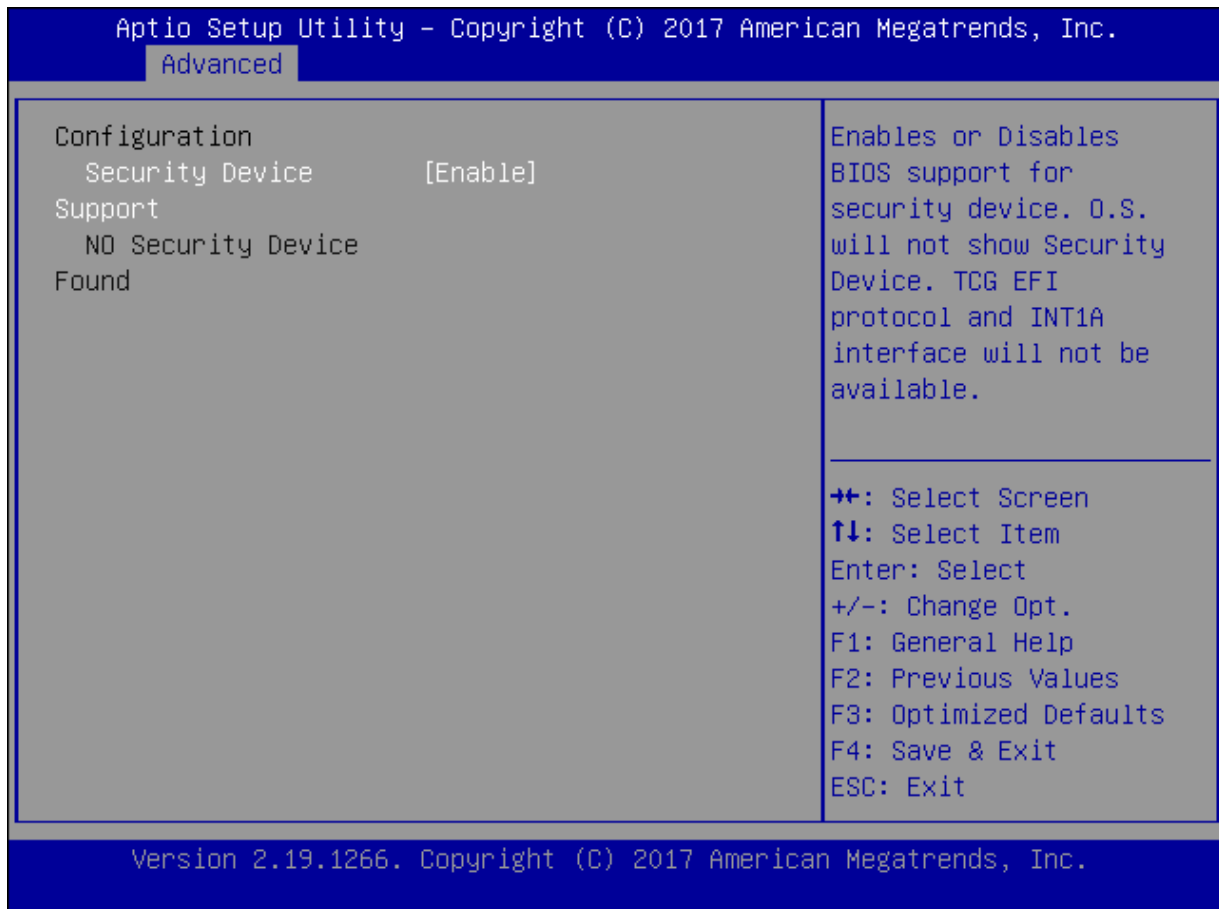
## Advanced Setup

Use [←] / [→] to select [Advanced] setup screen. Under this screen, you may use [↑] [↓] to select an item you want to configure.



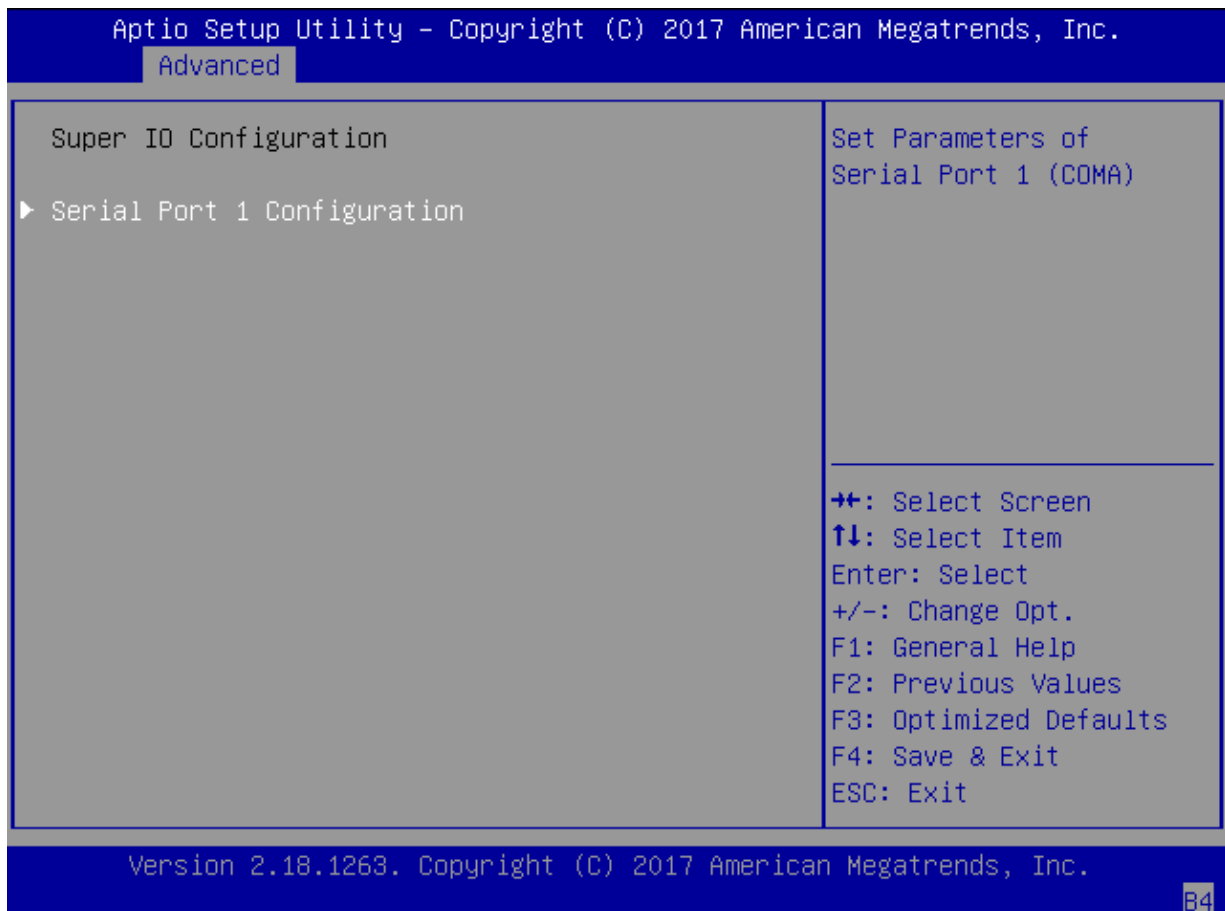
## Trusted Computing

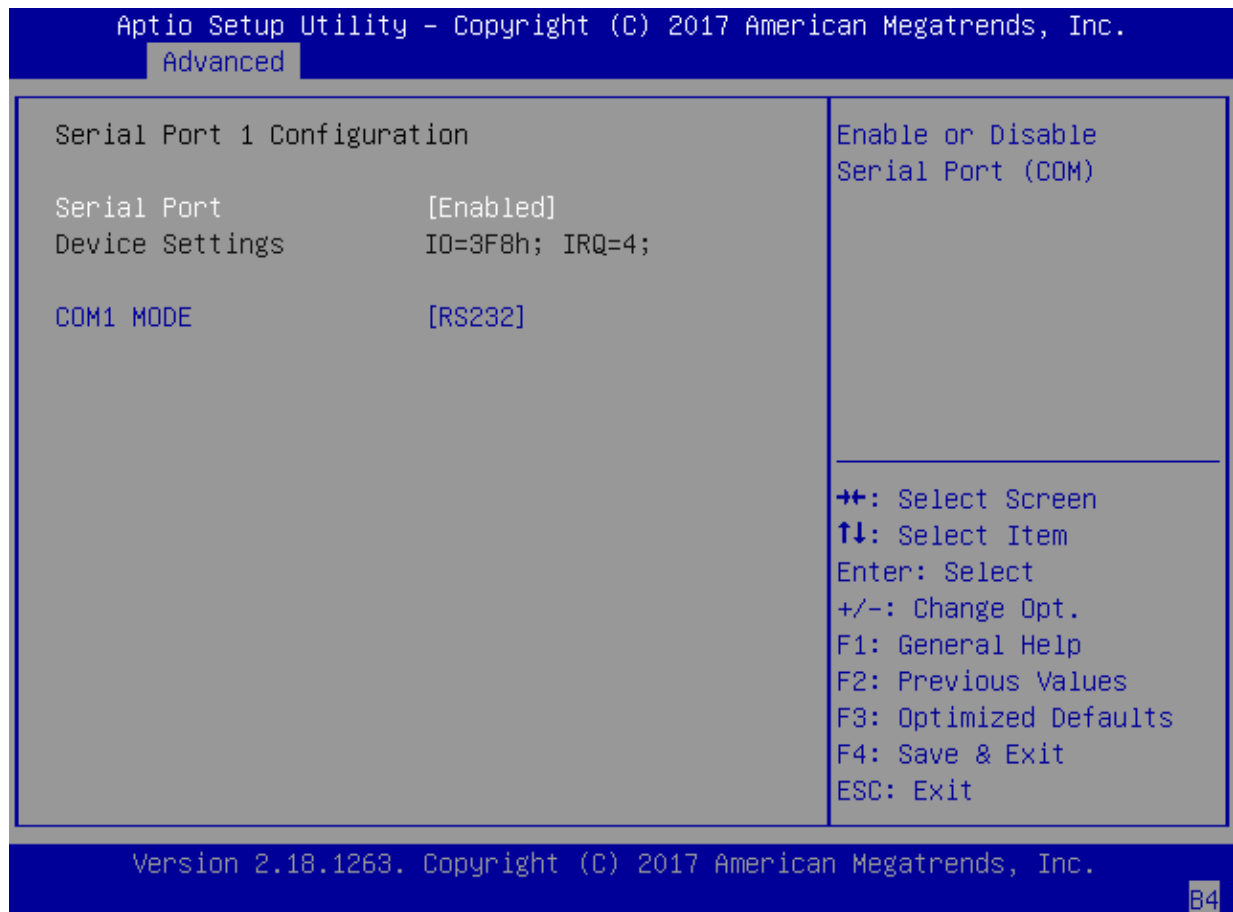
This option allows you to turn on/off the BIOS support for security device. Press <Enter> to access the submenu. The default is "Enabled".



## Super IO Configuration

This option allows you to configure parameters about Super IO Chip. Press "Enter " to access the submenu.

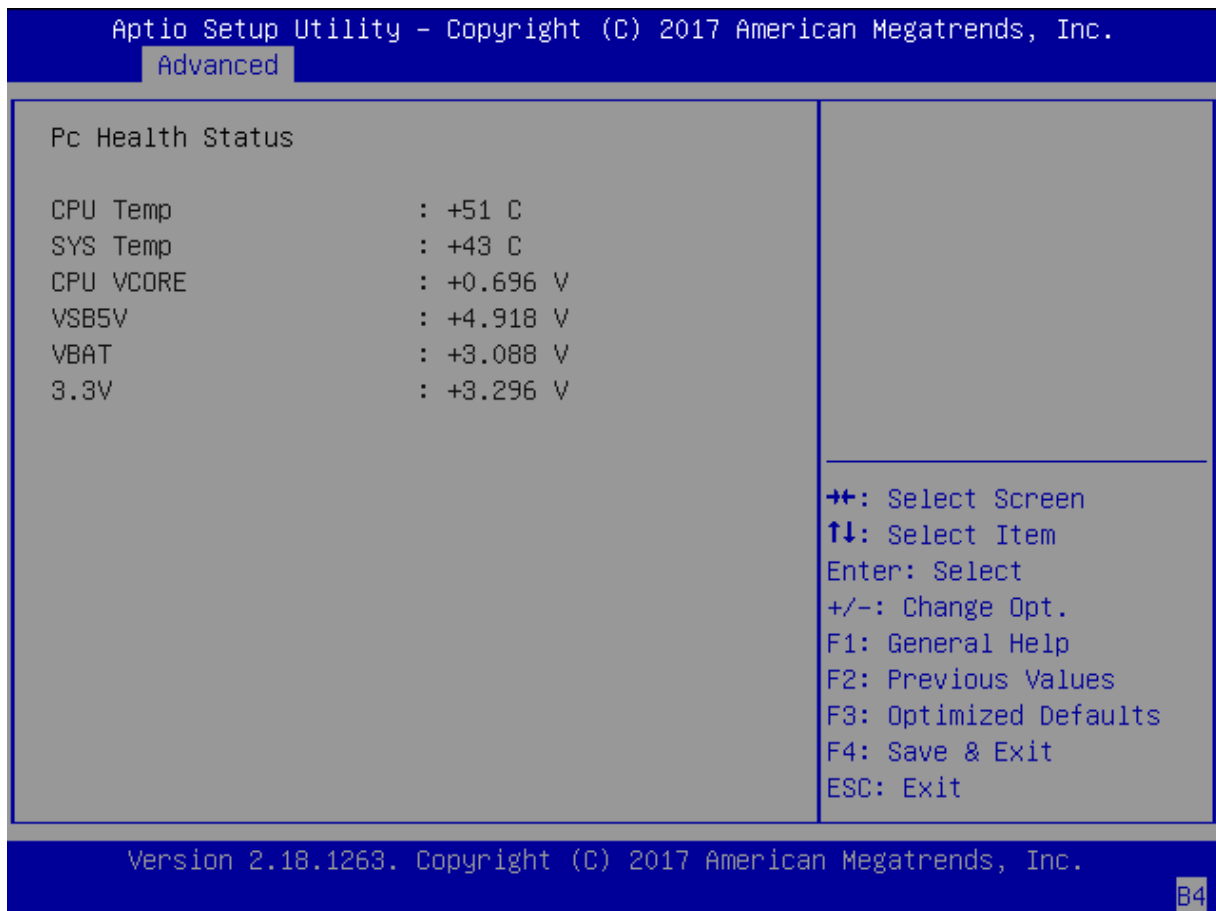


**Serial port 1 Configuration**

| Item            | Value                   | Description                                   |
|-----------------|-------------------------|-----------------------------------------------|
| Serial Port     | Enabled<br>Disabled     | Enable or Disable Serial Port 1.              |
| Device Settings | NA                      | IO=3F8h; IRQ = 4                              |
| Com1 MODE       | RS232<br>RS485<br>RS422 | Select Com Mode as <b>RS232/RS485/RS422</b> . |

