

PICO-EHL1

PICO-ITX Single Board Computer

User's Manual 1st Ed

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Packing List

Before setting up your product, please make sure the following items have been shipped:

| Item | Quantity |
|-------------|----------|
| ● PICO-EHL1 | 1 |

If any of these items are missing or damaged, please contact your distributor or sales representative immediately.

About this Document

This User's Manual contains all the essential information, such as detailed descriptions and explanations on the product's hardware and software features (if any), its specifications, dimensions, jumper/connector settings/definitions, and driver installation instructions (if any), to facilitate users in setting up their product.

Users may refer to the product page on AAEON.com for the latest version of this document.

Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references

1. All cautions and warnings on the device should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. Always completely disconnect the power before working on the system's hardware.
5. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
6. If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
7. Always disconnect this device from any AC supply before cleaning.
8. While cleaning, use a damp cloth instead of liquid or spray detergents.
9. Make sure the device is installed near a power outlet and is easily accessible.
10. Keep this device away from humidity.
11. Place the device on a solid surface during installation to prevent falls
12. Do not cover the openings on the device to ensure optimal heat dissipation.
13. Watch out for high temperatures when the system is running.
14. Do not touch the heat sink or heat spreader when the system is running
15. Never pour any liquid into the openings. This could cause fire or electric shock.
16. As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded containers.

17. If any of the following situations arises, please the contact our service personnel:
 - i. Damaged power cord or plug
 - ii. Liquid intrusion to the device
 - iii. Exposure to moisture
 - iv. Device is not working as expected or in a manner as described in this manual
 - v. The device is dropped or damaged
 - vi. Any obvious signs of damage displayed on the device

18. **DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WHERE THE STORAGE TEMPERATURE IS BELOW -20° C (-4°F) OR ABOVE 60°C (140°F) TO PREVENT DAMAGE.**

Warning!



This device complies with Part 15 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Attention:

Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte. Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur. Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage.

China RoHS Requirements (CN)

产品中有毒有害物质或元素名称及含量

AAEON Main Board/ Daughter Board/ Backplane

| 部件名称 | 有毒有害物质或元素 | | | | | |
|--|-----------|-----------|-----------|-----------------|---------------|-----------------|
| | 铅 (Pb) | 汞 (Hg) | 镉 (Cd) | 六价铬 (Cr(VI)) | 多溴联苯 (PBB) | 多溴二苯醚 (PBDE) |
| 印刷电路板 及其电子组件 | X | X | ○ | ○ | ○ | ○ |
| 外部信号 连接器及线材 | X | X | ○ | ○ | ○ | ○ |
| <p>○: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。</p> <p>X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。</p> <p>备注: 此产品所标示之环保使用期限, 系指在一般正常使用状况下。</p> | | | | | | |

China RoHS Requirement (EN)

Poisonous or Hazardous Substances or Elements in Products

AAEON Main Board/ Daughter Board/ Backplane

| Component | Poisonous or Hazardous Substances or Elements | | | | | |
|---|---|--------------|--------------|------------------------------|--------------------------------|---------------------------------------|
| | Lead (Pb) | Mercury (Hg) | Cadmium (Cd) | Hexavalent Chromium (Cr(VI)) | Polybrominated Biphenyls (PBB) | Polybrominated Diphenyl Ethers (PBDE) |
| PCB & Other Components | X | X | ○ | ○ | ○ | ○ |
| Wires & Connectors for External Connections | X | X | ○ | ○ | ○ | ○ |
| <p>○: The quantity of poisonous or hazardous substances or elements found in each of the component's parts is below the SJ/T 11363-2006-stipulated requirement.</p> <p>X: The quantity of poisonous or hazardous substances or elements found in at least one of the component's parts is beyond the SJ/T 11363-2006-stipulated requirement.</p> <p>Note: The Environment Friendly Use Period as labeled on this product is applicable under normal usage only</p> | | | | | | |

Table of Contents

| | |
|--|----------|
| Chapter 1 - Product Specifications | 1 |
| 1.1 Specifications | 2 |
| 1.2 Function Block Diagram | 5 |
| Chapter 2 – Hardware Information | 6 |
| 2.1 Dimensions | 7 |
| 2.2 Jumpers and Connectors..... | 8 |
| 2.3 List of Jumpers | 10 |
| 2.3.1 Clear CMOS Jumper & Auto Power Button Enable/Disable (JP1) | 10 |
| 2.4 List of Connectors..... | 11 |
| 2.4.1 RTC Battery Connector (CN1) | 12 |
| 2.4.2 LVDS Back Light Inverter (CN2)..... | 12 |
| 2.4.3 LVDS/eDP [Reserved] (CN3) | 13 |
| 2.4.4 HDMI (CN4)..... | 15 |
| 2.4.5 Audio (CN5)..... | 16 |
| 2.4.6 RJ-45 (CN8) | 17 |
| 2.4.7 M.2 2242 B-Key (CN9)..... | 18 |
| 2.4.8 SATA (CN10) | 21 |
| 2.4.9 SATA Power (CN11) | 22 |
| 2.4.10 4-bit DIO Header (CN12)..... | 22 |
| 2.4.11 USB 3.2 Connector (Supports 2 Ports) (CN13) | 23 |
| 2.4.12 mSATA/Mini Card (CN15)..... | 24 |
| 2.4.13 BIO (CN16) | 26 |
| 2.4.14 COM Dual Port Header (CN17) | 29 |
| 2.4.15 SPI Port (CN18)..... | 31 |
| 2.4.16 eSPI (Debug Card)/SMBus/I2C (CN19) | 31 |
| 2.4.17 4-pin Smart Fan Connector (CN20) | 32 |

| | | |
|---|---|-----------|
| 2.4.18 | Power Input +12V (CN21) | 33 |
| 2.4.19 | DC Jack Power Input (Reserved) (CN23) | 33 |
| 2.4.20 | USB 2.0 Connector (CN24/CN25)..... | 34 |
| 2.4.21 | Front Panel (CN26)..... | 35 |
| 2.5 | Thermal Assembly Options | 36 |
| 2.5.1 | Active Cooling Fan FAN01/02 | 36 |
| 2.5.2 | Fanless Heatspreader HSP01/02..... | 37 |
| Chapter 3 - AMI BIOS Setup | | 38 |
| 3.1 | System Test and Initialization | 39 |
| 3.2 | AMI BIOS Setup | 40 |
| 3.3 | Setup Submenu: Main | 41 |
| 3.4 | Setup Submenu: Advanced..... | 42 |
| 3.4.1 | CPU Configuration | 43 |
| 3.4.2 | PCH-FW Configuration | 44 |
| 3.4.2.1 | Firmware Update Configuration | 45 |
| 3.4.3 | PTT Configuration | 46 |
| 3.4.4 | Trusted Computing | 47 |
| 3.4.5 | SATA Configuration | 49 |
| 3.4.6 | Hardware Monitor..... | 50 |
| 3.4.6.1 | Smart Fan Mode Configuration | 51 |
| 3.4.7 | SIO Configuration | 52 |
| 3.4.7.1 | Serial Port Configuration | 53 |
| 3.4.7.2 | Serial Port Console Redirection..... | 54 |
| 3.4.8 | AAEON BIOS Robot..... | 55 |
| 3.4.9 | Power Management | 57 |
| 3.4.10 | Digital IO Port Configuration | 58 |
| 3.5 | Setup Submenu: Chipset | 59 |
| 3.5.1 | System Agent (SA) Configuration..... | 60 |

- 3.5.1.1 Memory Configuration61
 - 3.5.1.2 LVDS Panel Configuration 62
 - 3.6 Setup Submenu: Security..... 64
 - 3.6.1 Secure Boot 65
 - 3.6.1.1 Key Management..... 66
 - 3.7 Setup Submenu: Boot 68
 - 3.7.1 BBS Priorities..... 69
 - 3.8 Setup Submenu: Save & Exit..... 70
- Chapter 4 – Drivers Installation..... 71**
 - 4.1 Drivers Download and Installation..... 72
- Appendix A – Mating Connectors 74**
 - A.1 List of Mating Connectors and Cables..... 75
- Appendix B - I/O Information 76**
 - B.1 Direct Memory Access (DMA) Map..... 77
 - B.2 I/O Address Map 78
 - B.3 IRQ Mapping Chart..... 80
 - B.4 Large Memory Map..... 82
 - B.5 Memory Address Map 82
- Appendix C - Watchdog Timer Programming..... 83**
 - C.1 Introduction to Watchdog Timer 84
 - C.2 Programing the Watchdog Timer with AAEON SDK..... 85
 - C.3 Programing Watchdog Timer with AAEON Windows EAPI 86
 - C.3.1 Watchdog Timer Functions 87
 - C.3.1.1 EapiWDogGetCap() 87
 - C.3.1.2 EapiWDogStart() 88
 - C.3.1.3 EapiWDogTrigger() 89
 - C.3.1.4 EapiWDogStop()..... 89
 - C.3.1.5 EapiWDogReloadTimer() 90

C.3.1.6 EpiWDogGetStatus().....90

C.3.1.7 EpiWDogSetStatus()91

Chapter 1

Product Specifications

1.1 Specifications

System

| | |
|-----------------------|--|
| Form Factor | PICO-ITX |
| CPU | Intel Atom® x6000E, Celeron® N and J Processor Series: Intel Atom® x6425E (4C, 2.0GHz, up to 3.0GHz, TDP up to 12W) Intel Atom® x6211E (2C, 1.3GHz, up to 3.0GHz, TDP up to 6W) Intel® Celeron® Processor J6412 (4C, 2.0GHz, up to 2.6GHz, TDP up to 10W) Intel® Celeron® Processor N6210 (2C, 1.2GHz, up to 2.6GHz, TDP up to 6.5W) |
| Chipset | Integrated with Intel® SoC |
| Memory Type | DDR4 up to 3200MHz SODIMM x 1, up to 32GB |
| BIOS | UEFI |
| Wake on LAN | Yes |
| Watchdog Timer | 255 Levels |
| Security | TPM 2.0 (Optional) |
| RTC Battery | Lithium Battery 3V/240mAh |
| Dimension | 3.94" x 2.84" (100mm x 72mm) |
| Gross Weight | 0.18 lb. (0.08Kg) |
| OS Support | Windows® 10 (64-bit) Ubuntu 20.04.5/Kernel 5.15 |

Power

| | |
|--------------------------|--|
| Power Requirement | +12V |
| Power Supply Type | AT/ATX |
| Connector | 2-pin Phoenix Connector (Default) Lockable DC Jack Connector (Colay) |
| Power Consumption | Intel Atom® x6425E, DDR4 32GB, 2.67A@ +12V (Typical) Intel Atom® x6425E, DDR4 32GB, 2.84A@ +12V (Max) |

Display

| | |
|--------------------------|--|
| Controller | Intel® UHD Graphics for 10 th Gen Intel® Processors |
| LVDS/eDP | LVDS (2ch 18/24-bit) 1920 x 1200 (Optional: eDP 1.3, 3840 x 2160 @60Hz) |
| Display Interface | HDMI 1.4b x 1 (up to 3840 x 2160) DDI (BIO, Optional) |
| Multiple Display | Up to 3 Simultaneous Displays |

Audio

| | |
|------------------------|----------------------|
| Codec | Realtek ALC269 |
| Audio Interface | Line-in/Line-out/MIC |
| Speaker | — |

External I/O

| | |
|--------------------|---|
| Ethernet | Realtek 8111H Gigabit Ethernet 10/100/1000Base, RJ-45 x 1 |
| USB | USB 3.2 Gen 2 x 2 |
| Serial Port | — |
| Video | HDMI 1.4b x 1 (up to 3840 x 2160) |

Internal I/O

| | |
|-------------|---|
| USB | USB 2.0 x 2 |
| Serial Port | COM 1, COM 2 (RS-232/422/485, supports 5V/12V/RI) |
| Video | LVDS (2ch 18/24bit) 1920 x 1200 (Optional: eDP 1.3, 3840 x 2160 @60Hz) |
| SATA | SATA III x 1 +5V SATA Power Connector x 1 |
| Audio | Audio Header x 1 |
| DIO/GPIO | 4-bit |
| SMBus/I2C | SMBus/I2C x 1 (SMBus as default) |
| Touch | — |
| Fan | 4-pin Smart Fan x 1 |
| SIM | — |
| Front Panel | HDD LED, PWR LED, Power Button, Buzzer, Reset |

Expansion

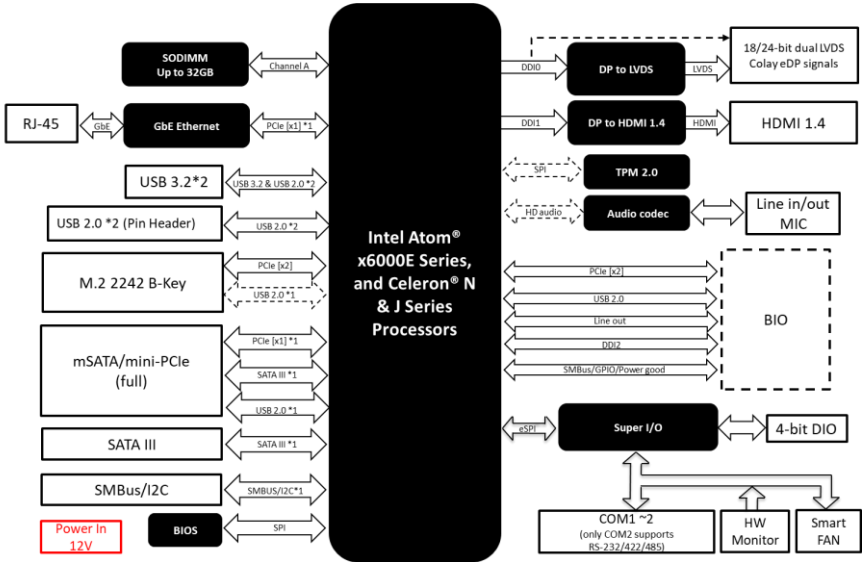
| | |
|------------------|---|
| Mini PCI-E/mSATA | Full Size mPCIe/mSATA x 1 (SATA as default, PCIe selected by BIOS) |
| M.2 | M.2 2242 B-Key x 1 (PCIe [x2] as default, USB 2.0 optional) |
| Others | BIO (Optional, supports PCIe [x2], USB 2.0, SMBus/GPIO, Line-out, DDI2) |

Environmental

| | |
|-----------------------|--|
| Operating Temperature | 32°F ~ 140°F (0°C ~ 60°C) |
| Storage Temperature | -40°F ~ 185°F (-40°C ~ 85°C) |
| Operating Humidity | 0% ~ 90% relative humidity, non-condensing |
| MTBF (Hours) | 494,537 |
| EMC | CE/FCC Class A |

1.2 Function Block Diagram

PICO-EHL1 A1.0 Block Diagram(External)

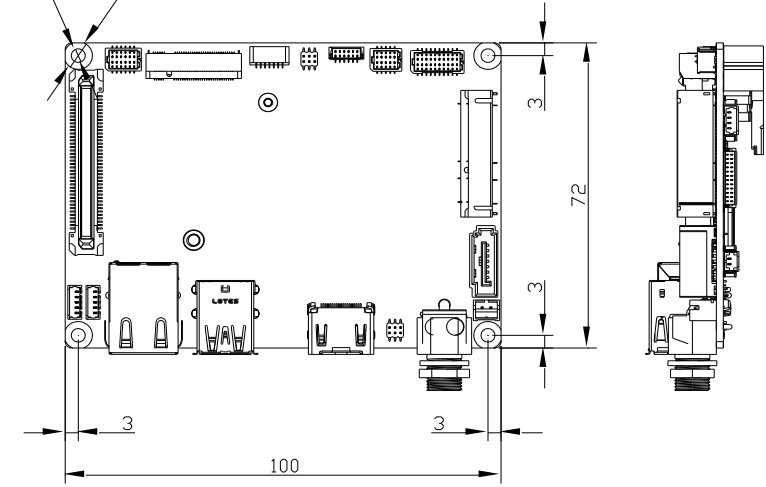


Chapter 2

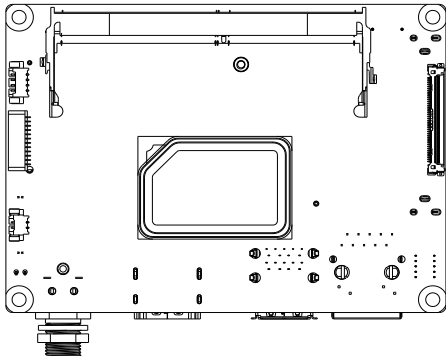
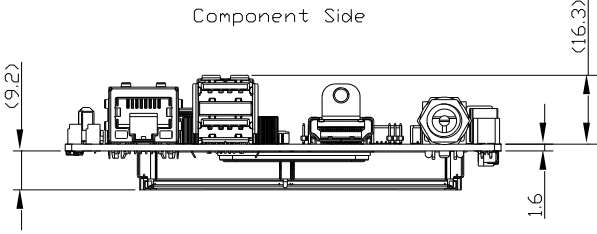
Hardware Information

