# EMS-SKLU Series

**6th Gen Intel® Core™ Processor i7/i5/i3/Celeron Fanless Rugged Embedded System**

# Quick Reference Guide

**9th Ed –17 March 2022**



Part No. E2017AAG0ACR

## FCC Statement

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

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

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

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

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

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

## A Message to the Customer

### *Avalue Customer Services*

Each and every Avalue's product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Avalue device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Avalue has come to be known.

Your satisfaction is our primary concern. Here is a guide to Avalue's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

### *Technical Support*

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. So please consult the user's manual first.

To receive the latest version of the user's manual; please visit our Web site at:

http://www.avalue.com.tw/

# Content

# 1. Getting Started

## 1.1 Safety Precautions

**Warning!**

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

**Caution!**

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

## 1.2 Packing List

- 1 x EMS-SKLU/EMS-SKLU-Marine 6th Gen Intel® Core™ Processor i7/i5/i3/Celeron Fanless Rugged Embedded System
- Other major components include the followings:
  - 44 Pin Multi I/O Cable
  - Wall Mount Kit
  - Terminal Block to Lockable DC Jack cable
  - DP to VGA Converter
  - 60W/120W adapter (optional)
  - Power cord (optional)

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

## 1.3 System Specifications

| System | |
|---|---|
| **Board** | • EBM-SKLUS **(EMS-SKLU)**<br><br>**With IET Extension Board**<br>• EBM-SKLUS +AUX-M01 **(EMS-SKLU-6 COM)**<br>• EBM-SKLUS +IET-BYPASS **(EMS-SKLU-6 LAN Bypass)**<br>• EBM-SKLUS +IET-Normal LAN **(EMS-SKLU- 6 LAN Normal)**<br>• EBM-SKLUS +IET-PSEBF **(EMS-SKLU-PSEBF)**<br>• EBM-SKLUS +IET-PSEBT **(EMS-SKLU-PSEBT)**<br>• EBM-SKLUS +AUX-M07 **(EMS-SKLU-4 COM Isolation)**<br>• EBM-SKLUS +EBM-BYTS DB-A **(EMS-SKLU-HDMI)**<br>• EBM-SKLUS +EBM-CDVS DB-A **(EMS-SKLU-DVI)**<br>• EBM-SKLUS +EBM-BYTS DB-E **(EMS-SKLU-USB)**<br>• EBM-SKLUS +AUX-M08 **(EMS-SKLU-GPIO)**<br><br>**Marine Version**<br>• EBM-SKLUS+AUX-M07+ EBM-CDVS DB-B B1 **(EMS-SKLU-Marine)** |
| **CPU** | • Intel® Core™ i7-6600U Processor (4M Cache, up to 3.40 GHz)<br>• Intel® Core™ i5-6300U Processor (3M Cache, up to 3.00 GHz)<br>• Intel® Core™ i3-6100U Processor (3M Cache, 2.30 GHz)<br>• Intel® Celeron® Processor 3955U (2M Cache, 2.00 GHz) |
| **BIOS** | • AMI UEFI BIOS 128 Mbit SPI Flash ROM |
| **I/O Chip** | • EC ITE IT8528E |
| **System Memory** | • One 260-pin SODIMM Socket Up to 16GB DDR4 2133MHz SDRAM |
| **Watchdog Timer** | • H/W Reset, 1sec. ~ 65535sec. |
| **H/W Status Monitor** | • CPU & system temperature monitoring and Voltages monitoring |
| **Battery** | • Horizontal battery socket<br>• Supports wide operating temperature (adjusting according to test result)<br>• Supports no RTC battery mode |
| **Expansion** | • IET interface (1 x DP, 4 x PCIex1, 3 x USB, 1 x LPC, 1 x Line-Out(R/L), 1 x SMBus)<br>• 1 x mini-PCIe Socket, supports PCIe, USB 2.0 and SIM Card slot<br>• 1 x M.2, supports B-Key 2242/3042 and SIM Card slot (SSD & 3G/4G) |
| **Storage** | |
| **Combination** | • 1 x 2.5” Drive Bay<br>• 1 x M.2 B-Key 2242/3042 |

| | |
|---|---|
| **Others** | • support TPM2.0 (default), RAID 0/1 |
| **Front Side External I/O** | |
| **I/O Connector** | • 1 x Dual deck USB connector for two USB 3.0 ports (USB 2.0 signal included)<br>• 1 x Swappable 2.5” drive bay (SATA III, 2A, 12mm)<br>• 2 x SIM Card Slot (Mini PCIe, M.2)<br>• 1 x Push Button for Power on/off (Sunk type)<br>• 1 x Push Button for Reset (Hidden Type)<br>• 1 x 2-Pin Terminal Block for wire-control power on/off<br>• 1 x Power LED (Green)<br>• 1 x Storage LED (Green) |
| **Rear Side External I/O** | |
| **COM** | • 2 x COM(RS 232/ 422/ 485(4-wire) selectable by Jumper; RS 485 supports Auto Flow**(EMS-SKLU, EMS-SKLU-6 LAN Bypass, EMS-SKLU-6 LAN Normal, EMS-SKLU-PSEBF, EMS-SKLU-PSEBT, EMS-SKLU-DVI, EMS-SKLU-USB, EMS-SKLU-GPIO)**<br>• 6 x COM (RS 232/ 422/ 485(4-wire) selectable by Jumper; RS 485 supports Auto Flow **(EMS-SKLU-6COM)**<br>• 6 x COM (RS 232/ 422/ 485(4-wire) selectable by Jumper; RS 485 supports Auto; COM3 ~ COM6 Supported 2.5kv Isolation) **(EMS-SKLU-4COM Isolation)**<br>• 4 x COM (C RS 232/ 422/ 485(4-wire) selectable by Jumper; RS 485 supports Auto) **(EMS-SKLU-HDMI)** |
| **LAN** | • 2 x Giga LAN **(EMS-SKLU, EMS-SKLU-DVI ,EMS-SKLU-6 COM, EMS-SKLU-4 COM Isolation, EMS-SKLU-Marine, EMS-SKLU-USB)**<br>• 4 x Giga LAN **(EMS-SKLU-HDMI)**<br>• 4 x Giga LAN ( 2 port Powered LAN support IEEE802.at **(EMS-SKLU-PSEBT)**<br>• 6 x Giga LAN (**EMS-SKLU-6 LAN Bypass, EMS-SKLU-6 LAN Normal)**<br>• 6 x Giga LAN (4 port Powered LAN support IEEE802.af) **(EMS-SKLU-PSEBF, EMS-SKLU-GPIO)** |
| **Display** | • 1 x DP+ 1.2 **(EMS-SKLU, EMS-SKLU-6 COM, EMS-SKLU-6 LAN Bypass, EMS-SKLU-6 LAN Normal, EMS-SKLU-4 COM Isolation, EMS-SKLU-PSEBF, EMS-SKLU-PSEBT,EMS-SKLU-Marine, EMS-SKLU-USB, EMS-SKLU-GPIO)**<br>• 1 x DP+ 1.2, 1 x DVI (**EMS-SKLU-DVI)**<br>• 1 x DP+ 1.2, 1 x HDMI **(EMS-SKLU-HDMI)**<br>(DP+ =DP to VGA converter is the standard accessory, and optional DP to DVI, DP to HDMI converters) |
| **Audio** | • 1 x Line-IN |

<table>
<tr><td></td><td>

- 1 x Mic-IN
- 1x Line-Out

</td></tr>
<tr><td>GPIO</td><td>

- 1 x 44bit GPIO
  (1 x 12bit GPIO, 6-bits for input and 6-bit for output + 1 x 32bit GPIO support 1.5KV isolation.) **(EMS-SKLU-GPIO)**

2 x 18-Pin Terminal Block for GPIO
-Supports 16-bit GPI & 16-bit GPO
-Supports 1.5KV Isolation

<table>
<tr><th>Input (DI)</th><th>Output (DO)</th></tr>
<tr><td>Input Channels: 16, source type<br>Input Voltage: 0~30Vdc input<br>Dry Contacts:<br>Logic Level 0: Close to GND<br>Logic Level 1: Open<br>Wet Contacts:<br>Logic level 0: +10V to 24V<br>Logic Level 1: +3V Max</td><td>Output Channels: 16, sink type.<br>Output Current: Max 250 mA Per channel<br>External voltage 10 to 30Vdc, open collector to 30V</td></tr>
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</td></tr>
<tr><td>USB</td><td>

- 4 x USB 3.0 (Rear 2; Front 2) **(EMS-SKLU)**
- 6 x USB 2.0/ 3.0 (Rear 4; Front 2) (**EMS-SKLU-HDMI, EMS-SKLU-DVI ,EMS-SKLU-6 COM, EMS-SKLU-6 LAN Bypass, EMS-SKLU-6 LAN Normal, EMS-SKLU-4 COM Isolation, EMS-SKLU-PSEBF, EMS-SKLU-PSEBT,EMS-SKLU-Marine)**
- 11 x USB2.0/ 3.0 (Rear 9, USB 3.0 x 6 + USB 2.0 x 3; Front 2) **(EMS-SKLU-USB)**
- 3 x USB 2.0/3.0 (USB 3.0 x 2 + USB 2.0 x 1) **(EMS-SKLU-GPIO)**

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<tr><td>SIM</td><td>

- 2 x SIM Card Slot

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<tr><td>SMBUS</td><td>

- 1 x SMBUS

</td></tr>
<tr><td>PS/2</td><td>

- 2 x PS/2

</td></tr>
<tr><td>Power Input</td><td>

- 1 x 3-Pin Terminal Block for DC-Input

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<tr><td>Antenna</td><td>

- 2 x Antenna mounting w/ cover

</td></tr>
<tr><td colspan="2">Internal I/O Connector</td></tr>
<tr><td>I/O Connector</td><td>

- 1 x 7+15-pin SATAIII connector (2A)
- 1 x 4-pin wafer connector for +5V, +12V and GND output.
- 1 x 6-Pin wafer connector for DC-OUT
- 1 x 3-pin header for CMOS (protect*Clear)
- 2 x 2 x 3-pin header for COM1/ 2 pin 9 signal selection (+5, +12, Ring)
- 1 x 2 x 7-pin header for LPC
- 1 x 2 x 3-Pin header for SPI

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|---|---|
| | • 1 x 3-pin DIP Switch for Power mode (AT/ATX)<br>• 1 x Buzzer<br>• 1 x 1 x 5-Pin header for 1 x USB 2.0 reservation<br>• 1 x 3-pin for EC |
| **Display** | |
| **Chipset** | • Intel® Skylake Processor integrated Graphics |
| **Resolution** | • 1 x DP+ 1.2<br>• One Panel Display max. 4096x2304@60Hz<br>• DP to VGA will be the standard accessory<br>• DP to DVI-I and DP to HDMI will be the optional accessory |
| **Ethernet** | |
| **Chipset** | • 1 x Intel I211AT GbE controller<br>• 1 x Intel I219LM Gigabit Ethernet PHY |
| **Ethernet Interface** | • 10/100/1000 Base-Tx GbE compatible |
| **Audio** | |
| **Chipset** | • Realtek ALC888S HD codec |
| **Audio Interface** | • Mic-In, Line-In and Line-Out |
| **Mechanical & Environmental** | |
| **Power Requirement** | • DC +9V ~ +32V (±0%), wide voltage single power input<br>• TVS component for surge protection<br>• Reverse current/voltage protection |
| **ACPI** | • Single power ATX Supports S0, S3, S4, S5<br>• Compliant with ACPI 5.0 |
| **Power Connector Type** | • 3-Pin Terminal Block (V+, V-, Ground) |
| **Power Mode** | • AT/ATX (ATX is the default setting) |
| **Dimension** | • 240mm x 151.5mm x 45mm **(EMS-SKLU)**<br>• 240mm x 151.5mm x 60mm **(EMS-SKLU-6 COM, EMS-SKLU-6 LAN Bypass, EMS-SKLU-6 LAN Normal, EMS-SKLU-PSEBF, EMS-SKLU-PSEBT, EMS-SKLU-4 COM Isolation, EMS-SKLU-HDMI, EMS-SKLU-DVI, EMS-SKLU-USB)**<br>• 240mm x 151.5mm x 75mm **(EMS-SKLU-Marine, EMS-SKLU-GPIO)** |
| **Weight** | • 3 Kg |
| **Color** | • Black |
| **Mounting Kit** | • Wall mount kit (Standard)<br>• Din Rail mount kit (Optional) |
| **Reliability** | |
| **CE/FCC** | • CE & FCC Class A w/ERP |
| **Safety** | • Avalue Standard Test Criteria |

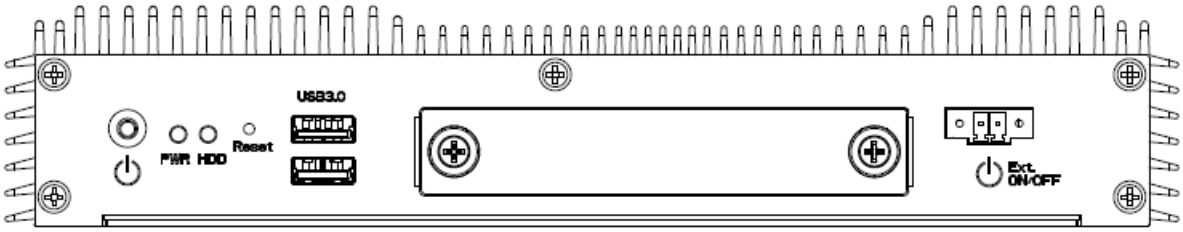
| | |
|---|---|
| **Dust and Rain Test** | • IP50 |
| **Vibration Test** | • With SSD : 5Grms, IEC 60068-2-64, Random, 5 ~ 500Hz, 1hr/axis |
| **Mechanical Shock Test** | • With SSD : 50Grms, IEC 60068-2-27, Half Sine, 11ms |
| **Drop Test** | • Avalue Standard Test Criteria |
| **Operating Temperature** | • [Group 1]<br>-20°C ~ 60°C (w/SSD) ambient w/ air flow<br>0°C ~ 40°C (w/HDD) ambient w/ air flow<br>**(EMS-SKLU, EMS-SKLU-6 COM, EMS-SKLU-6 LAN Bypass, EMS-SKLU-6 LAN Normal, EMS-SKLU-4 COM Isolation, EMS-SKLU-HDMI, EMS-SKLU-DVI,EMS-SKLU-Marine, EMS-SKLU-USB)**<br>• [Group 2]<br>-20°C ~ 50°C (w/SSD) ambient w/ air flow<br>0°C ~ 40°C (w/HDD) ambient w/ air flow<br>**(EMS-SKLU-PSEBF, EMS-SKLU-PSEBT, EMS-SKLU-GPIO)**<br>The default setting of turbo boost technology is enabled in BIOS.<br>• The processor frequency will be floating between base and turbo frequencies when turbo boost technology is enabled. |
| **Operating Humidity** | • 5% ~ 90% relative humidity, non-condensing |
| **Storage Temperature** | • -40°C ~ 85°C |
| **Other Request** | • IEC-60945 certified w/ EPM1718 Marine power board (Protected from the weather (formerly class B)) |
| **Compliant with following Flexible IET Expansion Modules** | |
| **IET-6 LAN Bypass** | • 4 x LAN support 2-Pair LAN bypass + 2 x USB 2.0 |
| **IET-6 LAN Normal** | • 4 x normal LAN + 2 x USB 2.0 |
| **IET-PSEBF** | • 4 x LAN support PoE 802.3af + 2 x USB 2.0 |
| **IET-PSEBT** | • 2 x LAN support PoE 802.3at + 2 x USB 2.0 |
| **EBM-CDVS DB-A** | • 1 x DVI-D + 2 x USB 2.0 |
| **EBM-BYTS DB-E** | • 4 x USB 3.0 + 3 x USB 2.0 |
| **EBM-BYTS DB-A** | • 1 x HDMI, 2 x RJ45, 2 x RS-232/422/485 (BIOS), 2 x USB 2.0 |
| **AUX-M01** | • 4 x RS-232/422/485(BIOS), 2 x USB 2.0 |
| **AUX-M07** | • 4 x RS-232/422/485(BIOS) w/ 2.5KV isolation, 2 x USB 2.0 |

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

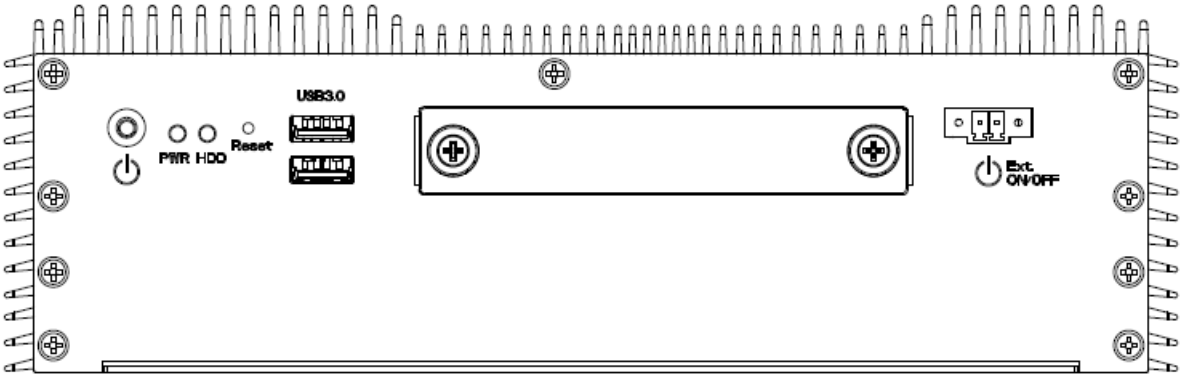
## 1.4 System Overview

### 1.4.1 Front View

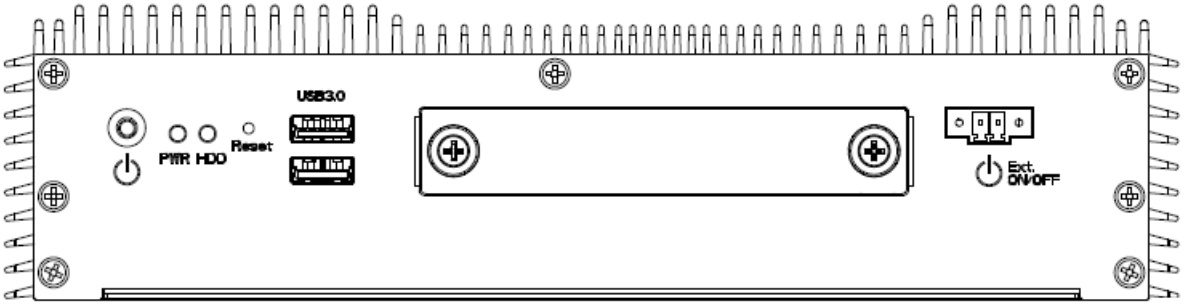
**EMS-SKLU**



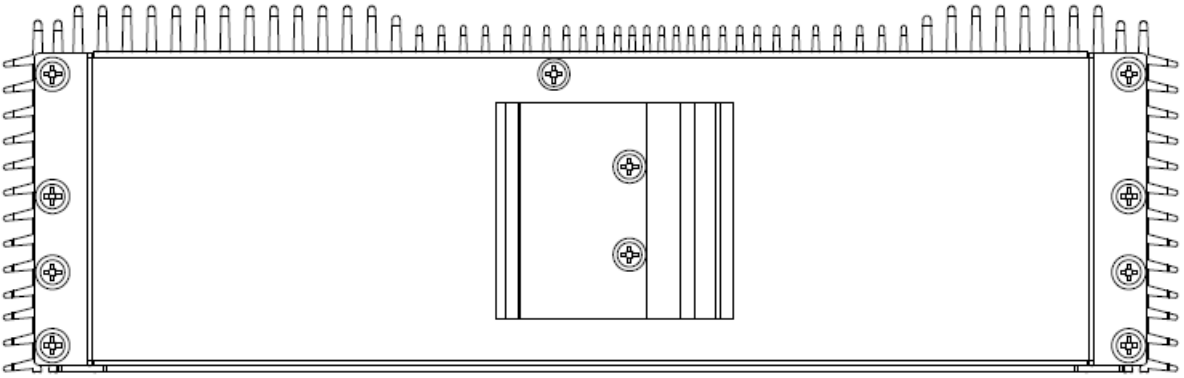

**EMS-SKLU-Marine**




**EMS-SKLU-DVI/EMS-SKLU-HDMI/EMS-SKLU-PSEF/EMS-SKLU-PSET /EMS-SKLU-4 COM Isolation/EMS-SKLU-6 COM /EMS-SKLU-6 LAN Bypass/EMS-SKLU-6 LAN Normal/EMS-SKLU-USB**

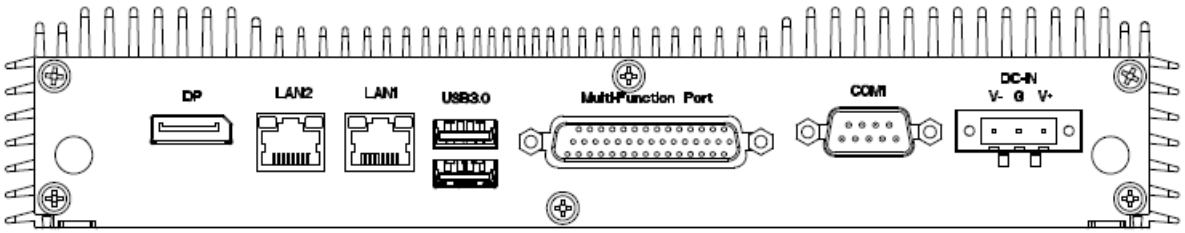



**EMS-SKLU-GPIO**

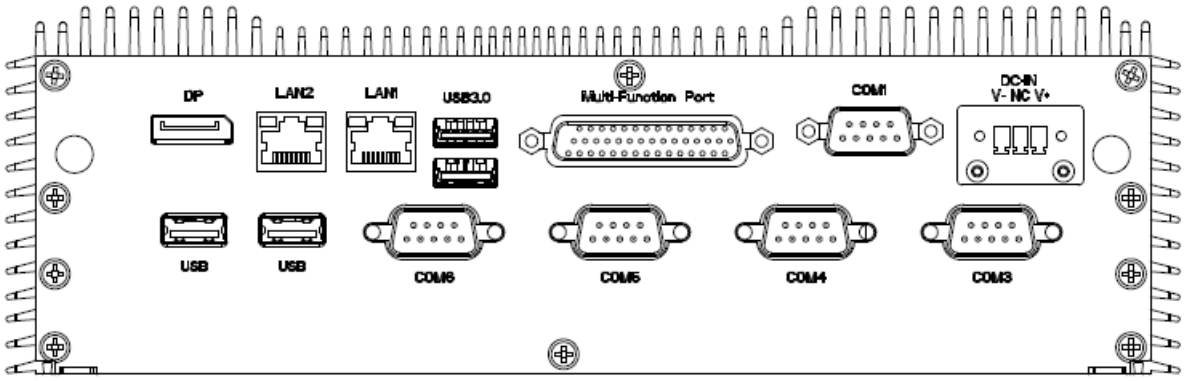


### 1.4.2 Rear View

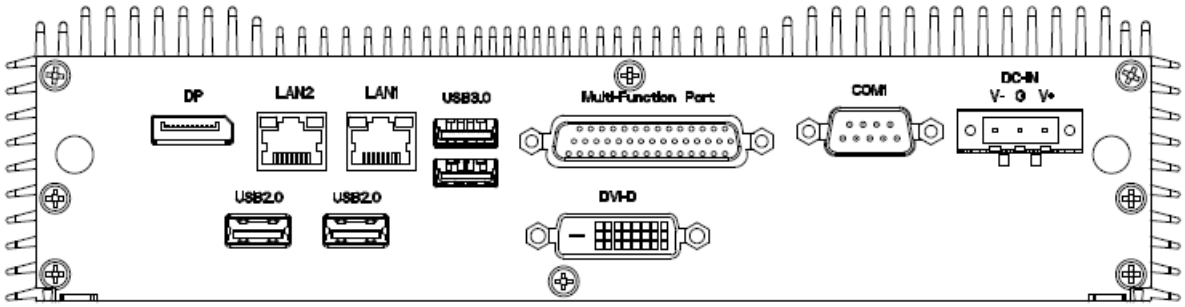
**EMS-SKLU**



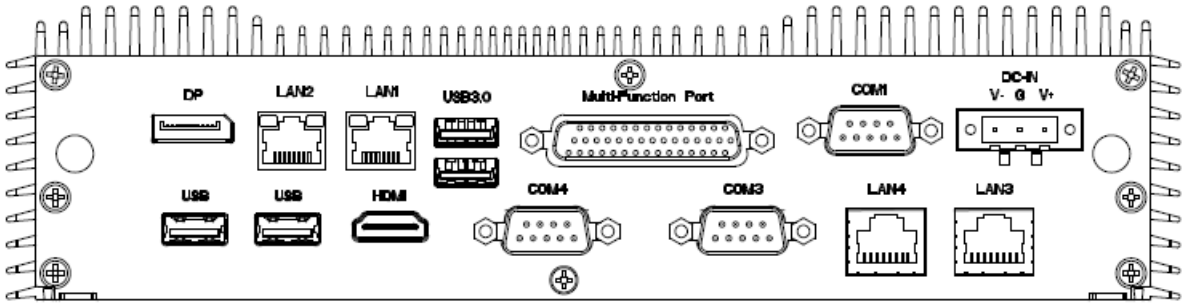

**EMS-SKLU-Marine**



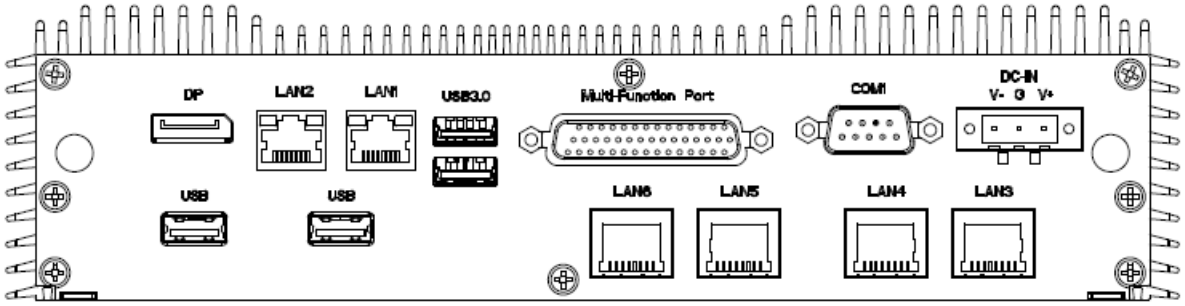

**EMS-SKLU-DVI**



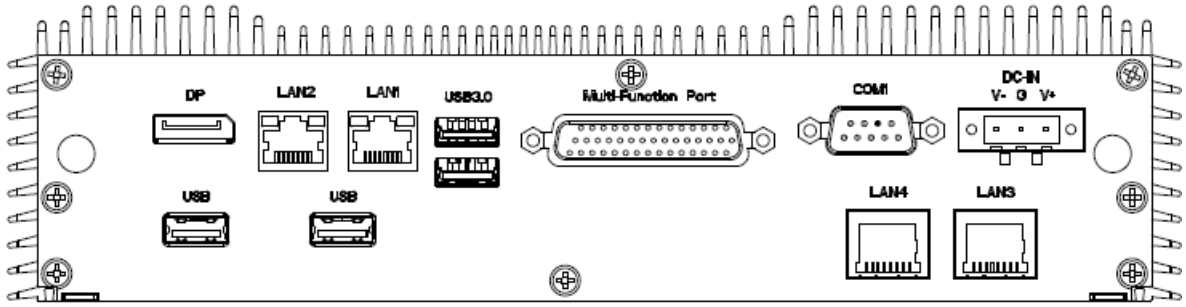

**EMS-SKLU-HDMI**



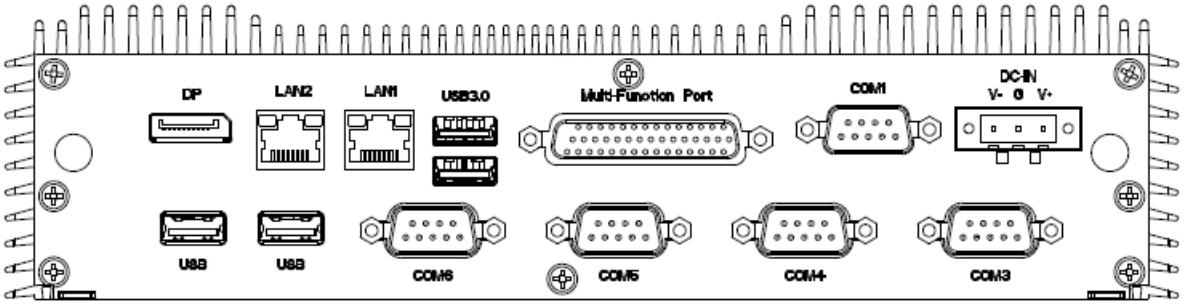
## EMS-SKLU-PSEF



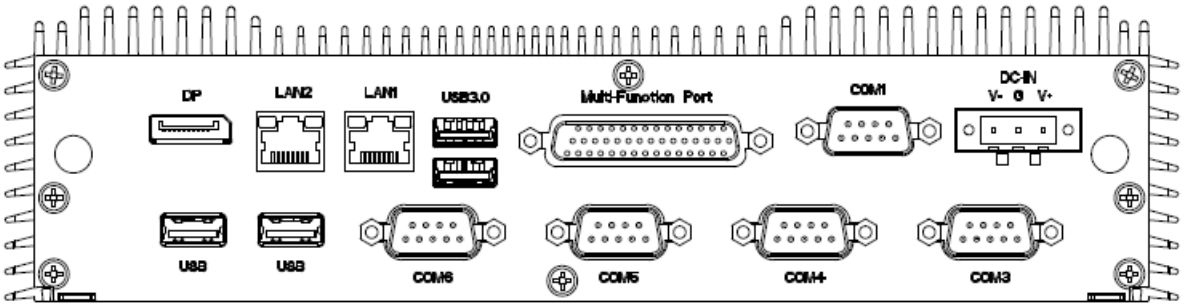

## EMS-SKLU-PSET



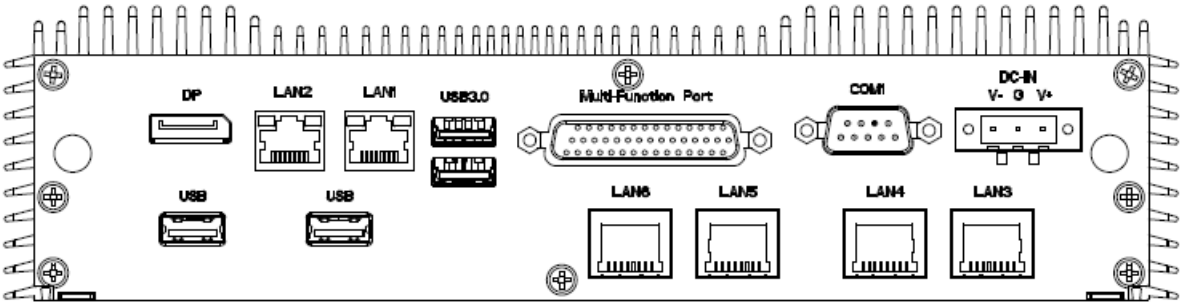

## EMS-SKLU-4 COM Isolation



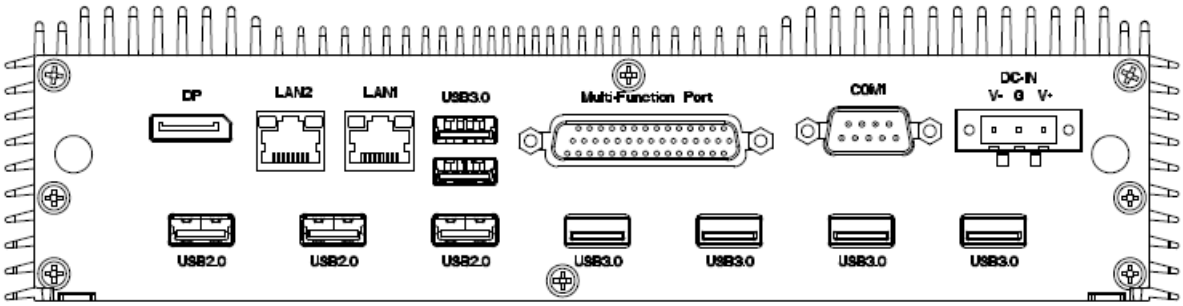

## EMS-SKLU-6 COM



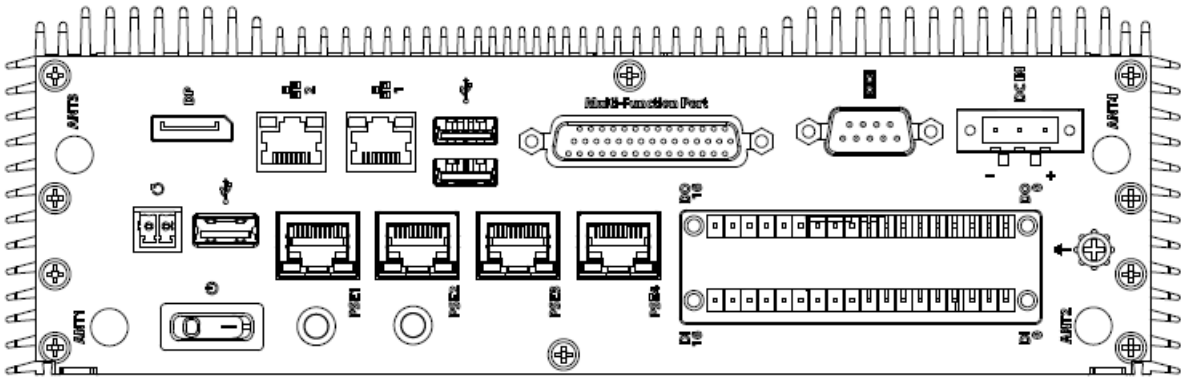
### EMS-SKLU-6 LAN Bypass/EMS-SKLU-6 LAN Normal




### EMS-SKLU-USB




### EMS-SKLU-GPIO



**EMS-SKLU**

**Connectors**

| Label | Function | Note |
|---|---|---|
| **PWR** | System power indicator | |
| **HDD** | HDD indicator | |
| **Reset** | Reset button | |
| **USB3.0** | 4 x USB3.0 connector | |
| **Ext. ON/OFF** | Power on button | |
| **DP** | DP connector | |

| | |
|---|---|
| **LAN1/2** | RJ-45 Ethernet 1/2 |
| **COM1** | Serial port connector 1 |
| **Multi-function port** | Multi-Function Port combined COM2,<br>2 PS/2, Audio, GPIO and SMBus |
| **DC-IN** | DC power-in connector |

**EMS-SKLU-Marine**

**Connectors**

| Label | Function | Note |
|---|---|---|
| **PWR** | System power indicator | |
| **HDD** | HDD indicator | |
| **Reset** | Reset button | |
| **USB3.0** | 4 x USB3.0 connector | |
| **USB** | 2 x USB2.0 connector | |
| **Ext. ON/OFF** | Power on button | |
| **DP** | DP connector | |
| **LAN1/2** | RJ-45 Ethernet 1/2 | |
| **COM1** | Serial port connector 1 | |
| **Multi-function port** | Multi-Function Port combined COM2,<br>2 PS/2, Audio, GPIO and SMBus | |
| **COM3/4/5/6** | Serial port connector 3/4/5/6 | support Isolation |
| **DC-IN** | DC power-in connector | |

**EMS-SKLU-DVI**

**Connectors**

| Label | Function | Note |
|---|---|---|
| **PWR** | System power indicator | |
| **HDD** | HDD indicator | |
| **Reset** | Reset button | |
| **USB3.0** | 4 x USB3.0 connector | |
| **Ext. ON/OFF** | Power on button | |
| **DC-IN** | DC power-in connector | |
| **LAN1/2** | RJ-45 Ethernet 1/2 | |
| **Multi-function port** | Multi-Function Port combined COM2,<br>2 PS/2, Audio, GPIO and SMBus | |
| **DVI-D** | DVI-D connector | |

| | |
|---|---|
| **USB2.0** | 2 x USB2.0 connector |
| **COM1** | Serial port connector 1 |
| **DP** | DP connector |

**EMS-SKLU-HDMI**

**Connectors**

| Label | Function | Note |
|---|---|---|
| **PWR** | System power indicator | |
| **HDD** | HDD indicator | |
| **Reset** | Reset button | |
| **USB3.0** | 4 x USB3.0 connector | |
| **Ext. ON/OFF** | Power on button | |
| **DP** | DP connector | |
| **USB2.0** | 2 x USB2.0 connector | |
| **COM1** | Serial port connector 1 | |
| **COM3/4** | Serial port connector 3/4 | |
| **DC-IN** | DC power-in connector | |
| **LAN1/2/3/4** | RJ-45 Ethernet 1/2/3/4 | |
| **Multi-function port** | Multi-Function Port combined COM2,<br>2 PS/2, Audio, GPIO and SMBus | |
| **HDMI** | HDMI connector | |

**EMS-SKLU-PSEF**

**Connectors**

| Label | Function | Note |
|---|---|---|
| **PWR** | System power indicator | |
| **HDD** | HDD indicator | |
| **Reset** | Reset button | |
| **USB3.0** | 4 x USB3.0 connector | |
| **Ext. ON/OFF** | Power on button | |
| **DP** | DP connector | |
| **USB2.0** | 2 x USB2.0 connector | |
| **COM1** | Serial port connector 1 | |
| **DC-IN** | DC power-in connector | |
| **LAN1/2/3/4/5/6** | RJ-45 Ethernet 1/2/3/4/5/6 | |
| **Multi-function port** | Multi-Function Port combined COM2, | |

| | |
|---|---|
| | 2 PS/2, Audio, GPIO and SMBus |

**EMS-SKLU-PSET**

**Connectors**

| Label | Function | Note |
|---|---|---|
| **PWR** | System power indicator | |
| **HDD** | HDD indicator | |
| **Reset** | Reset button | |
| **USB3.0** | 4 x USB3.0 connector | |
| **Ext. ON/OFF** | Power on button | |
| **DP** | DP connector | |
| **USB2.0** | 2 x USB2.0 connector | |
| **COM1** | Serial port connector 1 | |
| **DC-IN** | DC power-in connector | |
| **LAN1/2/3/4** | RJ-45 Ethernet 1/2/3/4 | |
| **Multi-function port** | Multi-Function Port combined COM2,<br>2 PS/2, Audio, GPIO and SMBus | |

**EMS-SKLU-4 COM Isolation**

**Connectors**

| Label | Function | Note |
|---|---|---|
| **PWR** | System power indicator | |
| **HDD** | HDD indicator | |
| **Reset** | Reset button | |
| **USB3.0** | 4 x USB3.0 connector | |
| **Ext. ON/OFF** | Power on button | |
| **DP** | DP connector | |
| **USB2.0** | 2 x USB2.0 connector | |
| **COM1/3/4/5/6** | Serial port connector 1/3/4/5/6 | |
| **DC-IN** | DC power-in connector | |
| **LAN1/2** | RJ-45 Ethernet 1/2 | |
| **Multi-function port** | Multi-Function Port combined COM2,<br>2 PS/2, Audio, GPIO and SMBus | |

**EMS-SKLU-6 COM**

**Connectors**

**EMS-SKLU Series**

| Label | Function | Note |
|---|---|---|
| **PWR** | System power indicator | |
| **HDD** | HDD indicator | |
| **Reset** | Reset button | |
| **USB3.0** | 4 x USB3.0 connector | |
| **Ext. ON/OFF** | Power on button | |
| **DP** | DP connector | |
| **USB2.0** | 2 x USB2.0 connector | |
| **COM1/3/4/5/6** | Serial port connector 1/3/4/5/6 | |
| **DC-IN** | DC power-in connector | |
| **LAN1/2** | RJ-45 Ethernet 1/2 | |
| **Multi-function port** | Multi-Function Port combined COM2,<br>2 PS/2, Audio, GPIO and SMBus | |

**EMS-SKLU-6 LAN Bypass/EMS-SKLU-6 LAN Normal**

**Connectors**

| Label | Function | Note |
|---|---|---|
| **PWR** | System power indicator | |
| **HDD** | HDD indicator | |
| **Reset** | Reset button | |
| **USB3.0** | 4 x USB3.0 connector | |
| **Ext. ON/OFF** | Power on button | |
| **DP** | DP connector | |
| **USB2.0** | 2 x USB2.0 connector | |
| **COM1** | Serial port connector 1 | |
| **DC-IN** | DC power-in connector | |
| **LAN1/2/3/4/5/6** | RJ-45 Ethernet 1/2/3/4/5/6 | |
| **Multi-function port** | Multi-Function Port combined COM2,<br>2 PS/2, Audio, GPIO and SMBus | |

**EMS-SKLU-USB**

**Connectors**

| Label | Function | Note |
|---|---|---|
| **PWR** | System power indicator | |
| **HDD** | HDD indicator | |
| **Reset** | Reset button | |

| | |
|---|---|
| **USB3.0** | 8 x USB3.0 connector |
| **Ext. ON/OFF** | Power on button |
| **DP** | DP connector |
| **USB2.0** | 3 x USB2.0 connector |
| **COM1** | Serial port connector 1 |
| **DC-IN** | DC power-in connector |
| **LAN1/2** | RJ-45 Ethernet 1/2 |
| **Multi-function port** | Multi-Function Port combined COM2,<br>2 PS/2, Audio, GPIO and SMBus |