## H/W Monitor

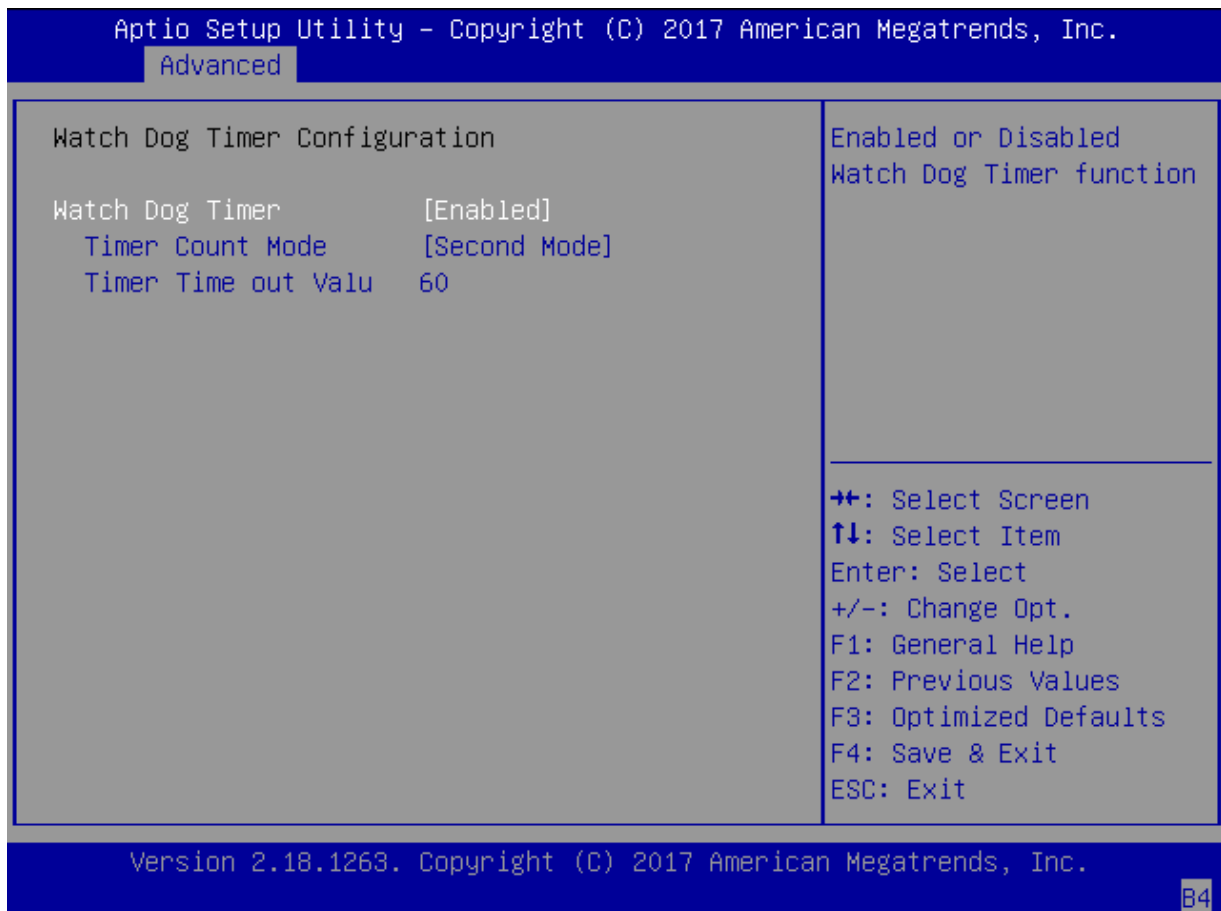
This option allows you to monitor the PC Health status.



| Item        | Description                                        |
|-------------|----------------------------------------------------|
| CPU Temp    | This value reports the CPU temperature.            |
| system Temp | This value reports the overall System temperature. |
| CPU VCORE   | This value reports the CPU VCORE.                  |
| VSB5V       | This value reports the VSB5V Input voltage.        |
| 3.3V        | This value reports the 3.3V Input voltage.         |
| VBAT        | This value reports the VBAT Input voltage.         |

## Watch Dog Timer Configuration

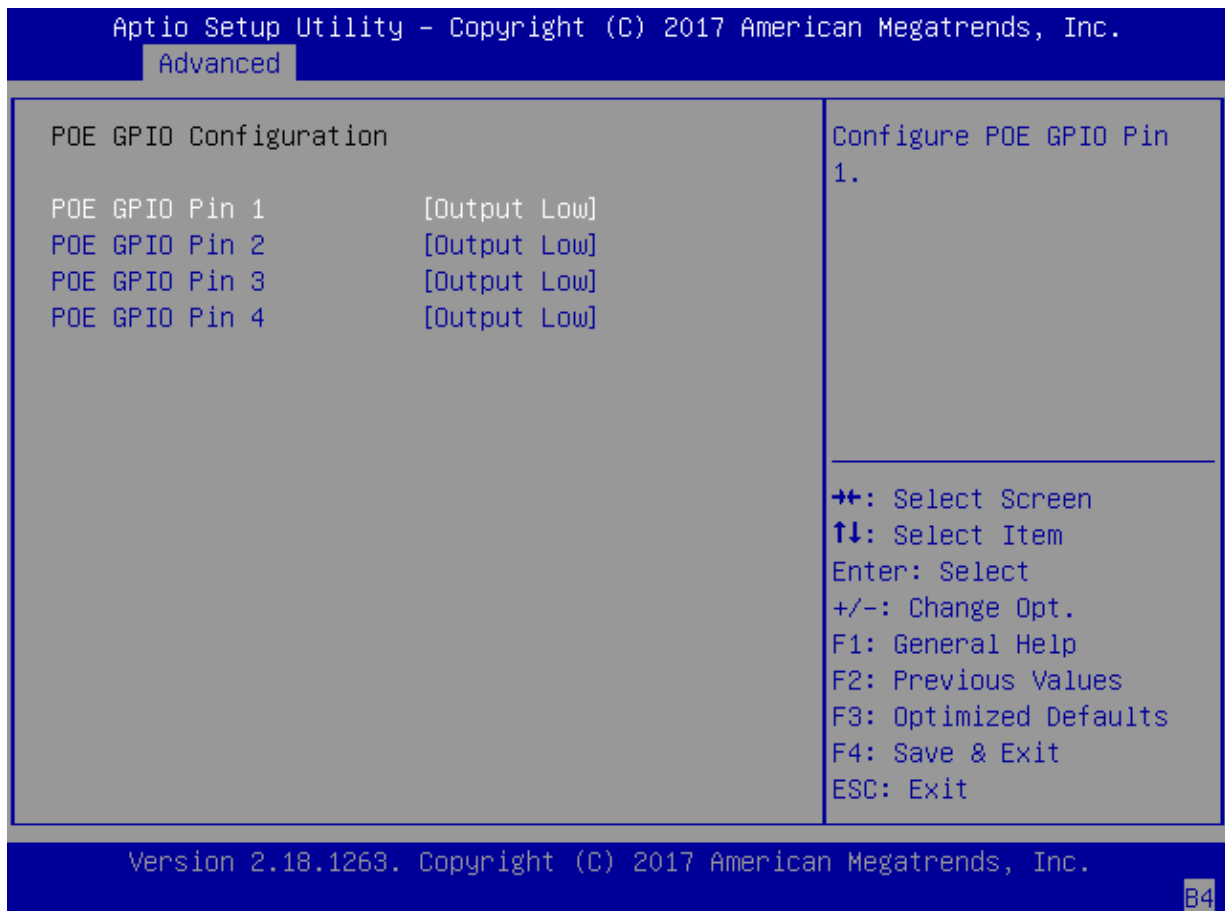
This option allows you to enable or disable Watchdog Timer function. The default is "Disabled".



| Item             | Value                      | Description                                     |
|------------------|----------------------------|-------------------------------------------------|
| Watch Dog Timer  | Enabled<br>Disabled        | Enable or Disable Watch Dog function            |
| Timer Count Mode | Second Mode<br>Minute Mode | Select <b>Second Mode</b> or <b>Minute Mode</b> |
| Timer out Value  | 1~255                      | Watch Dog Timer out Value                       |

## POE Configuration

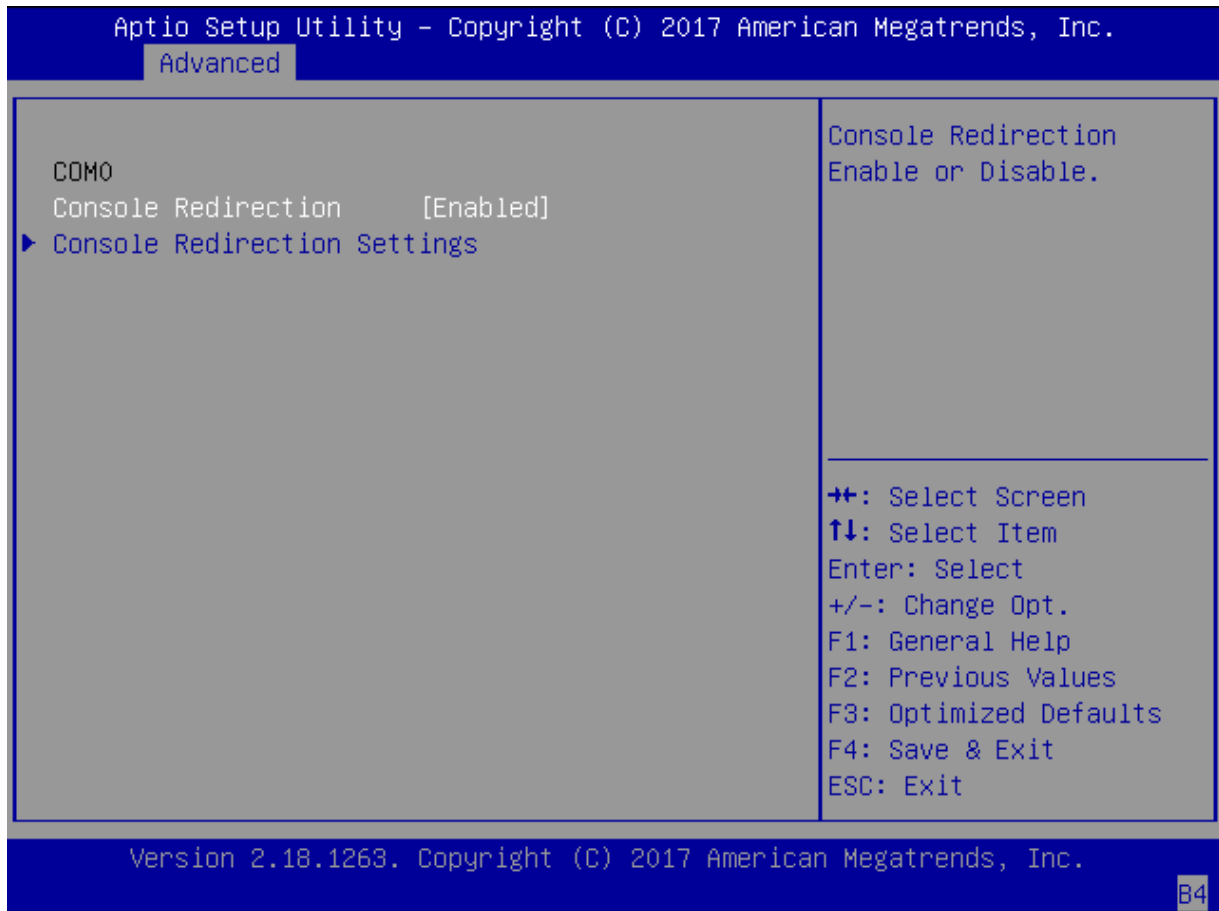
This option allows you to configure PoE GPIO pin output setting.



| Item           | Value                     | Description                  |
|----------------|---------------------------|------------------------------|
| POE GPIO Pin 1 | Output Low<br>Output High | Configuration POE GPIO Pin 1 |
| POE GPIO Pin 2 | Output Low<br>Output High | Configuration POE GPIO Pin 2 |
| POE GPIO Pin 3 | Output Low<br>Output High | Configuration POE GPIO Pin 3 |
| POE GPIO Pin 4 | Output Low<br>Output High | Configuration POE GPIO Pin 4 |