2.1 Dimensions

4x ϕ 3.2 THRU
4x ϕ 6.5 PAD



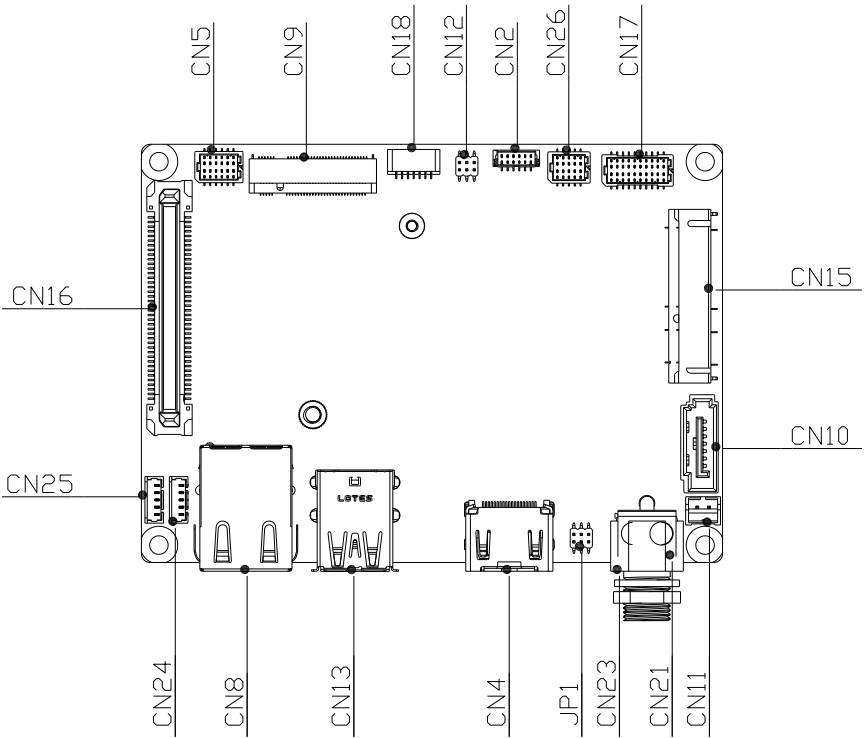
Component Side



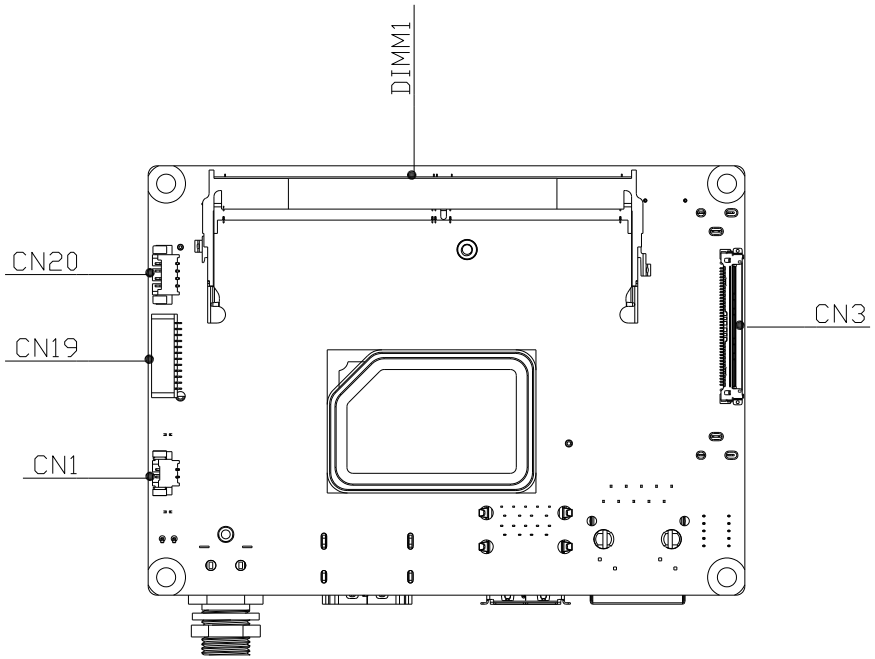
Solder Side

2.2 Jumpers and Connectors

Component Side:



Solder Side:



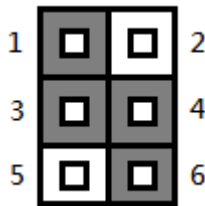
2.3 List of Jumpers

Jumpers allow users to manually customize system configurations to their suitable application needs.

Please refer to the table below for all of the board's jumpers that you can configure for your application

| Label | Function |
|-------|--|
| JP1 | Clear CMOS Jumper & Auto Power Button Enable/Disable |

2.3.1 Clear CMOS Jumper & Auto Power Button Enable/Disable (JP1)



| Clear CMOS Jumper | |
|-------------------|---------------------|
| Pin | Function |
| 1-3 | Save CMOS (Default) |
| 3-5 | Clear CMOS |

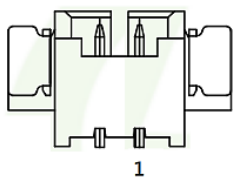
| Auto Power Button Enable/Disable | |
|----------------------------------|------------------|
| Pin | Function |
| 2-4 | Disable |
| 4-6 | Enable (Default) |

2.4 List of Connectors

Please refer to the table below for all of the board's connectors that you can configure for your application

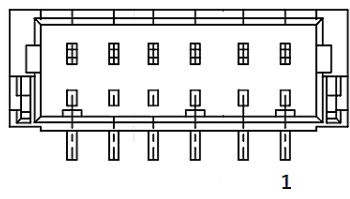
| Label | Function |
|-------|--------------------------------|
| CN1 | RTC Battery Connector |
| CN2 | LVDS Back Light Inverter |
| CN3 | LVDS/eDP [Reserved] |
| CN4 | HDMI |
| CN5 | Audio |
| CN8 | RJ-45 |
| CN9 | M.2 2242 B-Key |
| CN10 | SATA |
| CN11 | SATA Power |
| CN12 | 4-bit DIO |
| CN13 | USB 3.2 Dual Port |
| CN15 | Mini Card/mSATA |
| CN16 | BIO |
| CN17 | COM Port (Supports 2 Ports) |
| CN18 | SPI (For BIOS) |
| CN19 | Debug Card/I2C/SMBus |
| CN20 | 4 Pin Fan |
| CN21 | Power Input 12V |
| CN23 | DC Jack Power Input [Reserved] |
| CN24 | USB 2.0 Connector |
| CN25 | USB 2.0 Connector |
| CN26 | Front Panel |

2.4.1 RTC Battery Connector (CN1)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1 | +3.3V | PWR | +3.3V |
| 2 | GND | GND | - |

2.4.2 LVDS Back Light Inverter (CN2)

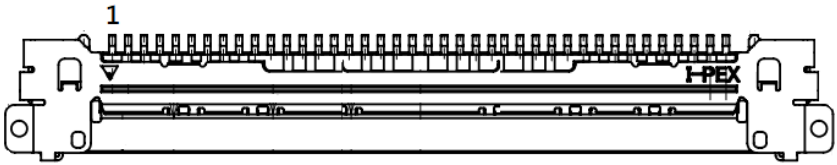


| Pin | Pin Name | Signal Type | Signal Level |
|-----|-------------|-------------|----------------------|
| 1 | BLK_PWR | PWR | +12V (Default) / +5V |
| 2 | BLK_PWR | PWR | +12V (Default) / +5V |
| 3 | BKL_CONTROL | Signal | - |
| 4 | GND | GND | - |
| 5 | GND | GND | - |
| 6 | BKL_ENABLE | Signal | - |

Note 1: Backlight Power can be 12V or 5V, set by BOM: Stuff R285 for 12V and stuff R287 for 5V. (Default: 12V)

Note 2: CN2 max current 2A.

2.4.3 LVDS/eDP [Reserved] (CN3)



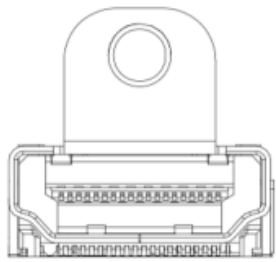
| Pin | Pin Name | Signal Type | Signal Level |
|-----|--------------|-------------|--------------|
| 1 | GND | GND | - |
| 2 | LVD1_CB_3_DP | DIFF | - |
| 3 | LVD1_CB_3_DN | DIFF | - |
| 4 | GND | GND | - |
| 5 | LVD1_CB_CLKP | DIFF | - |
| 6 | LVD1_CB_CLKN | DIFF | - |
| 7 | GND | GND | - |
| 8 | LVD1_CB_2_DP | DIFF | - |
| 9 | LVD1_CB_2_DN | DIFF | - |
| 10 | GND | GND | - |
| 11 | LVD1_CB_1_DP | DIFF | - |
| 12 | LVD1_CB_1_DN | DIFF | - |
| 13 | GND | GND | - |
| 14 | LVD1_CB_0_DP | DIFF | - |
| 15 | LVD1_CB_0_DN | DIFF | - |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|--------------------------------|-------------|--------------|
| 16 | GND | GND | - |
| 17 | +V3P3S | PWR | +3.3V |
| 18 | LVD1_DDC_CLK/ DDIO_HPD | Signal | - |
| 19 | LVD1_BKLTEN/ DDIO_BKLTEN | Signal | - |
| 20 | LVD1_DDC_DATA | Signal | - |
| 21 | LVD1_BKLCTL/ DDIO_BKLCTL | Signal | - |
| 22 | GND | GND | - |
| 23 | LVD1_CA_CLKP/ DDIO_AUX_DP | DIFF | - |
| 24 | LVD1_CA_CLKN/ DDIO_AUX_DN | DIFF | - |
| 25 | GND | GND | - |
| 26 | LVD1_CA_3_DP/ DDIO_LANE3_DP | DIFF | - |
| 27 | LVD1_CA_3_DN/ DDIO_LANE3_DN | DIFF | - |
| 28 | GND | GND | - |
| 29 | LVD1_CA_0_DP/ DDIO_LANE0_DP | DIFF | - |
| 30 | LVD1_CA_0_DN/ DDIO_LANE0_DN | DIFF | - |
| 31 | GND | GND | - |
| 32 | LVD1_CA_1_DP/ DDIO_LANE1_DP | DIFF | - |
| 33 | LVD1_CA_1_DN/ DDIO_LANE1_DN | DIFF | - |
| 34 | GND | GND | - |
| 35 | LVD1_CA_2_DP/ DDIO_LANE2_DP | DIFF | - |
| 36 | LVD1_CA_2_DN/ DDIO_LANE2_DN | DIFF | - |
| 37 | GND | GND | - |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 38 | +VDD | PWR | +3.3V |
| 39 | +VDD | PWR | +3.3V |
| 40 | +VDD | PWR | +3.3V |

Note: CN3: VDD power current max: 1.5A.

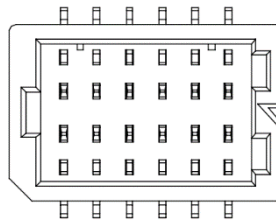
2.4.4 HDMI (CN4)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|-----------|-------------|--------------|
| 1 | HDMI_TX2+ | DIFF | - |
| 2 | GND | GND | - |
| 3 | HDMI_TX2- | DIFF | - |
| 4 | HDMI_TX1+ | DIFF | - |
| 5 | GND | GND | - |
| 6 | HDMI_TX1- | DIFF | - |
| 7 | HDMI_TX0+ | DIFF | - |
| 8 | GND | GND | - |
| 9 | HDMI_TX0- | DIFF | - |
| 10 | HDMI_CLK+ | DIFF | - |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|-----------|-------------|--------------|
| 11 | GND | GND | - |
| 12 | HDMI_CLK- | DIFF | - |
| 13 | NC | - | - |
| 14 | NC | - | - |
| 15 | DDC_CLK | Signal | +5V |
| 16 | DDC_DATA | Signal | +5V |
| 17 | GND | GND | - |
| 18 | +5V | PWR | +5V |
| 19 | HDMI_HPD | - | - |

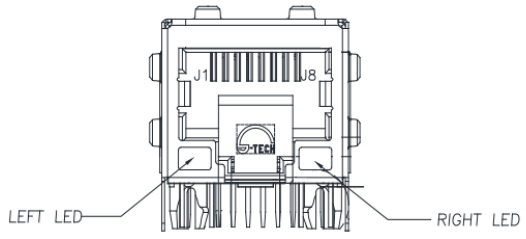
2.4.5 Audio (CN5)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1 | LOUT_R | Signal | - |
| 2 | MIC_R | Signal | - |
| 3 | LOUT_L | Signal | - |
| 4 | MIC_L | Signal | - |
| 5 | JD_LOUT | Signal | - |
| 6 | JD_MIC | Signal | - |
| 7 | AUD_GND | GND | - |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 8 | AUD_GND | GND | - |
| 9 | JD_LIN | Signal | - |
| 10 | LIN_R | Signal | - |
| 11 | +V5A_AUD | PWR | +5V |
| 12 | LIN_L | Signal | - |
| 13 | AUD_GND | GND | - |
| 14 | AUD_GND | GND | - |

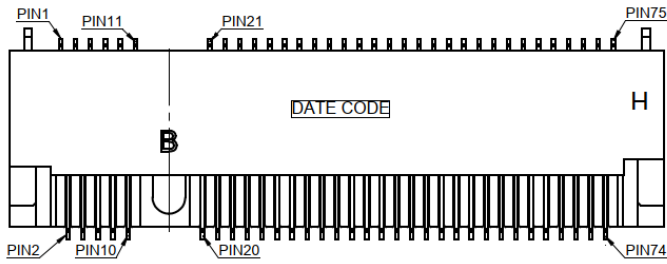
2.4.6 RJ-45 (CN8)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|------------|-------------|--------------|
| P1 | LAN1_MDI0+ | DIFF | - |
| P2 | LAN1_MDI0- | DIFF | - |
| P3 | LAN1_MDI1+ | DIFF | - |
| P4 | LAN1_MDI1- | DIFF | - |
| P5 | LAN1_CT | - | - |
| P6 | LAN1_CT | - | - |
| P7 | LAN1_MDI2+ | DIFF | - |
| P8 | LAN1_MDI2- | DIFF | - |
| P9 | LAN1_MDI3+ | DIFF | - |
| P10 | LAN1_MDI3- | DIFF | - |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------------|-------------|--------------|
| 2L2 | +V3P3A | VDD | +3.3V |
| 2L3 | LAN2_LED_100# | Signal | - |
| 2L4 | LAN2_LED_1000# | Signal | - |

2.4.7 M.2 2242 B-Key (CN9)



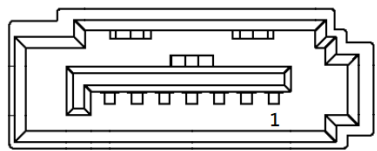
| Pin | Pin Name | Signal Type | Signal Level |
|-----|-------------------|-------------|--------------|
| 1 | GND | GND | - |
| 2 | +V3P3A | PWR | 3.3V |
| 3 | GND | GND | - |
| 4 | +V3P3A | PWR | 3.3V |
| 5 | GND | GND | - |
| 6 | FULL_CARD_PWR_OFF | - | - |
| 7 | USB2_4_DP | DIFF | - |
| 8 | W_DISABLE2# | Signal | - |
| 9 | USB2_4_DN | FIFF | - |
| 10 | SSD_LED# | Signal | - |
| 11 | GND | - | - |
| 20 | NC | - | - |
| 21 | GND | - | - |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|------------|-------------|--------------|
| 22 | NC | - | - |
| 23 | NC | - | - |
| 24 | NC | - | - |
| 25 | NC | - | - |
| 26 | NC | - | - |
| 27 | GND | - | - |
| 28 | NC | - | - |
| 29 | PCIE_5_RXN | DIFF | - |
| 30 | NC | - | - |
| 31 | PCIE_5_RXP | DIFF | - |
| 32 | NC | - | - |
| 33 | GND | GND | - |
| 34 | NC | - | - |
| 35 | PCIE_5_TXP | DIFF | - |
| 36 | NC | - | - |
| 37 | PCIE_5_TXN | DIFF | - |
| 38 | NC | - | - |
| 39 | GND | GND | - |
| 40 | NC | - | - |
| 41 | PCIE_4_RXP | DIFF | - |
| 42 | NC | - | - |
| 43 | PCIE_4_RXN | GND | - |
| 44 | NC | - | - |
| 45 | GND | GND | - |
| 46 | NC | - | - |
| 47 | PCIE_4_TXN | DIFF | - |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|---------------|-------------|--------------|
| 48 | NC | - | - |
| 49 | PCIE_4_TXP | DIFF | - |
| 50 | BUF_PLT_RST# | Signal | - |
| 51 | GND | GND | - |
| 52 | PCIE_CLKREQ#0 | Signal | - |
| 53 | PCIE_0_CLK_DN | DIFF | - |
| 54 | PCIE_WAKE# | Signal | - |
| 55 | PCIE_0_CLK_DP | DIFF | - |
| 56 | NC | - | - |
| 57 | GND | GND | - |
| 58 | NC | - | - |
| 59 | NC | - | - |
| 60 | NC | - | - |
| 61 | NC | - | - |
| 62 | NC | - | - |
| 63 | NC | - | - |
| 64 | NC | - | - |
| 65 | NC | - | - |
| 66 | NC | - | - |
| 67 | NC | - | - |
| 68 | NC | - | - |
| 69 | GND | GND | - |
| 70 | +V3P3A_2242 | PWR | 3.3V |
| 71 | GND | GND | - |
| 72 | +V3P3A_2242 | PWR | 3.3V |
| 73 | GND | GND | - |

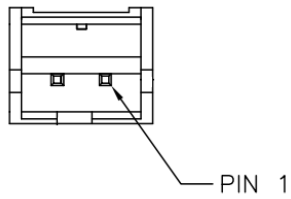
| Pin | Pin Name | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 74 | +V3P3A_2242 | PWR | 3.3V |
| 75 | NC | - | - |

2.4.8 SATA (CN10)



| Pin | Pin Name | Signal Type |
|-----|------------|-------------|
| 1 | GND | GND |
| 2 | SATA_1_TXP | DIFF |
| 3 | SATA_1_TXN | DIFF |
| 4 | GND | GND |
| 5 | SATA_1_RXN | DIFF |
| 6 | SATA_1_RXP | DIFF |
| 7 | GND | GND |

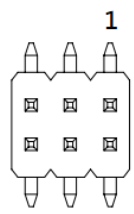
2.4.9 SATA Power (CN11)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1 | +V5S | VDD | 5V |
| 2 | GND | GND | - |

Note: SATA power current max: 1.5A.