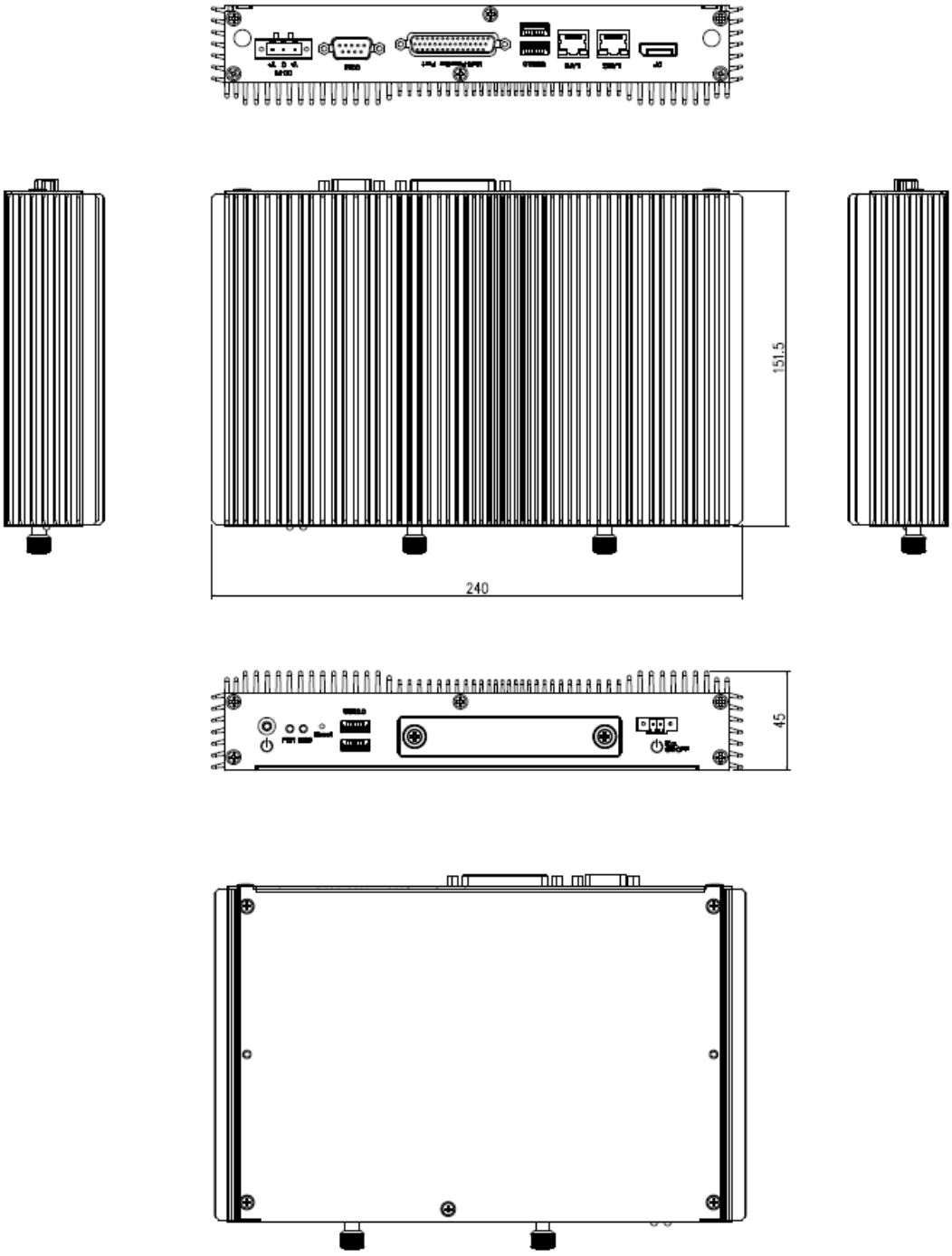
**EMS-SKLU-GPIO**

**Connectors**

| Label | Function | Note |
|---|---|---|
| **PWR** | System power indicator | |
| **HDD** | HDD indicator | |
| **Reset** | 2-pin remote reset | |
| **USB3.0** | 2 x USB3.0 connector | |
| **USB2.0** | 1 x USB2.0 connector | |
| **DP** | DP connector | |
| **COM1/2** | Serial port connector 1/2 | |
| **DC-IN** | DC power-in connector | |
| **LAN1/2/3/4/5/6** | RJ-45 Ethernet 1/2/3/4/5/6 | |
| **Multi-function port** | Multi-Function Port combined COM2,<br>2 PS/2, Audio, GPIO and SMBus | |
| **GPIO** | 32- bit GPIO | |

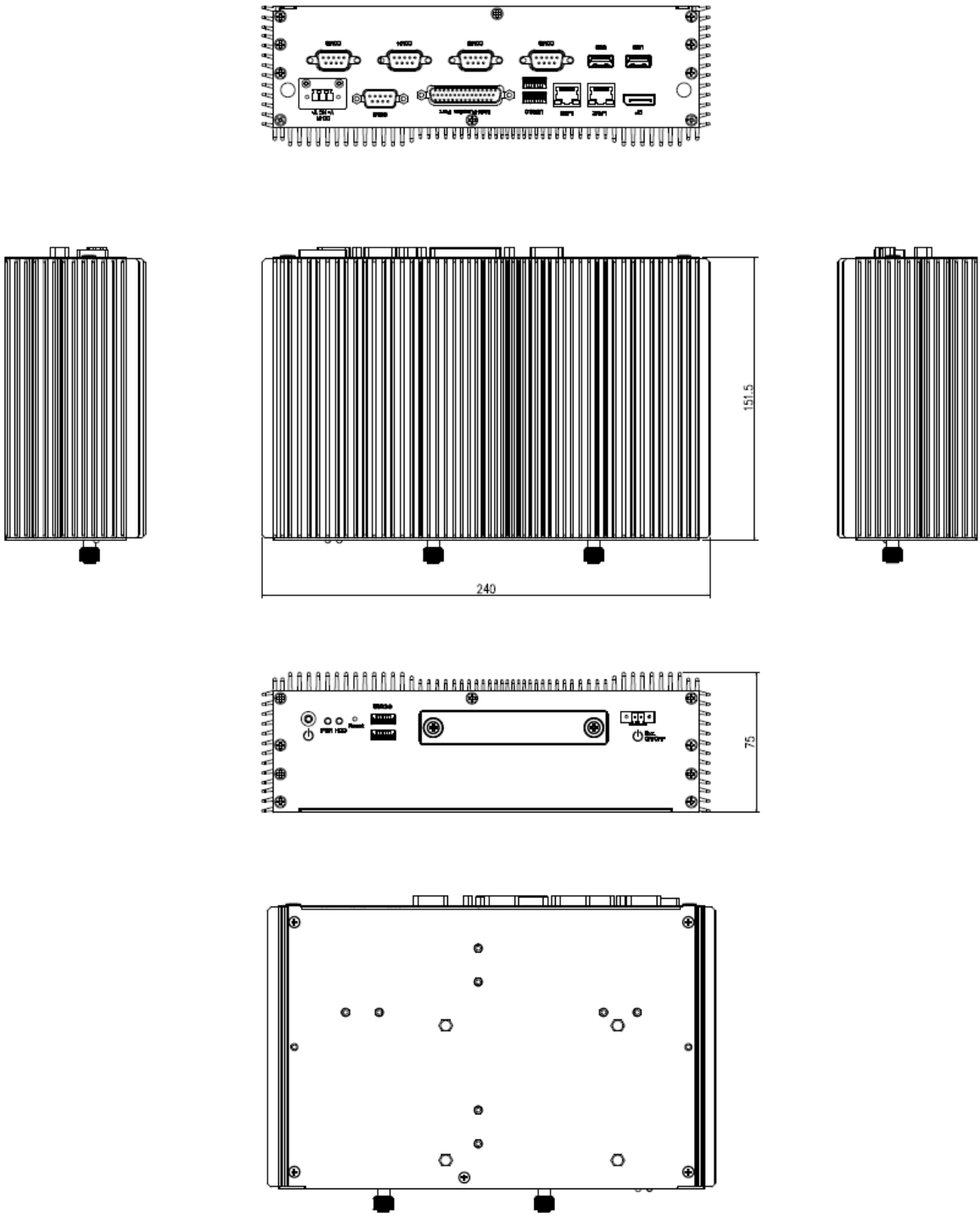
## 1.5 System Dimensions

### 1.5.1 EMS-SKLU Front & Top view



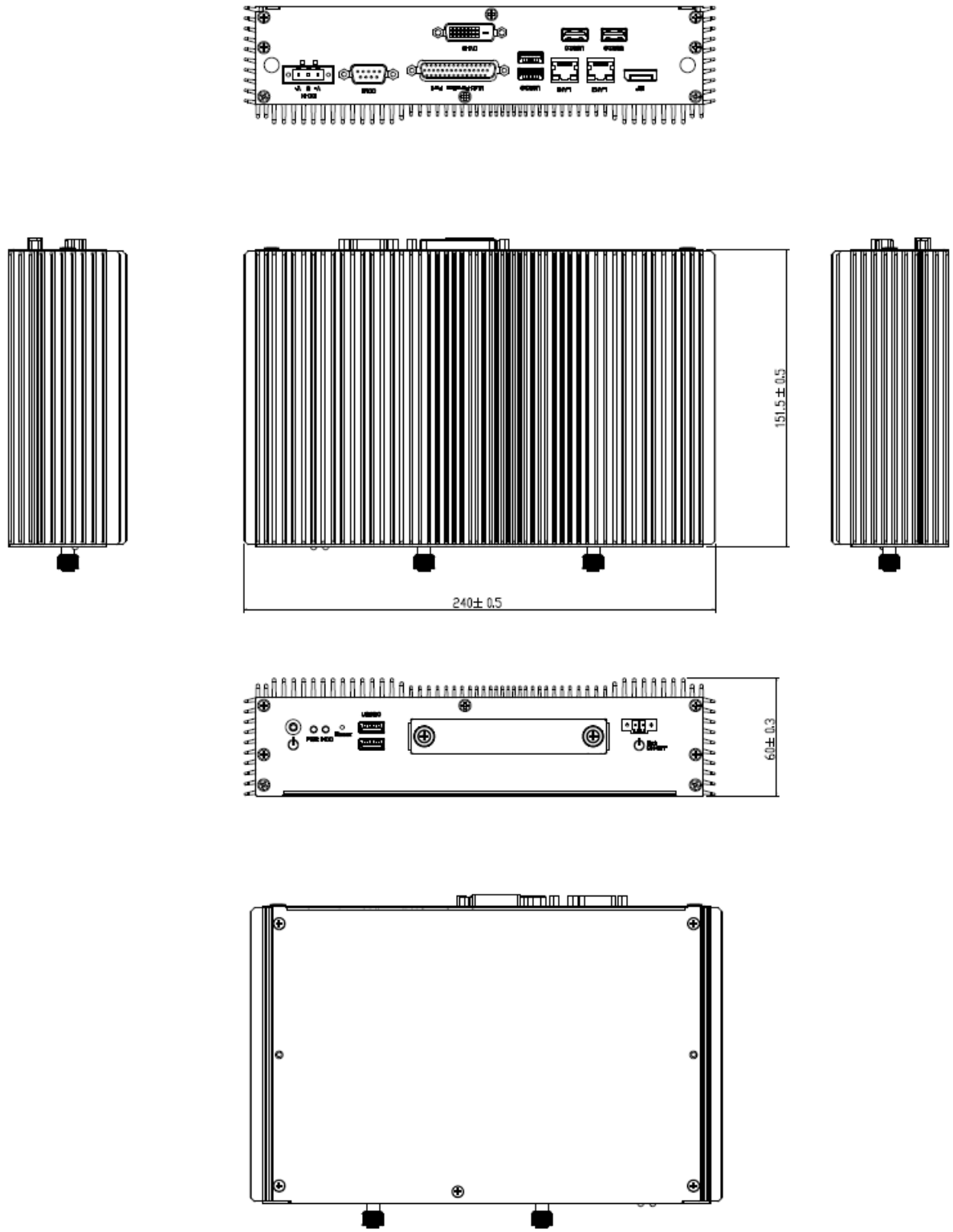

**(Unit: mm)**

### 1.5.2 EMS-SKLU-Marine Front & Top view



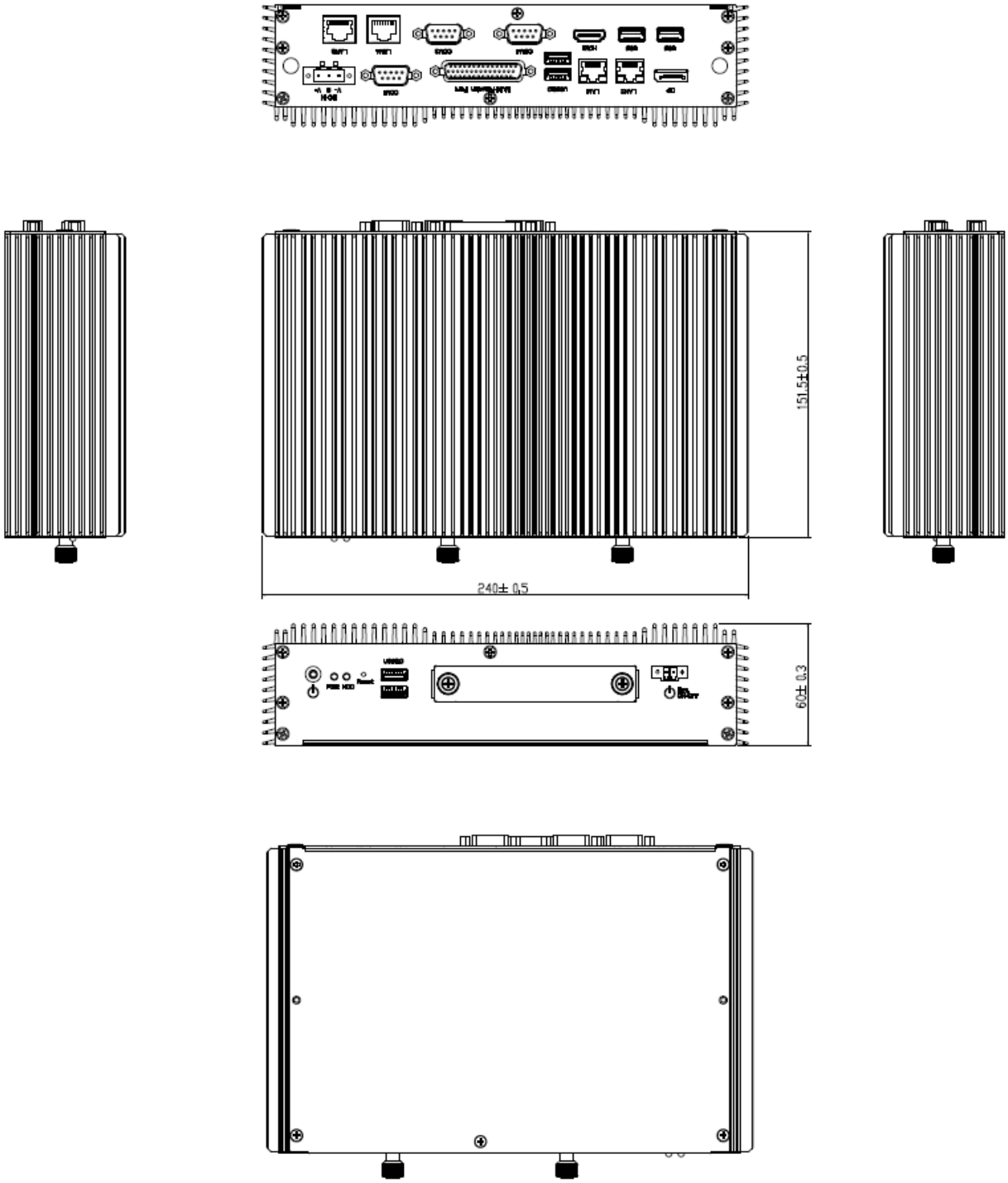

**(Unit: mm)**

### 1.5.3 EMS-SKLU-DVI Front & Top view



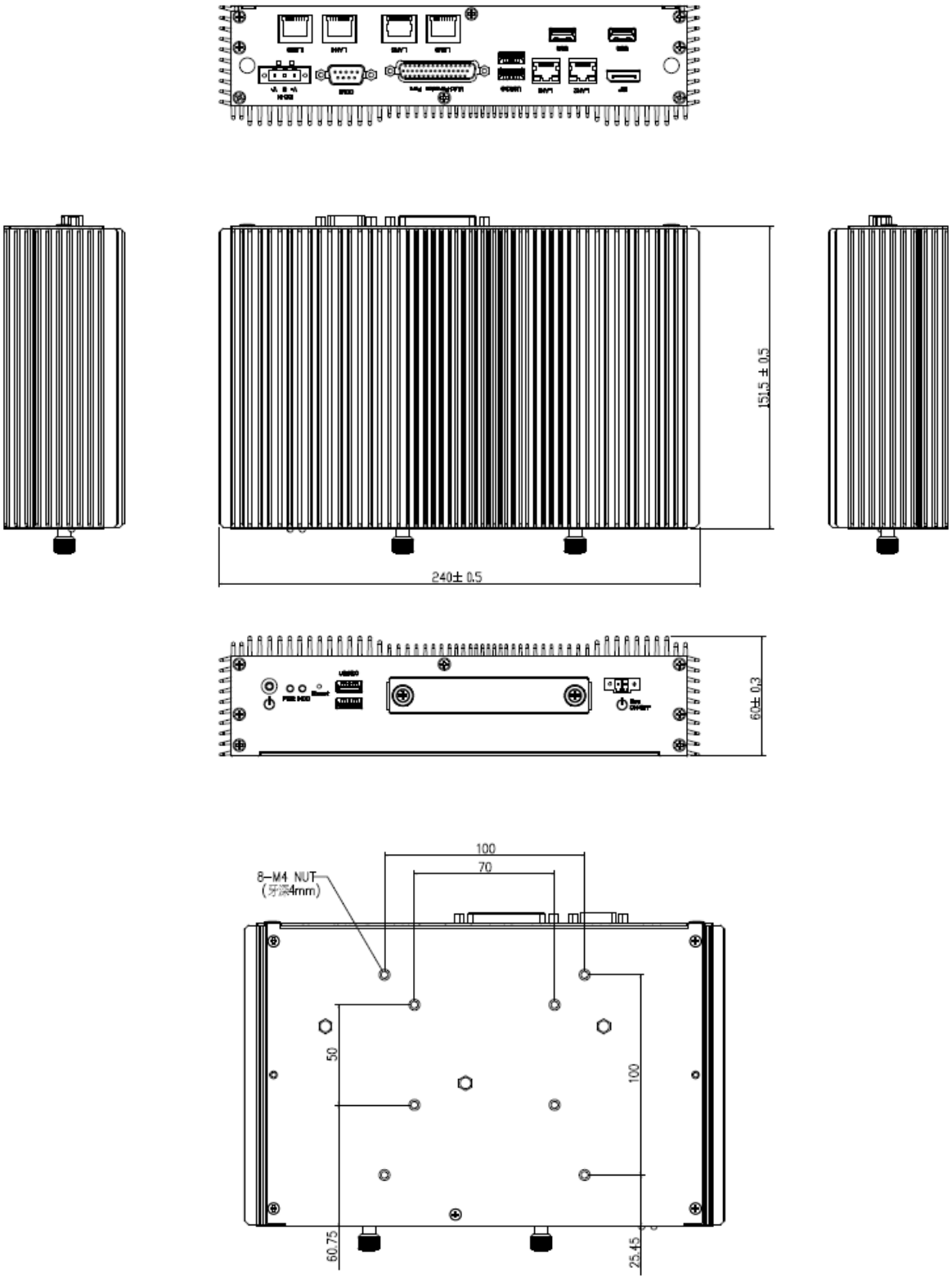

**(Unit: mm)**

### 1.5.4 EMS-SKLU-HDMI Front & Top view



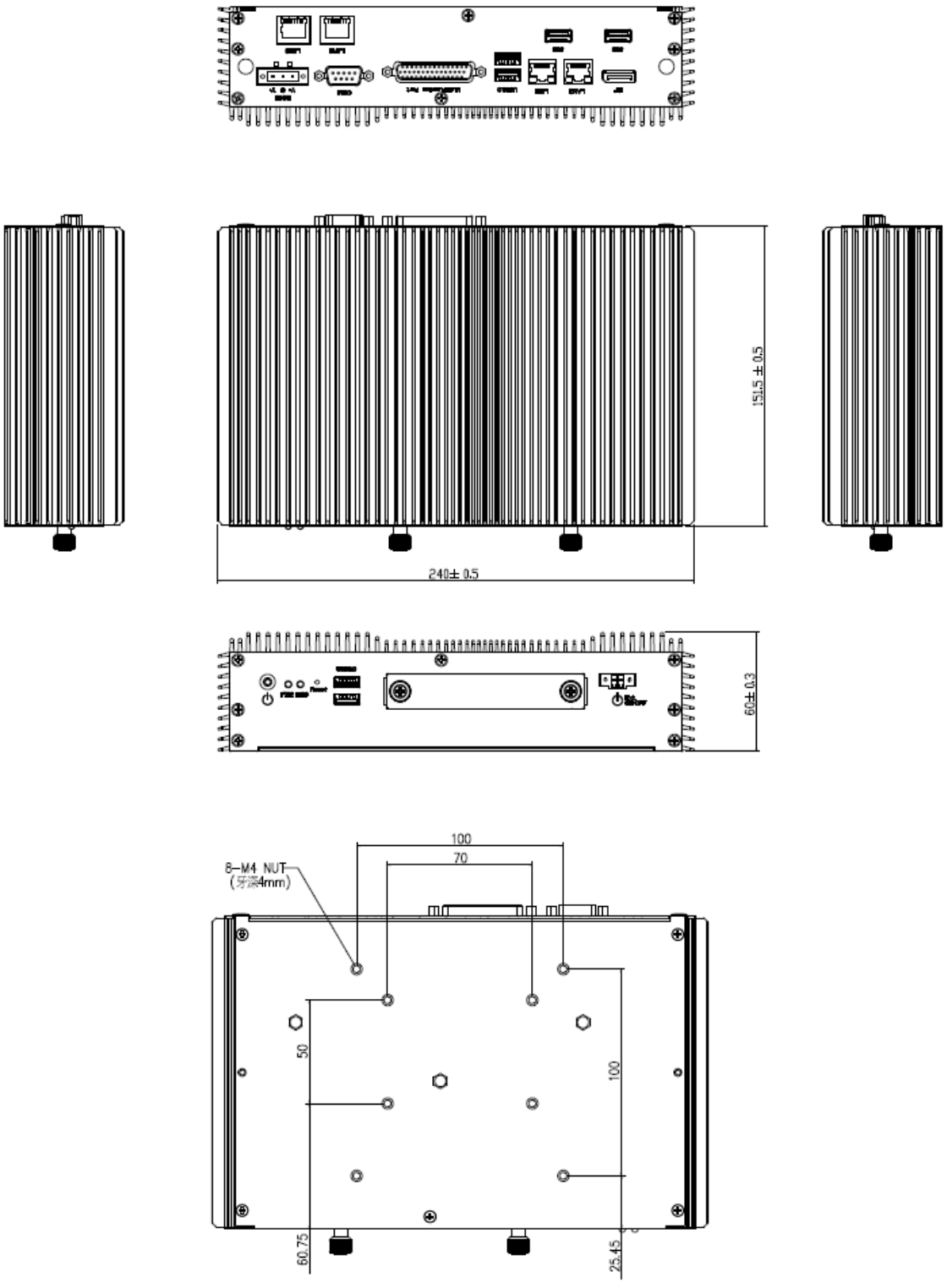

**(Unit: mm)**

### 1.5.5 EMS-SKLU-PSEF Front & Top view



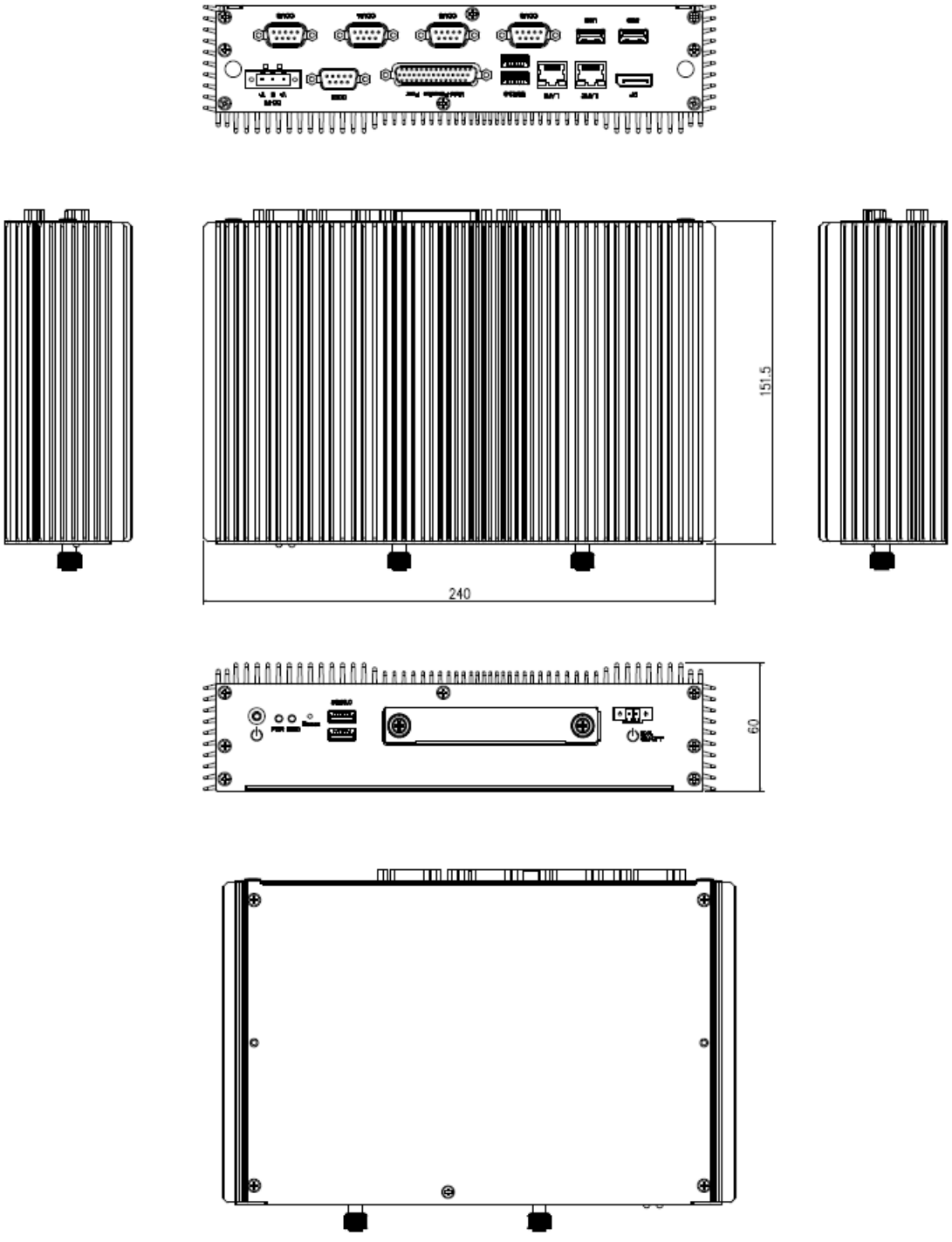

**(Unit: mm)**

### 1.5.6 EMS-SKLU-PSET Front & Top view



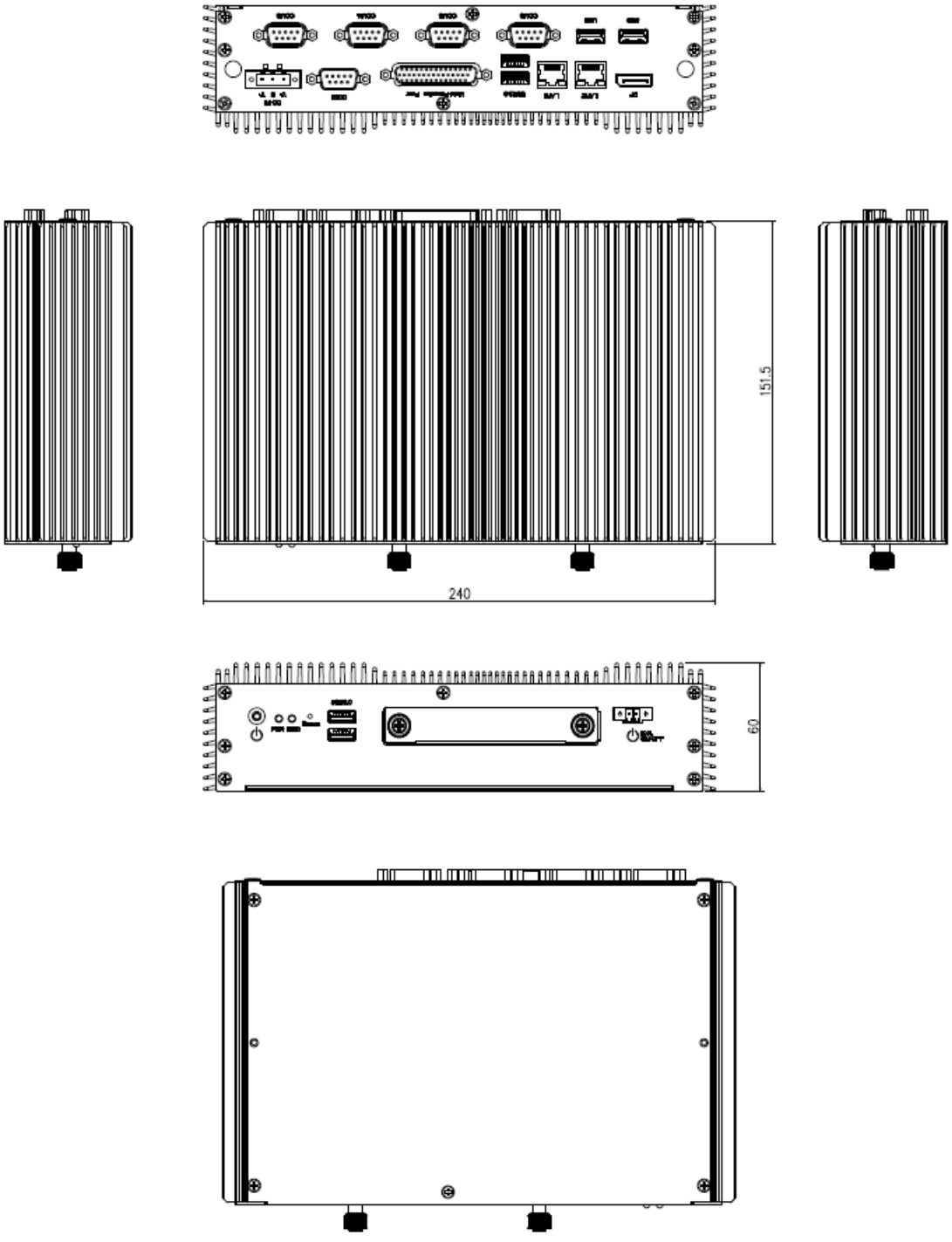

**(Unit: mm)**

### 1.5.7 EMS-SKLU-4 COM Isolation Front & Top view



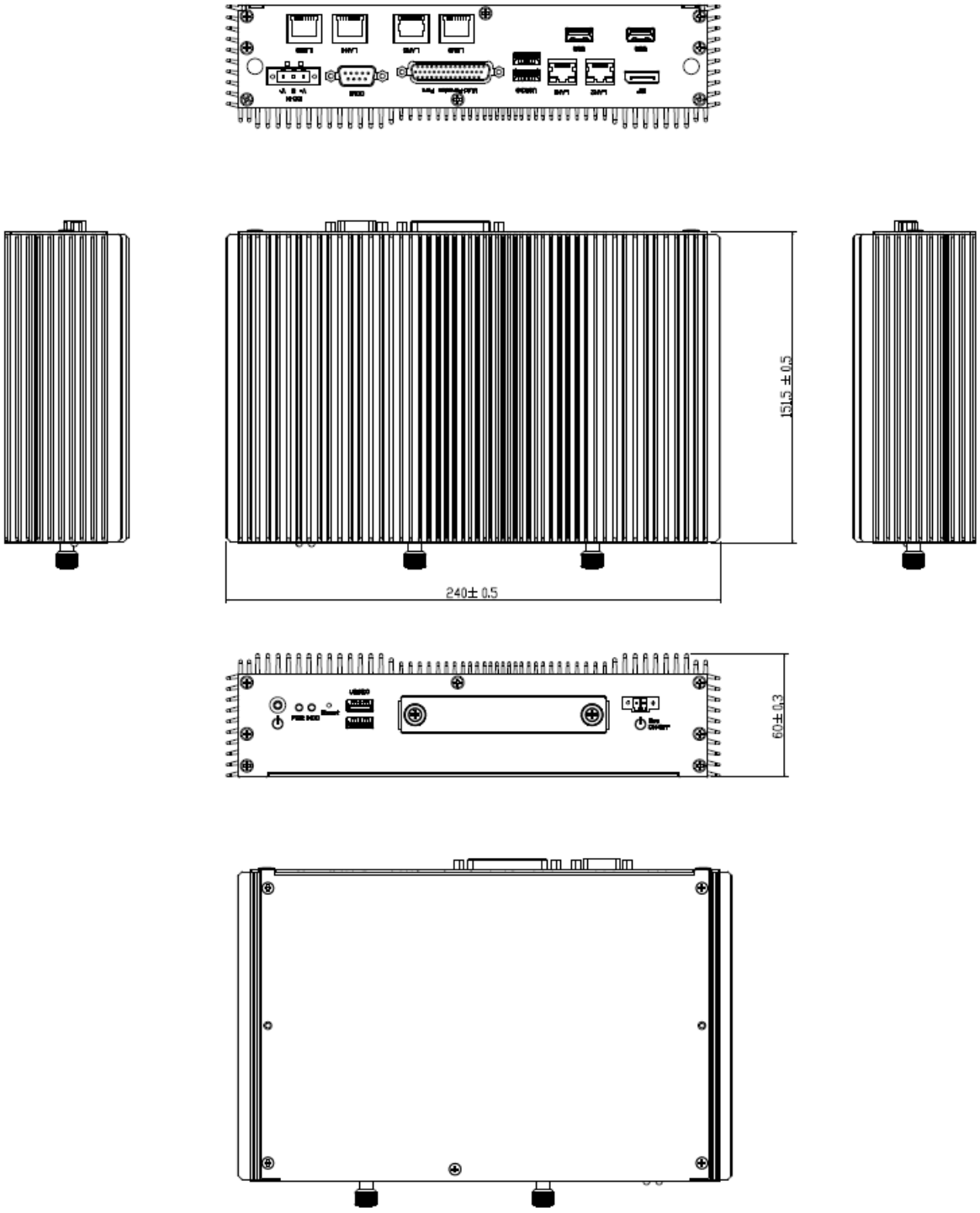

**(Unit: mm)**

### 1.5.8 EMS-SKLU-6 COM Front & Top view



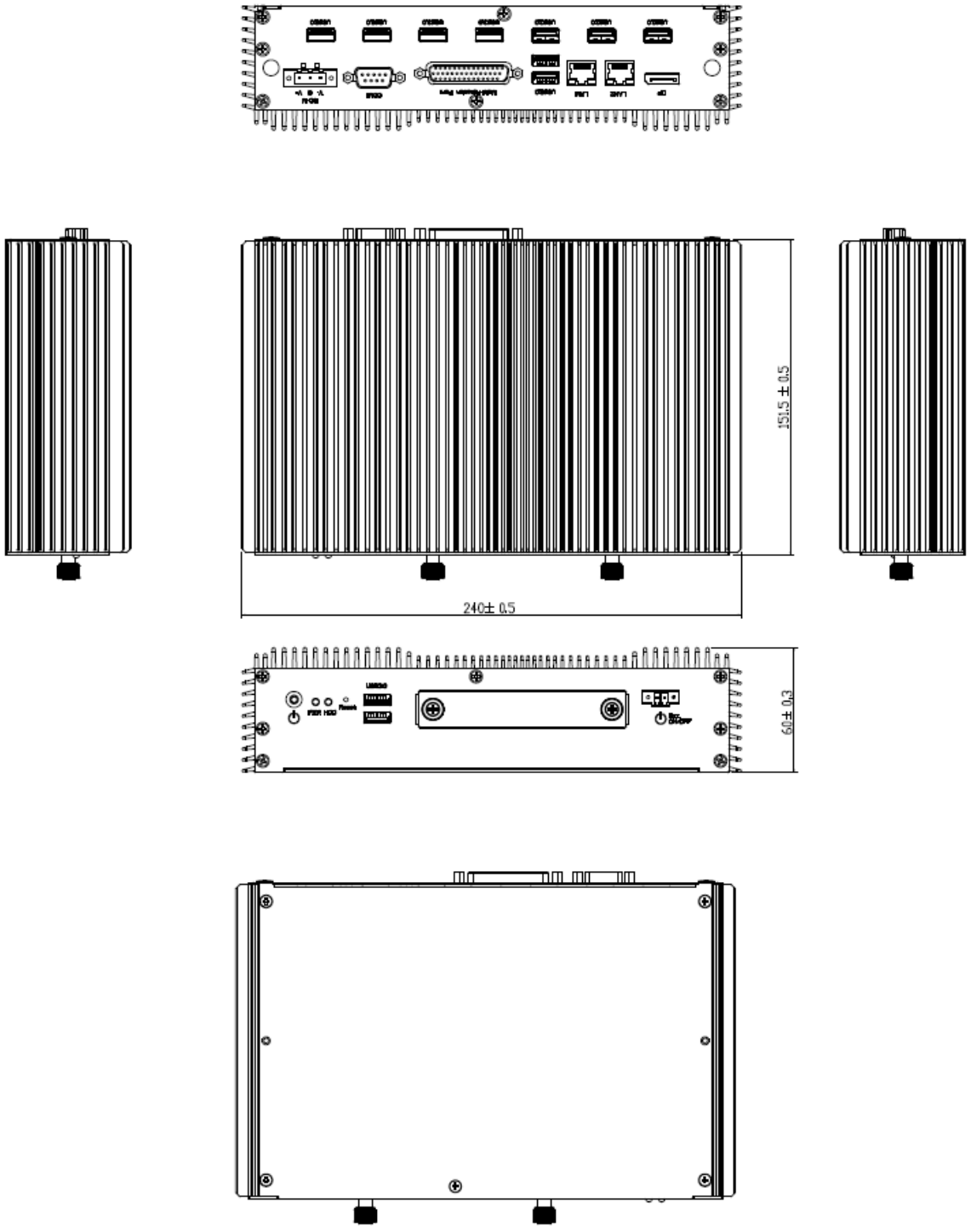

**(Unit: mm)**

### 1.5.9 EMS-SKLU-6 LAN Bypass/EMS-SKLU-6 LAN Normal Front & Top view



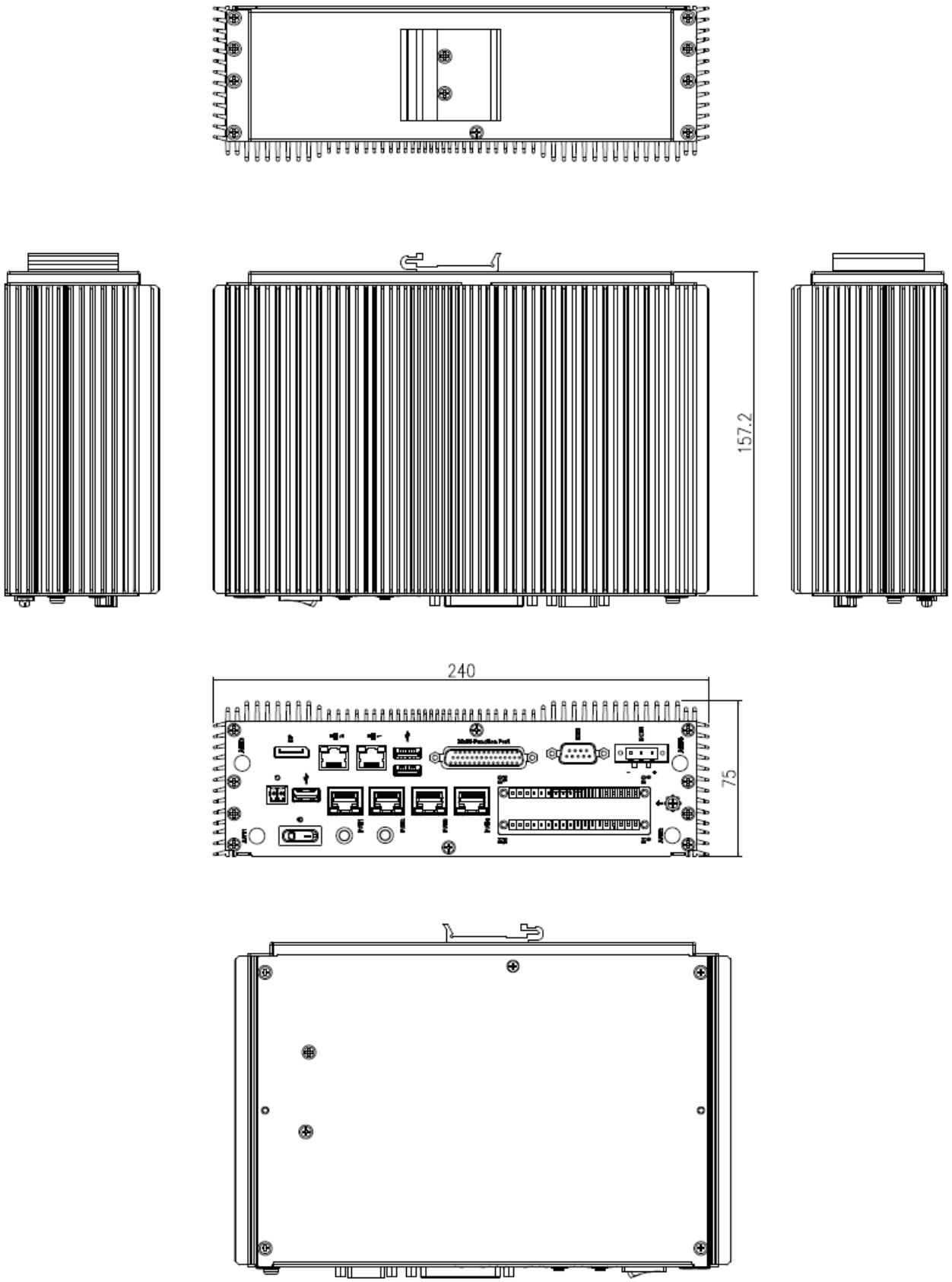

**(Unit: mm)**

### 1.5.10 EMS-SKLU-USB Front & Top view




**(Unit: mm)**

### 1.5.11 EMS-SKLU-GPIO Front & Top view




**(Unit: mm)**

# 2. Hardware Configuration

## Jumper and Connector Setting, Driver and BIOS Installing

For advanced information, please refer to:

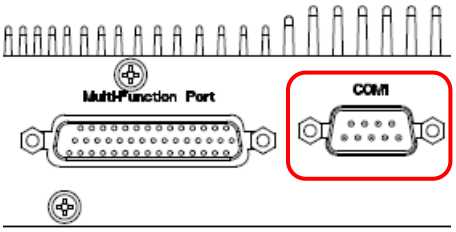
1- EBM-SKLUS, AUX-M01, IET-6 LAN Bypass, IET-6 LAN Normal, IET-PSEBF (4 port af), IET-PSEBT (2 port at), AUX-M07, AUX-M08, EBM-BYTS DB-A, EBM-CDVS DB-A, EBM-CDVS DB-B and EBM-BYTS DB-E included in this manual.