## Serial Port Console Redirection

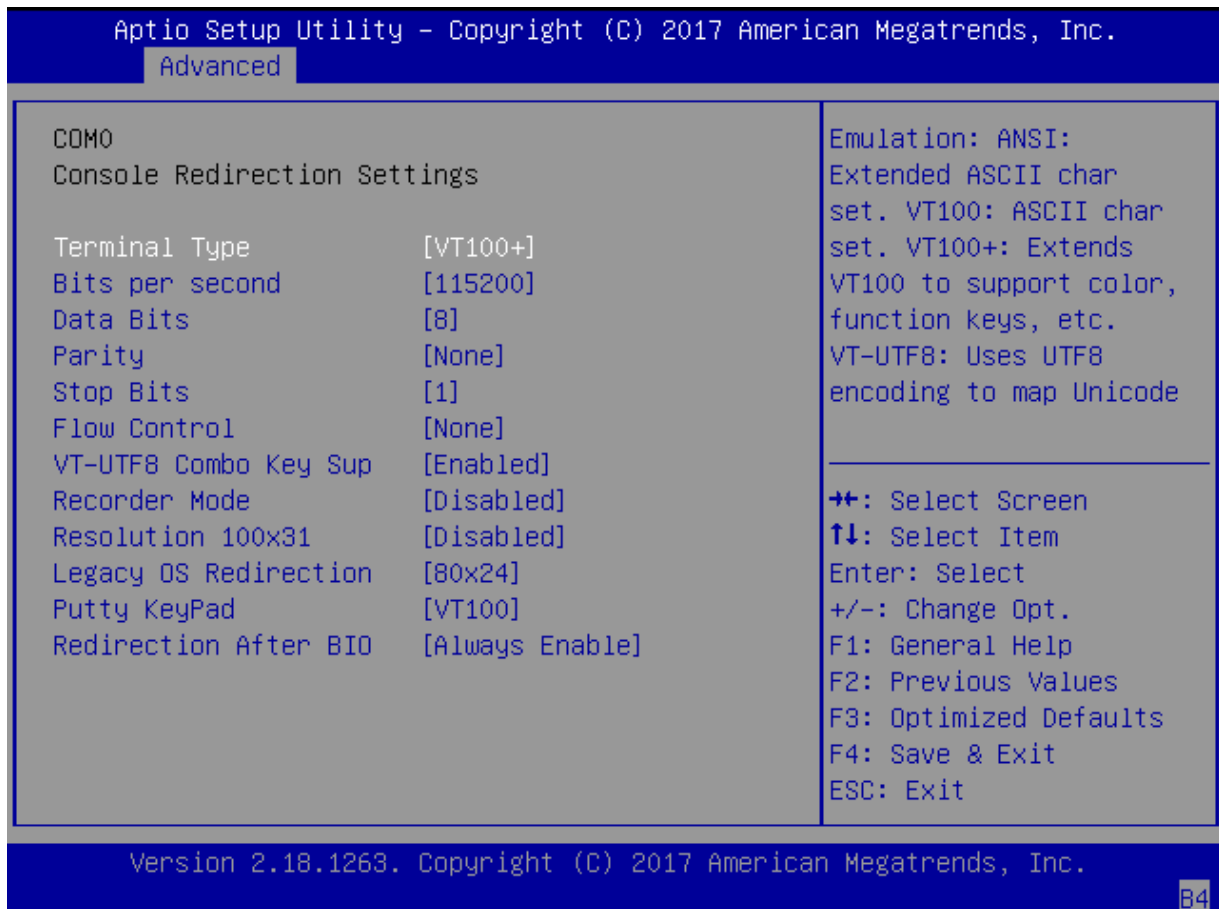
This option allows you to configure parameters about serial port console redirection. Press "Enter" to access the submenu. The default is "Enabled".



| Item                | Value               | Description                                           |
|---------------------|---------------------|-------------------------------------------------------|
| Console Redirection | Disabled<br>Enabled | Console Redirection <b>Enabled</b> or <b>Disabled</b> |

**Console Redirection Settings**

Select this item to enter the setting sub-menu. These settings specify how the host computer and the remote computer will exchange data. Both computers should have the same or compatible settings.

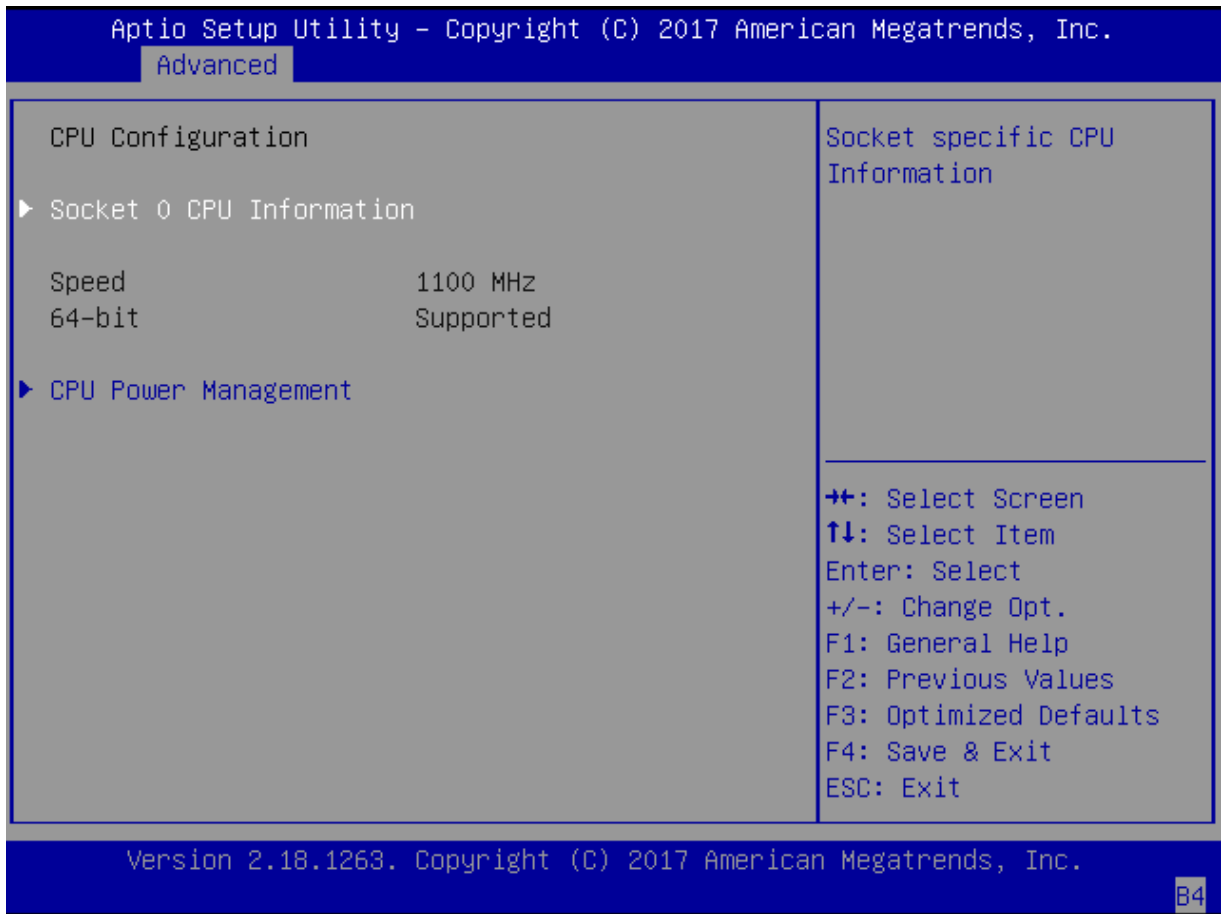


| Item            | Value         | Description                                                                                                                        |
|-----------------|---------------|------------------------------------------------------------------------------------------------------------------------------------|
| Terminal Type   | VT100         | <b>ANSI:</b> Extended ASCII char set.                                                                                              |
|                 | <b>VT100+</b> | <b>VT100:</b> ASCII char set.                                                                                                      |
|                 | VT-UTF8       | <b>VT100+:</b> Extends VT100 to support color, function keys, etc.                                                                 |
|                 | ANSI          | <b>VT-UTF8:</b> Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.                                                      |
| Bits per second | 9600          | Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds. |
|                 | 19200         |                                                                                                                                    |
|                 | 38400         |                                                                                                                                    |
|                 | 57600         |                                                                                                                                    |
| Data Bits       | <b>115200</b> | Data Bits                                                                                                                          |
|                 | 7             |                                                                                                                                    |
| Parity          | 8             | A parity bit can be sent with the data bits to detect some transmission errors.                                                    |
|                 | <b>None</b>   |                                                                                                                                    |
|                 | Even          |                                                                                                                                    |

|                              |                                                   |                                                                                  |
|------------------------------|---------------------------------------------------|----------------------------------------------------------------------------------|
|                              | Odd<br>Mark<br>Space                              |                                                                                  |
| Stop Bits                    | 1<br>2                                            | Stop bits indicate the end of a serial data packet.                              |
| Flow Control                 | None<br>Hardware RTS/CTS                          | Flow control can prevent data loss from buffer overflow.                         |
| VT-UTF8 Combo Key<br>Support | Disabled<br>Enabled                               | Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals                  |
| Recorder Mode                | Disabled<br>Enabled                               | With this mode enabled only text will be sent. This is to capture Terminal data. |
| Putty KeyPad                 | VT100<br>LINUX<br>XTERM86<br>SCO<br>ESCN<br>VT400 | Select FunctionKey and KeyPad on Putty.                                          |

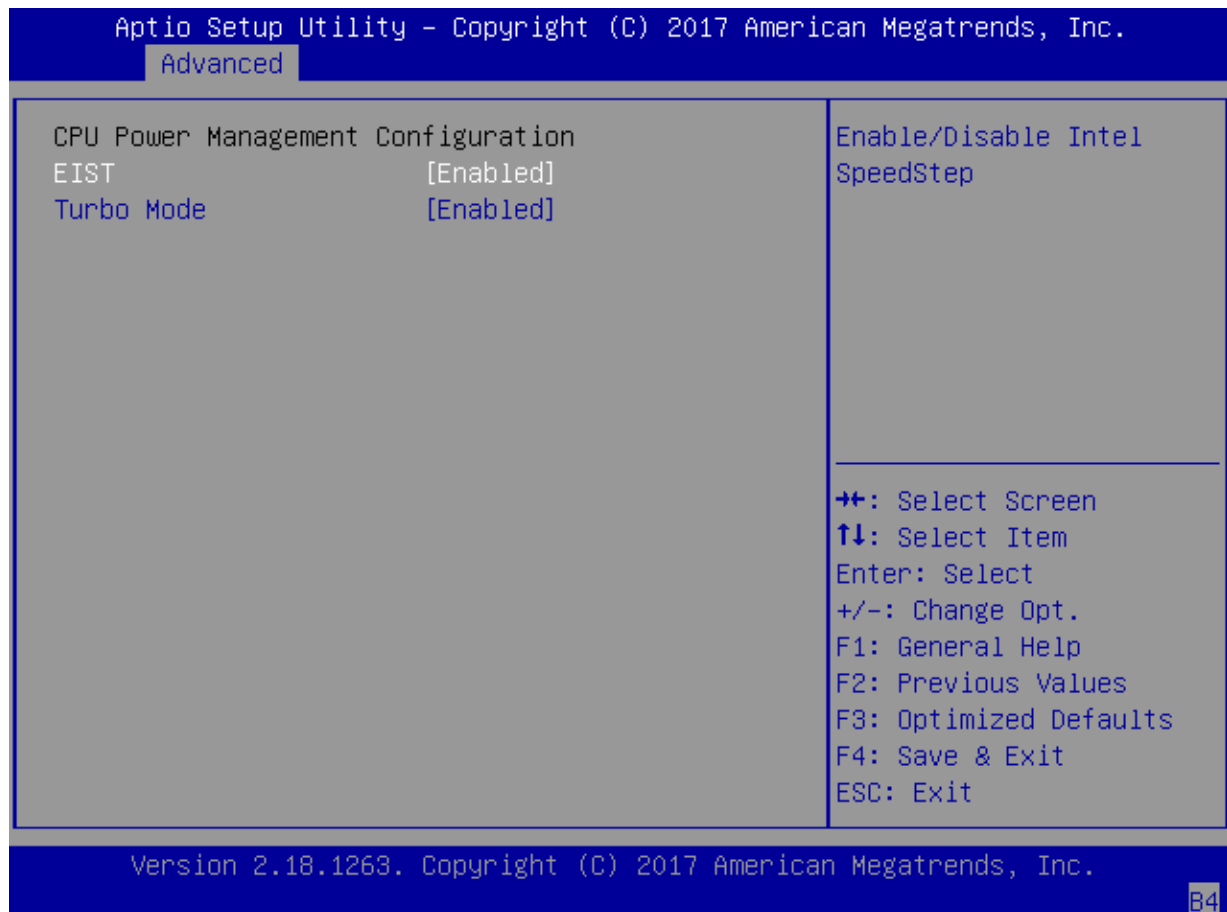
CPU Configuration

This option allows you to configure socket specific CPU information.