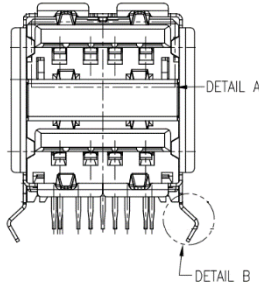
2.4.10 4-bit DIO Header (CN12)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1 | +V5S | VDD | 5V |
| 2 | DIO_0 | Signal | - |
| 3 | DIO_1 | Signal | - |
| 4 | DIO_2 | Signal | - |
| 5 | DIO_3 | Signal | - |
| 6 | GND | GND | - |

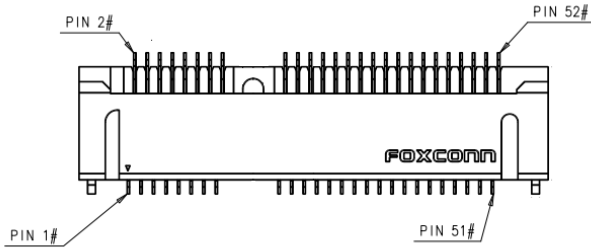
Note: DIO power current max: 0.5A.

2.4.11 USB 3.2 Connector (Supports 2 Ports) (CN13)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|------------|-------------|--------------|
| 1 | +V5A_USB12 | PWR | +5V |
| 2 | USB2_0_DN | DIFF | - |
| 3 | USB2_0_DP | DIFF | - |
| 4 | GND | GND | - |
| 5 | USB3_0_RXN | DIFF | - |
| 6 | USB3_0_RXP | DIFF | - |
| 7 | GND | GND | - |
| 8 | USB3_0_TXN | DIFF | - |
| 9 | USB3_0_TXP | DIFF | - |
| 10 | +V5A_USB12 | PWR | +5V |
| 11 | USB2_1_DN | DIFF | - |
| 12 | USB2_1_DP | DIFF | - |
| 13 | GND | - | - |
| 14 | USB3_1_RXN | DIFF | - |
| 15 | USB3_1_RXP | DIFF | - |
| 16 | GND | - | - |
| 17 | USB3_1_TXN | DIFF | - |
| 18 | USB3_1_TXP | DIFF | - |

2.4.12 mSATA/Mini Card (CN15)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|---------------|-------------|--------------|
| 1 | PCIE_WAKE# | Signal | - |
| 2 | +3.3V | PWR | +3.3V |
| 3 | NC | - | - |
| 4 | GND | GND | - |
| 5 | NC | - | - |
| 6 | +1.5V | PWR | +1.5V |
| 7 | PCIE_CLK_REQ# | Signal | - |
| 8 | NC | - | - |
| 9 | GND | GND | - |
| 10 | NC | - | - |
| 11 | PCIE_REF_CLK- | DIFF | - |
| 12 | NC | - | - |
| 13 | PCIE_REF_CLK+ | DIFF | - |
| 14 | NC | - | - |
| 15 | GND | GND | - |
| 16 | NC | - | - |
| 17 | NC | - | - |
| 18 | GND | GND | - |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|-------------------|-------------|--------------|
| 19 | NC | - | - |
| 20 | W_DISABLE# | Signal | +3.3V |
| 21 | GND | GND | - |
| 22 | PCIE_RST# | Signal | +3.3V |
| 23 | PCIE_RX-/SATA_RX+ | DIFF | - |
| 24 | +3.3V | PWR | +3.3V |
| 25 | PCIE_RX+/SATA_RX- | DIFF | - |
| 26 | GND | GND | - |
| 27 | GND | GND | - |
| 28 | +1.5V | PWR | +1.5V |
| 29 | GND | GND | - |
| 30 | SMB_CLK | Signal | +3.3V |
| 31 | PCIE_TX-/SATA_TX- | DIFF | - |
| 32 | SMB_DATA | Signal | +3.3V |
| 33 | PCIE_TX+/SATA_TX+ | DIFF | - |
| 34 | GND | GND | - |
| 35 | GND | GND | - |
| 36 | USB_D- | DIFF | - |
| 37 | GND | GND | - |
| 38 | USB_D+ | DIFF | - |
| 39 | +3.3V | PWR | +3.3V |
| 40 | GND | GND | - |
| 41 | +3.3V | PWR | +3.3V |
| 42 | NC | - | - |
| 43 | GND | GND | - |
| 44 | NC | - | - |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 45 | NC | - | - |
| 46 | NC | - | - |
| 47 | NC | - | - |
| 48 | +1.5V | PWR | +1.5V |
| 49 | NC | - | - |
| 50 | GND | GND | - |
| 51 | NC | - | - |
| 52 | +3.3V | PWR | +3.3V |

2.4.13 BIO (CN16)

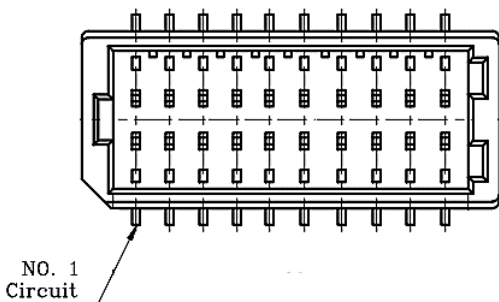
| Pin | Pin Name | Signal Type | Signal Level |
|-----|------------|-------------|--------------|
| 1 | +V12A | PWR | +12V |
| 2 | GND | GND | - |
| 3 | GND | GND | - |
| 4 | PCIE_0_TXN | DIFF | - |
| 5 | PCIE_0_RXN | DIFF | - |
| 6 | PCIE_0_TXP | DIFF | - |
| 7 | PCIE_0_RXP | DIFF | - |
| 8 | GND | GND | - |
| 9 | GND | GND | - |
| 10 | PCIE_1_TXN | DIFF | - |
| 11 | PCIE_1_RXN | DIFF | - |
| 12 | PCIE_1_TXP | DIFF | - |
| 13 | PCIE_1_RXP | DIFF | - |
| 14 | GND | GND | - |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------------|-------------|--------------|
| 15 | GND | GND | - |
| 16 | PS_ON# | Signal | - |
| 17 | DDI1_CTRL_CLK | - | - |
| 18 | DDI1_CTRL_DATA | - | - |
| 19 | +V5A | PWR | +5V |
| 20 | +V5A | PWR | +5V |
| 21 | +V5A | PWR | +5V |
| 22 | +V5A | PWR | +5V |
| 23 | PCIE_1_CLK_DP | DIFF | - |
| 24 | BUF_PLT_RST# | Signal | - |
| 25 | PCIE_1_CLK_DN | DIFF | - |
| 26 | GND | GND | - |
| 27 | GND | GND | - |
| 28 | DDI1_LANE1_DN | DIFF | - |
| 29 | DDI1_LANE0_DN | DIFF | - |
| 30 | DDI1_LANE1_DP | DIFF | - |
| 31 | DDI1_LANE0_DP | DIFF | - |
| 32 | GND | GND | - |
| 33 | GND | GND | - |
| 34 | DDI1_LANE3_DN | DIFF | - |
| 35 | DDI1_LANE2_DN | DIFF | - |
| 36 | DDI1_LANE3_DP | DIFF | - |
| 37 | DDI1_LANE2_DP | DIFF | - |
| 38 | GND | GND | - |
| 39 | GND | GND | - |
| 40 | DDI1_HPD_BIO | Signal | - |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 41 | DDI1_AUXN | DIFF | - |
| 42 | GND | GND | - |
| 43 | DDI1_AUXP | DIFF | - |
| 44 | USB3_2_TXN | DIFF | - |
| 45 | GND | GND | - |
| 46 | USB3_2_TXP | DIFF | - |
| 47 | USB2_6_DN | DIFF | - |
| 48 | GND | GND | - |
| 49 | USB2_6_DP | DIFF | - |
| 50 | USB3_2_RXN | DIFF | - |
| 51 | GND | GND | - |
| 52 | USB3_2_RXP | DIFF | - |
| 53 | SMB_CLK | - | - |
| 54 | GND | GND | - |
| 55 | SMB_DATA | - | - |
| 56 | PCIE_WAKE# | Signal | - |
| 57 | GND | GND | - |
| 58 | USB2_OC2# | Signal | - |
| 59 | +5V | PWR | +5V |
| 60 | USB 2.0_OC# | Signal | - |
| 61 | +5V | PWR | +5V |
| 62 | +5V | PWR | +5V |
| 63 | +5V | PWR | +5V |
| 64 | +5V | PWR | +5V |
| 65 | LPC_ADO | Signal | - |
| 66 | LPC_FRAME# | Signal | - |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 67 | LPC_AD1 | Signal | - |
| 68 | SERIRQ# | Signal | - |
| 69 | LPC_AD2 | Signal | - |
| 70 | NC | - | - |
| 71 | LPC_AD3 | Signal | - |
| 72 | GPIO | Signal | - |
| 73 | GND | GND | - |
| 74 | Audio_GND | GND | - |
| 75 | LPC_CLK | Signal | - |
| 76 | Audio_OUT_L | Signal | - |
| 77 | PME# | Signal | - |
| 78 | Audio_OUT_R | Signal | - |
| 79 | GND | GND | - |
| 80 | GND | GND | - |

2.4.14 COM Dual Port Header (CN17)



| Pin | Pin Name_RS232 | Pin Name_RS422 | Pin Name_RS485 |
|-----|----------------|----------------|----------------|
| 1 | DCD_1 | TX_1- | DATA_1- |
| 2 | DCD_2 | TX_2- | DATA_2- |

| Pin | Pin Name_RS232 | Pin Name_RS422 | Pin Name_RS485 |
|-----|----------------|----------------|----------------|
| 3 | RX_1 | TX_1+ | DATA_1+ |
| 4 | RX_2 | TX_2+ | DATA_2+ |
| 5 | TX_1 | RX_1+ | - |
| 6 | TX_2 | RX_2+ | - |
| 7 | DTR_1 | RX_1- | - |
| 8 | DTR_2 | RX_2- | - |
| 9 | GND | GND | GND |
| 10 | GND | GND | GND |
| 11 | DSR_1 | - | - |
| 12 | DSR_2 | - | - |
| 13 | RTS_1 | - | - |
| 14 | RTS_2 | - | - |
| 15 | CTS_1 | - | - |
| 16 | CTS_2 | - | - |
| 17 | RI_1/12V/5V | - | - |
| 18 | RI_2/12V/5V | - | - |
| 19 | UART_TX | - | - |
| 20 | UART_RX | - | - |

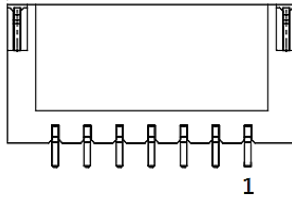
Note 1: COM RS-232/422/485 can be set by BIOS setting. Default is RS-232.

Note 2: RI1/+5V/+12V function can be set by BOM(R423-RI/R369-+12V/R370-+5V).
Default is RING.

Note 3: RI2/+5V/+12V function can be set by BOM(R424-RI/R372-+12V/R373-+5V).
Default is RING.

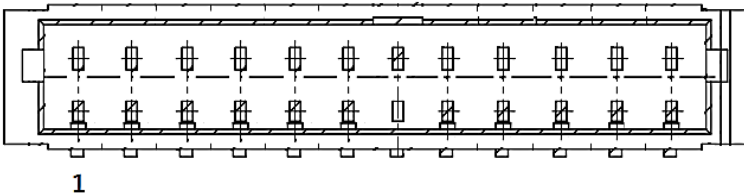
Note 4: Max current: 0.5A for each port.

2.4.15 SPI Port (CN18)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|------------|-------------|--------------|
| 1 | SPI_SO | Signal | - |
| 2 | GND | GND | - |
| 3 | SPI_CLK | Signal | - |
| 4 | +V3P3A_SPI | PWR | 3.3A |
| 5 | SPI_SI | Signal | - |
| 6 | SPI_CS | Signal | - |
| 7 | NC | - | - |

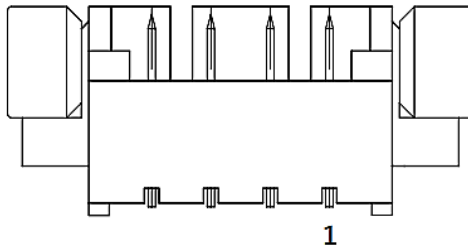
2.4.16 eSPI (Debug Card)/SMBus/I2C (CN19)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1 | ESPI_IO0 | Signal | +1.8V |
| 2 | ESPI_IO1 | Signal | +1.8V |
| 3 | ESPI_IO2 | Signal | +1.8V |
| 4 | ESPI_IO3 | Signal | +1.8V |
| 5 | +V3.3S | PWR | +3.3V |

| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------------------|-------------|--------------|
| 6 | ESPI_CS | Signal | - |
| 7 | ESPI_RESET# | Signal | +1.8V |
| 8 | GND | GND | - |
| 9 | ESPI_CLK | Signal | 1.8V |
| 10 | SMB_DATA/ I2C_SDA | Signal | +3.3V |
| 11 | SMB_CLK/ I2C_CLK | Signal | +3.3V |
| 12 | SMB_ALERT/INT_SERIRQ | Signal | +3.3V |

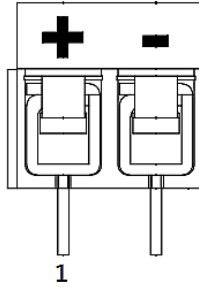
2.4.17 4-pin Smart Fan Connector (CN20)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1 | GND | GND | - |
| 2 | +V12S | PWR | +12V |
| 3 | FAN_TAC | Signal | - |
| 4 | FAN_CTL | Signal | - |

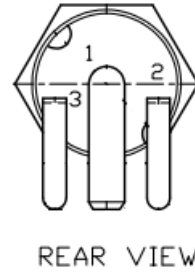
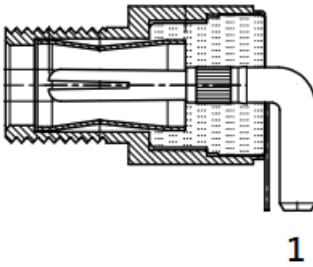
Note: Smart Fan power max current: 1.0A.

2.4.18 Power Input +12V (CN21)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1 | +V_IN | PWR | +12V |
| 2 | GND | GND | - |

2.4.19 DC Jack Power Input (Reserved) (CN23)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| 1 | +V_IN | PWR | +12V |
| 2 | GND | GND | - |
| 3 | GND | GND | - |

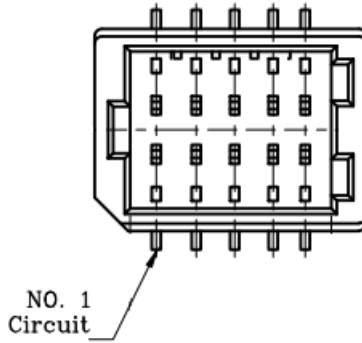
2.4.20 USB 2.0 Connector (CN24/CN25)



| Pin | Pin Name | Signal Type | Signal Level |
|-----|----------|-------------|--------------|
| P1 | +V5A | PWR | 5V |
| P2 | USB2_DN | DIFF | - |
| P3 | USB2_DP | DIFF | - |
| P4 | GND | GND | - |
| P5 | GND | GND | - |

Note: Each connector power current max: 0.5A.