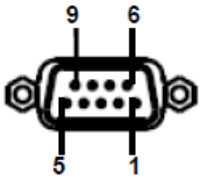
**Note:** If you need more information, please visit our website:

http://www.avalue.com.tw

## 2.1 EMS-SKLU connector mapping

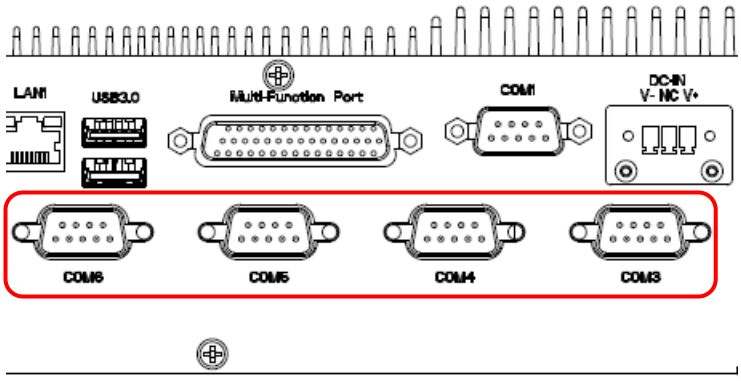
### 2.1.1 Serial port connector 1 (COM1)

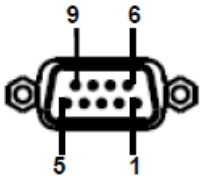



| Pin | RS-232 | RS-485 | RS-422 |
|---|---|---|---|
| 1 | DCD | DATA1- | TXD- |
| 2 | RXD | DATA1+ | TXD+ |
| 3 | TXD | NC | RXD+ |
| 4 | DTR | NC | RXD- |
| 5 | GND | GND | GND |
| 6 | DSR | | |
| 7 | RTS | | |
| 8 | CTS | | |
| 9 | RI | | |

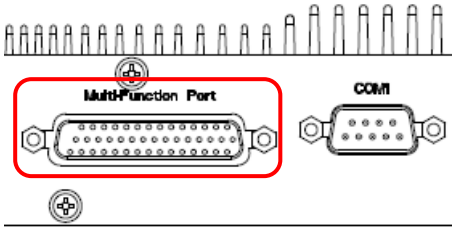
### 2.1.2 Serial port connector 3/4/5/6 (COM3/4/5/6)

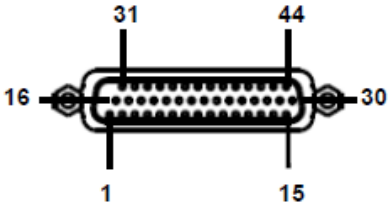


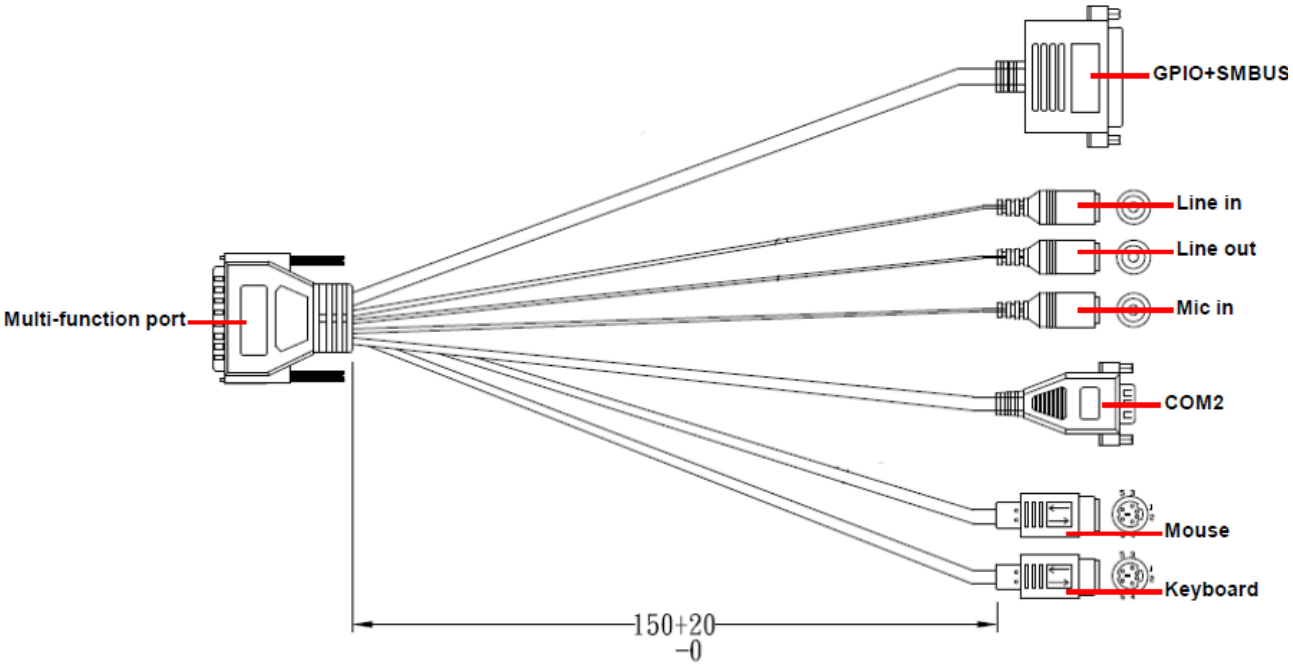

| Pin | RS-232 | RS-485 | RS-422 |
|---|---|---|---|
| 1 | DCD | DATA1- | TXD- |
| 2 | RXD | DATA1+ | TXD+ |
| 3 | TXD | NC | RXD+ |
| 4 | DTR | NC | RXD- |
| 5 | GND | GND | GND |
| 6 | DSR | | |
| 7 | RTS | | |
| 8 | CTS | | |
| 9 | RI | | |

### 2.1.3 Multi-Function Port combined COM2, 2 PS/2, Audio, GPIO and SMBus (Multi-function port)

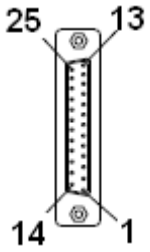



| PIN | Signal | PIN | Signal | PIN | Signal |
|---|---|---|---|---|---|
| 1 | LINE1_JD | 16 | FRONT_JD | 31 | LINE1_RIN |
| 2 | MIC1_JD | 17 | LINEOUT_R | 32 | GND |
| 3 | MIC_RIN | 18 | GND | 33 | LINE1_LIN |
| 4 | GND | 19 | LINEOUT_L | 34 | +5V |
| 5 | MIC_LIN | 20 | GND | 35 | DO3 |
| 6 | DO5 | 21 | DO4 | 36 | DO0 |
| 7 | DO2 | 22 | DO1 | 37 | DI3 |
| 8 | DI5 | 23 | DI4 | 38 | DI0 |
| 9 | DI2 | 24 | DI1 | 39 | SMB_CLK |
| 10 | MSCK | 25 | SMB_DATA | 40 | NRIB# |
| 11 | GND | 26 | GND | 41 | NRTSB# |
| 12 | MSDA | 27 | NCTSB# | 42 | COM2_GND |
| 13 | KBDA | 28 | NDSRB# | 43 | NTXDB_485RXP |
| 14 | VCC_PS2 | 29 | NDTRB#_485RXN | 44 | NDCDB#_485TXN |
| 15 | KBCK | 30 | NRXDB_485TXP | | |

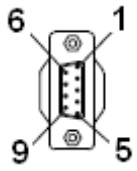


### 2.1.3.1 GPIO+SMBUS




| Signal | PIN | PIN | Signal |
|---|---|---|---|
| | 25 | 13 | |
| | 24 | 12 | |
| | 23 | 11 | |
| | 22 | 10 | |
| SMBUS_DATA | 21 | 9 | |
| SMBUS_CLK | 20 | 8 | GND |
| GPI-D5 | 19 | 7 | 5V |
| GPI-D4 | 18 | 6 | GPO-D5 |
| GPI-D3 | 17 | 5 | GPO-D4 |
| GPI-D2 | 16 | 4 | GPO-D3 |
| GPI-D1 | 15 | 3 | GPO-D2 |
| GPI-D0 | 14 | 2 | GPO-D1 |
| | | 1 | GPO-D0 |

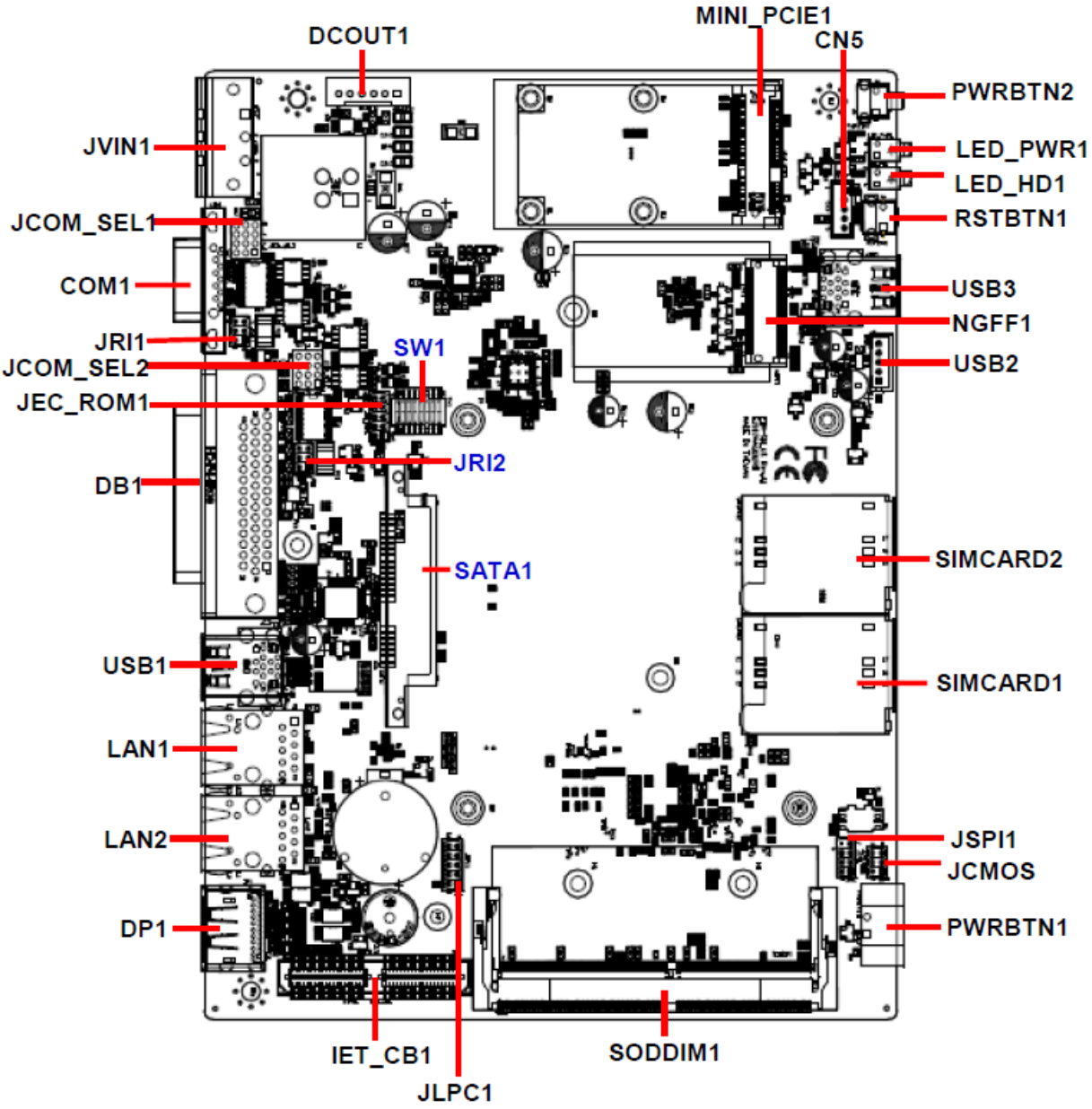
### 2.1.3.2 COM2



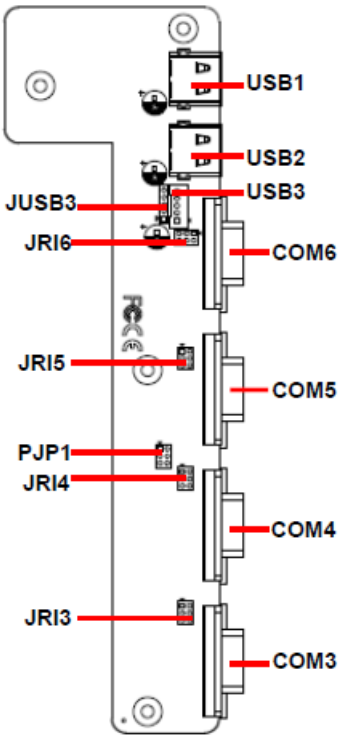

| Pin | RS-232 | RS-485 | RS-422 |
|---|---|---|---|
| 1 | DCD | DATA1- | TXD- |
| 2 | RXD | DATA1+ | TXD+ |
| 3 | TXD | NC | RXD+ |
| 4 | DTR | NC | RXD- |
| 5 | GND | GND | GND |
| 6 | DSR | | |
| 7 | RTS | | |
| 8 | CTS | | |
| 9 | RI | | |

## 2.2 EBM-SKLUS, AUX-M01, IET-6 LAN Bypass, IET-6 LAN Normal, IET-PSEBF (4 port af), IET-PSEBT (2 port at), AUX-M07, AUX-M08, EBM-BYTS DB-A, EBM-CDVS DB-A and EBM-BYTS DB-E Overviews

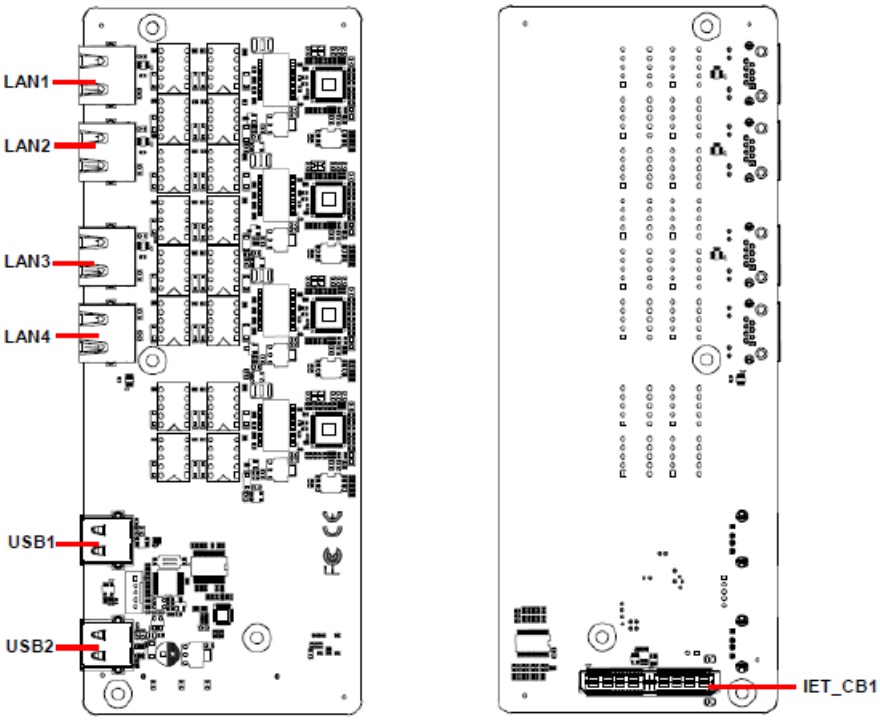
### 2.2.1 EBM-SKLUS



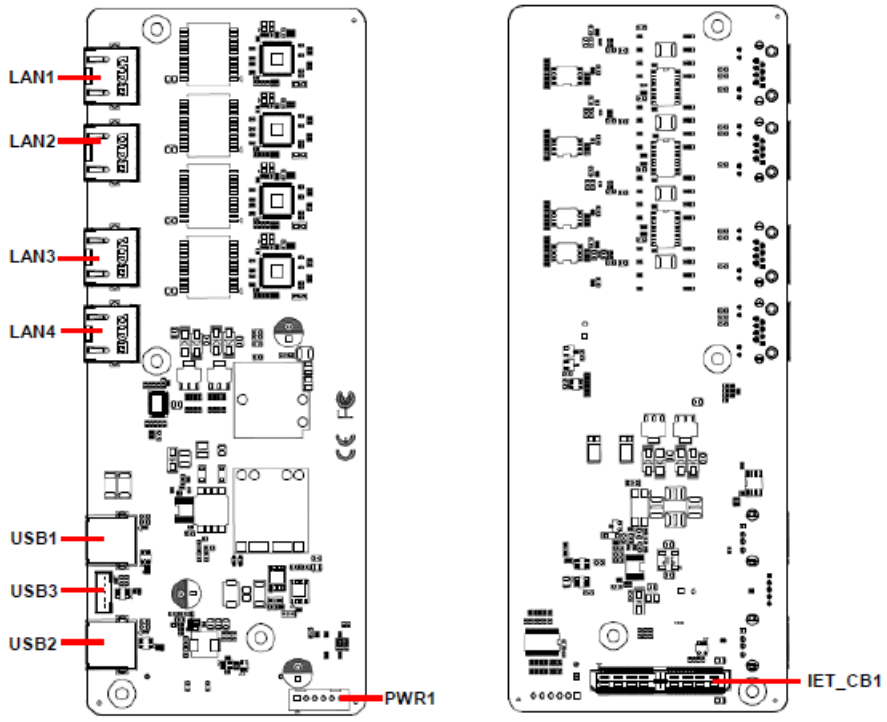
### 2.2.2 AUX-M01



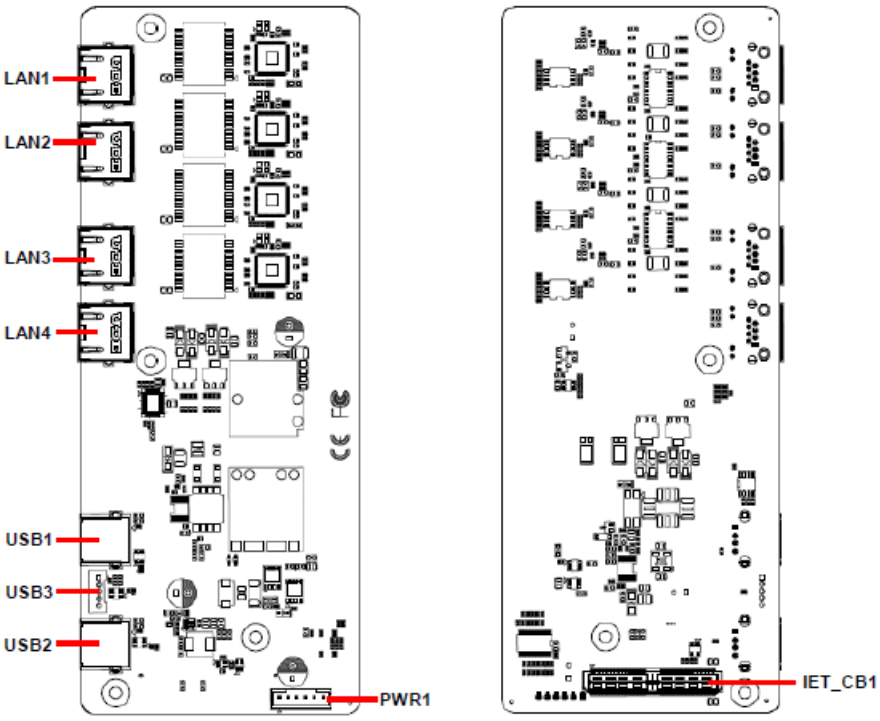

### 2.2.3 IET-6 LAN Bypass



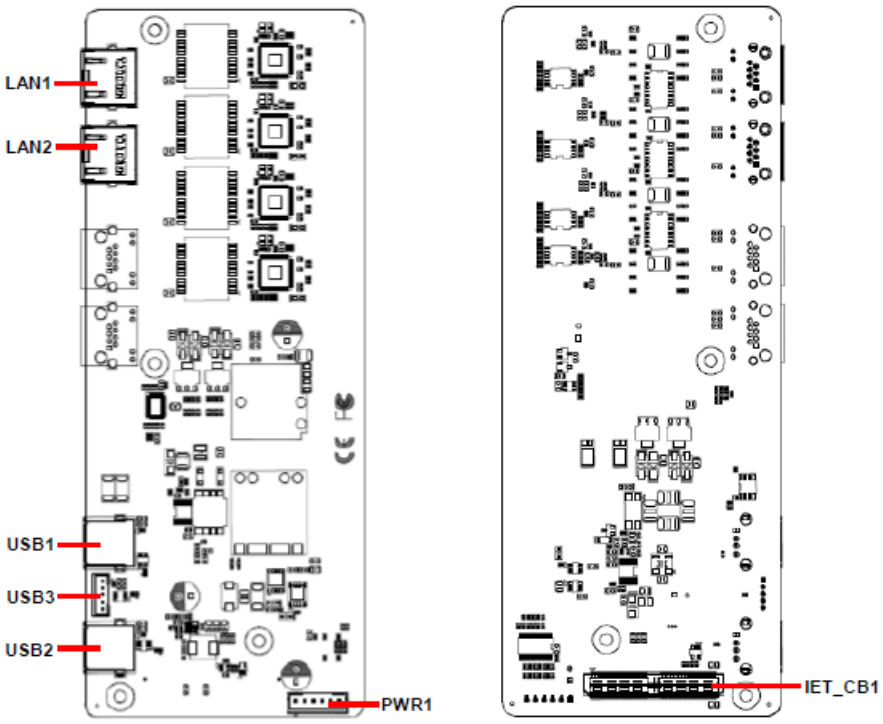
### 2.2.4 IET-6 LAN Normal



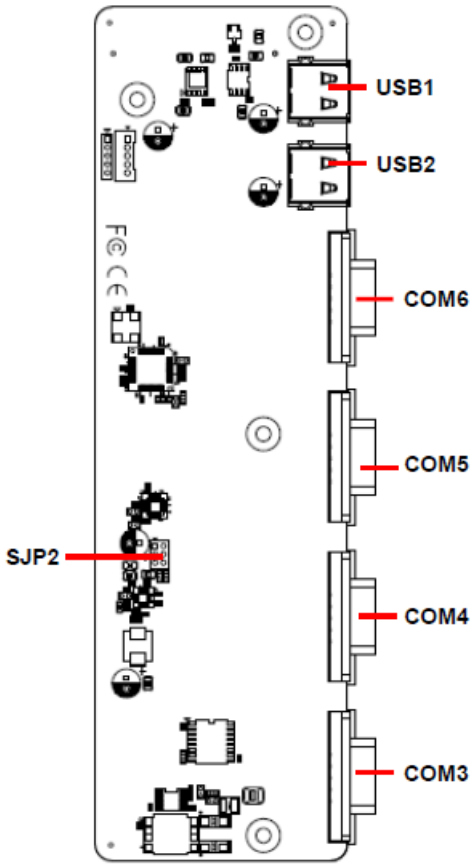

### 2.2.5 IET-PSEBF (4 port af)



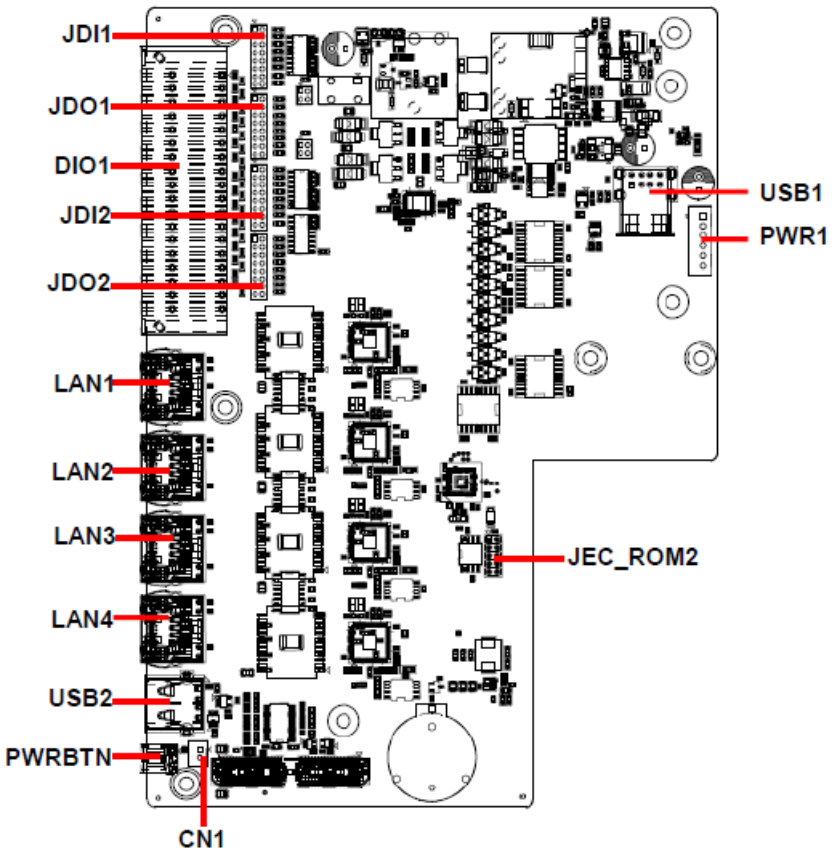
### 2.2.6 IET-PSEBT (2 port at)

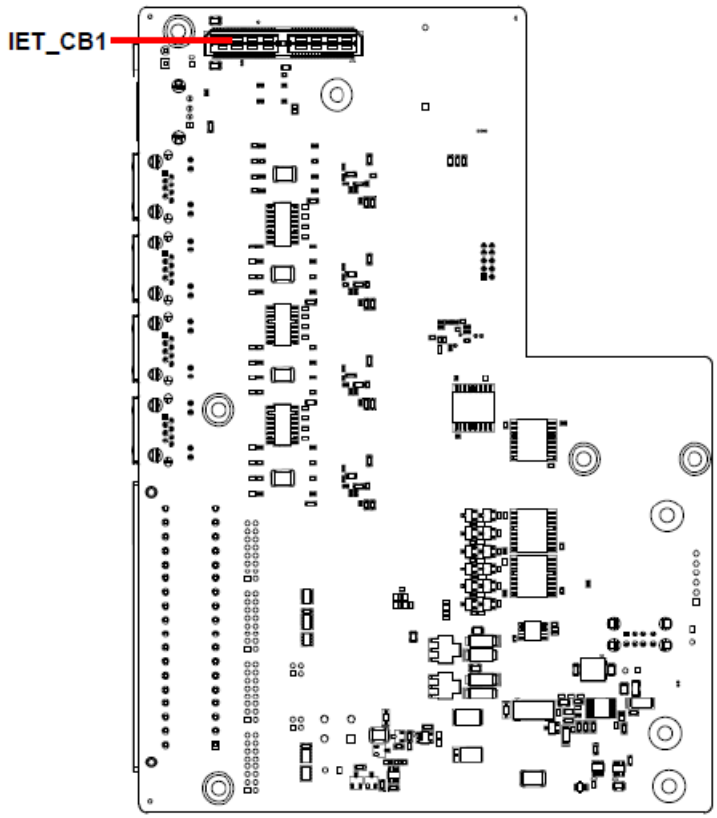



### 2.2.7 AUX-M07

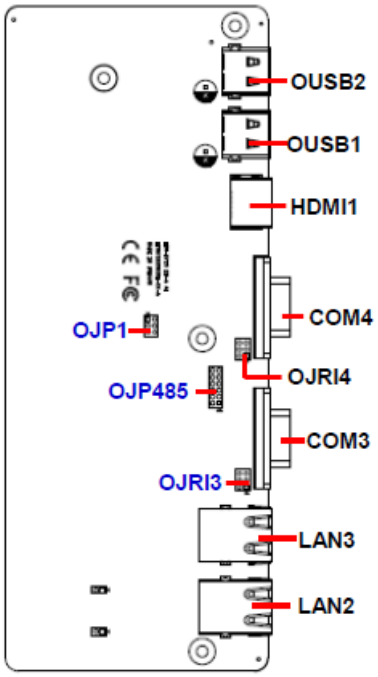


### 2.2.8 AUX-M08

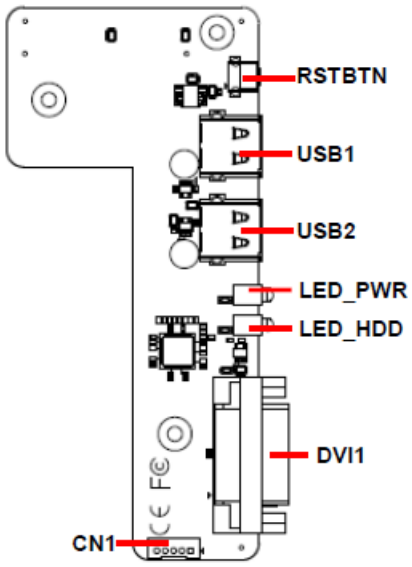

JDI1
JDO1
DIO1
JDI2
JDO2
LAN1
LAN2
LAN3
LAN4
USB2
PWRBTN
CN1
USB1
PWR1
JEC_ROM2


IET_CB1

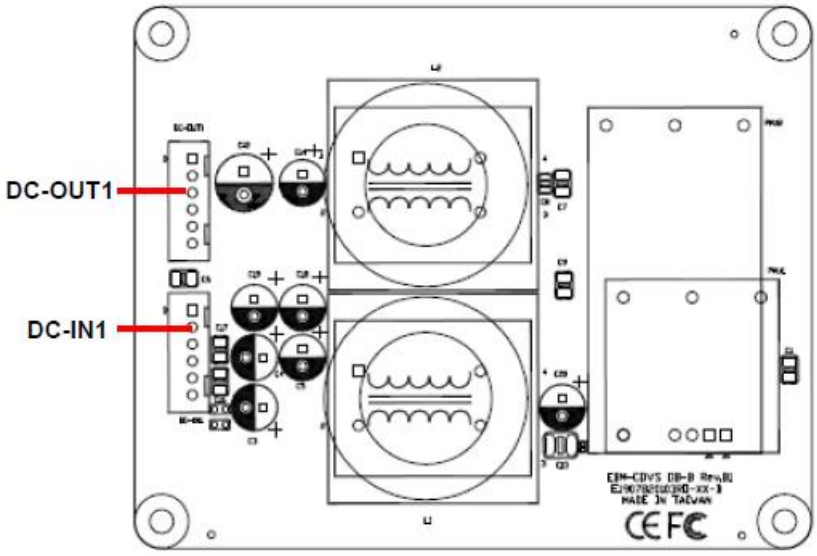
### 2.2.9 EBM-BYTS DB-A



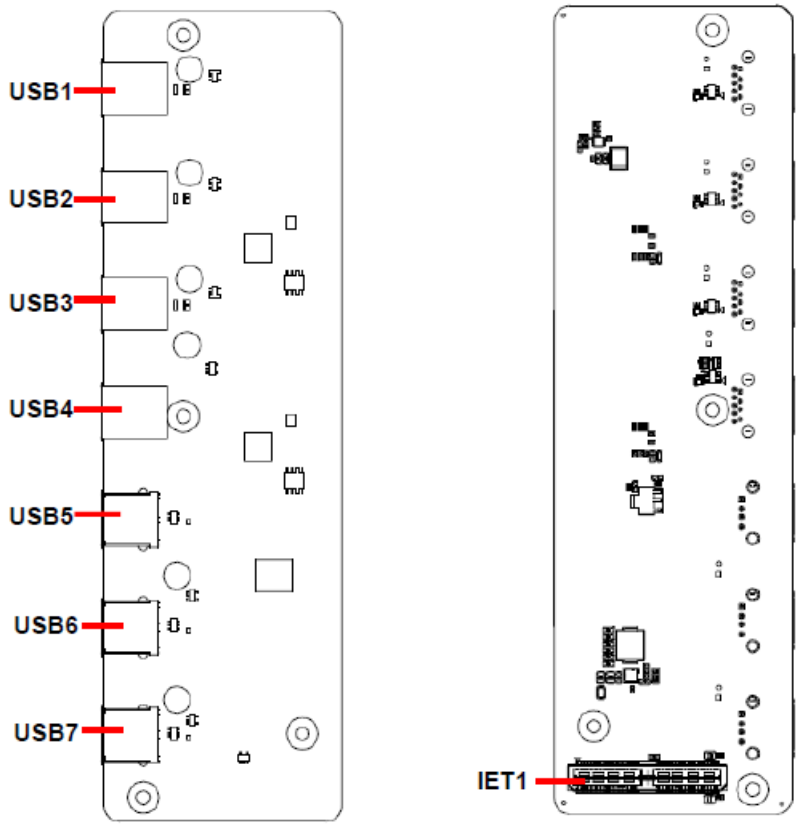

### 2.2.10 EBM-CDVS DB-A



### 2.2.11 EBM-CDVS DB-B




### 2.2.12 EBM-BYTS DB-E



## 2.3 EBM-SKLUS Jumper & Connector list

**Jumpers**

| Label | Function | Note |
|---|---|---|
| **JCMOS** | Clear CMOS | 3 x 2 header, pitch 2.00mm |
| **JRI1/2** | COM 1/2 pin 9 signal select | 3 x 2 header, pitch 2.00 mm |
| **JCOM_SEL1/2** | Serial port 1/2 – RS232/422/485 mode select | 4 x 3 header, pitch 2.00 mm |
| **SW1** | Multi-function select | DIP switch 8pin |

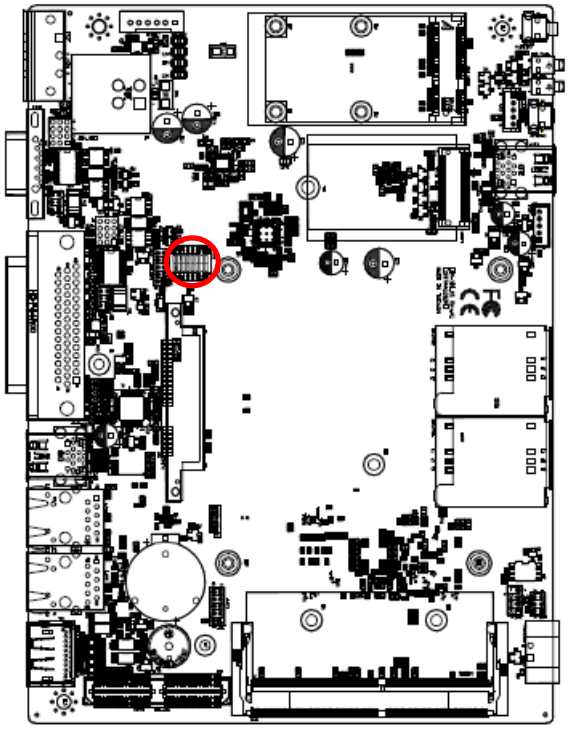
**Connectors**

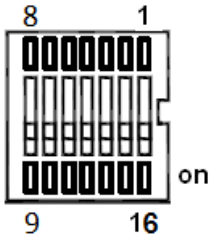
| Label | Function | Note |
|---|---|---|
| **USB1** | 2 x USB3.0 connector | |
| **USB2** | On-board header for USB2.0 | 5 x 1 wafer, pitch 2.00 mm |
| **USB3** | 2 x USB3.0 connector | |
| **LAN1/2** | RJ-45 Ethernet 1/2 | |
| **DB-1** | Multi-function port | 1. COM2<br>2. Audio(line-in, line-out, mic-in)<br>3. 2 x PS/2 for KB/MS<br>4. 12 bit GPIO/SMBUS |
| **COM1** | Serial port connector 1 | |
| **MINI_PCIE1** | Mini PCI Express connector | |
| **CN5** | Front Panel Connector | 5 x 1 wafer, pitch 2.00 mm |
| **PWRBTN1** | Power on/off connector | 1 x 2 terminal block, pitch 3.50 mm |
| **PWRBTN2** | Power on/off button | |
| **RSTBTN1** | Reset button | |
| **LED_PWR1** | LED Power | |
| **LED_HD1** | LED HDD | |
| **SIMCARD1/2** | SIM card slot 1/2 | |
| **SODDIM1** | DDR4 SODIMM connector | |
| **IET_CB1** | IET<br>Expansion slot | |
| **JLPC1** | LPC port connector | 5 x 2 header, pitch 2.00 mm |
| **JSPI1** | SPI connector | 4 x 2 header, pitch 2.00 mm |
| **SATA1** | Serial ATA connector | |

| | | |
|---|---|---|
| **DP1** | DP connector | |
| **NGFF1** | M.2 KEY-B 2242/3042 connector | |
| **DCOUT1** | DC Output connector | 6 x 1 wafer, pitch 2.50 mm |
| **JVIN1** | DC-Input connector | 1 x 3 terminal block, pitch 5.08 mm |
| **JEC_ROM1** | EC Debug connector | 5 x 2 header, pitch 2.00 mm |

## 2.4 EBM-SKLUS Jumpers & Connectors settings

### 2.4.1 Multi-function select (SW1)






**In Serial Port 1 mode**

| | RS-232* | RS-422 | RS-485 |
|---|---|---|---|
| 1 | OFF | ON | ON |
| 2 | ON | OFF | ON |

**In Serial Port 2 mode**

| | RS-232* | RS-422 | RS-485 |
|---|---|---|---|
| 3 | OFF | ON | ON |
| 4 | ON | OFF | ON |

**Power mode**

| | AT | ATX* |
|---|---|---|
| 5 | ON | OFF |

**DDI1 mode(IET)**

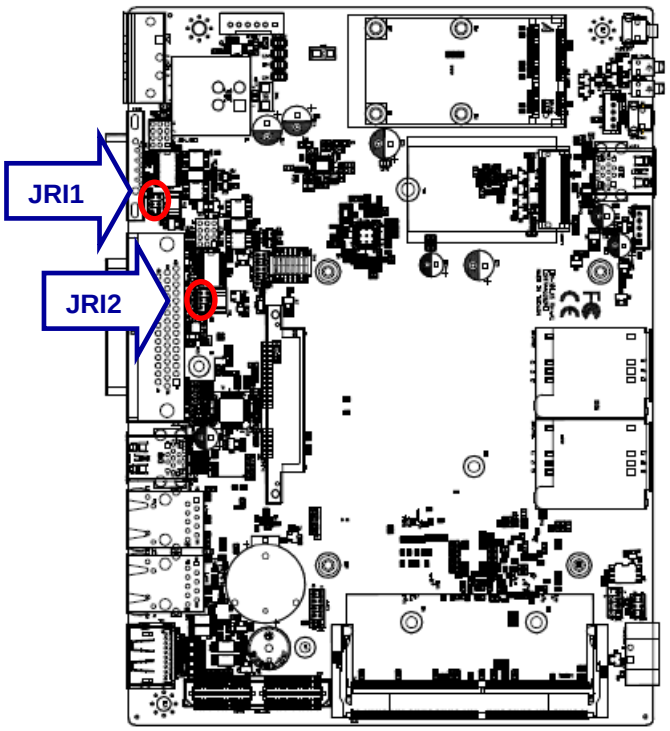
| | DisplayPort | HDMI* |
|---|---|---|
| 6 | ON | OFF |

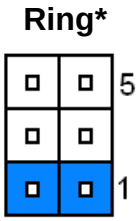
**DDI2 mode(DP+)**

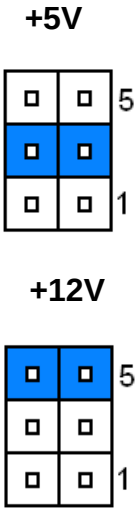
| | DisplayPort* | HDMI | Cable select |
|---|---|---|---|
| 7 | OFF | OFF | ON |
| 8 | ON | OFF | OFF |

*** Default**

### 2.4.2 COM 1/2 pin 9 signal select (JRI1/2)

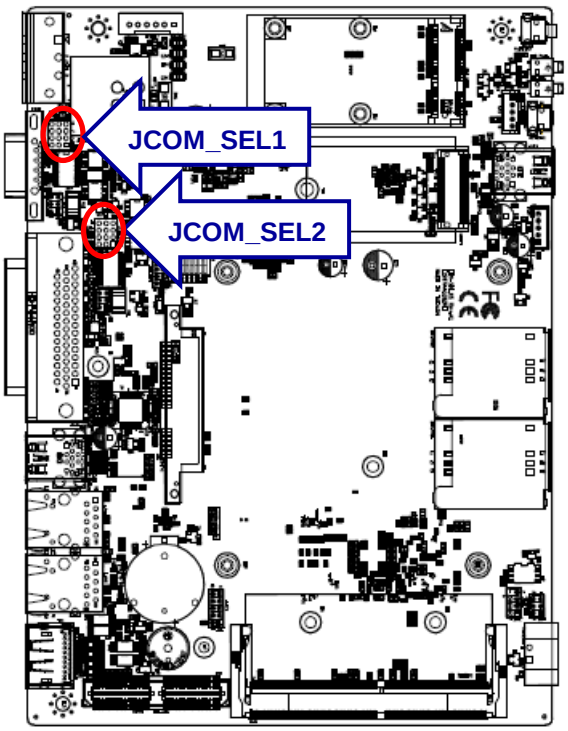


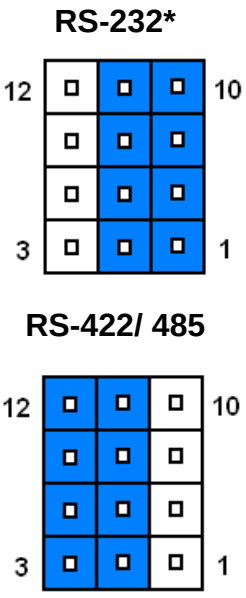




*** Default**

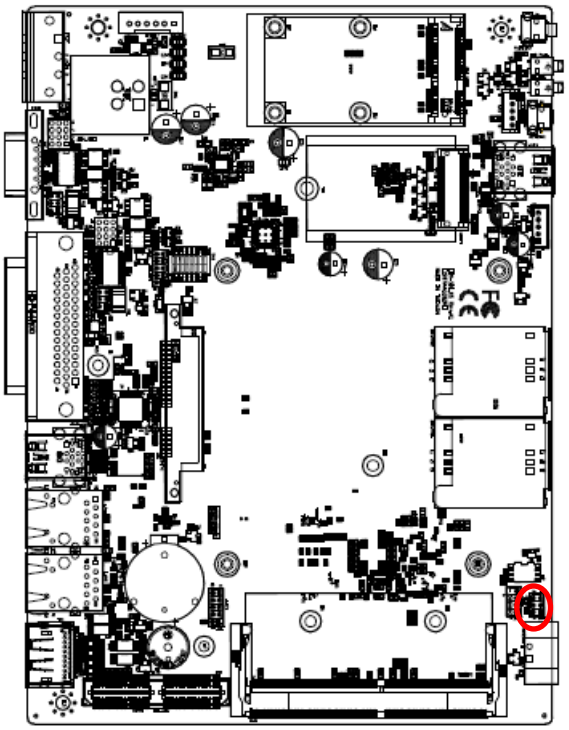
### 2.4.3 Serial port 1/2 RS-232/422/485 mode select (JCOM_SEL1/2)