**Socket 0 CPU Information**

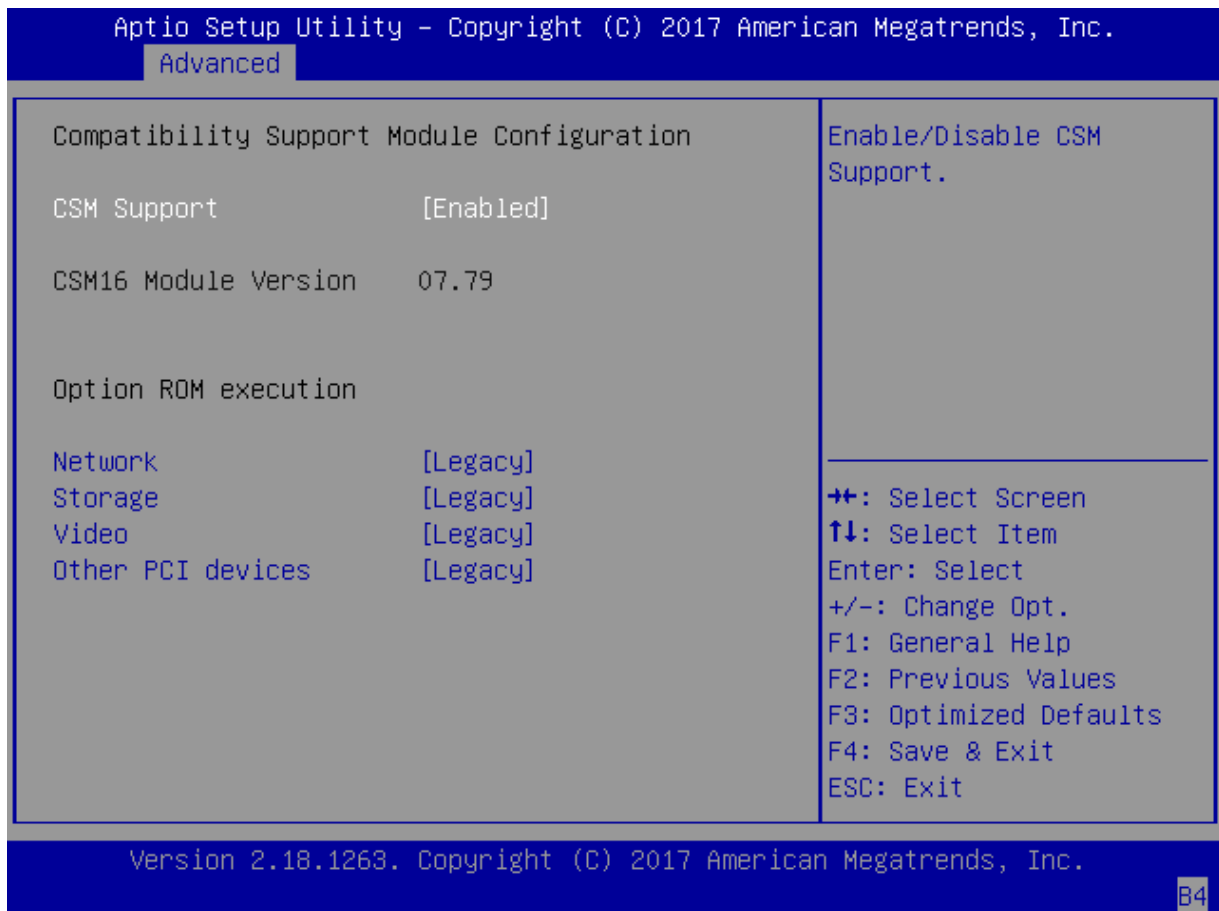
| Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.                                                                                                             |               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Advanced                                                                                                                                                                       |               |
| Socket 0 CPU Information                                                                                                                                                       |               |
| Intel(R) Celeron(R) CPU N3350 @ 1.10GHz                                                                                                                                        |               |
| CPU Signature                                                                                                                                                                  | 506C9         |
| Microcode Patch                                                                                                                                                                | 28            |
| Max CPU Speed                                                                                                                                                                  | 1100 MHz      |
| Min CPU Speed                                                                                                                                                                  | 800 MHz       |
| Processor Cores                                                                                                                                                                | 2             |
| Intel HT Technology                                                                                                                                                            | Not Supported |
| Intel VT-x Technology                                                                                                                                                          | Supported     |
| L1 Data Cache                                                                                                                                                                  | 24 kB x 2     |
| L1 Code Cache                                                                                                                                                                  | 32 kB x 2     |
| L2 Cache                                                                                                                                                                       | 1024 kB x 2   |
| L3 Cache                                                                                                                                                                       | Not Present   |
| ++: 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 |               |
| Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.                                                                                                                |               |
| AB                                                                                                                                                                             |               |

**CPU Power Management Configuration**

| Item       | Value               | Description                    |
|------------|---------------------|--------------------------------|
| EIST       | Disabled<br>Enabled | Enable/Disable Intel SpeedStep |
| Turbo Mode | Disabled<br>Enabled | Enable/Disable Turbo mode      |

## CSM Configuration

This option allows you to enable or disable ROM execution settings.

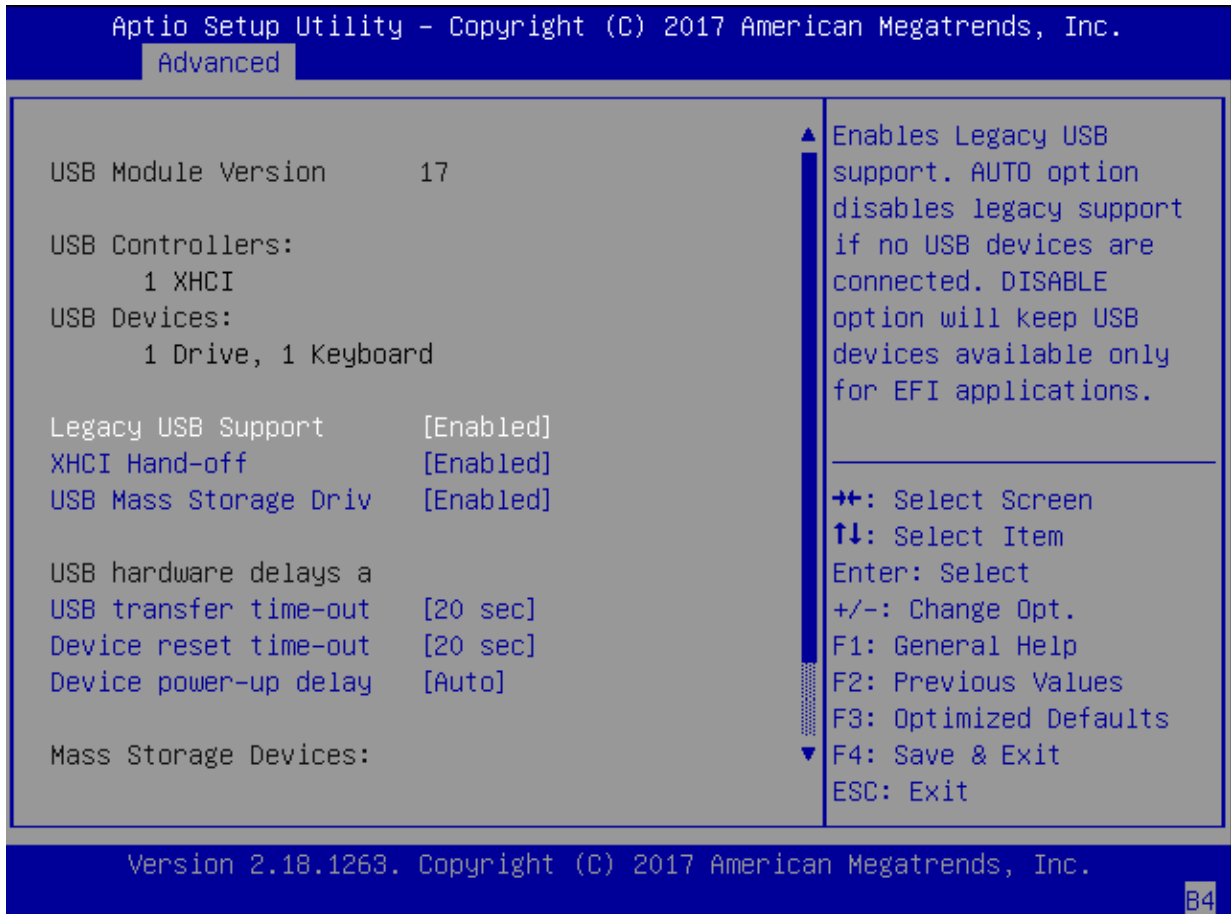


| Item             | Value                           | Description                                                                         |
|------------------|---------------------------------|-------------------------------------------------------------------------------------|
| CSM Support      | Disabled<br>Enabled             | Enable/Disable CSM Support                                                          |
| Network          | Do Not Launch<br>UEFI<br>Legacy | Controls the execution of UEFI and Legacy PXE OpROM                                 |
| Storage          | Do Not Launch<br>UEFI<br>Legacy | Controls the execution of UEFI and Legacy Storage OpROM                             |
| Video            | Do Not Launch<br>UEFI<br>Legacy | Controls the execution of UEFI and Legacy Video OpROM                               |
| Other PCI device | Do Not Launch<br>UEFI<br>Legacy | Determines OpROM execution policy for devices other than Network, Storage, or Video |

USB Configuration

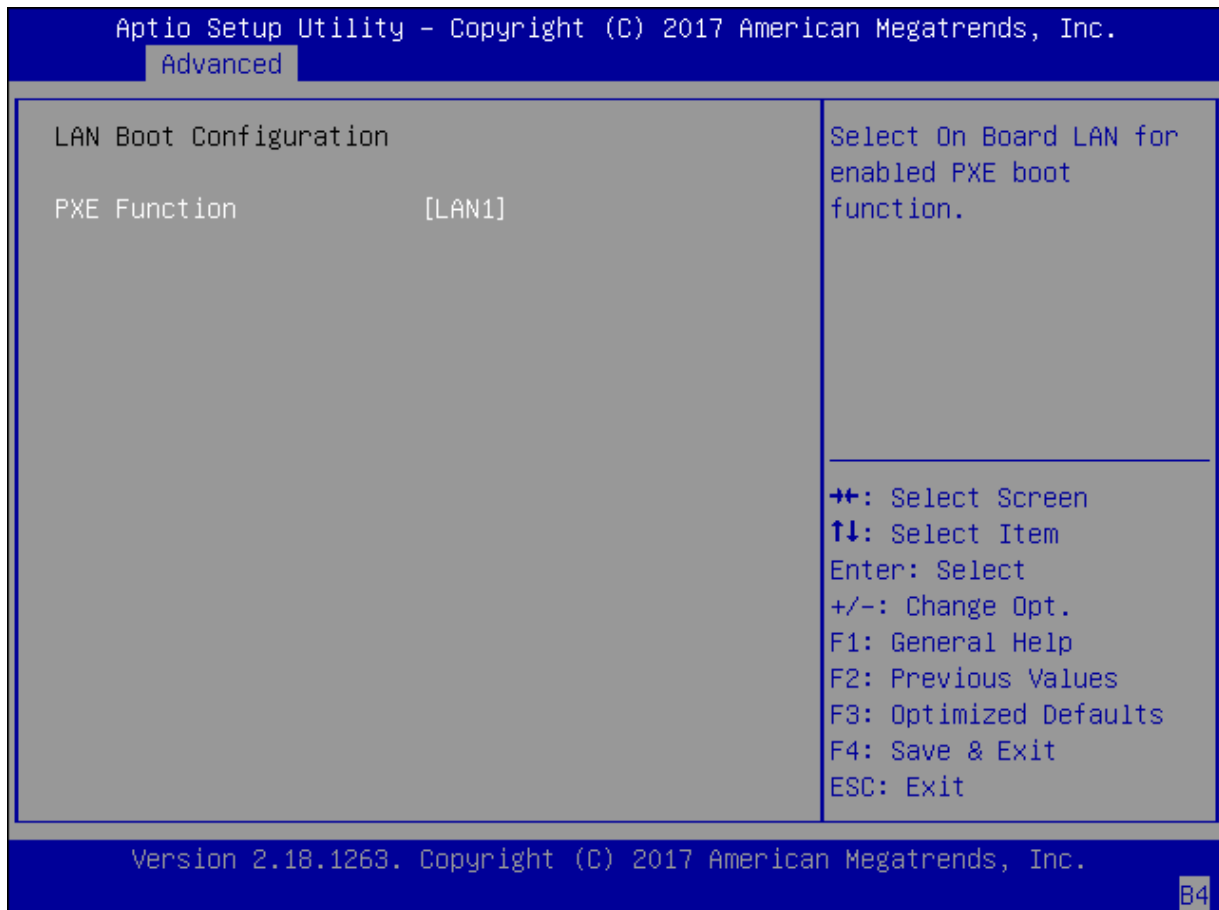
This option allows you to change USB configuration parameters.

Legacy USB Support



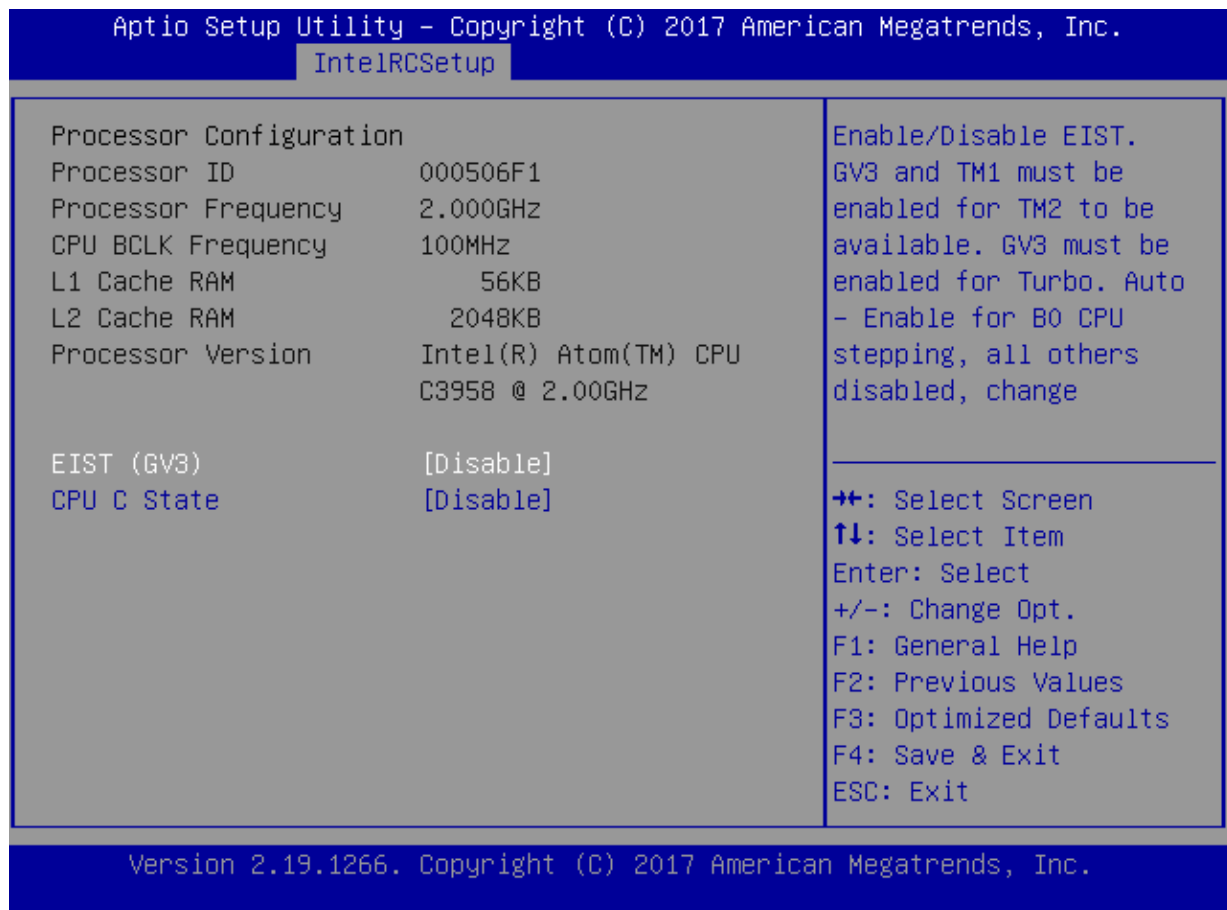
| Item               | Value                       | Description                                                                                                                                                                                 |
|--------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Legacy USB Support | Auto<br>Enabled<br>Disabled | Enables Legacy USB support. "Auto" disables legacy support if no USB devices are connected. "Disabled" will keep USB devices available only for EFI applications. The default is "Enabled". |