2.4.21 Front Panel (CN26)

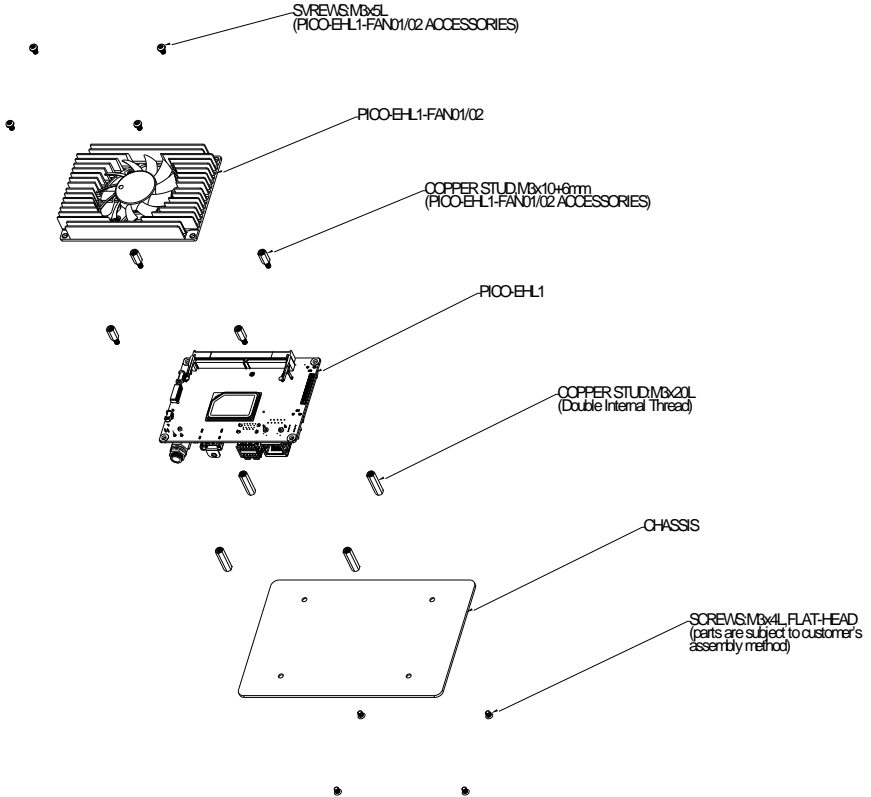


| Pin | Pin Name | Signal Type | Signal Level |
|-----|-------------|-------------|--------------|
| 1 | GND | GND | - |
| 2 | EXT_PWRBTN# | Signal | - |
| 3 | FP_IDELED# | Signal | - |
| 4 | +V3P3S | PWR | +3.3V |
| 5 | FP_BUZZER | Signal | - |
| 6 | +V5S | PWR | +5V |
| 7 | GND | - | - |
| 8 | +V3P3S | PWR | +3.3V |
| 9 | GND | - | - |
| 10 | HWRST# | Signal | - |

2.5 Thermal Assembly Options

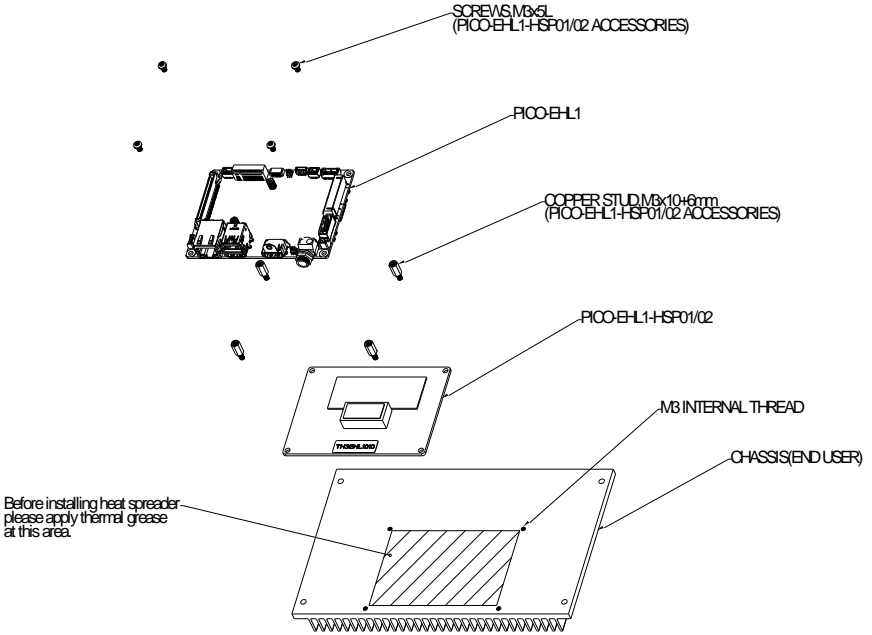
2.5.1 Active Cooling Fan FAN01/02

Active Cooling Fan, Part Number: PICO-EHL1-FAN01/02



2.5.2 Fanless Heatspreader HSP01/02

Heat spreader/fanless assembly, Part Number: PICO-EHL1-HSP01/02



Chapter 3

AMI BIOS Setup

3.1 System Test and Initialization

These routines test and initialize board hardware. If the routines encounter an error during the tests, you will either hear a few short beeps or see an error message on the screen. There are two kinds of errors: fatal and non-fatal. The system can usually continue the boot up sequence with non-fatal errors.

System configuration verification

These routines check the current system configuration stored in the CMOS memory and BIOS NVRAM. If system configuration is not found or a system configuration data error is detected, the system will load optimized default and re-boot with this default system configuration automatically.

There are four situations in which you will need to setup system configuration:

1. You are starting your system for the first time
2. You have changed the hardware attached to your system
3. The system configuration is reset by Clear-CMOS jumper
4. The CMOS memory has lost power and the configuration information has been erased.

The PICO-EHL1 CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the complete unit when it finally runs down.

3.2 AMI BIOS Setup

AMI BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed CMOS RAM and BIOS NVRAM so that it retains the Setup information when the power is turned off.

Entering Setup

Power on the computer and press or <ESC> immediately. This will allow you to enter Setup.

Main

Set the date, use tab to switch between date elements.

Advanced

Enable/disable boot option for legacy network devices.

Chipset

Host bridge parameters.

Boot

Enables/disables quiet boot option.

Security

Set setup administrator password.

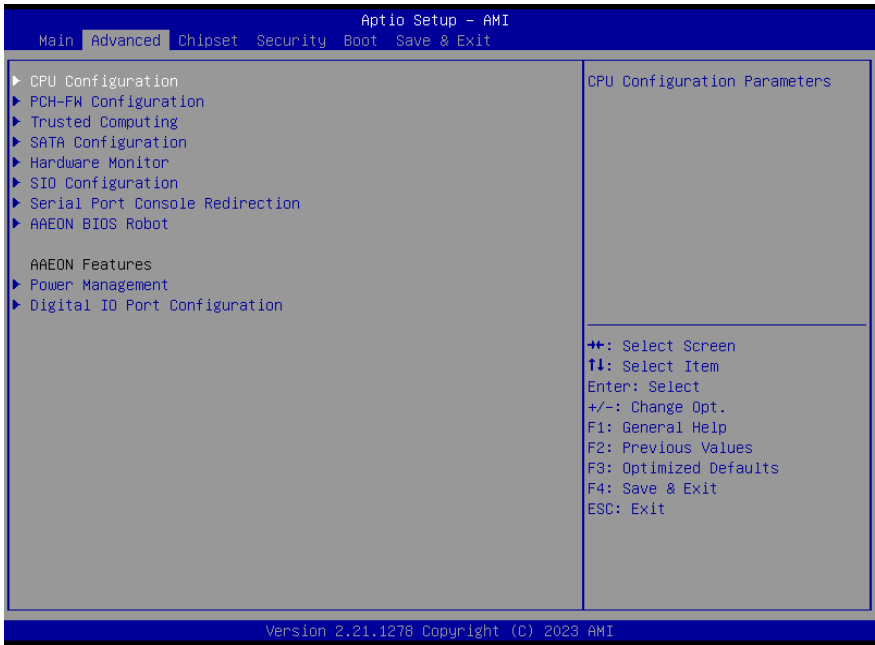
Save & Exit

Exit system setup after saving the changes.

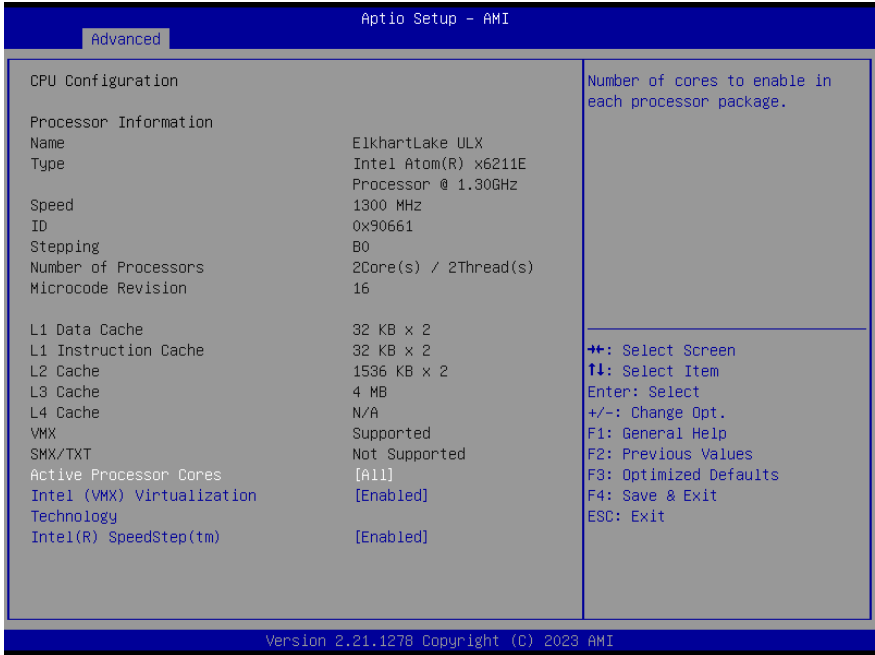
3.3 Setup Submenu: Main



3.4 Setup Submenu: Advanced



3.4.1 CPU Configuration

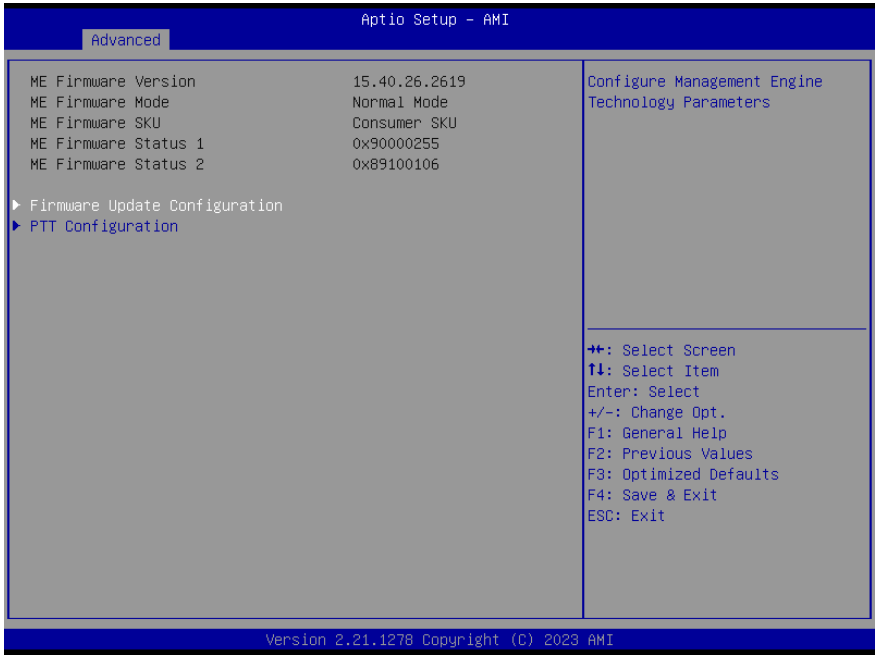


| Options Summary | | |
|---|----------|-----------------------------------|
| Active Processor Cores | All | Optimal Default, Failsafe Default |
| | 1~N | |
| Number of cores to enable in each processor package. | | |
| Intel (VMX) Virtualization Technology | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. | | |
| Intel® SpeedStep™ | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Allows more than two frequency ranges to be supported. | | |

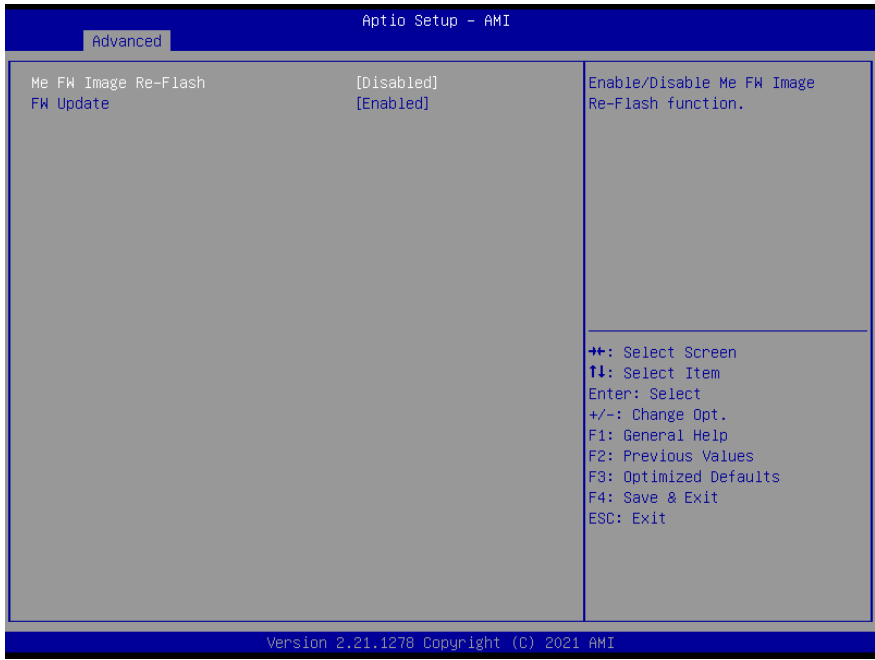
3.4.2 PCH-FW Configuration

PICO-ITX Board

PICO-EHL1

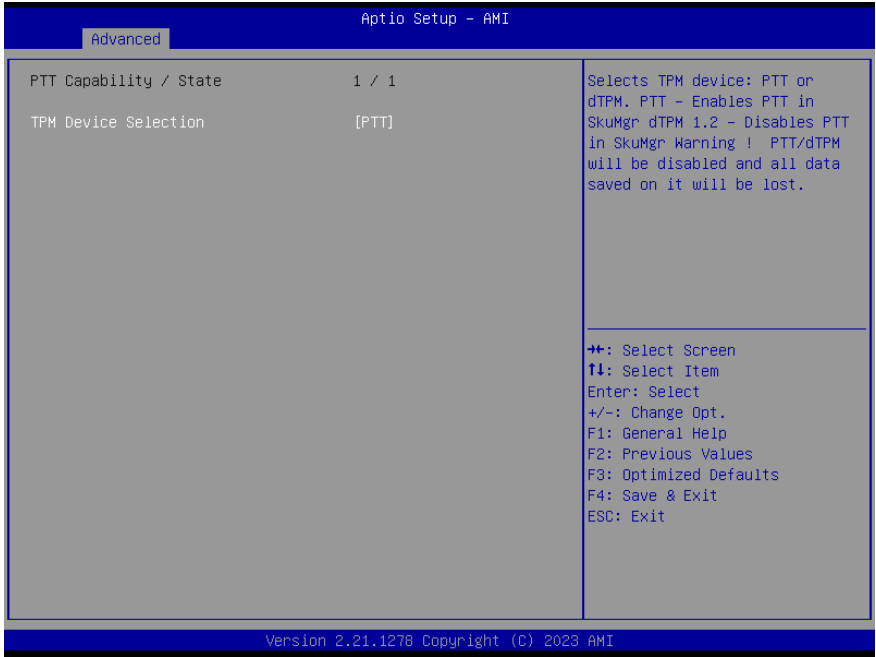


3.4.2.1 Firmware Update Configuration



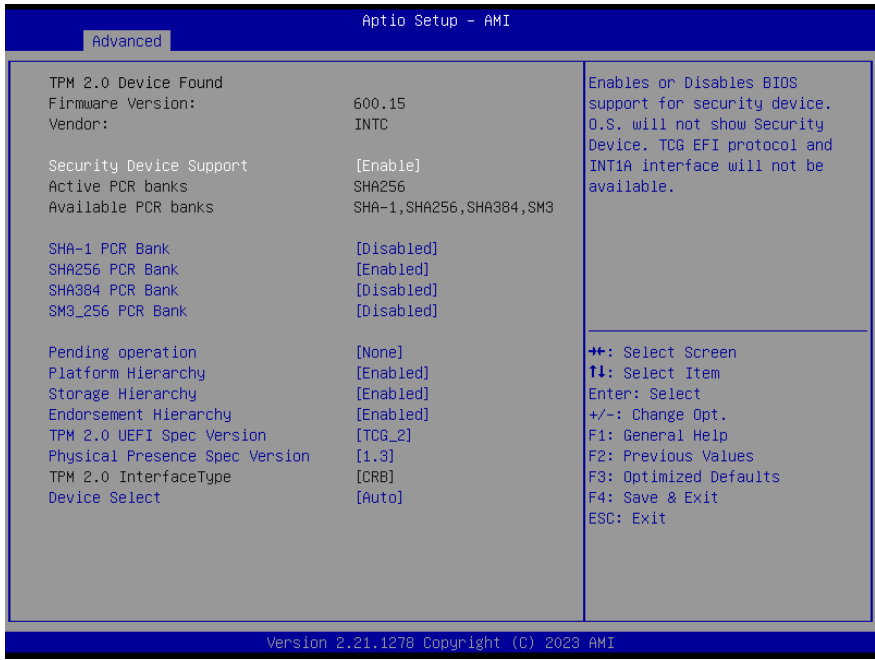
| Options Summary | | |
|---|----------|-----------------------------------|
| Me FW Image Re-Flash | Enabled | |
| | Disabled | Optimal Default, Failsafe Default |
| Enable/Disable Me FW Image Re-Flash function. | | |
| FW Update | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable/Disable ME FW Update function. | | |