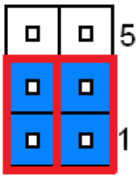


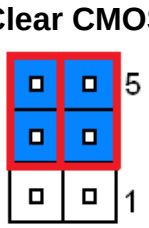




***Default**

### 2.4.4 Clear CMOS (JCMOS1)

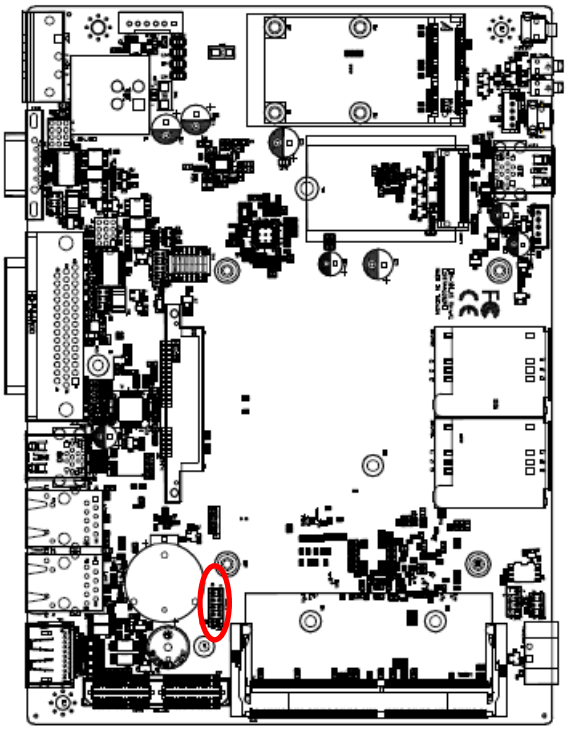


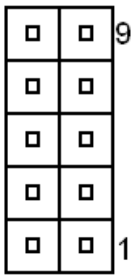



***Default**

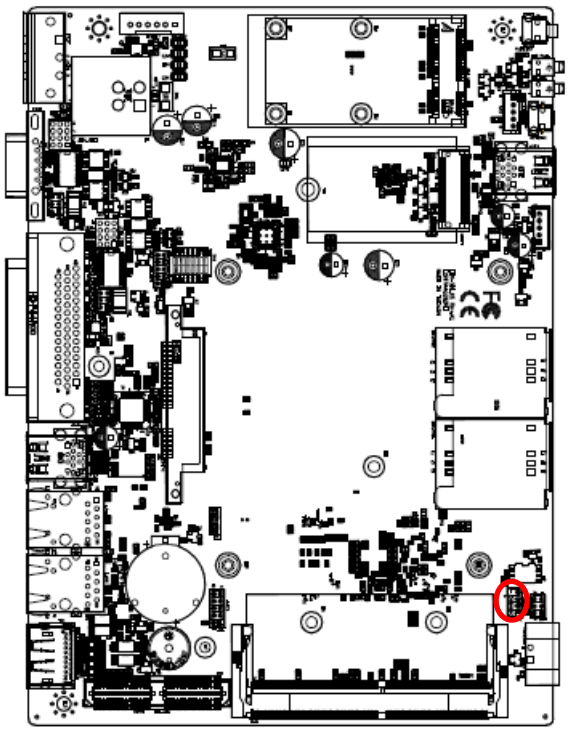
### 2.4.5 LPC port connector (JLPC1)

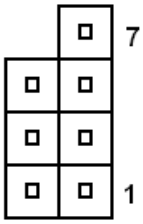





| Signal | PIN | PIN | Signal |
|---|---|---|---|
| GND | 10 | 9 | LPC_SERIRQ |
| CLK_24M_PORT80 | 8 | 7 | LPC_AD3 |
| LPC_LFRAME# | 6 | 5 | LPC_AD2 |
| RST_PORT80# | 4 | 3 | LPC_AD1 |
| +3.3V | 2 | 1 | LPC_AD0 |

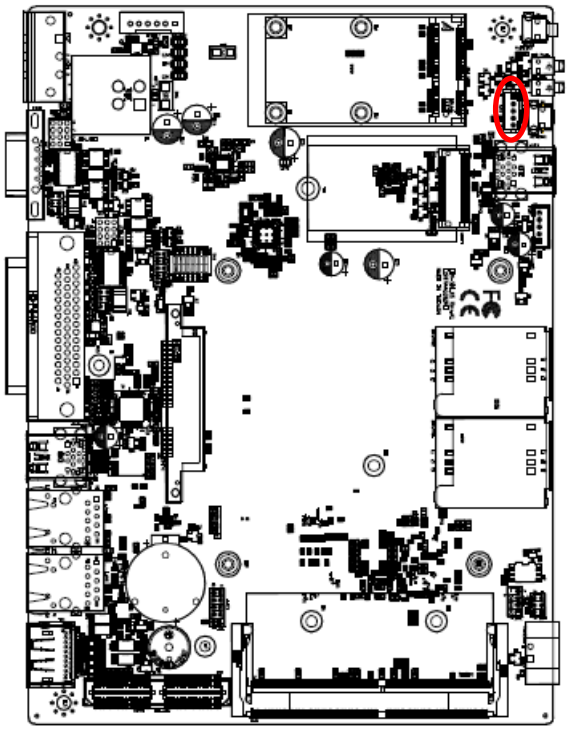
### 2.4.6 SPI connector (JSPI1)





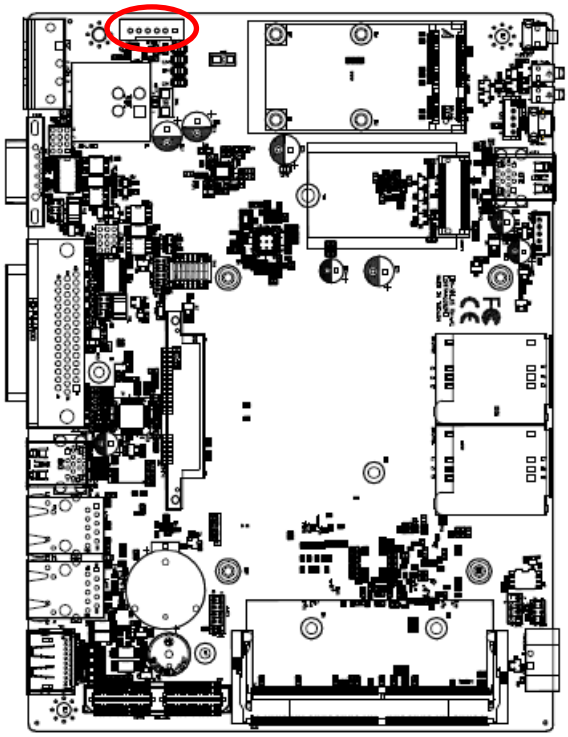

| Signal | PIN | PIN | Signal |
|---|---|---|---|
| | | 7 | HOLD# |
| SPI_SI | 6 | 5 | SPI_SO |
| SPI_CLK | 4 | 3 | SPI0_CS0# |
| GND | 2 | 1 | +3.3VSB |

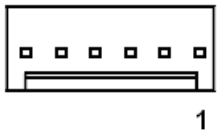
### 2.4.7 Front Panel Connector (CN5)




| Signal | PIN |
|---|---|
| PWRBTN_TO_EC# | 1 |
| PM_SYSRST# | 2 |
| GND | 3 |
| +5VSB | 4 |
| PWR_LED- | 5 |

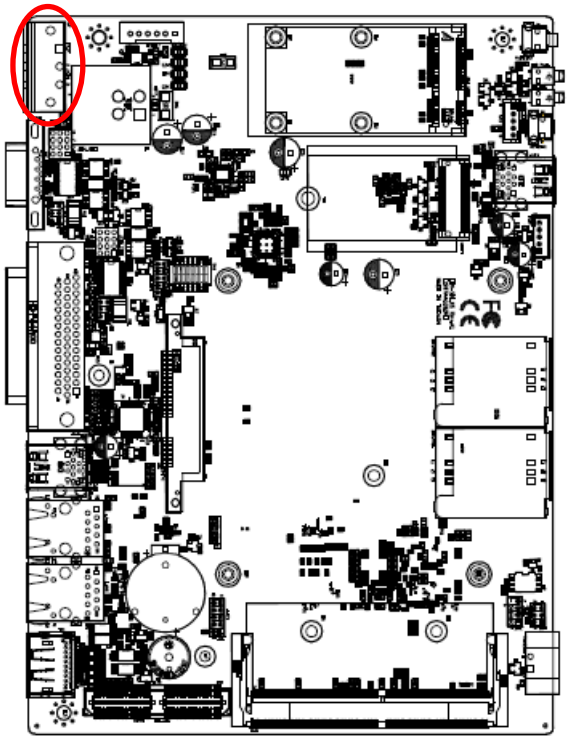
### 2.4.8 DC Output connector (DCOUT1)

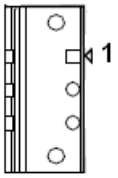





| Signal | PIN |
|---|---|
| +VIN | 1 |
| +VIN | 2 |
| +VIN | 3 |
| GND | 4 |
| GND | 5 |
| GND | 6 |

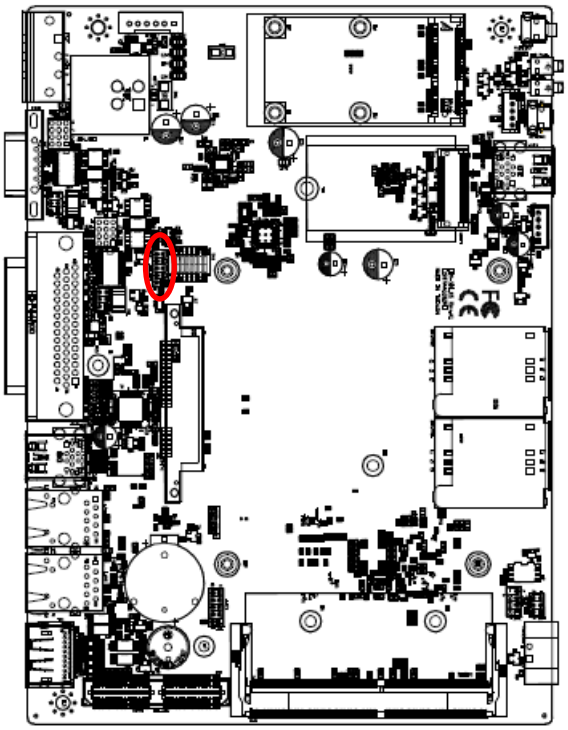
### 2.4.9 DC Input connector (JVIN1)

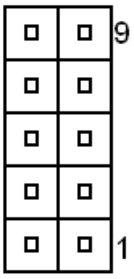





| Signal | PIN |
|---|---|
| +DC_IN | 1 |
| CHASSIS_GND | 2 |
| GND | 3 |

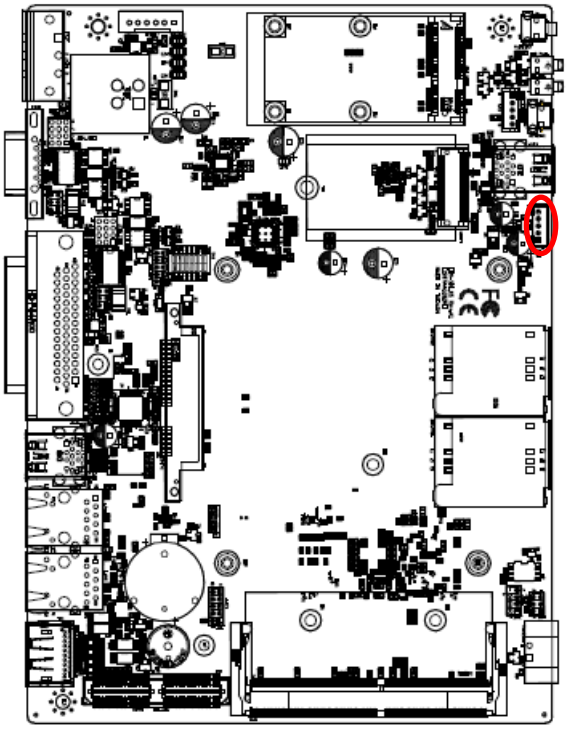
### 2.4.10 EC Debug connector (JEC_ROM1)





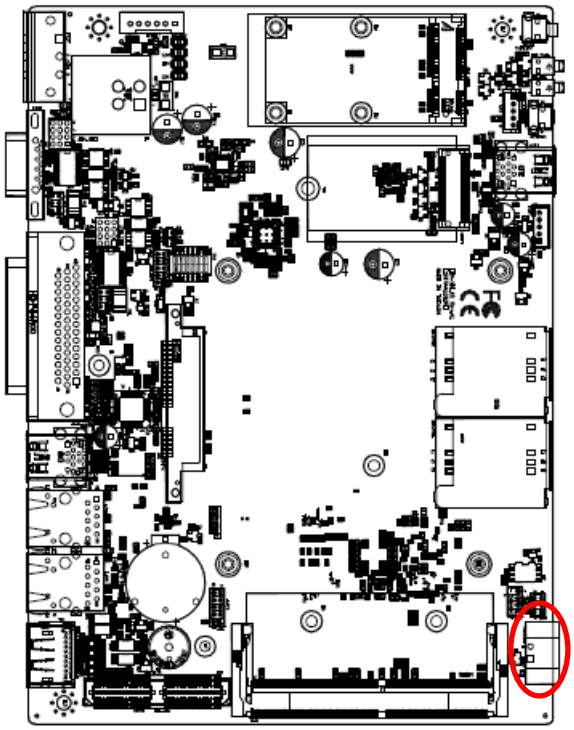

| Signal | PIN | PIN | Signal |
|---|---|---|---|
| EC_SMDAT_DEBUG | 10 | 9 | EC_SMCLK_DEBUG |
| NC | 8 | 7 | EC_HOLD# |
| EC_FMOSI | 6 | 5 | EC_FMISO |
| EC_FSCK | 4 | 3 | EC_FSCE# |
| GND | 2 | 1 | +VSPI_EC |

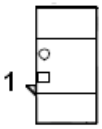
### 2.4.11 On-board header for USB2.0 (USB2)




| Signal | PIN |
|---|---|
| GND | 5 |
| GND | 4 |
| USB_z_PP2 | 3 |
| USB_z_PN2 | 2 |
| +5VSB | 1 |

### 2.4.12 Power ON/OFF connector (PWRBTN1)






| Signal | PIN |
|---|---|
| GND | 2 |
| PWRBTN#_R | 1 |

## 2.5 AUX-M01, IET-6 LAN Bypass, IET-6 LAN Normal, IET-PSEBF (4 port af), IET-PSEBT (2 port at), AUX-M07, AUX-M08, EBM-BYTS DB-A, EBM-CDVS DB-A, EBM-CDVS DB-B and EBM-BYTS DB-E Jumper & Connector list

### 2.5.1 AUX-M01

**Jumpers**

| Label | Function | Note |
|---|---|---|
| **JRI3/4/5/6** | COM 3/4/5/6 pin 9 signal select | 3 x 2 header, pitch 2.00mm |

**Connectors**

| Label | Function | Note |
|---|---|---|
| **USB1~2** | USB connector 1~2 | |
| **USB3** | USB connector 3 | 5 x 1 wafer, pitch 2.00mm |
| **JUSB3** | USB connector 3 | 5 x 1 header, pitch 2.00mm |
| **COM3~6** | Serial port connector 3~6 | |

### 2.5.2 IET-6 LAN Bypass

**Jumpers**

| Label | Function | Note |
|---|---|---|
| **SW1** | Normal/Bypass mode selector | |

**Connectors**

| Label | Function | Note |
|---|---|---|
| **USB1~2** | USB connector 1~2 | |
| **LAN1~4** | LAN connector 1~4 | |
| **IET_CB1** | IET Expansion slot | |

### 2.5.3 IET-6 LAN Normal

**Connectors**

| Label | Function | Note |
|---|---|---|
| **USB1~2** | USB connector 1~2 | |
| **USB3** | USB connector 3 | 5 x 1 wafer, pitch 2.00mm |
| **LAN1~4** | LAN connector 1~4 | |
| **PWR1** | Power connector | 6 x 1 wafer, pitch 2.50mm |
| **IET_CB1** | IET Expansion slot | |

### 2.5.4 IET-PSEBF (4 port af)

**Connectors**

| Label | Function | Note |
|---|---|---|
| **USB1~2** | USB connector 1~2 | |
| **USB3** | USB connector 3 | 5 x 1 wafer, pitch 2.00mm |
| **LAN1~4** | LAN connector 1~4 | |
| **PWR1** | Power connector | 6 x 1 wafer, pitch 2.50mm |
| **IET_CB1** | IET Expansion slot | |

### 2.5.5 IET-PSEBT (2 port at)

**Connectors**

| Label | Function | Note |
|---|---|---|
| **USB1~2** | USB connector 1~2 | |
| **USB3** | USB connector 3 | 5 x 1 wafer, pitch 2.00mm |
| **LAN1~2** | LAN connector 1~2 | |
| **PWR1** | Power connector | 6 x 1 wafer, pitch 2.50mm |
| **IET_CB1** | IET Expansion slot | |

### 2.5.6 AUX-M07

**Connectors**

| Label | Function | Note |
|---|---|---|
| **USB1~2** | USB connector 1~2 | |
| **COM3~6** | Serial port connector 3~6 | |

### 2.5.7 AUX-M08

**Jumpers**

| Label | Function | Note |
|---|---|---|
| **JDI1** | Digital Input connector 1 | 8 x 2 header, pitch 2.00 mm |
| **JDI2** | Digital Input connector 2 | 8 x 2 header, pitch 2.00 mm |
| **JDO1** | Digital Output connector 1 | 8 x 2 header, pitch 2.00 mm |
| **JDO2** | Digital Output connector 2 | 8 x 2 header, pitch 2.00 mm |

**Connectors**

| Label | Function | Note |
|---|---|---|
| **USB1~2** | USB connector 1~2 | |

| | | |
|---|---|---|
| **DIO1** | General purpose I/O connector | 18 x 2 terminal, pitch 3.50 mm |
| **JEC_ROM2** | EC Debug connector | 5 x 2 header, pitch 2.00 mm |
| **LAN1~4** | LAN connector 1~4 | |
| **PWR1** | Power connector | 6 x 1 wafer, pitch 2.50 mm |
| **PWRBTN** | Power button | |
| **CN1** | Remote power button | 2 x 1 wafer, pitch 2.00 mm |
| **IET_CB1** | IET Expansion slot | |

### 2.5.8 EBM-BYTS DB-A

**Jumpers**

| Label | Function | Note |
|---|---|---|
| **OJRI3/4** | COM 3/4 pin 9 signal select | 3 x 2 header, pitch 2.00mm |

**Connectors**

| Label | Function | Note |
|---|---|---|
| **OUSB1~2** | USB connector 1~2 | |
| **LAN2~3** | RJ-45 Ethernet 2~3 | |
| **COM3~4** | Serial port connector 3~4 | |
| **HDMI1** | HDMI connector | 3 x 2 header, pitch 2.00mm |
| **OJP485** | Serial port 1/ 2 – RS485 mode select | 6 x 2 header, pitch 2.00mm |

### 2.5.9 EBM-CDVS DB-A

**Connectors**

| Label | Function | Note |
|---|---|---|
| **USB1~2** | USB connector 1~2 | |
| **PWRBTN** | Power button | |
| **LED_PWR** | LED Power | |
| **LED_HDD** | LED HDD | |
| **CN1** | Front Panel connector 1 | 5 x 1 wafer, pitch 2.00 mm |
| **DVI1** | DVI connector | |

### 2.5.10 EBM-CDVS DB-B

**Connectors**

| Label | Function | Note |
|---|---|---|
| **DC-IN1** | DC Input connector | 6 x 1 wafer, pitch 2.50 mm |

| | | |
|---|---|---|
| **DC-OUT1** | DC Output connector | 6 x 1 wafer, pitch 2.50 mm |

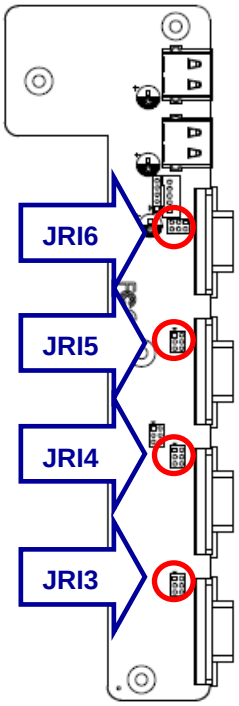
### 2.5.11 EBM-BYTS DB-E

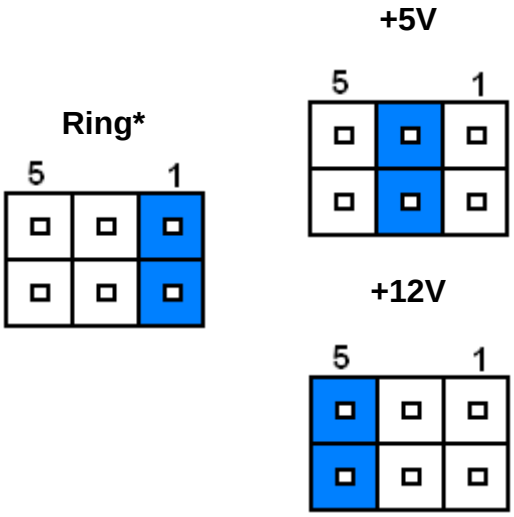
**Connectors**

| Label | Function | Note |
|---|---|---|
| **USB1~3** | 3 x USB2.0 connector | |
| **USB4~7** | 4 x USB3.0 connector | |

## 2.6 AUX-M01 Jumpers & Connectors settings

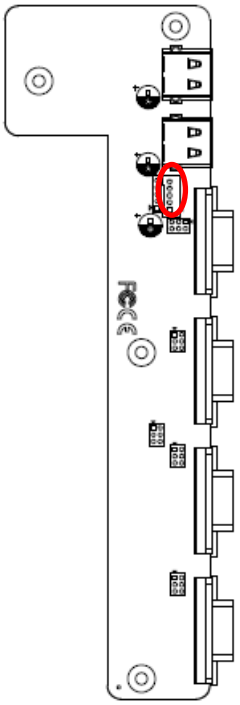
### 2.6.1 COM 3/4/5/6 pin 9 signal select (JRI3/4/5/6)



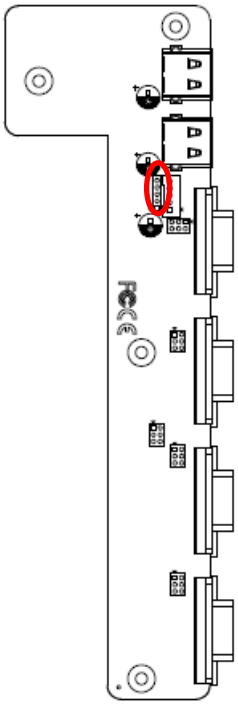

*** Default**

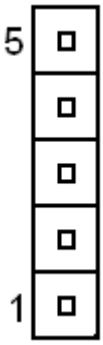
### 2.6.2 USB connector (USB3)




| Signal | PIN |
|---|---|
| GND | 5 |
| GND | 4 |
| PUSBP3 | 3 |
| PUSBN3 | 2 |
| PV5A_USB3 | 1 |

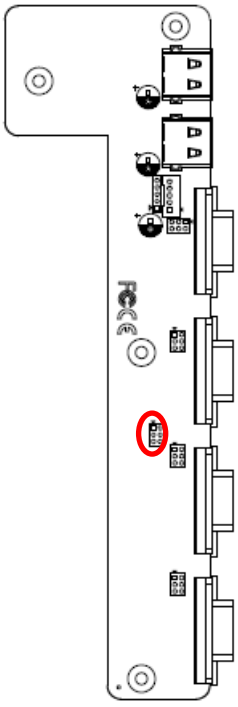
### 2.6.3 USB connector (JUSB3)

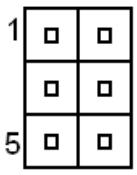





| Signal | PIN |
|---|---|
| GND | 5 |
| GND | 4 |
| PUSBP3 | 3 |
| PUSBN3 | 2 |
| PV5A_USB3 | 1 |

### 2.6.4 SMBUS of TCA9555 address setting (PJP1)

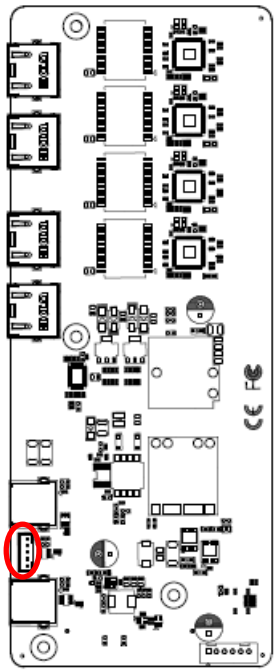





| Signal | PIN | PIN | Signal |
|---|---|---|---|
| GND | 1 | 2 | MC_9555A0 |
| GND | 3 | 4 | MC_9555A1 |
| GND | 5 | 6 | MC_9555A2 |

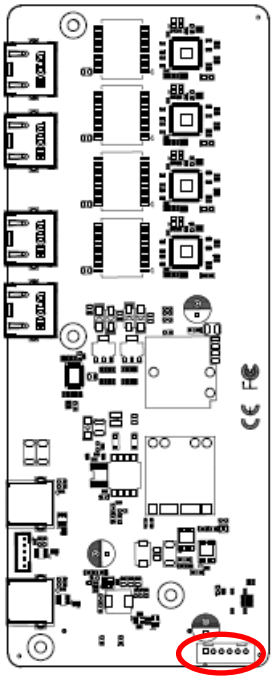
## 2.7 IET-6 LAN Normal Connectors settings

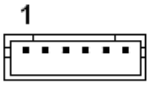
### 2.7.1 USB connector 3 (USB3)




| Signal | PIN |
|---|---|
| +5VSB | 1 |
| USB_DN_3 | 2 |
| USB_DP_3 | 3 |
| GND | 4 |
| GND | 5 |

### 2.7.2 Power connector (PWR1)

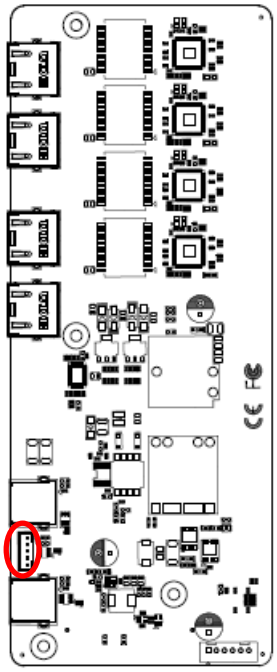





| Signal | PIN |
|---|---|
| +V12-26V | 1 |
| +V12-26V | 2 |
| +V12-26V | 3 |
| GND | 4 |
| GND | 5 |
| GND | 6 |

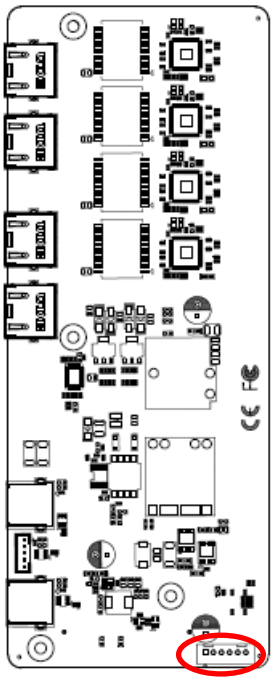
## 2.8 IET-PSEBF (4 port af) Jumpers & Connectors settings

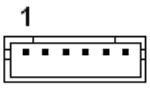
### 2.8.1 USB connector 3 (USB3)




| Signal | PIN |
|---|---|
| +5VSB | 1 |
| USB_DN_3 | 2 |
| USB_DP_3 | 3 |
| GND | 4 |
| GND | 5 |

### 2.8.2 Power connector (PWR1)

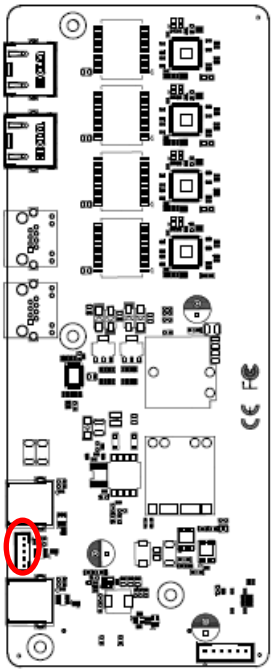





| Signal | PIN |
|---|---|
| +V12-26V | 1 |
| +V12-26V | 2 |
| +V12-26V | 3 |
| GND | 4 |
| GND | 5 |
| GND | 6 |

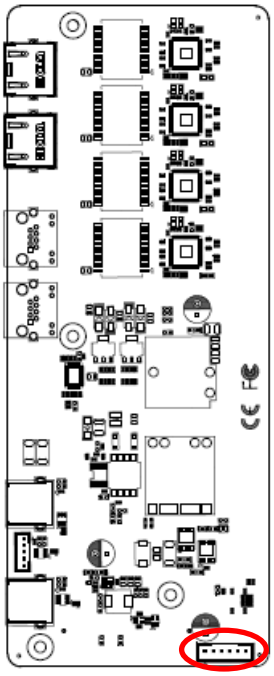
## 2.9 IET-PSEBT (2 port at) Jumpers & Connectors settings

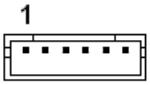
### 2.9.1 USB connector 3 (USB3)




| Signal | PIN |
|---|---|
| +5VSB | 1 |
| USB_DN_3 | 2 |
| USB_DP_3 | 3 |
| GND | 4 |
| GND | 5 |

### 2.9.2 Power connector (PWR1)

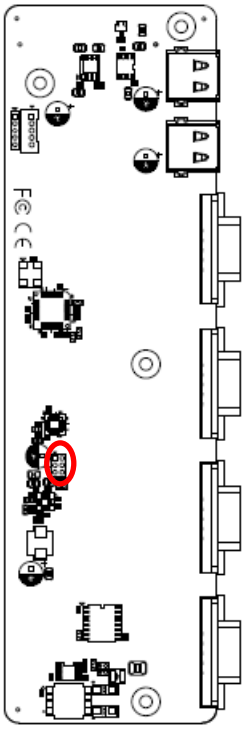


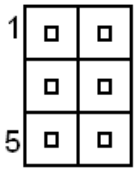



| Signal | PIN |
|---|---|
| +V12-26V | 1 |
| +V12-26V | 2 |
| +V12-26V | 3 |
| GND | 4 |
| GND | 5 |
| GND | 6 |

## 2.10 AUX-M07 Connector settings

### 2.10.1 SMBUS of TCA9555 address setting (SJP2)

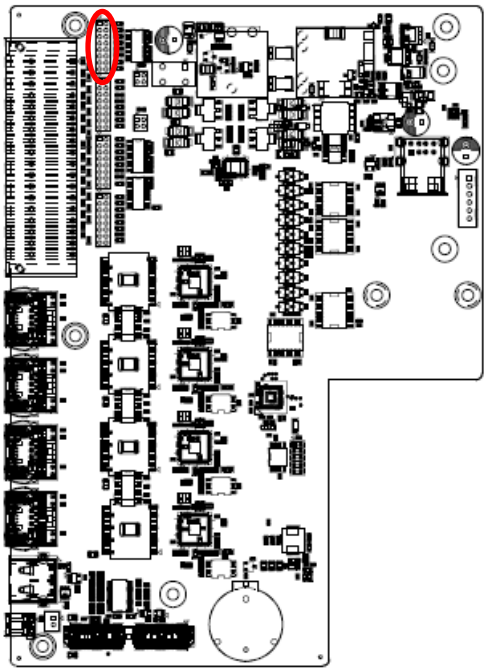


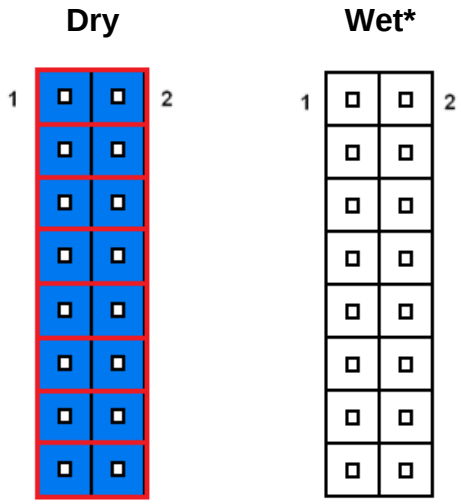



| Signal | PIN | PIN | Signal |
|---|---|---|---|
| GND | 1 | 2 | SMC_9555A0 |
| GND | 3 | 4 | SMC_9555A1 |
| GND | 5 | 6 | SMC_9555A2 |

## 2.11 AUX-M08 Connectors settings

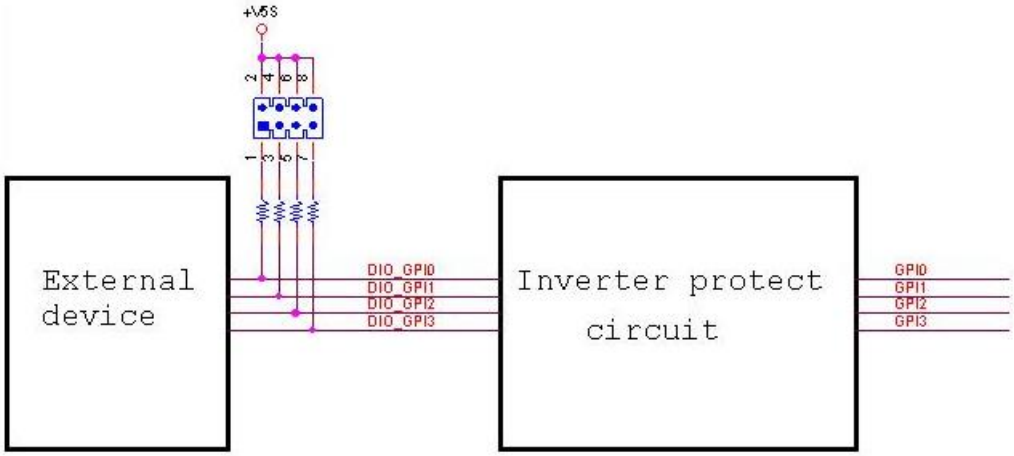
### 2.11.1 Digital Input connector 1 (JDI1)



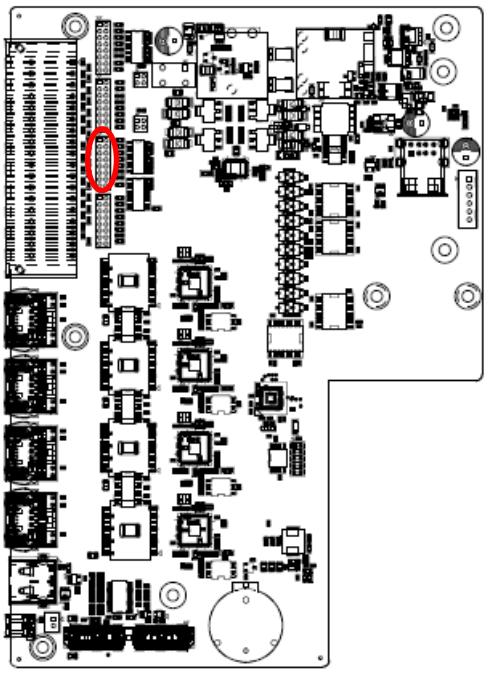


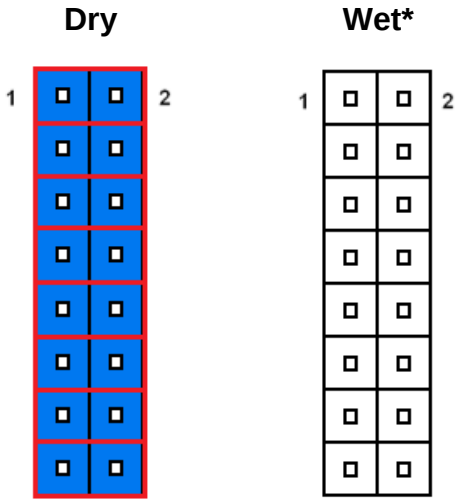

| Mode | Digital Input |
|---|---|
| Dry | Logic Level 0: Open<br>Logic Level 1: Close to GND |
| Wet* | Logic Level 0: +5V to 30V<br>Logic Level 1: +3V Max |

***Default**



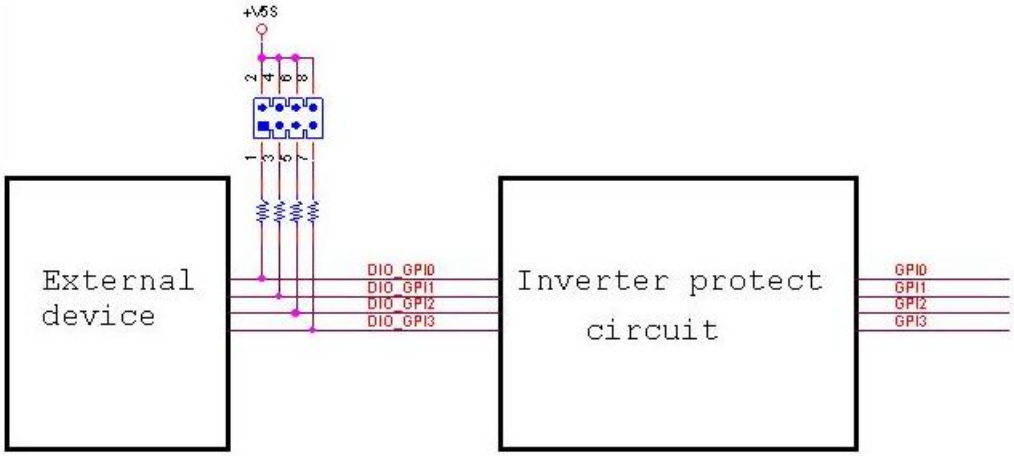
### 2.11.2 Digital Input connector 2 (JDI2)



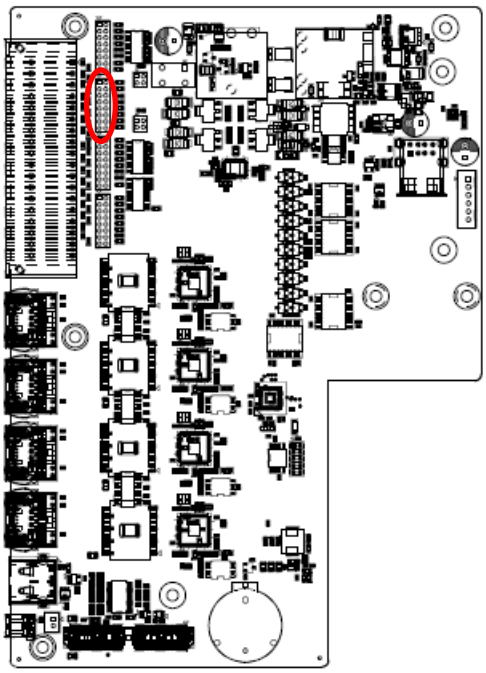


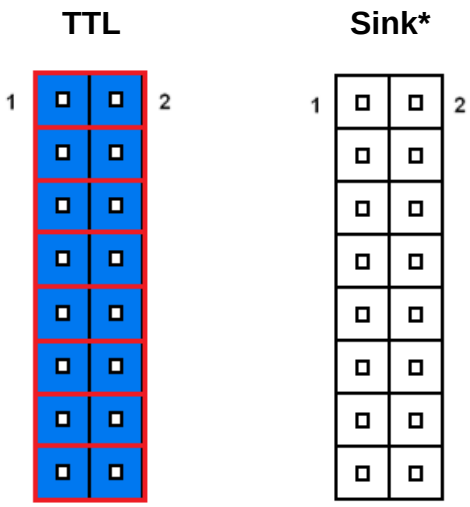

***Default**

| Mode | Digital Input |
|---|---|
| Dry | Logic Level 0: Open<br>Logic Level 1: Close to GND |
| Wet* | Logic Level 0: +5V to 30V<br>Logic Level 1: +3V Max |



### 2.11.3 Digital Output connector 1 (JDO1)

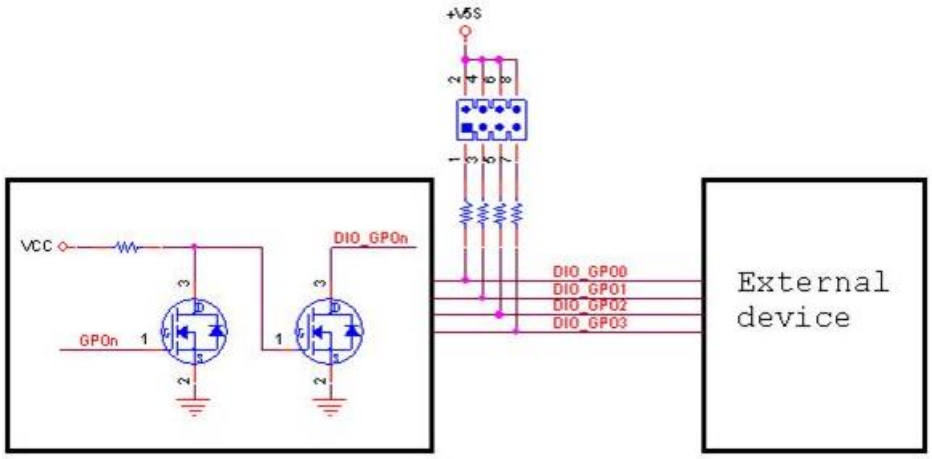




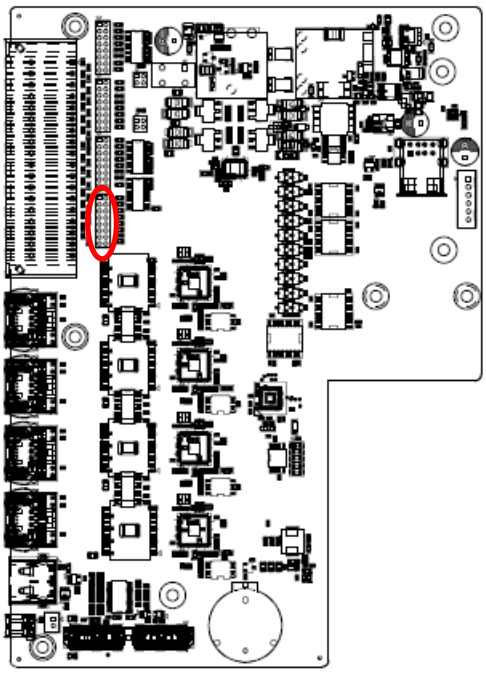

***Default**

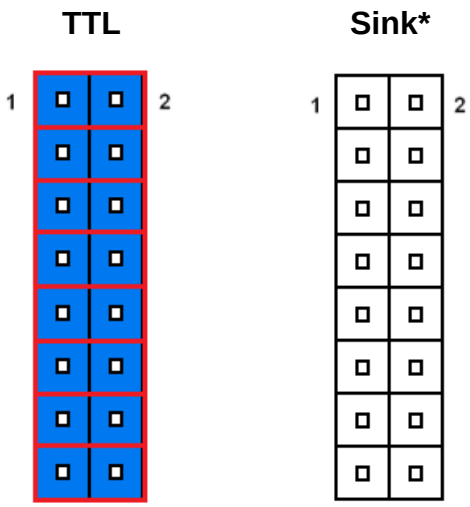
## Note:

Output Voltage: Max 250 mA per channel, current sink type.