## LAN Boot Configuration



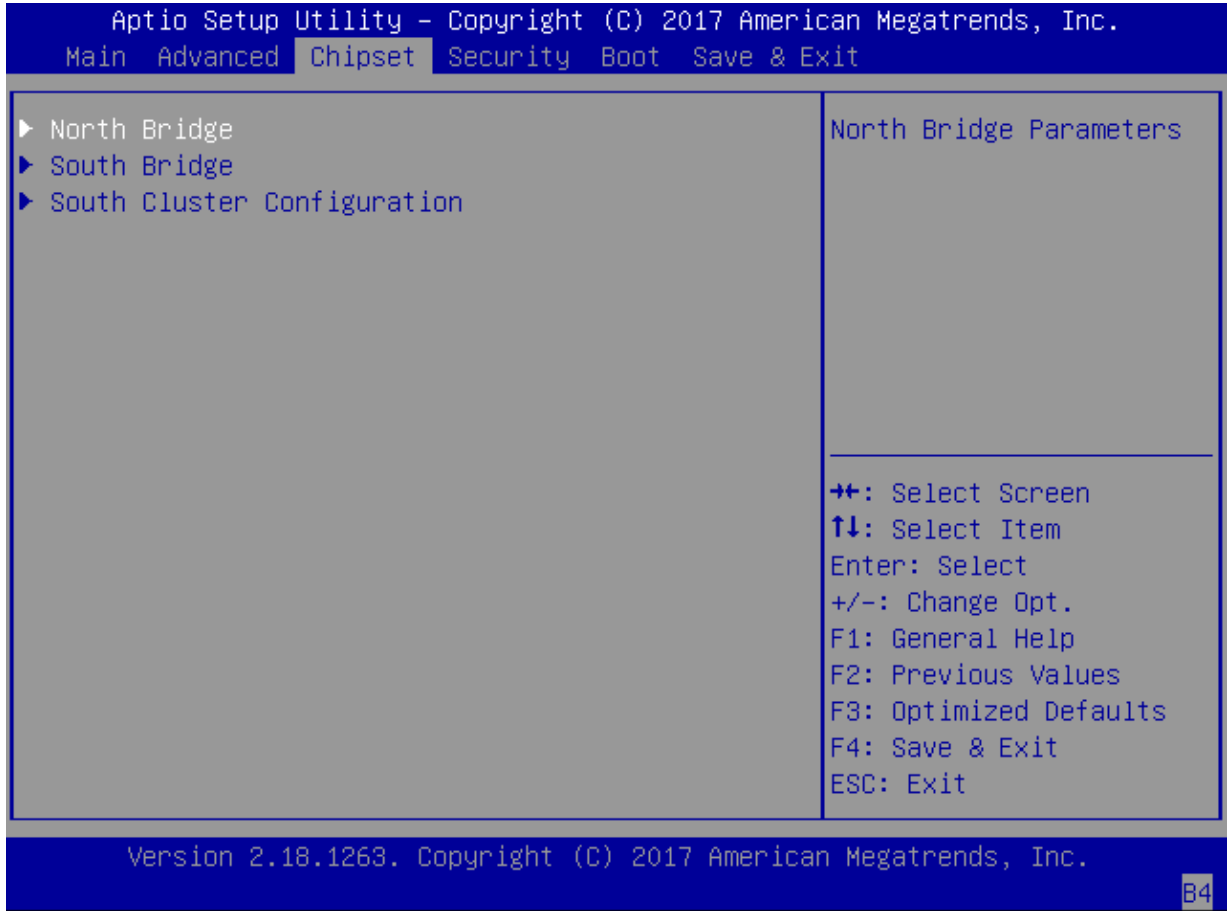
| Item         | Value            | Description                                         |
|--------------|------------------|-----------------------------------------------------|
| PXE Function | LAN1<br>Disabled | Select On-Board LAN for enabling PXE boot function. |

## Processor Configuration



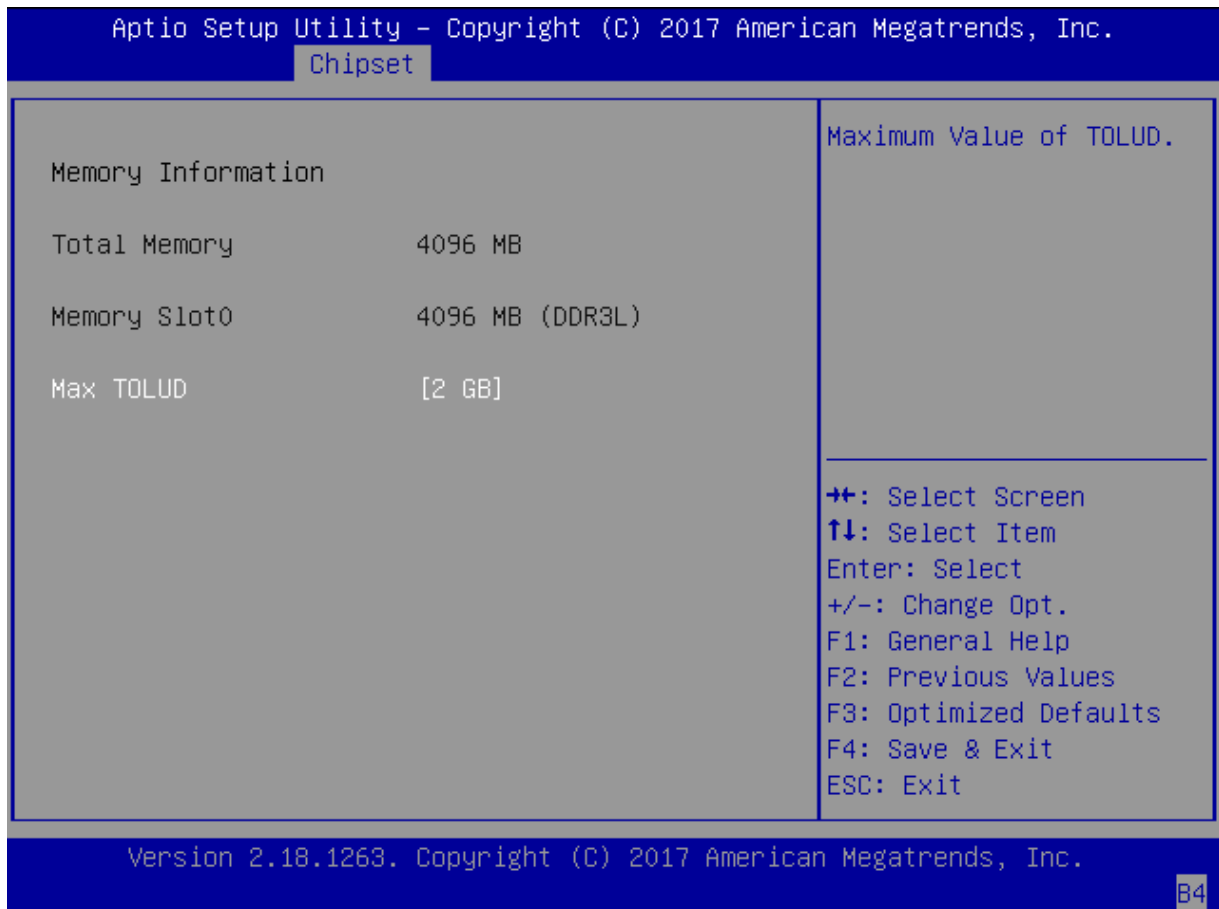
| Item        | Value               | Description                                                                                                                                                                                          |
|-------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EIST(GV3)   | Disable<br>Enabled  | Enable/Disable EIST. GV3 and TM1 must be enabled for TM2 to be available. GV3 must be enabled for <u>Turbo</u> . Auto - Enable for B0 CPU stepping, all others disabled, change setting to override. |
| CPU C State | Disabled<br>Enabled | "Enables the Enhanced Cx state of the CPU, takes effect after a reboot. Auto - Enable for B0 CPU stepping, all others disabled, change setting to override.                                          |

# Chipset



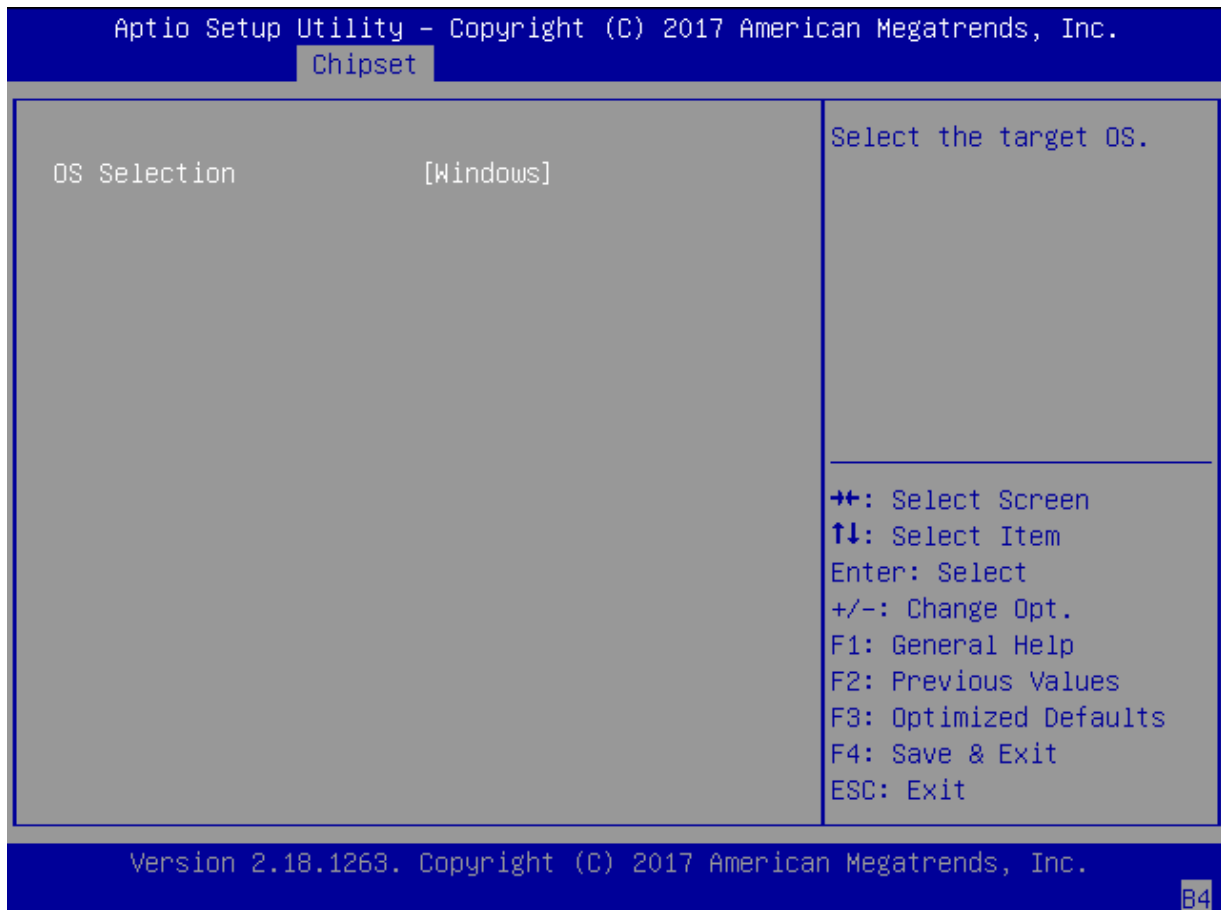
## North Bridge

This option enables or disables fast boot which skips memory training and attempts to boot using last known good configuration. The default is "Enabled".