3.4.3 PTT Configuration



| Options Summary | | |
|--|------|-----------------------------------|
| TPM Device Selection | dTPM | |
| | PTT | Optimal Default, Failsafe Default |
| Selects TPM device: PTT or discrete TPM. PTT - enables PTT in SkuMgr dTPM - disables PTT is SkuMgr Warning! PTT/dTPM will be disabled and all data saved on it will be lost. | | |

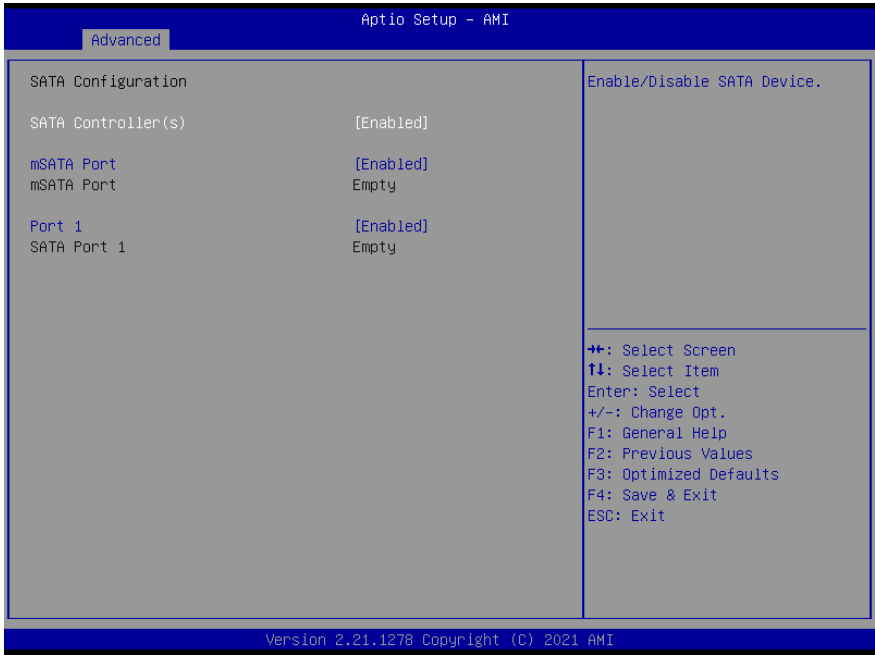
3.4.4 Trusted Computing



| Options Summary | | |
|---|----------|-----------------------------------|
| Security Device Support | Enable | Optimal Default, Failsafe Default |
| | Disable | |
| 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 | Optimal Default, Failsafe Default |
| | Enabled | |
| Enable or Disable SHA-1 PCR Bank | | |
| SHA256 PCR Bank | Enabled | Optimal Default, Failsafe Default |
| | Disabled | |
| Enable or Disable SHA256 PCR Bank. | | |
| SHA384 PCR Bank | Enabled | Optimal Default, Failsafe Default |
| | Disabled | |
| Enable or Disable SHA384 PCR Bank. | | |
| SM3_256 PCR Bank | Enabled | Optimal Default, Failsafe Default |
| | Disabled | |

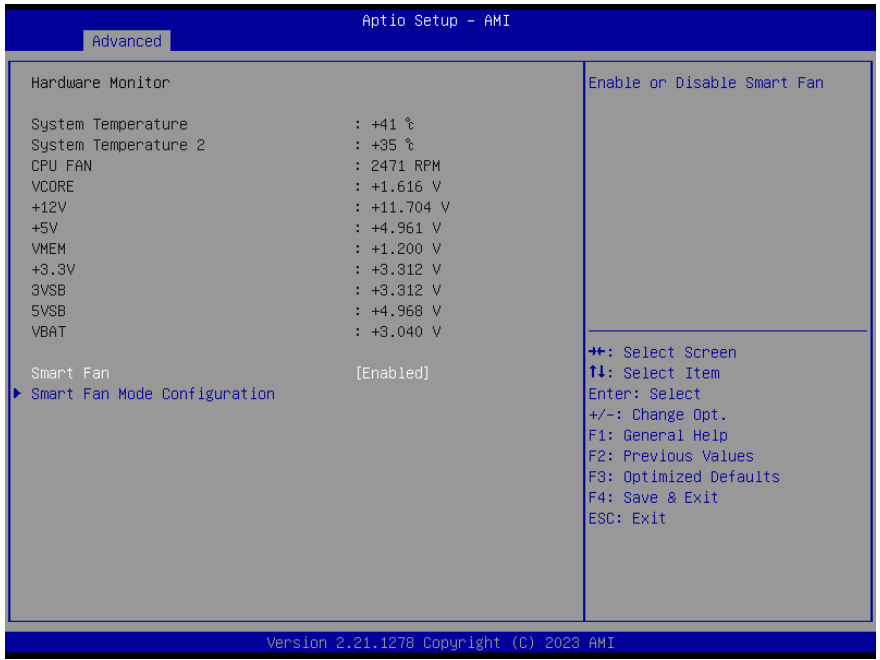
| Options Summary | | |
|--|-----------|-----------------------------------|
| Enable or Disable SM3_256 PCR Bank | | |
| Pending operation | None | Optimal Default, Failsafe Default |
| | TPM Clear | |
| Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device. | | |
| Platform Hierarchy | Enabled | Optimal Default, Failsafe Default |
| | Disabled | |
| Enable or Disable Platform Hierarchy | | |
| Storage Hierarchy | Enabled | Optimal Default, Failsafe Default |
| | Disabled | |
| Enable or Disable Storage Hierarchy | | |
| Endorsement Hierarchy | Enabled | Optimal Default, Failsafe Default |
| | Disabled | |
| Enable or Disable Endorsement Hierarchy | | |
| TPM 2.0 UEFI Spec Version | TCG_2 | Optimal Default, Failsafe Default |
| | TCG_1_2 | |
| Select the TCH2 Spec Version Support. TCG_1_2: The Compatible mode for Win8/Win10 TCG_2: Support new TCG2 protocol and event format for Win10 or later | | |
| Physical Presence Spec Version | 1.3 | Optimal Default, Failsafe Default |
| | 1.2 | |
| Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3 | | |
| Device Select | Auto | Optimal Default, Failsafe Default |
| | TPM 1.2 | |
| | TPM 2.0 | |
| TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated. | | |

3.4.5 SATA Configuration



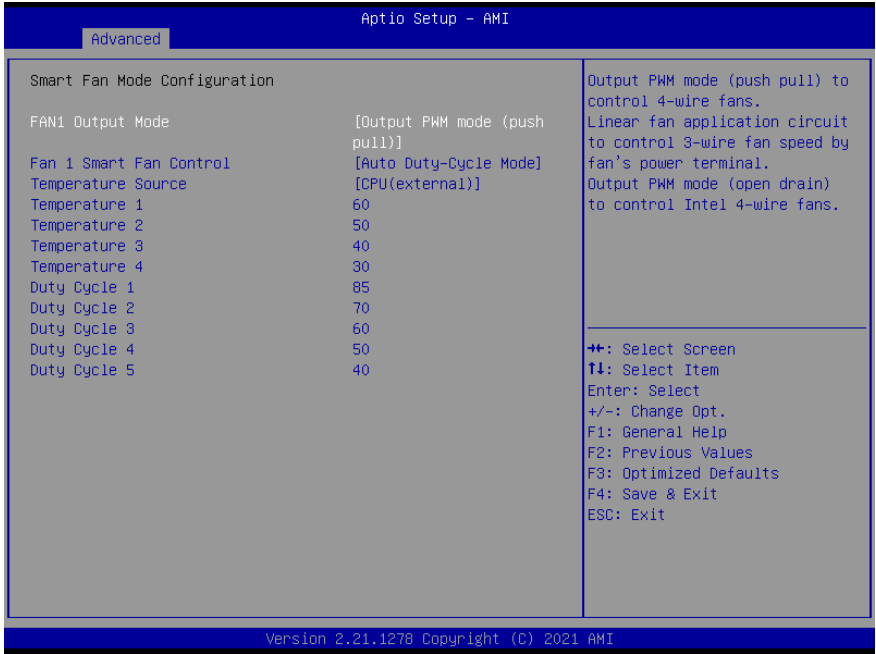
| Options Summary | | |
|------------------------------|----------|-----------------------------------|
| SATA Controller(s) | Enabled | Optimal Default, Failsafe Default |
| | Disabled | |
| Enable/Disable SATA Device. | | |
| Port* | Enabled | Optimal Default, Failsafe Default |
| | Disabled | |
| Enable or Disable SATA Port. | | |

3.4.6 Hardware Monitor



| Options Summary | | |
|--------------------------------|----------|-----------------------------------|
| Smart Fan | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enables or Disables Smart Fan. | | |

3.4.6.1 Smart Fan Mode Configuration



| Options Summary | | |
|--|------------------------------|-----------------------------------|
| Fan1 Output Mode | Output PWM mode (open drain) | |
| | Linear Fan Application | |
| | Output PWM mode (push pull) | Optimal Default, Failsafe Default |
| Fan1 Smart Fan control | Manual Duty Mode | |
| | Auto Duty-Cycle Mode | Optimal Default, Failsafe Default |
| Smart Fan Mode select | | |
| Manual Duty Mode | 60 | Optimal Default, Failsafe Default |
| Manual mode fan control, user can write expected duty cycle (PWM fan type) 1-100 | | |
| Temperature Source | CPU(PECI) Temperature | |
| | System Temperature | Optimal Default, Failsafe Default |
| | System Temperature 2 | |
| Select the monitored temperature source for this fan. | | |

| Options Summary | | |
|---|----|--|
| Temperature 1 | 60 | |
| Duty Cycle 1 | 85 | |
| Auto fan speed control. Fan speed will follow different temperature by different duty cycle 1-100 | | |

3.4.7 SIO Configuration

Advanced
Aptio Setup - AMI

```

AMI SIO Driver Version : A5.15.00

Super IO Chip Logical Device(s) Configuration
▶ [*Active*] Serial Port 1
▶ [*Active*] Serial Port 2

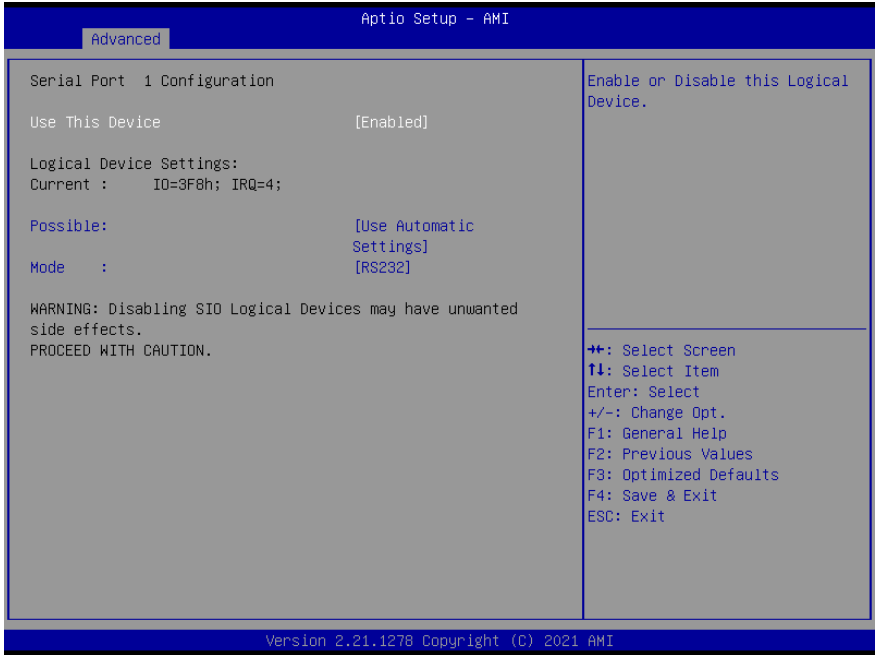
WARNING: Logical Devices state on the left side of the
control, reflects the current Logical Device state. Changes
made during Setup Session will be shown after you restart
the system.
                
```

View and Set Basic properties of the SIO Logical device. Like IO Base, IRQ Range, DMA Channel and Device Mode.

++: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 ESC: Exit

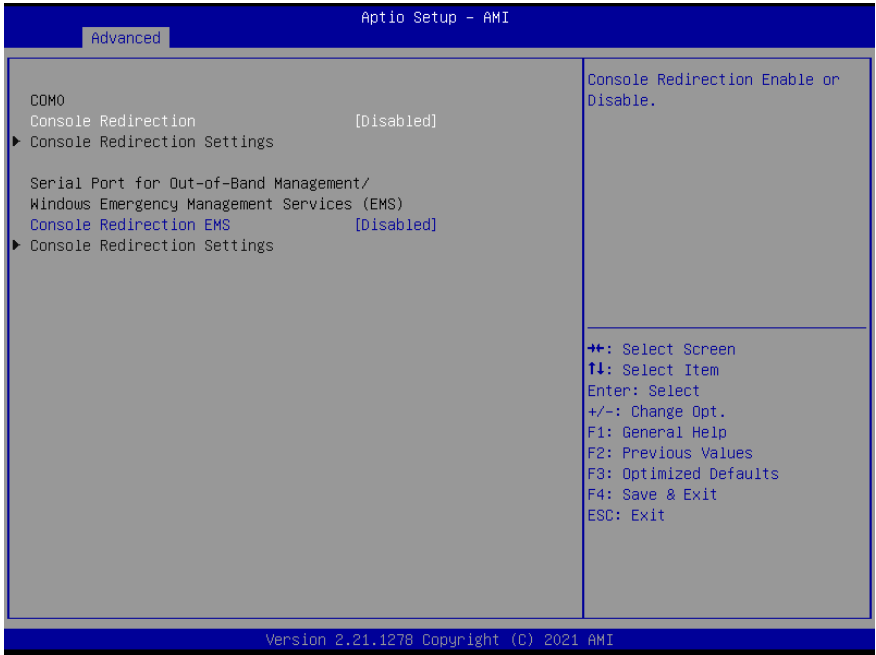
Version 2.21.1278 Copyright (C) 2023 AMI

3.4.7.1 Serial Port Configuration



| Options Summary | | |
|--|------------------------|-----------------------------------|
| Use This Device | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable or Disable this Logical Device. | | |
| Possible: | Use Automatic Settings | Optimal Default, Failsafe Default |
| | IO=3F8h; IRQ=4 | |
| | IO=2F8h; IRQ=3 | |
| Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts. | | |
| Mode | RS232 | Optimal Default, Failsafe Default |
| | RS422 | |
| | RS485 | |
| UART RS232/422/485 selection. | | |

3.4.7.2 Serial Port Console Redirection



| Options Summary | | |
|--|----------|-----------------------------------|
| Console Redirection | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Console Redirection Enable or Disable. | | |
| Console Redirection EMS | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Console Redirection Enable or Disable. | | |