### 2.11.4 Digital Output connector 2 (JDO2)

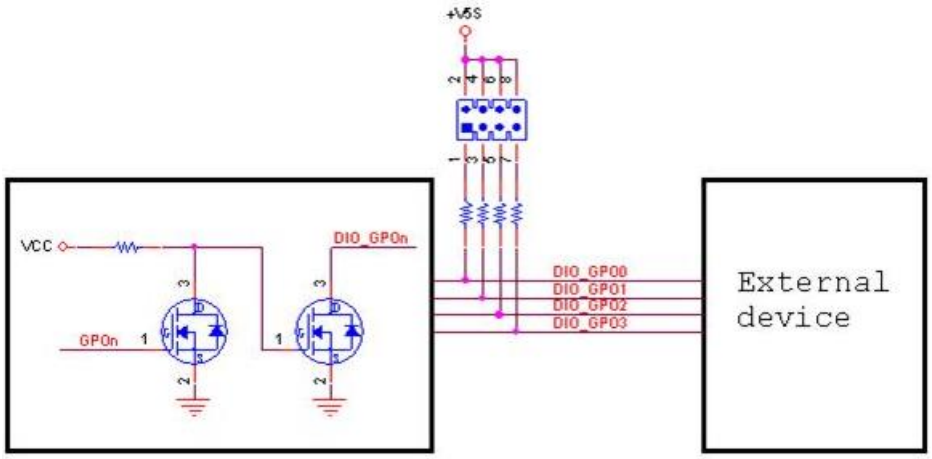




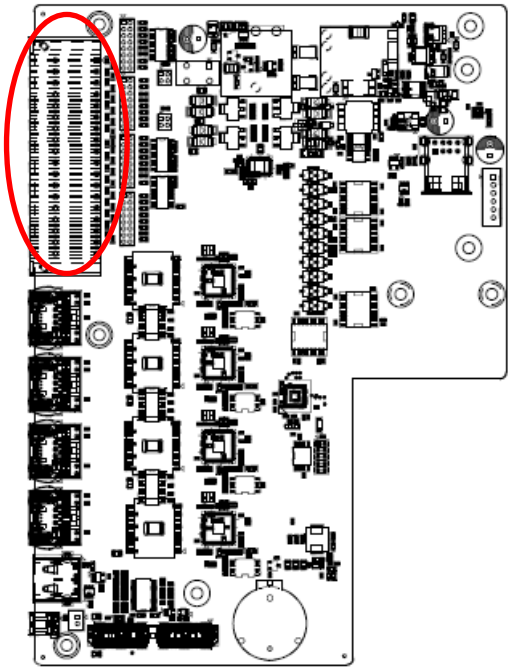

***Default**

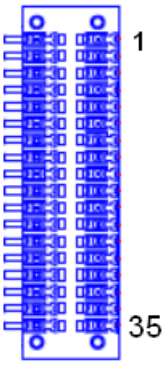
**Note:**

Output Voltage: Max 250 mA per channel, current sink type.



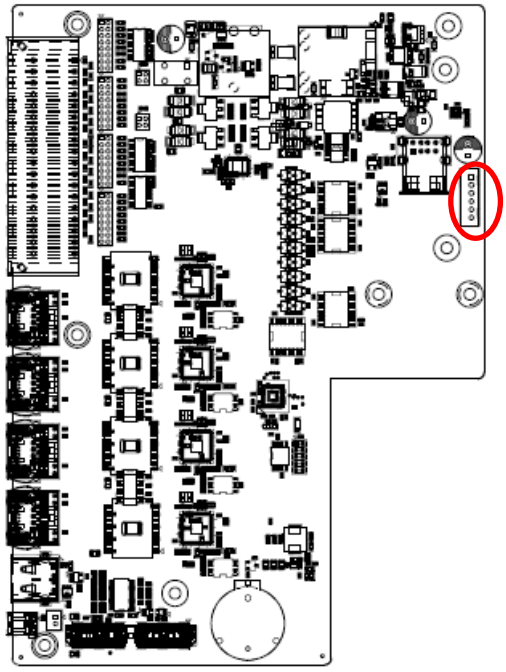
### 2.11.5 General purpose I/O connector (DIO1)





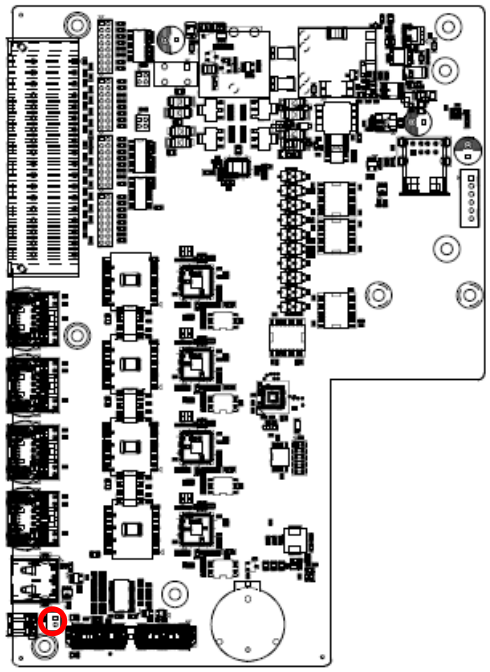

| Signal | PIN | PIN | Signal |
|---|---|---|---|
| DIO_GPO0 | 2 | 1 | DIO_GPI0 |
| DIO_GPO1 | 4 | 3 | DIO_GPI1 |
| DIO_GPO2 | 6 | 5 | DIO_GPI2 |
| DIO_GPO3 | 8 | 7 | DIO_GPI3 |
| DIO_GPO4 | 10 | 9 | DIO_GPI4 |
| DIO_GPO5 | 12 | 11 | DIO_GPI5 |
| DIO_GPO6 | 14 | 13 | DIO_GPI6 |
| DIO_GPO7 | 16 | 15 | DIO_GPI7 |
| DIO_GPO8 | 18 | 17 | DIO_GPI8 |
| DIO_GPO9 | 20 | 19 | DIO_GPI9 |
| DIO_GPO10 | 22 | 21 | DIO_GPI10 |
| DIO_GPO11 | 24 | 23 | DIO_GPI11 |
| DIO_GPO12 | 26 | 25 | DIO_GPI12 |
| DIO_GPO13 | 28 | 27 | DIO_GPI13 |
| DIO_GPO14 | 30 | 29 | DIO_GPI14 |
| DIO_GPO15 | 32 | 31 | DIO_GPI15 |
| +VEXT_DO | 34 | 33 | +VEXT_DI |
| GND | 36 | 35 | GND |

### 2.11.6 Power connector (PWR1)




| Signal | PIN |
|---|---|
| +VIN_PSE | 1 |
| +VIN_PSE | 2 |
| +VIN_PSE | 3 |
| GND | 4 |
| GND | 5 |
| GND | 6 |

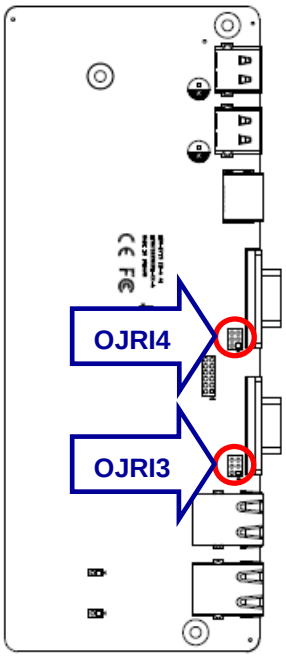
### 2.11.7 Remote power button (CN1)

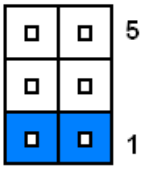


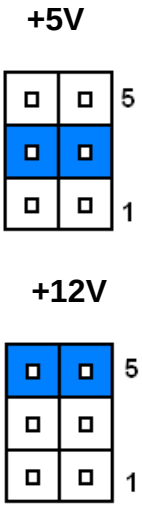

| Signal | PIN |
|---|---|
| PWRBTN_TO_EC# | 1 |
| GND | 2 |

## 2.12 EBM-BYTS DB-A Jumpers & Connectors settings

### 2.12.1 COM 3/4 pin 9 signal select (OJRI3/4)

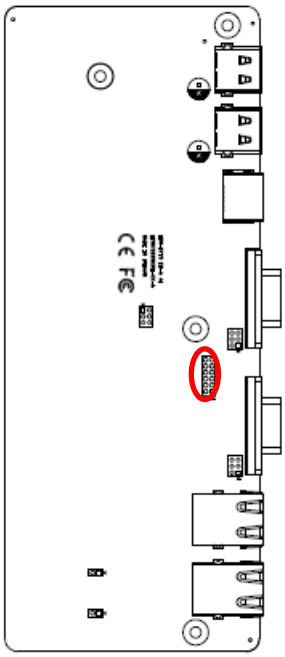


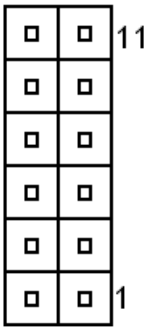




*** Default**

### 2.12.2 Serial port 1/ 2 – RS485 mode select (OJP485)





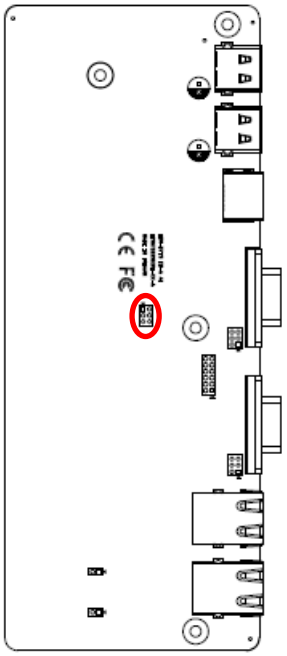

**In Serial Port 1 mode**

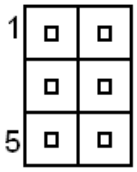
| PIN | ON | NC |
|---|---|---|
| 1-2 | Auto Direction | RTS# Control* |
| 3-4 | 485TXP external biasing resistor | OPEN* |
| 5-6 | 485TXN external biasing resistor | OPEN* |

**In Serial Port 2 mode**

| | ON | NC |
|---|---|---|
| 7-8 | Auto Direction | RTS# Control* |
| 9-10 | 485TXP external biasing resistor | OPEN* |
| 11-12 | 485TXN external biasing resistor | OPEN* |

### 2.12.3 SMBUS of TCA9555 address setting (OJP1)

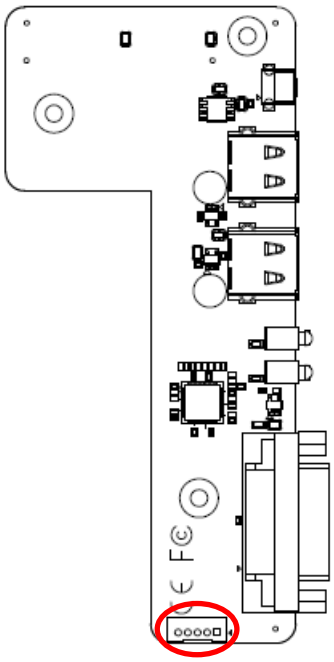


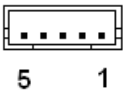



| Signal | PIN | PIN | Signal |
|---|---|---|---|
| GND | 1 | 2 | MC_9555A0 |
| GND | 3 | 4 | MC_9555A1 |
| GND | 5 | 6 | MC_9555A2 |

## 2.13 EBM-CDVS DB-A Connector settings

### 2.13.1 Front Panel Connector 1 (CN1)

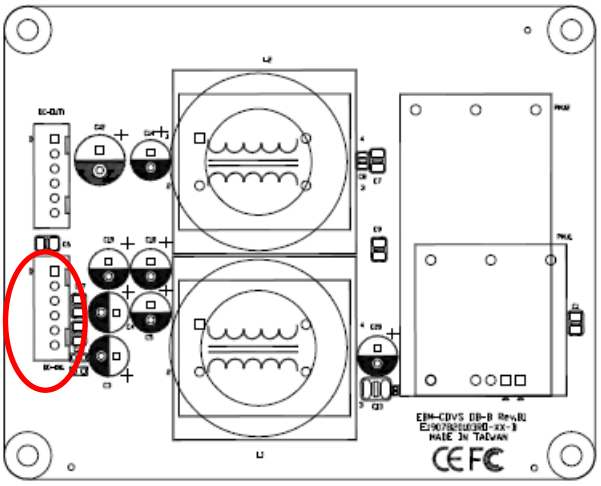





| Signal | PIN |
|---|---|
| NC | 1 |
| SYSRST# | 2 |
| GND | 3 |
| SATA_LED# | 4 |
| PWRSB_LED- | 5 |

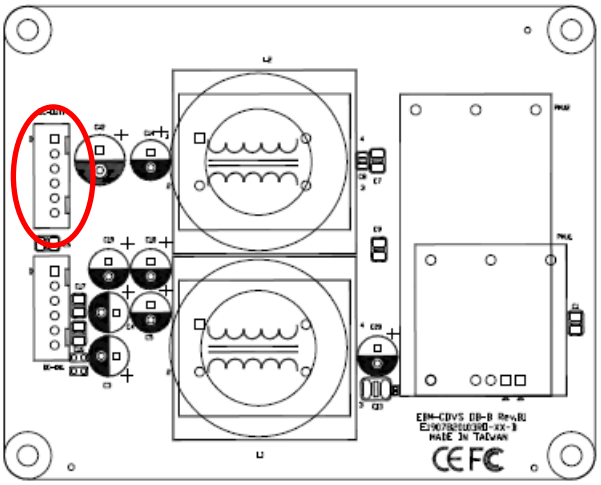
## 2.14 EBM-CDVS DB-B Connector settings

### 2.14.1 DC Input connector (DC-IN1)



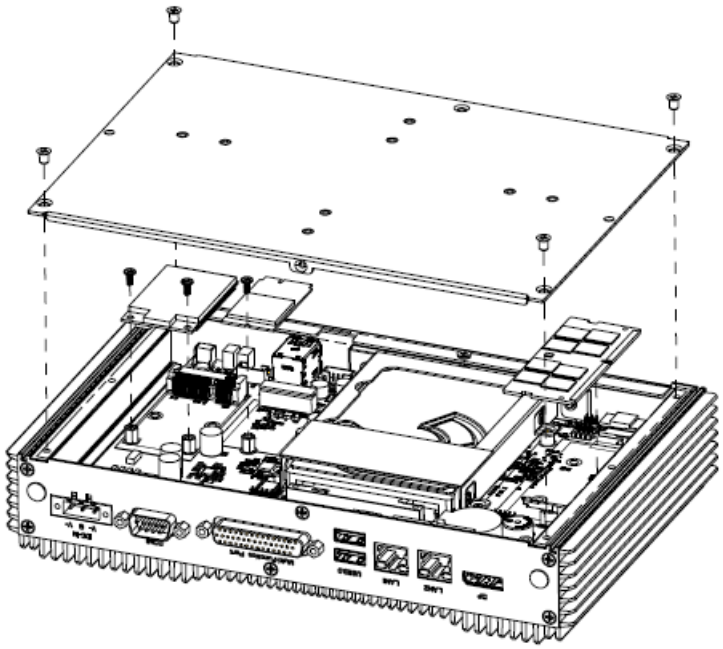

| Signal | PIN |
|---|---|
| +PWRIN | 1 |
| +PWRIN | 2 |
| +PWRIN | 3 |
| GND | 4 |
| GND | 5 |
| GND | 6 |

### 2.14.2 DC Output connector (DC-OUT1)




| Signal | PIN |
|---|---|
| +PWROUT | 1 |
| +PWROUT | 2 |
| +PWROUT | 3 |
| GND | 4 |
| GND | 5 |
| GND | 6 |

## 2.15 Installing Hard Disk & Memory, PCI devices (EMS-SKLU)

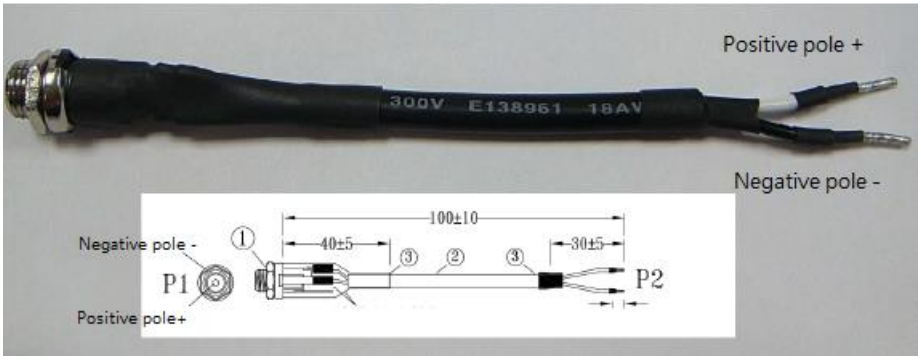


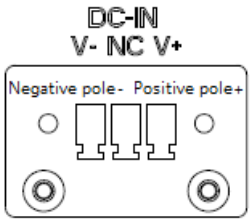
**Step 1.** Remove 4 screws from the bottom of your system and take it off.

**Step 2.** Slide the DDR4 SODIMM into the memory socket and press it down until properly seated.

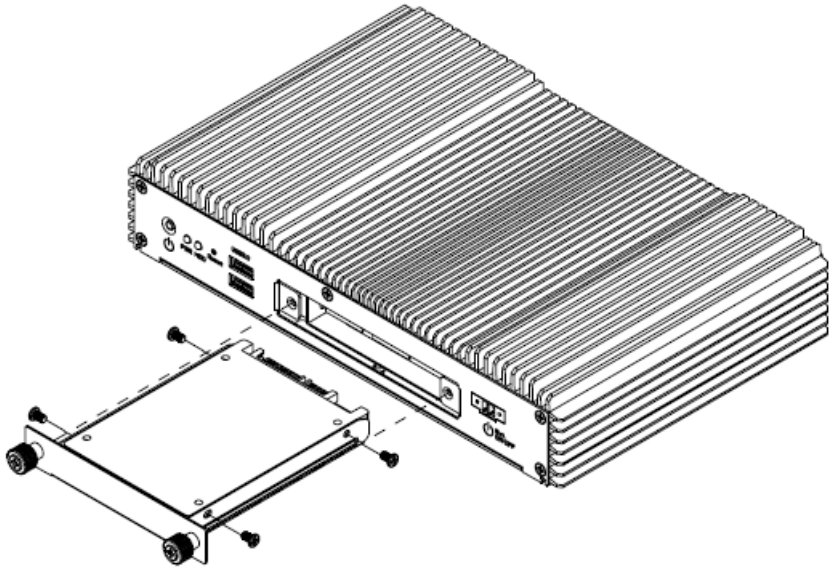
**Step 3.** Insert MPCIE card into designated locations and fasten with 2 screws to complete MPCIE installation.

**Step 4.** Insert M.2 B-Key card into designated locations and fasten with a screw to complete installation.




**WARNING:** Please target the right pole when you are setting it. The black wire is corresponding to the negative pole and another one is positive pole.



**Step 1.** Unfasten 2 screws from the HDD bracket and take it off.

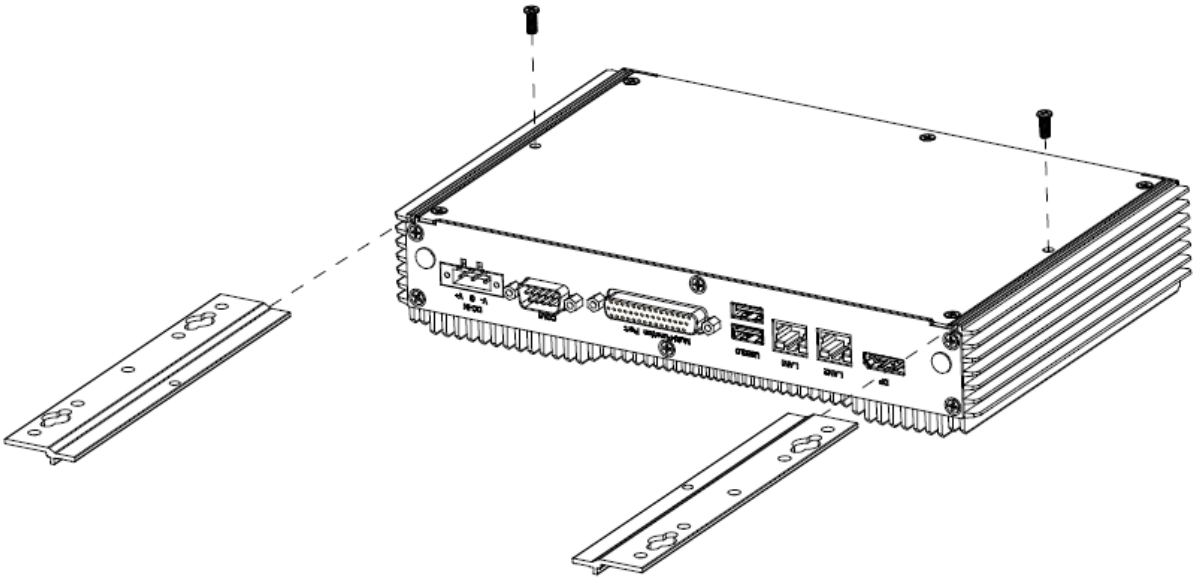
**Step 2.** Remove 4 screws to release the HDD bracket.

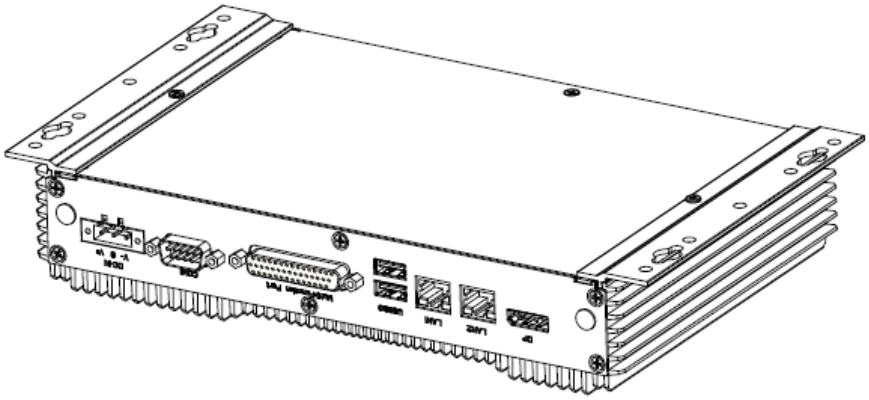
**Step 3.** Slide HDD into its bracket until properly seated.

**Step 4.** Secure HDD by means of 4 screws.

**Step 5.** Insert HDD bracket into designated locations and fasten with 2 screws to complete HDD installation.

## 2.16 Installing Mounting Brackets (EMS-SKLU)

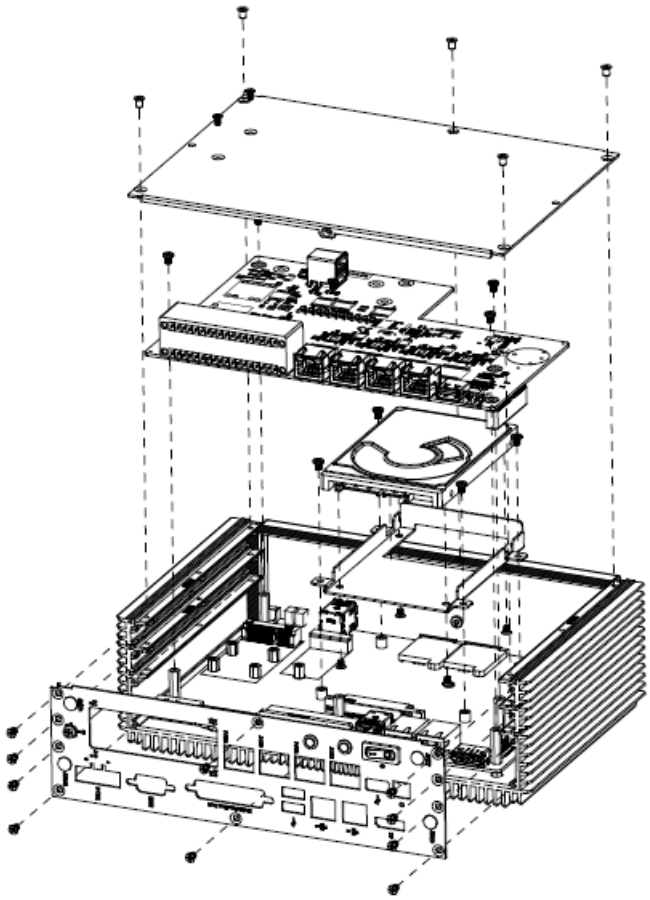




**Step 1.** Position brackets on rear sides, matching the holes on the system.

**Step 2.** Insert and fasten screw on each side of the system to secure Mounting brackets.

## 2.17 Installing Hard Disk (EMS-SKLU-GPIO)



**Step 1.** Remove 15 screws from the bottom and rear side of your system and take it off.

**Step 2.** Remove 4 screws from the board and take it off.

**Step 3.** Secure HDD by means of 4 screws.

**Step 4.** Insert HDD bracket into designated locations and fasten with 4 screws to complete HDD installation.

# 3.BIOS Setup

## 3.1 Introduction

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

## 3.2 Starting Setup

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

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

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

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

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

## 3.3 Using Setup

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

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

- **Navigating Through The Menu Bar**

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

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

- **To Display a Sub Menu**

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

## 3.4 Getting Help

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

## 3.5 In Case of Problems

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the AMI BIOS supports an override to the NVRAM settings which resets your system to its defaults.

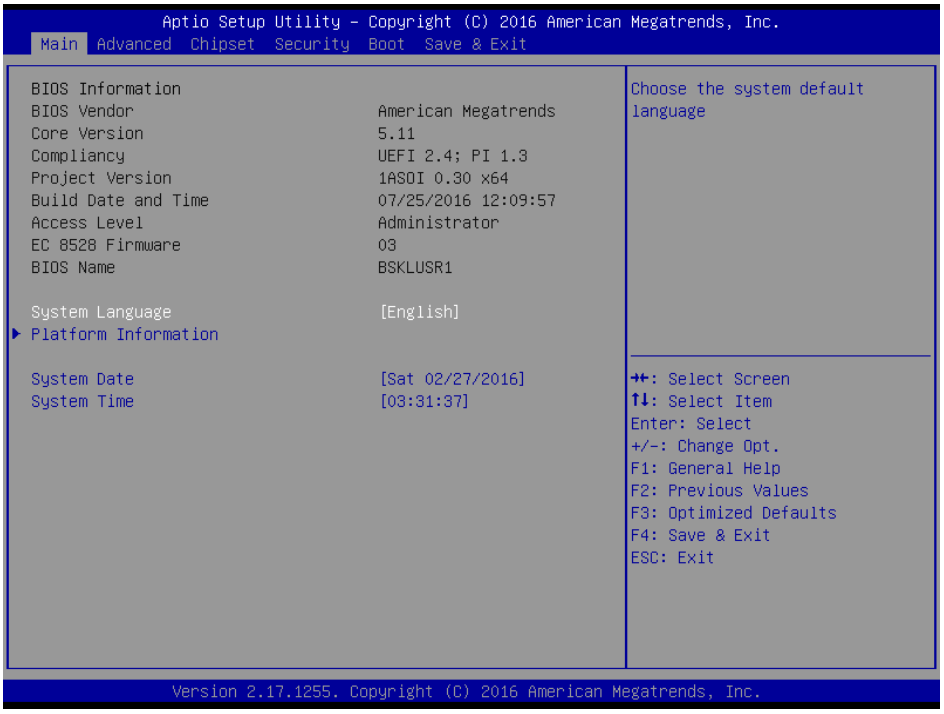
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance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

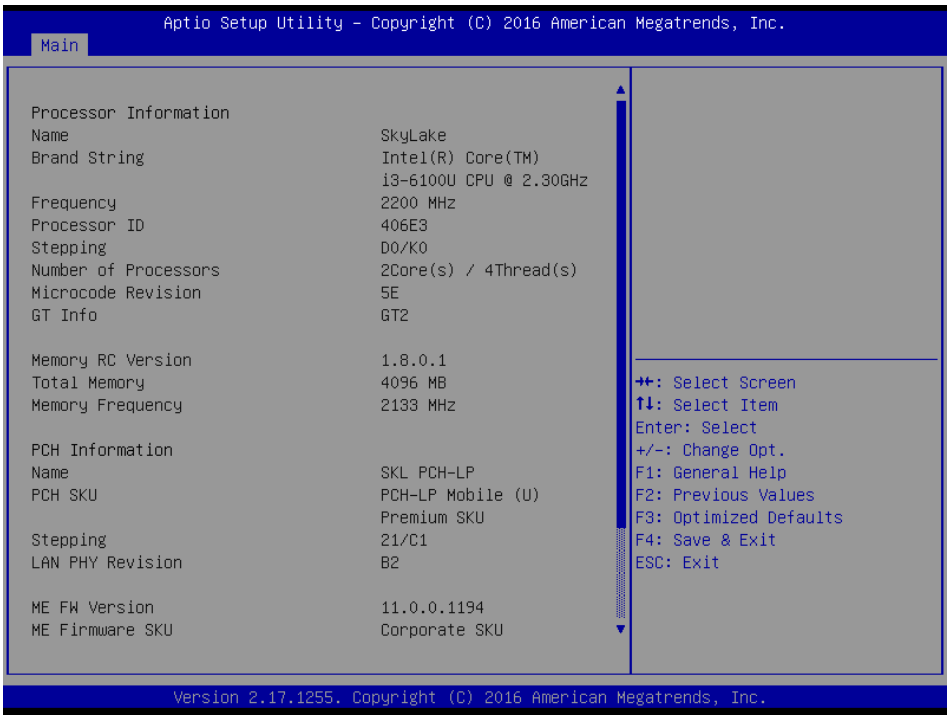
## 3.6 BIOS setup

Once you enter the Aptio Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

### 3.6.1 Main Menu

This section allows you to record some basic hardware configurations in your computer and set the system clock.



#### 3.6.1.1 System Language

This option allows choosing the system default language.

#### 3.6.1.2 System Date

Use the system date option to set the system date. Manually enter the day, month and year.

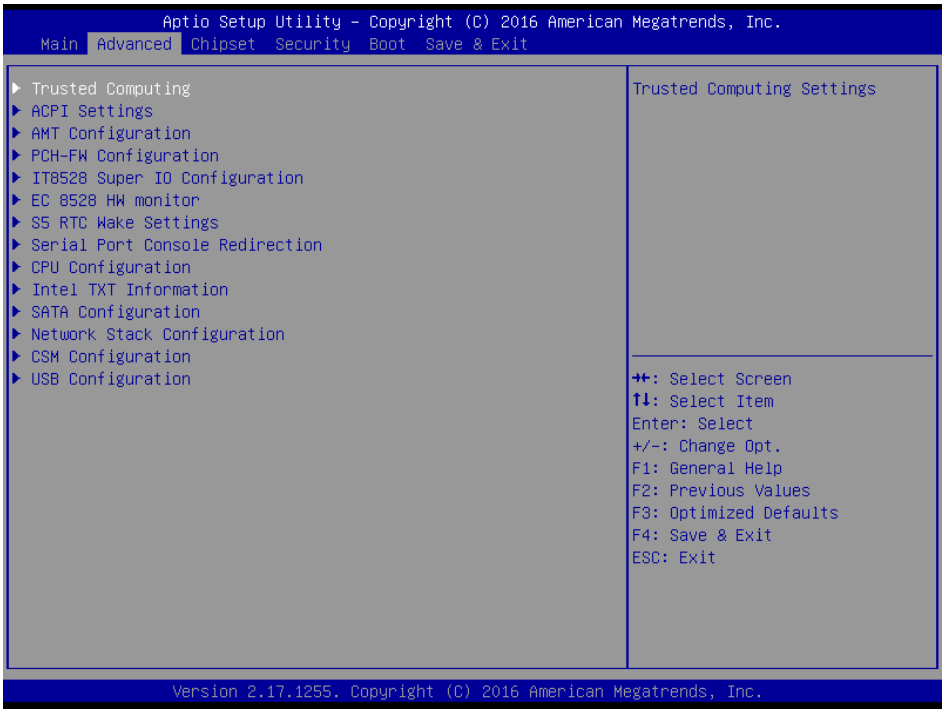
#### 3.6.1.3 System Time

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

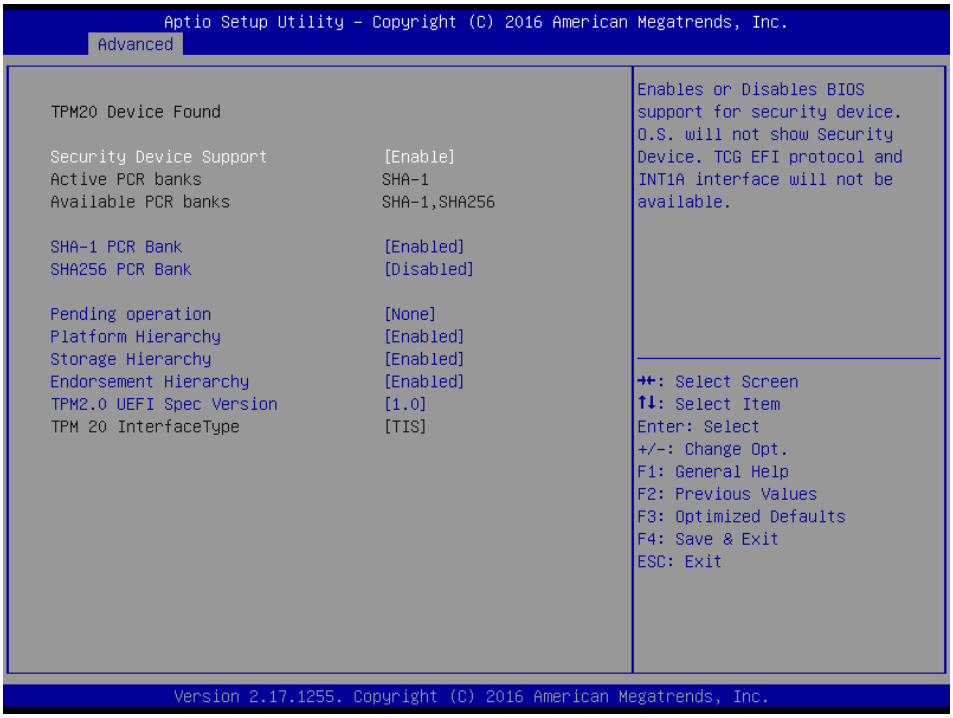
**Note:** The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.
Visit the Avalue website (www.avalue.com.tw) to download the latest product and BIOS information.

### 3.6.2 Advanced Menu

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

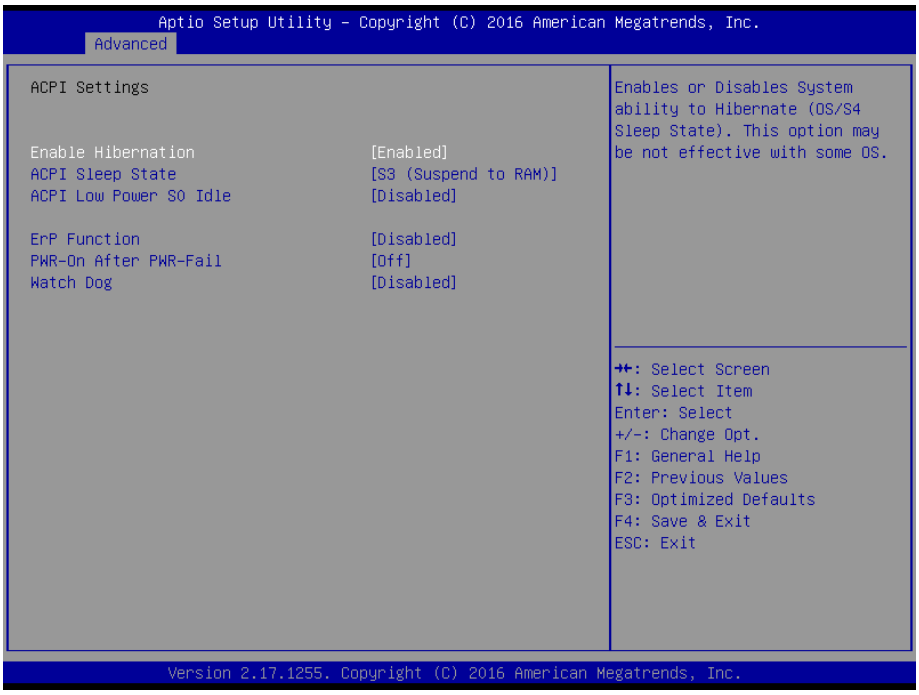


### 3.6.2.1 Trusted Computing



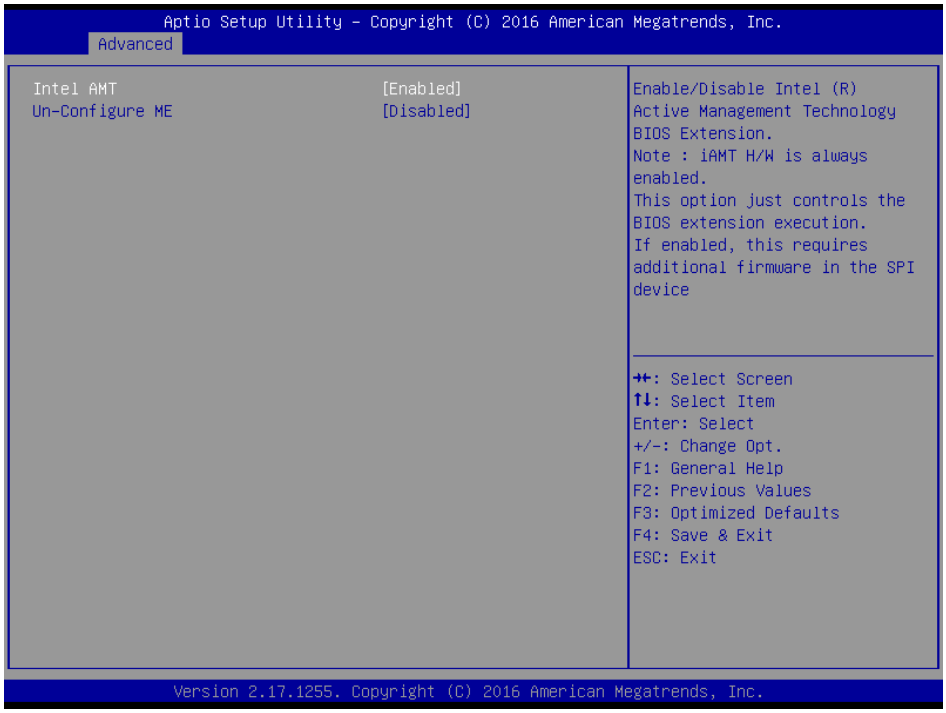

| Item | Options | Description |
|---|---|---|
| **Security Device Support** | Disable,<br>Enable**[Default]** | Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available. |
| **SHA-1 PCR Bank** | Disabled<br>Enabled**[Default]**, | Enables or Disables SHA-1 PCR Bank. |
| **SHA256 PCR Bank** | Disabled**[Default]**<br>Enabled, | Enables or Disables SHA256 PCR Bank. |
| **Pending operation** | 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. |
| **Platform Hierarchy** | Disabled<br>Enabled**[Default]**, | Enable or Disable Platform Hierarchy. |
| **Storage Hierarchy** | Disabled<br>Enabled**[Default]**, | Enable or Disable Storage Hierarchy. |
| **Endorsement Hierarchy** | Disabled<br>Enabled**[Default]**, | Enable or Disable Endorsement Hierarchy. |
| **TPM2.0 UEFI Spec Version** | 1.0**[Default]**,<br>1.x | Select the TCG2 Spec Version Support. 1.0: the Compatible mode for Win8/Win10, 1.x: For TCG2 newer spec for Win10. |

### 3.6.2.2 ACPI Settings



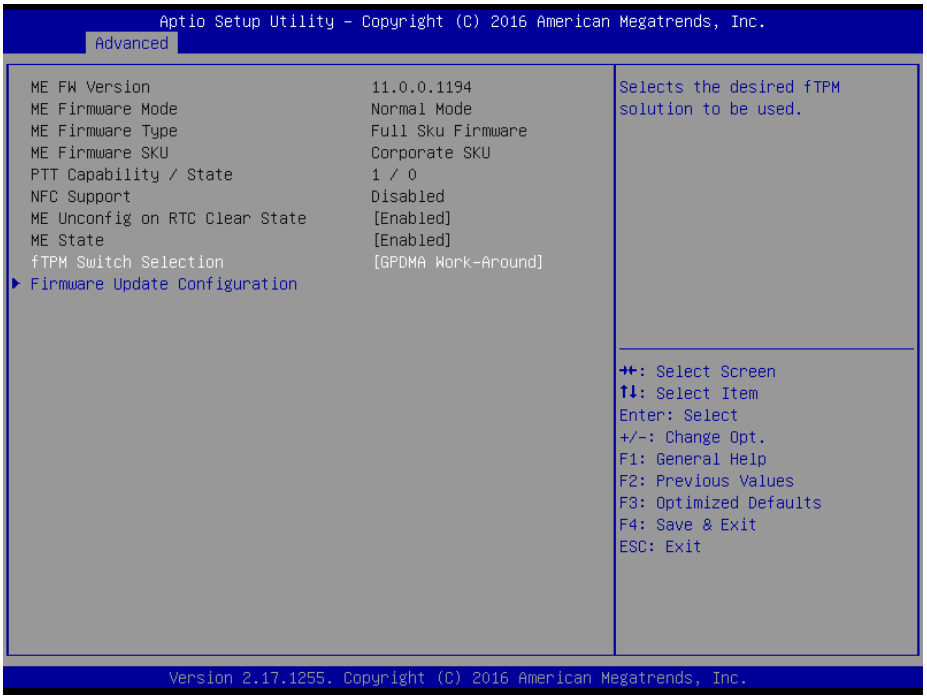

| Item | Options | Description |
|---|---|---|
| **Enable Hibernation** | Disabled<br>Enabled**[Default]**, | Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS. |
| **ACPI Sleep State** | Suspend Disabled,<br>S3 (Suspend to RAM) **[Default]** | Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed. |
| **ACPI Low Power S0 Idle** | Disabled**[Default]**,<br>Enabled | Enable or Disable ACPI Low Power S0 Idle Support. |
| **ErP Function** | Disabled**[Default]**,<br>Enabled | ErP Function (Deep S5). |
| **PWR-On After PWR-Fail** | Off**[Default]**<br>On<br>Last state | AC loss resume. |
| **Watch Dog** | Disabled**[Default]**,<br>30 sec<br>40 sec<br>50 sec<br>1 min<br>2 min<br>10 min<br>30 min | Select WatchDog. |

### 3.6.2.3 AMT Configuration



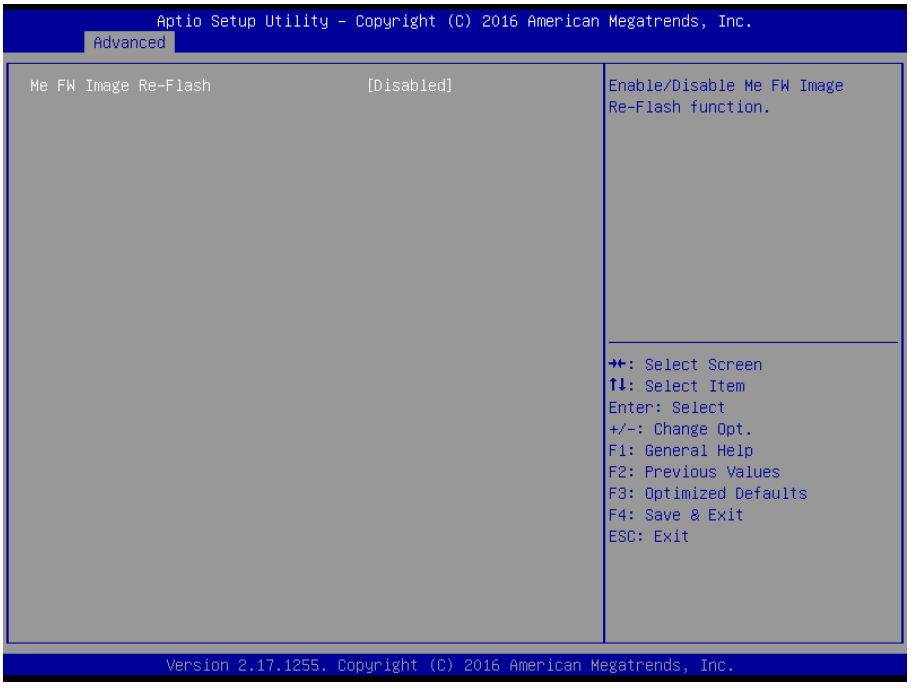

| Item | Options | Description |
|---|---|---|
| **Intel AMT** | Disabled<br>Enabled**[Default]**, | Enable/Disable Intel® Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device. |
| **Un-Configure ME** | Disabled**[Default]**<br>Enabled, | OEMFlag Bit 15: Un-Configure ME without password. |

### 3.6.2.4 PCH-FW Configuration




| Item | Options | Description |
|---|---|---|
| **fTPM Switch Selection** | GPDMA Work-Around**[Default]**, MSFT QFE Solution | Select the desired fTPM solution to be used. |

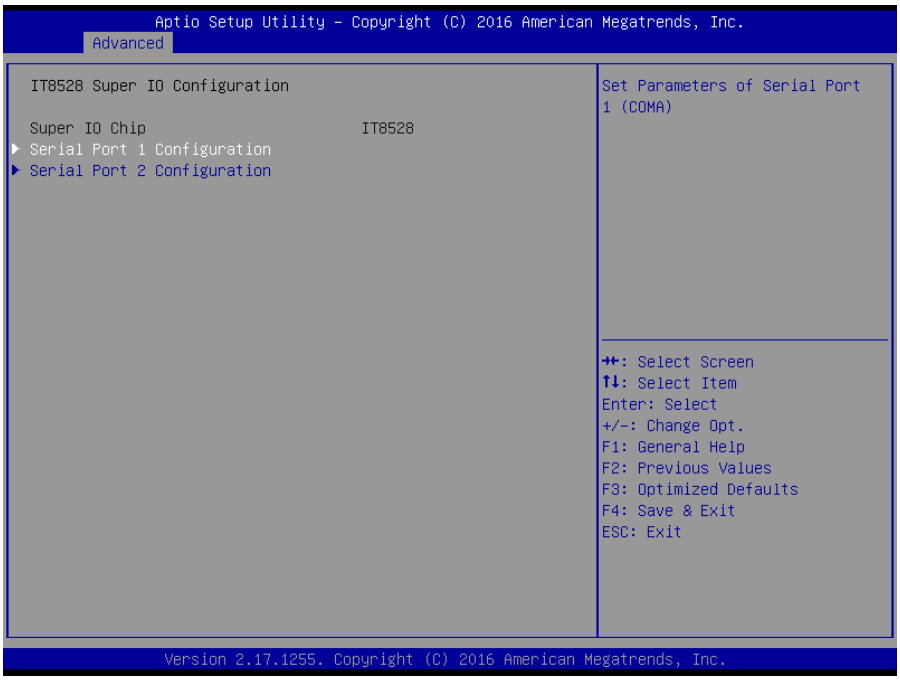
#### 3.6.2.4.1 Firmware Update Configuration




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

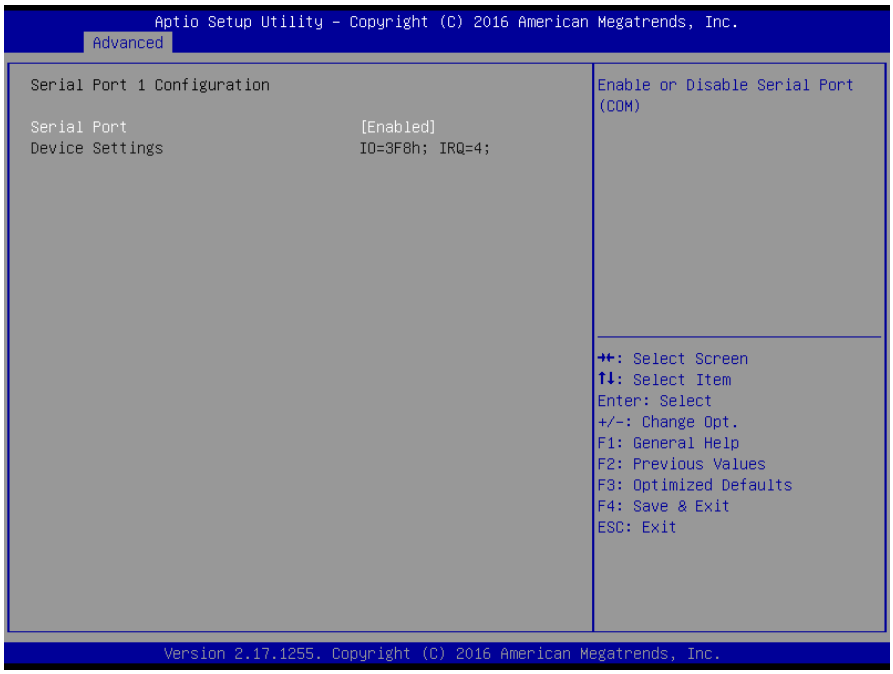
### 3.6.2.5 IT8528 Super IO Configuration

You can use this item to set up or change the IT8528 Super IO configuration for serial ports. Please refer to 3.6.2.5.1~ 3.6.2.5.2 for more information.