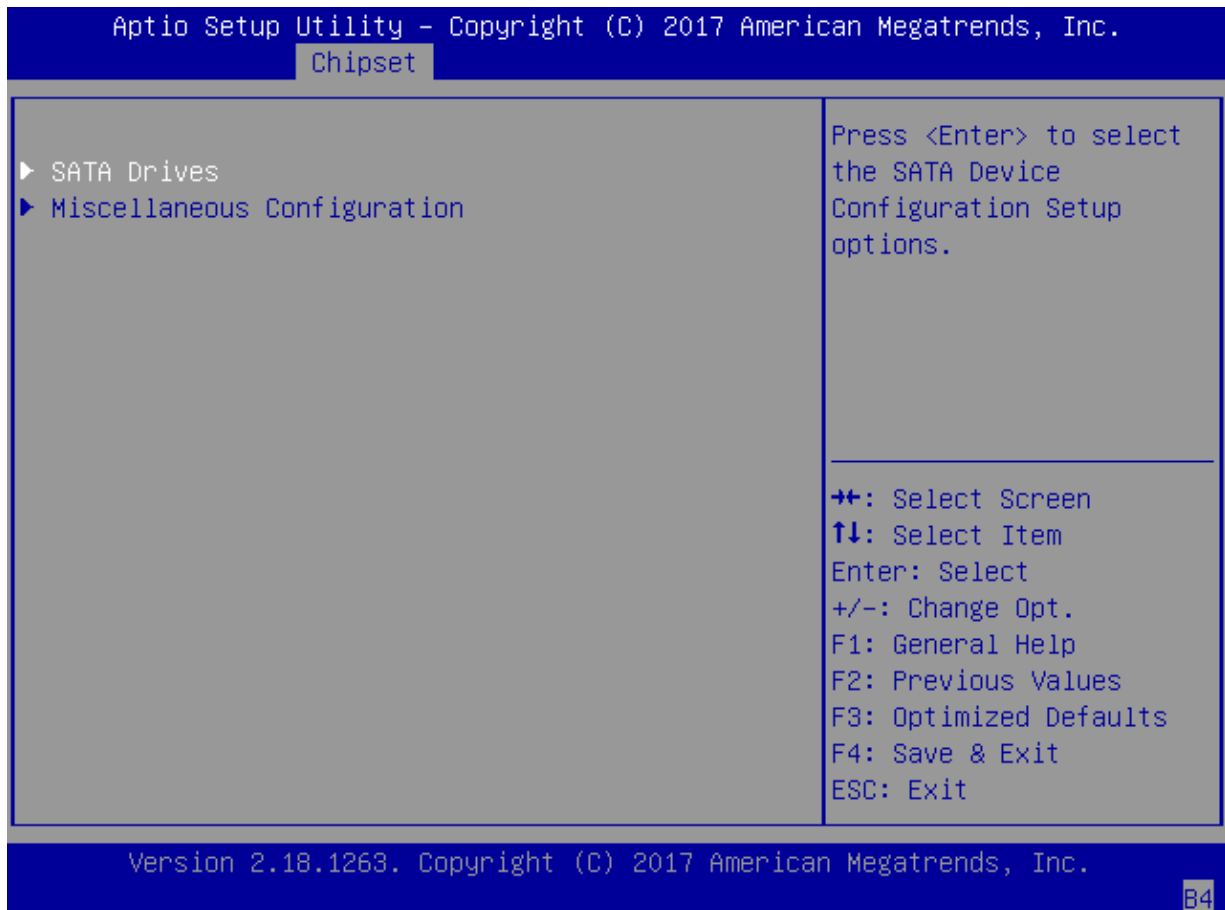
| Item      | Value   | Description            |
|-----------|---------|------------------------|
| Max TOLUD | 2 GB    | Maximum Value of TOLUD |
|           | 2.25 GB |                        |
|           | 2.5 GB  |                        |
|           | 2.75 GB |                        |
|           | 3 GB    |                        |

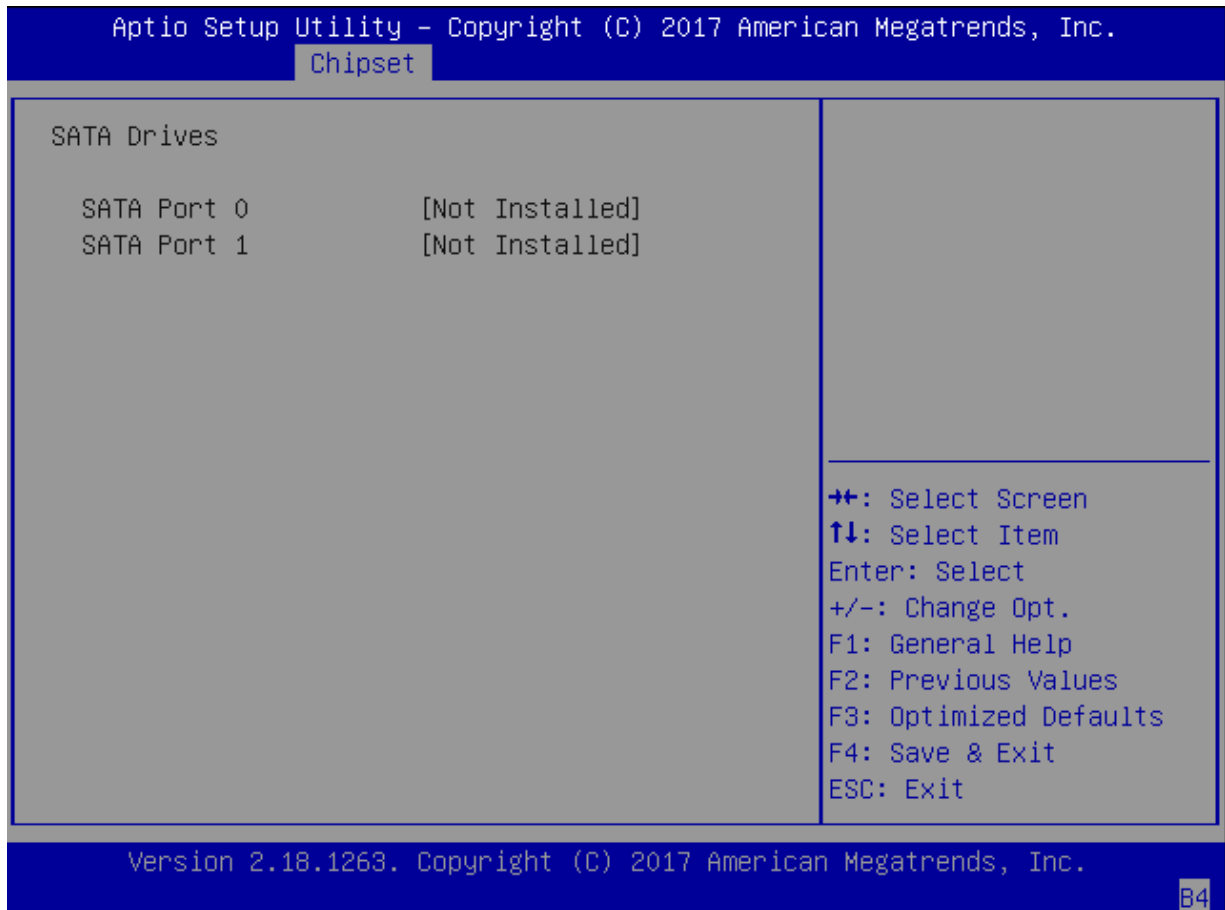
## South Bridge

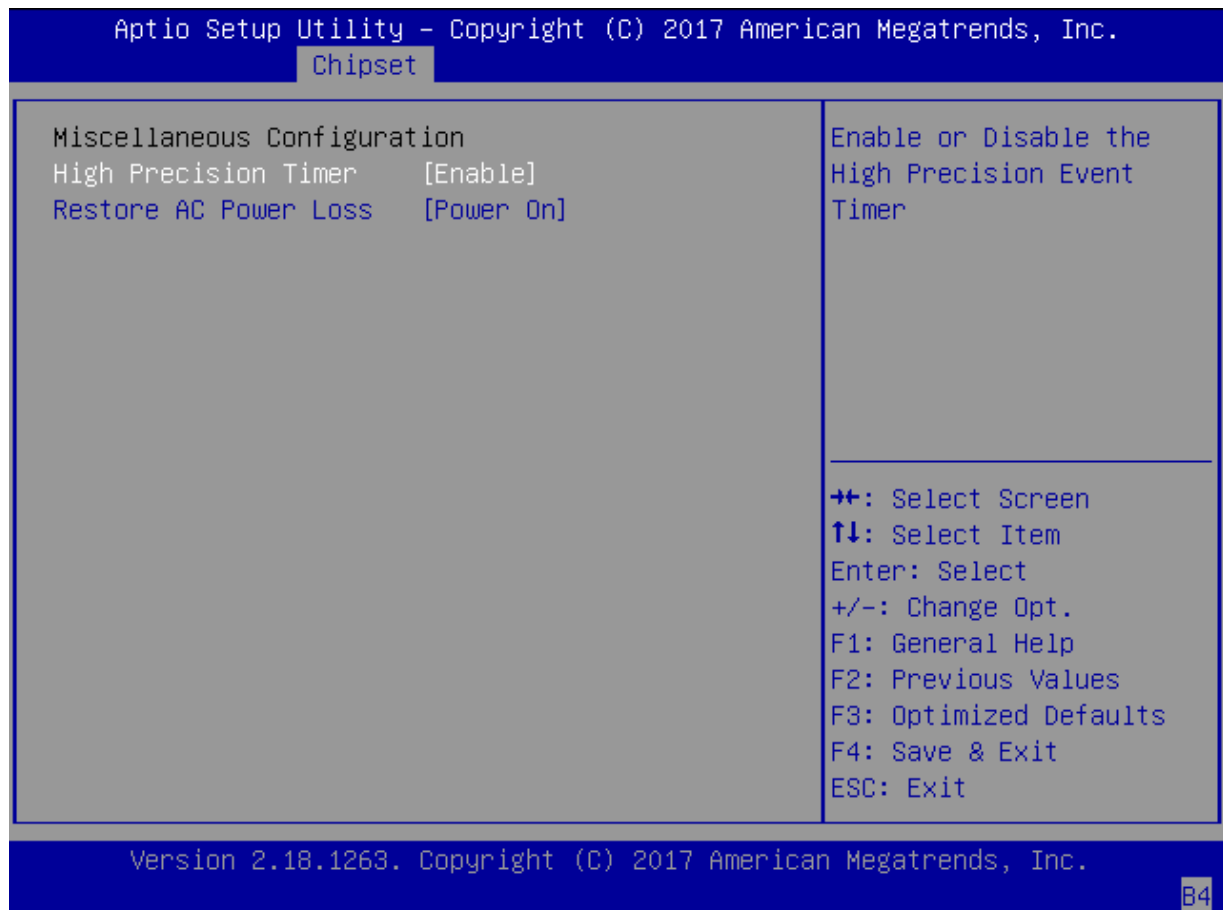


| Item         | Value                                      | Description          |
|--------------|--------------------------------------------|----------------------|
| OS Selection | Windows<br>Android<br>Win 7<br>Intel Linux | Select the target OS |

## South Cluster Configuration



**SATA Driver**

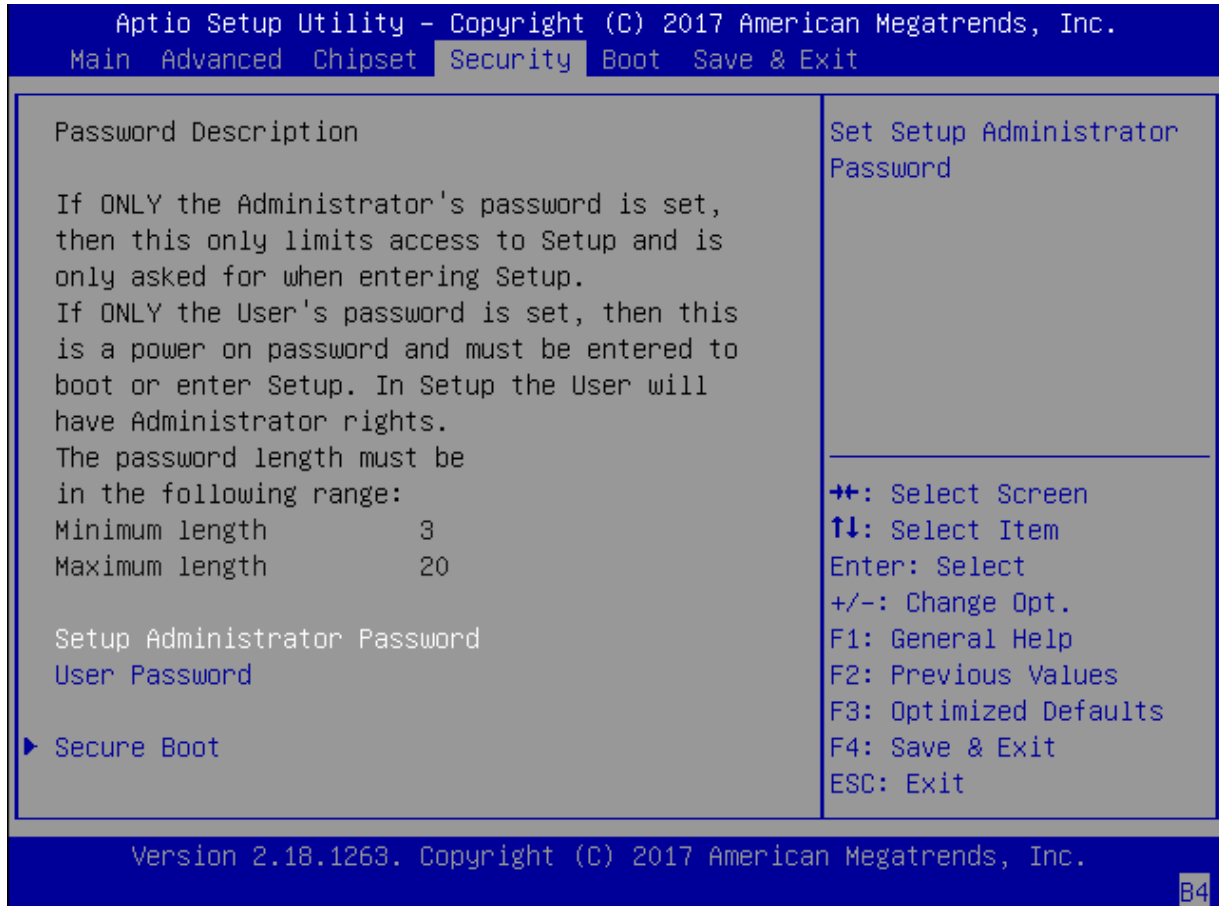
**Miscellaneous Configuration**

| Item                  | Value                               | Description                                                                                                                                          |
|-----------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| High Precision Timer  | Disabled<br>Enabled                 | Enable or Disable the High Precision Event Timer                                                                                                     |
| Restore AC Power Loss | Power On<br>Power Off<br>Last State | Specify what state to go to when power is re-applied after a power failure (G3 State). S0 state: System will boot directly as soon as power applied. |

## Security

Use [←] / [→] to select [Security] setup screen. Under this screen, you may use [↑] [↓] to select an item you would like to configure.