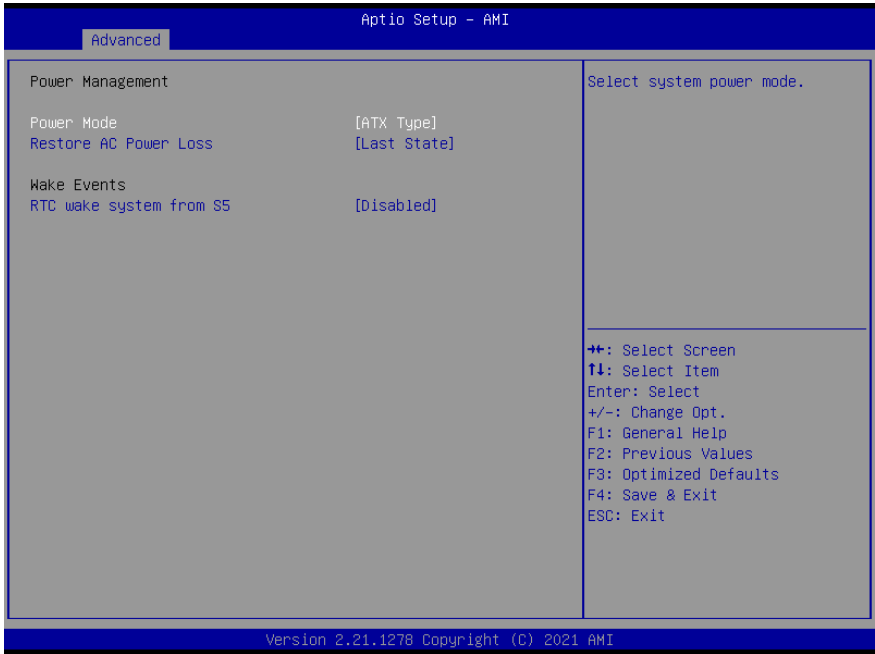
3.4.8 AAEON BIOS Robot



| Options Summary | | |
|---|----------|-----------------------------------|
| Sends watch dog before BIOS POST | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Enabled - Robot set Watch Dog Timer (WDT) right after power on, before BIOS start POST process. And then Robot will clear WDT on completion of POST. WDT will reset system automatically if it is not cleared before its timer counts down to zero. | | |
| POST Timer (second) | 30 | Optimal Default, Failsafe Default |
| Timer count set to Watch Dog Timer for POST. WARNING: Do not set to a value equal or shorter than normal POST time, otherwise system may never complete POST unless clearing BIOS settings. More than 2x normal POST time is suggested. | | |
| Sends watch dog before booting OS | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Enabled - Robot set Watch Dog Timer (WDT) after POST completion, before BIOS transfer control to OS. WARNING: Before enabling this function, a program in OS must be in responsible for clearing WDT. Also, this function should be disabled if OS is going to update itself. | | |

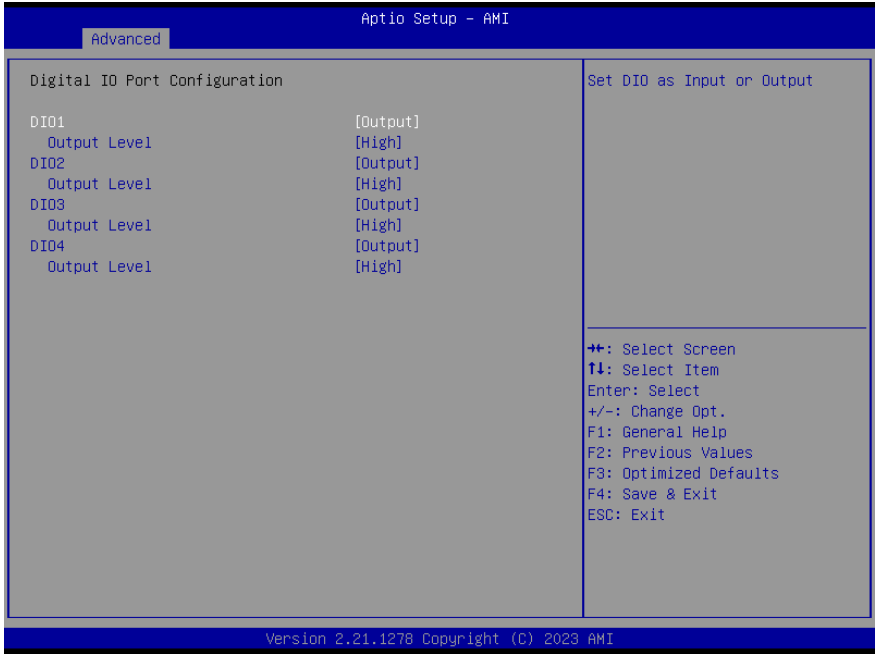
| Options Summary | | |
|--|------------|-----------------------------------|
| OS Timer (minute) | 3 | Optimal Default, Failsafe Default |
| Timer count set to Watch Dog Timer for OS loading. | | |
| Delayed POST (PEI phase) | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Enabled - Robot holds BIOS from starting POST, right after power on. This allows BIOS POST to start with stable power or start after system is physically warmed-up. Note: Robot does this before 'Sends watch dog'. | | |
| Delayed time (second) | 10 | Optimal Default, Failsafe Default |
| Period of time for Robot to hold BIOS from POST. | | |
| Delayed POST (DXE phase) | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Enabled - Robot holds BIOS before POST completion. This allows BIOS POST to start with stable power or start after system is physically warmed-up. Note: Robot does this after 'Sends watch dog before BIOS POST' | | |
| Delayed time (second) | 10 | Optimal Default, Failsafe Default |
| Period of time for Robot to hold BIOS from POST. | | |
| Reset system once | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Enabled - Robot resets system for one time on each boot. This will send a soft or hard reset to onboard devices, thus puts devices to more stable state. | | |
| Soft or hard reset | Soft reset | Optimal Default, Failsafe Default |
| | Hard reset | |
| Select reset type robot should send on each boot. | | |

3.4.9 Power Management



| Options Summary | | |
|--|------------|-----------------------------------|
| Power Mode | ATX Type | Optimal Default, Failsafe Default |
| | AT Type | |
| Select power supply mode. | | |
| Restore AC Power Loss | Last State | Optimal Default, Failsafe Default |
| | Always On | |
| | Always Off | |
| Select power state when power is re-applied after a power failure. | | |
| RTC wake system from S5 | Disabled | Optimal Default, Failsafe Default |
| | Fixed Time | |
| Fixed Time: System will wake on the hr :: min :: sec specified Dynamic Time : System will wake on the current time + Increase minutes(s). | | |

3.4.10 Digital IO Port Configuration



| Options Summary | | |
|---|--------|--|
| DIO Port* | Output | |
| | Input | |
| Set DIO as Input or Output | | |
| Output Level | High | |
| | Low | |
| Set output level when DIO pin is output | | |

3.5 Setup Submenu: Chipset



3.5.1 System Agent (SA) Configuration



| Options Summary | | |
|------------------|----------|-----------------------------------|
| VT-d | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| VT-d capability. | | |

3.5.11 Memory Configuration

The screenshot shows the 'Aptio Setup - AMI' BIOS interface. At the top, a blue bar contains the text 'Aptio Setup - AMI' and a 'Chipset' tab. The main area is divided into two columns. The left column, titled 'Memory Configuration', lists the following settings:

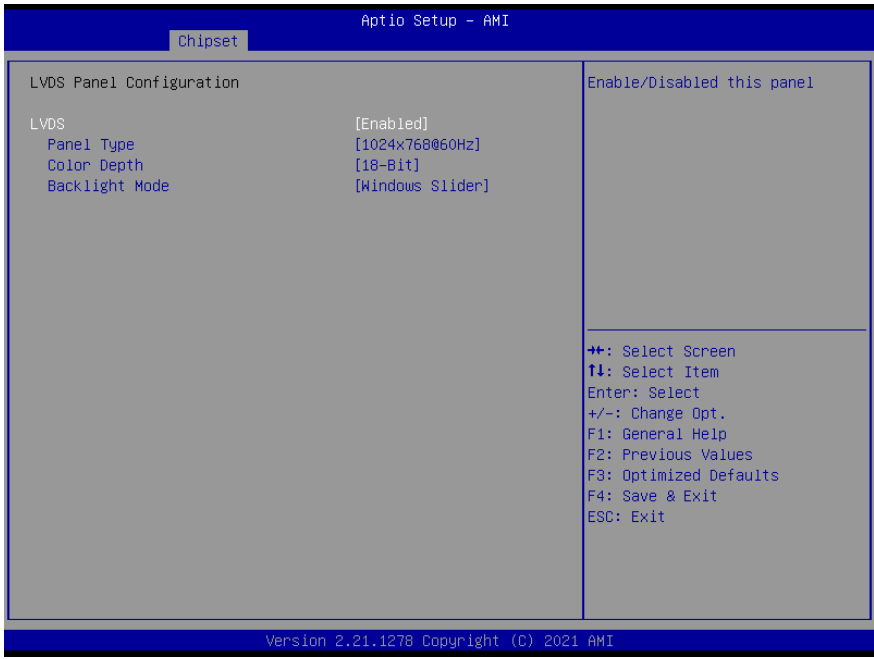
| | |
|-----------------------|---------------------------------------|
| Total Memory | 4096 MB |
| Memory Data Rate | 2400 MT/PS |
| Channel 1 Slot 0 Size | Populated & Enabled 4096 MB (DDR4) |
| In-Band ECC | [Disabled] |

The right column is titled 'Enable/Disable In-Band ECC' and contains a legend for navigation keys:

- ←→: Select Screen
- ↑↓: Select Item
- Enter: Select
- +/-: Change Opt.
- F1: General Help
- F2: Previous Values
- F3: Optimized Defaults
- F4: Save & Exit
- ESC: Exit

At the bottom of the screen, a blue bar displays the text 'Version 2.21.1278 Copyright (C) 2023 AMI'.

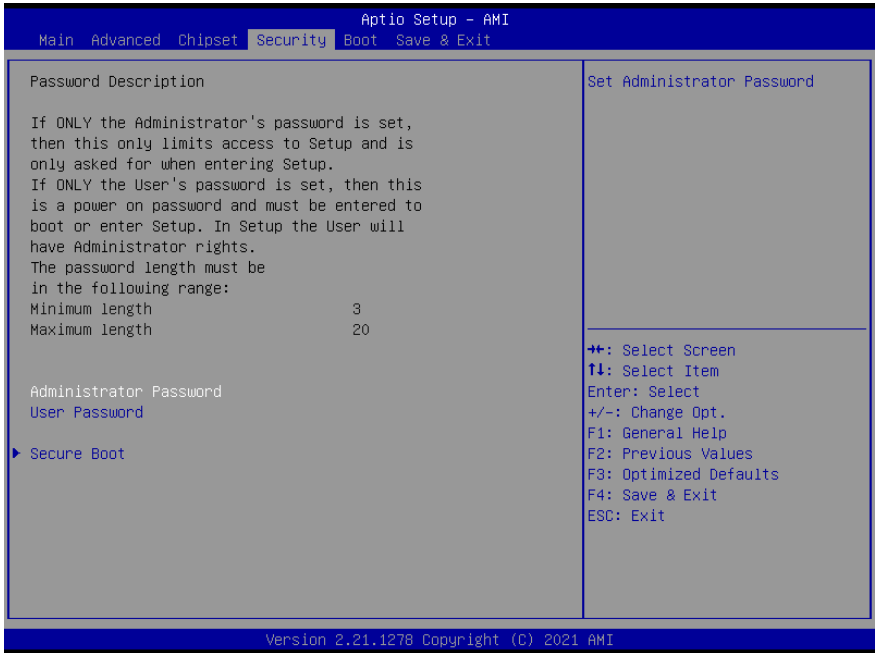
3.5.1.2 LVDS Panel Configuration



| Options Summary | | |
|----------------------------|----------------------|-----------------------------------|
| LVDS | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable/Disable this panel. | | |
| LVDS Panel Type | 640x480,18bit,60Hz | |
| | 800x480,18bit,60Hz | |
| | 800x600,18bit,60Hz | |
| | 1024x600,18bit,60Hz | |
| | 1024x768,18bit,60Hz | |
| | 1024x768,24bit,60Hz | Optimal Default, Failsafe Default |
| | 1280x768,24bit,60Hz | |
| | 1280x1024,48bit,60Hz | |
| | 1366x768,24bit,60Hz | |
| | 1440x900,48bit,60Hz | |
| | 1600x1200,48bit,60Hz | |
| | 1920x1080,48bit,60Hz | |
| 1920x1200,48bit,60Hz | | |

| Options Summary | | |
|--|--------------------|-----------------------------------|
| Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item. | | |
| Panel Mode | Single Channel | Optimal Default, Failsafe Default |
| | Dual Channel | |
| Panel mode selection for Single channel or Dual channel. | | |
| Color Depth | 18-bit | Optimal Default, Failsafe Default |
| | 24-bit | |
| | 36-bit | |
| | 48-bit | |
| Select panel type | | |
| Backlight Mode | BIOS & Application | |
| | Windows Slider | Optimal Default, Failsafe Default |
| Select backlight control signal type | | |

3.6 Setup Submenu: Security



Change User/Supervisor Password

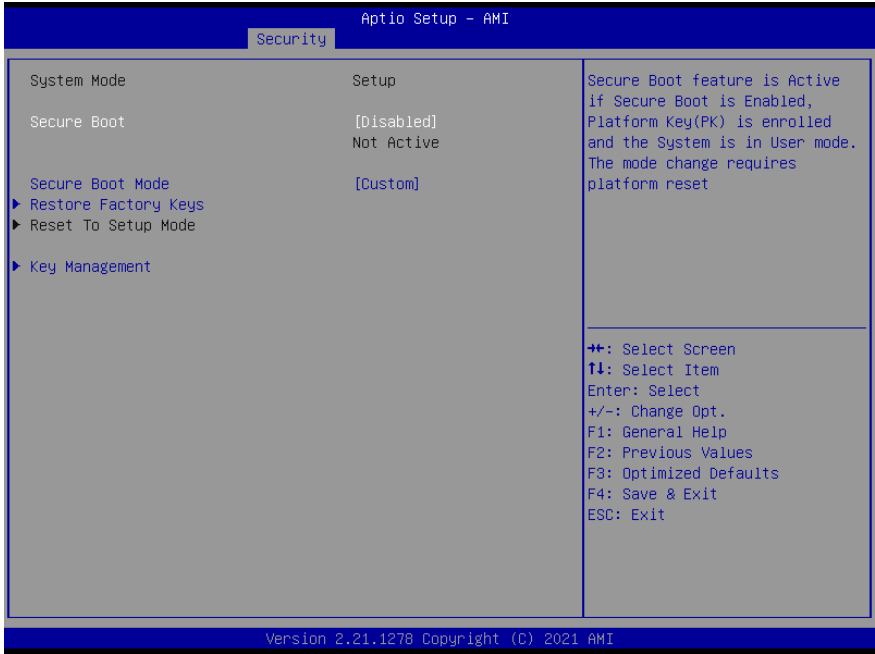
You can install a Supervisor password, and if you install a supervisor password, you can then install a user password. A user password does not provide access to many of the features in the Setup utility.

If you highlight these items and press Enter, a dialog box appears which lets you enter a password. You can enter no more than six letters or numbers. Press Enter after you have typed in the password. A second dialog box asks you to retype the password for confirmation. Press Enter after you have retyped it correctly. The password is required at boot time, or when the user enters the Setup utility.

Removing the Password

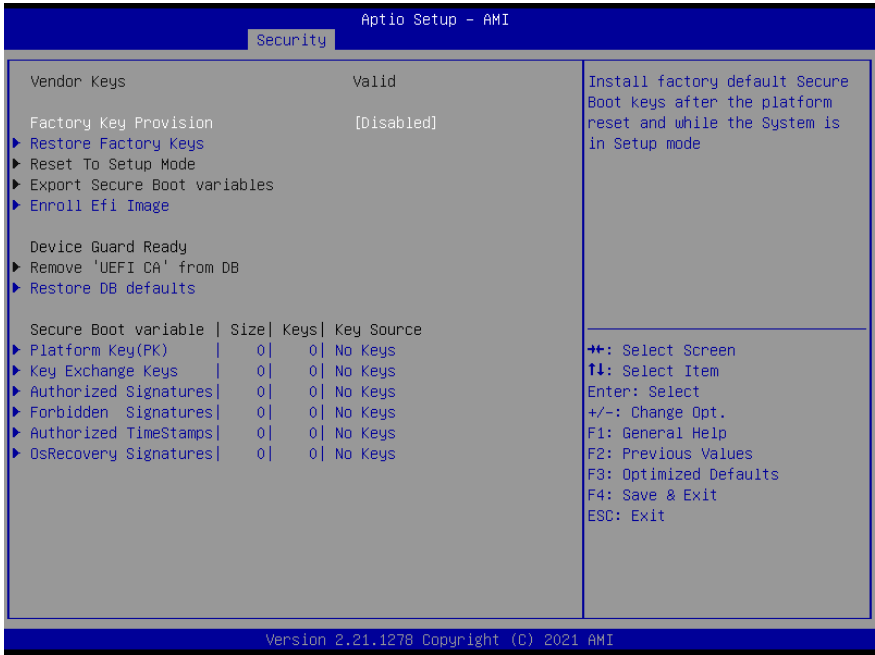
Highlight this item and type in the current password. At the next dialog box press Enter to disable password protection.