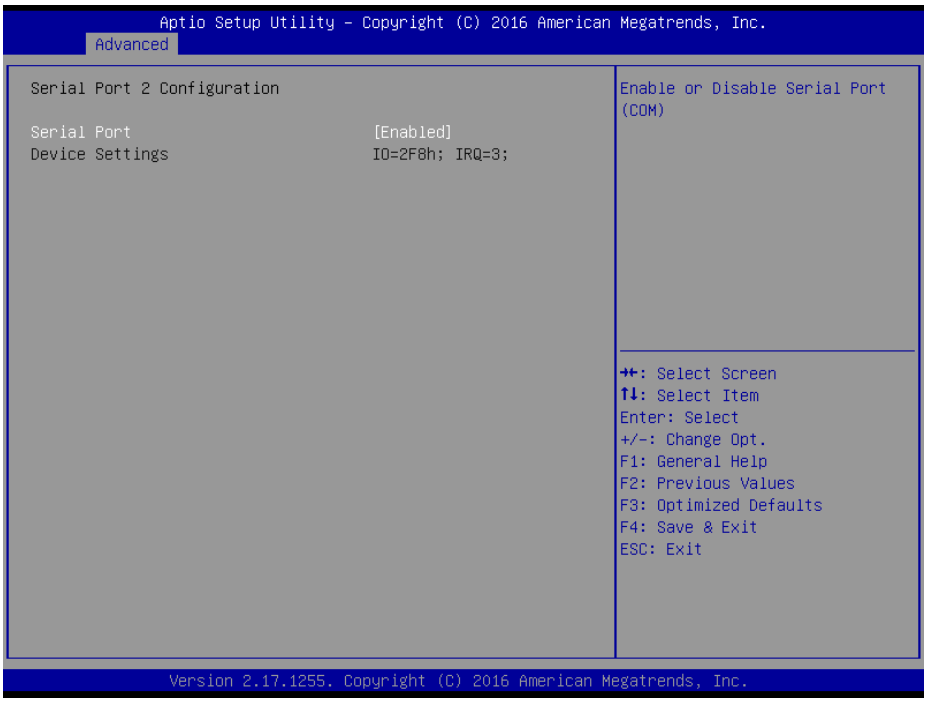

| Item | Description |
|---|---|
| **Serial Port 1 Configuration** | Set Parameters of Serial Port 1 (COMA). |
| **Serial Port 2 Configuration** | Set Parameters of Serial Port 2 (COMB). |

#### 3.6.2.5.1 Serial Port 1 Configuration



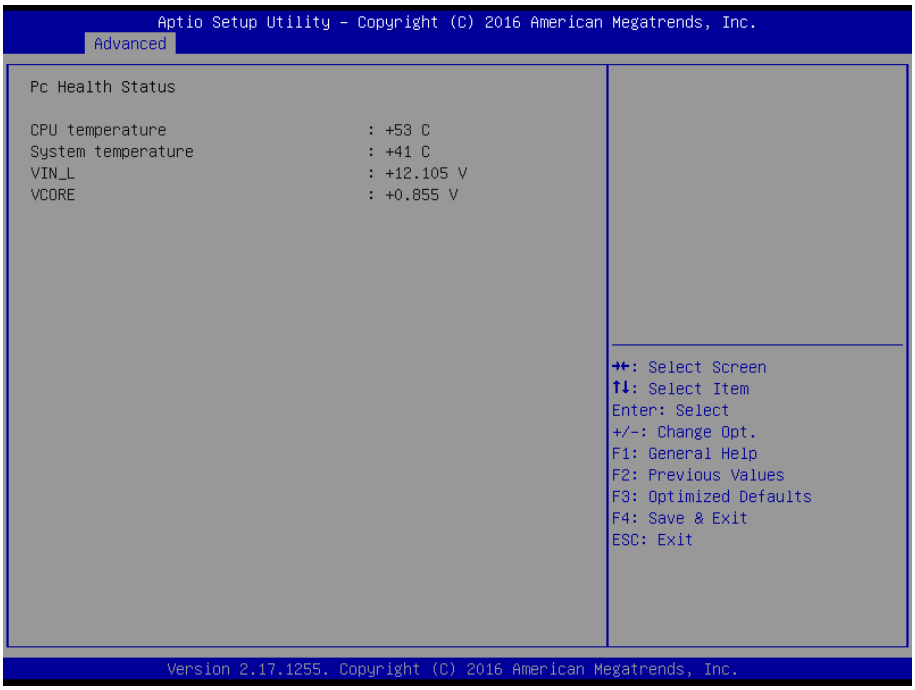
| Item | Option | Description |
|---|---|---|
| **Serial Port** | Enabled**[Default]**, Disabled | Enable or Disable Serial Port (COM). |

### 3.6.2.5.2 Serial Port 2 Configuration




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

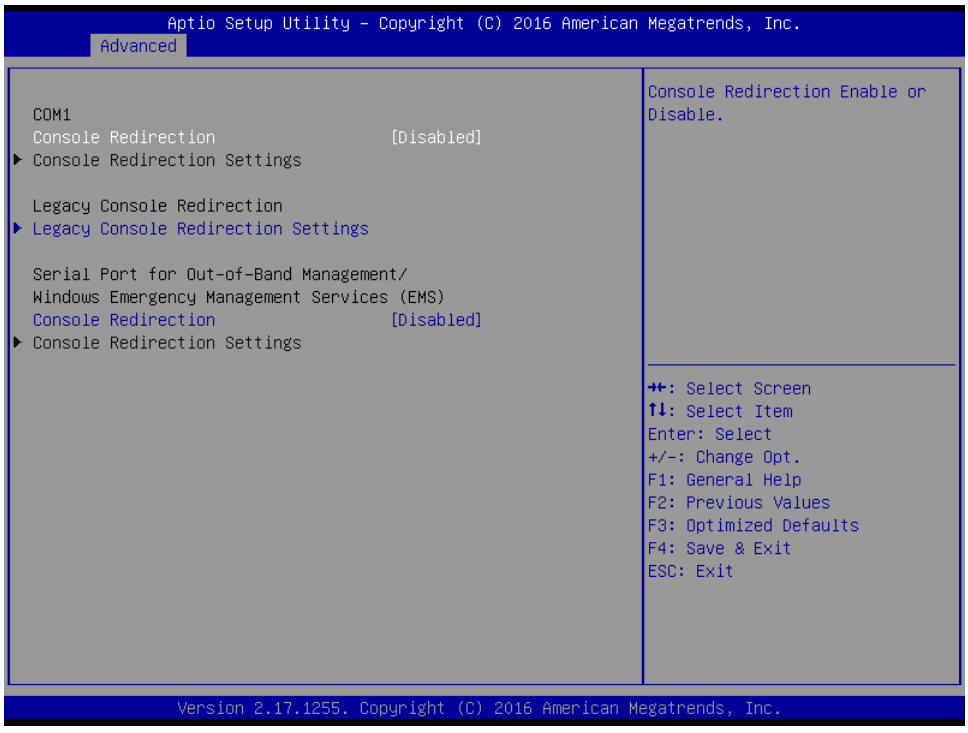
### 3.6.2.6 EC 8528 H/W Monitor



### 3.6.2.7 S5 RTC Wake Settings

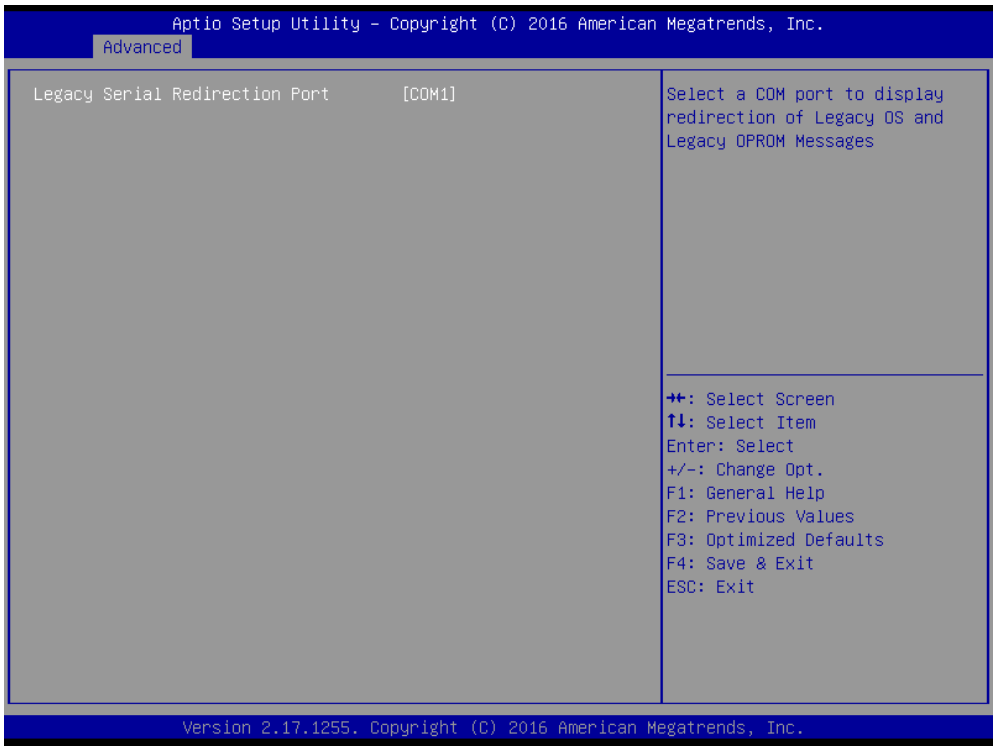

| Item | Options | Description |
|---|---|---|
| **Wake system from S5** | Disabled**[Default]**,<br>Fixed Time<br>Dynamic Time | Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time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

### 3.6.2.8 Serial Port Console Redirection



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

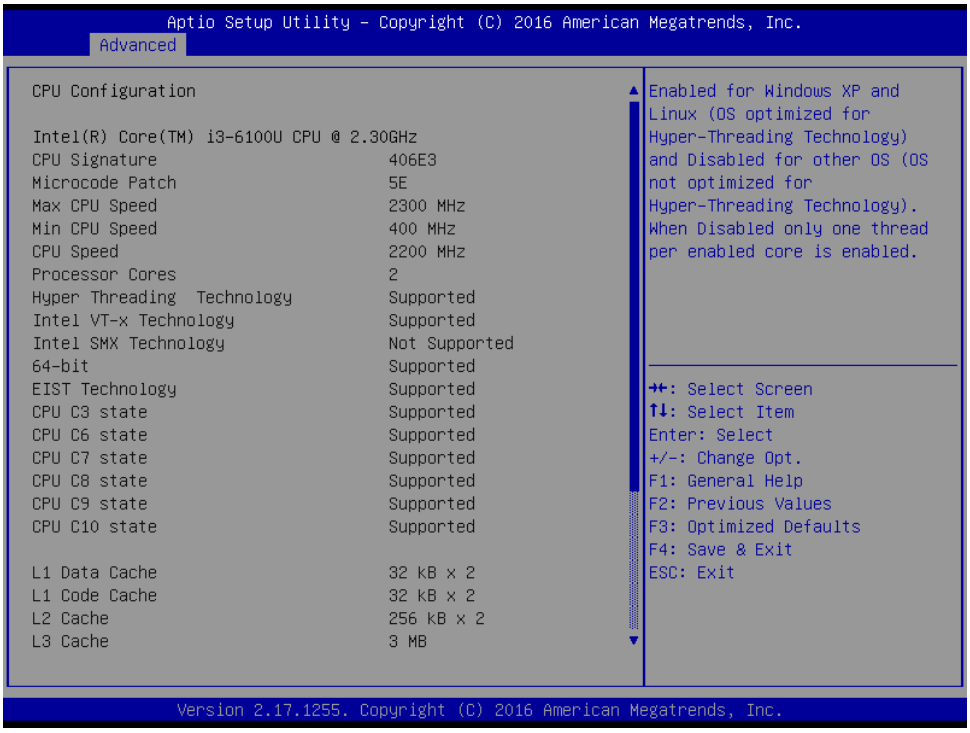
### 3.6.2.8.1 Legacy Console Redirection Settings



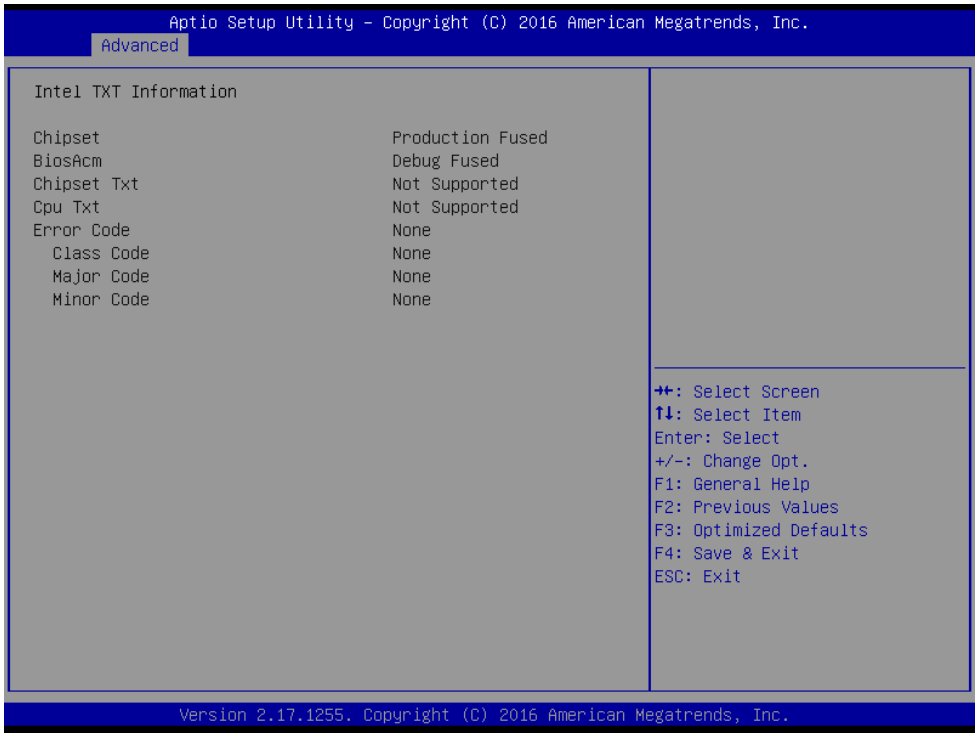

| Item | Option | Description |
|---|---|---|
| **Legacy Serial Redirection Port** | COM1**[Default]**, | Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages. |

### 3.6.2.9 CPU Configuration

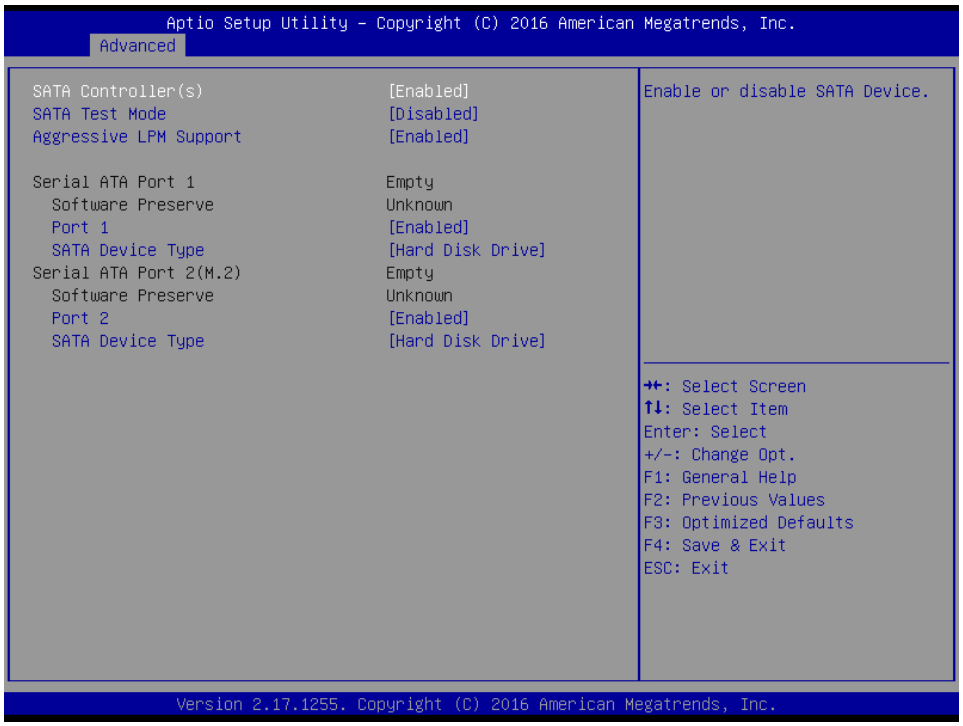
Use the CPU configuration menu to view detailed CPU specification and configure the CPU.




### 3.6.2.10 Intel TXT Information



### 3.6.2.11 SATA Configuration



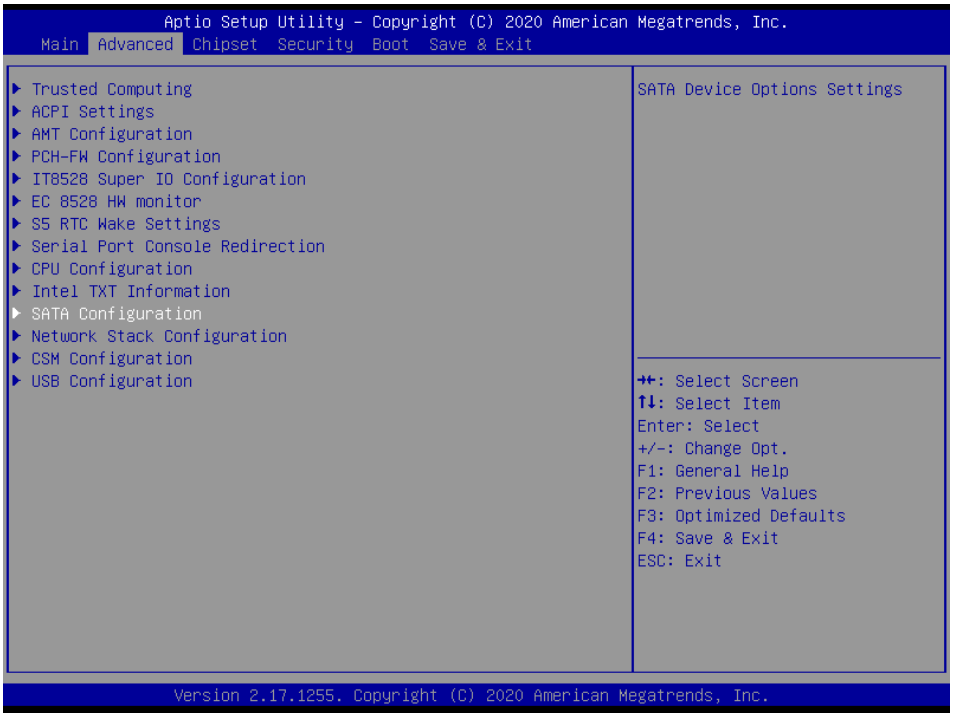

| Item | Options | Description |
|---|---|---|
| **SATA Controller(s)** | Enabled**[Default]**<br>Disabled, | Enable or disable SATA Device. |
| **SATA Test Mode** | Enabled<br>Disabled**[Default]**, | Test Mode Enable/Disable (Loop Back). |
| **Aggressive LPM Support** | Enabled**[Default]**<br>Disabled | Enable PCH to aggressively enter link power state. |
| **Port 1/2** | Enabled**[Default]**<br>Disabled, | Enable or Disable SATA Port. |
| **SATA Device Type** | Hard Disk Drive **[Default]**<br>Solid State Drive | Identify the SATA port is connected to Solid State Drive or Hard Disk Drive. |

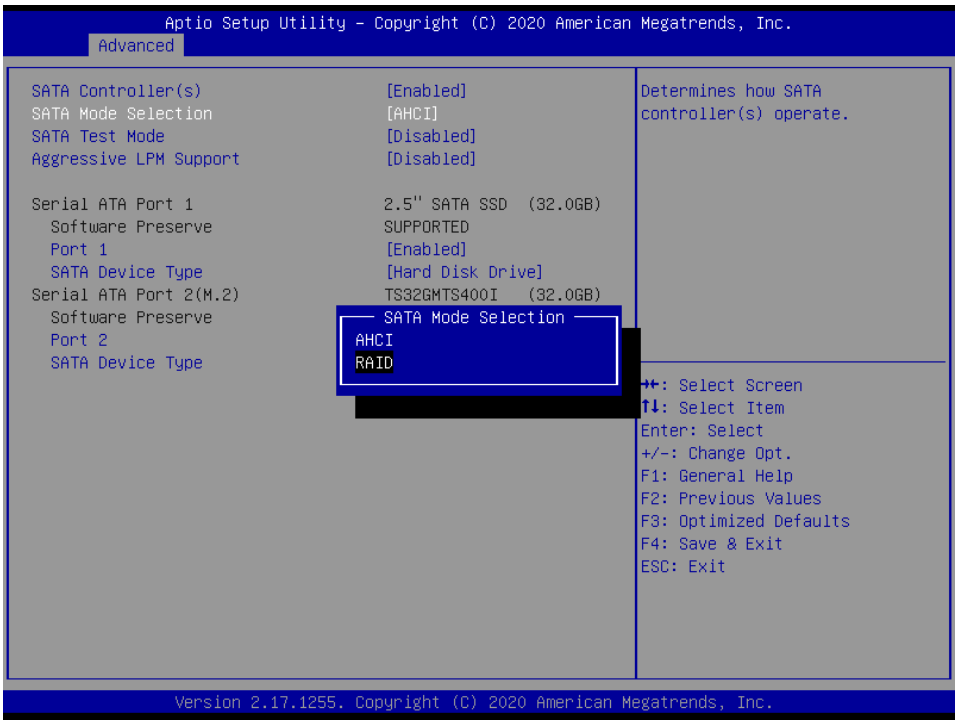
Note: RAID/RST Mode support RAID 0 & RAID 1.
To set RAID configuration, please follow the instruction below.

## ➢ Set RAID 0 (DATA Striping)

**Step 1:**

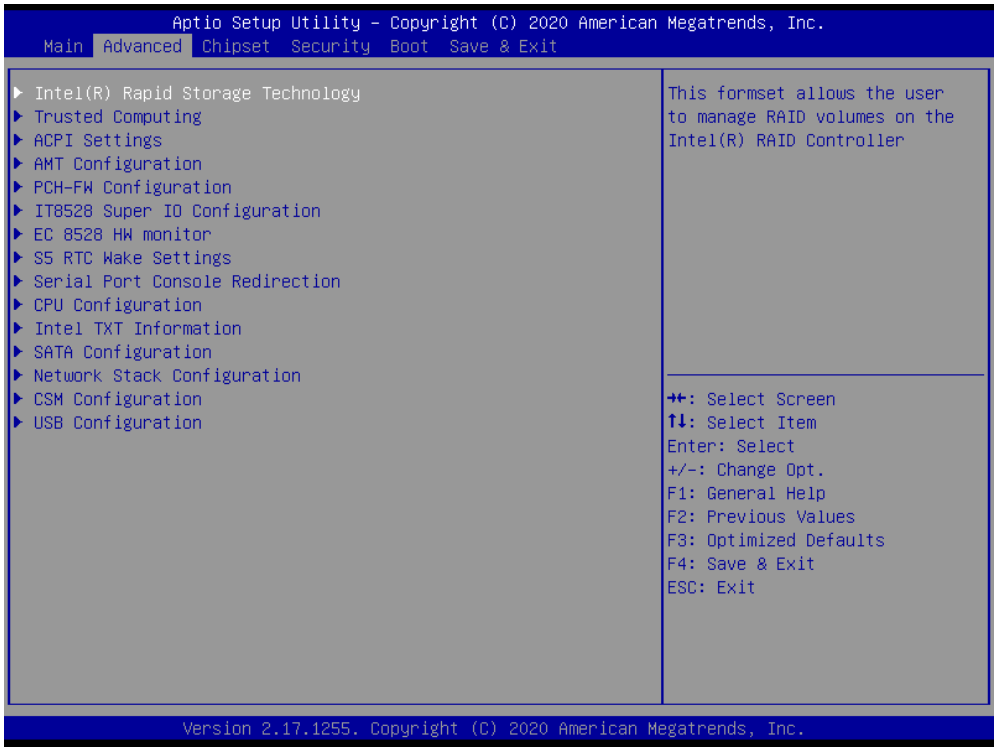
- Select “Advanced” Page
- Select “SATA Configuration” Item
- Select “SATA mode selection” Item as “RAID”
- Save and Reset System



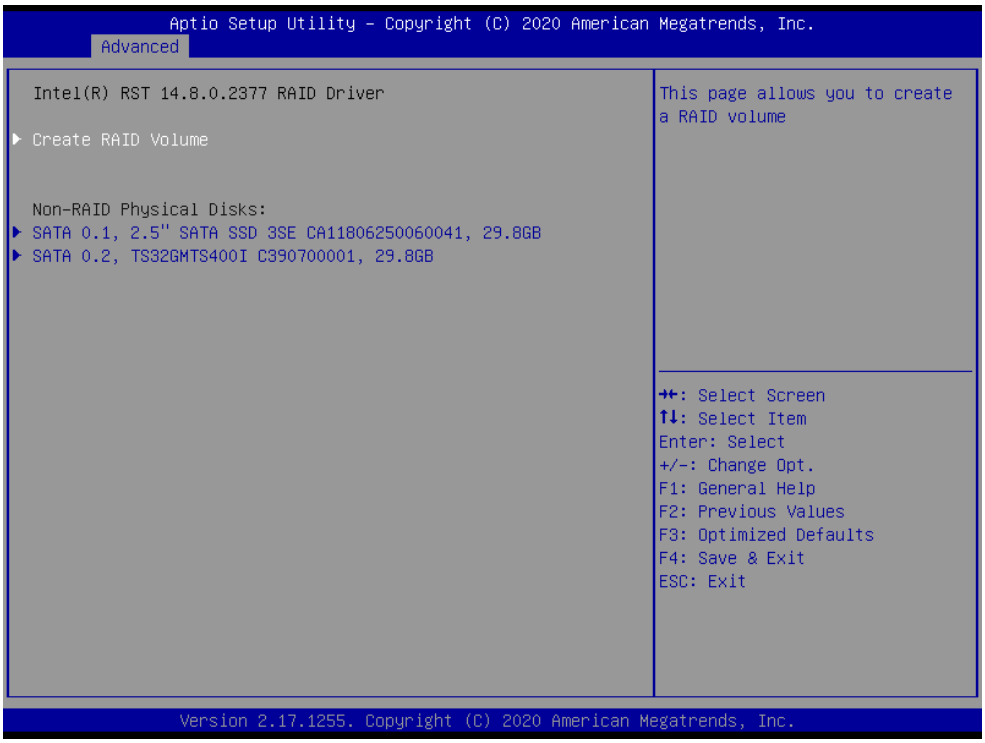
**Step 2:** Enter “Intel® Rapid Storage Technology”

- Select “Advanced” Page
- Select “Intel® Rapid Storage Technology



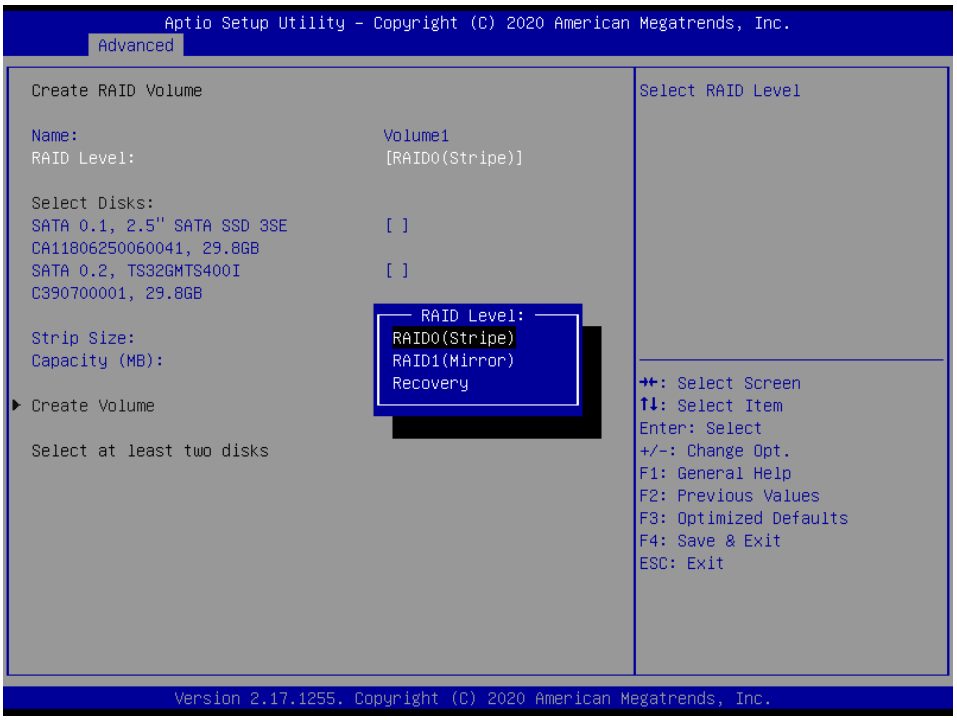

**Step 3:** Enter “Create RAID Volume”

- Select “Create RAID Volume



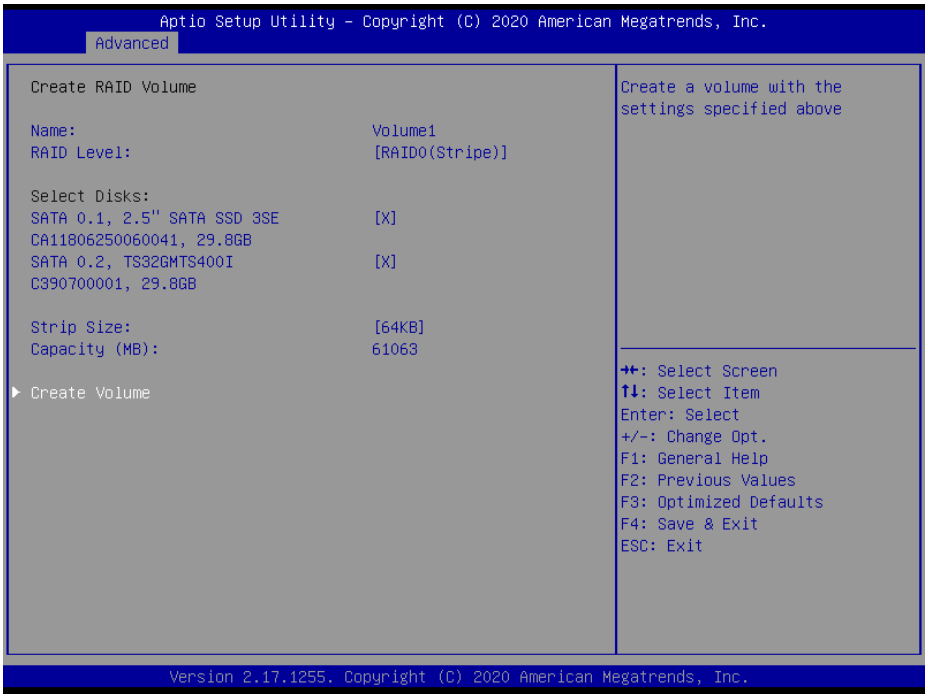
**Step 4:** Enter “Name “as “name of raid “and Set “RAID Level” as “RAID0”

- Enter “Name” item as “name of raid”
- Select “RAID Level” item as “RAID0”

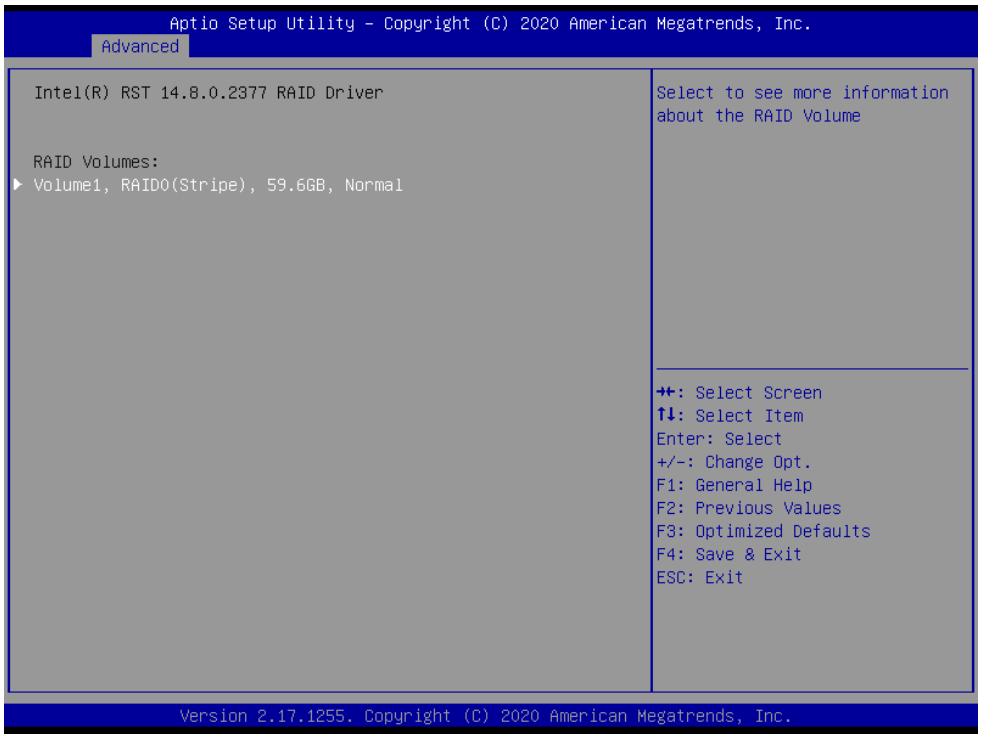



**Step 5:**

- Select disk SATA 0.1 and SATA 0.2
- Select “Strip Size”
- Select “Capacity”
- Enter “Create Volume”