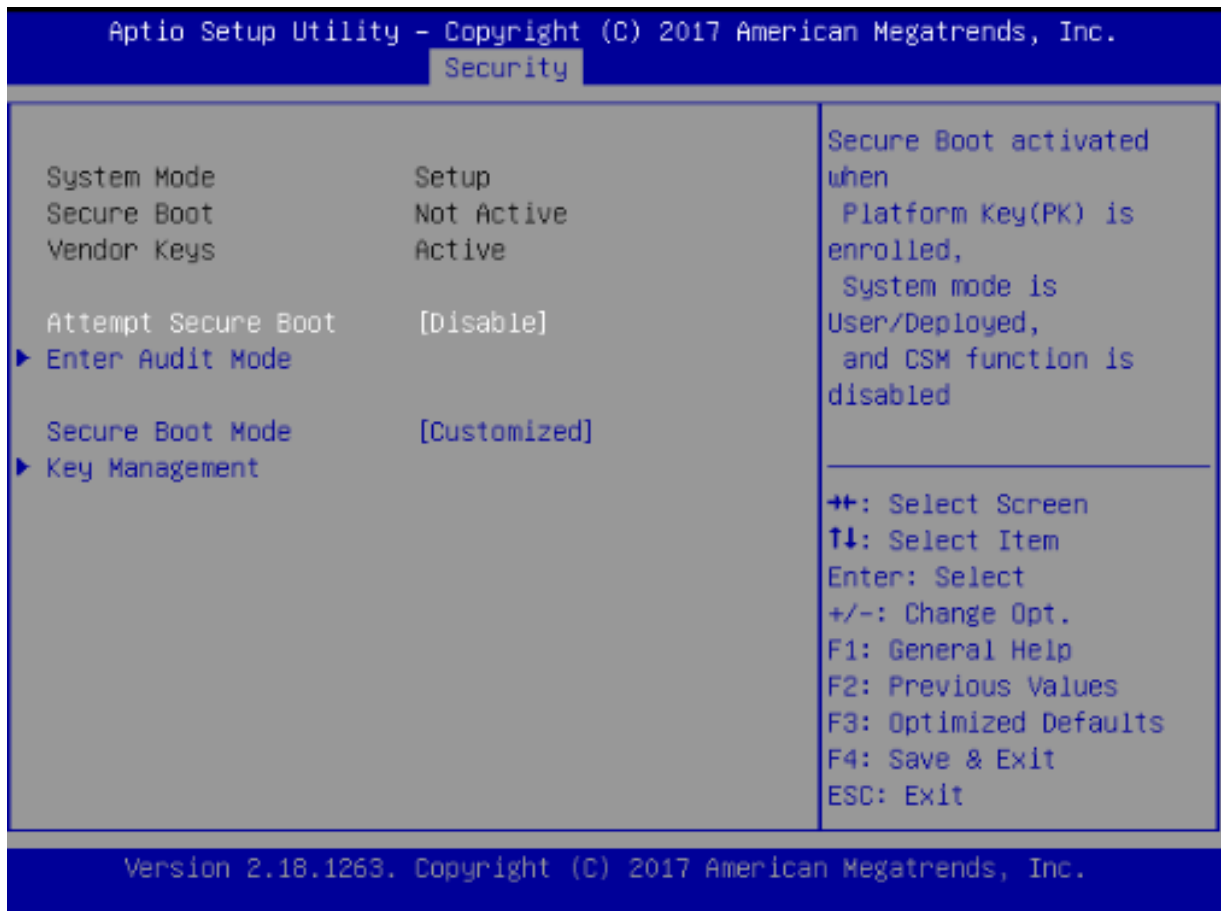
### Administrator Password & User Password:



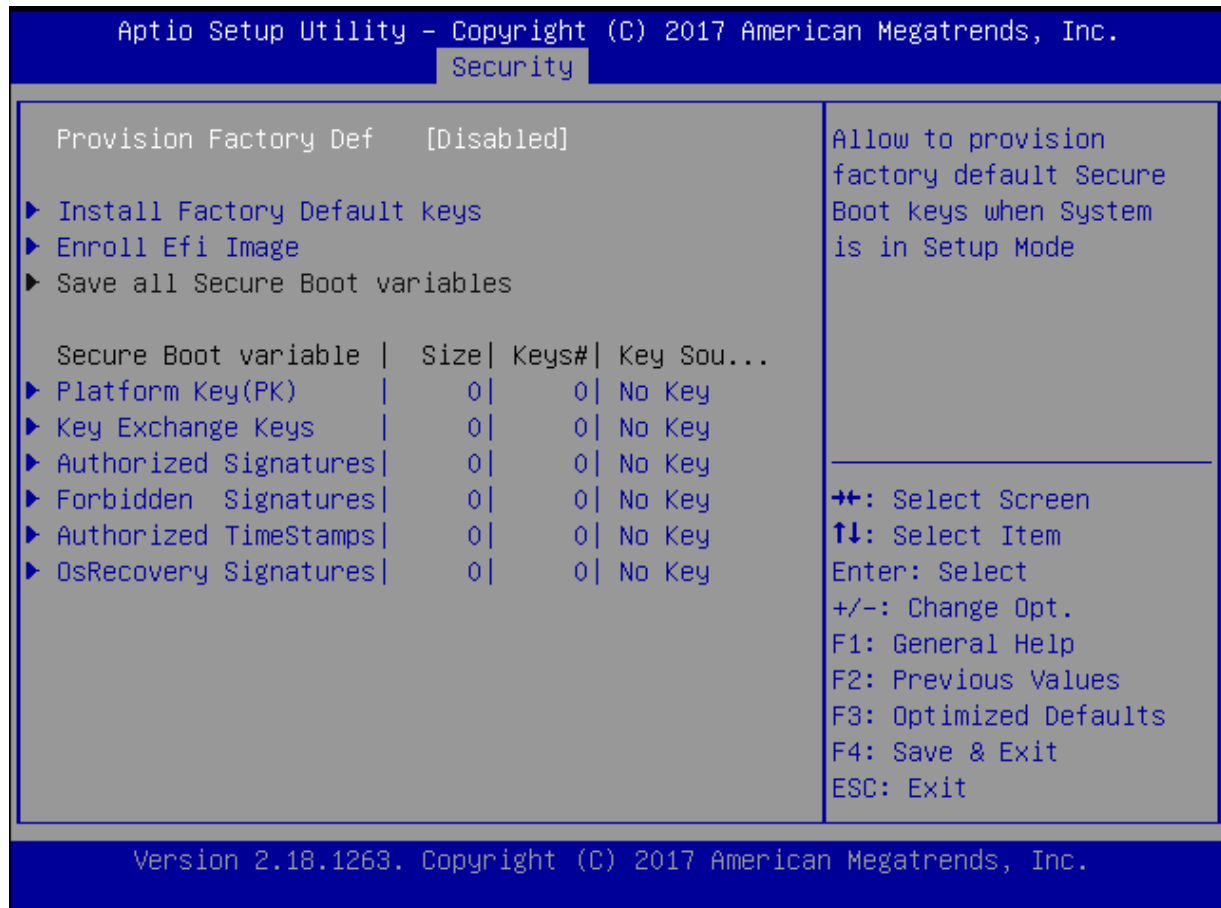
| Item                   | Description                                                                                                                                                         |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Administrator Password | If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.                                       |
| User Password          | If ONLY the User's password is set, then this is a power-on password and must be entered to boot or enter Setup. In Setup, the User will have Administrator rights. |

### Secure Boot

Enter Secure Boot page for more related settings.



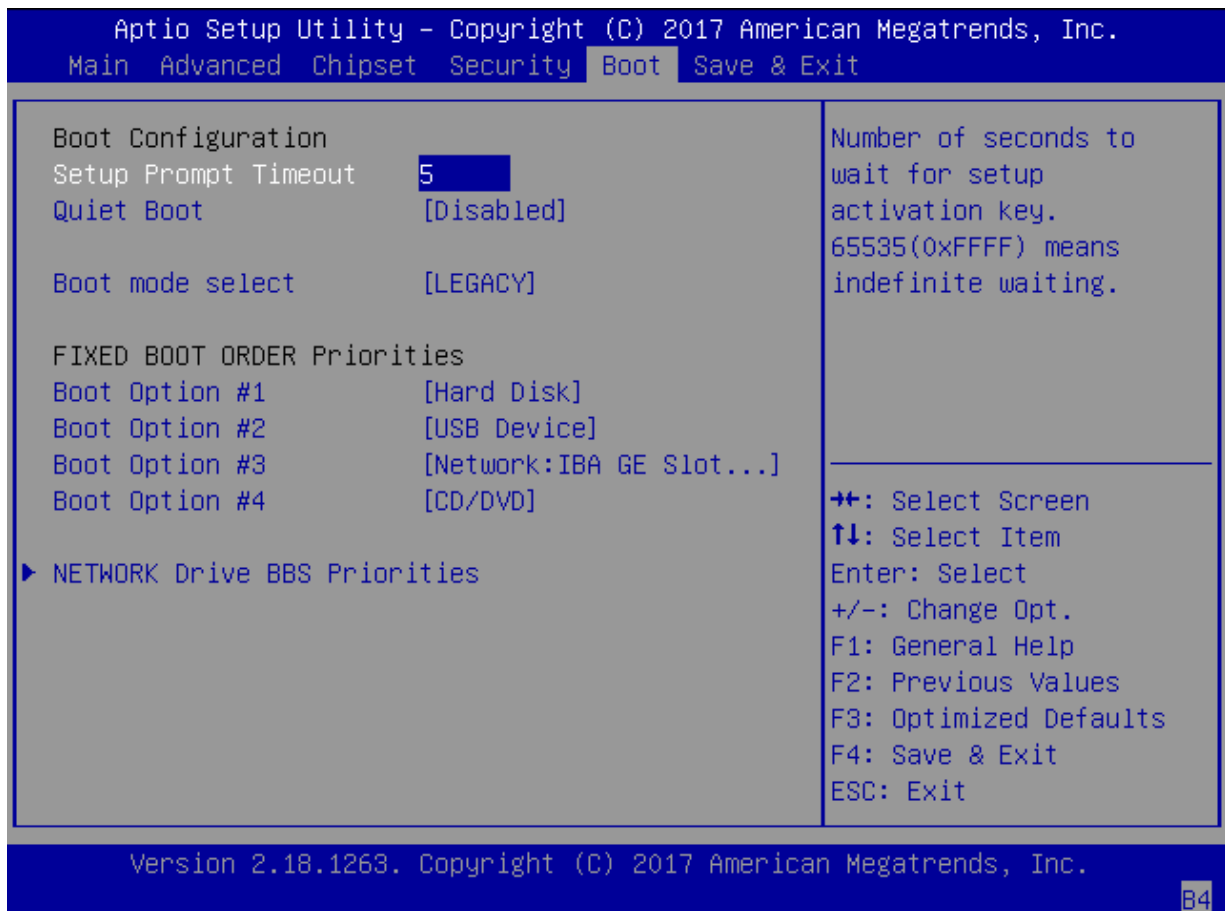
| Item                | Value               | Description                                                                                                         |
|---------------------|---------------------|---------------------------------------------------------------------------------------------------------------------|
| Attempt Secure Boot | Disabled<br>Enabled | Secure Boot activated when Platform Key(PK) is enrolled, System mode is User/Deployed, and CSM function is disabled |
| Secure Boot Mode    | Standard<br>Custom  | Secure Boot mode selector:<br>In Custom mode, Secure Boot Variables can be configured without authentication        |

**Key Management**

| Item                         | Value               | Description                                                                                                          |
|------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------|
| Provision Factory Defaults   | Disabled<br>Enabled | Allow to provision factory default Secure Boot keys when System is in Setup Mode.                                    |
| Install Factory Default keys | None                | Force System to User Mode - install all Factory Default keys                                                         |
| Enroll Efi Image             | None                | Allow the image to run in Secure Boot mode. Enroll SHA256 hash of the binary into Authorized Signature Database (db) |

## Boot Menu

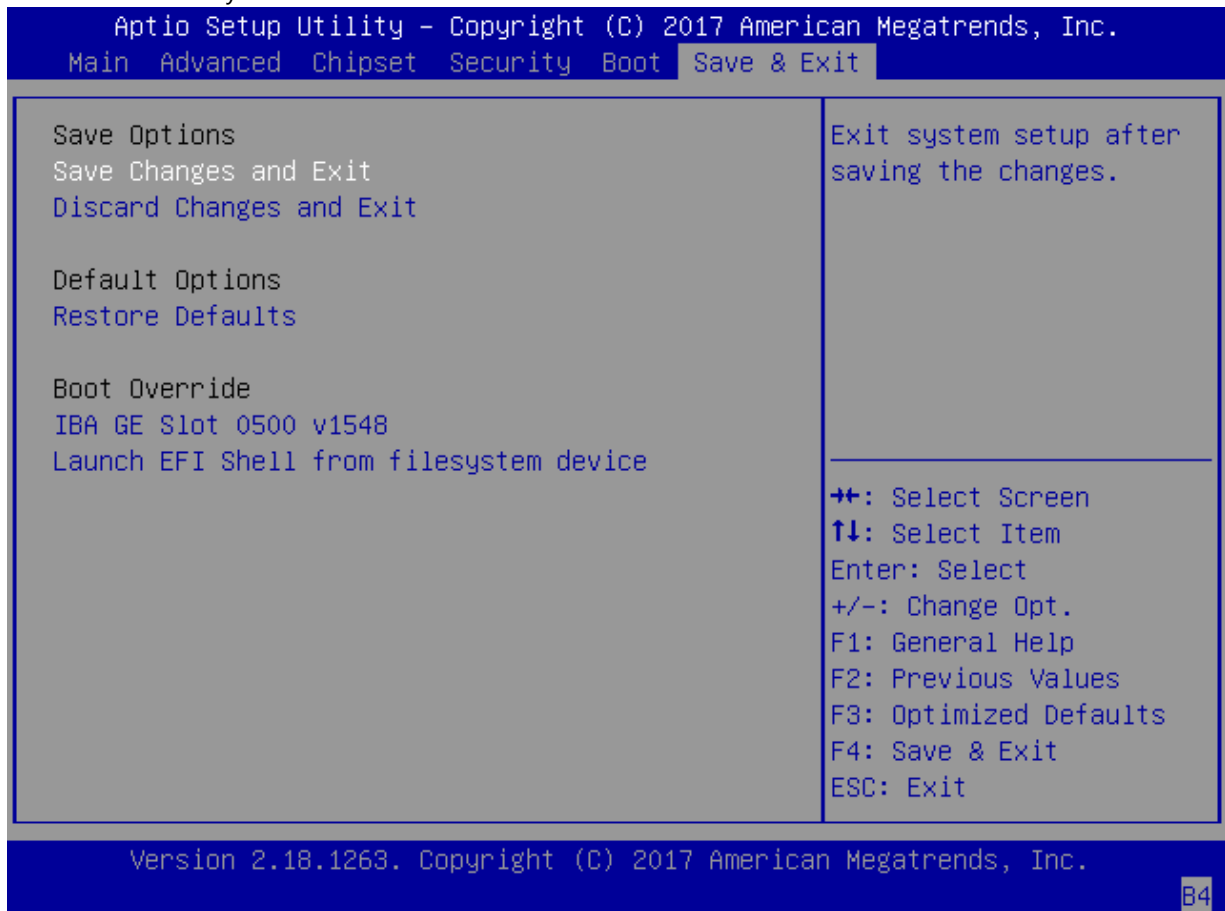
Select the Boot menu item from the BIOS setup screen to enter the [Boot] Setup screen.