3.6.1 Secure Boot



| Options Summary | | |
|--|----------|-----------------------------------|
| Secure Boot | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset | | |
| Secure Boot Mode | Custom | Optimal Default, Failsafe Default |
| | Standard | |
| Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication | | |
| Restore Factory Keys | | |
| Force System to User Mode. Install factory default Secure Boot key databases | | |
| Reset to Setup Mode | | |
| Delete all Secure Boot key databases from NVRAM | | |

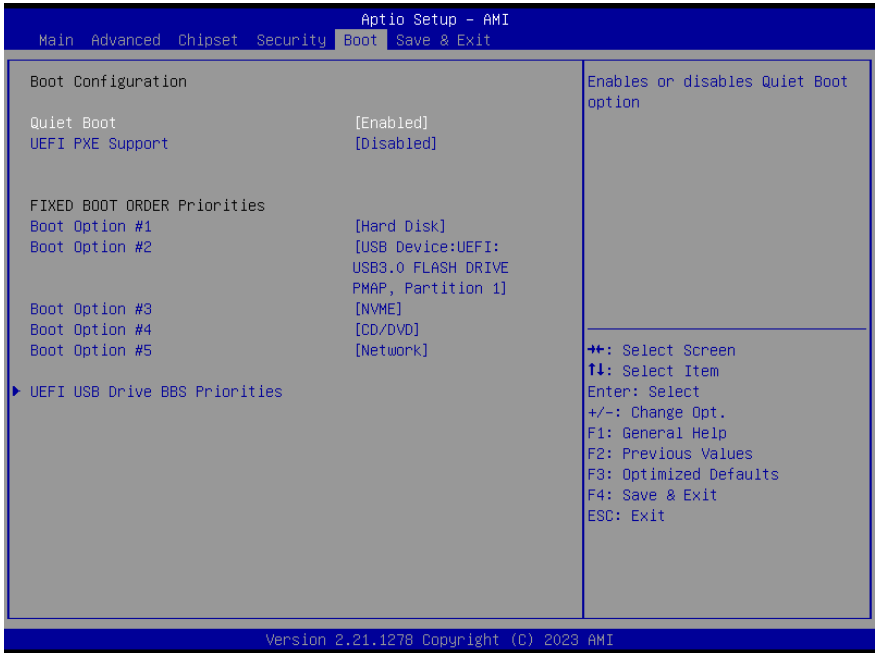
3.6.1.1 Key Management



| Options Summary | | |
|--|----------|-----------------------------------|
| Factory Key Provision | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset | | |
| Restore Factory Keys | | |
| Force System to User Mode. Install factory default Secure Boot key databases | | |
| Reset To Setup Mode | | |
| Delete all Secure Boot key databases from NVRAM | | |
| Export Secure Boot variables | | |
| Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device | | |
| Enroll Efi Image | | |
| Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db) | | |
| Remove 'UEFI CA' from DB | | |

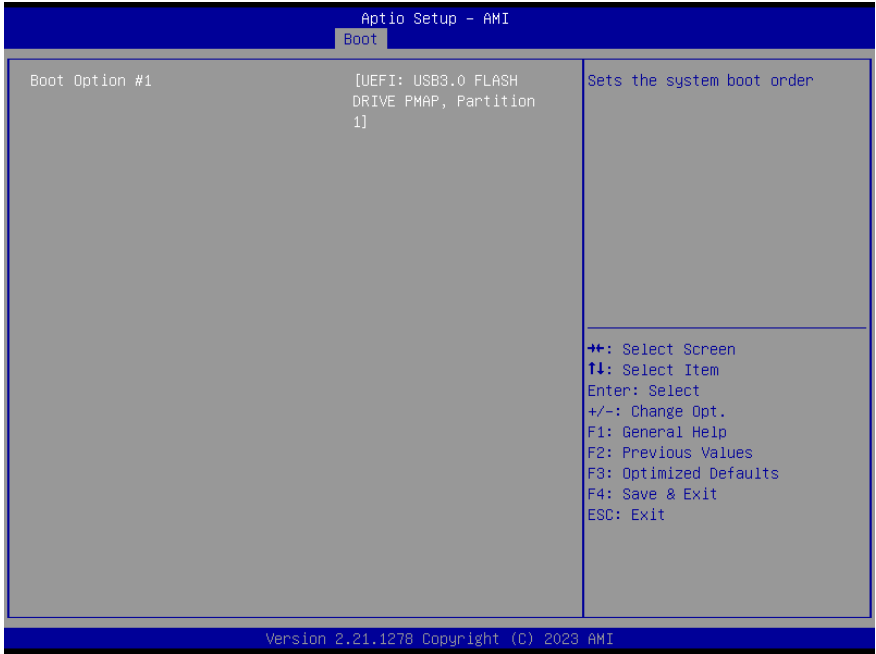
| Options Summary | |
|--|---------|
| Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized Signature database (db) | |
| Restore DB defaults | |
| Restore DB variable to factory defaults | |
| Platform Key (PK) | Details |
| | Export |
| | Update |
| | Delete |
| Key Exchange Keys | Details |
| | Export |
| | Update |
| | Append |
| | Delete |
| Authorized Signatures | Details |
| | Export |
| | Update |
| | Append |
| | Delete |
| Forbidden Signatures | Details |
| | Export |
| | Update |
| | Append |
| | Delete |
| Authorized TimeStamps | Update |
| | Append |
| OsRecovery Signatures | Update |
| | Append |
| Enroll Factory Defaults or load certificates from a file: 1.Public Key Certificate: a) EFI_SIGNATURE_LIST b) EFI_CERT_X509 (DER) c) EFI_CERT_RSA2048 (bin) d) EFI_CERT_SHAXXX 2.Authenticated UEFI Variable 3.EFI PE/COFF Image (SHA256) Key Source: Factory, External, Mixed. | |

3.7 Setup Submenu: Boot

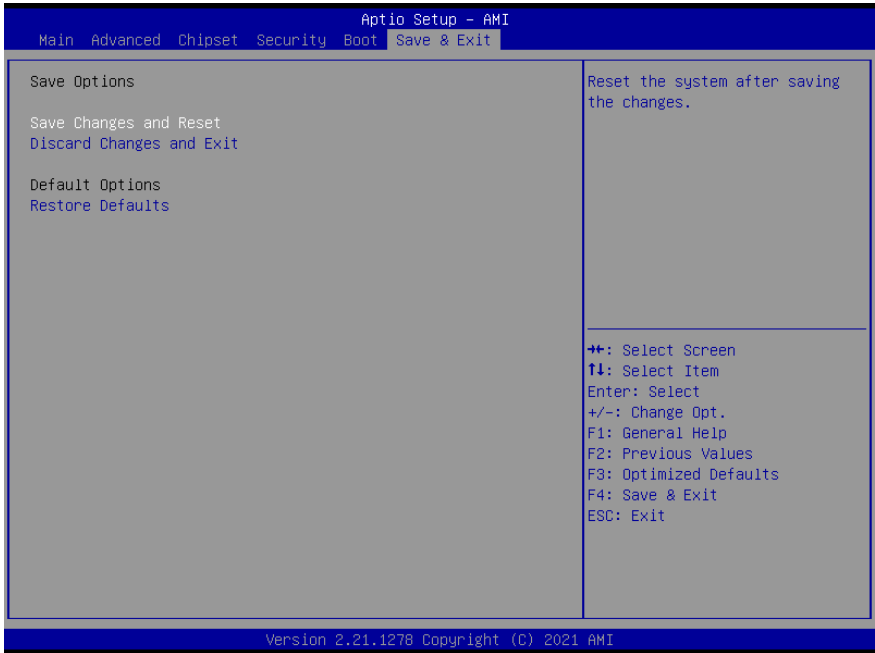


| Options Summary | | |
|--------------------------------------|----------|-----------------------------------|
| Quiet Boot | Disabled | |
| | Enabled | Optimal Default, Failsafe Default |
| Enable or Disable Quiet Boot option. | | |
| UEFI PXE Support | Disabled | Optimal Default, Failsafe Default |
| | Enabled | |
| Enable/Disable UEFI Network Stack. | | |
| FIXED BOOT ORDER Priorities | | |
| Sets the system boot order | | |

3.7.1 BBS Priorities



3.8 Setup Submenu: Save & Exit



| Options Summary | |
|--------------------------|--|
| Save Changes and Reset | Reset the system after saving the changes. |
| Discard Changes and Exit | Exit system setup without saving any changes. |
| Restore Defaults | Restore/Load Default values for all the setup options. |

Chapter 4

Drivers Installation

4.1 Drivers Download and Installation

Drivers for the PICO-EHL1 can be downloaded from the product page on the AAEON website by following this link:

<https://www.aaeon.com/en/p/pico-itx-turnkit-pico-ehl1>

Download the driver(s) you need and follow the steps below to install them.

Install Chipset Driver

1. Open the **Intel Chipset** folder.
2. Run the **SetupChipset.exe** file.
3. Follow the instructions
4. Drivers will be installed automatically

Install Graphics Driver

1. Open the **Intel Graphics** folder.
2. Run the **Installer.exe** file.
3. Follow the instructions
4. Driver will be installed automatically

Install LAN Driver

1. Open the **LAN** folder.
2. Run the **Install_Win10_10050_08132021.exe** file
3. Follow the instructions
4. Driver will be installed automatically

Install ME Driver

1. Open the **ME** folder.
2. Run the **SetupME.exe** file
3. Follow the instructions
4. Driver will be installed automatically

Install Serial IO Driver

1. Open the **Serial IO** folder.
2. Follow the instructions in the .inf files to manually install drivers.

Install Intel® PSE Drivers (Optional)

1. Open the **Intel® PSE Drivers** folder followed by the folder for the drivers you want to install
2. Follow the instructions in the .inf files to manually install drivers

Install Intel® Peripheral Drivers

1. Open **Intel® Peripheral Drivers** folder followed by the folder for the drivers you want to install
2. Follow the instructions in the .inf files to manually install drivers

Install Audio Drivers

1. Open the **Audio Drivers** folder
2. Run the **Setup.exe** file
3. Follow the instructions
4. Drivers will be installed automatically

Appendix A

Mating Connectors

A.1 List of Mating Connectors and Cables









The following table lists mating connectors and available cables.

| Connector Label | Function | Mating Connector | | Available Cable | AAEON Cable P/N |
|-----------------|--------------------------|------------------|----------------------|---------------------|-----------------|
| | | Vendor | Model no | | |
| CN1 | RTC Battery | Molex | 51021-0200 | Battery Cable | 175011301C |
| CN2 | LVDS Back Light Inverter | JST | SHR-06V-S-B | LVDS Inverter Cable | 170X000152 |
| CN5 | Audio with detect | ACES | 50247-012H0H0-001 | Audio cable | 170X000156 |
| CN10 | SATA | Molex | 887505318 | SATA Cable | 1709070500 |
| CN11 | SATA Power | JST | PHR-2 | SATA Power Cable | 1702150155 |
| CN12 | 4-bit DIO Header | SAMTEC | SFMC-103-T1-S-D | N/A | N/A |
| CN17 | COM Header | JST | SHDR-20V-S-B | Dual COM Cable | 170X000231 |
| CN19 | eSPI/SMBUS/I2C | JST | SHR-12V-S-B | LPC/eSPI Cable | 1703120130 |
| CN20 | 4-pin Smart FAN | Molex | 51021-0400 | N/A | N/A |
| CN21 | Power Input | Molex | 19211-0003 | Power Cable | 170204010R |
| CN23 | DC Jack Power Input | HUANG JI | 5525C257-3T00-R1-7.5 | Power Cable | 1702041004 |
| CN24/25 | USB2.0 Header | Molex | 51021-0500 | USB2.0 Cable | 1700050207 |
| CN26 | Front Panel | TE | E001H-2X5 | Front Panel Cable | 1709100108 |










































Appendix B











I/O Information

B.1 Direct Memory Access (DMA) Map











































- ▼  Direct memory access (DMA)
 -  0 Intel(R) Serial IO I2C Host Controller - 4BB9
 -  0 Intel(R) Serial IO I2C Host Controller - 4BBD
 -  1 Intel(R) Serial IO I2C Host Controller - 4BB9
 -  1 Intel(R) Serial IO I2C Host Controller - 4BBD
 -  6 Intel(R) Serial IO I2C Host Controller - 4BC0
 -  7 Intel(R) Serial IO I2C Host Controller - 4BC0
 -  ...











































B.2 I/O Address Map

| | | |
|---|---|-----------------------------------|
| ▼ |  | Input/output (IO) |
|  | [0000000000000000 - 000000000000CF7] | PCI Express Root Complex |
|  | [0000000000000020 - 0000000000000021] | Programmable interrupt controller |
|  | [0000000000000024 - 0000000000000025] | Programmable interrupt controller |
|  | [0000000000000028 - 0000000000000029] | Programmable interrupt controller |
|  | [000000000000002C - 000000000000002D] | Programmable interrupt controller |
|  | [000000000000002E - 000000000000002F] | Motherboard resources |
|  | [0000000000000030 - 0000000000000031] | Programmable interrupt controller |
|  | [0000000000000034 - 0000000000000035] | Programmable interrupt controller |
|  | [0000000000000038 - 0000000000000039] | Programmable interrupt controller |
|  | [000000000000003C - 000000000000003D] | Programmable interrupt controller |
|  | [0000000000000040 - 0000000000000043] | System timer |
|  | [000000000000004E - 000000000000004F] | Motherboard resources |
|  | [0000000000000050 - 0000000000000053] | System timer |
|  | [0000000000000061 - 0000000000000061] | Motherboard resources |
|  | [0000000000000063 - 0000000000000063] | Motherboard resources |
|  | [0000000000000065 - 0000000000000065] | Motherboard resources |
|  | [0000000000000067 - 0000000000000067] | Motherboard resources |
|  | [0000000000000070 - 0000000000000070] | Motherboard resources |
|  | [0000000000000080 - 0000000000000080] | Motherboard resources |
|  | [0000000000000092 - 0000000000000092] | Motherboard resources |
|  | [00000000000000A0 - 00000000000000A1] | Programmable interrupt controller |
|  | [00000000000000A4 - 00000000000000A5] | Programmable interrupt controller |
|  | [00000000000000A8 - 00000000000000A9] | Programmable interrupt controller |
|  | [00000000000000AC - 00000000000000AD] | Programmable interrupt controller |
|  | [00000000000000B0 - 00000000000000B1] | Programmable interrupt controller |
|  | [00000000000000B2 - 00000000000000B3] | Motherboard resources |
|  | [00000000000000B4 - 00000000000000B5] | Programmable interrupt controller |
|  | [00000000000000B8 - 00000000000000B9] | Programmable interrupt controller |
|  | [00000000000000BC - 00000000000000BD] | Programmable interrupt controller |
|  | [000000000000002E8 - 000000000000002EF] | Communications Port (COM4) |
|  | [000000000000002F8 - 000000000000002FF] | Communications Port (COM2) |
|  | [000000000000003E8 - 000000000000003EF] | Communications Port (COM3) |
|  | [000000000000003F8 - 000000000000003FF] | Communications Port (COM1) |
|  | [000000000000004D0 - 000000000000004D1] | Programmable interrupt controller |
|  | [00000000000000680 - 0000000000000069F] | Motherboard resources |
|  | [00000000000000A00 - 00000000000000A0F] | Motherboard resources |
|  | [00000000000000A10 - 00000000000000A1F] | Motherboard resources |
|  | [00000000000000A20 - 00000000000000A2F] | Motherboard resources |
|  | [00000000000000D00 - 000000000000FFFF] | PCI Express Root Complex |
|  | [0000000000000164E - 0000000000000164F] | Motherboard resources |

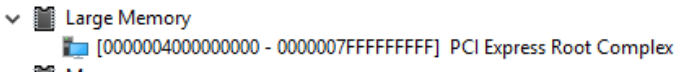
-  [000000000000164E - 000000000000164F] Motherboard resources
-  [0000000000001800 - 00000000000018FE] Motherboard resources
-  [0000000000001854 - 0000000000001857] Motherboard resources
-  [0000000000002000 - 00000000000020FE] Motherboard resources
-  [0000000000003000 - 0000000000003FFF] Intel(R) PCI Express Root Port #6 - 4B3E
-  [0000000000004000 - 000000000000403F] Intel(R) UHD Graphics
-  [0000000000004060 - 000000000000407F] Standard SATA AHCI Controller
-  [0000000000004080 - 0000000000004083] Standard SATA AHCI Controller
-  [0000000000004090 - 0000000000004097] Standard SATA AHCI Controller
-  [000000000000EFA0 - 000000000000EFBF] Intel(R) SMBus Controller - 4B23