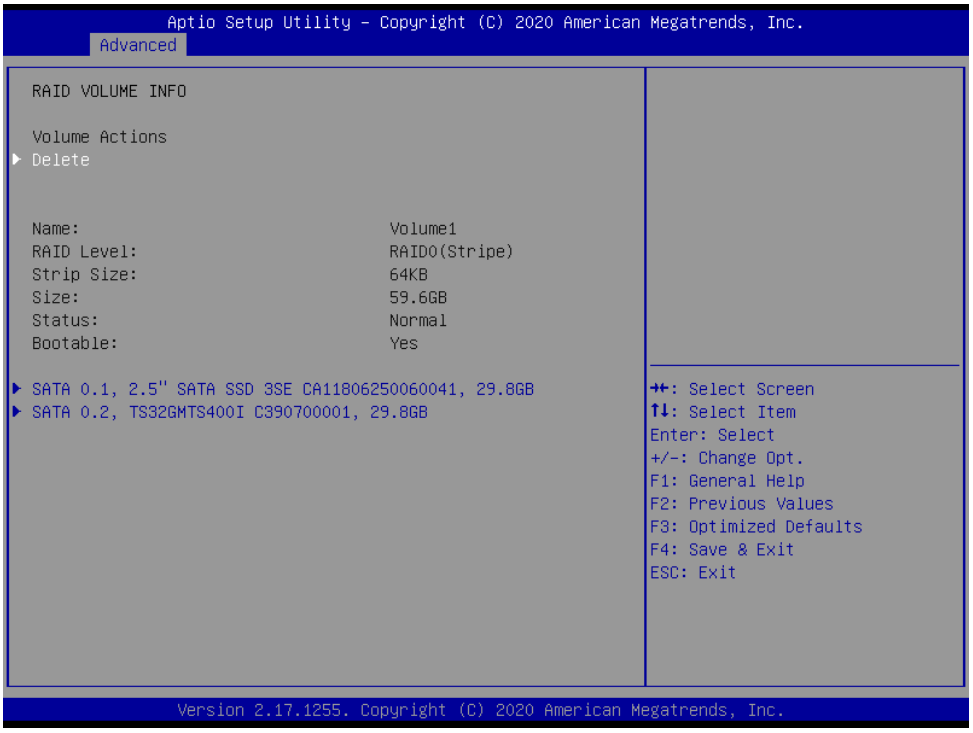


**Step 6:** Completed. This page show the information of raid created by user

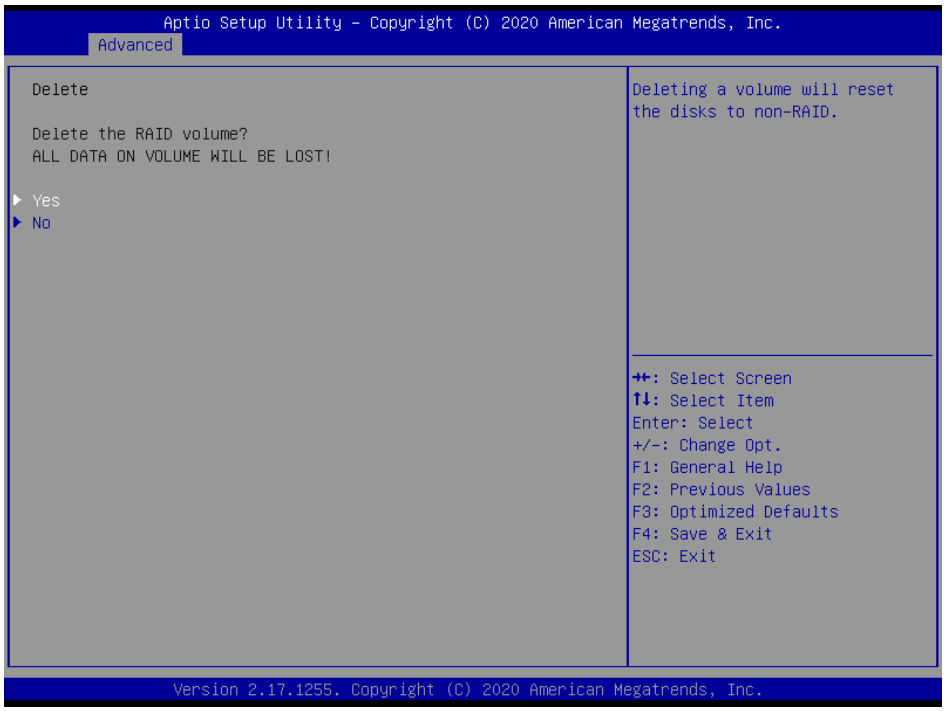



➢ **Delete Raid 0:**

**Step1:** Enter “Delete”

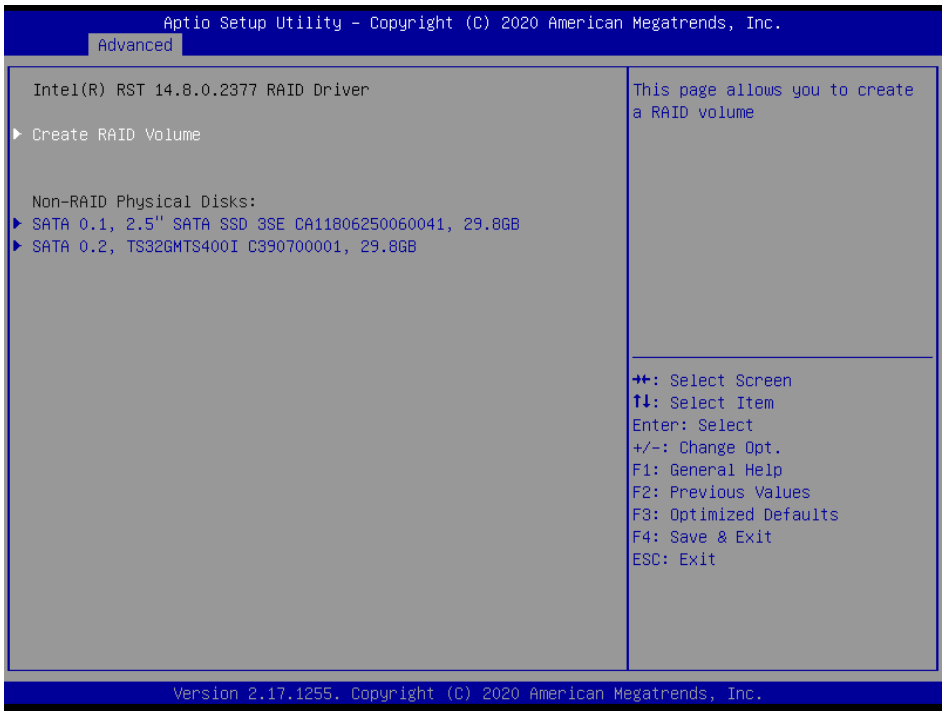


**Step 2:** Select “Yes “to delete RAID



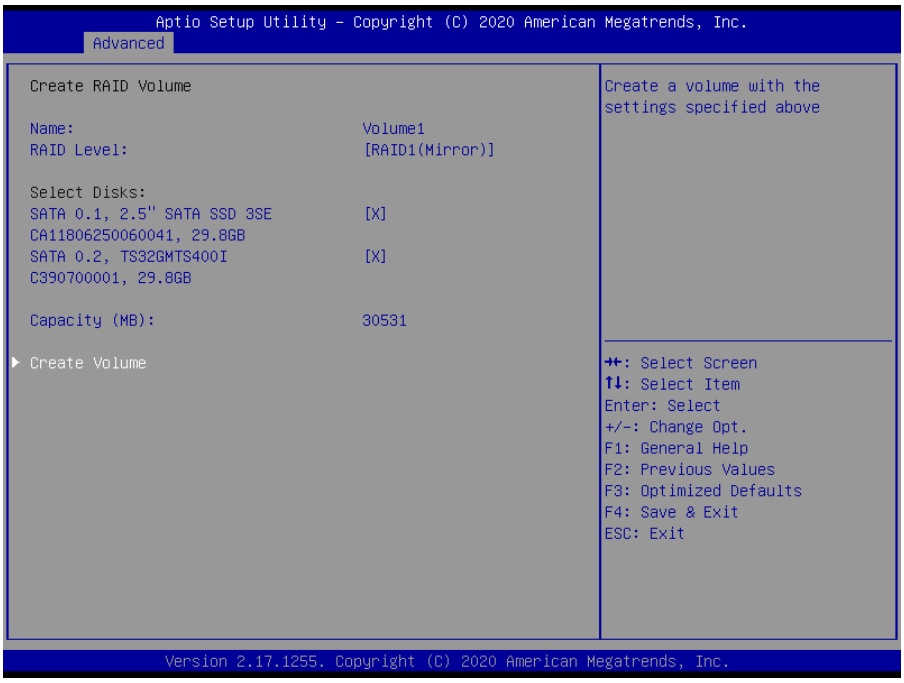

- **Set RAID 1 (DATA Mirroring)**

**Step1:** Enter “Create RAID Volume”

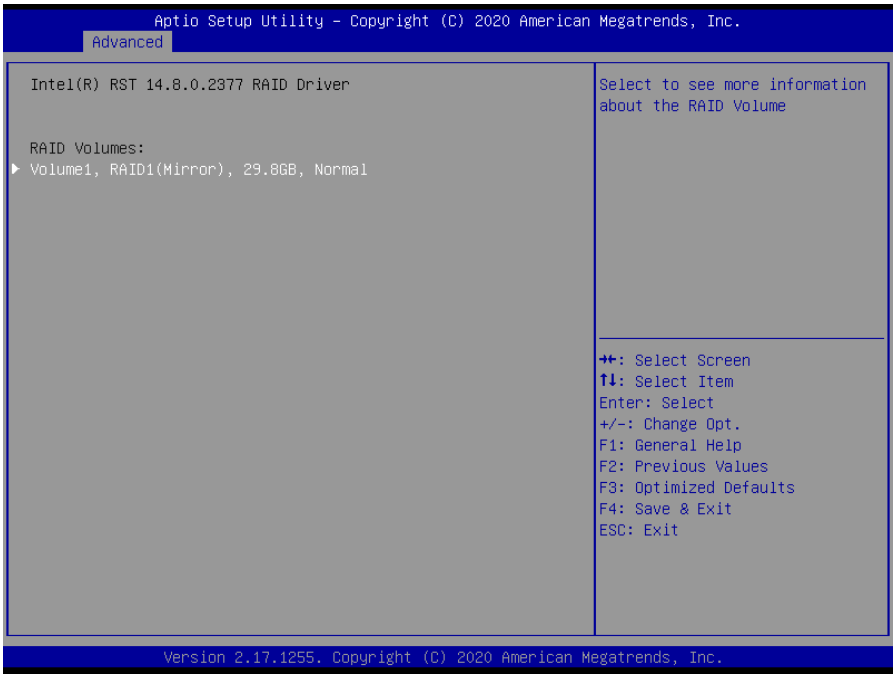


**Step2:**

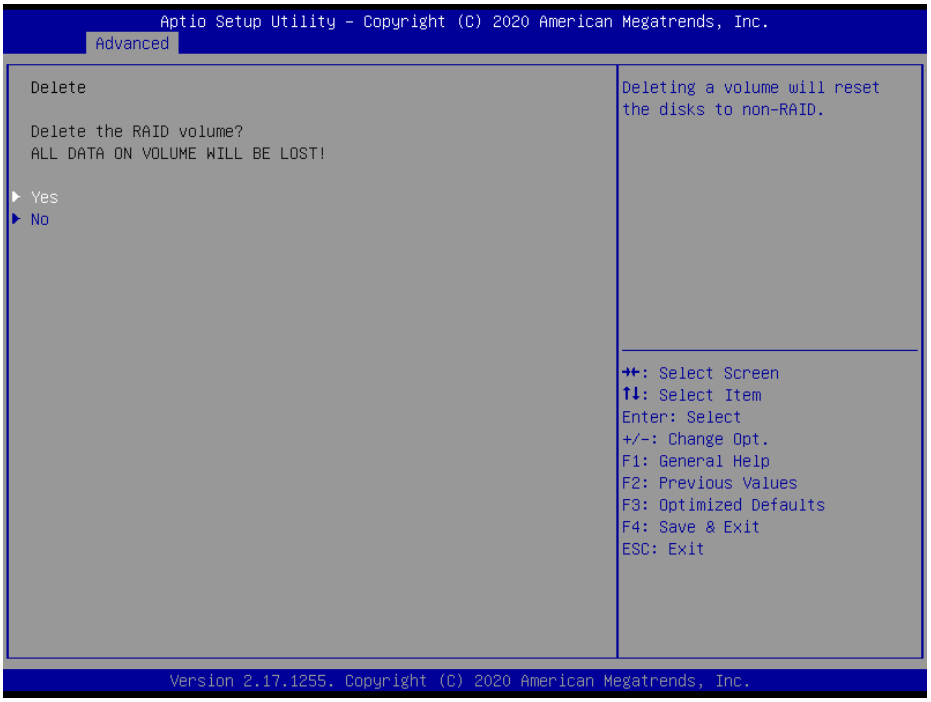
- Enter “Name ” as “name of raid”
- Set “RAID Level “ as “RAID1”
- Select disk “SATA 0.1” and ”SATA 0.2”
- Select “Strip Size”
- Select “Capacity”
- Enter “Create Volume”




**Step 3:** Raid 1 be created. Select”Volume1” to see detail.

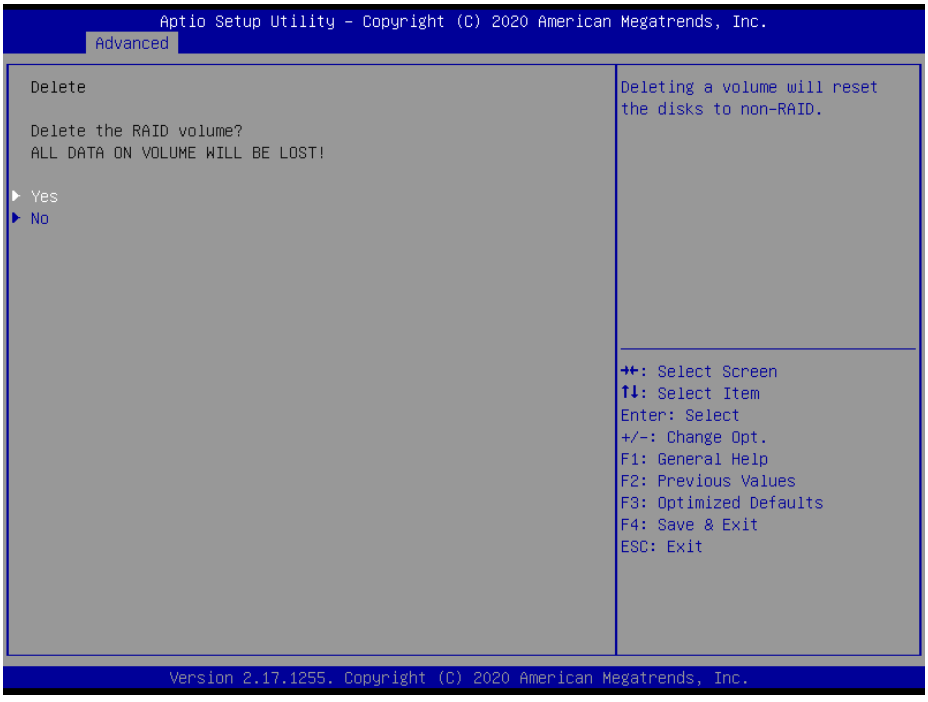


**Step 4:** Completed. This page show the information of raid created by user.

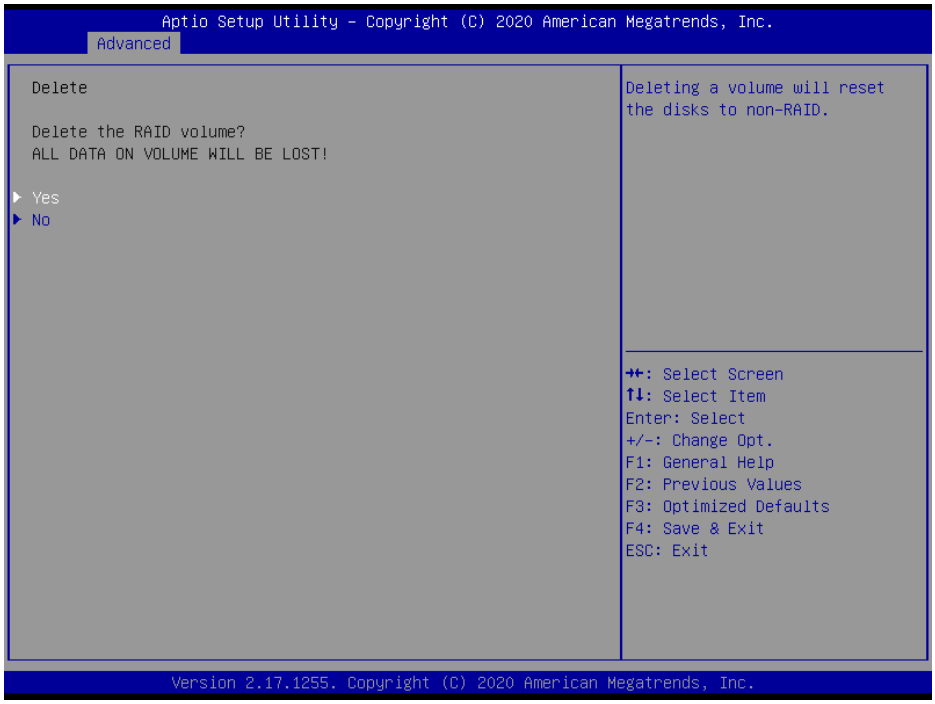



- **Delete Raid 1**

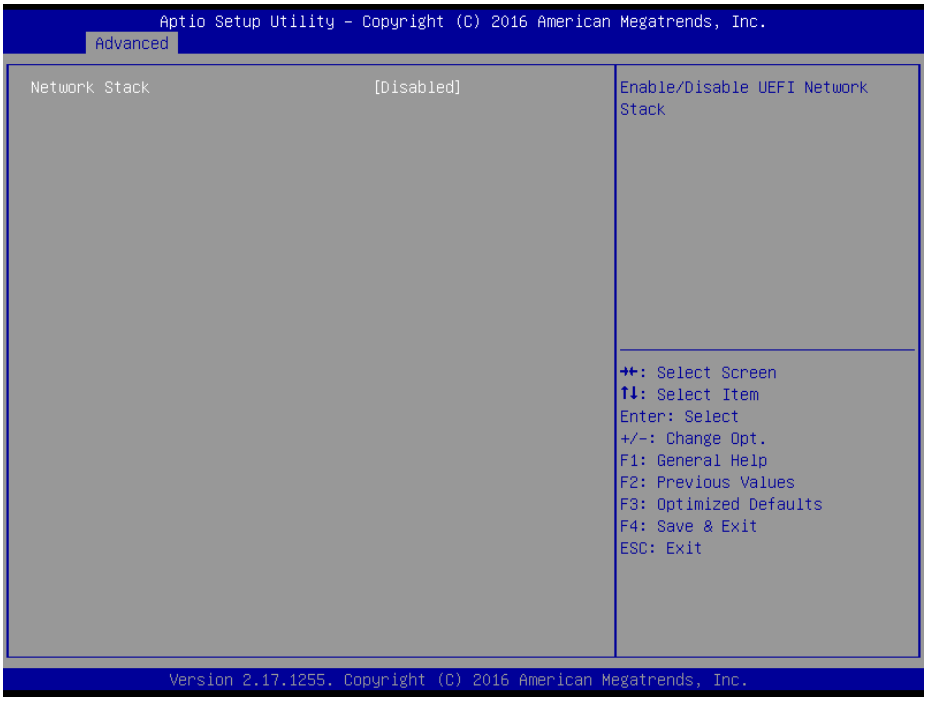
**Step1:** Enter “Delete”



**Step2:** Select “Yes” to delete RAID

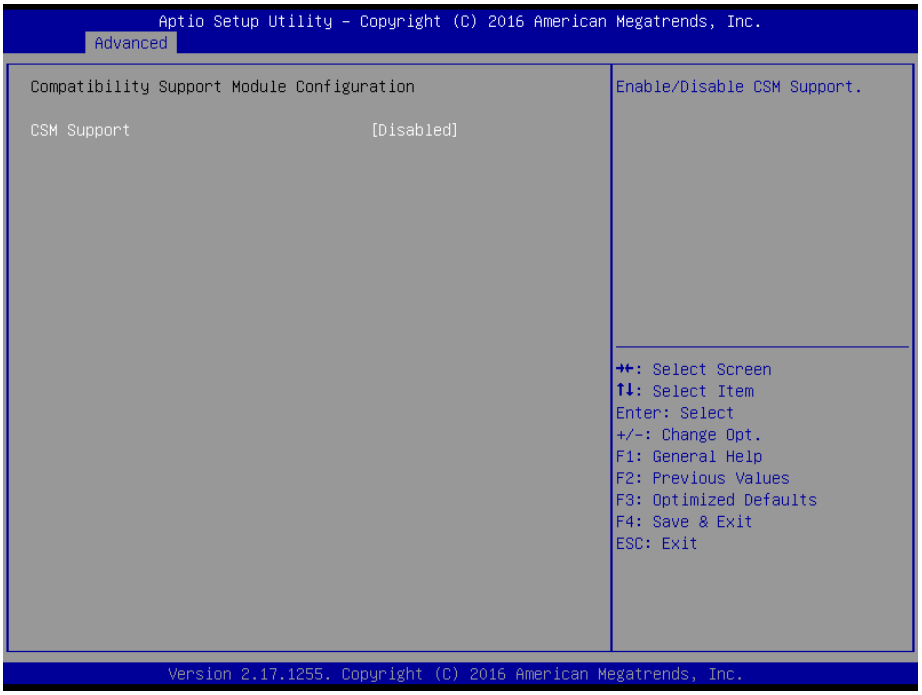



### 3.6.2.12 Network Stack Configuration




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

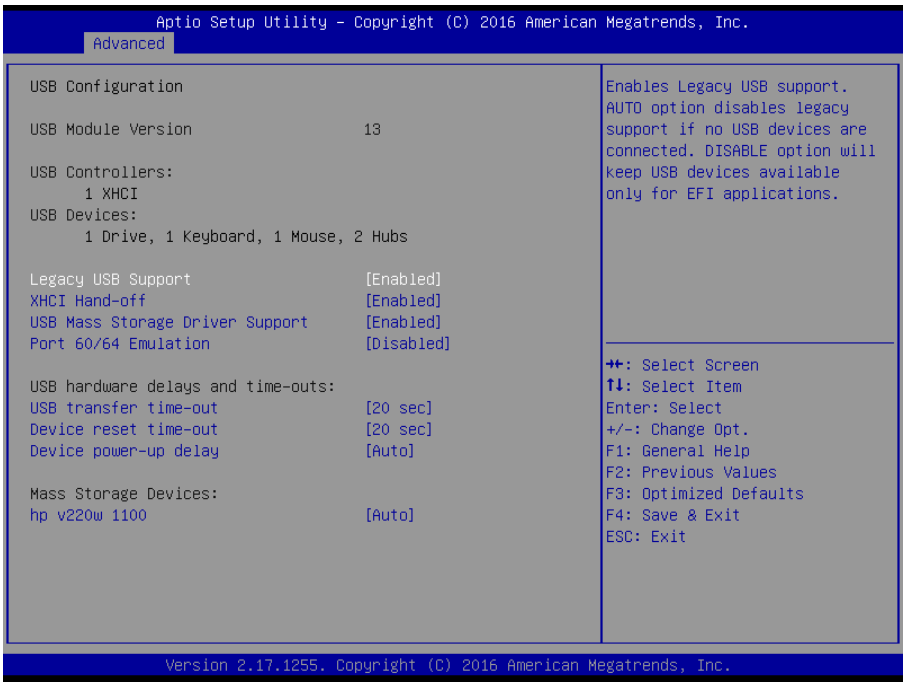
### 3.6.2.13 CSM Configuration




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

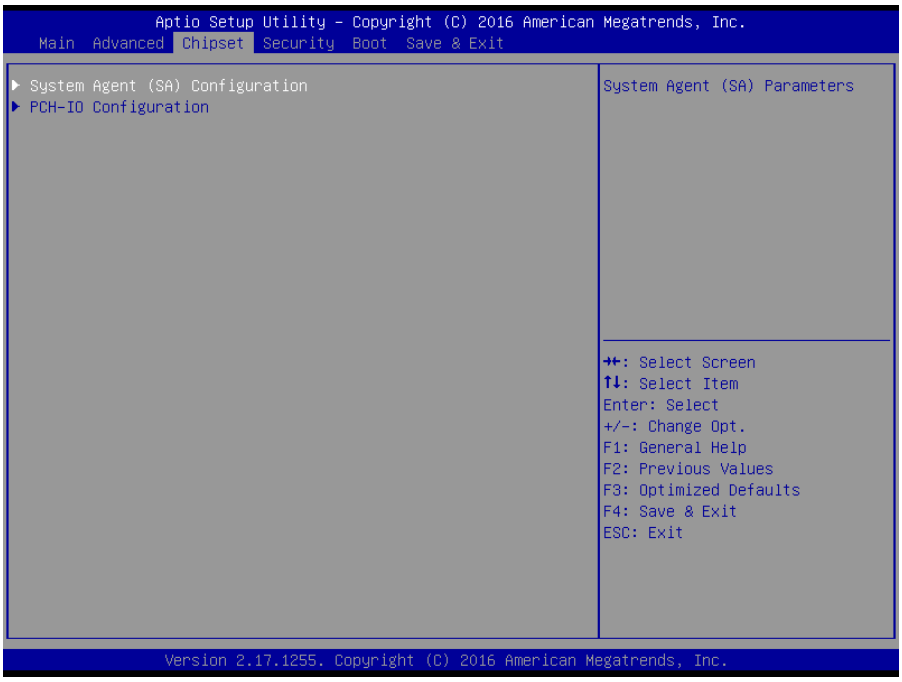
### 3.6.2.14 USB Configuration

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

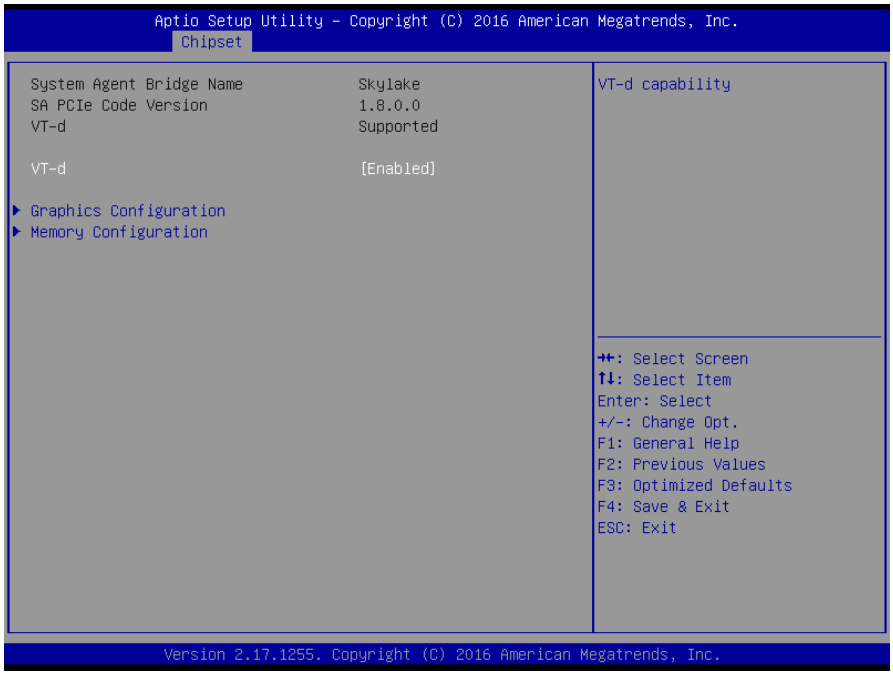


| Item | Options | Description |
|---|---|---|
| **Legacy USB Support** | Enabled**[Default]**<br>Disabled<br>Auto | Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications. |
| **XHCI Hand-off** | Enabled**[Default]**<br>Disabled | This is a workaround for OSew without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver. |
| **USB Mass Storage Driver Support** | Enabled**[Default]**<br>Disabled | Enable/Disable USB Mass Storage Driver Support. |
| **Port 60/64 Emulation** | Disabled**[Default]**<br>Enabled | Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes. |
| **USB transfer time-out** | 1 sec<br>5 sec<br>10 sec<br>20 sec**[Default]** | The time-out value for Control, Bulk, and Interrupt transfers. |
| **Device reset time-out** | 10 sec<br>20 sec**[Default]**<br>30 sec<br>40 sec | USB mass storage device Start Unit command time-out. |
| **Device power-up delay** | Auto**[Default]**<br>Manual | Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken form Hub descriptor. |
| **Hp v220w 1100** | 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 d drive type. |

### 3.6.3 Chipset

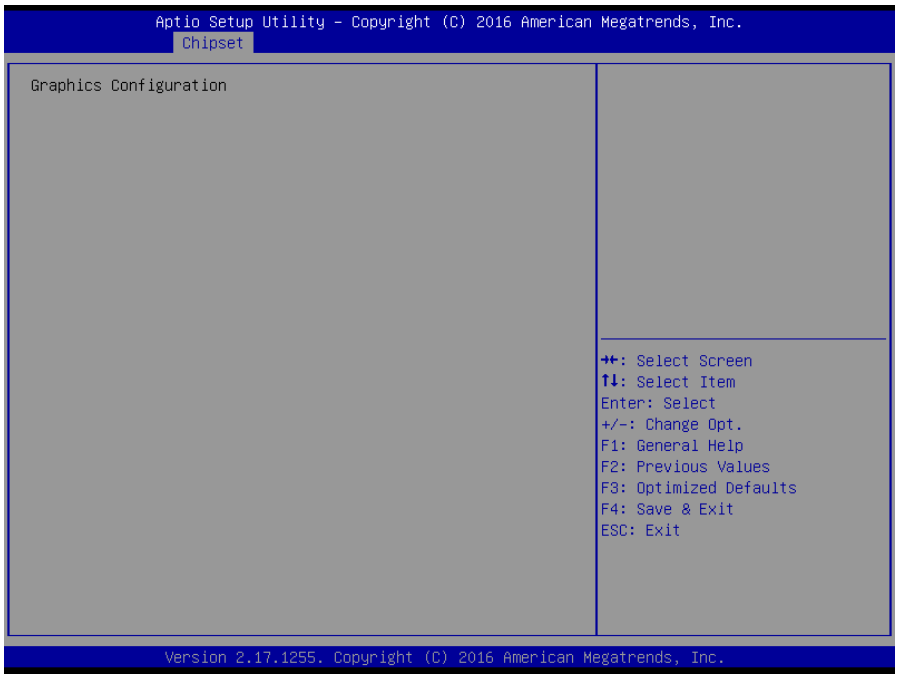



#### 3.6.3.1 System Agent (SA) Configuration




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

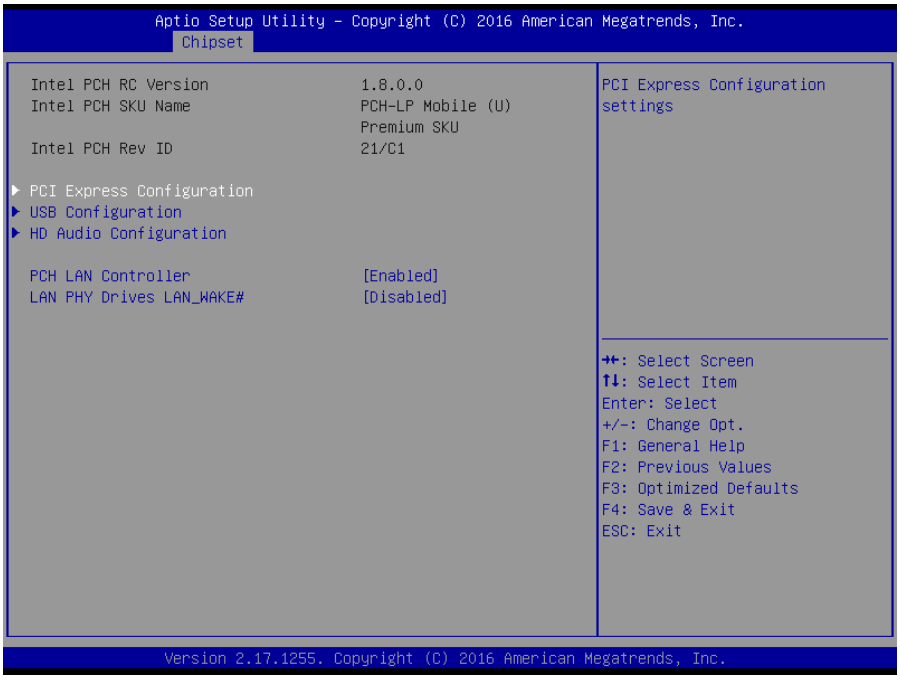
### 3.6.3.1.1 Graphics Configuration




### 3.6.3.1.2 Memory Configuration

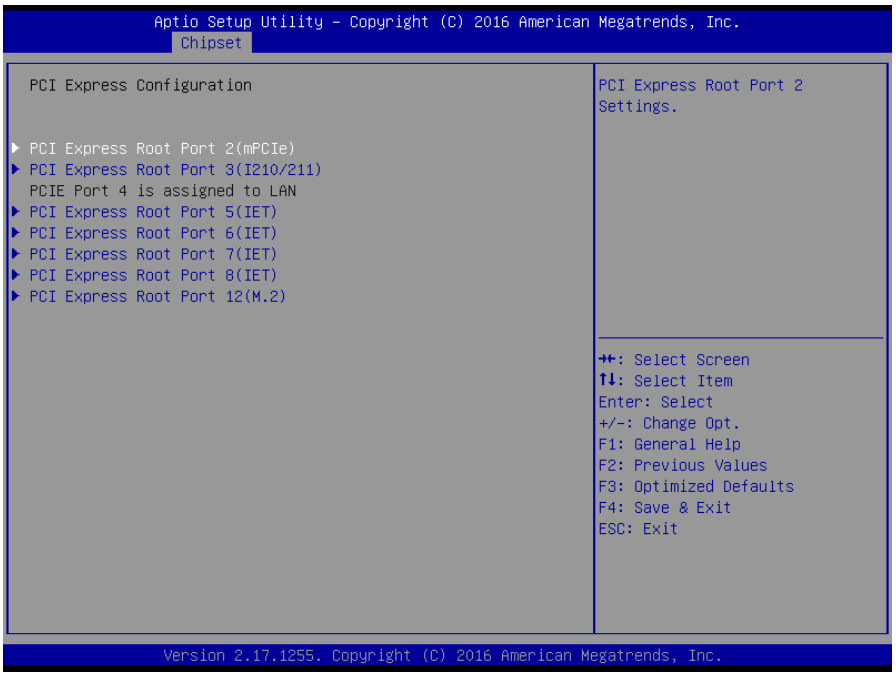

| Item | Option | Description |
|---|---|---|
| **Max TOLUD** | Dynamic**[Default]**<br>1GB/1.25GB/1.5GB/1.75GB<br>/2GB/2.25GB/2.5GB/2.75GB<br>/3GB/3.25GB | Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller. |

### 3.6.3.2 PCH-IO Configuration

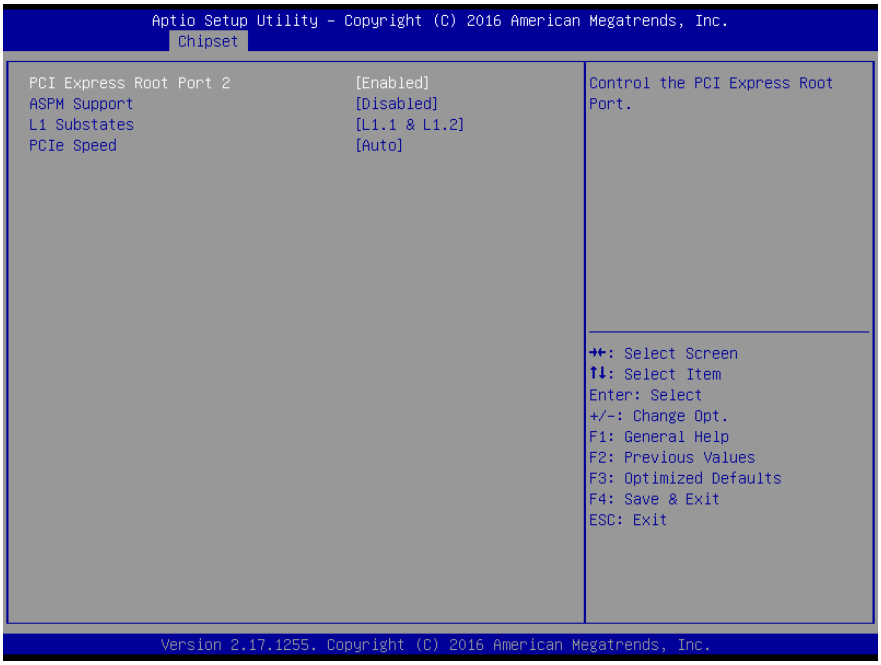



| Item | Option | Description |
|---|---|---|
| **PCH LAN Controller** | Disabled<br>Enabled**[Default]** | Enable or disable onboard NIC. |
| **LAN PHY Drives LAN_WAKE#** | Disabled**[Default]**<br>Enabled | Enable/Disable LAN Phy driving LAN_WAKE# else platform drives LAN_WAKE#. |

#### 3.6.3.2.1 PCI Express Configuration

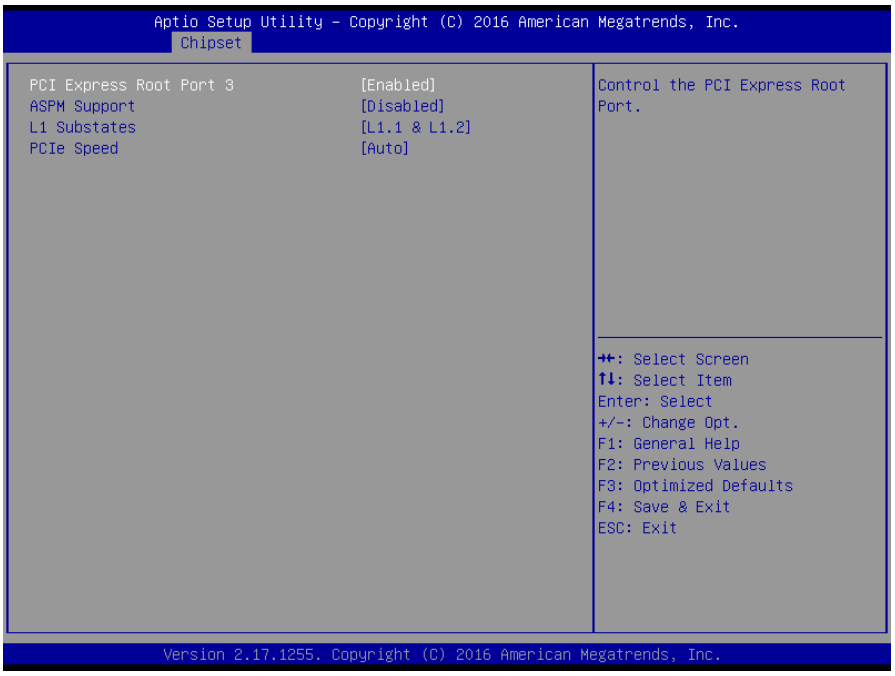


### 3.6.3.2.1.1 PCI Express Root Port2 (mPCIe)



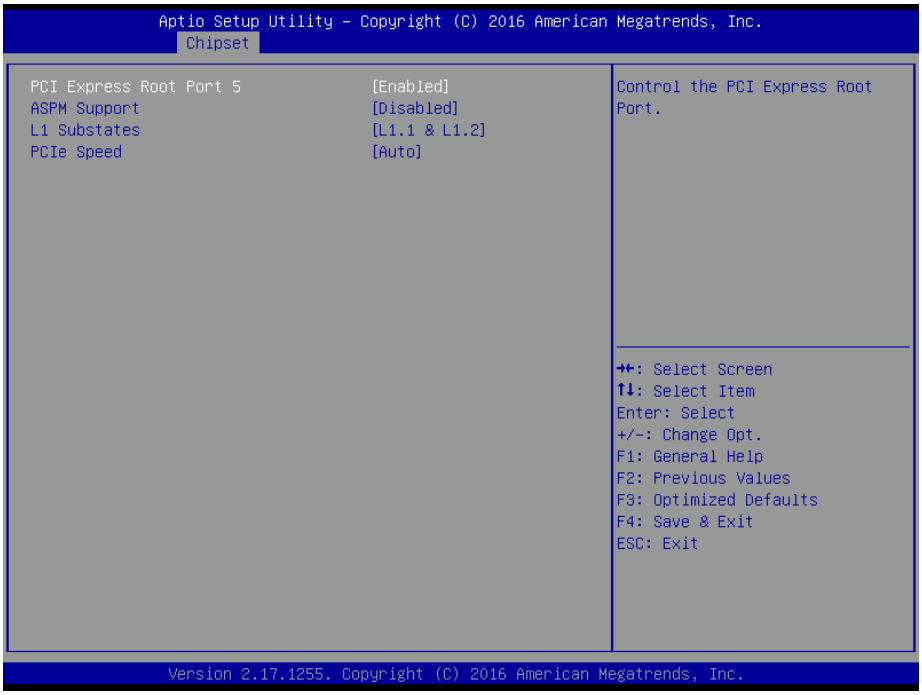

| Item | Option | Description |
|---|---|---|
| **PCI Express Root Port 2** | Enabled**[Default]**,<br>Disabled | Control the PCI Express Root Port. |
| **ASPM Support** | Disabled **[Default]**,<br>L0s<br>L1<br>L0sL1<br>Auto | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |
| **L1 Substates** | Disabled<br>L1.1<br>L1.2<br>L1.1 & L1.2**[Default]**, | PCI Express L1 Substates settings. |
| **PCIe Speed** | Auto**[Default]**<br>Gen1<br>Gen2<br>Gen3 | Select PCI Express port speed. |

### 3.6.3.2.1.2 PCI Express Root Port3 (I210/211)



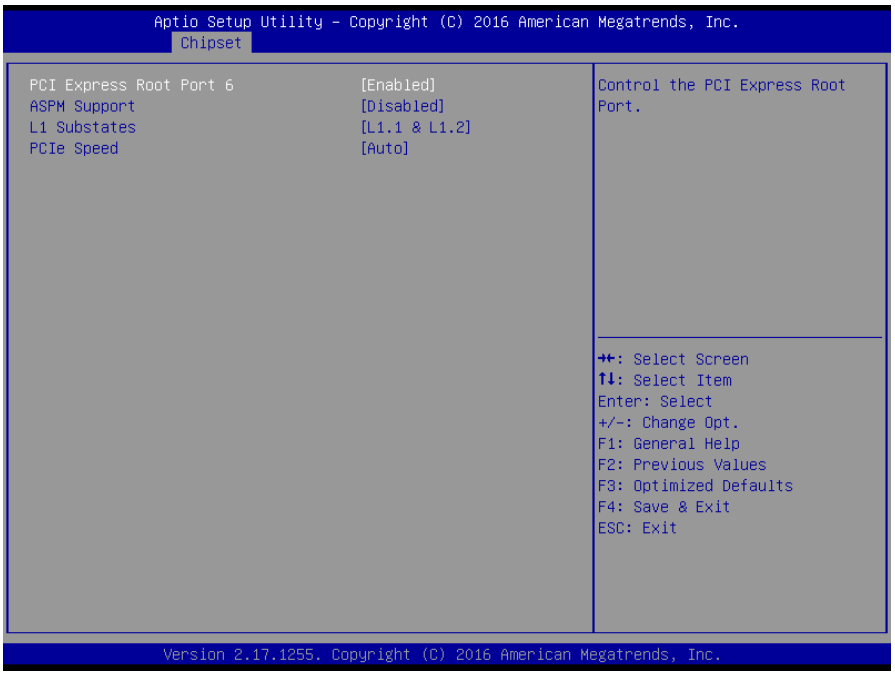

| Item | Option | Description |
|---|---|---|
| **PCI Express Root Port 3** | Enabled**[Default]**,<br>Disabled | Control the PCI Express Root Port. |
| **ASPM Support** | Disabled **[Default]**,<br>L0s<br>L1<br>L0sL1<br>Auto | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |
| **L1 Substates** | Disabled<br>L1.1<br>L1.2<br>L1.1 & L1.2**[Default]**, | PCI Express L1 Substates settings. |
| **PCIe Speed** | Auto**[Default]**<br>Gen1<br>Gen2<br>Gen3 | Select PCI Express port speed. |

### 3.6.3.2.1.3 PCI Express Root Port5 (IET)




| Item | Option | Description |
|---|---|---|
| **PCI Express Root Port 5** | Enabled**[Default]**,<br>Disabled | Control the PCI Express Root Port. |
| **ASPM Support** | Disabled **[Default]**,<br>L0s<br>L1<br>L0sL1<br>Auto | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |
| **L1 Substates** | Disabled<br>L1.1<br>L1.2<br>L1.1 & L1.2**[Default]**, | PCI Express L1 Substates settings. |
| **PCIe Speed** | Auto**[Default]**<br>Gen1<br>Gen2<br>Gen3 | Select PCI Express port speed. |