| Item             | Value                      | Description                            |
|------------------|----------------------------|----------------------------------------|
| Quiet Boot       | <b>Disabled</b><br>Enabled | Enables or disables Quiet Boot option. |
| Boot mode select | <b>LEGACY</b><br>UEFI      | Select boot mode <b>LEGACY/ UEFI</b> . |

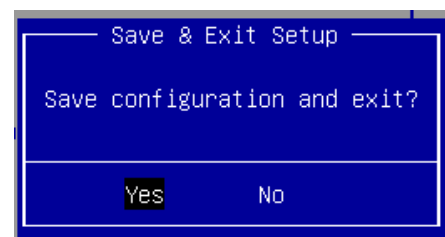
## Save and Exit Menu

Select the Save and Exit menu item from the BIOS setup screen to enter the [Save and Exit] Setup screen. Users can select any of the items in the left frame of the screen.



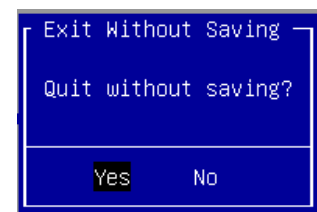
### Save Changes and Exit

When you have completed the system configuration, select this option to save the changes and Exit from BIOS Setup, so the new system configuration parameters can take effect. This window will appear after the 'Save Changes and Exit' option is selected. Select **YES** to save changes and exit Setup.



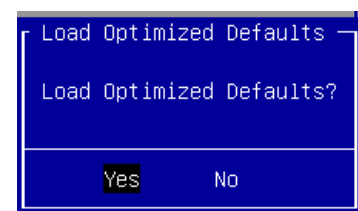
### Discard Changes and Exit

Select this option to quit Setup without saving any modifications to the system configuration. This window will appear after the 'Discard Changes and Exit' option is selected. Select **YES** to discard changes and exit Setup.



### Restore Defaults

Restore default values for all setup options. Select **YES** to load Optimized Defaults.



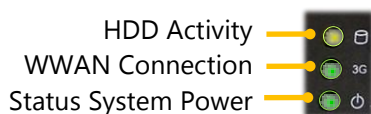
# APPENDIX A: LED INDICATOR EXPLANATIONS

The status explanations of LED indicators on Front Panel are as follows:

## Power Button

|                                                                                   |                                                                                                                             |                                                                                                                                                            |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |                                            |                                                                         |
| <b>Power-Off mode:</b><br><i>The system is not connected to any power source.</i> | <b>Stand-by mode:</b><br><i>The system is connected with power source; ready for powering up with a push on the button.</i> | <b>Power-On mode:</b><br><i>The system is powered on. Perform a graceful shutdown using the service commands to ensure that all of your data is saved.</i> |

## Status LED



### ► System Power

|                    |                                  |
|--------------------|----------------------------------|
| <i>Solid Green</i> | <i>The system is powered on</i>  |
| <i>Off</i>         | <i>The system is powered off</i> |

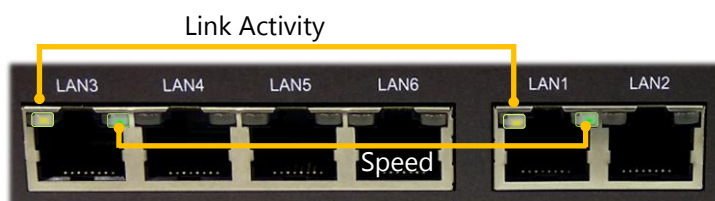
### ► WWAN Connection

|                       |                                                                      |
|-----------------------|----------------------------------------------------------------------|
| <i>Solid Green</i>    | <i>The system is connected with WWAN network.</i>                    |
| <i>Blinking Green</i> | <i>The system is transmitting/receiving data via WWAN connection</i> |
| <i>Off</i>            |                                                                      |

### ► HDD Activity

|                       |                                |
|-----------------------|--------------------------------|
| <i>Blinking Amber</i> | <i>Data access activity</i>    |
| <i>Off</i>            | <i>No data access activity</i> |

## GbE & PoE Ports



### ► Link Activity

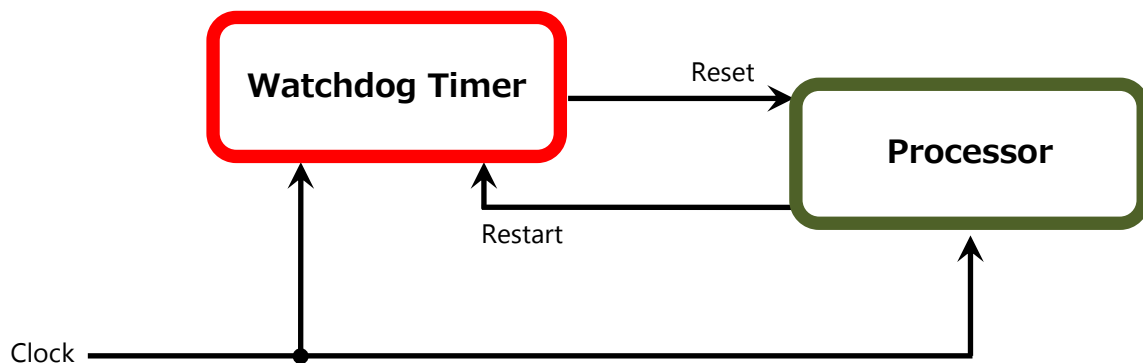
|                       |                                                                        |
|-----------------------|------------------------------------------------------------------------|
| <i>Blinking Amber</i> | <i>Link has been established and there is activity on this port</i>    |
| <i>Solid Amber</i>    | <i>Link has been established and there is no activity on this port</i> |
| <i>Off</i>            | <i>No link has been established</i>                                    |

### ► Speed

|                    |                                           |
|--------------------|-------------------------------------------|
| <i>Off</i>         | <i>Operating as a 10-Mbps connection</i>  |
| <i>Solid Green</i> | <i>Operating as a 100-Mbps connection</i> |

## APPENDIX B: PROGRAMMING WATCHDOG TIMER

A watchdog timer is a piece of hardware that can be used to automatically detect system anomalies and reset the processor in case there are any problems. Generally speaking, a watchdog timer is based on a counter that counts down from an initial value to zero. The software selects the counter's initial value and periodically restarts it. Should the counter reach zero before the software restarts it, the software is resumed to be malfunctioning and the processor's reset signal is asserted. Thus, the processor will be restarted as if a human operator had cycled the power.



To execute the utility: enter the number of seconds to start the countdown before the system can be reset.

```
wd_tst -swt xxx (Set Watchdog Timer 1-255 seconds and start to count-down)
```

```
wd_tst -stop (Stop Watchdog Timer)
```

- For a reference utility that contains sample code for watchdog function programming, please visit <http://www.lannerinc.com/support/download-center/drivers>, enter the product category and download the utility package of LEC-2137.

## APPENDIX C: SETTING UP CONSOLE REDIRECTIONS

Console redirection lets you monitor and configure a system from a remote terminal computer by re-directing keyboard input and text output through the serial port. The following steps illustrate how to use this feature. The BIOS of the system allows the redirection of the console I/O to a serial port. With this configured, you can remotely access the entire boot sequence through a console port.

1. Connect one end of the console cable to console port of the system and the other end to the serial port of the Remote Client System.
2. Configure the following settings in the BIOS Setup menu:  
**BIOS > Advanced > Serial Port Console Redirection > Console Redirection Settings**, select **115200** for the Baud Rate, **None** for Flow control, **8** for the Data Bit, **None** for Parity Check, and **1** for the Stop Bit.
3. Configure console redirection related settings on the client system. You can use a terminal emulation program that features communication with serial COM ports such as *TeraTerm* or *Putty*. Make sure the serial connection properties of the client conform to those set in Step 1 for server.

## APPENDIX D: INSTALLING INTEL® LAN CONTROLLER DRIVER FOR LINUX

To install the Intel® LAN controller base driver for the Red Hat® and Linux operating system, please visit <http://www.lannerinc.com/support/download-center/drivers>, enter the product category and download the utility package of LEC-2137.

For the latest driver update, please visit Intel® download center at <https://downloadcenter.intel.com/>, use the keyword search or the filter to access the driver's product page, and then download the latest controller driver as well as the ReadMe document.

|                         |                                                                                                                                   |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Product Name<br>Keyword | I210                                                                                                                              |
| Product Category        | Ethernet Products→ Gigabit Ethernet Controllers<br>→ Intel® Ethernet Server Adapter I210 Series                                   |
| Download Type           | Drivers                                                                                                                           |
| Operating System        | Linux*                                                                                                                            |
| Product page            | <a href="#">Intel® Network Adapter Driver for 82575/6, 82580, I350, and I210/211-Based Gigabit Network Connections for Linux*</a> |

# APPENDIX E: TERMS AND CONDITIONS

## Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after service freight charges for goods returned to the user.
3. The buyer will pay for the repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service," RMA goods will be returned at customer's expense.
5. The following conditions are excluded from this warranty:
  - ▶ Improper or inadequate maintenance by the customer
  - ▶ Unauthorized modification, misuse, or reversed engineering of the product
  - ▶ Operation outside of the environmental specifications for the product.

## RMA Service

### Requesting an RMA#

1. To obtain an RMA number, simply fill out and fax the "RMA Request Form" to your supplier.
2. The customer is required to fill out the problem code as listed. If your problem is not among the codes listed, please write the symptom description in the remarks box.
3. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
4. Mark the RMA# clearly on the box.



**Note:** Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected.

## RMA Service Request Form

When requesting RMA service, please fill out the following form. Without this form enclosed, your RMA cannot be processed.

| <b>RMA No:</b>                                                                                                        |            | Reasons to Return: <input type="checkbox"/> Repair(Please include failure details) |               |
|-----------------------------------------------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------|---------------|
|                                                                                                                       |            | <input type="checkbox"/> Testing Purpose                                           |               |
| Company:                                                                                                              |            | Contact Person:                                                                    |               |
| Phone No.                                                                                                             |            | Purchased Date:                                                                    |               |
| Fax No.:                                                                                                              |            | Applied Date:                                                                      |               |
| Return Shipping Address: _____                                                                                        |            |                                                                                    |               |
| Shipping by: <input type="checkbox"/> Air Freight <input type="checkbox"/> Sea <input type="checkbox"/> Express _____ |            |                                                                                    |               |
| <input type="checkbox"/> Others: _____                                                                                |            |                                                                                    |               |
|                                                                                                                       |            |                                                                                    |               |
| Item                                                                                                                  | Model Name | Serial Number                                                                      | Configuration |
|                                                                                                                       |            |                                                                                    |               |
|                                                                                                                       |            |                                                                                    |               |
|                                                                                                                       |            |                                                                                    |               |
|                                                                                                                       |            |                                                                                    |               |
|                                                                                                                       |            |                                                                                    |               |
|                                                                                                                       |            |                                                                                    |               |
|                                                                                                                       |            |                                                                                    |               |
|                                                                                                                       |            |                                                                                    |               |
|                                                                                                                       |            |                                                                                    |               |

| Item | Problem Code | Failure Status |
|------|--------------|----------------|
|      |              |                |
|      |              |                |
|      |              |                |
|      |              |                |
|      |              |                |
|      |              |                |
|      |              |                |
|      |              |                |

**\*Problem Code:**

|                    |                              |                    |                          |
|--------------------|------------------------------|--------------------|--------------------------|
| 01:D.O.A.          | 07: BIOS Problem             | 13: SCSI           | 19: DIO                  |
| 02: Second Time    | 08: Keyboard Controller Fail | 14: LPT Port       | 20: Buzzer               |
| R.M.A.             | 09: Cache RMA Problem        | 15: PS2            | 21: Shut Down            |
| 03: CMOS Data Lost | 10: Memory Socket Bad        | 16: LAN            | 22: Panel Fail           |
| 04: FDC Fail       | 11: Hang Up Software         | 17: COM Port       | 23: CRT Fail             |
| 05: HDC Fail       | 12: Out Look Damage          | 18: Watchdog Timer | 24: Others (Pls specify) |
| 06: Bad Slot       |                              |                    |                          |

***Request Party***

***Confirmed By Supplier***

\_\_\_\_\_  
Authorized Signature / Date

\_\_\_\_\_  
Authorized Signature / Date