B.3 IRQ Mapping Chart

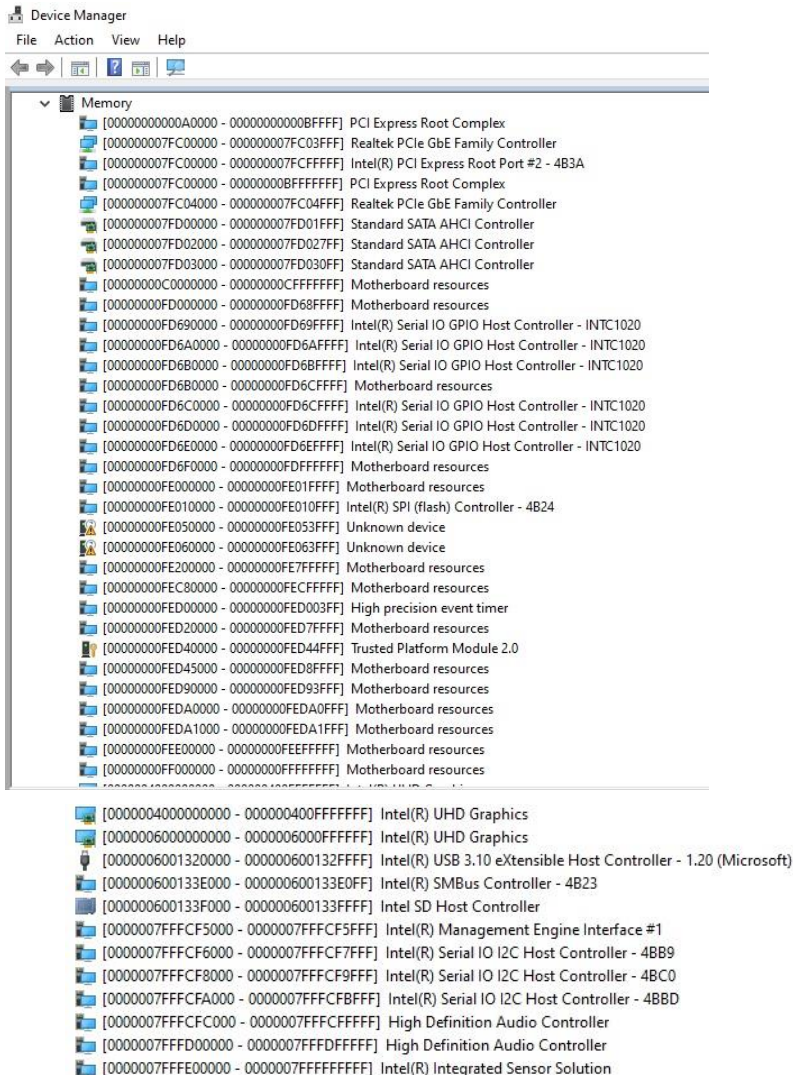
| | | | |
|---|---|-------------------------|--|
| ▼ |  | Interrupt request (IRQ) | |
| |  | (ISA) 0x00000000 (00) | System timer |
| |  | (ISA) 0x00000003 (03) | Communications Port (COM2) |
| |  | (ISA) 0x00000004 (04) | Communications Port (COM1) |
| |  | (ISA) 0x0000000B (11) | Communications Port (COM3) |
| |  | (ISA) 0x0000000B (11) | Communications Port (COM4) |
| |  | (ISA) 0x0000000E (14) | Intel(R) Serial IO GPIO Host Controller - INTC1020 |
| |  | (ISA) 0x00000023 (35) | Unknown device |
| |  | (ISA) 0x00000024 (36) | Unknown device |
| |  | (ISA) 0x00000036 (54) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000037 (55) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000038 (56) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000039 (57) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x0000003A (58) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x0000003B (59) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x0000003C (60) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x0000003D (61) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x0000003E (62) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x0000003F (63) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000040 (64) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000041 (65) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000042 (66) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000043 (67) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000044 (68) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000045 (69) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000046 (70) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000047 (71) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000048 (72) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000049 (73) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x0000004A (74) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x0000004B (75) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x0000004C (76) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x0000004D (77) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x0000004E (78) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x0000004F (79) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000050 (80) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000051 (81) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000052 (82) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000053 (83) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000054 (84) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000055 (85) | Microsoft ACPI-Compliant System |
| |  | (ISA) 0x00000056 (86) | Microsoft ACPI-Compliant System |

| | | |
|---|-------------------------|---|
|  | (ISA) 0x000001E8 (488) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001E9 (489) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001EA (490) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001EB (491) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001EC (492) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001ED (493) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001EE (494) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001EF (495) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001F0 (496) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001F1 (497) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001F2 (498) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001F3 (499) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001F4 (500) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001F5 (501) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001F6 (502) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001F7 (503) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001F8 (504) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001F9 (505) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001FA (506) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001FB (507) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001FC (508) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001FD (509) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001FE (510) | Microsoft ACPI-Compliant System |
|  | (ISA) 0x000001FF (511) | Microsoft ACPI-Compliant System |
|  | (PCI) 0x00000010 (16) | High Definition Audio Controller |
|  | (PCI) 0x00000010 (16) | SDA Standard Compliant SD Host Controller |
|  | (PCI) 0xFFFFFFFF (-18) | Intel(R) Serial IO I2C Host Controller - 4BB9 |
|  | (PCI) 0xFFFFFFFF (-17) | Intel(R) Serial IO I2C Host Controller - 4BBD |
|  | (PCI) 0xFFFFFFFF0 (-16) | Intel(R) Serial IO I2C Host Controller - 4BC0 |
|  | (PCI) 0xFFFFFFFF1 (-15) | Intel(R) Integrated Sensor Solution |
|  | (PCI) 0xFFFFFFFF2 (-14) | Intel(R) Management Engine Interface #1 |
|  | (PCI) 0xFFFFFFFF3 (-13) | Intel(R) I210 Gigabit Network Connection |
|  | (PCI) 0xFFFFFFFF4 (-12) | Intel(R) I210 Gigabit Network Connection |
|  | (PCI) 0xFFFFFFFF5 (-11) | Intel(R) I210 Gigabit Network Connection |
|  | (PCI) 0xFFFFFFFF6 (-10) | Intel(R) I210 Gigabit Network Connection |
|  | (PCI) 0xFFFFFFFF7 (-9) | Intel(R) I210 Gigabit Network Connection |
|  | (PCI) 0xFFFFFFFF8 (-8) | Intel(R) I210 Gigabit Network Connection |
|  | (PCI) 0xFFFFFFFF9 (-7) | Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft) |
|  | (PCI) 0xFFFFFFFFFA (-6) | Intel(R) UHD Graphics |
|  | (PCI) 0xFFFFFFFFFB (-5) | Standard SATA AHCI Controller |
|  | (PCI) 0xFFFFFFFFFC (-4) | Intel(R) PCI Express Root Port #1 - 4B39 |
|  | (PCI) 0xFFFFFFFFFD (-3) | Intel(R) PCI Express Root Port #0 - 4B38 |

B.4 Large Memory Map



B.5 Memory Address Map



Appendix C

Watchdog Timer Programming

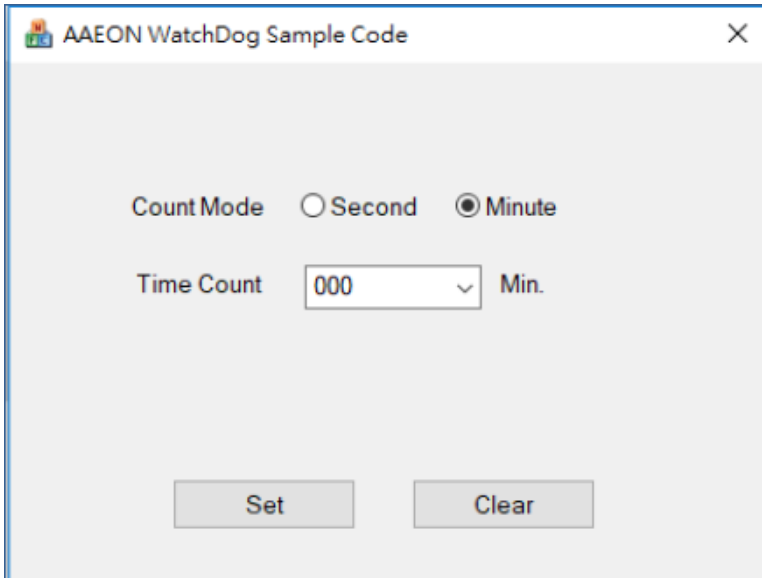
C.1 Introduction to Watchdog Timer

This section details how to set up and program the Watchdog Timer for your AAEON system or board. The watchdog timer is used to automatically detect malfunctions and recover the system. During normal operation, the system will regularly send a signal to reset the watchdog timer. If the system does not reset the watchdog timer, it will timeout and force the system into recovery and/or reboot.

The following sections refer to additional software used for programming your board, such as the AAEON Framework, AAEON SDK and AAEON Windows EAPI. If you need assistance with utilizing these tools, programming your Watchdog Timer, or would like additional documentation on these resources, contact your AAEON representative or visit our support page at <https://www.aaeon.com/en/support/>

C.2 Programing the Watchdog Timer with AAEON SDK

If you have installed the AAEON Framework, you can program the Watchdog Timer using the AAEON SDK. Simply locate where the SDK is installed, and double click the icon. The following dialog box will appear:



Count Mode: Set Watchdog Timer to count in minutes or seconds.

Time Count: The length of time (in minutes or seconds) before the Watchdog Timer will initiate a system recovery/ reboot.

Set: After selecting Count Mode and Time Count, this will save your changes and enable the Watchdog Timer function.

Clear: This will reset settings and disable the Watchdog Timer function.

C.3 Programing Watchdog Timer with AAEON Windows EAPI

AAEON Framework (KMDF Driver) must be installed before calling these functions.

EapiLibInitialize() should be the first to call before calling other EAPI functions.

EapiLibUnInitialize() should be called to release resources before program exit.

When building C/C++ apps, Lib (Library, aaeonEAPI.lib) is needed.

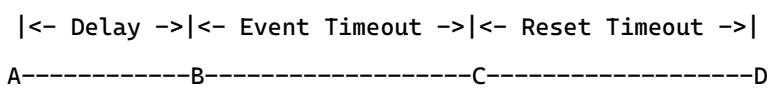
aaeonEAPI.lib is needed for C/C++ based app, make sure the lib files and executable files are in the same folder.

The following shows how to build and run codes:

There are two scenarios to invoke Watchdog Timer functions:

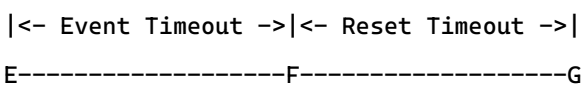
1. Use **EApiWDogStart**

After EApiWDogStart



2. Use **EApiWDogTrigger**

After EApiWDogTrigger



Stage A: Watchdog is started.

Stage B: Initial Delay Period.

Stage C/F: Event is triggered, NMI, IRQ, or PIN is Triggered. This allows for possible Software Recovery.

Stage D/G: System is reset.

Stage E: Watchdog is Triggered.

EapiWDogStop must be called before Stage C/F to prevent event from being generated.

EapiWDogStop must be called before Stage D/G to prevent system from being reset.

C.3.1 Watchdog Timer Functions

C.3.1.1 EapiWDogGetCap()

Command Line:

```
EapiWDogGetCap(...)
    __OUTOPT uint32_t *pMaxDelay,
    __OUTOPT uint32_t *pMaxEventTimeout,
    __OUTOPT uint32_t *pMaxResetTimeout
)
```

Use this command to get maximum Supported Delay / Supported Event Timeout / Supported Reset Timeout of the watchdog timer.

| Parameters | Function Parameters |
|---|--|
| *pMaxDelay | Maximum Supported Delay in milliseconds |
| *pMaxEvenTimeout | Maximum Supported Event Timeout in milliseconds; 0 = Unsupported |
| *pMaxResetTimeout | Maximum Supported Reset Timeout in milliseconds |
| Condition | Return Values |
| Library Uninitialized | EAPI_STATUS_NOT_INITIALIZED |
| pMaxDelay == NULL && pMaxResetTimeout == NULL && pMaxEventTimeout == NULL | EAPI_STATUS_INVALID_PARAMETER |
| Common Error | Common Error Code |
| Others | EAPI_STATUS_SUCCESS |

C.3.1.2 EapiWDogStart()

Command Line:

```
EApiWDogStart(  
    __IN uint32_t Delay,  
    __IN uint32_t Minute,  
    __IN uint32_t EventTimeout,  
    __IN uint32_t ResetTimeout  
)
```

Use this command to start the Watchdog Timer and set the timeout values.

To stop the Watchdog Timer, issue the command **EApiWDogStop**. After issuing EApiWDogStop, the command EApiWDogStart must be called again with new values to restart.

If the hardware implementation of the watchdog timer does not allow the user to select the exact time they want, the EAPI will select the next longer time setting available.

| Parameters | Function Parameters |
|---|-------------------------------|
| Delay | Delay in milliseconds |
| Minute | Control minutes or seconds |
| EventTimeout | Event Timeout in milliseconds |
| ResetTimeout | Reset Timeout in milliseconds |
| Condition | Return Values |
| Library Uninitialized | EAPI_STATUS_NOT_INITIALIZED |
| (Delay > gMaxDelay) (EventTimeout > gMaxEventTimeout) (ResetTimeout > gMaxResetTimeout) | EAPI_STATUS_INVALID_PARAMETER |
| Common Error | Common Error Code |
| Others | EAPI_STATUS_SUCCESS |

C.3.1.3 EapiWDogTrigger()

Command Line:

```
EapiWDogTrigger()
```

Use this command to trigger the Watchdog Timer.

| Parameters | Function Parameters |
|-----------------------|-----------------------------|
| None | |
| Condition | Return Values |
| Library Uninitialized | EAPI_STATUS_NOT_INITIALIZED |
| Watchdog Not Started | EAPI_STATUS_ERROR |
| Common Error | Common Error Code |
| Others | EAPI_STATUS_SUCCESS |

C.3.1.4 EapiWDogStop()

Command Line:

```
EapiWDogStop()
```

Use this command to close the Watchdog Instance. This will disable the Watchdog Timer and clear previous settings.

| Parameters | Function Parameters |
|-----------------------|-----------------------------|
| None | |
| Condition | Return Values |
| Library Uninitialized | EAPI_STATUS_NOT_INITIALIZED |
| Common Error | Common Error Code |
| Others | EAPI_STATUS_SUCCESS |

C.3.1.5 EapiWDogReloadTimer()

Command Line:

```
EapiWDogReloadTimer()
```

Use this command to reload the Timeout count

| Parameters | Function Parameters |
|-----------------------|-----------------------------|
| None | |
| Condition | Return Values |
| Library Uninitialized | EAPI_STATUS_NOT_INITIALIZED |
| Common Error | Common Error Code |
| Others | EAPI_STATUS_SUCCESS |

C.3.1.6 EapiWDogGetStatus()

Command Line:

```
EapiWDogGetStatus(
    __OUTOPT uint32_t *pwdtMinute,
    __OUTOPT uint32_t *pwdtCountTime,
    __OUTOPT uint32_t *pwdtReloadTime
)
```

Use this command to get the Watchdog Timer mode, time count value and reload timer.

| Parameters | Function Parameters |
|-----------------------|----------------------------------|
| *pwdtMinute | Get the mode of minute or second |
| *pwdtCountTime | Get WDT time count |
| *pwdtReloadTime | Get WDT ReloadTime |
| Condition | Return Values |
| Library Uninitialized | EAPI_STATUS_NOT_INITIALIZED |
| Common Error | Common Error Code |
| Others | EAPI_STATUS_SUCCESS |

C.3.1.7 EapiWDogSetStatus()

Command Line:

```
EApiWDogSetStatus(  
    __IN uint32_t wdtMinute,  
    __IN uint32_t wdtCountTime,  
    __IN uint32_t wdtReloadTime  
)
```

Use this command to set Watchdog Timer mode, time count value and reload timer.

| Parameters | Function Parameters |
|-----------------------|----------------------------------|
| wdtMinute | Set the mode of minute or second |
| wdtCountTime | Set WDT time count |
| wdtReloadTime | Set WDT ReloadTime |
| Condition | Return Values |
| Library Uninitialized | EAPI_STATUS_NOT_INITIALIZED |
| Common Error | Common Error Code |
| Others | EAPI_STATUS_SUCCESS |