### 3.6.3.2.1.4 PCI Express Root Port6 (IET)

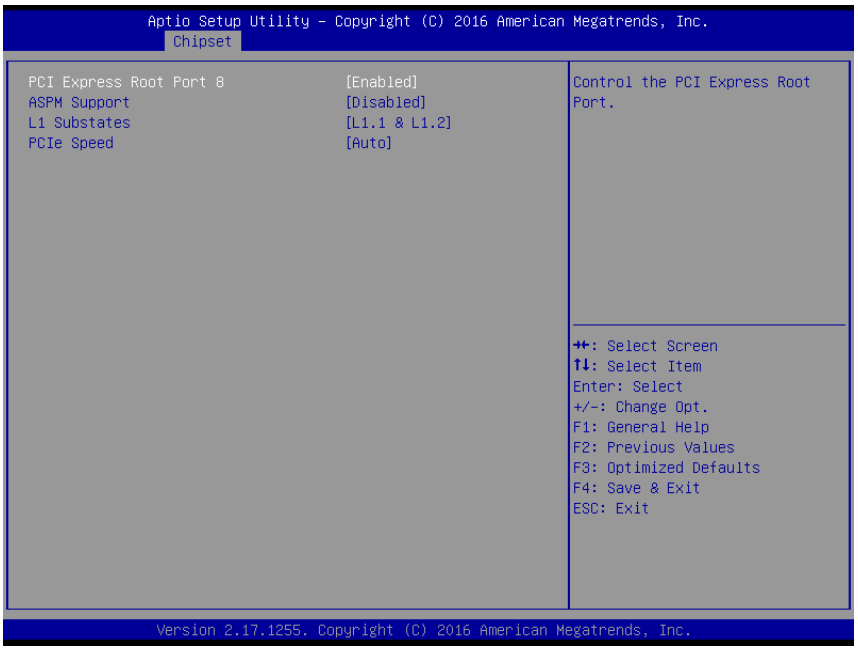



| Item | Option | Description |
|---|---|---|
| **PCI Express Root Port 6** | Enabled**[Default]**,<br>Disabled | Control the PCI Express Root Port. |
| **ASPM Support** | Disabled **[Default]**,<br>L0s<br>L1<br>L0sL1<br>Auto | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |
| **L1 Substates** | Disabled<br>L1.1<br>L1.2<br>L1.1 & L1.2**[Default]**, | PCI Express L1 Substates settings. |
| **PCIe Speed** | Auto**[Default]**<br>Gen1<br>Gen2<br>Gen3 | Select PCI Express port speed. |

### 3.6.3.2.1.5 PCI Express Root Port7 (IET)

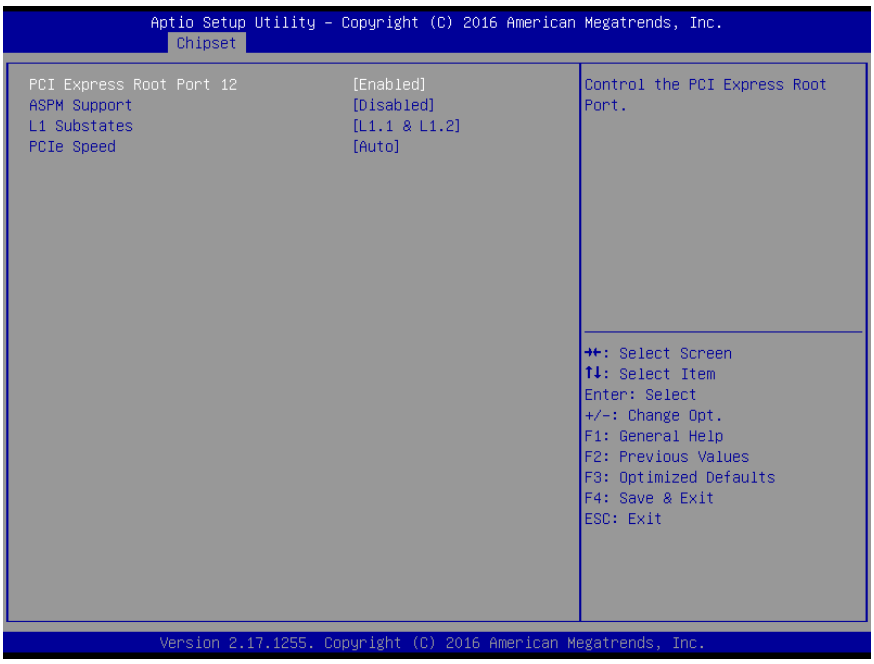

| Item | Option | Description |
|---|---|---|
| **PCI Express Root Port 7** | Enabled**[Default]**,<br>Disabled | Control the PCI Express Root Port. |
| **ASPM Support** | Disabled **[Default]**,<br>L0s<br>L1<br>L0sL1<br>Auto | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |
| **L1 Substates** | Disabled<br>L1.1<br>L1.2<br>L1.1 & L1.2**[Default]**, | PCI Express L1 Substates settings. |
| **PCIe Speed** | Auto**[Default]**<br>Gen1<br>Gen2<br>Gen3 | Select PCI Express port speed. |

### 3.6.3.2.1.6 PCI Express Root Port8 (IET)



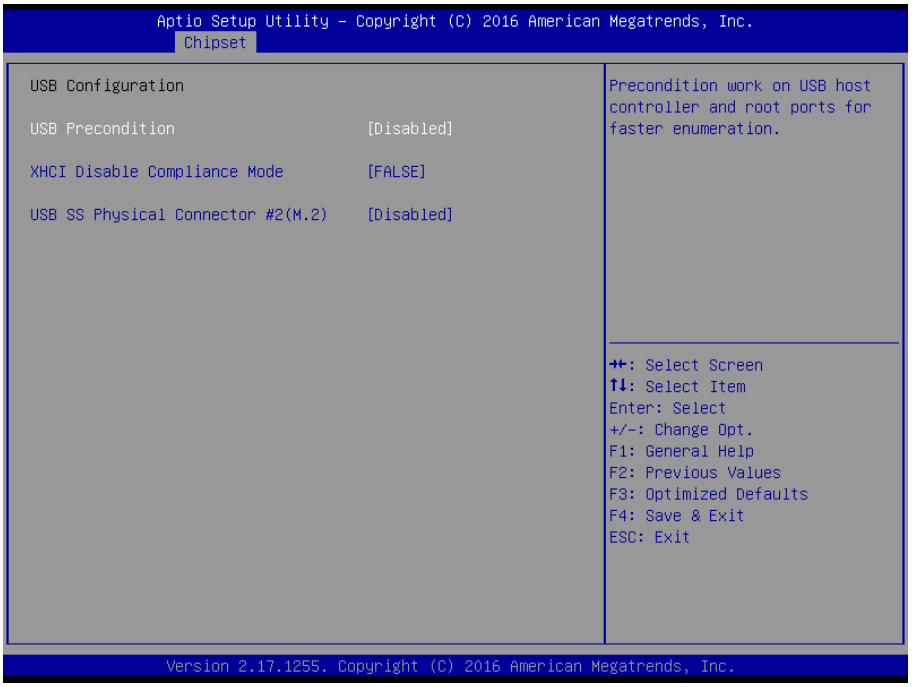

| Item | Option | Description |
|---|---|---|
| **PCI Express Root Port 8** | Enabled**[Default]**,<br>Disabled | Control the PCI Express Root Port. |
| **ASPM Support** | Disabled **[Default]**,<br>L0s<br>L1<br>L0sL1<br>Auto | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |
| **L1 Substates** | Disabled<br>L1.1<br>L1.2<br>L1.1 & L1.2**[Default]**, | PCI Express L1 Substates settings. |
| **PCIe Speed** | Auto**[Default]**<br>Gen1<br>Gen2<br>Gen3 | Select PCI Express port speed. |

### 3.6.3.2.1.7 PCI Express Root Port12 (M.2)



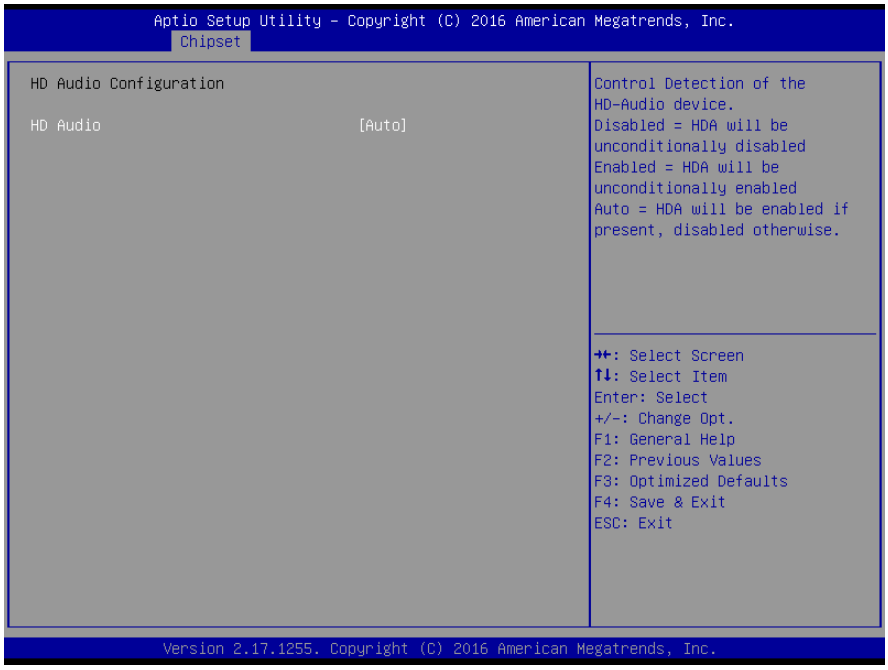

| Item | Option | Description |
|---|---|---|
| **PCI Express Root Port 12** | Enabled**[Default]**,<br>Disabled | Control the PCI Express Root Port. |
| **ASPM Support** | Disabled **[Default]**,<br>L0s<br>L1<br>L0sL1<br>Auto | Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM. |
| **L1 Substates** | Disabled<br>L1.1<br>L1.2<br>L1.1 & L1.2**[Default]**, | PCI Express L1 Substates settings. |
| **PCIe Speed** | Auto**[Default]**<br>Gen1<br>Gen2<br>Gen3 | Select PCI Express port speed. |

### 3.6.3.2.2 USB Configuration



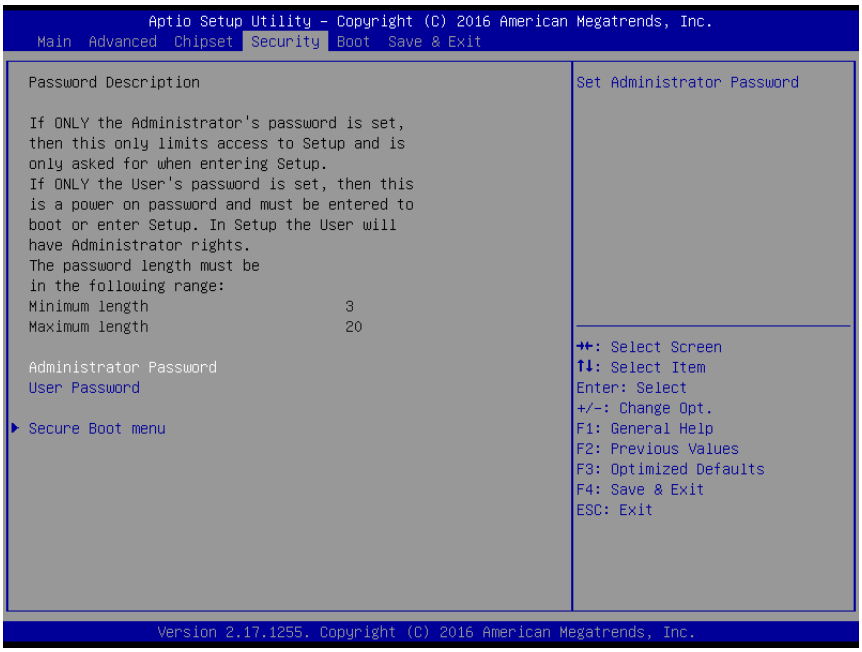

| Item | Option | Description |
|---|---|---|
| **USB Precondition** | Enabled<br>Disabled**[Default]**, | Precondition work on USB host controller and root ports for faster enumeration. |
| **XHCI Disable Compliance Mode** | FALSE**[Default]**,<br>TRUE | Option to disable Compliance Mode. Default is FALSE to not disable Compliance Mode. Set TRUE to disable Compliance Mode. |
| **USB SS Physical Connector #2(M.2)** | Disabled**[Default]**<br>Enabled | Enable/Disable USB port. |

### 3.6.3.2.3 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



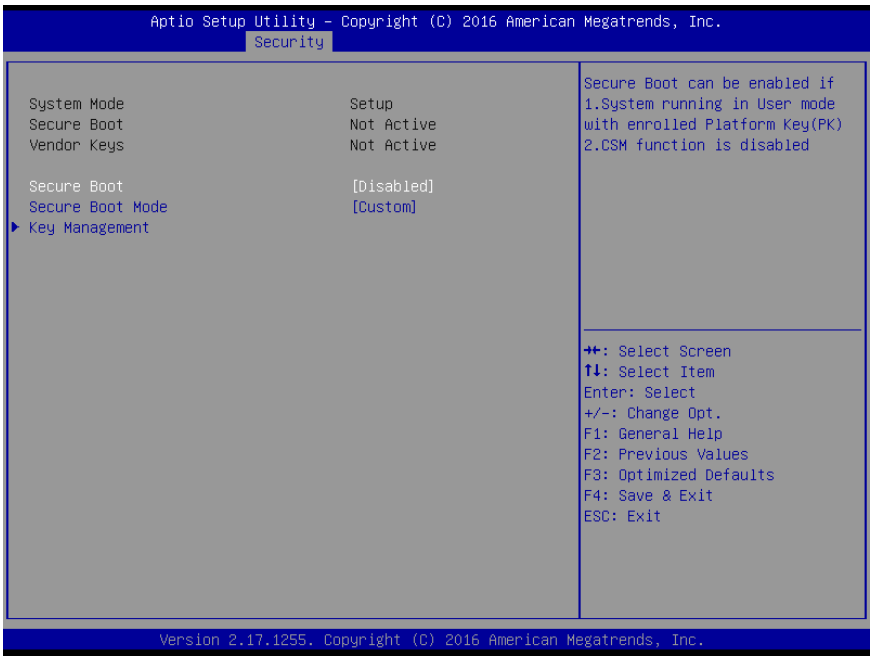
- **Administrator Password**

Set setup Administrator Password

- **User Password**

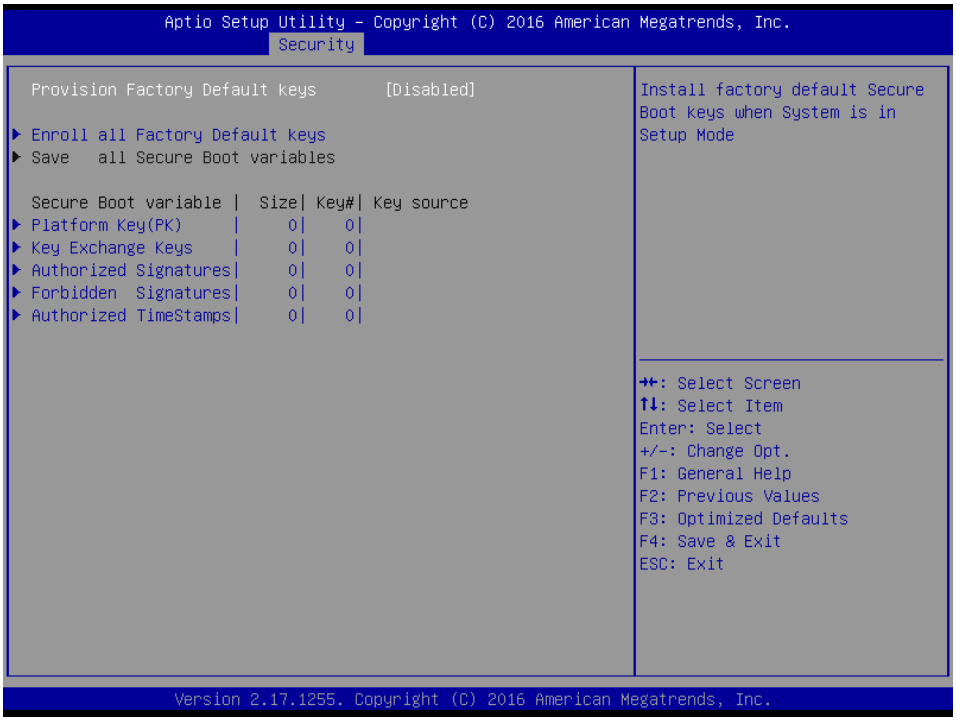
Set User Password

### 3.6.4.1 Secure Boot menu



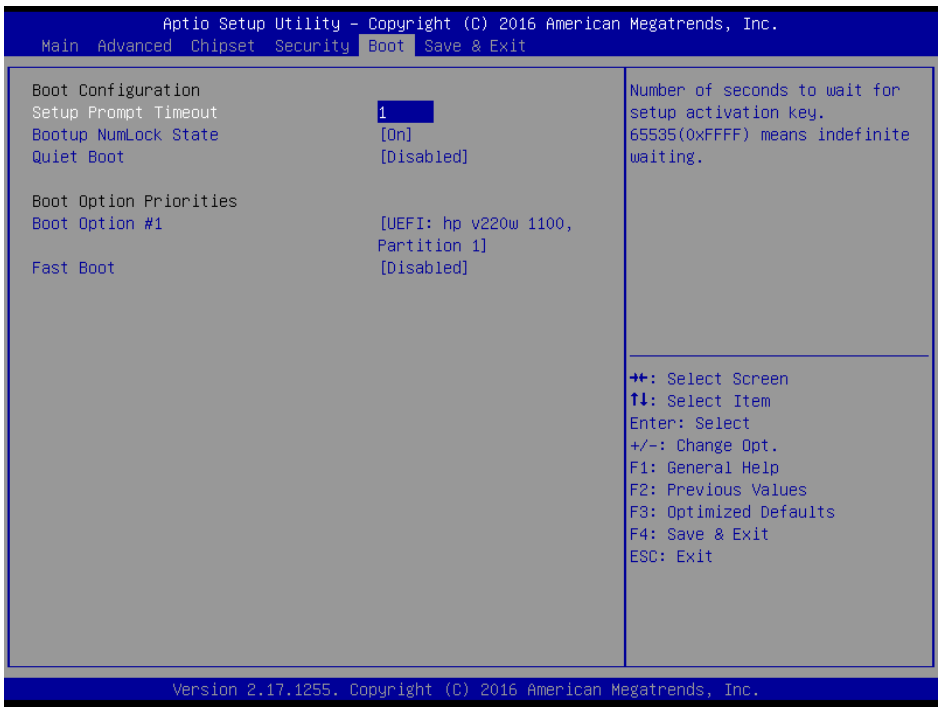

| Item | Option | Description |
|---|---|---|
| **Secure Boot** | Disabled**[Default]**<br>Enabled | Secure Boot can be enabled if 1.System running in User mode with enrolled Platform Key(PK) 2.CSM function is disabled. |
| **Secure Boot Mode** | Standard<br>Custom**[Default]** | Secure Boot mode selector.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

### 3.6.4.1.1 Key Management



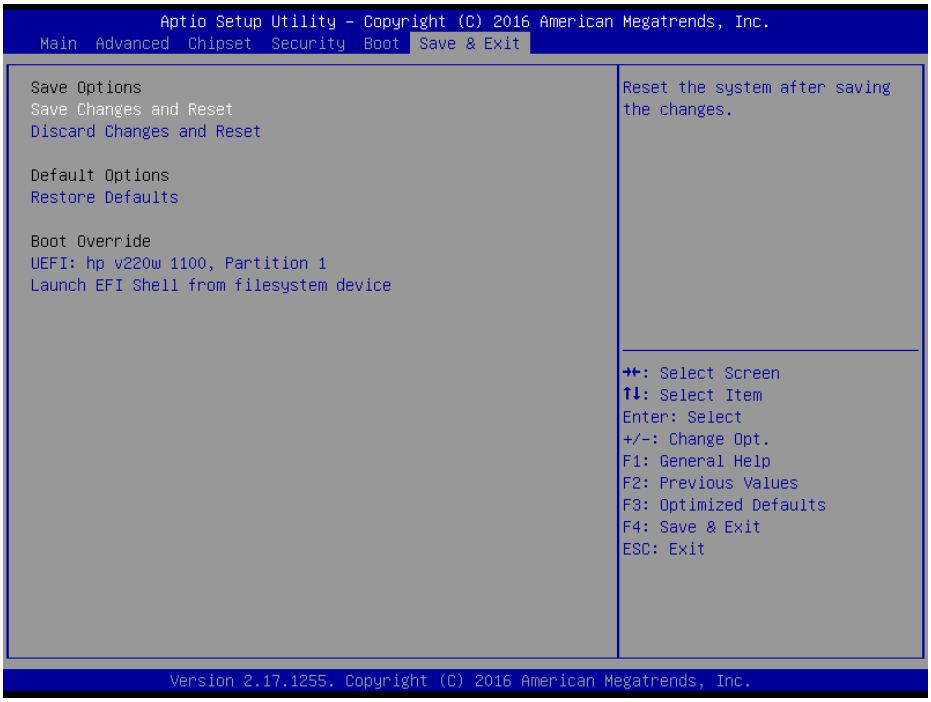

| Item | Option | Description |
|---|---|---|
| **Provision Factory Default keys** | Enabled,<br>Disabled**[Default]** | Install factory default Secure Boot Keys when System is in Setup Mode. |

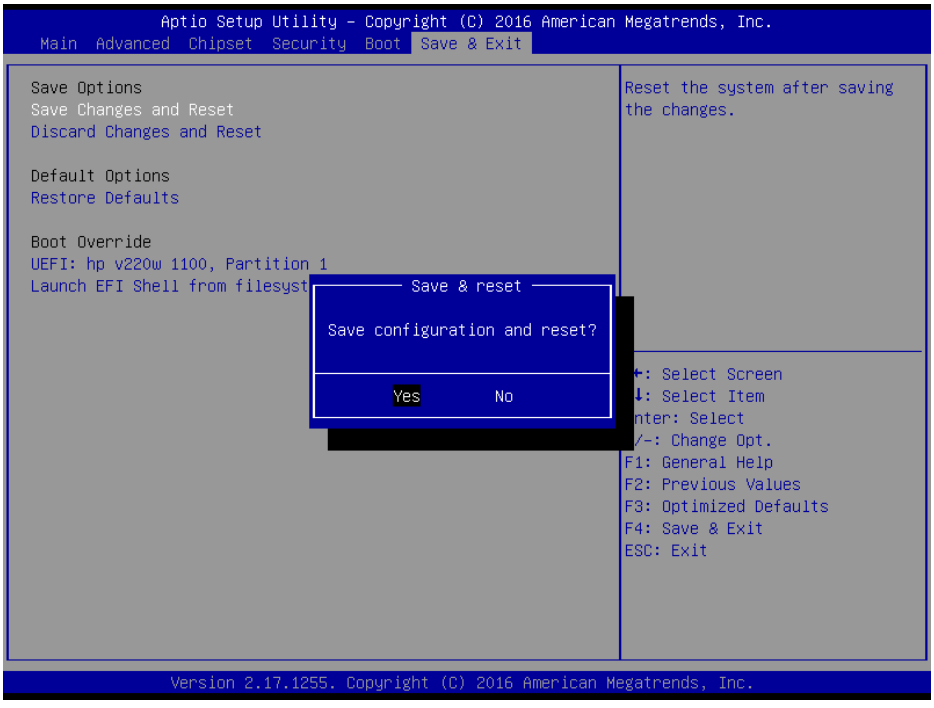
### 3.6.5 Boot




| 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 #1/2** | Set the system boot order. | |

### 3.6.6 Save and exit




#### *3.6.6.1 Save Changes and Reset*

Reset the system after saving the changes.

#### *3.6.6.2 Discard Changes and Reset*

Any changes made to BIOS settings during this session of the BIOS setup program are discarded. The setup program then exits and reboots the controller.

#### *3.6.6.3 Restore Defaults*

This option restores all BIOS settings to the factory default. This option is useful if the controller exhibits unpredictable behavior due to an incorrect or inappropriate BIOS setting.

#### *3.6.6.4 Launch EFI Shell from filesystem device*

Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

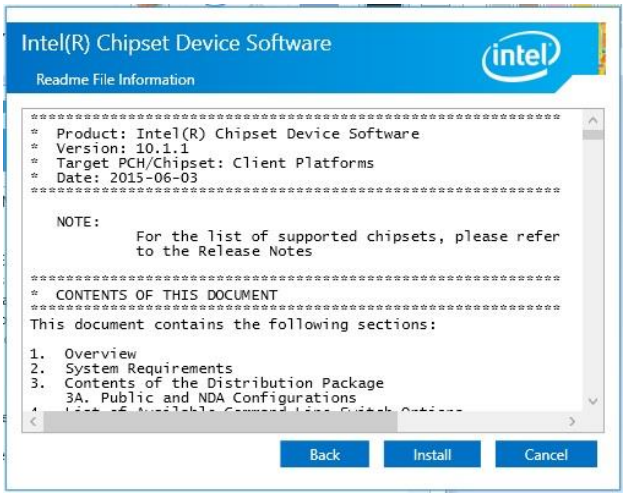
# 4. Drivers Installation

**Note**: Installation procedures and screen shots in this section are for your reference and may not be exactly the same as shown on your screen.

## 4.1 Install Chipset Driver

All drivers can be found on the Avalue Official Website: http://www.avalue.com.tw.

**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**.

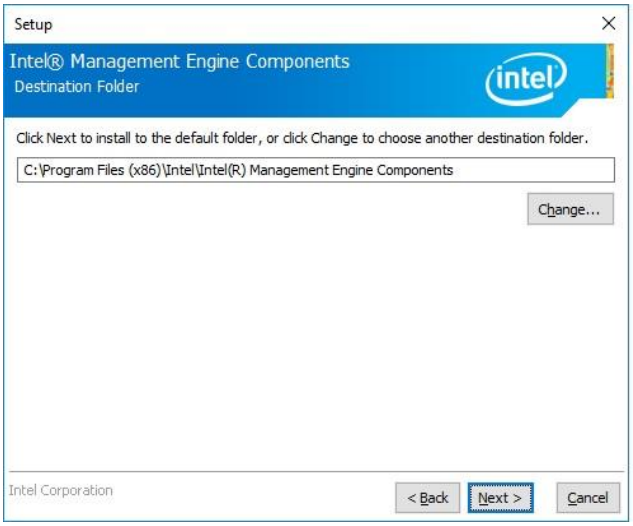

**Step 4.** Click **Restart Now/Restart Later** to complete setup.


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

## 4.2 Install ME Driver

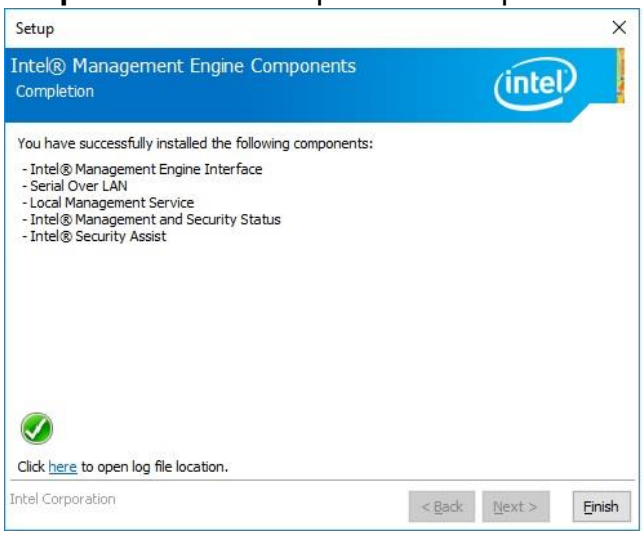
All drivers can be found on the Avalue Official Website: **http://www.avalue.com.tw**.

**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.

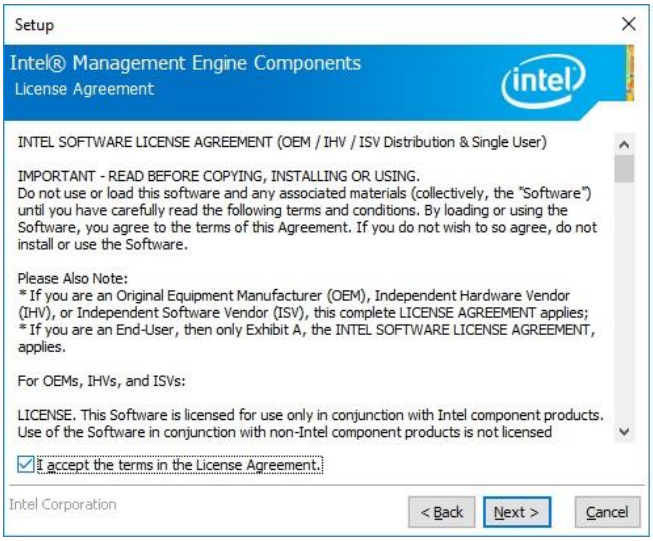



**Step 3.** Click **Next** to proceed setup.


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




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

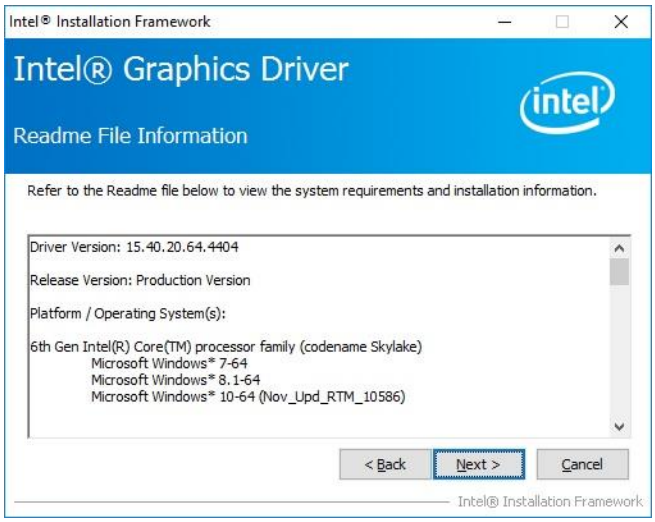



**Step 2.** Click **Next**.

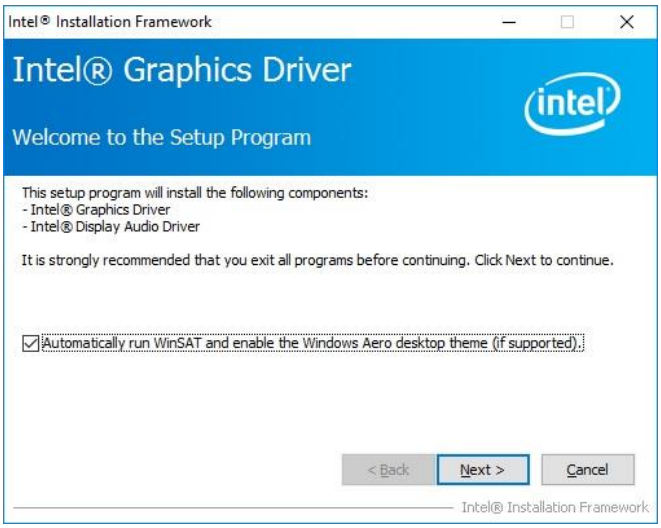
## 4.3 Install VGA Driver

All drivers can be found on the Avalue Official Website:
http://www.avalue.com.tw.

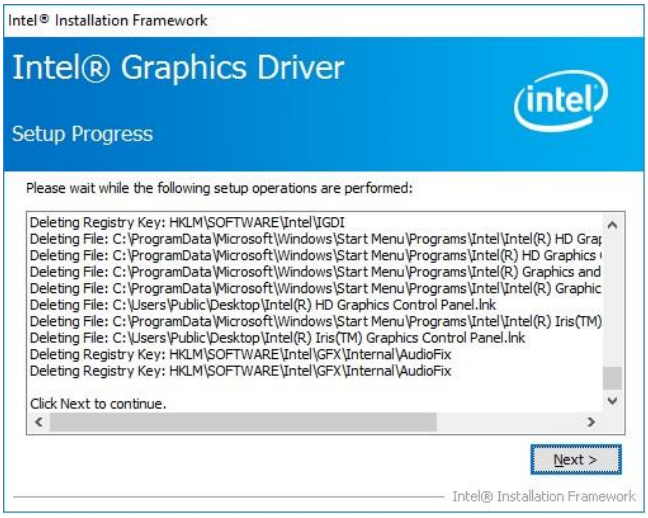
**Note:** The installation procedures and screen shots in this section are based on Windows 10 operation system.



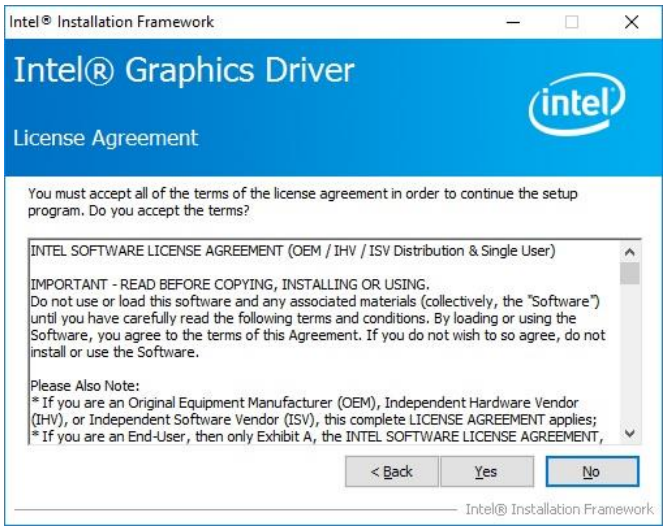

**Step 3.** Click **Next.**




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

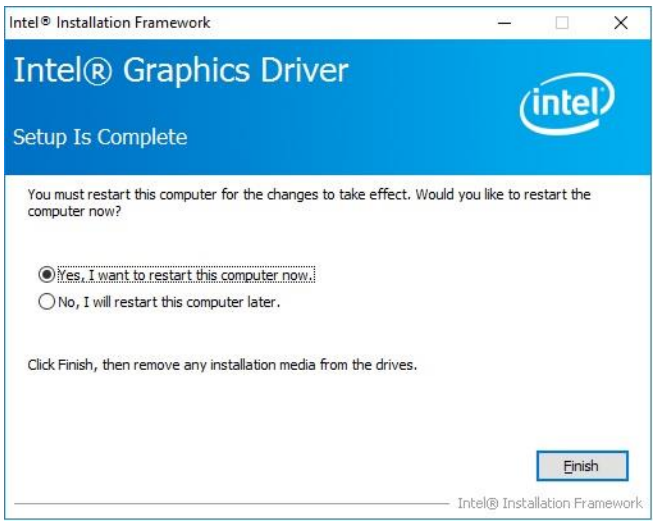



**Step 4.** Click **Next**.




**Step 2.**

Click **Yes** to accept license agreement.

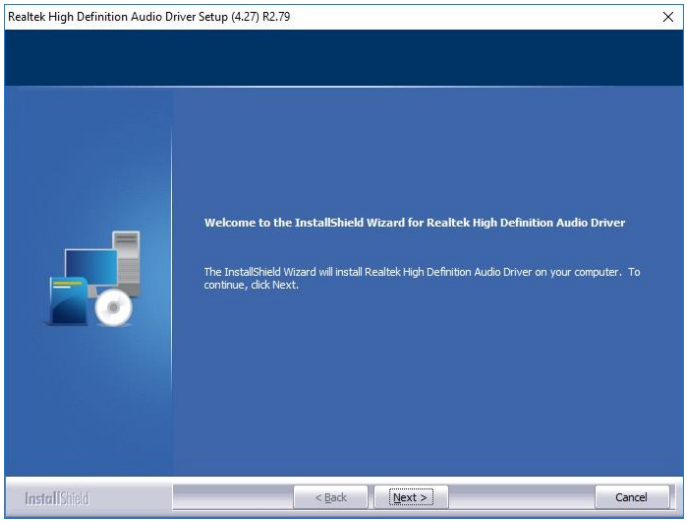



**Step 5.** Click **Finish** to complete setup.

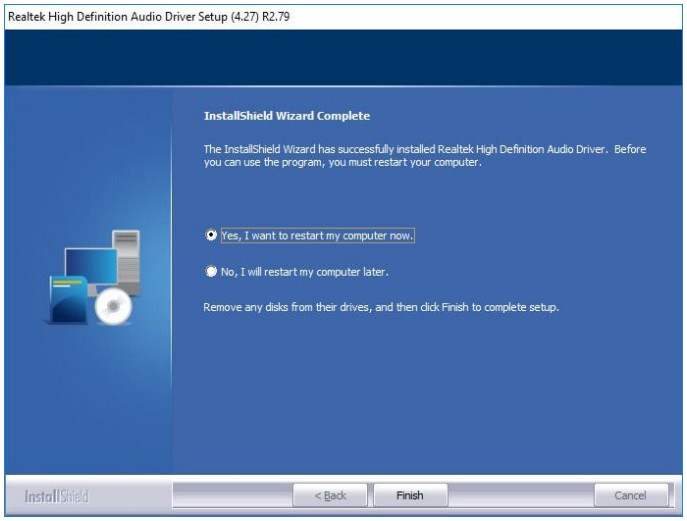
## 4.4 Install Audio Driver (For Realtek ALC888S)

All drivers can be found on the Avalue Official Website:
http://www.avalue.com.tw.

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




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

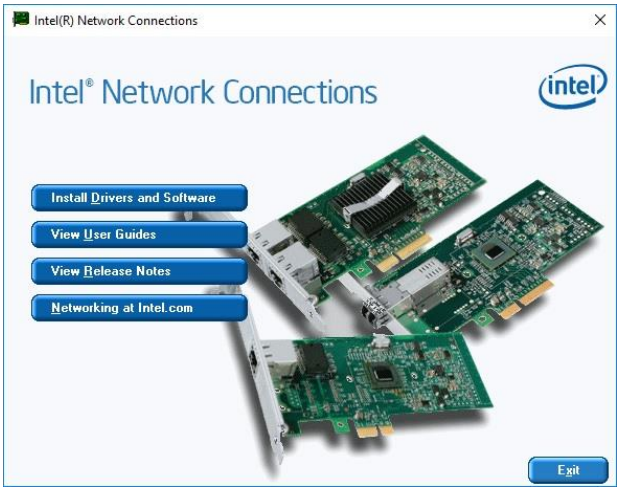



**Step 2.** Click **Finish** to complete the setup.

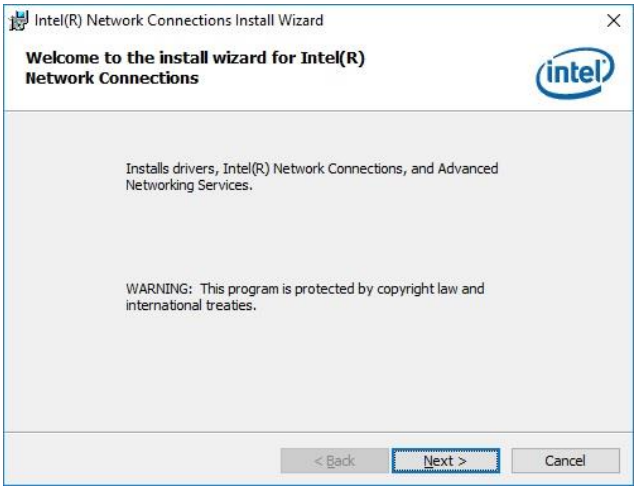
## 4.5 Install Ethernet Driver

All drivers can be found on the Avalue Official Website: [http://www.avalue.com.tw](http://www.avalue.com.tw).

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

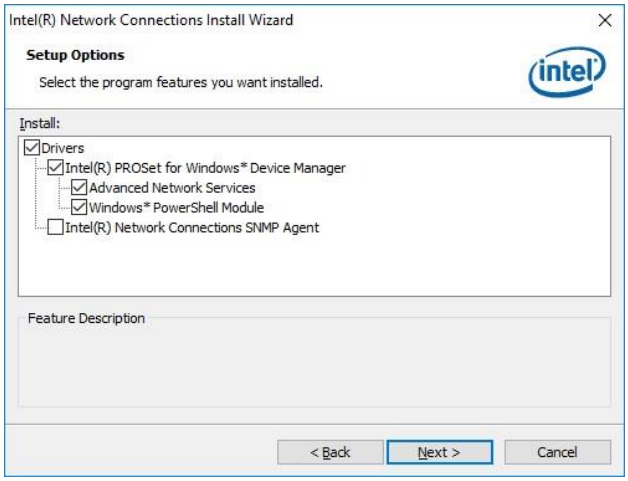



**Step 1.** Click **Install Drivers and Software**.

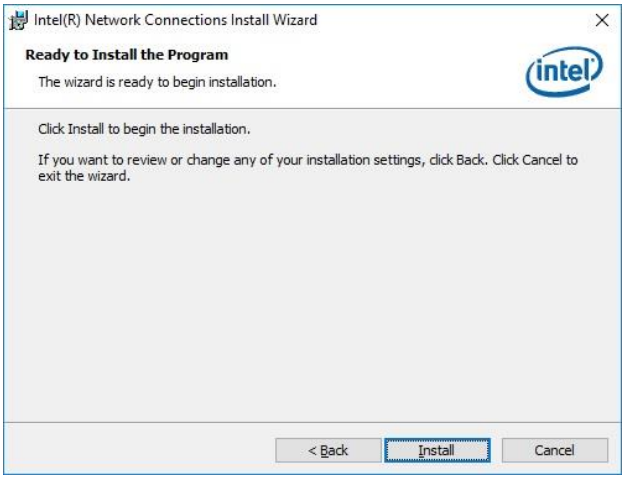



**Step 2.** Click **Next**.

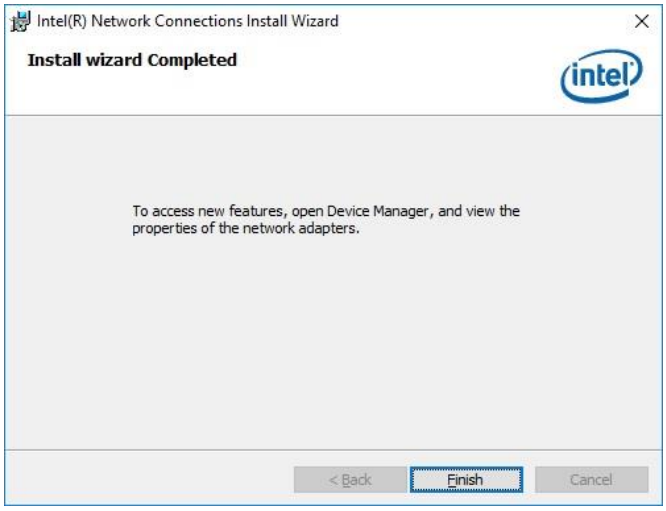

**Step 3.** Click **Next**.




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




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




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